Troubleshoot Punt Fabric Data Path Failure on Tomahawk and Lightspeed Card

Contents

Introduction

This document describes punt fabric data path failure messages seen during Cisco Aggregation Services Router (ASR) 9000 Series operation.

Background Information

The message appears in this format:

- Alarms are seen on the router console as shown here.
- It means that the loopback path of these messages is broken somewhere.

```
RP/0/RP0/CPU0:Oct 28 12:46:58.459 IST: pfm_node_rp[349]: %PLATFORM-DIAGS-3-PUNT_FABRIC_DATA_PATH_FAILED
```

```
Set|online_diag_rsp[24790]|System Punt/Fabric/data Path Test(0x2000004)|failure threshold is 3,
(slot, NP) failed: (0/9/CPU0, 1) (0/9/CPU0, 3)
```

The issue occurs for NP1 and NP3 on 0/9/CPU0 mentioned previously.

This document is intended for anyone who wants to understand the error message and the actions that must be taken if the problem is seen.

The Tomahawk-based line card (LC) is available as either a Service Edge Optimized (enhanced QoS) or Packet Transport Optimized (basic QoS) LC.

- SE - Services Edge Optimized
- TR - Packet Transport Optimized

The 4-Port and 8-Port 100 Gigabit Ethernet LC is available in two variants that support either LAN/WAN/OTN unified PHY CPAK ports or LAN PHY-only CPAK ports.

These LCs are Tomahawk-based:

- A9K-8X100G-LB-SE
- A9K-8X100G-LB-TR
- A9K-8X100GE-SE
- A9K-8X100GE-TR
- A9K-4X100GE-SE
- A9K-4X100GE-TR
- A9K-400G-DWDM-TR
- A9K-MOD400-SE
- A9K-MOD400-TR
- A9K-MOD200-SE
- A9K-MOD200-TR
- A9K-24X10GE-1G-SE
- A9K-24X10GE-1G-TR
- A9K-48X10GE-1G-SE
- A9K-48X10GE-1G-TR
- A99-12X100GE
- A99-8X100GE-SE
- A99-8X100GE-TR

> Note: Tomahawk-based LC part numbers that begin with A99-X are compatible with the Cisco ASR 9904, ASR 9906, ASR 9910, ASR 9912, and ASR 9922 chassis. They are not compatible with the Cisco ASR 9006 and ASR 9010 Routers.

Lightspeed-based LCs might be available as either a Service Edge Optimized (enhanced QoS) or Packet Transport Optimized (basic QoS) LC. Unlike Tomahawk-based LCs, not every LC model is available in both -SE and -TR types.

- SE - Services Edge Optimized
- TR - Packet Transport Optimized

These LCs are Lightspeed-based:

- A9K-16X100GE-TR

- A99-16X100GE-X-SE
- A99-32X100GE-TR

Lightspeed-Plus (LSP)-based LCs are available as either a Service Edge Optimized (enhanced QoS) or Packet Transport Optimized (basic QoS) LC.

These LCs are LSP-based:

- A9K-4HG-FLEX-TR
- A9K-4HG-FLEX-SE
- A99-4HG-FLEX-TR
- A99-4HG-FLEX-SE
- A9K-8HG-FLEX-TR
- A9K-8HG-FLEX-SE
- A9K-20HG-FLEX-TR
- A9K-20HG-FLEX-SE
- A99-32X100GE-X-TR
- A99-32X100GE-X-SE
- A99-10X400GE-X-TR
- A99-10X400GE-X-SE

Punt Fabric Diagnostic Packet Path

- The diagnostic application that runs on the route processor card CPU injects diagnostic packets destined for each Network Processor (NP) periodically.
- The diagnostic packet is looped back inside the NP and reinjected towards the route processor card CPU that sourced the packet.
- This periodic health check of every NP with a unique packet per NP by the diagnostic application on the route processor card provides an alert for any functional errors on the data path during router operation.
- It is essential to note that the diagnostic application on both the active route processor and the standby route processor injects one packet per NP periodically and maintains a per-NP success or failure count.
- Every minute a diagnostic packet is sent to NP, (to every Virtual Queues Interface (VQI) four times (total of four mins/VQI) and runs over all VQIs of that NP). In order to brief on this, here is an example:

Consider the LC has four NPs, online diagnostics has to exercise all NPs (to know they are healthy - fabric paths). Now, each NP can have 20 VQIs each (0-19, 20 - 39, 40-59, 60-79).

In the first minute, the online diagnostic sends one packet to each NP.

```
1 min : against VQI 0, 20, 40, 60 (to all 4 NPs)

2 min:"""""""""

3 min: """""""

4 min : """""
```

```
5th min : against VQI 1, 21, 41, 61..
```

```
6 min : """""""""
```

This repeats in a cycle once all VQI finishes.

- When a threshold of dropped diagnostic packets is reached, the application raises an alarm in Platform Fault Manager (PFM).

<#root>

```
RP/0/RP1/CPU0:AG2-2#
```

show pfm location 0/RP1/CPU0

```
node: node0_RP0_CPU0
----------------------

CURRENT TIME: Apr  7 01:04:04 2022PFM TOTAL: 1   EMERGENCY/ALERT(E/A): 0   CRITICAL(CR): 0   ERROR(ER):

-------------------------------------------------------------------------------------------------

Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle

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

Apr  7 00:54:52 2022|0 |PUNT_FABRIC_DATA_PATH_FAILED        |ER |10042 >>ID |System Punt/Fa|0x2000004
```

In order to collect all information about PFM alarms, capture this command output:

<#root>

show pfm location all

show pfm trace location all

If you want to see more information about alarms raised by a specific process, you can use this command:

<#root>

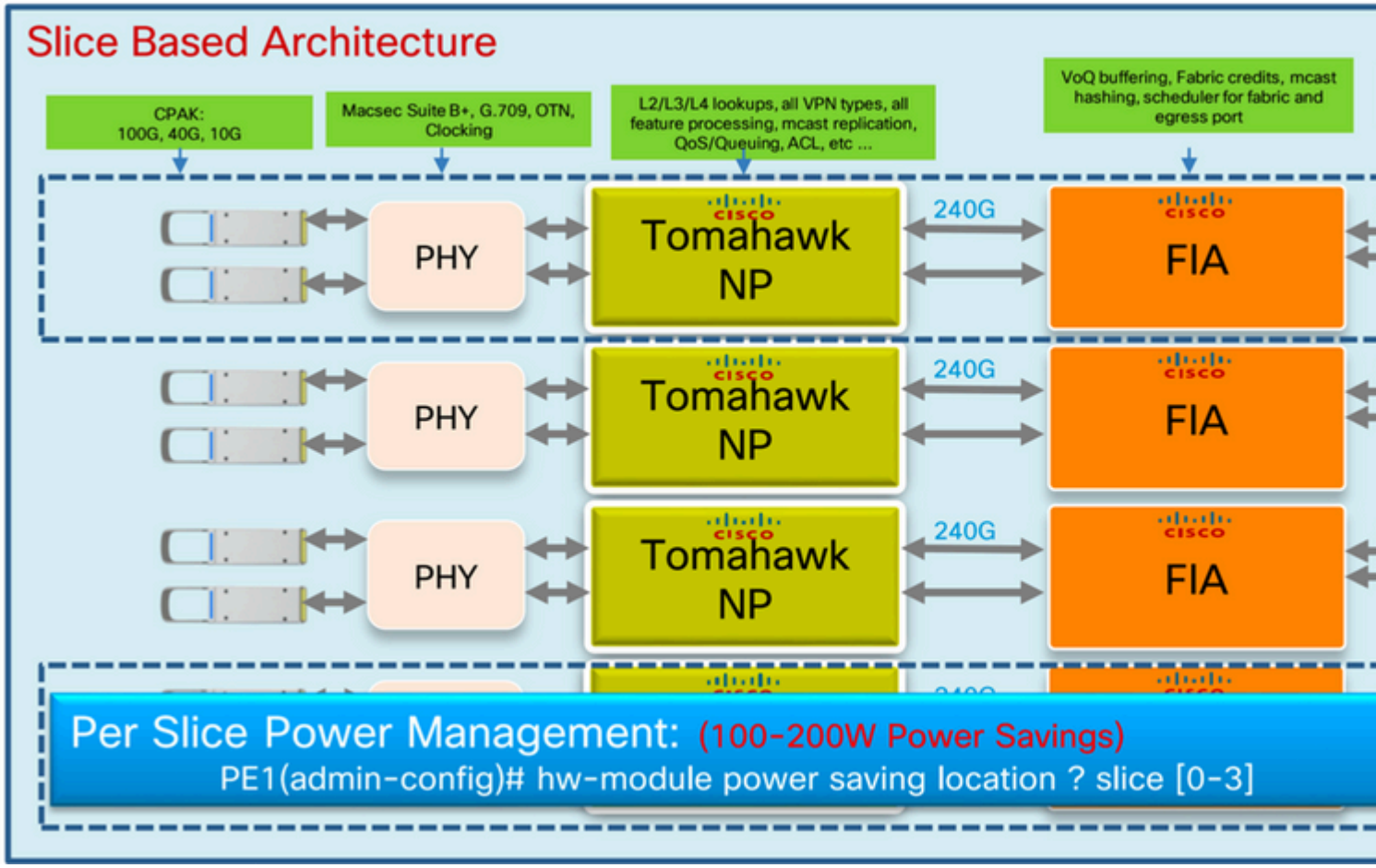
show pfm process name <*process_name*> location <*location*>

```
 >>> location where the PFM alarm is observed
```

High-level LC's Architecture

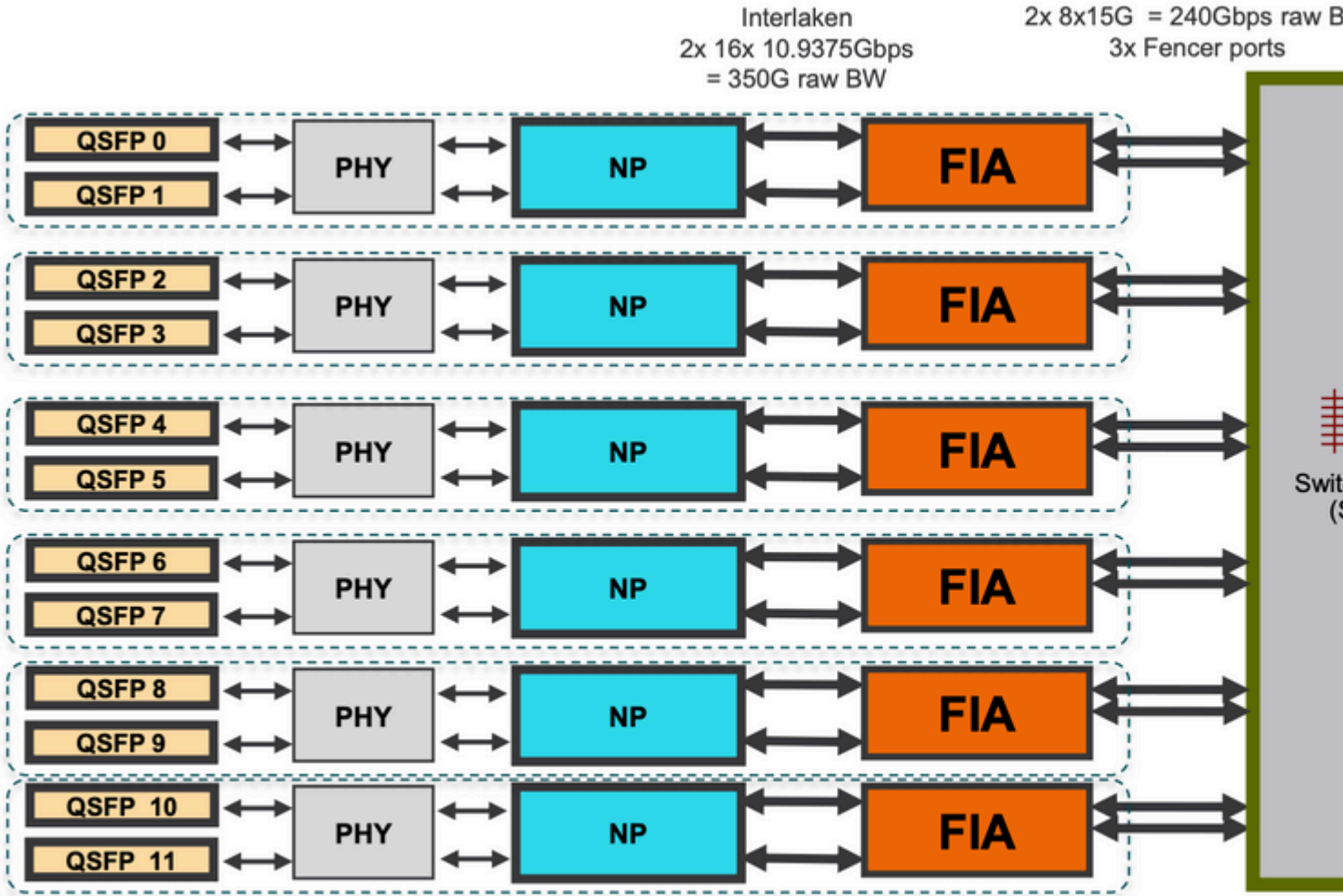
Tomahawk LC

8x100G Architecture



Tomahawk - 8x100G LC

12 x 100G Architecture



```
                Node: 0/0/CPU0:
----------------------------------------------------------------
NP Bridge Fia                       Ports
-- ------ --- -----------------------------------------------
0  --     0   TenGigE0/0/0/0/0 - TenGigE0/0/0/0/9, TenGigE0/0/0/1/0 - TenGigE0/0/0/1/9
1  --     1   TenGigE0/0/0/2/0 - TenGigE0/0/0/2/9, HundredGigE0/0/0/3
2  --     2   HundredGigE0/0/0/4 - HundredGigE0/0/0/5  >>>Below is the VQI assignment
3  --     3   HundredGigE0/0/0/6 - HundredGigE0/0/0/7
RP/0/RP0/CPU0:AG3_1#
```

sh controller fabric vqi assignment slot 2

```
 slot = 2
<snip>
fia_inst = 2 >>>FIA 2
 VQI = 40       SPEED_100G
 VQI = 41       SPEED_100G
 VQI = 42       SPEED_100G
 VQI = 43       SPEED_100G
 VQI = 44       SPEED_100G
 VQI = 45       SPEED_100G
 VQI = 46       SPEED_100G
 VQI = 47       SPEED_100G
 VQI = 56       SPEED_100G
 VQI = 57       SPEED_100G
 VQI = 58       SPEED_100G
 VQI = 59       SPEED_100G
 VQI = 60       SPEED_100G
 VQI = 61       SPEED_100G
 VQI = 62       SPEED_100G
 VQI = 63       SPEED_100G
```

When the ingress LC decides that it wants to send a particular packet to a particular egress NPU, the modify (MDF) stage on the ingress LC encapsulated a packet with a fabric destination header. When the FIA looks at that "address", it checks the VOQ for the particular egress NPU/destination/LC and sees if there is enough bandwidth available. When it is ready to dequeue it to that LC, the ingress FIA requests a grant from the fabric (the arbiter) for that destination LC. The Arbitration algorithm is QOS aware, it ensures that P1 class packets have preference over P2 class and so on. The arbiter relays the grant request from the ingress FIA to the egress FIA.

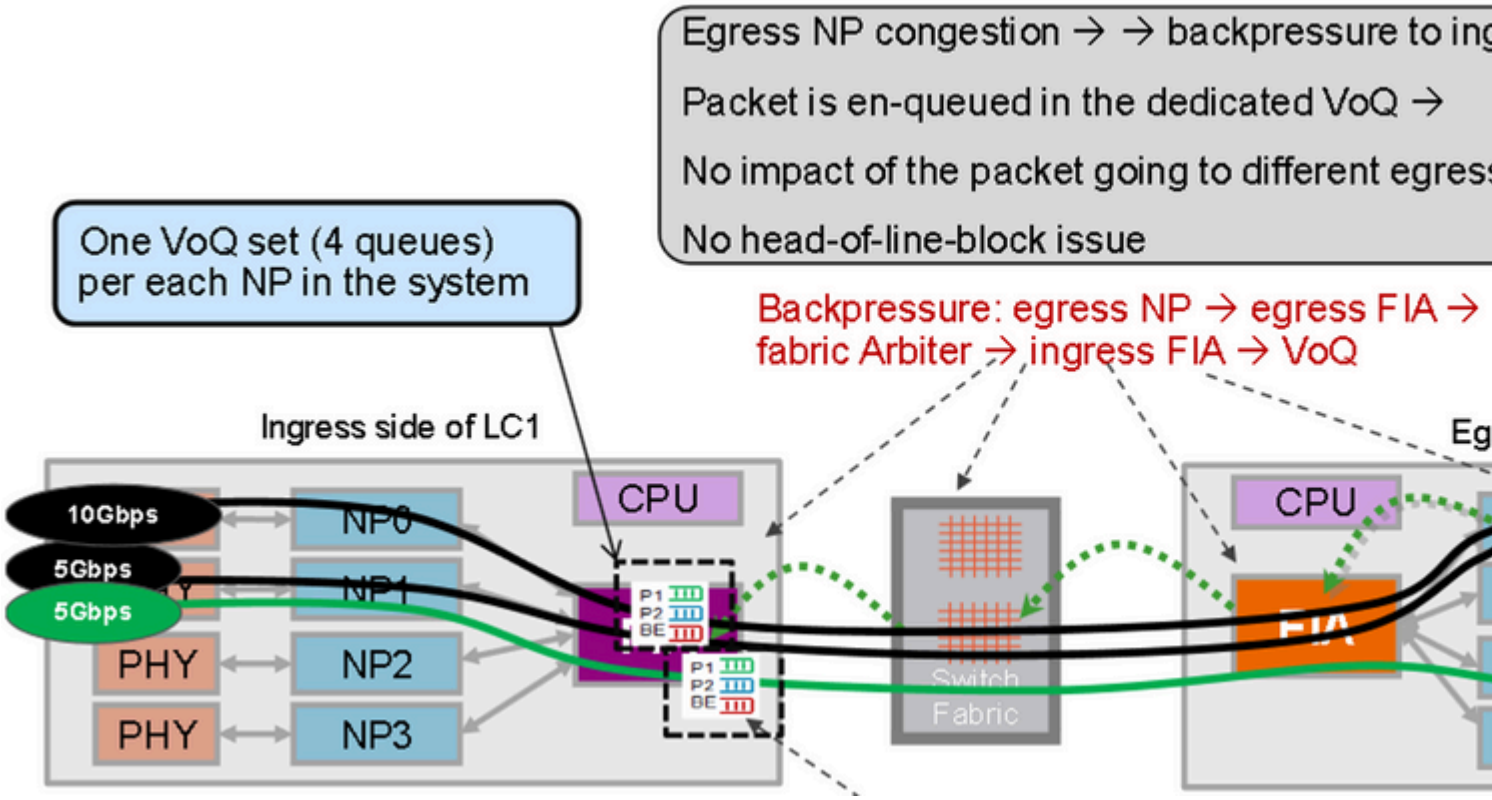
The ingress FIA can group multiple packets together going to that same egress LC into what is called a superframe. This means it is not native frames/packets that go over the switch fabric links but superframes. This is important to note because, in a test of a constant 100pps, the CLI can show the fabric counters only reporting 50pps. This is not packet loss, it would just mean that there are two packets in each superframe transmitting over the switch fabric. Superframes include sequencing information and destination FIAs support reordering (packets can be "sprayed" over multiple fabric links). Only unicast packets are placed into superframes, never multicast ones.

Once the packet is received by the egress LC, the grant is returned to the arbiter. The arbiter has a finite number of tokens per VOQ. When the arbiter permits the ingress FIA to send a (super) frame to a specific VOQ, that token is returned to the pool only when the egress FIA delivers the frames to the egress NP. If the egress NP has raised a back-pressure signal to the egress FIA, the token remains occupied. This is how the arbiter eventually runs out of tokens for that VOQ in the ingress FIA. When that happens, the ingress FIA starts dropping the incoming packets. The trigger for the back pressure is the utilisation level of Receive Frame Descriptor (RFD) buffers in an egress NP. RFD buffers are holding the packets while the NP microcode is processing them. The more feature processing the packet goes through, the longer it stays in RFD buffers.

1. Ingress FIA makes fabric requests to all chassis arbiters.
2. Active arbiter checks for free access grant tokens and processes its QoS algorithm if congestion is present.
3. Credit mechanism from local arbiter to active arbiter on RSP.
4. Active arbiter sends fabric grant token to ingress FIA.
5. Ingress FIA load-balances (super)frames over fabric links.
6. Egress FIA returns a fabric token to the central arbiter.

Better to mention, the credit mechanism from the local arbiter to the active arbiter on RSP. Also add another section to cover possible cases of arbiter faults (do not need to mention error codes, but to have a look at arbiter ASIC errors) to look at in case of any arbiter issue and not getting grants because of local or central arbiter and that causes queue pile up.

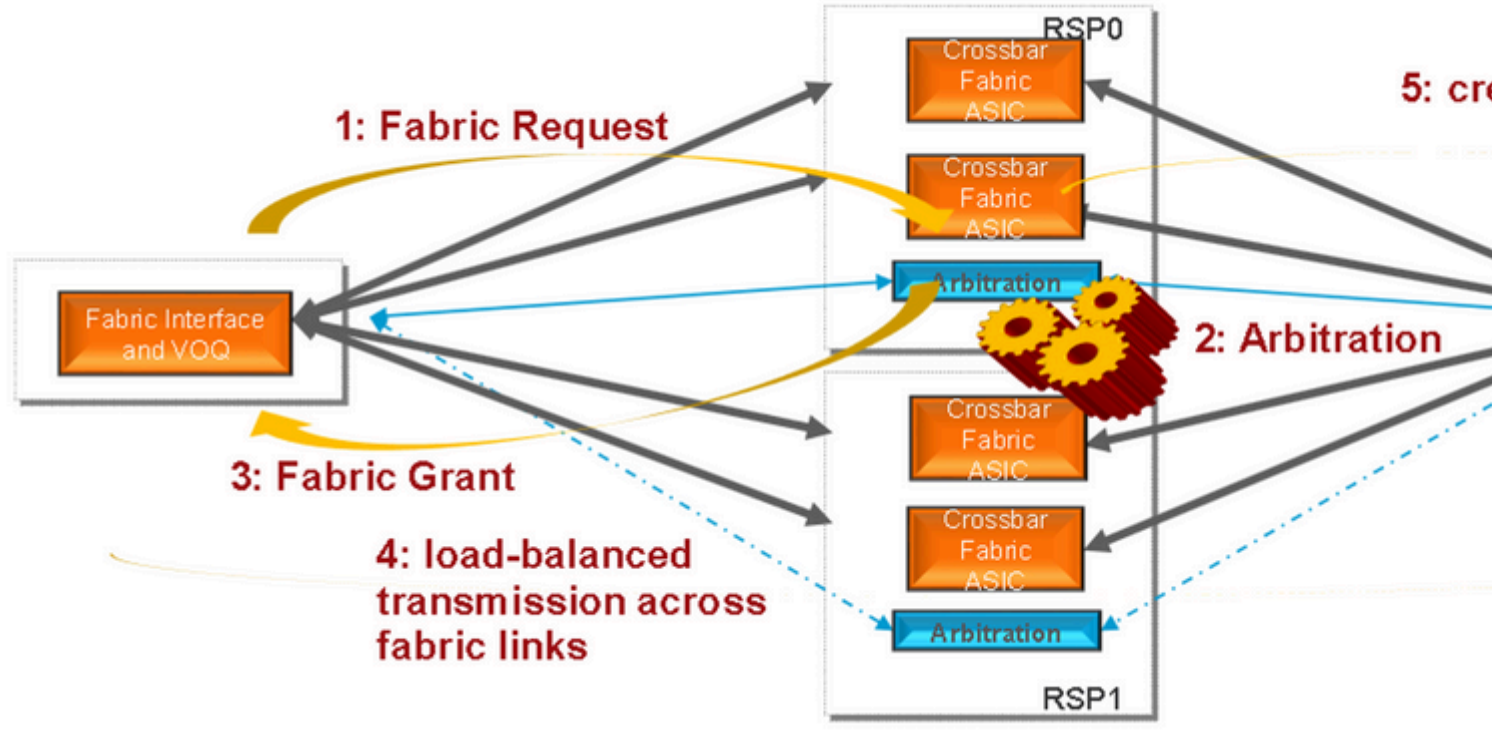
Virtual Output Queue Overview



Virtual Output Queue

Packets going to different egress NPs are put into different VOQ sets. Congestion on one NP does not block the packet that goes to different NPs.

Fabric Arbiter Diagram



Fabric Arbiter

Fabric Interconnects

ASR9006 and ASR9010 Switch Fabric Interconnects

    - PuntFabricDataPath diagnostic packets as unicast, while standby sends them as multicast. Response packets are sent back to originating RP CPU.

- NP Loopback test within LC.
    - NPULoopback test running on every LC CPU, sending diagnostic packets to every NP. Response packets are sent back to LC CPU.

Triage the Issue

The steps here provide some hints on how to narrow down the issues related to the punt-path failure. They do not need to be followed in the exact same order.

Information Needed to Start the Triage

- Find the affected NP and LC:

```
show logging | inc â€œPUNT_FABRIC_DATA_PATHâ€�

RP/0/RP1/CPU0:Oct 28 12:46:58.459 IST: pfm_node_rp[349]: %PLATFORM-DIAGS-3-PUNT_FABRIC_DATA_PATH_FAILED
 Set|online_diag_rsp[24790]|System Punt/Fabric/data Path Test(0x2000004)|failure threshold is 3, (slot,
 failed: (0/9/CPU0, 1) (0/9/CPU0, 3)
```

The issue occurs for NP1 and NP3 on 0/9/CPU0 mentioned previously.

- In order to find the chassis slot, enter the **run nslot all** command.
- PFM alarm

<#root>

```
RP/0/RP1/CPU0:AG2-2#
```

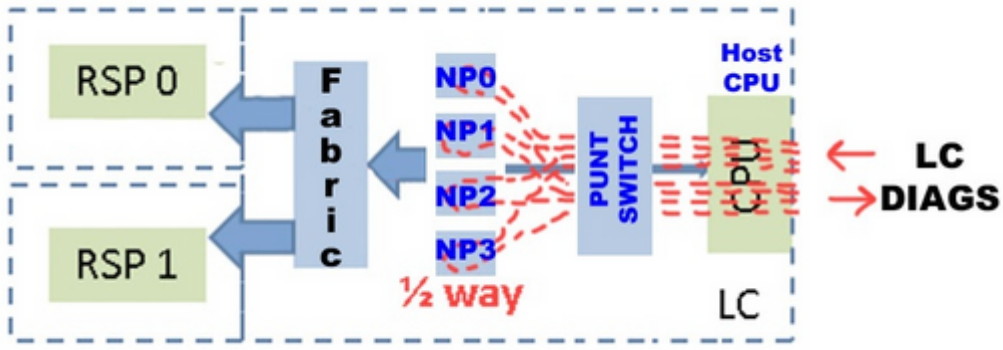
show pfm location 0/RP1/CPU0

```
node: node0_RP1_CPU0

----------------------

CURRENT TIME: Mar 25 12:11:29 2022

PFM TOTAL: 1   EMERGENCY/ALERT(E/A): 0   CRITICAL(CR): 0   ERROR(ER): 1

------------------------------------------------------------------------------------------------

Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle

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

Mar 25 12:03:30 2022|1 |PUNT_FABRIC_DATA_PATH_FAILED        |ER |8947   |System Punt/Fa|0x2000004

RP/0/RP1/CPU0:AG2-2#
```

sh pfm process 8947 location 0/rp1/CPU0

```
node: node0_RP1_CPU0

---------------------

CURRENT TIME: Mar 25 12:12:36 2022

PFM TOTAL: 1   EMERGENCY/ALERT(E/A): 0   CRITICAL(CR): 0   ERROR(ER): 1

PER PROCESS TOTAL: 0   EM: 0   CR: 0   ER: 0

Device/Path[1 ]:Fabric loopbac  [0x2000003 ] State:RDY  Tot: 0

Device/Path[2 ]:System Punt/Fa  [0x2000004 ] State:RDY  Tot: 1

1   Fault Id:          432

    Sev:               ER

    Fault Name:        PUNT_FABRIC_DATA_PATH_FAILED

    Raised Timestamp:  Mar 25 12:03:30 2022

    Clear Timestamp:   Mar 25 12:07:32 2022

    Changed Timestamp: Mar 25 12:07:32 2022

    Resync Mismatch:   FALSE

    MSG:               failure threshold is 3, (slot, NP) failed: (0/9/CPU0, 1) (0/9/CPU0, 3)
```

Diagnostics Packet Flow Diagram



- DIAG messages packet path between RP and LC (the diagnostic packet interval is one minute).

Packet path on RP:

```
online_diags <===> SPP <===> Fabric <===> NP
```

Packet path on LC:

```
online_diags <===> SPP <===> Punt-switch <=====> NP
```

- NP Loopback test within LC

Every minute a DIAGS packet per NP is injected from the LC CPU to the Punt Switch, and all are looped back at the NPs. They do NOT go to the fabric at all. The turnaround point or halfway mark is each NP's microcode.

- Diagnostic send path: LC: online diagnostics > Inject > LC-NP > (loop)
- Diagnostic return path: LC-NP > Punt > online diagnostics: LC

Diagnostic Test

<#root>

```
RP/0/RP0/CPU0:AG2-2(admin)#
```

show diagnostic content location <>

```
 >>> (in cXR)
```

<#root>

```
RP/0/RP0/CPU0:AG2-2#
```

show diagnostic content location <>

```
 >>> (in eXR)
A9K-8X100GE-L-SE 0/0/CPU0:

  Diagnostics test suite attributes:

    M/C/* - Minimal bootup level test / Complete bootup level test / NA

    B/O/* - Basic ondemand test / not Ondemand test / NA

    P/V/* - Per port test / Per device test / NA

    D/N/* - Disruptive test / Non-disruptive test / NA

      S/* - Only applicable to standby unit / NA

      X/* - Not a health monitoring test / NA

      F/* - Fixed monitoring interval test / NA

      E/* - Always enabled monitoring test / NA

      A/I - Monitoring is active / Monitoring is inactive

      n/a -  Not applicable
```

```
                                                        Test Interval    Thre- Timeout
  ID   Test Name                           Attributes     (day hh:mm:ss.ms shold ms   )
  ==== =================================== ============ ================ =====  =====
    1) CPUCtrlScratchRegister ----------> *B*N****A       000 00:01:00.000 3 n/a
    2) DBCtrlScratchRegister -----------> *B*N****A       000 00:01:00.000 3 n/a
    3) PortCtrlScratchRegister ---------> *B*N****A       000 00:01:00.000 3 n/a
    4) PHYScratchRegister --------------> *B*N****A       000 00:01:00.000 3 n/a
    5) NPULoopback ---------------------> *B*N****A       000 00:01:00.000 3 n/a
```

<#root>

```
RP/0/RP0/CPU0:AG2-2#
show diagnostic result location 0/0/CPU0

A9K-8X100GE-L-SE 0/0/CPU0:
  Overall diagnostic result: PASS

  Diagnostic level at card bootup: bypass

  Test results: (. = Pass, F = Fail, U = Untested)

  1  ) CPUCtrlScratchRegister ----------> .
  2  ) DBCtrlScratchRegister -----------> .
  3  ) PortCtrlScratchRegister ---------> .
  4  ) PHYScratchRegister --------------> .
  5  ) NPULoopback ---------------------> .
```

- You can test this parameter "inject diags packets" manually in detail as mentioned in this example:

<#root>

```
admin diag start location 0/x/cpu0 test NPULoopback (cXR)

RP/0/RP0/CPU0:AG3_1#
diagnostic start location 0/0/CPU0 test NPULoopback
   >>> eXR
Fri May 13 06:53:00.902 EDT
```

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show diagnostic res location 0/0/CPU0 test 5 detail

```
 >>> Here there are
 multiple test 1-5 (check previous examples)

Test results: (. = Pass, F = Fail, U = Untested)
_____________________________________________________________________________

  5  ) NPULoopback ----------------------> .

          Error code ------------------> 0 (DIAG_SUCCESS)

          Total run count -------------> 67319

          Last test execution time ----> Fri May 13 06:53:01 2022

          First test failure time -----> n/a

          Last test failure time ------> n/a

          Last test pass time ---------> Fri May 13 06:53:01 2022

          Total failure count ---------> 0

          Consecutive failure count ---> 0

   _____________________________________________________________________________
```

- Check if NP is receiving/sending DIAG messages:

<#root>

```
RP/0/RSP1/CPU0:AG2-2#
```

show controllers np counters location | inc DIAG| LC_CPU

```
 108  PARSE_RSP_INJ_DIAGS_CNT               25195          0  >>> total DIAG packets injected by Active
 904  PUNT_DIAGS_RSP_ACT                    12584          0  >>> Loopbacks to Active RP
 906  PUNT_DIAGS_RSP_STBY                   12611          0  >>> Loopbacks to Stdby R
 122  PARSE_LC_INJ_DIAGS_CNT                2618           0  >>> total DIAG packets injected by LC
 790  DIAGS                                12618           0  >>> total DIAG packets replied back to LC

16  MDF_TX_LC_CPU                     3998218312         937  >>> a packet punted to LC CPU


PARSE_RSP_INJ_DIAGS_CNT should match (PUNT_DIAGS_RSP_ACT + PUNT_DIAGS_RSP_STDBY)
PARSE_LC_INJ_DIAGS_CNT should match DIAGS

PARSE_XX_INJ_DIAGS_CNT should increment periodically.
```

- Checking if the Software Packet Path (SPP) is sending/receiving DIAG messages:

```
show spp sid stats location | inc DIAG

2. DIAG                         35430
 2. DIAG                         35430
```

These are received and sent DIAG counters. They can always match and increment together on LC.

- debug punt-inject l2-packets diag np 0 location 0/9/CPU0

Example Logs: SPP is sending and receiving the diagnostic packet with sequence no 0x4e packets.

```
LC/0/1/CPU0:Jun 6 04:14:05.581 : spp[89]: Sent DIAG packet. NP:0 Slot:0 Seq:0x4e

LC/0/1/CPU0:Jun 6 04:14:05.584 : spp[89]: Rcvd DIAG packet. NP:0 Slot:0 Seq:0x4e
```

- Check for any drops in the packet path:

<#root>

show drops all location

show drops all ongoing location

- Check online diagnostics debugs (in cXR):

Online-diagnostics are helpful many times in checking the timestamps when packets were sent/received or missed. Such timestamps can be compared with SPP captures for packet correlation.

<#root>

admin debug diagnostic engineer location

admin debug diagnostic error location

Note: Enter the **admin undebug all** command in order to disable these debugs.

Sample outputs from the debugs:

```
RP/0/RSP0/CPU0:Mar 25 05:43:43.384 EST: online_diag_rsp[349]: Slot 1 has 4 NPs  >>> Sending DIAG
 messages to NPs on slot 1
```

```
RP/0/RSP0/CPU0:Mar 25 05:43:43.384 EST: online_diag_rsp[349]: PuntFabricDataPath: sending
 a pak (seq 25), destination physical slot 1 (card type 0x3d02aa), NP 0, sfp=0xc6
RP/0/RSP0/CPU0:Mar 25 05:43:43.384 EST: online_diag_rsp[349]: PuntFabricDataPath: sending
 a pak (seq 25), destination physical slot 1 (card type 0x3d02aa), NP 1, sfp=0xde
RP/0/RSP0/CPU0:Mar 25 05:43:43.384 EST: online_diag_rsp[349]: PuntFabricDataPath: sending
 a pak (seq 25), destination physical slot 1 (card type 0x3d02aa), NP 2, sfp=0xf6
RP/0/RSP0/CPU0:Mar 25 05:43:43.384 EST: online_diag_rsp[349]: PuntFabricDataPath: sending
 a pak (seq 25), destination physical slot 1 (card type 0x3d02aa), NP 3, sfp=0x10e

RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: PuntFabricDataPath:
 Time took to receive 22 pkts: 503922888 nsec, timeout value: 500000000 nsec
RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: PuntFabricDataPath:
 Received 22 packets, expected 24  => Some replies missed

RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: PuntFabricDataPath:
 Got a packet from physical slot 1, np 0
RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: Successfully verified
 a packet, seq. no.: 25
RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: PuntFabricDataPath:
 Got a packet from physical slot 1, np 2  <= Replies from NP1 and NP3 missing
RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: Successfully verified
 a packet, seq. no.: 25
RP/0/RSP0/CPU0:Mar 25 05:43:43.888 EST: online_diag_rsp[349]: PuntFabricDataPath:
 Got a packet from physical slot 3, np 0
```

- Diagnostic trace:

<#root>

```
RP/0/RP1/CPU0:AG2-2#
```

show diagnostic trace location 0/rp1/CPU0

```
Fri Mar 25 12:16:40.866 IST

1765 wrapping entries (3136 possible, 2048 allocated, 0 filtered, 3503120 total)

Mar 16 02:40:21.641 diags/online/gold_error 0/RP1/CPU0 t7356 Failed to get ack: got 0 responses,
 expected 1

Mar 16 02:40:36.490 diags/online/message 0/RP1/CPU0 t8947 My nodeid 0x120, rack# is 0, slot# 1,
 board type = 0x100327

Mar 16 02:40:36.948 diags/online/message 0/RP1/CPU0 t8947 dev cnt=25, path cnt=3, shm loc for
 dev alarms@0x7fd4f0bec000, path alarms@0x7fd4f0bec01c, path alarm data@0x7fd4f0bec028

Mar 16 02:40:37.022 diags/online/message 0/RP1/CPU0 t8947 Last rpfo time: 1647378637

Mar 24 06:03:27.479 diags/online/error 0/RP1/CPU0 2105# t9057 PuntFabricDataPath test error:
 physical slot 11(LC# 9): expected np mask: 0x0000000f, actual: 0x0000000b, failed: 0x00000004

Mar 24 06:03:27.479 diags/online/error 0/RP1/CPU0 634# t9057 PuntFabricDataPath test failure detected,
 detail in the form of (0-based) (slot, NP: count): (LC9,2: 13)
```

Fabric Triage

- Fabric health (this provides a summary of Link status, statistics, drops, and alarms):

<#root>

show controllers fabric health location <>

- Spine health:

<#root>

show controllers fabric health spine all

- Onboard Failure Logging (OBFL) (after reload also this would be available):

<#root>

admin

sysadmin-vm:0_RP0#

show logging onboard fabric location 0/0

- Check fabric counters on ingress LC FIA:

<#root>

show controllers fabric fia errors ingress location <>

show controllers fabric fia stats location <LC/RP>

- Ingress LC crossbar (not applicable to Trident and SIP-700):

<#root>

show controllers fabric crossbar statistics instance [0-1] location <>

- Egress LC crossbar (not applicable to Trident and SIP-700):

<#root>

show controllers fabric crossbar statistics instance [0-1] location <>

- Egress LC FIA:

<#root>

```
show controllers fabric fia errors egress location <>
```

```
show controllers fabric fia stats location <LC/RP>
```

- Spine statistics:

<#root>

```
show controllers fabric crossbar statistics instance [0-1] spine [0-6]
```

- Check fabric drops:
  - Ingress LC FIA:

<#root>

```
show controllers fabric fia drops ingress location <>
```

- Egress LC FIA:

<#root>

```
show controllers fabric fia drops egress location <>
```

- ASIC errors:
  - LSP:

<#root>

```
show controllers fabric crossbar asic-errors instance 0 location<>
```

```
show asic-errors fia <> all location <>
```

  - Tomahawk:

<#root>

```
show asic-errors fia <> all location <>
```

<#root>

RP/0/RP0/CPU0:AG3_1#

show controllers np fabric-counters all np0 location 0/0/CPU0

```
                Node: 0/0/CPU0:

----------------------------------------------------------------

Egress fabric-to-bridge interface 2 counters for NP 0

 INTERLAKEN_CNT_TX_BYTES                       0x000073fc 23b6d99b

 INTERLAKEN_CNT_TX_FRM_GOOD                    0x000000ae a79d6612

 INTERLAKEN_CNT_TX_FRM_BAD                     0x00000000 00000000 >>> this is 0 which is good,
 need to check if it is incremented

 ----------------------------------------------------------------

Egress fabric-to-bridge interface 3 counters for NP 0

 INTERLAKEN_CNT_TX_BYTES                       0x0004abdd fe02068d

 INTERLAKEN_CNT_TX_FRM_GOOD                    0x000005b8 089aac95

 INTERLAKEN_CNT_TX_FRM_BAD                     0x00000000 00000000

 ----------------------------------------------------------------
                Node: 0/0/CPU0:
----------------------------------------------------------------

Ingress fabric-to-bridge interface 2 counters for NP 0

 INTERLAKEN_CNT_RX_BYTES                       0x0004aeb5 a4b9dbbe

 INTERLAKEN_CNT_RX_FRM_GOOD                    0x0000058e b7b91c15

 INTERLAKEN_CNT_RX_FRM_BAD                     0x00000000 00000000

 INTERLAKEN_CNT_RX_BURST_CRC32_ERROR           0x00000000 00000000

 INTERLAKEN_CNT_RX_BURST_CRC24_ERROR           0x00000000 00000000

 INTERLAKEN_CNT_RX_BURST_SIZE_ERROR            0x00000000 00000000

 ----------------------------------------------------------------

Ingress fabric-to-bridge interface 3 counters for NP 0

 INTERLAKEN_CNT_RX_BYTES                       0x000094ce b8783f95

 INTERLAKEN_CNT_RX_FRM_GOOD                    0x000000f5 33cf9ed7

 INTERLAKEN_CNT_RX_FRM_BAD                     0x00000000 00000000

 INTERLAKEN_CNT_RX_BURST_CRC32_ERROR           0x00000000 00000000

 INTERLAKEN_CNT_RX_BURST_CRC24_ERROR           0x00000000 00000000
```

```
 INTERLAKEN_CNT_RX_BURST_SIZE_ERROR            0x00000000 00000000
```

- In order to verify the link status of the FIA:

show controllers fabric fia link-status location <lc/RSP>

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers fabric fia link-status location 0/0/CPU0

```
 ********** FIA-0 **********

Category: link-0
spaui link-0                       Up >>> FIA to NP link

spaui link-1                       Up >>> FIA to NP link

arb  link-0                       Up >>> Arbitor link

xbar link-0                       Up >>> FIA to XBAR link

xbar link-1                       Up >>> FIA to XBAR link

xbar link-2                       Up >>> FIA to XBAR link
```

- In order to verify the link status of XBAR:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers fabric crossbar link-status instance 0 lo 0/0/CPU0

```
Mon May  2 04:05:06.161 EDT

PORT    Remote Slot  Remote Inst    Logical ID  Status

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

00      0/0/CPU0            01             2        Up

01      0/FC3               01             0        Up

02      0/FC3               00             0        Up

03      0/FC4               01             0        Up

04      0/FC2               01             0        Up

05      0/FC4               00             0        Up
```

```
06      0/FC2               00              0       Up

07      0/FC1               01              0       Up

10      0/FC1               00              0       Up

14      0/FC0               01              0       Up

15      0/FC0               00              0       Up

16      0/0/CPU0            02              0       Up

18      0/0/CPU0            02              2       Up

19      0/0/CPU0            02              1       Up

20      0/0/CPU0            03              2       Up

21      0/0/CPU0            03              1       Up

22      0/0/CPU0            03              0       Up

23      0/0/CPU0            00              2       Up

24      0/0/CPU0            00              1       Up

25      0/0/CPU0            00              0       Up

26      0/0/CPU0            01              0       Up

27      0/0/CPU0            01              1       Up
```

If you observe these logs in the LSP card:

```
LC/0/3/CPU0:Jul  5 13:05:53.365 IST: fab_xbar[172]: %PLATFORM-CIH-5-ASIC_ERROR_THRESHOLD :
 sfe[1]: An interface-err error has occurred causing  packet drop transient.
 ibbReg17.ibbExceptionHier.ibbReg17.ibbExceptionLeaf0.intIpcFnc0UcDataErr  Threshold has been exceeded
```

17*2 here helps to identify the port with the **show controllers fabric crossbar link-status instance 1 lo 0/3/CPU0** command:

Logs Collection:

<#root>

show platform

show inventory

show tech fabric

show tech np

show tech ethernet interface

show logging

show pfm location all

show pfm trace location <*location id*>

show controllers pm vqi location all

show hw-module fpd location all (cxr) / admin show hw-module fpd (exr)

show controllers fti trace <*process-name*> location <*Card location*>

admin show tech obfl

Cxr:
From Admin:

show logging onboard common location <>

show logging onboard error location <>

Exr:
From sysadmin/calvados:

show logging onboard fabric location <>

- If there are ASIC errors in FIA:

For LS:

<#root>

show controllers asic LS-FIA instance <*instance*> block <*block_name*> register-name <*register_name*> locati

For LSP:

<#root>

show controllers asic LSP-FIA instance <*instance*> block <*block_name*> register-name <*register_name*> locat

If the error reported is like this:

```
LC/0/9/CPU0:Mar  1 05:12:25.474 IST: fialc[137]: %PLATFORM-CIH-5-ASIC_ERROR_THRESHOLD :
fia[3]: A link-err error has occurred causing  performance loss persistent.
fnc2serdesReg1.fnc2serdesExceptionHier.fnc2serdesReg1.fnc2serdesExceptionLeaf0.
iNTprbsErrTxphyrdydropped6  Threshold has been exceeded
```

- The instance is the instance number of the FIA ASIC. Here it is â€œ3â€ block_name is â€œfnc2serdesReg1â€ and register_name is â€œfnc2serdesExceptionLeaf0â€.
- If ASIC errors on LC/RSP XBAR:

<#root>

show controllers asic SKB-XBAR instance <*instance*> block-name <*block_name*> register-name <*register_name*>

If the error reported is like this:

```
LC/0/7/CPU0:Mar  4 06:42:01.241 IST: fab_xbar[213]: %PLATFORM-CIH-5-ASIC_ERROR_THRESHOLD :
 sfe[0]: An interface-err error has occurred causing  packet drop transient.
 ibbReg11.ibbExceptionHier.ibbReg11.ibbExceptionLeaf0.intIpcFnc1UcDataErr  Threshold has been exceeded
```

- The instance is the instance a number of the SFE/XBAR ASIC. Here, â€œ0â€ block_name is â€œibbReg11â€ and register_name is â€œibbExceptionLeaf0â€.
- If ASIC errors are reported on FC XBAR:

<#root>

show controllers asic FC2-SKB-XBAR instance <*instance*> block-name <*block_name*> register-name <*register_n*

If the error reported is like this:

```
RP/0/RP0/CPU0:Mar  4 06:41:14.398 IST: fab_xbar_sp3[156]: %PLATFORM-CIH-3-ASIC_ERROR_SPECIAL_HANDLE_THRE
 fc3xbar[1]: A link-err error has occurred causing  packet drop transient.
 cflReg17.cflExceptionHier.cflReg17.cflExceptionLeaf4.intCflPal1RxAlignErrPktRcvd  Threshold has been ex
```

Then ASIC is â€œFC3-SKB-XBARâ€ instance is the instance a number of the SFE/XBAR ASIC. Here it is â€œ1â€, both come from â€œfc3xbar[1]â€ block_name is â€œcflReg17â€ and register_name is â€œcflExceptionLeaf4â€.

Example:

<#root>

```
RP/0/RSP0/CPU0: AG2-10#
sh logging | i ASIC


RP/0/RSP0/CPU0:May 11 20:48:57.658 IST: fab_xbar[184]: %PLATFORM-CIH-5-ASIC_ERROR_THRESHOLD :
 sfe[0]: An interface-err error has occurred causing  packet drop transient.
 ibbReg13.ibbExceptionHier.ibbReg13.ibbExceptionLeaf0.intIpcFnc0UcDataErr  Threshold has been exceeded

RP/0/RSP0/CPU0: AG2-10#
sh controllers fabric crossbar link-status instance 0 location 0/rsp0/CPU0


PORT    Remote Slot  Remote Inst    Logical ID  Status

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

04      0/0/CPU0            00             1        Up

06      0/0/CPU0            00             0        Up

08      0/7/CPU0            00             1        Up

10      0/7/CPU0            00             0        Up

24      0/2/CPU0            00             0        Up

26      0/2/CPU0            00             1        Up
 >>> ibbReg13 >> 13*2 = 26 SO IT IS POINTING TO LC2 â€“ IN THIS CASE YOU CAN DO OIR TO RECOVER THE ASIC

40      0/RSP0/CPU0         00             0        Up

RP/0/RSP0/CPU0: AG2-10#
show controllers asic SKB-XBAR instance 0 block-name ibbReg13 register-name ibbExceptionLeaf0 location 0


address   name                value

0x00050d080  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int1Stat 0x00000000 (4 bytes)

address   name                value

0x00050d084  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int1StatRw1s 0x00000000 (4 bytes)

address   name                value

0x00050d088  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int1Enable 0xfffffffb (4 bytes)
```

```
address   name                value

0x00050d08c  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int1First 0x00000000 (4 bytes)

address   name                value

0x00050d090  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int2Stat 0x00000c50 (4 bytes)

address   name                value

0x00050d094  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int2StatRw1s 0x00000c50 (4 bytes)

address   name                value

0x00050d098  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int2Enable 0x00000000 (4 bytes)

address   name                value

0x00050d09c  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_int2First 0x00000000 (4 bytes)

address   name                value

0x00050d0a0  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_haltEnable 0x00000000 (4 bytes)

address   name                value

0x00050d0a4  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_fault 0x00000000 (4 bytes)

address   name                value

0x00050d0a8  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_intMulti 0x00000840 (4 bytes)

address   name                value

0x00050d0ac  SkyboltRegisters_ibbReg13_ibbExceptionLeaf0_leaf 0x00000000 (4 bytes)

RP/0/RSP0/CPU0:AG2-10#
```

Arbiter Fault Triage

In order to check the link status:

<#root>

```
RP/0/RSP0/CPU0:AG2-10#
sho controllers fabric arbiter link-status location 0/1/$


Port    Remote Slot  Remote Elem    Remote Inst  Status

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

00      0/1/CPU0            FIA            0        Up

01      0/1/CPU0            FIA            1        Up
```

```
24      0/RSP0/CPU0         ARB            0        Up

25      0/RSP1/CPU0         ARB            0        Up
```

In order to check VQI availability:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
sh controllers fabric vqi assignment all

Current mode: Highbandwidth mode - 2K VQIs
Node          Number of VQIs
---------------------------
0/0/CPU0       80
0/1/CPU0       40
0/2/CPU0       48
0/3/CPU0       80
0/5/CPU0       80
0/7/CPU0       80
0/12/CPU0      64
RP*/RSP*       8
---------------------------
In Use   =      480
Available =    1568
```

Check the speed assigned to VQI:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
sh controller fabric vqi assignment slot 7

Thu May 12 07:58:59.897 EDT
 slot = 7
```

```
 fia_inst = 0
 VQI = 400      SPEED_100G
 VQI = 401      SPEED_100G
 VQI = 402      SPEED_100G
 VQI = 403      SPEED_100G
 VQI = 404      SPEED_100G
 VQI = 405      SPEED_100G
 VQI = 406      SPEED_100G
slot = 7
 fia_inst = 1
 VQI = 416      SPEED_40G
 VQI = 417      SPEED_40G
 VQI = 418      SPEED_40G
 VQI = 419      SPEED_40G
 VQI = 420      SPEED_100G
```

If you observe any tail drops on FIA, check these steps:

Check for queue depth in VQI:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
show controllers fabric fia q-depth location 0/0/CPU0


Thu May 12 08:00:42.186 EDT
 ********** FIA-0 **********
Category: q_stats_a-0
Voq       ddr            pri            Cellcnt   Slot_FIA_NP
28        0              2              2         LC0_1_1
 ********** FIA-0 **********
Category: q_stats_b-0
Voq       ddr            pri            Cellcnt   Slot_FIA_NP
```

```
 ********** FIA-1 **********

Category: q_stats_a-1

Voq       ddr            pri            Cellcnt   Slot_FIA_NP

7         0              2              12342         LC0_0_0
 >>> Here Packet count is high so we need to check for LC0 FIA0 NP0 (egress) is there any congestion
 or any other issue in LC0 FIA0 or NP0

Here Pri = 2 is the default queue (BE) , Pri = 0 is P1 (Voice, real time) queue, Pri = 1 is P2

97        0              2               23           LC1_0_0
```

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers fabric vqi assignment slot 02

```
 slot = 2

 fia_inst = 0

 VQI = 0        SPEED_10G

 VQI = 1        SPEED_10G

 VQI = 2        SPEED_10G

 VQI = 3        SPEED_10G

 VQI = 4        SPEED_10G

 VQI = 5        SPEED_10G

 VQI = 6        SPEED_10G

 VQI = 7        SPEED_10G
```

Port mapping details for the VQI:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers pm vqi location 0/0/CPU0

```
Platform-manager VQI Assignment Information

      Interface Name      | ifh Value | VQI | NP#

-------------------------------------------------
```

```
         TenGigE0_0_0_0_1 | 0x4000680 |   1 |   0

         TenGigE0_0_0_0_2 | 0x40006c0 |   2 |   0

         TenGigE0_0_0_0_3 | 0x4000700 |   3 |   0

         TenGigE0_0_0_0_4 | 0x4000740 |   4 |   0

         TenGigE0_0_0_0_5 | 0x4000780 |   5 |   0

         TenGigE0_0_0_0_6 | 0x40007c0 |   6 |   0

         TenGigE0_0_0_0_7 | 0x4000800 |   7 |   0
```

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers pm interface tenGigE 0/0/0/0/7

```
Ifname(1): TenGigE0_0_0_0_7, ifh: 0x4000800 :

iftype             0x1e

egress_uidb_index  0x12, 0x0, 0x0, 0x0

ingress_uidb_index 0x12, 0x0, 0x0, 0x0

port_num           0x0

subslot_num        0x0

ifsubinst          0x0

ifsubinst port     0x7

phy_port_num       0x7

channel_id         0x0

channel_map        0x0

lag_id             0x7e

virtual_port_id    0xa

switch_fabric_port 7     >>> VQI matching for the ports

in_tm_qid_fid0     0x38001e

in_tm_qid_fid1     0x0

in_qos_drop_base   0xa69400

out_tm_qid_fid0    0x1fe002

out_tm_qid_fid1    0xffffffff
```

```
np_port            0xd3
```

Logs collection:

<#root>

Show tech fabric

Show tech np

show controllers pm trace ?

```
  async        Platform manager async trace
  creation     Platform manager interface creation/deletion trace
  error        Platform manager error trace
  information  Platform manager information trace
  init         Platform manager init trace
  other        Platform manager common trace
  stats        Platform manager stats trace
```

NP Fault Triage

NP load verification:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controller np load all location 0/0/CPU0

```
                Node: 0/0/CPU0:
------------------------------------------------------------------
           Load                Packet Rate
  NP0:  2% utilization         3095766 pps
  NP1:  3% utilization         5335675 pps
```

```
  NP2:  0% utilization             498 pps
  NP3:  0% utilization            1117 pps
```

Port mapping:

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controllers np ports all location 0/0/CPU0

```
                Node: 0/0/CPU0:
----------------------------------------------------------------

NP Bridge Fia                        Ports
-- ------ --- -----------------------------------------------------
0  --     0   TenGigE0/0/0/0/0 - TenGigE0/0/0/0/9, TenGigE0/0/0/1/0 - TenGigE0/0/0/1/9
1  --     1   TenGigE0/0/0/2/0 - TenGigE0/0/0/2/9, HundredGigE0/0/0/3
2  --     2   HundredGigE0/0/0/4 - HundredGigE0/0/0/5
3  --     3   HundredGigE0/0/0/6 - HundredGigE0/0/0/7
```

Tomahawk

Note this is admin mode:

<#root>

```
sysadmin-vm:0_RP0#
```

show controller switch statistics location 0/LC0/LC-SW

```
Thu May  12 12:32:37.160 UTC+00:00
Rack  Card  Switch  Rack Serial Number
-------------------------------------
0     LC0   LC-SW
                                          Tx      Rx
      Phys   State                        Drops/  Drops/
Port  State  Changes  Tx Packets  Rx Packets  Errors  Errors  Connects To
-------------------------------------------------------------------------
```

```
0     Up     2        3950184361  3977756349  0       0       NP0

1     Up     2        0           0           0       0       NP0

8     Up     1        1319787462  209249871   0       0       LC CPU N0 P0

9     Up     1        3374323096  1819796660  0       0       LC CPU N0 P1

16    Up     2        2245174606  1089972811  0       0       NP1

17    Up     2        0           0           0       0       NP1

18    Up     2        65977       16543963    0       0       NP2

19    Up     2        0           0           0       0       NP2

32    Up     2        128588820   3904804720  0       0       NP3

33    Up     2        0           0           0       0       NP3
```

```
show asic-error np <> all loc <>   >>> Ignore the macwrap errors as they are seen for every
 interface flaps/ Execute 3-4 times to verify the drops increment
```

```
show controller np fast-drop <> loc <>  >>> Execute 3-4 times to verify the drops increment
```

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controller np fast-drop np0 location 0/0/CPU0

```
Thu May 12 10:13:22.981 EDT

                Node: 0/0/CPU0:

----------------------------------------------------------------

All fast drop counters for NP 0:

 TenGigE0/0/0/1/0-TenGigE0/0/0/1/9:[Priority1]    0

 TenGigE0/0/0/1/0-TenGigE0/0/0/1/9:[Priority2]    0

 TenGigE0/0/0/1/0-TenGigE0/0/0/1/9:[Priority3]    0

 TenGigE0/0/0/0/0-TenGigE0/0/0/0/9:[Priority1]    0

 TenGigE0/0/0/0/0-TenGigE0/0/0/0/9:[Priority2]    0

 TenGigE0/0/0/0/0-TenGigE0/0/0/0/9:[Priority3]    0
```

<#root>

show controllers np punt-path-counters all HOST-IF-0 np<> location <>

```
 [Check for IF_CNT_RX_FRM & IF_CNT_TX_FRM] >>> To check if diagnostic packets make it to the LC NP
 Host CPU network port
```

Lightspeed

<#root>

show asic-error np <> all loc <>

```
  >>> Ignore the macwrap errors as they are seen for every interface flap
```

<#root>

RP/0/RP0/CPU0:AG3_1#

sho asic-errors np 0 all location 0/5/CPU0

```
**************************************************************
*                          0_5_CPU0                          *
**************************************************************
**************************************************************
*                     Single Bit Errors                      *
**************************************************************
**************************************************************
*                    Multiple Bit Errors                     *
**************************************************************
**************************************************************
*                       Parity Errors                        *
**************************************************************
**************************************************************
*                       Generic Errors                       *
**************************************************************
ASR, ASR9K Lightspeed 20*100GE SE LC, 0/5/CPU0, npu[0]
Name            : mphmacwrapReg1.mphmacwrapExceptionLeaf4.mphWrapIrqUmacIpInt82
Leaf ID         : 0x2023e082
```

```
Error count     : 1
Last clearing   : Thu Apr  7 11:41:47 2022
Last N errors   : 1
-----------------------------------------------------------------
First N errors.
@Time, Error-Data
-----------------------------------------
```

<#root>

show controller np fast-drop <> loc <>

```
 >>> Execute 3-4 times to verify the drops increment
```

<#root>

```
RP/0/RP0/CPU0:AG3_1#
```

show controller np fast-drop np0 location 0/5/CPU0

```
Thu May 12 10:13:28.321 EDT
                Node: 0/5/CPU0:
-----------------------------------------------------------------
All fast drop counters for NP 0:
 HundredGigE0_5_0_0[Crit]                     0
 HundredGigE0_5_0_0[HP]                       0
 HundredGigE0_5_0_0[LP2]                      0
 HundredGigE0_5_0_0[LP1]                      0
 HundredGigE0_5_0_0[Crit+HP_OOR]              0
 HundredGigE0_5_0_0[LP2+LP1_OOR]              0
 HundredGigE0_5_0_1[Crit]                     0
 HundredGigE0_5_0_1[HP]                       0
 HundredGigE0_5_0_1[LP2]                      0
 HundredGigE0_5_0_1[LP1]                      0
 HundredGigE0_5_0_1[Crit+HP_OOR]              0
```

Note this is admin mode:

<#root>

```
sysadmin-vm:0_RP0#
```

show controller switch statistics location 0/LC5/LC-SW

```
>>> Execute 3-4
 times to verify the errors increment

Rack  Card  Switch  Rack Serial Number

-------------------------------------

0     LC5   LC-SW

                                          Tx      Rx

      Phys   State                        Drops/  Drops/

Port  State  Changes  Tx Packets  Rx Packets  Errors  Errors  Connects To

-------------------------------------------------------------------------

0     Up     4        1456694749  329318054   0       4       CPU -- EOBC

1     Up     2        21          23          0       0       CPU -- flexE

2     Up     4        1063966999  87683758    0       0       CPU -- PUNT

3     Up     4        885103800   3021484524  0       0       CPU -- BFD

4     Up     3        329319167   1456700372  0       0       RP0

5     Up     3        0           0           0       0       RP1

6     Up     1        11887785    2256        0       0       IPU 0

7     Up     1        0           1086        0       0       IPU 1

9     Up     4        74028034    3025657779  0       0       NP0

10    Up     4        5           0           0       0       NP0

11    Down   1        0           0           0       0       PHY0 -- flexE

12    Up     4        264928      264929      0       0       NP1

13    Up     2        5           0           0       0       NP1

14    Down   1        0           0           0       0       PHY1 -- flexE

15    Up     4        1516538834  1159586563  0       0       NP2
```

Log Collection:

<#root>

show tech np

show tech fabric

show asic-errors fia trace all location <>

- In eXR , collect the np_datalog:

<#root>

RP/0/RP0/CPU0:AG3_1#

run chvrf 0 ssh lc0_xr

LC : [one time capture]

show_np -e <> -d npdatalog [<> should be the affected NP]

Path where NP datalogs is saved : /misc/scratch/np/NPdatalog_0_0_CPU0_np0_prm__20220512-105332.txt.gz

LC : 5 to 10 times

show_np -e <> -d pipeline [<> should be the affected NP]

- For NP Init Failure on LSP:

<#root>

RP/0/RP0/CPU0:AG2-2#

show controllers np ports all location 0/6/CPU0

```
Node: 0/6/CPU0:
----------------------------------------------------------------
NP Bridge Fia                       Ports
-- ------ --- -----------------------------------------------

0  --     0   HundredGigE0/6/0/0 - HundredGigE0/6/0/31  --

1 --      1   HundredGigE0/6/0/4 - HundredGigE0/6/0/7
```

NP2 is down. >>>>>>>>>. NP Down/Init Failure

```
3 --      3   HundredGigE0/6/0/12 - HundredGigE0/6/0/154  --

4 --      4  HundredGigE0/6/0/16 - HundredGigE0/6/0/19
```

These logs observe:

```
LC/0/6/CPU0:Mar 23 02:53:56.175 IST: npu_server_lsp[138]: %PLATFORM-LDA-3-INIT_FAIL :
 Failed to initialize lda_bb_np_reset_process 13795 inst 0x2 LC INIT: Failed in NP HAL
 Reset np  (0x00000001 - Operation not permitted)  : npu_server_lsp : (PID=4597) :
  -Traceback= 7fea2d5cd9f6 7fea2d7d5816 7fea21465efa 7fea21465fc2 7fea42ad0bed 55a9dbd66031
 7fea45e1c855 7fea45e1cc2b 7fea2624d526 7fea3571b96a 7fea4d6e4831 55a9dbd691e9
LC/0/6/CPU0:Mar 23 02:53:56.185 IST: npu_server_lsp[138]: %PLATFORM-NP-4-INIT_DEBUG_MSG :
 LDA NP2 Reset failed!!  Check for a downlevel IPU version.
```

Log Collection:

<#root>

show tech-support ethernet interfaces

show tech-support ethernet controllers

show tech-support np

show tech-support fpd

admin show tech-support ctrace

 (in eXR)

show tech fabric

show asic-errors fia trace all location <>

show logging

gather

 (in eXR)
RP/0/RP0/CPU0:AG3_1#

admin

sysadmin-vm:0_RP0#
[sysadmin-vm:0_RP0:~]$

bash -l

[sysadmin-vm:0_RP0:~]$

gather

File will be generated and will get saved in rp0_xr:/misc/disk1

General Log Collection for Tomahawk, LSQ, and LSP

<#root>

show platform

show inventory

show tech fabric

show tech np

show tech ethernet interface

show logging

show pfm location all

show pfm trace location <*location id*>

sh pfm process <> location <>

show controllers pm vqi location all

show hw-module fpd location all

(cxr)

/ admin show hw-module fpd

(exr)

show controllers fti trace <*process-name*> location <*card location*>

Cxr:
From admin:

show logging onboard common location <>

show logging onboard error location <>

Exr:
From sysadmin/calvados:

show logging onboard fabric location <>"

Common Error Signature and Recommendation

Category	Error	Observa
NP Init failure	LC/0/0/CPU0:Sep 29 00:41:13.171 IST: pfm_node_lc[304]: %PLATFORM-NP-1-NP_INIT_FAIL_NO_RESET: Set|prm_server_ty[168018]|0x1008006|Persistent NP initialization failure, line card reload not required.	NP can g down. The issu RMA if damage/ The new Interface
ASIC FATAL FAULT-Double bit ECC error	LC/0/8/CPU0:May 29 18:29:09.836 IST: pfm_node_lc[301]: %FABRIC-FIA-0-ASIC_FATAL_FAULT : Set|fialc[159811]|0x108a000|Fabric interface asic ASIC0 encountered fatal fault 0x1 - DDR DOUBLE ECC ERROR	This is a The erro Interface The issu

SERDES error	â€¢RP/0/RSP1/CPU0:Apr 17 12:22:10.690 IST: pfm_node_rp[378]: %PLATFORM-CROSSBAR-1-SERDES_ERROR_LNK0 : Set|fab_xbar[209006]|0x101702f|XBAR_1_Slot_1	Fabric er
DATA_NB_SERDES_1_FAIL_0	LC/0/3/CPU0:Apr 10 18:55:03.213 IST: pfm_node_lc[304]: %FABRIC-FIA-1-DATA_NB_SERDES_1_FAIL_0 : Set|fialc[168004]|0x103d001|Data NB Serdes Link 1 Failure on FIA 1 RP/0/RSP0/CPU0:Apr 10 18:55:13.043 IST: FABMGR[227]: %PLATFORM-FABMGR-2-FABRIC_INTERNAL_FAULT: 0/3/CPU0 (slot 3) encountered fabric fault. Interfaces are going to be shutdown.	Interface In case o The inter
ASIC INIT Errors	â€¢LC/0/6/CPU0:Jul 17 00:01:40.738 2019:pfm_node_lc[301]: %FABRIC-FIA-1-ASIC_INIT_ERROR : Set|fialc[168003]|0x108a000|ASIC INIT Error detected on FIA instance 0	FIA insta
FIA ASIC FATAL error (TS_NI_INTR_LCL_TIMER_EXPIRED)	LC/0/19/CPU0:Mar 8 04:52:29.020 IST: pfm_node_lc[301]: %FABRIC-FIA-0-FATAL_INTERRUPT_ERROR : Set|fialc[172098]|0x108a003|FIA fatal error interrupt on FIA 3: TS_NI_INTR_LCL_TIMER_EXPIRED	For the n installati A few bo EFA. Th The inter
NP fast reset (Tomahawk)	LC/0/4/CPU0:Jul 6 04:06:49.259 IST: prm_server_ty[318]: %PLATFORM-NP-3-ECC : prm_ser_check: Completed NP fast reset to successfully recover from a soft error on NP 1. No further corrective action is required.	NP detec
NP parity LC reload	LC/0/6/CPU0:Jan 27 20:38:08.011 IST: prm_server_to[315]: %PLATFORM-NP-0-LC_RELOAD: NP3 had 3 fast resets within an hour, initiating NPdatalog collection and automatic LC reboot	Usually, usually s LC takes issue in t Interface
LC_NP_LOOPBACK_FAILED	LC/0/1/CPU0:Jul 26 17:29:06.146 IST: pfm_node_lc[304]: %PLATFORM-DIAGS-0-LC_NP_LOOPBACK_FAILED_TX_PATH : Set|online_diag_lc[168022]|Line card NPU loopback	LC NP l

	Test(0x2000006)|link failure mask is 0x1.	Alarm se Interface
FABRIC-FIA-1-SUSTAINED_CRC_ERR	LC/0/5/CPU0:Mar 6 05:47:34.748 IST: pfm_node_lc[303]: %FABRIC-FIA-1-SUSTAINED_CRC_ERR : Set|fialc[168004]|0x103d000|Fabric interface ASIC-0 has sustained CRC errors	Fia shutd With FIA The inter
FAB ARB XIF1 ERR	â€¢LC/0/6/CPU0:Jan 25 19:31:22.787 IST: pfm_node_lc[302]: %PLATFORM-FABARBITER-1-RX_LINK_ERR : Clear|fab_arb[163918]|0x1001001|LIT_XIF1_K_CHAR_ERR LC/0/6/CPU0:Jan 25 19:31:22.787 IST: pfm_node_lc[302]: %PLATFORM-FABARBITER-1-SYNC_ERR : Clear|fab_arb[163918]|0x1001001|LIT_XIF1_LOSS_SYNC LC/0/6/CPU0:Jan 25 19:33:23.010 IST: pfm_node_lc[302]: %PLATFORM-FABARBITER-1-RX_LINK_ERR : Set|fab_arb[163918]|0x1001001|LIT_XIF1_DISP_ERR	PUNT er The inter
FPOE_read_write error	xbar error trace (show tech fabric) Mar 25 00:14:03.497 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_board_spec.c:90: (ERROR) sm15_tom_get_ha_status: lda_get_active(SUP)) after retries 0 Mar 25 00:14:04.893 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_config.c:917: (ERROR) sm15_port_setup_auto_spread: asic:0 port:12 error, rc: 0x0 Mar 25 00:14:31.935 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_regio.c:686: (ERROR) sm15_pcie_read_fpoe: write_fpoe_beg asic:0 port:5 fpoe:2722 data:0x6271268 Mar 25 00:14:31.935 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_regio.c:166: (ERROR) sm15_rd_fpoe: RF_E:0x5 i:0 p:5 o:0xaa2 v:0x0 Mar 25 00:14:31.965 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_regio.c:686: (ERROR) sm15_pcie_read_fpoe: write_fpoe_beg asic:0 port:5 fpoe:2961 data:0x6271624	Cisco bu

	Mar 25 00:14:31.965 sm15/error.log_fab_xbar 0/7/CPU0 t4812 /sm15_regio.c:166: (ERROR) sm15_rd_fpoe: RF_E:0x5 i:0 p:5 o:0xb91 v:0x0	
FIA_XBAR SERDES	#show controller fabric fia link-status location 0/9/CPU0 ********** FIA-3 ********** Category: link-3 arb link-0 Up xbar link-0 Up xbar link-1 Up xbar link-2 Down xbar link-3 Down LC/0/9/CPU0:Oct 15 05:51:50.677 IST: pfm_node_lc[252]: %FABRIC-FIA-1-DATA_NB_SERDES_2_FAIL_0 : Clear|fialc[4574]|0x108b003|Data NB Serdes Link 2 Failure on FIA 3 | LC/0/9/CPU0:Oct 15 06:02:23.310 IST: pfm_node_lc[252]: %PLATFORM-CROSSBAR-1-SERDES_ERROR_LNK2 : Set|fab_xbar[4586]|0x1017008|FIA_3 | LC/0/9/CPU0:Oct 15 06:02:33.311 IST: pfm_node_lc[252]: %PLATFORM-CROSSBAR-1-SERDES_ERROR_LNK2 : Clear|fab_xbar[4586]|0x1017008|FIA_3 RP/0/RP1/CPU0:Mar 1 04:36:27.501 IST: FABMGR[218]: %PLATFORM-FABMGR-2-FABRIC_LINK_DOWN_FAULT : (0/8/CPU0 FIA 3) <--> (0/8/CPU0 XBAR 0) fabric link is down RP/0/RP1/CPU0:Mar 1 04:36:27.504 IST: FABMGR[218]: %PLATFORM-FABMGR-2-FABRIC_INTERNAL_FAULT: 0/8/CPU0 (slot 10) encountered fabric fault. Interfaces are going to be shutdown.	
NP DIAG ICFD fast reset	NP-DIAG on NP0, ICFD (STS-1), NP can be 0-4 NP3 had 3 fast resets within an hour, initiating NPdatalog collection and automatic LC reboot	Triggers And LC
PRM health monitoring failed to get packet NP fast resets	NP-DIAG health monitoring failure NP3 had 3 fast resets within an hour, initiating NPdatalog collection and automatic LC reboot	Triggers And LC
PRM health monitoring gets corrupted packet-NP fast resets	NP-DIAG health monitoring corruption on NP3 had 3 fast resets within an hour, initiating NPdatalog	Triggers And LC

	collection and automatic LC reboot	
Top inactivity failure	NP-DIAG failure on NP Interrupt from Ucode on Top inactivity - does NP fast resets	Triggers And LC
LSP NP Init Failure	LC/0/6/CPU0:Mar 23 02:53:56.175 IST: npu_server_lsp[138]: %PLATFORM-LDA-3-INIT_FAIL : Failed to initialize lda_bb_np_reset_process 13795 inst 0x2 LC INIT: Failed in NP HAL Reset np (0x00000001 - Operation not permitted) : npu_server_lsp : (PID=4597) : - Traceback= 7fea2d5cd9f6 7fea2d7d5816 7fea21465efa 7fea21465fc2 7fea42ad0bed 55a9dbd66031 7fea45e1c855 7fea45e1cc2b 7fea2624d526 7fea3571b96a 7fea4d6e4831 55a9dbd691e9 LC/0/6/CPU0:Mar 23 02:53:56.185 IST: npu_server_lsp[138]: %PLATFORM-NP-4-INIT_DEBUG_MSG : LDA NP2 Reset failed!! Check for a downlevel IPU version.	This info **show tech-** **show tech-** **show tech-** **show tech-** **admin show** **show tech f** **show loggi** **gather** RP/0/RP0/C sysadmin-v [sysadmin-v [sysadmin-v File is ge From sys **show loggi**
Tomahawk NP Init Failure (**DDR training FAIL)**	+++ show prm server trace error location 0/7/CPU0 [14:36:59.520 IST Sat Jan 29 2022] ++++ 97 wrapping entries (2112 possible, 320 allocated, 0 filtered, 97 total) Jan 29 00:22:10.135 prm_server/error 0/7/CPU0 t10 prm_np_Channel_PowerUp : 0x80001d46 Error powering channel 3 phase 4 Jan 29 00:22:10.136 prm_server/error 0/7/CPU0 t10 np_thread_channel_bringup : 0xa57c0200 Power phase 4 failed on channel 3 Jan 29 00:22:10.136 prm_server/error 0/7/CPU0 t10 np_thread_channel_bringup NP3 has failed to boot, trying again. Retry number 1 Jan 29 00:22:35.125 prm_server/error 0/7/CPU0 t10 prm_np_Channel_PowerUp : 0x80001d46 Error powering channel 3 phase 4 Jan 29 00:22:35.125 prm_server/error 0/7/CPU0 t10	node: no ---------- CURRE PFM TO ---------- Raised T ---------- Jan 29 0

	np_thread_channel_bringup : 0xa57c0200 Power phase 4 failed on channel 3 Jan 29 00:22:35.125 prm_server/error 0/7/CPU0 t10 np_thread_channel_bringup NP3 has failed to boot, trying again. Retry number 2 Jan 29 00:22:59.075 prm_server/error 0/7/CPU0 t10 prm_np_Channel_PowerUp : 0x80001d46 Error powering channel 3 phase 4 Jan 29 00:22:59.075 prm_server/error 0/7/CPU0 t10 np_thread_channel_bringup : 0xa57c0200 Power phase 4 failed on channel 3 Jan 29 00:22:59.075 prm_server/error 0/7/CPU0 t10 np_thread_channel_bringup After 3 attempt(s), NP3 has failed to initialize. Jan 29 00:23:00.087 prm_server/error 0/7/CPU0 t10 prm_send_pfm_msg: Persistent NP initialization failure, linecard reload not required. Check in NP Driver logs **<NP#3>DDR training FAIL (status 0x1)** <NP#3>ddr3TipRunAlg: tuning failed 0 <NP#3>ddrTipRunAlgo opcode: ddr3TipRunAlg failed (error 0x1) <NP#3>*** Error: Un-known 0x1	
LSP NP Init Failure (HbmReadParticleError error)	LC/0/13/CPU0:Jan 10 13:34:59.106 IST: npu_server_lsp[278]: %PLATFORM-NP-4-SHUTDOWN_START : NP4: EMRHIMREG.ch1Psch0HbmReadParticleError error detected, NP shutdown in progress LC/0/13/CPU0:Jan 10 13:34:59.106 IST: pfm_node_lc[330]: %PLATFORM-NP-0-UNRECOVERABLE_ERROR : Set|npu_server_lsp[4632]|0x10a5004|A non-recoverable error has been detected on NP4	+++ sho 2022] ++ Node: 0/ ---------- NPU **Cnt** --- ------- -- <snip> 4 hbmdpR 0x201dc 4 hbmdp

		0x201dc
Arbitor Link Down with Standby	Fabric-Manager: ############### Slice State ========== 0/RP0/CPU0 0 Online 0/RP1/CPU0 0 Online 0/0/CPU0 0 1 Online 0/1/CPU0 0 1 Online 0/8/CPU0 0 Offline (Backplane Arbiter Link Down) 0/8/CPU0 1 Offline (Backplane Arbiter Link Down) 0/8/CPU0 2 Offline (Backplane Arbiter Link Down) 0/8/CPU0 3 Offline (Backplane Arbiter Link Down)	
Serdes Error	show serdes trace location 0/X/CPU0 | i "HTL_ERR_DEVICE_NOT_CONNECTED"') you see these errors: 68413 Aug 12 22:44:33.525 vkg_serdes/error 0/3/CPU0 t5234 Error: vkg_mdx1_get_lasi_info() line:2910 mdx1_serdes_status_get failed on device 1 channel 12. rc=0x2103 - HTL_ERR_DEVICE_NOT_CONNECTED	Cisco bu

Known Defects

Cisco bug ID	Component	Title
Cisco bug ID CSCvy00012	asr9k-diags-online	Packet memory exhaustion by online_diag_rsp
Cisco bug ID CSCvw57721	asr9k-servicepack	Umbrella SMU containing updated firmware for Lightspeed NP and arbiter serdes
Cisco bug ID CSCvz75552	asr9k-vic-ls	Phy firmware hangs and causes optics to not get recognized on A9K-20HG-FLEX
Cisco bug ID CSCvz76691	asr9k-servicepack	Umbrella SMU with improved link status interrupt handling for Tomahawk linecards
Cisco bug ID CSCvz84139	asr9k-ls-fabric	fab_si crash when router upgraded to 742
Cisco bug ID	asr9k-pfm	ASR9K/eXR unable to commit fault-manager datapath port shutdown in

CSCwa81006		some scenarios
Cisco bug ID CSCvz16840	asr9k-fia	BLB sessions flap when CLI reload LC because forwarding path shut early due to changes added in 6.5.2
Cisco bug ID CSCwb64255	asr9k-fab-xbar	new SI settings for SKB in Starscream(9912) and Megatron(9922) chassis
Cisco bug ID CSCwa09794	asr9k-fab-xbar	new SI after fine-tuning for RO chassis for SKB-SM15
Cisco bug ID CSCvv45788	asr9k-fab-xbar	fab_xbar and mgid-programmer processes accessing hw at the same time
Cisco bug ID CSCwd22196	asr9k-prm	RFD buffer exhaustion between ILKN link on Tomahawk LC
Cisco bug ID CSCwb66960	asr9k-fab-infra	ASR9k punt fabric fault isolation
Cisco bug ID CSCwa79758	asr9k-fab-xbar	Multicast loss on LSP LC after doing OIR of another LSP LC with XBAR link fault
Cisco bug ID CSCvw88284	asr9k-lda-ls	RSP5 BW to default to 200G on 9910/9906 chassis instead of 600G.
Cisco bug ID CSCvm82379	asr9k-fab-arb	fab-arb crashed while taking sh tech fabric
Cisco bug ID CSCvh00349	asr9k-fia	ASR9k fabric can handle ucast packets sent while on standby
Cisco bug ID CSCvk44688	asr9k-fia	FPGA had errors repeatedly and it could not recover
Cisco bug ID CSCvy31670	asr9k-ls-fia	LSP: Removing FC0 enables the fabric rate limiter, FC4 does not
Cisco bug ID CSCvt59803	asr9k-ls-npdriver	LSP: PLATFORM-NP-4-SHUTDOWN IMRHIMREG.ch1Psch1HbmReadParticleError

Behavior of fault-manager datapath port shutdown/toggle Command

- The **fault-manager datapath port shutdown** command helps shut down the ports of respective FIA/NP for which the Punt Datapath Failure alarm is set, on Active RP/RSP, and the interface does not come up automatically until you reload the LC. This CLI command does not work as expected from the 7. x.x release. (CLI command **fault-manager datapath port shutdown** is not working as per design from 7. x.x) - fixed in 7.7.2.
- The **fault-manager datapath port toggle** CLI command works fine. It opens the port once the Punt Datapath Failure alarm is clear.
- This helps to prevent a service outage if proper link-level redundancy and BW availability on the redundant path is available.

Testing - to validate the previously mentioned command operation.

Inducing PUNT error generation on NP0 LC7:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
```

```
monitor np counter PUNT_DIAGS_RSP_ACT np0 count 20 location 0/7/CPU0
```

```
Wed Jul  7 14:15:17.489 UTC

Usage of NP monitor is recommended for cisco internal use only.
Please use instead 'show controllers np capture' for troubleshooting packet drops in NP
and 'monitor np interface' for per (sub)interface counter monitoring

Warning: Every packet captured will be dropped! If you use the 'count'
         option to capture multiple protocol packets, this could disrupt
         protocol sessions (eg, OSPF session flap). So if capturing protocol
         packets, capture only 1 at a time.

Warning: A mandatory NP reset will be done after monitor to clean up.
         This will cause ~150ms traffic outage. Links will stay Up.
 Proceed y/n [y] > y
 Monitor PUNT_DIAGS_RSP_ACT on NP0 ... (Ctrl-C to quit)


Wed Jul  7 14:17:08 2021 -- NP0 packet


 From Fabric: 127 byte packet
0000: 00 09 00 00 b4 22 00 00 ff ff ff ff 00 00 ff ff   ....4".........
0010: 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc aa aa aa aa   ....ppppLLLL****
0020: 55 55 55 55 00 00 00 00 01 00 00 00 00 00 00 00   UUUU............
0030: 00 00 00 00 ff ff ff ff 00 00 ff ff 00 ff 00 ff   ................
0040: f0 f0 f0 f0 cc cc cc cc aa aa aa aa 55 55 55 55   ppppLLLL****UUUU
0050: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
0060: ff ff ff ff 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0   ............pppp
0070: cc cc cc cc aa aa aa aa 55 55 55 55 00 00 00      LLLL****UUUU...


                                    (count 1 of 20)
Wed Jul  7 14:18:09 2021 -- NP0 packet
```

```
 From Fabric: 256 byte packet

0000: 00 09 00 00 b5 22 00 00 ff ff ff ff 00 00 ff ff   ....5".........
0010: 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc aa aa aa aa   ....ppppLLLL****
0020: 55 55 55 55 00 00 00 00 01 00 00 00 00 00 00 00   UUUU............
0030: 00 00 00 00 ff ff ff ff 00 00 ff ff 00 ff 00 ff   ................
0040: f0 f0 f0 f0 cc cc cc cc aa aa aa aa 55 55 55 55   ppppLLLL****UUUU
0050: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
0060: ff ff ff ff 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0   ............pppp
0070: cc cc cc cc aa aa aa aa 55 55 55 55 00 00 00 00   LLLL****UUUU....
0080: 01 00 00 00 00 00 00 00 00 00 00 00 ff ff ff ff   ................
0090: 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc   ........ppppLLLL
00a0: aa aa aa aa 55 55 55 55 00 00 00 00 01 00 00 00   ****UUUU........
00b0: 00 00 00 00 00 00 00 00 ff ff ff ff 00 00 ff ff   ................
00c0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00d0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00e0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00f0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................


                                    (count 2 of 20)

Wed Jul  7 14:19:09 2021 -- NP0 packet
Actual packet size 515 bytes truncated size 384:


 From Fabric: 384 byte packet

0000: 00 09 00 00 b6 22 00 00 ff ff ff ff 00 00 ff ff   ....6".........
0010: 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc aa aa aa aa   ....ppppLLLL****
0020: 55 55 55 55 00 00 00 00 01 00 00 00 00 00 00 00   UUUU............
0030: 00 00 00 00 ff ff ff ff 00 00 ff ff 00 ff 00 ff   ................
0040: f0 f0 f0 f0 cc cc cc cc aa aa aa aa 55 55 55 55   ppppLLLL****UUUU
```

```
0050: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
0060: ff ff ff ff 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0   ............pppp
0070: cc cc cc cc aa aa aa aa 55 55 55 55 00 00 00 00   LLLL****UUUU....
0080: 01 00 00 00 00 00 00 00 00 00 00 00 ff ff ff ff   ................
0090: 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc   ........ppppLLLL
00a0: aa aa aa aa 55 55 55 55 00 00 00 00 01 00 00 00   ****UUUU........
00b0: 00 00 00 00 00 00 00 00 ff ff ff ff 00 00 ff ff   ................
00c0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00d0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00e0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00f0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0100: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0110: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0120: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0130: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0140: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0150: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0170: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................

RP/0/RP0/CPU0:ASR-9922-A#
sh pfm location 0/RP0/CPU0

Wed Jul  7 14:19:17.174 UTC


node: node0_RP0_CPU0
----------------------
CURRENT TIME: Jul  7 14:19:17 2021
PFM TOTAL: 2   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 1
--------------------------------------------------------------------------------------------
Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle
```

```
--------------------+--+-----------------------------------+---+-------+--------------+----------

Jul  1 10:13:45 2021|0 |SPINE_UNAVAILABLE                  |E/A|5082   |Fabric Manager|0x1034000

Jul  7 14:19:09 2021|0 |PUNT_FABRIC_DATA_PATH_FAILED       |ER |9429   |System Punt/Fa|0x2000004

RP/0/RP0/CPU0:ASR-9922-A#sh pfm process 9429 location 0/Rp0/CPU0

Wed Jul  7 14:19:37.128 UTC




node: node0_RP0_CPU0

---------------------

CURRENT TIME: Jul  7 14:19:37 2021

PFM TOTAL: 2   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 1

PER PROCESS TOTAL: 0   EM: 0   CR: 0   ER: 0

Device/Path[1 ]:Fabric loopbac  [0x2000003 ] State:RDY  Tot: 0

Device/Path[2 ]:System Punt/Fa  [0x2000004 ] State:RDY  Tot: 1

1   Fault Id:          432

    Sev:               ER

    Fault Name:        PUNT_FABRIC_DATA_PATH_FAILED

    Raised Timestamp:  Jul  7 14:19:09 2021

    Clear Timestamp:   N/A

    Changed Timestamp: N/A

    Resync Mismatch:   FALSE

    MSG:               failure threshold is 3, (slot, NP) failed: (0/7/CPU0, 0)

Device/Path[3 ]:Crossbar Switc  [0x108c000 ] State:RDY  Tot: 0

Device/Path[4 ]:Crossbar Switc  [0x108c001 ] State:RDY  Tot: 0

Device/Path[5 ]:Crossbar Switc  [0x108c002 ] State:RDY  Tot: 0

Device/Path[6 ]:Crossbar Switc  [0x108c003 ] State:RDY  Tot: 0

Device/Path[7 ]:Crossbar Switc  [0x108c004 ] State:RDY  Tot: 0

Device/Path[8 ]:Crossbar Switc  [0x108c005 ] State:RDY  Tot: 0

Device/Path[9 ]:Crossbar Switc  [0x108c006 ] State:RDY  Tot: 0

Device/Path[10]:Crossbar Switc  [0x108c007 ] State:RDY  Tot: 0
```

```
Device/Path[11]:Crossbar Switc  [0x108c008 ] State:RDY  Tot: 0

Device/Path[12]:Crossbar Switc  [0x108c009 ] State:RDY  Tot: 0

Device/Path[13]:Crossbar Switc  [0x108c00a ] State:RDY  Tot: 0

Device/Path[14]:Crossbar Switc  [0x108c00b ] State:RDY  Tot: 0

Device/Path[15]:Crossbar Switc  [0x108c00c ] State:RDY  Tot: 0

Device/Path[16]:Crossbar Switc  [0x108c00d ] State:RDY  Tot: 0

Device/Path[17]:Crossbar Switc  [0x108c00e ] State:RDY  Tot: 0

Device/Path[18]:Fabric Interfa  [0x108b000 ] State:RDY  Tot: 0

Device/Path[19]:Fabric Arbiter  [0x1086000 ] State:RDY  Tot: 0

Device/Path[20]:CPU Controller  [0x108d000 ] State:RDY  Tot: 0

Device/Path[21]:Device Control  [0x109a000 ] State:RDY  Tot: 0

Device/Path[22]:ClkCtrl Contro  [0x109b000 ] State:RDY  Tot: 0

Device/Path[23]:NVRAM           [0x10ba000 ] State:RDY  Tot: 0

Device/Path[24]:Hooper switch   [0x1097000 ] State:RDY  Tot: 0

Device/Path[25]:Hooper switch   [0x1097001 ] State:RDY  Tot: 0

Device/Path[26]:Hooper switch   [0x1097002 ] State:RDY  Tot: 0

Device/Path[27]:Hooper switch   [0x1097003 ] State:RDY  Tot: 0
```

The Port did not go down in this case:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
sh ipv4 int brief location 0/7/CPU0

Wed Jul  7 14:21:29.693 UTC

Interface                      IP-Address      Status          Protocol Vrf-Name
TenGigE0/7/0/0                 unassigned      Down            Down     default
TenGigE0/7/0/1                 unassigned      Down            Down     default
TenGigE0/7/0/2                 unassigned      Down            Down     default
TenGigE0/7/0/3                 unassigned      Down            Down     default
TenGigE0/7/0/4                 unassigned      Down            Down     default
```

```
TenGigE0/7/0/5                 unassigned      Down            Down     default
TenGigE0/7/0/6                 unassigned      Down            Down     default
TenGigE0/7/0/7                 unassigned      Shutdown        Down     default
TenGigE0/7/0/8                 unassigned      Shutdown        Down     default
TenGigE0/7/0/9                 unassigned      Shutdown        Down     default
TenGigE0/7/0/10                unassigned      Down            Down     default
TenGigE0/7/0/11                unassigned      Down            Down     default
TenGigE0/7/0/12                unassigned      Down            Down     default
TenGigE0/7/0/13                unassigned      Shutdown        Down     default
TenGigE0/7/0/14                unassigned      Shutdown        Down     default
TenGigE0/7/0/15                unassigned      Shutdown        Down     default
TenGigE0/7/0/16                unassigned      Shutdown        Down     default
TenGigE0/7/0/17                unassigned      Shutdown        Down     default
TenGigE0/7/0/18                unassigned      Down            Down     default
TenGigE0/7/0/19                unassigned      Up              Up       default  >>>>>>> Port is UP
```

```
RP/0/RP0/CPU0:ASR-9922-A#
sh logging last 200 | in 0/7/0

Wed Jul  7 14:22:35.715 UTC
RP/0/RP0/CPU0:ASR-9922-A#
```

Test case 1.2:

NP/Ports behaviour with the **fault-manager datapath port toggle** command:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
sh run formal | in data

Wed Jul  7 14:52:11.714 UTC
Building configuration...
fault-manager datapath port toggle
```

```
RP/0/RP0/CPU0:ASR-9922-A#
```

No alarm in PFM:

```
<#root>
RP/0/RP0/CPU0:ASR-9922-A#
sh pfm location  0/Rp0/CPU0

Wed Jul  7 14:55:13.410 UTC

node: node0_RP0_CPU0
----------------------
CURRENT TIME: Jul  7 14:55:13 2021
PFM TOTAL: 1   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 0
------------------------------------------------------------------------------------------------
Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle
--------------------+--+-----------------------------------+---+-------+--------------+----------
Jul  1 10:13:45 2021|0 |SPINE_UNAVAILABLE                   |E/A|5082   |Fabric Manager|0x1034000

RP/0/RP0/CPU0:ASR-9922-A#
```

PUNT error generation in NP0 LC7:

```
<#root>
RP/0/RP0/CPU0:ASR-9922-A#
monitor np counter PUNT_DIAGS_RSP_ACT np0 count 20 location 0/7/CPU0

Wed Jul  7 14:51:18.596 UTC

Usage of NP monitor is recommended for cisco internal use only.
Please use instead 'show controllers np capture' for troubleshooting packet drops in NP
```

```
and 'monitor np interface' for per (sub)interface counter monitoring


Warning: Every packet captured will be dropped! If you use the 'count'
         option to capture multiple protocol packets, this could disrupt
         protocol sessions (eg, OSPF session flap). So if capturing protocol
         packets, capture only 1 at a time.




Warning: A mandatory NP reset will be done after monitor to clean up.
         This will cause ~150ms traffic outage. Links will stay Up.
 Proceed y/n [y] >
y

 Monitor PUNT_DIAGS_RSP_ACT on NP0 ... (Ctrl-C to quit)


Wed Jul  7 14:53:21 2021 -- NP0 packet


 From Fabric: 127 byte packet
0000: 00 09 00 00 d8 22 00 00 ff ff ff ff 00 00 ff ff   ....X".........
0010: 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc aa aa aa aa   ....ppppLLLL****
0020: 55 55 55 55 00 00 00 00 01 00 00 00 00 00 00 00   UUUU............
0030: 00 00 00 00 ff ff ff ff 00 00 ff ff 00 ff 00 ff   ................
0040: f0 f0 f0 f0 cc cc cc cc aa aa aa aa 55 55 55 55   ppppLLLL****UUUU
0050: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
0060: ff ff ff ff 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0   ............pppp
0070: cc cc cc cc aa aa aa aa 55 55 55 55 00 00 00      LLLL****UUUU...


                                    (count 1 of 20)
Wed Jul  7 14:54:22 2021 -- NP0 packet
```

```
 From Fabric: 256 byte packet
0000: 00 09 00 00 d9 22 00 00 ff ff ff ff 00 00 ff ff   ....Y".........
0010: 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc aa aa aa aa   ....ppppLLLL****
0020: 55 55 55 55 00 00 00 00 01 00 00 00 00 00 00 00   UUUU............
0030: 00 00 00 00 ff ff ff ff 00 00 ff ff 00 ff 00 ff   ................
0040: f0 f0 f0 f0 cc cc cc cc aa aa aa aa 55 55 55 55   ppppLLLL****UUUU
0050: 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
0060: ff ff ff ff 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0   ............pppp
0070: cc cc cc cc aa aa aa aa 55 55 55 55 00 00 00 00   LLLL****UUUU....
0080: 01 00 00 00 00 00 00 00 00 00 00 00 ff ff ff ff   ................
0090: 00 00 ff ff 00 ff 00 ff f0 f0 f0 f0 cc cc cc cc   ........ppppLLLL
00a0: aa aa aa aa 55 55 55 55 00 00 00 00 01 00 00 00   ****UUUU........
00b0: 00 00 00 00 00 00 00 00 ff ff ff ff 00 00 ff ff   ................
00c0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00d0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00e0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00f0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................

                                    (count 2 of 20)
```

RP/0/RP0/CPU0:ASR-9922-A#

sh pfm location 0/Rp0/CPU0

Wed Jul 7 14:56:24.459 UTC

```
node: node0_RP0_CPU0

----------------------

CURRENT TIME: Jul  7 14:56:24 2021

PFM TOTAL: 2   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 1

-------------------------------------------------------------------------------------------------

Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle

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

Jul  1 10:13:45 2021|0 |SPINE_UNAVAILABLE                   |E/A|5082   |Fabric Manager|0x1034000

Jul  7 14:55:23 2021|0 |PUNT_FABRIC_DATA_PATH_FAILED        |ER |9429   |System Punt/Fa|0x2000004

RP/0/RP0/CPU0:ASR-9922-A#sh pfm process 9429 location 0/RP0/CPU0

Wed Jul  7 14:56:39.961 UTC



node: node0_RP0_CPU0

----------------------

CURRENT TIME: Jul  7 14:56:40 2021

PFM TOTAL: 2   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 1

PER PROCESS TOTAL: 0   EM: 0   CR: 0   ER: 0

Device/Path[1 ]:Fabric loopbac  [0x2000003 ] State:RDY  Tot: 0

Device/Path[2 ]:System Punt/Fa  [0x2000004 ] State:RDY  Tot: 1

1   Fault Id:          432

    Sev:               ER

    Fault Name:        PUNT_FABRIC_DATA_PATH_FAILED

    Raised Timestamp:  Jul  7 14:55:23 2021

    Clear Timestamp:   N/A

    Changed Timestamp: N/A

    Resync Mismatch:   FALSE

    MSG:               failure threshold is 3, (slot, NP) failed: (0/7/CPU0, 0)

Device/Path[3 ]:Crossbar Switc  [0x108c000 ] State:RDY  Tot: 0
```

```
Device/Path[4 ]:Crossbar Switc  [0x108c001 ] State:RDY  Tot: 0

Device/Path[5 ]:Crossbar Switc  [0x108c002 ] State:RDY  Tot: 0

Device/Path[6 ]:Crossbar Switc  [0x108c003 ] State:RDY  Tot: 0

Device/Path[7 ]:Crossbar Switc  [0x108c004 ] State:RDY  Tot: 0

Device/Path[8 ]:Crossbar Switc  [0x108c005 ] State:RDY  Tot: 0

Device/Path[9 ]:Crossbar Switc  [0x108c006 ] State:RDY  Tot: 0

Device/Path[10]:Crossbar Switc  [0x108c007 ] State:RDY  Tot: 0

Device/Path[11]:Crossbar Switc  [0x108c008 ] State:RDY  Tot: 0

Device/Path[12]:Crossbar Switc  [0x108c009 ] State:RDY  Tot: 0

Device/Path[13]:Crossbar Switc  [0x108c00a ] State:RDY  Tot: 0

Device/Path[14]:Crossbar Switc  [0x108c00b ] State:RDY  Tot: 0

Device/Path[15]:Crossbar Switc  [0x108c00c ] State:RDY  Tot: 0

Device/Path[16]:Crossbar Switc  [0x108c00d ] State:RDY  Tot: 0

Device/Path[17]:Crossbar Switc  [0x108c00e ] State:RDY  Tot: 0

Device/Path[18]:Fabric Interfa  [0x108b000 ] State:RDY  Tot: 0

Device/Path[19]:Fabric Arbiter  [0x1086000 ] State:RDY  Tot: 0

Device/Path[20]:CPU Controller  [0x108d000 ] State:RDY  Tot: 0

Device/Path[21]:Device Control  [0x109a000 ] State:RDY  Tot: 0

Device/Path[22]:ClkCtrl Contro  [0x109b000 ] State:RDY  Tot: 0

Device/Path[23]:NVRAM           [0x10ba000 ] State:RDY  Tot: 0

Device/Path[24]:Hooper switch   [0x1097000 ] State:RDY  Tot: 0

Device/Path[25]:Hooper switch   [0x1097001 ] State:RDY  Tot: 0

Device/Path[26]:Hooper switch   [0x1097002 ] State:RDY  Tot: 0

Device/Path[27]:Hooper switch   [0x1097003 ] State:RDY  Tot: 0
```

Interface TenGigE0/7/0/19 went down of NP0:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
show logging last 200 | in 0/7/0

Wed Jul  7 14:58:42.959 UTC
```

```
LC/0/7/CPU0:Jul  7 14:55:23.798 UTC: ifmgr[270]: %PKT_INFRA-LINK-3-UPDOWN :
 Interface TenGigE0/7/0/19, changed state to Down

LC/0/7/CPU0:Jul  7 14:55:23.798 UTC: ifmgr[270]: %PKT_INFRA-LINEPROTO-5-UPDOWN :
 Line protocol on Interface TenGigE0/7/0/19, changed state to Down

RP/0/RP0/CPU0:Jul  7 14:55:23.802 UTC: BM-DISTRIB[1290]: %L2-BM-6-ACTIVE :
 TenGigE0/7/0/19 is no longer Active as part of Bundle-Ether854 (Link is down)

LC/0/7/CPU0:Jul  7 14:55:25.854 UTC: vic_0_0[379]: %PLATFORM-VIC-4-RFI :
 Interface TenGigE0/7/0/19, Detected Remote Fault

LC/0/7/CPU0:Jul  7 14:55:26.936 UTC: lda_server[114]: %PKT_INFRA-FM-2-FAULT_CRITICAL :
 ALARM_CRITICAL :OPTICS RX POWER LANE-0 LOW ALARM :CLEAR : Te0/7/0/0:
```

Stopped PUNT error generation:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
```

sh ipv4 int brief location 0/7/CPU0

```
Wed Jul  7 14:59:16.322 UTC

Interface                      IP-Address      Status          Protocol Vrf-Name
TenGigE0/7/0/0                 unassigned      Down            Down     default
TenGigE0/7/0/1                 unassigned      Down            Down     default
TenGigE0/7/0/2                 unassigned      Down            Down     default
TenGigE0/7/0/3                 unassigned      Down            Down     default
TenGigE0/7/0/4                 unassigned      Down            Down     default
TenGigE0/7/0/5                 unassigned      Down            Down     default
TenGigE0/7/0/6                 unassigned      Down            Down     default
TenGigE0/7/0/7                 unassigned      Shutdown        Down     default
TenGigE0/7/0/8                 unassigned      Shutdown        Down     default
TenGigE0/7/0/9                 unassigned      Shutdown        Down     default
TenGigE0/7/0/10                unassigned      Down            Down     default
TenGigE0/7/0/11                unassigned      Down            Down     default
TenGigE0/7/0/12                unassigned      Down            Down     default
TenGigE0/7/0/13                unassigned      Shutdown        Down     default
```

```
TenGigE0/7/0/14                unassigned      Shutdown        Down     default

TenGigE0/7/0/15                unassigned      Shutdown        Down     default

TenGigE0/7/0/16                unassigned      Shutdown        Down     default

TenGigE0/7/0/17                unassigned      Shutdown        Down     default

TenGigE0/7/0/18                unassigned      Down            Down     default

TenGigE0/7/0/19                unassigned      Down            Down     default  >>>>>>
```

Alarm stopped:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
sh pfm location  0/Rp0/CPU0


Wed Jul  7 15:01:44.478 UTC

node: node0_RP0_CPU0

----------------------

CURRENT TIME: Jul  7 15:01:44 2021

PFM TOTAL: 1   EMERGENCY/ALERT(E/A): 1   CRITICAL(CR): 0   ERROR(ER): 0

-------------------------------------------------------------------------------------------------

Raised Time         |S#|Fault Name                          |Sev|Proc_ID|Dev/Path Name |Handle

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

Jul  1 10:13:45 2021|0 |SPINE_UNAVAILABLE                   |E/A|5082   |Fabric Manager|0x1034000

RP/0/RP0/CPU0:ASR-9922-A#
```

Interface came UP:

<#root>

```
RP/0/RP0/CPU0:ASR-9922-A#
show logging  | in 0/7/0/19


Wed Jul  7 15:06:11.532 UTC

LC/0/7/CPU0:Jul  7 14:55:23.798 UTC: ifmgr[270]: %PKT_INFRA-LINK-3-UPDOWN :
 Interface TenGigE0/7/0/19, changed state to Down
```

```
LC/0/7/CPU0:Jul  7 14:55:23.798 UTC: ifmgr[270]: %PKT_INFRA-LINEPROTO-5-UPDOWN :
 Line protocol on Interface TenGigE0/7/0/19, changed state to Down

RP/0/RP0/CPU0:Jul  7 14:55:23.802 UTC: BM-DISTRIB[1290]: %L2-BM-6-ACTIVE :
 TenGigE0/7/0/19 is no longer Active as part of Bundle-Ether854 (Link is down)

LC/0/7/CPU0:Jul  7 14:55:25.854 UTC: vic_0_0[379]: %PLATFORM-VIC-4-RFI :
 Interface TenGigE0/7/0/19, Detected Remote Fault

LC/0/7/CPU0:Jul  7 15:03:27.204 UTC: ifmgr[270]: %PKT_INFRA-LINK-3-UPDOWN :
 Interface TenGigE0/7/0/19, changed state to Up

LC/0/7/CPU0:Jul  7 15:03:27.206 UTC: ifmgr[270]: %PKT_INFRA-LINEPROTO-5-UPDOWN :
 Line protocol on Interface TenGigE0/7/0/19, changed state to Up

RP/0/RP0/CPU0:Jul  7 15:03:29.219 UTC: BM-DISTRIB[1290]: %L2-BM-6-ACTIVE :
 TenGigE0/7/0/19 is Active as part of Bundle-Ether854
```