



## Using Node-To-Node Tests

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Node-To-Node tests monitor the response time and availability of multiprotocol networks on both an end-to-end and a hop-by-hop basis. After collecting this data, you can use the Operations Manager graphing function to examine changes in network performance metrics. You can select, display, and chart network performance data in real time. See [Viewing Test Trending, page 10-15](#). Also, Node-To-Node tests can be configured to trigger events when certain thresholds are crossed. These events appear in the Monitoring Dashboard displays.

This section describes how to create, edit, remove, and analyze Node-to-Node tests in IP Communications Operations Manager (Operations Manager), as well as how to suspend or resume Node-to-Node test operations.

This section includes the following topics:

- [Working with Node-To-Node Tests, page 10-1](#)
- [Managing Test Operations, page 10-14](#)
- [Working with Test Data, page 10-18](#)

## Working with Node-To-Node Tests

You can create Node-To-Node tests one at a time, or you can import a file to create more than one test at a time. Up to 150 Node-To-Node tests can exist at a time.



### Note

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If you ever need to uninstall Operations Manager, be sure to delete all the node-to-node tests from the application before you uninstall it. If you do not delete these tests, they will continue to run on the router. For instructions on deleting, see [Deleting a Test, page 10-14](#).

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This section includes the following topics:

- [Getting Started: Required Cisco IOS and IP SLA Versions, page 10-2](#)
- [Creating a Single Node-To-Node Test, page 10-2](#)
- [Importing Multiple Tests, page 10-10](#)
- [Editing Tests, page 10-13](#)
- [Deleting a Test, page 10-14](#)

## Getting Started: Required Cisco IOS and IP SLA Versions

Node-to-node tests rely upon Cisco IOS IP SLA technology. [Table 10-1](#) lists the versions of IP SLA and Cisco IOS that are required to successfully configure and run each type of node-to-node test.

**Table 10-1** IP SLA Mapping for Node-to-Node Tests

Test	Required Versions	
	IP SLA	Cisco IOS
Ping Echo	2.1.0 and higher	12.0(5)T, 12.1(1), and higher
Ping Path Echo		
UDP Echo		
Data Jitter <b>Note</b> Without ICPIF/MOS values.	2.2.0 and higher	12.3(4)T and higher
Data Jitter <b>Note</b> With ICPIF/MOS values.		
Gatekeeper Registration Delay		
VoIP Post Dial Delay		

To see device families on which node-to-node tests are supported, see [Supported Devices Table for IP Communications Operations Manager 1.0](#) on Cisco.com.

## Creating a Single Node-To-Node Test

Before you can create a test, the source device must be monitored by Operations Manager. See [Using Device Management, page 15-1](#) for more information.

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- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
- Step 2** Click **Create**. The information required for creating Node-to-Node tests is different for each test operation type. See the following for details:
- [Data Jitter, page 10-3](#)—Measures packet loss, round-trip latency, and delay variance (or jitter) in IP networks by generating synthetic UDP traffic.
  - [Ping Echo, page 10-5](#)—Measures end-to-end response time between a source device and any IP-enabled device.
  - [Ping Path Echo, page 10-6](#)—Measures hop-by-hop response time between a source device and any IP device on the network by discovering the path using traceroute, and then measuring response time between the source device and each hop in the path.
  - [UDP Echo, page 10-8](#)—Measures UDP response time between a source device and any IP-enabled device.
  - [VoIP Post-Dial Delay, page 10-9](#)—Measures call setup time using SIP or H323.
  - [Gatekeeper Registration Delay, page 10-10](#)—Measures the time required for a gateway to register with a gatekeeper.



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**Note** For VoIP Post-Dial Delay or Gatekeeper Registration Delay tests to run, the source gateway must have SIP or H323 configured on it.

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## Data Jitter

This test uses the UDP protocol to measure latency, one-way jitter, and packet drop. Jitter is interpacket delay. The source device sends a number of packets from the source device to the destination device with a specified interpacket delay. The destination (an IP SLA Responder) time stamps the packet and sends it back. Using this data, the one-way positive and negative jitter (from the source to the destination and back again), packet loss (also from the source to the destination and back again), and round-trip latency are obtained.

Positive jitter occurs when the one-way delay for a packet is longer than the previous packet delay. Negative jitter occurs when the one-way delay for a packet is shorter than the previous packet delay. If the sequence numbers become jumbled, the test reflects the error.

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**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.

**Step 3** In the Test Type pull-down menu select **Data Jitter**.

**Step 4** In the Source pane, do the following:

- Using the device selector, select a source device.



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**Note** If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

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- Select a source interface setting. You can leave it at **Default**, or enter a new setting.

**Step 5** In the Destination pane, do the following:

- Using the device selector, select a destination device.
- Enter a UDP port for the destination device (the default value is 16400). This is the port on the destination device to which packets are sent by the source device.



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**Note** If you want to switch the source and destination devices with each other, click the Swap Source and Destination button.

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**Step 6** In the Parameters pane, you can set the following parameters:

**Table 10-2** Data Jitter Test Parameters

Parameter	Default Value	Available Values	Description
Codec Type	—	<ul style="list-style-type: none"> <li>G.711ulaw</li> <li>G.711alaw</li> <li>G.729</li> </ul>	Used to determine the packet interval and the request payload.
Call Duration	8	1 - 59 seconds	Time of the call.
Voice Quality Expectation	Land line	<ul style="list-style-type: none"> <li>Land line</li> <li>Wireless campus</li> <li>Wireless on the move</li> <li>Multi-hop</li> </ul>	Corresponds to the Access Advantage factor of Mean Opinion Scores (MOS) and Calculated Planning Impairment Factor (ICPIF).
IP QoS	IP Precedence	<ul style="list-style-type: none"> <li>IP Precedence</li> <li>DSCP</li> </ul>	Defines the quality of service policies for the IP SLA packets.
	5	<ul style="list-style-type: none"> <li>IP Precedence—0 (none) through 7 (high)</li> <li>DSCP—0 (none) through 8 (CS1), 9, and 10 (AF11)</li> </ul>	This is converted to Type of Service (TOS) and set on the device.

**Step 7** In the Threshold pane, you can change the following settings:

**Table 10-3** Data Jitter Test Threshold Settings

Parameter	Default Value	Description
Source to Destination	3% (packet loss) 40 msec (jitter)	Threshold setting for packet loss and jitter.
Destination to Source	3% (packet loss) 40 msec (jitter)	Threshold setting for packet loss and jitter.
Average Latency	300 m/secs	Threshold setting for latency.
Node-to-Node Quality	Fair	Threshold setting for the test's quality.

**Step 8** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.
  - Choose how often you want the test to run.
  - Enter the time between which you want the test to run.

- Select the days on which the test should run.
- Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 9** Click **OK**.

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### Troubleshooting Note: Selecting a Source Device

If you recently added an IP SLA-enabled device and it does not appear in the IP SLA Devices group in the selector in the Source pane on the Node-to-Node Test Configuration dialog box, refresh the device group membership.

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- Step 1** Select **Devices > Device Groups**. The Group Administration and Configuration page appears.
- Step 2** In the Group Selector, select the OM@<server> group where <server> is the name of your server.
- Step 3** Click the **Refresh** button. A confirmation dialog box appears.
- Step 4** Click **Yes**. A progress bar appears. A success message is displayed.
- Step 5** Click **OK**.
- Step 6** If it is open, close the Node-to-Node Test Configuration dialog box. When you open it again, refreshed device groups are displayed in the Source pane.
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## Ping Echo

This test measures end-to-end latency information using ICMP. The test sends ICMP packets from the source device to the destination device and measures the time it takes to complete the round trip.

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- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
- Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.
- Step 3** In the Test Type pull-down menu select **Ping Echo**.
- Step 4** In the Source pane, do the following:

- Using the device selector, select a source device.



**Note** If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

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- Select a source interface setting. You can leave it at **Default**, or enter a new setting.

**Step 5** In the Destination pane, using the device selector, select a destination device.



**Note** If you want to switch the source and destination devices with each other, click the Swap Source and Destination button.

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**Step 6** In the Parameters pane, you can set the following parameters:

**Table 10-4** Ping Echo Test Parameters

Parameter	Default Value	Available Values	Description
Request Payload	32 bytes	28 to 16384 bytes	A default ICMP Ping packet has 32 bytes. Allows for variably sized operations.
IP QoS	IP Precedence	<ul style="list-style-type: none"> <li>IP Precedence</li> <li>DSCP</li> </ul>	Defines the quality of service policies for the IP SLA packets.
	0 (none)	<ul style="list-style-type: none"> <li>IP Precedence—0 (none) through 7 (high)</li> <li>DSCP—0 (none) through 8 (CS1), 9, and 10 (AF11)</li> </ul>	This is converted to TOS and set on the device.
Show Link in Service Level View	Not selected	—	Displays this test as a virtual link in the Service Level View.

**Step 7** If you want to change the Round-Trip Response Time Threshold, in the Thresholds pane, select the check box and enter a new setting (default is 300 m/secs).

**Step 8** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.
  - Choose how often you want the test to run.
  - Enter the time between which you want the test to run.
  - Select the days on which the test should run.
  - Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 9** Click **OK**.

## Ping Path Echo

This test measures hop-by-hop latency information using ICMP Ping and traceroute.

**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.

**Step 3** In the Test Type pull-down menu select **Ping Path Echo**.

**Step 4** In the Source pane, do the following:

- Using the device selector, select a source device.



**Note** If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

- Select a source interface setting. You can leave it at **Default**, or enter a new setting.

**Step 5** In the Destination pane, using the device selector, select a destination device.



**Note** If you want to switch the source and destination devices with each other, click the Swap Source and Destination button.

**Step 6** In the Parameters pane, you can set the following parameters:

**Table 10-5** Ping Path Echo Test Parameters

Parameter	Default Value	Available Values	Description
Request Payload	32 bytes	28 to 16384 bytes	A default ICMP Ping packet has 32 bytes. Allows for variably sized operations.
IP QoS	IP Precedence	<ul style="list-style-type: none"> <li>• IP Precedence</li> <li>• DSCP</li> </ul>	Defines the quality of service policies for the IP SLA packets.
	0 (none)	<ul style="list-style-type: none"> <li>• IP Precedence—0 (none) through 7 (high)</li> <li>• DSCP—0 (none) through 8 (CS1), 9, and 10 (AF11)</li> </ul>	This is converted to TOS and set on the device.

**Step 7** If you want to change the Round-Trip Response Time threshold, in the Thresholds pane, select the check box and enter a new setting (default is 300 m/secs).

**Step 8** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.
  - Choose how often you want the test to run.
  - Enter the time between which you want the test to run.
  - Select the days on which the test should run.
  - Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 9** Click **OK**.

## UDP Echo

This test measures UDP server latency. The UDP echo test sends a packet with the configured number of bytes to the destination with the specified port number and measures the response time. There are two destination device types for the UDP echo operation: RTR Responders, which use IP SLA, and UDP servers, which do not.

**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.

**Step 3** In the Test Type pull-down menu select **UDP Echo**.

**Step 4** In the Source pane, do the following:

- Using the device selector, select a source device.



**Note** If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

- Select a source interface setting. You can leave it at **Default**, or enter a new setting.

**Step 5** In the Destination pane, using the device selector, select a destination device.

**Step 6** Enter the UDP port number (the default value is 7) for the destination device to use when sending response packets.



**Note** If you want to switch the source and destination devices with each other, click the Swap Source and Destination button.

**Step 7** In the Parameters pane, you can set the following parameters:

**Table 10-6** UDP Echo Test Parameters

Parameter	Default Value	Available Values	Description
Request Payload	16 bytes	4 to 1500 bytes	Allows for variably sized operations.
IP QoS	IP Precedence	<ul style="list-style-type: none"> <li>IP Precedence</li> <li>DSCP</li> </ul>	Defines the quality of service policies for the IP SLA packets.
	0 (none)	<ul style="list-style-type: none"> <li>IP Precedence—0 (none) through 7 (high)</li> <li>DSCP—0 (none) through 8 (CS1), 9, and 10 (AF11)</li> </ul>	This is converted to TOS and set on the device.

**Step 8** If you want to change the Round-Trip Response Time threshold, in the Thresholds pane, select the check box and enter a new setting (default is 300 m/secs).

**Step 9** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.

- Choose how often you want the test to run.
- Enter the time between which you want the test to run.
- Select the days on which the test should run.
- Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 10** Click **OK**.

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## VoIP Post-Dial Delay

This test sends either H.323 or SIP call setup messages or receive messages, and measures the response time for post-dial delay.



**Note** For the VoIP Post-Dial Delay test to run, the source gateway must have SIP or H323 configured on it.

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**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.

**Step 3** In the Test Type pull-down menu select **VoIP Post-Dial Delay**.

**Step 4** In the Source pane, using the device selector, select a source device.



**Note** If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

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**Step 5** In the Destination pane, enter the phone number of the destination device.

**Step 6** In the Parameters pane, for Completion Time For, select either the **Ring** or **Answer** radio button.

You need to determine if you want to measure post-dial delay until the phone rings or until it is answered.

**Step 7** If you want to change the ringback response time threshold, in the Thresholds pane, select the check box and enter a new setting (default is 300 m/secs).

**Step 8** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.
  - Choose how often you want the test to run.
  - Enter the time between which you want the test to run.
  - Select the days on which the test should run.
  - Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 9** Click **OK**.

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## Gatekeeper Registration Delay

This test sends a lightweight Registration Request (RRQ) from an H.323 gateway to an H.323 gatekeeper and receives a Registration Confirmation (RCF) from the gatekeeper. The test then measures the response time.


**Note**

For the Gatekeeper Registration Delay test to run, the source gateway must have SIP or H323 configured on it.

**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Click **Create**. The Node-to-Node Test Configuration page appears.

**Step 3** In the Test Type pull-down menu select **Gatekeeper Registration Delay**.

**Step 4** In the Source pane, using the device selector, select a source device.


**Note**

If you cannot find a recently added device, refresh the device groups. See [Troubleshooting Note: Selecting a Source Device, page 10-5](#).

**Step 5** If you want to change the Registration Response Time threshold, in the Thresholds pane, select the check box and enter a new setting (default is 300 m/secs).

**Step 6** In the Run pane configure when the test should run.

- If you want the test to run only once, select the **Once** radio button.
- If you want to schedule the test to run at certain intervals, do the following:
  - Select the schedule radio button.
  - Choose how often you want the test to run.
  - Enter the time between which you want the test to run.
  - Select the days on which the test should run.
  - Enter a test name. The test name cannot contain tabs, question marks, quotation marks, asterisks, semicolons, commas, colons, forward slashes, straight slashes, or backslashes.

**Step 7** Click **OK**.

## Importing Multiple Tests

You can import up to 64 tests, the maximum that Operations Manager can support, by importing a seed file.

**Before You Begin**

- Before you can import a test, you must first add the source devices. See [Importing Devices into Operations Manager, page 15-8](#).
- Make sure your seed file is formatted correctly. See [Creating a Node-To-Node Test Import File, page 10-11](#) for more information.
- Place the seed file on the server, in the `NMSROOT\ImportFiles` directory.



**Note** NMSROOT is the directory where IP Communications Operations Manager is installed on your system. If you selected the default directory during installation, it is C:\Program Files\CSCOPx.

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- Step 1** Select **Diagnostics > Node-To-Node Tests**. The Node-To-Node Tests page appears.
- Step 2** Click **Import**. The Import Node-to-Node Tests page appears.
- Step 3** In the Seed Filename field, enter the name of the seed file that contains the test information; for example, Node\_to\_nodetestImport.txt. The file must be located on the server in the directory that is displayed next to the Server Path field name.
- Step 4** Click **OK**.

Operations Manager performs the following actions:

- If this is a file you have imported before, Operations Manager checks to see if any of the devices exist in Operations Manager. If all the information in the import file is the same as what already exists in Operations Manager, a message to that effect appears. Click **OK**.
- Operations Manager displays an error message if there are problems with the format of the import file. Click **OK**, then open the file and correct the listed problems. You cannot import the file until all problems are corrected.
- If there are no errors, a confirmation dialog box appears. The dialog box displays the number of new tests created and the number of tests that will be updated. Click **Yes**.

## Creating a Node-To-Node Test Import File

You can import up to 64 tests, the maximum that Operations Manager can support at one time. You can find an example of an import file in the <NMSROOT>\Importfiles folder.



**Note** NMSROOT is the directory where Operations Manager is installed on your system. If you selected the default directory during installation, it is C:\Program Files\CSCOPx.

For details on formatting test seed files for specific operations, see [Formatting Node-To-Node Test Import Files, page 10-12](#).

All test seed files should have the following information:

- Test name
- Operation type
- Source device name
- Destination device information
- Operation parameters
- Schedule parameters

The general format for a test seed file is as follows:

- If you create the import file manually, the import file header must say:

```
Cisco Systems Node-to-Node test import, version=3.0;type=CSV;source=manual
```

- All values must be separated by commas.
- Start and end dates must be formatted as mm/dd/yyyy; for example, 12/01/2004.
- Start and end times must be formatted on a 24-hour clock as hh:mm; for example, 23:30.
- Entering the source-ip-address is optional. This address is the same as the alternate test address.
- Fill in optional fields with double quotation marks; for example, "".
- For all days of the week, enter a one; otherwise, it should be a zero. If the entry for all days of the week is zero, then you need to enter the days of the week. Separate the days of the week with a vertical bar (|); for example, Mon|Tue|Thu|Fri.

## Formatting Node-To-Node Test Import Files

### Ping Echo test

```
<testName>,Ping-Echo,<source>,<source-ip-address>,<Destination-Name>,<sample-interval>,<IP
QoSType><IPQoSValue>,<request-payload>,<LSRHop1|LSRop2|LSRHop3|LSRHop4|LSRHop5|LSRHop6|LSR
Hop7|LSRHop8>,<completionTimeThreshold or "">,<start-time>,<end-time>,<AllDaysOfWeek. 1
for all days otherwise 0>,<DaysOfWeek, if AllDaysOfWeek is 0>
```

```
echo-import1,Ping-Echo,source-1,"",dest-1,1,DSCP,9,64,lsr-hop1|lsr-hop2,300,09:00,17:00,1
echo-import2,Ping-Echo,source-1,"",dest-1,1,IPPrecedence,4,64,lsr-hop1|lsr-hop2,"",09:00,1
7:00,0,mon|tue|wed|fri
```

LSRHop is an optional field.

### Ping Path Echo test

```
<testName>,Ping-Path-Echo,<source>,<source-ip-address>,<Destination-Name>,<sample-
interval>,<IPQoSType>,<IPQoSValue>,<request-payload>,<completionTimeThreshold or "">
,<start-time>,<end-time>,<AllDaysOfWeek. 1 for all days otherwise 0>,<DaysOfWeek, if
AllDaysOfWeek is 0>
```

```
ping-path-import2,Ping-Path-Echo,source-2,"",dest-2,3,DSCP,10,32,250,17:00,23:00,0,mon|tue
|wed|thu|fri
ping-path-import2,Ping-Path-Echo,source-2,"",dest-2,3,IPPrecedence,5,32,"",17:00,23:00,1
```

### UDP Echo test

```
<testName>,UDP-Echo,<source>,<source-ip-address>,<Destination-Name>,<destination-type>,<sa
mple-interval>,<IPQoSType>,<IPQoSValue>,<destination-port>,<request-payload>,<
completionTimeThreshold or "">,<start-time>,<end-time>,<AllDaysOfWeek. 1 for all days
otherwise 0>,<DaysOfWeek, if AllDaysOfWeek is 0>
```

```
udp-import1,UDP-Echo,source-1,"",udp-dest,IPSLA-Responder,1,IPPrecedence,4,2001,
32,300,17:00,23:00,0,mon|tue|wed|thu|fri
udp-import2,UDP-Echo,source-1,"",udp-dest,IPSLA-Responder,1,DSCP,48,2001,32,"",
17:00,23:00,1
```

The destination type can be either UDP-Server or IP SLA-Responder.

### Data Jitter test

Without Codec (Node-to-Node Quality) Support:

```
<testName>,Data-Jitter,<source>,<source-ip-address>,<IPSLA-Responder>,<sample-interval>,
<IPQoSType>,<IPQoSValue>,<request-payload>,<inter-packet-interval>,<number-of-packets>,
<destination-port>,<pktlossSDThreshold or "">,<pktlossDSThreshold or "">,<
```

```
<jitterSDThreshold or "">,<jitterDSThreshold or "">,<avgLatencyThreshold or "">,
<start-time>,<end-time>,<AllDaysOfWeek. 1 for all days otherwise 0>,<DaysOfWeek, if
AllDaysOfWeek is 0>
```

```
jitter-import1,Data-Jitter,source-1,source-1,dest-with-IPSLA-Responder,3,DSCP,24,64,30,20,
2002,30,30,25,25,50,17:00,23:00,0,mon|tue|wed|thu|fri
```

WITH Codec (Node-to-Node Quality) Support, valid for IOS version 12.3(4)T or higher:

```
<testName>,<Data-Jitter>,<source>,<source-ip-address>,<IPSLA-Responder>,<sample-interval>,
<IPQoSType>,<IPQoSValue>,<codecType>,<voiceQualityBenchMark>,<number-of-packets>,
<destination-port>,<pktlossSDThreshold or "">,<pktlossDSThreshold or "">,
<jitterSDThreshold or "">,<jitterDSThreshold or "">,<avgLatencyThreshold or "">,
<nodeToNodeQualityThreshold or "">,<start-time>,<end-time>,<AllDaysOfWeek. 1 for all days
otherwise 0>,<DaysOfWeek, if AllDaysOfWeek is 0>
```

```
jitter-import2,Data-Jitter,source-1,source-1,dest-with-IPSLA-Responder,3,IPPrecedence,5,G.
711ulaw,LandLine,20,2002,30,30,25,25,50,"",17:00,23:00,1
```

Read-community-string is an optional field. If you specify a community string, Operations Manager validates the IP SLA Responder.

#### VoIP Post-Dial Delay test

```
<testName>,Voip-Dial-Delay,<source GateWay>,<CalledNumber>,<AdminDetectPoint>,
<sample-interval>,<callSetupTimeThreshold or "">,<start-time>,<end-time>,<AllDaysOfWeek.
1 for all days otherwise 0>,<DaysOfWeek, if AllDaysOfWeek is 0>
```

```
dialdelay-import1,Voip-Dial-Delay,source-gateway,3456,Ringing,3,50,17:00,23:00,0,mon|tue|
wed|thu|fri dialdelay-import2,Voip-Dial-Delay,source-gateway,3456,Answer,1,"",
17:00,23:00,1
```

#### VoIP Gatekeeper Registration Delay test, scheduled daily

```
<testName>,Voip-GKReg-Delay,<source GateWay>,<sample-interval>,
<GatekeeperRegistrationTimeThresholdor "">,<start-time>,<end-time>,<AllDaysOfWeek. 1 for
all days otherwise 0>,<DaysOfWeek, if AllDaysOfWeek is 0>
```

```
gkregdelay-import1,Voip-GKReg-Delay,source-gateway,3,50,17:00,23:00,0,mon|tue|wed|thu|fri
gkregdelay-import2,Voip-GKReg-Delay,source-gateway,5,"",17:00,23:00,1
```

## Editing Tests

After you have created tests to Operations Manager, you can change test parameters, or, if you want to remove a test from Operations Manager, you can delete it.

You can use this function to edit the parameters of an existing test. For example, you can change the operation parameters of a test or change the schedule. You cannot change the destination device.

- 
- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
  - Step 2** Select the test you want to edit, and then click **Edit**. The Edit Node-to-Node Test page appears.
  - Step 3** You can change the test parameters, including scheduling and threshold settings. See [Working with Node-To-Node Tests, page 10-1](#) for more information.
  - Step 4** Click **OK** when done.
-

## Deleting a Test

You can use this function to delete one or more tests. You can delete tests in any state. See [Table 10-8 Test Status Definitions, page 10-18](#) for a description of possible states.

- 
- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
- Step 2** Select the tests you want to delete, and then click **Delete**. A confirmation dialog box appears.
- Step 3** Click **Yes**. Operations Manager deletes the tests you selected.
- 

## Node-To-Node Test Events

The threshold settings that you set during test creation or during modification determine when a Node-To-Node event is generated. See [Working with Node-To-Node Tests, page 10-1](#).

The events are raised on the source device. A threshold event is generated when the threshold violation occurs for three consecutive polling cycles. The event is cleared if the value falls below the threshold in the following polling cycle.

The following Node-To-Node events can be generated:

- NodeToNodeTestFailed
- RoundTripResponseTime\_ThresholdExceeded
- RingBackResponseTime\_ThresholdExceeded
- RegistrationResponseTime\_ThresholdExceeded
- AverageLatency\_ThresholdExceeded
- PacketLossSD\_ThresholdExceeded
- PacketLossDS\_ThresholdExceeded

For details on the Node-To-Node events, see [Events Processed, page D-1](#).

## Managing Test Operations

The following topics discuss these tasks:

- [Viewing Test Trending, page 10-15](#)
- [Viewing Test Information, page 10-15](#)
- [Printing Test Details, page 10-17](#)
- [Exporting Test Details, page 10-17](#)
- [Verifying the Status of a Test, page 10-18](#)

## Viewing Test Trending

You can select and examine changes in network performance metrics. You can select, display, and chart network performance data in real time. For details on the types of metrics you can graph, see [What Data Can I Collect?](#), page 7-1.

**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Select the test you want to trend, and click **Trend**.

- If you select a Data Jitter test, a Select Metrics dialog box appears.
  - a. Select the metrics you want to graph. The metrics must have the same units.
  - b. Click **View Graph**.
- If you select any of the other tests, a second dialog box does not appear.

A Node-to-Node Test Trend graph appears. For details about working with performance graphs, see [How to Use Performance Graphs](#), page 7-1.

## Viewing Test Information

You can find all the details about a particular test on the Test Details page. From this page, you can print or export test information.

**Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.

**Step 2** Select the test you want to view, and click **View**. The Test Details window opens.

[Table 10-7](#) explains the contents of the window.

**Table 10-7** Test Details

Field	Description
<b>General Parameters</b>	
General information about a test.	
Test Name	User-defined test name. Operations Manager also uses the test name to name the folder in which test data is stored. See the description of the Data Directory field in this table.
Operation Type	Type of test operation; for example, Ping Echo.
Source	Name or IP address of the source device.
Source Interface	IP address of an interface on the source device. Can also be listed as <i>Default</i> . In the case of <i>Default</i> , the IP SLA engine in the source device determines the source interface.
IP SLA Responder	Name of the IP SLA-enabled destination device.

Table 10-7 Test Details (continued)

Field	Description
Current Status	The status of the test. See <a href="#">Table 10-8 on page 10-18</a> for a description of possible states. The state of the test determines whether you can stop or define the test at any given point. The state also determines the state of the data collection.  If the status is Config Failed, a description of the cause of the failure appears. If the test status is Config Failed or Config Pending, an explanation appears.
Admin Index	Unique numeric identifier for a test on the source device. See the <a href="#">Note</a> following this table for more information.
Data Directory	Directory in which Operations Manager stores test data. The Data Directory name matches the test name. See <a href="#">Where Is Node-To-Node Test Data Stored?</a> , page 10-19.
<b>Schedule Parameters</b>	
When and how often the test runs.	
Polling Time	The number of hours in a 24-hour period during which polling occurs.
Occurrence Pattern	Dates on which the test starts and ends, and hours during which the test is scheduled to run. If the test runs weekly, the Schedule parameter displays days of the week when the test is scheduled to run.
<b>Operation-Specific Parameters (Data Jitter example)</b>	
Information about the specific kind of operation a test is running. The following part of the table is an example of operation-specific parameters for a <a href="#">Data Jitter</a> test. Other test types will have different operation-specific parameters. For information on operation-specific parameters for other operation types, see <a href="#">Creating a Single Node-To-Node Test</a> , page 10-2.	
Sample Interval (minutes)	The frequency with which the source device polls the destination device and Operations Manager polls the source device.
Duration	Test duration.
Codec	Used to determine the packet interval and the request payload.
IP QoS Type	The quality of service policies for the IP SLA packets.
IP QoS Value	Quality of service value.
Voice Quality Expectation	Corresponds to the Access Advantage factor of Mean Opinion Scores (MOS) and Calculated Planning Impairment Factor (ICPIF).
Destination Port	The default destination port is 16400.
<b>Threshold Parameters</b>	
Threshold settings for the test.	
Average Latency	Threshold Setting
Packet Loss Source to Destination	Threshold Setting
Packet Loss Destination to Source	Threshold Setting

**Table 10-7** Test Details (continued)

Field	Description
Jitter Source to Destination	Threshold Setting
Jitter Destination to Source	Threshold Setting
Node-to-Node Quality	Threshold Setting



**Note** While the test is the Running state, you can view test information directly on the source device. Telnet to the source device and use the command **show rtr configuration** *<admin index>*.

## Printing Test Details

You can print all the details about a test shown on the Test Details page.

- 
- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
  - Step 2** Select the test you want and click **View**. The Test Details window opens.
  - Step 3** To print the test details information, click the printer icon in the upper-right corner of the window. The records are reformatted into a print-friendly format and are displayed in a new browser window.
  - Step 4** Use the print function on your browser to print the display.
- 

## Exporting Test Details

You can export and save all the details about a single test as shown on the Test Details page, including configuration and status. This is not the same thing as exporting the data gathered by a test. To see how to save and export data gathered by a test, see [Copying Test Data to Another Server, page 10-20](#).

- 
- Step 1** Select **Diagnostics > Node-to-Node Tests**. The Node-to-Node Tests page appears.
  - Step 2** Select the test you want and click **View**. The Test Details window opens.
  - Step 3** To export the test details information, click the export icon in the upper-right corner of the window. Select either **CSV** or **PDF** format for export and click **OK**.
  - Step 4** If you chose CSV in [Step 3](#), do the following:
    - a. When the File Download dialog box appears, click **Save**.
    - b. In the Windows folder window, enter the filename and the location where you want to save the file.
    - c. Click **Save**.
    - d. In the Download Complete dialog box, click **Close**.

- Step 5** If you chose PDF in [Step 3](#), do the following:
- If a security information dialog box appears, click **Yes**. The records now appear in PDF format.
  - Use the PDF save function to save the file to your system.

## Verifying the Status of a Test

You can verify whether a test ran and completed correctly. You can also troubleshoot the test if necessary.

- Step 1** Select **Diagnostics > Node-To-Node Tests**. The Node-To-Node Tests page appears. All current Node-To-Node tests appear in the page. The last column in the table shows the status of each test.

**Table 10-8** Test Status Definitions

Test Status	Description
Running	The test is active and collecting data.
Config Pending	Either the device is not responding or configuration of the test is under way.
Delete Pending	Intermediate state, before the test is deleted. No actions can be performed on the test.
Suspended	The test is suspended from data collecting or polling. This occurs because the device was suspended.
Scheduled	Appears after you create or update a test. The status will change to Running at the first polling cycle.
Dormant	The test is active but not currently collecting data. Tests are in the Dormant state between polling cycles.
Config Failed	The test was not configured correctly. Possible problems include incorrect device credentials or low device memory. You can see more information on why the test configuration failed by viewing the <a href="#">Test Details</a> page.

## Working with Test Data

Operations Manager saves the data collected by tests to disk.

The following topics provide information you will need to use the data, keep the data safe, and prepare to run additional tests:

- [Where Is Node-To-Node Test Data Stored?](#), page 10-19
- [Maintaining Node-To-Node Test Data](#), page 10-19
- [Copying Test Data to Another Server](#), page 10-20
- [What Is the Format of the Node-To-Node Data?](#), page 10-20

## Where Is Node-To-Node Test Data Stored?

Node-to-node test data is stored on the Operations Manager server in the NMSROOT\data\N2Ntests folder.



### Note

NMSROOT is the directory where Operations Manager is installed on your system. If you selected the default directory during installation, it is C:\Program Files\CSCOPx.

Table 10-9 shows the two different types of files stored in the data storage directory.

**Table 10-9** Test Data Files and Log Files

File Names	Contents
YYYYMMDD.csv	The test data. Each file has multiple records. Each record is a comma-separated values (CSV) record, and there is one record in a file for each polling interval.
StudyInfo.log	The log includes test name, description, polling interval, devices, start date, end date, operation type, polling interval, and status.

## Maintaining Node-To-Node Test Data

You should perform all tasks related to maintaining test data, including the following:

- Verify that there is sufficient disk space to store test data.** Check disk space before a test is scheduled to run. Operations Manager appends data to a test's log files. Operations Manager produces one data file for each running test per day when a test is running. Assess the amount of space used by previous tests to derive an estimate.
 

For example, a test with a 16-hour polling cycle and a 1-minute sampling interval uses approximately 60 to 100 KB per day. A path echo test with a 16-hour polling cycle, a 1-minute sampling interval, and 12 hops uses approximately 1.2 MB per day.
- Export and save test data.** Operations Manager purges all data files more than 31 days old. You must save the test to another server to maintain data for more than 31 days. See [Copying Test Data to Another Server, page 10-20](#).
- Back up the test data.** Operations Manager writes test data to the Data Storage Directory, displayed in the Test Details window. Perform regular backups using the same method you use to back up your file system.
- Determine when to copy data to another server.** You should copy test data to another server before you examine it.
- Display and use the data.** You can analyze the results of the test after you import the test data into Microsoft Excel or by using a third-party report-generating tool.



### Note

Do not open test data files using any application that acquires an exclusive read-only lock on files while the test is in the Running state. If test data files are locked, Operations Manager will not be able to write output data and will instead write errors to the log files. Examples of applications that acquire an exclusive lock are Microsoft Excel and Microsoft Word. You can use these applications when the test is not running.

## Copying Test Data to Another Server

You must copy test data to another server before you examine it. You may also want to copy the test data to another server as a means of backup. Test data is in ASCII format. You can copy it to another server using whatever method is available to you; for example, SSH or copy-and-paste. Copy the test data files from the Data Storage Directory. Test data files are those whose names end with .csv, because the test data is written to CSV files.


**Note**

If you use drag-and-drop, you risk moving the test data instead of copying it.

## What Is the Format of the Node-To-Node Data?

Operations Manager provides one record type for each type of data collected. The record types are summarized in [Table 10-10](#).

For details on the format of all exported data, see [Data File Formats, page I-1](#).

**Table 10-10** *Node-To-Node Record Types*

Type	Definition
200	Echo—This record format captures end-to-end statistics for the following types of tests: <ul style="list-style-type: none"> <li>• ICMP Echo</li> <li>• UDP Echo</li> <li>• VoIP Post-Dial Delay</li> <li>• Gatekeeper Registration Delay</li> </ul>
201	Path Echo—This record format captures hop-by-hop statistics for ICMP Path Echo tests. The tests record information from source to destination.
204	Path Echo (Destination Hop)—This record format captures end-to-end statistics for ICMP Path Echo tests. The tests are from the source to the destination.
205	Data Jitter—This record format captures the end-to-end statistics for Data Jitter (Enhanced UDP) tests. The tests record information from source to destination.