



Memory Threshold Notifications

The Memory Threshold Notifications feature allows you to reserve memory for critical notifications and to configure a router to issue notifications when available memory falls below a specified threshold.

History for the Memory Threshold Notifications Feature

Release	Modification
12.2(18)S	This feature was introduced.
12.0(26)S	This feature was integrated into Cisco IOS Release 12.0(26) S.
12.3(4)T	This feature was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This feature was integrated into Cisco IOS Release 12.2(27)SBC.

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Information About Memory Threshold Notifications

The Memory Threshold Notifications feature provides two ways to mitigate low-memory conditions on a router: notifications can be sent to indicate that free memory has fallen below a configured threshold, and memory can be reserved to ensure that sufficient memory is available to issue critical notifications. To implement the Memory Threshold Notifications feature, you should understand the following concepts:

- [Memory Threshold Notifications, page 2](#)
- [Memory Reservation, page 2](#)

Memory Threshold Notifications

Notifications are messages issued by the router. When you specify a memory threshold using the **memory free low-watermark** command, for example, the router issues a notification when available free memory falls below the specified threshold, and again once available free memory rises to 5 percent above the specified threshold. The following are examples of memory threshold notifications:

Available Free Memory Less Than the Specified Threshold

```
000029: *Aug 12 22:31:19.559: %SYS-4-FREEMEMLOW: Free Memory has dropped below 2000k
Pool: Processor Free: 66814056 freemem_lwm: 204800000
```

Available Free Memory Recovered to More Than the Specified Threshold

```
000032: *Aug 12 22:33:29.411: %SYS-5-FREEMEMRECOVER: Free Memory has recovered 2000k
Pool: Processor Free: 66813960 freemem_lwm: 0
```

Memory Reservation

Memory reservation for critical operations ensures that management processes, such as event logging, continue to function even when router memory is exhausted.

How to Define Memory Threshold Notifications

This section contains the following procedures:

- [Setting a Low Free Memory Threshold, page 3](#)
- [Reserving Memory for Critical Notifications, page 3](#)

Setting a Low Free Memory Threshold

To set a low free memory threshold, perform the following steps:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **memory free low-watermark {processor *threshold* | io *threshold*}**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# configure terminal	Enters global configuration mode.
Step 3	<code>memory free low-watermark processor <i>threshold</i></code> OR <code>memory free low-watermark io <i>threshold</i></code> Example: Router(config)# <code>memory free low-watermark processor 20000</code> OR Example: Router(config)# <code>memory free low-watermark io 20000</code>	Specifies a threshold in kilobytes of free processor or input/output (I/O) memory. To view acceptable values for the memory threshold, enter the following command: • memory free low-watermark processor ? OR • memory free low-watermark io ?

Reserving Memory for Critical Notifications

When a router is overloaded by processes, the amount of available memory might fall to levels insufficient for it to issue critical notifications. To reserve a region of memory to be used by the router for the issuing of critical notifications, perform the following steps:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **memory reserve critical *kilobytes***

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: <code>Router> enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: <code>Router# configure terminal</code>	Enters global configuration mode.
Step 3	<code>memory reserve critical <i>kilobytes</i></code> Example: <code>Router(config)# memory reserve critical 1000</code>	Reserves the specified amount of memory in kilobytes so that the router can issue critical notifications. <ul style="list-style-type: none"> • The amount of memory reserved for critical notifications cannot exceed 25 percent of total available memory.

Configuration Examples for Memory Threshold Notifications

The following examples show how to configure a router to issue notifications when available memory falls below a specified threshold and how to reserve memory for critical notifications:

- [Setting a Low Free Memory Threshold: Examples, page 4](#)
- [Reserving Memory for Critical Notifications: Example, page 5](#)

Setting a Low Free Memory Threshold: Examples

The following example specifies a threshold of 20000 KB of free processor memory before the router issues notifications:

Threshold for Free Processor Memory

```
Router(config)# memory free low-watermark processor 20000
```

The following example specifies a threshold of 20000 KB of free I/O memory before the router issues notifications:

Threshold for Free IO Memory

```
Router(config)# memory free low-watermark io 20000
```

If available free memory falls below the specified threshold, the router sends a notification message like this one:

```
000029: *Aug 12 22:31:19.559: %SYS-4-FREEMEMLOW: Free Memory has dropped below 20000k
Pool: Processor Free: 66814056 freemem_lwm: 204800000
```

Once available free memory rises to above 5 percent of the threshold, another notification message like this is sent:

```
000032: *Aug 12 22:33:29.411: %SYS-5-FREEMEMRECOVER: Free Memory has recovered 20000k
Pool: Processor Free: 66813960 freemem_lwm: 0
```

Reserving Memory for Critical Notifications: Example

The following example reserves 1000 KB of memory for critical notifications:

```
Router# memory reserved critical 1000
```



Note

The amount of memory reserved for critical notifications cannot exceed 25 percent of total available memory.

Additional References

The following sections provide references related to the Memory Threshold Notifications feature:

Related Documents

Related Topic	Document Title
Logging system messages	“Troubleshooting, Logging, and Fault Management” chapter in the <i>Cisco IOS Configuration Fundamentals Configuration Guide</i>

Standards

Standards	Title
No new or modified standards are supported by this feature and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents new commands only.

- [memory free low-watermark](#)
- [memory reserve critical](#)

memory free low-watermark

To configure a router to issue system logging message notifications when available memory falls below a specified threshold, use the **memory free low-watermark** command in global configuration mode. To disable memory threshold notifications, use the **no** form of this command.

memory free low-watermark {*processor threshold* | *io threshold*}

no memory free low-watermark

Syntax Description		
	processor <i>threshold</i>	Sets the processor memory threshold in kilobytes. When available processor memory falls below this threshold, a notification message is triggered. Valid values are 1 to 4294967295.
	io <i>threshold</i>	Sets the input/output (I/O) memory threshold in kilobytes. When available I/O memory falls below this threshold, a notification message is triggered. Valid values are 1 to 4294967295.

Defaults Memory threshold notifications are disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.2(18)S	This command was introduced.
	12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
	12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines Using this command, you can configure a router to issue a system logging message each time available free memory falls below a specified threshold (“low-watermark”). Once available free memory rises to 5 percent above the threshold, another notification message is generated.

Examples The following example specifies a free processor memory notification threshold of 20000 KB:

```
Router(config)# memory free low-watermark processor 20000
```

If available free processor memory falls below this threshold, the router sends a notification message like this one:

```
000029: *Aug 12 22:31:19.559: %SYS-4-FREEMEMLOW: Free Memory has dropped below 20000k
Pool: Processor Free: 66814056 freemem_lwm: 204800000
```

Once available free processor memory rises to a point 5 percent above the threshold, another notification message like this is sent:

```
000032: *Aug 12 22:33:29.411: %SYS-5-FREEMEMRECOVER: Free Memory has recovered 20000k
```

■ memory free low-watermark

```
Pool: Processor Free: 66813960 freemem_lwm: 0
```

Related Commands	Command	Description
	memory reserve critical	Reserves memory for use by critical processes.

memory reserve critical

To configure the size of the memory region to be used for critical notifications (system logging messages), use the **memory reserve critical** command in global configuration mode. To disable the reservation of memory for critical notifications, use the **no** form of this command.

memory reserve critical *kilobytes*

no memory reserve critical

Syntax Description	<i>kilobytes</i>	Specifies the amount of memory to be reserved in kilobytes. Valid values are 1 to 4294967295, but the value you specify cannot exceed 25 percent of total memory. The default is 100 kilobytes.
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Defaults 100 kilobytes of memory is reserved for the logging process.

Command Modes Global configuration

Command History	Release	Modification
	12.2(18)S	This command was introduced.
	12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
	12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines This command reserves a region of memory on the router so that, when system resources are overloaded, the router retains enough memory to issue critical system logging messages.



Note

Once the size of the reserved memory region is specified, any change to the specified value takes effect only after the current configuration is saved and the system has been reloaded.

Examples The following example shows how to reserve 1,000 KB of system memory for logging messages at the next system restart:

```
Router(config)# memory reserve critical 1000
```

Related Commands	Command	Description
	memory free	Configures a router to issue syslog notifications when available memory falls below a specified threshold.
	low-watermark	

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