Understand High CPU Usage Reported for the Dataplane on Catalyst 9800

Contents

Introduction

This document describes the reasons why a high CPU usage is expected for the Catalyst 9800 if it concerns the dataplane.

Components used

- 9800-CL or 9800-L

Background information

The 9800-CL and 9800-L do not have a hardware dataplane forwarding chip, unlike the 9800-40 and 9800-80. Therefore the dataplane is emulated by a software process (that runs on the CPU).

A particularity of this software emulated dataplane is that the dataplane process is nearly always using a CPU core at 100%, because its only job is to constantly poll the network interface to see if a packet has arrived, even when there is little to no network traffic.

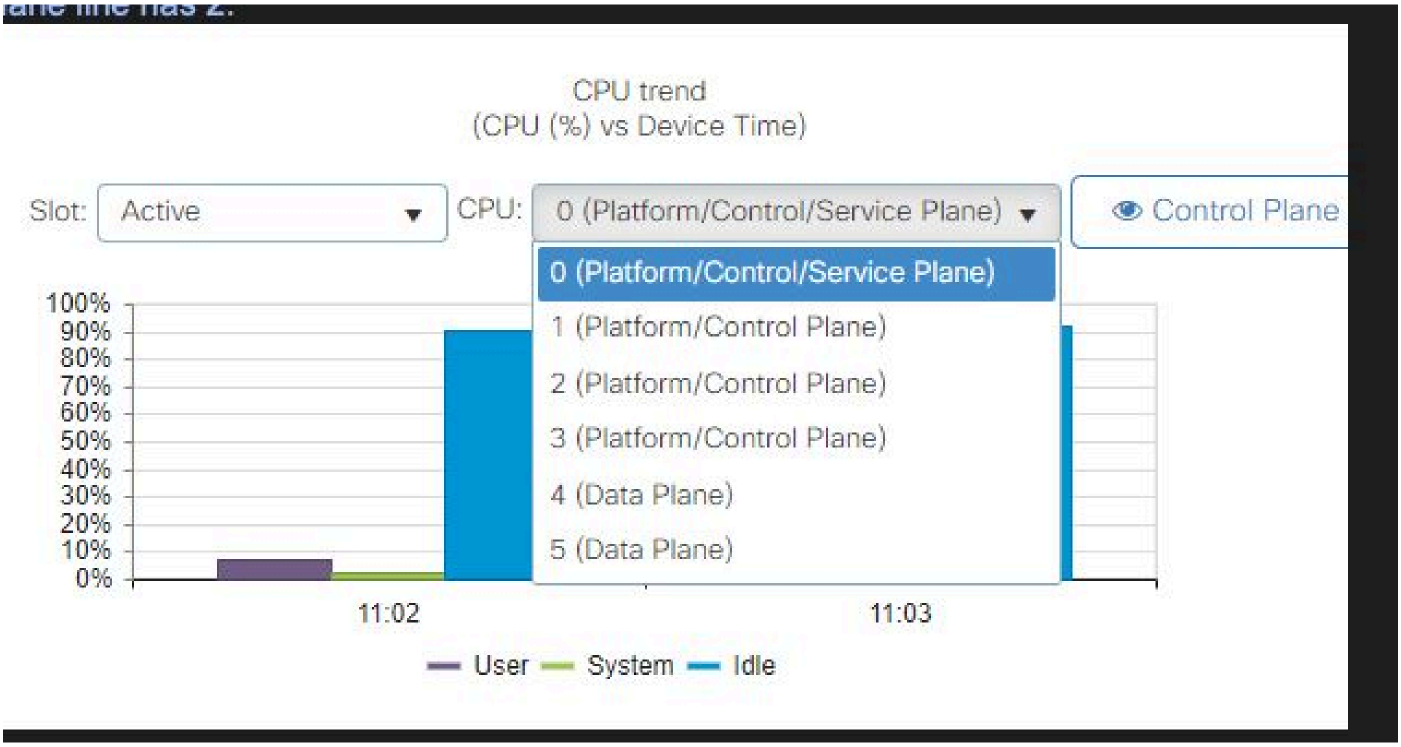
Symptoms

The Catalyst 9800 can sometimes display a high CPU utilization on given CPU cores. It is very important to identify if it is really a high CPU software problem or a dataplane symptom you can ignore.

The 9800 web UI homepage has a CPU trend widget which shows you the utilization of each CPU core. That widget also shows you what the CPU core is dedicated to.

In this example, you can see a 9800-CL medium OVA (not high throughput) deployed which has 4 control plane core and 2 data planes cores.

In this case, if core 4 and 5 show high utilization, you can ignore it.



Slot: Active

CPU: 0 (Platform/Control/Service Plane)

CPU utilization widget on 9800 web UI

In the CLI, the command **show platform software cpu alloc** shows you the role assigned to each CPU core (as shown in the previous web UI widget).

The command **show process cpu platform sorted** shows you the CPU utilization of each core and the top processes.

The process **ucode_pkt_PPE0** is the software process which emulates the dataplane and therefore that process can be ignored from the list of processes that contribute to CPU utilization.

The 9800-L assigns statically the last 5 CPU cores to the dataplane. It is typically only core 7 which shows a high utilization (and it is expected) due to the **ucode_pkt_PPE0** process that runs on it.

Here is an example of a small 9800-CL OVA where core 2 and 3 are dedicated to the dataplane.

The process **ucode_pkt_PPE0** shows very high utilization but this is normal and expected even when little network traffic is taking place.

```
myc9800-CL#show processes cpu platform sorted
CPU utilization for five seconds:  4%, one minute:  5%, five minutes:  6%
Core 0: CPU utilization for five seconds:  2%, one minute:  2%, five minutes:  1%
Core 1: CPU utilization for five seconds:  2%, one minute:  2%, five minutes:  2%
Core 2: CPU utilization for five seconds:  2%, one minute:  1%, five minutes:  2%
Core 3: CPU utilization for five seconds: 99%, one minute: 99%, five minutes: 99%
   Pid    PPid    5Sec    1Min    5Min  Status        Size  Name
--------------------------------------------------------------------------------
 20268   19784     99%     99%     99%  S           271872  ucode_pkt_PPE0
 28292    8568      1%      1%      1%  S          1087088  linux_iosd-imag
 19801   19314      1%      1%      1%  S           250064  fman_fp_image
 32539   32538      0%      0%      0%  S             1692  inet_gethost
 32538   31946      0%      0%      0%  S              364  inet_gethost
 32507   29493      0%      0%      0%  S             5592  confd-startup.s
```

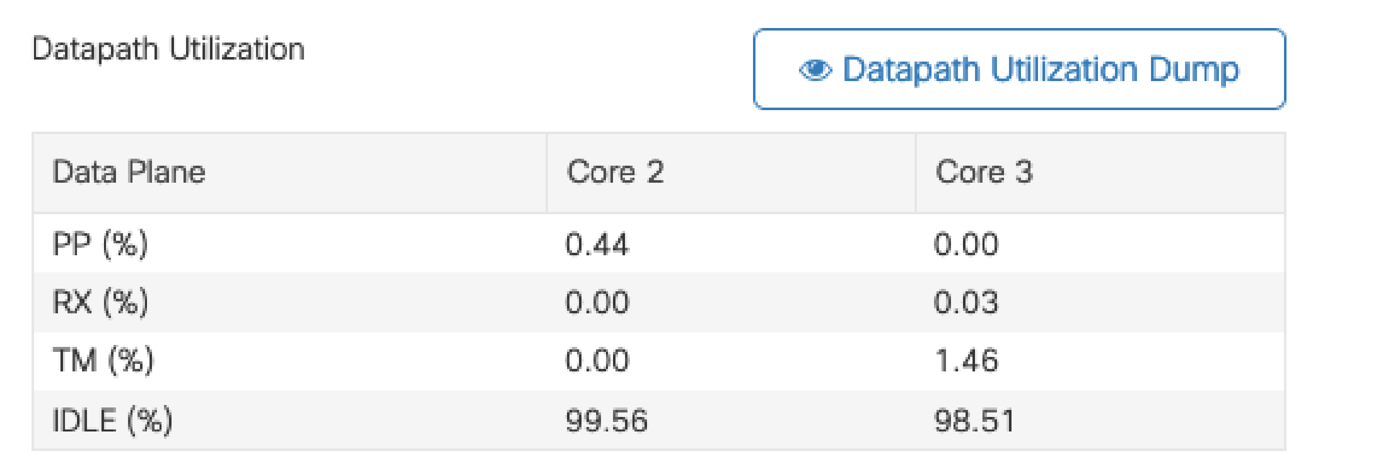
How to verify the dataplane utilization

You possibly wonder how to verify if the Catalyst 9800 is overwhelmed with network traffic if the dataplane CPU utilization is always high. There are specific widgets and CLI commands for this.

In the Web UI, go to Monitor->System->CPU utilization. On the right you have Datapath utilization.

The most important metric is **PP** in the form of a percentage. In this example, the datapath is 99.56% idle and is therefore logically 0.44% busy with the process of network packets, which is very low.

PP stands for Packet Processed, RX depicts time spent receiving traffic and TM time spent transmitting traffic. Idle is basically the opposite of PP (100% - PP), that is the time the dataplane spends waiting for something to do.



Data Plane	Core 2	Core 3
PP (%)	0.44	0.00
RX (%)	0.00	0.03
TM (%)	0.00	1.46
IDLE (%)	99.56	98.51

Datapath utilization

The equivalent CLI command of this dashboard is :

```
show platform hardware chassis active qfp datapath utilization sum
```