Onboard Failure Logging

Onboard Failure Logging (OBFL) captures and stores hardware failure and environmental information into nonvolatile memory. OBFL permits improved accuracy in hardware troubleshooting and root cause isolation analysis. Stored OBFL data can be retrieved in the event of a router crash or failure.

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Finding Feature Information

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

Hardware Compatibility Matrix for the Cisco cBR Series Routers

Note The hardware components that are introduced in a given Cisco IOS-XE Release are supported in all subsequent releases unless otherwise specified.

Table 1: Hardware Compatibility Matrix for the Cisco cBR Series Routers

Cisco CMTS Platform	Processor Engine	Interface Cards
Cisco cBR-8 Converged Broadband Router	**Cisco IOS-XE Release 16.5.1 and Later Releases** Cisco cBR-8 Supervisor: • PID—CBR-SUP-250G • PID—CBR-CCAP-SUP-160G	**Cisco IOS-XE Release 16.5.1 and Later Releases** Cisco cBR-8 CCAP Line Cards: • PID—CBR-LC-8D30-16U30 • PID—CBR-LC-8D31-16U30 • PID—CBR-RF-PIC • PID—CBR-RF-PROT-PIC • PID—CBR-CCAP-LC-40G • PID—CBR-CCAP-LC-40G-R • PID—CBR-CCAP-LC-G2-R • PID—CBR-SUP-8X10G-PIC • PID—CBR-2X100G-PIC Digital PICs: • PID—CBR-DPIC-8X10G • PID—CBR-DPIC-2X100G Cisco cBR-8 Downstream PHY Module: • PID—CBR-D31-DS-MOD Cisco cBR-8 Upstream PHY Modules: • PID—CBR-D31-US-MOD

Note Do not use DPICs (8X10G and 2x100G) to forward IP traffic, as it may cause buffer exhaustion, leading to line card reload.

The only allowed traffic on a DPIC interface is DEPI, UEPI, and GCP traffic from the Cisco cBR-8 router to Remote PHY devices. Other traffic such as DHCP, SSH, and UTSC should flow via another router, since DPICs cannot be used for normal routing.

Understanding OBFL

OBFL provides a mechanism to store hardware, software, and environment related critical data in a non-volatile memory, such as flash EPROM or EEPROM on routers. The logging information is used by the TAC team to troubleshoot and fix hardware issues.

OBFL collects data like temperatures and voltages. It stores the data in a dedicated area of the flash memory of the router. This data is retrieved by TAC personnel to troubleshoot routers. It can also be analyzed by back-end software to detect failure patterns, and possibly to recommend specific quality improvements.

Retrieval of the OBFL message

If the hardware is defective and the system cannot boot up, any data in flash is inaccessible. In that case, use any one of the following methods to recover OBFL data:

- Read the flash through JTAG: this requires provisions in hardware design and back-end hardware and software support tools.
- Repair the system; boot it; use the OBFL CLI commands.

Configuring OBFL

Use the **hw-module** {**all**|**slot**|**module**} {*slotnumber*/*subslotnumber*|*modulenumber*} **logging onboard** {**disable** | **enable**} command to enable or disable OBFL on a specified hardware module.

Note OBFL is enabled by default.

```
Router# hw-module slot R0 logging onboard enable
```

Displaying OBFL Logging Information

Use the **show logging onboard** {**slot**|**module**|**bay**} {*slotnumber*/*subslotnumber*|*modulenumber*} {**dram** | **message** | **serdes** | **status** | **temperature** | **uptime** | **voltage** | **firmware**] command to view the OBFL log information.

Note OBFL is enabled by default on the Cisco cBR series router.

For the card PICs, use the **show logging onboard bay** *slotnumber*/*subslotnumber* {**dram** | **message** | **serdes** | **status** | **temperature** | **uptime** | **voltage**| **firmware**] command to view its OBFL information.

Clearing OBFL Logging

Use the **clear logging onboard** {**slot**|**module**|**bay**} {*slotnumber*/*subslotnumber*|*modulenumber*} {**dram** | **message** | **serdes** | **temperature** | **voltage**|**firmware**} command to clear OBFL logging.

The following example shows how to clear firmware version:

```
Router# clear logging onboard slot R0 firmware
```

```
Router# clear logging onboard bay 4/4 firmware
```

Following example shows how to clear DRAM ECC error log:

```
Router# clear logging onboard slot R0 dram
```

Following example shows how to clear OBFL error message:

```
Router# clear logging onboard slot R0 message
```

Following example shows how to clear onboard serdes log:

```
Router# clear logging onboard slot R0 serdes
```

Following example shows how to clear onboard temperature log:

```
Router# clear logging onboard slot R0 temperature
```

Following example shows how to clear onboard voltage log:

```
Router# clear logging onboard slot R0 voltage
```

Configuration and Verification Examples

Example—Verifying OBFL Configuration Status

```
Router#show logging onboard slot R1 status
Status: Enabled

Router#show logging onboard slot 5 status
Status: Disabled
```

Example—Displaying OBFL Logs

```
The following onboard failure logging example shows firmware version for SUP160:
Router# show logging onboard slot R0 firmware

slot   timestamp            firmware                      version
---------------------------------------------------------------------------------------------------

  0    01/16/18 09:36:38    CPLD                          16052011

  0    01/16/18 09:36:38    ViperSO CPLD                  14091201

  0    01/16/18 09:36:38    ViperSIO CPLD                 14092901

  0    01/16/18 09:36:39    Rommon                        16.6(1r)S
```

```
  0    01/16/18 09:36:39    SUP-DC CPLD                  ffffffff
  0    01/16/18 09:36:39    SUP PSOC 0                   v4.1.0_i2c1
  0    01/16/18 09:36:39    SUP PSOC 1                   v4.0.8_i2c1
  0    01/16/18 09:36:39    SUP PSOC 2                   v4.1.1_IVB
  0    01/16/18 09:36:39    SUP PSOC 3                   v4.0.6_i2c1
  0    01/16/18 09:36:39    SUP-DC PSOC 0                N/A
  0    01/16/18 09:36:39    SUP-DC PSOC 1                N/A
  0    01/16/18 09:36:39    SUP-PIC PSOC 0               V2.0.6
  0    01/16/18 09:36:39    SUP-PIC PSOC 1               V2.0.6
  0    01/16/18 09:36:39    Blackbird                    00000112
  0    01/16/18 09:38:12    Raptor ESI                   0001003b
```

The following onboard failure logging example shows firmware version for linecards:

```
Router# show logging onboard slot 3 firmware

slot   timestamp            firmware                     version
-------------------------------------------------------------------------------------------------------

  3    01/16/18 09:41:43    CPLD                         00000025
  3    01/16/18 09:41:43    Rommon                       2011.03.18
  3    01/16/18 09:41:43    Basestar                     00110022
  3    01/16/18 09:41:43    Raider                       02020018
  3    01/16/18 09:41:43    Caprica                      00000023
  3    01/16/18 09:41:43    HA-PLL                       N/A
  3    01/16/18 09:41:43    PSOC 0                       v4.6
  3    01/16/18 09:41:44    PSOC 1                       v4.6
  3    01/16/18 09:42:04    dsphy0_fpga                  2.f
  3    01/16/18 09:42:04    dsphy0_micro                 1.e
  3    01/16/18 09:42:04    dsphy0_psoc                  3.9
  3    01/16/18 09:42:04    dsphy0_cpld                  0.6
  3    01/16/18 09:42:04    dsphy1_fpga                  2.f
  3    01/16/18 09:42:04    dsphy1_micro                 1.e
  3    01/16/18 09:42:04    dsphy1_psoc                  3.9
  3    01/16/18 09:42:04    dsphy1_cpld                  0.6
```

The following onboard failure logging example shows firmware version for RF-PICs:

```
Router# show logging onboard bay 4/3 firmware

slot   timestamp            firmware                    version

-------------------------------------------------------------------------------
  3    01/16/18 09:39:21    RF-PIC Firmware             0000073e
```

The following onboard failure logging example shows firmware version for SUP160-PIC:

```
Router# show logging onboard bay 4/4 firmware

slot   timestamp            firmware                    version

-------------------------------------------------------------------------------
  4    01/16/18 09:40:20    SUP-PIC CPLD                14071504

  4    01/16/18 09:40:20    DTI Client FPGA             00000005

  4    01/16/18 09:40:20    DTI Firmware                00000a03

  4    01/16/18 09:40:20    Raptor MAC                  00010031

  4    01/16/18 09:40:20    Cortina PHY                 201402061607
```

The following onboard failure logging example shows firmware version for D-PIC:

```
Router# show logging onboard bay 4/8 firmware
slot   timestamp            firmware           version
-------------------------------------------------------------------------------------------
8    01/16/18 09:40:13    DPIC Firmware       00010001 (UBOOT:2015.7 FPGA:00fd0000 00010011)
```

The following onboard failure logging example shows the firmware versions that recently booted up:

```
Router# show logging onboard slot R0 firmware reverse

slot   timestamp            firmware                    version

-------------------------------------------------------------------------------
  0    01/16/18 09:38:12    Raptor ESI                  0001003b

  0    01/16/18 09:36:39    Blackbird                   00000112

  0    01/16/18 09:36:39    SUP-PIC PSOC 1              V2.0.6

  0    01/16/18 09:36:39    SUP-PIC PSOC 0              V2.0.6

  0    01/16/18 09:36:39    SUP-DC PSOC 1               N/A

  0    01/16/18 09:36:39    SUP-DC PSOC 0               N/A

  0    01/16/18 09:36:39    SUP PSOC 3                  v4.0.6_i2c1

  0    01/16/18 09:36:39    SUP PSOC 2                  v4.1.1_IVB

  0    01/16/18 09:36:39    SUP PSOC 1                  v4.0.8_i2c1
```

```
  0    01/16/18 09:36:39    SUP PSOC 0                    v4.1.0_i2c1

  0    01/16/18 09:36:39    SUP-DC CPLD                   ffffffff

  0    01/16/18 09:36:39    Rommon                        16.6(1r)S

  0    01/16/18 09:36:38    ViperSIO CPLD                 14092901

  0    01/16/18 09:36:38    ViperSO CPLD                  14091201

  0    01/16/18 09:36:38    CPLD                          16052011
```

The following onboard failure logging example shows the firmware versions that are logged in the backup log file. The backup log file is created when an existing log file reaches its maximum size of 1MB.

```
sj-104-cbr-13#show logging onboard bay 4/4 firmware backup

slot   timestamp            firmware                      version

-------------------------------------------------------------------------------
  4    01/16/18 09:40:20    SUP-PIC CPLD                  14071504

  4    01/16/18 09:40:20    DTI Client FPGA               00000005

  4    01/16/18 09:40:20    DTI Firmware                  00000a03

  4    01/16/18 09:40:20    Raptor MAC                    00010031

  4    01/16/18 09:40:20    Cortina PHY                   201402061607
…
  4    01/17/18 08:38:22    SUP-PIC CPLD                  14071504

  4    01/17/18 08:38:22    DTI Client FPGA               00000005

  4    01/17/18 08:38:22    DTI Firmware                  00000a03

  4    01/17/18 08:38:22    Raptor MAC                    00010031

  4    01/17/18 08:38:22    Cortina PHY                   201402061607
```

The following onboard failure logging example shows the firmware versions that were recently logged in the backup log file:

```
Router# show logging onboard bay 4/4 firmware backup reverse

slot   timestamp            firmware                      version

  4    01/17/18 08:38:22    Cortina PHY                   201402061607
  4    01/17/18 08:38:22    Raptor MAC                    00010031

  4    01/17/18 08:38:22    DTI Firmware                  00000a03

  4    01/17/18 08:38:22    DTI Client FPGA               00000005

  4    01/17/18 08:38:22    SUP-PIC CPLD                  14071504

  …
  4    01/16/18 09:40:20    Cortina PHY                   201402061607
  4    01/16/18 09:40:20    Raptor MAC                    00010031

  4    01/16/18 09:40:20    DTI Firmware                  00000a03
```

```
  4    01/16/18 09:40:20    DTI Client FPGA               00000005

  4    01/16/18 09:40:20    SUP-PIC CPLD                  14071504
```

```
Router#show logging onboard slot R1 message
timestamp            module    sev  message
------------------------------------------------------------------------------------------------------------------
01/01/12 12:00:23    SUP_PSOC  3    SUP MB PSOC alert interrupt

01/01/12 12:00:23    SUP_PSOC  3    SUP MB PSOC alert interrupt

01/01/12 12:00:23    SUP_PSOC  3    SUP MB PSOC alert interrupt

01/01/12 12:00:23    SUP_PSOC  3    SUP MB PSOC alert interrupt

01/01/12 12:01:15    SUP_PSOC  3    SUP MB PSOC alert interrupt
```

```
Router#show logging onboard slot R1 voltage
Name               Id    Data (mV)  Poll      Last Update
-----------------------------------------------------------------------
PSOC-MB2_20: VO    40         1791  1         01/01/12 17:03:03
PSOC-MB2_21: VO    41         3290  1         01/01/12 17:03:03
PSOC-MB2_22: VO    42         3293  1         01/01/12 17:03:03
PSOC-MB2_23: VO    43         3299  1         01/01/12 17:03:03
PSOC-MB2_24: VO    44         4958  1         01/01/12 17:03:03
PSOC-MB2_25: VO    45         4508  1         01/01/12 17:03:03
PSOC-MB3_0: VOU    46         4999  1         01/01/12 17:03:03
PSOC-MB3_1: VOU    47         4982  1         01/01/12 17:03:03
PSOC-MB3_2: VOU    48         1499  1         01/01/12 17:03:03
PSOC-MB3_3: VOU    49         1193  1         01/01/12 17:03:03
PSOC-MB3_4: VOU    50          708  1         01/01/12 17:03:03
PSOC-MB3_5: VOU    51          757  1         01/01/12 17:03:03
PSOC-MB3_6: VOU    52          585  1         01/01/12 17:03:03
PSOC-MB3_7: VOU    53         1501  1         01/01/12 17:03:03
```

```
Router#show logging onboard slot R1 temperature
Name               Id     Data (C)  Poll      Last Update
-----------------------------------------------------------------------
Temp: BB_DIE       159          25  1         01/02/12 23:04:19
Temp: VP_DIE       160          21  1         01/02/12 23:04:19
Temp: RT-E_DIE     161          29  1         01/02/12 23:04:19
Temp: INLET_1      162          20  1         01/02/12 23:04:19
Temp: INLET_2      163          18  1         01/02/12 23:04:19
Temp: OUTLET_1     164          22  1         01/02/12 23:04:19
Temp: 3882_1       165          44  1         01/02/12 23:04:19
Temp: 3882_1A      166          38  1         01/02/12 23:04:19
Temp: 3882_1B      167          36  1         01/02/12 23:04:19
Temp: 3882_2       168          38  1         01/02/12 23:04:19
Temp: 3882_2A      169          37  1         01/02/12 23:04:19
Temp: 3882_2B      170          35  1         01/02/12 23:04:19
Temp: 3882_3       171          38  1         01/02/12 23:04:19
```

```
Router#show logging onboard slot R1 uptime latest
 Slot              Reset reason  Power On
-------------------------------------------------------
    1      reset local software  01/02/12 23:02:46
```

```
Router#show logging onboard slot R1 uptime
 Slot              Reset reason  Power On
-------------------------------------------------------
    0      reset local software  01/06/12 01:52:26
    4      reset local software  01/06/12 01:52:42
    0      reset local software  01/06/12 01:52:45
    0      reset local software  01/06/12 02:20:27
    4      reset local software  01/06/12 02:20:43
    0      reset local software  01/06/12 02:20:46
    0      reset local software  01/06/12 05:12:02
    4      reset local software  01/06/12 05:12:19
    0      reset local software  01/06/12 05:12:22
    0      reset local software  01/06/12 05:17:31
    4      reset local software  01/06/12 05:17:48
    0      reset local software  01/06/12 05:17:51
    0            reset power on  01/01/12 08:56:44
    4            reset power on  01/01/12 08:57:00
```

```
Router# show logging onboard slot R1 uptime detail
-----------------------------------------------
UPTIME SUMMARY INFORMATION
-----------------------------------------------
First customer power on: 01/15/18 17:33:12
Number of resets: 6
Number of slot changes: 0
Last reset reason: power reset from RP
Current slot: 2
Current power on: 01/17/18 16:14:59

-----------------------------------------------
UPTIME CONTINUOUS INFORMATION
-----------------------------------------------
 Slot              Reset reason  Power On               Up: Years    Days  Hours   Mins
-------------------------------------------------------------------------------------
    2       power reset from RP  01/15/18 17:33:12             0       0      0       0
    2       power reset from RP  01/16/18 11:44:28             0       0     18       0
    2       power reset from RP  01/16/18 12:13:19             0       0      0      15
    2       power reset from RP  01/16/18 17:12:43             0       0      4       0
    2       power reset from RP  01/17/18 14:34:36             0       0     21       0
    2       power reset from RP  01/17/18 16:14:59             0       0      1       0
```

```
Router#show logging onboard bay 4/3 message
timestamp            module    sev  message

-------------------------------------------------------------------------------------------------------------

01/02/12 08:14:22    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1

01/02/12 08:20:42    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1

01/02/12 09:13:23    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1

01/02/12 09:42:33    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1

01/02/12 11:56:09    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1

01/02/12 12:27:23    RFSW-PIC  6    CAT1836E07Q:7.13:Initialize:3/1
```

```
Router#show logging onboard bay 5/3 message
timestamp            module    sev  message

------------------------------------------------------------------------------------------------------------------------

01/22/15 01:06:05    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1

01/22/15 01:19:01    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1

01/22/15 01:31:47    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1

01/22/15 01:44:38    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1

01/22/15 01:59:04    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1

01/22/15 02:12:07    RFSW-PIC  6    JAB092709EL:7.35:Init--stby:3/1
```

```
Router#show logging onboard bay 4/4 message
timestamp            module    sev  message

------------------------------------------------------------------------------------------------------------------------

01/01/12 10:01:44    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:1[04]

01/01/12 10:01:45    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:2[04]

01/01/12 10:01:46    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:3[04]

01/01/12 10:01:49    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:4[04]

01/01/12 10:01:50    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:5[04]

01/01/12 10:01:51    SUP-PIC   0    TEST1122334:0.130:PLL-LOS:6[04]
```

```
Router#show logging onboard bay 5/5 message
timestamp            module    sev  message

------------------------------------------------------------------------------------------------------------------------

01/03/12 13:52:55    SUP-PIC   0    TEST8877665:0.130:PLL-LOS:1[04]

01/03/12 13:52:56    SUP-PIC   0    TEST8877665:0.130:PLL-LOS:2[04]

01/03/12 13:52:57    SUP-PIC   0    TEST8877665:0.130:PLL-LOS:3[04]

01/03/12 13:53:00    SUP-PIC   0    TEST8877665:0.130:PLL-LOS:4[04]

01/03/12 13:53:01    SUP-PIC   0    TEST8877665:0.130:PLL-LOS:5[04]
```

Feature Information for Onboard Failure Logging

Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 2: Feature Information for Onboard Failure Logging

Feature Name	Releases	Feature Information
Onboard Failure Logging	Cisco IOS XE Everest 16.6.1	This feature was integrated into Cisco IOS XE Everest 16.6.1 on theCisco cBR Series Converged Broadband Routers.