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 or switch stack and the diagnostic tests that have already run.

Generic Online Diagnostics (GOLD)

Note

- Before you enable online diagnostics tests, enable console logging to see all the warning messages.
- While tests are running, all the ports are shut down because a stress test is being performed with looping ports internally and external traffic might affect the test results. The switch must be rebooted to bring the switch to normal operation. When you issue the command to reload a switch, the system will ask you if the configuration should be saved. Do not save the configuration.
- If you are running the tests on other modules, after a test is initiated and complete, you must reset the module.

TestPortTxMonitoring

This test periodically monitors data-path traffic in the transmitted direction of each network port that is physically connected to a device with status as UP. This test is completed within a millisecond per port. This test also monitors the transmit counters at the ASIC level to verify that the ports are not stuck. The test displays syslog messages, and users can take corrective actions using the Cisco IOS Embedded Event Manager (EEM).

Configure the time interval and threshold by entering the **diagnostic monitor interval** and **diagnostic monitor threshold** commands, respectively. The test leverages the Cisco Discovery Protocol (CDP) protocol that transmits packets. The test runs every 75 seconds, and the failure threshold is set to five by default.

Attribute	Description
Disruptive or Nondisruptive	Nondisruptive.
Recommendation	Do not disable.
Default	On.
Intitial Release	Cisco IOS XE Everest 16.9.1.
Corrective action	Displays a syslog message indicating that a port has failed.
Hardware support	All modules, including supervisor engines.

TestUnusedPortLoopback

This test periodically verifies the data path between the supervisor module and network ports of a module during runtime to determine if any incoming network interface ports are locked. In this test, a Layer 2 packet is flooded on to the VLAN associated with the test port and the inband port of the supervisor engine. The packet loops back into the test port and returns to the supervisor engine on the same VLAN. This test runs only on unused (admin down, that is, the ports are shut down) network ports irrespective of whether a cable is connected or not, and completes within a millisecond per port. This test substitutes the lack of a nondisruptive loopback test in current ASICs, and test runs every 60 seconds.

Attribute	Description
Disruptive or Nondisruptive	Nondisruptive.
Recommendation	Do not disable. This test is automatically disabled during CPU-usage spikes to maintain accuracy.
Default	On.
Intitial Release	Cisco IOS XE Everest 16.9.1.
Corrective action	Displays a syslog message indicating that a port has failed. In modules other than supervisor engines, if all port groups fail (for example, at least one port per port ASIC fails more than the failure threshold for all port ASICs), the default action is to reset the module and power down the module after two resets.
Hardware support	All modules, including supervisor engines.

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:

Procedure

	Command or Action	Purpose
Step 1	**diagnostic start module** *number* **test** {*name* | *test-id* | *test-id-range* | **all** | **basic** | **complete** | **minimal** | **non-disruptive** | **per-port**} **Example:** `Device# diagnostic start module 2 test basic`	Starts the diagnostic tests. The **switch** *number* keyword is supported only on stacking device. You can specify the tests by using one of these options: • *name*—Enters the name of the test. • *test-id*—Enters the ID number of the test. • *test-id-range*—Enters the range of test IDs by using integers separated by a comma and a hyphen. • **all**—Starts all of the tests.

	Command or Action	Purpose
		• **basic**— Starts the basic test suite. • **complete**—Starts the complete test suite. • **minimal**—Starts the minimal bootup test suite. • **non-disruptive**—Starts the non-disruptive test suite. • **per-port**—Starts the per-port test suite.

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.

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device #configure terminal`	Enters global configuration mode.
Step 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*} **Example:** `Device(config)# diagnostic schedule module 3 test 1-5 on July 3 2013 23:10`	Schedules on-demand diagnostic tests for a specific day and time. The **switch** *number* keyword is supported only on stacking switches. When specifying the tests to be scheduled, use these options: • *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.

	Command or Action	Purpose
		• **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 non-disruptive test suite. • **per-port**—Starts the per-port test suite. You can schedule the tests as follows: • Daily—Use the **daily** *hh:mm* parameter. • Specific day and time—Use the **on** *mm dd yyyy hh:mm* parameter. • Weekly—Use the **weekly** *day-of-week hh:mm* 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 disabled, but 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:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**diagnostic monitor interval module***number* **test** {*name* | *test-id* | *test-id-range* | **all**} *hh:mm:ss milliseconds day* **Example:** `Device(config)# diagnostic monitor interval module 2 test 1 12:30:00 750 5`	Configures the health-monitoring interval of the specified tests. The **switch** *number* keyword is supported only on stacking switches. When specifying the tests, use one of these parameters: • *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 of the diagnostic tests. When specifying the interval, set these parameters: • *hh:mm:ss*—Monitoring interval in hours, minutes, and seconds. The range for *hh* is 0 to 24, and the range for *mm* and *ss* is 0 to 60. • *milliseconds*—Monitoring interval in milliseconds (ms). The range is from 0 to 999. • *day*—Monitoring interval in the number of days. The range is from 0 to 20.
Step 4	**diagnostic monitor syslog** **Example:** `Device(config)# diagnostic monitor syslog`	(Optional) Configures the switch to generate a syslog message when a health-monitoring test fails.
Step 5	**diagnostic monitor threshold module** *number number* **test** {*name* | *test-id* | *test-id-range* | **all**} **failure count** *count* **Example:** `Device(config)# diagnostic monitor threshold module 2 test 1 failure count 20`	(Optional) Sets the failure threshold for the health-monitoring tests. When specifying the tests, use one of these parameters: • *name*—Name of the test that appears in the **show diagnostic content** command output.

	Command or Action	Purpose
		• *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 of the diagnostic tests. The range for the failure threshold *count* is 0 to 99.
Step 6	**diagnostic monitor module***number* **test** {*name* | *test-id* | *test-id-range* | **all**} **Example:** `Device(config)# diagnostic monitor module 2 test 1`	Enables the specified health-monitoring tests. The **switch** *number* keyword is supported only on stacking switches. When specifying the tests, use one of these parameters: • *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 of the diagnostic tests.
Step 7	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.
Step 8	**show diagnostic** { **content** | **post** | **result** | **schedule** | **status** | **switch** }	Display the online diagnostic test results and the supported test suites.
Step 9	**show running-config** **Example:** `Device# show running-config`	Verifies your entries.
Step 10	**copy running-config startup-config** **Example:**	(Optional) Saves your entries in the configuration file.

	Command or Action	Purpose
	`Device# copy running-config startup-config`	

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#
```

Additional References for Online Diagnostics

Related Documents

Related Topic	Document Title
For complete syntax and usage information for the commands used in this chapter.	

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.