

Environmental monitoring

Provides information about environmental monitoring sections and capabilities.

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Environmental monitoring

Environmental monitoring is a router system that monitors environmental conditions and responds to abnormal events.

- monitors temperature of CPUs and motherboard
- records abnormal events and generates notifications
- monitors Simple Network Management Protocol (SNMP) traps
- generates and collects Onboard Failure Logging (OBFL) data
- sends call home event notifications
- logs system error messages, and
- displays present settings and status.

Environmental monitoring and reporting functions

Environmental monitoring and reporting functions are system capabilities that allow you to maintain normal system operation by identifying and resolving adverse conditions prior to loss of operation.

Function types

The environmental monitoring and reporting functions include:

- Environmental monitoring functions, on page 2
- Environmental Reporting Functions, on page 3

Environmental monitoring functions

Environmental monitoring functions use sensors to monitor the temperature of the cooling air as it moves through the chassis.

Environmental operating conditions

The router is expected to meet the following environmental operating conditions

- Non-operating Temperature: -40°F to 158°F (-40°C to 70°C)
- Non-operating Humidity: 5 to 95% relative humidity (non-condensing)
- Operating Temperature:

  -40° to 140°F (-40° to 60°C) in a sealed NEMA cabinet with no airflow

  -40° to 158°F (-40° to 70°C) in a vented cabinet with 40 lfm of air

  -40° to 167°F (-40° to 75°C) in a forced air enclosure with 200 lfm of air
- Operating Humidity: 10% to 95% relative humidity (non-condensing)
- Operating Altitude: -500 to 5,000 feet. Derate max operating temperature 1.5°C per 1000 feet.

Status condition levels

The following table displays the levels of status conditions used by the environmental monitoring system.

Table 1: Levels of Status Conditions Used by the Environmental Monitoring System

Status Level	Description
Normal	All monitored parameters are within normal tolerance.
Warning	The system has exceeded a specified threshold. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
Critical	An out-of-tolerance temperature or voltage condition exists. Although the system continues to operate, it is approaching shutdown. Immediate operator action is required.

Temperature and voltage cxceed max or min thresholds

The environmental monitoring system sends system messages to the console, for example, when the conditions described here are met:

The following example shows the warning messages indicating the maximum and minimum thresholds of the temperature or voltage:

```
Warnings :
--------
For all the temperature sensors (name starting with "Temp:") above,
the critical warning threshold is 100C (100C and higher)
the warning threshold is 80C (range from 80C to 99C)
the low warning threshold is 1C (range from -inf to 1C).
```

```
For all voltage sensors (names starting with "V:"),
the high warning threshold starts at that voltage +10%. (voltage + 10% is warning)
the low warning threshold starts at the voltage -10%. (voltage - 10% is warning)
```

Environmental Reporting Functions

Provides a list of commands to monitor and report environmental status for the router.

The following commands are available to retrieve and display environmental status reports:

- **show diag all eeprom**
- **show environment**
- **show environment all**
- **show inventory**
- **show platform** and **show platform diag**
- **show platform software status control-processor**
- **show diag slot R0 eeprom detail**
- **show version** and **show power**
-

```
Router# show diag all eeprom
MIDPLANE EEPROM data:
Product Identifier (PID) : IR8140H-P-K9
Version Identifier (VID) : V00
PCB Serial Number : FDO24370MFT
Top Assy. Revision : 15
Hardware Revision : 0.1
Asset ID : P2
CLEI Code : UNASSIGNED
External PoE Module POE0 EEPROM data is not initialized
Internal PoE is not present
Slot R0 EEPROM data:
Product Identifier (PID) : IR8140H-P-K9
Version Identifier (VID) : V00
PCB Serial Number : FDO24370MFT
Top Assy. Revision : 15
Hardware Revision : 0.1
CLEI Code : UNASSIGNED
Slot F0 EEPROM data:
Product Identifier (PID) : IR8140H-P-K9
Version Identifier (VID) : V00
PCB Serial Number : FDO24370MFT
Top Assy. Revision : 15
Hardware Revision : 0.1
CLEI Code : UNASSIGNED
Slot 0 EEPROM data:
Product Identifier (PID) : IR8140H-P-K9
Version Identifier (VID) : V00
PCB Serial Number : FDO24370MFT
Top Assy. Revision : 15
Hardware Revision : 0.1
CLEI Code : UNASSIGNED
Slot 1 EEPROM data is not initialized
Slot 2 EEPROM data is not initialized
Slot 3 contains a BBU Unit.
```

```
Please use 'show platform hardware battery sprom [details]' to get EEPROM data.
Slot 4 contains a BBU Unit.
Please use 'show platform hardware battery sprom [details]' to get EEPROM data.
Slot 5 contains a BBU Unit.
Please use 'show platform hardware battery sprom [details]' to get EEPROM data.
SPA EEPROM data for subslot 0/0:
Product Identifier (PID) : IR8140H-2x1GE
Version Identifier (VID) : V01
PCB Serial Number :
Top Assy. Part Number : 68-2236-01
Top Assy. Revision : A0
Hardware Revision : 2.2
CLEI Code : CNUIAHSAAA
SPA EEPROM data for subslot 0/1:
Product Identifier (PID) : IRMH-WPAN-NA
Version Identifier (VID) : V00
PCB Serial Number : FDO24350D18
Top Assy. Revision : 07
Hardware Revision : 2.0
CLEI Code : UNASSIGNED
SPA EEPROM data for subslot 0/2:
Product Identifier (PID) : IRMH-LTEAP18-GL
Version Identifier (VID) : V00
PCB Serial Number : FDO24360MVH
Hardware Revision : 1.0
CLEI Code : N/A
SPA EEPROM data for subslot 0/3:
Product Identifier (PID) : IRMH-LTEA-EA
Version Identifier (VID) : V00
PCB Serial Number : FDO24360MU4
Hardware Revision : 1.0
CLEI Code :
SPA EEPROM data for subslot 0/4 is not available
SPA EEPROM data for subslot 0/5 is not available
SPA EEPROM data for subslot 0/6 is not available
SPA EEPROM data for subslot 1/0 is not available
SPA EEPROM data for subslot 1/1 is not available
SPA EEPROM data for subslot 1/2 is not available
SPA EEPROM data for subslot 1/3 is not available
SPA EEPROM data for subslot 1/4 is not available
SPA EEPROM data for subslot 1/5 is not available
SPA EEPROM data for subslot 1/6 is not available
SPA EEPROM data for subslot 2/0 is not available
SPA EEPROM data for subslot 2/1 is not available
SPA EEPROM data for subslot 2/2 is not available
SPA EEPROM data for subslot 2/3 is not available
SPA EEPROM data for subslot 2/4 is not available
SPA EEPROM data for subslot 2/5 is not available
SPA EEPROM data for subslot 2/6 is not available
SPA EEPROM data for subslot 3/0 is not available
SPA EEPROM data for subslot 3/1 is not available
SPA EEPROM data for subslot 3/2 is not available
SPA EEPROM data for subslot 3/3 is not available
SPA EEPROM data for subslot 3/4 is not available
SPA EEPROM data for subslot 3/5 is not available
SPA EEPROM data for subslot 3/6 is not available
SPA EEPROM data for subslot 4/0 is not available
SPA EEPROM data for subslot 4/1 is not available
SPA EEPROM data for subslot 4/2 is not available
SPA EEPROM data for subslot 4/3 is not available
SPA EEPROM data for subslot 4/4 is not available
SPA EEPROM data for subslot 4/5 is not available
SPA EEPROM data for subslot 4/6 is not available
SPA EEPROM data for subslot 5/0 is not available
```

```
SPA EEPROM data for subslot 5/1 is not available
SPA EEPROM data for subslot 5/2 is not available
SPA EEPROM data for subslot 5/3 is not available
SPA EEPROM data for subslot 5/4 is not available
SPA EEPROM data for subslot 5/5 is not available
SPA EEPROM data for subslot 5/6 is not available
Router#
```

```
Router# show environment
Number of Critical alarms: 0
Number of Major alarms: 0
Number of Minor alarms: 0
Slot Sensor Current State Reading Threshold(Minor,Major,Critical,Shutdown)
---------- -------------- --------------- ------------ ---------------------------------------
R0 Temp: LM75BXXX Normal 39 Celsius (80 ,85 ,90 ,na )(Celsius)
Router#
```

```
Router# show environment all
Sensor List: Environmental Monitoring
Sensor Location State Reading
Temp: LM75BXXX R0 Normal 48 Celsius
```

```
Router# show inventory
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
INFO: Please use "show license UDI" to get serial number for licensing.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
NAME: "Chassis", DESCR: "Cisco Catalyst IR8140H Heavy Duty Series Router with PoE"
PID: IR8140H-P-K9 , VID: V00 , SN: FDO2441J91D
NAME: "Power Supply Module 0", DESCR: "60W AC Power Supply module"
PID: IRMH-PWR60W-AC , VID: V01 , SN: LIT22503LDK
NAME: "module 0", DESCR: "Cisco Catalyst IR8140H-P-K9 Fixed and pluggable Interface Module
 controller"
PID: IR8140H-P-K9 , VID: , SN:
NAME: "NIM subslot 0/1", DESCR: "IRMH-WPAN-NA Module"
PID: IRMH-WPAN-NA , VID: V00 , SN: FDO24350D18
NAME: "NIM subslot 0/2", DESCR: "IRMH-LTEAP18-GL Module"
PID: IRMH-LTEAP18-GL , VID: V00 , SN: FDO24360MVH
NAME: "Modem on Cellular0/2/0", DESCR: "Telit LM960"
PID: LM960 , VID: 1.0 , SN: 358347100029266
NAME: "PIM subslot 0/2", DESCR: "P-LTEAP18-GL Module"
PID: P-LTEAP18-GL , VID: V01 , SN: FOC242100XW
NAME: "NIM subslot 0/3", DESCR: "IRMH-LTEA-EA Module"
PID: IRMH-LTEA-EA , VID: V00 , SN: FDO24360MU4
NAME: "Modem on Cellular0/3/0", DESCR: "Sierra Wireless EM7455"
PID: EM7455 , VID: 1.0 , SN: 356129072307959
NAME: "PIM subslot 0/3", DESCR: "P-LTEA-EA Module"
PID: P-LTEA-EA , VID: V02 , SN: FOC24290CZ2
NAME: "NIM subslot 0/0", DESCR: "Front Panel 2 port Gigabitethernet Module"
PID: IR8140H-2x1GE , VID: V01 , SN:
NAME: "subslot 0/0 transceiver 1", DESCR: "GE T"
PID: GLC-TE , VID: V03 , SN: AVC24140C5S
NAME: "module 1", DESCR: "Supervisor Module with 1 Copper + 1 Fiber Port for IR8140"
PID: IRMH-SUP-SP , VID: , SN:
NAME: "module 3", DESCR: "Stackable Battery Backup unit for IR8140"
PID: CGR-BATT-4AH , VID: V03 , SN: NVT24231754
NAME: "module 4", DESCR: "Stackable Battery Backup unit for IR8140"
PID: CGR-BATT-4AH , VID: V03 , SN: NVT24233031
NAME: "module 5", DESCR: "Stackable Battery Backup unit for IR8140"
PID: CGR-BATT-4AH , VID: V03 , SN: NVT24232260
NAME: "module R0", DESCR: "Cisco Catalyst IR8140H-P-K9 Route Processor"
PID: IR8140H-P-K9 , VID: V00 , SN: FDO24370MFT
NAME: "module F0", DESCR: "Cisco Catalyst IR8140H-P-K9 Forwarding Processor"
PID: IR8140H-P-K9 , VID: , SN:
```

```
Router# show platform
Chassis type: IR8140H-P-K9
```

```
Slot Type State Insert time (ago)
--------- ------------------- --------------------- -----------------
0 IR8140H-P-K9 ok 01:35:07
0/0 IR8140H-2x1GE ok 01:33:56
0/1 IRMH-WPAN-NA ok 01:33:55
0/2 IRMH-LTEAP18-GL ok 01:33:55
0/3 IRMH-LTEA-EA ok 01:33:55
1 IRMH-SUP-SP ok 01:35:07
R0 IR8140H-P-K9 ok, active 01:35:07
F0 IR8140H-P-K9 ok, active 01:35:07
P0 IRMH-PWR60W-AC ok 01:34:29
Router#
```

```
Router# show platform diag
Chassis type: IR8140H-P-K9
Slot: 0, IR8140H-P-K9
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:42 (01:35:35 ago)
Software declared up time : 00:01:31 (01:34:46 ago)
CPLD version :
Firmware version : 1.4(DEV) [root-vganev 100]
Sub-slot: 0/0, IR8140H-2x1GE
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:01:53 (01:34:23 ago)
Logical insert detect time : 00:01:53 (01:34:23 ago)
Sub-slot: 0/1, IRMH-WPAN-NA
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:01:54 (01:34:23 ago)
Logical insert detect time : 00:01:54 (01:34:23 ago)
Sub-slot: 0/2, IRMH-LTEAP18-GL
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:01:54 (01:34:23 ago)
Logical insert detect time : 00:01:54 (01:34:23 ago)
Sub-slot: 0/3, IRMH-LTEA-EA
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:01:54 (01:34:22 ago)
Logical insert detect time : 00:01:54 (01:34:22 ago)
Slot: 1, IRMH-SUP-SP
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:42 (01:35:35 ago)
Software declared up time : 00:00:00 (never ago)
CPLD version : N/A
Firmware version : N/A
Slot: R0, IR8140H-P-K9
Running state : ok, active
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:42 (01:35:35 ago)
Software declared up time : 00:00:42 (01:35:35 ago)
CPLD version : 00000000
Firmware version : 1.4(DEV) [root-vganev 100]
Slot: F0, IR8140H-P-K9
Running state : ok, active
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:42 (01:35:35 ago)
Software declared up time : 00:01:32 (01:34:44 ago)
```

```
Hardware ready signal time : 00:00:00 (never ago)
Packet ready signal time : 00:01:38 (01:34:38 ago)
CPLD version : 00000000
Firmware version : 1.4(DEV) [root-vganev 100]
Slot: P0, IRMH-PWR60W-AC
State : ok
Physical insert detect time : 00:01:20 (01:34:57 ago)
Slot: GE-POE, Unknown
State : NA
Physical insert detect time : 00:00:00 (never ago)
Router#
```

```
Router# show platform software status control-processor
RP0: online, statistics updated 1 seconds ago
Load Average: healthy
1-Min: 1.04, status: healthy, under 5.00
5-Min: 0.94, status: healthy, under 5.00
15-Min: 0.96, status: healthy, under 5.00
Memory (kb): healthy
Total: 8116912
Used: 3315056 (41%), status: healthy
Free: 4801856 (59%)
Committed: 3109960 (38%), under 90%
Per-core Statistics
CPU0: CPU Utilization (percentage of time spent)
User: 1.25, System: 2.51, Nice: 0.00, Idle: 92.99
IRQ: 2.71, SIRQ: 0.52, IOwait: 0.00
CPU1: CPU Utilization (percentage of time spent)
User: 4.34, System: 3.43, Nice: 0.00, Idle: 92.21
IRQ: 0.00, SIRQ: 0.00, IOwait: 0.00
CPU2: CPU Utilization (percentage of time spent)
User: 4.02, System: 2.31, Nice: 0.00, Idle: 93.25
IRQ: 0.40, SIRQ: 0.00, IOwait: 0.00
CPU3: CPU Utilization (percentage of time spent)
User: 23.50, System: 39.40, Nice: 0.00, Idle: 28.69
IRQ: 8.38, SIRQ: 0.00, IOwait: 0.00
Router#
```

```
Router# show diag slot R0 eeprom detail
Slot R0 EEPROM data:
EEPROM version : 4
Compatible Type : 0xFF
Hardware Revision : 0.1
PCB Part Number : 73-104919-02
Board Revision : 03
Deviation Number : 0
Fab Version : 02
PCB Serial Number : FDO24370MFT
Top Assy. Part Number : 68-102792-02
Top Assy. Revision : 15
Chassis Serial Number : FDO2441J91D
Product Identifier (PID) : IR8140H-P-K9
Version Identifier (VID) : V00
CLEI Code : UNASSIGNED
RMA Test History : 00
RMA Number : 0-0-0-0
RMA History : 00
Asset ID : P2
Asset Alias : 20530
Power Consumption : 60000 mWatts (Maximum)
Power Consumption Mode 1 : 499260 mWatts
Power Consumption Mode 2 : 635950 mWatts
Power Consumption Mode 3 : 556720 mWatts
Chassis MAC Address : f86b.d978.8320
MAC Address block size : 16
```

```
Controller Type : 4396
Asset ID :
Router#

Router# show version
Cisco IOS XE Software, Version BLD_V175_THROTTLE_LATEST_20210124_063209_V17_5_0_148
Cisco IOS Software [Bengaluru], ISR Software (ARMV8EL_LINUX_IOSD-UNIVERSALK9_IOT-M),
Experimental Version 17.5.20210124:064309
[S2C-build-v175_throttle-507-/nobackup/mcpre/BLD-BLD_V175_THROTTLE_LATEST_20210124_063209
226]
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GPL code under the terms of GPL Version 2.0. For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
ROM: 1.4(REL)
CABO_SIT_Cellular uptime is 1 hour, 37 minutes
Uptime for this control processor is 1 hour, 38 minutes
System returned to ROM by reload
System image file is
"bootflash:ir8100-universalk9.BLD_V175_THROTTLE_LATEST_20210124_063209_V17_5_0_148.SSA.bin"
Last reload reason: Reload Command
This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
If you require further assistance please contact us by sending email to
export@cisco.com.
Technology Package License Information:
------------------------------------------------------------------
Technology Type Technology-package Technology-package
Current Next Reboot
------------------------------------------------------------------
Smart License Perpetual network-advantage network-advantage
Smart License Subscription None None
The current throughput level is 50000 kbps
Smart Licensing Status: Registration Not Applicable/Not Applicable
cisco IR8140H-P-K9 (1RU) processor with 1948753K/6147K bytes of memory.
Processor board ID FDO2441J91D
Router operating mode: Autonomous
2 Gigabit Ethernet interfaces
4 Cellular interfaces
32768K bytes of non-volatile configuration memory.
8116912K bytes of physical memory.
8032254K bytes of Bootflash at bootflash:.
Configuration register is 0x2102
Router#

Router# show power
Main PSU :
Total Power Consumed: 22.92 Watts
Configured Mode : N/A
Current runtime state same : N/A
```

```
PowerSupplySource : External PS
POE Module :
Configured Mode : N/A
Current runtime state same : N/A
Total power available : 15.4 Watts
Router#
```

Additional references

This topic provides references to MIBs associated with the power efficiency management feature.

MIBs

MIBs	MIBs Link
CISCO-ENTITY-FRU-CONTROL-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use the Cisco MIB Locator at: http://www.cisco.com/go/mibs .

Technical assistance

This reference provides information on accessing the Cisco Support website for technical documentation, troubleshooting tools, and subscription services for product alerts.

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html