Hewlett Packard Enterprise

HPE aruba networking

AOS-CX 10.13 Update: Averaging Instantaneous system power-consumption

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Nov 8th, 2023

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Overview

Overview

Customer wants tools and data to track energy consumption of network infrastructure

To report accurate power consumption to central, switch must offer the average of the instantaneous power consumption with a polling period of 10 minutes.

Achieve higher sustainability, energy efficiency & optimized network

Overview

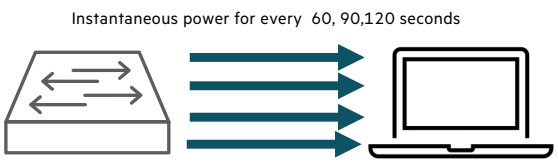
The power consumed average is calculated from the total power consumed as a running average over a period of time

- Available through CLI, REST API & SNMP

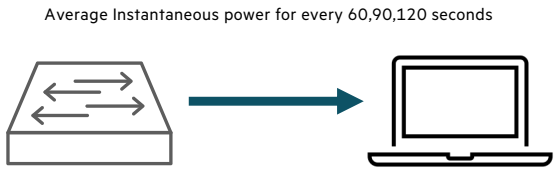
Capability to report :

- Total Average power consumption of Network Infrastructure
- **Before 10.13:** Instantaneous power is obtained, and average was manually calculated.
- **Starting from 10.13**; the switch computes averaging Instantaneous power with respect to time as entered by the user.

Multiple attempts and manual average output



Single CLI for averaging the Instantaneous power



Supported Platforms

PSU type	HW Power monitoring sensor	No power monitoring sensor
Modular / removable PSU	8100 8320 8325 8360v1/v2 8400 9300 10000 6400 6300M 6200M 4100i	None
Fixed PSU	6200F revB	6000 6100 6200F revA 6300F

Aruba AOS-CX Virtual Platform is not supported.

Use Cases

Use Cases

- Report total averaged power consumption of network infrastructure & Translate this power consumption into energy cost

- Total power consumption of Switch = Total power of the system (CPU+Mem+ASIC+Transceivers) + POE drawn power

- Report should be available for standalone fixed-port switch, chassis, VSF Stack, across CX switch portfolio, POE/ Non-POE switches

Details

Calculation time frame	Output power Vs Input Power	Power_IN = Power_OUT + power_loss_in_PSU
• The calculated average always pertains to the most-recent 10-minute time frame. • Even if the data is collected every 30 minutes the average reflects the last 10 minutes.	• The monitored instantaneous power and the average calculated is the power at the output of the power-supply. • It is not at the input of the PSU. So, it means that the energy loss, due to PSU efficiency not being 100%, is not considered.	• Average power monitoring specifically looks at Power_OUT and doesn't account for the power loss within the PSU.

Configuration

Configuration – Average Period

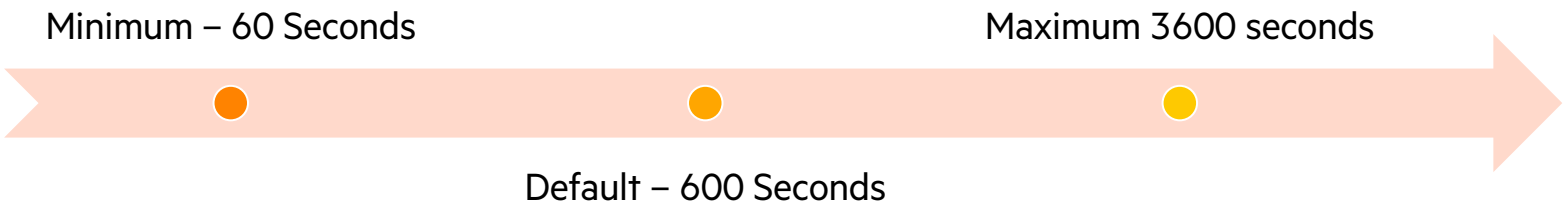
Data period timer should be programmable from 1 minute to 60 minutes

```
Bldg2-Acc-4100i# power consumption-average-period<60-3600>

Power Consumption Averaging Period : 400 seconds
Bldg2-Acc-4100i(config)# show environment power-consumption

Power Consumption Averaging Period : 400 seconds

                                    Instantaneous     Average
Name Description                        Power (W)   Power (W)
-----------------------------------------------------------------
1    4100i 24G CL4/6 POE 4SFP+ Switch      25.00       24.10
```



Monitoring of average instantaneous power using CLI

CLI – show environment power-consumption

```
Bldg2-Acc-4100i# show environment power-consumption


Power Consumption Averaging Period : 600 seconds


                                      Instantaneous     Average
Name Description                          Power (W)    Power (W)
-----------------------------------------------------------------
1    4100i 24G CL4/6 POE 4SFP+ Sw            25.00        24.34
```

This is the Consumed power

CLI – show environment power-supply

```
Bldg2-Acc-4100i# show environment power-supply
-------------------------------------------------------------------------------
         Product  Serial            PSU            Input   Voltage    Wattage
Mbr/PSU  Number   Number            Status         Type    Range      Maximum
-------------------------------------------------------------------------------
1/1      N/A      N/A               OK             AC      100V-240V  300
```

This is the maximum power that can be consumed

Monitoring of average instantaneous power using CLI

- **Using diagnostic CLI – diag show power-supply**

```
Bldg2-Acc-4100i# diag show power-supply
Subsystem: base
Maximum PSUs:                1
Minimum PSUs:                0
Power Maximum:               300 Watts
Power Instantaneous:         25 Watts
Power Correction Factor:     0 %
Power Instantaneous Average: 24 Watts
Power Instantaneous Period:  600 secs
Maximum PoE Power:       240 Watts
PoE Power configured:    No
Operational 54V status:  Good
Available PoE Power:     240 Watts


PSU: 1/1
Type:                  Aruba PSU
FRU EEPROM:            Absent
PSU CONTROLLER:        Absent
PoE Capable:           Capable
Product Name:          N/A
Serial Number:         N/A
Manufacturer Name:     Aruba
Revision Number:       N/A
Model Number:          N/A
Description:           Aruba 4000i POE Power Supply
Status:                ok
Present:               ok
Input Power:           ok
```

```
Output Power:          ok
Bit Status:           ok
MCU Status:           0
Comm Status:          ok
Power Maximum:        300 Watts
Power Correction:     0 Watts
Power Instantaneous:  25 Watts
Voltage Instantaneous:54.375 Volts
Current Instantaneous:0.470 Amps
Read Timestamp:       Tue Sep 19 16:50:12 PDT 2023
Last Read Uptime:     6377 s  524197 ms
Present Uptime:       46 s  144627 ms
Power OK Uptime:      46 s  144627 ms
PoE Power OK Uptime:  51 s  220449 ms
Fault Uptime:         0 s  000000 ms
Total Warning Counts: 0
Total Failure Counts: 0
```

Monitoring of average instantaneous power – For a Standalone Switch

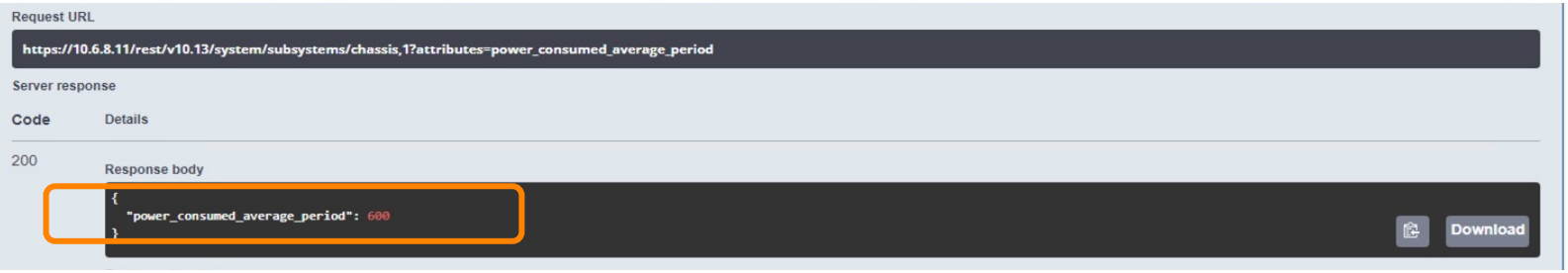
- **Using Rest API**

  Chassis – Power Global:

  https://a.b.c.d/rest/v10.13/system/subsystems/chassis,1?attributes=power_consumed_average

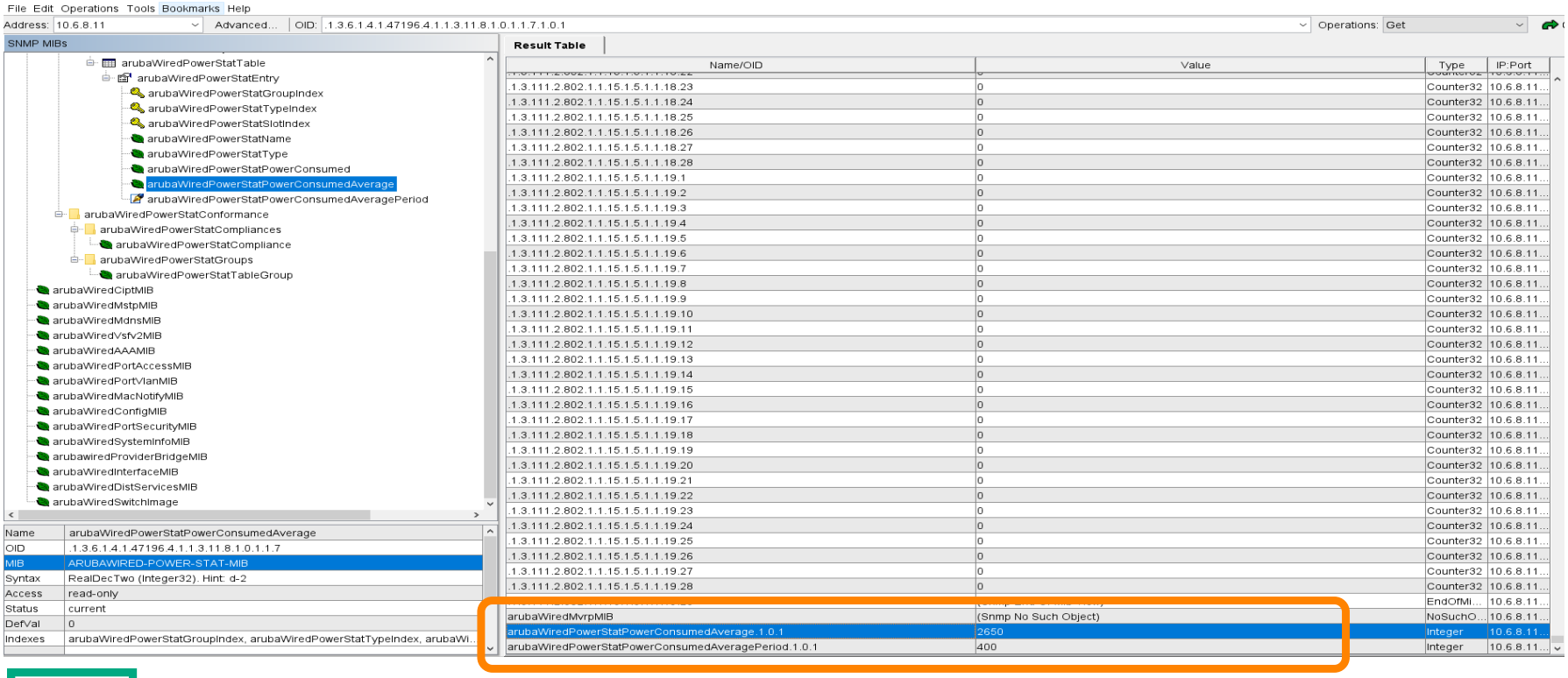
  Chassis - Average Period:

  https://a.b.c.d/rest/v10.13/system/subsystems/chassis,1?attributes=power_consumed_average_period



Monitoring of average instantaneous power – Using SNMP

O.I.D : 1.3.6.1.4.1.47196.4.1.1.3.11.8.1.0.1.1.7.1.0.1



Monitoring of Average power for a 6300 VSF stack using CLI

```
Bldg1-Acc-6300-VSF# show environment power-consumption


Power Consumption Averaging Period : 600 seconds


                                    Instantaneous     Average
Name Description                        Power (W)   Power (W)
-----------------------------------------------------------------
1    6300M 48G CL4 PoE 4SFP56 Swch          64.00       64.07
2    6300M 48SR5 CL8 PoE 2p50G 2p25        100.00      100.63


Total Power Consumption                    164.00
```

```
Bldg1-Acc-6300-VSF(config)# show environment power-consumption detail


Power Consumption Averaging Period : 600 seconds


                      Instantaneous     Average
Name Module Type          Power (W)   Power (W)
-----------------------------------------------
1    chassis total          101.00      101.50
2    chassis total           77.00       76.78
```

```
Bldg1-Acc-6300-VSF# # show environment power-consumption member 2


Power Consumption Averaging Period : 600 seconds


                     Instantaneous     Average
Name Module Type         Power (W)   Power (W)
-----------------------------------------------
2    chassis total           99.00      100.49
```

```
Bldg1-Acc-6300-VSF# show environment power-consumption member 5
VSF member 5 is not present in stack
```

Monitoring Averaging instantaneous power - 6405 Chassis

```
Bldg2-Acc-6405# show environment power-consumption


Power Consumption Averaging Period : 600 seconds


                                   Instantaneous     Average
Name Description                       Power (W)   Power (W)
-----------------------------------------------------------------
1    6405 Chassis                         177.00      176.84
```

```
Bldg2-Acc-6405#  show environment power-consumption detail


Power Consumption Averaging Period : 600 seconds


                     Instantaneous     Average
Name Module Type         Power (W)   Power (W)
-------------------------------------------------
1    chassis total          176.00      176.93
1/3    line                  54.00
1/1    management            18.00
1/2    management            19.00
       other                 85.00
```

Monitoring Averaging instantaneous power - 6200F

```
6200-VSF# show environment power-consumption
Power Consumption Averaging Period : 600 seconds

                                    Instantaneous     Average
Name Description                        Power (W)   Power (W)
----------------------------------------------------------------
1    6200F 48G CL4 4SFP 740W Swch           33.00       30.42
2    6200F 48G CL4 4SFP 740W Swch           30.00       29.30

Total Power Consumption                     63.00
```

```
6200-VSF# show system
Hostname                : 6200-VSF
System Description      : ML.10.13.0005H
Vendor                  : Aruba
Product Name            : S0M85A 6200F 48G CL4 4SFP 740W Swch
Chassis Serial Nbr      : CN3ZLMH021
Base MAC Address        : 38bd7a-c8b700
ArubaOS-CX Version      : ML.10.13.0005H
Time Zone               : US/Pacific
Up Time                 : 1 day, 23 minutes
CPU Util (%)            : 12
CPU Util (% avg 1 min)  : 10
CPU Util (% avg 5 min)  : 7
Memory Usage (%)        : 21
```

Power on Miglia (6200F RevB), which is the first fixed PSU SKU that can report power.

Best Practices

Best Practices

- Use this monitoring capability to assess the energy consumption and cost for the network organization and finances.
- Lots of NMS tools are capable of reporting energy cost.

Troubleshooting

Troubleshooting

4100i standalone

```
Bldg2-Acc-4100i# show events -d powerd
--------------------------------------------------
Event logs from current boot
--------------------------------------------------
2023-10-09T21:05:08.445566+00:00 4100i powerd[807]: Event|319|LOG_INFO|AMM|1/1|Power over Ethernet status is good
2023-10-09T21:05:13.615278+00:00 4100i powerd[807]: Event|301|LOG_INFO|AMM|1/1|PSU 1/1 changed state to OK
```

VSF 6300M Stack

```
Bldg1-Acc-6300-VSF# show events -d powerd
--------------------------------------------------
Event logs from current boot
--------------------------------------------------
2023-10-09T21:02:08.671502+00:00 6300 powerd[877]: Event|301|LOG_INFO|UKWN|1|PSU 1/2 changed state to Absent
2023-10-09T21:02:14.558473+00:00 6300 powerd[877]: Event|301|LOG_INFO|UKWN|1|PSU 1/1 changed state to OK
2023-10-09T14:05:08.804046-07:00 Bldg1-Acc-6300-VSF powerd[4531]: Event|301|LOG_INFO|UKWN|2|PSU 2/2 changed state to Absent
2023-10-09T14:05:08.804379-07:00 Bldg1-Acc-6300-VSF powerd[4531]: Event|301|LOG_INFO|UKWN|2|PSU 2/1 changed state to OK
```

Demo

Thank you

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