

Power management

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Power requirements

Cisco Catalyst IR1001-G2 Rugged Secure Router supports dynamic power management to optimize consumption based on deployment needs.

Cisco Catalyst IR1001-G2 Rugged Secure Router can be configured to operate using specific power profiles. It can be configured to schedule power-on or power-off time periods.

Note

- High power (Unconstrained power) mode is the default power mode.
- Cisco Catalyst IR1001-G2 Rugged Secure Router supports Dying Gasp on both Ethernet and Cellular interfaces.

Cisco Catalyst IR1001-G2 Rugged Secure Router operates using these power profiles:

Table 1: Low power

Power feature	Options
Power consumption	5.5 W
IOS functionality	Base IOS XE functionality

Power feature	Options
PIM support	100 kbps on Cellular and one Ethernet interface with speed 100
Serial port	Supports serial port
IOx App	Not supported
Cisco Apps	Not supported

Note

- GPS or cellular Dying Gasp is disabled to conserve power for 5.5W option and only Ethernet Dying Gasp remains active.

Table 2: High (Unconstrained) power

Power feature	Options
Power mode	>5.5 W
IOS functionality	Base IOS XE functionality
Ethernet ports	Two Ethernet ports and all six cores enabled at max performance and max DDR speed
Serial port	Supports serial port
IOx App	Not supported
Cisco Apps	Not supported

Configure power management

Use this task to configure power management to optimize power usage and operational modes for Cisco Catalyst IR1001-G2 Rugged Secure Router.

Procedure

Step 1 Use the **configure terminal** command to enter the global configuration mode.

Example:

```
Router# configure terminal
```

Step 2 Use the **powermgmt low-power** command to configure the router in low power mode. Reload the device to apply the power mode changes.

Example:

```
Router(config)# powermgmt low-power
```

Step 3 Use the **no powermgmt low-power** command to disable low power mode and return to normal power operation.

Example:

```
Router(config)# no powermgmt low-power
```

Step 4 Use the **powermgmt sense** command to enable the power sense feature, which allows the router to monitor the input (ignition power sense) voltage.

Example:

```
Router(config)# powermgmt sense
```

Step 5 Use the **powermgmt sense-voltage** command to set the ignition power sense voltage threshold that determines when power is turned on or off. When the input voltage falls below this threshold, the sense-off condition is triggered.

Example:

```
Router(config)# powermgmt sense-voltage
```

Step 6 Use the **powermgmt shutdown-delay** command to configure the delay timer that defines how long the router waits after a sense-off condition before performing a graceful shutdown.

Example:

```
Router(config)# powermgmt shutdown-delay
```

If the voltage recovers within this period, the router stays ON; otherwise, it shuts down.

Step 7 Use the **powermgmt time-based** command to select the time-based power management mode, which controls power operation based on configured time durations.

Example:

```
Router(config)# powermgmt time-based
```

Configure time based power management for on or off duration

Before you begin

Cisco Catalyst IR1001-G2 Rugged Secure Router allows you to configure time based power management. It helps in optimizing energy consumption and enhancing the efficiency of network operations.

You need to consider these points before configuring time based power management:

- The **on-duration** time is the amount of time the router stays ON.
- The total time interval between **on-duration** and **off-duration** is referred to as total time period.

  The start of this time period during configuration is referred to as the **start-time**.
- This time period can shift depending on when you start the time based power management configuration.
- During a power re-cycle the router comes back to its last previous state which can be ON or OFF state depending on when the configuration paused.

- During bootup you must calculate the time period only after the bootup is complete as the bootup time is not included as part of the total time period during configuration. The maximum configurable total time period is 1,440 minutes (24 hours).
- If the daylight saving progresses backward then the router stays ON.
- If you use the **clock set** command while a time based power management timer is active, the system recalculates all timer values based on the new clock time. This may cause unexpected timer behavior. To avoid this, it is recommended to stop the time based power management configuration, change the clock, and then reapply the configuration.
- If you want to switch to low-power profile mode during the configuration, you must reload the system. Once the system boots a syslog message is displayed to confirm the active power mode.

Use this task to configure power and time mode on Cisco Catalyst IR1001-G2 Rugged Secure Router.

Procedure

Step 1 Use the **configure terminal** command to enter the global configuration mode.

Example:

```
Router# configure terminal
```

Step 2 Use the **powermgmt time-based on-duration** *time-duration-minutes* **off-duration** *time-duration-minutes* command to manage recurring time based power cycle.

Example:

```
Router(config)# powermgmt time-based on-duration 60 off-duration 120
```

You need to keep the router ON for the number of minutes specified by **on-duration**, before powering it off for the number of minutes specified by **off-duration** , and then turn it back to ON again.

Step 3 Use the **exit** command to exit the router configure mode.

Example:

```
Router(config)# exit
```

Step 4 Use the **show powermgmt history** command to view historical power consumption details.

Example:

```
Router# show powermgmt history
```

Configure time based power management for start time and on duration

Use this task to configure power and time mode on Cisco Catalyst IR1001-G2 Rugged Secure Router.

Procedure

Step 1 Use the **configure terminal** command to enter the global configuration mode.

Example:

```
Router# configure terminal
```

Step 2 Use the **powermgmt time-based start-time** *start-time-minutes* **on-duration** *time-duration-minutes* command to manage power based on time.

Example:

```
Router(config)# powermgmt time-based start-time 10:00:00 on-duration 120
```

Step 3 Use the **exit** command to exit the router configure mode.

Example:

```
Router(config)# exit
```

Recover the router after a power-management shutdown

Recover the Cisco Catalyst IR1001-G2 Rugged Secure Router after a power-management shutdown.

Use this procedure when the router is powered off during an off-duration period or after an ignition-voltage sense event. When the input voltage falls below the configured threshold, a sense-off condition is triggered. If the voltage recovers within the shutdown-delay period, the router stays ON; otherwise, it shuts down. After IOS starts, remove the applicable power-management configuration.

Procedure

Step 1 Start IOS using one of the following recovery methods.

Reset button: Press and hold the reset button for a couple of seconds. The router starts booting IOS.

Console keyboard: Press and hold **W** until the router starts booting IOS.

The router starts booting IOS.

Step 2 After IOS starts, enter global configuration mode and remove the time-based command that matches the router configuration. If the power sense feature is enabled, remove that command as well.

Use the time-based command that matches the router's configuration:

If the power sense feature is enabled, use `no powermgmt sense`. If it is not enabled, omit that command.

Example:

```
Router# configure terminal
Router(config)# no powermgmt time-based on-duration 7 off-duration 65
Router(config)# no powermgmt sense
Router(config)# end
```

Or, for a start-time configuration:

Example:

```
Router# configure terminal
Router(config)# no powermgmt time-based start-time 11:11:11 on-duration 100
Router(config)# no powermgmt sense
Router(config)# end
```

Step 3 Use the show powermgmt command to check the router power status.

Example:

```
Router# show powermgmt
```

Reset Button

The Reset button resets the router configuration to the default configuration set by the factory. To restore the router configuration to the default configuration set by the factory, use a standard size #1 paper clip with wire gauge 0.033 inch or smaller and simultaneously press the reset button while applying power to the router.

Power management with clock changes

Table 3: Power management during clock change

Scenario	Trigger	System Behavior	Minimum On-Duration Safeguard
Time-Zone Configuration Change	The system time zone is changed while the **powermgmt** time-based command is active (for example, clock timezone IST 5 30).	The remaining on-duration is recalculated based on the new time zone (for example, recalculated using IST).	If the recalculated remaining on-duration is less than 180 seconds, the system resets it to 180 seconds to ensure the user has enough time to override the configuration.
NTP Clock Adjustments	The NTP-synchronized clock changes while powermgmt time-based is running.	The remaining on-duration is recalculated.	If the recalculated remaining on-duration is less than 180 seconds, it is automatically set to 180 seconds so the user can override the configuration if needed.
Daylight-Saving-Time (DST) Transitions	The system clock changes due to a Daylight-Saving-Time (DST) shift.	The remaining on-duration is recalculated.	If the recalculated remaining on-duration is less than 180 seconds, it is adjusted to 180 seconds to allow the user to override the configuration.

Monitor power status and configured values

Use this task to monitor the power status and configured value of the router:

Before you begin

By default the router is in high power mode.

Procedure

Step 1 Use the **enable** command to enter privileged EXEC mode.

Example:

```
Router> enable
```

Step 2 Use the **show powermgmt** command to monitor the power status and configured value of the router.

Example:

```
Router# show powermgmt
```

Monitor power management history

Use this task to review the remaining shutdown delay.

Procedure

Step 1 Use the **enable** command to enter privileged EXEC mode.

Example:

```
Router> enable
```

Step 2 Use the **show powermgmt history** command to display the power-consumption history.

Example:

```
Router# show powermgmt history

24-Hour Power History (Newest First):
4.977,5.082,0.700,0.700,0.700,0.700,0.700,0.700,
0.700,0.700,0.700,0.700,0.700,0.700,0.700,5.090,
5.093,5.094,5.090,5.088,5.093,5.092,5.091,5.127

31-Day Power History (Newest First):
Period       Max(W)    Min(W)    Avg(W)
-----------  --------  --------  --------
Today          5.766     4.280     4.983
1 day ago      5.596     4.268     5.141
2 days ago     5.916     4.315     5.179
```

```
3 days ago     6.016     4.335     5.138
================================================
```

View hardware power management registers

Use this task to review the remaining shutdown delay.

Procedure

Step 1 Use the **enable** command to enter privileged EXEC mode.

Example:

```
Router> enable
```

Step 2 Use the **show platform hardware powermgmt registers** command to display the power management settings, status, and event log.

Example:

```
#show platform hardware powermgmt registers

powermgmt state 0x01
input voltage  (13715 mV)
current timer  0x0000
high voltage threshold 0x7530
low voltage threshold  0x2328
high voltage timer 0x0001
low voltage timer  0x0014
sense enable 0x01
sense on threshold  0x3390
sense off threshold  0x3200
cfg-pwr-mode 0x00
low-pwr-mode 0x00
timer-based-enable 0x01
time-mgmt-clock 0x000000006A8A53F7
on-duration 0x0258
period 0x05A0
starttime 0x01C68CE2
last power-on voltage 0x3610 (13840 mV)
flash checksum 0x4826

SM log (Hex Dump that indicate power management events)
00000000  0000  0000  0000  0000  0000  0000  0000  0000
00000010  0000  0000  0000  0000  0000  0000  0000  0000
00000020  0000  0000  0000  0000  0000  0000  0000  0000
00000030  0000  0000  0000  0000  0000  0000  0000  0000
00000040  0000  0000  0000  0000  0000  0000  0000  0000
00000050  0000  0000  0000  0000  0000  0000  0000  0000
00000060  0000  0000  0000  0000  0000  0000  0000  0000
00000070  0000  0000  0000  0000  0000  0000  0000  0000
00000080  0000  0000  0000  0000  0000  0000  00
```

Debug ignition commands

Use these commands to display ignition power management errors, events, and state changes.

Procedure

Step 1 Use the **enable** command to enter privileged EXEC mode.

Example:

```
Router> enable
```

Step 2 Use the **debug ignition errors** command to display the ignition related errors.

Example:

```
Router# debug ignition errors
```

Step 3 Use the **debug ignition events** command to display the ignition related events.

Example:

```
Router# debug ignition events
```

Step 4 Use the **debug ignition states** command to display the changes in ignition power management states.

Example:

```
Router# debug ignition states
```