



# Configuring Online Diagnostics

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## Information About Configuring Online Diagnostics

With online diagnostics, you can test and verify the hardware functionality of the device while the device is connected to a live network. The online diagnostics contain packet switching tests that check different hardware components and verify the data path and the control signals.

The online diagnostics detect problems in these areas:

- Hardware components
- Interfaces (Ethernet ports and so forth)
- Solder joints

Online diagnostics are categorized as on-demand, scheduled, or health-monitoring diagnostics. On-demand diagnostics run from the CLI; scheduled diagnostics run at user-designated intervals or at specified times when the device is connected to a live network; and health-monitoring runs in the background with user-defined intervals. The health-monitoring test runs for every 90, 100, or 150 seconds based on the test.

After you configure online diagnostics, you can manually start diagnostic tests or display the test results. You can also see which tests are configured for the device and the diagnostic tests that have already run.

## How to Configure Online Diagnostics

### Starting Online Diagnostic Tests

After you configure diagnostic tests to run on the Device, use the **diagnostic start** privileged EXEC command to begin diagnostic testing.

After starting the tests, you cannot stop the testing process.

Use this privileged EXEC command to manually start online diagnostic testing:

## SUMMARY STEPS

1. **diagnostic start switch** *number test* {*name* | *test-id* | *test-id-range* | **all** | **basic** | **complete** | **minimal** | **non-disruptive** | **per-port**}

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><b>diagnostic start switch</b> <i>number test</i> {<i>name</i>   <i>test-id</i>   <i>test-id-range</i>   <b>all</b>   <b>basic</b>   <b>complete</b>   <b>minimal</b>   <b>non-disruptive</b>   <b>per-port</b>}</p> <p><b>Example:</b></p> <pre>Device# diagnostic start switch 2 test basic</pre>	<p>Starts the diagnostic tests.</p> <p>You can specify the tests by using one of these options:</p> <ul style="list-style-type: none"> <li>• <i>name</i>—Enters the name of the test.</li> <li>• <i>test-id</i>—Enters the ID number of the test.</li> <li>• <i>test-id-range</i>—Enters the range of test IDs by using integers separated by a comma and a hyphen.</li> <li>• <b>all</b>—Starts all of the tests.</li> <li>• <b>basic</b>— Starts the basic test suite.</li> <li>• <b>complete</b>—Starts the complete test suite.</li> <li>• <b>minimal</b>—Starts the minimal bootup test suite.</li> <li>• <b>non-disruptive</b>—Starts the non-disruptive test suite.</li> <li>• <b>per-port</b>—Starts the per-port test suite.</li> </ul>

## Configuring Online Diagnostics

You must configure the failure threshold and the interval between tests before enabling diagnostic monitoring.

## Scheduling Online Diagnostics

You can schedule online diagnostics to run at a designated time of day or on a daily, weekly, or monthly basis for a Device. Use the **no** form of this command to remove the scheduling.

## SUMMARY STEPS

1. **configure terminal**
2. **diagnostic schedule module** *number test* {*name* | *test-id* | *test-id-range* | **all** | **basic** | **complete** | **minimal** | **non-disruptive** | **per-port**} {**daily** | **on** *mm dd yyyy hh:mm* | **port** *inter-port-number port-number-list* | **weekly** *day-of-week hh:mm*}

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><b>configure terminal</b></p> <p><b>Example:</b></p> <pre>Device# configure terminal</pre>	Enters the global configuration mode.
Step 2	<p><b>diagnostic schedule module</b> <i>number test {name   test-id   test-id-range   all   basic   complete   minimal   non-disruptive   per-port} {daily   on mm dd yyyy hh:mm   port inter-port-number port-number-list   weekly day-of-week hh:mm}</i></p> <p><b>Example:</b></p> <pre>Device(config)# diagnostic schedule module 3 test 1-5 on July 3 2013 23:10</pre>	<p>Schedules on-demand diagnostic tests for a specific day and time.</p> <p>When specifying the tests to be scheduled, use these options:</p> <ul style="list-style-type: none"> <li>• <i>name</i>—Name of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id</i>—ID number of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id-range</i>—ID numbers of the tests that appear in the <b>show diagnostic content</b> command output.</li> <li>• <b>all</b>—All test IDs.</li> <li>• <b>basic</b>—Starts the basic on-demand diagnostic tests.</li> <li>• <b>complete</b>—Starts the complete test suite.</li> <li>• <b>minimal</b>—Starts the minimal bootup test suite.</li> <li>• <b>non-disruptive</b>—Starts the non-disruptive test suite.</li> <li>• <b>per-port</b>—Starts the per-port test suite.</li> </ul> <p>You can schedule the tests as follows:</p> <ul style="list-style-type: none"> <li>• Daily—Use the <b>daily</b> <i>hh:mm</i> parameter.</li> <li>• Specific day and time—Use the <b>on</b> <i>mm dd yyyy hh:mm</i> parameter.</li> <li>• Weekly—Use the <b>weekly</b> <i>day-of-week hh:mm</i> parameter.</li> </ul>

## Configuring Health-Monitoring Diagnostics

You can configure health-monitoring diagnostic testing on a device while it is connected to a live network. You can configure the execution interval for each health-monitoring test, enable the device to generate a syslog message because of a test failure, and enable a specific test.

Use the **no** form of this command to disable testing.

By default, health monitoring is disabled, but the device generates a syslog message when a test fails.

Follow these steps to configure and enable the health-monitoring diagnostic tests:

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **diagnostic monitor interval modulenumbers test** {*name* | *test-id* | *test-id-range* | **all**} *hh:mm:ss milliseconds day*
4. **diagnostic monitor syslog**
5. **diagnostic monitor threshold module number number test** {*name* | *test-id* | *test-id-range* | **all**} **failure count** *count*
6. **diagnostic monitor modulenumbers test** {*name* | *test-id* | *test-id-range* | **all**}
7. **end**
8. **show diagnostic** { **content** | **post** | **result** | **schedule** | **status** | **switch** }
9. **show running-config**
10. **copy running-config startup-config**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Device&gt; enable</pre>	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> <pre>Device# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>diagnostic monitor interval modulenumbers test</b> { <i>name</i>   <i>test-id</i>   <i>test-id-range</i>   <b>all</b> } <i>hh:mm:ss milliseconds day</i> <b>Example:</b> <pre>Device(config)# diagnostic monitor interval module 2 test 1 12:30:00 750 5</pre>	Configures the health-monitoring interval of the specified tests. <p>When specifying the tests, use one of these parameters:</p> <ul style="list-style-type: none"> <li>• <i>name</i>—Name of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id</i>—ID number of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id-range</i>—ID numbers of the tests that appear in the <b>show diagnostic content</b> command output.</li> <li>• <b>all</b>—All of the diagnostic tests.</li> </ul> <p>When specifying the interval, set these parameters:</p> <ul style="list-style-type: none"> <li>• <i>hh:mm:ss</i>—Monitoring interval in hours, minutes, and seconds. The range for <i>hh</i> is 0 to 24, and the range for <i>mm</i> and <i>ss</i> is 0 to 60.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <i>milliseconds</i>—Monitoring interval in milliseconds (ms). The range is from 0 to 999.</li> <li>• <i>day</i>—Monitoring interval in the number of days. The range is from 0 to 20.</li> </ul>
<b>Step 4</b>	<p><b>diagnostic monitor syslog</b></p> <p><b>Example:</b></p> <pre>Device(config)# diagnostic monitor syslog</pre>	(Optional) Configures the switch to generate a syslog message when a health-monitoring test fails.
<b>Step 5</b>	<p><b>diagnostic monitor threshold module <i>number number</i> test {<i>name</i>   <i>test-id</i>   <i>test-id-range</i>   <b>all</b>} failure count <i>count</i></b></p> <p><b>Example:</b></p> <pre>Device(config)# diagnostic monitor threshold module 2 test 1 failure count 20</pre>	<p>(Optional) Sets the failure threshold for the health-monitoring tests.</p> <p>When specifying the tests, use one of these parameters:</p> <ul style="list-style-type: none"> <li>• <i>name</i>—Name of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id</i>—ID number of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id-range</i>—ID numbers of the tests that appear in the <b>show diagnostic content</b> command output.</li> <li>• <b>all</b>—All of the diagnostic tests.</li> </ul> <p>The range for the failure threshold <i>count</i> is 0 to 99.</p>
<b>Step 6</b>	<p><b>diagnostic monitor module <i>number</i> test {<i>name</i>   <i>test-id</i>   <i>test-id-range</i>   <b>all</b>}</b></p> <p><b>Example:</b></p> <pre>Device(config)# diagnostic monitor module 2 test 1</pre>	<p>Enables the specified health-monitoring tests.</p> <p>The <b>switch <i>number</i></b> keyword is supported only on stacking switches.</p> <p>When specifying the tests, use one of these parameters:</p> <ul style="list-style-type: none"> <li>• <i>name</i>—Name of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id</i>—ID number of the test that appears in the <b>show diagnostic content</b> command output.</li> <li>• <i>test-id-range</i>—ID numbers of the tests that appear in the <b>show diagnostic content</b> command output.</li> <li>• <b>all</b>—All of the diagnostic tests.</li> </ul>
<b>Step 7</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config)# end</pre>	Returns to privileged EXEC mode.

	Command or Action	Purpose
<b>Step 8</b>	<code>show diagnostic { content   post   result   schedule   status   switch }</code>	Display the online diagnostic test results and the supported test suites.
<b>Step 9</b>	<b>show running-config</b> <b>Example:</b> Device# <code>show running-config</code>	Verifies your entries.
<b>Step 10</b>	<b>copy running-config startup-config</b> <b>Example:</b> Device# <code>copy running-config startup-config</code>	(Optional) Saves your entries in the configuration file.

## Monitoring and Maintaining Online Diagnostics

### Configuration Examples for Online Diagnostic Tests

#### Examples: Start Diagnostic Tests

This example shows how to start a diagnostic test by using the test name:

```
Device# diagnostic start module 3 test DiagFanTest
```

This example shows how to start all of the basic diagnostic tests:

```
Device# diagnostic start module 3 test all
```

#### Example: Configure a Health Monitoring Test

This example shows how to configure a health-monitoring test:

```
Device(config)# diagnostic monitor threshold module 1 test 1 failure count 50
Device(config)# diagnostic monitor interval module 1 test TestPortAsicStackPortLoopback
```

#### Examples: Schedule Diagnostic Test

This example shows how to schedule diagnostic testing for a specific day and time on a specific switch:

```
Device(config)# schedule module 3 test TestThermal on October 2 2018 23:00
```

This example shows how to schedule diagnostic testing to occur weekly at a certain time on a specific switch:

```
Device(config)# diagnostic schedule module 3 test 1,2,4-6 weekly saturday 10:30
```

## Examples: Displaying Online Diagnostics

This example shows how to display on demand diagnostic settings:

```
Device# show diagnostic ondemand settings
```

```
Test iterations = 1  
Action on test failure = continue
```

This example shows how to display diagnostic events for errors:

```
Device# show diagnostic events event-type error
```

```
Diagnostic events (storage for 500 events, 0 events recorded)  
Number of events matching above criteria = 0
```

```
No diagnostic log entry exists.
```

This example shows how to display the description for a diagnostic test:

```
Device#show diagnostic description module 3 test all  
TestGoldPktLoopback :  
The GOLD packet Loopback test verifies the MAC level loopback  
functionality. In this test, a GOLD packet, for which doppler  
provides the support in hardware, is sent. The packet loops back  
at MAC level and is matched against the stored packet. It is a  
non-disruptive test.  
  
TestFantray :  
This test verifies all fan modules have been inserted and working  
properly on the board. It is a non-disruptive test and can be  
run as a health monitoring test.  
  
TestPhyLoopback :  
The PHY Loopback test verifies the PHY level loopback  
functionality. In this test, a packet is sent which loops back  
at PHY level and is matched against the stored packet. It is a  
disruptive test and cannot be run as a health monitoring test.  
  
TestThermal :  
This test verifies the temperature reading from the sensor is  
below the yellow temperature threshold. It is a non-disruptive  
test and can be run as a health monitoring test.  
  
TestScratchRegister :  
The Scratch Register test monitors the health of  
application-specific integrated circuits (ASICs) by writing values  
into registers and reading back the values from these registers.  
It is a non-disruptive test and can be run as a health monitoring  
test.
```

TestMemory :

This test runs the exhaustive ASIC memory test during normal switch operation. Switch utilizes mbist for this test. Memory test is very disruptive in nature and requires switch reboot after the test.

Device#

The below example is not applicable to the C9500-12Q, C9500-16X, C9500-24Q, C9500-40X models of the Cisco Catalyst 9500 Series Switches. This example shows how to display the boot up level:

Device# **show diagnostic bootup level**

Current bootup diagnostic level: minimal

Device#

## Additional References for Online Diagnostics

### Related Documents

Related Topic	Document Title
System management commands	

### MIBs

MIB	MIBs Link
All supported MIBs for this release.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

### Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>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.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>



## Feature Information for Configuring Online Diagnostics

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Everest 16.6.1	Online Diagnostics	With online diagnostics, you can test and verify the hardware functionality of the device while the device is connected to a live network.

Use Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>.

