



## **RMON Configuration Guide, Cisco IOS Release 15M&T**

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# RMON Events and Alarms

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Remote Monitoring (RMON) is a standard monitoring specification that enables various network monitors and console systems to exchange network-monitoring data.

RMON delivers information in RMON groups of monitoring elements, each providing specific sets of data to meet common network-monitoring requirements.

This module describes the features of the RMON Alarm group and the RMON Events group, and explains how to configure RMON events and alarms.

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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## Information About RMON Events and Alarms

- [Overview of RMON Events and Alarms, page 1](#)
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## Overview of RMON Events and Alarms

Remote Monitoring (RMON) is a standard monitoring specification that enables various network monitors and console systems to exchange network-monitoring data.

RMON delivers information in RMON groups of monitoring elements, each providing specific sets of data to meet common network-monitoring requirements. Each group is optional so that you do not need to

support all the groups within the Management Information Base (MIB). Some RMON groups require support of other RMON groups to function properly.

The RMON Alarm group periodically takes statistical samples from variables in a probe and compares them with previously configured thresholds. If the monitored variable crosses a threshold, an event is generated. The RMON Alarm group provides information on the alarm type, the interval, and the start and stop thresholds.

The RMON Events group controls the generation and notification of events from a device. The RMON Events group provides information on the event type, the event description, and the time that the event was sent.

## RMON Event and Alarm Notifications

RMON allows various network agents and console systems to exchange network monitoring data. Thresholds allow you to minimize the number of notifications sent on the network. The RMON MIB defines two traps, the risingAlarm trap which is the rising-threshold value and fallingAlarm trap which is the falling-threshold value. Alarms are triggered when a problem exceeds a set rising-threshold value. No alarm notifications are sent until the network agent recovers, as defined by the falling-threshold value. This means that notifications are not sent each time a minor failure or recovery occurs.

You can set an RMON alarm on any MIB object in the access server. You cannot disable all the alarms you configure at the same time. The delta value tests the change between MIB variables, which affects the alarmSampleType in the alarmTable of the RMON MIB. The absolute value tests each MIB variable directly, which affects the alarmSampleType in the alarmTable of the RMON MIB.

Refer to RFC 1757 to learn more about alarms and events and how they interact with each other.

## HC Alarm MIB

The High Capacity (HC) Alarm MIB (HC-ALARM-MIB) provides the capability to create alarms that monitor thresholds crossed by 64-bit MIB objects on an access server. The Remote Monitoring (RMON)-1 Alarm group and RMON-1 notification types are specific to 32-bit objects. The HC alarm MIB supports the polling of 64-bit RMON objects and is an extension of the RMON-1 Alarm group.

The RMON-1 Events group controls the generation and notification of events from a device. When an event is created, it is added to the RMON-1 Events group table. Each entry in this table describes parameters of an event that can be triggered by alarms. An entry may specify that a log entry must be created whenever an event occurs. The entry may also specify that a notification should occur through Simple Network Management Protocol (SNMP) trap messages.

The HC Alarm MIB defines two SNMP traps: hcRisingAlarm and hcFallingAlarm. The hcRisingAlarm trap is used when a rising-threshold value is crossed, and the hcFallingAlarm trap is used when a falling-threshold value is crossed.

High Capacity (HC) alarms are triggered when a monitored variable exceeds a set rising-threshold value or falls below a set falling-threshold value. HC alarms can be set on any HC MIB object on an access server.

Given below is a typical flow of how a 64-bit RMON object is monitored:

- 1 A user creates an event. The user defines the actions to be executed when an event occurs: creation of a log entry or notification by SNMP trap messages. The event is added to the RMON-1 Events group table.
- 2 A user creates an HC alarm. The user defines the MIB object that needs to be monitored by the alarm, the interval for monitoring, the rising-threshold value, and the falling-threshold value. The user also defines the events that are triggered when a rising-threshold value or falling-threshold value is crossed. The HC alarm is added to the HC alarm table.

- 3 The HC alarm monitors the MIB object according to the defined interval. If the counter value crosses the respective thresholds, the HC alarm is triggered.
- 4 When an HC alarm is triggered, the defined events are also triggered.
- 5 When an event is triggered, the actions defined in the events are executed. Either a log entry is created or an SNMP trap is generated.

## How to Configure RMON Events and Alarms

- [Configuring RMON, page 3](#)
- [Configuring RMON Event and Alarm Notifications, page 5](#)

### Configuring RMON

This task explains how to configure RMON and RMON queue size. In native mode, RMON monitors only those packets that are received by the interface. In promiscuous mode, RMON monitors all packets on the LAN segment.

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **rmon** { **native** | **promiscuous** }
5. **exit**
6. **rmon queuesize** *size*
7. **exit**
8. **show rmon**

#### DETAILED STEPS

Command or Action	Purpose
<b>Step 1</b> <b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b> <b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.

Command or Action	Purpose
<p><b>Step 3</b> <code>interface type number</code></p> <p><b>Example:</b></p> <pre>Device(config)# interface FastEthernet 1/0</pre>	<p>Specifies an interface type and number, and places the router in interface configuration mode.</p>
<p><b>Step 4</b> <code>rmon {native   promiscuous}</code></p> <p><b>Example:</b></p> <pre>Device(config-if)# rmon native</pre>	<p>Configures RMON on Ethernet interfaces in native or promiscuous mode.</p> <ul style="list-style-type: none"> <li>In the example, RMON is configured in the native mode.</li> </ul>
<p><b>Step 5</b> <code>exit</code></p> <p><b>Example:</b></p> <pre>Device(config-if)# exit</pre>	<p>Exits the interface configuration mode and places the router in global configuration mode.</p>
<p><b>Step 6</b> <code>rmon queuesize size</code></p> <p><b>Example:</b></p> <pre>Device(config)# rmon queuesize 128</pre>	<p>(Optional) Configures the size of the queue that holds packets for analysis by the RMON process.</p>
<p><b>Step 7</b> <code>exit</code></p> <p><b>Example:</b></p> <pre>Device(config)# exit</pre>	<p>Exits global configuration mode and enters privileged EXEC mode.</p>
<p><b>Step 8</b> <code>show rmon</code></p> <p><b>Example:</b></p> <pre>Device# show rmon</pre>	<p>Displays general RMON statistics.</p>

# Configuring RMON Event and Alarm Notifications

## SUMMARY STEPS

1. enable
2. configure terminal
3. rmon event number [log] [trap community] [description string] [owner string]
4. rmon alarm number variable interval {delta | absolute} rising-threshold value [event-number] falling-threshold value [event-number] [owner string]
5. rmon hc-alarms number variable interval {delta | absolute} rising-threshold value [event-number] falling-threshold value [event-number] [owner string]
6. exit
7. show rmon alarms
8. show rmon hc-alarms
9. show rmon events

## DETAILED STEPS

Command or Action	Purpose
<p><b>Step 1</b> enable</p> <p><b>Example:</b></p> <pre>Device&gt; enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<p><b>Step 2</b> configure terminal</p> <p><b>Example:</b></p> <pre>Device# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p><b>Step 3</b> rmon event number [log] [trap community] [description string] [owner string]</p> <p><b>Example:</b></p> <pre>Device(config)# rmon event number</pre>	<p>Adds or removes an event (in the RMON event table) that is associated with an RMON event number.</p>
<p><b>Step 4</b> rmon alarm number variable interval {delta   absolute} rising-threshold value [event-number] falling-threshold value [event-number] [owner string]</p> <p><b>Example:</b></p> <pre>Device(config)# rmon alarm 10 ifEntry.20.1 20 delta rising-threshold 15 1 falling-threshold 0 owner owner1</pre>	<p>Configures an alarm on any MIB object.</p>

Command or Action	Purpose
<p><b>Step 5</b> <code>rmon hc-alarms</code> <i>number variable interval {delta   absolute} rising-threshold value [event-number] falling-threshold value [event-number] [owner string]</i></p> <p><b>Example:</b></p> <pre>Device(config)# rmon hc-alarms 2 ifInOctets.2 20 delta rising- threshold 2000 2 falling-threshold 1000 1 owner own</pre>	(Optional) Configures an HC alarm on any MIB object.
<p><b>Step 6</b> <code>exit</code></p> <p><b>Example:</b></p> <pre>Device(config)# exit</pre>	Exits the global configuration mode and enters the privileged EXEC mode.
<p><b>Step 7</b> <code>show rmon alarms</code></p> <p><b>Example:</b></p> <pre>Device# show rmon alarm</pre>	Displays the RMON alarm table.
<p><b>Step 8</b> <code>show rmon hc-alarms</code></p> <p><b>Example:</b></p> <pre>Device# show rmon hc-alarms</pre>	Displays the RMON HC alarm table.
<p><b>Step 9</b> <code>show rmon events</code></p> <p><b>Example:</b></p> <pre>Device# show rmon events</pre>	Displays the RMON event table.

## Configuration Examples for RMON Events and Alarms

- [Example: Configuring RMON, page 6](#)
- [Example: Configuring RMON Event and Alarm Notifications, page 7](#)

### Example: Configuring RMON

The following example shows how to configure RMON with a queuesize of 100 packets in promiscuous mode:

```
Device> enable
```

```
Device# configure terminal
Device(config)# interface fastethernet 0/0
Device(config-if)# rmon promiscuous
Device(config-if)# exit
Device(config)# rmon queuesize 100
```

The following is a sample output from the **show rmon** command. All counters are from the time the device was initialized.

```
Device# show rmon

145678 packets input (34562 promiscuous), 0 drops
145678 packets processed, 0 on queue, queue utilization 15/100
```

## Example: Configuring RMON Event and Alarm Notifications

The following example shows how to enable the **rmon event** global configuration command:

```
Device> enable
Device# configure terminal
Device(config)# rmon event 1 log trap eventtrap description "High ifOutErrors" owner
ownerA
```

The following example shows how to create RMON event number 1, which is defined as High ifOutErrors, and generates a log entry when the event is triggered by an alarm. The user ownerA owns the row that is created in the event table by this command. This example also shows how to generate a Simple Network Management Protocol (SNMP) trap when the event is triggered.

The following is a sample output from the **show rmon events** command:

```
Device# show rmon events

Event 1 is active, owned by ownerA
Description is High ifOutErrors
Event firing causes log and trap to community rmonTrap, last fired 00:00:00
```

The following example shows how to configure an RMON alarm using the **rmon alarm** global configuration command:

```
Device> enable
Device# configure terminal
Device(config)# rmon alarm 10 ifEntry.20.1 20 delta rising-threshold 15 1 falling-
threshold 0 owner ownerA
```

The following example shows how to configure RMON alarm number 10. The alarm monitors the MIB variable ifEntry.20.1 once every 20 seconds until the alarm is disabled, and checks the change in the rise or fall of the variable. If the ifEntry.20.1 value shows a MIB counter increase of 15 or more, such as from 100000 to 100015, the alarm is triggered. The alarm in turn triggers event number 1, which is configured with the **rmon event** command. Possible events include a log entry or an SNMP trap. If the ifEntry.20.1 value changes by 0, the alarm is reset and can be triggered again.

The following is sample output from the **show rmon alarms** command

```
Device# show rmon alarms

Alarm 2 is active, owned by owner_a
Monitors ifEntry.20.1.20 every 20 seconds
Taking delta samples, last value was 0
Rising threshold is 15, assigned to event 12
Falling threshold is 0, assigned to event 0
On startup enable rising or falling alarm
```

The following example shows how to configure an RMON HC alarm using the **rmon hc-alarms** global configuration command:

```
Device> enable
Device# configure terminal
Device(config)# rmon hc-alarms 2 ifInOctets.2 20 delta rising-threshold 2000 2 falling-
threshold 1000 1 owner own
```

The following example shows how to configure RMON HC alarm number 2. The alarm monitors the MIB variable ifInOctets.2 once every 20 seconds until the alarm is disabled, and checks the change in the rise or fall of the variable. If the ifInOctets.2 value shows a MIB counter increase of 2000 or more, such as from 100000 to 103000, the alarm is triggered. The alarm in turn triggers event number 2, which is configured with the **rmon event** command. Possible events include a log entry or a Simple Network Management Protocol (SNMP) trap. If the ifInOctets.2 value changes by 1000 (falling threshold is 1000), the alarm is reset and can be triggered again.

To display the contents of the RMON HC alarm table of the device, use the **show rmon hc-alarms** command in privileged EXEC mode. The following is a sample output from the command:

```
Device# show rmon hc-alarms

Monitors ifInOctets.1 every 20 second(s)
Taking absolute samples, last value was 0
Rising threshold Low is 4096, Rising threshold Hi is 0,
    assigned to event 0
Falling threshold Low is 1280, Falling threshold Hi is 0,
    assigned to event 0
On startup enable rising or falling alarm
```

## Additional References for RMON Events and Alarms

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
CNS commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	<a href="#">Cisco IOS Network Management Command Reference 3.0</a>

### MIBs

MIB	MIBs Link
<ul style="list-style-type: none"> <li>RMON MIB</li> <li>HC-Alarm MIB</li> </ul>	<p>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:</p> <p><a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></p>

### Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for RMON Events and Alarms

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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**Table 1** Feature Information for Configuring RMON Support

Feature Name	Releases	Feature Information
RMON Events and Alarms	Cisco IOS XE Release 2.1	<p>The RMON Events and Alarms feature introduces the ability to combine RMON alarms and events (classes of messages that indicate traffic violations and various unusual occurrences over a network) with existing MIBs allows you to choose where proactive monitoring will occur.</p> <p>The following commands were introduced or modified: <b>rmon alarm</b> and <b>rmon event</b>.</p>

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