



RBFS Resource Monitoring (Resmon)

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Table of Contents

| | |
|---|----|
| 1. Introduction | 3 |
| 1.1. Supported Hardware | 4 |
| 1.2. Guidelines and Limitations | 4 |
| 2. Components of RBFS Optics Integration | 5 |
| 2.1. Resmond-agent | 5 |
| 2.2. Resmond | 6 |
| 2.2.1. Reading from optics | 6 |
| 2.2.2. Resmond Logging | 6 |
| 3. Configuration Commands | 8 |
| 3.1. Interface Level Commands | 8 |
| 3.1.1. resmon monitoring poll-interval | 8 |
| 3.1.2. high-power-class-enable | 8 |
| 3.1.3. tx-disable | 9 |
| 4. Show Commands | 10 |
| 4.1. show cpu summary | 10 |
| 4.2. show cpu usage | 10 |
| 4.3. show memory summary | 10 |
| 4.4. show memory usage | 11 |
| 4.5. show process usage summary | 11 |
| 4.6. show process usage process-name <process-name> | 11 |
| 4.7. show process usage process-id <pid> | 12 |
| 4.8. show sensor fan | 13 |
| 4.9. show sensor fan detail | 14 |
| 4.10. show sensor power-supply | 14 |
| 4.11. show sensor power-supply detail | 14 |
| 4.12. show sensor system-led | 15 |
| 4.13. show sensor system-led detail | 16 |
| 4.14. show sensor temperature | 16 |
| 4.15. show sensor temperature | 16 |
| 4.16. show optics inventory | 17 |
| 4.17. show optics interface <interface-name> | 17 |

1. Introduction

An optic transceiver sends and receives data between devices using fiber optic medium. The optics modules available in a network may not be available to Brick Data Store (BDS). The BDS might not be able to access the optics information directly on the network, and hence it relies on i2c tools to interact with optics modules.

The RBFS optics support functionality provides a mechanism to represent optics modules in BDS, and it comes with the following features.

- Supports the following optics modules:
 - SFP, SFP+, QSFP, QSFP+, QSFP28 (DAC are not supported)
- Provides a mechanism to discover and monitor optics modules
- Provides CLIs to write to optics modules
- Provides show commands to visualize optics inventory and status of each module
- Logs the status of the optics module

The RBFS implementation supports pluggable optics modules on whitebox switches only.

This document describes how you can integrate and monitor the optics modules into the resource monitoring daemon (*resmond*) on RBFS. This functionality leverages the Open Optics Monitoring (OOM) tool from OCP for reading from or writing to optics modules from different vendors.

The RBFS optics integration is decoupled into two components: *resmond-agent* and *resmond*.

- **resmond-agent**: This daemon runs inside a container, which is responsible for interacting with optics modules.
- **resmond**: This daemon is responsible for managing optics in BDS.

This *resmond* daemon performs the following tasks:

- Optics inventory accounting: Identifying the following details of a discovered optics module.
 - Port
 - Type
 - Vendor
 - Serial Number

- Part Number
- Read the following optics data from a module:
 - RX/TX alarming (loss of light and loss of signal)
 - RX/TX power status
 - Voltage and BIAS status
 - Temperature
- Write the optics data to an optics module
- Enabling high power class on QSFP28
- Shutdown lasers (QSFP28, SFP+ and SFP)

1.1. Supported Hardware

- Edgecore AS5916-XKS

1.2. Guidelines and Limitations

- The current RBFS optics integration does not support the following functionalities:
 - Interrupt-based optics notification
 - Alarms

2. Components of RBFS Optics Integration

The RBFS optics integration is decoupled into two components: resmond-agent and resmond.

2.1. Resmond-agent

The resmond-agent is a daemon, which interacts with an optics module through an OCP-based OOM package. The resmond-agent exposes REST APIs so that the external applications can interact with optical modules.

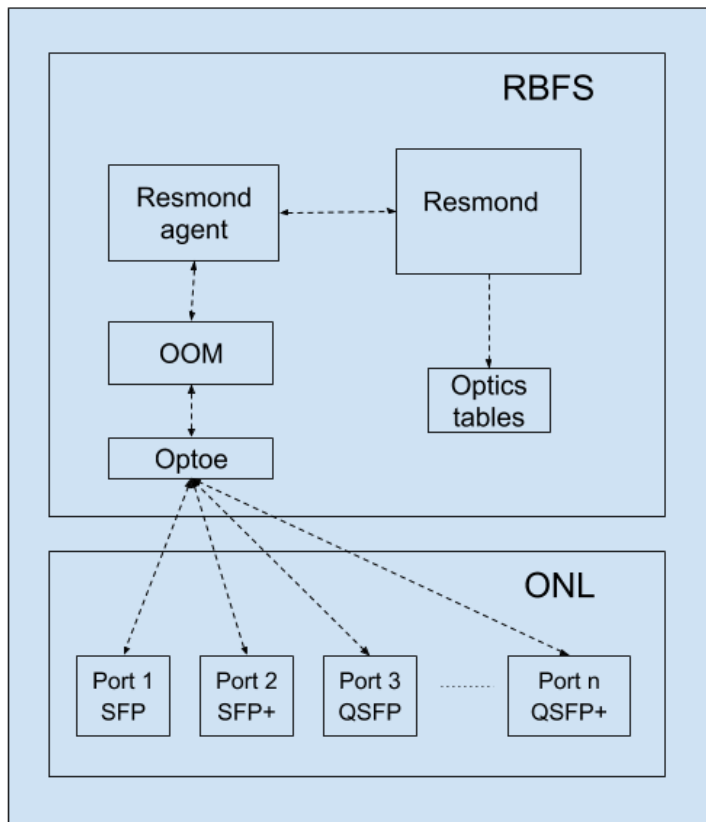


Figure 1. RBFS Optical Integration

The resmond-agent performs the following functions:

- Reads (Electrically Erasable Programmable Read-Only Memory) EEPROM data from the optics modules at specified intervals, and creates resmond optics BDS objects.
- Writes values to specified fields of optics module. The supported fields are:
 - TX_DISABLE: This field can be True or False
 - HIGH_POWER_CLASS_ENABLE: This field can be True or False
- Provides following URIs:

- `/resmond-agent/optics/get`: It collects optics module information available from all available ports
- `/resmond-agent/optics/set`: It sets value to the specified field of an optics module

2.2. Resmond

The resmond is a BD running inside the RtBrick container, which manages every optics module discovered by the resmond-agent. It polls hardware at specified interval to discover available optics modules.

2.2.1. Reading from optics

The resmond creates and maintains an inventory table and optics module table named `global.loc_0.resource.optics.inventory` and `global.loc_0.resource.optics.module` to keep information of each optics module. Objects corresponding to these tables are added by the resmond-agent.

The following optics modules are supported:

- SFP
- SFP+
- QSFP
- QSFP+
- QSFP28

Writing to optics

The resmond receives configuration related to the write operation. It sends REST query to resmond-agent (`/resmond-agent/optics/set` URI) to perform write operation to optics. The resmond receives set operation status code from the resmond-agent.

The following operations are supported:

- Enabling or disabling high-power class on the QSFP28 optics module
- Enabling or disabling lasers on optics module

2.2.2. Resmond Logging

The resmond can log the following events:

- Module temperature high alarm
- Module temperature high warning

- Module temperature low alarm
- Module temperature low warning
- Module voltage high alarm
- Module voltage high warning
- Module voltage low alarm
- Module voltage low warning
- Module lane power high alarm
- Module lane power high warning
- Module lane power low alarm
- Module lane power low warning
- Module lane bias high alarm
- Module lane bias high warning
- Module lane bias low alarm
- Module lane bias low warning

3. Configuration Commands

3.1. Interface Level Commands

- `resmon monitoring poll-interval`
- `high-power-class-enable`
- `tx-disable`

3.1.1. `resmon monitoring poll-interval`

This command sets the poll-interval for the resmond to discover optics.

Syntax

```
set poll-interval <poll_interval>
```

Command arguments

| | |
|-----------------|---|
| <poll_interval> | Specifies the interval (in milliseconds) at which optics should be polled. The interval can range from 1000 to 4294967295 milliseconds. The default interval is 5000. |
|-----------------|---|

Example

```
root@rtbrick: cfg> set poll-interval 15000
```

3.1.2. `high-power-class-enable`

This command enables or disables the high-power class of an optics module on a specific interface.

Syntax

```
set high-power-class-enable <false | true>
```

Command arguments

| | |
|----------------|--|
| <true false> | false - Disables high power class for optical module true - Enables high power class for optical module |
|----------------|--|

Example

```
root@rtbrick: cfg> set resmon optics interface ifp-0/0/53 high-power-class
enable
```

3.1.3. tx-disable

This command allows you to enable or disable lasers for an optical module.

Syntax

```
set tx-disable <false | true>
```

Command arguments

| | |
|----------------|--|
| <true false> | false - Enables lasers for optical module true - Disables lasers for optical module |
|----------------|--|

Example

```
root@rtbrick: cfg> set resmon optics interface ifp-0/0/53 tx enable
```

4. Show Commands

4.1. show cpu summary

This command CPU summary information.

```

supervisor@rta: op> show cpu summary
CPU_0
Vendor      : GenuineIntel
Model      : Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz
Architecture : x86_64
Serial No   : EA 06 08 00 FF FB EB BF
Clock(MHz) : 2899.983
BogoMIPS    : 3600.00
Physical cores : 4
Logical cores : 8
Endian      : True
Cache alignment : 64 Bytes
L1 data cache : 32768 Bytes
L1 instruction cache : 32768 Bytes
L2 unified cache : 262144 Bytes
L3 unified cache : 6291456 Bytes
L4 unified cache : 0 Bytes
supervisor@rta: op>

```

4.2. show cpu usage

This command displays the CPU usage information.

```

supervisor@rta: op> show cpu usage
Name      Total      User      Sys      Nice      I/O Wait      Idle      IRQ      Soft      IRQ
cpu       51%        40%       10%       0%        0%            48%       0%       0%
cpu0      27%        15%       11%       0%        0%            72%       0%       0%
cpu1      100%       93%        6%        0%        0%            0%        0%       0%
cpu2      36%        22%       13%       0%        0%            63%       0%       0%
cpu3      100%       100%      0%        0%        0%            0%        0%       0%
cpu4      42%        23%       19%       0%        0%            57%       0%       0%
cpu5      42%        27%       15%       0%        0%            57%       0%       0%
cpu6      35%        22%       12%       0%        0%            64%       0%       0%
cpu7      25%        17%        7%        0%        0%            75%       0%       0%
supervisor@rta: op>

```

4.3. show memory summary

This command displays the memory summary information.

```

supervisor@rta: op> show memory summary
System Memory
Maximum capacity      : 32 GB
Error correction type : None
Number of memory slots available : 2
Number of memory slots occupied : 2
Bank      Size      Location      Type      Speed      Configured Speed      Vendor      Serial No      Part No
BANK 0    8192 MB    ChannelA-DIMM0  DDR4      2400 MT/s    2400 MT/s    SK Hynix    2D83C347    HMA81G56AFR8N-UH
BANK 2    8192 MB    ChannelB-DIMM0  DDR4      2400 MT/s    2400 MT/s    859B       E2404AB8    CB8GS2400.C8ET
supervisor@rta: op>

```

4.4. show memory usage

This command displays the memory usage information.

```

supervisor@rta: op> show memory usage
Name      Total      Used      Free      Shared      Buffers      Cached
RAM       16.44 GB   15.8 GB   640.85 MB 693.64 MB  489.78 MB  490.77 MB
SWAP      2.15 GB   1.6 GB   545.29 MB n/a         n/a         n/a
supervisor@rta: op>

```

4.5. show process usage summary

This command displays the process usage summary information.

```

supervisor@rta: op> show process usage summary
Name      PID      VIRT      Resident Memory  Sharable Memory  CPU Percentage  Memory Percentage  CPU Affinity
bgp.appd.1  118     385.27 MB  104.67 MB        29.73 MB         0.0            0.64              0-7
bgp.iod.1   77      544.86 MB  108.49 MB        30.6 MB          12.6           0.66              0-7
confd      156     0 bytes    0 bytes          n/a              0.0            0.0               0-7
etcd       109     564.29 MB  115.95 MB        29.37 MB         0.0            0.71              0-7
f1bd      5492    9.88 GB   305.76 MB        71.39 MB         5.29           1.86              5
ifnd       85      461.63 MB  113.34 MB        29.4 MB           56.84          0.69              0-7
igmp.appd.1 141     369.55 MB  97.78 MB         29.44 MB          9.77           0.59              0-7
igmp.iod.1  134     411.83 MB  111.74 MB        29.51 MB         12.01          0.68              0-7
l2tpd.1    136     344.16 MB  86.14 MB         29.37 MB          1.83           0.52              0-7
lldpd     130     365.61 MB  88.89 MB         29.41 MB          0.0            0.54              0-7
mribd     101     402.42 MB  101.64 MB        29.5 MB           0.0            0.62              0-7
pin.appd.1  99      357.18 MB  92.57 MB         29.5 MB           0.41           0.56              0-7
pin.iod.1   74      409.99 MB  108.96 MB        29.55 MB         11.58          0.66              0-7
policy_server 105     369.42 MB  100.9 MB         29.55 MB          0.0            0.61              0-7
pooldd    147     343.1 MB   84.19 MB         29.41 MB          0.2            0.51              0-7
pppoed.1   70      357.94 MB  89.33 MB         29.37 MB         11.37          0.54              0-7
resmond   5356    353.52 MB  100.63 MB        31.56 MB          0.81           0.61              0-7
ribd      82      525.41 MB  107.52 MB        29.38 MB          11.16          0.65              0-7
staticd   72      355.74 MB  92.25 MB         29.37 MB         10.97          0.56              0-7
subscriberd.1 138     416.74 MB  92.13 MB         29.79 MB          1.83           0.56              0-7
supervisor@rta: op>

```

4.6. show process usage process-name <process-name>

This command displays the process usage for the specified process.

```
supervisor@rta: op> show process usage process-name fibd
Process Name: fibd
  PID                : 5492
  REST port          : 5522
  Debug port         : 5521
  Allowed CPU list   : 5
  CPU usage at user space : 3638
  CPU usage at kernel space : 3221
  CPU usage percentage : 7.050184
  Memory usage percentage : 1.859405
  Peak virtual memory usage : 9646312
  Current virtual memory usage : 9.88 GB
  Locked virtual memory : 33.55 MB
  RSS virtual memory : 305.76 MB
  Size of data segment : 805.8 MB
  Size of stack : 135.17 KB
  Size of text segment : 8.19 KB
  Shared library memory usage : 71.39 MB
  Swap space used : n/a
  Peak RSS : 308.9 MB
  Page table entry : 1.45 MB
  Process state : ACTIVE
Module Status:
  bd : Active
  bds : Active
  lwip : Active
supervisor@rta: op> □
```

4.7. show process usage process-id <pid>

This command displays the process usage for the specified process ID.

```
supervisor@rta: op> show process usage process-id 5492
Process Name: fibd
  PID                : 5492
  REST port          : 5522
  Debug port         : 5521
  Allowed CPU list   : 5
  CPU usage at user space : 3736
  CPU usage at kernel space : 3357
  CPU usage percentage : 7.414830
  Memory usage percentage : 1.859405
  Peak virtual memory usage : 9646312
  Current virtual memory usage : 9.88 GB
  Locked virtual memory : 33.55 MB
  RSS virtual memory : 305.76 MB
  Size of data segment : 805.8 MB
  Size of stack : 135.17 KB
  Size of text segment : 8.19 KB
  Shared library memory usage : 71.39 MB
  Swap space used : n/a
  Peak RSS : 308.9 MB
  Page table entry : 1.45 MB
  Process state : ACTIVE
Module Status:
  bd : Active
  bds : Active
  lwip : Active
supervisor@rta: op>
```

4.8. show sensor fan

This command displays the sensor fan information such as fan speed and status.

```
supervisor@rta: op> show sensor fan
Name                Fan Speed (rpm)      Status
PSU 1 - Fan 1       5800                 PRESENT, F2B
Chassis Fan - 1     8200                 PRESENT, F2B
Chassis Fan - 2     8300                 PRESENT, F2B
Chassis Fan - 3     8300                 PRESENT, F2B
Chassis Fan - 4     8300                 PRESENT, F2B
Chassis Fan - 5     8100                 PRESENT, F2B
Chassis Fan - 6     8200                 PRESENT, F2B
supervisor@rta: op>
```

4.9. show sensor fan detail

This command displays the sensor fan details.

```
supervisor@rta: op> show sensor fan detail

PSU 1 - Fan 1
  Sensor resource ID   : 8388614
  Vendor               : n/a
  Model                : NULL
  Serial No            : n/a
  Status               : PRESENT, F2B
  Status code          : 9
  Fan speed            : 5800 rpm
  Location              : PSU 1

Chassis Fan - 1
  Sensor resource ID   : 8388608
  Vendor               : ALTERA
  Model                : 5M1270ZF256C5N
  Serial No            : n/a
  Status               : PRESENT, F2B
  Status code          : 9
  Fan speed            : 8200 rpm
  Location              : Fan Board
```

4.10. show sensor power-supply

This command displays the sensor power supply information.

```
supervisor@rta: op> show sensor power-supply
```

| Name | Current In | Current Out | Voltage In | Voltage Out | Power In | Power Out | Status |
|-------|------------|-------------|------------|-------------|----------|-----------|--------------------|
| PSU-1 | 0 mA | 12031 mA | 0 mV | 11968 mV | 0 mW | 144000 mW | PRESENT |
| PSU-2 | 0 mA | 0 mA | 0 mV | 0 mV | 0 mW | 0 mW | PRESENT, UNPLUGGED |

4.11. show sensor power-supply detail

This command displays detailed information about the sensor power supply.

```
supervisor@rta: op> show sensor power-supply detail
```

PSU-1

```
Sensor resource ID : 16777216
Vendor              : n/a
Model               : YM-2651Y
Serial No          : n/a
Status              : PRESENT
Status code         : 1
Input current       : 0 mA
Output current      : 12031 mA
Input voltage       : 0 mV
Output voltage      : 11968 mV
Input power         : 0 mW
Output power        : 144000 mW
Location           : n/a
```

PSU-2

```
Sensor resource ID : 16777217
Vendor              : n/a
Model               : NULL
Serial No          : n/a
Status              : PRESENT, UNPLUGGED
Status code         : 5
Input current       : 0 mA
Output current      : 0 mA
Input voltage       : 0 mV
Output voltage      : 0 mV
Input power         : 0 mW
Output power        : 0 mW
Location           : n/a
```

4.12. show sensor system-led

This command displays system LED information.

```
supervisor@rta: op> show sensor system-led
Name                LED Mode      Status
-----
Chassis LED 1 (LOC LED)  OFF          PRESENT
Chassis LED 5 (FAN LED)  AUTO         PRESENT, ON
Chassis LED 2 (DIAG LED) OFF          PRESENT
Chassis LED 3 (PSU1 LED) AUTO         PRESENT, ON
Chassis LED 4 (PSU2 LED) AUTO         PRESENT, ON
supervisor@rta: op> █
```


4.13. show sensor system-led detail

This command displays detailed information about the system LED.

```
supervisor@rta: op> show sensor system-led detail

Chassis LED 1 (LOC LED)
  Sensor resource ID : 12582912
  LED mode           : OFF
  Status             : PRESENT
  Status code        : 1
  Capability          : ON_OFF, ORANGE
  Capability code     : 4097
Chassis LED 5 (FAN LED)
  Sensor resource ID : 12582916
  LED mode           : AUTO
  Status             : PRESENT, ON
  Status code        : 5
  Capability          : ON_OFF, AUTO
  Capability code     : 4194305
```

4.14. show sensor temperature

This command displays the sensor temperature information.

```
supervisor@rta: op> show sensor temperature
Name                Temperature      Status
CPU Core            59 °C          PRESENT
LM75-1-48           49 °C          PRESENT
LM75-2-49           33 °C          PRESENT
LM75-3-4A           34 °C          PRESENT
LM75-3-4B           31 °C          PRESENT
PSU-1 Thermal Sensor 1 32 °C          PRESENT
supervisor@rta: op> 
```

4.15. show sensor temperature

This command displays detailed information about the sensor temperature.

```
supervisor@rta: op> show sensor temperature detail
```

CPU Core

```
Sensor resource ID : 20971520
Vendor              : n/a
Model               : n/a
Serial No           : n/a
Status              : PRESENT
Status code         : 1
Temperature         : 59 m°C
Location            : CPU Core
Temperature threshold error : 55000 m°C
Temperature threshold warning : 45000 m°C
Temperature threshold shutdown : 60000 m°C
```

LM75-1-48

```
Sensor resource ID : 20971521
Vendor              : NXP
Model               : SOT96-1
Serial No           : n/a
Status              : PRESENT
Status code         : 1
Temperature         : 49 m°C
Location            : Main Board
Temperature threshold error : 55000 m°C
Temperature threshold warning : 45000 m°C
Temperature threshold shutdown : 60000 m°C
```

4.16. show optics inventory

This command displays optics inventory information.

```
supervisor@rta: op> show optics inventory
```

| Interface | Type | Connector Type | Vendor | Part Number | Serial Number | Power Class | Power State |
|------------|--------|------------------------|------------|-----------------|---------------|----------------|-------------|
| ifp-0/0/39 | SFP | Lucent Connector | FS | SFP-10GLR-31 | F1908006947 | Class 1 (1.5W) | LOW |
| ifp-0/0/43 | SFP | Lucent Connector | FS | SFP-10GSR-85 | F1930007471 | Class 1 (1.5W) | LOW |
| ifp-0/0/52 | QSFP28 | No Seperable connector | Fiberstore | QSFP28-100G-DAC | F1800032216-1 | Class 1 (1.5W) | LOW |
| ifp-0/0/53 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| ifp-0/0/54 | QSFP28 | No Seperable connector | Fiberstore | QSFP28-100G-DAC | I2706060007 | Class 1 (1.5W) | LOW |

```
supervisor@rta: op>
```

4.17. show optics interface <interface-name>

This command displays optics information for the specified interface.

```

supervisor@rta: op> show optics interface ifp-0/0/54
Physical Interface: ifp-0/0/54
Lane Id : 1
Laser bias current : 0.0 mA
Laser tx power : 0.0 mW / -30 dbm
Laser rx power : 0.0 mW / 0.0 dbm
Module temperature : n/a
Module voltage : n/a
Tx disable : False
High power class enable : True
Laser Tx loss of signal : True
Laser Tx loss of lock : True
Laser Rx loss of signal : True
Laser Rx loss of lock : True
Laser bias current high alarm : False
Laser bias current high warning : False
Laser bias current low alarm : False
Laser bias current low warning : False
Module voltage high alarm : n/a
Module voltage high warning : n/a
Module voltage low alarm : n/a
Module voltage low warning : n/a
Module temperature high alarm : True
Module temperature high warning : True
Module temperature low alarm : True
Module temperature low warning : True
Laser tx power high alarm : True
Laser tx power high warning : True
Laser tx power low alarm : True
Laser tx power low warning : True
Laser rx power high alarm : True
Laser rx power high warning : True
Laser rx power low alarm : True
Laser rx power low warning : True
Laser bias current high alarm threshold : 50.0 mA
Laser bias current high warning threshold : 50.0 mA
Laser bias current low alarm threshold : 50.0 mA
Laser bias current low warning threshold : 50.0 mA
Module voltage high alarm threshold : 6.0 V
Module voltage high warning threshold : 6.0 V
Module voltage low alarm threshold : 6.0 V
Module voltage low warning threshold : 6.0 V
Module temperature high alarm threshold : 25.123 °C
Module temperature high warning threshold : 25.667 °C
Module temperature low alarm threshold : 25.778 °C
Module temperature low warning threshold : 25.0 °C
Laser tx power high alarm threshold : 3.1 mW /4.914 dbm
Laser tx power high warning threshold : 3.1 mW /4.914 dbm
Laser tx power low alarm threshold : 3.1 mW /4.914 dbm
Laser tx power low warning threshold : 3.1 mW /4.914 dbm
Laser rx power high alarm threshold : 4.1 mW /6.128 dbm
Laser rx power high warning threshold : 4.1 mW /6.128 dbm
Laser rx power low alarm threshold : 4.1 mW /6.128 dbm
Laser rx power low warning threshold : 4.1 mW /6.128 dbm

```