

Troubleshoot Multiple Data Processing Cards Shutdown Due too Many npumgr Crashes

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Introduction

This document describes how to troubleshoot a problem that occurs when multiple Data Processing Card (DPCs) shutdown in a very short period due to npumgr crashes.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Hardware knowledge of ASR5000/5500
- StarOS
- Basic knowledge of Routing

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command

Abbreviations

SPGW
DPC
VLAN
NPU

Serving and Packet Data Network Gateway
Data Processing Card
Virtual Local Area Network
Network Processing Unit

Problem

As a part of a planned activity, new interfaces are bound in VLANs under ports done. The second part of the activity is to create static routes via these interfaces. As soon as VLAN is opened for traffic, npumgr crashes begun and subsequently made all DPC cards to shut down multiple times.

Troubleshoot

This section provides information in order to troubleshoot the problem of multiple DPC card shutdown in a very short period due to npumgr crashes.

Collected Show Support Details (SSD), activity logs and syslog that cover logs of the problem are shown here. Firstly, the rct stats are checked in order to see the reason for these shutdowns. It could be seen here that they are shut down due to too many npumgr crashes.

```
***** show rct stats verbose *****
Thursday September 19 03:57:04 IST 2019
RCT stats details (Last 18 Actions)
# Action Type From To Start Time Duration Status
---
7 Shutdown N/A 2 10 2019-Sep-19+00:09:51.587 2.322 sec Success
8 Shutdown N/A 1 0 2019-Sep-19+00:10:14.541 0.005 sec Success
9 Shutdown N/A 3 0 2019-Sep-19+00:10:44.625 0.005 sec Success
10 Shutdown N/A 4 0 2019-Sep-19+00:11:03.428 0.005 sec Success
11 Shutdown N/A 7 0 2019-Sep-19+00:11:34.771 0.478 sec Success
12 Shutdown N/A 8 0 2019-Sep-19+00:11:54.328 0.005 sec Success
13 Shutdown N/A 9 0 2019-Sep-19+00:12:19.656 0.005 sec Success
14 Shutdown N/A 10 0 2019-Sep-19+00:12:39.706 0.004 sec Success
15 Shutdown N/A 1 9 2019-Sep-19+00:32:30.567 0.005 sec Success
16 Shutdown N/A 2 0 2019-Sep-19+00:32:36.282 0.031 sec Success
17 Shutdown N/A 3 0 2019-Sep-19+00:32:56.456 0.005 sec Success
18 Shutdown N/A 4 0 2019-Sep-19+00:33:30.426 0.005 sec Success
```

```
RCT stats summary
-----
Migrations = 2, Average time = 10.890 sec
Management Card = 2, Average time = 10.890 sec
Packet Card = 0
Switchovers = 2, Average time = 18.526 sec
```

```
RCT stats verbose
-----
Stats 7:
Action : Shutdown
Type : N/A
From : 2
To : 10
Start Time : 2019-Sep-19+00:09:51.587
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 2.322 sec
Graceful : Enabled
```

Stats 8:

Action : Shutdown
Type : N/A
From : 1
To : 0
Start Time : 2019-Sep-19+00:10:14.541
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 9:

Action : Shutdown
Type : N/A
From : 3
To : 0
Start Time : 2019-Sep-19+00:10:44.625
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 10:

Action : Shutdown
Type : N/A
From : 4
To : 0
Start Time : 2019-Sep-19+00:11:03.428
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 11:

Action : Shutdown
Type : N/A
From : 7
To : 0
Start Time : 2019-Sep-19+00:11:34.771
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.478 sec
Graceful : Enabled

Stats 12:

Action : Shutdown
Type : N/A

From : 8
To : 0
Start Time : 2019-Sep-19+00:11:54.328
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 13:

Action : Shutdown
Type : N/A
From : 9
To : 0
Start Time : 2019-Sep-19+00:12:19.656
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 14:

Action : Shutdown
Type : N/A
From : 10
To : 0
Start Time : 2019-Sep-19+00:12:39.706
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.004 sec
Graceful : Enabled

Stats 15:

Action : Shutdown
Type : N/A
From : 1
To : 9
Start Time : 2019-Sep-19+00:32:30.567
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 16:

Action : Shutdown
Type : N/A
From : 2
To : 0
Start Time : 2019-Sep-19+00:32:36.282
Failure Reason : NPUMGR_TOO_MANY_CRASHES

Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.031 sec
Graceful : Enabled

Stats 17:

Action : Shutdown
Type : N/A
From : 3
To : 0
Start Time : 2019-Sep-19+00:32:56.456
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Stats 18:

Action : Shutdown
Type : N/A
From : 4
To : 0
Start Time : 2019-Sep-19+00:33:30.426
Failure Reason : NPUMGR_TOO_MANY_CRASHES
Failure Device : CARD
Is Card Usable : Yes
Recovery Status : Success
Facility : N/A
Instance : N/A
Duration : 0.005 sec
Graceful : Enabled

Then, check the details of npumgr crashes. Here, you see that npumgr gets crashed at function nexthop_get. Hence, you see an indication of some issues when you try to get the next hop.

***** CRASH #09 *****

SW Version : 21.9.7
Similar Crash Count : 16
Time of First Crash : 2019-Sep-19+00:08:16

Assertion failure at npu/npumgr/ares_npumgr_forwarding_handler.c:1829

Function: ares_npumgr_nexthop_get()
Expression: (nh_id) >= 0 && (nh_id) < ares_npumgr_db_get_count(SN_NPUSHM_TABREC_NH,
(ares_inst)->profile)
Proclet: npumgr (f=103000,i=30)
Process: card=3 cpu=0 arch=X pid=7066 cpu=~0% argv0=npumgr
Crash time: 2019-Sep-18+19:01:11 UTC
Recent errno: 11 Resource temporarily unavailable
Build_number: 71001
Stack (18024@0x0xffff0000):
[ffffe430/X] __kernel_vsyscall() sp=0xffff0428
[0c7df834/X] sn_assert() sp=0xffff0468
[002fcedb/X] ares_npumgr_nexthop_get() sp=0xffff04b8
[002feb23/X] ares_npumgr_fwd_ddf2_tcam_entry_update() sp=0xffff0948
[00301896/X] ares_npumgr_lpm_add() sp=0xffff0e98
[003c4345/X] ares_npumgr_fwd_add() sp=0xffff1768
[003e38fa/X] ares_npumgr_fwd_func() sp=0xffff1bf8

```
[003e444a/X] ares_sn_npumgr_forwarding_add_del_mod_handler() sp=0xffff2048
[0c892918/X] sn_msg_arriving_handle() sp=0xffff4138
[0c8713a6/X] sn_loop_run() sp=0xffff45e8
[0c55a3b5/X] main() sp=0xffff4658
```

***** CRASH #10 *****

```
SW Version          : 21.9.7
Similar Crash Count : 1
Time of First Crash : 2019-Sep-19+00:31:22
```

Assertion failure at npu/npumgr/ares_npumgr_port_handler.c:8409

Note: failed to find index of created lport 5/11#11-65: status=SN_STATUS_FAILURE[1]

Function: ares_sn_npumgr_port_lp_create_func()

Expression: 0

Code: CRASH

Procllet: npumgr (f=103000,i=11)

Process: card=1 cpu=1 arch=X pid=7181 argv0=npumgr

Crash time: 2019-Sep-18+19:01:22 UTC

Recent errno: 11 Resource temporarily unavailable

Build_number: 71001

Stack (14728@0x0xffcb8000):

```
[ffffe430/X] __kernel_vsyscall() sp=0xffcb8a48
[0c7df834/X] sn_assert() sp=0xffcb8a88
[003bd590/X] ares_sn_npumgr_port_lp_create_func() sp=0xffcb8f18
[003c10d4/X] ares_sn_npumgr_port_lp_create_handler() sp=0xffcb9368
[0c892918/X] sn_msg_arriving_handle() sp=0xffcbb458
[0c8713a6/X] sn_loop_run() sp=0xffcbb908
[0c55a3b5/X] main() sp=0xffcbb978
```

***** CRASH #11 *****

```
SW Version          : 21.9.7
Similar Crash Count : 107
Time of First Crash : 2019-Sep-19+00:09:03
```

Assertion failure at npu/npumgr/ares_npumgr_forwarding_handler.c:1829

Function: ares_npumgr_nexthop_get()

Expression: (nh_id) >= 0 && (nh_id) < ares_npumgr_db_get_count(SN_NPUSHM_TABREC_NH, (ares_inst)->profile)

Procllet: npumgr (f=103000,i=80)

Process: card=8 cpu=0 arch=X pid=9130 cpu=~98% argv0=npumgr

Crash time: 2019-Sep-18+19:03:35 UTC

Recent errno: 115 Operation now in progress

Build_number: 71001

Stack (10360@0x0xffe58000):

```
[ffffe430/X] __kernel_vsyscall() sp=0xffe58618
[0c7df834/X] sn_assert() sp=0xffe58658
[002fcedb/X] ares_npumgr_nexthop_get() sp=0xffe586a8
[002feb23/X] ares_npumgr_fwd_ddf2_tcam_entry_update() sp=0xffe58b38
[00301896/X] ares_npumgr_lpm_add() sp=0xffe59088
[003c4345/X] ares_npumgr_fwd_add() sp=0xffe59958
[003e1191/X] fwddb_import_add_entry() sp=0xffe59dd8
[003e2452/X] ares_npumgr_fwddb_import() sp=0xffe5a2c8
[0025e4ea/X] npumgr_rx_db_evt() sp=0xffe5a2f8
[0c8660d4/X] sn_epoll_run_events() sp=0xffe5a348
[0c872bca/X] sn_loop_run() sp=0xffe5a7f8
[0c55a3b5/X] main() sp=0xffe5a868
```

You can check the activity logs and here is the chronology of events that happened. As part of an activity, interfaces are created followed by static routes.

```
show ipv6 interface summary
```

```
Thursday September 19 00:09:16 IST 2019
Interface Name          Address/Mask          Port          Status
=====
SGi_LAG100_vlan50      2401:4900:c:f::201/126 5/10 vlan 50      UP           [sec]
SGi_LAG100_vlan64_VO4G_SBC 2401:4900:c:10::1/126 5/10 vlan 64 UP
SGi_LAG200_vlan51      2401:4900:c:f::205/126 5/11 vlan 51      UP           [sec]
SGi_LAG200_vlan65_VO4G_SBC 2401:4900:c:10::5/126 5/11 vlan 65 UP
```

```
Total interface count: 4
```

```
(config-ctx)# ipv6 route a:b:c:d:1/128 next-hop x:y:z:w::2 interface A
```

```
Thursday September 19 00:07:13 IST 2019
```

```
(config-ctx)#
```

```
(config-ctx)# ipv6 route a:b:c:d:1/128 next-hop x:y:z:w::2 interface B
```

```
Thursday September 19 00:07:21 IST 2019
```

```
Failure: Invalid Nexthop address!
```

```
(config-ctx)#
```

```
(config-ctx)# ipv6 route a:b:c:d:1/128 next-hop x:y:z:w::6 interface C
```

```
Thursday September 19 00:07:36 IST 2019
```

```
(config-ctx)# exit
```

```
Thursday September 19 00:07:50 IST 2019
```

```
[SGi]MOH-C25-SPG-04(config)#
```

VLAN is then configured inside the port and opened for traffic around September 19 00:08:16.

```
(config)# port ethernet 5/10
```

```
Thursday September 19 00:08:01 IST 2019
```

```
(config-port-5/10)# vla
```

```
(config-port-5/10)# vlan 64
```

```
Thursday September 19 00:08:05 IST 2019
```

```
(config-port-5/10-vlan-64)# bind interface C SGi
```

```
Thursday September 19 00:08:14 IST 2019
```

```
(config-port-5/10-vlan-64)# no shu
```

```
(config-port-5/10-vlan-64)# no shutdown
```

```
Thursday September 19 00:08:17 IST 2019
```

```
(config-port-5/10-vlan-64)# exit
```

```
Thursday September 19 00:08:19 IST 2019
```

```
(config-port-5/10)# exit
```

```
Thursday September 19 00:08:21 IST 2019
```

Here, the steps and configurations of planned activity for creating interfaces and static routes are followed by bind inside VLAN looks fine. But soon after this, it could be seen that the npumgr started to crash followed by DPC card shutdowns due to too many npumgr crashes.

```
show snmp trap history verbose | grep -i mgr
```

```
Thursday September 19 00:20:22 IST 2019
```

```
Thu Sep 19 00:08:18 2019 Internal trap notification 73 (ManagerFailure) facility npumgr instance 30 card 3 cpu 0
```

```
Thu Sep 19 00:08:18 2019 Internal trap notification 150 (TaskFailed) facility npumgr instance 30 on card 3 cpu 0
```

```
Thu Sep 19 00:08:18 2019 Internal trap notification 73 (ManagerFailure) facility npumgr instance 40 card 4 cpu 0
```

```
Thu Sep 19 00:08:18 2019 Internal trap notification 150 (TaskFailed) facility npumgr instance 40 on card 4 cpu 0
```

As an immediate workaround, VLANs are removed from the port. Soon, after you remove VLANs, the npumgr crashes stop.

```
configure
```

```

Thursday September 19 00:29:31 IST 2019
(config)# port eth
(config)# port ethernet 5/10
Thursday September 19 00:33:13 IST 2019
(config-port-5/10)# no vlan 64
Thursday September 19 00:33:23 IST 2019
(config-port-5/10)# exit
Thursday September 19 00:33:38 IST 2019
(config)# port ethernet 5/11
Thursday September 19 00:33:42 IST 2019
(config-port-5/11)# no vlan 65
Thursday September 19 00:33:50 IST 2019
(config-port-5/11)# end
Thursday September 19 00:33:52 IST 2019

```

```
***** show crash list *****
```

```
Thursday September 19 03:54:39 IST 2019
```

```

=====
# Time Process Card/CPU/ SW HW_SER_NUM
PID VERSION MIO / Crash Card
=====
 9 2019-Sep-19+00:31:11 npumgr 03/0/07066 21.9.7 FLM221503A5/FLM221404FF
10 2019-Sep-19+00:31:22 npumgr 01/1/07181 21.9.7 FLM221503A5/FLM221404FH
11 2019-Sep-19+00:33:35 npumgr 08/0/09130 21.9.7 FLM221503A5/FLM221404FU

```

When you further check syslogs, it can be seen that the system tried to get next-hop but it was unsuccessful at Sep 19 00:08:16. i.e. soon after VLAN was opened for traffic.

```

Sep 19 00:08:16 10.107.211.36 evlogd: [local-60sec16.758] [npumgr-fwd 168001 error] [3/2/7024
<npumgr:32> rding_handler.c:7739] [software internal system syslog] ECMP create fail - no
nexthop ARP: vpnid=6, type=ip[0], action=add[1], ip=2401:4900:c:f::408/128, tb_ver=3 ifentry-
flag=0, ifroute-flag=0, updatettl-flag=1, nh=2401:4900:c:10::1 dpti=0 priority=0, tos=0, ttl-
decr=1, nhlfe_ix=0, lport=0x050a000a
Sep 19 00:08:18 10.107.211.36 evlogd: [local-60sec18.448] [sitmain 4103 warning] [1/0/7008
<sitmain:10> sitproc.c:2653] [software internal system critical-info syslog] [npumgr pid 7102]
async core transfer and procler recovery is not set!
Sep 19 00:08:18 10.107.211.36 evlogd: [local-60sec18.852] [sitmain 4027 critical] [2/0/6993
<sitmain:20> crash_mini.c:602] [software internal system callhome-crash] Process Crash Info:
time 2019-Sep-18+18:38:16(hex time 5d827998) card 02 cpu 00 pid 07146 procname npumgr
crash_details Assertion failure at npu/npumgr/ares_npumgr_forwarding_handler.c:1829 Function:
ares_npumgr_nexthop_get() Expression: (nh_id) >= 0 && (nh_id) <
ares_npumgr_db_get_count(SN_NPUSHM_TABREC_NH, (ares_inst)->profile) Procler: npumgr
(f=103000,i=20) Process: card=2 cpu=0 arch=X pid=7146 cpu=~0% argv0=npumgr Crash time: 2019-
Sep-18+18:38:16 UTC Recent errno: 11 Resource temporarily unavailable Build_number: 71001
Stack (20600@0x0xffce5000): [ffffe430/X] __kernel_vsyscall() sp=0xffce5e38 [0c7df834/X]
sn_assert() sp=0xffce5e78 [002fcedb/X] ares_npumgr_nexthop_get() sp=0xffce5ec8
[002feb23/X] ares_npumgr_fwd_ddf2_tcam_entry_update() sp=0xffce6358 [00301896/X]
ares_npumgr_lpm_add() sp=0xffce68a8 [003c4345
Sep-18+18:38:16(hex time 5d827998) card 02 cpu 00 pid 07146 procname npumgr crash_details
Assertion failure at npu/npumgr/ares_npumgr_forwarding_handler.c:1829 Function:
ares_npumgr_nexthop_get() Expression: (nh_id) >= 0 && (nh_id) <
ares_npumgr_db_get_count(SN_NPUSHM_TABREC_NH, (ares_inst)->profile) Procler: npumgr
(f=103000,i=20) Process: card=2 cpu=0 arch=X pid=7146 cpu=~0% argv0=npumgr Crash time: 2019-
Sep-18+18:38:16 UTC Recent errno: 11 Resource temporarily unavailable Build_number: 71001
Stack (20600@0x0xffce5000): [ffffe430/X] __kernel_vsyscall() sp=0xffce5e38 [0c7df834/X]
sn_assert() sp=0xffce5e78 [002fcedb/X] ares_npumgr_nexthop_get() sp=0xffce5ec8
[002feb23/X] ares_npumgr_fwd_ddf2_tcam_entry_update() sp=0xffce6358 [00301896/X]
ares_npumgr_lpm_add() sp=0xffce68a8 [003c4345

```

When you further check the configuration from SSD, it can also be seen that one static route already exists before the start of the planned activity (interface and static route configurations).


```
context SGi
  ipv6 route a:b:c:d:1/128 next-hop x:y:z:w::1 interface C
#exit
```

From the configuration, it can be seen that there was already a static route present for IP a:b:c:d:1/128 via interface C next-hop as hop x:y:z:w::1. But as part of the activity, one more static route is defined with next-hop as hop x:y:z:w::2.

So, when the VLANs are opened for traffic, the system can not get the next hop x:y:z:w::1 as it was defined first. Also, there were logs that indicated Equal-Cost Multi-Path (ECMP) routing to next-hop not successful because it is not reachable. As a result, it was not able to forward packets of these VLANs traffic which eventually lead to npumgr crashes.

Multiple Card switchover is a by-product of too many npumgr crashes on the system.

Solution

There are multiple static routes to the same destination via the same interface but different next-hop that leads to the npumgr is not able to forward packets followed by npumgr crashes.

Hence, the incorrect static route is removed from the configuration. The same configurations are then successfully applied in another maintenance window without any issues.