Environmental Monitoring and PoE Management

The Cisco 8200 Series Secure Routers have hardware and software features that periodically monitor the router's environment. This chapter provides information on the environmental monitoring features on your router that allow you to monitor critical events and generate statistical reports on the status of various router components. This chapter includes these sections:

Environmental monitoring

The router provides a robust environment-monitoring system with several sensors that monitor the system temperatures. Microprocessors generate interrupts to the HOST CPU for critical events and generate a periodic status and statistics report. Some of the key functions of the environmental monitoring system:

- Monitoring temperature of CPUs, motherboard, and midplane
- Monitoring fan speed
- Recording abnormal events and generating notifications
- Monitoring Simple Network Management Protocol (SNMP) traps
- Generating and collecting Onboard Failure Logging (OBFL) data
- Sending call home event notifications
- Logging system error messages
- Displaying present settings and status

Environmental monitor and report functions

Monitoring and reporting functions allow you to maintain normal system operation by identifying and resolving adverse conditions prior to loss of operation.

Environmental monitoring functions

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

The local power supplies provide the ability to monitor:

- Input and output current
- Output voltage
- Input and output power
- Temperature
- Fan speed

The device is expected to meet the following environmental operating conditions:

- Operating Temperature Nominal—32°F to 104°F (0°C to 40°C)
- Operating Humidity Nominal—10% to 85% RH noncondensing
- Operating Humidity Short Term—10% to 85% RH noncondensing
- Operating Altitude—Sea level 0 ft to 10,000 ft (0 to 3000 m)
- AC Input Range—85 to 264 VAC

In addition, each power supply monitors its internal temperature and voltage. A power supply is either within tolerance (normal) or out of tolerance (critical). If an internal power supply's temperature or voltage reaches a critical level, the power supply shuts down without any interaction with the system processor.

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.

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

Fan Failure

When the system power is on, all the fans should be operational. Although the system continues to operate if a fan fails, the system displays this message:

```
%IOSXE_PEM-3-FANFAIL: The fan in slot 2/0 is encountering a failure condition
```

Sensors Out of Range

When sensors are out of range, the system displays this message:

```
%ENVIRONMENTAL-1-ALERT: V: 1.0v PCH, Location: R0, State: Warning, Reading: 1102 mV

%ENVIRONMENTAL-1-ALERT: V: PEM Out, Location: P1, State: Warning, Reading: 0 mV

%ENVIRONMENTAL-1-ALERT: Temp: Temp 3, Location R0, State : Warning, Reading : 90C
```

Fan Tray (Slot P2) Removed

When the fan tray for slot P2 is removed, the system displays this message:

```
%IOSXE_PEM-6-REMPEM_FM: PEM/FM slot P2 removed
```

Fan Tray (Slot P2) Reinserted

When the fan tray for slot P2 is reinserted, the system displays this message:

```
%IOSXE_PEM-6-INSPEM_FM: PEM/FM slot P2 inserted
```

Fan Tray (Slot 2) is Working Properly

When the fan tray for slot 2 is functioning properly, the system displays this message:

```
%IOSXE_PEM-6-PEMOK: The PEM in slot P2 is functioning properly
```

Fan 0 in Slot 2 (Fan Tray) is Not Working

When Fan 0 in the fan tray of slot 2 is not functioning properly, the system displays this message:

```
%IOSXE_PEM-3-FANFAIL: The fan in slot 2/0 is encountering a failure condition
```

Fan 0 in Slot 2 (Fan Tray) is Working Properly

When Fan 0 in the fan tray of slot 2 is functioning properly, the system displays this message:

```
%IOSXE_PEM-6-FANOK: The fan in slot 2/0 is functioning properly
```

Main Power Supply in Slot 1 is Powered Off

When the main power supply in slot 1 is powered off, the system displays this message:

```
%IOSXE_PEM-3-PEMFAIL: The PEM in slot 1 is switched off or encountering a
failure condition.
```

Main Power Supply is Inserted in Slot 1

When the main power supply is inserted in slot 1, the system displays these messages:

```
%IOSXE_PEM-6-INSPEM_FM: PEM/FM slot P1 inserted
%IOSXE_PEM-6-PEMOK: The PEM in slot 1 is functioning properly
```

Temperature and Voltage Exceed Max/Min Thresholds

The 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

You can retrieve and display environmental status reports using these commands:

- **debug environment**
- **debug platform software cman env monitor polling**
- **debug ilpower**
- **debug power** [**inline** | **main**]
- **show diag all eeprom**
- **show diag slot R0 eeprom detail**
- **show environment**
- **show environment all**
- **show inventory**
- **show platform all**
- **show platform diag**
- **show platform software status control-processor**
- **show version**
- **show power**
- **show power inline**

These commands show the current values of parameters such as temperature and voltage.

The environmental monitoring system updates the values of these parameters every 60 seconds. Brief examples of these commands are:

debug environment: Example

```
Router# debug environment location P0
Environmental sensor Temp: Temp 1 P0 debugging is on
Environmental sensor Temp: Temp 2 P0 debugging is on
Environmental sensor Temp: Temp 3 P0 debugging is on
Environmental sensor V: PEM Out P0 debugging is on
Environmental sensor I: PEM In P0 debugging is on
Environmental sensor I: PEM Out P0 debugging is on
Environmental sensor W: In pwr P0 debugging is on
Environmental sensor W: Out pwr P0 debugging is on
Environmental sensor RPM: fan0 P0 debugging is on
```

```
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 1 P0, In queue 1
*Jul  8 21:49:23.292 PDT:     State=Normal  Reading=35
*Jul  8 21:49:23.292 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 1 P0  State=Normal Reading=35
*Jul  8 21:49:23.292 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.292 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 2 P0, In queue 1
*Jul  8 21:49:23.292 PDT:     State=Normal  Reading=40
*Jul  8 21:49:23.292 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 2 P0  State=Normal Reading=40
*Jul  8 21:49:23.292 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.292 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 3 P0, In queue 1
*Jul  8 21:49:23.292 PDT:     State=Normal  Reading=44
*Jul  8 21:49:23.292 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.292 PDT:     Sensor: Temp: Temp 3 P0  State=Normal Reading=44
*Jul  8 21:49:23.292 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.292 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.292 PDT:     Sensor: V: PEM In P0, In queue 1
*Jul  8 21:49:23.292 PDT:     State=Normal  Reading=118501
*Jul  8 21:49:23.292 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: V: PEM In P0  State=Normal Reading=118501
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: V: PEM Out P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=12000
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: V: PEM Out P0  State=Normal Reading=12000
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: I: PEM In P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=820
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: I: PEM In P0  State=Normal Reading=828
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: I: PEM Out P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=7200
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: I: PEM Out P0  State=Normal Reading=7100
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: P: In pwr P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=97
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: P: In pwr P0  State=Normal Reading=98
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: P: Out pwr P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=87
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: P: Out pwr P0  State=Normal Reading=89
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:23.293 PDT:     Sensor: RPM: fan0 P0, In queue 1
*Jul  8 21:49:23.293 PDT:     State=Normal  Reading=5824
*Jul  8 21:49:23.293 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:23.293 PDT:     Sensor: RPM: fan0 P0  State=Normal Reading=5824
*Jul  8 21:49:23.293 PDT:     Inserting into queue 1 on spoke 189.
*Jul  8 21:49:23.293 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:43.296 PDT:     Sensor: Temp: Temp 1 P0, In queue 1
*Jul  8 21:49:43.296 PDT:     State=Normal  Reading=35
*Jul  8 21:49:43.296 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:43.296 PDT:     Sensor: Temp: Temp 1 P0  State=Normal Reading=35
```

```
*Jul  8 21:49:43.296 PDT:     Inserting into queue 1 on spoke 209.
*Jul  8 21:49:43.296 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:43.296 PDT:     Sensor: Temp: Temp 2 P0, In queue 1
*Jul  8 21:49:43.296 PDT:     State=Normal  Reading=40
*Jul  8 21:49:43.296 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:49:43.296 PDT:     Sensor: Temp: Temp 2 P0  State=Normal Reading=40
*Jul  8 21:49:43.296 PDT:     Inserting into queue 1 on spoke 209.
*Jul  8 21:49:43.296 PDT:     Rotation count=20 Displacement=0
*Jul  8 21:49:43.296 PDT:     Sensor: Temp: Temp 3 P0, In queue 1
*Jul  8 21:49:43.296 PDT:     State=Normal  Reading=44
*Jul  8 21:49:43.296 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:53:43.329 PDT:     State=Normal  Reading=5824
*Jul  8 21:53:43.329 PDT:     Rotation count=0  Poll period=20000
*Jul  8 21:53:43.329 PDT:     Sensor: RPM: fan0 P0  State=Normal Reading=5824
*Jul  8 21:53:43.329 PDT:     Inserting into queue 1 on spoke 149.
*Jul  8 21:53:43.329 PDT:     Rotation count=20 Displacement=0
```

debug platform software cman env monitor polling: Example

```
Router# debug platform software cman env monitor polling
platform software cman env monitor polling debugging is on
Router#
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 1 P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=35
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Temp 1, P0, 35
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 1 P0  State=Normal Reading=35
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 2 P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=40
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Temp 2, P0, 40
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 2 P0  State=Normal Reading=40
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 3 P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=44
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Temp 3, P0, 44
*Jul  8 21:56:23.351 PDT: Sensor: Temp: Temp 3 P0  State=Normal Reading=44
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: V: PEM In P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=118501
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback V: PEM In, P0, 118501
*Jul  8 21:56:23.351 PDT: Sensor: V: PEM In P0  State=Normal Reading=118501
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: V: PEM Out P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=12100
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback V: PEM Out, P0, 12000
*Jul  8 21:56:23.351 PDT: Sensor: V: PEM Out P0  State=Normal Reading=12000
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: I: PEM In P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=820
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback I: PEM In, P0, 828
*Jul  8 21:56:23.351 PDT: Sensor: I: PEM In P0  State=Normal Reading=828
```

```
*Jul  8 21:56:23.351 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.351 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.351 PDT: Sensor: I: PEM Out P0, In queue 1
*Jul  8 21:56:23.351 PDT: State=Normal  Reading=7200
*Jul  8 21:56:23.351 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.351 PDT: IOS-RP-ENVMON: sensor READ callback I: PEM Out, P0, 7100
*Jul  8 21:56:23.352 PDT: Sensor: I: PEM Out P0  State=Normal Reading=7100
*Jul  8 21:56:23.352 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.352 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.352 PDT: Sensor: P: In pwr P0, In queue 1
*Jul  8 21:56:23.352 PDT: State=Normal  Reading=97
*Jul  8 21:56:23.352 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback P: In pwr, P0, 98
*Jul  8 21:56:23.352 PDT: Sensor: P: In pwr P0  State=Normal Reading=98
*Jul  8 21:56:23.352 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.352 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.352 PDT: Sensor: P: Out pwr P0, In queue 1
*Jul  8 21:56:23.352 PDT: State=Normal  Reading=88
*Jul  8 21:56:23.352 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback P: Out pwr, P0, 88
*Jul  8 21:56:23.352 PDT: Sensor: P: Out pwr P0  State=Normal Reading=88
*Jul  8 21:56:23.352 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.352 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.352 PDT: Sensor: RPM: fan0 P0, In queue 1
*Jul  8 21:56:23.352 PDT: State=Normal  Reading=5888
*Jul  8 21:56:23.352 PDT: Rotation count=0  Poll period=20000
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback RPM: fan0, P0, 5888
*Jul  8 21:56:23.352 PDT: Sensor: RPM: fan0 P0  State=Normal Reading=5888
*Jul  8 21:56:23.352 PDT: Inserting into queue 1 on spoke 9.
*Jul  8 21:56:23.352 PDT: Rotation count=20 Displacement=0
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback RPM: fan0, P2, 12600
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback RPM: fan1, P2, 12840
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback RPM: fan2, P2, 12900
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback P: pwr, P2, 8
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Inlet 1, R0, 29
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Inlet 2, R0, 30
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Outlet 1, R0, 35
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback Temp: Outlet 2, R0, 36
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback Temp: CP-CPU, R0, 42
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 12v, R0, 12127
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 5v, R0, 5022
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 3.3v, R0, 3308
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 3.0v, R0, 3023
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 2.5v, R0, 2490
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.8v, R0, 1798
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.2v, R0, 1203
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.2v_CPU, R0, 1201
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.05v_CPU, R0, 1052
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.05v, R0, 1062
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 1.0v, R0, 1002
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback V: 0.6v, R0, 593
*Jul  8 21:56:23.352 PDT: IOS-RP-ENVMON: sensor READ callback P: pwr, R0, 86
*Jul  8 21:56:25.352 PDT: IOS-RP-ENVMON: sensor READ callback P: pwr: Pwr, 0/1, 5
*Jul  8 21:56:32.354 PDT: IOS-RP-ENVMON: sensor READ callback P: pwr: Pwr, 1/0, 27
```

debug ilpower: Example

```
Router# debug ilpower ?
  cdp         ILPOWER CDP messages
  controller  ILPOWER controller
  event       ILPOWER event
  ha          ILPOWER High-Availability
```

```
  port        ILPOWER port management
  powerman    ILPOWER powerman
  registries  ILPOWER registries
  scp         ILPOWER SCP messages
  upoe        ILPOWER upoe
```

debug power [inline|main]: Example

In this example, there is one 1000W power supply and one 450W power supply. Inline and main power output is shown.

```
Router# debug power ?
  inline  ILPM inline power related
  main    Main power related
  <cr>    <cr>
Router# debug power
POWER all debug debugging is on

Router# show debugging | include POWER
POWER:
POWER main debugging is on
POWER inline debugging is on
Router#
..

*Jul  8 21:56:23.351: %ENVIRONMENTAL-6-NOTICE: V: PEM Out, Location: P1, State: Warning,
Reading: 0 mV
*Jul  8 21:56:23.351: %IOSXE_PEM-6-PEMOK: The PEM in slot P1 is functioning properly
*Jul  8 21:56:23.351: %PLATFORM_POWER-6-MODEMATCH: Main power is in Boost mode
*Jul  8 21:56:23.351: Power M: Received Msg for 12V/Main, total power 1450, Run same as cfg
 Yes
*Jul  8 21:56:23.351: Power M: Received Msg for POE/ILPM, total power 500, Run same as cfg
 No
*Jul  8 21:56:23.351: Power I: Updating pool power is 500 watts
*Jul  8 21:56:23.351: Power I: Intimating modules of total power 500 watts
*Jul  8 21:56:23.351: Power M: Received Msg for 12V/Main, total power 1450, Run same as cfg
 Yes
*Jul  8 21:56:23.351: Power M: Received Msg for POE/ILPM, total power 500, Run same as cfg
 No
*Jul  8 21:56:23.351: Power I: Updating pool power is 500 watts
*Jul  8 21:56:23.351: Power I: Intimating modules of total power 500 watts
Router#
```

show diag all eeprom: Example

```
Router# show diag all eeprom
MIDPLANE EEPROM data:

Product Identifier (PID) : C8231-G2

 Version Identifier (VID) : V00

PCB Serial Number        : FOC28500NU4

Hardware Revision        : 1.0

CLEI Code                : NA

Power/Fan Module P0 EEPROM data:
```

```
Product Identifier (PID) : PWR-CC1-115WAC

Version Identifier (VID) : V02

PCB Serial Number        :

CLEI Code                : IPUPAMFAAB

Power/Fan Module P1 EEPROM data is not initialized

Internal PoE EEPROM data:

Product Identifier (PID) : C82G2-POE-DC-F

Version Identifier (VID) : V01

PCB Serial Number        : FOC274202QH

Top Assy. Part Number    : 78-0000-00

Hardware Revision        : 1.0

CLEI Code                : NA

Slot R0 EEPROM data:
Product Identifier (PID) : C8231-G2

 Version Identifier (VID) : V00

PCB Serial Number        : FOC28500NU4

Hardware Revision        : 1.0
 CLEI Code                : NA
Version Identifier (VID) : V00
Slot F0 EEPROM data:

Product Identifier (PID) : C8231-G2

PCB Serial Number        : FOC28500NU4

 Hardware Revision        : 1.0

CLEI Code                : NA

Slot 0 EEPROM data:

Product Identifier (PID) : C8231-G2

Version Identifier (VID) : V00

PCB Serial Number        : FOC28500NU4

 Hardware Revision        : 1.0

CLEI Code                : NA

SPA EEPROM data for subslot 0/0:

Product Identifier (PID) : 4x1G-4M-2xSFP+-E

 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 is not available

SPA EEPROM data for subslot 0/2 is not available
SPA EEPROM data for subslot 0/3 is not available

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
```

show environment: Example

In this example, note the output for the slots POE0 and POE1.

```
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: Inlet     Normal          66     Celsius     (68 ,na ,73 ,na )(Celsius)

R0          Temp: Outlet    Normal          63     Celsius     (68 ,na ,73 ,na )(Celsius)

R0          Temp: CPU       Normal          81     Celsius     (105,na ,120,na )(Celsius)

R0          V: 12V          Normal          11972  mV          na

R0          V: 5V           Normal          4911   mV          na

R0          V: 3.3V_SB      Normal          3294   mV          na

R0          V: 3.3V         Normal          3297   mV          na

R0          V: 1.8V         Normal          1827   mV          na

R0          V: 1.2V         Normal          1192   mV          na

R0          V: 1.1V_DDR     Normal          1099   mV          na

 R0          V: 1V           Normal          994    mV          na

R0          V: 0.75V_CORE   Normal          738    mV          na

R0          V: 0.75V_SYS    Normal          862    mV          na

R0          V: 0.8V_SW      Normal          796    mV          na

R0          V: 0.8V         Normal          798    mV          na

R0          V: 0.75V        Normal          749    mV          na
```

```
R0          I: VP12P0_MB    Normal          1939    mA          na

R0          P: Power        Normal          22      Watts       na
```

show environment all: Example

```
Router# show environment all
Sensor List:  Environmental Monitoring
 Sensor           Location          State             Reading
 Temp: Temp 1     P0                Normal            36 Celsius
 Temp: Temp 2     P0                Normal            38 Celsius
 Temp: Temp 3     P0                Normal            38 Celsius
 V: PEM In        P0                Normal            206502 mV
 V: PEM Out       P0                Normal            12000 mV
 I: PEM In        P0                Normal            281 mA
 I: PEM Out       P0                Normal            3500 mA
 P: In pwr        P0                Normal            53 Watts
 P: Out pwr       P0                Normal            43 Watts
 RPM: fan0        P0                Normal            3712 RPM
 RPM: fan0        P2                Normal            7260 RPM
 RPM: fan1        P2                Normal            7260 RPM
 RPM: fan2        P2                Normal            7200 RPM
 P: pwr           P2                Normal            3 Watts
 Temp: Inlet 1    R0                Normal            19 Celsius
 Temp: Inlet 2    R0                Normal            21 Celsius
 Temp: Outlet 1   R0                Normal            25 Celsius
 Temp: Outlet 2   R0                Normal            23 Celsius
 Temp: CP-CPU     R0                Normal            29 Celsius
 V: 12v           R0                Normal            11984 mV
 V: 5v            R0                Normal            5018 mV
 V: 3.3v          R0                Normal            3311 mV
 V: 3.0v          R0                Normal            2992 mV
 V: 2.5v          R0                Normal            2488 mV
 V: 1.8v          R0                Normal            1785 mV
 V: 1.2v          R0                Normal            1201 mV
 V: 1.2v_CPU      R0                Normal            1200 mV
 V: 1.05v_CPU     R0                Normal            1051 mV
 V: 1.05v         R0                Normal            1058 mV
 V: 1.0v          R0                Normal            1001 mV
 V: 0.6v          R0                Normal            595 mV
 P: pwr           R0                Normal            45 Watts
```

show inventory: Example

```
Router# show inventory

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
INFO: Please use "show license UDI" to get serial number for licensing.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
NAME: "Chassis", DESCR: "Cisco C8231-G2 Chassis"
PID: C8231-G2          , VID: V00  , SN: FGL2903L28C
NAME: "Power Supply Module 0", DESCR: "POE Power Supply for Cisco C8231"
PID: PWR-CC1-115WAC    , VID: V02  , SN:
NAME: "POE Module 0", DESCR: "POE Power Supply for Cisco C8231"
PID: PWR-CC1-115WAC    , VID: V02  , SN:
NAME: "GE-POE Module", DESCR: "Cisco 8000 POE"
PID: C82G2-POE-DC-F    , VID: V01  , SN: FOC274202QH
NAME: "module 0", DESCR: "Cisco C8231-G2 Built-In NIM controller"
PID: C8231-G2          , VID:      , SN:
NAME: "NIM subslot 0/0", DESCR: "4x1G-4M-2xSFP+-E"
```

```
PID: 4x1G-4M-2xSFP+-E  , VID: V01  , SN:
NAME: "subslot 0/0 transceiver 8", DESCR: "SFP+ 10GBASE-SR"
NAME: "subslot 0/0 transceiver 9", DESCR: "SFP+ 10GBASE-SR"
PID: SFP-10G-SR          , VID: V03  , SN: JUR2024G6CK
NAME: "module R0", DESCR: "Cisco C8231-G2 Route Processor"
NAME: "module F0", DESCR: "Cisco C8231-G2 Forwarding Processor"
PID: C8231-G2          , VID:      , SN:
```

show platform: Example

```
Router# show platform
 Chassis type: C8231-G2
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         C8231-G2            ok                    6d18h
0/0      4x1G-4M-2xSFP+-E    ok                    6d18h
R0        C8231-G2            ok, active            6d18h
F0        C8231-G2            ok, active            6d18h
P0        PWR-CC1-115WAC      ok                    6d18h
POE0      PWR-CC1-115WAC      ok                    6d18h
GE-POE    C82G2-POE-DC-F      ok                    6d18h
Slot      CPLD Version        Firmware Version
--------- ------------------- ---------------------------------------
0         25071721            17.18(1.5r).s1.cp
R0        25071721            17.18(1.5r).s1.cp
F0        25071721            17.18(1.5r).s1.cp
```

show platform diag: Example for C8375-E-G2

```
Router# show platform diag
Chassis type: C8231-G2

Slot: 0, C8231-G2

Running state               : ok

Internal state              : online

Internal operational state  : ok

Physical insert detect time : 00:00:29 (6d18h ago)

Software declared up time   : 00:01:09 (6d18h ago)

CPLD version                : 25071721

Firmware version            : 17.18(1.5r).s1.cp

Sub-slot: 0/0, 4x1G-4M-2xSFP+-E

Operational status          : ok

Internal state              : inserted

Physical insert detect time : 00:02:29 (6d18h ago)

Logical insert detect time  : 00:02:29 (6d18h ago)

Slot: R0, C8231-G2
```

```
Running state               : ok, active

 Internal state              : online

Internal operational state  : ok

Physical insert detect time : 00:00:29 (6d18h ago)

Software declared up time   : 00:00:29 (6d18h ago)

CPLD version                : 25071721

Firmware version            : 17.18(1.5r).s1.cp

Slot: F0, C8231-G2

Running state               : ok, active

Internal state              : online
Internal operational state  : ok

Physical insert detect time : 00:00:29 (6d18h ago)

Software declared up time   : 00:01:05 (6d18h ago)

Hardware ready signal time  : 00:01:01 (6d18h ago)

Packet ready signal time    : 00:01:19 (6d18h ago)

CPLD version                : 25071721

Firmware version            : 17.18(1.5r).s1.cp

Slot: P0, PWR-CC1-115WAC

State                       : ok

Physical insert detect time : 00:00:05 (6d18h ago)

Slot: POE0, PWR-CC1-115WAC

State                       : ok

Physical insert detect time : 00:00:05 (6d18h ago)

Slot: GE-POE, C82G2-POE-DC-F

State                       : ok

Physical insert detect time : 00:00:04 (6d18h ago)
```

show platform software status control-processor: Example

```
Router# show platform software status control-processor
RP0: online, statistics updated 2 seconds ago

Load Average: healthy

1-Min: 7.70, status: healthy, under 14.30
```

```
5-Min: 7.51, status: healthy, under 14.30

15-Min: 7.45, status: healthy, under 14.30

Memory (kb): healthy

Total: 7937336

Used: 4019196 (51%), status: healthy

Free: 3918140 (49%)

Committed: 5455148 (69%), under 90%

Per-core Statistics

CPU0: CPU Utilization (percentage of time spent)

User:  2.69, System:  5.39, Nice:  0.09, Idle: 90.60

IRQ:  0.99, SIRQ:  0.19, IOwait:  0.00

CPU1: CPU Utilization (percentage of time spent)

User: 99.90, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.00, IOwait:  0.00

CPU2: CPU Utilization (percentage of time spent)

 User: 99.90, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.00, IOwait:  0.00

CPU3: CPU Utilization (percentage of time spent)

 User: 99.90, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.00, IOwait:  0.00

CPU4: CPU Utilization (percentage of time spent)

User: 99.90, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.00, IOwait:  0.00

CPU5: CPU Utilization (percentage of time spent)

User: 99.80, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.10, IOwait:  0.00
CPU6: CPU Utilization (percentage of time spent)

 User: 99.80, System:  0.09, Nice:  0.00, Idle:  0.00

 IRQ:  0.09, SIRQ:  0.00, IOwait:  0.00

CPU7: CPU Utilization (percentage of time spent)

User: 99.90, System:  0.00, Nice:  0.00, Idle:  0.00

IRQ:  0.10, SIRQ:  0.00, IOwait:  0.00
```

show diag slot R0 eeprom detail: Example

```
Router# show diag slot R0 eeprom detail

       Slot R0 EEPROM data:

EEPROM version           : 4

Compatible Type          : 0xFF

FRU Specific Info        : 0100

PCB Serial Number        : FOC28500NU4

Controller Type          : 4596

Hardware Revision        : 1.0

PCB Part Number          : 74-134702-02

Board Revision           : 02

Top Assy. Part Number    : 68-104678-01

Deviation Number         : 0

Fab Version              : 02

Product Identifier (PID) : C8231-G2

Version Identifier (VID) : V00

CLEI Code                : NA

Chassis Serial Number    : FGL2903L28C

 Chassis MAC Address      : e4a4.1c83.2a80

MAC Address block size   : 96

Manufacturing Test Data  : 00 00 00 00 00 00 00 00

Asset ID                 :
```

show version: Example

```
Router# show version
Cisco IOS XE Software, Version BLD_V1718_THROTTLE_LATEST_20250613_033405_V17_18_0_46

Cisco IOS Software [IOSXE], c8kg2be Software (ARMV8EL_LINUX_IOSD-UNIVERSALK9-M),
Experimental Version 17.18.20250613:044429
[BLD_V1718_THROTTLE_LATEST_20250613_033405:/nobackup/mcpre/s2c-build-ws 101]
Copyright (c) 1986-2025 by Cisco Systems, Inc.

Compiled Fri 13-Jun-25 04:45 by mcpre

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```

```
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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: 17.18(1.5r).s1.cp
arata-ethp3 uptime is 6 days, 19 hours, 6 minutes
Uptime for this control processor is 6 days, 19 hours, 7 minutes
System returned to ROM by Image Install  at 23:27:59 UTC Fri Aug 8 2025
System image file is "bootflash:packages.conf"
Last reload reason: Image Install
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:
Controller-managed
The current throughput level is unthrottled
 Smart Licensing Status: Smart Licensing Using Policy
cisco C8231-G2 (1RU) processor with 3703220K/6147K bytes of memory.
Processor board ID FGL2903L28C
Router operating mode: Controller-Managed
1 Virtual Ethernet interface
4 Gigabit Ethernet interfaces
```

```
4 2.5 Gigabit Ethernet interfaces

2 Ten Gigabit Ethernet interfaces

32768K bytes of non-volatile configuration memory.

8388608K bytes of physical memory.

20249599K bytes of flash memory at bootflash:.

Configuration register is 0x3922
```

Power supply mode and available PoE

POE is available if a PSU is installed with a PoE capability. For information, see the Power Supply section in the Hardware Installation Guide for Cisco 8200 Series Secure Routers .

To ensure the PoE feature is functional on the external PoE module, verify the availability of PoE power on your router using the **show platform** and **show power** commands. The **show platform** displays the types of PSU(s) installed. The **show power** displays if the POE power available on the system or not.