



Configuring Online Diagnostics

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Information About Configuring Online Diagnostics

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

Online diagnostics detects 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 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

The following sections provide information about the various procedures that comprise the online diagnostics configuration.

Starting Online Diagnostic Tests

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

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

Use the **diagnostic start switch** privileged EXEC command to manually start online diagnostic testing:

Procedure

	Command or Action	Purpose
Step 1	<p>diagnostic start switch <i>number</i> test {<i>name</i> <i>test-id</i> <i>test-id-range</i> all basic complete minimal non-disruptive per-port}</p> <p>Example:</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"> • <i>name</i>: Enters the name of the test. • <i>test-id</i>: Enters the ID number of the test. • <i>test-id-range</i>: Enters the range of test IDs by using integers separated by a comma and a hyphen. • all: Starts all of the tests. • basic: Starts the basic test suite. • complete: Starts the complete test suite. • minimal: Starts the minimal bootup test suite. • non-disruptive: Starts the nondisruptive test suite. • per-port: Starts the per-port test suite.

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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 the **diagnostic schedule switch** command to remove the scheduling.

Procedure

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

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 enabled only for a few tests, and the device generates a syslog message when a test fails.

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

Procedure

	Command or Action	Purpose
Step 1	enable Example: <pre>Device> enable</pre>	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	configure terminal Example: <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 3	diagnostic monitor interval switch <i>number</i> test {<i>name</i> <i>test-id</i> <i>test-id-range</i> all} <i>hh:mm:ss milliseconds day</i> Example: <pre>Device(config)# diagnostic monitor interval switch 2 test 1 12:30:00 750 5</pre>	Configures the health-monitoring interval of the specified test. When specifying a test, use one of these parameters: <ul style="list-style-type: none"> • <i>name</i>: Name of the test that appears in the show diagnostic content command output. • <i>test-id</i>: ID number of the test that appears in the show diagnostic content command output. • <i>test-id-range</i>: ID numbers of the tests that appear in the show diagnostic content command output. • all: All the diagnostic tests. When specifying the interval, set these parameters: <ul style="list-style-type: none"> • <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. • <i>milliseconds</i>: Monitoring interval, in milliseconds (ms). The range is from 0 to 999.

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

	Command or Action	Purpose
Step 7	end Example: Device (config) # end	Returns to privileged EXEC mode.
Step 8	show diagnostic { content post result schedule status switch }	(Optional) Display the online diagnostic test results and the supported test suites.
Step 9	show running-config Example: Device# show running-config	(Optional) Verifies your entries.
Step 10	copy running-config startup-config Example: Device# copy running-config startup-config	(Optional) Saves your entries in the configuration file.

Monitoring and Maintaining Online Diagnostics

You can display the online diagnostic tests that are configured for a device or a device stack and check the test results by using the privileged EXEC **show** commands in this table:

Table 1: Commands for Diagnostic Test Configuration and Results

Command	Purpose
show diagnostic content switch [<i>number</i> all] The below command applies to the C9500-12Q, C9500-16X, C9500-24Q, C9500-40X models of the Cisco Catalyst 9500 Series Switches. show diagnostic content	Displays the online diagnostics configured for a switch.
show diagnostic status	Displays the diagnostic tests that are running currently. .
show diagnostic result switch [<i>number</i> all] [detail test { <i>name</i> <i>test-id</i> <i>test-id-range</i> all } [detail]]	Displays the online diagnostics test results.

Command	Purpose
show diagnostic switch [<i>number</i> all] [detail] The below command applies to the C9500-12Q, C9500-16X, C9500-24Q, C9500-40X models of the Cisco Catalyst 9500 Series Switches. show diagnostic detail	Displays the online diagnostics test results.
show diagnostic schedule [<i>number</i> all]	Displays the online diagnostics test schedule.
show diagnostic post The below command applies to the C9500-12Q, C9500-16X, C9500-24Q, C9500-40X models of the Cisco Catalyst 9500 Series Switches. show post	Displays the POST results. (The output is the same as the show post command output.)
show diagnostic events { <i>event-type</i> <i>module</i> }	Displays diagnostic events such as error, information, or warning based on the test result.
show diagnostic description module [<i>number</i>] test { <i>name</i> <i>test-id</i> all }	Displays the short description of the results from an individual test or all the tests.

Configuration Examples for Online Diagnostics

The following sections provide examples of online diagnostics configurations.

Examples: Start Diagnostic Tests

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

```
Device#
diagnostic start switch 2 test DiagFanTest
```

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

```
Device# diagnostic start switch 1 test all
```

Example: Configure a Health-Monitoring Test

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

```
Device(config)# diagnostic monitor threshold switch 1 test 1 failure count 50
```

```
Device(config)# diagnostic monitor interval switch 1 test TestPortAsicStackPortLoopback
```

Example: Schedule Diagnostic Test

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

```
Device(config)# diagnostic schedule test DiagThermalTest on June 3 2013 22:25
```

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

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

Example: 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 switch 1 test all
```

```
DiagGoldPktTest :
```

```
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.
```

```
DiagThermalTest :
```

```
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.
```

```
DiagFanTest :
```

```
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.
```

```
DiagPhyLoopbackTest :
```

```
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.
```

```
DiagScratchRegisterTest :
```

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.

DiagPoETest :

This test checks the PoE controller functionality. This is a disruptive test and should not be performed during normal switch operation.

DiagMemoryTest :

This test runs the exhaustive ASIC memory test during normal switch operation. NG3K 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
For complete syntax and usage information for the commands used in this chapter.	<i>Command Reference (Catalyst 9500 Series Switches)</i>

Feature Information for Configuring Online Diagnostics

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.

Use the Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 2: Feature Information for Configuring Online Diagnostics

Feature Name	Release	Feature Information
Online Diagnostics	Cisco IOS XE Everest 16.5.1a	With online diagnostics, you can test and verify the hardware functionality of the device while the device is connected to a live network.