

Monitor ASR1000 CPU through SNMP Utility

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Introduction

This document describes how to monitor Aggregation Services Router 1000 (ASR 1000) CPU through the Simple Network Management Protocol (SNMP) utility.

Prerequisites

Requirements

Cisco recommends that you have knowledge of the SNMP Configuration.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco IOS® XE
- ASR1000
- SNMP

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.

Background Information

There are various ways and commands available to monitor ASR1000 CPU and it becomes very much important to monitor it all the time. SNMP is one of the utilities to monitor the CPU of ASR1000 systems. You can find various show commands output and SNMP walk results In this article.

Problem: How to Correlate the show Commands Output with the SNMP Results to Monitor ASR1000 CPU?

In this document, you can see how to monitor the CPU of different modules such as Route Processor (RP), Extended Services Processor (ESP), and SPA Interface Processor (SIP) that reside on the ASR1000 router.

Solution

There are two types of CPU to monitor:

1. Control Plane CPU - Available on RP, ESP, and SIP.
2. Data Plane CPU - Available on Quantum Flow Processor (QFP) (resides on ESP)

List of show Commands to Monitor ASR1000 CPU

Control Plane CPU:

- **show proc cpu sorted | ex 0.00**
- **show processes cpu platform sorted**
- **show platform software status control-processor brief**
- **show process cpu platform location <R0/F0/0>**

Data Plane CPU:

- **show platform hardware qfp active datapath utilization**

Correlate SNMP OIDs with show Commands

When you use **show proc cpu sorted | ex 0.00**, the output generated is this:

```
ASR1002#show proc cpu sorted | ex 0.00 CPU utilization for five seconds: 51%/0%; one minute:
44%; five minutes: 25% PID Runtime(ms) Invoked uSecs 5Sec 1Min 5Min TTY Process 274 140997 2976
47378 50.55% 32.66% 17.41% 0 IP RIB Update 124 147354 10279 14335 0.64% 0.07% 0.01% 0 Per-minute
Jobs 411 191924 4812122 39 0.08% 0.03% 0.05% 0 MMA DB TIMER This command only shows processes
inside the IOS daemon. Please use 'show processes cpu platform sorted' to show processes from
the underlying operating system. LAPTOP ~ % snmpwalk -v2c -c cisco 10.197.219.243
1.3.6.1.4.1.9.2.1.56 snmpwalk -v2c -c cisco 10.197.219.243 1.3.6.1.4.1.9.2.1.57 snmpwalk -v2c -c
cisco 10.197.219.243 1.3.6.1.4.1.9.2.1.58 SNMPv2-SMI::enterprises.9.2.1.56.0 = INTEGER: 51
SNMPv2-SMI::enterprises.9.2.1.57.0 = INTEGER: 44 SNMPv2-SMI::enterprises.9.2.1.58.0 = INTEGER:
25 LAPTOP ~ %
```

When you use **show processes cpu platform sorted**, the output generated is this:

```
ASR1006#show processes cpu platform sorted CPU utilization for five seconds: 51%, one minute:
12%, five minutes: 6% Core 0: CPU utilization for five seconds: 59%, one minute: 17%, five
minutes: 7% Pid PPid 5Sec 1Min 5Min Status Size Name -----
----- 6843 5579 53% 9% 1% S 159371264 smand 3139 1688 3% 2% 1% R
49434624 hman ASR1006# LAPTOP ~ % snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.3.7 snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.4.7 snmpwalk -v2c -c cisco 10.197.219.245
```

```
1.3.6.1.4.1.9.9.109.1.1.1.1.5.7 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.3.7 = Gauge32: 51
SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.4.7 = Gauge32: 12 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.5.7 = Gauge32: 6 LAPTOP ~ %
```

When you use **show platform software status control-processor brief**, the output generated is this:

```
ASR1006#show platform software status control-processor brief | sec Load Load Average Slot
Status 1-Min 5-Min 15-Min RP0 Healthy 0.49 0.26 0.09 ESP0 Healthy 0.17 0.08 0.18 SIP0 Healthy
0.00 0.00 0.00 ASR1006-1# LAPTOP ~ % snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.24 snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.25 snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.26 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.24.1 = Gauge32: 0 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.24.7 = Gauge32: 49 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.24.9
= Gauge32: 17 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.25.1 = Gauge32: 0 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.25.7 = Gauge32: 26 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.25.9
= Gauge32: 8 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.26.1 = Gauge32: 0 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.26.7 = Gauge32: 9 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.26.9
= Gauge32: 18 LAPTOP ~ %
```

Here, it fetches the output of SIP/RP/ESP CPU for 1 min, 5 min, and 15 min. The order is SIP, RP, and ESP.

When you use **show process cpu platform location <R0/F0/0>**, the output generated is this:

```
ASR1006#show process cpu platform location R0 CPU utilization for five seconds: 3%, one minute:
10%, five minutes: 7% Core 0: CPU utilization for five seconds: 3%, one minute: 10%, five
minutes: 7% Pid PPid 5Sec 1Min 5Min Status Size Name </snip> ASR1006#show process cpu platform
location F0 CPU utilization for five seconds: 21%, one minute: 22%, five minutes: 22% Core 0:
CPU utilization for five seconds: 21%, one minute: 21%, five minutes: 22% Pid PPid 5Sec 1Min
5Min Status Size Name </snip> ASR1006#show process cpu platform location 0 CPU utilization for
five seconds: 1%, one minute: 2%, five minutes: 1% Core 0: CPU utilization for five seconds: 1%,
one minute: 2%, five minutes: 1% Pid PPid 5Sec 1Min 5Min Status Size Name -----
----- 1 0 0% 0% 0% S 2203648 init 2 0 0% 0%
0% S 0 kthreadd </snip> LAPTOP ~ % snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.6 snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.7 snmpwalk -v2c -c cisco 10.197.219.245
1.3.6.1.4.1.9.9.109.1.1.1.1.8 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.6.1 = Gauge32: 1 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.6.7 = Gauge32: 3 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.6.9 =
Gauge32: 21 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.7.1 = Gauge32: 2 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.7.7 = Gauge32: 10 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.7.9 =
Gauge32: 22 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.8.1 = Gauge32: 1 SNMPv2-
SMI::enterprises.9.9.109.1.1.1.1.8.7 = Gauge32: 7 SNMPv2-SMI::enterprises.9.9.109.1.1.1.1.8.9 =
Gauge32: 22 LAPTOP ~ %
```

Here, it gives the output in the order of SIP, RP, and ESP for 5 sec, 1 min, and 5 min. In Dual RP/ESP platforms, you can use the active RP/ESP. For example, if ESP1 is active then the command must be **show process cpu platform location F1**. You can use **show process cpu platform location <RP/FP> active** command also, but this is only for RP/ESP. For SIP, you have to specifically mention the location (slot).

When you use **show platform hardware qfp active datapath utilization**, the output generated is this:

```
ASR1002#show platform hardware qfp active datapath utilization CPP 0: Subdev 0 5 secs 1 min 5
min 60 min Input: Priority (pps) 7 6 6 6 (bps) 3936 3832 3840 3384 Non-Priority (pps) 28241
28259 28220 6047 (bps) 14459200 14468448 14448584 3095664 Total (pps) 28248 28265 28226 6053
(bps) 14463136 14472280 14452424 3099048 Output: Priority (pps) 1 1 1 0 (bps) 1040 1056 1064 408
Non-Priority (pps) 27894 28049 17309 3372 (bps) 8484592 8539056 5276496 1034552 Total (pps)
```

```

27895 28050 17310 3372 (bps) 8485632 8540112 5277560 1034960 Processing: Load (pct) 1 1 1 0
ASR1002# LAPTOP ~ % snmpwalk -v2c -c cisco 10.197.219.243 1.3.6.1.4.1.9.9.715.1.1.6.1.14 SNMPv2-
SMI::enterprises.9.9.715.1.1.6.1.14.9027.1 = Gauge32: 1 SNMPv2-
SMI::enterprises.9.9.715.1.1.6.1.14.9027.2 = Gauge32: 1 SNMPv2-
SMI::enterprises.9.9.715.1.1.6.1.14.9027.3 = Gauge32: 1 SNMPv2-
SMI::enterprises.9.9.715.1.1.6.1.14.9027.4 = Gauge32: 0 LAPTOP ~ %

```

In this output, if there are multiple Subdevs then it gives the average output of load.

Summary

Commands

show proc cpu sorted | ex 0.00

show processes cpu platform sorted

**show platform software status control-processor
brief**

show process cpu platform location <R0/F0/0>

**show platform hardware qfp active datapath
utilization**

SNMP OIDs

1.3.6.1.4.1.9.2.1.56

1.3.6.1.4.1.9.2.1.57

1.3.6.1.4.1.9.2.1.58

1.3.6.1.4.1.9.9.109.1.1.1.1.3.7

1.3.6.1.4.1.9.9.109.1.1.1.1.4.7

1.3.6.1.4.1.9.9.109.1.1.1.1.5.7

1.3.6.1.4.1.9.9.109.1.1.1.1.24

1.3.6.1.4.1.9.9.109.1.1.1.1.25

1.3.6.1.4.1.9.9.109.1.1.1.1.26

1.3.6.1.4.1.9.9.109.1.1.1.1.6

1.3.6.1.4.1.9.9.109.1.1.1.1.7

1.3.6.1.4.1.9.9.109.1.1.1.1.8

1.3.6.1.4.1.9.9.715.1.1.6.1.14