Brocade MLX Series and NetIron XMR Diagnostic Guide

Supporting NetIron OS 6.0.00
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Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Text formatting

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

<table>
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<th>Description</th>
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<td>Identifies command names</td>
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<td>Identifies command syntax examples</td>
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Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.
Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

**NOTE**
A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

**ATTENTION**
An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

**CAUTION**
A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

**DANGER**
A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.
Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

You can download additional publications supporting your product at www.brocade.com. Select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to MyBrocade. You can register at no cost to obtain a user ID and password.

Release notes are available on MyBrocade under Product Downloads.

White papers, online demonstrations, and data sheets are available through the Brocade website.

Contacting Brocade Technical Support

As a Brocade customer, you can contact Brocade Technical Support 24x7 online, by telephone, or by email. Brocade OEM customers contact their OEM/Solutions provider.

Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to http://www.brocade.com/services-support/index.html.

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

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<td>• Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33)</td>
</tr>
<tr>
<td>• For areas unable to access toll free number: +1-408-333-6061</td>
</tr>
<tr>
<td>• Toll-free numbers are available in many countries.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E-mail</th>
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<tbody>
<tr>
<td><a href="mailto:support@brocade.com">support@brocade.com</a></td>
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<tr>
<td>Please include:</td>
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<tr>
<td>• Problem summary</td>
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<tr>
<td>• Serial number</td>
</tr>
<tr>
<td>• Installation details</td>
</tr>
<tr>
<td>• Environment description</td>
</tr>
</tbody>
</table>

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

• OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
• Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.
• Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
• For questions regarding service levels and response times, contact your OEM/Solution Provider.

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Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

• Through the online feedback form in the HTML documents posted on www.brocade.com.
• By sending your feedback to documentation@brocade.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.
About This Document

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- What’s new in this document ................................................... xviii

Supported hardware and software

The following hardware platforms are supported by this release of this guide:

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<th>TABLE 1 Supported devices</th>
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<td>Brocade NetIron XMR 4000</td>
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<td>Brocade NetIron XMR 8000</td>
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<td>Brocade NetIron XMR 16000</td>
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<td>Brocade NetIron XMR 32000</td>
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<td>Brocade MLXe-4</td>
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<td>Brocade MLXe-16</td>
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<td>Brocade MLXe 20x10GE</td>
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<td>Brocade MLXe 2x100GE</td>
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<td>Brocade NetIron CER 2024F</td>
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<td>Brocade NetIron CER 2048CX</td>
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<td>Brocade NetIron CER 2048F</td>
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<tr>
<td>Brocade NetIron CER-RT 2048FX</td>
</tr>
</tbody>
</table>

Supported software

For the complete list of supported features and the summary of enhancements and configuration notes for this release, refer to the Brocade NetIron R6.0.00 Release Notes.
What’s new in this document

The following changes have been made since this document was last released:

- Added the following commands:
  - “debug statistics utilization-watermarks” on page 50
  - “debug tvf-domain” on page 107
  - “ipc show statistics” on page 54
  - “show memory pool” on page 26
  - “show memory task usage” on page 27
  - “show port utilization-watermark” on page 46

- Modified the following commands:
  - “debug ikev2” on page 453
  - “show bm histogram trace” on page 33
  - “show cpu histogram” on page 28
  - “show cpu histogram sequence” on page 30
  - “show tech-support” on page 511
Using Diagnostic Commands

In this chapter

- Show commands ................................................................. 1
- Generic debug commands ................................................. 2

This chapter describes how to use Brocade diagnostic debug commands to monitor and troubleshoot the Brocade NetIron XMR and Brocade MLX series device configurations. Debug commands are accessible from the Privileged EXEC mode in the Brocade NetIron command line interface (CLI). Most debug commands can be configured to send output to a destination that you specify.

When enabled, debug commands can noticeably affect system performance. Many debug commands are specifically designed to be used in conjunction with calls to Brocade Technical Support. If you report a problem, the support engineer may ask you to execute one or more of the debug commands described in this guide.

**ATTENTION**

Some debug commands report information about internal hardware settings and registers that are relevant primarily to the Brocade engineering staff. These commands are not described in this document.

### Show commands

Show commands provide information that is extremely helpful for troubleshooting. For most of the environments discussed in this document, related show commands, show command output, and output descriptions are included.

Many debug commands work in conjunction with show commands to generate output for a specific configuration.

**show log**

**Syntax:** show log

The **show log** command allows you to view the system log or traps logged on an SNMP trap receiver. Command output similar to the following is displayed. This output indicates that one switchover from standby to active has occurred.

```
Brocade# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
Buffer logging: level ACDMEINW, 24 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning
Static Log Buffer:
  Sep 28 11:31:25:A:Power Supply 1, 1st left, not installed
  Sep 28 11:31:25:A:Power Supply 3, middle left, not installed
```
Generic debug commands

The following generic debug commands perform functions related to all debugging actions:

- **debug ?** - Generates a list of debug options.
- **[no] debug all** - Enables or disables all debug functions.
- **show debug** - Shows all enabled debug settings.
- **debug destination** - Allows you to select an output destination: Telnet, SSH, console, or logging (default).

### debug ?

**Syntax:** debug ?

The **debug ?** command generates a list of available debug variables.

---

**ATTENTION**

Many first-level variables have their own variable subsets. When you enter a debug command, the system will indicate that there are additional variables by telling you that you have entered an incomplete command. Add a space and a question mark to your original command to view the additional variables.

Brocade# debug ip
Incomplete command.
Brocade# debug ip?
access-list Enable ACL debugging
all Enable all debugging
bfd Enable BFD debugging
destination Redirect debug message
dot1x Debug 802.1X and Events
filters Enable Filters debugging
gvrp Enable gvrp debugging
ip Debug trace IP
ipv6 Debug trace IPv6
isis Debug isis
mac Enable MAC database debugging
.
.

show debug

Syntax: show debug

The show debug command displays all enabled debug functions. Command output resembles the following example, which shows that RSTP and IS-IS debugging are enabled, with the console as the output destination.

Brocade# show debug
RSTP
  RSTP: debugging is on
Debug message destination: Console
INTEGRATED IS-IS :
  IS-IS: isis debugging is on INTEGRATED IS-IS :
  IS-IS: isis debugging is on

deploy all

Syntax: [no] deploy all

This command enables all debug functions, and must only be used during troubleshooting. To cancel this setting, enter the no deploy all command.

Brocade# deploy all
Warning! This may severely impact network performance!
All possible debuggings have been turned on

CAUTION
This command generates extensive output and can significantly slow device operation. Use this command with caution. Never use this command during periods of peak network activity. Enter no deploy all to stop the output.

NOTE
You may not be able to see the no deploy all command as you type it. However, if you have typed the command correctly, output will stop as soon as you press the Enter key.

deploy destination

Syntax: [no] deploy destination [console | logging | telnet num | ssh num]

This command allows you to specify a destination for debugging output. The default is the system console, but you can redirect output to a syslog buffer, or a Telnet or SSH session. The following parameters are available for this command:

- **console** - Directs output to the system console.
- **logging** - Directs output to the syslog buffer and to the syslog server (default).
- **telnet num** - Directs debugging output to a specified Telnet session (a number from 1 through 5).
- **ssh num** - Directs debugging output to a specified SSH session (a number from 1 through 5).
Generic debug commands

To send debug output to a Telnet session, first determine your session number using the `show who` command.

Brocade# show who

You must see output similar to the following example. For purpose of this example, the relevant Telnet session has been highlighted.

Console connections:
   established, monitor enabled
   1 minutes 57 seconds in idle
Telnet connections (inbound):
   1 closed
e       established, client ip address 10.55.1.128, user is <your login>
   you are connecting to this session
   15 seconds in idle
   3 closed
   4 closed
   5 closed
Telnet connection (outbound):
   6 closed
SSH connections:
   1 closed
   2 closed
   3 closed
   4 closed

This example indicates that you are connected through Telnet session 2. Redirect the debug output to your Telnet session by entering the following command.

Brocade# debug destination telnet 2

db ug destination console task

Syntax: debug destination console task task_name

This command allows you to send the debug messages from the task specified by the `task_name` string variable to the console.

The following example indicates that you have configured the console as the debug destination for the task OSPF.

Brocade# debug destination console task ospf
Debug message task: ospf destination: Console
Brocade# Apr 13 10:45:18.133 ip_fast_send: 10.44.44.44 -> 224.0.0.5: next hop
224.0.0.5, tx port 1793
Apr 13 10:45:18.133 ip_fast_send(224.0.0.5)pkt dropped : tx_port=1793 was=1793
Apr 13 10:45:18.133 IP(MEM): freeing packet at 0803fe42

d ebug destination telnet task

Syntax: debug destination telnet num task task_name

This command allows you to send the debug messages from the task specified by the `task_name` variable to a particular telnet session specified by the `num` variable.

The following example indicates that you have configured telnet session 2 as the debug destination for the task OSPF.

Brocade# debug destination telnet 2 task ospf
Debug message task: ospf destination: telnet 2
**Generic debug commands**

**debug destination ssh task**

**Syntax:** `debug destination ssh num task task_name`

This command allows you to send the debug messages from the task specified by the `task_name` variable to a particular SSH session specified by the `num` variable.

The following example indicates that you have configured SSH session 2 as the debug destination for the task OSPF.

```
Brocade# debug destination ssh 2 task ospf
```

**debug destination logging task**

**Syntax:** `debug destination logging task task_name`

This command allows you to send the debug messages from the task specified by the `task_name` variable to the syslog server.

The following example indicates that you have configured the syslog server as the debug destination for the task OSPF.

```
Brocade# debug destination logging task ospf
```

**debug destination show**

**Syntax:** `debug destination show task task_name`

This command displays the configured debug destination for the task specified by the `task_name` variable as shown in the following output.

```
Brocade# debug destination show task ospf
Task: ospf    Debug Dest: Console
```

**debug destination buffer**

**Syntax:** `debug destination buffer ASCII_string [create | show | task] | list`
Generic debug commands

- **ASCII_string** - Sends all debug messages to the buffer specified by ASCII_string variable. The buffer must be pre-created.
  - create - Creates a buffer for collecting debug messages.
  - show - Displays the contents of the buffer.
    - lines - Filter the contents of the buffer based on number of lines to print.
    - task - Filter the contents of the buffer based on the task name.
    - timestamp - Filter the contents of the buffer based on timestamp.
  - task - Sets the debug destination for a task.
- **list** - Lists all the buffers in the system along with the associated task names.

To create a buffer with name buff_1 of default size 500 KB, enter the following command.

**Brocade# debug destination buffer buff_1 create**

You can use the **debug destination buffer create size** command to create a buffer of specific size. The buffer size can take a value ranging from 100 KB to 1 MB. You must specify the buffer size in bytes.

To create a buffer with name buff_2 of size 1 MB (1048576 bytes), enter the following command.

**Brocade# debug destination buffer buff_2 create size 1048576**

To send the debug messages from a specific task (OSPF) to a specific buffer (buff_2), enter a command such as the following.

**Brocade# debug destination buffer buff_2 task ospf**

To display all the contents of a specific buffer (for example buff_2), enter the following command.

**Brocade# debug destination buffer buff_2 show**

Buffer Dump: buff_2

Apr 13 10:44:29.702 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.37.73.142
Apr 13 10:44:29.703 IP/ARP: rcvd packet src 10.37.73.142 0000002a0800: dst 10.37.73.129 000000000000: Port mgmt1
Apr 13 10:44:29.703 find_arp_table_entry_and_index: ARP Entry not found for IP 10.37.73.142 Port mgmt1
Apr 13 10:44:29.703 find_arp_table_entry: ARP Entry not found for IP 10.37.73.142 Port mgmt1
Apr 13 10:44:30.986 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.37.73.174
Apr 13 10:44:30.986 IP/ARP: rcvd packet src 10.37.73.174 00000090e400: dst 10.37.73.129 000000000000: Port mgmt1
Apr 13 10:44:30.986 find_arp_table_entry_and_index: ARP Entry not found for IP 10.37.73.174 Port mgmt1
Apr 13 10:44:30.986 find_arp_table_entry: ARP Entry not found for IP 10.37.73.174 Port mgmt1
Apr 13 10:44:33.376 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.37.73.172
Apr 13 10:44:33.376 IP/ARP: rcvd packet src 10.37.73.172 00000090d000: dst 10.37.73.129 000000000000: Port mgmt1
Apr 13 10:44:33.376 find_arp_table_entry_and_index: ARP Entry not found for IP 10.37.73.172 Port mgmt1
Apr 13 10:44:33.376 find_arp_table_entry: ARP Entry not found for IP 10.37.73.172 Port mgmt1
Apr 13 10:44:35.933 ip_fast_send: 10.44.44.44 -> 224.0.0.5: next hop 224.0.0.5, tx port 1793
Apr 13 10:44:35.933 ip_fast_send(224.0.0.5)pkt dropped : tx_port=1793 was=1793
Apr 13 10:44:35.933 IP(MEM): freeing packet at 0803fe42
To filter the contents of buffer (buff_2) based on task name (OSPF), enter the following command.

Brocade# debug destination buffer buff_2 show task ospf
Buffer: (buff_2)    Filter: Task (ospf)

To filter the contents of buffer (buff_2) based on timestamp, enter a command such as the following.

Brocade# debug destination buffer buff_2 show timestamp 04:13:10:45:06
Buffer: (buff_2)    Filter: Time Stamp (04:13:10:45:06)
Generic debug commands

To filter the contents of buffer (buff_2) based on number of lines to print (for example first five lines), enter a command such as the following.

Brocade# debug destination buffer buff_2 show lines first 5
  Buffer: (buff_2)  Dump First (5) lines

Apr 13 10:44:29.702 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.37.73.142
Apr 13 10:44:29.703 IP/ARP: rcvd packet src 10.37.73.142 0000002a0800: dst 10.37.73.129 000000000000: Port mgmt1
Apr 13 10:44:29.703 find_arp_table_entry_and_index: ARP Entry not found for IP 10.37.73.142 Port mgmt1
Apr 13 10:44:29.703 find_arp_table_entry: ARP Entry not found for IP 10.37.73.142 Port mgmt1
Apr 13 10:44:30.986 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.37.73.174

To filter the contents of buffer (buff_2) based on number of lines to print (for example last five lines), enter a command such as the following.

Brocade# debug destination buffer buff_2 show lines last 5
  Buffer: (buff_2)  Dump Last (5) lines

Apr 13 10:45:06.834 ip_fast_send: 10.44.44.44 -> 224.0.0.5: next hop 224.0.0.5, tx port 1793
Apr 13 10:45:06.834 ip_fast_send(224.0.0.5)pkt dropped : tx_port=1793 was=1793
Apr 13 10:45:06.834 IP(MEM): freeing packet at 0803fe42
Apr 13 10:45:08.734 MPLS: TNNL(a): Retry no. 1067, previously no router-id or route
Apr 13 10:45:08.734 MPLS: TNNL(a): try signal LSP

You can use the debug destination buffer list command to list all the buffers in the system along with the associated task names. The command output resembles the following example.

Brocade# debug destination buffer list
Buffer Name   Size  GLOBAL/Tasks
----------  ------  --------------
buff_1       512000  ospf
buff_2       1048576 *GLOBAL*

Brief and detail debug options

When enabled, many debug commands can significantly impact system performance. Many debug commands provide options for brief or detailed reporting. Generating detailed output places an additional burden on system performance, and in many cases the results may be more difficult to interpret than output generated using the brief option. To conserve performance and prevent system disruption, use the brief option whenever possible.

Disabling debug commands

When activated, most debug commands instruct the system to collect specific information about router configurations and activity. In all cases, adding no in front of the command disables the debug function.
Chapter 2
System and System Management Diagnostics

In this chapter

- Basic system information .......................................................... 9
- TCAM partitioning and usage ......................................................... 17
- Managing memory and CPU usage .............................................. 25
- Management module diagnostics ............................................... 36
- Interface module diagnostics ....................................................... 42
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- Switch fabric modules ................................................................. 58
- Power supplies, fans, and temperature ......................................... 61
- Fiber optic modules ...................................................................... 65
- Testing network connectivity ......................................................... 69

This chapter describes many of the common system and system management diagnostic processes for Brocade NetIron XMR series and Brocade MLX series devices.

Basic system information

Basic system troubleshooting includes the verification of software images and their locations, and monitoring hardware components such as fans and power supplies. The following sections describe how to display information, and what to look for when troubleshooting your hardware and system software.

System hardware show commands

This section describes the show command that displays system hardware information.

show chassis

Syntax: show chassis

The show chassis command displays information about the Brocade NetIron XMR and Brocade MLX series chassis, including power supplies, fan status and operating speeds, and temperature readings for all installed modules (temperatures are, by default, polled every 60 seconds). The following example shows output for the show chassis command.
Basic system information

Brocade# show chassis
*** NetIron XMR 8000 CHASSIS ***

---POWERS---
Power 1: Installed (Failed orDisconnected)
Power 2: Installed (Failed orDisconnected)
Power 3 (30351200 - AC 1200W): Installed (OK)
Power 4 (30351200 - AC 1200W): Installed (OK)
Total power budget for chassis = 2400W
Total power budget for LPs = 2049W
Slot Power-On Priority and Power Usage:
Slot2 pri=1 module type=NI-X-OC48x4 4-port OC48/12 STM16/STM4 Module power usage =132W
Slot3 pri=1 module type=NI-XMR-1Gx20-GC 20-port 10/100/1000 Copper Module power usage=156W
Slot4 pri=1 module type=NI-XMR-10Gx2 2-port 10GbE Module power usage=165W

--- FANS ---
Right fan tray (fan 1): Status = OK, Speed = MED (75%)
Right fan tray (fan 2): Status = OK, Speed = MED (75%)
Right fan tray (fan 3): Status = OK, Speed = MED (75%)
Right fan tray (fan 4): Status = OK, Speed = MED (75%)

--- TEMPERATURE READINGS ---
Active Mgmt Module: 38.0C 52.375C
Standby Mgmt Module: 35.250C
SNM1: 30.0C
SNM2: 27.5C
SNM3: 30.0C
LP2 Sensor1: 38.0C
LP2 Sensor2: 53.0C
LP3 Sensor1: 33.5C
LP3 Sensor2: 40.750C
LP4 Sensor1: 38.5C
LP4 Sensor2: 46.500C
LP4 Sensor3: UNUSED
Temperature Monitoring Poll Period is 60 seconds
For more information about how to troubleshoot hardware issues, refer to “Power supplies, fans, and temperature” on page 61.

System software show commands

This section describes the show command that displays system software information.

show version

Syntax: show version

Most boot issues occur because incorrect or incompatible images have been downloaded. The show version command displays all versions that are currently loaded, as shown in the following example.

Brocade# show version
HW: NetIron XMR Router
Backplane (Serial #: Not Exist, Part #: Not Exist)
NI-X-SF Switch Fabric Module 1 (Serial #: PR29050242, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 2 (Serial #: PR29050246, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 3 (Serial #: PR30050270, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0

NI-XMR-MR Management Module Active (Serial #: SA12061726, Part #: 31524-100A):
Boot : Version 3.5.0T165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Jul 10 2009 at 19:13:56 labeled as xmprm0350
(424484 bytes) from boot flash
Monitor : Version 3.5.0aT165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Jul 30 2009 at 17:35:22 labeled as xmb03500a
(424748 bytes) from code flash
IronWare : Version 3.5.0cT163 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Sep 17 2009 at 01:00:12 labeled as xmr03500c
(5840562 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 18
916 MHz Power PC processor (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM
Active Management uptime is 21 days 10 hours 44 minutes 44 seconds

NI-XMR-MR Management Module Standby (Serial #: SA11060307, Part #: 31524-100A):
Boot : Version 3.5.0T165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Jul 10 2009 at 19:13:56 labeled as xmprm0350
(424484 bytes) from boot flash
Monitor : Version 3.5.0aT165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Jul 30 2009 at 17:35:22 labeled as xmb03500a
(424748 bytes) from code flash
IronWare : Version 3.5.0cT163 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Sep 17 2009 at 01:00:12 labeled as xmr03500c
(5840562 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 18
916 MHz Power PC processor (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM
Standby Management uptime is 19 days 14 hours 4 minutes 45 seconds

NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module (Serial #: SA23060375, Part #: 31570-103A)
Boot : Version 3.3.0gT175 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Aug 29 2009 at 12:12:02 labeled as xmlprm03300g
(336122 bytes) from boot flash
Monitor : Version 3.3.0gT175 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Aug 29 2009 at 12:12:46 labeled as xmlb03300g
(659473 bytes) from code flash
IronWare : Version 3.3.0gT177 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on Aug 29 2009 at 18:37:36 labeled as xmlp03300g
(2410342 bytes) from Primary
FPGA versions:
Valid PBIF Version = 2.18, Build Time = 7/21/2009 12:21:0
Valid XPP Version = 2.25, Build Time = 8/2/2009 10:33:0

BCM5695GMAC 0
BCM5695GMAC 1
BCM5695GMAC 2
BCM5695GMAC 3
Basic system information

666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
1024 MB DRAM, 8 KB SRAM, 0 Bytes BRAM
PPCR0: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
LP Slot 3 uptime is 3 hours 11 minutes 50 seconds
SL 5: NI-XMR-10Gx4 4-port 10GbE Module (Serial #: pr32050022, Part #: 31546-100A)
Boot: Version 3.3.0gT175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Aug 29 2009 at 12:12:02 labeled as xmlprm03300g
(336122 bytes) from boot flash
Monitor: Version 3.3.0gT175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Aug 29 2009 at 12:12:46 labeled as xmlb03300g
(659473 bytes) from code flash
IronWare: Version 3.3.0gT177 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Aug 29 2009 at 18:37:36 labeled as xmlp03300g
(2410342 bytes) from Primary
FPGA versions:
Valid PBIF Version = 2.18, Build Time = 7/21/2009 12:21:0
Valid XPP Version = 2.25, Build Time = 8/2/2009 10:33:0
Valid XGMAC Version = 0.11, Build Time = 10/11/2009 12:45:0

show flash

Syntax: show flash

The show flash command displays the images that have been copied onto flash memory.

Brocade# show flash
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Active Management Module (Right Slot)
Code Flash - Type MT28F128J3, Size 32 MB
  o IronWare Image (Primary)
    Version 3.5.0T163, Size 5819609 bytes, Check Sum ec17
    Compiled on Jun 18 2009 at 07:15:12 labeled as xmr03500b201
  o LP Kernel Image (Monitor for LP Image Type 0)
    Version 3.5.0T175, Size 386693 bytes, Check Sum 5ff6
    Compiled on May 31 2009 at 14:42:56 labeled as xmlb03500b155
  o LP IronWare Image (Primary for LP Image Type 0)
    Version 3.5.0T177, Size 3128223 bytes, Check Sum f07b
    Compiled on Jun 18 2009 at 07:49:48 labeled as xmlp03500b201
  o Monitor Image
    Version 3.5.0T165, Size 424045 bytes, Check Sum 66f0
    Compiled on May 31 2009 at 14:41:14 labeled as xmb03500b155
  o Startup Configuration
    Size 12466 bytes, Check Sum 1bb2
    Modified on 14:01:37 Pacific Mon Jun 18 2009
Boot Flash - Type AM29LV040B, Size 512 KB
  o Boot Image
Version 3.5.0T165, Size 424038 bytes, Check Sum f1e9
Compiled on May 31 2009 at 14:42:00 labeled as xmprm03500b155

Standby Management Module (Left Slot)
Code Flash: Type MT28F128J3, Size 32 MB
  o IronWare Image (Primary)
    Version 3.5.0T163, Size 5819609 bytes, Check Sum ec17
    Compiled on Jun 18 2009 at 07:15:12 labeled as xmr03500b201
  o LP Kernel Image (Monitor for LP Image Type 0)
    Version 3.5.0T175, Size 386693 bytes, Check Sum 5ff6
    Compiled on May 31 2009 at 14:42:56 labeled as xmlb03500b155
  o LP IronWare Image (Primary for LP Image Type 0)
    Version 3.5.0T177, Size 3128223 bytes, Check Sum f07b
    Compiled on Jun 18 2009 at 07:49:48 labeled as xmlp03500b201
  o Monitor Image
    Version 3.5.0T165, Size 424045 bytes, Check Sum 66f0
    Compiled on May 31 2009 at 14:41:14 labeled as xmb03500b155
  o Startup Configuration
    Size 12466 bytes, Check Sum 1bb2
    Modified on 14:01:38 Pacific Mon Jun 18 2009

Boot Flash: Type AM29LV040B, Size 512 KB
  o Boot Image
    Version 3.5.0T165, Size 424038 bytes, Check Sum f1e9

show who

Syntax: show who

The show who command displays information about users who are logged in to a Telnet connection, including privilege levels, as shown in the following example.

Brocade# show who
Console connections:
    established
        3 days 17 hours 31 minutes 27 seconds in idle
Telnet server status: Enabled
Telnet connections (inbound):
    1   established, client ip address 10.53.1.65, privilege super-user
        you are connecting to this session
    2   closed
    3   closed
    4   closed
    5   closed
Telnet connections (outbound):
    6   established, server ip address 10.47.2.200, from Telnet session 1
        4 seconds in idle
    7   closed
    8   closed
    9   closed
   10   closed
SSH server status: Enabled
SSH connections:
    1   closed

show save

Syntax: show save [active-mp | lp | standby-mp]

- active-mp - Displays active Management Processor (MP) crash dump information.
- lp - Displays Line Processor (LP) crash dump information.
Basic system information

- **standby-mp** - Displays standby MP crash dump information. The `show save` command displays saved crash information. Command output resembles the following example.

```plaintext
Brocade# show save
Boot : 05.03.00T165 xmprm05300 built on Oct 24 2011 16:08:02 PDT
Monitor : 05.03.00T165 xmb05300b1 built on Nov 22 2011 22:58:34 PST
System : 05.03.00T163 xmr05300b1 built on Nov 22 2011 05:01:48 PST

Task : console
Created : 08:36:21 11-23-2011
System had been up for 5 minutes

EXCEPTION 0000, Soft Check - Timeout (30s)

Task : console

GP Registers
r0 : 200535d4 26ed90f0 21cd62c0 00000000
r4 : 21d0e1fc 00331f40 26ed9198 6c2022f4
r8 : 6c000000 00000001 0000000c 00000020
r12 : 00000000 22063740 00000000 00000000
r16 : 00000015 00150001 00000000 26ed72c
r20 : 00000069 00000000 1000c100 00000000
```

System debug commands

This section describes the system-related debug commands.

**Debug system trace**

**Syntax:** `[no] debug system trace`

This command performs a system debugging trace. Command output resembles the following example.

```plaintext
Brocade# debug system trace
SYSLOG: <13>Dec 10 20:48:43 Edge4 System: Module 5 powered off
Slot 5 is powered off.
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
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WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
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WARN IPC: Slot for dest FID 53252 is not UP
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WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP
WARN IPC: Slot for dest FID 53252 is not UP

debug system upgrade

Syntax: [no] debug system upgrade

This command enables and displays the debugging traces. Command output resembles the following example.

Brocade# debug system upgrade
*** Package upgrade CB parsed data ***
Manifest path :
Source : 4
MP MON : /Monitor/ManagementModule/xmb05300.bin
MP APP : /Application/ManagementModule/xmr05300b270.bin
MP BOOT : /Boot/ManagementModule/xmprm05200.bin
MBRIDGE : /FPGA/ManagementModule/mbridge_05300b270.xsvf
MBRIDGE32 : /FPGA/ManagementModule/mbridge32_05300b270.xsvf
SBRIDGE : /FPGA/ManagementModule/sbridge_05300b270.mcs
HSBRIDGE : /FPGA/ManagementModule/hbridge_05300b270.mcs
LP MON : /Monitor/InterfaceModule/xmlb05300.bin
LP APP : /Application/InterfaceModule/xmlp05300b270.bin
LP BOOT : /Boot/InterfaceModule/xmlprm05200.bin
LP FPGA All: /Combined/FPGA/lpfpga05300b270.bin
PBIF SP2 : /FPGA/InterfaceModule/pbifsp2_05300b270.bin
PBIF MRJ : /FPGA/InterfaceModule/pbifmrj_05300b270.bin
PBIF OC : /FPGA/InterfaceModule/pbifoc_05300b270.bin
PBIF 8x10 : /FPGA/InterfaceModule/pbif8x10_05300b270.bin
XPP SP2 : /FPGA/InterfaceModule/xppsp2_05300b270.bin
XPP MRJ : /FPGA/InterfaceModule/xppmrj_05300b270.bin
XPP OC : /FPGA/InterfaceModule/xppoc_05300b270.bin
XPP 8x10 : /FPGA/InterfaceModule/xpp8x10_05300b270.bin
XPP 2x100 : /FPGA/InterfaceModule/xpp2x100_05300b270.bin
STATS MRJ : /FPGA/InterfaceModule/statsmrj_05300b270.bin
STATS OC : /FPGA/InterfaceModule/statsoc_05300b270.bin
XGMAC SP2 : /FPGA/InterfaceModule/xgmacsp2_05300b270.bin
CE : 
CEB :
PBIF Metro :
num_downloads : 0
*** Package upgrade CB data ***
Manifest path :
Source : 4
num_downloads : 7
num_download_recs : 7
error count : 0

debug trace-l2 events

Syntax: [no] debug trace-l2 events

This command displays information about Layer 2 trace protocol events. Command output resembles the following example.
Brocade# debug trace-l2 events
Brocade# trace-l2 vlan 3
Dec 10 17:21:38 L2 Trace: trace_route_l2(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_timer(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_timer(): Stage 1
Dec 10 17:21:39 L2 Trace: trace_l2_append_payload(): manipulate_input_port = 0, in_port = 65535
Dec 10 17:21:39 L2 Trace: trace_l2_append_payload(): Unmodified hop->input_port = 4095
Dec 10 17:21:39 L2 Trace: trace_l2_append_payload(): Exit 2
Dec 10 17:21:39 L2 Trace: trace_l2_append_payload(): Exit 2
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Entering
Dec 10 17:21:39 L2 Trace: trace_l2_find_elapse_micro_seconds(): timel = 425976272
Dec 10 17:21:39 L2 Trace: trace_l2_receive_reply(): Exit 4: Processed Hop
Dec 10 17:21:40 L2 Trace: trace_l2_timer(): Entering
Dec 10 17:21:40 L2 Trace: trace_l2_timer(): Exit 3 (Stage 2)
Dec 10 17:21:40 L2 Trace: trace_l2_timer(): Entering
Dec 10 17:21:40 L2 Trace: trace_l2_timer(): Have no address
Vlan 3 L2 topology probed, use "trace-l2 show" to display
Dec 10 17:21:40 L2 Trace: trace_l2_timer(): Exit 4: End of function

Common diagnostic scenarios

System issues are rare. However, some problem sources can include:

- Software versions are not compatible.
- Line modules or switch fabric modules are not functioning properly.
- Environmental conditions, such as temperatures that are above or below operating thresholds, are affecting operation of hardware components.

If you are experiencing system issues, contact Brocade Technical Support for help in troubleshooting your system.
TCAM partitioning and usage

Ternary Content Addressable Memory (TCAM) is a component of Brocade devices that facilitates hardware-forwarding. As packets flow through the Brocade device from a given source to a given destination, the management processor records forwarding information about the flow in TCAM entries. A TCAM entry generally contains next-hop information, such as the outgoing port, the MAC address of the next-hop router, a VLAN tag, and so on. Once the Brocade device has this information in TCAM, packets with the same source and destination can be forwarded by hardware, bypassing the management processor, and speeding up forwarding time.

TCAM entries can contain Layer 2, Layer 3, or Layer 4 information. Each type of TCAM entry has its own format:

- Layer 2 TCAM entries contain destination MAC information and deal with 802.1p (priority) and VLAN information.
- Layer 3 TCAM entries contain destination IP information.
- Layer 4 TCAM entries contain destination IP, destination TCP/UDP port, source IP, and source TCP/UDP port information.

When a Brocade device is initialized, the software partitions the available TCAM into segments for Layer 2, Layer 3, or Layer 4 information. The percentage of TCAM devoted to each type of TCAM entry is determined by the profile.

Table 2 shows the TCAM sizes and functions for Brocade NetIron XMR and Brocade MLX series devices.

### Table 2: TCAM sizes and support

<table>
<thead>
<tr>
<th>TCAM</th>
<th>Brocade NetIron XMR</th>
<th>Brocade MLX series</th>
<th>Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCAM 0/TCAM 1</td>
<td>Cascaded 2x18 Mb</td>
<td>18 Mb</td>
<td>IPv4, IPv6, MAC DA, MAC SA, Layer 3 VPN routes (uplink and endpoints), IPv4 for RPF</td>
</tr>
<tr>
<td>TCAM 2</td>
<td>18 Mb</td>
<td>9 Mb</td>
<td>Inbound IPv4 ACL, inbound IPv6 ACL, inbound Layer 2 ACL, MAC SA, MAC DA, Layer 3 VPN routes (uplinks and endpoints), VPLS DA, VPLS SA (uplinks and endpoints), multicast</td>
</tr>
<tr>
<td>TCAM 3</td>
<td>9 Mb</td>
<td>9 Mb</td>
<td>Outbound IPv4 ACL, outbound IPv6 ACL, outbound Layer 2 ACL only</td>
</tr>
</tbody>
</table>

### TCAM show commands

This section describes the show commands that display TCAM information.

#### show cam ifl

**Syntax:** `show cam ifl slotnum/portnum`

This command displays Content Addressable Memory (CAM) Internal Forwarding Lookup (IFL) information for a specified slot and port.

```
Brocade# show cam ifl 7/7
Slot Index Port Outer VLAN Inner VLAN PRAM IFL ID IPv4/V6| (Hex)
  (Hex)   Routing
7       0081fe9 7/4 4000 0 181fe9 131071 1/1
7       0081fea 7/3 4000 0 181fea 131071 1/1
7       0081feb 7/2 4000 0 181feb 131071 1/1
```
TCAM partitioning and usage

---

槽位 | 端口 | 外部 VLAN | 内部 VLAN | PRAM | IFL ID | IPv4/IPv6
---|---|---|---|---|---|---
7 | 0081fec 7/1 | 4000 | 0 | 181fec 131071 1/1
7 | 0081fed 7/8 | 607 | 0 | 181fed 131071 1/1
7 | 0081fee 7/7 | 607 | 0 | 181fee 131071 1/1
7 | 0081fef 7/8 | 606 | 0 | 181fef 131071 1/1
7 | 0081ff0 7/7 | 606 | 0 | 181ff0 131071 1/1
7 | 0081ff1 7/8 | 605 | 0 | 181ff1 131071 1/1
7 | 0081ff2 7/7 | 605 | 0 | 181ff2 131071 1/1
7 | 0081ff3 7/8 | 604 | 0 | 181ff3 131071 1/1
7 | 0081ff4 7/7 | 604 | 0 | 181ff4 131071 1/1
7 | 0081ff5 7/8 | 603 | 0 | 181ff5 131071 1/1
7 | 0081ff6 7/7 | 603 | 0 | 181ff6 131071 1/1
7 | 0081ff7 7/8 | 602 | 0 | 181ff7 131070 1/1
7 | 0081ff8 7/7 | 602 | 0 | 181ff8 131070 1/1
7 | 0081ff9 7/8 | 601 | 0 | 181ff9 131071 1/1
7 | 0081ffa 7/7 | 601 | 0 | 181ffa 131071 1/1
7 | 0081ffb 7/8 | 6 | 0 | 181ffb 131071 1/1
7 | 0081ffc 7/7 | 6 | 0 | 181ffc 131071 1/1
7 | 0081ffd 7/19 | 4000 | 0 | 181ffd 131071 1/1
7 | 0081ffe 7/14 | 100 | 0 | 181ffe 131071 1/1
7 | 0081fff 7/18 | 4000 | 0 | 181fff 131071 1/1

show cam-detail-ip

**Syntax:** show cam-detail-ip slot/port ip_address/mask

This command displays CAM programming information for a specific L3 CAM entry.

The following parameters are available for this command:

- **slot/port** - Specifies the LP slot and port number.
- **ip_address/mask** - Specifies the IP address and mask of the L3 PRAM entry.

This command displays information from the L3 CAM entry, as shown in the following example.

**NOTE**

This command displays the L3-flow information for default VRF only and not supported for non-default VRF.

```
Brocade# show cam-detail-ip me/2 1.1.1.1/24
```

```
************(show cam ip <ipaddr/mask>) output************

LP Index | IP Address | MAC | Age | IFL/Out IF | PRAM | VLAN
---|---|---|---|---|---|---
2 | 01a8df(R) 1.1.1.0/24 | 0024.3892.4c01 | Dis 1 | 2/2 | 3ff62

************(dm cam [<interface> <index>]) output************

(CAM 0x0001a8da left): 0.0.0.0/255.255.255.255
(CAM 0x0001a8da right): 1.1.1.0/255.255.255.0

************(dm cam2pram <interface> <index>) output************

(CAM2PRAM entry 0x0351b4): 0003ffbb cam_idx: 0x0001a8da
(CAM2PRAM entry 0x0351b5 [MAC SA or Right IP]): 0003ff62

************(dm pram <interface> <index> ip) output************

PRAM 0x3ff62 255[01770000:00000002:00000024:38924c01]128
127[60008003:00000000:0400000d:00190200]0

************PRAM IP entry ************

DA HIGH | 0x0024 | Replacement DA (high 2 bytes)
DA LOW | 0x38924c01 | Replacement DA (low 4 bytes)
VLAN_ID | 0001 | Replacement VLAN ID
MULTICAST_VLAN | 0 | Set multicast flag in packet header
REPLACE_VLAN_ID | 1 | Use replacement VLAN ID
```
SPA_DISCARD_PKT 0  If 1, allow RPF to discard the packet
MTU_CHECK 1  If 1, enforce mtu check
REPLACE_DA 1  Use replacement DA
IGNORESPA_MASK 0  If 1, Ignore SPA mask
MONITOR 0  Copy packet to MONITOR port
CPU 0  Packet must be copied to CPU
DISCARD_INVLD 0  Discard if lookup invalid
DISCARD_PACKET 0  Force packet to be discarded
USE_FID 1  Use FID from this PRAM entry
USE_QOS_ID 0  Use QOS ID for rate limiting
INNER_VLAN_VALID 0  Inner Vlan Valid
QOS_ID 0x00  QOS rate limiting ID
VALID 0x000000d  Per-port entry valid
FID 0x0019  Forwarding ID
TRUNK_ADJUST 0  Adjust FID based on trunk index
PRIORITY_FORCE 0
PRIORITY 0
FWD_COMMAND 2  L3 hardware forwarding command
USE_TOS_ID 0  Use replacement TOS
TOS_ID 0x000  TOS replacement
IGNORE_ACLRES 0  Ignore ACL lookup
VLAN_ID 0000  Replacement Inner VLAN ID
PRAM_TYPE 0
TRUNK_ID 0
NEXT_HOP_ROUTER_INDEX 0x00000000
TNNL_MTU_CHECK_LENGTH 1500
SRC_IPV4_ADDR/SPA MASK 0x00000002
GRE_TNNL_INGRESS 0
GRE_TNNL_EGRESS 0
GRE_ENFORCE_SESSION_CHECK 0
6_TO_4_TNNL_INGRESS 0
6_TO_4_TNNL_EGRESS 0
6_TO_4_ENFORCE_SESSION_CHECK 0
TNNL_OUTER_TOS 0
REPLACE_INNER_VLAN 0

FID 25 (00000019): cpu = 0, mcpu = (0, 0), num_write_not_needed = 0
Slot0: 00000000 00000000
Slot1: 00000000 00000002
Slot2: 00000000 00000000
Slot3: 00000000 00000000
Slot4: 00000000 00000000
Slot5: 00000000 00000000
Slot6: 00000000 00000000
Slot7: 00000000 00000000
Slot8: 00000000 00000000
Slot9: 00000000 00000000
Slot10: 00000000 00000000
Slot11: 00000000 00000000
Slot12: 00000000 00000000
Slot13: 00000000 00000000
.
.
Slot29: 00000000 00000000
Slot30: 00000000 00000000
Slot31: 00000000 00000000
Slot32: 00000000 00000000
Slot33: 00000000 00000000

***********************************************************************
***** (dm fid-entry-table <fid>) output*************************************

***********************************************************************
***** (dm statsram pram <me/x> <index>) output*****************************

(STATSRAM entry 0x3ff62): pkt cnt: 118298, byte cnt: 17508104
show cam-detail-eth

**Syntax:** show cam-detail-eth slot/port mac_address [vlan | vpls-vlan] vlan_id

This command displays CAM programming information for a specific L2 CAM entry.

The following parameters are available for this command:

- **slot/port** - Specifies the LP slot and port number.
- **mac_address** - Specifies the MAC address of the L2 PRAM entry.
- **vlan** - Specifies the VLAN number.
- **vpls-vlan** - Specifies the VPLS-VLAN number.
- **vlan_id** - Specifies the VLAN ID number.

This command displays information from the L2 CAM entry, as shown in the following example.

Brocade# show cam-detail-eth me/2 fdab:1234:4567 vlan 100

```
**********************(show cam ethernet <slot/port>) output********************
LP Index MAC            Age Port  IFL/ Out IF PRAM  Type
(Hex)                         VLAN        (Hex)
2  4ffff ffff.ffff.0000 Dis 2/8   100    CPU    3ff5b DA
**********************(dm cam [<interface> <index>]) output**********************
(CAM 0x0004ffff): ffff.ffff.0000/ffff.ffff.0000 VPN 0/0
**********************(dm cam2pram <interface> <index>) output******************
(CAM2PRAM entry 0x09fffe): 0003ff5b cam_idx: 0x0004ffff
(CAM2PRAM entry 0x09ffffff [MAC SA or Right IP]): 0003ff80
**********************(dm pram <interface> <index> mac-da) output******************
PRAM 0x3ff5b 255[00000000:00000000:00000000:00000000:00000000:00000000]:128
127[00000000:00100000:8600800f:05f00000]0
**********************PRAM MAC entry (DA)***********************
ALT SRC PORT    1          Use alternate src port
MONITOR         0          Copy packet to MONITOR port
CPU             0          Packet must be copied to CPU
DISCARD INVLD   0          Discard if lookup invalid
DISCARD PACKET  0          Force packet to be discarded
USE FID         1          Use FID from this PRAM entry
USE QOS ID      1          Use QOS ID for rate limiting
INNER VLAN VALID 0000      Inner Vlan Valid
QOS ID          0x20       QOS rate limiting ID
VALID           0x000000f   Per-port entry valid
FID             0x05f0     Forwarding ID
TRUNK ADJUST    0          Adjust FID based on trunk index
DIS_QOS_OVERRIDE 0         Disable QOS Override
PRIORITY_FORCE  0          Force pram priority to packet
PRIORITY        0          Packet priority
FASTPATH ENA    0          DA/SA is a known router
IGNORE BLOCK    0          Ignore port or RX block
DPA KNOWN       0          DPA associated with this DA is known
US              0          Set RX_US bit
LOCAL ADDRESS   0          Address was learned locally
IGNORE US       0          Ignore router MAC
IGNORE ACLRES   0          Ignore ACL lookup
INNER VLAN      0000        Replacement Inner Vlan ID
PRAM TYPE       1          PRAM Entry Type
TRUNK ID        0           Trunk group ID
REPLACE VLAN    0           Use Outer Replacement VLAN ID
OUTER VLAN      0           Outer Replacement VLAN ID
MUTLICAST VLAN  0           Set Multicast VLAN Flag
MATCH ALL DA    0           Match All DA Entry
```
TCAM partitioning and usage

LOCAL_SWITCHING (MAC-DA only) 0  Perform L2 DA forwarding
DONT MODIFY PKT 0  Send Unmodified Copy
SOURCE PORT 0x00  Source Port of CAM entry
HPORT VALID 0x00  Host port per port entry valid
BOGUS LABEL BIT0  Indicates if this label is used for single hop acct
TAG 0  VPLS Tag Mode support
NEXT HOP INDEX 0  next hop router index
PRAM MCAST SKIP MCAST0 MCT/PBB mask indicating where to forward
PRAM EGRESS ID HI 0  higher 12-bits of PRAM_EGRESS_ID for HQOS support
PRAM EGRESS ID LO 0  Lower 4-bits of PRAM_EGRESS_ID for HQOS support
PUSH OUTER LABEL 0  Push the outer Label
REPLACE INNER VLAN 0  Use replacement inner VLAN

**************************(dm fid-entry-table <fid>) output**************************
FID 25 (00000019): cpu = 0, mcpu = (0, 0), num_write_not_needed = 0
Slot0: 00000000 00000000
Slot1: 00000000 00000000
Slot2: 00000000 00000000
Slot3: 00000000 00000000
Slot4: 00000000 00000000
Slot5: 00000000 00000000
Slot6: 00000000 00000000
Slot7: 00000000 00000000
Slot8: 00000000 00000000
Slot9: 00000000 00000000
Slot10: 00000000 00000000
Slot11: 00000000 00000000
Slot12: 00000000 00000000
Slot13: 00000000 00000000
Slot14: 00000000 00000000
.
.
.
Slot31: 00000000 00000000
Slot32: 00000000 00000000
Slot33: 00000000 00000000

**************************(dm statsram pram <me/x> <index>) output**************************
(STATSRAM entry 0x03ff5b): pkt cnt: 217243, byte cnt: 32151964

show cam l4

Syntax:  show cam l4 slot/port

This command displays TCAM partition information on a specific layer 4 interface, as shown in the following example.

Brocade# show cam l4 1/2
LP Index Src IP (Hex) (Dest IP) SPort Pro Age IFL/ Out IF Group PRAM VLAN Action (Hex)
1 a4000 0.0.0.0 0 17 Dis 0 Protoc 31 00084 (127.0.0.0 3784)
1 a4800 10.1.1.2 0 0 Dis 0 Pass 16 00097 (10.1.1.255 0)
1 a4802 10.1.1.2 0 0 Dis 0 Pass 16 00098 (10.1.1.255 0)
1 a4804 0.0.0.0 0 0 Dis 0 Drop 16 00099 (10.1.1.255 0)
1 a4806 0.0.0.0 0 0 Dis 0 Drop 16 0009a (10.1.1.255 0)
show cam-partition

Syntax: show cam-partition [brief | slot slotnum | usage]

The following parameters are available for this command:

- **brief** - Displays a brief summary of partition information.
- **slot slotnum** - Displays partition information for a specific slot.
- **usage** - Displays brief partition usage information.

The following examples show output for this command using these parameters.

The **show cam-partition brief** command displays TCAM information per partition and sub-partition in three formats: raw size, user size, and reserved size, as shown in the following example.

Brocade# show cam-partition brief
CAM partitioning profile: default
Slot 1 XPP20SP 0:
  # of CAM device = 4
  Total CAM Size = 917504 entries (63Mbits)
  IP: Raw Size 524288, User Size 524288 (0 reserved)
  Subpartition 0: Raw Size 12288, User Size 12288, (0 reserved)
  Subpartition 1: Raw Size 468107, User Size 468107, (0 reserved)
  Subpartition 2: Raw Size 37335, User Size 37335, (0 reserved)
  Subpartition 3: Raw Size 5140, User Size 5140, (0 reserved)
  Subpartition 4: Raw Size 778, User Size 778, (0 reserved)
  IPv6: Raw Size 131072, User Size 65536 (0 reserved)
  Subpartition 0: Raw Size 12288, User Size 6144, (0 reserved)
  Subpartition 1: Raw Size 107496, User Size 53748, (0 reserved)
  Subpartition 2: Raw Size 9332, User Size 4666, (0 reserved)
  Subpartition 3: Raw Size 1284, User Size 642, (0 reserved)
  Subpartition 4: Raw Size 384, User Size 192, (0 reserved)
  IP VPN Raw Size 131072, User Size 131072 (0 reserved)
  Subpartition 0: Raw Size 2048, User Size 2048, (0 reserved)
  Subpartition 1: Raw Size 116886, User Size 116886, (0 reserved)
  Subpartition 2: Raw Size 9333, User Size 9333, (0 reserved)
  Subpartition 3: Raw Size 1285, User Size 1285, (0 reserved)
  Subpartition 4: Raw Size 384, User Size 384, (0 reserved)
  MAC: Raw Size 131072, User Size 131072 (0 reserved)
  Subpartition 0: Raw Size 10, User Size 10, (0 reserved)
  Subpartition 1: Raw Size 32, User Size 32, (0 reserved)
  Subpartition 2: Raw Size 131030, User Size 131030, (0 reserved)
  Session: Raw Size 98304, User Size 49152 (0 reserved)
  Subpartition 0: Raw Size 79872, User Size 39936, (0 reserved)
  Subpartition 1: Raw Size 2048, User Size 1024, (0 reserved)
  Subpartition 2: Raw Size 16384, User Size 8192, (0 reserved)
  IPv6 Session: Raw Size 32768, User Size 4096 (0 reserved)
  Subpartition 0: Raw Size 15872, User Size 7938, (0 reserved)
  Subpartition 1: Raw Size 512, User Size 64, (0 reserved)
  Subpartition 2: Raw Size 16384, User Size 2048, (0 reserved)
  Out Session: Raw Size 196608, User Size 98304 (49152 reserved)
  Out IPv6 Session: Raw Size 65536, User Size 8192 (4096 reserved)

Slot 1 XPP20SP 0:
Slot 3 XPP20SP 0:
  # of CAM device = 4
  Total CAM Size = 917504 entries (63Mbits)

The **show cam-partition usage** command displays the amount of TCAM being used and how much is available, as shown in the following example.
NOTE
The display has been shortened for brevity.

Brocade# show cam-partition usage
CAM partitioning profile: default
Slot 1 XPP20SP 0:
Slot 1 XPP20SP 0:
  [IP] 524288(size), 518257(free), 01.15%(used)
  :SNet 0: 12288(size), 12269(free), 00.15%(used)
  :SNet 1:468107(size), 462099(free), 01.28%(used)
  :SNet 2: 37335(size), 37332(free), 00.00%(used)
  :SNet 3: 5140(size), 5140(free), 00.00%(used)
  :SNet 4: 778(size), 778(free), 00.00%(used)

  [IPV6] 65536(size), 65534(free), 00.00%(used)
  :SNet 0: 6144(size), 6144(free), 00.00%(used)
  :SNet 1: 53748(size), 53748(free), 00.00%(used)
  :SNet 2: 4666(size), 4666(free), 00.00%(used)
  :SNet 3: 642(size), 642(free), 00.00%(used)
  :SNet 4: 192(size), 192(free), 00.00%(used)

  [IP VPN]131072(size), 131072(free), 00.00%(used)
  :SNet 0: 2048(size), 2048(free), 00.00%(used)
  :SNet 1:116886(size), 116886(free), 00.00%(used)
  :SNet 2: 9333(size), 9333(free), 00.00%(used)
  :SNet 3: 1285(size), 1285(free), 00.00%(used)
  :SNet 4: 384(size), 384(free), 00.00%(used)

  [MAC]131072(size), 131067(free), 00.00%(used)
  :Forwarding:131030(size), 131025(free), 00.00%(used)
  :Protocol: 32(size), 32(free), 00.00%(used)
  :Flooding: 10(size), 10(free), 00.00%(used)
  [Session] 49152(size), 49152(free), 00.00%(used)
  :IP Multicast: 8192(size), 8192(free), 00.00%(used)
  :Receive ACL: 1024(size), 1024(free), 00.00%(used)
  :Rule ACL: 39936(size), 39936(free), 00.00%(used)
  [IPV6 Session] 4096(size), 4096(free), 00.00%(used)
  :IP Multicast: 2048(size), 2048(free), 00.00%(used)
  :Receive ACL: 64(size), 64(free), 00.00%(used)
  :Rule ACL: 1984(size), 1984(free), 00.00%(used)
  [Out Session] 49152(size), 49152(free), 00.00%(used)
  [Out V6 Session] 4096(size), 4096(free), 00.00%(used)

The **show cam-partition slot slotnum** command displays the TCAM information for a specific slot, as shown in the following example.

NOTE
The display has been shortened for brevity.

Brocade# show cam-partition slot 1
Session Section : 655360 (0a0000) - 753663 (0b7fff)
IP Source Guard Denial: 0 (000000) - -1 (fffff)
IP Source Guard Permit: 0 (000000) - -1 (fffff)
Rule-based ACL : 675840 (0a5000) - 753663 (0b7fff)
Broadcast ACL : 673792 (0a4800) - 675839 (0a4fff)
Receive ACL : 671744 (0a4000) - 673791 (0a47ff)
IP Multicast : 655360 (0a0000) - 671743 (0a3fff)
IP Multicast 1G : 655360 (0a0000) - 655359 (09fff)
IP Multicast 2GM : 655360 (0a0000) - 655359 (09fff)
Configuration notes

Keep the following information in mind when you are resetting TCAM partitioning:

- Partition TCAMs to best fit the applications that are running on your device.
- If you do not select a non-default profile, the default profile will be in effect.
- The system must be rebooted for TCAM changes to take effect. Always remember to write to memory before you reboot your system.
- Choose a TCAM profile based on all of the application requirements, not on the maximum available TCAM entries for any specific application. The maximum number of entries will vary for different applications.

Maximum TCAM address dependencies

The ability of the TCAM to store large numbers of addresses depends on the following factors:

- The number of source MAC addresses being learned by the TCAM.
- The number of destination MAC addresses being forwarded by the TCAM.
- The distribution of the MAC address entries across ports. For example, if one port is learning all the source MAC addresses, the available TCAM for that port will be used up. In addition, a large number of MAC address entries in the MAC table could increase CPU use.

Supernet TCAM partition sharing

In Brocade NetIron software versions prior to 03.2.00, TCAM resources could not be shared between the 32 levels of the IP Forwarding Information Base (FIB). Beginning with 03.2.00, TCAM allocation is optimized for dynamic allocation of resources to each level. If one level runs out of TCAM resources, it can obtain resources that have been allocated to another level but are unused. This feature applies to IPv4 and Layer 3 VPN routes.

Configuring adequate TCAM resources for VPLS CPU protection

There must be adequate TCAM resources available to use Virtual Private LAN Service (VPLS) CPU protection. Each endpoint and each uplink port requires a single TCAM entry. In addition, if an endpoint is a trunk port, one entry is required for each port in the trunk. To determine the number of entries required for your system, add the number of VPLS endpoints, ports within a trunk port used as an endpoint, and uplink ports. Use this number with the `system-max hw-flooding` command to configure adequate TCAM resources.

Common diagnostic scenarios

When troubleshooting TCAM issues, it is helpful to understand how to determine the most appropriate TCAM settings for your system and to know when a device is running out of TCAM. The following sections describe how to work with TCAM settings.

Determining appropriate TCAM settings

When a Brocade device boots, the system automatically sets default TCAM partitions. You can customize TCAM settings to best fit the specific tasks your devices are performing. The default TCAM settings are the same as the default partition percentage settings.
Managing memory and CPU usage

Changing TCAM partition profiles

TCAM is partitioned on the Brocade NetIron XMR and Brocade MLX series routers using a variety of profiles that you can select depending on your application. To implement TCAM partition profiles, enter the `cam-partition profile` command.

```
cam-partition profile
```

Syntax: `cam-partition profile [ipv4 | ipv4-ipv6 | ipv4-vpls | ipv4-vpn | ipv6 | l2-metro | l2-metro-2 | mpls-l3vpn | mpls-l3vpn-2 | mpls-vpls | mpls-vpls-2 | mpls-vpn-vpls | multi-service]`

You can change the default settings based on your specific needs. Brocade provides the following TCAM partitioning profiles for the Brocade NetIron XMR and Brocade MLX series routers:

- **ipv4**: Optimized for IPv4 applications.
- **ipv4-ipv6**: Optimized for IPv4 and IPv6 dual-stack applications.
- **ipv4-vpls**: Optimized for IPv4 and MPLS VPLS applications.
- **ipv4-vpn**: Optimized for IPv4 and MPLS Layer 3 VPN applications.
- **ipv6**: Optimized for IPv6 applications.
- **l2-metro** and **l2-metro-2**: Optimized for Layer 2 Metro applications.
- **mpls-l3vpn** and **mpls-l3vpn-2**: Optimized for MPLS Layer 3 VPN applications.
- **mpls-vpls** and **mpls-vpls-2**: Optimized for MPLS VPLS applications.
- **mpls-vpn-vpls**: Optimized for MPLS Layer 3 and Layer 2 VPN applications.
- **multi-service**: Optimized for Multi-Service applications.

To display the TCAM settings on your router, use the `show cam-partition` command, as described in “show cam-partition” on page 22.

Determining if a device is running out of TCAM

The `show cam-partition usage` command will tell you if the Brocade NetIron XMR and Brocade MLX series device is running out of TCAM.

Managing memory and CPU usage

To achieve maximum performance, it is important to understand CPU usage and memory issues in the Brocade NetIron XMR and Brocade MLX series router.
Managing memory and CPU usage

NOTE
The following commands are available only in MP OS mode. Brocade recommends TAC guidance to execute MP OS mode commands:

- `set sample-task task name`
- `set sample-rate value`
- `show sample`
- `show bm-dump-mode`
- `show bm-dump-mode hold`
- `show bm-overflow`

Memory and CPU usage show commands

The first step in determining how your device is using memory and CPU is to get a view of the activity. Several show commands display information about CPU usage and CPU task activity. This section lists these commands and provides output examples.

**show tasks**

**Syntax:** `show tasks`

This command displays CPU usage statistics for tasks, as shown in the following example.

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Pri</th>
<th>State</th>
<th>PC</th>
<th>Stack</th>
<th>Size</th>
<th>CPU Usage(%)</th>
<th>task vid</th>
</tr>
</thead>
<tbody>
<tr>
<td>idle</td>
<td>0</td>
<td>ready</td>
<td>0000448c</td>
<td>0404d0a0</td>
<td>4096</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>monitor</td>
<td>20</td>
<td>wait</td>
<td>0001493c</td>
<td>0404be10</td>
<td>16384</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>wd</td>
<td>31</td>
<td>wait</td>
<td>0001493c</td>
<td>0452df48</td>
<td>8192</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>flash</td>
<td>17</td>
<td>wait</td>
<td>0001493c</td>
<td>04535f48</td>
<td>8192</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>dbg</td>
<td>30</td>
<td>wait</td>
<td>0001493c</td>
<td>04532ef0</td>
<td>16384</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>boot</td>
<td>17</td>
<td>wait</td>
<td>0001493c</td>
<td>0462e088</td>
<td>16384</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>main</td>
<td>3</td>
<td>wait</td>
<td>0001493c</td>
<td>20819f38</td>
<td>131072</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>itc</td>
<td>6</td>
<td>wait</td>
<td>0001493c</td>
<td>2081eb03</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>tmr</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20854670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ip_rx</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20859788</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>scp</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20882670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>console</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>2088d660</td>
<td>32768</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>vlan</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20895660</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>mac_mgr</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>2089c670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>mrp</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20ca3670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>vsrp</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20ca6688</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>snms</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20caf670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>rtm</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>20cb8670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ip_tx</td>
<td>5</td>
<td>ready</td>
<td>0001493c</td>
<td>20f33670</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>rip</td>
<td>5</td>
<td>wait</td>
<td>0001493c</td>
<td>27629668</td>
<td>16384</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**show memory pool**

**Syntax:** `show memory pool`

This command displays memory utilization information, as shown in the following example.

<table>
<thead>
<tr>
<th>ID</th>
<th>Top</th>
<th>Current</th>
<th>Bottom</th>
<th>Allocate</th>
<th>Free</th>
<th>VSID</th>
</tr>
</thead>
</table>
Managing memory and CPU usage

show memory task usage

Syntax: show memory task usage task_name

This command displays memory leakage information per task, as shown in the following example.

Brocade# show memory task usage
Task name: $con, id 192
   Pool 0, alloc size 13490514, alloc count 653
Task name: main, id 161
   Pool 0, alloc size 10890302, alloc count 1872
   Pool 2, alloc size 35205305, alloc count 601
Task name: itc, id 1
   Pool 0, alloc size 9472, alloc count 4
   Pool 1, alloc size 200704, alloc count 1
   Pool 2, alloc size 1413, alloc count 4
Task name: tmr, id 20
   Pool 0, alloc size 19456, alloc count 23
   Pool 2, alloc size 14365, alloc count 65
Task name: ip_rx, id 30
   Pool 0, alloc size 208512, alloc count 25
   Pool 2, alloc size 241941, alloc count 18

show cpu

Syntax: show cpu [average | detail | histogram | lp]

- average - Displays average CPU utilization information.
- detail - Displays detailed information about the CPU utilization.
- histogram - Displays CPU wait and hold time and overall CPU utilization into the histogram data.
- lp - Displays CPU utilization information for the line card.

This command displays detailed information about the CPU utilization, as shown in the following example.

Brocade# show cpu detail
Name     State  Act  Wait  Hold  Time         CPU
$(idle)   -      A    0     0     257961164   99.2
$con      wait   A    0     139   12372        0.0
$mon      wait   A    0     0     13461        0.0
$flash    wait   A    123   0     11668        0.0
$dbg      wait   A    0     0      5980        0.0
$boot     wait   A    0     4     11986        0.0
main      wait   A    1     2292    4417        0.0
itc       wait   A    0     2      17        0.0
tmr       wait   A    357   0     432901       0.1
ip_rx     wait   A    44     5    144816        0.0
scp       wait   A    33    102    86138        0.0
lpagent   wait   A    2     0     4511        0.0
console   ready  A    55    60     11181        0.0
vlan      wait   A    4     324    19180        0.0
mac_mgr   wait   A    53    135     8971        0.0
mrp       wait   A    139   0     25373        0.0
show cpu histogram

Syntax: show cpu histogram {hold | wait | interrupt | timer} [above threshold-value | noclear | taskname name]

Syntax: show cpu histogram {util-1s | util-5s | util-10s} [above threshold-value | noclear | taskname name]

Syntax: show cpu histogram {util-all-1s | util-all-5s | util-all-10s} [above threshold-value | noclear]

- **hold** - Displays task hold-time information.
- **wait** - Displays task wait-time information.
- **interrupt** - Displays task user-interrupt usage information.
- **timer** - Displays task sys-timer time usage information.
- **{util-1s | util-5s | util-10s}** - Generates and displays CPU utilization per-task histogram data at 1-second, 5-second, or 10-second intervals.
- **{util-all-1s | util-all-5s | util-all-10s}** - Generates and displays total CPU utilization of a task histogram at 1-second, 5-second, or 10-second intervals.
- **above threshold-value** - Displays histogram information for tasks with a maximum hold time above the specified value.
- **noclear** - Specifies that histogram data should not be cleared after display. By default, information is cleared once read.
- **taskname name** - Displays histogram information for a specific task.

The following example displays task hold-time information.

```plaintext
Brocade# show cpu histogram hold
HISTOGRAM CPU HISTOGRAM INFO
---------------------------------------------------------------
No of Bucket : 51
Bucket Granularity : 10 ms
Last cleared at : 2012.07.10-07:29:20.704
No of Task : 67
Task Name        Bkt    Bkt       No of Time      HoldTime Total(s) HoldTime Max(ms) Time
sfm_mgr            1      000-010         4       .000463   .201  2012.07.10-07:29:20.701
vlan               1      000-010         1       .000025   .025  2012.07.10-07:29:20.700
mac_mgr            1      000-010         1       .000010   .010  2012.07.10-07:29:20.701
mrp                1      000-010         1       .000025   .025  2012.07.10-07:29:20.700
erp                1      000-010         1       .00009    .09    2012.07.10-07:29:20.700
mxrp               1      000-010         1       .000009   .009  2012.07.10-07:29:20.700
rtm                1      000-010         1       .000062   .062  2012.07.10-07:29:20.700
rtm6               1      000-010         1       .000091   .091  2012.07.10-07:29:20.700
ip_tx               1      000-010         1       .000207   .207  2012.07.10-07:29:20.700
l2vpn               1      000-010         1       .000018   .018  2012.07.10-07:29:20.700
ospf                1      000-010         1       .000046   .046  2012.07.10-07:29:20.700
isis                1      000-010         1       .000009   .009  2012.07.10-07:29:20.700
mcast               1      000-010         1       .000017   .017  2012.07.10-07:29:20.700
ospf6               1      000-010         1       .000012   .012  2012.07.10-07:29:20.700
mcast6              1      000-010         1       .000012   .012  2012.07.10-07:29:20.700
web                 1      000-010         1       .000029   .029  2012.07.10-07:29:20.700
lacp                1      000-010         1       .000013   .013  2012.07.10-07:29:20.700
loop_detect         1      000-010         1       .000009   .009  2012.07.10-07:29:20.700
cluster_mgr         1      000-010         1       .000011   .011  2012.07.10-07:29:20.700
telnet_0            1      000-010         4       .003       3  2012.07.10-07:29:20.672
```

The following example displays CPU utilization per-task histogram data for one second.

```plaintext
Brocade# show cpu histogram util-1s
HISTOGRAM CPU UTIL PER TASK INFO
No of Bucket : 51
Bucket Granularity : 5%
Last cleared at : 2014.03.12-06:51:42.789
No of Task : 69
Task Name        Bkt    Bkt       No of Time      CPUUtil Total(s) Time
sfm_mgr            1      000-005         15       3  2014.03.12-06:36:15.500
sfm_mgr            2      000-005         186      8  2014.03.12-06:50:15.500
```
Managing memory and CPU usage

sfm_mgr            3      000-005         83         12         12
2014.03.12-06:50:00.500
snms               1      000-005          4          4          4
2014.03.12-06:26:21.500
snms               2      000-005          4          7          7
2014.03.12-06:26:22.500
snms               3      000-005         14         13         12
2014.03.12-06:46:22.500
hw_access          1      000-005         58          1          1
2014.03.12-06:49:22.500
telnet_0           1      000-005          1          3          3
2014.03.12-06:51:32.500

The following example displays the total CPU utilization of a task histogram for one second.

Brocade# show cpu histogram util-all-1s
HISTOGRAM CPU UTILIZATION INFO
No of Bucket    : 51
Bucket Granularity : 5%
Last cleared at : 2014.03.12-03:55:59.650

---------------------------------------------------------------------------------
Bkt     Bkt      No of Time       Util                     Time
Num     Value(%)                   Max(%)
---------------------------------------------------------------------------------
1      000-005         74          4  2014.03.12-06:26:21.500
2      000-005        191          8  2014.03.12-06:50:15.500
3      000-005         98         13  2014.03.12-06:46:22.500
---------------------------------------------------------------------------------

show cpu histogram sequence

Syntax: show cpu histogram sequence [taskname name | above threshold-value | trace]

- **taskname name** - Displays histogram information for a specific CPU task.
- **above threshold-value** - Displays histogram information for CPU tasks with a maximum hold time above the specified value.
- **trace** - Displays high CPU condition task trace information.

The following example displays sequential execution of CPU task information.

Brocade# show cpu histogram sequence
HISTOGRAM TASK SEQUENCE INFO
---------------------------------------------
THRESHOLD : 10 ms
DURATION : 30 s
---------------------------------------------
Seq No Task Name Context HoldTime Start Time End Time Date Max (ms)
---------------------------------------------
1     snms TASK            16 07:33:08.790 07:33:08.806 2012.07.10
2     snms TASK            16 07:33:08.772 07:33:08.789 2012.07.10
3     snms TASK            17 07:33:08.755 07:33:08.772 2012.07.10
4     snms TASK            16 07:23:08.790 07:23:08.806 2012.07.10
5     snms TASK            16 07:23:08.772 07:23:08.789 2012.07.10
6     snms TASK            17 07:23:08.755 07:23:08.772 2012.07.10
7     snms TASK            16 07:13:08.790 07:13:08.806 2012.07.10
8     snms TASK            16 07:13:08.772 07:13:08.789 2012.07.10
9     snms TASK            17 07:13:08.755 07:13:08.772 2012.07.10
10    snms TASK            16 07:03:08.790 07:03:08.806 2012.07.10
11    snms TASK            16 07:03:08.772 07:03:08.789 2012.07.10
Sampling CPU usage

There are three commands that will show you how much CPU is being used for each task. The first two commands, issued from the management module monitor, identify a task to be sampled, and a rate at which to sample the task:

- set sample-task task name
- set sample-rate value
- show sample

When set sample-task and set sample-rate are configured, the show sample command samples the CPU for a period of time, and displays stack traces. The resulting information shows you what the CPU is doing, which can be especially helpful during periods of high CPU usage. The maximum number of traces that can be stored is 100. To display the stack traces during the sampling period, enter the show sample command.

To stop the sampling, enter the set sample-rate 0 command.

CPU memory show commands

The CPU uses memory buffers to handle interprocess communication (IPC) and external packets sent and received by the management processor. Buffer pools can consist of 256 bytes, 512 bytes, 1024 bytes, 1040 bytes, and 2048 bytes. All buffers are allocated from these pools on a best-fit basis. The pBuf table maintains start and end addresses, size, stack trace, and number of references for each allocated buffer.

show bm

Syntax: show bm

The show bm command determines if a task is suffering from a buffer leak and displays a general overview of the CPU buffer health, as shown in the following example.

Brocade# show bm

<table>
<thead>
<tr>
<th>SIZE</th>
<th>TOTAL</th>
<th>FREE</th>
<th>IN-USE</th>
<th>OUT-OF-BUF</th>
<th>BAD-FREE</th>
<th>BAD-REF</th>
<th>BAD-SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>256</td>
<td>1023</td>
<td>1022</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>512</td>
<td>1024</td>
<td>1024</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1024</td>
<td>1024</td>
<td>1024</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Managing memory and CPU usage

An overview of system activity can be helpful in troubleshooting issues. Too many IN-USE buffers must be justified or there may be memory leaks. BAD-SIG readings may indicate memory corruptions. BAD-REF readings may indicate improper freeing when buffers are shared.

show bm appid

Syntax: show bm appid num

The num variable specifies the application ID.

This command displays buffer usage information for the specified application ID. Command output resembles the following example.

Brocade# show bm appid 6
Pool id = 0 Application Buffer Usage:
Total buf used by appl = 1
vsvp (0x6 ) owns 0 buffers
Pool id = 1 Application Buffer Usage:
Total buf used by appl = 0
vsvp (0x6 ) owns 0 buffers
Pool id = 2 Application Buffer Usage:
Total buf used by appl = 0
vsvp (0x6 ) owns 0 buffers
Pool id = 3 Application Buffer Usage:
Total buf used by appl = 39
vsvp (0x6 ) owns 0 buffers

show bm-dump-mode

Syntax: show bm-dump-mode
Use the `show bm-dump-mode` command to pinpoint offending code that may be responsible for double frees and memory leaks. Command output resembles the following example.

```
MP-1 OS> show bm-dump-mode
Buffer dump mode is enabled
```

NOTE
A track state of 0 means that the buffer was allocated before the `show bm-dump-mode` command was executed.

```
show bm-dump-mode hold
```

Syntax: `show bm-dump-mode hold`

If a buffer leak is suspected, use the `show bm-dump-mode hold` command to help locate the source of the leak, as shown in the following example.

```
MP-1 OS> show bm-dump-mode hold
Buffer-ID     Second  Dir  Hold  Application
43636ac  60602   rx   1     o
4362ec   60585   tx   1     1
436298c  60585   tx   1     1
435fec   60585   tx   1     1
436f10c  60585   tx   1     1
436c18c  60585   tx   1     1
436a4ec  60394   tx   1     1
436bc8c  60387   tx   1     1
43769cc  60369   tx   1     1
43747ac  110     rx   1     0
```

```
show bm histogram trace
```

Syntax: `show bm histogram trace num`

This command displays histogram buffer sequence information. Command output resembles the following example.

```
Brocade# show bm histogram trace 3
HISTOGRAM BUFFER SEQUENCE INFO
-------------------------------------------
 DURATION : 60 s
 HYSTERESIS INTERVAL : 60 s
 SEQ IDX : 1
 THRESHOLD : Below IPC Critical limit (128)
POOL-ID SIZE(KB) TOTAL FREE IN-USE APP-OWN
-----------------------------------------------
 3 2  6144 128 6016 6648
-----------------------------------------------
Task Name           App-Owns(buffers)
-----------------------------------------------
 mac_mgr            3
 ip_tx              6
 rtm                4
 mcast              12
 console            1
 ip_rx              1
 rtm6               4
 mcast6             6
```
Managing memory and CPU usage

mpls     1
nht       2
vlanMgr   6608

--------------------------------------------
[ Taskname : vlanMgr   , AppId : 20 ]
[Stack trace corresponding to vlanMgr]
[ Taskname : mcast          , AppId : 17 ]

show bm hold

Syntax: show bm hold

This command displays hold buffer usage information. Command output resembles the following example.

Brocade# show bm hold
Buffer-ID Second Dir Hold Application
43636ac 60602   rx  1   0
4362ecc 60585   tx  1   1
436298c 60585   tx  1   1
435fcec 60585   tx  1   1
436f10c 60585   tx  1   1
436d18c 60585   tx  1   1
436a4ec 60394   tx  1   1
436bc8c 60387   tx  1   1
43769cc 60369   tx  1   1
43747ac 110     rx  1   0

show bm-overflow

Syntax: show bm-overflow [start | stop]

The command stops or starts buffer overflow monitoring.

This command displays buffer overruns, and is enabled by default. Output from this command resembles the following example, where non-cpu overflow indicates that the corruption was due to the monitor code and not the application code.

MP-1 OS> show bm-overflow
DABR Watch disabled, DABR disabled because no overflow detected yet.
Info for first overflow
bufptr = 0x29558800 payload = 0x2955810 sig_ptr = 0x2955ffc sig = 0x1234eeee
pid = 3  len = 1500  ref = 1  appl_ref = 1  pri = 0  flags = 0x0
Buf Alloc Stack:
Call Stack:
<-372cc<-371d4<-36dfc<-357d0<-358d4<-4074,-80e9040<-8024d58<-80257cc<-80251f0<-8
025a94<-80241d4<-80200e8<-801ff7cc<-8473d70<-8474474<-8474474<-43f0
Buf Data:
00 00 00 00 00 04 00 00-00 00 00 11 81 00 00 0a
0a 00 0e 82 ff ff ff ff ff 00 02a ff ff ff ff
ff ff ff ff ff ff ff ff ff ff ff ff ff
b3 fa 00 00 00 00 04 00 00-00 00 00 00 11 81 00 00
...Prev Buf Data
prev_bufptr = 0x2955000 prev_payload = 0x2955030 prev_sig_ptr = 0x29557fc prev_sig =
0x1234eeee prev_pid = 3  len = 1968
Prev Buf Alloc Stack:
Prev Buf Data:
00 00 00 00 00 04 00 00-00 00 00 11 81 00 00 0a
Managing memory and CPU usage

configuration notes

Several things can affect the memory in the Brocade NetIron XMR and Brocade MLX series device:

- When you change the table size for a parameter, device memory is reconfigured. When memory is reconfigured, you must save the change to the startup configuration file, and then reload the software for the change to take effect.

- Because Border Gateway Protocol version 4 (BGP4) can handle a very large number of routes, it requires a great deal of memory. In a typical configuration with a single BGP4 neighbor, a BGP4 router may need to hold up to 150,000 routes. Many configurations, especially those involving more than one neighbor, can require the router to hold even more routes. Brocade NetIron XMR and Brocade MLX series devices provide dynamic memory allocation for BGP4 data by automatically allocating memory when needed to support BGP4 neighbors, routes, and route attribute entries. Dynamic memory allocation is performed automatically by the software and does not require a reload.

- As a guideline, the Brocade NetIron XMR and Brocade MLX series devices with a 2-GB management module can accommodate 150 to 200 neighbors, with the assumption that the device receives a total of about one million routes from all neighbors and sends a total of about eight million routes to neighbors. For each additional one million incoming routes, the capacity for outgoing routes decreases by about two million.

- You can allocate memory for more VLANs or virtual routing interfaces. By default, you can configure up to 512 VLANs and virtual routing interfaces on the router. Although this is the default maximum, the Brocade NetIron XMR and Brocade MLX series devices can support up to 4094 VLANs and 4095 virtual routing interfaces. (VLAN IDs 0 and 4095 are reserved.) If many of your VLANs will have an identical configuration, you might want to configure VLAN groups.
Management module diagnostics

The management modules control Brocade NetIron XMR and Brocade MLX series hardware components, run networking protocols, and provide the Real Time Operating System (RTOS).

Each chassis requires one management module, and can accept a second module for redundancy that works in conjunction with the active management module. If the active management module becomes unavailable, the redundant management module automatically takes over the system operation, minimizing system downtime.

Running management module diagnostics

You can run diagnostics on the management modules to check if the devices needed for proper operation are accessible and in working order. The diagnostics for the Line Processor (LP) modules begin after the completion of diagnostics for the management processor (MP) modules, if the LP modules are present in the chassis.

MP module is considered to have passed the diagnostics if the result of all the checks is "Passed". If an MP or an LP does not pass the diag burn-in command, contact Brocade Technical Support for further assistance.

**NOTE**
Remove the standby management module from the chassis before running the diagnostics. If the standby management module is present, running the diagnostics on the interface module fails.

To run diagnostics on management modules, perform the following steps.

1. Reload the system and immediately press the B key repeatedly until the system boots into monitor mode.

2. Type `boot os flash primary` to enter the OS.
   The prompt will change from MP Monitor> to MP OS>.

3. From the MP OS> prompt, enter `diag burn-in`, as shown in the following example.

```
MP-1 OS>diag burn-in
PCI access                 - Passed
88E1145 PHY                - Passed
Storage Card               - Passed
M41T11 RTC                 - Passed
   FE (slot 0; FE 0; 0x11fe6000) access passed;
   FE (slot 0; FE 1; 0x11fe6000) access passed;
   FE (slot 0; FE 2; 0x11fe6000) access passed;
   FE (slot 1; FE 0; 0x11fe6000) access passed;
   FE (slot 1; FE 1; 0x11fe6000) access passed;
   FE (slot 1; FE 2; 0x11fe6000) access passed;
   SAND access                - Passed
   Valere power Supply 0 Passed
   Valere power Supply 1 Passed
   Power Supply access        - Passed
   Port 0 passed
   Port 1 passed
   Port 2 passed
   Port 3 passed
   Port 4 passed
```
Port 5 passed
Port 6 passed
Port 7 passed
Port 8 passed
Port 9 passed
Port 10 passed
Port 11 passed
Port 12 passed
Port 13 passed
Port 14 passed
Port 15 passed
Port 16 passed
Port 17 passed
Port 18 passed
Port 19 passed
Port 23 passed
Dx246 Switch Port Loopback - Passed

### PASS ###

MP-1 OS>
LP (6) [MLX-X 1Gx24 Copper] burn-in started
LP (6) PING test passed
LP (7) [MLX-X 1Gx24 Copper] burn-in started
LP (7) PING test passed

LP (6) (MLX-X 1Gx24 Copper) diagnostic Passed
LP (7) (MLX-X 1Gx24 Copper) diagnostic Passed

### PASS ###

NOTE
After the completion of diagnostics for the MP modules, the system displays the MP-1 OS>
prompt and then starts the diagnostics for the LP modules.

NOTE
Brocade requires that you remove physical connections to all ports on the module, and all
optics to all ports on the module, so the module does not receive traffic while the diagnostics
are running.

4. Enter the reset command to return the system to normal operation (system reboot).

MP-1 OS>reset

REBOOT S1: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module CARD_STATE_REBOOT 20 0000.003d.8500
BOOT S1: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module CARD_STATE_BOOT 20 0000.003d.8500
CARD_STATE_UP S1: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module CARD_STATE_SW_LOADED 20
0000.003d.8500
UP S1: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module CARD_STATE_UP 20 0000.003d.8500

After the system reboots, you can display the status of the module using the show module
command, as shown in the following example.

<table>
<thead>
<tr>
<th>Module</th>
<th>Status</th>
<th>Ports</th>
<th>Starting MAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (upper): NI-XMR-MR Management Module</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (lower):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1: NI-X-SF Switch Fabric Module</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F2: NI-X-SF Switch Fabric Module</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F3: NI-X-SF Switch Fabric Module</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Management module diagnostics

F4: NI-X-SF Switch Fabric Module    Active
S1: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module   CARD_STATE_SW_LOADED    20   0000.003d.8500
S2:
S3: NI-XMR-1Gx20-SFP 20-port 1GbE/100FX Module   CARD_STATE_UP    20   0000.003d.8550

Management modules

Table 3 lists the management modules that are available for the Brocade NetIron XMR and Brocade MLX series routers.

### TABLE 3 Management modules

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI-MLX-MR</td>
<td>Brocade MLXe and NetIron MLX management module, 1 GB SDRAM, dual PCMCIA slots, EIA or TIA-232 and 10/100/1000 Ethernet ports for out-of-band management.</td>
</tr>
<tr>
<td>NI-MLX-32-MR</td>
<td>Brocade MLXe-32 and NetIron MLX-32 management module, 1 GB SDRAM, dual PCMCIA slots, EIA or TIA-232 and 10/100/1000 Ethernet ports for out-of-band management.</td>
</tr>
<tr>
<td>NI-XMR-MR</td>
<td>NetIron XMR management module, 2 GB SDRAM, dual PCMCIA slots, EIA or TIA-232 and 10/100/1000 Ethernet ports for out-of-band management.</td>
</tr>
</tbody>
</table>

Management module show commands

This section describes the show commands that display information about management modules.

**show version**

**Syntax:**  show version

This command displays information about your management modules.

Brocade# show version
HW: NetIron XMR Router
Backplane (Serial #: Not Exist, Part #: Not Exist)
NI-X-SF Switch Fabric Module 1 (Serial #: PR29050242, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 2 (Serial #: PR29050246, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 3 (Serial #: PR30050270, Part #: 31523-100A)
FE 1: Type 00000, Version 0
FE 3: Type 00000, Version 0

---------------------------------------------------------
SL M1: NI-XMR-MR Management Module Active (Serial #: PR30050511, Part #: 31524-000A):
Boot     : Version 3.5.0T165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on May 31 2009 at 14:42:00 labeled as xmprm03500b155 (424038 bytes) from boot flash
Monitor  : Version 3.5.0T165 Copyright (c) 1996-2009 Brocade Communications, Inc. Compiled on May 31 2009 at 14:41:14 labeled as xmb03500b155 (424045 bytes) from code flash
IronWare : Version 3.5.0T163 Copyright (c) 1996-2009 Brocade Communications, Inc.
show module

**Syntax:** `show module`

This command displays the status of the management modules. Enter this command at any CLI level. Command output resembles the following example.

```
Brocade# show module
Module Status Ports Starting MAC
M1 (left): NI-MLX-MR Management Module Active
M2 (right): NI-MLX-MR Management Module Standby (Ready)
Management module status is either active or standby. Standby modules can be in one of the following modes:
- **Init** – The module is currently initializing as the standby module.
- **Ready** – The module is ready to take over as the active module, if necessary.
- **Wait** – The module is awaiting boot information from the active management module.
- **Sync** – The active module is currently synchronizing files with the standby module.
```

show redundancy

**Syntax:** `show redundancy`

This command displays module switchover activity, as shown in the following example.

```
Brocade# show redundancy
--- MP Redundancy Settings ---
Default Active Slot = 17
Running-Config Sync Period = 7 seconds
--- MP Redundancy Statistics ---

Current Active Session:
Active Slot = 9, Standby Slot = 10 (Ready State), Switchover Cause = No Switchover
Start Time = 0-0-17 19:47:39 (Wednesday)

Previous Active Session #1:
Active Slot = 10, Standby Slot = 9, Switchover Cause = Active Rebooted
Start Time = 0-0-17 19:46:9 (Wednesday), End Time = 0-0-17 19:47:39 (Wednesday)

Previous Active Session #2:
Active Slot = 9, Standby Slot = 10, Switchover Cause = Active Rebooted
Start Time = 0-0-17 19:44:14 (Wednesday), End Time = 0-0-17 19:46:9 (Wednesday)
```

show log

**Syntax:** `show log`

This command allows you to view the system log or the traps logged on an SNMP trap receiver, as shown in the following example, which indicates that one switchover occurred on the management module in slot 9.
Management module diagnostics

Management module debug commands

There are no debug commands that are specific to management modules.

Configuration notes

Management sessions can be established through the management port on the active management module. If a switchover occurs, the management port on the original active module shuts down and all open CLI, Web management interface, and Brocade Network Advisor (BNA) sessions close. You can open new sessions with the new active module after the switchover, if the new module has a management port.

For example, if you were accessing the Web management interface using a PC connected to the original active management port, you can open a new session if a PC is connected to the management port on the new active module. Open a new session using the same IP address you used before the switchover. (If a switchover occurs, the IP address you configured on the original active module is automatically assumed by the new active module.)

Common diagnostic scenarios

Management module switchover events

In a redundant management module configuration, whenever the standby management module assumes the role of active module a switchover event has occurred. This happens when the active module becomes unavailable (for example, power is lost or a component fails), you perform a manual switchover, or you remove or replace the active management module. When a switchover occurs between the active and standby modules, management sessions, syslog, and SNMP traps may be affected.
When an active module becomes unavailable

The following events will cause an active module to become unavailable and trigger a switchover:

- An active module experiences a problem significant enough to cause a reset of the module. If this is a software problem, capture the output from the `show tech` command. If the output contains a crash dump, contact Brocade Technical Support.
- The active module loses power. This may happen if a power supply fails, or because of a general disruption in power.

Before a switchover occurs, the active module resets itself and sends an interrupt signal to the standby module. The standby module then becomes the active module, allowing the modules to continue forwarding traffic.

The new active module also begins to manage the system. When the original active module again becomes available or is replaced, the new active module resumes in the role of standby.

Management module error messages

The following messages are displayed in the event of a switchover event, if there is a problem with the standby management module in a redundant configuration.

Warning: Active MP running image is not in its flash or PCMCIA card, image synchronization is not possible:

Warning: Standby Module is not allowed - put standby MP in reset.

Switchover syslog and SNMP traps

When a switchover occurs, the system sends a syslog message to the local syslog buffer and to the syslog server, if one is configured. The system also sends an SNMP trap to the receiver, if one is configured.

If the system is reset as the result of a switchover to the standby management module, the system sends a warm start message and trap.

Monitoring management module redundancy

You can monitor the following aspects of management module redundancy:

- The status of the management modules (if a module is the active or standby module).
- The switchover history for the management modules.

Management module LEDs

Management modules contain six LEDs that indicate operational status. Once you have installed a management module and powered on the system, you can read the LED indicators on the module faceplate. Table 4 lists these LEDs and describes what to do if an LED shows that the module is not operating properly.
Interface module diagnostics

NOTE
Brocade requires that you remove physical connections to all ports on the module, and all optics to all ports on the module, so the module does not receive traffic while the diagnostics are running.

NOTE
Brocade recommends that you run diagnostics on the module running with factory default configuration, so that the module does not work any protocol process while the diagnostics are running. If you need to configure some commands such as `snmp-server max-ifindex-per-module num` to recognize the modules, the minimum configuration to recognize would be approved.

<table>
<thead>
<tr>
<th>LED</th>
<th>Position</th>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1 and Slot 2</td>
<td>Adjacent to the PCMCIA slot it represents</td>
<td>On or blinking</td>
<td>The software is currently accessing the flash card.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>The software is not accessing a PCMCIA flash card inserted in a slot. If this occurs, you must:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Make sure the flash card is fully seated in the connector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• From a command prompt, type <code>dir/slot1</code> or <code>dir/slot 2</code> to see if either slot is readable.</td>
</tr>
<tr>
<td>Active</td>
<td>Lower left</td>
<td>On</td>
<td>The module is functioning as the active management module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>The module is functioning as the standby management module.</td>
</tr>
<tr>
<td>Pwr</td>
<td>Upper left</td>
<td>On</td>
<td>The module is receiving power.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>The module is not receiving power. If this occurs, you must:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Make sure the module is seated properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Make sure the power supply is operating properly. The Power LED must be green.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Try the module in another slot or chassis.</td>
</tr>
<tr>
<td>10/100/1000 Ethernet port</td>
<td>Above and to right of RJ-45 connector</td>
<td>On (green)</td>
<td>A link is established with the remote port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No link is established with the remote port. If this occurs, you must use a straight-through cable to the switch to verify that interface management is enabled and the link is good.</td>
</tr>
<tr>
<td>10/100/1000 Ethernet Port</td>
<td>Above and to left of RJ-45 connector</td>
<td>On or blinking (yellow)</td>
<td>The port is transmitting and receiving packets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off for extended period</td>
<td>The port is not transmitting or receiving packets. If this occurs, you must do the following tasks:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Verify that the port is enabled and configured properly for auto-negotiation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Try another port to identify a hardware failure.</td>
</tr>
</tbody>
</table>
To run diagnostics on an interface module, perform the following steps.

1. **Boot the module into interactive mode by entering the following commands.**
   
   ```
   Brocade# lp boot sys in 1
   Brocade# Reset slot 1
   Slot 1: booted to Interactive Mode.
   ```

2. **With the module in interactive mode, remote console to the module by entering the following command.**
   
   ```
   Brocade# rcon 1
   Remote connection to LP slot 1 established
   Press CTRL-X or type 'exit' to disconnect it
   LP-1 Monitor>
   ```

3. **Boot the module in the OS mode.**
   
   ```
   LP-1 Monitor>boot os flash primary
   LP-1 OS>
   ```

4. **Run the diagnostic using the `diag burn` command. You must see output similar to the following example.**
   
   ```
   LP-1 OS>diag burn
   PRAM 0 -- TM DDRII support disabled
   XPP PLL Status Register at 0 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 2 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 4 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 6 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 8 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 10 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 12 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 14 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 16 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 18 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 20 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 22 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 24 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 26 micro-sec = 0x0000ff0f
   XPP PLL Status Register at 28 micro-sec = 0x0000ff0f
   XPP Reset Sequence Done - PLL Status Register = 0x0000ff0f
   XPP Reset Sequence Done - PLL Status Register = 0x0000ff0f
   XPP Reset Sequence Done - PLL Status Register = 0x00c0ffff
   XPP: P1 board or higher detected
   PASSED
   Dev 0 PRAM passed
   STATSRAM 0 -- PASSED
   Dev 0 STATSRAM passed
   TXVLAN Table 0 -- PASSED
   Dev 0 TXVLANRAM passed
   CAM2PRAM 0 -- PASSED
   Dev 0 CAMTOPRAMRAM passed
   AGERAM 0 -- Pass 1
   Pass 2
   AGERAM memory tested for 2097152 entries
   PASSED
   Dev 0 AGERAM passed
   ServTypeTable 0 -- PASSED
   Dev 0 SERVTYPETBLERRAM passed
   TXNEXTHOP TABLE 0 -- PASSED
   ```
Interface module diagnostics

Dev 0 TXNEXTHOPTABLE passed
XPP 0 TOS TABLE -- PASSED
Dev 0 TOSTABLE passed
XPP 0 MULTICAST START OFFSET TABLE -- PASSED
Dev 0 MCASTSTARTTABLE passed
XPP 0 MULTICAST REPLACEMENT TABLE -- PASSED
Dev 0 MCASTREPLTABLE passed
PRAM 1 -- TM DDR support disabled
XPP PLL Status Register at 0 micro-sec = 0x0000ff0f
XPP PLL Status Register at 2 micro-sec = 0x0000ff0f
XPP PLL Status Register at 4 micro-sec = 0x0000ff0f
XPP PLL Status Register at 6 micro-sec = 0x0000ff0f
XPP PLL Status Register at 8 micro-sec = 0x0000ff0f
XPP PLL Status Register at 10 micro-sec = 0x0000ff0f
XPP PLL Status Register at 12 micro-sec = 0x0000ff0f
XPP PLL Status Register at 14 micro-sec = 0x0000ff0f
XPP PLL Status Register at 16 micro-sec = 0x0000ff0f
XPP PLL Status Register at 18 micro-sec = 0x0000ff0f
XPP PLL Status Register at 20 micro-sec = 0x0000ff0f
XPP PLL Status Register at 22 micro-sec = 0x0000ff0f
XPP PLL Status Register at 24 micro-sec = 0x0000ff0f
XPP PLL Status Register at 26 micro-sec = 0x0000ff0f
XPP PLL Status Register at 28 micro-sec = 0x0000ff0f
XPP Reset Sequence Done - PLL Status Register = 0x0000ff0f
XPP Reset Sequence Done - PLL Status Register = 0x0000ff0f
XPP Reset Sequence Done - PLL Status Register = 0x00c0ffff
XPP: P1 board or higher detected

5. Once the diagnostics are complete, return the interface module to operational status by entering the following commands.

Brocade# lp boot sys flash pri 1
Brocade# reset slot 1

6. Reconnect the ports you disconnected prior to running the tests.

Interface modules

Table 5 lists the interface modules that are available for the Brocade NetIron XMR and Brocade MLX series routers.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI-MLX-10Gx2</td>
<td>2-port 10 GbE module with IPv4, IPv6, and MPLS hardware support--Requires XFP optics.</td>
</tr>
<tr>
<td>NI-MLX-1Gx20-SFP</td>
<td>20-port FE or GE (100/1000) module with IPv4, IPv6, and MPLS hardware support--Requires SFP optics.</td>
</tr>
<tr>
<td>NI-MLX-1Gx20-GC</td>
<td>20-port 10/100/1000 copper module with IPv4, IPv6, and MPLS hardware support.</td>
</tr>
<tr>
<td>NI-X-OC192x2</td>
<td>2-port Packet over SONET (SDH) OC-192 (STM-64) interface module.</td>
</tr>
<tr>
<td>NI-X-OC192x1</td>
<td>1-port Packet over SONET (SDH) OC-192 (STM-64) interface module.</td>
</tr>
<tr>
<td>NI-X-OC48x8</td>
<td>8-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module.</td>
</tr>
<tr>
<td>NI-X-OC48x4</td>
<td>4-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module.</td>
</tr>
<tr>
<td>NI-X-OC48x2</td>
<td>2-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module.</td>
</tr>
</tbody>
</table>
Interface module diagnostics

TABLE 5 Interface modules (Continued)

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI-MLX-1Gx48-T-A</td>
<td>48-port 10/100/1000BASE-T mini-RJ-21 interface module with IPv4, IPv6, and MPLS hardware support.</td>
</tr>
<tr>
<td>NI-MLX-1Gx8-M</td>
<td>8-port 10 Gbps Ethernet (M) module with IPv4, IPv6, and MPLS hardware support - Requires SFP+ optics, high-speed fabric modules, and high-speed fans (NIBI-16-FAN-EXH-A) on 16-slot routers. Supported for Brocade MLX series devices only.</td>
</tr>
<tr>
<td>NI-MLX-10Gx8-D</td>
<td>8-port 10 Gbps Ethernet (D) module with IPv4 and IPv6 hardware support - Requires SFP+ optics, high-speed fabric modules, and high-speed fans (NIBI-16-FAN-EXH-A) on 16-slot routers. Supported for Brocade MLX series devices only.</td>
</tr>
<tr>
<td>NI-MLX-10Gx4</td>
<td>4-port 10 Gbps Ethernet module with XFP optical interfaces for wire-speed performance.</td>
</tr>
<tr>
<td>NI-MLX-1Gx24-GC</td>
<td>24-port 1 Gbps Ethernet copper module with RJ-45 interfaces for wire-speed performance.</td>
</tr>
<tr>
<td>NI-MLX-1Gx24-GF</td>
<td>24-port 1 Gbps fiber module for wire-speed performance.</td>
</tr>
<tr>
<td>24x1G-SFP</td>
<td>24-port 1 Gbps Ethernet module with SFP optical interfaces.</td>
</tr>
<tr>
<td>NI-XMR-10Gx4</td>
<td>4-port 10 Gbps Ethernet module with IPv4, IPv6, and MPLS hardware support—Requires XFP optics.</td>
</tr>
<tr>
<td>NI-XMR-10Gx2</td>
<td>2-port 10 Gbps Ethernet module with IPv4, IPv6, and MPLS hardware support—Requires XFP optics.</td>
</tr>
<tr>
<td>NI-XMR-1Gx20-SFP</td>
<td>20-port FE/GE (100/1000) module with IPv4, IPv6, and MPLS hardware support—Requires SFP optics.</td>
</tr>
<tr>
<td>NI-XMR-1Gx20-GC</td>
<td>20-port 10/100/1000 copper module with IPv4, IPv6, and MPLS hardware support.</td>
</tr>
</tbody>
</table>

Interface module show commands

This section describes the show commands that display information about interface modules.

show media

Syntax:  show media

This command displays information about the media installed in ports, which provides the type, vendor, part number, version, and serial number of the SFP or XFP device installed in a port. If no SFP or XFP device is installed in a port, the Type field displays “N/A”, the Vendor field is empty, and the other fields display “Unknown”. 
show optics

Syntax:  show optics slot-number

This command displays optics information for XFP and SFP ports, including temperature, transmit power, receive power, transmit bias, and current.

Brocade# show optics 4
Port Temperature Tx Power Rx Power Tx Bias Current
+----+-----------+----------+------------+-------------------+
4/1 30.8242 C -001.8822 dBm -002.5908 dBm 41.790 mA
Normal Normal Normal Normal
4/2 31.7070 C -001.4116 dBm -006.4092 dBm 41.976 mA
Normal Normal Normal Normal
4/3 30.1835 C -000.5794 dBm 0.000 mA
Normal Low-Alarm Normal Low-Alarm
4/4 0.0000 C 0.000 mA
Normal Normal Normal Normal

show port utilization-watermark

Syntax:  show port utilization-watermark [slot slot-number | ethernet slot/port]

This command displays highest and lowest watermark threshold information for each specified slot or Ethernet port.

Brocade# show port utilization-watermark ethernet 3/3
PORT 3/3
Start time of Current 1HrWindow :Nov 11 05:21:01
Start time of Current 24HrWindow:Nov 11 04:17:18
[ Pkts/Sec ]  [ Bits/Sec ]  [ Time ]
Currihr-InHigh : 119732  980846984  Nov 11 05:21:20
Currihr-InLow :  60867   498627796  Nov 11 05:21:10
Currihr-OutHigh : 119731  980850656  Nov 11 05:21:55
Currihr-OutLow :  55184   452067719  Nov 11 05:21:10
Interface module diagnostics

Table 6 displays the descriptions of the fields from the `show port utilization-watermark` command.

### TABLE 6  
Output from the `show port utilization-watermark` command

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT</td>
<td>The Ethernet port number</td>
</tr>
<tr>
<td>Start time of Current 1HrWindow</td>
<td>The start time of current one-hour window.</td>
</tr>
<tr>
<td>Start time of Current 24HrWindow</td>
<td>The start time of current 24-hour window.</td>
</tr>
<tr>
<td>Curr1hr-InHigh</td>
<td>The highest ingress bit rate and packet rate per second of the port for the current one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr1hr-InLow</td>
<td>The lowest ingress bit rate and packet rate per second of the port for the current one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr1hr-OutHigh</td>
<td>The highest egress bit rate and packet rate per second of the port for the current one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr1hr-OutLow</td>
<td>The lowest egress bit rate and packet rate per second of the port for the current one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last1hr-InHigh</td>
<td>The highest ingress bit rate and packet rate per second of the port for the previous one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last1hr-InLow</td>
<td>The lowest ingress bit rate and packet rate per second of the port for the previous one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last1hr-OutHigh</td>
<td>The highest egress bit rate and packet rate per second of the port for the previous one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last1hr-OutLow</td>
<td>The lowest egress bit rate and packet rate per second of the port for the previous one-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr24hr-InHigh</td>
<td>The highest ingress bit rate and packet rate per second of the port for the current 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr24hr-InLow</td>
<td>The lowest ingress bit rate and packet rate per second of the port for the current 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr24hr-OutHigh</td>
<td>The highest egress bit rate and packet rate per second of the port for the current 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Curr24hr-OutLow</td>
<td>The lowest egress bit rate and packet rate per second of the port for the current 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last24hr-InHigh</td>
<td>The highest ingress bit rate and packet rate per second of the port for the previous 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last24hr-InLow</td>
<td>The lowest ingress bit rate and packet rate per second of the port for the previous 24-hour window and its time stamp.</td>
</tr>
</tbody>
</table>

### Interface module diagnostics

- **Last1hr-InHigh**: 119731 980847580 Nov 11 04:25:39
- **Last1hr-InLow**: 59342 486132410 Nov 11 04:24:34
- **Last1hr-OutHigh**: 119731 980844700 Nov 11 04:17:56
- **Last1hr-OutLow**: 55393 453779522 Nov 11 04:24:34

- **Curr24hr-InHigh**: 119731 980847580 Nov 11 04:25:39
- **Curr24hr-InLow**: 59342 486132410 Nov 11 04:24:34
- **Curr24hr-OutHigh**: 119731 980850656 Nov 11 05:21:55
- **Curr24hr-OutLow**: 55184 452067719 Nov 11 05:21:10

Table 6 displays the descriptions of the fields from the `show port utilization-watermark` command.
Interface module diagnostics

TABLE 6  Output from the show port utilization-watermark command (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last24hr-OutHigh</td>
<td>The highest egress bit rate and packet rate per second of the port for the previous 24-hour window and its time stamp.</td>
</tr>
<tr>
<td>Last24hr-OutLow</td>
<td>The lowest egress bit rate and packet rate per second of the port for the previous 24-hour window and its time stamp.</td>
</tr>
</tbody>
</table>

**show tm-voq-stat**

**Syntax:** `show tm-voq-stat [src_port [pos slotnum/portnum | ethernet slotnum/portnum] dst_port [pos slotnum/portnum | ethernet slotnum/portnum]] priority`

This command displays traffic management statistics for interface modules, as shown in the following example.

```
Brocade# show tm-voq-stat src_port pos 1/1 dst_port pos 3/1 0
  EnQue Pkt Count           0
  EnQue Bytes Count         0
  DeQue Pkt Count           0
  DeQue Bytes Count         0
  Total Discard Pkt Count   0
  Total Discard Bytes Count 0
  Oldest Discard Pkt Count  0
  Oldest Discard Bytes Count 0
  WRED Dropped Pkt Count    0
  WRED Dropped Bytes Count  0
  Current Queue Depth       0
  Maximum Queue Depth since Last read 0
```

**show tm statistics**

**Syntax:** `show tm statistics slot slot-number`

You can monitor traffic manager statistics to ensure that traffic load balancing is working properly. The following example shows traffic statistics for an interface module identified by its slot number.

```
Brocade# show tm statistics slot 4
--------- Ports 4/1 - 4/20 ---------
Ingress Counters:
  Total Ingress Pkt Count: 22
  EnQue Pkt Count: 0
  EnQue Byte Count: 0
  DeQue Pkt Count: 0
  DeQue Byte Count: 0
  TotalQue Discard Pkt Count: 0
  TotalQue Discard Byte Count: 0
  Oldest Discard Pkt Count: 0
  Oldest Discard Byte Count: 0
  Egress Counters:
  EnQue Pkt Count: 0
  EnQue Byte Count: 0
  Discard Pkt Count: 0
  Discard Byte Count: 0
```

**show version**

**Syntax:** `show version`
This command displays information about your system, including all installed interface modules, as shown in the following example.

Brocade# show version
Monitor : Version 3.5.0B6T165 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 9 2009 at 18:46:18 labeled as xmb03500B6
(424489 bytes) from code flash
IronWare : Version 3.5.0T163 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 19 2009 at 07:17:58 labeled as xmr03500b279
(5836796 bytes) from Primary
Board ID : 00 MBridge Revision : 18
916 MHz Power PC processor (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
2048 MB DRAM
Standby Management uptime is 1 days 52 minutes 24 seconds
==========================================================================
SL 2: NI-X-OC48x4 4-port OC48/12 STM16/STM4 Module (Serial #:PR50060005, Part #:
35650-00BA)
Boot : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 9 2009 at 18:47:52 labeled as xmlprm03500B6
(387074 bytes) from boot flash
Monitor : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 9 2009 at 18:48:28 labeled as xmlb03500B6
(387059 bytes) from code flash
Compiled on Jul 19 2009 at 07:50:18 labeled as xmlp03500b279
(3163145 bytes) from Primary
IronWare : Version 3.5.0T177 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 19 2009 at 07:50:18 labeled as xmlp03500b279
(3163145 bytes) from Primary
FPGA versions:
Valid PBIF Version = 2.11, Build Time = 4/3/2009 13:0:00
Valid XPP Version = 3.11, Build Time = 5/14/2009 14:22:00
Valid STATS Version = 2.04, Build Time = 4/26/2009 12:12:00
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
1024 MB DRAM, 8 KB SRAM, 0 Bytes BRAM
PPCR0: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
LP Slot 2 uptime is 1 days 52 minutes 24 seconds
(3163145 bytes) from Primary
==========================================================================
SL 3: NI-XMR-1Gx20-GC 20-port 10/100/1000 Copper Module (Serial #: SA33061518,
Part #: 35555-200A)
Boot : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 9 2009 at 18:48:28 labeled as xmlb03500B6
(387059 bytes) from code flash
Compiled on Jul 9 2009 at 18:47:52 labeled as xmlprm03500B6
(387074 bytes) from boot flash
Monitor : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 9 2009 at 18:48:28 labeled as xmlb03500B6
(387059 bytes) from code flash
IronWare : Version 3.5.0T177 Copyright (c) 1996-2009 Brocade Communications, Inc.
Compiled on Jul 19 2009 at 07:50:18 labeled as xmlp03500b279
FPGA versions:
Valid PBIF Version = 2.13, Build Time = 2/14/2009 11:55:00
Valid XPP Version = 3.05, Build Time = 5/14/2009 11:12:00
Interface module diagnostics

BCM5695GMAC 0
BCM5695GMAC 1
BCM5695GMAC 2
BCM5695GMAC 3
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
1024 MB DRAM, 8 KB SRAM, 0 Bytes BRAM
PPCR0: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
LP Slot 3 uptime is 1 days 52 minutes 23 seconds

SL 4: NI-XMR-10Gx2 2-port 10GbE Module (Serial #: PR34050032, Part #: 31546-100A)
Boot : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
    Compiled on Jul 9 2009 at 18:47:52 labeled as xmlprm03500B6
    (387074 bytes) from boot flash
Monitor : Version 3.5.0B6T175 Copyright (c) 1996-2009 Brocade Communications, Inc.
    Compiled on Jul 9 2009 at 18:48:28 labeled as xmlb03500B6
    (387059 bytes) from code flash
IronWare : Version 3.5.0T177 Copyright (c) 1996-2009 Brocade Communications, Inc.
    Compiled on Jul 19 2009 at 07:50:18 labeled as xmlp03500b279
    (3163145 bytes) from Primary
FPGA versions:
    Valid PBIF Version = 2.13, Build Time = 2/14/2009 11:55:00
    Valid XPP Version = 3.05, Build Time = 5/14/2009 11:12:00
    Valid XGMAC Version = 0.11, Build Time = 10/11/2009 12:45:00

Clearing traffic management statistics

To clear traffic management statistics, enter the clear tm-voq-stat src_port dst_port command.

The following commands can be useful for displaying and clearing information about interface modules:

- `clear tm-voq-stat src_port dst_port [priority]`
- `show tm-voq-stat src_port multicast`
- `clear tm-voq-stat src_port multicast`
- `show tm-voq-stat src_port cpu-queue`
- `clear tm-voq-stat src_port cpu-queue`

Interface module debug commands

This section describes the debug commands that generate debugging information related to interface modules.

`debug statistics utilization-watermarks`

Syntax: `[no] debug statistics utilization-watermarks`

This command displays debugging information related to port utilization watermarks. When watermark data is received from each module, a message is displayed, as shown in the following example.
When watermark data is received from a module for the first time, a message is displayed, as shown in the following example.

```
Brocade# debug statistics utilization-watermarks
wtrmarks:msg received from module 2 [info:1,0]
```

When an hour window expires, a message is displayed, as shown in the following example.

```
Brocade# debug statistics utilization-watermarks
wtrmarks:slot 2 - new wtrmarks updated to hour&day windows
```

When the day window expires, a message is displayed, as shown in the following example.

```
Brocade# debug statistics utilization-watermarks
wtrmarks:port 1/2 - DayWndw expired; updating prev hour values
```

**Common diagnostic scenarios**

Common diagnostic situations involving interface modules can include the following situations:

- The module is not receiving power.
- A link has not been successfully established.
- A port is not transmitting or receiving packets.
- Packets fail to enter an ingress queue on the traffic manager. This can happen because the queue has reached its maximum length, or Weighted Random Early Detection (WRED) is enabled to prevent an output queue from ever filling to capacity.

Interface modules continue to send traffic when a switchover occurs between management modules. After a switchover event, interface modules send updates to the new active management module, which verifies that the interface modules are synchronized.

If the new active management module becomes out of sync with an interface module, information on the interface module may be overwritten, which can cause an interruption of traffic forwarding. This must only occur if there is a Layer 3 topology change elsewhere in the network during the management module switchover. Brocade NetIron XMR and Brocade MLX series routers support Layer 3 hitless failover with graceful restart for high availability routing in protocols such as BGP and OSPF. With these high availability features enabled, when a router experiences a failover or restart, forwarding disruptions are minimized, and route flapping is diminished to provide continuous service during a switchover or restart event.

**IPC diagnostics**

Interprocess communication (IPC) is a set of techniques that manage the exchange of data between two or more processors running on one or more computers connected by a network. IPC methods include message passing, synchronization, shared memory, and remote procedure calls (RPCs).

**IPC show commands**

This section describes the show commands that display IPC information.
ipc show dy-sync

Syntax:  ipc show dy-sync

This command displays dynamic IPC synchronization statistics. Command output resembles the following example.

Brocade# ipc show dy-sync
ARP table sync_type=2, enabled=1
  b_cast: serial # 000004DA, packets 1242, msg 1242, hello=160454
  b_cast buf=02962862, index=20, msg_i=0
  u_cast 1, msg # 1, dropped (alloc failure)=0
  u_specific reply 0, u_specific miss 0
10/1:1
  The above is slot/cpu u_cast pkt#
DAI table sync_type=30, enabled=1
  b_cast: serial # 00000001, packets 1, msg 2, hello=160454
  b_cast buf=0298B862, index=20, msg_i=0
  u_cast 1, msg # 2, dropped (alloc failure)=0
  u_specific reply 0, u_specific miss 0
10/1:1
  The above is slot/cpu u_cast pkt#
Label to VRF ta sync_type=25, enabled=1
  b_cast: serial # 00000000, packets 0, msg 0, hello=160454
  b_cast buf=0296A862, index=20, msg_i=0
  u_cast 1, msg # 0, dropped (alloc failure)=0
  u_specific reply 0, u_specific miss 0
10/1:1
  The above is slot/cpu u_cast pkt#
ND6 neighbor ta sync_type=12, enabled=1
  b_cast: serial # 000005D5, packets 1493, msg 1493, hello=160454
  b_cast buf=0299E862, index=20, msg_i=0
  u_cast 2, msg # 1, dropped (alloc failure)=0
  u_specific reply 0, u_specific miss 0
10/1:2
  The above is slot/cpu u_cast pkt#
NHT sync_type=23, enabled=1
  b_cast: serial # 00000000, packets 0, msg 0, hello=160454
  b_cast buf=02969862, index=20, msg_i=0
  u_cast 118, msg # 4096, dropped (alloc failure)=0
  u_specific reply 0, u_specific miss 0
10/1:118
  The above is slot/cpu u_cast pkt#
...

ipc show heartbeat history-log

Syntax:  ipc show heartbeat history-log

This command displays the IPC heartbeat error log from the standby MP and LP based on the Color-coded Heartbeat (CCHB) received on the active MP.

The following is the sample output from the `ipc show heartbeat history-log` command.

Brocade# ipc show heartbeat history-log
May  8 06:19:44: Stand By MP : CPU Rate    (above 80%), Low Buffer (Y), IPC Tx QFull (N), IPC Rx QFull (Y)
  IPC Unrel Tx Error (N), IPC Rel Tx Error (Y), IPC Send Buffer Error (N)
  IPC Send Buffer-retransmit Error (Y), IPC QFull Delay (Y), IPC Rel Tx Delay Error (N)

May  8 06:19:42: Slot 8 : CPU Rate    (above 80%), Low Buffer (Y), IPC Tx QFull (N), IPC Rx QFull (Y)
  IPC Unrel Tx Error (N), IPC Rel Tx Error (Y), IPC Send Buffer Error (N)
  IPC Send Buffer-retransmit Error (Y), IPC QFull Delay (Y), IPC Rel Tx Delay Error (N)

ipc show names

Syntax:  ipc show names

This command displays IPC message type names, with numbers that correspond to the `ipc show statistics` output.

Brocade# ipc show names
Names of registered IPC message types:
  2 IPC reset message
  3 IPC startup message
  5 IPC Test message
  8 File Tx End
  12 File Tx Request
  13 LP Card Boot
  14 LP Card SW Loaded
  15 LP Card Oper Info
  16 LP Ports Oper Info
  17 LP Port Oper Info
  18 LP Stripe Sync Send Done
  19 LP Stripe Sync Status
  31 LP Stripe Sync Loss
  32 Slot Info
  33 Module Reboot
  40 MP Red Standby Boot Info
  41 MP Red Standby SW Loaded
  45 MP Red Cmd
  49 MP Red Standby Info
  50 MP SW Upgrade Info
  72 HAL Set Port Value
  74 HAL Set Port Values
  76 HAL Set Ports Value
  78 HAL Set Port Active Mac Address
  80 HAL Set Port Active Mac Addresses
  82 HAL Set Port Data
  84 HAL Set Module Value
  86 SET LP PROM
  93 HAL Add Fid Portmask
ipc show statistics

Syntax:  ipc show statistics

This command displays IPC statistics, as shown in the following example.

Brocade# ipc show statistics
SCP ipc show statistics
SCP ipc message buffers outstanding = 0

------------- CPU and Reliable IPC Status (Slot/Cpu) -------------
0/0 DEAD  Expected rx seq:  1  Next tx seq:  0  In tx q:  0
1/0 ALIVE  Expected rx seq:  526  Next tx seq:  213  In tx q:  0
3/0 DEAD  Expected rx seq:  1  Next tx seq:  0  In tx q:  0

------------- Message count ----------------------------
Slot 1 : UnrelRxPkt=9  RelRxPkt=1  UnrelTxPkt=1205636  RelTxPkt=0
UnrelRxMsg=9  RelRxMsg=1  UnrelTxMsg=1205636  RelTxMsg=0
### IPC diagnostics

Slot 2:
```
UnrelRxPkt=1231054  RelRxPkt=325134  UnrelTxPkt=1343759  RelTxPkt=179
UnrelRxMsg=1314017  RelRxMsg=325134  UnrelTxMsg=1343759  RelTxMsg=180
```

Slot 4:
```
UnrelRxPkt=10  RelRxPkt=1  UnrelTxPkt=1205639  RelTxPkt=0
UnrelRxMsg=10  RelRxMsg=1  UnrelTxMsg=1205639  RelTxMsg=0
```

----MsgType:Count (* instead of : means unregistered type)---

<table>
<thead>
<tr>
<th>Reliable RX</th>
<th>15:2</th>
<th>17:2</th>
<th>227:2</th>
<th>244:4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>269:224053</td>
<td>324:1</td>
<td>426:67</td>
<td>434:101005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unreliable RX</th>
<th>1:1205700</th>
<th>2:3</th>
<th>3:3</th>
<th>13:5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14:5</td>
<td>15:1</td>
<td>16:2</td>
<td>33:6</td>
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<tr>
<td></td>
<td>35:3</td>
<td>62:3</td>
<td>72:8</td>
<td>82:1</td>
</tr>
<tr>
<td></td>
<td>117:1</td>
<td>119:1</td>
<td>120:83800</td>
<td>224:12092</td>
</tr>
<tr>
<td></td>
<td>225:274</td>
<td>245:64</td>
<td>249:12056</td>
<td>357:1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reliable TX</th>
<th>28:2</th>
<th>29:1</th>
<th>100:1</th>
<th>102:1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>105:5</td>
<td>111:1</td>
<td>114:1</td>
<td>116:1</td>
</tr>
<tr>
<td></td>
<td>118:2</td>
<td>121:1</td>
<td>122:1</td>
<td>129:1</td>
</tr>
<tr>
<td></td>
<td>131:1</td>
<td>132:1</td>
<td>133:1</td>
<td>145:2</td>
</tr>
<tr>
<td></td>
<td>155:1</td>
<td>158:1</td>
<td>165:2</td>
<td>166:1</td>
</tr>
<tr>
<td></td>
<td>169:1</td>
<td>173:1</td>
<td>174:1</td>
<td>175:6</td>
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<tr>
<td></td>
<td>176:1</td>
<td>178:1</td>
<td>181:1</td>
<td>184:1</td>
</tr>
<tr>
<td></td>
<td>187:40</td>
<td>195:1</td>
<td>201:1</td>
<td>203:1</td>
</tr>
<tr>
<td></td>
<td>204:1</td>
<td>205:20</td>
<td>207:1</td>
<td>212:1</td>
</tr>
<tr>
<td></td>
<td>217:29</td>
<td>227:1</td>
<td>230:1</td>
<td>231:1</td>
</tr>
<tr>
<td></td>
<td>232:1</td>
<td>233:3</td>
<td>234:1</td>
<td>250:12</td>
</tr>
<tr>
<td></td>
<td>257:3</td>
<td>260:1</td>
<td>263:1</td>
<td>318:2</td>
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<td></td>
<td>323:41</td>
<td>340:1</td>
<td>341:1</td>
<td>342:1</td>
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<td></td>
<td>334:1</td>
<td>344:1</td>
<td>345:1</td>
<td>346:1</td>
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<td></td>
<td>348:1</td>
<td>351:3</td>
<td>369:1</td>
<td>372:1</td>
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<td></td>
<td>377:1</td>
<td>380:1</td>
<td>383:1</td>
<td>411:1</td>
</tr>
<tr>
<td></td>
<td>428:4</td>
<td>477:1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reliable TX Drops</th>
<th>351:2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Unreliable TX</th>
<th>1:3742610</th>
<th>2:3</th>
<th>21:6</th>
<th>22:15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30:20</td>
<td>34:6</td>
<td>36:3</td>
<td>71:8</td>
</tr>
<tr>
<td></td>
<td>81:1</td>
<td>114:1</td>
<td>218:2</td>
<td>219:60662731</td>
</tr>
<tr>
<td></td>
<td>221:2411203</td>
<td>222:274</td>
<td>243:4</td>
<td>245:28</td>
</tr>
<tr>
<td></td>
<td>246:673</td>
<td>248:12056</td>
<td>356:1</td>
<td>410:1</td>
</tr>
</tbody>
</table>

| Unreliable TX Drops : |

<table>
<thead>
<tr>
<th>BufAllocFail</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>BufFreeFail</td>
<td>0</td>
</tr>
<tr>
<td>BadChecksum</td>
<td>0</td>
</tr>
<tr>
<td>TxTooBigPkt</td>
<td>0</td>
</tr>
<tr>
<td>TxBadMsgType</td>
<td>0</td>
</tr>
<tr>
<td>ItcSendFail</td>
<td>0</td>
</tr>
<tr>
<td>RxTooBigPkt</td>
<td>0</td>
</tr>
<tr>
<td>RxBadMsgType</td>
<td>0</td>
</tr>
<tr>
<td>TxBadContent</td>
<td>0</td>
</tr>
<tr>
<td>TxBadFid</td>
<td>0</td>
</tr>
<tr>
<td>TxEmptyFidMask</td>
<td>2</td>
</tr>
<tr>
<td>TxRelSemLock</td>
<td>0</td>
</tr>
<tr>
<td>TxUnrelSemLock</td>
<td>0</td>
</tr>
<tr>
<td>TxRelQFullErr</td>
<td>0</td>
</tr>
<tr>
<td>DelayTxRelErr</td>
<td>0</td>
</tr>
<tr>
<td>DelayTimerErr</td>
<td>0</td>
</tr>
<tr>
<td>DelayFlushErr</td>
<td>0</td>
</tr>
<tr>
<td>DelyTxRelQFul</td>
<td>0</td>
</tr>
<tr>
<td>RxBadFid</td>
<td>0</td>
</tr>
<tr>
<td>RxNoCallback</td>
<td>0</td>
</tr>
<tr>
<td>RxBadAckAddr</td>
<td>0</td>
</tr>
<tr>
<td>TxUnrelErr</td>
<td>0</td>
</tr>
<tr>
<td>TxRelErr</td>
<td>2</td>
</tr>
<tr>
<td>SendBufError</td>
<td>0</td>
</tr>
<tr>
<td>BufAlreadyFree</td>
<td>0</td>
</tr>
<tr>
<td>Retransmits</td>
<td>0</td>
</tr>
<tr>
<td>YieldSendBuf</td>
<td>0</td>
</tr>
<tr>
<td>YieldGetBuf</td>
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</tr>
<tr>
<td>RxBadContent</td>
<td>0</td>
</tr>
<tr>
<td>invld_qhead</td>
<td>0</td>
</tr>
<tr>
<td>bad_dest_slot</td>
<td>0</td>
</tr>
<tr>
<td>send_buf_err_in_retransmit</td>
<td>0</td>
</tr>
<tr>
<td>send_buf_err_ret_in_retransmit</td>
<td>0</td>
</tr>
<tr>
<td>bad_send_buf_ptr</td>
<td>0</td>
</tr>
<tr>
<td>ipc to itc failure cnt</td>
<td>0</td>
</tr>
<tr>
<td>QCountMinusErr</td>
<td>0</td>
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<tr>
<td>RxQIdxErr</td>
<td>0</td>
</tr>
<tr>
<td>LastBadRxQIdx</td>
<td>0</td>
</tr>
</tbody>
</table>
IPC diagnostics

LastRelRxMsgFr=1  LastRelRxQidx =525  LastRelRxBlkAd=623461858
RelRxQFul1 =0  LastRelRxQidx =0  RelRxOutOfWin =0
RelRxAlrdyVald=0  RelRxFfrags =0  LastAckTxSlot =3
LastAckTxSeq =1  LastAckRxSeq =213  LastAckRxSlot =1
RxAckNotInWin =0  RxAckAlrdyAckd=0  RxAckInvdBlk =0
RxAckNotInRang=0  RetransBadQIdx=0  LastBadTxQIdx =0
LastBadTxQIdxQ=0  LastBadTxQIdxW=0  LastBadTxQIdxA=0
CurrentRetranQ=0  FirstRetranWin=0  FirstRetranBlk=0
FirstRetranBuf=0  RxAckForNAcTQ =0
NonAckIPCprioBumps =0

-------------------- Card Down Events ---------------------

IPC debug commands

This section describes the debug command that generates information about IPC.

debag ip ipc

Syntax: [no] debag ip ipc

This command generates information about interprocess communication (IPC) activity in IP modules. The output generally includes a record of IPC messages sent and received, and any errors or warnings related to IP IPC. Several examples follow.

The following example indicates that the system is unable to obtain enough buffer space to send IPC messages to line cards.

Brocade# debag ip ipc
error - ip_ipc_icmp_config_info. system out of buffer
error - ip_ipc_ve_mac_addr system out of buffer
error - ip_ipc_vport_mask_info system out of buffer
error - ip_ipc_clear_cache_msg system out of buffer
error - ip_ipc_config_info. system out of buffer
error - ip_ipc_mcast_info. system out of buffer

The following message indicates that the routing table manager (RTM) is sending initialize data to line card 1, CPU 1.

RTM: ipc sync init data to (1,1), max routes 100

In the following example, Layer 3 port configuration information (state, MTU, redirect, encap, and so on) is being set for the specified port.

IP/IPC: set port data, port 1/10, type:2 value 1

In the following example, an IP address for a given port (1/10) is being sent to the line cards.

IP/IPC: set port address, port 1/10, add1, addr 10.10.10.1

In the following example, forwarding information is being sent to the line cards.

IP/IPC: send port table, FID_ID 10

In the following example, tunnel forwarding information is being sent to the line cards.

IP/IPC: send tunnel table, FID_ID 10
IP/IPC: send tunnel config, size 56

In the following example, DHCP configuration information is being sent to the line cards.
IP/IPC: send port dhcp index, FID_ID 10

In the following example, a DHCP list with 200 entries is being sent to the line cards.

IP/IPC: send dhcp list, size 200

**Common diagnostic scenarios**

If the error counts are continuously incrementing at a fast pace, or if the “In tx seq:” value continues to increase, contact Brocade Technical Support.

**ITC diagnostics**

An inter-task communication (ITC) is a data transfer between processes in two different tasks. ITC methods include message passing, synchronization, shared memory, and RPCs.

**ITC show commands**

This section describes the show commands that display ITC information.

**itc show error list**

**Syntax:**  itc show error list

This command displays error information about the ITC messages. Command output resembles the following example.

Brocade# itc show error list
------------- first 32 itc errors -------------
dest app id = 0x00000021 : src app id = 0x0000000b : msg type = 0x00130011 : error
  = ITC_ERR_DEST_QUEUE_FULL
dest app id = 0x00000021 : src app id = 0x0000000b : msg type = 0x00130011 : error
  = ITC_ERR_DEST_QUEUE_FULL
------------- itc errors per msgtype -------------
msgtype        req failed  resp failed
0x0130011        -        2          -        0

**show emac**

**Syntax:**  show emac [IF num | detail | name | phy_reg]

- **IF num** - Displays information about the Ethernet MAC Management Processor (MP) packet by interface number. **IF num** variable can take values from 1 through 3.
- **detail** - Displays detailed information about the Ethernet MAC MP packet.
- **name** - Displays information about the Ethernet MAC MP packet by name.
- **phy_reg** - Displays dump information about the ten physical registers.

Command output resembles the following example.

Brocade# show emac detail
intf : drx[0]  drx[1]  dtx  mrx  mtx  mbad
  1 : 477416   0   13928  1364593  13928   0
  2 : 1101925  35540  5592842  1137465  5592842   0
  3 : 0   0   0   0   0   0
TX  P0/Pri0  P0/Pri1  P1/Pri0  P1/Pri1 :
Switch fabric modules

switch fabric modules

Switch fabric modules switch user packets from one interface module in a chassis to another. Switch fabric modules are hot-swappable.
Switch fabric fault monitoring

The Switch Fabric Fault Monitoring feature allows to display information about the current status of links between the switch fabric modules (SFM)s and interface modules and sends log messages to the console regarding the “UP” or “DOWN” status of the switch fabric modules.

Switch fabric show commands

This section describes the show commands that display information about switch fabrics.

show sfm-links

Syntax: show sfm-links [sfm-number | all]

• sfm-number - Specifies an SFM for which you want to display link information.
• all - Displays link information for all SFMs in the chassis.

NOTE
If the number of non-operational links fall below the minimum threshold, the following warning message is displayed:
WARN: LP 3 has 8 links up, less than minimum to guarantee line rate traffic forwarding
This warning is displayed to inform users that the line rate traffic will not be maintained.

The show sfm-links all command displays information about the current status of links between the SFMs and interface modules in the Brocade NetIron XMR and Brocade MLX series devices. Each line in the output represents a link between an SFM and an interface module.

Brocade# show sfm-links all
SFM#/FE# | FE link# | LP#/TM# | TM link# | link state
----------+-----------+---------+-----------+---------
 2 / 1   | 32 | 3 / 1 | 13 | UP
 2 / 1   | 31 | 3 / 2 | 01 | UP
 2 / 1   | 11 | 3 / 1 | 01 | UP
 2 / 1   | 12 | 3 / 2 | 13 | UP
 2 / 3   | 32 | 3 / 1 | 19 | UP
 2 / 3   | 31 | 3 / 2 | 07 | UP
 2 / 3   | 11 | 3 / 1 | 07 | UP
 2 / 3   | 12 | 3 / 2 | 19 | UP
 3 / 1   | 32 | 3 / 1 | 16 | UP
 3 / 1   | 31 | 3 / 2 | 04 | UP
 3 / 3   | 12 | 3 / 2 | 22 | UP
WARN: LP 3 has 8 links up, less than minimum to guarantee line rate traffic forwarding

show version

Syntax: show version

This command displays information about the SFMs installed in your router chassis, as shown in the following example.
Switch fabric modules

Brocade# show version
HW: NetIron XMR Router
Backplane (Serial #: Not Exist, Part #: Not Exist)
NI-X-SF Switch Fabric Module 1 (Serial #: PR29050242, Part #: 31523-100A)
  FE 1: Type 00000, Version 0
  FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 2 (Serial #: PR29050246, Part #: 31523-100A)
  FE 1: Type 00000, Version 0
  FE 3: Type 00000, Version 0
NI-X-SF Switch Fabric Module 3 (Serial #: PR30050270, Part #: 31523-100A)
  FE 1: Type 00000, Version 0
  FE 3: Type 00000, Version 0

show sfm-utilization

**Syntax:** show sfm-utilization [sfm-number | all]
- **sfm-number**: Specifies the SFM for which to display the utilization information.
- **all**: Displays utilization information for all SFMs in the chassis.

The show sfm-utilization all command displays bandwidth usage on all SFMs on the device, as shown in the following example.

Brocade# show sfm-utilization all
SFM#2
----------+-----------+---------+-----------+---------
last 1 second utilization = 0.4%
last 5 seconds utilization = 0.3%
last 1 minute utilization = 0.1%
last 5 minutes utilization = 0.0%
SFM#3
----------+-----------+---------+-----------+---------
last 1 second utilization = 0.4%
last 5 seconds utilization = 0.4%
last 1 minute utilization = 0.1%
last 5 minutes utilization = 0.0%

To display bandwidth usage for a single SFM, enter the **show sfm-utilization sfm-number** command.

Brocade# show sfm-utilization 2
SFM#2
----------+-----------+---------+-----------+---------
last 1 second utilization = 0.4%
last 5 seconds utilization = 0.3%
last 1 minute utilization = 0.1%
last 5 minutes utilization = 0.0%

Switch fabric debug commands

There are no switch fabric-specific debug commands.

Common diagnostic scenarios

The following common scenarios may occur with switch fabric modules:
- The switch fabric module is not receiving power.
• If the switch fabric module is inactive (not switching packets), the links are down. Use the `show sfm-links all` command to identify which links are down.

**Switch fabric module not receiving power**

The switch fabric module front panel includes two LEDs, one labeled Pwr (power) and one labeled Active.

• If the Pwr LED is off for an extended period of time, the switch fabric module is not receiving power. Check the power connection and the power supply. Make sure the module is seated properly in the backplane.

• If the Pwr LED is on, but the Active LED is off, the module is not in active mode and cannot switch packets. In this case, refer to “Switch fabric module unable to switch packets”.

**Switch fabric module unable to switch packets**

If the switch fabric module is receiving power, but is still unable to switch packets, disable it and then re-enable it to determine if the problem re-occurs. You may need to perform these steps on each switch fabric module in your device to determine which one is faulty. If the problem continues, contact Brocade Technical Support for further assistance.

**Hot-swapping a switch fabric module**

You can remove and install switch fabric modules while the Brocade NetIron XMR and Brocade MLX series device is powered on and running. For more information, refer to the *Brocade MLX Series and Brocade NetIron XMR Installation Guide*.

**Power supplies, fans, and temperature**

Information about power supplies, fans, and temperature readings are sent to the static buffer log. New messages replace older ones, so only the most recent message is displayed. For example, only the most recent temperature warning message is shown in the log. The static buffer is not configurable, and static buffer messages do not appear in dynamic buffer logs.

**NOTE**

Always cover empty chassis slots with the slot panels that shipped with your device. Operating the device with exposed empty slots can cause the system to overheat.

**Power supply, fan, and temperature show commands**

This section describes the show commands that display power supply, fan, and temperature information.

**show log**

**Syntax:** `show log`

You can view power supply, fan, and temperature information using the `show log` command. Command output resembles the following example.
Brocade MLX Series and NetIron XMR Diagnostic Guide

Power supplies, fans, and temperature

Brocade# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
    Buffer logging: level ACDMEINW, 82 messages logged
    level code: A=alert C=critical D=debugging E=emergency E=error
    I=informational N=notification W=warning

Static Log Buffer:
Jun  4 09:43:01:A:System: AC Power Supply 4, 1st from left, Installed (O
Jun  4 09:43:01:A:System: AC Power Supply 4, 2nd from left, Installed (O

Dynamic Log Buffer (1000 lines):
Jun  4 17:25:30:I:Security: telnet login by debra from src IP 10.55.1.103 to PRI
    VILEGED EXEC mode
Jun  4 17:20:54:I:Security: ssh login from src IP 10.47.6.8 to USER EXEC mode
Jun  4 17:20:34:I:Security: ssh logout from src IP 10.47.6.8 from USER EXEC mode
Jun  4 17:20:31:I:Security: ssh login from src IP 10.47.6.8 to USER EXEC mode
Jun  4 14:20:42:I:Security: telnet logout by debra from src IP 10.55.1.103 from
    USER EXEC mode
Jun  4 14:05:06:I:Security: telnet login by debra from src IP 10.55.1.103 to PRI
    VILEGED EXEC mode
Jun  4 12:29:14:W:    Latched low RX Power warning, port 4/1
Jun  4 12:29:14:A:    Latched low RX Power alarm, port 4/1
Jun  4 12:24:15:I:System: Interface ethernet 4/1, state up
    VILEGED EXEC mode
Jun  4 12:24:14:A:    Latched low RX Power alarm, port 4/1
Jun  4 12:24:14:W:    Latched low RX Power warning, port 4/1
Jun  4 12:24:05:I:System: Interface ethernet 4/1, state down - link down
Jun  4 12:24:02:I:System: Interface ethernet 4/1, state up

show fan-threshold

Syntax: show fan-threshold

This command displays the current settings of temperature thresholds and fan speeds, as shown
in the following example.

Brocade# show fan-threshold
=== Thermal Sensor Control Block (THERMALSENSOR_TEST_RULE_MP) ===
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 85
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0

=== Thermal Sensor Control Block (THERMALSENSOR_TEST_RULE_SNMP) ===
Fan Speed Low: -1 - 30
Fan Speed Med: 27 - 40
Fan Speed Med-Hi: 37 - 50
Fan Speed Hi: 47 - 75
state = 1 (FAN_STATE_MED)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0

=== Thermal Sensor Control Block (THERMALSENSOR_TEST_RULE_LP) ===
Fan Speed Low: -1 - 50
Fan Speed Med: 46 - 55
Fan Speed Med-Hi: 51 - 60
Fan Speed Hi: 56 - 95
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 3
Power supplies, fans, and temperature

```
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

--- Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_LP_XPP) ---
Fan Speed Low: -1 - 50
Fan Speed Med: 45 - 65
Fan Speed Med-Hi: 60 - 75
Fan Speed Hi: 70 - 113
state = 1 (FAN_STATE_MED)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

--- Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_STANDBY_MP) ---
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 85
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

--- Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_MP_CPU) ---
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 95
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

--- Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_STANDBY_MP_CPU) ---
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 95
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 3
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

show chassis

Syntax: show chassis

The show chassis command displays power supply and fan information, as well as temperature readings for the chassis.

Brocade# show chassis
*** NetIron XMR 8000 CHASSIS ***

---POWERS---
Power 1: Installed (Failed or Disconnected)
Power 2: Installed (Failed or Disconnected)
Power 3 (30351200 - AC 1200W): Installed (OK)
Power 4 (30351200 - AC 1200W): Installed (OK)
Total power budget for chassis = 2400W
Total power budget for LPs = 2049W
Slot Power-On Priority and Power Usage:
  Slot2 pri=1 module type=NI-X-OC48x4 4-port OC48/12 STM16/STM4 Module power usage = 132W
  Slot3 pri=1 module type=NI-XMR-1Gx20-GC 20-port 10/100/1000 Copper Module power usage = 156W
  Slot4 pri=1 module type=NI-XMR-10Gx2 2-port 10GbE Module power usage = 165W

--- FANS ---
Right fan tray (fan 1): Status = OK, Speed = MED (75%)
Right fan tray (fan 2): Status = OK, Speed = MED (75%)
Right fan tray (fan 3): Status = OK, Speed = MED (75%)
```
Power supplies, fans, and temperature

Right fan tray (fan 4): Status = OK, Speed = MED (75%)

--- TEMPERATURE READINGS ---
Active Mgmt Module: 30.250C 44.125C
SNM1: 25.5C
SNM2: 23.0C
SNM3: 25.5C
LP2 Sensor1: 35.0C
LP2 Sensor2: 50.375C
LP3 Sensor1: 30.5C
LP3 Sensor2: 38.500C
LP4 Sensor1: 35.0C
LP4 Sensor2: 43.875C
LP4 Sensor3: UNUSED
Temperature Monitoring Poll Period is 60 seconds

--- MISC INFO ---
Backplane EEPROM MAC Address: 0000.00e2.ca00

show temperature

Syntax: show temperature

The show temperature command displays temperature readings for each interface module. The temperature is polled every 60 seconds.

Brocade# show temperature

<table>
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<tr>
<th>SLOT #:</th>
<th>CARD TYPE:</th>
<th>SENSOR #</th>
<th>TEMPERATURE (C):</th>
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<td>48.125C</td>
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<tr>
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<td>LP</td>
<td>1</td>
<td>33.0C</td>
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<td>1</td>
<td>LP</td>
<td>2</td>
<td>47.625C</td>
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<td>UNUSED</td>
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<table>
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<tr>
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<tr>
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</tr>
<tr>
<td>3</td>
<td>31.5C</td>
</tr>
<tr>
<td>4</td>
<td>22.5C</td>
</tr>
</tbody>
</table>

Common diagnostic scenarios

- The power supply is not providing power. Check all power connections, and replace a faulty power supply if necessary. For more information, refer to the Brocade MLX Series and Brocade NetIron XMR Installation Guide.

- The fans are not receiving power. Check all power connections, and replace a faulty power supply if necessary. For more information, refer to the Brocade MLX Series and Brocade NetIron XMR Installation Guide.
• The temperature is outside the normal operating range. Refer to “Temperature outside normal operating range”.

Temperature outside normal operating range

If the device detects temperatures outside the normal range, it will automatically perform one of the following functions depending on the severity of the reading:
• Leave the fan speed as is.
• Increase the fan speed.
• Decrease the fan speed.
• Shut down a module to prevent damage after the first warning.
• Generate a syslog message and an SNMP trap.

If none of these measures resolves the problem, you must perform the following steps.
1. Shut down the device immediately.
2. Inspect all fans for damage or failure.
3. Inspect electrical connections to the fans.
4. Replace any component that has been damaged by excessive temperature.

The following are the normal operating temperature, humidity, and altitude specifications for Brocade NetIron XMR and Brocade MLX series routers:
• Operating temperature: 0° to 40°C (32° to 104°F)
• Relative humidity: 5 to 90%, at 40°C (104°F), noncondensing
• Operating altitude: 0 to 3048 meters (0 to 10,000 ft)

Fiber optic modules

The most common problems with fiber optic modules are caused by dirty connectors. Optical cables that are contaminated in any way (with dust, hand oil, and so on) can degrade the optic eye pattern. Some of the following symptoms may be experienced:
• Port appears to not function (either no link or unstable link)
• Cyclic redundancy check (CRC) errors
• Port flapping
• Packet loss

Before inserting the fiber cable into the fiber optic transceiver, ensure that it is free of dust by cleaning the end. A “Fiber Swiper” cleaner is provided by Brocade for this purpose with each optic shipment (reference instructions provided with the Fiber Swiper).

It is very important that the end of an optical cable is clean when using any data rate. However, it is critical that cable ends are clean when using 10 Gigabit data rates. This must be the first step in troubleshooting symptoms such as those stated above. Always ensure that the optical cables are cleaned.
Fiber optic modules

NOTE
When not using a fiber optic module port connector, replace the protective cover to prevent dust or dirt from contaminating the connector.

Fiber optic show commands

This section describes the show command that displays optics information.

show version

Syntax: show version

This command displays information about optic modules installed in the Brocade NetIron XMR and Brocade MLX series routers. Optics information resembles the output segment in the following example.

Brocade# show version
System Mode: MLX
Chassis: NetIron 8-slot (Serial #: GOLD, Part #: 35549-000C)
NI-X-SF Switch Fabric Module 1 (Serial #: PR23050271, Part #: 31523-100A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
NI-X-SF Switch Fabric Module 2 (Serial #: SA21091164, Part #: 35523-302A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
NI-X-SF Switch Fabric Module 3 (Serial #: SA21091204, Part #: 35523-302A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
==========================================================================
SL M2: NI-MLX-MR Management Module Active (Serial #: SA21091472, Part #: 35524-103C):
Boot     : Version 5.1.0T165 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:06:58 labeled as xmprm05100
(524038 bytes) from boot flash
Monitor  : Version 5.1.0T165 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:06:30 labeled as xmb05100
(524053 bytes) from code flash
IronWare : Version 5.1.0T163 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:23:16 labeled as xmr05100b312
(6985918 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 32
916 MHz Power PC processor 7447A (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM
Active Management uptime is 6 minutes 21 seconds
==========================================================================
SL M1: NI-MLX-MR Management Module Standby (Serial #: SA21091421, Part #: 35524-103C):
Boot     : Version 5.1.0T165 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:06:58 labeled as xmprm05100
(524038 bytes) from boot flash
Monitor  : Version 5.1.0T165 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Fiber optic modules

Compiled on Aug 11 2010 at 14:06:30 labeled as xmb05100
(524053 bytes) from code flash
IronWare : Version 5.1.0T163 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:23:16 labeled as xmr05100b312
(6985918 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 32
916 MHz Power PC processor 7447A (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM
Standby Management uptime is 5 minutes 33 seconds
==========================================================================
SL 1: BR-MLX-1GCx24-X 24-port 10/100/1000Base-T Copper Module (Serial #: Not Exist, Part #: Not Exist)
License: MLX (LID: ÿÿÿÿÿÿÿÿ)
Boot : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
(492544 bytes) from boot flash
Monitor : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
(493244 bytes) from code flash
IronWare : Version 5.1.0T177 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:28:44 labeled as xmlp05100b312
(4949977 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.24, Build Time = 8/4/2010 14:57:00
Valid XPP Version = 6.03, Build Time = 2/18/2010 16:38:00
Valid STATS Version = 0.08, Build Time = 2/18/2010 16:30:00

BCM56512GMAC 0
BCM56512GMAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (MX29LV040C), 16 MB Code Flash (MT28F128J3)
1024 MB DRAM, 8 KB SRAM, 28631153 Bytes BRAM
PPCR0: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
LP Slot 1 uptime is 5 minutes 36 seconds
==========================================================================
SL 3: BR-MLX-10Gx4-X 4-port 10GbE Module (Serial #: BMY0319F00J, Part #: 60-1001875-07)
License: MLX (LID: doaF1GoFF1)
Boot : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
(492544 bytes) from boot flash
Monitor : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
(493244 bytes) from code flash
IronWare : Version 5.1.0T177 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:28:44 labeled as xmlp05100b312
(4949977 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.22, Build Time = 2/5/2010 14:43:00
Valid XPP Version = 6.04, Build Time = 2/3/2010 14:39:00

Valid XGMAC Version = 0.13, Build Time = 2/3/2010 14:42:00

X10G2MAC 0
X10G2MAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (MX29LV040C), 16 MB Code Flash (MT28F128J3)
1024 MB DRAM, 8 KB SRAM, 28631153 Bytes BRAM
PPCR0: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
PPCR1: 1024K entries CAM, 16384K PRAM, 2048K AGE RAM
LP Slot 3 uptime is 5 minutes 38 seconds

==========================================================================

SL 4: NI-MLX-1Gx48-T 48-port 10/100/1000Base-T MRJ21 Module (Serial #: SA05091472, Part #: 35663-20EA)
Boot     : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100 (492544 bytes) from boot flash
Monitor  : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100 (493244 bytes) from code flash
IronWare : Version 5.1.0T177 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:28:44 labeled as xmlp05100b312 (494997 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.24, Build Time = 8/4/2010 14:57:00

Valid XPP Version = 6.03, Build Time = 2/18/2010 16:38:00

Valid STATS Version = 0.08, Build Time = 2/18/2010 16:30:00

BCM56502GMAC 0
BCM56502GMAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
1024 MB DRAM, 8 KB SRAM, 0 Bytes BRAM
PPCR0: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
PPCR1: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
LP Slot 4 uptime is 5 minutes 42 seconds

==========================================================================

SL 6: NI-MLX-10Gx4 4-port 10GbE Module (Serial #: SA12090950, Part #: 35600-202D)
Boot     : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100 (492544 bytes) from boot flash
Monitor  : Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100 (493244 bytes) from code flash
IronWare : Version 5.1.0T177 Copyright (c) 1996-2009 Brocade Communications Systems, Inc.
Compiled on Aug 28 2010 at 04:28:44 labeled as xmlp05100b312 (494997 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.22, Build Time = 2/5/2010 14:43:00
Valid XPP Version = 6.04, Build Time = 2/3/2010 14:39:00
Valid XGMAC Version = 0.13, Build Time = 2/3/2010 14:42:00

X10G2MAC 0
X10G2MAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
512 MB DRAM, 8 KB SRAM, 286331153 Bytes BRAM
PPCR0: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
PPCR1: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
LP Slot 6 uptime is 5 minutes 44 seconds
==========================================================================
All show version done

Fiber optic debug commands

There are no fiber optic-specific debug commands.

Testing network connectivity

You can test connectivity to other network devices by pinging those devices. You also can trace routes.

Pinging an IP address

To verify that a Brocade NetIron XMR and Brocade MLX series router can reach another device through the network, enter the ping command at any level of the CLI.

ping

Syntax: ping [ip addr | hostname | vrf instance-name] [source ip addr] [count num] [timeout msec] [ttl num] [size byte] [quiet] [numeric] [no-fragment] [verify] [data 1-to-4 byte hex] [brief]

- ip addr - Specifies the IP address of the device.
- hostname - Specifies the host name.
- vrf instance-name - Specifies a VPN routing or forwarding instance as the origin of the ping packets.
- source ip addr - Specifies an IP address to be used as the origin of the ping packets.
- count num - Specifies how many ping packets the device sends.
- timeout msec - Specifies how many milliseconds the device waits for a reply from the pinged device.
- ttl num - Specifies the maximum number of hops.
- size byte - Specifies the size of the ICMP data portion of the packet.
- quiet - Hides informational messages such as a summary of the ping parameters sent to the device and displays only messages indicating the success or failure of the ping.
- numeric - Allows the display to list devices by IP address instead of by name.
Testing network connectivity

- **no-fragment** - Turns on the “do not fragment” bit in the IP header of the ping packet.
- **verify** - Verifies that the data in the echo packet (the reply packet) is the same as the data in the echo request (the ping).
- **data 1-to-4 byte hex** - Specifies a specific data pattern for the payload instead of the default data pattern.

**NOTE**
If you address the ping to the IP broadcast address, the device lists the first four responses to the ping.

Tracing a route

To determine the path through which the router can reach another network device, enter the **traceroute** command at any level of the CLI.

**traceroute**

**Syntax:** traceroute destination_IPv4 address [maxttl value] [minttl value] [numeric] [timeout seconds]

- **destination_IPv4 address** - Specifies the IPv4 address of the remote device.
- **maxttl value** - Specifies the maximum Time-to-Live (TTL) value. This value equals the maximum number of hops traversed by the **traceroute** command. Valid values are from 1 through 255. The default value is 1, incremented by 1 with each successive hop.
- **minttl value** - Specifies the minimum TTL value. This value equals the minimum number of hops traversed by the **traceroute** command. Valid values are from 1 through 255. The default value is 1, incremented by 1 with each successive hop.
- **numeric** - Allows the listing of devices by IP address rather than by name.
- **timeout seconds** - Specifies the time in seconds that traceroute can take to reach the next hop before the command times out. Valid values are from 1 through 120 seconds. The default time-out value is 2 seconds.

Each line of output represents a hop along the IP network path. For each packet sent, traceroute records the round-trip time (RTT) in milliseconds and the IP address of the router that returned the ICMP TTL-exceeded message. An asterisk (*) indicates that no information could be obtained for the specified hop or traceroute timed out.

**Brocade# traceroute 10.157.22.199**

*Type Control-c to abort*

Tracing the route to IP node (10.157.22.199) from 1 to 30 hops

```
1   *       20 ms<1 ms 10.20.96.1
2    4 ms  <1 ms  <1 ms 10.31.20.25
3    <1 ms  <1 ms  <1 ms 10.16.200.121
4    <1 ms  <1 ms  <1 ms 10.110.111.102
5    <1 ms  <1 ms  <1 ms 10.49.131.1
6    <1 ms  <1 ms  <1 ms 10.49.130.18
7    <1 ms  <1 ms  <1 ms 10.125.199.61
8    1 ms  3 ms  2 ms  10.125.31.70
9    3 ms  1 ms  1 ms  10.125.26.202
10   1 ms  1 ms  1 ms  10.125.30.179
11   3 ms  3 ms  3 ms  10.125.13.118
12   3 ms  3 ms  3 ms  10.250.5.56
13   *   *   *   *
```
<p>| | | | | |</p>
<table>
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Testing network connectivity
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- Packet over SONET modules ................................................. 81
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This chapter describes common Layer 1 diagnostic procedures for the Brocade NetIron XMR and Brocade MLX series routers. In general, Layer 1 issues are related to hardware, the most common being the following physical connectivity problems:

- Faulty ports
- Faulty cables
- Faulty hardware
- Input and output errors
- Cyclic redundancy check (CRC) errors
- Excessive or late collisions
- Overruns
- Output buffer failures

Ethernet diagnostics

The following sections describe how to troubleshoot Layer 1 issues for Ethernet interfaces.

Ethernet autonegotiation

10BASE-T, 100BASE-TX, and 1000BASE-T all use an RJ-45 connector, which creates the potential for connecting electrically-incompatible components to each other, and which can cause network disruption. The IEEE developed autonegotiation to eliminate the possibility of dissimilar technologies interfering with one other.

Autonegotiation uses electrical pulses generated by a device over a 10 Mbps, 100 Mbps, or 1000 Mbps link (when the link is not sending or receiving data) to detect the presence of a connection to another device. These unipolar, positive-only pulses have a duration of 100 ns, and are generated in trains of a maximum of 33 pulses. These pulse trains are referred to as fast link pulse (FLP) bursts. The time interval between the start of each burst is 16 ms, with a tolerance of 8 ms.
**Autonegotiation and 10BASE-T**

An FLP burst is not recognized as valid by a 10BASE-T device receiving it from an autonegotiation device. The 10BASE-T device will detect a failure of the link. To avoid this, when the autonegotiation device receives the 10BASE-T pulses, it automatically switches to 10BASE-T half-duplex mode. If the 10BASE-T device is operating in full-duplex mode, a duplex mismatch can occur.

**Duplex mismatches**

A duplex mismatch can occur between devices in the following situations:

- One device is manually set to half duplex and one device is manually set to full duplex.
- One device is set to autonegotiation and one device is manually set to full duplex.

Duplex mismatches are difficult to diagnose because the network still appears to be working. Simple tests, such as ping, report a valid connection even though network performance can be much slower than normal.

When one device operates in full duplex while the other one operates in half duplex, the connection works at a very low speed if both devices attempt to send frames at the same time. This is because a full-duplex device may transmit data while it is receiving, but if the other device is working in half duplex, it cannot receive data while it is sending. The half-duplex device senses a collision and attempts to resend the frame it was sending. Depending on timing, the half-duplex device may sense a late collision, which it will interpret as a hard error, and will not attempt to resend the frame. At the other end, the full-duplex device does not detect a collision and does not resend the frame, even if the half-duplex device has already discarded it as corrupted by collision.

The packet loss happens when both devices are transmitting at the same time, and may happen even when the link is used, from the user's perspective, in one direction only. A Transmission Control Protocol (TCP) stream requires that all packets sent be acknowledged by the receiving device, even if actual data is sent in one direction only. Packet collisions may occur with acknowledgement packets traveling in the other direction.

Because the full-duplex device does not expect incoming frames to be truncated by collision detection, the device reports Frame Check Sequence (FCS) errors. The combination of late collisions reported at the half-duplex end, and FCS errors reported by the full duplex end, can indicate a duplex mismatch.

**Priority**

When one device receives the technology abilities of the other device, both devices decide the best possible mode of operation supported (each device chooses the mode that is topmost on the following list). The priority among modes specified in the 2002 edition of IEEE 802.3 is as follows:

- 1000BASE-T full duplex
- 1000BASE-T half duplex
- 100BASE-T2 full duplex
- 100BASE-TX full duplex
- 100BASE-T2 half duplex
- 100BASE-T4
- 100BASE-TX half duplex
- 10BASE-T full duplex
- 10BASE-T half duplex
Currently, all network equipment manufacturers recommend using autonegotiation on all access ports. On rare occasions where autonegotiation may fail, you may still need to force settings.

**Unidirectional Link Detection**

Unidirectional Link Detection (UDLD) monitors a link between two Brocade devices and brings the ports on each side of the link down if the link fails at any point between the two devices. This feature is useful for links that are individual ports and for trunk links.

Ports with UDLD enabled exchange proprietary health-check packets once every second (the keepalive interval). If a port does not receive a health-check packet from the port at the other end of the link within the keepalive interval, the port waits for two more intervals. If the port still does not receive a health-check packet after waiting for three intervals, the port concludes that the link has failed and takes the port down.

**NOTE**

UDLD is supported only on Ethernet ports.

**Configuring a UDLD holddown threshold**

You can configure a UDLD holddown threshold to prevent network flapping that affects ring topologies. If a port fails after a specified number of times, UDLD brings the port down. A port is considered to have failed if it consistently loses UDLD packets during the specified duration. The port would then be considered as a blocked port and UDLD considers the port state as down. A syslog message is generated to indicate a UDLD holddown is in effect on that port. The port remains disabled until it is manually restored. To display UDLD holddown information, refer to “show link-keepalive ethernet” on page 77.

**Ethernet show commands**

This section describes the show commands that display information about Ethernet interfaces and UDLD.

**show interface brief**

**Syntax:** show interface brief

This command displays a summary of the information provided in the show interface command. Command output resembles the following example.

```
Brocade# show interface brief
Port Link Port-State Dupl Speed Trunk Tag Priori MAC Name Type
1/1 Up Forward Full 100G None Yes level0 0000.0004.0000 default-port
```

**show interface ethernet**

**Syntax:** show interface ethernet slotnum/portnum

This command displays information about a specific Ethernet interface, as shown in the following example with protected vlans configured on an interface.

```
Brocade# show interface ethernet 3/12
10GigabitEthernet3/12 is disabled, line protocol is down
  STP Root Guard is disabled, STP BPDU Guard is disabled
  Hardware is 10GigabitEthernet, address is 0024.3888.a600 (bia 0024.3888.a66b)
```
Ethernet diagnostics

Configured speed 10Gbit, actual unknown, configured duplex fdx, actual unknown
Member of 2 L2 VLAN(S) (tagged), port is in tagged mode, port state is Disabled
STP configured to ON, Priority is level0, flow control enabled
Priority force disabled, Drop precedence level 0, Drop precedence force disabled
dhcp-snooping-trust configured to OFF
mirror disabled, monitor disabled
LACP BPDU Forwarding:Disabled
LLDP BPDU Forwarding:Disabled
Not member of any active trunks
Not member of any configured trunks
No port name
Port is not enabled to receive all vlan packets for pbr
MTU 9216 bytes, encapsulation ethernet
Openflow: Enabled, Openflow Index 108, Flow Type Layer3
Openflow: Hybrid Mode Enabled
Protected VLANs : 11, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114,
115, 116, 117, 118, 119, 120, 122, 123
124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135,
136, 137, 138, 139, 140, 141, 142, 143
Cluster L2 protocol forwarding enabled
300 second input rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
300 second output rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 multicasts, 0 unicasts
0 input errors, 0 CRC, 0 frame, 0 ignored
0 runts, 0 giants
NP received 0 packets, Sent to TM 0 packets
NP Ingress dropped 0 packets
0 packets output, 0 bytes, 0 underruns
Transmitted 0 broadcasts, 0 multicasts, 0 unicasts
0 output errors, 0 collisions
NP transmitted 0 packets, Received from TM 0 packets

When there are unprotected vlans on an interface, the vlans are not shown in "show interface" output:

From "show open" output:

Brocade# show interface ethernet 1/6
Protected VLANs : None
Unprotected VLANs : 300, 301, 302, 303, 304, 305, 306, 307, 308, 309,
310, 311, 312, 313, 314, 315, 316, 317, 318, 319,
320, 321, 322, 323, 324, 325, 326, 327, 328, 329,
330, 331, 332, 333, 334, 335, 336, 337, 338, 339,
340,

Brocade# show interface ethernet 1/6
GigabitEthernet1/6 is down, line protocol is down
STP Root Guard is disabled, STP BPDU Guard is disabled
Hardware is GigabitEthernet, address is 0024.3888.a605 (bia 0024.3888.a605)
Configured speed auto, actual unknown, configured duplex fdx, actual unknown
Member of 41 L2 VLAN(S) (tagged), port is in tagged mode, port state is Disabled
STP configured to ON, Priority is level0, flow control enabled
Priority force disabled, Drop precedence level 0, Drop precedence force disabled
dhcp-snooping-trust configured to OFF
mirror disabled, monitor disabled
LACP BPDU Forwarding:Disabled
LLDP BPDU Forwarding:Disabled
Not member of any active trunks
Not member of any configured trunks
No port name
Port is not enabled to receive all vlan packets for pbr
MTU 9216 bytes, encapsulation ethernet
Openflow: Enabled, Openflow Index 6, Flow Type Layer3
Openflow: Hybrid Mode Enabled
Protected VLANs : --None--
Cluster L2 protocol forwarding enabled
300 second input rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
300 second output rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 multicasts, 0 uncasts
0 input errors, 0 CRC, 0 frame, 0 ignored
0 runts, 0 giants
NP received 0 packets, Sent to TM 0 packets
NP Ingress dropped 0 packets
0 packets output, 0 bytes, 0 underruns
Transmitted 0 broadcasts, 0 multicasts, 0 uncasts
0 output errors, 0 collisions
NP transmitted 0 packets, Received from TM 0 packets

show link-keepalive ethernet

Syntax: show link-keepalive ethernet slot/port

To display link keepalive information for Ethernet ports, enter the show link-keepalive ethernet command.

Brocade# show link-keepalive ethernet 4/1
Current State: up Remote MAC Addr: 0000.00d2.5100
Local Port: 4/1 Remote Port: 2/1
Local System ID: e0927400 Remote System ID: e0d25100
Packets sent: 254 Packets received: 255
Transitions: 1

show statistics

Syntax: show statistics ethernet slot/port

The slot/port variable specifies the port that you want to display statistics for.

To display statistical information about the traffic passing through a specified Ethernet port, enter the following command at any CLI level.

Brocade# show statistics ethernet 9/1
PORT 9/1 Counters:

<table>
<thead>
<tr>
<th>InOctets</th>
<th>210753498112</th>
<th>OutOctets</th>
<th>210753550720</th>
</tr>
</thead>
<tbody>
<tr>
<td>InPkts</td>
<td>1646511726</td>
<td>OutPkts</td>
<td>1646512119</td>
</tr>
<tr>
<td>InBroadcastPkts</td>
<td>0</td>
<td>OutBroadcastPkts</td>
<td>0</td>
</tr>
<tr>
<td>InMulticastPkts</td>
<td>0</td>
<td>OutMulticastPkts</td>
<td>0</td>
</tr>
<tr>
<td>InUnicastPkts</td>
<td>1646511726</td>
<td>OutUnicastPkts</td>
<td>1646512142</td>
</tr>
<tr>
<td>InDiscards</td>
<td>0</td>
<td>OutDiscards</td>
<td>0</td>
</tr>
<tr>
<td>InErrors</td>
<td>0</td>
<td>OutErrors</td>
<td>0</td>
</tr>
<tr>
<td>InCollisions</td>
<td>0</td>
<td>OutCollisions</td>
<td>0</td>
</tr>
<tr>
<td>Alignment</td>
<td>0</td>
<td>PCS</td>
<td>0</td>
</tr>
<tr>
<td>InFlowCtrlPkts</td>
<td>0</td>
<td>OutFlowCtrlPkts</td>
<td>0</td>
</tr>
<tr>
<td>GiantPkts</td>
<td>0</td>
<td>ShortPkts</td>
<td>0</td>
</tr>
<tr>
<td>InBitsPerSec</td>
<td>3440829770</td>
<td>OutBitsPerSec</td>
<td>3440686411</td>
</tr>
<tr>
<td>InPktsPerSec</td>
<td>3360185</td>
<td>OutPktsPerSec</td>
<td>3360085</td>
</tr>
<tr>
<td>InUtilization</td>
<td>39.78%</td>
<td>OutUtilization</td>
<td>39.78%</td>
</tr>
</tbody>
</table>
Table 7 describes the output parameters of the `show statistics ethernet` command.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InOctets</td>
<td>The total number of good octets and bad octets received.</td>
</tr>
<tr>
<td>OutOctets</td>
<td>The total number of good octets and bad octets transmitted.</td>
</tr>
<tr>
<td>InPkts</td>
<td>The total number of packets received. The count includes rejected and local packets that are not transmitted to the switching core for transmission.</td>
</tr>
<tr>
<td>OutPkts</td>
<td>The number of good packets received. The count includes unicast, multicast, and broadcasts packets.</td>
</tr>
<tr>
<td>InBroadcastPkts</td>
<td>The total number of good broadcast packets received.</td>
</tr>
<tr>
<td>OutBroadcastPkts</td>
<td>The total number of good broadcast packets transmitted.</td>
</tr>
<tr>
<td>InMulticastPkts</td>
<td>The total number of good multicast packets received.</td>
</tr>
<tr>
<td>OutMulticastPkts</td>
<td>The total number of good multicast packets transmitted.</td>
</tr>
<tr>
<td>InUnicastPkts</td>
<td>The total number of good unicast packets received.</td>
</tr>
<tr>
<td>OutUnicastPkts</td>
<td>The total number of good unicast packets transmitted.</td>
</tr>
<tr>
<td>InDiscards</td>
<td>The total number of packets that were received and then dropped due to a lack of receive buffers.</td>
</tr>
<tr>
<td>OutDiscards</td>
<td>The total number of packets that were transmitted and then dropped due to a lack of transmit buffers.</td>
</tr>
<tr>
<td>InErrors</td>
<td>The total number of packets received that had Alignment errors or phy errors.</td>
</tr>
<tr>
<td>OutErrors</td>
<td>The total number of packets transmitted that had Alignment errors or phy errors.</td>
</tr>
<tr>
<td>InCollisions</td>
<td>The total number of packets received in which a Collision event was detected.</td>
</tr>
<tr>
<td>OutCollisions</td>
<td>The total number of packets transmitted in which a Collision event was detected.</td>
</tr>
<tr>
<td>OutLateCollisions</td>
<td>The total number of packets transmitted in which a Collision event was detected, but for which a receive error (Rx Error) event was not detected.</td>
</tr>
<tr>
<td>Alignment</td>
<td>The total number of packets received that were from 64 – 1518 octets long, but had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).</td>
</tr>
<tr>
<td>FCS</td>
<td>The Frame Checksum error.</td>
</tr>
<tr>
<td>InFlowCtrlPkts</td>
<td>The total number of ingress flow control packets. “N/A” indicates that the interface module does not support flow control statistics.</td>
</tr>
<tr>
<td>OutFlowCtrlPkts</td>
<td>The total number of egress flow control packets. “N/A” indicates that interface module does not support flow control statistics.</td>
</tr>
<tr>
<td>GiantPkts</td>
<td>The total number of packets for which all of the following was true:</td>
</tr>
<tr>
<td></td>
<td>• The data length was longer than the maximum allowable frame size.</td>
</tr>
<tr>
<td></td>
<td>• No Rx Error was detected.</td>
</tr>
<tr>
<td></td>
<td>This counter is only for 10GbE interfaces.</td>
</tr>
<tr>
<td>ShortPkts</td>
<td>The total number of packets received for which all of the following was true:</td>
</tr>
<tr>
<td></td>
<td>• The data length was less than 64 bytes.</td>
</tr>
<tr>
<td></td>
<td>• No Rx Error was detected.</td>
</tr>
<tr>
<td></td>
<td>• No Collision or late Collision was detected.</td>
</tr>
<tr>
<td>InBitsPerSec</td>
<td>The number of bits received per second.</td>
</tr>
<tr>
<td>OutBitsPerSec</td>
<td>The number of bits transmitted per second.</td>
</tr>
</tbody>
</table>
There are no specific Ethernet interface debug commands.

Common diagnostic scenarios

The following issues can occur with Ethernet interfaces:

- **Faulty hardware**
  Whenever you encounter a connection problem, check for a faulty hardware. Replace cables, try another port, and check all cable connections. If you find a faulty port, contact Brocade Technical Support for assistance.

- **Link failures**
  Link failures can be due either to a failure of the transmission medium or of the devices at each end of a connection. Be sure to check all of the hardware involved in the link, including cables and ports.

- **CSMA/CD**
  The Carrier Sense Multiple Access (CSMA) with Collision Detection (CD) protocol controls access to shared Ethernet media. A switched network (for example, Fast Ethernet) may use a full-duplex mode with access to the full link speed between directly connected network interface cards (NICs), switch-to-NIC cables, or switch-to-switch cables.

- **CRC errors**
  The Cyclic Redundancy Check (CRC) length specifies whether the CRC portion of each frame transmitted on the interface is 16 bits or 32 bits long. The default is 32 bits.

  A CRC alignment error is generated when the total number of packets received is from 64 through 1518 octets, but contains either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).

- **Runts**
  Any received packet that is less than 64 bytes is illegal, and is called a runt. In most cases, runts arise from a collision, and although they indicate an illegal reception, they may occur on correctly functioning networks. The receiving Brocade device discards all runt frames.

- **Giants**
  Any received packet that is greater than the maximum frame size is called a giant. In theory, the jabber control circuit in the transceiver must prevent any node from generating such a frame, but certain failures in the physical layer may also give rise to oversized Ethernet frames. Like runts, giants are discarded by the receiving Brocade device.
• Misaligned frames
Any frame that does not contain an integral number of received octets (bytes) is also illegal. A receiver has no way of knowing which bits are legal, and how to compute the CRC-32 of the frame. Such frames are therefore also discarded by the Ethernet receiver.

• Old software versions
Feature issues are often caused because the device is running an old version of the software. Brocade recommends that you always update software to reflect the latest patches and versions. If you have questions about your software version, contact Brocade Technical Support for assistance.

Link fault signaling

Link fault signaling (LFS) is a physical layer protocol that enables communication on a link between two 10 Gigabit Ethernet devices. When LFS is configured on a Brocade 10 Gigabit Ethernet port, the port can detect and report fault conditions on transmit and receive ports. Brocade NetIron software supports LFS among all 10 Gigabit Ethernet devices, including LFS support between First and Second generation devices. LFS is disabled by default on 10 Gbps interfaces.

When link-fault-signaling is enabled on an interface, the following syslog messages are generated whenever there is change of interface operational status.

When both fibers are removed or RX is removed, following syslog is raised:

    Interface ethernet 1/1, state down - link down

When link is up i.e. both RX and TX are connected and no errors detected, the following syslog is raised:

    Interface ethernet 1/1, state up

When remote RX or local TX is removed, the following syslog is raised:

    Interface ethernet 1/1, state down - remote fault

When link is up and hardware detects some errors say high bit error rate on RX, the following syslog is raised:

    Interface ethernet 1/1, state down - local fault

---

**NOTE**
When a local fault or RX link down is raised on one end, a corresponding remote fault is detected and raised on the other end as well.

After the fiber is installed, the Link and Activity LEDs on the module light up when traffic is flowing across the link.

**NOTE**
LFS is disabled by default on 10 Gbps interfaces. It is enabled by default (and cannot be disabled) on 1 Gbps interfaces.
LFS show commands

This section describes the show command that displays LFS information.

show link-fault-signaling

Syntax: show link-fault-signaling

This command displays the LFS state configured on ports.

Brocade# show link-fault-signaling
Global Remote Fault : OFF
PORT #: REMOTE FAULT:
PORT 1/1: OFF
PORT 1/2: OFF
PORT 1/3: OFF
PORT 1/4: ON
PORT 1/5: OFF
PORT 1/6: OFF
PORT 1/7: OFF
PORT 1/8: OFF
PORT 1/9: OFF

LFS debug commands

There are no specific link fault signaling debug commands.

Packet over SONET modules

Packet over SONET (POS) is a transport technology that encapsulates packet data such as an IP datagram directly into Synchronous Optical Network (SONET) using Point-to-Point Protocol (PPP) or High-level Data Link Control (HDLC). POS modules allow direct connection to interfaces within SONET.

MIBs for POS modules

Several MIB objects allow you to collect errors for POS links. SONET equipment detects alarms and error conditions from the three layers of the SONET protocol: section, line, and path. Other devices on the network are notified of these events. For more information about these MIBs, refer to the Unified IP MIB Reference.

Automatic protection switching

You can manually force a protect interface to take over as a working interface by entering the aps force command on the protect interface. This command is useful when you want to bring down a working interface for maintenance purposes.
Path Trace (J1 byte) field

The Path Trace (J1 byte) field in the SONET payload envelope (SPE) transmits a 64-byte, fixed-length string that the receiving Path Terminating Equipment uses to verify the connection to the sending device. You can configure the string that a POS interface transmits in the Path Trace field, and you can display Path Trace strings received and configured on the POS interface.

Cable specifications

Table 8 lists the cable specifications for POS modules.

<table>
<thead>
<tr>
<th>Transceiver</th>
<th>Power budget</th>
<th>Launch window</th>
<th>Transmit power</th>
<th>Receive power</th>
<th>Maximum distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC-3c POS interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-mode short-reach</td>
<td>13 dB</td>
<td>1270 to 1380 nm</td>
<td>-28 to -8 dBm</td>
<td>-31 to -8 dBm</td>
<td>9.75 miles (15 Km)</td>
</tr>
<tr>
<td>Single-mode intermediate-reach</td>
<td>29 dB</td>
<td>1280 to 1335 nm</td>
<td>-5 to 0 dBm</td>
<td>-34 to -8 dBm</td>
<td>26 miles (40 Km)</td>
</tr>
<tr>
<td>Multimode</td>
<td>11.5 dB</td>
<td>1270 to 1380 nm</td>
<td>-18 to -14 dBm</td>
<td>-30 to -14 dBm</td>
<td>1.3 miles (2 Km)</td>
</tr>
<tr>
<td>OC-12c POS interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-mode long-reach</td>
<td>25 dBm</td>
<td>1280 to 1335 nm</td>
<td>-3 to 2 dBm</td>
<td>-28 to -8 dBm</td>
<td>65 miles (100 Km)</td>
</tr>
<tr>
<td>Single-mode intermediate-reach</td>
<td>13 dBm</td>
<td>1274 to 1356 nm</td>
<td>-15 to -8 dBm</td>
<td>-28 to -7 dBm</td>
<td>9.32 miles (40 Km)</td>
</tr>
<tr>
<td>Multimode short-reach</td>
<td>6 dBm</td>
<td>1270 to 1380 nm</td>
<td>-20 to -14 dBm</td>
<td>-26 to -14 dBm</td>
<td>1640 ft. (500 m)</td>
</tr>
<tr>
<td>OC-48c POS interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-mode short-reach</td>
<td>8 dB</td>
<td>1260 to 1580 nm</td>
<td>-10 to -3 dBm</td>
<td>-18 to -3 dBm</td>
<td>9.75 miles (15 Km)</td>
</tr>
<tr>
<td>Single-mode intermediate-reach</td>
<td>13 dB</td>
<td>1260 to 1360 nm</td>
<td>-5 to 0 dBm</td>
<td>-18 to 0 dBm</td>
<td>26 miles (40 Km)</td>
</tr>
</tbody>
</table>

1. If the transceiver part number for the OC-12c POS module is HFCT-5208B (before May 2000), the maximum distance is 15 Km, not 40 Km.

NOTE
It is recommended that you do not use Network Processor Architecture (NPA) POS modules and non-NPA POS modules in the same circuit. For example, if you have an NPA module on one end of a POS link, do not use a non-NPA module on the other end of the link.
POS show commands

Use the following commands to display information about POS modules.

**show pos next-hop**

**Syntax:** `show pos next-hop`

This command shows the next hop that was learned through POS interface. Command output resembles the following example.

Brocade# show pos next-hop
Total number of POS next-hop entries: 1
Entries in default routing instance:

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Type</th>
<th>Age</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.0.1</td>
<td>Other</td>
<td>0</td>
<td>4/1</td>
</tr>
</tbody>
</table>

**show interface brief**

**Syntax:** `show interface brief [pos slotnum/portnum | slot slotnum]`

This command displays brief interface information about the specified POS port or all the ports in the specified slot. The following example shows information for the module in slot 2.

Brocade# show interface brief slot 2
Port Link L2 State Dupl Speed Trunk Tag Priori MAC
1/1 Up Forward Full 622M None No level0 0000.00a0.4400
1/2 Up Forward Full 622M None No level0 0000.00a0.4401
1/3 Up Forward Full 622M None No level0 0000.00a0.4402

**show interface pos**

**Syntax:** `show interface pos slotnum/portnum`

This command displays detailed information about the configured (as opposed to transmitted) and received Path Trace strings. The following example shows that POS is enabled for port 1/1.

Brocade# show interface pos 1/1
PacketOverSonet 1/1 is up, line protocol is down (PPP down)
Hardware is PacketOverSonet , address is 0000.00f3.5500 (bia 0000.00f3.5500)
Configured speed 2488Mbit, actual 2488Mbit
mirror disabled, monitor disabled
Not member of any active trunks
Not member of any configured trunks
No port name
MTU 4474 bytes, encapsulation PPP
LCP FSM: state CLOSED(2)
IPCP FSM: state INITIAL(0)
IPV6CP FSM: state INITIAL(0)
OSINLCP FSM: state INITIAL(0)
MPLSCP FSM: state INITIAL(0)
300 second input rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
300 second output rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
218181 packets input, 12540899181 total bytes, 13090860 good bytes
Input 7282 short pkts, 28169 long pkts, 0 abort pkts
Input 3035 fcs err pkts, 0 drop pkts, 0 drop abort pkts,124565265788 invalid pkts
NP received 218183 packets, Sent to TM 218182 packets
NP Ingress dropped 1 packets
219582 packets output, 14060380 total bytes, 13174920 good bytes
Output 0 short pkts, 0 long pkts, 0 abort pkts, 0 drop abort pkts
NP transmitted 219584 packets, Received from TM 219584 packets

The following example shows that POS is disabled for port 4/1.

Brocade# show interface pos 4/1
PacketOverSonet 4/1 is disabled, line protocol is down
  Hardware is PacketOverSonet , address is 0000.00f3.a778 (bia 0000.00f3.a778)
  Configured speed 2488Mbit, actual unknown
  mirror disabled, monitor disabled
  Not member of any active trunks
  Not member of any configured trunks
  No port name
  MTU 4474 bytes, encapsulation PPP
  LCP FSM: state INITIAL(0)
  IPCP FSM: state INITIAL(0)
  IPV6CP FSM: state INITIAL(0)
  OSPF LCP FSM: state INITIAL(0)
  MPLSCP FSM: state INITIAL(0)
  300 second input rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
  300 second output rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
  0 packets input, 0 total bytes, 0 good bytes
  Input 0 short pkts, 0 long pkts, 0 abort pkts
  Input 0 fcs err pkts, 0 drop pkts, 0 drop abort pkts, 0 invalid pkts
  NP received 11 packets, Sent to TM 0 packets
  NP Ingress dropped 11 packets
  0 packets output, 0 total bytes, 0 good bytes
  Output 0 short pkts, 0 long pkts, 0 abort pkts, 0 drop abort pkts
  NP transmitted 0 packets, Received from TM 0 packets

show controller

Syntax: show controller [curr15min | day | prev15min] [ethernet slotnum/portnum | pos portnum | slot slotnum]

- **curr15min** - Shows statistics for the current 15-minute interval.
- **day** - Shows statistics for the day.
- **prev15min** - Shows statistics for the previous 15-minute interval.
- **ethernet slotnum/portnum** - Shows statistics for the specified interval for an Ethernet port.
- **pos portnum** - Shows statistics for the specified interval for a POS port.
- **slot slotnum** - Shows statistics for all the ports in the slot specified.

This command displays the alarm statistics for the specified port for the specified interval, as shown in the following example.

Brocade# show controller curr15min pos 4/1
--------------------------------------------
POS alarms statistics - PORT pos4/1
--------------------------------------------
ACTIVE ALARMS : None
ACTIVE DEFECTS : None

Elapsed time [7 min 3 secs]
FM-PARMS
Section
Packet over SONET modules

LOS = 0  LOF = 0  TIM-S = 0
Line
AIS-L = 0  RFI-L = 0  SD-L = 0  SF-L = 0
Path
AIS-P = 0  RFI-P = 0  LOP = 0  PLM-P = 0
AIS-PFE = 0  PLM-PFE = 0  UNEQ-P = 0  TIM-P = 0

PM-PARMS
Section
CV = 0  ES = 0  SES = 0  SEFS = 0
Line
CV = 0  ES = 0  SES = 0  UAS = 0
CV-FE = 0  ES-FE = 0  SES-FE = 0  UAS-FE = 0
Path
CV = 0  ES = 0  SES = 0  UAS = 0
CV-FE = 0  ES-FE = 0  SES-FE = 0  UAS-FE = 0  PJ = 0

show statistics pos

Syntax:  show statistics pos [slotnum/portnum]
This command shows statistical information for a specified port, as shown in the following example.

Brocade# show statistics pos 1/1

PORT 1/1 Counters:
   In Good Pkts             218181       Out Good Pkts             219582
   In Bytes       125409302971           Out Bytes           14060380
   In Good Bytes           13090860      Out Good Bytes           13174920
   In Short Pkts               7282      Out Short Pkts                  0
   In Long Pkts              28169       Out Long Pkts                  0
   In Abort Pkts                  0      Out Abort Pkts                  0
   In FCS Error               3035
   In Discrd Pkt                  0      Out Discrd Pkt                  0
   In Drop Pkt                  0
   In Invalid Pkt       124566469576
   InBitsPerSec                  0       OutBitsPerSec                  0
   InPktsPerSec                  0       OutPktsPerSec                  0
   InUtilization               0.0%      OutUtilization               0.0%

Brocade# show statistics pos brief

POS Packets Errors
Port  [Receive Transmit]  [Align FCS Giant Short]
2/1    1475     12301       0 1378   3  0

show pos-timing

Syntax:  show pos-timing
This command displays POS timing information, as shown in the following example.
POS APS show command

This section describes the show command that displays information about a POS APS configuration.

`show aps`

Syntax: `show aps`

This command displays information about a POS APS configuration.

Brocade# show aps
POS2/1 working group 1 channel 1 Enabled Selected
This output indicates that POS interface 2/1 is the working interface for channel 1 in APS group 1, and the interface is active. A tilde next to Selected (for example, ~Selected) indicates that the interface is not active.

Clearing POS queue level statistics

You can clear POS queue level statistics from the following queues:

- Per-queue or all queues
- Multicast queue
- CPU queue
- CPU copy queue

**Clearing all POS queue level statistics**

The following command clears all POS queue level statistics.

`clear tm-voq-stat src_port pos dst_port pos`

Syntax: `clear tm-voq-stat src_port pos source-port dst_port pos | ethernet destination-port priority`

You must specify the `source-port` and the `destination-port` for this command. Optionally, you can specify a priority to clear only queue level statistics for a single priority.
Clearing multicast POS queue level statistics

The following command clears multicast POS queue level statistics.

```
clear tm-voq-stat src_port pos multicast
```

Syntax: `clear tm-voq-stat src_port pos source-port multicast priority | all`

Brocade# clear tm-voq-stat src_port pos 1/1 multicast 0

You must specify the `source-port` for this command. Optionally, you can specify a priority to clear queue level statistics for a single priority or use the `all` parameter to clear all queue level statistics.

Clearing CPU POS queue level statistics

The following command clears CPU POS queue level statistics.

```
clear tm-voq-stat src_port pos cpu-queue
```

Syntax: `clear tm-voq-stat src_port pos source-port cpu-queue priority | all`

Brocade# clear tm-voq-stat src_port pos 1/1 cpu-queue 0

You must specify the `source-port` for this command. Optionally, you can specify a priority to clear queue level statistics for a single priority or use the `all` parameter to clear all queue level statistics.

Clearing CPU copy queue level statistics

The following command clears the CPU copy queue level statistics.

```
clear tm-voq-stat src_port pos cpu-copy-queue
```

Syntax: `clear tm-voq-stat src_port pos source-port cpu-copy-queue priority | all`

Brocade# clear tm-voq-stat src_port pos 1/1 cpu-copy-queue all

You must specify the `source-port` for this command. Optionally, you can specify a priority to clear queue level statistics for a single priority or use the `all` parameter to clear all queue level statistics.

Configuration notes

- When you change the maximum frame size setting for a POS module, you must write to memory and reboot for the change to take effect.
- Both sides of a POS link must use the same encapsulation type.
- The setting for POS keepalive messages must be the same on both ends of the link. Keepalive messages are enabled by default for POS interfaces.
- The Data-Link Connection Identifier (DLCI) is the circuit ID for the link and can be a number in the range from 1 through 1023. The circuit ID must be the same on both ends of the link.
- POS modules use their own field-programmable gate arrays (FPGAs).
- Bandwidth – You can change a 2488 Mbps port to run at 622 Mbps if needed.
- SPE scrambling is enabled by default. Both ends of a link must use the same scrambling algorithm.
• Cyclic Redundancy Check (CRC) – You can specify the length of the CRC field in each packet sent by the POS interface. The default length is 32 bits. You can change the length to 16 bits.
• POS overhead flags – You can change the following values in the POS frame header:
  - c2 – Payload content type. The default is 0x16, which specifies PPP with scrambling enabled.
  - j1 – Path trace byte. Default is 0x0.
  - j0 – Section trace byte. Default is 0x1.

Common diagnostic scenarios

Issues with POS modules are usually hardware-related. The following problems may occur:
• Memory defects are in the module hardware.
• The module is not sending bridge protocol data units (BPDUs).
• Free queue depth levels are rising and falling.
• Modules in a particular chassis slot are showing similar errors. In this case, the chassis slot connector may be faulty. Contact Brocade Technical Support if you suspect a faulty chassis slot.

802.1ag CFM

Connectivity Fault Management (CFM) is a standard protocol defined in IEEE 802.1ag that provides fault localization functionalities and monitors the health of a link in an end-to-end Ethernet framework. The CFM protocol which supports over Virtual Local Area Network (VLAN), Virtual Private LAN Service (VPLS), Virtual Lease Line (VLL), and Provider Backbone Bridging (PBB) networks monitors the connectivity of the ports in the network and gives appropriate scope to customers, providers, and operators.

CFM show commands

This section describes the CFM-related show commands.

show cfm

Syntax: show cfm [domain name] [ma name] brief

  • domain name - Displays CFM information for the specified domain name.
  • ma name - Displays CFM information for the specified maintenance association (MA) name.

This command displays the current configuration and status of CFM. Command output resembles the following example.

Brocade# show cfm
Domain: D1
Index: 1
Level: 3
  Maintenance association: MA
    Ma Index: 1
    CCM interval: 3.3 ms
    PBB-VPLS ID: 100
show cfm brief

**Syntax:** show cfm brief

This command displays a summary of the configured Maintenance End Points (MEPs) and Remote MEPS (RMEPs). Command output resembles the following example.

Brocade# show cfm brief
Domain: D1
Index: 1
Level: 3 Num of MA: 1
  Maintenance association: MA
  MA Index: 1
  CCM interval: 3.3 ms
  PBB-VPLS ID: 100
  Priority: 3
  ETH-AIS TX: DISABLED
  ETH-AIS RX: DISABLED
  ETH-AIS Interval: 10 sec
  Num of MEP: 1 Num of RMEP: 1
  rmepstart: 0 rmepfail: 0 rmepok 1

show cfm connectivity

**Syntax:** show cfm connectivity [domain name] [ma name] [rmep-id num]

- **domain name** - Displays CFM information for the specified domain name.
- **ma name** - Displays CFM information for the specified MA name.
- **rmep-id num** - Displays CFM information for the specified Remote MEP (RMEP) ID.

This command displays connectivity statistics for the remote database. Command output resembles the following examples.

Brocade# show cfm connectivity
Domain: D1 Index: 1
Level: 3
  Maintenance association: MA
  MA Index: 1
  CCM interval: 3.3 ms
  PBB-VPLS ID: 100
  Priority: 3
  ETH-AIS TX: ENABLED
  ETH-AIS RX: ENABLED
  ETH-AIS Interval: 60 sec
  RMEP MAC VLAN/ISID AGE PORT SLOTS STATE AIS_STATE
  ===== ======== ===== === ======== ======== ========
  11 0000.002a.cf94 11000 1523 2/6 2 OK AIS recvd
This command displays connectivity statistics for the specified domain name. Command output resembles the following examples.

```
Brocade# show cfm connectivity domain customer ma customer rme-id 11
Domain: D1 Level: 3
Maintenance association: MA PBB-VPLS VLAN/VPLS/VLL ID: 100 Priority: 3
CCM interval: 3.3 ms
```

```
RMEP MAC   PORT Oper Age CCM RDI Port Intf Intvl Seq core
--- ------  ---- ---- ---- ---- ---- ---- ---- ----
11 0000.002a.cf94 2/6   OK 1532 16483 N   0    0    N    N    1
```

### CFM debug commands

This section describes the CFM-related debug commands.

**debug cfm**

**Syntax:** `[no] debug cfm level`

This command enables 802.1ag debugging. The `level` variable is a value from 0 through 7. Setting the level to 7 enables debugging of all CFM packets.

Command output resembles the following example.

```
Brocade# debug cfm 1
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 17
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
Dec 10 17:36:35 CFM: receive packet :rx_l2_bpdu 12
```

**debug cfm ipc**

**Syntax:** `[no] debug cfm ipc`

This command enables debugging and displays information for CFM IPC events. Command output resembles the following example.

```
Brocade# debug cfm ipc
Brocade(config-cfm-md-test)# show vlan-group 1
Brocade(config-cfm-md-test)# vlan-group 1
SYSLOG: <14>Dec 10 19:59:12 Dist1 VLAN Group 1: added by unknown from console session.
Brocade(config-vlan-group-1)# add 3001 to 3010
```
SYSLOG: <14>Dec 10 19:59:19 Dist1 VLAN Group 1: VLAN: 3001 to VLAN: 3010 VLANs added to by unknown from console session.
Brocade(config-vlan-group-1)# exit
Brocade(config)#cfm-enable
Brocade(config-cfm)# domain-name test id 1 level 7
Brocade(config-cfm-md-test)# ma-name 3001 id 1 vlan-id 3001 priority 0
Dec 10 19:59:26 Send MA CO to LP: md test ma 3001 Add 1
Brocade(config-cfm-md-test-ma-3001)# ma-name 3002 id 2 vlan-id 3002 priority 1
Dec 10 19:59:27 Send MA CO to LP: md test ma 3002 Add 1
Brocade(config-cfm-md-test-ma-3002)# ma-name 3003 id 3 vlan-id 3003 priority 2
Dec 10 19:59:28 Send MA CO to LP: md test ma 3003 Add 1
Brocade(config-cfm-md-test-ma-3003)# ma-name 3004 id 4 vlan-id 3004 priority 3
Dec 10 19:59:28 Send MA CO to LP: md test ma 3004 Add 1
Brocade(config-cfm-md-test-ma-3004)# ma-name 3005 id 5 vlan-id 3005 priority 4
Dec 10 19:59:29 Send MA CO to LP: md test ma 3005 Add 1
Brocade(config-cfm-md-test-ma-3005)# ma-name 3006 id 6 vlan-id 3006 priority 5
Dec 10 19:59:30 Send MA CO to LP: md test ma 3006 Add 1
Brocade(config-cfm-md-test-ma-3006)# ma-name 3007 id 7 vlan-id 3007 priority 6
Dec 10 19:59:30 Send MA CO to LP: md test ma 3007 Add 1
Brocade(config-cfm-md-test-ma-3007)# ma-name 3008 id 8 vlan-id 3008 priority 7
Dec 10 19:59:35 Send MA CO to LP: md test ma 3008 Add 1
Brocade(config-cfm-md-test-ma-3008)#end
Brocade(config)#vlan-group 1
Brocade(config-vlan-group-1)#tag ethernet 3/1
Dec 10 20:00:55 CFM configuration for Vlan 3001 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3001 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3002 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3002 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3003 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3003 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3004 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3004 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3005 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3005 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3006 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3006 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3007 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3007 Add 0
Dec 10 20:00:55 CFM configuration for Vlan 3008 deleted due to vlan configuration changes
Dec 10 20:00:55 dotlag_clean_cfm_port_for_ma:1
Dec 10 20:00:55 Send MA CO to LP: md test ma 3008 Add 0
Brocade(config-vlan-group-1)#end
SYSLOG: <14>Dec 10 20:01:06 Dist1 Security: running-config was changed from console
debug cfm md

Syntax: [no] debug cfm md mdName ma maName [mep-id mepId | rmep-id rmepId]

- md mdName - Enables debugging traces for the specified Maintenance Domain (MD).
- ma maName - Enables debugging traces for the specified Maintenance Association (MA).
- mep-id mepId - Enables debugging traces for the specified Maintenance End Point (MEP).
- rmep-id rmepId - Enables debugging traces for the specified Remote MEP (RMEP).

This command enables and displays debugging information at the MA, MEP, and RMEP level.

The `debug cfm md mdName ma maName` command displays debug logs for the specified MD at the MA level. Command output resembles the following example.

Brocade# debug cfm md md1 ma ma1
CFM: MA debugging is on
Mar 21  05:24:43 CFM: TX CCM with MEP id 4 Seq num 759 on MD md1 MA ma1
Mar 21  05:24:53 CFM: TX CCM with MEP id 4 Seq num 760 on MD md1 MA ma1

The `debug cfm md mdName ma maName mep-id mepId` command displays debug logs for the specified MD at the MA and MEP level. Command output resembles the following example.

Brocade# debug cfm md md1 ma ma1 mep-id 4
CFM: MEP debugging is on
Mar 21  05:25:13 CFM: TX CCM with MEP id 4 Seq num 762 on MD md1 MA ma1
Mar 21  05:25:23 CFM: TX CCM with MEP id 4 Seq num 763 on MD md1 MA ma1
Mar 21  05:25:33 CFM: TX CCM with MEP id 4 Seq num 764 on MD md1 MA ma1

The `debug cfm md mdName ma maName rmep-id rmepId` command displays debug logs for the specified MD at the MA and RMEP level. Command output resembles the following example.

Brocade# debug cfm md md1 ma ma1 rmep-id 6
CFM: RMEP debugging is on
Mar 21  05:29:02 dotlagip_process_equal_ccm: RMEP 6 in Domain md1 MA ma1
Mar 21  05:29:02 Seq number OK, received 7, ours 7
Mar 21  05:29:12 dotlagip_process_equal_ccm: RMEP 6 in Domain md1 MA ma1
Mar 21  05:29:12 Seq number OK, received 8, ours 8

d debug cfm packet

Syntax: [no] debug cfm packet

This command enables debugging and displays information about CFM packets. This command is used to monitor the receipt of the ETH-DM packet on the LP.

NOTE
This is a generic debug command and displays the information for all CFM packets as well.

d debug cfm detail

Syntax: [no] debug cfm detail

This command is used to dump the contents (time stamps) of the ETH-DM packet.

NOTE
This is a generic debug command and displays the information for all CFM packets as well.

The `debug cfm packet` and `debug cfm detail` command output resembles the following example.

Brocade# debug cfm
Brocade(config-cfm)# cfm-enable
Brocade(config-cfm)# domain-name test id 1 level 7
Brocade(config-cfm-md-test)# ma-name 3001 id 1 vlan-id 3001 priority 0
Dec 10 20:38:03 Send MA CO to LP: md test ma 3001 Add 1
Dec 10 20:38:03 dot1ag_default_create_mip
Dec 10 20:38:03 dot1ag_create_cfm_port vlan_id 3001 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:03 Send CFM port to LP: vlan 3001 port 3/1
Dec 10 20:38:03 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
Brocade(config-cfm-md-test-ma-3001)# ma-name 3002 id 2 vlan-id 3002 priority 1
Dec 10 20:38:03 Send MA CO to LP: md test ma 3002 Add 1
Dec 10 20:38:03 dot1ag_default_create_mip
Dec 10 20:38:03 dot1ag_create_cfm_port vlan_id 3002 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:03 Send CFM port to LP: vlan 3002 port 3/1
Dec 10 20:38:03 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
Brocade(config-cfm-md-test-ma-3002)# ma-name 3003 id 3 vlan-id 3003 priority 2
Dec 10 20:38:04 Send MA CO to LP: md test ma 3003 Add 1
Dec 10 20:38:04 dot1ag_default_create_mip
Dec 10 20:38:04 dot1ag_create_cfm_port vlan_id 3003 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:04 Send CFM port to LP: vlan 3003 port 3/1
Dec 10 20:38:04 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
Brocade(config-cfm-md-test-ma-3003)# ma-name 3004 id 4 vlan-id 3004 priority 3
Dec 10 20:38:05 Send MA CO to LP: md test ma 3004 Add 1
Dec 10 20:38:05 dot1ag_default_create_mip
Dec 10 20:38:05 dot1ag_create_cfm_port vlan_id 3004 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:05 Send CFM port to LP: vlan 3004 port 3/1
Dec 10 20:38:05 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
Brocade(config-cfm-md-test-ma-3004)# ma-name 3005 id 5 vlan-id 3005 priority 4
Dec 10 20:38:06 Send MA CO to LP: md test ma 3005 Add 1
Dec 10 20:38:06 dot1ag_default_create_mip
Dec 10 20:38:06 dot1ag_create_cfm_port vlan_id 3005 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:06 Send CFM port to LP: vlan 3005 port 3/1
Dec 10 20:38:06 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
Brocade(config-cfm-md-test-ma-3005)# ma-name 3006 id 6 vlan-id 3006 priority 5
Dec 10 20:38:06 Send MA CO to LP: md test ma 3006 Add 1
Dec 10 20:38:06 dot1ag_default_create_mip
Dec 10 20:38:06 dot1ag_create_cfm_port vlan_id 3006 port_id 3/1 is_mep 0 is_mp 1
Dec 10 20:38:06 Send CFM port to LP: vlan 3006 port 3/1
Dec 10 20:38:06 level 7 is valid, is MEP 0, mep-id 0, is MIP 1
802.1ag CFM
This chapter describes Layer 2 troubleshooting and diagnostic processes for the Brocade NetIron XMR and Brocade MLX series routers.

**CAUTION**

Enabling diagnostic commands may degrade system performance. These commands are best used to troubleshoot specific problems while working with qualified Brocade service technicians. Whenever possible, troubleshoot your system during periods of low network traffic and user activity to preserve system performance.

### MAC address learning

In MAC address learning, the source MAC address of each received packet is stored so that future packets destined for that address can be forwarded only to the interface where that address is located. (Packets destined for unrecognized addresses are forwarded out every bridge interface.) MAC address learning, defined in the IEEE 802.1 standard, helps minimize traffic on the attached LANs.
Address Resolution Protocol

Routers use Address Resolution Protocol (ARP) to learn the MAC addresses of devices on the network. The router sends an ARP request that contains the IP address of a device, and receives the MAC address for that device in an ARP reply. These dynamically learned entries are stored in the ARP cache. You can also manually configure MAC addresses, which are called static entries.

A static ARP entry in the ARP cache resembles the following example.

<table>
<thead>
<tr>
<th>Index</th>
<th>IP Address</th>
<th>MAC Address Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.95.6.111</td>
<td>0000.003b.d2101</td>
</tr>
</tbody>
</table>

A dynamic entry in the ARP cache resembles the following example.

<table>
<thead>
<tr>
<th>IP Address</th>
<th>MAC Address</th>
<th>Type</th>
<th>Age</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.95.6.1020000.00fc.ea21</td>
<td>Dynamic</td>
<td>06</td>
<td></td>
</tr>
</tbody>
</table>

ARP age

The ARP age is the amount of time the device keeps a learned MAC address in the ARP cache. The device resets the timer to zero each time the ARP entry is refreshed and removes the entry if the timer reaches the ARP age. The default ARP age is 10 minutes.

Changing the ARP aging period

When the switch places an entry in the ARP cache, it also starts an aging timer for the entry. The aging timer ensures that the ARP cache does not retain learned entries that are no longer valid. An entry can become invalid when the device with the MAC address of the entry is no longer on the network.

ARP age affects dynamic entries only. You cannot change the ARP age on Layer 2 switches. If you set the ARP age to zero, aging is disabled and entries do not age out.

Proxy ARP

Routers use Proxy ARP to answer ARP requests for a host by replying with the router MAC address instead of the host address.

MAC address learning show commands

The following commands display information about the MAC address table.

show mac-address

Syntax: show mac-address

This command displays the MAC address table, which contains MAC addresses learned from other devices or added using the static-mac-address command. This table does not contain the MAC addresses of the Brocade device ports.
NOTE
The information displayed in the columns with headings, CamF, and CIDX0 through CIDX5, is not relevant for day-to-day management of the device. This information is used by the technical support staff for debug purposes. Contact Brocade Technical Support for more information.

**show mac vpls**

**Syntax:** show mac vpls vpls-id mac-address starting-entry number-of-entries

- **vpls-id** - Specifies the Virtual Private LAN Service (VPLS) ID for which database entries are displayed.
- **mac-address** - Specifies the MAC address for which database entries are displayed.
- **starting-entry** - Specifies the point in the database from which the entries are displayed. Entering 0 causes entries to be displayed from the start; entering 200 causes the first 200 entries to be skipped; and so on.
- **number-of-entries** - Specifies the number of database entries to be displayed from the starting-entry.

This command displays the contents of the VPLS MAC database, which stores entries associating MAC addresses with VC Label Switched Paths (LSPs). The following example displays the VPLS MAC database on the management processor.

Brocade# show mac vpls
VPLS mac entries in the table: 2 (Local: 2, Remote: 0)

VPLS   MAC Address  L/R/IB Port  Vlan(In-Tag)/Peer ISID Age
-----   ===========    ====== ====  ================= ====     ===
 1       0000.0004.0000 IB     1/2   300               30000    0
 1       0000.0003.0000 L      1/1   200               NA       0

To display a specific entry in the VPLS MAC database on the management processor, enter the following command.

Brocade# show mac vpls 1 0000.0004.0000
VPLS: 1    MAC: 0000.0004.0000    Age: 0
Local MAC Port: 1/2    VLAN: 300 ISID: 30000
Associated B-MAC: 0000.0000.0201
Trunk slot mask: 0x00000000

Brocade# show mac-address
Total entries from all ports = 75

<table>
<thead>
<tr>
<th>MAC</th>
<th>Port</th>
<th>Age</th>
<th>CamF</th>
<th>CIDX0</th>
<th>CIDX1</th>
<th>CIDX2</th>
<th>CIDX3</th>
<th>CIDX4</th>
<th>CIDX5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000.0000.0000</td>
<td>10</td>
<td>17293</td>
<td>00H</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0000.009f.8086</td>
<td>1</td>
<td>12</td>
<td>08H</td>
<td>23</td>
<td>15</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0000.0009.914b</td>
<td>16</td>
<td>2130</td>
<td>00H</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0000.009a.0163</td>
<td>16</td>
<td>130</td>
<td>00H</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0000.009d.41a5</td>
<td>11</td>
<td>475</td>
<td>00H</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0000.005c.01d1</td>
<td>11</td>
<td>1</td>
<td>0ch</td>
<td>0</td>
<td>20</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>0AH</td>
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<td>15</td>
<td>09H</td>
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</table>
MAC address learning debug commands

This section describes the debug commands that generate information about Address Resolution Protocol (ARP).

debug ip arp

Syntax: [no] debug ip arp [event | ipc | itc | packet]

- **event** - Displays information about ARP events.
- **ipc** - Displays information about ARP IPC messages.
- **itc** - Displays information about ARP ITC messages.
- **packet** - Displays information about ARP packets.

This command displays information about ARP transactions. The `debug ip arp` command enables debugging for all ARP variables, or you can enable the options individually. Command output resembles the following example.

```
Brocade# debug ip arp
ARP:  event debugging is on
ARP:  packets debugging is on
ARP:  ipc debugging is on
ARP:  itc debugging is on
Dec 10 14:49:53 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.47.13.205
Dec 10 14:49:53 IP/ARP: src 10.47.13.205 fwd route does not match ingress port 1536
Dec 10 14:49:53 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.20.179.11
Dec 10 14:49:53 IP/ARP: rcvd packet src 10.20.179.11 000000adec00: dst 10.20.185.70 000000000000: Port 1062
Dec 10 14:49:54 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.20.176.3
Dec 10 14:49:54 IP/ARP: rcvd packet src 10.20.176.3 0000000fb600: dst 10.20.185.4 000000000000: Port mgmt1
Dec 10 14:49:54 IP/ARP: Pkt rcvd on port mgmt1, src IP = 10.20.68.133
Dec 10 14:49:54 IP/ARP: rcvd packet src 10.20.68.133 000000d5d07a: dst 10.20.68.129 000000000000: Port mgmt1
```

**debug ip arp event**

Syntax: [no] debug ip arp event

This command displays information about ARP events, and is useful in determining whether the router is sending and receiving ARP requests. Command output is similar to the following example, which shows send and receive activity for ARP packets.

```
Brocade# debug ip arp event
IP/ARP:  sent request for 10.223.143.22
IP/ARP:  sent packet src 10.223.143.16 000000e2b000: dst 10.223.143.22 000000000000: Port 1062
IP/ARP:  sent request for 10.223.143.3
IP/ARP:  sent packet src 10.223.143.16 000000e2b000: dst 10.223.143.3 000000000000: Port 1062
IP/ARP:  sent request for 10.28.144.206
IP/ARP:  sent packet src 10.28.144.205 000000e2b000: dst 10.28.144.206 000000000000: Port 843
```
MAC address learning

IP/ARP: Received arp request from Lp for dest 10.28.144.206 Port: 843 Router: 1
IP/ARP: sent request for 10.28.181.171
IP/ARP: sent packet src 10.28.181.161 000000e2b000: dst 10.28.181.171 000000000000: Port 753

debug ip arp ipc

Syntax: [no] debug ip arp ipc

This command generates information about ARP interprocess communication (IPC) activity. Command output resembles the following example.

Brocade# debug ip arp ipc
IP/ARP: Received arp request from Lp for dest 10.142.108.94 Port: 1049 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.106.82 Port: 848 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.108.94 Port: 1049 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.106.82 Port: 848 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.108.94 Port: 1049 Router: 1
IP/ARP: Received arp request from Lp for dest 10.28.144.206 Port: 843 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.78.18 Port: 846 Router: 1
IP/ARP: Received arp request from Lp for dest 10.28.144.206 Port: 843 Router: 1
IP/ARP: Received arp request from Lp for dest 10.142.78.18 Port: 846 Router: 1

debug ip arp itc

Syntax: [no] debug ip arp itc

This command generates information about ARP inter-task communications (ITC) activity, which communicates between the processing tasks concerning activity or configuration changes. Command output resembles the following example, which indicates that a static IP address was added.

Brocade# debug ip arp itc
ARP: itc debugging is on
IP/ARP: Add static arp for Addr: 10.1.1.19 Mac: 100120013019 Port: 1
Vrf_index: 0 Add: 1

dump ip arp packet

Syntax: [no] debug ip arp packet

This command displays information about ARP packet activity. Command output resembles the following example, which indicates that the source router is polling routers 10.142.106.98, 10.28.181.122, 10.223.143.27, and 10.142.108.94 to learn their MAC addresses and add them to the source router ARP table.
MAC address learning

debug mac

Syntax: [no] debug mac [action | cam | error | info | learning | mport | port security]

• action - Displays information about the MAC database.
• cam - Displays Layer 2 CAM settings.
• error - Displays MAC table management error messages.
• info - Displays MAC table management information.
• learning - Displays MAC database learning information.
• mport - Displays Multiport MAC event messages.
• port security - Displays MAC table management port security messages.

The debug mac command generates information about MAC address databases, actions, settings, MAC table management, and MAC learning.

debug mac action

Syntax: [no] debug mac action [vlan vlan_id] [mac_address]

• vlan vlan_id - Displays all MAC address-related actions for the specified VLAN.
• mac_address - Displays specified MAC address-related actions for all VLANs.

To display a specific MAC address-related action for a specific VLAN, you must specify both the VLAN ID and MAC address options.

Use the debug mac action command to display actions-related information for the MAC database.

Brocade# debug mac action
  info - mac_static_flush() - execution
  info - mac_pms_flush() - execution
  info - mac_static_flush() - execution
  MAC ACTION - Normal SPECIFIC FLUSH
  Ports: ethe 2/2 to 2/3
  Vlans: 1
  MAC ACTION - Premature ALL_SYSTEM FLUSH
  MAC ACTION - Normal SPECIFIC FLUSH
  Ports: All Ports
  Vlans: All VLANs
If both the VLAN ID and MAC address options are specified, output such as the following is displayed.

Brocade# debug mac action vlan 100 0000.0052.0000
info - mac_static_flush() - execution
info - mac_pms_flush() - execution
info - mac_static_flush() - execution
MAC ACTION - Normal SPECIFIC FLUSH
MAC ACTION - Premature ALL_SYSTEM FLUSH
MAC ACTION - Normal SPECIFIC FLUSH

**debug mac error**

**Syntax:** [no] debug mac error

Use the `debug mac error` command to display major errors related to MAC learning. The output in the following example indicates an insufficient amount of buffer space and results in a queue overflow.

Brocade# debug mac error
error - macmgr_ipc_distribute_table. system out of ipc buffers info -
macmgr_ipc_learn_sa_entry. Not learning. port not in forwarding state info -
macmgr_ipc_free_sa_entry. Queue overflowing error - macmgr_ipc_sync_change_age. info -
system out of buffer

d debug mac info

**Syntax:** [no] debug mac info

Use the `debug mac info` command to generate information about MAC database activity, such as flushing and table distribution.

Brocade# debug mac info
info - macmgr_ipc_flush_entry. Send flush.
info - macmgr_ipc_distribute_table. Distributing. mac table to slot 4

d debug mac learning

**Syntax:** [no] debug mac learning [vlan vlan_id] [mac_address]

- `vlan vlan_id` - Displays all MAC addresses for the specified VLAN.
- `mac_address` - Displays specified MAC addresses for all VLANs.

To display a specific MAC address for a specific VLAN, you must specify both the VLAN ID and MAC address options.

Use the `debug mac learning` command to track a specific MAC address or set of MAC addresses based on the VLAN ID, MAC address, or both, and display debug information about the MAC addresses learned.

**CAUTION**

The `debug mac learning` command may generate large amounts of output and degrade system performance. Use this command with caution.
If you specify only the MAC address, the **debug mac learning** command output resembles the following example.

Brocade# debug mac learning 0000.0052.0000
learning: debugging is on
info - macmgr_ipc_learn_da_entry. Learn DA 0000.0052.0000 IPC received
info - macmgr_ipc_learn_sa_entry. Learn SA IPC received Mar 20 23:58:30
mac address 0000.0052.0000. Port 42 vlan 100 Mar 20 23:58:30 info -
macmgr_ipc_sync_add_entry. Send add entry for 0000.0052.0000 port 42 vlan 512.

If you specify only the VLAN ID, the **debug mac learning** command output resembles the following example.

Brocade# debug mac learning vlan 200
learning: debugging is on
info - macmgr_ipc_learn_da_entry. Learn DA 0000.0052.0000 IPC received
info - macmgr_ipc_learn_sa_entry. Learn SA IPC received Mar 20 23:58:30
mac address 0000.00b1.a030. Port 42 vlan 200 Mar 20 23:58:30 info -
macmgr_ipc_sync_add_entry. Send add entry for 0000.00b1.a030 port 42 vlan 200.
info - macmgr_ipc_learn_da_entry. Learn DA 0000.0078.9123 IPC received
info - macmgr_ipc_learn_da_entry. Learn DA 0000.0078.9123 IPC received

If you specify both the VLAN ID and MAC address, the **debug mac learning** command output resembles the following example.

Brocade# debug mac learning vlan 300 0000.0052.0000
learning: debugging is on
info - macmgr_ipc_learn_da_entry. Learn DA 0000.0052.0000 IPC received
info - macmgr_ipc_learn_sa_entry. Learn SA IPC received Mar 20 23:58:30
mac address 0000.0052.0000. Port 42 vlan 300 Mar 20 23:58:30 info -
macmgr_ipc_sync_add_entry. Send add entry for 0000.0052.0000 port 42 vlan 300

**debug ip icmp**

**Syntax:** `[no] debug ip icmp [events | external_loop | internal_loop | packets | port_loop]

- **events** - Displays information about ICMP events.
- **external_loop** - Displays ICMP external loop activity.
- **internal_loop** - Displays ICMP internal loop activity.
- **packets** - Displays information about ICMP packets.
- **port_loop** - Displays port loop activity.

The **debug ip icmp** command displays information about IPv4 Internet Control Message Protocol (ICMP) transactions. This command is useful in determining if a router is sending or receiving ICMP messages, and for troubleshooting end-to-end connections.

**debug ip icmp events**

**Syntax:** `[no] debug ip icmp events

This command generates information about ICMP events, such as sent and received echo (ping) requests, destination-unreachable messages, and redirect messages. Command output resembles the following example.

Brocade# debug ip icmp events
ICMP: rcvd echo request packet of length 40 from 10.1.1.2
ICMP: send echo request packet of length 60 to 10.1.1.2
**debug ip icmp packets**

**Syntax:** [no] debug ip icmp packets

This command generates information about ICMP packets. Command output resembles the following example.

```
Brocade# debug ip icmp packets
ICMP:dst (10.2.3.4), src (0.0.0.0) echo request type
ICMP: Received message from 10.102.50.254 to 10.47.16.33 port mgmt1 type 11 size 36
ICMP: rxed error message from 10.102.50.254:May 23 16:11:32 original destination 10.47.16.33 ICMP Time Exceeded
IP/ICMP: rxed message: size: 36
ICMP: Received message from 10.98.68.129 to 10.47.16.33 port mgmt1 type 11 size 36
ICMP: rxed error message from 10.98.68.129:May 23 16:11:33 original destination 10.47.16.33 ICMP Time Exceeded
```

**debug ipv6 icmp**

**Syntax:** [no] debug ipv6 icmp

This command generates information about IPv6 Internet Control Message Protocol (ICMP) activity, such as sending or receiving ICMP requests, responses, ICMP error messages, and redirected ICMP packets. Command output resembles the following example.

```
Brocade# debug ipv6 icmp
ICMPv6: Sending Echo Request to 2001:DB8:1::6, length 24
ICMPv6: Received Echo Request from 2001:DB8:1::6 port mgmt1 type 11 size 36
ICMPv6: rxed error message from 2001:DB8:1::6:May 23 16:11:32 original destination 2001:DB8:1::6 ICMP Time Exceeded
ICMPv6: Received Echo Request from 2001:DB8:1::6, length 24
ICMPv6: rxed error message from 2001:DB8:1::6:May 23 16:11:33 original destination 2001:DB8:1::6 ICMP Time Exceeded
```

**Configuration notes**

- Enabling port-priority changes the source MAC address of all ARP packets to a virtual MAC address.
- The location of the `static-mac-address` command in the CLI depends on whether you configure port-based VLANs on the device. If the device does not have more than one port-based VLAN (VLAN 1, which is the default VLAN that contains all the ports), the `static-mac-address` command is at the global CONFIG level of the CLI. If the device has more than one port-based VLAN, then the `static-mac-address` command is not available at the global CONFIG level. In this case, the command is available at the configuration level for each port-based VLAN.
- ARP is enabled by default and cannot be disabled.
- The ARP request broadcast is a MAC broadcast, which means it goes only to devices that are directly attached to the switch. A MAC broadcast is not routed to other networks. However, some routers, including Brocade Layer 3 switches, can be configured to reply to ARP requests from one network on behalf of devices on another network.
- If the router receives an ARP request packet it cannot deliver to the final destination because of the ARP time-out, and no ARP response is received, the router sends an ICMP Host Unreachable message to the source.
Super Aggregated VLANs

A Super Aggregated VLAN (SAV) contains multiple VLANs. This feature allows you to construct Layer 2 paths and channels. A path contains multiple channels, each of which is a dedicated circuit between two endpoints. The two devices at the endpoints of the channel appear to each other to be directly attached, yet the network that connects them remains transparent.

You can aggregate up to 4090 VLANs inside a SAV, for a total VLAN capacity on one router of 16,728,100 channels (4090 * 4090). Because devices connected through the channel are not visible to devices in other channels, each client has a private link to the other side of the channel. SAVs are useful for applications such as Virtual Private Network (VPN) or Transparent LAN Services (TLS) where clients need a private, dedicated Ethernet connection that can reach its subnet transparently across multiple networks. A SAV allows point-to-point and point-to-multipoint connections.

SAV show commands

This section describes the show commands that display VLAN information.

show vlan

Syntax: show vlan

This command displays information about configured VLANs, as shown in the following example.

Brocade# show vlan
Configured PORT-VLAN entries: 3
Maximum PORT-VLAN entries: 4090
Default PORT-VLAN id: 1
PORT-VLAN 1, Name DEFAULT-VLAN, Priority Level0
L2 protocols: NONE
Untagged Ports: ethernet 2/1 to 2/20 ethernet 3/1 to 3/20 ethernet
PORT-VLAN 2, Name [None], Priority Level0
L2 protocols: NONE
ip-protocol VLAN, Dynamic port disabled
Name: basic
PORT-VLAN 1001, Name [None], Priority Level0
L2 protocols: MRP
Tagged Ports: ethernet 3/1 ethernet 3/12 to 3/13 ethernet 3/20
Bytes received: 6000

show vlan ethernet

Syntax: show vlan ethernet slot/port

This command, with a slot/port entry, displays VLAN information for the specified port, as shown in the following example.

Brocade# show vlan ethernet 4/1
Port 4/1 is a member of 2 VLANs
VLANs 1 100

show vlan detail

Syntax: show vlan detail [vlan-id]
The `vlan-id` variable displays information about a specific VLAN.

This command displays detailed information about VLAN states, port types, and port modes, as well as control protocols configured on the VLAN, as shown in the following example.

Brocade# show vlan detail
Untagged Ports: ethernet 2/1 to 2/20 ethernet 4/4
Tagged Ports: None
Dual-mode Ports: ethernet 3/1 to 3/20 jjjj ethernet 4/1 to 4/3
Default VLAN: 1
Control VLAN: 4095
VLAN Tag-type: 0x8100
AVP Count : 24
EVP Count : 28
PORT-VLAN 1, Name DEFAULT-VLAN, Priority Level0

-----------------------------------------------
Port Type Tag-Mode Protocol State
2/1 PHYSICAL UNTAGGED NON DISABLED
2/2 PHYSICAL UNTAGGED NONE DISABLED
2/3 PHYSICAL UNTAGGED NONE DISABLED
2/4 PHYSICAL UNTAGGED NONE DISABLED
2/5 PHYSICAL UNTAGGED NONE DISABLED
.
.
.
4/1 PHYSICAL UNTAGGED NONE FORWARDING
4/2 PHYSICAL UNTAGGED NONE FORWARDING
4/3 PHYSICAL UNTAGGED NONE FORWARDING
4/4 PHYSICAL UNTAGGED NONE DISABLED
PORT-VLAN 100, Name [None], Priority Level0

-----------------------------------------------
Port Type Tag-Mode Protocol State
1/1 PHYSICAL TAGGED STP DISABLED
1/2 PHYSICAL TAGGED STP DISABLED

SAV debug commands

There are no debug commands specific to SAV.

Configuration notes

- A maximum of 1544 bytes is supported on ports where SAVs are configured. An additional 8 bytes over the untagged port maximum allows for support of two VLAN tags.
- For core devices, you must configure a VLAN tag-type (tag ID) that is different than the tag-type used on edge devices. If you use the default tag-type (8100) on the edge devices, set the tag-type on the core devices to another value, such as 9100.
Common diagnostic scenarios

In an environment that includes a Brocade NetIron XMR and Brocade MLX series device with both VPLS and SAV configured, one VPLS endpoint port is connected to a carrier and will be receiving dual tags, with both tags using tag-type 8100. The outer tag is the carrier's VLAN and the inner tag is from the end user.

The frame structure is DA | SA | 8100 tag=1000 | 8100 tag=100 | Data from the carrier side. The port must support multiple VLANs coming in from the carrier.

The other VPLS endpoint goes to the end user with a single tag, and the frame structure is DA | SA | 8100 tag=100 | Data.

Use the following configuration on the two endpoints to support dual tags on one side of the VPLS and a single tag on the other side:

**Carrier side endpoint configuration**

Router MPLS

- vpls vpls1000 1000
- vpls-peer 10.2.2.2
- vlan 1000
- tagged ethe 3/1

**End user side endpoint configuration**

[Global config]

- tag-type 9100 eth 3/1

Router MPLS

- vpls vpls1000 1000
- vpls-peer 10.1.1.1
- vlan 100
- untagged ethe 3/1

This configuration works in the following way:

Packets will ingress the carrier endpoint with dual tags, both with tag-type 8100. The VLAN ID 1000 will be stripped off the outer tag, and the inner tag customer VLAN ID 100 will be sent over the VPLS as payload. The packet will then egress the end user endpoint with a single tag-type 8100 VLAN ID of 100.

Packets will ingress the end user endpoint with a single VLAN tag, tag-type 8100, VLAN ID 100. The port is configured with SAV tag-type 9100 and is also configured as untagged, so the packets will be accepted and the VLAN ID 100 will be sent over the VPLS as payload. The packet will then egress the carrier endpoint tagged interface, where it will add the outer tag with tag-type 8100 VLAN ID 1000.
TVF LAG load balancing

Transparent VLAN Flooding (TVF) LAG load balancing supports LAG load balancing for the LAG member ports in the TVF VLAN. This feature is used for the Policy-Based Routing (PBR) telemetry application.

TVF debug commands

This section describes the debug commands used to enable debugging of the TVF LAG load balancing feature.

**debug vlan tvf-lag-lb**

**Syntax:** `debug vlan tvf-lag-lb vlan_id`

This command displays the TVF LAG load balancing debug messages for the specified VLAN ID. The following is the sample debug output for LAG member port up and down handling.

```
Brocade# debug vlan tvf-lag-lb 100
TVF LAG load balance debugging is now ON for vlan 100
Brocade(config-lag-test)# disable ethernet 5/1
Brocade(config-lag-test)# [vlanmgr_tvf_lag_lb_update_port]: VLAN 100 TVF LAG load balancing update port 5/1 DOWN
[vlan_tvf_lag_lb_fid_program]: TVF group id 257 program FID group
vlanmgr_set_hw_flooding(): VLAN: 100 TVF LAG load balancing is enabled
[vlan_tvf_lag_lb_fid_program]: TVF group id 258 program FID group

Brocade(config-lag-test)# enable ethernet 5/1
Brocade(config-lag-test)# [vlanmgr_tvf_lag_lb_update_port]: VLAN 100 TVF LAG load balancing update port 5/1 UP
[vlan_tvf_lag_lb_fid_program]: TVF group id 257 program FID group
vlanmgr_set_hw_flooding(): VLAN: 100 TVF LAG load balancing is enabled
[vlan_tvf_lag_lb_fid_program]: TVF group id 258 program FID group
```

**debug tvf-domain**

**Syntax:** `debug tvf-domain [domain_ID]`

This command enables TVF domain debugging for the specified TVF domain ID, as shown in the following example. The debug command can be enabled both on the MP and LP.

```
Brocade# debug tvf-domain 5
TVF domain ID debug ON for TVF 5
Jan 18 07:26:50.957 vlancu generic tvf domain id 5
Jan 18 07:26:50.957 req size 300, union 272, datasize 0
Jan 18 07:26:50.957 vlancmgr_itc_tvf_domain_configuration() ITC configuration received, opcode 128, tvf domain 5
Jan 18 07:26:50.957 Adding TVF domain into DB: 5
Jan 18 07:26:50.957 vlancmgr_set_tvf_domain_hw_flooding(): Adding TVF domain into DB: 5
Jan 18 07:26:50.957 vlancmgr_set_tvf_domain_hw_flooding(): Removing TVF domain from DB: 5
Jan 18 07:26:50.957 vlancmgr_set_tvf_domain_hw_flooding(): TVF domain 5 TVF LAG load balancing is enabled
Jan 18 07:26:50.957 vlancmgr_set_tvf_domain_hw_flooding(): Syncing tvf domain 5 FID to LP
Add TVF domain done 1, id 5
```
ERP

Ethernet Ring Protection (ERP) is a non-proprietary protocol that integrates an Automatic Protection Switching (APS) protocol and protection switching mechanisms to provide Layer 2 loop avoidance and fast reconvergence in Layer 2 ring topologies. ERP supports multi-ring and ladder topologies. ERP can also function with IEEE 802.1ag to support link monitoring when non-participating devices exist within the Ethernet ring.

ERP show commands

This section describes the show commands that display ERP information.

show erp

Syntax: show erp [enter | erp_id]

- `enter` - Specifies that you must press the Enter key (carriage return) after the `show erp` command to view ERP information for all links.
- `erp_id` - Displays ERP information for the specified ERP ID.

This command displays ERP statistics. Command output resembles the following example.

```
Brocade# show erp 7
ERP 7(version 2)- VLAN 504
==================================================================
Erp   ID   Status   Oper   Node   Topo
state  role   group
1 enabled Idle rpl-owner -

Ring type   WTR        WTB      Guard    Holdoff   Msg
            time(min)  time(ms)  time(ms)  time(ms)  intv(ms)
Major-ring  5          7000     2000     0        1000

I/F     Port ERP port state Interface status Interface type
L   1/12 blocking normal rpl
R   1/11 forwarding normal non-rpl

RAPS sent RAPS rcvd RAPS dropped RAPS ignored Oper state changes
3   3   0   0   0
```

show erp history-log

Syntax: show erp history-log [brief | erp_id]

- `brief` - Displays only the last 30 debug logs stored for ERP.
- `erp_id` - Specifies the ERP ID for which you want to display debug logs.

This command displays the debug logs for all the ERP instances. Command output resembles the following example.

```
Brocade# show erp history-log
timestamp     instance  slot/port prot_state port_state trigger
Aug 25 09:18:51 5   1/5       protection DISABLED ERP_PL_REMOTE_FS
Aug 25 09:20:11 5   1/5       manual switch BLOCKING ERP_PL_LOCAL_CLEAR_S
Aug 25 09:21:01 4   1/3       manual switch BLOCKING ERP_PL_LOCAL_CLEAR_S
```
Metro Ring Protocol (MRP) is a proprietary protocol that prevents Layer 2 loops and provides fast reconvergence in Layer 2 ring topologies. MRP is especially useful in Metropolitan Area Networks (MANs), which typically require more flexibility than Spanning Tree Protocol (STP) can deliver.

This section describes how to use debug commands to monitor MRP environments for the Brocade NetIron XMR and Brocade MLX series routers.

**Using MRP diagnostics**

When you enable MRP diagnostics, the software tracks Ring Health Packets (RHPs) according to their sequence numbers, and calculates how long it takes an RHP to travel once through the entire ring. When you display the diagnostics, the CLI shows the average round-trip time for the RHPs sent since you enabled diagnostics. The calculated results have a granularity of 1 microsecond.

**Enabling MRP diagnostics**

To enable MRP diagnostics for a ring, enter the following command on the master node, at the configuration level for the ring (this command is valid only on the master node).

diagnostics

**MRP show commands**

This section describes the show command that displays MRP information.

**show metro-ring**

**Syntax:** `show metro-ring ring_id diagnostics`

This command displays MRP diagnostics results. In the following example, the results are for metro ring 1.

Brocade# show metro-ring 1 diagnostics
Metro Ring 1
--------------
diagnostics results

<table>
<thead>
<tr>
<th>Ring id</th>
<th>Diag</th>
<th>RHP average</th>
<th>Recommended hello time (ms)</th>
<th>Recommended Prefwring time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>enabled</td>
<td>&lt; 126</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

**show metro-ring history-log**

**Syntax:** `show metro-ring history-log [brief | mrp_id]`

- **brief** - Displays only the last 30 debug logs stored for MRP.
- **mrp_id** - Specifies the MRP ID for which you want to display debug logs.
This command displays the debug logs for all the MRP instances. Command output resembles the following example.

Brocade# show metro-ring history-log
timestamp instance slot/port prot_state port_state trigger
Aug 25 09:18:51 5 1/5 - DISABLED MRP_TRUNK_DOWN
Aug 25 09:20:11 5 1/5 - BLOCKING MRP_REDUNDANT_PORT_UP
Aug 25 09:21:01 4 1/3 - FRWDING EMRP_TRUNK_PRIMARY_CHANGE

MRP debug commands

This section describes the MRP-related debug commands.

default mrp bpdus

Syntax: [no] debug mrp bpdu

When this command is enabled, you will see an error message whenever a bridge protocol data unit (BPDU) is lost on the master node (not shown for member nodes).

Command output resembles the following example.

Brocade# debug mrp bpdu
bpdu: debugging is on
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session
Dec 10 17:24:35 mrprhp_receive: receiving packet on port 6/2 old input port 6/2, vlan VLAN: 22 for unconfigured ring 151 to add session

debug mrp diagnostics

Syntax: [no] debug mrp diagnostics

This command displays MRP diagnostic information. To activate diagnostic reporting, first enable MRP diagnostics debugging, then display the diagnostic information using the show debug command.

Command output resembles the following example.
Spanning Tree Protocol and derivatives

The following sections describe diagnostic procedures for Spanning Tree Protocol (STP) and STP derivatives, including SSTP, MSTP, RSTP, and SuperSpan.

**NOTE**
Layer 2 protocols such as STP, RSTP, MRP, and VSRP can be enabled on port-based VLANs, but cannot be enabled or disabled on protocol-based VLANs.

**STP**
A control protocol, such as Spanning Tree Protocol (STP), can block one or more ports in a protocol-based VLAN that uses a virtual routing interface to route to other VLANs. For IP VLANs and IP subnet VLANs, even though some of the physical ports of the virtual routing interface are blocked, the virtual routing interface can still route as long as at least one port in the protocol-based VLAN is not blocked by STP.
SSTP

For VLANs where Single Spanning Tree Protocol (SSTP) is enabled, the ports become members of a single spanning tree. For VLANs where SSTP is disabled, ports are excluded from the single spanning tree. VLANs can be selectively added or removed from the single spanning tree domain as well.

RSTP

Rapid Spanning Tree Protocol (RSTP) provides rapid traffic reconvergence for point-to-point links within a few milliseconds (less than 500 milliseconds) following the failure of a bridge or bridge port. This reconvergence occurs more rapidly than that provided by STP because convergence in RSTP bridges is based on the explicit handshakes between designated ports and their connected root ports rather than on timer values.

MSTP

With Multiple Spanning Tree Protocol (MSTP), the entire network runs a common instance of RSTP. Within the common instance, one or more VLANs can be individually configured into distinct regions. The entire network runs the Common Spanning Tree (CST) instance and the regions run a local instance, or Internal Spanning Tree (IST). Because the CST treats each IST as a single bridge, ports are blocked to prevent loops that might occur within an IST and also throughout the CST. In addition, MSTP can co-exist with individual devices running STP or RSTP in the Common and Internal Spanning Tree instance (CIST). With the exception of the provisions for multiple instances, MSTP operates exactly like RSTP.

SuperSpan

SuperSpan is an STP enhancement that allows service providers (SPs) to use STP in both SP networks and customer networks. The Brocade NetIron XMR and Brocade MLX series devices are configured to tunnel each customer's STP BPDUs through the SP. From the customer's perspective, the SP network is a loop-free non-blocking device or network. The SP network behaves like a hub in the sense that the necessary blocking occurs in the customer network, not in the SP network.

STP show commands

This section describes the show command that displays STP information.

```
show spanning-tree
```

Syntax: `show spanning-tree [detail [vlan vlan-id [ethernet slot/port]] | protect | pvst-mode | root-protect | vlan vlan-id]
```

- `detail` - Displays detailed STP information.
- `vlan vlan-id` - Specifies a VLAN for detailed STP information.
- `ethernet slot/port` - Specifies an Ethernet port within the VLAN for detailed STP information.
- `protect` - Displays STP BPDU guard information.
- `pvst-mode` - Displays PVST information.
- `root-protect` - Displays STP root guard information.
• **vlan vlan id** - Displays STP information for the specified VLAN.

This command displays STP information, as shown in the following example (in this instance, for VLAN 10).

Brocade# show spanning-tree vlan 10
VLAN 10 - STP instance 1
---

STP Bridge Parameters:
Bridge Identifier MaxAge Hello FwdDly Time Change Change
hex 8000000000a04000 20 2 15 1 0 0
RootBridge Identifier Root Max Hel Fwd
hex 8000000000a04000 0 8000000000a04000 Root 20 2 15

STP Port Parameters:
Port Prio Path State Designat- Designated Root Bridge
Num rity Cost ed Cost Root Bridge
1/3 128 4 DISABLED 0 0000000000000000 0000000000000000
1/13 128 4 DISABLED 0 0000000000000000 0000000000000000

**show spanning-tree history-log**

**Syntax:** show spanning-tree history-log [brief | vlan vlan-id]

- **brief** - Displays only the last 30 debug logs stored for STP.
- **vlan vlan-id** - Specifies the VLAN ID for which you want to display STP debug logs.

This command displays the STP debug logs for all the VLANs. Command output resembles the following example.

Brocade# show spanning-tree history-log

```
<table>
<thead>
<tr>
<th>timestamp</th>
<th>PORT</th>
<th>VLAN ID</th>
<th>Event</th>
<th>Triggered starting API</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 20 09:20:11</td>
<td>1/2</td>
<td>100</td>
<td>Superior BPDU recvd</td>
<td>stputil_process_bpdu</td>
</tr>
<tr>
<td>Sept 20 09:20:11</td>
<td>1/1</td>
<td>4095</td>
<td>MAX_ageTimer expiry</td>
<td>stptimer_update</td>
</tr>
<tr>
<td>Sept 20 11:18:40</td>
<td>1/3</td>
<td>4095</td>
<td>Superior BPDU recvd</td>
<td>stputil_process_bpdu</td>
</tr>
<tr>
<td>Sept 20 11:18:42</td>
<td>1/1</td>
<td>100</td>
<td>MAX_ageTimer expiry</td>
<td>stptimer_update</td>
</tr>
</tbody>
</table>
```

**STP debug commands**

This section describes the debug commands for STP, MSTP, and RSTP environments.

**CAUTION**

Enabling diagnostic commands may degrade system performance. These commands are best used to troubleshoot specific problems while working with qualified Brocade service technicians. Whenever possible, troubleshoot your system during periods of low network traffic and user activity to preserve system performance.

**NOTE**

Because STP and RSTP debug commands are virtually identical, only STP commands are described in detail in this chapter.
Spanning Tree Protocol and derivatives

debug spanning-tree

Syntax: [no] debug spanning-tree [config-bpdu | event | port [ethernet slot/port | pos slot/port] | reset | show | tcn-bpdu | verbose | vlan vlan id]

This command generates information about all BPDUs and spanning tree events (by default) or specific events as defined by the variables shown in the syntax line. In many cases, generic debugging is not useful. If multiple STP instances are configured, it can be difficult to identify content for a specific instance from the extensive output that may be generated. Use the debug spanning-tree port and debug spanning-tree vlan commands to define specific instances for debugging.

- config-bpdu - Generates information about STP configuration bridge protocol data units (BPDUs).
- event - Generates information about STP non-BPDU events (timer, configuration, and so on).
- port - Restricts STP debugging to specific ports.
- ethernet slot/port - Restricts STP debugging to a specific Ethernet interface.
- pos slot/port - Restricts STP debugging to a specific POS interface.
- reset - Resets all STP debugging parameters to the default.
- show - Displays current STP debug settings.
- tcn-bpdu - Enables or disables STP TCN BPDU debugging.
- verbose - Enables or disables STP verbose debugging mode.
- vlan vlan id - Restricts STP debugging to specific VLAN.

This command generates information about all STP activity and events. Command output resembles the following example.

Brocade# debug spanning-tree
STP: debugging is on
STP: Sending Config BPDU - VLAN 3 Port 2/3
0000 00 00 00 800000000001c042 00000000
800000000001c042 8043 0000 0000 0000 0000
STP: Sending Config BPDU - VLAN 3 Port 2/4
0000 00 00 00 800000000001c042 00000000
800000000001c042 8044 0000 0000 0000 0000
STP: Sending Config BPDU - VLAN 2 Port 2/1

debug spanning-tree config-bpdu

Syntax: [no] debug spanning-tree config-bpdu

This command generates information about STP BPDUs. Command output resembles the following example.

Brocade# debug spanning-tree config-bpdu
STP: Received Config BPDU - VLAN 10 Port 3/20
 0000 00 00 01 80000000003d8500 00000000
80000000003d8500 8050 0000 1400 0200 0f00
STP: Received Config BPDU - VLAN 10 Port 3/20
 0000 00 00 01 80000000003d8500 00000000
80000000003d8500 8050 0000 1400 0200 0f00
STP: Received Config BPDU - VLAN 10 Port 3/20
 0000 00 00 01 80000000003d8500 00000000
Spanning Tree Protocol and derivatives

Syntax: [no] debug spanning-tree event
This command displays information about non-BPDU events, such as timer, configuration, and so on. Command output resembles the following example.

Brocade# debug spanning-tree event
  STP: LISTENING - VLAN 10 Port 3/20
  STP: LEARNING - VLAN 10 Port 3/20
  STP: Sending TCN BPDU - VLAN 10 Port 3/20
  STP: FORWARDING - VLAN 10 Port 3/20
  STP: TCN ACK Received - VLAN 10 Port 3/20

d debug spanning-tree port

Syntax: [no] debug spanning-tree port [ethernet slot/port  |  pos slot/port]
This command displays spanning tree information about a port for a specific interface. Command output resembles the following example.

Brocade# debug spanning-tree port ethernet 2/2
  STP debugging turned on for ports ethe 2/2
  55 STP: Sending Config BPDU - VLAN 2 Port 2/2
  55 0000 00 00 00 800000000001c040 00000000
  800000000001c040 8042 0000 0000 0000 0000
  STP: Sending Config BPDU - VLAN 2 Port 2/2
  0000 00 00 00 800000000001c040 00000000
  800000000001c040 8042 0000 0000 0000 0000
  STP: Sending Config BPDU - VLAN 2 Port 2/2
  0000 00 00 00 800000000001c040 00000000
  800000000001c040 8042 0000 0000 0000 0000
  STP: Sending Config BPDU - VLAN 2 Port 2/2
  0000 00 00 00 800000000001c040 00000000
  800000000001c040 8042 0000 0000 0000 0000
  STP: Sending Config BPDU - VLAN 2 Port 2/2
  0000 00 00 00 800000000001c040 00000000
  800000000001c040 8042 0000 0000 0000 0000

debug spanning-tree reset

Syntax: [no] debug spanning-tree reset
This command resets all STP debugging parameters to the default. The default mode disables all STP debugs. The show debug command will no longer show STP debug as enabled. This command works in the same way as the no debug spanning-tree command.

d debug spanning-tree show

Syntax: [no] debug spanning-tree show
This command generates information about the STP debug configuration. The following command output shows the default configuration.
Spanning Tree Protocol and derivatives

Brocade# debug spanning-tree show
STP Debug Parameters
-----------------------
STP debugging is ON [Mode: Brief]
NonBpduEvents ConfigBpduEvents TcnBpduEvents are being tracked
Ports: All
VLANs: All

default spanning-tree tcn-bpdu

Syntax: [no] debug spanning-tree tcn-bpdu
This command displays information about TCN BPDU events. Command output resembles the following example.

Brocade# debug spanning-tree tcn-bpdu
  STP: Sending TCN BPDU - VLAN 10 Port 3/20
  STP: TCN ACK Received - VLAN 10 Port 3/20

default spanning-tree verbose

Syntax: [no] debug spanning-tree verbose
In verbose mode, STP BPDU information is translated into BPDU fields and values, which are easier to read than the default hex output. Command output resembles the following example.

Brocade# debug spanning-tree verbose
  STP: Sending Config BPDU - VLAN 2 Port 2/2
    protocol-id: 0000
    protocol-version: 00
    type: 00
    flags: 00
    root-id: 800000000001c040
    path-cost: 00000000
    bridge-id: 800000000001c040
    port-id: 8042
    message-age: 0000
    max-age: 0000
    hello-time: 0000
    hello-time: 0000

default spanning-tree vlan

Syntax: [no] debug spanning-tree vlan vlan id
This command restricts debug output to a specific VLAN. Command output resembles the following example.

Brocade# debug spanning-tree vlan 2
  STP: Sending Config BPDU - VLAN 2 Port 2/1
    0000 00 00 00 800000000001c040 00000000

MSTP show commands

This section describes the show command that displays MSTP information.
show mstp

Syntax: show mstp instance-id [config | detail | region region-id]

- **instance-id** - Specifies the ID of the MSTP instance.
- **config** - Displays MSTP configuration information.
- **detail** - Displays detailed MSTP information.
- **region region-id** - Displays information related to a particular MSTP Provider Bridge (PB) or Provider Backbone Bridging (PBB) region.

This command displays general MSTP information. Command output resembles the following example for MSTP over PBB operation.

Brocade# show mstp
Region 1:
---------

MSTP Instance 0 (CIST) - VLAN Scope: None
----------------------------------------------------------------------------------------------------------
Bridge Identifier Bridge Bridge Bridge Bridge Root Root Root Root
Identifier hex MaxAge Hello FwdDly Hop MaxAge Hello FwdDly Hop
hex sec sec sec cnt sec sec sec sec cnt
8000000000af7800 20 2 15 20 20 2 15 20
Root ExtPath RegionalRoot IntPath Designated Root
Bridge Cost Bridge Cost Bridge Port
hex hex hex
8000000000af7800 0 8000000000af7800 0 8000000000af7800 Root
Port Pri PortPath P2P Edge Role State Designated Designated
Num Cost Mac Port hex hex
2/5 128 20000 F F DESIGNATED FORWARDING 0 8000000000af7800
3/5 128 20000 F F DESIGNATED FORWARDING 0 8000000000af7800

MSTP Instance 1 - VLANs: VPLS 1 VLAN 100
----------------------------------------------------------------------------------------------------------
Bridge Identifier Max RegionalRoot IntPath Designated Root Root
Identifier hex Hop Bridge Cost Bridge Port Hop
hex cnt hex hex hex cnt
8001001bedaf7800 20 8001001bedaf7800 0 8001001bedaf7800 Root 20
Port Pri PortPath P2P Edge Role State Designated Designated
Num Cost Mac Port hex hex
ted cost bridge
2/5 128 20000 F F DESIGNATED FORWARDING 0 8001001bedaf7800
3/5 128 20000 F F DESIGNATED FORWARDING 0 8001001bedaf7800

Region 2:
---------

MSTP Instance 0 (CIST) - VLAN Scope: None
----------------------------------------------------------------------------------------------------------
Bridge Identifier Bridge Bridge Bridge Bridge Root Root Root Root
Identifier hex MaxAge Hello FwdDly Hop MaxAge Hello FwdDly Hop
hex sec sec sec cnt sec sec sec sec cnt
8000000000af7800 20 2 15 20 20 2 15 20
Root ExtPath RegionalRoot IntPath Designated Root
Bridge Cost Bridge Cost Bridge Port
hex hex hex

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8000000000af7800 0 8000000000af7800 0 8000000000af7800 Root

Port Pri PortPath P2P Edge Role State Designated Designated
Num Cost Mac Port 
2/5 128 20000 F F DESIGNATED FORWARDING 0 8000000000af7800
3/5 128 20000 F F DESIGNATED FORWARDING 0 8000000000af7800

MSTP Instance 1 - VLANs: VPLS 1 VLAN 200
----------------------------------------------------------------------------
Bridge Max RegionalRoot IntPath Designated Root Root
Identifier Hop Bridge Cost Bridge Port Hop
hex cnt hex hex cnt
8001001bedaf7800 20 8001001bedaf7800 0 8001001bedaf7800 Root 20

Port Pri PortPath P2P Edge Role State Designated Designated
Num Cost Mac Port 
2/5 128 20000 F F DESIGNATED FORWARDING 0 8001001bedaf7800
3/5 128 20000 F F DESIGNATED FORWARDING 0 8001001bedaf7800

show mstp config

Syntax: show mstp config

This command displays MSTP configuration information. Command output resembles the following example for MSTP over PBB operation.

Brocade# show mstp config
Mstp-region 1
Mstp-region name PBB-Domain
Mstp-region revision 1
Mstp-region instance 1 vpls 1 vlan 100
Mstp-region start

Mstp-region 2
Mstp-region name PB-Domain1
Mstp-region revision 1
Mstp-region instance 1 vpls 1 vlan 200
Mstp-region start

show mstp detail

Syntax: show mstp detail

This command displays detailed MSTP information. Command output resembles the following example for MSTP over PBB operation.

Brocade# show mstp detail
Region 10
-------

MSTP Instance 0 (CIST) - VLAN Scope: None
----------------------------------------------------------------------------
Bridge: 8000000000198800 [Priority 32768, SysId 0, Mac 001bed198800]
FwdDelay 15, HelloTime 2, MaxHops 20, TxHoldCount 6

Port 1/11 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000af7800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 2
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MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/12 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 2
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/13 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/14 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/15 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/16 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 132, RST 0, Config 0, TCN 0
Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/17 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
Spanning Tree Protocol and derivatives

MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 133, RST 0, Config 0, TCN 0
               Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/18 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 133, RST 0, Config 0, TCN 0
               Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/19 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 133, RST 0, Config 0, TCN 0
               Sent MST 3262, RST 0, Config 0, TCN 0

Port 1/20 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary T
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 133, RST 0, Config 0, TCN 0
               Sent MST 3262, RST 0, Config 0, TCN 0

Port 3/1 - Role: ROOT - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 0
ActiveTimers - helloWhen 1 rrWhile 15 rcvdInfoWhile 5
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 1723, RST 0, Config 0, TCN 0
               Sent MST 1952, RST 0, Config 0, TCN 0

Port 3/2 - Role: ROOT - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 0
ActiveTimers - helloWhen 1 rrWhile 15 rcvdInfoWhile 5
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
               PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs        - Rcvd MST 1723, RST 0, Config 0, TCN 0
               Sent MST 1952, RST 0, Config 0, TCN 0

Port 3/5 - Role: ROOT - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated   - Root 8000000000034400, RegionalRoot 8000000000034400,
               Bridge 8000000000198800, ExtCost 0, IntCost 0
ActiveTimers - helloWhen 1 rrWhile 15 rcvdInfoWhile 5
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 1723, RST 0, Config 0, TCN 0
Sent MST 1952, RST 0, Config 0, TCN 0

Port 3/6 - Role: ROOT - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000034400, ExtCost 0, IntCost 0
ActiveTimers - helloWhen 1 rrWhile 15 rcvdInfoWhile 5
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 1723, RST 0, Config 0, TCN 0
Sent MST 1952, RST 0, Config 0, TCN 0

Port 5/1 - Role: DESIGNATED - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 10024, RST 0, Config 0, TCN 0
Sent MST 9871, RST 0, Config 0, TCN 0

Port 5/2 - Role: DESIGNATED - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 10024, RST 0, Config 0, TCN 0
Sent MST 9871, RST 0, Config 0, TCN 0

Port 5/3 - Role: DESIGNATED - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 10024, RST 0, Config 0, TCN 0
Sent MST 9871, RST 0, Config 0, TCN 0

Port 5/4 - Role: DESIGNATED - State: FORWARDING
PathCost 2000, Priority 128, OperEdge F, OperPt2PtMac F, Boundary F
Designated - Root 8000000000034400, RegionalRoot 8000000000034400,
Bridge 8000000000198800, ExtCost 0, IntCost 2000
ActiveTimers - helloWhen 1
MachineState - PRX-RECEIVE, PTX-IDLE, PPM-SENDING_RSTP, PIM-CURRENT
PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE
BPDUs - Rcvd MST 10024, RST 0, Config 0, TCN 0
Sent MST 9871, RST 0, Config 0, TCN 0

MSTP Instance 1 - VLANs: 801
--------------------------------------------------------------------------------
Bridge: 8001001bed198800 [Priority 32768, SysId 1, Mac 001bed198800]
Port 1/11 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128
Designated - RegionalRoot 8001001bed034400, IntCost 2000
Bridge 8001001bed198800
ActiveTimers -
MachineState - PIM-CURRENT, PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE

Port 1/12 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128
Designated - RegionalRoot 8001001bed034400, IntCost 2000
Bridge 8001001bed198800
ActiveTimers -
MachineState - PIM-CURRENT, PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE

Port 1/13 - Role: DESIGNATED - State: FORWARDING
PathCost 20000, Priority 128
Designated - RegionalRoot 8001001bed034400, IntCost 2000
Bridge 8001001bed198800
ActiveTimers -
MachineState - PIM-CURRENT, PRT-ACTIVE_PORT, PST-FORWARDING, TCM-ACTIVE

show mstp region

Syntax: show mstp region region-id

The region-id variable specifies the ID of the configured MSTP region.

This command displays information related to a particular MSTP PB or PBB region. Command output resembles the following example for MSTP over PBB operation.

Brocade# show mstp region 10
Region 10
--------

MSTP Instance 0 (CIST) - VLAN Scope: None

----------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Bridge Identifier</th>
<th>MaxAge</th>
<th>Hello</th>
<th>FwdDly</th>
<th>Hop</th>
<th>Root Identifier</th>
<th>MaxAge</th>
<th>Hello</th>
<th>FwdDly</th>
<th>Hop</th>
</tr>
</thead>
<tbody>
<tr>
<td>hex</td>
<td>sec</td>
<td>sec</td>
<td>sec</td>
<td>cnt</td>
<td>hex</td>
<td>sec</td>
<td>sec</td>
<td>sec</td>
<td>cnt</td>
</tr>
<tr>
<td>8000000000198800</td>
<td>20</td>
<td>2</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>2</td>
<td>15</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

Root Bridge ExtPath RegionalRoot IntPath Designated Root Bridge Cost Bridge Cost Bridge Port
hex hex 8000000000034400 0 8000000000034400 2000 8000000000034400 3/1

Port PortPath P2P Edge Role State Designated Designated
<table>
<thead>
<tr>
<th>Num</th>
<th>Pri</th>
<th>Cost</th>
<th>Cost</th>
<th>Mac</th>
<th>Port</th>
<th>Port</th>
<th>State</th>
<th>Designated</th>
<th>cost</th>
<th>Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/11</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/12</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/13</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/14</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/15</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/16</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/17</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/18</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/19</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>1/20</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>DESIGNATED FORWARDING</td>
<td>0</td>
<td>80000000000198800</td>
<td></td>
</tr>
<tr>
<td>3/1</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>ROOT FORWARDING</td>
<td>0</td>
<td>8000000000034400</td>
<td></td>
</tr>
<tr>
<td>3/2</td>
<td>128</td>
<td>20000</td>
<td>F</td>
<td>F</td>
<td>128</td>
<td>20000</td>
<td>ROOT FORWARDING</td>
<td>0</td>
<td>8000000000034400</td>
<td></td>
</tr>
</tbody>
</table>
Spanning Tree Protocol and derivatives

3/5 128 2000 F F ROOT FORWARDING 0 8000000000034400
3/6 128 2000 F F ROOT FORWARDING 0 8000000000034400
5/1 128 2000 F F DESIGNATED FORWARDING 0 8000000000198800
5/2 128 2000 F F DESIGNATED FORWARDING 0 8000000000198800
5/3 128 2000 F F DESIGNATED FORWARDING 0 8000000000198800
5/4 128 2000 F F DESIGNATED FORWARDING 0 8000000000198800

MSTP Instance 1 - VLANs: 801

```
Bridge Max RegionalRoot IntPath Designated Root Root Identifier Hop Bridge Cost Bridge Port Hop
hex cnt hex hex cnt hex cnt 8001001bed198800 20 8001001bed034400 2000 8001001bed034400 3/1 19
```

Port Pri PortPath P2P Edge Role State Designated Designated
Num Cost Mac Port bridge
1/11 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/12 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/13 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/14 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/15 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/16 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/17 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/18 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/19 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
1/20 128 20000 F F DESIGNATED FORWARDING 2000 8001001bed198800
3/1 128 2000 F F ROOT FORWARDING 0 8001001bed034400
3/2 128 2000 F F ROOT FORWARDING 0 8001001bed034400
3/5 128 2000 F F ROOT FORWARDING 0 8001001bed034400
3/6 128 2000 F F ROOT FORWARDING 0 8001001bed034400
5/1 128 2000 F F DESIGNATED FORWARDING 2000 8001001bed198800
5/2 128 2000 F F DESIGNATED FORWARDING 2000 8001001bed198800
5/3 128 2000 F F DESIGNATED FORWARDING 2000 8001001bed198800
5/4 128 2000 F F DESIGNATED FORWARDING 2000 8001001bed198800

show mstp history-log

**Syntax:** show mstp history-log [brief | region region-id]

- **brief** - Displays only the last 30 debug logs stored for MSTP.
- **region region-id** - Displays the MSTP debug logs for the specified region ID.

The show mstp history-log brief command displays only the last 30 debug logs stored for MSTP. Command output resembles the following example.

```
Brocade# show mstp history-log brief
Timestamp RegId Port MSTID Event            Triggered API
Jun 7 00:29:24 10 5/1 1 tcWhile Xprd mstptimer_update
Jun 7 00:29:24 10 5/1 0 tcWhile Xprd mstptimer_update
Jun 7 00:29:24 10 1/11 1 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 1/11 0 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 5/1 1 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 5/1 0 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 1/11 1 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 1/11 0 tcWhile Xprd mstptimer_update
Jun 7 00:28:48 10 1/11 1 tcWhile Xprd mstptimer_update
Jun 7 00:28:25 10 5/1 0 Rx Pkt Delay- MP mstpmgr_rx_bpdu()
Jun 7 00:28:13 10 5/1 1 tcWhile Xprd mstptimer_update
Jun 7 00:28:13 10 5/1 0 tcWhile Xprd mstptimer_update
```
Spanning Tree Protocol and derivatives

The show mstp history-log region command displays the MSTP debug logs for the specified region ID. Command output resembles the following example.

Brocade# show mstp history-log region 10
Timestamp         RegId Port  MSTID Event            Triggered API
---------          ----- ---- ----- --------------- --------------------------------------
Jun  7 00:28:13  10    3/1   1     tcWhile Xprd     mstptimer_update
Jun  7 00:28:13  10    3/1   0     tcWhile Xprd     mstptimer_update
Jun  7 00:28:13  10    1/11  1     tcWhile Xprd     mstptimer_update
Jun  7 00:28:13  10    1/11  0     tcWhile Xprd     mstptimer_update
Jun  7 00:28:12  10    3/1   0     Rx Pkt Delay- MP mstpmgr_rx_bpdu()
Jun  7 00:27:39  10    -     1     RootRole select mstp_updtRolesMsti
Jun  7 00:27:39  10    3/1   1     Superior PDU rx mstp_pim_action
Jun  7 00:27:39  10    3/1   0     Superior PDU rx mstp_pim_action
Jun  7 00:27:39  10    3/1   0     Rx Pkt Delay- MP mstpmgr_rx_bpdu()
Jun  7 00:27:39  10    5/1   1     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    5/1   0     Moved to FWD mstp_enableForwarding
Jun  7 00:27:39  10    5/1   0     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    5/1   0     Moved to FWD mstp_enableForwarding
Jun  7 00:27:39  10    3/1   1     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    3/1   1     Moved to FWD mstp_enableForwarding
Jun  7 00:27:39  10    3/1   0     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    3/1   0     Moved to FWD mstp_enableForwarding
Jun  7 00:27:39  10    1/11  1     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    1/11  1     Moved to FWD mstp_enableForwarding
Jun  7 00:27:39  10    1/11  0     TCM Detected     mstp_tcm_action
Jun  7 00:27:39  10    1/11  0     Moved to FWD mstp_enableForwarding
Jun  7 00:27:11  10    5/1   0     Rx Pkt Delay- MP mstpmgr_rx_bpdu()
Jun  7 00:27:11  10    -     0     MSTP Timer Delay mstptimer_tick
Spanning Tree Protocol and derivatives

MSTP debug commands

This section describes the MSTP-related debug commands.

debu mstp

Syntax: [no] debug mstp [bpdu | event | mstid num | port [ethernet slot/port | pos slot/port] | region region-id | show | state | verbose]

- bpdu - Displays MSTP bridge protocol data units (BPDUs).
- event - Displays MSTP state machine events.
- mstid num - Displays debugging information for a specific MSTP instance.
- port - Displays debugging information for a specific MSTP port.
- ethernet slot/port - Specifies the Ethernet interface.
- pos slot/port - Specifies the POS interface.
- region region-id - Displays debugging information related to a particular MSTP PB or PBB region.
- show - Displays the current MSTP debug parameters.
• **state** - Displays debugging information about the MSTP port state events.
• **verbose** - Displays MSTP debugging information in the verbose mode.

The `debug mstp` command generates debugging information for the configured MSTP debugging parameters. Command output resembles the following example.

Brocade# debug mstp
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 2/5
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 2/5
Aug 12 17:41:14 Region 1, MST 0, Port 2/5 - sent MST BPDU
  0000 03 02 54 8000000000af7800 00000000
  8000000000af7800 8035 0000 1400 0200 0f00
Aug 12 17:41:14 Region 1, MST 1, Port 2/5 - sent MSTI config message
  7e 8001000000af7800 00000000 8000 80 14
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 3/5
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 17:41:14 Region 1, MST 0, Port 3/5 - sent MST BPDU
  0000 03 02 54 8000000000af7800 00000000
  8000000000af7800 8065 0000 1400 0200 0f00
Aug 12 17:41:14 Region 1, MST 1, Port 3/5 - sent MSTI config message
  7e 8001000000af7800 00000000 8000 80 14
Aug 12 17:41:14 Region 2, MSTP: PRX RECEIVE->RECEIVE - Port 3/5
Aug 12 17:41:14 Region 2, MST 0, Port 3/5 - received BPDU
  0000 03 02 14 8000000000af7800 00000000
  8000000000af7800 8000 80 14
Aug 12 17:41:14 Region 2, MSTP: PIM CURRENT->RECEIVE - MST 0, Port 3/5
Aug 12 17:41:14 Region 2, MSTP: PIM RECEIVE->OTHER - MST 0, Port 3/5
Aug 12 17:41:14 Region 2, MSTP: PRX RECEIVE->RECEIVE - Port 2/5

**debug mstp bpdu**

**Syntax:** `[no] debug mstp bpdu`

This command displays MSTP BPDUs. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp bpdu
MSTP: debugging is on
Aug 12 17:59:32 Region 1, MST 0, Port 2/5 - sent MST BPDU
  0000 03 02 54 8000000000af7800 00000000
  8000000000af7800 8035 0000 1400 0200 0f00
Aug 12 17:59:32 Region 1, MST 1, Port 2/5 - sent MSTI config message
  7e 8001000000af7800 00000000 8000 80 14
Aug 12 17:59:32 Region 1, MST 0, Port 3/5 - sent MST BPDU
  0000 03 02 54 8000000000af7800 00000000
  8000000000af7800 8065 0000 1400 0200 0f00
Aug 12 17:59:32 Region 1, MST 1, Port 3/5 - sent MSTI config message
  7e 8001000000af7800 00000000 8000 80 14

**debug mstp event**

**Syntax:** `[no] debug mstp event`

This command displays MSTP state events. Command output resembles the following example for MSTP PBB configurations.
Brocade# debug mstp event
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 2/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 2/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PRX RECEIVE->RECEIVE - Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PIM CURRENT->RECEIVE - MST 0, Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PIM RECEIVE->OTHER - MST 0, Port 3/5
Aug 12 18:02:30 Region 1, MSTP: PIM CURRENT->RECEIVE - MST 1, Port 3/5

debug mstp mstid

Syntax: [no] debug mstp mstid num region region-id

- num - Specifies the ID of the MSTP instance in the configured regions.
- region region-id - Specifies the ID of the MSTP PB or PBB region.

This command displays debugging information for a specific MSTP instance in the configured regions. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp mstid 1
Aug 12 18:49:26 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 2/5
Aug 12 18:49:26 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 2/5
Aug 12 18:49:26 Region 1, MST 1, Port 2/5 - sent MSTI config message 7e 8001000000af7800 00000000 8000 80 14
Aug 12 18:49:26 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 3/5
Aug 12 18:49:26 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 18:49:26 Region 1, MST 1, Port 3/5 - sent MSTI config message 7e 8001000000af7800 00000000 8000 80 14
Aug 12 18:49:26 Region 2, MSTP: PRX RECEIVE->RECEIVE - Port 3/5
Aug 12 18:49:26 Region 2, MST 1, Port 3/5 - received MSTI config message 7e 8001000000af7800 00000000 8000 80 14
Aug 12 18:49:26 Region 2, MSTP: PIM CURRENT->RECEIVE - MST 1, Port 3/5
Aug 12 18:49:26 Region 2, MSTP: PIM RECEIVE->OTHER - MST 1, Port 3/5
Aug 12 18:49:26 Region 2, MSTP: PRX RECEIVE->RECEIVE - Port 2/5
Aug 12 18:49:26 Region 2, MST 1, Port 2/5 - received MSTI config message

debug mstp port

Syntax: [no] debug mstp port [ethernet slot/port | pos slot/port]

- ethernet slot/port - Specifies the Ethernet interface.
- pos slot/port - Specifies the Packet over SONET (POS) interface.

This command displays debugging information for a specific MSTP port in the configured regions. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp port ethernet 1/15
MSTP debugging turned on for ports ethernet 1/15

debug mstp region

Syntax: [no] debug mstp region region-id

The region-id variable specifies the ID of the configured MSTP region.

This command displays debugging information related to a particular MSTP PB or PBB region. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp region 1
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 2/5
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 2/5
Aug 12 17:41:14 Region 1, MST 0, Port 2/5 - sent MST BPDU
 0000 03 02 54 8000000000af7800 00000000
 8000000000af7800 8035 0000 1400 0200 0f00
Aug 12 17:41:14 Region 1, MST 1, Port 2/5 - sent MSTI config message
 7e 8001000000af7800 00000000 8000 80 14
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_PERIODIC - Port 3/5
Aug 12 17:41:14 Region 1, MSTP: PTX IDLE->TRANSMIT_RSTP - Port 3/5
Aug 12 17:41:14 Region 1, MST 0, Port 3/5 - sent MST BPDU
 0000 03 02 54 8000000000af7800 00000000
 8000000000af7800 8065 0000 1400 0200 0f00
Aug 12 17:41:14 Region 1, MST 1, Port 3/5 - sent MSTI config message
 7e 8001000000af7800 00000000 8000 80 14
Aug 12 17:41:14 Region 1, MSTP: PRX RECEIVE->RECEIVE - Port 3/5
Aug 12 17:41:14 Region 1, MSTP: PRX RECEIVE->OTHER - MST 0, Port 3/5
Aug 12 17:41:14 Region 1, MSTP: PRX RECEIVE->OTHER - MST 1, Port 3/5
Aug 12 17:41:14 Region 1, MSTP: PRX RECEIVE->RECEIVE - Port 2/5

debug mstp show

Syntax: [no] debug mstp show

This command displays the current MSTP debug parameters. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp show
MSTP debug Parameters
---------------------
MSTP debugging is OFF [Mode: Brief]
StateMachineEvents BpduEvents PortStateEvents are being tracked
Ports: All
MSTP instances: (indices) All
Regions: All

debug mstp state

Syntax: [no] debug mstp state

This command displays debugging information related to MSTP port state events. Command output resembles the following example for MSTP PBB configurations.

Brocade# debug mstp state
Aug 12 19:14:08 Region 1, MSTP: MST 0, Port 2/5 - State: LEARNING
Aug 12 19:14:08 Region 1, MSTP: MST 1, Port 2/5 - State: LEARNING
Aug 12 19:14:23 Region 1, MSTP: MST 0, Port 2/5 - State: FORWARDING
Aug 12 19:14:23 Region 1, MSTP: MST 1, Port 2/5 - State: FORWARDING

debug mstp verbose

Syntax: [no] debug mstp verbose

This command displays debugging information for the configured MSTP debug parameters in the verbose mode. Command output resembles the following example for MSTP PBB configurations.
Spanning Tree Protocol and derivatives

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RSTP show commands

This section describes the show command that displays RSTP information.

show rstp

Syntax: show rstp [detail | vlan vlan-id | vpls-id vpls-id]

- `detail` - Displays detailed RSTP information.
- `vlan` `vlan-id` - Displays RSTP information for the specified VLAN.
- `vpls-id` `vpls-id` - Displays RSTP information for the specified Provider Backbone Bridging (PBB) VPLS instance.

This command displays RSTP information. Command output resembles the following example for RSTP PBB configurations.

Brocade# show rstp vpls-id 1
VPLS Instance ID 1  - RSTP instance 0
--------------------------------------------------------------------
RSTP (IEEE 802.1w) Bridge Parameters:
Bridge Identifier Bridge Bridge Bridge Force tx
Identifier MaxAge Hello FwdDly Version Hold
hex sec sec sec cnt
0001000480a04000 20 2 15 Default 3
RootBridge RootPath DesignatedBridge Root Max Hel Fwd
Identifier Cost Identifier Port Age lo Dly
hex hex sec sec sec
0001000480a04000 0 001000480a04000 Root 20 2 15
RSTP (IEEE 802.1w) Port Parameters:
<--- Config Params -->!< current state ---------->
Port Pri PortPath P2P Edge Role State Designa- Designated
Num Cost Mac Port tecost bridge
1/3 128 20000 T F DISABLED DISABLED 0 0000000000000000
Spanning Tree Protocol and derivatives

show rstp detail

Syntax:  show rstp detail [vpls-id vpls-id]

The vpls-id vpls-id parameter specifies the ID of the VPLS instance for which you want to display the detailed RSTP information.

This command displays detailed RSTP information. Command output resembles the following example for RSTP PBB configurations.

Brocade# show rstp detail vpls-id 1
VPLS Instance ID – 1  - RSTP instance 0

RSTP (IEEE 802.1w) Bridge Parameters:
BridgeId 0001000480a04000, RootBridgeId 0001000480a04000
Control ports - ethernet 1/3 ethernet 1/13
ForceVersion 2, MigrateTime 3, TxHoldCount 3

RSTP (IEEE 802.1w) Port Parameters:
Port 1/3 - Role: DISABLED - State: DISABLED
Port 1/13 - Role: DISABLED - State: DISABLED

show rstp history-log

Syntax:  show rstp history-log [brief | vlan vlan-id]

- **brief** - Displays the last 30 RSTP debug logs.
- **vlan vlan-id** - Displays the RSTP debug logs related to the specified VLAN.

The following table provides description of the events displayed in the command output.

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior PDU rx</td>
<td>Indicates that a superior message is received in a port.</td>
</tr>
<tr>
<td>Moved blk</td>
<td>Indicates that a port moved to discarding state from forwarding state.</td>
</tr>
</tbody>
</table>
| tcWhile Xprd   | Indicates the tcWhile expiry notification, when the timer is decremented to 
                  zero from twice the hello time. tcWhile is the interval where TCN 
                  messages are sent through the root port and for which the 
                  configuration messages are sent with the Topology Change flag set. |
| rbWhile Xprd   | Indicates the rbWhile timer expiry, from twice the hello time to zero and the 
                  port is not a backup port.                                           |
| recvInfWhl Xprd| Indicates the time remaining before the information held for the port expires, 
                  which means before message age equals or exceeds the maximum age of 
                  the information received on the port.                                |
| rRWhile Exp    | Indicates that the Recent Root While (rRWhile) timer is nonzero if the port is, 
                  or has recently been a root port. The initial value of this timer is 
                  Forward Delay as communicated by the root bridge. The timer is set to 
                  its initial value when the port becomes a root port, and this value is 
                  maintained while the port continues to be a root port. 
                  The timer will be expired (set to zero) if the port moves to discarding 
                  state.                                                                   |
| RootProtct Viol| Displayed when there is a root protection violation, which means a superior bpdu 
                  was received on the protected port.                                     |
| AltRole select | Indicates that the bridge role is selected as an alternate port.             |
This command displays the RSTP debug logs for all the VLANs. Command output resembles the following example.

```
Brocade# show rstp history-log
timestamp          PORT   VLAN ID    Event                            Triggered starting API
================================================================================================
Sept  20 09:20:11  1/1    100        PRT due to rrwhile timer expiry  rstputil_port_timer_update
Sept  20 09:21:11  1/3    4095       PRT due to rbwhile expiry        rstputil_port_timer_update
Sept  20 09:22:11  1/2    200        PRT due to rbwhile expiry        rstputil_port_timer_update
Sept  20 11:18:40  1/1    4095       Superior BPDU recvd              rstputil_process_bpdu
Sept  20 11:18:42  1/1    100        rcvdInfoWhile Timer Expiry       rstputil_port_timer_update
Sept  20 11:19:40  1/1    200        Superior BPDU recvd              rstputil_process_bpdu
```

### RSTP debug commands

The `debug rstp` commands are similar in form and function to the `debug spanning-tree` commands in a non-PBB environment. To support RSTP over PBB networks, the existing RSTP-related debug commands are enhanced to enable debugging on a VPLS VLAN instance.

This section describes the debug commands for the RSTP over PBB environment.

**debug rstp**

**Syntax:**

```
debug rstp [bpdu | event | mct | port [ethernet slot/port | pos slot/port] | reset | show  
    | verbose | vlan vlan-id | vpls-id vpls-id]
```

- **bpdu** - Enables or disables RSTP BPDU debugging.
- **event** - Enables or disables RSTP non-BPDU events debugging.
- **mct** - Enables or disables RSTP MCT debugging.
- **port** - Displays debugging information for a specific RSTP instance on the ports.
- **ethernet slot/port** - Specifies the Ethernet interface.
- **pos slot/port** - Specifies the Packet over SONET (POS) interface
- **reset** - Resets all the RSTP debugging parameters to default.
- **show** - Displays the current RSTP debugging parameters.
- **verbose** - Enables or disables the RSTP verbose debug mode.
- **vlan vlan-id** - Displays debugging information for a specific RSTP VLAN instance.
- **vpls-id vpls-id** - Displays debugging information for a specific RSTP VPLS instance.
The **debug rstp** command generates debugging information for the configured RSTP debugging parameters. Command output resembles the following example.

Brocade# debug rstp
RSTP: debugging is on
Apr 16 09:02:32.865 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/2
  0000 02 02 7e 80000000008ff2c0 00000000
  80000000008ff2c0 8092 0000 0014 0002 000f
Apr 16 09:02:32.865 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/2
Apr 16 09:02:32.865 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/2
Apr 16 09:02:32.866 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/3
  0000 02 02 7e 80000000008ff2c0 00000000
  80000000008ff2c0 8093 0000 0014 0002 000f
Apr 16 09:02:32.866 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/3
Apr 16 09:02:32.866 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/3
Apr 16 09:02:32.867 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:02:32.867 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:02:32.867 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:02:34.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:02:34.148 0000 02 02 7c 80000000008ff2c0 000007d0
  8000000000903a20 8001 0001 0014 0002 000f
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/2
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/3
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/4
Apr 16 09:02:34.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/4
Apr 16 09:02:34.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:02:34.148 0000 02 02 7c 80000000008ff2c0 000007d0
  8000000000903a20 8004 0001 0014 0002 000f
Apr 16 09:02:36.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:02:36.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:02:36.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:02:38.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
debug rstp bpdus

Syntax: [no] debug rstp bpdus

This command enables or disables debugging of RSTP BPDUs. Command output resembles the following example.

Brocade# debug rstp bpdus
RSTP Bpdu debugging ON

debug rstp event

Syntax: [no] debug rstp event

This command enables or disables debugging of RSTP non-BPDU events. Command output resembles the following example.

Brocade# debug rstp event
RSTP Event debugging ON

debug rstp mct

Syntax: [no] debug rstp mct

This command enables or disables debugging of RSTP MCT events. Command output resembles the following example.

Brocade# debug rstp mct
RSTP MCT debugging ON

debug rstp port

Syntax: [no] debug rstp port [ethernet slot/port | pos slot/port]

- ethernet slot/port - Specifies the Ethernet interface.
- pos slot/port - Specifies the POS interface.
Spanning Tree Protocol and derivatives

This command displays debugging information for a specific RSTP instance on the ports. Command output resembles the following example.

```bash
Brocade# debug rstp port ethernet 1/2
RSTP debugging turned on for ports ethernet 1/2
```

**debug rstp reset**

**Syntax:** `[no] debug rstp reset`

This command resets all the RSTP debugging parameters to default.

**debug rstp show**

**Syntax:** `[no] debug rstp show`

This command displays the current RSTP debugging parameters. Command output resembles the following example.

```bash
Brocade# debug rstp show
RSTP Debug Parameters
---------------------
RSTP debugging is OFF [Mode: Brief]
NonBpduEvents BpduEvents are being tracked
Ports: All
VLANs: All
VPLS ID: All
VPLS : All
```

**debug rstp verbose**

**Syntax:** `[no] debug rstp verbose`

This command displays debugging information for the configured RSTP debugging parameters in the verbose mode. Command output resembles the following example.

```bash
Brocade# debug rstp verbose
RSTP debugging set to VERBOSE mode
Brocade# debug rstp show
RSTP Debug Parameters
---------------------
RSTP debugging is OFF [Mode: Verbose]
BpduEvents are being tracked
Ports: All
VLANs:
VPLSs: 1
```

```bash
Brocade# debug rstp
RSTP: debugging is on
Apr 16 09:04:56.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:04:56.148 protocol-id: 0000
    protocol-version: 02
type: 02
    flags: 7c
root-id: 80000000008ffc20
    path-cost: 000007d0
bridge-id: 8000000000903a20
    port-id: 8001
message-age: 0001
    max-age: 0014
```
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hello-time: 0002
forward-delay: 000f
Apr 16 09:04:56.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:04:56.148 protocol-id: 0000
protocol-version: 02
type: 02
flags: 7c
root-id: 80000000008ffc20
path-cost: 000007d0
bridge-id: 8000000000903a20
port-id: 8004
message-age: 0001
max-age: 0014
hello-time: 0002
forward-delay: 000f
Apr 16 09:04:56.867 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/2
protocol-id: 0000
protocol-version: 02
type: 02
flags: 7e - agree fwd lrn designated propose
root-id: 80000000008ffc20
path-cost: 00000000
bridge-id: 80000000008ffc20
port-id: 8092
message-age: 0000
max-age: 0014
hello-time: 0002
forward-delay: 000f

debug rstp vlan

Syntax: [no] debug rstp vlan vlan-id

The vlan-id variable specifies the ID of the configured VLAN.

This command enables or disables RSTP debugging for a specific VLAN and displays debugging information for that VLAN. Command output resembles the following example.

Brocade# debug rstp vlan 2
RSTP debugging turned on for VLAN instance 2

d debug rstp vpls-id

Syntax: [no] debug rstp vpls-id vpls-id

The vpls-id variable specifies the ID of the configured PBB VPLS instance.

This command enables or disables RSTP debugging for a specific VPLS instance and displays debugging information for that VPLS instance. Command output resembles the following example.

Brocade# debug rstp vpls-id 1
RSTP debugging turned on for vpls instance 1
Brocade# debug rstp
RSTP: debugging is on
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:03:16.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:03:16.148 0000 02 02 7c 80000000008ffc20 8000000000903a20 8001 0001 0014 0002 000f
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/2
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/3
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/4
Apr 16 09:03:16.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/4
Apr 16 09:03:16.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:03:16.148 0000 02 02 7c 80000000008ffc20 000007d0
8000000000903a20 8004 0001 0014 0002 000f
Apr 16 09:03:16.865 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/2
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8092 0000 0014 0002 000f
Apr 16 09:03:16.865 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/2
Apr 16 09:03:16.865 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/2
Apr 16 09:03:16.865 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/3
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8093 0000 0014 0002 000f
Apr 16 09:03:16.865 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/3
Apr 16 09:03:16.865 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/3
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:03:18.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:03:18.148 0000 02 02 7c 80000000008ffc20 000007d0
8000000000903a20 8001 0001 0014 0002 000f
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/2
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/3
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/4
Apr 16 09:03:18.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/4
Apr 16 09:03:18.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:03:18.148 0000 02 02 7c 80000000008ffc20 00000000
80000000008ffc20 8093 0000 0014 0002 000f
Apr 16 09:03:18.865 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/2
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8092 0000 0014 0002 000f
Apr 16 09:03:18.865 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/2
Apr 16 09:03:18.865 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/2
Apr 16 09:03:18.865 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/3
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8093 0000 0014 0002 000f
Apr 16 09:03:18.865 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/3
Apr 16 09:03:18.865 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/3
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/1
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/1
Apr 16 09:03:20.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/1
Apr 16 09:03:20.148 0000 02 02 7c 80000000008ffc20 000007d0
8000000000903a20 8001 0001 0014 0002 000f
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/2
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/3
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_PERIODIC - VPLS Instance 1, Port 1/4
Apr 16 09:03:20.148 RSTP: PTX IDLE->TRANSMIT_RSTP - VPLS Instance 1, Port 1/4
Apr 16 09:03:20.148 RSTP: Sending RST BPDU - VPLS Instance 1 Port 1/4
Apr 16 09:03:20.148 0000 02 02 7c 80000000008ffc20 00000000
80000000008ffc20 8093 0000 0014 0002 000f
Apr 16 09:03:20.867 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/2
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8092 0000 0014 0002 000f
Apr 16 09:03:20.867 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/2
Apr 16 09:03:20.867 RSTP: PIM RECEIVE->REPEAT - VPLS Instance 1, Port 1/2
Apr 16 09:03:20.867 RSTP: Received RSTP BPDU - VPLS Instance 1 Port 1/3
0000 02 02 7e 80000000008ffc20 00000000
80000000008ffc20 8093 0000 0014 0002 000f
Apr 16 09:03:20.867 RSTP: PIM CURRENT->RECEIVE - VPLS Instance 1, Port 1/3
Configuration notes

- Changing the STP state of the primary port in a trunk group affects all ports in the trunk group.
- With RSTP, rapid convergence will not occur on ports connected to shared media devices, such as hubs. To take advantage of the rapid convergence provided by RSTP, make sure to explicitly configure all point-to-point links in a topology.
- When you enable SuperSpan globally, and then create a new VLAN, the new VLAN inherits the global SuperSpan state.
- In many cases, generic debugging is not useful. If multiple STP instances are configured, it can be difficult to identify content for a specific instance from the extensive output that may be generated. Use the `debug spanning-tree port` and `debug spanning-tree vlan` commands to define specific instances for debugging.

Common diagnostic scenarios

- Spanning Tree loops.
- Spanning Tree reacts to topology changes and port flapping.
- Port flapping can trigger a new Spanning Tree learning process.

LACP trunking

The Link Aggregation Control Protocol (LACP) allows ports on both sides of a redundant link to automatically configure themselves into a trunk link (aggregate link), eliminating the need for manual configuration. LACP has two modes:

- Active mode – When active link aggregation is enabled, the Brocade port can exchange standard LACP Data Unit (LACPDU) messages to negotiate trunk group configuration with the port on the other side of the link. In addition, the Brocade port actively sends LACPDU messages on the link to search for a link aggregation partner at the other end of the link, and can initiate an LACPDU exchange to negotiate link aggregation parameters with an appropriately configured remote port.

- Passive mode – In passive link aggregation, the Brocade port can exchange LACPDU messages with the port at the remote end of the link, but this port cannot search for a link aggregation port or initiate negotiation of an aggregate link. In passive mode, the port at the remote end of the link must initiate the LACPDU exchange.

When you enable link aggregation on a group of Brocade ports, the Brocade ports can negotiate with the ports at the remote ends of the links to establish trunk groups.

Trunk show commands

The following show commands display information about trunking configurations.

```
show lag
```

Syntax: `show lag`
This command displays trunk information for the ports managed by the CPU. The CPU assigns the hash values evenly to the trunk ports managed by the CPU.

```
Brocade# show lag
Max number of trunks: 128
Available: 127
Configured number of server trunks: 1

Configured trunks:

Trunk ID: 1
Type: Server
Ports_Configured: 2
Base FID: 0x0400
FID count: 16

Ports          14/6     14/8
Port Names     ve4012   TestCa*
Port_Status    disable  disable

Operational trunks:

Trunk ID: 1
Type: Server
Duplex: None
Speed: None
Tag: Dual
Priority: level0
Active Ports: 0

Ports          14/6     14/8
Link_Status    down     down
```

**Trunk debug commands**

There are no debug commands specific to LACP trunking.

**Configuration notes**

- You cannot use 802.3ad link aggregation on a port configured as a member of a static trunk group.
- When LACP dynamically adds or changes a trunk group, the `show lag` command displays the trunk as both configured and active. However, the `show running-config` or `write terminal` commands do not contain a trunk command defining the new or changed trunk group.
- You can enable link aggregation on 802.1q tagged ports (ports that belong to more than one port-based VLAN).
- LACP cannot be configured on a VPLS endpoint port, and a VPLS endpoint cannot be configured on a physical port that has LACP enabled. This restriction is enforced by the CLI. If a VPLS endpoint receives any LACP traffic, this traffic will be dropped by the router at ingress. However, if the VPLS has CPU protection enabled, this traffic will be hardware flooded.
Brocade recommends that you disable or remove the cables from the ports you plan to enable for dynamic link aggregation. Doing so prevents the possibility that LACP will use a partial configuration to talk to the other side of a link. A partial configuration does not cause errors, but sometimes requires LACP to be disabled and re-enabled on both sides of the link to ensure that a full configuration is used. It is easier to disable a port or remove its cable first. This applies both for active link aggregation and passive link aggregation.

**Trunk formation rules**

When troubleshooting trunks, make sure the following rules for trunk formation have been considered:

- Any number of ports between 2 and 20 within the same chassis can be used to configure a trunk port.
- Use the server trunk option when configuring a trunk group that connects to VPLS or Virtual Lease Line (VLL) endpoints.
- Ports in a trunk must have the same speed, negotiation mode, and Quality of Service (QoS) priority or the trunk is rejected.
- All ports configured in a trunk must be configured with the same port attributes.
- Primary port policy applies to all secondary ports. No trunk is rejected.
- The trunk is rejected if any trunk port has mirroring or monitoring configured.
- The trunk is rejected if any trunk port has VLAN or inner-VLAN translation configured.

**Layer 2 requirements**

The trunk is rejected if the trunk ports:

- Do not have the same untagged VLAN component.
- Do not share the same SuperSpan Customer ID (CID).
- Do not share the same VLAN membership.
- Do not share the same uplink VLAN membership.
- Do not share the same protocol-VLAN configuration.
- Are configured as primary and secondary interfaces.

**Layer 3 requirements**

The trunk is rejected if any secondary trunk port has any Layer 3 configurations, such as IPv4 or IPv6 addresses, OSPF, RIP, RIPng, IS-IS, and so on.

**Layer 4 (ACL) requirements**

All trunk ports must have the same ACL configurations or the trunk is rejected. You can have a maximum of 128 server trunks and 80 switch trunks.

**NOTE**

These trunking rules are applicable for statically configured trunks as well as dynamic trunks created using LACP.
Common diagnostic scenarios

- When adding a new port to a 4-port LACP trunk, the existing ports go down and come back up in order to establish the fifth port. For existing 5-port trunks, when one port flaps, the other ports in the trunk will not flap.

- LACP trunk links may not operate properly between Brocade devices and third-party devices because of a mismatch between the link configurations. If the link is fixed on the third-party side, the link on the Brocade side must be a trunk. If it is link-aggregated on the third-party side, then it needs to be the same on the Brocade side.

- When adding new ports to a static or dynamic (LACP) trunk, you must reconfigure the Link Aggregation Group (LAG).

- LACP links may not operate properly due to misconfigurations. Contact Brocade Technical Support for help with configuration issues.

UDLD

Unidirectional Link Detection (UDLD) monitors a link between two routers to quickly detect link failures. UDLD brings the ports on both ends of the link down if the link goes down at any point between the two devices. This feature is useful for individual port links and for trunk links.

UDLD show commands

This section describes the show commands that display UDLD information.

show link-keepalive

Syntax: show link-keepalive

This command displays UDLD information for all ports.

Brocade# show link-keepalive
Total link-keepalive enabled ports: 4
Keepalive Retries: 5 Keepalive Interval: 1 Sec.

<table>
<thead>
<tr>
<th>Port</th>
<th>Physical Link</th>
<th>Link-keepalive</th>
<th>Logical Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1</td>
<td>up</td>
<td>up</td>
<td>up</td>
</tr>
<tr>
<td>4/2</td>
<td>up</td>
<td>up</td>
<td>up</td>
</tr>
<tr>
<td>4/3</td>
<td>down</td>
<td>down</td>
<td>down</td>
</tr>
<tr>
<td>4/4</td>
<td>up</td>
<td>down</td>
<td>down</td>
</tr>
</tbody>
</table>

show interface brief

Syntax: show interface brief

This command displays concise information if a port is disabled by UDLD, as shown in the following example.

Brocade#show interface brief

<table>
<thead>
<tr>
<th>Port</th>
<th>Link</th>
<th>State</th>
<th>Dupl</th>
<th>Speed</th>
<th>Trunk</th>
<th>Tag</th>
<th>Priori</th>
<th>MAC Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1</td>
<td>Up</td>
<td>LK-DISABLE</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td></td>
<td>level0</td>
<td>0000.00a9.bb00</td>
</tr>
<tr>
<td>1/2</td>
<td>Down</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td></td>
<td>level0</td>
<td>0000.00a9.bb01</td>
</tr>
<tr>
<td>1/3</td>
<td>Down</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td></td>
<td>level0</td>
<td>0000.00a9.bb02</td>
</tr>
<tr>
<td>1/4</td>
<td>Down</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td></td>
<td>level0</td>
<td>0000.00a9.bb03</td>
</tr>
</tbody>
</table>
show link-keepalive ethernet

Syntax: show link-keepalive ethernet slot/port

This command displays detailed UDLD information for a specific port, as shown in the following example.

Brocade# show link-keepalive ethernet 4/1
Current State: up Remote MAC Addr: 0000.00d2.5100
Local Port: 4/1 Remote Port: 2/1
Local System ID: e0927400 Remote System ID: e0d25100
Packets sent: 254 Packets received: 255
Transitions: 1

UDLD debug commands

This section describes the UDLD-related debug commands.

d debug link-keepalive packet

Syntax: [no] debug link-keepalive packet [tx | rx]

- **tx** - Enables debugging for all ports for transmit PDUs.
- **rx** - Enables debugging for all ports for receive PDUs.

This command enables debugging for all ports for transmit PDUs or receive PDUs or both. This command is available only on LP.

Command output resembles the following example when debugging is enabled for all ports for both transmit and receive PDUs.

Brocade# debug link-keepalive packet
Link-Keepalive: All Ports RX TX debugging is on
Brocade# Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr  3 09:39:06.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local  Seq Num: 9
Remote Seq Num: 5
Local   Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)
--------------------------------------------
Apr  3 09:39:06.074 UDLD PDU Received by 1/2:
--------------------------------------------
Local  Seq Num: 6
Remote Seq Num: 9
Local  Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr  3 09:39:06.074 Remote Port = 2/1 (00008081)
Apr  3 09:39:06.074 Last rx clock:7500
Apr  3 09:39:06.074 udld_lka->wrong_seq_cnt:0
Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr  3 09:39:12.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local  Seq Num: 10
Remote Seq Num: 6
UDLD

Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)

------------------------------------------------------------------------
Apr  3 09:39:12.074 UDLD PDU Received by 1/2:
------------------------------------------------------------------------

Local  Seq Num: 7
Remote Seq Num: 10
Local  Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)

------------------------------------------------------------------------
Remote Running New Version
Apr  3 09:39:12.074 Remote Port = 2/1 (00008081)
Apr  3 09:39:12.074 Last rx clock:7740
Apr  3 09:39:12.074 udld_lka->wrong_seq_cnt:0

The following is a sample output from the `debug link-keepalive packet tx` command.

Brocade# debug link-keepalive packet tx
Link-Keepalive: All Ports TX debugging is on
Brocade# Sending Local Port In New Version: 1/2 (00008042)
------------------------------------------------------------------------
Apr  3 09:41:48.050 UDLD PDU sent by 1/2 (00008042)
------------------------------------------------------------------------

Local  Seq Num: 36
Remote Seq Num: 32
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)

------------------------------------------------------------------------
Sending Local Port In New Version: 1/2 (00008042)
------------------------------------------------------------------------
Apr  3 09:41:54.050 UDLD PDU sent by 1/2 (00008042)
------------------------------------------------------------------------

Local  Seq Num: 37
Remote Seq Num: 33
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)

------------------------------------------------------------------------
Sending Local Port In New Version: 1/2 (00008042)
------------------------------------------------------------------------
Apr  3 09:42:00.050 UDLD PDU sent by 1/2 (00008042)
------------------------------------------------------------------------

Local  Seq Num: 38
Remote Seq Num: 34
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)

------------------------------------------------------------------------

The following is a sample output from the `debug link-keepalive packet rx` command.

Brocade# debug link-keepalive packet rx
Link-Keepalive: All Ports RX debugging is on
Brocade# Apr  3 09:40:54.074 UDLD PDU Received by 1/2:
------------------------------------------------------------------------

Local  Seq Num: 24
Remote Seq Num: 27
Local  Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)

------------------------------------------------------------------------
Remote Running New Version
Apr  3 09:40:54.074 Remote Port = 2/1 (00008081)
Apr  3 09:40:54.074 Last rx clock:11820
Apr  3 09:40:54.074 udld_lka->wrong_seq_cnt:0
Apr 3 09:41:00.074 UDLD PDU Received by 1/2:

--------------------------------------------
Local Seq Num: 25
Remote Seq Num: 28
Local Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:41:00.074 Remote Port = 2/1 (00008081)
Apr 3 09:41:00.074 Last rx clock:12060
Apr 3 09:41:00.074 udld_lka->wrong_seq_cnt:0
no debug all
All possible debug messages have been turned off

Use the no form of the command to disable PDU debugging for all ports.

debug link-keepalive packet eth

**Syntax:** `[no] debug link-keepalive packet eth slot/port [tx | rx]

- **tx** - Enables debugging for a specific port for transmit PDUs.
- **rx** - Enables debugging for a specific port for receive PDUs.

This command enables debugging for a specific port for transmit PDUs or receive PDUs or both. This command is available only on LP.

Command output resembles the following example when debugging is enabled for a specific port for both transmit and receive PDUs.

Brocade# debug link-keepalive packet eth 1/2
Link-Keepalive: Specified Ports RX TX debugging is on
Brocade# Sending Local Port In New Version: 1/2 (00008042)

--------------------------------------------
Apr 3 09:43:30.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local Seq Num: 53
Remote Seq Num: 49
Local Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)
--------------------------------------------
Apr 3 09:43:30.074 UDLD PDU Received by 1/2:
--------------------------------------------
Local Seq Num: 50
Remote Seq Num: 53
Local Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:43:30.074 Remote Port = 2/1 (00008081)
Apr 3 09:43:30.074 Last rx clock:18060
Apr 3 09:43:30.074 udld_lka->wrong_seq_cnt:0
Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr 3 09:43:36.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local Seq Num: 54
Remote Seq Num: 50
Local Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)
--------------------------------------------
UDLD

Apr 3 09:43:36.074 UDLD PDU Received by 1/2:
--------------------------------------------
Local  Seq Num: 51
Remote Seq Num: 54
Local  Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:43:36.074 Remote Port = 2/1 (00008081)
Apr 3 09:43:36.074 Last rx clock:18300
Apr 3 09:43:36.074 udld_lka->wrong_seq_cnt:0

The following is a sample output from the `debug link-keepalive packet eth slot/port tx` command.

Brocade# debug link-keepalive packet eth 1/2 tx
Link-Keepalive: Specified Ports TX debugging is on
Brocade# Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr 3 09:45:24.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local  Seq Num: 72
Remote Seq Num: 68
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)
--------------------------------------------
Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr 3 09:45:30.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local  Seq Num: 73
Remote Seq Num: 69
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)
--------------------------------------------
Sending Local Port In New Version: 1/2 (00008042)
--------------------------------------------
Apr 3 09:45:36.050 UDLD PDU sent by 1/2 (00008042)
--------------------------------------------
Local  Seq Num: 74
Remote Seq Num: 70
Local  Port No: 2/1 (00008042)
Remote Port No: 2/1 (00008081)

The following is a sample output from the `debug link-keepalive packet eth slot/port rx` command.

Brocade# debug link-keepalive packet eth 1/2 rx
Link-Keepalive: Specified Ports RX debugging is on
Brocade# Apr 3 09:44:18.074 UDLD PDU Received by 1/2:
--------------------------------------------
Local  Seq Num: 58
Remote Seq Num: 61
Local  Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:44:18.074 Remote Port = 2/1 (00008081)
Apr 3 09:44:18.074 Last rx clock:19980
Apr 3 09:44:18.074 udld_lka->wrong_seq_cnt:0
Apr 3 09:44:24.074 UDLD PDU Received by 1/2:
--------------------------------------------
Local  Seq Num: 59
Remote Seq Num: 62
Local Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:44:24.074 Remote Port = 2/1 (00008081)
Apr 3 09:44:24.074 Last rx clock:20220
Apr 3 09:44:24.074 udld_lka->wrong_seq_cnt:0
Apr 3 09:44:30.074 UDLD PDU Received by 1/2:
--------------------------------------------
Remote Seq Num: 63
Local Port No: 2/1 (00008081)
Remote Port No: 1/2 (00008042)
--------------------------------------------
Remote Running New Version
Apr 3 09:44:30.074 Remote Port = 2/1 (00008081)
Apr 3 09:44:30.074 Last rx clock:20460
Apr 3 09:44:30.074 udld_lka->wrong_seq_cnt:0

Use the no form of the command to disable PDU debugging for a specified port.

dump link-keepalive show

Syntax: dump link-keepalive show

This command displays debugging parameters for link-keepalive protocol. Command output resembles the following example.

Brocade# dump link-keepalive show
Link-keepalive debug parameters
---------------------------------------------
RX debugging is on for ports ethe 1/2
TX debugging is on for ports ethe 1/2

Clearing UDLD statistics

To clear UDLD statistics, enter the following command.

clear link-keepalive statistics

Syntax: clear link-keepalive statistics

This command clears the packets sent, packets received, and transitions counters in the show link-keepalive ethernet slot/port display.

Configuration notes

- UDLD is supported only on Ethernet ports.
- To configure UDLD on a trunk group, you must configure the feature on each port of the group individually.
- Configuring UDLD on the primary port of a trunk group enables the feature on that port only.
- Dynamic trunking is not supported. If you want to configure a trunk group that contains ports where UDLD is enabled, you must remove the UDLD configuration from the ports. After you create the trunk group, you can add the UDLD configuration again.
• When a specified number of port failures occurs, UDLD can bring the port down. Syslog messages are generated when this occurs.
• Once the UDLD holddown threshold for a port is reached, a warning message is generated and written to the system log. The message means that UDLD is blocked on the specified port until the holddown counter is cleared for the port.

Common diagnostic scenarios
• Port flapping occurs when UDLD is configured.
  Port flapping can occur because of a problem with a dirty optic module connection or other hardware issue.
• UDLD may bring a port down (port blocked) because of a malformed.
• UDLD packets may be sent from a port, but not received on a port.
  This may be a hardware issue with the port or the module.
• UDLD links may not operate properly between Brocade devices and third-party devices.
  UDLD is proprietary and not compatible between vendors. Contact Brocade Technical Support for assistance.
• UDLD interfaces may flap during a write memory exercise.
  CPU usage may be too high. Contact Brocade Technical Support for assistance.
• UDLD port numbers on remote devices may be reported incorrectly (wrong ID number) by the Brocade device.
  The remote port number reflects the port ID sent by the remote router or switch and interpreted by the local router. In cases where the local router interprets the port ID differently than the remote, the port ID shown may be incorrect.

VSRP
Virtual Switch Redundancy Protocol (VSRP) is a proprietary protocol that provides redundancy and sub-second failover in Layer 2 mesh topologies. Based on the Virtual Router Redundancy Protocol Extended (VRRP-E), VSRP provides one or more backups for the Brocade NetIron XMR and Brocade MLX series routers. If the active Brocade NetIron XMR and Brocade MLX series routers become unavailable, one of the backups takes over as the active device and continues forwarding traffic for the network.

VSRP provides Layer 2 redundancy, meaning that Layer 2 links are backed up. You can configure VSRP to provide redundancy for Layer 2 only or also for Layer 3.
• Layer 2 only – The Layer 2 links are backed up, but specific IP addresses are not backed up.
• Layer 2 and Layer 3 – The Layer 2 links are backed up and a specific IP address is also backed up. Layer 3 VSRP is the same as VRRP-E. However, using VSRP provides redundancy at both layers at the same time.

VSRP show commands
This section describes the show commands that display VSRP information.
show log

Syntax:  show log

This command displays log messages, as shown in the following example.

Brocade#show log
Syslog logging: enabled (0 messages dropped, 1 flushes, 0 overruns)
    Buffer logging: level ACDMEINW, 5 messages logged
    level code:  A=alert  C=critical  D=debugging  E=emergency  E=error
    I=informational  N=notification  W=warning

Dynamic Log Buffer (50 lines):
I:VSRP: VLAN 5 VRID 5 - transition to Backup
I:VSRP: VLAN 5 VRID 5 - transition to Master
I:VSRP: VLAN 5 VRID 5 - transition to Master-Confirm
I:VSRP: VLAN 5 VRID 5 - transition to Backup
I:System: Interface ethernet 1/6, state up
This log output shows all of the events that have taken place.

show vsrp

Syntax:  show vsrp

This command displays VSRP diagnostic information, as shown in the following example.

Brocade# show vsrp
VLAN 5
    Auth-type no authentication
VRID 5
    =========
    State           Administrative-status Advertise-backup Preempt-mode
    Initialize      Enabled               Disabled         True
    Parameter        Configured Current    Unit/Formula
    Priority         150        1          (150-0)*(0.0/1.0)
    Hello-interval   1          1          sec/10
    Dead-interval    3          3          sec/10
    Hold-interval    3          3          sec/10
    Initial-ttl      2          2          hops

    Member ports: ethe 1/6
    Operational ports: None
info - vsrp_set_init() - init for vrid 5
info - vsrp_set_backup() - instance 5 set to backup state
info - vsrp_set_master_confirm() - vrid 5 set to master confirm

In this example, VRID 5 is in the initialization state, with a priority of 150. Because the current master’s priority is lower than 150, VRID 5 changes from backup to master.

In the following section of output, the new master receives a Hello message with a higher priority (200) and reverts to backup. In the output, several VSRP PDUs are received, but none with a priority higher than 200, so the new master remains the master.
VSRP debug commands

This section describes how to use debug commands to monitor VSRP environments.

deg vsrp

Syntax: [no] debug vsrp [all | aware | error | events | packets | show | state | verbose | vlan vlan id]

- all - Displays information about all VSRP events.
- aware - Displays information about VSRP aware.
- error - Displays VSRP errors.
- events - Displays VSRP events.
- packets - Displays information about VSRP packets.
- show - Displays VSRP debug parameters.
- state - Displays VSRP state changes.
- verbose - Displays VSRP information in verbose mode.
- vlan vlan id - Displays VSRP debug information for a specific VLAN.

This command generates information about VSRP activity. All VSRP routers go to the backup state when they are first reloaded. Command output is similar to the following, where router 1 goes to the master-confirm and master states. For Layer 3 VSRP, the master sends out the gratuitous ARP for the virtual router IP address, and then sends out the Hello packet as Layer 2 VSRP.

Brocade# debug vsrp all
VSRP debugging is setup for all attributes
Brocade# debug vsrp
VSRP: debugging is on

May 17 11:06:18 VSRP: VLAN VLAN: 100, VRID 1, State BACKUP
May 17 11:06:25 VSRP: Packet received on port 1/6, vlan VLAN: 100
  ver:2 type:1 vrid:1 pri:111 #ip:0 aut:0
  adv:1 dea:3 hld:3 ttl:2 scl:10 chksum:0xa93c 10.53.5.1
May 17 11:06:35 VSRP: Packet received on port 1/6, vlan VLAN: 100
  ver:2 type:1 vrid:1 pri:111 #ip:0 aut:0
  adv:1 dea:3 hld:3 ttl:2 scl:10 chksum:0xa93c 10.53.5.1
May 17 11:06:42 VSRP: VLAN VLAN:100, VRID 1, State MASTER-CONFIRM
May 17 11:06:42 VSRP: vlan VLAN:10, VRID 10, state MASTER
  ver:2 type:1 vrid:10 pri:110 #ip:1 aut:0
  adv:1 dea:3 hld:3 ttl:2 scl:10 chksum:0xaa3c 10.53.5.1

VSRP PDU received - vlan 5 - port 1/6
ver:2 type:1 vrid:5 pri:200 #ip:0 aut:0
  adv:1 dea:3 hld:3 ttl:2 scl:10 chksum:0x11ecApr 26 16:09:13
event:
-------------
info - vrp_set_backup() - instance 5 set to backup state

VSRP PDU received - vlan 5 - port 1/6
ver:2 type:3 vrid:5 pri:200 #ip:0 aut:0
  adv:1 dea:3 hld:3 ttl:2 scl:10 chksum:0x0fecApr 26 16:09:14-----------------------------

info - vrp_set_backup() - instance 5 set to backup state
VPORT Scaling

Virtual Ports (VPORTs) are port-VLAN abstractions as well as trunk port abstractions. VPORTs allow independent port states for VLANs of the same physical port and allow multiple ports to appear as a single port in the case of trunking. VPORTs control Layer 2 protocols associated with the VLAN port. To improve VPORT scalability up to 32k, optimization of ITC, IPC, and hardware updates are done, based on the effective VPORT (EVP) count. The EVP count is the number of VLAN and port combination in the system.

VPORT Scaling show commands

This section describes the show command that displays detailed information about the VLAN.
show vlan detail

Syntax: show vlan detail

This command displays detailed information about VLAN states, port types, port modes, actual VPORT (AVP) count, EVP count, and control protocols configured on the VLAN, as shown in the following example.

The AVP count is the number of VPORTs configured in the system, whereas the EVP count is the number of VLAN and port combination in the system.

```
Brocade# show vlan detail
Untagged Ports: ethernet 2/1 to 2/20 ethernet 4/4
Tagged Ports: None
Dual-mode Ports: ethernet 3/1 to 3/20jjj ethernet 4/1 to 4/3
Default VLAN: 1
Control VLAN: 4095
VLAN Tag-type: 0x8100
AVP Count : 24
EVP Count : 28
PORT-VLAN 1, Name DEFAULT-VLAN, Priority Level0
----------------------------------------------------------
<table>
<thead>
<tr>
<th>Port</th>
<th>Type</th>
<th>Tag-Mode</th>
<th>Protocol</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NON</td>
<td>DISABLED</td>
</tr>
<tr>
<td>2/2</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>DISABLED</td>
</tr>
<tr>
<td>2/3</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>DISABLED</td>
</tr>
<tr>
<td>2/4</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>DISABLED</td>
</tr>
<tr>
<td>2/5</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>DISABLED</td>
</tr>
<tr>
<td>4/1</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>FORWARDING</td>
</tr>
<tr>
<td>4/2</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>FORWARDING</td>
</tr>
<tr>
<td>4/3</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>FORWARDING</td>
</tr>
<tr>
<td>4/4</td>
<td>PHYSICAL</td>
<td>UNTAGGED</td>
<td>NONE</td>
<td>DISABLED</td>
</tr>
</tbody>
</table>
PORT-VLAN 100, Name [None], Priority Level0
----------------------------------------------------------
<table>
<thead>
<tr>
<th>Port</th>
<th>Type</th>
<th>Tag-Mode</th>
<th>Protocol</th>
<th>State</th>
</tr>
</thead>
</table>
```

LLDP

Link Layer Discovery Protocol (LLDP) enables a station to advertise its capabilities and to discover other LLDP-enabled stations in the same 802 LAN. An LLDP agent can transmit and receive information to and from another LLDP agent located on an adjacent device, but it cannot solicit information from another LLDP agent, nor can it acknowledge information received from another LLDP agent.

LLDP debug commands

This section describes the LLDP-related debug commands.

dump lldp

Syntax: dump lldp
This command displays information about LLDP port state changes. Command output resembles the following example.

Brocade# debug lldp
   LLDP: All Ports: debugging is on
Nov 17 19:29:37 LLDP port 1/1 : Tx INIT -> INIT ; Rx WAIT_PORT_OPER ->
   WAIT_PORT_OPER
Nov 17 19:29:37 LLDP: Ethernet: 1/1 tx_enabled = 1 rx_enabled = 1
Nov 17 19:29:37 LLDP port 1/2 : Tx INIT -> INIT ; Rx WAIT_PORT_OPER ->
   WAIT_PORT_OPER
Nov 17 19:29:37 LLDP: Ethernet: 1/2 tx_enabled = 1 rx_enabled = 1
Nov 17 19:29:37 LLDP port 1/3 : Tx INIT -> IDLE ; Rx INIT -> WAIT_FOR_FRAME
Nov 17 19:29:37 LLDP: Ethernet: 1/3 tx_enabled = 1 rx_enabled = 1
Nov 17 19:29:44 LLDP event : Packet recieved on port: 1/1
Nov 17 19:29:44 LLDP event : Packet recieved on port: 1/2
Nov 17 19:29:44 LLDP event : Packet recieved on port: 1/3
Nov 17 19:30:08 LLDP event : poll timer triggered
Nov 17 19:30:08 LLDP event : poll timer triggered, calling timer handler
Nov 17 19:30:08 LLDP event : Packet sent from port: 1/1
Nov 17 19:30:08 LLDP event : called transmit PDU on port 1/1
Nov 17 19:30:08 LLDP event : poll timer triggered
Nov 17 19:30:08 LLDP event : poll timer triggered, calling timer handler
Nov 17 19:30:08 LLDP event : Packet sent from port: 1/2
Nov 17 19:30:08 LLDP event : called transmit PDU on port 1/2
Nov 17 19:30:08 LLDP event : poll timer triggered
Nov 17 19:30:08 LLDP event : poll timer triggered, calling timer handler
Nov 17 19:30:08 LLDP event : Packet sent from port: 1/3
Nov 17 19:30:08 LLDP event : called transmit PDU on port 1/3

debug lldp port

Syntax: debug lldp port ethernet slot/port

The ethernet slot/port parameter limits the display of LLDP port state change information to the specific Ethernet port. Command output resembles the following example.

Brocade# debug lldp port ethernet 1/1
LLDP debug port set to 1/1.
Nov 17 19:29:37 LLDP port 1/1 : Tx INIT -> INIT ; Rx WAIT_PORT_OPER ->
   WAIT_PORT_OPER
Nov 17 19:29:37 LLDP: Ethernet: 1/1 tx_enabled = 1 rx_enabled = 1
Nov 17 19:29:44 LLDP event : Packet recieved on port: 1/1
Nov 17 19:30:08 LLDP event : poll timer triggered
Nov 17 19:30:08 LLDP event : poll timer triggered, calling timer handler
Nov 17 19:30:08 LLDP event : Packet sent from port: 1/1
Nov 17 19:30:08 LLDP event : called transmit PDU on port 1/1

MMRP

Multiple MAC Registration Protocol (MMRP) allows dynamic registration of group MAC address or individual MAC addresses among the end stations and bridges in the same Local Area Network (LAN). MAC address registration information controls transfer of frames destined for the group MAC address to be forwarded only to the registered group members.
MMRP debug commands

This section describes the MMRP-related debug commands.

**debug mmrp**

Syntax:  [no] debug mmrp [cli | config | db-event | error-event | ethernet | event | itc | pdu | reset | rx-event | show | sm-event | timer | tx-event | verbose]

- **cli** - Enables or disables MMRP CLI debugging.
- **config** - Enables or disables MMRP configuration debugging.
- **db-event** - Enables or disables MMRP database event debugging.
- **error-event** - Enables or disables MMRP error event debugging.
- **ethernet** - Enables or disables MMRP port debugging.
- **event** - Enables or disables MMRP event debugging.
- **itc** - Enables or disables MMRP inter-task communication (ITC) debugging.
- **pdu** - Enables or disables Multiple MAC Registration Protocol data unit (MMRPDU) message debugging.
- **reset** - Resets all the MMRP debugging parameters to default.
- **rx-event** - Enables or disables MMRP receive event debugging.
- **sm-event** - Enables or disables MMRP state machine event debugging.
- **timer** - Enables or disables MMRP timer debugging.
- **tx-event** - Enables or disables MMRP transmit event debugging.
- **verbose** - Enables or disables the MMRP verbose debugging mode.
- **show** - Displays the current MMRP debugging parameters.

**debug mmrp show**

Syntax:  debug mmrp show

This command displays the current MMRP debugging parameters. Command output resembles the following example.

```
Brocade# debug mmrp show
MMRP Debug Parameters
-----------------------
MMRP debugging is OFF [Mode: Brief]
Event: OFF
PDU Tx: OFF
PDU Rx: OFF
PDU Error: OFF
Timer: OFF
CLI: OFF
Config: OFF
ITC: OFF
Rx-Event: OFF
Tx-Event: OFF
Db-Event: OFF
Error-Event: OFF
State-machine Event: OFF
```
Multiple VLAN Registration Protocol (MVRP) allows the propagation of VLAN configuration information from one MVRP-aware switch to other MVRP-aware switches. With MVRP, an access switch is manually configured with all the desired VLANs for the network, and all the other switches on the network learn the VLAN configuration information dynamically. This avoids unnecessary flooding and provides a solution for better resource utilization and bandwidth conservation.

**MVRP debug commands**

This section describes the MVRP-related debug commands.

```plaintext
debug mvrp
```

**Syntax:** [no] debug mvrp [cli | config | db-event | error-event | ethernet | event | itc | pdu | reset | rx-event | show | sm-event | timer | tx-event | verbose]

- **cli** - Enables or disables MVRP CLI debugging.
- **config** - Enables or disables MVRP configuration debugging.
- **db-event** - Enables or disables MVRP database event debugging.
- **error-event** - Enables or disables MVRP error event debugging.
- **ethernet** - Enables or disables MVRP port debugging.
- **event** - Enables or disables MVRP event debugging.
- **itc** - Enables or disables MVRP inter-task communication (ITC) debugging.
- **pdu** - Enables or disables Multiple VLAN Registration Protocol data unit (MVRPDU) message debugging.
- **reset** - Resets all the MVRP debugging parameters to default.
- **rx-event** - Enables or disables MVRP receive event debugging.
- **show** - Displays the current MVRP debugging parameters.
- **sm-event** - Enables or disables MVRP state machine event debugging.
- **timer** - Enables or disables MVRP timer debugging.
- **tx-event** - Enables or disables MVRP transmit event debugging.
- **verbose** - Enables or disables the MVRP verbose debugging mode.

The `debug MVRP` command enables or disables MVRP-related debugging events.

```plaintext
debug mvrp show
```

**Syntax:** debug mvrp show

This command displays the current MVRP debugging parameters. Command output resembles the following example.

```
Brocade# debug mvrp show
MVRP Debug Parameters
----------------------
MVRP ethe 1/1 to 1/2 debugging is OFF [Mode: Brief]
Event: OFF
PDU Tx: OFF
PDU Rx: OFF
```
MMRP

Multiple MAC Registration Protocol (MMRP) allows dynamic registration of group MAC address or individual MAC addresses among the end stations and bridges in the same Local Area Network (LAN). MAC address registration information controls transfer of frames destined for the group MAC address to be forwarded only to the registered group members.

MMRP debug commands

This section describes the MMRP-related debug commands.

debug mmrp

Syntax: [no] debug mmrp [cli | config | db-event | error-event | ethernet | event | itc | pdu | reset | rx-event | show | sm-event | timer | tx-event | verbose]

- cli - Enables or disables MMRP CLI debugging.
- config - Enables or disables MMRP configuration debugging.
- db-event - Enables or disables MMRP database event debugging.
- error-event - Enables or disables MMRP error event debugging.
- ethernet - Enables or disables MMRP port debugging.
- event - Enables or disables MMRP event debugging.
- itc - Enables or disables MMRP inter-task communication (ITC) debugging.
- pdu - Enables or disables Multiple MAC Registration Protocol data unit (MMRPU) message debugging.
- reset - Resets all the MMRP debugging parameters to default.
- rx-event - Enables or disables MMRP receive event debugging.
- sm-event - Enables or disables MMRP state machine event debugging.
- timer - Enables or disables MMRP timer debugging.
- tx-event - Enables or disables MMRP transmit event debugging.
- verbose - Enables or disables the MMRP verbose debugging mode.
- show - Displays the current MMRP debugging parameters.

debug mmrp show

Syntax: debug mmrp show
ARP

Address Resolution Protocol (ARP) is a standard IP protocol that enables the Brocade device to obtain the MAC address of another device’s interface when the Brocade device knows the IP address of the interface. ARP is enabled by default and cannot be disabled.

ARP debug commands

This section describes the ARP-related debug commands.

debug arp-guard

Syntax: debug arp-guard [all]

This command when enabled on LP displays all debug messages for ARP guard. Command output resembles the following example.

Brocade# debug arp-guard
Jun 2 15:03:24.175 ARP_GUARD: Entered ag_ipc_callback_get_all_statistics()
Jun 2 15:03:24.175 ARP_GUARD: stats REQ rcvd for 2 ports & total buflen of 52 needed on this LP
Jun 2 15:03:24.175 ARP_GUARD: Stats REQ on port 2/3 for 2 VLANs rcvd
Jun 2 15:03:24.175 ARP_GUARD: REQ-ptr-offset = 0x0899f883, RESP-ptr-offset = 0x0803f780
Jun 2 15:03:24.175 ARP_GUARD:Equivalent (decimal) port=50,absolute_port_id=2
Jun 2 15:03:24.175 ARP_GUARD: Entered ag_fill_statistics()
Jun 2 15:03:24.175 ARP_GUARD: stats REQ rcvd for 1 VLANs
Jun 2 15:03:24.175 ARP_GUARD: Stats REQ on port 2/4 for 2 VLANs rcvd
Jun 2 15:03:24.175 ARP_GUARD: REQ-ptr-offset = 0x0899f890, RESP-ptr-offset = 0x0803f799
Jun 2 15:03:24.175 ARP_GUARD:Equivalent (decimal) port=51,absolute_port_id=3
Jun 2 15:03:24.175 ARP_GUARD: Entered ag_fill_statistics()
Jun 2 15:03:24.175 ARP_GUARD: stats-REQ rcvd for 1 VLANs
Jun 2 15:03:24.175 ARP_GUARD: On VLAN 100, tot_arp_rcvd=10, arp_pkt_failed=10
Jun 2 15:03:24.175 2.Full-filled REQ for all(1) VLANs, so breaking
Jun 2 15:03:24.175 ARP_GUARD: Exiting ag_ipc_callback_get_all_statistics()
Chapter 5

MPLS Diagnostics

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This chapter contains diagnostic information for the MPLS configurations.

MPLS

Multiprotocol Label Switching (MPLS) debug and show commands help the users to diagnose and determine the cause of faults for MPLS-related features.

The following sections describe show and debug commands that can be used to obtain information about MPLS activity.

MPLS show commands

This section describes the show commands that display MPLS information.

show mpls bypass-lsp

Syntax: show mpls bypass-lsp [detail]

This command displays detailed information about the MPLS bypass LSP, as shown in the following example.

Brocade# show mpls bypass-lsp detail
LSP b1, to 10.2.2.2
  From: 10.1.1.1, admin: UP, status: UP, tunnel interface(primary path): tnl1
  Times primary LSP goes up since enabled: 1
  Metric: 0, number of installed aliases: 0
  Maximum retries: 0, no. of retries: 0
  Pri. path: NONE, up: yes, active: yes
  Setup priority: 7, hold priority: 0
  Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
  Constraint-based routing enabled: yes
  Tie breaking: random, hop limit: 0
  LDP tunneling enabled: no
  Active Path attributes:
    Tunnel interface: tnl1, outbound interface: e1/4
    Tunnel index: 2, Tunnel instance: 1 outbound label: 3
  Path calculated using constraint-based routing: yes
Path calculated using interface constraint: no
Recorded routes:
  Protection codes: P: Local  N: Node  B: Bandwidth  I: InUse
  10.30.30.1
exclude interface(s): e1/1
Tunnel bandwidth
Maximum BW: 0 kbps
Reservable BW [priority] kbps:
Riding ingress backup lsps: 1
State  LSPname
UP    to_DUT2
Number of active riding ingress backup lsps: 0
Number of inactive riding ingress backup lsps: 1

show mpls interface

Syntax: show mpls interface [brief | ethernet slotnum/portnum | pos slotnum/portnum | tunnel tunnel-id | ve num]

- **brief** - Displays information about the MPLS interface in brief.
- **ethernet slotnum/portnum** - Displays MPLS interface information for the specified Ethernet interface.
- **pos slotnum/portnum** - Displays MPLS interface information for the specified POS interface.
- **tunnel tunnel-id** - Displays MPLS interface information for the specified tunnel interface.
- **ve num** - Displays MPLS interface information for the specified virtual interface.

This command displays information about the MPLS interface. For an Ethernet interface, the command output resembles the following example.

```
Brocade# show mpls interface ethernet 1/1
Admin: Up  Oper: Up
Maximum BW: 10000000 kbps, maximum reservable BW: 10000000 kbps
Admin group: 0x00000000
Reservable BW [priority] kbps:
Last sent reservable BW [priority] kbps:
Configured Protecting bypass lsps: 1
b1(UP)
```

The following example shows information in brief, such as the interface name, maximum bandwidth on the interface, administration group, administration status, operational status, and so on.

```
Brocade# show mpls interface brief
Interface  AdminGrp  Admin Oper  MaxBW  MaxResvBW  BypsLSPcnt
e1/1 0x00000000  Up  Up  10000000  95000000  0
e1/2 0x00000000  Up  Up  10000000  10000000  0
e1/3 0x00000000  Up  Up  10000000  10000000  0
```

show mpls memory

Syntax: show mpls memory
This command displays information about MPLS memory usage, as shown in the following example.

Brocade# show mpls memory
Id SubId GenSize BlockSize GenBlocks CurrGens CurrBlocks FreeBlocks
---------------------------------------------------------------------
1  0    10820       108       100        1        100         96
1  1    33900      308       110        1        110        103
1  2    10060      1004        10        1         10          5
1  3     9032      3004        3         2          6         35
Total Allocated = 72844 bytes
Total Available = 62132 bytes
Id SubId GenSize BlockSize GenBlocks CurrGens CurrBlocks FreeBlocks
---------------------------------------------------------------------
2  0     8340        20       416        1        416         378
2  1     9276        52       178        3         534         83
2  2     9512        84       113        2        226        112
2  3     9656       132        73        2        146         43
2  4     9796       244        52        3        156         13
2  5     9878       110        40        1        40         35
2  6     9632       356        27        2        54         21
2  7     9880       580        17        2        34         8
2  8     9980       996        10        1        10         2
2  9    10000      1996         9         9         45          5
Total Allocated = 252676 bytes
Total Available = 62032 bytes
Total non-pool memory: 529514 bytes
Mem-Type Alloc BytesAlloc TotalAlloc TotalFree AllocPeak AllocFail FreeFail
Misc    11 1413432   11    0    11    0    0
Dbg-Cntr 102 3264 102    0 102    0    0
IF-Entry  0   0     1    1    1    0    0
RLDF-If  0   0     1    1    1    0    0
TNNL-Vif  1   884736 1   0    1    0    0
CORE-MPLS  122 11097734 129    7 122    0    0
Total memory allocated by MPLS: 13399166 bytes

show mpls rsvp interface

Syntax: show mpls rsvp interface [brief | detail | ethernet slotnum/portnum | pos slotnum/portnum | ve num]

- **brief** - Displays a brief summary of the RSVP interface.
- **detail** - Displays detailed information about the RSVP interface.
- **ethernet slotnum/portnum** - Displays RSVP interface information for the specified Ethernet interface.
- **pos slotnum/portnum** - Displays RSVP interface information for the specified POS interface.
- **ve num** - Displays RSVP interface information for the specified virtual routing interface.

This command displays debug messages related to the RSVP interface, as shown in the following example.

Brocade# show mpls rsvp interface
Interface State MD5 Auth ReliableMsg Bundle SRefresh Act/Inact/Resv Preempts
el/1    Up    OFF OFF OFF OFF OFF 1/0/0 0
el/3    Up    OFF OFF OFF OFF OFF 0/0/0 0
el/4    Up    OFF OFF OFF OFF OFF 1/0/0 0
For an Ethernet interface, the command output resembles the following example.

```
Brocade# show mpls rsvp interface ethernet 1/1
Interface State MD5 Auth ReliableMsg Bundle SRefresh
e1/1 Up    OFF       OFF         OFF    OFF

Total Since last clear
PacketType Sent Received Sent Received
Path     2   3       2   3
Resv     3   3       3   3
PathErr  0   0       0   0
ResvErr  0   0       0   0
PathTear 0   0      0   0
ResvTear 0   0      0   0
ResvConf 0   0      0   0
Bundle   0   0      0   0
Ack      0   0      0   0
SumRefresh 0   0   0   0

Errors Total Since last clear
Rcv MD5 Auth Errors 0   0
```

```
show mpls rsvp session

Syntax: show mpls rsvp session [backup | brief | bypass | [destination destination_ip_address [source source_ip_address [tunnel-id tunnel_id]]] | detail | detour | down | egress | extensive | in-interface interface | ingress | name | out-interface interface | transit | up | wide]

• backup - Displays information about backup RSVP sessions.
• brief - Displays brief information about RSVP sessions.
• bypass - Displays information about bypass RSVP sessions.
• destination destination_ip_address - Displays information about RSVP sessions for the specified destination IP address.
• source source_ip_address - Displays information about RSVP sessions for the specified source IP address.
• tunnel-id tunnel_id - Displays information about RSVP sessions for the specified tunnel ID.

NOTE
The source source_ip_address option must be used along with the destination destination_ip_address option. The tunnel-id tunnel_id option must be used along with the source source_ip_address option.

• detail - Displays detailed information about RSVP sessions.
• detour - Displays information about detour RSVP sessions.
• down - Displays information about inactive RSVP sessions.
• egress - Displays information about egress RSVP sessions.
• extensive - Displays extensive information about RSVP sessions.
• in-interface interface - Displays information about RSVP sessions that are coming into an interface. The interface parameter can be an Ethernet, POS, or virtual interface.
• ingress - Displays information about ingress RSVP sessions.
• name - Displays RSVP session information for the specified session name.
**out-interface** `interface` - Displays information about RSVP sessions that are going out of an interface. The `interface` can be an Ethernet, POS, or virtual interface.

**transit** - Displays information about transit RSVP sessions.

**up** - Displays information about active RSVP sessions.

**wide** - Displays the full LSP name in a single line when used with other RSVP session options, such as `backup`, `detour`, `ingress`, and so on.

This command displays RSVP session information. Command output resembles the following example:

```
Brocade# show mpls rsvp session destination 10.2.2.2 source 10.1.1.1 tunnel-id 2
To              From                 St Style Lbl_In  Lbl_Out Out_If LSPname
10.2.2.2         10.1.1.1              Up SE    -       3       e1/1   to_DUT2
Tunnel ID: 2, LSP ID: 1
Time left in seconds (PATH refresh: 0, ttd: 26
RESV refresh: 3, ttd: 123)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Set-up priority: 6Holding Priority: 3
Fast Reroute: Facility backup desired
Setup priority: 7, hold priority: 0
Session attribute flags:0x17
(Label recording,SE Style,Protection: Local,Node)
Bandwidth: 0 kbps, hop limit: 255
Backup LSP: UP. Nexthop (link) protection available.
Up/Down times: 1, num retries: 0
Explicit path hop count: 1
10.10.10.2 (S)
Received RRO count: 1
Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: Rt rId
10.10.10.2
PATH sentto: 10.10.10.10 (e1/1           ) (MD5 OFF)
RESV rcvfrom: 10.10.10.10 (e1/1           ) (MD5 OFF)
To              From                 St Style Lbl_In  Lbl_Out Out_If LSPname
10.2.2.2         10.10.10.10(BI)       Dn -     -       -       e1/4   to_DUT2
Tunnel ID: 2, LSP ID: 1
Time left in seconds (PATH refresh: 0, ttd: 4294835)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Explicit path hop count: 1
10.30.30.1 (S)
PATH rcvfrom: None (downstream only)
PATH sentto: 10.30.30.30 (e1/4           ) (MD5 OFF)
Riding bypass lsp: b1
The following example shows RSVP sessions that are going out of Ethernet interface 1/1.
```

```
Brocade# show mpls rsvp session destination 10.2.2.2 out-interface ethernet 1/1
To              From                 St Style Lbl_In  Lbl_Out Out_If LSPname
10.2.2.2         10.1.1.1              Up SE    -       3       e1/1   to_DUT2
10.2.2.2         10.10.10.10(BI)       Dn -     -       -       e1/4   to_DUT2
```
**show mpls ted database**

**Syntax:** `show mpls ted database [brief | detail]`

- **brief** - Displays brief information about Traffic Engineering Database (TED).
- **detail** - Displays detailed information about TED.

This command displays information about TED that contains topology information about nodes in an MPLS domain and the links that connect them. Command output resembles the following example.

Brocade# show mpls ted database detail
NodeID: 10.20.20.20, Type: Router
info from applied local policies:
  cspf-group member information (name/penalty):
    group1/100
      Type: P2P, To: 10.1.1.1, Local: 10.1.1.2, Remote: 10.1.1.1, Gen 16
info from applied local policies:
  cspf-group member information (name/penalty):
    group2/10

**show mpls ted path**

**Syntax:** `show mpls ted path ip address [path-name path_name]`

This command displays information related to the TED path for the specified destination IP address and path name, as shown in the following example.

Brocade# show mpls ted path 10.2.2.2 path-name to2
Path to 10.2.2.2 found! Time taken to compute: 0 msec
Hop-count: 1 Cost: 1 OSPF Area Id: 0
  Hop 1: 10.10.10.2, Rtr 10.2.2.2

If the specified path name does not exist, the `show mpls ted path` command displays the following error message.

Brocade# show mpls ted path 10.2.2.2 path-name to_DUT8
No path found for destination 10.2.2.2 with path name to_DUT8

**show interfaces tunnel**

**Syntax:** `show interfaces tunnel tunnel_id`

This command displays the port status and configuration information for the tunnel interface. The following example shows GRE tunnel statistics such as the number of MPLS packets forwarded to and from the GRE tunnels, and so on.

Brocade# show interfaces tunnel 2
Tunnel1 is up, line protocol is up
  Hardware is Tunnel
  Tunnel source 10.2.2.2
  Tunnel destination is 10.4.4.4
  Tunnel mode gre ip
  Port name is LDP-GRE-1
  Internet address is: 10.1.1.1/24
  Tunnel TOS 0, Tunnel TTL 10, Tunnel MTU 600 bytes
  Keepalive is not Enabled
  VRF forwarding: Red

  Tunnel Packet Statistics:
    Unicast Packets  Multicast Packets
In-Port(s) [Rcv-from-tnnl Xmit-to-tnnl] [Rcv-from-tnnl Xmit-to-tnnl]
e5/25 - e5/48 63329 0 0 0
e6/1 - e6/2 0 10789735539 0 0

show ip-tunnels

Syntax: show ip-tunnels tunnel_id

This command displays tunnel interface information such as the status of the tunnel interface, tunnel source, tunnel destination, and so on. The following example shows information for a GRE tunnel interface.

Brocade# show ip-tunnels 2
GRE tnnl 2 UP : src_ip 10.2.2.2, dst_ip 10.3.3.3
TTL 255, TOS 0, NHT 1, MTU 1476

show mpls forwarding

Syntax: show mpls forwarding [A.B.C.D or A.B.C.D/L | in-label num]

- A.B.C.D or A.B.C.D/L - Displays MPLS forwarding information for a specific IP address.
- in-label num - Displays MPLS forwarding information for a specific incoming label.

This command displays MPLS forwarding information, as shown in the following example.

Brocade# show mpls forwarding
Total number of MPLS forwarding entries: 1
Dest-prefix In-lbl Out-lbl Out-intf Sig Next-hop
1 10.44.44.44/32 - 3 e2/15 R 10.1.1.4
2 10.44.44.44/32 1024 3 e2/15 L 10.1.1.4
3 0.0.0.0/0 100 101 e3/14 S 10.1.1.2
4 0.0.0.0/0 101 102 e1/9 S 10.1.1.41

show mpls lsp

Syntax: show mpls lsp [[brief | wide | debug | detail | extensive | autobw-samples ] | [up | down [wide | detail | extensive]] | [name lsp-name [extensive | debug | autobw-samples]]

- brief - Displays status information about signalled Label Switched Path (LSPs).
- wide - Displays the full LSP name in a single line.
- debug - Displays debug information about the LSP.
- detail - Displays detailed information about the LSP.
- extensive - Displays extensive information about the LSP.
- autobw-samples - Displays the sample history for all the auto-bandwidth LSPs. If a specific LSP name is given as parameter, only that LSPs sample history will be displayed.
- up - Displays information about active LSPs.
- down - Displays information about inactive LSPs.
- name lsp-name - Displays LSP information for the specified LSP name.

The show mpls lsp brief command output resembles the following example.

Brocade# show mpls lsp brief
*: The LSP is taking a Secondary Path

Name To Admin Oper Tunnel Up/Dn Retry Active State State Intf Times No. Path
The `show mpls lsp wide` command output resembles the following example.

```
Brocade# show mpls lsp wide
Name  To     Admin  Oper  Tunnel Up/Dn  Retry  Active
      State  State  Intf  Times  No.  Path
  tunnel1       10.3.3.3 UP     UP  tnl1  1  0
  tunnel2       10.3.3.3 UP     UP  tnl2  1  0  ppath1
  tunnelfromsanfranciscotonewyork 10.3.3.3 UP    UP  tnl3  1  0
```

The `show mpls lsp detail` command output resembles the following example.

```
Brocade# show mpls lsp detail
LSP t1, to 10.3.3.3
Path selected: pathsecondaryb, mode: manual revert-timer:
Path selected is up for 3 seconds for the latest instance, traffic will be switched
it in 7 seconds.
From: 10.2.3.4, admin: UP, status: UP, tunnel interface: tnl1
Times primary LSP goes up since enabled: 1
Metric: 1, number of installed aliases: 0
Maximum retries: 0, no. of retries: 3
Pri. path: dir, active: no
Setup priority: 7, hold priority: 0, ipmtu 1400
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Constraint-based routing enabled: yes
Tie breaking: random, hop limit: 0
Sec. path: v2, active: active
Hot-standby: no, status: up
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Constraint-based routing enabled: yes
hop limit: 0
Active Path attributes:
Tunnel interface: tnl1, outbound interface: e1/1
Tunnel index: 5, outbound label: 1966
Path calculated using constraint-based routing: no
Explicit path hop count: 1
10.10.10.2 (S) -> 10.20.20.2 (S)
Recorded routes:
  Protection codes: P: Local N: Node B: Bandwidth I: InUse
  10.10.10.2 -> 10.20.20.2
BFD session status: UP
Config param: global, min-tx: 1000, min-rx: 1000, multiplier: 3
Negotiated tx-interval: 1000, rx-interval: 3000, multiplier: 3
Local discriminator: 1, remote discriminator: 1
```

The `show mpls lsp extensive` command displays extensive information such as hop type, hop address, protection flags, label flags, and label about the Label Switched Path (LSP). Command output resembles the following example for a regular LSP.

```
Brocade# show mpls lsp extensive
LSP lsp1, to 10.23.23.23
  From: 10.34.34.34, admin: UP, status: UP, tunnel interface (primary path): tnl1
  Times primary LSP goes up since enabled: 1
  Metric: 0, Adaptive
  Maximum retries: NONE, no. of retries: 0
  Pri. path: NONE, up: yes, active: yes
  Setup priority: 7, hold priority: 0
  Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
```
Auto-bandwidth. template: template1, mode: monitor-only
   adjustment interval: 86400 sec, adjustment threshold: 0
   minimum bw: 0 kbps, maximum bw: 2147483647 kbps
   overflow limit: 0, underflow limit: 20, sample-record: disabled
Constraint-based routing enabled: yes
Path calculated using constraint-based routing: yes
Path calculated using interface constraint: no
Path cost: 20
Tie breaking: random, hop limit: 0
LDP tunneling enabled: no
Soft preemption enabled: no
Sec. path: via16, active: no
Hot-standby: no, status: down, adaptive
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Auto-bandwidth. template: NONE, mode: monitor-and-signal
   adjustment interval: 300 sec, adjustment threshold: Table
   minimum bw: 0 kbps, maximum bw: 2147483647 kbps
   overflow limit: 5, underflow-limit: 10, sample-record: enabled
Constraint-based routing enabled: yes
hop limit: 0
Soft preemption enabled: no
Active Path attributes:
   Tunnel interface: tnl1, outbound interface: e4/3
   Tunnel index: 2, Tunnel instance: 1 outbound label: 2049
   Auto-bandwidth running info. Mode: monitor-only
   adjustment interval: 1200 sec(T), adjustment threshold: Table(T)
   overflow limit: 0, underflow limit: 3
   minimum bw: 0 kbps(T), maximum bw: 9647 kbps(T)
   Samples collected: 14, max sampled bw: 0 kbps, last sample: 0 kbps
   Overflow-count: 0, Underflow-count: 2, max-underflow-sample: 34kbps
   Sample-record: enabled(T)
   adjustment due in 1174 seconds
   Adjustment ignored: 0 time(s)
   No adjustment since activation. Current bandwidth: 0 kbps
Recorded routes:
   Protection codes/Rtr Id flag: P: Local  N: Node  B: Bandwidth  I: InUse R: RtrId
   10.31.31.16 -> 10.161.161.1

The `show mpls lsp autobw-samples` command displays the sample history for all the auto-bandwidth LSPs. If a specific LSP name is given as parameter, only that LSP's sample history will be displayed as shown in the following example.

Brocade# show mpls lsp name Lsp1 autobw-samples
LSP lsp1, to 10.23.23.23
   From: 10.34.34.34, admin: UP, status: UP, tunnel interface(primary path): tnl1
   Times primary LSP goes up since enabled: 1
   Metric: 0, Adaptive
   Maximum retries: NONE, no. of retries: 0
   Pri. path: NONE, up: yes, active: yes
   Setup priority: 7, hold priority: 0
   Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
   Auto-bandwidth. template: template1, mode: monitor-only
   adjustment interval: 86400 sec, adjustment threshold: 0
   minimum bw: 0 kbps, maximum bw: 2147483647 kbps
   overflow limit: 0, underflow limit: 20, sample-record: disabled
   Constraint-based routing enabled: yes
   Path calculated using constraint-based routing: yes
   Path calculated using interface constraint: no
Path cost: 20
Tie breaking: random, hop limit: 0
LDP tunneling enabled: no
Soft preemption enabled: no
Sec. path: via16, active: no
Hot-standby: no, status: down, adaptive
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Auto-bandwidth. template: NONE, mode: monitor-and-signal
  adjustment interval: 300 sec, adjustment threshold: Table
  minimum bw: 0 kbps, maximum bw: 2147483647 kbps
  overflow limit: 5, underflow-limit: 10, sample-record: enabled
Constraint-based routing enabled: yes
hop limit: 0
Soft preemption enabled: no
Active Path attributes:
Tunnel interface: tnl1, outbound interface: e4/3
Tunnel index: 2, Tunnel instance: 1 outbound label: 2049
Auto-bandwidth running info. Mode: monitor-only
  adjustment interval: 1200 sec(T), adjustment threshold: 3000(A)
  overflow limit: 0, underflow limit: 4
  minimum bw: 0 kbps(T), maximum bw: 9647 kbps(T)
Samples collected: 5, max sampled bw: 6598 kbps, last sample: 0 kbps
Overflow-count: 0, Underflow-count: 2, max-underflow-sample: 34 kbps
Sample-record: enabled(T)
  adjustment due in 1174 seconds
  Adjustment ignored: 0 time(s)
No adjustment since activation. Current bandwidth: 0 kbps
Recorded routes:
Protection codes/Rtr Id flag: P: Local  N: Node  B: Bandwidth  I: InUse R: RtrId
10.31.31.16 -> 10.161.161.1
Auto Bandwidth Sample History:
1 Feb 4 19:56:06 : Path p1 active with rate 3000 kbps
  2 Feb 4 19:57:06 : 4445 kbps
  3 Feb 4 19:58:06 : 4855 kbps
  4 Feb 4 19:59:06 : 4501 kbps
  5 Feb 4 20:00:06 : 4200 kbps
  6 Feb 4 20:01:06 : 4455 kbps
  7 Feb 4 20:02:06 : 4319 kbps
  8 Feb 4 20:03:06 : 4299 kbps
  9 Feb 4 20:04:06 : 4582 kbps
10 Sample recording disabled
11 Feb 4 20:16:31 : 3630 kbps
12 Feb 4 20:17:31 : 2924 kbps
13 Feb 4 20:17:38 : Rate adjusted from 2500 to 4500 kbps
  Reason: Adjustment-interval expiry
14 Feb 4 20:18:06 : 4500 kbps
15 Feb 4 20:19:06 : 4500 kbps
16 Feb 4 20:20:06 : 4500 kbps
17 Feb 4 20:21:06 : 4500 kbps
18 Feb 4 20:16:31 : 4500 kbps
19 Feb 4 20:17:31 : 4500 kbps
20 Feb 4 20:17:38 : Adjustment ignored. Threshold not crossed
21 Feb 4 20:16:31 : 9000 kbps
22 Feb 4 20:17:31 : 9000 kbps
23 Feb 4 20:17:38 : Rate adjusted from 4500 to 9000 kbps
  Reason: Overflow limit exceeded
24 Feb 4 20:18:06 : 4500 kbps
25 Feb 4 20:19:06 : 4500 kbps
The `show mpls lsp up` command output resembles the following example.

Brocade# show mpls lsp up detail
LSP to_DUT2, to 10.2.2.2
From: 10.1.1.1, admin: UP, status: UP, tunnel interface(primary path): tnl0
Times primary LSP goes up since enabled: 1
Metric: 0, number of installed aliases: 0
Maximum retries: 0, no. of retries: 0
Pri. path: to2, up: yes, active: yes
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Constraint-based routing enabled: yes
Tie breaking: random, hop limit: 0
LDP tunneling enabled: no
Active Path attributes:
Tunnel interface: tnl0, outbound interface: e1/1
Tunnel index: 1, Tunnel instance: 1 outbound label: 3
Path calculated using constraint-based routing: yes
Path calculated using interface constraint: no
Explicit path hop count: 1
10.10.10.2 (S)
Recorded routes:
Protection codes: P: Local  N: Node  B: Bandwidth  I: InUse
10.10.10.2
Fast Reroute: facility backup desired
Backup LSP: UP, out-label: 3, outbound interface: e1/4 bypass_lsp: b1
FRR Forwarding State: Pri(active), Backup(up)

**show mpls lsp name**

**Syntax:** `show mpls lsp name lsp-name [extensive | debug]`

- The `lsp-name` parameter specifies the name of the LSP for which you want to display information.
- **extensive** - Displays extensive information about the specified LSP.
- **debug** - Displays debug information about the specified LSP.

This command displays global revertiveness configuration and Fast Reroute (FRR) adaptive configuration information for the specified LSP name.

Brocade# show mpls lsp name tunnel1
LSP tunnel1, to 10.3.3.3
From: 10.2.2.2, admin: UP, status: UP, tunnel interface(primary path): tnl0
Times primary LSP goes up since enabled: 1
Metric: 0, number of installed aliases: 0  Adaptive
Maximum retries: NONE, no. of retries: 0
Pri. path: p1, up: yes, active: yes
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Constraint-based routing enabled: yes
Path calculated using constraint-based routing: yes
Path calculated using interface constraint: yes
Tie breaking: random, hop limit: 0
LDP tunneling enabled: no
Active Path attributes:
Tunnel interface: tnl0, outbound interface: e1/1
Tunnel index: 1, Tunnel instance: 2 outbound label: 3
Explicit path hop count: 1
10.10.10.6 (S)
Recorded routes:
  Protection codes: P: Local  N: Node  B: Bandwidth  I: InUse
  10.10.10.6
Fast Reroute: facility backup desired
Setup priority: 0, hold priority: 0
Hop Limit: 3
Exclude any of admin groups: 2
Include any of admin groups: 5 6
Include all of admin groups: 5
Backup LSP: UP, out-label: 3, outbound interface: e1/3 bypass_lsp: by1
Path cspf-group computation-mode: disabled
Global revertiveness enabled with hold time 20 secs
FRR Forwarding State: Pri(active), Backup(up)

show mpls statistics label

Syntax: show mpls statistics label [Label_num | slot/port]

This command displays the MPLS statistics for the specified interface, as shown in the following example.

Brocade# show mpls statistics label 6/1
In-label  In-Port(s)   In-Packet Count
1024 e6/1 - e6/2                 0
1025 e6/1 - e6/2       21652924531

The following is the sample output if the Label_num variable is specified.

Brocade# show mpls statistics label 2047
In-label   In-Port(s)   In-Packet Count     In-Byte Count     Rate(in kbps)
2047 e1/1 - e1/24               131             11004              1000
2047 e2/1 - e2/24                 0                --                --
2047 e3/1 - e3/24                 0                --                --

show mpls debug flooding-thresholds

Syntax: show mpls debug flooding-thresholds

This command displays the current bandwidth in percentage and thresholds in use, as shown in the following example.

Brocade# show mpls debug flooding-thresholds
Interface : e4/3
New Reserved BW percentage             : 40
Old Reserved BW percentage(Advertised) : 35
UP threshold Config in use             : Default
DOWN threshold Config in use           : Default
Last up threshold trigger              : 30
Last down threshold trigger            : None
Last threshold trigger was from        : UP threshold

show mpls debug counter

Syntax: show mpls debug counter [aall | ai3 | amb | amb1 | ambl | amh | ase | asel | bfd | i3 | ipl | ipr | nbase-root | ntl | rcp | rcs | ridf | rlm | rri | rric | rrt | rsip | rspx | rsvc | rttc | sck | yads]

- aall - Displays counters for the ACL library.
- ai3 - Displays counters for the I3 library.
- amb - Displays counters for the MIB manager.
- **ambl** - Displays counters for the MIB library.
- **amh** - Displays counters for the MIB handler.
- **ase** - Displays counters for the system manager.
- **asel** - Displays counters for the system manager lite.
- **bfd** - Displays counters for the BFD stub.
- **i3** - Displays counters for the I3 stub.
- **ipl** - Displays counters for the IP library.
- **ipr** - Displays counters for the Route (RSIR) stub.
- **nbase-root** - Displays counters for NBASE-ROOT.
- **ntl** - Displays counters for the NTL library.
- **rcp** - Displays counters for LDP Path Manager.
- **rcs** - Displays counters for LDP Session Controller.
- **rldf** - Displays counters for the RLDF stub.
- **rlm** - Displays counters for the label manager.
- **rr** - Displays counters for RSVP.
- **rric** - Displays counters for the RRIC stub.
- **rrt** - Displays counters for TE-MIB.
- **rsip** - Displays counters for the IP stub.
- **rspx** - Displays counters for the proxy stub.
- **rstc** - Displays counters for CPCS LDT.
- **sck** - Displays counters for the socket stub.
- **yads** - Displays counters for CAM DS.

This command displays the debug counters. The debug counter keeps track of each debug statement access regardless of the match condition.

```
Brocade# show mpls debug counter
Counter-mnemonic | Severity | HitCount
PCT_IPR | 2, 0  | Audit  | 1
PCT_IPR | 16, 0 | Dev    | 12
PCT_IPR | 16, 1 | Dev    | 4
PCT_IPR | 16, 20| Dev    | 1
PCT_ASE | 2, 0  | Dev    | 122
PCT_ASE | 6, 0  | Dev    | 32
PCT_ASE | 24, 0 | Audit  | 13
PCT_ASE | 26, 0 | Dev    | 44
PCT_RLM | 10, 0 | Audit  | 1
PCT_RLM | 54, 0 | Audit  | 1
PCT_RLM | 88, 1 | Dev    | 311
PCT_RLM | 90, 1 | Dev    | 311
PCT_RLM | 91, 1 | Dev    | 311
PCT_RLDF | 33, 8 | Dev    | 1
PCT_RLDF | 46, 0 | Dev    | 311
PCT_RLDF | 49, 75| Dev    | 304
PCT_RSIP | 13, 0 | Audit  | 2
PCT_RSIP | 23, 0 | Dev    | 26
PCT_RRI | 177, 2| Exception | 25
PCT_RRI | 291, 1| Dev    | 1587
PCT_RRI | 292, 1| Dev    | 1587
```
show np extended-counters usage slot

Syntax:  show np extended-counters usage slot slotnum [detail]

This command displays information about the Network Processor (NP) usage of extended counters.

- **slotnum** - Specifies the slot for which you want to display information about the extended counters.
- **detail** - Displays detailed information about the extended counters.

Command output resembles the following example.

Brocade# show np extended-counters usage slot 5
Slot 5:
  Extended-Counters Mode:
    Routed-Switched: Separate
    Per Priority: Enabled
  Number of Unique Statistics ID (port-vlan's) allowed per NP: 1023
  Number of Unique Statistics ID (port-vlan's) allocated:
    NP 1: 29
    NP 2: 42

show mpls debug rsvp igp-sync

Syntax:  show mpls debug rsvp igp-sync [brief | link | lsp | stats]

This command displays debug information related to the RSVP Interior Gateway protocol (IGP) synchronization.

- **brief** - Displays all the RSVP IGP synchronization summary.
- **link** - Displays the RSVP IGP synchronization link information.
- **lsp** - Displays the RSVP IGP synchronization details of one or more LSPs.
- **stats** - Displays the RSVP IGP synchronization debug statistics.

show mpls debug rsvp igp-sync brief

Syntax:  show mpls debug rsvp igp-sync brief

This command displays all the RSVP IGP synchronization summary. The following is a sample output from this command.

Brocade# show mpls debug rsvp igp-sync brief
Rsvp IGP Sync summary
  RSVP-OSPF Sync: Disabled
  RSVP-ISIS Sync: Enabled

show mpls debug rsvp igp-sync link

Syntax:  show mpls debug rsvp igp-sync link [A.B.C.D] [detail] [down-ind]

- **A.B.C.D** - Specifies the link IP address.
- **detail** - Displays detailed RSVP IGP synchronization information for all link entries.
- **down-ind** - Initiates a link down event for OSPF or ISIS link taking the neighbor IP address, link IP address, and area ID as the input parameters.
The following is a sample output from the `show mpls debug rsvp igp-sync link` command.

```
Brocade# show mpls debug rsvp igp-sync link
Link Address   Remote Router     LSP Count
10.1.1.1       10.11.11.11       1
10.1.1.2       10.11.11.11       4
10.2.2.2       10.11.11.11       3
10.1.1.4       10.11.11.11       2
10.1.1.3       10.22.22.22       2
10.1.1.4       10.22.22.22       4
10.1.1.4       10.33.33.33       2
```

The following is a sample output from the `show mpls debug rsvp igp-sync link detail` command.

```
Brocade# show mpls debug rsvp igp-sync link detail
Link Address: 10.1.1.1
    Neighbor router Id: 10.11.11.11
    LSP paths using this IGP link: 1
    LSP List:
        lsp04-1:path_1_to_4,

Link Address: 10.1.1.2
    Neighbor router Id: 10.11.11.11
    LSP paths using this IGP link: 4
    LSP List:
        lsp04-1:path_1_to_4, lsp04-63:path_1_to_4_6, lsp04-63:path_1_to_4_6

Link Address: 10.2.2.2
    Neighbor router Id: 10.11.11.11
    LSP paths using this IGP link: 3
    LSP List:
        dbyp-12.1.1.1-1:, lsp04-28:sec_path_1_to_4_1, lsp04-29:sec_path_1_to_4_1

Link Address: 10.1.1.4
    Neighbor router Id: 10.11.11.11
    LSP paths using this IGP link: 2
    LSP List:
        lsp04-29:, lsp04-11:

Link Address: 10.1.1.3
    Neighbor router Id: 10.22.22.22
    LSP paths using this IGP link: 2
    LSP List:
        lsp04-1:path_1_to_4, lsp04-28:sec_path_1_to_4_strict,

Link Address: 10.1.1.4
    Neighbor router Id: 10.22.22.22
    LSP paths using this IGP link: 4
    LSP List:
        lsp04-63:path_1_to_4_6, lsp04-63:path_1_to_4_6, lsp04-28:sec_path_1_to_4_1

Link Address: 10.1.1.4
    Neighbor router Id: 10.33.33.33
    LSP paths using this IGP link: 2
    LSP List:
        lsp04-1:path_1_to_4, lsp04-28:sec_path_1_to_4_strict,
```

The following is a sample output from the `show mpls debug rsvp igp-sync down-ind` command.

```
Brocade# show mpls debug rsvp igp-sync down-ind ospf 10.1.1.3 10.1.1.4
255.255.255.255
Generating Rsvp IGP Sync link down event for:
    IGP: ISIS
    Neighbor IP: 10.1.1.3
    Link IP: 10.1.1.4
```
Area Id: 255.255.255.255

show mpls debug rsvp igp-sync lsp

Syntax: show mpls debug rsvp igp-sync lsp [lsp_name | detail]

- **lsp_name** - Specifies the LSP name.
- **detail** - Displays RSVP IGP synchronization details of all LSPs.

This command displays RSVP IGP synchronization details of one or more LSPs. The following is a sample output from the `show mpls debug rsvp igp-sync lsp` command when an LSP name is specified.

Brocade# show mpls debug rsvp igp-sync lsp lsp04-28
LSP: lsp04-28, Path: path_1_to_4_strict
  CSPF: enabled, Record Route: enabled, Frr: disabled
  CSPF hops: 3, Record route hops: 3
  RSVP IGP Sync Links:
    10.11.11.11->10.1.1.2, 10.22.22.22->10.1.1.3
    10.33.33.33->10.1.1.4,
  RRO hops: 3 hops
  10.1.1.2, 10.1.1.3, 10.1.1.4,
  CSPF hops: 3 hops
  10.1.1.2, 10.1.1.3, 10.1.1.4,
LSP: lsp04-28, Path: sec_path_1_to_4_2
  CSPF: enabled, Record Route: enabled, Frr: disabled
  CSPF hops: 2, Record route hops: 2
  RSVP IGP Sync Links:
    10.11.11.11->10.1.1.3, 10.33.33.33->10.1.1.4
  RRO hops: 2 hops
  10.1.1.3, 10.1.1.4,
  CSPF hops: 2 hops
  10.1.1.3, 10.1.1.4,

The following is a sample output from the `show mpls debug rsvp igp-sync lsp detail` command.

Brocade# show mpls debug rsvp igp-sync lsp detail
LSP: dbyp-10.1.1.1-1, Path:
  CSPF: enabled, Record Route: enabled, Frr: disabled
  CSPF hops: 1, Record route hops: 1
  RSVP IGP Sync Links:
    10.11.11.11->10.1.1.3,
  RRO hops: 1 hops
  10.1.1.3,
  CSPF hops: 1 hops
  10.1.1.3,
LSP: lsp04-1, Path: path_1_to_4
  CSPF: enabled, Record Route: enabled, Frr: enabled
  CSPF hops: 3, Record route hops: 4
  RSVP IGP Sync Links:
    10.11.11.11->10.1.1.1.1, 10.11.11.11->10.1.1.2
    20.22.22.22->20.1.1.3, 30.33.33.33->30.1.1.4
  RRO hops: 4 hops
  10.1.1.1.1, 10.1.1.2, 20.1.1.3, 30.1.1.4
  CSPF hops: 3 hops
  10.1.1.2, 20.1.1.3, 30.1.1.4,
LSP: lsp04-11, Path:
  CSPF: enabled, Record Route: enabled, Frr: disabled
  CSPF hops: 1, Record route hops: 1
  RSVP IGP Sync Links:
10.11.11.11->10.1.1.4,
RRO hops: 1 hops
10.1.1.4,
CSPF hops: 1 hops
10.1.1.4,

show mpls debug rsvp igp-sync stats

Syntax: show mpls debug rsvp igp-sync stats

This command displays the RSVP IGP synchronization debug statistics. The following is a sample output from the show mpls debug rsvp igp-sync stats command.

Brocade# show mpls debug rsvp igp-sync stats
Rsvp IGP Sync debug statistics:
  Debug trace: Disabled
  Debug print: Disabled
  ospf_enable = 0
  ospf_disable = 0
  isis_enable = 1
  isis_disable = 0
  ospf_rmt_link_down = 0
  isis_rmt_link_down = 3
  total_rmt_link_down = 3
  ospf_lcl_link_down = 0
  isis_lcl_link_down = 3
  total_lcl_link_down = 0
  lsp_down_ind = 0
  alloc_fail = 0
  duplicate_entry = 0
  error = 0

show mpls debug rsvp igp-sync stats reset

Syntax: show mpls debug rsvp igp-sync stats reset

This command resets the RSVP IGP synchronization debug statistics. The following is a sample output from the show mpls debug rsvp igp-sync stats reset command.

Brocade# show mpls debug rsvp igp-sync stats reset
Rsvp IGP Sync summary
RSPV-OSPF Sync: Enabled
RSPV-ISIS Sync: Disabled
Rsvp IGP Sync debug statistics:
  Debug trace: Disabled
  Debug print: Disabled
  ospf_enable = 0
  ospf_disable = 0
  isis_enable = 0
  isis_disable = 0
  igp_notify = 14
  igp_notify_noactn = 0
  invalid_link_addr = 0
  ospf_rmt_link_down = 8
  isis_rmt_link_down = 0
  total_rmt_link_down = 8
  ospf_lcl_link_down = 6
  isis_lcl_link_down = 0
  total_lcl_link_down = 6
  lsp_down_ind = 0
isync_lsp_down = 0
lsp_up_ind = 0
link_db_built = 0
rro_updt_rbld = 0
igp_itc_send = 8
igp_itc_rcvd = 8
itc_send_failed = 0
rtr_id_failed = 0
no_rrt_tnnl_cb = 0
link_db_failed = 0
alloc_fail = 0
duplicate_entry = 0
error = 0

Resetting RSVP IGP Sync debug stats

**MPLS debug commands**

This section describes the debug commands used for monitoring the MPLS environment.

**debug mpls?**

**Syntax:** debug mpls?

This command displays all the module types of MPLS.

Brocade# debug mpls?

```
all    turns on/off all MPLS debugs
api    MPLS API debug
cspf   MPLS cspf debug
dynamic-bypass MPLS dynamic bypass debug
table    MPLS table debug	error    MPLS error msgs
forwarding    MPLS forwarding debug
ldp    MPLS ldp debug
lmgr    MPLS label manager debug
oam    MPLS OAM debug
routing    MPLS routing (rsir) debug
rsir    MPLS RSIR debug
rsvp    MPLS rsvp debug
```

**debug mpls**

**Syntax:** [no] debug mpls

This command is used to turn on the debugging output, while preserving the debugging configuration.

Brocade# debug mpls
Brocade# show debug
MPLS Debug Settings
    MPLS Debug is ON
        Forwarding
            All
debug mpls all

Syntax: [no] debug mpls all
This command is used to turn on debugging for all MPLS configurations.

debug mpls error

Syntax: [no] debug mpls error
This command is used to turn on error debugging for all the modules.

Brocade# debug mpls error
Brocade# show debug
MPLS Debug Settings
    MPLS Debug is OFF
        Error
            All

debug mpls routing error

Syntax: [no] debug mpls routing error
This command displays debugging information related to Interior Gateway Protocol (IGP) neighbor down events. Command output resembles the following example.

Brocade# debug mpls routing error
Sep 15 00:23:09 MPLS: ISIS level-2 neighbor 10.32.174.54 on interface eth 4/7 is dead

MPLS clear command

Use the following clear command to clear MPLS counter information.

clear mpls debug counters

Syntax: clear mpls debug counters [aall | ai3 | amb | ambl | amh | ase | asel | bfd | i3 | ipl | ipr
    | nbbase-root | ntl | rcp | rcs | rldf | rlm | rri | rric | rrt | rsip | rspx | rstc | sck | yads]
This command clears the debug counters.

NOTE
The show mpls debug counter and clear mpls debug counters commands are hidden CLI commands.

MPLS API

The Multiprotocol Label Switching (MPLS) Application Programming Interface (API) is the MPLS interface to applications, such as L2VPN (for VLL and VPLS), BGP, IPSTATIC, IS-IS, OSPF, and PBR. The applications must register for the events with the MPLS when they need to use the MPLS tunnels. The MPLS API generates events when the tunnels and pseudowires are established and released, and sends the events only to the applications that have been registered.
MPLS API show commands

This section describes the show commands that display MPLS API information.

show mpls debug api aggrhist

Syntax: show mpls debug api aggrhist application_type

This command displays detailed information about the aggregation history for a specific application.

show mpls debug api apihist

Syntax: show mpls debug api apihist application_type

This command displays information about the history of each event queued for the specified application. Command output resembles the following example.

Brocade# show mpls debug api apihist bgp
MPLS MPLS_APP_BGP API APPDQ history lifo
<table>
<thead>
<tr>
<th>time</th>
<th>type</th>
<th>state</th>
<th>peer-addr</th>
<th>index</th>
<th>tnnl-vif</th>
<th>vc_id</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 18 10:07:27</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>1</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 10:07:22</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 10:07:21</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>3</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 09:51:59</td>
<td>tnnl</td>
<td>down</td>
<td>10.2.2.1</td>
<td>3</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 09:51:59</td>
<td>tnnl</td>
<td>down</td>
<td>10.2.2.1</td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 09:51:59</td>
<td>tnnl</td>
<td>down</td>
<td>10.2.2.1</td>
<td>1</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:57</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>1</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:56</td>
<td>tnnl</td>
<td>up</td>
<td>10.5.5.1</td>
<td>8</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:54</td>
<td>tnnl</td>
<td>up</td>
<td>10.5.5.1</td>
<td>6</td>
<td>6</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:53</td>
<td>tnnl</td>
<td>up</td>
<td>10.5.5.1</td>
<td>7</td>
<td>7</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:52</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Aug 18 08:39:51</td>
<td>tnnl</td>
<td>up</td>
<td>10.2.2.1</td>
<td>3</td>
<td>2</td>
<td>--</td>
</tr>
</tbody>
</table>

show mpls debug api queue

Syntax: show mpls debug api queue application_type

This command displays an MPLS API queue summary for the specified application, as shown in the following example.

Brocade# show mpls debug api queue pbr
MPLS_APP_PBR queue
Num events processed 1

show mpls debug api registration

Syntax: show mpls debug api registration application_type

This command displays MPLS API registration-related information for the specified application. Command output resembles the following example.

Brocade# show mpls debug api registration ipstatic
DEST ADDR API reg detail
DEST ADDR 10.1.1.1
    snapshot_sent Y
    numsnapshots 1
    longest netmask 0xffffffff
show mpls debug l2vpn tunnels

Syntax: show mpls debug l2vpn tunnels peer ip address

This command displays information about the Layer 2 Virtual Private Network (L2VPN) tunnels.

MPLS API debug commands

This section describes the debug commands that generate debugging information about MPLS API.

debug mpls api

Syntax: [no] debug mpls api

This command displays debugging information about MPLS API, as shown in the following example.

Brocade# debug mpls api
Brocade# router isis
Aug 18 21:32:18 mpls_app_register_tnnl_name app_type MPLS_APP_ISIS is registered
Aug 18 21:32:18 sending event queued itc to app_type MPLS_APP_ISIS dest_app_id 15

Brocade# no router isis
Aug 18 21:32:10 mpls_app_deregister_igpShortcut app_type MPLS_APP_ISIS is de-registered

Brocade# ip route next-hop-enable-mpls
Jan 11 04:53:38 mpls_api dest addr registering MPLS_APP_IP_STATIC value 10.1.1.1
Jan 11 04:53:38 mpls_app_lookup_dest_ipaddr MPLS_APP_IP_STATIC app_type init
remote addr 10.1.1.1
Jan 11 04:53:38 mpls_app_lookup_dest_ipaddr MPLS_APP_IP_STATIC app_type registered for remote addr 10.1.1.1
Jan 11 04:53:38 send dest addr snapshot
Jan 11 04:53:38 sending event queued itc to app_type MPLS_APP_IP_STATIC
dest_app_id 12
Jan 11 04:53:38 mpls_app_tunnel_deregister
Jan 11 04:53:38 mpls_app_deregister_dest_addr app_type MPLS_APP_IP_STATIC
dest_addr 10.20.160.1
Jan 11 04:53:40 mpls_app_tunnel_deregister
Jan 11 04:53:40 mpls_app_deregister_dest_addr app_type MPLS_APP_IP_STATIC
dest_addr 10.20.160.1

Brocade# no ip route next-hop-enable-mpls
Jan 11 04:53:31 mpls_app_deregister_all app_type MPLS_APP_IP_STATIC is de-registered

Brocade# set next-hop-lsp to-mlxE-1
Jan 11 04:55:59 mpls_app_register_tnnl_name app_type MPLS_APP_PBR tnnl name to-mlxE-1 registered
Jan 11 04:55:59 mpls_app_send_tnnl_name_snapshot app_type MPLS_APP_PBR tnnl name to-mlxE-1 sending snapshot
Jan 11 04:55:59 mpls_app_register_tnnl_name app_type MPLS_APP_PBR tnnl name to-mlxE-1 sending snapshot
Jan 11 04:55:59 sending event queued itc to app_type MPLS_APP_PBR dest_app_id 27

Brocade# no set next-hop-lsp to-mlxE-1
Jan 11 04:55:52 mpls_app_deregister_name app_type MPLS_APP_PBR tnnl_name to-mlxE-1 is deregistered

Brocade# next-hop-mpls
MPLS API

Jan 11 05:05:42 mpls_api dest addr registering MPLS_APP_BGP value 10.1.1.1
Jan 11 05:05:42 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type init remote
  addr 10.1.1.1
Jan 11 05:05:42 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type registered for
  remote addr 10.1.1.1
Jan 11 05:05:42 send dest addr snapshot
Jan 11 05:05:42 sending event queued itc to app_type MPLS_APP_BGP dest_app_id 13
Jan 11 05:05:42 mpls_api dest addr registering MPLS_APP_BGP value 10.1.1.2
Jan 11 05:05:42 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type init remote
  addr 10.1.1.2
Jan 11 05:05:42 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type registered for
  remote addr 10.1.1.2
Jan 11 05:05:42 send dest addr snapshot
Jan 11 05:05:43 mpls_api dest addr registering MPLS_APP_BGP value 10.10.1.10
Jan 11 05:05:43 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type init remote
  addr 10.10.1.10
Jan 11 05:05:43 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type registered for
  remote addr 10.10.1.10
Jan 11 05:05:43 send dest addr snapshot
Jan 11 05:05:43 send dest addr snapshot no route
Jan 11 05:05:43 mpls_api dest addr registering MPLS_APP_BGP value 10.5.5.1
Jan 11 05:05:43 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type init remote
  addr 10.5.5.1
Jan 11 05:05:43 mpls_app_lookup_dest_ipaddr MPLS_APP_BGP app_type registered for
  remote addr 10.5.5.1
Jan 11 05:05:43 send dest addr snapshot
Jan 11 05:05:43 sending event queued itc to app_type MPLS_APP_BGP dest_app_id 13
Brocade# no next-hop-mpls
Jan 11 05:06:22 mpls_app_tunnel_deregister
Jan 11 05:06:22 mpls_app_deregister_dest_addr deregistered app_type MPLS_APP_BGP
dest_addr 10.1.1.1
Jan 11 05:06:22 mpls_app_tunnel_deregister
Jan 11 05:06:22 mpls_app_deregister_dest_addr deregistered app_type MPLS_APP_BGP
dest_addr 10.1.1.2
Jan 11 05:06:22 mpls_app_tunnel_deregister
Jan 11 05:06:22 mpls_app_deregister_dest_addr deregistered app_type MPLS_APP_BGP
dest_addr 10.10.1.10
Jan 11 05:06:22 mpls_app_tunnel_deregister
Jan 11 05:06:22 mpls_app_deregister_dest_addr deregistered app_type MPLS_APP_BGP
dest_addr 10.10.1.10

debug mpls l2vpn events

Syntax: [no] debug mpls l2vpn events
This command displays debugging information about the events processing in MPLS Layer 2 VPN.

MPLS CSPF debug commands

Constrained Shortest Path First (CSPF) computes the shortest path that fulfills a set of constraints. This means that CSPF runs a shortest path algorithm after pruning any links that violate a given set of constraints, such as minimum bandwidth required per link (also known as bandwidth guaranteed constraint).

debug mpls cspf

Syntax: [no] debug mpls cspf [computation | mapping | ted | error | all]
This debug command displays information about CSPF computations, mapping, TE databases, and errors.

- **computation** - Displays CSPF computation information.
- **mapping** - Displays information about address mappings in the CSPF module.
- **ted** - Displays information about the TE database.
- **error** - Displays CSPF error messages.
- **all** - Displays all debug error messages related to the CSPF module.

**debug mpls cspf computation**

**Syntax:** [no] debug mpls cspf computation [all | detail | lsp]

- **all** - Displays all debug messages related to CSPF computation.
- **detail** - Displays more detailed information about CSPF computation.
- **lsp** - Displays CSPF computation messages for specific LSPs.

This command displays CSPF computation information filtered by more specific criteria. If an LSP does not come up with error code “No path found”, it means that CSPF could not calculate a path for the destination with the specified set of constraints. Enable this debug tracing to know why the path computation failed. Route query-related events for LSP, including Detour path and Facility path, are traced by enabling this debugging module.

Command output resembles the following example.

Brocade# debug mpls cspf computation
MPLS: CSPF: Unable to find router ID corresponding to destination IP 10.100.100.100 in area 0, LSP not created
MPLS: CSPF: Strict Hop - Locate Link from SrcRtr 10.20.20.20 to DstRtr 10.100.100.100, DstIntfAddr 10.1.1.1
MPLS: CSPF: Strict Hop processing matching link to 10.100.100.100

[O[0]:10.1.2.2:10.1.2.1:10.20.20.20:10.100.100.100]
MPLS: CSPF: Link Constraints - Satisfied:

[O[0]:10.1.2.2:10.1.2.1:10.20.20.20:10.100.100.100]
CSPF: Strict Hop processing matching link to 10.100.100.100

[O[0]:10.1.1.2:10.1.1.1:10.20.20.20:10.100.100.100]
MPLS: CSPF: Link Constraints - Satisfied: [O[0]:10.1.1.2:10.1.1.1:10.20.20.20:10.100.100.100]

MPLS: CSPF: Found Link from SrcRtr 10.20.20.20 to DstRtr 10.100.100.100, DstIntfAddr 10.1.1.1

[O[0]:10.1.1.2:10.1.1.1:10.20.20.20:10.100.100.100]
MPLS: CSPF: Final CSPF route in area 0

Hop 1: 10.1.1.1, Rtr 10.100.100.100

RSIR: route query for 10.1.1.1/32
RSIR: Route Query success, NH 10.1.1.0 EgressIf e1/1 Ingr 0 Egr 0
RSIR: Route Query success, NH 10.1.1.0 EgressIf e1/1 Ingr 0 Egr 0

MPLS: CSPF: Strict Hop - Locate Link from SrcRtr 10.20.20.20 to DstRtr 10.100.100.100, DstIntfAddr 10.1.2.1
MPLS: CSPF: Strict Hop processing matching link to 10.100.100.100

[O[0]:10.1.2.2:10.1.2.1:10.20.20.20:10.100.100.100]
MPLS: CSPF: Link Constraints - Satisfied: [O[0]:10.1.2.2:10.1.2.1:10.20.20.20:10.100.100.100]

MPLS: CSPF: Found Link from SrcRtr 10.20.20.20 to DstRtr 10.100.100.100, DstIntfAddr 10.1.2.1

[O[0]:10.1.2.2:10.1.2.1:10.20.20.20:10.100.100.100]
MPLS: CSPF: Final CSPF route in area 0

Hop 1: 10.1.2.1, Rtr 10.100.100.100
RSIR: route query for 10.1.2.1/32
RSIR: Route Query success, NH 10.1.2.0 EgressIf e1/2 Ingr 0 Egr 0
MPLS: CSPF: Processing TE Link: From Node: [0:0:10.100.100.100] Link
[0[0]:10.1.3.1:10.1.3.2:10.100.100.100:10.20.20.20]
MPLS: CSPF: match cspf-group group1, penalty 65000, mode: add-penalty
RSIR: CSPF Begin FRR BACKUP_CSPF route calculation
MPLS: CSPF: match cspf-group group1, penalty 65000, mode: add-penalty
MPLS: CSPF: bypass lsp[bypass1] usable with cost 65001 and 0 LSP riding on it
MPLS: CSPF: bypass lsp[bypass1] is selected with cost 65001 and 1 LSP riding on it

debug mpls cspf computation lsp

Syntax: [no] debug mpls cspf computation lsp [name name] [sess_obj source_ip_address destination_ip_address tunnel_id]

This command displays CSPF computation information for specific LSPs.

• name name - Limits the display of information to debug messages for the LSP that matches with the specified LSP name.

• sess_obj source_ip_address destination_ip_address tunnel_id - Limits the display of information to debug messages for the LSP that matches with the specified session object, which includes source IP address, destination IP address, and tunnel ID.

Command output resembles the following example.

Brocade# debug mpls cspf computation lsp sess_obj 10.7.7.1 10.7.7.2 100
Dec 10 00:51:04 MPLS: CSPF: Begin Constrained Dijkstra from 10.7.7.2 to 10.7.7.1, dstIntf 10.7.7.1
Dec 10 00:51:04 MPLS: CSPF: Node Constraints - Satisfied [I:2:PE2.00]
Dec 10 00:51:04 MPLS: CSPF: Traversing TE Links node_from 10.7.7.2, node_from->dist 0X00000000, node_from 0X36C6B072
Dec 10 00:51:04 MPLS: CSPF: Processing TE Link: From Node: [I:2:PE2.00] Link [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: node_to [I:2:PE2.00], node_to->dist 0X80000000, te_link->te_metric 0X0000000A, node_to 0X36C6B63C
Dec 10 00:51:04 MPLS: CSPF: Link Constraints - Satisfied: [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: Processing TE Link: From Node: [I:2:PE2.00] Link [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: node_to [I:2:PE2.00], node_to->dist 0X80000000, te_link->te_metric 0X0000000A, node_to 0X36C6B5CA
Dec 10 00:51:04 MPLS: CSPF: Link Constraints - Satisfied: [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: Processing TE Link: From Node: [I:2:PE2.00] Link [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: node_to [I:2:PE2.00], node_to->dist 0X80000000, te_link->te_metric 0X0000000A, node_to 0X36C6B5CA
Dec 10 00:51:04 MPLS: CSPF: Link Constraints - Satisfied: [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: Processing TE Link: From Node: [I:2:PE2.00] Link [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
Dec 10 00:51:04 MPLS: CSPF: node_to [I:2:PE2.00], node_to->dist 0X80000000, te_link->te_metric 0X0000000A, node_to 0X36C6B5CA
Dec 10 00:51:04 MPLS: CSPF: Link Constraints - Satisfied: [I[2]:10.1.1.2:10.1.1.1:PE2.00:PE4.00]
MPLS forwarding debug commands

This section describes the debug commands that generate MPLS forwarding information.

**debug mpls forwarding**

**Syntax:** `[no] debug mpls forwarding [all | ldp | rsvp | resource | error]`

- **all** - Displays all debug messages related to MPLS forwarding.
- **ldp** - Displays LDP-related forwarding information.
- **rsvp** - Displays RSVP-related forwarding information.
- **resource** - Displays information about available MPLS resources.
- **error** - Displays MPLS forwarding-related error messages.

The MPLS control plane interacts with the data forwarding plane through the forwarding interface. This debugging command displays RSVP, LDP, and resource usage-related information.

Command output resembles the following example.

```
Brocade# debug mpls forwarding
RLDF: ADD out_cb(0x14319B54), out-s-idx=3, out-int=2, out-lbl=0
  lsp_cb=0x1431A220
RLDF: ADD xc_cb(0x14319910), in_cb=0x1308137C, out_cb=0x14319B54,
  lsp_cb=0x1431A220
RLDF : Check BW
  Path_TSpec valid: BW = 0 Kb/sec
  Resv_TSpec valid: BW = 0 Kb/sec
  Alloc BW[outseg idx: 3]: setup/hold priority 3/7:
  Path_TSpec valid: BW = 0 Kb/sec
  Resv_TSpec valid: BW = 0 Kb/sec
  Allocated BW 0 kbps for priority 0
RLDF: Update XC: lsp_cb 0x00000000, in_cb 0x00000000, out_cb 0x14319B54, xc_cb
0x14319910
RLDF: Update XC: lsp xc_id 3, in-lbl 0, in-if port_id 65535, out-seg_idx 3, out-if e1/2
RLDF: update_tnnl_vif_nht_index: Old 65535, new 1
RLDF - tnl 6 goes up
RLDF - tnnl add - For an UP tunnel, the out_seg are the same
RLDF - tnnl add - For an UP tunnel, the out_seg are the same
RLDF - rx'ed DISASSOCIATE_FEC_XC for fec 10.100.100.100
RLDF - tnl 5 goes down
RLDF - tnl 5 deleted from mpls route table and indicated to application
RLDF - LDP Tnnl 5 for fec 10.100.100.100 deleted
RLDF: DEL xc_cb (0x1306BF0C) lsp_cb (0x1306C394)
RLDF: DEL out_cb(0x1306C150), out-s-idx=1, out-int=1, out-lbl=0
  lsp_cb=0x1306C394
RLDF: DEL in_cb(0x13081D38), lsp_cb 0x1306C394
RLDF: free lsp_cb=0x1306C394 lsp_xc_index=0x00000001
RLDF: ADD lsp_cb(0x1306C5D8), lsp_xc_index=0x00000001
RLDF: ADD out_cb(0x1306BF0C), out-s-idx=4, out-int=0, out-lbl=0
  lsp_cb=0x1306C5D8
RLDF: Add_in_cb(0x13081E9C),lbsp_xc_index=0, in-if=0, in-lbl=0 lsp_cb 0x1306C5D8
RLDF: ADD xc_cb(0x1306C81C), in_cb=0x13081E9C, out_cb=0x1306BF0C,
  lsp_cb=0x1306C5D8
RLDF: Update XC: lsp_cb 0x00000000, in_cb 0x00000000, out_cb 0x1306BF0C, xc_cb
0x1306C81C
RLDF: Update XC: lsp xc_id 4, in-lbl 0, in-if port_id 65535, out-seg_idx 4, out-if e1/1
RLDF - rx'ed ASSOCIATE_FEC_XC for fec 10.100.100.100
RLDF - tnl 5 goes up
RLDF - tnl 5 added to mpls route table and indicated to application
RLDF - LDP tnnl 0x00000005 installed for fec 10.100.100.100, outgoing port e1/1
```

**debug mpls forwarding ldp**

**Syntax:** `[no] debug mpls forwarding ldp [fec-key [all | prefix [all | prefix_ip]] | vc [all | vc_id]]`

- **fec-key all** - Enables or disables all Label Distribution Protocol (LDP) forwarding debugging for all the Forwarding Equivalence Classes (FECs).
- **prefix all** - Enables or disables all LDP forwarding prefix FEC debugging.
- **prefix** *prefix_ip* - Enables or disables LDP forwarding prefix FEC debugging for the specified prefix IP address and subnet mask.

- **vc all** - Enables or disables all LDP forwarding VC FEC debugging.

- **vc vc_id** - Enables or disables LDP forwarding VC FEC debugging for the specified VC ID.

This command displays LDP-related forwarding debugging information based on the specified filter options. Command output resembles the following example.

Brocade# debug mpls forwarding ldp fec-key prefix 10.130.130.3/32
Brocade(config-vif-15)# enable
Feb 22 14:12:06.274 RLDF: implicit xc, update_flags: 0X00000015, lspxc_flags: 0X00000000, lsp_ref_type: 2, in_seg_ref_type: 0, out_seg_ref_type: 2, lsp_xc_index: 803
Feb 22 14:12:06.274 RLDF: implicit xc, add transit out_seg, out_if: 1553
Feb 22 14:12:06.274 RLDF: Attempt to recover fec_type: 2, fec_addr: 10.130.130.3, fec_prefix_len: 32
Feb 22 14:12:06.274 RLDF: rldf_check_recovery_cbs: not recover lsp_cb 0X00000000, recovery state 0X000000FF
Feb 22 14:12:06.274 RLDF: In attempt to recover lsp_cb, DIDNOT Recover
Feb 22 14:12:06.274 RLDF: ADD lsp_cb(0X2D9B9F70), lsp_xc_idx=0X00000323, lsp_sync_index=0X00000004, sync_info: 0X2F597810
Feb 22 14:12:06.274 RLDF: ADD outcb(0X2D98A598), out-s-idx=1473, out-int=1553, out-lbl=0 lsp_cb=0X2D9B9F70
Feb 22 14:12:06.274 RLDF: implicit xc, create ldp tunnel
Feb 22 14:12:06.275 RLDF: Updating sync node 0X2F597810 in sync library
Feb 22 14:12:06.275 RLDF: update_tnnl_vif_nht_index: Old 65535, new 1
Feb 22 14:12:06.275 RLDF: ADD tnnl_vif_index=7 allocate accounting_label=1048580
Feb 22 14:12:06.275 RLDF - tnl 7 goes up
Feb 22 14:12:06.275 RLDF - tnl 7 added to mpls route table and indicated to application
Feb 22 14:12:06.275 RLDF: Updating sync node 0X2F597810 in sync library
Feb 22 14:12:06.318 RLDF: slib pack lsp cb with size 186, buffer available was 1838, action 3
Feb 22 14:12:06.318 RLDF: mpls_sync_pack_lsp: fec_type: 2, fec_addr: 10.130.130.3, fec_prefix_len: 32, lsp_flags: 0X00000005, lsp_inseg_label: 0

**debug mpls forwarding rsvp**

Syntax: [no] debug mpls forwarding rsvp [all | lsp session-obj [all | source_ip_address destination_ip_address tunnel_id]]

- **all** - Enables or disables all RSVP forwarding debugging.

- **lsp session-obj all** - Enables or disables all RSVP session object debugging.

- **lsp session-obj source_ip_address destination_ip_address tunnel_id** - Enables or disables RSVP session object debugging for the specified RSVP session object.

The **debug mpls forwarding rsvp all** command output resembles the following example.

Brocade# debug mpls forwarding rsvp all
Num_hops downstream 1, upstream 1, exclude 1
Dec 10 00:59:58 MPLS: CSPF: RSIR: BYPASS_CSPF: Finding Bypass path to: 10.1.17.1
Dec 10 00:59:58 RSIR: BYPASS_CSPF: Constraints: BW: 0 kbps Setup Prio: 4
Hop-Limit: 255
exc-any: 0x00000000 inc-any: 0x00000000 inc-all: 0x00000000
Dec 10 00:59:58 RSIR: BYPASS_CSPF: Removed link local IP: 10.1.17.2
Dec 10 00:59:58 RSIR: BYPASS_CSPF: Exclude_hops[0]: 0.0.0.0
Dec 10 00:59:58 RSIR: CSPF Begin FRR BYPASS_CSPF route calculation
Dec 10 00:59:58 RSIR: CSPF End FRR BYPASS_CSPF route calculation. Route not found, error_code: 1
Dec 10 00:59:58 CSPF failed to calculate bypass route to 10.1.17.1
Dec 10 00:59:58 MPLS: CSPF: RSIR: BYPASS_CSPF: My IP address from upstream entry: 10.1.17.2
Num_hops downstream 1, upstream 1, exclude 1
Dec 10 00:59:58 MPLS: CSPF: RSIR: BYPASS_CSPF: Finding Bypass path to: 10.1.17.1
Dec 10 00:59:58 RSIR: BYPASS_CSPF: Constraints: BW: 0 kbps Setup Prio: 4
Hop-Limit: 255
exc-any: 0x00000000 inc-any: 0x00000000 inc-all: 0x00000000
Dec 10 00:59:58 RSIR: CSPF Begin FRR BYPASS_CSPF route calculation
Dec 10 00:59:58 RSIR: CSPF End FRR BYPASS_CSPF route calculation. Route not found, error_code: 1

The debug mpls forwarding rsvp lsp session-obj command output resembles the following example.

Brocade# debug mpls forwarding rsvp lsp sess-obj 10.110.110.1 10.130.130.1 13
Brocade (config)# router mpls
Brocade(config-mpls)# lsp t-2
Brocade(config-mpls-lsp-t-2)# to 10.130.130.3
Brocade(config-mpls-lsp-t-2)# enable
Connecting signaled LSP t-2
Feb 22 13:49:56.767 RLDF: ADD lsp_cb(0X2D9B9000), lsp_xc_idx=0X0000031E, lsp_sync_index=0X00000004, sync_info: 0X00000000
Feb 22 13:49:56.767 RLDF: Add in_cb(0X2D95D2D0), lblsp-idx=0, in-if=0, in-lbl=0 lsp_cb 0X2D9B9000
Feb 22 13:49:56.767 RLDF : Check BW
Feb 22 13:49:56.767 Path_TSpec valid: BW = 0 Kb/sec
DUT1(config-mpls)#Feb 22 13:49:56.771 RLDF: ADD out_cb(0X2D98A598), out-s_idx=1468, out-int=1553, out-lbl=0 lsp_cb=0X2D9B9000
Feb 22 13:49:56.772 RLDF: ADD xc_cb(0X2D998618), in_cb=0X2D959D2D0, out_cb=0X2D959D2D0, out_cb=0X2D9B9000
Feb 22 13:49:56.772 RLDF : Check BW
Feb 22 13:49:56.772 Path_TSpec valid: BW = 0 Kb/sec
Feb 22 13:49:56.772 Resv_TSpec valid: BW = 0 Kb/sec
Feb 22 13:49:56.772 Alloc BW[outseg idx: 1468]: setup/hold priority 7/0:
Feb 22 13:49:56.772 Path_TSpec valid: BW = 0 Kb/sec
Feb 22 13:49:56.772 Resv_TSpec valid: BW = 0 Kb/sec

debug mpls forwarding resource

Syntax: [no] debug mpls forwarding resource

This command displays information about available MPLS resources. Command output resembles the following example.

Brocade# debug mpls forwarding resource
Check BW:
    Path_TSpec valid: BW = 50 Kb/sec
    Resv_TSpec valid: BW = 50 Kb/sec
Alloc BW[outseg idx: 7]: setup/hold priority 7/0:
    Path_TSpec valid: BW = 50 Kb/sec
    Resv_TSpec valid: BW = 50 Kb/sec
Allocated BW 50 kbps for priority 0
MPLS routing debug commands

This section describes the debug commands that generate MPLS routing information.

**debug mpls routing**

Syntax: `[no] debug mpls routing [all | error | interface | prefix]`

This command displays MPLS routing-related information.

- **all** - Displays all debug messages related to MPLS routing.
- **error** - Displays MPLS routing-related error messages.
- **interface** - Limits the messages to specific interfaces. This filter captures the event of a particular IP interface indication (or polling) by routing stub module to MPLS.
- **prefix** - Limits the messages to specific prefixes. The purpose of this filter is to trace a particular IP route notification by routing module to MPLS.

Command output resembles the following example.

Brocade# debug mpls routing
RSIR skip route add: 10.1.1.0/24, ingr(0), egr(0)
RSIR port state change indication for e1/1: Admin: UP Oper: UP
RSIR IP address indication to RRI for e1/1: addr add 10.1.1.2/24
RSIR IP address indication to RCP for e1/1: addr add 10.1.1.2/24
RSIR IP address indication to RCS for e1/1: addr add 10.1.1.2/24
RSIR route add(RSVP) indication: 10.1.2.0/24, idx 0x0X0A3682E6, sh_cut 0x0X00000000 nh 10.1.2.0, intf e1/2, ingr 0, egr 0, r_flag 0x0X00000000
RSIR skip route add: 10.1.2.0/24, ingr(0), egr(0)
RSIR port state change indication for e1/2: Admin: UP Oper: UP
RSIR IP address indication to RRI for e1/2: addr add 10.1.2.2/24
RSIR IP address indication to RCP for e1/2: addr add 10.1.2.2/24
RSIR IP address indication to RCS for e1/2: addr add 10.1.2.2/24
RSIR route add(RSVP) indication: 10.1.3.0/24, idx 0x0X0A3682F6, sh_cut 0x0X00000000 nh 10.1.3.0, intf e1/3, ingr 0, egr 0, r_flag 0x0X00000000
RSIR skip route add: 10.1.3.0/24, ingr(0), egr(0)
RSIR port state change indication for e1/3: Admin: UP Oper: UP
RSIR IP address indication to RRI for e1/3: addr add 10.1.3.2/24
RSIR IP address indication to RCP for e1/3: addr add 10.1.3.2/24
RSIR IP address indication to RCS for e1/3: addr add 10.1.3.2/24
RSIR port state change indication for e1/4: Admin: UP Oper: UP

**debug mpls routing interface**

Syntax: `[no] debug mpls routing interface [all | ethernet slot/port | pos slot/port | ve index]`

This command displays MPLS routing-related information to the specific interfaces.

- **all** - Displays all debug messages related to MPLS routing for all the interfaces.
- **ethernet slot/port** - Limits the messages to specific Ethernet interfaces.
- **pos slot/port** - Limits the messages to specific POS interfaces.
- **ve index** - Limits the messages to specific virtual Ethernet interfaces.

Command output resembles the following example.

Brocade# debug mpls routing interface all
Dec 10 01:02:29 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:29 RSIR IP address indication to RRI for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:29 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:29 RSIR IP address indication to RCP for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:29 RSIR IP address indication to RCS for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:29 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:29 RSIR IP address indication to RRI for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:29 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:29 RSIR IP address indication to RCP for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:29 RSIR IP address indication to RCS for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:30 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:30 RSIR IP address indication to RRI for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:30 RSIR port state change indication for e1/14: Admin: UP Oper: UP
Dec 10 01:02:30 RSIR IP address indication to RCP for e1/14: addr add 10.1.2.3/24
Dec 10 01:02:30 RSIR IP address indication to RCS for e1/14: addr add 10.1.2.3/24

debug mpls routing prefix

Syntax:  [no] debug mpls routing prefix ip-address prefix-length

- ip-address - Specifies the IP address.
- prefix-length - Specifies the prefix length.

This command limits the display of MPLS routing-related information to specific prefixes.

MPLS RSVP debug commands

This section describes the debug commands that generate MPLS RSVP information.

debug mpls rsvp

Syntax:  [no] debug mpls rsvp [all | error | event | packets | session | tunnel]

- all - Displays all messages related to the MPLS RSVP module.
- error - Displays debug messages related to MPLS RSVP errors.
- event - Displays debug messages related to MPLS RSVP events. This includes those events that are not session-specific, for example, interface up or down, IP route indication, and so on.
- packets - Displays debug messages related to MPLS RSVP packets.
- session - Displays debug messages related to a specific MPLS RSVP session.
- tunnel - Displays debug messages related to MPLS RSVP LSP interaction with other modules as virtual interfaces.

debug mpls rsvp event

Syntax:  [no] debug mpls rsvp event

This command displays information about MPLS RSVP events, as shown in the following example.

Brocade# debug mpls rsvp event
RSVP: kill_tc DEL_IN_SEG Sess 0xda02020 10.33.33.1(2)<-10.11.11.
RSVP: kill_session 0xda02020 10.33.33.1(2)<-10.11.11.1
RSVP: make_session 0xda022f0 10.4.1.2(1)<-10.11.11
RSVP: make_PSB 0xda10fc8 Sess 0xda022f0 10.4.1.2(1)<-10.11.11.1
RSVP: make_PSB 0xda107f8 Sess 0xda022f0 10.4.1.2(1)<-10.11.11.1
RSVP: new_tc QUERY_ROUTE Sess 0xda022f0 10.4.1.2(1)<-10.11.11
RSVP: kill_tc QUERY_ROUTE Sess 0xda022f0 10.4.1.2(1)<-10.11.11.1
rrr_query_route_rsp: inserting PSB 0xda10fc8 in unrouted list
RSVP_FRR: rrr_frr_merge_point: Merging PSB not found.
RSVP_FRR: Path Tear on non-merging protected LSP, PSB 0xda10fc8.
debug mpls rsvp packets

Syntax: [no] debug mpls rsvp packets [all | detail | count number | direction [send | receive] | pkt_type [ack | all | bundle | path | pathterr | resv | resverr | resvtear | summary-fresh | hello] | interface | sess_obj | source_ip_address [destination_ip_address | p2mp-Id] | tunnel_id]

This command displays MPLS RSVP packets-related information, which is further filtered by direction, packet type, interface, and session object.

- all - Displays all messages related to MPLS RSVP packets.
- detail - Displays detailed information about MPLS RSVP packets.
- count number - Limits the display of MPLS RSVP packets to the specified number.
- direction - Displays information about MPLS RSVP packets for the specified direction.
- send - Displays information about sent MPLS RSVP packets.
- receive - Displays information about received MPLS RSVP packets.
- pkt_type - Displays information about MPLS RSVP packet types (similar to the debug rsvp packets detail command).
  - ack - Displays information about MPLS RSVP reservation request acknowledgement messages.
  - all - Turns on or off debugging of all MPLS RSVP packet types.
  - bundle - Displays MPLS RSVP bundle messages.
  - path - Displays MPLS RSVP path messages.
  - pathterr - Displays MPLS RSVP path error messages.
  - pathtear - Displays MPLS RSVP path tear messages.
  - resv - Displays MPLS RSVP reservation request messages.
  - resverr - Displays MPLS RSVP reservation request error messages.
  - resvtear - Displays MPLS RSVP reservation tear messages.
  - summary-refresh - Displays MPLS RSVP summary refresh messages.
  - hello - Displays MPLS RSVP hello messages.
- **interface** - Displays RSVP packets transmitted or received on an interface.
- **sess_obj source_ip_address [destination_ip_address | p2mp-id] tunnel_id** - Displays information about the MPLS RSVP packets for the specified RSVP session object or Point to Multipoint (P2MP) session object. RSVP session object includes source IP address, destination IP address, and tunnel ID. P2MP session object incudes source IP address, P2MP ID, and tunnel ID.

The **debug mpls rsvp packets** command output resembles the following example.

```
Brocade# debug mpls rsvp packets
Send Path message: src 10.20.20.20, dst 10.100.100.100 on port 1/1
Dest 10.100.100.100, tunnelId 1, ext tunnelId 10.20.20.20
Receive Resv message: src 10.1.2.1, dst 10.1.2.2 on port 1/2
Dest 10.100.100.100, tunnelId 2, ext tunnelId 10.20.20.20
```

The **debug mpls rsvp packets pkt_type hello** command output resembles the following example.

```
Brocade# debug mpls rsvp packets pkt_type hello
Feb 27 21:58:03.367 Send Hello message: src 10.31.31.16, dst 10.31.31.15 on e4/3
Feb 27 21:58:03.368 Receive Hello message: src 10.31.31.15, dst 10.31.31.16 on e4/3
```

**debug mpls rsvp packets detail**

**Syntax:** [no] debug mpls rsvp packets detail

This command displays detailed information about MPLS RSVP packets. Command output resembles the following example, if the **debug mpls rsvp packets** command is enabled on an interface Ethernet 4/3 in detail mode.

```
Brocade# debug mpls rsvp packets pkt_type hello interface ethernet 4/3
Brocade# debug mpls rsvp packets detail
Feb 27 22:00:09.368 Send Hello message: src 10.31.31.16, dst 10.31.31.15 on e4/3
Feb 27 22:00:09.368 Type 20(Hello) ver 1 flags 0x00 cksum 0xa0d0 ttl 1 len 20
Feb 27 22:00:09.368 Obj_class 22 (HELLO) ctype 1 (HELLO_REQ) length 12
Feb 27 22:00:09.368 Source instance: 0x0002ade9 , Destination instance: 0x0001d1ae
Feb 27 22:00:09.368 Receive Hello message: src 10.31.31.15, dst 10.31.31.16 on e4/3
Feb 27 22:00:09.368 Type 20(Hello) ver 1 flags 0x00 cksum 0xa0cf ttl 1 len 20
Feb 27 22:00:09.368 Obj_class 22 (HELLO) ctype 2 (HELLO_ACK) length 12
Feb 27 22:00:09.368 Source instance: 0x0001d1ae , Destination instance: 0x0002ade9
Feb 27 22:00:09.369
```

**debug mpls rsvp packets interface**

**Syntax:** [no] debug mpls rsvp packets interface [all | ethernet slot/port | pos slot/port | ve index]

This command limits the display of MPLS RSVP packets to the specific interfaces.

- **all** - Displays all MPLS RSVP packets on all interfaces.
- **ethernet slot/port** - Limits the display of packets to specific Ethernet interfaces.
- **pos slot/port** - Limits the display of packets to specific POS interfaces.
- **ve index** - Limits the display of packets to specific virtual Ethernet interfaces.
Command output resembles the following example.

Brocade# debug mpls rsvp packets interface all
Dec 10 01:03:26 Send Path message: src 10.7.7.2, dst 10.7.7.1 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 2974, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Send Path message: src 10.7.7.2, dst 10.7.7.1 on port 2/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 3634, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Send Path message: src 10.7.7.2, dst 10.7.7.1 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 2791, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 1058, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Send Path message: src 10.7.7.2, dst 10.7.7.1 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 625, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Send Path message: src 10.7.7.2, dst 10.7.7.1 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 775, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 825, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 939, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 2646, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 3183, ext tunnelId 10.7.7.2, lspId 1
Dec 10 01:03:26 Receive Resv message: src 10.1.17.1, dst 10.1.17.2 on port 3/1
Dec 10 01:03:26 Dest 10.7.7.1, tunnelId 3297, ext tunnelId 10.7.7.2, lspId 1

debug mpls rsvp packets sess_obj

Syntax: [no] debug mpls rsvp packets sess_obj [source_ip_address [destination_ip_address | p2mp-Id] tunnel_id]

- **source_ip_address** - Specifies the source IP address.
- **destination_ip_address** - Specifies the destination IP address.
- **p2mp-Id** - Specifies the P2MP ID in decimal or IP address format. This variable is applicable to P2MP LSPs only and can be used to filter the debug tracing based on P2MP session object.
- **tunnel_id** - Specifies the tunnel ID.

This command displays information about the MPLS RSVP packets for the specified RSVP session object or Point to Multipoint (P2MP) session object. RSVP session object includes source IP address, destination IP address, and tunnel ID. P2MP session object includes source IP address, P2MP ID, and tunnel ID. A command output such as the following is displayed when a RSVP packet matching the session object filter is received.

Brocade# debug mpls rsvp packets sess_obj 10.0.0.1 10.1.1.1 1
Jun 1 10:30:36.008 Send Path message: src 10.0.0.1, dst 10.0.0.2 on port 4/12
Jun 1 10:30:36.008 Type 1(Path) ver 1 flags 0x00 cksum 0xb0c8 ttl 63 len 220
Jun 1 10:30:36.008 Obj_class 1 (SESSION) ctype 13 length 16:
Jun 1 10:30:36.008 p2mp_id 10.1.1.1, tunnel_id 1, ext tunnel_id (source) 10.0.0.2
Jun 1 10:30:36.008 Obj_class 3 (RSVP_HOP) ctype 1 length 12:
Jun 1 10:30:36.008 Address: 10.0.0.1 LSH: 0000009c
Jun 1 10:30:36.008 Obj_class 5 (TIME) ctype 1 length 8:
Jun 1 10:30:36.008 Value: 30000
Jun 1 10:30:36.008 Obj_class 19 (LABEL_REQ) ctype 1 length 8:
Jun 1 10:30:36.008 Label_request: 0000800
Jun 1 10:30:36.008 Obj_class 207 (SESSION_ATTR) ctype 7 length 20:
Jun 1 10:30:36.008 Setup_pri: 7 hold_pri: 7 flags: 00000000
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Jun 1 10:30:36.008 Session name: Sundeep-p2mp
Jun 1 10:30:36.008 Obj_class 11 (SENDER TEMPLATE) ctype 12 length 20:
Jun 1 10:30:36.008 Source 20.0.0.2, lsp_id 1
Jun 1 10:30:36.008 subgrpOrigId 10.0.0.2, subgrpId 1
Jun 1 10:30:36.008 Obj_class 12 (SENDER_TSPEC) ctype 2 length 36:
Jun 1 10:30:36.008 Max rate: 0, mean rate: 800, max burst: 0
Jun 1 10:30:36.008 0x00 0x00 0x00 0x07
Jun 1 10:30:36.008 0x01 0x00 0x00 0x06
Jun 1 10:30:36.008 0x7f 0x00 0x00 0x05
Jun 1 10:30:36.008 0x47 0xc3 0x50 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 Obj_class 13 (ADSPEC) ctype 2 length 84
Jun 1 10:30:36.008 0x00 0x00 0x00 0x13
Jun 1 10:30:36.008 0x01 0x80 0x00 0x08
Jun 1 10:30:36.008 0x04 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x01
Jun 1 10:30:36.008 0x06 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x85 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x86 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x87 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x88 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x86 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x87 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x88 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x87 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x88 0x00 0x00 0x01
Jun 1 10:30:36.008 0x00 0x00 0x00 0x00
Jun 1 10:30:36.008 0x5 0x80 0x00 0x00
Jun 1 10:30:36.008 Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun 1 10:30:36.008 S2L dest addr 10.0.0.2
Jun 1 10:30:36.713 Send Resv message: src 10.0.0.1, dst 10.0.0.2 on port 4/11
Jun 1 10:30:36.713 Type 2(Resv) ver 1 flags 0x00 cksum 0xcf8a ttl 63 len 144
Jun 1 10:30:36.713 Obj_class 1 (SESSION) ctype 13 length 16:
Jun 1 10:30:36.713 p2mpId 10.1.1.1, tunnelid 1, ext tunnelid (source) 10.0.0.2
Jun 1 10:30:36.714 Obj_class 3 (RSVP_HOP) ctype 1 length 12:
Jun 1 10:30:36.714 Address: 10.0.0.1 LIH: 00000000
Jun 1 10:30:36.714 Obj_class 5 (TIME) ctype 1 length 8:
Jun 1 10:30:36.714 Value: 30000
Jun 1 10:30:36.714 Obj_class 8 (STYLE) ctype 1 length 8:
Jun 1 10:30:36.714 Style: SE
Jun 1 10:30:36.714 Obj_class 9 (FLOWSPEC) ctype 2 length 36:
Jun 1 10:30:36.714 Max rate: 0, mean rate: 800, max burst: 0
Jun 1 10:30:36.714 0x00 0x00 0x00 0x07
Jun 1 10:30:36.714 0x05 0x00 0x00 0x06
Jun 1 10:30:36.714 0x7f 0x00 0x00 0x05
Jun 1 10:30:36.714 0x47 0xc3 0x50 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 0x00 0x00 0x00 0x00
Jun 1 10:30:36.714 Obj_class 10 (FILTER_SPEC) ctype 12 length 20:
Jun 1 10:30:36.714 Source 10.0.0.2, lsp_id 1
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Jun  1 10:30:36.714  subgrpOrigId 10.0.0.2, subgrpId 1
Jun  1 10:30:36.714  Obj_class 16 (LABEL) ctype 1 length 8:
Jun  1 10:30:36.714   Label: 1024
Jun  1 10:30:36.714  Obj_class 21 (RECORDED_ROUTE) ctype 1 length 20:
Jun  1 10:30:36.714   (#1) ipv4 prefix, 8 bytes, 10.0.0.1/32, flags: 0x00000000
Jun  1 10:30:36.714   (#2) ipv4 prefix, 8 bytes, 10.0.0.2/32, flags: 0x00000000
Jun  1 10:30:36.714  Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun  1 10:30:36.714   S2L dest addr 10.0.0.2

Jun 12 06:44:07.216  Send ResvTear message: src 10.0.0.1, dst 10.0.0.2 on port 4/11
Jun 12 06:44:07.216  Type 6(ResvTear) ver 1 flags 0x00 cksum 0xee22 ttl 63 len 80
Jun 12 06:44:07.216  Obj_class 1 (SESSION) ctype 13 length 16:
Jun 12 06:44:07.216   p2mpId 10.1.1.1, tunnelid 1, ext tunnelid (source) 10.0.0.2
Jun 12 06:44:07.216  Obj_class 3 (RSVP_HOP) ctype 1 length 12:
Jun 12 06:44:07.216   Address: 10.0.0.1 LIH: 00000000
Jun 12 06:44:07.217  Obj_class 8 (STYLE) ctype 1 length 8:
Jun 12 06:44:07.217   Style: SE
Jun 12 06:44:07.217  Obj_class 10 (FILTER_SPEC) ctype 12 length 20:
Jun 12 06:44:07.217   Source 10.0.0.2, lsp_id 1
Jun 12 06:44:07.217   subgrpOrigId 10.0.0.2, subgrpId 2
Jun 12 06:44:07.217  Obj_class 16 (LABEL) ctype 1 length 8:
Jun 12 06:44:07.217   Label: 1025
Jun 12 06:44:07.217  Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun 12 06:44:07.217   S2L dest addr 10.0.1.2

Jun 12 05:44:34.330  Send PathTear message: src 10.0.2.1, dst 10.0.2.2 on port 4/12
Jun 12 05:44:34.330  Type 5(PathTear) ver 1 flags 0x00 cksum 0x7a5f ttl 63 len 100
Jun 12 05:44:34.330  Obj_class 1 (SESSION) ctype 13 length 16:
Jun 12 05:44:34.330   p2mpId 10.1.1.1, tunnelid 1, ext tunnelid (source) 10.0.0.2
Jun 12 05:44:34.330  Obj_class 3 (RSVP_HOP) ctype 1 length 12:
Jun 12 05:44:34.330   Address: 10.0.0.1 LIH: 0000009c
Jun 12 05:44:34.330  Obj_class 11 (SENDER_TEMPLATE) ctype 12 length 20:
Jun 12 05:44:34.330   Source 10.0.0.2, lsp_id 1
Jun 12 05:44:34.330   subgrpOrigId 10.0.0.2, subgrpId 3
Jun 12 05:44:34.330  Obj_class 12 (SENDER_TSPEC) ctype 2 length 36:
Jun 12 05:44:34.330   Max rate: 0, mean rate: 0, max burst: 0
Jun 12 05:44:34.330     0x00 0x00 0x00 0x07
Jun 12 05:44:34.330     0x01 0x00 0x00 0x06
Jun 12 05:44:34.330     0x7f 0x00 0x00 0x05
Jun 12 05:44:34.330     0x00 0x00 0x00 0x00
Jun 12 05:44:34.330     0x00 0x00 0x00 0x00
Jun 12 05:44:34.330     0x00 0x00 0x00 0x00
Jun 12 05:44:34.330     0x00 0x00 0x00 0x00
Jun 12 05:44:34.330     0x00 0x00 0x00 0x00
Jun 12 05:44:34.330   Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun 12 05:44:34.330   S2L dest addr 10.0.1.2

Jun 12 06:23:01.462  Send PathErr message: src 10.0.0.1, dst 10.0.0.2 on port 4/11
Jun 12 06:23:01.462  Type 3(PathErr) ver 1 flags 0x00 cksum 0x24a0 ttl 63 len 184
Jun 12 06:23:01.462  Obj_class 1 (SESSION) ctype 13 length 16:
Jun 12 06:23:01.462   p2mpId 10.1.1.1, tunnelid 1, ext tunnelid (source) 10.0.0.2
Jun 12 06:23:01.462  Obj_class 6 (ERROR) ctype 1 length 12:
Jun 12 06:23:01.462   Node: 10.11.11.10 Flags: 0x00 code: 23 value 0
Jun 12 06:23:01.462  Obj_class 11 (SENDER_TEMPLATE) ctype 12 length 20:
Jun 12 06:23:01.462   Source 10.0.0.2, lsp_id 1
Jun 12 06:23:01.462   subgrpOrigId 10.0.0.2, subgrpId 2
Jun 12 06:23:01.462  Obj_class 12 (SENDER_TSPEC) ctype 2 length 36:
Jun 12 06:23:01.462   Max rate: 0, mean rate: 0, max burst: 0
Jun 12 06:23:01.462     0x00 0x00 0x00 0x07
Jun 12 06:23:01.462     0x01 0x00 0x00 0x06
Jun 12 06:23:01.462     0x7f 0x00 0x00 0x05
Jun 12 06:23:01.462     0x00 0x00 0x00 0x00
Jun 12 06:23:01.462     0x00 0x00 0x00 0x00
Jun 12 06:23:01.462     0x00 0x00 0x00 0x00
Jun 12 06:23:01.462     0x00 0x00 0x00 0x00
Jun 12 06:23:01.462     0x00 0x00 0x00 0x00
Jun 12 06:23:01.462   Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun 12 06:23:01.462   S2L dest addr 10.0.0.2
debug mpls rsvp session

Syntax: [no] debug mpls rsvp session [all | detail | lsp]

This command displays MPLS RSVP session-related information.

- **all** - Displays all messages related to a MPLS RSVP session.
- **detail** - Displays messages related to a MPLS RSVP session in a detailed version.
- **lsp** - Limits the display of a MPLS RSVP session to specific LSPs.

Command output resembles the following example.

```plaintext
Brocade# debug mpls rsvp session
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "Resv_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
```

Jun 12 06:23:01.462 0x7f 0x00 0x00 0x05
Jun 12 06:23:01.462 0x00 0x00 0x00 0x00
Jun 12 06:23:01.462 0x00 0x00 0x00 0x00
Jun 12 06:23:01.462 0x00 0x00 0x00 0x00
Jun 12 06:23:01.462 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 Obj_class 13 (ADSPEC) ctype 2 length 84
Jun 12 06:23:01.463 0x00 0x00 0x00 0x13
Jun 12 06:23:01.463 0x01 0x80 0x00 0x08
Jun 12 06:23:01.463 0x04 0x00 0x00 0x01
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x08 0x00 0x00 0x01
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 0x00 0x00 0x00 0x00
Jun 12 06:23:01.463 Obj_class 50 (S2L_SUB_LSP) ctype 1 length 8
Jun 12 06:23:01.463 S2L dest addr 10.0.1.2

Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "Resv_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Resv_refresh_tmr_exp" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "Resv_refresh_tmr_exp" for SESS(10.100.100.100/1/10.20.20.20) Destp 0X142ED82C
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "Path_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "Resv_refresh_tmr_exp" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80
Processing input queue event "RSVP_pkt" for SESS(10.100.100.100/2/10.20.20.20) Destp 0X142ECC80

**debug mpls rsvp session lsp**

**Syntax:** `[no] debug mpls rsvp session lsp [name name | sess_obj source_ip_address | destination_ip_address | p2mp-id tunnel_id]`

- **name name** - Displays RSVP session information for the specified LSP name.
- **sess_obj** - Displays RSVP session information for the specified RSVP session object or P2MP session object. RSVP session object includes source IP address, destination IP address, and tunnel ID. P2MP session object incudes source IP address, P2MP ID, and tunnel ID.
  - **source_ip_address** - Specifies the source IP address.
  - **destination_ip_address** - Specifies the destination IP address.
  - **p2mp-id** - Specifies the P2MP ID in decimal or IP address format. This variable is applicable to P2MP LSPs only and can be used to filter the debug tracing based on P2MP session object.
  - **tunnel_id** - Specifies the tunnel ID.

This command displays RSVP session information for specific LSPs. Command output resembles the following example.

Brocade# debug mpls rsvp session lsp sess_obj 10.0.0.0 10.0.0.1 100
Dec 11 20:01:32.344 SESS(10.0.0.1/29433/10.0.0.1): Add PSB(0x0X31183BC4)
Dec 11 20:01:32.344 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31183BC4) received, new ttd: 597811550, ps_tc_flags: 0X0000001C
Dec 11 20:01:32.345 RSVP: New TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): Found route to dest, nhop 31.31.31.16
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): TC-action(QUERY_ROUTE) finished
Dec 11 20:01:32.345 RSVP: Free TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.345 RSVP: New TC action LDB_RESERVE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): refresh PSB(0x0X31183BC4)
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): Tx PATH to 10.31.31.16
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): RSVP->LMGR(Reserve) sent, PSB(0x0X31183BC4)
Dec 11 20:01:32.345 Lsp/Grp 0x0X00000000(2)/0x0X00000000(2), Osg/Grp 0x0X00000000(0)/0x0X00000000(0)
Dec 11 20:01:32.345 Isg/Grp 0x0X00000000(2)/0x0X00000000(2), XC 0x0X00000000(0), TCSBP 0x0X00000000
Dec 11 20:01:32.345 SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_reserve) deferred
Dec 11 20:01:32.346 SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Reserve) finished: PSB 0x0X31183BC4
Dec 11 20:01:32.346 Lsp/Grp 0x0X00998001(2)/0x0X00990001(2), Osg/Grp 0x0X00000000(0)/0x0X00000000(0)
Dec 11 20:01:32.346 Isg/Grp 0x0X008B4001(2)/0x0X008AC001(2), XC 0x0X00000000(0), TCSBP 0x0X00000000
Dec 11 20:01:32.346 RSVP: Free TC action LDB_reserve for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.346 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Add PSB(0x0X31183CC8) to shared path
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31183CC8) received, new ttd: 597811550, ps_tc_flags: 0X0000001C
Dec 11 20:01:32.347 RSVP: New TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Found route to dest, nhop 31.31.31.16
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): TC-action(QUERY_ROUTE) finished
Dec 11 20:01:32.347 RSVP: Free TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.347 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Add PSB(0x0X31183CC8) to shared path
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31183CC8) received, new ttd: 597811550, ps_tc_flags: 0X0000001C
Dec 11 20:01:32.347 RSVP: New TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): refresh PSB(0x0X31183CC8)
Dec 11 20:01:32.347 RSVP: Free TC action LDB_reserve for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.347 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): Add PSB(0x0X31182BCC) to shared path
Dec 11 20:01:32.347 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31182BCC) received, new ttd: 597811550, ps_tc_flags: 0X0000001C
Dec 11 20:01:32.347 RSVP: New TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
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Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): Found route to dest, nhop 31.31.31.16
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): Merge not possible for protected path (in-if 148)
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): TC-action(QUERY_ROUTE) finished
Dec 11 20:01:32.348 RSVP: Free TC action QUERY_ROUTE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.348 RSVP: New TC action LDB_RESERVE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_RESERVE) deferred
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Reserve) finished: PSB 0x0X31182BCC
Dec 11 20:01:32.348 SESS(10.0.0.1/29433/10.0.0.1): Tx PATH to 10.31.31.16
Dec 11 20:01:32.349 SESS(10.0.0.1/29433/10.0.0.1): refresh PSB(0x0X31182BCC)
Dec 11 20:01:32.349 RSVP: Free TC action LDB_RESERVE for Sess(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.479 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1): Rx RESV, lbl 0X00000000
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_CONNECT) deferred
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Connect) finished: PSB 0x0X31182BCC
Dec 11 20:01:32.479 Lsp/Grp 0x0X00998001(1)/0x0X00990001(1), Osg/Grp 0x0X00000000(0)/0x0X00000000(0)
Dec 11 20:01:32.479 Lsp/Grp 0x0X008BC001(2)/0x0X008AC001(1), XC 0x0X00000000(2), TCSBP 0x0X00000000
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_CONNECT) deferred
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Connect) sent, PSB 0x0X31183BC4
Dec 11 20:01:32.479 SESS(10.0.0.1/29433/10.0.0.1): Tx RESV, out_if 149 lbl 2356
Dec 11 20:01:32.480 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:32.480 SESS(10.0.0.1/29433/10.0.0.1): Tx RESV, out_if 149 lbl 2356
Dec 11 20:01:32.480 SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_CONNECT) deferred
Dec 11 20:01:32.480 SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Connect) finished: PSB 0x0X31183BC4
Dec 11 20:01:32.684  Lsp/Grp 0x000998001(1)/0x000990001(1), Osg/Grp 0x0000000000(2)/0x0000000001(1)
Dec 11 20:01:32.684  Isg/Grp 0x00008BC001(1)/0x0000000001(1), XC 0x0000000000(2), TCSBP 0x0X2E6C908
Dec 11 20:01:32.684  SESS(10.0.0.1/29433/10.0.0.1): TC-action(LDB_CONNECT) deferred
Dec 11 20:01:32.685  SESS(10.0.0.1/29433/10.0.0.1), LMGR->RSVP(Connect) finished: PSB 0x0X31182BCC
Dec 11 20:01:32.685  Lsp/Grp 0x000998001(1)/0x000990001(1), Osg/Grp 0x0000000000(2)/0x0000000001(1)
Dec 11 20:01:32.685  Isg/Grp 0x00008BC001(1)/0x0000000001(1), XC 0x0000000000(2), TCSBP 0x0X2E6C908
Dec 11 20:01:32.685  RSVP: Free TC action LDB_CONNECT for SESS(10.0.0.1/29433/10.0.0.1), destp 0x0X2E779B14
Dec 11 20:01:32.685  SESS(10.0.0.1/29433/10.0.0.1): Tx RESV, out_if 149 lbl 2356
Dec 11 20:01:35.281 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:35.281 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31183BC4) received, new ttd: 597814450, ps_tc_flags: 0X0000000020
Dec 11 20:01:35.281 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:35.281 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X311833C8) received, new ttd: 597814450, ps_tc_flags: 0X0000000020
Dec 11 20:01:35.282 Processing input queue event "RSVP_pkt" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:35.282 SESS(10.0.0.1/29433/10.0.0.1): path for PSB(0x0X31182BCC) received, new ttd: 597814450, ps_tc_flags: 0X0000000020
Dec 11 20:01:36.483 SESS(10.0.0.1/29433/10.0.0.1): PSB(0x0X31183BC4), srefresh send path
Dec 11 20:01:36.483 SESS(10.0.0.1/29433/10.0.0.1): PSB(0x0X311833C8), srefresh send path
Dec 11 20:01:36.483 SESS(10.0.0.1/29433/10.0.0.1): PSB(0x0X31182BCC), srefresh send path
Dec 11 20:01:36.483 Processing input queue event "Clean_path_state_tmr_exp" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:36.483 Processing input queue event "Clean_path_state_tmr_exp" for SESS(10.0.0.1/29433/10.0.0.1) Destp 0X2E779B14
Dec 11 20:01:38.278 SESS(10.0.0.1/29433/10.0.0.1): srefresh receive resv, RSB(0x0X2E70D0C0), new ttld: 151, fsb_idx: 0

debug mpls rsvp tunnel

Syntax:  [no] debug mpls rsvp tunnel [all | detail | lsp]

This command displays MPLS RSVP LSP tunnel interface-related information.

- **all** - Displays all messages related to a MPLS RSVP tunnel.
- **detail** - Displays detailed information about RSVP tunnel state transitions for all tunnels and their retries whenever the retry timer is expired.
- **lsp** - Displays RSVP tunnel information to specific LSPs.

Command output resembles the following example.

Brocade# debug mpls rsvp tunnel
MPLS: TNNL(test1): try signal LSP
MPLS: TNNL(test1): event = 2(ENABLE_CSPF_OK), change from state 3(PATH_SENT) to 2(ROUTE_FOUND)
MPLS: TNNL(test1): event = 31(SENT_PATH), change from state 2(ROUTE_FOUND) to 3(PATH_SENT)
RSVP_TNNL(test1): Update tunnel_vif_index 2
RSVP_TNNL(test1): Update tunnel_oper old 0, new 1
MPLS: TNNL(test1): tnl 2 goes up
MPLS: TNNL(test1): primary(current instance), path path1 up
MPLS: TNNL(test1): activate primary
MPLS: TNNL(test1): tnl 2 added to mpls route table and indicated to application
MPLS: TNNL(test1): notify IP with vif 2 UP notification

debug mpls rsvp tunnel lsp

Syntax: [no] debug mpls rsvp tunnel lsp [name name] [sess_obj source_ip_address destination_ip_address tunnel_id]

This command displays RSVP tunnel information for specific LSPs.

- **name name** - Limits the display of information to debug messages for the specified LSP name.
- **sess_obj source_ip_address destination_ip_address tunnel_id** - Limits the display of information to debug messages for the specified LSP session object, which includes source IP address, destination IP address, and tunnel ID.

Command output resembles the following example.

Brocade# debug mpls rsvp tunnel lsp name PE3
Brocade# debug mpls
Brocade# clear mpls lsp PE3
Disconnecting signaled LSP PE3
Dec 10 01:17:49 MPLS: TNNL(PE3): tnl 1 deleted from mpls route table and indicated to application
Dec 10 01:17:49 MPLS: TNNL(PE3): possible delete LP with tunnel vif 1 using vif index 1
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM:
   old_st Pri(active), Sec(down), Det(up)
   evt FRR_FWD_EVT_PRI_DE_ACT
   new_st Pri(up), Sec(down), Det(up)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM: action_none
Dec 10 01:17:49 RSVP_TNNL(PE3): delete from LP with tunnel vif 1 using vif index 1
Dec 10 01:17:49 RSVP_TNNL(PE3): Update tunnel_vif_index 1
Dec 10 01:17:49 RSVP_TNNL(PE3): Update tunnel_oper old 1, new 0
Dec 10 01:17:49 MPLS: TNNL: tnl 1 goes down
Dec 10 01:17:49 MPLS: TNNL(PE3): primary down
Dec 10 01:17:49 MPLS: TNNL(PE3): event = 21(DOWN_REROUTE_OR_NO_CSPF), change from state 3(PATH_SENT) to 2ROUTE_FOUND
Dec 10 01:17:49 MPLS: TNNL(PE3): tnl 1 deleted from mpls route table and indicated to application
Dec 10 01:17:49 MPLS: TNNL(PE3): suppress vif 1 DOWN notification
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM:
   old_st Pri(up), Sec(down), Det(up)
   evt FRR_FWD_EVT_FAULT_ON_FRR
   new_st Pri(down), Sec(down), Det(down)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM: action_none
Dec 10 01:17:49 MPLS: TNNL(PE3, detour): event = 41(RX_PATHERR), change from state 3(PATH_SENT) to 4(PATH_ERROR)
Dec 10 01:17:49 MPLS: TNNL(PE3, detour): change from state 3(ENABLE_CSPF_FAIL) to 0(INIT)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM:
   old_st Pri(down), Sec(down), Det(down)
   evt FRR_FWD_EVT_FAULT_DET
   new_st Pri(down), Sec(down), Det(down)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM: action_none
Dec 10 01:17:49 MPLS: TNNL(PE3, detour): change from state 0(UNKNOWN_EVT) to 0(INIT)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM:
  old_st Pri(down), Sec(down), Det(down)
  evt FRR_FWD_EVT_FAULT_DET
  new_st Pri(down), Sec(down), Det(down)
Dec 10 01:17:49 MPLS: TNNL(PE3): FRR_FWD_FSM: action_none
Connecting signaled LSP PE3
Dec 10 01:17:49 MPLS: TNNL(PE3): try signal LSP
Dec 10 01:17:49 MPLS: TNNL(PE3): event = 31(SENT_PATH), change from state 2(ROUTE_FOUND) to 3(PATH_SENT)

**MPLS label manager debug commands**

This section describes the debug commands that generate MPLS label manager information.

**debug mpls lmgr**

**Syntax:** `[no] debug mpls lmgr [all | error | ldp | rsvp]`

This command displays label manager-related information.

- **all** - Displays all the debug messages related to label manager.
- **error** - Displays label manager-related error messages.
- **ldp** - Displays label manager information for LDP.
- **rsvp** - Displays label manager information for RSVP.

Command output resembles the following example.

```
Brocade# debug mpls lmgr
LMGR 1 sent LSI_COMMON_LSP_XC SESSION (10.100.100.100, 0X0007, 10.20.20.20) LSP (0X0001, 10.20.20.20), ref_flags (2,4,0,0,0,0,0), update_flags 0X00000001, lspxc_flags 0X00000000, rvs_ref flags (0,0,0,0,0,0,0,0), rvs_update_flags 0X00000000, in_seg_index 0, xc_index 5, out_seg_index 0.
LMGR 1 rcvd LSI_COMMON_LSP_XC SESSION (10.100.100.100, 0X0007, 10.20.20.20) LSP (0X0001, 10.20.20.20), ref_flags (2,4,0,0,0,0,0,0), update_flags 0X00000001, lspxc_flags 0X00000000, rvs_ref flags (0,0,0,0,0,0,0,0), rvs_update_flags 0X00000000, rc 1, in_seg_index 0, xc_index 5, out_seg_index 0.
LMGR 1 sent LSI_COMMON_LSP_XC SESSION (10.100.100.100, 0X0007, 10.20.20.20) LSP (0X0001, 10.20.20.20), ref_flags (2,4,0,0,0,0,0,0), update_flags 0X00000001, lspxc_flags 0X00000000, rvs_ref flags (0,0,0,0,0,0,0,0), rvs_update_flags 0X00000000, in_seg_index 0, xc_index 5, out_seg_index 0.
LMGR 1 rcvd LSI_COMMON_LSP_XC SESSION (10.100.100.100, 0X0007, 10.20.20.20) LSP (0X0001, 10.20.20.20), ref_flags (2,4,0,0,0,0,0,0), update_flags 0X00000001, lspxc_flags 0X00000000, rvs_ref flags (0,0,0,0,0,0,0,0), rvs_update_flags 0X00000000, rc 1, in_seg_index 0, xc_index 5, out_seg_index 0.
```

**debug mpls lmgr rsvp**

**Syntax:** `[no] debug mpls lmgr rsvp [all | lsp [name name]]
  sess_obj [source_ip_address destination_ip_address tunnel_id]]`

This command displays label manager information for RSVP.

- **all** - Displays all debug messages related to label manager for RSVP.
- **lsp** - Displays label manager information for RSVP for specific LSPs.
• **name name** - Limits the display of information to debug messages for the specified LSP name.

• **sess_obj source_ip_address destination_ip_address tunnel_id** - Limits the display of information to debug messages for the specified LSP session object, which includes source IP address, destination IP address, and tunnel ID.

Command output resembles the following example.

Brocade# debug mpls lmgr rsvp all
Brocade# clear mpls lsp PE3
Disconnecting signaled LSP PE3
Connecting signaled LSP PE3
Dec 10 01:20:04 LMGR 1 sent LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (2,4,0,0,0,0,0), update_flags 0X00000011, lspxc_flags 0X00000000,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000,
in_seg_index 0, xc_index 4251, out_seg_index 0.
Dec 10 01:20:04 LMGR 1 rcvd LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (2,4,0,0,0,0,0), update_flags 0X00000011, lspxc_flags 0X00000000,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000, rc 1,
in_seg_index 0, xc_index 4251, out_seg_index 0.
Dec 10 01:20:04 LMGR 1 sent LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (1,4,2,2,1,0,2), update_flags 0X00000004C, lspxc_flags 0X00000000,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000,
in_seg_index 0, xc_index 4251, out_seg_index 4071.
Dec 10 01:20:04 LMGR 1 rcvd LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (1,4,2,2,1,0,2), update_flags 0X00000004C, lspxc_flags 0X00000000,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000, rc 1,
in_seg_index 0, xc_index 4251, out_seg_index 4071.
Dec 10 01:20:04 LMGR 1 sent LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (1,4,2,2,1,0,2), update_flags 0X00000004C, lspxc_flags 0X00000000C,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000,
in_seg_index 0, xc_index 4251, out_seg_index 4072.
Dec 10 01:20:04 LMGR 1 rcvd LSI_COMMON_LSP_XC SESSION (10.7.7.3, 0X1E24, 10.7.7.2)
LSP (0X0001, 10.7.7.2),
ref_flags (1,4,2,2,1,0,2), update_flags 0X00000004C, lspxc_flags 0X00000000C,
rvs_ref flags (0,0,0,0,0,0,0), rvs_update_flags 0X00000000, rc 1,
in_seg_index 0, xc_index 4251, out_seg_index 4072.

**VLL debug commands**

This section describes the debug commands that generate VLL information.

**debug vll**

**Syntax:** [no] debug vll [events | fsm | ipc]

• **events** - Displays debugging information related to VLL events such as tunnel change, and bitmap change for syslogs.

• **fsm** - Displays debugging information related to all VLL Finite State Machines (FSMs).

• **ipc** - Displays debugging information related to Interprocess Communication (IPC) messages sent to the LP.

Command output resembles the following example.
Brocade# debug vll fsm
  MPLS: VLL FSM (Finite State Machine) debugging is on
Brocade# debug vll events
  MPLS: VLL Events debugging is on
Brocade# debug vll ipc
  MPLS: VLL IPC debugging is on
Brocade(config)# router mpls
Brocade(config-mpls)# no vll mct-vll-1 1
Nov 21 02:42:51 VLL EVENTS: Unconfigured VLL 1 in Tagged-mode (default-mode)
Nov 21 02:42:51 VLL_MCT_SYNC_MSG: VC-ID: 1 Send sync message (Type: [VLL deletion]) is Success (err = 0)
Nov 21 02:42:51 VLL EVENTS: Sending VC withdrawal for VLL 1, vll-index 0, pw-index 0x00000003
Nov 21 02:42:51 VLL EVENTS: Bitmap Event vll-index 0, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Bitmap event is DOWN, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Final Index min_index 0, max-index 0
Nov 21 02:42:51 VLL IPC: Sending IPC to LP as VLL 1 changed to non-operational with config-deletion
Nov 21 02:42:51 VLL EVENTS: Sending VC withdrawal for VLL 1, vll-index 0, pw-index 0x00000003
Nov 21 02:42:51 VLL EVENTS: Bitmap Event vll-index 0, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Bitmap event is DOWN, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Final Index min_index 0, max-index 0
Nov 21 02:42:51 VLL IPC: Sending IPC to LP as VLL 1 changed to non-operational state
Nov 21 02:42:51 VLL EVENTS: Trunk Outbound - vll_name = mct-vll-1, vll_id = 1, vll_port = 96, vlan_id = 401
Nov 21 02:42:51 VLL DY-SYNC: Peer 10.0.0.3, remote_vc = 798761, tunnel_label = 0, mode TAGGED-MODE, action DELETE, PW_role Active, MCT_role Active, MCT_ID = 1, MCT_Client_ID = 3
Nov 21 02:42:51 VLL DY-SYNC: vll_id = 1, vclabel = 798761, Peer 10.0.0.3, action DELETE, PW_role Spoke, Forward_type PE_to_DROP, MCT_ID = 1, MCT_Client_ID = 3
Nov 21 02:42:51 VLL DY-SYNC: vll_id = 1, vclabel = 798773, Peer 10.0.0.1, action ADD, PW_role Standby, Forward_type PE_to_DROP, MCT_ID = 1, MCT_Client_ID = 3
Nov 21 02:42:51 VLL DY-SYNC: vll_id = 1, vclabel = 798774, Peer 10.0.0.2, action ADD, PW_role Active, Forward_type PE_to_EP, MCT_ID = 1, MCT_Client_ID = 3
Nov 21 02:42:51 VLL DY-SYNC: vll_id = 1, vclabel = 798775, Peer 10.0.0.3, action ADD, PW_role Standby, Forward_type PE_to_EP, MCT_ID = 1, MCT_Client_ID = 3
Nov 21 02:42:51 VLL EVENTS: Trunk Outbound - vll_name = mct-vll-1, vll_id = 1, vll_port = 96, vlan_id = 401
Nov 21 02:42:51 VLL EVENTS: Bitmap Event vll-index 0, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Bitmap event is DOWN, min-index 0, max-index 0
Nov 21 02:42:51 VLL EVENTS: Final Index min_index 0, max-index 0
Nov 21 02:42:51 VLL IPC: Sending IPC to LP as VLL 1 changed to non-operational state
Brocade(config-mpls)# vll mct-vll-1 1
Nov 21 02:43:16 VLL EVENTS: VLL ID 1 has allocated vll-index 0
Nov 21 02:43:16 VLL EVENTS: Configured VLL 1 in Tagged-mode (default-mode)
Brocade(config-mpls-vll-mct-vll-1)# vll-peer 10.0.0.1 10.0.0.2
Brocade(config-mpls-vll-mct-vll-1)# vlan 401
Brocade(config-mpls-vll-mct-vll-1-vlan-401)# tagged e 3/1
Nov 21 02:43:27 VLL IPC: Sending IPC to LP for VLL 1 to program the drop cam
Nov 21 02:43:27 VLL DY-SYNC: Trunk Outbound - vll_name = mct-vll-1, vll_id = 1, vll_port = 96, vlan_id = 401
Nov 21 02:43:27 VLL DY-SYNC: Peer 0.0.0.0, remote_vc = 0, tunnel_label = 0, mode TAGGED-MODE, action UPDATE, PW_role Active, MCT_role None, MCT_ID = 0, MCT_Client_ID = 0.

Nov 21 02:43:27 VLL IPC: Sending IPC to LP for VLL 1 to program the drop cam
Nov 21 02:43:27 VLL DY-SYNC: Trunk Outbound - vll_name = mct-vll-1, vll_id = 1, vll_port = 96, vlan_id = 401
Nov 21 02:43:27 VLL DY-SYNC: Peer 0.0.0.0, remote_vc = 0, tunnel_label = 0, mode TAGGED-MODE, action UPDATE, PW_role Active, MCT_role None, MCT_ID = 0, MCT_Client_ID = 0.

Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Send sync message (Type: [MCT status]) is Success (err = 0)
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Send sync message (Type: [MCT status]) is Success (err = 0)
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])

Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Send sync message (Type: [MCT status]) is Success (err = 0)
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Send sync message (Type: [MCT status]) is Success (err = 0)
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 1 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])
Nov 21 02:43:27 VLL MCT_SYNC_MSG: VC-ID: 5 Received sync message (Type: [MCT status])

debug vll-local

Syntax: [no] debug vll-local

This command displays information about activity in local Virtual Lease Line (VLL-Local) configurations. In the following example, VLL-local 10 is turned off, and then turned on again. With debug vll-local enabled, the activity around this event is displayed.

Brocade# debug vll-local
DEBUG VLL LOCAL : MP_VLL_LOCAL_DY_SYNC: name = 10, vll_local_id = 10
:port1 = 65535, vlan_id1 = 1 cos1 = 0
:port2 = 23, vlan_id2 = 501, cos2 = 0 state = 0
DEBUG VLL LOCAL : state change: name = 10, vll_local_id = 10, state = 0 oldState = 1
DEBUG VLL LOCAL : MP_VLL_LOCAL_DY_SYNC: name = 10, vll_local_id = 10
:port1 = 65535, vlan_id1 = 1 cos1 = 0
:port2 = 65535, vlan_id2 = 501, cos2 = 0 state = 0
DEBUG VLL LOCAL : state change: name = 10, vll_local_id = 10, state = 0 oldState = 0
DEBUG VLL LOCAL : MP_VLL_LOCAL_DY_SYNC: name = 10, vll_local_id = 10
:port1 = 65535, vlan_id1 = 1 cos1 = 0
:port2 = 65535, vlan_id2 = 501, cos2 = 0 state = 0
DEBUG VLL LOCAL : state change: name = 10, vll_local_id = 10, state = 0 oldState = 0
DEBUG VLL LOCAL : MP_VLL_LOCAL_DY_SYNC: name = 10, vll_local_id = 10
:port1 = 65535, vlan_id1 = 1 cos1 = 0
:port2 = 65535, vlan_id2 = 1, cos2 = 0 state = 0
DEBUG VLL LOCAL : state change: name = 10, vll_local_id = 1, state = 0 oldState =
MPLS dynamic bypass LSP

The dynamic bypass Label Switched Path (LSP) behavior is used to provide Fast Reroute (FRR) link or node protection to a facility-protected LSP at the Point of Local Repair (PLR). PLR tunnels the traffic on the protected LSP to the bypass LSP in case of failure. Multiple protected LSPs can use the same bypass LSP in case of protected LSP link or node failures.

MPLS dynamic bypass show commands

This section describes the show commands that display information about the MPLS dynamic bypass LSPs.

show mpls debug dynamic-bypass

**Syntax:** show mpls debug dynamic-bypass [lsp | reset]

- **lsp** - Displays information about all the dynamic bypass LSPs.
- **reset** - Resets the dynamic bypass debug counters.

This command enables debugging of MPLS dynamic bypass LSPs. Command output resembles the following example.

```
Brocade# show mpls debug dynamic-bypass
Dynamic Bypass: Enabled
Enable on all interfaces: No
Reoptimization time: 0 seconds.
Maximum bypasses per merge point: 1000
Maximum allowed dynamic bypasses: 1000
Current number of dynamic bypasses 998
Debug Print enabled = 0
cspf_get_dbyp_fail = 0
cspf_get_telink_fail = 0
cspf_get_router_id_fail = 0
cspf_dbyp_add_check_fail = 0
cspf_cspf_fail = 0
cspf_gen_name_fail = 0
cspf_dbyp_create = 998
```
The `show mpls debug dynamic-bypass lsp` command displays information about all the dynamic bypass LSPs. Command output resembles the following example.

Brocade# show mpls debug dynamic-bypass lsp
LSP dbyp-10.1.1.1-1 Backup: 1/0, Delete Wait: 0 Reop: 0/0
LSP dbyp-10.1.1.1-10 Backup: 1/0, Delete Wait: 0 Reop: 0/0
LSP dbyp-10.1.1.1-100 Backup: 1/0, Delete Wait: 0 Reop: 0/0
The show mpls debug dynamic-bypass reset command resets the dynamic bypass debug counters. Command output resembles the following example.

Brocade# show mpls debug dynamic-bypass reset
Dynamic Bypass: Enabled
Enable on all interfaces: No
Reoptimization time: 0 seconds.
Maximum bypasses per merge point: 1000
Maximum allowed dynamic bypasses: 1000
Current number of dynamic bypasses 998
Debug Print enabled = 0
cspf_get_dbyp_fail = 0
cspf_get_telink_fail = 0
cspf_get_router_id_fail = 0
cspf_dbyp_add_check_fail = 0
cspf_cspf_fail = 0
cspf_gen_name_fail = 0
cspf_dbyp_create = 998
cspf_set_new_lsp_fail = 0
bsearch_not_static = 47296
bsearch_not_dynamic = 5322
bsearch_area_fail = 0
bsearch_rid_fail = 0
bsearch_no_bypif = 0
bsearch_rldf_cac_fail = 1182
bsearch_cac_hprio_fail = 0
bsearch_cac_sprio_fail = 1230771
bsearch_use_bypass_fail = 1
bsearch_found_dbyp = 1473
bsearch_found_sbyp = 2
bsearch_no_bypass = 3849
tmr_down_wait = 0
tmr_nobkp_wait = 0
tmr_dec_bkp_wait = 4
tmr_up_remove = 998
tmr_expired = 0
Resetting Mpls dynamic bypass debug counters

MPLS dynamic bypass debug commands

This section describes the debug command that enables dynamic bypass console logs.

```
debug mpls dynamic-bypass all
```

**Syntax:** `[no] debug mpls dynamic-bypass all`

This command enables and displays the dynamic bypass-related logs on the console. Command output resembles the following example.

```
Brocade# debug mpls dynamic-bypass all
MPLS: dynamic-bypass debugging is on
```

**NOTE**

The `debug mpls all` or `debug all` command do not enable dynamic bypass debugging; however, the `no debug mpls all` or `no debug all` commands disable the dynamic bypass debugging if dynamic bypass debugging is already enabled.
MPLS LDP

Brocade devices support the Label Distribution Protocol (LDP) for setting up non-traffic-engineered tunnel LSPs in an MPLS network.

When used to create tunnel LSPs, LDP allows a set of destination IP prefixes (known as a Forwarding Equivalence Class (FEC)) to be associated with an LSP. Each label switch router (LSR) establishes a peer relationship with its neighboring LDP-enabled routers and exchanges label mapping information, which is stored in an LDP database.

The result of an LDP configuration is a full mesh of LSPs in an MPLS network, with each LDP-enabled router a potential ingress, transit, or egress LSR, depending on the destination.

MPLS LDP show commands

You can display the following information about LDP:

- The LDP version number, as well as the LSR’s LDP identifier and loopback number
- Information about active LDP-created LSPs on the device
- Information about LDP-created tunnel LSPs for which this device is the ingress LER
- The contents of the LDP database
- Information about the LDP session between this LSR and its LDP peers
- Information about the connection between this LSR and its LDP peers
- Information about LDP-enabled interfaces on the LSR

show mpls ldp

Syntax: show mpls ldp

To display the LDP version number, the LSR’s LDP identifier and loopback number, and the LDP hello interval and hold time, enter the show mpls ldp command.

Brocade# show mpls ldp
Label Distribution Protocol version 1
  LSR ID: 10.15.1.15, using Loopback 1 (deleting it will stop LDP)
  Hello interval: Link 5 sec, Targeted 15 sec
  Hold time value sent in Hellos: Link 15 sec, Targeted 45 sec
  Keepalive interval: 6 sec, Hold time multiple: 6 intervals
  Keepalive timeout: 36 sec
  Load sharing: 1
  Tunnel metric: 0
  FEC used for auto discovered peers: current 129, configured 129
  Label Withdrawal Delay: 30s

show mpls ldp database

Syntax: show mpls ldp database

This command displays the LSR LDP Label Information Base, which contains all the labels that have been learned from each LSR peer, as well as all of the labels that has been sent to its LDP peers. Command output resembles the following example.
Brocade# show mpls ldp database
Session 10.1.1.1:0 - 10.2.2.2:0
Downstream label database:
<table>
<thead>
<tr>
<th>Label</th>
<th>Prefix</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10.2.2.2/32</td>
<td>Installed</td>
</tr>
<tr>
<td>1104</td>
<td>10.3.3.3/32</td>
<td>Retained</td>
</tr>
<tr>
<td>1107</td>
<td>10.44.44.44/32</td>
<td>Retained</td>
</tr>
<tr>
<td>800005</td>
<td>VC-FEC</td>
<td>Installed</td>
</tr>
</tbody>
</table>
Upstream label database:
<table>
<thead>
<tr>
<th>Label</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10.1.1.1/32</td>
</tr>
<tr>
<td>1024</td>
<td>10.2.2.2/32</td>
</tr>
<tr>
<td>1026</td>
<td>10.3.3.3/32</td>
</tr>
<tr>
<td>1029</td>
<td>10.44.44.44/32</td>
</tr>
<tr>
<td>800005</td>
<td>VC-FEC</td>
</tr>
<tr>
<td>800006</td>
<td>VC-FEC</td>
</tr>
</tbody>
</table>

show mpls ldp fec prefix

**Syntax:** show mpls ldp fec prefix [ip_address]

This command displays the host address and prefix FECs from the LDP FEC database. Command output resembles the following example.

Brocade# show mpls ldp fec prefix
Total number of prefix FECs: 6
Total number of prefix FECs installed: 1
Total number of prefix FECs filtered (in/out): 2/2

<table>
<thead>
<tr>
<th>Destination</th>
<th>State</th>
<th>Out-intf</th>
<th>Next-hop</th>
<th>Ingress</th>
<th>Egress</th>
<th>Filtered</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.14.14.14/32</td>
<td>current</td>
<td>--</td>
<td>--</td>
<td>No</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>192.168.1.1/32</td>
<td>current</td>
<td>e2/1</td>
<td>23.23.23.12</td>
<td>Yes</td>
<td>No</td>
<td>In</td>
</tr>
<tr>
<td>192.168.1.2/32</td>
<td>current</td>
<td>e2/1</td>
<td>23.23.23.12</td>
<td>Yes</td>
<td>No</td>
<td>In</td>
</tr>
<tr>
<td>192.168.1.3/32</td>
<td>current</td>
<td>e2/1</td>
<td>23.23.23.12</td>
<td>Yes</td>
<td>No</td>
<td>Out</td>
</tr>
<tr>
<td>192.168.1.4/32</td>
<td>current</td>
<td>e2/1</td>
<td>23.23.23.12</td>
<td>Yes</td>
<td>No</td>
<td>Out</td>
</tr>
<tr>
<td>192.168.1.5/32</td>
<td>current</td>
<td>e2/1</td>
<td>23.23.23.12</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
</tr>
</tbody>
</table>

The following is the sample output from the **show mpls ldp fec prefix** command if IP address is specified.

FEC_CB: 0x2d19811c, idx: 8, type: 2, pend_notif: None
State: current, Ingr: Yes, Egr: No, UM Dist. done: Yes
next_hop: 10.23.23.14, out_if: e2/1

Downstream mappings:
<table>
<thead>
<tr>
<th>Local LDP ID</th>
<th>Peer LDP ID</th>
<th>Label</th>
<th>State</th>
<th>CB</th>
</tr>
</thead>
</table>

Upstream mappings:
<table>
<thead>
<tr>
<th>Local LDP ID</th>
<th>Peer LDP ID</th>
<th>Label</th>
<th>CB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.12.12.12:0</td>
<td>10.15.15.15:0</td>
<td>3</td>
<td>0x2d14f610(-1)</td>
</tr>
<tr>
<td>10.12.12.12:0</td>
<td>10.21.21.21:0</td>
<td>(f)</td>
<td>-</td>
</tr>
</tbody>
</table>
show mpls ldp fec summary

Syntax: show mpls ldp fec summary

This command displays LDP FEC summary information. Command output resembles the following example.

Brocade# show mpls ldp fec summary
LDP FEC summary:
  Total number of prefix FECs: 1
  Total number of prefix FECs installed: 0
  Total number of prefix FECs filtered: 0
  Total number of VC-FEC type 128: 0
  Total number of VC-FEC type 129: 0
  Total number of VC FECs installed: 0

LDP error statistics:
  Total number of route update processing errors: 0
  Total number of VC FEC processing errors: 0

show mpls ldp fec vc

Syntax: show mpls ldp fec vc vc-id

The vc-id variable specifies the ID of the Virtual Circuit (VC).

This command displays a list of VC FECs from the LDP FEC database. Command output resembles the following example.

Brocade# show mpls ldp fec vc
Total number of VC FECs: 2
Total number of VC FECs Installed: 2
Peer LDP ID    State   VC-ID  VC-Type FEC-Type Ingress Egress
10.125.125.1:0 current  100  4 128       Yes Yes
10.125.125.1:0 current  1000 5 128       Yes Yes

To display detailed information about a specific VC, enter the show mpls ldp fec vc command with a VC ID, as shown in the following example.

Brocade# show mpls ldp fec vc 100
FEC_CB: 0x29391510, idx: 6, type: 128, pend_notif: None
State: current, Ingr: Yes, Egr: Yes, UM Dist. done: Yes
VC-Id: 100, vc-type: 4, grp-id: 0
Local-mtu: 1500, remote-mtu: 1500, MTU enforcement: enabled

Downstream mappings:
  Local LDP ID  Peer LDP ID  Label    State    CB
  10.128.128.28:0  10.125.125.1:0  8000000  Installed  0x29391328(-1)

Upstream mappings:
  Local LDP ID  Peer LDP ID  Label    CB
  10.128.128.28:0  10.125.125.1:0  800003   0x2939141c(-1)

show mpls ldp interface

Syntax: show mpls ldp interface

This command displays information about LDP-enabled interfaces on the LSR. Command output resembles the following example.
Brocade# show mpls ldp interface

<table>
<thead>
<tr>
<th>Interface</th>
<th>Label-space</th>
<th>Nbr</th>
<th>Hello</th>
<th>Next</th>
</tr>
</thead>
<tbody>
<tr>
<td>e1/1</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>0 sec</td>
</tr>
<tr>
<td>gre_tnl200</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>2 sec</td>
</tr>
<tr>
<td>(targeted)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>--</td>
</tr>
</tbody>
</table>

**show mpls ldp neighbor**

**Syntax:** show mpls ldp neighbor [detail | peer ip-addr [label space id]]

- **detail** - Displays detailed information about the connection between the LSR and its LDP-enabled neighbors.
- **peer ip-addr** - Specifies the LDP ID of the neighbor.
- **label space id** - Specifies the label space ID of the peer.

This command displays information about the connection between the LSR and its LDP-enabled neighbors. Command output resembles the following example.

Brocade# show mpls ldp neighbor

<table>
<thead>
<tr>
<th>Nbr Transport</th>
<th>Interface</th>
<th>Nbr LDP ID</th>
<th>Max Hold</th>
<th>Time Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.1.1</td>
<td>e1/1</td>
<td>10.1.1.1:0</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>10.3.3.3</td>
<td>gre_tnl200</td>
<td>10.3.3.3:0</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

To display detailed information about the connection between the LSR and its LDP-enabled neighbors, enter the `show mpls ldp neighbor detail` command.

Brocade# show mpls ldp neighbor detail

Number of link neighbors: 2
Number of targeted neighbors: 1
Nbr Transport Addr: 10.42.42.42, Interface: e1/5, Nbr LDP ID: 10.42.42.42:0
MaxHold: 13 sec, Time Left: 9 sec, Up Time: 9 hr 22 min 50 sec
Configured Hold time: 13 sec, Neighbor Proposed Hold Time: 15 sec

**show mpls ldp path**

**Syntax:** show mpls ldp path

Use the `show mpls ldp path` command to display information about active LDP-created LSPs for which the device is an ingress, transit, or egress LSR. Command output resembles the following example.

Brocade# show mpls ldp path

<table>
<thead>
<tr>
<th>Destination route</th>
<th>Upstr-session(label)</th>
<th>Downstr-session(label, intf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2.2.2/32</td>
<td>10.1.1.1:0(3)</td>
<td></td>
</tr>
<tr>
<td>10.1.1.1/32</td>
<td></td>
<td>10.1.1.1:0(3, e1/1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.1.1.1:0(3, e1/2)</td>
</tr>
<tr>
<td>10.3.3.3/32</td>
<td>10.3.3.3:0(5050)</td>
<td>10.4.4.4:0(2057, gre_tnl200)</td>
</tr>
</tbody>
</table>

**NOTE**

In this context, “upstream” and “downstream” refer to the direction that data traffic flows in an LSP. This is the opposite of the direction that labels are distributed using LDP.

**show mpls ldp peer**

**Syntax:** show mpls ldp peer [detail]

This command displays LDP peer information. Command output resembles the following example.
Brocade# show mpls ldp peer
Peer LDP ID          State
10.2.2.2:0          Operational
10.3.3.3:0          Operational
10.8.8.8:0          Operational
10.9.9.9:0          Unknown
To display more detailed information about the LDP peers, enter the show mpls ldp peer detail command, as shown in the following example.

Brocade# show mpls ldp peer detail
Peer LDP ID: 10.2.2.2:0, Local LDP ID: 10.1.1.1:0, State: Operational
Session Status UP, Entity Idx: 4, Targeted: No, Target Adj Added: Yes
Num VLL: 2, Num VPLS: 0
Rcvd VC-FECs:
  From 10.2.2.2: Label: 800001, VC Id: 120, Grp_Id: 0, VC Type: 4
Peer LDP ID: 10.8.8.8:0, Local LDP ID: 10.1.1.1:0, State: Operational
Session Status UP, Entity Idx: 2, Targeted: Yes, Target Adj Added: Yes
Num VLL: 2, Num VPLS: 0
Rcvd VC-FECs:
  From 10.8.8.8: Label: 16, VC Id: 19, Grp_Id: 0, VC Type: 32773
  From 10.8.8.8: Label: 18, VC Id: 18, Grp_Id: 0, VC Type: 32772

show mpls ldp session

Syntax: show mpls ldp session [detail | a.b.c.d filtered [in | out]]

- detail - Displays detailed information about the LDP sessions.
- filtered - Displays a list of filtered upstream and downstream mappings for the session. You can use the in and out options with the filtered option to display only the filtered downstream or filtered upstream mappings, respectively.

To display detailed information about the LDP sessions, enter the show mpls ldp session detail command.

Brocade# show mpls ldp session detail
Number of link LDP sessions: 1
  Number of Operational link LDP sessions: 1
  Number of targeted LDP sessions: 0
  Number of Operational targeted LDP sessions: 0
  Adj: Link, Role: Active, Next keepalive: 4 sec, Hold time left: 39 sec
  Keepalive interval: 5 sec, Max hold time: 40 sec
  Configured keepalive timeout: 40 sec
  Peer proposed keepalive timeout: 49 sec
  Up time: 17 hr 21 min 23 sec
  Neighboring interfaces: e2/1
  Number of FECs installed from peer: 7
  Number of FECs filtered for peer (in/out): 0/0
  Next-hop addresses received from the peer:
    192.168.1.2  192.168.1.3  192.168.1.4  192.168.1.5
  IGP Sync:
    Unrecognized Notification Capability: Local: Off, Remote: Off
    Local State: In-sync, RemoteState: -
    Receive label silence time: 1000 ms, Timer not running
    Graceful restart: disabled
  Number of FECs Received from peer: 7
The following is the sample output from the `show mpls ldp session a.b.c.d filtered` command.

Brocade# show mpls ldp session 10.12.12.12  filtered
Number of link LDP sessions: 1
Number of Operational link LDP sessions: 1
Number of targeted LDP sessions: 0
Number of Operational targeted LDP sessions: 0

Adj: Link, Role: Active, Next keepalive: 4 sec, Hold time left: 39 sec
Keepalive interval: 5 sec, Max hold time: 40 sec
Configured keepalive timeout: 40 sec
Peer proposed keepalive timeout: 49 sec
Up time: 17 hr 21 min 23 sec
Neighboring interfaces: e2/1
Next-hop addresses received from the peer:
192.168.1.2  192.168.1.3  192.168.1.4  192.168.1.5
IGP Sync:
Unrecognized Notification Capability: Local: Off, Remote: Off
Local State: In-sync, RemoteState: -
Receive label silence time: 1000 ms, Timer not running
Graceful restart: disabled
Number of FECs Received from peer: 7
Number of FECs installed from peer: 2
Number of FECs filtered for peer(in/out): 5/3
Outbound FEC filtering prefix-list: list-out
FECs received from peer and filtered inbound
3 192.168.1.6/32
3 192.168.1.7/32
3 192.168.1.8/32
3 192.168.1.9/32
3 192.168.1.10/32

This command filters and displays information about LDP-created LSPs based on the out-interface. Command output resembles the following example.

Brocade# show mpls ldp tunnel out-interface ve 15
Total LDP tunnels on interface: 3

<table>
<thead>
<tr>
<th>To</th>
<th>Oper</th>
<th>Tunnel</th>
<th>Outbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.130.130.3</td>
<td>UP</td>
<td>tnl7</td>
<td>ve15</td>
</tr>
</tbody>
</table>
MPLS LDP debug commands

This section describes the debug commands that generate MPLS LDP information.

**debug mpls ldp**

Syntax: `[no] debug mpls ldp [all | adjacency | error | event | fec | gr | packets | socket | state | tcpdump | tunnel]`

- **all** - Displays all messages related to a MPLS LDP module.
- **adjacency** - Displays debug messages related to MPLS LDP adjacency messages.
- **error** - Displays debug messages related to MPLS LDP errors.
- **event** - Displays debug messages related to MPLS LDP events.
- **fec** - Displays MPLS LDP FEC information.
- **gr** - Displays debug messages related to MPLS LDP Graceful Restart (GR).
- **packets** - Displays debug messages related to MPLS LDP packets.
- **socket** - Displays debug messages related to MPLS LDP sockets.
- **state** - Displays debug messages related to MPLS LDP states.
- **tcpdump** - Displays MPLS LDP packets as raw data.
- **tunnel** - Displays debug messages related to MPLS LDP LSP interaction with other modules as virtual interfaces.

This command displays MPLS LDP-related information, as shown in the following example.

Brocade# debug mpls ldp all
Dec 10 01:26:34 LDP_PKT: send targeted Hello to <10.7.7.3, 646>
Dec 10 01:26:34 LDP_PKT: send targeted Hello to <10.7.7.1, 646>
Warning: LDP session 10.7.7.1 doesn't exist!
telnet@PE2#:Dec 10 01:26:36 LDP_PKT: receive link Hello from 10.1.1.1 on e2/1
Dec 10 01:26:37 LDP_TCPDUMP: rx from 10.7.7.3, TCP length 18
0001000e 07070703 00000201 00040000 142e
Dec 10 01:26:37 LDP_PKT: receive targeted Hello from 10.7.7.1 on e2/1
Dec 10 01:26:37 LDP_ADJ: Targeted adajacency to 10.7.7.1:0, entity idx 4 is added
Dec 10 01:26:37 LDP_EVT: LDP session to 10.7.7.1 is initiated, targeted adjacency
Yes
Dec 10 01:26:37 LDP_SC 1 Initialization FSM, Session CB 159/13, input 0, old state
0, new state 1, action 1.
Dec 10 01:26:37 LDP_SC 1 SM Socket FSM, CB 124/9, input 0, old state 0, new state
1, action 1, Session CB 159/13,
local LDP ID 10.7.7.2:0, peer LDP ID 10.7.7.1:0.
Dec 10 01:26:37 LDP_SCK: receive TCP socket request
Dec 10 01:26:37 LDP_SCK: try connecting 10.7.7.1, local port 9003
Dec 10 01:26:37 LDP_SCK: start connecting 10.7.7.1 local port 9003, TCB 0X117EF03E
Dec 10 01:26:37 LDP_SCK: connection accepted by peer 10.7.7.1, ready to send TCB
0X117EF03E
Dec 10 01:26:37 LDP_SC 1 SM Socket FSM, CB 124/9, input 1, old state 1, new state
2, action 2, Session CB 159/13,
local LDP ID 10.7.7.2:0, peer LDP ID 10.7.7.1:0.
Dec 10 01:26:37 LDP_SC 1 Initialization FSM, Session CB 159/13, input 1, old state
1, new state 2, action 2.
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 4, old state 2, new state 3, action 4.
Dec 10 01:26:37 LDP_GR: PM add session to 10.7.7.1:2, gr 0, reconnect 0, recovery 0
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 5, old state 3, new state 4, action 5.
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 7, old state 4, new state 5, action 6.
Dec 10 01:26:37 LDP_PKT: Rcvd PDU <-> 10.7.7.1, ver 1, pdu len 32, id 10.7.7.2:0
(tcb a00014a9)
Dec 10 01:26:37 Msg: Initialize(0x0200) len 22, id 0x00000001
Dec 10 01:26:37 LDP_TCPDUMP: tx to 10.7.7.1, TCP length 36
00110020 07070702 00000200 00160000 00010500 000e0001 00240000 10000707 07010000
Dec 10 01:26:37 LDP_TCPDUMP: rx from 10.7.7.1, TCP length 36
00110020 07070701 00000200 00160000 00010500 000e0001 00240000 05a00707 07020000
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 9, old state 5, new state 6, action 8.
Dec 10 01:26:37 LDP_PKT: Rcvd PDU <-> 10.7.7.1, ver 1, pdu len 14, id 10.7.7.2:0
(tcb a00014a9)
Dec 10 01:26:37 Msg: Keepalive(0x0201) len 4, id 0x00000003
Dec 10 01:26:37 LDP_TCPDUMP: tx to 10.7.7.1, TCP length 18
0011000e 07070702 00000201 00040000 0003
Dec 10 01:26:37 LDP_TCPDUMP: rx from 10.7.7.1, TCP length 18
0011000e 07070701 00000201 00040000 0002
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 11, old state 8, new state 9, action 11.
Dec 10 01:26:37 LDP_EVT: LDP session to 10.7.7.1, entity idx 4, type targeted goes UF, use TCB 0xa00014a9:0x17ef03e
Dec 10 01:26:37 LDP_PKT: Rcvd PDU <-> 10.7.7.1, ver 1, pdu len 40, id 10.7.7.2:0
(tcb a00014a9)
Dec 10 01:26:37 Msg: Address(0x0300) len 30, id 0x08000000
Dec 10 01:26:37 LDP_TCPDUMP: tx to 10.7.7.1, TCP length 44
00110028 07070702 00000300 00e80000 00000101 00160001 07070702 0e010203 1101101 1101102 16010102
Dec 10 01:26:37 LDP SC 1 Initialization FSM, Session CB 159/13, input 16, old state 9, new state 10, action 16.
Dec 10 01:26:37 LDP_EVT: LDP session to 10.7.7.1, entity idx 4, type targeted goes UF, use TCB 0xa00014a9:0x17ef03e
Dec 10 01:26:37 LDP_PKT: Rcvd PDU <-> 10.7.7.1, ver 1, pdu len 40, id 10.7.7.2:0
(tcb a00014a9)
Dec 10 01:26:37 LDP_TCPDUMP: tx to 10.7.7.1, TCP length 56
00110034 07070701 00000300 002a8000 00000101 00220001 01020004 03030b02
03060702 03080302 07070701 10c0301 11011101 c0a81502
Dec 10 01:26:37 LDP PM 1 Egress FSM, CB 52/5, input 0, old state 0, new state 0, action 1, FEC CB 159/1,
FEC Prefix: 10.3.11.0, len 24.
Dec 10 01:26:37 LDP PM 1 Egress FSM, CB 52/5, input 3, old state 0, new state 0, action 0, FEC CB 159/1,
FEC Prefix: 10.3.11.0, len 24.
Dec 10 01:26:37 LDP PM 1 Egress FSM, CB 139/17, input 0, old state 0, new state 0, action 1, FEC CB 175/9,
FEC Prefix: 10.6.7.0, len 24.
Dec 10 01:26:37 LDP PM 1 Egress FSM, CB 139/17, input 3, old state 0, new state 0, action 0, FEC CB 175/9,
FEC Prefix: 10.6.7.0, len 24.
**debug mpls ldp adjacency**

**Syntax:** `[no] debug mpls ldp adjacency

This command displays information about MPLS LDP adjacencies.

Brocade# debug mpls ldp adjacency
LDP_ADJ: Link adjacency to 10.140.140.4:0 on interface e1/2 is deleted, reason 4
LDP_ADJ: Link adjacency to 10.140.140.4:0 on interface e1/2 is added

**debug mpls ldp error**

**Syntax:** `[no] debug mpls ldp error

This command displays the errors detected by LDP components such as LDP session keepalive timer expiration, hello adjacency timeout, and so on.

Brocade# debug mpls ldp error
LDP_ERR: Session KeepAlive error to peer 10.120.120.2 has expired

**debug mpls ldp event**

**Syntax:** `[no] debug mpls ldp event

This command displays session up and down events, similar to the following example.

Brocade# debug mpls ldp event
LDP_EVT: LDP session to 10.140.140.4, entity idx 1, type non-targeted goes DOWN, use TCB 0XA0000010:0X12BF2B70
LDP_EVT: remove session to 10.140.140.4. Session is deleted
LDP_EVT: initiate LDP session to peer 10.140.140.4. Session is not found
LDP_EVT: initiate session block 0X344BF140, entity idx 1 and insert to tree
LDP_EVT: LDP session to 10.140.140.4 is initiated, targeted adjacency No
LDP_EVT: LDP session to 10.140.140.4, entity idx 1, type non-targeted goes UP, use TCB 0XA0000012:0X12BF244A
debug mpls ldp fec

Syntax: [no] debug mpls ldp fec [all | lsr-id ip_address label_space | key [prefix ip-address prefix-length | vc vc_id]]

This command displays MPLS LDP FEC information.

- **all** - Displays all MPLS LDP FEC-related information.
- **lsr-id ip_address label_space** - Limits the MPLS LDP FEC information displayed to a specific LSR ID.
- **key** - Limits the information displayed to a specific FEC key value.
- **prefix ip-address prefix-length** - Limits the display of MPLS LDP FEC-related information to specific prefixes.
- **vc vc_id** - Displays MPLS LDP FEC-related information for a specific VC ID.

Command output resembles the following example.

```
Brocade# debug mpls ldp fec
LDP PM 1 Ingress FSM, CB 171/33, input 0, old state 0, new state 0, action 1, FEC CB 169/33,
FEC Prefix: 10.100.100.100, len 32.
LDP PM 1 Egress FSM, CB 205/45, input 0, old state 0, new state 0, action 1, FEC CB 184/45,
FEC Prefix: 10.20.20.20, len 32.
LDP PM 1 UM FSM, CB 164/29, input 0, old state 0, new state 1, action 1, UT CB 101/5, session CB 117/25, FEC CB 184/45.
FEC Prefix: 10.20.20.20, len 32.
LDP PM 1 UM FSM, CB 164/29, input 3, old state 1, new state 2, action 23, UT CB 101/5, session CB 117/25, FEC CB 184/45.
FEC Prefix: 10.20.20.20, len 32.
LDP PM 1 UM FSM, CB 164/29, input 1, old state 2, new state 2, action 2, UT CB 101/5, session CB 117/25, FEC CB 184/45.
FEC Prefix: 10.20.20.20, len 32.
```

debug mpls ldp gr

Syntax: [no] debug mpls ldp gr

This command displays debug messages related to MPLS LDP Graceful Restart (GR), including the internal GR FSM transitions.

Command output resembles the following example.

```
Brocade# debug mpls ldp gr
```

debug mpls ldp packets

Syntax: [no] debug mpls ldp packets [all | detail | direction | lsr_id | pkt_type]

This command displays MPLS LDP packet information, which is further filtered by direction, packet types, and LSR ID.

- **all** - Displays all MPLS LDP packets.
- **detail** - Displays messages about MPLS LDP packets in a detailed version.
- **direction** - Limits the display of MPLS LDP packets to specific directions (send and receive).
- **lsr_id** - Limits the display of MPLS LDP packets to a specific LSR ID.
- **pkt_type** - Limits the display of MPLS LDP packets to specific packet types.

Command output resembles the following example.

```
Brocade# debug mpls ldp packets\nMsg: Keepalive(0x0201) len 4, id 0x000000131
LDP_PKT: send link Hello to e1/1
LDP_PKT: receive link Hello from 10.1.1.2 on e1/1
LDP_PKT: send link Hello to e1/1
LDP_PKT: Rcvd PDU <- 10.20.20.20, ver 1, pdu len 14, id 10.100.100.100:0 (tcb 0dfa0328)
Msg: Keepalive(0x0201) len 4, id 0x000000132
LDP_PKT: receive link Hello from 10.1.1.2 on e1/1
LDP_PKT: send link Hello to e1/1
LDP_PKT: receive link Hello from 10.1.1.2 on e1/1
LDP_PKT: Rcvd PDU <- 10.20.20.20, ver 1, pdu len 14, id 10.100.100.100:0 (tcb 0dfa0328)
Msg: Keepalive(0x0201) len 4, id 0x000000133
LDP_PKT: receive UDP packet for invalid destination address 10.1.1.1
```

**debug mpls ldp packets pkt_type**

Syntax: `[no] debug mpls ldp packets pkt_type [all | address | initialization | label | notification | hello | keepalive]`

This command displays MPLS LDP packets with specific LDP packet types.
- **all** - Displays MPLS LDP packets of all types.
- **address** - Displays information about MPLS LDP addresses, including address withdraw messages.
- **initialization** - Displays LDP Initialization messages.
- **label** - Displays LDP label mapping, withdraw, request, release, and abort messages.
- **notification** - Displays LDP notification information.
- **hello** - Displays information about the periodic link Hello messages sent and received.
- **keepalive** - Displays LDP Keepalive messages after the session comes up.

Command output resembles the following example.

```
Brocade# debug mpls ldp packets pkt_type all
Dec 10 01:28:01 LDP_PKT: receive link Hello from 10.1.1.1 on e2/1
Dec 10 01:28:01 LDP_PKT: Rcvd PDU <- 10.7.7.1, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a00014a9)
Dec 10 01:28:01 Msg: Keepalive(0x0201) len 4, id 0x00000011
Dec 10 01:28:01 LDP_PKT: Rcvd PDU <- 10.7.7.3, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a0000028)
Dec 10 01:28:01 Msg: Keepalive(0x0201) len 4, id 0x0000013b
Dec 10 01:28:03 LDP_PKT: Rcvd PDU <- 10.7.7.6, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a0000025)
Dec 10 01:28:01 Msg: Keepalive(0x0201) len 4, id 0x00000143b
Dec 10 01:28:03 LDP_PKT: send targeted Hello to <10.7.7.3, 646>
Dec 10 01:28:04 LDP_PKT: send targeted Hello to <10.7.7.1, 646>
Dec 10 01:28:06 LDP_PKT: receive link Hello from 10.1.1.1 on e2/1
```
Dec 10 01:28:07 LDP_PKT: Rcvd PDU <- 10.7.7.1, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a000014a9)
Dec 10 01:28:07 Msg: Keepalive(0x0201) len 4, id 0x00000012
Dec 10 01:28:07 LDP_PKT: receive targeted Hello from 10.7.7.1 on e2/1
Dec 10 01:28:07 LDP_PKT: Rcvd PDU <- 10.7.7.2, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a0000028)
Dec 10 01:28:07 Msg: Keepalive(0x0201) len 4, id 0x0000143c
Dec 10 01:28:09 LDP_PKT: send link Hello to e2/1
Dec 10 01:28:09 LDP_PKT: Rcvd PDU <- 10.7.7.6, ver 1, pdu len 14, id 10.7.7.2:0 (tcb a0000025)
Dec 10 01:28:09 Msg: Keepalive(0x0201) len 4, id 0x0000143d
no Dec 10 01:28:10 LDP_PKT: receive targeted Hello from 10.7.6 on e2/2
debug Dec 10 01:28:11 LDP_PKT: receive link Hello from 10.1.1.1 on e2/1

debug mpls ldp packets pkt_type address

Syntax: [no] debug mpls ldp packets pkt_type address
This command displays information about MPLS LDP addresses, including address withdraw messages.

Brocade# debug mpls ldp pkt_type address
LDP um 0d9098c8 fec 10.11.11.0 ses 10.22.22.1: inp 0, st 0 -> 1, act A, gen 0
LDP um 0d9098c8 fec 10.11.11.0 ses 10.22.22.1: inp 3, st 1 -> 2, act W, gen 0
LDP um 0d9098c8 fec 10.11.11.0 ses 10.22.22.1: inp 1, st 2 -> 2, act B, gen 0
LDP um 0d9098c8 fec 10.11.11.0 ses 10.22.22.1: inp 13, st 2 -> 5, act G, gen 0
LDP um 0d9098c8 fec 10.11.11.0 ses 10.22.22.1: inp 1, st 5 -> 2, act I, gen 0
LDP: Send PDU -> 10.22.22.1, ver 1, pdu len 32, id 10.11.11.1:0 (tcb 0000002f)
Msg: Address(0x0300) len 22, id 0x80000000
Tlv: Addr_lst(0x0101) len 14, fam 256
Addr: 10.1.1.1 10.5.1.1 10.11.11.1

debug mpls ldp packets pkt_type initialization

Syntax: [no] debug mpls ldp packets pkt_type initialization
This command displays LDP Initialization messages, as shown in the following example.

Brocade# debug mpls ldp packets pkt_type initialization
Msg: Initialize(0x0200) len 22, id 0x00000001
LDP: Send PDU -> 10.5.1.1, ver 1, pdu len 32, id 10.4.1.1:0 (tcb f0020000)
Msg: Keepalive(0x0201) len 4, id 0x00000002
LDP: Send PDU -> 10.5.1.1, ver 1, pdu len 32, id 10.4.1.1:0 (tcbf000s000)
Msg: Address(0x0300) len 22, id 0x80000000
LDP: Send PDU -> 10.5.1.1, ver 1, pdu len 33, id 10.4.1.1:0 (tcbf000s000)
Msg: LabelMap(0x0400) len 23, id 0x80000000
LDP: Send PDU -> 10.5.1.1, ver 1, pdu len 33, id 10.4.1.1:0 (tcbf0002000)
Msg: LabelMap(0x0400) len 23, id 0x80000000

debug mpls ldp packets pkt_type notification

Syntax: [no] debug mpls ldp packets pkt_type notification
This command displays LDP notification information, which is generated when an unexpected event occurs. In the following example, an MPLS interface has gone down and come back up.

Brocade# debug mpls ldp packets pkt_type notification
Msg: Notification(0x0001) len 22, id 0x00000001
LDP: Send PDU -> 10.5.1.1, ver 1, pdu len 28, id 10.4.1.1:0 (tcb f0030000)
Msg: Notification(0x0001) len 18, id 0x00000001
debug mpls ldp packets pkt_type hello

Syntax:  [no] debug mpls ldp packets pkt_type hello

This command displays information about the periodic link Hello messages sent and received.

Brocade# debug mpls ldp packets pkt_type hello
LDP: Send link Hello to e1/1
LDP: Send link Hello to e1/2
LDP: Rcvd link Hello from 10.1.1.2 on e1/1
LDP: Rcvd link Hello from 10.5.1.2 on e1/2

debug mpls ldp packets direction

Syntax:  [no] debug mpls ldp packets direction [send | receive]

• send  - Displays information about the sent LDP packets.
• receive - Displays information about the received LDP packets.

This command limits the display of MPLS LDP packets to the specified direction.

debug mpls ldp packets lsr_id

Syntax:  [no] debug mpls ldp packets lsr-id [ip_address | label_space_id]

• ip_address - Specifies the IP address.
• label_space_id - Specifies the label ID.

This command displays MPLS LDP packets for the specified LDP LSR ID.

debug mpls ldp socket

Syntax:  [no] debug mpls ldp socket

This command displays information about LDP sockets. Command output resembles the following example.

Brocade# debug mpls ldp socket
LDP_SCK: close UDP link tx socket on interface e1/2
LDP_SCK: close UDP link rx socket on e1/2, ucb 0XFF010000#1, appl_sock 0X34B8A280
LDP_SCK: start closing TCP session<10.130.130.3,646-10.140.140.4,9006>, TCB 0X12BF244A
LDP_SCK: start closing TCP listen socket TCB 0X230015D5
LDP_SCK: TCP start listen for <10.130.130.3, 646>, TCB 0X12BF2726
LDP_SCK: open link hello tx socket on interface e1/2
LDP_SCK: complete link hello tx socket open ucb 0XFF010000, count1, appl_sock 0X34B8A380
LDP_SCK: open link hello tx socket on interface e1/2
LDP_SCK: complete link hello tx socket open ucb 0XFF010000, count1, appl_sock 0X34B8A380
LDP_SCK: open link hello tx socket on interface e1/2
LDP_SCK: receive incoming connection from <10.140.140.4, 9007>, listen TCB 0X12BF2726, TCB 0X12BF2870
LDP_SCK: accept incoming connection from <10.140.140.4, 9007>, TCP handle 0X12BF2870, pending_data No
LDP_SCK: connection established with <10.140.140.4, 9007>, TCB 0X12BF2870
debug mpls ldp state

Syntax: [no] debug mpls ldp state

This command displays the MPLS LDP states. The following states are possible:

- 0 - Unknown
- 1 - No route
- 2 - Route found
- 3 - Path sent
- 4 - Path error

Command output resembles the following example.

Brocade# debug mpls ldp state
LDP SC 1 Initialization FSM, Session CB 207/33, input 3, old state 0, new state 2, action 3.
LDP SC 1 Initialization FSM, Session CB 207/33, input 4, old state 2, new state 3, action 4.
LDP SC 1 Initialization FSM, Session CB 207/33, input 5, old state 3, new state 4, action 5.
LDP SC 1 Initialization FSM, Session CB 207/33, input 8, old state 4, new state 8, action 7.
LDP SC 1 Initialization FSM, Session CB 207/33, input 11, old state 8, new state 9, action 11.
LDP SC 1 Initialization FSM, Session CB 207/33, input 16, old state 9, new state 10, action 24.

dump mpls ldp tcpdump

Syntax: [no] debug mpls ldp tcpdump

This command displays information about LDP dumps. Command output resembles the following example.

Brocade# debug mpls ldp tcpdump
LDP_TCPDUMP: tx to 10.140.140.4, TCP length 18 0001000e 82828203 00000201 00040000 000a
LDP_TCPDUMP: rx from 10.140.140.4, TCP length 18 0001000e 8c8c8c04 00000201 00040000 000b

dump mpls ldp tunnel

Syntax: [no] debug mpls ldp tunnel [all | prefix ip-address prefix-length]

This command displays MPLS LDP tunnel-related information.

- all - Displays all MPLS LDP tunnel up and down events.
- prefix ip-address prefix-length - Limits the display of information to specific prefixes.

Command output resembles the following example.

Brocade# debug mpls ldp tunnel
LDP_TUNNEL: tunnel(5) to 10.100.100.100 is up
MPLS VPLS

Virtual Private LAN Service (VPLS) is a method for carrying Layer 2 frames between Customer Edge (CE) devices across an MPLS domain. The Brocade implementation supports VPLS as described in the IETF Internet Draft, “draft-ietf-l2vpn-vpls-ldp-05.txt”.

VPLS CPU protection shields the management module CPU from being overwhelmed by VPLS traffic that requires CPU processing, such as source-MAC learning, or forwarding of unknown-unicast or broadcast traffic.

MPLS VPLS show commands

This section describes the show commands that display MPLS VPLS information.

show mpls vpls

Syntax: show mpls vpls

This command displays information about VPLS instances configured on the device.

Brocade# show mpls vpls

<table>
<thead>
<tr>
<th>Name</th>
<th>Id</th>
<th>Vlans</th>
<th>Ports</th>
<th>Up</th>
<th>Peers</th>
<th>Up</th>
<th>VC-label</th>
</tr>
</thead>
<tbody>
<tr>
<td>test</td>
<td>100</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>32</td>
</tr>
</tbody>
</table>

show mpls vpls summary

Syntax: show mpls vpls summary

This command displays a summary of VPLS statistics, including the number of VPLS instances, number of VPLS peers, label range size, and maximum size of the VPLS MAC database.

Brocade# show mpls vpls summary

Total VPLS configured: 3, maximum number of VPLS allowed: 4096
Total VPLS peers configured: 1, total peers operational: 1
Maximum VPLS macentries allowed: 8192, currently installed: 3
VPLS global raw mode VC-Type is Ethernet (0x5)
VPLS global MTU is 1500, MTU enforcement is OFF
Global CPU protection: OFF
MVIDs in use: 1 of 1 total allocated

show mpls vpls detail

Syntax: show mpls vpls detail

This command displays more detailed information about each VPLS instance.

Brocade# show mpls vpls detail

VPLS 1, Id 1, Max mac entries: 8192
   IF-ID: 4096
   VLAN 300
     Tagged: ethe 1/5
     VLAN 300 isid 40000
     Tagged: ethe 4/1
   CPU-Protection: ON, MVID: 0x001, VPLS FID: 0x0000a00c
Local Switching: Enabled
Extended Counter: ON

show mpls vpls id

Syntax: show mpls vpls id vpls id

The vpls id variable specifies the ID of the VPLS instance for which you want to display debugging information.

This command shows the tunnel LSPs being used to forward VPLS traffic from a device to a peer. If VPLS traffic to the peer is being load balanced across multiple tunnel LSPs, then the command lists the tunnel LSPs used for load balancing, as shown in the following example.

Brocade# show mpls vpls id 2
VPLS b, Id 2, Max mac entries: 100000
Routing Interface Id 3
Total vlans: 1, Tagged ports: 1 (1 Up), Untagged ports 0 (0 Up)
IFL-ID: n/a
Vlan 444
  Tagged: ethe 4/5 ethe 4/5
VC-Mode: Raw
CPU-Protection: ON, MVID: 0x005, VPLS FIDs: 0x0000a00a, 0x0000a00a
Local Switching: Enabled
Extended Counter: ON
Multicast Snooping: Disabled

show mpls vpls down

Syntax: show mpls vpls down

This command displays information about VPLS instances that are not fully operational, as shown in the following example.

Brocade# show mpls vpls down
The following VPLS'es are not completely operational:

<table>
<thead>
<tr>
<th>Name</th>
<th>Id</th>
<th>Ports</th>
<th>Num Vlans</th>
<th>Num Ports</th>
<th>Num Up</th>
<th>Peers Up</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>vpls1</td>
<td>1003</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>ON</td>
</tr>
<tr>
<td>vpls2</td>
<td>1004</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>ON</td>
</tr>
</tbody>
</table>

show mac vpls

Syntax: show mac vpls vpls id mac address

- vpls id - Specifies the VPLS ID.
- mac address - Specifies the MAC address.

The VPLS MAC database stores entries associating remote MAC addresses with the VC LSPs, and local MAC addresses with the CE devices. Each VPLS instance has a separate VPLS MAC database. Command output resembles the following example.
This command displays the VPLS MAC database on the management processor for a VPLS instance specified by its VPLS ID.

Brocade# show mac vpls 1
Total MAC entries for VPLS 1: 10 (Local: 5, Remote: 5)
VPLS MAC Address L/R Port Vlan/Peer Age
==== ========= === ==== ========= ===
1 0000.0000.1601 R 5/1 10.3.3.3 0
1 0000.0000.1003 L 5/3 2 0
1 0000.0000.1603 R 5/1 10.3.3.3 0
1 0000.0000.1005 L 5/3 2 0
1 0000.0000.1002 L 5/3 2 0
1 0000.0000.1605 R 5/1 10.3.3.3 0
1 0000.0000.1602 R 5/1 10.3.3.3 0
1 0000.0000.1004 L 5/3 2 0
1 0000.0000.1001 L 5/3 2 0
1 0000.0000.1604 R 5/1 10.3.3.3 0

This command displays a specific entry in the MAC database on the management processor.

Brocade# show mac vpls 1 0000.0000.1601
VPLS: 1 MAC: 0000.0000.1601 Age: 0
Remote MAC Port: ethe 5/1 Peer: 10.3.3.3
Trunk slot mask: 00000000

show mpls statistics vpls

Syntax: show mpls statistics vpls [vpls-name | vpls-id]

- **vpls-name** - Indicates the configured name for a VPLS instance.
- **vpls-id** - Indicates the ID of a VPLS instance.

This command displays traffic statistics for all VPLS instances, or a specific instance. The following example shows statistics for all VPLS traffic.
NOTE
The VPLS name is repeated for each module from which the statistics are collected, to be displayed on the Management console.

**show mpls debug vpls**

**Syntax:** `show mpls debug vpls vpls id`

This command displays generic VPLS debug information. Enter a VPLS ID to display information about a specific VPLS instance, as shown in the following example.

```bash
Brocade# show mpls debug vpls 1
ID: 1 Name: test 1
CPU-Prot: OFF MVID: INVD FID: 0x00002002
MAC Info:
  Total MACs: 2 Local: 2 Remote: 0
  Max Exceed: 0 Table Full: 0
```

**show mpls debug vpls local**

**Syntax:** `show mpls debug vpls local num`

The num variable specifies the ID of the VPLS instance for which you want to display the debugging information.
This command displays information about all the VPLS local entries. Command output resembles the following example.

Brocade# show mpls debug vpls local
VPLS 1:

<table>
<thead>
<tr>
<th>VLAN</th>
<th>In-Tag</th>
<th>Port</th>
<th>Valid</th>
<th>Blocked</th>
<th>Pending</th>
<th>CCEP</th>
<th>R-CCEP-ST</th>
<th>VVPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>n/a</td>
<td>4/1</td>
<td>1</td>
<td>No</td>
<td>0</td>
<td>No</td>
<td>DOWN</td>
<td>1</td>
</tr>
</tbody>
</table>

Local Broadcast Fids:
---------------------
Vlan 500  -- Fid: 00008007, Ports: 1
Port 4/1  -- Fid: 00000000

VPLS 45:

<table>
<thead>
<tr>
<th>VLAN</th>
<th>In-Tag</th>
<th>Port</th>
<th>Valid</th>
<th>Blocked</th>
<th>Pending</th>
<th>CCEP</th>
<th>R-CCEP-ST</th>
<th>VVPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>n/a</td>
<td>4/1</td>
<td>1</td>
<td>No</td>
<td>0</td>
<td>No</td>
<td>DOWN</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Local Broadcast Fids:
---------------------
Vlan 600  -- Fid: 00008007, Ports: 1
Port 4/1  -- Fid: 00000000

show mpls debug vpls remote

Syntax:  show mpls debug vpls remote vpls id

The vpls id variable specifies the ID of the VPLS instance for which you want to display debugging information.

This command displays the state of all the configured VPLS peers for the specified VPLS ID. Command output resembles the following example.

Brocade# show mpls debug vpls remote 1
VPLS 1:

* - Single Hop LSP
Peer: 10.8.8.8  Valid: Yes  Pending Delete: 0
Label: 983040  Tagged: No  Load Balance: No
MCT-SPK: No  F-Port: 2/1  Num LSP Tnnls: 1
VVPort: 2

<table>
<thead>
<tr>
<th>VC</th>
<th>Tunnel Byp/Def</th>
<th>NHT</th>
<th>Use</th>
<th>Tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>Label</td>
<td>Label</td>
<td>Label</td>
<td>Index</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>2/1</td>
<td>983040</td>
<td>1</td>
<td>*</td>
<td>0</td>
</tr>
</tbody>
</table>

Internally, a maximum of four LSP tunnels is maintained to reach the peer. If load balancing is disabled, information for only one tunnel is displayed in the output.

show mpls debug vpls fsm-trace

Syntax:  show mpls debug vpls fsm-trace vpls id

This command displays the VPLS peer FSM history trace that includes FSM state, the events that it received, and also the time stamp as to when the transition happened.
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MPLS VPLS

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Brocade# show mpls debug vpls fsm-trace 1

<table>
<thead>
<tr>
<th>Time</th>
<th>FSM State</th>
<th>Rcvd Event</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 16 02:07:34</td>
<td>WAIT_PT</td>
<td>PORT_UP</td>
<td>A</td>
</tr>
<tr>
<td>Oct 16 02:17:34</td>
<td>WAIT_TNNL</td>
<td>TNNL_UP</td>
<td>B</td>
</tr>
<tr>
<td>Oct 16 02:17:34</td>
<td>WAIT_PW_UP</td>
<td>PW_UP</td>
<td>E</td>
</tr>
<tr>
<td>Oct 16 03:04:24</td>
<td>OPER</td>
<td>PW_DN</td>
<td>I</td>
</tr>
<tr>
<td>Oct 16 03:05:34</td>
<td>WAIT_PW_UP</td>
<td>PW_UP</td>
<td>E</td>
</tr>
</tbody>
</table>

show mpls debug vpls mac-move

Syntax: show mpls debug vpls mac-move [counter | detail | clear-counter]

- **counter** - Displays the total count of VPLS MAC move occurred since VPLS is enabled or the last time the counter is cleared by the user.
- **detail** - Displays the VPLS MAC moves history in detail.
- **clear-counter** - Resets the history and the MAC move counter to 0.

This command displays VPLS MAC move counters and history for all the VPLS instances configured. The `debug vpls mac-move counter` command output resembles the following example.

Brocade#show mpls debug vpls mac-move counter
Total MAC Moved: 30

The `debug vpls mac-move detail` command output resembles the following example.

Brocade#show mpls debug vpls mac-move detail
Total MAC Moved: 30

<table>
<thead>
<tr>
<th>Time-Stamp</th>
<th>VPLS-ID</th>
<th>MAC Address</th>
<th>From peer or port v:v</th>
<th>To peer or port v:v</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 17 08:55:23 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:23 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:24 1</td>
<td>0001.0500.0100 1/1 200:300(V)</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:24 1</td>
<td>0001.0500.0100 1/3 100</td>
<td>1/1 200:300(V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:25 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:25 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:26 1</td>
<td>0001.0500.0100 1/1 200:300(V)</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:26 1</td>
<td>0001.0500.0100 1/3 100</td>
<td>1/1 200:300(V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:27 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:27 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:28 1</td>
<td>0001.0500.0100 1/1 200:300(V)</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:28 1</td>
<td>0001.0500.0100 1/3 100</td>
<td>1/1 200:300(V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:29 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:29 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:30 1</td>
<td>0001.0500.0100 1/1 200:300(V)</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:30 1</td>
<td>0001.0500.0100 1/3 100</td>
<td>1/1 200:300(V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:31 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:31 1</td>
<td>0001.0400.0800 peer 10.140.140.4</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:32 1</td>
<td>0001.0500.0100 1/1 200:300(V)</td>
<td>1/3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul 17 08:55:32 1</td>
<td>0001.0500.0100 1/3 100</td>
<td>1/1 200:300(V)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clearing VPLS traffic statistics

To clear the entries stored for all VPLS statistics, enter the following command.

clear mpls statistics vpls

Syntax: clear mpls statistics vpls [vpls-name | vpls-id]
To clear entries for a specific VPLS instance, enter the VPLS name or ID number.

- **vpls-name** - The configured name for a VPLS instance.
- **vpls-id** - The ID of a VPLS instance.

### MPLS VPLS debug commands

This section describes the debug commands that generate MPLS VPLS information.

**debug vpls**

**Syntax:** `[no] debug vpls [cam | count | dy-sync | events | failover | filter | forwarding | generic | mac | statistics | topology]

- **cam** - Displays information about VPLS CAM or PRAM programming.
- **count** - Displays information about the VPLS debug print counter.
- **dy-sync** - Displays information about VPLS table synchronization between management and CPU cards.
- **events** - Displays information about VPLS control-plane events.
- **failover** - Displays information about VPLS failover events.
- **filter** - Displays VPLS filtering options.
- **forwarding** - Displays information about VPLS CPU packet forwarding.
- **generic** - Enables generic VPLS debugging.
- **mac** - Displays VPLS MAC learning, aging, deletion, and movement.
- **statistics** - Displays information about VPLS statistics.
- **topology** - Displays information about VPLS topology group events.

**debug vpls cam**

**Syntax:** `[no] debug vpls cam [additions | deletions | updates]

This command displays information about VPLS CAM or PRAM programming.

**NOTE**

This command is available only on the Line Processor.

- **additions** - Displays information about VPLS CAM or PRAM additions.
- **deletions** - Displays information about VPLS CAM or PRAM deletions.
- **updates** - Displays information about VPLS CAM or PRAM updates.

Brocade# debug vpls cam
  VPLS CAM: all debugging is on
  VPLS CAM-DEL: lp_cam_del_vpls_mac_cam_all() - Delete all CAMs for MAC 0000.0004.0000
  VPLS CAM-CAM: lp_cam_del_vpls_mac_cam_single() - MAC 0000.0004.0000
  (VPLS_SA_VC_ENTRY): deleted single CAM 0001800a and PRAM.
  deleting cam-index 98314 for PPCR 1:1, CAM_TYPE:13
  cam-index chain:
  VPLS CAM-ADD: lp_cam_add_vpls_mac_egress_one_ppcr() - Add CAM entry for MAC 0000.0004.0000, port 1/1, vc-label 000f0000, type VPLS_SA_VC_ENTRY.
  VPLS CAM-ADD: lp_cam_add_vpls_mac_egress_one_ppcr() - SA-VC CAM add success. CAM 0001800a, new PRAM 000000c7.
adding cam-index 98314 for PPCR 1:1 CAM_TYPE:13

debug vpls cam additions

Syntax: [no] debug vpls cam additions
This command generates debug output when a VPLS CAM or PRAM addition operation is performed by VPLS due to the addition of MAC CAM or PRAM entry to the hardware.

debug vpls cam deletions

Syntax: [no] debug vpls cam deletions
This command generates debug output when a VPLS CAM or PRAM deletion operation is performed by VPLS due to the deletion of MAC CAM or PRAM entry from the hardware.

debug vpls cam updates

Syntax: [no] debug vpls cam updates
This command generates debug output when a VPLS CAM or PRAM entry is being updated due to a change in the PRAM information in regard to a forwarding decision.

debug vpls count

Syntax: [no] debug vpls count
This command specifies the number of debug prints generated by the debug vpls command. Use this command to limit high-volume displays such as MAC learning activity and certain dy-sync activity.

debug vpls dy-sync

Syntax: [no] debug vpls dy-sync [local | mac | remote | tlv]
- local - Displays information about VPLS local entry dy-sync.
- mac - Displays information about VPLS MAC table dy-sync.
- remote - Displays information about VPLS remote entry dy-sync.
- tlv - Displays information about VPLS TLV dy-sync.
This command monitors all VPLS dy-sync activity. Dy-sync is a method of synchronizing internal VPLS data between management and CPU cards. This includes VPLS configuration (TLV), local entry or endpoint status (local), remote entry or VPLS peer status (remote), and VPLS MAC table activity. This data is used generally for internal debugging.

debug vpls dy-sync local

Syntax: [no] debug vpls dy-sync local
This command generates information about local VPLS dy-sync activity. Command output resembles the following example for a specified VLAN (VLAN ID 2).

Brocade# debug vpls dy-sync local
Brocade(config-mpls-vpls-test1)# vlan 2
Brocade(config-mpls-vpls-test1-vlan-2)# no tag e 2/19
VPLS MAC-GROUP: vpls_mac_delete_local_entry() - VPLS 1, port 2/19, vlan 2: HW CAMs flushed 620.
debug vpls dy-sync mac

Syntax: [no] debug vpls dy-sync mac

The following output was generated with debug vpls dy-sync mac enabled and indicates that an existing VPLS MAC has been deleted and then reinstalled.

Brocade# debug vpls dy-sync mac
Brocade# clear mac vpls e 2/19
VPLS MAC: mpls_vpls_delete_mac_entry_from_table() - VPLS 1, MAC 0000.0000.0601
1 mac entries flushed
VPLS MAC-LOCAL: mpls_vpls_mac_sync_itc_callback() - VPLS_MAC_SYNC_LOCAL_ENTRY: MAC
0000.0000.0601, port 2/19, vlan 2
VPLS MAC-LOCAL: vpls_local_sa_learning() - MAC 0000.0000.0601, port 2/19, vlan 2.
VPLS MAC: mpls_vpls_insert_mac_entry_in_table() - VPLS 1, MAC 0000.0000.0601
VPLS DY-SYNC-MAC: mpls_vpls_mp_send_create_delete_one_mac_entry() - VPLS 1,
action 1, mac 0000.0000.0601
VPLS DY-SYNC-MAC: mpls_vpls_pack_mac_table_change() - VPLS 1, action 1, mac
0000.0000.0601, local 1.
VPLS MAC-LOCAL: mpls_vpls_mac_sync_itc_callback() - VPLS_MAC_SYNC_LOCAL_ENTRY: MAC
0000.0000.0601, port 2/19, vlan 2
VPLS MAC-LOCAL: vpls_local_sa_learning() - MAC 0000.0000.0601, port 2/19, vlan 2.
VPLS MAC: mpls_vpls_insert_mac_entry_in_table() - VPLS 1, MAC 0000.0000.0601
VPLS MAC-LOCAL: vpls_local_sa_learning() - Existing entry.
VPLS DY-SYNC-MAC: mpls_vpls_mp_send_create_delete_one_mac_entry() - VPLS 1,
action 1, mac 0000.0000.0601
VPLS DY-SYNC-MAC: mpls_vpls_pack_mac_table_change() - VPLS 1, action 1, mac
0000.0000.0601, local 1.
VPLS DY-SYNC-MAC: mpls_vpls_mp_send_create_delete_one_mac_entry() - VPLS 1,
action 3, mac 0000.0000.0601
VPLS DY-SYNC-MAC: mpls_vpls_pack_mac_table_change() - VPLS 1, action 3, mac
0000.0000.0601, local 1.
debug vpls dy-sync remote

Syntax:  [no] debug vpls dy-sync remote

This command generates information about VPLS remote entry dy-sync activity. The following output was generated with this command enabled, and indicates that an existing peer was deleted and then reinstalled.

Brocade# debug vpls dy-sync remote
Brocade(config-mpls-vpls-test1-vlan2)# no vpls-peer 10.5.5.5
VPLS MAC-GROUP: vpls_mac_delete_remote_entry () - VPLS 1, VC-label 000f0000: HW CAMs flushed 4.
VPLS DY-SYNC-REM: mpls_vpls_send_remote_entry_info () - called
VPLS DY-SYNC-REM: mpls_vpls_sync_timer () - Flush REMOTE packet
(config-mpls-vpls-test1-vlan-2)# vpls-peer 10.5.5.5
VPLS DY-SYNC-REM: mpls_vpls_pack_one_vpls_remote_entry_tnnl () - called
VPLS DY-SYNC-REM: mpls_vpls_pack_one_vpls_remote_entry_tnn () - called
VPLS DY-SYNC-REM: mpls_vpls_pack_one_vpls_remote_entry () - called
VPLS DY-SYNC-REM: mpls_vpls_send_remote_entry_info () - called
VPLS DY-SYNC-REM: mpls_vpls_sync_timer () - Flush REMOTE packet

debug vpls dy-sync tlv

Syntax:  [no] debug vpls dy-sync tlv

This command generates information about the VPLS configuration that is being synchronized (dy-sync) between management and CPU cards. The following output results when a VPLS instance is deleted and then reinstalled.

Brocade# debug vpls dy-sync tlv
Brocade(config-mpls)# no vpls 1 1
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_vlan_port() - VPLS 1, vlan 2, port 1/2.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_port_config() - VPLS 1, port 1/2, vlan 2, mode 0.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_vlan() - VPLS 1, vlan 2, vlan-fid 65535.
VPLS DY-SYNC-TLV: mpls_vpls_send_ipc_delete_vpls_table() - VPLS 1.

Brocade(config-mpls)# vpls 1 1
Brocade(config-mpls-vpls-1)# vpls-peer 10.200.200.1
Brocade(config-mpls-vpls-1)# vlan 2
Brocade(config-mpls-vpls-1-vlan-2)# untagged ethe 1/2
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_vlan_name() - VPLS 1, action 1, name 1.
VPLS 1, action 1, value 0.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_fid() - VPLS 1, action 1, Fid 0x0000a002.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_mvid() - VPLS 1, action 1, value 2048.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_vlan_id() - VPLS 1, vlan 2.
VPLS DY-SYNC-TLV: mpls_vpls_pack_one_ipc_tlv_vpls_vlan() - VPLS 1, vlan 2, vlan-fid 32772.
**debug vpls events**

**Syntax:** `[no] debug vpls events`  
This command displays information about VPLS label-range allocation, LDP session status (up or down), LSP tunnel switchovers, VPLS endpoint port transitions, VPLS peer state machine transitions, label exchanges, VC bindings, and VC withdrawals. The following example shows an MPLS uplink being disabled and then re-enabled.

Brocade# debug vpls events  
Brocade(config-if-e1000-2/9)# disable  
VPLS EVENT-LSP: mpls_vpls_process_tnnl_down() - VPLS test1: Peer 10.5.5.5, tunnel 1 is down.  
VPLS EVENT-LSP: mpls_vpls_del_vpls_peer_in_tnnl_list() - VPLS test1: Delete peer 10.5.5.5 from tunnel-list of 1.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS fsm: vpls test1 peer 10.5.5.5 event TNNL_DN st OPER->WAIT_TNNL act F.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS: vpls test1 peer 10.5.5.5 is now DOWN, num up peer->0.  
VPLS MAC-GROUP: vpls_mac_delete_remote_entry() - VPLS 1, VC-label 000f0000: HW CAMs flush 4.  
VPLS EVENT-PEER: mpls_vpls_send_vc_withdrawal() - VPLS 1, group 0, peer 10.5.5.5, Send label withdrawal for 983040.  
(config-if-e1000-2/9)#enable  
VPLS EVENT-LDP: mpls_ldp_peer_session_ind() - VPLS test1, peer 10.5.5.5 LDP session is down.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS fsm: vpls test1 peer 10.5.5.5 event LDP_DN st WAIT_TNNL->WAIT_TNNL act -.  
VPLS EVENT-LSP: mpls_vpls_process_tnnl_up() - VPLS test1: Peer 10.5.5.5, tunnel 1 is up.  
VPLS EVENT-LSP: mpls_vpls_add_vpls_peer_in_tnnl_list() = VPLS test1: Add peer 10.5.5.5 to tunnel-list of 1.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS fsm: vpls test1 peer 10.5.5.5, send local-label 983040.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS fsm: vpls test1 peer 10.5.5.5 event RCV_LBL st WAIT_VC->OPER act D.  
VPLS EVENT-FSM: mpls_vpls_peer_fsm_step() - VPLS: vpls test1 peer 10.5.5.5 is now UP, num up peer->1.

**debug vpls failover**

**Syntax:** `[no] debug vpls failover`  
This command enables debugging of VPLS failover-related events, as shown in the following example.

Brocade# debug vpls failover  
VPLS Failover: debugging is on  
Oct 8 18:36:36 VPLS DY-SYNC-TLV: mpls_vpls_pack_one_tlv_tsl_to_stdby() -  
Oct 8 18:36:36 VPLS FAILOVER: mpls_vpls_send_to_stdby_tlv_peer_tsl() - called  
SYSLOG: <14>Oct 8 18:36:37 FWD2(XMR12) System: Interface ethernet 1/19, state down - link down  
SYSLOG: <14>Oct 8 18:36:53 FWD2(XMR12) System: Interface ethernet 1/20, state down - link down  
Oct 8 18:36:53 VPLS DY-SYNC-TLV: mpls_vpls_pack_one_tlv_tsl_to_stdby() -  
Oct 8 18:36:53 VPLS FAILOVER: mpls_vpls_send_to_stdby_tlv_peer_tsl() - called
SYSLOG: <13>Oct  8 18:36:53 FWD2(XMR12) MPLS: VPLS 1 peer 10.6.6.6 (VC ID 1) is down
SYSLOG: <14>Oct  8 18:37:10 FWD2(XMR12) System: Interface ethernet 1/20, state up
rldf_complete_lsi_rsv_conn_xc: update sync node
rldf_complete_lsi_rsv_conn_xc: update sync node for VC FEC
Oct  8 18:37:23 VPLS DY-SYNC-TLV: mpls_vpls_pack_one_tlv_tsl_to_stdby() - called
SYSLOG: <13>Oct  8 18:37:23 FWD2(XMR12) MPLS: VPLS 1 peer 10.6.6.6 (VC ID 1) is up

debug vpls filter

Syntax: [no] debug vpls filter [b-src-mac | b-dst-mac | dst-mac-address | id | inner-tag | outer-vlan | src-mac-address | src-port | topo-id | topo-hw-idx | vc-label | vpls-peer-ip-address]

This command displays VPLS filtering options.

- **b-src-mac**: Filter to include outer source MAC address.
- **b-dst-mac**: Filter to include outer destination MAC address.
- **dst-mac-address**: Filter to include destination MAC address (LP only).
- **id**: Filter to include VPLS ID.
- **inner-tag**: Filter to include inner-tag ID (VLAN or ISID).
- **outer-vlan**: Filter to include VPLS outer VLAN.
- **src-mac-address**: Filter to include source MAC address.
- **src-port**: Filter to include source port.
- **topo-id**: Filter to include topology group ID (MP only).
- **topo-hw-idx**: Filter to include topology group hardware index (LP only).
- **vc-label**: Filter to include local VC label.
- **vpls-peer-ip-address**: Filter to include this VPLS peer IP address.

**NOTE**
To clear a specific filter, enter the `no debug vpls filter id num` command from the MP or LP console.
To clear all VPLS filters, enter the `no debug vpls filter` command from the MP or LP console.

debug vpls forwarding

Syntax: [no] debug vpls forwarding

This command is used to generate some CPU packet forwarding in regard to VPLS traffic. On the LP, it generates how the packet was received and how it was software forwarded. On the MP, it generates the packet handling of those applications such as Multicast or 802.1ag to send out control packets through VPLS to a remote peer.

Brocade# debug vpls forwarding
VPLS Forwarding: debugging is on
VPLS EGRESS FWD: lp_l2_vpls_outbound_process_packet() - RX pkt from MPLS uplink
src-port:1/1. VC label:983040
VPLS EGRESS FWD: lp_l2_vpls_outbound_process_packet() - DA missed in CAM.
VPLS EGRESS FWD: lp_l2_vpls_outbound_forward_packet() - Payload Tag 0x81000008 exists.
VPLS EGRESS FWD: lp_l2_vpls_outbound_forward_packet() - Unknown VPLS MAC 0000.0003.0000, VPLS 1.
VPLS EGRESS FWD: lp_l2_vpls_outbound_forward_packet() - UNKNOWN: send pkt to all end-points.
VPLS EGRESS FWD: lp_l2_vpls_broadcast_local() - Bcast pkt to VPLS VLAN 300,
inner_vid_valid:0 inner_vlan_id 0x00000000, FID 0x800b, Egress:1,
priority:0x00000000, inner_vlan_priority:0x00000000
VPLS EGRESS FWD: lp_l2_vpls_broadcast_local() - Bcast pkt to VPLS VLAN 3000,
inner_vid_valid:0 inner_vlan_id 0x00000000, FID 0x800c, Egress:1,
priority:0x00000000, inner_vlan_priority:0x00000000

**debug vpls generic**

**Syntax:** `[no] debug vpls generic`

This command generates generic information about VPLS events such as VPLS MAC table allocation failures, and VPLS MAC table deletions.

**debug vpls mac**

**Syntax:** `[no] debug vpls mac [errors | group | local | remote]

- **errors** - Displays information about VPLS MAC errors.
- **group** - Displays information about a VPLS MAC group.
- **local** - Displays information about VPLS local MAC learning.
- **remote** - Displays information about VPLS remote MAC learning.

This command generates information about VPLS MAC learning, aging, deletions, and topology changes. This command can be enabled for either local or remote MAC monitoring (or both).

**NOTE**

Use of this command can generate a large number of debug prints. To limit debug prints, use the `debug vpls count` command.

**debug vpls mac local**

**Syntax:** `[no] debug vpls mac local`

This command generates information about local MAC activity, as shown in the following example.

Brocade# debug vpls mac local
VPLS MAC: mpls_vpls_delete_mac_entry_from_table() - VPLS 1, MAC 0000.0000.0601
VPLS MAC-GROUP: mac_group_delete_mac_entry_from_list()- 26d9f025: pt/lbl 58, vpls 1,
update_head 0, p 00000000, n 00000000.
VPLS MAC-GROUP: mp_vpls_mac_send_group_flush_msg()- Send IPC to LPs: Flush MACs for VLAN
4294967295, port(label 0000003a, is-vlan 0, hw-only 0.
VPLS MAC-GROUP: mac_flush_by_group() - VPLS 4294967295, port(label 0000003a, hw-only 0:
Enteries processed 1.
1 mac entries flushed

**debug vpls statistics**

**Syntax:** `[no] debug vpls statistics`
This command can be used to monitor statistics collection activity for VPLS instances. The following output was generated with `debug vpls statistics` enabled, and as a result of the `show mpls statistics vpls` command.

```
Brocade# debug vpls statistics
debug vpls statistics is enabled
Brocade# show mpls statistics vpls
VPLS STATIS: get_mpls_vpls_stat_from_lp () - VPLS 1.
VPLS STATIS: get_mpls_vpls_stat_from_lp () - VPLS 1
VPLS-Name  In-Port(s)   Endpt-Out-Pkts   Tnl-Out-Pkts
-----------  -----------  --------------  --------------
test1  e2/1 - e2/20 1252  0
        e4/1 - e4/2 1260  0
        e4/3 - e4/4  0  0
```

deploy vpls topology

**Syntax:** `[no] debug vpls topology`

This command is used to debug the topology group-related handling in the VPLS area. If there are any VPLS VLANs configured in a topology group, this command allows you to see what is taking place when topology group events occurred, such as topology group master VLAN changes, forwarding state changes, and so on.

**NOTE**
This command is available only on the Management Processor.

```
Brocade# debug vpls topology
VPLS TOPO: mpls_vpls_topo_itc_membership_update() - Send ITC update: Topo 2 VPLS VLANs exist=1.
VPLS TOPO: mpls_vpls_topo_inherit_control_state() - Inherit control state for Topo 2.
VPLS TOPO: mpls_vpls_topo_add_vpls_vlan() - Add VPLS 1 VLAN 300:0xffffffff to topo (2) member list. Member count 1
VPLS TOPO: mpls_vpls_topo_update_end_points() - Topo 1 VLAN 300:0xffffffff old topo_hw_index 0x00000000 new topo_hw_index 0x00000000
VPLS TOPO: mpls_vpls_topo_update_end_points() - Update VPLS end-point state: VLAN 1 VLAN 300:0xffffffff Port 1/5 Block 0. topo_hw_index:0x00000000
VPLS TOPO: mpls_vpls_topo_add_member_vlan() - Set VPLS 1 VLAN 300:0xffffffff as member of topo ID 2. with topo_hw_index 0x00000000
```

deploy vpls fsm-trace

**Syntax:** `[no] debug vpls fsm-trace vpls_id vpls_peer_ IP_ address`

This command shows VPLS peer FSM trace history. Command output resembles the following example.

```
Brocade# debug vpls fsm-trace 1 10.11.11.11
Time  FSM State  Rcvd Event  Action
------  ---------  -----------  --------
Nov 16 22:52:51  0 WAIT_PT  PARAM_UPDT -
Nov 16 22:53:24  0 WAIT_PT  PORT_UP     A
Nov 16 22:53:38  1 WAIT_TNNL  TNNL_UP     B
Nov 16 22:56:41  2 WAIT_PW_UP  PW_UP       E
Nov 16 22:57:10  3 OPER      PW_DN       I
Nov 16 22:57:22  2 WAIT_PW_UP  PW_UP       E
Nov 16 22:58:02  3 OPER      PORT_DN     G
```
Common diagnostic scenarios

- You cannot configure MPLS on a port that is part of a dynamic link aggregation.

  Where MPLS is enabled globally on the device, a port that is configured in a trunk can be enabled as an MPLS interface port to create an MPLS trunk. You can either include a primary trunk port that has already been MPLS-enabled in a new trunk or MPLS-enable a primary trunk port of an already configured trunk. This feature was introduced in version 03.5.00 of the Brocade NetIron software. The following considerations must be considered when configuring MPLS on a trunk:
  - Only static server trunks and per-packet server trunks are supported.
  - Switch and LACP trunks are not supported.
  - MPLS is enabled on the primary port of the trunk and this enables MPLS on the entire trunk. Secondary ports of the trunk cannot be individually configured for MPLS.

- MPLS interfaces are not forwarding traffic.

  This may be caused because the customer is running software codes that do not match. It is recommended that customers always update software so that all interface modules are running the same code. If you have questions about your software version, contact Brocade Technical Support for assistance.

- For a VPLS VLAN that is configured as multicast active, VPLS does not accept a receiver report.

  This issue is resolved by upgrading the software version to include the latest patches.

- MPLS traffic is lost.

  This issue is resolved by upgrading the software version to include the latest patches.
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This chapter describes the diagnostic commands for Brocade NetIron XMR and Brocade MLX series Layer 3 protocol environments.

**BFD**

Bidirectional Forwarding Detection (BFD) quickly detects the failure of a forwarding path by confirming that the next-hop router is alive. Without BFD, failure detection can take from 3 to 30 seconds and may cause unacceptable levels of packet loss.

**BFD show commands**

This section describes the show commands that display BFD information.

**show bfd**

**Syntax:** show bfd

This command displays information about BFD activity, as shown in the following example.

```
Brocade# show bfd
BFD State: ENABLED Version: 1 Use PBIF Assist: Y
Current Registered Protocols: bgp/1 ospf/0 mpls/0
All Sessions: Current: 4 Maximum Allowed: 100 Maximum Exceeded Count: 0
LP Sessions: Maximum Allowed on LP: 40 Maximum Exceeded Count for LPs: 0
LP Sessions LP Sessions LP Sessions LP Sessions
  1   0   2   2   3   2   4   0
  5   0   6   0   7   0   8   0
  9   0   10  0   11  0   12  0
 13  0   14  0   15  0   16  0
```
BFD Enabled ports count: 2
Port       MinTx       MinRx       Mult Sessions
eth 2/1    100         100         3    2

show bfd application

Syntax: show bfd application

This command displays information about BFD applications, as shown in the following example.

Brocade# show bfd application
Registered Protocols Count: 3
Protocol VRFID Parameter
ospf 0 1
bgp 0 0
mpls 0 0

show bfd neighbor

Syntax: show bfd neighbor [interface ethernet slotnum/port-num] | interface pos slotnum/port-num | interface ve port-num]

- interface ethernet slotnum/port-num - Displays BFD neighbor information for the specified Ethernet interface.
- interface pos slotnum/port-num - Displays POS information for a specific interface, slot, and port.
- interface ve port-num - Displays BFD neighbor information for the specified virtual interface.

When the show bfd application command is enabled, the show bfd neighbor command displays output similar to the following example.

Brocade# show bfd neighbor
Total Entries:7 R:RXRemote(Y:Yes/N:No)H:Hop(S:Single/M:Multi)
NeighborAddress state Interface Holddown Interval R/H
10.3.0.1 UP ve 30 600000 200000 Y/S
10.31.31.14 UP ve 30 25000000 5000000 Y/M
10.4.0.1 UP ve 40 600000 200000 Y/S
10.1.0.1 UP ve 10 300000 100000 Y/S
10.11.11.14 UP ve 10 25000000 5000000 Y/M

show bfd neighbor detail

Syntax: show bfd neighbor detail [IP-address | IPv6-address]

- IP-address - Displays BFD neighbor information for the specified IPv4 address.
- IPv6-address - Displays BFD neighbor information for the specified IPv6 address.

This command displays BFD neighbor information in the detailed format.

Brocade# show bfd neighbor detail
Total number of Neighbor entries: 2
NeighborAddress State Interface Holddown Interval RH
10.1.1.1 UP eth 4/1 1800000 600000 1
Registered Protocols(Protocol/VRFID): isis_task/0 ospf/0
Local: Disc: 1, Diag: 0, Demand: 0 Poll: 0
MinTxInterval: 500000, MinRxInterval: 500000, Multiplier: 3
Remote: Disc: 684, Diag: 0, Demand: 0 Poll: 0
show bfd debug

**Syntax:** show bfd debug

This command displays more information about BFD sessions, as shown in the following example.

Brocade# show bfd debug
BFD enabled: Yes, timer enabled: Yes
Max LP session: 80, total session: 1, MPLS session: 1
Max no rx packet poll interval 868 ms Max intervals of BFD timer call 25 ms

Error counters
- BFD disabled on system: 0
- No session: 0
- UDP checksum fail: 0
- Bad TTL: 0
- Send IPC error: 0
- Tx IPC free buf error: 0
- Rx IPC msg length error: 0
- Physical port blocked: 0

BFD enabled interfaces

show bfd debug session

**Syntax:** show bfd debug session session_ID

This command displays details of BFD sessions on the LP. Without the session ID parameter, the command output displays a summary line for each session. With the session ID specified, the output displays details about the specified session, as shown in the following examples.

Brocade# show bfd debug session
Session: 1, state: UP, type: MPLS-ingr, local/remote discr: 1/1, Active
BFD

Clearing BFD neighbor sessions

You can clear all BFD neighbor sessions or a specified BFD neighbor session using the following command.

clear bfd neighbor

Syntax: clear bfd neighbor [IP-address | IPv6-address]

- **IP-address** - Specifies the IPv4 address of a neighbor whose BFD session you want to clear.
- **IPv6-address** - Specifies the IPv6 address of a neighbor whose BFD session you want to clear.

Executing this command without specifying an IPv4 or IPv6 address clears the sessions of all BFD neighbors.

BFD debug commands

This section describes how to use diagnostic debug commands to monitor BFD environments.

debug bfd

Syntax: [no] debug bfd [application | hitless-upgrade | ipc-error | ipc-event | ltc | pbif | timer]

- **application** - Displays information about BFD applications.
- **hitless-upgrade** - Displays information about hitless upgrade events.
• **ipc-error** - Displays information about interprocess communication (IPC) errors.
• **ipc-event** - Displays information about IPC events.
• **itc** - Displays information about BFD inter-task communication (ITC) activity.
• **pbif** - Enables debugging of BFD use of Peripheral Bus Interface FPGA (PBIF) Assist.
• **timer** - Enables debugging of BFD timer operation on LP.

**debug bfd application**

**Syntax:** `[no] debug bfd application**

This command generates information about BFD application activity. When this command is enabled, output resembles the following example, which shows that the OSPF application was disabled, and then enabled.

```
Brocade# debug bfd application
    application: debugging is on
BFD/APP: Application: AppId: ospf App Subid: 0 DeRegistered with BFD
BFD/APP: Application: AppId: ospf App Subid: 0 Registerd with BFD
```

**debug bfd hitless-upgrade**

**Syntax:** `[no] debug bfd hitless-upgrade**

This command displays information about BFD hitless upgrade events, as shown in the following example.

```
Brocade# debug bfd hitless-upgrade
MP switchover done, clearing all session without graceful restart app.
bfd_mp_delete_all_app_sessions_with_no_graceful_restart() called
BFD: LP Hitless Upgrade started

Resetting LP 1...
Resetting LP 2...
Resetting LP 3...
Resetting LP 4...
BFD/IPC: saving of IPC message during LP Upgrade started
BFD/IPC: Saving of IPC message during LP Upgrade finished.
BFD/IPC: sending saved ipc to LP
bdf_mp_add_all_app_sessions_with_no_graceful_restart called
BFD: LP Hitless Upgrade finished
```

**debug bfd ipc-error**

**Syntax:** `[no] debug bfd ipc-error**

This command generates information about BFD interprocess communication (IPC) errors. The following example shows output from a session with **debug ip ospf bfd**, **debug bfd ipc-event**, and **debug bfd ipc-error** enabled.

```
Brocade# debug ip ospf bfd
    OSPF: BFD events debugging is on
Brocade# debug bfd ipc-error
    ipc-error: debugging is on
Brocade# debug bfd ipc-event
    ipc-event: debugging is on
Brocade# show bfd neighbor
Dec 19 14:51:37 BFD/IPC:Sending MP Request for all sessions information to LP 2.
```

```
Dec 19 14:51:37 BFD/IPC:Received LP Response for all sessions information from LP 2.
Total number of Neighbor entries: 2

<table>
<thead>
<tr>
<th>NeighborAddress</th>
<th>State</th>
<th>Interface</th>
<th>Holddown</th>
<th>Interval</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2.2.2</td>
<td>UP</td>
<td>eth 2/2</td>
<td>300000</td>
<td>100000</td>
<td>1</td>
</tr>
<tr>
<td>fe80::20c:dbff:fee2:b529</td>
<td>UP</td>
<td>eth 2/2</td>
<td>300000</td>
<td>100000</td>
<td>1</td>
</tr>
</tbody>
</table>

SYSLOG: Dec 19 14:51:58:<13>R1, OSPF: nbr state changed, rid 10.1.1.1, nbr addr 10.2.2.2, nbr rid 10.2.2.2, state down
SYSLOG: Dec 19 14:51:58:<13>R1, OSPF: interface state changed, rid 10.1.1.1, intf addr 10.2.2.1, state designated router

BFD/ITC: Received Delete Session Request from App:ospf for Port:eth 2/2 Neighbor:10.2.2.2
BFD: ipc set session admin down(0->2), for session 22
BFD/IPC: Received session parameter change for session=22
BFD: ipc delete session (0->2), for session 22
BFD/ITC: Received Create Session Request from App:ospf for Port:eth 2/2 Neighbor:10.2.2.2
BFD: ipc create session (0->2), for session 76
SYSLOG: Dec 19 14:52:01:<13>R1, OSPF: interface state changed, rid 10.1.1.1, intf addr 10.2.2.1, state backup designated router
BFD/IPC: Received session parameter change for session=76
BFD/IPC: Received session state change notification for session=76
OSPF: ITC Session State Change Notification rxd for nbr 10.2.2.2
SYSLOG: Dec 19 14:52:01:<13>R1, OSPF: nbr state changed, rid 10.1.1.1, nbr addr 10.2.2.2, nbr rid 10.2.2.2, state full

Brocade#debug bfd neighbor
BFD/IPC: Sending MP Request for all sessions information to LP 2.
BFD/IPC: Received LP Response for all sessions information from LP 2.
Total number of Neighbor entries: 2

<table>
<thead>
<tr>
<th>NeighborAddress</th>
<th>State</th>
<th>Interface</th>
<th>Holddown</th>
<th>Interval</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>fe80::20c:dbff:fee2:b529</td>
<td>UP</td>
<td>eth 2/2</td>
<td>300000</td>
<td>100000</td>
<td>1</td>
</tr>
<tr>
<td>10.2.2.2</td>
<td>UP</td>
<td>eth 2/2</td>
<td>300000</td>
<td>100000</td>
<td>1</td>
</tr>
</tbody>
</table>

debug bfd ipc-event

Syntax: [no] debug bfd ipc-event

These commands generate information about IPC and ITC errors. The previous example shows output from a session with these two commands enabled.

debug bfd itc

Syntax: [no] debug bfd itc

This command displays information about BFD ITC activity. Command output resembles the following example.

Brocade# debug bfd itc
  itc: debugging is on
Brocade# show bfd neighbor
BFD/ITC: Received Delete Session Request from App:ospf for Port:eth 2/2 Neighbor:10.2.2.2
BFD/ITC: Received Create Session Request from App:ospf for Port:eth 2/2 Neighbor:10.2.2.2
OSPF: ITC Session State Change Notification rxd for nbr 10.2.2.2

debug bfd pbif

Syntax: [no] debug bfd pbif
This command enables debugging of PBIF Assist feature that is used in the transmission of BFD packets. The following example shows output from a session with `debug bfd pbif` and `debug bfd ipc-event` enabled.

Brocade# debug bfd pbif
  BFD: pbif debugging is on
Brocade# debug bfd ipc-event
  BFD: ipc-event debugging is on
Feb 11 07:49:28 BFD/IPC: Received set use pbif assist to FALSE
Feb 11 07:49:28 BFD: Use of PBIF TX Assist Disabled, Disabling Use of PBIF TX Assist for all sessions
Feb 11 07:49:28 BFD: Tx PBIF Assist disabled for session 1
Feb 11 07:49:28 BFD: send IPC to MP for Use PBIF Assist change to N for session 1
Feb 11 07:49:56 BFD/IPC: Received set use pbif assist to TRUE
Feb 11 07:49:56 BFD: Use of PBIF TX Assist enabled, Enabling PBIF TX Assist for all qualified sessions
Feb 11 07:49:56 BFD: PBIF TX Assist Request successful for session 1 with interval 925 ms handle 1a480140
Feb 11 07:49:56 BFD: send IPC to MP for Use PBIF Assist change to Y for session 1

**debug bfd timer**

**Syntax:** `[no] debug bfd timer`  
This command enables debugging of BFD timer operation.

The following example shows the output from a session with `debug bfd timer`, `debug bfd ipc-event`, and `debug bfd pbif` enabled.

Brocade# debug bfd timer
  BFD: timer debugging is on
Brocade# debug bfd pbif
  BFD: pbif debugging is on
Brocade# debug bfd ipc-event
  BFD: ipc-event debugging is on
Feb 11 07:52:41 BFD: Timer called at interval of 46 ms
Feb 11 07:52:41 BFD: Timer called at interval of 17 ms
Feb 11 07:52:41 BFD: Negotiated TX Interval 1000000 microsec, Jittered Transmit Interval 822 ms, random num 1572
Feb 11 07:52:41 BFD: Tx PBIF Assist disabled for session 1
Feb 11 07:52:41 BFD: send IPC to MP for Use PBIF Assist change to N for session 1
Feb 11 07:52:42 BFD: Negotiated TX Interval 1000000 microsec, Jittered Transmit Interval 827 ms, random num 3827
Feb 11 07:52:42 BFD: send IPC to MP for Use PBIF Assist change to Y for session 1
Configuration notes

- BFD session establishment on an interface does not start until 90 seconds after the interface comes up. The reason for this delay is to ensure that the link is not affected by unstable link conditions which could cause BFD to flap. This delay time is not user-configurable.
- BFD supports multi-slot trunks in cases where all BFD packets are transmitted only on a single path, which does not change unless the trunk active membership changes. BFD is not supported on multi-slot trunks where per-packet switching is used (where the path taken by the BFD packets varies).
- The BFD Control Message is a UDP message with destination port 3784.
- When you configure BFD, you must set timing and interval parameters.

Common diagnostic scenarios

- It takes a few minutes for BFD to come up after a partner link comes up over Layer 2. This is an expected behavior. The Brocade device waits for 90 seconds after a port state changes from down to up before sending the BFD packet out.
- When configuring BFD, one end detects a session but the other end does not. The `ip ospf bfd` command must be enabled at the interface level or the `bfd all/interfaces` command must be enabled at the router OSPF level.

BGP

Border Gateway Protocol version 4 (BGP4) is the standard Exterior Gateway Protocol (EGP) used on the Internet to route traffic between Autonomous Systems. BGP maintains a routing table (separate from the main router routing table) of the accessible routes and addresses of Autonomous System neighbors.

BGP show commands

This section describes the show commands that display BGP information.

show debug

Syntax: show debug
This command can be used at any time to display debug settings for a device. The following example shows debug settings for a device that has only BGP debug settings enabled.

Brocade# show debug
Debug message destination: console
IP Routing
  BGP:bgp debugging is on
  BGP:events debugging is on
  BGP:keepalives debugging is on
  BGP(RED):bgp debugging is on
  BGP(RED):events debugging is on
  BGP(RED):keepalives debugging is on

show ip bgp debug

Syntax: show ip bgp debug [memory | network | profiling | reset-profiling | route-table | variables | out-policy]

This command displays information about BGP network configurations, including next hops, available memory, profile data, and internal variables.

- **memory** - Displays BGP memory pool information.
- **network** - Displays information about BGP networks.
- **profiling** - Displays profile data on BGP functions.
- **reset-profiling** - Resets the profile data collection setting.
- **route-table** - Displays routing table information.
- **variables** - Displays BGP internal variables.
- **out-policy** - Displays outbound peer policies.

Command output from the `show ip bgp debug` command resembles the following example.

Brocade# show ip bgp debug
BGP Debug Information

<table>
<thead>
<tr>
<th>Pid</th>
<th>Size</th>
<th>Address</th>
<th>Total</th>
<th>Used</th>
<th>Free</th>
<th>NoMem</th>
<th>Errors</th>
<th>#_pools</th>
<th>p_unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
<td>021da799</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2000</td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>021da7c5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2000</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>021da7f1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2000</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>021da81d</td>
<td>910</td>
<td>2</td>
<td>908</td>
<td>0</td>
<td>1</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>48</td>
<td>021da849</td>
<td>630</td>
<td>1</td>
<td>629</td>
<td>0</td>
<td>1</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>64</td>
<td>021da875</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>200</td>
</tr>
<tr>
<td>6</td>
<td>96</td>
<td>021da817</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td>7</td>
<td>128</td>
<td>021da8cd</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>256</td>
<td>021da8ff9</td>
<td>31</td>
<td>2</td>
<td>29</td>
<td>0</td>
<td>1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>48</td>
<td>021da925</td>
<td>5041</td>
<td>5</td>
<td>5036</td>
<td>0</td>
<td>1</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>44</td>
<td>021da951</td>
<td>10666</td>
<td>5</td>
<td>10661</td>
<td>0</td>
<td>1</td>
<td>8000</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>86</td>
<td>021da979</td>
<td>5688</td>
<td>7</td>
<td>5681</td>
<td>0</td>
<td>1</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>92</td>
<td>021da9a9</td>
<td>5333</td>
<td>4</td>
<td>5329</td>
<td>0</td>
<td>1</td>
<td>4000</td>
<td></td>
</tr>
</tbody>
</table>

Total Memory Use for Route and Attributes Tables : 1871568
Memory Block Not Available Count : 0
Bad Memory Pool ID Count : 0
TCP buffers : 2048 0 0 0
BGP Tx Parameters : 5 30 3
BGP route update time counter : sched: N 0 (100)
BGP route update count : 0 (0) last:
event : (1:1) 0.0.0.0/0
BGP io semaphore take 5, yield 1, 0
Max timer process: 1-0 s-0 (0), io: 0 0 us
io_rx_yield_time 0x021d9480, 2
1 sec timer value: 0, 0 TB
MP active: 1, standby up 0
Graceful_restart: enable 0, restart time 120, stale-routes 360, purge 600
  Restarted 0, fwd 0, restart_up_time_count[0] 0

BGP inbound/outbound policy caching Enabled

BGP internal debug trace flags:
bgp class data structure is clean

show ip bgp debug memory

Syntax: show ip bgp debug memory [check-as-path | check-free | dump-used]

- **check-as-path** - Checks AS paths.
- **check-free** - Checks free pool entry.
- **dump-used** - Dumps used pool entry.

This command displays information about the internal sizes of various BGP entities. It shows a summary of how many chunks were allocated and freed for each pool, as the example that follows illustrates.

Brocade# show ip bgp debug memory
BGP_CLASS_VRF: 26367, BGP_PEER_CLASS: 179124, BGP_CONFIGURATION_CLASS: 4135
BGP_NLRI_ENTRY: 86, BGP_PATRICIA_KEY_ADDRESS: 16, BGP_PATRICIA_NODE: 48
BGP_RIB_OUT_NLRI_ENTRY: 44, BGP_RIB_OUT_HOLDER: 28, BGP_WITHDRAWN_ROUTE_ENTRY: 42
BGP_NEXTHOP_ADDRESS: 16, BGP_NEXTHOP_ENTRY: 199, BGP_WITHDRAWN_ROUTE_ENTRY: 36
BGP_ROUTE_DAMPING_REUSE_LIST: 2052, BGP_ROUTE_DAMPING_BLOCK: 3522,
BGP_DAMPENING:37374
BGP pool 0 allocated 1 chunk freed 0 chunk
BGP pool 1 allocated 0 chunk freed 0 chunk
BGP pool 2 allocated 0 chunk freed 0 chunk
BGP pool 3 allocated 1 chunk freed 0 chunk
BGP pool 4 allocated 1 chunk freed 0 chunk
BGP pool 5 allocated 1 chunk freed 0 chunk
BGP pool 6 allocated 0 chunk freed 0 chunk
BGP pool 7 allocated 0 chunk freed 0 chunk
BGP pool 8 allocated 0 chunk freed 0 chunk
BGP pool 9 allocated 1 chunk freed 0 chunk
BGP pool 10 allocated 1 chunk freed 0 chunk
BGP pool 11 allocated 1 chunk freed 0 chunk
BGP pool 12 allocated 1 chunk freed 0 chunk
BGP pool 13 allocated 0 chunk freed 0 chunk
BGP pool 14 allocated 0 chunk freed 0 chunk
BGP pool 15 allocated 1 chunk freed 0 chunk
BGP pool 16 allocated 0 chunk freed 0 chunk
BGP pool 17 allocated 0 chunk freed 0 chunk

show ip bgp debug memory check-free

Syntax: show ip bgp debug memory check-free pool-id

This command shows the number of free entries in the memory pool. Command output is similar to the following example (in this case, memory pool 1).

Brocade# show ip bgp debug memory check-free 1
Number of free entry in the pool(1) = 0, expected 0
show ip bgp debug memory dump-used

Syntax:  show ip bgp debug memory dump-used pool-id

This command displays (in page mode) all memory chunks that are held by a pool (either fully used or still with free entries), as the following example illustrates.

Brocade# show ip bgp debug memory dump-used 10
Pool 10: memory chunk that had free entry:
chunk addr: 2827c000, total entry 2520, free 2405, used 115
Pool 10: memory chunk that had all entries in use:

show ip bgp debug network

Syntax:  show ip bgp debug network [X:X::X: | A.B.C.D or A.B.C.D/L]

- X:X::X: - IPv6 network address.
- A.B.C.D or A.B.C.D/L - IP network address.

This command displays internal BGP information about network command-related data structures. Command output resembles the following example (shown for an IP network address).

Brocade# show ip bgp debug network 10.2.2.2/32
BGP: network 10.2.2.2/32 found
(x05236ebc, 00000000, 00000000) 10.2.2.2/32
  weight:32768 back_door:0 imported:0
  route-map:<>  sptr:x00000000
  next_hop:0.0.0.0 med:0 type:0

show ip bgp debug profiling

Syntax:  show ip bgp debug profiling

This command displays BGP profiling information, as shown in the following example.

Brocade# show ip bgp debug profiling
BGP Profiling Data:
Send TOTAL=0   FREQ=0   AVG=0
SendRibOut TOTAL=0   FREQ=0   AVG=0
SendRibOutAddAS TOTAL=0   FREQ=0   AVG=0
SendRibOutAddNLRI TOTAL=0   FREQ=0   AVG=0
Recv TOTAL=0   FREQ=0   AVG=0
RecvASAloc TOTAL=0   FREQ=0   AVG=0
RecvUpd TOTAL=0   FREQ=0   AVG=0
RecvAschk TOTAL=0   FREQ=0   AVG=0
RecvAsloop TOTAL=0   FREQ=0   AVG=0
RecvAsadd1 TOTAL=0   FREQ=0   AVG=0
RecvAsadd2 TOTAL=0   FREQ=0   AVG=0
RecvUpdnlri TOTAL=0   FREQ=0   AVG=0
RecvUpdvpn4nlri TOTAL=0   FREQ=0   AVG=0
RecvVpnv4copy TOTAL=0   FREQ=0   AVG=0
RecvVpnv4alloc TOTAL=0   FREQ=0   AVG=0
RecvVpnv4ribin TOTAL=0   FREQ=0   AVG=0
RecvVpnv4process TOTAL=0   FREQ=0   AVG=0
RecvVpnv4processImp TOTAL=0   FREQ=0   AVG=0
RecvVpnv4processnewas TOTAL=0   FREQ=0   AVG=0
RecvRibinTree2 TOTAL=0   FREQ=0   AVG=0
RecvRibinTree3 TOTAL=0   FREQ=0   AVG=0
RecvRibinTree4 TOTAL=0   FREQ=0   AVG=0
### show ip bgp debug route-table

**Syntax:** `show ip bgp debug route-table`

This command displays the Network Layer Reachability Information (NLRI) count in the BGP route table, as shown in the following example.

Brocade# show ip bgp debug route-table
There are 7 NLRIs in BGP Route Table, time 0 ms

### show ip bgp debug variables

**Syntax:** `show ip bgp debug variables`

This command displays detailed BGP information about internal flags, statistics, and states. Command output resembles the following example.

Brocade# show ip bgp debug variables
safi:0, &bgp:04d2dfdc, enabled:1, operational:1, dbg_mem=&021da72e/0, curr_afi:0
io_process_running:0, io_process_next_peer_number=1
in_long_loops 0, clear_all 0, timer 00000000, count 0
timer_enabled:1, timer_next_peer_number:0, ls timer 1, short timer 1
scheduler id:1:1, ip:0.0.0.0/0, time=16977
bgp_tcb:021cae08 (0x0001001f, 0), tick_cnt=17, seconds=691
bgp_tcb6:0001002f (0x00000000, 0x04d2e0c4)
*peer:021d9546, *peer_group:021da4f2, RIB_in_root_node:0bb373b4
Maximum Peer Index Number:2, check neightops:0 0
router_id:10.3.3.3, configured:0, cluster_id:0.0.0.0, configured:0
route_is_router_reflector:0, client_to_client_reflection:1
networks:x021cdbe9, aggregate:x021cde0d
show ip bgp debug out-policy

Syntax:  show ip bgp debug out-policy

This command displays outbound peer policies. Command output resembles the following example.

Brocade# show ip bgp debug out-policy
BGP(vrf 0/safi 0) outbound policy entries: 13
Outbound Policy Group: 0x34731a00 (Hash 0), ID: 1, Drop 1, Use Count: 0, Staring: 0, Update: 0
  Ribout Group: 0x34831000, ID: 1, Type: -1, Peer Count: 0, Mask: 0x00000000 (0), ribout: 0, withdrawn: 0
Outbound Policy Group: 0x347a5600 (Hash 0), ID: 9, Drop 0, Use Count: 1, Staring: 42, Update: 0
  Ribout Group: 0x35563000, ID: 2, Type: 1, Peer Count: 1, Mask: 0x00000004 (2), ribout: 2102, withdrawn: 0
Outbound Policy Group: 0x355e9e00 (Hash 31), ID: 5, Drop 0, Use Count: 6, Staring: 18, Update: 0
  Ribout Group: 0x35615000, ID: 6, Type: 2, Peer Count: 6, Mask: 0x0000003f (5), ribout: 175020, withdrawn: 0
    routemap: map10
Outbound Policy Group: 0x355e9200 (Hash 110), ID: 2, Drop 0, Use Count: 6, Staring: 0, Update: 0
  Ribout Group: 0x355f1000, ID: 3, Type: 2, Peer Count: 6, Mask: 0x00000003f (5), ribout: 175020, withdrawn: 0
    routemap: map0
Outbound Policy Group: 0x347a5400 (Hash 111), ID: 8, Drop 0, Use Count: 6, Staring: 36, Update: 0
  Ribout Group: 0x35627000, ID: 9, Type: 2, Peer Count: 6, Mask: 0x00000003f (5), ribout: 175020, withdrawn: 0
    routemap: map1

show ip bgp debug out-policy peer-list

Syntax:  show ip bgp debug out-policy peer-list

This command displays the peer grouping. The Brocade device groups BGP peers together based on their outbound policies. To reduce RIB-out memory usage, the device then groups the peers within an outbound policy group according to their RIB-out routes. Peers in a group have the same Policy-ID and Group-ID.

RIB-out peer grouping is not shared among different VRFs or address families, and is not supported for VPNv4 or Layer 2 VPN peers.

Brocade# show ip bgp debug out-policy peer-list
BGP sorted peers on outbound policy (safi=0)
Index -> PeerIdx Peer Address Policy-ID Group-ID Vrf-idx
  0 0 10.0.100.2 2 3 0
show ip bgp nexthop

Syntax: show ip bgp nexthop [ip-address | unreachable]

- **ip-address** - Displays the next hop with the specified IP address.
- **unreachable** - Displays only the unreachable next hops.

This command displays information about IPv4 next hops. The information includes next hops, route type, cost, resolve schema, next hop router IP address, and outgoing interface. Command output resembles the following example.

Brocade# show ip bgp nexthop
safi : BGP UNICAST SAFI
Type Codes - B:BGP D:Connected I:ISIS O:OSPF R:RIP S:Static
OSPF Codes - i:Internal 1:External Type 1 2:External Type 2

<table>
<thead>
<tr>
<th>Next Hop</th>
<th>RouteType</th>
<th>Cost</th>
<th>ResolveSchema</th>
<th>Router IP</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.122.122.122</td>
<td>Oi</td>
<td>2</td>
<td>IPv4/6</td>
<td>10.32.32.2</td>
<td>eth 1/3</td>
</tr>
<tr>
<td>10.132.10.10</td>
<td>Oi</td>
<td>2</td>
<td>IPv4/6</td>
<td>10.22.22.10</td>
<td>eth 1/2</td>
</tr>
</tbody>
</table>

show ipv6 bgp nexthop

Syntax: show ipv6 bgp nexthop [ipv6-address | unreachable]

- **ipv6-address** - Displays the next hop with the specified IPv6 address.
- **unreachable** - Displays only the unreachable next hops.

This command displays information about IPv6 next hops. The information includes next hops, route type, cost, resolve schema, next hop router IPv6 address, and outgoing interface. Command output resembles the following example.

Brocade# show ipv6 bgp nexthop
safi : BGP IPV6 UNICAST SAFI
Type Codes - B:BGP D:Connected I:ISIS O:OSPF R:RIP S:Static
OSPF Codes - i:Internal 1:External Type 1 2:External Type 2

<table>
<thead>
<tr>
<th>Next Hop</th>
<th>RouteType</th>
<th>Cost</th>
<th>ResolveSchema</th>
<th>Router IP</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001:DB8::9</td>
<td>Oi</td>
<td>2</td>
<td>IPv4/6</td>
<td>fe80::224:38ff:fe43:6d41</td>
<td>eth 1/1</td>
</tr>
<tr>
<td>2001:DB8::20</td>
<td>Oi</td>
<td>2</td>
<td>IPv4/6</td>
<td>fe80::224:38ff:fe43:6d42</td>
<td>eth 1/2</td>
</tr>
</tbody>
</table>

show ip rtm

Syntax: show ip rtm [vrf vrf name] | include bgp

- **vrf vrf name** - Specifies that you want to display the RTM information for the specified VRF.
- **include bgp** - Includes the matching lines from BGP output.
This command displays information about the Routing Table Manager (RTM) BGP rib count, as shown in the following example.

Brocade# show ip rtm vrf vpn1 | include bgp
client bgp (0x105b1104):
bgp route limit 0, current 0

BGP debug commands

This section describes the debug commands used for monitoring the BGP environment.

debuge ip bgp

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] [dampening | events | general | graceful-restart | keepalives | updates [rx | tx] | route-selection]

• all-vrfs - Displays information for all virtual routing and forwarding events.
• vrf-name - Displays information for a specific VRF event.
• dampening - Displays BGP dampening activity.
• events - Displays BGP event information.
• general - Displays BGP common debugs.
• graceful-restart - Displays information about graceful-restart events.
• keepalives - Displays keepalive activity.
• updates [rx | tx] - Displays BGP receive, transmit, or receive and transmit update messages about debug processing.
• route-selection - Displays BGP route selection debug information.

This command enables common BGP debugs to be displayed for all VRFs or for a specific VRF. Command output resembles the following example.

Brocade# debug ip bgp
/**** local-as of peer has changed ****/
BGP: 10.1.1.2 Rcv TCP connection closed remotely. handle 00000005:0a0132d4, key 0
BGP: 10.1.1.2 remote peer closed TCP connection
BGP: 10.1.1.2 rcv notification: CEASE Message
BGP: 10.1.1.2 BGP connection closed

BGP: 10.1.1.2 start peer
BGP: 10.1.1.2 Init TCP Connection to peer, local IP 10.1.1.1
BGP: 10.1.1.2 Rcv TCP connection closed remotely. handle 0000000 6:0a0132d4, key 0
BGP: 10.1.1.2 TCP connection failed
BGP: Rcv incoming TCP connection check. handle 00000007:0a0123d4, key 0
BGP: Incoming TCP connection. peer 10.1.1.2 OKed
BGP: Rcv incoming TCP connection UP. handle 00000007:0a0123d4, key 0
BGP: 10.1.1.2 New incoming TCP connection is open, local IP 10.1.1.1
BGP: 10.1.1.2 sending MultiProtocol cap, afi/safi=1/1, length 4
BGP: 10.1.1.2 sending IPEN, holdTime=180 route_refresh=1 cooperative=1, restart 0/0
BGP: 10.1.1.2 rcv OPEN w/Option parameter length 16, as 2. hold_time 180
BGP: 10.1.1.2 rcv capability 2, len 0
BGP: 10.1.1.2 rcv capability 128, len 0
**debug ip bgp route-selection**

**Syntax:** `[no] debug ip bgp [all-vrfs | vrf-name] route-selection

This command enables debugging of BGP route selection for all VRFs or for a specified VRF. Command output resembles the following example.

Brocade# debug ip bgp route-selection
BGP: Clearing install flags for 2001:DB8:0:61::/64
BGP: 2001:DB8::20 Move path to front for 2001:DB8:0:51::/64
BGP: select best route 2001:DB8:0:61::/64 load_share (ibgp 1, ip 1), (ebgp 1, ip 1)
BGP: eligible route 1
BGP: 2001:DB8::20 Best path up 2001:DB8:0:61::/64, install
BGP: 2001:DB8::20 Move path to front for 2001:DB8:0:61::/64
BGP: add bgp routes to IPv6 table 2001:DB8:0:61::/64
BGP: Adding 2001:DB8:0:61::/64 to ipv6 route table, next_hop=2001:DB8::20
BGP: Clearing install flags for 2001:DB8:0:61::/64
BGP: 2001:DB8::20 Move path to front for 2001:DB8:0:51::/64
BGP: select best route 2001:DB8:0:61::/64 load_share (ibgp 1, ip 1), (ebgp 1, ip 1)
BGP: eligible route 1
BGP: 2001:DB8::20 Best path up 2001:DB8:0:61::/64, install
BGP: 2001:DB8::20 Move path to front for 2001:DB8:0:61::/64
BGP: add bgp routes to IPv6 table 2001:DB8:0:61::/64
BGP: Adding 2001:DB8:0:61::/64 to ipv6 route table, next_hop=2001:DB8::20

**debug ip bgp dampening**

**Syntax:** `[no] debug ip bgp [all-vrfs | vrf-name] dampening

This command displays information about dampening process configurations, route penalties, durations, restraint, and release. Command output resembles the following example.

Brocade# debug ip bgp dampening
BGP: dampening debugging is on
BGP: 2001:DB8::20 dampening 2001:DB8::/64 down, penalty=9154 flaps=572
BGP: 2001:DB8::20 dampening 2001:DB8::/64 up, penalty=8640 suppressed

In this example, dampening is enforced on route 2001:DB8::/64 due to flap activity, and lifted after a period of time.

**debug ip bgp events**

**Syntax:** `[no] debug ip bgp [all-vrfs | vrf-name] events

This command generates information about BGP events, such as connection attempts and keepalive timer activity, as shown in the following example.

Brocade# debug ip bgp events
BGP: events debugging is on
BGP: From Peer 192.168.1.2 received Long AS_PATH=
AS_CONFED_SET(4) 1 2 3 AS_CONFED_SEQUENCE(3) 4 AS_SET(1)
5 6 7 AS_SEQ(2) 8 9 attribute length (9) More than configured MAXASLIMIT 7
The following line of output indicates a four-byte ASN.
Sep 9 18:36:42 BGP: 192.168.1.1 rcv capability 65, len 4
debug ip bgp graceful-restart

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] graceful-restart

Enable this command to receive information about BGP graceful restarts. The graceful restart feature minimizes disruptions in forwarding and route flapping when a router experiences a restart. Command output resembles the following example.

Brocade# debug ip bgp graceful-restart
  BGP: graceful-restart debugging is on
  SYSLOG: <13>Dec 10 22:46:50 R3 BGP: Peer 10.1.1.2 DOWN (User Reset Peer Session)
  Dec 10 22:46:50 BGP: 10.1.1.2 delete NLRI #RIB_out 6, (safi 0)
  Dec 10 22:46:50 BGP: 10.1.1.2 RIB_out peer reset #RIB_out 6 (safi 0)

  Dec 10 22:47:01 BGP: 10.1.1.2 rcv UPDATE EOR (0), waiting EOR 0
  Dec 10 22:47:01 BGP: 10.1.1.2 sending EOR (safi 0)...
  Dec 10 22:47:01 BGP: 10.1.1.2 sending UPDATE EOR[0]

debug ip bgp keepalives

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] keepalives

Brocade devices use keepalives to collect information about applications and services. For example, you can configure a keepalive to continually monitor and report on the online status of a resource, such as BGP. Command output resembles the following example.

Brocade# debug ip bgp keepalives
  BGP: keepalives debugging is on
  BGP: 10.28.156.234 KEEPA LIVE received
  BGP: 10.142.72.222 KEEPA LIVE received
  BGP: 10.28.148.234 KEEPA LIVE received
  BGP: 10.142.72.222 sending KEEPA LIVE
  BGP: 10.28.165.234 sending KEEPA LIVE

debug ip bgp neighbor

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] neighbor [ipv4-address | ipv6-address]

This command specifies the IPv4 or IPv6 neighbor filter for BGP debugging for all VRFs or for a specified VRF. Only one IPv4 neighbor filter and one IPv6 neighbor filter can be configured on each VRF.

The neighbor filter acts exclusively, which means that wherever an IPv4 neighbor filter is configured, the corresponding IPv6 debugs are not shown. The neighbor filter functions with the updates [rx|tx], keepalives, events, and graceful-restart keywords of the debug ip bgp command. For example, when debug ip bgp updates and debug ip bgp neighbor 2001:DB8::20 are configured, BGP update debugs are displayed only for neighbor 2001:DB8::20.

Command output resembles the following example.

Brocade# debug ip bgp neighbor 2001:DB8::20
  BGP: neighbor 2001:DB8::20 debugging is on
Brocade# debug ip bgp updates rx
  BGP: updates RX debugging is on
  BGP: 2001:DB8::20 rcv UPDATE 2001:DB8::/64 -- withdrawn
  BGP: rcv UPDATE w/attr: Origin=IGP AS_PATH= AS_SEQ(2) 65400 65181 209 7018
  NextHop=2001:DB8::20
debug ip bgp ip-prefix

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] ip-prefix ip prefix/mask

debug ip bgp ipv6-prefix

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] ipv6-prefix ipv6 prefix/mask

debug ip bgp ip-prefix-list

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] ip-prefix-list name

debug ip bgp ipv6-prefix-list

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] ipv6-prefix-list name

These commands specify the IPv4 or IPv6 prefix filter for BGP debugging information for all VRFs or for a specified VRF. Only one IPv4 prefix filter or prefix list and one IPv6 prefix filter or prefix list can be configured on a VRF. Prefix filters and prefix lists cannot be configured simultaneously. IPv6 and IPv4 filters are applied separately. Configuring an IPv4 prefix list or prefix filter does not automatically block IPv6 debugging, unlike the neighbor filter. To block IPv6 debugging, AFI/SAFI must be configured along with the prefix filter.

**NOTE**
Prefix filtering is not functional during update receive processing for VPNv4. Prefix filtering is functional with the updates [rx/tx], route-selection, and dampening keywords of the debug ip bgp command.

**NOTE**
Removing the configured ip-prefix-list name or ipv6-prefix-list name also automatically removes the associated filter.

Output from any of these commands resembles the following example, where the first example reflects an IPv4 prefix filter, or a similar IPv4 prefix list along with AFI/SAFI as IPv4 and unicast.

Brocade# debug ip bgp ip-prefix 10.1.1.1/24
  BGP: ip-prefix debugging is on
  permit 10.1.1.0/24

  /*** Route-Addition *****/
  Sep 9 18:38:13 BGP: BGP rcv UPDATE w/attr: Origin=IGP AS_PATH= AS_SEQ(2) 2
  NextHop=10.1.1.2 MED=0
  Sep 9 18:38:13 BGP: (0): 10.1.1.2 rcv UPDATE 10.1.1.0/24

  /*** Route-Deletion *****/
  Sep 9 18:38:23 BGP: 10.1.1.2 rcv UPDATE 10.1.1.0/24 - withdrawn

The next example reflects an IPv6 prefix filter, or a similar IPv6 prefix list along with AFI/SAFI as IPv6 and unicast.

Brocade# debug ip bgp ipv6-prefix 2001:DB8::1/64
  BGP: ipv6-prefix debugging is on
  permit 2001:DB8::/64

  /*** Route-Addition *****/

Sep 9 18:38:24 BGP: BGP rcv UPDATE w/attr: Origin=IGP AS_PATH= AS_SEQ(2) 2
NextHop=10.1.1.2 MED=0
Sep 9 18:38:24 BGP: (0): 2001:DB8::1 rcv UPDATE 2001:DB8::/64

  /*** Route-Deletion *****/
  Sep 9 18:38:24 BGP: 2001:DB8::1 rcv UPDATE 2001:DB8::/64 - withdrawn
BGP

Sep 9 24:01:32 BGP: rcv UPDATE w/attr: Origin=IGP AS_PATH= AS_SEQ(2) 65400 65181 209 7018 NextHop=21:1::20
Sep 9 24:01:32 BGP: (2): 2001:DB8::20 rcv UPDATE 2001:DB8::/64

/**** Route-Deletion ****/
Sep 9 24:01:40 BGP: 2001:DB8::20 rcv UPDATE 2001:DB8::/64 -- withdrawn

d debug ip bgp route-map

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] route-map map-name

This command associates an existing route map filter with BGP debugging. The route map filter is functional with the route-selection and dampening keywords of the debug ip bgp command.

CAUTION

This command may degrade performance.

NOTE

Removing the configured route map automatically removes the associated filter.

NOTE

To debug the entire update receive process until route selection and route updates correspond to the update, you must enable the debug ip bgp updates rx, and debug ip bgp route-selection commands along with the appropriate filters. In this case, all of the filters (NBR+AFI/Safi+PREFIX+ROUTE_MAP) are applied if they are configured.

d debug ip bgp route-updates

Syntax: [no] debug ip bgp route-updates

This command shows the routes that have been shared with a neighbor. The route information includes the four-byte AS4_PATH attribute and the AS_PATH attribute.

Command output resembles the following example.

Brocade# debug ip bgp route-updates

d debug ip bgp updates

Syntax: [no] debug ip bgp [all-vrfs | vrf-name] updates [rx | tx]

This command enables debugging of BGP update message processing for all VRFs or for a specific VRF. Update debugging is supported in both IPv4 and IPv6 update message processing. If you do not specify either all VRFs or a specific VRF, the debug ip bgp updates command enables debugging for both receive and transmit update message processing.

Command output resembles the following example.

Brocade# debug ip bgp updates
BFD for BGP4 debug commands

To debug Bidirectional Forwarding Detection (BFD) for BGP4, use the following debugging commands:

- `debug ip bgp [all-vrfs | vrf vrf-name] bfd`
- `debug bfd application` (Refer to this command on page 236.)
- `debug bfd itc` (Refer to this command on page 240.)

**debug ip bgp bfd**

**Syntax:** `debug ip bgp [all-vrfs | vrf vrf-name] bfd`

- `all-vrfs` - Displays information for all BGP BFD events.
- `vrf vrf-name` - Displays information for a specific VRF event.

**Command output resembles the following example.**

```
Brocade# debug ip bgp bfd
Sep 9 18:37:07 BFD:ITC, Received BFD MHOP ITC Create Session Request from bgp(0)
Sep 9 18:37:07 BFD: BFD MHOP ITC Create Session Response Sent to bgp(0)
Sep 9 18:37:07 BGP: 10.1.1.2 Peer Received BFD MHOP Create Session Response ITC message
Sep 9 18:37:07 BGP: 10.1.1.2 Peer Received BFD session UP state notification
Sep 9 18:37:07 BGP: 10.1.1.2 Peer BGP-BFD state changed to UP
Sep 9 18:37:07 BFD: BFD MHOP ITC Update Session Negotiated Parameters Request Sent to bgp(0)
Sep 9 18:37:07 BFD: BFD MHOP ITC Update Session Negotiated Parameters Request Sent to bgp(0)
Sep 9 18:37:07 BGP: 10.1.1.2 Peer Received BFD MHOP Update Session Negotiated Parameters Request ITC message
Sep 9 18:37:07 BFD: BFD MHOP ITC Update Session Negotiated Parameters Response Sent to bgp(0)
Sep 9 18:37:07 BFD: BFD MHOP ITC Update Session Negotiated Parameters Response Sent to bgp(0)
```

IPv6 ND debug commands

This section describes the IPv6 ND-related debug commands.

**debug ipv6 nd**

**Syntax:** `[no] debug ipv6 nd`

This command enables debugging for all neighbors. To enable debugging for a specific neighbor, enter the `debug ipv6 nd` command followed by the `debug ipv6 address X.X::X.X` command.

**Command output resembles the following example.**

```
Brocade# debug ipv6 nd
IPv6 Generic:
```
Configuration notes

- If you configure the Brocade NetIron XMR and Brocade MLX series router to use a loopback interface to communicate with a BGP4 neighbor, you must also configure a loopback interface on the neighbor, and configure the neighbor to use that loopback interface to communicate with the router.

- Brocade NetIron XMR and Brocade MLX series routers use the same router ID for both OSPF and BGP4. If the router is already configured for OSPF, you may want to use the router ID that is already in use rather than set a new one. To display the router ID, enter the show ip command at any CLI level.

- The command to set the router ID for a specified VRF is the same as the command for the default VRF. The only difference is that when setting it for a specific VRF, the ip router-id command is configured within the VRF.

- When setting the router ID, you can specify an IP address that is being used for an interface, but do not specify an IP address that is in use by another device.

- The OSPF Stub Router Advertisement feature is helpful for preventing a loss of traffic during short periods when adjacency failures are detected and traffic is rerouted. With this feature, traffic can be rerouted before an adjacency failure occurs (due to common service interruptions such as a router being shut down for maintenance). This feature is also useful during router startup because it gives the router enough time to build up the routing table before forwarding traffic. This is helpful where BGP is enabled because it takes time for the BGP routing table to converge.

- Under normal operation, restarting a BGP router reconfigures the network. In this situation, routes available through the restarting router are deleted when the router goes down and are then rediscovered and added back to the routing tables when the router comes back up. In a network where routers are regularly restarted, performance may be significantly degraded, limiting the availability of network resources. The BGP Graceful Restart feature dampens the network response and limits route flapping by allowing routes to remain available during a restart. BGP graceful restart operates between a router and its peers and must be configured on all devices.
• When you enable BGP4, you do not need to reset the system. The protocol is activated as soon as it is enabled. The router also begins a BGP4 session with a BGP4 neighbor as soon as you add the neighbor.

• The router attempts to establish a BGP4 session with a neighbor as soon as you enter a command specifying the neighbor IP address. To completely configure neighbor parameters before the router can establish a session, you can administratively shut down the neighbor.

**Disabling BGP4**

If you disable BGP4, the router removes all configuration information for the disabled protocol from the running configuration. To restore the BGP4 configuration, you must reload the software, which loads the configuration from the startup configuration. When you save the configuration to the startup configuration file after disabling the protocol, all configuration information for the disabled protocol is removed from the startup configuration file. You will see a CLI error message similar to the following example.

Brocade(config)# no router bgp
router bgp mode now disabled. All bgp configuration data will be lost when writing to flash?

When you test a BGP4 configuration, and are likely to disable and re-enable the protocol, you might want to make a backup of the startup configuration file that contains the BGP4 configuration information. If you remove the configuration information by saving the configuration after you disable the protocol, you can then restore the configuration by copying the backup to the flash memory.

To disable BGP4 without losing the BGP4 configuration information, remove the local AS (for example, by entering the `no local-as num` command). In this case, BGP4 retains the other configuration information but is not operational until you again set the local AS.

**Forwarding disruptions and port flapping**

The BGP Graceful Restart feature supports high-availability routing. With this feature enabled, disruptions in forwarding are minimized and route flapping diminished to provide continuous service during times when a router experiences a restart. For more information about BGP Graceful Restart, refer to the *Brocade NetIron Routing Configuration Guide*.

**Performance degrades during restarts**

BGP Graceful Restart also helps minimize performance degradation during restarts. For more information about BGP Graceful Restart, refer to the *Brocade NetIron Routing Configuration Guide*.

**Reducing the complexity of BGP configurations**

The following information can help to simplify your BGP configurations.

**Confederations**

A *confederation* is a BGP4 Autonomous System (AS) that has been subdivided into multiple, smaller autonomous systems. Subdividing an autonomous system into smaller autonomous systems simplifies administration and reduces BGP-related traffic, thus reducing the complexity of the Interior Border Gateway Protocol (IBGP) mesh among the BGP routers in the AS.
Router reflection
Another way to reduce the complexity of an IBGP mesh is to use route reflection. However, if you want to run different Interior Gateway Protocols (IGPs) within an AS, configure a confederation. You can run a separate IGP within each sub-AS.

For more information on how to configure these features, refer to the Brocade NetIron Routing Configuration Guide.

BGP memory considerations
BGP4 handles a very large number of routes and therefore requires a substantial amount of memory. For example, in a typical configuration with a single BGP4 neighbor, a BGP4 router may need to manage as many as 250,000 routes. Many configurations, especially those involving more than one neighbor may require the router to retain even more routes. The Brocade devices provide dynamic memory allocation for BGP4 data, automatically allocating memory when needed to support BGP4 neighbors, routes, and route attribute entries. Dynamic memory allocation is performed automatically by the software and does not require a reload.

Common diagnostic scenarios
MD5 Authentication is incorrect between two BGP peers when a BGP session remains connected. Because MD5 authentication occurs at the TCP layer, the `debug ip bgp` command will not help in this situation. To determine the exact error, issue the `debug ip tcp transactions` command.

HTTP/HTTPSdebug commands
This section describes the commands used for HTTP/HTTPS client debugging.

`debug ip http client`

Syntax: `[no] debug ip http client [alloc | buffer | caller | connection | engine | packet | request | tcpev]`

- **alloc** - Displays HTTP client allocation debugging.
- **buffer** - Displays HTTP client API buffer level debugging.
- **caller** - Displays HTTP client API caller level debugging.
- **connection** - Displays HTTP client connection to server debugging.
- **engine** - Displays HTTP client engine <FSM> debugging.
- **packet** - Displays HTTP client packet level debugging.
- **request** - Displays HTTP client method level debugging.
- **tcpev** - Displays HTTP client TCP event level debugging.

This command enables debugging for the HTTP/HTTPS client. Command output resembles the following example.

```
Brocade# debug ip http client
Jun 10 21:52:57.902 HC:[A:0]: CU msg cu_action 0x00000001
```
OSPF

The Open Shortest Path First (OSPF) protocol uses link state advertisements (LSAs) to update neighboring routers about interfaces and information on those interfaces. OSPF routers maintain identical databases that describe their area topology, helping any individual router to determine the shortest path between itself and any neighboring router.

OSPF show commands

This section describes the show commands that display OSPF information.

show ip ospf

Syntax: show ip ospf

This command displays information related to an OSPF router advertisement configuration. Command output resembles the following example.

Brocade# show ip ospf
OSPF Version                  Version 2
Router Id                     10.1.1.1
ASBR Status                   Yes
ABR Status                    Yes        (1)
Redistribute Ext Routes from  Static BGP
Initial SPF schedule delay    0          (msecs)
Minimum hold time for SPFs    0          (msecs)
Maximum hold time for SPFs    0          (msecs)
External LSA Counter          10001
External LSA Checksum Sum     13albaba
Originate New LSA Counter     662043
Rx New LSA Counter            93400
External LSA Limit            14447047
Database Overflow Interval    0
Database Overflow State :     NOT OVERFLOWED
RFC 1583 Compatibility :      Enabled
Slow neighbor Flap-Action :   Enabled,   timer 300
Nonstop Routing:              Disabled
Graceful Restart:             Disabled,   timer 120
Graceful Restart Helper:      Enabled

show ip ospf config

Syntax: show ip ospf config

This command displays general OSPF configuration information.

Brocade# show ip ospf config
Router OSPF: Enabled
Redistribution: Disabled
Default OSPF Metric: 10
OSPF Redistribution Metric: Type2
OSPF External LSA Limit: 1447047
OSPF Database Overflow Interval: 0
RFC 1583 Compatibility: Enabled
Router id: 192.168.100.1

Interface State Change Trap: Enabled
Virtual Interface State Change Trap: Enabled
Neighbor State Change Trap: Enabled
Virtual Neighbor State Change Trap: Enabled
Interface Configuration Error Trap: Enabled
Virtual Interface Configuration Error Trap: Enabled
Interface Authentication Failure Trap: Enabled
Virtual Interface Authentication Failure Trap: Enabled
Interface Receive Bad Packet Trap: Enabled
Virtual Interface Receive Bad Packet Trap: Enabled
Interface Retransmit Packet Trap: Disabled
Virtual Interface Retransmit Packet Trap: Disabled
Originate LSA Trap: Disabled
Originate MaxAge LSA Trap: Disabled
Link State Database Overflow Trap: Disabled
Link State Database Approaching Overflow Trap: Disabled

OSPF Area currently defined:
<table>
<thead>
<tr>
<th>Area-ID</th>
<th>Area-Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>normal</td>
<td>0</td>
</tr>
</tbody>
</table>

OSPF Interfaces currently defined:

Ethernet Interface: 3/1-3/2
ip ospf md5-authentication-key-activation-wait-time 300
ip ospf cost 0
ip ospf area 0

Ethernet Interface: v1
ip ospf md5-authentication-key-activation-wait-time 300
ip ospf cost 0
ip ospf area 0

show tasks

Syntax: show tasks

This command displays CPU usage statistics and other OSPF tasks.

Brocade# show tasks

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Pri</th>
<th>State</th>
<th>PC</th>
<th>Stack</th>
<th>Size</th>
<th>CPU Usage(%)</th>
<th>task id</th>
<th>task vid</th>
</tr>
</thead>
<tbody>
<tr>
<td>idle 0</td>
<td>ready</td>
<td>00001904</td>
<td>04058fa0</td>
<td>4096</td>
<td>99</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>monitor 20</td>
<td>wait</td>
<td>0000d89c</td>
<td>0404bd80</td>
<td>8192</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>int 16</td>
<td>wait</td>
<td>0000d89c</td>
<td>0405f90</td>
<td>16384</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>timer 15</td>
<td>wait</td>
<td>0000d89c</td>
<td>0405f90</td>
<td>16384</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>dbg 30</td>
<td>wait</td>
<td>0000d89c</td>
<td>0404ff08</td>
<td>8192</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>flash 17</td>
<td>wait</td>
<td>0000d89c</td>
<td>0409ff08</td>
<td>8192</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>wd 31</td>
<td>wait</td>
<td>0000d89c</td>
<td>0409df80</td>
<td>8192</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>boot 17</td>
<td>wait</td>
<td>0000d89c</td>
<td>04203e28</td>
<td>65536</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>main 3</td>
<td>wait</td>
<td>0000d89c</td>
<td>2060cf80</td>
<td>65536</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>itc 6</td>
<td>wait</td>
<td>0000d89c</td>
<td>20612ae8</td>
<td>16384</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>tmr 5</td>
<td>wait</td>
<td>0000d89c</td>
<td>20627628</td>
<td>16384</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ip_rx 5</td>
<td>wait</td>
<td>0000d89c</td>
<td>20627548</td>
<td>16384</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
show ip ospf area

**Syntax:** `show ip ospf area [area-id | num]`

- `area-id` - Shows information for the specified area.
- `num` - Corresponds to the entry number you enter. The entry number identifies the position of the entry in the area table.

This command displays OSPF area information.

Brocade# show ip ospf area

<table>
<thead>
<tr>
<th>Index</th>
<th>Area</th>
<th>Type</th>
<th>Cost</th>
<th>SFFR</th>
<th>ABR</th>
<th>ASBR</th>
<th>LSA</th>
<th>Chksum (Hex)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0.0.0</td>
<td>normal</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0000781f</td>
</tr>
<tr>
<td>2</td>
<td>10.147.60.0</td>
<td>normal</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0000fee6</td>
</tr>
<tr>
<td>3</td>
<td>10.147.80.0</td>
<td>stub</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>000181cd</td>
</tr>
</tbody>
</table>

show ip ospf neighbor

**Syntax:** `show ip ospf neighbor [extensive | num | router-id ip-addr]`

- `extensive` - Displays detailed information about the neighbor.
• **num** - Specifies the index position in the neighbor table for which you want to display neighbor information. For example, if you enter “1”, only the first entry in the table is displayed.

• **router-id ip-addr** - Displays only the neighbor entries for the specified router.

The `show ip ospf neighbor extensive` command displays detailed information about the neighbor. Command output resembles the following example.

Brocade# show ip ospf neighbor extensive
Number of Neighbors is 2, in FULL state 2

<table>
<thead>
<tr>
<th>Port</th>
<th>Address</th>
<th>Pri</th>
<th>State</th>
<th>Neigh Address</th>
<th>Neigh ID</th>
<th>Ev Opt Cnt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/7</td>
<td>10.1.1.1</td>
<td>1</td>
<td>FULL/BDR</td>
<td>10.1.1.2</td>
<td>10.1.1.36</td>
<td>5 66 0</td>
</tr>
<tr>
<td>1/5</td>
<td>10.1.1.1</td>
<td>1</td>
<td>FULL/BDR</td>
<td>10.1.1.5</td>
<td>10.4.4.4</td>
<td>4 72 8276</td>
</tr>
</tbody>
</table>

Neighbor is known for 8d:16h:17m:33s and up for 8d:16h:16m:50s
Neighbor is marked SLOW and is known for 8d:16h:16m:34s and up for 8d:16h:15m:50s

The `show ip ospf neighbor 1` command output resembles the following example.

Brocade# show ip ospf neighbor 1
Port Address Pri State Neigh Address Neigh ID Ev Opt Cnt
1/7 10.1.1.1 1 FULL/BDR 10.1.1.2 10.1.1.36 5 66 0
address 10.1.1.2, priority 1, id 10.1.1.36
designated_router 10.1.1.1, backup_designated_router 10.1.1.2, interface state DR
state 0, event 5, mode 2, flags 00000001, option 00000042
ls_request_queue_count 0, ls_request_list_has_changed 0, ls_req_can_be_sent 0
retransmit_queue_count 0, database_summary_queue_count 0
pktx_count 0, inactivity_timer_enabled 1, periodic_inactivity_time_counter 1
md5_sequence 0, sequence 1762200, neighbor_sequence 0
last_dd_sequence 1762199, last_exchange 0
last_dd_flags 26e44b29, last_dd_options 26e44b28
periodic_slave_hold_time_counter 165
slow_neighbor_wait_timer 10
flag_ret_Q_full_slow_neighbor 1
sptr_retransmit 00000000, sptr_retransmit_tail 00000000
sptr_database_summary 00000000
sptr_ls_request[1-5, 9] 00000000 00000000 00000000 00000000 00000000 00000000
interface 1/7, address 10.1.1.1, subnet/nexthop 10.1.1.0

**show ip ospf interface**

**Syntax:** `show ip ospf interface [ip-addr]`

The `ip-addr` variable specifies the IP address.

This command displays OSPF interface information, including the IP address, the OSPF state, link ID, interface options, and cost, as shown in the following example.

Brocade# show ip ospf interface
eth 2/1 admin up, oper down, ospf enabled, state down
   IP Address 192.168.1.1, Area 1
   Database Filter: Not Configured
   State down, Pri 1, Cost 1, Options ------E-, Type broadcast Events 0
   Timers(sec): Transmit 1, Retrans 5, Hello 10, Dead 40

**show ip ospf interface brief**

**Syntax:** `show ip ospf interface brief`

This command displays the OSPF database information in brief format, as shown in the following example.
Brocade# show ip ospf interface brief
eth 2/1 admin up, oper down, ospf enabled, state down
IP Address 192.168.1.1, Area 1
Database Filter: Not Configured
State down, Pri 1, Cost 1, Options ------E-, Type broadcast Events 0
Timers(sec): Transmit 1, Retrans 5, Hello 10, Dead 40

show ip ospf routes

Syntax: show ip ospf routes [ip-addr]

- ip-addr - Specifies a destination IP address for which to display route entries.

This command displays OSPF route information, as shown in the following example.

Brocade# show ip ospf routes
OSPF Area 0x00000000 ASBR Routes 1:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Mask</th>
<th>Path_Cost</th>
<th>Type2_Cost</th>
<th>Path_Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.65.12.1</td>
<td>10.255.255.255</td>
<td>1</td>
<td>0</td>
<td>Intra</td>
</tr>
</tbody>
</table>

Adv_Router | Link_State | Dest_Type | State | Tag | Flags |
-------------|------------|-----------|-------|-----|-------|
10.65.12.1  | 10.65.12.1  | Asbr      | Valid  | 0   | 6000  |

Paths Out_Port | Next_Hop | Type | State |
-------------|----------|-----|------|
1 v49       | 10.1.49.2 | OSPF | 21   |
2 v12       | 10.1.12.2 | OSPF | 21   |
3 v11       | 10.1.11.2 | OSPF | 21   |
4 v10       | 10.1.10.2 | OSPF  | 00   |

OSPF Area 0x00000041 ASBR Routes 1:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Mask</th>
<th>Path_Cost</th>
<th>Type2_Cost</th>
<th>Path_Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.65.12.1</td>
<td>10.255.255.255</td>
<td>1</td>
<td>0</td>
<td>Intra</td>
</tr>
</tbody>
</table>

Adv_Router | Link_State | Dest_Type | State | Tag | Flags |
-------------|------------|-----------|-------|-----|-------|
10.65.12.1  | 10.65.12.1  | Asbr      | Valid  | 0   | 6000  |

Paths Out_Port | Next_Hop | Type | State |
-------------|----------|-----|------|
1 v204      | 10.65.5.251 | OSPF | 21   |
2 v201      | 10.65.2.251 | OSPF | 20   |
3 v202      | 10.65.3.251 | OSPF | 20   |
4 v205      | 10.65.6.251 | OSPF  | 00   |

OSPF Area Summary Routes 1:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Mask</th>
<th>Path_Cost</th>
<th>Type2_Cost</th>
<th>Path_Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.65.0.0</td>
<td>10.255.0.0</td>
<td>0</td>
<td>0</td>
<td>Inter</td>
</tr>
</tbody>
</table>

Adv_Router | Link_State | Dest_Type | State | Tag | Flags |
-------------|------------|-----------|-------|-----|-------|
10.1.10.1   | 0.0.0.0     | Network   | Valid  | 0   | 0000  |

Paths Out_Port | Next_Hop | Type | State |
-------------|----------|-----|------|
1 1/1       | 0.0.0.0   | DIRECT | 00   |

OSPF Regular Routes 208:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Mask</th>
<th>Path_Cost</th>
<th>Type2_Cost</th>
<th>Path_Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.10.0</td>
<td>10.255.255.252</td>
<td>1</td>
<td>0</td>
<td>Intra</td>
</tr>
</tbody>
</table>

Adv_Router | Link_State | Dest_Type | State | Tag | Flags |
-------------|------------|-----------|-------|-----|-------|
10.1.10.1   | 10.1.10.2   | Network   | Valid  | 0   | 0000  |

Paths Out_Port | Next_Hop | Type | State |
-------------|----------|-----|------|
1 v10       | 0.0.0.0   | OSPF  | 00   |

Destination | Mask            | Path_Cost | Type2_Cost | Path_Type |
-------------|-----------------|-----------|------------|-----------|
10.1.11.0   | 10.255.255.252 | 1         | 0          | Intra     |

Adv_Router | Link_State | Dest_Type | State | Tag | Flags |
-------------|------------|-----------|-------|-----|-------|
10.1.10.1   | 10.1.11.2   | Network   | Valid  | 0   | 0000  |

Paths Out_Port | Next_Hop | Type | State |
-------------|----------|-----|------|
1 v11       | 0.0.0.0   | OSPF  | 00   |

show ip ospf redistribute route

Syntax: show ip ospf redistribute route [ip-addr ip-mask]
• **ip-addr** - Specifies a destination IP address for which to display route entries.
• **ip-mask** - Specifies the route mask.

This command displays routes that have been redistributed into OSPF.

Brocade# show ip ospf redistribute route
10.3.0.0 10.255.0.0 static
10.1.0.0 10.255.0.0 static
10.11.61.0 10.255.255.0 connected
10.1.0.0 10.255.0.0 static

In this example, four routes have been redistributed. Three of the routes were redistributed from static IP routes and one was redistributed from a directly-connected IP route.

To display route redistribution for a specific IP address and mask, enter the following command as shown in the following example.

Brocade# show ip ospf redistribute route 10.1.0.0 10.255.0.0
10.1.0.0 10.255.0.0 static

**show ip ospf database**

**Syntax:** `show ip ospf database`

This command displays the OSPF database, as shown in the following example.

Brocade# show ip ospf database
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
0               Rtr  10.21.21.21     10.21.21.21     80000006 338  0xcd13 Done
LSA Header:  options: -------E-, seq-nbr: 0x80000006, length: 60, flags:------EB
  link id = 10.31.31.31, link data = 10.50.50.10, type = virtual(4)
  tos count = 0, tos0_metric = 1
  link id = 10.10.10.10, link data = 10.10.10.10, type = transit(2)
  tos count = 0, tos0_metric = 1
  link id = 10.20.20.10, link data = 10.20.20.10, type = transit(2)
  tos count = 0, tos0_metric = 1

Network LSA:
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
0               Net 10.20.20.10    10.21.21.21     80000002 353  0x6285 Done
LSA Header:  age: 426, options: -------P--, seq-nbr: 0x80000002, length: 36
NetworkMask: 255.255.255.0
attached router: 10.21.21.21
attached router: 10.11.11.11

NSSA LSA:
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
2               NSSA 10.0.0.0         10.130.130.3   80000001 426  0x780b Done
LSA Header:  age: 426, options: -------P--, seq-nbr: 0x80000001, length: 36
NetworkMask: 255.255.255.0
TOS 0:  metric_type: 2, metric: 10
forwarding_address: 10.30.30.10
external_route_tag: 0

AS-external LSA:
Index Age  LS ID           Router Netmask Metric  Flag Fwd Address SyncState
1     1064 10.1.1.0         10.21.21.21     ffffff00 0000000a 0000 0.0.0.0 Done
LSA Header:  age: 1064, options: -------E-, seq-nbr: 0x800000001, length: 36
NetworkMask: 255.255.255.0
TOS 0:  metric_type: 2, metric: 10
**OSPF**

```
forwarding_address: 0.0.0.0
external_route_tag: 0
```

**show ip ospf database external-link-state**

**Syntax:**
```
show ip ospf database external-link-state [advertise num | extensive | link-state-id ip-addr | router-id ip-addr | sequence-number num(Hex)]
```

- **advertise num** - Displays the hexadecimal data in the specified LSA packet. The `num` variable identifies the LSA packet by its position in the router’s External LSA table. Enter the `show ip ospf database external-link-state` command to display the table.
- **extensive** - Displays the LSAs in decrypted format.

**NOTE**
The `extensive` option displays the entire database and cannot be used in combination with other display options.

- **link-state-id ip-addr** - Displays the External LSAs for the LSA source for the specified IP address.
- **router-id ip-addr** - Shows the External LSAs for the specified OSPF router.
- **sequence-number num(Hex)** - Displays the External LSA entries for the specified hexadecimal LSA sequence number.

This command displays external link state information, as shown in the following example.

```
Brocade# show ip ospf database external-link-state
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
0               Rtr  10.21.21.21     10.21.21.21     80000006 338  0xcd13 Done
LSA Header:  options: -------E-, seq-nbr: 0x80000006, length: 60, flags:-----EB
link id = 10.31.31.31, link data = 10.50.50.10, type = virtual(4)
tos count = 0, tos0_metric = 1
link id = 10.10.10.10, link data = 10.10.10.10, type = transit(2)
tos count = 0, tos0_metric = 1
link id = 10.20.20.10, link data = 10.20.20.10, type = transit(2)
tos count = 0, tos0_metric = 1
Network LSA:
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
0               Net 10.20.20.10    10.21.21.21     80000002 353  0x6285 Done
LSA Header:  options: -------E-, seq-nbr: 0x80000002, length: 32
NetworkMask: 255.255.255.0
attached router: 10.21.21.21
attached router: 10.11.11.11
NSSA LSA:
Area ID         Type LS ID           Adv Rtr         Seq(Hex) Age  Cksum  SyncState
2               NSSA 10.0.0.0         10.130.130.3   80000001 426  0x780b Done
LSA Header:  age: 426, options: ------P---, seq-nbr: 0x80000001, length: 36
NetworkMask: 255.255.255.0
TOS: 0: metric_type: 2, metric: 10
forwarding_address: 10.30.30.10
external_route_tag: 0
AS-external LSA:
Index Age  LS ID           Router     Netmask  Metric   Flag Fwd Address SyncState
1     1064 10.1.1.0     10.21.21.21  fffff00 0000000a 0000 0.0.0.0 Done
LSA Header:  age: 1064, options: ------E-, seq-nbr: 0x80000001, length: 36
```
NetworkMask: 255.255.255.0
TOS 0: metric_type: 2, metric: 10
forwarding_address: 0.0.0.0
external_route_tag: 0

show ip ospf database database-summary

Syntax: show ip ospf database database-summary

This command displays database summary information, as shown in the following example.

<table>
<thead>
<tr>
<th>Area ID</th>
<th>Router</th>
<th>Network</th>
<th>Sum-Net</th>
<th>Sum-ASBR</th>
<th>NSSA-Ext</th>
<th>Opq-Area</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0.0.0</td>
<td>104</td>
<td>184</td>
<td>19</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>349</td>
</tr>
<tr>
<td>AS External</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>308</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>184</td>
<td>19</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>657</td>
</tr>
</tbody>
</table>

show ip ospf database link-state


- **advertise num** - Displays the hexadecimal data in the specified LSA packet. The *num* variable identifies the LSA packet by its position in the router LSA table. To determine an LSA packet’s position in the table, enter the show ip ospf database link-state command to display the table.
- **asbr** - Displays the link state by ASBR link.
- **ip-addr** - Displays the link state ID.
- **[adv-router ip-addr]** - Displays the link state by advertising router.
- **extensive** - Displays the LSAs in decrypted format.

**NOTE**
The **extensive** option displays the entire database and cannot be used in combination with other display options.

- **link-state-id ip-addr** - Displays the LSAs for the LSA source for the specified IP address.
- **network** - Shows network LSAs.
- **nssa** - Shows NSSA LSAs.
- **router** - Displays LSAs by router link.
- **router-id ip-addr** - Shows the LSAs for the specified OSPF router.
- **self-originate** - Shows self-originated LSAs.
- **sequence-number num(Hex)** - Displays the LSA entries for the specified hexadecimal LSA sequence number.
- **summary** - Shows summary information.

This command displays database link state information, as shown in the following example.

<table>
<thead>
<tr>
<th>Area ID</th>
<th>Type LS ID</th>
<th>Adv Rtr</th>
<th>Seq(Hex)</th>
<th>Age</th>
<th>Cksum</th>
<th>SyncState</th>
</tr>
</thead>
</table>

LSA Header: options: -------E-, seq-nbr: 0x80000006, length: 60, flags:-----EB link id = 10.31.31.31, link data = 10.50.50.10, type = virtual(4)
tos count = 0, tos0_metric = 1
link id = 10.10.10.10, link data = 10.10.10.10, type = transit(2)
tos count = 0, tos0_metric = 1
link id = 10.20.20.10, link data = 10.20.20.10, type = transit(2)
tos count = 0, tos0_metric = 1

Network LSA:
Area ID    Type LS ID    Adv Rtr         Seq(Hex) Age   Cksum  SyncState
0          Net 10.20.20.10  10.21.21.21  80000002 353  0x6285 Done
LSA Header: options: -------E-, seq-nbr: 0x80000002, length: 32
NetworkMask: 255.255.255.0
attached router: 10.21.21.21
attached router: 10.11.11.11

NSSA LSA:
Area ID    Type LS ID    Adv Rtr         Seq(Hex) Age   Cksum  SyncState
2          NSSA 10.0.0.0    10.130.130.3  80000001 426  0x780b Done
LSA Header: age: 426, options: -----P---, seq-nbr: 0x80000001, length: 36
NetworkMask: 255.255.255.0
TOS 0:     metric_type: 2, metric: 10
forwarding_address: 10.30.30.10
external_route_tag: 0

AS-external LSA:
Index Age  LS ID    Router         Netmask  Metric   Flag  Fwd Address  SyncState
SyncState
1     1064 10.1.1.0    10.21.21.21    ffffff00 0000000a 0000 0.0.0.0 Done
LSA Header: age: 1064, options: -------E-, seq-nbr: 0x80000001, length: 36
NetworkMask: 255.255.255.0
TOS 0:     metric_type: 2, metric: 10
forwarding_address: 0.0.0.0
external_route_tag: 0

show ip ospf border-routers
Syntax: show ip ospf border-routers [ip-addr]

• ip-addr - Displays the ABR and ASBR entries for the specified IP address.
This command displays OSPF ABR and ASBR information, as shown in the following example.

Brocade# show ip ospf border-routers
router ID    router type next hop router    outgoing interface    Area
1     1.65.12.1    ABR     10.1.49.2    v49         0
1     1.65.12.1    ABR     10.1.49.2    v49         0
1     1.65.12.1    ABR     10.65.2.251    v201        65
1     1.65.12.1    ASBR    10.65.2.251    v201        65

show ip ospf trap
Syntax: show ip ospf trap
All traps are enabled by default when you enable OSPF. This command displays the state of each OSPF trap.

Brocade# show ip ospf trap
Interface State Change Trap: Enabled
Virtual Interface State Change Trap: Enabled
Neighbor State Change Trap: Enabled
Virtual Neighbor State Change Trap: Enabled
Interface Configuration Error Trap: Enabled
Virtual Interface Configuration Error Trap: Enabled
Interface Authentication Failure Trap: Enabled
Virtual Interface Authentication Failure Trap: Enabled
Interface Receive Bad Packet Trap: Enabled
Virtual Interface Receive Bad Packet Trap: Enabled
Interface Retransmit Packet Trap: Disabled
Virtual Interface Retransmit Packet Trap: Disabled
Originate LSA Trap: Disabled
Originate MaxAge LSA Trap: Disabled
Link State Database Overflow Trap: Disabled
Link State Database Approaching Overflow Trap: Disabled

show run

Syntax: show run

This command displays OSPF virtual neighbor and virtual link information, as shown in the following example.

Brocade# show run
Current configuration:
ver V2.2.1T143
module 1 rx-bi-1g-24-port-fiber
module 2 rx-bi-10g-4-port
module 6 rx-bi-10g-4-port
module 7 rx-bi-1g-24-port-copper
!
no spanning-tree
!
vlan 1 name DEFAULT-VLAN
!
clock summer-time
clock timezone us Pacific
hostname R11-RX8
router ospf
   area 2
   area 1
   area 1 virtual-link 10.1.1.10

show ip ospf virtual neighbor

Syntax: show ip ospf virtual neighbor [num]

The num variable specifies the index entry of the neighbors.
This command displays OSPF virtual neighbor information, as shown in the following example.

Brocade# show ip ospf virtual neighbor

<table>
<thead>
<tr>
<th>Indx</th>
<th>Transit Area</th>
<th>Router ID</th>
<th>Neighbor address</th>
<th>options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>10.1.1.10</td>
<td>135.14.1.10</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>Address</th>
<th>state</th>
<th>events</th>
<th>count</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/2</td>
<td>10.11.1.27</td>
<td>FULL</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

show ip ospf virtual link

Syntax: show ip ospf virtual link [num]

- num - Displays the table beginning at the specified entry number.

This command displays OSPF virtual link information, as shown in the following example.

Brocade# show ip ospf virtual link

<table>
<thead>
<tr>
<th>Indx</th>
<th>Transit Area</th>
<th>Router ID</th>
<th>Transit(sec)</th>
<th>Retrans(sec)</th>
<th>Hello(sec)</th>
<th>Dead(sec)</th>
<th>events</th>
<th>state</th>
<th>Authentication-Key</th>
<th>Authentication-Key-Id</th>
<th>Authentication-Key-Activation-Wait-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>10.1.1.10</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
<td>ptr2ptr</td>
<td>None</td>
<td>None</td>
<td>300</td>
</tr>
</tbody>
</table>

show ip ospf database grace-link-state

Syntax: show ip ospf database grace-link-state

This command displays Type 9 graceful LSAs, as shown in the following example.

Brocade# show ip ospf database grace-link-state

<table>
<thead>
<tr>
<th>Area</th>
<th>Interface</th>
<th>Adv Rtr</th>
<th>Age</th>
<th>Seq(Hex)</th>
<th>Prd</th>
<th>Rsn</th>
<th>Nbr Intf</th>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>eth 1/2</td>
<td>10.2.2.2</td>
<td>7</td>
<td>80000001</td>
<td>60</td>
<td>SW</td>
<td>10.1.1.2</td>
<td></td>
</tr>
</tbody>
</table>

show ip ospf debug

Syntax: show ip ospf debug

This command generates descriptive information about OSPF activity, as shown in the following example.

Brocade# show ip ospf debug

External LSA Counter 1
Timer enable 1, ls counter 5, ticks/sec 10, curtime 1167, md5_seq 0
sptr_area_list 0x0b10002c, import_routes 1
build_routing_table 0, is pending 0, ospf_spf_pending_list_fwd 0
route_calculation_in_progress 0
ospf->osspf_schedule_build_wait_time 0
SPF build timers: last end 896, scheduled 821, init 863, run 821
route_calc_process_take_semaphore 6
process_redis_events 0, ospf_flush_cache_for_new_route 0
originate_ext_lsa_counts 2, ospfOriginNewLsas 20
*ospf->of_max_one_second_timer_value 0, ospf->of_one_second_timer_value 0
*ospf->of_max_redis_timer_value 0, ospf->of_redis_timer_value 0
ospf->of_max_r_cal_time_value 0 0 0 0 0 0 0
of_max_change_ext_route_fwd_addr_time_value
ospf->of_max_originate_external_lsa_time_value 0
show ip ospf debug memory

Syntax: show ip ospf debug memory

This command displays information about OSPF memory pools. Command output resembles the following example.

Brocade# show ip ospf debug memory
OSPF Memory Use 1302832

<table>
<thead>
<tr>
<th>Pid</th>
<th>SBlock</th>
<th>TBlocks</th>
<th>UBlocks</th>
<th>FBlocks</th>
<th>EBlocks</th>
<th>SAddress</th>
<th>CAddress</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>00000000</td>
<td>00000000</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>2000</td>
<td>30</td>
<td>1970</td>
<td>0</td>
<td>07ab7b48</td>
<td>07ab8070</td>
</tr>
<tr>
<td>2</td>
<td>56</td>
<td>4000</td>
<td>25</td>
<td>3975</td>
<td>0</td>
<td>0921a8a0</td>
<td>0921ae18</td>
</tr>
<tr>
<td>3</td>
<td>132</td>
<td>32</td>
<td>10</td>
<td>22</td>
<td>0</td>
<td>07ab7d8</td>
<td>07ab7d8</td>
</tr>
<tr>
<td>4</td>
<td>260</td>
<td>16</td>
<td>2</td>
<td>14</td>
<td>0</td>
<td>07ab8b98</td>
<td>07ab9c17</td>
</tr>
<tr>
<td>5</td>
<td>516</td>
<td>32</td>
<td>4</td>
<td>28</td>
<td>0</td>
<td>0925cfc0</td>
<td>0925e482</td>
</tr>
<tr>
<td>6</td>
<td>1504</td>
<td>32</td>
<td>0</td>
<td>32</td>
<td>0</td>
<td>0b100028</td>
<td>0b1273f1</td>
</tr>
<tr>
<td>7</td>
<td>53571</td>
<td>16</td>
<td>3</td>
<td>13</td>
<td>0</td>
<td>00000000</td>
<td>00000000</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>00000000</td>
<td>00000000</td>
</tr>
</tbody>
</table>

Total Memory blocks allocated 75

Mega Memory List

Pool Id | Total Mega blocks | Errors |
--------|------------------|--------|
1        | 1                | 0      |
2        | 1                | 0      |
3        | 1                | 0      |
4        | 1                | 0      |
5        | 1                | 0      |
6        | 1                | 0      |
7        | 1                | 0      |
8        | 1                | 0      |

OSPF Main Routing Table: 078dd444
code_count 6, top 0x078dd5b4, default_valid 0, default_route 0xffffffff
Table private pool:
init#=4096 unit_s=36 total=4096 in_use=5 fail=0 upper=no-limit min_mem=0

<table>
<thead>
<tr>
<th>UBlocks</th>
<th>EBlocks</th>
<th>Total</th>
<th>PType</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>OSPF_MEMORY_POOL_ANY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>msg_q_length</th>
<th>msg_q_high_mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*ospf->of_max_process_adver_time_value 0, of_process_adver_time_value 0
*ospf->of_max_find_lsa_time_value 0, ospf->of_find_lsa_time_value 0
*ospf->of_max_find_database_time_value 0
*ospf->of_max_find_ls_request_time_value 0, ospf->of_count_on_finding_lsa 0
1 3 0 14 OSPF_MEMORY_POOL_ROUTER_LINK_ADVERTISEMENT
2 1 0 2 OSPF_MEMORY_POOL_NETWORK_LINK_ADVERTISEMENT
3 15 0 17 OSPF_MEMORY_POOL_SUMMARY_LINK_ADVERTISEMENT
4 1 0 2 OSPF_MEMORY_POOL_EXTERNAL_LINK_ADVERTISEMENT
5 0 0 0 OSPF_MEMORY_POOL_GRACE_LINK_ADVERTISEMENT
6 5 0 9 OSPF_MEMORY_POOL_OPAQUE_AREA_ADVERTISEMENT
7 0 0 1 OSPF_MEMORY_POOL_LS_DATABASE_SUMMARY
8 0 0 10 OSPF_MEMORY_POOL_LS_DATABASE_NODE
9 0 0 30 OSPF_MEMORY_POOL_SHORTEST_PATH_NODE

Total Memory blocks allocated 75

Mega Memory List
Pool Id = 1, Total Mega blocks = 1 Errors = 0
Pool Id = 2, Total Mega blocks = 1 Errors = 0
Pool Id = 3, Total Mega blocks = 1 Errors = 0
Pool Id = 4, Total Mega blocks = 1 Errors = 0
Pool Id = 5, Total Mega blocks = 1 Errors = 0
Pool Id = 6, Total Mega blocks = 1 Errors = 0
Pool Id = 7, Total Mega blocks = 1 Errors = 0
Pool Id = 8, Total Mega blocks = 1 Errors = 0

OSPF Main Routing Table: 078dd444
node_count 6, top 0x078dd5b4, default_valid 0, default_route 0xffffffff
init#=4096 unit_s=36 total=4096 in_use=5 fail=0 upper=no-limit min_mem=0

Mega Memory List
Pool Id = 1, Total Mega blocks = 1 Errors = 0
Pool Id = 2, Total Mega blocks = 1 Errors = 0
Pool Id = 3, Total Mega blocks = 1 Errors = 0
Pool Id = 4, Total Mega blocks = 1 Errors = 0
Pool Id = 5, Total Mega blocks = 1 Errors = 0
Pool Id = 6, Total Mega blocks = 1 Errors = 0
Pool Id = 7, Total Mega blocks = 1 Errors = 0
Pool Id = 8, Total Mega blocks = 1 Errors = 0

OSPF Main Routing Table: 078dd444
node_count 6, top 0x078dd5b4, default_valid 0, default_route 0xffffffff
init#=4096 unit_s=36 total=4096 in_use=5 fail=0 upper=no-limit min_mem=0

UBlocks EBlocks Total PType
0 0 0 0 OSPF_MEMORY_POOL_ANY
1 3 0 14 OSPF_MEMORY_POOL_ROUTER_LINK_ADVERTISEMENT
2 1 0 2 OSPF_MEMORY_POOL_NETWORK_LINK_ADVERTISEMENT
3 15 0 17 OSPF_MEMORY_POOL_SUMMARY_LINK_ADVERTISEMENT
4 1 0 2 OSPF_MEMORY_POOL_EXTERNAL_LINK_ADVERTISEMENT
5 0 0 0 OSPF_MEMORY_POOL_GRACE_LINK_ADVERTISEMENT
6 5 0 9 OSPF_MEMORY_POOL_OPAQUE_AREA_ADVERTISEMENT
7 0 0 1 OSPF_MEMORY_POOL_LS_DATABASE_SUMMARY
8 0 0 10 OSPF_MEMORY_POOL_LS_DATABASE_NODE
9 0 0 30 OSPF_MEMORY_POOL_SHORTEST_PATH_NODE
10 8 0 8 OSPF_MEMORY_POOL_OSPF_ROUTE_INFO
11 6 0 6 OSPF_MEMORY_POOL_OSPF_MAIN_ROUTE_ENTRY
12 0 0 0 OSPF_MEMORY_POOL_OSPF_SUMMARY_ROUTE_ENTRY
13 0 0 0 OSPF_MEMORY_POOL_OSPF_EXT_SUMMARY_ROUTE_ENTRY
14 1 0 1 OSPF_MEMORY_POOL_OSPF_ABR_ROUTE_ENTRY
15 1 0 1 OSPF_MEMORY_POOL_OSPF_ASBR_ROUTE_ENTRY
16 1 0 1 OSPF_MEMORY_POOL_OSPF_EXTERNAL_ROUTE
17 0 0 0 OSPF_MEMORY_POOL_ADVERTISEMENT_NODE
18 25 0 35 OSPF_MEMORY_POOL_LS_DATABASE_ENTRY
19 0 0 2 OSPF_MEMORY_POOL_LS_REQUEST
20 0 0 4 OSPF_MEMORY_POOL_LS_HEADER_QUEUE
21 0 0 5 OSPF_MEMORY_POOL_NEIGHBOR_LIST
22 0 0 0 OSPF_MEMORY_POOL_TRANSIT_AREA_ENTRY
23 0 0 29 OSPF_MEMORY_POOL_NEXT_HOP_BLOCK
show ip ospf debug misc

Syntax: show ip ospf debug misc

This command displays miscellaneous OSPF information, including router counts and SPF calculations, as shown in the following example.

Brocade# show ip ospf debug misc
Type-5 Forwarding Addr Count : 0
Imported Route Count :  1
External Route Flap Count :  0
NSSA Route Flap Count :  0
External Lsa Count :  1
NSSA Lsa Count :  0
OSPF Recalc Statistics:
    phase_number: 0, area_id: 0xffffffff, next_chunk: 0x00000000
    duration(50ms):  0
MAX_AGE EXT lsa count 0, total EXT lsa count 1

show ip ospf debug graceful-restart

Syntax: show ip ospf debug graceful-restart

This command displays information about OSPF graceful restart events, as shown in the following example.

Brocade# show ip ospf debug graceful-restart
MP active: 1, standby up 0, nbr (1 0), vi (0, 0)
OSPF graceful-restart: enable 0, helper 1, timer 120/0, count 0, restarting 0
OSPF graceful-restart helper:
    Neighbor             ID      Area   Interface State Grace Helper Time
    10.1.1.1           10.1.1.1     0      1/1      8       0      0 0
OSPF graceful-restart LSA:
    Area Interface         ID      Type Age   Max Seq        Interface Option

show ip ospf debug filtered-lsa area

Syntax: show ip ospf debug filtered-lsa area [area_ID | area_IP] [in | out]

- **area_ID** - Specifies the area ID.
- **area_IP** - Specifies the area IP address.
- **in** - Displays filtered LSAs in an area in IN direction.
- **out** - Displays filtered LSAs in an area in OUT direction.

This command displays the type-3 filtered LSAs for an area either in IN direction or OUT direction. The command output resembles the following example

Brocade# show ip ospf debug filtered-lsa area 0 in
Prefix List Name: 233deny
Direction : IN
Area : 0
Filtered LSA list:
Prefix       Mask
10.3.0.0     10.255.252.0

Clearing OSPF neighbors
You can clear all OSPF neighbors or a specified OSPF neighbor using the following command.

clear ip ospf neighbor

Syntax: clear ip ospf neighbor [all | ip-address]

- all - Clears all of the OSPF neighbors on the router.
- ip-address - Clears a specific OSPF neighbor.

OSPF debug commands
The following section describes the OSPF debug commands and shows examples of output from these commands.

degub ip ospf


- A.B.C.D - Displays OSPF information for a specific IP address.
- adj - Displays information about IP OSPF adjacencies.
- all-vrfs - Displays OSPF information specific to all VRFs.
- bfd - Displays information about OSPF BFD events.
- error - Displays IP OSPF errors.
- events - Displays IP OSPF events.
- flood - Displays IP OSPF flood information.
- graceful-restart - Displays information about graceful restarts.
- log-debug-message - Displays log-debug messages.
- log-empty-lsa - Displays information about empty link state advertisements (LSAs).
- lsa-filtering - Displays type-3 LSAs as and when a router generates and filters these LSAs.
- lsa-generation - Displays information about LSAs.
- max-metric - Displays information about a max-metric configuration.
- packet - Displays IP OSPF packet information.
- retransmission - Displays IP OSPF retransmission information.
- route ip-addr - Displays information about IP OSPF routes.
- sham-link - Displays information about a sham-link configuration.
- shortcuts - Displays information about OSPF shortcuts for IP over MPLS.
- spf - Displays IP OSPF SPF information.
- vrf - Displays OSPF information for the specified VRF.
debug ip ospf

Syntax:  [no] debug ip ospf A.B.C.D

This command generates OSPF debugging information about a specific neighbor. Output indicates state transitions, hello packets received, LSA acknowledgements received, LSA processing and flooding information, and database descriptions, similar to the following example.

Brocade# debug ip ospf 10.1.1.1
OSPF: rvcd
10.1.1.1
OSPF: Neighbor 10.1.1.1, int 1/1, state FULL processing event HELLO_RECEIVED
hello from 10.1.1.1 area 0 on interface 10.1.1.2, state DR, DR 10.1.1.2, BDR
OSPF: Neighbor 10.1.1.1, int 1/1, state FULL processing event ADJACENCY_OK
OSPF: rcv lsa ack from neighbor 10.1.1.1, state FULL
OSPF: rcv LSA ack from 10.1.1.1, type 10, id 10.0.0.7,seq 0x80000009,adv 10.2.2.2,
age 1

debug ip ospf adj

Syntax:  [no] debug ip ospf adj

This command displays information about OSPF adjacencies and authentication, including designated router (DR) and backup designated router (BDR) elections, sent and received hello packets, neighbor state transitions, and database description information. Command output resembles the following example.

Brocade# debug ip ospf adj
OSPF: adjacency events debugging is on
OSPF: rvcd hello from 10.1.1.1 area 0 on interface 10.1.1.2, state DR, DR 0.0.0.0,
BDR 0.0.0.0
OSPF: Neighbor 10.1.1.1, int 1/1, state DOWN processing event HELLO_RECEIVED
OSPF: Neighbor 10.1.1.1 state changed from Down to Initializing - event
HELLO_RECEIVED, intf-type 1
OSPF: Neighbor 10.1.1.1, int 1/1, state INITIALIZING processing event ONE_WAY
OSPF: send hello on area 0 interface 10.2.2.2
OSPF: send hello on area 0 interface 10.1.1.2
OSPF: Neighbor 10.1.1.1, int 1/1, state INITIALIZING processing event
TWO_WAY_RECEIVED
OSPF: establish adjacency with 10.1.1.1
OSPF: DR/BDR election for 10.1.1.2 on 1/1
OSPF: Run interface 10.1.1.2 DR elect, state changed to DR from DR
OSPF: interface (10.1.1.2) state = INTERFACE_DESIGNATED_ROUTER
OSPF: Neighbor 10.1.1.1, int 1/1, state EXCHANGE_START processing event
ADJACENCY_OK
OSPF: 10.1.1.2 Flushing Network LSA if needed as we are not DR anymore, state old
5, new 5
OSPF: elect BDR(backup designated router): Router ID 10.1.1.1 IP interface
10.1.1.1
OSPF: elect DR(designated router): Router ID 10.2.2.2, IP interface 10.1.1.2
OSPF: Neighbor 10.1.1.1 state changed from Initializing to ExStart - event
TWO_WAY_RECEIVED, intf-type 1

debug ip ospf all-vrfs

Syntax:  [no] debug ip ospf all-vrfs

This command enables OSPF debugging for all VPN routing and forwarding activity. Output is similar to that of the debug ip ospf command.
debug ip ospf bfd
Syntax: [no] debug ip ospf bfd
This command displays information about OSPF BFD events.

debug ip ospf error
Syntax: [no] debug ip ospf error
This command reports the receipt of OSPF packets with errors, or mismatches between hello packet options.

CAUTION
If the router receives too many packets with errors, substantial output may be generated and severely affect system performance. To prevent a disruption of system activity, use this command only when network traffic levels are low.

debug ip ospf events
Syntax: [no] debug ip ospf events
This command displays information about internal OSPF events related to configuration or interaction with the standby management processor and interface state transitions. Command output resembles the following example.

Brocade# debug ip ospf events
OSPF: Interface 1/1 (10.1.1.2) state Down processing event Interface Up
OSPF: interface 10.1.1.2 up, state changed to WAITING from Down
OSPF: Interface 1/1 (10.1.1.2) state Waiting processing event Neighbor Change
OSPF: Interface 1/1 (10.1.1.2) state Waiting processing event Backup Seen

debug ip ospf flood
Syntax: [no] debug ip ospf flood
This command displays information about LSA flooding activity. Command output resembles the following example.

Brocade# debug ip ospf flood
OSPF: flooding debugging is on
OSPF: flood LSA Type:1 AdvRtr:10.2.2.2 Age:0 LsId:10.2.2.2
OSPF: flood advertisement throughout a specific area = 00000001
OSPF: flood LSA Type:3 AdvRtr:10.2.2.2 Age:0 LsId:0.0.0.0
OSPF: flood advertisement throughout a specific area = 00000001
OSPF: flood LSA Type:3 AdvRtr:10.2.2.2 Age:0 LsId:0.0.0.0
OSPF: flood advertisement throughout a specific area = 00000003
OSPF: flood LSA Type:3 AdvRtr:10.2.2.2 Age:0 LsId:10.2.2.2

debug ip ospf graceful-restart
Syntax: [no] debug ip ospf graceful-restart
Enable this command to receive information about OSPF graceful restart events, including restart phases, graceful LSA transmit and receive activity, and syslog messages, as shown in the following example.
Brocade# debug ip ospf graceful-restart
Restart Router:
  rw_mbridge_isr is called (cause = 00ff0002)
  rw_isr_active_mp_lost() called
MP Manufacture Info:
  === Manufacturing Information ====
Board Class : 01 (Mgmt)
Foundry Assembly Part Number : 31524-000A
Chassis Type: NI-XMR (ac)
Foundry Serial Number : PR30050521
Date of Manufacture : 255-255-2225
Bench Test Status : UNKNOWN
Burn-in Test Status : UNKNOWN
Manufacturing Deviation : 55555
RNA Number : 5555555555
PCB Revision : 55555
MFG Test : 5555555555
End Time: my_slot = 18, active_mp_slot = 18, standby_mp_slot = 17
  rw_mbridge_isr is called (cause = 00fc0005)
  rw_isr_present is called:
    OLD: prw = 000000fc, fan = 00000000, lp = 0000fe76, snm = 00080000, mnm = 00000000
    NEW: prw = 000000fc, fan = 00000000, lp = 0000fe76, snm = 00080000, mnm = 00000000
  rw_isr_power is called (snapshot = 000000fc)
RW_MBRIDGE_CARD_PRESENT_REG = 0008fe76
RW_MBRIDGE_CARD_POWER_OFF_REG = 00070189
SNM1 presence detected, powering it on
SNM2 presence detected, powering it on
SNM3 presence detected, powering it on
Power on SNM1: Writing 00070189 to RW_MBRIDGE_CARD_POWER_OFF_REG
Power on SNM2: Writing 00070189 to RW_MBRIDGE_CARD_POWER_OFF_REG
Power on SNM3: Writing 00070189 to RW_MBRIDGE_CARD_POWER_OFF_REG
MGMT board temp is: 35.500C 52.625C
Power Supply 1 is Installed (OK)
Power Supply 2 is Installed (OK)
Power Supply 3 is Not Installed (FAILED)
Power Supply 4 is Not Installed (FAILED)
Power Supply 5 is Not Installed (FAILED)
Power Supply 6 is Not Installed (FAILED)
Power Supply 7 is Not Installed (FAILED)
Power Supply 8 is Not Installed (FAILED)
Write 00070189 to RW_MBRIDGE_CARD_POWER_OFF_REG
Module is up in slot 1
Module is up in slot 4
Module is up in slot 8
Module is up in slot 9
All Modules Are Up (4 total)
SYSLOG: Feb 1 23:59:19:<13>XMR1, System: Module up in slot 4
SYSLOG: Feb 1 23:59:19:<13>XMR1, System: Module up in slot 8
SYSLOG: Feb 1 23:59:19:<13>XMR1, System: Module up in slot 9
SYSLOG: Feb 1 23:59:19:<13>XMR1, System: Module up in slot 1
SYSLOG: Feb 1 23:59:19:<13>XMR1, System: Interface ethernet1/1, state up
SYSLOG: Feb 1 23:59:19:<14>XMR1, System: Interface ethernet1/9, state up
SYSLOG: Feb 1 23:59:19:<14>XMR1, System: Interface ethernet1/12, state up
SYSLOG: Feb 1 23:59:19:<14>XMR1, System: Interface ethernet9/1, state up
SYSLOG: Feb 1 23:59:19:<9>XMR1, System: Management module at slot 18 state changed from standby to active
OSPF: switchover handoff done
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 0, auth 0
OSPF: Graceful Restart setup, waiting for 2 (0) peers

SYSLOG: Feb 1 23:59:20:<14>XMR1, System: Interface ethernetmgmt1, state up
ipc_send_mp_red_active_boot_info: reboot_needed = 0
Start code flash synchronization to standby MP.
Code flash synchronization to standby MP is done.
OSPF: GR no waiting from neighbor 10.0.0.2, interface state Waiting, DR 10.0.0.2
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 116 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 115 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 115 sec
OSPF: GR no waiting from neighbor 10.0.0.2, interface state Waiting, DR 10.0.0.2
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 115 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 115 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 114 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 113 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 112 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 112 sec
Start running config synchronization to standby MP.
Running config synchronization to standby MP is done.
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 112 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 112 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 111 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 111 sec
OSPF: Graceful Restart (1) SPF waiting for 1 (0) neighbors, 110 sec
OSPF: Graceful Restart all none-VI neighbors back to FULL state
OSPF: GR restart phase neighbor connect Done, neighbor 0 (0), abort 0
OSPF: Graceful Restart phase neighbor full Done
OSPF: Graceful Restart phase VI neighbor full done
OSPF: restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: Graceful Restart reoriginate router LSA, restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: Graceful Restart originated router/network LSAs
OSPF: Graceful restart: start SPF
RTM: switch over done for protocol ospf
RTM: switch over done for ALL protocol
OSPF: Graceful Restart phase originate lsa DONE
OSPF: originate grace LSA, interface 10.1.1.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 3600, auth 0
OSPF: originate grace LSA, interface 10.0.0.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 3600, auth 0
OSPF: originate grace LSA, interface 10.0.0.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 3600, auth 0
OSPF: originate grace LSA, interface 10.0.0.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 3600, auth 0
OSPF: Graceful Restart phase flush lsa DONE
Standby MP is ready
OSPF: GR restart phase neighbor connect Done, neighbor 0 (0), abort 0
OSPF: Graceful Restart phase neighbor full Done
OSPF: Graceful Restart phase VI neighbor full done
OSPF: restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: Graceful Restart reoriginate router LSA, restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: restart_detected = OSPF_RESTART_STATE_SPF_ORIGINATE_LSA
OSPF: Graceful Restart originated router/network LSAs
OSPF: Graceful restart: start SPF
RTM: switch over done for protocol ospf
RTM: switch over done for ALL protocol
OSPF: Graceful Restart phase originate lsa DONE
OSPF: originate grace LSA, interface 10.1.1.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.1.1.1, age 3600, auth 0
OSPF: originate grace LSA, interface 10.0.0.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 3600, auth 0
OSPF: originate grace LSA, interface 10.0.0.1
OSPF: send_grace_ls to 224.0.0.5, intf addr 10.0.0.1, age 3600, auth 0
OSPF: Graceful Restart phase originate lsa DONE
Standby MP is ready

The following example shows output from a graceful restart on a helper router.

OSPF: rcv GRACE LSA from 10.0.0.1, age 0, Adv 10.1.1.1
OSPF: install new GraceLSA, int 0, neighbor 10.0.0.1, age 0
OSPF: rcv Grace_LSA from 10.0.0.1, area 0
OSPF: neighbor 10.0.0.1 entering graceful restart state, timer 120, lsa age 0,
max 120, helping 0
OSPF: flood grace LSA, AdvRtr:10.1.1.1, Age:0
OSPF: rcv GRACE LSA from 10.0.0.1, age 0, Adv 10.1.1.1

SYSLOG: Dec 15 17:29:43:<13>XMR2, OSPF: nbr state changed, rid 10.2.2.2, nbr addr
10.0.0.1, nbr rid 10.1.1.1, state full
OSPF: rcv GRACE LSA from 10.0.0.1, age 3600, Adv 10.1.1.1
OSPF: LSA flush rcvd Type:9 AdvRtr:10.1.1.1 LsId:10.0.0.0
OSPF: install new GraceLSA, int 0, neighbor 10.0.0.1, age 3600
OSPF: rcv Grace_LSA from 10.0.0.1, area 0
OSPF: neighbor 10.0.0.1 exiting graceful restart state, timer 120, lsa age 3600,
max 3600,
helping 0
OSPF: flood grace LSA, AdvRtr:10.1.1.1, Age:3600
OSPF: age out GraceLSA, from 10.1.1.1, age 3600
OSPF: remove grace LSA, age 3600

**debug ip ospf log-debug-message**

**Syntax:** `[no] debug ip ospf log-debug-message`

This command logs instances when large (greater than MTU) LSA update messages are sent or received. Command output resembles the following example.

Brocade# debug ip ospf log-debug-message
OSPF: debug-message logging debugging is on
10.1.1.2, nbr rid 10.15.15.15, state down
intf addr 10.1.1.1, state designated router
10.101.1.2, nbr rid 10.15.15.15, state down
intf addr 10.101.1.1, state designated router

debug ip ospf log-empty-lsa

Syntax: [no] debug ip ospf log-empty-lsa

This command logs instances when empty or truncated LSA update messages are sent or received. Command output resembles the following example.

Brocade# debug ip ospf log-empty-lsa
OSPF: empty-LSA logging debugging is on
10.1.1.2, nbr rid 10.15.15.15, state down
SYSLOG: <13>Dec 10 23:56:45 R3 OSPF: interface state changed, rid 10.13.13.13, 
intf addr 10.1.1.1, state designated router
10.101.1.2, nbr rid 10.15.15.15, state down
SYSLOG: <13>Dec 10 23:56:45 R3 OSPF: interface state changed, rid 10.13.13.13, 
intf addr 10.101.1.1, state designated router
intf addr 10.1.1.1, state backup designated router
10.1.1.2, nbr rid 10.15.15.15, state full
SYSLOG: <13>Dec 10 23:56:47 R3 OSPF: intf rcvd bad pkt: Cannot associate neighbor, 
rid 10.13.13.13, intf addr 10.101.1.1, pkt size 120, checksum 41856, pkt src addr 
10.101.1.2, pkt type link state update
SYSLOG: <13>Dec 10 23:56:48 R3 OSPF: intf rcvd bad pkt: Cannot associate neighbor, 
rid 10.13.13.13, intf addr 10.101.1.1, pkt size 60, checksum 48577, pkt src addr 
10.101.1.2, pkt type link state update
SYSLOG: <13>Dec 10 23:56:52 R3 OSPF: intf rcvd bad pkt: Cannot associate neighbor, 
rid 10.13.13.13, intf addr 10.101.1.1, pkt size 88, checksum 50589, pkt src addr 
10.101.1.2, pkt type link state update

debug ip ospf lsa-filtering

Syntax: [no] debug ip ospf lsa-filtering

This command displays type-3 LSAs as and when a router generates and filters these LSAs as shown in the following example.

Brocade# debug ip ospf lsa-filtering
Jan 18 17:14:39 Prefix Fitering IN Prefix = 10.0.10.0, Mask = 255.255.255.0, Area 
= 0
Jan 18 17:14:39 Action: DENY
Jan 18 17:14:39 Prefix Fitering IN Prefix = 10.30.30.0, Mask = 255.255.255.0, Area 
= 0
Jan 18 17:14:39 Action: DENY
Jan 18 17:14:39 Prefix Fitering IN Prefix = 10.30.31.0, Mask = 255.255.255.0, Area 
= 0
Jan 18 17:14:39 Action: PERMIT

debug ip ospf lsa-generation

Syntax: [no] debug ip ospf lsa-generation
This command generates information about LSAs in output similar to the following example.

Brocade# debug ip ospf lsa-generation
Jan 15 16:35:25 OSPF: install a new lsa, type 3, ls_id 0.0.0.0, age 0, seq 80000003 area-id 10
Jan 15 16:35:25 OSPF: NSR : Sync node add, type 3, ls_id 0.0.0.0, age 0, seq 80000003
Jan 15 16:35:25 OSPF: originate router LSA, area 0
Jan 15 16:35:25 OSPF: install a new lsa, type 1, ls_id 10.2.2.2, age 0, seq 80000004 area-id 0
Jan 15 16:35:25 OSPF: NSR : Sync node add, type 1, ls_id 10.2.2.2, age 0, seq 80000004
Jan 15 16:35:25 OSPF:NSR Sync ACK received for LSA
Jan 15 16:35:25 OSPF:ls_header.id 0.0.0.0 type 3 ToBesyncedState 2
Jan 15 16:35:25 OSPF:NSR Sync ACK received for LSA
Jan 15 16:35:25 OSPF:ls_header.id 10.2.2.2 type 1 ToBesyncedState 2
Jan 15 16:35:25 OSPF: install a new lsa, type 3, ls_id 10.0.0.0, age 0, seq 80000001 area-id 1
Jan 15 16:35:25 OSPF: NSR : Sync node add, type 3, ls_id 10.0.0.0, age 0, seq 80000001
Jan 15 16:35:25 OSPF:NSR Sync ACK received for LSA
Jan 15 16:35:25 OSPF:ls_header.id 10.0.0.0 type 3 ToBesyncedState 2
Jan 15 16:35:25 OSPF: originate external lsa 10.0.0.0 with ffffff00 forwarding address 0.0.0.0
Jan 15 16:35:28 OSPF: install a new lsa, type 5, ls_id 10.0.0.0, age 0, seq 80000001 area-id 0
Jan 15 16:35:28 OSPF: NSR : Sync node add, type 5, ls_id 10.0.0.0, age 0, seq80000001
Jan 15 16:35:29 OSPF:NSR Sync ACK received for LSA
Jan 15 16:35:29 OSPF:ls_header.id 10.0.0.0 type 5 ToBesyncedState2

This output indicates that the sequence number (seq) is a unique identifier for each LSA. When a router initiates an LSA, it includes a sequence number, which is recorded in the link state database of every receiving router. If a router receives an LSA that is already in the database and has the same sequence number, the received LSA is discarded. If the information is the same but the sequence number is greater, the LSA information and new sequence number are entered into the database and the LSA is flooded. Sequence numbers allow LSA flooding to stop when all routers have received the most recent LSA.

**NOTE**
This command can be enabled on the standby MP as well.

**debug ip ospf packet**

**Syntax:** `[no] debug ip ospf packet`

This command when enabled displays all received and transmitted OSPF packets with decoded options and flags. Command output resembles the following example.

Brocade# debug ip ospf packet
  Type:1 Age:1 LSID:10.21.21.21 Adv:10.21.21.21 Options:--------E- Links:0x01, Flags:-Nt-VEB
  Link ID: 0x6a323200, link Data: 0xffffff00 , type 3, TOS 0, metric 1
  Type:1 Age:6 LSID:10.31.31.31 Adv:10.31.31.31 Options:--------E- Links:0x1, Flags:------E
OSPF

Link ID: 0x6a32320a, Link Data: 0x6a32328c

Rid:10.11.11.11 Flags:IMoMa, 00002b43
Rid:10.21.21.21 Flags:IMoMa, 036290e6
Rid:10.11.11.11 Flags:---Sl, 036290e6
   LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:--------E-
   LSType:3, LSID:10.40.40.0 Adv-Router:10.11.11.11 Options:--------E-
   LSType:3, LSID:10.30.30.0 Adv-Router:10.11.11.11 Options:--------E-
Rid:10.21.21.21 Flags:---Ma, 036290e7
   LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:--------E-
   LSType:1, LSID:10.21.21.21 Adv-Router:10.21.21.21 Options:--------E-
Sep 26 06:46:00.973 OSPF: recv from:10.30.30.10 Intf: ve 30 LS-Ack L:144 A:0
Rid:10.130.130.3
   LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:---------
   LSType:3, LSID:10.20.20.0 Adv-Router:10.11.11.11 Options:---------
   LSType:3, LSID:10.50.50.0 Adv-Router:10.11.11.11 Options:---------
   LSType:3, LSID:10.10.10.0 Adv-Router:10.11.11.11 Options:---------
   LSType:3, LSID:10.60.60.0 Adv-Router:10.11.11.11 Options:---------
   LSType:3, LSID:10.40.40.0 Adv-Router:10.11.11.11 Options:---------
Sep 26 06:45:52.549 OSPF: send to:10.0.0.5 Intf: ve 20 Hello L:48 A:0
Rid:10.11.11.11 Options:--------E- DR:10.20.20.10 BDR:10.20.20.140
Sep 26 06:45:53.673 OSPF: recv from:10.10.10.10 Intf: ve 10 Hello L:48 A:0
Rid:10.21.21.21 Options:--------E- DR:10.10.10.10 BDR:10.10.10.140
eb
deb ip ospf packet-hello

Syntax: [no] deb ip ospf packet-hello

This command enables display of sent and received OSPF hello packets.

Brocade# debug ip ospf packet-hello
Sep 26 06:45:52.549 OSPF: send to:10.0.0.5 Intf: ve 20 Hello L:48 A:0
Rid:10.11.11.11 Options:--------E- DR:10.20.20.10 BDR:10.20.20.140
Sep 26 06:45:53.673 OSPF: recv from:10.10.10.10 Intf: ve 10 Hello L:48 A:0
Rid:10.21.21.21 Options:--------E- DR:10.10.10.10 BDR:10.10.10.140
deb ip ospf packet-dd

Syntax: [no] deb ip ospf packet-dd

This command enables display of sent and received OSPF Database Descriptor (DD) packets.

Brocade# debug ip ospf packet-dd
Rid:10.11.11.11 Flags:IMoMa, 00002b43
Rid:10.21.21.21 Flags:IMoMa, 036290e6
Rid:10.11.11.11 Flags:---Sl, 036290e6
   LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:--------E-
   LSType:3, LSID:10.40.40.0 Adv-Router:10.11.11.11 Options:--------E-
   LSType:3, LSID:10.30.30.0 Adv-Router:10.11.11.11 Options:--------E-
Rid:10.21.21.21 Flags:---Ma, 036290e7
LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:--------E-
LSType:1, LSID:10.21.21.21 Adv-Router:10.21.21.21 Options:--------E-

**debug ip ospf packet-lsrequest**

**Syntax:** `[no] debug ip ospf packet-lsrequest`  
This command enables display of sent and received OSPF LS request packets.

Brocade# debug ip ospf packet-lsrequest
Apr 18 11:30:06.705 OSPF: send to:10.2.45.1 Intf:eth 3/5 LS-Req L:60 A:0
Rid:10.2.2.2
  Type:1, LSID:10.1.1.1 Adv:10.2.2.2
  Type:2, LSID:10.2.45.2 Adv:10.2.2.2
  Type:2, LSID:10.2.46.2 Adv:10.2.2.2
Apr 18 11:30:06.705 OSPF: recv from:10.2.45.1 Intf:eth 3/5 LS-Req L:36 A:0
Rid:10.1.1.1
  Type:1, LSID:10.2.2.2 Adv:10.2.2.2

**debug ip ospf packet-lsupdate**

**Syntax:** `[no] debug ip ospf packet-lsupdate`  
This command enables display of sent and received OSPF LS update packets.

Brocade# debug ip ospf packet-lsupdate
Rid:10.21.21.21
  Type:1 Age:1 LSID:10.21.21.21 Adv:10.21.21.21 Options:--------E- Links:0x01,
    Flags:-Nt-VEB
    Link ID: 0x6a323200, link Data: 0xffffff00
    , type 3, TOS 0, metric 1
  Type:1 Age:6 LSID:10.31.31.31 Adv:10.31.31.31 Options:--------E- Links:0x01,
    Flags:------E
    Link ID: 0x6a32320a, link Data: 0x6a32328c

**debug ip ospf packet-lsacknowledge**

**Syntax:** `[no] debug ip ospf packet-lsacknowledge`  
This command enables display of sent and received OSPF LS acknowledge packets.

Brocade# debug ip ospf packet-lsacknowledge
Sep 26 06:46:00.973 OSPF: recv from:10.30.30.10 Intf:ve 30 LS-Ack L:144 A:0
Rid:10.130.130.3
  LSType:1, LSID:10.11.11.11 Adv-Router:10.11.11.11 Options:--------
  LSType:3, LSID:10.20.20.0 Adv-Router:10.11.11.11 Options:--------
  LSType:3, LSID:10.50.50.0 Adv-Router:10.11.11.11 Options:--------
  LSType:3, LSID:10.10.10.0 Adv-Router:10.11.11.11 Options:--------
  LSType:3, LSID:10.60.60.0 Adv-Router:10.11.11.11 Options:--------
  LSType:3, LSID:10.40.40.0 Adv-Router:10.11.11.11 Options:--------

**debug ip ospf retransmission**

**Syntax:** `[no] debug ip ospf retransmission`  
This command generates internal information about OSPF retransmission of LSAs. Command output resembles the following example.
Brocade# debug ip ospf retransmission
OSPF: retransmission debugging is on
OSPF: examine each neighbor and add advertisement to the retransmission list if necessary
OSPF: remove current database copy from all neighbors retransmission lists

debug ip ospf route

Syntax: [no] debug ip ospf route ip-addr

This command generates network-specific information during Dijkstra computation, routing table calculation, and LSA origination. This command is useful for tracking a specific OSPF prefix. Command output resembles the following example.

Brocade# debug ip ospf route 10.1.1.1
OSPF: debug ospf route 10.1.1.1
OSPF: Orig summary LSA to area 0, route 10.1.1.1, type 1, prem 1...
OSPF: Originating type 4 summary LSA to area 0, route 10.1.1.1
OSPF: Orig summary LSA to area 1, route 10.1.1.1, type 1, prem 1...
OSPF: Orig summary LSA to area 3, route 10.1.1.1, type 1, prem 1...
OSPF: delete route 10.1.1.1 from rtm 0x053742b0, not_in_main 0

debug ip ospf sham-link

Syntax: [no] debug ip ospf sham-link

This command generates information about OSPF sham-links. A sham-link is required between any two VPN sites that belong to the same OSPF area and share an OSPF backdoor link. If no backdoor link exists between the sites, no sham-link is required.

debug ip ospf shortcuts

Syntax: [no] debug ip ospf shortcuts

This command generates information about OSPF shortcuts for IP over MPLS. Command output resembles the following example.

Brocade# debug ip ospf shortcuts
OSPF: Clearing OSPF DSPT Route Table, num of entries 5
OSPF: Clearing OSPF DSPT Route Table completed, num of entries 5

debug ip ospf spf

Syntax: [no] debug ip ospf spf

This command generates information about OSPF SPF activity including SPF runs and calculations. Command output resembles the following example.

Brocade# debug ip ospf spf
    OSPF: spf-short debugging is on
Dec 10 20:20:50 OSPF: Schedule SPF(12001), in prog 0, ospf build_routing_table 0
    phase 1
Dec 10 20:20:50 OSPF: schedule spf, init spf delay 0, next hold 0 (ticks)
Dec 10 20:20:50 OSPF: Add to spf pending list, current time 2983323, scheduled
    2983323, next run 2983323
Dec 10 20:20:50 OSPF: timer: give semaphore, start spf phase 1, time 2983323,
    scheduled 2983323, run time 2983323
Dec 10 20:20:50 OSPF: begin intra SPF run, chunk-id 00000000/-1 just_become_abr 0,
    is_abr 0
Dec 10 20:20:50 OSPF: invalidate whole routing table, recal_just_become_abr 0, just_become_abr 0
Dec 10 20:20:50 OSPF: completed SPF for all areas
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_INTRAN end at 2983323, is_abr 0
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_TRANSIT end at 2983323
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_TYPE5 end at 2983323
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_TYPE7 end at 2983323
Dec 10 20:20:50 OSPF: summary phase, is_abr 0
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_SUMMARY end at 2983323
Dec 10 20:20:50 OSPF: No tunnel phase
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_NO_TNNL end at 2983323
Dec 10 20:20:50 OSPF: translation phase, is_abr 0
Dec 10 20:20:50 OSPF: ROUTE CALC PHASE_TRANSLATION end at 2983323
Dec 10 20:20:50 OSPF: SPF_cleanup: current 2983323, set next run time 2983323, current hold 0, next hold 0
Dec 10 20:20:50 OSPF: ROUTE CALC end at 2983323, pending 0
Dec 10 20:20:53 OSPF: Schedule SPF(12001), in prog 0, ospf build_routing_table 0 phase 1
Dec 10 20:20:53 OSPF: schedule spf, init spf delay 0, next hold 0 (ticks)
Dec 10 20:20:53 OSPF: Add to spf pending list, current time 2983393, scheduled 2983393, next run 2983393
Dec 10 20:20:53 OSPF: Schedule SPF(12002), in prog 0, ospf build_routing_table 0 phase 1
Dec 10 20:20:54 OSPF: timer: give semaphore, start spf phase 1, time 2983395, scheduled 2983393, run time 2983393
Dec 10 20:20:54 OSPF: begin intra SPF run, chunk-id 00000000/-1 just_become_abr 0, is_abr 0
Dec 10 20:20:54 OSPF: invalidate whole routing table, recal_just_become_abr 0, just_become_abr 0
Dec 10 20:20:54 OSPF: completed SPF for all areas

**IPv6 OSPF debug commands**

This section describes the debug commands used for monitoring the IPv6 OSPF environment.

```plaintext
d debug ipv6 ospf
```


- **bfd** - Displays information about OSPFv3 BFD events.
- **gr-helper** - Displays information about graceful restart (GR) helper operation.
- **ism** - Displays debug information about the ISM.
- **ism-events** - Displays events on the ISM.
- **ism-status** - Displays status of the ISM.
- **lsa** - Displays LSAs.
- **lsa-flooding** - Displays LSA-flooding activity.
- **lsa-generation** - Displays information about LSA generation.
- **lsa-install** - Displays installed LSAs.
- **lsa-maxage** - Displays the maximum aging information for LSAs.
- **lsa-refresh** - Displays LSA refresh information.
- **nsm** - Displays information about the NSM.
- **nsm-events** - Displays event information for the NSM.
- **nsm-status** - Displays NSM status information.
- **packet** - Displays all OSPFv3 packets in rx or tx mode.
- **packet-dd** - Displays all OSPFv3 data description packets in rx or tx mode.
- **packet-hello** - Displays all OSPFv3 hello packets in rx or tx mode.
- **packet-lsa-ack** - Displays all OSPFv3 LSA ACK packets in rx or tx mode.
- **packet-lsa-req** - Displays all OSPFv3 LSA request packets in rx or tx mode.
- **packet-lsa-update** - Displays all OSPFv3 LSA update packets in rx or tx mode.
- **route** - Displays all OSPFv3 routes.
- **route-calc-external** - Displays external route calculations.
- **route-calc-inter-area** - Displays inter-area route calculations.
- **route-calc-intra-area** - Displays intra-area route calculations.
- **route-calc-spf** - Displays SPF route calculations.
- **route-calc-transit** - Displays transit route calculations.
- **route-install** - Displays all OSPFv3 routes installed.
- **virtual-link** - Displays all OSPFv3 virtual links.

The `debug ipv6 ospf` command displays information about OSPF activity, including interface state machine (ISM), neighbor state machine (NSM), and link state advertisement (LSA) data, packets, routes, and virtual links.

### debug ipv6 ospf gr-helper

**Syntax:** `[no] debug ipv6 ospf gr-helper`

This command displays information about graceful restart (GR) helper operation. Command output resembles the following example.

```bash
Brocade# debug ipv6 ospf gr-helper
May 10 15:33:48.860 OSPFv3: GR HELPER: Received type:Grace Lsa Id:10.0.0.2 Adv Router:10.0.0.7
May 10 15:33:48.860 OSPFv3: GR HELPER: Entering gr helper for nbr 10.0.0.7 on interface eth 21/19
May 10 15:34:14.535 OSPFv3: GR HELPER: Successfully exiting gr helper for the nbr 10.0.0.7 on interface eth 21/19
```

### debug ipv6 ospf ism

**Syntax:** `[no] debug ipv6 ospf ism`

This command generates comprehensive information about OSPF ISM status changes. Command output resembles the following example.

```bash
Brocade# debug ipv6 ospf ism
```
This output indicates a status change for ISM 137, from up to down to waiting. A switch from the designated router (DR) to the backup designated router (BDR) has also occurred.

**debug ipv6 ospf ism-events**

**Syntax:** `[no] debug ipv6 ospf ism-events`  
This command displays IPv6 OSPF interface state machine (ISM) activity, such as an interface coming up or going down. Command output resembles the following example.

```
Brocade# debug ipv6 ospf ism-events
OSPFv3 ISM[137]: Interfaces
OSPFv3 ISM[137]: BackupSeen goes up
```

**debug ipv6 ospf ism-status**

**Syntax:** `[no] debug ipv6 ospf ism-status`  
This command displays IPv6 OSPF ISM status information. Command output resembles the following example.

```
Brocade# debug ipv6 ospf ism-status
OSPFv3 ISM[137]: Status change Down -> Waiting (Priority > 0)
OSPFv3 ISM[137]: Status change Waiting -> BDR (BackupSeen, DR Election)
OSPFv3 ISM[137]: (dr:0.0.0.0,bdr:0.0.0.0) -> (dr:10.2.2.2,bdr:10.2.3.4)
```

This output indicates that ISM 137 has gone down and is waiting for a switch from the designated router (DR) to the backup designated router (BDR).

**debug ipv6 ospf lsa**

**Syntax:** `[no] debug ipv6 ospf lsa`  
This command displays information about OSPF LSAs. Command output resembles the following example.

```
Brocade# debug ipv6 ospf lsa
OSPFv3 LSA Update Intra-Area-Prefix (Stub): Checking Interface 137
OSPFv3 LSA Update Intra-Area-Prefix (Stub): Interface 137 is down
OSPFv3 LSA Update Intra-Area-Prefix (Stub): No prefix to advertise for Area 0.0.0.0
OSPFv3 LSA Update Intra-Area-Prefix (Stub): Area 0.0.0.0
OSPFv3 ISM (137): Status change Down -> Waiting (Priority > 0)
OSPFv3 LSA: Create LSA Type :Router id: 0 Advrouter:10.2.3.4
OSPFv3 LSA Update Intra-Area-Prefix (Stub): Checking Interface 137
OSPFv3 LSA Update Intra-Area-Prefix (Stub): Include 2001:DB8:1::2/64
OSPFv3 LSA: Create LSA Type :Router Id: 0 Advrouter: 10.2.3.4
OSPFv3 :LSA Update Intra-Area Prefix (Stub): Area 0.0.0.0
OSPFv3 :LSA Update Link: Interface 137
OSPFv3 LSA: Create LSA Type :Link id: 137 Advrouter: 10.2.3.4
```

**debug ipv6 ospf lsa-flooding**

**Syntax:** `[no] debug ipv6 ospf lsa-flooding`
This command displays IPv6 OSPF LSA flooding activity. Command output resembles the following example.

Brocade# debug ipv6 ospf lsa-flooding
OSPFV3 LSA: schedule flooding 10.2.2.2
OSPFV3 LSA: schedule flooding 10.2.2.2
OSPFV3 LSA: schedule flooding 10.2.2.2
OSPFV3 LSA: schedule flooding 10.2.2.2

debug ipv6 ospf lsa-generation

Syntax: [no] debug ipv6 ospf lsa-generation

This command shows additions or deletions of LSAs from the link state database. Command output resembles the following example.

Brocade# debug ipv6 ospf lsa-generation
OSPFV3 LSA: Create LSA Type :Router Id: 0 Advrouter:10.2.3.4
OSPFV3 LSA: Create LSA Type :IntraPrefix Id: 0 Advrouter: 10.2.3.4
OSPFV3 LSA: Delete LSA Type Link Id: 137 Advrouter 10.2.3.4
OSPFV3 LSA: Create LSA Header Type: Router Id: 0 Advrouter:10.2.3.4
OSPFV3 LSA: Create LSA Header Type: Router Id: 0 Advrouter: 10.2.2.2
OSPFV3 LSA: Create LSA Header Type: Router Id: 0 Advrouter: 10.2.3.4

debug ipv6 ospf lsa-install

Syntax: [no] debug ipv6 ospf lsa-install

This command generates information about new LSAs that are installed in the link state database. Command output resembles the following example.

Brocade# debug ipv6 ospf lsa-install
OSPFV3 LSA: Turnover type: IntraPrefix Lsa Id: 0.0.0.0 AdvRouter:10.2.3.4: contents not changed
OSPFV3 LSA: Turnover type: Router Lsa Id: 0.0.0.0 AdvRouter:10.2.3.4: contents not changed
OSPFV3 LSA: Turnover type: Router Lsa Id:0.0.0.0 AdvRouter:10.2.3.4: contents changed
OSPFV3 LSA: Turnover type: IntraPrefix Lsa Id: 0.0.0.0 AdvRouter: 10.2.2.2: contents changed

debug ipv6 ospf lsa-maxage

Syntax: [no] debug ipv6 ospf lsa-maxage

This command identifies LSAs that are removed from the link state database because the router has not received any updates about the LSA in a specified amount of time. Command output resembles the following example.

Brocade# debug ipv6 ospf lsa-maxage
OSPFV3 LSA: Premature aging: Type: Interface, ID : 0, AdvRouter 10.2.3.4

debug ip rtm

Syntax: [no] debug ip rtm [A.B.C.D | all | errors | nexthop]

- A.B.C.D - Displays RTM information for a specified IPv4 address.
- all - Displays all RTM information.
- **errors** - Displays RTM errors.
- **nexthop** - Logs various next hop-related events to the console.

This command displays information about the routing table manager (RTM), including changes in the routing table. With `debug ip rtm` enabled, and using the `show ip route` command, output resembles the following examples for specific routing table activity.

Brocade# debug ip rtm
IP: rtm debugging is on
Brocade# show ip route
Total number of IP routes: 9
Type Codes - B:BGP D:Connected I:ISIS S:Static R:RIP O:OSPF; Cost - Dist/Metric
Destination Gateway Port Cost Type
...
7 10.11.11.0/24 10.10.10.2 eth 1/1 110/10 O2
10.11.11.0/24 10.10.11.2 eth 1/1 110/10 O2
...
RTM: Remove 10.11.11.0/24 (ospf) from rtm
RTM: un-install 10.11.11.0/24 (ospf) in rtm

This example indicates that OSPF route 10.11.11.0/24 has been deleted from the route table.

RTM: Add 10.11.11.0/24 (ospf) to rtm, path 2
RTM: install 10.11.11.0/24 (ospf) in rtm

**Configuration notes**

- If a router is to operate as an Autonomous System Boundary Router (ASBR), you must enable the ASBR capability at the system level.
- All router ports must be assigned to one of the defined areas on an OSPF router. When a port is assigned to an area, all corresponding subnets on that port are automatically included in the assignment.
- For NetIron MLX-32 or XMR 32000 systems running application image version 03.6.00 or later, configured for OSPF graceful restart, and intended for use in switchover or hitless upgrades, the OSPF dead interval must be changed to 60 seconds on OSPF interfaces. This ensures that the graceful restart process succeeds without a timeout. For instructions on changing the OSPF dead interval, refer to the Brocade NetIron Routing Configuration Guide.
- If a Brocade NetIron XMR and Brocade MLX series router is to function as a graceful restart router, a secondary management module must be installed. If the router functions as a graceful restart helper router only, a second management module is not necessary.
- If you disable OSPF, the Brocade NetIron XMR and Brocade MLX series router removes all OSPF configuration information from the running configuration. In addition, after disabling OSPF, when you save the configuration to the startup configuration file, all configuration information for OSPF is removed from the startup configuration file.

The CLI displays a warning message similar to the following example.

Brocade(config-ospf-router)# no router ospf
router ospf mode now disabled. All ospf config data will be lost when writing to flash!

If you have disabled OSPF but have not yet saved the startup configuration file and reloaded the software, you can restore the configuration information by re-entering the `router ospf` command to enable the protocol. If you have already saved the startup configuration file and reloaded the software, the information is gone.
If you are testing an OSPF configuration and are likely to disable and re-enable OSPF, you may want to make a backup copy of the startup configuration file before you begin. Then, if you remove the configuration information by saving the configuration after disabling the protocol, you can restore the configuration by saving the backup copy of the startup configuration file onto the flash memory.

Common diagnostic scenarios

- A third-party router and a Brocade router are both receiving bad OSPF packets. This indicates that the carrier may be the source of the corruption.
- The graceful restart process times out on a Brocade MLX-32 or NetIron XMR 32000 system. For routers that are configured for graceful restart and intended for use in hitless upgrades, you must change the OSPF dead interval to 60 seconds to prevent timeouts.
- There are frequent OSPF link flapping events. This issue is resolved by upgrading the software version to include the latest patches.

Reverse Path Forwarding (RPF)

RPF prevents malicious users from spoofing a source IP address. It does this by checking that the source address specified for a packet is received from a network to which the router has access. Packets with invalid source addresses are not forwarded. Packets that fail the RPF test can be logged.

RPF show commands

This section describes the show commands that display RPF information.

**show ip interface**

Syntax: `show ip interface ethernet slotnum/portnum`

The `slotnum/portnum` variable specifies the slot and port number of the Ethernet interface.

This command displays information about RPF configurations and packets that have been dropped because they failed the RPF check, as shown in the following example in bold.

```
Brocade# show ip interface ethernet 7/1
Interface Ethernet 7/1 (384)
  port enabled
  port state: UP
  ip address: 10.2.3.4/8
  Port belongs to VRF: default
  encapsulation: Ethernet, mtu: 1500
  MAC Address 0000.0024.a6c0
  directed-broadcast-forwarding: disabled
  No inbound ip access-list is set
  No outbound ip access-list is set
  No Helper Addresses are configured
  RPF mode: strict RPF Log: Disabled
  376720 unicast RPF drop 36068 unicast RPF suppressed drop
```
NOTE
RPF accounting information is always available through the physical interface, even if the physical port belongs to one or more VEs.

show ip rpf

Syntax: show ip rpf
This command displays information about the RPF statistics check.

Brocade# show ip rpf
Global RPF check enabled
RPF-Exclude-Default disabled
All Unicast RPF metro information.
  Current operating mode: LOOSE; loose mode count: 3
  Current urpf fail count log mode: DISABLED, log mode count: 0
  Current Hardware URPF fail mode:
    PPCR0:  soft drop
    PPCR1:  soft drop
    PPCR2:  soft drop

show ip next-hop

Syntax: show ip next-hop ip-addr
The ip-addr variable specifies the next-hop IP address.

This command displays forwarding information for the specified IP address.

Brocade# show ip next-hop 10.2.2.2
Forwarding route entry: 10.2.2.2
Software forwarding for matching Prefix: 10.0.0.0/8
  No of paths: 2; CAM index: 0x0002802e (163886);
  HW virtual Next-Hop index in shadow: 0x0200001b (33554459)
  HW real    Next-Hop index in shadow: 0x0000001b (27)

Hardware Forwarding entry as programed:
  No of paths: 2; Type of route entry: ECMP
  Next-Hop index as programed in hw: 0x0000001b (27)

Software Next Hop Entry for address: 0x250532e8
  action: fwd
  Paths: (control plane): 2, (forwarding plane): 2
  Buckets: (as paths seen by lpm): 2, (max allocated): 2
  bucket assignment:(0, 1, 0, 1, 0, 1, 0, 1)
  Virtual HW next-hop id: 0x0200001b (33554459)
  ref count: 1, set id: 0x2c7dbb40

Hardware Next Hop Entry for virtual id: 0x0200001b
PPCR id  real id  cmd  port  tx index  vlan id  urpf mode
0        27      route  2/1  0      20       vlan mode
0        28      route  1/29 1      1       port mode
1        27      route  2/1  0      20       vlan mode
1        28      route  1/29 1      1       port mode
2        27      route  2/1  0      20       vlan mode
2        28      route  1/29 1      1       port mode

Software ECMP SIP Entry at: 0x2506b000
Virtual Hardware id: 0x0200001e, Real Hardware id: 30; urpf action: port mode, SIP filter: disable, SIP Access: 0

<table>
<thead>
<tr>
<th>Path</th>
<th>Interface</th>
<th>If no</th>
<th>Port</th>
<th>FID no</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ve 20</td>
<td>149</td>
<td>2/1</td>
<td>64</td>
</tr>
<tr>
<td>1</td>
<td>eth 1/29</td>
<td>28</td>
<td>1/29</td>
<td>28</td>
</tr>
</tbody>
</table>

Hardware ECMP SIP Entry for virtual id: 0x0200001e; Real hardware id: 30

PPCR  URPF Mode  SIP_EN. SIP Acc. || ECMP no  Valid  Value  Software
0     port mode  FALSE   0        || 0        TRUE   1      Trunk Pri: 2/1
|| 1        TRUE   4      eth 1/5
|| 2        TRUE   1      Trunk Pri: 2/1
|| 3        TRUE   4      eth 1/5
|| 4        TRUE   1      Trunk Pri: 2/1
|| 5        FALSE  0
|| 6        TRUE   1      Trunk Pri: 2/1
|| 7        TRUE   4      eth 1/5
1     port mode  FALSE   0        || 0        TRUE   1      Trunk Pri: 2/1
|| 1        TRUE   4      eth 1/5
|| 2        TRUE   1      Trunk Pri: 2/1
|| 3        TRUE   4      eth 1/5
|| 4        TRUE   1      Trunk Pri: 2/1
|| 5        FALSE  0
|| 6        TRUE   1      Trunk Pri: 2/1
|| 7        TRUE   4      eth 1/5
2     port mode  FALSE   0        || 0        TRUE   1      Trunk Pri: 2/1
|| 1        TRUE   4      eth 1/5
|| 2        TRUE   1      Trunk Pri: 2/1
|| 3        TRUE   4      eth 1/5
|| 4        TRUE   1      Trunk Pri: 2/1
|| 5        FALSE  0
|| 6        TRUE   1      Trunk Pri: 2/1
|| 7        TRUE   4      eth 1/5

show logging

Syntax: show logging

If you have enabled the log option of the rpf-mode command, packet information is saved to the system log. To display the log, enter the show logging command, as shown in the following example.

Brocade# show logging
Syslog logging: enabled (0 messages dropped, 0 flushes, 1305 overruns)
Buffer logging: level ACDMEINW, 50 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning
Dynamic Log Buffer (50 lines):
May 11 12:12:54:1:RPF: Denied 1 packets on port 7/5 tcp 10.4.4.1(0) -> 10.6.7.8(0)

NOTE
A maximum of 256 RPF messages are logged per minute.

Clearing RPF statistics

To clear RPF statistics on a specific physical interface, use the following command.
clear ip interface ethernet

Syntax: clear ip interface ethernet slot/port

RPF debug commands

There are no debug commands specific to RPF.

Configuration notes

• IP packets with the source IP address of 0.0.0.0 will always fail the RPF check.
• If you attempt to enable the global RPF command on a system with incompatible CAM settings, the command will be rejected and you will receive a console message.
• Because the RPF feature requires that the entire IP route table be available in hardware, the feature must work in conjunction with Foundry Direct Routing (FDR). FDR is the default mode of operation for the Brocade NetIron XMR series and Brocade MLX series routers.
• You cannot configure RPF on a physical port that has VRF configured on it, or if the physical port belongs to a virtual interface with a VRF configuration.
• Only RPF loose mode is supported for GRE routes.
• If a default route is present on the router, loose mode will permit all traffic.
• RPF can only be configured at the physical port level. It must not be configured on virtual interfaces.
• The following considerations must be taken into account when configuring Reverse Path Forwarding (RPF) with ECMP routes:
  - For a source IP address matching an ECMP route, RPF will permit the packet if it arrives on any of the next-hop interfaces for that route. For example, if there are two best next hops for a network route 10.11.11.0/24, one pointing to 10.10.10.1 (Gigabit Ethernet 7/1) and the other to 10.10.30.1 (Gigabit Ethernet 7/12), then incoming packets with source address matching 10.11.11.0/24 will be permitted on either Gigabit Ethernet 7/1 or Gigabit Ethernet 7/12.
  - A disadvantage of this configuration is that if some other route shares any of these next hops, the packets with a source IP address matching that route will also be permitted from any of the interfaces associated with those next hops. For example, if 10.12.12.0/24 has the next hop 10.10.10.1, then packets from 10.12.12.0/24 will also be permitted on either Gigabit Ethernet 7/1 or Gigabit Ethernet 7/12.

Common diagnostic scenarios

• The RPF check fails.
  The OSPF best route back to the BSR is different from the interface where PIM is enabled.
• RPF packet drop occurs.
  Rate limiting is configured on the port where the drops occurred. The problem is resolved when the configuration is changed.
RIP

Routing Information Protocol (RIP) is an IP route exchange protocol that uses a distance vector (a number representing distance) to measure the cost of a given route. The cost is a distance vector because the cost often is equivalent to the number of router hops between the Brocade device and the destination network. A Brocade device supports the following RIP versions:

- Version 1
- Version 1 compatible with Version 2
- Version 2 (the default)

IPv6 RIP, known as Routing Information Protocol Next Generation (RIPng), functions similarly to IPv4 RIP version 2. RIPng supports IPv6 addresses and prefixes.

RIP debug commands

This section describes the debug commands that display RIP information.

dump ip rip

Syntax: debug ip rip [all-vrfs | database | events | packet | trigger | vrf]

- all-vrfs - Displays information about all VRFs of the RIP.
- database - Displays RIP database related events.
- events - Displays RIP events.
- packet - Displays RIP packet information.
- trigger - Displays information about triggered updates and periodic updates.
- vrf - Displays information about a specific VRF of the RIP.

dump ip rip all-vrfs

Syntax: debug ip rip all-vrfs [database | events | packet | trigger]

This command displays information about all VRFs of the RIP based on the options specified. The following is the sample output from the debug ip rip all-vrfs database command.

Brocade# debug ip rip all-vrfs database
Feb 7 09:26:23.825 RIP(default-vrf): Sending update on interface 1/5
Feb 7 09:26:23.825 RIP(default-vrf): src 10.4.15.3, port 520
Feb 7 09:26:23.825 RIP(default-vrf): dest 224.0.0.9 (1/5), port 520
Feb 7 09:26:23.825 command response version 2 packet size 52
Feb 7 09:26:23.825 prefix 10.3.3.3/32 metric 1 tag 0 NextHop10.4.15.3
Feb 7 09:26:23.825 RIP(red): Sending update on interface v22
Feb 7 09:26:23.825 RIP(red): src 10.1.1.1, port 520
Feb 7 09:26:23.825 RIP(red): dest 224.0.0.9 (v22), port 520
Feb 7 09:26:23.825 command response version 2 packet size 72
Feb 7 09:26:23.825 prefix 10.4.15.0/24 metric 1 tag 0 NextHop10.3.3.3
Feb 7 09:26:23.825 RIP(red): Sending update on interface lb3
Feb 7 09:26:23.825 RIP(red): dest 224.0.0.9 (lb3), port 520
Feb 7 09:26:23.825 command response version 2 packet size 52
Feb 7 09:26:23.825 prefix 10.3.3.33/32 metric 1 tag 0 NextHop10.1.1.1
Feb 7 09:26:23.825 RIP(red): Sending update on interface lb3
RIP

Feb 7 09:26:23.825 RIP(red): src 10.3.3.33, port 520
Feb 7 09:26:23.825 RIP(red): dest 224.0.0.9 (lb3), port 520
Feb 7 09:26:23.825 command response version 2 packet size 52
Feb 7 09:26:23.825 prefix 10.1.1.0/24 metric 1 tag 0 NextHop 10.3.3.3

deploy ip rip database

Syntax: debug ip rip database

This command displays information about RIP database events. The following is the sample output from the debug ip rip database command.

Brocade# debug ip rip database
Feb 7 08:48:54.462 RIP(default-vrf): Adding local connected route 10.3.3.3/32 on interface lb1
Feb 7 08:48:54.462 RIP(default-vrf): new 10.3.3.3/32 metric 1 from 0.0.0.0
Feb 7 08:49:22.363 RIP(default-vrf): Adding local connected route 10.4.15.0/24 on interface 1/5
Feb 7 08:49:22.363 RIP(default-vrf): new 10.4.15.0/24 metric 1 from 0.0.0.0
Feb 7 08:49:22.363 RIP(default-vrf): (v2) process response packet
Feb 7 08:49:22.363 RIP(default-vrf): Sending update on interface lb1
Feb 7 08:49:22.364 RIP(default-vrf): src 10.3.3.3, port 520
Feb 7 08:49:22.364 RIP(default-vrf): dest 224.0.0.9 (lb1), port 520
Feb 7 08:49:22.364 command response version 2 packet size 52
Feb 7 08:49:22.364 prefix 10.4.15.0/24 metric 1 tag 0 NextHop 10.3.3.3
Feb 7 08:49:34.973 RIP(default-vrf): (v2) process response packet
Feb 7 08:49:34.973 header: type:RESPONSE PACKET, version:2
Feb 7 08:49:34.973 RIP(default-vrf): refresh 10.4.4.4/32 metric 2 from 10.4.15.4 eth 1/5
Feb 7 08:49:34.973 RIP(default-vrf): existing route metric 2 from 10.4.15.4 eth 1/5
Feb 7 08:49:34.973 RIP(default-vrf): Sending update on interface 1/5
Feb 7 08:49:44.661 RIP(default-vrf): src 10.4.15.3, port 520
Feb 7 08:49:44.661 RIP(default-vrf): dest 224.0.0.9 (1/5), port 520
Feb 7 08:49:44.661 command response version 2 packet size 52
Feb 7 08:49:44.661 prefix 10.3.3.3/32 metric 1 tag 0 NextHop 10.4.15.3

deploy ip rip events

Syntax: debug ip rip events

This command displays information about RIP events. The following is the sample output from the debug ip rip events command.

Brocade# debug ip rip events
Feb 7 08:57:14.060 RIP(default-vrf): stop running on interface 1/5
Feb 7 08:57:14.060 RIP(default-vrf): update timer expired
Brocade(config-if-e1000-1/5)# ip rip v2-only
Feb 7 08:57:16.910 RIP(default-vrf): start running on interface 1/5
Brocade(config-if-e1000-1/5)# Feb 7 08:57:16.911 RIP(default-vrf): update timer expired
Feb 7 08:57:17.409 RIP(default-vrf): update timer expired

deploy ip rip packet

Syntax: debug ip rip packet
This command displays information about RIP packets sent and received. The following is the sample output from the `debug ip rip packet` command.

Brocade# debug ip rip packet
Feb 7 09:05:14.412 RIP (default-vrf): send updates (periodic) to 224.0.0.9 via eth 1/5 (10.4.15.4)
Feb 7 09:05:14.412 RIP: build route
Feb 7 09:05:14.412 header: type: RESPONSE PACKET, version: 2
Feb 7 09:05:14.412 RIP (default-vrf): build one route
Feb 7 09:05:14.412 RIP: route entry: family: 2, target: 10.4.4.4, subnet_mask: 255.255.255.255, metric: 1, next_hop: 10.4.15.4, route_tag: 0
Feb 7 09:05:14.412 RIP (default-vrf): send updates (periodic) to 224.0.0.9 via loopback 1 (10.4.4.4)
Feb 7 09:05:14.412 RIP: build route
Feb 7 09:05:14.412 header: type: RESPONSE PACKET, version: 2
Feb 7 09:05:14.412 RIP (default-vrf): build one route
Feb 7 09:05:14.412 RIP: route entry: family: 2, target: 10.3.3.3, subnet_mask: 255.255.255.255, metric: 2, next_hop: 10.4.15.3, route_tag: 0
Feb 7 09:05:14.412 RIP (default-vrf): build one route
Feb 7 09:05:14.412 RIP: route entry: family: 2, target: 10.4.15.0, subnet_mask: 255.255.255.0, metric: 1, next_hop: 10.4.15.4, route_tag: 0
Feb 7 09:05:35.131 RIP (default-vrf): rcvd updates from 10.4.15.3 on eth 1/5
Feb 7 09:05:35.131 RIP: route entry: family: 2, target: 10.3.3.3, subnet_mask: 255.255.255.255, metric: 1, next_hop: 10.4.4.4, route_tag: 0
Feb 7 09:05:41.412 RIP (default-vrf): send updates (periodic) to 224.0.0.9 via eth 1/5 (10.4.15.4)
Feb 7 09:05:41.412 RIP: build route

**Syntax:** `debug ip rip trigger`

This command displays information about triggered updates which is being sent, and periodic updates. The following is the sample output from the `debug ip rip trigger` command.

Brocade# debug ip rip trigger
Feb 7 09:10:35.964 RIP (default-vrf): triggered update sent on port 1793
Brocade(config-if-e1000-1/5)# ip rip v2-only
Brocade(config-if-e1000-1/5)# Feb 7 09:10:39.413 RIP (default-vrf): triggered update sent on port 4
Feb 7 09:10:39.414 RIP (default-vrf): triggered update sent on port 1793
Feb 7 09:10:49.413 RIP (default-vrf): periodic update sent on port 4
Feb 7 09:10:49.414 RIP (default-vrf): periodic update sent on port 1793

**Syntax:** `debug ip rip vrf vrf_name [database | events | packet | trigger]`

This command displays information about a particular VRF of the RIP for the specified option. The following is the sample output from the `debug ip rip vrf` command when `packet` option is specified.

Brocade# debug ip rip vrf red packet
Feb 7 09:18:53.822 RIP (red): send updates (periodic) to 224.0.0.9 via ve 22 (10.1.1.1)
Feb 7 09:18:53.822 RIP (red): build one route
Feb 7 09:18:53.822 RIP (red): route entry: family: 2, target: 10.3.3.3, subnet_mask: 255.255.255.255, metric: 1, next_hop: 10.1.1.1, route_tag: 0
Feb 7 09:18:53.822 RIP (red): send updates (periodic) to 224.0.0.9 via loopback 3 (10.3.3.33)
**RIPng debug commands**

This section describes the debug commands that display RIPng information.

**debug ipv6 rip**

Syntax: `debug ipv6 rip [all-vrfs | events | receive | transmit | vrf]`

- **all-vrfs** - Displays information about all VRFs of the RIPng.
- **events** - Displays RIPng events.
- **receive** - Displays received update packets in RIPng.
- **transmit** - Displays transmitted update packets in RIPng.
- **vrf** - Displays information about a specific VRF of the RIPng.

**debug ipv6 rip all-vrfs**

Syntax: `debug ipv6 rip all-vrfs [events | receive | transmit]`

This command displays information about all VRFs of the RIPng based on the options specified. The following is the sample output from the `debug ipv6 rip all-vrfs transmit` command.

```
Brocade# debug ipv6 rip all-vrfs transmit
Feb 7 09:48:59.133 RIPng(red): RIPng: update timer expired
Feb 7 09:48:59.133 RIPng(red): RIPng: Sending update on interface v22
Feb 7 09:48:59.133 RIPng(red): src fe80::21b:edff:fe9f:6f00, port 521
Feb 7 09:48:59.133 RIPng(red): dest ff02::9 (v22), port 521
Feb 7 09:48:59.133 command response version 1 packet size 24
Feb 7 09:48:59.133 prefix 2001:DB8:3::33/128 metric 1 tag 0
Feb 7 09:49:05.133 RIPng(default-vrf): RIPng: update timer expired
Feb 7 09:49:05.133 RIPng(default-vrf): RIPng: Sending update on interface 1/5
Feb 7 09:49:05.133 RIPng(default-vrf): src fe80::21b:edff:fe9f:6f04, port 521
Feb 7 09:49:05.133 dest ff02::9 (1/5), port 521
Feb 7 09:49:05.133 command response version 1 packet size 24
Feb 7 09:49:05.133 prefix 2001:DB8:3::3/128 metric 1 tag 0
Feb 7 09:49:18.999 RIPng(default-vrf): RIPng: received packet from fe80::224:38ff:fe2d:1e04 port 521 on interface 1/5
Feb 7 09:49:18.999 command response version 1 packet size 24
Feb 7 09:49:18.999 prefix 2001:DB8:3::3/128 metric 1 tag 0
Feb 7 09:49:30.133 RIPng(red): RIPng: update timer expired
Feb 7 09:49:30.133 RIPng(red): RIPng: Sending update on interface v22
Feb 7 09:49:30.133 RIPng(red): src fe80::21b:edff:fe9f:6f00, port 521
Feb 7 09:49:30.133 RIPng(red): dest ff02::9 (v22), port 521
Feb 7 09:49:30.133 command response version 1 packet size 24
Feb 7 09:49:30.133 prefix 2001:DB8:3::33/128 metric 1 tag 0
```

**debug ipv6 rip events**

Syntax: `debug ipv6 rip events`

This command displays information about RIPng events. The following is the sample output from the `debug ipv6 rip events` command.

```
Feb 7 09:18:53.822 RIP(red): build one route
Feb 7 09:18:53.822 RIP: route entry: family:2, target:10.1.1.0,
subnet_mask:255.255.255.0, metric:1, next_hop:10.3.3.33, route_tag:0
```
Brocade# debug ipv6 rip events
Feb 7 09:31:25.029 RIPng(default-vrf): RIPng: disable on interface 1/5
Feb 7 09:31:25.029 RIPng(default-vrf): RIPng: stop running on interface 1/5, disable 0
Feb 7 09:31:25.029 RIPng(default-vrf): RIPng: Removing local connected route 2001:DB8:15::/64 on interface 1/5
Feb 7 09:31:25.029 RIPng(default-vrf): RIPng: garbage prefix 2001:DB8:15::/64 timer 16, metric 0, tag 674353720
Feb 7 09:31:25.029 RIPng(default-vrf): from :: on interface Ethernet 1/5
Brocade(config-if-e1000-1/5)# ipv6 rip enable
Feb 7 09:31:29.378 RIPng(default-vrf): RIPng: enable on interface 1/5
Feb 7 09:31:29.378 RIPng(default-vrf): RIPng: start running on interface 1/5
Feb 7 09:31:29.378 RIPng(default-vrf): RIPng: Adding local connected route 2001:DB8:15::/64 on interface 1/5
Feb 7 09:31:30.076 RIPng(default-vrf): RIPng: triggered update

debug ipv6 rip receive

Syntax: debug ipv6 rip receive
This command displays information about RIPng received update packets. The following is the sample output from the debug ipv6 rip receive command.

Brocade# debug ipv6 rip receive
Feb 7 09:36:15.015 RIPng(default-vrf): RIPng: received packet from fe80::38ff:fe2d:1e04 port 521 on interface 1/5
Feb 7 09:36:15.015 command response version 1 packet size 24
Feb 7 09:36:15.015 prefix 2001:DB8:4::4/128 metric 1 tag 0
Feb 7 09:36:15.015 from :: on interface Ethernet 1/5
Feb 7 09:36:45.014 RIPng(default-vrf): RIPng: received packet from fe80::38ff:fe2d:1e04 port 521 on interface 1/5
Feb 7 09:36:45.014 command response version 1 packet size 24
Feb 7 09:36:45.014 prefix 2001:DB8:4::4/128 metric 1 tag 0

debug ipv6 rip transmit

Syntax: debug ipv6 rip transmit
This command displays information about RIPng transmitted update packets. The following is the sample output from the debug ipv6 rip transmit command.

Brocade# debug ipv6 rip transmit
Feb 7 09:39:28.079 RIPng(default-vrf): RIPng: Sending update on interface 1/5
Feb 7 09:39:28.079 RIPng(default-vrf): dest ff02::9 (1/5), port 521
Feb 7 09:39:28.079 command response version 1 packet size 24
Feb 7 09:39:28.079 prefix 2001:DB8:3::3/128 metric 1 tag 0
Feb 7 09:39:58.079 RIPng(default-vrf): RIPng: Sending update on interface 1/5
Feb 7 09:39:58.079 RIPng(default-vrf): src fe80::21b:edff:fe9f:6f04, port 521
Feb 7 09:39:58.079 RIPng(default-vrf): dest ff02::9 (1/5), port 521
Feb 7 09:39:58.079 command response version 1 packet size 24
Feb 7 09:39:58.079 prefix 2001:DB8:3::3/128 metric 1 tag 0

debug ipv6 rip vrf

Syntax: debug ipv6 rip vrf vrf_name [events | receive | transmit]
This command displays information about a particular VRF of the RIPng for the specified option. The following is the sample output from the `debug ipv6 rip vrf` command when `events` option is specified.

Brocade# debug ipv6 rip vrf red events
Feb 7 09:43:11.733 RIPng(red): RIPng: state up on interface lb3
Feb 7 09:43:11.733 RIPng(red): RIPng: start running on interface lb3
Feb 7 09:43:11.733 RIPng(red): RIPng: Adding local connected route 2001:DB8:3::33/128 on interface lb3
Feb 7 09:43:11.733 RIPng(red): RIPng: Adding local connected route 2001:DB8:3::33/128 on interface lb3
Feb 7 09:43:11.733 RIPng(red): RIPng: triggered update
Feb 7 09:43:13.131 RIPng(red): RIPng: triggered update
Feb 7 09:43:13.131 RIPng(red): RIPng: Sending update on interface v22
Feb 7 09:43:13.131 RIPng(red): src fe80::21b:edff:fe9f:6f00, port 521
Feb 7 09:43:13.131 RIPng(red): dest ff02::9 (v22), port 521
Feb 7 09:43:13.131 command response version 1 packet size 24
Feb 7 09:43:13.131 prefix 2001:DB8:3::33/128 metric 1 tag 0

IS-IS

Intermediate System to Intermediate System (IS-IS) is a link-state interior gateway protocol. IS-IS designates an intermediate system (router) as either a Level 1 or Level 2 router. A Level 1 router routes traffic only within the area where it resides. A Level 2 router routes traffic between areas within a routing domain.

**NOTE**
The Brocade device does not support routing of Connectionless-Mode Network Protocol (CLNP) packets. The Brocade device uses IS-IS for TCP/IP only.

Detailed IS-IS configuration instructions can be found in the *Brocade NetIron Routing Configuration Guide*.

**IS-IS show commands**

This section describes the show commands that display information about IS-IS activity and configurations. Some of these are regular user commands, and some are debug commands.

**show isis**

**Syntax:** show isis

This command displays general IPv4 IS-IS information, as shown in the following example.

Brocade# show isis
  IS-IS Routing Protocol Operation State: Enabled
  IS-Type: Level-1-2
  System ID: 0000.0011.1111
  Manual area address(es):47
  Level-1-2 Database State: On
  Administrative Distance: 115
  Maximum Paths: 4
  Default redistribution metric: 0
  Protocol Routes redistributed into IS-IS: Static
  Number of Routes redistributed into IS-IS: 11
  Level-1 Auth-mode: None
Level-2 Auth-mode: None
Metric Style Supported for Level-1: Wide
Metric Style Supported for Level-2: Wide
IS-IS Partial SPF Optimizations: Enabled
Timers:
  L1 SPF: Max-wait 120s Init-wait 100ms Second-wait 120000ms
  L2 SPF: Max-wait 100s Init-wait 100ms Second-wait 100000ms
  L1 SPF is not scheduled
  L2 SPF is not scheduled
PSPF: Max-wait 120000ms Init-wait 120000ms Second-wait 120000ms
PSPF is not scheduled
  LSP: max-lifetime 1200s, refresh-interval 900s, gen-interval 10s
  retransmit-interval 5s, lsp-interval 33ms
  SNP: csnp-interval 10s, psnp-interval 2s
  Global Hello Padding: Enabled
  Global Hello Padding For Point to Point Circuits: Enabled
  Ptpt Three Way HandShake Mechanism: Enabled
  IS-IS Traffic Engineering Support: Disabled
  BFD: Disabled
Interfaces with IPv4 IS-IS configured:
et 1/1

show isis interface

Syntax: show isis interface

This command displays information about IS-IS interfaces, as shown in the following example.

Brocade# show isis interface
Total number of IS-IS Interfaces: 2
Interface : gre_tnl 1
  Circuit State: UP Circuit Mode: LEVEL-1-2
  Circuit Type: PTP Passive State: FALSE
  Circuit Number: 0x02, MTU: 1497
  Level-1 Metric: 10, Level-1 Priority: 64
  Level-1 Auth-mode: None
  Level-2 Auth-mode: None
  Level-1 Metric: 10, Level-1 Priority: 50
  Level-1 Hello Interval: 10 Level-1 Hello Multiplier: 3
  Level-1 Designated IS: XMR1-02 Level-1 DIS Changes: 0
  Level-2 Metric: 10, Level-2 Priority: 50
  Level-2 Hello Interval: 10 Level-2 Hello Multiplier: 3
  Level-2 Designated IS: MLX2-02 Level-2 DIS Changes: 0
  Circuit State Changes: 1 Circuit Adjacencies State Changes: 1
  Rejected Adjacencies: 0
  Circuit Authentication L1 failures: 0
  Circuit Authentication L2 failures: 0
  Bad LSPs 0
  Control Messages Sent: 318 Control Messages Received: 229
  IP Enabled: TRUE
  IP Address and Subnet Mask:
  10.50.50.20     10.255.255.0
  IPv6 Enabled: FALSE

show isis neighbor

Syntax: show isis neighbor

This command displays information about IS-IS neighbors, as shown in the following example.
show isis debug

Syntax:  show isis debug [adj-options-order | adj-timer | child-link-info | ip-nexthop-set |
          ipv6-nexthop-set | ipv6-pent-level-info | link-info | lsp-list | lsp-timer | memory | nexthops |
          parent-link-info | pent | pent-level-info | pspf-lsp-list | redis | route-info | summary |
          v6-nexthops | v6route-info]

•  adj-options-order - Displays IS-IS adjacency options in a label switched path (LSP).
•  adj-timer - Displays IS-IS adjacency hold timers.
•  child-link-info - Displays IS-IS child link debugging information.
•  ip-nexthop-set - Displays IS-IS IP next-hop information.
•  ipv6-nexthop-set - Displays IS-IS IPv6 next-hop information.
•  ipv6-pent-level-info - Displays an integrated IS-IS IPv6 level information list associated with path entries.
•  link-info - Displays IS-IS link debugging information.
•  lsp-list - Displays IS-IS LSP list debugging information.
•  lsp-timer - Displays IS-IS LSP hold timers.
•  memory - Displays IS-IS memory debugging information.
•  nexthops - Displays IS-IS next-hop lists debugging information.
•  parent-link-info - Displays IS-IS parent link debugging information.
•  pent - Displays IS-IS SPD path entries.
•  pent-level-info - Displays an integrated IS-IS level information list associated with path entries.
•  pspf-lsp-list - Displays integrated IS-IS PSPF LSP list.
•  redis - Displays IS-IS redistribution debugging information.
•  route-info - Displays integrated IS-IS route information list.
•  summary - Displays a summary of IS-IS debugging information.
•  v6-nexthops - Displays debugging information for IS-IS next-hop lists.
•  v6route-info - Displays the IS-IS route information list.

The command output resembles the following example.

Brocade# show isis debug
Router-id: 10.140.140.4
Tics: 168833
[SPF: Act:NOT RUNNING Bld:N Run[N,N]
Code assertions are ON
Ptpt 3way HandShake Enabled
Manual Area Addresses: 57(1) 0.0.0057(3) 0.0.0001(3)
Union Area Addresses: 0.0.0001(3) 0.0.0057(3) 57(1)
isis.run_pspf=N, Ir_pspf_level1=N, Ir_pspf_level2=Y
PSPF bucket count: Reached Maximum
show isis debug adj-options-order

Syntax: show isis debug adj-options-order

This command displays IS-IS adjacency options in a label switched path (LSP).

Brocade# show isis debug adj-options-order
Level-1 List
LSP-ID Dut2.00-00
  Metric: 10       IS Dut2.01
LSP-ID Dut2.01-00
  Metric: 0        IS Dut2.00
Level-2 List
LSP-ID Dut2.00-00
  Metric: 10       IS Dut2.01
LSP-ID Dut2.01-00
  Metric: 0        IS Dut2.00
  Metric: 0        IS Dut4.00

show isis debug adj-timer

Syntax: show isis debug adj-timer

This command displays information about IS-IS adjacency hold timers.

Brocade# show isis debug adj-timer
Summary:
WheelTimer: cur_time 371080, cur_slot 280, num_slots 400, active_slots 11
  Callbacks[Tmo=0x08acba6d,Print=0x08acba6a]
  Buckets Callbacks[Ins=0x0849f108,Rem=0x08acba69,GetRdy=0x0849f1d0]
  Ready Queue: Empty
  Total(Rdy+Slots): BuckNodes 11, ElemNodes 14
  Avg/Active Slot: BuckNodes 1, ElemNodes 1
  Slot HighWaterMark: BuckNodes 1, ElemNodes 2

show isis debug child-link-info

Syntax: show isis debug child-link-info system-id

This command displays all the child link information for a specific router. The system-id variable specifies the router name or system ID.

Command output resembles the following example.

Brocade# show isis debug child-link-info R1
Link-1
Parent: R1, Child: R2
  Link Metric: 10, Total Metric: 10, Link State: Active
  Link-2
  Parent: R1, Child: R3
  Link Metric: 10, Total Metric: 10, Link State: Active

show isis debug ip-nexthop-set

Syntax: show isis debug ip-nexthop-set

This command displays the IP address of each set of next hops in all sets of next hops. The maximum number of hops in a set is eight.

Command output resembles the following example.

Brocade# show isis debug ip-nexthop-set
Set 1 with No Of Nexthops 1 Address 277ac1a4 up since 00:00:06
  Nexthop IPAddr 10.1.1.3, Circ-id 0(eth 1/1)
  Pent List Pointing to this Nexthop Set
  Pent-Id XMR16.00-00 level-1
  Pent-Id XMR16.01-00 level-1

show isis debug ipv6-nexthop-set

Syntax: show isis debug ipv6-nexthop-set

This command displays the IPv6 next-hop set, as the following example illustrates.

Brocade# show isis debug ipv6-nexthop-set
Set 1 with No Of Nexthops 1 Address 277ac1e0 up since 00:00:43
  Nexthop IPAddr fe80::20c:dbff:fef6:3300, Circ-id 0(eth 1/1)
  Pent List Pointing to this Nexthop Set
  Pent-Id XMR16.00-00 level-1
  Pent-Id XMR16.01-00 level-1

show isis debug ipv6-pent-level-info

Syntax: show isis debug ipv6-pent-level-info

This command displays an integrated IS-IS IPv6 level information list associated with path entries, when IS-IS multi-topology is enabled.

Command output resembles the following example, when IS-IS multi-topology is enabled.

Brocade# show isis debug ipv6-pent-level-info
  Pent-Id  level metric pref Chg(N-D-MC-PC-IPV4NC-IPV6NC-PSIFC)
  XMR44.00-00 L1 10 1 (0-0-0-0-0-0-0)
  2001:DB8::/32 cost:10, Pre:1, Up/Down:0, Credit: 0, flags: Act Ena  IPv6
  2001:DB8::/32 cost:10, Pre:1, Up/Down:0, Credit: 0, flags: Act Ena  IPv6
  2001:DB8::/32 cost:10, Pre:1, Up/Down:0, Credit: 0, flags: Act Ena  IPv6

  Pent is not found 0000.0000.0000.00-00 level 2
  XMR43.00-00 L2 0 1 (0-0-0-0-0-0-0)

show isis debug link-info

Syntax: show isis debug link-info
This command displays all the link information that exists in the IS-IS domain, as shown in the following example.

Brocade# show isis debug link-info
Link-1
  Parent: R1, Child: R2
  Link Metric: 10, Total Metric: 10, Link State: Active
Link-2
  Parent: R1, Child: R3
  Link Metric: 10, Total Metric: 10, Link State: Active
Link-3
  Parent: R2, Child: R4
  Link Metric: 10, Total Metric: 20, Link State: Active
Link-4
  Parent: R3, Child: R4
  Link Metric: 15, Total Metric: 25, Link State: In-Active

show isis debug lsp-list

Syntax: show isis debug lsp-list

This command displays the number of instances of certain IS-IS items, such as the number of LSPs in each hash table, the number of partial sequence numbers (PSNPs), and so on.

Brocade# show isis debug lsp-list
sizeof(LSPI) = 124, LSPI_SIZE = 382, nd_srm_size = 129
LSP Hash L1 Count: 1
LSP Hash L2 Count: 39
LSP Sort L1 Count: 1
LSP Sort L2 Count: 39
LSP PSNP List Count: 0
LSP Tx List Count: 0
LSP Flood Count: 25

show isis debug lsp-timer

Syntax: show isis debug lsp-timer

This command displays information about the LSP timer, as shown in the following example.

Brocade# show isis debug lsp-timer
Summary:
  WheelTimer: cur_time 371574, cur_slot 374, num_slots 400, active_slots 19
  Callbacks[Tmo=0x08ad8438,Print=0x08ad8498]
    Buckets Callbacks[Ins=0x0849f108,Rem=0x0849f178,GetRdy=0x0849f1d0]
    Ready Queue: Empty
  Total(Rdy+Slots): BuckNodes 19, ElemNodes 32
  Avg/Active Slot: BuckNodes 1, ElemNodes 1
  Slot HighWaterMark: BuckNodes 1, ElemNodes 3

show isis debug memory

Syntax: show isis debug memory

This command displays various dimensions of memory (in bytes). Primarily, you would note any indication of a failure or error. If you notice errors, then the other items in the display might lead to a part of memory related to the problem.
show isis debug memory

Syntax:  show isis debug memory pool

This command displays information about the memory pool, as shown in the following example.

Brocade# show isis debug memory pool
Pool# 0 @ 0x0928ef4c
blk_size: 292,  initial_blk_cnt: 60,  exp_blk_cnt: 20
curr_#_of_blks 60,  #_of_sub_pools: 1
#_of_blks_in_use: 3,  #_of_blks_free: 57,  #_of_mem_alloc_failed: 0
total_memory_allocated_for_this_pool: 17524
sptr_memory_list: 0x28ca6370 &0x0928ef70
sptr_sub_pool_list: 0x28ca6000 &0x0928efa0
Pool# 1 @ 0x0928ef78
blk_size: 68,  initial_blk_cnt: 60,  exp_blk_cnt: 20
curr_#_of_blks 60,  #_of_sub_pools: 1
#_of_blks_in_use: 0,  #_of_blks_free: 60,  #_of_mem_alloc_failed: 0
total_memory_allocated_for_this_pool: 4084
sptr_memory_list: 0x28cab004 &0x0928ef9c
sptr_sub_pool_list: 0x28cab000 &0x0928efcc
Pool# 2 @ 0x0928efa4
blk_size: 44,  initial_blk_cnt: 1000,  exp_blk_cnt: 250
curr_#_of_blks 1000,  #_of_sub_pools: 1
#_of_blks_in_use: 1,  #_of_blks_free: 1000,  #_of_mem_alloc_failed: 0
total_memory_allocated_for_this_pool: 44004
sptr_memory_list: 0x28cac004 &0x0928efc8
sptr_sub_pool_list: 0x28cac000 &0x0928efc8
Pool# 3 @ 0x0928efd0
blk_size: 285,  initial_blk_cnt: 60,  exp_blk_cnt: 20
curr_#_of_blks 60,  #_of_sub_pools: 1
#_of_blks_in_use: 1,  #_of_blks_free: 59,  #_of_mem_alloc_failed: 0
total_memory_allocated_for_this_pool: 17104
sptr_memory_list: 0x28cb7121, &0x0928eff4
sptr_sub_pool_list: 0x28cb7000 &0x0928eff8
Pool# 4 @ 0x0928effc
blk_size: 471,  initial_blk_cnt: 256,  exp_blk_cnt: 20
curr_#_of_blks 256,  #_of_sub_pools: 1
#_of_blks_in_use: 4,  #_of_blks_free: 252,  #_of_mem_alloc_failed: 0
total_memory_allocated_for_this_pool: 120580
sptr_memory_list: 0x28cbb760, &0x0928f020
sptr_sub_pool_list: 0x28cbb000 &0x0928f024
Pool# 5 @ 0x0928f028
blk_size: 121,  initial_blk_cnt: 1024,  exp_blk_cnt: 20
curr_#_of_blks 1024,  #_of_sub_pools: 1
show isis debug nexthops

Syntax: show isis debug nexthops

This command displays all of the next hops available on the system, as shown in the following example.

Brocade# show isis debug nexthops
IS-IS IP Nexthops List:
  Node (2185b00c) -> Nexthop (29124050) ref 3, If 158(eth 4/15) Addr 10.0.0.38
  Node (2185b030) -> Nexthop (291240c0) ref 3, If 146(eth 4/3) Addr 10.0.0.14
  Node (2185b0b4) -> Nexthop (291240e0) ref 3, If 42(eth 1/43) Addr 10.1.6.2
  Node (2185b06c) -> Nexthop (29124090) ref 1, If 14(eth 1/15) Addr 10.1.1.2
  Node (2185b060) -> Nexthop (291240a0) ref 1, If 150(eth 4/7) Addr 10.0.0.30
  Node (2185b03c) -> Nexthop (291240b0) ref 1, If 154(eth 4/11) Addr 10.0.0.18
  Node (2185b0e4) -> Nexthop (29124100) ref 1, If 157(eth 4/14) Addr 10.0.0.34
  Node (2185b1bc) -> Nexthop (29124240) ref 3, If 17(eth 1/18) Addr 10.1.2.2
  Node (2185b1d4) -> Nexthop (29124250) ref 2, If 152(eth 4/9) Addr 10.0.0.25
  Node (2185b1ec) -> Nexthop (29124260) ref 2, If 155(eth 4/12) Addr 10.0.0.46
  Node (2185b3e4) -> Nexthop (29124410) ref 1, If 144(eth 4/1) Addr 10.0.0.21
  Node (2185b288) -> Nexthop (29124480) ref 1, If 147(eth 4/4) Addr 10.0.0.6
  Node (2185b1b0) -> Nexthop (291243e0) ref 3, If 49(eth 2/2) Addr 10.0.0.10

show isis debug parent-link-info

Syntax: show isis debug parent-link-info system-id

This command displays all the parent link information for a specific router. The system-id variable specifies the router name or system ID.

Command output resembles the following example.

Brocade# show isis debug parent-link-info R4
Link-1
  Parent: R2, Child: R4
  Link Metric: 10, Total Metric: 20, Link State: Active
Link-2
  Parent: R3, Child: R4
  Link Metric: 15, Total Metric: 25, Link State: In-Active

show isis debug pent

Syntax: show isis debug pent

This command displays path entries. It displays all the nodes in the topology and the cost to each node from the root node, the preference, flags, and the IPv4 and IPv6 next-hop associations, as the following example illustrates.
show isis debug pent-level-info

Syntax: show isis debug pent-level-info

When IS-IS multi-topology is enabled, this command displays an integrated IS-IS IPv4 level information list associated with path entries.

Command output resembles the following example, when IS-IS multi-topology is enabled.

Brocade# show isis debug pent
Path Table for Level 1:
Pent 2aa8e008
  Hash-Idx 34 PENT_IS R2-0-0  cost 0 pref 1 flags 0
    No IP Nexthops associated with this Pent entry
    No IPv6 Nexthops associated with this Pent entry
Path Table for Level 2:
Pent 2aa8e2b0
  Hash-Idx 0 PENT_IS R4-3-0  cost 61 pref 2 flags 0
    Pent IPv4 Nexthop Set 2c2e1020
      10.3.1.4 eth 3/1
      No IPv6 Nexthops associated with this Pent entry
Pent 2aa8e118
  Hash-Idx 0 PENT_IS R4-0-0  cost 1 pref 2 flags 0
    Pent IPv4 Nexthop Set 2c2e1020
      10.3.1.4 eth 3/1
    No IPv6 Nexthops associated with this Pent entry
Pent 2aa8e448
  Hash-Idx 0 PENT_IS R1-3-0  cost 120 pref 2 flags 0
    Pent IPv4 Nexthop Set 2c2e1030
      10.37.1.1 eth 3/7
    No IPv6 Nexthops associated with this Pent entry

show isis debug pent-level-info

Command output resembles the following example, when IS-IS multi-topology is not enabled.

Brocade# show isis debug pent-level-info
Pent-Id  level metric pref Chg(N-D-MC-PC-IPV4NC-IPV6NC-PSPFC)
  XMR44.00-00 L1  10 1 (0-0-0-0-0-0-0)
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.4.4.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.1.6.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.22.22.22/10.255.255.255 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4

Pent is not found 0000.0000.0000.00-00 level 2
  XMR43.00-00 L2  0 1 (0-0-0-0-0-0-0)

Command output resembles the following example, when IS-IS multi-topology is not enabled.

Brocade# show isis debug pent-level-info
Pent-Id  level metric pref Chg(N-D-MC-PC-IPV4NC-IPV6NC-PSPFC)
  XMR2.00-00 L2  10 2 (0-0-0-0-0-0-0)
  10.0.0.0/10.255.255.252 cost:306, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.4/10.255.255.252 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.36/10.255.255.252 cost:1000, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:1, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.1.6.0/10.255.255.0 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.8/10.255.255.252 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.12/10.255.255.252 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.12/10.255.255.252 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.0.0.0/10.255.255.0 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
  10.22.22.22/10.255.255.255 cost:10, Pre:2, Up/Down:0 flags:Act Ena   IPv4
show isis debug pspf-lsp-list

Syntax: show isis debug pspf-lsp-list level

- **level** - Displays information for a specific list level.

This command displays the LSPs in the partial SPF list. The argument "level" is optional. If you do not mention the argument level, the LSPs in both the Level-1 and Level-2 lists are displayed.

```
Brocade# show isis debug pspf-lsp-list

ISIS Level-1 PSPF LSP List
LSP-ID            State      Time-Stamp(Tics)            Last-Trans-Time(Tics)
mu2.00-00         Update     0m0s      (1202772185)       1h10m9s   (0)
mu2.00-01         New         0m0s      (1202772185)       1h10m9s   (0)

ISIS Level-2 PSPF LSP List
LSP-ID             State      Time-Stamp(Tics)            Last-Trans-Time(Tics)
mu2.00-00         Update     0m0s      (1202772185)     1h10m9s   (0)
mu2.00-01         New         0m0s      (1202772185)     1h10m9s   (0)
```

show isis debug redis

Syntax: show isis debug redis

This command shows all routes that have been added, deleted, and so on, from other protocols.

```
Brocade# show isis debug redis
ISIS Redistribution Stats:
    Add 20, Modify 0, Del 0, Clear 0, Clear-All 0, Invalid 0
    Invalid-Add 0, Invalid-Mod 0
Prefix Mask level rt_type cost met_type
  10.1.10.0/24 3 0 1 1
  10.1.2.0/24 3 0 1 1
  10.1.5.0/24 3 0 1 1
  10.1.2.0/24 3 0 1 1
  10.1.5.0/24 3 0 1 1
  10.1.8.0/24 3 0 1 1
  10.1.8.0/24 3 0 1 1
  10.1.11.0/24 3 0 1 1
  10.1.3.0/24 3 0 1 1
  10.1.3.0/24 3 0 1 1
  10.1.6.0/24 3 0 1 1
  10.1.9.0/24 3 0 1 1
  10.1.6.0/24 3 0 1 1
  10.1.9.0/24 3 0 1 1
  10.1.10.0/24 3 0 1 1
```
show isis debug route-info

Syntax: show isis debug route-info [A.B.C.D | A.B.C.D/L]

- A.B.C.D | A.B.C.D/L - Specifies the IP network address.

This command displays the routes in the IS-IS route table. For each route, it displays the next hops, the cost from the root node, flags, and its parent path entries, as shown in the following example.

Brocade# show isis debug route-info 10.0.0.1/32
10.0.0.1 255.255.255.255 30 L2 00000000 00000008 000
Path: 1  Next Hop IP: 192.168.1.125  Interface: 4/16
Route 3741d938
Level-1 Info List is empty
Level-2 Info List
  PENT-V4:AR1.00-00 cost:10, Pre:2, Up/Down:0 flags:Act Ena  IPv4

show isis debug summary

Syntax: show isis debug summary

This command displays summary information about redistributed routes, such as whether a route is active (UP=yes or no), the metric (cost), the level (L column), and so on.

Brocade# show isis debug summary
Summary UP Met L
10.1.0.0 /16 Y 1 3 (e1=11,e2=11,i1=0,i2=0) (l1=12e0fc34/1 l2=12e0fb14/1)

show isis debug v6-nexthops

Syntax: show isis debug v6-nexthops

This command displays information about IS-IS IPv6 next hops, as shown in the following example.

Brocade# show isis debug v6-nexthops
IS-IS IPv6 Nexthops List:
IS-IS IPv6 Null0 Nexthops List:
Node 2185b000 -> Nexthop 2809f000 ref 0, If 65534(drop) Addr ::
IS-IS IPv6 Nexthops Set List:

show isis debug v6route-info

Syntax: show isis debug v6route-info

This command displays the routes in the IS-IS IPv6 route table. For each route, it displays the next hops, the cost from the root node, flags, and its parent path entries, as shown in the following example.

Brocade# show isis debug v6route-info
ISIS IPv6 Routing Table
Total Routes: 1  Level1: 0 Level2: 1 Equal-cost multi-path: 1
Type IPv6 Prefix Next Hop Router Interface Cost
L2 2001:DB8::/64 fe80::202:17ff:fe6e:c41c eth 1/11 0
  PENT:Cisco.00-00 cost:10, Pre:2, Up/Down:0 flags:Act Ena  IPv6

show ip route isis

Syntax: show ip route isis
This command displays information about IS-IS routes, as shown in the following example.

Brocade# show ip route isis

Type Codes - B:BGP D:Connected I:ISIS S:Static R:RIP O:OSPF; Cost - Dist/Metric

<table>
<thead>
<tr>
<th>Destination</th>
<th>Gateway</th>
<th>Port</th>
<th>Cost</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.30.30.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>2</td>
<td>10.100.100.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>3</td>
<td>10.100.101.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>4</td>
<td>10.100.102.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>5</td>
<td>10.100.103.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>6</td>
<td>10.100.104.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>7</td>
<td>10.100.105.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>8</td>
<td>10.100.106.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
<tr>
<td>9</td>
<td>10.100.107.0/24</td>
<td>10.50.50.10</td>
<td>gre_tnl 1</td>
<td>115/20</td>
</tr>
</tbody>
</table>

show isis hostname

Syntax: show isis hostname

This command displays IS-IS name mappings, as shown in the following example.

Brocade# show isis hostname

Total number of entries in IS-IS Hostname Table: 1

<table>
<thead>
<tr>
<th>System ID</th>
<th>Hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 0000.00cc.dddd</td>
<td>IMR</td>
</tr>
</tbody>
</table>

IS-IS debug commands

This section describes the debug commands used for monitoring the IS-IS environment.

debug isis


- **adj** - Displays information about IS-IS adjacencies.
- **bfd** - Displays IS-IS BFD information.
- **error** - Displays IS-IS errors.
- **interface** - Limits the display of IS-IS information to a specific interface.
- **l1-csnp** - Displays level 1 CSNP PDU information.
- **l1-hello** - Displays level 1 hello PDU information.
- **l1-lsp** - Displays level 1 LSP PDU information.
- **l1-psnp** - Displays level 1 PSNP PDU information.
- **l2-csnp** - Displays level 2 CSNP PDU information.
- **l2-hello** - Displays level 2 hello PDU information.
- **l2-lsp** - Displays level 2 LSP PDU information.
- **l2-psnp** - Displays level 2 PSNP PDU information.
- **lsp-flood** - Displays information about LSP flooding.
- **lsp-dump** - Displays a dump of context-specific LSP contents.
- **memory** - Displays memory information.
• nsr - Displays IS-IS nonstop routing information.
• pp-hello - Displays PP hello PDU information.
• ppp - Displays OSI Point-to-Point Protocol (PPP) information.
• pspf - Displays IS-IS partial SPF information.
• pspf-detail - Displays IS-IS partial SPF information details.
• redistribution - Displays IS-IS route redistribution information.
• route-table - Displays IS-IS route table information.
• spf - Displays IS-IS SPF information.
• spf-log - Displays information about the SPF log.
• te - Displays information about IS-IS traffic engineering.
• trace - Displays trace information for the IS-IS code path.

deb ug isis adj

Syntax: [no] debug isis adj

This command generates information about IS-IS adjacencies. Command output resembles the following example.

Brocade# debug isis adj
ISIS: Clearing all adjacencies on 1/1
ISIS: Deleting PTPT Adj to rtr1 on 1/1 from HT Timer for HT 30 Index 1
ISIS: L1 DIS change on 1/4 to rtr2-3
ISIS: L2 DIS change on 1/4 to rtr2-3
ISIS: Deleting PTPT Adj to rtr1 on 1/1 [HoldTimer expiry]
ISIS: Deleting PTPT Adj to rtr1 on 1/1 from HT Timer for HT 30 [Index 0]
ISIS: Deleting PTPT Adj to rtr1 on 1/2 [HoldTimer expiry]
ISIS: Deleting PTPT Adj to rtr1 on 1/2 from HT Timer for HT 30 [Index 1]
ISIS: Adding PTPT Adj 0000.0000.0001 on 1/1 to HT Timer for HT 30 [Index 0]
ISIS: Adding PTPT Adj 0000.0000.0000 on 1/2 to HT Timer for HT 7680 [Index 1]
ISIS: L1 DIS change on 1/4 to rtr2-3
ISIS: L2 DIS change on 1/4 to rtr2-3
ISIS: L1 DIS change on 1/4 to rtr2-3
ISIS: Adding PTPT Adj rtr1 on 1/1 to HT Timer for HT 30 [Index 0]
ISIS: Adding PTPT Adj rtr1 on 1/2 to HT Timer for HT 30 [Index 1]

debug isis l1-csnp

Syntax: [no] debug isis l1-csnp

This command displays information about level 1 complete sequence number PDUs (CSNPs) sent and received on the device. Command output resembles the following example.

Brocade# debug isis l1-csnp
ISIS: Sending L1 CSNP on 2/24, length 1497
ISIS: Received L1 CSNP on 2/24, length 256 from 0000.0026.b337

debug isis l1-hello

Syntax: [no] debug isis l1-hello

This command generates information about level 1 hello PDUs sent and received. Command output resembles the following example.
Brocade# debug isis l1-hello
ISIS: Received L1 LAN IIH on 2/24, length 256 from 0000.0026.b337
ISIS: Sending L1 LAN IIH on 2/24, length 1497
ISIS: Received L1 LAN IIH on 2/24, length 256 from 0000.0026.b337

debug isis l1-lsp

Syntax: [no] debug isis l1-lsp
This command generates information about level 1 link state PDUs (LSPs) sent and received. Command output resembles the following example.
Brocade# debug isis l1-lsp
ISIS: Sending L1 LSP on 2/24, length 27
ISIS: Received L1 LSP on 2/24, length 256 from 0000.0026.b337

debug isis l1-psnp

Syntax: [no] debug isis l1-psnp
This command generates information about level 1 partial sequence number PDUs (PSNPs) sent and received. Command output resembles the following example.
Brocade# debug isis l1-psnp
ISIS: Received L1 PSNP on 2/24, length 256
ISIS: Received L1 PSNP on 2/24, length 35

debug isis l2-csnp

Syntax: [no] debug isis l2-csnp
This command generates information about level 2 CSN PDUs sent and received. Command output resembles the following example (source MAC addresses are shown).
Brocade# debug isis l2-csnp
ISIS: Rcvd L2 CSNP on 2/1, length 906 from frl.iad.QA.Tes [MAC 0000.00e3.0c02]
ISIS: Rcvd L2 CSNP on 1/1, length 906
ISIS: Rcvd L2 CSNP on 1/2, length 906 from frl.sjc.QA.Tes [MAC 0000.00e3.b629]
ISIS: Rcvd L2 CSNP on v510, length 906
ISIS: Rcvd L2 CSNP on v510, length 906 from frl.sjc.QA.Tes [MAC 0000.00e3.b600]
ISIS: Rcvd L2 CSNP on 2/1, length 906
ISIS: Rcvd L2 CSNP on 2/1, length 906 from frl.iad.QA.Tes [MAC 0000.00e3.0c02]
ISIS: Rcvd L2 CSNP on 1/1, length 906

debug isis l2-hello

Syntax: [no] debug isis l2-hello
This command generates information about level 2 hello PDUs sent and received. Command output resembles the following example.
Brocade# debug isis l2-hello
ISIS: Received L2 LAN IIH on 2/24, length 256 from 0000.0026.b337
ISIS: Sending L2 LAN IIH on 2/24, length 1497
ISIS: Received L2 LAN IIH on 2/24, length 256 from 0000.0026.b337

debug isis l2-lsp

Syntax: [no] debug isis l2-lsp
This command generates information about level 2 link state PDUs sent and received. Command output resembles the following example.

Brocade# debug isis l2-lsp
ISIS: Sending L2 LSP on 2/24, length 27
ISIS: Received L2 LSP on 2/24, length 256 from 0000.0026.b337

**debug isis l2-psnp**

**Syntax:** `[no] debug isis l2-psnp**

This command generates information about level 2 PSN PDUs (PSNPs) sent and received. Command output resembles the following example.

Brocade# debug isis l2-psnp
ISIS: Received L2 PSNP on 2/24, length 256
ISIS: Received L2 PSNP on 2/24, length 35

**debug isis memory**

**Syntax:** `[no] debug isis memory**

This command generates information about IS-IS memory allocations and releases. Command output resembles the following example.

Brocade# debug isis memory
ISIS: Memory Allocated for buffer description at 21a54ad8
ISIS: Memory Allocated for packet-buffer at 211e1680
ISIS: Memory Released for buffer descriptor at 21a54ad
ISIS: Memory Allocation for circuit IP address failed

**debug isis nsr**

**Syntax:** `[no] debug isis nsr**

This command displays information related to LSP, neighbor syncing, and NSR state-related information. Command output resembles the following example.

Brocade# debug isis nsr
ISIS: Sending L1-LSP XMR36.01-00 Seq-No 6173 Flags Lsp Update Length 53 to standby
ISIS: Ack recv for L1 Lsp XMR36.01-00 Addition from Standby
ISIS: Sending L1 Nbr CES Flags Neighbor Delete to standby
ISIS: Ack recv for L2 Neighbor CES Deletion from Standby
ISIS: Sending L2 Nbr CES Flags Neighbor Update to standby
ISIS: Ack recv for L2 Neighbor CES Addition from Standby

**debug isis pp-hello**

**Syntax:** `[no] debug isis pp-hello**

This command displays information about point-to-point hello PDUs sent and received. Command output resembles the following example.

Brocade# debug isis pp-hello
ISIS: Sending PTP IIH on 9/1, length 1492
ISIS: Received PTP IIH on 9/1, length 256

**debug isis ppp**

**Syntax:** `[no] debug isis ppp**
This command generates information about OSI PPP packets sent and received. Command output resembles the following example.

Brocade# debug isis ppp
ISIS PPP: sending isis packet on pos port 512
ISIS: osicp datainput rx pkt length 1492 on unit 32
ISIS: Received PTP IIH on 9/1, length 256
ISIS: Sending PTP IIH on 9/1, length 1492
ISIS PPP: sending isis packet on pos port 512

debug isis pspf

Syntax: [no] debug isis pspf

This command generates information about IS-IS PSPF activity. Command output resembles the following example.

Brocade# debug isis pspf
ISIS: Comparing old options against new to detect routes that may have been removed
ISIS: Checking ISOC_EIPREACH,
ISIS: Checking ISOC_EIPREACH,
ISIS: Comparing new options against old to detect routes that may have been added
ISIS: isis_check_if_partial_spf_needed called
ISIS: isis_identify_and_process_changed_ip_information_in_lsp called
ISIS: Checking ISOC_EREACH
ISIS: Checking ISOC_IREACH

debug isis pspf-detail

Syntax: [no] debug isis pspf-detail

This command generates detailed information about IS-IS PSPF activity. Command output resembles the following example.

Brocade# debug isis pspf-detail
ISIS: Total Route Calculation Time is 0 milliseconds.
ISIS: PSPF Started for level 2
PENT_IP found id = 10.0.6.0 10.255.255.0 cost 41 pref 2 up=0
PENT_IP found id = 10.0.170.0 10.255.255.0 cost 20 pref 2 up=0
PENT_IP found id = 10.0.12.0 10.255.255.0 cost 50 pref 2 up=0
PENT_IP found id = 10.0.18.0 10.255.255.0 cost 50 pref 2 up=0
PENT_IP found id = 10.0.4.0 10.255.255.0 cost 41 pref 2 up=0
PENT_IP found id = 10.0.10.0 10.255.255.0 cost 50 pref 2 up=0
PENT_IP found id = 10.0.16.0 10.255.255.0 cost 50 pref 2 up=0
PENT_IP found id = 10.131.243.16 10.255.255.252 cost 40 pref 2 up=0

debug isis redistribution

Syntax: [no] debug isis redistribution

This command displays route redistribution information into or out of IS-IS routes. Command output resembles the following example.

Brocade# debug isis redistribution
ISIS: Imported CONNECTED route 10.10.0.3 10.255.0.0
ISIS: Imported CONNECTED route 10.10.0.3 10.255.0.0
ISIS: Added external route 10.10.0.3 10.255.0.0 to L12 LSP
ISIS: Added external route 10.10.0.0 10.255.0.0 to L12 LSP
ISIS: Unimported CONNECTED route 10.10.0.0 10.255 0.0
ISIS: Unimported CONNECTED route 10.10.0.0 10.255.0.0
ISIS: Deleted external route 10.10.0.0 10.255.0.0 from L12 LSP
ISIS: Deleted external route 10.10.0.0 10.255.0.0 from L12 LSP

This output indicates several redistribution activities, including importing and unimporting connected routes, and adding and deleting external routes.

**debug isis route-table**

**Syntax:** [no] debug isis route-table

This command reports changes to the IS-IS route table. Command output resembles the following example.

Brocade# debug isis route-table
ISIS: Deleting route 10.10.0.0 10.255.0.0 level 2
ISIS: Deleting route 10.10.0.0 10.255.0.0 level 2
ISIS: Creating new route for 10.10.0.0 10.255.0.0 level 2 type 1
ISIS: Adding path Next hop = 10.147.201.200 Interface 2/4
ISIS: Creating new route for 10.10.0.0 10.255.0.0 level 2 type 1

**debug isis spf**

**Syntax:** [no] debug isis spf

This command generates information about SPF calculations made for IS-IS. Command output resembles the following example.

Brocade# debug isis spf
ISIS6: MT IPv6 SPF start...
ISIS: Building SPF tree for Level:1, ISPF:No, SPF_Index: Native Table,
isis.ipv4_rtm_update_index[level1]: Native Table,
isis.ipv6_rtm_update_index[level1]: Native Table
ISIS: Tent-id R3.00-00 type 2 OptType 0 Added with cost 0 Pref 1 Updown bit 0
ISIS: Adding Pent-id R3.00-00 type 2 OptType 0 Added with cost 0 Pref 1 Updown bit 0 to Path List
ISIS: The Pent Already exists in Path
ISIS: The Pent Entry Flags for Native Table 0
ISIS: Updating the Active Info for 2001:DB8::/64 Previous active Level 2, safi IPv6
ISIS: L1 Level Info List is empty
ISIS: Updating the Active Info for 2001:DB8::/64 Previous active Level 2, safi IPv6
ISIS: L1 Level Info List is empty
ISIS: Updating the Active Info for 2001:DB8::/64 Previous active Level 2, safi IPv6
ISIS: L1 Level Info List is empty
ISIS: Building SPF tree for Level:2, ISPF:No, SPF_Index: Native Table,
isis.ipv4_rtm_update_index[level2]: Native Table,
isis.ipv6_rtm_update_index[level2]: Native Table
ISIS: Tent-id R3.00-00 type 2 OptType 0 Added with cost 0 Pref 1 Updown bit 0
ISIS: Adding Pent-id R3.00-00 type 2 OptType 0 Added with cost 0 Pref 1 Updown bit 0 to Path List
ISIS: The Pent Already exists in Path
ISIS: The Pent Entry Flags for Native Table 0
ISIS: Tent-id R2.00-00 type 2 OptType 0 Added with cost 14 Pref 2 Updown bit 0
ISIS: Adding Pent-id R2.00-00 type 2 OptType 0 Added with cost 10 Pref 2 Updown bit 0 to Path List
ISIS: The Pent Already exists in Path
ISIS: The Pent Entry Flags for Native Table 0
isis: The Pent IPv6 Nexthop is not Changed in this SPF run
isis: Trying to Add Level Info 2001:DB8::/64 cost 10  Pref 2 Opttype 236 UpDown 0
isis: level info element exists for this Pent Entry with cost 10  Pref 2 Updown Bit 0
isis: Level info flags after update 33
isis:Trying to delete Disabled Route Level Info for 2001:DB8::/64 Level-2 safi IPv6 Table_Index Native
isis: Updating the Active Info for 2001:DB8::/64 Previous active Level 2, safi IPv6
isis: L1 Level Info List is empty
isis: MT IPv6 SPF end!

*debug isis spf-stct*

**Syntax:** `[no] debug isis spf-stct`

This command displays debug information related to incremental shortcut LSP SPF optimizations, as shown in the following example.

```
brocade# debug isis spf-stct
isis: Fixing SPF type for Tunnel-0 with Status: UP
isis: ISIS: Trigering ISTCT SPF
isis: ISTCT SPF triggered for LSP Tunnel-0 Up istct_spf_level2:0
isis: Level-2 isis.ipv4_rtm_update_index: STCT, isis.prev_ipv4_rtm_update_index: STCT
isis: ISTCT SPF Scheduled, istct_spf_level2:1 istct_spf_level1:0
isis: ISTCT SPF Scheduled for level-2
isis: Processing Changed LSP Shortcut List
isis: Processing tunnel0 Up State
isis: Adding shortcut link to XMR17.00-00 with Tnnl_index: 0
isis: Newly added Stct link from XMR16.00-00 to XMR17.00-00 is Active
isis: Pent Adj count: 1, MAX_MSPILT: 8, iso_tmo->rt_msplit: 4
isis: Adding Pent XMR17.00-00 to beginning of Change Adj List
isis: Processing of Changed LSP Shortcut List took 0 msec
isis: Processing Pent Changed Adj List
isis: Updating Pent XMR17.00-00 Nexthop Set
isis: Adding Pent XMR17.00-00 to Level-2 nd_pspf_pe_list
isis: Adding Pent XMR17.00-00 Active Child to Pent Change Adj List
isis: Processing of Pent Change Adj List took 0 msec
```

*debug isis trace*

**Syntax:** `[no] debug isis trace`

This command generates information about internal IS-IS functions. Command output resembles the following example.

```
brocade# debug isis trace
isis:proc_SNPE
isis: build_csnp
isis: build_csnp
isis: sig_description
```

**Configuration notes**

None of the IS-IS parameters require a software reload for changes to take effect, and most parameter changes take effect immediately. However, changes for the following parameters take effect only after you disable and then re-enable redistribution:
- Changing the default metric.
- Adding, changing, or negating route redistribution parameters.

Common diagnostic scenarios

- Packets are dropped during authentication mode change.

Changing the authentication mode can cause packets to drop during the transition period because not all of the routers are reconfigured simultaneously. During such a transition, it can be useful to disable IS-IS authentication checking temporarily until all routers are reconfigured and the network is stable.

Use the `no isis auth-check` command to disable IS-IS authentication checking on a specified interface.

Brocade(config)# interface ethernet 3/1
Brocade(if-e10000-3/1)# no isis auth-check level-1

Syntax: `[no] isis auth-check [level-1 | level-2]`

This command enables and disables IS-IS authentication checking. The default is enabled and the `no` parameter disables authentication checking.

The `level-1` parameter specifies that authentication checking is enabled or disabled for Level 1 Hello packets.

The `level-2` parameter specifies that authentication checking is enabled or disabled for Level 2 Hello packets.

**NOTE**
If either Level 1 or Level 2 are not specified, the configuration is applied to both Level 1 and Level 2.

- NetIron LSPs are timed-out by its neighbors.

The maximum LSP lifetime interval and the LSP refresh interval must be set so that the LSPs are refreshed before the maximum LSP lifetime interval expires; otherwise, the Brocade device's originated LSPs may be timed-out by its neighbors.

To prevent a neighbor from timing-out LSPs, give the LSP refresh interval a shorter setting than that of the maximum LSP lifetime interval. The LSP refresh interval is the maximum number of seconds the Brocade device waits between sending updated LSPs to its IS-IS neighbors. The interval can be from 1 through 65535 seconds. The default is 900 seconds.

For example, to change the LSP refresh interval to 20000 seconds, enter a command similar to the following example.

Brocade(config-isis-router)# lsp-refresh-interval 20000

Syntax: `[no] lsp-refresh-interval` `secs`

The `secs` variable specifies the maximum refresh interval and can be from 1 through 65535 seconds. The default is 900 seconds (15 minutes).

- An IS-IS link is experiencing low performance rates.
If an IS-IS link is performing poorly, it may be due to padding that is added to the end of a hello packet to make the packet the same size as the maximum length of a PDU supported by the Brocade device. The Brocade device adds this padding by default to the following types of hello packets:

- ES hello (ESH PDU)
- IS hello (ISH PDU)
- IS-IS hello (IIH PDU)

When padding is enabled, the maximum length of a hello PDU sent by the Brocade device is 1514 bytes.

If you suspect that padding is affecting the performance of the link, you can disable padding globally or on individual interfaces. If you enable or disable padding on an interface, the interface setting overrides the global setting.

To globally disable padding of IS-IS hello PDUs, enter the following command.

Brocade(config-isis-router)# no hello padding

This command disables all hello PDU padding on the Brocade device. To re-enable padding, enter the following command.

Brocade(config-isis-router)# hello padding

Syntax: \[no\] hello padding

By default, hello padding is enabled. Enter the no form of the command to disable hello padding.

- IS-IS adjacent ports are flapping.
  Check for any high CPU condition or evidence of packet loss. Do a ping test to see if packet loss occurs.

- Summary addresses are used to enhance performance.
  Summary addresses can enhance performance by reducing the size of the Link State database, reducing the amount of data the Brocade device needs to send to its neighbors, and reducing the CPU cycles used for IS-IS.

  When you configure a summary address, the address applies only to Level-2 routes by default. You can specify Level-1 only, Level-2 only, or Level-1 and Level-2 when you configure the address.

  To configure a summary address, enter a command similar to the following example.

Brocade(config-isis-router-ipv4u)# summary-address 192.168.0.0 10.255.0.0

This command configures a summary address for all Level-2 IS-IS route destinations between 192.168.1.0 and 192.168.255.255.

Syntax: \[no\] summary-address ip-addr subnet-mask [level-1 | level-1-2 | level-2]

The ip-addr subnet-mask variables specify the aggregate address. The mask indicates the significant bits in the address. Ones are significant, and zeros allow any value. In the example, the mask 10.255.0.0 matches on all addresses that begin with 192.168 and contain any values for the final two octets.

The level-1 | level-1-2 | level-2 parameter specifies the route types to which the aggregate route applies. The default is level-2.
VRRP and VRRP-E

This section describes how to troubleshoot the IP VRRP and VRRP-E environments for the Brocade NetIron XMR and Brocade MLX series routers.

Virtual Router Redundancy Protocol (VRRP) is an election protocol that provides alternate router paths for a host without changing the IP address or MAC address by which the host knows its gateway.

Virtual Router Redundancy Protocol Extended (VRRP-E) is a proprietary version of VRRP that overcomes limitations in the standard protocol.

VRRP show commands

This section describes the show commands that display VRRP information.

show ip vrrp

Syntax: show ip vrrp [brief | ethernet slotnum/portnum | ve num | vrid num | statistics]

- **brief** - Displays IPv4 VRRP summary information. If you do not use this parameter, detailed information is displayed instead.
- **ethernet slotnum/portnum** - Specifies an Ethernet port. If you use this parameter, the command displays IPv4 VRRP information only for the specified port.
- **ve num** - Specifies a virtual interface. If you use this parameter, the command displays IPv4 VRRP information only for the specified virtual interface.
- **vrid num** - Displays IPv4 VRRP information only for the specified virtual router ID.
- **statistics** - Displays statistics.

show ip vrrp brief

Syntax: show ip vrrp brief

This command displays IPv4 VRRP summary information, as shown in the following example.

Brocade# show ip vrrp brief
Total number of VRRP-Extended routers defined: 4
Inte- VRID Current  P  State  Master IP       Backup IP       Virtual IP
face      Priority           Address         Address         Address
-----------------------------------------------------------------------------
v10   1    100         Init   Unknown         Unknown         192.168.1.1
v20   1    100         Init   Unknown         Unknown         10.10.20.1
v30   1    100         Init   Unknown         Unknown         10.10.30.1
v100  1    100         Init   Unknown         Unknown         10.10.100.1

show ip vrrp-extended

Syntax: show ip vrrp-extended [brief | ethernet slotnum/portnum | ve num | vrid num | statistics]

- **brief** - Displays IPv4 VRRP-E summary information.
- **ethernet slotnum/portnum** - Specifies an Ethernet port. If you use this parameter, the command displays IPv4 VRRP-E information only for the specified port.
• **ve num** - Specifies a virtual interface. If you use this parameter, the command displays IPv4 VRRP-E information only for the specified virtual interface.

• **vrid num** - Displays IPv4 VRRP-E information only for the specified virtual router ID.

• **statistics** - Displays statistics.

The following example shows the output from the `show ip vrrp-extended ethernet slotnum/portnum` command.

```plaintext
Brocade# show ip vrrp-extended ethernet 1/1
Interface ethernet 1/1
auth-type md5-authentication key $$$$$$
VRID 1
state master
administrative-status enabled
version v2
mode owner
priority 255
current priority 255
hello-interval 1000 msec
ip-address 10.0.0.3
virtual mac address 0000.0000.0101
advertise backup: disabled
next hello sent in 00:00:00.1
```

The following example shows output from the `show ip vrrp-extended statistics` command.

```plaintext
Brocade# show ip vrrp-extended statistics
Interface ethernet 1/1
rxed vrrp header error count = 0
rxed vrrp auth error count = 0
rxed vrrp auth passwd mismatch error count = 0
rxed vrrp vrid not found error count = 0
VRID 1
rxed arp packet drop count = 0
rxed ip packet drop count = 0
rxed vrrp port mismatch count = 0
rxed vrrp ip address mismatch count = 0
rxed vrrp hello interval mismatch count = 0
rxed vrrp priority zero from master count = 0
transitioned to master state count = 1
transitioned to backup state count = 1
```

**show ipv6 vrrp**

Syntax: `show ipv6 vrrp [brief | ethernet slotnum/portnum | statistics | ve num | vrid num]`

• **brief** - Displays IPv6 VRRP summary information.

• **ethernet slotnum/portnum** - Limits the display of IPv6 VRRP information only to the specific Ethernet interface.

• **statistics** - Displays virtual router statistics.

• **ve num** - Displays IPv6 VRRP information only for the specified virtual interface.

• **vrid num** - Displays IPv6 VRRP information only for the specified virtual router ID.

**show ipv6 vrrp brief**

Syntax: `show ipv6 vrrp brief`
This command displays IPv6 VRRP summary information.

Brocade# show ip vrrp brief
Total number of VRRP routers defined: 1
Flags Codes - P:Preempt 2:V2 3:V3
Intf  VRID  CurrPrio Flags  State  Master-IPv6- Address  Backup-IPv6- Address  Virtual-IPv6- Address
-------------------------------------------------------------------------------
1/3 13 100 P3 Master Local 2001:DB8::2 fe80::3013:2

show ipv6 vrrp vrid

Syntax:  show ipv6 vrrp vrid num
This command displays IPv6 VRRP information only for the specified virtual router ID.

Brocade# show ipv6 vrrp vrid 13
Interface 1/3
------------------------------------------
auth-type no authentication VRID 13 (index 1)
interface 1/3
state master
administrative-status enabled
version v3
mode non-owner(backup)
virtual mac 0000.0000.020d
priority 100
current priority 100
track-priority 1
hello-interval 200 ms
backup hello-interval 60000 ms
advertise backup disabled
dead-interval 700 ms
preempt-mode true
ipv6-address fe80::3013:2
ipv6-address 2001:DB8::9
next hello sent in 200 ms

show ipv6 vrrp statistics

Syntax:  show ipv6 vrrp statistics
This command displays router statistics information.

Brocade# show ipv6 vrrp statistics
Global IPv6 VRRP statistics
------------------------------------------
- received vrrp packets with checksum errors = 0
- received vrrp packets with invalid version number = 0
- received vrrp packets with unknown or inactive vrid = 0
Interface 1/3
------------------------------------------
VRID 13
- number of transitions to backup state = 1
- number of transitions to master state = 1
- total number of vrrp packets received = 0
  . received backup advertisements = 19
  . received packets with zero priority = 0
  received packets with invalid type = 0
  . received packets with invalid authentication type = 0

Brocade# show ip vrrp brief
Total number of VRRP routers defined: 1
Flags Codes - P:Preempt 2:V2 3:V3
Intf  VRID  CurrPrio Flags  State  Master-IPv6- Address  Backup-IPv6- Address  Virtual-IPv6- Address
-------------------------------------------------------------------------------
1/3 13 100 P3 Master Local 2001:DB8::2 fe80::3013:2

show ipv6 vrrp vrid

Syntax:  show ipv6 vrrp vrid num
This command displays IPv6 VRRP information only for the specified virtual router ID.

Brocade# show ipv6 vrrp vrid 13
Interface 1/3
------------------------------------------
auth-type no authentication VRID 13 (index 1)
interface 1/3
state master
administrative-status enabled
version v3
mode non-owner(backup)
virtual mac 0000.0000.020d
priority 100
current priority 100
track-priority 1
hello-interval 200 ms
backup hello-interval 60000 ms
advertise backup disabled
dead-interval 700 ms
preempt-mode true
ipv6-address fe80::3013:2
ipv6-address 2001:DB8::9
next hello sent in 200 ms

show ipv6 vrrp statistics

Syntax:  show ipv6 vrrp statistics
This command displays router statistics information.

Brocade# show ipv6 vrrp statistics
Global IPv6 VRRP statistics
------------------------------------------
- received vrrp packets with checksum errors = 0
- received vrrp packets with invalid version number = 0
- received vrrp packets with unknown or inactive vrid = 0
Interface 1/3
------------------------------------------
VRID 13
- number of transitions to backup state = 1
- number of transitions to master state = 1
- total number of vrrp packets received = 0
  . received backup advertisements = 19
  . received packets with zero priority = 0
  received packets with invalid type = 0
  . received packets with invalid authentication type = 0
. received packets with authentication type mismatch = 0
. received packets with authentication failures = 0
. received packets dropped by owner = 0
. received packets with ttl errors = 0
. received packets with ipv6 address mismatch = 0
. received packets with advertisement interval mismatch = 0
. received packets with invalid length = 0
- total number of vrrp packets sent = 1175
. sent backup advertisements = 0
. sent packets with zero priority = 0
- received neighbor solicitation packets dropped = 0
- received proxy neighbor solicitation packets dropped = 0
- received ipv6 packets dropped = 0

show ipv6 vrrp-extended

Syntax: show ipv6 vrrp-extended [brief | ethernet slotnum/portnum | statistics | ve num | vrid num]

- **brief** - Displays IPv6 VRRP-E summary information.
- **ethernet slotnum/portnum** - Limits the display of IPv6 VRRP-E information only to the specific Ethernet interface.
- **statistics** - Displays virtual router statistics.
- **ve num** - Displays IPv6 VRRP-E information only for the specified virtual interface.
- **vrid num** - Displays IPv6 VRRP-E information only for the specified virtual router ID.

show ipv6 vrrp-extended brief

Syntax: show ipv6 vrrp-extended brief

This command displays IPv6 VRRP-E summary information.

Brocade# show ipv6 vrrp-extended brief
Total number of VRRP routers defined: 1
Flags Codes - P:Preempt 2:V2 3:V3
Intf VRID CurrPrio Flags State Master-IPv6 Backup-IPv6 Virtual-IPv6
-Address -Address -Address
---------------------------------------------------------
1/3 13 100 P3 Master Local 2001:DB8::2 2001:DB8::99

show ipv6 vrrp-extended vrid

Syntax: show ipv6 vrrp-extended vrid num

This command displays IPv6 VRRP-E information only for the specified virtual router ID.

Brocade# show ipv6 vrrp-extended vrid 13
Interface 1/3
------------------------------------------
auth-type no authentication VRID 13 (index 1)
interface 1/3
state master
administrative-status enabled
mode non-owner(backup)
virtual mac 0000.001d.000d
priority 100
current priority 100
track-priority 5
hello-interval 1 sec
backup hello-interval 60 sec
advertise backup enabled
dead-interval 3.1 sec
preempt-mode true
virtual ipv6 address 2001:DB8::99
next hello sent in 0.1 sec
backup router 2001:DB8::2 expires in 175.0 sec

show ipv6 vrrp-extended statistics

Syntax: show ipv6 vrrp-extended statistics
This command displays virtual router statistics information.

Brocade# show ipv6 vrrp-extended statistics
Global IPv6 VRRP-Extended statistics
-----------------------------
- received vrrp-extended packets with checksum errors = 0
- received vrrp-extended packets with invalid version number = 0
- received vrrp-extended packets with unknown or inactive vrid = 0
Interface 1/3
-----------------------------
VRID 13
- number of transitions to backup state = 1
- number of transitions to master state = 1
- total number of vrrp-extended packets received = 0
  . received backup advertisements = 19
  . received packets with zero priority = 0
  . received packets with invalid type = 0
  . received packets with invalid authentication type = 0
  . received packets with authentication type mismatch = 0
  . received packets with authentication failures = 0
  . received packets dropped by owner = 0
  . received packets with ttl errors = 0
  . received packets with ipv6 address mismatch = 0
  . received packets with advertisement interval mismatch = 0
  . received packets with invalid length = 0
- total number of vrrp-extended packets sent = 1175
  . sent backup advertisements = 0
  . sent packets with zero priority = 0
- received neighbor solicitation packets dropped = 0
- received proxy neighbor solicitation packets dropped = 0
- received ipv6 packets dropped = 0

Clearing VRRP statistics

clear ip vrrp statistics

Syntax: clear ip vrrp statistics
This command clears IPv4 VRRP statistics.

clear ipv6 vrrp statistics

Syntax: clear ipv6 vrrp statistics
This command clears IPv6 VRRP statistics.
Clearing VRRP-E statistics

clear ip vrrp-extended statistics

Syntax: clear ip vrrp-extended statistics
This command clears IPv4 VRRP-E statistics.

clear ipv6 vrrp-extended statistics

Syntax: clear ipv6 vrrp-extended statistics
This command clears IPv6 VRRP-E statistics.

VRRP debug commands

This section describes the debug commands used for monitoring the VRRP environment.

debug ip vrrp

Syntax: [no] debug ip vrrp [all | error | ethernet slotnum/portnum | events | packets | show | state | ve num | verbose | vrid num]

- all - Displays information about all IPv4 VRRP instances (default).
- error - Displays error conditions where a packet is not being processed.
- ethernet slotnum/portnum - Displays information about IPv4 VRRP instances on a specific physical interface.
- events - Displays information about activate and shutdown, port up and port down, timer events, backup VRRP router events, and so on.
- packets - Displays information about IPv4 VRRP transmitted and received packets, including ARP packets.
- show - Shows the current IPv4 VRRP debug settings.
- state - Displays information about IPv4 VRRP state changes, such as monitor transitions from master to backup, or vice versa.
- ve num - Displays information about a specific virtual interface.
- verbose - Decodes hex output into more easily understood fields and values.
- vrid num - Displays information about a specific virtual router ID.

This command displays information about IPv4 VRRP instances. The default is all instances. Several parameters are available to help isolate a specific IPv4 VRRP instance.

VRRP-E controls protocol authentication using the message digest 5 (MD5) authentication algorithm.

If debugging is enabled and MD5 authentication is configured on an interface, the debug ip vrrp command output resembles the following example.

Brocade# debug ip vrrp
Aug 10 18:17:39 VRRP6: Configuration VRRP_CONFIG_MD5_AUTHENTICATION request received
Aug 10 18:17:39 VRRP6: Port 2/6, VRID 2 - send advertisement
  Ver:3 Type:1 Vrid:2 Pri:240 #IF:1 AuthType:2 Adv:1 Chksum:0x0000
  HMAC-MD5 CODE:[000000000000000004000010]
If debugging is enabled and MD5 authentication is valid with its VRRP-E peer, the `debug ip vrrp` command output resembles the following example.

Brocade# debug ip vrrp
Ver:3 Type:1 Vrid:2 Pri:255 #IP:1 AuthType:2 Adv:1 Chksum:0x0000
HMAC-MD5 CODE:[00000000000000000400010]
IpAddr: 2001:DB8::40:10

If debugging is enabled and MD5 authentication fails, the `debug ip vrrp` command output resembles the following example.

Brocade# debug ip vrrp
Aug 10 18:32:32 VRRP6: Dropping pkt on port 2/6, vrid 2 - md5 authentication failed
debAug 10 18:32:33 VRRP6: Port 2/6, VRID 2 - send advertisement
Ver:3 Type:1 Vrid:2 Pri:240 #IP:1 AuthType:2 Adv:1 Chksum:0x0000
HMAC-MD5 CODE:[00000000000000000400010]
IpAddr: 2001:DB8::40:10

dump ipv6 vrrp

Syntax: [no] debug ipv6 vrrp [all | error | ethernet slotnum/portnum | events | packets | show | state | ve num | verbose | vrid num]

- **all** - Displays information about all IPv6 VRRP instances.
- **error** - Displays error conditions where a packet is not being processed.
- **ethernet slotnum/portnum** - Displays information about IPv6 VRRP instances on a specific physical interface.
- **events** - Displays information about activate and shutdown, port up and port down, timer events, backup VRRP router events, and so on.
- **packets** - Displays information about IPv6 VRRP transmitted and received packets, including ARP packets.
- **show** - Displays the current IPv6 VRRP debug settings.
- **state** - Displays information about IPv6 VRRP state changes, such as monitor transitions from master to backup, or vice versa.
- **ve num** - Displays information about a specific virtual interface.
- **verbose** - Decodes hex output into more easily understood fields and values.
- **vrid num** - Displays information about a specific virtual router ID.

This command displays information about IPv6 VRRP instances. The default is all instances. Several parameters are available to help isolate a specific IPv6 VRRP instance.

The command output resembles the following example.

Brocade# debug ipv6 vrrp
IPv6 VRRP: debugging is on
VRRP6: Port 1/3, VRID 23 - send advertisement
Ver:3 Type:1 Vrid:23 Pri:100 #IP:2 AuthType:0 Adv:100 Chksum:0xd37c
IpAddr: fe80::3013:2 2001:DB8::2
VRRP6: Port 1/3, VRID 23 - send advertisement
Ver:3 Type:1 Vrid:23 Pri:100 #IP:2 AuthType:0 Adv:100 Chksum:0xd37c
IpAddr: fe80::3013:2 2001:DB8::2
Configuration notes

The following rules apply to VRRP-E configurations:

- The interfaces of all routers in a virtual router must be in the same IP subnet.
- The IP address assigned to the virtual router cannot be configured on any of the Brocade devices.
- The address you enter with the `ip-address` command cannot be the same as a real IP address configured on the interface.
- The hello interval must be set to the same value on all the Brocade devices.
- The dead interval must be set to the same value on all the Brocade devices.
- The track priority for a virtual router must be lower than the VRRP-E priority.
- When you configure the Master (Owner), the address you enter with the `ip-address` command must already be configured on the interface.
- When you configure a Backup router, the router interface on which you are configuring the virtual router must have a real IP address that is in the same subnet (but is not the same address) as the address associated with the virtual router by the Owner.
- If you disable VRRP-E, the router removes all information for the disabled protocol from the running configuration. When you save to the startup configuration after disabling the protocol, all information for the disabled protocol is removed from the startup configuration.

**CAUTION**

You must configure a VRF on an interface before configuring a Virtual Router (VRRP-E) on it. If you enable the Virtual Router before you enable the VRF, the Virtual Router configuration will be deleted.

DHCPv6

Dynamic Host Configuration Protocol for IPv6 (DHCPv6) enables DHCP servers to pass configuration parameters such as IPv6 network addresses to IPv6 nodes, and controls automatic allocation of reusable network addresses.

DHCPv6 allows a DHCPv6 server to dynamically delegate IPv6 prefixes to a DHCPv6 client using the DHCPv6 Prefix Delegation (PD) option. Using the DHCPv6 relay agent PD notification feature, service providers automatically delegate IPv6 prefixes to a customer-premises equipment (CPE) which acts as a DHCPv6 client. The CPE then assigns IPv6 subnets from the delegated IPv6 prefix to its downstream customer interfaces.

**DHCPv6 debug commands**

This section describes the DHCPv6-related debug commands.

```
debug ipv6 dhcp
```

Syntax: `[no] debug ipv6 dhcp [pd all | pd flash | pd pd-option | pd static | sync]`
DHCPv6

- **pd all** - Enables all IPv6 PD debugging.
- **pd flash** - Enables PD debugging for read and write to a flash file.
- **pd pd-option** - Enables debugging for processing of PD options in DHCPv6 messages.
- **pd static** - Enables debugging of DHCPv6 interface with IPv6 static route module.
- **sync** - Enables debugging of DHCPv6 synchronization between active and standby Management Processors (MPs).

### debug ipv6 dhcp pd all

**Syntax:** `[no] debug ipv6 dhcp pd all`  
This command enables all IPv6 PD debugging. Command output resembles the following example.

```
Brocade# debug ipv6 dhcp pd all
DHCP6 PD: all debugging is on
Oct 27 22:16:44.845 DHCP6 PD: writing data to file dhcp6_delegated_prefixes_data
```

### debug ipv6 dhcp pd flash

**Syntax:** `[no] debug ipv6 dhcp pd flash`  
This command enables PD debugging for read and write to a flash file. Command output resembles the following example.

```
Brocade# debug ipv6 dhcp pd flash
Nov  7 19:14:02 DHCP6 PD: writing data to file dhcp6_delegated_prefixes_data
Nov  7 19:14:02 DHCP6 PD: 2 entries saved to flash file
Nov  7 19:12:26 DHCP6,PD: Calendar Time when file last updated was : 18:47:37
Nov  7 19:12:26 DHCP6,PD: Current Calendar Time: 19:12:26 GMT+00 Mon Nov 07 2011
Nov  7 19:12:26 DHCP6 PD: reading file dhcp6_delegated_prefixes_data. Time difference is 1489
Nov  7 19:12:26 DHCP6 PD: Parsing line
Nov  7 19:12:26 DHCP6 PD: Parsing line #VRF Name   IPv6_Prefix
Client              Interface LeaseTime Checksum
Nov  7 19:12:26 DHCP6 PD: Parsing successful for default-vrf 2001:DB8:100::/48
2001:DB8:1::1          eth 1/9    3600 00001230
```

### debug ipv6 dhcp pd pd-option

**Syntax:** `[no] debug ipv6 dhcp pd pd-option`  
This command enables debugging for processing of PD options in DHCPv6 messages. Command output resembles the following example.
IPv6 neighbor discovery debug commands

This section describes the debug commands that are helpful in debugging neighbor discovery for IPv6 (ND6) feature.

**debug ipv6 ra**

**Syntax:** debug ipv6 ra

This command displays debugging information related to ND6 Router Advertisement (RA) messages.

Brocade# debug ipv6 ra
Jun 28 10:27:13.147 ICMPv6-RA: DNS server list with lifetime 800
Jun 28 10:27:13.147 DNS address 1::2
Jun 28 10:27:13.147 DNS address 1::1
Jun 28 10:27:13.147 ICMPv6-RA: Domain name list with lifetime 800
Jun 28 10:27:13.147 dnssl_config->domain_name abc.com, dns_name 3abc3com
Inter-VRF routing

Inter-VRF routing allows leaking of specific route prefixes from one Virtual Routing and Forwarding (VRF) instance to another VRF on the same router, thereby eliminating the need for external routing or loopback interfaces to selectively access the network. This feature is useful in cases where all VRFs share the same path to reach an external domain, while maintaining their internal routing information limited to their own VRF.

Inter-VRF routing show commands

This section describes the show commands that display information related to inter-VRF routing.

show ip rtm inter-vrf-list

Syntax:  show ip rtm inter-vrf-list

This command displays a global list of IPv4 VRF nodes processed by the Routing Table Manager (RTM) every 100 ms. The elements in the list are either importing routes from other VRFs or exporting routes to other VRFS. Command output resembles the following example.

Brocade# show ip rtm inter-vrf-list
List of vrf nodes which are processed for every 100msec
VRF :vpn1
VRF :vpn5
VRF :vpn7
VRF :vpn8
VRF :vpn4

show ipv6 rtm inter-vrf-list

Syntax:  show ipv6 rtm inter-vrf-list

This command displays a global list of IPv6 VRF nodes processed by the RTM every 100 ms. Command output resembles the following example.

Brocade# show ipv6 rtm inter-vrf-list
List of ipv6 vrf nodes which are processed for every 100msec
VRF :default-vrf
VRF :vpn4

show ip rtm [vrf vrf-name] [inter-vrf-route-change-list | inter-vrf-imported-vrf-list | inter-vrf-export-list]

- **vrf vrf-name** - Specifies the name of the VRF instance.
- **inter-vrf-route-change-list** - Displays a list of changed IP route entries for a specific VRF, which is yet to be leaked to another VRF.
- **inter-vrf-imported-vrf-list** - Displays a list of imported route entries for a specific VRF.
- **inter-vrf-export-list** - Displays a list of exported route entries for a specific VRF.

The `show ip rtm vrf vrf-name inter-vrf-route-change-list` command displays a list of changed IP route entries for a specified VRF, which is yet to be leaked to another VRF. Command output resembles the following example.

Brocade# show ip rtm vrf vpn1 inter-vrf-route-change-list
Leaked route list count: 208 for VRF:vpn1
   IP address: 10.13.34.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.35.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.36.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.37.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.38.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.39.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.40.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.41.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.42.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.43.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.44.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.45.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.46.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.47.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.48.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s
   IP address: 10.13.49.0, prefix_length:24, type:4, sub_type: 3, action: 2, time_stamp: 18m33s

The show ip rtm vrf vrf-name inter-vrf-imported-vrf-list command displays a list of source VRFs with configuration changes, the last VRF index, and the route index processed in the last 100 ms. Command output resembles the following example.

Brocade# show ip rtm vrf vpn8 inter-vrf-imported-vrf-list
Imported list for VRF:vpn8
   VRF:vpn7, index: 5, route_map:ml

The show ip rtm vrf vrf-name inter-vrf-export-list command displays a list of exported route entries for the specified VRF. Command output resembles the following example.

Brocade# show ip rtm vrf vpn7 inter-vrf-export-list
exported list for VRF:vpn7
   VRF:vpn8, index: 6

show ipv6 rtm

Syntax: show ipv6 rtm [vrf vrf-name] [inter-vrf-route-change-list | inter-vrf-imported-vrf-list | inter-vrf-export-list]

- **vrf vrf-name** - Specifies the name of the VRF instance.
- **inter-vrf-route-change-list** - Displays a list of changed IPv6 route entries for a specific VRF, which is yet to be leaked to another VRF.
- **inter-vrf-imported-vrf-list** - Displays a list of imported route entries for a specific VRF.
- **inter-vrf-export-list** - Displays a list of exported route entries for a specific VRF.
The `show ipv6 rtm vrf vrf-name inter-vrf-route-change-list` command displays a list of changed IPv6 route entries for a specific VRF, which is yet to be leaked to another VRF. Command output resembles the following example.

Brocade# show ipv6 rtm vrf vpn1 inter-vrf-route-change-list
Leaked route list count: 208 for VRF:vpn1
  IPv6 address: 2001:DB8:73::73, prefix_length:24, type:4, sub_type: 3,
  action: 2, time_stamp: 18m33s
  IPv6 address: 2001:DB8:83::83, prefix_length:24, type:4, sub_type: 3,
  action: 2, time_stamp: 18m33s
  IPv6 address: 2001:DB8:93::93, prefix_length:24, type:4, sub_type: 3,
  action: 2, time_stamp: 18m33s

The `show ipv6 rtm vrf vrf-name inter-vrf-imported-vrf-list` command displays a list of imported route entries for a specific VRF. Command output resembles the following example.

Brocade# show ipv6 rtm vrf vpn8 inter-vrf-imported-vrf-list
Imported list for VRF:vpn8
  VRF:vpn7, index: 5, route_map:ml

The `show ipv6 rtm vrf vrf-name inter-vrf-export-list` command displays a list of exported route entries for a specific VRF. Command output resembles the following example.

Brocade# show ipv6 rtm vrf vpn7 inter-vrf-export-list
exported list for VRF:vpn7
  VRF:vpn8, index: 6

**Inter-VRF routing debug commands**

This section describes the debug commands related to inter-VRF routing.

**debug ip rtm inter-vrf-routing**

*Syntax: [no] debug ip rtm inter-vrf-routing*

This command enables inter-VRF routing debugging for IPv4 routes. Command output resembles the following example.

Brocade# debug ip rtm inter-vrf-routing
Mar 26 11:11:24.436 VRF:vpn1 is added to imported list of VRF:vpn4 with route_map:ospfmetric
Mar 26 11:11:24.436 import route-map is changed for vrf vpn4 for src-vrf vpn1
Mar 26 11:11:24.436 VRF:vpn1 is added to changed list of VRF:vpn4 with flags :1
Mar 26 11:11:24.436 VRF:vpn4 is added to export list of VRF vpn1
Mar 26 11:11:24.517 Processing the changed node list for VRF:vpn4
Mar 26 11:11:24.517 Processing the VRF:vpn1 operation:1,clear_ip_route:0,
cleaning_stale_entries:0, clear_ip_route_op_pending:0
Mar 26 11:11:24.614 Processing the changed node list for VRF:vpn4
Mar 26 11:11:24.614 Processing the VRF:vpn1 operation:1,clear_ip_route:0,
cleaning_stale_entries:0, clear_ip_route_op_pending:0

**debug ipv6 rtm inter-vrf-routing**

*Syntax: [no] debug ipv6 rtm inter-vrf-routing*

This command enables inter-VRF routing debugging for IPv6 routes. Command output resembles the following example.

Brocade# debug ipv6 rtm inter-vrf-routing
RTM failure counter API

Routing Table Manager (RTM) failure counters store information about the number of failed operations along with the number of routes added, modified, and deleted in the routing table on a per-protocol basis.

RTM API show commands

This section describes the show commands that display information about RTM counters.

show ip rtm api

Syntax: show ip rtm api

This command displays information about RTM failure statistics along with the number of IP routes added, modified, and deleted in the routing table on a per-protocol basis. Command output resembles the following example.
Brocade# show ip rtm api

RTM API Call Stats for vrf default-vrf safi 0:

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<tr>
<th></th>
<th>Total</th>
<th>Local</th>
<th>Connect</th>
<th>Static</th>
<th>RIP</th>
<th>OSPF</th>
<th>ISIS</th>
<th>BGP</th>
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Total
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RTM_DEL_LABEL : 0
RTM_RE_ENTRY : 0

RTM_ADD_FAIL

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RTM_MOD_FAIL

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RTM_DEL_FAIL

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RTM API Call Stats for vrf default-vrf safi 1:

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</table>

Total
RTM_ADD_LABEL : 0
RTM_DEL_LABEL : 0
RTM_RE_ENTRY : 0

RTM_ADD_FAIL

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RTM_MOD_FAIL

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</tr>
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<td>INVALID_ROUTE</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

RTM_DEL_FAIL

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Connect</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVALID_ROUTE</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

show ipv6 rtm api

Syntax: show ipv6 rtm api
This command displays information about RTM failure statistics along with the number of IPv6 routes added, modified, and deleted in the routing table on a per-protocol basis. Command output resembles the following example.

```plaintext
Brocade# show ipv6 rtm api
RTM API Call Stats for vrf default-vrf safi 0:

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Local</th>
<th>Connect</th>
<th>Static</th>
<th>RIP</th>
<th>OSPF</th>
<th>ISIS</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM_ADD</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>RTM_MOD</td>
<td>8</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RTM_DEL</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTM_RE_ENTRY</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

```plaintext
RTM next-hop debug commands
```

```plaintext
RTM API Call Stats for vrf default-vrf safi 1:

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Connect</th>
<th>Static</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM_ADD</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RTM_MOD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RTM_DEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTM_RE_ENTRY</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

```plaintext
RTM ADD_FAIL

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Connect</th>
<th>Static</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM_RESET</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>INVALID_COST</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MALLOC_FAIL</td>
<td>9</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>FILTER_DENY</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>RTM_MOD_FAIL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTM_RESET</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>INVALID_COST</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MALLOC_FAIL</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>FILTER_DENY</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

```plaintext
RTM MOD_FAIL

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Connect</th>
<th>Static</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM_RESET</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>INVALID_COST</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PATH_FAIL</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>MALLOC_FAIL</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>FILTER_DENY</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

```plaintext
RTM DEL_FAIL

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Connect</th>
<th>Static</th>
<th>BGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM_RESET</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>INVALID_COST</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MALLOC_FAIL</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>INVALID_ROUTE</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
```
This section describes the debug command that displays information about the RTM next hop and route update.

**debug ipv6 rtm nexthop**

**Syntax: debug ipv6 rtm nexthop**

This command enables debugging for the IPv6 nexthop table and displays information about various next-hop related events. Command output resembles the following example.

Brocade# debug ipv6 rtm nexthop
Aug  9 16:56:30.200 RTM6(default-vrf/0): allocate_nh id 1597, got id 1597, path 1 (::, ve 60)
Aug  9 16:56:30.200 RTM6(default-vrf/0): pack ipv6 nh entry, mode 4, id 1597, path 1 (::, ve 60)
Aug  9 16:56:30.200 RTM6: pack ipv6 route entry: length of packet 89 and each route size is 34
Aug  9 16:56:30.200 RTM6(default-vrf/0): pack ipv6 route 2001:DB8::/64
Aug 9 16:56:30.200 RTM6(default-vrf/0): pack ipv6 nh entry to standby MP, mode 4, id65536, path 1

**debug ip rtm nexthop**

**Syntax: debug ip rtm nexthop**

This command enables debugging for the IPv4 nexthop table and displays information about various next-hop related events. Command output resembles the following example.

Brocade# debug ip rtm nexthop
Aug 29 16:24:51.840 RTM(default-vrf/0): allocate_nh id 65535, got id 65537, path 1 (30.1.1.43, eth 2/1)
Aug 29 16:24:51.840 RTM defaults-vrf/0): pack ip nh entry, mode 4, id 65537, path 1 (30.1.1.43, eth 2/1)
Aug 29 16:24:51.840 RTM(default-vrf/0): pack ip nh entry to standby MP, mode 4, id 65537, path 1
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• QoS ............................................. 352
• Traffic management ................... 366
• Route map .................................. 370
• Telemetry solutions .................. 371

This chapter provides diagnostic information for Access Control List (ACL) and Quality of Service (QoS) environments, including traffic management.

ACLs

Access Control List (ACL) debug and show commands help users to diagnose and determine the cause of faults for ACL-related features. For details on Layer 2 ACLs, refer to the Layer 2 ACL chapter in the NetIron Series Configuration Guide.

ACL show commands

This section describes the show commands that display ACL information.

show access-list

Syntax:  show access-list number | all

This command displays the IPv4 ACLs configured on a Brocade device.

Enter the ACL number for the number variable:

• 1 through 99 for standard ACLs
• 100 through 199 for extended ACLs

Enter all to display information for all ACLs configured on the device.

For a numbered ACL, enter a command similar to the following example.

Brocade# show access-list 99
ACL configuration:
!
Standard IP access list 10
access-list 99 deny host 10.10.10.1
access-list 99 permit any
show access-list name

Syntax: show access-list name acl-name

The acl-name variable specifies the name of the ACL.

This command displays the named IPv4 ACLs configured on a Brocade device. Command output resembles the following example.

Brocade# show access-list name xGW_Filter2

Extended IP access list  xGW_Filter2
  0: permit ip host 10.33.44.55 any
  1: permit ip any any

When the display-config-format option is configured, the show access-list name command output resembles the following example

Brocade# show access-list name xGW_Filter2

ip access-list extended xGW_Filter2
  permit vlan 2405 ip host 10.33.44.55 any
  permit vlan 3000 ip any any

show access-list accounting brief

Syntax: show access-list accounting brief [l2 | policy-based-routing | rate-limit]

- l2 - Limits the display to Layer 2 ACL accounting information.
- policy-based-routing - Limits the display to policy-based routing accounting information.
- rate-limit - Limits the display to rate limiting ACL accounting information.

If no option is specified, IPv4 ACL accounting statistics are displayed.

To display a brief summary of the number of hits in all ACLs on a device, enter the following command.

Brocade# show access-list accounting brief

Collecting ACL accounting summary for VE 1 ...  Completed successfully.
ACL Accounting Summary: (ac = accumulated since accounting started)

<table>
<thead>
<tr>
<th>Int</th>
<th>In ACL</th>
<th>Total In Hit</th>
<th>Out ACL</th>
<th>Total Out Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td>VE 1</td>
<td>111</td>
<td>473963(1s)</td>
<td>25540391(1m)</td>
<td>87014178(5m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>112554569(ac)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

show access-list accounting

Syntax: show access-list accounting [ethernet slotnum/portnum | pos slotnum/portnum | ve ve-number] [in | out] [l2 | policy-based-routing | rate-limit]

- ethernet slotnum/portnum - Displays a report for an Ethernet interface.
- pos slotnum/portnum - Displays a report for a POS port.
- ve ve-number - Displays a report for the ports that are included in a virtual routing interface. For example, if ports 1/2, 1/4, and 1/6 are all members of ve 2, the report includes information for all three ports.
- in - Displays statistics for incoming traffic.
- out - Displays statistics for outgoing traffic.
- **l2** - Limits the display to Layer 2 ACL accounting information.
- **policy-based-routing** - Limits the display to policy-based routing accounting information. This option is only available for incoming traffic.
- **rate-limit** - Limits the display to rate limiting ACL accounting information.

This command displays statistics for an interface, as shown in the following example.

```bash
Brocade# show access-list accounting ve 1 in
Collecting ACL accounting for VE 1 ... Completed successfully.
ACL Accounting Information:
Inbound: ACL 111
  1: deny tcp any any
      Hit count: (1 sec)               237000   (1 min)12502822
      (5 min)                         87014178   (accum) 99517000
  3: permit ip any any
      Hit count: (1 sec)               236961   (1 min) 13037569
      (5 min)                         0   (accum) 13037569
  0: deny tcp 10.1.1.0 10.0.0.255 10.2.2.0 10.0.0.255
      Hit count: (1 sec)                    0   (1 min) 0
      (5 min)                         0   (accum) 0
  2: deny udp any any
      Hit count: (1 sec)                    0   (1 min) 0
      (5 min)                         0   (accum) 0
```

**show access-list subnet-broadcast accounting**

Syntax: `show access-list subnet-broadcast accounting [ethernet slotnum/portnum | pos slotnum/portnum | ve ve-number]`

- **ethernet slotnum/portnum** - Specifies the Ethernet interface for which you want to display the accounting information.
- **pos slotnum/portnum** - Specifies the POS interface for which you want to display the accounting information.
- **ve ve-number** - Specifies the VE interface for which you want to display the accounting information.

This command displays the accounting information for an IP broadcast ACL at the IP interface level, as shown in the following example.

```bash
Brocade# show access-list subnet-broadcast accounting ethernet 4/1
Subnet broadcast ACL 120
  0: permit udp host 10.10.10.1 host 10.20.20.255
      Hit count: (1 sec)                    0   (1 min) 0
      (5 min)                         0   (accum) 0
  1: permit tcp host 10.10.10.1 host 10.20.20.255
      Hit count: (1 sec)                   10   (1 min) 67
      (5 min)                         0   (accum) 67
  2: deny ip any any
      Hit count: (1 sec)                    0   (1 min) 0
      (5 min)                         0   (accum) 0
```

**show access-list subnet-broadcast accounting global**

Syntax: `show access-list subnet-broadcast accounting global`

This command displays the accounting information for an IP broadcast ACL at the global level, as shown in the following example.

```bash
Brocade# show access-list subnet-broadcast accounting global
```
Subnet broadcast ACL 1

0: permit enable-accounting host 10.1.1.2
Hit count: (1 sec) 2 (1 min) 150
(5 min) 0 (accum) 384

**show ipv6 access-list**

**Syntax:**  show ipv6 access-list

This command displays the IPv6 ACLs configured on a Brocade device. Command output resembles the following example.

Brocade# show ipv6 access-list Test_v6

ipv6 access-list Test_v6: 2 entries
10: permit ipv6 2001:DB8::/64 any
20: deny ipv6 any any

When the display-config-format option is configured, the **show ipv6 access-list** command output resembles the following example.

Brocade# show ipv6 access-list Test_v6

ip access-list extended Test_filter1
permit vlan 112 ip host 10.100.50.1 any
permit vlan 114 udp any eq 2075 any

**Clearing ACL statistics**

Statistics on the ACL account report can be cleared in the following situations:

- When a software reload occurs
- When the ACL is bound to or unbound from an interface
- When you enter the **clear access-list** command

**clear access-list**

**Syntax:**  clear access-list [all | ethernet slotnum/portnum | pos slotnum/portnum | ve ve-num]

- **all** - Clears all statistics for all ACLs.
- **ethernet slotnum/portnum** - Clears statistics for ACLs on an Ethernet port.
- **pos slotnum/portnum** - Clears statistics for ACLs on a POS port.
- **ve ve-num** - Clears statistics for all ACLs bound to ports that are members of a virtual routing interface.

**clear access-list subnet-broadcast accounting global**

**Syntax:**  clear access-list subnet-broadcast accounting global

This command clears the accounting information for an IP broadcast ACL at the global level.

**clear access-list subnet-broadcast accounting**

**Syntax:**  clear access-list subnet-broadcast accounting [ethernet slotnum/portnum | pos slotnum/portnum | ve ve-number]

This command clears the accounting information for an IP broadcast ACL at the IP interface level.
The **ethernet**, **pos**, and **ve** keywords specify the interfaces for which you want to clear the accounting information.

### ACL debug commands

This section describes how to use diagnostic debug commands to monitor Layer 2 and Layer 4 ACLs for Brocade NetIron XMR series and Brocade MLX series routers.

**NOTE**

To save space, date and time stamps have been removed from all output examples.

In most Layer 4 instances, a debug command must be accompanied by a user activity, such as binding or unbinding an ACL. In a few instances, background activity for Layer 4 ACLs is displayed simply by enabling the debug function. Many of the debug ACL commands work in conjunction with related show commands, as described in the examples in this chapter.

**debug access-list**

**Syntax:** `[no] debug access-list [accounting | ipv4 | ipv6 | l2 | mirror | policy-based-routing | rate-limit | receive | lsp-out-acl]`

- **accounting** - Displays ACL accounting statistics.
- **ipv4** - Displays information about IPv4 ACLs.
- **ipv6** - Displays information about IPv6 ACLs.
- **l2** - Displays information about Layer 2 ACLs.
- **mirror** - Displays ACL-based mirroring.
- **policy-based-routing** - Displays information about policy-based routing activity.
- **rate-limit** - Displays information about ACL-based rate limiting.
- **receive** - Displays information about IP receive ACLs.
- **lsp-out-acl** - Displays information about Label Switched Path (LSP) accounting.

**debug access-list accounting**

**Syntax:** `[no] debug access-list accounting`

This command displays information about inbound or outbound ACL accounting activity. The following example shows inbound rate limit accounting for port 4/2.
7  ACLs

Brocade# debug access-list accounting
Brocade# show access-list accounting ethernet 4/2 in rate-limit
RL ACL accounting: retrieve for one interface
RL ACL accounting: retrieve for port 4/2, acl 101, outbound 0
RL ACL accounting: retrieve for port 4/2, acl 102, outbound 0
RL ACL Accounting Information:
Inbound: ACL 101
0: permit tcp any any
Hit count: (1 sec) 70 (1 min) 0 (5 min) 0 (accum) 0
1: deny ip any any
Hit count: (1 sec) 0 (1 min) 0 (5 min) 0 (accum) 0
ACL 102
0: permit ip 192.168.2.0 10.0.0.255 10.1.1.0 10.0.0.255
Hit count: (1 sec) 0 (1 min) 0 (5 min) 0 (accum) 0
1: deny ip 192.168.2.0 10.0.0.255 10.1.1.0 10.0.0.255
Hit count: (1 sec) 0 (1 min) 0 (5 min) 0 (accum) 0
2: deny ip any any
Hit count: (1 sec) 0 (1 min) 0 (5 min) 0 (accum) 0

debug access-list ipv4

**Syntax:** [no] debug access-list ipv4

This command generates information about IPv4 access list activity. The following example displays information about inbound activity for access group 101.

Brocade# debug access-list ipv4
Brocade# ip access-gr 101 in
Bind/Unbind ACL: ACL 101, port 4/2, add 1, outbound 0
Send ITC ACL bind/unbind message: ACL_ID=101, name=, port=121, add=1, dir=in, mask=
Received ITC ACL bind/unbind message: ACL type 0, ACL 101, add 1, outbound 0
COMMAND << ip access-group 101 in>>
Generated ACL binding command for LP: ip access-group 101 in

debug access-list l2

**Syntax:** [no] debug access-list l2

This command generates information about Layer 2 ACL activity, as shown in the following example, which shows Layer 2 inbound accounting information for interface 4/2.

Brocade# debug access-list l2
Brocade# show access-list accounting ethernet 4/2 in l2
L2 ACL accounting: retrieve for one interface
L2 ACL accounting: retrieve for port 4/2, acl 410, outbound 0
Collecting L2 ACL accounting for 410 on port 4/2 ... Completed successfully.
L2 ACL Accounting Information:
Inbound: ACL 410
0: permit 0000.0000.0001 0000.00ff.ffff any any
Hit count: (1 sec) 70 (1 min) 0 (5 min) 0 (accum) 0
1: deny any any any
Hit count: (1 sec) 0 (1 min) 0 (5 min) 0 (accum) 0

debug access-list policy-based-routing

**Syntax:** [no] debug access-list policy-based-routing
This command generates information about access list policy-based routing, as shown in the following example.

```bash
Brocade# debug access-list policy-based-routing
Policy-Based Routing: debugging is on
PBR: Routemap refresh timer callback
IPv6 PBR: next_hop 2001:DB8::1 is resolved to port 1/6(5), VLAN 50, DA 0000.008c.ff00
IPv6 PBR: Routemap ipv6_pbr_map: ipv6 nexthop 2001:DB8::1 - resolved
IPv6 PBR: Routemap ipv6_pbr_map instance 10 - number of nexthops 1
IPv6 PBR: PPCR 3:1: Update nexthop entries for ipv6_pbr_map
IPv6 PBR: PPCR 3:1: 3/1: Update nexthop entries for ipv6_pbr_map
IPv6 PBR: PPCR 3:2: Update nexthop entries for ipv6_pbr_map
```

**debug access-list rate-limit**

**Syntax:** `[no] debug access-list rate-limit`

This command generates information about rate limiting for IPv4 access lists. To establish a rate limit for the access group you want to observe, enter commands similar to the following example.

```bash
Brocade# debug access-list rate-limit
Brocade# rate-limit in access-group 101 500000000 750000000
Brocade# ip access-gr 101 in
Bind/Unbind ACL: ACL 101, port 4/2, add 1, outbound 0
Send ITC ACL bind/unbind message: ACL_ID=101, name=, port=121, add=1, dir=in, mask=
Received ITC ACL bind/unbind message: ACL type 0, ACL 101, add 1, outbound 0
COMMAND < ip access-group 101 in>
Generated ACL binding command for LP: ip access-group 101 in
ACL-based Rate-Limiting: debugging is ON
```

**debug access-list receive generic**

**Syntax:** `[no] debug access-list receive generic`

This command generates information about generic access list receive activity, as shown in the following example for access-list 101, sequence 10, which shows an ACL bind/unbind message being sent and received.

```bash
Brocade# debug access-list receive generic
Brocade# ip receive access-list 101 sequence 10
Send ITC Receive ACL bind/unbind message:
  ACL ID 101
  Sequence num 10
  Policy name
  strict acl enabled FALSE
  add 1
Received ITC Receive-ACL bind/unbind message:
  ACL ID 101
  Sequence num 10
  Policy name
  strict acl enabled FALSE
  add 1
IP Receive ACL: Set global ACL 101 sequence 10 add 1
IP Receive ACL: Create/update ACL 101
Generated IP Receive ACL binding command for LP: ip receive access-list
```
debug access-list lsp-out-acl

Syntax: [no] debug access-list lsp-out-acl [cam | generic]

- **cam** - Displays information about LSP CAM programming for IPv4 access lists.
- **generic** - Displays generic LSP accounting information for IPv4 access lists.

The **debug access-list lsp-out-acl cam** command output resembles the following example.

Brocade# debug access-list lsp-out-acl cam
LSP outbound ACL CAM/PRAM programming: debugging is on
0x00000000 outer label id 0x00100001
May 02 15:22:15 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index
May 02 15:22:15 CAM(SW CAM index:0x00017f9d HW CAM index:0x000c40c4):
May 02 15:22:15 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02 15:22:15 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 PPCR port index 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 Outer Label ID 0x00100001 (MASK: 0x0001ffff)
May 02 15:22:15 Inner Label ID 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 USE QOS ID FALSE
May 02 15:22:15 QOS ID 0x00000000

Brocade# debug access-list lsp-out-acl cam
LSP outbound ACL CAM/PRAM programming: debugging is on
0x00000000 outer label id 0x00100001
May 02 15:22:15 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index
May 02 15:22:15 CAM(SW CAM index:0x00017f9d HW CAM index:0x000c40c4):
May 02 15:22:15 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02 15:22:15 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 PPCR port index 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 Outer Label ID 0x00100001 (MASK: 0x0001ffff)
May 02 15:22:15 Inner Label ID 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 USE QOS ID FALSE
May 02 15:22:15 QOS ID 0x00000000

Brocade# debug access-list lsp-out-acl cam
LSP outbound ACL CAM/PRAM programming: debugging is on
0x00000000 outer label id 0x00100001
May 02 15:22:15 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index
May 02 15:22:15 CAM(SW CAM index:0x00017f9e HW CAM index:0x000c40c2):
May 02 15:22:15 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02 15:22:15 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 PPCR port index 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 Outer Label ID 0x00100001 (MASK: 0x0001ffff)
May 02 15:22:15 Inner Label ID 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 USE QOS ID FALSE
May 02 15:22:15 QOS ID 0x00000000

Brocade# debug access-list lsp-out-acl cam
LSP outbound ACL CAM/PRAM programming: debugging is on
0x00000000 outer label id 0x00100001
May 02 15:22:15 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index
May 02 15:22:15 CAM(SW CAM index:0x00017f9e HW CAM index:0x000c40c2):
May 02 15:22:15 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02 15:22:15 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 PPCR port index 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 Outer Label ID 0x00100001 (MASK: 0x0001ffff)
May 02 15:22:15 Inner Label ID 0x00000000 (MASK: 0x00000000)
May 02 15:22:15 USE QOS ID FALSE
May 02 15:22:15 QOS ID 0x00000000
May 02  15:22:45 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index 0x00000000 outer label id 0x00100001
May 02  15:22:45 LSP-OUT-ACL: PPCR 4:1: tunnel vif index 1 egress port id 4/1
May 02  15:22:45 CAM(SW CAM index:0x00017f9e HW CAM index:0x000c40c2):
May 02  15:22:45 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02  15:22:45 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02  15:22:45 PPCR port index 0x00000000 (MASK: 0x0000000f)
May 02  15:22:45 Outer Label ID 0x00100001 (MASK: 0x001fffff)
May 02  15:22:45 Inner Label ID 0x00000000 (MASK: 0x00000000)
May 02  15:22:45 LSP-OUT-ACL: PPCR 4:1: init CAM entry - ppcr hw port index 0x00000000 outer label id 0x00100001
May 02  15:22:45 LSP-OUT-ACL: PPCR 4:1: tunnel vif index 1 egress port id 4/1
May 02  15:22:45 CAM(SW CAM index:0x00017f9e HW CAM index:0x000c40c2):
May 02  15:22:45 Dest MAC 0000.00f5.de30 (MASK: 0000.00ff.ffff)
May 02  15:22:45 PTYPE[4:0] 0x00000000 (MASK: 0x00000000)
May 02  15:22:45 PPCR port index 0x00000000 (MASK: 0x0000000f)
May 02  15:22:45 Outer Label ID 0x00100001 (MASK: 0x001fffff)
May 02  15:22:45 Inner Label ID 0x00000000 (MASK: 0x00000000)

The debug access-list lsp-out-acl generic command output resembles the following example.

Brocade# debug access-list lsp-out-acl generic
LSP outbound ACL Generic: debugging is on
May 02  15:26:35 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:35 LSP-OUT-ACL: PPCR 4:1: tnnl vif index 1: delete CAM entry 0x00017f9f
May 02  15:26:35 LSP-OUT-ACL: PPCR 4:1: reset accounting entry at index 0
May 02  15:26:35 LSP-OUT-ACL: PPCR 4:1: updated highest possible valid accounting index to 0
May 02  15:26:35 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: delete ACL CAM/PRAM entry - tunnel vif index 1
May 02  15:26:38 PPCR 4:1: nht entry index 0 change notification
May 02  15:26:38 LSP-OUT-ACL: Scheduled timer to update CAM/PRAM entries.
May 02  15:26:38 LSP-OUT-ACL: update load-interval to 300
May 02  15:26:38 LSP-OUT-ACL: add/update ACL CAM/PRAM entry for tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: setting BYPASS TUNNEL PKT FLAG TO FALSE bypass_label 4294967295 NHT valid index 0 is_bypass_tnnl_pkt 0
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: CAM entries reqd = 1 CAM entries available = 100
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: program CAM entries for egress port 4/1
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: no entry found for tunnel vif index 1 egress port 4/1 -> create new entry
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: found free accounting entry at index 0
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: added tunnel vif index 1 egress port id 4/1 to accounting entry 0
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: updated highest possible valid accounting index to 0
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: allocate 60 rate buckets for LSP tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: reset HW counters for tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: created new LSP tunnel vif index 1 entry - add/update outbound label ACL entry
May 02  15:26:38 LSP-OUT-ACL: add/update ACL CAM/PRAM entry for tunnel vif index 1
May 02  15:26:38 LSP-OUT-ACL: setting BYPASS TUNNEL PKT FLAG TO FALSE bypass_label 4294967295 NHT valid index 0 is_bypass_tnnl_pkt 0
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: CAM entries reqd = 1 CAM entries available = 99
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: program CAM entries for egress port 4/1
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: found existing accounting entry 0 for tunnel vif index 1 egress port 4/1
May 02  15:26:38 LSP-OUT-ACL: PPCR 4:1: updated ACL CAM/PRAM entry - tunnel vif index 1
debug ipv6 access-list

Syntax: [no] debug ipv6 access-list [error | ipv6 | ipv6-cam | rate-limit | receive | stats]

- **error** - Displays error information about the IPv6 access list.
- **ipv6** - Displays information about the IPv6 access list activity.
- **ipv6-cam** - Displays CAM information about the IPv6 access list.
- **rate-limit** - Enables debugging traces for the IPv6 ACL-based rate limiting.
- **receive** - Enables debugging traces for the IPv6 receive ACLs.
- **stats** - Displays statistical information about the IPv6 access list.

debug ipv6 access-list error

Syntax: [no] debug ipv6 access-list error

This command generates error information about the IPv6 access list.

Command output resembles the following example.

Brocade# debug ipv6 access-list error
Nov 02 17:01:10: PPCR 2:1: L4_CU_ERRNO_OUT_OF_RESOURCE: actual_ipv6_in_acl_rule_cam_sz 3072, MAX_IPV6_IN_ACL_RULE_CAM_SZ 3072
Nov 02 17:05:10: Send L4 status to MP: port id 2/3, acl id 10, acl name ipv6-pbr, msg type 6

debug ipv6 access-list ipv6

Syntax: [no] debug ipv6 access-list ipv6

This command generates information about the IPv6 access list activity. The following example assumes an IPv6 traffic filter on incoming traffic to a virtual interface abc10.

Command output resembles the following example.
Brocade# debug ipv6 access-list ipv6
Brocade# ipv6 traffic-filter abc10 in
Send ITC ACL bind/unbind message: ACL_ID=0, name=abc10, port=651, add=1, dir=in, mask=
Received ITC IPv6 ACL bind/unbind message: ACL type 2, ACL abc10, add 1, outbound 0
Set IPv6 ACL abc10 in internal: port number 651, enable 1
COMMAND(b) <<ipv6 traffic-filter abc10 in>>

default ipv6 access-list ipv6-cam

Syntax: [no] debug ipv6 access-list ipv6-cam

This command generates CAM information about the IPv6 access list.

Command output resembles the following example.

Brocade# debug ipv6 access-list ipv6-cam
IPv6: ACL CAM entry debugging is on
Nov 02 17:01:10
PPCR 2:1: port 2/3: IPv6 ACL CAM sharing disabled, hence group id not allocated
Nov 02 17:01:10 PPCR 2:1: IPv6 inbound ACL CAM entry type 7: ACL v6acl(10) vid 4096 port id 2/3
Nov 02 17:01:10 Src 2001:DB8::/ffff:ffff:ffff:ffff::
Src port 0x0000/0x0000
Dst :::::
Dst port 0x0000/0x0000
Next Header 0x00/0x00
Est 0x0/0x0
SYN 0x0/0x0
Traffic Class 0x0/0x0
Group id 0x00000002/0x0000001f
Default VRF 0x00000000/0x00000000
VLAN 0x00000000/0x00000000
Nov 02 17:01:10 PRAM(0x000000aa):
001b0200-04000004-00000000-40000003
edb50104-0000001b-00000000-00000000
Nov 02 17:01:10 OUTER_LABEL 0
Nov 02 17:01:10 PUSH_OUTER_LABEL 0
INNER_LABEL 0
DROP_PRECEDENCE[2:0] 0 Bit[2]:If 1, force PRAM drp into packet
PRAM_HVALID 0x000 HPORT[11:0] Per-port entry valid
DA HIGH 0x0104
DA LOW 0x001bedb5
SUPPRESS RPF DROP 0
REPLACE_DA 1
ENFORCE_TNNL_MTU_CHK 0
NEXT_HOP_INDEX 0
MULTICAST_VLAN 0
PRAM_SFLOW 0
Nov 02 17:01:10 VLAN_ID 0001
REPLACE_VLAN 1
PRAM_ENTRY_Type 0
USE_ALT_SRC_PORT 0
MONITOR 0
CPU 0
DISCARD INVLD 0
DISCARD PACKET 0
USE PID 1
USE QOS ID 0
### 7 ACLs

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRAM_LVALID</td>
<td>0x0</td>
<td>LPORT[11:10] Per-port entry valid</td>
</tr>
<tr>
<td>QOS ID</td>
<td>0x000</td>
<td></td>
</tr>
<tr>
<td>PRAM_LVALID</td>
<td>0x004</td>
<td>LPORT[9:0] Per-port entry valid</td>
</tr>
<tr>
<td>FID</td>
<td>0x001b</td>
<td></td>
</tr>
<tr>
<td>TRUNK_ADJUST</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>DISABLE_QOS_OVERRIDE</td>
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<td>PRIORITY_FORCE</td>
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<td>PRIORITY</td>
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<td>FORCE_FASTPATH</td>
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<tr>
<td>IGNORE_TTL_CHK</td>
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<tr>
<td>PBR_VLAN_PRESERVE</td>
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<td></td>
</tr>
<tr>
<td>USE_TOS_ID</td>
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<td></td>
</tr>
<tr>
<td>TOS_ID</td>
<td>0x000</td>
<td></td>
</tr>
</tbody>
</table>

Nov 02 17:01:10

PPCR 2:1: IPv6 inbound ACL CAM entry type 7: ACL v6acl(20) vid 4096 port id 2/3

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Src port</td>
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</tr>
<tr>
<td>Dst port</td>
<td>0x0000/0x0000</td>
<td></td>
</tr>
<tr>
<td>Next Header</td>
<td>0x00/0x00</td>
<td></td>
</tr>
<tr>
<td>Est</td>
<td>0x0/0x0</td>
<td></td>
</tr>
<tr>
<td>SYM</td>
<td>0x0/0x0</td>
<td></td>
</tr>
<tr>
<td>Traffic Class</td>
<td>0x00/0x0</td>
<td></td>
</tr>
<tr>
<td>Group id</td>
<td>0x0000000002/0x0000001f</td>
<td></td>
</tr>
<tr>
<td>Default VRF</td>
<td>0x00000000/0x00000000</td>
<td></td>
</tr>
<tr>
<td>VLAN</td>
<td>0x00000000/0x00000000</td>
<td></td>
</tr>
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</table>

Nov 02 17:01:10 PRAM(0x000000ab):

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRAM_LVALID</td>
<td>0x0</td>
<td>LPORT[11:10] Per-port entry valid</td>
</tr>
<tr>
<td>QOS ID</td>
<td>0x000</td>
<td></td>
</tr>
<tr>
<td>PRAM_LVALID</td>
<td>0x004</td>
<td>LPORT[9:0] Per-port entry valid</td>
</tr>
<tr>
<td>FID</td>
<td>0x001b</td>
<td></td>
</tr>
<tr>
<td>TRUNK_ADJUST</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>DISABLE_QOS_OVERRIDE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PRIORITY_FORCE</td>
<td>0</td>
<td></td>
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<tr>
<td>PRIORITY</td>
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<td></td>
</tr>
<tr>
<td>FORCE_FASTPATH</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IGNORE_TTL_CHK</td>
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<td></td>
</tr>
<tr>
<td>PBR_VLAN_PRESERVE</td>
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<td></td>
</tr>
<tr>
<td>USE_TOS_ID</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>TOS_ID</td>
<td>0x000</td>
<td></td>
</tr>
</tbody>
</table>

Nov 02 17:01:10 VLAN_ID 0001

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRAM_LVALID</td>
<td>0x0</td>
<td>LPORT[11:10] Per-port entry valid</td>
</tr>
<tr>
<td>QOS ID</td>
<td>0x000</td>
<td></td>
</tr>
<tr>
<td>PRAM_LVALID</td>
<td>0x004</td>
<td>LPORT[9:0] Per-port entry valid</td>
</tr>
<tr>
<td>FID</td>
<td>0x001b</td>
<td></td>
</tr>
<tr>
<td>TRUNK_ADJUST</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>DISABLE_QOS_OVERRIDE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PRIORITY_FORCE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PRIORITY</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
ACLs

- FORCE_FASTPATH: 1
- IGNORE_TTL_CHK: 0
- PBR_VLAN_PRESERVE: 0
- USE_TOS_ID: 0
- TOS_ID: 0x000

Nov 02 17:01:10 PPCR 2:1: port 2/3: IPv6 ACL CAM sharing disabled, hence group id not allocated.

Nov 02 17:01:10
PPCR 2:1: IPv6 inbound ACL CAM entry type 7: ACL v6acl-1(10) vid 4096 port id 2/3
Nov 02 17:01:10 Src 2001:DB8::/ffff:ffff:ffff:ffff::
Src port: 0x0000/0x0000
Dst: ::/::
Dst port: 0x0000/0x0000
Next Header: 0x00/0x00
Est: 0x00/0x00
SYN: 0x00/0x00
Traffic Class: 0x00/0x00
Group id: 0x00000002/0x0000001f
Default VRF: 0x00000000/0x00000000
VLAN: 0x00000000/0x00000000
Nov 02 17:01:10 PRAM(0x000000ac):
06f00000-00000004-00000000-00000000
00000000-00000000-00000000-00000000
Nov 02 17:01:10 OUTER_LABEL: 0
Nov 02 17:01:10 PUSH_OUTER_LABEL: 0
INNER_LABEL: 0
DROP_PRECEDENCE[2:0]: 0 Bit[2]: If 1, force PRAM drp into packet
PRAM_HVALID: 0x000 HPOR[11:0] Per-port entry valid
DA HIGH: 0x000
DA LOW: 0x00000000
SUPPRESS RPF DROP: 0
REPLACE_DA: 0
ENFORCE_TNNL_MTU_CHK: 0
NEXT_HOP_INDEX: 0
MULTICAST_VLAN: 0
PRAM_SFLOW: 0
Nov 02 17:01:10 VLAN_ID: 0x0000
REPLACE_VLAN: 0
PRAM_ENTRY_TYPE: 0
USE_ALT_SRC_PORT: 0
MONITOR: 0
CPU: 0
DISCARD_INVLD: 0
DISCARD_PACKET: 0
USE_FID: 0
USE_QOS_ID: 0
PRAM_LVALID: 0x0 LPORT[11:10] Per-port entry valid
QOS_ID: 0x000
PRAM_LVALID: 0x004 LPORT[9:0] Per-port entry valid
FID: 0x06f0
TRUNK_ADJUST: 0
DISABLE_QOS_OVERRIDE: 0
PRIORITY_FORCE: 0
PRIORITY: 0
FORCE_FASTPATH: 0
IGNORE_TTL_CHK: 0
PBR_VLAN_PRESERVE: 0
USE_TOS_ID: 0
TOS_ID: 0x000
ACLs 7

debug ipv6 access-list rate-limit

Syntax:  [no] debug ipv6 access-list rate-limit

This command enables debugging for the IPv6 ACL-based rate limiting. The debug command can be enabled both on MP and LP.

On MP, the command output resembles the following example for a configuration flow when the rate limiting feature is enabled.

Brocade# debug ipv6 access-list rate-limit
IPv6: ACL-based Rate-Limiting debugging is on
Brocade(config-if-e1000-4/8)# rate-limit input access-group name ipv6 rl-perm 20000 10000
Dec 17 12:17:22.820 RL-ACL: port 4/8: RL config: attrib 5001, vlan_pri_flag 0x00, rl_vrf_idx 0
Average rate is adjusted to 195456 bits per second.
Dec 17 12:17:22.821 RL: port 4/8: allocate temp_rl_config

On LP, the command output resembles the following example for a configuration flow when the rate limiting feature is enabled.

Brocade# debug ipv6 access-list rate-limit
IPv6: ACL-based Rate-Limiting debugging is on
Dec 17 12:17:22.250 RL: port 4/8: allocate temp_rl_config
Dec 17 12:17:22.250 RL-ACL: port 4/8: init class_id[0] to RL_INVALID_CLASS
Dec 17 12:17:22.250 rl_lp_xpp_add: cir 20, cbs 1250
Dec 17 12:17:22.250 RL-ACL: port 4/8: MAX IN UNIQUE CLASSES 1024, Use priority for
in RL 1
    in_class_pool[3] 35, pri_flag 0
    rl_config->class_id[0] 4096, next_avail_class 35
Dec 17 12:17:22.275 RL-ACL: port 4/8: ACL rl-perm priority 0x00
    init rx class index 35
    cir 20
    eir 0
    mark_value 0
Dec 17 12:17:22.275 RL-ACL: , cbs 1250, ebs 0
Dec 17 12:17:22.275 rl_lp_set_rx_hw_config : ppcr = 9 class_index = 35 mar_value = 0
Dec 17 12:17:22.275 rl_lp_set_rx_hw_config: , cir 20, eir 0
Dec 17 12:17:22.275 rl_lp_set_rx_hw_config: , cbs 9240, ebs 9240
Dec 17 12:17:22.275 RL-ACL: port 4/8: Schedule callback function to update inbound rule ACL entries
PPCR 4:1: Cleaning inbound IPv6 rule CAM count...
Dec 17 12:17:22.275 RL-ACL: port 4/1: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/2: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/3: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/4: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/5: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/5: ACL rl-perm not defined
Dec 17 12:17:22.275 RL-ACL: port 4/6: construct list of unique ACLs
Dec 17 12:17:22.275 RL-ACL: port 4/6: ACL rl-perm not defined
Dec 17 12:17:22.275 RL-ACL: port 4/7: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/7: ACL rl-perm not defined
Dec 17 12:17:24.275 RL-ACL: port 4/8: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/8: added ACL rl-perm VRF 0, count = 1
Dec 17 12:17:24.275 RL-ACL: port 4/10: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/11: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/12: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/14: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/16: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/17: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/18: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/19: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/20: construct list of unique ACLs
Dec 17 12:17:24.275 RL-ACL: port 4/24: construct list of unique ACLs

debug ipv6 access-list receive

Syntax: [no] debug ipv6 access-list receive [time | cam | generic | packet]

- **time** - Enables debugging traces for the IPv6 receive ACL binding time.
- **cam** - Enables debugging traces for the IPv6 receive ACL CAM and PRAM programming.
- **generic** - Enables debugging traces for the IPv6 receive ACL generic events.
- **packet** - Enables debugging traces for the IPv6 receive ACL related packet.

The following is the sample output from the `debug ipv6 access-list receive generic` command.

```
Brocade# debug ipv6 access-list receive generic
Brocade(config)# ipv6 receive access-list b1 sequence 10
Dec 18 11:51:42.021 Send ITC Receive ACL bind/unbind message:
   ACL b1
       Sequence num 10
       Policy name
       strict acl enabled FALSE
       add 1
Dec 18 11:51:42.021 Received ITC Receive-ACL bind/unbind message:
   ACL b1
       Sequence num 10
       Policy name
       strict acl enabled FALSE
       add 1
Dec 18 11:51:42.021 IPv6 Receive ACL: Set global IPv6 ACL b1 sequence 10 add 1
Dec 18 11:51:42.021 IPv6 Receive ACL: Create/update ACL b1
Dec 18 11:51:42.021 Generated IPv6 Receive ACL binding command for LP: ipv6 receive access-list b1 sequence 10 , mode 14
```

debug ipv6 access-list stats

Syntax: [no] debug ipv6 access-list stats
This command generates statistical information about the IPv6 access lists. In the following example, with this command enabled, the `show ipv6 access-list accounting brief` command generates a brief accounting summary.

Brocade# debug ipv6 access-list stats
Brocade# show ipv6 access-list accounting ethernet 4/2
IPv6 ACL accounting: interface 122, port id 121
IPv6 ACL accounting: retrieve for port 4/2, acl abc10, outbound 0
IPv6 inbound ACL accounting: abc10 filter from 0, num 1
Collecting IPv6 ACL accounting for 4/2 ... Completed successfully.
IPv6 ACL Accounting Information:
Inbound: IPv6 ACL abc10
  10: permit tcp any any
    Hit count: (1 sec) 99 (1 min) 1515 (5 min) 0 (accum) 1515
Brocade# show ipv6 access-list accounting brief
IPv6 in/out ACL accounting: retrieve brief information: Max IPv6 interfaces 1193
Collecting IPv6 ACL accounting summary for 4/2 ... Completed successfully.
IPv6 ACL Accounting Summary: (ac = accumulated since accounting started)
<table>
<thead>
<tr>
<th>Int</th>
<th>In ACL</th>
<th>Total In Hit</th>
<th>Out ACL</th>
<th>Total Out Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/2</td>
<td>abc10</td>
<td>99 (1s)</td>
<td></td>
<td>1515 (1m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 (5m)</td>
<td></td>
<td>1515 (ac)</td>
</tr>
</tbody>
</table>

Configuration notes

Do not apply an empty ACL (an ACL ID without any corresponding entries) to an interface. If you accidentally do this, the software applies the default ACL action (deny all) to the interface and denies all traffic.

Considerations when implementing ACL CAM sharing

The following considerations apply when implementing the ACL CAM sharing feature:

- If you enable ACL CAM sharing, ACL statistics will be generated per-packet processor (PPCR) instead of per-port. If you require per-port granularity statistics for your application, you cannot use this feature.
- This feature is only applicable for inbound IPv4 ACLs, IPv6 ACLs, VPNv4 ACLs, Layer 2 ACLs, and global Policy Based Routing (PBR) policies.
- This feature is not applicable for ACL-based rate limiting and interface-level PBR policies.
- This feature cannot be applied to a virtual interface.
- CAM entry matching within this feature is based on the ACL group ID.

ACL deny logging

Carefully consider the following guidelines before configuring the ACL deny logging feature on your router:
• The ACL deny logging feature cannot be used in conjunction with the deny traffic redirection feature (the ip access-group redirect-deny-to-interf command). If you configure both features on the same interface, the ACL deny logging feature will take precedence and the deny traffic redirection will be disabled. Although disabled, deny traffic redirection will still be shown in the running configuration.

• ACL deny logging is a CPU-based feature. Consequently, to maintain maximum performance, Brocade recommends that you selectively enable the logging option only on the deny filters where you are interested in seeing the logs.

• ACL deny logging generates syslog entries only. No SNMP traps are issued.

• The ACL deny logging feature is supported for inbound ACLs only.

• You can configure the maximum number of ACL session entries using the system-max session-limit command as described in the NetIron Series Configuration Guide.

• ACL deny logging is applicable only for traffic matching ACL deny clauses. It is not applicable for traffic matching ACL permit clauses.

Common diagnostic scenarios

• Interrupted policy routing causes severe network problems.
  This issue is resolved by upgrading the software version to include the latest patches. It is recommended that customers always update software to reflect the latest patches and versions. If you have questions about your software version, contact Brocade Technical Support for assistance.

• You need to enable ACL filtering based on VLAN membership or VE port.
  Before you can bind an ACL to specific VLAN members on a port, you must first enable support for the ACL per-port per-VLAN feature. If this feature is not already enabled on your device, enable it using the following commands.

  Brocade(config)# enable acl-per-port-per-vlan
  Brocade(config)# write memory
  Brocade(config)# exit

• When an ACL is removed from a port with port mapping (ACL-based rate-limiting) configured, the Brocade MLX series device stops all traffic on this port.
  If you make an ACL configuration change, you must reapply the ACLs to their interfaces for the change to take effect. An ACL configuration change includes any of the following actions:
      - Adding, changing, or removing an ACL or an entry in an ACL
      - Changing a PBR policy
      - Changing ToS-based QoS mappings
  To reapply ACLs following an ACL configuration change, enter the following command at the global CONFIG level of the CLI:

  Brocade(config)# ip rebind-acl all
QoS

Quality of Service (QoS) features prioritize the use of bandwidth in a router. When QoS features are enabled, traffic is classified as it arrives at the router, and processed on the basis of configured priorities. Traffic can be dropped, prioritized for guaranteed delivery, or subject to limited delivery options, depending on how you configure QoS features.

QoS show commands

This section describes the show commands that display QoS information.

show qos-toS

Syntax: show qos-toS

This command displays QoS and Type of Service (ToS) configuration information, as shown in the following example.

```
ospf_r_calc 5 wait 0000d89c 2089ff10 16384 0 0 1
isis_task 5 wait 0000d89c 208a3628 16384 0 0 1
isis_spf 5 wait 0000d89c 208a8f10 16384 0 0 1
mcast 5 wait 0000d89c 208ac628 16384 0 0 1
vrrp 5 wait 0000d89c 208b4628 16384 0 0 1
ripng 5 wait 0000d89c 208b9628 16384 0 0 1
ospf6 5 wait 0000d89c 208c3628 16384 0 0 1
ospf6_rt 5 wait 0000d89c 208c7f08 16384 0 0 1
mcast6 5 wait 0000d89c 208cb628 16384 0 0 1
14 5 wait 0000d89c 208cf620 16384 0 0 1
stp 5 wait 0000d89c 209a7620 16384 0 0 1
snmp 5 wait 0000d89c 209c3628 32768 0 0 1
rmon 5 wait 0000d89c 209cc628 32768 0 0 1
web 5 wait 0000d89c 209d6628 32768 0 0 1
lacp 5 wait 0000d89c 209da628 16384 0 0 1
dot1x 5 wait 0000d89c 209e6620 16384 0 0 1
hw_access 5 wait 0000d89c 209e6628 16384 0 0 1
DSCP-DSCP map: (dscp = dl/d2)

0 | 0 1 2 3 4 5 6 7 8 9
1 | 10 11 12 13 14 15 16 17 18 19
2 | 20 21 22 23 24 25 26 27 28 29
3 | 30 31 32 33 34 35 36 37 38 39
4 | 40 41 42 43 44 45 46 47 48 49
5 | 50 51 52 53 54 55 56 57 58 59
6 | 60 61 62 63
```

show qos wred

Syntax: show qos wred

This command displays information about Weighted Random Early Detection (WRED), as shown in the following example.

```
DSCP-DSCP map: (dscp = dl/d2)

d2 | 0 1 2 3 4 5 6 7 8 9
d1 | 0 1 2 3 4 5 6 7 8 9

0 | 0 1 2 3 4 5 6 7 8 9
1 | 10 11 12 13 14 15 16 17 18 19
2 | 20 21 22 23 24 25 26 27 28 29
3 | 30 31 32 33 34 35 36 37 38 39
4 | 40 41 42 43 44 45 46 47 48 49
5 | 50 51 52 53 54 55 56 57 58 59
6 | 60 61 62 63
```
show qos-map binding

**Syntax:** show qos-map binding slot/port

This command displays the QoS policy maps that are bounded to the specified port.

```
Brocade# show qos-map binding 4/1
qos pcp encode-policy off
qos exp encode-policy off
qos dscp encode-policy off
```

show qos-map binding global

**Syntax:** show qos-map binding global

This command displays the QoS policy maps that are bound globally on the device, as shown in the following example.

```
Brocade# show qos-map binding global
qos pcp decode-policy default-map
qos pcp encode-policy default-map
qos exp decode-policy default-map
qos exp encode-policy default-map
qos dscp decode-policy default-map
qos dscp encode-policy default-map
```

show qos-map

**Syntax:** show qos-map [dscp | exp | pcp] decode-map [map-name | all-zero-map | default-map]

This command displays information about the QoS ingress decode policy map configuration.

- **dscp** - Displays configuration information for the Differentiated Services Code Point (DSCP) policy map.
- **exp** - Displays configuration information for the Experimental (EXP) policy map.
- **pcp** - Displays configuration information for the Priority Code Point (PCP) policy map.
- **map-name** - Specifies the name of the policy map whose configuration you want to display.
- **all-zero-map** - Displays the all-zero-map configuration information for the specified ingress policy map.
• **default-map** - Displays the default configuration information for the specified ingress policy map.

The following example displays information about the default PCP decode policy map.

Brocade# show qos-map pcp decode-map default-map

PCP decode default-map

PCP  0 to priority  0 drop-precedence  0
PCP  1 to priority  1 drop-precedence  0
PCP  2 to priority  2 drop-precedence  0
PCP  3 to priority  3 drop-precedence  0
PCP  4 to priority  4 drop-precedence  0
PCP  5 to priority  5 drop-precedence  0
PCP  6 to priority  6 drop-precedence  0
PCP  7 to priority  7 drop-precedence  0

**show qos-map**

Syntax:  show qos-map [dscp | exp | pcp] encode-map [map-name | all-zero-map | default-map]

This command displays information about the QoS egress encode policy map configuration.

• **dscp** - Displays configuration information for the DSCP policy map.
• **exp** - Displays configuration information for the EXP policy map.
• **pcp** - Displays configuration information for the PCP policy map.
• **map-name** - Specifies the name of the policy map whose configuration you want to display.
• **all-zero-map** - Displays the all-zero-map configuration information for the specified egress policy map.
• **default-map** - Displays the default configuration information for the specified egress policy map.

Command output resembles the following example.

Brocade# show qos-map dscp encode-map test2

DSCP encode map test2
Priority 0 drop-precedence 0 to DSCP 0
Priority 0 drop-precedence 1 to DSCP 2
Priority 0 drop-precedence 2 to DSCP 4
Priority 0 drop-precedence 3 to DSCP 6
Priority 1 drop-precedence 0 to DSCP 44
Priority 1 drop-precedence 1 to DSCP 44
Priority 1 drop-precedence 2 to DSCP 44
Priority 1 drop-precedence 3 to DSCP 44
Priority 2 drop-precedence 0 to DSCP 20
Priority 2 drop-precedence 1 to DSCP 25
Priority 2 drop-precedence 2 to DSCP 20
Priority 2 drop-precedence 3 to DSCP 20
Priority 3 drop-precedence 0 to DSCP 55
Priority 3 drop-precedence 1 to DSCP 55
Priority 3 drop-precedence 2 to DSCP 55
Priority 3 drop-precedence 3 to DSCP 55
Priority 4 drop-precedence 0 to DSCP 32
Priority 4 drop-precedence 1 to DSCP 34
Priority 4 drop-precedence 2 to DSCP 36
Priority 4 drop-precedence 3 to DSCP 38
Priority 5 drop-precedence 0 to DSCP 54
Priority 5 drop-precedence 1 to DSCP 54
Priority 5 drop-precedence 2 to DSCP 54
Priority 5 drop-precedence 3 to DSCP 54
Priority 6 drop-precedence 0 to DSCP 48
Priority 6 drop-precedence 1 to DSCP 50
Priority 6 drop-precedence 2 to DSCP 52
Priority 6 drop-precedence 3 to DSCP 54
Priority 7 drop-precedence 0 to DSCP 27
Priority 7 drop-precedence 1 to DSCP 27
Priority 7 drop-precedence 2 to DSCP 27
Priority 7 drop-precedence 3 to DSCP 27

PCP decode default-map
PCP 0 to priority 0 drop-precedence 0
PCP 1 to priority 1 drop-precedence 0
PCP 2 to priority 2 drop-precedence 0
PCP 3 to priority 3 drop-precedence 0
PCP 4 to priority 4 drop-precedence 0
PCP 5 to priority 5 drop-precedence 0
PCP 6 to priority 6 drop-precedence 0
PCP 7 to priority 7 drop-precedence 0

show qos scheduler

Syntax: show qos scheduler

This command displays the type of QoS scheduler applied at each port. By default strict scheduler is applied at all the physical ports of the device.

Brocade# show qos scheduler
Port | Scheme  | Type  | Pri7 | Pri6 | Pri5 | Pri4 | Pri3 | Pri2 | Pri1 | Pri0
---|----------+-------+------|------|------|------|------|------|------|------|------
1/1 | strict |       |      |      |      |      |      |      |      |      |      
1/2 | weighted | Weight | 100 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
3/1 | strict |       |      |      |      |      |      |      |      |      |      
3/2 | strict |       |      |      |      |      |      |      |      |      |      
3/3 | strict |       |      |      |      |      |      |      |      |      |      
3/4 | strict |       |      |      |      |      |      |      |      |      |      
4/1 | weighted | Weight | 100 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
4/2 | weighted | Weight | 100 | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
4/3 | strict |       |      |      |      |      |      |      |      |      |      
4/4 | strict |       |      |      |      |      |      |      |      |      |      
4/5 | strict |       |      |      |      |      |      |      |      |      |      
4/6 | strict |       |      |      |      |      |      |      |      |      |      
4/7 | strict |       |      |      |      |      |      |      |      |      |      
4/8 | strict |       |      |      |      |      |      |      |      |      |      

show tm port-mapping

Syntax: show tm port-mapping

This command displays information about the Traffic Manager (TM) port to queue mapping, as shown in the following example.

Brocade# show tm port-mapping
Maximum total TM ports: 1008
Currently used TM ports: 16
Currently available TM ports: 992

show np statistics

Syntax: show np statistics
This command displays the Network Processor (NP) statistics for all the interface modules within a device.

**NOTE**
The display has been shortened for brevity.

```
Brocade# show np statistics
Port 1/1 RX
NP Rx Raw Good Packet = (667856409355)
NP Rx Forward Packet = (667823373386)
NP Rx Discard Packet = (33035969)
NP Rx Misc Packet = (0)
NP Rx Unicast Packet = (0)
NP Rx Broadcast Packet = (2)
NP Rx Multicast Packet = (667856409353)
NP Rx Send to TM Packet = (667823373386)
NP Rx Bad Packet = (0)
NP Rx Lookup Unavailable = (0)
NP Rx ACL Drop = (0)
NP Rx Priority 0/1 Drop = (33035968)
NP Rx Priority 2/3 Drop = (1)
NP Rx Priority 4/5 Drop = (0)
NP Rx Priority 6/7 Drop = (0)
NP Rx Suppress RPF Drop = (0)
NP Rx RPF Drop = (0)
NP Rx IPv4 Packet = (667856409353)
NP Rx IPv6 Packet = (0)
NP Rx Route-only Drop = (0)
NP Rx IPv6 Suppress RPF Drop = (0)
NP Rx IPv6 RPF Drop Count = (0)
NP Rx IPv4 Byte = (184327873143207)
NP Rx IPv6 Byte = (0)
NP Rx Routed Packet Drop = (0)

Port 1/1 TX
NP Tx Sent to MAC Packet = (10548)
NP Tx Raw Good Packet = (10568)
NP Tx Source Port Supress Drop = (20)
NP Tx Bad Packet Count = (0)
NP Tx Unicast Packet = (1)
NP Tx Broadcast Packet = (1)
NP Tx Multicast Packet = (10546)
NP Tx Receive from TM = (10568)
NP Tx ACL Drop = (0)
NP Tx IPv6 HW Forwarded Packet = (0)
NP Tx IPv4 Packet = (10546)
NP Tx IPv6 Packet = (0)
NP Tx IPv4 Byte = (953896)
NP Tx IPv6 Byte = (0)

Port 1/2 RX
NP Rx Raw Good Packet = (119)
NP Rx Forward Packet = (119)
NP Rx Discard Packet = (0)
NP Rx Misc Packet = (0)
NP Rx Unicast Packet = (0)
NP Rx Broadcast Packet = (4)
NP Rx Multicast Packet = (115)
NP Rx Send to TM Packet = (119)
```
show np statistics slot

Syntax: show np statistics slot slotnum

This command displays the NP statistics for a specified slot, as shown in the following example.

Brocade# show np statistics slot 1
Port 1/1 RX
 NP Rx Raw Good Packet = (667856409355)
 NP Rx Forward Packet = (66782337386)
 NP Rx Discard Packet = (33035969)
 NP Rx Misc Packet = (0)
 NP Rx Unicast Packet = (0)
 NP Rx Broadcast Packet = (2)
 NP Rx Multicast Packet = (667856409353)
 NP Rx Send to TM Packet = (66782337386)
 NP Rx Bad Packet = (0)
 NP Rx Lookup Unavailable = (0)
 NP Rx ACL Drop = (0)
 NP Rx Priority 0/1 Drop = (33035968)
 NP Rx Priority 2/3 Drop = (1)
 NP Rx Priority 4/5 Drop = (0)
 NP Rx Priority 6/7 Drop = (0)
 NP Rx Suppress RPF Drop = (0)
 NP Rx RPF Drop = (0)
 NP Rx IPv4 Packet = (667856409353)
 NP Rx IPv6 Packet = (0)
 NP Rx Route-only Drop = (0)
 NP Rx IPv6 Suppress RPF Drop = (0)
 NP Rx IPv6 RPF Drop Count = (0)
 NP Rx IPv4 Byte = (9660)
 NP Rx IPv6 Byte = (0)
 NP Rx Routed Packet Drop = (0)

Port 1/1 TX
 NP Tx Sent to MAC Packet = (10548)
 NP Tx Raw Good Packet = (10568)
 NP Tx Source Port Supress Drop = (20)
 NP Tx Bad Packet Count = (0)
 NP Tx Unicast Packet = (1)
 NP Tx Broadcast Packet = (1)
 NP Tx Multicast Packet = (10546)
show np statistics ethernet

Syntax: show np statistics ethernet slot/port

This command displays the NP statistics for the specified Ethernet interface.

Brocade# show np statistics ethernet 1/1
Port 1/1 RX
NP Rx Raw Good Packet = (667856409355)
show np debug-stats

**Syntax:** show np debug-stats slot slot_number | all

- **slot slot_number** - Displays Network Processor (NP) debug statistics from the specified line card.
- **all** - Displays NP debug statistics of all operational line cards.

This command is available on the MP and displays the NP debug statistics of a specific, or all of the operational line cards.

The following is sample output from the show np debug-stats slot command.

Brocade# show np debug-stats slot 3

Packet Processor #1 (Ports 3/1 to 3/4)

---------------------------------------

L2 Source Address Learning Drop : 0
<table>
<thead>
<tr>
<th>QoS7</th>
<th>Rate Limit VPLS Local Learning Drop</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unknown MPLS Drop</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rate Limit VPLS Remote Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv4 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv6 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>VPLS Tx</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>VLL Tx</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Unknown L3 VPN Ingress Drop</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv6 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv4 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE Invalid Drop</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6to4 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6to4 Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE MPLS Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE IPv6 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>VPLS Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Source Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv4 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IPv6 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Multicast RPF Drop Count</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>MPLS LSR Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6to4 Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>MPLS RSVP Tx Count</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE MPLS Tx Count</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>GRE IPv6 Tx Count</td>
<td>0</td>
</tr>
</tbody>
</table>

Packet Processor #2 (Ports 3/5 to 3/8):

<table>
<thead>
<tr>
<th>L2 Source Address Learning Drop</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate Limit VPLS Local Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td>Unknown MPLS Drop</td>
<td>0</td>
</tr>
<tr>
<td>Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>Rate Limit VPLS Remote Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Tx</td>
<td>0</td>
</tr>
<tr>
<td>VLL Tx</td>
<td>0</td>
</tr>
<tr>
<td>Unknown L3 VPN Ingress Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>GRE Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Invalid Drop</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>GRE MPLS Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE IPv6 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>Source Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td>Multicast RPF Drop Count</td>
<td>0</td>
</tr>
<tr>
<td>MPLS LSR Tx Counter</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 9 displays the descriptions of the fields from the `show np debug-stats slot` command.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet Processor #num</td>
<td>The packet processor number.</td>
</tr>
<tr>
<td>L2 Source Address Learning Drop</td>
<td>The count of all Layer 2 source address learning drop packets.</td>
</tr>
<tr>
<td>Rate Limit VPLS Local Learning Drop</td>
<td>The count of all rate limit VPLS local learning drop packets.</td>
</tr>
<tr>
<td>Unknown MPLS Drop</td>
<td>The count of all unknown MPLS drop packets.</td>
</tr>
<tr>
<td>Destination Address VC Miss</td>
<td>The count of all destination address VC lookup miss packets.</td>
</tr>
<tr>
<td>Rate Limit VPLS Remote Learning Drop</td>
<td>The count of all rate limit VPLS remote learn drop packets.</td>
</tr>
<tr>
<td>IPv4 Destination Address VC Miss</td>
<td>The count of all IPv4 destination address VC lookup miss packets.</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Miss</td>
<td>The count of all IPv6 destination address VC lookup miss packets.</td>
</tr>
<tr>
<td>VPLS Tx</td>
<td>The count of all VPLS destination address hit transmit processing packets.</td>
</tr>
<tr>
<td>VLL Tx</td>
<td>The count of all VLL destination address hit transmit processing packets.</td>
</tr>
<tr>
<td>Unknown L3 VPN Ingress Drop</td>
<td>The count of all unknown L3 VPN ingress drop packets.</td>
</tr>
<tr>
<td>IPv6 VPN Tx</td>
<td>The count of all IPv6 VPN transmit processing packets.</td>
</tr>
<tr>
<td>IPv4 VPN Tx</td>
<td>The count of all IPv4 VPN transmit processing packets.</td>
</tr>
<tr>
<td>GRE Rx Counter</td>
<td>The count of all GRE encapsulated IPv4 payload packets proceeded for IP DPA processing.</td>
</tr>
<tr>
<td>GRE Invalid Drop</td>
<td>The count of all packets with invalid protocol type in GRE header.</td>
</tr>
<tr>
<td>6to4 Rx Counter</td>
<td>The count of all valid outer IPv4 header and source ingress check hit packets.</td>
</tr>
<tr>
<td>GRE Enforce Source Ingress Check Miss</td>
<td>The count of all GRE outer IPv4 source ingress check miss packets.</td>
</tr>
<tr>
<td>6to4 Enforce Source Ingress Check Miss</td>
<td>The count of all outer IPv4 source ingress check miss packets.</td>
</tr>
<tr>
<td>GRE MPLS Rx Counter</td>
<td>The count of all GRE encapsulated MPLS payload packets proceeded for MPLS receive processing.</td>
</tr>
<tr>
<td>GRE IPv6 Rx Counter</td>
<td>The count of all GRE encapsulated IPv6 payload packets proceeded for IP DPA processing.</td>
</tr>
<tr>
<td>Source Address Port VLAN Miss</td>
<td>The count of all source address port VLAN miss packets.</td>
</tr>
<tr>
<td>VPLS Source Address Port VLAN Miss</td>
<td>The count of all VPLS source address port VLAN miss packets.</td>
</tr>
<tr>
<td>Source Address VC Miss</td>
<td>The count of all source address VC miss packets.</td>
</tr>
<tr>
<td>IPv4 HW Forwarding Counter</td>
<td>The count of all valid IPv4 hardware forwarded packets.</td>
</tr>
<tr>
<td>IPv6 HW Forwarding Counter</td>
<td>The count of all valid IPv6 hardware forwarded packets.</td>
</tr>
<tr>
<td>Multicast RPF Drop Count</td>
<td>The count of all multicast RPF failed packets.</td>
</tr>
<tr>
<td>MPLS LSR Tx Counter</td>
<td>The count of valid transit LSR cross-connect packets.</td>
</tr>
</tbody>
</table>
The following is sample output from the `show np debug-stats all` command.

Brocade# show np debug-stats all
Slot# 2 Packet Processor# 1 (Ports 2/1 to 2/24):
-----------------------------------------------
L2 Source Address Learning Drop          :0
Rate Limit VPLS Local Learning Drop      :0
Unknown MPLS Drop                        :0
Destination Address VC Miss              :0
Rate Limit VPLS Remote Learning Drop     :0
IPv4 Destination Address VC Miss         :0
IPv6 Destination Address VC Miss         :0
VPLS Tx                                  :0
VLL Tx                                   :0
Unknown L3 VPN Ingress Drop              :0
IPv6 VPN Tx                              :0
IPv4 VPN Tx                              :0
GRE Rx Counter                           :0
GRE Invalid Drop                         :0
6to4 Rx Counter                          :0
GRE Enforce Source Ingress Check Miss    :0
6to4 Enforce Source Ingress Check Miss   :0
GRE MPLS Rx Counter                      :0
GRE IPv6 Rx Counter                      :0
PBB Rx Drop Counter                      :0
PBB Tx Counter                           :0
IPv4 Destination Address VC Drop         :0
IPv6 Destination Address VC Drop         :0
Source Address Port VLAN Miss            :0
VPLS Source Address Port VLAN Miss       :0
Source Address VC Miss                   :0
IPv4 HW Forwarding Counter               :0
IPv6 HW Forwarding Counter               :0
Multicast RPF Drop Count                 :0
MPLS LSR Tx Counter                      :0
GRE Tx Counter                           :0
6to4 Tx Counter                          :0
MPLS RSVP Tx Count                       :0
GRE MPLS Tx Count                        :0
GRE IPv6 Tx Counter                      :0

Slot# 3 Packet Processor# 1 (Ports 3/1 to 3/2):
-----------------------------------------------
L2 Source Address Learning Drop          :0
Rate Limit VPLS Local Learning Drop      :0
Unknown MPLS Drop                        :0
Destination Address VC Miss              :0
Rate Limit VPLS Remote Learning Drop     :0

---

**TABLE 9**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRE Tx Counter</td>
<td>The count of valid IPv4 payload with GRE encapsulation.</td>
</tr>
<tr>
<td>6to4 Tx Counter</td>
<td>The count of all valid 6to4 transmit packets.</td>
</tr>
<tr>
<td>MPLS RSVP Tx Count</td>
<td>The count of all valid MPLS RSVP transmit packets.</td>
</tr>
<tr>
<td>GRE MPLS Tx Count</td>
<td>The count of all valid GRE encapsulated MPLS transmit packets.</td>
</tr>
<tr>
<td>GRE IPv6 Tx Count</td>
<td>The count of all valid IPv6 payload with IPv4 GRE encapsulation.</td>
</tr>
</tbody>
</table>

---

Field Description:
- **GRE Tx Counter**: The count of valid IPv4 payload with GRE encapsulation.
- **6to4 Tx Counter**: The count of all valid 6to4 transmit packets.
- **MPLS RSVP Tx Count**: The count of all valid MPLS RSVP transmit packets.
- **GRE MPLS Tx Count**: The count of all valid GRE encapsulated MPLS transmit packets.
- **GRE IPv6 Tx Count**: The count of all valid IPv6 payload with IPv4 GRE encapsulation.
<table>
<thead>
<tr>
<th>Metric</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Tx</td>
<td>0</td>
</tr>
<tr>
<td>VLL Tx</td>
<td>0</td>
</tr>
<tr>
<td>Unknown L3 VPN Ingress Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>GRE Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Invalid Drop</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>GRE MPLS Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE IPv6 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>PBB Rx Drop Counter</td>
<td>0</td>
</tr>
<tr>
<td>PBB Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 Destination Address VC Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Drop</td>
<td>0</td>
</tr>
<tr>
<td>Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>Source Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 HW Forwarding Counter</td>
<td>0</td>
</tr>
<tr>
<td>Mulicast RPF Drop Count</td>
<td>0</td>
</tr>
<tr>
<td>MPLS LSR Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>MPLS RSVP Tx Count</td>
<td>0</td>
</tr>
<tr>
<td>GRE MPLS Tx Count</td>
<td>0</td>
</tr>
<tr>
<td>GRE IPv6 Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>Slot# 3 Packet Processor# 2 (Ports 3/3 to 3/4):</td>
<td></td>
</tr>
<tr>
<td>L2 Source Address Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td>Rate Limit VPLS Local Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td>Unknown MPLS Drop</td>
<td>0</td>
</tr>
<tr>
<td>Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>Rate Limit VPLS Remote Learning Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Tx</td>
<td>0</td>
</tr>
<tr>
<td>VLL Tx</td>
<td>0</td>
</tr>
<tr>
<td>Unknown L3 VPN Ingress Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 VPN Tx</td>
<td>0</td>
</tr>
<tr>
<td>GRE Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Invalid Drop</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>6to4 Enforce Source Ingress Check Miss</td>
<td>0</td>
</tr>
<tr>
<td>GRE MPLS Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>GRE IPv6 Rx Counter</td>
<td>0</td>
</tr>
<tr>
<td>PBB Rx Drop Counter</td>
<td>0</td>
</tr>
<tr>
<td>PBB Tx Counter</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 Destination Address VC Drop</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Destination Address VC Drop</td>
<td>0</td>
</tr>
<tr>
<td>Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>VPLS Source Address Port VLAN Miss</td>
<td>0</td>
</tr>
<tr>
<td>Source Address VC Miss</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 HW Forwarding Counter</td>
<td>0</td>
</tr>
</tbody>
</table>
IPv6 HW Forwarding Counter :0
Multicast RPF Drop Count :0
MPLS LSR Tx Counter :0
GRE Tx Counter :0
6to4 Tx Counter :0
MPLS RSVP Tx Count :0
GRE MPLS Tx Count :0
GRE IPv6 Tx Counter :0
Brocade#

clear np debug-stats

Syntax: clear np debug-stats slot slot_number | all

- **slot slot_number** - Clears NP debug statistics of the specified line card.
- **all** - Clears NP debug statistics of all operational line cards.

This command is available on the MP and clears the NP debug statistics of a specific, or all of the operational line cards.

show np reason log slot

Syntax: show np reason log slot [slot_number | all]

- **slot slot_number** - Displays the reason log for all devices of the module in the specified slot.
- **all** - Displays the reason log for the devices of all the line cards.

This command is available on the MP and displays the reason log of a specific, or all of the operational line cards.

The following is sample output from the **show np reason log slot** command.

Brocade# show np reason log slot 1
Slot 1: Module: NI-MLX-10Gx8-M 8-port 10GbE (M) Module

NP Id : 0
----------------
Log# Processing Block Category Description
1  Rx Processing Normal Processing Received valid VLAN
8  Legacy, VLL and VPLS Normal Processing PRAM valid port set
   (PBB) Endpoint Processing(DA)
18 Legacy, VLL and VPLS Discard packet PRAM discard packet set
   (PBB) Endpoint Processing(DA) or Port Blocked

NP Id : 1
----------------
Log# Processing Block Category Description
1  Rx Processing Normal Processing Received valid VLAN
8  Legacy, VLL and VPLS Normal Processing PRAM valid port set
   (PBB) Endpoint Processing(DA)
18 Legacy, VLL and VPLS Discard packet PRAM discard packet set
   (PBB) Endpoint Processing(DA) or Port Blocked
**Table 10** displays the descriptions of the fields from the `show np reason log slot` command.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot #</td>
<td>The slot number</td>
</tr>
<tr>
<td>Module</td>
<td>The module name</td>
</tr>
<tr>
<td>NP Id</td>
<td>The ID of the network processor.</td>
</tr>
<tr>
<td>Log#</td>
<td>The log number</td>
</tr>
<tr>
<td>Processing Block</td>
<td>The block of the corresponding processing associated with the ID.</td>
</tr>
<tr>
<td>Category</td>
<td>The type of processing associated with the ID.</td>
</tr>
<tr>
<td>Description</td>
<td>Shows what exactly happened or reason associated with the Id.</td>
</tr>
</tbody>
</table>

The following is sample output from the `show np reason log slot all` command.

```plaintext
Brocade# show np reason log slot all
Slot #2  Module:  NI-MLX-10Gx8-M 8-port 10GbE (M) Module
NP Id : 0
---------------
None
Log#  Processing Block      Category              Description
NP Id : 1
---------------
None
Log#  Processing Block      Category              Description
Slot #4  Module:  BR-MLX-40Gx4-M 4-port 40GbE Module
NP Id : 0
---------------
Log#  Processing Block      Category              Description
1 Rx Processing  Normal Processing     Received valid VLAN
8 Legacy, VLL and VPLS (PBB) Endpoint Processing (DA)  Normal Processing PRAM valid port set
18 Legacy, VLL and VPLS (PBB) Endpoint Processing (DA)  Discard packet PRAM discard packet set or Port Blocked
NP Id : 1
---------------
Log#  Processing Block      Category              Description
1 Rx Processing  Normal Processing     Received valid VLAN
8 Legacy, VLL and VPLS (PBB) Endpoint Processing (DA)  Normal Processing PRAM valid port set
18 Legacy, VLL and VPLS (PBB) Endpoint Processing (DA)  Discard packet PRAM discard packet set or Port Blocked
```

**clear np reason log slot**

**Syntax:** `clear np reason log slot [slot_number | all]`

- `slot slot_number` - Clears the reason log of the network processing unit (NPU).
- `all` - Clears the reason log of the NPUs of all operational line cards.
Traffic management

Traffic management show commands

The following sections describe the show commands you can use to display traffic management information.

show tm log histogram

**Syntax:** Show tm log histogram [slot slot_num]

This command displays histogram information of traffic manager (TM) error interrupts for a particular slot specified by the [slot slot_num] option or all the available slots in the chassis.

The following is the sample command output displaying histogram information for the specified slot number 1.

Brocade# show tm log histogram slot 1
Slot 1:

<table>
<thead>
<tr>
<th>TM 0:</th>
<th>Last 1 minute</th>
<th>last 5 minute</th>
<th>last 1 hour</th>
<th>last 1 day</th>
<th>&gt;1 day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassembly errors</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>CRC errors</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>IPT DRAM errors</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>LP/TM table entry Re-initialized</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>FDR OVERFLOWS</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Table 11 displays the descriptions of the fields from the show tm log histogram command.

### TABLE 11  Output from the show tm log histogram command

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot #</td>
<td>The slot number.</td>
</tr>
<tr>
<td>TM #</td>
<td>The traffic manager (TM) number in that LP.</td>
</tr>
<tr>
<td>Reassembly errors</td>
<td>The packet reassembly failure due to link cyclic redundancy check (CRC) errors.</td>
</tr>
<tr>
<td>CRC errors</td>
<td>The TM-Fabric link CRC errors.</td>
</tr>
<tr>
<td>IPT DRAM errors</td>
<td>The CRC errors at ingress TM memory.</td>
</tr>
<tr>
<td>LP/TM table entry Re-initialized</td>
<td>The TM table recovery done for bit flip errors.</td>
</tr>
<tr>
<td>FDR OVERFLOWS</td>
<td>The fabric to egress TM FIFO overflows.</td>
</tr>
</tbody>
</table>

The following is the sample command output displaying histogram information for all the available slots.

Brocade# show tm log histogram
Slot 1:

<table>
<thead>
<tr>
<th>Field</th>
<th>Last 1 minute</th>
<th>last 5 minute</th>
<th>last 1 hour</th>
<th>last 1 day</th>
<th>&gt;1 day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassembly errors</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>CRC errors</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>IPT DRAM errors</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Line card reset</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>LP/TM table entry Re-initialized</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>FDR OVERFLOWS</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Slot 2:

<table>
<thead>
<tr>
<th>Field</th>
<th>Last 1 minute</th>
<th>last 5 minute</th>
<th>last 1 hour</th>
<th>last 1 day</th>
<th>&gt;1 day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassembly errors</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>CRC errors</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>IPT DRAM errors</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Line card reset</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>LP/TM table entry Re-initialized</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>FDR OVERFLOWS</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**show tm non-empty-queues**

Syntax: show tm non-empty-queues [slot slot_num] [detail]

- **slot slot_num** - Displays non-empty queue information such as queue ID, current queue size, and credit balance for a particular slot or all the available slots in the chassis.
- **detail** - Displays detailed non-empty queue information such as queue ID, destination port to which the queue is mapped, priority of the queue, and type of queue (Unicast, Multicast or CPU queue) for a particular slot or all the available slots in the chassis.
The following is the sample command output displaying non-empty queue information for the specified slot number 13.

Brocade# show tm non-empty-queues slot 13
--------- Ports 13/1 - 13/2 ---------
96(96/32650) 1328(576/32680) 1392(6048/32493) 1880(1472/32466) 2112(1552/32573)
2408(4272/32725)
--------- Ports 13/3 - 13/4 ---------
120(912/32582) 528(592/32570) 544(1216/32457) 584(1552/32690) 776(1568/32666)
1328(2912/32501) 1424(3104/32645) 1608(1536/32576) 1624(352/32737)
1632(1296/32689) 2200(112/32598)

The following is the sample command output displaying detailed non-empty queue information for the specified slot number 13.

Brocade# show tm non-empty-queues slot 13 detail
--------- Ports 13/1 - 13/2 ---------
96(dst port:2/20 prio:3 Q:non-full Q-sz:32650bytes) 1328(dst port:11/2 prio:6
Q:non-full Q-sz:32501bytes) 1392(dst port: 11/24 prio:0 Q:full Q-sz:1048576bytes)
0(dst port:Mul Prio:0 Q:non-full Q-sz:1024bytes) 8164(dst port:CPU unknown prio:4
Q:full Q-sz:1048576bytes)

**show tm statistics**

**Syntax: show tm statistics**

This command displays all traffic manager statistics for the port groups that belong to each traffic manager, as shown in the following example.

Brocade# show tm statistics
--------- Ports 2/1 - 2/20 ---------
Ingress Counters:
  Total Ingress Pkt Count: 464418
  EnQue Pkt Count: 464418
  EnQue Byte Count: 51904240
  DeQue Pkt Count: 464418
  DeQue Byte Count: 51904240
  TotalQue Discard Pkt Count: 0
  TotalQue Discard Byte Count: 0
  Oldest Discard Pkt Count: 0
  Oldest Discard Byte Count: 0
Egress Counters:
  EnQue Pkt Count: 701812
  EnQue Byte Count: 78785888
  Discard Pkt Count: 0
  Discard Byte Count: 0
--------- Ports 4/1 - 4/20 ---------
Ingress Counters:
  Total Ingress Pkt Count: 0
  EnQue Pkt Count: 0
  EnQue Byte Count: 0
  DeQue Pkt Count: 0
  DeQue Byte Count: 0
  TotalQue Discard Pkt Count: 0
  TotalQue Discard Byte Count: 0
  Oldest Discard Pkt Count: 0
  Oldest Discard Byte Count: 0
Egress Counters:
  EnQue Pkt Count: 0
  EnQue Byte Count: 0
  Discard Pkt Count: 0
NOTE
The byte counts displayed from the `show tm statistics` command incorporate proprietary internal headers of various lengths.

**show tm statistics ethernet**

**Syntax:** `show tm statistics ethernet slotnum/portnum`

This command displays traffic manager statistics for a specified Ethernet port group (identified by a slot and port within the group), as shown in the following example.

```bash
Brocade# show tm statistics ethernet 2/1
-------- Ports 2/1 - 2/20 --------
Ingress Counters:
    Total Ingress Pkt Count: 464454
    EnQue Pkt Count: 464454
    EnQue Byte Count: 51907696
    DeQue Pkt Count: 464454
    DeQue Byte Count: 51907696
    TotalQue Discard Pkt Count: 0
    TotalQue Discard Byte Count: 0
    Oldest Discard Pkt Count: 0
    Oldest Discard Byte Count: 0
Egress Counters:
    EnQue Pkt Count: 701866
    EnQue Byte Count: 78791072
    Discard Pkt Count: 0
    Discard Byte Count: 0
```

**show tm statistics slot**

**Syntax:** `show tm statistics slot slotnum`

This command displays all traffic manager statistics for an interface module identified by slot number, as shown in the following example.

```bash
Brocade# show tm statistics slot 4
-------- Ports 4/1 - 4/20 --------
Ingress Counters:
    Total Ingress Pkt Count: 0
    EnQue Pkt Count: 0
    EnQue Byte Count: 0
    DeQue Pkt Count: 0
    DeQue Byte Count: 0
    TotalQue Discard Pkt Count: 0
    TotalQue Discard Byte Count: 0
    Oldest Discard Pkt Count: 0
    Oldest Discard Byte Count: 0
Egress Counters:
    EnQue Pkt Count: 0
    EnQue Byte Count: 0
    Discard Pkt Count: 0
    Discard Byte Count: 0
```
Clearing traffic management statistics

You can clear traffic management statistics selectively for a specified port group, an interface module, or for an entire Brocade NetIron XMR series and Brocade MLX series router using the `clear tm statistics` command.

**clear tm statistics**

Syntax: `clear tm statistics [ethernet slotnum/portnum | slot slotnum]`

- `ethernet slotnum/portnum` - Clears traffic manager statistics for a specific Ethernet interface.
- `slot slotnum` - Clears traffic manager statistics for a specific interface module.

**Configuration notes**

- A traffic manager contains a specific number of ports depending on the interface module. Specifying a particular port and slot gathers statistics for all ports that belong to the same port group.
- The Brocade device classifies packets into one of eight internal priorities. Traffic scheduling allows you to selectively forward traffic according to the forwarding queue that is mapped to one of the following schemes:
  - **Strict priority-based scheduling** – This scheme guarantees that higher-priority traffic is always serviced before lower-priority traffic. The disadvantage of strict priority-based scheduling is that lower-priority traffic can be starved of any access.
  - **WFQ weight-based traffic scheduling** – With Weighted Fair Queuing (WFQ) destination-based scheduling enabled, some weight-based bandwidth is allocated to all queues. With this scheme, the configured weight distribution is guaranteed across all traffic leaving an egress port, and an input port is guaranteed allocation in relationship to the configured weight distribution.
  - **Mixed strict priority and weight-based scheduling** – This scheme provides a mixture of strict priority for the three highest-priority queues and WFQ for the remaining priority queues.

Route map

A route map is a named set of match conditions and parameter settings that the Brocade device can use to modify route attributes and control redistribution of the routes. Route maps contain match statements and set statements. Each route map contains a permit or deny action for routes that match the match statements.

You can use the PBR route map feature to match the IP information based on the ACLs and set routing information in the IP traffic.

**Route map show commands**

This section describes the show commands that display route map information.
show pbr route-map

Syntax: show pbr route-map map-name

The map-name parameter specifies the name of the route map.

This command checks and displays whether the route map definitions are properly synchronized to the LP. Command output resembles the following example.

Brocade# show pbr route-map ipv6-pbr
Routemap ipv6-pbr: (next-hop-lsp defined = 0, next-hop-ip-tunnel defined = 0)
route-map ipv6-pbr permit 10
match ipv6 address v6acl
set ipv6 next-hop 2001:DB8::1
set ipv6 next-hop 2001:DB8::1

show route-map

Syntax: show route-map [map-name | binding map-name]

• map-name - Specifies the name of the route map.
• binding - Specifies the interface binding definitions.

This command checks and displays whether the route map and interface binding are properly synchronized to the LP.

Command output resembles the following example.

Brocade# show route-map binding ipv6-pbr
IPv6 Bindings of ipv6-pbr : 2/3

Telemetry solutions

Telemetry solutions provides for logical grouping of related route map instances and information related to them, such as interface to which the route maps are bound to, current output port or VLAN, and ACLs bound to the route map instances.

Telemetry solutions show commands

This section describes the show commands that display information related to route map instances.

show telemetry rule-name

Syntax: show telemetry [detail] rule-name name

[detail] - Displays detailed information about each rule name.

name - Specifies the rule name for which you want to display the route map information.

This command displays information related to route map instances that are either bound or not bound to an interface.

If a rule name is not bound to an interface, the command output resembles the following example.
Telemetry solutions

Brocade# show telemetry rule-name
Paths with leading * are configured but disabled, entries with + are for IPv6

<table>
<thead>
<tr>
<th>Name</th>
<th>Input</th>
<th>Policy</th>
<th>Match</th>
<th>VLAN</th>
<th>Port(s)/IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>example</td>
<td>N/A</td>
<td>test1</td>
<td>test2</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>*default-rulename</td>
<td>N/A</td>
<td>example</td>
<td>test2</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

If a rule name configured on a route map is bound to an interface, the command output resembles the following example.

Brocade# show telemetry rule-name
Paths with leading * are configured but disabled, entries with + are for IPv6

<table>
<thead>
<tr>
<th>Name</th>
<th>Input</th>
<th>Policy</th>
<th>Match</th>
<th>VLAN</th>
<th>Port(s)/IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>example</td>
<td>2/1</td>
<td>test1</td>
<td>test2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>default-rulename</td>
<td>2/2</td>
<td>example</td>
<td>test2</td>
<td>9/9</td>
<td></td>
</tr>
</tbody>
</table>

The `show telemetry detail rule-name` command displays detailed information about all the configured rule names, as shown in the following example.

Brocade# show telemetry detail rule-name
Rule name: example
Input: IPv4 - 2/1
Route-map Policy: test1
IPv4 ACL match: test2
Output: IPv4 - 9/9 9/17 10/1 10/9

Rule name: default-rulename
Input: IPv4 - 2/2
Route-map Policy: example
IPv4 ACL match: test2
Output:

The `show telemetry rule-name name` command displays information about the specified rule name, as shown in the following example.

Brocade# show telemetry rule-name example
Paths with leading * are configured but disabled, entries with + are for IPv6

<table>
<thead>
<tr>
<th>Name</th>
<th>Input</th>
<th>Policy</th>
<th>Match</th>
<th>VLAN</th>
<th>Port(s)/IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>example</td>
<td>2/1</td>
<td>test1</td>
<td>test2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The `show telemetry detail rule-name name` command displays detailed information about the specified rule name, as shown in the following example.

Brocade# show telemetry detail rule-name example
Rule name: example
Input: IPv4 - 2/1
Route-map Policy: test1
IPv4 ACL match: test2
Output: IPv4 - 9/9 9/17 10/1 10/9
Chapter 8

Multicast Diagnostics

In this chapter

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This chapter provides diagnostic information about IP multicast environments on Brocade NetIron XMR series and Brocade MLX series routers.

IP multicasting

Multicast protocols allow a group or channel to be accessed over different networks by multiple stations (clients) for the receipt and transmission of multicast data.

Brocade devices support two multicast routing protocols—Distance Vector Multicast Routing Protocol (DVMRP) and Protocol-Independent Multicast (PIM) protocol along with the Internet Group Management Protocol (IGMP).

PIM and DVMRP are broadcast and pruning multicast protocols that deliver IP multicast datagrams. DVMRP and PIM build a different multicast tree for each source and destination host group.

DVMRP

Brocade devices provide multicast routing with the Distance Vector Multicast Routing Protocol (DVMRP). DVMRP uses IGMP to manage the IP multicast groups.

DVMRP is a broadcast and pruning multicast protocol that delivers IP multicast datagrams to intended receivers. The receiver registers the interested groups using IGMP. DVMRP builds a multicast delivery tree with the sender forming the root. Initially, multicast datagrams are delivered to all nodes on the tree. Those leaves that do not have any group members send prune messages to the upstream router, noting the absence of a group. The upstream router maintains a prune state for this group for the given sender. A prune state is aged out after a given configurable interval, allowing multicasts to resume.
DVMRP show commands

You can use show commands to display the following DVMRP information:

- DVMRP group information
- DVMRP interface information
- DVMRP multicast cache information
- DVMRP neighbor information
- DVMRP active prune information
- Available multicast resources
- IP multicast route information
- Active multicast traffic information

**show ip mcache**

**Syntax:** show ip mcache

This command displays information about the DVMRP multicast cache, as shown in the following example.

Brocade# show ip mcache
Total 2 entries
1    (10.2.1.2, 226.1.1.1) in v20 (e2/2)
    L3 (HW) 1: e2/4 (VL40)
    fast=1 slow=0 leaf=0 prun=0 frag=0 tag=0 tnnl=0 swL2=0 hwL2=0 swRepl=0
    age=0 fid: 8012,
2    (10.1.1.2, 225.1.1.1) in v10 (e2/1)
    L3 (HW) 1: e2/3 (VL30)
    fast=1 slow=0 leaf=0 prun=0 frag=0 tag=0 tnnl=0 swL2=0 hwL2=0 swRepl=0
    age=0 fid: 8011,
Total number of mcache entries 2

**show ip dvmrp group**

**Syntax:** show ip dvmrp group

This command displays information about DVMRP groups, as shown in the following example.

Brocade# show ip dvmrp group
Total number of groups: 2
1    Group 225.1.1.1    Ports
    Group member at e2/3: v30
2    Group 226.1.1.1    Ports
    Group member at e2/4: v40

**show ip dvmrp interface**

**Syntax:** show ip dvmrp interface

This command displays DVMRP interface information, as shown in the following example.

Brocade# show ip dvmrp interface
Interface e5/2
TTL Threshold: 1, Enabled, Querier
Local Address: 10.5.1.1
DR: itself
Neighbor:
  10.5.1.2
Interface e8/1
TTL Threshold: 1, Enabled, Querier
Local Address: 10.8.1.1
DR: itself
Interface v10
TTL Threshold: 1, Enabled, Querier
Local Address: 10.1.1.1 logical Vid=1
DR: itself
Interface v20
TTL Threshold: 1, Enabled, Querier
Local Address: 10.2.1.1 logical Vid=2
DR: itself
Interface v30
TTL Threshold: 1, Enabled, Querier
Local Address: 10.3.1.1 logical Vid=3
DR: itself
Interface v40
TTL Threshold: 1, Enabled, Querier
Local Address: 10.4.1.1 logical Vid=4
DR: itself

show ip dvmrp nbr

**Syntax:** show ip dvmrp nbr

This command displays information about DVMRP neighbors, as shown in the following example.

Brocade# show ip dvmrp nbr
Port   Phy_p  Neighbor        GenId    Age   UpTime
  e5/2   e5/2   10.5.1.2       00000000 170   440

show ip dvmrp prune

**Syntax:** show ip dvmrp prune

This command displays DVMRP prune information, as shown in the following example.

Brocade# show ip dvmrp prune
Port SourceNet  Group  Nbr         Age
  e5/2  10.2.1.2  226.1.1.1  10.5.1.1  60
  e5/2  10.1.1.2  225.1.1.1  10.5.1.1  60

show ip dvmrp resource

**Syntax:** show ip dvmrp resource

This command displays information about available multicast resources, as shown in the following example.
show ip dvmrp route

**Syntax:** show ip dvmrp route

This command displays IP multicast route information, as shown in the following example.

Brocade# show ip dvmrp resource

<table>
<thead>
<tr>
<th>Resource</th>
<th>allocated</th>
<th>in-use</th>
<th>available</th>
<th>allo-fail</th>
<th>up-limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVMRP route</td>
<td>2048</td>
<td>13</td>
<td>2035</td>
<td>0</td>
<td>2048</td>
</tr>
<tr>
<td>route interface</td>
<td>2048</td>
<td>13</td>
<td>2035</td>
<td>0</td>
<td>8192</td>
</tr>
<tr>
<td>NBR list</td>
<td>128</td>
<td>1</td>
<td>127</td>
<td>0</td>
<td>1874</td>
</tr>
<tr>
<td>prune list</td>
<td>64</td>
<td>2</td>
<td>62</td>
<td>0</td>
<td>256</td>
</tr>
<tr>
<td>graft list</td>
<td>64</td>
<td>0</td>
<td>64</td>
<td>0</td>
<td>256</td>
</tr>
<tr>
<td>mcache</td>
<td>128</td>
<td>2</td>
<td>126</td>
<td>0</td>
<td>4096</td>
</tr>
<tr>
<td>mcache hash link</td>
<td>547</td>
<td>2</td>
<td>545</td>
<td>0</td>
<td>no-limit</td>
</tr>
<tr>
<td>graft if no mcache</td>
<td>197</td>
<td>0</td>
<td>197</td>
<td>0</td>
<td>no-limit</td>
</tr>
<tr>
<td>IGMP group</td>
<td>256</td>
<td>2</td>
<td>254</td>
<td>0</td>
<td>2048</td>
</tr>
<tr>
<td>pim/dvm intf. group</td>
<td>256</td>
<td>2</td>
<td>254</td>
<td>0</td>
<td>no-limit</td>
</tr>
<tr>
<td>pim/dvm global group</td>
<td>256</td>
<td>2</td>
<td>254</td>
<td>0</td>
<td>4096</td>
</tr>
<tr>
<td>HW replica vlan</td>
<td>2000</td>
<td>4</td>
<td>1996</td>
<td>0</td>
<td>no-limit</td>
</tr>
<tr>
<td>HW replica port</td>
<td>1024</td>
<td>2</td>
<td>1022</td>
<td>0</td>
<td>no-limit</td>
</tr>
</tbody>
</table>

Brocade# show ip dvmrp route

<table>
<thead>
<tr>
<th>SourceNet</th>
<th>Mask</th>
<th>Gateway</th>
<th>P</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.0.0</td>
<td>10.255.0.0</td>
<td>* v153 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Int v153 phy_p e1/36 nbr 10.1.1.2 age=0 NOT downstream

show ip dvmrp traffic

**Syntax:** show ip dvmrp traffic

This command displays active multicast traffic information, as shown in the following example.

Brocade# show ip dvmrp traffic

<table>
<thead>
<tr>
<th>Port</th>
<th>[Rx]</th>
<th>[Tx]</th>
<th>Dscrd</th>
<th>[Rx]</th>
<th>[Tx]</th>
<th>Dscrd</th>
<th>[Rx]</th>
<th>[Tx]</th>
<th>Dscrd</th>
</tr>
</thead>
<tbody>
<tr>
<td>e5/2</td>
<td>111</td>
<td>112</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>e8/1</td>
<td>0</td>
<td>220</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>v10</td>
<td>0</td>
<td>211</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>v20</td>
<td>0</td>
<td>210</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>1718</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

IGMP Statistics:
Total Discard/chksum 0/0

**DVMRP debug commands**

This section describes the debug commands used for monitoring the DVMRP environment.

dystem pim-dvmrp

**Syntax:** [no] debug ip pim-dvmrp [add-del-oif | bootstrap | clear | event | group | ip | join-prune | level | nbr-change | route-change | show | source | vlan-id | vpls-id]
• **add-del-oif** - Displays multicast cache (mcache) additions or deletions.

• **bootstrap** - Displays bootstrap messages in detail.

• **clear** - Clears PIM-DVMRP debug settings.

• **event** - Displays information about infrastructure events and callback handling.

• **group** - Displays activity for a specific group.

• **ipc** - Displays information about IPC messages between the management processor and a line processor.

• **join-prune** - Displays information about join or prune messages.

• **level** - Sets the level of debug information from 1 through 3 (3 generates the most detailed information).

• **nbr-change** - Displays information about neighbor port changes.

• **route-change** - Displays information about route change events.

• **show** - Shows PIM-DVMRP debug settings.

• **source** - Displays information about multicast traffic from a specific source.

• **vlan-id** - Displays information about a specified VLAN.

• **vpls-id** - Displays information about a specific VPLS ID.

**debug ip pim-dvmrp add-del-oif**

Syntax: `[no] debug ip pim-dvmrp add-del-oif [stack]

This command monitors and displays instances of multicast cache activity, such as outbound interface (OIF) additions or deletions. When the stack option is selected, this command also generates a stack trace of the add or delete event. Command output is similar to the following example.

```
Brocade# debug ip pim-dvmrp add-del-oif
Added oif v10, e2/1 to (10.10.10.2, 224.225.0.1) entry
```

This example indicates that VLAN 10 on port e2/1 has been added to the OIF table for the multicast stream (10.10.10.2, 224.225.0.1).

**debug ip pim-dvmrp clear**

Syntax: `[no] debug ip pim-dvmrp clear

This command clears all PIM-DVMRP debug settings.

**debug ip pim-dvmrp ipc**

Syntax: `[no] debug ip pim-dvmrp ipc

This command displays IPC messages between the management processor and a line processor. Output is similar to the following example, which indicates a line processor notification has been enabled for the stream (10.10.10.1, 224.255.0.1). This stream originates from port e2/1 on VLAN 10.

```
Brocade# debug ip pim-dvmrp ipc
receive slave messages S_G_CREAT_NOTIF, entry (10.10.10.1, 224.255.0.1) intf v10, e2/1
```
IGMP V2 and V3

The Internet Group Management Protocol (IGMP) allows an IPv4 system to communicate IP multicast group membership information to its neighboring routers. The routers in turn limit the multicast of IP packets with multicast destination addresses to only those interfaces on the router that are identified as IP multicast group members.

In IGMP V2, when a router sends a query to the interfaces, the clients on the interfaces respond with a membership report of multicast groups to the router. The router can then send traffic to these groups, regardless of the traffic source. When an interface no longer needs to receive traffic from a group, it sends a leave message to the router, which in turn sends a group-specific query to that interface to see if any other clients on the same interface are still active.
IGMP V3 provides selective filtering of traffic based on traffic source. A router running IGMP V3 sends queries to every multicast-enabled interface at the specified interval. These general queries determine if any interface wants to receive traffic from the router.

IGMP show commands

This section describes the show commands that display IGMP information.

**show ip igmp group**

**Syntax:** `show ip igmp [vrf vrf-name] group [group-address [detail] [tracking]]`

- `vrf vrf-name` - Specifies that you want to display IGMP group information for the VRF specified.
- `group-address` - Displays a report for a specific multicast group. Omit the `group-address` parameter for a report for all multicast groups.
- `detail` - Displays the source list of the multicast group.
- `tracking` - Displays information on interfaces that have tracking enabled.

This command displays the status of all IGMP multicast groups on a device, as shown in the following example.

```
Brocade# show ip igmp group
Total 2 entries
-----------------------------------------------------
Idx Group Address    Port   Intf   Mode    Timer Srcs
---+----------------+------+------+-------+-----+----
 1 232.0.0.1      e6/2   v30    include     0   7
 2 226.0.0.1      e6/2   v30    exclude   240   2
 e6/3   e6/3    include     0   3
Total number of groups 2
```

**show ip igmp group detail**

**Syntax:** `show ip igmp group group-address detail`

This command displays the status of a specific IGMP multicast group, as shown in the following example.

```
Brocade# show ip igmp group 239.0.0.1 detail
Total 2 entries
-----------------------------------------------------
Idx Group Address    Port   Intf   Mode    Timer Srcs
---+----------------+------+------+-------+-----+----
 1 226.0.0.1      e6/2   v30    exclude   218   2
 S: 10.40.40.12
 S: 10.40.40.11
 S: 10.40.40.10
 S: 10.40.40.2  (Age: 218)
 S: 10.40.40.3  (Age: 218)
 226.0.0.1      e6/3   e6/3   include     0   3
 S: 10.30.30.3  (Age: 165)
 S: 10.30.30.2  (Age: 165)
 S: 10.30.30.1  (Age: 165)
```
**show ip igmp group tracking**

**Syntax:** `show ip igmp group group-address tracking`

If tracking and fast leave are enabled, you can display the list of clients that belong to a particular group by entering a command similar to the one in the following example.

```
Brocade# show ip igmp group 224.1.10.1 tracking
```

<table>
<thead>
<tr>
<th>Idx</th>
<th>Group Address</th>
<th>Port</th>
<th>Intf</th>
<th>Mode</th>
<th>Timer</th>
<th>Srcs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.0.0.1</td>
<td>e6/2</td>
<td>v30</td>
<td>exclude</td>
<td>253</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S: 10.40.40.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S: 10.40.40.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S: 10.40.40.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S: 10.40.40.2</td>
<td></td>
<td></td>
<td></td>
<td>(Age: 253)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C: 10.10.10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Age: 253)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S: 10.40.40.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C: 10.10.10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Age: 253)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0.0.1</td>
<td>e6/3</td>
<td>e6/3</td>
<td>include</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>S: 10.30.30.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C: 10.2.0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Age: 196)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S: 10.30.30.2</td>
<td></td>
<td></td>
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<tr>
<td>C: 10.2.0.1</td>
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<tr>
<td>(Age: 196)</td>
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<tr>
<td>S: 10.30.30.1</td>
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<tr>
<td>C: 10.2.0.1</td>
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<tr>
<td>(Age: 196)</td>
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</tr>
</tbody>
</table>

**show ip igmp static**

**Syntax:** `show ip igmp [vrf vrf-name] static`

This command displays information about IGMP static memberships.

The `vrf` parameter with the `vrf-name` variable displays IGMP static information for a specified VRF.

```
Brocade# show ip igmp static
```

<table>
<thead>
<tr>
<th>Group Address</th>
<th>Interface Port List</th>
</tr>
</thead>
<tbody>
<tr>
<td>229.1.0.12</td>
<td>4/1 ethe 4/1</td>
</tr>
<tr>
<td>229.1.0.13</td>
<td>4/1 ethe 4/1</td>
</tr>
<tr>
<td>229.1.0.14</td>
<td>4/1 ethe 4/1</td>
</tr>
<tr>
<td>229.1.0.92</td>
<td>4/1 ethe 4/1</td>
</tr>
</tbody>
</table>

**show ip igmp interface**

**Syntax:** `show ip igmp [vrf vrf-name] interface [ethernet slotnum/portnum | pos slotnum/portnum | ve num]`

- `vrf vrf-name` - Displays IGMP interface information for the VRF specified by the `vrf-name` variable.
- `ethernet slotnum/portnum` - Displays information for a specific Ethernet interface.
- `pos slotnum/portnum` - Displays information for a specific POS interface.
- `ve num` - Displays information for a specific virtual routing interface.
This command displays the status of a multicast enabled port, as shown in the following example.

```
Brocade# show ip igmp interface
-------------------------------------------
Intf/Port|Groups| Version |Querier        |  Timer  |V1Rtr|V2Rtr|Tracking
 |      |Oper  Cfg|               |OQrr GenQ|     |     |
-------------------------------------------
v200           2    2    -                                        Disabled
  e2/15           2    - Self               0   59 No    No
  e2/1           2    - Self               0   59 No    Yes
  e1/5           2    - Self (MCT-Blk)     0   40 No    No
```

```
show ip igmp traffic
Syntax: show ip igmp [vrf vrf-name] traffic
The vrf parameter with the vrf-name variable displays IGMP traffic information for a specific VRF.

This command displays the traffic status on each virtual routing interface, as shown in the following example.

```
Brocade# show ip igmp traffic
Recv  QryV2 QryV3 G-Qry GSQry MbrV2 MbrV3 Leave  IsIN  IsEX ToIN ToEX ALLOW BLK
v5       29     0     0     0     0     0     0     0     0    0    0    0    0
v18      15     0     0     0     0    30     0    60     0    0    0    0    0
v110      0     0     0     0     0    97     0   142    37    2    2    3    2
Send  QryV1 QryV2 QryV3 G-Qry GSQry
v5        0     2     0     0     0
v18       0     0    30    30     0
v110      0     0    30    44    11
```

```
show ip igmp settings
Syntax: show ip igmp [vrf vrf-name] settings
The vrf parameter with the vrf-name variable displays IGMP setting information for a specific VRF.

This command displays global IGMP settings or IGMP settings for a specific VRF. Global IGMP settings are shown in the following example.

```
Brocade# show ip igmp settings
IGMP Global Configuration
  Query Interval : 125s
  Configured Query Interval : 125s
  Max Response Time : 10s
  Group Membership Time : 260s
  Configured Version : 2
  Operating Version : 2
```

**Clearing the IGMP group membership table**

To clear the IGMP group membership table, enter the following command.

```
clear ip igmp cache
Syntax: clear ip igmp [vrf vrf-name] cache
```
This command clears the IGMP membership for the default router instance or for a specified VRF. Use the `vrf` option with the `vrf-name` variable to clear the traffic information for a specific VRF instance.

**Clearing IGMP traffic statistics**

To clear statistics for IGMP traffic, enter the following command.

```
clear ip igmp traffic
```

**Syntax:** `clear ip igmp [vrf vrf-name] traffic`

This command clears all the multicast traffic information on all interfaces on the device. Use the `vrf` option to clear the traffic information for a VRF instance specified by the `vrf-name` variable. This option became available in version 03.5.00 of the Multi-Service IronWare software.

**Clearing IGMP group flows**

To clear all the IGMP flows, enter the following command at the Privileged EXEC level of the CLI.

```
clear ip multicast all
```

**Syntax:** `clear ip multicast all`

**IGMP debug commands**

This section describes the debug commands used for monitoring the IGMP environment.

```
debug ip igmp
```

**Syntax:** `[no] debug ip igmp`

This command generates information about IGMP activity, including IGMP membership queries, membership responses, and the conversion of IGMP V2 to IGMP V3 through DNS lookup. Command output resembles the following example.

```
Brocade# debug ip igmp
IGMP.RCV: Type Query Port 0/0 PktLen 8. GrpAddr 0.0.0.0 Src: 10.28.172.53
IGMP.RCV: Type Query Port 1/1 PktLen 8. GrpAddr 0.0.0.0 Src: 10.28.172.110
```

```
debug ip igmp protocol query
```

**Syntax:** `debug ip igmp protocol query`

This command displays information about the Internet Group Management Protocol (IGMP) query suppression state on the Cluster Client Edge Ports (CCEPs). Command output resembles the following example.

```
Brocade# debug ip igmp protocol query
Jul 2 04:55:37.273 IGMP.VRF0: [ Port 2/15,v200 ] Sent General Query version 2 using src 10.2.2.1
Jul 2 04:56:03.273 IGMP.VRF0: [ Port 1/5,v200 ] Skipped General Query on CCEP port
```
debug ip vrf

Syntax: [no] debug ip vrf

This command generates information about synchronization of VRF routing information to line cards, similar to the following example, which shows a download request from the line card to start the tree download for VRF 1.

Brocade# debug ip vrf
RTM (vrf): Processing tree download for vrf 1

Configuration notes

- Each of the multicast protocols uses IGMP. IGMP is automatically enabled on an interface when you configure PIM or DVMRP on an interface, and is disabled on the interface if you disable PIM or DVMRP on the interface.
- IGMP V3 does not support static IGMP group members.
- Static IGMP groups are supported only in Layer 3 mode.
- Because VLANs are not VRF-aware, any changes to the default VLAN or tagged port moves is counted by all VRFs in existence at the time, including the default VRF.

Common diagnostic scenarios

- With flow-control and IGMP enabled, performance is considerably slower than expected. This issue is resolved by upgrading the software version to include the latest patches. It is recommended that customers always update software to reflect the latest patches and versions. If you have questions about your software version, contact Brocade Technical Support for assistance.
- Sporadic difficulty in accessing the Web management console. This issue is resolved by upgrading the software version to reflect the latest patches and versions, and disabling the following IGMP settings:

  no ip igmp snooping
  no ip igmp snooping querier

- Even though multicast function is not configured, LP and MP CPU usage is high when the Brocade NetIron XMR device receives a large number of invalid IGMP packets. The following solutions are proposed to avoid this issue:
  - Enter the following commands to deny IGMP packets:

    Brocade# ip receive access-list 100 sequence 5
    Brocade# access-list 100 deny igmp any any
    Brocade# access-list 100 permit ip any any

    Control packets can be flooded to the router and cause high CPU because the CPU must process these packets. Brocade NetIron XMR series and Brocade MLX series devices use IP receive ACL (firewall) to filter these packets.
  - Enter the following commands to deny any IP fragment packets and prevent excessive LP and MP CPU usage:

    Brocade# ip receive access-list 100 sequence 5
    Brocade# access-list 100 deny ip any any fragment
    Brocade# access-list 100 permit ip any any
The router will bind this ACL to all interfaces.

**Multicast**

When you enable IP multicast traffic reduction, you also can configure the following features:

- **IGMP mode** – When you enable IP multicast traffic reduction, the device passively listens for IGMP Group Membership reports by default. If the multicast domain does not have a router to send IGMP queries to elicit these Group Membership reports, you can enable the device to actively send the IGMP queries.

- **Query interval** – The query interval specifies how often the device sends Group Membership queries. This query interval applies only to the active IGMP mode. The default is 60 seconds. You can change the interval to a value from 10 through 600 seconds.

- **Age interval** – The age interval specifies how long an IGMP group can remain in the IGMP group table without the device receiving a Group Membership report for the group. If the age interval expires before the device receives another Group Membership report for the group, the device removes the entry from the table. The default is 140 seconds. You can change the interval to a value from 10 through 1220 seconds.

Furthermore, when you enable IP multicast traffic reduction, the device forwards all IP multicast traffic by default, but you can enable the device to do the following:

- Forward IP multicast traffic only for groups for which the device has received a Group Membership report.

- Drop traffic for all other groups.

**NOTE**

If the “route-only” feature is enabled on the Brocade device, then IP multicast traffic reduction will not be supported. This feature is also not supported on the default VLAN of the Brocade device.

To verify that IP multicast traffic reduction is enabled, enter the `show ip multicast` command at any level of the CLI.

**Multicast show commands**

This section describes the show commands that display multicast information.

**show ip multicast**

**Syntax:** show ip multicast

This command displays IP multicast traffic reduction information, as shown in the following example.
show ip multicast pimsm-snooping

Syntax: show ip multicast pimsm-snooping

This command displays PIM SM information, as shown in the following example.

Brocade# show ip multicast pimsm-snooping
PIMSM snooping is enabled
VLAN ID 100
PIMSM neighbor list:
  10.31.31.4 : 12/2 expires 142 s
  10.31.31.13 : 10/7 expires 136 s
  10.31.31.2 : 3/1 expires 172 s
Number of Multicast Groups: 2
1   Group: 225.1.0.291
    IGMP report ports :
    Mapped mac address : 0100.5e01.001d Fid:0x041b
    PIMv2*G join ports : 1/1
2   Group: 225.1.0.24
    IGMP report ports : 4/48
    Mapped mac address : 0100.5e01.0018 Fid:0x041a
    PIMv2*G join ports : 1/1

Brocade# show ip multicast
IP multicast is enabled - Passive
IP pimsm snooping is enabled
VLAN ID 23
Active 10.10.10.10 Report ports: 1/1 7/1
Report FID OX0400
Number of Multicast Groups: 2
1   Group: 225.1.0.291
    IGMP report ports :
    Mapped mac address : 0100.5e01.001d Fid:0x041b
    PIMv2*G join ports : 1/1
2   Group: 225.1.0.24
    IGMP report ports : 4/48
    Mapped mac address : 0100.5e01.0018 Fid:0x041a
    PIMv2*G join ports : 1/1

show ip multicast pimsm-snooping

Syntax: show ip multicast pimsm-snooping

This command displays PIM SM information, as shown in the following example.
**show ip multicast statistics**

**Syntax:** `show ip multicast vlan vlan-id statistics`

This command displays IP multicast statistics, as shown in the following example. The command in this example shows the statistics for VLAN 1.

```
Brocade# show ip multicast vlan 1 statistics
IP multicast is enabled - Passive
VLAN ID 1
Reports Received: 34
Leaves Received: 21
General Queries Received: 60
Group Specific Queries Received: 2
Others Received: 0
General Queries Sent: 0
Group Specific Queries Sent: 0
```

**Multicast debug commands**

This section describes the debug commands that generate multicast information.

**debug [ip | ipv6] multicast add-del-oif**

**Syntax:** `debug [ip | ipv6] multicast add-del-oif`

- `ip` - Displays debug information for IPv4 multicast.
- `ipv6` - Displays debug information for IPv6 multicast.

This command displays information about addition or deletion of the outgoing interfaces (OIFs) to or from the mcache entry.

```
Brocade# debug ipv6 multicast add-del-oif
L2MCASTV6.MLD.ADD_DEL: l2mcast_l2mdb_process_port_down
```

**debug [ip | ipv6] multicast error**

**Syntax:** `debug [ip | ipv6] multicast error`

- `ip` - Displays debug information for IPv4 multicast.
- `ipv6` - Displays debug information for IPv6 multicast.

This command displays information about any kind of unexpected error.

```
Brocade# debug ip multicast error
L2MCASTV4.IGMP.ERR: Rx packet has invalid checksum. Dropping packet
```

**debug [ip | ipv6] multicast events**

**Syntax:** `debug [ip | ipv6] multicast events`

- `ip` - Displays debug information for IPv4 multicast.
- `ipv6` - Displays debug information for IPv6 multicast.

This command displays information about system events such as VRF changes, interface changes, and so on.

```
Brocade# debug ip multicast events
```
L2MCAST IGMPV4: l2mcast_mct_itc_process_mdup_message - Received mdup with dest-ip 10.0.0.1 from peer
L2MCASTV4: l2mcast_mct_receive_igmp_mld_packet - Received packet from MDUP_MSG_FROM_CCEP for dest-ip 10.0.0.1 on VLAN 21

debug [ip | ipv6] multicast ipc

Syntax: debug [ip | ipv6] multicast ipc

• ip - Displays debug information for IPv4 multicast.
• ipv6 - Displays debug information for IPv6 multicast.

This command displays debug information about the IPC messages communicated between the MP and the LP.

Brocade# debug ipv6 multicast ipc
L2MCASTV6.MLD.IPC: mgmt_send_enable_disable

debug [ip | ipv6] multicast protocol

Syntax: debug [ip | ipv6] multicast protocol

• ip - Displays debug information for IPv4 multicast.
• ipv6 - Displays debug information for IPv6 multicast.

This command displays information related to the processing and handling of multicast query or reports.

Brocade# debug ip multicast protocol
L2MCASTV4.IGMP: l2mcast_process_igmpv3_mldv2_report
L2MCASTV4.IGMP: Received IGMPV2 report for group 10.0.0.1 from 8/4 on vlan 21

Clearing IP multicast statistics

To clear IP multicast statistics on a device, enter the following command at the Privileged EXEC level of the CLI.

clear ip multicast

Syntax: clear ip multicast [all | group group-id]

• all - Clears the learned flows for all groups.
• group group-id - Clears the flows for the specified group, but does not clear the flows for other groups.

This command resets statistics counters to zero for all the statistics displayed by the show ip multicast statistics command.

The following example shows IGMP flows information listed by the show ip multicast command, followed by removal of the information by the clear ip multicast all command.
To clear the learned IGMP flows for a specific IP multicast group, use the `clear ip multicast group` command.

The following example shows how to clear the IGMP flows for a specific group and retain reports for other groups.

```
Brocade# show ip multicast
IP multicast is enabled - Active
VLAN ID 1
Active 192.168.2.30 Router Ports 4/13
Multicast Group: 239.255.162.5, Port: 4/4 4/13
Multicast Group: 239.255.162.4, Port: 4/10 4/13

Brocade# clear ip multicast all

Brocade# show ip multicast
IP multicast is enabled - Active
VLAN ID 1
Active 192.168.2.30 Router Ports 4/13

Brocade# clear ip multicast group 239.255.162.5

Brocade# show ip multicast
IP multicast is enabled - Active
VLAN ID 1
Active 192.168.2.30 Router Ports 4/13
Multicast Group: 239.255.162.4, Port: 4/10 4/13
```

### Configuration notes

You must enter the `ip multicast-routing` command before changing the global IP multicast parameters. Otherwise, the changes do not take effect and the software uses the default values. Also, entering `no ip multicast-routing` will reset all parameters to their default values.

### Common diagnostic scenarios

- Multicast is not working.
  VLANS and route-only will not work together. Removing the route-only setting eliminates the problem.

- Multicast packets are not being transferred between two Brocade MLX series devices.
  The two Brocade MLX series devices have network address overlap. The problem is resolved when the network address of one of the devices is changed.
The Multicast Source Discovery Protocol (MSDP) is used by Protocol-Independent Multicast (PIM) Sparse routers to exchange routing information for PIM Sparse multicast groups across PIM Sparse domains. Routers running MSDP can discover PIM Sparse sources that are in other PIM Sparse domains.

**MSDP show commands**

You can display the following MSDP information using show commands:

- **Summary information** – The IP addresses of the peers, the state of the Brocade device’s MSDP session with each peer, and statistics for Keepalive, Source Active, and Notification messages sent to and received from each of the peers.
- **Peer information** – The IP address of the peer, along with detailed MSDP and TCP statistics.
- **Source Active cache entries** – The Source Active messages cached by the router.

**show ip msdp summary**

**Syntax:** show ip msdp summary

This command displays summary MSDP information, as shown in the following example.

Brocade# show ip msdp summary

MSDP Peer Status Summary
KA: Keepalive SA:Source-Active NOT: Notification
Peer Address State KA SA NOT
In Out In Out In Out
10.251.17.30 ESTABLISH 3 3 0 640 0 0
10.251.17.41 ESTABLISH 0 3 651 0 0 0

**show ip msdp peer**

**Syntax:** show ip msdp peer

This command displays MSDP peer information, as shown in the following example.

Brocade# show ip msdp peer

Total number of MSDP Peers: 2

IP Address State
1 10.251.17.30 ESTABLISHED
Keep Alive Time Hold Time
60 90

Message Sent Message Received
Keep Alive 2 3
Notifications 0 0
Source-Active 0 640
Last Connection Reset Reason:Reason Unknown
Notification Message Error Code Received:Unspecified
Notification Message Error SubCode Received:Not Applicable
Notification Message Error Code Transmitted:Unspecified
Notification Message Error SubCode Transmitted:Not Applicable
show ip msdp sa-cache

Syntax: show ip msdp sa-cache

This command displays multiple copies of the same Source Active (SA) entries originating from different Rendezvous Points (RPs) in a sorted order. Command output resembles the following example.

Brocade# show ip msdp sa-cache
Total of 10 SA cache entries
Index RP address (Source,Group) Orig Peer Age/Uptime
1 10.4.4.4 (10.200.200.100,227.1.1.1) 10.4.4.4 32 /00:14:07
2 10.5.5.5 (10.200.200.100,227.1.1.1) 172.168.2.2 39 /00:14:07
3 10.6.6.6 (10.200.200.100,227.1.1.1) 172.168.2.2 39 /00:14:05
4 10.7.7.7 (10.200.200.100,227.1.1.1) 172.168.2.2 39 /00:14:05
5 10.4.4.4 (10.200.200.100,227.1.1.2) 10.4.4.4 32 /00:14:07
6 10.5.5.5 (10.200.200.100,227.1.1.2) 172.168.2.2 39 /00:14:07
7 10.6.6.6 (10.200.200.100,227.1.1.2) 172.168.2.2 39 /00:14:05
8 10.7.7.7 (10.200.200.100,227.1.1.2) 172.168.2.2 39 /00:14:05
9 10.4.4.4 (10.200.200.100,227.1.1.3) 10.4.4.4 32 /00:14:07
10 10.5.5.5 (10.200.200.100,227.1.1.3) 172.168.2.2 39 /00:14:07
Total number of matching entries:10

show ip msdp debug

Syntax: show ip msdp debug

This command displays information about internal MSDP activity, such as the number of peers, timer settings, internal clock ticks, and Source Active (SA) cache memory pool data. Command output resembles the following example.

Brocade# show ip msdp debug
[BEGIN] MSDP Debug Info
Oper is On
Max # of peers 1, # of peers 1
Srvr IP 0.0.0.0, sockInit Yes
Orig-id 0/1/0/0.0.0.0, SA filter-orig No, orig-rmap "/00000000
entry-per-ticks 3200, adv-int 60, adv-entry-per-tick 35, state-ticks 533, start-offset 10
SA agetime 6, Holddown 75, KA 60, hold-timer 90, conn-retry 30
SA Cache memory Pool Information:
pool: 25da9600, unit_size: 24, initial_number:256, upper_limit:32000
   total_number:256, allocated_number:10, alloc_failure 0
   flag: 0, pool_index:1, avail_data:25ef60f0
[END] MSDP Debug Info

MSDP debug commands

This section describes the debug commands that generate MSDP information.
debug ip msdp

Syntax:  [no] debug ip msdp [alarms | events | message]

- alarms - Displays information about MSDP alarms.
- events - Displays information about MSDP events.
- message - Displays information about MSDP messages.

The *debug ip msdp* command generates information about Multicast Source Discovery Protocol (MSDP) alarms, events, and messages.

d debug ip msdp alarms

Syntax:  [no] debug ip msdp alarms

This command generates information about MSDP RX processing errors, such as invalid headers or incomplete or truncated information, errors during transmission of SA advertisement transmission, (for example, buffer unavailability), and peer connection socket errors and notification messages. Command output resembles the following example.

Brocade# debug ip msdp alarms
  MSDP:  alarms debugging is on
  MSDP:  S=xxxxxxxxx P=0 Initiate Transport Connection to MSDP peer

d debug ip msdp events

Syntax:  [no] debug ip msdp events

This command tracks originating SA advertisements, major peer events, and peer keepalive timer events. Command output resembles the following example.

Brocade# debug ip msdp events
MSDP:  events debugging is on
MSDP:  192.1.1.2: Process START event, local = 10.1.1.2
MSDP:  10.1.1.2: TCP Connection to Remote Peer is Open
MSDP:  10.1.1.2: MSDP-TCP Connection opened
MSDP:  10.1.1.2: TCP_OPEN DONE, State 4
MSDP:  10.1.1.2: Originating SA
MSDP:  10.1.1.2: TX Keep Alive timer expired, send keep alive to peer
MSDP:  10.1.1.2: Originating SA
MSDP:  10.1.1.2: TX Keep Alive timer expired, send keep alive to peer

d debug ip msdp message

Syntax:  [no] debug ip msdp message

This command generates information (including message contents) about MSDP messages received, transmitted, and forwarded, and flag errors in MSDP messages. Command output resembles the following example.
Clearing MSDP information

You can clear the following MSDP information:

- Peer information
- Source Active cache entries
- MSDP statistics

To clear MSDP peer information, enter the `clear ip msdp peer` command at the Privileged EXEC level of the CLI.

```
clear ip msdp peer
```

**Syntax:** `clear ip msdp peer ip-addr`

This command displays a message to indicate when the connection has been successfully closed. To clear all the peers, omit the `ip-addr` variable from the command.

To clear the Source Active cache, enter the `clear ip msdp sa-cache` command at the Privileged EXEC level of the CLI.

```
clear ip msdp sa-cache
```

**Syntax:** `clear ip msdp sa-cache ip-addr`

This command clears all of the cache entries. Use the `ip-addr` variable to clear only the entries matching either a source or a group.

To clear MSDP statistics, enter the `clear ip msdp statistics` command at the Privileged EXEC level of the CLI.

```
clear ip msdp statistics
```

**Syntax:** `clear ip msdp statistics ip-addr`

This command clears statistics for all the peers. To clear statistics for a specific peer, enter the peer’s IP address using the `ip-addr` variable.

Configuration notes

- MSDP depends on BGP and Multiprotocol BGP (MBGP) for inter-domain operations.
- Routers that run MSDP usually also run BGP. The source address used by the MSDP router is normally configured to be the same source address used by BGP.
- For MSDP mesh groups, on each device that will be part of the mesh group, there must be a mesh group definition for all the peers in the mesh group.
- It is recommended that you use the `connect-source loopback num` parameter when issuing the `msdp-peer` command. If you do not use this parameter, the Brocade device uses the outgoing interface’s IP address. You must also make sure the IP address of the `connect-source loopback` parameter is the source IP address used by the PIM-RP, and the BGP router.

Common diagnostic scenarios

- High CPU usage with MSDP traffic between two peers.
  This issue can be resolved by resetting both peers.
- PIM SM Multicast packets are not being successfully transmitted.
  A device downstream has multicast passive and PIM snooping enabled. Once PIM snooping is disabled on the downstream device, and added on MBGP links, the problem is resolved.
- Unable to remove an MSDP peer.
  This issue is resolved by upgrading the software version to reflect the latest patches and versions.

PIM DM and PIM SM

Protocol-Independent Multicast (PIM) helps to simplify the complexity of the routing protocol. PIM is similar to DVMRP in that PIM builds source-routed multicast delivery trees and employs reverse path check when forwarding multicast packets.

There are two PIM modes: Dense and Sparse. The Dense Mode (DM) is suitable for densely populated multicast groups, primarily in the LAN environment. The Sparse Mode (SM) is suitable for sparsely populated multicast groups with the focus on WAN.

The Brocade device supports PIM DM V1 and V2. The default is V2. You can specify the version on an individual interface basis.

The primary difference between PIM DM V1 and V2 is the methods the protocols use for messaging:
- PIM DM V1 – Uses the IGMP to send messages.
- PIM DM V2 – Sends messages to the multicast address 224.0.0.13 (ALL-PIM-ROUTERS) with protocol number 103.

The CLI commands for configuring and managing PIM DM are the same for V1 and V2. The only difference is the command you use to enable the protocol on an interface.

**NOTE**

If you want to continue to use PIM DM V1 on an interface, you must change the version, and then save the configuration. However, this does not mean you can run different PIM versions on devices that are connected to each other. The devices must run the same version of PIM. To connect a Brocade device running PIM to a device that is running PIM V1, you must change the PIM version on the Brocade device to V1 (or change the version on the device to V2, if supported).
PIM DM and PIM SM show commands

The following section describes show commands you can use to display PIM DM and PIM SM information.

**show ip pim counter mct**

**Syntax:** show ip pim counter mct

This command displays statistics and error counters for the Multicast MAC Database Update Protocol (MDUP) channel between the Multi-Chassis Trunking (MCT) Peers. Command output resembles the following example.

Brocade# show ip pim counter mct

Multicast MCT Statistics for IPv4 (DN):
Messages assembled into the send buffer : 0
Messages processed out of the recv buffer: 0
Segments sent successfully to TCP : 0
Segments failed to be accepted by TCP : 0
Segments assembed into the receive buffer: 0
Messages dropped because (size > 1500) : 0
Messages dropped because it won't fit into available space in send buffer : 0
Segments dropped because it won't fit into available space in receive buffer: 0
Received messages dropped because of cluster-id mismatch : 0
Received messages dropped because the peer was not recognized : 0
Received messages dropped because cluster not active : 0
Received messages dropped because MCT VLAN unrecognized : 0
Received messages dropped because of bad message type : 0
Received messages dropped because of bad checksum : 0
Received bytes skipped because of sync or checksum errors : 0

**show ip pim counter nsr**

**Syntax:** show ip pim counter nsr

This command displays Multicast NSR-related status counters from the management processor. Command output resembles the following example.

Brocade# show ip pim counter nsr

Mcache sync (entity id: 203)
  pack: 1078
  unpack: 0
  ack: 1078
RPset sync (entity id: 201)
  pack: 3
  unpack: 0
  ack: 3
BSR status (entity id: 202)
  pack: 3
  unpack: 0
  ack: 3

**show ip pim counter**

**Syntax:** show ip pim counter

This command displays the PIM counters from the line processor, as shown in the following example.

Brocade# show ip pim counter
show ip pim neighbor

Syntax: show ip pim neighbor

This command displays PIM neighbor states, as shown in the following example.

Brocade# show ip pim neighbor

<table>
<thead>
<tr>
<th>Port</th>
<th>PhyPort</th>
<th>Neighbor</th>
<th>Holdtime</th>
<th>Age</th>
<th>UpTime</th>
<th>VRF</th>
<th>Prio</th>
</tr>
</thead>
<tbody>
<tr>
<td>e1/22</td>
<td>e1/22</td>
<td>10.5.1.1</td>
<td>105</td>
<td>0</td>
<td>00:04:40</td>
<td>default-vrf 1</td>
<td></td>
</tr>
<tr>
<td>v46</td>
<td>e3/4</td>
<td>10.5.1.1</td>
<td>105</td>
<td>10</td>
<td>00:04:30</td>
<td>default-vrf 1</td>
<td></td>
</tr>
<tr>
<td>v59</td>
<td>e1/1</td>
<td>10.10.10.1</td>
<td>105</td>
<td>0</td>
<td>00:04:40</td>
<td>default-vrf 1</td>
<td></td>
</tr>
<tr>
<td>v67</td>
<td>e1/1</td>
<td>10.3.1.1</td>
<td>105</td>
<td>0</td>
<td>00:04:40</td>
<td>default-vrf 1</td>
<td></td>
</tr>
<tr>
<td>v420</td>
<td>e1/1</td>
<td>10.100.100.1</td>
<td>105</td>
<td>0</td>
<td>00:04:40</td>
<td>default-vrf 1</td>
<td></td>
</tr>
</tbody>
</table>

show ip pim sparse

Syntax: show ip pim sparse

This command displays global PIM SM configuration information, as shown in the following example.

Brocade# show ip pim sparse

Global PIM Sparse Mode Settings
Hello interval : 30  Neighbor timeout : 105
Bootstrap Msg interval: 60  Candidate-RP Advertisement interval: 60
Join/Prune interval : 60  SPT Threshold : 1
Inactivity interval : 180
SSM Enabled: Yes
SSM Group Range: 226.0.0.0/8

<table>
<thead>
<tr>
<th>Interface</th>
<th>Local Address</th>
<th>Mode</th>
<th>Ver</th>
<th>Designated Router</th>
<th>TTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>e6/3</td>
<td>10.2.0.10</td>
<td>SM</td>
<td>V2</td>
<td>Itself</td>
<td>1</td>
</tr>
<tr>
<td>e6/4</td>
<td>10.3.0.10</td>
<td>SM</td>
<td>V2</td>
<td>Itself</td>
<td>1</td>
</tr>
<tr>
<td>v30</td>
<td>10.10.10.10</td>
<td>SM</td>
<td>V2</td>
<td>Itself</td>
<td>1</td>
</tr>
</tbody>
</table>
show ip pim group

Syntax: show ip pim group
This command displays PIM group configuration information, as shown in the following example.

Brocade# show ip pim group
Total number of Groups: 2
Index 1    Group 239.255.162.1    Ports e3/11

show ip pim bsr

Syntax: show ip pim bsr
This command displays PIM bootstrap router (BSR) information, as shown in the following example.

Brocade# show ip pim bsr
PIMv2 Bootstrap information
This system is the elected Bootstrap Router (BSR)
BSR address: 10.95.7.1
Uptime: 00:33:52, BSR priority: 5, Hash mask length: 32
Next bootstrap message in 00:00:20
Next Candidate-RP-advertisement in 00:00:10
RP: 10.95.7.1
group prefixes:
224.0.0.0 / 4
Candidate-RP-advertisement period: 60
This example shows information for a router that has been elected as the BSR. The following example shows information for a router that is not the BSR. Note that some fields shown in the first example do not appear in the second example.

Brocade# show ip pim bsr
PIMv2 Bootstrap information
BSR address = 10.95.7.1
BSR priority = 5

show ip pim rp-candidate

Syntax: show ip pim rp-candidate
This command displays candidate RP information, as shown in the following example.

Brocade# show ip pim rp-candidate
Next Candidate-RP-advertisement in 00:00:10
RP: 10.95.7.1
group prefixes:
224.0.0.0 / 4
Candidate-RP-advertisement period: 60
This example shows information displayed on a candidate RP router. The following example shows the message displayed for a non-candidate RP router.

Brocade# show ip pim rp-candidate
This system is not a Candidate-RP.
show ip pim rp-map

Syntax: show ip pim rp-map
This command displays RP-to-group mappings, as shown in the following example.

Brocade# show ip pim rp-map
Number of group-to-RP mappings: 6

<table>
<thead>
<tr>
<th>Group address</th>
<th>RP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 239.255.163.1</td>
<td>10.99.99.5</td>
</tr>
<tr>
<td>2 239.255.163.2</td>
<td>10.99.99.5</td>
</tr>
<tr>
<td>3 239.255.163.3</td>
<td>10.99.99.5</td>
</tr>
<tr>
<td>4 239.255.162.1</td>
<td>10.99.99.5</td>
</tr>
<tr>
<td>5 239.255.162.2</td>
<td>10.43.43.1</td>
</tr>
<tr>
<td>6 239.255.162.3</td>
<td>10.99.99.5</td>
</tr>
</tbody>
</table>

show ip pim rp-hash

Syntax: show ip pim rp-hash group-address
The group-address parameter is the address of a PIM Sparse IP multicast group.
This command displays RP hash information for a PIM Sparse group (identified by the group-address variable), as shown in the following example.

Brocade# show ip pim rp-hash 239.255.162.1
  RP: 10.95.7.1, v2
    Info source: 10.95.7.1, via bootstrap

show ip pim rp-set

Syntax: show ip pim rp-set
To display the RP set list, enter this command at any CLI level.

Brocade# show ip pim rp-set
Group address Static-RP-address Override
-----------------------------------------------
Access-List 44 10.99.99.5 On
Number of group prefixes Learnt from BSR: 1
Group prefix = 239.255.162.0/24 # RPs expected: 1
# RPs received: 1
RP 1: 10.43.43.1 priority=0 age=0

show ip pim nbr

Syntax: show ip pim nbr
This command displays information about PIM neighbors, as shown in the following example.
show ip pim mcache

Syntax: show ip pim mcache A.B.C.D A.B.C.D

The A.B.C.D variable specifies the IPv4 source or group address.

This command displays information about the IPv4 PIM multicast cache. Command output resembles the following example.

Brocade# show ip pim mcache 10.198.198.111 232.26.26.8
IP Multicast Mcache Table
Entry Flags : SM - Sparse Mode, SSM - Source Specific Multicast, DM - Dense Mode
RPT - RPT Bit, SPT - SPT Bit, LSRC - Local Source, LRCV - Local Receiver, JOIN - Join Upstream
HW - HW Forwarding Enabled, FAST - Resource Allocated, TAG - Need For Replication Entry
REGPROB - Register In Progress, REGSUPP - Register Suppression Timer
MSDPADV - Advertise MSDP, NEEDRTE - Route Required for Src/RP, PRUN - DM Prune Upstream
Interface Flags: IM - Immediate, IH - Inherited, WA - Won Assert
MJ - Membership Join, MI - Membership Include, ME - Membership Exclude
BR - Blocked RPT, BA - Blocked Assert, BF - Blocked Filter, BI - Blocked IIF,
BM - Blocked MCT
Total entries in mcache: 1
1 (10.2.2.101, 239.0.1.3) in v200 (e2/15), Uptime 00:01:08, Rate 42229 (SM)
Source is directly connected. RP 10.2.2.1
Flags (0x3046cec1) SM SPT L2REG LSRC LRCV JOIN HW FAST MSDPADV
Access ports: ethe 2/1
AgeSltMsk: 00000002, FID: 0x8006, MVID: NotReq, RegPkt: 0, AvgRate: 41688,
profile: none
Forwarding_oif: 1, Immediate_oif: 1, Blocked_oif: 1
L2 (HW) 1:
    TR(e2/1,e2/1), 00:01:08/181, Flags: IM IH
Blocked OIF 1:
    TR(e1/5,e1/5)(VL200), 00:01:08/0, Flags: MJ BM
Number of matching entries: 1

show ipv6 pim mcache

Syntax: show ipv6 pim mcache

This command displays information about the IPv6 PIM multicast cache. Command output resembles the following example.

Brocade# show ipv6 pim mcache
IP Multicast Mcache Table
Entry Flags: SM - Sparse Mode, SSM - Source Specific Multicast, DM - Dense Mode
RPT - RPT Bit, SPT - SPT Bit, LSRC - Local Source, LRCV - Local Receiver, JOIN - Join Upstream
HW - HW Forwarding Enabled, FAST - Resource Allocated, TAG - Need For Replication Entry
REGPROB - Register In Progress, REGSUPP - Register Suppression Timer
MSDPADV - Advertise MSDP, NEEDRTE - Route Required for Src/RP, PRUN - DM Prune Upstream
Interface Flags: IM - Immediate, IH - Inherited, WA - Won Assert
MJ - Membership Join, MI - Membership Include, ME - Membership Exclude
BR - Blocked RPT, BA - Blocked Assert, BF - Blocked Filter, BI - Blocked IIF, BM - Blocked MCT
Total entries in mcache: 1
1 (2001:DB8:62:62::11, 2001:DB8::2) in v62 (tag e1/1), Uptime 00:00:58
(SM) upstream neighbor is L2 fe80::21b:edff:fea4:a441. RP 2001:DB8:2:3:4::b Flags (0x304680c1) SM SPT LSRC LRCV HW FAST fast ports: AgeSltMsk: 00000003, FID: 0xffff (D), DIT: NotReq, profile: none, KAT Timer value: 240 Forwarding_oif: 0, Immediate_oif: 0, Blocked_oif: 1 Blocked OIF 1:
TR(e1/39,e1/39)(VL62), 00:00:01/0, Flags: MJ BM
Number of matching entries: 1

Syntax: show ip pim traffic

This command displays PIM traffic statistics, as shown in the following example.

Brocade# show ip pim traffic

<table>
<thead>
<tr>
<th>Port</th>
<th>Hello</th>
<th>J/P</th>
<th>Register</th>
<th>ReqStop</th>
<th>Assert</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[Rx]</td>
<td>[Tx]</td>
<td>[Rx]</td>
<td>[Tx]</td>
<td>[Rx]</td>
</tr>
<tr>
<td>e3/8</td>
<td>19</td>
<td>19</td>
<td>32</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>v1</td>
<td>18</td>
<td>19</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>v2</td>
<td>0</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>57</td>
<td>32</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

IGMP Statistics:
Total Recv/Xmit 85/110
Total Discard/chksum 0/0

NOTE
If you have configured interfaces for standard PIM (Dense Mode) on your router, statistics for these interfaces are listed first in the display.

Clearing the PIM forwarding cache

You can clear the PIM forwarding cache by using the following command.

clear pim-cache

Syntax: clear pim-cache
PIM debug commands

The following section describes the debug commands used to display PIM DM and PIM SM related debug information. For debug commands for PIM-DVMRP, refer to “DVMRP debug commands” on page 376.

debug ip pim oif


- **add-del** - Displays debugs related to the addition and deletion of outbound interfaces (OIFs) for a forwarding entry.
- **fsm** - Displays debugs related to OIF FSM related information.
- **timer** - Displays debugs related to the periodic OIF timers.

The following is the sample output from the debug ip pim oif command.

Brocade# debug ip pim oif
  PIM: OIF FSM debugging is on
  PIM: OIF timer debugging is on
  PIM: OIF External add-del debugging is on

debug ip pim bootstrap

Syntax: [no] debug [ip | ipv6] pim bootstrap

This command displays bootstrap messages in detail as shown in the following example.

Brocade# debug ip pim bootstrap
PIM: bootstrap debugging is on
Brocade# May 14 14:05:21.640 PIM-BSR.VRF0: Prefer BSR 10.11.11.11(Pr 1) over current BSR 10.11.11.11(Pr 1)
May 14 14:05:21.640 PIM-BSR.VRF0: Intf 2/4 - accept BSM from BSR 10.11.11.11(Pr 1), local state AccPref, curr BSR 10.11.11.11 (Pr 1)
May 14 14:05:21.640 PIMv4-BSR.VRF0: Intf 2/16 - Ignoring BSRMsg from 10.11.11.11 due to RPF-failure. RPFIfId e2/4
May 14 14:05:21.640 PIMv4-BSR.VRF0: Intf tn2 - Ignoring BSRMsg from 10.11.11.11 due to RPF-failure. RPFIfId e2/4
May 14 14:05:21.641 PIMv4-BSR.VRF0: Intf 2/12 - Ignoring BSRMsg from 10.11.11.11 due to RPF-failure. RPFIfId e2/4

debug ip pim clear

Syntax: [no] debug [ip | ipv6] pim clear

This command clears all PIM related debug settings.

debug ip pim entry

Syntax: [no] debug [ip | ipv6] pim entry [add-del | hw | kat]

- **add-del** - Displays debugs related to the addition and deletion of software forwarding entries.
- **hw** - Displays debugs related to programming of forwarding entries in hardware.
- **kat** - Displays debugs related to programming of the KAT timer that is used to age out forwarding entries (for PIMSM only).
The following is the sample output from the `debug ip pim entry` command.

Brocade# debug ip pim entry
  PIM: KAT timer debugging is on
  PIM: Entry Hw programming debugging is on
  PIM: Entry creation/deletion debugging is on

`debug ip pim entry`

**Syntax:** `[no] debug [ip | ipv6] pim event**

This command displays debugging information about infrastructure events and callback handling. The following is the sample output from the **debug ip pim event** command.

Brocade# debug ip pim event
Aug 17 03:53:42.646 MCAST_MCT: mcast_mct_send_message_to_peer: msg_type 2, msg_len 32, client 300, vlan 200
Aug 17 03:53:42.653 MCAST_MCT: mcast_mct_send_message_on_mdup: app_id 64, seg_size 44, seg_base 0 returned 0
Aug 17 03:53:48.149 MCAST_MCT: mcast_mct_send_message_to_peer: msg_type 2, msg_len 32, client 300, vlan 200
Aug 17 03:53:48.153 MCAST_MCT: mcast_mct_send_message_on_mdup: app_id 64, seg_size 44, seg_base 0 returned 0

`debug ip pim filter`

**Syntax:** `[no] debug [ip | ipv6] pim filter [group-prefix | level | source-prefix | stack | vrf-index]**

- `group-prefix` - Filters and displays debugs relevant to groups that are within the group prefix range.
- `level` - Displays additional information including data structure logs.
- `source-prefix` - Filters and displays debugs relevant to sources that are within the source prefix range.
- `stack` - Displays function call stack information along with other debugging information.
- `vrf-index` - Filters and displays debugs relevant to the particular VRF index.

The following is the sample output from the `debug ip pim filter group-prefix` command.

Brocade# debug ip pim filter group-prefix 225.0.0.1/32
  PIM: Filter Group prefix debugging is on, value = 225.0.0.1

The following is the sample output from the `debug ip pim filter level` command.

Brocade# debug ip pim filter level 2
  PIM: Debug Level debugging is on, value = 2

`debug ip pim ipc`

**Syntax:** `[no] debug [ip | ipv6] pim ipc**

This command displays information about the IPC messages that are exchanged between the MP and the LP.

Brocade# debug ip pim ipc
  PIM: ipc debugging is on

`debug ip pim join-prune`

**Syntax:** `[no] debug [ip | ipv6] pim join-prune**
This command displays information about the PIM joins and prunes that received and sent by the router.

Brocade# debug ip pim join-prune
PIM: join-prune debugging is on

Brocade# May 14 14:15:16.117 PIMSM.VRF0: BEGIN J/P proc: rpf_nbr 10.1.1.4, to_me=1 from 10.1.1.2, intf tn2 ----
May 14 14:15:16.117 Group=225.0.0.1. Join list: 1 srcs
May 14 14:15:16.117 J-Src=10.15.15.100, wc=0, rpt=0, SM=1
May 14 14:15:16.117 PIM.VRF0: Processing (S,G) Join (10.15.15.100 225.0.0.1)
from 10.1.1.2, intf tn2,2/16
May 14 14:15:16.117 Group=225.0.0.1. Prune list: 0 srcs
May 14 14:15:16.117 Group=225.0.0.2. Join list: 1 srcs
May 14 14:15:16.117 J-Src=10.15.15.100, wc=0, rpt=0, SM=1
May 14 14:15:16.117 PIM.VRF0: Processing (S,G) Join (10.15.15.100 225.0.0.2)
from 10.1.1.2, intf tn2,2/16
May 14 14:15:16.117 Group=225.0.0.3. Prune list: 0 srcs
May 14 14:15:16.117 Group=225.0.0.4. Join list: 1 srcs
May 14 14:15:16.117 J-Src=10.15.15.100, wc=0, rpt=0, SM=1
May 14 14:15:16.117 PIM.VRF0: Processing (S,G) Join (10.15.15.100 225.0.0.3)
from 10.1.1.2, intf tn2,2/16
May 14 14:15:16.117 Group=225.0.0.4. Prune list: 0 srcs
May 14 14:15:16.117 Group=225.0.0.4. Join list: 1 srcs
May 14 14:15:16.117 J-Src=10.15.15.100, wc=0, rpt=0, SM=1
May 14 14:15:16.117 PIM.VRF0: Processing (S,G) Join (10.15.15.100 225.0.0.4)
from 10.1.1.2, intf tn2,2/16
May 14 14:15:16.117 Group=225.0.0.4. Prune list: 0 srcs
May 14 14:15:16.634 PIMSM.VRF0: END J/P proc. ---------------------

debug ip pim nbr-change


This command displays information about preventing PIM IPv4 neighbors on Cluster Client Edge Ports (CCEPs). Command output resembles the following example.

Brocade# debug ip pim nbr-change
PIM: nbr-change debugging is on

Apr 9 17:20:02.668 PIM.VRF0: Rx Hello msg from 10.2.2.101 on intf v62, 1/1
Apr 9 17:20:02.938 PIM.VRF0: Rx Hello msg from 10.2.2.103 on intf v62, 1/3
Apr 9 17:20:02.938 PIM.VRF0: Rx Hello msg from 10.2.2.103 on intf v62, 1/3 is dropped:
Neighbors not allowed on CCEPs

debug ip pim optimization

Syntax: [no] debug [ip | ipv6] pim optimization

This command displays information about the hardware forwarding resources used by all multicast flows in the system.

Brocade# debug ip pim optimization
PIM: optimization debugging is on

debug ip pim rate-update

Syntax: [no] debug [ip | ipv6] pim rate-update
This command displays the IPC messages exchanged between the LP and the MP to communicate rates of PIM streams.

Brocade# debug ip pim rate-update
PIM-INFO(HW rate update).VRF 0: (10.1.1.1, 225.0.0.1) Total pkts: 100

debug ip pim reg-proc


This command displays information about the sending and processing of PIM register messages at the first hop and the Rendezvous Point (RP). Also displays information about the periodic null-registers.

Brocade# debug ip pim reg-proc
PIM: regproc debugging is on
RegSupp expires. RegSupp 1 RegProbe 0, send null reg to RP: 10.11.11.11
May 14 14:21:42.076 PIMSM-REG.VRF0: (10.15.15.100 225.0.0.2) RegSupp expires.
RegSupp 1 RegProbe 0, send null reg to RP: 10.11.11.11
May 14 14:21:42.076 PIMSM-REG.VRF0: (10.15.15.100 225.0.0.3) RegSupp expires.
RegSupp 1 RegProbe 0, send null reg to RP: 10.11.11.11
May 14 14:21:42.076 PIMSM-REG.VRF0: (10.15.15.100 225.0.0.4) RegSupp expires.
RegSupp 1 RegProbe 0, send null reg to RP: 10.11.11.11
May 14 14:21:42.078 PIM.0: rcvd reg stop (10.15.15.100 225.0.0.1) from 10.11.11.11
May 14 14:21:42.078 PIM vrf 0 rx RegStop. Reg Suppr Timer restarted for
(10.15.15.100 225.0.0.1)
May 14 14:21:42.078 PIM.0: rcvd reg stop (10.15.15.100 225.0.0.2) from 10.11.11.11
May 14 14:21:42.078 PIM vrf 0 rx RegStop. Reg Suppr Timer restarted for
(10.15.15.100 225.0.0.2)
May 14 14:21:42.078 PIM.0: rcvd reg stop (10.15.15.100 225.0.0.3) from 10.11.11.11
May 14 14:21:42.078 PIM vrf 0 rx RegStop. Reg Suppr Timer restarted for
(10.15.15.100 225.0.0.3)
May 14 14:21:42.078 PIM.0: rcvd reg stop (10.15.15.100 225.0.0.4) from 10.11.11.11
May 14 14:21:42.078 PIM vrf 0 rx RegStop. Reg Suppr Timer

debug ip pim route-change


This command displays information about route change events.

Brocade# debug ip pim route-change
PIM: route-change debugging is on

Brocade# May 14 14:24:41.077 PIM-RtChg-VRF0: RPF Lookup for Dest:10.11.11.11 safi
URTM, Mcast ECMP Paths 1

debug ip pim rp

Syntax: [no] debug [ip | ipv6] pim rp

This command displays information about the impact on the multicast flows when the RP address changes for a particular group prefix.

Brocade# debug ip pim rp
PIM: rp debugging is on

debug ip pim show

Syntax: [no] debug [ip | ipv6] pim show
This command displays PIM related debug settings.

Brocade# debug ip pim show
PIM debugging is enabled
PIM: OIF FSM debugging is on
PIM: OIF timer debugging is on
PIM: bootstrap debugging is on
PIM: rp debugging is on
PIM: KAT timer debugging is on
PIM: Entry Hw programming debugging is on
PIM: Entry creation/deletion debugging is on

d debug ip pim sync-lib

This command displays information about the impact that hitless upgrade and MP switchover have on multicast flows.

Brocade# debug ip pim sync-lib
PIM: sync-lib debugging is on

d debug ip pim timer-type

The decimal variable specifies the type of timer to be enabled.

This command displays information regarding the events associated with the multicast protocol and hardware timers in the system. Note that only one of the timer types can be enabled at the same time.

Brocade# debug ip pim timer-type 5
PIM: timer-type PIMTMR_HELLO debugging is on

Configuration notes

The following limitations apply to implementation of PIM SM:

- PIM Border Routers (PMBRs) are not supported. You cannot configure a routing interface as a PMBR interface for PIM SM.
- PIM SM and regular PIM (Dense Mode) cannot be used on the same interface.
- You cannot configure or display PIM SM information using the Web management interface. (You can display some general PIM information, but not specific PIM SM information.)
- If you want to continue to use PIM DM V1 on an interface, you must change the version, and then save the configuration. This does not mean you can run different PIM versions on devices that are connected to each other. The devices must run the same version of PIM. If you want to connect a device running PIM to a device that is running PIM V1, you must change the PIM version on the device to V1 (or change the version on the device to V2, if supported).
- When PIM routing is enabled, the line rate for receive traffic is reduced by about 5 percent. The reduction occurs due to overhead from the VLAN multicasting feature, which PIM routing uses. This behavior is normal and does not indicate a problem with the device.
- You do not need to enable IP multicast routing globally when configuring PIM SM.
- It is recommended that you configure the same device as both the BSR and the RP.
• It is possible to configure the device as only a candidate BSR or RP, but it is recommended that you configure the same interface on the same device as both a BSR and an RP.
• Specify the same IP address as the RP on all PIM SM routers within the PIM SM domain. Make sure the router is on the backbone or is otherwise well connected to the rest of the network.
• Use the same join or prune message interval on all the PIM SM routers in the PIM SM domain. If the routers do not all use the same timer interval, the performance of PIM SM can be adversely affected.

Common diagnostic scenarios

• The following PIM SM error appears:
  ERROR - cannot enable PIM sparse or DVMRP on an interface.
  This issue is resolved by upgrading the software version to reflect the latest patches and versions.
• Specific multicast sources are not being forwarded properly.
  The dmzo router was directed to an incorrect rpf. After modifying the configuration, the problem is resolved.
• Enabling IP PIM-SPARSE caused high CPU usage.
  This can occur when the device runs out of CAM due to large amounts of multicast traffic flooding the CAM. Make sure the device is using the most current patch of the software, and contact Brocade Technical Support for assistance.

MLD

Multicast Listener Discovery (MLD) discovers multicast listeners, or nodes that want to receive multicast packets on directly attached links. MLDv2 supports source filtering, the ability of a node to send reports on traffic that is from a specific address source or from all multicast addresses except the specified address sources. The information is then provided to the source-specific multicast (SSM) routing protocols such as PIM-SSM.

MLD show commands

The following section describes show commands you can use to display MLD information.

show ipv6 mld interface

Syntax:  show ipv6 mld interface

This command displays the MLD definitions for an interface. Command output resembles the following example.

Brocade# show ipv6 mld interface
=================================================================================
---------+------+---------+---------------------------------------+---------+----
-+---------
Intf/Port|Groups| Version |Querier                                |  Timer  |
|V1Rtr|Tracking|      |Oper  Cfg|                                       |OQrr GenQ|
---------+----+----+----+---------------------------------------+----+----+----
-+---------
 evidence information.

**MLD debug commands**

This section describes the **debug** commands that generate MLD information.

**debug ipv6 mld protocol query**

**Syntax:** `debug ipv6 mld protocol query`

This command displays information about MLD query suppression state on the CCEPs. Command output resembles the following example.

Brocade# debug ipv6 mld protocol query
Apr 9 18:11:56.102 MLD.VRF0: [ Port 1/37,v62 ] Sent General Query version 2 using src fe80::211:ff:fe04:1001
Apr 9 18:11:56.102 MLD.VRF0: [ Port 1/33,v62 ] Sent General Query version 2 using src fe80::211:ff:fe04:1001
Apr 9 18:11:27.103 MLD.VRF0: [ Port 2/1,v62 ] Skipped General Query on CCEP port
802.1x

802.1x port security allows you to configure a Brocade device to grant access to a port based on information supplied by a client to an authentication server.

This section describes how to use show commands and debug commands to monitor 802.1x configurations and activity on Brocade NetIron XMR series and Brocade MLX series routers.

CAUTION

Enabling diagnostic commands may degrade system performance. These commands are best used to troubleshoot specific problems while working with qualified Brocade service technicians. Whenever possible, troubleshoot your system during periods of low network traffic and user activity to preserve system performance.

NOTE

To save space, date and time stamps have been removed from all output examples.
802.1x show commands

You can display the following 802.1x-related information:

- Information about the 802.1x configuration on the device and on individual ports
- Statistics about the EAPOL frames passing through the device
- Information about 802.1x-enabled ports dynamically assigned to a VLAN
- Information about the user-defined and dynamically applied MAC address and IP ACLs currently active on the device
- Information about the 802.1x multiple client configuration

show dot1x

Syntax: show dot1x

This command displays information about the 802.1x configuration, as shown in the following example.

```
Brocade# show dot1x
PAE Capability               : Authenticator Only
system-auth-control          : Enable
Number of ports enabled      : 25
re-authentication            : Disable
global-filter-strict-security: Enable
quiet-period                 : 60 Seconds
tx-period                    : 30 Seconds
supptimeout                  : 30 Seconds
servertimeout                : 30 Seconds
maxreq                       : 3
re-authperiod                : 3600 Seconds
Protocol Version             : 1
auth-fail-action             : Block Traffic
MAC Session Aging            : All
MAC Session Max Age          : 120 Seconds
Maximum Failed Attempts      : 3
```

show dot1x configuration

Syntax: show dot1x configuration [all | ethernet slotnum/portnum]

This command displays information about the 802.1x configuration on all ports, or on a specified port. The following example shows the output from this command when issued for a specific port.

```
Brocade# show dot1x configuration ethernet 1/3
Port 1/3 Configuration:
AuthControlledPortControl    : Auto
max-clients                  : 32
multiple-clients             : Enable
filter-strict-security       : Enable
```

show dot1x statistics

Syntax: show dot1x statistics [all | ethernet slotnum/portnum]

This command displays 802.1x statistics for all ports, or for a specified port. The following example shows the output from this command when issued for a specific port.
Brocade# show dot1x statistics ethernet 3/3
Port 1/3 Statistics:
RX EAPOL Start: 0
RX EAPOL Logoff: 0
RX EAPOL Invalid: 0
RX EAPOL Total: 2
RX EAP Resp/Id: 1
RX EAP Resp other than Resp/Id: 1
RX EAP Length Error: 0
Last EAPOL Version: 1
Last EAPOL Source: 0000.000b.8bef
TX EAPOL Total: 3
TX EAP Req/Id: 1
TX EAP Req other than Req/Id: 1
Num Sessions: 1
Num Restricted Sessions: 0
Num Authorized Sessions: 1

show interfaces
Syntax: show interfaces ethernet slotnum/portnum

The show interface command displays the VLAN to which an 802.1x-enabled port has been dynamically assigned, as well as the port from which it was moved (that is, the port’s default VLAN).

The following example indicates the port’s dynamically assigned VLAN. Information about the dynamically assigned VLAN is shown in bold type. In this example, the 802.1x-enabled port has been moved from VLAN 1 to VLAN 4094. When the client disconnects, the port will be moved back to VLAN 1.

Brocade# show interfaces ethernet 12/2
GigabitEthernet1/3 is up, line protocol is up
Hardware is GigabitEthernet, address is 0000.00e2.5800 (bia 0000.00e2.5800)
Configured speed auto, actual 100Mbit, configured duplex fdx, actual fdx
Configured mdi mode AUTO, actual MDIX
Member of L2 VLAN ID **4094 (dot1x-RADIUS assigned)**, original L2 VLAN ID is 1,
port is untagged, port state is Forwarding
STP configured to ON, Priority is level0, flow control enabled
Force-DSCP disabled
mirror disabled, monitor disabled
Not member of any active trunks
Not member of any configured trunks
No port name
Internet address is 10.12.12.250/24, MTU 1522 bytes, encapsulation ethernet
300 second input rate: 810 bits/sec, 0 packets/sec, 0.00% utilization
300 second output rate: 1253 bits/sec, 1 packets/sec, 0.00% utilization
70178 packets input, 7148796 bytes, 0 no buffer
Received 0 broadcasts, 0 multicasts, 70178 unicasts
0 input errors, 0 CRC, 0 frame, 0 ignored
0 runts, 0 giants, DMA received 70178 packets
91892 packets output, 10081165 bytes, 0 underruns
Transmitted 9853 broadcasts, 13330 multicasts, 68709 unicasts
0 output errors, 0 collisions, DMA transmitted 91892 packets

show dot1x mac-address-filter

Syntax: show dot1x mac-address-filter [all | ethernet slotnum/portnum]
The all keyword displays all dynamically applied MAC address filters active on the device.

Use the ethernet slotnum/portnum parameter to display information for one port.

This command displays information about MAC filters. If you specify a specific port, and if the MAC address filter is dynamically assigned by 802.1x, the command output resembles the following example.

Brocade# show dot1x mac-address-filter ethernet 1/1
Port 1/1 MAC Address Filter information:
  802.1x dynamic MAC Filter (user defined) :
    mac access-list 401 in
  Port default MAC Filter :
    mac access-list 400 in

“Port default MAC Filter” appears if a default MAC filter has been configured on the port. This is the filter that will be applied to the port once the dynamically assigned MAC filter is removed. If a default MAC filter has not been configured, the message "No Port default MAC" is displayed.

When the dynamically assigned MAC address filter is removed, output resembles the following example.

Brocade# show dot1x mac-address-filter ethernet 1/1
Port 1/1 MAC Address Filter information:
  Port default MAC Filter :
    mac access-list 400 in

show dot1x ip-acl

Syntax: show dot1x ip-acl [all | ethernet slotnum/portnum]

- all - Displays all dynamically applied IP ACLs active on the device.
- ethernet slotnum/portnum - Displays information for one port.

This command displays information about what IP ACLs have been applied to an 802.1x-enabled port. If an IP ACL was dynamically applied by 802.1x, output from this command resembles the following example.

Brocade# show dot1x ip-acl ethernet 1/1
Port 1/1 IP ACL information:
  802.1x dynamic IP ACL (user defined) in:
    ip access-list extended Port_1/1_E_IN in
  Port default IP ACL in:
    ip access-list 100 in
    No outbound ip access-list is set

“Port default IP ACL” appears if a default IP ACL has been configured on the port. This is the IP ACL that will be applied to the port once the dynamically assigned IP ACL is removed. If a default IP ACL has not been configured, the message “No Port default IP ACL” is displayed.

When the dynamically assigned IP ACL is removed from the port, the command output shows the following information.

Brocade# show dot1x ip-acl ethernet 1/1
Port 1/1 IP ACL information:
  Port default IP ACL in:
    ip access-list 100 in
    No outbound ip access-list is set
show dot1x mac-sessions

Syntax: show dot1x mac-sessions

This command displays information about the 802.1x MAC sessions on all ports, as shown in the following example.

Brocade# show dot1x mac-sessions
Port   MAC             Username                     VLAN Auth State ACL|MAC Age
-----------------------------------------------------------------------------
1/1    0000.000b.8cd7  Mary M                          1    DENIED  n|n|n   0
1/2    0000.000b.8cb3  adminmorn                    4094 PERMITTED y|n|n   0
1/3    0000.000b.8bef  reports                       4094 PERMITTED y|n|n   0
1/4    0000.001f.6a63  testgroup                     4094 PERMITTED y|n|n   0
1/5    0000.001a.ff7e  admineve                      4094 PERMITTED y|n|n   0

show dot1x mac-sessions brief

Syntax: show dot1x mac-sessions brief

This command displays information about the 802.1x MAC sessions in brief, as shown in the following example.

Brocade# show dot1x mac-sessions brief
Port       Number of users Dynamic Dynamic Dynamic
Restricted Authorized Total VLAN ACL (In/Out) MAC-Filt
---------+----------+----------+-----+-------+-----------+--------
1/1          0          0     1 no          no/no   no
1/2          0          1     1 yes        yes/no   no
1/3          0          1     1 yes        yes/no   no
1/4          0          1     1 yes        yes/no   no
1/5          0          1     1 yes        yes/no   no

Clearing 802.1x statistics

You can clear the 802.1x statistics counters on all interfaces at once, on individual interfaces, or on a range of interfaces.

To clear the 802.1x statistics counters on all interfaces on the device, enter the following command.

clear dot1x statistics all

Syntax: clear dot1x statistics all

Use the following command to clear 802.1x statistics for a specific Ethernet port.

clear dot1x statistics ethernet

Syntax: clear dot1x statistics ethernet slotnum/portnum

802.1x debug commands

This section describes the 802.1x-related debug commands.
debug dot1x

Syntax: [no] debug dot1x [all | dumpclass | events | fault | packets | port | state | timers]

This command displays information about 802.1x authentication events, activity, and settings.

- **all** - Displays general information about 802.1x activity for all ports.
- **dumpclass** - Displays the internal data structure.
- **events** - Displays significant events for all ports.
- **fault** - Displays any internal errors for all ports.
- **packets** - Displays information about 802.1x packets.
- **port** - Displays information about 802.1x events and timers for specified ports.
- **state** - Displays 802.1x port state information.
- **timers** - Displays 802.1x timer information.

```plaintext
debug dot1x all

Syntax: [no] debug dot1x all

This command provides a complete profile of the authentication process, including events, faults, timers, and packets. This command works globally across all ports. Command output resembles the following example.

Brocade# debug dot1x all
802.1x All debugging ON
Dec 21 17:11:48 : 802.1X: Timer tick expired
  : 802.1X 3/16 Tx EAPOL on vlan_id 1 for dst 0000.0000.0003, len 8:
  EAP PACKET - EAPCode: FAILURE
dump TX 802.1X: 8 bytes
   01000004 04000004 ........
   802.1x: port 3/16 Tx (OK) EAPOL-FAIL Pkt (EAPId: 0)
  : 802.1X: Port 3/16 txEAP timer expired. Transmitting an EAP ReqId
  : 802.1X 3/16 Tx EAPOL on vlan_id 1 for dst 0000.0000.0003, len 9:
  EAP PACKET - EAPCode: REQUEST EAPType: IDENTITY
dump TX 802.1X: 9 bytes
   01000005 01000005 010000fc ........
   : 802.1x: port 3/16 Tx (OK) EAPOL-EAP-REQUEST-ID Pkt (EAPId: 0)
  : 802.1x: Timer tick expired
  : 802.1x: Timer tick expired
  : 802.1x: Timer tick expired
  : 802.1x: Timer tick expired
  : 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=0
  EAP START Dec 21 17:12:02 dump RX 802.1X: 18 bytes
   0180c200 00030000 00aa0001 888e0101 ..........
   : 802.1x: AuthPAE AUTH_INVALID --> AUTH_INIT
   : 802.1x: port 4/1 Rx EAPOL_START
  : 802.1x: port 4/1 BkEnd BKEND_INVALID --> BKEND_INIT
  : 802.1x: port 4/1 BkEnd BKEND_INIT --> BKEND_IDLE
  : 802.1x: port 4/1 AuthPAE AUTH_INVALID --> AUTH_INIT
  : 802.1x: port 4/1 AuthPAE AUTH_INIT --> AUTH_DISCONCTED
  : 802.1x: port 4/1 AuthPAE AUTH_DISCONCTED --> AUTH_CONNTING
  : 802.1x 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 9:
  EAP PACKET - EAPCode: REQUEST EAPType: IDENTITY
dump TX 802.1X: 9 bytes
   01000005 01000005 010000fc ........
   : 802.1x: port 4/1 Tx (OK) EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
```
802.1x 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 9:
EAP PACKET - EAPCode: REQUEST  EAPType: IDENTITY
dump TX 802.1x: 9 bytes
01000005 01010005 01011607 ...........
: 802.1x: port 4/1 Tx (OK) EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=6
EAP PACKET - EAPCode: RESPONSE  EAPType: IDENTITY
dump RX 802.1x: 24 bytes
0180c200 00030000 00aa0001 88e0100 ............. 00060201 00060161 ........a
: 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 AuthPAE AUTH_CONNTING --> AUTH_ENTCATING
: 802.1x: port 4/1 BkEnd BKEND_IDLE --> BKEND_RESPONSE
: 802.1x: port 4/1 aWhile timer (AuthServer) started for 30 secs
: 802.1x: port 4/1 Tx EAP PDU (EAPId: 1) to AuthServer
: 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=6
EAP PACKET - EAPCode: RESPONSE  EAPType: IDENTITY
dump RX 802.1x: 24 bytes
0180c200 00030000 00aa0001 88e0100 ............. 00060201 00060161 ........a
: 802.1x: port 4/1 Rx AAA_INTERACTIVE from AuthServer
: 802.1x: port 4/1 Rx AAA_INTERACTIVE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: REQUEST  EAPType: MD5
dump TX 802.1x: 26 bytes
01000016 01020016 04102fb9 32b79134 ........../.2..4
17b5e71 89b9eb79 b42b0b04 ...q...y+. 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERFACE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: REQUEST  EAPType: MD5
dump TX 802.1x: 26 bytes
01000016 01020016 04102fb9 32b79134 ........../.2..4
17b5e71 89b9eb79 b42b0b04 ...q...y+. 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERFACE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: REQUEST  EAPType: MD5
dump TX 802.1x: 26 bytes
01000016 01020016 04102fb9 32b79134 ........../.2..4
17b5e71 89b9eb79 b42b0b04 ...q...y+. 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERFACE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: REQUEST  EAPType: MD5
dump TX 802.1x: 26 bytes
01000016 01020016 04102fb9 32b79134 ........../.2..4
17b5e71 89b9eb79 b42b0b04 ...q...y+. 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERFACE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL onvlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: REQUEST  EAPType: MD5
dump TX 802.1x: 26 bytes
01000016 01020016 04102fb9 32b79134 ........../.2..4
17b5e71 89b9eb79 b42b0b04 ...q...y+. 802.1x: port 4/1 Rx EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERFACE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 26:
EAP PACKET - EAPCode: SUCCESS
dump TX 802.1x: 8 bytes
01000004 03020004 ............
: 802.1x: port 4/1 Tx (OK) EAPOL-SUCCESS Pkt (EAPId: 2)
: 802.1x: port 4/1 BkEnd BKEND_RESPONSE --> BKEND_SUCCESS
802.1x

: 802.1x: port 4/1 BkEnd BKEND_SUCCESS --> BKEND_IDLE
: 802.1x: port 4/1 AuthPAE AUTH_ENTCATING --> AUTH_ENTCATED
: 802.1x: Port 4/1 Programming Permitted MAC 0000.00aa.0001 on VLAN 1
: 802.1x: Timer tick expired
: 802.1x: Timer tick expired

debg dot1x dumpclass

Syntax: [no] debug dot1x dumpclass

This command displays the internal data structure. Command output resembles the following example.

Brocade# debug dot1x dumpclass
DOT1X Class: 0x2085e280
Flags:  EnabAll: 0 ReAuthEnab/ReAuthMax: 0/3 MaxReq: 3 SysAuthEnab: 0
        AuthFailAction/Vlanid: Restricted/99 Aging/Age: All/120
Timers:  SecHold: 60 Quiet: 60 TxWhen: 30 ReAuth: 3600 SuppTmO: 30 SrvrTmO: 30

debg dot1x events

Syntax: [no] debug dot1x events

This command displays authentications that have failed or succeeded, the application of VLAN and ACLs requested by RADIUS, and so on. This command works globally across all ports. Command output resembles the following example.

Brocade# debug dot1x events
events: debugging is on
: 802.1x: port 4/1 Rx EAPOL_START
: 802.1x: port 4/1 BkEnd BKEND_INVALID --> BKEND_INIT
: 802.1x: port 4/1 BkEnd BKEND_INIT --> BKEND_IDLE
: 802.1x: port 4/1 AuthPAE AUTH_INVALID --> AUTH_INIT
: 802.1x: port 4/1 AuthPAE AUTH_INIT --> AUTH_DISCONCTED
: 802.1x: port 4/1 AuthPAE AUTH_DISCONCTED --> AUTH_CONNTING
: 802.1x: port 4/1 Tx (OK) EAPOL-EAP-REQUEST-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx EAPOL-EAP-RESPONSE-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 AuthPAE AUTH_CONNTING --> AUTH_ENTCATING
: 802.1x: port 4/1 BkEnd BKEND_IDLE --> BKEND_RESPONSE
: 802.1x: port 4/1 Tx EAP PDU (EAPId: 1) to AuthServer
: 802.1x: port 4/1 Rx EAPOL-EAP-RESPONSE-ID Pkt (EAPId: 1)
: 802.1x: port 4/1 Rx AAA_INTERACTIVE from AuthServer
: 802.1x: port 4/1 Rx from Server: EAP-REQUEST-MD5 (EAPId: 2) Len 22
: 802.1x: port 4/1 BkEnd BKEND_RESPONSE --> BKEND_REQUEST
: 802.1x: port 4/1 Fwd (OK) EAPOL-EAP Pkt (EAPId: 2) from AuthServer to Supplicant
: 802.1x: port 4/1 Rx EAP-EAP-RESPONSE-MD5 Pkt (EAPId: 2) Len 24
: 802.1x: port 4/1 BkEnd BKEND_REQUEST --> BKEND_RESPONSE
: 802.1x: port 4/1 Tx EAP PDU (EAPId: 2) to AuthServer
: 802.1x: port 4/1 Rx AAA_ACCEPT from AuthServer
: 802.1x: port 4/1 Created user-defined mac filter 400.
: 802.1x: Port 4/1 Binding with the RADIUS assigned MAC ACL ID: 400
: 802.1x: port 4/1 Rx Tunnel Data (Type=0, Medium_Type=0, PvrGrpId=NULL)
: 802.1x: port 4/1 Tx (OK) EAPOL-SUCCESS Pkt (EAPId: 2)
: 802.1x: port 4/1 BkEnd BKEND_RESPONSE --> BKEND_SUCCESS
: 802.1x: port 4/1 BkEnd BKEND_SUCCESS --> BKEND_IDLE
: 802.1x: port 4/1 AuthPAE AUTH_ENTCATING --> AUTH_ENTCATED
: 802.1x: Port 4/1 Programming Permitted MAC 0000.00aa.0001 on VLAN 1
: 802.1x: port 4/1 Rx EAPOL_LOGOFF
: 802.1x: port 4/1 AuthPAE AUTH_ENTCATED --> AUTH_DISCONCTED
802.1x

debug dot1x fault

Syntax: [no] debug dot1x fault

This command reports any kind of internal errors, such as out-of-memory, invalid RADIUS-response, and so on. This command works globally across all ports. Command output resembles the following example.

Brocade# debug dot1x fault
fault: debugging is on
: 802.1x: Port 4/1 Preprocess of user-defined L2-ACL failed due to invalid ACL
: 802.1x: Port 4/1 Preprocess of user-defined L2-ACL failed due to invalid ACL
: 802.1x: Port 4/1 Preprocess of user-defined L2-ACL failed due to invalid ACL
: 802.1x: Port 4/1 Preprocess of user-defined L2-ACL failed due to invalid ACL

debug dot1x packets

Syntax: [no] debug dot1x packets

This command displays information about 802.1x packets. Command output resembles the following example.

Brocade# debug dot1x packets
packets: debugging is on
: 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=0
EAP START Dec 21 17:26:04 dump RX 802.1x: 18 bytes
0180c200 00030000 00aa0001 888e0101 ................
00004ef5                               ..
: 802.1x 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 9:
EAP PACKET - EAPCode: REQUEST  EAPType: IDENTITY
dump TX 802.1x: 9 bytes
01000005 01010005 01000000 ................
802.1x 4/1 Tx EAPOL on vlan_id 1 for dst 0000.00aa.0001, len 9:
EAP PACKET - EAPCode: REQUEST  EAPType: IDENTITY
dump TX 802.1x: 9 bytes
01000005 01010005 01000000 ................
: 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=6
EAP PACKET - EAPCode: RESPONSE  EAPType: IDENTITY
dump RX 802.1x: 24 bytes
0180c200 00030000 00aa0001 888e0100 ................
: 802.1x: port 4/1 Rx EAPOL Pkt SA=0000.00aa.0001, DA=0000.0000.0003, len=6

debug dot1x port

Syntax: [no] debug dot1x port [all | event | timer] slotnum/portnum

- **all** slotnum/portnum - Displays 802.1x event and timer information for a specified port.
- **event** slotnum/portnum - Displays 802.1x event information for a specified port.
- **timer** slotnum/portnum - Displays 802.1x timer settings for a specified port.
This command displays event and timer information for a specified port, as shown in the following example.

Brocade# debug dot1x port all 3/15
802.1X Events debugging on port 94 ON
802.1X Timers debugging on port 94 ON

SYSLOG: Nov 7 17:39:22:<12>MLX_4K, DOT1X: Port 3/15, MAC Address 0000.00cd.5f4e
Access: unauthenticated

: 802.1x: port 3/15 Rx EAPOL-EAP-RESPONSE-ID Pkt (EAPId: 1)
: 802.1x: port 3/15 AuthPAE AUTH_CONNTING --> AUTH_ENTCATING
: 802.1x: port 3/15 BkEnd BKEND_IDLE --> BKEND_RESPONSE
: 802.1x: port 3/15 aWhile timer (AuthServer) started for 35 secs
: 802.1x: port 3/15 Tx EAP PDU (EAPId: 1) to AuthServer
: 802.1x: port 3/15 Rx AAA_INTERACTIVE from AuthServer
: 802.1x: port 3/15 Rx from Server: EAP-REQUEST-PEAP(EAPId: 237)Len 6
: 802.1x: port 3/15 BkEnd BKEND_RESPONSE --> BKEND_REQUEST
: 802.1x: port 3/15 Fwd(OK) EAPOL-EAP Pkt (EAPId:237) from AuthServer to Supplicant
: 802.1x: port 3/15 aWhile timer (Supplicant) started for 30 secs
: 802.1x: port 3/15 Rx EAP-RESPONSE-NAK Pkt (EAPId: 237) Len 6
: 802.1x: port 3/15 BkEnd BKEND_REQUEST --> BKEND_RESPONSE
: 802.1x: port 3/15 aWhile timer (AuthServer) started for 35 secs
: 802.1x: port 3/15 Tx EAP PDU (EAPId: 237) to AuthServer
: 802.1x: port 3/15 Rx AAA_INTERACTIVE from AuthServer
: 802.1x: port 3/15 Rx from Server: EAP-REQUEST-MD5 (EAPId: 238) Len 30
: 802.1x: port 3/15 BkEnd BKEND_RESPONSE --> BKEND_REQUEST
: 802.1x: port 3/15 Fwd(OK) EAPOL-EAP Pkt (EAPId: 238) from AuthServer to Supplicant
: 802.1x: port 3/15 aWhile timer (Supplicant) started for 30 secs
: 802.1x: port 3/15 Rx EAP-RESPONSE-MD5 Pkt (EAPId: 238) Len 23
: 802.1x: port 3/15 BkEnd BKEND_REQUEST --> BKEND_RESPONSE
: 802.1x: port 3/15 aWhile timer (AuthServer) started for 35 secs
: 802.1x: port 3/15 Tx EAP PDU (EAPId: 238) to AuthServer
: 802.1x: port 3/15 Rx AAA_ACCEPT from AuthServer
: 802.1x: port 3/15 Tx (OK) EAPOL-SUCCESS Pkt (EAPId: 238)
: 802.1x: port 3/15 BkEnd BKEND_SUCCESS --> BKEND_IDE
: 802.1x: port 3/15 AuthPAE AUTH_ENTCATING --> AUTH_ENTCATED
: SYSLOG: Nov 7 17:39:22:<14>MLX_4K, DOT1X: Port 3/15, MAC Address 0000.00cd.5f4e
802.1x: Port 3/15 Programming Permitted MAC 0000.00cd.5f4e on VLAN 1
Access: authorized

**debug dot1x state**

**Syntax:** `[no] debug dot1x state slotnum/portnum`

This command displays information about the 802.1x state of a specified port. Command output resembles the following example.

Brocade# debug dot1x state 4/1
Port 4/1. #Sess 0 #RestSess 0 #AuthSess 0. #DeniedSess 0
DFACLIn 0 DFACLOut 0 DF2ACL 0. DfVLAN 4096 InVLAN 4096 (UserCfg)
Flags pEnab pCtrl reAut ACLSS MClnt |X| Aging RvtVl DynVl OvRst DoSpr
1 AUTO 0 1 1 None 0 0 1 1 1
Timers TxEAP 23. EAPTrries: 0

**debug dot1x timers**

**Syntax:** `[no] debug dot1x timers`
This command enables debugging and displays information about 802.1x timers. Command output resembles the following example.

Brocade# debug dot1x timers
timers: debugging is on
802.1x: Timer tick expired
802.1x: Timer tick expired
802.1x: Timer tick expired
802.1x: Timer tick expired
802.1x: Port 4/1 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Timer tick expired
802.1x: Timer tick expired
802.1x: Port 4/1 aWhile timer (Supplicant) started for 30 secs
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Timer tick expired
802.1x: Port 4/1 aWhile timer (Supplicant) started for 30 secs
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Timer tick expired
802.1x: Port 3/15 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Port 3/17 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Port 3/18 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Port 3/19 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Port 3/20 txEAP timer expired. Transmitting an EAP ReqId
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Port 4/1 aWhile timer (Supplicant) started for 30 secs
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Timer tick expired
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Port 4/1 aWhile timer (Supplicant) started for 30 secs
802.1x: Port 4/1 aWhile timer (AuthServer) started for 30 secs
802.1x: Timer tick expired
802.1x: Timer tick expired

MAC security

The Media Access Control (MAC) security protocol allows you to secure the data communication from the transmitter to the receiver.

The debug commands described in this section are used for debugging MACsec Key Agreement (MKA) and MAC security configurations settings on Brocade NetIron XMR series and Brocade MLX series routers.

detach dot1x-mka

Syntax:  debug dot1x-mka [all | cli | events | protocol | mkpdu-rx | mkpdu-tx | port | show | timers]

- **all** - Displays information about MKA and MAC security configurations.
- **cli** - Enables or disables MKA CLI debugging.
- **events** - Enables or disables MKA event debugging.
- **protocol** - Enables or disables MKA protocol debugging.
- **mkpdu-rx** - Enables or disables MKA protocol data unit receive debugging.
- **mkpdu-tx** - Enables or disables MKA protocol data unit transmit debugging.
• **port** - Enables or disables MKA port debugging.
• **show** - Displays the current MKA debugging settings.
• **timers** - Enables or disables MKA timer debugging.

The `debug dot1x-mka all` command output resembles the following example.

Brocade# debug dot1x-mka all
802.1X MKA All debugging ON

DUT5_8#Oct 27 06:38:31.395 [port 2/3] PORT UP event
Oct 27 06:38:31.395 [port 2/3] Initializing MI and MN for the participant
Oct 27 06:38:31.395 [port 2/3] Start Hello timer for transmitting the MKPDU
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { Basic Param } SCI: 0024389e2d320001
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { Basic Param } MI: cd858915091cc5190795e2da, MN: 1, Agility: 0x0080c02
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { Basic Param } CKN: 0102030405060708090a0b0c0d0e0f10
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { SAK Use Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 0
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { SAK Use Param } LTX: 0, LRX: 0, OTX: 0, ORX: 0, PlainTX: 0, PlainRX: 0
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { SAK Use Param } LKI: 00000000000000000000000000000000, LLPN: 0x00000000
Oct 27 06:38:31.395 [port 2/3] ( Tx MKPDU ) { SAK Use Param } OKI: 00000000000000000000000000000000, OLPN: 0x00000000
Oct 27 06:38:31.395 [port 2/3] Port 2/3 moved to blocking
Oct 27 06:38:32.256 [port 2/3] Received MKPDU - mkpdu len 84
Oct 27 06:38:32.256 [port 2/3] Key length 16 icv_pdu_len 86
Oct 27 06:38:32.257 [port 2/3] ICV Validation successful
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } MI: 9b6742dc9f81a7d350e5c2, MN: 1, Agility: 0x0080c02
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } CKN: 0102030405060708090a0b0c0d0e0f10
Oct 27 06:38:32.257 [port 2/3] MKPDU - Processing basic parameter info len 60
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } SCI: 0024389e2d320001
Oct 27 06:38:32.257 [port 2/3] ( Rx MKPDU ) { Basic Param } MI: cd858915091cc5190795e2da, MN: 2, Agility: 0x0080c02
Oct 27 06:38:32.257 [port 2/3] ( Tx MKPDU ) { SAK Use Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 0
Oct 27 06:38:32.257 [port 2/3] Include Potential peer with mn 1 to MKPDU
Oct 27 06:38:32.257 [port 2/3] ( Tx MKPDU ) { SAK Use Param } LTX: 0, LRX: 0, OTX: 0, ORX: 0, PlainTX: 0, PlainRX: 0
MAC security

Oct 27 06:38:32.257 [port 2/3] { Tx MKPDU } { SAK Use Param } LKI: 00000000000000000000000000000000, LLPN: 0x00000000
Oct 27 06:38:32.257 [port 2/3] { Tx MKPDU } { SAK Use Param } OKI: 00000000000000000000000000000000, OLPN: 0x00000000
Oct 27 06:38:32.257 [port 2/3] CP current state change
Oct 27 06:38:32.280 [port 2/3] Received MKPDU - mkpdu len 104
Oct 27 06:38:32.280 [port 2/3] Key length 16 icv_pdu_len 106
Oct 27 06:38:32.280 [port 2/3] CP current state change
Oct 27 06:38:32.280 [port 2/3] { Rx MKPDU } { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.280 [port 2/3] { Rx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.280 [port 2/3] { Rx MKPDU } { Basic Param } MI: cd858915091cc5190795e2da, MN: 2, Agility: 0x0080c01
Oct 27 06:38:32.280 [port 2/3] MKPDU - Processing basic parameter info len 60
Oct 27 06:38:32.280 [port 2/3] Received Peer mn = 2
Oct 27 06:38:32.280 [port 2/3] Re-start participant peer life timer
Oct 27 06:38:32.280 [port 2/3] { Rx MKPDU } { Basic Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 0
Oct 27 06:38:32.280 [port 2/3] Include Live peer with mn 2 to MKPDU
Oct 27 06:38:32.281 [port 2/3] { Tx MKPDU } { SAK Use Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 0
Oct 27 06:38:32.281 [port 2/3] { Tx MKPDU } { SAK Use Param } LTX: 0, LRX: 0, OTX: 0, ORX: 0, PlainTX: 0, PlainRX: 0
Oct 27 06:38:32.281 [port 2/3] Stop MKA SAK delay timer
Oct 27 06:38:32.281 Current Key Server SCI 00000000000000000000000000000000
Oct 27 06:38:32.281 key_server_priority 16 curr_key_server_priority 0
Oct 27 06:38:32.281 Key Server has been changed
Oct 27 06:38:32.281 macsec_capable 2, actor_macsec_capable 2
Oct 27 06:38:32.281 Selected MACsec capability 2
Oct 27 06:38:32.281 Oper cipher offset - 1
Oct 27 06:38:32.281 [port 2/3] CP current state change
Oct 27 06:38:32.281 [port 2/3] CP SM state change from [change] to [secure]
Oct 27 06:38:32.281 Peer has better priorities so he will be ELECTED KEY SERVER -priority 16
Oct 27 06:38:32.281 Key Server SCI 0024388f6b920001
Oct 27 06:38:32.281 [port 2/3] MKPDU - Processing potential peer parameter info
Oct 27 06:38:32.281 [port 2/3] { Rx MKPDU } { Potential Peer Param } MI: cd858915091cc5190795e2da, MN: 2
Oct 27 06:38:32.281 CP current state change
Oct 27 06:38:32.282 [port 2/3] Received MKPDU - mkpdu len 104
Oct 27 06:38:32.282 [port 2/3] Key length 16 icv_pdu_len 106
Oct 27 06:38:32.282 [port 2/3] ICV Validation successful
Oct 27 06:38:32.282 [port 2/3] { Rx MKPDU } { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.282 [port 2/3] { Rx MKPDU } { Basic Param } SCI: 0024388f6b920001
MAC security

Oct 27 06:38:32.282 [port 2/3] { Rx MKPDU } { Basic Param } MI: 9b6742dc9f81a71d350e5c2, MN: 3, Agility: 0x0080c201
Oct 27 06:38:32.282 [port 2/3] { Rx MKPDU } { Basic Param } CKN: 0102030405060708090a0b0c0d0e0f10
Oct 27 06:38:32.282 [port 2/3] MKPDU - Processing basic parameter info len 60
Oct 27 06:38:32.282 [port 2/3] Received Peer mn = 3
Oct 27 06:38:32.282 [port 2/3] Re-start participant peer life timer
Oct 27 06:38:32.282 [port 2/3] MKPDU - Processing Live peer parameter info
Oct 27 06:38:32.283 [port 2/3] (Rx MKPDU ) { Live Peer Param } MI: cd858915091cc5190795e2da, MN: 3
Oct 27 06:38:32.283 [port 2/3] Peer has my recent MI and MN info, peer_mn 3
actor_mn 3
Oct 27 06:38:32.283 [port 2/3] CP current state secure
Oct 27 06:38:32.325 [port 2/3] Received MKPDU - mkpdu len 180
Oct 27 06:38:32.325 [port 2/3] Key length 16 icv_pdu_len 182
Oct 27 06:38:32.325 [port 2/3] ICV Validation successful
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.326 [port 2/3] MKPDU - Processing basic parameter info len 60
Oct 27 06:38:32.326 [port 2/3] Received Peer mn = 4
Oct 27 06:38:32.326 [port 2/3] Re-start participant peer life timer
Oct 27 06:38:32.326 [port 2/3] MKPDU - Processing Live peer parameter info
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { Live Peer Param } MI: cd858915091cc5190795e2da, MN: 3
Oct 27 06:38:32.326 [port 2/3] Peer has my recent MI and MN info, peer_mn 3
actor_mn 3
Oct 27 06:38:32.326 [port 2/3] MKPDU - Processing SAK use parameter info
Oct 27 06:38:32.326 [port 2/3] Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 40
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { SAK Use Param } LTX: 0, LRX: 0, OTX: 0, ORX: 0, PlainTX: 0, PlainRX: 0
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { SAK Use Param } OKI: 00000000000000000000000000000000, OLPN: 0x00000000
Oct 27 06:38:32.326 [port 2/3] SAK use info - no change of KI and AN
Oct 27 06:38:32.326 [port 2/3] Default cipher suite GCM-AES-128 to be used with conf-offset 1
Oct 27 06:38:32.326 [port 2/3] { Rx MKPDU } { Distr SAK Param } Type: 4, AN: 0, Offset: 1, Len: 28
Oct 27 06:38:32.326 [port 2/3] Rx Distr SAK d73d455028d263e2ea1b38c39ce6a13ba41c66b09217616
Oct 27 06:38:32.326 [port 2/3] Unwrap SAK 117c078f206e50827537afe6b89ca3f3c
Oct 27 06:38:32.326 [port 2/3] Installing a new SAK Key - Distr AN 0
Oct 27 06:38:32.326 [port 2/3] CP current state secure
Oct 27 06:38:32.326 [port 2/3] Sending IPC to LP for creating rcv SA an 0
Oct 27 06:38:32.326 [port 2/3] Sending IPC to LP for creating transmit SA an 0
Oct 27 06:38:32.338 [port 2/3] Received MKPDU - mkpdu len 180
Oct 27 06:38:32.338 [port 2/3] Key length 16 icv_pdu_len 182
Oct 27 06:38:32.338 [port 2/3] ICV Validation successful
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Basic Param } MI: 9b6742dce9f8171d350e5c2, MN: 5, Agility: 0x0080c021
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Basic Param } CKN: 0102030405060708090a0b0c0d0e0f10
Oct 27 06:38:32.338 [port 2/3] MKPDU - Processing basic parameter info len 60
Oct 27 06:38:32.338 [port 2/3] Received Peer mn = 5
Oct 27 06:38:32.338 [port 2/3] Re-start participant peer life timer
Oct 27 06:38:32.338 [port 2/3] MKPDU - Processing Live peer parameter info
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Live Peer Param } MI: cd85891509c5190795e2da, MN: 3
Oct 27 06:38:32.338 [port 2/3] Peer has my recent MI and MN info, peer_mn 3
Oct 27 06:38:32.338 [port 2/3] MKPDU - Processing SAK use parameter info
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { SAK Use Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 40
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { SAK Use Param } LTX: 0, LRX: 1, OTX: 0, ORX: 0, PlainTX: 0, PlainRX: 0
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { SAK Use Param } LKI: 9b6742dce9f8171d350e5c200000001, LLPN: 0x00000000
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { SAK Use Param } OKI: 00000000000000000000000000000000, OLPN: 0x00000000
Oct 27 06:38:32.338 [port 2/3] SAK use info - no change of KI and AN
Oct 27 06:38:32.338 [port 2/3] Default cipher suite GCM-AES-128 to be used with conf-offset 1
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Distr SAK Param } Type: 4, AN: 0, Offset: 1, Len: 28
Oct 27 06:38:32.338 [port 2/3] { Rx MKPDU } { Distr SAK Param } KN: 1, SAK: <Not displayed>
Oct 27 06:38:32.338 [port 2/3] Received same SAK Key - Distr AN 0
Oct 27 06:38:32.338 [port 2/3] CP current state receive
Oct 27 06:38:32.338 [port 2/3] IPC response - RX SA is ready to receive
Oct 27 06:38:32.338 [port 2/3] CP current state receive
Oct 27 06:38:32.338 [port 2/3] CP SM state change from [receive] to [receiving]
Oct 27 06:38:32.338 [port 2/3] CP current state receiving
Oct 27 06:38:32.338 [port 2/3] CP has set new_info, so transmit MKPDU
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } Version: 1, Priority: 16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } MI: cd85891509c5190795e2da, MN: 3
Oct 27 06:38:32.338 [port 2/3] Include Live peer with mn 5 to MKPDU
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } Type: 3, LAN: 0, OAN: 0, Delay: 0, Len: 40
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:38:32.338 [port 2/3] Include Live peer with mn 5 to MKPDU
Oct 27 06:38:32.338 [port 2/3] Include Live peer with mn 5 to MKPDU
Oct 27 06:38:32.338 [port 2/3] { Tx MKPDU } { Basic Param } SCI: 0024388f6b920001
The debug dot1x-mka cli command output resembles the following example.

Brocade# debug dot1x-mka cli

DOT1X-MKA cli debugging ON
DUT5_8#conf t
Oct 27 06:26:47.953 MKA ckn - ports ethe 2/2 to 2/16 ethe 2/19 to 2/20
Oct 27 06:26:47.953 MKA ckn - ports ethe 2/17 to 2/18
Oct 27 06:26:47.953 MKA no group - ports ethe 4/3
DUT5_8(config-dot1x-mka-2/8)#mka-cfg-group 15
DUT5_8(config-dot1x-mka-2/8)#pre-shared-key 0102030405060708090a0b0c0d0e0f10
key-name 0102030405060708090a0b0c0d0e0f11
Oct 27 06:29:55.303 Start dot1x_cu_send_config_request
Oct 27 06:29:55.303 Start DOT1X_MKA_PORT_CAK_CKN_CONFIG
Oct 27 06:29:55.304 End DOT1X_MKA_PORT_CAK_CKN_CONFIG

The debug dot1x-mka protocol command output resembles the following example.

Brocade# debug dot1x-mka protocol
DOT1X-MKA proto debugging ON
DUT5_8#Oct 27 06:33:40.876 [port 2/3] Update Next PN 81239
DUT5_8#Oct 27 06:33:41.589 [port 2/3] CP current state retire
Oct 27 06:33:42.882 [port 2/3] Update Next PN 81240
DUT5_8#Oct 27 06:33:43.620 [port 2/3] CP current state retire
DUT5_8#Oct 27 06:33:44.876 [port 2/3] Update Next PN 81242
Oct 27 06:33:45.587 [port 2/3] CP current state retire
Oct 27 06:33:46.876 [port 2/3] Update Next PN 81243
DUT5_8(config)#Oct 27 06:33:48.880 [port 2/3] Update Next PN 81244
Oct 27 06:33:49.620 [port 2/3] CP current state retire
Oct 27 06:33:50.876 [port 2/3] Update Next PN 81245
Oct 27 06:33:51.588 [port 2/3] CP current state retire
Oct 27 06:33:52.876 [port 2/3] Update Next PN 81246
Oct 27 06:33:53.589 [port 2/3] CP current state retire
Oct 27 06:33:54.880 [port 2/3] Update Next PN 81247
Oct 27 06:33:55.621 [port 2/3] CP current state retire
Oct 27 06:33:56.877 [port 2/3] Update Next PN 81248
Oct 27 06:33:57.589 [port 2/3] CP current state retire
DUT5_8(config)#Oct 27 06:33:58.877 [port 2/3] Update Next PN 81249
nt etOct 27 06:33:58.877 [port 2/3] CP current state retire2/3
Oct 27 06:33:59.589 [port 2/3] CP current state retire
DUT5_8(config-if-e10000-2/3)#Oct 27 06:34:00.881 [port 2/3] Update Next PN 81250
DUT5_8(config-if-e10000-2/3)#
DUT5_8(config-if-e10000-2/3)#Oct 27 06:34:01.621 [port 2/3] CP current state retire
DUT5_8(config-if-e10000-2/3)#
DUT5_8(config-if-e10000-2/3)#
dis
DUT5_8(config-if-e10000-2/3)#Oct 27 06:34:02.825 [port 2/3] PORT DOWN event
Oct 27 06:34:02.825 Port 2/3 moved to blocking
Oct 27 06:34:02.825 [port 2/3] Delete participant for port 2/3
Oct 27 06:34:02.825 Deleting all peers
Oct 27 06:34:02.825 [port 2/3] Logon process initialized
Oct 27 06:34:02.825 Port 2/3 moved to blocking
Oct 27 06:34:02.825 [port 2/3] CP current state init
Oct 27 06:34:02.825 [port 2/3] Deleting all SAs
Oct 27 06:34:02.825 [port 2/3] CP SM state change from [init] to [change]
ena
DUT5_8(config-if-e10000-2/3)#Oct 27 06:34:03.927 [port 2/3] PORT UP event
Oct 27 06:34:03.928 [port 2/3] Activate Participant for caK, ckn
DUT5_8(config-if-e10000-2/3)#Oct 27 06:34:03.928 [port 2/3] Initializing MI and MN for the participant
Oct 27 06:34:03.928 Actor MI f2570d864df4107aff60f591
Oct 27 06:34:03.928 Port 2/3 moved to blocking
Oct 27 06:34:04.771 no peers found for the participant
Oct 27 06:34:04.771 no peers found for the participant
Oct 27 06:34:04.771 [port 2/3] CP current state change
Oct 27 06:34:04.775 Current Key Server SCI 0000000000000000

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9
Oct 27 06:34:04.775 key_server_priority 16 curr_key_server_priority 0
Oct 27 06:34:04.775 Key Server has been changed
Oct 27 06:34:04.775 macsec_capable 2, actor_macsec_capable 2
Oct 27 06:34:04.775 Selected MACsec capability 2
Oct 27 06:34:04.775 Oper cipher offset - 1
Oct 27 06:34:04.775 [port 2/3] MKA state is SECURED
Oct 27 06:34:04.775 [port 2/3] CP current state change
Oct 27 06:34:04.775 [port 2/3] CP SM state change from [change] to [secure]
Oct 27 06:34:04.775 Peer has better priorities so he will be ELECTED KEY SERVER -priority 16
Oct 27 06:34:04.775 Key Server SCI 0024388f6b920001
Oct 27 06:34:04.775 [port 2/3] CP current state secure
Oct 27 06:34:04.858 [port 2/3] CP current state secure
Oct 27 06:34:04.889 [port 2/3] CP current state receive
Oct 27 06:34:04.898 [port 2/3] IPC response - RX SA is ready to receive
Oct 27 06:34:04.898 [port 2/3] CP current state receiving
Oct 27 06:34:04.898 [port 2/3] CP SM state change from [receiving] to [ready]
Oct 27 06:34:05.042 [port 2/3] CP current state ready
Oct 27 06:34:05.042 Port 2/3 moved to non-blocking
Oct 27 06:34:05.042 [port 2/3] Enabling transmit SA an 0
Oct 27 06:34:05.043 [port 2/3] IPC response- TX SA is transmitting
Oct 27 06:34:05.043 [port 2/3] CP current state transmit
Oct 27 06:34:05.043 [port 2/3] CP SM state change from [transmitting] to [transmitting]
Oct 27 06:34:05.043 [port 2/3] CP current state transmitting
Oct 27 06:34:05.043 [port 2/3] CP SM state change from [transmitting] to [retire]
Oct 27 06:34:06.608 [port 2/3] CP current state retire
Oct 27 06:34:06.881 [port 2/3] Update Next PN 2
Oct 27 06:34:06.881 [port 2/3] Update Next PN 5
Oct 27 06:34:08.608 [port 2/3] CP current state retire
Oct 27 06:34:08.870 [port 2/3] Update Next PN 6
Oct 27 06:34:08.870 [port 2/3] Update Next PN 7
Oct 27 06:34:10.609 [port 2/3] CP current state retire
Oct 27 06:34:10.870 [port 2/3] Update Next PN 6
Oct 27 06:34:12.608 [port 2/3] CP current state retire
Oct 27 06:34:12.882 [port 2/3] Update Next PN 8
Oct 27 06:34:14.609 [port 2/3] CP current state retire
Oct 27 06:34:14.870 [port 2/3] Update Next PN 8
Oct 27 06:34:16.622 [port 2/3] CP current state retire
Oct 27 06:34:16.870 [port 2/3] Update Next PN 9

The `debug dot1x-mka timer` command output resembles the following example.

Brocade# debug dot1x-mka timer
DOT1X-MKA timer debugging ON
Oct 27 06:35:30.613 [port 2/3] Re-start participant peer life timer
Oct 27 06:35:31.605 Hello timer expired for port 2/3, send MKPDU
Oct 27 06:35:31.605 Start Hello timer for port 2/3
Oct 27 06:35:32.618 [port 2/3] Re-start participant peer life timer
Oct 27 06:35:33.605 Hello timer expired for port 2/3, send MKPDU
Oct 27 06:35:33.605 Start Hello timer for port 2/3
Oct 27 06:35:34.614 [port 2/3] Re-start participant peer life timer
Oct 27 06:35:35.605 Hello timer expired for port 2/3, send MKPDU
Oct 27 06:35:35.605 Start Hello timer for port 2/3
Oct 27 06:35:36.614 [port 2/3] Re-start participant peer life timer
MAC security

Oct 27 06:35:37.605 Hello timer expired for port 2/3, send MKPDU

The debug dot1x-mka rx command output resembles the following example.

Brocade# debug dot1x-mka rx
DOT1X-MKA rx debugging ON
DUT5_8#Oct 27 06:36:18.617 [port 2/3] Received MKPDU - mkpdu len 148
Oct 27 06:36:18.617 [port 2/3] Key length 16 icv_pdu_len 150
Oct 27 06:36:18.617 [port 2/3] ICV Validation successful
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { Basic Param } Version: 1, Priority:
16, Desired: 1, Capable: 2, Length: 60
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { Basic Param } SCI: 0024388f6b920001
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { Basic Param } MI:
e721c1c5133c6f5c5d14455d, MN: 73, Agility: 0x0080c021
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { Basic Param } CKN:
0102030405060708090a0b0c0d0e0f1001012030405060708090a0b0c0d0e0f10
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { Basic Param } MI:
f257d864d4107aff0f9f1, MN: 72
Oct 27 06:36:18.617 [port 2/3] Peer has my recent MI and MN info, peer_mn 72
actor_mn 72
Oct 27 06:36:18.617 [port 2/3] MKPDU - Processing SAK use parameter info
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { SAK Use Param } LTX: 0, LRX: 0, OTX:
1, ORX: 1, PlainTX: 0, PlainRX: 0
Oct 27 06:36:18.617 [port 2/3] Rx MKPDU } { SAK Use Param } OKI:
e721c1c5133c6f5c5d14455d00000001, OLPN: 0x00000000
Oct 27 06:36:18.617 [port 2/3] SAK use info - no change of KI and AN

Configuration notes

- The client’s 802.1x MAC session establishes a relationship between the user name and the MAC address used for authentication. If a user attempts to gain access from different clients (with different MAC addresses), the user must be authenticated from each client.

- If a client has been denied access to the network (that is, the client’s 802.1x MAC session is set to “access-denied”), then you can cause the client to be re-authenticated by manually disconnecting the client from the network, or by using the clear dot1x mac-session command.

- When a client has been denied access to the network, the 802.1x MAC session is aged out if no traffic is received from the client’s MAC address over a fixed hardware aging period (70 seconds), plus a configurable software aging period. You can optionally change the software aging period for 802.1x MAC sessions or disable aging altogether. After the denied client’s 802.1x MAC session is aged out, traffic from that client is no longer blocked, and the client can be re-authenticated.

- To implement 802.1x port security, at least one of the RADIUS servers identified to the Brocade device must support the 802.1x standard.
Denial of Service attacks

In a Denial of Service (DoS) attack, a router is flooded with useless packets, hindering normal operation. Brocade devices include measures for defending against two types of DoS attacks: Smurf attacks and TCP SYN attacks.

A Smurf attack is a kind of DoS attack where an attacker causes a victim to be flooded with ICMP echo (Ping) replies sent from another (intermediary) network. For detailed information about how to prevent Smurf attacks, refer to the NetIron Series Configuration Guide.

In a TCP SYN attack, an attacker floods a host with TCP SYN packets that have random source IP addresses. For each of these TCP SYN packets, the destination host responds with a SYN ACK packet and adds information to the connection queue. However, because the source host does not exist, no ACK packet is sent back to the destination host, and an entry remains in the connection queue until it ages out (after about a minute). If the attacker sends enough TCP SYN packets, the connection queue can fill up, and service can be denied to legitimate TCP connections.

DoS show commands

This section describes the DoS-related show commands.

**show statistics dos-attack**

**Syntax:** show statistics dos-attack

This command displays information about ICMP and TCP SYN packets dropped, passed, and blocked because burst thresholds were exceeded. Command output resembles the following example.

```
Brocade# show statistics dos-attack
-------- Local Attack Statistics --------
ICMP Drop Count Port Block Count SYN Drop Count SYN Block Count
----------------- -------------- ----------------- ---------------
0                0              0                 0               0
```

Clearing DoS attack statistics

To clear statistics about ICMP and TCP SYN packets dropped because burst thresholds were exceeded, enter the following command.

**clear statistics dos-attack**

**Syntax:** clear statistics dos-attack

DoS debug commands

There are no debug commands specific to DoS attacks.
Port loop detection

Brocade port loop detection allows the Brocade device to detect loops and disable a port that is on the receiving end of a loop. A loop is detected by sending test packet BPDUs. There are two modes of loop detection: Loose mode and Strict mode.

Port loop detection show commands

This section describes the show command that displays loop detection information.

**show loop-detection**

**Syntax:** show loop-detection

This command displays the loop detection configuration and current status, as shown in the following example.

```plaintext
Brocade# show loop-detection
loop detection packets interval: 10 (unit 100 msec)
loop detection disable duration: 10 (In minutes, 0 means permanently disabled)
Ports mode loop detection

------------------------
port-num disable-count
1/12 0
1/11 0
Vlan mode loop detection
------------------------
vlan-id disable-count
100 2
10 0
200 0

Ports disabled by loop detection

------------------------
port age(minutes) disable cause
1/11 1 Disabled by VLAN: 100 loopdetect 1/11
1/12 1 Disabled by VLAN: 100 loopdetect 1/12
```

Port loop detection debug commands

This section describes the debug command that generates loop detection information.

**debug loopdetect**

**Syntax:** [no] debug loopdetect [detail | error | info]

This command enables loop detect debugging.

- **detail** - Displays loop detect detail messages.
- **error** - Displays loop detect error messages.
- **info** - Displays loop detect information messages.

The following command example displays loop detect information messages.

```plaintext
Brocade# debug loopdetect info
loop_detect_cu_enable: sending itc message for Inv VLAN: 13
ITC loop_detect_itc_enable rxd
```
Port loop detection

```
set_port_or_vlan_loop_detection(port Inv VLAN: 13, del=0)
[loop_detect_send_ipc_request]: sending ipc msg 1 for port Inv VLAN: 13 to fid 53283 enable 0 strict vlan VLAN: 0
loop_detect_clear_loop_detection: for port_id Inv VLAN: 13
Dec 1 01:21:00 loop_detect_port_event_handler - port 2/5 up event
Dec 1 01:21:00 loop_detect_port_event_handler - port 2/7 up event
loop
loop_detect_cu_enable: sending itc message for Inv VLAN: 13
ITC loop_detect_itc_enable rxd

set_port_or_vlan_loop_detection(port Inv VLAN: 13, del=1)
[loop_detect_send_ipc_request]: sending ipc msg 0 for port Inv VLAN: 13 to fid 53283 enable 1 strict vlan VLAN: 0
[loop_detect_lp_ipc_control] rx opcode=3
loop_detect_process_loop_detected: (2/5 VLAN: 13) sending_port Inv type 2
Dec 1 01:21:08 loop_detect_process_loop_detected: loop detect is shutting port 2/5 VLAN: 13
[loop_detect_lp_ipc_control] rx opcode=3
loop_detect_process_loop_detected: (2/7 VLAN: 13) sending_port Inv type 2
Dec 1 01:21:08 loop_detect_process_loop_detected: loop detect is shutting port 2/7 VLAN: 13

The following command example displays loop detect detail messages.

Brocade# debug loopdetect detail
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
loop_detect_send_bpdu: send loop-detect to port Inv VLAN: 13
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
loop_detect_send_bpdu: send loop-detect to port Inv VLAN: 13
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
loop_detect_send_bpdu: send loop-detect to port Inv VLAN: 13
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
loop_detect_send_bpdu: send loop-detect to port Inv VLAN: 13
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
loop_detect_send_bpdu: send loop-detect to port Inv VLAN: 13
loop_detect_send_bpdu: i/f 2/5 stp state is blocking, do not send loop-detect
```

**Configuration notes**

The following information applies to Loose mode loop detection:

- Loop detection is configured on the VLAN. Different VLANs may disable different ports.
- Loose mode can disable multiple ports of a loop. A disabled port affects every VLAN using it.
- Loose mode disables the receiving port if packets originate from any port or member port of a VLAN on the same device.
- The VLAN of the receiving port must be configured for loop detection in order to disable the port.
- Loose mode floods test packets to the entire VLAN. This can impact system performance if too many VLANs are configured for Loose mode loop detection.

The following information applies to Strict mode loop detection:

- A port is disabled only if a packet is looped back to that same port. Loop detection must be configured on the physical port.
- Strict mode overcomes specific hardware issues where packets are echoed back to the input port.
Port mirroring and monitoring

You can monitor the traffic on the Brocade ports by configuring another port to mirror the traffic on the ports you want to monitor. The port thus configured is called a mirror port. By attaching a protocol analyzer to the mirror port, you can observe the traffic on the monitored ports.

Port mirroring show commands

This section describes the show commands that display port mirroring information.

**show monitor config**

**Syntax:** `show monitor config`

This command displays the inbound and outbound traffic that is being mirrored to each mirror port, as shown in the following example.

```
Brocade# show monitor config
Monitored Port 3/1
    Input traffic mirrored to: 2/1
    Output traffic mirrored to: 1/1
Monitored Port 4/1
    Input traffic mirrored to: 1/2
    Output traffic mirrored to: 2/1
```

**show monitor actual**

**Syntax:** `show monitor actual`

This command displays the actual traffic being mirrored to each mirror port, as shown in the following example.

```
Brocade# show monitor actual
Monitored Port 3/1
    Output traffic mirrored to: 1/1
Monitored Port 4/1
    Input traffic mirrored to: 1/2
```

This command output displays the output traffic mirrored to mirror port 1/1 from port 3/1 and input traffic mirrored to mirror port 1/2 from port 4/1, which are explicitly configured.

Port mirroring debug commands

This section describes the debug command that generates port mirroring information.

**debug access-list mirror generic**

**Syntax:** `[no] debug access-list mirror generic`

This command displays information about generic access list mirroring activity. Command output resembles the following example.

```
Brocade# debug access-list mirror generic
ACL based Mirroring-Generic: debugging is on
Port24  7212413945  0  0  0  0  0
Port47  0  6559006109  0  0  0  0
```
Configuration notes

The following information must be considered when configuring ACL-based inbound mirroring:

- All ports using the same PPCR must have a common destination ACL mirror port when configuring ACL-based inbound mirroring.
- ACL-based inbound mirroring and port-based inbound mirroring are mutually exclusive on a per-port basis.

For ACL CAM sharing to function, either of the following conditions must be operative:

- All ports that belong to a PPCR must have the `acl-mirror-port` command configured to direct mirrored traffic to the same port.
- None of the ports that belong to the PPCR can have the `acl-mirror-port` command configured.

---

RADIUS

You can use a Remote Authentication Dial In User Service (RADIUS) server to secure the following types of access to the Brocade devices:

- Telnet access
- SSH access
- Web management access
- Access to the Privileged EXEC level and CONFIG level of the CLI

**NOTE**

Brocade devices do not support RADIUS security for SNMP (Brocade Network Advisor) access.
RADIUS show commands

This section describes the RADIUS-specific show commands.

**show aaa**

**Syntax:** show aaa

This command displays information about all RADIUS servers configured on the device. Command output resembles the following example.

```plaintext
Brocade# show aaa
Radius key: networks
Radius retries: 3
Radius timeout: 3 seconds
Radius dead-time: 3 minutes
Radius Server: 10.95.6.90 Auth Port=1645 Acct Port=1646:
opens=2 closes=1 timeouts=1 errors=0
packets in=1 packets out=4
health-check=enabled|disabled dead-time-interval=45m
auto-authenticate-time-interval=30m available|dead
```

**show web**

**Syntax:** show web

This command displays the privilege level of Web management interface users.

```plaintext
Brocade# show web
User                             Privilege       IP address
set                                     0        192.168.1.234
```

RADIUS debug commands

This section describes the debug command used for monitoring the RADIUS servers identified on the device.

**debug ip aaa**

**Syntax:** [no] debug ip aaa

This command enables authentication, authorization, and accounting (AAA) debugging and displays debug information about AAA or RADIUS authentication. Command output resembles the following example.

```plaintext
Brocade# debug ip aaa
IP:     aaa debugging is on
**Radius StartTimer cu_radius_start_health_check called

**Radius StartTimer Success

Sep 30 06:26:38 RADIUS HCSM received event eHealthCheckPollTimerExpired for server 2001:DB8:7ae7:d1ff:fe8d:1b82:1 when in state sHealthCheckInit

Sep 30 06:26:38 AAA: Reuse RADIUS UDP port by health check

Sep 30 06:26:38 Tracing the outgoing Radius Authentication packet..
```
Configuration notes

- You must deploy at least one RADIUS server in your network.
- Brocade devices support authentication using up to eight RADIUS servers. The device tries to use the servers in the order you add them to the device's configuration. If one RADIUS server is not responding, the Brocade device tries the next one in the list.
- You can select only one primary authentication method for each type of access to a device (CLI through Telnet, CLI Privileged EXEC and CONFIG levels). For example, you can select RADIUS as the primary authentication method for Telnet CLI access, but you cannot also select TACACS+ authentication as the primary method for the same type of access. However, you can configure backup authentication methods for each access type.

sFlow

sFlow is a system for observing traffic flow patterns and quantities within and among a set of Brocade devices. sFlow performs the following tasks:

- Samples packet flows
- Collects the packet headers from sampled packets and collects ingress and egress information on these packets
- Composes the collected information into flow sample messages
- Relays these messages to an external device known as a collector

Participating devices also relay byte and packet counter data (counter samples) for ports to the collector.

Displaying sFlow statistics

When traffic is received in the sFlow enabled interface, packets are sent to the LP CPU. The packets are processed by sFlow module by adding sFlow header along with the packet header and thereafter sent to the sFlow collector. The statistics of sFlow samples are maintained in the sFlow collector.

This section describes the show command that displays sFlow information.

**show sflow**

**Syntax: show sflow**

This command displays sFlow configuration information and statistics, as shown in the following example.

```
Brocade# show sflow
sFlow services are enabled.
sFlow agent IP address: 10.30.30.2
Collector IP 10.10.10.1, UDP 6343
Polling interval is 20 seconds.
```
Configured default sampling rate: 1 per 2048 packets.
0 UDP packets exported
0 sFlow samples collected.

<table>
<thead>
<tr>
<th>sFlow ports</th>
<th>Global Sample Rate</th>
<th>Port Sample Rate</th>
<th>Hardware Sample Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/1</td>
<td>2048</td>
<td>2048</td>
<td>2048</td>
</tr>
<tr>
<td>3/2</td>
<td>2048</td>
<td>2048</td>
<td>2048</td>
</tr>
<tr>
<td>3/3</td>
<td>2048</td>
<td>2048</td>
<td>2048</td>
</tr>
<tr>
<td>3/4</td>
<td>2048</td>
<td>2048</td>
<td>2048</td>
</tr>
</tbody>
</table>

show sFlow statistics

Syntax: show sFlow statistics

This command displays the total count per interface for both sFlow and ACL based samples in all the slots where sFlow is configured.

Brocade# show sFlow statistics
SFlow Ports Flow Samples count Acl Samples Count
1/1 800 0
1/5 0 900
2/1 600 0

Clearing sFlow statistics

To clear the UDP packet and sFlow sample counters in the show sFlow display, enter the following command.

clear statistics

Syntax: clear statistics

This command clears the values in the following fields of the show sFlow display:

- UDP packets exported
- sFlow samples collected

Use the clear statistics sflow command to clear all the statistics collected per interface.

Brocade# clear statistics sflow
Brocade# show sFlow statistics ethernet 1/1
SFlow Ports Flow Samples count Acl Samples Count
1/1 800 0

sFlow debug commands

There are no debug commands specific to sFlow.
Configuration notes

- Before you enable sFlow, make sure the device has an IP address that sFlow can use as its source address.
- It is recommended that you do not change the denominator to a value lower than the default. Sampling requires CPU resources. Using a low denominator for the sampling rate can cause high CPU utilization.
- sFlow uses CPU resources to send sFlow samples to the collector. If you set a low sampling value on a high rate interface (for example, 10 GE), the interface module CPU utilization can become high.
- If you change the router ID or other IP address value that sFlow uses for its agent address, you must disable and then re-enable sFlow to cause the feature to use the new source address.
- Sample data is collected from inbound traffic on ports enabled for sFlow. However, both traffic directions are counted for byte and packet counter statistics sent to the collector.
- Port mirroring and sFlow cannot be enabled simultaneously on the same port.

SNMP

The Simple Network Management Protocol (SNMP) forms part of the Internet Protocol (IP) suite as defined by the Internet Engineering Task Force (IETF). SNMP is used in network management systems to monitor network-attached devices administration and management.

SNMP is disabled by default on Brocade devices. SNMP must be enabled in order to manage a Brocade device using Brocade Network Advisor.

SNMP show commands

This section describes the show commands that display SNMP information.

show snmp server

Syntax: show snmp server

This command displays both the read-only and read-write community strings.

NOTE
If display of the strings is encrypted, the strings are not displayed. Encryption is enabled by default.

To display the SNMP community string, enter the following commands.

Brocade(config)# enable password-display
Brocade(config)# show snmp server

The enable password-display command allows the community string to be displayed, but only in the output of the show snmp server command. Display of the string is still encrypted in the startup configuration file and running configuration file. Enter the enable password-display command at the global CONFIG level of the CLI.

show snmp engineid

Syntax: show snmp engineid
This command displays the engine ID of a management module, as shown in the following example.

Brocade# show snmp engineid
Local SNMP Engine ID: 800007c70300e05290ab60
Engine Boots: 3
Engine time: 5

show snmp group
Syntax: show snmp group
This command displays the definition of an SNMP group, as shown in the following example.

Brocade# show snmp group
groupname = exceptifgrp
security model = v3
security level = authNoPriv
ACL id = 2
readview = exceptif
writeview = <none>

show snmp user
Syntax: show snmp user
This command displays the definition of an SNMP user account, as shown in the following example.

Brocade# show snmp user
username = bob
acl id = 2
group = admin
security model = v3
group acl id = 0
authtype = md5
authkey = 3aca18d90b8d172760e2dd2e8f59b7fe
privtype = des, privkey = 1088359af3701730173e6332d406ee
engine ID= 800007c70300e05290ab0000

show snmp traffic
Syntax: show snmp traffic [ipv4 addr | ipv6 addr | all]
• ipv4 addr - Displays the PDU counters of the specified IPv4 client.
• ipv6 addr - Displays the PDU counters of the specified IPv6 client.
• all - Displays the PDU counters of all the configured SNMP clients.
The show snmp traffic all command displays the PDU counters of all the configured SNMP clients and the aggregated counters.

NOTE
If no snmp client is configured in the system, then the show snmp traffic command displays only the aggregated counters.

The following is the sample output from the show snmp traffic all command.

Brocade# show snmp traffic all
---------------------------------------------------------------------------
SNMP Statistics for IPv4 client : 172.20.18.21
SNMP

SNMP9

----------------------------------------------------------------------------
0 received, 0 sent
Receive Statistics
0 bad versions, 0 bad community names
0 bad community uses, 0 asn parse errors, 0 memory errors
0 bad types, 0 too bigs, 0 no such names, 0 bad values
0 read onlys, 0 general errors, 0 total request variables
0 total set variables, 0 get requests, 0 get next requests
0 get bulk requests, 0 set requests, 0 silent drops, 0 proxy drops
0 unknown security models, 0 invalid messages, 0 unknown PDU handlers
0 unavailable contexts, 0 unknown contexts, 0 unsupported security levels
0 not in time windows, 0 unknown usernames, 0 unknown engine IDs
0 wrong digests, 0 decryption errors
0 ACL drops
Transmit Statistics
0 too bigs, 0 no such names, 0 bad values
0 general errors, 0 get requests, 0 get next requests
0 set requests, 0 get responses, 0 reports

SNMP debug commands

This section describes the debug commands used for debugging the SNMP PDUs.

default snmp client

Syntax: [no] debug snmp client [ipv4 addr | ipv6 addr | all]

- ipv4 addr - Enables SNMP debugging for the specified IPv4 client
- ipv6 addr - Enables SNMP debugging for the specified IPv6 client
- all - Removes any existing individual client related debug configuration and enables SNMP debugging for all SNMP PDUs

To enable SNMP debugging for a specific IPv4 client, enter a command such as the following.

Brocade# debug snmp client 172.20.1.181
SNMP debugging enabled for client 172.20.1.181

To enable SNMP debugging for a specific IPv6 client, enter a command such as the following.

Brocade# debug snmp client 2001:DB8::4
SNMP debugging enabled for client 2001:DB8::4

To enable SNMP debugging for all clients, enter a command such as the following.

Brocade# debug snmp client all
Warning: Enabling SNMP debugging for all clients will remove any existing debug configuration for individual clients.
SNMP debugging enabled for all clients.

Use the no form of the command to disable debugging for the specified IP address or for all clients.

Brocade# no debug snmp client 172.20.1.181
SNMP debugging disabled for client 172.20.1.181

Brocade# no debug snmp client all
SNMP debugging is disabled for all clients

When the SNMP engine receives a request from the debug-enabled client, a set of debug messages as shown in the following sample output will be printed at various stages of processing.

SNMP Processing varbinds ifDescr.9, ifDescr.10, sysLocation.0

Sep 26 19:43:41.577 172.20.1.181: 23045: SNMP response error status = 1, error index =3

Sep 26 19:43:41.600 172.20.1.181: 23045: SNMP response varbinds ifDescr.9 = Port 1/9, ifDescr.10 = Port 1/10.

**Table 12** lists the parameters that will be printed in the debug messages at various stages of processing.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>The IP address of the client which sent the request.</td>
</tr>
<tr>
<td>Request-id</td>
<td>The request ID in the SNMP PDU being processed.</td>
</tr>
<tr>
<td>SNMP request type</td>
<td>The type of the SNMP PDU being processed and it can be any one of the following:</td>
</tr>
<tr>
<td>User</td>
<td>The SNMP user can be any one of the following:</td>
</tr>
<tr>
<td>Queue depth</td>
<td>The queue depth and queue time of the SNMP request.</td>
</tr>
<tr>
<td>Queue time</td>
<td><strong>NOTE:</strong> These parameters will be displayed only when the request is queued in the SNMP engine.</td>
</tr>
<tr>
<td>error status</td>
<td>The error status and error index of the SNMP response.</td>
</tr>
<tr>
<td>error index</td>
<td><strong>NOTE:</strong> These parameters will be printed only on errors in SNMP response.</td>
</tr>
</tbody>
</table>

**Table 12** List of parameters displayed in the SNMP debug messages

**Syntax:** `debug snmp client show`  
This command displays the debug configuration for SNMP as shown in the following command example.  

Brocade# debug snmp client show  
SNMP debugging enabled for client(s) 172.20.1.181, 2001:DB8::4

**Configuration notes**

- SNMP read-only or read-write community strings are always required for SNMP access to the device.
- SNMP access is disabled by default.
- The syntax for using ACLs for SNMP access is different from the syntax for controlling Telnet, SSH, and Web management access using ACLs.
When `snmp-server community` is configured, all incoming SNMP packets are validated first by their community strings and then by their bound ACLs. Packets are permitted if no filters are configured for an ACL.

- If you do not enable Telnet access, you can access the CLI using a serial connection to the management module. If you do not enable SNMP access, you will not be able to use Brocade Network Advisor or third-party SNMP management applications.
- You cannot authenticate Simple Network Management Protocol (SNMP) access to a Brocade device using TACACS or TACACS+.
- Brocade devices do not support RADIUS security for SNMP access.
- The TACACS or TACACS+, RADIUS, and Telnet login password authentication methods are not supported for SNMP access.
- For CLI access, you must configure authentication-method lists if you want the device to authenticate access using local user accounts or a RADIUS server. Otherwise, the device will authenticate using only the locally based password for the Super User privilege level.
- When no authentication-method list is configured specifically for Web management access, the device performs authentication using the SNMP community strings:
  - For read-only access, use the user name “get” and the password “public”. The default read-only community string is “public”.
  - There is no default read-write community string, which means you cannot open a read-write management session using the Web management interface. You first must configure a read-write community string using the CLI. Then you can log on using “set” as the user name and the read-write community string you configure as the password.
- If you configure an authentication-method list for Web management access and specify “local” as the primary authentication method, users who attempt to access the device using the Web management interface must supply a user name and password configured in one of the local user accounts on the device. You cannot access the device by entering “set” or “get” and the corresponding SNMP community string.
- For devices that can be managed using Brocade Network Advisor, the default authentication method (if no authentication-method list is configured for SNMP) is the CLI Super User level password. If no Super User level password is configured, then access through Brocade Network Advisor is not authenticated. To use local user accounts to authenticate access through Brocade Network Advisor, configure an authentication-method list for SNMP access and specify “local” as the primary authentication method.

**TACACS and TACACAS+**

TACACS+ is an enhancement to the TACACS security protocol. TACACS+ improves on TACACS by separating the functions of authentication, authorization, and accounting (AAA) and by encrypting all the traffic between the Brocade device and the TACACS+ server.

**TACACS show commands**

This section describes the show commands that display information about the TACACS servers.

```plaintext
show aaa
```

**Syntax:** `show aaa`
This command displays information about all the TACACS+ and RADIUS servers identified on the device.

Brocade# show aaa
Tacacs+ key: foundry
Tacacs+ retries: 1
Tacacs+ timeout: 15 seconds
Tacacs+ dead-time: 3 minutes
Tacacs+ Server: 10.95.6.90 Port:49:
  opens=6 closes=3 timeouts=3 errors=0
  packets in=4 packets out=4
no connection
Radius key: networks
Radius retries: 3
Radius timeout: 3 seconds
Radius dead-time: 3 minutes
Radius Server: 10.95.6.90 Auth Port=1645 Acct Port=1646:
  opens=2 closes=1 timeouts=1 errors=0
  packets in=1 packets out=4
no connection

show web

Syntax: show web

The show web command displays the privilege level of Web management interface users.

Brocade# show web

User     Privilege   IP address
set       0       192.168.1.234

TACACS debug commands

This section describes the debug command used for monitoring the TACACS servers.

debug ip aaa

Syntax: [no] debug ip aaa [event | ipc | itc | packet]

• event - Displays information about ARP events.
• ipc - Displays information about ARP IPC messages.
• itc - Displays information about ARP ITC messages.
• packet - Displays information about ARP packets.

This command displays information about AAA or TACACS+ authentication, as the following example illustrates.

Brocade# debug ip aaa
COMMAND ACCOUNTING STARTS...
RADIUS accounting for context 2
Reseting RADIUS Client structure
RADIUS: Reset client 0, Total number of active clients=1

AAA: Open RADIUS UDP port

Tracing the outgoing Radius Accounting packet..
UDP packet source IP=172.20.1.2, port=1061, destination IP=172.2
0.1.1, port=1813
**Radius timer - 0 kicks in.
RADIUS retransmission for user lab, context=2, client=0
Tracing the outgoing Radius Accounting packet..
UDP packet source IP=172.20.1.2, port=1061, destination IP=172.20.1.1, port=1813
**Radius timer - 0 kicks in.
RADIUS retransmission for user lab, context=2, client=0
Tracing the outgoing Radius Accounting packet..
UDP packet source IP=172.20.1.2, port=1061, destination IP=172.20.1.1, port=1813
**Radius timer - 0 kicks in.
RADIUS timeout for user lab, context=2, client=0
RADIUS Timer cancelled for client 0.
Closing RADIUS UDP port
RADIUS: radius_authenticate_stop for client Idx 0. Actv Clients left 0
Reseting RADIUS Client structure
Accounting status - timeout.
Accounting status - reject.
aaa_send_aaa_response()..session 2, err_code=3
Unsuccessful accounting for session 2, code 3.

**Configuration notes**

- You must deploy at least one TACACS or TACACS+ server in your network.
- The Brocade device supports authentication using up to eight TACACS or TACACS+ servers. The device tries to use the servers in the order you add them to the device’s configuration.
- You can select one primary authentication method for each type of access to a device (CLI through Telnet, CLI Privileged EXEC and CONFIG levels). For example, you can select TACACS+ as the primary authentication method for Telnet CLI access. You cannot also select RADIUS as a primary method for the same type of access, but you can configure backup authentication methods for each access application.
- You can configure the device to authenticate using a TACACS or TACACS+ server, but not both.
- TACACS+ provides for authentication, authorization, and accounting, but an implementation or configuration is not required to employ all three.
- If you erase a tacacs-server command (by entering the no form of the command), make sure you also erase the aaa commands that specify TACACS or TACACS+ as an authentication method. Otherwise, when you exit from the CONFIG mode or from a Telnet session, the system continues to believe it is TACACS or TACACS+ enabled and you will not be able to access the system.
- TACACS+ command authorization can be performed only for commands entered from Telnet or SSH sessions, or from the console. No authorization is performed for commands entered at the Web management interface or Brocade Network Advisor.

**Common diagnostic scenarios**

- During enable authentication with the login password, the password checked is the login password and not the enable password configured on the TACACS+ server.
  This problem is resolved when the “implicit-user” option is configured. The enable password then correctly checks against the enable password configured on the TACACS+ server.
- TACACS does not work after reboot. The key is still in configuration, but authentication does not work until the key is removed and added back to the configuration.
This issue is resolved by upgrading the software version to reflect the latest patches and versions.

### Telnet and SSH connections

The first time you log on to the console port, you must use a serial connection in order to assign an IP address to the port. Once an IP address is assigned, you can access the CLI through a local Telnet, SSH, or SNMP connection through the management port. When accessing the CLI through Telnet, you maybe prompted for a password. By default, the password required is the one you enter for general access at initial setup.

**NOTE**
Telnet, SSH, Web, and SNMP servers are disabled by default, and can be enabled selectively.

### Telnet and SSH show commands

This section describes the show command that displays Telnet information.

**show telnet**

**Syntax:** show telnet

This command shows you the number of open Telnet sessions at any given time, including information about each session. Command output resembles the following example.

```plaintext
Brocade# show telnet
Console connections:
    established
        3 days 17 hours 31 minutes 27 seconds in idle
Telnet server status: Enabled
Telnet connections (inbound):
    1    established, client ip address 10.53.1.65, privilege super-user
         you are connecting to this session
        closed
        closed
        closed
        closed
Telnet connections (outbound):
    6    established, server ip address 10.47.2.200, from Telnet session 1
         4 seconds in idle
        closed
        closed
        closed
        closed
        closed
SSH server status: Enabled
SSH connections:
    1    closed
```

### Telnet and SSH debug commands

This section describes the debug commands that generate information about Telnet and SSH connections.
Telnet and SSH connections

**debug ip telnet**

**Syntax:** `[no] debug ip telnet`

This command generates information about incoming Telnet connections, as shown in the following example.

Brocade# debug ip telnet
TELNET: Data is ready to receive
TELNET: Data is ready to receive

**debug ip ssh**

**Syntax:** `[no] debug ip ssh`

This command generates information about SSH connections.

The following example shows information about SSH connections for a user logging in.

Brocade# debug ip ssh
Nov 30 22:54:01 SSH[0]: ssh_is_connection_allowed..NEW CONNECTION
Nov 30 22:54:01 SSH[0]:ssh_socket_control: new connection
Nov 30 22:54:01 SSH[0]:ShtcpConnectionStatus: pending
Nov 30 22:54:01 SSH[0]:Awaiting child task init complete
Nov 30 22:54:01 SSH[0]:ssh_socket_control:Incoming connection ready
Nov 30 22:54:01 SSH[0]:tcp incoming tcb 0x117ee46e, handle 0xa0000007
Nov 30 22:54:01 SSH[0]:ShtcpConnectionStatus: connection established
Nov 30 22:54:02 SSH[0]:ShtcpReceiveStatus: string length 47
Nov 30 22:54:02 SSH[0]:ShtcpSend: eSendComplete: sent 24/24
Nov 30 22:54:02 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:02 SSH[0]:ShtcpSend: eSendComplete: sent 240/240
Nov 30 22:54:02 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:02 SSH[0]:ShtcpReceiveStatus: string length 456
Nov 30 22:54:02 SSH[0]:ShtcpReceiveStatus: string length 272
Nov 30 22:54:04 SSH[0]:ShtcpSend: eSendComplete: sent 768/768
Nov 30 22:54:04 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:05 SSH[0]:ShtcpReceiveStatus: string length 16
Nov 30 22:54:05 SSH[0]:ShtcpSend: eSendComplete: sent 16/16
Nov 30 22:54:05 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:08 SSH[0]:ShtcpReceiveStatus: string length 52
Nov 30 22:54:08 SSH[0]:ShtcpSend: eSendComplete: sent 52/52
Nov 30 22:54:08 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:10 SSH[0]:ShtcpReceiveStatus: string length 68
Nov 30 22:54:10 SSH[0]:ShtcpSend: eSendComplete: sent 84/84
Nov 30 22:54:10 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:11 SSH[0]:ShtcpReceiveStatus: string length 116
Nov 30 22:54:11 SSH[0]:ShtcpSend: eSendComplete: sent 36/36
Nov 30 22:54:11 SSH[0]:ShtcpReceiveStatus: string length 68
Nov 30 22:54:11 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:11 SSH[0]:ShtcpSend: eSendComplete: sent 52/52
Nov 30 22:54:11 SSH[0]:ShtcpReceiveStatus: string length 148
Nov 30 22:54:11 SSH[0]:ProcessPendingSend: send completion status=Complete, result=0
Nov 30 22:54:11 SSH[0]:ShtcpSend: eSendComplete: sent 36/36
The Network Time Protocol (NTP) allows synchronization of system clocks among a set of distributed time servers and clients. The NTP transmits timekeeping information from the primary time servers to the secondary time servers and clients using both private networks and the public Internet.

**NTP show commands**

This section describes the show commands that display NTP information.

**show ntp status**

**Syntax: show ntp status**

This command displays information about the NTP status. The following is the command example, when the NTP panic mode is enabled.

Brocade# show ntp status
Clock is unsynchronized, no reference clock
NTP server mode is enabled, NTP client mode is enabled
NTP master mode is disabled, NTP master stratum is 8
NTP is in panic mode
You can disable the NTP panic mode by performing the following steps:
1. Remove the clock time zone and clock summer time configurations from the device by entering the following commands.

   Brocade(config)# no clock summer-time
   Brocade(config)# no clock timezone us pacific

   Syntax: [no] clock summer-time
   Syntax: [no] clock timezone us time-zone

   The time-zone variable specifies the timezone and can be any one of the following: alaska, aleutian, arizona, central, east-indiana, eastern, hawaii, michigan, mountain, pacific, samoa.

2. Exit the configuration mode by entering the following command.

   Brocade(config)# exit

   Syntax: exit

3. Set the clock using the current Coordinated Universal Time (UTC) time, by entering the following command.

   Brocade# clock set 17:40:00 04-11-12

   Syntax: [no] clock set hh:mm:ss mm-dd-yy

   The hh:mm:ss mm-dd-yy variables specify the time to be set in timestamp format.

4. Wait for NTP to synchronize and then the syslog messages such as the following are displayed.


5. Reconfigure the clock time zone and clock summer time configurations that are removed in step 1.

   Brocade# config terminal
   Brocade(config)# clock timezone us pacific
   Brocade(config)# show clock
   09:41:27.182 Pacific Wed Apr 11 2012
   Brocade(config)# clock summer-time
   Brocade(config)# show clock
   10:41:35.632 Pacific Wed Apr 11 2012

   show ntp associations

   Syntax: show ntp associations

   This command displays information about NTP servers and peers associations, as shown in the following example.

   Brocade# show ntp associations
   address ref clock    st when poll reach delay offset  disp
   *~172.19.69.1  172.24.114.33 3 25 64 3 2.89 0.234 39377
   ~2001:DB8::234 INIT 16 - 64 0 0.00 0.000 15937
   * synced, # selected, + candidate, - outlayer, x falseticker, ~ configured

   show ntp associations detail

   Syntax: show ntp associations detail
This command displays detailed association information of all the NTP servers and peers, as shown in the following example.

Brocade# show ntp association detail
10.216.1.101 configured server, sys peer, stratum 2
ref ID 10.123.2.5, time d21da76.1ed27000 (16:14:22.51710712 GMT+05:30 Fri Sep 16 2011)
our mode client, peer mode server, our poll intvl 6, peer poll intvl 6,
root delay 0.02256774 msec, root disp 0.01150512, reach 377, root dist 0.36969603
delay 290.94232711 msec, offset -1.08355772 msec, dispersion 4.58729275,
precision 2**-16, version 4
org time d21da713.f8f25000 (16:14:35.4176629760 GMT+05:30 Fri Sep 16 2011)
rcv time d21da714.2602742a (16:14:36.637695018 GMT+05:30 Fri Sep 16 2011)
xmt time d21da713.d31f723f (16:14:35.342053439 GMT+05:30 Fri Sep 16 2011)
filter delay 296.5594 322.7792 323.5571 297.6697 290.9942 303.5554 305.9971 295.0019
filter offset 0.4430 -13.4441 -14.2241 -4.0003 -1.0083 -1.4414 -3.0034 1.9941
filter disp 1.9984 1.0025 0.0035 6.8889 5.8899 4.8895 3.9920 2.9944
filter epoch 5779 5843 5909 5452 5518 5585 5650 5715

Syntax: show ntp associations detail IPv4 address | IPv6 address

- IPv4 address - Specifies the IPv4 address of the NTP peer.
- IPv6 address - Specifies the IPv6 address of the NTP peer.

This command displays all the NTP servers and peers association information for a specific IP address, as shown in the following example.

Brocade# show ntp association detail 10.99.40.1
10.99.40.1 configured server, candidate, stratum 3
ref ID 10.45.57.38, time d288de7d.690ca57 (10:33:33.1762436551 Pacific Tue Dec 06 2011)
our mode client, peer mode server, our poll intvl 10, peer poll intvl 10,
root delay 0.02618408 msec, root disp 0.10108947, reach 3, root dist 0.23610585
delay 0.92163588 msec, offset 60.77749188 msec, dispersion 70.33842156,
precision 2**-16, version 4
org time d288defa.b260a7ff (10:35:38.2992678687 Pacific Tue Dec 06 2011)
rcv time d288defa.a2efbd41 (10:35:38.2733620545 Pacific Tue Dec 06 2011)
xmt time d288defa.a2ae54f8 (10:35:38.2729334008 Pacific Tue Dec 06 2011)
filter delay 0.000 6.7770 6.7773 6.7711 6.7720 6.7736 6.7700 0.9921
filter offset 0.000 19.0047 19.1145 19.2245 19.3313 17.4410 15.4463 60.7777
filter disp 1.9984 16000.000 15.9975 15.9945 15.9915 15.8885 15.8855 0.0030
filter epoch 55683 55683 55685 55687 55689 55691 55693 56748

show ntp statistics

Syntax: show ntp statistics

This command displays NTP statistics, as shown in the following example.

Brocade# show ntp statistics
NTP statistics:
  Number of NTP packets received = 139
  Number of NTP packets sent = 239
  Number of NTP packets processed = 130
  Number of NTP packets with bad format = 0
  Number of NTPv3 packets received = 0
  Number of NTP packets with bad auth = 0
  Number of NTP packets restricted = 0
  Number of NTP KoD packets sent = 0
  Number of NTP packets declined = 0
show ntp statistics peer

Syntax:  show ntp statistics peer

This command displays NTP server and peer statistics, as shown in the following example.

Brocade# show ntp statistics peer
Peer: 10.216.1.101
    Number of NTP packets received     = 32
    Number of NTP packets sent         = 32
    Number of NTP packets processed    = 32
    Number of NTP packets failed tests = 0
    Number of duplicate NTP packets    = 0
    Number of bogus NTP packets        = 0
    Number of bad length NTP packets   = 0
    Number of RATE KoD NTP packets     = 0
    The last packet received 77 seconds ago
    The last peer association struct updated 71 seconds ago

NTP debug commands

This section describes the debug commands that generate NTP information.

debug ip ntp

Syntax:  [no] debug ip ntp [algorithms | association | broadcast | clockadjust | errors | packet | server]

•  algorithms - Displays information about the NTP system algorithms.
•  association - Displays information about the NTP server and peer association.
•  broadcast - Displays information about the NTP broadcast server and client.
•  clockadjust - Displays information about the NTP clock-adjust process.
•  errors - Displays information about the NTP error events.
•  packet - Displays information about the NTP input and output packets.
•  server - Displays information about the NTP server.

debug ip ntp algorithms

Syntax:  [no] debug ip ntp algorithms

This command displays information about the NTP system algorithms. Command output resembles the following example.

Brocade# debug ip ntp algorithms
Oct 19 18:18:08 NTP: ntp_clock_select: final survivor 10.45.57.38
Oct 19 18:18:08 NTP: ntp_clock_select: final survivor 10.189.94.4
Oct 19 18:18:08 NTP: ntp_clock_select: final survivor 10.20.99.139
Oct 19 18:18:08 NTP: ntp_clock_select: number of final survivors 5 and leap vote 0
Oct 19 18:18:08 NTP: ntp_clock_select: combine offset -0.00029317 jitter 0.01741329
debug ip ntp association

Syntax: [no] debug ip ntp association

This command displays information about the NTP server and peer association. Command output resembles the following example.

Brocade# debug ip ntp association

d debug ip ntp broadcast

Syntax: [no] debug ip ntp broadcast

This command displays information about the NTP broadcast server and client. Command output resembles the following example.

Brocade# debug ip ntp broadcast
Oct 19 18:32:46 NTP: ntp_timer: interface mgmt1 is up, we may send broadcast packet
Oct 19 18:32:49 NTP: Sending NTP broadcast packet to subnet 10.20.111.255 via port mgmt1
Oct 19 18:33:56 NTP: Sending NTP broadcast packet to subnet 10.20.111.255 via port mgmt1

d debug ip ntp clockadjust

Syntax: [no] debug ip ntp clockadjust

This command displays information about the NTP clock-adjust process. Command output resembles the following example.

Brocade# debug ip ntp clockadjust
Oct 19 18:34:33 NTP: ntp_clock_update: at 1767 sample 1571 associd 5
Oct 19 18:34:33 NTP: ntp_local_clock: hufbuf - ptr 2 mindly 0.00291813 huffpuff correction 0.00419663
Oct 19 18:34:33 NTP: ntp_local_clock: clk offset -0.00287231 clk jit 0.01699589 clk stab 0.13831413 sys_poll 7
Oct 19 18:34:34 NTP: ntp_set_freq: drift 0.00000047, old freq 24999934
Oct 19 18:34:34 NTP: ntp_set_freq: new freq 24999923
Oct 19 18:34:34 NTP: ntp_adj_host_clock: new offset -0.00287231, freq 24999923
Oct 19 18:34:34 NTP: Adjusting the clock. offset -0.00287231, calib used 63564

d debug ip ntp errors

Syntax: [no] debug ip ntp errors

This command displays information about the NTP error events.

d debug ip ntp packet

Syntax: [no] debug ip ntp packet

This command displays information about the NTP input and output packets. Command output resembles the following example.
IP security

The debug commands in this section apply to Internet Protocol security (IPsec) operation.

IPsec debug commands on LP

This section describes the IPsec-related debug commands available on LP.

default ipsec

Syntax: [no] debug ipsec [error | log | packet | trace]

• error - Displays IPsec error conditions.
• log - Displays IPsec logging information.
• **packet** - Displays IPsec packet processing information.

• **trace** - Displays trace information for IPsec.

On LP, the `debug ipsec packet` command output resembles the following example.

```
Brocade# debug ipsec packet
IPsec: packet debugging is on
IPsec packet received: Packet size: 93, IPsec 4 Bytes: 0x80550000
Foundry header:
00: 05 f2 44 03 98 54 cf fa 3c 18 0c b8 0c 00 00 00
10: 80 55 00 00
Packet (starting with Ethernet Header):
00: 00 24 38 92 79 00 74 8e f8 31 f7 01 08 00 45 c0
10: 00 3b 0c e0 00 00 40 06 dc bf c8 2e 00 00 c8 2e
20: 00 01 00 b3 1f f1 8d cc d8 6d 8d 47 9d b0 50 18
30: fd e8 6b 89 00 00 ff ff ff ff ff ff ff ff ff
40: ff ff ff ff ff ff 00 13 04
IPsec packet received: Packet size: 80, IPsec 4 Bytes: 0x80160000
Foundry header:
00: 05 f2 44 03 98 54 cf fa 3c 18 0d 78 0c 00 00 00
10: 80 16 00 00
Packet (starting with Ethernet Header):
00: 00 24 38 92 79 00 74 8e f6 31 f7 01 08 00 45 c0
10: 00 2c 0c dc 00 00 40 06 dc cb c8 2f 00 00 c8 2f
20: 00 01 1f bc 00 b3 14 5f 8f 02 00 00 00 00 60 02
30: fd e8 46 4d 00 00 02 04 05 b4 00 00
IPsec packet received: Packet size: 80, IPsec 4 Bytes: 0x80160000
Foundry header:
00: 05 f2 44 03 98 54 cf fa 3c 18 0d 78 0c 00 00 00
10: 80 16 00 00
Packet (starting with Ethernet Header):
00: 00 24 38 92 79 00 74 8e f5 31 f7 01 08 00 45 c0
10: 00 2c 0c dc 00 00 40 06 dc cb c8 2f 00 00 c8 2f
20: 00 01 1f bc 00 b3 14 5f 8f 02 00 00 00 00 60 02
30: fd e8 46 4d 00 00 02 04 05 b4 00 00
The `debug ipsec trace` command output resembles the following example.

```
Brocade# debug ipsec trace
IPsec: trace debugging is on
Jan 13 10:25:18.599 IPsec: Packet received for IPsec Tunnel 17
Jan 13 10:25:18.650 IPsec: Packet received for IPsec Tunnel 23
Jan 13 10:25:18.750 IPsec: Packet received for IPsec Tunnel 23
Jan 13 10:25:18.900 IPsec: Packet received for IPsec Tunnel 46
Jan 13 10:25:19.199 IPsec: Packet received for IPsec Tunnel 67
Jan 13 10:25:19.300 IPsec: Packet received for IPsec Tunnel 40
Jan 13 10:25:19.300 IPsec: Packet received for IPsec Tunnel 57
Jan 13 10:25:19.500 IPsec: Packet received for IPsec Tunnel 10
Jan 13 10:25:19.500 IPsec: Packet received for IPsec Tunnel 33
Jan 13 10:25:19.500 IPsec: Packet received for IPsec Tunnel 38
Jan 13 10:25:20.150 IPsec: Packet received for IPsec Tunnel 68
Jan 13 10:25:20.775 IPsec: Packet received for IPsec Tunnel 46
Jan 13 10:25:21.099 IPsec: Packet received for IPsec Tunnel 18
Jan 13 10:25:22.300 IPsec: Packet received for IPsec Tunnel 37
Jan 13 10:25:23.349 IPsec: Packet received for IPsec Tunnel 63
Jan 13 10:25:23.525 IPsec: Packet received for IPsec Tunnel 21
Jan 13 10:25:23.699 IPsec: Packet received for IPsec Tunnel 36
Jan 13 10:25:24.625 IPsec: Packet received for IPsec Tunnel 59
Jan 13 10:25:24.824 IPsec: Packet received for IPsec Tunnel 20
Jan 13 10:25:24.824 IPsec: Packet received for IPsec Tunnel 39
```
**IPsec debug commands on MP**

This section describes the IPsec-related debug commands available on MP.

**debug ipsec esp**

**Syntax:** `[no] debug ipsec esp`

This command turns on debugging of Encapsulating Security Payload (ESP). After key roll-over finishes (if it is in process), the ESP debugging facility can show error data (if it exists). Note that the first row of information shows the SPI in hexadecimal format (0x1d97c), and this value is the equivalent of decimal 121212.

On MP, the command output resembles the following example.

```
Brocade# debug ipsec esp
IPSec: esp debugging is on
Brocade# show ipsec esp
Dec 12 11:37:39 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
psec sa
  IPSEC Security Association Database(Entries:2)
      SPDID Dir Encap SPI    Destination          AuthAlg  EncryptAlg
      8  out ESP   121212     ::                   sha1     Null
      8  in  ESP   121212     FE80::               sha1     Null
Dec 12 11:37:49 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
Dec 12 11:37:59 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
Dec 12 11:38:08 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
Dec 12 11:38:18 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
Dec 12 11:38:30 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
Dec 12 11:38:40 IPSEC,ESP: decrypt ok, seq=0  (SA: ESP  in spi=0x1d97c dst=FE80::)
```

**debug ipsec sa**

**Syntax:** `[no] debug ipsec sa`

This command displays debugging information related to the security associations used by IPsec for OSPFv3 packets. The command output resembles the following example.

```
Brocade# debug ipsec sa
IPSec: sa debugging is on
Brocade(config)# interface ethernet 1/8
Brocade(config-if-e1000-1/8) # ipv6 ospf authentication ipsec spi 121212 esp sha1
nocrypto 1234567890123456789012345678901234567890
Brocade(config-if-e1000-1/8) #Dec 12 11:45:37 IPSEC,SA: ipipsec_pfkeyv2_input() :: receiving 'ADD' command
Dec 12 11:45:37 IPSEC,SA: Adding SA: ESP  in spi=0x1d97c dst=FE80::, replay=0
Dec 12 11:45:37 IPSEC,SA: ipipsec_pfkeyv2_input() :: succeeded
Dec 12 11:45:37 IPSEC,SA: ipipsec_pfkeyv2_input() :: receiving 'X_ADDFLOW' command
Dec 12 11:45:37 IPSEC,SA: ipipsec_pfkeyv2_input() :: succeeded
Dec 12 11:45:47 IPSEC,SA: ipipsec_pfkeyv2_input() :: receiving 'ADD' command
Dec 12 11:45:47 IPSEC,SA: Adding SA: ESP  out spi=0x1d97c dst=:, replay=0
Dec 12 11:45:47 IPSEC,SA: ipipsec_pfkeyv2_input() :: succeeded
Dec 12 11:45:47 IPSEC,SA: ipipsec_pfkeyv2_input() :: receiving 'X_ADDFLOW' command
Dec 12 11:45:47 IPSEC,SA: ipipsec_pfkeyv2_input() :: succeeded
```
debug ipsec policy

Syntax: [no] debug ipsec policy

This command displays debugging information for IPsec policy. The command output resembles the following example.

Brocade# debug ipsec policy
IPSec: policy debugging is on
Brocade(config)# interface ethernet 1/8
Brocade(config-if-e1000-1/8)# ipv6 ospf authentication ipsec spi 121212 esp sha1	no-encrypt 1234567890123456789012345678901234567890
Brocade(config-if-e1000-1/8)# Dec 12 11:47:45 IPSec,Policy: Creating flow [input
use 'prot=OSPF src=FE80::/10:0 dst=::/0:0' -> SA: ESP in spi=0x1d97c dst=FE80::*] : ok
Brocade(config-if-e1000-1/8)#Dec 12 11:47:55 IPSec,Policy: Creating flow [output
use 'prot=OSPF src=FE80::/10:0 dst=::/0:0' -> SA: ESP out spi=0x1d97c dst=::] : ok

department ipsec in

Syntax: [no] debug ipsec in

This command displays debugging information related to inbound OSPFv3 packets with IPsec. The command output resembles the following example.

Brocade# debug ipsec in
IPSec: in debugging is on
Dec 12 11:39:49 IPSec,IN: ESP spi=121212 (pkt 'ESP FE80:: -> FE80::')
payloadlength =64
Dec 12 11:39:49 IPSec,IN: Incoming packet matches Policy : input use 'prot=OSPF
src=FE80::/10:0 dst=:/0:0' -> SA: ESP in spi=0x1d97c dst=FE80::*
12 11:39:59 IPSec,IN: ESP spi=121212 (pkt 'ESP FE80:: -> FE80::*') payloadlength =64
Dec 12 11:39:59 IPSec,IN: Incoming packet matches Policy : input use 'prot=OSPF
src=FE80::/10:0 dst=:/0:0' -> SA: ESP in spi=0x1d97c dst=FE80::*

IPSEC Security Policy Database(Entries:2)
PType Dir Proto Source(Prefix:TCP/UDP Port) Destination(Prefix:TCP/UDP Port)
SA: SPDID Dir Encap SPI Destination
use in OSPF FE80::/10:any :/0:any
SA: 8 in ESP 121212 FE80::*
use out OSPF FE80::/10:any :/0:any
SA: 8 out ESP 121212 :

department ipsec out

Syntax: [no] debug ipsec out

This command displays debugging information related to outbound OSPFv3 packets with IPsec. The command output resembles the following example.
IKEv2

The Internet Key Exchange Protocol version 2 (IKEv2) for the BR-MLX-10Gx4-M-IPSEC is used to set up and manage secure tunnels across the external networks.

IKEv2 debug commands on the LP

This section describes the IKEv2-related debug options available on the LP.
debug ikev2

Syntax: [no] debug ikev2 [back-up | error | event | packet {receive | send} [detail] | peer {ip-address | ipv6-address} | trace | tunnel tunnel-id]

- **back-up** - Enables IKEv2 backup events debugging.
- **error** - Enables IKEv2 error debugging.
- **event** - Enables IKEv2 event debugging.
- **packet {receive | send}** - Enables IKEv2 packet debugging in receive or send mode.
- **detail** - Displays detailed IKEv2 packet debugging information.
- **peer {ip-address | ipv6-address}** - Displays IKEv2 debugging information for the specified peer.
- **trace** - Enables IKEv2 trace debugging.
- **tunnel tunnel-id** - Enables IKEv2 events debugging related to a specific Internet Protocol security (IPsec) tunnel. The `tunnel-id` variable can be from 1 through 8192. The configured tunnel ID value must be valid, existing, and an IPsec tunnel ID.

On the LP, the `debug ikev2 packet` command output resembles the following example.

Brocade# debug ikev2 packet
Jun 25 09:22:27.000 IKE: Sending request to 10.100.113.2 [500]
Jun 25 09:22:27.000 IKE: Sending message 10.100.113.2[500]: IKE_SA_INIT, #1(4), ID 00000000
Jun 25 09:22:27.000 lp_ipsec_ike_tx_ipv4_ike_packet send packet to 10.100.113.2:500 from 10.52.23.51:500 length 248
Jun 25 09:22:32.000 IKE: Resending message 52.100.113.2[500], IKE_SA_INIT, #1(4), ID 00000000, 1(3)
Jun 25 09:22:32.000 lp_ipsec_ike_tx_ipv4_ike_packet send packet to 10.100.113.2:500 from 10.52.23.51:500 length 248
Jun 25 09:22:42.000 IKE: Resending message 10.100.113.2[500], IKE_SA_INIT, #1(4), ID 00000000, 2(3)
Jun 25 09:22:42.000 lp_ipsec_ike_tx_ipv4_ike_packet send packet 10.100.113.2:500 from 10.52.23.51:500 length 248

On the LP, the `debug ikev2 packet detail` command output resembles the following example.

Brocade# debug ikev2 packet detail
Jun 25 09:23:51.375 +++ ISAKMP package start (message # 1) +++
Jun 25 09:23:51.375   < IKE Header >
Jun 25 09:23:51.375   IKE_SA Initiator's SPI: 0x9499cb7fcf1160a4
Jun 25 09:23:51.375   IKE_SA Responder's SPI: 0x0000000000000000
Jun 25 09:23:51.375   Next Payload:     security association (33)
Jun 25 09:23:51.375   Version:          2.0
Jun 25 09:23:51.375   Exchange Type:    IKE_SA_INIT
Jun 25 09:23:51.375   Flags:            [ INITIATOR ]
Jun 25 09:23:51.375   Message ID:       0
Jun 25 09:23:51.375   Length:           216 (#x)
Jun 25 09:23:51.375   < security association >
Jun 25 09:23:51.375   Next Payload: key exchange (34)
Jun 25 09:23:51.375   Payload Length: 48 (#x)
Jun 25 09:23:51.375   << proposal >>
Jun 25 09:23:51.375   Proposal #:  1
Jun 25 09:23:51.375   SPI Size:  0
Jun 25 09:23:51.375   # of Transforms: 4
Jun 25 09:23:51.375   <<< transform >>>
Jun 25 09:23:51.375   Type: encr
Jun 25 09:23:51.375   ID: aes
IKEv2

Jun 25 09:23:51.375     Attr: 800e0100
Jun 25 09:23:51.375     <<< transform >>>
Jun 25 09:23:51.375     Type: integ
Jun 25 09:23:51.375     ID:   sha384
Jun 25 09:23:51.375     <<< transform >>>
Jun 25 09:23:51.375     Type: prf
Jun 25 09:23:51.375     ID:   sha384
Jun 25 09:23:51.375     <<< transform >>>
Jun 25 09:23:51.375     Type: dh
Jun 25 09:23:51.375     ID:   ecp384
Jun 25 09:23:51.375     < key exchange >
Jun 25 09:23:51.375     Next Payload: nonce (40)
Jun 25 09:23:51.375     Payload Length: 104 (#x)
Jun 25 09:23:51.375     dh group: 'ecp384'
Jun 25 09:23:51.375     data:
f9648262 be296717 a90476fb 8433915e 919c15cb 5c774fc1 335bd463 cfbacf67
9762b9be 05c04f41 70f4c45c 5e2b746a c3aced6 2f86b16e c3eb102a 547c1b5c
83a8515b 2ca67cc2 15f1e1c7 b5681e9 e0ee4ff2 557f1f11 4b57d646 15c30c55

Jun 25 09:23:51.375     < nonce >
Jun 25 09:23:51.375     Next Payload: none (0)
Jun 25 09:23:51.375     Payload Length: 36 (#x)
Jun 25 09:23:51.375     data:
dbe908e0 42e89912 fcd45200 94fc988e 875ea6a2 b56cda27 ad8c05f e18ed8df

Jun 25 09:23:51.375     --- ISAKMP package end (message # 1) ---

On the LP, the **debug ikev2 error** command output resembles the following example.

Brocade# debug ikev2 error
Jun 25 09:25:11.525 IKE: ike_wr_check_matching_condition not found #1
Jun 25 09:25:11.525 IKE match condition not found for tunnel id 203
Jun 25 09:25:11.525 IKE: ipike_isakmp_handle_error: error: 1
Jun 25 09:25:11.525 IKE: IKE error: 12
Jun 25 09:25:11.525 ike sa not present on primary

On the LP, the **debug ikev2 tunnel** command output resembles the following example.

Brocade# debug ikev2 tunnel 8
Oct 13 07:39:09.525 IKE2 EVENT: received IPC Msg IKE_MP_LP_IKE_CLEAR and length 46
Oct 13 07:39:09.525 IKE: ike_wr_sa_create_delete(): delete initiator cookie: 0xa668567626c451525, responder cookie: 0xffb12e05dca5624
Oct 13 07:39:09.525 IKE2 EVENT: IKE IPC send message IKE_LP_MP_IKE_SA_DEL_E and len 47 to MP
Oct 13 07:39:09.525 IKE: ipike_isakmp_hash_obj_cookie() :: hash key: id=0, type=37, init=1 -> val = e32752b
Oct 13 07:39:09.525 IKE: ipike_isakmp_hash_add() :: hash: id=0, type=37, init=1, phase=0
Oct 13 07:39:09.525 IKE: ipike_isakmp_hash_add() :: elements: cookie=2 id=2
Oct 13 07:39:09.525 IKE: Message encrypted 88 bytes
Oct 13 07:39:09.525 IKE2 IKEv2:ipcom_hash_for_each took 1 ms
Oct 13 07:39:09.525 IKE2 IKEv2:ipcom_hash_for_each longest CPU holdtime was 0 ms
Oct 13 07:39:09.525 IKE: ipike_isakmp_free_exchange() :: exchange 736180768 type - INFORMATIONAL
Oct 13 07:39:09.550 IKE: ipike_isakmp_hash_obj_cookie() :: hash key: id=0, type=0, init=0 -> val = 61b21908
Oct 13 07:39:09.550 IKE: ipike_isakmp_hash_remove() :: hash elements: 1 1
IKEV2 debug commands on the MP

This section describes the IKEv2-related debug options available on the MP.

**debug ikev2**

Syntax: `[no] debug ikev2 [back-up | error | event | extended-log | trace | tunnel tunnel-id]`

- **back-up** - Enables IKEv2 backup events debugging.
- **error** - Enables IKEv2 error debugging.
- **event** - Enables IKEv2 event debugging.
- **extended-log** - Enables IKEv2 extended log debugging.
• **trace** - Enables IKEv2 trace debugging.

• **tunnel tunnel-id** - Enables IKEv2 events debugging related to a specific Internet Protocol security (IPsec) tunnel. The `tunnel-id` variable can be from 1 through 8192. The configured tunnel ID value must be valid, existing, and an IPsec tunnel ID.

On the MP, the `debug ikev2 error` command output resembles the following example.

```
Brocade# debug ikev2 error
IKEV2: Error debugging is on
Jan 13 18:01:36.102 received IPC Msg from LP 0, MsgType IKE_LP_MP_IKE_SA_DEL_E and Length 43
Jan 13 18:01:36.102 IKE sa delete for tunnel id 23 initiator spi id dbd8945d0c3f4ac2 and responder id 0000000000000000, state 4, tlv count 0
Jan 13 18:01:36.102 received IPC Msg from LP 0, MsgType IKE_LP_MP_IKE_SA_DEL_E and Length 43
Jan 13 18:01:36.102 IKE sa delete for tunnel id 104 initiator spi id 9bdfebeb9a2cc95 and responder id 0000000000000000, state 4, tlv count 0
Jan 13 18:01:36.102 received IPC Msg from LP 0, MsgType IKE_LP_MP_IKE_SA_DEL_E and Length 43
Jan 13 18:01:36.102 IKE sa delete for tunnel id 105 initiator spi id 422d7510315491a and responder id 0000000000000000, state 4, tlv count 0
```

On the MP, the `debug ikev2 tunnel` command output resembles the following example.

```
Brocade# debug ikev2 tunnel 8
ike_ipc_send_to_lp: to LP mask -1 with MsgType IKE_MP_LP_IKE_CLEAR and length 46
delete ike sa with initiaor spi 66356fa6a8b659db and responder spi a8d5d17b93b14c8 from the list
delete ipsec sa spi 0000d6cf
ike_ipsec_update_tunnel_nht for tunnel 8
ike_ipsec_update_tunnel_nht delete nht for tunnel 8
delete ipsec sa spi 0000769f
ike_ipsec_update_tunnel_nht for tunnel 8
delete tunnel 8 nht 2
```

**PKI**

The Public Key Infrastructure (PKI) for the BR-MLX-10Gx4-M-IPSEC is used to provide a security infrastructure for entities to have a secured communication.

**PKI debug commands on the MP**

This section describes the PKI-related debug options available on the MP.

```
debug pki
```

**Syntax:** `[no] debug pki [error | itc | timer | trace | user]`

- **error** - Enables PKI error debugging.
- **itc** - Enables PKI ITC debugging.
- **timer** - Enables PKI timer debugging.
- **trace** - Enables PKI path trace debugging.
- **user** - Enables PKI user interface debugging.
On the MP, the `debug pki trace` output for the command `pki authenticate trustpoint` resembles the following example.

Brocade# debug pki trace
Aug 3 16:45:28.808 PKI:
pki_process_user_request_entry_for_trustpoint_authentication, connecting to HTTP server
Aug 3 16:45:28.808 PKI: pki_httpc_callback called with: itc error:0:user_data:24
Aug 3 16:45:28.808 PKI: pki_user_find_user_request_from_internal_pki_list called
Aug 3 16:45:28.808 PKI: pki_user_find_user_request_from_internal_pki_list, user request 24 found in list.
Aug 3 16:45:28.808 PKI: pki_httpc_callback,CONNECT:caller_handle:1
Aug 3 16:45:28.808 PKI: pki_httpc_add_httpc_handle_to_list
Aug 3 16:45:28.808 PKI: HTTPC Handle I added to user entry 811773841
Aug 3 16:45:29.012 PKI: pki_timer_msg_handler called
Aug 3 16:45:29.025 PKI: Received HTTP_CLIENT_API_OUTGOING_UP:handle:1
Aug 3 16:45:29.025 PKI: HTTP node found :handle:1
Aug 3 16:45:29.025 PKI: pki_httpc_send_request: request :24
Aug 3 16:45:29.025 PKI: pki_httpc_send_request: success
Aug 3 16:45:29.025 PKI: pki_httpc_callback called with: itc error:0:user_data:24
Aug 3 16:45:29.026 PKI: pki_user_find_user_request_from_internal_pki_list called
Aug 3 16:45:29.026 PKI: pki_user_find_user_request_from_internal_pki_list, user request 24 found in list.
Aug 3 16:45:29.026 PKI: pki_http_client_callback,GET/POST:request_handle:1
Aug 3 16:45:29.208 PKI: pki_timer_msg_handler called
Aug 3 16:45:29.244 PKI: Received HTTP_CLIENT_API_RECV_DATA_READY:handle:1, receive_length:3511
(output truncated)
PKI
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This chapter describes diagnostics for forwarding protocols and environments on Brocade NetIron XMR series and Brocade MLX series routers.

ARP

Address Resolution Protocol (ARP) is a standard protocol that enables a router to obtain the MAC address of an interface on another device when the router knows the IP address of the interface. ARP is enabled by default and cannot be disabled.

ARP show commands

This section describes the show commands that display ARP information.

show ip arp-inspection

Syntax: show ip arp-inspection [vlan vlan_id]

This command displays the ARP inspection status and the trusted and untrusted ports in a VLAN. Command output resembles the following example.

Brocade# show ip arp-inspection
ARP inspected VLANs:
1000

ARP inspection trusted ports:
ethe 2/1

show ip static-arp

Syntax: show ip static-arp
This command displays the ARP inspection table. Command output resembles the following example.

Brocade# show ip static-arp
Total no. of entries: 2

<table>
<thead>
<tr>
<th>Index</th>
<th>IP Address</th>
<th>MAC Address</th>
<th>Port/Vlan:Vlan:Port/Vlan:Peer</th>
<th>VLAN</th>
<th>ESI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.10.10.10</td>
<td>0000.0033.4444</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10.11.11.11</td>
<td>0000.0066.7777</td>
<td>4/1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10.12.12.12</td>
<td>0000.0023.4343</td>
<td>*:10.2.3.105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ARP debug commands

For ARP debug commands, refer to “debug ip arp” on page 98.

Configuration notes

To delete the static MAC entry, you must delete the static ARP entry first.

ECMP

Equal-Cost MultiPath (ECMP) supports traffic that is forwarded in software. ECMP applies only to traffic forwarded by software, not to traffic forwarded by hardware. Normally, traffic is forwarded in software when you configure a CPU-based feature such as ACLs, rate limiting, or NetFlow Switching. Traffic also is forwarded by software if the CAM (used for hardware-forwarding) becomes full.

ECMP show commands

This section describes the show commands that display ECMP information.

show ipv6

Syntax:  show ipv6
This command displays the status of ECMP load sharing for IPv6, as shown in the following example.

Brocade# show ipv6
Global Settings

  unicast-routing enabled, hop-limit 64
No Inbound Access List Set
No Outbound Access List Set
Prefix-based IPv6 Load-sharing is Enabled, Number of load share paths: 4

show ipv6 cache

Syntax:  show ipv6 cache [index-number | ipv6-prefix/prefix-length | ipv6-address | ethernet slot/port | pos slot/port | tunnel number | ve number]
This command displays all the entries in the IPv6 forwarding cache, or those specified using the syntax variables.

- **index-number** - Displays the IPv6 cache for the specific entry index.
- **ipv6-prefix/prefix-length** - Displays the IPv6 cache for the specific IPv6 prefix.
- **ipv6-address** - Displays the IPv6 cache for the specific IPv6 address.
- **ethernet slot/port** - Displays the IPv6 cache for the specific Ethernet interface.
- **pos slot/port** - Displays the IPv6 cache for the specific POS interface.
- **tunnel number** - Displays the IPv6 cache for the specific tunnel interface.
- **ve number** - Displays the IPv6 cache for the specific virtual Ethernet interface.

```
Brocade# show ipv6 cache
Total number of cache entries: 10
    IPv6 Address                  Next Hop               Port
  1  2001:DB8:2::2                LOCAL                  tunnel 2
  2  2000:4::106                 LOCAL                  ethe 2
  3  2001:DB8:4::110              DIRECT                ethe 2
  4  2001:DB8:c0a8:46a::1         LOCAL                  ethe 2
  5  fe80::2e0:52ff:fe99:9737    LOCAL                  ethe 2
  6  fe80::ffff:ffff:feff:ffff   LOCAL                  loopback 2
  7  fe80::c0a8:46a               LOCAL                  tunnel 2
  8  fe80::c0a8:46a               LOCAL                  tunnel 6
  9  2001:DB8::1                 LOCAL                  loopback 2
 10  fe80::2e0:52ff:fe99:9700    LOCAL                  ethe 1
```

**ECMP debug commands**

There are no debug commands specific to ECMP.

**Multicast VRF**

The provider edge (PE) router maintains a Virtual Routing and Forwarding table (VRF) for each customer that is attached to it through a customer edge (CE) router. The VRF contains routes between the PE and the CE and Label Switched Paths (LSPs) across the MPLS domain for each PE that is a member of the customer’s VPN. VRFs are defined on interfaces of the PE.

**Multicast VRF show commands**

This section describes the show commands that display multicast VRF information.

```
show ip bgp vpnv4 neighbor flap-statistics
```

**Syntax:** `show ip bgp vpnv4 vrf-name neighbor ip-addr flap-statistics`

- **vrf-name** - Specifies the VPNv4 neighbor for which you want to display flap statistics.
- **ip-addr** - Specifies a particular route.

This command displays flap statistics for routes learned from the specified VRF neighbor, as shown in the following example.

```
Brocade# show ip bgp vpnv4 neighbor 10.2.2.2 flap-statistics
Total number of flapping routes: 0
```
This output shows the total number of routes in the Layer 3 switch BGP4 route table that have changed state and have been marked as flapping routes.

`show ip pim prune`

**Syntax:** `show ip pim [vrf vrf-name] prune`

- **vrf vrf-name** - Specifies the VRF name for which you want to display multicast cache entries.

This command displays all multicast cache entries that are currently in a pruned state and have not yet aged out, as shown in the following example.

```
Brocade# show ip pim vrf med prune
Index Port    PhyPort SourceNet       Group           Nbr             Age sec
1 v12     1/1     10.47.2.10     228.172.0.77    0.0.0.0         40
2 v12     1/1     10.47.2.10     228.172.0.73    0.0.0.0         40
3 v12     1/1     10.47.2.10     228.172.0.69    0.0.0.0         40
4 v12     1/1     10.47.2.10     228.172.0.65    0.0.0.0         40
5 v12     1/1     10.47.2.10     228.172.0.61    0.0.0.0         40
6 v12     1/1     10.47.2.10     228.172.0.57    0.0.0.0         40
7 v12     1/1     10.47.2.10     228.172.0.53    0.0.0.0         40
8 v12     1/1     10.47.2.10     228.172.0.49    0.0.0.0         40
9 v12     1/1     10.47.2.10     228.172.0.45    0.0.0.0         40
```

Total Prune entries: 9

`show ip pim group`

**Syntax:** `show ip pim vrf vrf-name group`

This command displays PIM group information for an entire PIM group, or for the VRF instance identified by the **vrf vrf-name** option. Command output resembles the following example.

```
 Brocade# show ip pim vrf group
 Total number of Groups: 2
 Index 1     Group 239.255.162.1     Ports e3/11
```

### Multicast VRF debug commands

This section describes the multicast VRF-related debug commands.

`debug ip vrf`

**Syntax:** `[no] debug ip vrf`

This command generates information about synchronization of VRF routing information to line cards, as shown in the following example.

```
Brocade# debug ip vrf
RTM (vrf): Processing tree download for vrf 1
```

This is a download request from the line card to start the tree download for VRF 1.
debug ip bgp all-vrfs

Syntax: [no] debug ip bgp all-vrfs [A.B.C.D | dampening | events | graceful-restart | keepalives | updates]

- A.B.C.D - Displays information about a BGP neighbor address.
- dampening - Displays information about BGP dampening.
- events - Displays information about BGP events.
- graceful-restart - Displays information about graceful restart events.
- keepalives - Displays information about BGP keepalives.
- updates - Displays information about BGP updates.

This command displays information about BGP activity, with output that is limited to VRF events.

d debug ip ospf all-vrfs

Syntax: [no] debug ip ospf all-vrfs [A.B.C.D | adj | bfd | error | events | flood | graceful-restart | log-debug-message | log-empty-lsa | lsa-generation | max-metric | packet | retransmission | route | sham-link | shortcuts | spf]

- A.B.C.D - Display OSPF information for a specific IP address.
- adj - Displays OSPF adjacency events.
- bfd - Displays OSPF BFD events.
- error - Displays possible OSPF error in run time.
- events - Displays OSPF events.
- flood - Displays OSPF flooding information.
- graceful-restart - Displays OSPF graceful restart events.
- log-debug-message - Enables OSPF debug message logging.
- log-empty-lsa - Enables OSPF empty LSA logging.
- lsa-generation - Enables OSPF LSA generation.
- max-metric - Displays information about OSPF Stub Router Advertisement.
- packet - Displays information about OSPF packets.
- retransmission - Displays OSPF retransmission events.
- route - Displays information about OSPF routes.
- sham-link - Displays OSPF sham-link traces.
- shortcuts - Displays OSPF shortcuts.
- spf - Displays OSPF SPF traces.

This command displays OSPF information for all VRF activity. Command output resembles the following example.

Brocade# debug ip ospf all-vrfs adj
OSPF: adjacency events debugging is on
Dec 10 20:41:09 OSPF: rcvd hello from 10.101.1.2 area 0 on interface 10.101.1.1, state BackupDR, DR 10.101.1.2, BDR 10.101.1.1
Dec 10 20:41:09 OSPF: Neighbor 10.101.1.2, int v501, state FULL processing event HELLO_RECEIVED
Dec 10 20:41:14 OSPF: send hello on area 0 interface 10.13.13.13
Configuration notes

You must configure a VRF on an interface before configuring a Virtual Router (VRRP-E) on it. If you enable the Virtual Router before you enable the VRF, the Virtual Router configuration will be deleted.

Trunking

Trunk groups are manually-configured aggregate links containing multiple ports. Trunk groups enable load sharing of traffic, and they also provide redundant, alternate paths for traffic if any of the segments fail.

Trunking show commands

Trunk group configuration information can be displayed using the same command for either a server or switch trunk. The information is displayed in two sections: configured trunks and operational trunks.

show lag error counters id

Syntax: show lag error counters id LAG-id

This command displays error counters for the configured Link Aggregation Group (LAG). Command output resembles the following example.

Brocade# show lag error counters id 2
LAG Id: 2
LAG ITC Error Count = 1
LAG IPC Error Count = 2
LAG FID Error Count = 0
LAG All ports down Error Count = 0

show lag error debug id

Syntax: show lag error debug id LAG-id

This command displays the reason code for why a LAG or some of the ports within a LAG are in down states. Command output resembles the following example.

Brocade# show lag error debug id 1
LAG Id: 1
Type: Dynamic
LAG Ports Down and Reason:
e2/1:Physically down
e2/2: Administratively Down
e2/3: Threshold reached
e2/11: Timeout
e2/12: Peer is out of sync

**show lag ethernet**

**Syntax:** `show lag ethernet slotnum/portnum to slotnum/portnum`

This command displays information about trunk groups, and is divided into sections for configured trunks and operational trunks. A configured trunk group is one that has not yet been activated.

To display server trunk group information for a range of ports, enter a command similar to the following example.

```
Brocade# show lag ethernet 12/1 to 12/3
Max number of trunks: 128
available: 127
Configured number of server trunks: 1
Configured trunks:
Trunk ID: 1
Type: Server
Ports_Configured: 3
Base FID: 0x0400
FID count: 16
Ports         12/1    12/2      12/3
Port Names    none    none      none
Port_Status   enable  enable    enable
Operational trunks:
Trunk ID: 1
Type: Server
Duplex: Full
Speed: 1G
Tag: No
Priority: level0
Active Ports: 3
Ports                12/1    12/2    12/3
Link_Status          active  active  active
```

To display switch trunk group information for specific ports, enter a command similar to the following example.

```
Brocade# show lag ethernet 9/1 to 9/2
Max number 206 (128 server trunks, 78 switch trunks)
Number of hash buckets per server trunk: 256
Configured number of server trunks: 0
Configured trunks:
Trunk ID: 66
Type: Switch
Ports_Configured: 2
Ports         9/1     9/2
Port Names    none    none
Port_Status   enable  enable
Operational trunks:
Trunk ID: 66
Type: Switch
Duplex: Full
Speed: 10G
Tag: No
```
Trunking

Priority: level0
Active Ports: 1
Ports                      9/1  9/2
Link_Status                active down
Load Sharing
Mac Address                0    0
IP                         0    0
Multicast                  0    0
PBR                        0    0

show trunk

Syntax: show trunk

This command displays trunk or LAG information on LP such as the type of trunk, trunk FID, number of maximum ports per trunk, configured ports and its status, and so on.

Command output resembles the following example.

Brocade# show trunk
Trunk ID: 1
Type: Server(base_fid=0780, base_oar_fid=0780, 100G LAG shadow_fid = 07C0)
Number of FIDs = 4
3/1      3/2
active    active
Active primary: 3/1
Active Port Count: Sw 2, Hw(ppcr, val): (3:1, 2) (3:2, 2)

Show lag_ecmp_port command

This new CLI command takes the incoming port on which the traffic is entering and the flow type and their relevant parameters as input. It identifies the actual outgoing port of the particular flow, based on the hashing mechanism used in the XPP.

The lag port cannot be identified if per packet load balancing is enabled on that trunk.

Handling switched traffic

For switched traffic flows, the Layer 2 parameters and a valid lag_id are to be supplied as input. The lag port is identified based on the trunk hash calculated for input parameters and the lag_id supplied by the user.

The supplied destination MAC address must not match the input ports MAC address for L2 switched and MPLS switched traffic flows or an and message will be displayed.

Handling routed traffic

For routed traffic, the destination MAC of the traffic flow must match the MAC address of the input port or VRRP MAC address or an error message will be displayed.

For routed traffic, the lag_id should be specified as zero, if route to be identified. When the lag_id is a non zero value, it is assumed that the ECMP path is known and only the trunk output port is calculated and displayed. The IP address specified will not be validated for route entries.

For routed IP flows, when the IP destination address is provided as an input, the next hop details are fetched based on the destination IP address and the ECMP hash value is calculated from the input parameters. The next hop details will have the outgoing trunk or port information. When the next hop outgoing interface is a LAG, then the output port is identified using the trunk hash calculated from the input parameters.
For MPLS flows, the ECMP path is selected based on the outer MPLS label.

All the flow parameters must be specified through the CLI configuration. The fields can be specified as zero if those fields are masked in the load balancing configuration.

**Hash-diversify and hash rotate options**

The CLI command also takes the hash-diversify and hash rotate values as part of the CLI command. When these values are specified in the command, then these values are used for calculating the ECMP or Trunk hash instead of using the real values used in the XPP. This helps in identifying the impact of changes to these values in XPP, instead of changing them.

```plaintext
Syntax: show lag_ecmp_port [inport incoming port | lag_id lag_id | flowtype [l2_switched_non_ip | l2_mpls_switched | ipv4 | ipv4_ipv4 | ipv4_gre_ipv4 | ipv6_ipv4_ipv6 | ipv4_gre_ipv6]
          gre_mpls|gre|macinmac |[src_mac|dst_mac|eth_type|vlan_id|inn_vlan_id|isid|label]
          inn_src_mac|inn_dst_mac|inn_vlan_id|src_ip|dst_ip|inn_src_ip|inn_dst_ip
          [proto|sport|dport] hash-diversify val hash-rotate val
```

**Parameters**

- **inport**
  - Input port number of the traffic.

- **lag_id**
  - Egress LAG ID of the traffic.

- **flowtype**
  - Traffic type for the incoming traffic.

- **l2_switched_non-IP**
  - This traffic type is for switched traffic. The payload must not be IP packets. The destination MAC address must not match the ports MAC address.
  1. **src_mac** (Source MAC value)
  2. **dst_mac** (Destination MAC value)
  3. **eth_type** (Ethernet type following first Tag)
  4. **vlan_id** (VLAN ID)
  5. **inn_vlan_id** (Inner VLAN ID)

- **l2_mpls_switched**
  - This traffic type is for switched traffic. The MPLS labels are optional. It should be provided if not masked in the load balancing configuration. The payload must not be IP packets. The destination MAC address must not match the ports MAC address.
  1. **src_mac** (Source MAC value)
  2. **dst_mac** (Destination MAC value)
  3. **eth_type** (Ethernet type following first Tag)
  4. **vlan_id** (VLAN ID)
  5. **inn_vlan_id** (Inner VLAN ID)
  6. **label lbl0** (MPLS Label 0, outermost label)
     - **lbl1** (MPLS Label 1)
Trunking

- lbl2 (MPLS Label 2)
- lbl3 (MPLS Label 3)

**ipv4**

This traffic type is for routed and switched IP traffic. When the destination MAC address matches the ports MAC or VRRP MAC, then the traffic is considered as routed traffic. Otherwise, the traffic is considered as switching traffic.

1. **src_mac** (Source MAC value)
2. **dst_mac** (Destination MAC value)
3. **vlan_id** (VLAN ID)
4. **src_ip** (IPv4 source address)
5. **dst_ip** (IPv4 destination address)
6. **proto** (Protocol)
7. **sport** (TCP/UDP source port)
8. **dport** (TCP/UDP destination port)

**ipv4_ipv4** and **ipv4_gre_ipv4**

This traffic type is for tunneled IPv4 traffic flows. The traffic type **ipv4_gre_ipv4** is used for IPv4 over GRE and **ipv4_ipv4** is used for IPv4 over IPv4 tunnel. When the destination MAC address matches the ports MAC or VRRP MAC, then the traffic is considered as routed traffic. Otherwise, the traffic is considered as switching traffic. The outer destination IP address specified must have a valid routing entry for the routing flows.

1. **src_mac** (Source MAC value)
2. **dst_mac** (Destination MAC value)
3. **vlan_id** (VLAN ID)
4. **src_ip** (IPv4 source address)
5. **dst_ip** (IPv4 destination address)
6. **inn_src_ip** (Inner IPv4 source address)
7. **inn_dst_ip** (Inner IPv4 destination address)
8. **inn_proto** (Protocol)
9. **sport** (TCP/UDP source port)
10. **dport** (TCP/UDP destination port)

**ipv6**

This traffic type is for routed IPv6 traffic. When the destination MAC address matches the ports MAC or VRRP MAC, then the traffic is considered as routed traffic. Otherwise, the traffic is considered as switching traffic.

The destination IPv6 address specified must have a valid routing entry for routing flows.

1. **src_mac** (Source MAC value)
2. **dst_mac** (Destination MAC value)
3. **vlan_id** (VLAN ID)
4. src_ip (IPv6 source address)
5. dst_ip (IPv6 destination address)
6. proto (Next Header)
7. sport (TCP/UDP source port)
8. dport (TCP/UDP destination port)

ipv4_ipv6 and ipv4_gre_ipv6

This traffic type is for tunneled IPv6 traffic flows. The traffic type ipv4_gre_ipv6 is used for IPv6 over GRE and ipv4_ipv6 is used for IPv6 over IPv4 tunnel. When the destination MAC address matches the ports MAC or VRRP MAC, then the traffic is considered as routed traffic. Otherwise, the traffic is considered as switching traffic. The outer destination IP address specified must have a valid routing entry for routing flows.

1. src_mac (Source MAC value)
2. dst_mac (Destination MAC value)
3. vlan_id (VLAN ID)
4. src_ip (IPv4 source address)
5. dst_ip (IPv4 destination address)
6. inn_src_ip (IPv6 source address)
7. inn_dst_ip (IPv6 destination address)
8. inn_proto (Next Header)
9. sport (TCP/UDP source port)
10. dport (TCP/UDP destination port)

mpls

This traffic type is used for router MPLS traffic flow. The outer MPLS label must have valid entry in MPLS forwarding table. The destination MAC address of the packet must match the ports MAC address or the VRRP MAC address.

For inner payload details, the input parameters are based on the mpls_payload_type parameters. For IP type only, IP address and port details are required.

1. src_mac (Source MAC value)
2. dst_mac (Destination MAC value)
3. vlan_id (VLAN ID)
4. label lbl0 (MPLS Label 0, outermost label)
   • lbl1 (MPLS Label 1)
   • lbl2 (MPLS Label 2)
   • lbl3 (MPLS Label 3)
5. mpls_payload_type (IPv4/IPv6/ETH/ETH_ITAG)
6. inn_src_mac (Inner SA MAC for L2VPN)
7. inn_dst_mac (Inner DA MAC for L2 VPN)
8. inn_vlanid (Inner VLAN ID)
9.  *isid* (ISID)
10. *ipv4/ipv6*
    - *src_ip* (IPv4/IPv6 source address)
    - *dst_ip* (IPv4/IPv6 destination address)
11. *proto* (Protocol/next Header)
12. *sport* (TCP/UDP Source port)
13. *dport* (TCP/UDP Destination port)

**gre_mpls**

The traffic type is used for routed GRE egress and transit traffic flows. The outer destination IP address specified must have a valid routing entry. The destination MAC address specified must match the ports MAC address or VRRP MAC address configured.

1.  *src_mac* (Source MAC value)
2.  *dst_mac* (Destination MAC value)
3.  *vlan_id* (VLAN ID)
4.  *dst_ip* (GRE IPv4 destination address)
5.  **label** *lbl0* (MPLS Label 0, outermost label)
    - *lbl1* (MPLS Label 1)
    - *lbl2* (MPLS Label 2)
    - *lbl3* (MPLS Label 3)
6.  **mac-in-mac**

   1.  *src_mac* (Source MAC address value)
   2.  *dst_mac* (Destination MAC address value)
   3.  *vlan_id* (VLAN ID)
   4.  *isid* (ISID)
   5.  *inn_src_mac* (Inner source MAC)
   6.  *inn_dst_mac* (Inner destination MAC)
   7.  *ipv4/ipv6*
      - *src_ip* (IPv4/IPv6 source address)
      - *dst_ip* (IPv4/IPv6 destination address)
   8.  *proto* (Protocol/Next Header)

**Modes**
This command operates in all modes.

**Usage guidelines**
This CLI command can be used identify the output trunk port and ECMP interface of the given traffic flow. The flow type and other relevant packet fields are taken as CLI command input.

Table 13 provides the mappings between the traffic types and the associated flow_types to be used for the **lag_ecmp_port** commands.
TABLE 13  Traffic type and flow type for the show lag-ecmp-port command

<table>
<thead>
<tr>
<th>Number</th>
<th>Traffic type</th>
<th>Flow type for CLI command</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L2 switched traffic with non IP payload</td>
<td>l2_switched_non_ip</td>
</tr>
<tr>
<td>2</td>
<td>L2 switched MPLS packet</td>
<td>l2_switched_mpls</td>
</tr>
<tr>
<td>3</td>
<td>L2 switched traffic with IPv4 payload (header following Ethernet header)</td>
<td>ipv4</td>
</tr>
<tr>
<td>4</td>
<td>L2 switched with IPv6 payload (header following Ethernet header)</td>
<td>ipv6</td>
</tr>
<tr>
<td>5</td>
<td>IPv4 routed traffic</td>
<td>ipv4</td>
</tr>
<tr>
<td>6</td>
<td>IPv6 routed traffic</td>
<td>ipv6</td>
</tr>
<tr>
<td>7</td>
<td>IPv4 over IPv4 tunnel</td>
<td>ipv4_ipv4</td>
</tr>
<tr>
<td>8</td>
<td>IPv4 payload over GRE tunnel (IPv4)</td>
<td>ipv4_gre_ipv4</td>
</tr>
<tr>
<td>9</td>
<td>IPv6 router traffic</td>
<td>ipv6</td>
</tr>
<tr>
<td>10</td>
<td>IPv6 over IPv4 tunnel</td>
<td>ipv4_ipv6</td>
</tr>
<tr>
<td>11</td>
<td>IPv6 over GRE tunnel (IPv4)</td>
<td>ipv4_gre_ipv6</td>
</tr>
<tr>
<td>12</td>
<td>Routed MPLS traffic with inner payload as IP (L2VPN)</td>
<td>mpls</td>
</tr>
<tr>
<td>13</td>
<td>Routed MPLS traffic with inner payload is Ethernet (L2VPN)</td>
<td>mpls</td>
</tr>
<tr>
<td>14</td>
<td>Routed MPLS traffic with inner payload is Ethernet ITAG (L2VPN)</td>
<td>mpls</td>
</tr>
<tr>
<td>15</td>
<td>Routed MPLS traffic over GRE tunnel (IPv4)</td>
<td>gre_mpls</td>
</tr>
<tr>
<td>16</td>
<td>MAC in MAC traffic flow</td>
<td>macinmac</td>
</tr>
</tbody>
</table>

Error Conditions

- When both the destination IP address and the lag_id are not provided as input, the CLI command throws an error.
- When the destination IP address provided did not have and valid next hop entry, or when the lag_id specified is zero.
- When the destination MAC matches the ports MAC address for switched traffic flows.
- When the destination MAC does not match the ports MAC address for routed traffic.
- When the lag ID supplied is not a deployed LAG.
- When the MPLS label supplied for the routed traffic does not have a valid cross connect entry.
- When per packet load balancing is enabled on the line card.

History

Release | Command history
---------|-------------------
NetIron Release 05.4.00 | This command was introduced.

Related commands

None.

Trunking debug commands

There are no debug commands specific to trunking.
Configuration notes

There are several trunk group rules. For a full description of these trunk rules, refer to the NetIron Series Configuration Guide.

The following items must be considered when configuring trunk groups:

- You can use both static trunk groups and 802.3ad trunking on the same device. However, you can use only one type of trunking for a given port. For example, you can configure port 1/1 as a member of a static trunk group or you can enable 802.3ad link aggregation on the port, but you cannot do both.
- The ports in a trunk group make a single logical link. Therefore, all the ports in a trunk group must be connected to the same device at the other end.
- A trunk threshold must be configured on only one end of the trunk. If a threshold is set on both sides, link failures will result in race-conditions and the trunk will not function properly.
- If you connect physical cables before configuring the trunk groups and then reboot, traffic on the ports can create a spanning tree loop.

Common diagnostic scenarios

Trunk transaction failed; ports overlap with other trunks.

With a static trunk, you must first remove the existing trunk and reconfigure a new one. If you are using dynamic trunk configuration, you would be able to add a port dynamically in the trunk.

MCT

Multi-Chassis Trunking (MCT) provides switch-level redundancy. If one of the switches goes down, then the LAG is still up and the traffic flows without any disruption.

MCT show commands

This section describes the show command that displays MCT information.

show cluster

Syntax:  show cluster

This command displays the complete cluster information on the ICL peer and clients, as shown in the following example.

Brocade# show cluster
Cluster abc 1
------------
Rbridge Id: 100, Session Vlan: 4090
Cluster State: Deploy
Clients State: All client ports are administratively disabled [Optional]
Client Isolation Mode: Strict [Optional]
Configured Member Vlan Range: 20 to 30
Active Member Vlan Range: 20
ICL Info:
----------
Name Port Trunk
ic1 1/1 -
Peer Info:
----------
Peer IP: 10.10.10.2, Peer Rbridge Id: 200, ICL: ic1
KeepAlive Interval: 20 , Hold Time: 60, Fast Failover
Active Vlan Range: 20
Peer State: CCP Up (Up Time: 0 days: 0 hr:15 min:44 sec)
Client Info:
----------
Name Rbridge-id Config Port Trunk FSM-State
| c1 300 Deployed 1/13 | Up |

The following command output displays the complete cluster information on the ICL peer and clients for Layer 2 Virtual Private Network (L2VPN) MCT.

Brocade# show cluster
Cluster clu 1
----------
Rbridge Id: 4, Session Vlan: 0
Cluster State: Deploy
Client Isolation Mode: Loose
Configured Member Vlan Range: 20
Active Member Vlan Range: 20

L2VPN Peer Info:
----------
Peer IP: 10.5.5.5, Peer Rbridge Id: 5
KeepAlive Interval: 300 , Hold Time: 900
Node KeepAlive Interval: 2000 , Hold Time: 6000
l2vpn-revertible-timer 300
Peer State: CCP Up (Up Time: 0 days: 0 hr:21 min:52 sec)

Client Info:
----------
Name Rbridge-id Config Port Trunk FSM-State
| c1 | 101 Deployed 1/4 2 Admin Up |
| c2 | 102 Deployed 1/2 1 Up |

**MCT debug commands**

This section describes the MCT-related debug commands.

**debug cluster forwarding**

**Syntax:** `[no] debug cluster forwarding`

This command displays all the MCT forwarding-related events or messages in the MP that can affect traffic forwarding. Some examples include remote CCEP status changes, MCT FID creation, FID updates, and so on.

Command output resembles the following example.

Brocade# debug cluster forwarding
CLUSTER FORWARDING: MCT CCEP control FID 0xa006 for vlan 101 - REMOVE CCEP port 1/1
CLUSTER FORWARDING: Processing remote CCEP UP event for port eth 1/1
CLUSTER FORWARDING: Processed remote CCEP event for port 1/1 for 100 vlans
CLUSTER FORWARDING: MCT CCEP control FID 0xa006 for vlan 101 - ADD CCEP port 1/1
CLUSTER FORWARDING: Processing remote CCEP DOWN event for port eth 1/1
debug cluster actions

Syntax: [no] debug cluster actions

This command displays the debug messages for MCT-related events, such as MCT FID port changes, and so on.

Command output resembles the following example.

Brocade# debug cluster actions
CLUSTER ACTIONS: Mac learning disabled for MAC 0000.0022.0001 on ICL 4/2, vlan 101
CLUSTER ACTIONS: Received remote CCEP UP IPC

debug cluster active-passive

Syntax: [no] debug cluster active-passive

This command displays the MCT active-passive messages for the cluster.

Command output resembles the following example.

Brocade# debug cluster active-passive
CLUSTER MODE - Update Client Role, Client:client-1 My Client role: 1, Peer Client Role: 0
CLUSTER MODE - Client: client-1, Client old role: Passive, New elected role: Active
Cluster Mode: For Client client-1 Revert Mode timer expired, move to Active
Cluster Mode: For Client client-1 CCEP is UP, Role Revert Mode is ON

debug cluster cam

Syntax: [no] debug cluster cam

This command displays all the CAM- or PRAM-related activities for MCT-related events in the LP.

Command output resembles the following example.

Brocade# debug cluster cam
CLUSTER CAM: Added peer interface cam:mac 0000.003b.a200, ppcr 0
CLUSTER CAM: Deleted peer interface cam:mac 0000.003b.a200, ppcr 0

debug cluster ipc

Syntax: [no] debug cluster ipc

This command is helpful to debug IPC to LP to sync forwarding information in the LP.

Command output resembles the following example.

Brocade# debug cluster ipc
CLUSTER IPC: MCT FID 0xa005 received for vlan 101
CLUSTER IPC: cluster 1, vlan mask change

debug cluster config

Syntax: [no] debug cluster config
This command displays information about the Layer 2 Virtual Private Network (L2VPN) cluster configurations.

Command output resembles the following example.

```
Brocade# debug cluster config
Brocade(config)#cluster c1
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLUSTER ITC message received
Brocade(config-cluster-c)# rbridge-id 4
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_RBRIDGE_ID ITC message received
Brocade(config-cluster-c)# session-vlan 31
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_MGMT_VLAN ITC message received
Brocade(config-cluster-c)# icl icl1 ethernet 1/3
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLUSTER_ICL ITC message received
Brocade(config-cluster-c)# peer 10.31.31.5 rbridge-id 5 icl icl1
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLUSTER_PEER ITC message received
Brocade(config-cluster-c)# l2vpn-peer 10.5.5.5 rbridge-id 5
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_L2VPN_PEER_TIMERS ITC message received
Brocade(config-cluster-c)# deploy
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_CLUSTER_DEPLOY ITC message received
Nov 23 08:39:03 CLUSTER CONFIG: sending EVENT_ID_CLUSTER_DEPLOY event cluster 1
Brocade(config-cluster-c)# client c1
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLIENT_PORTS ITC message received
Brocade(config-cluster-c-client-c1)# rbridge-id 101
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_CLIENT_RBRIDGE_ID ITC message received
Brocade(config-cluster-c-client-c1)# client-interface ethernet 1/4
Nov 23 08:39:03 CLUSTER CONFIG: LACP port id for ccep 1/4 is 2051
Brocade(config-cluster-c-client-c1)# deploy
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_CLIENT_DEPLOY ITC message received
Nov 23 08:39:03 CLUSTER CONFIG: sending EVENT_ID_CLUSTER_CLIENT_DEPLOY event cluster 1, client port 3
Brocade(config-cluster-c-client-c1)# client c2
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLIENT_PORTS ITC message received
Brocade(config-cluster-c-client-c2)# rbridge-id 102
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_CLIENT_RBRIDGE_ID ITC message received
Brocade(config-cluster-c-client-c2)# client-interface ethernet 1/2
Nov 23 08:39:03 CLUSTER CONFIG: CLUSTER_CONFIG_ADD_CLIENT_PORTS ITC message received
Nov 23 08:39:03 CLUSTER CONFIG: LACP port id for ccep 1/2 is 2049
```

```

d debug cluster ccp fsm
Syntax: [no] debug cluster ccp fsm
This command displays information related to Finite State Machine (FSM) transactions.
```
Command output resembles the following example.

Brocade# debug cluster ccp fsm
Oct 19 14:36:27 CCP: Fsm2 entry 10.5.5.5
Oct 19 14:36:27 CLUSTER CCP: sent an init msg to = 10.5.5.5
Oct 19 14:36:27 CLUSTER CCP: Fsm4 sending keepalive to 10.5.5.5 in state recv
Oct 19 14:36:27 CLUSTER CCP: Fsm6 10.5.5.5 going operational

debuge cluster ccp packet

Syntax: [no] debug cluster ccp packet

This command displays information specific to L2VPN timer packet exchange operation.

Command output resembles the following example.

Brocade# debug cluster ccp packet
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - cluster id 00000001
cluster_rbridge_id 00000005 magic_no 000014ef
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - matching cluster rbridge id found
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive -Received CCP Keepalive packet to be sent on VE interface - using source mac address 001bed3b 0000a200
Nov 23 08:42:42 CLUSTER CCP PACKET: Tx L2VPN CCP Keepalive IP 10.5.5.5, vlan 31, port 1/3
Nov 23 08:42:42 Couldn't get the Area ID for patherr from 10.13.13.5
Nov 23 08:42:42 Couldn't get the Area ID for patherr from 10.13.13.5
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - cluster id 00000001
cluster_rbridge_id 00000005 magic_no 000014ef
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - matching cluster rbridge id found
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive -Received CCP Keepalive packet to be sent on VE interface - using source mac address 001bed3b 0000a200
Nov 23 08:42:42 CLUSTER CCP PACKET: Tx L2VPN CCP Keepalive IP 10.5.5.5, vlan 31, port 1/3
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - cluster id 00000001
cluster_rbridge_id 00000005 magic_no 000014ef
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - matching cluster rbridge id found
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive -Received CCP Keepalive packet to be sent on VE interface - using source mac address 001bed3b 0000a200
Nov 23 08:42:42 CLUSTER CCP PACKET: Tx L2VPN CCP Keepalive IP 10.5.5.5, vlan 31, port 1/3
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - cluster id 00000001
cluster_rbridge_id 00000005 magic_no 000014ef
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive - matching cluster rbridge id found
Nov 23 08:42:42 CLUSTER CCP PACKET: Rx Keepalive -Received CCP Keepalive

debuge cluster fsm

Syntax: [no] debug cluster fsm

This command displays FSM information for the cluster.

Command output resembles the following example.

Brocade# debug cluster fsm
Nov 23 08:40:27 CLUSTER CONFIG: CLUSTER_CONFIG_CLUSTER_DEPLOY ITC message received
Nov 23 08:40:27 CLUSTER CONFIG: sending EVENT_ID_CLUSTER_DEPLOY event cluster 1
Nov 23 08:40:27 CLUSTER CONFIG: sending EVENT_ID_CLUSTER_CLIENT_DEPLOY event
cluster 1, client port 3
Nov 23 08:40:27 CLUSTER CONFIG: sending EVENT_ID_CLUSTER_CLIENT_DEPLOY event
cluster 1, client port 1
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, peer rbridge id 5, old state: Init, event: CCP Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_DEPLOY event
Nov 23 08:40:29 CLUSTER FSM: new state: Loading
Nov 23 08:40:29 CLUSTER FSM: Received CCRR message from peer when CCP is up
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 101, old state: Init, event: CCP Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_DEPLOY event
Nov 23 08:40:29 CLUSTER FSM: new state: Admin Up, master: TRUE
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Init, event: CCP Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_DEPLOY event
Nov 23 08:40:29 CLUSTER FSM: new state: Admin Up, master: FALSE
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Admin Up, event: Remote Up
Nov 23 08:40:29 CLUSTER FSM: CCRR message sent for client for multiple clients
Nov 23 08:40:29 CLUSTER FSM: new state: Loading
Nov 23 08:40:29 CLUSTER FSM: Received CCRR message from peer when CCP is up
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Init, event: CCP Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_DEPLOY event
Nov 23 08:40:29 CLUSTER FSM: new state: Admin Up, master: TRUE
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Admin Up, event: Remote Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_CCPR_UP event
Nov 23 08:40:29 CLUSTER FSM: CCRR message sent for client 102 (return code : 0, value = 00660018)
Nov 23 08:40:29 CLUSTER FSM: new state: Remote Up, master: FALSE
Nov 23 08:40:29 CLUSTER FSM: Received Loading-Done message from peer
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, peer rbridge id 5, old state: Loading, event: Loading Done
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_CCP_UP event
Nov 23 08:40:29 CLUSTER FSM: new state: CCP Up
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Remote Up, event: Spoke Down
Nov 23 08:40:29 CLUSTER FSM: Sending client fsm state to LP, state 1
Nov 23 08:40:29 CLUSTER FSM: CCRR message sent for client 102 (return code : 0, value = 00660018)
Nov 23 08:40:29 CLUSTER FSM: new state: Remote Up, master: FALSE
Nov 23 08:40:29 CLUSTER FSM: Received Loading-Done message from peer
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, peer rbridge id 5, old state: Remote Up, event: Remote Up
Nov 23 08:40:29 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_CCPR_UP event
Nov 23 08:40:29 CLUSTER FSM: CCRR message sent for client 102 (return code : 0, value = 00660018)
Nov 23 08:40:29 CLUSTER FSM: new state: Remote Up, master: FALSE
Nov 23 08:40:29 CLUSTER FSM: Cluster LWVPN: Spoke PW event - Master/Slave selection for client rbridge 102 successful (event = 2)
Nov 23 08:40:29 CLUSTER FSM: cluster id 1, client id 102, old state: Remote Up, event: Spoke Up
Nov 23 08:40:29 CLUSTER FSM: new state: Remote Up, master: FALSE
Nov 23 08:40:29 CLUSTER FSM: Cluster LWVPN: Spoke PW event - Master/Slave selection for client rbridge 102 successful (event = 1)
Nov 23 08:40:29 CLUSTER FSM: Received CCRR message from peer when CCP is up
Nov 23 08:40:29 CLUSTER FSM: Received CCRR message from peer when CCP is up

**debug cluster fsm client**

**Syntax:** `[no] debug cluster fsm client`  
This command displays cluster FSM information for the client.

**Command output resembles the following example.**

Brocade# debug cluster fsm client 400
CLUSTER fsm debugging is now ON for client rbridge 400
Brocade(config)#interface ethernet 3/13
Brocade(config-if-e1000-3/13)#disable

Brocade(config-if-e1000-3/13)#
SYSLOG: <44>Dec  5 15:55:50 Brocade LACP: ethernet 3/13 state changes from FORWARD to LACP_BLOCKED


SYSLOG: <44>Dec  5 15:55:50 Brocade LACP: ethernet 3/13 state changes from LACP_BLOCKED to DOWN
Dec  5 15:55:50 CLUSTER FSM: sending EVENT_ID_MCT_LOCAL_CCEP_DOWN event

SYSLOG: <46>Dec  5 15:55:50 Brocade CLUSTER FSM: Cluster MCT-VPLS (Id: 1), client R4 (RBridge Id: 400) - Local client CCEP down
Dec  5 15:55:50 CLUSTER FSM: cluster id 1, client id 400, old state: Up, event: Local Down
Dec  5 15:55:50 CLUSTER FSM: Sending client fsm state to LP, state 1
Dec  5 15:55:51 CLUSTER FSM: Received CCRR message from peer when CCP is up (value = 01900016)

Brocade(config-if-e1000-3/13)#enable

Brocade(config-if-e1000-3/13)#
SYSLOG: <44>Dec  5 15:55:58 Brocade LACP: ethernet 3/13 state changes from DOWN to LACP_BLOCKED


SYSLOG: <46>Dec  5 15:56:00 Brocade LACP: Port 3/13 mux state transition: not aggregate -> aggregate

SYSLOG: <44>Dec  5 15:56:00 Brocade LACP: ethernet 3/13 state changes from LACP_BLOCKED to FORWARD

SYSLOG: <46>Dec  5 15:56:00 Brocade System: Interface ethernet 3/13, state up
Dec  5 15:56:00 CLUSTER FSM: sending EVENT_ID_MCT_LOCAL_CCEP_UP event

SYSLOG: <46>Dec  5 15:56:00 Brocade CLUSTER FSM: Cluster MCT-VPLS (Id: 1), client R4 (RBridge Id: 400) - Local client CCEP up
Dec  5 15:56:00 CLUSTER FSM: cluster id 1, client id 400, old state: Remote Up, event: Local Up
Dec  5 15:56:00 CLUSTER FSM: sending EVENT_ID_MCT_LOCAL_CCEP_UP event
Dec  5 15:56:00 CLUSTER FSM: new state: Preforwarding Remote Up, master: FALSE
Dec  5 15:56:00 CLUSTER FSM: Received CCRR message from peer when CCP is up (value = 0190001e)
Dec  5 15:56:00 CLUSTER FSM: cluster id 1, client id 400, old state: Preforwarding Remote Up, event: CCRR Ack Rcvd
Dec  5 15:56:00 CLUSTER FSM: Sending client fsm state to LP, state 2
Dec  5 15:56:00 CLUSTER FSM: new state: Up, master: FALSE
debug cluster l2vpn

Syntax: [no] debug cluster l2vpn

This command displays the events specific to L2VPN operation.

Command output resembles the following example.

Brocade# debug cluster l2vpn
Oct 19 14:32:40 CLUSTER_L2VPN: clustermgr_cluster_deploy Done for L2VPN cluster
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN task received Cluster Deploy event
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN task received Client Deploy event
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN ading client information for port 1/2
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN task received Client Deploy event
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN ading client information for port 1/4
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN task received Remote CCEP 1/2 is up
Oct 19 14:32:40 CLUSTER_L2VPN: L2VPN task received CCP is up

dump cluster mdup

Syntax: [no] debug cluster mdup

This command displays information related to MAC Database Update Protocol (MDUP) operation.

Command output resembles the following example.

Brocade# debug cluster mdup
CLUSTER mdup debugging is now ON
Brocade# Dec 5 16:04:35 CLUSTER MDUP: Received MAC FLUSH message, option: Flush
Client Rbridge, cluster_id: 1, Peer Rbridge: 1, Flush Rbridge: 400, vlan: , port_id: 65535
Dec 5 16:04:35 CLUSTER MDUP: Received MAC FLUSH message, option: Flush
Client Rbridge, cluster_id: 1, Peer Rbridge: 1, Flush Rbridge: 1, vlan: , port_id: 12
Dec 5 16:04:35 CLUSTER MDUP: Received MAC INFO message, Type: Rbridge, cluster: 1, vlan: , Rbridge_id: 400
Dec 5 16:04:35 CLUSTER FSM: Received CCRR message from peer when CCP is up (value = 0190001a)
Dec 5 16:04:35 CLUSTER FSM: cluster id 1, client id 400, old state: Up, event: Remote Down
Dec 5 16:04:35 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_CCEP_DOWN event
SYSLOG: <46>Dec 5 16:04:37 Brocade CLUSTER FSM: Cluster MCT-VPLS (Id: 1), client
R4 (Rbridge Id: 400) - Remote client CCEP down
Dec 5 16:04:35 CLUSTER FSM: Sending client fsm state to LP, state 3
Dec 5 16:04:35 CLUSTER FSM: new state: Local Up, master: FALSE
Dec 5 16:04:35 CLUSTER FSM: Received CCRR message from peer when CCP is up (value = 0190001a)
Dec 5 16:04:35 CLUSTER MDUP: Convert CCR to CCL for cluster_id: 1, client rbridge
id = 400
SYSLOG: <41>Dec 5 16:04:37 Brocade DOT1AG: Remote MEP 4000 in Domain VPLS_SP, MA
vlps_420 aged out
SYSLOG: <41>Dec 5 16:04:39 Brocade DOT1AG: Remote MEP 4000 in Domain VPLS_SP, MA
vlps_420 become UP state
Dec 5 16:04:39 CLUSTER FSM: Received CCRR message from peer when CCP is up (value = 0190001e)
Dec 5 16:04:39 CLUSTER FSM: cluster id 1, client id 400, old state: Local Up, event: Remote Up
Dec 5 16:04:39 CLUSTER FSM: sending EVENT_ID_MCT_REMOTE_CCEP_UP event
VPLS unicast forwarding

VPLS enhances the point-to-point connectivity defined in the Draft-Martini IETF documents by specifying a method for Virtual Circuits (VCs) to provide point-to-multipoint connectivity across the MPLS domain, allowing traffic to flow between remotely connected sites as if the sites were connected by a Layer 2 switch.

VPLS can be used to transport Ethernet frames to and from multiple, geographically dispersed sites belonging to a customer VPN. The provider edge (PE) devices connecting the customer sites provide functions similar to a Layer 2 switch. The PE devices learn the MAC addresses of locally connected customer devices, flood broadcast and unknown-unicast frames to other PE devices in the VPN, and create associations between remote MAC addresses and the VC LSPs used to reach them.

For more information about MPLS VPLS diagnostics, refer to Chapter 5, “MPLS Diagnostics”.

VPLS unicast forwarding show commands

This section describes the show commands that display VPLS unicast forwarding information.

show mpls debug vpls

Syntax:  show mpls debug vpls *vpls id*

This command displays generic VPLS debug information, as shown in the following example.

Brocade# show mpls debug vpls 1
ID: 1 Name: test 1
CPU-Prot: OFF MVID: INVD FID: 0x00002002
MAC Info:
   Total MACs: 2 Local: 2 Remote: 0
   Max Exceed: 0 Table Full: 0

Configuration notes

- ICL ports must not be untagged members of any VLAN. An ICL is preferably a LAG that provides port level redundancy and higher bandwidth for cluster communication.
- ICL ports can be part of MCT VLANs as well as regular VLANs.
- The ICL VLAN mask must be a superset of the client VLAN mask.
- MAC learning is disabled on ICL ports for the MCT VLANs.
- MAC Database Update Protocol (MDUP) will synchronize all MAC entries for VLANs served by an ICL link.
- On CCEP ports, MCT does not support MPLS, VLL, VPLS, 802.1ah, 802.1ad, and routing protocols.

VPLS unicast forwarding
show mpls debug vpls local

Syntax:  `show mpls debug vpls local num`

This command displays the state of a VPLS. Specify the VPLS ID to see the local entries for a specific VPLS. Command output resembles the following example (specified for VPLS 2).

Brocade# show mpls debug vpls local 2
VPLS 2:
VLAN  Port   Valid  Pending
====  ====   =====  ========
 4     2/19   1      0
Local Broadcast Fids:
VLAN 4        --  Fid: 00008fa6, Ports: 1
Port 2/19   --  Fid: 0000003a

show mpls debug vpls remote

Syntax:  `show mpls debug vpls remote num`

This command displays the state of all VPLS peers configured in the system. To display information for a specific VPLS, enter a VPLS ID number. Command output resembles the following example (specified for remote VPLS 1).

Brocade# show mpls debug vpls remote 1
VPLS 1:
Peer:  10.5.5.5             Valid:  Yes     Pending Delete: 0
Label: 983040              Tagged: No      Load Balance:   No
Num LSP Tnnls:  1
VC        Tunnel    NHT            Use
Port  Label     Index     COS  COS
====  =====     ======    =====     ===  ===
 2/9   983040    3         0         0    0
 2/9   983040    3         0         0    0
 2/9   983040    3         0         0    0
 2/9   983040    3         0         0    0
Active Trunk Index: 0

Internally, a maximum of four LSP tunnels are maintained to reach the peer. If load balancing is disabled, information for only one tunnel is displayed in the output.

Common diagnostic scenarios

- VPLS does not accept a receiver report where VPLS VLAN 1002 is configured with multicast active.
  
  This issue is resolved by upgrading the software version to reflect the latest patches and versions.

- VPLS drops multicast traffic with multicast addresses that have not been reported to the Brocade MLX series routers (through IGMP Report).
  
  This issue is resolved by upgrading the software version to reflect the latest patches and versions.
GRE and IPv6 tunnels

The following commands provide information about Generic Routing Encapsulation (GRE) and IPv6 tunnels. Because both tunnel types are used by various applications (Multicast, PBR, and so on), the following commands display specific debugging messages with detailed information. These commands help to isolate events for a specific tunnel, a range of tunnels, or all tunnels.

**debug iptunnel**

**Syntax:** `[no] debug iptunnel [errors | events | ipc | keepalives | packets | statistics | tunnel-type [gre | ipv6] [range tunnel-id low - tunnel-id high]]`

- **errors** - Displays IP tunnel errors.
- **events** - Displays IP tunnel events.
- **ipc** - Displays IP tunnel IPC messages.
- **keepalives** - Displays keepalive information (for GRE tunnels only).
- **packets** - Displays IP tunnel packets information.
- **statistics** - Displays tunnel statistics.
- **tunnel-type** - Displays information for a specific tunnel type.
- **gre** - Displays information for a specific GRE tunnel.
- **ipv6** - Displays information for a specific IPv6 tunnel.
- **range tunnel-id low - tunnel-id high** - Displays information for a range of tunnels (specify lower and higher tunnel ID values).

**debug iptunnel errors**

**Syntax:** `[no] debug iptunnel errors [range tunnel-id low - tunnel-id high]`

This command displays any error messages for the specified range of tunnels, including unexpected events as part of the packet flow, IPC flow, or configuration of IP tunnels.

Command output resembles the following example.

```
Brocade# debug iptunnel errors
Apr 28 11:54:24 TNNL_GRE:ERRORS: tnnl 2- IP tunnel is invalid
Apr 28 11:54:24 TNNL_GRE:ERRORS: tnnl 2- L3 encapsulate and send - Dropping as Tnnl is Down
```

**debug iptunnel events**

**Syntax:** `[no] debug iptunnel events [range tunnel-id low - tunnel-id high]`

This command displays any tunnel events for the specified range of tunnels, including route changes, IPv4 or IPv6 port state notifications, tunnel status changes because of destination route changes or source interface changes, and any events that cause the tunnel status and operational information to be changed that can affect the routes.

Command output resembles the following example.

```
Brocade# debug iptunnel events
///Disable the tunnel on local side
TNNL_GRE:EVENTS:tnnl 1-IP notify - Removing Tunnel IP - tnnl, state DOWN
TNNL_GRE:EVENTS:tnnl 1-IP notify-Tnnl state DOWN: Notifying all routing protocols
TNNL_GRE:EVENTS:tnnl 1-Deleting NHT for tnnl, nht 0
```
GRE and IPv6 tunnels

TNNL_GRE:EVENTS:tnnl 1-Active MP Sending NHT for tnl,nht_idx 0, action Delete
TNNL_GRE:EVENTS:tnnl 1-Update NHT Entry as Tnnl Dest route change for Tunnel

//Enable the tunnel on local side
TNNL_GRE:EVENTS:tnnl 1-IP notify - Adding Tunnel IP - tnnl, state UP
TNNL_GRE:EVENTS:tnnl 1-IP notify-Tnnl state UP: Notifying all routing protocols
TNNL_GRE:EVENTS:tnnl 1-NHT entry Created for tnnl, nht 0, IP 10.11.11.21
TNNL_GRE:EVENTS:tnnl 1-Creating NHT and sending info to LP for tnnl
TNNL_GRE:EVENTS:tnnl 1-Active MP Sending NHT for tnl,nht_idx 0, action Add
TNNL_GRE:EVENTS:tnnl 1-Adding NHT index for tnnl, nht 0, outport 2/12

debug iptunnel ipc

Syntax: [no] debug iptunnel ipc [range tunnel-id low - tunnel-id high]

This command displays IPC messages related to debugging information for the specified range of tunnels. Command output resembles the following example.

Brocade# debug iptunnel ipc
TNNL_GRE:IPC:tnnl 1-Sending GRE Tunnel Update for tnnl
TNNL_GRE:IPC:tnnl 1-One Tunnel update - src-ip 10.11.11.1, dst-ip 10.11.11.21

With tunnel enabled manually
TNNL_GRE:IPC:tnnl 1-Sending GRE Tunnel Update for tnnl
TNNL_GRE:IPC:tnnl 1-Tnnl is UP
TNNL_GRE:IPC:tnnl 1-One Tunnel update - src-ip 10.11.11.1, dst-ip 10.11.11.21

debug iptunnel keepalives

Syntax: [no] debug iptunnel keepalives [range tunnel-id low - tunnel-id high]

This command displays keepalive events for the specified range of tunnels. The output displays messages about the receiving and transmitting of keepalive packets, keepalive timer actions, and bringing the tunnel up or down based on keepalive actions.

NOTE
This command only applies to GRE tunnels and does not work for IPv6 tunnels.

Normal keepalive messages:

Brocade# debug iptunnel keepalives
TNNL_GRE:KALIVE:tnnl 1-Keepalive Timer- For Tunnel, remaining time 10
TNNL_GRE:KALIVE:tnnl 1-TX Keepalive packet on tnnl, src 10.11.11.1, dst 10.11.11.21
TNNL_GRE:KALIVE:tnnl 1-Rx Keepalive packet received at MP for tunnel
TNNL_GRE:KALIVE:tnnl 1-Rx Keepalive packet, src 10.11.11.21, dst 10.11.11.1
TNNL_GRE:KALIVE:tnnl 1-Reset the keepalives in the Keepalive List for tunnel

With tunnel disabled on the remote side so that keepalives bring down the tunnel:

TNNL_GRE:KALIVE:tnnl 1-Bring DOWN GRE Tunnel due to keepalive timeout
TNNL_GRE:EVENTS:tnnl 1-IP notify - Removing Tunnel IP - tnnl, state DOWN
TNNL_GRE:EVENTS:tnnl 1-IP notify-Tnnl state DOWN: Notifying all routing protocols
TNNL_GRE:KALIVE:tnnl 1-TX Keepalive packet on tnnl, src 10.11.11.1, dst 10.11.11.21

With tunnel enabled on the remote side so that the tunnel comes back up on the local side:

TNNL_GRE:KALIVE:tnnl 1-TX Keepalive packet on tnnl, src 10.11.11.1, dst 10.11.11.21
GRE and IPv6 tunnels

TNNL_GRE:KALIVE:tnnl 1-Keepalive packet received at MP for tunnel
TNNL_GRE:KALIVE:tnnl 1-Rx Keepalive packet, src 10.11.11.21, dst 10.11.11.1
TNNL_GRE:KALIVE:tnnl 1-Reset the keepalives in the Keepalive List for tunnel
TNNL_GRE:KALIVE:tnnl 1-Bring UP GRE Tunnel as keepalive response is received
TNNL_GRE:EVENTS:tnnl 1-IP notify - Adding Tunnel IP - tnnl, state UP
TNNL_GRE:EVENTS:tnnl 1-IP notify-Tnnl state UP: Notifying all routing protocols

debug iptunnel packets

Syntax: [no] debug iptunnel packets [range tunnel-id low - tunnel-id high]

This command displays packet processing details for the specified range of tunnels. Output shows the packets received and transmitted on any particular tunnel including control packets, keepalive packets, and so on.

Command output resembles the following example.

Brocade# debug iptunnel packets
TNNL_GRE:PKTS:tnnl 1-Sending packets to tunnel, dest 10.11.111.21
TNNL_GRE:PKTS:tnnl 1-Sending packets to tunnel, dest 10.11.111.21

debug iptunnel statistics

Syntax: [no] debug iptunnel statistics [range tunnel-id low - tunnel-id high]

This command displays tunnel statistics for the specified range of tunnels, including messages about statistics collection, statistics IPC actions, background polling of statistics information, and so on.

Command output resembles the following example.

Brocade# debug iptunnel statistics
TNNL_GRE:STATS: tnnl 1-Statistics sync processed for IP tunnel
TNNL_GRE:STATS: tnnl 1-Statistics sync processed for IP tunnel
TNNL_GRE:STATS: tnnl 1-Statistics sync processed for IP tunnel
TNNL_GRE:STATS: tnnl 1-LP to MP IPC:PPCR0: recv_ucast 2, recv_mcast 0, xmit_ucast 0, xmit_mcast 0

debug iptunnel tunnel-type

Syntax: [no] debug iptunnel tunnel-type [gre | ipv6] [range tunnel-id low - tunnel-id high]

You can specify the type of tunnel to debug. The valid options are gre for GRE tunnels and ipv6 for IPv6 tunnels. Within a specified range of tunnels, information is filtered for the tunnel type if it is configured. If a tunnel type is not configured, debug messages are printed based on range only.

The no debug iptunnel tunnel-type command resets the previously configured tunnel type (if any), and prints messages for tunnels within the specified range.

Common diagnostic scenario

Use this procedure to troubleshoot forwarding issues you encounter (packets not being forwarded to the destination endpoints of the tunnel). This debugging procedure is only applicable for IPv6 packet forwarding issue seen on IPv6 tunnels.

1. Check if the tunnel interface is up.
   - show ipv6 interface tunnel tunnel_id must show the tunnel state as up.
LP CPU packet statistics

Protocol control packets and data packets are forwarded to the Line Processor Central Processing Unit (LP CPU) for packet processing. The LP CPU forwards the packets to a destination port or the Forwarding ID (FID), and the packet is either sent to the Management Processor (MP) module for processing, or the packet is dropped based on the forwarding decision. At various stages of the LP CPU packet processing, packet counters are maintained to assist with debugging.

NOTE
LP CPU packet statistics are maintained after MP switchover.

NOTE
LP CPU packet statistics are reset to zero after hitless upgrade and LP reboot.

LP CPU packet statistics show command

This section describes the show commands that display LP CPU packet information.

show lp-cpu packet statistics

Syntax: show lp-cpu packet statistics

This command displays the total number of packets that are received, dropped, forwarded, or flooded by the LP CPU during packet processing. For packets that are dropped, packet drop causes are indicated in the output display. This command also displays the number of packets processed by the LP CPU received from Layer 2, Layer 3, MPLS uplinks, VPLS, and other data packets. The LP CPU counters are text-wrapped to zero on the CLI. The LP CPU counters are not cleared after you display packet statistics using the show lp-cpu packet statistics command. The LP CPU counters are displayed on both the MP and the LP.

The following counters are not displayed on the CLI using the show lp-cpu packet statistics command:

- PBIF RX or TX packet counters
- XPP and TM packet counters
- MP or LP IPC packet counters
LP CPU packet statistics

- Packets originated by the MP or LP.

**NOTE**
The `show lp-cpu packet statistics` command displays statistics for packets that are received by the LP CPU from hardware only.

This command can be used on both the MP and LP modules. On the LP module, the `show lp-cpu packet statistics` command displays LP CPU counters only for a specific LP module. The following example output displays the total number of packets received by the LP CPU from MPLS, VPLS, VLL, ARP, and other data packets on module 4.

```
Brocade# show lp-cpu packet statistics
MODULE 4
----------
Total Packets Received: 1000
MPLS uplink packets received: 0
  VPLS packets received: 0
  VLL packets received: 0
  L3 VPN packets received: 0
  Other MPLS packets received: 0
ARP packets received: 0
  ARP response packets received: 0
  ARP request packets received: 0
IPV4 packets received: 0
  IPv4 unicast packets routed: 0
  IPv4 protocol packets received: 0
  GRE tunnel packets received: 0
  6to4 tunnel packets received: 0
IPV6 packets received: 0
  IPv6 unicast packets routed: 0
  IPv6 protocol packets received: 0
IPv4 packets received: 0
IPv4 packets received: 0
IPv4 multicast packets routed: 0
IPv6 multicast packets routed: 0
L2VPN endpoint packets received: 0
  VPLS endpoint packets received: 0
  VLL endpoint packets received: 0
  Local-VLL endpoint packets received: 0
L2 packets received: 1000
  L2 known unicast packets forwarded: 600
  L2 unknown unicast packets flooded: 100
  L2 broadcast Packets flooded: 100
  L2 multicast Packets flooded: 0
  Packets received for SA learning: 0
Other packets received: 0
Total Packets dropped: 200
Packet drop causes:
[PP – Post Processing Drops; CV – Configuration Violation Drops;
PE – Packet Error Drops; PFE – Potential Forwarding Error Drops;
OD – Other Drops]

3-L2 packet forwarded in hardware (PP): 100
20-L2 port state is blocking (CV): 100

ARP packets captured for DAI: 0
ARP packets failed DAI: 0
```

Table 14 displays the descriptions of the fields from the `show lp-cpu packet statistics` command.
### TABLE 14  
Output from the **show lp-cpu packet statistics** command

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>The interface module number that is currently connected to the chassis.</td>
</tr>
<tr>
<td>Total packets Received</td>
<td>The total number of packets received by the LP CPU. For example, when a packet is received by the LP CPU from a local port, the Total packets Received counter is incremented. The LP CPU performs various checks on the received packet. For example, the Total packet Received counter is incremented when a packet is received on a trunk that has no active local ports, or when a packet is received with an invalid VLAN ID.</td>
</tr>
<tr>
<td>MPLS uplink packets received</td>
<td>The number of MPLS labeled packets (VPLS, VLL, L3 VPN, and other MPLS packets) received on MPLS uplinks by the LP CPU.</td>
</tr>
<tr>
<td>VPLS packets received</td>
<td></td>
</tr>
<tr>
<td>VLL packets received</td>
<td></td>
</tr>
<tr>
<td>L3 VPN packets received</td>
<td></td>
</tr>
<tr>
<td>Other MPLS packets received</td>
<td></td>
</tr>
<tr>
<td>ARP packets received</td>
<td>The total number of ARP packets received by the LP CPU.</td>
</tr>
<tr>
<td>ARP response packets received</td>
<td></td>
</tr>
<tr>
<td>ARP request packets received</td>
<td></td>
</tr>
<tr>
<td>IPv4 packets received</td>
<td>The total number of IPv4 routed packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 unicast packets routed</td>
<td>The number of IPv4 unicast packets routed by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 protocol packets received</td>
<td>The number of IPv4 protocol packets received by the router or the switch.</td>
</tr>
<tr>
<td>GRE tunnel packets received</td>
<td>The number of IPv4 or GRE packets received by the LP CPU.</td>
</tr>
<tr>
<td>6to4 tunnel packets received</td>
<td>The number of IPv4 6to4 tunnel packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 packets received</td>
<td>The total number of IPv6 packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 unicast packets routed</td>
<td>The number of IPv6 unicast packets routed by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 protocol packets received</td>
<td>The number of IPv6 protocol packets destined to the router or the switch.</td>
</tr>
<tr>
<td>IPv4 multicast packets routed</td>
<td>The number of IPv4 multicast packets (including multicast snooping packets), received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 multicast packets routed</td>
<td>The number of IPv6 multicast packets routed by the LP CPU.</td>
</tr>
<tr>
<td>L2VPN endpoint packets received</td>
<td>The total number of L2VPN endpoint packets received by the LP CPU.</td>
</tr>
<tr>
<td>VPLS endpoint packets received</td>
<td>The number of VPLS packets received on the VPLS endpoints.</td>
</tr>
<tr>
<td>VLL endpoint packets received</td>
<td>The number of VLL packets received on the VLL endpoints.</td>
</tr>
<tr>
<td>Local-VLL Endpoint packets received</td>
<td>The number of local-VLL endpoint packets received by the LP CPU.</td>
</tr>
<tr>
<td>L2 packets received</td>
<td>The number of packets received for Layer 2 processing by the LP CPU. The Layer 2 packets received counter is incremented when Layer 2 forwarding receives a packet.</td>
</tr>
<tr>
<td>L2 known unicast packets forwarded</td>
<td>The number of known Layer 2 unicast packets forwarded by the LP CPU. The L2 known unicast packets forwarded counter is incremented when a packet received with a known unicast MAC address is forwarded to the destination port.</td>
</tr>
<tr>
<td>L2 unknown unicast packets flooded</td>
<td>The number of Layer 2 unknown-unicast packets flooded by the LP CPU.</td>
</tr>
</tbody>
</table>
### TABLE 14  
Output from the **show lp-cpu packet statistics** command (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2 broadcast packets flooded</td>
<td>The number of Layer 2 broadcast packets flooded by the LP CPU.</td>
</tr>
<tr>
<td>L2 multicast packets flooded</td>
<td>The number of Layer 2 multicast packet (including packets forwarded by IGMP snooping and multi-port MAC packets) received by the LP CPU.</td>
</tr>
<tr>
<td>Packets received for SA learning</td>
<td>The number of packets received for source MAC address learning.</td>
</tr>
<tr>
<td>Other packets received</td>
<td>The number of miscellaneous packets received by the LP CPU. The Other packets received counter is incremented when a packet is not processed by any of the forwarding counters displayed previously (for example, MPLS uplinks packets received counter, ARP packets received counter, and so on).</td>
</tr>
<tr>
<td>Total packets dropped</td>
<td>The total number of packets dropped by the LP CPU.</td>
</tr>
<tr>
<td>Packet drop causes</td>
<td>The reasons for dropping a packet, and the number of packets that are dropped for a given reason. The LP CPU forwards the packet to a destination port or destination FID, drops the packet based on the forwarding decision, or drops the packet due to errors in packet processing by the LP CPU. Packets can be dropped based on following reasons:</td>
</tr>
<tr>
<td></td>
<td>• Post Processing (PP) Drops - The packets are dropped because the packets were forwarded in hardware by the LP CPU and copied to the CPU to learn SA or DA MAC addresses, or for sFlow logging. The PP drops are to be expected and are not harmful to the LP CPU packet processing. For a complete list of all PP drop causes, refer to Table 15 on page 489.</td>
</tr>
<tr>
<td></td>
<td>• Configuration Violation (CV) Drops- The packets are dropped because of configuration violations, such as Layer 2 packets received on a route-only switch. A route-only switch implies that Layer 2 packets are only routed, not switched. Layer 2 packets are usually forwarded within the same VLAN and are not routed to a different VLAN. If packets are configured to route only, then Layer 2 packets are dropped. A CV drop can also occur when the number of broadcast packets has exceeded the configured limit set by the user. A port in a blocking state constitutes a CV drop. For a complete list of all CV drop causes, refer to Table 15 on page 489.</td>
</tr>
<tr>
<td></td>
<td>• Packet Error (PE) Drop - A packet is dropped because it is received with errors because the packet is corrupted, or the packet contains incorrect information such as an invalid SA or DA MAC address. For a complete list of all PE drop causes, refer to Table 15 on page 489.</td>
</tr>
<tr>
<td></td>
<td>• Potential Forwarding Error (PFE) Drops - A PFE drop occurs when the information required to forward a packet to its destination is not available in the LP software. For example, the destination FID is invalid, or ARP is not resolved. For a complete list of all PFE drop causes, refer to Table 15 on page 489.</td>
</tr>
<tr>
<td></td>
<td>• Other Drops (OD) - OD drops are drops that cannot be classified into any of the preceding drop causes. For a complete list of all OD drop causes, refer to Table 15 on page 489.</td>
</tr>
</tbody>
</table>

**Packet drop causes (continued)**  
Packets can be dropped based on following reasons (continued):  
• Packet Error (PE) Drop - A packet is dropped because it is received with errors because the packet is corrupted, or the packet contains incorrect information such as an invalid SA or DA MAC address. For a complete list of all PE drop causes, refer to Table 15 on page 489.  
• Potential Forwarding Error (PFE) Drops - A PFE drop occurs when the information required to forward a packet to its destination is not available in the LP software. For example, the destination FID is invalid, or ARP is not resolved. For a complete list of all PFE drop causes, refer to Table 15 on page 489.  
• Other Drops (OD) - OD drops are drops that cannot be classified into any of the preceding drop causes. For a complete list of all OD drop causes, refer to Table 15 on page 489.  

For example, the following is displayed in the output:  
**3-L2 packet forwarded in hardware(PP):9619**  
• 3 refers to the drop code.  
• L2 packet forwarded in hardware refers to the type of packet drop cause.  
For a list of all packet drop causes, refer to Table 2.  
• 9619 refers to the number of packets that are dropped.

| ARP packets captured for DAI       | The number of ARP packets captured for Dynamic ARP Inspection (DAI).         |
| ARP packets failed DAI             | The number of DAI-failed ARP Packets.                                       |
### TABLE 15  Packet drop causes for LP CPU counters

<table>
<thead>
<tr>
<th>Drop Category</th>
<th>Drop code</th>
<th>Drop message</th>
<th>Drop description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Processing (PP) Drops</td>
<td>1</td>
<td>Layer 2 packet forwarded in hardware (PP)</td>
<td>A Layer 2 packet is forwarded in hardware, and a copy of the packet is sent to the CPU for source MAC learning.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Layer 3 packet forwarded in hardware (PP)</td>
<td>A Layer 3 packet is forwarded in hardware, and a copy of the packet is sent to the CPU for source MAC learning.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>IPv4 RPF logging packet (PP)</td>
<td>An IPv4 packet is dropped because of the RPF check failure, and the packet is sent to the CPU for logging.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>IPv6 RPF logging packet (PP)</td>
<td>A IPv6 packet is dropped because of the RPF check failure, and the packet is sent to the CPU for logging.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>IPv4 multicast filtering drop (PP)</td>
<td>An IPv4 multicast packet is received for a group with no receivers. IPv4 multicast filtering is enabled.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>IPv6 multicast filtering drop (PP)</td>
<td>An IPv6 multicast packet is received for a group with no receivers. IPv6 multicast filtering is enabled.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>ACL logging packet (PP)</td>
<td>A packet is dropped because of ACL filtering, and the packet is sent to the CPU for logging.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Packet received for sFlow sampling (PP)</td>
<td>A packet is forwarded in hardware, and a copy of the packet is sent to the CPU for sFlow sampling.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>IP packet forwarded as fragments and dropped the original (PP)</td>
<td>The IP packet is sent as fragments, and the original packet is dropped.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>L3 multicast drop</td>
<td>A packet is dropped in multicast processing.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Reserved UDLD packet (PP)</td>
<td>A Brocade UDLD packet is processed and dropped.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>PBB Packet for source MAC learning (PP)</td>
<td>A PBB packet is sent to software for software MAC learning.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>PBB Packet for software s-flooding (PP)</td>
<td>The original packet is dropped in software, and copies of the packet are sent to the provider edge ports.</td>
</tr>
<tr>
<td>Configuration Violation (CV) Drops</td>
<td>14</td>
<td>Route-only enabled (CV)</td>
<td>A switch is configured in route-only mode, and the Layer 2 packet received is dropped.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Invalid VLAN ID (CV)</td>
<td>A packet is received with a VLAN ID that is not configured in the switch.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Layer 2 Trace - L2 Switching not enabled (CV)</td>
<td>Layer 2 switching is not enabled on the switch, and the Layer 2 trace route packet received is dropped.</td>
</tr>
</tbody>
</table>
### Packet drop causes for LP CPU counters (Continued)

<table>
<thead>
<tr>
<th>Drop Category</th>
<th>Drop code</th>
<th>Drop message</th>
<th>Drop description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td></td>
<td>Layer 2 Trace - unknown VLAN (CV)</td>
<td>The Layer 2 trace route packet is received with a VLAN ID that is not configured in the switch.</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Port security violation (CV)</td>
<td>A packet with an unauthorized MAC address is received on a port.</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>Logical port state is down (CV)</td>
<td>The link level protocol state is not enabled.</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Layer 2 port state is blocking (CV)</td>
<td>The port on which the packet is received is not in the forwarding state.</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Layer 2 Trace - STP port state is blocking (CV)</td>
<td>The port on which the Layer 2 trace packet is received is not in the forwarding state.</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>STP/PVST protected port drop (CV)</td>
<td>The port is configured to drop BPDUs.</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>STP packet dropped on STP boundary port (CV)</td>
<td>A BPDU is received on a configured SuperSpan boundary port.</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>STP packet dropped on layer 2 free port (CV)</td>
<td>A Layer 2 protocol packet is received on a port with all Layer 2 protocols disabled.</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>STP packet dropped while cluster VLAN processing (CV)</td>
<td>An STP BPDU is received on a port when the <code>cluster-l2protocol-forward</code> command is not enabled.</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Broadcast packet limit reached (CV)</td>
<td>The number of received Layer 2 broadcast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>Multicast packet limit reached (CV)</td>
<td>The number of received Layer 2 multicast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>Unknown unicast packet limit reached (CV)</td>
<td>The number of received Layer 2 unknown-unicast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>IP port is down (CV)</td>
<td>The port on which the packet is received is down.</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>ARP inspection failed</td>
<td>A packet is dropped because of an ARP inspection failure.</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>Port disabled for IPv4 multicast (CV)</td>
<td>An IPv4 multicast packet is received on a disabled multicast port.</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>Port disabled for IPv6 multicast (CV)</td>
<td>An IPv6 multicast packet is received on a disabled multicast port.</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>IP receive ACL deny (CV)</td>
<td>Packets are dropped in software by the IP receive ACL configuration.</td>
</tr>
<tr>
<td>Drop Category</td>
<td>Drop code</td>
<td>Drop message</td>
<td>Drop description</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>34 Dos attack drop exceeded config</td>
<td>34</td>
<td>Dos attack drop exceeded configuration limit (CV)</td>
<td>Packets are dropped in software by the DOS attack configuration.</td>
</tr>
<tr>
<td>35 MPLS unknown VC label (CV)</td>
<td>35</td>
<td>MPLS unknown VC label (CV)</td>
<td>An MPLS packet is received with an unknown VC label.</td>
</tr>
<tr>
<td>36 VPLS ISID Configuration Mismatch (CV)</td>
<td>36</td>
<td>VPLS ISID Configuration Mismatch (CV)</td>
<td>The ISID value received in a packet is not the same as the configured ISID value in the VPLS instance.</td>
</tr>
<tr>
<td>37 VPLS Local Switching disabled drop (CV)</td>
<td>37</td>
<td>VPLS Local Switching disabled drop (CV)</td>
<td>VPLS local switching is disabled in the VPLS instance.</td>
</tr>
<tr>
<td>38 VPLS CPU Broadcast packet limit reached (CV)</td>
<td>38</td>
<td>VPLS CPU Broadcast packet limit reached (CV)</td>
<td>The number of received VPLS broadcast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>39 VPLS CPU Multicast packet limit reached (CV)</td>
<td>39</td>
<td>VPLS CPU Multicast packet limit reached (CV)</td>
<td>The number of received VPLS multicast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>40 VPLS CPU Unknown unicast packet limit reached (CV)</td>
<td>40</td>
<td>VPLS CPU Unknown unicast packet limit reached (CV)</td>
<td>The number of received VPLS unknown-unicast packets that have exceeded the configured limit in a given time interval.</td>
</tr>
<tr>
<td>41 ARP not resolved (CV)</td>
<td>41</td>
<td>ARP not resolved (CV)</td>
<td>Packets are dropped because ARP is not resolved for a destination IP address. Packets that are dropped when ARP is not resolved are known as IP drop pending packets. IP drop pending packets are configured.</td>
</tr>
<tr>
<td>Packet Error (PE) Drops</td>
<td>42</td>
<td>Invalid destination MAC (PE)</td>
<td>Packets received with flow control destination MAC addresses, and other invalid destination MAC addresses.</td>
</tr>
<tr>
<td>43 Layer 2 Trace - BAD packet (PE)</td>
<td>43</td>
<td>Layer 2 Trace - BAD packet (PE)</td>
<td>A Layer 2 trace route packet is received with an incorrect packet length or type information.</td>
</tr>
<tr>
<td>44 IP TTL too small (PE)</td>
<td>44</td>
<td>IP TTL too small (PE)</td>
<td>An IP packet is received with an expired TTL.</td>
</tr>
<tr>
<td>45 IP header length error (PE)</td>
<td>45</td>
<td>IP header length error (PE)</td>
<td>A malformed IPv4 packet with an incorrect header length.</td>
</tr>
<tr>
<td>46 IP Header error (PE)</td>
<td>46</td>
<td>IP Header error (PE)</td>
<td>An IPv4 packet is dropped because of an invalid IPv4 header.</td>
</tr>
<tr>
<td>47 Multicast packet received with unicast address (PE)</td>
<td>47</td>
<td>Multicast packet received with unicast address (PE)</td>
<td>A Layer 3 IP multicast packet is received with a unicast destination MAC address.</td>
</tr>
<tr>
<td>48 Packet received with error bit set (PE)</td>
<td>48</td>
<td>Packet received with error bit set (PE)</td>
<td>A packet is sent to the CPU as an error packet.</td>
</tr>
</tbody>
</table>
### TABLE 15  
Packet drop causes for LP CPU counters (Continued)

<table>
<thead>
<tr>
<th>Drop Category</th>
<th>Drop code</th>
<th>Drop message</th>
<th>Drop description</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 Invalid source MAC (PFE)</td>
<td>50</td>
<td>Layer 2 Trace - next Hop information failed (PFE)</td>
<td>A packet is dropped because it was unable to send a Layer 2 trace packet to the next hop.</td>
</tr>
<tr>
<td>51 MAC table uninitialized (PFE)</td>
<td></td>
<td></td>
<td>The MAC address database is not initialized in the software.</td>
</tr>
<tr>
<td>52 IPv4 protocol drop (PFE)</td>
<td>54</td>
<td>Layer 3 invalid CAM entry type (PFE)</td>
<td>A Layer 3 packet is dropped because of an invalid CAM entry type.</td>
</tr>
<tr>
<td>53 IP no route (PFE)</td>
<td>55</td>
<td>Layer 3 invalid FID (PFE)</td>
<td>The forwarding information for a Layer 3 packet is invalid in software.</td>
</tr>
<tr>
<td>54 Layer 3 invalid FID (PFE)</td>
<td>56</td>
<td>IPv6 protocol drop (PFE)</td>
<td>A packet is dropped during IPv6 processing.</td>
</tr>
<tr>
<td>55 Layer 3 invalid FID (PFE)</td>
<td>57</td>
<td>MPLS LSP XC drop (PFE)</td>
<td>A packet is dropped because of MPLS transit processing.</td>
</tr>
<tr>
<td>56 IPv6 protocol drop (PFE)</td>
<td>58</td>
<td>VLL Local processing drop (PFE)</td>
<td>A packet is dropped by local VLL processing.</td>
</tr>
<tr>
<td>57 VLL processing drop (PFE)</td>
<td>59</td>
<td>VPLS processing drop (PFE)</td>
<td>A packet is dropped by VPLS processing.</td>
</tr>
<tr>
<td>58 VPLS processing drop (PFE)</td>
<td>60</td>
<td>Layer 2 invalid FID (PFE)</td>
<td>The forwarding information for a Layer 2 packet is invalid in software.</td>
</tr>
<tr>
<td>59 VPLS processing drop (PFE)</td>
<td>61</td>
<td>Layer 2 local processing drop (PFE)</td>
<td>A packet is dropped by VPLS processing.</td>
</tr>
<tr>
<td>60 Layer 2 invalid FID (PFE)</td>
<td>62</td>
<td>Invalid Flooding domain (PFE)</td>
<td>The flooding information required to flood the packet is invalid.</td>
</tr>
<tr>
<td>61 Layer 2 invalid FID (PFE)</td>
<td>63</td>
<td>Invalid trunk drops (PFE)</td>
<td>Trunk information is incorrect in software.</td>
</tr>
<tr>
<td>62 Invalid Flooding domain (PFE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63 Invalid trunk drops (PFE)</td>
<td>64</td>
<td>No Active Ports in Trunk (OD)</td>
<td>A packet is received on a trunk port with no active trunk ports in the local line card.</td>
</tr>
<tr>
<td>64 No Active Ports in Trunk (OD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65 Invalid source port (OD)</td>
<td>66</td>
<td>DA learned on source port (OD)</td>
<td>The destination MAC address is learned on the port on which the packet is received.</td>
</tr>
<tr>
<td>66 DA learned on source port (OD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>67 PPP control packet drop (OD)</td>
<td></td>
<td></td>
<td>A packet is dropped because of an unsupported Point-to-Point Protocol (PPP) control packet.</td>
</tr>
</tbody>
</table>
show lp-cpu packet statistics brief

Syntax:  show lp-cpu packet statistics brief

This command displays the total number of packets processed and dropped on all LPS by the LP CPU. This command can be used on both the MP and the LP modules. On the LP module, this command displays brief counters only for a specific LP module. The following example output displays the total number of packet statistics that are processed and dropped on module 4 and module 7 on the MP.

Brocade# show lp-cpu packet statistics brief

MODULE 4
--------
Packets processed: 1000
Packets dropped: 200

MODULE 7
--------
Packets processed: 236076
Packets dropped: 194163

show lp-cpu packet statistics protocol

Syntax:  show lp-cpu packet statistics protocol [l2 | l3] [slotnum/portnum | slotnum]

-  l2  - Displays Layer 2 protocol packet counters received by the LP CPU.
-  l3  - Displays Layer 3 protocol packet counters received by the LP CPU.
-  slotnum/portnum  - Displays protocol packet statistics for an individual port.
-  slotnum  - Displays protocol packet statistics for all ports on the LP.

This command displays Layer 2 or Layer 3 protocol packets received on a specific slot port, or for all ports on the LP. This command can be used on both the MP and the LP, and the output display is the same for both types of modules when Layer 2 or Layer 3 protocol counters are displayed.

The following example output displays Layer 2 protocol packet counters received by the LP CPU on port 4/1 on the MP.

<table>
<thead>
<tr>
<th>Drop Category</th>
<th>Drop code</th>
<th>Drop message</th>
<th>Drop description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>68</td>
<td>NON ISIS OSI packet (OD)</td>
<td>A packet is dropped because a non-IS-IS OSI packet is received.</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>Loop detection BPDU drop (OD)</td>
<td>A packet is dropped because of an invalid loop detect BPDU.</td>
</tr>
</tbody>
</table>
Table 16 displays the output from the `show lp-cpu packet statistics protocol l2` command. 

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACP packets received</td>
<td>The number of LACP packets received by the LP CPU.</td>
</tr>
<tr>
<td>STP packets received</td>
<td>The number of STP packets received by the LP CPU.</td>
</tr>
<tr>
<td>PVST packets received</td>
<td>The number of PVST packets received by the LP CPU.</td>
</tr>
<tr>
<td>VSRP packets received</td>
<td>The number of VSRP packets received by the LP CPU.</td>
</tr>
<tr>
<td>ERP packets received</td>
<td>The number of ERP packets received by the LP CPU.</td>
</tr>
<tr>
<td>MRP packets received</td>
<td>The number of MRP packets received by the LP CPU.</td>
</tr>
<tr>
<td>L2 Trace Packets received</td>
<td>The number of Layer 2 trace packets received by the LP CPU.</td>
</tr>
<tr>
<td>Loop detect packets received</td>
<td>The number of loop detect packets received by the LP CPU. Loop detect packets refers to a protocol used to detect loops in the network.</td>
</tr>
<tr>
<td>FDP packets received</td>
<td>The number of FDP packets received by the LP CPU.</td>
</tr>
<tr>
<td>CDP packets received</td>
<td>The number of CDP packets received by the LP CPU.</td>
</tr>
<tr>
<td>Dot1x packet received</td>
<td>The number of Dot1x packets received by the LP CPU.</td>
</tr>
<tr>
<td>UDLD packets received</td>
<td>The number of UDLD packets received by the LP CPU.</td>
</tr>
</tbody>
</table>
The following example output displays Layer 3 protocol packet counters received by the LP CPU on port 4/1 on the MP.

```
Brocade# show lp-cpu packet statistics protocol l3 4/1
IPv4 Protocol packets:
IPv4 IGMP packets received:0
IPv4 ICMP packets received:0
IPv4 UDP packets received:0
IPv4 TCP packets received:0
IPv4 RSVP packets received:0
IPv4 IGP packets received:0
IPv4 OSPF packets received:0
IPv4 VRRP packets received:0
IPv4 GRE packets received:0
IPv4 BFD packets received:0
IPv6 over IPv4 packets received:0
IPv6 Protocol packets:
IPv6 BFD packets received:0
IPv6 PIM packets received:0
IPv6 ICMP packets received:0
IPv6 UDP packets received:0
IPv6 TCP packets received:0
IPv6 OSPF packets received:0
IPv6 VRRP packets received:0
```

Table 17 displays the output from the `show lp-cpu packet statistics protocol l3 slotnum/portnum` command.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4 Protocol packets received</td>
<td>The number of IPv4 protocol packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 IGMP packets received</td>
<td>The number of IPv4 IGMP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 ICMP packets received</td>
<td>The number of IPv4 ICMP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 UDP packets received</td>
<td>The number of IPv4 UDP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 TCP packets received</td>
<td>The number of IPv4 TCP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 RSVP packets received</td>
<td>The number of IPv4 RSVP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 IGP packets received</td>
<td>The number of IPv4 IGP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 OSPF packets received</td>
<td>The number of IPv4 OSPF packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 VRRP packets received</td>
<td>The number of IPv4 VRRP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 PIM packets received</td>
<td>The number of IPv4 PIM packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 GRE packets received</td>
<td>The number of IPv4 GRE packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv4 BFD packets received</td>
<td>The number of IPv4 BFD packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 over IPv4 packets received</td>
<td>The number of IPv6 over IPv4 packets received by the LP CPU. IPv6 over IPv4 packets refers to IPv6 packets encapsulated in the IPv4 header.</td>
</tr>
<tr>
<td>IPv6 Protocol packets</td>
<td>The number of IPv6 protocol packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 BFD packets received</td>
<td>The number of IPv6 BFD packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 PIM packets received</td>
<td>The number of IPv6 PIM packets received by the LP CPU.</td>
</tr>
</tbody>
</table>
show lp-cpu packet statistics slot

Syntax: show lp-cpu packet statistics slot slot-number

The slot-number variable specifies the slot number for which you want to display packet statistics.

This command displays a detailed view of packet statistics processed on a specified LP module, and the total number of packets received on each slot number. Since the packet statistics for each of the LP modules are polled from the MP module, the show lp-cpu packet statistics slot command is supported only on the MP module. The following example output displays the total number of packets received by the LP CPU from MPLS, ARP, IPv4, IPv6, and other data packets on module 4.

```
Brocade# show lp-cpu packet statistics slot 4
MODULE 4
----------
Total Packets Received: 1000
MPIS uplink packets received: 0
  VPLS packets received: 0
  VLL packets received: 0
  L3 VPN packets received: 0
  Other MPLS packets received: 0
ARP packets received: 0
  ARP response packets received: 0
  ARP request packets received: 0
IPv4 packets received: 0
  IPv4 unicast packets routed: 0
  IPv4 protocol packets received: 0
  GRE tunnel packets received: 0
  6to4 tunnel packets received: 0
IPv6 packets received: 0
  IPv6 unicast packets routed: 0
  IPv6 protocol packets received: 0
IPv4 multicast packets routed: 0
IPv6 multicast packets routed: 0
L2VPN endpoint packets received: 0
  VPLS endpoint packets received: 0
  VLL endpoint packets received: 0
  Local-VLL endpoint packets received: 0
L2 packets received: 1000
  L2 known unicast packets forwarded: 600
  L2 unknown unicast packets flooded: 100
  L2 broadcast Packets flooded: 100
  L2 multicast Packets flooded: 0
  Packets received for SA learning: 0
Other packets received: 0
Total Packets dropped: 200
```

### TABLE 17
Output from the `show lp-cpu packet statistics protocol l3` command (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 ICMP packets received</td>
<td>The number of IPv6 ICMP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 UDP packets received</td>
<td>The number of IPv6 UDP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 TCP packets received</td>
<td>The number of IPv6 TCP packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 OSPF packets received</td>
<td>The number of IPv6 OSPF packets received by the LP CPU.</td>
</tr>
<tr>
<td>IPv6 VRRP packets received</td>
<td>The number of IPv6 VRRP packets received by the LP CPU.</td>
</tr>
</tbody>
</table>
Packet drop causes:
[PP - Post Processing Drops; CV - Configuration Violation Drops;
PE - Packet Error Drops; PFE - Potential Forwarding Error Drops;
OD - Other Drops]

3-L2 packet forwarded in hardware (PP): 100
20-L2 port state is blocking (CV): 100

ARP packets captured for DAI: 0
ARP packets failed DAI: 0

packets processed by port:
  port 4/1: 1000
  port 4/2: 0
  port 4/3: 0
  port 4/4: 0

LP CPU packet statistics clear command

NOTE
LP CPU packet statistics can only be cleared using the clear lp-cpu packet statistics command.

clear lp-cpu packet statistics

Syntax: clear lp-cpu packet statistics slot-number

This command clears all packet statistics processed on a specific LP, or for all LPs. This command
is used on both the MP and the LP. On the MP module, the clear lp-cpu packet statistics command
clears all packet statistics for a specific slot, or clears packet statistics on all LPs. On the LP
module, the clear lp-cpu packet statistics command clears packet statistics on all ports of the LP.

The slot-number variable specifies the slot number for which you want to clear packet statistics.

To clear all LP CPU packet statistics processed on all LPs, enter the following command.
Brocade# clear lp-cpu packet statistics

To clear all LP CPU packet statistics processed on slot 1 on the MP, enter the following command.
Brocade# clear lp-cpu packet statistics 1

CPU aggregate counter statistics

This section describes the commands that display the aggregate statistics for all the CPU queues.
To display CPU aggregate statistics per priority from the Multicast queue on a module, enter a
command such as the following.
Brocade(config)# show tm-voq-stat src_port eth 2/1 cpu-queue-all 2
EnQue Pkt Count 100
EnQue Bytes Count 22400
DeQue Pkt Count 100
DeQue Bytes Count 22400
Total Discard Pkt Count 0
Total Discard Bytes Count 0
Oldest Discard Pkt Count 0
Oldest Discard Bytes Count 0
WRED Dropped Pkt Count 0
Syntax: show tm-voq-stat src_port source-port cpu-queue-all [priority | all]
You must specify a source-port.

You can optionally specify a priority to limit the display to a single priority or use the all parameter to display all priorities.

You can still configure statistics for each of the CPU queue like cpu-copy-queue, cpu-mgmt-queue, cpu-proto-queue or cpu-queue.

Brocade(config)# show tm-voq-stat src_port eth x/y cpu-copy-queue 1
Brocade(config)# show tm-voq-stat src_port eth x/y cpu-mgmt-queue 1
Brocade(config)# show tm-voq-stat src_port eth x/y cpu-proto-queue 1
Brocade(config)# show tm-voq-stat src_port eth x/y cpu-queue 1

Syntax: show tm-voq-stat src_port source-port cpu-queue | cpu-copy-queue | cpu-mgmt-queue | cpu-proto-queue [priority | all]
The range for the priority is from 0 through 7 and all is for all priority.
The following example is the sample output from the cpu-copy-queue command.
Brocade(config)# show tm-voq-stat src_port eth 2/2 cpu-copy-queue 1
  EnQue Pkt Count 0
  EnQue Bytes Count 0
  DeQue Pkt Count 0
  DeQue Bytes Count 0
  Total Discard Pkt Count 0
  Total Discard Bytes Count 0
  Oldest Discard Pkt Count 0
  Oldest Discard Bytes Count 0
  WRED Dropped Pkt Count 0
  WRED Dropped Bytes Count 0
  Current Queue Depth 0
  Maximum Queue Depth since Last read 0

The following example is the sample output from the cpu-proto-queue command.
Brocade(config)# show tm-voq-stat src_port eth 2/2 cpu-proto-queue 1
  EnQue Pkt Count 0
  EnQue Bytes Count 0
  DeQue Pkt Count 0
  DeQue Bytes Count 0
  Total Discard Pkt Count 0
  Total Discard Bytes Count 0
  Oldest Discard Pkt Count 0
  Oldest Discard Bytes Count 0
  WRED Dropped Pkt Count 0
  WRED Dropped Bytes Count 0
  Current Queue Depth 0
  Maximum Queue Depth since Last read 0

The clear tm-voq-stat src_port source-port cpu-queue-all command clears all the statistics collected per priority.
Brocade(config)# clear tm-voq-stat src_port eth 2/1 cpu-queue-all 2
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• Software licensing ...................................................... 499

This chapter contains diagnostic information for software licensing.

Software licensing

Software licensing enables premium features in the software. Software licensing uses the same command parsing control that is used in the EEPROM version of packaging, so it is built on an already proven infrastructure. Software licenses can be pre-installed in the factory or ordered and installed on demand by the customer.

Software licensing show command

This section describes the show command that displays software licensing information.

show license

Syntax: show license

This command displays the licenses in the system, as shown in the following example.

Brocade# show license
Total no. of entries: 6
Index Package Name Lid Valid Type Period
1 NI-CES-2024-L3U egut-cdOJ yes trial 2 hours
2 NI-CES-2024-L3U egut-cdOJ yes trial 48 hours
3 NI-CER-2048-ADV ucHJFOFGOH no trial 1 days
4 NI-CER-2048-ADV ucHJFOFGOH no normal unlimited
5 NI-CES-2024-L3U egut-cdOJ yes normal unlimited

For Brocade MLX series devices, the command output resembles the following example.

Brocade# show license
Index Package Name Lid Slot License Status License Type Period
1 BR-MLX-10Gx4-MLUpg dosFIGFhFGG S4 normal active unlimited
2 BR-MLX-10Gx4-MLUpg dosFIGFhFGG S4 trial not used 3 hours
3 BR-MLX-1Gx24-MLUpg ONMLKJIHG S3 normal active unlimited
4 BR-MLX-1Gx24-MLUpg ONMLKJIHG S3 trial not used 3 hours

Software licensing debug command

This section describes the debug command that generates software licensing information.
Software licensing

**debug license**

**Syntax: [no] debug license**

This command is used to display the package information on which the license has been loaded. It is encoded as a Hex value. This information can be displayed only when the show command is used with the license index; for example, `show license 1`.

**Before enabling debugging:**

Brocade# show license

<table>
<thead>
<tr>
<th>Index</th>
<th>Package Name</th>
<th>Lid</th>
<th>License Type</th>
<th>Status</th>
<th>License Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0x80000003</td>
<td></td>
<td></td>
<td></td>
<td>unlimited</td>
</tr>
</tbody>
</table>

Brocade# show license 1

License information for license <1>:

- **package name:** NI-CES-2048-L3U
- **lid:** ucGNFOGHGO
- **license type:** normal
- **status:** active
- **license period:** unlimited

**After enabling debugging:**

Brocade# debug license

License all debugging ON

Brocade# show license 1

License information for license <1>:

- **package name:** NI-CES-2048-L3U
- **lid:** ucGNFOGHGO
- **license type:** normal
- **status:** active
- **license period:** unlimited

Brocade license information:

- **pkg info:** 0x80000003
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- **NETCONF** ................................................................. 501

This chapter contains diagnostic information for the Netconf protocol environments.

**NETCONF**

Network Configuration (NETCONF) is a XML-based protocol that deals with automated configuration management. The NETCONF protocol runs on top of a secure transport, such as Simple Object Access Protocol (SOAP) or Secure Shell (SSH).

**NETCONF debug commands**

This section describes the NETCONF-related debug commands.

**debug ip netconf content**

**Syntax:** `[no] debug ip netconf content**

This command enables NETCONF application data debugging and displays debug messages related to the configuration and state data manipulated by the NETCONF protocol, NETCONF remote procedure calls, and NETCONF notifications. Command output resembles the following example.

```
Brocade# debug ip netconf content
NETCONF: content debugging is on
```

**debug ip netconf engine**

**Syntax:** `[no] debug ip netconf engine**

This command enables NETCONF engine debugging, as shown in the following example.

```
Brocade# debug ip netconf engine
    NETCONF: engine debugging is on
Dec 22 19:02:45 NETCONF [0]: FSM state: 1
Dec 22 19:02:45 NETCONF [0]: FSM state: 2
Dec 22 19:03:11 NETCONF [0]: FSM state: 2
Dec 22 19:03:11 NETCONF [0]: FSM state: 2
Dec 22 19:03:11 NETCONF [0]: FSM state: 3
Dec 22 19:03:31 NETCONF [0]: FSM state: 3
Dec 22 19:03:31 NETCONF [0]: FSM state: 3
Dec 22 19:03:31 NETCONF [0]: FSM state: 3
Dec 22 19:03:31 NETCONF [0]: FSM state: 3
```
debug ip netconf framer

Syntax: [no] debug ip netconf framer

This command displays the NETCONF XML framer level debugging information, as shown in the following example.

Brocade# debug ip netconf framer
NETCONF: framer debugging is on
Dec 22 19:12:25 NETCONF[0]: Framing Rpc Reply
Dec 22 19:12:25 NETCONF[0]: RxFrame(24271e96, 238a05d4, 33536)
Dec 22 19:12:25 NETCONF[0]: Framing Netiron Config
Dec 22 19:12:25 NETCONF[0]: RxFrame(24274bd0, 238a0675, 33375)
Dec 22 19:12:25 NETCONF[0]: Framing Vlan Config
Dec 22 19:12:25 NETCONF[0]: RxFrame(2427790a, 238a068c, 33352)
Dec 22 19:12:25 NETCONF[0]: Fetching VLAN. Config. VLAN ID 0
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 47
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 55
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching VLAN. Config. VLAN ID 1
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 47
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 55
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching Tagged/Untagged/Uplink Switch. Config. PORT ID 65535
Dec 22 19:12:25 NETCONF[0]: Fetching VLAN. Config. VLAN ID 4095
Dec 22 19:12:25 NETCONF[0]: RxFrame() returns 0, used 515
Dec 22 19:12:25 NETCONF[0]: RxFrame() returns 0, used 562
Dec 22 19:12:25 NETCONF[0]: RxFrame() returns 0, used 753

debug ip netconf operation

Syntax: [no] debug ip netconf operation
This command displays information about NETCONF operations, such as retrieve, configure, copy, delete, and so on, as shown in the following example.

Brocade# debug ip netconf operation
  NETCONF: operation debugging is on
Dec 22 19:27:55 NETCONF[0]: Received NETCONF <get-config> operation
Dec 22 19:28:32 NETCONF[0]: Received NETCONF <close-session> operation

**debug ip netconf parser**

**Syntax:** `[no] debug ip netconf parser

This command enables NETCONF XML parser level debugging, as shown in the following example.

Brocade# debug ip netconf parser
  NETCONF: parser debugging is on
Dec 22 19:33:58 NETCONF: netconf_error_reset() cdb session 11
Dec 22 19:34:41 Object = rpc, Context = 0x2426f15c and Cookie = 0x24271e96
Dec 22 19:34:41 Object = get-config, Context = 0x24271e96 and Cookie = 0x24271e96
Dec 22 19:34:41 Object = rpc, Context = 0x2426f15c and Cookie = 0x24271e96
Dec 22 19:34:41 Object = get-config, Context = 0x24271e96 and Cookie = 0x24274bd0
Dec 22 19:34:41 Object = filter, Context = 0x24274bd0 and Cookie = 0x24274bd0
Dec 22 19:34:41 NETCONF[0]: FILTER(filter): 24271e96
Dec 22 19:34:41 Object = rpc, Context = 0x2426f15c and Cookie = 0x24271e96
Dec 22 19:34:41 Object = get-config, Context = 0x24271e96 and Cookie = 0x24274bd0
Dec 22 19:34:41 Object = filter, Context = 0x24274bd0 and Cookie = 0x24274bd0
Dec 22 19:34:41 Object = netiron-config, Context = 0x2427790a and Cookie = 0x2427790a
Dec 22 19:34:41 Object = rpc, Context = 0x2426f15c and Cookie = 0x24271e96
Dec 22 19:34:41 Object = get-config, Context = 0x24271e96 and Cookie = 0x24274bd0
Dec 22 19:34:41 Object = filter, Context = 0x24274bd0 and Cookie = 0x2427790a
Dec 22 19:34:41 Object = netiron-config, Context = 0x2427790a and Cookie = 0x2427790a
Dec 22 19:34:41 Object = vlan-config, Context = 0x2427a644 and Cookie = 0x2427a644
Dec 22 19:34:41 14 contexts available after releasing context for vlan-config
Dec 22 19:34:41 15 contexts available after releasing context for netiron-config
Dec 22 19:34:41 17 contexts available after releasing context for get-config
Dec 22 19:34:41 NETCONF: netconf_error_reset() cdb session 11

**debug ip netconf rpc**

**Syntax:** `[no] debug ip netconf rpc

This command displays debug messages related to the NETCONF Remote Procedure Call (RPC) layer. NETCONF uses RPC-based mechanisms to ease the communication between the NETCONF client and NETCONF server.

Command output resembles the following example.

Brocade# debug ip netconf rpc
  NETCONF: rpc debugging is on
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16845 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16926 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16944 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16959 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16979 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (16995 ) is too-big : 16768
Dec 22 19:57:26 NETCONF [0]: Rpc request length (17012 ) is too-big : 16768
debug ip netconf transport

Syntax: [no] debug ip netconf transport

This command displays debug messages related to the NETCONF transport layer.

The following example output is generated when the NETCONF server is enabled or disabled, and NETCONF transport layer debugging is enabled.

Brocade# debug ip netconf transport
NETCONF: transport debugging is on
Brocade(config)# netconf server
Oct 26 13:11:16 NETCONF: Enabling the Netconf Server port
Oct 26 13:11:16 NETCONF: Received TCP listen callback
Brocade(config)# no netconf server
Oct 26 13:11:23 NETCONF: Disabling the Netconf server port
Brocade# no debug ip netconf transport
NETCONF: transport debugging is off
OpenFlow Diagnostics

In this chapter

- OpenFlow

This chapter contains diagnostic information for the OpenFlow protocol environments.

OpenFlow

OpenFlow is a programmable network protocol that manages and directs traffic among Ethernet switches, routers, and wireless access points over the network in support of Software-Defined Networking (SDN) applications. OpenFlow can be used for traffic flow management in metro, WAN, and data center networks, and also security management in enterprise and campus data center applications, and other applications with the appropriate use of OpenFlow controllers.

OpenFlow debug commands

This section describes the OpenFlow-related debug commands.

debug openflow

Syntax: [no] debug openflow [config | flow-all | forwarding | hardware | ipc | meter | opm | show ]

- config - Displays OpenFlow configuration debug messages.
- flow-all - Displays all the OpenFlow flow debug messages.
- forwarding - Displays OpenFlow forwarding debug messages.
- hardware - Displays OpenFlow hardware debug messages.
- ipc - Displays OpenFlow Interprocess Communication (IPC) debug messages.
- meter - Displays OpenFlow meter related debug messages.
- opm - Enables debug for the OPM task.
- show - Displays OpenFlow debug flags.

The debug openflow command enables logging of OpenFlow-related messages.

d debug openflow config

Syntax: [no] debug openflow config

This command displays OpenFlow configuration debug messages. Command output resembles the following example.

Brocade# debug openflow config
Mar 27 00:30:28.135 OPENFLOW CONFIG: Flow type for port 1/12 is set to L2
debug openflow flow-all

Syntax: [no] debug openflow flow-all

This command displays all the OpenFlow flow debug messages. Command output resembles the following example.

Brocade# debug openflow flow-all
Mar 27 00:41:54.134 Received DELETE flow message flow id = 4
Mar 27 00:41:54.134 OPENFLOW CONFIG: All L2 rules matched, Flow Validation Successful
Mar 27 00:41:54.134 OPENFLOW FORWARD: L2 RULE: Flow Id: 4, In Port: 1/6, In Vlan: 0, Tagged 0
  Vlan Upbit: 0, Priority:32768,Ether Type: 0
  Source Mac: 0000.0000.0000, Dest Mac: 0000.0000.0000 , Src Mac Mask: 0000.0000.0000, Dest Mac Mask: 0000.00ff.ffff
Mar 27 00:41:54.134 OPENFLOW FORWARDING:openflow copy flow - member count 1
Mar 27 00:41:54.134 OPENFLOW FORWARDING: Actions - out port 1/8,vlan 4096,tagged 0,prio 15,tos 3
  src-mac 0000.0000.0000, dst-mac 0000.0000.0000
Mar 27 00:41:54.134 OPENFLOW - Programming flow with 1 output member only
Mar 27 00:41:54.134 SO_SOCKIF: task so.30.77, read 8 bytes on sockfd 30
Mar 27 00:41:54.134 Openflow: Received an IPC from from LP
Mar 27 00:41:54.134 Update the programmed status of the flow.
Mar 27 00:41:54.134 Update the ADD status for flow id = 4

debug openflow forwarding

Syntax: [no] debug openflow forwarding

This command displays OpenFlow forwarding debug messages. Command output resembles the following example.

Brocade# debug openflow forwarding
OpenFlow Forwarding debugging is now ON
4P-06-31-14-1#Mar 27 00:23:56.229 OPENFLOW:FWD: Adding a flow in the Openflow Generic Mode.
Mar 27 00:23:56.229 OPENFLOW FORWARDING: L2 RULE: Flow Id: 6, In Port: 1/3, In Vlan: 0, Tagged 0
  Vlan Upbit: 0, Priority:32768,Ether Type: 0
  Source Mac: 0000.0000.0000, Dest Mac: 0000.0000.0000 , Src Mac Mask: 0000.0000.0000, Dest Mac Mask: 0000.00ff.ffff
Mar 27 00:23:56.229 OPENFLOW FORWARDING:openflow copy flow - member count 1
Mar 27 00:23:56.229 OPENFLOW FORWARDING: Actions - out port 1/4,vlan 4096,tagged 0,prio 15,tos 3
  src-mac 0000.0000.0000, dst-mac 0000.0000.0000
Mar 27 00:23:56.229 OPENFLOW - Programming flow with 1 output member only
debug openflow hardware

Syntax: [no] debug openflow hardware

This command displays OpenFlow hardware debug messages. Command output resembles the following example.

Brocade# debug openflow hardware
Openflow Hardware debugging is now ON
LP-1#Mar 27 00:38:34 OPENFLOW HARDWARE: generic flow add - FID 0x0000ffff, mvid 2048
Mar 27 00:38:34 OPENFLOW HARDWARE: Openflow L2 flow - member count 0
Mar 27 00:38:34 OPENFLOW HARDWARE: pram fid 0x00000005
Mar 27 00:38:34 OPENFLOW HARDWARE: Created CAM index 0x0002801b, PRAM index 0x000000b5 for flow 3 on port 1/5

Command output such as the following will be displayed, when protected VLANs are configured.

Brocade# debug openflow hardware
Jan 25 03:13:01.875 OPENFLOW HARDWARE: Adding Hybrid Vlans
Jan 25 03:13:01.875 L3 Vlan id 10
Jan 25 03:13:01.875 OPENFLOW HARDWARE: Created CAM index 0x0001473f, PRAM index 0x000000bd on port 1/1 for Hybrid Vlan 10

Command output such as the following will be displayed, when protected VLANs are deleted.

Brocade# debug openflow hardware
Jan 25 03:17:59.925 OPENFLOW HARDWARE: Deleting Hybrid Vlans
Jan 25 03:17:59.925 L3 Cam entry found for vlan 10
Jan 25 03:17:59.925 OPENFLOW HARDWARE: Deleted CAM index 0x0001474a on port 1/1 for Hybrid Vlan 10

debug openflow ipc

Syntax: [no] debug openflow ipc

This command displays OpenFlow IPC debug messages. Command output resembles the following example.

Brocade# debug openflow ipc
Mar 27 00:39:48.460 OPENFLOW METER: Adding Meter with Meter ID: 1023
Mar 27 00:39:48.460 OPENFLOW METER: Building Meter Band for Meter ID: 1023

debug openflow meter

Syntax: [no] debug openflow meter

This LP command displays OpenFlow meter related debug messages. Command output resembles the following example.

Brocade# debug openflow meter
Apr 28 13:35:59.400 OPENFLOW METER: Adding Meter with Meter ID: 1023
Apr 28 13:35:59.400 OPENFLOW METER: Building Meter Band for Meter ID: 1023
OpenFlow

Apr 28 13:35:59.400 OPENFLOW METER: openflow_fill_meter_band_entry, Meter Band: DROP, rate: 3000, burst size: 1250
Apr 28 13:35:59.400 OPENFLOW METER: Building Meter Band for Meter: 1023
Average rate is adjusted to 1693952 bits per second.
Average excess rate is adjusted to 2996992 bits per second.
Apr 28 13:35:59.400 OPENFLOW METER: METER 1023 info is added to DB
Apr 28 13:35:59.400 Committed rate 1693952, max_burst 1250
Apr 28 13:35:59.400 Excess rate 2996992, max_burst 1250
Apr 28 13:35:59.400 OPENFLOW METER: openflow_lp_calculate_meter_param: EIR re-adjust, cir 109, eir 85
Apr 28 13:35:59.400 OPENFLOW METER: openflow_lp_calculate_meter_param: EIR re-adjust, cir 109, eir 85
Apr 28 13:35:59.400 OPENFLOW METER: METER 1023 is successfully created in hardware

**debug openflow opm**

**Syntax:** `[no] debug openflow opm`

This command enables debug for the OPM task. Command output resembles the following example.

Brocade# debug openflow opm
OPM Trace: received OFPT_HELLO. xid 1

**debug openflow show**

**Syntax:** `[no] debug openflow show`

This command displays OpenFlow debug flags. Command output resembles the following example.

Brocade# debug openflow show
Openflow debugging is : ENABLED
Openflow ALL debugging is : OFF
Openflow Stack ALL debugging is : OFF
Openflow Stack ERR debugging is : ON
Openflow Stack WARN debugging is : ON
Openflow Stack INFO debugging is : OFF
Openflow IPC debugging is : OFF
Openflow Hardware debugging is : OFF
Openflow Config debugging is : OFF
Openflow Forwarding debugging is : OFF

**debug ip ssl**

**Syntax:** `[no] debug ip ssl`

This command enables debugging of a Secure Socket Layer (SSL) connection. Command output resembles the following example.

Brocade# debug ip ssl
Dec 6 22:11:28 SSL: ssl_open request to open SSL connection: ssl10.25.105.201:444
Dec 6 22:11:28 SSL[0]: set_ssl_client_session_free: Marking the session free
Dec 6 22:11:28 SSL[0]: ssl_open to ssl10.25.105.201:444: successful
Dec 6 22:11:28 SSL: TCP connection has been established (sock fd: 2)
Dec 6 22:11:28 SSL[0]: Initiating SSL Handshake for sockfd 2
Dec 6 22:11:28 SSL[0]: ssl_complete_handler: for command 6, Status 2
Dec 6 22:11:28 SSL[0]: Connection is open. Starting SSL Handshake
Dec 6 22:11:29 SSL[0]: ssl_complete_handler: for command 3, Status 2
Dec 6 22:11:29 SSL[0]: SSL Handshake successful, Encryption has started
Dec 6 22:11:29 SSL[0]: ssl_connect for stream ssl:10.25.105.201:444 successful
Dec 6 22:11:29 SSL[0]: send request initiated for 8 bytes
Dec 6 22:11:29 SSL[0]: receive request initiated for 8 bytes
Dec 6 22:11:29 SSL[0]: ssl_complete_handler: for command 1, Status 2
Dec 6 22:11:29 SSL[0]: Send Success 8/8
Dec 6 22:11:29 SSL[0]: ssl_complete_handler: for command 2, Status 2
Dec 6 22:11:29 SSL[0]: receive success 8 bytes
Dec 6 22:14:52 SSL[0]: ssl_close request for ssl:10.25.105.201:444
Dec 6 22:14:52 SSL[0]: Closing the SSL connection
Dec 6 22:14:52 SSL[0]: TP Close request initiated
Dec 6 22:14:52 SSL[0]: Remote close connection called for socket 2
Dec 6 22:14:52 SSL[0]: Closing the SSL connection
Dec 6 22:14:53 SSL[0]: ssltcpCloseConnection: Closing
Dec 6 22:14:53 SSL[0]: ssltcpCloseStatus: Pending
Dec 6 22:15:52 SSL[0]: ssl_complete_handler: for command 4, Status 2
Dec 6 22:15:52 SSL[0]: Command:eTpAbort/eTpClose called!
Dec 6 22:15:52 SSL[0]: set_ssl_client_session_free: Marking the session free
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show tech-support

The show tech-support command is useful when collecting a large amount of information about the Brocade NetIron XMR series and Brocade MLX series routers for troubleshooting purposes. The output of this command is used by technical support representatives when reporting a problem.

show tech-support

Syntax: show tech-support [bfd | bgp | cluster | fib | ip | ipv6 | interface-link | isis | l2 | mpls | oam | openflow | rtm | rtm6 | sfm | system | tm]

- bfd - Generates system and debugging information specific to Bidirectional Forwarding Detection (BFD) configurations.
- bgp - Generates system and debugging information specific to Border Gateway Protocol (BGP) configurations.
- cluster - Generates system and debugging information specific to cluster configurations.
- fib - Generates system and debugging information specific to Forwarding Information Base (FIB) configurations.
- ip - Generates system and debugging information specific to IPv4 configurations.
- ipv6 - Generates system and debugging information specific to IPv6 configurations.
- interface-link - Generates system and debugging information related to all the data registered and the hardware information from the physical layer, medium access layer, and optics.
- isis - Generates system and debugging information specific to Intermediate System to Intermediate System (IS-IS) configurations.
- l2 - Generates system and debugging information specific to Layer 2 protocols: RSTP, MSTP, STP, LACP, ERP, MRP, VLAN, and VSRP.
- mpls - Generates system and debugging information specific to Multiprotocol Label Switching (MPLS) configurations.
- oam - Generates system and debugging information specific to Operations, Administration, and Maintenance (OAM) configurations.
- openflow - Generates system and debugging information specific to OpenFlow configurations.
- rtm - Generates system and debugging information specific to IPv4 routing table manager (RTM) configurations.
• **rtm6** - Generates system and debugging information specific to IPv6 RTM configurations.
• **sfm** - Generates system and debugging information specific to Switch Fabric Module (SFM) configurations.
• **system** - Generates system-related debugging information.
• **tm** - Generates system and debugging information specific to Traffic Manager (TM) configurations.

The **show tech-support** command displays the output of several show commands at once. The output from this command varies depending on the router configuration. The format of the **show tech-support** command output is modified to include a header for each of the subcommands which gets called from the CLI to help in automated parsing and lookup of the output.

The header contains the following keywords:

• **BEGIN** - Used to indicate a subcommand that will begin execution next. If the command is an internal command, a textual description of the command is displayed.
• **CONTEXT** - Used to indicate where the subcommands are executed, such as INTERNAL, MP, MP-OS, LP, and LP-OS.
• **TIME-STAMP** - A time stamp, with millisecond granularity, helps in determining the time difference between separate runs of the same command.

In addition to the header, the **show clock** command is run at the beginning and the end of the **show tech-support** command for elapsed time calculation.

The default output of the **show tech-support** command includes the output of the following commands:

• **show version**
• **show running-config**
• **dm save**
• **show interfaces**
• **show statistics**
• **show logging**
• **show save**
• **show clock**
• **show bm-overflow**
• **show memory**
• **show memory pool**
• **show cpu**
• **show bm**
• **show emac**
• **dx 0 mib**
• **dx 1 mib**
• **show mq**
• **show cpu lp**
• **ipc show stat**
• **show flash**
show tech-support

- dir
- show media
- show redundancy
- show module
- show chassis
- show power
- show temperature
- show fan
- show ip ssh
- show ip ssh config
- show snmp
- show mac statistics
- show ip route summary
- show ipv6 route summary
- show mpls summary
- show tm log
- show tm statistics
- show tm non
- show tm non detail
- show tm log histogram
- show cpu histogram hold noclear
- show cpu histogram wait noclear
- itc show statistics
- itc show error list

The following example shows the truncated output of the show tech-support default command.

Brocade# show tech-support

BEGIN: show clock
CONTEXT: MP
TIME-STAMP: 3753400
07:23:12.928 GMT+00 Thu Nov 29 2012

BEGIN: show version
CONTEXT: MP
TIME-STAMP: 3754300
System Mode: MLX
Chassis: NetIron 4-slot (Serial #: A32752FB0G, Part #: 35550-000C)
NI-X-SF Switch Fabric Module 1 (Serial #: S62643F0CW, Part #: 35548-102F)
FE 1: Type fe200, Version 2
Switch Fabric Module 1 Up Time is 1 hours 2 minutes 34 seconds
NI-X-SF Switch Fabric Module 2 (Serial #: S62646F0DY, Part #: 35548-102F)
FE 1: Type fe200, Version 2
Switch Fabric Module 2 Up Time is 1 hours 2 minutes 34 seconds
show tech-support

NI-X-SF Switch Fabric Module 3 (Serial #: S62641F0BZ, Part #: 35548-102E)
FE 1: Type fe200, Version 2
Switch Fabric Module 3 Up Time is 1 hours 2 minutes 34 seconds

SL M1: NI-MLX-MR Management Module Active (Serial #: N02642F1PH, Part #: 35524-103K):
Boot : Version 5.4.0T165 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Jun 15 2012 at 11:09:28 labeled as xmprm05400
(521694 bytes) from boot flash
Monitor : Version 5.4.0T165 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Jun 15 2012 at 11:08:50 labeled as xmb05400
(528223 bytes) from code flash
IronWare : Version 5.5.0T163 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Nov 28 2012 at 18:07:18 labeled as xmr05500b280
(9087307 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 36
Warning: Invalid MBRIDGE FPGA, expected revision 37
916 MHz Power PC processor 7447A (version 8003/0101) 166 MHz bus
512 KB Boot Flash (MX29LV040C), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM INSTALLED
1024 MB DRAM ADDRESSABLE
Active Management uptime is 1 hours 2 minutes 34 seconds

SL M2: NI-MLX-MR Management Module Standby (Serial #: N00414G00B, Part #: 35524-104A):
Boot : Version 5.4.0T165 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Jun 15 2012 at 11:09:28 labeled as xmprm05400
(521694 bytes) from boot flash
Monitor : Version 5.4.0T165 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Jun 15 2012 at 11:08:50 labeled as xmb05400
(528223 bytes) from code flash
IronWare : Version 5.5.0T163 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Nov 28 2012 at 18:07:18 labeled as xmr05500b280
(9087307 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 36
916 MHz Power PC processor 7447A (version 8003/0101) 166 MHz bus
512 KB Boot Flash (MX29LV040C), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM INSTALLED
1024 MB DRAM ADDRESSABLE
Standby Management uptime is 1 hours 1 minutes 59 seconds

SL 2: BR-MLX-1Gx24-X 24-port 1GbE SFP Module (Serial #: BND0417G038, Part #: 60-1001892-08)
License: MLX-1Gx24-X-Upgrade (LID: dpfFJGMiFIN)
Boot : Version 5.1.0T175 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
(492544 bytes) from boot flash
Monitor : Version 5.4.0T175 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
Compiled on Jun 15 2012 at 11:10:18 labeled as xmlb05400
(526710 bytes) from code flash
IronWare : Version 5.5.0T177 Copyright (c) 1996-2012 Brocade Communications Systems, Inc.
show tech-support bfd

Syntax: show tech-support bfd [session session-id]

The session session-id parameter specifies the BFD session ID.

This command generates system and debugging information specific to BFD configurations.

The default output of the show tech-support bfd command includes the output of the following commands:

- show bfd
- show bfd neighbor detail
- show bfd application
- show bfd mpls detail
- show bfd debug

For the specified session ID, the output of the show tech-support bfd command includes the output of the show bfd debug session session-id command.
show tech-support bgp

Syntax:  show tech-support bgp [[vrf vrf-name  | l2vpn vpls | vpnv4 | ipv4 unicast | ipv4 multicast] [route ip-prefix] | [[ipv6 unicast | ipv6 multicast] [route ipv6-prefix]]]

- **vrf vrf-name** - Specifies the name of the Virtual Routing and Forwarding (VRF) instance for which you want to display the configuration information.
- **l2vpn vpls** - Displays information related to all the BGP Layer 2 Virtual Private Network (L2VPN) Virtual Private LAN Services (VPLS) routes.
- **vpnv4** - Displays information related to all the BGP Virtual Private Network Version 4 (VPNv4) routes.
- **ipv4 unicast** - Displays the IPv4 unicast route information for BGP routes.
- **ipv4 multicast** - Displays the IPv4 multicast route information for BGP routes.
- **route ip-prefix** - Specifies the IPv4 destination prefix and mask length for the BGP route.
- **ipv6 unicast** - Displays the IPv6 unicast route information for BGP routes.
- **ipv6 multicast** - Displays the IPv6 multicast route information for BGP routes.
- **route ipv6-prefix** - Specifies the IPv6 destination prefix and mask length for the BGP route.

This command generates system and debugging information specific to BGP configurations.

The default output of the `show tech-support bgp` command includes the output of the following commands:

- `show ip bgp config`
- `show ip bgp peer-group`
- `show ip bgp summary`
- `show ip bgp neighbors`
- `show ip bgp nexthop`
- `show ip bgp debug`
- `show ip bgp debug memory`
- `show ip bgp debug out-policy`
- `show ip bgp debug out-policy peer-list`
- `show ip tcp connections all-vrfs`
- `show ipv6 tcp connections`
- `show ip tcp debug`

For a particular route, the output of the `show tech-support bgp` command includes the output of the following commands:

- `show ip bgp route detail ip-prefix`
- `show ip bgp nexthop nexthop-addr`
- `show ip route nexthop-addr`

show tech-support fib

Syntax:  show tech-support fib ipv4 ip-address/prefix

The `ipv4 ip-address/prefix` parameter specifies the destination IPv4 address and IP subnet mask length.
This command generates system and debugging information specific to FIB configurations. The command displays route details of an IPv4 address or prefix including information such as Management Processor (MP) route information, MP data structure information, Line Processor (LP) cache information, Programmable Random Access Memory (PRAM) information, and LP data structure information.

For a static or dynamically learned route, the output of the `show tech-support fib` command includes the output of the following commands:

- `show ip route ip-address/prefix debug`
- `show arp nexthop ip`
- `dm pram port index ip`

For a Generic Routing Encapsulation (GRE) tunnel route, the output of the `show tech-support fib` command includes the output of the following commands:

- `show ip route ip-address/prefix debug`
- `show ip-tunnels tunnel-id`
- `show nht-table`
- `dm pram port ingress-pram-index ip`

For an IP over MPLS (IPoMPLS) tunnel route, the output of the `show tech-support fib` command includes the output of the following commands:

- `show ip route ip-address/prefix debug`
- `show mpls lsp name name`
- `show nht-table`
- `dm pram port ingress-pram-index ip`

`show tech-support ip multicast`

**Syntax:** `show tech-support ip multicast [vlan vlan_id | vpls vpls_id] [group_address]`

- `vlan vlan_id` - Displays multicast snooping information for the specified VLAN ID.
- `vpls vpls_id` - Displays multicast snooping information for the specified VPLS ID
- `group_address` - Displays multicast snooping information for the specified group address.

The `show tech-support ip multicast` command is used on both the MP and the LP to collect snooping information specific to IPv4 multicast. The list of commands captured from the MP and LP will be different.

On the MP module, the default output of the `show tech-support ip multicast` command includes the output of the following commands:

- `show ip multicast`
- `show ip multicast resource`
- `show ip multicast static`

When you specify either the VLAN ID or VPLS ID on the MP, the `show tech-support ip multicast` command output includes the output of the following commands:

- `show ip multicast`
- `show ip multicast resource`
- `show ip multicast static`
• show ip multicast vlan vlan_id | vpls vpls_id
• show ip multicast vlan vlan_id | vpls vpls_id statistics
• show ip multicast vlan vlan_id | vpls vpls_id igmpv3
• show ip multicast vlan vlan_id | vpls vpls_id pim
• show ip multicast vlan vlan_id | vpls vpls_id tracking

When you specify a group address along with the VLAN ID or VPLS ID, the show tech-support ip multicast command displays multicast snooping information for the specified group address along with the global and VLAN- or VPLS-specific snooping information.

On the LP module, when you specify either the VLAN ID or VPLS ID, the show tech-support ip multicast command output includes the output of the following commands:

• show ip multicast
• show ip multicast resource
• show ip multicast vlan vlan_id | vpls vpls_id

show tech-support ip ospf

Syntax: show tech-support ip ospf [route ip-address | vrf vrf-name | vrf-all]

• route ip-address - Specifies the destination IP address for the OSPF route.
• vrf vrf-name - Specifies the name of the VRF instance for which you want to display the configuration information.
• vrf-all - Displays the configuration information for all the VRF instances.

This command generates system and debugging information specific to IPv4 OSPF configurations.

The default output of the show tech-support ip ospf command includes the output of the following commands:

• show ip ospf summary
• show ip ospf
• show ip ospf interface
• show ip ospf neighbor extensive
• show ip ospf border-routers
• show ip ospf database database-summary
• show ip ospf traffic
• show ip ospf debug
• show ip ospf debug memory
• show ip ospf debug appendix-e
• show ip ospf debug summary-routes
• show ip ospf debug misc
• show ip ospf config
• show ip ospf area
• show ip ospf sham-links
• show ip ospf virtual link
• show ip ospf virtual neighbor
show tech-support

- show ip ospf debug interface
- show ip ospf debug graceful-restart
- show ip ospf debug hello-timer
- show ip ospf debug opaque-link
- show ip ospf debug dspt
- show ip ospf debug lsp.shortcuts

For a particular route, the output of the **show tech-support ip ospf** command includes the output of the following commands:

- show ip ospf route ip-address
- show ip ospf database link-state link-state-id ip-address

**show tech-support ip pim**

**Syntax:** show tech-support ip pim [vrf vrf-name | all-vrf | mcache group_address | source_address | vrf vrf-name mcache group_address | source_address]

- **vrf vrf-name** - Specifies the name of the VRF instance for which you want to display the PIM-specific configuration information.
- **vrf-all** - Displays the PIM-specific configuration information for all the VRF instances.
- **mcache group_address | source_address** - Displays all IPv4 multicast cache entries for the specified group or source address.

The **show tech-support ip pim** command is used on both the MP and the LP to collect system and debugging information specific to IPv4 PIM. The list of commands captured from the MP and LP will be different.

On the MP module, with the default VRF or when you specify the **vrf vrf-name** parameter, the **show tech-support ip pim** command output includes the output of the following commands:

- show ip pim sparse
- show ip pim dense
- show ip pim interface
- show ip pim neighbor
- show ip pim bsr
- show ip pim anycast-rp
- show ip pim rp-candidate
- show ip pim rp-set
- show ip pim prune
- show ip pim nsr
- show ip pim traffic
- show ip pim resource
- show ip pim optimization
- show ip pim counters
- show ip pim counter nsr
- show ip pim counter mct
- show ip pim counter tbp
show tech-support

- show ip pim mcache count
- show ip msdp summary
- show task-counter mcast
- show task mcast
- show ip igmp settings
- show ip igmp interface
- show ip igmp static
- show ip igmp ssm-map

On the LP module, with the default VRF or when you specify the `vrf vrf-name` parameter, the `show tech-support ip pim` command output includes the output of the following commands:

- show ip pim settings
- show ip pim interface
- show ip pim neighbor
- show ip pim anycast-rp
- show ip pim rp-set
- show ip pim rep-table
- show ip pim resource
- show ip pim counters

On the MP module, when you specify the `mcache group_address | source_address` parameter, the `show tech-support ip pim` command output includes the output of the following commands:

- show ip igmp group
- show ip pim mcache `group_address | source_address`

On the LP module, when you specify the `mcache group_address | source_address` parameter, the `show tech-support ip pim` command output includes the output of the following commands:

- show ip igmp group
- show ip pim mcache `group_address | source_address`

show tech-support ip vrrp

Syntax: `show tech-support ip vrrp`

This command generates system and debugging information specific to IPv4 VRRP configurations.

The default output of the `show tech-support ip vrrp` command includes the output of the following commands:

- show ip vrrp brief
- show ip vrrp statistics

show tech-support ip vrrp-extended

Syntax: `show tech-support ip vrrp-extended`

This command generates system and debugging information specific to IPv4 VRRP-extended (VRRP-E) configurations.
The default output of the `show tech-support ip vrrp-extended` command includes the output of the following commands:

- `show ip vrrp-extended brief`
- `show ip vrrp-extended statistics`

### `show tech-support ipv6 multicast`

**Syntax:** `show tech-support ipv6 multicast [vlan vlan_id] [group_address]`

- `vlan vlan_id` - Displays multicast snooping information for the specified VLAN ID.
- `group_address` - Displays multicast snooping information for the specified group address.

The `show tech-support ipv6 multicast` command is used on both the MP and the LP to collect snooping information specific to IPv6 multicast. The list of commands captured from the MP and LP will be different.

On the MP module, the default output of `show tech-support ipv6 multicast` command includes the output of the following commands:

- `show ipv6 multicast`
- `show ipv6 multicast resource`
- `show ipv6 multicast static`

When you specify the VLAN ID on the MP, the `show tech-support ipv6 multicast` command output includes the output of the following commands:

- `show ipv6 multicast`
- `show ipv6 multicast resource`
- `show ipv6 multicast static`
- `show ipv6 multicast vlan vlan_id`
- `show ipv6 multicast vlan vlan_id statistics`
- `show ipv6 multicast vlan vlan_id mldv2`
- `show ipv6 multicast vlan vlan_id pim`
- `show ipv6 multicast vlan vlan_id tracking`

When you specify a group address along with the VLAN ID, the `show tech-support ipv6 multicast` command displays multicast snooping information for the specified group address along with the global and VLAN-specific snooping information.

On the LP module, when you specify the VLAN ID, the `show tech-support ipv6 multicast` command output includes the output of the following commands:

- `show ipv6 multicast`
- `show ipv6 multicast resource`
- `show ipv6 multicast vlan vlan_id`

### `show tech-support ipv6 ospf`

**Syntax:** `show tech-support ipv6 ospf [route ipv6-address | vrf vrf-name | vrf-all]`

- `route ipv6-address` - Specifies the destination IPv6 address for an OSPF route.
- `vrf vrf-name` - Specifies the name of the VRF instance for which you want to display the configuration information.
• **vrf-all** - Displays the configuration information for all VRF instances.

This command generates system and debugging information specific to IPv6 OSPF configurations.

The default output of the `show tech-support ipv6 ospf` command includes the output of the following commands:

- `show ipv6 ospf summary`
- `show ipv6 ospf`
- `show ipv6 ospf area`
- `show ipv6 ospf spf tree`
- `show ipv6 ospf interface`
- `show ipv6 ospf neighbor`
- `show ipv6 ospf mem`
- `show ipv6 ospf virtual-links`
- `show ipv6 ospf virtual-neighbor`

For a particular route, the output of the `show tech-support ipv6 ospf` command includes the output of the following commands:

- `show ipv6 ospf route ipv6-prefix`
- `show ipv6 ospf database prefix ipv6-prefix`

**show tech-support ipv6 pim**

**Syntax:** `show tech-support ipv6 pim [vrf vrf-name | all-vrf | mcache group_address | source_address | vrf vrf-name mcache group_address | source_address]`

- **vrf vrf-name** - Specifies the name of the VRF instance for which you want to display the PIM-specific configuration information.
- **vrf-all** - Displays the PIM-specific configuration information for all the VRF instances.
- **mcache group_address | source_address** - Displays all IPv6 multicast cache entries for the specified group or source address.

The `show tech-support ipv6 pim` command is used on both the MP and the LP to collect system and debugging information specific to IPv6 PIM. The list of commands captured from the MP and LP will be different.

On the MP module, with the default VRF or when you specify the **vrf vrf-name** parameter, the `show tech-support ipv6 pim` command output includes the output of the following commands:

- `show ipv6 pim sparse`
- `show ipv6 pim interface`
- `show ipv6 pim neighbor`
- `show ipv6 pim bsr`
- `show ipv6 pim anycast-rp`
- `show ipv6 pim rp-candidate`
- `show ipv6 pim rp-set`
- `show ipv6 pim resource`
- `show ipv6 pim group`
- `show ipv6 pim traffic`
- show ipv6 pim counter
- show ipv6 pim counter mct
- show ipv6 pim counter tbp
- show task-counter mcast6
- show task mcast6
- show ipv6 mld settings
- show ipv6 mld interface
- show ipv6 mld traffic

On the LP module, with the default VRF or when you specify the `vrf vrf-name` parameter, the `show tech-support ipv6 pim` command output includes the output of the following commands:

- show ipv6 pim settings
- show ipv6 pim interface
- show ipv6 pim neighbor
- show ipv6 pim anycast-rp
- show ipv6 pim rp-set
- show ipv6 pim counters
- show ipv6 pim resource

On the MP module, when you specify the `mcache group_address | source_address` parameter, the `show tech-support ipv6 pim` command output includes the output of the following commands:

- show ipv6 mld group
- show ipv6 pim mcache `group_address | source_address`

On the LP module, when you specify the `mcache group_address | source_address` parameter, the `show tech-support ipv6 pim` command output includes the output of the following command:

- show ipv6 pim mcache `group_address | source_address`

**show tech-support ipv6 vrrp**

*Syntax: show tech-support ipv6 vrrp*

This command generates system and debugging information specific to IPv6 VRRP configurations.

The default output of the `show tech-support ipv6 vrrp` command includes the output of the following commands:

- show ipv6 vrrp brief
- show ipv6 vrrp statistics

**show tech-support ipv6 vrrp-extended**

*Syntax: show tech-support ipv6 vrrp-extended*

This command generates system and debugging information specific to IPv6 VRRP-E configurations.

The default output of the `show tech-support ipv6 vrrp-extended` command includes the output of the following commands:

- show ipv6 vrrp-extended brief
• show ipv6 vrrp-extended statistics

show tech-support interface-link

Syntax: show tech-support interface-link [slot]
The optional slot variable specifies the slot number for which you want to collect information for the link layer.

This command executed on the global level collects debugging information for all the slots.

The output of the show tech-support interface-link command includes the output of the following commands:
• show module
• show logging
• show running-config interface
• show statistics
• show interfaces brief
• show media
• show optic
• show optic thresholds
• show local-fault
• show remote-fault
• show bip

show tech-support isis

Syntax: show tech-support isis route [ip-prefix | ipv6-prefix]
• route ip-prefix - Specifies the IPv4 destination prefix and mask length for the IS-IS route.
• route ipv6-prefix - Specifies the IPv6 destination prefix and mask length for the IS-IS route.

This command generates system and debugging information specific to IS-IS configurations.

The default output of the show tech-support isis command includes the output of the following commands:
• show isis configuration
• show isis interface
• show isis neighbor detail
• show isis hostname
• show isis spf-log detail
• show isis counts
• show isis traffic
• show isis shortcut detail
• show isis debug
• show isis debug counters
• show isis debug memory
• show isis debug memory pool
• show isis debug pent
• show isis debug ip-nexthop-set
• show isis debug ipv6-pent
• show isis debug ipv6-nexthop-set
• show isis debug link-info
• show isis debug redis
• show isis debug adj-timer
• show isis debug lsp-timer
• show isis debug adj-options-order

For a particular route, the output of the `show tech-support isis` command includes the output of the following commands:

• show isis debug route-info `ip-prefix`
• show isis debug v6route-info `ipv6-prefix`

show tech-support l4

Syntax: `show tech-support l4 acl acl | all`
• `acl acl` - Specifies the name of the Access Control List (ACL) instance for which you want to display the Layer 4 configuration information.
• `acl all` - Collects Layer 4 configuration information for all the ACL instances.

The `show tech-support l4 acl acl | all` command is supported only on MP.

Syntax: `show tech-support l4 pbr policy name | all`
• `pbr policy-name` - Specifies the name of the Policy-Based Routing (PBR) instance for which you want to display the Layer 4 configuration information.
• `pbr all` - Collects Layer 4 configuration information for all the PBR instances.

The `show tech-support l4 pbr policy name | all` command is supported only on LP.

The output of the `show tech-support l4 acl acl | all` command includes the output of the following commands:

• show cam-partition usage
  The `show cam-partition usage` command is supported only on Brocade MLX series devices.

• show resources
• show access-list count
• show ipv6 access-list count
• show access-list [all | acl-name]
• show access-list all | acl
• show ipv6 access-list [all | acl-name]
• show ipv6 access-list all | acl
• show access-list bindings
• show ipv6 access-list bindings
Based on the specified ACL name, the output of the `show tech-support l4 acl acl` command will be filtered as follows:

- If an IPv4 inbound ACL is specified, use the `show cam l4 slot/port` command.
- If an IPv4 outbound ACL is specified, use the `show cam l4out slot/port` command.
- If an IPv6 inbound ACL is specified, use the `show cam v6acl slot/port` command.
- If an IPv6 outbound ACL is specified, use the `show cam v6out slot/port` command.

The output of the `show tech-support l4 pbr all` command includes the output of the following commands:

- `show tech-support l4 pbr policy name | all` (supported only on LP)

In each LP, the output of the `show tech-support l4 pbr policy name | all` command includes the output of the following commands:

- `show route-map binding cr | pbr name`
- `show pbr route-map pbr name`
- `show route-map binding pbr-name`
- `show pbr interface slot | port`

show tech-support mpls

Syntax: `show tech-support mpls [brief | detail | debug | ldp | rsvp | static-lsp]`

- `brief` - Collects brief technical support information for the MPLS configurations.
- `detail` - Collects detailed technical support information for the MPLS configurations.
- `debug` - Collects debugging information for the MPLS configurations.
- `ldp` - Collects Label Distribution Protocol (LDP)-related debug information.
- `rsvp` - Collects Resource ReSerVation Protocol (RSVP)-related debug information.
- `static-lsp` - Collects static Label Switched Path (LSP)-related debug information.

The `show tech-support mpls` command generates system and debugging information specific to MPLS configurations. Instead of collecting output of all `show mpls` and `show mpls debug` using the `show tech-support mpls` command, you can collect information based on protocol and the level of detail you require. You can also use the `brief`, `detail`, and `debug` options with the `ldp`, `rsvp`, and `static-lsp` options to specify the level of debugging information to be displayed for the specified protocol. For example, execute the `show tech-support mpls ldp detail` command to collect detailed technical support information for the MPLS LDP configurations.

The default output of the `show tech-support mpls` command includes the output of the following commands:

- `show mpls autobw-template`
- `show mpls bfd`
- `show mpls bypass-lsp extensive`
- `show mpls config`
- `show mpls dynamic-bypass`
- `show mpls dynamic-bypass interface detail`
- `show mpls forwarding`
- `show mpls interfaces`
• show mpls ldp
• show mpls ldp database
• show mpls ldp fec prefix
• show mpls ldp fec vc
• show mpls ldp interface
• show mpls ldp neighbor detail
• show mpls ldp path
• show mpls ldp peer detail
• show mpls ldp session detail
• show mpls ldp statistics
• show mpls ldp targeted-peer
• show mpls ldp tunnel detail
• show mpls lsp extensive
• show mpls memory
• show mpls path detail
• show mpls policy
• show mpls route
• show mpls rsvp
• show mpls rsvp interface detail
• show mpls rsvp neighbor
• show mpls rsvp session debug
• show mpls rsvp statistics
• show mpls statistics 6pe
• show mpls statistics label
• show mpls statistics ldp transit
• show mpls statistics lsp
• show mpls statistics oam
• show mpls statistics tunnel
• show mpls summary
• show mpls ted database detail
• show mpls debug counters
• show mpls debug cs pf map
• show mpls debug cs pf tables
• show mpls debug dynamic-bypass
• show mpls debug flooding-thresholds
• show mpls debug ldp lsp
• show mpls debug ldp peer
• show mpls debug ldp session
• show mpls debug lib
show mpls debug lmgr
• show mpls debug lsp
• show mpls debug next-hop
• show mpls debug oam
• show mpls debug oam session all
• show mpls debug perf
• show mpls debug pw
• show mpls debug pw pw-status-tree
• show mpls debug rcp fec-history
• show mpls debug rcp lsp-cb
• show mpls debug rcp session
• show mpls debug rcp summary
• show mpls debug rcse
• show mpls debug rldf
• show mpls debug rldf-hist
• show mpls debug rri addr
• show mpls debug rri interface
• show mpls debug rri route
• show mpls debug rsir
• show mpls debug rsir del-pending-fec-tree
• show mpls debug rsir egress-fec-tree
• show mpls debug rsir query-fec-tree
• show mpls debug rsir unresolved-fec-tree
• show mpls debug rsvp
• show mpls debug secondary-lsp
• show mpls debug settings
• show mpls debug tunnel-interface

The output of the **show tech-support mpls brief** command includes the output of the following commands:

• show mpls config brief
• show mpls forwarding
• show mpls interfaces brief
• show mpls memory
• show mpls route
• show mpls statistics oam
• show mpls statistics tunnel
• show mpls summary
• show mpls autobw-template wide
• show mpls bfd
• show mpls bypass-lsp wide
• show mpls dynamic-bypass
• show mpls dynamic-bypass interface brief
• show mpls lsp wide
• show mpls path wide
• show mpls policy
• show mpls rsvp
• show mpls rsvp interface brief
• show mpls rsvp neighbor
• show mpls rsvp session wide
• show mpls rsvp session p2mp s2l
• show mpls forwarding p2mp
• show mpls rsvp statistics
• show mpls statistics lsp
• show mpls rsvp igp-sync
• show mpls rsvp igp-sync link
• show mpls rsvp igp-sync lsp
• show mpls ted database
• show mpls ldp
• show mpls ldp database
• show mpls ldp fec prefix
• show mpls ldp fec vc
• show mpls ldp interface
• show mpls ldp neighbor
• show mpls ldp path
• show mpls ldp peer brief
• show mpls ldp session brief
• show mpls ldp statistics ldp tunnel
• show mpls ldp statistics
• show mpls ldp targeted-peer
• show mpls ldp tunnel brief
• show mpls ldp static-lsp

The output of the **show tech-support mpls ldp brief** command includes the output of the following commands:

• show mpls ldp
• show mpls ldp database
• show mpls ldp fec prefix
• show mpls ldp fec vc
• show mpls ldp interface
• show mpls ldp neighbor
• show mpls ldp path
• show mpls ldp peer brief
• show mpls ldp session brief
• show mpls statistics ldp tunnel
• show mpls ldp statistics
• show mpls ldp targeted-peer
• show mpls ldp tunnel brief

The output of the **show tech-support mpls rsvp detail** command includes the output of the following commands:

• show mpls autobw-template detail
• show mpls bfd
• show mpls bypass-lsp detail
• show mpls dynamic-bypass
• show mpls dynamic-bypass interface detail
• show mpls lsp detail
• show mpls path detail
• show mpls policy
• show mpls rsvp
• show mpls rsvp interface detail
• show mpls rsvp neighbor
• show mpls rsvp session detail
• show mpls rsvp session p2mp detail
• show mpls forwarding p2mp detail
• show mpls rsvp statistics
• show mpls statistics lsp
• show mpls rsvp igp-sync
• show mpls rsvp igp-sync link detail
• show mpls rsvp igp-sync lsp detail
• show mpls ted database detail

The output of the **show tech-support mpls static-lsp debug** command includes the output of the following commands:

• show mpls label-range
• show mpls static-lsp debug

**show tech-support mpls label**

**Syntax:**  
`show tech-support mpls label label [brief | detail]`

- **label** - Specifies the label ID.
- **brief** - Displays brief technical support information for the MPLS label.
- **detail** - Displays detailed technical support information for the MPLS label.
This command combines and displays the output of the `show tech-support` commands related to MPLS cross-connect entries and corresponding label RAM information on each packet processor.

On the MP module, the `show tech-support mpls label` command output includes the output of the following commands:

- `show mpls forwarding`

For each of the LPs that has the MPLS interface enabled, the following command outputs are collected and displayed:

- `show mpls lsp_xc in-label`
- `show nht-table`
- `dm label-ram me/N LABEL`
- `dm pram slot/interface pram_index mpls`

`show tech-support openflow`

**Syntax:** `show tech-support openflow`

This command generates system and debugging information specific to OpenFlow configurations. The output of the `show tech-support openflow` command includes the output of the following commands:

- `show openflow datapath-id`
- `show openflow controller`
- `show openflow interface`
- `show openflow flows`
- `show versions`
- `show interfaces`
- `show statistics`
- `show running-config`
- `show logging`
- `show save`

`show tech-support rtm`

**Syntax:** `show tech-support rtm [vrf vrf-name [route ip-prefix]]`

- `vrf vrf-name` - Specifies the name of the VRF instance for which you want to display the configuration information.
- `route ip-prefix` - Specifies the IPv4 destination prefix and mask length for the RTM route.

This command generates system and debugging information specific to IPv4 RTM configurations. The default output of the `show tech-support rtm` command includes the output of the following commands:

- `show ip rtm`
- `show ip route summary`
- `show ip route nexthop`
- `show ip rtm api`
For a particular route, the output of the `show tech-support rtm` command includes the output of the following commands:

- `show ip route ip-prefix debug`
- `show ip static route ip-prefix`
- `show ip ospf routes ip-address`
- `show isis routes ip-prefix`
- `show ip bgp routes ip-prefix`
- `show ip rip route ip-prefix`
- `show ip network ip-prefix`

`show tech-support rtm6`

Syntax: `show tech-support rtm6 [vrf vrf-name [route ipv6-prefix]]`

- `vrf vrf-name` - Specifies the name of the VRF instance for which you want to display the configuration information.
- `route ipv6-prefix` - Specifies the IPv6 destination prefix and mask length for the RTM route.

This command generates system and debugging information specific to IPv6 RTM configurations.

The default output of the `show tech-support rtm6` command includes the output of the following commands:

- `show ipv6 rtm`
- `show ipv6 route summary`
- `show ipv6 rtm api`

For a particular route, the output of the `show tech-support rtm6` command includes the output of the following commands:

- `show ipv6 route ipv6-prefix debug`
- `show ipv6 static route ipv6-prefix`
- `show ipv6 ospf routes ipv6-address`
- `show ipv6 isis routes ipv6-prefix`
- `show ipv6 bgp routes ipv6-prefix`
- `show ipv6 rip route ipv6-prefix`
- `show ipv6 network ipv6-prefix`

`show tech-support sfm`

Syntax: `show tech-support sfm`

This command generates system and debugging information specific to SFM and high-speed SFM (hSFM) configurations.

The output of the `show tech-support sfm` command includes the output of the following commands:

- `show sfm-mode`
- `show sfm-serdes-mode`
- `show sfm utilization`
show tech-support system

Syntax:  show tech-support system

This command is available on both the MP and the LP separately to fetch the system-related information for debugging purposes.

The output of the show tech-support system command executed from the MP includes the output of the following commands:

- show clock
- show version
- show flash
- dir
- show redundancy
- show module
- show sfm-mode
- show sfm-utilization all
- show sfm-link all error
- show sfm-links all
- dm rw-snm all all get-link-stats brief
- show sfm logging
- show tm log
- show interface brief
- show lag brief
- show lag
- show stat brief
- show memory
- show task
- show cpu
- show cpu lp
- show np stat
show tech-support

- show tm stat all
- show tm non
- ipc show stats
- ipc show dy-sync master
- dm pstat
- show temp
- show chassis
- show memory pool
- show memory
- show emac
- show bm

The output of the **show tech-support system** command executed from the LP includes the output of the following commands:

- show tm stats all
- show tm link serdes-error
- dm status rx me/x
- dm status tx me/x
- dm debug -stat me/x
- show packet pbif
- dm packet xpp
- dm tm nif-stats
- show memory pool
- show memory
- tsec 0 show
- show bm

**show tech-support tm**

**Syntax:** show tech-support tm [slot slot_number] [critical-registers]

- **slot slot_number** - Collects technical support information related to the TM for a specific slot.
- **critical-registers** - Collects critical registers information for the TM.

This command generates system and debugging information specific to TM configurations.

The output of the **show tech-support tm** command includes the output of the following commands:

- show tm statistics
- show tm non-empty queues
- show tm interrupts
- show tm link serdes errors
- show tm critical registers
- show tm logging
Tracing routing history

The IP Forwarding Information Base (FIB) trace feature records the history of routing events on the line processor (LP) along with the allocated and de-allocated Content Addressable Memory (CAM) and Parameter Random Access Memory (PRAM) indexes. The trace information is used for debugging purposes.

**NOTE**
The debug tracing is supported only on the LP.

**trace-util ip**

**Syntax:** `trace-util ip [change-size | clear-trace | dump | show-trace-ctrl | start-trace | stop-trace | stop-when-full | time-stamp]`

- **change-size** - Reinitializes the trace and changes trace buffer size.
- **clear-trace** - Clears trace buffer entries.
- **dump** - Dumps trace buffer entries.
- **show-trace-ctrl** - Displays trace control information.
- **start-trace** - Starts tracing of routing events.
- **stop-trace** - Stops tracing of routing events.
- **stop-when-full** - Stops tracing of routing events if the trace buffer is full.
- **time-stamp** - Allows to either skip or capture the time stamp.

The `trace-util ip` command records the history of routing events.

**trace-util ip dump**

**Syntax:** `trace-util ip dump [ all | grp-by-ip | ip-prefix]`

- **all** - Displays all trace buffer entries.
- **grp-by-ip** - Displays all trace buffer entries grouped by the IP address.
- **ip-prefix** - Displays all trace buffer entries for the specified IP prefix and mask.

The `trace-util ip dump all` command displays all trace buffer entries. Command output resembles the following example.

```
Brocade# trace-util ip dump all
Trace Control Info:
    start_tag_id:0x0000
    stop_tag_id :0x0000
    num_entries :16384
    next_entry  :71
    p_log_buf   :0x25575000
    flag        :0x00000aa0
    Trace Control Block Initialized       (0x00000020)
    Trace Control Start Tracing is SET    (0x00000080)
70 Mar 27 16:27:14 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY: ipaddr.10.0.0.0/8, ppcr:7 cam_index:0x0004549e, pram_index:0x000000a4
69 Mar 27 16:27:14 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY: ipaddr.10.0.0.0/8, ppcr:6 cam_index:0x0004549e, pram_index:0x000000a4
68 Mar 27 16:27:14 (tag_id:0x0006) IP_ADD_NETWORK_ROUTE_TO_L3_CAM:
                          ipaddr:10.0.0.0/8)
67 Mar 27 16:27:14 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
```

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The trace-util ip dump grp-by-ip command displays all trace buffer entries grouped by the IP address. Command output resembles the following example.

Brocade# trace-util ip dump grp-by-ip
Trace for IP address 0:0:0:0/0 count[2] start of list[20]
20 Jan 1 00:00:00 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.0.0.0.0/0, ppcr:6 cam_index:0x00040800, pram_index:0x0000008a
21 Jan 1 00:00:00 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.0.0.0.0/0, ppcr:7 cam_index:0x00040800, pram_index:0x0000008a
-----------
Trace for IP address 1:0:0:0/24 count[3] start of list[42]
42 Mar 27 16:18:03 (tag_id:0x0006) IP_ADD_NETWORK_ROUTE_TO_L3_CAM:
ipaddr.10.0.0.0/24
43 Mar 27 16:18:03 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.10.0.0.0/24, ppcr:6 cam_index:0x00045498, pram_index:0x000000a0
44 Mar 27 16:18:03 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.10.0.0.0/24, ppcr:7 cam_index:0x00045498, pram_index:0x000000a0
-----------
Trace for IP address 1:0:0:0/0 count[2] start of list[40]
40 Mar 27 16:18:03 (tag_id:0x0402) LP_IP_CAM_ADD_IP_ROUTE_CAM_ENTRY:
ipaddr:10.0.0.0/0, ppcr:6, cam_level:0,cam_index:0x00075810, pram_index:0x0000009f

The trace-util ip dump ip-prefix command displays all trace buffer entries for the specified IP prefix and mask. Command output resembles the following example.

Brocade# trace-util ip dump ip-prefix 10.0.0.0/24
display trace for IP address 1:0:0:0/24 [T=N]
Trace for IP address 1:0:0:0/24 count[3] start of list[42]
42 Mar 27 16:18:03 (tag_id:0x0006) IP_ADD_NETWORK_ROUTE_TO_L3_CAM:
ipaddr:10.0.0.0/24
43 Mar 27 16:18:03 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.10.0.0.0/24, ppcr:6 cam_index:0x00045498, pram_index:0x000000a0
44 Mar 27 16:18:03 (tag_id:0x0403) LP_IP_CAM_ADD_IP_ROUTE_CAM2PRAM_ENTRY:
ipaddr.10.0.0.0/24, ppcr:7 cam_index:0x00045498, pram_index:0x000000a0

trace-util ip change-size

Syntax:  trace-util ip change-size size

The size variable specifies the size of the trace buffer. The buffer size can take a value from 256 through 307200.
This command allows configuring trace buffer size. Command output resembles the following example.

Brocade# trace-util ip change-size 5000
successful reinit of trace

Syntax: `ip fib-trace-size size [all | slot]`
- `size` - Specifies the size of the trace buffer. The buffer size can take a value from 256 through 307200.
- `all` - Configures the specified trace buffer size for all slots.
- `slot` - Configures the specified trace buffer size for a specific slot.

You can change the trace buffer size from the Management Processor (MP) by entering a command such as the following.

Brocade# ip fib-trace-size 256 all

trace-util nexthop

Syntax: `trace-util nexthop [clear-trace | dump-trace | remove-filter | set-filter | set-start-tag | set-stop-tag | show-trace-ctrl | start-trace | stop-trace | stop-when-full | time-stamp | translate-tag]`
- `clear-trace` - Clears trace buffer entries.
- `dump-trace` - Dumps trace buffer entries.
- `remove-filter` - Removes the filter key.
- `set-filter` - Sets the filter key.
- `set-start-tag` - Allows to set up of start trace tag ID.
- `set-stop-tag` - Allows to set up of stop trace tag ID.
- `show-trace-ctrl` - Displays trace control information.
- `start-trace` - Starts tracing of routing events.
- `stop-trace` - Stops tracing of routing events.
- `stop-when-full` - Stops tracing of routing events if the trace buffer is full.
- `time-stamp` - Allows to either skip or capture the timestamp.
- `translate-tag` - Translates the tag ID to a string.

The `trace-util nexthop dump-trace` command displays the associated next-hop traces. Command output resembles the following example.

Brocade# trace-util nexthop dump-trace lifo
Trace Control Info:
  start_tag_id:0x00000
  stop_tag_id :0x00000
  num_entries :4096
  next_entry :6
  p_log_buf :0x254f3000
  flag :0x00000ca0
  Trace Control Block Initialized       (0x00000020)
  Trace Control Start Tracing is SET    (0x00000080)

0 Apr 23 11:04:25 (tag_id:0x0507) LP_IP_NEXTHOP_UPD_PRAM_VALID:update pram for 0x2ba8b810, PPCR 7 out intf ve 10,pram_index 0x0000009a
The `trace-util nexthop time-stamp` command allows you to either skip or capture the timestamp in the next-hop traces. Command output resembles the following example when you specify the `skip-capture` option.

Brocade# trace-util nexthop time-stamp skip-capture
Done!

Brocade# trace nexthop dump fifo
Trace Control Info:
   start_tag_id : 0x0000
   stop_tag_id  : 0x0000
   num_entries  : 16384
   next_entry   : 5
   p_log_buf    : 0x25836000
   flag         : 0x00000cb0

   Trace Control Block Initialized       (0x00000020)
   Trace Control Skip Time Stamp capture (0x00000010)
   Trace Control Start Tracing is SET    (0x00000080)

0 (tag_id:0x0506) LP_IP_NEXTHOP_REL_REC: started 0x2e7ac410
1 (tag_id:0x0502) LP_IP_NEXTHOP_PRAM_ALLOC_REC: started 0x2e7ac410
2 (tag_id:0x0507) LP_IP_NEXTHOP_UPD_PRAM_VALID: update pram for 0x2e7ac410, PPCR 9
   out intf eth 4/17, pram_index 0x0003001d
3 (tag_id:0x0507) LP_IP_NEXTHOP_UPD_PRAM_VALID: update pram for 0x2e7ac410, PPCR 10
   out intf eth 4/17, pram_index 0x0003001d
4 (tag_id:0x0507) LP_IP_NEXTHOP_UPD_PRAM_VALID: update pram for 0x2e7ac410, PPCR 11
   out intf eth 4/17, pram_index 0x0003001d

The `supportsave` command is useful when collecting a large amount of debug information for troubleshooting purposes. The output of this command is used by technical support representatives when reporting a problem.

The `supportsave` command has the following advantages over the `show tech-support` command:

- Allows you to add additional commands to collect more data.
- Allows you to transfer the collected data to an external server such as the Trivial File Transfer Protocol (TFTP) server.
supportsave

Collects all relevant support information to a remote TFTP server location.

**Syntax**

```
supportsave tftp_IPaddress [custom]
supportsave show
supportsave [add-cmd index cmd_string | del-cmd index [to index] | show | config]
```

**Parameters**

- **tftp_IPaddress**: Specifies the IPv4 address of a TFTP server.
- **custom**: Executes commands present in all custom and default commands lists and sends the output to the specified TFTP server address. This is an optional parameter and is supported only in privileged EXEC mode.
  
  If you do not specify the `custom` option, the `supportsave` command executes all commands present only in the default commands list and sends the output to the specified TFTP server address.
- **show**: Displays output for all commands present in the default commands list. This option is supported in privileged EXEC mode.
- **config**: Displays all commands present in the default and custom commands lists.
- **add-cmd**: Adds a command to the custom commands list. You can add up to 128 commands to the custom command list. This option is supported only in privileged EXEC mode.
  
  **index**: Specifies the index in the custom commands list where an additional command needs to be added.
  
  The valid range is from 1 through 128.
  
  **cmd_string**: Specifies the privileged EXEC mode commands to be added to the custom commands list.
- **del-cmd**: Removes a command present at the given index or index range from the custom commands list. This option is supported only in privileged EXEC mode.
  
  **index**: Specifies the index of a command in the custom commands list that needs to be removed. The valid range is from 1 through 8.
  
  **to**: To specify a range, you can use this option to specify the end index in the custom commands list. This is an optional parameter.

**Modes**

Privileged EXEC mode

**Usage Guidelines**

- Parallel execution of the `supportsave` command from two different sessions is not allowed.
- Parallel execution of the `supportsave` command and the `copy tftp/scp` commands is not allowed.
- Only IPv4 is supported for the TFTP destination.
- Commands added to the custom commands list must be privileged EXEC mode MP commands.
- Commands are not expanded while adding a command to the custom commands list.
- Brocade recommends not to add any filters with the commands.
Modifying the custom commands list using the `supportsave add-cmd` or `supportsave del-cmd` commands is not allowed while the `supportsave` data collection is in progress.

The abort operation of the `supportsave` command using CTRL+C will only happen after execution of the current command in the list.

The `supportsave` command cannot be added to the custom commands list. Also, the commands which change the CLI mode (`exit`, `quit`, `end`) and commands which restart the router (`switchover`, `reload`, `reload-yes`) must not be added.

Commands cannot be added to the custom commands list with an already existing index using the `add-cmd` option.

Brocade recommends not to close the SSH/Telnet session while `supportsave` data collection is in progress. If the connection fails, the `supportsave` data collection will be terminated.

Brocade recommends not to close the TFTP connection while `supportsave` data collection is in progress using the TFTP server.

When the `supportsave` data collection is in progress, if a command produces more than 5 MB of output, then the output will be chunked into 5 MB files and the chunk files are sent to the TFTP server.

During `supportsave` data collection, if the total output of all the commands exceeds 100 MB, then the `supportsave` operation is terminated.

The file name format of the generated file is as follows:

```
"ss_<randomchars>_<date_time_stamp>_<c or d>_<command_index_in_the_list>_<current_chunk_number>_.txt"
```

The `c` stands for custom command and the `d` stands for default command.

**Examples**

The following is the sample output from the `supportsave show` command.

```
Brocade# supportsave show
DEFAULT COMMANDS
-------------------
1: show tech-support

CUSTOM COMMANDS
----------------
1: show run
2: show ip interface
3: <EMPTY>
4: show interface
5: show cam-partition usage
6: show run
7: show ip interface
8: show ip tcp connection
```

The following is the sample output from the `supportsave` command when the TFTP IP address is specified.

```
Brocade# supportsave 10.1.1.1
.................................................................................................................................................................................................................................................................Supportsave completed
```

The content of the generated file includes the host name, command name, and the corresponding output as shown in the following example. Also, an indication of whether the collected data is complete or partial is included at the end.

```
Brocade
-------------show version------------------------
```
Started at 04:49:09.405 GMT+00 Tue Feb 14 2012
...
Ended at 04:49:09.405 GMT+00 Tue Feb 14 2012

-----------show version [END]---------------------

The following syslog message is generated at the beginning of the supportsave data collection.
SUPPORTESAVE: Data collection has been initiated

Either one of the following syslog messages is generated at the end of the supportsave data collection.
SUPPORTESAVE: Data collection has been completed successfully
SUPPORTESAVE: Partial Data collection has been completed successfully

The following syslog message is generated when the TFTP connection fails.
SUPPORTESAVE: TFTP connection failed with server ip address 10.0.0.1

<table>
<thead>
<tr>
<th>History</th>
<th>Related Commands</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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