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OmniSwitch 6624/6648/ 6800/7700/7800/8800 Troubleshooting Guide

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This troubleshooting guide documents OmniSwitch 6624/6648/770/7800/8800 hardware, including chassis and associated components, and Release 5.1 software. The specifications described in this guide are subject to change without notice.

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About This Guide

This *OmniSwitch Troubleshooting Guide* describes how to use Command Line Interface (CLI) and Dshell commands available on the OmniSwitch 6600 Family, OmniSwitch 6800 Series, OmniSwitch 7700/7800, and the OmniSwitch 8800 to troubleshoot switch and network problems.

Supported Platforms

This information in this guide applies to the following products:

- OmniSwitch 6624 (OmniSwitch 6600-24)
- OmniSwitch 6648 (OmniSwitch 6600-48)
- OmniSwitch 6600-P24
- OmniSwitch 6600-U24
- OmniSwitch 6602-24
- OmniSwitch 6602-48
- OmniSwitch 6800
- OmniSwitch 7700
- OmniSwitch 7800
- OmniSwitch 8800

Note. All references to OmniSwitch 6624 and 6648 switches also apply to the OmniSwitch 6600-P24, OmniSwitch 6600-U24, OmniSwitch 6602-24, and OmniSwitch 6602-48 unless specified otherwise.

Unsupported Platforms

The information in this guide does not apply to the following products:

- OmniSwitch (original version with no numeric model name)
- Omni Switch/Router
- OmniStack
- OmniAccess

Note. Troubleshooting documentation for legacy products (e.g., Omni Switch/Router) can be downloaded at http://support.ind.alcatel.com/releasefiles/indexpage.cfm.

Who Should Read this Manual?

The principal audience for this user guide is Service and Support personnel who need to troubleshoot switch problems in a live network. In addition, network administrators and IT support personnel who need to configure and maintain switches and routers can use this guide to troubleshoot a problem upon advice from Alcatel Service and Support personnel..

However, this guide is *not* intended for novice or first-time users of Alcatel OmniSwitches. Misuse or failure to follow procedures in this guide correctly can cause lengthy network down time and/or permanent damage to hardware. Caution must be followed on distribution of this document.

When Should I Read this Manual?

Always read the appropriate section or sections of this guide *before* you log into a switch to troubleshoot problems. Once you are familiar with the commands and procedures in the appropriate sections you can use this document as reference material when you troubleshoot a problem.

What is in this Manual?

The principal sections (i.e., the chapters numbered numerically) use CLI and Dshell commands to analyze and troubleshoot switch problems. Each section documents a specific switch feature (e.g., hardware, server load balancing, routing).

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

Appendix A provides an architecture overview for the OmniSwitch 6600 Family, OmniSwitch 7700/7800, and the OmniSwitch 8800.

Appendices B and C provide the following for debug and technical support CLI commands:

- Command description.
- Syntax.
- Description of keywords and variables included in the syntax.
- Default values.
- Usage guidelines, which include tips on when and how to use the command.
- Examples of command lines using the command.

- Related commands.
- Release history, which indicates the release when the command was introduced.

Appendix D provides a list of useful VI editor commands and a sample VI session that modifies the **boot.params** file.

What is Not in this Manual?

This guide is intended for troubleshooting switches in live networks. It does not provide step-by-step instructions on how to set up particular features on the switch or a comprehensive reference to all CLI commands available in the OmniSwitch. For detailed syntax on non debug CLI commands and comprehensive information on how to configure particular software features in the switch, consult the user guides, which are listed in "Related Documentation" on page xvii.

How is the Information Organized?

Each chapter in this guide includes troubleshooting guidelines related to a single software feature, such as server load balancing or link aggregation.

Related Documentation

The following are the titles and descriptions of all the Release 5.1 and later OmniSwitch user guides:

- *OmniSwitch 6600 Family Getting Started Guide*

  Describes the hardware and software procedures for getting an OmniSwitch 6624 or 6648 up and running. Also provides information on fundamental aspects of OmniSwitch software and stacking architecture.

- *OmniSwitch 6800 Series Getting Started Guide*

  Describes the hardware and software procedures for getting an OmniSwitch 6800 up and running. Also provides information on fundamental aspects of OmniSwitch software and stacking architecture.

- *OmniSwitch 7700/7800 Getting Started Guide*

  Describes the hardware and software procedures for getting an OmniSwitch 7700 or 7800 up and running. Also provides information on fundamental aspects of OmniSwitch software architecture.

- *OmniSwitch 8800 Getting Started Guide*

  Describes the hardware and software procedures for getting an OmniSwitch 8800 up and running. Also provides information on fundamental aspects of OmniSwitch software architecture.

- *OmniSwitch 6600 Family Hardware Users Guide*

  Complete technical specifications and procedures for all OmniSwitch 6624 and 6648 chassis, power supplies, fans, uplink modules, and stacking modules.

- *OmniSwitch 6800 Series Hardware Users Guide*

  Complete technical specifications and procedures for all OmniSwitch 6800 chassis, power supplies, fans, uplink modules, and stacking modules.

- *OmniSwitch 7700/7800 Hardware Users Guide*

  Complete technical specifications and procedures for all OmniSwitch 7700 and 7800 chassis, power supplies, fans, and Network Interface (NI) modules.

- *OmniSwitch 8800 Hardware Users Guide*

  Complete technical specifications and procedures for all OmniSwitch 8800 chassis, power supplies, fans, and Network Interface (NI) modules.

- *OmniSwitch CLI Reference Guide*

  Complete reference to all CLI commands supported on the OmniSwitch 6624/6648, 7700/7800, and 8800. Includes syntax definitions, default values, examples, usage guidelines and CLI-to-MIB variable mappings.

- *OmniSwitch 6600 Family Switch Management Guide*

  Includes procedures for readying an individual switch for integration into a network. Topics include the software directory architecture, image rollback protections, authenticated switch access, managing switch files, system configuration, using SNMP, and using web management software (WebView).

- *OmniSwitch 6800 Series Switch Management Guide*

  Includes procedures for readying an individual switch for integration into a network. Topics include the software directory architecture, image rollback protections, authenticated switch access, managing switch files, system configuration, using SNMP, and using web management software (WebView).

- *OmniSwitch 7700/7800/8800 Switch Management Guide*

  Includes procedures for readying an individual switch for integration into a network. Topics include the software directory architecture, image rollback protections, authenticated switch access, managing switch files, system configuration, using SNMP, and using web management software (WebView).

- *OmniSwitch 6600 Family Network Configuration Guide*

  Includes network configuration procedures and descriptive information on all the major software features and protocols included in the base software package. Chapters cover Layer 2 information (Ethernet and VLAN configuration), Layer 3 information (RIP and static routes), security options (authenticated VLANs), Quality of Service (QoS), and link aggregation.

- *OmniSwitch 6800 Series Network Configuration Guide*

  Includes network configuration procedures and descriptive information on all the major software features and protocols included in the base software package. Chapters cover Layer 2 information (Ethernet and VLAN configuration), Layer 3 information (RIP and static routes), security options (authenticated VLANs), Quality of Service (QoS), and link aggregation.

- *OmniSwitch 7700/7800/8800 Network Configuration Guide*

  Includes network configuration procedures and descriptive information on all the major software features and protocols included in the base software package. Chapters cover Layer 2 information (Ethernet and VLAN configuration), Layer 3 information (routing protocols, such as RIP and IPX), security options (authenticated VLANs), Quality of Service (QoS), link aggregation, and server load balancing.

- *OmniSwitch 6600 Family Advanced Routing Configuration Guide*

  Includes network configuration procedures and descriptive information on the software features included in the advanced routing software package (OSPF).

- *OmniSwitch 6800 Series Advanced Routing Configuration Guide*

  Includes network configuration procedures and descriptive information on the software features and protocols included in the advanced routing software package (OSPF, DVMRP, PIM-SM).

- *OmniSwitch 7700/7800/8800 Advanced Routing Configuration Guide*

  Includes network configuration procedures and descriptive information on all the software features and protocols included in the advanced routing software package. Chapters cover multicast routing (DVMRP and PIM-SM) and OSPF.

- Technical Tips, Field Notices

  Includes information published by Alcatel's Service and Support group.

- *Release Notes*

  Includes critical Open Problem Reports, feature exceptions, and other important information on the features supported in the current release and any limitations to their support.

These user guides are included on the Alcatel Enterprise User Manual CD that ships with every switch. You can also download these guides at http://www.ind.alcatel.com/library/manuals/index.cfm?cnt=index.

Before Calling Alcatel's Technical Assistance Center

Before calling Alcatel's Technical Assistance Center (TAC), make sure that you have read through the appropriate section (or sections) and have completed the actions suggested for your system's problem.

Additionally, do the following and document the results so that the Alcatel TAC can better assist you:

- Have a network diagram ready. Make sure that relevant information is listed, such as all IP addresses and their associated network masks.
- Have any information that you gathered while troubleshooting the issue to this point available to provide to the TAC engineer.
- If the problem appears to be with only a few-fewer than four-switches, capture the output from the **show tech-support** CLI command on these switches. (See Appendix C, "Technical Support Commands," for more information on **show tech-support** CLI commands.)

When calling Alcatel TAC in order to troubleshoot or report a problem following information can be helpful to get a quick resolution:

- All the dump files that were created, if any
- Output of switch log or the switch log files **swlog1.log** and **swlog2.log**
- Configuration file **boot.cfg**
- A capture of the **show microcode** command
- A capture of the **show module long** command
- A capture of the **show tech-support** command from CLI.
- If a CMM fail over to the redundant CMM happened because of this failure then include this information from both of the CMMs.

Dial-in or Telnet access can also helpful for effective problem resolution.

1 Troubleshooting the Switch System

In order to troubleshoot the system, a basic understanding of the operation of Chassis Management Modules (CMMs) and their interaction with Network Interface (NI) modules is required. Some concepts are covered in this chapter:

- Understanding of the "Diagnosing Switch Problems" chapter in the appropriate *OmniSwitch Switch Management Guide*.
- Understanding of the "Using Switch Logging" from the appropriate *OmniSwitch Network Configuration Guide* is highly recommended.

In This Chapter

Introduction

The CMM is the Management Module of the switch. All of the critical operations of the switch including the monitoring is the responsibility of the CMM. CMM not only provides monitoring but also synchronizes all of the NI for different operations. The operation of the CMM is the same in OS-6/7/8XXX switches. The only difference is that OS-6/7XXX has the switching fabric inherent to the module whereas OS-8800 has fabric at the back of the chassis.

NI has a build in CPU. Each NI has its own CPU, which acts independently of the CMM. The CPU of the NI has to interact with the CPU on the CMM for certain operations. If this operation becomes out of sync then it can create problems specific to that NI.

In order to troubleshoot the system, an understanding of the CMM and NI operation is essential.

Troubleshooting System for OS-6624/6648 and OS-7/8XXX

If the switch is having any problems the first place to look for is the CMM. All the task are supervised by CMM. Any in coherency between CMM and the NI can cause problems to appear.

1 The first step for troubleshooting problems with the switch is to look at the overall general health of the switch.

OmniSwitch 7700/7800/8800

Verify that all of the modules in the chassis are up and operational, using the command:

```
-> show module status

Operational                Firmware
Slot     Status      Admin-Status   Rev           MAC
------+-------------+------------+---------+-----------------
CMM-A    UP            POWER ON      36      00:d0:95:6b:09:40

NI-1     UP            POWER ON      5       00:d0:95:6b:22:5c

NI-3     UP            POWER ON      5       00:d0:95:6b:23:2e

NI-5     UP            POWER ON      5       00:d0:95:6b:3a:20
```

OmniSwitch 6624/6648

If the switch is having any problems the first place to look for is the CMM. All the task are supervised by CMM. Any in coherency between CMM and the NI can cause problems to appear. For OS-6600 with 8 units stacked together, the CMM will be:

- Primary
- Secondary
- Idle

The switch with the lowest ID will become the primary CMM.

The first step for troubleshooting problems with the switch is to look at the overall general health of the switch.

Verify that all of the modules in the chassis are up and operational, using the command:

```
-> show module status
        Operational                Firmware
Slot     Status      Admin-Status   Rev           MAC
------+-------------+------------+---------+-----------------
CMM-1    UP            POWER ON      N/A     00:d0:95:84:4b:d2


CMM-2    SECONDARY     POWER ON      N/A     00:d0:95:84:4b:d2


NI-1     UP            POWER ON      N/A     00:d0:95:84:4b:d4
```

```
NI-2      UP           POWER ON      N/A     00:d0:95:84:3d:26


NI-3      UP           POWER ON      N/A     00:d0:95:86:50:f4


NI-4      UP           POWER ON      N/A     00:d0:95:84:49:be


NI-5      UP           POWER ON      N/A     00:d0:95:84:39:be


NI-6      UP           POWER ON      N/A     00:d0:95:84:4a:90


NI-7      UP           POWER ON      N/A     00:d0:95:84:39:f4


NI-8      UP           POWER ON      N/A     00:d0:95:84:3c:44
```

OmniSwitch 6600 with 8 stackable switches show up. Notice that the switch with ID 1 is the primary CMM and the switch with ID of 2 is the secondary. All the switch also show up as NI because each switch has a CPU and is also a NI.

To verify the stacking topology, use the following command:

```
-> show stack topology
                Link A    Link A    Link A      Link B    Link B    Link B
NI    Role      State     RemoteNI  RemoteLink  State     RemoteNI  RemoteLink
---+-----------+---------+---------+-----------+---------+---------+----------
1  PRIMARY        ACTIVE      8          51      ACTIVE    2          52
2  SECONDARY      ACTIVE      3          27      ACTIVE    1          52
3  IDLE           ACTIVE      2          51      ACTIVE    4          52
4  IDLE           ACTIVE      5          51      ACTIVE    3          28
5  IDLE           ACTIVE      4          51      ACTIVE    6          52
6  IDLE           ACTIVE      7          51      ACTIVE    5          52
7  IDLE           ACTIVE      6          51      ACTIVE    8          52
8  IDLE           ACTIVE      1          51      ACTIVE    7          2
```

The above command shows the stacking topology. Switch 1 is the primary connected to Switch 8 on port 51 and Switch 2 on port 52. The state of CPUs for all the switches in the stack is shown by the output of this command.

2 Verify the power supply (or supplies).

OmniSwitch 7700/7800/8800

Omni Switch 7/8XXX has build-in mechanism to power off the modules if the power supply is not enough. Switching off a power supply in a chassis which does not have redundant power supply will result in power off of the modules. Make sure that there is no power involvement.

Check the power supply status, using the command:

```
-> show power supply 1
Module in slot PS-1
  Model Name:                    OSR-PS-06,
  Description:                   OSR-PS-06,
  Part Number:                   901750-10,
  Hardware Revision:            ,
  Serial Number:                B42N101P2,
  Manufacture Date:             OCT 18 2001,
  Firmware Version:             ,
  Admin Status:                 POWER ON,
  Operational Status:           UP
```

Make sure that all the known good power supplies are operational.

OmniSwitch 6624/6648

Check the power supply status, using the command:

```
-> show power supply


Power Supplies in chassis 1
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 2
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 3
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 4
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 5
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 6
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT

Power Supplies in chassis 7
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT
```

```
Power Supplies in chassis 8
PS    Operational Status
-----+-------------------
PS-1   UP
PS-2          NOT PRESENT
```

Make sure that all the known good power supplies are operational.

3 Verify the CPU utilization.

OmniSwitch 6624/6648 and 7700/7800/8800

The CPU utilization of CMM can be viewed by using the command:

```
-> show health
* - current value exceeds threshold



Device                            Min  1 Hr  1 Hr
Resources                Limit Curr   Avg   Avg   Max
----------------+-------+-----+------+-----+-----+-------
Receive                  80   00      00     00    0
Transmit/Receive         80   00      00     00    00
Memory                   80   43      43     43    43
Cpu                      80   02      06     05    07
Temperature Cmm          50   38      37     37    37
Temperature Cmm Cpu      50   32      32     31    32
```

The above command shows the receive, transmit/receive, memory, CPU, temperature CMM and temperature CMM CPU statistics for current, 1 minimum average, 1 hour average and 1 hour maximum. All the values should be within the threshold. Anything above the threshold depicts that some abnormal behavior. Normally 1 hour average maximum might be high if the switch was booted up in the last hour but it should be fairly steady during normal operation.

If none of the above are above the threshold then the next step is to try to isolate the problem to a particular NI. Due to the distributed architecture every NI has it own CPU to perform some operations locally. It is possible that a particular NI might be at high CPU utilization at a time when other NI as well as the CPU are within the thresholds.

If none of the above are above the threshold then the next step is to try to isolate the problem to a particular NI (or a switch within an OmniSwitch 6624/6648 stack) with the **show health** *slot_number* CLI command:

```
-> show health 5
* - current value exceeds threshold


Slot  05                         1 Min  1 Hr  1 Hr
Resources                Limit Curr   Avg   Avg   Max
----------------+-------+-----+------+-----+-----+-------
Receive                  80   01      01     01    01
Transmit/Receive         80   01      01     01    01
Memory                   80   39      39     39    39
Cpu                      80   21      22     21    24
```

The principle for the health of an NI is the same as for CMM.

The average on one minute is calculated from the average of 12 samples. Each sample is an average of the CPU utilization during 5 seconds. Those values are stored in a table. The current minute (**1 Min Avg** or "min") displays the average of the last 12 samples.

Every 60 seconds the average of the 12 samples is recorded into the average value for this minute. Those values are stored in a form of 60 samples which represent one hour.

Most probably one of the above would help to localize the problem to a particular NI or to CMM. For more details see, Section "Monitoring Switch Health" in the chapter titled "Diagnosing Switch Problems" in the appropriate *OmniSwitch Network Configuration Guide.*

4 Check the switch log.

OmniSwitch 6624/6648 and 7700/7800/8800

Now, one of the most important things to check is the switch log. Switch log would contain the error messages depending on the settings of the log levels and applications configured to generate error messages. Default settings of the log switch log can be view using the command:

```
-> show swlog

Switch Logging is:
              - INITIALIZED
              - RUNNING

Log Device(s)
----------------
flash
console

Only Applications not at the level 'info' (6) are shown
Application ID   Level
----------------------------
CHASSIS (64)     debug3 (9)
```

By default, log devices are set to be flash and console. This can be changed and specific log servers can be used to log the messages, please refer to the Switch Management Guide for further details. The application trace level is set for 'info'. Any error messages or informational messages would be logged in the switch log.

Switch log should be viewed to see if any errors messages were generated by the switch. The command to use is:

```
-> show log swlog
Displaying file contents for 'swlog2.log'
FILEID: fileName[swlog2.log], endPtr[32]
         configSize[64000], currentSize[64000], mode[2]
Displaying file contents for 'swlog1.log'
FILEID: fileName[swlog1.log], endPtr[395]
         configSize[64000], currentSize[64000], mode[1]

Time Stamp               Application    Level   Log Message

------------------------+--------------+-------+--------------------------------

MON AUG 21 23:09:57 2023   HSM-CHASSIS   info   == HSM == GBIC extraction detect
ed on NI slot 1, GBIC port 2
MON AUG 21 23:28:33 2023   HSM-CHASSIS   info   == HSM == GBIC Insertion detecte
d on NI slot 1, GBIC port 1
MON AUG 21 23:28:33 2023   HSM-CHASSIS   info   == HSM == GBIC Insertion detecte
```

```
d on NI slot 1, GBIC port 2
MON AUG 21 23:28:39 2023   HSM-CHASSIS   info   == HSM == GBIC extraction detect
ed on NI slot 5, GBIC port 2
MON AUG 21 23:30:39 2023   HSM-CHASSIS   info   == HSM == GBIC Insertion detecte
d on NI slot 5, GBIC port 2
MON AUG 21 23:30:41 2023   HSM-CHASSIS   info   == HSM == GBIC extraction detect
ed on NI slot 1, GBIC port 1
MON AUG 21 23:30:45 2023   HSM-CHASSIS   info   == HSM == GBIC extraction detect
ed on NI slot 1, GBIC port 2
TUE AUG 22 00:05:45 2023   CSM-CHASSIS   info   == CSM == !!!ACTIVATING!!!
TUE AUG 22 00:05:45 2023   CSM-CHASSIS   info   == CSM == !!! REBOOT !!!
TUE AUG 22 00:05:53 2023        SYSTEM   alarm  System rebooted via ssReboot(),
restart type=0x2 (COLD)
```

The log message are kept in two log files: swlog1.log and swlog2.log in flash. In the above example, log messages show that some GBICs were extracted and inserted at a particular time. In addition, the switch was rebooted. This information helps to relate the time of the problem together with the events happening at the switch. In addition, it also provides an idea about if the source of the problem was external or internal to the switch.

If the log messages do not show enough information then they can be changed for specific applications to a higher log level or for all the applications running in the switch. For setting up different log levels in switch log, please refer to the “Using Switch Logging” chapter in the appropriate *OmniSwitch Network Configuration Guide.*

If the switch is running in redundant configuration make sure that the two CMMs are completely synchronized. This can be done using the command:

```
-> show running-directory
Running CMM            : PRIMARY,
Running configuration  : WORKING,
Certify/Restore Status : CERTIFIED,
Synchronization Status : SYNCHRONIZED
```

If the two CMMs are not synchronized and the problem leads to the failure of Primary CMM then it will result in re-initialization of all of the modules. If the two CMMs are properly synchronized and primary CMM failed, the take over mechanism will be transparent to the end user. So, for complete redundancy keep the two CMMs synchronized.

Look for any post-mortem dump files that may be created due to the problem with the switch. Post Mortem Dump files have an extension of *.dmp and are created in /flash directory of the CMM (be sure to check the secondary CMM, if running in redundant mode). System dump files are normally named as “cs_system.dmp”, Memory related dump files are normally created as “MemMon000.dmp” and NI related dump files are named as “SloXSliYver1.dmp”, where X is the slot number and Y is the slice number.

The creation of a dump file indicates a problem with the switch. System related dump files can be viewed through CLI but other dump files cannot. For system related dump files use the command:

```
-> show log pmd cs_system.pmd
```

Capture the output of this command. In addition, if there are any dump files created in the switch, they should be downloaded through FTP to forward them to technical support. Technical Support can have them analyzed to find the source of the problem.

Advanced Troubleshooting

One level of switch logging is stored in the two log files located in the /flash directory. There is another low level debug that can be enabled and used for diagnosing the problems. This debug is known as "systrace", meaning system trace. The information in this trace is stored in NVRAM on the CMM, so it is valid until powered off. Soft reboot of the switch will retain the trace information but powering off the switch will result in loosing all of the information. This is less CMM intensive so can be used to collect all the background information about the different tasks running in the switch.

The command to look at the default settings for systrace is

```
->  debug systrace show
sysTrace is:
        - INITIALIZED
        - RUNNING
        - configured to TRACE CALLERS
        - configured to NOT WATCH on stdout


All Applications have their trace level set to level 'info' (6)
```

Systrace is set for the level of "info" for all the applications. Any application with trace level other than 6 is displayed in the above command output. Notice that it is initialized by default and is running in the background. By default it is configured not to display messages on the console. The purpose of systrace is to track all the system processes called and the caller.

Application log levels can be changed and specific applications can also be set for the logging purposes. The commands are similar to switch log.

```
-> debug systrace appid ?


                               WEB VRRP VLAN TRAP TELNET SYSTEM STP SSL SSH
                               SNMP SMNI SLB SESSION RSVP RMON QOS QDRIVER
                               QDISPATCHER PSM PRB-CHASSIS PORT-MGR POLICY PMM
                               NOSNMP NI-SUPERVISION NI-INTERFACE NAN-DRIVER
                               MODULE MIPGW LINKAGG LDAP IPX IPMS IPC-MON
                               IPC-LINK IPC-DIAG IP-HELPER IP INTERFACE
                               HSM-CHASSIS HEALTH GMAP GM FTP EPILOGUE EIPC
                               DRC DISTRIB DIAG CVM-CHASSIS CSM-CHASSIS CONFIG
                               CMS-CHASSIS CMM-INTERFACE CLI CHASSIS
                               CCM-CHASSIS BRIDGE AMAP ALL AAA 802.1Q <num>
(System Service & File Mgmt Command Set)
```

The applications and the log levels are the same as switch log applications. Please refer to the "Section Switch Logging Commands Overview" section in the "Using Switch Logging" chapter in the appropriate *OmniSwitch Network Configuration Guide*.

Systrace can be enabled using the command:

```
->  debug systrace enable
```

To look at the systrace log file use the following command:

```
swnygb02 > debug systrace show log
TStamp(us)  AppId  Level  Task       Comment
----------+------+------+----------+-------------------------------------
3349119104 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3349118980 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
```

```
_SM_IPCUP_TIMEOUT
3349118948 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
3345200526 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3342928783 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3342928661 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
_SM_IPCUP_TIMEOUT
3342928628 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
3336738410 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3336738287 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
_SM_IPCUP_TIMEOUT
3336738256 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
3334849145 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3330548020 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3330547902 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
_SM_IPCUP_TIMEOUT
3330547869 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
3324495309 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3324357940 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3324357816 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
_SM_IPCUP_TIMEOUT
3324357782 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
3318167293 CSM-CH info   tCsCSMtask ***HELLO FSM TRACE***
3318167171 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> Event = CS_CSM_HELLO
_SM_IPCUP_TIMEOUT
3318167139 CSM-CH info   tCsCSMtask csCsmHelloReceptio - -> CS_TIMEOUT
```

This information is useful to analyze the different processes taking place in the switch.

Other useful command to use in case of problem is:

```
->  show tech-support
```

This command captures all of the information from the chassis, including the hardware information, configuration, software release active and some other statistics about the number of buffers being used at the time of the use of command. The output of the command is saved in /flash as “tech_support.log”. Other variation of this command is:

```
-> show tech-support layer2
```

This command collects Layer 2 data only.

```
-> show tech-support layer3
```

This command collects Layer 3 data only.

Dshell Troubleshooting

To further diagnose the task consuming the CPU on the CMM one needs to use the following Dshell commands:

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

```
Working: [Kernel]->spyReport
NAME          ENTRY         TID   PRI   total % (ticks)  delta % (ticks)
--------     --------      -----  ---   ---------------  ---------------
tExcTask     excTask     7545100    0     0% (     179)    0% (       0)
tLogTask     logTask     753f800     0     0% (       0)    0% (       0)
tShell       shell       41b1600    1     0% (      25)    1% (       1)
tWdbTask                 73ae6a0    3     0% (       0)    0% (       0)
IPC_tick     IPC_tick    6862660    4     6% (   11855)    0% (       0)
tSpyTask     spyComTask  41aab10    5     0% (       0)    0% (       0)
tAioIoTask1  aioIoTask   7528580   50     0% (       0)    0% (       0)
tAioIoTask0  aioIoTask   75212d0   50     0% (       0)    0% (       0)
tNetTask     netTask     741c820   50     1% (    2047)   10% (       7)
tIpedrMsg    ipedrKerne  53043b0   50     0% (      25)    0% (       0)
tAioWait     aioWaitTas  752f830   51     0% (       0)    0% (       0)
bbussIntMoni tBbusIntMo  6864a00   70     0% (       0)    0% (       0)
ipc_monitor  ipc_monito  67ff4a0   70     0% (      10)    0% (       0)
tL2Stat      esmStatMsg  57626b0   70     0% (     701)    0% (       0)
Gateway      mipGateway  67e1770   80     0% (       2)    0% (       0)
EIpc         eipcMgr_ma  678ac10   80     0% (       0)    0% (       0)
EsmDrv       esmDrv      579f990   80     0% (     124)    0% (       0)
tMemMon      memMonTask  7230d60   90     0% (       0)    0% (       0)
tCS_PTB      csPtbMain   67ee930   93     0% (      19)    0% (       0)
tCS_CCM      csCcmMain   722d590   93     0% (      18)    0% (       0)
tCS_PRB      csPrbMain   72299f0   93     0% (     132)    0% (       0)
tCS_CMS      csCmsMain   7227720   93     0% (       0)    0% (       0)
tCS_HSM      Letext      7225420   93     0% (     438)    0% (       0)
tCsCSMtask   Letext      67f3c10   94     0% (     207)    0% (       0)
tNanISR      nanProcInt  4ae2660   95     0% (       0)    0% (       0)
SwLogging    swLogTask   724b900  100     0% (       4)    0% (       0)
DSTwatcher   dstWatcher  7214f00  100     0% (       0)    0% (       0)
tWhirlpool   batch_entr  71fb210  100     0% (       4)    0% (       0)
ipc_tests    ipc_tests_  67fd1f0  100     0% (       3)    0% (       0)
PortMgr      pmMain      67df2f0  100     0% (       6)    0% (       0)
PsMgr        psm_main    67d9030  100     0% (       0)    0% (       0)
VlanMgr      Letext      678f1d0  100     0% (     292)    0% (       0)
TrapMgr      trap_task   6774fc0  100     0% (      10)    0% (       0)
PartMgr      partm_eup_  675fcf0  100     0% (       0)    0% (       0)
SNMPagt      snmp_task   6980d70  100     0% (      93)    0% (       0)
SesMgr       sesmgr_mai  697b8a0  100     0% (       1)    0% (       0)
SsApp        tssAppMain  59126b0  100     0% (      11)    0% (       0)
Ftpd         cmmFtpd     58f3a80  100     0% (      38)    0% (       0)
NanDrvr      nanDriver   58da2b0  100     0% (       0)    0% (       0)
Health       healthMonM  58d7b70  100     0% (     414)    0% (       0)
L3Hre        l3hre_cmm_  58709d0  100     0% (       7)    0% (       0)
DbgNiGw      dbgGw_main  585f170  100     0% (       0)    0% (       0)
SrcLrn       slCmmMain   5798ab0  100     0% (      91)    0% (       0)
```

```
GrpMob        gmcControl  5793320  100      0% (      80)    0% (       0)
Stp           stpCMM_mai  56b3eb0  100      0% (      82)    0% (       0)
8021q         main_8021q  5841290  100      0% (       0)    0% (       0)
LnkAgg        la_cmm_mai  543dbc0  100      0% (      57)    0% (       0)
tSlcMsgHdl    slcMsgProc  54397f0  100      0% (      70)    0% (       0)
AmapMgr       xmap_main_  53f0140  100      0% (     924)    0% (       0)
GmapMgr       gmap_main_  535c750  100      0% (     164)    0% (       0)
PMirMon       pmmMain     5340e20  100      0% (       3)    0% (       0)
Ipedr         ipedrMain   5327730  100      3% (    6664)   26% (      17)
AAA           aaa_main    5324110  100      0% (     152)    0% (       0)
stpTick       stpcmm_tim  5316800  100      0% (      27)    0% (       0)
tIpedrPkt     ipedrPktDu  52f3d90  100      0% (       0)    0% (       0)
AVLAN         aaaAvlanMa  5256670  100      0% (       7)    0% (       0)
onex          onex_main   52513e0  100      0% (      15)    0% (       0)
Ipmem         ipmem_main  522fad0  100      0% (     398)    0% (       0)
la_cmm_tick   la_cmm_tic  522b370  100      0% (      19)    0% (       0)
ipmfm         ipmfm_main  51e7cc0  100      0% (      23)    0% (       0)
ipmpm         ipmpm_main  58b99e0  100      0% (      24)    0% (       0)
Ipx           ipxMain     4fbd180  100      0% (      41)    0% (       0)
Vrrp          vrrpMain    4fba330  100      0% (    1318)    9% (       6)
UdpRly        udpRlyMain  4f926d0  100      0% (     804)    0% (       0)
Qos           qos_main    4f70ac0  100      0% (      36)    0% (       0)
PolMgr        pyPolicyMa  4e7cdb0  100      0% (       3)    0% (       0)
SlbCtrl       slbcMain    4e787f0  100      0% (       4)    0% (       0)
WebView       tEmWeb      4e74000  100      0% (       2)    0% (       0)
SNMP GTW      snmp_udp_g  4add0a0  100      0% (       1)    0% (       0)
SNMP TIMER    snmp_timer  4ada6e0  100      0% (       2)    0% (       0)
GmapTimer     gmap_proc_  4ad7080  100      0% (       2)    0% (       0)
DrcTm         tmMain      4acf630  100      0% (      28)    0% (       0)
tDrcIprm      iprmMain    499bba0  100      0% (     336)    0% (       0)
tOspf         ospfMain    4898d60  100      1% (    3419)   16% (      11)
tPimsm        pimsmMain   46d39e0  100      0% (     371)    0% (       0)
tDrcIpmrm     ipmrmMain   46132e0  100      0% (      66)    0% (       0)
cliConsole    clishell_m  44b3b00  100      0% (       0)    0% (       0)
tWebTimer     web_timer   4b7e520  107      0% (       2)    0% (       0)
tssApp_SNMP_  tssAppChil  58fbbf0  110      0% (       0)    0% (       0)
tssApp_3_4    tssAppChil  4251500  110      0% (       0)    0% (       0)
CfgMgr        confMain    67ec480  120      0% (     455)    0% (       0)
tCS_CCM2      csCcmChild  4ae03b0  130      0% (       0)    0% (       0)
Sshd          cmmsshd     5b38d50  150      0% (       0)    0% (       0)
Telnetd       cmmtelnetd  590d420  150      0% (      13)    0% (       0)
Rmon          rmonMain    5873ff0  150      0% (      86)    0% (       0)
tCS_CVM       csCvmMain   72194a0  200      0% (       0)    0% (       0)
SmNiMgr       smNiTask    586e060  200      0% (       0)    0% (       0)
tIpxTimer     ipxTimer    4f83f90  200      0% (       8)    0% (       0
tIpxGapper    ipxGapper   4f7b1c0  200      0% (       0)    0% (       0)
SesMon_3      Letext      429ef90  200      0% (       0)    0% (       0)
tTelnetOut0   cmmtelnetO  429c5d0  200      0% (       0)    0% (       0)
tTelnetIn0    cmmtelnetI  42652e0  200      0% (       0)    0% (       0)
CliShell0     clishell_m  42611b0  200      0% (       0)    0% (       0)
tPolMonSvr    pyMonitorM  4e45ae0  210      0% (       1)    0% (       0)
tDcacheUpd    dcacheUpd   74f8e70  250      0% (      41)    0% (       0)
KERNEL                                      3% (    6051)   23% (      15)
INTERRUPT                                   0% (      19)    0% (       0)
IDLE                                       79% (  154794)   12% (       8)
TOTAL                                      93% (  193565)   97% (      65)
```

```
2 tasks were created.
2 tasks were deleted.
spyStop
value = 0 = 0x0
```

It seems that the CPU task is high because of **tNetTask**, **Ipedr**, and **tOSPF**.

Check to see if any of the task is suspended on the CMM.

```
Working: [Kernel]->i

NAME        ENTRY       TID    PRI   STATUS      PC       SP     ERRNO  DELAY
---------- ------------ -------- --- ---------- -------- -------- ------- -----
tExcTask   excTask       7545100   0 PEND         17fd68  7544d40  3d0001     0
tLogTask   logTask       753f800   0 PEND         17fd68  753f430       0     0
tShell     shell         41b1600   1 READY        15c0e0  41b09a0   30065     0
tWdbTask   150520        73ae6a0   3 PEND         158540  73ae130       0     0
IPC_tick   IPC_tick      6862660   4 READY        158540  6862340       0     0
tDrcIprm   iprmMain      499bba0 100 PEND+T       158540  499b520       b   243
tOspf      ospfMain      4898d60 100 SUSPEND      158540  48986d0       b   299


value = 0 = 0x0
Working: [Kernel]->
```

In the above example, the OSPF task is suspended. Typically when a task is suspended, the system will automatically reboot and generate a system dump file. In the event that the system does not reboot, then try to gather the task trace and memory dump for that specific task using the following command:

```
Working: [Kernel]->tt 0x4898d60
108e9c vxTaskEntry +c : Letext (&dataInfo, 67f3920, 67f3a20, 34000000, 66ff800,
6a69800)
66b69b4 Letext +2d4: zcSelect (5, 67f3a20, 0, 0, 6a6c800, 247)
6ff56f8 zcSelect +458: semTake (67eedc0, ffffffff, a, 28, a, 0)
158b4c semTake +2c : semBTake (67eedc0, ffffffff, &semTakeTbl, 0, &semBTake,
264c00)
value = 0 = 0x0

Working: [Kernel]->ti 0x4898d60

  NAME        ENTRY       TID    PRI   STATUS      PC       SP     ERRNO  DELAY
---------- ------------ -------- --- ---------- -------- -------- ------- -----
tOspf      ospfMain      4898d60 100 SUSPEND      13e060  490f920       b     0

stack: base 0x49103d0  end 0x49009d0  size 63312  high 10036  margin 53276

options: 0x4
VX_DEALLOC_STACK

%pc    =   13e060   %npc   =   13e064   %ccr   =        0   %y     =        0
%asi   =        0   %cwp   =        0   %tt    =        0   %tl    =        0
%pil   =        0   %pstate =       1e
%g0    =               0   %g1    =                0   %g2    =                0
%g3    =               0   %g4    =                0   %g5    =                0
%g6    =               0   %g7    =                0   %i0    =                0
%i1    =               0   %i2    =                0   %i3    =                0
%i4    =               0   %i5    =                0   %fp    =          490f9e0
%i7    =               0   %l0    =                0   %l1    =                0
%l2    =               0   %l3    =                0   %l4    =                0
%l5    =               0   %l6    =                0   %l7    =                0
```

```
%o0   =         490f9e0   %o1   =                0   %o2   =                0
%o3   =               0   %o4   =                0   %o5   =                0
%sp   =         490f920   %o7   =                0
value = 76612560 = 0x49103d0
Certified: [Kernel]->
```

To troubleshoot a CPU or memory spike with 5.1.5.X, you can start a software routine in dshell and it will log the task name to the swlog whenever there is a spike in CPU or memory usage.

```
Switch/> dshell
Certified: [Kernel]->lkup "Hog"
catchCpuHog               0x00152700 text     => to turn on CPU watch
catchMemHog               0x0013fa80 text     => to turn on Memory watch
releaseCpuHog             0x00152720 text     => to turn off CPU watch
releaseMemHog             0x0013fb60 text    => to turn off Memory watch
value = 58685232 = 0x37f7730
Certified: [Kernel]->
```

To troubleshoot a problem related to stack overflow:

```
Working: [Kernel]->checkStack

  NAME        ENTRY        TID      SIZE   CUR  HIGH  MARGIN
------------ ------------ -------- ----- ----- ----- ------
tExcTask     excTask      7525070  19992   960  4344  15648
tLogTask     logTask      751f750   8184   976  2176   6008
tPingTmo854  0x0000103d60 3d9c580   8184   800  1068   7116
tShell       shell        3c13ef0  19048  6368  8644  10404
tWdbTask     0x0000168200 7395dc0   7904  1392  2060   5844
IPC_tick     IPC_tick     6efb040  32760   800  4952  27808
tCsCSMtask2  csCsmHelloBa 7214c40  19992  1200  4264  15728
tCS_PTB      csPtbMain    5ca5960   8184   800  5152   3032
tCS_CCM      csCcmMain    720f8e0  13312  1632  9436   3876
tCS_PRB      csPrbMain    720bc50   9320  1504  5588   3732
tCS_CMS      csCmsMain    7209240   8176  1872  3044   5132
tCS_HSM      csHsmMain    7206f20  29320  1472  7556  21764
tCsCSMtask   csCsmMain    5cb2240  29320  2304 14516  14804
tCsCSMtask3  csCsmChecksu 5caaa40  19984   848  6724  13260
tAioIoTask1  aioIoTask    7508450  28664   944  1136  27528
tAioIoTask0  aioIoTask    7501180  28656   944  1136  27520
tNetTask     netTask      74040a0  14992   944  5204   9788
tIpedrMsg    ipedrKernelM 4d4a7a0  19984   944  2828  17156
tTrapPing    0x0005b89e60 3aa7830  19984  2864  3172  16812
```

OmniSwitch 7700/7800/8800 Dshell Task Definitions

tExcTask	Exception Handling Task
tLogTask	Log Task
tShell	Shell Task
tWdbTask	Wind Debug Agent
IPC_tick	IPC ticks
tSpyTask	Spy Task monitor the system utilization
tAioIoTask1	Asynchronous I/O Support

tAioIoTask0	Asynchronous I/O Support
tNetTask	Routing Task
tIpedrMsg	IP Ethernet Driver Message Handle Task
tAioWait	Asynchronous I/O Support
bbussIntMoni	BBUS monitor Task
ipc_monitor	IPC monitor Task
tL2Stat	L2 statistics gathering task
Gateway	Management Information Protocol Gateway
EIpc	Extended IPC task
EsmDrv	Ethernet switching manager Driver Task
tMemMon	Memory Monitor Task
tCS_PTB	Chassis Supervision Pass-through Support
tCS_CCM	Chassis Configuration Manager
tCS_PRB	Chassis Supervision Prober Task
tCS_CMS	Chassis MAC Server
tCS_HSM	Chassis Supervision Hardware Services Manager
tCsCSMtask	Chassis Supervision Chassis State Manager
tNanISR	Nantucket Interrupt Service Routine
SwLogging	Switch Logging Task
DSTwatcher	Clock Task of the switch
tWhirlpool	Encryption Support
ipc_tests	IPC debugging and test support
PortMgr	Port Manager Task
PsMgr	Power Supply Manager Task
VlanMgr	VLAN Manager Task
TrapMgr	Trap Manager Task
PartMgr	Partition management task
SNMPagt	SNMP agent task
SesMgr	Session Manager Task
SsApp	Session Application Task
Ftpd	FTP Daemon Task
NanDrvr	Nantucket Driver Task

Health	Health Task
L3Hre	Layer 3 HRE Task
DbgNiGw	NI Debug support
SrcLrn	Source Learning Task
GrpMob	Group Mobility Task
Stp	Spanning Tree Task
8021q	802.1Q Task
LnkAgg	Link Aggregation Task
tSlcMsgHdl	Source Learning Message Handler Task
AmapMgr	AMAP Manager Task
GmapMgr	GMAP Manager Task
PMirMon	Port Mirror Monitoring Task
Ipedr	IP Extended Dynamic Routing Task
AAA	AAA task
stpTick	STP Timing Task
tIpedrPkt	IP Ethernet Driver Task
AVLAN	Authenticated VLAN Task
onex	802.1X Task
Ipmem	IP Multicast Task
la_cmm_tick	CMM Link Aggregation Timer
ipmfm	IP Multicast Forwarding
ipmpm	IP Multicast Management
Ipx	IPX Task
Vrrp	VRRP Task
UdpRly	UDP Relay Task
Qos	QOS Task
PolMgr	Policy Manager Task
SlbCtrl	Server Load Balancing Control Task
WebView	WebView Task
SNMP GTW	SNMP Gateway
SNMP TIMER	SNMP Timer
GmapTimer	GMAP Timer Task

DrcTm	Dynamic Routing Control Timer Task
tDrcIprm	Dynamic Routing Control Task for IP Route Manager
tOspf	OSPF Task
tPimsm	PIM SIM Task
tDrcIprm	Dynamic Routing Control IP Route Manager task
cliConsole	CLI Console Task
tWebTimer	Web Session Timer
tssApp_SNMP	Temporary System Services task to support SNMP
tssApp_3_4	Temporary System Services task to support CLI
CfgMgr	Configuration Manager Task
tCS_CCM2	Chassis Configuration Manager
Sshd	Secure Shell Daemon Task
Telnetd	Telnet Task
Rmon	RMON Task
tCS_CVM	Chassis Version Manager Task
SmNiMgr	CMM-NI Shared Memory Manager
TIpxTimer	IPX Timer
TIpxGapper	IPX Routing Protocol InterPacket Gap Control
SesMon_3	Session Monitor for Session Number
tTelnetOut0	Telnet Session 0 out task
tTelnetIn0	Telnet Session 0 in Task
CliShell0	CLI session 0 shell Task
TPolMonSvr	Policy Manager Monitor LDAP Servers
TDcacheUpd	FPGA Support

OmniSwitch 6624/6648 Dshell Task Definitions

tExcTask	Exception Handling Task
tLogTask	Log Task
tShell	Shell Task
tNetTask	Routing Task
qdrCpu	Queue Driver of from CPU queues
qdsCpu	Queue Dispatcher of to CPU queues

tIpedrMsg	IP Ethernet Driver Task Message handler
tahw_sch	Spanning Tree Support
qdsUnr	Queue Dispatcher of unresolved queues
taSM_DVR	NI Stack Manager
ipcReceive	IPC Receive Task
taSM_NI	NI Stack Manager
la_ni_tick_	NI Link Aggregation Timer
tahw_stp	Spanning Tree Support
IPCHAWKTIME	IPC Timer
ipc_monitor	IPC monitor task
tNiSup&Prb	NI supervision and Prober task
tL2Stat	L2 statistics gathering task
taEipc	Extended IPC task
CfgMgr	Configuration Manager Task
Gateway	MIP gateway
EIpc	Extended IPC task
Ftpd	FTP Daemon Task
taStp	Spanning Tree task
tMemMon	Memory Monitor task
tssApp_SNMP	Temporary task to support SNMP
tssApp_12_4	Temporary task to support CLI
tCS_CCM	Chassis Configuration Manager
tCS_PRB	Chassis supervision Prober task
tCS_CMS	Chassis MAC Server
tCS_HSM	Chassis Supervision Hardware Services Manager
tCsCSMtask	Chassis Supervision Chassis State Manager
SwLogging	Switch Logging task
DSTwatcher	Daylight saving task
tWhirlpool	Encryption Support
ipc_tests	IPC debugging and test support
ipc_ping	IPC ping task
IXE2424_	IXE2424 task

taNiEsmDrv	NI Ethernet switching driver task
tsLnkState	Link State monitor task
PortMgr	Port manager task
PsMgr	Power supply Manager task
VlanMgr	VLAN Manager task
TrapMgr	Trap manager task
SM_CMM	CMM Stack Manager
PartMgr	Partition Manager task
SNMPagt	SNMP agent
SNMP GTW	SNMP Gateway
SNMP TIMER	SNMP Agent Timer
SesMgr	Session Manager Task
SsApp	Session Application Task
Ntpd	NTP Daemon Task
Health	Health Monitor task
EsmDrv	Ethernet NI software (ESM) driver task
SrcLrn	Source learning task
tSlcMsgHdl	Source learning message handler task
GrpMob	Group Mobility task
Stp	Spanning tree task
stpTick	CMM Spanning tree timer
8021q	802.1Q task
LnkAgg	Link Aggregation task
la_cmm_tick	CMM Link Aggregation timer
AmapMgr	AMAP manager task
GmapMgr	GMAP manager task
GmapTimer	GMAP timer task
PMirMon	Port Mirroring task
Ipedr	IP Ethernet driver task
tIpedrPkt	IP ethernet packet handler task
AAA	AAA task
AVLAN	Authenticated VLAN task

onex	802.1X
Vrrp	VRRP task
UdpRly	UDP Relay task
Qos	CMM QOS
PolMgr	Policy Manager task
Ipmem	IP Multicast Task
ipmfm	IP Multicast Forwarding
ipmpm	IP Multicast Management
DrcTm	Dynamic Routing Control Timer task
TDrcIprm	Dynamic Routing Control IP Route Manager task
taDot1q_	802.1Q task
taSLNEvent	Source learning event handler
taGmnCtrl	NI group mobility
taVmnCtrl	NI VLAN manager
taLnkAgg	NI link aggregation
taQoS	NI QOS task
taIpni	IP task on a NI
taIpms	IPMS task
taXMAP_ni	XMAP task on a NI
taUdpRelay	NI UDP relay
taAvlan	NI Authenticated VLAN
taPortMir	NI Port Mirroring
taQFab	Software fabric for stacks
tSLNAdrLrn	NI source learning task
RADIUS	Radius task
cliConsole	Console
tWebTimer	Web Session Timer
tCS_CCM2	Chassis Configuration Manager
Sshd	SSH daemon (secure shell)
NtpDaemon	NTP daemon (network time protocol)
Rmon	RMON task
WebView	WebView Task

tCS_CVM	Chassis Version Manager
SesMon_12	Session Monitor
tTelnetOut0e4208c	Telnet Outgoing
tTelnetIn0	Telnet Incoming
CliShell0	CLI session 0 shell Task
tPolMonSvr	Policy Manager Monitor LDAP Servers
tDcacheUpd	FPGA Support

To further qualify the source of the problem we need to look at each and every NI.

Troubleshooting NIs on OmniSwitch 7700/7800/8800

Looking at the health statistics of each NI would give an idea about which one is causing the problem. Following CLI command can be used to diagnose:

```
Show health <slot number>
```

Example:

```
-> show health 5
* - current value exceeds threshold


Slot  05                            1 Min  1 Hr  1 Hr
Resources                Limit Curr   Avg    Avg   Max
----------------+-------+-----+------+-----+-----+-------
Receive                  80   01      01     01    01
Transmit/Receive         80   01      01     01    01
Memory                   80   39      39     39    39
Cpu                      80   21      22     21    24
```

The NI Debugger software can be launched in Dshell using the following command:

```
Working: [dshell]-> <nidebug
```

This will launch the NI Debugger. To change to a specific slot and slice (Coronado) the following command can be used:

changeSlot *slot***,***slice*

Now the processor on that slot can be accessed just like CMM to see all tasks (running or suspended), tasks consuming the CPU the most, and other commands like **task trace (tt)** or **task info (ti)**.

```
Working: [Kernel]->NiDebug
1:0 nidbg>
1:0 nidbg> nisup_cpuShow
1:0
1:0 Task                 Cpu
1:0 Id       Name        Abs  Rel
1:0 -------- ----------- ---- ----
1:0 017fd170 tsHw_qdisp   13%  13%
1:0 015ea1c0 taIpni        2%   9%
1:0 015fae50 taVmnCtrl     0%   2%
```

```
1:0 0160cef8 t_ipc_cmm_p   1%   1%
1:0 015f61d0 taL3Hre       0%   1%
1:0 015ee670 taXMAP_ni     0%   1%
1:0 015f7768 taStp         0%   0%
1:0 015f4080 taQoS         0%   0%
1:0 015ed4c0 taIpms        0%   0%
1:0 017fb470 tExcTask      0%   0%
1:0 017f8fb8 tDBG_sp_tk    0%   0%
1:0 017f6290 tNiSup&Prb    0%   0%
1:0 01602bf8 taHw_qdrv     0%   0%
1:0 01601e30 taIpc_ni      0%   0%
1:0 01601450 taEipc        0%   0%
1:0 015fed08 taSLNEvent    0%   0%
1:0 015fbc18 taGmnCtrl     0%   0%
1:0 015fa088 taLnkAgg      0%   0%
1:0 015f0f90 taDot1q_ni    0%   0%
1:0 015eb370 taIpx         0%   0%
1:0 015e70d0 taUdpRelay    0%   0%
1:0 015e47b0 taAvlan       0%   0%
1:0 015e2e30 taPortMir     0%   0%
1:0 015e1030 tQDriverSub   0%   0%
1:0 015c09e0 la_ni_tick_   0%   0%
1:0 015a2b28 taEniMsgHdl   0%   0%
1:0 015a16d0 tahw_stp      0%   0%
1:0 015a0ca0 tahw_sch      0%   0%
1:0 01593e98 tSLNAdrLrn    0%   0%
1:0 01590da8 tSLNDAMgr     0%   0%
1:0 014f5e80 tsLnkState    0%   0%
1:0 014f4cd0 tsStatistic   0%   0%
1:0          KERNEL        1%   1%
1:0          INTERRUPT     0%   0%
1:0          IDLE         78%  69%
1:0 value = 0 = 0x0
```

To force a NI to create a dump file the following command can be used in Dshell:

```
Working: [Kernel]->pmdni_generate  1,0,"slo1slic0.pmd"
```

Syntax is **pmdni_generate** *slot*,*slice*, *file_name*.

This will result in generating a PMD file for slot 1 slice 0 in /flash directory, which can then be forwarded to Engineering for analysis. In addition, there is a software available known as "ni_pmdexploit" which can be used on UNIX OS to exploit the PMD files in VI format. The OMD files generated on the switch for NI are in binary format and cannot be viewed by switch log commands on the switch. These files need to be converted to VI format to be analyzed.

The format to exploit a NI pmd file is "ni_pmdexploit <filename> < <new filename". Once it is exploited, it can be viewed using normal UNIX editors.

OmniSwitch 6624/6648 Dshell Troubleshooting

One of the important things in OS-6600 is to confirm the stack topology. This can be confirmed using the command:

```
Working: [Kernel]->smctx
****************************************************

local_slot=1 * base_mac= 00:d0:95:84:4b:d2 * local_mac=0000 1111 1111 * TYPE_48
* heart_beat=19007

state=SUPERV role=PRIMARY (primary_slot=1 secondary_slot=2) opposite_way=0

nb=7 elements=0x300ff in_loop=1 supervision=ON (check=0x10100 change=0x0)

gport1=0x1a lport1=0x1a status=1  *  gport2=0x1b lport2=0x1b status=1

neighbor1 (nb1=7) [0]=0|0  [1]=8|1a [2]=7|1b [3]=6|1a [4]=5|1b [5]=4|1a [6]=3|1b
[7]=2|1a
neighbor2 (nb2=7) [0]=2|1b [1]=2|1b [2]=3|1a [3]=4|1b [4]=5|1a [5]=6|1b [6]=7|1a
[7]=8|1b

topology role    [1]=1  [2]=2  [3]=3  [4]=3  [5]=3  [6]=3  [7]=3  [8]=3
topology outport [1]=ff [2]=1b [3]=1b [4]=1b [5]=1a [6]=1a [7]=1a [8]=1a
topology base mac
   [2]=  00:d0:95:84:3d:24
   [3]=  00:d0:95:86:50:f2
   [4]=  00:d0:95:84:49:bc
   [5]=  00:d0:95:84:39:bc
   [6]=  00:d0:95:84:4a:8e
   [7]=  00:d0:95:84:39:f2
   [8]=  00:d0:95:84:3c:42

netid   [1]=1|1 [2]=0|0 [3]=0|0 [4]=0|0 [5]=0|0 [6]=0|0 [7]=0|0 [8]=0|0
lookup  [1]=ff  [2]=1b  [3]=1b  [4]=1b  [5]=1b  [6]=1b  [7]=1b  [8]=1a
subrole [1]=2   [2]=4   [3]=7   [4]=7   [5]=7   [6]=7   [7]=6   [8]=5
list    [1]=1   [2]=2   [3]=3   [4]=4   [5]=5   [6]=6   [7]=7   [8]=8   [0]=8

hop      [0] [1] [2] [3] [4] [5] [6] [7] [8]
    [0] -1  -1  -1  -1  -1  -1  -1  -1  -1
    [1] -1   0   1   2   3   4   5   6   1
    [2] -1   1   0   1   2   3   4   5   6
    [3] -1   2   1   0   1   2   3   4   5
    [4] -1   3   2   1   0   1   2   3   4
    [5] -1   4   3   2   1   0   1   2   3
    [6] -1   5   4   3   2   1   0   1   2
    [7] -1   6   5   4   3   2   1   0   1
    [8] -1   1   6   5   4   3   2   1   0

*****************************************************************

value = 2 = 0x2
```

This command indicates the role of the local stack.

output definitions

Local slot	Local Stack ID.
Base Mac	Base Mac Address of this Stack.

output definitions (continued)

Local Mac	Local Mac address used for IPC communication across the stacking cables.
Role	Primary or Secondary.
Nb	Neighbor ID (1-Based).
In_loop	1 if the stacks are connected in a loop for redundant path.
Neighbor1	Shows the connections to other stacks through the port number.
Topology Role	1=Primary, 2= Secondary, 3=Idle.
Topology Outport	Displays the port used to access the other stacks.
Topology base Mac	Displays the base mac addresses of all the other stacks.
Lookup	The stacking port to be used to do a lookup for another stack.
Hop	Displays the hops for each stack to the other stack.
Gport	Global port used for stacking (either stack_number a or stack_number b).
Lport	Logical port used for stacking (either stack_number a or stack_number b).
Status	1=up, 0=down.

To view the stack topology in detail, use the following command:

```
Working: [Kernel]->stack_topo

local_slot=1 role=PRIMARY P=1 S=2 (elements=0x300ff nb=8 loop=1 sup=2 type=2)

    7 elements seen by link1 (gport=0x1a lport=0x1a status=1)
       slot=8 originate_port=26 role=IDLE
       slot=7 originate_port=27 role=IDLE
       slot=6 originate_port=26 role=IDLE
       slot=5 originate_port=27 role=IDLE
       slot=4 originate_port=26 role=IDLE
       slot=3 originate_port=27 role=IDLE
       slot=2 originate_port=26 role=SECONDARY
    7 elements seen by link2 (gport=0x1b lport=0x1b status=1)
       slot=2 originate_port=27 role=SECONDARY
       slot=3 originate_port=26 role=IDLE
       slot=4 originate_port=27 role=IDLE
       slot=5 originate_port=26 role=IDLE
       slot=6 originate_port=27 role=IDLE
       slot=7 originate_port=26 role=IDLE
       slot=8 originate_port=27 role=IDLE

NI=1 CMM=65 role=1
   * state_linkA=1 remote_slotA=8 remote_linkA=51
   * state_linkB=1 remote_slotB=2 remote_linkB=52

NI=2 CMM=66 role=2
   * state_linkA=1 remote_slotA=3 remote_linkA=27
   * state_linkB=1 remote_slotB=1 remote_linkB=52

NI=3 CMM=0  role=3
   * state_linkA=1 remote_slotA=2 remote_linkA=51
   * state_linkB=1 remote_slotB=4 remote_linkB=52
```

```
NI=4 CMM=0  role=3
   * state_linkA=1 remote_slotA=5 remote_linkA=51
   * state_linkB=1 remote_slotB=3 remote_linkB=28

NI=5 CMM=0  role=3
   * state_linkA=1 remote_slotA=4 remote_linkA=51
   * state_linkB=1 remote_slotB=6 remote_linkB=52

NI=6 CMM=0  role=3
   * state_linkA=1 remote_slotA=7 remote_linkA=51
   * state_linkB=1 remote_slotB=5 remote_linkB=52

NI=7 CMM=0  role=3
   * state_linkA=1 remote_slotA=6 remote_linkA=51
   * state_linkB=1 remote_slotB=8 remote_linkB=52

NI=8 CMM=0  role=3
   * state_linkA=1 remote_slotA=1 remote_linkA=51
   * state_linkB=1 remote_slotB=7 remote_linkB=52
```

output definitions

local slot number	Local stack number.
role	Either Primary, secondary or idle.
nb	Number of stacks.
loop	If redundant path is available
elements seen by link	Number of elements seen by the link with the global/local port number as 1a, in the order they are seen and the role of each stack
NI	NI number of the switch in the stack.
CMM	CMM number of the switch in the stack. CMM number can be 65 (Primary), 66 (Secondary) or 0 (Idle). Role can be 1 (Primary), 2 (Secondary) or 3 (Idle).
state_link	Status of link A and B which can be 1 if up or 0 if down.
remote_slot	Remote slot number.
remote_link	Remote link number.

Accessing Dshell on Idle Switches

OS6600 in standalone environment is like one NI for OmniSwitch 7000 and 8000 series switches. Just going into Dshell will allow the use of normal Vx Works commands.

There are two ways to access Dshell. One is using the **dshell** command from CLI or pressing **control-w**, **control-w** (twice). The second method is used when the console or telnet is not accessible. However, before doing so, it must be enabled by following the steps below on the primary and secondary switches:

1 From the CLI prompt enter:

```
->dshell
```

2 From the Dshell prompt enter

```
Certified: [Kernel]->WWON=1
```

In stacking environment, only the primary and secondary switches have console enabled whereas console is disabled for the idle switches. To enable the Dshell access to the idle switches use the following command on primary stack:

Nisup_control_WW_on *slot*

You must execute this command on each idle switch in the stack. Please note that these switches will not allow to exit with the **exit** command. To restore normal Dshell access you will need to reboot the switch.

Using AlcatelDebug.cfg

When you are using IPMS/DVMRP with 802.1Q it is recommended that **debug interfaces set backpressure enable** be used. This command can be put in the **boot.cfg** file, but it is overwritten as soon as **write memory** is issued, since it is a debug command and the setting is lost after a reboot. To retain the debug settings after a system reboot, put debug commands into a file called **AlcatelDebug.cfg** in both the working and certified directories. Use Notepad or VI editor to create the **AlcatelDebug.cfg** file.

Example:

```
-> vi AlcatelDebug.cfg
-> debug set WWON 1 => to allow dshell access in the event of the console lockup
-> debug set esmDebugLevel 4 => see port up/down event on swlog
-> debug interfaces set backpressure enable => to enable system backpressure
```

Troubleshooting IPC on OS-6/7/8XXX Series of Switches

IPC (Inter Process Communication) is should by the system to communicate between different software modules. This communication can be between different processes in the same software module or between two entirely separate modules. This process can be between NI and CMM or between CMM to CMM.

Burst Bus commonly known as BBUS (management bus) is used for the IPC communication. IPC uses connectionless build-in Vx Works sockets to communicate.

Typical problems that can arise because of the problems with IPC can cause the following symptoms:

- Loss of access to the console of the switch
- Loss of messages between CMM and NI resulting in switching and routing problems.
- High CPU utilization on CMM

Debugging IPC

IPC has 5 different buffer pools:

- Urgent Pools
- Control Pools for control messages
- Normal Pools for some control messages as well as other messages
- Jumbo Pools
- Local Pools

Each of these pools have some dedicated buffers available. Once any of these processes initiates a socket to communicate, it is suppose to tear the socket down after the communication is done. If it does not tear the socket then it might result in occupying the buffer space which will not be available for other processes.

IPC pools can be looked in dshell using the command:

```
Working: [Kernel]->ipc_pools
UrgentPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 5096, remaining: 5090
    In socket queues: 1 Not queued: 3:
    In DMA queues: 2

NormalPool: Full size is 2024, remaining: 2022
    In socket queues: 0 Not queued: 2:
    In DMA queues: 0

JumboPool: Full size is 256, remaining: 255
    In socket queues: 1 Not queued: 0:
    In DMA queues: 0
```

```
LocalPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0
```

Each type of pool has the following listed in the command output:

- Maximum size of buffers available
- Currently available buffers
- Socket Queues being used
- Not Queued in pool
- Direct Memory Access Queues

Currently available buffers should always be around the maximum available in normal operation. In some scenarios, it might happen that the remaining pools are decrementing at a fast rate and are never freeing up the buffers. This can lead to problem with IPC.

Iterative use of the command will help to identify the situation.

An example is as follows:

```
Working: [Kernel]->ipc_pools
UrgentPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 5096, remaining: 5062
    In socket queues: 4 Not queued: 20:
    In DMA queues: 10

NormalPool: Full size is 2024, remaining: 2022
    In socket queues: 0 Not queued: 2:
    In DMA queues: 0

JumboPool: Full size is 256, remaining: 255
    In socket queues: 1 Not queued: 0:
    In DMA queues: 0

LocalPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

Working: [Kernel]->ipc_pools
UrgentPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 5096, remaining: 5060
    In socket queues: 6 Not queued: 20:
    In DMA queues: 10

NormalPool: Full size is 2024, remaining: 2022
    In socket queues: 0 Not queued: 2:
    In DMA queues: 0

JumboPool: Full size is 256, remaining: 255
    In socket queues: 1 Not queued: 0:
    In DMA queues: 0
```

```
LocalPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    DMA queues: 0
```

In the above two outputs it seems that the control pool is stuck and the socket queues are incrementing. In order to find out which task is using these queues we need to look at the socket information.

To look in detail about these pools the following commands can be used in Dshell:

- **Ipc_urgent_pools_detail** *number*
- **Ipc_control_pools_detail** *number*
- **Ipc_normal_pools_detail** *number*
- **Ipc_jumbo_pools_detail** *number*
- **Ipc_local_pools_detail** *number*

The above commands have an option to specify the number of sockets to be displayed in Dshell. If no number is specified then it will display all the sockets in use which can be real problem in case of thousands of sockets being used.

```
Working: [Kernel]->ipc_control_pools_detail
ipc_control_pools_details

ControlPool: Full size is 5096, remaining: 5090
  Socket ID = 0x3, dest slot = 66, remote addr = 0x0, ipc status = D
  Task ID = 0x67f3c10, PayLoad Len= 68,  ipc priority = 0x1, data ptr = 0x5e09f9
8
  next = 0x0, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

  Socket ID = 0x5, dest slot = 66, remote addr = 0x8400041, ipc status = D
  Task ID = 0x67f3c10, PayLoad Len= 68,  ipc priority = 0x1, data ptr = 0x5e09ff
8
  next = 0x0, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

  Socket ID = 0x8, dest slot = 66, remote addr = 0xf400042, ipc status = G
  Task ID = 0x6862660, PayLoad Len= 64,  ipc priority = 0x1, data ptr = 0x5e0a1d
8
  next = 0x6818ba4, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

  Socket ID = 0x8, dest slot = 66, remote addr = 0xf400042, ipc status = G
  Task ID = 0x6862660, PayLoad Len= 64,  ipc priority = 0x1, data ptr = 0x5e1ba5
8
  next = 0x68231d8, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

  Socket ID = 0x8, dest slot = 65, remote addr = 0x5090041, ipc status = S
  Task ID = 0x6862660, PayLoad Len= 68,  ipc priority = 0x1, data ptr = 0x5e202b
8
  next = 0x0, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

  Socket ID = 0x1, dest slot = 66, remote addr = 0x10400042, ipc status = G
  Task ID = 0x6862660, PayLoad Len= 64,  ipc priority = 0x1, data ptr = 0x5e6999

8
  next = 0x0, pFreeQ = 0x6f565d0, data_offset = 0, free_list_num = 3

   In socket queues: 1 Not queued: 3:
   In DMA queues: 2
```

```
value = 10 = 0xa
Working: [Kernel]->
```

The above command displays a lot of information but we are interested in the most repeating socket ID. In the above example it is 0x8. To look into what does this socket means the following command can be used in Dshell:

```
Working: [Kernel]->ipc_socket_info 0x8
ipc_socket_info
Socket 8:

LocalSocketID = 0x8, localidx = 0x8, Local_address = 0xf400041
RemoteSocketID = 0x8, Remote_Address = 0xf400042
QnumBufs = 1, NumBufs = 1588, seqSent = 1588, seqRecv = 1588
USRnumBufs = 1, State = 0x3, OptionFlgs = 0x0, priority = 1
blk_timeout = 0, LingerTime = 0, RxQ_Full_Threshold = 65536,
RxQ_Numbuf_Threshold = 128 congestion = 0, SockMask = 0x100,
SockMsbs = 0x0, use_sw_buf = 1
remote_cong = 0, init_done = 13, sem_use = 0, alignmentSpace = 0
Task id = 0x67f3c10 (tCsCSMtask), LastTimeStamp = 1046954691
recvErrs = 0, txCnt = 1588, txErr = 0, eagainCnt = 0
xoffsent = 0, xonsent = 0, xoffrecv = 0, xonrecv = 0, congcount = 0
value = 8 = 0x8
Working: [Kernel]->
```

The output of the above command shows that tCsCSMtask is the one consuming this socket.

Older versions of the code might not show the task name in the task ID so the following command can be used to find out the tasked:

```
Working: [Kernel]->ti 0x67f3c10

  NAME        ENTRY       TID    PRI   STATUS      PC       SP     ERRNO  DELAY
---------- ------------ -------- --- ---------- -------- -------- ------- -----
tCsCSMtask csCsmMain     67f3c10  94 PEND         158540  67f34a0  3d0002     0

stack: base 0x67f3c10  end 0x67eede8  size 19320  high 15072  margin 4248

options: 0x4
VX_DEALLOC_STACK

%pc   =   158540   %npc  =   158544   %ccr  =       44   %y    =        0
%asi  =       15   %cwp  =        0   %tt   =        0   %tl   =        0
%pil  =        0   %pstate =       1e
%g0   =               0   %g1   =                0   %g2   =                0
%g3   =               0   %g4   =                0   %g5   =                0
%g6   =               0   %g7   =                0   %i0   =          67eedc0
%i1   = ffffffffffffffff   %i2   =           1e5c54   %i3   =                0
%i4   =          158440   %i5   =           264c00   %fp   =          67f3560
%i7   =          158b4c   %l0   =                0   %l1   =          67eedc0
%l2   =               0   %l3   =               14   %l4   =          66fc800
%l5   =         6a62038   %l6   =          66ff810   %l7   =                4
%o0   =               0   %o1   =                0   %o2   =                0
%o3   =               0   %o4   =                0   %o5   =                0
%sp   =         67f34a0   %o7   =                0


value = 109001744 = 0x67f3c10
Working: [Kernel]->
```

Now doing a task trace on this task can be helpful to see if the task is moving:

```
Working: [Kernel]->tt 0x67f3c10
108e9c vxTaskEntry    +c  : Letext (&dataInfo, 67f3920, 67f3a20, 34000000, 66ff8
00, 6a69800)
66b69b4 Letext         +2d4: zcSelect (5, 67f3a20, 0, 0, 6a6c800, 247)
6ff56f8 zcSelect       +458: semTake (67eedc0, ffffffff, a, 28, a, 0)
158b4c semTake        +2c : semBTake (67eedc0, ffffffff, &semTakeTbl, 0, &semBTa
ke, 264c00)
value = 0 = 0x0
Working: [Kernel]->
```

Using this command multiple times will give an idea if the task is stuck in some routine.

Gathering this data and attaching in the Problem Report will help Engineering to identify the source of the problem.

The CMM also keeps a prospective of NI for their IPC Pools. These can be displayed using the following commands:

- **IpcSlotPools** *slot,slice*
- **IpcSlotUrgentPoolsDetail** *slot,slice*
- **IpcSlotControlPoolsDetail** *slot,slice*
- **IpcSlotNormalPoolsDetail** *slot,slice*
- **IpcSlotJumboPoolsDetail** *slot,slice*
- **IpcSlotLocalPoolsDetail** *slot,slice*

Rest of the information about the sockets and the tasks can be found using the same commands as discussed above.

If a NI generating many IPC messages then CMM might not be able to see the IPC pools of that and as well as any other NI. E.g.

```
Certified: [Kernel]->ipcSlotPools 6,0
ipcSlotPools slot 6, slice 0

UrgentPool: Full size is 0, remaining: 256
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 0, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

NormalPool: Full size is 0, remaining: 255
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

JumboPool: Full size is 0, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0
```

```
LocalPool: Full size is 0, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

value = 6 = 0x6
```

The above display of the command does not show the Full size of any of the pools. This indicates that CMM is unable to view the IPC pools of the NI. In this scenario, one needs to load the NI Debugger and go to the NI and look at the IPC Pools. One of the NI would be generating many IPC messages that would result in IPC sockets to be eaten up by that NI resulting in flooding of enormous amount of IPC messages and in turn loosing communication with the CMM.

The following is an example of using the **NiDebug** command to display the IPC pools of all NIs.

```
Certified:[Kernel]->NiDebug
nidbg> ipc_pools
ipc_pools

UrgentPool: Full size is 256, remaining: 256
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

NormalPool: Full size is 256, remaining: 131
    In socket queues: 123 Not queued: 2:
    In DMA queues: 0

JumboPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

LocalPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0



 value = 0 = 0x0



nidbg> ipc_normal_pools_detail 10
                              ipc_normal_pools_details

NormalPool: Full size is 256, remaining: 135
    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
62d108
    next = 0x17ca60c, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
630108
    next = 0x17c8bec, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
```

```
631908
    next = 0x17c8c44, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
632108
    next = 0x17caab0, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
632908
    next = 0x17c98d0, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
633908
    next = 0x17c9d1c, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
634108
    next = 0x17c9e7c, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
634908
    next = 0x17ca244, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
635908
    next = 0x17ca1ec, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

    Socket ID = 0x19, dest slot = 2, remote addr = 0x3030002, ipc status = S
    Task ID = 0x17fd170, PayLoad Len= 128,  ipc priority = 0x1, data ptr = 0x1
636908
    next = 0x0, pFreeQ = 0x2fc7a8, data_offset = 0, free_list_num = 6

      In socket queues: 119 Not queued: 2:
      In DMA queues: 0



 value = 10 = 0xa



    LocalSocketID = 0x19, localidx = 0x19, Local_address = 0x100b0002
    RemoteSocketID = 0x0, Remote_Address = 0x0
    QnumBufs = 124, NumBufs = 4276, seqSent = 0, seqRecv = 0
    USRnumBufs = 0, State = 0x2, OptionFlgs = 0x0, priority = 1
    blk_timeout = 0, LingerTime = 0, RxQ_Full_Threshold = 65536, RxQ_Numbuf_Thre
shold = 128
    congestion = 0, SockMask = 0x2000000, SockMsbs = 0x0, use_sw_buf = 0
    remote_cong = 0, init_done = 0, sem_use = 0, alignmentSpace = 0
    Task id = 0x15f7768 (taStp), LastTimeStamp = 0
    recvErrs = 0, txCnt = 68, txErr = 0, eagainCnt = 0
    xoffsent = 0, xonsent = 0, xoffrecv = 0, xonrecv = 0, congcount = 0
value = 25 = 0x19
```

```
nidbg> tt 0x15f7768
    1e6ce0 vxTaskEntry    +c  : stp_task_entry (0, 0, 0, 0,
0, 0)
    f22e8 stp_task_entry +80 : stpNISock_start (22bc00, 22bea0, 22bdc4, 3, 22bd
f4, 3)
```

Multiple task trace of the task with IPC Pools should be taken. This process might have to be repeated on multiple NI in order to find out the cause of the problem and identify the NI causing the problem to happen.

OmniSwitch 6624/6648 Example

Follow the steps below for an example of displaying IPC pool data on an OmniSwitch 6624/6648;r

1 Check the **In socket queues** and **Not queued** fields for all the pools and identify the pool that has the highest value with the **ipc_pools** command as shown below:

```
Working: [Kernel]->ipc_pools
ipc_pools

UrgentPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

ControlPool: Full size is 4096, remaining: 3451
    In socket queues: 640 Not queued: 5:
    In DMA queues: 0

NormalPool: Full size is 1024, remaining: 377
    In socket queues: 620 Not queued: 16:
    In DMA queues: 0

JumboPool: Full size is 256, remaining: 256
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

LocalPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0



value = 1 = 0x1
```

2 Find the most repeated socket ID **ipc_normal_pools_detail** command as shown below:

```
Working: [Kernel]->ipc_pools_detail 1,0

NormalPool: Full size is 1024, remaining: 377
  Socket ID = 0x7, dest slot = 1, remote addr = 0x60001, ipc status = G
  Task ID = 0x756ba38, PayLoad Len= 20,  ipc priority = 0x1, data ptr = 0x6cfcba
0
  next = 0x0, pFreeQ = 0x74fb4e0, data_offset = 0, free_list_num = 6

  Socket ID = 0x100, dest slot = 90, remote addr = 0x50001, ipc status = S
  Task ID = 0x7571700, PayLoad Len= 812,  ipc priority = 0x1, data ptr = 0x6cfd3
a0
  next = 0x739fac0, pFreeQ = 0x74fb4e0, data_offset = 0, free_list_num = 6
```

```
    Socket ID = 0x100, dest slot = 5, remote addr = 0x5400042, ipc status = S
    Task ID = 0x7571700, PayLoad Len= 812,  ipc priority = 0x1, data ptr = 0x6cfe3
  a0
    next = 0x739b810, pFreeQ = 0x74fb4e0, data_offset = 0, free_list_num = 6

    Socket ID = 0x100, dest slot = 65, remote addr = 0x8440041, ipc status = S
    Task ID = 0x7571700, PayLoad Len= 812,  ipc priority = 0x1, data ptr = 0x6cfeb
  a0
    next = 0x7396da4, pFreeQ = 0x74fb4e0, data_offset = 0, free_list_num = 6

    Socket ID = 0x2, dest slot = 65, remote addr = 0x11b0001, ipc status = G
    Task ID = 0x5514c80, PayLoad Len= 20,  ipc priority = 0x1, data ptr = 0x6cffba
  0
    next = 0x73a1cac, pFreeQ = 0x74fb4e0, data_offset = 0, free_list_num = 6
```

3 Obtain the task ID with the **ipc_socket_info** command. Use the most-repeated socket ID discovered in Step 2.

```
Certified: [Kernel]->ipc_socket_info 0x100
ipc_socket_info
Socket 100:

LocalSocketID = 0x100, localidx = 0x100, Local_address = 0x5450041
RemoteSocketID = 0x0, Remote_Address = 0x0
QnumBufs = 128, NumBufs = 193, seqSent = 0, seqRecv = 0
USRnumBufs = -65, State = 0x2, OptionFlgs = 0x0, priority = 1
blk_timeout = 0, LingerTime = 0, RxQ_Full_Threshold = 65536,
RxQ_Numbuf_Threshold = 128
congestion = 0, SockMask = 0x200, SockMsbs = 0x5, use_sw_buf = 0
remote_cong = 0, init_done = 0, sem_use = 0, alignmentSpace = 0
Task id = 0x4e105c0 (WebView), LastTimeStamp = 1063601688
recvErrs = 0, txCnt = 0, txErr = 0, eagainCnt = 0
xoffsent = 0, xonsent = 0, xoffrecv = 0, xonrecv = 0, congcount = 0
value = 68 = 0x44 = 'D'
```

4 Dump the task ID discovered in Step 3 with the **tt** command as shown below:

```
Certified: [Kernel]->tt 0x4e105c0
```

Run this command 3–4 times.

On the primary switch in the stack you can execute the **debugDisplayRcvDesc** Dshell command to see the near-end of IPC health as shown below:

```
->dshell
Certified: [Kernel]-> debugDisplayRcvDesc
```

Port Numbering Conversion Overview

The sections below document how to convert port number parameters.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

ifindex to gport

To convert from **ifindex** to global port (**gport**) number use the **findGlobalPortFromIfIndex** Dshell command as shown below:

```
-> dshell
Working: [Kernel]->findGlobalPortFromIfIndex 16011
value = 505 = 0x1f9
```

gport to ifindex

To convert from global port (**gport**) to **ifindex** use the **findIfIndexFromGlobalPort** Dshell command as shown below:

```
-> dshell
Working: [Kernel]->findIfIndexFromGlobalPort 505
value = 16011 = 0x3e8b
```

Converting from lport

The **lport** numbering process varies on each platform type (e.g., Falcon/Eagle or Hawk), as well as module type (e.g., ENI-C24, GNI-C2, GNI-U12, GNI-U8, GNI-C24, GNI-U24, etc.). To determine the **lport** value use two Dshell commands: **dmpValidPorts** and **dmpAbsPort**.

The following subsections describe conversions based on platform type. You need to be careful that both commands can be used on either Dshell or **Nidebug** based on platform type. In addition, input values for **dmpAbsPort** vary depending on platform type.

OmniSwitch 7700/7800/8800 (Falcon/Eagle) Example

The following displays all valid **lport** values with the **dmpValidPorts** command from **NiDebug**. Afterwards, you should do a dump for each slice.

1 Use the **dmpValidPorts** command as shown below:

```
8:0 nidbg> dmpValidPorts
8:0                  valid lports: [ 0 ][ 1 ][ 2 ][ 3 ][ 4 ][ 5 ]
8:0
8:0 valid uports: [ 1 ][ 2 ][ 3 ][ 4 ][ 5 ][ 6 ]
```

2 Find the corresponding **lport** value from the **uport** value using **dmpAbsPort** command. Please note that you *must* use the **uport** value for this command.

```
8:0 nidbg> dmpAbsPort 1
```

Note that **1** is the **uport** number. Output similar to the following will be displayed:

```
8:0
8:0     Valid               1
8:0     in LSM              0
8:0 ---------- Port Numbers  ------------------
8:0     Slot                8
8:0     Slice               0
8:0     Mac                 0
8:0     Bus                 0
8:0     phy                 0
8:0     gport             224
8:0     lport               0
8:0     iport               0
8:0     pport               0
8:0     uport               1
```

OmniSwitch 6624/6648 (Hawk) Example

Find all valid **lports** values with the **dmpValidPorts** command from Dshell on each element (i.e., each slot in a stack). Afterwards, you should do a dump for each slot.

1 Use the **dmpValidPorts** command as shown below:

```
Certified: [Kernel]->dmpValidPorts
valid lports: [ 0 ][ 1 ][ 2 ][ 3 ][ 4 ][ 5 ][ 6 ][ 7 ][ 8 ][ 9 ][ 10 ][ 11 ][ 12
][ 13 ][ 14 ][ 15 ][ 16 ][ 17 ][ 18 ][ 19 ][ 20 ][ 21 ][ 22 ][ 23 ][ 24 ][ 25 ][
26 ][ 27
][ 32 ][ 33 ][ 34 ][ 35 ][ 36 ][ 37 ][ 38 ][ 39 ][ 40 ][ 41 ][ 42 ][ 43 ][ 44 ][
45 ][ 46 ][ 47 ][ 48 ][ 49 ][ 50 ][ 51 ][ 52 ][ 53 ][ 54 ][ 55 ][ 58 ][ 59 ]
value = 1 = 0x1
```

2 Find the corresponding uport value from lport value using the **dmpAbsPort** command. Make sure you use the **lport** value as the input value. This is different from Falcon/Eagle.

```
Certified: [Kernel]->dmpAbsPort 49
```

Note that **49** is the **lport** number. Output similar to the following will be displayed:

```
        Valid               1
        in LSM              0
        portType            4
---------- Port Numbers  ------------------
        Slot                3
        gport             177
        lport              49
        dport              17
        pport              17
        uport              42
```

2 Troubleshooting Switched Ethernet Connectivity

This chapter assumes that it has been verified that the connectivity problem is across Ethernet media and the connection between the non-communicating devices is switched/bridged not routed (i.e., Devices are in the same IP Subnet).

For configuration assistance in designing and configuring switched Ethernet connectivity, please refer to the "Configuring Ethernet Ports" chapter in the appropriate *OmniSwitch Network Configuration Guide*. For known specifications and limitations, Please refer to the appropriate Release Notes Revision.

In This Chapter

Overview of Troubleshooting Approach

- Verify physical layer connectivity.
- Verify current running configuration is accurate.
- Verify source learning.
- Investigate any error conditions.
- Verify health of NIs involved.
- Verify health of CMM.

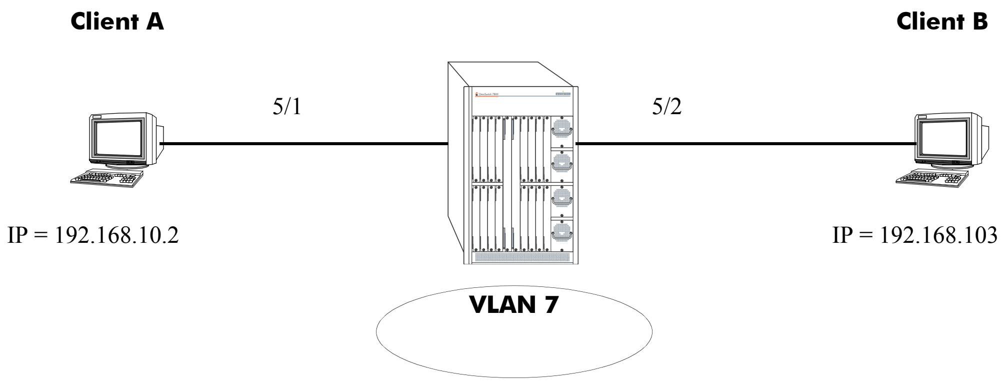


Diagram 1

Verify Physical Layer Connectivity

Verify that there is valid link light along the entire data path between the devices that can not switch to each other. Make sure to include all interswitch links. Verify LED's on all involved CMMs and NIs are Solid OK1, Blinking OK2. If this is not the case, contact technical support.

Use the show interfaces command to verify operational status is Up, speed and duplex are correct and match the other side of the connection. Run this command on the same interface multiple times to verify errors (Error Frames, CRC Error Frames, Alignment Errors) are not incrementing. If the error counts are incrementing verify the health of the cabling as well as the NIC involved. Also note that if the Collision Frames is incrementing, this is normal for a half duplex connection. If the port is set to full duplex and these errors are still incrementing, verify the duplex setting on the other side of the connection. Finally, if these commands were run while the end stations were trying to ping each other, verify Bytes Received is incrementing. If is not, verify the NIC card.

Note. Remember to do this for each port along the data path, not just the ports that directly attached to the end stations.

```
-> show interfaces 5/1
Slot/Port  5/1  :
  Operational Status     : up,
  Type                   : Fast Ethernet,
  MAC address            : 00:d0:95:7a:63:87,
  BandWidth (Megabits)   : 100,               Duplex           : Full,
  Long Accept            : Enable,            Runt Accept      : Disable,
  Long Frame Size(Bytes) : 1553,              Runt Size(Bytes) : 64
    Input :
     Bytes Received    :              14397,
     Lost Frames       :                  0,
     Unicast Frames    :                  6,
     Broadcast Frames  :                 93,
     Multicast Frames  :                  7,
     UnderSize Frames  :                  0,
     OverSize Frames   :                  0,
     Collision Frames  :                  0,
     Error Frames      :                  0,
     CRC Error Frames  :                  0,
     Alignments Error  :                  0
    Output :
     Bytes transmitted :              83244,
     Lost Frames       :                  0,
     Unicast Frames    :                 10,
     Broadcast Frames  :                 84,
     Multicast Frames  :               1106,
     UnderSize Frames  :                  0,
     OverSize Frames   :                  0,
    Collision Frames  :                 0,
     Error Frames      :                  0
```

If the port reports operational status down, verify the physical link, but also verify the necessary NIs and CMM are receiving power and are up and operational. Use the **show ni** command followed by the slot number and the **show cmm** command to verify this.

```
-> show ni 5
Module in slot 5
  Model Name:                  OS7-ENI-C24 ,
  Description:                 24PT 10/100 MOD,
  Part Number:                 902136-10,
  Hardware Revision:           A02,
  Serial Number:               22030298,
  Manufacture Date:            MAY 18 2002,
  Firmware Version:            6,
  Admin Status:                POWER ON,
  Operational Status:          UP,
  Power Consumption:           44,
  Power Control Checksum:      0x808,
  MAC Address:                 00:d0:95:7a:63:87,
  ASIC - Physical:             0x1a01 0x0201 0x0201 0x001e 0x001e 0x001e


-> show cmm
Module in slot CMM-A-1
  Model Name:                  OS7800-CMM ,
  Description:                 BBUS Bridge,
  Part Number:                 901753-10,
  Hardware Revision:           306,
  Serial Number:               2153117A,
  Manufacture Date:            APR 11 2002,
  Firmware Version:            38,
  Admin Status:                POWER ON,
  Operational Status:          UP,
  Power Consumption:           85,
  Power Control Checksum:      0x80e,
  MAC Address:                 00:d0:95:79:62:8a,
  ASIC - Physical:             0x0801 0x0801 0x0801 0x0801 0x0801 0x0801 0x08
Module in slot CMM-A-2
  Model Name:                  ,
  Description:                 Processor,
  Part Number:                 901753-10,
  Hardware Revision:           303,
  Serial Number:               2133035A,
  Manufacture Date:            APR 11 2002,
  Firmware Version:            38
```

Verify Current Running Configuration

If the physical layer looks OK, then verify the configuration. Use the show configuration snapshot all to display the current running configuration. Use this command to verify the ports that are involved are in the correct VLAN. Also review the output of the command to verify there is nothing explicit in the configuration that would cause the problem, such as a deny ACL that could be found under the QoS subsection.

```
-> show configuration snapshot all
! Chassis :
system name OS7800
! Configuration:
! VLAN :
vlan 7 enable name "VLAN 7"
vlan 7 port default 5/1
vlan 7 port default 5/2
! 802.1Q :
! Spanning tree :
! Bridging :
! IPMS :
! AAA :
aaa authentication console "local"
! QOS :
qos apply
! Policy manager :
! Session manager :
! SNMP :
! IP route manager :
ip router router-id 127.0.0.1
ip router primary-address 127.0.0.1
! RIP :
! OSPF :
! BGP :
! IP multicast :
! Health monitor :
! Interface :
! Link Aggregate :
! Port mirroring :
! UDP Relay :
! Server load balance :
! System service :
! VRRP :
! Web :
! AMAP :
! GMAP :
! Module :
```

To further verify the ports are in the correct VLAN and that they are in spanning tree forwarding instead of blocking use the **show vlan port** command. Also note that the port type must match what it is connecting to. If the port is 802.1Q tagged enabled for the required vlan, then the device it attaches to must also be Q tagged enabled for that vlan. Remember to run this command on all ports in the data path.

```
-> show vlan 7 port
port     type      status
--------+---------+--------------
   5/1    default   forwarding
   5/2    default   forwarding
   5/9    qtagged     inactive
```

If ports that should be in forwarding are in blocking, or vice versa, please consult Chapter 4, "Troubleshooting Spanning Tree."

Verify Source Learning

If the configuration looks correct, source learning should be examined. If connectivity exists but is slow, or intermittent source learning could be the root cause, since data packets would be flooded. However, if there is no packet throughput between the devices the problem is likely not due to a source learning problem.

To verify that the MAC addresses are being learned correctly use the **show mac-address-table slot** command. Verify that the correct mac address is being learned of the correct port, in the correct vlan.

```
-> show mac-address-table slot 5
Legend: Mac Address: * = address not valid

  Vlan      Mac Address          Type       Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
  7   00:00:39:73:13:0e     learned         10800     bridging      5/1
  7   00:b0:d0:75:f1:97     learned         10800     bridging      5/2
Total number of Valid MAC addresses above = 2
```

Verify Switch Health

If source learning appears to be not working correctly, verify the health of the switch with the show health, and show health slot commands. Be sure to run the latter command on all necessary NIs. Any variables that have reached or exceeded their limit value could cause forwarding problems on the switch. In this case please contact Technical Support. For more detailed source learning trouble shooting, please see Chapter 3, "Troubleshooting Source Learning."

```
-> show health
* - current value exceeds threshold

Device                          1 Min  1 Hr  1 Hr
Resources           Limit   Curr   Avg    Avg   Max
-----------------+-------+------+------+-----+----
Receive               80      00     00     00    00
Transmit/Receive      80      00     00     00    00
Memory                80      39     39     39    39
Cpu                   80      02     02     02    03
Temperature Cmm       50      39     39     39    39
Temperature Cmm Cpu   50      31     31     31    31


-> show health 5
* - current value exceeds threshold

Slot  05                        1 Min  1 Hr  1 Hr
Resources           Limit   Curr   Avg    Avg   Max
-----------------+-------+------+------+-----+----
Receive               80      00     00     00    01
Transmit/Receive      80      01     01     01    01
Memory                80      16     16     16    16
Cpu                   80      29     33     32    35
```

Verify ARP

If everything checked appears to be valid, verify that this is not an ARP problem. On the end stations involved, enter a static mac address for the device it is trying to communicate with. If connectivity is restored, please see Chapter 11, "Troubleshooting ARP."

Using the Log File

If none of the above suggest a reason as to why Ethernet switching is not properly working, look into the log file and see if there are any messages that may suggest why switching is not working properly. Use the **show log swlog** command to view the system log file. Look for evidence of a system or interface problem around the time the problem began.

```
-> show log swlog
Displaying file contents for ’swlog2.log’
FILEID: fileName[swlog2.log], endPtr[32]
         configSize[64000], currentSize[64000], mode[2]
Displaying file contents for ’swlog1.log’
         FILEID: fileName[swlog1.log], endPtr[48903]
         configSize[64000], currentSize[64000], mode[1]

Time Stamp               Application    Level   Log Message
------------------------+--------------+-------+--------------------------------
THU DEC 12 08:13:51 2002         SYSTEM    info Switch Logging device ’swlog1.lt
THU DEC 12 08:13:53 2002         SYSTEM    info Switch Logging device ’swlog2.lt
THU DEC 12 08:13:56 2002         SYSTEM    info Switch Logging device ’/dev/cont
THU DEC 12 08:13:56 2002    CSM-CHASSIS    info == CSM == start up
THU DEC 12 08:13:56 2002    CSM-CHASSIS    info == CSM == Activating a new vers
THU DEC 12 08:13:56 2002    CSM-CHASSIS    info == CSM == The working version i
THU DEC 12 08:13:56 2002    CSM-CHASSIS    info == CSM == MONITORING ON
THU DEC 12 08:13:56 2002    CSM-CHASSIS    info == CSM == This CMM is primary
```

After following the troubleshooting steps via CLI for physical connection, configuration validation, system health and source learning, here are the additional commands in dshell to troubleshoot problems related connectivity problem:

Checking the 7700/7800 Nantucket Fabric

```
nanlistB04
```

```
Certified: [Kernel]->nanListB04
No SOP Interrupt: 0
Multicast FIFO Full Interrupt: 0
Multicast Buffer Full Interrupt: 0
Unicast Buffer Full Interrupt: 0
Multicast Dump Interrupt: 0
Unicast Dump Interrupt: 0
Unicast Attempt Count: 8a620
Multicast Attempt Count: acecf
Unicast In Count: 8a627
Multicast In Count: acecf
Unicast Out Count: 8a634
Multicast Out Count: 3600e
Dummy Count: 61578
```
Total FLength Count: 0
```
value = 0 = 0x0
Certified: [Kernel]->
```

The total Flengtlh Count value should be 0 or a small value, a large value indicating that there are frames being back up in the fabric queue.

Checking the 7700/7800 Nantucket Fabric for Interrupts, Data Counts and Error Counts

```
Working: [Kernel]->nanListB02
HB Out of Sync Interrupts: 0
Error Count Exceeded Interrupts: 0
Framing Error Interrupts: 0
Parity Error Interrupts: 0
B02 Data Port 0 Frame Count = 690dbd37
B02 Data Port 1 Frame Count = 0
B02 Data Port 2 Frame Count = 542e70d9
B02 Data Port 3 Frame Count = 0
B02 Data Port 4 Frame Count = 0
B02 Data Port 5 Frame Count = 0
B02 Data Port 6 Frame Count = 0
B02 Data Port 7 Frame Count = 9e75d47
B02 Data Port 8 Frame Count = 690dbd39
B02 Data Port 9 Frame Count = 0
B02 Data Port 10 Frame Count = 542e70d9
B02 Data Port 11 Frame Count = 0
B02 Data Port 12 Frame Count = 0
B02 Data Port 13 Frame Count = 0
B02 Data Port 14 Frame Count = 0
B02 Data Port 15 Frame Count = 9e75d47
```

Checking the Traffic Queue on the NI

```
Working: [Kernel]->FindBuffer 3,0 => where 3 is the slot number
Queue = 0x62 length = 0x40, Address 0x6881880
Queue = 0x63 length = 0x40, Address 0x68818c0
value = 3 = 0x3
```

The above capture shows one of the queues is backed up on the NI. Check if the queue is sending traffic using the following command syntax:

esmDumpCoronado *slot*,*slice*,*address*,*bytes*

```
Working: [Kernel]->esmDumpCoronado 3,0,0x6881880,20


  6881880 :         90          0    2f906d3          0          0          0
      40         0
  68818a0 :         40          0          0          0    d8d0620          0
       0         0
  68818c0 :      10090          0    2f906d3          0
value = 3 = 0x3
Working: [Kernel]->esmDumpCoronado 3,0,0x6881880,20

  6881880 :         90          0    2f906d3          0          0          0
      40         0
  68818a0 :         40          0          0          0    d8d0620          0
       0         0
  68818c0 :      10090          0    2f906d3          0
value = 3 = 0x3
```

The above capture shows the queue is stuck and not moving.

Check for Catalina (MAC) or Port Lockup

```
Lab-Span1 > dshell
Working: [Kernel]->getNiResetCount

Slot  1, ASICResetCnt_p addr 0x2c3ee0
Slot  2, ASICResetCnt_p addr 0x2c3ee0

ENI HALF Duplex Reset count addr 0x2c3f60
 phy  0:         0         0         0         0         0         0         0
       0
 phy  1:         0         0         0         0         0         0         0
       0

PHY FIFO LOCKUP Reset count addr 0x2c3fc0
 phy  0:         0         0         0         0         0         0         0
       0
 phy  1:         0         0         0         0         0         0         0
       0

value = 0 = 0x0
Working: [Kernel]->
```

3 Troubleshooting Source Learning

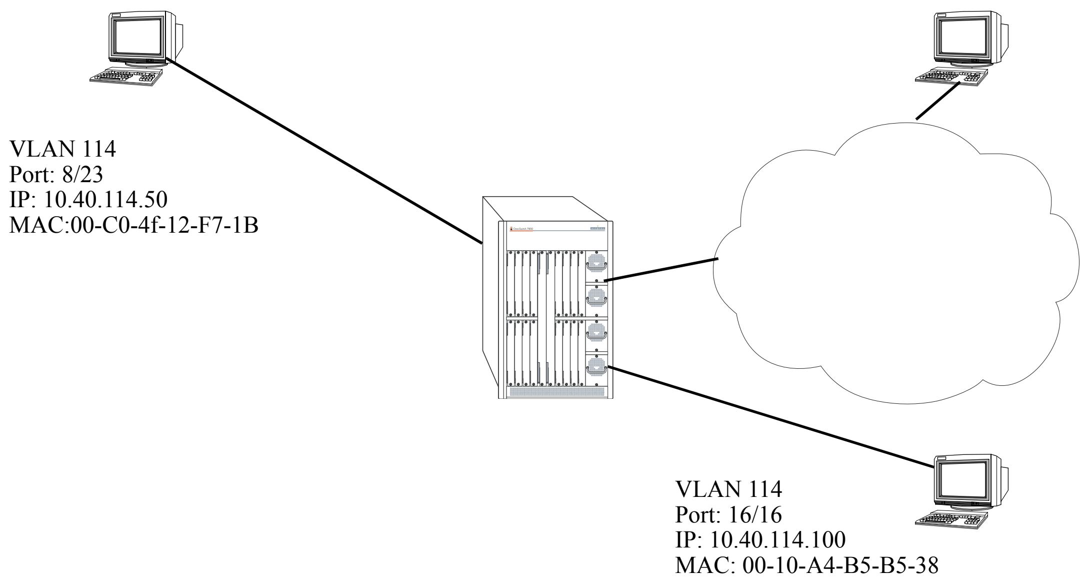
In order to troubleshoot Source Learning problems, a basic understanding of the process is required.

A review of the “Managing Source Learning” chapter from the appropriate *OmniSwitch Network Configuration Guide* is required. The following RFC and IEEE standards are supported:

RFCs supported	2674 - *Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions*
IEEE Standards supported	802.1Q - *Virtual Bridged Local Area Networks* 802.1D - *Media Access Control Bridges*

In This Chapter

Introduction



Source Learning Example

When a packet first arrives on NI source learning examines the packet and tries to classify the packet to join its correct VLAN. If a port is statically defined in a VLAN, the MAC address is classified in the default VLAN. Otherwise, if Group Mobility is being used the MAC address is classified into the correct VLAN based on the rules defined.

As soon as the MAC address is classified in a VLAN, an entry is made in Source Address Pseudo-CAM associating the MAC address with the VLAN ID and the Source Port. This Source Address is then relayed to the CMM for management purposes.

If an entry already exists in MAC address database with the same VLAN ID and the same source port number then no new entry is made. If VLAN ID or the source port is different from the existing entry in MAC address database then the previous entry is aged out and a new entry is made in the MAC address database. This process of adding a MAC address in the MAC address database is known as Source Learning.

A MAC address can be denied to learn on a port based on different policies configured through QOS or Learned Port Security. A MAC address may be learned in a wrong VLAN based on the policies defined for the port.

Note: This document does not discuss the basic operation of Source Learning. To learn about how Source Learning works, refer to the “Managing Source Learning” in the appropriate *OmniSwitch Network Configuration Guide*.

Troubleshooting a Source Learning Problem

In order to troubleshoot a source learning problem the first step is to verify that the physical link is up and the port has correctly auto-negotiated with the end-station.

The next thing is to verify that the port is a member of the right VLAN, if a port is statically configured for a VLAN, or the Group Mobility policies are correctly defined. The workstation configuration should also be verified.

The first thing to look for is the MAC address table to verify that the MAC address is being learned:

```
->  show mac-address-table

    Vlan      Mac Address          Type       Protocol    Operation    Interface

------+-------------------+-------------+-----------+-----------+-----------

    105   00:00:5e:00:01:69     learned         10800     bridging      4/2
    105   00:d0:95:6b:4c:d8     learned         10800     bridging      4/2
    105   00:d0:95:79:62:eb     learned         10806     bridging      4/2
    150   00:d0:95:6b:4c:e7     learned         10800     bridging      4/2
    1     00:d0:95:79:65:ea     learned         10800     bridging      6/1
    108   00:d0:95:6b:4c:db     learned         10800     bridging      6/1
    110   00:d0:95:6b:4c:dd     learned         10800     bridging      7/1
    114   00:c0:4f:12:f7:1b     learned         10800     bridging      8/23
    112   00:d0:95:6b:4c:df     learned         10800     bridging      9/2
    112   00:d0:95:79:65:10     learned         10806     bridging      9/2
    50    00:00:5e:00:01:32     learned         10800     bridging     11/1
    50    00:d0:95:83:e7:81     learned         10800     bridging     11/1
    51    00:00:5e:00:01:33     learned         10800     bridging     11/1
    51    00:d0:95:83:e7:82     learned         10800     bridging     11/1
    52    00:00:5e:00:01:34     learned         10800     bridging     11/1
    52    00:d0:95:83:e7:83     learned         10800     bridging     11/1
    53    00:00:5e:00:01:35     learned         10800     bridging     11/1
    53    00:d0:95:83:e7:84     learned         10800     bridging     11/1
    54    00:00:5e:00:01:36     learned         10800     bridging     11/1
    54    00:d0:95:83:e7:85     learned         10800     bridging     11/1
    55    00:00:5e:00:01:37     learned         10800     bridging     11/1
    55    00:d0:95:83:e7:86     learned         10800     bridging     11/1
    56    00:00:5e:00:01:38     learned         10800     bridging     11/1
    56    00:d0:95:83:e7:87     learned         10800     bridging     11/1
    57    00:00:5e:00:01:39     learned         10800     bridging     11/1
    57    00:d0:95:83:e7:88     learned         10800     bridging     11/1
    58    00:00:5e:00:01:3a     learned         10800     bridging     11/1
    58    00:d0:95:83:e7:89     learned         10800     bridging     11/1
    59    00:00:5e:00:01:3b     learned         10800     bridging     11/1
    59    00:d0:95:83:e7:8a     learned         10800     bridging     11/1
    60    00:00:5e:00:01:3c     learned         10800     bridging     11/1
    60    00:d0:95:83:e7:8b     learned         10800     bridging     11/1
    61    00:00:5e:00:01:3d     learned         10800     bridging     11/1
    61    00:d0:95:83:e7:8c     learned         10800     bridging     11/1
    62    00:00:5e:00:01:3e     learned         10800     bridging     11/1
    62    00:d0:95:83:e7:8d     learned         10800     bridging     11/1
    114   00:10:a4:b5:b5:38     learned         10806     bridging     16/16
Total number of Valid MAC addresses above = 37
```

The above command shows all the MAC addresses learned by the switch.

In order to narrow down to a specific NI the following command can be used (any valid slot number can be specified):

```
->  show mac-address-table slot 8
Legend: Mac Address: * = address not valid

  Vlan      Mac Address          Type       Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
  114   00:c0:4f:12:f7:1b     learned          10800     bridging      8/23
Total number of Valid MAC addresses above = 1
```

This does show that the MAC address 00:c0:4f:12:f7:1b is learned on port 8/23, see the figure on page 3-2. So, the source learning process for this workstation has been completed successfully.

Now, a single MAC address can be a member of multiple VLANs based on different protocols. To verify that the MAC address has been learned in all of the VLANs, the above command can be used. The protocol field will be different based on different protocols being used and classified into different VLANs.

MAC addresses can also be viewed based on VLAN ID, using the following command:

```
->show mac-address-table 114
Legend: Mac Address: * = address not valid

  Vlan      Mac Address          Type       Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
  114   00:c0:4f:12:f7:1b     learned          10800     bridging      8/23
  114   00:10:a4:b5:b5:38     learned          10806     bridging     16/16
Total number of Valid MAC addresses above = 2
```

The above command shows the two workstations learned in VLAN 114 on NI 8 and 16.

Whether it be a Layer 3 packet or layer 2, the first step is to have the source MAC address learned in the MAC address table. Layer 3 involves resolution of ARP, for more details on ARP see troubleshooting section of ARP, and then the available routes to the destination which involves routing, for more details on Routing see troubleshooting section of Routing.

By default the MAC address aging time is set to 300 seconds. This can be viewed:

```
->show mac-address-table aging-time
Mac Address Aging Time (seconds) for Vlan 1 = 300
Mac Address Aging Time (seconds) for Vlan 114 = 300
```

This can be changed using the command:

```
->mac-address-table aging-time 500
Mac Address Aging Time (seconds) for Vlan 1 = 500
Mac Address Aging Time (seconds) for Vlan 114 = 500
```

This can also be changed on a particular VLAN:

```
->mac-address-table aging-time 600 vlan 114
```

It may be required to change the aging timer to a higher value to prevent the aging time of silent devices.

Another method by which silent devices can be accommodated is to use the permanent/static MAC address assigned to a port using the command:

```
->mac-address-table permanent 00:10:a4:b5:b5:38 16/16 114
```

Once, the MAC addresses are learned on the ports then the devices should be able to communicate depending on the upper layers. Variations of MAC-related commands can be viewed in the “Managing Source Learning” chapter from the appropriate *OmniSwitch Network Configuration Guide*.

Advanced Troubleshooting

The advanced troubleshooting for Source learning related problems is to look whether the traffic is coming in from a port and the NI is not learning the MAC, if not prevented by using any other rules.

```
->debug ip packet board ni 8 start
R 8/23 00c04f12f71b->00d0957962c4 IP 10.40.114.50->10.40.114.2 ICMP 8,0
seq=58460.
8 S 8/23 00d0957962c4->00c04f12f71b IP 10.40.114.2->10.40.114.50 ICMP 0,0
seq=58460.
ebug ip 8 R 8/23 00c04f12f71b->00d0957962c4 IP 10.40.114.50->10.40.114.2 ICMP
8,0 seq=58716.
8 S 8/23 00d0957962c4->00c04f12f71b IP 10.40.114.2->10.40.114.50 ICMP 0,0
seq=58716.
packet 8 R 8/23 00c04f12f71b->00d0957962c4 IP 10.40.114.50->10.40.114.2 ICMP 8,0
seq=58972.
8 S 8/23 00d0957962c4->00c04f12f71b IP 10.40.114.2->10.40.114.50 ICMP 0,0
seq=58972.
stop8 R 8/23 00c04f12f71b->00d0957962c4 IP 10.40.114.50->10.40.114.2 ICMP 8,0
seq=59228.
8 S 8/23 00d0957962c4->00c04f12f71b IP 10.40.114.2->10.40.114.50 ICMP 0,0
seq=59228.

->debug ip packet stop
```

This command shows that the packets are coming into the switch and a reply is being sent by the switch to the end station.

Various combinations of **debug ip packet** command can be used to find out the incoming traffic. The combinations possible are as follows:

debug ip packet [start] [timeout *seconds***] [stop] [direction {in | out | all}] [format {header | text | all}] [output {screen | switchlog}] [board {cmm | ni [1-16] | all | none} [ether-type {arp | ip | hex [hex] | all}] [ip-address** *ip_address***] [ip-pair [ip1] [ip2]] [protocol {tcp | udp | icmp | igmp | num [integer] | all}] [show-broadcast {on | off}] show-multicast {on | off}]**

start	Starts an IP packet debug session.
timeout	Sets the duration of the debug session, in seconds. To specify a duration for the debug session, enter timeout, then enter the session length.
seconds	The debug session length, in seconds.
stop	Stops IP packet debug session.
direction in	Debugs incoming packets
direction out	Debugs outgoing packets.
direction all	Debugs both incoming and outgoing packets.
format header	Debugs the packet header.

format text	Debugs the packet text.
format all	Debugs the entire packet.
output screen	Output will appear on screen.
output switchlog	Output will be saved to a log file.
board cmm	Debugs CMM packets.
board ni	Debugs packets for a Network Interface (NI). To debug a specific interface, enter **ni**, then enter the slot number of the NI.
board all	Debugs packets for all CMMs and NIs on the switch
board none	Clears the previous board settings.

If the problems are associated with the source learning on a specific NI then the limitations of the Number of MAC addresses learned should also be considered. Current limitations are:

Number of learned MAC addresses per network interface (NI) module	32K
Number of learned MAC addresses per switch	64K

The total number of MAC addresses learned per switch can be viewed using the command:

```
-> show mac-address-table count
Mac Address Table Count:
  Permanent Address Count           = 0,
  DeleteOnReset Address Count       = 0,
  DeleteOnTimeout Address Count     = 0,
  Dynamic Learned Address Count     = 36,
  Total MAC Address In Use          = 36
```

If the problem is still not resolved then kindly contact Tech Support for further troubleshooting.

Dshell Troubleshooting

The OmniSwitch 6/7/8XXX has a distributed architecture. Source Learning is specific to a NI. Each NI has a layer 2 pseudo-cam which is which can hold 64K entries. 32K entries are reserved for L2 Source Addresses which are local to that NI in L2SA table and the rest of 32K entries are reserved for L2 Destination Addresses which can be from local or remote NI in L2DA table.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

If a problem is specific to a NI and the MAC address is not being learned by the switch, then the first step is to verify from the pseudo-cam of that NI that the MAC address has been learned. There can be a possibility that the NI has learned the MAC but CMM is not reporting that MAC because of IPC messages lost between the CMM and NI.

The commands available to troubleshoot this problem are:

slcDumpL2SA: Display all the SA PseudoCAM entries on one slot/slice.

- Format: **slcDumpL2SA** *slot_num*, *slice_num*

slcDumpL2DA: Display all the Destination Address (DA) PseudoCAM entries on one slot/slice.

- Format: **slcDumpL2DA** *slot_num*, *slice_num*

slcLkupL2SA: Display the SA PCAM entries with MAC, VLAN) tuple on a slot/slice, the high 4 bytes of MAC are MacHi, other 2 bytes are macLo, VLAN non-significant value is 0.

Format: **slcLkupL2SA** *slot_num*, *slice_num*, *macHi*, *macLo*, *vlanId*

slcLkupL2DA: Display the DA PCAM entries with (MAC, VLAN} tuple on a slot/slice, the high 4 bytes of MAC are MacHi, other 2 bytes are macLo, VLAN non-significant value is 0.

- Format: **slcLkupL2DA** *slot_num*, *slice_num*, *macHi*, *macLo*, *vlanId*

Now, if device A connected on slot 8 is unable to communicate to device B in slot 16 then the following steps can be taken to verify configuration on the NI

First look at the source MAC on slot 8 using the command:

```
Working: [Kernel]->slcDumpL2SA 8,0
 Index      Mac Address      Vlan   GlobalPort  4-words content
-------+-------------------+------+-----------+----------------------------------
----
0x371b   00:c0:4f:12:f7:1b  114       250      007200c0 4f12f71b 00000000
0000003a
Total L2 SA entry amount = 1
```

Look at the source MAC on slot 16:

```
Working: [Kernel]->slcDumpL2SA 16,0
 Index      Mac Address      Vlan   GlobalPort  4-words content

-------+-------------------+------+-----------+----------------------------------
----
0x3538   00:10:a4:b5:b5:38  114       499      00720010 a4b5b538 00000000
```

```
000001f3
Total L2 SA entry amount = 1
```

Both of the MAC addresses are learned in the correct VLANs on the right NI.

Now, if device A is trying to communicate to device B then the next thing to look for is the destination MAC address table. This is to verify that the destination MAC address table has the information about the device B.

```
Working: [Kernel]->slcDumpL2DA 8,0
 Index      Mac Address      Vlan   GlobalPort  4-words content
-------+-------------------+------+-----------+----------------------------------
----
0x3004   00:20:da:00:70:04    1         0      00010020 da007004 c0004000
00024000
0x3538   00:10:a4:b5:b5:38  114       499      00720010 a4b5b538 00180000
1f057f3
```

So the entry do show up for the destination device.

Similarly for bidirectional traffic the entry should show up on slot 16.

```
Working: [Kernel]->slcDumpL2DA 16,0
 Index      Mac Address      Vlan   GlobalPort  4-words content
-------+-------------------+------+-----------+----------------------------------
----
0x3004   00:20:da:00:70:04    1         0      00010020 da007004 c0004000
00024000
0x371b   00:c0:4f:12:f7:1b  114       250      007200c0 4f12f71b 00180000
1f05b3a
```

So, the two devices should be able to communicate.

The L2SA and L2DA tables will be different for each slot. L2SA table will be based on the MAC address learned on that slot. This will not be synchronized to all the other modules. Only the CMM will know about it. When the request comes in from device A for device B, first a lookup is done on the local L2SA and L2DA tables to see if there is a matching entry. If there is no matching entry then a request is sent on the BBUS to all the other Coronados, if any Coronado has the matching entry in its L2SA table it responds back with the Global port number of that entry. L2DA table is updated on the originating Coronado and the packet is forwarded to the Global port to reach the destination.

If no other Coronado responds back to the request then the packet is sent over the flood queue to all the other Coronado to be flooded out of the ports in the same VLAN. If a device responds back on the flooded request, L2SA for that NI is updated and the Global port number is send to the originating device using the same lookup as the response will be a unicast packet.

To see Source learning in action on an NI, set the debug level higher (levels are 1-6):

```
-> Sl_NiDebug=4
```

To see Source Learning in action on a CMM, set the debug level higher (levels are 1-6):

```
-> Sl_CmmDebug=5
```

To view the messages on the console, disable systrace:

```
-> Sl_no_systrace=1
```

The following is a sample output:

```
Working: [Kernel]->Sl_no_systrace=1
Sl_no_systrace = 0x56402f4: value = 1 = 0x1
Working: [Kernel]->nidbg
3:0 nidbg> Sl_NiDebug=4
3:0                    Sl_NiDebug = 0x2d1fc4: value = 4 = 0x4
3:0 nidbg> 3:0
3:0  ----------------------------- HRE PACKET HRADER -----------------------
3:0 isIPMS = 0, isSAMatched = 0, isDAMatched = 0, isMcst = 1, qId = 49, isRouted =
0, isTagged = 0, isFlood = 1, protoco
l = 0, sPort = 64
3:0 payLoadLength = 66, isLocked = 0, lockId = 0
3:0 isFBMsg = 0, isIPCMsg = 0, isSTPfrm = 0, isPrtTagged = 0, sVlanId = 21, reQId =
2, mcVlanId = 21
3:0 conditionCodes = 0x180, daMac = 0x00005e000115
3:0 saMac = 0x006008:91bb72, tagType = 0x8100, taginfo = 15, ethType = 800
3:0 ----------------------------- HRE PACKET HEADER END -----------------------
3:0
3:0 sln_salrn: gport = 64, vlanId = 21
3:0
SA 00:60:08:91:bb:72 successfully added to SA CAM
```

OS-6600

To look at the forwarding database on OS-6600 in Dshell use the **slcDumpSlotSlice** command., which displays which slot/slice is considered to be up and operational by the source learning software:

```
Certified: [Kernel]->slcDumpSlotSlice
Source Learning Slice Up List:
slot/slice 2/0, type = 838930434, firstgport = 64, lastgport = 123
value = 68 = 0x44 = 'D'
```

To look at the forwarding database on OS-6600 in Dshell use the **dumpL2** command:

```
Certified: [Kernel]->dumpL2


 Addr#  VID        Addr              DN PN Age     AVID
-----------------------------------------------
 00000 0001 00:01:02:03:00:00 00 30 STATIC  xxxx
 00001 0001 00:10:a4:f5:89:e2 03 00 DYNAMIC xxxx
 00002 0002 00:00:5e:00:01:02 02 26 DYNAMIC xxxx
 00003 0002 00:d0:95:84:07:1e 02 26 STATIC  xxxx
 00004 0003 00:00:5e:00:01:03 02 26 DYNAMIC xxxx
 00005 0003 00:d0:95:84:07:1e 02 26 STATIC  xxxx
 00006 0004 00:d0:95:84:07:1e 02 26 STATIC  xxxx
 00007 0320 00:d0:95:84:3c:ce 02 01 DYNAMIC xxxx
 00008 0333 00:d0:95:84:3c:ce 02 13 DYNAMIC xxxx
 00009 0334 00:d0:95:82:12:ef 02 08 STATIC  xxxx
 00010 0334 00:d0:95:84:3c:ce 02 08 DYNAMIC xxxx
 00011 0336 00:d0:95:79:64:ab 03 24 STATIC  xxxx
 00012 0340 00:d0:95:84:3c:ce 03 10 DYNAMIC xxxx
 00013 0451 00:d0:95:84:3c:ce 03 11 DYNAMIC xxxx
 00014 0999 00:00:5e:00:01:02 02 00 STATIC  xxxx
 00015 0999 00:00:c0:e0:29:e6 02 00 DYNAMIC xxxx
 00016 0999 00:20:da:0a:54:10 02 00 STATIC  xxxx
 00017 0999 00:20:da:6c:20:4c 02 00 STATIC  xxxx
 00018 0999 00:90:27:17:f7:eb 02 00 STATIC  xxxx
 00019 0999 00:a0:24:d2:3f:cb 02 00 STATIC  xxxx


Do you want to printf more addresses 0 -> No 1 -> Yes a -> all  1


 Addr# VID  Addr              DN PN Age     AVID
-----------------------------------------------
 00020 0999 00:b0:d0:77:3e:3d 02 00 STATIC  xxxx
 00021 0999 00:d0:95:2a:02:4c 02 00 STATIC  xxxx
 00022 0999 00:d0:95:6a:84:51 02 00 STATIC  xxxx
 00023 0999 00:d0:95:84:3b:a0 02 00 DYNAMIC xxxx
 00024 0999 00:d0:95:84:3d:90 02 00 DYNAMIC xxxx
 00025 0999 00:d0:95:88:a7:28 02 00 STATIC  xxxx
 00026 0999 08:00:20:87:44:61 02 00 STATIC  xxxx


   No more addr in Master DB.
```

```
      L2 Physical Pool Stats:
                                 Total   Used    Free
           DstSwp Tables       16384     0    16384
           NetID Tables        16384     0    16384
           Protocol Tables     2046      1     2045
           ASIC Rsrc Wraps     2048     26     2022


  value = 294 = 0x126
```

Output of many fields are described below:

output definitions

Addr	The index.
VID	The VLAN ID.
Addr	The MAC address learned.
DN	The device number (stack number).
PN	The port number.
Age	The MAC address type, which can be Dynamic or Static.
AVID	The Authenticated VLAN ID.
DstSwp Tables	The entry for Next Hop info.
NetID Tables	Contains transmit enables, prepend information, and address based VLAN information.

To see Source learning in action, set the debug level higher (levels are 1-6):

```
  SlnDebugLevel=1
```

The following is a sample output:

```
Certified: [Kernel]->SlnDebugLevel=1
SlnDebugLevel = 0x65c8af8: value = 1 = 0x1
=============== Start of CPU Unresolved Packet ===============
TxFlags = 0x2017, BufSize = 64, DiffservCodePoint = 0x0, CpuCode = 0x20, PrtclCode
= 0x1f, RxPNum = 10
PrepRxDevNum = 1, PrepRxPNum = 10, DstUnrCode = 0x1f, SrcUnrCode = 0x0, PacketRa-
mAddr = 0x68228
DstMacAddr16_48 = 0x3d9f8000, DstMacAddr0_15 = 0xe639
SrcMacAddr32_47 = 0x8000, SrcMacAddr0_31 = 0x180a539f
IPPayLoadOffset = 38, EnetType = 0x800, TagPriority = 1, TagVID = 3072
DstIPAddr = 0xc0a80b1b, SrcIPAddr = 0xc0a80b06
SrcIPSkt = 0x7f80, DstIPSkt = 0x7d00
hslnProcessL2Packet(258): vlanid = 0, gport = 42.
hsln_core_adrlrn_handler: Get the packet from Q-Dispatcher...
=======================
address pktPtr = 0x63e255c
queue_port_id = 0x402a
length = 60
lock = 0
packet_info = 0x0
ccode = 0x80
da = 00:80:9f:3d:50:b3
sa = 00:80:9f:53:0a:18
=== End of E_FRAME_PARAMS ===
```

4 Troubleshooting Spanning Tree

In order to troubleshoot spanning tree related problems an understanding of the protocol and its features are needed. The OmniSwitch supports two Spanning Tree Algorithms; 802.1D (standard) and 802.1w (rapid reconfiguration). In addition, the Omniswitch supports two Spanning Tree operating modes: flat (single STP instance per switch) and 1x1 (single STP instance per VLAN).

Spanning Tree Protocol is defined in the IEEE 802.1D standard.

The 802.1w amendment to that standard, Rapid Reconfiguration of Spanning Tree, improves upon STP by providing rapid reconfiguration capability via Rapid Spanning Tree Protocol

For configuration assistance please read the “Configuring Spanning Tree Parameters” in the appropriate *OmniSwitch Network Configuration Guide*.

In This Chapter

Introduction

The primary purpose for spanning tree is to allow for physical redundancy in a bridged network, while assuring the absence of data loops. The protocol allows for dynamic fail-over as well.

One of the most important tools needed in troubleshooting a STP problem, is to be prepared before it happens. It is essential to have a network diagram that depicts both the physical (cables) and logical (VLANs) configurations. It also very useful to know which ports are normally in blocking/forwarding prior to any problem.

Troubleshooting Spanning Tree

A failure of the Spanning Tree Protocol (STP) will usually cause either a bridge loop on the LAN or constant reconvergence of STP. This in turn can cause several resultant problems.

- If there is a bridge loop on the LAN, there can appear to be a broadcast storm since broadcast packets will continuously loop the network. In addition, unicast traffic can be affected as the port a unicast address is learned off of, can toggle from one port to another in a very short time period.
- If STP is constantly reconverging, this can cause temporary network outages as ports could through the 30 seconds of listening and learning as defined by 802.1D. One can see if STP is constantly reconverging that the LAN could be perpetually down.

In determining the cause of the STP problem, its useful to first verify the configuration, especially if the network having problems has recently been installed.

Use the **show spantree** command to verify that STP is enabled and that both sides of the link are running the same STP protocol.

```
-> show spantree
 Vlan STP Status Protocol Priority
-----+----------+--------+--------
    1      ON     802.1D   32768
    10     ON     802.1D   32768
```

Use the **show spantree** command and specify a VLAN to verify the correct mode, designated root ID, root port, and configurable timers. The timers need to be consistent across a physical link running STP. Also very useful to note in this command are Topology changes and Topology age. If topology changes are incrementing quickly, the LAN can not agree who is root. This can be caused by dropped BPDUs (which will be discussed later), a bridge that insists it is root regardless of received BPDUs, or a physical link going in and out of service.

```
-> show spantree 10
Spanning Tree Parameters for Vlan 10
  Spanning Tree Status :                   ON,
  Protocol             :          IEEE 802.1D,
  mode                 : 1X1 (1 STP per Vlan),
  Priority             :       32768 (0x8000),
  Bridge ID            :   8000-00:d0:95:79:62:8a,
  Designated Root      :   8000-00:d0:95:79:62:8a,
  Cost to Root Bridge  :                    0,
  Root Port            :                 None,
  Next Best Root Cost  :                    0,
  Next Best Root Port  :                 None,
  Hold Time            :                    1,
  Topology Changes     :                    0,
  Topology age         :            0:0:0
    Current Parameters (seconds)
      Max Age             =    20,
      Forward Delay       =    15,
      Hello Time          =     2
    Parameters system uses when attempting to become root
      System Max Age       =    20,
      System Forward Delay =    15,
      System Hello Time    =     2
```

Use the **show spantree ports** command to determine if the port is in forwarding or blocking and are in the correct VLAN. Remember that in any LAN with physical redundancy there must be at least one port in blocking status. If it is known which ports are usually in blocking, those ports can be a good place to start to verify they are still in blocking status.

```
-> show spantree ports
 Vlan  Port Oper Status  Path Cost  Role
-----+-----+------------+--------+-----
   10  5/10     FORW         100   DESG
```

If ports that should be in blocking are now in forwarding, there are two likely causes. The first is that there was a physical failure in a link that was previously in forwarding. The second is that the BPDUs from the root are being dropped. If it appears that BPDUs are being dropped, troubleshoot this as if it were any other packet being dropped.

Use the **show interfaces** command to look for errors incrementing on the port as well as to verify duplex settings match on either side of the link.

```
-> show interfaces 5/10
Slot/Port  5/10 :
  Operational Status     : up,
  Type                   : Fast Ethernet,
  MAC address            : 00:d0:95:7a:63:90,
  BandWidth (Megabits)   : 10,                Duplex           : Half,
  Long Accept            : Enable,            Runt Accept      : Disable,
  Long Frame Size(Bytes) : 1553,              Runt Size(Bytes) : 64
    Input :
     Bytes Received    :              765702,
     Lost Frames       :                   0,
     Unicast Frames    :                2317,
     Broadcast Frames  :                3855,
     Multicast Frames  :                 480,
     UnderSize Frames  :                   0,
     OverSize Frames   :                   0,
     Collision Frames  :                   0,
     Error Frames      :                   0,
     CRC Error Frames  :                   0,
     Alignments Error  :                   0
    Output :
     Bytes transmitted :              566131,
     Lost Frames       :                   0,
     Unicast Frames    :                2153,
     Broadcast Frames  :                   8,
     Multicast Frames  :                5931,
     UnderSize Frames  :                   0,
     OverSize Frames   :                   0,
     Collision Frames  :                   0,
     Error Frames      :                   0
```

Since STP is run in a distributed fashion it is important to verify that each NI that is involved is not having a resource problem. Use the **show health** command to verify the resources available on an NI.

```
-> show health 5
* - current value exceeds threshold

Slot  05                        1 Min  1 Hr  1 Hr
Resources          Limit   Curr   Avg    Avg   Max
-----------------+-------+------+------+-----+----
Receive              80     01     01    01    01
Transmit/Receive     80     01     01    01    01
Memory               80     39     39    39    39
Cpu                  80     26     29    28    30
```

If the problem has been ascertained to be layer 2 data loop, and it is needed to restore network connectivity quickly, it is recommended to disable all redundant links either administratively or by disconnecting cables.

Dshell

As mentioned previously, it is important to verify the health of the NI as well as the CMM. Please refer to Chapter 1, "Troubleshooting the Switch System," for directions.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

The commands run above to verify STP configuration on a particular port give the CMM perspective. Since STP is run on the NI it is important to query the NI to verify what was seen from the CMM. To verify a ports forwarding status use the **esmDumpCoronado slot,slice, 0x6608000+***vlan_id****4,32** command. This will indicate if the port as the NI sees it is in forwarding/blocking. The 32 in the above command shows 32 register values starting from the vlan_id specified. If the *vlan_id* used is 1 then the above command will display the values from VLAN 1 to VLAN 31. The bits are dedicated to the ports in the following order, starting from least significant bit. The bits are set (value=1) to indicate that the ports are forwarding for that VLAN. If 0 then the port is blocking for that VLAN.

Please note that the examples in this section have the following assumptions:

- Ports 1-12: First 12 Ethernet ports.
- Port 13: First Gigabit port.
- Ports 14,15,16: Not used.
- Ports 17-28: Second half of 12 Ethernet ports.
- Port 29: Second Gigabit port.
- Port 1/1 is a member of VLANs 1,140,141,150, and 511.

```
-> show vlan port 1/1
 vlan     type      status
--------+---------+--------------
     1    default   forwarding
   140    qtagged   forwarding
   141    qtagged   forwarding
   150    qtagged   forwarding
   511    qtagged   forwarding


-> dshell
Working: [Kernel]->esmDumpCoronado 1,0,0x6608000+1*4,32


     6608004 :       1000          0          0          0          0          0
          0          0
     6608024 :          0          0          0          0          0          0
          0          0
     6608044 :          0          0          0          0          0          0
          0          0
     6608064 :          0          0          0          0          0          0
          0          0

value = 1 = 0x1
```

```
Working: [Kernel]->esmDumpCoronado 1,0,0x6608000+140*4,32

     6608230 :       1000       1000          0          0          0          0
          0          0
     6608250 :          0          0       1000          0          0          0
          0          0
     6608270 :          0          0          0          0          0          0
          0          0
     6608290 :          0          0          0          0          0          0
          0          0

value = 1 = 0x1

Working: [Kernel]->esmDumpCoronado 1,0,0x6608000+511*4,32

     66087fc :       1000          0          0          0          0          0
          0          0
     660881c :          0          0          0          0          0          0
          0          0
     660883c :          0          0          0          0          0          0
          0          0
     660885c :          0          0          0          0          0          0
          0          0

value = 1 = 0x1
```

The above commands that the spanning tree vector is set for Gigabit port 1/1 for VLANs 1, 140, 141, 150, and 511.

Now, the following:

```
-> show vlan port 9/1
   vlan     type      status
--------+---------+--------------
     1    default   forwarding

-> show vlan port 9/2
     vlan     type      status
--------+---------+--------------
     1    default   forwarding

-> show vlan port 9/24
     vlan     type      status
--------+---------+--------------
     2    default   forwarding

-> show vlan 3 port
   port     type      status
--------+---------+--------------
   9/11   default   forwarding
   9/12   default   forwarding


-> dshell
Working: [Kernel]->esmDumpCoronado 1,0,0x6608000+1*4,32

 66087fc :       203        8000000        c00          0          0          0
      0          0
 660881c :          0          0          0          0          0          0
      0          0
 660883c :          0          0          0          0          0          0
```

```
        0          0
  660885c :          0          0          0          0          0          0
        0          0

value = 1 = 0x1
```

Binary: 0000 0000 0011

For VLAN 1 the bits set are 203 which are equivalent to binary 0000 0000 0011. Bits 1 and 2 are set indicating that ports 1 and 2 have the spanning tree vector set for VLAN 1. The next register value is for VLAN 2, hex value is 8000000.

Binary: 1000 0000 0000 0000 0000 0000 0000

Binary value indicates that bit 28 is set which means that port 24 is set for VLAN 2. The next register value will indicate the value for VLAN 3. Hex value is c00.

Binary: 1100 0000 0000

Bits 11 and 12 are set indicating that spanning tree has been set for ports 11 and 12. These ports are forwarding.

Each NI when boots up sends a message to every other NI indicating that it is up and running. This message is critical for setting up the port Queues to transfer data as well as for Spanning tree. If an IPC message is lost by a particular NI then other NI will not see that NI as being a part of spanning tree domain. This may result in split spanning tree leading to a layer 2 loop. This kind of scenario might happen in the case of hot swaps.

To verify that each NI known about every other NI the following command should be used in NI Debugger, This should be run on all NIs that are used in STP.

```
Working: [Kernel]->NiDebug
1:0 nidbg> stpNISock_boardupprint
1:0
1:0  STP boards up :
1:0      board in slot : 2   slice : 0  is up
1:0      board in slot : 4   slice : 0  is up
1:0      board in slot : 5   slice : 0  is up
1:0      board in slot : 6   slice : 0  is up
1:0      board in slot : 7   slice : 0  is up
1:0      board in slot : 8   slice : 0  is up
1:0      board in slot : 9   slice : 0  is up
1:0      board in slot : 10   slice : 0  is up
1:0      board in slot : 11   slice : 0  is up
1:0      board in slot : 12   slice : 0  is up
1:0      board in slot : 13   slice : 0  is up
1:0      board in slot : 14   slice : 0  is up
1:0      board in slot : 16   slice : 0  is up
1:0 value = 0 = 0x0
```

This command will show all the other slots except for itself.

To look at all the BPDUs being received and transmitted on a particular slot and slice the following command can be used in **NiDebug** command. This will display, BPDUs as well as notifications when there is a topology change in real time.

```
1:0 nidbg> stp_printf_flag=1

1:0 *** stpkern_bpduIn stp_id=511 portid=c type=2
1:0 PIM port c state 4  1024  0
```

```
1:0 Message age of received BPDU  : 0
1:0 PIM port c state 5  1024  0
1:0 recordProposed operPointToPointMAC=1
1:0 PIM port c state 7  1536  0
1:0 PIM port c state 4  1536  0
1:0 port 12 is forward (5)
1:0 tick (tack) time is now 701603
1:0
1:0 RSTBPDU transmitted on port 33    on STP 57
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
1:0
1:0 RSTBPDU transmitted on port 33    on STP 51
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
1:0 tick (tack) time is now 701628
1:0 tick (tack) time is now 701634
1:0 tick (tack) time is now 701635
1:0
1:0 RSTBPDU transmitted on port 33    on STP 60
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
1:0 tick (tack) time is now 701636
1:0
1:0 RSTBPDU transmitted on port 12    on STP 140
1:0   Root bridge ID = c800d0 957962aa
1:0   Path to Root cost = 0
1:0   Designated bridge ID = c800d0 957962aa
1:0   Designated portId = 29196
1:0   Bridge     portId = 29196
1:0   Message age          : 0
1:0 tick (tack) time is now 701637
1:0
1:0 RSTBPDU transmitted on port 33    on STP 52
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
1:0 RSTBPDU transmitted on port 33    on STP 61
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
```

```
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
1:0 tick (tack) time is now 701647
1:0 tick (tack) time is now 701648
1:0
1:0 RSTBPDU transmitted on port 33    on STP 53
1:0   Root bridge ID = 3200d0 95820514
1:0   Path to Root cost = 3
1:0   Designated bridge ID = 800000d0 957962aa
1:0   Designated portId = 29697
1:0   Bridge     portId = 29697
1:0   Message age          : 256
1:0   Proposing
```

Generic Troubleshooting in Dshell

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

The **stp_help** command (executed from the **NiDebug** Dshell command prompt) displays the trace menu for the Spanning Tree algorithm on NIs. Enter **stpNI_help** at ???? at what? Text missing here. ????

```
-> dshell
Working: [Kernel]->NiDebug
NiDebug>>stp_help
stpNISock_globals : Global variables
stpNISock_warningprint : warning trace
stpNISock_totraceprint : time-out trace
stpNISock_traceprint : event trace
stpNISock_intraceprint : inter-NI trace
stpNISock_boardupprint : boards up
stpNISock_printon : activates STP Socket Handler printf
stpNISock_printoff : desactivates STP Socket Handler printf
stpni_printStaFied : status field description trace
stpni_debugPport : Physical Port editing trace
stpni_debugLport : Logical Port editing trace
stpni_debugport : Physical & Logical Port editing trace
stpni_traceprint : event and warning trace
stpni_printon : activates STP NI printf
stpni_printoff : desactivates STP NI printf
```

These NI spanning tree trace utilities are described in the subsections that follow.

Event Trace (stpni_traceprint)

This trace includes the events received and generated by the Spanning Tree and the warning detected while processing an event. A warning entry contains the name of the C source file and a line number. The explanation of the warning can be given by Engineering.

Each event trace entry is built as follows:

- An ASCII pattern reflecting the event.
- Up to 4 parameters (a -1 (or 0xffffffff) indicates that the parameter is not significant).

The following is an example of the **stpni_traceprint** command printout:

```
Nidebug>> stpni_traceprint
64 - PVLANBLK (1,1000000,18,ffffffff)
65 - PORTATCH (19,1,ffffffff,ffffffff)
66 - PVLANBLK (1,2000000,19,ffffffff)
67 - PORTATCH (1a,1,ffffffff,ffffffff
68 - PVLANBLK (1,4000000,1a,ffffffff)
69 - PORTATCH (1b,1,ffffffff,ffffffff)
70 - PVLANBLK (1,8000000,1b,ffffffff)
71 - PORTATCH (1900001,1,ffffffff,ffffffff)
72 - PORTDELE (1,ffffffff,ffffffff,ffffffff)
73 - PORTATCH (1,1,ffffffff,ffffffff)
```

```
74 - PORTDELE (2,ffffffff,ffffffff,ffffffff)
75 - PORTATCH (2,1,ffffffff,ffffffff)
76 - LINK_UP (1,64,1,ffffffff)
77 - LINK_UP (2,64,1,ffffffff)
78 - LINK_UP (14,64,1,ffffffff)
79 - LINKDOWN (1,ffffffff,ffffffff,ffffffff)
80 - LINKDOWN (2,ffffffff,ffffffff,ffffffff
81 - LINK_UP (1,64,1,ffffffff)
82 - LINK_UP (2,64,1,ffffffff)
83 - AGGR_UP (1,120,2e,ffffffff)
84 - Warning File:stpni_bpduEvt.c line:744
85 - PORTJOIN (1,121,ffffffff,ffffffff)
```

Event names displayed by the **stpni_traceprint** command are described in the subsections that follow.

PORTATCH

This corresponds to a port attached event received from the Spanning Tree CMM. The Spanning Tree CMM generates this event when it receives a Port attach indication from the Port Manager.

The parameters are:

- First parameter: Global port identifier.
- Second parameter: Default VLAN associated to the port.

PORTDELE

This corresponds to a port detach event received from the Spanning Tree CMM. The Spanning Tree CMM generates this event when either it receives a Port detach indication from the Port Manager or there is change in the port type (e.g. transition from aggregable to fixed, mobile to fixed).

- First parameter: Global port identifier.

ADDVLAN

This event is generated by the Spanning Tree CMM when it receives a VLAN added event from the VLAN Manager. This events is sent to all the NI that are up and running by the Spanning Tree CMM.

The parameters are:

- First parameter: The VLAN identifier.
- Second parameter: The Spanning Tree type. A **1** indicates Flat Spanning Tree while a **2** indicates 1x1 Spanning Tree.
- Third parameter: The VLAN administrative state. A **1** indicates Enable while a **2** indicates Disable.
- Fourth parameter: The Spanning Tree administrative state. A **1** indicates Enable while a **2** indicates Disable.

MODVLADM

This event is received is sent by the Spanning Tree CMM to the NIs when the administrative state of a VLAN is changed (event generated by the VLAN Manager to the Spanning Tree CMM).

The parameters are:

- First parameter: The VLAN identifier.
- Second parameter: The VLAN administrative state. A **1** indicates Enable while a **2** indicates Disable.

MODVLSTP

This event is received is sent by the Spanning Tree CMM to the NIs when the Spanning Tree state of a VLAN is changed (event generated by the VLAN Manager to the Spanning Tree CMM).

The parameters are:

- First parameter: The VLAN identifier.
- Second parameter: New Spanning Tree. A **1** indicates Enable while a **2** indicates Disable.

Note. When the Spanning Tree state is Disable, all the ports (Up) are moved to the forwarding state and are removed from the Spanning Tree scope.

ADDQTAG

This event is received is sent by the Spanning Tree CMM to the NI when a tag is added to a port belonging to that NI. This event is generated on the CMM by the 802.1Q application.

The parameters are:

- First parameter: Global port identifier.
- Second parameter: The 802.1Q tag.

Note. This event is processed by the Spanning Tree NI as a port attach event.

DELQTAG

This event is received is sent by the Spanning Tree CMM to the NI when a tag is removed a port belonging to that NI. This event is generated on the CMM by the 802.1q application.

The single parameters is:

- First parameter: Global port identifier.

Note. This event is processed by the Spanning Tree NI as a port attach event.

MDEFVLAN

This event is received is sent by the Spanning Tree CMM to the NI when the default VLAN of a fixed or q-tagged port is change (this also applies to logical port). This event is generated on the CMM by VLAN Manager application.

The parameters are:

- First parameter: Global port identifier.
- Second parameter: new default VLAN.

PORTAGGR

This event is currently unused.

PORTDISG

This event is currently unused.

AGGR_UP

This event is sent by Link Aggregation NI when it detects that a aggregator comes up; It could be either a static aggregator (OmniChannel) or a dynamic aggregator (802.3ad). This message is generated when the first port joins the aggregator only.

The parameters are:

- First parameter: The aggregator identifier (logical port ID value between 0 and 31).
- Second parameter: The global port identifier of the physical port that has joined the aggregator.
- Third parameter: The output QID to be used by the Spanning Tree (not significant).

Note. The output QID is no more used by the Spanning Tree since at the time Link aggregation is asking for the default queue associated to the physical port, Qdriver might not be ready the provide it. However Link Aggregation keeps providing this parameter even if now this one is not significant.

AGGRDOWN

This event is sent by Link Aggregation NI when it detects that a aggregator goes down; It could be either a static aggregator (OmniChannel) or a dynamic aggregator (802.3ad). This message is generated when the last port has leaved the aggregator.

The single parameter is:

- First parameter: The aggregator identifier (logical port ID value between 0 and 31).

PORTJOIN

This event is sent by Link Aggregation NI when a physical port is joining an aggregator; It could be either a static aggregator (OmniChannel) or a dynamic aggregator (802.3ad). This message is generated after the first port has joined the aggregator (see "AGGR_UP" on page 4-13).

The parameters are:

- First parameter: The aggregator identifier (logical port ID value between 0 and 31).
- Second parameter: The global port identifier of the physical port that has joined the aggregator.

PORTLEAV

This event is sent by Link Aggregation NI when a physical port is leaving an aggregator; It could be either a static aggregator (OmniChannel) or a dynamic aggregator (802.3ad). This message is generated after the first port has joined the aggregator (see "AGGR_UP" on page 4-13). Link aggregation provides the aggregator identifier, the global port identifier of the port which is leaving it and the global port identifier of the newly primary port

The parameters are:

- First parameter: The aggregator identifier (logical port ID value between 0 and 31).
- Second parameter: The global port identifier of the physical port that has joined the aggregator.
- Third parameter: The global port identifier of the physical port that will have the primary port role.
- Fourth parameter: The output QID of the newly primary port (not significant; see note of "AGGR_UP" on page 4-13).

BRGPARAM

The is event is generated by the Spanning Tree CMM when a configuration parameter of the Spanning Tree is changed by the operator. This message is sent to all the NI that are up and running.

The parameters are:

- First parameter: The spanning identifier (i.e., VLAN identifier).
- Second parameter: The type of the parameter. A **1** indicates Spanning Protocol (802.1w(third parameter=4)/802.1D(third parameter=3)), a **2** indicates Spanning Tree (Flat (third parameter=**1**)/ or **1x1** (third parameter=**2**)/), a **3** indicates the bridge priority value, a **4** indicates the Hello timer value, and a **5** indicates the forward delay value, and a **6** indicates the maximum age.
- Third parameter: The value of the parameter.

PTSTPMOD

The is event is generated by the Spanning Tree CMM when the Spanning Tree configuration parameter of a port is changed by the operator.

The parameters are:

- First parameter: The spanning identifier (i.e., VLAN identifier).
- Second parameter: The global port identifier.
- Third and fourth parameters: The type of the parameter/value. A **0x11** indicates mode of the port (dynamic(1), blocking(2), forwarding(3)), a **0x12** indicates Spanning Tree administrative state of the port (enable(1),disable(2)), a **0x13** indicates port administrative state, a **0x14** indicates port priority, a **0x15** indicates port path cost, and a **0x16** indicates port connection type (half-duplex(1),point to point (2),auto point to point(3),edge(4)).

PORTMOD

The is event is sent by the Spanning Tree CMM to the Spanning Tree NI when the administrative state of a port is modified by the operator.

The parameters are:

- First parameter: The spanning identifier (i.e., VLAN identifier).
- Second parameter: The global port identifier.
- Third and fourth parameters: The type of the parameter/value. A **0x13** indicates port administrative state (enable (1),disable(2)).

PORTVLBK

This event is an internal event which generated by the Spanning Tree when STP is processing a Port/ VLAN blocking that can take place at VLAN level or port level.

The parameters are:

- First parameter: The blocking status. A **0x44** indicates blocking already done, a **0x88** indicates nothing to do, a **0x55** indicates blocking at port level, and a **0xaa** indicates blocking at VLAN level.
- Second parameter: The local port identifier.
- Third parameter: The VLAN identifier.

PVLANBLK

This event is registered when the Spanning Tree is generated a Port VLAN Blocking message to Source Learning NI.

The parameters are:

- First parameter: The VLAN identifier.
- Second parameter: The port vector.
- Third parameter: The local port identifier.

The Port VLAN blocking message sent to the Source Learning NI has the following structure:

*uint16 VlanId, uint32 PortVecto*r

This event has the following values for the message ID:

- *appID*: APPID_SPANNING_TREE.
- *subMsgNum*: STP_PortVlanBlocking.

These event fields are defined below:

- *VlanId*: A value 1 to 4095 identifies a VLAN (0 means that the message is applied to ports defined by the *PortVector* on all VLANs).
- *PortVector*: A field of bits, one bit by the physical port, which indicates if the port is concerned by the change of state.

GMBPDU

This message is sent by the Spanning tree NI to the local Group Mobility NI each time a BPDU is received on a mobile port. Group mobility can take two actions depending on how the mobile port has been configured:

- Ignore BPDU: In this case Spanning Tree will keep on sending GMBPDU each time a BPDU will be received on the port (there is no Spanning Tree computation for the port).
- Move port to fixed: Group Mobility asks Spanning Tree to revert the mobile port to the fixed state and the port will be added to Spanning Tree associated to VLAN 1.

The BPDUonMobPort message sent by the Spanning Tree NI has the following format:

uint8 LocalPortId, uint8 bpdu_lgth, uint8 bpdu_data[STP_BPDULGTH]

This event has the following values for the message ID:

- *appID*: APPID_SPANNING_TREE
- *subMsgNum*: STP_BPDUonMobPort

These event fields are defined below:

- *LocalPortId*: Identifies the physical Port (local reference: 0 to 23) which received the BPDU.
- *bpdu_lgth*: The length in bytes of the following BPDU.
- *bpdu_data*: The BPDU.

GMIGBPDU

This message is sent by Group Mobility NI in response to a BPDU on mobile port message sent by the Spanning Tree. By sending this message group mobility tells to Spanning Tree to ignore BPDU on the mobile port.

The single parameters is:

- First parameter: The global port identifier.

GM2FIXED

This message is sent by Group Mobility NI in response to a BPDU on mobile port message sent by the Spanning Tree. By sending this message group mobility tells to Spanning Tree that the mobile port must be reverted to the fixed state.

The parameters are:

- First parameter: The global port identifier.
- Second parameter: The default VLAN.

VMADDVPA

The event is sent by the VLAN manager NI when a new VLAN needs to be added to a mobile port (no longer used by the VLAN manager).

The parameters are:

- First parameter: The global port identifier.
- Second parameter: The default VLAN.

VMDELVPA

The event is sent by the VLAN manager NI when a VLAN needs to be removed from a mobile port (no more used by VLAN manager).

The parameters are:

- First parameter: The global port identifier.
- Second parameter: The default VLAN.

VMDEFVPA

The event is sent by the VLAN manager NI when a the default VLAN of a mobile port needs to be changed.

The parameters are:

- First parameter: The global port identifier.
- Second parameter: The default VLAN.

TOPOCHGT

This event notifies a change of Spanning Tree topology. The format of the message is:

uint16 VlanId, uint16 aging_timer

This event has the following values for the message ID:

- *appID*: APPID_SPANNING_TREE
- *subMsgNum*: STP_TopologyChange

These event fields are defined below:

- *VlanId*: A value of 1 to 4095 identifies a VLAN and 0 means that the message is applied to all the VLANs (single Spanning Tree per switch).
- *aging_timer*: The value in second of the aging timer.

LINK_UP

This event is sent by the ENI driver when a link goes up.

The parameters are:

- First parameter: The global port identifier.
- Second parameter: The default link bandwidth.
- Third parameter: The link mode (full-duplex(1),half-duplex(2),auto-negociate(3)).

LINKDOWN

This event is sent by the ENI driver when a link goes down.

The parameters are:

- First parameter: The global port identifier.

NI_UP

This event is sent by NI Supervision when it detects that a new NI is up and running.

The parameters are:

- First parameter: The slot number.
- Second parameter: The slice number.

NI_DOWN

This event is sent by NI Supervision when it detects that a new NI is up and running.

The parameters are:

- First parameter: The slot number.
- Second parameter: The slice number.

Physical and Logical Port Dumps

Logical Ports (stpni_debugLport)

Here follows the display of the Logical port seen by the Spanning Tree. Each line corresponds to the local port identifier index.

```
Certified: [Kernel]->stpni_debugLport
  Logical Ports array:
sta field:
- 0x80 -> 1:Point to point Port
- 0x20 -> 1:Aggregable port
- 0x02 -> 1:Link up ; 0:link Down
- 0x01 -> 1:Adm up ; 0:Adm Down
- 0x04 -> Fixed Port
- 0x08 -> Q-tagged Port
- 0x10 -> Mobile Port


sta dGid qid  portid   nTag vector   Prim Mac Address       Bw   Duplex
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
0b  0001 0233 01900001 0001 00000000 03000000 38 00:00:00:00:00:00 03e8 00
0b  0001 0187 01900002 0001 00000300 00000000 09 00:00:00:00:00:00 0064 00
0b  0001 01cb 01900003 0003 0c000000 00000000 1a 00:00:00:00:00:00 03e8 00
0b  0001 01a3 01900004 0001 00030000 00000000 10 00:00:00:00:00:00 0064 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
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00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
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00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
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00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
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00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000 00000000 00000000 ff 00:00:00:00:00:00 0000 00
value = 9 = 0x9
```

The fields displayed by the **stpni_debugLport** command are described below:

output definitions

dGid	The field contains the value of the default VLAN associated to the port. When the default GID is 0, it indicates that the port is in the IDLE state (field sta=00).
Qid	Default QID (not used).
Portid	Global port identifier (0x0190xxxx indicates that it is a logical port, and 0x0001 indicates that it is logical port 1).
NTag	Number of tags (802.1q) attached to that port. This field should always be 0 when the port is FIXED or MOBILE.
Vector	Bitmap of the local ports that belong to the aggregator (logical port). In the example local port 1 and 2 belong to the aggregator (MSB= port 31 and LSB = port 0).
Prim	Local port identifier of the primary port. If the primary port does not belong to that NI, the primary reference is set to 0xff.
Bw	Bandwidth as received on Link up from the ENI driver.
Duplex	Duplex mode as received from ENI driver on Link Up.

Physical Port (stpni_debugPport)

Here is the display of the Physical Port seen by the Spanning Tree NI:

```
Certified: [Kernel]->stpni_debugPport

  Physical Ports array:
sta field:
- 0x80 -> 1:Point to point Port
- 0x20 -> 1:Aggregable port
- 0x02 -> 1:Link up ; 0:link Down
- 0x01 -> 1:Adm up ; 0:Adm Down
- 0x04 -> Fixed Port
- 0x08 -> Q-tagged Port
- 0x10 -> Mobile Port


sta dGid qid  portid   nTag lpid prim Mac Address       Bw   Duplex
07  03e7 0162 00000040 0000   ff   ff 00:d0:95:84:3c:d0 0064 00
07  0140 0166 00000041 0000   ff   ff 00:d0:95:84:3c:d1 0064 01
05  0001 016a 00000042 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 016e 00000043 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 0172 00000044 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 0176 00000045 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 017a 00000046 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 017e 00000047 0000   ff   ff 00:00:00:00:00:00 0000 00
23  0000 0182 00000048 0000   82   ff 00:d0:95:84:3c:d8 0064 01
23  0000 0186 00000049 0000   82   ff 00:d0:95:84:3c:d9 0064 01
05  0001 018a 0000004a 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 018e 0000004b 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 0192 0000004c 0000   ff   ff 00:00:00:00:00:00 0000 00
07  014d 0196 0000004d 0000   ff   ff 00:d0:95:84:3c:dd 0064 01
05  0001 019a 0000004e 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 019e 0000004f 0000   ff   ff 00:00:00:00:00:00 0000 00
23  0000 01a2 00000050 0000   84   ff 00:d0:95:84:3c:e0 0064 01
```

```
23  0000 01a6 00000051 0000   84   ff 00:d0:95:84:3c:e1 0064 01
05  0001 01aa 00000052 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01ae 00000053 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01b2 00000054 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01b6 00000055 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01ba 00000056 0000   ff   ff 00:00:00:00:00:00 0000 00
0b  0001 01be 00000057 0003   ff   ff 00:d0:95:84:3c:e7 0064 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
23  0000 01ca 0000005a 0000   83   ff 00:d0:95:84:3d:02 03e8 01
23  0000 01ce 0000005b 0000   83   ff 00:d0:95:84:3d:03 03e8 01
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
07  0001 01d2 00000060 0000   ff   ff 00:d0:95:84:3c:e8 000a 00
05  0001 01d6 00000061 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01da 00000062 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01de 00000063 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01e2 00000064 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01e6 00000065 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01ea 00000066 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01ee 00000067 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01f2 00000068 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 01f6 00000069 0000   ff   ff 00:00:00:00:00:00 0000 00
07  0154 01fa 0000006a 0000   ff   ff 00:d0:95:84:3c:f2 0064 01
07  01c3 01fe 0000006b 0000   ff   ff 00:d0:95:84:3c:f3 0064 01
05  0001 0202 0000006c 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 0206 0000006d 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 020a 0000006e 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 020e 0000006f 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 0212 00000070 0000   ff   ff 00:00:00:00:00:00 0000 00
07  0002 0216 00000071 0000   ff   ff 00:d0:95:84:3c:f9 0064 01
05  0001 021a 00000072 0000   ff   ff 00:00:00:00:00:00 0000 00
07  0003 021e 00000073 0000   ff   ff 00:d0:95:84:3c:fb 0064 01
05  0001 0222 00000074 0000   ff   ff 00:00:00:00:00:00 0000 00
07  0004 0226 00000075 0000   ff   ff 00:d0:95:84:3c:fd 0064 01
05  0001 022a 00000076 0000   ff   ff 00:00:00:00:00:00 0000 00
05  0001 022e 00000077 0000   ff   ff 00:00:00:00:00:00 0000 00
23  0000 0232 00000078 0000   81   ff 00:d0:95:84:3d:00 03e8 01
23  0000 0236 00000079 0000   81   ff 00:d0:95:84:3d:01 03e8 01
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
00  0000 0000 00000000 0000   ff   ff 00:00:00:00:00:00 0000 00
value = 9 = 0x9
```

The fields displayed by the **stpni_debugPport** command are described below:

output definitions

dGid	The field contains the value of the default VLAN associated to the port. When the default GID is 0, it indicates that the port is in the IDLE state (field sta=00).
Qid	The information displayed for the QID is significant if the Link up bit is set (**sta** field).

output definitions (continued)

Portid	Global port identifier (0x0190xxxx indicates that it is a logical port, and 0x0001 indicates that it is logical port 1).
NTag	Number of tags (802.1q) attached to that port. This field should always be 0 when the port is FIXED or MOBILE.
Vector	Bitmap of the local ports that belong to the aggregator (logical port). In the example local port 1 and 2 belong to the aggregator (MSB= port 31 and LSB = port 0).
lpid	Local port identifier of the logical port to which to physical port is bounded. In the current display, it indicates that physical ports 1 and 2 are bounded to logical port 1 (0x81). Within the Spanning Tree NI, a logical port type is identified by setting bit 7 to 1 in the local port (1 byte field). This field is not significant if the port is not aggregable (see the interpretation of the **sta** field in the display).
Prim	Not significant for the physical port.
Bw	Bandwidth as received on Link up from the ENI driver.
Duplex	Duplex mode as received from ENI driver on Link Up.

Physical and Logical Port Trace Display (stpni_debugport)

This is a combination of the Logical and Physical port display. See "Logical Ports (stpni_debugLport)" on page 4-19 and "Physical Port (stpni_debugPport)" on page 4-20 for more information.

Socket Handler Traces

These traces include Global data, warning, and event traces. They are implemented on the CMM and NI. These traces are listed below and described in the following subsections:

stpNISock_globals	Global variables.
stpNISock_warningprint	Warning trace.
stpNISock_totraceprint	Time-out trace.
stpNISock_traceprint	Event trace.
stpNISock_intraceprint	Inter-NI trace.
stpNISock_boardupprint	Boards seen alive by the Socket Handler.
stpNISock_printon	Activates STP Socket Handler printf.
stpNISock_printoff	Deactivates STP Socket Handler printf.

stpNISock_globals

This trace handles the Socket Handler. Its components are listed below:

- **sockGlobal_protThreshold**: This parameter is the maximum number of message that can be processed consecutively on the Protocol Manager channel (CMM/NI STP channel).
- **sockGlobal_maxmsgprot**: This counter is the maximum number of message (counter) processed consecutively on the Protocol Manager channel (CMM/NI STP channel).
- **sockGlobal_evtThreshold**: This parameter is the maximum number of message that can be processed consecutively on the Message Event Manager channel (inter-NI STP channel).

- **sockGlobal_maxmsgevt**: This counter is the maximum number of message (counter) processed consecutively on the Message Event Manager channel (inter-NI STP channel).
- **sockGlobal_looptick**: This flag is set to 1 indicates that we loop until the maximum number of message processed (Threshold) is overtaken.
- **sockGlobal_maxtick**: This counter is the maximum number of ticks processed consecutively.
- **sockGlobal_maxtickact**: This parameter is the maximum number of times the function attached to the tick can be called consecutively.
- **sockGlobal_tmoval**: This parameter is the value of the time-out for retry mechanism.
- **sockGlobal_localchannelevt**: This counter is the number of message received on the Message event channel (inter-NI STP channel).
- **sockGlobal_localchannelservice**: This counter is the number of message received on the service channel.

stpNISock_warningprint

A warning entry contains the name of the C source file and a line number. The explanation of the warning is found in the STP Socket Handler source code:

```
/home/perforce/xxxx/engr/sw/bridging/spanning_tree/common/src/stp_sockHdl.c
```

stpNISock_traceprint

This trace records all the event received by the Socket Handler. This following is a sample output:

```
Trace Index : 4
remote_addr : 3 0 12 20
msg -> 0 or ack -> 1 : 1 seqID : 2
message ID : 0
Trace Index : 5
remote_addr : 3 0 12 20
msg -> 0 or ack -> 1 : 0 seqID : 2
message ID : c00ab
```

This trace displays the following parameters:

output definitions

Remote_addr	Consists of the transmitting slot, transmitting slice, transmitting AppId, transmitting SnapId.
msg or ack	A **0** indicates a message while a **1** indicates an acknowledgement.
seqID	The sequence identifier of the message or acknowledgement.
message ID	The first word consists of the AppId of the transmitting application. The last word consists of an event identifier message or acknowledgement and sequence identifier parameters, which appear only in case of reliable mode. The reliable mode concerns only the Protocol Manager (CMM/NI STP) and Message event Manager (inter-NI STP) channels.

Inter-NI Trace (stpNISock_intraceprint)

This trace records all the inter-NI STP events received by the Socket Handler and has the following format:

- An ASCII pattern reflecting the event.
- Up to 4 parameters (a -1 (or 0xffffffff) indicates that the parameter is not significant).

Time-out Trace (stpNISock_totraceprint)

This trace records all the time-out on the Protocol Manager channel (CMM/NI STP channel) and the Message Event Manager channel (inter-NI STP channel). The following is a sample output:

```
Trace Index : 1
Slot : 255 Slice : 255 seqID : 1 eventID : 25
currentretry : 0 maxretry : 31
```

This trace displays the following parameters:

output definitions

Slot	Slot of the transmitting processor.
Slice	Slice of the transmitting processor.
seqID	The message sequence identifier.
EventID	The event identifier.
Currentretry	The number of time-out always appeared.
Maxretry	The maximum time-out allowed.

Board Up (stpNISock_boardupprint)

This trace indicates the boards seen alive by the Socket Handler.

stpNISock_printon

This trace activates the printf of the following traces:

- Warning trace.
- Time-out trace.
- Event trace.
- Inter-NI trace.

StpNISock_printoff

This trace deactivates the printf of the traces shown in "stpNISock_printon" on page 4-24.

CMM Spanning Tree Traces

Trace Menu

The **stpCMMSock_help** Dshell command displays the Spanning Tree Manager menu as shown below.

```
-> dshell
Certified: [Kernel]->stpCMMSock_help
 CMM    Slot : 65      Slice : 0
 stpCMMSock_globals         : Global variables
 stpCMMSock_warningprint    : warning trace
 stpCMMSock_totraceprint    : time-out trace
 stpCMMSock_traceprint      : event trace
 stpCMMSock_ttimetraceprint : treatment time trace
 stpCMMSock_boardupprint    : boards up
 stpCMMSock_printon         : activates STP Socket Handler printf
 stpCMMSock_printoff        : desactivates STP Socket Handler printf
 stpCMMSock_bufferprint     : internal buffer statistics
value = 0 = 0x0
```

Note. See "Socket Handler Traces" on page 4-22 for the non CMM Spanning Tree traces.

stpCMM_traceprint

The following is an example of the stpCMM_traceprint trace display:

```
Certified: [Kernel]->stpCMM_traceprint
********** STP CMM TRACE **********
1 PSMREG 0 0 0
2 MACADDR 0 0 0
3 BOARDUP 1 1 302059521
4 MSGtoNI 9 1 0
5 MSGtoNI 14 1 0
6 MSGtoNI 9 1 0
7 PMATTCH 0 0 0
8 MSGtoNI 21 1 0
9 PMATTCH 1 0 0
10 MSGtoNI 21 1 0
11 PMATTCH 2 0 0
12 MSGtoNI 21 1 0
13 PMATTCH 3 0 0
14 MSGtoNI 21 1 0
15 PMATTCH 4 0 0
```

Writing a PR for Spanning Tree

The following subsections describe some guidelines to follow when writing a PR that addresses Spanning Tree. Please note that the following subsections use Dshell commands, not CLI commands.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

Exception in Spanning Tree (NI and CMM case)

When there is an exception in a task, the task is suspended by the Operating system. This could happen when the application tries to access to an un-aligned memory area, release of buffer that is already release, etc. If the Spanning Tree does not respond, ask for the task information (**i** Dshell command). If the task is suspended do the following:

1 Get the task registers with the **ti** *task_id* command.

2 Get the task stack with the **tt** *task_id* command.

3 Disassemble the code around the faulty PC (exception program counter).

Note. Perform the step above between address - 0x20 and address+0x100.

Port Does Not Forward

If the show spanning tree command indicates that the port is forwarding, but no traffic is seen through that port do the following:

1 Perform the following steps on the NI:

a Select the suspected NI (**changeSlot**).

b Dump the event trace (**stpni_traceprint**).

c Dump the port trace (**stpni_debugport**).

2 Perform the following steps on the CMM.

a Dump the event trace.

b Dump the Spanning Tree memory for the VLAN (0x6608000+(*vlan_id**4))

Spanning Tree Unchanged When Port State Has Changed

If the show spanning tree CLI command still displays the same information while a port state has changed then the problem could be due to a broken communication path between the CMM and NI. In this case do the following (for both the CMM and NI):

- Time-out trace of the socket handler (**stpNISock_totraceprint** or **stpCMMSock_totraceprint**).
- Warning trace of the socket handler (**stpNISock_warningprint** or **stpCMMSock_warningprint**).
- Event trace (**stpni_traceprint** and **stpCMM_traceprint**).
- Board-up trace (**stpNISock_boardupprint** or **stpCMMSock_boardupprint**).

Other Cases

For analysis of Spanning Tree on an NI do the following:

- Event trace (**stpni_traceprint**).
- Dump the port trace (**stpni_debugport**).
- Time-out trace of the socket handler (**stpNISock_totraceprint** or **stpCMMSock_totraceprint**).
- Warning trace of the socket handler (**stpNISock_warningprint** or **stpCMMSock_warningprint**).
- Inter-NI trace: (**stpNISock_intraceprint**).
- Boards seen alive by the Socket Handler (**stpNISock_boardupprint** or **stpCMMSock_boardupprint**).

For analysis of Spanning Tree on a CMM do the following:

- Event trace (**stpCMM_traceprint**).
- Time-out trace of the socket handler (**stpNISock_totraceprint** or **stpCMMSock_totraceprint**).
- Warning trace of the socket handler (**stpNISock_warningprint** or **stpCMMSock_warningprint**).
- Boards seen alive by the Socket Handler (**stpNISock_boardupprint** or **stpCMMSock_boardupprint**).

5 Troubleshooting BOOTP/ DHCP/UDP Relay

In order to troubleshoot a BOOTP/DHCP and UDP Relay, a basic understanding of the protocol is required. Some basic concepts are covered below. The OmniSwitch supports UDP Relay.

Reading the "DHCP Relay" chapter from the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

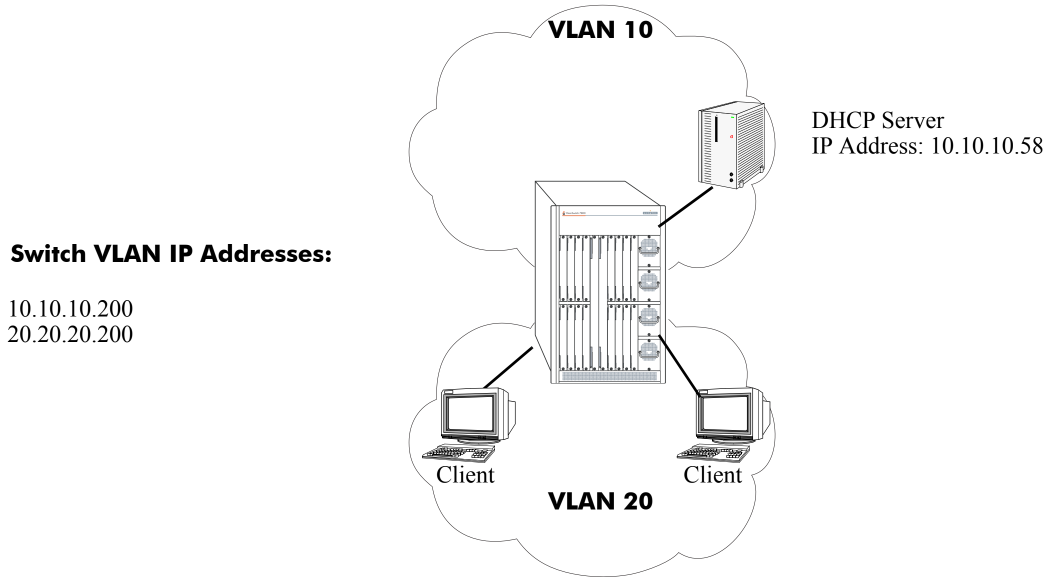
Starting the Troubleshooting Procedure

There are two key ingredients for any troubleshooting episode. These are:

- Network Diagram.
- OSI Model.

Use a Network Diagram

It is extremely important to know where the server is in relation to the client, which switch both the client and the server is directly connected to and their port numbers. A network diagram presents this kind of information, for example, in an easily understood matter.



Sample Diagram Showing the Relay Point, Client, and Server

Use the OSI Model to Guide Your Troubleshooting

Note that bridging cannot work unless the physical layer is working. The same is true for all layers above the physical. Start with this layer first then work your way up through the other layers.

UDP Relay Configuration Problems

Incorrect Server IP Address

Specifying the incorrect IP address for the server is a simple and common mistake that causes UDP relay to fail. The **show ip helper** CLI command lists the IP address (s) of all DHCP servers. This is the most useful command to determine if the IP address for the server is correct.

The following is a sample of the **show ip helper** CLI command:

```
-> show ip helper
Ip helper :
Forward Delay(seconds) = 3,
Max number of hops     = 4,
Forward option     = standard
Forwarding Address :
   10.10.10.58
```

Note that if the forward option is set to any thing other than standard, there will be restrictions as to which UDP frames will be forwarded via the UDP relay function. the "DHCP Relay" chapter from the appropriate *OmniSwitch Network Configuration Guide*.

Forward Delay Timer

Forward delay is the amount of time in seconds UDP relay will wait before forwarding a request to a DHCP server, or the same DHCP server. (If only one is configured on the switch.) This allows the DHCP server who initially got the DHCP request packet from the client to respond before the request is forwarded to another DHCP server.

Additionally, the relay agent uses the forward delay value to determine if the client has waited long enough before sending another DHCP request. The relay agent will discard the DHCP request packet sent by the client if the delay variable in the DHCP request packet is less than the forward delay time.

Please note that the **show ip helper** CLI command is a universal command. It applies for all DHCP server(s) configured on the switch.

Maximum number of hops

This value lists the maximum number of relays/hops a DHCP request packet will pass through before being discarded. This prevents a DHCP request packet from looping through a network. A DHCP request packet will be discarded if its hop count is greater than or equal to the maximum number of hops.

Displaying DHCP Statistics

The **show ip helper stats** CLI command lists the total number of DHCP packets sent by both the client and the server. It also lists forward delay violations and violations for maximum hop count. This command is especially useful to determine if the client is not incrementing its forward delay variable or if DHCP request packets are looping through the network. And it also gives you a clear sense if the UDP Relay agent is forwarding packets to or from either the client or the server. If there are incrementing Delay of Hops Violations, this would explain why a pc is unable to get a DHCP address. A sniffer trace would be useful in this instance.

The following is an example of the **show ip helper stats** CLI command:

```
-> show ip helper stats
Global Statistics :
    Reception From Client :
      Total Count =        567, Delta =         66,
    Forw Delay Violation :
      Total Count =         18, Delta =         10,
    Max Hops Violation :
      Total Count =          0, Delta =          0,
Server Specific Statistics :
    Server  10.10.10.58
      Tx Server :
            Total Count =         31, Delta =         28
```

Note. See the “DHCP Relay Commands” chapter in the *OmniSwitch CLI Reference Guide* for more information.

UDP Relay and Group Mobility

If UDP Relay is being used with a Mobile DHCP Rule, determine if the end station is simply getting the wrong IP address scope. If this is the case, verify group mobility, as the source VLAN of the UDP request could be wrong when it reaches the UDP Relay function.

If no address is received and AVLAN forwarding is being used, again check group mobility and verify the UDP request is being classified into the correct VLAN. This can be done by using the **show mac-address-table** CLI command.

Take a trace both on the client connection as well as on the server connection can often be helpful to illuminate configuration errors.

Advanced Troubleshooting for UDP Relay

To monitor the UDP traffic, the **debug ip packet protocol udp** CLI command can be used.

Note. See the “IP Commands” chapter in the *OmniSwitch CLI Reference Guide* for more information.

The output below shows the entire conversation of a DHCP client with MAC address 000039:73130 in VLAN 20 to a DHCP server in VLAN 10 with a IP address of 10.10.10.58. (Note the sequence of “Discover-Offer-Request-Acknowledge” shown.) This network is diagramed in the figure on page 5-2.

This output can be very verbose if done on a live switch and it can be useful to type in the stop command prior to the start command and use the arrow up key to stop the debug display. (The stop command is the **debug ip packet protocol udp stop** CLI command.

```
-> debug ip packet protocol udp start
C R 5/3 00003973130e->ffffffffffff IP 0.0.0.0->255.255.255.255 UDP 68,67
Discover with time=0
C R 5/3 00003973130e->ffffffffffff IP 0.0.0.0->255.255.255.255 UDP 68,67
Discover
C S 5/10 00d09579628b->00c04f046c2a IP 10.10.10.200->10.10.10.58 UDP 67,67
Relayed Discover
C R 5/10 00c04f046c2a->00d09579628b IP 10.10.10.58->20.20.20.200 UDP 67,67 Offer
C S 1/F 00d09579628d->ffffffffffff IP 10.10.10.58->255.255.255.255 UDP 67,68
Relayed Offer
C R 5/3 00003973130e->ffffffffffff IP 0.0.0.0->255.255.255.255 UDP 68,67 Request
C S 5/10 00d09579628b->00c04f046c2a IP 10.10.10.200->10.10.10.58 UDP 67,67
Relayed Request
C R 5/10 00c04f046c2a->00d09579628b IP 10.10.10.58->20.20.20.200 UDP 67,67
Acknowledge
C S 1/F 00d09579628d->ffffffffffff IP 10.10.10.58->255.255.255.255 UDP 67,68
Relayed Acknowledge
5 R CMM (00d09579628b)->(00c04f046c2a) IP 10.10.10.200->10.10.10.58 UDP 67,67
5 S 5/10 00d09579628b->00c04f046c2a IP 10.10.10.200->10.10.10.58 UDP 67,67
5 R CMM (00d09579628b)->(00c04f046c2a) IP 10.10.10.200->10.10.10.58 UDP 67,67
5 S 5/10 00d09579628b->00c04f046c2a IP 10.10.10.200->10.10.10.58 UDP 67,67
5 R 5/3 00003973130e->(ffffffffffff) ARP Request 20.20.20.1->20.20.20.1
```

Dshell

To send the UDP Relay debug to the console, follow the following commands:

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

- Use the command **udprelay_do_systrace = 0** to disable systrace and enable console output.
- Use the command **C** = *x* (where x=1 to 9.) This increases the levels of **udprelay** debug. A level of 5 will display the source, destination IP, and MAC lines seen below. A level of 8 will include the hex dump of the packet. In addition, this level is very CPU intensive and will delay the UDP function. A level of 9 displays all packets as well as IPC messages. At this time running a level of 9 uses up so much of the UDP function that the relay agent can not pass traffic. A level of 9 is *not* recommended.
- And to turn it off use the **udprelayDebugLevelCMM = -1** command.

The following is a sample UDP relay debug session:

```
enqueue_to_ip_using_ipc: Packet sent to IP using IPC
 handle_event_udprelay_cmm(): Received on bsd socket
 handle_event_bsd_udprelay_cmm: Recieved message from the bsd socket Received 284
bytes from bsd
socket 0x1a
We got in a tweaked zero IP address packet on bsd socket
Recvd on bsd socket pkt from 0.0.0.0, rtr-port addr=192.168.20.254, 0x-1062726402
Received short packet from bsd socket  from 192.168.20.254, len=284 bytesReceived
request packet
for the bootp service on bsd socket   BOOTP REQ: secs=0 hops=0x0
  BOOTP REQ: Haven't waited long enough: secs=0 s/b >= 3
 handle_event_udprelay_cmm(): received on  ipc socket
 handle_event_ipc_udprelay_cmm: num of bytes received = 352
 handle_event_ni_udprelay_cmm: Recieved message from the NI
 handle_event_ni_udprelay_cmm: Recieved message from the NI for regular UDP packet
 hex_dump_udprelay_cmm: Printing the buffer at address = 0x60c3b10
00
03  00  01  01  5d  0e  70  50   -- 31  20  30  01  4a  00  00  00
14  60  14  41  00  ff  ff  ff   -- ff  ff  ff  00  0b  85  03  07
f0  81  00  00  14  08  00  45   -- 00  01  38  4d  cb  40  00  20
11  0b  eb  00  00  00  00  ff   -- ff  ff  ff  00  44  00  43  01
24  9e  a6  01  01  06  00  73   -- 02  3f  32  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
0b  85  03  07  f0  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  00
```

```
00  00  00  00  00  00  00  00   -- 00  00  00  00  00  00  00  63
82  53  63  35  01  03  32  04   -- c0  a8  14  9a  36  04  c0  a8
1e  05  39  02  02  4e  37  04   -- 01  1c  03  2b  3c  10  41  69
72  65  73  70  61  63  65  2e   -- 41  50  31  32  30  30  ff
```

In the example above, the BOOTP request was dropped because the number of seconds elapsed since the start of the process was not incremented (secs=0), and the forward delay was set to 3 seconds.

We got in a tweaked zero IP address packet on BSD socket shown below:

```
Recvd on bsd socket pkt from 0.0.0.0, rtr-port addr=20.20.20.200, 0x336860360
Received request packet for the bootp service on bsd socket   BOOTP REQ: secs=0
hops=0x0
```

The **BOOTP REQ** field shows that we haven’t waited long enough. (The seconds shown is 0, when it should be greater than or equal to 3.)

```
  handle_uevent_udprelay_cmm(d): received on  ipcp socket
relayDebug
handle_event_ipc_Ludprelay_cmm: num oef bytes received = v368elCMM =-1
handle_event_ni_udprelay_cmm: Recieved message from the NI
  handle_event_ni_udprelay_cmm: Recieved message from the NI for regular UDP pack
```

Finally, the Dshell command **bootpSizeCheck** turns on/off the bootpSizeCheck function. (By default it is off.) To turn it on enter the following:

```
Working: [Kernel]-> bootpSizeCheck = 1
```

To turn it on enter the following:

```
Working: [Kernel]-> bootpSixeCheck = 0
```

Note. OS-6600 supports minimum of 64 byte size packets.

6 Troubleshooting DNS

In order to troubleshoot a DNS problem, a basic understanding of the protocol/feature is required. Some basic concepts are covered below. Reading the "Enabling the DNS Resolver" section in the "Logging Into the Switch" chapter in the appropriate *OmniSwitch Switch Management Guide* is highly recommended.

In This Chapter

Introduction

The primary function of Domain Name Service or DNS enables the user to enter a pre-configured name rather than an IP address to reach another host, via telnet, ftp, or ping. Once requested the switch contacts a DNS server to find out what IP address is mapped to the name. If the server finds the entry a response is sent to the switch indicating what IP address the name is associated with. The switch then attempts to execute the command to the IP address. You can set up to 3 DNS servers from the CLI, WebView, or through SNMP. If one server does not know the resolution the next server is queried to see if it knows the resolution. You can also configure a domain name that the switch can belong to.

For example, say you want to set the domain name to "Alcatel.com" rather than entering

```
-> ping switch1.Alcatel.com
```

you could just enter

```
-> ping switch1
```

For all other domains you still need to enter the full syntax (**ping switch2.xylan.com**).

Troubleshooting a DNS Failure

Starting the Troubleshooting Procedure

If you try to use DNS resolution and it does not resolve, or connect from the switch with error such as "unknown host" take the following steps.

Verify IP connectivity from the switch in question to the DNS server by pinging the server (destination) in question from the switch (source) by its IP address. If successful, move on to layer 7 DNS or Name resolution issue. If ping fails, verify IP configuration. If ping is successful, verify that UDP port 53 is not being filtered.

Layer 7 DNS or Name Resolution Issue

First verify that the switch is configured properly by using the **show dns** CLI command. Using this command will show you the current settings and whether it is enabled and properly configured.

```
-> show dns

Resolver is  : enabled
domainName   : Alcatel.com
nameServer(s): 10.255.10.254
             : 11.255.10.254
             : 12.255.10.254
```

If there is more than one server on the network, make sure that the switch is pointing to the proper DNS server(s).

If it is configured properly, then verify that you can still ping the server(s) by IP address; if successful ping by name. If a ping by IP works but name doesn't, verify the spelling of the name and that the proper domain has been specified (labdevice.Alcatel.com).

If configuration appears ok to this point you may want to look at the DNS server to verify that the name you are entering is configured in the server and is active, so that it will know how to respond properly. Can another device use the DNS server to resolve the name in question? What about resolution of names in other domains? If the server configuration appears ok, and other devices work with that server, then you can take a trace (sniff) to see if the request is being sent to the server and what the server is responding with.

A proper request and response will look similar to the following:

- In the request you should see a DLC header that has the Mac address of the switch as the source and the MAC address of the DNS server as the destination.
- Next you will see the IP header, which should state that the protocol is UDP (17), the source IP address should be the switch, and the destination IP address should be the DNS server.
- Next you have a UDP header that should have the DNS destination port of 53 (source port would vary). The last portion is the DNS header, which should indicate the ID number (the response will have the same number); it will show you the name the switch is asking to resolve to an IP address.

- If you find conflicting information, then see which portion has the wrong information and focus on that layer again (layer 2, 3, or 7).
- The response packet should contain the following fields: DLC with the source Mac address of the DNS server, and the destination MAC address of the switch. The IP header will contain the source IP address of the DNS server, and the destination IP address of the switch. The UDP header will contain the source port 53 (the destination port varies). The DNS header will contain a response flag, and the answer section will contain the name and the IP address that the name references.

DNS Configuration Considerations

CLI has a limitation when entering the domain name to 126 characters. If you enter the name from WebView you can enter up to 255 characters, and it will show up properly from the CLI. There is a limit of up to a maximum of 3 DNS servers.

7 Troubleshooting Link Aggregation

In order to troubleshoot a Link Aggregation issue a basic understanding of the protocol is required. Reading the “Configuring Static Link Aggregation” and “Configuring Dynamic Link Aggregation” chapters in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

The OmniSwitch supports two Link Aggregation Algorithms:

Two methods exist for configuring Link Aggregation:

- **Static Link Aggregation Groups**—Also referred to as OmniChannel used for Aggregation of Multiple Link Segments between Alcatel Omniswitches.
- **Dynamic Link Aggregation Groups**—Also referred to as the IEEE 802.1ad standard used for Aggregation of Multiple Link Segments between Alcatel Omniswitch and other Vendor.

In This Chapter

Link Aggregation Limits and Guidelines

Consider the following when configuring Static Link Aggregation groups:

- Maximum number of link aggregation groups: 30 (OmniSwitch 6624/6648), 32 (OmniSwitch 7700/7800), or 16 (OmniSwitch 8800).
- Number of links per group supported: 2, 4, 8, or 16
- Link aggregation groups are identified by unique MAC addresses, which are created by the switch.
- Load balancing is performed on ingress ports by the link aggregation groups to evenly balance traffic flows on the physical links.
- The load is to be balanced between parallel links; because of this, Spanning Tree will be shut off on all, but one link, which belongs to a channel. This port is referred to as the Primary port and the rest of the ports are Secondary ports.

By default, first-generation Network Interface (NI) modules are not optimized for link aggregation. The table below shows which NI modules are first-generation modules and are not optimized for link aggregation. ***???? Where is this table, not provided in CS edits. ????*** Use the **show ni**, **show module**, or **show ni** commands to display the part number of the NI module. Second-generation NI modules are distinguished from first-generation NI modules by "ENI2" or "GNI2" in the part number. (First-generation modules have ENI, GNI, or 10GNI in their part numbers instead.) If the NI is a second-generation module you do not need to optimize it.

To modify the optimization status of an NI module use the **linkagg slot optimization** command. To use this command, enter **linkagg slot** followed by the slot number of the NI module then **optimization** and either **enable** or **disable**. For example, to enable link aggregation optimization on an NI module is Slot 5 enter:

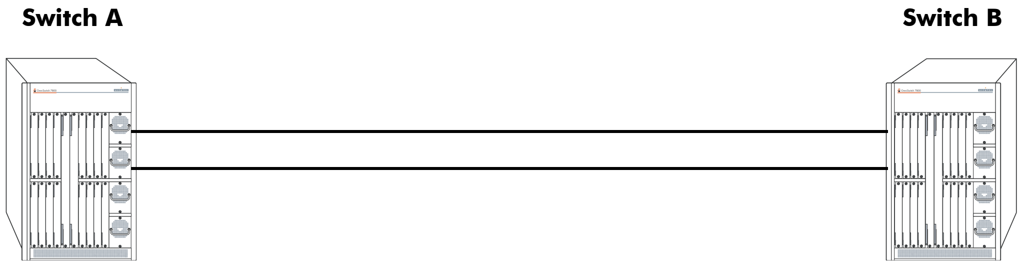
```
-> linkagg slot 5 optimization enable
```

When a port is a member of an aggregate group and optimization is enabled on this NI, all bridged traffic sent from any other port (not part of the aggregate group) on the same switching ASIC to the aggregate will be dropped. In this case, traffic needs to be routed between that port and the aggregate group. In a chassis with both first-generation and second-generation NI modules you must configure static link aggregation on all of the first-generation NI modules before you must configure static link aggregation on all of these NI modules before you configure it on any of the second-generation NI modules. In addition, hot insertion or hot swapping of a first-generation NI module into a chassis that has only second-generation NI modules can cause configuration problems.

OmniSwitch 6624/6648 Restrictions

You can create up to 4 link aggregation (both dynamic and static) groups on a single OmniSwitch 6624 switch, up to 8 link aggregation groups on a single 6648 switch, and up to 30 link aggregation groups per stack. In addition, ports must be configured sequentially and the first port configured must begin with port number 1, 9, 17, or 25 on an OmniSwitch 6624 or 1, 9, 17, 25, 33, 41, 49, or 51 on an OmniSwitch 6648. (In a stack, ports on different switches can be assigned to the same dynamic aggregate group.)

Troubleshooting a Link Aggregation Failure



Link Aggregation Setup

The figure above has the following setup:

- Switch A and Switch B connected back to back and Link Aggregation configured.
- Port 7/1 of Switch A is connected to port 7/1 of Switch B.
- Port 7/2 of Switch A is connected to port 7/2 of Switch B.
- VLAN 10 is assigned to this aggregate.
- PC1 connected to Switch A slot/port 1/5.
- PC2 connected to Switch B slot/port 1/5.

Verify the Configuration

First, verify that the ports and aggregates involved are assigned correctly. The CLI command **show linkagg** will confirm that the aggregates are configured and are enabled and up as shown below:

```
-> show linkagg
Number  Aggregate  SNMP Id   Size Admin State  Oper State     Att/Sel Ports
-------+----------+---------+----+------------+--------------+-------------
   2     Dynamic   40000002   8    ENABLED      UP             2  2
   3     Static    40000003   2    ENABLED      UP             2  2
```

The **show linkagg** command followed by the aggregation number will show the aggregate state, size, number of active ports, number of inactive ports, as well as the primary port. (See the sample below.) Note also the primary port is the port that spanning tree runs on. It is important to verify that this port is not changing regularly as that could cause spanning tree problems.

```
-> show linkagg 3

SNMP Id                  : 40000003,
  Aggregate Number         : 3,
  SNMP Descriptor          : Omnichannel Aggregate Number 3 ref 40000003 size 2,
  Name                     : ,
  Admin State              : ENABLED,
  Operational State        : UP,
  Aggregate Size           : 2,
  Number of Selected Ports : 2,
  Number of Reserved Ports : 2,
  Number of Attached Ports : 2,
  Primary Port             : 7/1
```

The **show linkagg port** CLI command followed by the slot and port number will display the port and link state as well as if it is the primary port. (See the samples below.) If the operational or administrative state is down and the port is primary, this indicates a software problem.

```
-> show linkagg port 7/1

Static Aggregable Port
  SNMP Id                      : 7001,
  Slot/Port                    : 7/1,
  Administrative State         : ENABLED,
  Operational State            : UP,
  Port State                   : ATTACHED,
  Link State                   : UP,
  Selected Agg Number          : 3,
  Port position in the aggregate: 0,
  Primary port                 : YES


-> show linkagg 2

Dynamic Aggregate
  SNMP Id                 : 40000002,
  Aggregate Number        : 2,
  SNMP Descriptor         : Dynamic Aggregate Number 2 ref 40000002 size 8,
  Name                    : ,
  Admin State             : ENABLED,
  Operational State       : UP,
  Aggregate Size          : 8,
  Number of Selected Ports : 2,
  Number of Reserved Ports : 2,
  Number of Attached Ports : 2,
  Primary Port            : 8/1
LACP
  MACAddress              : [00:d0:95:6b:54:0c],
  Actor System Id         : [00:00:00:00:00:00],
  Actor System Priority   : 0,
  Actor Admin Key         : 0,
  Actor Oper Key          : 2,
  Partner System Id       : [00:00:00:00:00:00],
  Partner System Priority  : 0,
  Partner Admin Key       : 0,
  Partner Oper Key        : 2
```

Verify spanning tree on the virtual port that represents the link aggregate is in forwarding with the **show spantree** command. Note the aggregate group will be displayed as **0/aggregate ID**.

```
-> show spantree 10 ports
Spanning Tree Port Summary for Vlan 10
         Adm Oper Man. Path  Desig Fw  Prim. Adm Op
Port  Pri St  St   mode Cost   Cost Role Tx  Port  Cnx Cnx  Desig Bridge ID
-----+---+---+----+----+-----+-----+----+---+-----+---+---+---------------------
- 5/1    7 ENA FORW   No    19     3 DESG   1  5/1  AUT PTP C350-
00:d0:95:79:62:8a
0/3    7 ENA FORW   No     3     0 ROOT   1  0/3  AUT PTP 8000-00:d0:95:88:67:ca
```

If there are still connectivity problems across the aggregate link, make sure to check basic Ethernet connectivity including spanning tree

Source Learning

When one of the primary links go down, the filtering database is purged and the process of learning the source addresses is started again. The next available port is chosen to be the primary port. If the port that goes down happens to be a secondary port, the MAC addresses learned on that particular port are re-assigned to other ports evenly.

Link Aggregation Affecting Other Traffic

Note that depending on what software and hardware is being used, enabling link aggregation on a port could affect other traffic on the same NI. Please call Customer Support if you suspect this to be the case.

Problems Creating a Group

Note that if there are problems creating a linkagg group or adding ports to an existing group the below should be considered:

- Ports involved in a link aggregate need to all be of the same line speed.
- Mobile ports can not be a part of a link aggregate.
- There are a maximum of 32 aggregate groups allowed on an OmniSwitch 7700/7800/8800switch, 30 on a stack of OmniSwitch 6624/6648 switches, and 8 on a single OmniSwitch 6624/6648 switch. The number goes down on OmniSwitch 7700/7800/8800 switches depending on the size of the aggregate, see below.

Problems Deleting a Group

To delete a static link aggregate, the attached ports must first be deleted with the **no static agg** CLI command. To delete a dynamic (802.3AD) aggregate, use the **no lacp linkagg** CLI command.

LACP 802.3AD

Most of the steps followed previously in this chapter apply to troubleshooting LACP. To verify the configuration use the show linkagg [agg. Number]. Again, verify the aggregate is enabled and up.

The most important aspect in troubleshooting LACP is to verify the transmission of valid LACPDUs. For this you can go to the Dshell section as well as use a sniffer tool.

Advanced Link Aggregation Troubleshooting

To verify that the link aggregate software recognizes all the available slices, perform the following steps:

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

1 Use the **lagg_Sock_cmm_boardupprint** Dshell command, which displays all Network Interface (NI) modes that are currently operating.

2 Verify that all NIs are present in the output.

```
-> dshell
Working: [Kernel]->lagg_Sock_cmm_boardupprint

LAGG boards up :
     board in slot : 2   slice : 0  is up
     board in slot : 5   slice : 0  is up
     board in slot : 6   slice : 0  is up
     board in slot : 7   slice : 0  is up
     board in slot : 8   slice : 0  is up
value = 0 = 0x0
Working: [Kernel]->
```

To view the status of all ports and weather they are part of an aggregate use the **la_pm_port_prt** Dshell command, which displays the the status of port mirroring and whether any ports are part of a link aggregation group. Note that **status=2** indicates that port is part of an aggregate.

```
Working: [Kernel]->la_pm_port_prt
7/ 1 -> 0x0443e818 ifdx=7001 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
7/ 2 -> 0x04442fa0 ifdx=7002 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
8/ 1 -> 0x04442d30 ifdx=8001 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
8/ 2 -> 0x04444090 ifdx=8002 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
8/ 3 -> 0x04443ff0 ifdx=8003 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
8/ 4 -> 0x044375c8 ifdx=8004 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=2 bop_checked=1
8/ 5 -> 0x043d1348 ifdx=8005 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=0 bop_checked=1
8/ 6 -> 0x043d1318 ifdx=8006 port_id=-1 assign=1 mirrored=0
                    admin_status=1 agg_status=0 bop_checked=1
```

To display an aggregate's configuration use the command **la_cmm_agg_prt** Dshell command. This will display the aggregate as well as the individual ports that are configured. Note the *ifindex* as it will be needed.

```
-> dshell
Working: [Kernel]->la_cmm_agg_prt

2 -> 0x0443a958 ifindex=40000002 id=2 type=1 max_size=8 selected=2 reserved=2 a
ttached=2
```

```
           MAC=00:d0:95:6b:54:0c name=
           primary_port_index=0 admin_state=1 oper_state=2
           Individual=0
           Actor   : ID=00:00:00:00:00:00 Prio=0 Admin Key=0 Oper Key=2
           Partner : ID=00:00:00:00:00:00 Prio=0 Admin Key=0 Oper Key=2
      0x04442ea8 status=6 ifindex=8001 port_id=224 port_type=1 port_index=0
           adminstate=1 operstate=1 link_up_down=1
           activation_order=1 bandwidth=100 agg_ctx_p=0x0443a958
           agg_port_ctx_p=0x04442ea8 obj_port_ctx_p=0x04442d30
      0x04442c20 status=6 ifindex=8002 port_id=225 port_type=1 port_index=1
           adminstate=1 operstate=1 link_up_down=1
           activation_order=2 bandwidth=100 agg_ctx_p=0x0443a958
           agg_port_ctx_p=0x04442c20 obj_port_ctx_p=0x04444090
3 -> 0x0443c090 ifindex=40000003 id=3 type=0 max_size=2 selected=2 reserved=2 a
ttached=2
           MAC=00:d0:95:87:a5:f2 name=
           primary_port_index=0 admin_state=1 oper_state=2
      0x04443288 status=6 ifindex=7001 port_id=204 port_type=0 port_index=0
           adminstate=1 operstate=1 link_up_down=1
           activation_order=1 bandwidth=1000 agg_ctx_p=0x0443c090
           agg_port_ctx_p=0x04443288 obj_port_ctx_p=0x0443e818
      0x0443e7d0 status=6 ifindex=7002 port_id=220 port_type=0 port_index=1
           adminstate=1 operstate=1 link_up_down=1
           activation_order=2 bandwidth=1000 agg_ctx_p=0x0443c090
           agg_port_ctx_p=0x0443e7d0 obj_port_ctx_p=0x04442fa0
value = 84125696 = 0x503a800
```

To understand the output better, note that help is available in **nidebug** Dshell with the command **la_ni_info**.

```
-> dshell
Working: [Kernel]->NiDebug
:0 nidbg> la_ni_info
7:0
7:0 LAGG values translation BOOL TRUE(1) FALSE(0)
7:0 NO CONFIG(0)  CONF_NOT_SAVE(0x1) CONF_SAVED(0x2) CONF_CERTIFIED(0x4)
7:0 PORT_STATUS CREATED(1)  CONFIGURABLE(2) CONFIGURED(3) SELECTED(4)
RESERVED(5) ATTACHED(6)
7:0 AGGREGABLE_STATUS NS(0)  NOT_AGGREGABLE(1) AGGREGABLE(2)
7:0 TOKEN MSGTYPE NS(0)  TRANSIT(1) TRANSIT_RSP_NOK(2) JOIN(3) DYN_DATA_REQ(4) D
YN_DATA_RSP_OK(5) DYN_DATA_RSP_NOK(6)
7:0 TOKEN STATE IDLE(0)  UPDATE(1) PASSIVE(2) READY(3) REQUEST(4) GOT(5)
7:0 value = 0 = 0x0
```

To look at traffic statistics per aggregate use the command **la_cmm_agg_stats_prt** *ifindex* Dshell command.

```
-> dshell
Working: [Kernel]->la_cmm_agg_stats_prt 40000003

Aggregate Statistics [40000003]
  agg_nb_octets_rx_ok       = 0
  agg_multicast_frm_rx_ok   = 0
  agg_broadcast_frm_rx_ok   = 0
  agg_unicast_frm_rx_ok     = 0
  agg_frm_discard_rx        = 0
  agg_frm_with_rx_errors    = 0
  agg_unknown_protocol_frms = 0
  agg_nb_octets_tx_ok       = 0
```

```
    agg_multicast_frm_tx_ok   = 0
    agg_broadcast_frm_tx_ok   = 0
    agg_unicast_frm_tx_ok     = 0
    agg_frm_discard_tx        = 0
    agg_frm_with_tx_errors    = 0

value = 40000003 = 0x2625a03
```

Since LACP is run on the NI it is important to verify the NI has the proper information. Many of the same commands run above are available in the NI debugger. (See the table below.) The syntax and output are the same.

la_ni_agg_prt	Displays aggregates.
la_ni_port_prt	Displays ports.
la_ni_port_up_prt	Displays ports up.
la_ni_lacp_port_stats_prt	Displays LACP statistics.
la_ni_trace_prt	Dumps link aggregation trace.
lagg_Sock_ni_traceprint	An event trace.
lagg_Sock_ni_boardupprint	Displays boards up.

To look at LACP statistics use the **la_ni_lacp_port_stats_prt** command. It monitors real time LACP-DUs. It is important to verify that receive and transmit are incrementing on all active ports in a LACP aggregate.

```
-> dshell
Working: [Kernel]->NiDebug
8:0 nidbg> la_ni_lacp_port_stats_prt
8:0
8:0  8:0: 0
8:0       lacpdus_rx             = 252289
8:0       marker_pdus_rx         = 0
8:0       marker_response_pdus_rx = 0
8:0       unknown_rx             = 0
8:0       illegal_rx             = 0
8:0       lacpdus_tx             = 252289
8:0       marker_pdus_tx         = 0
8:0       marker_response_pdus_tx = 0
8:0  8:0: 1
8:0       lacpdus_rx             = 252289
8:0       marker_pdus_rx         = 0
8:0       marker_response_pdus_rx = 0
8:0       unknown_rx             = 0
8:0       illegal_rx             = 0
8:0       lacpdus_tx             = 252289
8:0       marker_pdus_tx         = 0
8:0       marker_response_pdus_tx = 0
```

Note. LACPDUs are processed on the CMM.

If writing a PR for link aggregation it can be useful to attach the output of the Dshell command **la_cmm_trace_prt**, which displays the actions/events the CMM handled.

6800 Link Aggregation Debug Functions

The following functions are available for Link Aggregation debugging on the NI. A summary is shown below.

```
Display  Aggregates  : la_ni_agg_prt
Display  Ports       : la_ni_port_prt
Display  Ports Up    : la_ni_port_up_prt
Display  LACP stats  : la_ni_lacp_port_stats_prt
Dump     LA Trace    : la_ni_trace_prt
Freeze   LA Trace    : la_ni_trace_freeze
Unfreeze LA Trace    : la_ni_trace_unfreeze
Global   variables   : la_ni_display_add
Display  Token       : la_ni_token_prt
Display  To unit tab : la_ni_tok_table_prt
values translation   : la_ni_info
KITE debug           : la_ni_kite_help
Socket Handler debug : lagg_ni_Sock_help
```

la_ni_agg_prt

```
Certified: [Kernel]->la_ni_agg_prt
-> 0x0b8203c8 status=6 ifindex=1047 port_id=55 port_type=0 port_index=2adminstate=1
operstate=1 link_up_down=1 activation_order=3 multicast_state_origin=0x0
agg_ctx_p=0x0b8
```

la_ni_port_prt

```
Certified: [Kernel]->la_ni_port_prt

1:0: 0 -> 0x0ce87d28 status=0 ifdx=-1 id=0 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0: 2 -> 0x0ce93e98 status=0 ifdx=-1 id=2 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0: 4 -> 0x0ce92f90 status=0 ifdx=-1 id=4 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0: 5 -> 0x0f75fe30 status=0 ifdx=-1 id=5 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0: 6 -> 0x0ce736e0 status=0 ifdx=-1 id=6 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0: 7 -> 0x0ce93050 status=0 ifdx=-1 id=7 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

1:0:48 -> 0x0ce92bd0 status=0 ifdx=-1 id=48 type=0 agg_id=-1 port_index=-1
          adminstate=1 operstate=2 link_up_down=1 activation_order=0 agg_ctx_p=0x0

value = 87 = 0x57 = 'W'
```

la_ni_port_up_prt

```
Certified: [Kernel]->la_ni_port_up_prt

   1:0: 0 -> 0x0ce87d28 status=0 port_id=0 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0: 2 -> 0x0ce93e98 status=0 port_id=2 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0: 4 -> 0x0ce92f90 status=0 port_id=4 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0: 5 -> 0x0f75fe30 status=0 port_id=5 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0: 6 -> 0x0ce736e0 status=0 port_id=6 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0: 7 -> 0x0ce93050 status=0 port_id=7 adminstate=1 link_up_down=1
agg_ctx=0x00000000
   1:0:48 -> 0x0ce92bd0 status=0 port_id=48 adminstate=1 link_up_down=1
agg_ctx=0x00000000
value = 91 = 0x5b = '['
```

la_ni_port_stats_prt

```
Certified: [Kernel]->la_ni_lacp_port_stats_prt

value = 1 = 0x1
```

la_ni_info

```
Certified: [Kernel]->la_ni_info
LAGG values translationBOOL TRUE(1) FALSE(0)
NO CONFIG(0)  CONF_NOT_SAVE(0x1) CONF_SAVED(0x2) CONF_CERTIFIED(0x4)
PORT_STATUS CREATED(1)  CONFIGURABLE(2) CONFIGURED(3) SELECTED(4) RESERVED(5)
ATTACHED(6)
AGGREGABLE_STATUS NS(0)  NOT_AGGREGABLE(1) AGGREGABLE(2)
TOKEN MSGTYPE NS(0)  TRANSIT(1) TRANSIT_RSP_NOK(2) JOIN(3) DYN_DATA_REQ(4)
DYN_DATA_RSP_OK(5) DYN_DATA_RSP_NOK(6)
TOKEN STATE IDLE(0)  UPDATE(1) PASSIVE(2) READY(3) REQUEST(4) GOT(5)
value = 69 = 0x45 = 'E'
```

lagg_ni_Sock_help

```
Certified: [Kernel]->lagg_ni_Sock_help
 NI     Slot : 1      Slice : 0
 lagg_Sock_ni_globals         : Global variables
 lagg_Sock_ni_warningprint    : warning trace
 lagg_Sock_ni_totraceprint    : time-out trace
 lagg_Sock_ni_traceprint      : event trace [appid]
 lagg_Sock_ni_ttimetraceprint : treatment time trace
 lagg_Sock_ni_intraceprint    : inter-NI trace
 lagg_Sock_ni_boardupprint    : boards up
 lagg_Sock_ni_printon         : activates STP Socket Handler printf
 lagg_Sock_ni_printoff        : desactivates STP Socket Handler printf
 lagg_Sock_ni_bufferprint     : internal buffer statistics
 lagg_Sock_ni_Qtraceprint     : inQ trace [evtid]
 lagg_Sock_dump_stats         :  Event Tx stats
value = 49 = 0x31 = '1'
```

la_ni_trace_freeze

```
Certified: [Kernel]->la_ni_trace_freeze
value = 244315184 = 0xe8ff430
```

la_ni_trace_unfreeze

```
Certified: [Kernel]->la_ni_trace_unfreeze
#_LA_SRV_TRACE_NI_LINKAGG_TRAC_UNFROZEN
value = 40 = 0x28 = '('
```

la_ni_kite_help

The **la_ni_kite_help** function may be accessed from the D-shell and will display the following output:

```
Working: [Kernel]->la_ni_kite_help

la_ni_kite_get_bcm_trunk_info(unit,agg_id)  : display BCM info for given unit,agg
value = 83 = 0x53 = 'S'
```

8 Troubleshooting 802.1Q

In order to troubleshoot an 802.1Q problem on a port, a basic understanding of the networking OSI model is required to assist one with the troubleshooting steps to resolve a particular network problem.

Alcatel's OmniSwitch supports 802.1Q specifications as defined by RFC 2674/IEEE 802.1Q/D11.

Reading the "Configuring 802.1Q" in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

Troubleshooting 802.1Q

When troubleshooting an 802.1Q problem, it is important to not only investigate the 802.1Q feature and configuration, but also the basic Ethernet connectivity between the problematic switches. Please refer to Chapter 2, "Troubleshooting Switched Ethernet Connectivity," of this document.

Switch A
Switch B

802.1Q Example

If there is no traffic passing at all across an 802.1Q link, verify basic Ethernet connectivity.

If there are particular VLANs that are not able to pass traffic, verify the configuration on both sides of the link using the **show vlan port** CLI command. This will display the 802.1Q VLANs that are configured. It will also display the default untagged VLAN. Confirm that these are configured correctly.

```
-> show vlan port 1/24
vlan     type      status
--------+---------+--------------
     1    default   forwarding
    30    qtagged   forwarding
    40    qtagged   forwarding
    50    qtagged   forwarding
```

Verify the ports are in forwarding as expected. Note which bridge mode the switch is running in (1 per VLAN or 1 per switch) If spanning tree appears to not be working correctly, please see Chapter 4, "Troubleshooting Spanning Tree," of this document.

Note that different spanning tree protocols can be used on the same tagged port.

To verify which VLAN a specific flow is being classified into, use the **show mac-address-table** command shown below:

```
-> show mac-address-table 5/24

Legend: Mac Address: * = address not valid

  Vlan       Mac Address          Type        Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
  30   00:d0:95:88:67:ce     learned          10806     bridging      5/24
  50   00:d0:95:88:67:d0     learned          10806     bridging      5/24
Total number of Valid MAC addresses above = 2
```

Default VLAN Traffic

If traffic that should be in the default VLAN is not passing properly, first verify that the default VLAN is set correctly, as see above. Also note the switch can be configured to either accept or deny untagged packets.

When enabling a port on the OmniSwitch 7700/7800/8800 to accept tagged traffic, you can specify whether only 802.1Q tagged traffic is allowed on the port (deny all bridged traffic), or whether the port accepts both tagged and untagged traffic.

OmniSwitch 7700/7800/8800 has a feature that enables it to accept all data on a bridged VLAN or deny all of the bridged traffic.

The **vlan 802.1q frame type all** CLI command allows all the bridged traffic to be accepted on a tagged link. When using an OmniSwitch 7700/7800/8800 with an OmniSwitch or Omni Switch/Router where default VLAN needs to be bridged, this command should be set to all so that the bridged traffic can be accepted by the OmniSwitch 7700/7800/8800 in addition to the tagged traffic.

For devices that cannot bridge on the tagged link, e.g. an OmniCore, the OmniSwitch 7700/7800/8800 can be configured to accept only tagged traffic and ignore all the bridged traffic using the command. If frame type is set to tagged, all non tagged traffic will be dropped.

The **vlan 802.1q frame type tagged** CLI command will deny all of the bridged traffic. Bridged traffic is classified as traffic without a VLAN Identification (VID). Any packet without VID will be discarded. Only tagged traffic will be accepted.

To verify if the port will receive untagged frames use the **show 802.1q** CLI command as shown below. Note the **Acceptable Frame Type** field, **Any Frame Type** indicates this port will receive untagged frames as well as tagged frames.

```
-> show 802.1q 5/24

Acceptable Frame Type    :      Any Frame Type
Force Tag Internal       :                  on
Tagged VLANS    Internal Description
-------------+-----------------------------------------+
          30   TAG PORT 5/24 VLAN 30
          40   TAG PORT 5/24 VLAN 40
          50   TAG PORT 5/24 VLAN 50
```

Tagged Packet on an Untagged Port

If a tagged packet comes on an untagged or group mobility port (i.e., the **vlan 802.1q** CLI command has not been used), then it can be classified in a VLAN other than the VLAN it currently belongs to. If this classified VLAN (i.e., different then the packet tag) is now tagged on the egress side, then there are two possible options.

One option is to carry the original tag of the packet and other option is to replace it with the classified VLAN as the tag. If the force tag internal is disabled (on), then the tag is not replaced with the classified VLAN. If the force tag internal is enabled (off), then the tag is replaced with the classified VLAN as the tag.

Please note the above output of show 802.1Q CLI command shown in "Default VLAN Traffic" on page 8-3.

Question: What needs to be done if the native VLAN needs to be tagged when connected to an OmniSwitch 7700/7800/8800?

Answer: The Gigabit/Ethernet port can be moved into a different dummy VLAN, and then the tagged service can be created for the previous native VLAN. CLI Commands are as follows:

1 Dummy VLAN 99 created:

```
>vlan 99
```

2 A tag service is to be created on port 99 in VLAN 1.

```
->vlan 99 port default 1/1
```

3 Tag service created on VLAN 1.

```
->vlan 1 802.1q 1/1
```

4 (View the 802.1Q services created on port 1/1.

```
->show 802.1q 1/1
```

802.1Q with VLAN ID of 0

A VLAN ID of 0 means that Tag Header contains only user priority information; no VLAN identifier is present in the frame. This frame will be claimed in the default VLAN for processing.

802.1Q and 64 Byte Packets

The Omni Switch 7700/7800/8800 was designed to send out tagged frames with a minimum size of 68 bytes. If the Omni Switch 7700/7800/8800 receives a tagged packet of 64 bytes it will be padded and sent out 68 bytes (if untagged it will be 64 bytes).

Advanced Troubleshooting

To verify the 802.1Q configuration from the CMM perspective use the **debug 802.1q** CLI command.

If frame type is set to **all**, then the egress default VLAN will equal the ports default VLAN. If force tag internal is set to **off**, e.g. force tag internal will equal 0, otherwise it will be fffffff.

The following shows the **debug 802.1q** CLI command used to verify that the slot and port are up.

```
-> debug 802.1q 5/24
Slot Status =              slot up
Port Status =              port up


  GENERAL INFO ESM: USER PORT 1-12  = CORONADO PORT 0-11
  GENERAL INFO ESM: USER PORT 13-24  = CORONADO PORT 16-27
  GENERAL INFO GSM-2: USER PORT 1  = CORONADO PORT 12
  GENERAL INFO GSM-2: USER PORT 2  = CORONADO PORT 28
  GENERAL INFO GSM-8: USER PORT 1  = CORONADO PORT 0
  GENERAL INFO GSM-8: USER PORT 2  = CORONADO PORT 16
  GENERAL INFO GSM-8: USER PORT 3  = CORONADO PORT 1
  GENERAL INFO GSM-8: USER PORT 4  = CORONADO PORT 17
  GENERAL INFO GSM-8: USER PORT 5  = CORONADO PORT 2
  GENERAL INFO GSM-8: USER PORT 6  = CORONADO PORT 18
  GENERAL INFO GSM-8: USER PORT 7  = CORONADO PORT 3
  GENERAL INFO GSM-8: USER PORT 8  = CORONADO PORT 19
  HARDWARE INFO for slot = 5 and port = 24:

At reg_addr = 660012c, Ingress tag-untag:= 8000000:
At reg_addr = 6a00010, Eg tag-untag: = 8000000:
At reg_addr = 660106c,for protocol = 0,ing default vlan: = a
At reg_addr = 66010ec,for protocol = 1,ing default vlan: = a
At reg_addr = 660116c,for protocol = 2,ing default vlan: = a
At reg_addr = 66011ec,for protocol = 3,ing default vlan: = a
At reg_addr = 660126c,for protocol = 4,ing default vlan: = a
At reg_addr = 66012ec,for protocol = 5,ing default vlan: = a
At reg_addr = 660136c,for protocol = 6,ing default vlan: = a
At reg_addr = 66013ec,for protocol = 7,ing default vlan: = a
At reg_addr = 660146c,for protocol = 8,ing default vlan: = a
At reg_addr = 66014ec,for protocol = 9,ing default vlan: = a
At reg_addr = 660156c,for protocol = a,ing default vlan: = a
At reg_addr = 66015ec,for protocol = b,ing default vlan: = a
At reg_addr = 660166c,for protocol = c,ing default vlan: = a
At reg_addr = 66016ec,for protocol = d,ing default vlan: = a
At reg_addr = 660176c,for protocol = e,ing default vlan: = a
At reg_addr = 66017ec,for protocol = f,ing default vlan: = a
At reg_addr = 6a7006c, egress default vlan: = a
At reg_addr = 6600118, protocol cam on/off: = 0 :
At reg_addr = 660011c, trusted/untrusted: = 0
At reg_addr = 6600130, secure/unsecure: = 0
At reg_addr = 6608078, for vlan = 1e,spanning tree vector: = 8000000
At reg_addr = 66080a0, for vlan = 28,spanning tree vector: = 8000000
At reg_addr = 66080c8, for vlan = 32,spanning tree vector: = 8000000
At reg_addr = 6a00014, Eg force tag internal: = ffffffff:
```

output definitions

Aggregate/Slot Status	Whether the slot or aggregate link is actively running.
Port Status	Whether the port is actively running.
General Info	Provides general information on the modules in the chassis, including module type, number of ports, and ASIC.
Hardware Info	Lists the various debug messages for the selected slot and port.

Dshell Commands

The first step in troubleshooting for an 802.1Q problem through Dshell is to verify the configurations. Validating the configurations in Dshell remove the chances of inconsistency between the CLI and Dshell.

Following is the list of commands to verify the configuration of the 802.1Q ports in Dshell. These commands will verify that there is no inconsistency between the CLI and Dshell.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

The Dshell command **print_default_vlan_8021q_cmm** shows the default or native VLAN for all of the 802.1Q ports. Slot and port are zero based.

```
-> dshell
Working: [Kernel]->print_default_vlan_8021q_cmm 4,23

For slot = 4 and port = 23, default_vlan = 10value = 4 = 0x4

Working: [Kernel]->print_port_aggregation_status_8021q_cmm 6,0

print_port_aggregation_status_8021q_cmm: Slot number = 6, Port number = 0,  por
t_aggregation_status =   AGGREGABLE PORT
value = 6 = 0x6

Working: [Kernel]->print_configured_list_aggregate_8021q_cmm 6,0

print_configured_list_8021q_cmm: aggregate_id = 6, number_of_configured_vlans =
0, vlan list =
value = 0 = 0x0
```

Note~~.~~ Use the Dshell NIDebuger to run the following command.

To see the 802.1Q VLANs for a particular port use the **print_configured_list_8021q_ni** *zero_based_port* command as shown below: ???? This command was not marked for deletion but the example below was. Is this correct and/or is there a new example if this command should stay? ????

```
-> dshell
Working: [Kernel]->NiDebug
5:0 nidbg> print_configured_list_8021q_ni 23
5:0
5:0  print_configured_list_8021q_ni: Port number = 23, number_of_configured_vlan
s = 3, vlan list = 30,40,50,
5:0 value = 23 = 0x17

5:0 nidbg> print_acceptable_frame_type_8021q_ni 23
5:0
5:0  print_acceptable_frame_type_8021q_ni: Port number = 23,  acceptable_frame_t
ype =   ANY FRAME TYPE
5:0 value = 23 = 0x17
5:0 nidbg> print_force_tag_internal_8021q_ni  23
5:0
5:0  print_force_tag_internal_8021q_ni: Port number = 23,  force_tag_internal =
   ON
5:0 value = 23 = 0x17

5:0 nidbg> print_default_vlan_8021q_ni 23
5:0
5:0  print_default_vlan_8021q_ni:  For port = 23, default vlan = 10 value = 23 =
   0x17


5:0 nidbg> print_configured_list_aggregate_8021q_ni  2
5:0
5:0  print_configured_list_8021q_ni: Aggregate number = 2, number_of_configured_
vlans = 3, vlan list = 30,40,50,
5:0 value = 2 = 0x2

5:0 nidbg> print_port_aggregation_status_8021q_ni 2
5:0
5:0  print_port_aggregation_status_8021q_ni: Port number = 2,  port_aggregation_
status =   NOT AGGREGABLE PORT
5:0 value = 2 = 0x2

5:0 nidbg> print_port_list_in_aggregate_8021q_ni  3
5:0
5:0  print_port_list_in_aggregate_8021q_ni: aggregate_id = 3, number_of_ports =
0, port_list =
5:0 value = 3 = 0x3

5:0 nidbg> print_default_vlan_aggregate_8021q_ni  2
5:0
5:0  print_default_vlan_aggregate_8021q_ni:  For aggregate = 2, default vlan = 1
   value = 2 = 0x2
```

9 Troubleshooting Group Mobility

In order to troubleshoot a VLAN Mobility problem, a basic understanding of the technology is required. Reviewing the “Assigning Ports to VLANs” and “Defining VLAN Rules” chapters in the appropriate *OmniSwitch Network Configuration Guide* is highly recommended.

In This Chapter

Troubleshooting a VLAN Mobility Failure

There is no systematic procedure to troubleshoot a VLAN mobility issue. This section will give you a checklist, with a generally best course of action to take to determine the source of the VLAN mobility failure.

1 Verify that port mobility has been turned on for a given port and is still active.

2 Determine VLAN rules.

3 Determine mobile port membership.

4 Verify Traffic on a mobile port.

5 Correct rules, or move devices appropriately.

In general, the above steps are a good guideline for determining what is causing mobile port(s) to join incorrect VLAN(s) or to not join any VLAN(s). Most likely, all troubleshooting steps will not be needed. After each step in the troubleshooting process, determine if a configuration modification is necessary, and make any needed corrections.

Note that mobility is different in AOS products when compared to legacy XOS products. The newer AOS products implement mobility on the port level. There is no longer the concept of having a “mobile group” as there was in the legacy XOS.

For dynamic assignment of a port to a VLAN, port mobility must be enabled on a given port. To determine if port mobility is enabled for given port, issue the **show vlan port mobile** CLI command, or for a specific port, use the **show vlan port mobile** CLI command with the slot/port option. If port mobility has not been enabled, use the **show vlan port mobile** CLI command to enable it. All variables in this output are important to understand if there are problems with group mobility. (See below for an example of this command.)

- Verify the feature is enabled ON for this port. The default is OFF.
- If mobile is on and the feature appears to still not be working, understand that if ignore BPDU is off, and the port is an interswitch connection, the arrival of a BPDU will turn mobility off on the port.
- If traffic is not passing on the default vlan, verify that it is configured to the correct vlan and that Default Vlan is enabled. If it is not enable, only traffic matching a specific rule will pass.
- If there is a device such as a printer, that only sources traffic when it boots, it may be advantageous to turn off default VLAN restore.

Note. OS-6600 supports only one rule per port. One port can only become a member of one rule unlike OS-7700/7800/8800, which support multiple rules per port. Hubs are also not supported on a mobile port.

```
-> show vlan port mobile 6/1-3
Mobility            : on,
Config  Default Vlan: 1,
Default Vlan Enabled: on,
Default Vlan Restore: on,
Authentication      : off,
Ignore BPDUs        : off
```

With VLAN mobility, it is critical that the network administrator have a good understanding of the traffic on their network in order to assign proper rules. It is not only important to verify the required rules have been configured, but it is also important to understand the concept of precedence for rules that may overlap. In addition, it is important not to design beyond the limitations of the software. This can be verified by referencing the latest release notes for the current software revision.

To verify the rules that have been configured, use the **show vlan rules** CLI command as shown below:

```
-> show vlan rules
11.2.1.1.1.1.1 Legend: type: * = binding rule
type               vlan    rule
-----------------+------+-------------------------------------------------------
  ip-net            255    21.0.0.0, 255.0.0.0
  protocol          355    ipx-e
  mac-ip-port*     1500    00:da:95:00:ce:3f, 21.0.0.43, 3/10
  dhcp-mac-range    255    00:da:95:00:59:10, 00:da:95:00:59:9f
```

To determine if a port has seen traffic that has matched a configured rule, use the show vlan port [slot/port] CLI command with the slot/port option shown below:

```
-> show vlan port 6/1
vlan     type      status
--------+---------+-------------
     1    default   forwarding
   255    mobile    forwarding
```

If the desired group is not present, and there are no other mobile groups present for the switch, verify the port is set to mobile and that a BPDU has not turned off mobility.

If there are other groups learned on the port, but one is missing verify both the rule configuration as well as the traffic on the ingress of that port. Note rule precedence if there is a possibility for overlapping rules.

A sniffer may be useful to verify the traffic coming into the port is what is expected.

Binding Rules

Note that for a frame to be classified into a vlan with binding rules, the frame must match ALL binding rules, for it to be classified into that particular vlan. If it does not match all binding rules, the frame will either be classified as default, or another vlan should it match other rules configured on the switch

Port Rules

Port rules only apply to outgoing mobile port traffic and do not classify incoming traffic. If a mobile port is specified in a port rule, its incoming traffic is still classified for VLAN assignment in the same manner as all other mobile port traffic.

Precedence

Due to the variety of rules that can be configured there can be traffic that can match multiple rules, i.e. an IP frame could match a network address rule as well as a protocol rule. For this reason, all rules are arranged in a precedence. When a frame is received on a mobile port, switch software starts with rule one in the rule precedence table and progresses down the list until there is a successful match between rule criteria and frame contents. The higher the rule is in the list, the higher its level of precedence. To verify which VLAN a frame is being classified into use the **show mac-address-table** CLI for the MAC address in question as shown below:

```
-> show mac-address-table 00:b0:d0:75:f1:97
Legend: Mac Address: * = address not valid

 Vlan      Mac Address          Type       Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
 255   00:b0:d0:75:f1:97     learned          10800     bridging      6/1
Total number of Valid MAC addresses above = 1
```

Please see the “Defining VLAN Rules” chapter in the appropriate *OmniSwitch Network Configuration Guide* for a detailed list of all rules and their relative precedence. has important information about VLAN Rule precedence.

Advanced Troubleshooting

To verify if a port is a candidate for mobility as well as if mobility as been turned on for a given port use the **debug vlan rule ports** CLI command. Note that ports 6/1-2 are mobile ports. Ports 7/1-2 and 8/1-2 are not a candidate for mobility because they are either 802.1Q ports or part of a link aggregate.

```
-> debug vlan rule ports
 port   candidate   mobile
------+-----------+---------
 2/1        +          -
 2/2        +          -
 6/1        +          +
 6/2        +          +
 7/1        -          -
 7/2        -          -
 8/1        -          -
 8/2        -          -
```

To look at the protocol indicator map use the **debug vlan rule protocol-map** CLI command as shown below. This command displays the Protocol Indicator (PI) map. In order for group mobility to classify packets on the OmniSwitch, it needs to program the hardware with protocol type and protocol indicator. The Protocol Indicator is later used in the CAM lookup. This command displays the protocols programmed and the Protocol Indicator.

```
-> debug vlan rule protocol-map

*** Protocol Indicator Map ***
proto = Ethernet II IP    Frame = E-II  PI = 0
proto = Ethernet II ARP    Frame = E-II  PI = 0
proto = Ethernet II RARP    Frame = E-II  PI = 0
proto = SNAP IP    Frame = 802.3PI = 1
proto = SNAP ARP    Frame = 802.3  PI = 1
proto = SNAP RARP    Frame = 802.3  PI = 1
proto = IPX Ethernet II    Frame = E-II  PI = 4
proto = IPX Novell    Frame = 802.3  PI = 3
proto = IPX LLC    Frame = 802.3  PI = 2
proto = IPX SNAP    Frame = 802.3  PI = 5
```

Note. OmniSwitch 6624/6648 switches do not have the protocol CAM. Instead, database shown above is maintained in software.

The **debug vlan rule memory** command displays the memory allocated for the group mobility rules, as shown below:

```
-> debug vlan rule memory
*** RULE MEM BLOCKS ***
1. 4443338  1
```

The **debug vlan rule database** command displays the group mobility rules database, as shown below:

```
-> debug vlan rule database
IP NETWORK RULES
B  ssz=2  p=56644e0  l=56644e0  r=4443364  v=60
R  ssz=1  p=4443340  l=56644e0  r=56644e0  v=90
PROTOCOL RULES
B  ssz=1  p=56644e0  l=56644e0  r=56644e0  v=70
```

Dshell

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

NI Debug Dshell

Use the **gmnSetPrintDestination** command from the **NiDebug** Dshell command to redirect the output of the group mobility commands to the current session.

```
-> dshell
Working: [dshell]->NiDebug
6:0 nidbg> gmnSetPrintDestination

6:0                           value = 0 = 0x0
```

All NIs should have a copy of all rules configured on the switch, regardless if that NI has used the rule yet. To verify that the rules have been loaded on the NI use the **gmnShowRules** command from the **NiDebug** Dshell command. Use the same rule index from above, i.e. 0 = IP net address rule.

```
-> dshell
Working: [dshell]->NiDebug
6:0 nidbg> gmnShowRules 0
6:0
6:0 NI IP Network Address Rules (2 rules)
6:0 ---------------------------
6:0 net = 5a5a5a00  mask = ffffff00  vid = 90
6:0 net = 3c3c3c00  mask = ffffff00  vid = 60
6:0 value = 0 = 0x0
```

To verify that the NI sees a port as mobile use the **gmnIsPortMobile** (port number (zero based)) command from the **NiDebug** Dshell command. (Please note that 1= mobile and 0=non-mobile.)

```
-> dshell
Working: [dshell]->NiDebug
6:0 nidbg> gmnIsPortMobile 1
6:0                         value = 1 = 0x1
```

This **gmnClassifyDebug** command displays group mobility classification process on the NI as the packets are received. This has to be issued in conjunction with the **gmnPrintDestination** command to see the output on the console. This command is issued on the NiDebug prompt for the NI we want to debug.

```
-> dshell
Working: [dshell]->gmnPrintDestination = 0

Working: [dshell]->gmnClassifyDebug = 1
```

6800 Group Mobility Troubleshooting

The following commands and debugging functions are available for troubleshooting Group Mobility on the NI. A summary is shown below.

- **show vlan rules**
- **gmHelp**
- **gmcKiteDebug**
- **gmcShowPorts**
- **gmcShowRules**
- **gmnKiteDebug**
- **gmnKiteShowRules**
- **gmnMacVlanShowBuffer**

show vlan rules

```
SW_2T19-> show vlan rules

Legend: type: * = binding rule

   type             vlan    rule
-----------------+------+-------------------------------------------------------
  ip-net              9    166.24.9.0, 255.255.255.0
  ip-net            104    166.24.104.0, 255.255.248.0
  ip-net            112    166.24.112.0, 255.255.248.0
  dhcp-port         104    1/1
  dhcp-port         104    1/2
  dhcp-port         104    1/3
  dhcp-port         104    1/4
```

gmHelp

```
Working: [Kernel]->gmHelp

***************************************************
              Group Mobility Help for CMM
***************************************************
'gmcKiteDebug = 1' must be done in order to see the outputs on below debug
commands.
It also enables the real time debugger. To disable 'gmcKiteDebug = 0'.

gmcShowPorts ----------------Displays all the ports in the system
gmcShowMipTables -----------Displays all MIP tables used
gmcShowRules (GmcRuleType) -Displays all rules of specified type
gmcShowPiMap ---------------Displays Protocol Indicator Map
gmcShowConnections ---------Displays connections with all CMM interfaces
gmcShowNiConnections -------Displays connections with all NI interfaces
gmcMacVlanShowBuffer (int type) - If type=0, display macvlan_sw malloc counter only
                                - If type=1, display above and macvlan_sw table
gmcDebugKiteShowCML (int slot) -- Display CML setting at CMM
```

```
***************************************************
              Group Mobility Help for NI
***************************************************
gmnKiteDebug = 1 ------- Enable real time debugging
gmnKiteDebug = 0 ------- Disable real time debugging
gmnKiteShowEframe = 1 -- Display E_FRAME_PARAM when gmnKiteDebug is enabled
gmnKiteShowEframe = 0 -- Do not display E_FRAME_PARAM when gmnKiteDebug is enabled

gmnKiteShowDefVlan -------- Display def vlan stored at gmn
gmnKiteShowPiMap   -------- Display protoCam0 and protoCam1
gmnKiteDebugPI     -------- Display the proto and port-proto rule's PI map
setting
gmnKiteShowPortSet -------- Display port configuration stored at gmn

gmn_bcm_port_ifilter_get -- Read ingress filtering setting from HW
gmn_bcm_port_learn_get ---- Read CML setting from HW
gmn_bcm_port_discard_get -- Read whether the port is tagged or untagged port
from HW
gmn_bcm_vlan_port_get (int vid) -- Read VPM for the vlan from HW

gmnKiteShowRules ----------------- Display Mobile rule table at gmn
gmnMacVlanShowBuffer (int type) -- If type=0, display macvlan_sw malloc counter
only
                                -- If type=1, display above and macvlan_sw table
```

gmcKiteDebug

```
Certified: [Kernel]-> gmcKiteDebug = 1
```

gmcShowPorts

```
Certified: [Kernel]->gmcShowPorts
GMC_LOG: "gmcShowPorts", gmc:  1/1  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/2  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/3  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/4  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/5  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/6  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/7  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/8  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/9  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/10  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/11  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/12  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/13  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/14  pot=1  mob=1
GMC_LOG: "gmcShowPorts", gmc:  1/15  pot=1  mob=1
```

gmcShowRules

```
Certified: [Kernel]->gmcShowRules
GMC_LOG: "gmcShowRule", ht=1 bht=0 col=R GMC_LOG: "gmcShowRule", GMC_LOG: "gmcSh
owRule", vid =    9
GMC_LOG: "gmcShowRule", ht=2 bht=1 col=B GMC_LOG: "gmcShowRule", GMC_LOG: "gmcSh
owRule", vid =  104
```

```
GMC_LOG: "gmcShowRule", ht=1 bht=0 col=R GMC_LOG: "gmcShowRule", GMC_LOG: "gmcSh
owRule", vid =  112
value = 12 = 0xc
```

gmnKiteDebug

```
Certified: [Kernel]->gmnKiteDebug = 1


Certified: [Kernel]->gmnKiteShowPortSet
port mobile enabled restore ignoreBPDU auth ifilter
----+------+-------+-------+----------+----+-------
   0      1       1       1          0    0       0
   1      1       1       1          0    0       0
   2      1       1       1          0    0       0
   3      1       1       1          0    0       0
   4      1       1       1          0    0       0
   5      1       1       1          0    0       0
   6      1       1       1          0    0       0
   7      1       1       1          0    0       0
```

gmnKiteShowRules

```
Certified: [Kernel]->gmnKiteShowRules

IP Network Address Rules
---------------------------
net = a6186800  mask = fffff800  vid = 104
net = a6180900  mask = ffffff00  vid = 9
net = a6187000  mask = fffff800  vid = 112

DHCP Port Rules
---------------------------
port = 74   vid = 104
port = 39   vid = 104
port = 98   vid = 104
port = 16   vid = 104
```

gmnMacVlanShowBuffer

```
Certified: [Kernel]->gmnMacVlanShowBuffer
gmnKiteMacVlan_bufferCount = 0
gmnKiteMallocCount         = 0
gmnKiteFreeCount           = 0
value = 31 = 0x1f
```

10 Troubleshooting QoS

In order to troubleshoot Quality of Service (QoS), a basic understanding of the concept is required. Some basic concepts are covered below.

Reading the “Configuring QoS” and “Configuring ACLs” chapters in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

QoS Behavior

It is important to know how QoS behaves by default in order to understand the way it works and to be able to troubleshoot it. So first of all, a list of default behaviors.

Default

By default, flows that do not match any policies are accepted on the switch. This applies to bridged, routed, and multicast flows.

Use the following command to change the defaults:

- **qos default routed disposition deny**
- **qos default bridged disposition deny**
- **qos default multicast disposition deny**

When QoS is enabled, make sure that you create policy rules on the switch to allow traffic when you change the global disposition to deny; otherwise no traffic will go through.

When QoS is enabled and policy rules have been defined, if there is more than one policy that matches the flow, the switch uses the policy with the highest precedence.

To view the current global configuration for QoS, use the **show qos config** CLI command.

Be aware of the following limitations:

- Maximum number of policy rules 2048.
- Maximum number of policy conditions 2048.
- Maximum number of policy actions 2048.

QoS Queues and Ports

There are 2048 queues per NI and by default 4 default queues per port on OmniSwitch 7700/7800/8800 switches. Default queues are created for each port on the switch at start up. The switch creates additional queues based on policy rules that match incoming flows.

On the OmniSwitch 6624/6648, 4 default queues are created for each port at startup. Additional queues are not created.

When a flow matches a policy, it is placed in a QoS queue. If the disposition is accept and no other action parameters are configured, the flow is placed in a default queue.

By default, QoS is enabled on all ports. If QoS is disabled on a port, only default queues will be created on the disabled port. However, ACL and NAT will continue to be enforced on that port.

Note. In Release 5.1.5 and later, QoS can no longer be disabled on a port.

On the OmniSwitch 6624/6648, flows always share queues. On the OmniSwitch 7700/7800/8800, flows may share queues if they match the same policy and the policy action is configured for sharing through the policy action CLI command. In order to be shared, the flows must arrive on the same slice and be destined for the same egress port.

The default maximum reserve bandwidth is the physical bandwidth allowed by the port (use the CLI command **qos port** *slot/port* **maximum default bandwidth** to alter it).

By default switch ports are not trusted; that is, they do not recognize 802.1p or ToS/DSCP settings in packets of incoming traffic. By default, the port defaults for 802.1p and ToS/DSCP are 0.

Troubleshooting QoS

Information Gathering on Symptoms and Recent Changes

The first step in any troubleshooting process is to gather information. The more information you have about the symptoms and characteristics of a problem—including when it first occurred—the better your chances are of solving the problem quickly and efficiently.

Starting the Troubleshooting Procedure

There is no systematic procedure to troubleshoot a QoS issue. This section will give you a checklist, recapitulating some of the actions available to you to troubleshoot QoS issues.

QoS Activation

By default the QoS Manager is enabled on the switch. If QoS is disabled, policies will not work. To check whether or not QoS is enabled, use the **show qos config** command. To enable QoS if it is disabled, use the following command:

```
-> qos enable
```

Note. Use the **qos enable** CLI command to activate QoS globally.

When QoS is disabled globally, any flows coming into the switch are not matched to policies. Note that individual policy rules may be enabled or disabled with the policy rule command. The global setting overrides the setting for individual rules.

QoS Apply

Another common mistake for having a policy not work is to forget to apply the QoS configuration to the configuration. Most QoS commands require a **qos apply** CLI command before the configuration is active. This is valid for QoS configuration on the CLI. Loading a QoS ASCII configuration file does not require a **qos apply** command.

Note. Use the **qos apply** CLI command to activate your QoS settings. (You still need to save on exit.)

Rebooting without applying the changes will cause the settings to return to their last applied values.

Invalid Policies

Valid condition/action combinations are listed in the user manual. The CLI prevents you from configuring invalid condition combinations that are never allowed.

Use the Policy Condition/Action Combinations table in the user documentation as a guide when creating policy rules.

Two important limitations to remember:

- Layer 2 and Layer 3/4 conditions should not be combined.
- Layer 2 conditions cannot combine source and destination parameters.
- On the OmniSwitch 6624/6648, source and destination parameters may not be combined in the same condition.

Rules Order

The order of entry when defining rules use **policy rule** command with the **precedence** option. The Range for precedence is 0-65535. The rule with the highest precedence will be applied.

When a flow comes into the switch, the Layer 2 source rules are examined first for a match. If no match is found, the Layer 2 destination rules are examined. If no match is found, the Layer 3 rules are examined. If a flow matches more than one rule in a particular precedence list (for example, the Layer 2 source list), the precedence determines which rule the switch will apply to the flow.

More than one rule may have the same condition, but the rule with the highest precedence will be applied to the flow matching the condition. If a policy is configured with the same precedence value as another policy, the policy that was created first has the higher precedence. The new policy is considered lower priority.

For the following rules, if condition “oktftp” and “noip” are satisfied, the rule “oktftp” would take precedence over rule “nopip” because it has a higher precedence number. See the examples below:

```
-> policy rule oktftp precedence 200 condition oktftp action oktftp
-> policy rule noip precedence 100 condition noip action noip
```

Viewing QoS Settings

When troubleshooting, it is essential to keep track of all your QoS settings that are effective; i.e. that have been applied. A good way to display all the QoS settings is to use the **show configuration snapshot qos** CLI command, which generates a snapshot file of the switch's QoS current running configuration. See the following example below:

```
-> show configuration snapshot qos
! QOS :
qos disable stats interval 30 log level 7 log console
policy condition noip source ip 192.168.10.0 mask 255.255.255.0
policy condition oktftp source ip 192.168.10.0 mask 255.255.255.0 ip protocol 17
destination ip port 69
policy action noip disposition deny
policy action oktftp
policy rule oktftp precedence 200 condition oktftp action oktftp
policy rule noip precedence 100 condition noip action noip
qos apply
```

Viewing QoS Policy Rules

To display all your pending and applied policy, use the show policy rule CLI command to display information about all pending and applied policy rules or a particular policy rule. For example:

```
-> show policy rule

Policy                            From  Prec Enab Inact Refl Log Save
+BLOCK_20                          cli     0  Yes    No   No  No  Yes
Cnd/Act:                        BLOCK_20 -> BLOCK_20
```

The above display indicates that rule **BLOCK_20** is active and is used to classify traffic on the switch (the **Inact** field displays No). The rule **BLOCK_20** has been configured since the last **qos apply** command was entered, as indicated by the plus (+) sign. If the rule has been created recently, it will not be used to classify traffic until the next **qos apply**. If the rule has been modified recently, the changes will not be effective until the next **qos apply**.

output definitions

+	Indicates that the policy rule has been modified or has been created since the last **qos apply** command.
From	Where the rule originated.
Prec	The precedence of the rule. Precedence determines the order in which the switch will apply rules.
Enable	Whether or not the rule is enabled.
Inactive	Whether or not the rule is currently being enforced on the switch.
Reflexive	Whether the rule is reflexive or not.
Log	Whether the log is activated or not.
Cnd/Act	The condition and the action associated with the rule; configured through the policy condition and policy action commands respectively.

Validation

In order to validate the policy which are not applied yet (pending policies) or you may want to see how theoretical traffic would be classified by policies that are already applied on the switch, the **show policy classify** CLI command can be used.

```
-> show policy classified L3 applied
```

The switch will display information about the potential L3 traffic and attempt to match it to a policy (applied policies only).

```
-> show policy classified L3
```

The same as above but this time attempt to match to applied and pending policies.

Note. The following test might result in an invalid combination of condition/action parameters.

Example 1

This policy denies access to subnet 192.168.20.0 from any source.

```
-> policy condition BLOCK_20 destination ip 192.168.20.0 mask 255.255.255.0
-> policy action BLOCK_20 disposition deny
-> policy rule BLOCK_20 condition BLOCK_20 action BLOCK_20
```

A theoretical traffic going to 192.168.20.4 can be tested against that policy as following:

```
-> show policy classify L3 destination ip 192.168.20.4

Packet headers:
L2:
*Port    :                       0/0  (any) ->  0/0  (any)
*MAC     :                    000000:000000 -> 000000:000000
*VLAN    :                                0 ->    0
*802.1p  : 0
L3/L4:
*IP      :                          0.0.0.0 -> 192.168.20.4
*TOS/DSCP: 0/0

Using pending l3 policies
Classify L3:
*Matches rule 'BLOCK_20': action BLOCK_20 (deny)
```

In this example, the display indicates that the switch found a rule, BLOCK_20, to classify destination traffic with the specified Layer 3 information.

Example 2

This policy allows TFTP traffic (IP protocol = 17 =UDP; UDP port =69 = TFTP) from subnet 192.168.10.0 to the outside.

```
-> policy condition oktftp destination ip port 69 ip protocol 17 source ip
192.168.10.0 mask 255.255.255.0
-> policy action oktftp disposition accept
-> policy rule oktftp condition oktftp action oktftp
```

What happens when some traffic comes in for ip destination port 80? Since it does not satisfy condition “oktftp”, it depends on the global disposition for router and bridged traffic (**qos default routed disposition** and **qos default bridged disposition**). In our case, the global disposition is default; i.e. accept. We will receive the result below to accept the traffic when no rules are matched.

```
-> show policy classify L3 destination ip port 80  /* just to test the rule  */
Packet headers:
L2:
*Port    :                     0/0  (any) ->  0/0  (any)
*MAC     :                  000000:000000 -> 000000:000000
*VLAN    :                              0 ->    0
*802.1p  : 0
L3/L4:
*IP      :                        0.0.0.0 -> 0.0.0.0
*TOS/DSCP: 0/0


Using pending l3 policies
Classify L3:
*No rule matched: (accept)
```

Example 3

This policy allows TFTP traffic (specified in the condition by IP protocol 17 and UDP port 69) from subnet 192.168.10.0 to the outside but denies any other traffic to go out from this subnet.

```
-> show configuration snapshot qos

qos disable stats interval 30 log level 7 log console
policy condition noip source ip 192.168.10.0 mask 255.255.255.0
policy condition oktftp source ip 192.168.10.0 mask 255.255.255.0 ip protocol 17
destination ip port 69
policy action noip disposition deny
policy action oktftp
policy rule oktftp precedence 200 condition oktftp action oktftp
policy rule noip precedence 100 condition noip action noip

-> show policy rule
Policy                            From  Prec Enab Inact Refl Log Save
oktftp                            cli   200  Yes    No   No  No  Yes
Cnd/Act:                            oktftp -> oktftp


noip                              cli   100  Yes    No   No  No  Yes
Cnd/Act:                              noip -> noip
```

The policy rules can be tested for TFTP traffic coming from subnet 192.168.10.0:

```
-> show policy classify L3 destination ip port 69 ip protocol 17 source ip
192.168.10.0
Packet headers:
L2:
*Port    :                     0/0  (any) ->  0/0  (any)
*MAC     :                  000000:000000 -> 000000:000000
*VLAN    :                              0 ->    0
*802.1p  : 0
L3/L4:
```

```
*IP      :                    192.168.10.0 -> 0.0.0.0
*UDP     :                               0 -> 69
*TOS/DSCP: 0/0

Using pending l3 policies
Classify L3:
*Matches rule 'oktftp': action oktftp (accept)
```

In this example, the display indicates that the switch found a rule, “oktftp”, to classify destination traffic with the specified Layer 3 information.

Correction

If the policy is found invalid, you can use the **qos revert** CLI command. This command ignores any pending policies (any additions, modifications, or deletions to the policy configuration since the last **qos apply**) and writes the last applied policies to the pending configuration.

Note. Use the **qos revert** CLI command to delete any QoS configuration that has not been applied to the configuration through the **qos apply** command.

In some cases, you may want to remove all of your rules (pending and applied) and start over again.

Note. Use the **qos flush** CLI command to deletes any QoS configuration that has been applied to the configuration through the **qos apply** command.

To return the global QoS configuration to its default settings, use the **qos reset** CLI command. The defaults will then be active on the switch.

Note. Use the **qos reset** CLI command to reset the QoS configuration to its defaults.

Reflexive Rules

Forgetting to set a rule to be reflexive could be the cause of troubles. Ask yourself when you configure a rule, “what about the reverse flow?”

Note. The OmniSwitch 6624/6648 does not support reflexive rules; you have to configure a rule for the reverse flow.

When implementing unidirectional layer 3 rules, make sure to address the policy for the reverse flow. By default, the reverse flow is treated like a “standalone” flow and policy rules need to be configured to address the reverse flow. On the other hand, implementing reflexive rules address both directions of a flow, eliminating the need for specific rules for the reverse flow.

Reflexive policies allow a reverse flow back through the switch when the reverse flow would normally be denied. If a rule is reflexive, the reply packets will be filtered the same as the initial flow.

For example, a TFTP session in one direction will prompt a reply back from the host. If a policy is created to deny traffic from that host to the switch, the replies from the host will still be accepted on the switch if the TFTP session policy is configured as a reflexive policy.

If we do not define the rule “oktftp” below, no TFTP session would take place between TFTP client 192.168.10.4 and TFTP server 192.168.20.10.

```
-> policy condition noip destination ip 192.168.10.0 mask 255.255.255.0
-> policy condition oktftp source ip 192.168.10.0 mask 255.255.255.0 ip
protocol 17 destination ip port 69
-> policy action noip disposition deny
-> policy action oktftp
-> policy rule oktftp precedence 200 condition oktftp action okftp reflexive
-> policy rule noip precedence 100 condition noip action noip
-> qos apply
```

Another problem could be that the reflexive timer is too low. When reflexive policy rules are configured and traffic that matches a reflexive rule arrives on the switch, the switch will wait for the reverse flow.

When the timer expires, the reflexivity will not be effective anymore. To change the timeout, enter the **qos reflexive timeout** CLI command with the desired number of seconds.

Typically Layer 3 ACLs are configured to be reflexive. Reflexive policies are only supported for TCP or UDP traffic. Dynamic port negotiation is not supported.

QoS Log

The QoS software in the switch creates its own log for QoS-specific events. By default the QoS log displays a maximum of 256 lines. To change the maximum number of lines that may display or change the level of detail given in the log.

To change the number of lines in the log use the **qos log lines** CLI command. To change the log level use the **qos log level** CLI command.

Log events may also be forwarded to the console in real time by using the **qos log console** CLI command.

To display information about any QoS rules on the switch, use the **qos debug** CLI command with the **rules** keyword (i.e., **debug qos rules**).

To change the type of debugging, use **no** with the relevant type of information that you want to remove. For example:

```
-> debug qos no rules
```

To turn off debugging (which effectively turns off logging), enter the following CLI command:

```
-> no debug qos
```

Enter the **qos apply** CLI command to save the changes.

The **qos log level** CLI command configures the level of detail for these messages. The level of log detail is in the range from 1 (least detail) to 9 (most detail).

To view the QoS log, use the **show qos log** command. The display is similar to the following:

```
-> show qos log
**QOS Log**
Validate classify: valid
Conditionop noip (3)
Validate condition: valid
Conditionop noip (3)
Validate condition: valid
Conditionop noip (1)
Actionop noip (3)
Validate action: valid
Actionop noip (1)
Ruleop(0) noip (3)
Validate rule: valid
Ruleop(0) noip (3)
Validate rule: valid
Ruleop(0) noip (1)
Update rule 0 with flags 9000402f
Update cond noip for rule 0 (1)
Update QOS_CONDITION_NAME for rule 0 (1)
Update QOS_CONDITION_SRCIPADDRMASK for rule 0 (1)
Classify on item 75 for 0 (1,1)
Update QOS_CONDITION_L3SRCIPADDR for rule 0 (1)
Update QOS_CONDITION_L3SRCIPMASK for rule 0 (1)
Update QOS_CONDITION_STATUS for rule 0 (1)
Validate classify: valid
Validate classify: valid
Validate config: valid
Validate config: valid
Apply QoS configuration
Validate config: valid
Validate config: valid
Apply QoS configuration
Ruleop(0) oktftp (2)
Validate rule: valid
Ruleop(0) oktftp (2)
Validate rule: valid
Ruleop(1) oktftp (0)
Update cond oktftp for rule 1 (0)
```

QoS Statistics

The **show qos statistics** CLI command displays statistics about the global QoS configuration as shown below:

```
-> show qos statistics
QoS stats
                       Events     Matches     Drops
L2:                    21         2           1
L3 Ingress:            0          0           0
L3 Egress:             0          0           0
IGMP Join:             0          0           0
Fragments: 0
Bad Fragments: 0
Unknown Fragments: 0
Sent NI messages: 9
Received NI messages: 4322
Failed NI messages: 0
Load balanced flows: 0
Reflexive flows: 0
Reflexive correction: 0
Flow lookups: 0
Flow hits: 0
Max PTree nodes: 0
Max PTree depth: 0
Flow hits: 0
```

output definitions

Events	The number of Layer 2 or Layer 3 flows transmitted on the switch.
Matches	The number of Layer 2 or Layer 3 flows that match policies.
Drops	The number of Layer 2 or Layer 3 flows that were dropped.

Note. See the *Omniswitch CLI Reference Guide* for more information.

Debug QoS

The CLI command **debug qos** *option* configures the type of QoS events that will be displayed in the QoS log. This command has the following syntax:

debug qos [info] [config] [rule] [main] [route] [hre] [port] [msg] [sl] [mem] [cam] [mapper] [flows] [queue] [slot] [l2] [l3] [classifier] [nat] [sem] [pm] [ingress] [egress] [rsvp] [balance] [nimsg]

Note. See "QoS Log" on page 10-9 for more information.

Debug QoS Internal

The CLI command **debug qos internal** displays debugging information for QoS internal to the switch. This command has the following syntax:

debug qos internal "[*slice slot/slice***] [flow] [queue] [port] [l2tree] [vector] [pending] [verbose] [mapper] [pool] [log]"**

One of the most useful commands to debug all your QoS policy rules is **debug qos internal** *slice/slot* **flow** where *slot* is the slot number and *slice* is the slice (ASIC) number. On the OmniSwitch 7700/7800, each slot has one slice (slice 0). On the OmniSwitch 8800, each slot may have up to 4 slices (slices 0 to 3). On the OmniSwitch 6624/6648, each block of 24 ports makes up a slice (slice 0 and slice 1). (The uplink slots are part of slice 0.)

```
-> debug qos internal "slice 1/0 flow"
L3 Flows (3 entries):
 QID  CAM P                    Flow                    Timeout
*0002d: 0 TCP (  0)   192.168.10.11:*    -  192.168.20.11:20     HRE
        (rule 0, flags 00006001 vpn 0 pdi 5 HREDONE accept)

*0002d: 0 TCP (  0)   192.168.10.11:*    -  192.168.20.11:21     HRE
        (rule 1, flags 00006001 vpn 0 pdi 5 HREDONE accept)

*fffff: 0 UDP (  0)   192.168.10.11:*    -255.255.255.255:*     240
 (rule 2, flags 00002001 vpn 29 pdi 0 FORHRE deny)
```

output definitions

QID	Queue ID Identifying the physical port. Range 0- 512.
P	The IP port.
Rule	The rule number in QoS policy configuration file.
Vpn	The virtual port number.
Pdi	The priority descriptor index. Used to match an entry in the PDI or DSCP table, which contains the QoS policies.
HREDONE	The result of the classification by the HRE.
Flow	The flow with the format *IP address*:*port*.

OmniSwitch 6624/6648 Dshell Troubleshooting

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

qosIxHelp

```
dshell->qosIxeHelp

???? Example output of qosIxHelp needed ????
```

qosDBState

Shows the IP and CAM usage and Semaphore.

```
Working: [Kernel]->qosDBState
protectDataMutex ID:   0x0000078f
protectDataMutex   :   0x6a78920
DB  status:

Semaphore Id        : 0x6a78920
Semaphore Type      : MUTEX
Task Queuing        : PRIORITY
Pended Tasks        : 0
Owner               : NONE
IP count 40
Mac count 79
value = 13 = 0xd
Working: [Kernel]->
```

QoS Dump

There are several QoS DUMP as well: **qosL2Dump**, **qosL3Dump**, and **qosL4Dump**. The most useful dump is **qosL3DumpC "IP"**, as show below:

```
Working: [Kernel]->qosL3DumpC "51.51.51.200"
Count IP             NHMac             INGR VLAN QVID EGR0  EGR1  IR   TG   BC
Subnet             NSR
33: 051.051.051.200  00:00:00:00:00:00 3/25 0110 0000 03/25 -1/-1 0/-1 0/-1 0/-1
051.051.051.000   255
```

output definitions

IP	IP address
NHMAC	Next Hop MAC address. Should match the ARP entry for the IP address.
INGR	Ingress slot/port. The source port for the packet containing the IP address as the source IP.
VLAN	Ingress VLAN ID. The VLAN for the INGR port.

output definitions (continued)

QVID	Egress VLAN ID. A value appears in this field if the packet is being routed to the destination IP address, which is the address that appears in the IP field.
EGR0	The egress slot/port on ASIC 0. The port that will forward a routed packet to the destination IP address, which is the address that appears in the IP field. EGR0 must be equal to EGR1. A **-1** in this field indicates that packets cannot be routed to the IP on this slot.
EGR1	The egress slot/port on ASIC 1. The port that will forward a routed packet to the destination IP address, which is the address that appears in the IP field. EGR0 must be equal to EGR1. A **-1** in this field indicates that packets cannot be routed to the IP on this slot.
IR	Ignore routing. Packets to this IP are switched and not routed on this ASIC. The value of this field is usually **1** on all ASICs, except the ASIC where the address resides. A value of **0** on all ASICs may indicate that the ARP for the IP address is not yet available.
TG	Tagged, if **1** set the QVID value on the egress routed packet, if the egress port (as indicated by EGR0 EGR1) is tagged.
BC	If **1** this is an IP broadcast packet, and packets to this destination IP are flooded out on the ports of the egress VLAN.
subnet	The IP subnet.
NSR	Always 255.

Example QoS Rules

See below for the steps to create a rule for blocking an offending MAC address using the CLI on the OmniSwitch. Please note the rule does not take effect until you use the qos apply CLI command. Any time you make a change you need to reissue the qos apply command for it to take.

To setup the Rule and have it run:

```
-> policy condition block_mac source mac 00:02:A5:1E:E3:6C
-> policy action block_mac disposition deny
-> policy rule block_mac condition block_mac action block_mac
-> qos apply
```

To view QoS policy rules (example of a traffic-shaping rule):

```
-> show configuration snapshot qos

! QOS :
qos stats interval 30 log level 7 log console
policy condition ip_traffic2 source ip 192.168.10.20
policy action BW maximum bandwidth    40.0M
policy rule flowShape condition ip_traffic2 action BW
qos apply
```

To disable the Rule:

```
-> policy rule block_mac  disable
-> qos apply
```

To verify rule is active:

```
-> show active policy rule
Policy                            From  Prec Enab Inact Refl Log Save   Matches
block_mac                         cli      0  Yes    No   No  No  Yes         1
Cnd/Act:                        block_mac -> block_mac
```

To delete the rule:

```
-> no policy rule block_mac
-> qos apply
```

To delete the whole rule set:

```
-> no policy rule block_mac
-> no policy condition block_mac
-> no policy action block_mac
-> qos apply
```

To delete all QoS:

```
-> qos flush
-> qos apply
```

Example of a traffic shaping rule:

```
-> qos stats interval 30 log level 7 log console
-> policy condition ip_traffic2 source ip 192.168.10.20
-> policy action BW maximum bandwidth    40.0M
-> policy rule flowShape condition ip_traffic2 action BW
-> qos apply
```

Example of a Layer 2 ACL:

```
-> policy condition block_mac source mac 00:02:A5:1E:E3:6C
-> policy action block_mac disposition deny
-> policy rule block_mac condition block_mac action block_mac
-> qos apply
```

Example of a QoS mapping rule:

```
-> qos trust ports
-> policy map group Group2  1-2:5 4:5 5-6:7
-> policy condition QoS_map source ip 192.168.11.0 mask 255.255.255.0
-> policy action Map1 map tos to dscp using Group2
-> policy rule R1 condition QoS_map action Map1
-> qos apply
```

11 Troubleshooting ARP

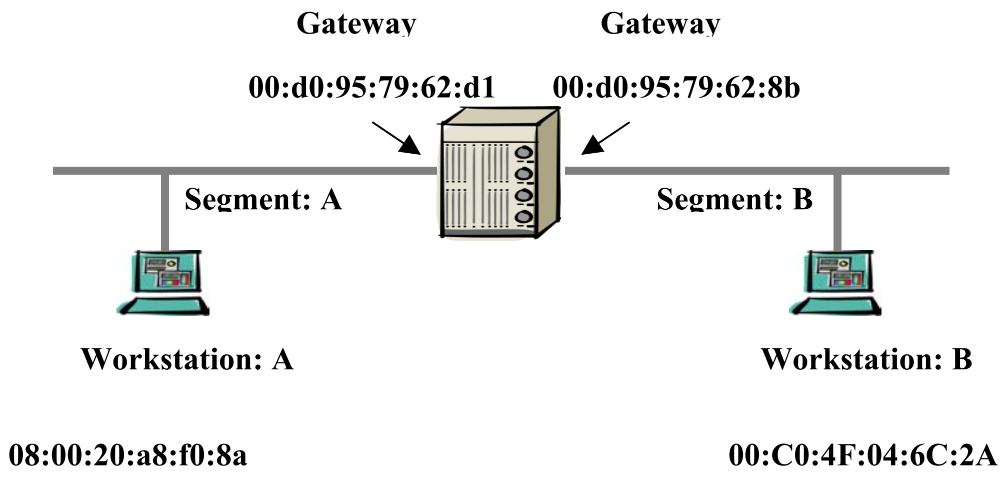
The OmniSwitch supports Address Resolution Protocol (ARP). In order to troubleshoot issues related to ARP, a basic understanding of the protocol is required. Some basic concepts are covered in the sections below.

RFCs supported	IETF RFC 826

Reading the IETF RFC 826 specification is highly recommended to anyone implementing or troubleshooting an ARP issue on their network. Reading "Configuring IP" in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

ARP Protocol Failure



If device A is not able to communicate with device B, it could be a result of ARP resolution failure. To troubleshoot ARP the first reference point is to make sure that the MAC address of device A and device B are learned on the right port and in correct VLAN.

Use the following command syntax:

show mac-address-table slot *number*

In our case we have a device connected in slot 16, so the command to verify the MAC address is as follows:

```
-> show mac-address-table slot 16
Legend: Mac Address: * = address not valid

   Vlan      Mac Address          Type       Protocol    Operation    Interface
------+------------------+-------------+-----------+-----------+-----------
10 08:00:20:a8:f0:8a learned       10800 bridging      16/2
Total number of Valid MAC addresses above = 1
```

This command displays that MAC Address 08:00:20:a8:f0:8a, belonging to Device A, is learned on port 16/2 and in VLAN 10.

A more comprehensive look for all the MAC addresses learned by the switch can be done by using the **show mac-address-table** command. For example:

```
-> show mac-address-table
```

Now, verify that the gateway defined in device A points towards the correct IP address. In our case, the gateway of device A is defined as 10.10.42.1.

When device A ARPs for the gateway IP address exist on the switch, an associated ARP cache entry is created by the switch. This entry can be viewed by using the **show arp** command.

To search for a specific ARP entry, use the following command syntax:

show arp *ip-address*

For example:

```
-> show arp 10.255.11.219

Total 39 arp entries
Flags (P=Proxy, A=Authentication, V=VRRP)

 IP Addr           Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+-----------
10.10.42.159      08:00:20:a8:f0:8a DYNAMIC            16/ 2  vlan 10
```

To search for an ARP entry associated with a MAC address use the following command syntax:

show arp *mac-address*

For example:

```
-> show arp 10.255.11.219

Total 39 arp entries
Flags (P=Proxy, A=Authentication, V=VRRP)

 IP Addr           Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+-----------
10.10.42.159      08:00:20:a8:f0:8a DYNAMIC            16/ 2  vlan 10
```

This confirms that the switch has learned the ARP entry of the device A.

Now, device A should have also resolved the ARP entry to the gateway IP address. It can be verified on the workstation's command prompt using the following DoS command:

```
C:\> arp -a

Interface: 10.10.42.1 on Interface 0x1000003

  Internet Address      Physical Address      Type
  10.10.42.1             00-d0-95-79-62-d1     dynamic
```

To confirm the MAC address of the routing instance, use the following command:

```
-> show ip interface vlan 10

  vlan 10
    Link type                       =   ETH_II,
    Link status                     =   UP,
    SNMP interface index            =   13600010
    Interface index                 =   4
    Enable IP forwarding            =   YES,
    Administrative status           =   ENABLED,
    Operational status              =   ACTIVATED,
    Enable trap                     =   NO,
    Internet address                =   10.10.42.1,
    Broadcast address               =   10.10.42.255,
    Subnet mask                     =   255.255.255.0,
    Hardware address                =   00:d0:95:79:62:d1,
    Vrrp MAC                        =   00:00:00:00:00:00,
    Auth MAC                        =   00:00:00:00:00:00,
    Maximum Transfer Unit (MTU)     =   1500
    Packets received                =   1969,
    Packets sent                    =   12094,
    Bytes received                  =   55510,
    Bytes sent                      =   774556,
    Multicast packets received      =   0,
    Multicast packets sent          =   10122,
    Broadcast packets received      =   0,
    Broadcast packets sent          =   4,
    Input errors                    =   0
    Output errors                   =   0
    Collisions                      =   0
    Dropped                         =   0
```

Similar steps should be taken to verify the ARP resolution on the other device B.

Common Error Conditions

If the ARP is not getting resolved in either of the two workstations, then the following conditions may exist:

- General health of the switch or NI.
- Physical link status might not be operational
- MAC address not learned on the port
- ARP request not reaching the switch, which may be possible because:

  - The workstation is not sending an ARP request

  - The workstation is not able to understand the ARP request

  - ARP packet might have got corrupted

  - Duplicate IP addresses configured on the workstations in the same VLAN

Advanced ARP Troubleshooting

If the MAC addresses is already learned on the port and the ARP is not getting resolved then we can further troubleshoot on the switch to see if the ARP request is reaching the switch and switch is responding back.

To troubleshoot the ARP packets we need to use the diagnostic CLI commands. Precaution must be taken when using these commands as it might dump a lot of information on the screen.

The command to use is as follows:

```
-> debug ip packet start ip-address 10.10.42.159 start

-> 16 R 16/2 080020a8f08a->(ffffffffffff) ARP Request 10.10.42.159->10.10.42.1
16 S 16/2 00d0957962d1->080020a8f08a ARP Reply 10.10.42.1->10.10.42.159
16 R 16/2 080020a8f08a->00d0957962d1 IP 10.10.42.159->10.10.42.1 ICMP 8,0 seq=0.
16 S 16/2 00d0957962d1->080020a8f08a IP 10.10.42.1->10.10.42.159 ICMP 0,0 seq=0.

-> debug ip packet stop
```

The above capture shows that a request for ARP came in on slot 16 port 2 for ip address 10.10.42.1. The reply was sent by the switch to 10.10.42.159 at MAC address 08:00:20:a8:f0:8a.

This confirms that the switch is replying back to the ARP. Now the ARP cache of the workstation should also show the correct ARP entry for the switch. If not, then a sniffer should be placed between the switch and the workstation to look at the packets to analyze if the packets are corrupted or either one of the devices is not responding in the correct format.

If the **debug ip packet** command does not show any output when specified with IP address then other variations like traffic from that NI can be analyzed using the command:

```
-> debug ip packet start board ni 16

-> debug ip packet stop
```

This command will show all the packets coming in NI 16, so the output will be a little confusing and packets will have to be filtered to gather the required information.

If none of the above commands show any traffic coming in from the IP address for the device then it will point towards the physical layer issue. Workstation as well as the physical port to which the workstation is connected needs to be examined for further analysis.

Some devices may be silent like printers. They ARP at the time of the bootup but after that they do not ARP at all. In order to accommodate those devices OmniSwitch allows different choices:

- To increase the ARP time out value. By default the ARP timeout value is set for 300 seconds. It can be increased up to 1200 seconds using the following command:

```
-> arp time-out 1200
```

- MAC Address aging time can also be increased from the default value of 300 seconds to any higher value using the following command:

```
-> mac-address-table aging-time <value>
```

- Silent devices MAC address can be added in the MAC address table as permanent using the following command:

```
-> mac-address-table permanent 08:00:20:a8:f0:8a 16/2 10 bridging
```

Refer to Source learning section for more details about permanent MAC entries.

If the ARP cache of the switch is not showing the correct ARP entries for the edge devices then the following command can be used to clear the ARP table and re-learn all the ARP entries:

```
-> clear arp-cache
```

Note. Clearing the ARP cache might cause a slight interruption in the network, if done at peak hours and on the Core switch. This will re invoke the process of ARP learning for each and every devices associated with that particular switch.

Dshell Troubleshooting

In order to troubleshoot ARP cache make sure all the steps mentioned in the earlier sections have been taken. Dshell should be used when no more error collection can be done from the CLI and debug CLI.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

According to the architecture of BOP, ARP is processed on the NI. It is never sent to the CMM for processing. This is done to prevent high CPU utilization on CMM and to have distributed ARP. This feature was implemented in 5.1.1.R03. Software revision before 5.1.1.R03 processed ARP on the CMM, CMM synchronized the ARP tables with all of the NIs.

With 5.1.1.R03 and onwards ARP is processed on the NI. In normal scenario ARP table on the CMM which can be displayed using **show arp** command in the CLI will be the same as the NI arp table. In case, an ARP entry is missing in the CMM arp table and debug CLI shows that the ARP is getting into the switch and a reply is being sent by the NI then NI arp table can be viewed using the NI Debugger.

Load the NI debugger and go to the specific NI in question. One needs to be in the correct slot/slice to view the routing table on that slice. (For more details about loading the NI debugger and going to the correct slot/slice, please refer to the NI Debugger section.)

```
NiDebug>>>ipni_arpShow
NiDebug>>>
Slot 16. NI Arp Table
destination    gateway            port  la_hold expire    arp_flags  rt_flags   refcnt use  vlan
10.10.42.159   08:00:20:a8:f0:8a  481   0x0     1948474   0          405        0      0    10
10.11.5.1      00:d0:95:6b:4c:eb  12    0x0     1948e70   0          405        0      0    511
10.40.105.1    00:00:5e:00:01:69  29    0x0     0         8e         405        0      0    105
10.40.105.4    00:d0:95:79:62:eb  124   0x0     1946736   0          405        0      0    105
10.40.106.1    00:00:5e:00:01:6a  29    0x0     0         8e         405        0      0    106
10.40.106.3    00:d0:95:6b:4c:d9  140   0x0     194827b   0          405        0      0    106
10.40.108.1    00:00:5e:00:01:6c  29    0x0     0         8e         405        0      0    108
10.40.108.3    00:d0:95:6b:4c:db  172   0x0     1948272   0          405        0      0    108
10.40.108.4    00:d0:95:79:65:f0  172   0x0     194790a   0          405        0      0    108
10.40.108.129  08:00:20:c0:92:43  172   0x0     19488e3   0          405        0      0    108
10.40.110.1    00:00:5e:00:01:6e  29    0x0     0         8e         405        0      0    110
10.40.110.3    00:d0:95:6b:4c:dd  204   0x0     19484c1   0          405        0      0    110
10.40.110.4    00:d0:95:7c:5b:9b  204   0x0     1946868   0          405        0      0    110
10.40.110.139  08:00:20:b1:1c:49  204   0x0     19484a5   0          405        0      0    110
10.40.110.240  00:00:39:2c:6d:0e  204   0x0     1947a84   0          405        0      0    110
10.40.111.3    00:d0:95:6b:4c:de  33    0x0     1948453   0          405        0      0    111
10.40.111.4    00:d0:95:79:65:67  33    0x0     194672c   0          405        0      0    111
10.40.112.1    00:00:5e:00:01:70  29    0x0     0         8e         405        0      0    112
10.40.112.3    00:d0:95:6b:4c:df  284   0x0     1948273   0          405        0      0    112
10.40.112.4    00:d0:95:79:65:10  284   0x0     194674f   0          405        0      0    112
10.40.117.3    00:d0:95:6b:4c:e3  428   0x0     194827d   0          405        0      0    117
10.40.117.4    00:d0:95:7c:48:59  428   0x0     1947cfc   0          405        0      0    117
10.40.140.1    00:00:5e:00:01:8c  29    0x0     0         8e         405        0      0    140
10.40.140.3    00:d0:95:6b:4c:e5  12    0x0     194827b   0          405        0      0    140
10.40.141.3    00:d0:95:6b:4c:e6  12    0x0     194827b   0          405        0      0    141
10.40.150.1    00:00:5e:00:01:96  29    0x0     0         8e         405        0      0    150
10.40.150.110  00:d0:95:7c:5b:9c  204   0x0     19482ff   0          405        0      1    150
10.40.211.3    00:d0:95:6b:4c:e8  268   0x0     1948273   0          405        0      0    211
10.40.211.4    00:d0:95:79:66:48  268   0x0     194757e   0          405        0      0    211
10.40.212.1    00:00:5e:00:01:d4  29    0x0     0         8e         405        0      0    212
```

```
10.40.212.3    00:d0:95:6b:4c:e9  300   0x0     1948275  0          405        0      0   212
10.40.212.4    00:d0:95:7c:7d:78  300   0x0     1946929  0          405        0      0   212
10.40.212.127  08:00:20:b0:ea:d1  300   0x0     1948092  0          405        0      0   212
10.40.212.238  00:c0:4f:12:f7:1b  300   0x0     1947153  0          405        0      0   212
192.168.50.1   00:d0:95:82:05:16  380   0x0     194847e  0          405        0      0   50
192.168.50.2   00:d0:95:83:e7:81  380   0x0     1948e5c  0          405        0      0   50
192.168.50.5   00:d0:95:6a:f5:bb  380   0x0     1948165  0          405        0      0   50
192.168.51.5   00:d0:95:6a:f5:bc  380   0x0     194693a  0          405        0      0   51
192.168.52.5   00:d0:95:6a:f5:bd  380   0x0     194673b  0          405        0      0   52
192.168.53.5   00:d0:95:6a:f5:be  380   0x0     1945b2a  0          405        0      0   53
192.168.54.5   00:d0:95:6a:f5:bf  380   0x0     1946746  0          405        0      0   54
192.168.56.2   00:d0:95:83:e7:87  380   0x0     19469e4  0          405        0      0   56
192.168.57.1   00:d0:95:82:05:1d  380   0x0     1948764  0          405        0      0   57
192.168.57.2   00:d0:95:83:e7:88  380   0x0     1948041  0          405        0      0   57
192.168.57.5   00:d0:95:6a:f5:c2  380   0x0     1948165  0          405        0      0   57
192.168.58.5   00:d0:95:6a:f5:c3  0380  0x0     1948165  0          405
NiDebug>>>quit
```

Source Port is shown as 481. It is calculated based on Coronado ports. Each Coronado has 32 ports. 32*16=512 ports is the total Coronado port that can exist on OS7800.

First 15 modules will have 480 ports. The count starts from 0 so ports 0 to 479 exist on the first 15 slots. 480 is the first port on slot 16 and 481 is the second port on slot 16. So, this does confirm that the arp was learned on port 16/2.

The table on the NI shows all the ARP entries as on the CMM. If a particular NI is having problems to another NI then the arp table of that NI should also be looked at. The ARP entry for device A does exist on NI 16, source NI of the device.

If an entry exists on an NI ARP table and is not fully synchronized with all the other NIs then the problem might be because the IPC message is lost from that NI to the CMM which holds the master ARP table. This will result in un synchronized ARP across the NIs which will cause problems when routing between NIs.

To look at the number of ARP entries being added and deleted in the switch use the following command:

```
Working: [Kernel]->ipedrArpStatShow
arp add : 3
arp add fail : 0
arp del : 3
arp del fail: 1
arp change : 0
arp refresh : 0
arp putlist : 0
value = 0 = 0x0
Working: [Kernel]->
```

If arp add, del and fail are changing in large numbers then it might indicate unusual activity in the network which may be a result of some virus or spoof attack. In normal conditions the entries should be quite stable.

If everything from the switch point of view looks fine then the best tool to find out the source of the problem is to use a sniffer.

Viewing the ARP Table on OmniSwitch 6624/6648 Switches

To look at the ARP table on OS-6600 use the following command in Dshell:

```
Working: [Kernel]->ipni_arpShow

Slot 2. NI Arp Table

destination    gateway            port  la_hold expire    arp_flags  rt_flags   refcnt use  vlan
2.2.2.100      00:00:5e:00:01:02  29    0x0     0         8e         405        0      2
4.4.4.1        00:d0:95:84:07:1e  90    0x0     1ddddf1   0          405        0      4
4.4.4.100      00:00:5e:00:01:04  29    0x0     0         8e         405        0      4
10.255.13.2    00:20:da:0a:54:10  64    0x0     1ddddd1   0          405        0      999
10.255.13.90   00:d0:95:6a:84:51  64    0x0     1dded3e   200        405        0      999
131.118.33.41  00:d0:95:79:64:ab  120   0x0     1ddec01   0          05         0      336
value = 0 = 0x0

Working: [Kernel]->
```

To look at the ARP statistics use the following command in Dshell:

```
Working: [Kernel]->ipni_arplookup "10.255.13.2"
value = 0 = 0x0
Working: [Kernel]->ipedrArpStatShow
arp add : 3161
arp add fail : 0
arp del : 3155
arp del fail: 0
arp change : 476
arp refresh : 7686
arp putlist : 0
value = 16 = 0x10
```

12 Troubleshooting IP Routing

In order to troubleshoot an IP Routing problem, a basic understanding of the IP protocol/feature is required. Some basic concepts are covered below. Reading RFCs 791, 1812 and 1716 are highly recommended to anyone implementing or troubleshooting IP Routing on their switch/network. IP Routing is a process by which layer 3 packets are forwarded between two different subnets or networks.

Here is a list of the IP RFCs to review:

- RFC 791 (IP)
- RFC 1812 (Requirements for IP Version 4 Routers)
- RFC 1716 (Towards Requirements for IP Routers)

Here is a list of the RIP RFCs to review:

- RFC 1058 (RIP v1)
- RFC 2453 (RIP v2)
- RFC 1722 (RIP v2 Protocol Applicability Statement)
- RFC 1723 (RIP v2 Carrying Additional Information)
- RFC 1724 (RIP v2 MIB Extension)

Here is a list of the OSPF RFCs to review:

- RFC 2328 (OSPF Version 2)
- RFC 1403 (BGP OSPF Interaction)
- RFC 1587 (The OSPF NSSA Option)
- RFC 1765 (OSPF Database Overflow)
- RFC 2370 (The OSPF Opaque LSA Option)
- RFC 1745 (BGP4/IDRP for IP-OSPF Interaction)
- RFC 1586 (Guidelines for Running OSPF Over Frame Relay Networks)
- RFC 1370 (Applicability statement for OSPF)
- RFC 1850 (OSPF v2 MIB)

Reading the "Configuring IP" chapter in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

Introduction

The primary function of IP Routing is processing Layer 3 IP packets and forwarding them in between two different networks or subnets. This is broken down into two functions. First is determining the best path to get from one network or subnet to the next and second is to forwarding the packet into that destination network.

With that being said you need to figure out what type of routing the client is doing. This section will only go over basic IP Routing. If the client is using an advanced routing protocol such as OSPF, VRRP, RIP II, etc., please refer to the appropriate sections in the index.

Note. This document does not discuss the basic operation of IP. To learn about how IP works, refer to the "Configuring IP" chapter in the appropriate *OmniSwitch Network Configuration Guide*.

IP Routing Protocol Failure

A failure of IP Routing would be a particular device that is unable to get out of the network; you will have problems getting to a different subnet.

Troubleshooting via the CLI

If devices in different VLANs cannot communicate, we have a routing failure. The first thing to do is verify the IP setup of the devices in question to make sure they are correct; check for IP address, subnet mask, and default gateway address on both devices.

If the devices can communicate within their respective VLANs, but not outside of the VLAN, verify the default gateway is correct for the subnet, and try pinging it. If it responds, the device should be able to get out of its VLAN without issue.

The next step is to ping the gateway to the destination VLAN. Assuming the Falcon is doing the routing for the VLANs, this address will show in the output of a **show vlan router ip** command.

```
-> show vlan router ip

vlan     ip address         ip mask         encap     mode      oper   mtu
------+-----------------+-----------------+---------+---------+------+-----
1      192.168.001.001   255.255.255.000     e2      forward    on    1500
2      192.168.002.001   255.255.255.000     e2      forward   off    1500
```

If the address does not respond to a ping, verify that a port in the VLAN is forwarding via the **show vlan port** command. Without an active port in a VLAN, the router instance is not active and will not respond to pings.

```
-> show vlan 1 port

port     type      status
--------+---------+--------------
1/1       default     inactive
1/2       default     inactive
1/3       default     inactive
```

```
.....
4/19      default     inactive
4/20      default     inactive
4/21      default     inactive
4/22      default   forwarding
4/23      default     inactive
.....
```

If the destination VLAN gateway address does respond to a ping, there should be no issue with routing, and the cause is likely to be with Source Learning assuming all other items check out properly (i.e. PC IP setup, link status, etc.) (see Chapter 2: Managing Source Learning). If source and destination devices can both ping their respective default gateways and the gateway address to the other VLAN/subnet, the next step after verifying that Source Learning is functioning properly would be to take a Sniffer trace to see if in fact the packets are arriving at the destination machine. (Refer to "Troubleshooting with Debug CLI" on page 12-11.)

Check for physical issues via the **show interfaces** command to see if the switch is dropping packets.

```
-> show interfaces ethernet 4/2

Slot/Port  4/2  :
  Operational Status     : down,
  Type                   : Fast Ethernet,
  MAC address            : 00:d0:95:6b:53:95,
  BandWidth (Megabits)   : 100,                 Duplex           : -,
  Long Accept            : Enable,              Runt Accept      : Disable,
  Long Frame Size(Bytes) : 1553,                Runt Size(Bytes) : 64
    Input :
     Bytes Received    :                14397,
     Lost Frames       :                    0,
     Unicast Frames    :                    6,
     Broadcast Frames  :                   93,
     Multicast Frames  :                    7,
     UnderSize Frames  :                    0,
     OverSize Frames   :                    0,
     Collision Frames  :                    0,
     Error Frames      :                    0,
     CRC Error Frames  :                    0,
     Alignments Error  :                    0
    Output :
     Bytes transmitted :                83244,
     Lost Frames       :                    0,
     Unicast Frames    :                   10,
     Broadcast Frames  :                   84,
     Multicast Frames  :                 1106,
     UnderSize Frames  :                    0,
     OverSize Frames   :                    0,
    Collision Frames  :                    0,
     Error Frames      :                    0
```

Any error conditions in this display should be corrected prior to proceeding.

If you are attempting to ping a device by name rather than by IP address, verify that the name server configuration is correct, and that the DNS servers in question are functioning, and that the addresses it returns are correct for the device you are trying to ping.

```
-> show dns
Resolver is  : disabled
```

```
domainName   :
nameServer(s):
```

Verify that the switch has a valid route to the destination subnet via the **show ip route** command:

```
-> show ip route

Dest Address      Subnet Mask       Gateway Addr      Age       Protocol
------------------+-----------------+-----------------+---------+-----------
  127.0.0.1         255.255.255.255   127.0.0.1         00:14:39  LOCAL
  192.168.1.0       255.255.255.0     192.168.1.1       00:13:08  LOCAL
  192.168.10.0      255.255.255.0     192.168.10.50     00:14:35  LOCAL
  192.168.10.1      255.255.255.255   192.168.11.1      00:14:35  NETMGT
```

If a route is listed to the destination's network, you should be able to ping it. If this ping fails, you will need to determine why. Verify RIP, OSPF, or BGP configurations so that the unit can learn the proper route to the destination.

The **show ip protocols** command will tell you what routing protocols are loaded, giving you a starting point for investigation.

```
-> show ip protocols
Router ID                                 = 192.168.1.1,
Primary addr                              = 192.168.1.1,
RIP status                                = Not Loaded,
OSPF status                               = Not Loaded,
BGP status                                = Not Loaded,
DVMRP status                              = Not Loaded,
PIMSM status                              = Not Loaded,
Debug level                               = 1,
Debug sections                            = none
```

A **traceroute** command (**tracert** in Windows, traceroute from a UNIX/Linux machine, and from the Falcon CLI) should indicate where the path has failed. If it fails on an intermediate hop between the Falcon and the destination, your efforts should be expended on the device that showed a failure in the path. Note that this may lead you back to another device to troubleshoot some other sort of failure, such as link down, etc. If the traceroute ends at the gateway to the destination VLAN, you do not have a routing problem, but rather a likely problem in the destination VLAN with either physical issues (cabling, bad NICs, dropped packets, etc.), Source Learning, or device IP setup.

```
-> traceroute 192.168.1.2
traceroute to 192.168.1.2, 30 hops max, 40 byte packets
192.168.1.2  50 ms  33.3333 ms  33.3333 ms
```

The **show icmp statistics** command may help by giving you an indication of redirect messages being sent. These usually indicate that the route in question has an issue, and that the router instance knows of a different route to get to the destination. From there you can look at the **show ip route** command to see what your routing table looks like. Verify via this command that the routes you think a packet should take are properly displayed in the table, and contrast that with any differences noted by the **traceroute** command output.

```
-> show icmp statistics

  Messages                    Received        Sent
---------------------------+----------+-------------
  Total                           9579        9392
  Error                              0          15
```

```
    Destination unreachable         201          15
    Time exceeded                     0           0
    Parameter problem                 0           0
    Source quench                     0           0
    Redirect                          0           0
    Echo request                   9377           0
    Echo reply                        1        9377
    Address mask request              0           0
    Address mask reply                0           0
```

The **show ip router database** command may yield a clue, possibly telling you that an interface that is designated as a router interface is down or disabled for some reason.

```
-> show ip router database
Destination         Gateway          Protocol Metric VLAN
-------------------+----------------+--------+------+-----
192.168.1.0/24      192.168.1.1      LOCAL    1      1
192.168.1.0/24      192.168.1.1      STATIC   1      1
Inactive Static Routes
Destination       Gateway        Metric
-----------------+--------------+------
```

If a route shows up as inactive, that must be investigated and corrected.

```
-> show ip interface

Total 3 interfaces
Name      IP Address      Subnet Mask     Type     Status   Forward
---------+---------------+---------------+--------+--------+----------
  loopback  127.0.0.1       255.0.0.0       ETH_II       UP        NO
  EMP       24.24.24.24     255.0.0.0       ETH_II     DOWN        NO
  vlan 1    10.255.11.224   255.255.255.0   ETH_II       UP       YES
```

Or:

```
-> show ip interface vlan 1
vlan 1
    Link type                      =   ETH_II,
    Link status                    =   UP,
    SNMP interface index           =   13600001
    Interface index                =   3
    Enable IP forwarding           =   YES,
    Administrative status          =   ENABLED,
    Operational status             =   ACTIVATED,
    Enable trap                    =   NO,
    Internet address               =   10.255.11.224,
    Broadcast address              =   10.255.11.255,
    Subnet mask                    =   255.255.255.0,
    Hardware address               =   00:d0:95:6a:f4:58,
    Vrrp MAC                       =   00:00:00:00:00:00,
    Auth MAC                       =   00:00:00:00:00:00,
    Maximum Transfer Unit (MTU)    =   1500
    Packets received               =   239333,
    Packets sent                   =   168910,
    Bytes received                 =   42210028,
    Bytes sent                     =   100375790,
    Multicast packets received     =   20802,
    Multicast packets sent         =   0,
    Broadcast packets received     =   51008,
    Broadcast packets sent         =   155,
    Input errors                   =   0
    Output errors                  =   1
    Collisions                     =   0
    Dropped                        =   0
```

The **show ip traffic** command gives switch-wide statistics for traffic, and the "No Route Discards" statistic should somewhat resemble the "icmp stats destination unreachable" number, in that both numbers should be increasing at a similar rate. This can be misleading, as a number of "No Route Discards" on a network is normal; the key here is to see that the numbers are increasing in similar proportion.

```
-> show ip traffic

  Datagrams received
------------------------+------------
  Total                       426277
  IP header error                  0
  Destination IP error             2
  Unknown protocol                 0
  Local discards                   0
  Delivered to users          249109
  Reassemble needed                0
  Reassembled                      0
  Reassemble failed                0


  Datagrams sent
  ------------------------+------------
  Fowarded                         1
  Generated                   178466
  Local discards                 426
  No route discards               15
  Fragmented                       1
  Fragment failed                  0
  Fragments generated              0
```

The **show tcp ports** command displays the TCP connection table.

```
-> show tcp ports

Local Address       Local Port   Remote Address    Remote Port    State
------------------+------------+-----------------+--------------+-------------
0.0.0.0                     21   0.0.0.0                     0    LISTEN
0.0.0.0                     23   0.0.0.0                     0    LISTEN
0.0.0.0                     80   0.0.0.0                     0    LISTEN
0.0.0.0                    260   0.0.0.0                     0    LISTEN
0.0.0.0                   6778   0.0.0.0                     0    LISTEN
0.0.0.0                   7170   0.0.0.0                     0    LISTEN
10.255.11.228               23   128.251.17.224           1677    ESTABLISHED
10.255.11.228               443   0.0.0.0                      0    LISTEN

Output fields are described below:
```

output definitions

Local Address	Local IP address for this TCP connection. If a connection is in the LISTEN state and will accept connections for any IP interface associated with the node, IP address 0.0.0.0 is used.
Local Port	Local port for this TCP connection.
Remote Address	Remote IP address for this TCP connection.
Remote Port	Remote port number for this TCP connection.
State	Describes the state of the TCP connection, as defined in RFC 973. Possible values are: **closed**, **listen**, **synSent**, **synReceived**, **established**, **finWait1**, **finWait2**, **closeWait**, **lastAck**, **closing**, **timeWait**, and **deleteTCB**.

The **show udp statistics** command displays UDP errors and statistics.

```
-> show udp statistics

Total datagrams received   = 349,
Error datagrams received   =   0,
No port datagrams received =  28,
Total datagrams sent        = 317
```

Output fields are described below:

output definitions

Total datagrams received	Total number of UDP datagrams delivered to UDP applications.
Error datagrams received	Number of UDP datagrams that could not be delivered for any reason.
No port datagrams received	Number of UDP datagrams that could not be delivered for reasons other than lack of application at the destination.
Total datagrams sent	Total number of UDP datagrams sent from this switch.

The **show udp ports** command displays the UDP Listener table. The table shows the local IP addresses and the local port number for each UDP listener.

```
-> show udp ports

  Local Address     Local Port
------------------+--------------
  0.0.0.0                67
  0.0.0.0                161
```

Output fields are described below:

output definitions

Local Address	Local IP address for this UDP connection.
Local Port	Local port number for this UDP connection.

The **show ip config** command displays IP configuration on the switch:

```
-> show ip config

IP directed-broadcast = ON,
IP default TTL         = 64
```

There are user-configurable parameters that can be changed as per requirement. The **vlan mtu-ip** command sets the MTU (Maximum Transmission Unit) size for a VLAN.

```
-> vlan 110 mtu-ip 1500
```

The **show ip interface** command displays statistics of a particular IP interface.

```
-> show ip interface vlan 110

vlan 110
    Link type                       =   ETH_II,
    Link status                     =   UP,
    SNMP interface index            =   13600110
    Interface index                 =   26
    Enable IP forwarding            =   YES,
    Administrative status           =   ENABLED,
    Operational status              =   ACTIVATED,
    Enable trap                     =   NO,
    Internet address                =   10.40.110.2,
    Broadcast address               =   10.40.110.255,
    Subnet mask                     =   255.255.255.0,
    Hardware address                =   00:d0:95:79:62:c1,
    Vrrp MAC                        =   00:00:00:00:00:00,
    Auth MAC                        =   00:00:00:00:00:00,
    Maximum Transfer Unit (MTU)     =   1500
    Packets received                =   1094,
    Packets sent                    =   5740,
    Bytes received                  =   108592,
    Bytes sent                      =   331560,
    Multicast packets received      =   749,
    Multicast packets sent          =   5424,
    Broadcast packets received      =   0,
    Broadcast packets sent          =   4,
    Input errors                    =   2
    Output errors                   =   0
    Collisions                      =   0
    Dropped                          =   0
```

The show ip router database command displays a list of all routes (static and dynamic) that exist in the IP router database. This database serves as a central repository where routes are first processed for redistribution and where duplicate routes are compared to determine the best route to use. If a route does not appear in the IP router database list, then the switch does not know about it. In the case of dynamically learned routes, this could indicate that the route was never received by the switch.

```
-> show ip router database

  Destination         Gateway          Protocol Metric VLAN
-------------------+----------------+--------+------+-----
  10.1.96.0/24        192.168.59.2     OSPF     1      59
  10.1.96.0/24        192.168.60.2     OSPF     1      60
  10.1.96.0/24        192.168.61.2     OSPF     1      61
  10.1.96.0/24        192.168.62.2     OSPF     1      62
  10.1.99.0/24        192.168.59.2     OSPF     1      59
```

```
10.1.99.0/24        192.168.60.2      OSPF     1      60
10.1.99.0/24        192.168.61.2      OSPF     1      61
10.1.99.0/24        192.168.62.2      OSPF     1      62
10.11.5.0/24        10.11.5.2         LOCAL    1      511
10.40.100.0/24      10.40.100.2       LOCAL    1      100
10.40.105.0/24      10.40.105.2       LOCAL    1      105
10.40.108.0/24      10.40.108.2       LOCAL    1      108
10.40.110.0/24      10.40.110.2       LOCAL    1      110
```

Troubleshooting with Debug CLI

As always, being able to obtain a trace of the traffic via a Sniffer application will tell you the bottom line. If the packets leave the source and arrive at the destination segment properly, the issue does not lie with routing, the switch, or any intermediate device.

In debug you can look at certain types of traffic crossing through the switch. In this instance, we are looking to see if packets are being transmitted from source to destination, specifically to see if ARP request and responses are traversing the switch. (These examples are pings being sent to a non-existent IP address.)

debug ip packet

IP routing can be debugged in debug CLI using the following command:

debug ip packet [start] [timeout *seconds***] [stop] [direction {in | out | all}] [format {header | text | all}] [output {console | file** *filename***}] [board {cmm | ni [1-16] | all | none} [ether-type {arp | ip | hex** [*hex_number*] **| all}] [ip-address** *ip_address***] [ip-address** *ip_address***] [ip-pair** [*ip1*] [*ip2*]**] [protocol {tcp | udp | icmp | igmp | num** [*integer*] **| all}] [show-broadcast {on | off}] show-multicast {on | off}]**

There are several options available which helps to classify the kind of traffic one may be interested in.

start	Starts an IP packet debug session.
timeout	Sets the duration of the debug session, in seconds. To specify a duration for the debug session, enter **timeout**, then enter the session length.
seconds	The debug session length, in seconds.
stop	Stops IP packet debug session.
direction	Specifies the type of the packets you want to debug. Specify **in** to debug incoming packets; specify **out** to debug outgoing packets; specify **all** to debug both incoming and outgoing packets.
format	Specifies the area of the packet you want to debug. Specify **header** to debug the packets header; specify **hex** to debug the packet text; specify **all** to debug the entire packet.
output	Specifies where you want the debug information to go. Specify **console** to print the output to the screen; specify **file** to save the output to a log file.
filename	The filename for the output file.
board	Specifies the slot (board) that you want to debug. Specify **cmm** to debug CMM packets; specify **ni**, then enter the slot number of the NI to debug a network interface card; specify **all** to debug packets for all CMMs and NIs on the switch; specify **none** to clear the previous board settings.
ether-type	Specifies a specific Ethernet packet type to debug. Specify **arp** to debug ARP packets; specify **ip** to debug IP packets; specify **hex** and enter an ethernet packet type in hex format (e.g., 800) to debug a specific ethernet packet type; specify **all** to debug all Ethernet packet types.

ip-address	Specifies an IP address to debug. The debug output will only be for packets received from this IP address. Enter **ip-address,** then enter the IP address that you want to debug.
ip-pair	Use this option to match packets exchanged between two network addresses. Enter **ip-pair**, then enter each IP address.
protocol	Specifies a protocol type to debug. Specify **tcp** to debug TCP packets; specify **udp** to debug UPD packets; specify **icmp** to debug ICMP packets; specify **igmp** to debug IGMP packets; specify **num** to numerically specify a protocol (e.g., 89); specify **all** to debug all protocol types.
show-broadcast	Specifies whether or not to display broadcast packets. Specify **on** to display broadcast packets on the screen or in the log; specify **off** if you do not want to display broadcast packets.
show-multicast	Specifies whether or not to display multicast packets. Specify **on** to display multicast packets on the screen or in the log; specify **off** if you do not want to display multicast packets.

The **debug ip packet** command syntax starts IP debugging on NI #1 to show only broadcast packets, which will include ARPs, and then outputs them to console. For example:

```
-> debug ip packet start board ni 1 show-broadcast on output console
1 R 1/22 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 S CMM 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 R 1/22 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 S CMM 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
```

This should be done on the destination machine's Falcon NI; if the output shows ARP Requests from your source IP, the issue does not lie with routing.

To stop the output, use the **debug ip packet stop** command syntax. For example:

```
-> debug ip packet stop board ni 1 show-broadcast on output console
```

To be more specific, we can use the **debug ip packet** command to look only for packets destined to our troubled destination IP address. For example:

```
-> debug ip packet start ip-address 192.168.1.24 output console
1 R 1/22 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 S CMM 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 R 1/22 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 S CMM 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 R 1/22 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
1 S CMM 00d095206408->(ffffffffffff) ARP Request 192.168.1.2->192.168.1.24
```

To stop the output, enter the following command syntax:

```
-> debug ip packet stop ip-address 192.168.1.24 output console
```

RIP Troubleshooting

The following commands are used to troubleshoot RIP failures:

```
show ip rip interface    //check for status enable and version Rip V1 or V2
show ip rip redis-filter
show ip rip
show ip rip peer
show ip rip routes
show ip rip debug    //level 0 is disabled

7700-> ip rip debug-type ?
                         ^
                         WARNING TIME SETUP SEND REDIST RECV RDB INFO ERROR
                         CONFIG ALL AGE
(IP Routing & Multicast Command Set)
```

To debug RIP:

```
1) ip rip debug-level 0
2) ip rip debug-type all
3) ip rip debug-level 255
4) ip rip debug-level 0
```

Verify the required parameters for a RIP interface using the **show ip rip interface** command:

```
-> show ip rip interface 11.40.150.1
Interface IP Address                   = 11.40.150.1,
IP Interface Number (VLANId)           = 6,
Interface Admin status                 = disabled,
IP Interface Status                    = enabled,
Interface Config AuthType              = None,
Interface Config AuthKey               = ,
Interface Config Send-Version          = v1,
Interface Config Receive-Version       = v1,
Interface Config Default Metric        = 1,
RIP Config Status                      = Active,
Received Packets                       = 0,
Received Bad Packets                   = 0,
Received Bad Routes                    = 0,
Sent Updates                           = 0
```

This interface can be configured for RIP v 1 or RIP v 2. Now, enable the RIP interface using the command:

```
-> ip rip interface 10.40.150.1 status enable

->show ip rip interface
                      Intf Admin   IP Intf      Updates
   IP Address    vlan   status     status    sent/recv(bad)
----------------+-----+----------+----------+---------------

   11.40.211.4   2      enabled     enabled     0/0(0)
   11.41.211.4   3      enabled     enabled     0/0(0)
   9.9.1.1       4      enabled     enabled     0/0(0)
```

```
     11.40.150.1    6      enabled     enabled     0/0(0)
```

The interface is enabled. Verify that local interface redistribution is enabled, using the commands:

```
->show ip rip redist
Status:  ACT - Active    NIS - Not In Service
Protocol      Metric      Route-Tag  Status
-------------+-----------+----------+------
LOCAL         1           0          ACT

-> show ip rip redist-filter
Control:    All-Sub - All Subnets     No-Sub - No Subnets
             Aggreg  - Aggregate
Permit:     Perm    - Permit          Deny   - Deny
Status:     ACT     - Active          NIS    - Not In Service
Proto   Destination           Control Permit Metric Tag   Status
-------+---------------------+-------+------+------+-----+------
LOCAL   0.0.0.0/0            All-Sub  Perm    0     0     ACT
```

Verify that RIP is enabled globally and redistribution is also enabled, using the command:

```
-> show ip rip
Status                      = Enabled,
Host Route Support          = Enabled,
Redistribution cfg status   = Enabled,
Redistribution oper status = Enabled,
Route Tag                   = 0,
Hold Down Timer             = 0
```

Now, verify if the peer relationship is established between the two routers.

```
-> show ip rip peer
                 Total   Bad     Bad            Secs since
    IP Address   Recvd  Packets Routes Version  last update
----------------+------+-------+------+-------+-----------
9.9.1.2          10     0       0      1       17
11.40.150.2      12     0       0      1       17
11.40.150.100    10     0       0      1       12
11.40.211.1      12     0       0      1       21
11.41.211.1      12     0       0      1       12
```

This command shows the number of updates received as well as the time since the last update.

If the peer relationship is not formed then the next thing to look for will be the other router to check if it is setup correctly.

Now, look at the routing table for RIP protocol, using the command:

```
-> show ip rip routes
Destination        Mask               Gateway            Metric
------------------+------------------+------------------+-------
0.0.0.0            0.0.0.0            11.41.211.1        2
6.0.0.0            255.0.0.0          9.9.1.2            2
8.0.0.0            255.0.0.0          11.40.150.100      2
9.9.1.0            255.255.255.0      9.9.1.1            1
10.10.41.57        255.255.255.255    11.40.211.1        2
10.10.42.57        255.255.255.255    11.41.211.1        2
```

```
10.10.42.159       255.255.255.255    11.41.211.1        2
11.40.117.0        255.255.255.0      11.40.211.1        2
11.40.150.0        255.255.255.0      11.40.150.1        1
11.40.211.0        255.255.255.0      11.40.211.4        1
11.41.117.0        255.255.255.0      11.41.211.1        2
11.41.211.0        255.255.255.0      11.41.211.4        1
192.168.10.0       255.255.255.0      11.40.150.100      2
```

Notice, that route 6.0.0.0 and 8.0.0.0 appears with the natural subnet mask, even though it is configured to be class C mask. This is because RIP v1 does not advertise the mask and router always assume the natural mask.

9.9.1.0 appears with a class C mask because it is locally defined network on the switch. If the protocol used was RIP v2 then the routing tables will be as follows:

```
-> show ip rip routes
Destination        Mask               Gateway            Metric
------------------+------------------+------------------+-------
0.0.0.0            0.0.0.0            11.41.211.1        2
6.0.0.0            255.255.255.0      9.9.1.2            2
8.0.0.0            255.255.255.0      11.40.150.100      2
9.9.1.0            255.255.255.0      9.9.1.1            1
10.10.41.57        255.255.255.255    11.40.211.1        2
10.10.42.57        255.255.255.255    11.41.211.1        2
10.10.42.159       255.255.255.255    11.41.211.1        2
11.40.117.0        255.255.255.0      11.40.211.1        2
11.40.150.0        255.255.255.0      11.40.150.1        1
11.40.211.0        255.255.255.0      11.40.211.4        1
11.41.117.0        255.255.255.0      11.41.211.1        2
11.41.211.0        255.255.255.0      11.41.211.4        1
192.168.10.0       255.255.255.0      11.40.150.100      2
```

At this point the route tables should be coherent and the end users should be able to reach any portion of the network.

In case of any RIP problems debug CLI commands can be used to troubleshoot the protocol. By default, debug of RIP is disabled with the debug-level of 0. The debug levels set by default can be seen by the following command:

```
-> show ip rip debug
Debug Level       = 0
Types/Sections
error             = on
warning           = off
recv              = off
send              = off
rdb               = off
age               = off
config            = off
redist            = off
info              = off
setup             = off
time              = off
```

In case of any problems with protocol operation of RIP different kinds of debug messages can be turned on to look at the protocol operations being performed by the switch. Debug level 255 is the highest. Following is the details of the different debug-types:

error	Includes error conditions, failures, processing errors, etc.
warning	Includes general warnings, non-fatal conditions.
recv	Enables debugging in the receive flow path of the code.
send	Enables debugging in the send flow path of the code.
rdb	Debugs RIP database handling.
age	Debugs code handling database entry aging/timeouts.
redist	Debugs redistribution code.
info	Provides general information.
setup	Provides information during initialization.
time	Debugs timeout handler.
all	Enables all debug options.

Any combination of debug-types can be set.

Lets look at all the RIP debug messages by using the option all:

```
-> ip rip debug-type all

-> ip rip debug-level 255
tRip-:   processRipNetQueue: Enter.
tRip-:   processRipNetQueue:  Received RIP packet:24
tRip-:   ripRecv:Received packet from 11.40.211.4
tRip-:   ripRecv:Received my own packet on VLAN 2
tRip-:   processRipNetQueue:  Received RIP packet:244
tRip-:   ripRecv:Received packet from 11.40.211.1
tRip-:   ripRecv: Rx: RESP ver=v1 src=11.40.211.1 inIf=11.40.211.4 port=520
tuples=12 len=244
```

(Received RIP packet from interface 11.40.211.1, version 1 with 12 routes.)

```
tRip-:   ripPeerLookupEntry: looking for peer->11.40.211.1
tRip-:   ripPeerAddEntry: Adding Peer->11.40.211.1 to PeerTable
tRip-:   ripPeerLookupEntry: looking for peer->11.40.211.1
tRip-:   ripPeerRefreshAgeoutTimer: peer->11.40.211.1 age set to 68
tRip-:   ripPeerLookupEntry: looking for peer->11.40.211.1
```

(Looking in peer table, if the peer 11.40.211.1 already exists or not.)

```
tRip-:   in ripRdbLookup for 0.0.0.0 (0.0.0.0)
tRip-:   Adding 0.0.0.0/0->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 6.0.0.0 (255.0.0.0)
tRip-:   Adding 6.0.0.0/8->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 8.0.0.0 (255.0.0.0)
tRip-:   Adding 8.0.0.0/8->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 10.10.41.57 (255.255.255.255)
tRip-:   Adding 10.10.41.57/32->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 10.10.42.57 (255.255.255.255)
tRip-:   Adding 10.10.42.57/32->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 10.10.42.159 (255.255.255.255)
tRip-:   Adding 10.10.42.159/32->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 11.40.1.0 (255.255.255.0)
```

```
tRip-:   Adding 11.40.1.0/24->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 11.40.117.0 (255.255.255.0)
tRip-:   Adding 11.40.117.0/24->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 11.40.150.0 (255.255.255.0)
tRip-:   Adding 11.40.150.0/24->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 11.41.117.0 (255.255.255.0)
tRip-:   Adding 11.41.117.0/24->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 11.41.211.0 (255.255.255.0)
tRip-:   Adding 11.41.211.0/24->11.40.211.1 to FIB
tRip-:   in ripRdbLookup for 192.168.10.0 (255.255.255.0)
tRip-:   Adding 192.168.10.0/24->11.40.211.1 to FIB
```

(Looking for all the received routes in the Routing Database and adding in Forward Information Base (FIB).)

```
tRip-:   processRipNetQueue: Exit after 2 msgs
tRip-:   processRipMsgQ: Enter
tRip-:   processRipMsgQ: Received DRC message. payload_len 4
tRip-:   Got DRC msg of type 1 from tDrcTm
tRip-:   processRipMsgQ: Received DRC message. payload_len 4
tRip-:   Got DRC msg of type 0 from tRip
tRip-:   ripRdbSendCreateRouteMsg: Adding 12 routes to IPRM database ...
```

(Adding the received 12 routes in IP Router Manager Database.)

```
tRip-:   ripPeerAgeout: Currtime=69
tRip-:   enqueueRipPipeMsg: Enter.
tRip-:   processRipMsgQ: Exit after 2 msgs
tRip-:   ripMain: Entering select.
tRip-:   ripMain: select exited with n 1
tRip-:   processRipMsgQ: Enter
tRip-:   processRipMsgQ: Received DRC message. payload_len 4
tRip-:   Got DRC msg of type 0 from tRip
tRip-:   ripPeerAgeout: Currtime=70
tRip-:   processRipMsgQ: Received DRC message. payload_len 4
tRip-:   Got DRC msg of type 0 from tRip
tRip-:   ripPeerAgeout: Currtime=71
tRip-:   enqueueRipPipeMsg: Enter.
tRip-:   processRipMsgQ: Exit after 2 msgs
tRip-:   ripMain: Entering select.
tRip-:   ripMain: select exited with n 1
tRip-:   processRipMsgQ: Enter
tRip-:   processRipMsgQ: Received DRC message. payload_len 4
tRip-:   Got DRC msg of type 0 from tRip
tRip-:   Entering ripUpdate
```

(Sending RIP update to the Peer.)

```
tRip-:   ripUpdate: Sending flash update on interface=11.40.211.4, vlan=2
tRip-:   ripSupply: Forcing metric for 0.0.0.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(1) dst=0.0.0.0 mask=0.0.0.0 gw=0.0.0.0
met=16
tRip-:   ripSupply: Forcing metric for 6.0.0.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(2) dst=6.0.0.0 mask=0.0.0.0 gw=0.0.0.0
met=16
tRip-:   ripSupply: Forcing metric for 8.0.0.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(3) dst=8.0.0.0 mask=0.0.0.0 gw=0.0.0.0
met=16
tRip-:   ripSupply: Forcing metric for 10.10.41.57 to INFINITY (split horizon)
```

```
tRip-:   in ripRdbLookup for 10.0.0.0 (255.0.0.0)
tRip-:   ripSupply:       Adding tuple(4) dst=10.10.41.57 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 10.10.42.57 to INFINITY (split horizon)
tRip-:   in ripRdbLookup for 10.0.0.0 (255.0.0.0)
tRip-:   ripSupply:       Adding tuple(5) dst=10.10.42.57 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 10.10.42.159 to INFINITY (split horizon)
tRip-:   in ripRdbLookup for 10.0.0.0 (255.0.0.0)
tRip-:   ripSupply:       Adding tuple(6) dst=10.10.42.159 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 11.40.1.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(7) dst=11.40.1.0 mask=0.0.0.0 gw=0.0.0.0
met=16
tRip-:   ripSupply: Forcing metric for 11.40.117.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(8) dst=11.40.117.0 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 11.40.150.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(9) dst=11.40.150.0 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 11.41.117.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(10) dst=11.41.117.0 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 11.41.211.0 to INFINITY (split horizon)
tRip-:   ripSupply:       Adding tuple(11) dst=11.41.211.0 mask=0.0.0.0
gw=0.0.0.0 met=16
tRip-:   ripSupply: Forcing metric for 192.168.10.0 to INFINITY (split horizon)
```

Notice that the routes received on the same interfaces are being sent out with metric of 16, split horizon.

```
tRip-:ripSupply:       Adding tuple(12) dst=192.168.10.0 mask=0.0.0.0 gw=0.0.0.0
met=16
tRip-:ripSupply: Tx RESP ver=v1 dest=11.40.211.255 OutIf=11.40.211.4 dport=520
routes=12 len=244
tRip-:ripPeerAgeout: Currtime=72
```

This command is useful in understanding the protocol as well as troubleshooting the problem If one has thorough understanding of the protocol then looking at this capture will help to identify the cause of the problem.

If the advanced troubleshooting does not help to identify the cause of the problem kindly contact tech-support for further troubleshooting.

OSPF Troubleshooting

The following commands are used to troubleshoot OSPF failures:

```
show ip ospf interface x.y.z.
show ip ospf area 2.2.2.2
show ip ospf
show ip ospf neighbor
//state is FULL (connect to DR or BDR) or 2 Ways (router to router)
show ip ospf interface          //DR or BDR
show ip ospf lsdb                  //within area
```

A debug-level of 50 for detail and 75 for more detail.

```
7700-> ip ospf debug-type ?
                     ^
                     WARNING VLINK TM TIME SUMMARY STATE SPF SETUP
                     SEND RESTART REDIST RECV RDB MIP LSDB INTF INFO
                     HELPER HELLO FLOOD ERROR DBEXCH AUTH AREA ALL
                     AGE
(IP Routing & Multicast Command Set)
```

To debug OSPF:

```
1) show ip ospf debug          //level 0 is disabled
2) ip ospf debug-level 0
3) ip ospf debug-type warning
4) ip ospf debug-type error
5) ip ospf debug-type state
6) ip ospf debug-level (50 detail; 75 more detail)
7) ip ospf debug-level 0        //to stop
```

Verify the required parameters for an OSPF interface using the **show ip ospf interface** command:

```
-> show ip ospf interface 10.40.110.2
VLAN Id                               = 110,
Interface IP Address                  = 10.40.110.2,
Interface IP Mask                     = 255.255.255.0,
Admin Status                          = Disabled,
Operational Status                    = Up,
OSPF Interface State                  = Down,
Interface Type                        = Broadcast,
Area Id                               = 0.0.0.5,
Designated Router IP Address          = 0.0.0.0,
Designated Router RouterId            = 0.0.0.0,
Backup Designated Router IP Address   = 0.0.0.0,
Backup Designated Router RouterId     = 0.0.0.0,
MTU  (bytes)                          = 1492,
Metric Cost                           = 1,
Priority                              = 1,
Hello Interval (seconds)              = 10,
Transit Delay (seconds)               = 1,
Retrans Interval (seconds)            = 5,
Dead Interval (seconds)               = 40,
Poll Interval (seconds)               = 120,
Link Type                             = Broadcast,
Authentication Type                   = none,
# of Events                           = 0,
# of Init State Neighbors              = 0,
# of Exchange State Neighbors          = 0,
# of Full State Neighbors              = 0
```

This interface has been assigned to area 0.0.0.5. OSPF interface status is down because the administrative status of the OSPF interface is down. If the priority of the interface is set to 0 then this interface will not participate in the elections for DR and BDR.

Check to verify that the area 0.0.0.5 was created on the switch and is operational.

```
-> show ip ospf area 0.0.0.5
   Area Id      AdminStatus      Type       OperStatus
---------------+-------------+-------------+------------
   0.0.0.0           enabled      normal       up
   0.0.0.5           enabled      normal       up
```

Verify that the area-type on both the interfaces is same.

```
-> show ip ospf area 0.0.0.5
-> show ip ospf area 0.0.0.5
Area Identifier                           = 0.0.0.5,
Admin Status                              = Enabled,
Operational Status                        = Up,
Area Type                                 = normal,
Area Summary                              = Enabled,
Time since last SPF Run                   = 00h:00m:00s,
# of Area Border Routers known            = 0,
# of AS Border Routers known              = 0,
# of Active Virtual Links                 = 0,
# of LSAs in area                         = 0,
# of SPF Calculations done                = 0,
# of Incremental SPF Calculations done    = 0,
# of Neighbors in Init State              = 0,
# of Neighbors in Exchange State          = 0,
# of Neighbors in Full State              = 0,
# of Interfaces attached                  = 1,
Attached Interfaces                       =10..40.110.2
```

Note, that the interface 10.40.110.2 should appear in the area configuration as an attached interface.

Now, check to see if OSPF is enabled globally.

```
-> show ip ospf
Router Id                        = 192.168.50.4,
OSPF Version Number              = 2,
Admin Status                     = Enabled,
Area Border Router ?             = Yes,
AS Border Router Status          = Enabled,
Route Redistribution Status      = Disabled,
Route Tag                        = 0,
SPF Hold  Time (in seconds)      = 10,
SPF Delay  Time (in seconds)     = 5,
MTU Checking                     = Disabled,
# of Routes                      = 0,
# of AS-External LSAs            = 0,
# of self-originated LSAs        = 0,
# of LSAs received               = 0,
External LSDB Limit              = 0,
Exit Overflow Interval           = 0,
# of SPF calculations done       = 0,
# of Incr SPF calculations done  = 0,
# of Init State Nbrs             = 0,
# of Exchange State Nbrs         = 0,
# of Full State Nbrs             = 0,
# of attached areas              = 0,
# of Active areas                = 0,
# of Transit areas               = 0,
# of attached NSSAs              = 0
```

Since, OSPF is enabled globally so enable OSPF on the interface.

```
-> ip ospf interface 10.40.110.2 status enable
```

Verify the neighbor relationship between the two routers using the show ip ospf neighbor CLI command.

```
-> show ip ospf neighbor
IP Address        Area Id          Router Id     Vlan  State    Mode
----------------+----------------+----------------+----+-------+--------
10.40.110.3      0.0.0.5          192.168.50.3     110  Full     Master
```

The neighbor relationship is full. Neighbor relationship can be one of the following six states:

Init	Initialization State
2way	The two routers are able to receive hello packets from each other. This will also be the state when neighbor adjacency is formed with a router other than DR and BDR
Exstart	Starting the synchronization process
Exchange	Exchanging the database
Load	Performing SPF calculations and loading routes in route table
Full	Neighbors are completely synchronized

To view the DR and BDR for this interface, the following command can be used:

```
-> show ip ospf interface
      IP                DR            Backup DR          Admin    Oper
     Address          Address         Address     Vlan  Status  Status  State
----------------+----------------+----------------+----+--------+------+-------
     10.40.110.2      10.40.110.3      10.40.110.2   110  enabled  up    BDR
```

So, the above command shows that 10.40.110.3 is the Designated Router and 10.40.110.2 is the Backup Designated Router. So, if there were two more routers in this subnet then they should form full adjacency with these routers but between themselves they will have 2way relationship. As, all the routes are to be synchronized by the DR and the BDR.

To look at the Link State Database use the **show ip ospf lsdb** CLI command:

```
-> show ip ospf lsdb
Area Id       Type        LS Id         Orig Router-Id     SeqNo      Age
----------------+-------+----------------+----------------+------------+-----
0.0.0.0          rtr     192.168.50.4     192.168.50.4     0x80000002  10
```

```
0.0.0.0          sumnet  10.40.0.0        192.168.50.4     0x80000002  5
0.0.0.5          rtr     11.40.211.1      11.40.211.1      0x80000041  6
0.0.0.5          rtr     11.41.211.1      11.41.211.1      0x80000033  6
0.0.0.5          rtr     192.168.50.3     192.168.50.3     0x800000b8  1
0.0.0.5          rtr     192.168.50.4     192.168.50.4     0x80000003  5
0.0.0.5          net     10.40.110.3      192.168.50.3     0x80000007  1
0.0.0.5          net     10.40.111.3      192.168.50.3     0x80000047  5
0.0.0.5          net     10.40.212.3      192.168.50.3     0x80000003  5
0.0.0.5          sumnet  10.0.128.0       192.168.50.3     0x8000007b  2
0.0.0.5          sumnet  10.10.42.0       192.168.50.4     0x80000002  5
0.0.0.5          sumnet  10.26.0.0        192.168.50.3     0x80000072  2
0.0.0.5          sumnet  10.32.64.0       192.168.50.3     0x8000007d  2
0.0.0.5          sumnet  10.190.0.0       192.168.50.3     0x80000051  5
0.0.0.5          sumnet  10.210.0.0       192.168.50.3     0x8000003e  5
0.0.0.5          sumnet  10.211.0.0       192.168.50.3     0x8000003e  5
0.0.0.5          sumnet  10.216.0.0       192.168.50.3     0x8000003d  5
0.0.0.5          sumnet  11.11.1.0        192.168.50.3     0x80000051  5
0.0.0.5          sumnet  192.168.99.0     192.168.50.3     0x8000007f  2
0.0.0.5          sumasbr 10.26.0.1        192.168.50.3     0x8000003f  5
0.0.0.5          sumasbr 10.45.192.1      192.168.50.3     0x8000003f  5
0.0.0.5          sumasbr 10.48.64.1       192.168.50.3     0x8000003b  5
0.0.0.5          sumasbr 10.190.0.5       192.168.50.3     0x8000003a  5
0.0.0.5          sumasbr 192.168.50.2     192.168.50.3     0x8000003d  5
0.0.0.5          sumasbr 192.168.50.6     192.168.50.3     0x8000003d  5
```

The Link State table should have all of the routes synchronized between the two neighbors. It will not have any entries for any external protocol. To look at external link state database use the command:

```
-> show ip ospf ext-lsdb
      LS Id         Orig Router-Id     SeqNo      Age     Protocol
-----------------+------------------+----------+--------+----------
  10.0.128.0       10.26.0.1         0x80000032   123     OSPF
  10.10.42.0       10.26.0.1         0x80000032   123     OSPF
  10.26.64.0       10.26.0.1         0x80000072   123     OSPF
  10.32.64.0       10.26.0.1         0x80000032   123     OSPF
  10.40.150.0      10.26.0.1         0x80000032   123     OSPF
  10.40.150.0      11.40.211.1       0x80000035   121     OSPF
  10.40.150.0      11.41.211.1       0x8000002d   121     OSPF
  10.190.0.0       10.26.0.1         0x80000032   123     OSPF
  10.190.0.0       10.48.64.1        0x80000028   57      OSPF
  10.210.0.0       10.26.0.1         0x80000032   123     OSPF
  10.211.0.0       10.26.0.1         0x80000032   123     OSPF
  10.212.0.0       10.26.0.1         0x80000032   123     OSPF
  10.213.0.0       10.48.64.1        0x80000034   57      OSPF
  10.214.0.0       10.26.0.1         0x80000032   123     OSPF
  10.216.0.0       10.26.0.1         0x80000032   123     OSPF
  10.217.0.0       10.26.0.1         0x80000032   123     OSPF
  11.11.1.0        10.26.0.1         0x80000032   123     OSPF
  11.40.1.0        11.40.211.1       0x80000036   121     OSPF
  11.40.1.0        11.41.211.1       0x8000002d   121     OSPF
  11.40.117.0      11.40.211.1       0x80000035   121     OSPF
  11.40.211.0      11.40.211.1       0x80000036   121     OSPF
  11.41.117.0      11.41.211.1       0x8000002d   121     OSPF
  11.41.211.0      11.41.211.1       0x8000002f   121     OSPF
  192.168.50.0     10.26.0.1         0x80000032   123     OSPF
  192.168.51.0     10.26.0.1         0x80000032   123     OSPF
  192.168.52.0     10.26.0.1         0x80000032   123     OSPF
  192.168.53.0     10.26.0.1         0x80000032   123     OSPF
```

```
        192.168.54.0      10.26.0.1         0x80000032   123     OSPF
        192.168.55.0      10.26.0.1         0x80000032   123     OSPF
        192.168.56.0      10.26.0.1         0x80000032   123     OSPF
        192.168.57.0      10.26.0.1         0x80000032   123     OSPF
        192.168.58.0      10.26.0.1         0x80000032   123     OSPF
        192.168.59.0      10.26.0.1         0x80000032   123     OSPF
        192.168.60.0      10.26.0.1         0x80000032   123     OSPF
        192.168.61.0      10.26.0.1         0x80000032   123     OSPF
        192.168.62.0      10.26.0.1         0x80000032   123     OSPF
```

These routes may be using RIP v1 or v2, static or local route redistribution. Therefore a separate table is maintained for all the external link states.

The routing table can be viewed using the following commands:

Now, the routing table should have all of the OSPF routes.

```
-> show ip route
+ = Equal cost multipath routes
Total 14 routes

   Dest Address      Subnet Mask       Gateway Addr      Age       Protocol
------------------+-----------------+-----------------+---------+-----------
   10.10.42.0        255.255.255.0     10.10.42.1        23:54:47  LOCAL
   10.40.108.0       255.255.255.0     10.40.110.3       00:03:07  OSPF
   10.40.110.0       255.255.255.0     10.40.110.2       23:54:51  LOCAL
   10.40.111.0       255.255.255.0     10.40.110.3       00:03:07  OSPF
   10.40.112.0       255.255.255.0     10.40.110.3       00:03:07  OSPF
   10.40.150.0       255.255.255.0     10.40.150.2       23:54:51  LOCAL
   10.40.212.0       255.255.255.0     10.40.110.3       00:03:07  OSPF
   10.255.13.0       255.255.255.0     10.255.13.151     23:55:57  LOCAL
   11.40.1.0         255.255.255.0     10.40.110.3       00:03:02  OSPF
   11.40.117.0       255.255.255.0     10.40.110.3       00:03:02  OSPF
   11.40.211.0       255.255.255.0     10.40.110.3       00:03:02  OSPF
   11.41.117.0       255.255.255.0     10.40.110.3       00:03:02  OSPF
   11.41.211.0       255.255.255.0     10.40.110.3       00:03:02  OSPF
   127.0.0.1         255.255.255.255   127.0.0.1            1d 0h  LOCAL


-> show ip ospf routes
Destination/Mask          Gateway       Metric   Vlan     Type
---------------------+-----------------+--------+------+----------
10.10.42.0/24        10.10.42.1        1          10     Intra
10.40.0.0/13         127.0.0.1         2          -1     Intra
10.40.108.0/24       10.40.110.3       2          110    Intra
10.40.110.0/24       10.40.110.2       1          110    Intra
10.40.111.0/24       10.40.110.3       2          110    Intra
10.40.112.0/24       10.40.110.3       2          110    Intra
10.40.150.0/24       10.40.110.3       2          110    Intra
10.40.212.0/24       10.40.110.3       2          110    Intra
11.40.1.0/24         10.40.110.3       1          110    AS-Ext
11.40.117.0/24       10.40.110.3       1          110    AS-Ext
11.40.211.0/24       10.40.110.3       1          110    AS-Ext
11.41.117.0/24       10.40.110.3       1          110    AS-Ext
11.41.211.0/24       10.40.110.3       1          110    AS-Ext
```

If local, static, or any other external protocol routes need to be redistributed into OSPF then the first step is to make that OSPF router to be a AS Border Router. This need OSPF status to be disabled.

```
-> ip ospf status disable

-> ip ospf asbr

-> ip ospf redist local

-> ip ospf redist-filter 0.0.0.0 0.0.0.0

->ip ospf redist status enable

-> ip ospf status enable
```

For any redistribution into OSPF, OSPF status needs to be disabled and then re-enabled. This allows all of the routing tables on the NI to get synchronized.

Debug CLI has some OSPF commands just like RIP which shows the setup process. Debug Level by default is set to 0. Debug type by default is set for errors.

```
-> show ip ospf debug
Debug Level       = 0,
Types/Sections
error             = on,
warning           = off,
state             = off,
recv              = off,
send              = off,
flood             = off,
spf               = off,
lsdb              = off,
rdb               = off,
age               = off,
vlink             = off,
redist            = off,
summary           = off,
dbexch            = off,
hello             = off,
auth              = off,
area              = off,
intf              = off,
mip               = off,
info              = off,
setup             = off,
time              = off,
tm                = off,
```

error	Administratively enables/disables debugging error messages only. Error messages provide information of program faults.
warning	Administratively enables/disables debugging warning messages only.
state	Administratively enables/disables debugging OSPF state messages only. State messages show the switch state in relation to its neighbors.
recv	Administratively enables/disables debugging messages for packets received by OSPF only.

send	Administratively enables/disables debugging messages for packets sent by OSPF only.
flood	Administratively enables/disables debugging messages for the flooding of Link State Advertisements (LSAs) in OSPF only.
spf	Administratively enables/disables debugging messages for OSPF’s Shortest Path First (SPF) calculations only.
lsdb	Administratively enables/disables debugging messages for OSPF’s Link State Database (LSDB) related operations only.
rdb	Administratively enables/disables debugging messages for OSPF’s routing database (RDB) related operations only.
age	Administratively enables/disables debugging messages for OSPF’s aging process of LSAs only. LSAs are sent out on a periodic basis.
vlink	Administratively enables/disables debugging messages for OSPF's virtual links operations only.
redist	Administratively enables/disables debugging messages for OSPF’s route redistribution process only.
summary	Administratively enables/disables debugging messages for all OSPF's summarizations only. Summarization of routes can be set for stubby areas and NSSAs.
dbexch	Administratively enables/disables debugging messages for OSPF neighbors’ database exchange only.
hello	Administratively enables/disables debugging messages for OSPF's hello handshaking process only.
auth	Administratively enables/disables debugging messages for OSPF’s authentication process only. Authentication can be simple or MD5.
area	Administratively enables/disables debugging messages for OSPF's area events only.
intf	Administratively enables/disables debugging messages for OSPF’s interface operations only.
mip	Administratively enables/disables debugging messages for MIP processing of OSPF specific commands only.
info	Administratively enables/disables debugging messages for purpose to provide OSPF information only.
setup	Administratively enables/disables debugging messages for OSPF’s initialization setup only.
time	Administratively enables/disables debugging messages for OSPF’s time related events only. Timers are set for interfaces and LSAs.
tm	Administratively enables/disables debugging messages for OSPF’s Task Manager communication events only.

Let’s look at all the messages that appear on the console during the setup of OSPF adjacency. The enabled debug types are state, hello and area using the command:

This command is too verbose so special care should be taken when using this command.

```
-> ip ospf debug-type warning

-> ip ospf debug-type error

-> ip ospf debug-type state

-> ip ospf debug-level 255
```

(Building Router LSA to advertise on the interface.)

```
tOspf-:  ospfAreaTimer:3356 ospfBuildRouterLsa(area 0.0.0.5, flags 0x5).
[curTime = 7404s]
tOspf-:  ospfBuildRouterLsa: Built Router LSA: Area 5 Seq 0x80000001 numLinks 1
Age 0
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT HELLORX; STATE DOWN.
```

(Neighbor state is down, received Hello packet from Neighbor.)

```
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV DOWN; EVENT HELLORX;
NEXT INIT.
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT 2WAYRX; STATE INIT.
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV INIT; EVENT 2WAYRX;
NEXT 2WAY.
```

(Received Hello, neighbor state is 2 WAY.)

```
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT ADJOK; STATE 2WAY.
tOspf-:  ospfNbrAdjOk: nbr 10.40.110.3: moving to EXSTART
tOspf-:  ospfNbrClearAdjacency: Clearing Adjacency : NBR 10.40.110.3, Intf addr
10.40.110.2
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV 2WAY; EVENT ADJOK; NEXT
EXSTART.
tOspf-:  ospfBuildRouterLsa: Built Router LSA: Area 5 Seq 0x80000002 numLinks 1
Age 0
tOspf-:  ospfRecvDD: EXSTART: ddPkt I_M_MS (Master, More, Init) Nbr Addr
10.40.110.3:
         len = 0, nbr rtrId = 192.168.50.3, nbr seqnum = 7408000, ddPkt seqnum =
106867000
tOspf-:  ospfRecvDD: EXSTART: ddPkt I_M_MS (Slave, noMore, noInit) Nbr Addr
10.40.110.3:
         len = 20, nbr rtrId = 192.168.50.3, nbr seqnum = 7408000, ddPkt seqnum
= 7408000
```

(Negotiating for Master and Slave relationship.)

```
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT NEGODONE; STATE EXSTART.
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV EXSTART; EVENT
NEGODONE; NEXT EXCHANGE.
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT EXCHDONE; STATE EXCHANGE.
Exchange Done with the Neighbor
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV EXCHANGE; EVENT EXCH-
DONE; NEXT LOADING.
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT LOADDONE; STATE LOADING.
tOspf-:  ospfBuildRouterLsa: area 0.0.0.5, lsa time = 7408, curTime =
7409.Aborting!
```

```
tOspf-:  ospfNbrStateMachine: (10.40.110.3) Change! PREV LOADING; EVENT LOAD-
DONE; NEXT FULL.
```

(Loading of the LSAs done, spf calculations being done and the routes are getting loaded in the route table. The state moves to Full with the neighbor.)

```
tOspf-:  ospfAreaTimer:3356 ospfBuildRouterLsa(area 0.0.0.5, flags 0x5).
[curTime = 7410s]
tOspf-:  ospfBuildRouterLsa: Built Router LSA: Area 5 Seq 0x80000003 numLinks 1
Age 0
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT HELLORX; STATE FULL.
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT 2WAYRX; STATE FULL.
tOspf-:  ospfNbrStateMachine: NBR 10.40.110.3; EVENT HELLORX; STATE FULL.
```

Other debug-types may be enabled as per need. The output of this command is verbose so care should be taken before enabling the debug types.

For further troubleshooting the problem contact tech support.

BGP Troubleshooting

Be sure that the BGP neighbor Operational State is 'established'.   The BGP neighbor 'maximum-prefix' default is 5000.   This value may be increased to 65000, which is the limitation of the NI routing table; a total of 64K route entries. The maximum number of BGP routes will be a subset of this number, depending on how many other routes exist (RIP, OSPF, etc.). The number of BGP routes can be learn, depends on the system memory resources.

When the Operation State is idle or active, increasing the maximum-prefix may resolve the issue.

The following commands are used to troubleshoot BGP failures:

```
show ip bgp neighbors
show ip bgp routes
show ip bgp statistics
show ip bgp aggregate-address
show ip bgp path
show ip bgp network


-> show ip bgp neighbors
Legends: Nbr = Neighbor
         As  = Autonomous System
Nbr address     As    Admin state Oper state   BGP Id          Up/Down
---------------+-----+-----------+------------+---------------+-----------
152.23.1.9       227  enabled     established  20.23.24.20     17h:00m:17s
152.23.1.10      227   enabled     established  20.23.24.17     19h:21m:18s
```

```
-> show ip bgp neighbors statistics  152.23.1.9
Neighbor address                   = 152.23.1.9,
# of UP transitions                = 4,
Time of last UP transition         = 21d:11h:42m,
# of DOWN transitions              = 6,
Time of last DOWN transition       = 21d:11h:43m,
Last DOWN reason                   = hold_timeout,
# of msgs rcvd                     = 102904,
# of Update msgs rcvd              = 4,
# of prefixes rcvd                 = 1,
# of Route Refresh msgs rcvd       = 0,
# of Notification msgs rcvd        = 1,
Last rcvd Notification reason      = update message error [malformed aspath]
Time last msg was rcvd             = 00h:00m:06s,
# of msgs sent                     = 187265,
# of Update msgs sent              = 85668,
# of Route Refresh msgs sent       = 0
# of Notification msgs sent        = 1,
Last sent Notification reason      = hold time out [none]
Time last msg was sent             = 00h:00m:00s,


7700-> ip bgp debug-type ?
                     ^
                     WARNINGS TM TCP SYNC SENDUPD ROUTE REDIST
                     RECVUPD POLICY PEER OPEN NOTIFY MIP LOCAL
                     KEEPALIVE INFO FSM ERRORS DAMP ALL AGGR
(IP Routing & Multicast Command Set)
```

To debug BGP:

```
1) ip bgp debug-level 51
2) ip bgp debug-type peer
3) ip bgp debug-type open
4) ip bgp debug-level 0
```

Dshell Troubleshooting Advanced IP Routing

The following Dshell commands are used to troubleshoot advanced IP routing.

ipdbg=x

This command runs on the NI of the 7700/8800. Value can be 'OR'ed (for example, 0x20001000 is 'OR'ed with IPDBG_DBG and IPDBG_WARN). The most common value is 0x20000000. The default value is 0x10000000. Please run this command with a **taskDelay** <*tick value*>. A value of 300 ticks equals 5 seconds. To change to a different module, use the command '**changeslot** <*slot#*>. For the 6600 and 6800, this command is run directly on the stack in Dshell.

```
->dshell

1:0 nidbg>ipdbg=0x20000000;taskDelay 600;ipdbg=0x10000000

Working: [Kernel]->ipdbgHelp
IPDBG_IPRCV      0x1
IPDBG_ARPRCV     0x2
IPDBG_IPSND      0x10
IPDBG_ARPSND     0x20
IPDBG_DECODE     0x100
IPDBG_HEXDMP     0x200
IPDBG_ARPTIMER   0x400
IPDBG_DBG        0x1000
IPDBG_AVLAN      0x2000
IPDBG_ROUTE      0x4000
IPDBG_ARP        0x8000
IPDBG_CMMRCV     0x10000
IPDBG_CMMSND     0x20000
IPDBG_CMMDECODE   0x40000
IPDBG_CMMHEX     0x80000
IPDBG_CMMDBG     0x100000
IPDBG_CMMDMP     0x200000
IPDBG_ECMP       0x400000
IPDBG_VRRP       0x800000
IPDBG_SOCK       0x1000000
IPDBG_DOS        0x2000000
IPDBG_PRODSPEC   0x4000000
IPDBG_NOERR      0x10000000
IPDBG_WARN       0x20000000
IPDBG_VERBOSE    0x40000000
IPDBG_HEX        0x80000000
value = 0 = 0x0
Working: [Kernel]->
```

ifShow

Shows the IP router interfaces on the CMM.

```
->dshell
Certified: [Kernel]->ifShow
lo (unit number 0):
     Flags: (0x8069) UP LOOPBACK MULTICAST ARP R
     Type: SOFTWARE_LOOPBACK
```

```
            Internet address: 127.0.0.1
            Netmask 0xff000000 Subnetmask 0xff000000
            Metric is 0
            Maximum Transfer Unit size is 32768
            46 packets received; 46 packets sent
            0 multicast packets received
            0 multicast packets sent
            0 input errors; 0 output errors
            0 collisions; 0 dropped
```

iprmShowRoutes

Shows the types of routes on the CMM.

```
->dshell
Working: [Kernel]->iprmShowRoutes
tShell-:
          TOS Destination     Gateway      Protocol  Metric  Pri  VLAN  tShell-:
-
tShell-:   0   0.0.0.0/0      172.50.1.254  STATIC-0  1       0  0     0x0
tShell-:   0   128.0.0.0/8    10.255.13.1   STATIC-0  1       0  0     0x400
tShell-:   0   172.50.0.0/16  172.50.1.23    LOCAL -0 1       0  0     0x0
```

iprmCountRoutes

Shows the total number of IP routes on the CMM.

```
->dshell
Working: [Kernel]->iprmCountRoutes
  25 routes in IPRM RIB
     21 OSPF
     0 RIP
     1 STATIC
     3 LOCAL
     0 BGP
     0 others
value = 15 = 0xf
```

ipni_ifShow

Shows the IP router interfaces per NI.

```
1:0 nidbg> ipni_ifShow
1:0
1:0 fe8 vlan202. [@0x014885a0]
1:0     Flags 0x1041  State 0x1
1:0     Internet address: 169.10.108.3
1:0     Netmask 0xfffffc00 Subnetmask 0xfffffc00
1:0     Ethernet Address: 00:d0:95:86:88:69
1:0     VRRP Ethernet Address: 00:00:00:00:00:00
1:0     Maximum Transfer Unit size is 1500
1:0     Arp timeout is 300.
1:0     If address list pointer 1488510
```

```
1:0
1:0 fe7 vlan180. [@0x01488690]
1:0     Flags 0x1041  State 0x1
1:0     Internet address: 169.10.208.3
1:0     Netmask 0xfffff000 Subnetmask 0xfffff000
1:0     Ethernet Address: 00:d0:95:86:88:68
1:0     VRRP Ethernet Address: 00:00:00:00:00:00
1:0     Maximum Transfer Unit size is 1500
1:0     Arp timeout is 300.
1:0     If address list pointer 1488600
1:0
```

Iprm_routeShow

Shows the type of routes per NI.

```
1:0 nidbg> ipni_routeShow
1:0
1:0 Slot 1. NI Routes
1:0 destination     gateway            flags  refcnt    vlan
1:0 169.10.0.0      169.10.0.5           101       0       5
1:0 169.10.8.0      169.10.0.134        c003       0       5
1:0 169.10.8.0      169.10.0.135        8003       0       5
1:0 169.10.32.0     169.10.32.3          101       0     120
1:0 169.10.64.0     169.10.64.3          101       0     110
1:0 169.10.80.0     169.10.80.3          101       0     130
1:0 169.10.108.0    169.10.108.3         101       0     202
1:0 169.10.128.0    169.10.128.3         101       0     160
1:0 169.10.160.0    169.10.160.3         101       0     150
1:0 169.10.176.0    169.10.176.3         101       0     140
```

Ipni_routeCount

Shows the total number of IP routes per NI.

```
1:0 nidbg> ipni_routeCount
1:0
1:0 routes: 166 ecmps: 156 Unique Destinations: 88 arps: 3017 other: 0
1:0 value = 0 = 0x0
```

ospfDbgDumpEnv

```
Working: [Kernel]->ospfDbgDumpEnv
Dumping ospfEnv contents...

curTime/upTime           = 1742821s
operStatus               = 1
iprmTaskStatus           = 1
iprmRegd                 = 1
numAreas                 = 1
numActiveAreas           = 1
numRoutes                = 148 (23)
isShuttingDown           = 0
```

```
sessionId                = 0
spfCount                 = 97
incrSpfCount             = 0
ageTimer                 = 180
ageTicks                 = 61
***Dumping myConfig contents***
cfg.flags                = 0x223
cfg.mcastExtensions      = 0x0
cfg.spfHold              = 10
cfg.spfDelay             = 5
cfg.routeTag             = 0
cfg.redistHostRoutes     = 0
routerId                 = 0xa111b67
version                  = 2
areaBdrRtrStatus         = 0
spfStatus                = 1
***Dumping Global spfInfo contents***
incrSpfCount             = 0x0
spfLast                  = 0x18fadb
spfSignature             = 0x0
spfMaxNodes              = 0x1388
incrSpfMaxNodes          = 0x1388
.................
candidateList            = NULL!!
pathTypeMask             = 0x0
intraSignature           = 0x0
interSignature           = 0x0
extSignature             = 0x1
startEvent               = 0x0
nextEvent                = 0x0
maxNodes                 = 0x0
numNodes                 = 0x0
totalNodes               = 0x0
handle                   = 0x0
spfRunCount              = 0x0
startTime                = 0x0
schedTime                = 0xffffffff
transAreaId              = 0x0
lsType/lsId/advRtr       = 0x0/0x0/0x0
.................
*** List/Lsdb/Rdb pointers ***
*ifList                  = 0x4793410
*vlinkList               = 0x47a54a8
*hostList                = 0x47a55b8
*nbrList                 = 0x47a5530
*asExtLsdb               = 0x4795048 (16)
*netSum                  = 0x4777c18
*asbrSum                 = 0x4777b90
*freeExtLsaList          = 0x0
*freeSumLsaList          = 0x0
*stubAreaList            = 0x0
*areaList                = 0x47940b8
&areaTable[]             = 0x48f2cc8
redistProtoMask          = 0x2
redistTable[0]  = 0x0
redistTable[1]  = 0x47936f0
redistTable[2]  = 0x0
redistTable[3]  = 0x0
redistTable[4]  = 0x0
```

```
redistTable[5]  = 0x0
redistTable[6]  = 0x0
redistTable[7]  = 0x0
*rdbRtr                  = 0x47a5640
*rdbNet                  = 0x48ed4a8
*rdbAsbr                 = 0x47cb6a0
*extRdb                  = 0x47adbd4
*** ipConfig contents ***
defaultEncap             = 0
defaultTTL               = 0
primaryAddr              = 0
defaultGwAddr            = 0
ifCfgList                = 0x0
rdbSyncCount             = 0
rdbSyncTimer             = -1
*** Fast Memory Pool Ids ***
NbrPoolId                = 0x48edbd8
RoutePoolId              = 0x48ed858
LsaQueuePoolId           = 0x48ed818
RdbSyncMsgPoolId         = 0x48ed7d8
AreaAggrNodePool         = 0x48ed678
AreaAggrLeafPool         = 0x48ed798
RouteNodePool            = 0x48ed558
RouteLeafPool            = 0x48ed598
RedistNodePool           = 0x48ed4d8
RedistLeafPool           = 0x48ed518
blockResizeTimer         = 1744861 [0x1a9fd
**** OSPF Graceful Restart Info ****
CONFIG:
restartSupport           = 1
helperSupport            = 1
helperStrictLSAChecking  = 1
restartInterval          = 120
RUNNING STATE:
inRestart          = 0
inHelper           = 0
restartExitReason  = 1
restartTimer       = 0
restartDelayTimer  = 0
value = 23 = 0x17
Working: [Kernel]->
```

13 Troubleshooting Virtual Router Redundancy Protocol (VRRP)

In This Chapter

Overview

VRRP specifies an election protocol. All protocol messaging (not user data) is performed using IP multicast datagrams. The Multicast IP address is 224.0.0.18. This allows VRRP to operate over a variety of LAN technologies supporting IP. There source MAC address for these datagrams is also specified in the RFC. That is 00-00-5E-00-01-(VRID).

The last pair in the Mac address is the Virtual Router ID (VRID). This is a configurable item. A virtual router is defined by the VRID and a set of IP addresses. Thus a router may associate a virtual router with a real address on an interface as well as different addresses for the virtual router and the interface. The mapping between VRID and addresses must be coordinated among all VRRP routers on a LAN. It is allowed reuse the same VRID with a different address mapping on a different VLAN. Each Virtual Router is restricted to a single VLAN.

Only the Master Router for each Virtual Router sends periodic VRRP Advertisements. A back-up router will not preempt a Master unless it has a higher priority. It is possible to preempt all preempt attempts. The only exception is when there is a VRRP router that has the virtual router as an interface address. In that case that router will always preempt.

After election of the Master Router, the Master Router will send VRRP Advertisements.

As long the Backup Router receives the VRRP Advertisements, it will only listen. The moment it’s not receiving VRRP advertisements for a configured amount of time, the Backup Router will announce itself as new Master Router in the VLAN.

In case more then one Backup Router exist, the one with the second highest priority will become Master Router.

It should be noted that while the VRRP router must reply to ARP messages for the IP/MAC address information it must not reply to echo request unless the virtual address is a real address on that switch.

VRRP defines three possible types of authentication. Do not mistake this authentication for access to the network or its resources. This refers to whether or not a VRRP router will accept another VRRP routers messages. The 3 types are None, Simple Text Password, and IP security.

Protocol Information

This next section describes how VRRP routers exchange information.

IP Field Descriptions

Source Address	The primary address of the interface the packet is being sent from.
Destination Address	The IP Multicast address 224.0.0.18
TTL	Must be 255 or packet is dropped.
Protocol	112 decimal.

VRRP Field Descriptions

Version	Specifies the VRRP version of the packet. Currently this is version 2.
Type	There is only one type. 1-Advertisement. A packet set to anything other than 1 is discarded.
VRID	The virtual Router Identifier.
Priority	Priority field can be 1-255 decimal. Higher Priorities have preference. 255 is always used by a VRRP router that uses the Virtual IP address as a real address on an interface. Default is 100.
Count IP Address	The number of IP addresses in this advertisement.
Authentication Type	Indicates the method of authentication. As mentioned before, there are 3 types: No Authentication, Simple Text Password, IP authentications.

VRRP States

There are only 3 states that a VRRP Router can be in. They are initialize, Master, and Back-up.

OmniSwitch 7700/7800/8800 Implementation

This section will cover how and what the OmniSwitch 7700/7800/8800s will support.

VRRP Security

The OmniSwitch7700/7800/8800 will support no authentication and simple text password. However the third method mentioned in the RFC, IP Authentication with HD5 HMAC is not supported in this the current release of VRRP software.

OmniSwitch VRRP Limitations

VRRP has a 255 VRRP Instance Limit in a chassis. In addition, VRRP is done in hardware for all VRRP IDs. However, you can only use a VRRP ID once. It cannot be reused in another VLAN. The RFC indicated no limitation on reusing VRRP IDs in multiple VLANs, but OmniSwitch7700/7800/8800 does not support this in the first release. This could cause a problem if the VRRP Partner Router is limited on the number of Hardware Routed VRRP IDs like the OmniCore.

The OmniCore is limited to 4 VRRP IDs (0-3) because it can route in hardware only 4 Virtual MAC addresses. These Virtual MAC addresses can be reused in separate VLANs however. When used with the OmniSwitch7700/7800/8800 switches with the same limitations as the OmniCore will need to be the stand-by router. If you do not design the network this way the limited VRRP Router will have to route in software. This will slow communications and may be too much for the device to handle. For example, the OmniCore EMM can handle only about 28 Kbps at the upper level.

CMM Failover

When the CMM receives a Takeover message from the Chassis Supervisor it will first inform ARP to purge all entries for the virtual router IP/Mac addresses.

VRRP will then continue with a normal start-up procedure, even though interfaces are already enabled upon bootup of secondary. If the switch is the virtual IP address owner the switch will become the Master and add the appropriate entries for the Virtual IP address/MAC address to the ARP table. For all other configured virtual routers the routers will become back up.

There will be a time during a fail over that the system will not be sending VRRP advertisements. If the failover interval exceeds the Master Timeout Interval (the timer that tells a back-up it needs to take over as the master. Formula for this interval is found in the RFC.) The backup Router will take over as the Master. However the ARP and HRE tables on the Network Interface (NI) cards will still contain the virtual IP/ MAC entries. As a consequence there could be a short period of time that 2 routers will be responding to packets for the Virtual address. This will stop when VRRP is activated on the secondary CMM and the ARP and HRE tables are cleared.

Important Information about using the CLI Command set for VRRP:

- A virtual router must be disabled before it may be modified.
- If a password is configured for VRRP authentication, the same password must be configured for all participating VRRP routers.
- A value of 255 indicates that the VRRP router owns the IP address, that is, that the router contains the real physical interface to which the IP address is assigned. The system automatically sets this value to 255 if it detects that this router is the IP address owner. The IP address owner will always be the master router if it is available.
- VRRP routers backing up a virtual router must use priority values from 1 to 254. The default priority value for VRRP routers backing up a virtual router is 100. If you configure more than one backup, their priority values should be different. Preempt and no preempt settings specifies whether or not a higher priority router may preempt a lower priority router.
- The system sets the priority value to zero in the last VRRP advertisement packet before a master router is shut down (when a router is added or deleted to the configuration).

show vrrp statistics

Displays statistics about VRRP packets for all virtual routers configured on the switch or for a particular virtual router.

show vrrp [*vrid*] statistics

Syntax Definitions

vrid	The virtual router ID, in the range from 1–255 (OmniSwitch 7700, 7800, or 8800) or 1–7 (OmniSwitch 6624 or 6648).

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

Use the **show vrrp statistics** command to display information about VRRP packets. Use the **show vrrp** command to display information about the virtual router configuration.

Examples

```
-> show vrrp statistics
Checksum   Version      VRID
 Errors      Errors      Errors
----------+-----------+---------
         0          0         0

VRID  VLAN   State          UpTime   Become Master   Adv. Rcvd
----+ ----+ -------------+----------+--------------+------------
   1      1  master         378890           1             0
   2     15  backup           4483           0         64783
   7      2  initialize          0           0             0
```

output definitions

Checksum Errors	The total number of VRRP packets received with an invalid checksum value.
Version Errors	The total number of VRRP packets received with an invalid version number.
VRID Errors	The total number of VRRP packets received with an invalid VRID for this virtual router.
VRID	The virtual router identifier.
VLAN	The VLAN associated with the VRRP instance.

output definitions (continued)

State	The administrative state of the VRRP instance; **initialize** means that this VRRP instance is waiting for a startup event, such as a reboot or when the virtual router is disabled; **backup** means that this instance is monitoring the availability and the state of the master router; **master** means that this instance is functioning as the master router.
UpTime	Time interval (in hundredths of a second) since this virtual router was last initialized.
Become Master	The total number of times this virtual router's state has transitioned from backup to master.
Adv. Rcvd	The total number of VRRP advertisements received by this instance.

```
-> show vrrp 1 statistics
Virtual Router VRID = 1 on VLAN = 1
   State                                  = master
   UpTime (1/100th second)                = 378890
   Become master                          = 1
   Advertisement interval errors          = 0
   Password errors                        = 0
   Authentication errors                  = 0
   Authentication type errors             = 0
   IP TTL errors                          = 0
   IP address list errors                 = 0
   Zero priority advertisements sent      = 0
   Zero priority advertisements received  = 0
```

output definitions

VRID	The virtual router identifier.
VLAN	The VLAN associated with the VRRP instance.
State	The administrative state of the VRRP instance; **initialize** means that this VRRP instance is waiting for a startup event, such as a reboot or adding a new virtual router to the configuration; **backup** means that this instance is monitoring the availability and the state of the master router; **master** means that this instance is functioning as the master router.
UpTime	Time interval (in hundredths of a second) since this virtual router was last initialized.
Become master	The total number of times this virtual router's state has transitioned from backup to master.
Advertisements received	The total number of VRRP advertisements received by this instance.
Type errors	The total number of VRRP packets received with an invalid value in the VRRP type field.
Advertisement interval errors	The total number of VRRP packets received in which the advertisement interval was different than the one configured for the virtual router.
Password errors	The total number of VRRP packets received that did not pass the simple text password authentication check.
Authentication errors	The total number of VRRP packets received with an unknown or invalid authentication type.

output definitions (continued)

Authentication type errors	The total number of VRRP packets received in which the AuthType value was different than the one configured for the virtual router.
IP TTL errors	The total number of VRRP packets received in which the IP address list does not match the configured list for the virtual router.
IP address list errors	The total number of VRRP packets in which the IP address list does not match the configured list for the virtual router.
Zero priority advertisements sent	The total number of VRRP advertisements with a priority of 0 sent by the virtual router.
Zero priority advertisements received	The total number of VRRP advertisements with a priority of 0 received by the virtual router.

Release History

Release 5.1; command was introduced.

OmniSwitch VRRP Troubleshooting

The following commands can be used to troubleshoot VRRP:

swlog appid vrrp level debug3

Example output:

```
sw-2> swlog appid vrrp level debug3
+++ vrrpAdverTimer
+++ vrrpSendAdvPkt: vrid=1 pri0=0
+++ vrrpSendAdvPkt: VRID 10 (0xa) sent 20 bytes
+++ vrrpAdverTimer
+++ vrrpSendAdvPkt: vrid=1 pri0=0
+++ vrrpSendAdvPkt: VRID 10 (0xa) sent 20 bytes
+++ vrrpAdverTimer
+++ vrrpSendAdvPkt: vrid=1 pri0=0
+++ vrrpSendAdvPkt: VRID 10 (0xa) sent 20 bytes
```

debug ip packet protocol num 112 start timeout 30

Example output:

```
C S 1/F 00005e00010b->01005e000012 IP 192.168.101.254->224.0.0.18 VRRP
C S 1/F 00005e00010c->01005e000012 IP 192.168.102.254->224.0.0.18 VRRP
1 R CMM (00005e00010a)->01005e000012 IP 192.168.100.254->224.0.0.18 VRRP 33,10
1 S IPM 00005e00010a->01005e000012 IP 192.168.100.254->224.0.0.18 VRRP 33,10
1 R CMM (00005e00010b)->01005e000012 IP 192.168.101.254->224.0.0.18 VRRP 33,11
1 S IPM 00005e00010b->01005e000012 IP 192.168.101.254->224.0.0.18 VRRP 33,11
1 R CMM (00005e00010c)->01005e000012 IP 192.168.102.254->224.0.0.18 VRRP 33,12
```

Other things to check in case of problems:

- Use a sniffer to see if packets are send by the master VRRP router and received at the backup VRRP routers.
- If two VRRP routers both believe that they are the masters and you have check the cabling and the port membership of the VLAN the VRRP instance is in then it is possible that there is a disagreement in one or more of the VRRP configured parameters. The **show vrrp** *vrrpid* **statistics** command will show you if you are receiving advertisements from the other VRRP Routers and if those advertisements are being dropped because of an error in the packet. ~~Here is an example of the output.~~

ARP Table

The ARP Table of the OmniSwitch that is the Master Router will have the Virtual MAC Learned in the ARP Table. It will not be learned on a port. In the example below I use the **show arp** command to illustrate before and after a switch the VRRP master.

```
-> show arp

Total 3 arp entries
 Flags (P=Proxy, A=Authentication, V=VRRP)

 IP Addr           Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+----------
172.50.1.254      00:00:5e:00:01:32   STATIC     PV      UNKNOWN  vlan 500

 172.51.1.254      00:00:5e:00:01:33   STATIC     PV      UNKNOWN  vlan 501

 172.52.1.254      00:00:5e:00:01:34   STATIC     PV      UNKNOWN  vlan 502

-----------------+-------------------+----------+-------+--------+----------

-> vrrp 1 2 disable
SUN FEB 19 23:05:28 : VRRP (77) info message : Virtual router VRID=1 VLAN=2 state
is initialize
-> SUN FEB 19 23:05:28 : VRRP (77) info message : Virtual router VRID=1 VLAN=2
disabled
vrrp 1 2 priority 110
-> vrrp 1 2 enable
SUN FEB 19 23:05:41 : VRRP (77) info message : Virtual router VRID=1 VLAN=2 enabled
-> SUN FEB 19 23:05:42 : VRRP (77) info message : Virtual router VRID=1 VLAN=2
state is backup
SUN FEB 19 23:05:46 : VRRP (77) info message : Virtual router VRID=1 VLAN=2 state
is master

Total 1 arp entries
 Flags (P=Proxy, A=Authentication, V=VRRP)

 IP Addr           Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+----------
 10.1.96.5         00:50:04:b2:c9:ee   STATIC     PV      UNKNOWN  vlan 2
```

Dshell Troubleshooting

In a situation where VRRP is flapping, go into Dshell of the switch that is configured as the backup virtual router that is flapping and enter **vrrpTMon(1,** *vrid, vlanId***)**. For example, for virtual router 200 on VLAN 200 the command will be: **vrrpTMon(1,200,200)**. You should then see the advertisements arriving once per second on your console. Before running Dshell commands make sure to verify the configuration of all VRRP participated switches.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

```
7800-1 -> dshell
Working: [Kernel]->vrrpTMon (1,200,200)
vrrpDbg = 00000010 vrrpDbgVR = 00C800C8
value = 1 = 0x1

Working: [Kernel]->
I 54758886   VRID 200  VLAN 200
  4500 0014 0DC3 0000 FF70 0000 ACC8 011C
  E000 0012 21C8 FF01 0001 3150 ACC8 011C
  0000 0000 0000 0000

I 54758986   VRID 200  VLAN 200
  4500 0014 7449 0000 FF70 0000 ACC8 011C
  E000 0012 21C8 FF01 0001 3150 ACC8 011C
  0000 0000 0000 0000

I 54759086   VRID 200  VLAN 200
  4500 0014 E847 0000 FF70 0000 ACC8 011C
  E000 0012 21C8 FF01 0001 3150 ACC8 011C
0000 0000 0000 0000
```

Watch for the sequence number increasing. This indicates 3 hello packets received in 3 seconds.

Disable this Dshell command by setting value 0.

```
Working: [Kernel]->vrrpTMon 0
```

14 Troubleshooting IP Multicast Switching (IPMS)

In order to troubleshoot IP Multicast Switching, a basic understanding of its function is required. Some basic concepts are covered below. OmniSwitch 7700/7800/8800 supports IP Multicast Switching and Routing.

Reading the "Configuring IP Multicast Switching" chapter in the appropriate *OmniSwitch Network Configuration Guide* is also highly recommended.

In This Chapter

Troubleshooting a Device that Cannot Join an IP Multicast Stream

If a device cannot join a stream, the first thing to do is to verify Layer 2/Layer 3 connectivity and that no physical errors exist. The next step is to look at the switch the device is attache to, see if the device is a member of the multicast group. This is done by issuing the **show ip multicast groups** command:

```
-> show ip multicast groups
  Destination IP         Source IP       VLAN Slot/Port Expire
--------------------+--------------------+----+---------+------
224.0.0.9            10.10.10.50            1      5/23    250
224.0.1.22           10.10.10.65            1      5/23    249
224.0.1.24           10.10.10.5             1      5/23    247
239.255.255.250      10.10.10.50            1      5/23    244
239.255.255.250      10.10.10.66            1      5/23    140
239.255.255.254      10.10.10.5             1      5/23    251
239.255.255.254      10.10.10.70            1      5/23    137
```

Note. Complete details of the output of this and other IP Multicast commands can be obtained from the "IP Multicast Switching" chapter in the appropriate *OmniSwitch CLI Reference Guide*.

This will show a listing of the multicast groups currently known by this switch, listing the IP address of the stream (Destination IP), and the source of the IGMP join message (Source IP, in this instance the "client"). If the switch has seen an IGMP message it will add the client to this list, you can verify the slot and port from the table. The above example shows the multicast streams available on the switch, which is connected via slot 5 port 23. In the next example, a client (10.10.10.64) has join a VLAN 1 multicast stream:

```
-> show ip multicast groups
  Destination IP         Source IP       VLAN Slot/Port Expire
--------------------+--------------------+----+---------+------
224.0.0.9            10.10.10.50            1      5/23    192
224.0.1.22           10.10.10.65            1      5/23    191
224.0.1.24           10.10.10.5             1      5/23    195
224.77.1.0           10.10.10.64            1      5/15    217
224.77.205.58        10.10.10.64            1      5/15    221
239.255.255.250      10.10.10.50            1      5/23    196
239.255.255.254      10.10.10.70            1      5/23    191
```

This shows a functional stream is now being sent to slot 5 port 15, and gives the multicast stream's IP address(es). The expiry timer shows the number of seconds left before the particular stream times out on the slot/port if an IGMP message is not received. When the switch receives an IGMP message it will reset the timer to 260 seconds; this process repeats until the station leaves the stream, or the stream itself fails for some reason.

If your device cannot join a stream, you will not see it in the list. The next step to take is to repeat the **show ip multicast groups** command on the next switch in line between the end station and the stream source until you find out where the stream fails. You will find a point where a stream exists on one switch, but not on the next one in line to the destination. The task then becomes configuring those units to properly pass IP Multicast traffic (see the "Configuring IP Multicast" chapter in the appropriate *OmniSwitch Network Configuration Guide.*

Troubleshooting a Device that Drops Out of an IP Multicast Stream

If the issue is a device can actually join a multicast stream, but loses it after a period of time, there are a few items to check. First, does the device lose the stream when the Expiry timer reaches zero in the **show ip multicast groups** command?

```
-> show ip multicast groups
  Destination IP          Source IP        VLAN Slot/Port Expire
--------------------+--------------------+----+---------+------
224.0.0.9            10.10.10.50            1      5/23    242
224.0.1.22           10.10.10.65            1      5/23    239
224.0.1.24           10.10.10.5             1      5/23    235
224.77.1.0           10.10.10.64            1      5/15    235
224.77.205.58        10.10.10.64            1      5/15    234
239.255.255.250      10.10.10.66            1      5/23    236
239.255.255.254      10.10.10.5             1      5/23    235
239.255.255.254      10.10.10.70            1      5/23    260
```

Once this timer reaches zero, the switch will stop sending the multicast stream to this port, as it believes there are no longer any devices requesting it. This could happen if in the VLAN where the device connects, an IP multicast router does not exist. The multicast client will send IGMP messages on layer 3, and if the VLAN has no L3 instance, there is no way for it to listen to those messages. It is then recommended to have at least one IP multicast router configured and enabled on the VLAN.

Issue a **show vlan** command to check the configuration of the VLAN. For example:

```
-> show vlan 1
Name                : VLAN 1,
Administrative State: enabled,
Operational State   : disabled,
Spanning Tree State : enabled,
Authentication      : disabled,
IP Router Port      : none,
IPX Router Port     : none
```

Assign the VLAN an IP address that is proper for your network:

```
-> vlan 1 router ip 10.10.10.7 mask 255.255.255.0
```

Then reissue the **show vlan** command to verify:

```
-> show vlan 1
Name                : VLAN 1,
Administrative State: enabled,
Operational State   : disabled,
Spanning Tree State : enabled,
Authentication      : disabled,
IP Router Port      : 10.10.10.7  255.255.255.0  forward  e2,
IPX Router Port     : none
```

Now that an IP address has been assigned, recheck the **show ip multicast groups** command and verify that the slot/port in question has an entry. You should see the timer decrement and reset as described above.

Is Multicast Switching enabled on your switch? If it is not enabled, you will likely notice high utilization for the switch, and devices in the VLANs where multicast traffic is flowing will be being flooded with the stream(s). As Multicast Switching comes standard with this release, it should be enabled.

Use the **show ip multicast switching** command to display the current IPMS configuration on a switch.

If it is not enabled, you will see:

```
-> show ip multicast switching

IPMS Configuration

IPMS State:            Disabled,
Hardware Routing:      Disabled,
Priority:              high,
Max Ingress Bandwidth: 10,
Leave Timeout:         1,
Membership Timeout:    260,
Neighbor Timeout:      90,
Querier Timeout:       260,
Query Interval:        125
```

To enable it, enter:

```
-> ip multicast switching
```

Then the **show ip multicast switching** command will show:

```
-> show ip multicast switching

IPMS Configuration

IPMS State:            Enabled,
Hardware Routing:      Disabled,
Priority:              high,
Max Ingress Bandwidth: 10,
Leave Timeout:         1,
Membership Timeout:    260,
Neighbor Timeout:      90,
Querier Timeout:       260,
Query Interval:        125
```

With the presence of multicast router on the network, you need to see if IP Multicast enabled switch has this router listed as a multicast neighbor. In addition, one multicast querier should exist per network, this querier corresponds to the one switch or router participant of the multicast domain with the lowest IP address.

```
-> show ip multicast neighbors
     Source IP      VLAN Slot/Port Expire  Type
--------------------+----+---------+------+-------
10.10.10.187          5     4/5      Never Static
```

The above example has a static-neighbor configured. A static-neighbor is a port configured to receive all multicast streams on a VLAN, as well as to receive all IGMP reports for the VLAN.

If you do not see the neighbor switch in the output, as a work around you may want to add it as a Static Neighbor and verify connectivity. See the “Configuring a Static Neighbor” section in the appropriate

OmniSwitch Network Configuration Guide. Also, see the “IPMS Application Example” section as it gives a good example of how and when to use several of the IPMS commands.

To find where a multicast stream begins in your network, you can use the **show ip multicast forwarding** command. This is similar to the **show ip multicast groups** command, but notice that “Source IP” in this command differs in that this states the entry point of the stream (server), whereas the **show ip multicast group** command displays the source IP of the IGMP join message (client). The slot/port output also gives you the “trail” to follow in tracking down the source of the multicast stream/server.

```
-> show ip multicast forwarding
                                        Source              Destination
 Multicast Group       Source IP       Type VLAN Slot/Port Type VLAN Slot/Port
-------------------+-------------------+----+----+---------+----+----+---------
        224.77.1.0        10.10.10.68  NATV    1      5/13 NATV    1      5/15
     224.77.205.58        10.10.10.68  NATV    1      5/13 NATV    1      5/15
```

Is your switch set up so that there are policies preventing multicast traffic from entering or leaving a particular VLAN? Use the **show ip multicast policy-cache** command to check:

```
-> show ip multicast policy-cache
Policy  Group Address    Src Address      Vlan   Port   Disp   Time
-------+----------------+----------------+------+------+------+------
MBR     224.0.0.9        10.10.10.50      1      5/23   ACPT   133
MBR     224.0.1.22       10.10.10.65      1      5/23   ACPT   132
MBR     224.0.1.24       10.10.10.5       1      5/23   ACPT   136
MBR     224.77.0.0       10.10.10.68      1      5/13   ACPT   138
MBR     224.77.1.0       10.10.10.64      1      5/15   ACPT   259
MBR     224.77.205.58    10.10.10.64      1      5/15   ACPT   258
MBR     239.255.255.250  10.10.10.50      1      5/23   ACPT   137
MBR     239.255.255.250  10.10.10.66      1      5/23   ACPT   258
MBR     239.255.255.254  10.10.10.70      1      5/23   ACPT   259
```

The “DISP” column should display ACPT for “Accept.”

IPMS follows the IGMP V2 specification, which means that the queriers are elected based on the switch/ router with the lowest IP address. During startup, all switches will be listed because they all send initial IGMP queries. After the official querier is elected, the other switches will stop flooding IGMP queries of their own. Eventually, only one querier in the network will remain, and will be the only one listed in the **show ip multicast queriers** command for all switches in the VLAN. The querier periodically sends a Membership Query message to the all-systems group (224.0.0.1). The hosts then respond with a host membership report message to the group address for the stream(s) they want to receive. The querier receives the message, and adds the group to its’ membership list.

```
-> show ip multicast queriers
      Source IP      VLAN Slot/Port Expire  Type
--------------------+----+---------+------+-------
10.10.10.190           1       5/1    167 Dynamic
```

Type of “Dynamic” means that the IP address was learned via IGMP messages, so the address should be alive and functioning; it is worth verifying that you can ping the addresses along your path, however.

You may also have a misconfigured or malfunctioning ip multicast static-querier. In the **show ip multicast queriers** command, look for Type of "Static" and check to see if the IP addresses configured exist and are functioning properly.

Also mentioned was that if a group membership expires it may be because it isn't on an IP VLAN. This is probably due to a querying problem. IPMS cannot send IGMP queries on a VLAN that doesn't have an IP address, but you can still have another switch in the same VLAN that is configured for IP and is querying. In this case, things will work because there is still a querier present, even if it is not a local switch. Remember that queriers are required for the re-solicitation of IGMP clients. Queries are sent every 120 seconds, to which all clients must respond with a membership report.

Also check the flood limits (show interfaces flood rate) to see if the switch is dropping packets due to them being over the limit:

You want to see **Flood only** in an IPMS environment. If you see:

```
-> show interfaces flood rate
Slot/Port   peak rate(Mb/second)   Enable
-----------+---------------------+---------------
4/1          47                    Flood/multicast
4/2          47                    Flood/multicast
4/3          47                    Flood/multicast
```

You will want to set it back to **Flood only** via:

```
-> interfaces 4 flood
```

Note that this is by slot, not by VLAN.

Troubleshooting IPMS in Debug CLI

The Debug CLI will allow you to view traffic traversing the switch in many ways. The most useful command for troubleshooting IP Multicast is:

```
-> debug ip packet show-multicast on board ni 1 output console
```

This command turns on debug for IP packets, turns on the ability to show multicast packets, looks only on blade #1, and outputs to console. The output is:

```
-> 1 R IPM 00d095206406->(01005e000001) IP 10.10.10.190->224.0.0.1 IGMPv2 MQ
1 S CMM 00d095206406->01005e000001 IP 10.10.10.190->224.0.0.1 IGMPv2 MQ
1 R IPM 00a0c955af3e->(01005e4d0100) IP 10.10.10.51->224.77.1.0 IGMPv2 MR
1 S CMM 00a0c955af3e->01005e4d0100 IP 10.10.10.51->224.77.1.0 IGMPv2 MR
1 R IPM 00c04f0c3b2d->(01005e7ffffe) IP 10.10.10.5->239.255.255.254 IGMPv2 MR
1 S CMM 00c04f0c3b2d->01005e7ffffe IP 10.10.10.5->239.255.255.254 IGMPv2 MR
1 R IPM 00c04f0c3b2d->(01005e7ffffe) IP 10.10.10.5->239.255.255.254 IGMPv2 MR
1 S CMM 00c04f0c3b2d->01005e7ffffe IP 10.10.10.5->239.255.255.254 IGMPv2 MR
1 R IPM 0060971c0c45->(01005e000009) IP 10.10.10.220->224.0.0.9 IGMPv2 MR
1 S CMM 0060971c0c45->01005e000009 IP 10.10.10.220->224.0.0.9 IGMPv2 MR
1 R IPM 0008c709f671->(01005e3796d0) IP 10.10.10.222->229.55.150.208 IGMPv2 MR
1 S CMM 0008c709f671->01005e3796d0 IP 10.10.10.222->229.55.150.208 IGMPv2 MR
1 R IPM 0008c709f671->(01005e3796d0) IP 10.10.10.222->229.55.150.208 IGMPv2 MR
1 S CMM 0008c709f671->01005e3796d0 IP 10.10.10.222->229.55.150.208 IGMPv2 MR
1 R IPM 00d095265480->(01005e000004) IP 10.10.10.34->224.0.0.4 IGMPv1 DV RSP
1 S CMM 00d095265480->01005e000004 IP 10.10.10.34->224.0.0.4 IGMPv1 DV RSP
1 R IPM 00a0c955af3e->(01005e4db6d6) IP 10.10.10.51->224.77.182.214 IGMPv2 MR
1 S CMM 00a0c955af3e->01005e4db6d6 IP 10.10.10.51->224.77.182.214 IGMPv2 MR
1 R IPM 0008c709f671->(01005e000118) IP 10.10.10.222->224.0.1.24 IGMPv2 MR
1 S CMM 0008c709f671->01005e000118 IP 10.10.10.222->224.0.1.24 IGMPv2 MR
1 R IPM 0008c709f671->(01005e000118) IP 10.10.10.222->224.0.1.24 IGMPv2 MR
1 S CMM 0008c709f671->01005e000118 IP 10.10.10.222->224.0.1.24 IGMPv2 MR
1 R IPM 0010a4c59c87->(01005e000116) IP 10.10.10.54->224.0.1.22 IGMPv2 MR
1 S CMM 0010a4c59c87->01005e000116 IP 10.10.10.54->224.0.1.22 IGMPv2 MR
1 R IPM 0010a4c59c87->(01005e000116) IP 10.10.10.54->224.0.1.22 IGMPv2 MR
1 S CMM 0010a4c59c87->01005e000116 IP 10.10.10.54->224.0.1.22 IGMPv2 MR
```

For this example, Ghost was used to multicast to a client as follows: Ghost server at 10.10.10.222, connected to an OSR9, which was uplinked to a Falcon 7700 via 10/100 Ethernet on 1/22; the Ghost multicast client was at 10.10.10.51 on 1/7. From the output, we can see that the client is receiving a stream with multicast address 224.77.182.214, which matches with the output of the **show ip multicast forwarding** command:

```
-> show ip multicast forwarding
                                        Source              Destination
 Multicast Group       Source IP       Type VLAN Slot/Port Type VLAN Slot/Port
-------------------+-------------------+----+----+---------+----+----+---------
    224.77.182.214       10.10.10.222  NATV    1      1/22 NATV    1       1/7
```

Showing the IP address of the source of the actual stream as 10.10.10.222.

Note the output of the show ip multicast queriers command during this test:

```
-> show ip multicast queriers
     Source IP      VLAN Slot/Port Expire  Type
--------------------+----+---------+------+-------
10.10.10.190           1      1/22    146 Dynamic
```

The .190 address is that of the uplinked OSR9 in the test.

The **show ip multicast neighbors** command will show the neighbors in this test network:

```
-> show ip multicast neighbors
     Source IP      VLAN Slot/Port Expire  Type
--------------------+----+---------+------+-------
10.10.10.34            1      1/22     85 Dynamic
```

It is actually unrelated to the test, other than it being in the test network while testing was being done. It is worthwhile to note that there is a neighbor being listed, and that it, too, was learned from port 1/22, the uplink port to the OSR9.

The **show ip multicast groups** command during the test:

```
-> show ip multicast groups
 Destination IP         Source IP       VLAN Slot/Port Expire
--------------------+--------------------+----+---------+------
224.0.0.9            10.10.10.220           1      1/22    157
224.0.1.22           10.10.10.54            1      1/22    210
224.0.1.24           10.10.10.222           1      1/22    210
224.77.1.0           10.10.10.51            1       1/7    156
224.77.182.214       10.10.10.51            1       1/7    162
229.55.150.208       10.10.10.222           1      1/22    210
239.255.255.254      10.10.10.5             1      1/22    210
239.255.255.254      10.10.10.222           1      1/22     85
```

You can match the groups to the associated IP addresses from the above debug command to verify that all is functioning properly.

Note for the debug CLI command:

The command

```
-> debug ip packet show-multicast on board ni 1 output console
```

will only set the options for debug. In order to actually see the output, you must enter:

```
-> debug ip packet start
```

And to stop the output:

```
-> debug ip packet stop
```

Another tip is to enter the full debug ip packet command, then enter debug ip packet stop, to which you will get a response "...already stopped," and then enter debug ip packet start. That way, in order to stop the display, you can simply up-arrow twice and hit enter to stop the display, which will likely be scrolling by quickly enough so that you cannot see what you are entering!

Dshell Troubleshooting

The IPMS application has its own shell to verify the specific data displayed on the CLI. Use a question mark to display the local list of commands for each level. Every CLI commend has a corresponding output on this shell with extended information on each entry. See examples below:

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

```
Certified: [Kernel]->ipmsdbg_shell
IPMS Debug Session
type '~' to quit session
MAIN> ?
Main Menu

   main    -  Main Menu
   clist   -  Display Sub-tasks
   restart - Restart IPMS

MAIN> clist
Connected Tasks

   ipmem
   ipmfm
   ipmni1  [slot/slice 1/0] [chipset C1] [ONLINE] []
   ipmni2  [slot/slice 8/0] [chipset C1] [ONLINE] []
   ipmni3  [slot/slice 9/0] [chipset C2] [ONLINE] []
   ipmni4  [slot/slice 16/0] [chipset C1] [ONLINE] []
   ipmni5  [slot/slice 2/0] [chipset C1] [ONLINE] []
   ipmni6  [slot/slice 7/0] [chipset C1] [ONLINE] []
   ipmni7  [slot/slice 10/0] [chipset C1] [ONLINE] []
   ipmni8  [slot/slice 15/0] [chipset C1] [ONLINE] []
   ipmni9  [slot/slice 6/0] [chipset C1] [ONLINE] []
   ipmni10  [slot/slice 3/0] [chipset C1] [ONLINE] []
   ipmni11  [slot/slice 11/0] [chipset C1] [ONLINE] []
   ipmni12  [slot/slice 14/0] [chipset C2] [ONLINE] []
   ipmni13  [slot/slice 4/0] [chipset C1] [ONLINE] []
   ipmni14  [slot/slice 5/0] [chipset C2] [ONLINE] []
   ipmni15  [slot/slice 12/0] [chipset C1] [ONLINE] []
   ipmni16  [slot/slice 13/0] [chipset C2] [ONLINE] []

MAIN> ipmem

IPMEM> ?

Current State:      Enabled
Hardware Routing:   Enabled
Priority:           0
Max Bandwidth:      10
RP Rate Threshold:  65536
PIM CKSUM mode:     Header Only

Available Commands:
     grp - Group Membership
     nbr - Neighbors
     qry - Queriers
     src - Sources
     prx - Proxy
    vprx - Proxy by Vlan
   v3prx - IGMPv3 Proxies
    qint - Querier interface list
    qtmr - Querier timer list
    hwrt - Toggle hardware flag
    enbl - Toggle enable flag


IPMEM> grp

Hash    Destination IP       Client IP       VLAN VPN  EXP  TYP Mode Version Flags
IDX       Source MAC
==== =================== =================== ==== === ===== === ==== ======= =====
0001 239.1.1.1           172.50.255.23      0500 128  241  NAT Excl  2      00000
0014 00b0d0:43d3f5
0022 224.0.1.22          172.99.255.153     0549 012  243  NAT Excl  2      00000
0001 0000c0:4affec
0024 224.0.1.24          172.99.255.153     0549 012  247  NAT Excl  2      00000
0001 0000c0:4affec
0090 239.0.0.90          172.99.255.153     0549 012  244  NAT Excl  2      00000
0001 0000c0:4affec
0101 239.1.1.101         172.50.255.23      0500 128  245  NAT Excl  2      00000
0014 00b0d0:43d3f5
0254 239.255.255.254     172.99.255.153     0549 012  247  NAT Excl  2      00000
0001 0000c0:4affec


IPMEM> nbr

Hash       Source IP      VLAN VPN EXP TYP  ID  FLAGS
==== =================== ==== === === === ==== =====
0000          172.62.1.28  512 128  90 NAT 0014 00000
0001          172.63.1.28  513 128  90 NAT 0014 00000
[ Deleted lines to reduce size]
0062          172.60.1.28  510 128  90 NAT 0014 00000
0063          172.61.1.28  511 128  90 NAT 0014 00000


IPMEM> qry

Hash       Source IP      VLAN VPN  EXP  TYP  ID FLAGS
==== =================== ==== ==== ==== === === =====
0000          172.62.1.23  512  128  204 NAT  14 00000
0001          172.63.1.23  513  128  204 NAT  14 00000
[ Deleted lines to reduce size]
0062          172.60.1.23  510  128  204 NAT  14 00000
0063          172.61.1.23  511  128  204 NAT  14 00000
```

```
IPMEM> src

Hash Multicast Source IP/  Multicast Dest IP   VLAN VPN TYP EXP RTY Pkt Cnt
INDX  Unicast Source IP
==== =================== =================== ==== === === === === =======
0291       172.99.255.153          239.1.1.101  549  12 NAT -63009   0       0
0001              0.0.0.0


IPMEM> qint

  VLAN        Intf Addr/           MAC      ACT State Version Nbr V1 Port Timeout
            Querier Addr
-------- -------------------- ------------- --- ----- ------- --- ------- -------
  0100           172.100.1.25 000001:005e00   1  Self       3   0
                 172.100.1.25
  0200           172.200.1.25 ac4401:1ce000   1  Self       3   0
                 172.200.1.25
  0500            172.50.1.25 000001:000000   1 Other       3   0
                  172.50.1.23
  …[ Deleted lines to reduce size]....

                  172.97.1.23
  0548            172.98.1.25 000000:000000   1 Other       3   0
                  172.98.1.23
  0549            172.99.1.25 000000:000000   1 Other       3   0
                  172.99.1.23


IPMEM> qtmr

               Last   Total Total
  Expire  VLAN Change Joins Groups
--------- ---- ------ ----- ------
 00000089 0200   63060  0000   0000
 00000089 0100   63060  0000   0000
 00000255 0522   62902  0000   0000
 ….[ Deleted lines to reduce size]...
 00000255 0502   62902  0000   0000
 00000255 0500   62902  0000   0000


IPMEM> v3prx

   Group Address     VLAN Mode      Source IP       Mode Port Time  Client IP
==================== ==== ==== ==================== ==== ==== ==== ================
239.255.255.254      0549 Excl                      0012 0254       172.99.255.153
224.0.1.22           0549 Excl                      0012 0256       172.99.255.153
224.0.1.24           0549 Excl                      0012 0256       172.99.255.153
239.1.1.101          0500 Excl                      0128 0237        172.50.255.23
239.0.0.90           0549 Excl                      0012 0238       172.99.255.153
239.1.1.1            0500 Excl                      0128 0256        172.50.255.23
```

```
MAIN> ?
Main Menu

   main    -  Main Menu
   clist   -  Display Sub-tasks
   restart - Restart IPMS

MAIN> clist
Connected Tasks

   ipmem
   ipmfm
   ipmni1  [slot/slice 1/0] [chipset C1] [ONLINE] []
   ipmni2  [slot/slice 8/0] [chipset C1] [ONLINE] []
   ipmni3  [slot/slice 9/0] [chipset C2] [ONLINE] []
   ipmni4  [slot/slice 16/0] [chipset C1] [ONLINE] []
   ipmni5  [slot/slice 2/0] [chipset C1] [ONLINE] []
   ipmni6  [slot/slice 7/0] [chipset C1] [ONLINE] []
   ipmni7  [slot/slice 10/0] [chipset C1] [ONLINE] []
   ipmni8  [slot/slice 15/0] [chipset C1] [ONLINE] []
   ipmni9  [slot/slice 6/0] [chipset C1] [ONLINE] []
   ipmni10  [slot/slice 3/0] [chipset C1] [ONLINE] []
   ipmni11  [slot/slice 11/0] [chipset C1] [ONLINE] []
   ipmni12  [slot/slice 14/0] [chipset C2] [ONLINE] []
   ipmni13  [slot/slice 4/0] [chipset C1] [ONLINE] []
   ipmni14  [slot/slice 5/0] [chipset C2] [ONLINE] []
   ipmni15  [slot/slice 12/0] [chipset C1] [ONLINE] []
   ipmni16  [slot/slice 13/0] [chipset C2] [ONLINE] []

MAIN> ipmfm

IPMFM> ?

IPMFM State: Enabled
Hardware Routing: Enabled
Available Commands:

    fwd - IPMFM Forwarding Table
    dst - IPMFM Destination Table
   task - IPMFM Display connections
   dgid - IPMFM DGID usage
   rtvl - IPMFM Router MAC VLAN Table


IPMFM> fwd

Hsh/  Multicast Dest IP/       Source IP       STYPE SVLN SVPN SVCI
ID     Tunnel Dest IP/      Tunnel Source IP   DTYPE DVLN TTTL
      Router MAC Address                       PRNT  TTL  CGRP VFLG DVPN DVCI DFLG
==== =================== =================== ===== ==== ==== ==== ==== ==== ====
0291         239.1.1.101       172.99.255.153  NATV 0549 0012 0000
0001             0.0.0.0              0.0.0.0  NATV 0549 0000
        00:00:00:00:00:00                      0000 0000 3078 0004
                                                                   0128 0000 0013
0128 0000
```

```
IPMFM> dst

HASH    Destination IP    VLAN VPN  VCI    TYPE     ID
==== =================== ==== === ==== ========= ====
0000             0.0.0.0 0526 128 0000       NATV 0014 0001
                         0534 128 0000       NATV 0014 0001
                         0535 128 0000       NATV 0014 0001
                         ….[ Deleted lines to reduce size]....
                         0532 128 0000       NATV 0014 0001
                         0508 128 0000       NATV 0014 0001
                         0527 128 0000       NATV 0014 0001
0090          239.0.0.90 0549 012 0000       NATV 0001 0001
0257           239.1.1.1 0500 128 0000       NATV 0014 0001
0278          224.0.1.22 0549 012 0000       NATV 0001 0001
0280          224.0.1.24 0549 012 0000       NATV 0001 0001
0357         239.1.1.101 0500 128 0000       NATV 0014 0001
0510     239.255.255.254 0549 012 0000       NATV 0001 0001


IPMFM> task

   ipmfm
   ipmni1 [ipmem id 1] [NP Not Present] [CORO 1]
   ipmni2 [ipmem id 2] [NP Not Present] [CORO 1]
   ipmni3 [ipmem id 3] [NP Not Present] [CORO 2]
   ipmni4 [ipmem id 4] [NP Not Present] [CORO 1]
   ipmni5 [ipmem id 5] [NP Not Present] [CORO 1]
   ipmni6 [ipmem id 6] [NP Not Present] [CORO 1]
   ipmni7 [ipmem id 7] [NP Not Present] [CORO 1]
   ipmni8 [ipmem id 8] [NP Not Present] [CORO 1]
   ipmni9 [ipmem id 9] [NP Not Present] [CORO 1]
   ipmni10 [ipmem id 10] [NP Not Present] [CORO 1]
   ipmni11 [ipmem id 11] [NP Not Present] [CORO 1]
   ipmni12 [ipmem id 12] [NP Not Present] [CORO 2]
   ipmni13 [ipmem id 13] [NP Not Present] [CORO 1]
   ipmni14 [ipmem id 14] [NP Not Present] [CORO 2]
   ipmni15 [ipmem id 15] [NP Not Present] [CORO 1]
   ipmni16 [ipmem id 16] [NP Not Present] [CORO 2]
```

To run the following commands you need to specify an NI.

```
1:0 nidbg> ipmni_print_flags
1:0                             flow error        - 0x1
1:0     flow commit       - 0x2
1:0     flow hardware     - 0x4
1:0     flow aged         - 0x8
1:0     flow flood        - 0x10
1:0     flow local        - 0x20
1:0     flow drop         - 0x40
1:0
1:0     forward last      - 0x1
1:0     forward hardware  - 0x2
1:0
1:0     port last         - 0x1
1:0
1:0     menu switch       - 0x1
1:0     menu port         - 0x2
```

```
1:0     menu route        - 0x4
1:0     menu cmm          - 0x8
1:0
1:0     alarm             - 0x8
1:0     error             - 0x80
1:0     alert             - 0x800
1:0     config            - 0x8000
1:0     table             - 0x80000
1:0     egress            - 0x800000
1:0     hardware          - 0x8000000
1:0     ingress igmp      - 0x80000000
1:0     message           - 0x4000
1:0     ingress native    - 0x40000
1:0     port updates      - 0x400000
1:0     ingress tunnel    - 0x40000000
1:0 value = 0 = 0x0

1:0 nidbg> ipms_dbg|=0x40000; taskDelay 120; ipms_dbg = 0xfc
1:0                     value = 262396 = 0x400fc
THU JUN 09 11:50:49 : IPMS (17) info message:
+++ IPMNI1 1/0             ipmni_mpm  285: 224.0.0.18 172.77.1.25 527 29
 = test_free_buf_list + 0xb8
1:0
THU JUN 09 11:50:50 : IPMS (17) info message:
+++ IPMNI1 1/0             ipmni_mpm  285: 224.0.0.18 172.93.1.25 543 29
+++ IPMNI1 1/0             ipmni_mpm  285: 224.0.0.18 172.77.1.25 527 29

THU JUN 09 11:50:51 : IPMS (17) info message:
+++ IPMNI1 1/0             ipmni_mpm  285: 224.0.0.18 172.93.1.25 543 29
+++ IPMNI1 1/0             ipmni_mpm  285: 224.0.0.18 172.77.1.25 527 29
value = 0 = 0x0
1:0                           ipms_dbg = 0x2d3bdc: value = 252 = 0xfc

1:0 nidbg> ipmni_print_state
1:0                             mode               - (0xc3)     BU   HW   EN
1:0     configuration     - (0xc3)     BU   HW   EN
1:0     capability        - (0x40)     BU
1:0     run               - y
1:0     loop              - y
1:0     init              - y
1:0     ready             - y
1:0     ok                - y
1:0     recovery          - n
1:0
1:0     clock             - 246149
1:0     id                - 1
1:0     flood             - 51
1:0     debug             - 0xfc
1:0
1:0     priority          - 0
1:0     pay               - 10
1:0     length            - 100
1:0     max               - 380
1:0
1:0     entry             - 0
1:0     queue             - 0
1:0     watermark         - 0
1:0     pending           - 0
```

```
1:0
1:0     create           - 0
1:0     enqueue          - 0
1:0     global drop      - 0
1:0     flow drop        - 3
1:0     buffer           - 0
1:0     lock             - 0
1:0     queue            - 0
1:0     no frame         - 0
1:0     drops            - 0
1:0     lookup           - 0
1:0     fragment         - 0
1:0     frame            - 0
1:0     ip cksum         - 0
1:0     igmp cksum       - 0
1:0     grp              - 0
1:0     alloc            - 0
1:0     modify           - 0
1:0     free             - 0
1:0     send             - 0
1:0     recv             - 0
1:0     flow             - 0
1:0     duplicate        - 0
1:0     recovery         - 0
1:0 value = 0 = 0x0
```

15 Troubleshooting DVMRP

In This Chapter

Introduction

DVMRP is used to route Multicast packets through different IP Networks. This is a Dense Mode Multicast Routing Protocol. Dense Mode refers to the network environment the protocol was designed to service. Dense Mode protocols are designed for LAN environments where there are a lot of users and bandwidth is plentiful. Sparse Mode Multicast Routing Protocols (Protocol Independent Multicast/Sparse-Mode PIM/SM is an example) are designed for WAN environments where there are few users and a limited amount of bandwidth.

Why have a Multicast Routing Protocol in your network?   Multicast will not work in a routed environment. If a switch receives a multicast packet it will flood that packet out all ports in the VLAN, but it will not forward out the router port.   So, in order to have multicast packet across the network you will have to bridge that packet across. This is not an ideal solution. A routed protocol like DVMRP will allow you to keep your broadcasts domains intact and allow the multicast packets to go to the IP networks that need that traffic.

DVMRP is a Flood/Prune protocol. What that means is when a switch has DVMRP enabled and receives a multicast stream it floods that stream to all ports in that VLAN letting the DVMRP router know that the multicast is available. Then the forwarding router listens for prune messages, indicating that certain devices do not need that multicast. It can then stop sending to that port. If a prune message is not received, the flooding will continue. If, after a prune, a multicast router receives an IGMP join for that multicast it will send a Graft message. When a switch receives a Graft message for a multicast stream it does not know about, it will forward that message to the other DVMRP switches connected to it. This process continues until the graft reaches a switch with the multicast already being sent to clients.

DVMRP forwards multicast datagrams by computing the shortest (reverse) path tree from the source (physical) network to all possible recipients of the multicast datagram.

A router is called a “parent” of the virtual network if that router is responsible for forwarding datagrams onto that virtual network. The Virtual network can be considered a “child” virtual network of that router. Using the child’s information the router can do Reverse path Broadcasting.

DVMRP Troubleshooting

Note that if a multicast stream is not working, it does not necessarily mean that IP multicast routing is at fault. Verify that IP multicast switching is working properly.

DVMRP Global and Interface Commands

See the “DVMRP Commands” chapter in the *OmniSwitch CLI Reference Guide* for more information about the following commands:

```
-> show ip dvmrp
DVMRP Admin Status          = enabled,
Flash Interval              = 5,
Graft Timeout               = 5,
Neighbor Interval           = 10,
Neighbor Timeout            = 35,
Prune Lifetime              = 7200,
Prune Timeout               = 3,
Report Interval             = 60,
Route Holddown              = 120,
Route Timeout             = 140,


Number of Routes          = 6,
Number of Reachable Routes = 6

-> show ip dvmrp interface
  Address           Vlan   Tunnel   Metric   Admin-Status   Oper-Status
-----------------+------+--------+--------+---------------+-------------
  192.168.10.1       1       No       1         Enabled      Enabled
  192.168.11.1       2       No       1         Enabled      Enabled
  192.168.12.1       3       No       1         Enabled      Enabled
```

If an interface is not enabled then no multicast traffic will be routed to that VLAN the Interface represents.

What if everything is enabled in this switch correctly? It could be another switches problem or this switch may be unable to process the messages correctly. Now see if you are seeing all the correct neighbors with the following command.

```
-> show ip dvmrp neighbor
  Neighbor Address  Vlan    Uptime      Expires     GenID      Version  State
----------------+------+-----------+-----------+-----------+---------+-------
  192.168.12.3      3    00h:24m:19s 00h:00m:31s  1024473904  3.8      active
  192.168.11.2      2    00h:23m:40s 00h:00m:35s      760301      3.255  active
```

If a neighbor is missing then it is likely that DVMRP does not recognize that device as a DVMRP neighbor. Here is the way to see the multicast routing information.

```
-> show ip dvmrp route
Legends:  Flags:  L = Local, R = Remote, F = Flash, H = Holddown, I = Invalid
     Address/Mask        Gateway       Metric     Age      Expires  Flags
-------------------+------------------+------+-----------+---------+-----
   192.168.10.0/24          -            1    00h:27m:13s     -       L
   192.168.11.0/24          -            1    00h:27m:13s     -       L
   192.168.12.0/24          -            1    00h:27m:13s     -       L
   192.168.13.0/24    192.168.11.2       2    00h:25m:17s  02m:03s    R
   192.168.14.0/24    192.168.12.3       2    00h:24m:49s  01m:45s    R
   192.168.15.0/24    192.168.12.3       2    00h:24m:49s  01m:45s    R
```

The above commands are made easier if you have a detailed diagram. Using the diagram you can know you Multicast VLANS and where they can be seen from any switch in the network. Local routes will not be seen if the IP interface is not enabled in the switch or in DVMRP. If you see this, make sure the interface is enabled with the following commands.

```
-> show ip dvmrp interface
  Address           Vlan   Tunnel   Metric   Admin-Status   Oper-Status
-----------------+------+--------+--------+---------------+-------------
  192.168.10.1       1       No       1         Disabled     Disabled
  192.168.11.1       2       No       1         Enabled      Enabled
  192.168.12.1       3       No       1         Enabled      Enabled


-> ip dvmrp interface 192.168.10.1

-> show ip dvmrp interface
  Address           Vlan   Tunnel   Metric   Admin-Status   Oper-Status
-----------------+------+--------+--------+---------------+-------------
```

```
    192.168.10.1       1       No       1         Enabled      Enabled
    192.168.11.1       2       No       1         Enabled      Enabled
    192.168.12.1       3       No       1         Enabled      Enabled
```

Remote routes will be seen if they are learned from another switch. Again be sure that the interfaces are enabled. If that is the case it possible that the other switch is not configured correctly.

If the above commands look good in your switch and in the other switches you can use the following command to see if the switch has a next hop. If it does the problem may not be this switch. It may be the next switch on the VLAN indicated here.

```
-> show ip dvmrp nexthop
  Src Address/Mask     Vlan   Hop Type
-------------------+-------+----------
     192.168.10.25/24    2      branch
```

DVMRP Debug Commands

If you have looked at all the switches and you are sure you have configured correctly then it is time to use the DVMRP Debug command.

```
-> show ip dvmrp debug
Debug Level                = 1,
Error                      = on,
Flash                      = off,
Grafts                     = off,
IGMP                       = off,
Init                       = off,
IPMRM                      = off,
MIP                        = off,
Misc                       = off
Nbr                        = off,
Probes                     = off,
Prunes                     = off,
Routes                     = off,
Time                       = off,
TM                         = off,
```

Notice that by default the Debug Level is 1 and the only Debug Type configured is error messages. These can be changed with the following commands.

```
-> ip dvmrp debug-type ?
                      ^
                      TM TIME ROUTES PRUNES PROBES NBR MISC MIP IPMRM INIT
                      IGMP GRAFTS FLASH ERROR ALL
(IP Routing & Multicast Command Set)

-> no ip dvmrp debug-type ?
                      ^
                      TM TIME ROUTES PRUNES PROBES NBR MISC MIP IPMRM INIT
                      IGMP GRAFTS FLASH ERROR ALL
(IP Routing & Multicast Command Set)

-> ip dvmrp debug-level 95

-> ip dvmrp debug-level 1
```

The first command turns on a debug-type while the second turns off a debug type.

The third command turns on the debug level. The low is 0, which is no debugging at all, and the high is 110, which prints everything to the screen. There is so much going on in the switch and so much put to the screen that an explanation of what level would bring what output. Instead we are recommending that a setting of 95 is the most useful setting. If that setting does not yield the required information to derive the problem the Customer Support will engage Engineering for more help.

Below is a recommended setting for use in conjunction with customer support. Keep in mind that more testing may be needed, as this may not yield a reason for a failure. Follow the Customer Support Engineers instructions. It is a good practice to disable DVMRP and then enable after the debug set-up is accomplished. This is so you capture the entire communication between DVMRP routers.

```
-> show ip dvmrp debug
Debug Level                = 1,
Error                      = on,
Flash                      = off,
Grafts                     = on,
IGMP                       = on,
Init                       = on,
IPMRM                      = on,
MIP                        = off,
Misc                       = off
Nbr                        = on,
Probes                     = on
Prunes                     = on,
Routes                     = on,
Time                       = off,
TM                         = off,

-> ip dvmrp debug-level 95

-> ip dvmrp status enable
tDvmrp-:         dvmrpSetGenId: Genid is 1025108923
tDvmrp-:         dvmrpEnable: V1 Config=1 Oper=2
tDvmrp-:         dvmrpProtoEnabledOnVlan: V1 mprotos=0x0
tDvmrp-:         dvmrpSendIpmrmProto: V1 Configured
tDvmrp-:         MIP and TM says we're enabled.
tDvmrp-:         dvmrpAddMembership: V1 do IP_ADD_MEMBERSHIP
tDvmrp-:         dvmrpSendIpmrmProto: V1 Enabled
tDvmrp-:         dvmrpAddIntf: look for 192.168.10.1-255.255.255.0
tDvmrp-:         dvmrpAddIntf:   found
tDvmrp-:         dvmrpAddIntf:   in holddown
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.10.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.10.0-255.255.255.0
tDvmrp-:         V1 Remove-Discard-Source S,G 192.168.10.25,224.2.142.227
tDvmrp-:         V1 Remove-Discard-Source S,G 192.168.10.25,224.2.178.69
tDvmrp-:         dvmrpDeleteGListEntry: rt 192.168.10.0-255.255.255.0
tDvmrp-:         dvmrpPurgeGroup:
tDvmrp-:         dvmrpDelPrnSentForGrp:
tDvmrp-:         dvmrpPurgeGroup:
tDvmrp-:         dvmrpDelPrnSentForGrp:
tDvmrp-:         dvmrpEnable: V2 Config=1 Oper=2
tDvmrp-:         dvmrpProtoEnabledOnVlan: V2 mprotos=0x0
tDvmrp-:         dvmrpSendIpmrmProto: V2 Configured
tDvmrp-:         MIP and TM says we're enabled.
tDvmrp-:         dvmrpAddMembership: V2 do IP_ADD_MEMBERSHIP
tDvmrp-:         dvmrpSendIpmrmProto: V2 Enabled
tDvmrp-:         dvmrpAddIntf: look for 192.168.11.1-255.255.255.0
tDvmrp-:         dvmrpAddIntf:   found
tDvmrp-:         dvmrpAddIntf:   in holddown
```

```
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.11.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.11.0-255.255.255.0
tDvmrp-:         dvmrpInitChildAndSubs: All V1 nbrs dependent on us for rt
192.168.11.0
tDvmrp-:         dvmrpDeleteGListEntry: rt 192.168.11.0-255.255.255.0
tDvmrp-:         dvmrpEnable: V3 Config=1 Oper=2
tDvmrp-:         dvmrpProtoEnabledOnVlan: V3 mprotos=0x0
tDvmrp-:         dvmrpSendIpmrmProto: V3 Configured
tDvmrp-:         MIP and TM says we're enabled.
tDvmrp-:         dvmrpAddMembership: V3 do IP_ADD_MEMBERSHIP
tDvmrp-:         dvmrpSendIpmrmProto: V3 Enabled
tDvmrp-:         dvmrpAddIntf: look for 192.168.12.1-255.255.255.0
tDvmrp-:         dvmrpAddIntf:   found
tDvmrp-:         dvmrpAddIntf:   in holddown
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.12.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.12.0-255.255.255.0
tDvmrp-:         dvmrpInitChildAndSubs: All V1 nbrs dependent on us for rt
192.168.12.0
tDvmrp-:         dvmrpInitChildAndSubs: All V2 nbrs dependent on us for rt
192.168.12.0
tDvmrp-:         dvmrpDeleteGListEntry: rt 192.168.12.0-255.255.255.0
tDvmrp-> -:      dvmrpRecvIpmrmSGInfo: V1 Lookup ipsa 192.168.10.25-
255.255.255.255
tDvmrp-:                                    ipda 224.2.178.69, tsrc 0.0.0.0
tDvmrp-:         Found route 192.168.10.0 to ipsa
tDvmrp-:         Route looks good
tDvmrp-:         Lookup S,G 192.168.10.25-255.255.255.255 224.2.178.69 on rib
tDvmrp-:         dvmrpRecvIpmrmSGInfo: A new (S,G) entry
tDvmrp-:         Insert S,G in rib's list
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         No change in Forwarding vector list, return 0
tDvmrp-:         Send NullRoute to IPMRM.
tDvmrp-:         Null Route to IPMRM V1 192.168.10.25-255.255.255.255
224.2.178.69
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned from local route, don't send prune
tDvmrp-:         dvmrpRecvIpmrmSGInfo: V1 Lookup ipsa 192.168.10.25-
255.255.255.255
tDvmrp-:                                    ipda 224.2.142.227, tsrc 0.0.0.0
tDvmrp-:         Found route 192.168.10.0 to ipsa
tDvmrp-:         Route looks good
tDvmrp-:         Lookup S,G 192.168.10.25-255.255.255.255 224.2.142.227 on rib
tDvmrp-:         dvmrpRecvIpmrmSGInfo: A new (S,G) entry
tDvmrp-:         Insert S,G in rib's list
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
```

```
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         No change in Forwarding vector list, return 0
tDvmrp-:         Send NullRoute to IPMRM.
tDvmrp-:         Null Route to IPMRM V1 192.168.10.25-255.255.255.255
224.2.142.227
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned from local route, don't send prune
tDvmrp-:         dvmrpRecvIpmrmSGInfo: V2 Lookup ipsa 192.168.13.25-
255.255.255.255
tDvmrp-:                                       ipda 224.2.142.227, tsrc 0.0.0.0
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         Route looks good
tDvmrp-:         Lookup S,G 192.168.13.25-255.255.255.255 224.2.142.227 on rib
tDvmrp-:         dvmrpRecvIpmrmSGInfo:  V2 S,G found 192.168.13.25 224.2.142.227
tDvmrp-:         Prune state pending, send another Prune
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned S,G from non-local route, upstrGw=192.168.11.2
tDvmrp-:         dvmrpSendPrune: Unable to find nbr for Prune.
tDvmrp-:         Null Route to IPMRM V2 192.168.13.25-255.255.255.255
224.2.142.227
tDvmrp-:         dvmrpRecvIpmrmSGInfo: V2 Lookup ipsa 192.168.13.25-
255.255.255.255
tDvmrp-:                                       ipda 224.2.178.69, tsrc 0.0.0.0
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         Route looks good
tDvmrp-:         Lookup S,G 192.168.13.25-255.255.255.255 224.2.178.69 on rib
tDvmrp-:         dvmrpRecvIpmrmSGInfo:  V2 S,G found 192.168.13.25 224.2.178.69
tDvmrp-:         Prune state pending, send another Prune
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned S,G from non-local route, upstrGw=192.168.11.2
tDvmrp-:         dvmrpSendPrune: Unable to find nbr for Prune.
tDvmrp-:         Null Route to IPMRM V2 192.168.13.25-255.255.255.255
224.2.178.69
tDvmrp-:         dvmrpRecvIpmrmSGInfo: V2 Lookup ipsa 192.168.13.25-
255.255.255.255
tDvmrp-:                                       ipda 224.2.201.38, tsrc 0.0.0.0
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         Route looks good
tDvmrp-:         Lookup S,G 192.168.13.25-255.255.255.255 224.2.201.38 on rib
tDvmrp-:         dvmrpRecvIpmrmSGInfo:  V2 S,G found 192.168.13.25 224.2.201.38
tDvmrp-:         Prune state pending, send another Prune
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned S,G from non-local route, upstrGw=192.168.11.2
tDvmrp-:         dvmrpSendPrune: Unable to find nbr for Prune.
tDvmrp-:         Null Route to IPMRM V2 192.168.13.25-255.255.255.255
224.2.201.38
tDvmrp-:         IGMP packet from 192.168.10.1
tDvmrp-:         IGMP packet from 192.168.10.1
```

```
tDvmrp-:         IGMP packet from 192.168.10.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         On V3 Unable to peer with nbr 192.168.12.3
tDvmrp-:         dvmrpAddNeighbor: 192.168.12.3 new nbr
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.12.3 as sub to rt
192.168.10.0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.10.25-255.255.255.255 224.2.142.227
tDvmrp-:                         V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.10.25-255.255.255.255 224.2.178.69
tDvmrp-:                         V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.12.3 as sub to rt
192.168.11.0
tDvmrp-:         IGMP packet from 192.168.10.1
```

```
tDvmrp-:         IGMP packet from 192.168.10.1
tDvmrp-:         IGMP packet from 192.168.10.1
tDvmrp-:         IGMP packet from 192.168.10.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.11.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         IGMP packet from 192.168.12.1
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.10.0-
255.255.255.0
tDvmrp-:                                    orig metric 34 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.11.0-
255.255.255.0
tDvmrp-:                                    orig metric 34 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.12.0-
255.255.255.0
tDvmrp-:                                    orig metric 33 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Local, same vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                    orig metric 35 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=35, adj=35
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.14.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdateReachable:
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.14.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.14.0-255.255.255.0
tDvmrp-:         While holddown same nbr with same metric
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.15.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdateReachable:
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.15.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.15.0-255.255.255.0
tDvmrp-:         While holddown same nbr with same metric
tDvmrp-:         dvmrpRecvPrune:
tDvmrp-:         No netmask, so using 255.255.255.0
tDvmrp-:         Pruning 192.168.10.0-255.255.255.0, 224.2.142.227
```

```
tDvmrp-:         Found S,G matching source network 255.255.255.0
tDvmrp-:         Creating a new prune state S,G 192.168.10.25 224.2.142.227
tDvmrp-:                                      V3 time:218 Nbr:192.168.12.3
tDvmrp-:         dvmrpPruneTimeEnQ:
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
tDvmrp-:         #subords=1, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         (dvmrpRecvPrune updates IPMRM)
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.10.25-255.255.255.255 224.2.142.227
tDvmrp-:                         V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned from local route, don't send prune
tDvmrp-:         dvmrpAddNeighbor: 192.168.11.2 new nbr
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.11.2 as sub to rt
192.168.10.0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
tDvmrp-:         #subords=2, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.10.25-255.255.255.255 224.2.142.227
tDvmrp-:                         V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V2 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=2, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
```

```
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=2
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 2
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.178.69
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V2 (forward on)
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.11.2 as sub to rt
192.168.12.0
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.11.2 as sub to rt
192.168.14.0
tDvmrp-:         dvmrpAddAsSubordinate: No fwdr, add 192.168.11.2 as sub to rt
192.168.15.0
tDvmrp-:         IGMP packet from 192.168.12.3
tDvmrp-:         dvmrpRecvPrune:
tDvmrp-:         No netmask, so using 255.255.255.0
tDvmrp-:         Pruning 192.168.10.0-255.255.255.0, 224.2.178.69
tDvmrp-:         Found S,G matching source network 255.255.255.0
tDvmrp-:         Creating a new prune state S,G 192.168.10.25 224.2.178.69
tDvmrp-:                                       V3 time:255 Nbr:192.168.12.3
tDvmrp-:         dvmrpPruneTimeEnQ:
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=2, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         (dvmrpRecvPrune updates IPMRM)
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.178.69
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V2 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                    orig metric 32 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=32, adj=32
tDvmrp-:         IGMP packet from 192.168.12.3
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.10.0-
255.255.255.0
tDvmrp-:                                    orig metric 32 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
```

```
tDvmrp-:         Metric orig=32, adj=32
tDvmrp-:         dvmrpUpdateUnreachable:
tDvmrp-:         Nbr[192.168.11.2] no longer a subordinate for rt 192.168.10.0
tDvmrp-:         dvmrpUpdateUnreachable Nbr[192.168.11.2] no longer a subordi-
nate for rt 192.168.10.0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
tDvmrp-:         #subords=1, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.142.227
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned from local route, don't send prune
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=1, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.178.69
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned from local route, don't send prune
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.11.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Local, same vlan
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.12.0-
255.255.255.0
tDvmrp-:                                    orig metric 32 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=32, adj=32
tDvmrp-:         dvmrpUpdateUnreachable:
tDvmrp-:         Nbr[192.168.11.2] no longer a subordinate for rt 192.168.12.0
tDvmrp-:         dvmrpUpdateUnreachable Nbr[192.168.11.2] no longer a subordi-
nate for rt 192.168.12.0
```

```
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdateReachable:
tDvmrp-:         dvmrpRibRemoveHoldDown: 192.168.13.0-255.255.255.0
tDvmrp-:         dvmrpRibDelinkHoldDownQ: 192.168.13.0-255.255.255.0
tDvmrp-:         V2 Remove-Discard-Source S,G 192.168.13.25,224.0.1.24
tDvmrp-:         V2 Remove-Discard-Source S,G 192.168.13.25,224.2.142.227
tDvmrp-:         V2 Remove-Discard-Source S,G 192.168.13.25,224.2.178.69
tDvmrp-:         V2 Remove-Discard-Source S,G 192.168.13.25,224.2.201.38
tDvmrp-:         While holddown same nbr with same metric
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.0.1.24
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.0.1.24 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.0.1.24 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.13.25-255.255.255.255 224.0.1.24
tDvmrp-:                        V2, GW 192.168.11.2, PruneSent 0
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendPrune:
tDvmrp-:         Learned S,G from non-local route, upstrGw=192.168.11.2
tDvmrp-:         dvmrpSetMinPruneTime:
tDvmrp-:         Set prSent timer 7200
tDvmrp-:         Prune S,G 192.168.13.25 224.0.1.24  time 7200 V2 Nbr
192.168.11.2
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.142.227
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         No change in Forwarding vector list, return 0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.178.69
```

```
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         No change in Forwarding vector list, return 0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.201.38
tDvmrp-:         #subords=0, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.201.38 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.201.38 not learned on V3
tDvmrp-:         # of IFs to fwd to: 0
tDvmrp-:         No change in Forwarding vector list, return 0
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.14.0-
255.255.255.0
tDvmrp-:                                     orig metric 32 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=32, adj=32
tDvmrp-:         dvmrpUpdateUnreachable:
tDvmrp-:         Nbr[192.168.11.2] no longer a subordinate for rt 192.168.14.0
tDvmrp-:         dvmrpUpdateUnreachable Nbr[192.168.11.2] no longer a subordi-
nate for rt 192.168.14.0
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.15.0-
255.255.255.0
tDvmrp-:                                     orig metric 32 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=32, adj=32
tDvmrp-:         dvmrpUpdateUnreachable:
tDvmrp-:         Nbr[192.168.11.2] no longer a subordinate for rt 192.168.15.0
tDvmrp-:         dvmrpUpdateUnreachable Nbr[192.168.11.2] no longer a subordi-
nate for rt 192.168.15.0
tDvmrp-:         dvmrpNegCacheTout: (S,G) timeout 192.168.13.25-255.255.255.0
224.0.1.24
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                     orig metric 35 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=35, adj=35
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         Nbr 192.168.12.3 indicating dependency for [192.168.13.0-
255.255.255.0]
```

```
tDvmrp-:         dvmrpUpdatePoisoned: nbr 192.168.12.3 is dependent on us for rt
192.168.13.0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.0.1.24
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.0.1.24 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.0.1.24 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.13.25-255.255.255.255 224.0.1.24
tDvmrp-:                         V2, GW 192.168.11.2, PruneSent 1
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendGraft: cancel prSent timer
tDvmrp-:         dvmrpSendGraftPkt: V2 S,G 192.168.13.25 224.0.1.24 Nbr
192.168.11.2
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.142.227
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                         192.168.13.25-255.255.255.255 224.2.142.227
tDvmrp-:                         V2, GW 192.168.11.2, PruneSent 1
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendGraft: cancel prSent timer
tDvmrp-:         dvmrpSendGraftPkt: V2 S,G 192.168.13.25 224.2.142.227 Nbr
192.168.11.2
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.178.69
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
```

```
tDvmrp-:         Group 224.2.178.69 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.13.25-255.255.255.255 224.2.178.69
tDvmrp-:                        V2, GW 192.168.11.2, PruneSent 1
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendGraft: cancel prSent timer
tDvmrp-:         dvmrpSendGraftPkt: V2 S,G 192.168.13.25 224.2.178.69 Nbr
192.168.11.2
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.13.0 - grp 224.2.201.38
tDvmrp-:         #subords=1, pruncnt=0
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         V1 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.201.38 not learned on V1
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 not sub/nbr
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V3 not rib->upstrVl=2, may need forwarding
tDvmrp-:         Group 224.2.201.38 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.13.25-255.255.255.255 224.2.201.38
tDvmrp-:                        V2, GW 192.168.11.2, PruneSent 1
tDvmrp-:         V3 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpSendGraft: cancel prSent timer
tDvmrp-:         dvmrpSendGraftPkt: V2 S,G 192.168.13.25 224.2.201.38 Nbr
192.168.11.2
tDvmrp-:         dvmrpRecvGraftAck: V2 S,G 192.168.13.25 224.0.1.24 Nbr
192.168.11.2
tDvmrp-:         dvmrpDelGacksForGroup: Delete Gack for S,G 192.168.13.0
224.0.1.24
tDvmrp-:         dvmrpRecvGraftAck: V2 S,G 192.168.13.25 224.2.142.227 Nbr
192.168.11.2
tDvmrp-:         dvmrpDelGacksForGroup: Delete Gack for S,G 192.168.13.0
224.2.142.227
tDvmrp-:         dvmrpRecvGraftAck: V2 S,G 192.168.13.25 224.2.178.69 Nbr
192.168.11.2
tDvmrp-:         dvmrpDelGacksForGroup: Delete Gack for S,G 192.168.13.0
224.2.178.69
tDvmrp-:         dvmrpRecvGraftAck: V2 S,G 192.168.13.25 224.2.201.38 Nbr
192.168.11.2
tDvmrp-:         dvmrpDelGacksForGroup: Delete Gack for S,G 192.168.13.0
224.2.201.38
```

```
-> tDvmrp-:      dvmrpRecvIpmrmDelEntry: V2  S,G 192.168.13.25-255.255.255.255
tDvmrp-:                                    224.2.142.227
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         S,G entry found for deletion
tDvmrp-:         dvmrpPurgeGroup:
tDvmrp-:         dvmrpDelPrnSentForGrp:
tDvmrp-:         dvmrpRecvIpmrmDelEntry: V2  S,G 192.168.13.25-255.255.255.255
tDvmrp-:                                    224.2.201.38
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         S,G entry found for deletion
tDvmrp-:         dvmrpPurgeGroup:
tDvmrp-:         dvmrpDelPrnSentForGrp:
tDvmrp-:         dvmrpRecvIpmrmDelEntry: V2  S,G 192.168.13.25-255.255.255.255
tDvmrp-:                                    224.2.178.69
tDvmrp-:         Found route 192.168.13.0 to ipsa
tDvmrp-:         S,G entry found for deletion
tDvmrp-:         dvmrpPurgeGroup:
tDvmrp-:         dvmrpDelPrnSentForGrp:
tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.10.0-
255.255.255.0
tDvmrp-:                                 orig metric 34 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.11.0-
255.255.255.0
tDvmrp-:                                 orig metric 34 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.12.0-
255.255.255.0
tDvmrp-:                                 orig metric 33 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Local, same vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                 orig metric 35 frm 192.168.12.3
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=35, adj=35
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.14.0-
255.255.255.0
tDvmrp-:                                 orig metric 1 frm 192.168.12.3
tDvmrps-:        dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdateReachable:
tDvmrph-:        dvmrpRibResetAgeoutTimer:
tDvmrp-:         dvmrpUpdateRoute: V3 UPDATE route for 192.168.15.0-
255.255.255.0
tDvmrp-:                                 orig metric 1 frm 192.168.12.3
tDvrp - :        dvmrpUpdatPresentRoute:
```

```
tDvm-> rpshow -:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdateReachable:
tDvmrp-:         dvmrpRibResetAgeoutTimer:

-> show ip dvmrp route

tDvmrp-:         dvmrpRecvReport:
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.10.0-
255.255.255.0
tDvmrp-:                                    orig metric 34 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         Nbr 192.168.11.2 indicating dependency for [192.168.10.0-
255.255.255.0]
tDvmrp-:         dvmrpUpdatePoisoned: nbr 192.168.11.2 is dependent on us for rt
192.168.10.0
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.142.227
tDvmrp-:         #subords=2, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.142.227 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.142.227
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V2 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: call it...
tDvmrp-:         dvmrpComputeForwardingVector:
tDvmrp-:         For rt 192.168.10.0 - grp 224.2.178.69
tDvmrp-:         #subords=2, pruncnt=1
tDvmrp-:         Looking at V1...
tDvmrp-:         V1 not sub/nbr
tDvmrp-:         Looking at V2...
tDvmrp-:         V2 is a sub/nbr, numFwdIfs=1
tDvmrp-:         V2 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V2
tDvmrp-:         Looking at V3...
tDvmrp-:         V3 not sub/nbr
tDvmrp-:         V3 not rib->upstrVl=1, may need forwarding
tDvmrp-:         Group 224.2.178.69 not learned on V3
tDvmrp-:         # of IFs to fwd to: 1
tDvmrp-:         Forwarding vector list changed, return 1
tDvmrp-:         dvmrpComputeForwardingVectorForRoute: Update IPMRM
tDvmrp-:         dvmrpSendIpmrmRoute: Update/add to IPMRM S,G
tDvmrp-:                        192.168.10.25-255.255.255.255 224.2.178.69
```

```
tDvmrp-:                        V1, GW 0.0.0.0, PruneSent 0
tDvmrp-:         V2 (forward on)
tDvmrp-:         Forward on 0 tunnels
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.11.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Local, same vlan
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.12.0-
255.255.255.0
tDvmrp-:                                    orig metric 34 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=34, adj=34
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         Nbr 192.168.11.2 indicating dependency for [192.168.12.0-
255.255.255.0]
tDvmrp-:         dvmrpUpdatePoisoned: nbr 192.168.11.2 is dependent on us for rt
192.168.12.0
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.13.0-
255.255.255.0
tDvmrp-:                                    orig metric 1 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=1, adj=2
tDvmrp-:         dvmrpUpdate Reachable:
tDvmrp-:         dvmrpRibResetAgeoutTimer:
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.14.0-
255.255.255.0
tDvmrp-:                                    orig metric 35 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=35, adj=35
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         Nbr 192.168.11.2 indicating dependency for [192.168.14.0-
255.255.255.0]
tDvmrp-:         dvmrpUpdatePoisoned: nbr 192.168.11.2 is dependent on us for rt
192.168.14.0
tDvmrp-:         dvmrpUpdateRoute: V2 UPDATE route for 192.168.15.0-
255.255.255.0
tDvmrp-:                                    orig metric 35 frm 192.168.11.2
tDvmrp-:         dvmrpUpdatePresentRoute:
tDvmrp-:         Metric orig=35, adj=35
tDvmrp-:         dvmrpUpdatePoisoned:
tDvmrp-:         Received on diff vlan
tDvmrp-:         Nbr 192.168.11.2 indicating dependency for [192.168.15.0-
255.255.255.0]
tDvmrp-:         dvmrpUpdatePoisoned: nbr 192.168.11.2 is dependent on us for rt
192.168.15.0

-> ip dvmrp debug-level 0

-> debug ip dvmrp route vlan 515
        Address|           Mask|Met|      Exp|Vlan|        Gateway|Flags
1.      172.66.0.0|    255.255.0.0|  2|   107| 515|    172.65.1.23|    R
Total # Routes learned on Vlan [515] --------------: 1


-> debug ip dvmrp nbr
Vlan|   Intf Address|           Mask|Metric|  # Nbrs
```

```
100|   172.100.1.25|  255.255.255.0|     1|       0|
515|    172.65.1.25|    255.255.0.0|     1|       1|


-> debug ip dvmrp group
Vlan |           Group | G Mode |             Src | S Mode


-> debug ip dvmrp prune
************Prune Table*****************
| Actn|        Source |          Group|       Neighbor|  Time|Vlan|   Exp
total=0


7800-1 -> debug ip dvmrp graft
***********Graft Status*****************
|        Source |          Group|       Neighbor|Vlan| Ack|Time


-> debug ip dvmrp timer


CALLOUT QUEUE:
[PRB3] id=365 time=1
[PRB4] id=366 time=2
[PRB5] id=367 time=2
[PRB1] id=368 time=2
[PRB2] id=370 time=2
[RRT V515] id=348 time=16
[NBT V515] id=369 time=8


-> debug ip dvmrp rib ageq
No.       Addr/Mask      UpVl        UpGw          Age       Exp    Kids Subs
1      172.66.0.0/16      515     172.65.1.23  00h:04m:35s 01m:44s    1    0


-> debug ip dvmrp rib holdq
No.       Addr/Mask      UpVl        UpGw          Age       Exp    Kids Subs


->
```

16 Troubleshooting PIM-SM

In order to troubleshoot issues related to Protocol Independent Multicast-Sparse Mode (PIM-SM), a basic understanding of the protocol—as well as IP multicast technology—are required. Basic PIM-SM concepts are explained below; for detailed protocol specifications please refer to RFC 2362 (PIM-SM) as well as the *OmniSwitch 7700/7800/8800 Advanced Routing Configuration Guide*, which contains a protocol overview and PIM-SM configuration information.

In This Chapter

Introduction

Traditional multicast routing protocols like DVMRP, MOSPF or PIM-DM were implemented to provide multicast routing in campus network. These traditional dense mode multicast protocol were intended for use within regions where a group is widely represented or bandwidth is not an issue. However when group members and senders to these groups are sparsely distributed across a wide area, traditional multicast routing protocol schemes do not provide an efficient way to establish distribution trees. For instance membership reports or data packets are being eventually forwarded over many links where no receivers or senders are located.

PIM-SM architecture provides a way for efficiently routing to multicast groups that may span wide area Internets. PIM-SM, including those with WAN links, scales well to a network of any size. The explicit join mechanism will prevent unwanted traffic from flooding the WAN links. Data multicast traffic will be forwarded only to networks segment that have active receivers which have specifically requested the data.

PIM-SM uses a shared tree to distribute the information about active sources. Depending on the configuration options the traffic can remain on the shared tree or switch over to an optimized source distribution tree called Shortest Path Tree, SPT. The traffic starts to flow down the shared tree and then routers along the path determine if there is a better path to the source. If a better, more direct path exists the designated router (router closest to the receiver) will send a “join” message towards the source and then re-route the traffic along this path.

PIM-SM uses the concept of Rendezvous Point (RP). Sources register with the RP and then data is forwarded down the shared tree to the receivers. If the shared tree is not an optimal path between the source and the receiver the routers will dynamically create a source tree and stop traffic from flowing down the shared tree.

Definition of Terms

Bootstrap Router (BSR). A BSR is dynamically elected between the C-BSR (candidates BSR) within a PIM-SM domain. Bootstrap messages are sent to discover all C-BSR and associated CBSR priority. The BSR is the router with the highest CBSR priority. It is responsible for sending bootstrap messages, which contains RP-Set.

Designated Router (DR). The DR is the highest IP addressed PIM-SM router on a LAN segment. It is responsible for sending corresponding Join/Prune messages to the RP on behalf of directly connected receivers and sources.

Rendezvous Point (RP). Each multicast group has a shared-tree via which receivers receives data from sources. The RP is the root of this per-group shared tree, called RP tree. C-RPs (Candidates RP) are PIM-SM routers configured to eventually become RP for some or all multicast groups address. Priority can also be configured for a C-RP and will be used on DR when membership to a multicast group is required.

RP-Set. List of reachable C-RP sent in bootstrap messages distributed by the BSR to all PIM-SM router in the domain. The BSR compiles the list based on C-RP advertisement. C-RPs periodically unicast C-RP-Advertisements to the BSR for that domain The RP-Set details each C-RP with their group multicast address availability. DRs store these bootstrap messages and use it when membership to a specific multicast group is required.

RP Tree (Shared Tree). The set of paths connecting all receivers of a group to the RP.

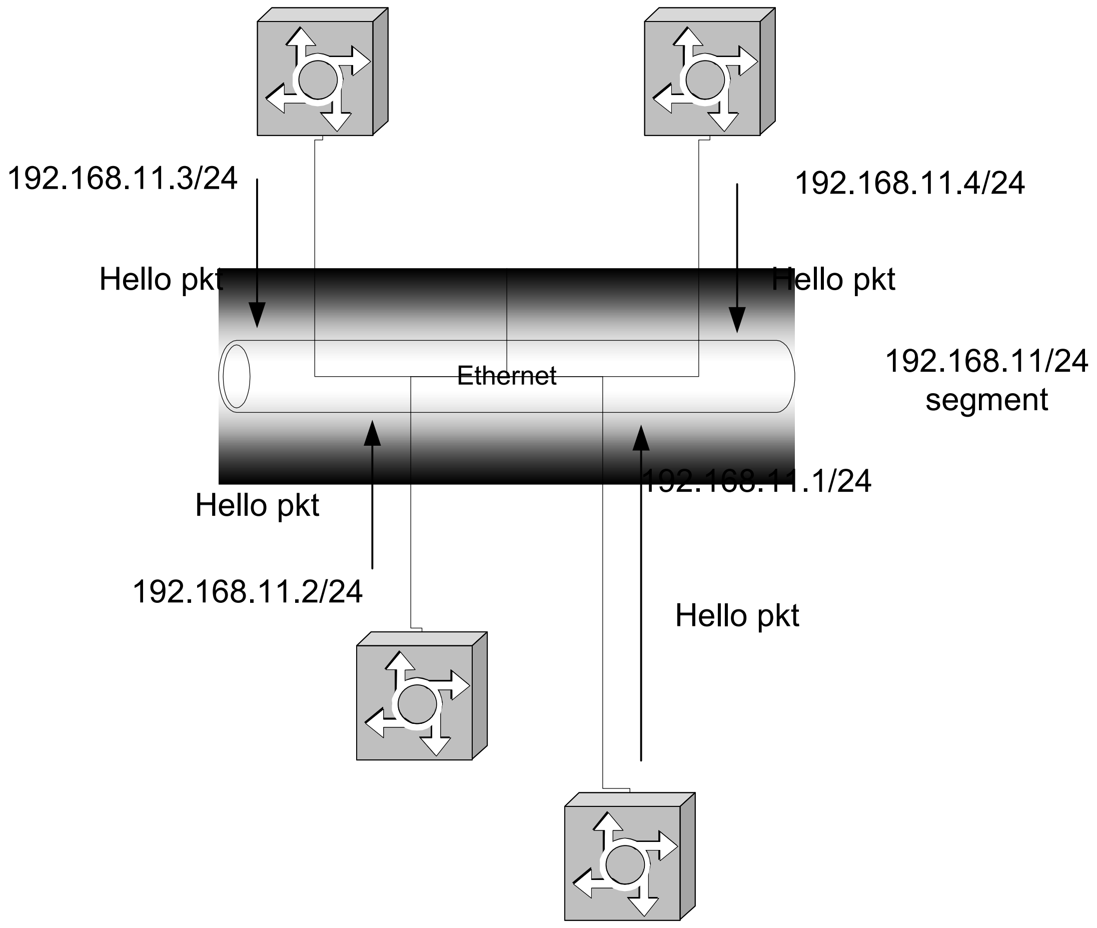
Shortest Path Tree (SPT). The SPT is the multicast distribution tree that connects, using the shortest path, receivers of a specific group to the source. The SPT computation is based on unicast routing but is not depending on any particular unicast routing protocol.

Protocol Overview

DR Election

Hello messages are sent periodically between PIM neighbors. This informs routers which interface has PIM neighbors. Hello messages are multicast packets using address 224.0.0.13, which corresponds to ALL-PIM-ROUTERS group.

When a router receives a Hello message, it stores the IP address for that neighbor and determines the Designated Router (DR) for that specific interface. The highest IP address system is elected DR. DR information is refreshed on each Hello messages received. Holdtime parameter is the amount of time a receiver must keep the neighbor reachable, in seconds.



Simplified Hello Message Format

```
IP: ----- IP Header -----

      IP: Protocol        = 103 (PIM)

      IP: Source address      = [192.168.11.1]

      IP: Destination address = [224.0.0.13]
```

```
PIM: ----- PIM Header -----

      PIM:

      PIM: Version        = 2

      PIM: Message Type   = 0 (Hello)

      PIM: Reserved       = 0

      PIM: Checksum       = 4017 (correct)

      PIM: Option Type    = 1 (PIM-SM)

      PIM: Option Length  = 2

      PIM: Option Value   = 0x0069 (Hold time in seconds)
```

Debugging Hello Messages

To debug DR election and view Hello messages sent and received on PIM router interface, use the following commands:

```
-> ip pimsm debug-type hello

-> ip pimsm debug-level 100
```

Debug output:

```
tPimsm-:        Sending hello on 2 with IP 192.168.12.1

tPimsm-:        Sending hello on 100 with IP 10.1.1.1

tPimsm-:        Sending hello on 1 with IP 192.168.11.1
```

Sending hello on 2 is a Hello message sent on VLAN 2, and the interface with IP 192.168.12.1 is the router interface sending the Hello message

```
tPimsm-:        Received hello from 192.168.11.2 on 1, len=22

tPimsm-:        Recvd. hello from 192.168.11.2 on vlan 1 Holdtime 105

tPimsm-:        Recvd. hello from 192.168.11.2 on vlan 1 Priority 1

tPimsm-:        Recvd. hello from 192.168.11.2 on vlan 1 Genid 56455
```

Received hello from 192.168.11.2 is the sender of the Hello message on 1. len=22 is respectively the VLAN on which the packet is received, and the packet length Holdtime 105 is the holdtime in seconds. Priority 1 all PIM-SM routers have the same value and are not configurable.

Genid 56455.

Related CLI Command

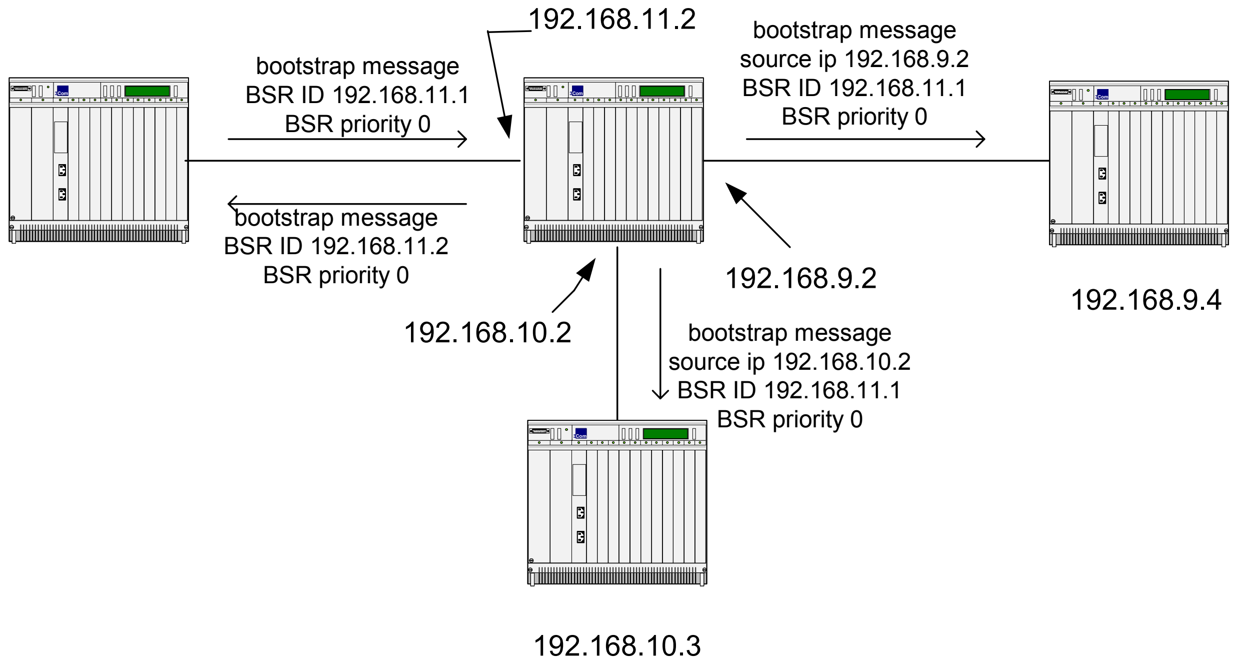
To view if a PIM router interface is the DR for the LAN segment, enter the following command:

```
-> show ip pimsm neighbor

Neighbor Address  Vlan     Uptime      Expires     Mode
-----------------+--------+-----------+-----------+---------
192.168.11.2      2        17h:49m:48s 00h:01m:28s Sparse (DR)
192.168.12.2      2        17h:19m:34s 00h:01m:15s Sparse (DR)
```

If (DR) is not present it means the interface has not DR role on the segment.

BSR Election

Candidates-BSR sends Bootstrap messages within its PIM-SM domain. Bootstrap messages are multicast to the ALL-PIM-ROUTERS group. Bootstrap message parameters C-BSR ID, which are equal to the BSR IP address, and the C-BSR priority, are used for the BSR election. The BSR will be the router with the highest priority; in case the routers have the same priority, the highest IP address will become the BSR. After BSR has been elected, intermediate routers forward Bootstrap messages originated at the BSR.



Simplified Packet Format

```
IP: ----- IP Header -----

      IP: Protocol        = 103 (PIM)

      IP: Source address      = [192.168.11.2]

      IP: Destination address = [224.0.0.13]

PIM: ----- PIM Header -----

      PIM:

      PIM: Version        = 2

      PIM: Message Type   = 4(Bootstrap)

      PIM: Reserved       = 0

      PIM: Checksum       = 71af (correct)

      PIM: Fragment tag            = 0

      PIM: Hash mask length        = 30

      PIM: BSR-priority            = 0
```

Debugging BSR/Bootstrap

Commands to debug received and forwarded bootstrap, the command will return information on BSR election as well as Bootstrap messages in general.

```
-> ip pimsm debug-type bootstrap

-> ip pimsm debug-level 100
```

Debug output on 192.168.11.2:

```
tPimsm-:        pimsmBSRStateTransition - Entering with Event TMR  State : CAND
OperStatus DOWN

tPimsm-:        Originate msg.State change to ELCTD

Transitioning from status down to up in order to participate to BSR election.

tPimsm-:        BSR Available : 192.168.11.2

C-BSR is the address that will be used in the generated Bootstrap messages.

tPimsm-:        pimsmBSRStateTransition - Leaving with Event TMR  State : ELCTD
Status UP
```

The router selects itself as initial BSR.

```
tPimsm-:        Received bootstrap message from 192.168.11.1, bsr
addr:192.168.11.1 on vlan 1

tPimsm-:        Ignoring less preferred bsr 192.168.11.1, Pri 0. Bsr
192.168.11.2, Pri 0

Bootstrap message received and action taken, notice BSR ID and BSR priority.

tPimsm-:        Received bootstrap message from 192.168.11.1, bsr
addr:192.168.11.1 on vlan 1

tPimsm-:        Ignoring less preferred bsr 192.168.11.1, Pri 0. Bsr
192.168.11.2, Pri 0

tPimsm-:        Sent BS on vlan 1 ipda = 224.0.0.13

tPimsm-:        Sent BS on vlan 1 ipda = 224.0.0.13
```

Bootstrap messages sent with IP destination and VLAN information.

Debug output on 192.168.11.1:

```
tPimsm-:     pimsmBSRStateTransition - Entering with Event TMR  State : CAND
OperStatus DOWN

tPimsm-:        Originate msg.State change to ELCTD

tPimsm-:        BSR Available : 192.168.11.1

tPimsm-:        pimsmBSRStateTransition - Leaving with Event TMR  State : ELCTD
Status UP

tPimsm-:        Sent BS on vlan 1 ipda = 224.0.0.13

tPimsm-:        Sent BS on vlan 2 ipda = 224.0.0.13

tPimsm-:        Sent BS on vlan 1 ipda = 224.0.0.13

tPimsm-:        Sent BS on vlan 2 ipda = 224.0.0.13

tPimsm-:        Received bootstrap message from 192.168.11.2, bsr
addr:192.168.11.2 on vlan 1

tPimsm-:        pimsmBSRStateTransition - Entering with Event CHNG  State :
ELCTD OperStatus UP
```

Received bootstrap triggered BSR change.

```
tPimsm-:        BSR Available : 192.168.11.2
```

Election of a New BSR

```
tPimsm-:        pimsmBSRStateTransition - Leaving with Event CHNG  State : CAND
Status UP

........

Forwarding BSR on VLAN 2
```

Bootstrap message forwarded on the corresponding VLAN.

Related CLI Command

To view which routers are assuming the role of the BSR, expiry time, C-BSR address, and C-BSR priority, type:

```
-> show ip pimsm
Status                     = enabled,
BSR Address                = 192.168.13.1,
BSR Expiry Time            = 00h:02m:01s,
CBSR Address               = 0.0.0.0,
CBSR Mask Length           = 30,
CBSR Priority              = 0,
.......
```

IF you don't want a PIM router to assume BSR role, enter the following syntax:

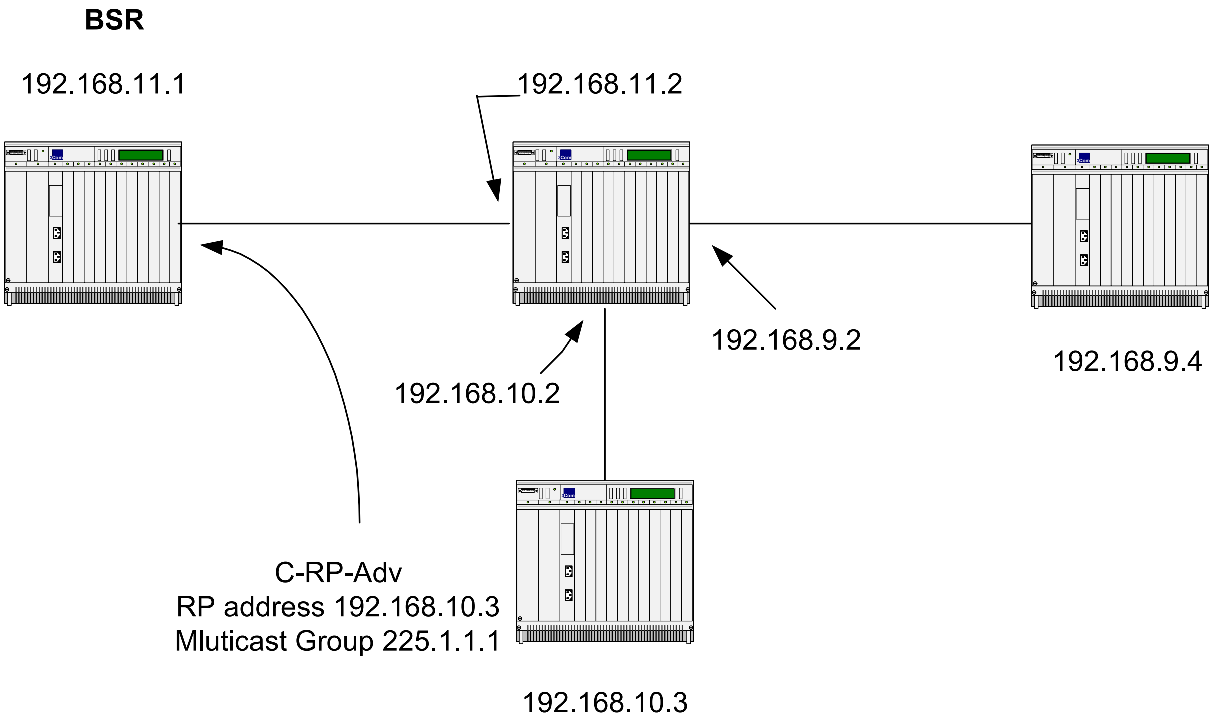
```
-> no ip pimsm cbsr-address
```

This command will result in a C-BSR address of 0.0.0.0

C-RP Advertisements

Candidate-RPs advertisements are periodically unicast from the C-RP to the BSR. These advertisements contain group multicast address the router can be responsible for and the priority for the corresponding group address. C-RP could be configured to participate as RP for specific multicast groups or for all multicast groups. Highest priority will be 0. Other parameters present in the packet are:

- Holdtime timer, which is the amount of time the advertisement, is valid.
- The prefix count, which tells the number of group addresses contained in the advertisement.
- The unicast RP address which is the interface to advertise as RP.
- The mask length.



Simplified RP-Advertisement Packet Format

IP: ----- IP Header -----

IP: Protocol = 103 (PIM)

IP: Header checksum = DF9E (correct)

IP: Source address = [192.168.10.3]

IP: Destination address = [192.168.11.1]

IP: No options

IP:

```
PIM: ----- PIM Header -----
   PIM: Version       = 2
   PIM: Message Type   = 8(Candidate-RP-Advertisement)
   PIM: Reserved       = 0
   PIM: Checksum       = 269d (correct)
   PIM: Prefix count           = 1
   PIM: Priority               = 0
   PIM: Holdtime               = 150 (in seconds)
   PIM: *** Encoded-Unicast-RP-Address ***
   PIM: Address family = 1 (IP (IP version 4))
   PIM: Encoding type  = 0
   PIM: Unicast address = [192.168.11.1]
   PIM:
   PIM: *** Encoded Group Address-1 ***
   PIM: Address family         = 1 (IP (IP version 4))
   PIM: Encoding type          = 0
   PIM: Reserved               = 0
   PIM: Mask length            = 32
   PIM: Group multicast address  = [225.1.1.1]
```

Debugging C-RP-Adv

The commands below should be issued on the BSR since the packets are directed to it, other possibility is to use these commands on the originated C-RP in order to identify if the advertisement are really sent.

```
-> ip pimsm debug-type crp

-> ip pimsm debug-level 100
```

Debugging output on BSR:

```
tPimsm-:        Recv. CRP-Adv (RP:192.168.10.3,Prefix Cnt:1, Pri:0) from
192.168.10.3:192.168.11.1 on vlan 1
tPimsm-:        RP : 192.168.10.3 : Prefix: 225.1.1.1 Mask : 255.255.255.255
```

Information on the C-RP unicast address, number of count, priority and mcast group as well as on which PIM interface the advertisement has been received can be seen on with this debug command.

Another output from a C-RP advertisement, advertises itself for all multicast groups. All group addresses are represented by the pair 224.0.0.0 240.0.0.0, which covers 224.0.0.0 up to 239.255.255.255.

```
tPimsm-:        Recv. CRP-Adv (RP:192.168.10.3,Prefix Cnt:1, Pri:0) from
192.168.10.3:192.168.11.1 on vlan 2
tPimsm-:        RP : 192.168.10.3 : Prefix: 224.0.0.0 Mask : 240.0.0.0
```

Related CLI Command

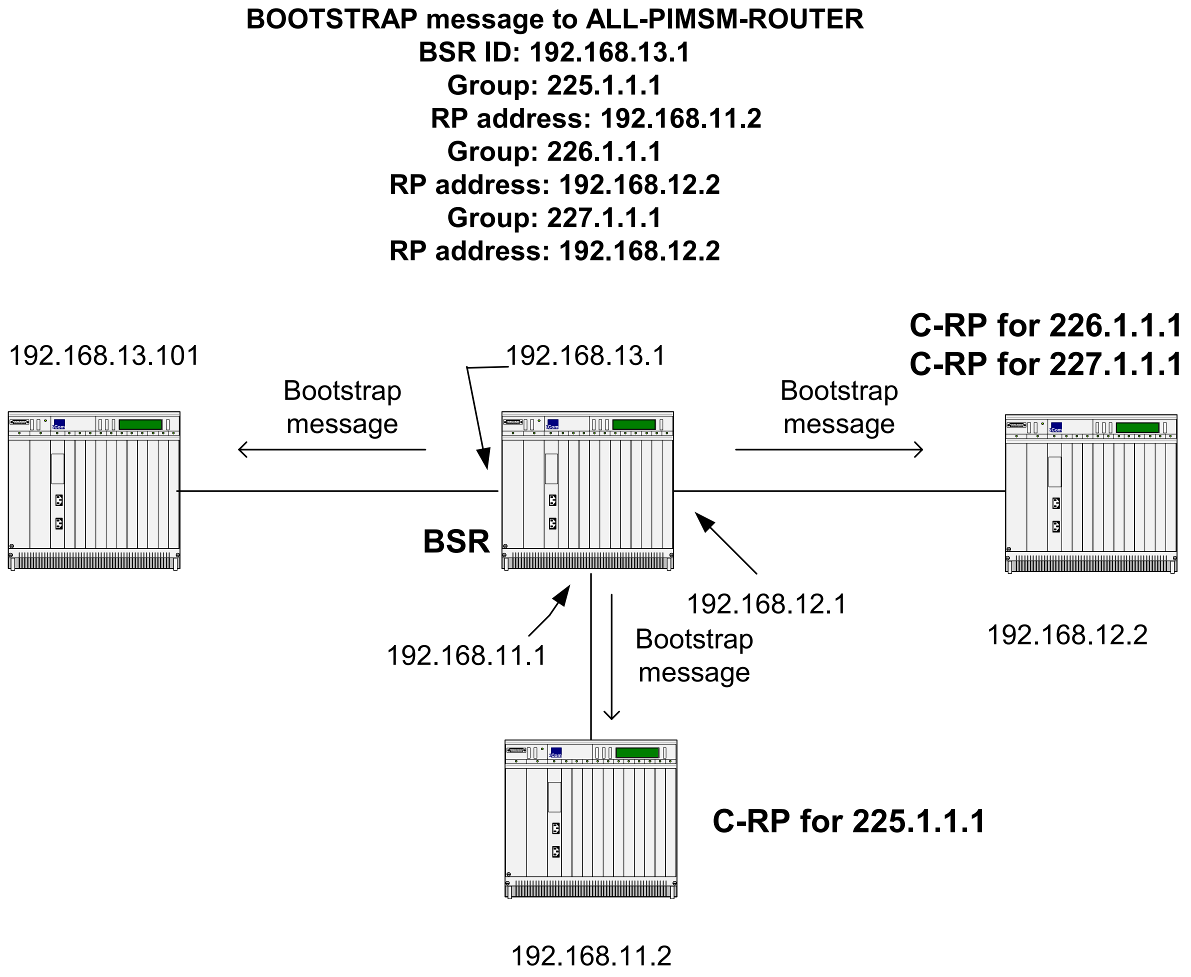
To view the set of multicast group address the PIM router wants to participate in issue:

```
-> show ip pimsm rp-candidate
Group Address      RP Address      Status
------------------+---------------+--------
 225.1.1.1/32       192.168.11.2    enabled
```

RP-SET

An RP-SET contains a set of Candidates-RP IP addresses that want to participate as RP for multicast group. The RP-SET is derived from the C RP-Advertisements received by the BSR. RP-SETs are advertised by the BSR in a bootstrap message to all PIM SM routers by using the ALL-PIM-ROUTER address 224.0.0.13. It contains details on the each C-RP IP address, the multicast group routers want to participate and the corresponding priority.

The DR to determine the RP for each group which it has active members uses the RP-SET. The hash function algorithm, used to select the RP, takes as input the group address and the addresses of the Candidate RPs and gives as output one RP address to be used. The protocol requires that all routers hash to the same RP within a domain for the same multicast group.



Simplified Bootstrap RP-SET Packet Taken on a 192.168.12/24 Network

```
IP: ----- IP Header -----
    IP: Version = 4, header length = 20 bytes
    IP: Protocol       = 103 (PIM)
    IP: Source address      = [192.168.12.1]
    IP: Destination address = [224.0.0.13]


PIM: ----- PIM Header -----
    PIM: Version       = 2
    PIM: Message Type   = 4(Bootstrap)
    PIM: Hash mask length        = 30
    PIM: BSR-priority            = 0
    PIM: *** Encoded-Unicast BSR Address ***
    PIM: Address family = 1 (IP (IP version 4))
    PIM: Encoding type  = 0
    PIM: Unicast address = [192.168.13.1]
    PIM:
    PIM: *** Encoded-Group Address # 1 ***
    PIM: Address family          = 1 (IP (IP version 4))
    PIM: Encoding type           = 0
    PIM: Reserved                = 0
    PIM: Mask length             = 32
    PIM: Group multicast address  = [225.1.1.1]
    PIM: RP-count-1              = 1
    PIM: Fragment RP-count-1     = 1
    PIM: Reserved                = 0
    PIM:
    PIM: *** Encoded-Unicast RP Address # 1 ***
    PIM: Address family = 1 (IP (IP version 4))
    PIM: Encoding type  = 0
    PIM: Unicast address = [192.168.11.2]
```

```
PIM: RP1-Holdtime          = 150 (in seconds)

PIM: RP1-Priority          = 0

PIM: Reserved              = 0

PIM:

PIM: *** Encoded-Group Address # 2 ***

PIM: Address family        = 1 (IP (IP version 4))

PIM: Encoding type         = 0

PIM: Reserved              = 0

PIM: Mask length           = 32

PIM: Group multicast address  = [226.1.1.1]

PIM: RP-count-2            = 1

PIM: Fragment RP-count-2     = 1

PIM: Reserved              = 0

PIM:

PIM: *** Encoded-Unicast RP Address # 1 ***

PIM: Address family = 1 (IP (IP version 4))

PIM: Encoding type  = 0

PIM: Unicast address = [192.168.12.2]

PIM: RP1-Holdtime          = 150 (in seconds)

PIM: RP1-Priority          = 0

PIM: Reserved              = 0

PIM:

PIM: *** Encoded-Group Address # 3 ***

PIM: Address family        = 1 (IP (IP version 4))

PIM: Encoding type         = 0

PIM: Reserved              = 0

PIM: Mask length           = 32

PIM: Group multicast address  = [227.1.1.1]

PIM: RP-count-3            = 1

PIM: Fragment RP-count-3     = 1

PIM: Reserved              = 0

PIM:
```

```
PIM: *** Encoded-Unicast RP Address # 1 ***

PIM: Address family = 1 (IP (IP version 4))

PIM: Encoding type  = 0

PIM: Unicast address = [192.168.12.2]

PIM: RP1-Holdtime          = 150 (in seconds)

PIM: RP1-Priority          = 0

PIM: Reserved              = 0
```

The RP-Holdtime parameters is the corresponding time the BSR will hold related RP multicast group information in its table as valid. This parameter is reset to 150 s when a C-RP Advertisement is received at BSR and originated by the RP in question.

Debugging RP-SET

As mentioned previously, RP-SET are included in Bootstrap messages. Commands to debug RP-SET:

```
-> ip pimsm debug-type bootstrap

-> ip pimsm debug-level 100
```

On Non BSR You Should See

```
tPimsm-:     Received bootstrap message from 192.168.12.1, bsr addr:192.168.13.1
on vlan 2
tPimsm-:        AcceptBSMsg: Contents
tPimsm-:        AcceptBSMsg: Prefix : 225.1.1.1 Mask : 255.255.255.255
tPimsm-:        AcceptBSMsg: RP:  192.168.11.2 Priority : 0
tPimsm-:        AcceptBSMsg: current rplist does exist
tPimsm-:        AcceptBSMsg: removing timer
tPimsm-:        AcceptBSMsg: bit already set for indx:1
tPimsm-:        AcceptBSMsg: Prefix : 226.1.1.1 Mask : 255.255.255.255
tPimsm-:        AcceptBSMsg: RP:  192.168.12.2 Priority : 0
tPimsm-:        AcceptBSMsg: current rplist does exist
tPimsm-:        AcceptBSMsg: removing timer
tPimsm-:        AcceptBSMsg: bit already set for indx:2
tPimsm-:        AcceptBSMsg: Prefix : 227.1.1.1 Mask : 255.255.255.255
tPimsm-:        AcceptBSMsg: RP:  192.168.12.2 Priority : 0
tPimsm-:        AcceptBSMsg: current rplist does exist
tPimsm-:        AcceptBSMsg: removing timer
tPimsm-:        AcceptBSMsg: bit already set for indx:2
tPimsm-:        AcceptBSMsg: check Rehash
tPimsm-:        CheckRehash : SET adding rp:indx:1
tPimsm-:        CheckRehash : SET adding rp:indx:2
```

This output shows the IP address of the routing relaying the bootstrap message, the BSR ID, the VLAN ID, the various multicast group, RP IP address and priority.

Issuing the same command on the BSR would detail the C-RP Advertisement received, and the bootstrap messages sent on various interfaces.

Related CLI Command

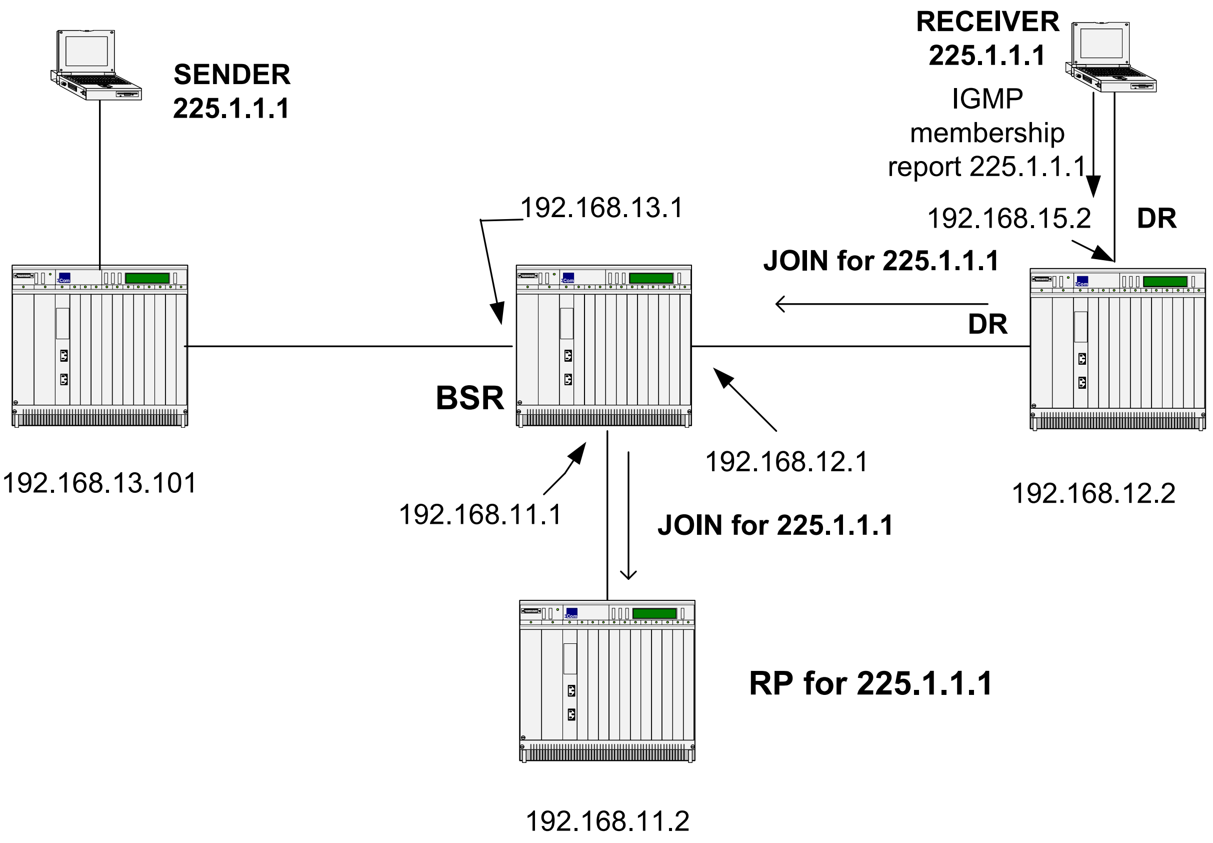
To View RP-SET on a router, use the **show ip pimsm rp-set** command. For example:

```
-> show ip pimsm rp-set
Group Address      Address         Holdtime Expires
------------------+---------------+--------+-----------
225.1.1.1/32       192.168.11.2    150      00h:00m:00s
226.1.1.1/32       192.168.12.2    150      00h:00m:00s
227.1.1.1/32       192.168.12.2    150      00h:00m:00s
```

Join/Prune

Join/Prune messages are sent by the DR to join or prune a branch off the multicast distribution tree in order to receive multicast group on a specific LAN segment that has active group members. Registration of the members is achieved with IGMP host membership report. Upon reception of such message each upstream router between the receiver and the RP creates or updates its multicast route entry for specific multicast group(s) adding interface where join/prune request have been received. When the RP receives the join/prune message it sends join request toward the sender(s). Refer to user manual under section-shared tree for drawing and additional protocol details.

A JOIN/PRUNE message contains, the upstream neighbor message, the multicast group address a router wishes to join, number of joins and pruned source and the RP address.



Simplified Join Packet

IP: ----- IP Header -----

IP: Protocol = 103 (PIM)

IP: Source address = [192.168.12.2]

IP: Destination address = [224.0.0.13]

```
PIM: ----- PIM Header -----
    PIM:
    PIM: Version        = 2
    PIM: Message Type   = 3(Join/Prune)
    PIM: Reserved       = 0
    PIM: Checksum       = 5794 (correct)
    PIM:
    PIM: *** Encoded-Unicast-Upstream Neighbor Address ***
    PIM: Address family = 1 (IP (IP version 4))
    PIM: Encoding type  = 0
    PIM: Unicast address = [192.168.12.1]
    PIM: Reserved              = 0
    PIM: Number of groups        = 1
    PIM: Hold time              = 210 (in seconds)
    PIM:
    PIM: *** Group # 1 ***
    PIM:
    PIM: *** Encoded-Multicast Group Address-1 ***
    PIM: Address family          = 1 (IP (IP version 4))
    PIM: Encoding type           = 0
    PIM: Reserved              = 0
    PIM: Mask length             = 32
    PIM: Group multicast address  = [225.1.1.1]
    PIM: Number of joined sources = 1
    PIM: Number of pruned sources = 0
    PIM:
    PIM: *** Encoded-Joined Source Address # 1 ***
    PIM: Address family = 1 (IP (IP version 4))
    PIM: Encoding type  = 0
    PIM: Reserved       = 0
    PIM: Flags                 = 07
    PIM:               .... .1.. = Sparse bit - PIM-SM
```

PIM: .... ..1. = WC bit - join / prune applies to the (*,G) or (*,*,RP) entry

PIM: ....1 = RPT-bit - information about (S,G) is sent towards the RP

PIM: Mask length = 32

PIM: Source address = [192.168.11.2]

Simplified PRUNE Packet

The main difference between a JOIN and PRUNE is the number of joined source versus pruned source:

PIM: *** Encoded-Multicast Group Address-1 ***

PIM: Address family = 1 (IP (IP version 4))

PIM: Encoding type = 0

PIM: Reserved = 0

PIM: Mask length = 32

PIM: Group multicast address = [225.1.1.1]

PIM: Number of joined sources = 0

PIM: Number of pruned sources = 1

Debugging JOIN/PRUNE Event

The commands below will allow you to see any JOIN/PRUNE message:

```
-> ip pimsm debug-type joinprune
```

```
-> ip pimsm debug-level 100
```

That will show if the message is join or prune, the upstream router, outgoing VLAN, the multicast group and the RP.

```
tPimsm-:        BuildJoinPrune: for nbr:192.168.12.1 on vlan:2
tPimsm-:        BuildJoinPrune: next route
tPimsm-:        Sending Triggered GJoins Joins 1 Prunes 0
tPimsm-:        BuildJoinPrune: for nbr:192.168.12.1 on vlan:2
tPimsm-:        BuildJoinPrune: next route
tPimsm-:        BuildJoinPrune: (*,225.1.1.1) route
tPimsm-:        BuildJoinPrune: next route
tPimsm-:        Send Join (192.168.11.2,225.1.1.1) on vlan 2,bits:7 holdtime 210
tPimsm-:        BuildJoinPrune: for nbr:192.168.12.1 on vlan:2
tPimsm-:        BuildJoinPrune: next route
tPimsm-:        BuildJoinPrune: (*,225.1.1.1) route
tPimsm-:        BuildJoinPrune: next route
tPimsm-:        Send Join (192.168.11.2,225.1.1.1) on vlan 2,bits:7 holdtime 210
```

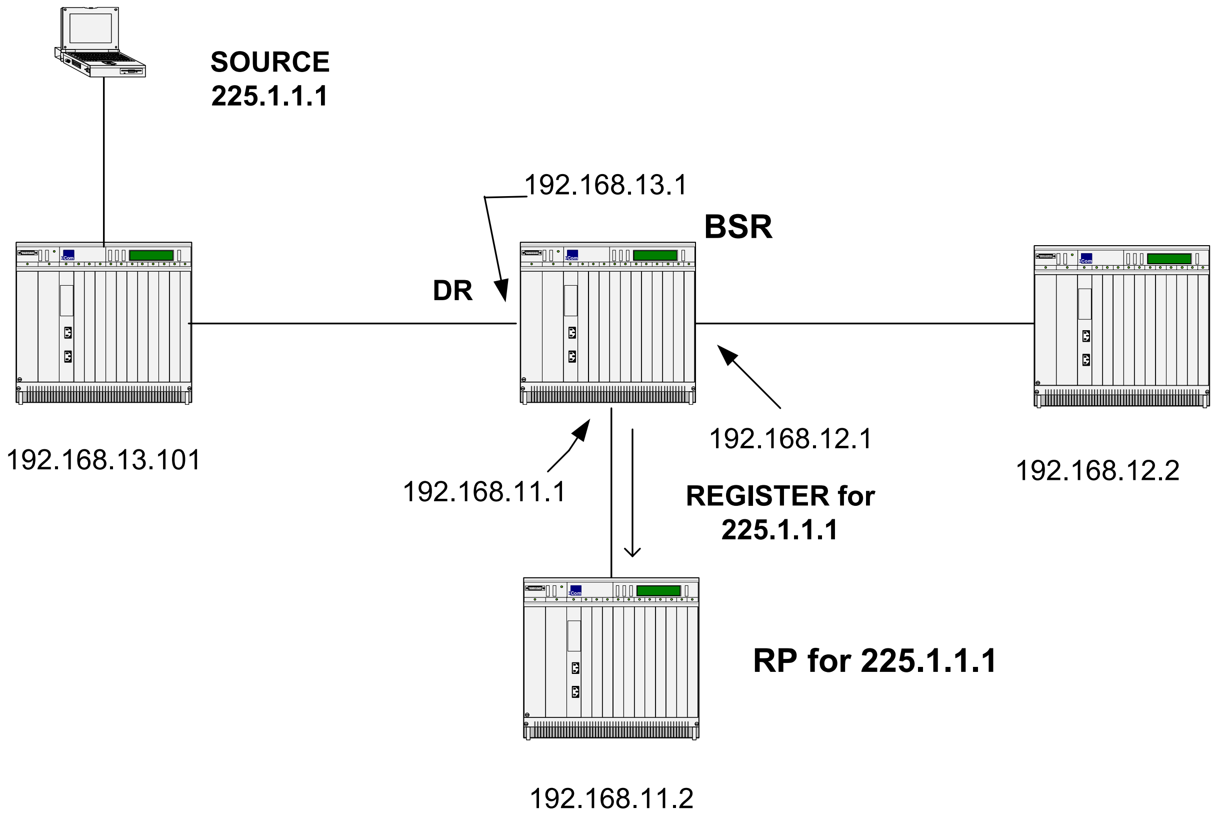
Register

When a source starts transmitting to a multicast group, the DR on the segment encapsulates the data and sends it as unicast to the RP representing the group. The source IP address will be the DR and the destination IP address will be the RP. Two behaviors are possible:

1-The RP joins the source tree by sending a PIM join to the DR. Packets will then flow from the source to the RP unencapsulated.

2-The RP does not join the source tree. The multicast packets will be encapsulated by the DR and send to the unicast address of the RP.

Upon reception of the multicast stream, the RP forwards the packets unencapsulated to receivers if any. If there are no receivers the RP issues a REGISTER STOP message to the source.

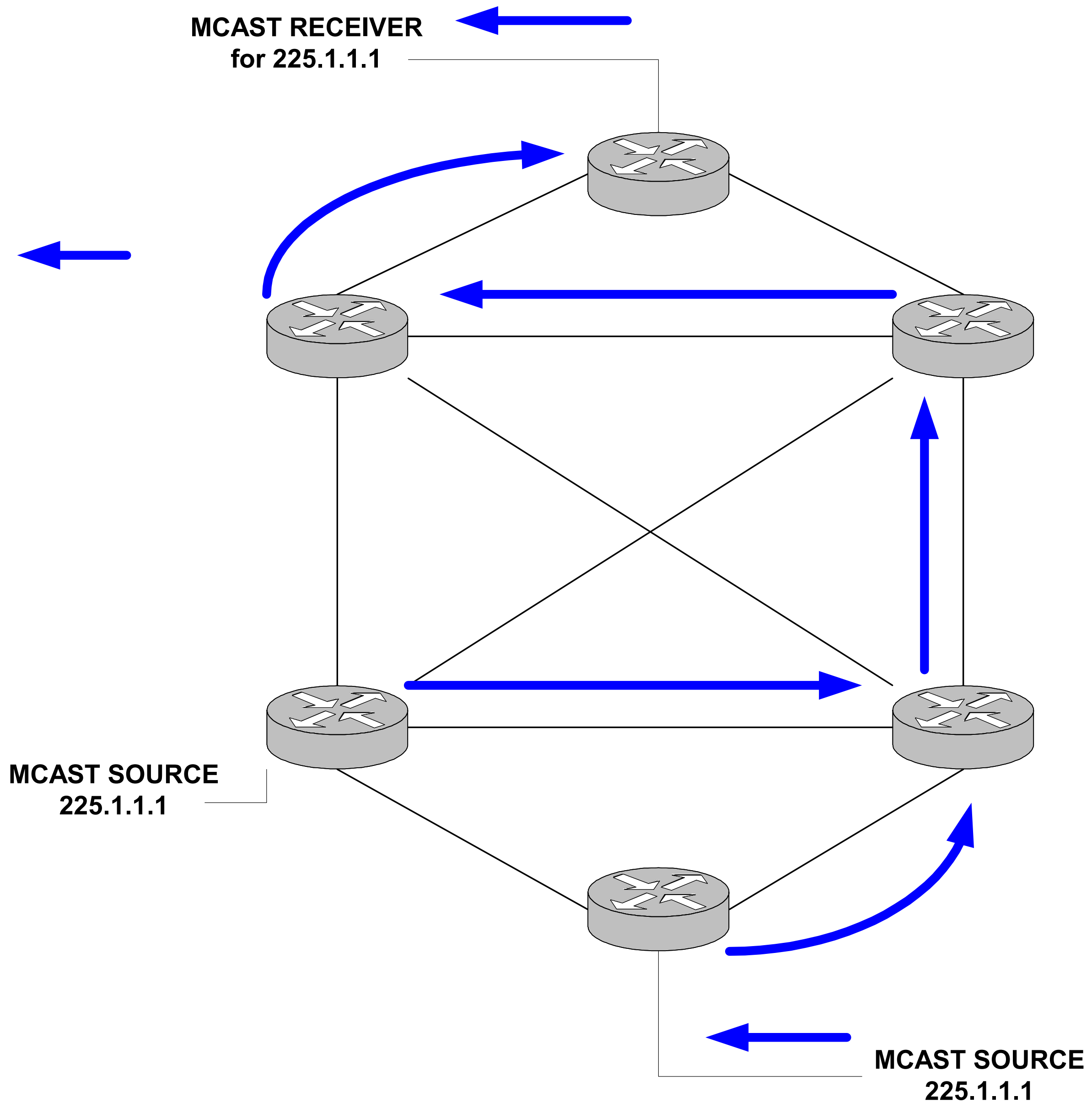


Simplified REGISTER Packet Format

```
IP: ----- IP Header -----
IP: Source address      = [192.168.13.1]
IP: Destination address = [192.168.11.2]


PIM: ----- PIM Header -----
    PIM: Version        = 2
    PIM: Message Type   = 1(Register)
    PIM: Reserved       = 0
    PIM: Checksum       = deff (should be 45b5)
    PIM: Reserved       = 0
    PIM: Flags               = 00
    PIM:           0... .... = Border bit - router is a DR for a source that i
    PIM:           .0.. .... = Null-Register bit - DR not probing the RP
    PIM: Multicast data packet
```

Shared Tree

A shared distribution tree is formed around the RP, from which all traffic is distributed regardless of the location of the traffic sources. The advantage of shared distribution trees is simple topology on PIM SM routers. The DR is sending a JOIN message to the RP, and a graft to the SPT. The disadvantage is that the path between the source and receivers might not be the shortest one, which could introduce delay. The rendezvous router may also be a traffic bottleneck if there are many high data rate sources. The Source Path Tree can be called RP TREE too.



Related CLI Command

In order to view the IP multicast routing table as well as source and distribution tree type:

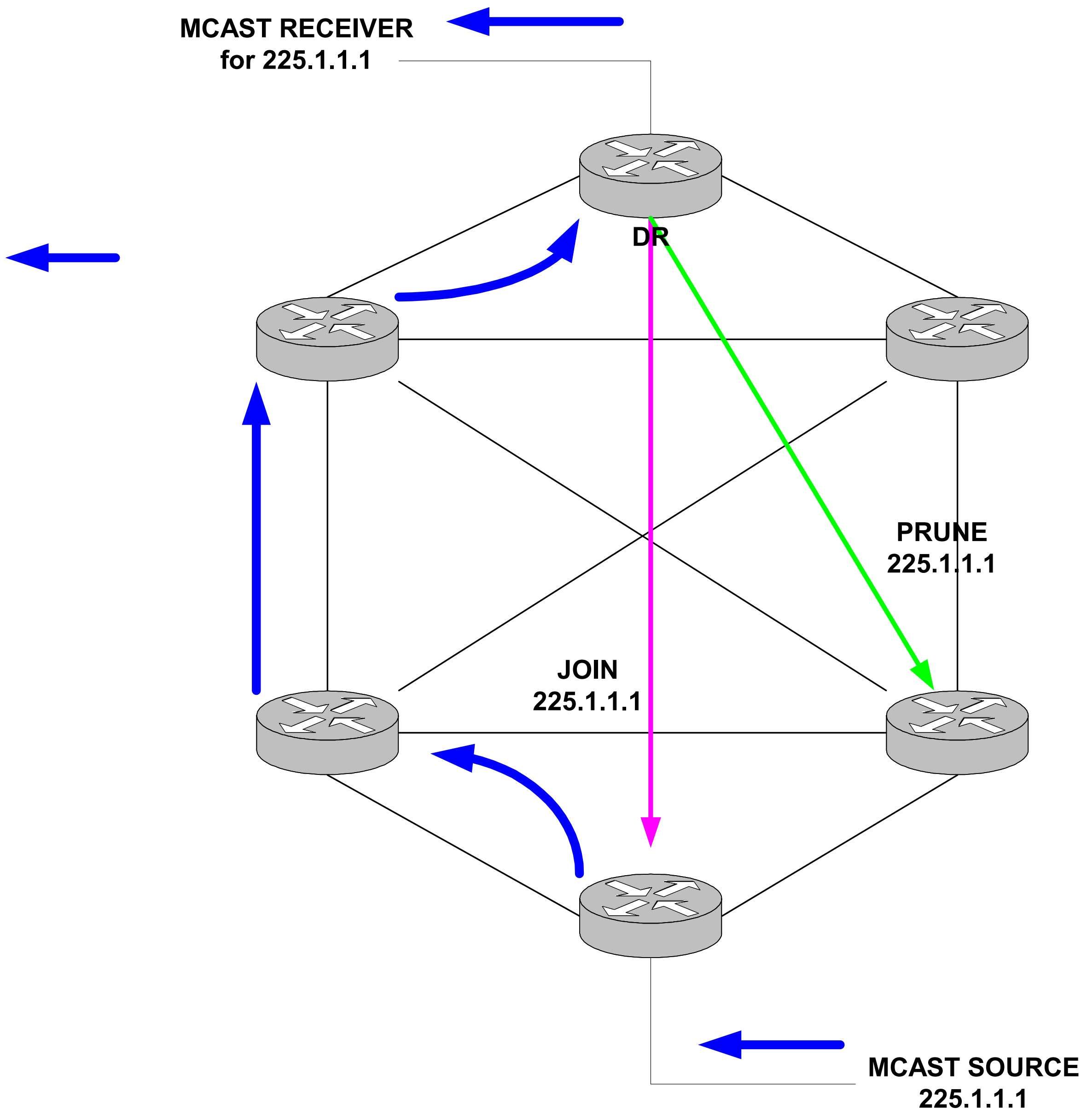
```
-> show ip pimsm mroute


Group Address   Src Address        Assert Assert      Assert Flags
                                   Metric expires     Pref
---------------+------------------+------+-----------+------+-----
225.1.1.1       192.168.14.115/32  0      00h:00m:00s 0      rpt
```

Source-Based Tree

PIM SM protocol allows a DR to build a Shortest Path Tree, which could provide a shortest path toward the source. It is being referenced as Source Based Tree because the DR closest to the receiver is initiating the process.

When a PIM SM graft the shared path tree, a counter is initiated for this specific group on the last DR closest to the receiver that will be incremented every data packet received. Once the data exceeds a configured threshold the router switches over to source based tree mode. A JOIN message is sent directly toward the source, after the shortest path tree is activated the DR sends a PRUNE message to the RP.

Note. Currently, the threshold cannot be configured from Clips.



Related CLI Command

To view the distribution tree issue:

```
-> show ip pimsm mroute

Group Address   Src Address        Assert Assert      Assert Flags
                                   Metric expires     Pref
---------------+------------------+------+-----------+------+-----
225.1.1.1       192.168.14.115/32  0      00h:00m:00s 0      spt
```

Troubleshooting Examples: Limitations

Incorrect BSR ID

Turn on BSR debugging to view bootstrap messages:

```
-> ip pimsm debug-type bootstrap

-> ip pimsm debug-level 100


tPimsm-:     Received bootstrap message from 192.168.11.1, bsr addr:192.168.13.1
on vlan 2
tPimsm-:        RPF check failed for bootstrap msg. SA: 192.168.11.1,BSR
:192.168.13.1, vlan 2
tPimsm-:        pimsmBSRStateTransition - Entering with Event TMR  State : ELCTD
OperStatus UP
tPimsm-:        BsrTimer Expired. Orig Message No State change
tPimsm-:        pimsmBSRStateTransition - Leaving with Event TMR  State : ELCTD
Status UP
tPimsm-:        Sent BS on vlan 2 ipda = 224.0.0.13
```

An IP unicast routing issue causes this; the receiving router does not have a route entry for 192.16811.1.

Multicast Group Status is Shown as Disabled

```
-> show ip pimsm rp-candidate
Group Address      RP Address      Status
------------------+---------------+--------
227.1.1.1/32       192.168.12.2    disabled
226.1.1.1/32       192.168.12.2    disabled
```

This is caused by a missing C-RP address

```
-> show ip pimsm
Status                     = enabled,
BSR Address                = 192.168.13.1,
BSR Expiry Time            = 00h:01m:21s,
CBSR Address               = 0.0.0.0,
CBSR Mask Length           = 30,
CBSR Priority              = 0,
CRP Address                = 0.0.0.0,
CRP Hold Time              = 150,
CRP Expiry Time            = 00h:05m:00s,
CRP Interval               = 60,
CRP Priority               = 0,
Data Timeout               = 210,
Join/Prune Interval        = 60,
Max RPs                    = 32,
Probe Time                 = 5,
Register Checksum          = header,
Register Suppress Timeout  = 60


-> ip pimsm crp-address 192.168.12.2
-> show ip pimsm
Status                    = enabled,
BSR Address               = 192.168.13.1,
BSR Expiry Time           = 00h:01m:43s,
CBSR Address              = 0.0.0.0,
CBSR Mask Length          = 30,
CBSR Priority             = 0,
CRP Address               = 192.168.12.2,
CRP Hold Time             = 150,
CRP Expiry Time           = 00h:05m:00s,
CRP Interval              = 60,
CRP Priority              = 0,
Data Timeout              = 210,
Join/Prune Interval       = 60,
Max RPs                   = 32,
Probe Time                = 5,
Register Checksum         = header,
Register Suppress Timeout  = 60


-> show ip pimsm rp-candidate

Group Address      RP Address      Status
------------------+---------------+--------
227.1.1.1/32       192.168.12.2    enabled
226.1.1.1/32       192.168.12.2    enabled
```

PIM-SM Limitations

Only one C-RP should be configured per PIM domain. Having multiple C-RPs is not currently supported.

The problem with fragmentation and reassembly of PIM-SM tunneled packets (PIM register-encapsulated packets fall into this category), is if packets need to be fragmented, it might prevent mcast stream to be delivered properly. A smaller MTU size would work around this issue.

Upstream Neighbor/Next Hop Debug Commands

Use following debug commands to find an upstream neighbor or to verify next hop.

```
 -> debug ip pimsm rpf 172.100.1.254
Source IP Address         = 172.100.1.254,
RPF Vlan                  = 100,
RPF Neighbor              = 172.100.1.254,
RPF Route/Mask            = 172.100.1.0/24,
RPF Metric Preference     = 1,
RPF Metric                = 0


-> debug ip pimsm rp-hash 224.0.0.0

Group Address      RP Address
------------------+------------------
224.0.0.0          172.100.1.254
```

```
-> debug ip pimsm rp

Group Address      RP Address
------------------+------------------
224.0.1.22         172.100.1.254
224.0.1.24         172.100.1.254
239.0.0.90         172.100.1.254
239.1.1.200        172.100.1.254
239.1.1.201        172.100.1.254
239.1.1.202        172.100.1.254
239.255.255.254    172.100.1.254
```

17 Troubleshooting Server Load Balancing

In order to successfully troubleshoot the Alcatel Server Load Balancing feature, a brief understanding of this services functions are necessary.

Our Basic Definition

The "Server Load Balancing" (SLB) term used in this document refers to the functionality of distributing client requests across servers logically grouped in "clusters."

A "cluster" logically aggregates a set of servers that run identical applications with access to the same content (e.g. a Web server).

Points to Remember

- Each cluster's Virtual IP address (VIP) is seen by clients
- 15 clusters are supported per switch
- Each cluster can have up to 5 servers

Note. The Alcatel OmniSwitch 7700/7800/8800 supports two different types of SLB distribution algorithms. Reading "Configuring Server Load Balancing" in the *OmniSwitch 7700/7800/8800 Network Configuration Guide* for a more detailed explanation of these algorithms is highly recommended.

In This Chapter

Introduction

The primary function of a Server Load Balance cluster is to provide a method to logically treat a group of physical servers (known as a server farm) as one large virtual server (known as an SLB cluster).

Note. This document does not discuss the basic operation of Server Load Balancing. To learn about how SLB works, refer to "Configuring Server Load Balancing" in the *OmniSwitch 7700/7800/8800 Network Configuration Guide*.

This document assumes the reader has knowledge of the Server Load Balance operation.

In the following pages we will discuss:

- How to determine a Server Load Balance failure
- Troubleshooting a Server Load Balance Failure

Server Load Balance Failure

What is an SLB Failure?

A failure in the Alcatel Server Load Balance feature will appear in 1 of 2 forms. We will discuss these two forms in the following paragraphs:

- Complete failure of service
- Partial failure of service

Description of a Complete Failure of Service

A complete failure of service is best described as a loss of connectivity to all servers for all users. This can be verified by a simple connectivity test (ping) to the SLB cluster Virtual IP (SLB VIP).

Description of a Partial Failure of Service

A partial failure of service is best described as a condition where the traffic distribution rules are not being adhered to, but cluster connectivity is still present.

Troubleshooting Commands

Below is a list of commands, which will be used and discussed in this chapter.

show ip slb (Displays SLB information)

show ip slb *cluster-name*

For example:

```
-> show ip slb cluster Intranet
Cluster Intranet
  VIP                             : 128.241.130.205,
  Admin status                    : Enabled,
  Operational status              : In Service,
  Routed flows success ratio (%)  = 100,
  Ping period (seconds)           = 60,
  Ping timeout (milliseconds)     = 3000,
  Ping retries                    = 3,
  Redirect algorithm              : round robin,
  Sticky time (seconds)           = 600,
  Number of flows                 = 45768,
  Number of servers               = 2
    Server 128.220.40.4
      Admin status = Enabled, Operational Status = In Service,
      Weight = 10, Number of flows = 2000, Availability (%) = 98
    Server 128.220.40.5
      Admin status = Enabled, Operational Status = Discovery,
      Weight = 10, Number of flows = 0, Availability (%) = 0
```

ip slb admin {enable | disable} (Enables or disables the SLB service)

ip slb cluster *cluster-name* **admin status {enable | disable}**

ip slb cluster *cluster-name* **distribution {round robin | server failover}**

[no] ip slb server ip *ip-address*

For example:

```
-> show ip slb
Admin status                      : Enabled,
Operational status                : In Service,
Number of clusters                = 3
```

Viewing data of *all* clusters:

show ip slb clusters

For example:

```
-> show ip slb clusters
                               Admin    Operational          #     %
Cluster Name  VIP              Status   Status               Srv   Avail
--------------+----------------+--------+--------------------+-----+---------
WorldWideWeb  128.241.130.204  Enabled  In Service           3     95
Intranet      128.241.130.205  Enabled  In Service           2     100
FileTransfer  128.241.130.206  Enabled  Out of Service       2     50
```

Troubleshooting a Complete Failure

Gathering pertinent information is essential in order to properly characterize the problem. Obtain symptom facts, review all recent network or architecture changes, localize the problem, e.g. does it affect only certain floors, or departments? Devise an action plan.

The first step in any troubleshooting process is to gather information. The more information you have about the symptoms and characteristics of a problem, including when it first occurred, the better your chances of solving the problem quickly and efficiently. Typical questions you might ask at this stage before beginning to troubleshoot spanning tree include:

- Do the symptoms occur regularly or intermittently?
- Are the symptoms related to certain applications (running simultaneously with), or do they affect all network operations?
- Are other SLB clusters located on this switch malfunctioning?
- How many users are involved?
- Do the symptoms correlate to other activities in the network?
- When was the first occurrence of the symptom?
- Were there any changes in any hardware or software network components?
- Has anyone connected or disconnected a PC (laptop or desktop), or another component to or from the network?
- Has anyone installed an interface card in a computer/server?
- Has DHCP possibly provided a lease to a user with the SLB VIP?
- Has anyone stepped on a cable?
- Has any maintenance work been performed in the building recently (by a telephone company or building maintenance personnel, for example)?
- Has anyone (including cleaning personnel) moved/unplugged any equipment or furniture?

Note. In general, it is advised to restart a device immediately after major changes have been made to it; you want to make sure that all your changes have been saved. You also want to verify that after a reboot (equivalent to a power outage or a crash), the device will come up with the correct and complete configuration.

Troubleshooting a Partial Failure

The number one cause of a partial failure is misconfiguration. In the following area, we will show you how to determine the SLB configuration.

The Troubleshooting Procedure

If you have reason to believe that the SLB cluster is operational, however inaccessible, Alcatel's 7700/7800/8800 provides useful commands for narrowing down the problem.

One of the most useful commands used in troubleshooting SLB problems on the 7700/7800/8800 product line is the **show ip slb clusters** command.

For example:

```
-> show ip slb clusters
                                 Admin    Operational         #     %
Cluster Name   VIP               Status   Status              Srv   Avail
---------------+----------------+--------+-------------------+-----+---------
WorldWideWeb   128.241.130.204  Enabled  In Service          3     95
Intranet       128.241.130.205  Enabled  In Service          2     100
FileTransfer   128.241.130.206  Enabled  Out of Service      2     50
```

As shown in the example above, this command will provide pertinent information in verifying which server cluster(s) are inaccessible or malfunctioning.

After you have determined which SLB cluster is not accessible, performing the **show ip slb cluster** *cluster-name* command will provide more detailed information on the configuration and status of the above named SLB cluster.

The **show active policy rule** and **show policy condition** commands are also useful when troubleshooting SLB problems:

```
-> show active policy rule
            Policy               From  Prec Enab   Act Refl Log Save   Matches
 SLB-rule-FTP                     api 65000  Yes   Yes   No  No  Yes         7
   (  L3):                    SLB-cond-FTP -> SLB-act-FTP

-> show policy condition
 Condition Name                  From          Src -> Dest
 SLB-cond-FTP                     api
 *IP     :                                     Any -> 172.160.1.100
```

18 Troubleshooting Authenticated VLANs

In order to troubleshoot Authenticated VLAN (AVLAN), a basic understanding of how authentication works in the switch is required. Understanding of Radius and DHCP server will be useful in troubleshooting Authenticated VLAN.

Note. Reading the "Managing Authentication Servers" and the "Configuring Authenticated VLANs" chapters in the appropriate *OmniSwitch Network Configuration Guide* is highly recommended.

In This Chapter

Introduction

The main function of Authenticated VLAN is to control user access to network resources based on VLAN assignment and user login process. This process is sometimes called user authentication or Layer 2 Authentication. The term Authenticated VLANs (AVLANs) and Layer 2 Authenticaion are synonymous.

Note. This document does not discuss the basic operation of the AVLAN. To learn about how AVLAN works, refer to the "Managing Authentication Servers" and the "Configuring Authenticated VLANs" chapters in the appropriate *OmniSwitch Network Configuration Guide*.

Troubleshooting AVLAN

DHCP Request Failure

If the client (PC-1) is configured to get the DHCP IP address and can not get DHCP address during the first phase of authentication process, it could be because of wrong configuration in the switch, communication failure or miss configured DHCP server.

Use the command:

```
-> show ip helper
```

This command is to verify IP addresses for DHCP servers that will receive BOOTP/DHCP packets forwarded by this UDP Relay service is set correctly. The example of command output is shown below:

```
-> show ip helper
Forward Delay(seconds) = 3,
Max number of hops = 4,
Forward option = standard
Forwarding Address:
192.168.10.100
```

In addition with IP helper address, verify that the Gateway of the DHCP server is correctly specified. The Gateway is a router port in any of the authenticated VLANs in the switch. It specifies the scope into which an authentication client receives an IP address.

```
-> show aaa avlan config
default DHCP relay address = 192.168.10.1,
authentication DNS name    = not configured
```

If the IP address for the DHCP server is set correctly then try to ping the server to verify the connectivity.

You can also verify the MAC-address-table and ARP table entries.

```
-> show mac-address-table
```

The mac-address-table CLI command confirms that the switch has learned the MAC address of the DHCP server has been learned.

```
-> show mac-address-table
Legend: Mac Address: * = address not valid

  Vlan      Mac Address          Type       Protocol    Operation    Interface
------+-------------------+--------------+-----------+------------+-----------
   2     00:c0:4f:0c:3a:e4     learned            0     bridging      1/21

Total number of Valid MAC addresses above = 1
```

Now verify that the Gateway defined in DHCP server point towards the right IP address. ARP table confirms that the switch has learned the ARP entry of the DHCP server. Verify that the IP address of the DHCP server has been learned in the correct VLAN and the port it has been attached.

```
-> show arp

Total 1 arp entries
  Flags (P=Proxy, A=Authentication, V=VRRP)

  IP Addr           Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+-----------
```

```
 192.168.10.100    00:c0:4f:0c:3a:e4   DYNAMIC    1/21  vlan 2
```

There are couples of other things you can verify is on the DHCP server itself.

- Router IP address is set to the IP address of one of the authenticated VLANs in the switch.
- Address pool must be created in order to assign the DHCP IP address.

Authentication Failure

If the client (PC-1) is cannot successfully completes the authentication, it could be because of wrong configuration in the switch, communication failure or miss configured RADIUS server.

Use the command:

```
-> show aaa server
```

1 Verify that the correct IP address of the radius server has been entered. The Authentication port and Accounting port must match with the Radius server's port configuration.

To verify the port configuration on the radius server open the **radius.ini** file in Notepad and check for below entries.

- [Ports]
- UDPAuthPort = 1812
- UDPAcctPort = 1813

You can also use UDPAuthPort = 1645 and UDPAcctPort = 1646 if you want. It's ok to use these ports based on old RFC. Whatever is there it should be same on both Switch and the Server.

The example of the **show aaa server** CLI command is shown below:

```
-> show aaa server
Server name = rad-1
Server type         = RADIUS,
IP Address 1        = 192.168.10.100,
Retry number        = 3,
Time out (sec)      = 2,
Authentication port = 1812,
Accounting port     = 1813
```

To modify any of the above fields use the **aaa radius-server** CLI command. For detail reference of how to set such parameters, read the "Managing Authentication Servers" and the "Configuring Authenticated VLANs" chapters in the appropriate *OmniSwitch Network Configuration Guide*.

2 Ping the radius server to verify the good connectivity. If server doesn't respond, fix the connectivity issue first and then troubleshoot Authentication configuration.

3 You can also verify the MAC address-table and ARP table entries.

```
-> show mac-address-table
```

The MAC address table confirms that the switch has learned mac-address of the RADIUS server has been learned.

```
-> show mac-address-table
Legend: Mac Address: * = address not valid

  Vlan      Mac Address          Type       Protocol    Operation     Interface

------+-------------------+--------------+-----------+------------+-----------

     2   00:c0:4f:0c:3a:e4     learned              0     bridging      1/21
Total number of Valid MAC addresses above = 1
```

Now verify that the Gateway defined in RADIUS server point towards the right IP address. ARP table confirms that the switch has learned the ARP entry of the RADIUS server. Verify that the IP address of the RADIUS server has been learned in the correct VLAN and the port it has been attached.

```
-> show arp

Total 1 arp entries
  Flags (P=Proxy, A=Authentication, V=VRRP)

  IP Addr            Hardware Addr       Type       Flags   Port     Interface
-----------------+-------------------+----------+-------+--------+-----------
192.168.10.100    00:c0:4f:0c:3a:e4   DYNAMIC    1/21  vlan 2
```

4 Verify that the Authentication shared secret on the radius server and the switch (Radius client) is same.

There is no show command to check the Authentication shared secret on the switch for the security purpose. The only way to verify is reenter the shared secret using the **aaa radius-server** CLI command

5 If so far so good and radius server is rejecting user request, verify the user configuration on the radius server to make sure he/she is using correct user name and password. Read the the "Managing Authentication Servers" chapter in the appropriate *OmniSwitch Network Configuration Guide* for detail information about Radius server attributes and configuration. Check log file on the radius server for more information.

Problem Communicating Using Multiple Protocols Simultaneously

If client can't communicate to the remote station in the Authenticated VLAN using multiple protocols simultaneously then check below possible configuration mistakes.

Let's take an example of user who is trying to communicate to the target machine using both IP and IPX. The communication might failure because of one or more of the following steps.

1 If client can't communicate using IP and IPX, troubleshoot the basic authentication issues using the procedures described in "DHCP Request Failure" on page 18-2 and "Authentication Failure" on page 18-3 explained earlier in this chapter.

2 If authentication works fine using IP not IPX then troubleshoot the Radius Server as explained in next steps.

3 Locate **Alcatel.dct** file under Radius installed folder on the Radius Server. Open this file using Notepad and look for the ATTRIBUTE "Alcatel-Auth-Group-Protocol". If you don't see this attribute then contact Alcatel Customer Support to get the latest **Alcatel.dct** (Alcatel Dictionary) file. Replace it with the new one.

4 Once the new file is in place make sure you associate multiple protocol with the Authenticated VLAN that user moving into. Refer to the "Managing Authentication Servers" chapter in the appropriate *OmniSwitch Network Configuration Guide* for Vendor-Specific Attributes for RADIUS.

Useful Notes on Client Issues

- If using telnet authentication manual IP release and renew required getting the new IP after authentication.

Troubleshooting Using Debug Systrace

Telnet Authentication and De-authentication

Do not change the **aaaDebugFunction** flag under Dshell, keep it the default setting.

In addition with that use below commands to capture maximum debug information:

```
-> debug systrace no appid all

-> debug systrace appid 20 level debug3

-> debug systrace watch enable
```

After gathering all information disable the systrace using below command.

```
-> debug systrace watch disable
```

The best way to troubleshoot is to verify the working and non-working case. Compare the results of both cases and find the possible point of failure.

Get the IP Address from Default VLAN

```
-> 2356669885 AAA    debug3 entering in aaaProcessPortManager
2356670006 AAA     debug3 rec from PM 1, status ad UP, op UP
2356670145 AAA     debug2 [ONEX] onex_process_pm LINK_STATUS 1002
2358821890 AAA     debug1 begin Authent Evt : Req, St : IDLE, name : admin, Rec
ses :    0/   1(TRUNCATED)
2358822025 AAA    debug3 Entering in aaaAuthentReq
2358822084 AAA    debug3 Entering in aaa_ProcessAuthent
2359129753 AAA    debug3 Entering in aaa_ReplyHdlMgt
2359130018 AAA    debug1 Send auth Success, session    0
2359130099 AAA    debug3 Entering in aaa_userReturnST_IDLE
2359130170 AAA    debug1 AAA_Serv>> Ctx admin removed from No link, set in No
link
2359130247 AAA    debug1 End Authent Evt St : IDLE, name : , ses :    0/   0,
Ret = OK
2360615756 AAA    debug3 AAA_Serv>> sort aaaSortUserCtx
2362006927 AAA    debug3 Ip Address not in same Vlan than Default Dhcp Gateway
2362007048 AAA    debug1 Send a DHCP Release to DHCP Server 133.2.253.1
2362007107 AAA    debug2 op=1, htype=1, hlen=6, hops=0, xid=1
2362007164 AAA    debug2 secs=0, flags=0x00000000, ciaddr=172.31.21.161,
yiaddr=0.0.0.0
2362007226 AAA    debug2 siaddr=0.0.0.0, giaddr=0.0.0.0,
chaddr=00:90:27:75:dc:a2
2362007271 AAA    debug2 sname=<>file=<>
2362007490 AAA    debug1 DHCP Release sent successfully

->
```

Initiate the Telnet Authentication

```
-> 2394037098 AAA    debug1 Send AAA_HDL_MGT_USER_REQ
2394037225 AAA    debug1 Message succefully sent
2394037384 AAA    debug3 Entering in aaa_ProcessHdlMsg
2394037565 AAA    debug1 AVLAN begin Evt : Req,St : IDLE, name :  Avlan ses
0x60008 00.00.00.00.00.00
2394037621 AAA    debug3 aaaAvlanUserReq ses rec 0x3ef, Avlan ses 0x60008
2394037675 AAA    debug1 Ctx admin removed from No link, set in MAC link
2394037721 AAA    debug3 aaaAvlanFormatSendAuthReq
2394037768 AAA    debug1 Send Auth. Req. to AAA name : admin, Avlan ses 60008
2394080316 AAA    debug12394080448  AVLAAAAN end St : WAIT    RESP, name :
admin, Ret = OKdebug1 begin Authent Evt : Req, St : IDLE, name : admin, Rec ses
: 60008/   (TRUNCATED)
2394277037 AAA    debug3 Entering in aaaAuthentReq
2394321109 AAA    debug3 Entering in aaa_ProcessAuthent
2394385614 AAA    debug3 Entering in aaa_FormatSendAuthReq
2394451209 AAA    debug1 Send Auth/Log to RADIUS for admin, Refser:0x2 AAA ses
0x1e0020
23945393902394539440  AAAAAA        debug1deb ug3AAA_Serv>> Ctx a dmin removed
from N[RAD] radMain : messo link, set in Chal_age received from AARsp linkA
23947124523947125147  AAAAAA        debug1info   End Authent Evt St :  WAIT
RESP1, name :[RAD] Message Authen admin, ses : 60008/tication Request - m   7,
Ret = OKsgID = 140026 - received from(TRUNCATED)
2394930753 AAA    info   [RAD] radBuildServeurAuth : id = 7
2394997268 AAA    info   [RAD] radAddAttr : adding attribute type 1
2395083317 AAA    info   [RAD] radAddAttr : adding attribute type 2
2395148871 AAA    info   [RAD] radBuildServeurAuth : RADIUS client address =
0x8502fdfc
2395234856 AAA    info   [RAD] radAddAttr : adding attribute type 4
2395323003 AAA    info   [RAD] radAddAttr : adding attribute type 5
2395387501 AAA    info   [RAD] rad_buildauth: port 1 added to access-request
2395474782 AAA    info   [RAD] radDoSend OK : id=7, addr=0x8502fd01 port=1645
try=1
2395562721 AAA    info   [RAD] radDoSend OK : id=7, addr=0x8502fd01 port=1645
try=1
2395671413 AAA    debug3 [RAD] radProcPkt: Got a reply from Radius server , id =
7, code 2, length 59
2395779908 AAA    info   [RAD] radProcPkt: Attribute type 25, length 27
2395845441 AAA    info   [RAD] radProcPkt: classe (_SBR-CL DN="ADMIN" AT="0"_)
rcvd.
2395955105 AAA    info   [RAD] radProcPkt: Attribute type 26, length 12
2396019598 AAA    info   [RAD] radProcPkt: Xylan-specific attribute type 1,
length 6
2396106681 AAA    info   [RAD] radAddAuthGroup :numOfVlans=1, groupeNbr=103,
protobind=0
2396216328 AAA    info   [RAD] radProcPkt: RADIUS authentication succeeded
(admin)
2396302335 AAA    info   [RAD] radSendMsgToAaa : message Authentication Reply -
msgID = 140046(TRUNCATED)
2396412150 AAA    debug3 in aaa_DispatchClientRsp,msgId=0x140046
2396499091 AAA    debug1 begin Authent Evt : Auth Reply Ok, St : WAIT RESP1,
name : admin, Rec(TRUNCATED)
2396607639 AAA    debug3 Entering in aaa_AuthRspOK
2396650688 AAA    debug3 Entering in aaa_ReplyHdlMgt
2396716214 AAA    debug1 Send auth Success, session 60008
23967818172396781906  AAAAAA        debug1debug3  AVLAN begin Evt : AEntering in
aaa_useruth Reply Ok,St : WAReturnST_IDLEIT RESP, name : admin Avla2396933365n
se(TRUNC ATED)AAA 2396977 445debug1  AAAAAA_S   erv>> Ctx admin r emoved from
```

```
Chal_Rsdebug3p link, set in  No linkEntering in aaaAvlanAuthRspOK2
3971075352397129005  AAAAAA        debudebug3g1  AAA_Serv>>End Authent Evt St
:entering in aaaAvla IDLE, name : , ses nSendOneCtxToSeconda:    0/   0, Ret =
OryCmm K
2397304273 AAA    debug2 SL 0xa0070 00.90.27.75.dc.a2, VL 103, proto 1 p 1
2397391330 AAA    debug3 Entering in aaaAvlanReplyHdlMgt
2397455810 AAA    debug1 Send Authent. Success, name : admin, hdl ses 0x3efx
Avlan ses 0x60008
2397544001 AAA    debug2 Ask stat user admin ref 0x516bcf0 00.90.27.75.dc.a2
2397630062 AAA    debug3 Entering in aaaAvlanFormatSendAcct
2397696619 AAA    debug1 Send login Acct Evt to AAA admin, 103
2397761123 AAA    debug1 AVLAN end St : CONNECTED, name : admin, Ret = OK
2397847134 AAA    debug2 Receiv. stat user admin ref 0x60008 00.90.27.75.dc.a2
```

Release/Renew IP

```
ERROR: Invalid entry: "RElease/Renew"
-> 2422393032 AAA    debug1 Send a DHCP Release to DHCP Server 133.2.253.1
2422393140 AAA    debug2 op=1, htype=1, hlen=6, hops=0, xid=1
2422393204 AAA    debug2 secs=0, flags=0x00000000, ciaddr=10.0.1.150,
yiaddr=0.0.0.0
2422393266 AAA    debug2 siaddr=0.0.0.0, giaddr=0.0.0.0,
chaddr=00:90:27:75:dc:a2
2422393311 AAA    debug2 sname=<>file=<>
2422393554 AAA    debug1 DHCP Release sent successfully
```

De-Authenticating

```
-> 2450771829 AAA    debug1 Send AAA_HDL_MGT_LOGOUT_REQ
2450771954 AAA    debug1 Message succefully sent
2450772220 AAA    debug3 Entering in aaa_ProcessHdlMsg
2450772284 AAA    debug3 Entering in aaaAvlanReplyHdlFailNoCtx
2450772346 AAA    debug1 Send authent. Failure session  3f0
2450772540 AAA    debug1 AVLAN begin Evt : Logout Usr,St : CONNECTED, name :
admin Avlan ses 0(TRUNCATED)
2450772591 AAA    debug3 Entering in aaaAvlanLogHdlPerf1
2450772654 AAA    debug2 SL 0xa0071 00.90.27.75.dc.a2, VL 103, proto 1 p 1
2450793571 AAA    debug3 AAA_Serv>> entering in aaaAvlanSendOneCtxToSecondaryCmm
2450880635 AAA    debug2 Ask stat user admin ref 0x516bcf0 00.90.27.75.dc.a2
2450968891 AAA    debug1 Ctx admin removed from MAC link, set in Account. link
2451055841 AAA    debug1 AVLAN end St : CONNECTED, name : admin, Ret = OK
2451121440 AAA    debug2 Rec Fr SL Del 00.90.27.75.dc.a2, VL 103,  p 1, prot = 0
2451230029 AAA    debug2 Receiv. stat user admin ref 0x60008 00.90.27.75.dc.a2
2451317046 AAA    debug3 Entering in aaaAvlanFormatSendAcct
2451383711 AAA    debug1 Send logout Acct Evt to AAA admin, 103
2451449301 AAA    debug3  in aaaAvlanReturnST_IDLE
2451492283 AAA    debug1 Ctx admin removed from Account. link, set in No link
```

Release/Renew to Go Back to Default VLAN

```
ERROR: Invalid entry: "Release/Renew"
-> 2476994772 AAA    debug3 Ip Address not in same Vlan than Default Dhcp Gate-
way
2476994902 AAA    debug1 Send a DHCP Release to DHCP Server 133.2.253.1
2476994961 AAA    debug2 op=1, htype=1, hlen=6, hops=0, xid=1
2476995017 AAA    debug2 secs=0, flags=0x00000000, ciaddr=172.31.21.161,
yiaddr=0.0.0.0
2476995079 AAA    debug2 siaddr=0.0.0.0, giaddr=0.0.0.0,
chaddr=00:90:27:75:dc:a2
2476995124 AAA    debug2 sname=<>file=<>
2476995365 AAA    debug1 DHCP Release sent successfully
2477000684 AAA    debug3 AAA_Serv>> sort aaaSortUserCtx
```

HTTP/S Authentication

Start of Authentication using https://x.x.x.253

```
-> 2163508216 AAA    debug3 Entering in aaa_ProcessHdlMsg
2163508471 AAA    debug1 AVLAN begin Evt : Req,St : IDLE, name :  Avlan ses
0x9000b  00.00.00.00.00.00
2163508527 AAA    debug3 aaaAvlanUserReq ses rec 0x5a22bc0, Avlan ses 0x9000b
2163508584 AAA    debug1 Ctx admin removed from No link, set in MAC link
2163508629 AAA    debug3 aaaAvlanFormatSendAuthReq
2163508839 AAA    debug1 Send Auth. Req. to AAA name : admin, Avlan ses 9000b
2163508921 AAA    debug1 AVLAN end St : WAIT RESP, name : admin, Ret = OK
2163509108 AAA    debug1 begin Authent Evt : Req, St : IDLE, name : admin, Rec
ses : 9000b/   (TRUNCATED)
2163638516 AAA    debug3 Entering in aaaAuthentReq
2163682571 AAA    debug3 Entering in aaa_ProcessAuthent
2163747084 AAA    debug3 Entering in aaa_FormatSendAuthReq
2163812695 AAA    debug1 Send Auth/Log to RADIUS for admin, Refser:0x2 AAA ses
0x2e0030
21639008772163900923  AAAAAA        debug1debug3  AAA_Serv>> C[RAD] radMain :
messtx admin removed froage received from AAm No link, set in ChAal_Rsp link
21640721640750534983  AAAA   AA    debug1  infEnd Authent Evt St :o WAIT
RESP1,name :   admin, ses : 9000 b/   8, Ret = OK[RAD] Message Authentication
Request - msgID = 140026 - received from(TRUNCATED)
2164292241 AAA    info   [RAD] radBuildServeurAuth : id = 10
2164357668 AAA    info   [RAD] radAddAttr : adding attribute type 1
2164444794 AAA    info   [RAD] radAddAttr : adding attribute type 2
2164510338 AAA    info   [RAD] radBuildServeurAuth : RADIUS client address =
0x8502fdfc
2164617813 AAA    info   [RAD] radAddAttr : adding attribute type 4
2164681287 AAA    info   [RAD] radAddAttr : adding attribute type 5
2164768333 AAA    info   [RAD] rad_buildauth: port 1 added to access-request
2164833038 AAA    info   [RAD] radDoSend OK : id=10, addr=0x8502fd01 port=1645
try=1
2164942484 AAA    info   [RAD] radDoSend OK : id=10, addr=0x8502fd01 port=1645
try=1
2165029680 AAA    debug3 [RAD] radProcPkt: Got a reply from Radius server , id =
10, code 2, length 59
2165138155 AAA    info   [RAD] radProcPkt: Attribute type 25, length 27
2165225209 AAA    info   [RAD] radProcPkt: classe (_SBR-CL DN="ADMIN" AT="0"_)
rcvd.
2165313348 AAA    info   [RAD] radProcPkt: Attribute type 26, length 12
2165400417 AAA    info   [RAD] radProcPkt: Xylan-specific attribute type 1,
length 6
2165487500 AAA    info   [RAD] radAddAuthGroup :numOfVlans=1, groupeNbr=103,
protobind=0
2165573496 AAA    info   [RAD] radProcPkt: RADIUS authentication succeeded
(admin)
2165682084 AAA    info   [RAD] radSendMsgToAaa : message Authentication Reply -
msgID = 140046(TRUNCATED)
2165791914 AAA    debug3 in aaa_DispatchClientRsp,msgId=0x140046
2165856331 AAA    debug1 begin Authent Evt : Auth Reply Ok, St : WAIT RESP1,
name : admin, Rec(TRUNCATED)
2165965890 AAA    debug3 Entering in aaa_AuthRspOK
2166030420 AAA    debug3 Entering in aaa_ReplyHdlMgt
2166095975 AAA    debug1 Send auth Success, session 9000b
2166161550 AAA    debug32166161654  EntAAAering in aaa_user
ReturnST_IDLEde2166227153bug1  AAAA   VLAN begin Evt :  Auth Reply Ok,St :
debug1WAIT RESP, nam e : admin Avlan se(AAA_Serv>> Ctx adminTRUNCATED) removed
from Chal_Rsp link, 2166400173set in No  linkAAA 21664443 23debug3  AAAEnteri
ng in aaaAvlanAut hRspOKdebug1 21665End Authent Evt St :08777 IDLE, name : ,
ses :    0/   0, RAAAet = OK debug3 AAA_Serv>> entering in aaaAvlanSendOneCtxTo-
SecondaryCmm
2166662500 AAA    debug2 SL 0xa0070 00.10.a4.b5.bc.48, VL 103, proto 1 p 1
2166749577 AAA    debug3 Entering in aaaAvlanReplyHdlMgt
2166815137 AAA    debug1 Send Authent. Success, name : admin, hdl ses 0x5a22bc0x
Avlan ses 0x9000b
2166922686 AAA    debug2 Ask stat user admin ref 0x516bfa8 00.10.a4.b5.bc.48
2167010902 AAA    debug3 Entering in aaaAvlanFormatSendAcct
2167076367 AAA    debug1 Send login Acct Evt to AAA admin, 103
2167146149 AAA    debug1 AVLAN end St : CONNECTED, name : admin, Ret = OK
2167234431 AAA    debug2 Receiv. stat user admin ref 0x9000b 00.10.a4.b5.bc.48
2202536369 AAA    debug1 Send a DHCP Release to DHCP Server 133.2.253.1
2202536483 AAA    debug2 op=1, htype=1, hlen=6, hops=0, xid=1
2202536546 AAA    debug2 secs=0, flags=0x00000000, ciaddr=10.0.1.151,
yiaddr=0.0.0.0
2202536608 AAA    debug2 siaddr=0.0.0.0, giaddr=0.0.0.0,
chaddr=00:10:a4:b5:bc:48
2202536653 AAA    debug2 sname=<>file=<>
2202536871 AAA    debug1 DHCP Release sent successfully
```

De-Authenticate using https://x.x.x.253

```
-> 2243269618 AAA    debug3 Entering in aaa_ProcessHdlMsg
2243269736 AAA    debug3 Entering in aaaAvlanReplyHdlFailNoCtx
2243269809 AAA    debug1 Send authent. Failure session 4a72618
2243270033 AAA    debug1 AVLAN begin Evt : Logout Usr,St : CONNECTED, name :
admin Avlan ses 0(TRUNCATED)
2243270260 AAA    debug3 Entering in aaaAvlanLogHdlPerf1
2243270330 AAA    debug2 SL 0xa0071 00.10.a4.b5.bc.48, VL 103, proto 1 p 1
2243270405 AAA    debug3 AAA_Serv>> entering in aaaAvlanSendOneCtxToSecondaryCmm
2243270463 AAA    debug2 Ask stat user admin ref 0x516bfa8 00.10.a4.b5.bc.48
2243357036 AAA    debug1 Ctx admin removed from MAC link, set in Account. link
2243443989 AAA    debug1 AVLAN end St : CONNECTED, name : admin, Ret = OK
2243509583 AAA    debug2 Rec Fr SL Del 00.10.a4.b5.bc.48, VL 103,  p 1, prot = 0
2243618200 AAA    debug2 Receiv. stat user admin ref 0x9000b 00.10.a4.b5.bc.48
2243705189 AAA    debug3 Entering in aaaAvlanFormatSendAcct
2243771852 AAA    debug1 Send logout Acct Evt to AAA admin, 103
2243837443 AAA    debug3  in aaaAvlanReturnST_IDLE
2243880420 AAA    debug1 Ctx admin removed from Account. link, set in No link
2252923311 AAA    debug3 Ip Address not in same Vlan than Default Dhcp Gateway
2252923436 AAA    debug1 Send a DHCP Release to DHCP Server 133.2.253.1
2252923489 AAA    debug2 op=1, htype=1, hlen=6, hops=0, xid=1
2252923544 AAA    debug2 secs=0, flags=0x00000000, ciaddr=172.31.21.160,
yiaddr=0.0.0.0
2252923604 AAA    debug2 siaddr=0.0.0.0, giaddr=0.0.0.0,
chaddr=00:10:a4:b5:bc:48
2252923648 AAA    debug2 sname=<>file=<>
2252923886 AAA    debug1 DHCP Release sent successfully
2252938688 AAA    debug3 AAA_Serv>> sort aaaSortUserCtx
```

AVClient

AVClient Authentication Start

```
-> 1592327563 AAA    debug3 XCAP rec. from Auth Dispat 00.90.27.75.dc.a2
1592327668 AAA    debug1 XCAP new control block
1592327740 AAA    debug3 Memory : allocate space for ccb : 4abbdf0
1592327795 AAA    debug3 aaaHdlUtilBufInNormalList, free Id 108784624, typ 8
1592327871 AAA    debug1 Send to Authentication dispatcher slice 0 slot 1 port 1
1592327933 AAA    debug1 Message succefully sent
1592327979 AAA    debug1 aaaHdlXcap_start_timer: Timer:0 CCB:4abbdf0
1592328030 AAA    debug1 aaaHdlXcap_start_timer: Time:1071000900 Timeout:
1071000960
1592833650 AAA    debug3 XCAP rec. from Auth Dispat 00.90.27.75.dc.a2
1592833721 AAA    debug1 XCAP existing control block 0x4abbdf0
1592833765 AAA    debug1 XCAP Received AAA_HDL_XCAP_DATA
1592833821 AAA    debug3 aaaHdlUtilBufInNormalList, free Id 108783920, typ 8
1592833881 AAA    debug1 aaaHdlXcap_send_xvss_quest : No Echo
1592833931 AAA    debug1 Send to Authentication dispatcher slice 0 slot 1 port 1
1592833989 AAA    debug1 Message succefully sent
1592876009 AAA    debug1 aaaHdlXcap_start_timer: Timer:0 CCB:4abbdf0
1592963070 AAA    debug1 aaaHdlXcap_clear_timer: Timer:0 CCB:4abbdf0
1593028661 AAA    debug1 aaaHdlXcap_start_timer: Time:1071000900 Timeout:
1071000960
1593227043 AAA    debug3 XCAP rec. from Auth Dispat 00.90.27.75.dc.a2
1593227107 AAA    debug1 XCAP existing control block 0x4abbdf0
1593269448 AAA    debug1 XCAP Received AAA_HDL_XCAP_DATA
1593335029 AAA    debug1 aaaHdlXcap_clear_timer: Timer:0 CCB:4abbdf0
1593400608 AAA    debug3 aaaHdlUtilBufInNormalList, free Id 108785284, typ 8
1593487696 AAA    debug1 Send AAA_HDL_MGT_USER_REQ
1593553275 AAA    debug11593553350  MeAAAssage succefully    sent debug3 Enter-
ing in aaa_ProcessHdlMsg
1593661847 AAA    debug1 AVLAN begin Evt : Req,St : IDLE, name :  Avlan ses
0x8000a  00.00.00.00.00.00
1593771485 AAA    debug3 aaaAvlanUserReq ses rec 0x4abbdf0, Avlan ses 0x8000a
1593858571 AAA    debug1 Ctx admin removed from No link, set in MAC link
1593945613 AAA    debug3 aaaAvlanFormatSendAuthReq
1593989703 AAA    debug1 Send Auth. Req. to AAA name : admin, Avlan ses 8000a
1594076811 1594076926AAA    AA Adebug1     AVLAN edebug1nd St : WAIT R ESP, name
: admin, begin Authent Evt : Ret = OKReq, St : IDLE, name : admin, Rec ses :
8000a/   (TRUNCATED)
1594275680 AAA    debug3 Entering in aaaAuthentReq
1594318659 AAA    debug3 Entering in aaa_ProcessAuthent
1594384252 AAA    debug3 Entering in aaa_FormatSendAuthReq
1594449847 AAA    debug1 Send Auth/Log to RADIUS for admin, Refser:0x2 AAA ses
0x2b002d
1594559537 AAA    debug11594559641  AAAAAA_Serv>> Ctx admi   n removed from No
link, set in Chal_debug3Rsp link[RAD1594668089] radMain  : message received
AAAfrom AAA 1594debug1732585  End AuAAAthent Evt St : WA   IT RESP1, name :
admin, ses : 8000a/info   6, Ret = OK [RAD] Message Authentication Request -
msgID = 140026 - received from(TRUNCATED)
1594951952 AAA    info   [RAD] radBuildServeurAuth : id = 9
1595017406 AAA    info   [RAD] radAddAttr : adding attribute type 1
1595081951 AAA    info   [RAD] radAddAttr : adding attribute type 2
1595147511 AAA    info   [RAD] radBuildServeurAuth : RADIUS client address =
0x8502fdfc
1595256057 AAA    info   [RAD] radAddAttr : adding attribute type 4
1595321634 AAA    info   [RAD] radAddAttr : adding attribute type 5
```

```
1595408715 AAA    info   [RAD] rad_buildauth: port 1 added to access-request
1595473430 AAA    info   [RAD] radDoSend OK : id=9, addr=0x8502fd01 port=1645
try=1
1595582865 AAA    info   [RAD] radDoSend OK : id=9, addr=0x8502fd01 port=1645
try=1
1595670050 AAA    debug3 [RAD] radProcPkt: Got a reply from Radius server , id =
9, code 2, length 59
1595778543 AAA    info   [RAD] radProcPkt: Attribute type 25, length 27
1595865571 AAA    info   [RAD] radProcPkt: classe (_SBR-CL DN="ADMIN" AT="0"_)
rcvd.
1595953731 AAA    info   [RAD] radProcPkt: Attribute type 26, length 12
1596040797 AAA    info   [RAD] radProcPkt: Xylan-specific attribute type 1,
length 6
1596127892 AAA    info   [RAD] radAddAuthGroup :numOfVlans=1, groupeNbr=103,
protobind=0
1596213884 AAA    info   [RAD] radProcPkt: RADIUS authentication succeeded
(admin)
1596300968 AAA    info   [RAD] radSendMsgToAaa : message Authentication Reply -
msgID = 140046(TRUNCATED)
1596435553 AAA    debug3 in aaa_DispatchClientRsp,msgId=0x140046
1596500948 AAA    debug1 begin Authent Evt : Auth Reply Ok, St : WAIT RESP1,
name : admin, Rec(TRUNCATED)
1596609497 AAA    debug3 Entering in aaa_AuthRspOK
1596675141 AAA    debug3 Entering in aaa_ReplyHdlMgt
1596718079 AAA    debug1 Send auth Success, session 8000a15967836691596783761
AAAAAA        debug3deb ug1Entering in aaa_ userReturnST_IDLEAVLAN begin Evt :
Aut1596892230h Reply Ok ,St : WAIT RESP, naAAAme : admin Avlan se(TRUNCATED)
1596979322debug1  AAAA   AA_Serv>> Ctx adm in removed from Chadebug3l_Rsp
link,se t in No linkEntering in aaaAvlanAuthRs1597109393pOKAAA15   97130885
debug1A AAEnd Authent Evt S   t : IDLE, name :  , ses :    0/ 0, debug3Ret =
OKAAA_Serv>> entering in aaaAvlanSendOneCtxToSecondaryCmm
1597306117 AAA    debug2 SL 0xa0070 00.90.27.75.dc.a2, VL 103, proto 1 p 1
1597393189 AAA    debug3 Entering in aaaAvlanReplyHdlMgt
1597458749 AAA    debug1 Send Authent. Success, name : admin, hdl ses 0x4abbdf0x
Avlan ses 0x8000a
1597567346 AAA   1597567404  debugAAA2     Ask stat usdebug3er admin ref 0
x516bec0 00.90.27.7XCAP received a mess5.dc.a2age from AAA1597698585159771994
6AAA    AAA    debu g3debug1  Entering AAA_HDL_MGT_USER_RSPin aaaAvlanFormatSen
/ AAA_HDL_MGT_CHAL_dAcctREQ received 11597850146597850090  AAAAAA
debugdebug13  Send login aaaHdlUtilBufInNormaAcct Evt to AAA admilList, free Id
10863n, 1030344, typ 6115980049465980048880  AAAAAA       debugdebug11  AVLAN
end SSend to Authenticat it : CONNECTED, name on dispatcher slice : admin, Ret =
OK0 slot 1 port 115981779431598199405  AAAA   AA    debug2  debReceiv. stat user
adug1min ref 0x8000a 00.90.27.75.dc.a2Message succefully sent
1598330577 AAA    debug1 Send to Authentication dispatcher slice 0 slot 1 port 1
1598418719 AAA    debug1 Message succefully sent
1598461700 AAA    debug1 aaaHdlXcap_free_ccb: Free ccb  4abbdf0
1598526202 AAA    debug3 Memory : free space for CCB : 4abbdf0
1600175529 AAA    debug2 aaaReleaseIpRecRequest, Mac address 00.90.27.75.dc.a2
not found
```

AVClient logout:

```
-> 1628234237 AAA    debug3 XCAP rec. from Auth Dispat 00.90.27.75.dc.a2
1628234342 AAA    debug1 XCAP new control block
1628234407 AAA    debug3 Memory : allocate space for ccb : 4ad5b10
1628234459 AAA    debug1 Removing MAC = 00902775dca2 from all Authenticated
vlans
```

```
1628234512 AAA    debug3 aaaHdlUtilBufInNormalList, free Id 108802664, typ 8
1628234571 AAA    debug1 Send AAA_HDL_MGT_LOGOUT_REQ
1628234637 AAA    debug1 Message succefully sent
1628234753 AAA    debug3 Entering in aaa_ProcessHdlMsg
1628234810 AAA    debug3 Entering in aaaAvlanReplyHdlFailNoCtx
1628298934 AAA    debug1 Send authent. Failure session 4ad5b10
16283656031628365646  AAAAAA       debug1deb ug3AVLAN begin Evt  : Logout
Usr,St : CXCAP received a messONNECTED, name : admage from AAAin Avlan ses
0(TRUNCATED)16
285397161628561215  AAAAAA       debugdebug31  Entering inAAA_HDL_MGT_LOGOUT_R
aaaAvlanLogHdlPerf1SP received
16286701628670943900  AAAAA   A    debug3  debuaaaHdlUtilBufInNormag2lList, free
Id 108 636724, typ 6SL 0xa0071 00.90.27.75.dc1628802043.a2, VL 10 3, proto 1 p 1
AAA 1628867630  debuAAAg1     Send to Audebug3thentication d ispatcher slice 0
sAAA_Serv>> entering lot 1 port 1in aaaAvlanSendOneCtxToSeco1628997693ndaryCmm
AAA1629040683     Adebug1AA    Message  succefully sent debug21629107320  Ask
AAAstat user admin r   ef 0x516bec0 00.9 0.27.75.dc.a2debug1
aaaHdlXcap_free_ccb: Free ccb  4ad5b101629193696 16292384AAA76     AAAdebug1
Ctx admin removed  from MAC link, setdebug3 in Account. l inkMemory : free space
for CCB : 4ad5b
162936855310AAA    debug1 AVLAN end St : CONNECTED, name : admin, Ret = OK
1629456745 AAA    debug2 Rec Fr SL Del 00.90.27.75.dc.a2, VL 103,  p 1, prot = 0
1629543807 AAA    debug2 Receiv. stat user admin ref 0x8000a 00.90.27.75.dc.a2
1629630849 AAA    debug3 Entering in aaaAvlanFormatSendAcct
1629696433 AAA    debug1 Send logout Acct Evt to AAA admin, 103
1629783513 AAA    debug3  in aaaAvlanReturnST_IDLE
1629827577 AAA    debug1 Ctx admin removed from Account. link, set in No link
```

Dshell Troubleshooting

A set of AVLAN Dshell commands is available under adHelp. Following are the Dshell commands under **adHelp** for 6600/6800. For 7700/8800 **adHelp** is available under **nidbg**.

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

B05PC1-OS601> dshell
Working: [Kernel]->adHelp

Authentication Dispatcher (AD) Debugging Help

```
- adDebugResetCounter         : Clear debug counters
- adDebugSetDump = X          : X=1: Enable additional dump hexa in INFO's trace
                             X=0: Disable additional dump hexa in INFO's trace
- adDebugSetFilterFrame 0xXXXX: Set frame type filter
                                Available only for INFO's trace
                                XXXX = Bit field
                                XXXX = FFFF = No filter
                                Bit  1: ARP      Bit 2: DHCP
                                Bit  3: TELNET   Bit 4: HTTP
                                Bit  5: DNS      Bit 6: XCAP
                                Bit  7: 802.1x   Bit 8: Spoofing
```

```
                                 Bit  9: Configuration
- adDebugSetFilterLevel 0xX    : Set trace level filter
                                X = Bit field
                                Bit  1: ERROR    Bit 2: WARNING
                                Bit  3: INFO
- adDebugSetFilterPort X        : Set user port number filter
                                Available only for INFO's trace
                                X = 0 = No filter
- adDebugShowAvlanIp           : Display Authentication IP addresses configured
- adDebugShowContext           : Display AD's context
- adDebugShowCounter           : Display debug counters
- adDebugShowPort              : Display 802.1x port configured
value = 1424 = 0x590
Working: [Kernel]->
Working: [Kernel]->
Working: [Kernel]->
Working: [Kernel]->
Working: [Kernel]->adDebugSetFilterLevel 0xff
value = 255 = 0xff
Working: [Kernel]->
Working: [Kernel]->adDebugSetFilterFrame 0xffff
value = 65535 = 0xffff
Working: [Kernel]->
AD INFO-> ARP request rcv.on glb.port=0x0,user port=1:Slot=1,Auth.IP
addr.=0x1,Src.MAC known=0x0,Cond.codes=0x16080,Frame=0x63dead8

AD INFO-> TELNET pkt.rcv.from qDispatcher: Slot=1,Glb.port=0x0,User
port=1,Msg.=0x6b01e98,Cond.codes=0x10080,Frame=0x63dead8
```

Notes.

1. The above is not a complete capture of the successful authentication process. A capture of the entire process would be several pages.

2. It is recommended that you run this command only in a test environment and with a specific flat set, rather than all “ffff” shown in the above example.

The Authenticated VLAN adDebugShowContext Function

The **adDebugShowContext** function displays the following output:

```
Working: [Kernel]->adDebugShowContext

AD show context

        NI Slot                           = 1
        NI Slice                          = 0
        Configuration socket identifier   = 286
        Packet socket identifier          = 287
        Authenticated IP addr.configured  = Yes
        DNS name + 'avlBootpmode' config. = Yes
        802.1x node parameters configured = Yes
        Default Traffic before authent    = No
        Port bounding configured          = No
        avlBootpMode IP address           = 172.16.106.5
        Authenticated MAC address         = 00.20.DA.00.00.02
        XCAP 802.3 SNAP header            = AA.AA.03.00.20DA.0202
        Authenticated DNS name            = authent.com
        802.1x EAPol SNAP header          = AA.AA.03.00.0000.888E
        802.1x Authentication control     = Disable (2)
        802.1x Authentication share       = Unic (2)
        802.1x PAE group MAC address      = 01.80.C2.00.00.03
        802.1x node MAC address           = 00.D0.95.89.9C.D1
        Debug level                       = 0x0
        Debug frame type filtered         = 0xffffffff
        Debug user port filtered          = 0
        Debug dump                        = No (0)
value = 1031 = 0x407
```

Run the **adDebugShowCounter** command to see any possible errors.

```
Working: [Kernel]->adDebugShowCounter

AD show debug counters

        Mem:  'calloc' failed                    = 0
        IPC:   Number of message sending retries = 0
        IPC:   'zcSendto' failed                 = 0
        IPC:   Unexpected msg.identifier to send = 0
        IPC:   'zcSelect' failed                 = 0
        IPC:   'zcRecvFrom' failed               = 0
        IPC:   Unexpected remote application     = 0
        IPC:   Buffer reception failed           = 0
        IPC:   'zcSocket' failed                 = 0
        IPC:   'zcBind' failed                   = 0
        IPC:   Buffer too small for msg. sending = 0
        IPC:   'zcBufCreate' failed              = 0
        IPC:   'zcBufDelete' failed              = 0
        IPC:   Unconsistent msg.and buf.length   = 0
        AVLAN: Unconsistent IP mask config.      = 0
        AVLAN: Unexpected message identifier rcv.= 0
        AVLAN: DNS request rcv.but DNS not conf. = 0
        AVLAN: AvlBootpIp address not config.    = 0
        8021X: Unexpected message identifier rcv.= 0
        8021X: Unexpected node configuration     = 0
        8021X: Unexpected port configuration     = 0
        8021X: Erroneous destination MAC address = 0
        8021X: Maximum port configured reached   = 0
        Qdrv:  'qDriverCreateStaticQ' failed     = 0
        Qdrv:  'qDriverGetDefaultQ' failed       = 0
        Qdrv:  'qDriverGetFreeHWBuffer' failed   = 0
        Qdrv:  'qDriverReleaseHWBuffer' failed   = 0
        Qdrv:  'qDriverGetDefaultQ' failed       = 0
        Qdrv:  'qEnqueue' failed                 = 0
        Qdrv:  'qEnqueue' (flood) failed         = 0
        Qdrv:  Dato to send too big              = 0
        Qdsp:  Unexpected message identifier rcv.= 0
        Qdsp:  Unexpected frame type received    = 0
        DNS:   Unconsistent DNS header received  = 0
        DNS:   Unconsistent DNS name format rcv. = 0
        DNS:   DNS request rcv.but no Auth.IP    = 0
        IP:    Reverse spoofing failed           = 0
        IP:    IP/TCP/UDP header checksum failed = 0
        IP:    Unexpected IP header received     = 0
        XCAP:  Unexpected message identifier rcv.= 0
value = 1866 = 0x74a
```

To verify the Authentication IP bound to each VLAN with subnet mask please run the **adDebugShowAvlanIp** command.

```
Working: [Kernel]->adDebugShowAvlanIp

AD show AVLAN IP addresses
        VLAN number               = 1
        IP address                = 10.0.0.92
        Mask                      = 255.255.0.0
        Authentication IP address = 10.0.0.253

        VLAN number               = 13
        IP address                = 10.4.2.18
        Mask                      = 255.255.0.0
        Authentication IP address = 10.4.0.253
```

19 Troubleshooting 802.1X

The 802.1X standard defines port-based network access controls, and provides the structure for authenticating physical devices attached to a LAN. It uses the Extensible Authentication Protocol (EAP).

Note. See the "Configuring 802.1X" chapter in the appropriate *OmniSwitch Network Configuration Guide* for a detailed explanation about different 802.1X components.

Understanding and troubleshooting of Radius Server in conjunction with switch level troubleshooting is very helpful.

In This Chapter

Troubleshooting with the CLI

1 Make sure the Radius and Accounting ports are configured the same on both switch and Radius Server. The default on the Radius Server can be either 1645/1812 for Radius and 1646/1813 for the Accounting.

```
Layer-2: show aaa server
Server name = rad1
  Server type         = RADIUS,
  IP Address 1        = 133.2.253.1,
  Retry number        = 3,
  Time out (sec)      = 2,
  Authentication port = 1645,
  Accounting port     = 1646
```

2 Verify the port is configured for 802.1x authentication.

```
Layer-2: show vlan port mobile

                cfg                                  ignore
  port   mobile  def  authent   enabled   restore   bpdu
-------+--------+----+--------+---------+---------+-------
  2/1      on       1 on-avlan       on         on      on
  2/2      on       1 on-avlan       on         on      on
  2/3      on       1 on-8021x       on         on      on
  2/4      on       1 on-8021x       on         on      on
```

3 Check the physical status and VLAN assignment of the port.

```
Layer-2: show vlan port 2/3
  vlan     type      status
--------+---------+--------------
     1    default   forwarding
   101    mobile    forwarding
```

4 Check the status of the MAC address table on the 802.1x port.

```
Layer-2: show mac-address-table 2/3
Legend: Mac Address: * = address not valid

   Vlan      Mac Address          Type       Protocol    Operation    Interface
  ------+-------------------+-------------+-----------+------------+-----------
   101   00:0f:1f:d5:54:95     learned         10800     bridging      2/3
Total number of Valid MAC addresses above = 1
```

5 If a user can not move to VLAN-X after authentication, it could mean that authentication is disabled on that VLAN, or that the Radius server didn't return a specific VLAN number in the return list attribute. Please verify that the server is configured properly with the correct return list attribute type as explained in the user guide. To move a user into a specific VLAN, Radius server has to return the attribute "Alcatel-Auth-Group" with a valid Authenticated VLAN number.

```
Layer-2: show vlan 101
Name                : bungaku,
Administrative State: enabled,
Operational State   : enabled,
Spanning Tree State : disabled,
Authentication      : enabled,
IP Router Port      : none,
IPX Router Port     : none,
```

6 Verify the status of the 802.1x port using the **show 802.1x** command. Read the *OmniSwitch CLI Reference Guide* to understand the explanation for each field.

```
Layer-2: show 802.1x 2/3
802.1x slot/port = 2/3
  authenticator PAE state     = AUTHENTICATED,
  backend authenticator state = IDLE,
  direction                   = both,
  operational directions      = both,
  port-control                = auto,
  port status                 = Authorized,
  quiet-period (seconds)      = 60,
  tx-period (seconds)         = 30,
  supp-timeout (seconds)      = 30,
  server-timeout (seconds)    = 30,
  max-req                     = 2,
  re-authperiod (seconds)     = 3600,
  reauthentication            = no
```

7 Check for the 802.1x port statistics. Read the *OmniSwitch CLI Reference Guide* to understand the detail of each field.

Layer-2: show 802.1x statistic 2/3

```
802.1x slot/port = 2/3
  EAPOL frames received            = 28,
  EAPOL frames transmitted         = 38,
  EAPOL start frames received      = 8,
  EAPOL logoff frames received     = 0,
  EAP Resp/Id frames received      = 10,
  EAP Response frames received     = 10,
  EAP Req/Id frames transmitted    = 13,
  EAP Req frames transmitted       = 10,
  Invalid EAPOL frames received    = 0,
  EAP length error frames received = 0,
  Last EAPOL frame version         = 1,
  Last EAPOL frame source           = 00:0f:1f:d5:54:95
```

Troubleshooting Using Debug CLI

Assuming Radius communication takes place on UDP port 1645:

Layer-2: debug ip packet protocol udp port 1645 start

```
C S 1/1 00d09579640e->00d0956af558 IP 10.1.1.1->133.2.253.1 UDP 1025,1645
C R 1/1 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
C S 1/1 00d09579640e->00d0956af558 IP 10.1.1.1->133.2.253.1 UDP 1025,1645
C R 1/1 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
1 R CMM (00d09579640e)->(00d0956af558) IP 10.1.1.1->133.2.253.1 UDP 1025,1645
1 S 1/1 00d09579640e->00d0956af558 IP 10.1.1.1->133.2.253.1 UDP 1025,1645
1 R 1/1 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
1 S CMM 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
1 R CMM (00d09579640e)->(00d0956af558) IP 10.1.1.1->133.2.253.1 UDP 1025,1645
1 S 1/1 00d09579640e->00d0956af558 IP 10.1.1.1->133.2.253.1 UDP 1025,1645
1 R 1/1 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
1 S CMM 00d0956af558->00d09579640e IP 133.2.253.1->10.1.1.1 UDP 1645,1025
2 R 2/3 000f1fd55495->(ffffffffffff) ARP Request 133.2.222.152->133.2.222.152
2 R 2/3 000f1fd55495->(ffffffffffff) ARP Request 133.2.222.152->133.2.222.152
2 R 2/3 000f1fd55495->(ffffffffffff) ARP Request 133.2.222.152->133.2.222.152
```

Layer-2: debug systrace appid aaa level debug3
Layer-2: debug systrace enable
Layer-2: debug systrace show log

To verify what the Radius server has returned, please look at the following line in bold:

radAddAuthGroup :numOfVlans=1, groupeNbr=101, protobind=0

For example:

```
 431612866 AAA    debug3 entering in aaaProcessPortManager
 431612997 AAA    debug3 rec from PM 34, status ad UP, op DOWN
 431613178 AAA    debug2 [ONEX] onex_process_pm LINK_STATUS 2003
 432450759 TRAP   warnin ping NMS 10.2.0.250 : no echo
 433243756 AAA    debug3 entering in aaaProcessPortManager
 433243886 AAA    debug3 rec from PM 34, status ad UP, op UP
 433244071 AAA    debug2 [ONEX] onex_process_pm LINK_STATUS 2003
 433244189 AAA    debug2 [ONEX] onex_auth_txCannedFail sent to 2003
 433244328 AAA    debug2 [ONEX] onex_auth_txReqId sent to 2003
 440336239 AAA    debug2 [ONEX] onex_auth_disp_proc_eapol received from 34
0:f:1f:d5:54:95
 440336371 AAA    debug2 [ONEX] onex_auth_disp_proc eap resp/ID
 440336460 AAA    info   [ONEX] onex_bauthsm_sendRespToServer user name len 7,
eap msg len 7
 440336740 AAA    debug1 begin Authent Evt : Req, St : IDLE, name : user101, Rec
ses : 48c4288(TRUNCATED)
 440336834 AAA    debug3 Entering in aaaAuthentReq
 440336915 AAA    debug3 Entering in aaa_ProcessAuthent
 440337002 AAA    debug3 Entering in aaa_FormatSendAuthReq
 440356146 AAA    debug1 Send Auth/Log to RADIUS for user101, Refser:0x2 AAA ses
0xf0011
 440435825  440435891AA AAAA        debug1d ebug3AAA_Serv>> Ctx  user101 removed
fr[RAD] radMain : messom No link, set in Cage received from AAhal_Rsp linkA
  440440595058594997  AAAAAA        infodebug  1  [RAD] Message AEnd Authent Evt
St :uthentication Reques WAIT RESP1, name : t - msgID = 140026 -user101, ses :
48c42 received from(TRUNC88/   c, Ret = OKATED)
```

```
 440814250 AAA    info   [RAD] radBuildServeurAuth : id = 19
 440874069 AAA    info   [RAD] radAddAttr : adding attribute type 1
 440933046 AAA    info   [RAD] radBuildServeurAuth : RADIUS client address =
0xa010101
 441012638 AAA    info   [RAD] radAddAttr : adding attribute type 4
 441091272 AAA    info   [RAD] radAddAttr : adding attribute type 5
 441152216 AAA    info   [RAD] rad_buildauth: port 35 added to access-request
 441230837 AAA    info   [RAD] radAddAttr : adding attribute type 79
 441311563 AAA    info   [RAD] rad_buildauth: EAP msg added to access-request
 441391033 AAA    info   [RAD] radAddAttr : adding attribute type 80
 441451000 AAA    info   [RAD] rad_buildauth: PW_MESSAGE_AUTHENTICATOR added to
access-request
 441550316 AAA    info   [RAD] radBuildReq : Updated MESSAGE_AUTHENTICATOR
 441610744 AAA    info   [RAD] radDoSend OK : id=19, addr=0x8502fd01 port=1645
try=1
441709499 AAA    info   [RAD] radDoSend OK : id=19, addr=0x8502fd01 port=1645
try=1
 441789195 AAA    debug3 [RAD] radProcPkt: Got a reply from Radius server , id =
19, code 11, length 77
 441889383 AAA    info   [RAD] radProcPkt: RADIUS challenge for user (user101)
 441968957 AAA    info   [RAD] radProcPkt: Attribute type 24, length 15
 442048564 AAA    info   [RAD] radProcPkt: state rcvd.
 442107543 AAA    info   [RAD] radProcPkt: Attribute type 79, length 24
 442167497 AAA    info   [RAD] radProcPkt: Attribute type 80, length 18
 442247130 AAA    info   [RAD] radProcPkt: RADIUS challenge for user (user101)
 442326726 AAA    info   [RAD] radSendMsgToAaa : message Challenge Request -
msgID = 140048 - (TRUNCATED)
 442426339 AAA    debug3 in aaa_DispatchClientRsp,msgId=0x140048
 442485995 AAA    debug1 begin Authent Evt : Chal Req, St : WAIT RESP1, name :
user101, Rec se(TRUNCATED)
 442605885 AAA    debug3 Entering in aaa_AuthChalReq
 442645390 AAA    debug3 Entering in aaa_ReplyAuthChalReq
 442705166 AAA    debug1 Send Challenge Question, name : user101, session
48c4288
 442784858  442784996AAA    AAA    debug1  deAAA_Serv>> Ctx user1bug201 removed
from  Chal_Rsp link, set [ONEX] onex_bauthsm_in Client_Rsp linktx
Req sent to 2003 4 42944015442944172  AAAAAA       debug1debug2  End Authent
[ONEX] onex_auth_disEvt St : WAIT CHAL, p_proc_eapol receivename : user101, ses
d from 34/ 0:f:1f:d5: 48c4288/   c, Ret :54:95= OK
 443142527 AAA    debug2 [ONEX] onex_auth_disp_proc eap resp!=id
 443202791 AAA    debug1 begin Authent Evt : Chal Resp, St : WAIT CHAL, name :
user101, Rec se(TRUNCATED)
 443322375 AAA    debug3 Entering in aaa_UserChalRsp
 443361687 AAA    debug3 Entering in aaa_FormatSendChalRsp
 443420706 AAA    debug1 AAA_Serv>> Send Challenge Response to RADIUS client,
name user101, Re(TRUNCATED)
 443540837 AAA    debug1  443540929AAA_ Serv>> Ctx user101 AAAremoved from
Client_Rsp link, set  in Chal_Rsp linkdebug3  443660523[RAD]  radMain : message
AAAreceived from AAA     debug144372043 4End Authent Evt St  : WAIT RESP2,
nameAAA : user101, ses :    48c4288/   c, Re t = OKinfo   [RAD] Message Chal-
lenge Reply - msgID = 14002a - received from AAA f(TRUNCATED)
 443899513 AAA    info   [RAD] radBuildServeurAuth : id = 20
 443959256 AAA    info   [RAD] radAddAttr : adding attribute type 1
 444039009 AAA    info   [RAD] radBuildServeurAuth : RADIUS client address =
0xa010101
 444117495 AAA    info   [RAD] radAddAttr : adding attribute type 4
 444177453 AAA    info   [RAD] radBuildServeurAuth : RADIUS client specData =
SBR-CH 439|1
 444276734 AAA    info   [RAD] radAddAttr : adding attribute type 24
 444336676 AAA    info   [RAD] radAddAttr : adding attribute type 5
 444417261 AAA    info   [RAD] rad_buildauth: port 13 added to access-request
 444496871 AAA    info   [RAD] radAddAttr : adding attribute type 79
 444556834 AAA    info   [RAD] rad_buildauth: EAP msg added to access-request
 444636441 AAA    info   [RAD] radAddAttr : adding attribute type 80
 444716065 AAA    info   [RAD] rad_buildauth: PW_MESSAGE_AUTHENTICATOR added to
access-request
 444795713 AAA    info   [RAD] radBuildReq : Updated MESSAGE_AUTHENTICATOR
 444875605 AAA    info   [RAD] radDoSend OK : id=20, addr=0x8502fd01 port=1645
try=1
 444954886 AAA    info   [RAD] radDoSend OK : id=20, addr=0x8502fd01 port=1645
try=1
 445054248 AAA    debug3 [RAD] radProcPkt: Got a reply from Radius server , id =
20, code 2, length 113
 445154438 AAA    info   [RAD] radProcPkt: Attribute type 25, length 57
 445214356 AAA    info   [RAD] radProcPkt: classe
(_SBR2CLÆ†›žÍÛ¨Õ÷À_€$_€_˜€_€_ªÔèÕ'Äà±_€_Æ(TRUNCATED)
 445333272 AAA    info   [RAD] radProcPkt: Attribute type 79, length 6
 445393232 AAA    info   [RAD] radProcPkt: Attribute type 26, length 12
 445473011 AAA    info   [RAD] radProcPkt: Xylan-specific attribute type 1,
length 6
 445552466 AAA    info   [RAD] radAddAuthGroup :numOfVlans=1, groupeNbr=101, proto-
bind=0
 445650740 AAA    info   [RAD] radProcPkt: Attribute type 80, length 18
 445710761 AAA    info   [RAD] radProcPkt: RADIUS authentication succeeded ()
 445790313 AAA    info   [RAD] radSendMsgToAaa : message Authentication Reply -
msgID = 140046(TRUNCATED)
 445889783 AAA    debug3 in aaa_DispatchClientRsp,msgId=0x140046
 445969235 AAA    debug1 begin Authent Evt : Auth Reply Ok, St : WAIT RESP2,
name : user101, R(TRUNCATED)
 446069472 AAA    debug3 Entering in aaa_AuthRspOK
 446128451 AAA    debug3 8021X Authentication
 446168732 AAA    debug3 Entering in aaa_ReplyHdlMgt
 446228701 AAA    debug1 Send auth Success, session 48c4288
 446287686 AAA    debug3  446287793Ente ring in aaa_userRetAAAurnST_IDLE
 446347653 AAA     debug2  AAA[   ONEX] onex_proces s_aaa_rsp eap messadebug1ge
@ 48c42a0 l en: 4AAA_Serv>> Ctx user101 removed fr om Chal_Rsp link,
s446467496et in No li nkAAA     44652658info0    AAA[ONEX] o   nex_process_aaa_r
sp auth success ifidebug1ndex 2003  En d Authent Evt St : 446606251IDLE, name  :
, ses :    0/   0AAA, Ret = OK    debug2 [ONEX] onex_auth_txCannedSuccess sent
to 2003
 446746845 AAA    debug2 SL 0xa0070 00.0f.1f.d5.54.95, VL 101, proto 1 p 2003,
flush 0
 447276940 AAA    debug2 SL 0xa0070 00.0f.1f.d5.54.95, VL 101, proto 1 p 2003,
flush 0
 447355590 AAA    debug2 SL 0xa0070 00.0f.1f.d5.54.95, VL 101, proto 1 p 2003,
flush 0
```

Dshell Troubleshooting

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

Launch the NiDebugger. Go to the NI where user is connected.

```
2:0 nidbg> adHelp
2:0
2:0
2:0 Authentication Dispatcher (AD) debugging help
2:0
2:0 - adDebugResetCounter         : Clear debug counters
2:0 - adDebugSetDump = X          : X=1: Enable additional dump hexa in INFO's
trace
2:0                                 X=0: Disable additional dump hexa in INFO's
trace
2:0 - adDebugSetFilterFrame 0xXXXX: Set frame type filter
2:0                                 Available only for INFO's trace
2:0                                 XXXX = Bit field
2:0                                 XXXX = FFFF = No filter
2:0                                 Bit  1: ARP      Bit 2: DHCP
2:0                                 Bit  3: TELNET   Bit 4: HTTP
2:0                                 Bit  5: DNS      Bit 6: XCAP
2:0                                 Bit  7: 802.1x   Bit 8: Spoofing
2:0                                 Bit  9: Configuration
2:0 - adDebugSetFilterLevel 0xX   : Set trace level filter
2:0                                 X = Bit field
2:0                                 Bit  1: ERROR    Bit 2: WARNING
2:0                                 Bit  3: INFO
2:0 - adDebugSetFilterPort X      : Set user port number filter
2:0                                 Available only for INFO's trace
2:0                                 X = 0 = No filter
2:0 - adDebugShowAvlanIp          : Display Authentication IP addresses config-
ured
2:0 - adDebugShowContext          : Display AD's context
2:0 - adDebugShowCounter          : Display debug counters
2:0 - adDebugShowPort             : Display 802.1x port configured
2:0 value = 0 = 0x0
```

Check the port status using the following command:

```
2:0 nidbg> adDebugShowPort
2:0
2:0
2:0 AD show port configuration
2:0
2:0     User port        = 3
2:0     State            = authorized_serv_data (4)
2:0     Direction        = In-Out (0)
2:0     Source MAC addr. = 00.0F.1F.D5.54.95
2:0
2:0     User port        = 4
2:0     State            = unauthorized (3)
```

```
2:0     Direction        = In-Out (0)
2:0     Source MAC addr. = 00.00.00.00.00.00
2:0 value = 0 = 0x0
```

To verify the sequence of the packet flow, set the below Dshell flags to troubleshoot the issue. The best way to troubleshoot is to compare the failed case with good case.

```
2:0 nidbg> adDebugSetFilterFrame 0xffff
2:0 nidbg> adDebugSetFilterLevel 0xff

2:0 AD INFO-> 802.1x port config.rcv.: Msg.=0x4370000
2:0
2:0 AD INFO-> 802.1x port config.rcv.:
2:0    Slot=2,Msg.=0x4370000
2:0
2:0 AD INFO-> 802.1x's port broadcast egress traffic blocked:
2:0    Slot=2,Glb.port=0x22,User port=3
2:0 slnFlushPortVlanHandler(1623): count = 1
2:0 qDriverSendReadyToEsmDriver: zcSendto succeeded  port 0x22
2:0
2:0 AD INFO-> EAPol pkt.rcv.from AAA's 802.1x:
2:0    Slot=2,Msg.=0x44ff800
2:0
2:0 AD INFO-> EAPol pkt.sent out:
2:0    Slot=2,Glb.port=0x22,User port=3,Frame=0x44fa000
2:0
2:0 AD INFO-> EAPol pkt.rcv.from AAA's 802.1x:
2:0    Slot=2,Msg.=0x4509800
2:0
2:0 AD INFO-> EAPol pkt.sent out:
2:0    Slot=2,Glb.port=0x22,User port=3,Frame=0x4506800
2:0
2:0 AD INFO-> No EAPol pkt., rcv.on 802.1x glb.port=0x22,user port=3: discarded:
2:0    Slot=2,802.1x port's state=3,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x4180,Frame=0x4662800
2:0
2:0 AD INFO-> No EAPol pkt., rcv.on 802.1x glb.port=0x22,user port=3: discarded:
2:0    Slot=2,802.1x port's state=3,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x4180,Frame=0x436f000
2:0
2:0 AD INFO-> EAPol pkt., rcv.on 802.1x glb.port=0x22,user port=3: sent to
802.1x CMM:
2:0    Slot=2,802.1x port's state=3,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x8080,Frame=0x4474800
2:0
2:0 AD INFO-> EAPol pkt.sent to AAA's 802.1x:
2:0    Slot=2,Glb.port=0x22,User port=3,Msg.=0x15cfd70
2:0
2:0 AD INFO-> 802.1x port config.rcv.: Msg.=0x4478000
2:0
2:0 AD INFO-> 802.1x port config.rcv.:
2:0    Slot=2,Msg.=0x4478000
2:0
2:0 AD INFO-> 802.1x's port broadcast egress traffic blocked:
2:0    Slot=2,Glb.port=0x22,User port=3
2:0
2:0 AD INFO-> EAPol pkt.rcv.from AAA's 802.1x:
2:0    Slot=2,Msg.=0x447d800
```

```
2:0
2:0 AD INFO-> EAPol pkt.sent out:
2:0    Slot=2,Glb.port=0x22,User port=3,Frame=0x4479000
2:0
2:0 AD INFO-> EAPol pkt.from supplicant, rcv.on 802.1x glb.port=0x22,user
port=3: sent to 802.1x CMM:
2:0    Slot=2,802.1x port's state=6,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x8080,Frame=0x447c800
2:0
2:0 AD INFO-> EAPol pkt.sent to AAA's 802.1x:
2:0    Slot=2,Glb.port=0x22,User port=3,Msg.=0x15cfe90
2:0
2:0 AD INFO-> 802.1x port config.rcv.: Msg.=0x4484000
2:0
2:0 AD INFO-> 802.1x port config.rcv.:
2:0    Slot=2,Msg.=0x4484000
2:0
2:0 AD INFO-> 802.1x's port broadcast egress traffic unblocked:
2:0    Slot=2,Glb.port=0x22,User port=3
2:0
2:0 AD INFO-> EAPol pkt.rcv.from AAA's 802.1x:
2:0    Slot=2,Msg.=0x4481800
2:0
2:0 AD INFO-> EAPol pkt.sent out:
2:0    Slot=2,Glb.port=0x22,User port=3,Frame=0x4488000
2:0
2:0 AD INFO-> DHCP pkt.from known src.MAC, rcv.on 802.1x glb.port=0x22,user
port=3: sent to UDP Relay NI:
2:0    Slot=2,802.1x port's state=4,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x4100,Frame=0x446c800
2:0
2:0 AD INFO-> DHCP pkt.from known src.MAC, rcv.on 802.1x glb.port=0x22,user
port=3: sent to UDP Relay NI:
2:0    Slot=2,802.1x port's state=4,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC addr.=00.0F.1F.D5.54.95,Cond.codes=0x4100,Frame=0x4483800
2:0
2:0 AD INFO-> ARP request, rcv.on 802.1x glb.port=0x22,user port=3:
2:0    Slot=2,802.1x port's state=4,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC known=0x1,Cond.codes=0x6000,Frame=0x44a4000
2:0
2:0 AD INFO-> ARP request, rcv.on 802.1x glb.port=0x22,user port=3:
2:0    Slot=2,802.1x port's state=4,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC known=0x1,Cond.codes=0x6000,Frame=0x4578000
2:0
2:0 AD INFO-> ARP request, rcv.on 802.1x glb.port=0x22,user port=3:
2:0    Slot=2,802.1x port's state=4,Auth.Ctrl=1,Auth.Share=2,
2:0    Src.MAC known=0x1,Cond.codes=0x6000,Frame=0x4678000
```

A packet capture that is more specific to EAPOL is done by setting bit-7 of the **adDebugSetFilterFrame** Dshell command.

A OS6600/OS7700/OS8800 Architecture Overview

The switch benefits from an intelligent, multi-layer switching, fully distributed and passive backplane architectural design that provides redundancy of critical hardware and software elements for a continuous (non-stop) traffic processing in any network conditions without a single point of failure. Switch processing scheme includes a non-blocking store-and-forward crossbar design switching fabric with a distributed processing. The architecture supports a true redundancy of management and the switch fabric. The OmniSwitch 7000 new and highly intelligent design encompasses advanced distributed architecture including state-of-the-art ASICs.

The architecture is designed around three major ASICs named the Catalina, the Coronado and the Nantucket.

In This Chapter

The MAC ASIC

There are two different types of MAC layer ASICs:

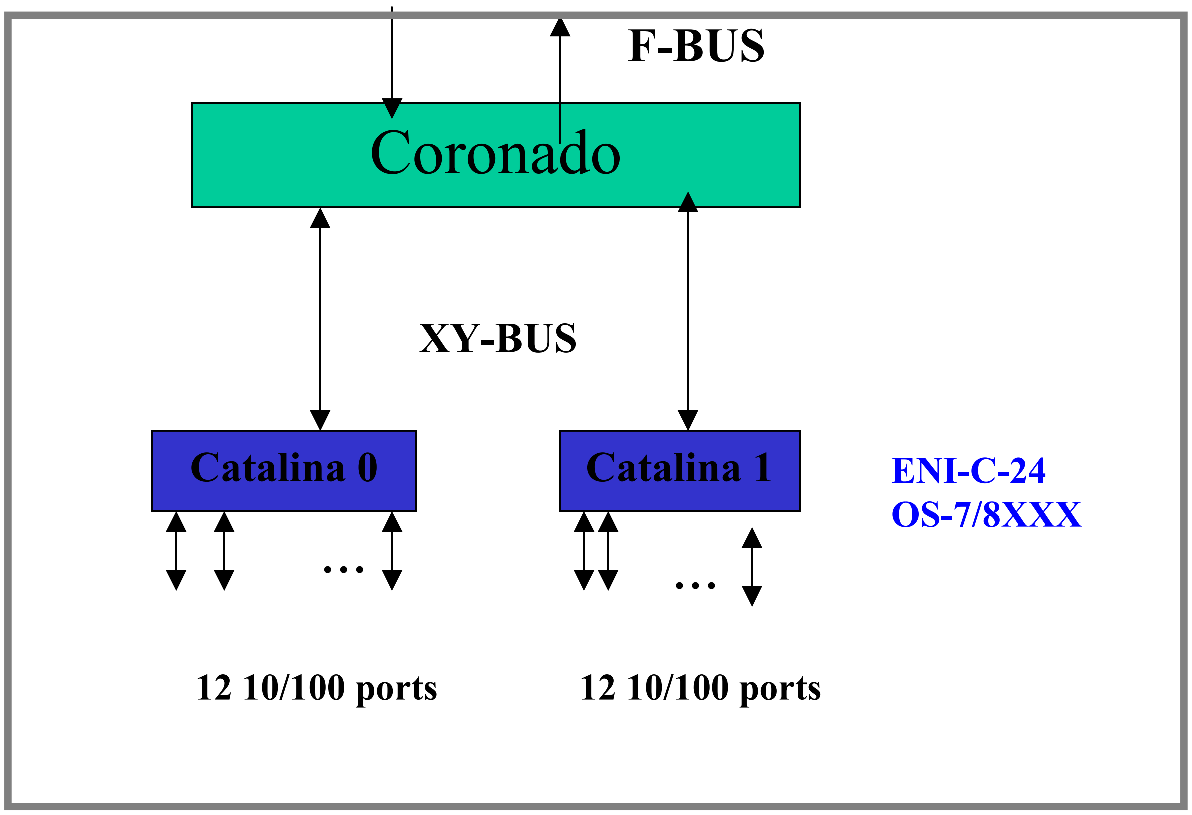
- Catalina
- Firenze

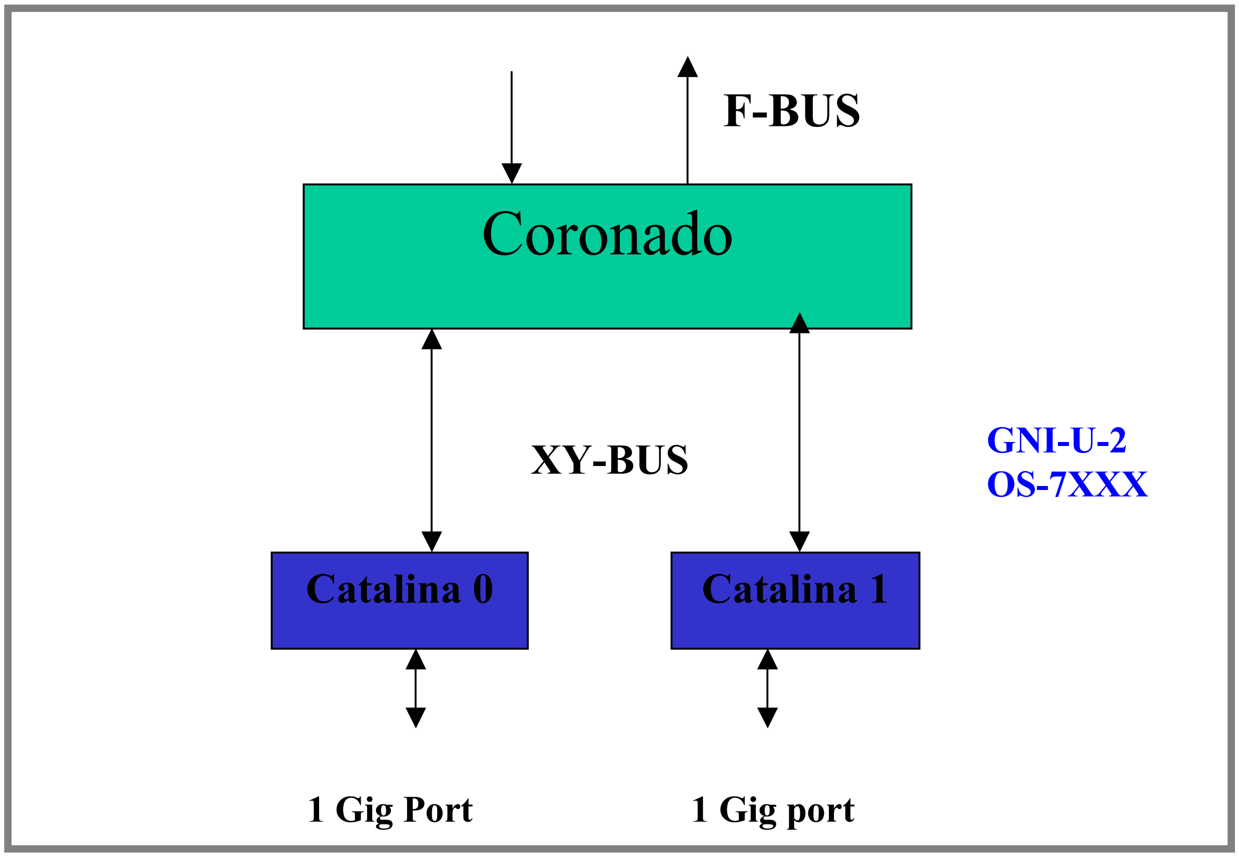
Catalina

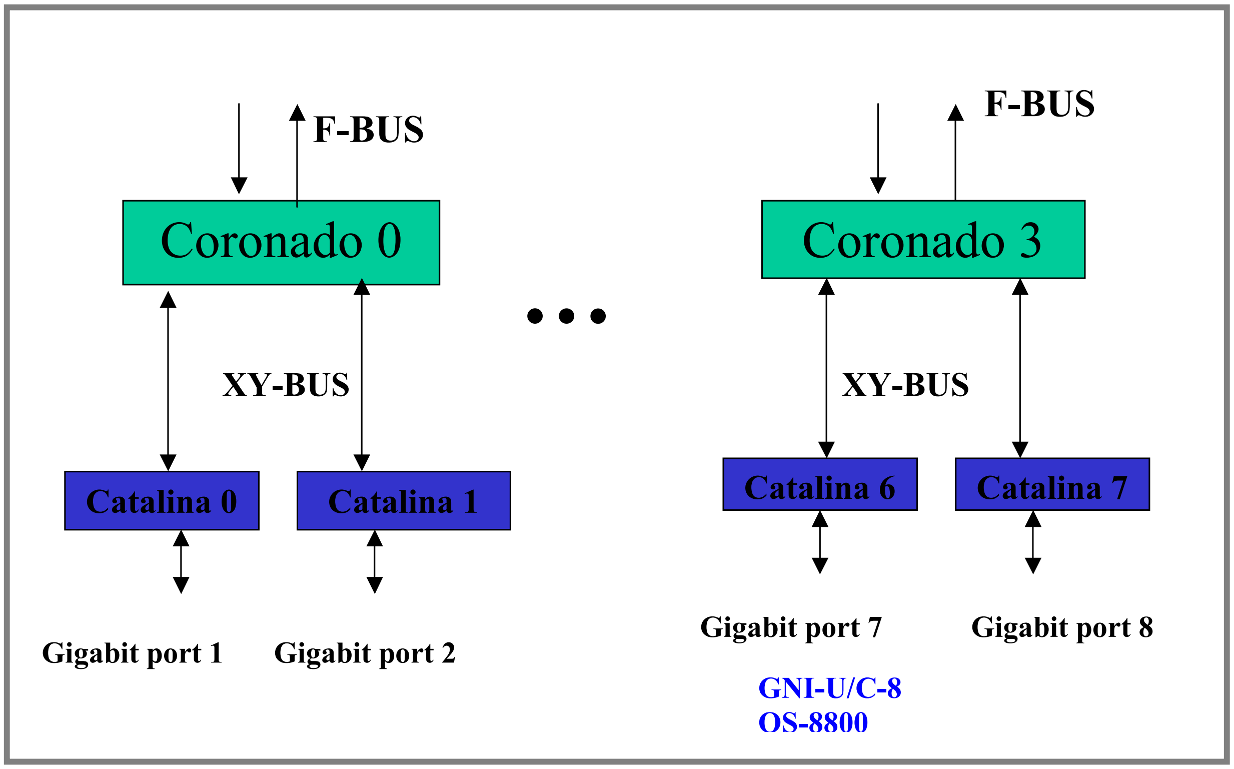
The Catalina basically provides three functions: Media Access Control (MAC) Layer functions, data buffering, and statistics accumulation and storage for each port.

The Catalina provides the interface between Ethernet analog devices (10/100 Mbps and 1000 Mbps) and the Coronado. The Catalina has a total of thirteen network interfaces, twelve of which support 10/100 Mbps Ethernet through a RMII (Reduced Media Independent Interface) and the thirteenth supports 1000 Mbps. All Catalina ASIC buffer memory is dedicated to providing a smooth stream of data inbound from the Ethernet ports to the Coronado or outbound from the Coronado to the Ethernet ports.

The Catalina does not contain system-level buffering for storing frames for later transmission. The Coronado Queue Manager provides this function. Catalina packet processing is limited to physical-layer processing. It does not perform any protocol processing or frame recognition. The Coronado handles these functions. One or two Catalina ASIC is located on any network interface.




F-BUS
Coronado
XY-BUS
GNI-U-2
OS-7XXX
Catalina 0
Catalina 1
1 Gig Port
1 Gig port


F-BUS
F-BUS
Coronado 0
Coronado 3
XY-BUS
XY-BUS
Catalina 0
Catalina 1
Catalina 6
Catalina 7
Gigabit port 1
Gigabit port 2
Gigabit port 7
Gigabit port 8
GNI-U/C-8
OS-8800

Firenze

The Firenze basically provides three functions: Media Access Control (MAC) Layer functions, Data buffering, Flow Control and statistics accumulation and storage for each port.

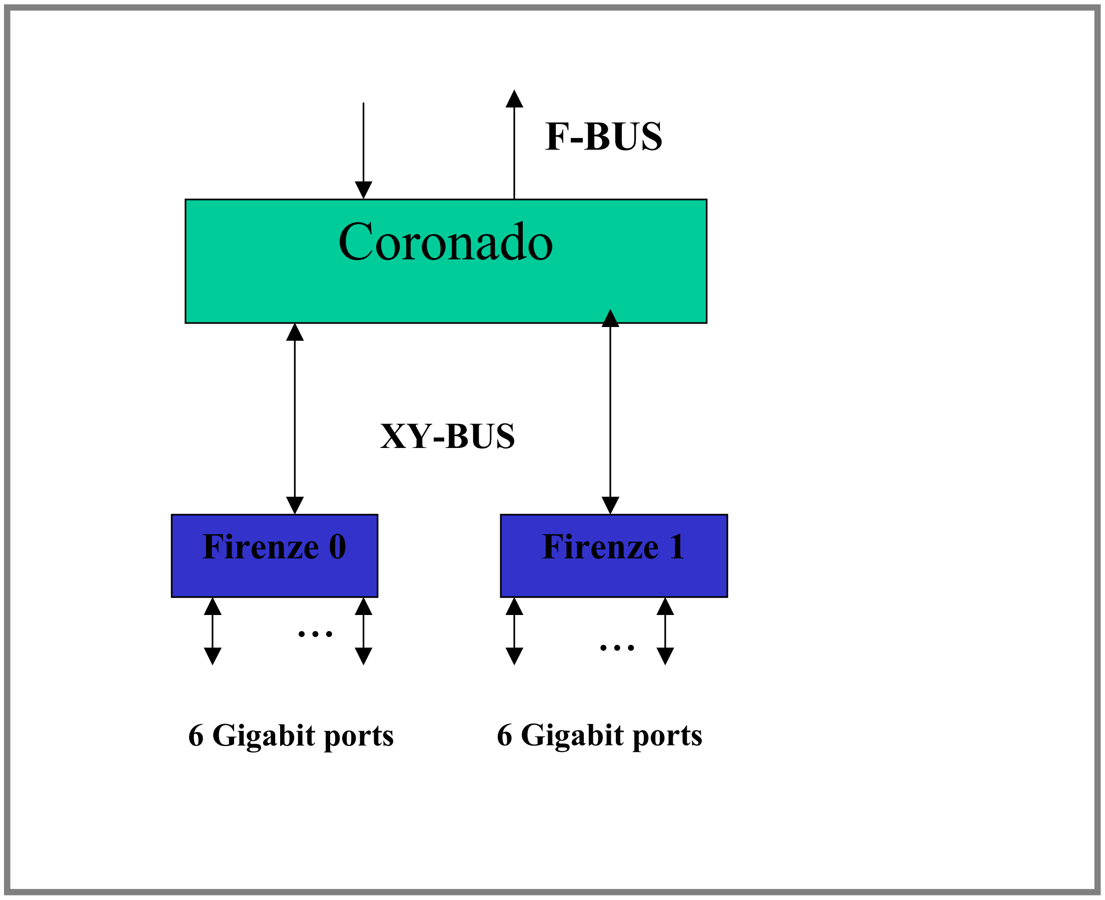
Firenze handles up to six Ethernet interfaces that can support independently either 10 or 100 or 1000 Mbit/s throughput using independently either TBI or GMII interfaces.

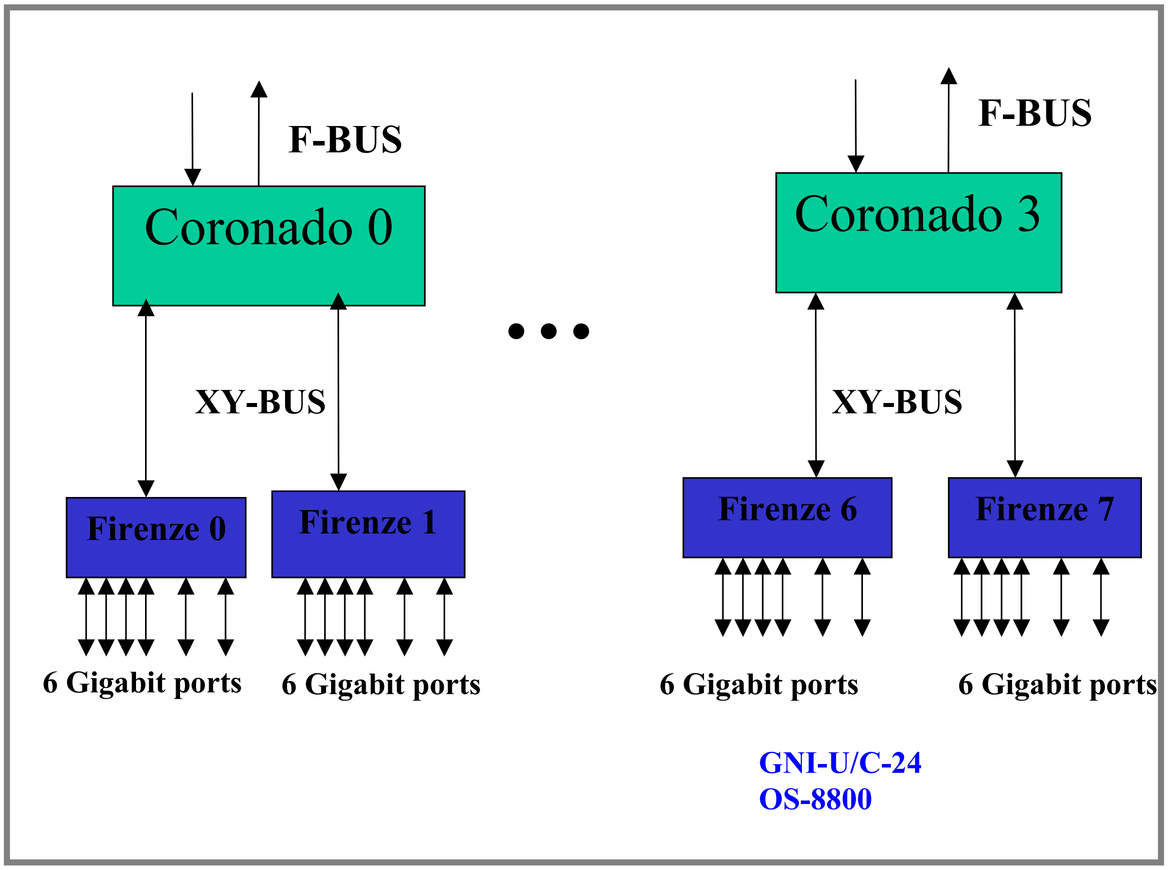
The Firenze Based GNI is a 1Gbps Ethernet Switching Module for the Falcon system. Two Versions of the board are configured as below:

- GNI-U12, 12-port fiber Gigabit module equipped with twelve Pluggable SFP Transceivers which can support short, long and very long haul applications.
- GNI-C12, 12-port copper Gigabit module equipped with twelve RJ45 connector, individually configurable as 10/100 or 1000 Base-T.

The Firenze based GNI modules for Eagle OS-8800 are as follows:

- OS8-GNI2-C24, 24-port copper Gigabit module equipped with Twenty four RJ45 connector compatible with cat5 or cat5e minimum cabling specification. Due to the use of Ten-Bit Interface
- TBI between the PHY and Firenze, the ports are limited to 1000BASE-T speed only.
- GNI2-U24, 24-port fiber Gigabit module equipped with Twenty four Pluggable SFP Transceivers.





The Coronado ASIC

The Coronado ASIC is the centerpiece of this advanced architectural design. While each ASIC performs a vital function in the overall architecture, the Coronado provides most of the key features like wire-rate L2 and L3 switching and routing.

Coronado features include:

- Classifier and switching ASIC
- Full wire-speed L2/L3
- Provides connectivity for 24x10/100 Mbps ports or 2x1000 Mbps ports
- Up to 64K L3 Table Entries. 64K L2 Entries.
- Four Priority Levels. 2,048 Virtual Queues.
- Flow based QoS with IEEE 802.1Q/p, IP-TOSp or IP-DiffServ
- Up to 4,096 IEEE 802.1Q VLAN support.
- Link Aggregation.
- Port mirroring/monitoring.

The Coronado ASIC contains both Ingress and Egress functions. Ethernet frames flow from the Catalina through the Ingress Coronado, through the Nantucket switch fabric, then through the Coronado Egress logic and finally out the Egress Catalina.

Note: Frames always flow through the Nantucket, even if the input and output ports are on the same Coronado ASIC. One or more Coronado ASIC are located on the network interface cards. It is a store and forward technology meaning that the entire PDU must be received before it is transferred across the fabric to the egress port. Each Coronado provides 2.4Gbps interface to the backplane.

Coronado has a build-in Hardware Routing Engine known as HRE. This HRE provides the function of Layer 2 switching as well as Layer 3 routing. Coronado also has classifier logic built-in, which enables the packet to be classified according to the policies defined.

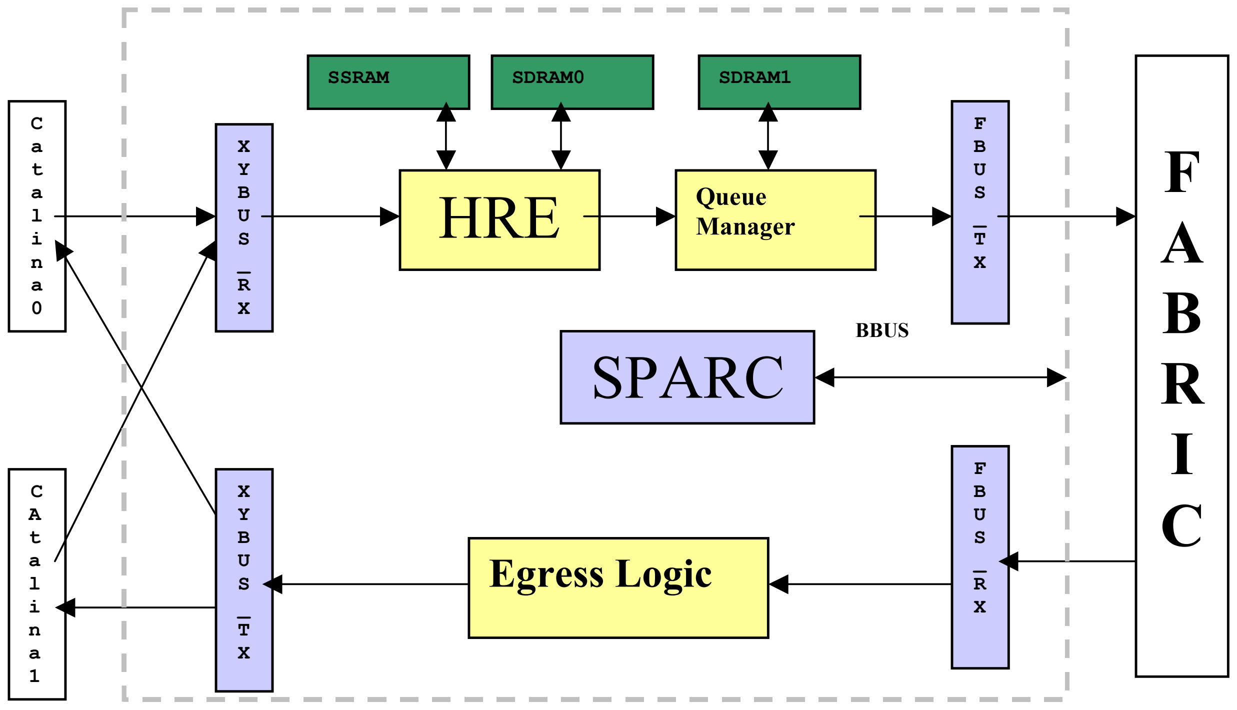
On the Network Interface cards for OmniSwitch 7XXX, there is one Coronado per NI.

Ethernet switching modules (10/100MB) always have one Coronado for both OmniSwitch 7/8XXX.

OmniSwitch 8800 has four Coronado ASICs (0 t0 3) per NI for all the GNI modules

Coronado is referred to as a Slice. Therefore, the Coronado on a network interface card in a working chassis is referred to by slot and slice number.

Functional Description



Coronado: The "Brain" of the System

- Provides hardware performance for most features on the OmniSwitch.
- Involved in both the ingress and egress packet processing.
- Provides a high speed connection to Catalina via the XYBUS. XYBUS is two unidirectional busses between Catalina and Coronado. XYBUS is 1.24 Gbps.
- Provides 2 high speed connections to the fabric via the FBUS. An FBUS is two unidirectional busses.
- Provides connections to all the ASICs via the management BUS known as BBUS. BBUS is a bidirectional bus used for Management purposes for NI/CMM communications.

Coronado Specifications

- On Chip 170 KB memory (for FIFOs, Queue Manager and ingress buffering)
- Off Chip memory
- SSRAM: 2Mbytes for pseudoCAM entries (128k)
- 64k Layer 2 entries (32K for SA and 32K for DA)
- 64k Layer 3 entries
- SDRAM-0: 32Mbytes (Part of it is allocated to HW for HRE header cache, Priority Description Index etc; remaining is available to Software)
- SDRAM-1: 16Mbytes used for the buffers
- V7 Sparc Core running at 143 MHz—integrates cache memory:
    - 8KB for instruction
    - 4KB for data (sending on BBUS)
    - 2KB for packet cache (for faster access to the packet being processed)
- Provides software support for distributed features. Executes the Operating System on each NI. The configuration of the Coronado is updated by the CMM.
- The Coronado ASIC supports 2048 queues and 4096 buffers. Buffers are organized in two lists:
    - List 1: 4096-128=3968 buffers of 2048 bytes
    - List 2: 128 buffers of 16384 bytes for Jumbo Frames
- Coronado keeps track of the buffer utilization on per port basis. A per port threshold triggers the 802.3x pause frame.
- Each queue can be assigned:
    - An egress physical port or can be designated as a multicast queue
    - A pay that determines the right to transmit a certain amount of data
    - A priority (4 for unicast - 4 for multicast)
    - A maximum length, which is the maximum number of packets that can be queued

- Queues are maintained by the software module known as the Queue Driver runs on each NI. It provides the interaction to other software modules in the Falcon/Eagle product to create/modify/delete/manage all the queues in the system. This module provides debugging information required for the queues and maintains the statistics. This module maintains all the information required about all the queues on the Coronado.

Software Module Interaction

- Coronado ASIC interacts with the following software modules:
- Ethernet Driver
- Queue Dispatcher
- NI Supervision Task
- L2 Source Learning
- L3 Manager/IPMS
- QoS Manager
- Link Aggregation

Queue Driver Interaction

The interactions of each module with Queue Driver is as follows:

Ethernet Driver

Ethernet driver on the CMM is responsible for initializing the Coronado when the system comes up, when a board is inserted/removed from the slot and when a link goes up or down. On the initial initialization the Ethernet driver on the CMM should send the slot configuration information for all the slots in the system. The initial configuration sent by the Ethernet driver has the following information for each of the slots present in the system:

- Number of default queues per port (this is user configurable. The default value is 4 queues per port. The CLI command to change this is provided by the Ethernet driver. The value of this parameter can be either 2 or 4. This value is configurable per slot).
- Port configuration for each of the ports in the slot.
- Based on the port configuration the Queue Driver will assign ports.

Queue Dispatcher

The interaction between the queue driver and the queue dispatcher is mainly for freeing a default queue associated with a port when the port goes down and to modify the priority of a queue. When the queue driver gets the link down event for a port a message is sent to the queue dispatcher task. The Queue dispatcher performs the appropriate steps to free the queue and updates the status of the request by sending a message back to the queue driver. The queue driver maintains statistics about the number of queues in an error state. When the priority of a queue needs to be changed, a message is sent to the queue dispatcher.

NI Supervision

Queue driver sends the task initialization and task ready messages to the NI Supervision task just before receiving any configuration information from the CMM Ethernet driver. This indicates to the NI supervision task that the queue driver task is ready.

Source Learning

L2 Destination Address Manager is a software block of Source Learning. It is responsible for destination MAC address learning and programming the L2 destination address pseudo cam on the Coronado.

L3 Manager/IPMS

The L3 Manager/IPMS Module interacts with the Queue Driver to get the default queue associated with a physical port associated with the pseudo cam entry.

QoS Manager

The interaction between the QoS Manager and the Queue Driver can be under following conditions:

Destination MAC Learning

When a L2 destination MAC address is learnt, the source-learning module notifies the QoS Manager of the MAC learnt. QoS Manager checks to see if any QoS Policy is configured for the MAC address. If a QoS Policy is present and if it requires that a new queue be created for the flow, then the QoS Manager requests the Queue Driver for a new queue with the appropriate policy requirements for the queue. The Queue driver will allocate a new queue if a free queue is available. Depending on the policy, the QoS Manager can request for multiple consecutive queues. In this case, the QoS Manager can request for number of consecutive default queues and later modify the parameters of the individual queues

L3 Pseudo CAM Learning

When a L3 address is learned, the L3 manager module notifies the QoS Manager of the L3 address learnt. QoS Manager checks to see if any QoS Policy is configured for the L3 address. If a QoS Policy is present and if it requires that a new queue be created for the flow, then the QoS Manager requests the Queue Driver for a new queue with the appropriate policy requirements for the queue. The Queue driver will allocate a new queue if a free queue is available. Depending on the policy, the QoS Manager can request for multiple consecutive queues. In this case the QoS Manager can request for number of consecutive default queues and later modify the parameters of the individual queues

QoS Policy Change

When a QoS Policy changes, the QoS Manager is notified. QoS Manager checks to see if any flows exist for the policy and if a new queue was allocated for it. If so, it requests the Queue Driver to modify certain parameters of the queue with the appropriate queue parameters. Only certain parameters of a queue can be modified on the fly.

QoS Policy Deleted

When a QoS Policy is deleted, the QoS Manager is notified. It checks to see if there are any flows associated with the QoS Policy. The queue id for all the pseudo cam entries associated with the policy should be reprogrammed with a default queue and the existing queue has to be freed. The QoS Manager requests the Queue Driver to free the queue.

L2 destination MAC Aged/Deleted

When a L2 destination MAC address is aged/deleted from the pseudo cam, the QoS Manager is notified. QoS Manager checks to see if any QoS Policy was configured for this MAC address. If so it checks to see if the queue associated with this MAC is used for any other flows. If not the QoS Manager requests the Queue Driver to free the queue.

L3 PseudoCAM Entry Aged/Deleted

When a L2/L3 pseudo cam entry is aged/deleted, the QoS Manager is notified. QoS Manager checks to see if any QoS Policy was configured for this L2/L3 flow. If so it checks to see if the queue associated with this flow is used for any other flows. If not the QoS Manager requests the Queue Driver to free the queue.

Request to Free Queues Sent to QoS Manager

Request for freeing some qos queues, when there are no sufficient queues available for allocating for link aggregation, is sent to the QoS.

Link Goes Up/Down

When a link goes up or down the qos requests for freeing/adding the QoS queues associated with those ports if any policies exists on those ports.

Link Aggregation

Link Aggregation feature allows software to aggregate a set of ports (not necessarily contiguous or on the same Coronado) into a group. Each port is referred to as a channel that can carry some bandwidth. This feature requires that all the queues associated with all the ports in the group to be contiguous. Events resulting in Link Aggregation and Q driver interaction may be for the creation and deletion of link aggregation group.

Coronado Tables

Coronado maintains two different kinds of tables:

- Layer 2 Tables
- Layer 3 Tables

Layer 2 Tables

- 64,000 pseudo CAM entries are split in 2 tables:
- L2-Source Address (L2-SA) Table containing
- VLAN membership (GID)
- Value (MAC address)
- 2-L2-Destination Address (L2-DA) Table containing
- VLAN Membership (GID)
- Value (MAC address)
- Destination Queues to use (QID/ReQID)
- Priority Description Index (PDI) containing Internal Priority
- Request for additional L3/L4 lookup and use of resultant QID

Layer 3 Tables

- 64,000 pseudo CAM entries. A single table is maintained for all the Source and Destination L3 addresses. Entries are based on selected lookup mode.
- Now, the primary functions and the architecture of Source Learning, Hardware Routing Engine (HRE) and QOS functional blocks will be discussed.

Source Learning

Coronado ASIC is a ingress classifier that performs Layer 2 hardware table lookups to the VLAN Id corresponds to the incoming packets.

In principle, Coronado will perform a Layer 2 Source Address (L2 SA) lookup based on whether the incoming port is a tagging or non-tagging port, a copy of the packet is re-queued to the Source Learning queue for processing if the lookup fails. Coronado then performs a L2 Destination Address (L2 DA) pseudoCam lookup to find out the destination Queue Identifier (QID) to queue the packet to the egress port. Coronado always put the packet in the flood queue if the L2 DA lookup fails until Source Learning updates DA entry.

Source Learning is responsible for managing (creation, update, deletion) MAC address entry in Layer 2 pseudoCam hardware source and destination address tables and communicating other interested entities (QOS, Layer 3,...) regarding the new learned mac address.

By taking advantage of the Coronado hardware processing capabilities, Source Learning is distributed on every Coronado in the switch. The processing load is spread among all the Coronados, thus performance is increased. On the other hand, Address Learning is independent from the presence of CMM.

Each Coronado sends an event to the CMM to update the filtering database on CMM whenever there is an operation on its Source Address pseudoCam. As a result, each Coronado has a local view of layer 2 pseudoCam information of its own slot/slice, and the software filtering database on the CMM has global view of the layer 2 pseudoCam information in the switch.

Hardware Routing Engine (HRE)

This feature is responsible for managing the Coronado HRE resources that perform IP and IPX packet classification and forwarding.

This functionality employees five principal Coronado resources—header cache entries, pseudo-CAM entries, hash function registers, modes, and router MACs.

Header Cache Entries

Contain the information necessary to modify and forward a packet, including both modifications to the packet's content and Coronado-specific handling information.

Pseudo-CAM Entries

Used for classifying traffic based on its IP or IPX address information and, in the case of IPMS, some layer 2 information. The HRE does not have Content Addressable Memory (CAMs) for storing address information. Instead it uses hash tables (called pseudo-CAMs) that can be interpreted by the Coronado. The entries in these hash tables contain both address information to be matched against the content of the packet and the resulting action to take when the entry is matched. There are two basic actions:

- Forward the packet using information in a specified header cache entry.
- Perform another refining lookup to match additional, more specific address information.

Hash Function Registers

Used to define the hash algorithms used to lookup pseudo- CAM entries in the hash tables.

Modes are used to govern the classification process:

Mode 0	For IP entries, full IP destination host address. For IPX, destination network number.
Mode 1	For IP entries, full IP destination and source host addresses. For IPX, not used.
Mode 2	For IP entries, full IP destination and source host addresses and TCP/UDP destination port number. For IPX, IPX destination network number and IPX destination node.
Mode 3	For IP entries, full IP destination and source host addresses and TCP/UDP destination and source ports. For IPX, not used.
Mode 4	Only used for IP firewalling. Uses same matching criteria as Mode 3.
Mode 5	Only used for IPMS. Matches full IP destination and source host addresses, source port number, and source VLAN identifier.
Mode 6	Unused.

They identify which hash table is to be used, which hash function is to be used, and what portions of the address information in the packet are required to match that in the pseudo-CAM entry. There are seven modes, each represented by a configuration register. Some of these have special meaning. For example, mode 0 is the initial mode. Each packet classification starts in this mode. Each pseudo-CAM entry that has as its action to perform another lookup includes a number representing the mode to be used in that subsequent lookup.

Router MACs

Helps identify candidate traffic for classification. The HRE only operates on traffic that is identified as requiring layers 3 and 4 classification. Candidate traffic for such classification must be of the type IP or IPX and must have its layer 2 destination MAC be a router MAC for this switch or be a bridged MAC that has been marked for layer 3 and 4 classification or be an IP multicast MAC. This feature only manages router MACs. Bridged MACs are managed by layer 2 source learning and IP multicast MACs are managed by the IP multicast routing and switching (IPMS) feature. These resources are used to implement the forwarding features - IP and IPX unicast routing, IP multicast routing and switching, bridging based on layers 3 and 4 information, and IP firewall.

IP and IPX Unicast Routing

When an IP or IPX packet is addressed to a router MAC on the switch, the HRE attempts to classify the packet using data in the pseudoCAMs. If a match is found, the packet is updated and forwarded using information from header cache entry. If not, the packet is routed using one of two default header cache entries (one each for IP and IPX). These are configured to route the packet to either the IP or IPX software process on the Coronado.

IP Multicast Routing and Switching

When an IP multicast packet is received, the HRE attempts to classify the packet using data in the pseudo-CAMs. If a match is found, the packet is sent to egress processing which uses the information stored in the header cache entry as well as other Coronado tables updated by the IPMS feature to forward the packet. If no match is found, the packet is forwarded to the IPMS software process on the Coronado.

Bridging Based on Layer 3 and 4 Information

When an IP packet is addressed to a MAC with an entry in the layer 2 DA pseudo-CAMs that indicates the treatment for the bridged packet depends on layer 3 and 4 information, the HRE attempts to classify the packet using data in the pseudo-CAMs. If a match is found, the packet is not modified but is forwarded using information from the header cache entry. If a match is not found, the packet is forwarded to the QoS software task.

IP Firewall

The HRE has the capability to match TCP traffic with particular flag bits set. This capability can be enabled based on the destination MAC of the packet, the destination host IP address of the packet, or the final matching pseudo-CAM entry for a flow. When this is enabled and the packet has the appropriate flag bit set, the packet is forwarded normally and a copy is sent to the IP software process on the Coronado.

QoS/Policy Manager

Policies describe subsets of traffic, and what to do with that traffic. The Policy Processor determines what policies are enforceable, and organizes the policies into lists used by the classifier. QoS uses the same policies for Prioritization/Shaping, IP Filtering (ACLs), NAT, and IPMS Filtering. Using the same policies for all these functions has several benefits:

- All policies affecting the traffic are centrally located
- All policies share the same expressive power.
- Traffic is only classified once in a single routine.
- A single GUI application (PolicyView) can manage policies, and subsequently manage all these facilities.

QoS determines which policies can possibly be matched on a switch, and constructs lists for each of the L2 and L3/L4 classifiers. If a policy contains classification criteria that cannot be met by the hardware, QoS logs a message indicating what parameters could not be matched, and the policy is not used in classification.

The QoS manager calls the classifiers in response to messages from source learning, routing, and IPMS. QoS uses lists maintained by the QoS Policy Processor to make it’s decisions.

Coronado Egress Logic

- Coronado receives a packet from the Fabric through FBUS destined for a Queue existing on the same Coronado. There is not a lot of egress Logic to be performed for Unicast packets.
- If the destination port is untagged, 802.1Q tag is stripped and the packet is forwarded to the destination port.
- Coronado limits the flood bandwidth or Flood and Multicast Bandwidth per port. Bandwidth limitation is based on dual leaky bucket algorithm. Packets are credited in chunks of 64 bytes every 130.98us.
- IPMS processing is completed by the Coronado on the egress, started by the HRE.
- Updates IPMS routed packets- decrements TTL and rewrite MAC-DA.
- Duplicates the packet whenever needed. Multicast packets are duplicated by the software on a Q-Tag link.

The Fabric Architecture

ASIC provides the switching fabric functionality for the OmniSwitch Series. The switching fabric does no frame processing and does not distinguish between L2 switching and L3 routing. The fabric provides only a limited amount of FIFO buffering for each port, flood and the multicast queue. Most of the system buffering is in the Ingress Coronado's Queue Manager. The backplane fabric is a bit-sliced ASIC. Each chip contains a control element and data buffering and queuing logic. All fabrics in the primary fabric operate in a lock step under control of the "master" fabric. The fabric provides one unicast queue for each physical port on the OmniSwitch Series plus broadcast and multicast queues and, inter-processor communication queues. Switching Fabric monitors the depth of its on-chip queues and provides flow control feedback to the Coronado ASICs. Switching fabric also generates control messages for each of four priorities to drive the Coronado bandwidth control. The backplane is wired like a wagon wheel where the fabric card is the "hub" and the point-to-point backplane connections are the spokes. Each network interface card (NI) is at the end of a spoke. Each NI is connected to the redundant fabric by an identical but separate set of connections. For redundancy, each NI slot is wired to both fabric cards by separate traces.

OS7XXX and OS8800 use different Fabric ASICs for the backplane connectivity between all the slots:

- OS-7XXX uses Nantucket ASIC
- OS-8800 uses ROMA ASIC

Nantucket ASIC

The Nantucket ASICs have the following:

- Support for 8 and 16 Coronados only.
- No dynamic queue numbering for each NI slot.
- Fixed eight Nantuckets per Fabric board.
- Maximum of one redundant Fabric board.

The Nantucket software is arranged as:

- Nantucket operational software resides on the CMM.
- Nantucket operational software runs on the UltraSPARC IIe on the CMM.
- All accesses to Nantucket registers is through the PCI bridge and over the Bbus bridges.
- Minimum user interface software is provided for configuring and statusing the Nantucket ASICs.
- Minimum SNMP software is provided for configuring and statusing the Nantucket ASICs.

Additional Nantucket Specifications

- Nantucket Fabric consists of eight Nantucket ASICs for the primary Fabric in OS-7800 and four Nantucket ASICs for the primary Fabric in OS-7700.
- Nantucket Fabric consists of eight/four Nantucket ASICs for the redundant Fabric, when running with a redundant CMM.
- Nantucket uses six SRAM memories, each SRAM is 32 bits wide by 11264 words deep.
- Nantucket has a point to point interface to all Coronados running at 500MHz.
- No packet processing on Nantucket
- Provides very little buffering
- Supports 512 per-port queues
- Supports 1 per-Coronado broadcast queue and 1 intercommunication queue.
- Supports flow control/pay generation for Coronado bandwidth control
- Supports VLAN spanning tree masks

Nantucket supports the following messages:

- Ingress packets w/header
- Egress packets w/header
- Flow control messages
- Bandwidth management control messages "pay."

Functional Description:

The Nantucket software resides on Chassis Management Module (CMM) and run on the UltraSPARC IIe processor within the CMM. The Nantucket software communicates to the Nantucket ASIC via the PCI Bridge and Bbus Bridges. The Nantucket Software has interfaces to the following:

- Primary CMM SDRAM, EEPROM via the UltraSparc IIe PCI Bridge
- Secondary CMM EEPROM via the UltraSparc IIe PCI Bridge
- 2 Primary Fabric Board Burst Bus Bridges via the UltraSparc IIe PCI Bridge
- 2 Secondary Fabric Board Burst Bus Bridges via the UltraSparc IIe PCI Bridge
- 8 Primary Fabric Board Nantucket ASICs via two Burst Bus Bridges
- 8 Secondary Fabric Board Nantucket ASICs via two Burst Bus Bridges
- Primary and Secondary Fabric Board Flash and Backplane EEPROM via the Burst Bus Bridge.

Data Flow

The following describes the data flow of unicast, Multicast and IP packets through the major modules of the Nantucket ASIC:

- Receives serial input from Coronado at 500MHz
- Outputs 4 bit parallel data at 125MHz to the Data Port Input module
- Separates the 4 bit parallel input from the XyPhy input module into data and control streams.
- Send 192 bit data chunks to the Memory Manager module.
- Send chunk present, start of packet (SOP) and coupons to the Packet Chainer module.

The Packet Chainer Module performs:

- Processes incoming packet chunks from the Data Port Input module.
- Sends SOP, chain ID and packet type (unicast or multicast) to the Queue Manager module.
- For unicast and uP packets, decode the QID and pass the QID to the Queue Manager module upon EOF.
- For multicast packets, decode the QID and pass to the Queue Manager module upon EOF.

The Queue Manager Module performs:

- Enqueues packets controlled by the Packet Chainer module, links the chain to the unicast queue or copy the packet head pointer into multiple multicast fifos.
- Dequeues packets controlled by the Calendar Manager module from one of 512 unicast queues or one of 16 multicast queues.
- Generates four paycheck messages for each physical port every 32.7 us denoting if measured queue depth is above or below the pay threshold values.
- Generates a per physical port coupon message every 2us to the ingress Coronado denoting if measured queue depth is above or below the coupon threshold value.

Calendar Manager Module

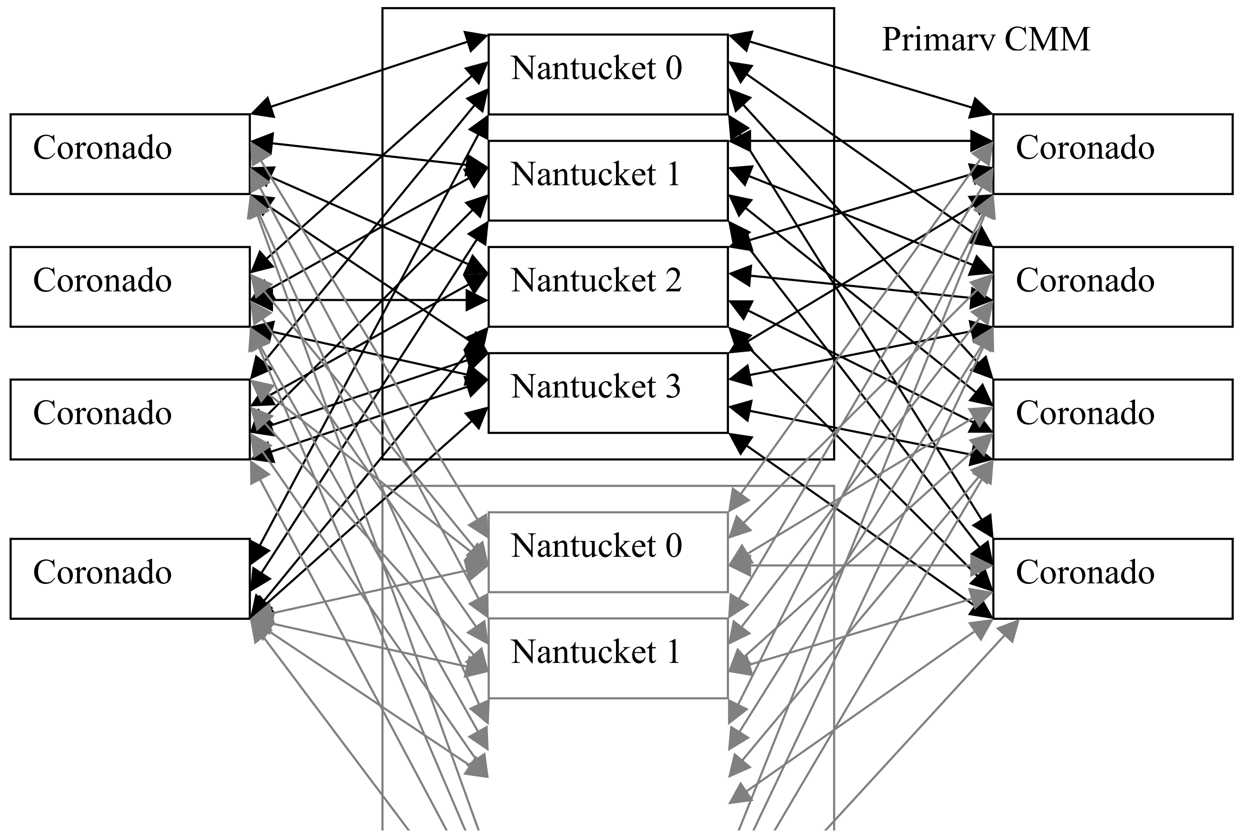
- Generates dequeue requests to the Queue Manager module with priorities of uP packets highest, multicast packets second highest and unicast packets lowest.
- Request dequeues from 512 unicast queues by sending a QID.
- Request dequeues from uP queue by sending FIFO ID.
- Calendar for a Coronado with 24 10/100 ports would be: 0,1,2,3,4,5,6,7,8,9,...,23.
- Calendar for a Coronado with 12 10/100 ports and 1 Gigabit port would be:0,1,0,2,...9,0,10,11,12.
- Memory Manager Module
- Interfaces between the six SRAMs (32x11264 words) and the data ports.
- Assigns packet chunks to free buffers.
- Queues buffer pointers in per-port queues.
- Returns free buffers to the free buffer list.

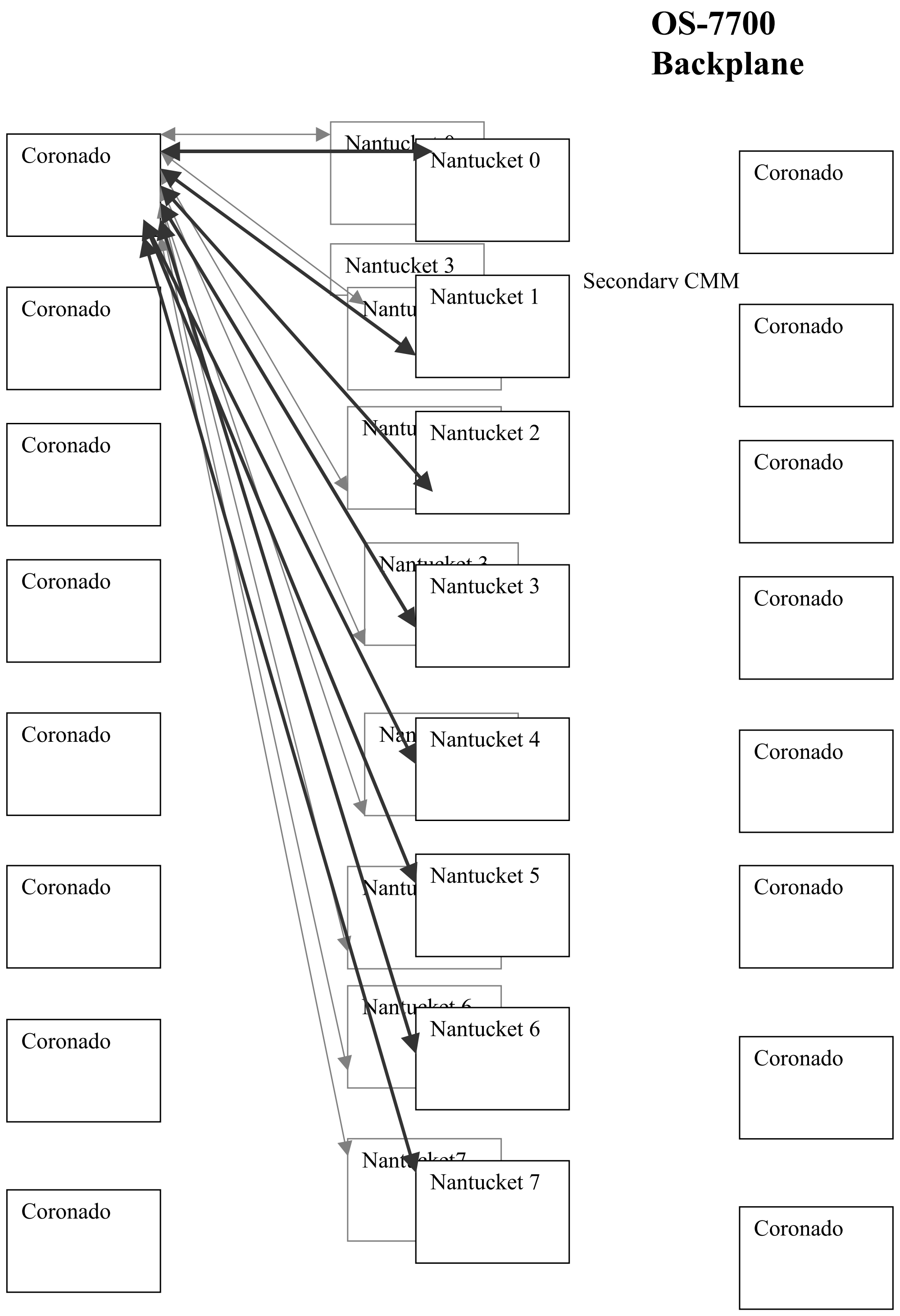
Data Port Output Module

- Combines data and control streams into nibble wide output.
- Transmit to the XyPhy Output module (B09) at 125MHz.
- XyPhy Output Module
- Serializes nibble wide input from the Data Port Output module (B08).
- Transmits serial output at 500MHz.

Nantucket Redundancy

- The Redundant/Secondary Fabric Board Nantucket ASICs initialize at startup and initialize prior to any Primary Fabric Board failures.
- The Nantucket software monitors and detect Primary Fabric failures which includes Fbus link failure, no frames received, no backpressure/paychecks received, no calendar pointers are updated, etc.
- When a failure condition is detected that requires switchover to the Secondary Fabric, the Nantucket software writes to a register to cause the primary/secondary signal to the Coronado to transition to'0'.
- This will simulate to the Coronado the Primary Fabric being removed.
- The Coronados detect the primary/secondary deasserted signal and perform the failover procedure.
- The method allows all Coronados to switchover at that same time.


Primary CMM
Nantucket 0
Nantucket 1
Nantucket 2
Nantucket 3
Nantucket 0
Nantucket 1
Coronado
Coronado
Coronado
Coronado
Coronado
Coronado
Coronado
Coronado



Every Coronado is connected to Primary CMM and secondary CMM with all the Nantuckets. Maximum of 16 connections to Coronado can exist on each Coronado.

OS-7800 Architecture

Roma

Each Fabric Module is based on two Roma ASICs, which provide the store-and-forward switching fabric function for the OS-8800 product. The Roma ASIC is bit-sliced; a group of eight Roma ASICs operates together as a single synchronized fabric. A total of four Fabric modules are required to build a complete Fabric in the OS-8800 system. An optional fifth Fabric Module may be used for fabric redundancy. In a group of eight Roma ASICs, there is always one master and seven slaves. These ROMA ASICs are located on Switch Fabric Modules at the rear of the chassis.

The SFM module consists of two identical fabric slices. Each fabric slice consists of one Roma ASIC. There is also a bridge FPGA that interfaces the on-board ASICs to the CMM modules through the BBUS management bus. Major SFM elements are the following:

- Two Roma ASICs
- One Bbus FPGA
- One DC-DC Converter
- Reset Circuitry
- Clock Circuitry
- Power Fail Detect/ Uncontrolled Power Failure Circuitry

Following is the fabric hardware environment:

- The Roma-based fabric always operates using a set of eight Roma ASICs
- The eight operational Roma chips must be numbered according to bit slice position
- An additional two hot-standby Roma ASICs can provide for fabric redundancy
- Two Roma ASICs per separately insertable card, five fabric slots per Eagle chassis
- 64 fabric ports per Roma ASIC (supports up 64 Coronado ASICs or 16 Calais ASICs)
- Support for any architecturally coherent combination of Coronado and Calais ASICs
- 512 logical ports per system corresponding to Roma queues (maximum)
- 384 physical ports per system corresponding to Roma unicast queues (maximum)
- 64 IPC queues per system (maximum)
- 64 multicast FIFOs per system (maximum)
- 24 physical ports per NI slot (maximum)
- Calendar mechanism for dequeuing unicast and multicast frames
- Multicast (VLAN) vector table for multicast propagation control
- Greater than 500 MHz raw link rate per fabric port (each direction)
- 2.4 Gbps per Coronado
- 10 Gbps per Calais (or equivalent replacement hardware)
- Four paycheck levels to support flow prioritization

- Separate paychecks for multicast
- Generates ingress coupons, receives egress coupons for backpressure capability
- Ingress coupon generation period: ~2 microseconds
- Paycheck generation period: 32.125 microseconds
- The BBUS provides access to individual Roma chips based on a chip index number

Functional Description

The Roma Driver's primary responsibilities are to initialize, monitor, and support the central component of the Eagle switch/router's switching fabric system: a set of up to ten Roma ASICs, with exactly eight operational during fabric operation.

The operational fabric consists of 8 slices for each connected Coronado ASIC (these 8 slices correspond one-to-one with the 8 operational Roma ASICs). The fundamental logic for packet switching through the fabric is contained in 5 basic architectural components:

- Link Control
- Calendar
- Multicast Vector Table
- IPC Mapping
- Flow Control

Link Control

This establishes that Roma-Coronado communication is working on each link and is aligned across the 8 fabric bit slices.

Calendar

Each fabric port has a calendar of unicast and multicast egress destinations for the corresponding Coronado. There is a limited ability to designate dequeuing frequency for some destinations, affecting the egress bandwidth allocated to destinations. During a given cycle of the Primary Cycle, a single calendar entry for each fabric port is processed (in a specified order). During other cycles, other calendar entries are processed. IPC packets are given absolute priority, so there are no calendar entries for IPC.

Multicast Vector Table

Indicates multicast domain membership for fabric ports. On fabric ingress, frames are put into a given fabric port's multicast FIFO based on this vector.

IPC Mapping

On ingress, Coronado IPC QIDs are identified based on agreed upon values (for Roma the values are selected from offsets 12 through 15). On egress, an internal Roma table maps IPC QIDs to fabric ports (one-to-one).

Flow Control

Coupon and paycheck thresholds are set for unicast and IPC queues (multicast is limited by Coronado for fabric ingress). These thresholds are used to generate ingress backpressure and paycheck messages. Each Roma ASIC participating as an operational bit slice is responsible for 2 NIs according to the scheme: bit slice n is responsible for NI slots 2(n+1) and 2(n+1)-1. Bit slices are zero-based (0 - 7); NI slots are one-based (1 - 16).

In order to support basic system operation, the Roma driver must maintain the correct destination port mapping on the Roma ASIC chips, including any required multicast and IPC port mapping; appropriate internal flow control thresholds should be maintained as well. These form a small but significant part of the initialization process and the Roma driver needs to adapt in case of changes to NI slot configuration. However, the high level sequencing and selection of Roma Driver activity is mostly a function of a set of external events, most of which can be termed “hot swap” events. The following 10 scenarios represent high-level states for the Roma Driver which correspond to its handling of some kind of major.

Initialization

This state is entered when the Roma Driver is first spawned as a task on the primary CMM. Early on, the fabric slot and NI slot configuration must be completely determined to effectively program the Roma ASICs. An overview of the ASIC setup follows:

- Bit Slice oriented setup - includes programming chip IDs and master chip selection.
- Fabric Port setup - includes calendar, flow control, and multicast vector setup
- Synchronizing Roma chips - includes starting primary cycle and timer resets
- Manual link acquisition - verify that all links are up, includes retries
- Automatic HW recovery mechanism setup - includes link acquisition and hot swap
- During switch operation, this is the state that the Roma Driver will be in the vast majority of the time. Remaining in this state implies there are no changes to: physical Fabric slot configuration, NI slot configuration, the primary CMM slot, or detected framing errors. Processing in this state consists of an infinite loop where the following tasks are performed:
- Respond to interrupts and use low intensity poll for backup
- Check messages for updates to multicast vector and board changes
- Synchronize the multicast vector shadow table when 2 CMMs are present
- Maintain statistical counts and rates

Fabric Slot Insertion

This state assumes that four operating fabric slots are currently occupied. The state is entered when a fifth fabric card is inserted into the remaining available slot. This card should not disturb the operational fabric, and it will assume the role of redundant fabric card.

Fabric Slot Extraction

This state assumes that there are five fabric slots occupied, with one fabric card serving as the redundant card. Roma Driver will have already set up the operational Roma chip set to use built-in hot swap handling. Upon extraction of fabric card, most of the hot swap handling is done by Roma ASIC logic. The performs the following tasks when a fabric card is removed:

- Recover the new fabric slot set state since the operational fabric may change.
- Report fabric slot states to Chassis Supervision.
- Change hot swap settings on the master since a standby slot is no longer present.
- On operational fabric set changes, update flow control settings.

NI Slot Insertion

When a new NI card is inserted, Roma Driver will attempt to disturb existing fabric traffic as little as possible. The following tasks are performed: Remove perpetual coupons for NI.

Setup Calendars and Flow Control for New NI

- Restart Calendar Manager.
- Enable transmit and take internal blocks out of reset for NI.
- Acquire links to all Coronados on the NI.

NI Slot Extraction

When an NI card is extracted, Roma Driver performs the following tasks:

- Set perpetual coupons to drain traffic for NI.
- Disable transmit and put internal blocks in reset for NI.
- Remove auto link acquisition mechanism for NI.

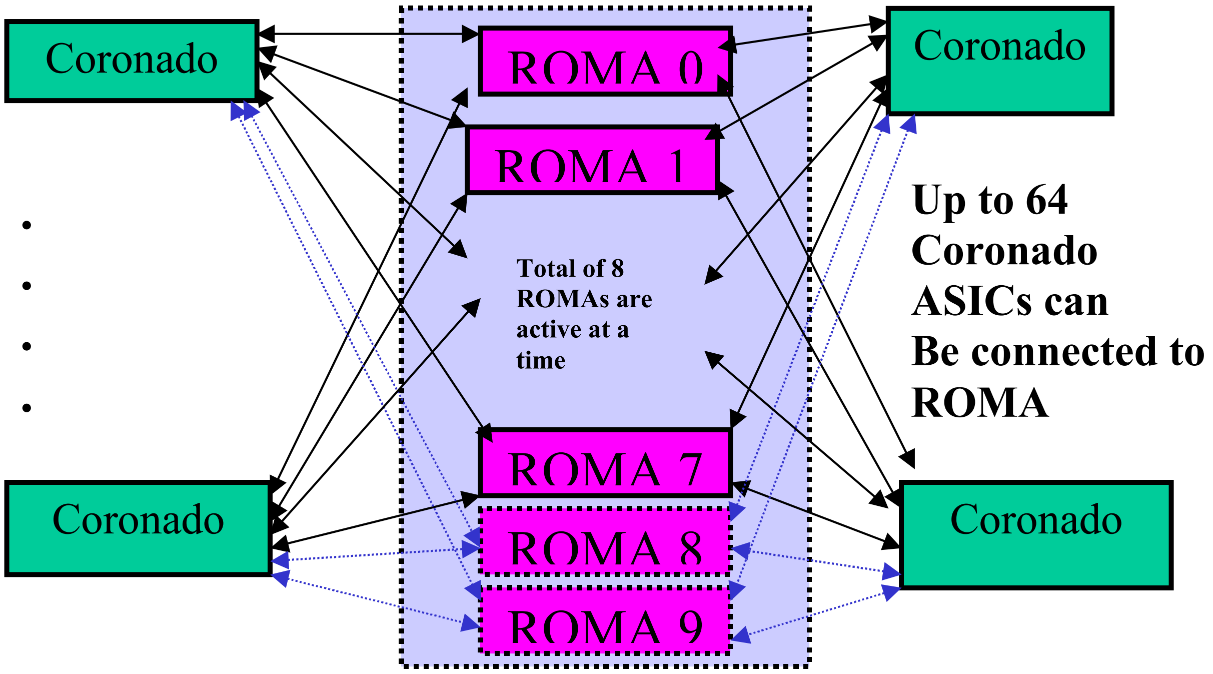
CMM Takeover and Hot Swap

Following a good takeover or CMM hot swap, the primary objective of the Roma Driver is to disturb the Roma ASICs as little as possible. If the takeover results in an irrecoverable fabric-related failure, the driver attempts to detect this condition and execute a “reload all” to the chassis. The following tasks are performed:

- Recover the new fabric slot set state since it is unknown to the secondary driver.
- Monitor the Roma ASIC registers to detect fatal error condition.
- Send reload all message to chassis supervision if fatal error detected.

Framing Error

The Framing Error event represents an event where the Roma ASIC detects an error in a packet header on ingress. Since this will potentially corrupt the buffer system, a free list rebuild is required when this is detected.


Coronado
Coronado
ROMA 0
ROMA 1
Total of 8 ROMAs are active at a time
ROMA 7
ROMA 8
ROMA 9
Coronado
Coronado
Up to 64 Coronado ASICs can Be connected to ROMA

OS-8800 Switching Fabric

Chassis Management Module (CMM)

Chassis Management Module (CMM) controls the major functionality and synchronization between two different components in the distributed architecture. The main responsibilities of the CMM for both OS7XXX and OS8800 are the same:

- Booting up all the modules in the chassis.
- Downloading the customer specific configurations on the NI.
- Synchronization of the fabric modules
- Power distribution
- Switch diagnostics
- Important availability features, including redundancy (when used in conjunction with another CMM), software rollback, temperature management, and power management.
- Providing access to the switch through Command Line Interface (CLI), Web management and SNMP
- Provides an out of band Ethernet Management Port (EMP)

OS7000 CMM

The CMM for OS7000 contains the following:

- System Processor
- Ultra Space 11e (400MHz)
- 64MB SDRAM Memory
- Switching Fabrics
- 4 Switching fabrics, Nantucket, in OS-7700
- 8 Switching fabrics, Nantucket, in OS-7800
- Management
- DB-9 console/modem Port
- RJ45-Out of Band 10/100 LAN Port
- Reset Switch
- Hot Swappable
- Up to 2 CMMs per chassis
- Management redundancy
- Switching Fabric Redundancy

OS8800 CMM

The CMM for OS8800 contains the following:

- System Processor
- Ultra Space 11e (400MHz)
- 64MB SDRAM Memory
- Management
- DB-9 console/modem Port
- RJ45-Out of Band 10/100 LAN Port
- Reset Switch
- Hot Swappable
- Up to 2 CMMs per chassis
- Management redundancy

Functional Description of CMM

Software and Configuration management is implemented in such a way to provide the operator with:

- Flexibility
- Resiliency
- And to minimize the service interruption during the update of a network.
- 2 Software versions are stored into flash:
- 1 working version: operational release, used for upgrades.
- 1 certified version: operator validated trusted release.
- Automatic rollback from the working version to the certified version in case of failure of the working version.
- Possibility to certify a version when the operator has considered its behavior acceptable
- All of the files making up the "working" software release must be contained in "/flash/working" directory.
- All of the files making up the "certified" software release must be contained in "/flash/certified" directory.
- The "boot.params" file stored in "/flash" is the configuration file that contains the system boot parameters as well as the Image Rollback variables. The two software releases use the same boot parameters and Image Rollback variables.
- New software version can be activated by loading the images in "/flash/working" and rebooting the switch in working directory using the command "reload working no roll-back timeout"
- A running "working" version can be certified any time after the "working" version is loaded and verified.
- The configuration file of a certified software version cannot be modified while working with "certified" version.
- If the working version is certified and the switch is rebooted or reboots for any other reason, it will boot up in the new certified version.
- If the working and certified versions of code as well as configurations are completely synchronized the switch will boot up in certified directory but the running directory will be set to "working". This flexibility allows to modify configurations and save them. Certification of the new configurations will be required to save the configurations in certified directory.

CMM Software Startup Process

CMM startup process consists of the following steps:

- Boot ROM
- Vx Works Flash File System
- MiniBoot

AOS

Boot ROM

- Sparc Processor executes the Sparc Boot ROM code from flash Memory in the protected memory.
- Performs minimum diagnostic tests of the Sparc Processor
- Verifies memory used by Sparc Processor is fine
- If the diagnostic tests find an error, the CMM/Fabric LED will flash to indicate the error and the processor will retry to boot.
- Boot ROM is not field upgradeable
- Boot ROM image contains:
- Access to Flash File System (FFS)
- Zmodem
- IP stack for EMP Port
- FTP code

Note. Sparc Boot ROM loads the miniboot from the FFS in non protected area of the Flash Memory.

MiniBoot

MiniBoot contains VX Works Operating system

Performs the following tasks:

- Post Mortem Dump (PMD) Processing to save as much diagnostic as possible in the FFS after a system crash.
- Hardware diagnostics to determine if all the boards are operational at boot time.
- Image Rollback to select either the current uncommitted (working) software release or the previously-committed (certified) release.
- Loads the VX Works and passes the control to VX Works
- On error, the miniboot returns to the “Boot ROM” step to allow the user to load new software into the flash memory.

AOS Start

AOS executes to initialize and start up the system based on the command file which contains:

- Socket Send mechanism: allows sending messages to all CMM and NI processors in the Falcon
- The System services fault management code
- The System services timer facility
- The chassis manager
- Specific services like telnetd, ftpd, cli and snmp

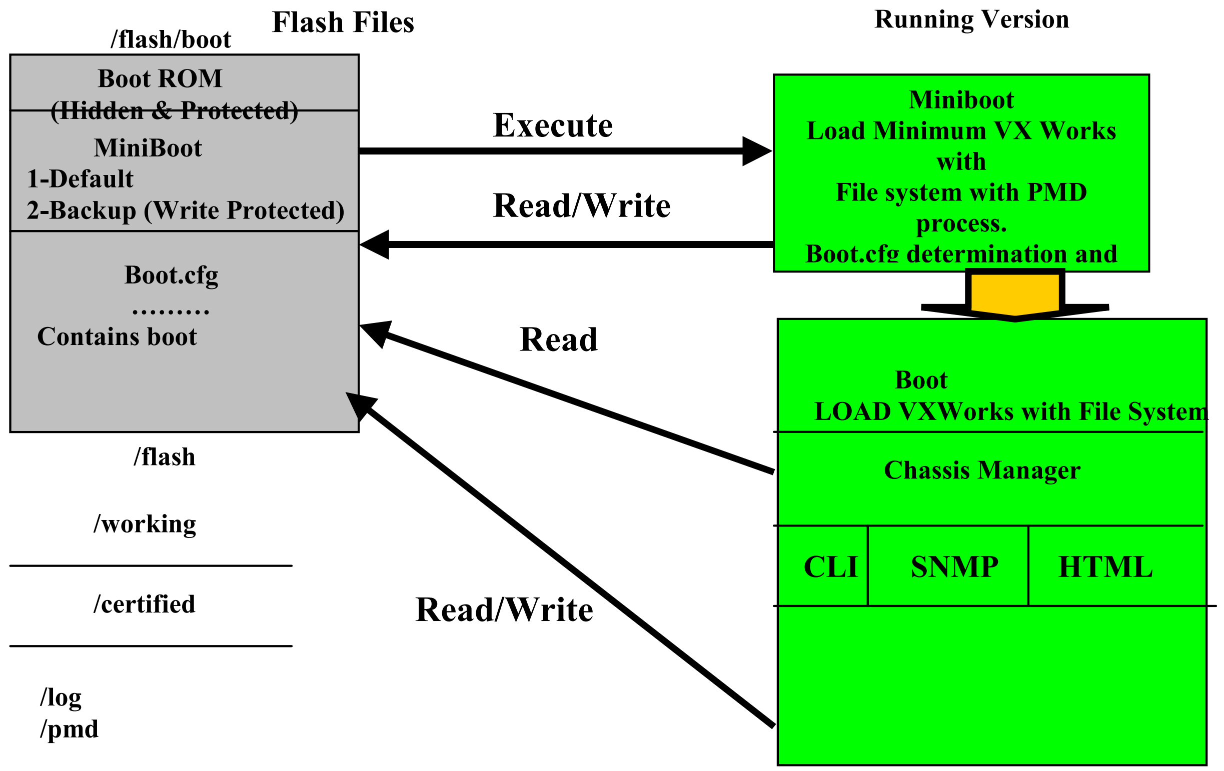
Chassis Manager Component of System Services

- Discover the number of slots, daughter boards, power, temperature and other environmental factors
- Discover the NI boards
- Discover the primary/backup processor status of CMM. If secondary then does not load NI boards and all processes are started in secondary mode.
- AOS startup code selects the modules to load from the FFS.
- After starting all services System Services Fault Manager acts as a “health monitor” and exchanges messages with objects in the system to make sure they are working properly.

CMM Reload of NI Module

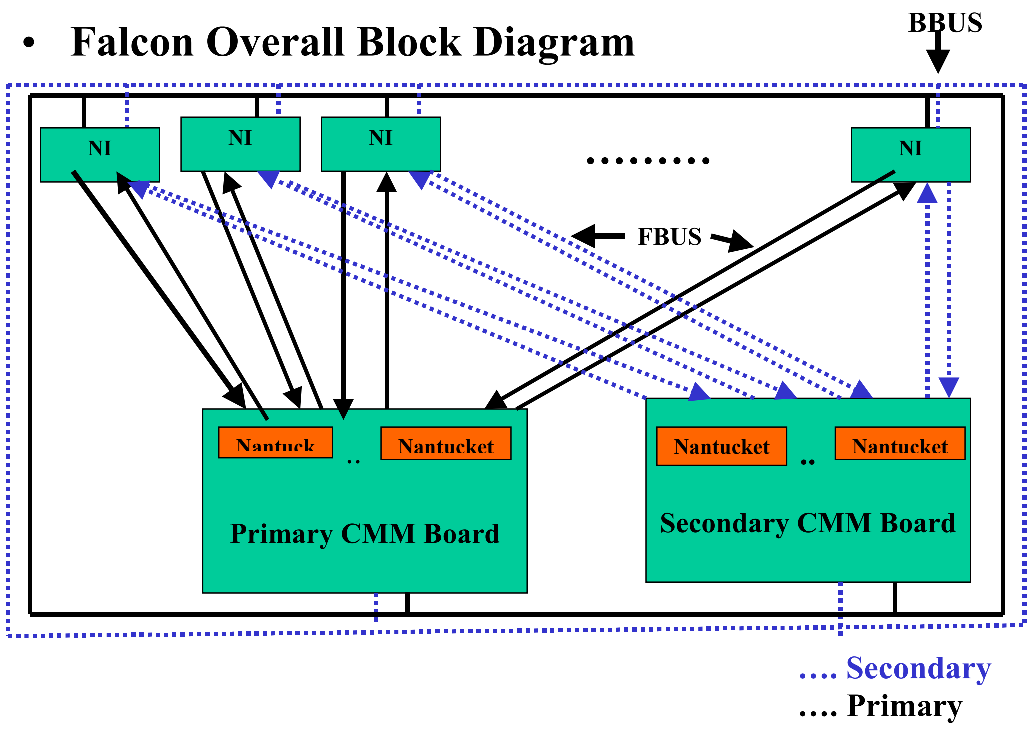
CMM reloads the NI when:

- CMM Chassis Manger detects a board that does not have the images loaded.
- User enters explicit command to reload the NI.
- CMM fail over happens and the configurations/images were not synchronized between Primary and Secondary CMM.


Flash Files
/flash/boot
Boot ROM
~~(Hidden & Protected)~~
MiniBoot
1-Default
2-Backup (Write Protected)
Boot.cfg
………
Contains boot
/flash
/working
/certified
/log
/pmd
Running Version
Miniboot
Load Minimum VX Works
with
File system with PMD
process.
Boot.cfg determination and
Execute
Read/Write
Read
Read/Write
Boot
LOAD VXWorks with File System
Chassis Manager
CLI
SNMP
HTML

Software Management
Command Fos
Configuration Save
Version Activate
Version Restore
Version Certify
Version Query

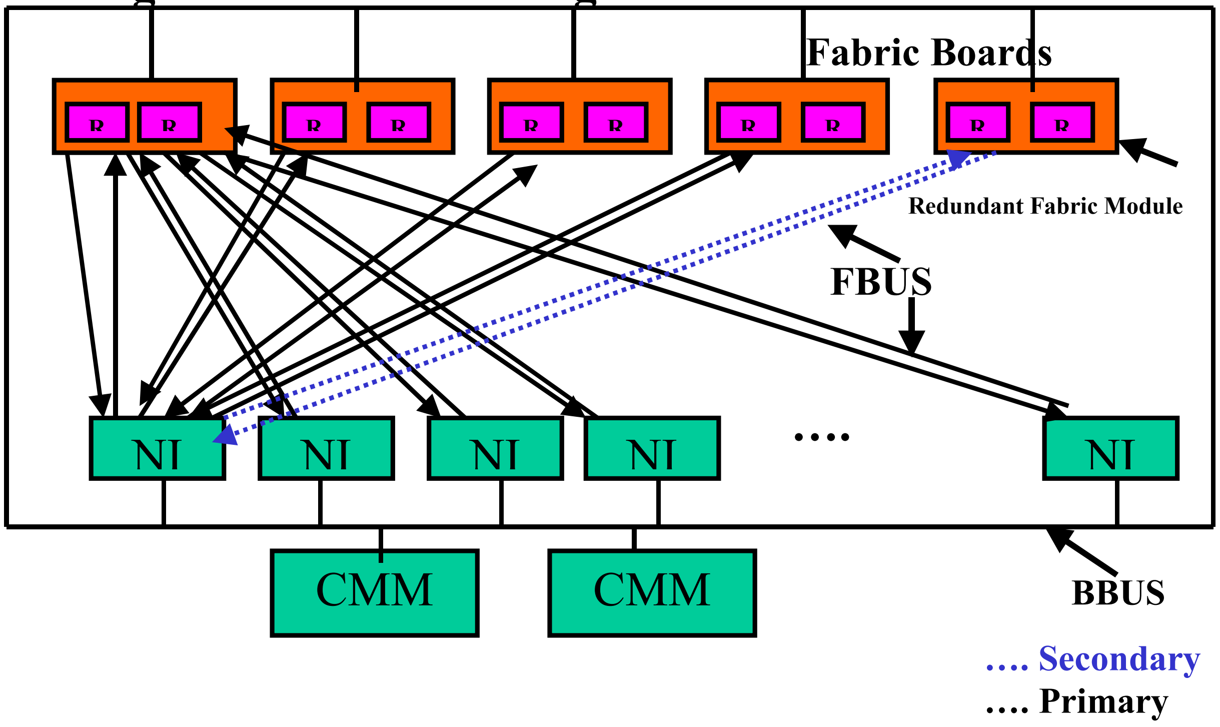
- **Falcon Overall Block Diagram**



Overall System Architecture

- Fabric resides on CMM
- Number of Nantuckets can be 4 or 8 depending on the chassis
- Fabric Bus is connected to the CMM as well as to the All NI
- Burst Bus (BBUS) is connected to all the NI from the CMM
- CMM and Switch redundancy fail-over simultaneously
- Up to 16 Coronados can be connected to each Nantucket

- **Eagle Overall Block Diagram**



- Fabric resides independent of the CMM. It resides at the Back of the Chassis. CMM can fail over independent of Switching Fabric and vice versa.
- Minimum of 4 Switching Fabric Modules (SFM) with 8 ROMS chips are required to operate. The additional SFM provides (4+1) redundancy.
- FBUS is not connected to the CMMs
- BBUS is connected to both the CMMs and all the NI in the chassis including the SFMs.
- Up to 64 Coronados can be connected to each ROMA

Packet Walk

Packet Walk Principles

- All switching and routing is performed on the Ingress side of the switch. There are no address lookups made on the Egress side.
- The Coronado combines the L2 switching and L3 routing logic into the same ASIC.
- Data always flows through the Nantucket even if the source and destination ports are on the same Coronado.
- As indicated the “switching fabric” functionality is provided by Nantucket ASICs. The Nantucket ASICs set also performs part of the broadcast/multicast processing by sending copies of multicast packets to each Coronado in the system, and participates in the priority de-queuing logic.

Data Flow Overview

- Data flows in a 10/100 Mbps or Gigabit Ethernet port through the Catalina MAC ASIC and into the Coronado ASIC.
- The Coronado’s HRE-X (Hardware Routing Engine) performs CAM (Content Address Memory) look-ups on the source and destination addresses and selects a QID (queue ID) to switch the frame. The queue selection is based upon L2 or L3 switching/routing criteria plus QoS priorities. The Coronado ASIC can manage up to 2,048 queues. The Coronado could also queue up some frames for software processing by the on-chip Sparc CPU for some specific unknown packets, which requires a particular treatment.
- The Coronado’s Queue Manager then de-queues the frame from the appropriate queue based upon destination and priority. The frame is output from the Coronado into the Nantucket switching fabric.
- The Nantucket provides minimal buffering and delivers the data to the destination Coronado for Egress processing. Note that the destination Coronado can be the same Coronado or it can be different.
- The Coronado Egress processing sends the frame to the output port via the Catalina Ethernet interfaces. Notice that there is no CAM lookup processing or software processing during Egress. The Egress processing logic also handles multicast processing in cooperation with the Nantucket.

Specific Packet Flows

Unknown L2 Source, Known L2 Destination

The Catalina ASIC

Packet arrives at Catalina. CRC check done. If valid CRC it is put on XYBUS to Coronado

The Coronado ASIC

- The FIFO logic maintains queues of frames from both Xybus interfaces and selects an incoming frame for HRE processing. This FIFO is done on the on chip memory of the HRE.
- The parser logic selects fields from the frame to identify the protocol and find key values that are used by the HRE for lookups (DA, SA)
- Coronado does a L2 SA pCAM lookup.
- Coronado determines this is an unknown source due to failed lookup in L2 SA table.
- Since the SA is unknown, there is no pCAM entry, so the default Group ID (VLAN) is used
- If the port is secured then the frame is not forwarded
- The packet is requeued to NI SPARC, for software processing.
- Software creates an entry into the L2 SA table with packet's mac address and Group ID
- Coronado checks for special L2 DA (ARP, STP, IGMP, IPMS, Router)
- Since the frame is known is present in the L2 DA table for that NI, the L2 entry provides the destination QID as well as the PDI (internal priority).
- Access the PDI and select internal priority.
- Enqueue the data to the final QID. The QID determines the destination port, priority and bandwidth.
- Coronado's queue manager dequeues the frame based upon destination and priority. The frame is output from the Coronado into the Nantucket switching fabric via the FBUS.

Note. The Queue Manager will alternately dequeue the Multicast and Unicast Queues.

The Nantucket ASIC

The Nantucket provides minimal buffering and delivers data to the Coronado for egress processing.

The Coronado ASIC

- The Coronado receives the packet via the FBUS.
- The Coronado then strips the 802.1q header that was added on ingress, if needed.

The Catalina ASIC

- Packet is then put on to the Xybus to be received by the Catalina.
- Catalina Egress will generate the CRC and regulate the packet framing including the interpacket gap.

Unknown Destination

Known L2 Source, Unknown L2 Destination

The Catalina ASIC

Packet arrives at Catalina. CRC check done. If valid CRC it is put on XYBUS to Coronado

The Coronado ASIC

- The FIFO logic maintains queues of frames from both Xybus interfaces and selects an incoming frame for HRE processing. This FIFO is done on the on chip memory of the HRE.
- The parser logic selects fields from the frame to identify the protocol and find key values that are used by the HRE for lookups (DA, SA)
- Coronado does a L2 SA pCAM lookup.
- Coronado determines this is a known source and retrieves Group ID.
- Coronado checks for special L2 DA (ARP,STP,IGMP,IPMS,Router)
- Coronado performs L2 DA pCAM lookup based on Group ID.
- Because the L2 DA is unknown on that NI, the lookup fails.
- Coronado sets the QID to the flood queue, and the PDI to the unknown_DA and ReQId is set to Software queue for unknown_DA. 802.1Q header is added.
- Enqueue the data to the final QID. In this case the QID is 511. The QID determines the destination port, priority and bandwidth.
- Coronado’s queue manager dequeues the frame based upon destination and priority. The frame is output from the Coronado into the Nantucket switching fabric via the FBUS.
- Note the Queue Manager will alternately dequeue the Multicast and Unicast Queues.

The Nantucket ASIC

- The Nantucket sends the packet to all egress Coronados, that have the bit set in the VLAN flood vector for this Group ID.
- The Nantucket provides minimal buffering and delivers data to the Coronado for egress processing.

The Coronado ASIC

- The Coronado receives the packet via the FBUS.
- The Coronado then strips the 802.1q header that was added on ingress, if needed.

The Catalina ASIC

- Packet is then put on to the Xybus to be received by the Catalina.
- Catalina Egress will generate the CRC and regulate the packet framing including the interpacket gap.
- The above delivers the first few packets of a flow that has an unknown destination via the flood queue.

Traffic is Being Passed; the Switch is Attempting to Put a Correct L2 DA Entry on the NI

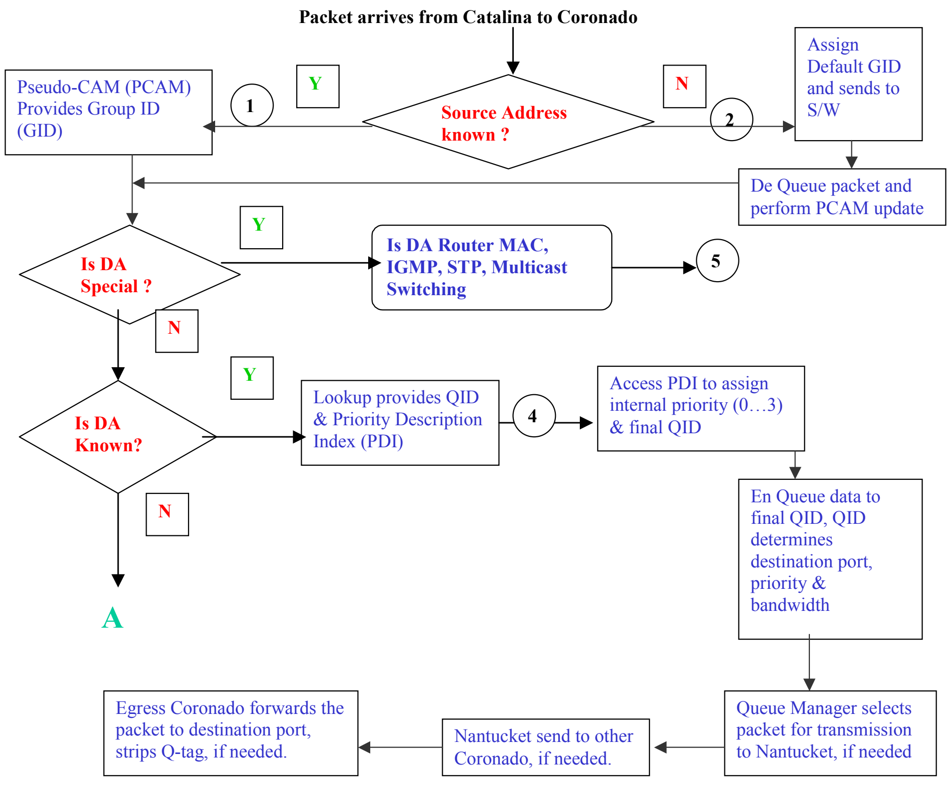
The Coronado ASIC

- Ingress Coronado sends IPC messages to all active Coronados on the BBUS inquiring about the destination address. All the active Coronados look into their L2SA table and if they have a matching entry then they sends the Group ID, Mac address, QID, PDI, and request for additional L3/L4 lookups to the Ingress Coronado.
- Once this information is put into the L2 DA table of the ingress Coronado, the packets are processed as a known DA and are no longer put on the flood queue.

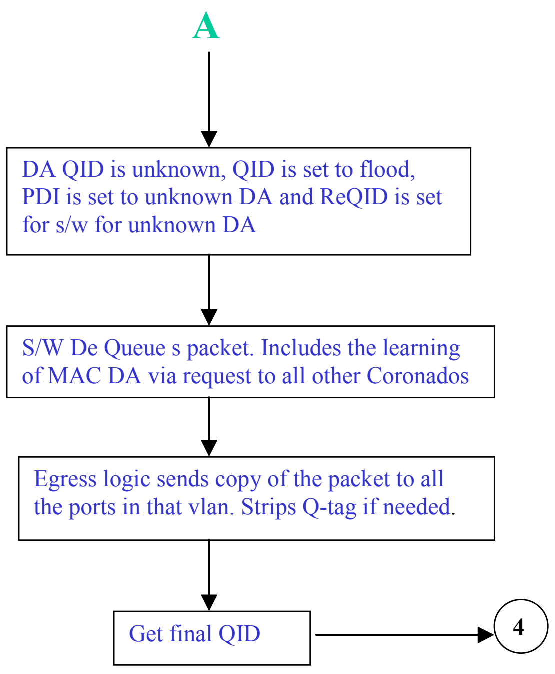
Unknown L3 DA

The Coronado ASIC

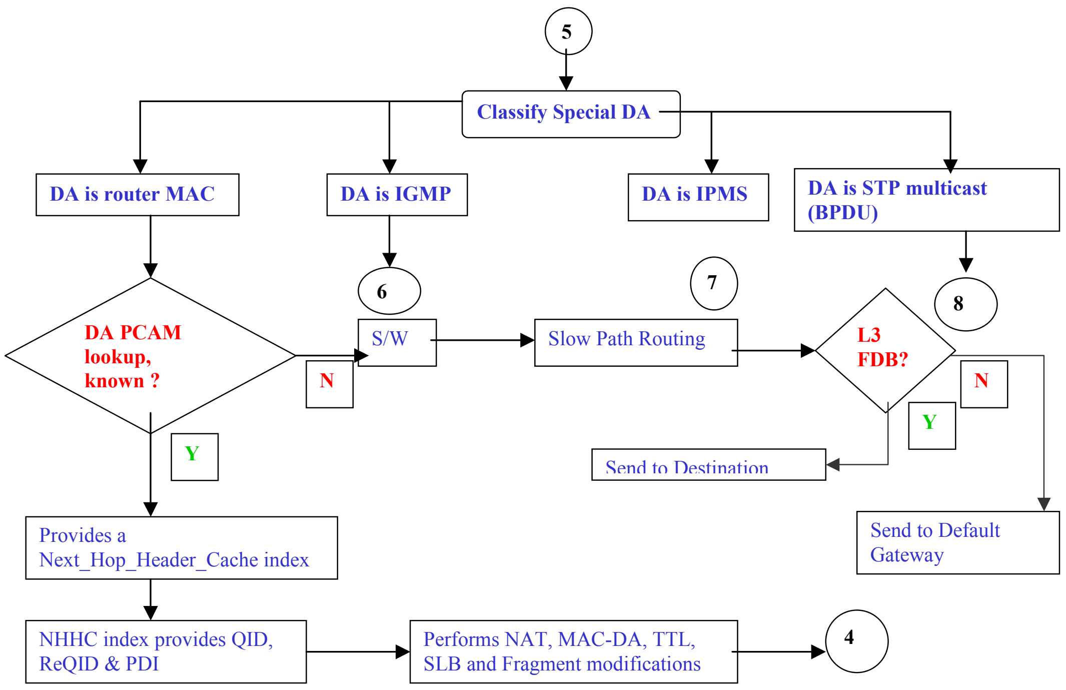
- The FIFO logic maintains queues of frames from both Xybus interfaces and selects an incoming frame for HRE processing. This FIFO is done on the on chip memory of the HRE.
- The parser logic selects fields from the frame to identify the protocol and find key values that are used by the HRE for lookups (DA, SA)
- Coronado does a L2 SA pCAM lookup.
- Coronado determines this is a known source and retrieves Group ID.
- Coronado checks for special L2 DA (ARP,STP,IGMP,IPMS,Router)
- This lookup matches a Router, therefore routing is needed.
- Coronado performs L3 DA address lookup.
- This lookup fails and the packet is requeued to the software on the Sparc. (Slow path)
- The L3 DA is compared to the L3 FDB (routing table).
- If this lookup fails, the packet is sent to the default gateway.
- Which ever route the packet matches, the Coronado retrieves the Next Hop Router Cache (NHRC) Index for this packet.
- The Coronado uses this index, to look up the NHRC and retrieve the QID and PDI.
- The L3 DA table in the pCAM is updated accordingly with this information.
- The frame is output from the Coronado into the Nantucket switching fabric via the FBUS.


Packet arrives from Catalina to Coronado
Source Address known ?
Y
1
Pseudo-CAM (PCAM) Provides Group ID (GID)
N
2
Assign Default GID and sends to S/W
De Queue packet and perform PCAM update
Is DA Special ?
Y
Is DA Router MAC, IGMP, STP, Multicast Switching
5
N
Is DA Known?
Y
Lookup provides QID & Priority Description Index (PDI)
4
Access PDI to assign internal priority (0…3) & final QID
N
A
En Queue data to final QID, QID determines destination port, priority & bandwidth
Queue Manager selects packet for transmission to Nantucket, if needed
Nantucket send to other Coronado, if needed.
Egress Coronado forwards the packet to destination port, strips Q-tag, if needed.

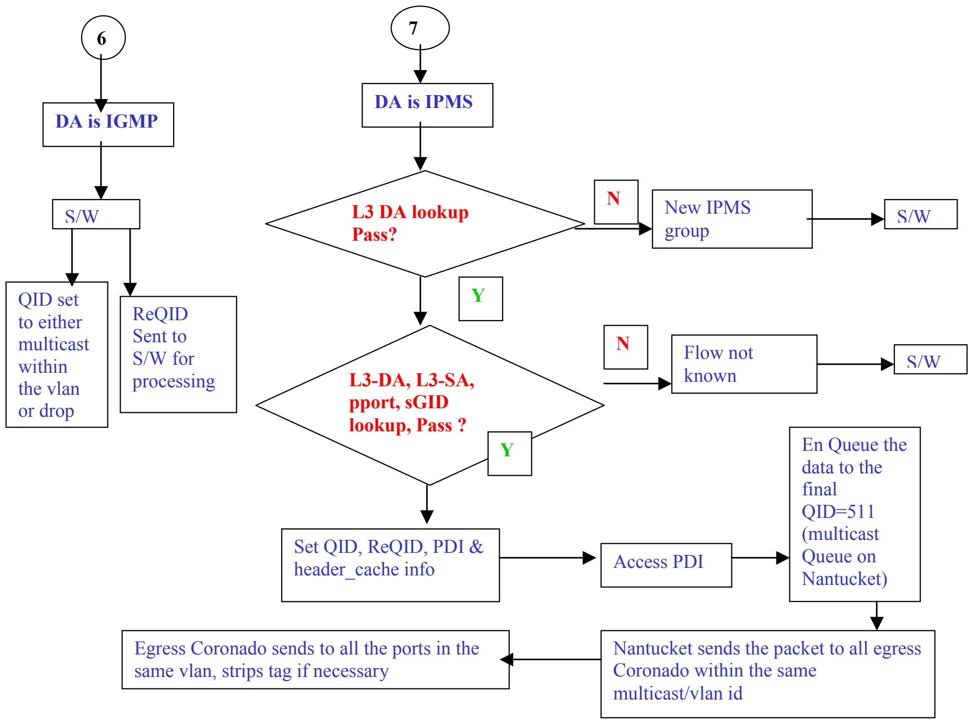
Known/Unknown SA and Known DA


A
DA QID is unknown, QID is set to flood, PDI is set to unknown DA and ReQID is set for s/w for unknown DA
S/W De Queue s packet. Includes the learning of MAC DA via request to all other Coronados
Egress logic sends copy of the packet to all the ports in that vlan. Strips Q-tag if needed.
Get final QID
4

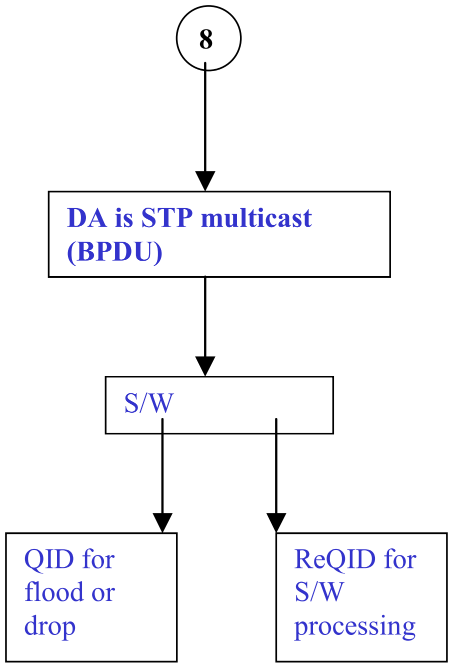
Unknown DA


5
Classify Special DA
DA is router MAC
DA is IGMP
DA is IPMS
DA is STP multicast (BPDU)
6
7
8
DA PCAM lookup, known ?
S/W
Slow Path Routing
L3 FDB?
N
N
Y
Y
Send to Destination
Send to Default Gateway
Provides a Next_Hop_Header_Cache index
NHHC index provides QID, ReQID & PDI
Performs NAT, MAC-DA, TTL, SLB and Fragment modifications
4

L3 Packet Walk


6
DA is IGMP
S/W
QID set to either multicast within the vlan or drop
ReQID Sent to S/W for processing
7
DA is IPMS
L3 DA lookup Pass?
N
New IPMS group
S/W
Y
L3-DA, L3-SA, pport, sGID lookup, Pass ?
N
Flow not known
S/W
Y
Set QID, ReQID, PDI & header_cache info
Access PDI
En Queue the data to the final QID=511 (multicast Queue on Nantucket)
Nantucket sends the packet to all egress Coronado within the same multicast/vlan id
Egress Coronado sends to all the ports in the same vlan, strips tag if necessary

IGMP/IPMS



BPDU

Hardware Buses on OmniSwitch 7700/7800/8800 Switches

Xybus

The interface between the MAC to Coronado, which is 0-1

Fbus

The interface between the Coronado to the Fabric ASIC (Nantucket or Roma). For the OmniSwitch 7700 (Falcon half chassis) it is 0-7. For the OmniSwitch 7800 (Falcon full chassis) it is 0-15. For the OmniSwitch 8800 (Eagle) it is 0-63.

Bbus

This the management bridge bus connecting the CMM sand NIs. It is a single bridge bus.

Bus Mapping on OmniSwitch 7700/7800/8800 Switches

Xybus Mapping

Each board type has own mapping, described for all existing board type below.

- **OS7-ENI-C24** and **OS8-ENI-C24**: Single slice board, connects two Catalina MAC ASICs through xybus0 and xybus1.
- **OS7-ENI-FM12**: Single slice board, connects one Catalina MAC ASICs through xybus0,
- **OS7-GNI-U2**: Single slice board, connects two Catalina MAC ASICs through xybus0 and xybus1.
- **OS8-GNI-U/C8**: Four slice board, each slice connects two Catalina MAC ASICs through xybus0 and xybus1.
- **OS7-GNI-U/C12**: Single slice board, connects two Firenze MAC ASICs through xybus0 and xybus1.
- **OS8-GNI-C24**: Two slices board, each slice connecting two Firenze MAC through xybus0 and xybus1.
- **OS8-GNI-U24**: Four slice board, Slice 0 and 2 connecting one Firenze MAC through xybus0 and Slice 1 and 3 connecting one Firenze MAC through xybus1.

Fbus Mapping

Note. Dshell commands should only be used by Alcatel personnel or under the direction of Alcatel. Misuse or failure to follow procedures that use Dshell commands in this guide correctly can cause lengthy network down time and/or permanent damage to hardware.

Falcon (OmniSwitch 7700/7800) Fbus Mapping

```
-> dshell
Working: [Kernel]->nanListMapping
```

Full Chassis (OS7800):

```
Fbus/Nan Port:   0,2,4,6,7,5,3,1,14,12,10, 8, 9,11,13,15
NI Slot:               1,2,3,4,5,6,7,8, 9,10,11,12,13,14,15,16
```

Half Chassis (OS7700):

```
Fbus/Nan Port: 0,2,4,6,1,3,5,7
NI Slot:             1,2,3,4,5,6,7,8
```

Eagle (OmniSwitch 8800) Fbus Mapping

Unlike Falcon, Eagle (OmniSwitch 8800) uses strict fbus number starting from 0 through 63.

Formula: Fbus_number = (slot_number - 1) * 4

For example, a OS8-GNI-U8 in slot 4, (4-1)*4=12. Since the OS8-GNI-U8 is a 4-slice board, Fbus number starts from 12, up to 15.

OS6624/6648 Architecture

OmniSwitch 6XXX is a stackable version of the OS7/8XXX Switches. It provides pure Ethernet switching for 10/100 and Gigabit ports, along with stackability.

The key features of OmniSwitch 6XXX are:

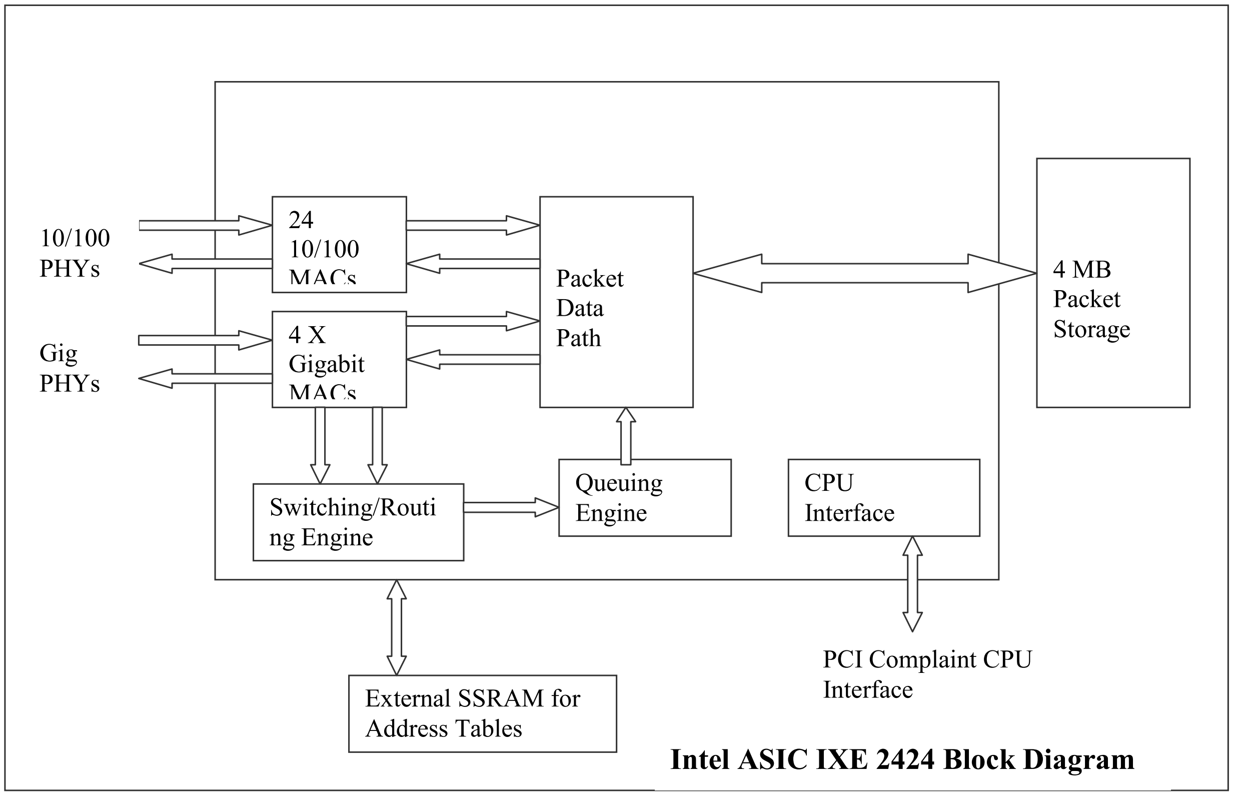
- ELEMENT - One Standalone HAWK Unit (1 or 2 Intel Devices)
- Module - Insertable modules (Gigabit copper, fiber, or stackable)
- SLOT - Software numbering of an element
- Virtual Chassis - a stack of Hawk units (max stack =8)
- GARP - Generic Attributes Registration Protocol - A generalized protocol, defined in IEEE802.1p, for signaling between workstations and the network.
- GMRP - GARP Multicast Registration Protocol - a version of GARP, which allows devices to request membership in a specific multicast group. Part of the IEEE802.1Q/P, cited by Alcatel Enterprise QOS requirements.
- GVRP - GARP VLAN Registration Protocol - a version of GARP, which allows devices to request membership in a specific virtual LAN.
- IGMP - Internet Group Management Protocol, Version 2. The Hawk “snoops” this protocol to determine which ports should receive copies of multicast packets.
- IP Multicast - data packets sent from an IP host and intended for reception by a number of IP destination hosts. IP multicast frames have a Class D address in the 224.0.0.0 to 224.255.255.255 range. Each address refers to an individual “broadcast stream” rather than a destination host. IP multicast was originally implemented using Ethernet multicast MAC addresses and was received by all hosts on the LAN.
- SFP - Small Form Factor Pluggable - Small form factor Fiber Gigabit connectors.
- Group Mobility - Alcatel Proprietary Protocol based VLAN
- Spanning Tree- Both 802.1D and 802.1W
- QOS
- Routing- Local, Static, RIP (2) and OSPF
- Link Aggregation
- 802.1Q
- Authenticated VLANs
- UDP/Bootp Relay
- Redundant Management when stacked

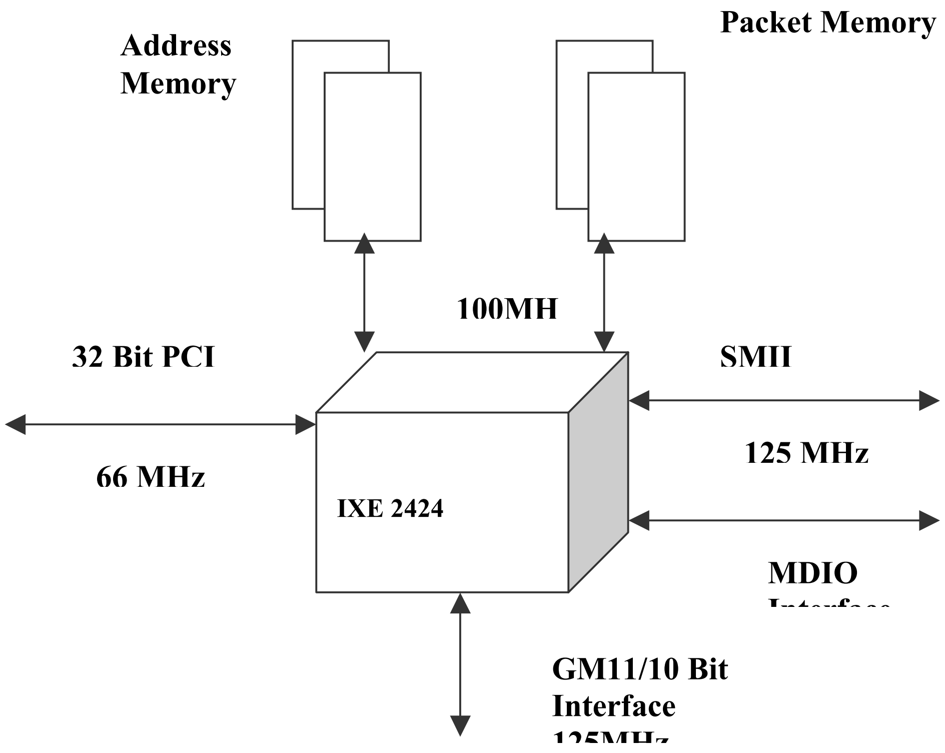
Hardware Architectural Overview

OS6600 uses off the shelf Intel ASIC. Intel IXE2424 Switching ASIC is used to implement the required functionality.

The key features of Intel IXE2424 are:

- Provides 24 10/100 FE ports and 4 GE ports.
- L2 and L3 switching
- Integrated FE and GE Macs
- L2/L3/L4 Prioritization16K MAC, 16K IP, 8K IPX, 4K VLAN Tables, IEEE 802.1s
- Multiple Spanning Tree IEEE 802.1v VLAN Classification by Protocol





External Interfaces to IXE 2424

Layer 2 Forwarding

- Packets enter the IXE2424 through the SMII & GMII/TBI pins from external PHY devices. First, the MAC associated with the port the packet was received from processes the packet. The MAC checks the CRC to see if the packet is valid and also updates appropriate receive packet port statistics.
- In parallel, two things happen next.
- The entire packet is stored in external packet memory and
- The 64 byte packet header is sent to the address resolution logic (ASIC)
- External packet memory contains dedicated memory space for each port. The system processor (via the Memory Start and Depth Address Registers) configures this address space at power up.
- The packet headers are queued, on a per port basis, before being placed in the processing pipeline. The headers are examined for errors (i.e. length field, legal MAC address etc). The header is then examined for
- Presence of prepend word
- Ethernet frame format
- Protocol carried
- Presence of VLAN tag

The Next step is address resolution. Note some packets like BPDU, GARP, LACP etc, bypass address resolution and are passed to CPU for further processing.

Address Resolution Protocol

The IXE2424 switches packets based on flow. For Layer 2 packets, the IXE2424 identifies the flow using 802.1Q VLAN tag and Source and Destination Ethernet addresses. For IP addresses, the flow can be identified by the Source and Destination IP addresses, the protocol carried by the packet, and Source and Destination Socket numbers. The flow entries are created in the software using the Address Resolution Task provided by Intel's driver software.

The Address Resolution task registers with the Notification Manager to be notified when an unresolved entry is received. The Notification Manager function running in the Interrupt Handler context wakes up this task upon receiving an unresolved entry. The Address Resolution task contains functions for learning addresses. The Address Resolution task checks the unresolved queues for new entries and uses the CAM interface to add new addresses to the table. An entry is created for the address with default settings. The task sends an event through the Event Manager indicating that a new entry has been created. The Configuration Management task waits on this event and with an occurrence, processes the newly added address, and applies any special properties configured for that address.

Address Learning

Address Learning in the IXE2424 is performed primarily in the software. The hardware provides a CAM interface to facilitate fast learning of addresses.

On power-up, the switch does not know which addresses are associated with which ports. So, when the switch receives the first packet, the source address lookup fails. This packet is considered source and destination address unresolved and is sent to the CPU for address learning. The CPU is interrupted indicating that an unknown address has been received.

The Address Resolution task that is provided as a part of the driver registers for such an event with the event manager. This task wakes up, processes the unknown address and creates an entry for the address. An event is then sent through the Event Manager and wakes up the Configuration Management task. The configuration task goes through the list of rules and if the address matches any of the configured rules, those rules are applied to the new learned address.

For destination unresolved packets, the packet is broadcast on all other ports within the VLAN and a destination unresolved entry is sent to the CPU. The destination (if one exists) receives the packet and responds back. The driver then learns the destination. All future packets are then forwarded in hardware with no software intervention.

If the source address was unknown, an unresolved entry is sent to the CPU and depending on whether or not the destination was resolved or unresolved (or was a broadcast), the packet is sent to the destination port (if the packet was resolved) or flooded within the VLAN (if the destination was unknown or the packet was a broadcast packet). The IXE2424 provides the option to turn off such forwarding and the driver provides an API to do this.

Location of Address Tables

The IXE2424 has two modes of operation - Normal Mode and Low Cost Layer 2 Mode. The locations of address tables are different for the two modes. In Normal Mode, Layer 4 Record Entries and 12 Last Address Record Entries are stored on-chip. The rest of the data structures are stored in off-chip address memory. In Low Cost Layer 2 Mode of operation, there is no external address memory used. All data structures are contained on-chip.

For the Hawk, we will use the Normal mode with External Address memory.

Address Look-up Methodology

Source and Destination Addresses are searched in parallel and then a sync process occurs to ensure both are completed. The IXE2424 uses a fast method of organizing and searching the address records to meet wire speed performance requirements. Record Entries (see Layer 2 Data Structures section below) contain the addresses. A proprietary binary search algorithm is employed to look for these addresses; no hashing algorithm is used. Records are organized into 1366 sections of 12 each (supporting a maximum of 16K records) for L2. A similar organization exists for IP records (64K max records) and IPX (8K max entries). Note that in Layer 2 only mode, all 40K addresses can be MAC addresses.

For the Hawk platform we will only use the ASIC in mode 4, which is Layer 3 switching with routing and Layer 4 classification. Phase 1 will be L3 switching with L4 classification.

A binary search (on-chip) is performed among the Last Address (LA) of every section to find section where the address should belong. A discriminated search is then performed with 10 bits to locate the Record Entry where the address will fall if it is present. An external search for the record entry is then performed. If the Record Entry matches with the address for which the search is performed, the rules and protocol entries are also retrieved from external RAM.

L2 Data Structures

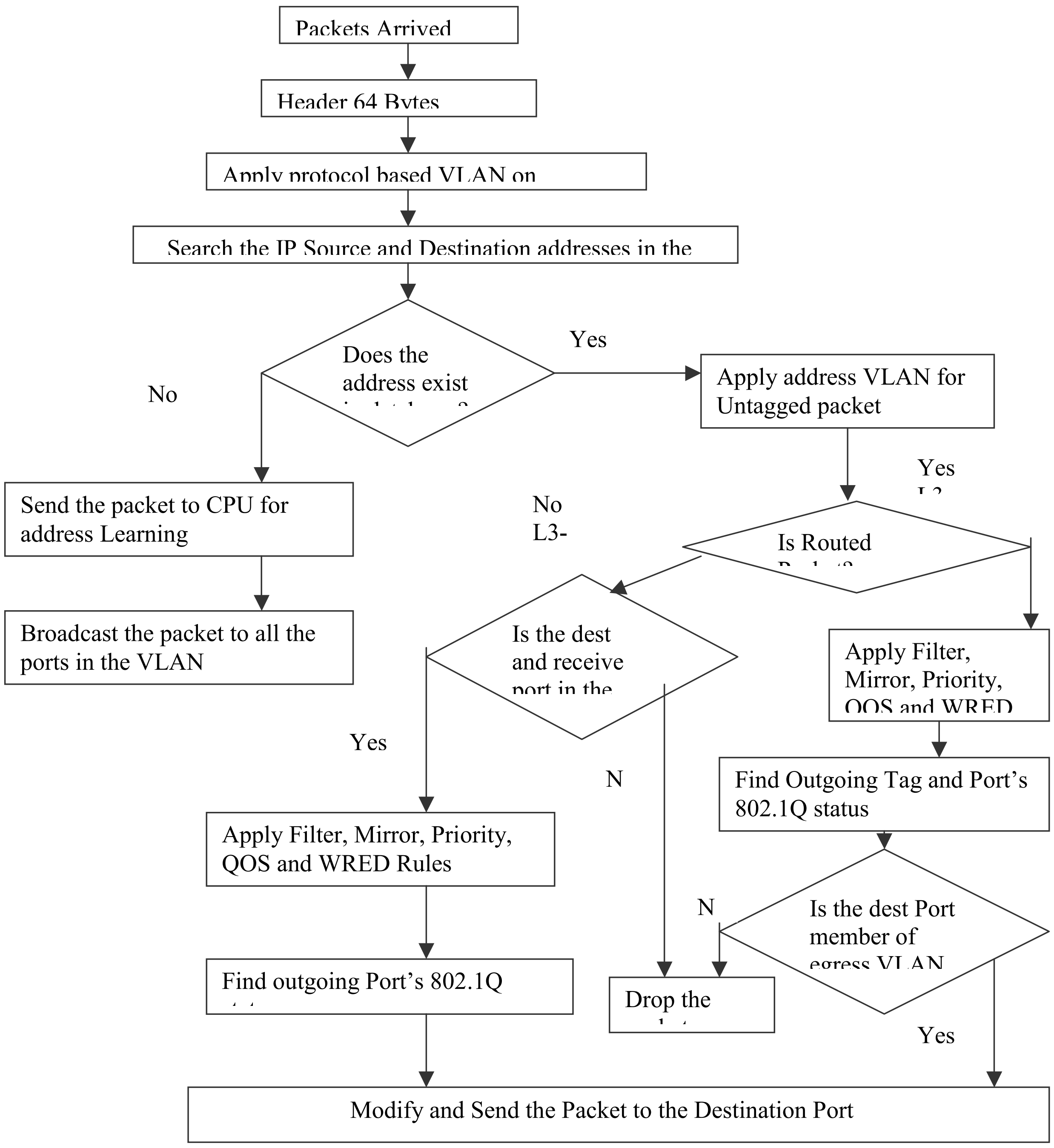
The layer 2 data structures for OS6600 are:

- 1-Record Entry
- Contains exact address used for match when searching tables
- MAC Address
- VLAN Tag ID (VID)
- 2-Rules Entry
- Contains information on which port the address resides on
- Device Number (IXE2424 number in cascaded systems)
- Port Number (which port this address resides on)
- Pointer to Protocol Specific Information
- Pointer to Destination Swap Information

3-Protocol Entry

- Used to allow different rules to be applied for different protocols associated with same address. Protocol Offset Register is used to identify which protocols will be used in the system. Up to 18 Layer 2 protocols are supported. There is a separate protocol entry for each protocol defined in the Protocol Offset Register
- Priority level of the packet for queuing
- Filter (6 bits), Mirror (5 bits), Priority (5 bits), TOS (6 bits) indices for flow-based rules. Each address that is to be used in a flow definition is assigned a unique index for the appropriate rule (i.e. Filter, Mirror, priority or TOS).
- TOS marking rules
- Global destination/source priority rules (i.e. all packets with this destination address get this priority).
- Global destination/source filter rules (i.e. filter all packets with this source address)
- Global destination/source mirror rule (i.e. mirror all packets with this source address)
- Pointer to NetID
- 4-NetID Entry
- Contains transmit enables, prepend information and address based VLAN information.

Layer 3 Forwarding


Packets Arrived
Header 64 Bytes
Apply protocol based VLAN on
Search the IP Source and Destination addresses in the
Does the address exist
Yes
No
Apply address VLAN for Untagged packet
Send the packet to CPU for address Learning
Broadcast the packet to all the ports in the VLAN
Yes
No L3-
Is Routed
Is the dest and receive port in the
Apply Filter, Mirror, Priority, QOS and WRED
Yes
N
Find Outgoing Tag and Port's 802.1Q status
Apply Filter, Mirror, Priority, QOS and WRED Rules
N
Is the dest Port member of egress VLAN
Find outgoing Port's 802.1Q
Drop the
Yes
Modify and Send the Packet to the Destination Port

VLANs

The IXE2424 supports VLANs based on:

- Ports. This is accomplished using Port Net ID Entry described below.
- 802.1Q Tags. This tag is included in the packet.
- Protocols. This is accomplished using the Protocol to VID Lookup Table described below.
- Addresses. This is accomplished by using the AVID field in NetId (L2, IP or IPX), if Address-based VLAN feature is enabled.

The VLAN Tag ID (VID) in the Record entry is determined one of two ways

- For a tagged packet VID is the VLAN ID in the tag.
- For an untagged packet, VID is the default VLAN ID associated with the protocol the packet belongs to. See Protocol Based VLANs description below.

Port Based VLANs

This is the default means of creating VLANs when no other type VLANs (802.1Q for example) has been programmed. Port Net ID Entry is fetched based on the receive port number. This entry determines the ports (including CPU) on which the packet received on that port can be transmitted.

Protocol Based VLANs

Can be configured on the IXE2424 by having different protocols point to different VLAN ID Entries where a VLAN tag is programmed per protocol per port. The IXE2424 supports 19 different Protocol Based Entries (IP, IPX, ARP etc) including 9 programmable protocols. Protocol to VID Lookup Table assigns the VID on a per port, per protocol basis. Protocol-based VLAN control bit has to be set for this feature to work.

Address Based VLANs

Layer 2, IP & IPX NetID entries has AVID (address based vid) field, which is used for untagged packets as the 802.1Q VLAN ID for all further tag based processing, when Address-based VLAN feature is enabled.

Tag Net ID Entry

- Contains related information like tagged set and member set. A 4x32 bit entry is present for every possible VLAN (4096 supported).
- VLAN Tag Valid. Indicates if this VLAN tag has been configured by the CPU. If not, all packets with this tag are dropped.
- Ports on which a packet with this Tag can go out on.
- VLAN Statistics Index. IXE2424 can collect statistics on up to 15 VLANs, identified by this index.
- IP Statistics Index. The IXE2424 can collect statistics on up to 256 IP Routed packets, identified by this index.
- Tagged Set Port indicates which ports have nodes attached that can accept tagged packets on this VLAN; packets are forwarded untagged to ports that cannot accept the tagged packets.
- Multicast Forward indicates which ports are disabled from transmitting unregistered multicast packets on this VLAN. If the bit is set for a particular port, unregistered multicast packets are not transmitted on that port.
- Priority, Bandwidth Management and QOS

Priority

- Each port on the IXE2424 has four output/transmit queues that store pointers to packets to be transmitted. Each queue corresponds to one distinct priority level. Packets in higher priority queues are serviced before packets in lower priority queues. These transmit queues support weighted fair queuing as well as strict priority queuing algorithms.
- The IXE2424 supports three methods of assigning device priority to a packet: 802.1p Priority, Rules-based Priority and QoS flow.

802.1p Priority

The incoming packet may have a priority associated with its 802.1Q Tag. 802.1p priority specifies eight levels of priority. This priority level is mapped to one of the four device priority levels (per port) using the Priority Map Register. Note this Priority Map Register applies to all ports on the IXE2424. If the incoming packet is untagged, it is assigned a default 802.1p priority level of zero. However, the priority regeneration feature may be used to change this priority level on a per-port basis using the Port Regenerate Tag Priority Level Entry Register.

Rules-Based Priority

- Several types of priority rules are supported. Each rule is associated with a specific device priority. If a packet satisfies a certain priority rule, it is assigned the device priority corresponding to that rule.
- Global Priority Rules enable assignment of specific device priority to all packets from a specific source address (global source priority) or all packets meant for a specific destination address (global destination priority). This is enabled through the Rules Entry data structure.
- Flow-based Priority Rules enable assignment of priorities by setting up priority flows. A flow refers to packet transmission between a specific source and a specific destination address. When a packet is detected to belong to a priority flow, it may be assigned a device priority as a set up for the flow. This is enabled through the Rules Entry data structure.
- Protocol-based Priority is enabled by Flow-Based and Global Priority. It allows the user to assign different device priority for packets that satisfy the same flow rules or global priority rules, but correspond to different protocols.

QOS Flow

The QoS-specified device priority may override the device priority already assigned to a packet through the VLAN tag, or through the global or flow-based priority. The decision to override previously assigned device priority in favor of QoS-specified device priority is based on the value of bit 30 of SIC Control 0 Register. The user configures this bit.

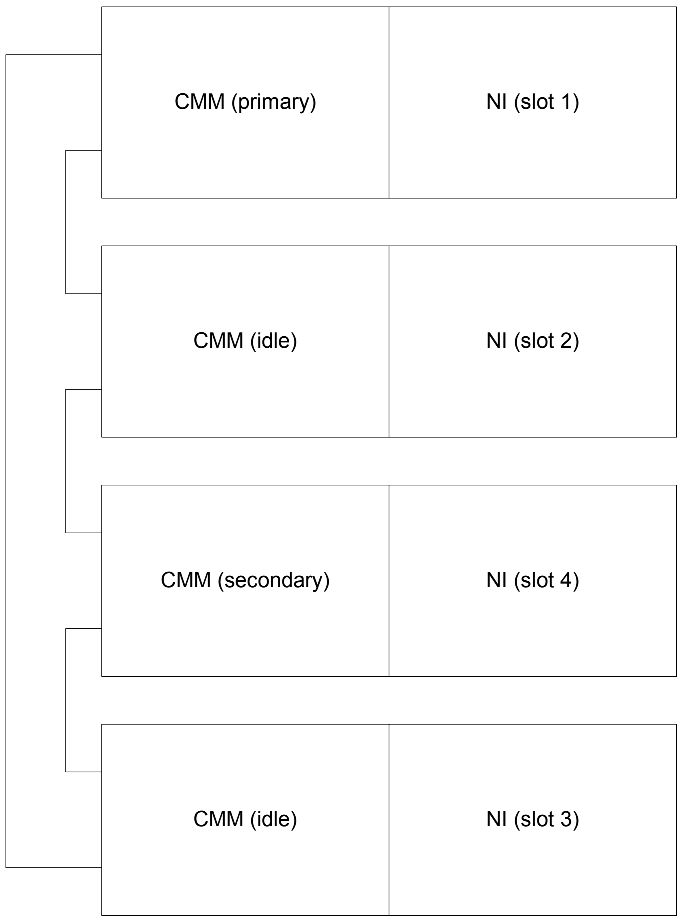
Bandwidth Management and QoS

- The IXE2424 provides Bandwidth Management at two levels. First, the device manages bandwidth between different output queues (that store pointers to the packet entries for transmission) at each port through a priority queuing scheme. Credit based and strict priority are supported. The choice of one of these two algorithms is configured on a per port basis using the Weighted Fair Queuing Port Address Control Registers.
- The second level of Bandwidth Management is at the per-output queue level, through QoS rules for packet flows, setup by the user. This provides bandwidth management on per queue and per flow basis and is termed QoS bandwidth management. The corresponding flows are termed QoS flows. A QoS flow essentially specifies a traffic-policing rule and allows users to limit bandwidth assigned for the specific flow. QoS flows may be specified in terms of flow between two specific addresses, A and B; flow from a specific address to any destination address; and flow to a specific destination address from any source address.
- A QoS flow specifies a data limit value, time interval over which the data limit is to be enforced, and a priority level (which determines the transmit queue number) for the flow. The IXE2424 device keeps track of the amount of data that has been transmitted within the user-specified time intervals for each QoS flow. If a packet causes a specific QoS flow to exceed its data allocation, it is dropped. Multiple QoS flows may be mapped to the same transmit queue and still be guaranteed the required bandwidth for that flow - the bandwidth management feature takes care of guaranteeing the bandwidth for the queue (by not allowing other queues to take away unauthorized bandwidth) and the QoS feature guarantees bandwidth for all flows mapped to the same queue (by not allowing any of the flows to exceed their allocated data rate). The device level Bandwidth Management feature is responsible for guaranteeing the bandwidth for an output queue (by not allowing other queues to take away unauthorized bandwidth) and the QoS feature guarantees the bandwidth for all flows mapped to the same queue (by not allowing other flows to exceed their allocated data rate). By combining these two types of bandwidth management, users can efficiently manage bandwidth for different types of traffic with the IXE2424 device.

CMM Functionality for OS6600

The overall software architecture of Falcon is retained for Hawk. The user will perceive the system as a virtual chassis; where one element is elected as the primary CMM, another as the secondary CMM and the rest of the elements as NI. The two elements that are elected primary CMM and secondary CMM are also NI. This choice was directed by finding a solution to manage the entire stack with a single IP address.

A Hawk used as standalone switch/router includes the equivalent of the CMM application as well as the NI applications. When several Hawks are connected together via the stacking link, two of the Hawks contains CMM and NI applications running on the same processor, and the rest contain a limited Chassis Supervision and NI applications.



The chassis like, or V-Chassis, strategy allows the system to keep the same management interface. Since on Falcon/Eagle, the management uses the notion of slot, this notion of slot is retained for Hawk. Since there is no chassis, we need to provide a means by which a slot number is assigned to an element. The current strategy is to have the user assigning a slot number, via a push button on the front panel, located below the LCD display. The default slot number is one. This mechanism provides several advantages. It removes the risk that from one reboot to another a dynamic allocation protocol might under certain circumstances assign a different slot number. The second advantage is that even if the user removes an element (slot) or adds one, the current configuration will still be applicable. There is no need to have successive numbers in a stack. Eight (8) is the maximum number of slots allowed in a single stack.

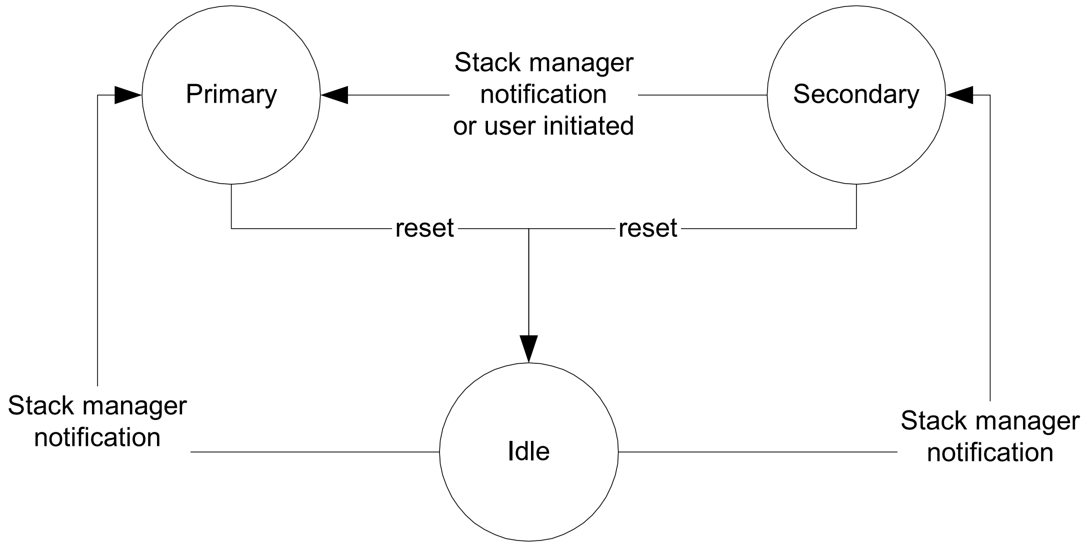
The V-Chassis provides to the user the same interface and the same set of commands to configure the system. The user configures a port; adds a port in a VLAN, etc, by providing both the port number and the slot number. Chassis Supervision, NI Prober and Supervision and IPC are the main applications that are impacted by the virtual chassis concept. They will both rely on the first application to have information allowing them to perform their services correctly (i.e. NI present, NI UP, NI down).

The V-chassis imposes some constraints on Chassis Supervision. Chassis Supervision does not run the Falcon election protocol, i.e. Hello Protocol, to define the mode (primary or secondary). Chassis Supervision receives the mode from Stack Manager. This implies that the Hello Protocol is not activated on both the primary and secondary CMM, because the Stack Manager monitors the two CMMs. In Hawk three modes are defined for Chassis Supervision. The new mode is idle. In the idle mode allows the system to have Chassis Supervision available on all elements.

In primary mode, Chassis Supervision behaves as defined in Falcon with the following restrictions:

- CSM (Chassis State Machine) does not activate the Hello Protocol.
- HSM (Hardware Service Manager) does not need to control the available power when a NI is declared present. On a real chassis (Falcon or Eagle), when Chassis Supervision learns the presence of a new NI, it first computes whether or not there is enough power to switch on the new NI. This phase must be bypassed on Hawk since each element has its own power supply.
- HSM needs to communicate to all elements within the stack a new temperature threshold, when it receives the new configuration.
- Prober does not need to monitor the presence of either the NI or CMM boards. The service is now available via Stack Manager.
- CVM (Chassis Version Manager) when synchronizing the primary Flash with the secondary Flash needs to extend the service to all the elements present in the stack, ensuring that all elements have the same content on the flash.
- When a new element is inserted in the stack, CVM must control that the flash content of this new element is synchronized with the content of the primary flash.
- There is no need to have a synchronization of the MAC addresses.
- In secondary mode, Chassis Supervision, Chassis Supervision behaves as defined in Falcon with the following restrictions:
- Prober does not need to monitor the presence of either the NI or CMM boards. The service is now available via Stack Manager.
- Prober needs to monitor the temperature and report a temperature rising over a defined warning threshold to HSM.
- When HSM receives a message from prober indicating that the temperature has risen over the defined shutoff threshold, it must send a trap and shutdown the local unit.

- In idle mode the role of Chassis Supervision is limited to monitoring the temperature, power supply, fan(s), handling of flash synchronization and takeover. The following services are provided when running in idle mode:
- Prober needs to monitor the temperature and report a temperature rising over a defined warning threshold to HSM.
- When HSM receives a message from prober indicating that the temperature has risen over the defined shutoff threshold, it must send a trap and shutdown the local unit.
- CVM must listen to flash synchronization coming from CVM on the primary.
- Chassis Supervision does not implement the Hello Protocol as defined in Falcon/Eagle. It receives notification from Stack Manager to change to a new mode. The following figure illustrates the different possible transitions.


Primary
Stack manager notification or user initiated
Secondary
reset
reset
Stack manager notification
Idle
Stack manager notification

- When running in idle mode and upon reception of a notification of Stack Manager indicating the new state, Chassis Supervision shutdowns the daughter tasks and spawns them according to the new mode.

The process of multiple CMMs is composed of following steps:

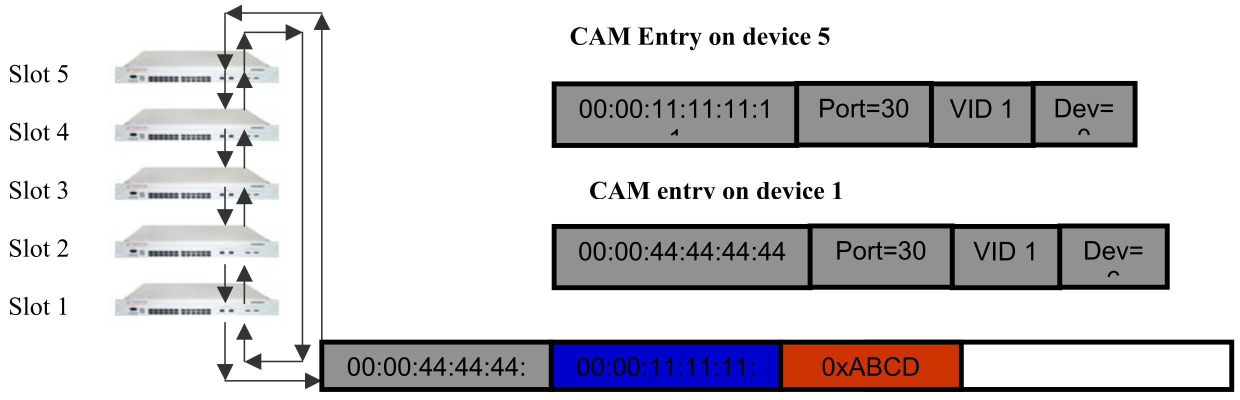
- Bootup
- Role election
- Lowest slot number is elected as Primary
- Following number is elected as secondary
- Redundancy
- Failure of primary
- Secondary takeover
- Lowest idle number become secondary
- Failure of secondary
- Lowest idle number become new secondary
- Failure of both
- Election of a new primary and secondary

OS6600 IPC Communication

IPC software interface is unchanged. IPC provides the following services:

- NI-NI communication
- CMM-NI communication
- CMM is the primary or active
- CMM-CMM communication
- Each element in a stack is addressable from its CMM perspective. Different Types of Sockets are:
- Connection oriented socket
- Connectionless socket
- Multicast socket
- IPC is transported as a layer 2 protocol over Ethernet frame
- Provides Segmentation and Reassembly
- Fragment packet bigger than 1400 bytes
- Provides reliability
- Interface with Stack Manager to obtain MAC address and outgoing port number
- Use special MAC to identify IPC packet
- For all slots a Special MAC is used. Example: slot 7 uses 00:00:77:77:77:77, slot 8 uses 00:00:88:88:88:88

The following diagram can illustrate IPC connection between different slots:

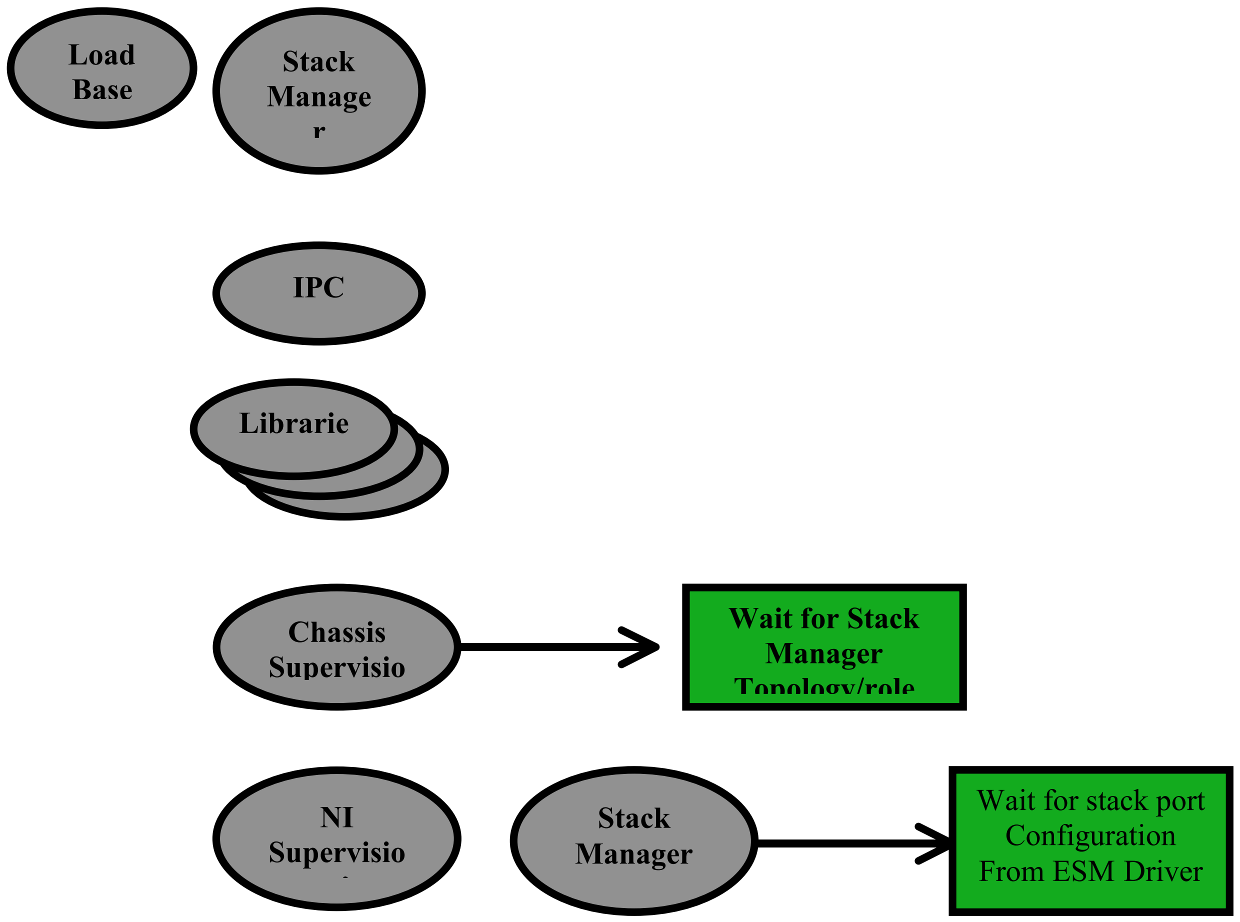


IPC Frame sent from Slot 1 to Slot 4

OS6600 BOOT Sequence

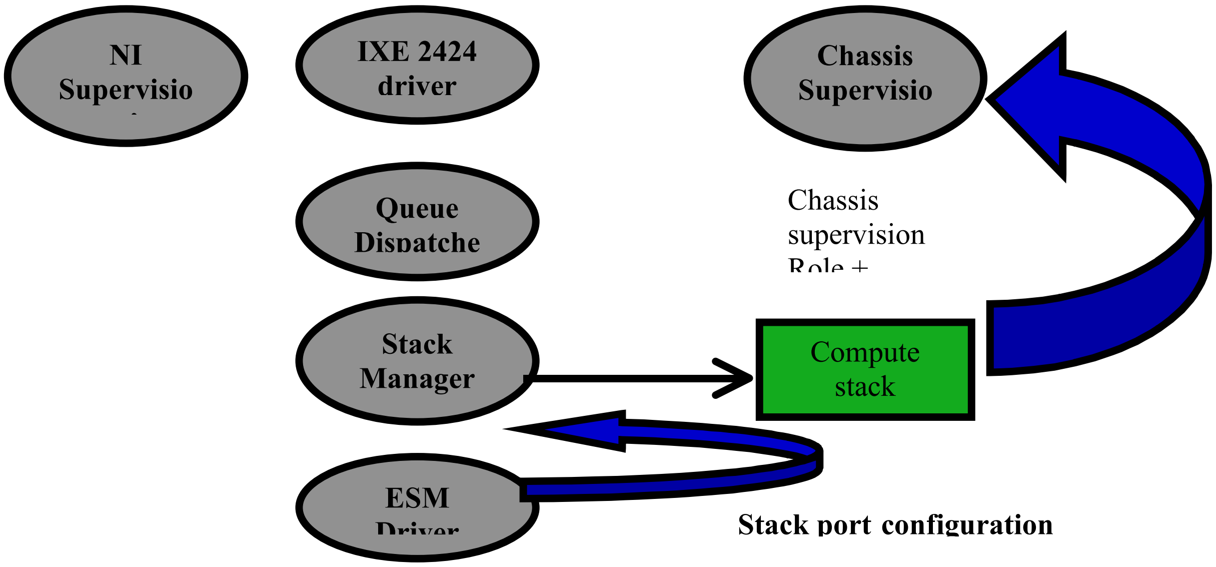
- Different from Falcon/Eagle
- No NI code to download
- Each element is independent from the other
- For instance it is possible to have a primary which has not the lowest slot number

The following figures illustrate the bootup process:

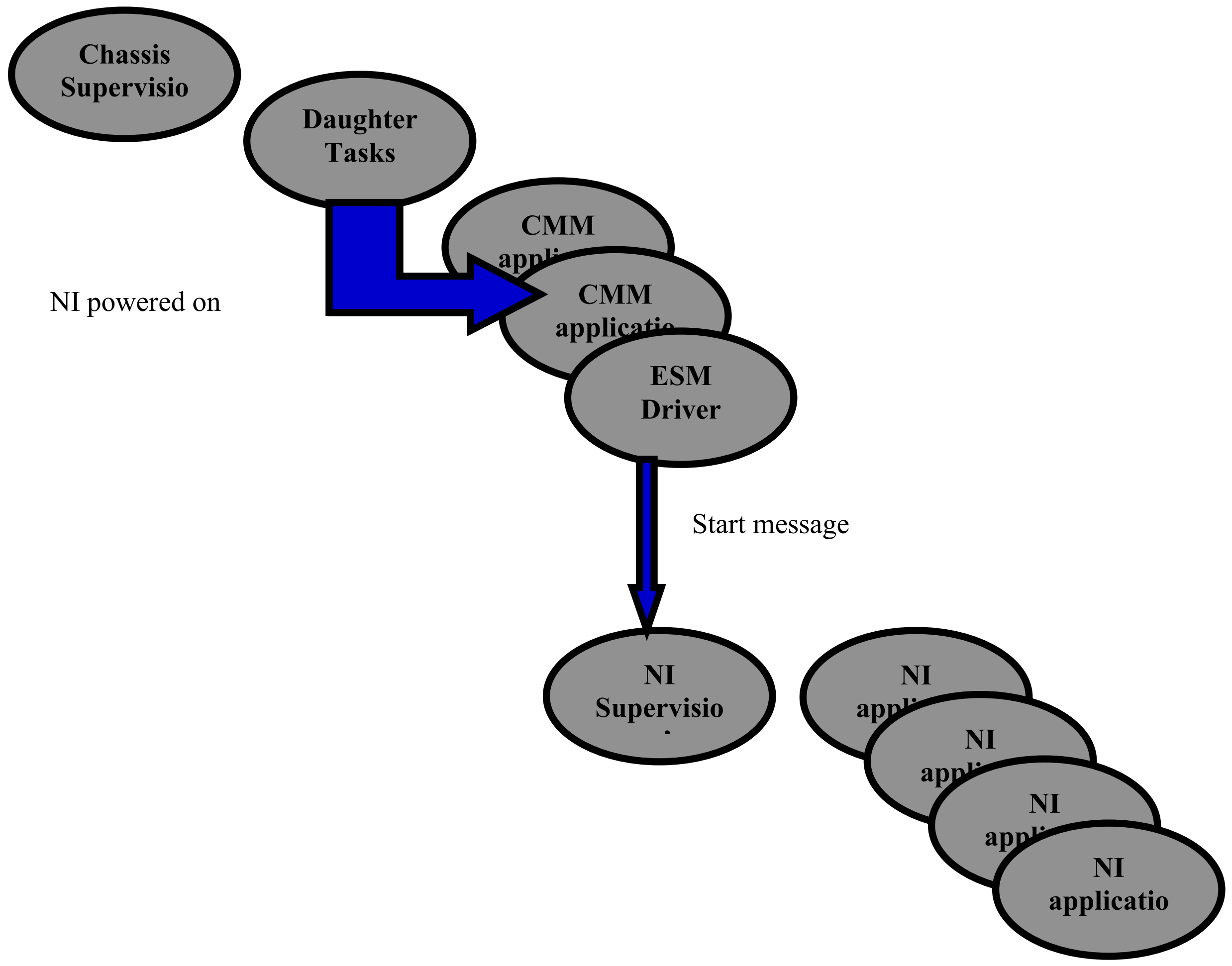

Load Base
Stack Manage r
IPC
Librarie
Chassis Supervisio
Wait for Stack Manager Topology/role
NI Supervisio
Stack Manager
Wait for stack port Configuration From ESM Driver

- Load the Base Code
- Load the Stack Manager Library
- Start IPC
- Load all the libraries
- Start Chassis Supervision
- Wait for Stack Manager
- Get the topology of the stacks

- Get the Role of the Stack-Primary, Secondary or Idle
- Start NI supervision and Prober
- Start Stack Manager
- Get the stack port Configuration from the ESM Driver



- NI Supervision performs the following Tasks:
- Load and Start the IXE2424 driver
- Start the Queue Dispatcher
- Start Stack Manager to compute the stack topology and the role of the chassis from chassis supervision
- Start ESM driver by getting the information from Stack Manager
- Chassis Supervision performs the following tasks:
- Start all the daughter tasks when powered on, which include
- CMM applications
- Start the ESM Driver, which includes:



- NI supervision and Prober Task. NI Supervision task in turn starts the NI applications.

B Debug Commands

This chapter documents the following Command Line Interface (CLI) debug commands. **Blue text** indicates that the text is hypertext-linked to additional documentation for that command.

802.1Q Debug Commands	**debug 802.1q**
DVMRP Debug Commands	**ip dvmrp debug-level** **ip dvmrp debug-type** **debug ip dvmrp graft** **debug ip dvmrp group** **debug ip dvmrp nbr vlan** **debug ip dvmrp prune recv** **debug ip dvmrp rib holdq ageq** **debug ip dvmrp route valid hold vlan** **show ip dvmrp debug**
IP Debug Commands	**debug ip packet** (configures IP debug parameters) **debug ip set** **debug ip** **debug ip level** **debug ip packet default** **debug ip packet** (displays IP debug configuration parameters) **debug ip mask**
DHCP Relay Debug Commands	**debug ip helper packet size**
Multicast Routing Debug Commands	**debug ip mroute debug-level** **ip mroute debug-type**
OSPF Debug Commands	**ip ospf debug-level** **ip ospf debug-type** **show ip ospf debug**
PIM-SM Debug Commands	**ip pimsm debug-level** **ip pimsm debug-type** **show ip pimsm debug**
RIP Debug Commands	**ip rip debug-type** **ip rip debug-level** **show ip rip debug**
Trap Debug Commands	**debug trap trace** **debug trap reset** **debug trap interface** **debug trap generate** **debug trap data**

SNMP Debug Commands	**debug snmp trace** **debug snmp reset** **debug snmp interface** **debug snmp data**
Session Debug Commands	**debug session trace** **debug session reset** **debug session interface** **debug session data**
Hardware Slot Debug Commands	**debug slot information**
Interfaces Debug Commands	**debug interfaces set backpressure** **debug interfaces backpressure** **debug interfaces led** **debug interfaces mdix** **debug interfaces phy** **debug interfaces mac** **debug interfaces port structure** **debug interfaces mac stats** **debug interfaces mac port** **debug interfaces mac nonport** **debug interfaces switching** **debug interfaces set mdix** **debug interfaces set automdix** **debug interfaces set linkled** **debug interfaces set linkled activity**
IPC Debug Commands	**debug ipc pools slot** **debug ipc pools cmm** **debug ipc bbus** **debug ipc active sockets** **debug ipc active sockets slot** **debug ipc active sockets appid**
Fabric ASIC Debug Commands	**debug fabric threshold** **debug fabric status** **debug fabric stats** **debug fabric output** **debug fabric mcvectors** **debug fabric input** **debug fabric fbus** **debug fabric errors** **debug fabric calendars**

Server Load Balancing (SLB) Debug Commands	**debug slb help** **debug slb** **debug slb adminstatus** **debug slb createcluster** **debug slb deletecluster** **debug slb clusteradminstatus** **debug slb clusterdistribution** **debug slb clusterpingperiod** **debug slb clusterpingtimeout** **debug slb clusterpingretries** **debug slb clusterstickytime** **debug slb server** **debug slb removeserver** **debug slb dumpcluster** **debug slb dumpclusters** **debug slb dumpserver** **debug slb dumpservers** **debug slb dumpni** **debug slb dumpvlan** **debug slb dumpmisc** **debug slb discoveryperiod** **debug slb discoverytimeout** **debug slb discoveryretries** **debug slb statperiod** **debug slb deadlinewindow** **debug slb link** **debug slb resetcmm** **debug slb resetni** **debug slb cmmtrace** **debug slb nitrace** **debug slb nidebug** **debug slb flags** **debug slb traps** **debug slb simservers** **debug slb serverarp** **debug slb packetloss** **debug slb kill** **debug slb ni** **debug slb snapshot** **debug slb certify** **debug slb takeover**
HTTP Debug Commands	**debug http sessiondb**

HRE Debug Commands	**debug hre warn** **debug hre trace** **debug hre pcam** **debug hre pcam verbose** **debug hre pcam mode range** **debug hre ipx flow** **debug hre ipms flow** **debug hre ip flow** **debug hre history** **debug hre error** **debug hre debug** **debug hre cmm warn** **debug hre cmm trace** **debug hre cmm error** **debug hre cmm debug** **debug hre clear ipx** **debug hre clear ip** **debug hre cache verbose** **debug hre cache**
Health Debug Commands	**debug health** **debug health cpu** **debug health temperature cpu** **debug health temperature cmm** **debug health status** **debug health rx** **debug health txrx** **debug health memory**
GMAP Debug Commands	**debug gmap flags**
Console Debug Commands	**debug console flow control** **debug console show flow control**
Command Information Debug Commands	**debug command-info**
CLI Debug Commands	**debug clishell data** **debug cli mip-response**
CLI Shell Debug Commands	**debug clishell data**
AMAP Debug Commands	**debug amap database**
Chassis Debug Commands	**debug chassis show** **debug chassis secondary emp** **debug chassis show state trace** **debug chassis secondary emp** **debug chassis hello** **debug chassis hello timers** **debug chassis auto-reboot** **debug chassis auto-reboot ni**
Bridging Debug Commands	**debug bridge hash-bitmask sa** **debug bridge hash-bitmask da**

VLAN Debug Commands	**debug vlan vpas** **debug vlan rule protocol-map** **debug vlan rule ports** **debug vlan rule memory** **debug vlan rule database** **debug vlan rule communication** **debug vlan communication** **debug vlan database** **debug vlan communication**
Port Manager (PM) Debug Commands	**debug pm object** **debug pm mibs** **debug pm eventlist** **debug pm bindings** **debug pm index**
AAA Debug Commands	**debug aaa**
Port Debug Commands	**debug port information**
QoS Debug Commands	**debug qos**
IPX Debug Commands	**debug ipx info** **debug ipx info rip** **debug ipx info host** **debug ipx trace** **debug ipx vlan**
Systrace Debug Commands	**debug systrace** **debug systrace watch** **debug systrace show** **debug systrace appid level** **debug systrace show log**
Post Mortem Dump (PMD) Debug Commands	**show log pmd** **debug remove pmd** **debug pmd remove** **debug pmd show** **debug dump pmd** **debug pmd ni** **debug show pmd**
Memory Monitoring Debug Commands	**debug memory monitor** **debug memory monitor show status** **debug memory monitor show log** **debug memory monitor show log global** **debug memory monitor show log task** **debug memory monitor show log size**
Ktrace Debug Commands	**debug ktrace** **debug ktrace show** **debug ktrace appid level** **debug ktrace show log**
Ed Debug Commands	**debug ed**
Set Debug Commands	**debug set**
Debug Show Commands	**debug show**
IPv6 Debug Commands	**debug ipv6 trace**

debug 802.1q

Retrieves debugging messages for the tagged port selected.

debug 802.1q {*slot*/*port* | *aggregate_id*}

Syntax Definitions

slot	The slot number to configure 802.1Q tagging.
port	The port number to configure 802.1Q tagging.
aggregate_id	The aggregate link number to configure 802.1Q tagging.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

Retrieves debugging messages for the tagged port selected.

Examples

```
-> debug 802.1q 5
Aggregate Status =          aggregate up

-> debug 802.1q 3/1
Slot Status =               slot up
Port Status =               port up

 GENERAL INFO ESM: USER PORT 1-12  = CORONADO PORT 0-11
 GENERAL INFO ESM: USER PORT 13-24  = CORONADO PORT 16-27
 GENERAL INFO GSM: USER PORT 1  = CORONADO PORT 12
 GENERAL INFO GSM: USER PORT 2  = CORONADO PORT 28
 HARDWARE INFO for slot = 3 and port = 1:
At reg_addr = 660012c, Ingress tag-untag:= 1:
At reg_addr = 6a00010, Eg tag-untag: = 1:
At reg_addr = 6601000,for protocol = 0,ing default vlan: = 1
At reg_addr = 6601080,for protocol = 1,ing default vlan: = 1
At reg_addr = 6601100,for protocol = 2,ing default vlan: = 1
At reg_addr = 6601180,for protocol = 3,ing default vlan: = 1
At reg_addr = 6601200,for protocol = 4,ing default vlan: = 1
At reg_addr = 6601280,for protocol = 5,ing default vlan: = 1
At reg_addr = 6601300,for protocol = 6,ing default vlan: = 1
At reg_addr = 6a70000, egress default vlan: = 1
At reg_addr = 6600118, protocol cam on/off: = 18 :
At reg_addr = 660011c, trusted/untrusted: = fff0fe6
At reg_addr = 6600130, secure/unsecure: = 18
At reg_addr = 6608020, for vlan = 8,spanning tree vector: = 1
At reg_addr = 6a00014, Eg force tag internal: = 0:
```

output definitions

Aggregate/Slot Status	Whether the slot or aggregate link is actively running.
Port Status	Whether the port is actively running.
General Info	Provides general information on the modules in the chassis, including module type, number of ports, and ASIC.
Hardware Info	Lists the various debug messages for the selected slot and port.

Release History

Release 5.1; command was introduced.

Related Commands

N/A

MIB Objects

N/A

ip dvmrp debug-level

Defines the level of debugging for DVMRP protocol on the switch.

ip dvmrp debug-level *level*

Syntax Definitions

level	Specifies the DVMRP debug level (0–255). Higher debug-levels will include all messages that correspond to a lower value. For example, a debug level of 2 will display all messages for level 1 and level 2. As a rule of thumb, higher levels will display more detailed messages; lower levels will display more basic messages.

Defaults

parameter	default
level	1

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

When the debug level is set to 0, DVMRP debug logging is turned off.

Examples

```
-> ip dvmrp debug-level 2
```

Release History

Release 5.1; command was introduced.

Related Commands

ip dvmrp debug-type	Enables or disables DVMRP debugging for a specified message type, or for all message types.
show ip dvmrp debug	Displays the current level of debugging for DVMRP protocol on the switch, as well as the current DVMRP debugging status for all messages types.

MIB Objects

```
ALADVMRPDEBUGCONFIG
   alaDvmrpDebugLevel
```

ip dvmrp debug-type

Enables or disables DVMRP debugging for a specified message type, or for all message types.

Note. Debugging for a specified message type will only be enabled if its debug level is a value greater than zero (i.e., 1–255). For information on specifying the debug level, refer to the **ip dvmrp debug-level** command.

ip dvmrp debug-type *message_type*

no ip dvmrp debug-type *message_type*

Syntax Definitions

message_type	Enables or disables DVMRP debugging for the specified item. Select from the list below. You may enter multiple message types in any order. For example, **ip dvmrp debug-type time flash init**.

supported message types	descriptions
all	Enables or disables DVMRP debugging for all items listed below. The syntax **all** can be used to easily turn debugging for all message types on or off.
error	Enables or disables debugging for DVMRP Error messages.
flash	Enables or disables debugging for DVMRP Flash processing.
graft	Enables or disables debugging for DVMRP Graft processing.
igmp	Enables or disables debugging for DVMRP Internet Group Management Protocol (IGMP) packet processing.
ipmrm	Enables or disables debugging for DVMRP IP Multicast Routing Manager (IPMRM) interaction.
init	Enables or disables debugging related to DVMRP initialization code.
mip	Enables or disables debugging for MIP (Management Internal Protocol) processing. Includes CLI and SNMP.
misc	Enables or disables miscellaneous debugging of DVMRP.
nbr	Enables or disables debugging for DVMRP Neighbor processing.
probes	Enables or disables debugging for DVMRP Probe processing.
prunes	Enables or disables debugging for DVMRP Prune processing.
routes	Enables or disables debugging for DVMRP Route processing.
time	Enables or disables debugging for DVMRP Timer processing.
tm	Enables or disables debugging for DVMRP Task Manager interaction.

Defaults

parameter	default
message_type	error

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- Use the **no** form of the command to disable debugging for the specified item.
- Reminder: Debugging for a specified message type will only be enabled if its debug level is a value greater than zero (i.e., 1–255). For information on specifying the debug level, refer to the **ip dvmrp debug-level** command.
- The syntax **all** can be used to easily turn debugging for all message types on or off (e.g., **ip dvmrp debug-type all** or **no ip dvmrp debug-type all**).

Examples

```
-> ip dvmrp debug-type all
-> ip dvmrp debug-type tm igmp flash
-> no ip dvmrp debug-type misc
-> no ip dvmrp debug-type all
```

Release History

Release 5.1; command was introduced.

Related Commands

ip dvmrp debug-level	Defines the level of debugging for DVMRP protocol on the switch.
show ip dvmrp debug	Displays the current level of debugging for DVMRP protocol, as well as the current DVMRP debugging status for all message types.

MIB Objects

```
ALADVMRPDEBUGCONFIG
   alaDvmrpDebugAll
   alaDvmrpDebugError
   alaDvmrpDebugFlash
   alaDvmrpDebugGrafts
   alaDvmrpDebugIgmp
   alaDvmrpDebugInit
   alaDvmrpDebugIpmrm
   alaDvmrpDebugMip
   alaDvmrpDebugNbr
   alaDvmrpDebugProbes
   alaDvmrpDebugPrunes
   alaDvmrpDebugRoutes
   alaDvmrpDebugTime
   alaDvmrpDebugTm
```

show ip dvmrp debug

Displays the current level of debugging for DVMRP protocol on the switch, as well as the current DVMRP debugging status for all messages types.

show ip dvmrp debug

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- The administrative debugging status for message types displayed in the table are determined by the **ip dvmrp debug-type** command.
- To configure debug levels, refer to the **ip dvmrp debug-level** command.

Examples

```
-> show ip dvmrp debug

Debug Level = 1,
Error       = on,
Flash       = off,
Grafts      = off,
IGMP        = off,
IPMRM       = off,
Init        = off,
MIP         = off,
Misc        = off
Nbr         = on,
Probes      = off,
Prunes      = off,
Routes      = on,
Time        = off,
TM          = off,
```

output definitions

Debug Level	The current debug level value. For information on setting this parameter, see the **ip dvmrp debug-level** command on page B-8.
error	The current debugging status for DVMRP Error messages. Options include **on** or **off**.
Flash	The current debugging status for DVMRP Flash processing. Options include **on** or **off**.

output definitions (continued)

Grafts	The current debugging status for DVMRP Graft processing. Options include **on** or **off**.
IGMP	The current debugging status for DVMRP Internet Group Management Protocol (IGMP) packet processing. Options include **on** or **off**.
IPMRM	The current debugging status for DVMRP IP Multicast Routing Manager (IPMRM) interaction. Options include **on** or **off**.
Init	The current debugging status for DVMRP Initialization. Options include **on** or **off**.
MIP	The current debugging status for DVMRP MIP (Management Internal Protocol) processing. Includes CLI and SNMP. Options include **on** or **off**.
Misc	The current status of miscellaneous DVMRP debugging. Options include **on** or **off**.
Nbr	The current debugging status for DVMRP Neighbor processing. Options include **on** or **off**.
Probes	The current debugging status for DVMRP Probe processing. Options include **on** or **off**.
Prunes	The current debugging status for DVMRP Prune processing. Options include **on** or **off**.
Routes	The current debugging status for DVMRP Route processing. Options include **on** or **off**.
Time	The current debugging status for DVMRP Timer processing. Options include **on** or **off**.
TM	The current debugging status for DVMRP Task Manager interaction. Options include **on** or **off**.

Release History

Release 5.1; command was introduced.

Related Commands

ip dvmrp debug-level	Defines the level of debugging for DVMRP protocol on the switch.
ip dvmrp debug-type	Enables or disables DVMRP debugging for a specified message type, or for all message types.

debug ip packet

Enables/disables/configures the IP packet debug feature. This command is generally used only when working with a field engineer to debug a problem on the switch.

debug ip packet [start] [timeout *seconds*] **[stop] [direction {in | out | all}] [format {header | text | all}] [output {console | file** *filename*}] **[board {cmm | ni [1-16] | all | none} [ether-type {arp | ip | hex** [*hex_number*] **| all}] [ip-address** *ip_address*] **[ip-address** *ip_address*] **[ip-pair** [*ip1*] [*ip2*]] **[protocol {tcp | udp | icmp | igmp | num** [*integer*] **| all}] [show-broadcast {on | off}] show-multicast {on | off}]**

Syntax Definitions

start	Starts an IP packet debug session.
timeout	Sets the duration of the debug session, in seconds. To specify a duration for the debug session, enter **timeout**, then enter the session length.
seconds	The debug session length, in seconds.
stop	Stops IP packet debug session.
direction	Specifies the type of the packets you want to debug. Specify **in** to debug incoming packets; specify **out** to debug outgoing packets; specify **all** to debug both incoming and outgoing packets.
format	Specifies the area of the packet you want to debug. Specify **header** to debug the packets header; specify **hex** to debug the packet text; specify **all** to debug the entire packet.
output	Specifies where you want the debug information to go. Specify **console** to print the output to the screen; specify **file** to save the output to a log file.
filename	The filename for the output file.
board	Specifies the slot (board) that you want to debug. Specify **cmm** to debug CMM packets; specify **ni**, then enter the slot number of the NI to debug a network interface card; specify **all** to debug packets for all CMMs and NIs on the switch; specify **none** to clear the previous board settings.
ether-type	Specifies a specific Ethernet packet type to debug. Specify **arp** to debug ARP packets; specify **ip** to debug IP packets; specify **hex** and enter an ethernet packet type in hex format (e.g., 800) to debug a specific ethernet packet type; specify **all** to debug all Ethernet packet types.
ip-address	Specifies an IP address to debug. The debug output will only be for packets received from this IP address. Enter **ip-address,** then enter the IP address that you want to debug.
ip-pair	Use this option to match packets exchanged between two network addresses. Enter **ip-pair**, then enter each IP address.

protocol	Specifies a protocol type to debug. Specify **tcp** to debug TCP packets; specify **udp** to debug UPD packets; specify **icmp** to debug ICMP packets; specify **igmp** to debug IGMP packets; specify **num** to numerically specify a protocol (e.g., 89); specify **all** to debug all protocol types.
show-broadcast	Specifies whether or not to display broadcast packets. Specify **on** to display broadcast packets on the screen or in the log; specify **off** if you do not want to display broadcast packets.
show-multicast	Specifies whether or not to display multicast packets. Specify **on** to display multicast packets on the screen or in the log; specify **off** if you do not want to display multicast packets.

Defaults

parameter	default
timeout	-1
in | out | all	all
header | text | all	header
console | file	console
cmm | ni | all | none	all
arp | ip | hex | all	all
tcp | udp | icmp | igmp | num | all	all
on | off	on
on | off	on

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- If you use the basic command to start debug (**debug ip packet start**) the switch will use default parameters for all of the debug options. Once you configure one of the optional parameters, the switch will use the new parameter(s) until changed.
- If you do not specify a timeout value, the session will continue until it is stopped.
- You must enter the **start** keyword to begin debugging.
- The command **debug ip packet** without the **start** keyword displays IP debug configuration parameters.

Examples

```
-> debug ip packet start timeout 1
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ip level	Configures IP debug level. This command allows you to set the level (amount) of information displayed.

debug ip level

Configures the IP debug level. This command allows you to set the level (amount) of information displayed. The lower the level, the more significant the event. For example, a level of 1 will display only the most critical problems. A level of 99 would display all of the available information for the specified debug type. It is best to use the default level of 1 unless instructed to increase the level by a field engineer. If more information is needed to debug a problem, a higher level can be selected.

debug ip level *level*

Syntax Definitions

level	Debug level. Valid range is 0–255.

Defaults

parameter	default
level	1

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

The debug level applies to the debug configuration set with the **debug ip packet** command. You cannot set different levels for different configurations.

Examples

```
-> debug ip level 1
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ip packet	Enables/disables/configures the IP packet debug feature.

debug ip packet default

Returns IP packet debug options to default values.

debug ip packet default

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

See "Defaults" on page B-14 for default values.

Examples

```
-> debug ip packet default
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ip packet	Configures IP packet debug.

debug ip packet

Displays IP debug configuration parameters. This command is generally used only when working with a field engineer to debug a problem on the switch.

debug ip packet

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

This command is used to display IP debug configuration parameters. To start IP debugging you must enter the **start** keyword.

Examples

```
-> debug ip packet

packet dump                                                 off,
timeout in seconds                                            0,
output device                                           console,
board                                                       all,
ether-type                                                  all,
protocol                                                    all,
direction                                             in + out,
mcast/bcast                                                  on,
format                                                   header,
IP address filter
```

output definitions

packet dump	IP debug administrative status (on/off).
timeout in seconds	Duration of the debug session, in seconds. (0 = off).
output device	Output device for debug information (e.g., file, console).
ether-type	Ethernet packet type to debug (e.g., ARP, IP).
protocol	Protocol type to debug (e.g., TCP, UDP).
direction	Type of traffic to debug incoming (in) or outgoing (out).
mcast/bcast	Specifies whether or not to show broadcast/multicast packets.
format	Area of the packet to debug (e.g., header, text).
ip address filter	Interface to debug.

Release History

Release 5.1; command was introduced.

Related Commands

debug ip packet	Configures IP packet debug.

debug ip mroute debug-level

Configures the Mutlicast Routing debug level.

debug ip mroute debug-level *level*

Syntax Definitions

level	Specifies the Mutlicast Routing debug level (0–255).

Defaults

parameter	default
level	

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

Higher debug-levels will include all messages that correspond to a lower value. For example, a debug level of 2 will display all messages for level 1 and level 2. As a rule of thumb, higher levels will display more detailed messages; lower levels will display more basic messages.

Examples

```
-> debug ip mroute debug-level 10
```

Release History

Release 5.1; command was introduced.

Related Commands

ip mroute debug-type	Displays the current multicast routing debug levels and types.

ip mroute debug-type

Displays the current multicast routing debug levels and types.

ip mroute debug-type [tm | protos {on | off} | misc | mip {on | off} | ipms {on | off} | init | fib {on | off} | error {on | off} | all | aging {on | off}]

no ip mroute debug-type [tm | protos {on | off} | misc | mip {on | off} | ipms {on | off} | init | fib {on | off} | error {on | off} | all | aging {on | off}]

Syntax Definitions

debug level	The current debug level value.
protos	The current state of messages related to multicast routing protocols (e.g., whether they are enabled or disabled on interfaces, which protocols are going up or down, etc.).
mip	The current state of messages related to MIP (Management Internal Protocol).
ipms	The current state of messages related to IPMS interaction.
fib	The current state of messages related to IPMRM FIB processing.
error	The current state of messages related to all error handling.
aging	The current state of messages related to IPMRM FIB aging entries.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

Use the **no** form of the command to turn off a specific type of debug or all debug types.

Examples

```
-> debug ip mroute debug-type error
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ip mroute debug-level	Configures the Mutlicast Routing debug level.

ip ospf debug-level

Configures OSPF debugging level. The level refers to the granularity of the information provided. Generally, the higher the number, the more specific the information.

ip ospf debug-level *level*

Syntax Definitions

level	The debugging level. The valid range 0–255.

Defaults

parameter	default
level	0

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

This command allows you to select the granularity at which you wish to view debugging information. Currently, in OSPF, there are three levels available:

- **10**–Only critical errors and warnings.
- **50**–Most errors, warnings, and events.
- **99**–All errors, warnings and events.

Examples

```
-> ip ospf debug-level 10
```

Release History

Release 5.1; command was introduced.

Related Commands

ip ospf debug-type	Configures type of OSPF functionality to debug.
show ip ospf debug	Displays current OSPF debug level and types.

MIB Objects

```
ALAOSPFDEBUGCONFIG
   alaOspfDebugLevel
```

ip ospf debug-type

Configures the type of OSPF functionality to debug.

ip ospf debug-type [error] [warning] [state] [recv] [send] [flood] [spf] [lsdb] [rdb] [age] [vlink] [redist] [summary] [dbexch] [hello] [auth] [area] [intf] [mip] [info] [setup] [time] [tm] [all]

no ip ospf debug-type [error] [warning] [state] [recv] [send] [flood] [spf] [lsdb] [rdb] [age] [vlink] [redist] [summary] [dbexch] [hello] [auth] [area] [intf] [mip] [info] [setup] [time] [tm] [all]

Syntax Definitions

error	Administratively enables/disables debugging error messages. Error messages provide information of program faults.
warning	Administratively enables/disables debugging warning messages.
state	Administratively enables/disables debugging OSPF state messages. State messages show the switch state in relation to its neighbors.
recv	Administratively enables/disables debugging messages for packets received by OSPF.
send	Administratively enables/disables debugging messages for packets sent by OSPF.
flood	Administratively enables/disables debugging messages for the flooding of Link State Advertisements (LSAs) in OSPF.
spf	Administratively enables/disables debugging messages for OSPF’s Shortest Path First (SPF) calculations.
lsdb	Administratively enables/disables debugging messages for OSPF’s Link State Database (LSDB) related operations.
rdb	Administratively enables/disables debugging messages for OSPF’s routing database (RDB) related operations.
age	Administratively enables/disables debugging messages for OSPF’s aging process of LSAs.
vlink	Administratively enables/disables debugging messages for OSPF’s virtual links operations.
redist	Administratively enables/disables debugging messages for OSPF’s route redistribution process.
summary	Administratively enables/disables debugging messages for all OSPF’s summarizations.
dbexch	Administratively enables/disables debugging messages for OSPF neighbors’ database exchange.
hello	Administratively enables/disables debugging messages for OSPF’s hello handshaking process.

auth	Administratively enables/disables debugging messages for OSPF's authentication process.
area	Administratively enables/disables debugging messages for OSPF's area events.
intf	Administratively enables/disables debugging messages for OSPF's interface operations.
mip	Administratively enables/disables debugging messages for MIP processing of OSPF specific commands.
info	Administratively enables/disables debugging messages for purpose to provide OSPF information.
setup	Administratively enables/disables debugging messages for OSPF's initialization setup.
time	Administratively enables/disables debugging messages for OSPF's time related events.
tm	Administratively enables/disables debugging messages for DRC's Task Manager communication events.
all	Administratively enables/disables all debugging listed above for OSPF.

Defaults

parameter	default
error | warning | state | recv | send | flood | spf | lsdb | rdb | age | vlink | redist | summary | dbexch | hello| auth | area | intf | mip | info | setup | time | tm | all	**error**

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- The debug command allows you to enable debugging on various OSPF functions. These messages can be highly detailed, or very general, depending upon the debug level set.
- Use the **no** form of the command to turn off the selected debugging type.

Examples

```
-> ip ospf debug-type all
```

Release History

Release 5.1; command was introduced.

Related Commands

ip ospf debug-level	Configures OSPF debugging level.
show ip ospf debug	Displays current OSPF debug level and types.

MIB Objects

```
ALAOSPFDEBUGCONFIG
  alaOspfDebugError
  alaOspfDebugWarning
  alaOspfDebugState
  alaOspfDebugRecv
  alaOspfDebugSend
  alaOspfDebugFlood
  alaOspfDebugSPF
  alaOspfDebugLsdb
  alaOspfDebugRdb
  alaOspfDebugAge
  alaOspfDebugVlink
  alaOspfDebugRedist
  alaOspfDebugSummary
  alaOspfDebugDbexch
  alaOspfDebugHello
  alaOspfDebugAuth
  alaOspfDebugArea
  alaOspfDebugIntf
  alaOspfDebugMip
  alaOspfDebugInfo
  alaOspfDebugSetup
  alaOspfDebugTime
  alaOspfDebugTm
  alaOspfDebugAll
```

show ip ospf debug

Displays current OSPF debug level and types.

show ip ospf debug

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command is used to display the debugging information currently enabled for the OSPF router.
- See the related commands sections below to modify the list.

Examples

```
-> show ip ospf debug

Debug Level       = 0,
Types/Sections
error             = on,
warning           = on,
state             = on,
recv              = on,
send              = on,
flood             = on,
spf               = on,
lsdb              = on,
rdb               = on,
age               = on,
vlink             = on,
redist            = on,
summary           = on,
dbexch            = on,
hello             = on,
auth              = on,
area              = on,
intf              = on,
mip               = on,
info              = on,
setup             = on,
time              = on,
tm                = on,
```

output definitions

Debug Level	The granularity of the debug messages. This number will be 10, 50, or 99, where the lower number is least specific.
error	The error debug messages status. Error messages provide information of program faults.
warning	The warning debug messages status. Debugging messages show router operation calls.
state	The state debug messages status. State messages show the router state in relation to its neighbors.
recv	The received OSPF packet debug messages status.
send	The status OSPF packet debug messages status.
flood	The flood debug messages status.
spf	The Shortest Path First (SPF) debug messages status.
lsdb	The Link State Database (LSDB) debug messages status.
rdb	The Routing Database (RDB) debug messages status.
age	The aging debug messages status.
vlink	The virtual link debug messages status.
redist	The redistribution debug messages status.
summary	The summary debug messages status. Summarization of routes can be set for stubby areas and NSSAs.
dbexch	The data base exchange debug messages status.
hello	The hello debug messages status.
auth	The authorization debug messages status.
area	The area related debug messages status.
intf	The interface related debug messages status.
mip	The MIP operations debug messages status.
info	The information debug messages status.
setup	The setup debug messages status.
time	The time debug messages status.
tm	The DRC debug messages status.

Release History

Release 5.1; command was introduced.

Related Commands

ip ospf debug-level	Configures OSPF debugging level.
ip ospf debug-type	Configures type of OSPF traffic to debug.

MIB Objects

```
alaOspfDebugLevel
alaOspfDebugError
alaOspfDebugWarning
alaOspfDebugState
alaOspfDebugRecv
alaOspfDebugSend
alaOspfDebugFlood
alaOspfDebugSPF
alaOspfDebugLsdb
alaOspfDebugRdb
alaOspfDebugAge
alaOspfDebugVlink
alaOspfDebugRedist
alaOspfDebugSummary
alaOspfDebugDbexch
alaOspfDebugHello
alaOspfDebugAuth
alaOspfDebugArea
alaOspfDebugIntf
alaOspfDebugMip
alaOspfDebugInfo
alaOspfDebugSetup
alaOspfDebugTime
alaOspfDebugTm
alaOspfDebugAll
```

ip pimsm debug-level

Defines the level of PIM-SM debug messages that are generated.

ip pimsm debug-level *level*

Syntax Definitions

level	Specifies the PIM-SM debug level (0–255). Higher debug-levels will include all messages that correspond to a lower value. For example, a debug-level of 1 will display only those messages that are defined with a level of 1; however, a debug level of 2 will display all messages of level 1 and level 2, etc. Higher levels will display detailed messages; lower levels will display basic messages.

Defaults

parameter	default
level	1

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

When the debug level is set to 0, PIM-SM debug logging is turned off.

Examples

```
-> ip pimsm debug-level 2
```

Release History

Release 5.1; command was introduced.

Related Commands

ip pimsm debug-type	Configures the type(s) of PIM-SM debug messages to display.
show ip pimsm debug	Displays the current PIM-SM debug levels and types.

MIB Objects

```
ALAPIMSMDEBUGCONFIG
   alaPimsmDebugLevel
```

ip pimsm debug-type

Configures the type(s) of PIM-SM debug messages to display.

ip pimsm debug-type *message_list*

no ip pimsm debug-type *message_list*

Syntax Definitions

message_list	Specifies the type(s) of PIM-SM messages to be debugged. Select supported PIM-SM message types from the list below. You may enter multiple message types in any order. For example, **ip pimsm debug-type time flash init**.

supported message types	descriptions
all	Enables or disables PIM-SM debugging for all items listed below. The syntax **all** can be used to easily turn debugging for all message types on or off.
assert	Enables or disables debugging for Assert Metric messages.
bootstrap	Enables or disables debugging for Bootstrap Router (BSR) messages.
crp	Enables or disables debugging for Candidate Rendezvous Point (C-RP) messages.
error	Enables or disables debugging for PIM-SM Error messages.
hello	Enables or disables debugging for PIM-SM Hello messages.
igmp	Enables or disables debugging for Internet Group Management Protocol (IGMP) messages.
ipmrm	Enables or disables debugging for messages exchanged with IP Multicast Routing Manager (IPMRM).
init	Enables or disables debugging related to PIM-SM initialization code.
joinprune	Enables or disables debugging related to Join/Prune.
mip	Enables or disables debugging related to MIP (Management Internal Protocol).
misc	Enables or disables miscellaneous debugging of PIM-SM.
nbr	Enables or disables debugging for PIM-SM Neighbor processing.
route	Enables or disables debugging for PIM-SM Route processing.
spt	Enables or disables debugging related to Shortest-Path Tree (SPT).
time	Enables or disables debugging for PIM-SM Timer processing.
tm	Enables or disables debugging for PIM-SM Task Manager interaction.

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- The message-types specified in the command line will only be displayed if the debug level has been set to a number greater than zero (i.e., 1–255). For information on specifying the debug level, refer to the **ip pimsm debug-level** command on page B-29.
- The syntax **all** can be used to easily turn on/off all message types (e.g., **ip pimsm debug-type all** or **no ip pimsm debug-type all**).

Examples

```
-> ip pimsm debug-type all
-> ip pimsm debug-type bootstrap assert
-> no ip pimsm debug-type all
```

Release History

Release 5.1; command was introduced.

Related Commands

ip pimsm debug-level	Defines the level of PIM-SM messages that are generated.
show ip pimsm debug	Displays the current PIM-SM debug levels and types.

MIB Objects

```
ALAPIMSMDEBUGCONFIG
  alaPimsmDebugAll
  alaPimsmDebugAssert
  alaPimsmDebugBootstrap
  alaPimsmDebugCRP
  alaPimsmDebugError
  alaPimsmDebugHello
  alaPimsmDebugIgmp
  alaPimsmDebugInit
  alaPimsmDebugIpmrm
  alaPimsmDebugJoinPrune
  alaPimsmDebugMip
  alaPimsmDebugMisc
  alaPimsmDebugNbr
  alaPimsmDebugRoute
  alaPimsmDebugSpt
  alaPimsmDebugTime
  alaPimsmDebugTm
```

show ip pimsm debug

Displays the current PIM-SM debug levels and types.

show ip pimsm debug

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

The debug types displayed in the table are determined by the **ip pimsm debug-type** command on page B-30. To configure debug levels, refer to the **ip pimsm debug-level** command on page B-29.

Examples

```
-> show ip pimsm debug

Debug Level    = 1,
assert         = off,
bootstrap      = off,
crp            = off,
error          = off,
hello          = off,
igmp           = off,
init           = off,
ipmrm          = off,
joinprune      = off,
mip            = off,
misc           = off,
nbr            = off,
route          = off,
spt            = off,
time           = off,
tm             = off
```

output definitions

Debug Level	The current debug level value. For information on setting this parameter, see the **ip pimsm debug-level** command on page B-29.
assert	The current state of messages related to assert metric. Options include **on** or **off**.
bootstrap	The current state of messages related to bootstrap. Options include **on** or **off**.

output definitions (continued)

crp	The current state of messages related to Candidate Rendezvous Point (C-RP). Options include **on** or **off**.
error	The current state of messages related to all error handling. Options include **on** or **off**.
hello	The current state of messages related to hello messages. Options include **on** or **off**.
igmp	The current state of messages related to Internet Group Management Protocol (IGMP) packet processing. Options include **on** or **off**.
init	The current state of messages related to initialization code. Options include **on** or **off**.
ipmrm	The current state of messages exchanged with IP Multicast Routing Manager (IPMRM). Options include **on** or **off**.
joinprune	The current state of messages related to Join/Prune. Options include **on** or **off**.
mip	The current state of messages related to MIP (Management Internal Protocol). Options include **on** or **off**.
misc	The current status of miscellaneous message handling. Options include **on** or **off**.
nbr	The current state of messages related to the neighbors. Options include **on** or **off**.
route	The current state of messages related to routes. Options include **on** or **off**.
spt	The current state of messages related to Shortest-Path Tree (SPT).
time	The current state of messages related to the time. Options include **on** or **off**.
tm	The current state of messages related to the Task Manager. Options include **on** or **off**.

Release History

Release 5.1; command was introduced.

Related Commands

ip pimsm debug-level	Defines the level of PIM-SM debug messages that are generated.
ip pimsm debug-type	Configures the type(s) of PIM-SM debug messages to display.

ip rip debug-type

Configures the type of RIP messages to debug. The debug feature on the switch is generally used only under the direction of a field engineer. Use this command to configure the type of RIP debug warnings (e.g., errors, warning) that will be logged.

ip rip debug-type [error] [warning] [recv] [send] [rdb] [age] [redist] [info] [setup] [time] [tm] [all]

no ip rip debug-type [error] [warning] [recv] [send] [rdb] [age] [redist] [info] [setup] [time] [tm] [all]

Syntax Definitions

error	Includes error conditions, failures, processing errors, etc.
warning	Includes general warnings, non-fatal conditions.
recv	Enables debugging in the receive flow path of the code.
send	Enables debugging in the send flow path of the code.
rdb	Debugs RIP database handling.
age	Debugs code handling database entry aging/timeouts.
redist	Debugs redistribution code.
info	Provides general information.
setup	Provides information during initialization.
time	Debugs timeout handler.
all	Enables all debug options.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- Use the **no** form of the command to delete a debug type.
- RIP must be enabled on the switch with the **ip rip status** CLI command before you can configure the debug type.
- To configure more than one debug type, you must repeat the command for each type.
- Use the **debug ip level** command to set the debug level for the configured type(s).

Examples

```
-> ip rip debug-type all
```

Release History

Release 5.1; command was introduced.

Related Commands

ip rip debug-level	Configures RIP debugging level.
show ip rip debug	Displays the current RIP debug levels and types.

MIB Objects

```
alaRipLogTable
   alaRipDebugType
```

ip rip debug-level

Configures RIP debug level. You can set the level of information displayed using the **ip rip debug level** command. The lower the level, the more significant the event. For example, a level of 1 will display only the most critical problems. A level of 99 would display all of the available information for the specified debug type. It is best to use the default level of 1 unless instructed to increase the level by a field engineer. If more information is needed to debug a problem, a higher level can be selected.

ip rip debug-level *level*

Syntax Definitions

level	Debug level. Valid range is 0–255.

Defaults

parameter	default
level	1

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- RIP must be enabled on the switch with the **ip rip status** CLI command before you can configure the debug level.
- The debug level applies to all debug types that are configured. You cannot set different levels for each debug type.
- When the debug level is set to 0, the log is turned off.

Examples

```
-> ip rip debug-level 3
```

Release History

Release 5.1; command was introduced.

Related Commands

ip rip debug-type	Configures the type of RIP messages to debug.
show ip rip debug	Displays the current RIP debug levels and types.

MIB Objects

```
alaRipLogTable
   alaRipDebugLevel
```

show ip rip debug

Displays the current RIP debug levels and types.

show ip rip debug

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> show ip rip debug

Debug Level       = 3
Types/Sections
error             = on
warning           = on
recv              = on
send              = on
rdb               = on
age               = on
config            = on
redist            = on
info              = on
setup             = on
time              = on
```

output definitions

Debug Level	Debug level. The valid range 0–255. The default level is 0.
Types/Selections	The status of each debug type is shown here (on/off). See page B-34 for a description of debug types.

Release History

Release 5.1; command was introduced.

Related Commands

ip rip debug-level	Configures RIP debugging level.
ip rip debug-type	Configures the type of RIP messages to debug.

MIB Objects

```
dispDrcRipDebug
```

debug slot information

Displays all the information about a specific slot. It includes all the details about the ports, statistics, MDIX, IPC pools, and other phy-related information.

debug slot information *slot*

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

The **debug slot information** command combines the functions of the **debug interfaces backpressure**, **show interfaces counters**, **debug interfaces led**, **debug interfaces mdix**, **debug ipc pools slot**, **debug interfaces phy**, **debug interfaces mac**, and **debug interfaces port structure** commands.

Examples

```
-> debug slot information 1
#########################################
debug interfaces 1 backpressure
#########################################
 Slot   Backpressure
------+--------------
  1     disable

#########################################
show interfaces 1 counters
#########################################
 1/16,
  InOctets      =          258342824,  OutOctets      =          241185604,
  InUcastPkts   =            1198288,  OutUcastPkts   =             628318,
  InMcastPkts   =             132887,  OutMcastPkts   =              99632,
  InBcastPkts   =             639052,  OutBcastPkts   =               2488,
  InPauseFrames =                  0,  OutPauseFrames =                  0
 1/18,
  InOctets      =           24973594,  OutOctets      =          102309903,
  InUcastPkts   =             316757,  OutUcastPkts   =             481006,
  InMcastPkts   =                354,  OutMcastPkts   =             134096,
  InBcastPkts   =               2172,  OutBcastPkts   =             639437,
  InPauseFrames =                  0,  OutPauseFrames =                  0
 1/20,
  InOctets      =            1504323,  OutOctets      =           77527634,
  InUcastPkts   =               9547,  OutUcastPkts   =             172421,
  InMcastPkts   =               1333,  OutMcastPkts   =             133117,
  InBcastPkts   =                196,  OutBcastPkts   =             641403,
    InPauseFrames =                   0,  OutPauseFrames =                    0

  ########################################
  debug interfaces 1 Led
  ########################################
   Slot/Port   Activity   LNK
  -----------+----------+--------
    1/1         normal       OFF
    1/2         normal       OFF
    1/3         normal       OFF
    1/4         normal       OFF
    1/5         normal       OFF
    1/6         normal       OFF
    1/7         normal       OFF
    1/8         normal       OFF
    1/9         normal       OFF
    1/10        normal       OFF
    1/11        normal       OFF
    1/12        normal       OFF
    1/13        normal       OFF
    1/14        normal       OFF
    1/15        normal       OFF
    1/16        normal       ON
    1/17        normal       OFF
    1/18        normal       ON
    1/19        normal       OFF
    1/20        normal       ON
    1/21        normal       OFF
    1/22        normal       OFF
    1/23        normal       OFF
    1/24        normal       OFF

  ########################################
  debug interfaces 1 mdix
  ########################################
    1/1       disable  enable
    1/2       disable  enable
    1/3       disable  enable
    1/4       disable  enable
    1/5       disable  enable
    1/6       disable  enable
    1/7       disable  enable
    1/8       enable   enable
    1/9       disable  enable
    1/10      disable  enable
    1/11      disable  enable
    1/12      disable  enable
    1/13      disable  enable
    1/14      disable  enable
    1/15      disable  enable
    1/16      disable  enable
    1/17      disable  enable
    1/18      disable  enable
    1/19      disable  enable
    1/20      enable   enable
    1/21      disable  enable
    1/22      disable  enable
    1/23      disable  enable
    1/24      enable   enable
```

```
#########################################
debug ipc pools slot 1
#########################################

IPC Pools slot 1, slice 0:
 UrgentPool: Full size is 256, remaining: 256
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 ControlPool: Full size is 1024, remaining: 1023
    In socket queues: 0 Not queued: 1:
    In DMA queues: 0

 NormalPool: Full size is 256, remaining: 255
    In socket queues: 0 Not queued: 1:
    In DMA queues: 0

 JumboPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 LocalPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0


#########################################
debug interfaces 1 phy
#########################################

slot/port( 1/1 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c429     0     0   210
slot/port( 1/2 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/3 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/4 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
```

```
slot/port( 1/5 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c429     0     0   210
slot/port( 1/6 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/7 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40  e100  c42b     0     0   210
slot/port( 1/8 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/9 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c425     0     0   210
slot/port( 1/10):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c421     0     0   210
slot/port( 1/11):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c421     0     0   210
slot/port( 1/12):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c421     0     0   210
slot/port( 1/13):
Phy ID :  1e
```

```
    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c423     0     0   210
slot/port( 1/14):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c423     0     0   210
slot/port( 1/15):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40  e100  c423     0     0   210
slot/port( 1/16):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  41e1     7  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  7780  8000    f4   de2     0     0   200
   18 :     2     0    c8   100  c423     0     0   210
slot/port( 1/17):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/18):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  45e1     7  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  6780  8000    f4   de2     0     0   200
   18 :     2     0    c8   100  c41b     0     0   210
slot/port( 1/19):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/20):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  41e1     7  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  6780  8000    f4   de2     0     0   200
   18 :     2     0    c8  2100  c419     0     0   210
slot/port( 1/21):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c419     0     0   210
slot/port( 1/22):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c41d     0     0   210
slot/port( 1/23):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    54   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/24):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000    d4   de2    31     0   202
   18 :     0     0   1c8   100  c41d     0     0   210
########################################
debug interfaces 1 mac
########################################
ERROR: Type <0> for Debug_mac is unknown


########################################
debug interfaces 1 port structure
########################################

slot/port = ( 1/1 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3e9      gport  = 0x     0
    Mac   = 0x00:d0:95:6a:5f:28
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:28         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/2 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ea      gport  = 0x     1
    Mac   = 0x00:d0:95:6a:5f:29
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:29         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/3 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3eb       gport  = 0x     2
    Mac   = 0x00:d0:95:6a:5f:2a
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2a         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/4 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ec       gport  = 0x     3
    Mac   = 0x00:d0:95:6a:5f:2b
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2b         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/5 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ed       gport  = 0x     4
    Mac   = 0x00:d0:95:6a:5f:2c
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2c         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/6 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ee       gport  = 0x     5
    Mac   = 0x00:d0:95:6a:5f:2d
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2d         pause DA = 0x 1:80:c2: 0: 0: 1
```

```
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/7 )
    slice  =  0   mac_chip  =  0
    index  = 0x   3ef       gport  = 0x     6
     Mac   = 0x00:d0:95:6a:5f:2e
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:2e         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/8 )
    slice  =  0   mac_chip  =  0
    index  = 0x   3f0       gport  = 0x     7
     Mac   = 0x00:d0:95:6a:5f:2f
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:2f         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/9 )
    slice  =  0   mac_chip  =  0
    index  = 0x   3f1       gport  = 0x     8
     Mac   = 0x00:d0:95:6a:5f:30
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:30         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/10)
    slice  =  0   mac_chip  =  0
    index  = 0x   3f2       gport  = 0x     9
     Mac   = 0x00:d0:95:6a:5f:31
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:31         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/11)
    slice  =  0   mac_chip  =  0
    index  = 0x   3f3       gport  = 0x     a
     Mac   = 0x00:d0:95:6a:5f:32
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:32         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/12)
    slice  =  0   mac_chip  =  0
    index  = 0x   3f4       gport  = 0x     b
     Mac   = 0x00:d0:95:6a:5f:33
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:33         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/13)
    slice  =  0   mac_chip  =  1
    index  = 0x   3f5       gport  = 0x    10
     Mac   = 0x00:d0:95:6a:5f:34
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:34         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/14)
    slice  =  0   mac_chip  =  1
    index  = 0x   3f6       gport  = 0x    11
     Mac   = 0x00:d0:95:6a:5f:35
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
```

```
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:35         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/15)
    slice  =  0   mac_chip  =  1
    index  = 0x   3f7       gport  = 0x    12
     Mac   = 0x00:d0:95:6a:5f:36
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:36         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/16)
    slice  =  0   mac_chip  =  1
    index  = 0x   3f8       gport  = 0x    13
     Mac   = 0x00:d0:95:6a:5f:37
 prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   = 100  d_duplex =   1
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:37         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/17)
    slice  =  0   mac_chip  =  1
    index  = 0x   3f9       gport  = 0x    14
     Mac   = 0x00:d0:95:6a:5f:38
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:38         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/18)
    slice  =  0   mac_chip  =  1
    index  = 0x   3fa       gport  = 0x    15
     Mac   = 0x00:d0:95:6a:5f:39
 prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   = 100  d_duplex =   1
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg      =      12       backoff =       0
   trap     =   0
  pause SA = 0x 0:d0:95:6a:5f:39         pause DA = 0x 1:80:c2: 0: 0: 1
    long    =   1   long sz =    1553
    runt    =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/19)
    slice   =  0   mac_chip  =  1
    index   = 0x   3fb       gport  = 0x    16
     Mac    = 0x00:d0:95:6a:5f:3a
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw    =   3  d_duplex =   3
    mtu     =    1553       flood   =       1     flood lmt =       1
   ifg      =      12       backoff =       0
   trap     =   0
  pause SA = 0x 0:d0:95:6a:5f:3a         pause DA = 0x 1:80:c2: 0: 0: 1
    long    =   1   long sz =    1553
    runt    =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/20)
    slice   =  0   mac_chip  =  1
    index   = 0x   3fc       gport  = 0x    17
     Mac    = 0x00:d0:95:6a:5f:3b
 prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw    = 100  d_duplex =   1
    mtu     =    1553       flood   =       1     flood lmt =       1
   ifg      =      12       backoff =       0
   trap     =   0
  pause SA = 0x 0:d0:95:6a:5f:3b         pause DA = 0x 1:80:c2: 0: 0: 1
    long    =   1   long sz =    1553
    runt    =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/21)
    slice   =  0   mac_chip  =  1
    index   = 0x   3fd       gport  = 0x    18
     Mac    = 0x00:d0:95:6a:5f:3c
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw    =   3  d_duplex =   3
    mtu     =    1553       flood   =       1     flood lmt =       1
   ifg      =      12       backoff =       0
   trap     =   0
  pause SA = 0x 0:d0:95:6a:5f:3c         pause DA = 0x 1:80:c2: 0: 0: 1
    long    =   1   long sz =    1553
    runt    =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/22)
    slice   =  0   mac_chip  =  1
    index   = 0x   3fe       gport  = 0x    19
     Mac    = 0x00:d0:95:6a:5f:3d
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw    =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3d         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/23)
    slice  =  0   mac_chip  =  1
    index  = 0x   3ff       gport  = 0x    1a
     Mac   = 0x00:d0:95:6a:5f:3e
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3e         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/24)
    slice  =  0   mac_chip  =  1
    index  = 0x   400       gport  = 0x    1b
     Mac   = 0x00:d0:95:6a:5f:3f
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3f         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces set backpressure

Enables and disables fabric back pressure on a Network Interface (NI) or an entire chassis.

debug interfaces set [*slot*] **backpressure {enable | disable}**

Syntax Definitions

slot	The slot number to enable or disable fabric back pressure. The valid range is 1–8 on an OmniSwitch 7700, 1–16 on an OmniSwitch 7800, and 1–16 on an OmniSwitch 8800.
enable	Enables fabric backpressure.
disable	Disables fabric backpressure.

Defaults

parameter	default
enable | disable	disable

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

If the slot number is not specified then the switch back pressure feature will be enabled or disabled on an entire chassis.

Examples

```
-> debug interfaces set backpressure enable
-> debug interfaces set backpressure disable
-> debug interfaces set 3 backpressure enable
-> debug interfaces set 3 backpressure disable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug interfaces backpressure	Displays if fabric back pressure is enabled or disabled on an NI or an entire chassis.

MIB Objects

N/A

debug interfaces backpressure

Displays if fabric back pressure is enabled or disabled on a Network Interface (NI) or an entire chassis.

debug interfaces [*slot*] **backpressure**

Syntax Definitions

slot	The slot number to display the fabric back pressure state. The valid range is 1–8 on an OmniSwitch 7700 and 1–16 on an OmniSwitch 7800, and 1–16 on an OmniSwitch 8800.

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

If the slot number is not specified then the switch back pressure state will be displayed for an entire chassis.

Examples

```
-> debug interfaces backpressure
 Slot   Backpressure
------+--------------
 1      disable
 2      disable
 3      enable
 4      enable
 5      disable
 6      disable
 7      disable
 8      enable
-> debug interfaces 3 backpressure
 Slot   Backpressure
------+--------------
 3      enable
```

output definitions

Slot	The slot number of the NI.
Backpressure	Displays if the switch fabric back pressure feature is enabled or disabled on this NI. (The default is disabled.)

Release History

Release 5.1; command was introduced.

Related Commands

debug interfaces set backpressure	Enables and disables fabric back pressure on an NI or an entire chassis.

MIB Objects

N/A

debug interfaces led

Displays LED information.

debug interfaces *slot* **led**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 led
Slot/Port   Activity   LNK
-----------+----------+--------
  1/1         normal       OFF
  1/2         normal       OFF
  1/3         normal       OFF
  1/4         normal       OFF
  1/5         normal       OFF
  1/6         normal       OFF
  1/7         normal       OFF
  1/8         normal       OFF
  1/9         normal       OFF
  1/10        normal       OFF
  1/11        normal       OFF
  1/12        normal       OFF
  1/13        normal       OFF
  1/14        normal       OFF
  1/15        normal       OFF
  1/16        normal       ON
  1/17        normal       OFF
  1/18        normal       ON
  1/19        normal       OFF
  1/20        normal       ON
  1/21        normal       OFF
  1/22        normal       OFF
  1/23        normal       OFF
  1/24        normal       OFF
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces mdix

Displays Media Dependent Interface with Crossover (MDIX) information.

debug interfaces *slot* **mdix**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 mdix
  1/1       disable  enable
  1/2       disable  enable
  1/3       disable  enable
  1/4       disable  enable
  1/5       enable   enable
  1/6       disable  enable
  1/7       disable  enable
  1/8       disable  enable
  1/9       disable  enable
  1/10      disable  enable
  1/11      disable  enable
  1/12      disable  enable
  1/13      enable   enable
  1/14      disable  enable
  1/15      disable  enable
  1/16      disable  enable
  1/17      disable  enable
  1/18      disable  enable
  1/19      disable  enable
  1/20      enable   enable
  1/21      enable   enable
  1/22      disable  enable
  1/23      disable  enable
  1/24      disable  enable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces phy

Displays PHY information.

debug interfaces *slot* **phy**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 phy
slot/port( 1/1 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c429     0     0   210
slot/port( 1/2 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/3 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/4 ):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/5 ):
Phy ID :  1e
```

```
     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40  e100  c429     0     0   210
slot/port( 1/6 ):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/7 ):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/8 ):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c42b     0     0   210
slot/port( 1/9 ):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c425     0     0   210
slot/port( 1/10):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c421     0     0   210
slot/port( 1/11):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c421     0     0   210
slot/port( 1/12):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
    10 :   184   100  8000     0   de2     0     0   202
    18 :     0     0    40   100  c421     0     0   210
slot/port( 1/13):
Phy ID :  1e

     0 :  3000  7809    13  78f7   de1     0     4  2801
     8 :     0     0     0     0     0     0     0     0
```

```
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c423     0     0   210
slot/port( 1/14):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c423     0     0   210
slot/port( 1/15):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c423     0     0   210
slot/port( 1/16):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  41e1     5  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  7780  8000     0   de2     0     0   200
   18 :     2     0    88   100  c423     0     0   210
slot/port( 1/17):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/18):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  45e1     5  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  4780  8000     0   de2     0     0   200
   18 :     2     0    88   100  c41b     0     0   210
slot/port( 1/19):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/20):
Phy ID :  1e

    0 :  3000  782d    13  78f7   de1  41e1     5  6801
    8 :     0     0     0     0     0     0     0     0
   10 :   184  4780  8000     0   de2     0     0   200
   18 :     2     0    88  2100  c419     0     0   210
slot/port( 1/21):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c419     0     0   210
slot/port( 1/22):
```

```
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c41d     0     0   210
slot/port( 1/23):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c41b     0     0   210
slot/port( 1/24):
Phy ID :  1e

    0 :  3000  7809    13  78f7   de1     0     4  2801
    8 :     0     0     0     0     0     0     0     0
   10 :   184   100  8000     0   de2     0     0   202
   18 :     0     0    40   100  c41d     0     0   210
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces mac

Displays MAC information.

debug interfaces *slot* **mac**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 mac
ERROR: Type <0> for Debug_mac is unknown
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces port structure

Displays port structure information.

debug interfaces *slot* **port structure**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 port structure
slot/port = ( 1/1 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3e9       gport  = 0x     0
    Mac   = 0x00:d0:95:6a:5f:28
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:28         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/2 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ea       gport  = 0x     1
    Mac   = 0x00:d0:95:6a:5f:29
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:29         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0
```

```
slot/port = ( 1/3 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3eb       gport  = 0x     2
    Mac   = 0x00:d0:95:6a:5f:2a
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2a         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/4 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ec       gport  = 0x     3
    Mac   = 0x00:d0:95:6a:5f:2b
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2b         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/5 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ed       gport  = 0x     4
    Mac   = 0x00:d0:95:6a:5f:2c
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2c         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/6 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ee       gport  = 0x     5
    Mac   = 0x00:d0:95:6a:5f:2d
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2d         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0
```

```
slot/port = ( 1/7 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3ef       gport  = 0x     6
    Mac   = 0x00:d0:95:6a:5f:2e
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2e         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/8 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3f0       gport  = 0x     7
    Mac   = 0x00:d0:95:6a:5f:2f
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:2f         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/9 )
   slice  =  0   mac_chip  =  0
   index  = 0x   3f1       gport  = 0x     8
    Mac   = 0x00:d0:95:6a:5f:30
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:30         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/10)
   slice  =  0   mac_chip  =  0
   index  = 0x   3f2       gport  = 0x     9
    Mac   = 0x00:d0:95:6a:5f:31
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:31         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
```

```
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/11)
   slice  =  0   mac_chip  =  0
   index  = 0x   3f3       gport  = 0x      a
    Mac   = 0x00:d0:95:6a:5f:32
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:32         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/12)
   slice  =  0   mac_chip  =  0
   index  = 0x   3f4       gport  = 0x      b
    Mac   = 0x00:d0:95:6a:5f:33
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:33         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/13)
   slice  =  0   mac_chip  =  1
   index  = 0x   3f5       gport  = 0x     10
    Mac   = 0x00:d0:95:6a:5f:34
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:34         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
   runt   =   0   runt sz =   0
flowstate =   0 flowmode  =       0     flowwait  =       0

slot/port = ( 1/14)
   slice  =  0   mac_chip  =  1
   index  = 0x   3f6       gport  = 0x     11
    Mac   = 0x00:d0:95:6a:5f:35
prevLink  =   0 cur_Link  =   2         linkUptime=       0
  admin   =   1   auto    =   1            bw     =   3   duplex  =   3
   d_bw   =   3  d_duplex =   3
   mtu    =    1553       flood   =       1     flood lmt =       1
  ifg     =      12       backoff =       0
  trap    =   0
 pause SA = 0x 0:d0:95:6a:5f:35         pause DA = 0x 1:80:c2: 0: 0: 1
   long   =   1   long sz =    1553
```

```
     runt   =   0   runt sz =   0
  flowstate =   0 flowmode  =       0     flowwait  =       0

  slot/port = ( 1/15)
     slice  =  0   mac_chip  =  1
     index  = 0x   3f7       gport  = 0x    12
      Mac   = 0x00:d0:95:6a:5f:36
  prevLink  =   0 cur_Link  =   2         linkUptime=       0
    admin   =   1   auto    =   1            bw     =   3   duplex  =   3
     d_bw   =   3  d_duplex =   3
     mtu    =    1553       flood   =       1     flood lmt =       1
    ifg     =      12       backoff =       0
    trap    =   0
   pause SA = 0x 0:d0:95:6a:5f:36         pause DA = 0x 1:80:c2: 0: 0: 1
     long   =   1   long sz =    1553
     runt   =   0   runt sz =   0
  flowstate =   0 flowmode  =       0     flowwait  =       0

  slot/port = ( 1/16)
     slice  =  0   mac_chip  =  1
     index  = 0x   3f8       gport  = 0x    13
      Mac   = 0x00:d0:95:6a:5f:37
  prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
    admin   =   1   auto    =   1            bw     =   3   duplex  =   3
     d_bw   = 100  d_duplex =   1
     mtu    =    1553       flood   =       1     flood lmt =       1
    ifg     =      12       backoff =       0
    trap    =   0
   pause SA = 0x 0:d0:95:6a:5f:37         pause DA = 0x 1:80:c2: 0: 0: 1
     long   =   1   long sz =    1553
     runt   =   0   runt sz =   0
  flowstate =   0 flowmode  =       0     flowwait  =       0

  slot/port = ( 1/17)
     slice  =  0   mac_chip  =  1
     index  = 0x   3f9       gport  = 0x    14
      Mac   = 0x00:d0:95:6a:5f:38
  prevLink  =   0 cur_Link  =   2         linkUptime=       0
    admin   =   1   auto    =   1            bw     =   3   duplex  =   3
     d_bw   =   3  d_duplex =   3
     mtu    =    1553       flood   =       1     flood lmt =       1
    ifg     =      12       backoff =       0
    trap    =   0
   pause SA = 0x 0:d0:95:6a:5f:38         pause DA = 0x 1:80:c2: 0: 0: 1
     long   =   1   long sz =    1553
     runt   =   0   runt sz =   0
  flowstate =   0 flowmode  =       0     flowwait  =       0

  slot/port = ( 1/18)
     slice  =  0   mac_chip  =  1
     index  = 0x   3fa       gport  = 0x    15
      Mac   = 0x00:d0:95:6a:5f:39
  prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
    admin   =   1   auto    =   1            bw     =   3   duplex  =   3
     d_bw   = 100  d_duplex =   1
     mtu    =    1553       flood   =       1     flood lmt =       1
    ifg     =      12       backoff =       0
    trap    =   0
   pause SA = 0x 0:d0:95:6a:5f:39         pause DA = 0x 1:80:c2: 0: 0: 1
```

```
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/19)
    slice  =  0   mac_chip  =  1
    index  = 0x   3fb       gport  = 0x    16
     Mac   = 0x00:d0:95:6a:5f:3a
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3a         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/20)
    slice  =  0   mac_chip  =  1
    index  = 0x   3fc       gport  = 0x    17
     Mac   = 0x00:d0:95:6a:5f:3b
 prevLink  =   0 cur_Link  =   1         linkUptime=3f79780e
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   = 100  d_duplex =   1
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3b         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/21)
    slice  =  0   mac_chip  =  1
    index  = 0x   3fd       gport  = 0x    18
     Mac   = 0x00:d0:95:6a:5f:3c
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3c         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/22)
    slice  =  0   mac_chip  =  1
    index  = 0x   3fe       gport  = 0x    19
     Mac   = 0x00:d0:95:6a:5f:3d
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3d         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/23)
    slice  =  0   mac_chip  =  1
    index  = 0x   3ff       gport  = 0x    1a
     Mac   = 0x00:d0:95:6a:5f:3e
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3e         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0

 slot/port = ( 1/24)
    slice  =  0   mac_chip  =  1
    index  = 0x   400       gport  = 0x    1b
     Mac   = 0x00:d0:95:6a:5f:3f
 prevLink  =   0 cur_Link  =   2         linkUptime=       0
   admin   =   1   auto    =   1            bw     =   3   duplex  =   3
    d_bw   =   3  d_duplex =   3
    mtu    =    1553       flood   =       1     flood lmt =       1
   ifg     =      12       backoff =       0
   trap    =   0
  pause SA = 0x 0:d0:95:6a:5f:3f         pause DA = 0x 1:80:c2: 0: 0: 1
    long   =   1   long sz =    1553
    runt   =   0   runt sz =   0
 flowstate =   0 flowmode  =       0     flowwait  =       0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces mac stats

Displays MAC stats for a slot or slot/port.

debug interfaces {*slot* | *slot*/*port*} **mac stats**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.
port	The port number of the interface.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 mac stats
ERROR: Type <3> for Debug_mac is unknown
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces mac port

Displays MAC level register information.

debug interfaces {*slot* | *slot*/*port*} **mac port**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.
port	The port number of the interface.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1/1 mac port
slot/port(01/01):

  100 :       200      a66c         0  956a5f28        d0  c2000001       180
      4
  120 :         4         0         0         0         0       611       bd4
      0
```

Output fields are described below:

output definitions

Slot	The slot number of the NI.
Port	The port number of the interface.

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces mac nonport

Displays MAC level information for nonport from the register values.

debug interfaces {*slot* | *slot*/*port*} **mac nonport**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.
port	The port number of the interface.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1/1 mac nonport

slot/port(01/01):
Mac Asic Version :  1
    0 :         b         3         0         0       1ff       1ff         1
      0
   20 :  deadbeef  deadbeef     15446     fffff     10101         0        ff
      f
   40 :  80000000  deadbeef  deadbeef  deadbeef    3ff577    1ffaff        91
      a
   60 :         a         0         5        96        aa         0         0  d
eadbeef
   80 :  ff00000f  ff00000f  1f000001         0         0        ff        ff
     43
   a0 :       201         0         0      3f3f   1000171         0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug interfaces switching

Displays the register value specified in hexadecimal for all the slots or displays a specified number of register values starting from the hexadecimal address for all the slots.

debug interfaces [*slot* **|** *slot/port***] switching** *0xhex* **[***num***]**

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.
port	The port number of the interface.
0Xhex	The register value in hexadecimal (e.g., **0xffff**).
num	The number of register values to be displayed.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug interfaces 1 switching 0xffff
 ASIC Ver :  1
     ffff :   d207bff4
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug ipc pools slot

Displays IPC pools on a particular slot.

debug ipc pools slot *slot*

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ipc pools slot 1

IPC Pools slot 1, slice 0:
 UrgentPool: Full size is 256, remaining: 256
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 ControlPool: Full size is 1024, remaining: 1023
    In socket queues: 0 Not queued: 1:
    In DMA queues: 0

 NormalPool: Full size is 256, remaining: 255
    In socket queues: 0 Not queued: 1:
    In DMA queues: 0

 JumboPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 LocalPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ipc pools cmm	Displays IPC Pools on Chassis Management Modules (CMMs).
debug ipc bbus	Displays IPC pools for the Burst Bus with transmit and received count, Direct Memory Access errors, and parity errors.
debug ipc active sockets	Displays all the active sockets on Chassis Management Modules (CMMs).
debug ipc active sockets slot	Displays all the active sockets on a particular slot.

debug ipc pools cmm

Displays IPC Pools on Chassis Management Modules (CMMs).

debug ipc pools CMM

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ipc pools cmm
IPC Pools for CMM:
 UrgentPool: Full size is 1024, remaining: 1024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 ControlPool: Full size is 5096, remaining: 5096
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 NormalPool: Full size is 2024, remaining: 2024
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0

 JumboPool: Full size is 256, remaining: 255
  Socket ID = 0x61, dest slot = 65, remote addr = 0x43430041, ipc status = G
  Task ID = 0x4553de0, PayLoad Len= 972,  ipc priority = 0x1, data ptr = 0x621a9
10
  next = 0x0, pFreeQ = 0x6e9be10, data_offset = 0, free_list_num = 2

    In socket queues: 0 Not queued: 1:
    In DMA queues: 0

 LocalPool: Full size is 64, remaining: 64
    In socket queues: 0 Not queued: 0:
    In DMA queues: 0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ipc pools slot	Displays IPC pools on a particular slot.
debug ipc bbus	Displays IPC pools for the Burst Bus with transmit and received count, Direct Memory Access errors, and parity errors.
debug ipc active sockets	Displays all the active sockets on Chassis Management Modules (CMMs).
debug ipc active sockets slot	Displays all the active sockets on a particular slot.

debug ipc bbus

Displays IPC pools for the Burst Bus with transmit and received count, Direct Memory Access errors, and parity errors.

debug ipc bbus

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ipc bbus


Slot|Enabled | Tx Cnt  | Rx Cnt  |DMA Errs |PT Errs  |
 ----|--------|---------|---------|---------|---------|

   1|       1|   570044|   271497|        0|        0|

   2|       1|     5977|   106238|        0|        0|

   3|       0|        0|      316|        0|        0|

   4|       1|     9961|   283391|        0|        0|

   5|       0|        0|        0|        0|        0|

   6|       1|     9061|   237393|        0|        0|

   7|       1|    10755|   233827|        0|        0|

   8|       1|     5981|   106051|        0|        0|

   9|       1|    10913|   234603|        0|        0|

  10|       1|     5951|   109021|        0|        0|

  11|       1|     6434|   289241|        0|        0|

  12|       1|     5929|   110932|        0|        0|
  13|       1|     5944|   106369|         0|         0|

  14|       1|     5946|   108400|         0|         0|

  15|       0|        0|        0|         0|         0|

  16|       1|     5955|   107128|         0|         0|
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ipc pools cmm	Displays IPC Pools on Chassis Management Modules (CMMs).
debug ipc pools slot	Displays IPC pools on a particular slot.
debug ipc active sockets	Displays all the active sockets on Chassis Management Modules (CMMs).
debug ipc active sockets slot	Displays all the active sockets on a particular slot.

debug ipc active sockets

Displays all the active sockets on Chassis Management Modules (CMMs).

debug ipc active sockets

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ipc active sockets
Enter Process CB
328 Falsock control blocks found
CB ADR  |S| LocAdr  |RemAdr  |TasName|
--------|-|--------|--------|--------|
6E9C108|3|10400041|10400042|tCsC-
SMta
6E9C1D0|2| 6400041|       0|tCsC-
SMta
6E9C298|2| 9400041|       0|tCsC-
SMta
6E9C360|2| 8400041|       0|tCsC-
SMta
6E9C428|2| 7400041|       0|tCsC-
SMta
6E9C4F0|2| D400041|       0|tCsC-
SMta
6E9C5B8|2|12400041|   0|tCS_PTB
6E9C680|2| 1400041|   0|tCS_CCM
6E9C748|2| 2400041|   0|tCS_CCM
6E9C810|2| 5400041|   0|tCS_PRB
6E9C8D8|2| B400041|   0|tCS_CMS
6E9C9A0|2| C400041|   0|tCS_CMS
6E9CA68|2| 4400041|   0|tCS_HSM
6E9CB30|2| 3400041|   0|tCS_HSM
6E9CBF8|2| A400041|   0|tCS_CVM
6E9CCC0|2| 1420041|   0|CfgMgr
6E9CD88|2| 2420041|   0|CfgMgr
6E9CE50|2| 3420041|       0|CfgMgr
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ipc pools cmm	Displays IPC Pools on Chassis Management Modules (CMMs).
debug ipc bbus	Displays IPC pools for the Burst Bus with transmit and received count, Direct Memory Access errors, and parity errors.
debug ipc pools slot	Displays IPC pools on a particular slot.
debug ipc active sockets slot	Displays all the active sockets on a particular slot.

debug ipc active sockets slot

Displays all the active sockets on a particular slot.

debug ipc active sockets slot *slot*

Syntax Definitions

slot	The slot number of the Network Interface (NI) module.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ipc active sockets slot 11

93 Falsock control blocks found slot 11

CB ADR  |S|                                     LocAdr  |RemAdr  |   TaskName|
 --------|-|--------|--------|--------|

   2A5C18|2|                                      303000B|       0|         NI
Task
   2A5CE0|2|                                        5000B|       0|         NI
Task
   2A5DA8|2|                                      11A000B|       0|         NI
Task
   2A5E70|2|                                        2000B|       0|         NI
Task
   2A5F38|3|                                      115000B|   5000B|         NI
Task
   2A6000|2|                                      209000B|       0|         NI
Task
   2A60C8|3|                                      909000B|   5000B|         NI
Task
   2A6190|3|                                      809000B|100B000B|         NI
Task
   2A6258|3|                                      309000B| 308000B|         NI
Task
   2A6320|3|                                      A09000B| 303000B|         NI
Task
   2A63E8|3|                                      F09000B| 20A000B|         NI
Task
   2A64B0|3|                                      609000B|   6000B|         NI
Task
```

```
   2A6578|2|                                                208000B|       0|          NI
Task
   2A6640|3|                                                A08000B|   5000B|          NI
Task
   2A6708|3|                                                908000B|100B000B|          NI
Task
   2A67D0|3|                                                308000B| 309000B|          NI
Task
   2A6898|3|                                                708000B|   6000B|          NI
Task
   2A6960|3|                                                F08000B| 20A000B|          NI
Task
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ipc pools cmm	Displays IPC Pools on Chassis Management Modules (CMMs).
debug ipc bbus	Displays IPC pools for the Burst Bus with transmit and received count, Direct Memory Access errors, and parity errors.
debug ipc active sockets	Displays all the active sockets on Chassis Management Modules (CMMs).
debug ipc pools slot	Displays IPC pools on a particular slot.

debug fabric threshold

Displays the threshold number for each fabric ASIC. In addition, it also displays the Unicast pay generated internally using Pay algorithm and Coupons generated.

debug fabric threshold

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

This command is not valid for OS-6600 series of switches.

Examples

```
-> debug fabric threshold
Nantucket Threshold Ucst Ucst Ucst Ucst Unicast
 Number     Number  Pay3 Pay2 Pay1 Pay0 Coupon
--------- --------- ---- ---- ---- ---- -------
    0         1     330   f0   90   60    2d0
    0         2     330   f0   90   60    2d0
    0         3     330   f0   90   60    2d0
    0         4     330   f0   90   60    2d0
    0         5     330   f0   90   60    2d0
    0         6     330   f0   90   60    2d0
    0         7     330   f0   90   60    2d0
      0         8     330   f0   90   60    2d0
  0         9     330   f0   90   60    2d0
  0        10     330   f0   90   60    2d0
  0        11     330   f0   90   60    2d0
  0        12     330   f0   90   60    2d0
  0        13     660  28a  180   c0    5a0
  0        14     330   f0   90   60    2d0
  0        15     330   f0   90   60    2d0
  0        16     330   f0   90   60    2d0
  0        17     330   f0   90   60    2d0
  0        18     330   f0   90   60    2d0
  0        19     330   f0   90   60    2d0
  0        20     330   f0   90   60    2d0
  0        21     330   f0   90   60    2d0
  0        22     330   f0   90   60    2d0
  0        23     330   f0   90   60    2d0
  0        24     330   f0   90   60    2d0
  0        25     330   f0   90   60    2d0
  0        26     330   f0   90   60    2d0
```

```
     0        27     330   f0   90   60    2d0
     0        28     330   f0   90   60    2d0
     0        29     660  28a  180   c0    5a0
     0        30     330   f0   90   60    2d0
     0        31      20   20   20   20     20
     0        32     330   f0   90   60    2d0
     0        33     330   f0   90   60    2d0
     0        34     330   f0   90   60    2d0
     0        35     330   f0   90   60    2d0
     0        36     330   f0   90   60    2d0
     0        37     330   f0   90   60    2d0
     0        38     330   f0   90   60    2d0
     0        39     330   f0   90   60    2d0
     0        40     330   f0   90   60    2d0
     0        41     330   f0   90   60    2d0
     0        42     330   f0   90   60    2d0
     0        43     330   f0   90   60    2d0
     0        44     330   f0   90   60    2d0
     0        45     660  28a  180   c0    5a0
     0        46     330   f0   90   60    2d0
     0        47     330   f0   90   60    2d0
     0        48     330   f0   90   60    2d0
     0        49     330   f0   90   60    2d0
     0        50     330   f0   90   60    2d0
     0        51     330   f0   90   60    2d0
     0        52     330   f0   90   60    2d0
     0        53     330   f0   90   60    2d0
     0        54     330   f0   90   60    2d0
     0        55     330   f0   90   60    2d0
     0        56     330   f0   90   60    2d0
     0        57     330   f0   90   60    2d0
     0        58     330   f0   90   60    2d0
     0        59     330   f0   90   60    2d0
     0        60     330   f0   90   60    2d0
     0        61     660  28a  180   c0    5a0
     0        62     330   f0   90   60    2d0
     0        63      20   20   20   20     20
     0        64     330   f0   90   60    2d0
  ------- --------- ---- ---- ---- ---- -------
     1         1     330   f0   90   60    2d0
     1         2     330   f0   90   60    2d0
     1         3     330   f0   90   60    2d0
     1         4     330   f0   90   60    2d0
     1         5     330   f0   90   60    2d0
     1         6     330   f0   90   60    2d0
     1         7     330   f0   90   60    2d0
     1         8     330   f0   90   60    2d0
     1         9     330   f0   90   60    2d0
     1        10     330   f0   90   60    2d0
     1        11     330   f0   90   60    2d0
     1        12     330   f0   90   60    2d0
     1        13     660  28a  180   c0    5a0
     1        14     330   f0   90   60    2d0
     1        15     330   f0   90   60    2d0
     1        16     330   f0   90   60    2d0
     1        17     330   f0   90   60    2d0
     1        18     330   f0   90   60    2d0
     1        19     330   f0   90   60    2d0
     1        20     330   f0   90   60    2d0
     1        21     330   f0   90   60    2d0
     1        22     330   f0   90   60    2d0
     1        23     330   f0   90   60    2d0
     1        24     330   f0   90   60    2d0
     1        25     330   f0   90   60    2d0
     1        26     330   f0   90   60    2d0
     1        27     330   f0   90   60    2d0
     1        28     330   f0   90   60    2d0
     1        29     660  28a  180   c0    5a0
     1        30     330   f0   90   60    2d0
     1        31      20   20   20   20     20
     1        32     330   f0   90   60    2d0
     1        33     330   f0   90   60    2d0
     1        34     330   f0   90   60    2d0
     1        35     330   f0   90   60    2d0
     1        36     330   f0   90   60    2d0
     1        37     330   f0   90   60    2d0
     1        38     330   f0   90   60    2d0
     1        39     330   f0   90   60    2d0
     1        40     330   f0   90   60    2d0
     1        41     330   f0   90   60    2d0
     1        42     330   f0   90   60    2d0
     1        43     330   f0   90   60    2d0
     1        44     330   f0   90   60    2d0
     1        45     660  28a  180   c0    5a0
     1        46     330   f0   90   60    2d0
     1        47     330   f0   90   60    2d0
     1        48     330   f0   90   60    2d0
     1        49     330   f0   90   60    2d0
     1        50     330   f0   90   60    2d0
     1        51     330   f0   90   60    2d0
     1        52     330   f0   90   60    2d0
     1        53     330   f0   90   60    2d0
     1        54     330   f0   90   60    2d0
     1        55     330   f0   90   60    2d0
     1        56     330   f0   90   60    2d0
     1        57     330   f0   90   60    2d0
     1        58     330   f0   90   60    2d0
     1        59     330   f0   90   60    2d0
     1        60     330   f0   90   60    2d0
     1        61     660  28a  180   c0    5a0
     1        62     330   f0   90   60    2d0
     1        63      20   20   20   20     20
     1        64     330   f0   90   60    2d0
 --------- --------- ---- ---- ---- ---- -------
         2         1     330   f0   90   60    2d0
         2         2     330   f0   90   60    2d0
         2         3     330   f0   90   60    2d0
         2         4     330   f0   90   60    2d0
         2         5     330   f0   90   60    2d0
         2         6     330   f0   90   60    2d0
         2         7     330   f0   90   60    2d0
         2         8     330   f0   90   60    2d0
         2         9     330   f0   90   60    2d0
         2        10     330   f0   90   60    2d0
         2        11     330   f0   90   60    2d0
         2        12     330   f0   90   60    2d0
         2        13     660  28a  180   c0    5a0
         2        14     330   f0   90   60    2d0
```

```
      2         15      330   f0   90   60    2d0
      2         16      330   f0   90   60    2d0
      2         17      330   f0   90   60    2d0
      2         18      330   f0   90   60    2d0
      2         19      330   f0   90   60    2d0
      2         20      330   f0   90   60    2d0
      2         21      330   f0   90   60    2d0
      2         22      330   f0   90   60    2d0
      2         23      330   f0   90   60    2d0
      2         24      330   f0   90   60    2d0
      2         25      330   f0   90   60    2d0
      2         26      330   f0   90   60    2d0
      2         27      330   f0   90   60    2d0
      2         28      330   f0   90   60    2d0
      2         29      660  28a  180   c0    5a0
      2         30      330   f0   90   60    2d0
      2         31       20   20   20   20     20
      2         32      330   f0   90   60    2d0
      2         33      330   f0   90   60    2d0
      2         34      330   f0   90   60    2d0
      2         35      330   f0   90   60    2d0
      2         36      330   f0   90   60    2d0
      2         37      330   f0   90   60    2d0
      2         38      330   f0   90   60    2d0
      2         39      330   f0   90   60    2d0
      2         40      330   f0   90   60    2d0
      2         41      330   f0   90   60    2d0
      2         42      330   f0   90   60    2d0
      2         43      330   f0   90   60    2d0
      2         44      330   f0   90   60    2d0
      2         45      66  28a  180   c0    5a0
     2         46      330   f0   90   60    2d0
     2         47      330   f0   90   60    2d0
     2         48      330   f0   90   60    2d0
     2         49      330   f0   90   60    2d0
     2         50      330   f0   90   60    2d0
     2         51      330   f0   90   60    2d0
     2         52      330   f0   90   60    2d0
     2         53      330   f0   90   60    2d0
     2         54      330   f0   90   60    2d0
     2         55      330   f0   90   60    2d0
     2         56      330   f0   90   60    2d0
     2         57      330   f0   90   60    2d0
     2         58      330   f0   90   60    2d0
     2         59      330   f0   90   60    2d0
     2         60      330   f0   90   60    2d0
     2         61      660  28a  180   c0    5a0
     2         62      330   f0   90   60    2d0
     2         63       20   20   20   20     20
     2         64      330   f0   90   60    2d0
--------- --------- ---- ---- ---- ---- -------
     3          1      330   f0   90   60    2d0
     3          2      330   f0   90   60    2d0
     3          3      330   f0   90   60    2d0
     3          4      330   f0   90   60    2d0
     3          5      330   f0   90   60    2d0
     3          6      330   f0   90   60    2d0
     3          7      330   f0   90   60    2d0
     3          8      330   f0   90   60    2d0
```

```
        3         9     330   f0   90   60    2d0
        3        10     330   f0   90   60    2d0
        3        11     330   f0   90   60    2d0
        3        12     330   f0   90   60    2d0
        3        13     660  28a  180   c0    5a0
        3        14     330   f0   90   60    2d0
        3        15     330   f0   90   60    2d0
        3        16     330   f0   90   60    2d0
        3        17     330   f0   90   60    2d0
        3        18     330   f0   90   60    2d0
        3        19     330   f0   90   60    2d0
        3        20     330   f0   90   60    2d0
        3        21     330   f0   90   60    2d0
        3        22     330   f0   90   60    2d0
        3        23     330   f0   90   60    2d0
        3        24     330   f0   90   60    2d0
        3        25     330   f0   90   60    2d0
        3        26     330   f0   90   60    2d0
        3        27     330   f0   90   60    2d0
        3        28     330   f0   90   60    2d0
        3        29     660  28a  180   c0    5a0
        3        30     330   f0   90   60    2d0
        3        31      20   20   20   20     20
        3        32     330   f0   90   60    2d0
        3        33     330   f0   90   60    2d0
        3        34     330   f0   90   60    2d0
        3        35     330   f0   90   60    2d0
        3        36     330   f0   90   60    2d0
        3        37     330   f0   90   60    2d0
        3        38     330   f0   90   60    2d0
        3        39     330   f0   90   60    2d0
        3        40     330   f0   90   60    2d0
        3        41     330   f0   90   60    2d0
        3        42     330   f0   90   60    2d0
        3        43     330   f0   90   60    2d0
        3        44     330   f0   90   60    2d0
        3        45     660  28a  180   c0    5a0
        3        46     330   f0   90   60    2d0
        3        47     330   f0   90   60    2d0
        3        48     330   f0   90   60    2d0
        3        49     330   f0   90   60    2d0
        3        50     330   f0   90   60    2d0
        3        51     330   f0   90   60    2d0
        3        52     330   f0   90   60    2d0
        3        53     330   f0   90   60    2d0
        3        54     330   f0   90   60    2d0
        3        55     330   f0   90   60    2d0
        3        56     330   f0   90   60    2d0
        3        57     330   f0   90   60    2d0
        3        58     330   f0   90   60    2d0
        3        59     330   f0   90   60    2d0
        3        60     330   f0   90   60    2d0
        3        61     660  28a  180   c0    5a0
        3        62     330   f0   90   60    2d0
        3        63      20   20   20   20     20
        3        64     330   f0   90   60    2d0
--------- --------- ---- ---- ---- ---- -------
        4         1     330   f0   90   60    2d0
        4         2     330   f0   90   60    2d0
```

```
     4          3     330    f0    90    60     2d0
     4          4     330    f0    90    60     2d0
     4          5     330    f0    90    60     2d0
     4          6     330    f0    90    60     2d0
     4          7     330    f0    90    60     2d0
     4          8     330    f0    90    60     2d0
     4          9     330    f0    90    60     2d0
     4         10     330    f0    90    60     2d0
     4         11     330    f0    90    60     2d0
     4         12     330    f0    90    60     2d0
     4         13     660   28a   180    c0     5a0
     4         14     330    f0    90    60     2d0
     4         15     330    f0    90    60     2d0
     4         16     330    f0    90    60     2d0
     4         17     330    f0    90    60     2d0
     4         18     330    f0    90    60     2d0
     4         19     330    f0    90    60     2d0
     4         20     330    f0    90    60     2d0
     4         21     330    f0    90    60     2d0
     4         22     330    f0    90    60     2d0
     4         23     330    f0    90    60     2d0
     4         24     330    f0    90    60     2d0
     4         25     330    f0    90    60     2d0
     4         26     330    f0    90    60     2d0
     4         27     330    f0    90    60     2d0
     4         28     330    f0    90    60     2d0
     4         29     660   28a   180    c0     5a0
     4         30     330    f0    90    60     2d0
     4         31      20    20    20    20      20
     4         32     330    f0    90    60     2d0
     4         33     330    f0    90    60     2d0
     4         34     330    f0    90    60     2d0
     4         35     330    f0    90    60     2d0
     4         36     330    f0    90    60     2d0
     4         37     330    f0    90    60     2d0
     4         38     330    f0    90    60     2d0
     4         39     330    f0    90    60     2d0
     4         40     330    f0    90    60     2d0
     4         41     330    f0    90    60     2d0
     4         42     330    f0    90    60     2d0
     4         43     330    f0    90    60     2d0
     4         44     330    f0    90    60     2d0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric status

Displays the overall status of all the fabric ASICs. It displays the chip version and netlist version being used. In addition, it also displays if any internal or external interrupts were received.

debug fabric status

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

This command is not valid for OS-6600 series of switches.

Examples

```
-> debug fabric status
 Nantucket  Chip   Netlist  Internal   External
  Number   Version Version Interrupts Interrupts
 --------- ------- ------- ---------- ----------
     0        1       8        No         No
     1        1       8        No         No
     2        1       8        No         No
     3        1       8        No         No
     4        1       8        No         No
     5        1       8        No         No
     6        1       8        No         No
     7        1       8        No         No

 RFL Count RLS Count NBI Count NBE Count FL Count
 --------- --------- --------- --------- --------
         0         0         0         0        0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric stats	Displays the fabric ASIC statistics.

debug fabric stats

Displays the fabric ASIC statistics.

debug fabric stats

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- “Unicast In” should be equal to the “Unicast Out”.
- For Multicast, multicast in will be different from multicast out. Iteration of this command should show the queues moving.

Examples

```
-> debug fabric stats
 Nantucket Unicast Unicast Unicast  Dummy
   Number      In     Out   Attempt  Count
  --------- ------- ------- ------- -------
      0      884282  884282  884282  140584
      1      884282  884282  884282  140584
      2      884283  884283  884283  140584
      3      884283  884283  884283  140584
      4     884283  884283  884283  140584
      5     884283  884283  884283  140584
      6      884283  884284  884284  140584
      7      884284  884284  884284  140584

  Nantucket Multicast Multicast Multicast
   Number      In        Out      Attempt
  --------- --------- --------- ---------
      0       269345    631193    269345
      1       269345    631193    269345
      2       269345    631193    269345
      3       269345    631193    269345
      4       269345    631193    269345
      5       269345    631193    269345
      6       269345    631193    269345
      7       269345    631193    269345
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.

debug fabric output

Displays the fabric ASIC port number and the frame count.

debug fabric output

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- Each fabric ASIC has 16 ports in case of 7800 and 8 port in case of 7700.
- The frame count on the similar ports for all the fabric ASICs should be same.

Examples

```
-> debug fabric output
Nantucket   Port   Frame
  Number   Number  Count
 --------- ------ -------
     0        0     55509
     0        1     59200
     0        2     55029
     0        3     55110
     0        4     45451
     0        5     47993
     0        6     31451
     0        7     45447
     0        8     47328
     0        9     47327
     0       10      9005
     0       11     59975
     0       12     59988
     0       13     45449
     0       14     48030
     0       15     62795
 --------- ------ -------
     1        0     55509
     1        1     59200
     1        2     55029
     1        3     55110
     1        4     45451
     1        5     47993
```

```
        1        6     31451
        1        7     45447
        1        8     47328
        1        9     47327
        1       10      9006
        1       11     59975
        1       12     59988
        1       13     45449
        1       14     48030
        1       15     62795
--------- ------ -------
        2        0     55509
        2        1     59200
        2        2     55029
        2        3     55110
        2        4     45451
        2        5     47993
        2        6     31452
        2        7     45447
        2        8     47328
        2        9     47327
        2       10      9006
        2       11     59975
        2       12     59988
        2       13     45449
        2       14     48030
        2       15     62795
--------- ------ -------
        3        0     55509
        3        1     59202
        3        2     55029
        3        3     55110
        3        4     45451
        3        5     47993
        3        6     31452
        3        7     45447
        3        8     47328
        3        9     47327
        3       10      9006
        3       11     59975
        3       12     59988
        3       13     45449
        3       14     48030
        3       15     62795
--------- ------ -------
        4        0     55509
        4        1     59202
        4        2     55029
        4        3     55110
        4        4     45451
        4        5     47993
        4        6     31452
        4        7     45447
        4        8     47328
        4        9     47327
        4       10      9008
        4       11     59975
        4       12     59988
        4       13     45449
```

```
      4        14     48030
      4        15     62795
  --------- ------ -------
      5         0     55509
      5         1     59202
      5         2     55029
      5         3     55110
      5         4     45451
      5         5     47993
      5         6     31452
      5         7     45449
      5         8     47328
      5         9     47327
      5        10      9008
      5        11     59975
      5        12     59988
      5        13     45449
      5        14     48031
      5        15     62795
  --------- ------ -------
      6         0     55509
      6         1     59202
      6         2     55029
      6         3     55110
      6         4     45451
      6         5     47993
      6         6     31452
      6         7     45450
      6         8     47328
      6         9     47327
      6        10      9008
      6        11     59975
      6        12     59988
      6        13     45449
      6        14     48032
      6        15     62795
  --------- ------ -------
      7         0     55509
      7         1     59202
      7         2     55029
      7         3     55110
      7         4     45452
      7         5     47993
      7         6     31452
      7         7     45450
      7         8     47328
      7         9     47327
      7        10      9008
      7        11     59975
      7        12     59988
      7        13     45449
      7        14     48032
      7        15     62795
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric mcvectors

Displays the Fabric ASIC port number and the frame count for multicast packets.

debug fabric mcvectors

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- Each fabric ASIC has 16 ports in case of 7800 and 8 port in case of 7700.
- The frame count on the similar ports for all the fabric ASICs should be same.

Examples

```
->debug fabric mcvector
Nantucket  Vlan  Multicast
  Number   Number  Vector
 --------- ------ ---------
     0        1    de6d
     0       50     404
     0       51     404
     0       52     404
     0       53     404
     0       54     404
     0       55     404
     0       56     404
     0       57     404
     0       58     404
     0       59     404
     0       60     404
     0       61     404
     0       62     404
     0      100       5
     0      102       4
     0      103       4
     0      104      44
     0      105      44
    0      106      4
    0      107      4
    0      108     24
    0      109     24
```

```
        0       110        c
        0       111        c
        0       112     4004
        0       114     1006
        0       115        4
        0       116        4
        0       117      804
        0       130      804
        0       140        7
        0       141        5
        0       150     586d
        0       211     4004
        0       212     1004
        0       311        4
        0       411        4
        0       511        5
        0       611        6
        0       711        4
    --------- ------ ---------
        1         1     de6d
         1        50     404
         1        51     404
         1        52     404
         1        53     404
         1        54     404
         1        55     404
         1        56     404
         1        57     404
         1        58     404
         1        59     404
         1        60     404
         1        61     404
         1        62     404
         1       100       5
         1       102       4
         1       103       4
         1       104      44
         1       105      44
         1       106       4
         1       107       4
         1       108      24
         1       109      24
         1       110       c
         1       111       c
         1       112    4004
         1       114    1006
         1       115       4
         1       116       4
         1       117     804
         1       130     804
         1       140       7
         1       141       5
         1       150    586d
         1       211    4004
         1       212    1004
         1       311       4
         1       411       4
         1       511       5
         1       611       6
         1       711        4
  --------- ------ ---------
         2         1    de6d
         2        50     404
         2        51     404
         2        52     404
         2        53     404
         2        54     404
         2        55     404
        2        56     404
        2        57     404
        2        58     404
        2        59     404
        2        60     404
        2        61     404
        2        62     404
        2       100       5
        2       102       4
        2       103       4
        2       104      44
        2       105      44
        2       106       4
        2       107       4
        2       108      24
        2       109      24
        2       110       c
        2       111       c
        2       112    4004
        2       114    1006
        2       115       4
        2       116       4
        2       117     804
        2       130     804
        2       140       7
        2       141       5
        2       150    586d
        2       211    4004
        2       212    1004
        2       311       4
        2       411       4
        2       511       5
        2       611       6
        2       711       4
 --------- ------ ---------
        3         1    de6d
        3        50     404
        3        51     404
        3        52     404
        3        53     404
        3        54     404
        3        55     404
        3        56     404
        3        57     404
        3        58     404
        3        59     404
        3        60     404
        3        61     404
        3        62     404
        3       100       5
```

```
       3       102        4
       3       103        4
       3       104       44
       3       105       44
       3       106        4
       3       107        4
       3       108       24
       3       109       24
       3       110        c
       3       111        c
       3       112     4004
       3       114     1006
       3       115        4
       3       116        4
       3       117      804
       3       130      804
       3       140        7
       3       141        5
       3       150     586d
       3       211     4004
       3       212     1004
       3       311        4
       3       411        4
       3       511        5
       3       611        6
       3       711        4
--------- ------ ---------
       4         1     de6d
       4        50      404
       4        51      404
       4        52      404
       4        53      404
       4        54      404
       4        55      404
       4        56      404
       4        57      404
       4        58      404
       4        59      404
       4        60      404
       4        61      404
       4        62      404
       4       100        5
       4       102        4
       4       103        4
       4       104       44
       4       105       44
       4       106        4
       4       107        4
       4       108       24
       4       109       24
       4       110        c
       4       111        c
       4       112     4004
       4       114     1006
       4       115        4
       4       116        4
       4       117      804
       4       130      804
       4       140        7
```

```
         4       141        5
         4       150     586d
         4       211     4004
         4       212     1004
         4       311        4
         4       411        4
         4       511        5
         4       611        6
         4       711        4
 --------- ------ ---------
         5         1     de6d
         5        50      404
         5        51      404
         5        52      404
         5        53      404
         5        54      404
         5        55      404
         5        56      404
         5        57      404
         5        58      404
         5        59      404
         5        60      404
         5        61      404
         5        62      404
         5       100        5
         5       102        4
         5       103        4
         5       104       44
         5       105       44
         5       106        4
         5       107        4
         5       108       24
         5       109       24
         5       110        c
         5       111        c
         5       112     4004
         5       114     1006
         5       115        4
         5       116        4
         5       117      804
         5       130      804
         5       140        7
         5       141        5
         5       150     586d
         5       211     4004
         5       212     1004
         5       311        4
         5       411        4
         5       511        5
         5       611        6
         5       711        4
 --------- ------ ---------
         6         1     de6d
         6        50      404
         6        51      404
         6        52      404
         6        53      404
         6        54      404
         6        55      404
```

```
        6        56     404
        6        57     404
        6        58     404
        6        59     404
        6        60     404
        6        61     404
        6        62     404
        6       100       5
        6       102       4
        6       103       4
        6       104      44
        6       105      44
        6       106       4
        6       107       4
        6       108      24
        6       109      24
        6       110       c
        6       111       c
        6       112    4004
        6       114    1006
        6       115       4
        6       116       4
        6       117     804
        6       130     804
        6       140       7
        6       141       5
        6       150    586d
        6       211    4004
        6       212    1004
        6       311       4
        6       411       4
        6       511       5
        6       611       6
        6       711       4
--------- ------ ---------
        7         1    de6d
        7        50     404
        7        51     404
        7        52     404
        7        53     404
        7        54     404
        7        55     404
        7        56     404
        7        57     404
        7        58     404
        7        59     404
        7        60     404
        7        61     404
        7        62     404
        7       100       5
        7       102       4
        7       103       4
        7       104      44
        7       105      44
        7       106       4
        7       107       4
        7       108      24
        7       109      24
        7       110       c
```

```
    7        111       c
    7        112    4004
    7        114    1006
    7        115       4
    7        116       4
    7        117     804
    7        130     804
    7        140       7
    7        141       5
    7        150    586d
    7        211    4004
    7        212    1004
    7        311       4
    7        411       4
    7        511       5
    7        611       6
    7        711       4
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric input

Displays the fabric ASIC port number, frame count, and error count.

debug fabric input

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- Each fabric ASIC has 16 ports in case of 7800 and 8 port in case of 7700.
- The frame count on the similar ports for all the fabric ASICs should be same.
- There should be no errors on any fabric.

Examples

```
-> debug fabric input
  Nantucket Port    Frame   Error
  Number    Number  Count   Count
 --------- ------ ------- -------
     0        0   5405287       0
     0        1   5129581       0
     0        2   5135540       0
     0        3   5149705       0
     0        4         0       0
     0        5   5157878       0
     0        6   5170104       0
     0        7         0       0
     0        8   5125861       0
     0        9   5134184       0
     0       10   5281984       0
     0       11   5134611       0
     0       12   5135085       0
     0       13         0       0
     0       14   5157432       0
     0       15   5135397       0
 --------- ------ ------- -------
     1        0   5405287       0
     1        1   5129581       0
     1        2   5135540       0
     1        3   5149705       0
     1        4         0       0
```

```
        1        5   5157878       0
        1        6   5170104       0
        1        7         0       0
        1        8   5125861       0
        1        9   5134184       0
        1       10   5281984       0
        1       11   5134611       0
        1       12   5135085       0
        1       13         0       0
        1       14   5157433       0
        1       15   5135397       0
--------- ------ ------- -------
        2        0   5405287       0
        2        1   5129581       0
        2        2   5135540       0
        2        3   5149706       0
        2        4         0       0
        2        5   5157878       0
        2        6   5170105       0
        2        7         0       0
        2        8   5125862       0
        2        9   5134184       0
        2       10   5281985       0
        2       11   5134612       0
        2       12   5135085       0
        2       13         0       0
        2       14   5157433       0
        2       15   5135397       0
--------- ------ ------- -------
        3        0   5405287       0
        3        1   5129582       0
        3        2   5135540       0
        3        3   5149706       0
        3        4         0       0
        3        5   5157878       0
        3        6   5170105       0
        3        7         0       0
        3        8   5125862       0
        3        9   5134185       0
        3       10   5281985       0
        3       11   5134612       0
        3       12   5135085       0
        3       13         0       0
        3       14   5157433       0
        3       15   5135398       0
--------- ------ ------- -------
        4        0   5405287       0
        4        1   5129582       0
        4        2   5135540       0
        4        3   5149706       0
        4        4         0       0
        4        5   5157878       0
        4        6   5170105       0
        4        7         0       0
        4        8   5125862       0
        4        9   5134185       0
        4       10   5281985       0
        4       11   5134612       0
        4       12   5135086       0
        4       13         0       0
        4       14   5157433       0
        4       15   5135398       0
 --------- ------ ------- -------
        5        0   5405287       0
        5        1   5129582       0
        5        2   5135541       0
        5        3   5149706       0
        5        4         0       0
        5        5   5157879       0
        5        6   5170105       0
        5        7         0       0
        5        8   5125862       0
        5        9   5134185       0
        5       10   5281985       0
        5       11   5134612       0
        5       12   5135086       0
        5       13         0       0
        5       14   5157434       0
        5       15   5135398       0
 --------- ------ ------- -------
        6        0   5405287       0
        6        1   5129582       0
        6        2   5135541       0
        6        3   5149706       0
        6        4         0       0
        6        5   5157879       0
        6        6   5170105       0
        6        7         0       0
        6        8   5125862       0
        6        9   5134185       0
        6       10   5281985       0
        6       11   5134612       0
        6       12   5135086       0
        6       13         0       0
        6       14   5157434       0
        6       15   5135398       0
 --------- ------ ------- -------
        7        0   5405287       0
        7        1   5129582       0
        7        2   5135541       0
        7        3   5149707       0
        7        4         0       0
        7        5   5157879       0
        7        6   5170106       0
        7        7         0       0
        7        8   5125863       0
        7        9   5134185       0
        7       10   5281986       0
        7       11   5134613       0
        7       12   5135086       0
        7       13         0       0
        7       14   5157434       0
        7       15   5135398       0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric fbus

Displays the fabric ASIC port number and the synchronization status for all the FBUSs.

debug fabric fbus

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- Each fabric ASIC has 16 ports in case of 7800 and 8 port in case of 7700.
- The synchronization status on the similar ports for all the fabric ASICs should be same.

Examples

```
-> debug fabric fbus
Nantucket  Port  Descrambler  8b9b   Link
  Number   Number    Lock      Lock  In Sync
 --------- ------ ----------- ------ -------
     0        0      Yes         Yes    Yes
     0        1      Yes         Yes    Yes
     0        2      Yes         Yes    Yes
     0        3      Yes         Yes    Yes
     0        4      No          No     No
     0        5      Yes         Yes    Yes
     0        6      Yes         Yes    Yes
     0        7      No          No     No
     0        8      Yes         Yes    Yes
     0        9      Yes         Yes    Yes
     0       10      Yes         Yes    Yes
     0       11      Yes         Yes    Yes
     0       12      Yes         Yes    Yes
     0       13      No          No     No
     0       14      Yes         Yes    Yes
     0       15      Yes         Yes    Yes
 --------- ------ ----------- ------ -------
     1        0      Yes         Yes    Yes
     1        1      Yes         Yes    Yes
     1        2      Yes         Yes    Yes
     1        3      Yes         Yes    Yes
     1        4      No          No     No
     1        5      Yes         Yes    Yes
```

```
    1        6      Yes         Yes    Yes
    1        7      No          No     No
    1        8      Yes         Yes    Yes
    1        9      Yes         Yes    Yes
    1       10      Yes         Yes    Yes
    1       11      Yes         Yes    Yes
    1       12      Yes         Yes    Yes
    1       13      No          No     No
    1       14      Yes         Yes    Yes
    1       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    2        0      Yes         Yes    Yes
    2        1      Yes         Yes    Yes
    2        2      Yes         Yes    Yes
    2        3      Yes         Yes    Yes
    2        4      No          No     No
    2        5      Yes         Yes    Yes
    2        6      Yes         Yes    Yes
    2        7      No          No     No
    2        8      Yes         Yes    Yes
    2        9      Yes         Yes    Yes
    2       10      Yes         Yes    Yes
    2       11      Yes         Yes    Yes
    2       12      Yes         Yes    Yes
    2       13      No          No     No
    2       14      Yes         Yes    Yes
    2       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    3        0      Yes         Yes    Yes
    3        1      Yes         Yes    Yes
    3        2      Yes         Yes    Yes
    3        3      Yes         Yes    Yes
    3        4      No          No     No
    3        5      Yes         Yes    Yes
    3        6      Yes         Yes    Yes
    3        7      No          No     No
    3        8      Yes         Yes    Yes
    3        9      Yes         Yes    Yes
    3       10      Yes         Yes    Yes
    3       11      Yes         Yes    Yes
    3       12      Yes         Yes    Yes
    3       13      No          No     No
    3       14      Yes         Yes    Yes
    3       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    4        0      Yes         Yes    Yes
    4        1      Yes         Yes    Yes
    4        2      Yes         Yes    Yes
    4        3      Yes         Yes    Yes
    4        4      No          No     No
    4        5      Yes         Yes    Yes
    4        6      Yes         Yes    Yes
    4        7      No          No     No
    4        8      Yes         Yes    Yes
    4        9      Yes         Yes    Yes
    4       10      Yes         Yes    Yes
    4       11      Yes         Yes    Yes
    4       12      Yes         Yes    Yes
    4       13      No          No     No
    4       14      Yes         Yes    Yes
    4       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    5        0      Yes         Yes    Yes
    5        1      Yes         Yes    Yes
    5        2      Yes         Yes    Yes
    5        3      Yes         Yes    Yes
    5        4      No          No     No
    5        5      Yes         Yes    Yes
    5        6      Yes         Yes    Yes
    5        7      No          No     No
    5        8      Yes         Yes    Yes
    5        9      Yes         Yes    Yes
    5       10      Yes         Yes    Yes
    5       11      Yes         Yes    Yes
    5       12      Yes         Yes    Yes
    5       13      No          No     No
    5       14      Yes         Yes    Yes
    5       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    6        0      Yes         Yes    Yes
    6        1      Yes         Yes    Yes
    6        2      Yes         Yes    Yes
    6        3      Yes         Yes    Yes
    6        4      No          No     No
    6        5      Yes         Yes    Yes
    6        6      Yes         Yes    Yes
    6        7      No          No     No
    6        8      Yes         Yes    Yes
    6        9      Yes         Yes    Yes
    6       10      Yes         Yes    Yes
    6       11      Yes         Yes    Yes
    6       12      Yes         Yes    Yes
    6       13      No          No     No
    6       14      Yes         Yes    Yes
    6       15      Yes         Yes    Yes
--------- ------ ----------- ------ -------
    7        0      Yes         Yes    Yes
    7        1      Yes         Yes    Yes
    7        2      Yes         Yes    Yes
    7        3      Yes         Yes    Yes
    7        4      No          No     No
    7        5      Yes         Yes    Yes
    7        6      Yes         Yes    Yes
    7        7      No          No     No
    7        8      Yes         Yes    Yes
    7        9      Yes         Yes    Yes
    7       10      Yes         Yes    Yes
    7       11      Yes         Yes    Yes
    7       12      Yes         Yes    Yes
    7       13      No          No     No
    7       14      Yes         Yes    Yes
    7       15      Yes         Yes    Yes
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric errors

Displays the errors detected for all the fabric ASICs on a switch.

debug fabric errors

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

This command is only not for OS-6600 series of switches.

Examples

```
- >debug fabric errors
Nantucket  B04   B08  Framing Parity
  Number   Error Error  Error  Error
 --------- ----- ----- ------- ------
    0        No    No     No      No
    1        No    No     No      No
    2        No    No     No      No
    3        No    No     No      No
    4        No    No     No      No
    5        No    No     No      No
    6        No    No     No      No
    7        No    No     No      No
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug fabric calendars

Displays the fabric ASIC port number, calendar number, and the calendar length.

debug fabric calendars

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command is not valid for OS-6600 series of switches.
- Each fabric ASIC has 16 ports in case of 7800 and 8 port in case of 7700.
- The calendar number and length should be the same for all the similar ports on all the fabric ASICs.

Examples

```
-> debug fabric calendars
Nantucket  Calendar Calendar
  Number    Number   Length
 --------- -------- --------
     0         1        2
     0         2       24
     0         3        1
     0         4        2
     0         5       24
     0         6        2
     0         7        2
     0         8       24
     0         9        2
     0        10       24
     0        11        2
     0        12        2
     0        13        2
     0        14       24
     0        15        2
     0        16       24
 --------- -------- --------
     1         1        2
     1         2       24
     1         3        1
     1         4        2
     1         5       24
     1         6        2
```

```
        1         7        2
        1         8       24
        1         9        2
        1        10       24
        1        11        2
        1        12        2
        1        13        2
        1        14       24
        1        15        2
        1        16       24
   --------- -------- --------
        2         1        2
        2         2       24
        2         3        1
        2         4        2
        2         5       24
        2         6        2
        2         7        2
        2         8       24
        2         9        2
        2        10       24
        2        11        2
        2        12        2
        2        13        2
        2        14       24
        2        15        2
        2        16       24
   --------- -------- --------
        3         1        2
        3         2       24
        3         3        1
        3         4        2
        3         5       24
        3         6        2
        3         7        2
        3         8       24
        3         9        2
        3        10       24
        3        11        2
        3        12        2
        3        13        2
        3        14       24
        3        15        2
        3        16       24
  --------- -------- --------
        4         1        2
        4         2       24
        4         3        1
        4         4        2
        4         5       24
        4         6        2
        4         7        2
        4         8       24
        4         9        2
        4        10       24
        4        11        2
        4        12        2
        4        13        2
        4        14       24
```

```
      4         15         2
      4         16        24
    --------- -------- --------
      5          1         2
      5          2        24
      5          3         1
      5          4         2
      5          5        24
      5          6         2
      5          7         2
      5          8        24
      5          9         2
      5         10        24
      5         11         2
      5         12         2
      5         13         2
      5         14        24
      5         15         2
      5         16        24
    --------- -------- --------
      6          1         2
      6          2        24
      6          3         1
      6          4         2
      6          5        24
      6          6         2
      6          7         2
      6          8        24
      6          9         2
      6         10        24
      6         11         2
      6         12         2
      6         13         2
     6         14        24
     6         15         2
     6         16        24
   --------- -------- --------
     7          1         2
     7          2        24
     7          3         1
     7          4         2
     7          5        24
     7          6         2
     7          7         2
     7          8        24
     7          9         2
     7         10        24
     7         11         2
     7         12         2
     7         13         2
     7         14        24
     7         15         2
     7         16        24
   Nan Cal  Cal
    Num Num Entry
    --- --- ----- --- --- --- --- --- --- --- ---
     0   1   1- 8   c  1c   0   0   0   0   0   0
             9-16   0   0   0   0   0   0   0   0
            17-24   0   0   0   0   0   0   0   0
```

```
        25-32   0   0   0   0   0   0   0   0
 0    2  1- 8  20  21  22  23  24  25  26  27
         9-16  28  29  2a  2b  30  31  32  33
        17-24  34  35  36  37  38  39  3a  3b
        25-32  20  20  20  20  20  20  20  20
 0    3  1- 8  57  41  42  43  44  45  50  51
         9-16  52  53  54  55  40  40  40  40
        17-24  40  40  40  40  40  40  40  40
        25-32  40  40  40  40  40  40  40  40
 0    4  1- 8  6c  7c  60  60  60  60  60  60
         9-16  60  60  60  60  60  60  60  60
        17-24  60  60  60  60  60  60  60  60
        25-32  60  60  60  60  60  60  60  60
 0    5  1- 8  80  81  82  83  84  85  86  87
         9-16  88  89  8a  8b  90  91  92  93
        17-24  94  95  96  97  98  99  9a  9b
        25-32  80  80  80  80  80  80  80  80
 0    6  1- 8  ac  bc  a0  a0  a0  a0  a0  a0
         9-16  a0  a0  a0  a0  a0  a0  a0  a0
        17-24  a0  a0  a0  a0  a0  a0  a0  a0
        25-32  a0  a0  a0  a0  a0  a0  a0  a0
 0    7  1- 8  cc  dc  c0  c0  c0  c0  c0  c0
         9-16  c0  c0  c0  c0  c0  c0  c0  c0
        17-24  c0  c0  c0  c0  c0  c0  c0  c0
        25-32  c0  c0  c0  c0  c0  c0  c0  c0
 0    8  1- 8  e0  e1  e2  e3  e4  e5  e6  e7
         9-16  e8  e9  ea  eb  f0  f1  f2  f3
        17-24  f4  f5  f6  f7  f8  f9  fa  fb
        25-32  e0  e0  e0  e0  e0  e0  e0  e0
 0    9  1- 8 10c 11c 100 100 100 100 100 100
         9-16 100 100 100 100 100 100 100 100
        17-24 100 100 100 100 100 100 100 100
        25-32 100 100 100 100 100 100 100 100
 0   10  1- 8 120 121 122 123 124 125 126 127
         9-16 128 129 12a 12b 130 131 132 133
        17-24 134 135 136 137 138 139 13a 13b
        25-32 120 120 120 120 120 120 120 120
 0   11  1- 8 14c 15c 140 140 140 140 140 140
         9-16 140 140 140 140 140 140 140 140
        17-24 140 140 140 140 140 140 140 140
        25-32 140 140 140 140 140 140 140 140
 0   12  1- 8 16c 17c 160 160 160 160 160 160
         9-16 160 160 160 160 160 160 160 160
        17-24 160 160 160 160 160 160 160 160
        25-32 160 160 160 160 160 160 160 160
 0   13  1- 8 18c 19c 180 180 180 180 180 180
         9-16 180 180 180 180 180 180 180 180
        17-24 180 180 180 180 180 180 180 180
        25-32 180 180 180 180 180 180 180 180
 0   14  1- 8 1a0 1a1 1a2 1a3 1a4 1a5 1a6 1a7
         9-16 1a8 1a9 1aa 1ab 1b0 1b1 1b2 1b3
        17-24 1b4 1b5 1b6 1b7 1b8 1b9 1ba 1bb
        25-32 1a0 1a0 1a0 1a0 1a0 1a0 1a0 1a0
 0   15  1- 8 1cc 1dc 1c0 1c0 1c0 1c0 1c0 1c0
         9-16 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
        17-24 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
        25-32 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
 0   16  1- 8 1e0 1e1 1e2 1e3 1e4 1e5 1e6 1e7
         9-16 1e8 1e9 1ea 1eb 1f0 1f1 1f2 1f3
```

```
          17-24 1f4 1f5 1f6 1f7 1f8 1f9 1fa 1fb
          25-32 1e0 1e0 1e0 1e0 1e0 1e0 1e0 1e0
 --- --- ----- --- --- --- --- --- --- --- ---
   1   1   1- 8   c  1c   0   0   0   0   0   0
           9-16   0   0   0   0   0   0   0   0
          17-24   0   0   0   0   0   0   0   0
          25-32   0   0   0   0   0   0   0   0
   1   2   1- 8  20  21  22  23  24  25  26  27
           9-16  28  29  2a  2b  30  31  32  33
17-24 34  35  36  37  38  39  3a  3b
          25-32   0   0   0   0   0   0   0   0
   1   2   1- 8  20  21  22  23  24  25  26  27
           9-16  28  29  2a  2b  30  31  32  33
          17-24  34  35  36  37  38  39  3a  3b
          25-32  20  20  20  20  20  20  20  20
   1   3   1- 8  57  41  42  43  44  45  50  51
           9-16  52  53  54  55  40  40  40  40
          17-24  40  40  40  40  40  40  40  40
          25-32  40  40  40  40  40  40  40  40
   1   4   1- 8  6c  7c  60  60  60  60  60  60
           9-16  60  60  60  60  60  60  60  60
          17-24  60  60  60  60  60  60  60  60
          25-32  60  60  60  60  60  60  60  60
   1   5   1- 8  80  81  82  83  84  85  86  87
           9-16  88  89  8a  8b  90  91  92  93
          17-24  94  95  96  97  98  99  9a  9b
          25-32  80  80  80  80  80  80  80  80
   1   6   1- 8  ac  bc  a0  a0  a0  a0  a0  a0
           9-16  a0  a0  a0  a0  a0  a0  a0  a0
          17-24  a0  a0  a0  a0  a0  a0  a0  a0
          25-32  a0  a0  a0  a0  a0  a0  a0  a0
   1   7   1- 8  cc  dc  c0  c0  c0  c0  c0  c0
           9-16  c0  c0  c0  c0  c0  c0  c0  c0
          17-24  c0  c0  c0  c0  c0  c0  c0  c0
          25-32  c0  c0  c0  c0  c0  c0  c0  c0
   1   8   1- 8  e0  e1  e2  e3  e4  e5  e6  e7
           9-16  e8  e9  ea  eb  f0  f1  f2  f3
17-24 f4  f5  f6  f7  f8  f9  fa  fb
          25-32 1a0 1a0 1a0 1a0 1a0 1a0 1a0 1a0
   1  15   1- 8 1cc 1dc 1c0 1c0 1c0 1c0 1c0 1c0
           9-16 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
          17-24 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
          25-32 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
   1  16   1- 8 1e0 1e1 1e2 1e3 1e4 1e5 1e6 1e7
           9-16 1e8 1e9 1ea 1eb 1f0 1f1 1f2 1f3
          17-24 1f4 1f5 1f6 1f7 1f8 1f9 1fa 1fb
          25-32 1e0 1e0 1e0 1e0 1e0 1e0 1e0 1e0
 --- --- ----- --- --- --- --- --- --- --- ---
   2   1   1- 8   c  1c   0   0   0   0   0   0
           9-16   0   0   0   0   0   0   0   0
          17-24   0   0   0   0   0   0   0   0
          25-32   0   0   0   0   0   0   0   0
   2   2   1- 8  20  21  22  23  24  25  26  27
           9-16  28  29  2a  2b  30  31  32  33
          17-24  34  35  36  37  38  39  3a  3b
          25-32  20  20  20  20  20  20  20  20
   2   3   1- 8  57  41  42  43  44  45  50  51
           9-16  52  53  54  55  40  40  40  40
          17-24  40  40  40  40  40  40  40  40
          25-32  40  40  40  40  40  40  40  40
  2   4    1- 8  6c  7c  60  60  60  60  60  60
9-16 60   60  60  60  60  60  60  60
         17-24  60  60  60  60  60  60  60  60
         25-32  60  60  60  60  60  60  60  60
 2   5    1- 8  80  81  82  83  84  85  86  87
          9-16  88  89  8a  8b  90  91  92  93
         17-24  94  95  96  97  98  99  9a  9b
         25-32  80  80  80  80  80  80  80  80
 2   6    1- 8  ac  bc  a0  a0  a0  a0  a0  a0
          9-16  a0  a0  a0  a0  a0  a0  a0  a0
         17-24  a0  a0  a0  a0  a0  a0  a0  a0
         25-32  a0  a0  a0  a0  a0  a0  a0  a0
 2   7    1- 8  cc  dc  c0  c0  c0  c0  c0  c0
          9-16  c0  c0  c0  c0  c0  c0  c0  c0
         17-24  c0  c0  c0  c0  c0  c0  c0  c0
         25-32  c0  c0  c0  c0  c0  c0  c0  c0
 2   8    1- 8  e0  e1  e2  e3  e4  e5  e6  e7
          9-16  e8  e9  ea  eb  f0  f1  f2  f3
         17-24  f4  f5  f6  f7  f8  f9  fa  fb
         25-32  e0  e0  e0  e0  e0  e0  e0  e0
 2   9    1- 8 10c 11c 100 100 100 100 100 100
          9-16 100 100 100 100 100 100 100 100
         17-24 100 100 100 100 100 100 100 100
         25-32 100 100 100 100 100 100 100 100
 2  10    1- 8 120 121 122 123 124 125 126 127
          9-16 128 129 12a 12b 130 131 132 133
          17-24 134 135 136 137 138 139 13a 13b
          25-32 120 120 120 120 120 120 120 120
  2  11    1- 8 14c 15c 140 140 140 140 140 140
           9-16 140 140 140 140 140 140 140 140
          17-24 140 140 140 140 140 140 140 140
          25-32 140 140 140 140 140 140 140 140
  2  12    1- 8 16c 17c 160 160 160 160 160 160
           9-16 160 160 160 160 160 160 160 160
          17-24 160 160 160 160 160 160 160 160
          25-32 160 160 160 160 160 160 160 160
  2  13    1- 8 18c 19c 180 180 180 180 180 180
           9-16 180 180 180 180 180 180 180 180
          17-24 180 180 180 180 180 180 180 180
          25-32 180 180 180 180 180 180 180 180
  2  14    1- 8 1a0 1a1 1a2 1a3 1a4 1a5 1a6 1a7
           9-16 1a8 1a9 1aa 1ab 1b0 1b1 1b2 1b3
          17-24 1b4 1b5 1b6 1b7 1b8 1b9 1ba 1bb
          25-32 1a0 1a0 1a0 1a0 1a0 1a0 1a0 1a0
  2  15    1- 8 1cc 1dc 1c0 1c0 1c0 1c0 1c0 1c0
           9-16 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
          17-24 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
          25-32 1c0 1c0 1c0 1c0 1c0 1c0 1c0 1c0
  2  16    1- 8 1e0 1e1 1e2 1e3 1e4 1e5 1e6 1e7
           9-16 1e8 1e9 1ea 1eb 1f0 1f1 1f2 1f3
         17-24 1f4 1f5 1f6 1f7 1f8 1f9 1fa 1fb
         25-32 1e0 1e0 1e0 1e0 1e0 1e0 1e0 1e0
--- --- ----- --- --- --- --- --- --- --- ---
 3   1    1- 8   c  1c   0   0   0   0   0   0
          9-16   0   0   0   0   0   0   0   0
         17-24   0   0   0   0   0   0   0   0
         25-32   0   0   0   0   0   0   0   0
 3   2    1- 8  20  21  22  23  24  25  26  27
```

```
          9-16  28  29  2a  2b  30  31  32  33
         17-24  34  35  36  37  38  39  3a  3b
         25-32  20  20  20  20  20  20  20  20
 3    3   1- 8  57  41  42  43  44  45  50  51
          9-16  52  53  54  55  40  40  40  40
         17-24  40  40  40  40  40  40  40  40
         25-32  40  40  40  40  40  40  40  40
 3    4   1- 8  6c  7c  60  60  60  60  60  60
          9-16  60  60  60  60  60  60  60  60
         17-24  60  60  60  60  60  60  60  60
         25-32  60  60  60  60  60  60  60  60
 3    5   1- 8  80  81  82  83  84  85  86  87
          9-16  88  89  8a  8b  90  91  92  93
         17-24  94  95  96  97  98  99  9a  9b
         25-32  80  80  80  80  80  80  80  80
 3    6   1- 8  ac  bc  a0  a0  a0  a0  a0  a0
          9-16  a0  a0  a0  a0  a0  a0  a0  a0
         17-24  a0  a0  a0  a0  a0  a0  a0  a0
         25-32  a0  a0  a0  a0  a0  a0  a0  a0
 3    7   1- 8  cc  dc  c0  c0  c0  c0  c0  c0
          9-16  c0  c0  c0  c0  c0  c0  c0  c0
         17-24  c0  c0  c0  c0  c0  c0  c0  c0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug fabric status	Displays the overall status of all the fabric ASICs.
debug fabric stats	Displays the fabric ASIC statistics.

debug slb help

Prints a list of all debug Server Load Balancing (SLB) options.

debug slb help

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- Server Load Balancing (SLB) is not supported on OS-6600 series of switches.
- Not all the commands by the **help** option are implemented right now.

Examples

```
-> debug slb help
Command Name             Parameters
--------------------------------------------------------------
AdminStatus              <status=0|1>
CreateCluster            <name> <ipaddress>
DeleteCluster            <name>
ClusterAdminStatus       <name> <status=0|1>
ClusterDistribution      <name> <distrib=1|2>
ClusterPingPeriod        <name> <seconds>
ClusterPingTimeout       <name> <milliseconds>
ClusterPingRetries       <name> <retries>
ClusterStickytime        <name> <seconds>
Server                   <name> <ipaddr> <status=0|1> <weight>
RemoveServer             <name> <ipaddr>
DumpCluster              <clusterid>
DumpClusters
DumpServer               <clusterid> <serverid>
DumpServers
DumpNI
DumpVlan
DumpMisc
DiscoveryPeriod          <milliseconds>
DiscoveryTimeout         <milliseconds>
DiscoveryRetries         <number>
StatPeriod               <milliseconds>
DeadlineWindow           <milliseconds>
Link                     <port number> <adm-0|1> [<lnk-0|1>]
ResetCMM
ResetNI                  <slot> <slice>
```

```
CMMTrace                 <level>
NITrace                  <level>
NIDebug                  <slot> <slice>
Flags
Traps                    <enable=0|1>
SimServers               <enable=0|1>
ServerArp                <clusterid> <serverid> <macaddr> <port>
PacketLoss               <percentage>
Kill
NI                       <slot> <slice> <status=0|1>
Snapshot
Certify
Takeover                 <resetni=0|1>
Help
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug http sessiondb

Displays the HTTP session database.

debug http sessiondb

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug http sessiondb
    Sess    SessName      Name   TimeOut      Status         URL Name--&--StatMsg
---+----+------------+---------+-------+---------------+-------------------------
-------

Current Active WebView Session: 0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre warn

Enables and disables the Hardware Routing Engine (HRE) warning messages on a specific HRE.

debug hre warn {enable | disable} *slot/slice*

Syntax Definitions

enable	Enables warning messages.
disable	Disables warning messages.
slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre warn enable 8/0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug hre trace	Enables and disables Hardware Routing Engine (HRE) trace messages on a specific HRE.

debug hre trace

Enables and disables Hardware Routing Engine (HRE) trace messages on a specific HRE.

debug hre trace {enable | disable} *slot/slice*

Syntax Definitions

enable	Enables trace messages.
disable	Disables trace messages.
slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre trace enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug hre warn	Enables and disables the Hardware Routing Engine (HRE) warning messages on a specific HRE.

debug hre pcam

Displays all the PCAM entries known on a particular slot and slice.

debug hre pcam *slot*/*slice*

There are two possible arguments to this command - <start> and <count>. <start> is the PCAM index to start with; default is 0. <count> is the number of entries to display; max is 24, default is 12.

Syntax Definitions

slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.
start	The PCAM index to start with.
count	The number of entries to display. The range is 0–24.

Defaults

parameter	default
start	0
count	12

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre pcam 11/0
*00005: e0000005 00000000 00000000 4c280000
        [ip] dst=224.0.0.5
        restart[mode=5], dakey=0000

*00012: e0000012 00000001 00000000 4c280000
        [ip] dst=224.0.0.18
        restart[mode=5], dakey=0001

 0c000: 003d0001 c0a83d02 fff9015c 0c000000
        [ipms] src=192.168.61.2, dakey=0001, sgid=03d, svpn=015c
        forward[hdr=fff9]

 0c001: 003c0001 c0a83c02 fff6015c 0c000000
        [ipms] src=192.168.60.2, dakey=0001, sgid=03c, svpn=015c
        forward[hdr=fff6]

 0c002: 003b0001 c0a83b02 fff5015c 0c000000
        [ipms] src=192.168.59.2, dakey=0001, sgid=03b, svpn=015c
```

```
            forward[hdr=fff5]

     0c003: 003a0001 c0a83a02 fff2015c 1c00c008
            [ipms] src=192.168.58.2, dakey=0001, sgid=03a, svpn=015c
            forward[hdr=fff2], next=0c008

     0c004: 00390001 c0a83902 fff1015c 1c00c000
            [ipms] src=192.168.57.2, dakey=0001, sgid=039, svpn=015c
            forward[hdr=fff1], next=0c000

     0c005: 00380001 c0a83802 fff0015c 1c00c001
            [ipms] src=192.168.56.2, dakey=0001, sgid=038, svpn=015c
            forward[hdr=fff0], next=0c001

     0c006: 003e0000 c0a83e02 ffef015c 0c000000
            [ipms] src=192.168.62.2, dakey=0000, sgid=03e, svpn=015c
            forward[hdr=ffef]

     0c007: 003d0000 c0a83d02 ffee015c 0c000000
            [ipms] src=192.168.61.2, dakey=0000, sgid=03d, svpn=015c
            forward[hdr=ffee]

     0c008: 003e0001 c0a83e02 ffe9015c 0c000000
            [ipms] src=192.168.62.2, dakey=0001, sgid=03e, svpn=015c
            forward[hdr=ffe9]

     0c009: 003c0000 c0a83c02 ffec015c 0c000000
            [ipms] src=192.168.60.2, dakey=0000, sgid=03c, svpn=015c
            forward[hdr=ffec]
```

Release History

Release 5.1; command was introduced.

Related Commands

debug hre pcam verbose	Displays all the PCAM entries known on a particular slot and slice.

debug hre pcam verbose

Displays all the PCAM entries known on a particular slot and slice.

debug hre pcam verbose *slot*/*slice* **[***start count***]**

Syntax Definitions

slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.
start	The PCAM index to start with.
count	The number of entries to display. The range is 0–24.

Defaults

parameter	default
start	0
count	12

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre pcam verbose 11/0
*00005: e0000005 00000000 00000000 4c280000
        [ip] dst=224.0.0.5
        restart[mode=5], dakey=0000
        mode=0, alloc=hash, collisions=0001
        agetype=branch, child=0c006

*00012: e0000012 00000001 00000000 4c280000
        [ip] dst=224.0.0.18
        restart[mode=5], dakey=0001
        mode=0, alloc=hash, collisions=0001
        agetype=branch, child=0c008

 0c000: 003d0001 c0a83d02 fff9015c 0c000000
        [ipms] src=192.168.61.2, dakey=0001, sgid=03d, svpn=015c
        forward[hdr=fff9]
        mode=5, alloc=collision, prev=0c004
        agetype=leaf, current=4, base=4, initial=2, parent=00012
        siblingprev=0c008, siblingnext=0c001

 0c001: 003c0001 c0a83c02 fff6015c 0c000000
```

```
       [ipms] src=192.168.60.2, dakey=0001, sgid=03c, svpn=015c
       forward[hdr=fff6]
       mode=5, alloc=collision, prev=0c005
       agetype=leaf, current=4, base=4, initial=2, parent=00012
       siblingprev=0c000, siblingnext=0c002

0c002: 003b0001 c0a83b02 fff5015c 0c000000
       [ipms] src=192.168.59.2, dakey=0001, sgid=03b, svpn=015c
       forward[hdr=fff5]
       mode=5, alloc=collision, prev=0c00d
       agetype=leaf, current=4, base=4, initial=2, parent=00012
       siblingprev=0c001, siblingnext=0c003

0c003: 003a0001 c0a83a02 fff2015c 1c00c008
       [ipms] src=192.168.58.2, dakey=0001, sgid=03a, svpn=015c
       forward[hdr=fff2], next=0c008
       mode=5, alloc=collision, prev=0c00e
       agetype=leaf, current=4, base=4, initial=2, parent=00012
       siblingprev=0c002, siblingnext=0c004
```

Release History

Release 5.1; command was introduced.

Related Commands

debug hre pcam	Displays all the PCAM entries known on a particular slot and slice.

debug hre pcam mode range

This command displays the range of PCAM indices assigned to each mode.

debug hre pcam mode range *slot*/*slice*

Syntax Definitions

slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre pcam mode range 11/0
mode 0: 00000 -> 03fff
mode 1: 04000 -> 07fff
mode 2: 08000 -> 0bfff
mode 3: 0c000 -> 0ffff
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre history

Displays the history of the Hardware Routing Engine (HRE).

debug hre history *slot/slice*

Syntax Definitions

slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre history 11/0
IP flush all count = 0

IP flush net count = 886
    last net = 0a286c04, last mask = ffffffff
    last time = 140 seconds ago by 15

ARP flush count = 514
    last next hop ip address = 0a286c04
    last time = 140 seconds ago by 15

IPMS flush all count = 1
    last time = 12826 seconds ago by 17

IPX flush all count = 1
    last time = 12823 seconds ago by 16

IPX flush net count = 0

Aging period is 30 seconds
    0 PCAM entries created, 0 entries aged in last cycle
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre error

Enables/Disables error messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM) for a specific slot/slice.

debug hre error {enable | disable} *slot/slice*

Syntax Definitions

enable	Enables error messages.
disable	Disables error messages.
slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre error enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre debug

Enables/Disables debug messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM) for a specific slot/slice.

debug hre debug {enable | disable} *slot*/*slice*

Syntax Definitions

enable	Enables debug messages.
disable	Disables debug messages.
slot	Specifies an NI slot number.
slice	Specifies an NI slice (ASIC) number.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre debug enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre cmm warn

Enables/Disables warning messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM).

debug hre cmm warn {enable | disable}

Syntax Definitions

enable	Enables warning messages.
disable	Disables warning messages.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre cmm warn enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre cmm trace

Enables/Disables trace messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM).

debug hre cmm trace {enable | disable}

Syntax Definitions

enable	Enables warning messages.
disable	Disables warning messages.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre cmm trace enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre cmm error

Enables/Disables error messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM).

debug hre cmm error {enable | disable}

Syntax Definitions

enable	Enables warning messages.
disable	Disables warning messages.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre cmm error enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug hre cmm debug

Enables/Disables debug messages from Hardware Routing Engine (HRE) support software on a Chassis Management Module (CMM).

debug hre cmm debug {enable | disable}

Syntax Definitions

enable	Enables warning messages.
disable	Disables warning messages.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-66000 series does not have a HRE so this commands is not supported on these switches.

Examples

```
-> debug hre cmm debug enable 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug health

Enables and disables health debugging.

debug health {enable | disable}

Syntax Definitions

enable	Enables health debugging.
disable	Disables health debugging.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug health enable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug health cpu	Displays the history of CPU utilization on a Chassis Management Module (CMM) if no parameters are specified and displays the history of the CPU's health if parameters are specified.

debug health cpu

Displays the history of CPU utilization on a Chassis Management Module (CMM) if no parameters are specified and displays the history of the CPU's health if parameters are specified.

debug health cpu [*slot*]

Syntax Definitions

slot	Specifies an interface slot number.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

If no parameters are specified:

```
-> debug health cpu
Device Level Cpu Utilization
SECONDS:  [4]8 [5]15 [6]4 [7]14 [8]4 [9]16 [10]3 [11]15 [0]4 [1]18 [2]5
[3]23
MINUTES:  [2]10 [3]10 [4]9 [5]11 [6]10 [7]10 [8]10 [9]10 [10]10 [11]10
[12]11 [13]10 [14]9 [15]10 [16]9 [17]10 [18]10 [19]9 [20]9
[21]10 [22]9 [23]10 [24]9 [25]9 [26]11 [27]10 [28]9 [29]10
[30]10 [31]11 [32]10 [33]9 [34]10 [35]9 [36]10 [37]10 [38]10
[39]11 [40]10 [41]10 [42]12 [43]10 [44]10 [45]10 [46]9 [47]11
[48]11 [49]9 [50]11 [51]9 [52]11 [53]10 [54]10 [55]10 [56]10
[57]10 [58]11 [59]11 [0]10 [1]10
sec<23> min<10> hrAvg<9> hrMax<12>
```

If a slot number is specified:

```
-> debug health cpu 11
Slot 11 Cpu Utilization
SECONDS:  [11]19 [0]26 [1]17 [2]18 [3]17 [4]15 [5]17 [6]17 [7]19 [8]18
[9]19 [10]21
MINUTES:  [59]18 [0]18 [1]19 [2]17 [3]18 [4]19 [5]18 [6]18 [7]17 [8]19
[9]17 [10]18 [11]18 [12]17 [13]18 [14]18 [15]20 [16]18 [17]18
[18]19 [19]19 [20]18 [21]17 [22]19 [23]18 [24]18 [25]19 [26]18
[27]19 [28]17 [29]18 [30]18 [31]19 [32]19 [33]18 [34]19 [35]17
[36]19 [37]18 [38]18 [39]19 [40]19 [41]18 [42]17 [43]18 [44]18
[45]18 [46]18 [47]18 [48]19 [49]18 [50]18 [51]19 [52]17 [53]19
[54]19 [55]19 [56]18 [57]18 [58]19
sec<21> min<18> hrAvg<18> hrMax<20>
```

Release History

Release 5.1; command was introduced.

Related Commands

debug health	Enables and disables health debugging.

debug health rx

Displays health of receive utilization on a particular slot or slot/port.

debug health rx [*slot*[/*port*]]

Syntax Definitions

slot	Specifies an interface slot number.
port	Specifies an interface port number.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

A slot number is specified:

```
-> debug health rx 2

Slot 2 Input Utilization
SECONDS:  [1]0 [2]0 [3]0 [4]0 [5]0 [6]0 [7]0 [8]0 [9]0 [10]0 [11]0 [0]0
MINUTES:  [36]0 [37]0 [38]0 [39]0 [40]0 [41]0 [42]0 [43]0 [44]0 [45]0
[46]0 [47]0 [48]0 [49]0 [50]0 [51]0 [52]0 [53]0 [54]0 [55]0
[56]0 [57]0 [58]0 [59]0 [0]0 [1]0 [2]0 [3]0 [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 [17]0 [18]0
[19]0 [20]0 [21]0 [22]0 [23]0 [24]0 [25]0 [26]0 [27]0 [28]0
[29]0 [30]0 [31]0 [32]0 [33]0 [34]0 [35]0

sec<0> min<0> hrAvg<0> hrMax<0>
```

A slot and port number is specified:

```
-> debug health rx 2/1

Port 2/1 Input Utilization
SECONDS:
MINUTES:

sec<0> min<0> hrAvg<0> hrMax<0>
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug health memory

Displays history of memory utilization on CMM when no slot number is specified and displays history of memory utilization on a particular slot if a slot number is specified.

debug health memory [*slot*]

Syntax Definitions

slot	Specifies an interface slot number.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

No slot number is specified:

```
-> debug health memory
Device Level Memory Utilization
SECONDS:  [10]46 [11]46 [0]46 [1]46 [2]46 [3]46 [4]46 [5]46 [6]46 [7]46
[8]46 [9]46
MINUTES:  [1]46 [2]46 [3]46 [4]46 [5]46 [6]46 [7]46 [8]46 [9]46 [10]46
[11]46 [12]46 [13]46 [14]46 [15]46 [16]46 [17]46 [18]46 [19]46
[20]46 [21]46 [22]46 [23]46 [24]46 [25]46 [26]46 [27]46 [28]46
[29]46 [30]46 [31]46 [32]46 [33]46 [34]46 [35]46 [36]46 [37]46
[38]46 [39]46 [40]46 [41]46 [42]46 [43]46 [44]46 [45]46 [46]46
[47]46 [48]46 [49]46 [50]46 [51]46 [52]46 [53]46 [54]46 [55]46
[56]46 [57]46 [58]46 [59]46 [0]46
sec<46> min<46> hrAvg<46> hrMax<46>
```

A slot number is specified:

```
-> debug health memory 11
Slot 11 Memory Utilization
SECONDS:  [2]43 [3]43 [4]43 [5]43 [6]43 [7]43 [8]43 [9]43 [10]43 [11]43
[0]43 [1]43
MINUTES:  [2]43 [3]43 [4]43 [5]43 [6]43 [7]43 [8]43 [9]43 [10]43 [11]43
[12]43 [13]43 [14]43 [15]43 [16]43 [17]43 [18]43 [19]43 [20]43
[21]43 [22]43 [23]43 [24]43 [25]43 [26]43 [27]43 [28]43 [29]43
[30]43 [31]43 [32]43 [33]43 [34]43 [35]43 [36]43 [37]43 [38]43
[39]43 [40]43 [41]43 [42]43 [43]43 [44]43 [45]43 [46]43 [47]43
[48]43 [49]43 [50]43 [51]43 [52]43 [53]43 [54]43 [55]43 [56]43
[57]43 [58]43 [59]43 [0]43 [1]43
sec<43> min<43> hrAvg<43> hrMax<43>
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug gmap flags

Displays the GMAP flags and information about GMAP entries in GMAP database.

debug gmap flags

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug gmap flags
GMAP Holdtime   Interval (minutes)      = 4320,
GMAP Updatetime Interval (seconds)      = 300,
GMAP Gaptime    Interval (milliseconds) = 133

 MAC Address   Protocol   VLAN  Src Switch ID  Timeout(sec)
-------------+---------+------+-------------+------------
0010A4:B5B538     10806    111  00D095:7962AA  00:00:00:00        252288
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug console flow control

Enables and disables the flow control for the console.

debug console flow control {enable | disable}

Syntax Definitions

enable	Enables flow control.
disable	Disables flow control.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug console flow control enable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug console show flow control

Displays the current flow control status.

debug console show flow control

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug console show flow control
Flow Control: Enabled
```

Output fields are described below:

output definitions

Flow Control	The current flow control status, which can be **Enabled** or **Disabled**.

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug command-info

Enables and disables the command-info mode.

debug command-info {enable | disable}

Syntax Definitions

enable	Enables command-info mode.
disable	Disables command-info mode.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug command-info enable
CLI command info mode on
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug clishell data

Displays the current information about the session.

debug clishell data

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
->  debug clishell data
Session Id      : 3
EUPM User       : 0
CLI oper mode   : 0
Def sub-parser  : 12
I/O ctrl option : 14
Command prefix  :
MIP appOut      : 71578880
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug amap database

Verifies if the AMAP database is fine or not.

debug amap database

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug amap database
AMAP Debug database ok
```

Output fields are described below:

output definitions

AMAP Debug database	The current status of the AMAP database.

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis show

Displays all the debug configurations.

debug chassis show

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug chassis show
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis secondary emp

Enables and disables the Ethernet Management Port (EMP) port on a secondary Chassis Management Module (CMM)

debug chassis secondary emp {enable | disable}

Syntax Definitions

enable	Enables the secondary CMM's EMP port.
disable	Disables the secondary CMM's EMP port.

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

OS-6600 series does not have an EMP port.

Examples

```
-> debug chassis secondary emp enable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis hello

Enables and disables hello messages from the secondary Chassis Management Module (CMM) to the primary CMM.

debug chassis hello {enable | disable}

Syntax Definitions

enable	Enables hello messages.
disable	Disables hello messages.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug chassis hello disable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis hello timers

Enables and disables hello timers from the primary Chassis Management Module (CMM) to the secondary. If the secondary CMM does not respond back in the interval, it is rebooted.

debug chassis hello timers {enable | disable}

Syntax Definitions

enable	Enables hello timers.
disable	Disables hello timers.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug chassis hello timers disable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis auto-reboot

Enables and disables chassis auto-reboots after a fatal error.

debug chassis auto-reboot {enable | disable | on | off}

Syntax Definitions

enable	Enables chassis auto-reboots after a fatal error.
disable	Disables chassis auto-reboots after a fatal error.
on	Same as **enable**.
off	Same as **disable**.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug chassis auto-reboot enable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug chassis auto-reboot ni

Enables and disables Network Interface (NI) module auto-reboots after a fatal error.

debug chassis auto-reboot ni {enable | disable}

Syntax Definitions

enable	Enables NI auto-reboots after a fatal error.
disable	Disables NI auto-reboots after a fatal error.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug chassis auto-reboot ni enable
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan vpas

Displays the information about all the ports with their IfIndex and the VLAN membership.

debug vlan vpas

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug vlan vpas
port   vlan     type      status
------+-------+---------+------------
  1001     1    default   forwarding
  1001   140    qtagged   forwarding
  1001   141    qtagged   forwarding
  1001   150    qtagged   forwarding
  1001   511    qtagged   forwarding
  1002     1    default   forwarding
  1002   100    qtagged   forwarding
  1002   150    qtagged   forwarding
  2001     1    default     inactive
  2001   100    qtagged     inactive
  2001   102    qtagged     inactive
  2001   103    qtagged     inactive
  2001   104    qtagged     inactive
  2001   114    qtagged     inactive
  2001   115    qtagged     inactive
  2001   116    qtagged     inactive
  2001   130    qtagged     inactive
  2001   311    qtagged     inactive
  2001   411    qtagged     inactive
  2001   611    qtagged     inactive
  2001   711    qtagged     inactive
  2002     1    default     inactive
  2002   111    qtagged     inactive
  2002   150    qtagged     inactive
  2003     1    default     inactive
  2004     1    default     inactive
  2005     1    default     inactive
  2006     1    default     inactive
```

```
2006   105    qtagged     inactive
2006   108    qtagged     inactive
2006   110    qtagged     inactive
2006   111    qtagged     inactive
2006   112    qtagged     inactive
2006   117    qtagged     inactive
2006   150    qtagged     inactive
2006   211    qtagged     inactive
2006   212    qtagged     inactive
2007     1    default     inactive
2007    62    qtagged     inactive
2007   150    qtagged     inactive
2007   211    qtagged     inactive
2008     1    default     inactive
2009    62    default     inactive
2010     1    default     inactive
2011     1    default     inactive
2011   150    qtagged     inactive
2011   211    qtagged     inactive
2012     1    default     inactive
2012    50    qtagged     inactive
2012    51    qtagged     inactive
2012    52    qtagged     inactive
2012    53    qtagged     inactive
2012    54    qtagged     inactive
2012    55    qtagged     inactive
2012    56    qtagged     inactive
2012    57    qtagged     inactive
2012    58    qtagged     inactive
2012    59    qtagged     inactive
2012    60    qtagged     inactive
2012    61    qtagged     inactive
2012    62    qtagged     inactive
2012   100    qtagged     inactive
2012   102    qtagged     inactive
2012   103    qtagged     inactive
2012   104    qtagged     inactive
2012   105    qtagged     inactive
2012   106    qtagged     inactive
2012   107    qtagged     inactive
2012   108    qtagged     inactive
2012   109    qtagged     inactive
2012   110    qtagged     inactive
2012   111    qtagged     inactive
2012   112    qtagged     inactive
2012   114    qtagged     inactive
2012   115    qtagged     inactive
2012   116    qtagged     inactive
2012   117    qtagged     inactive
2012   130    qtagged     inactive
2012   140    qtagged     inactive
2012   141    qtagged     inactive
2012   150    qtagged     inactive
2012   211    qtagged     inactive
2012   212    qtagged     inactive
2012   311    qtagged     inactive
2012   511    qtagged     inactive
2012   711    qtagged     inactive
4001     1    default     inactive
```

```
   4001   104    qtagged     inactive
   4001   150    qtagged     inactive
   4002     1    default   forwarding
   4002   105    qtagged   forwarding
   4002   150    qtagged   forwarding
   6001     1    default   forwarding
   6001   108    qtagged   forwarding
   6001   150    qtagged   forwarding
   6002     1    default     inactive
   6002   109    qtagged     inactive
   6002   150    qtagged     inactive
   7001     1    default   forwarding
   7001   110    qtagged   forwarding
   7001   150    qtagged   forwarding
   7002     1    default     inactive
   7002   111    qtagged     inactive
   7002   150    qtagged     inactive
   8001   611    default     inactive
   8002   140    default     inactive
   8003   140    default     inactive
   8004   140    default     inactive
   8005   140    default     inactive
   8006   140    default     inactive
   8007   140    default     inactive
   8008   140    default     inactive
   8009   140    default     inactive
   8010   140    default     inactive
   8011   140    default     inactive
   8012   140    default     inactive
   8013   140    default     inactive
   8014   140    default     inactive
   8015   140    default     inactive
   8016   140    default     inactive
   8017   140    default     inactive
   8018   140    default     inactive
   8019   140    default     inactive
   8020   140    default     inactive
   8021   140    default     inactive
   8022   140    default     inactive
   8023   114    default     inactive
   8024   140    default     inactive
   9001     1    default     inactive
   9001   150    qtagged     inactive
   9001   211    qtagged     inactive
   9002     1    default   forwarding
   9002   112    qtagged   forwarding
   9002   150    qtagged   forwarding
  10001     1    default     inactive
  10001   150    qtagged     inactive
  10001   212    qtagged     inactive
  10002     1    default     inactive
  10002   114    qtagged     inactive
  10002   150    qtagged     inactive
  11001     1    default   forwarding
  11002     1    default   forwarding
  12001     1    default     inactive
  12002     1    default     inactive
  13001     1    default     inactive
  13002     1    default     inactive
```

```
    13003     1    default     inactive
    13004     1    default     inactive
    13005     1    default     inactive
    13006     1    default     inactive
    13007     1    default     inactive
    13008     1    default     inactive
    13009     1    default     inactive
    13010     1    default     inactive
    13011     1    default     inactive
    13012     1    default     inactive
    13013     1    default     inactive
    13014     1    default     inactive
    13015     1    default     inactive
    13016     1    default     inactive
    13017     1    default     inactive
    13018     1    default     inactive
    13019     1    default     inactive
    13020     1    default     inactive
    13021     1    default     inactive
    13022     1    default     inactive
    13023     1    default     inactive
    13024     1    default     inactive
    14001     1    default     inactive
    14001   117    qtagged     inactive
    14001   150    qtagged     inactive
    14002     1    default     inactive
    14002   130    qtagged     inactive
    14002   150    qtagged     inactive
    16001     1    default     inactive
    16002     1    default     inactive
    16003     1    default     inactive
    16004     1    default     inactive
    16005     1    default     inactive
    16006     1    default     inactive
    16007     1    default     inactive
    16008     1    default     inactive
    16009     1    default     inactive
    16010     1    default     inactive
    16011     1    default     inactive
    16012     1    default     inactive
    16013     1    default     inactive
    16014     1    default     inactive
    16015     1    default     inactive
    16016     1    default     inactive
    16017     1    default     inactive
    16018     1    default     inactive
    16019     1    default     inactive
    16020     1    default     inactive
    16021     1    default     inactive
    16022     1    default     inactive
    16023     1    default     inactive
    16024     1    default     inactive
    40000001     1    default   forwarding
    40000001    50    qtagged   forwarding
    40000001    51    qtagged   forwarding
    40000001    52    qtagged   forwarding
    40000001    53    qtagged   forwarding
    40000001    54    qtagged   forwarding
    40000001    55    qtagged   forwarding
```

```
40000001    56    qtagged   forwarding
40000001    57    qtagged   forwarding
40000001    58    qtagged   forwarding
40000001    59    qtagged   forwarding
40000001    60    qtagged   forwarding
40000001    61    qtagged   forwarding
40000001    62    qtagged   forwarding
40000002     1    default     blocking
40000002    50    qtagged     blocking
40000002    51    qtagged     blocking
40000002    52    qtagged     blocking
40000002    53    qtagged     blocking
40000002    54    qtagged     blocking
40000002    55    qtagged     blocking
40000002    56    qtagged     blocking
40000002    57    qtagged     blocking
40000002    58    qtagged     blocking
40000002    59    qtagged     blocking
40000002    60    qtagged     blocking
40000002    61    qtagged     blocking
40000002    62    qtagged     blocking
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan rule protocol-map

Displays the protocol map available. If a proprietary protocol type is configured on the switch that will also display in the output of this command.

debug vlan rule protocol-map

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug vlan rule protocol-map
*** Protocol Indicator Map ***
proto = Ethernet II IP    Frame = E-II  PI = 0
proto = Ethernet II ARP    Frame = E-II  PI = 0
proto = Ethernet II RARP    Frame = E-II  PI = 0
proto = SNAP IP    Frame = 802.3PI = 1
proto = SNAP ARP    Frame = 802.3  PI = 1
proto = SNAP RARP    Frame = 802.3  PI = 1
proto = IPX Ethernet II    Frame = E-II  PI = 4
proto = IPX Novell    Frame = 802.3  PI = 3
proto = IPX LLC    Frame = 802.3  PI = 2
proto = IPX SNAP    Frame = 802.3  PI = 5
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan rule ports

Displays all the ports available and can be a candidate for VLAN rules.

debug vlan rule ports

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

All the ports shown as "+" are in use. If a "+" appears under mobile column then it indicates that the port has been configured as mobile port.

Examples

```
-> debug vlan rule ports
port   candidate   mobile
-----+-----------+---------
 1/1        -         -
 1/2        -         -
 2/1        -         -
 2/2        -         -
 2/3        +         -
 2/4        +         -
 2/5        +         -
 2/6        -         -
 2/7        -         -
 2/8        +         -
 2/9        +         -
 2/10       +         -
 2/11       -         -
 2/12       -         -
 4/1        -         -
 4/2        -         -
 6/1        -         -
 6/2        -         -
 7/1        -         -
 7/2        -         -
 8/1        +         -
 8/2        +         -
 8/3        +         -
 8/4        +         -
 8/5        +         -
 8/6        +         -
 8/7        +         -
```

```
  8/8          +          -
  8/9          +          -
  8/10         +          -
  8/11         +          -
  8/12         +          -
  8/13         +          -
  8/14         +          -
  8/15         +          -
  8/16         +          -
  8/17         +          -
  8/18         +          -
  8/19         +          -
  8/20         +          -
  8/21         +          -
  8/22         +          -
  8/23         +          -
  8/24         +          -
  9/1          -          -
  9/2          -          -
 10/1          -          -
 10/2          -          -
 11/1          -          -
 11/2          -          -
 12/1          -          -
 12/2          -          -
 13/1          +          -
 13/2          +          -
 13/3          +          -
 13/4          +          -
 13/5          +          -
 13/6          +          -
 13/7          +          -
 13/8          +          -
 13/9          +          -
 13/10         +          -
 13/11         +          -
 13/12         +          -
 13/13         +          -
 13/14         +          -
 13/15         +          -
 13/16         +          -
 13/17         +          -
 13/18         +          -
 13/19         +          -
 13/20         +          -
 13/21         +          -
 13/22         +          -
 13/23         +          -
 13/24         +          -
 14/1          -          -
 14/2          -          -
 16/1          +          +
 16/2          +          +
 16/3          +          +
 16/4          +          +
 16/5          +          +
 16/6          +          +
 16/7          +          +
 16/8          +          +
 16/9         +          +
 16/10        +          +
 16/11        +          +
 16/12        +          +
 16/13        +          +
 16/14        +          +
 16/15        +          +
 16/16        +          +
 16/17        +          +
 16/18        +          +
 16/19        +          +
 16/20        +          +
 16/21        +          +
 16/22        +          +
 16/23        +          +
 16/24        +          +
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan rule database

Displays the rules configured on the switch for Group Mobility.

debug vlan rule database

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug vlan rule database
IP NETWORK RULES
 B  ssz=2  p=563bf88  l=563bf88  r=46fb4ac  v=111
 R  ssz=1  p=46fb488  l=563bf88  r=563bf88  v=114
PORT RULES
 B  ssz=1  p=563bf88  l=563bf88  r=563bf88  v=103
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan rule communication

Displays the communication of the Chassis Management Module (CMM) with all the software modules and all Network Interface (NI) modules for synchronizing the rules configured on the CMM.

debug vlan rule communication

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- **GlobSlice** indicates the slot number.
- If an NI is not present in the chassis then the state will appear as dead.
- The **state** field should always be **RX** (received) or **CFGD** (configured) but should never be dead for any module that exists in the NI. Dead will indicate that the module is not working properly.

Examples

```
-> debug vlan rule communication
VlnMgr  skt=0x75    rapp=8     rsnp=3      CNXN-OR   state:RX
 CSping  skt=0x73    rapp=64    rsnp=6      CNXNLESS  state:RX
 CfgMgr  skt=0x74    rapp=66    rsnp=3      CNXNLESS  state:RX
    CLI  skt=0x74    rapp=67    rsnp=67     CNXNLESS  state:RX
   SNMP  skt=0x74    rapp=68    rsnp=4      CNXNLESS  state:CFGD
 WbView  skt=0x74    rapp=69    rsnp=2      CNXNLESS  state:CFGD
 PrtMgr  skt=0x76    rapp=65    rsnp=0      CNXNLESS  state:RX
 CSniev  skt=0x73    rapp=64    rsnp=3      CNXNLESS  state:RX
   GMAP  skt=0x77    rapp=19    rsnp=6      CNXN-OR   state:RX
    PSM  skt=0x78    rapp=81    rsnp=1      CNXN-OR   state:RX
 SrcLrn  skt=0x79    rapp=10    rsnp=1      CNXN-OR   state:CFGD
 MpGate  skt=0x74    rapp=70    rsnp=3      CNXNLESS  state:RX
AAA_AVLAN  skt=0x7a    rapp=20    rsnp=1      CNXN-OR   state:CFGD
AAA_ONEX  skt=0x7b    rapp=91    rsnp=3      CNXN-OR   state:CFGD
GlobSlice: 0  skt=0x130   rslot=1   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 1  skt=0x130   rslot=2   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 2  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0      CNXN-OR
state:DEAD
GlobSlice: 3  skt=0x130   rslot=4   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 4  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0      CNXN-OR
state:DEAD
```

```
GlobSlice: 5  skt=0x130   rslot=6   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 6  skt=0x130   rslot=7   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 7  skt=0x130   rslot=8   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 8  skt=0x130   rslot=9   rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice: 9  skt=0x130   rslot=10  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice:10  skt=0x130   rslot=11  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice:11  skt=0x130   rslot=12  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice:12  skt=0x130   rslot=13  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice:13  skt=0x130   rslot=14  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
GlobSlice:14  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0      CNXN-OR
state:DEAD
GlobSlice:15  skt=0x130   rslot=16  rslice=0   rapp=9     rsnp=2      CNXNLESS
state:RX
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug vlan communication

Displays the communication of the Chassis management Module (CMM) with all the software modules and all Network Interface (NI) modules.

debug vlan communication

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- **GlobSlice** indicates the slot number.
- If an NI is not present in the chassis then the state will appear as dead.

Examples

```
-> debug vlan communication
***CMM Connections***

   CS Ping  sid=   1c  rap=  64  rsp=   6       CNXNLESS        NO-RX  notify=0
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
    SL VPA  sid=   26  rap=  10  rsp=   7        CNXN-OR        NO-RX  notify=0
 defaults assumed=0
    txrty=0 txfail=0  bfrty=0
    802.1Q  sid=   1e  rap=   7  rsp=   3        CNXN-OR  ESTABLISHED  notify=5
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
  Port Mgr  sid=   1f  rap=  65  rsp=   0       CNXNLESS  ESTABLISHED  notify=0
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
    SrcLrn  sid=   25  rap=  10  rsp=   1        CNXN-OR  ESTABLISHED  notify=5
 defaults assumed=0
    txrty=0 txfail=0  bfrty=0
 CS Ni Evt  sid=   1c  rap=  64  rsp=   3       CNXNLESS  ESTABLISHED  notify=0
 defaults assumed=0
    txrty=0 txfail=0  bfrty=0
    CS Mac  sid=   1c  rap=  64  rsp=  11       CNXNLESS  ESTABLISHED  notify=0
 defaults assumed=0
    txrty=0 txfail=0  bfrty=0
   Cfg Mgr  sid=   1d  rap=  66  rsp=   3       CNXNLESS  ESTABLISHED  notify=0
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
       CLI  sid=   1d  rap=  67  rsp=  67       CNXNLESS  ESTABLISHED  notify=0
```

```
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
     SNMP  sid=   1d  rap=  68  rsp=   4       CNXNLESS        NO-RX  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
  Webview  sid=   1d  rap=  69  rsp=   2       CNXNLESS        NO-RX  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
  IPMS MC  sid=   27  rap=  17  rsp=  23        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
   Regist  sid=   36  rap=  68  rsp=   7       CNXNLESS        NO-RX  notify=0
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
   GrpMob  sid=   2c  rap=   9  rsp=   3        CNXN-OR  ESTABLISHED  notify=5
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
       IP  sid=   20  rap=  15  rsp=   7        CNXN-OR  ESTABLISHED  notify=80
 defaults assumed=0
   txrty=0 txfail=0  bfrty=0
      DRC  sid=   23  rap=  74  rsp=   1        CNXN-OR        NO-RX  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
      SLB  sid=   24  rap=  25  rsp=   1        CNXN-OR  ESTABLISHED  notify=16
 defaults assumed=0
   txrty=0 txfail=0  bfrty=0
      IPX  sid=   21  rap=  16  rsp=  10        CNXN-OR  ESTABLISHED  notify=32
 defaults assumed=0
   txrty=0 txfail=0  bfrty=0
  UDP Rly  sid=   22  rap=  22  rsp=   0        CNXN-OR  ESTABLISHED  notify=1
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
      AAA  sid=   28  rap=  20  rsp=   1        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
 Nan Drvr  sid=   29  rap=  78  rsp=   3        CNXN-OR        NO-RX  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
Span Tree  sid=   2a  rap=  11  rsp=   1        CNXN-OR  ESTABLISHED  notify=7
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
  STP SVC  sid=   2b  rap=  11  rsp=   7        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
     XMAP  sid=   2d  rap=  18  rsp=   5        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
     GMAP  sid=   2e  rap=  19  rsp=   5        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
      PSM  sid=   2f  rap=  81  rsp=   1        CNXN-OR  ESTABLISHED  notify=0
defaults assumed=1
   txrty=0 txfail=0  bfrty=0
 Mip Gtwy  sid=   1d  rap=  70  rsp=   3       CNXNLESS  ESTABLISHED  notify=0
defaults assumed=0
   txrty=0 txfail=0  bfrty=0
     VRRP  sid=   30  rap=  77  rsp=   1        CNXN-OR  ESTABLISHED  notify=16
 defaults assumed=0
   txrty=0 txfail=0  bfrty=0
   IPMS VL  sid=   32  rap=  17  rsp=  34        CNXN-OR  ESTABLISHED  notify=80
  defaults assumed=0
    txrty=0 txfail=0  bfrty=0
       QOS  sid=   31  rap=  13  rsp=   2        CNXN-OR  ESTABLISHED  notify=82
  defaults assumed=0
    txrty=0 txfail=0  bfrty=0
  Link Agg  sid=   33  rap=  12  rsp=   1        CNXN-OR  ESTABLISHED  notify=4
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
    Mirror  sid=   34  rap=  23  rsp=   1        CNXN-OR        NO-RX  notify=0
 defaults assumed=1
    txrty=0 txfail=0  bfrty=0
  SNMP Agt  sid=   35  rap=  68  rsp=   7        CNXN-OR  ESTABLISHED  notify=8
 defaults assumed=0
    txrty=0 txfail=0  bfrty=0


***NI Connections***

GlobSlice: 0  skt=0x131   rslot=1   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary:YES  nrCnxns:1  sync:3
GlobSlice: 1  skt=0x131   rslot=2   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 2  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0
         CNXN-OR   state:DEAD  primary: NO  nrCnxns:0  sync:0
GlobSlice: 3  skt=0x131   rslot=4   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 4  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0
         CNXN-OR   state:DEAD  primary: NO  nrCnxns:0  sync:0
GlobSlice: 5  skt=0x131   rslot=6   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 6  skt=0x131   rslot=7   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 7  skt=0x131   rslot=8   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 8  skt=0x131   rslot=9   rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice: 9  skt=0x131   rslot=10  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice:10  skt=0x131   rslot=11  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice:11  skt=0x131   rslot=12  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice:12  skt=0x131   rslot=13  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice:13  skt=0x131   rslot=14  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
GlobSlice:14  skt=0x0     rslot=0   rslice=0   rapp=0     rsnp=0
         CNXN-OR   state:DEAD  primary: NO  nrCnxns:0  sync:0
GlobSlice:15  skt=0x131   rslot=16  rslice=0   rapp=8     rsnp=2
         CNXNLESS  state:RX    primary: NO  nrCnxns:1  sync:3
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug port information

Displays all the information related to an interface. It includes the counters, mobile port configuration, tag, aggregate, phy, LED, and MAC related information

debug port information *slot/port*

Syntax Definitions

slot	Specifies an interface slot number.
port	Specifies an interface port number.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug port information 11/1
```

Release History

Release 5.1; command was introduced.

Related Commands

N/A

debug qos

Configures the type of QoS events that will be displayed in the QoS log.

debug qos [info] [config] [rule] [main] [route] [hre] [port] [msg] [sl] [ioctl] [mem] [cam] [mapper] [flows] [queue] [slot] [l2] [l3] [classifier] [nat] [sem] [pm] [ingress] [egress] [rsvp] [balance] [nimsg]

debug no qos

debug no qos [info] [config] [rule] [main] [route] [hre] [port] [msg] [sl] [ioctl] [mem] [cam] [mapper] [flows] [queue] [slot] [l2] [l3] [classifier] [nat] [sem] [pm] [ingress] [egress] [rsvp] [balance] [nimsg]

Syntax Definitions

flows	Logs events for flows on the switch.
queue	Logs events for queues created and destroyed on the switch.
rule	Logs events for rules configured on the switch.
l2	Logs Layer 2 QoS events on the switch.
l3	Logs Layer 3 QoS events on the switch.
nat	Logs events for Network Address Translation policies. Not supported for the OmniSwitch 6624/6648.
port	Logs events related to QoS ports.
msg	Logs QoS messages.
classifier	Logs information whenever the switch classifies a flow; more details are provided if the log level is higher.
info	Logs basic information about the switch
config	Logs information about the global configuration.
main	Logs information about basic program interfaces.
route	Logs information about routing.
hre	Logs information about hardware route programming.
sl	Logs information about source learning.
mem	Logs information about memory.
cam	Logs information about CAM operations.
mapper	Logs information about mapping queues.
slot	Logs events related to slots.
sem	Logs information about semaphore, process locking.
pm	Logs events related to the Policy Manager.
ingress	Logs information about packets arriving on the switch.

egress	Logs information about packets leaving the switch.
rsvp	Logs information about RSVP flows. Currently not supported.
balance	Logs information about flows that are part of a load balancing cluster. Not supported for the OmniSwitch 6624/6648.
nimsg	Logs information about QoS interfaces.

Defaults

By default basic information messages are logged (**info**). Error messages are always logged.

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- Use this command to troubleshoot QoS events on the switch.
- Use the **no** form of the command to change the type of messages that will be logged or to return debugging to its default state.

Examples

```
-> debug qos flows queue
-> qos debug no flows no queue
-> debug no qos
```

Release History

Release 5.1; command was introduced.

MIB Objects

```
alaQoSConfigTable
   alaQoSConfigDebug
```

debug systrace

Enables or disables sysTrace logging. The system trace, or *sysTrace*, facility provides a consistent, high-level mechanism for capturing event records in a history buffer. Captured sysTrace information can be referenced for system debugging or following the unlikely event of a system crash. This trace facility will generally be used by higher level applications.

debug systrace {enable | disable}

Syntax Definitions

enable	Enables sysTrace logging.
disable	Disables sysTrace logging.

Defaults

parameter	default
enable | disable	**enable**

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug systrace enable
-> debug systrace disable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show log	Displays sysTrace debug log information.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug systrace watch

Enables the sysTrace log on the console, or turns off (disables) the console display.

debug systrace watch {enable | disable}

Syntax Definitions

N/A

Defaults

parameter	default
enable | disable	

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug systrace watch enable
-> debug systrace watch disable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace Logging
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show log	Displays sysTrace debug log information.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug systrace show

Displays sysTrace debug log information (e.g., sysTrace status, Application IDs with non-default Severity Level settings).

debug systrace show

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug systrace show
   sysTrace is:
   - INITIALIZED
   - RUNNING
   - configured to TRACE CALLERS
   - configured to NOT WATCH on stdout

   Only applications not at the level 'info' (6) are shown

   Application ID      Level
   --------------------------------------------------------
   SNMP         (68)   debug 1   (7)
   MIPGW        (70)   debug 1   (7)
   SYSTEM       (75)   debug 3   (9)
```

Output fields are described here:

output definitions

Application ID	The Application ID (subsystem) for which the Severity Level is not set to the info (6) default setting.
Level	The Severity Level of the above-referenced Application ID. Levels include off (1), alarm (2), error (3), alert (4), warning (5), info (6), debug1 (7), debug2 (8), and debug3 (9).

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug systrace appid level

Adds or removes a sysTrace capture level for a specified application ID (i.e., subsystem).

debug systrace appid {*app_id* | *integer*} **level** {*level* | *integer*}

debug systrace no appid *app_id*

Syntax Definitions

app_id	An application ID keyword value. Currently supported application IDs are listed below.
appid *integer*	A numerical equivalent value for the application ID. Currently supported numeric equivalent values are listed below.

Supported Application IDs and Numerical Equivalents

802.1q - 7	**interface - 6**	**psm - 81**
aaa - 20	**ip - 15**	**qdispatcher - 3**
amap - 18	**ipc-diag - 1**	**qdriver - 2**
bridge - 10	**ip-helper - 22**	**qos - 13**
chassis - 64	**ipc-link - 4**	**rmon - 79**
cli - 67	**ipc-mon - 21**	**rsvp - 14**
config - 66	**ipms - 17**	**session - 71**
dbggw - 89	**ipx - 16**	**slb - 25**
diag - 0	**lanpower - 108**	**smni - 83**
distrib - 84	**ldap - 86**	**snmp - 68**
drc - 74	**linkagg - 12**	**ssh - 109**
eipc - 26	**mipgw - 70**	**ssl - 88**
epilogue - 85	**module - 24**	**stp - 11**
ftp - 82	**nan-driver - 78**	**system - 75**
gmap - 19	**ni-supervision - 5**	**telnet - 80**
gm - 9	**nosnmp - 87**	**trap - 72**
health - 76	**pmm - 23**	**vlan - 8**
idle - 255	**policy - 73**	**vrrp - 77**
	port-mgr - 65	**web - 69**

level	The severity level keyword for the application ID (shown below). All sysTrace events of the specified level and lower will be captured.
level *integer*	A numerical equivalent value for the severity level (shown below). Values may range from 1–9.

Supported Levels	Numeric Equivalents	Description
off	**1**	Off.
alarm	**2**	Highest severity. The system is about to crash and reboot.
error	**3**	System functionality is reduced.
alert	**4**	A violation has occurred.
warning	**5**	A unexpected, non-critical event has occurred.
info	**6**	Any other non-debug message (default).
debug1	**7**	A normal event debug message.
debug2	**8**	A debug-specific message.
debug3	**9**	Lowest severity. A maximum verbosity debug message.

Defaults

parameter	default
level	info

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- You may enter more than one application ID in the command line. Separate each application ID with a space.
- Application IDs may be entered in any order.

Examples

```
-> debug systrace appid 254 level off
-> debug systrace appid policy level info
-> debug systrace appid policy snmp web aaa vlan level alert
-> debug systrace no appid debug2
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace show	Displays sysTrace debug log information.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug systrace show log

Displays sysTrace log information.

debug systrace show log [*file*]

Syntax Definitions

file	Specifies a particular file from which sysTrace log information will be displayed.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug systrace show log filename
   TimeStamp     AppID     Trace Level Task    Caller    Session ID Comment
   -----------------+----------+--------------------+-----------+--------------+-------------+----------------
   0xd3db513d  0x43 CLI     0x6   info 0x00ccd590 CliShell0 0x0305f608 0xffffffff
   [CLISHELL2] INIT socket nb : 175, local APP_ID: 67 and SNAP_ID: 66(TRUNCATED)
   0xd3db4ff1  0x43 CLI 0x6 info 0x00ccd590 CliShell0 0x0305f608 0xffffffff
   [CLISHELL2] INIT socket nb : 174, local APP_ID: 67 and SNAP_ID: 2(TRUNCATED)
   0xd3db4f47  0x43 CLI 0x6 info 0x00ccd590 CliShell0 0x030732bc 0xffffffff
   [CTRACE] CLI(ccd590) INITIALIZED address=3178b68/size=4096
   0xd3db4ed8  0x43 CLI 0x6 info 0x00ccd590 CliShell0 0x0305f914 0xffffffff
   [CLISHELL2] Task spawned, inactivity timer: 100000,file descriptor: 61
   0xc6d8b3e0  0x43 CLI 0x6 info 0x00cd1890 N/A 0x03073454 0xffffffff
   [CTRACE] CLI (cd1890) end by cd1890 address=16d1de0/size=4096
   0x0e0641fe  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task tShell has a memory leak at address 0x01527d68. Size is 52.
   0x0e0641e7  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task tShell has a memory leak at address 0x035ff510. Size is 129.
   0x0e0641d0  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task tShell has a memory leak at address 0x035ff478. Size is 140.
   0x0e0641b8  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task tShell has a memory leak at address 0x035ff3e0. Size is 140.
   0x0e0641a1  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task tShell has a memory leak at address 0x01096590. Size is 140.
   0x010fb724  0x4b SYSTEM 0x5 warning 0x03186c10 tMemMon 0x000a7ad4 0xffffffff
   Task has a memory leak at address 0x031773d0. Size is 32.
   0x010a5e85  0x4b SYSTEM 0x6 info0x035ffd60 N/A 0x000b2da4 0xffffffff ====>SYSTEM
   BOOT THU DEC 13 02:06:48 2001 <=====
   0x010a5e28  0x4b SYSTEM 0x6 info0x035ffd60 N/A 0x00067c9c 0xffffffff initializ-
   ing sysTrace, trace buffer at 0x31c0938, size=16384 entries.
```

Output fields are described here:

output definitions

Timestamp	The timestamp indicating when the sysTrace log entry occurred. Values can range from 0x00000000 through 0xffffffff.
AppID	The Application ID for which the stored sysTrace log information is displayed. Values can range from 0x00 through 0xff.
Trace Level	The Severity Level for which the stored sysTrace log information is displayed.
Task	The Task for which the stored sysTrace log information is displayed.
Caller	The function that called the sysTrace log.
Session ID	The Session ID for which the stored sysTrace log information is displayed. Values can range from 0x00000000 through 0xffffffff.
Comment	The condition that resulted in the sysTrace log entry.

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show	Displays sysTrace debug log information.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

show log pmd

Displays the contents of a stored Post Mortem Dump (PMD) file. The PMD file is a diagnostic aid that stores system information following some precipitating event (e.g., a system error).

show log pmd *file_name* [**type** *type_string* | **id** *registrationidentifier_int* | **subid** *subidentifier_int* | **taskname** *taskname_string* | **taskid** *tasknumber_int* | **record** *recordtype_string* | **address** *address_int*]

Syntax Definitions

file_name	Specifies a file containing the PMD dump information.
type_string	Specifies a registration type. Valid registration types include task, application, user-defined.
registrationidentifier_int	Specifies a registration identifier. Valid identifiers include **task number**, **unique value**, **snap/app id**.
subidentifier_int	Specifies a value that is unique when used with the registration type and registration identifier.
taskname_string	Specifies the name associated with the desired task.
tasknumber_int	Specifies the numeric value corresponding with the desired task.
recordtype_string	Specifies a record type. Valid record types include **userdefined**, **stackinfo**, **taskinfo**, **taskname**, **textstring**, **rawmemory**, **stacktrace**, **tasknumber**.
address_int	Specifies the address of the data buffer (specified in the original registration), to which memory list data will be sent.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

If no additional filter parameter is entered, all stored PMD file information will be displayed.

Examples

```
-> show log pmd filename
PMD Version -> 102
File Dump Type -> Mixed
Date Created - Coordinated universal time:  Wed Dec 19 09:22:27 2001

-----------------------------------------------------------------------------------
Registration Type ->Application         Application Id. ->4b
```

```
Record Type -> MemoryData  Address -> 1b2b74  Size -> c4
 0  0  0  7  0 6e 31 3d  3 3e df  5  0  0 37 54  0  0 18 b6  0  0 11 87  0  0 7a 88
0 0 2c 4f
 0  0 c7 58  0  0 58 40  0  0 53 fc  0  0 b9 f0  0  0 d6 71  0  7 4c 54  0  6 a6 48
0 d c3 20
 0 4e 6f 24  0  0 9e c5  0 23 2a  2  0  5 77 c4  0  2 91 f1  0  1 63  8  0  7  d  8
0 4 2c  6
 0  9 3e d4  0  e dd 7e  0 24 2d  4  0 2a 43 e0  0 a1  4 89  0 80 1c d7  1 7e c1 dd
0 0  0  0
 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 2f
3 18 42 50
 3 43  8 d0  0  0  0  0  3 43  9 18  2 6a 7e 38  0  0  0  0  3 43  8 e8  2 21 42 b0
3 43  7 90
3 18 15  0
--------------------------------------------------------------
Registration Type ->Task        Task No. ->3571290
Record Type -> TaskName Task Id  -> 3571290

tExcTask
--------------------------------------------------------------
Registration Type ->Task        Task No. ->3571290
Record Type -> StackCheck       Task Id  -> 3571290

  NAME        ENTRY        TID     SIZE   CUR  HIGH  MARGIN
------------ ------------ -------- ----- ----- ----- ------
tExcTask     excTask      3571290  19984   976  3488  16496

--------------------------------------------------------------
Registration Type ->Task        Task No. ->3571290
Record Type -> StackTrace       Task Id  -> 3571290

 e371c vxTaskEntry    +c  : excTask (0, 0, 0, 0, 0, 0)
 fb304 excTask        +24 : msgQReceive (1b8c00, 3571120, 1c, ffffffff, 0, 0)
130578 msgQReceive    +278: qJobGet (10000003, ffffffff, 7a000400, 1b8c00, 1ed400,
9e)

--------------------------------------------------------------
Registration Type ->Task        Task No. ->3571290
Record Type -> TaskInfo Task Id  -> 3571290
  Address -> 0  Size -> 40

 task id= 3571290
 task priority= 0
 task status= 2
 task option bits= 7
 original entry point of task= fb2e0
 size of stack in bytes= 4e10
 current stack usage in bytes= 3d0
 maximum stack usage in bytes= da0
 current stack margin in bytes = 4070
 most recent task error status = 3d0001
 delay/timeout ticks = 0
 saved stack pointer= 3570ec0
 the bottom of the stack= 3571290
 the effective end of the stack= 356c480
 the actual end of the stack= 356c470

--------------------------------------------------------------
```

```
Registration Type ->Task        Task No. ->3571290
Record Type -> UserDefined      Task Id  -> 3571290
  Address -> 1adcc38  Size -> 10
46 69 72 73 74 20 69 74 65 72 61 74 69 6f 6e  a
-------------------------------------------------------------
Registration Type ->Task        Task No. ->3571290
Record Type -> UserDefined      Task Id  -> 3571290
  Address -> 1adcc50  Size -> 11
53 65 63 6f 6e 64 20 69 74 65 72 61 74 69 6f 6e  a
-------------------------------------------------------------
Registration Type ->Task        Task No. ->356b990
Record Type -> TaskName Task Id  -> 356b990

tLogTask
-------------------------------------------------------------
Registration Type ->Task        Task No. ->356b990
Record Type -> StackCheck       Task Id  -> 356b990

  NAME        ENTRY        TID     SIZE   CUR  HIGH  MARGIN
------------ ------------ -------- ----- ----- ----- ------
tLogTask     logTask      356b990   8176   976  1168   7008

-------------------------------------------------------------
Registration Type ->Task        Task No. ->356b990
Record Type -> StackTrace       Task Id  -> 356b990

 e371c vxTaskEntry    +c  : logTask (0, 0, 0, 0, 0, 0)
100cac logTask        +2c : msgQReceive (1b8c00, 356b820, 20, ffffffff,
&fppTaskRegsCFmt, 9e)
130578 msgQReceive    +278: qJobGet (10000003, ffffffff, 7a000400, 1b8c00, 1ed400,
0)

-------------------------------------------------------------
Registration Type ->Task        Task No. ->356b990
Record Type -> TaskInfo Task Id  -> 356b990
  Address -> 0  Size -> 40

 task id= 356b990
 task priority= 0
 task status= 2
 task option bits= 6
 original entry point of task= 100c80
 size of stack in bytes= 1ff0
 current stack usage in bytes= 3d0
 maximum stack usage in bytes= 490
 current stack margin in bytes = 1b60
 most recent task error status = 0
 delay/timeout ticks = 0
 saved stack pointer= 356b5c0
 the bottom of the stack= 356b990
 the effective end of the stack= 35699a0
 the actual end of the stack= 3569990
-------------------------------------------------------------
```

Output fields are described here:

output definitions

PMD Version	The Post Mortem Dump (PMD) version ID.
File Dump Type	The file dump type.
Date Created	The date when the log was created.
Registration Type	The type of data being registered with PMD.
Application ID	The ID of the Application registering with PMD.
Record Type	The type of data registered with PMD.
Address	The address of the data being registered.
Size	The size (number of bytes) being registered.
Task Number	The number of the task registering with PMD.
Task ID	The vxWorks Task ID of the task registering with PMD.
Task Priority	The priority of the task registering with PMD.
Task Status	The status of the task registering with PMD.
Task Option Bits	The option bits of the task registering with PMD.
Original Entry Point of Task	The starting function of the task registering with PMD.
Size of Stack (bytes)	The size of the stack of the task registering with PMD.
Current Stack Usage (bytes)	The amount of the stack currently being used by the task registered with PMD.
Maximum Stack Usage (bytes)	The maximum amount of the stack used by the task registered with PMD.
Task Error Status	The current error status of the task registering with PMD.
Delay/Timeout Ticks	The number of ticks that the task will delay before becoming active.
Saved Stack Pointer	The stack pointer of the task registered with PMD.
Bottom of Stack	The base of the task's stack of the task registered with PMD.
Effective End of Stack	The end of the task's stack based upon the size shown previously.
Actual End of Stack	The actual end of the task's stack.

Release History

Release 5.1; command was introduced.

Related Commands

N/A

MIB Objects

N/A

debug memory monitor

Enables or disables memory monitoring functions.

debug memory monitor {enable | disable}

Syntax Definitions

enable	Enables memory monitoring.
disable	Disables memory monitoring.

Defaults

parameter	default
enable | disable	disable

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug memory monitor enable
-> debug memory monitor disable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor show log	Displays memory monitoring log information.
debug memory monitor show log global	Displays memory monitoring global statistics.
debug memory monitor show log task	Displays memory monitoring task statistics.
debug memory monitor show log size	Displays memory monitoring size statistics.

MIB Objects

N/A

debug memory monitor show status

The debug memory monitor show status command displays memory monitoring status information.

debug memory monitor show status

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug pmd ni 3/0
```

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor show log	Displays memory monitoring log information.
debug memory monitor show log global	Displays memory monitoring global statistics.
debug memory monitor show log task	Displays memory monitoring task statistics.
debug memory monitor show log size	Displays memory monitoring size statistics.

debug memory monitor show log

Displays memory monitoring log information.

debug memory monitor show log

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug memory monitor show log
   Task             Memory   Memory  Addr of  OS func    Calling Previous
   Name    Comments   Addr      Size OS call Called Function Caller
   ----------+----------+---------------+-----------+--------+---------+-------------+-------------------------
   tssApp_2* TCB Stac 00ca1550 20680 0013a180 objAllocEx taskSpawn  ssAppChild
   tssApp_2* Vx B Sem 02317ca8    28 001374d0 objAlloc   pipe       ssAppChild
   tssApp_2* Vx B Sem 02317f78    28 001374d0 objAlloc   pipe       ssAppChild
   tssApp_2*          0107be78  5121 0012cfc8 malloc     pipe       ssAppChild
   tssApp_2*          023182b0    16 0012cfa8 malloc     pipe       ssAppChild
   tssApp_2*          024fdc90     9 00105fb0 malloc     pipe       ssAppChild
   tssApp_2*          016d6548   288 000af228 malloc     ssAppChild mip_msg_qu
   CliShell0 Vx C Sem 035fe590    28 0011f038 semCCreate zcSelect   mip_msg_do
   SsApp     Vx C Sem 035fe4b8    28 0011f038 semCCreate zcSelect   tssAppMain
   CliShell0          02318250     2 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          02317538    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          016d6670   272 02b33a3c malloc     SSYaccStac SSYaccPars
   CliShell0          02318260     1 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          02317718    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          016d68b0   272 02b33a3c malloc     SSYaccStac PropagateP
   CliShell0          023182c8     4 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          027b0060    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          01896b28   272 02b33a3c malloc     SSYaccStac SSYaccPars
   CliShell0          023182d8     4 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          035fe4e0    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          01e3d928   272 02b33a3c malloc     SSYaccStac SSYaccPars
   CliShell0          024fdca8     4 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          035fe3e0    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          022b3ab0   272 02b33a3c malloc     SSYaccStac SSYaccPars
   CliShell0          024fdcb8     3 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          01e37e40    56 02b33a3c malloc     SSLexLexem SSYaccStac
   CliShell0          022b3bc8   272 02b33a3c malloc     SSYaccStac SSYaccPars
```

```
CliShell0          02314da8   272 02b33a3c malloc     SSYaccStac SSYaccInit
CliShell0          023183d8   512 02b33a3c malloc     CliParse   clishell_m
CliShell0          027b0100   576 02b33a3c malloc     CliParse   clishell_m
CliShell0          0107a128 2404 02b33a3c malloc     CliParse   clishell_m
CliShell0          0107aa98  1280 02b33a3c malloc     CliParse   clishell_m
Stp       Vx C Sem024fdcc8 28 0011f038 semCCreate zcSelect   stpSock_st
LnkAgg Vx C Sem 023182e8  28 0011f038 semCCreate zcSelect   lagg_Sock_
AmapMgr Vx C Sem 02318270      28 0011f038 semCCreate zcSelect   xmap_main_
GrpMob Vx C Sem 035fe5b8 28 0011f038 semCCreate zcSelect   gmcWaitFor
GmapMgr Vx C Sem 02317fa0      28 0011f038 semCCreate zcRecvfrom gmap_main_
VlanMgr   Vx C Sem 02317cd0    28 0011f038 semCCreate zcSelect   vmcWaitFor
NanDrvr   Vx C Sem 02318158    28 0011f038 semCCreate zcRecvfrom nanDriver
```

Output fields are described here:

output definitions

Task Name	The task that "owns" the memory block.
Comments	The type of memory block that has been allocated. Comments include: • TCB Stack—this block belongs to the task whose name is listed • PX Msg Q—Posix Message Queue • Vx Msg Q—vxWorks Message Queue • P Sem—Posix Semaphore • Vx B Sem—vxWorks binary semaphore • Vx C Sem—vxWorks counting semaphore • Vx M Sem—vxWorks mutual exclusion semaphore • Leak—Memory leak.
Memory Address	The address of the memory block.
Memory Size	The size of the memory block.
Address of OS Call	The address of the call that allocated the block.
OS Function Called	The function that contained the call that allocated the block.
Calling Function	The function that called the above-mentioned function.
Previous Caller	The function that called the above-mentioned function.

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor	Enables or disables memory monitoring functions.
debug memory monitor show log global	Displays memory monitoring global statistics.
debug memory monitor show log task	Displays memory monitoring task statistics.
debug memory monitor show log size	Displays memory monitoring size statistics.

MIB Objects

N/A

debug memory monitor show log global

Displays memory monitoring global statistics.

debug memory monitor show log global

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug memory monitor show log global
Current    = 33741
Cumulative = 687952
```

Output fields are described here:

output definitions

Current	The amount of dynamic memory allocated (currently) since the last enable.
Cumulative	The amount of dynamic memory allocated (cumulative) since the last enable.

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor	Enables or disables memory monitoring functions.
debug memory monitor show log	Displays memory monitoring log information.
debug memory monitor show log task	Displays memory monitoring task statistics.
debug memory monitor show log size	Displays memory monitoring size statistics.

MIB Objects

N/A

debug memory monitor show log task

Displays memory monitoring task statistics.

debug memory monitor show log task

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug memory monitor show log task
Task Name          Current     Cumulative
----------------+-------------+-------------
       tssApp0_4        26369          52594
      cliConsole        16169          20186
      tIpxGapper          242            242
       tIpxTimer          214            214
        tDrcIprm      1801287        1801315
           DrcTm       479453         675448
         WebView        53690         340083
            Rmon       285084         334616
         SlbCtrl          578            578
          PolMgr          808          15704
             Qos        47096         938852
          UdpRly         8320           8348
            Vrrp          622           1198
             Ipx        29634          29634
           ipmpm       231152         231152
           ipmfm       480422         480450
           Ipmem       423686         423686
         GmapMgr         9128         263872
         AmapMgr          284         891188
          LnkAgg        86988        1867592
           8021q          128            184
         stpTick         1024           1024
             Stp        70782        1555454
          GrpMob          128         669300
          SrcLrn        12516          12572
          EsmDrv          356          74752
           PsMgr          168            308
           L3Hre          528            528
          Health          249         127649
             AAA       221312         222236
           Ipedr        31500         105868
         NanDrvr           56          74396
            Ftpd           56             56
         Telnetd         9552           9552
         tCS_CVM           28             28
   tssApp65535_3          228            228
           SsApp        49088         198284
          SesMgr        69200         202029
         SNMPagt        26347         210129
         TrapMgr         4548          63976
            EIpc         2336           2392
         VlanMgr          208         149672
         PortMgr          804          75424
         Gateway           84            140
          CfgMgr          228         897491
         tCS_HSM         1240           2500
         tCS_CMS          188            328
         tCS_PRB          312            340
         tCS_CCM          612          12555
      tCsCSMtask       586128       15256874
      tSwLogTask                       13519+
```

Output fields are described here:

output definitions

Task Name	The task that "owns" the memory block.
Current	The amount of dynamic memory allocated (currently) since log was enabled.
Cumulative	The amount of dynamic memory allocated (cumulative) since log was enabled.

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor	Enables or disables memory monitoring functions.
debug memory monitor show log	Displays memory monitoring log information.
debug memory monitor show log global	Displays memory monitoring global statistics.
debug memory monitor show log size	Displays memory monitoring size statistics.

MIB Objects

N/A

debug memory monitor show log size

Displays memory monitoring size statistics.

debug memory monitor show log size

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug memory monitor show log size
Lower Upper   Currently   Cummulatively
Limit Limit   Allocated     Allocated
-----+-----+-------------+-------------+
    0    16         14439         31689
   16    32          6299       7704923
   32    64          4833        373109
   64   128         44248        145775
  128   256         12367        122315
  256   512         52096        228673
  512  1024         26778        365552
 1024  2048         24572        358630
 2048  4096         49648        274071
 4096  8192         50793       1534291
 8192 16384        478292        673610
16384 32768        431784       1075783
32768 65536        850216       1588017
65536             5130020       25675316
```

Output fields are described here:

output definitions

Lower Limit	The lower limit of the memory size range being measured.
Upper Limit	The upper limit of the memory size range being measured.
Currently Allocated	The amount of memory currently allocated (in bytes).
Cummulatively Allocated	The amount of memory cumulatively allocated (in bytes).

Release History

Release 5.1; command was introduced.

Related Commands

debug memory monitor	Enables or disables memory monitoring functions.
debug memory monitor show log	Displays memory monitoring log information.
debug memory monitor show log global	Displays memory monitoring global statistics.
debug memory monitor show log task	Displays memory monitoring task statistics.

MIB Objects

N/A

debug ktrace

Enables or disables kTrace logging. The kernel trace, or *kTrace*, facility provides a consistent, low-level mechanism for capturing integer-based event records in a history buffer. This trace facility will generally be used by lower level functions to track information, such as which task is operating.

debug ktrace {enable | disable}

Syntax Definitions

enable	Enables kTrace logging.
disable	Disables kTrace logging.

Defaults

parameter	default
enable | disable	**enable**

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ktrace enable
-> debug ktrace disable
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show	Displays sysTrace debug log information.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug ktrace show

Displays current kTrace parameters (e.g., kTrace status, Application IDs with non-default Severity Level settings).

debug ktrace show

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ktrace show
kTrace is:
- INITIALIZED
- RUNNING
- configured to TRACE CALLERS

All applications have their trace level set to the level 'info' (6)
```

Output fields are described here:

output definitions

Application ID	If an Application ID (subsystem) keyword is displayed, such as SNMP (68), its Severity Level is not set to the info (6) default setting.
Level	The Severity Level of the above-referenced Application ID. Levels include off (1), alarm (2), error (3), alert (4), warning (5), info (6), debug1 (7), debug2 (8), and debug3 (9).

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show	Displays sysTrace debug log information.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug ktrace appid level

Adds or removes a kTrace capture level for a specified application ID (i.e., subsystem).

debug ktrace appid {*app_id* | *integer*} **level** {*level* | *integer*}

debug ktrace no appid *app_id*

Syntax Definitions

app_id	An application ID keyword value. Currently supported application IDs are listed below.
appid *integer*	A numerical equivalent value for the application ID. Currently supported numeric equivalent values are listed below.

Supported Application IDs and Numeric Equivalents

802.1q - 7	**ipc-diag - 1**	**psm - 81**
aaa - 20	**ip-helper - 22**	**qdispatcher - 3**
bridge - 10	**ipc-link - 4**	**qdriver - 2**
chassis - 64	**ipc-mon - 21**	**qos - 13**
cli - 67	**ipms - 17**	**rmon - 79**
config - 66	**ipx - 16**	**rsvp - 14**
dbggw - 89	**lanpower - 108**	**session - 71**
diag - 0	**ldap - 86**	**slb - 25**
distrib - 84	**linkagg - 12**	**smni - 83**
drc - 74	**mipgw - 70**	**snmp - 68**
eipc - 26	**module - 24**	**ssl - 88**
epilogue - 85	**nan-driver - 78**	**stp - 11**
ftp - 82	**ni-supervision - 5**	**system - 75**
health - 76	**nosnmp - 87**	**telnet - 80**
idle - 255	**pmm - 23**	**trap - 72**
interface - 6	**policy - 73**	**vlan - 8**
ip - 15	**port-mgr - 65**	**vrrp - 77**
		web - 69

level	The severity level keyword for the application ID (shown below). All kTrace events of the specified level and lower will be captured.
level *integer*	A numerical equivalent value for the severity level (shown below). Values may range from 1–9.

Supported Levels	Numeric Equivalents	Description
off	**1**	Off.
alarm	**2**	Highest severity. The system is about to crash and reboot.
error	**3**	System functionality is reduced.
alert	**4**	A violation has occurred.
warning	**5**	A unexpected, non-critical event has occurred.
info	**6**	Any other non-debug message (default).
debug1	**7**	A normal event debug message.
debug2	**8**	A debug-specific message.
debug3	**9**	Lowest severity. A maximum verbosity debug message.

Defaults

parameter	default
level	info (6)

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- You may enter more than one application ID in the command line. Separate each application ID with a space.
- Application IDs may be entered in any order.

Examples

```
-> debug ktrace appid 254 level off
-> debug ktrace appid policy level info
-> debug ktrace appid policy snmp web aaa vlan level alert
-> debug ktrace no appid debug2
```

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace show	Displays current kTrace parameters.
debug ktrace show log	Displays kTrace log information.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show	Displays sysTrace debug log information.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

debug ktrace show log

Displays kTrace log information.

debug ktrace show log [*file*]

Syntax Definitions

file	Specifies a particular file from which kTrace log information will be displayed.

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

N/A

Examples

```
-> debug ktrace show log
   Event     Timestamp AppID Level    Task ID  Caller (arg1, arg2, arg3, arg4)
   -----------+--------------+--------+-------------+--------+--------------------------------------------
   TSWITCH 0x4cad9a4   0x4b   info (6) SSAppKTL (0x00ca6370) 0x00066578 0x027b23b0
   0x00ca6370 0x00000000 0x00000000
   TSWITCH 0xd4cad98d  0x4b   info (6) ipcInteg (0x027b23b0) 0x00066578 0x00ca6370
   0x027b23b0 0x00000000 0x00000000
   TSWITCH 0xd4cad8ae  0x4b   info (6) SSAppKTL (0x00ca6370) 0x00066578 0x03186c10
   0x00ca6370 0x00000000 0x00000000
   TCREATE 0xd4cad810  0x4b   info (6) tssApp_2 (0x00cab440) 0x000665d0 0x00ca6370
   0x00000000 0x00000000 0x00000000
   TSWITCH 0xd4cad787  0x4b   info (6) tssApp_2 (0x00cab440) 0x00066578 0x03186c10
   0x00cab440 0x00000000 0x00000000
   TSWITCH 0xd4cad77c  0x4b   info (6) tMemMon (0x03186c10) 0x00066578 0x00cab440
   0x03186c10 0x00000000 0x00000000
   TSWITCH 0xd4cad771  0x4b   info (6) tssApp_2 (0x00cab440) 0x00066578 0x00cab440
   0x03186c10 0x00000000 0x00000000
   TSWITCH 0xd4cad751  0x4b   info (6) tMemMon (0x03186c10) 0x00066578 0x03186c10
   0x00cab440 0x00000000 0x00000000
   KICKDOG 0xd276db09  0x4b   info (6) tCsCSMta (0x022fb0d0) 0x00046760 0x0000001e
   0x0000001e 0x00000002 0x0000001e
   TSWITCH 0xd276d875  0x4b   info (6) SSApp (0x01d62350) 0x00066578 0x03186c10
   0x01d62350 0x00000000 0x00000000
```

Output fields are described here:

output definitions

Event	The event for which kTrace log information is displayed.
Timestamp	The timestamp for the kTrace log information being displayed. Values can range from 0x00000000 through 0xffffffff.
AppID	The Application ID (subsystem) for which kTrace log information is displayed. Values can range from 0x00 through 0xff.
Level	The Severity Level for which kTrace log information is displayed.Values include off (1), alarm (2), error (3), alert (4), warning (5), info (6) (default) debug1 (7), debug2 (8), and debug3 (9).
Task ID	The Task for which kTrace log information is displayed.
Caller	The address of the function containing the call that logged the event.

Release History

Release 5.1; command was introduced.

Related Commands

debug ktrace	Enables or disables kTrace logging.
debug ktrace appid level	Adds or removes a kTrace capture level for a specified subsystem.
debug ktrace show	Displays current kTrace parameters.
debug systrace	Enables or disables sysTrace logging.
debug systrace watch	Enables or disables sysTrace log output to the console.
debug systrace appid level	Adds or removes a sysTrace capture level for a specified subsystem.
debug systrace show	Displays sysTrace debug log information.
debug systrace show log	Displays the sysTrace log.
show log pmd	Displays the contents of a stored Post Mortem Dump (PMD) file.

MIB Objects

N/A

C Technical Support Commands

This chapter describes Technical Support Command Line Interface (CLI) **show** commands that create log files of the output from multiple standard CLI **show** commands. These log files can be transferred with FTP to a workstation for off-line analysis and troubleshooting.

Note. See the *OmniSwitch CLI Reference Guide* for more information on standard CLI **show** commands.

A summary of available commands is listed here:

show tech-support
show tech-support layer2
show tech-support layer3
show tech-support layer3 rip
show tech-support layer3 pimsm
show tech-support layer3 ospf
show tech-support layer3 mroute
show tech-support layer3 ipx
show tech-support layer3 dvmrp
show tech-support layer3 bgp

show tech-support

Creates a log file of the output of several system-wide Command Line Interface (CLI) commands.

show tech-support

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support.log** in the **/flash** directory of the output produced by the **show hardware info**, **show chassis**, **show module long**, **show fan**, **show power**, **show temperature**, **show system**, **show running-directory**, **show microcode certified**, **show microcode working**, **show microcode loaded**, **debug ipc pools slot**, **show aaa authentication**, **show health**, **show vlan**, **show spantree**, **show interfaces status**, **show ip interface**, **show ip config**, and **show ip protocols** CLI commands.
- If an existing file called **tech_support.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on the **debug ipc pools slot** command.

Examples

```
-> show tech-support
....................
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer2

Creates a log file of the output of several Layer 2 Command Line Interface (CLI) commands.

show tech-support layer2

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_layer2.log** in the **/flash** directory of the output produced by the **show interfaces**, **show interfaces accounting**, **show interfaces collisions**, **show vlan port**, **show vlan port mobile**, **show linkagg**, **show linkagg port**, **show spantree ports**, **show mac-address-table count**, **show mac-address-table aging-time**, **show mac-address-table**, **debug fabric stats**, **debug fabric fbus**, **debug fabric errors**, **debug fabric input**, and **debug fabric stats** CLI commands.
- If an existing file called **tech_support_layer2.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on the **debug fabric** commands.

Examples

```
-> show tech-support layer2
................
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3

Creates a log file of the output of several Layer 3 Command Line Interface (CLI) commands.

show tech-support layer3

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_layer3.log** in the **/flash** directory of the output produced by the **show vlan router mac status**, **show ip router database**, **show ip traffic**, **show icmp statistics**, **show tcp statistics**, **show tcp ports**, **show udp statistics**, **show udp ports**, **show vrrp**, **show vrrp statistics**, **show ip slb**, **show ip route**, and **show arp** CLI commands.
- If an existing file called **tech_support_layer3.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- Server Load Balancing (SLB) is not supported on OmniSwitch 6624 and 6648 switches and therefore the **show ip slb** command output is not relevant for these switches.

Examples

```
-> show tech-support layer3
.............
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.

show tech-support layer3 rip

Creates a log file of the output of several Routing Information Protocol (RIP) Command Line Interface (CLI) commands.

show tech-support layer3 rip

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_rip.log** in the **/flash** directory of the output produced by the **show ip rip**, **show ip rip routes**, **show ip rip redist-filter**, **show ip rip redist**, **show ip rip interface**, **show ip rip peer**, and **show ip rip debug** CLI commands.
- If an existing file called **tech_support_rip.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on **debug** commands.

Examples

```
-> show tech-support layer3 rip
.......
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 pimsm

Creates a log file of the output of several Protocol-Independent Multicast Sparse Mode (PIM-SM) Command Line Interface (CLI) commands.

show tech-support layer3 pimsm

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_pimsm.log** in the **/flash** directory of the output produced by the **show ip pimsm**, **show ip pimsm neighbor**, **show ip pimsm rp-candidate**, **show ip pimsm rp-set**, **show ip pimsm interface**, **show ip pimsm nexthop**, **show ip pimsm mroute**, and **show ip pimsm debug** CLI commands.
- If an existing file called **tech_support_pimsm.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on **debug** commands.

Examples

```
-> show tech-support layer3 pimsm
........
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 ospf

Creates a log file of the output of several Open Shortest Path First routing (OSPF) Command Line Interface (CLI) commands.

show tech-support layer3 ospf

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_ospf.log** in the **/flash** directory of the output produced by the **show ip ospf**, **show ip ospf area**, **show ip ospf interface**, **show ip ospf neighbor**, **show ip ospf lsdb**, **show ip ospf host**, **show ip ospf border-routers**, **show ip ospf ext-lsdb**, **show ip ospf redist**, **show ip ospf redist-filter**, **show ip ospf routes**, **show ip ospf virtual-link**, and **show ip ospf debug** CLI commands.
- If an existing file called **tech_support_ospf.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on **debug** commands.

Examples

```
-> show tech-support layer3 ospf
.............
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 mroute

Creates a log file of the output of several multicast routing Command Line Interface (CLI) commands.

show tech-support layer3 pimsm

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_mroute.log** in the **/flash** directory of the output produced by the **show ip mroute**, **show ip mroute interface**, **show ip mroute-nexthop**, **show ip mroute-boundary**, and **show ip mroute debug** CLI commands.
- If an existing file called **tech_support_mroute.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on **debug** commands.

Examples

```
-> show tech-support layer3 mroute
.....
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 ipx

Creates a log file of the output of several Internet Packet Exchange (IPX) protocol Command Line Interface (CLI) commands.

show tech-support layer3 ipx

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 6624, 6648, 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_ipx.log** in the **/flash** directory of the output produced by the **show ipx interface**, **show ipx default-route**, **show ipx route**, **show ipx servers**, **show ipx filter**, **show ipx type-20-propagation**, **show ipx packet-extension**, and **show ipx timers** CLI commands.
- If an existing file called **tech_support_ipx.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.

Examples

```
-> show tech-support layer3 ipx
.........
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 dvmrp

Creates a log file of the output of several Distance Vector Multicast Routing Protocol (DVMRP) Command Line Interface (CLI) commands.

show tech-support layer3 dvmrp

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_dvmrp.log** in the **/flash** directory of the output produced by the **show ip dvmrp**, **show ip dvmrp prune**, **show ip dvmrp route**, **show ip dvmrp neighbor**, **show ip dvmrp interface**, **show ip dvmrp nexthop**, **show ip dvmrp tunnel**, and **show ip dvmrp debug** CLI commands.
- If an existing file called **tech_support_dvmrp.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, "Debug Commands," for more information on **debug** commands.

Examples

```
-> show tech-support layer3 dvmrp
........
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

show tech-support layer3 bgp

Creates a log file of the output of several Border Gateway Protocol (BGP) Command Line Interface (CLI) commands.

show tech-support layer3 bgp

Syntax Definitions

N/A

Defaults

N/A

Platforms Supported

OmniSwitch 7700, 7800, 8800

Usage Guidelines

- This command creates a file called **tech_support_bgp.log** in the **/flash** directory of the output produced by the **show ip bgp**, **show ip bgp statistics**, **show ip bgp aggregate-address**, **show ip bgp network**, **show ip bgp path**, **show ip bgp neighbors**, **show ip bgp neighbors policy**, **show ip bgp neighbors statistics**, **show ip bgp policy community-list**, **show ip bgp redist-filter**, **show ip bgp routes**, and **show ip bgp debug** CLI commands.
- If an existing file called **tech_support_bgp.log** already exists then it will be overwritten when this command is executed.
- See the *OmniSwitch CLI Reference Guide* for more information on **show** commands.
- See Appendix B, “Debug Commands,” for more information on **debug** commands.

Examples

```
-> show tech-support layer3 bgp
............
```

Release History

Release 5.1; command was introduced.

Related Commands

show tech-support	Creates a log file of the output of system-wide CLI commands.
show tech-support layer2	Creates a log file of the output of several Layer 2 CLI commands.
show tech-support layer3	Creates a log file of the output of several Layer 3 CLI commands.

D Modifying Files with VI Editor

The switch has a built in Unix text editor called VI.

This section covers some basic VI commands and how to use VI to modify the IP address of the EMP (Ethernet Management Port), which is stored in the **boot.params** file. The **boot.params** file can also be modified via MiniBoot.

In This Chapter

Useful VI Commands

The following are some useful VI commands:

u - undo the last command.

CTL/L -reprint current screen.

CTL/F-pages forward one screen.

CTL/B-pages back one screen.

j -moves cursor down one line.

k -moves cursor up one line.

h - moves cursor back one character.

l - moves cursor forward one character.

Enter key - moves cursor to the beginning of next line.

0 -zero moves cursor to beginning of current line.

$ -- moves cursor to end of current line.

space bar - moves cursor forward one character.

w-moves cursor forward to the next word.

e - moves cursor backward to the end of previous word.

b - moves cursor backward to the beginning of the previous word.

/ *pattern* - this will search for the entered pattern.

n - this will repeat the last search (/).

s - deletes current character and enters insertion mode.

J - Joins the current line with the next line.

a - append test after cursor. Use **Esc** key to terminate.

A - Append test at end of line. Use **Esc** key to terminate.

i - Inserts text before the cursor. Use **Esc** key to terminate.

I - Inserts text at the beginning of the line. Use **Esc** key to terminate.

o -Opens new line below current line for text insertion. Use **Esc** key to terminate.

O - Opens new line above the current line for text insertion. Use **Esc** key to terminate.

Delete key - Overwrites last character during text insertion.

Esc key -Stops text insertion.

x - Deletes current character.

dd-Deletes the current line.

Dew - Deletes the current word.

P - Puts back text from previous delete.

yy-Puts the current line in buffer; leaves the current line intact.

p-Places the line in the buffer after the current position of the cursor.

ZZ-Exits VI and saves the changes.

:q-quits VI session and does not save any of the changes.

Sample VI Session

The following is a sample way to use the VI editor to modify the **boot.params** file.

Note. The commands performed below are executed from the /flash directory (root).

```
vi boot.params
boot empipaddr 192.168.11.1:ffffff00
boot empgatewayipaddr 192.168.11.254
boot serialbaudrate 9600
boot serialparity none
boot serialwordsize 8
boot serialstopbits 1
boot serialmode modemControlOff
boot reboottimer 0
boot runningversion working
boot nextrunningversion certified
boot numresets 54
```

The following is one of the ways you could now edit the IP address listed above.

Type the letter **l** to move one space to the right (**h** to move to the left) until you are at the front of the IP address you want to modify, and then issue the letter **x** to delete the character to the right; repeat until the address is removed. Issue an **i** to insert characters, and type in the new address. When you are finished, type **ZZ** to exit, and save your changes. If you do not want to save the changes issue the following:

```
:q!
```

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