



Using Performance Graphs

These topics explain how to use performance graphing:

- [How to Use Performance Graphs, page 7-1](#)
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- [Working with Tabular Displays for Performance Graphs, page 7-10](#)
- [Troubleshooting Performance Graphing, page 7-11](#)

How to Use Performance Graphs

IP Communications Operations Manager (Operations Manager) allows you to select and examine changes in network performance metrics. You can select, display, and chart network performance data in real time. The performance graphs are accessed through the Service Level View, Alert Details page, and Node-To-Node Tests page.

The following topics explain what data you can graph and help you to understand the information displayed:

- [What Data Can I Collect?, page 7-1](#)
- [Performance Graphing Notes, page 7-4](#)
- [Viewing a Performance Graph, page 7-5](#)
- [Understanding the Layout of a Performance Graph, page 7-6](#)

What Data Can I Collect?

Operations Manager performance graphing enables you to graph the utilization statistics displayed in [Table 7-1](#) and the Node-To-Node test metrics displayed in [Table 7-2](#).

Table 7-1 Utilization Metrics that You Can Graph by Device Type

Device Type	CPU	DSP ¹	Memory	Calls	Port Utilization	Channel Utilization	Zones	Device Specific Usage
Cisco CallManager	X			X ²	BRI FXS FXO T1/E1 PRI T1 CAS			Cisco CallManager Resource Utilization: <ul style="list-style-type: none"> • MOH multicast • MOH unicast • MTP resource • Transcoder • Hardware conference • Software conference • Percentage conference active • Percentage conference streams active • Location bandwidth available
Cisco CallManager Express	X		X	X ³				<ul style="list-style-type: none"> • IP phones registered • Key IP phones registered
Cisco CallManager-controlled MGCP ⁴ gateways					FXS FXO	T1/E1 PRI T1 CAS BRI ⁵		
Voice Mail Gateway	X				Voice mail and PBX ports			
Gatekeeper	X		X				X ⁶	
Cisco IOS gateways	X	X	X	X ⁷	E&M FXO FXS	T1/E1 PRI T1/E1 CAS ⁸ BRI		
SRST	X		X					Minutes in SRST mode
Unity					Inbound Outbound			
Unity Express	X							<ul style="list-style-type: none"> • Capacity Utilization • Session Utilization • Orphaned mailboxes

1. DSP = Digital signal processor.

2. Active calls on Cisco CallManager.

3. E-phone active call legs.

4. MGCP = Media Gateway Control Protocol.

5. BRI channel status for MGCP gateways is supported only with Cisco CallManager 4.1 and later.

6. Zone information includes bandwidth, requests, and errors.

7. Active call legs on Cisco IOS gateway.
8. T1/E1 CAS channel status for Cisco IOS gateways is only reported for Cisco AS5200 Series Universal Access Servers.

The data files for the performance metrics listed in [Table 7-1](#) are located on the server, in the NMSROOT\data\gsu_#GSUdata#_ directory. If you do not have access to the directory, contact a local administrator for the server where Operations Manager is installed. The filenames are created using the device name and the date. These files are kept for 72 hours, after which they are purged.

**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 7-2 *Graphable Metrics for Node-To-Node Tests*

Node-To-Node Test	Graphable Metrics
Data Jitter	<ul style="list-style-type: none"> • Source-to-destination packet loss. • Destination-to-source packet loss. • Source to destination jitter. • Destination to source jitter. • Average latency. • Node-To-Node quality.
Ping Echo	Round-trip response time.
Ping Path Echo	Round-trip response time.
UDP Echo	Round-trip response time.
VoIP Post Dial Delay	Ringback response time.
Gatekeeper Registration Delay	Registration response time.

The data files for the performance metrics listed in [Table 7-2](#) are located on the server, in the NMSROOT\data\N2Ntests directory. The data files in this folder are purged after 31 days. If you do not have access to the directory, contact a local administrator for the server where Operations Manager is installed.

**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.

Performance Graphing Notes

This section contains information you should be aware of when working with performance graphing.

Table 7-3 Performance Graphing Notes

Summary	Explanation
<p>An MGCP gateway on a Catalyst 6000 switch. When you have all three capabilities (voice gateway, switch, and MGCP) performance graphing cannot graph all the data. Only the common metrics will be available for graphing.</p>	<p>When graphing performance metrics for a device that has these three capabilities (voice gateway, switch, and MGCP) you will only be able to graph the common metrics.</p> <ol style="list-style-type: none"> 1. Select the device for which you want to graph performance metrics. 2. Select Performance. A metrics dialog box appears. 3. Select the desired metrics, and click Next. A second dialog box appears, listing the MGCP gateway ports. 4. Select a port, and then click View. <p>Note In the Alert Details page you will not have the option to graph HighUtilization events.</p>
<p>A voice gateway, MGCP, and H323 on a router. When you have all these capabilities on one device, each metric displays two graphs.</p>	<p>When graphing performance metrics for a device that has these capabilities (voice gateway, MGCP, H323, and router), each metric displays two graphs.</p> <p>Also, when graphing multiple devices or devices that have multiple polling intervals, the least common multiple is used to plot the x axis. Real-time graphs will refresh at this common polling interval.</p>
<p>Location Bandwidth Available text box. The location bandwidth is located on the Cisco CallManager system.</p>	<p>Enter the location on the Cisco CallManager system. This location is configured through Cisco CallManager. If you have questions regarding the location bandwidth, see your Cisco CallManager documentation.</p> <ol style="list-style-type: none"> 1. Select the device for which you want to graph the location bandwidth availability. 2. Select Performance. A metrics dialog box appears. 3. Select the Location Bandwidth Available check box. 4. Enter the location on the Cisco CallManager system where the location bandwidth resides. 5. Click View.
<p>Zone Home text box. The zone is located on the gatekeeper system.</p>	<p>Enter the location on the gatekeeper system. This location is configured through the gatekeeper. If you have questions regarding the location bandwidth, see your gatekeeper documentation.</p> <ol style="list-style-type: none"> 1. Select the device for which you want to graph the zone home. 2. Select Performance. A metrics dialog box appears. 3. Select the Zone Home check box. 4. Enter the location on the gatekeeper where the zone home resides. 5. Click View.

Viewing a Performance Graph

The performance graphs are available through the Service Level View, Alert Details page (see [Understanding the Layout of the Detailed Device View, page 3-19](#)), and Node-To-Node Tests page (see [Viewing Test Trending, page 10-15](#)).

Before you Begin

- Verify that Operations Manager is monitoring the devices for which you want to collect utilization statistics. This includes the Cisco CallManager that the ports are registered to. See [Verifying Device Import, page 15-14](#).
- Enable the Voice Utilization polling settings. By default the voice utilization polling settings are not enabled. Operations Manager uses the statistics gathered during Voice Utilization polling for charting network performance. See [Managing Polling Parameters, page 17-11](#).
- Review the [Performance Graphing Notes, page 7-4](#).

Step 1 In the Service Level View (see [Using the Service Level View, page 2-1](#)), right-click on the device for which you want to see the performance metrics.



Note If you want to select multiple devices, hold the Ctrl key when clicking the devices.

Step 2 From the menu select **Performance**. The Select Metrics dialog box appears.

Step 3 Select the desired metric, and click **View Graph**. A performance graph appears (see [Figure 7-1](#)).

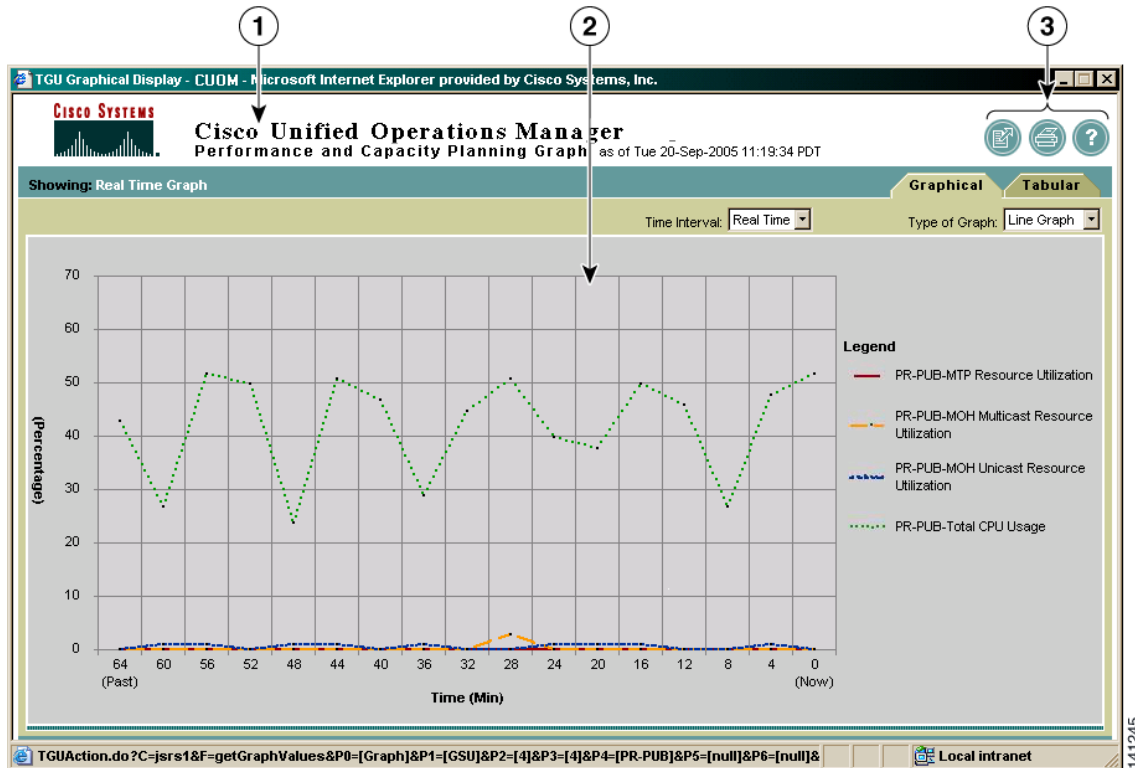


Note If not all expected values are plotted on a graph, the most likely reason is that one or more values is very small in comparison to the maximum value. For example, for the values 250, 2, and 1, the smaller values, 2 and 1, will not be plotted.



Note If you receive errors while creating performance graphs, you can look in the Error.log file for error details. The log file is located in the NMSROOT\data\gsu_#GSUdata#_ directory. Also, see [Troubleshooting Performance Graphing, page 7-11](#).

Figure 7-1 Performance Graph



1	Launch information and view status bar area. See the “Launch Information and View Status Bar Area” section on page 7-6.	3	Window tools area. See the “Window Tools Area” section on page 7-7.
2	Graph or tabular display pane. See the “Graph or Tabular Display Pane” section on page 7-7.		

Understanding the Layout of a Performance Graph

These topics provide details about the information in a performance graph. These panes are illustrated in [Figure 7-1](#).

Launch Information and View Status Bar Area

The launch information area shows the time on the server when the performance graph was started.

The view status bar lists the selected view, which is shown in the graph display pane.

Graph or Tabular Display Pane

The graph or tabular display pane is the core of a performance graph. It displays the performance metrics as a graph or in tabular format. See [Figure 7-2](#) for an illustration of a graph display.



Note

You can plot four graphs at one time. You can combine devices and metrics, but the maximum number of graphs that can be displayed is four.

To choose either a graph or tabular display, choose the desired tab located at the top right of the page, under the window tools area.

The information in a graph can be viewed as a snapshot in time or it can be refreshed at regular intervals by selecting a time interval or *Real Time* from the Time Interval pull-down menu located above the graph.



Note

If you select a device that does not have data available for the selected time interval, a message appears stating such. An empty graph appears. The graphical display opens, but it does not automatically refresh even if Real Time is selected in the Time Interval pull-down menu. You must manually refresh the data by using the browser refresh after a period of time. Once the graph displays data, if Real Time is selected, the graph will refresh automatically. At any time, you can change the time interval to get historical information, if there is any.




There are three types of graphs that you can display: line graph, bar graph, or area chart. For details on the graphs, see [Working with Graphs, page 7-8](#). (For details on the tabular display, see [Working with Tabular Displays for Performance Graphs, page 7-10](#).)

Choose the type of graph you want displayed by selecting it from the Type of Graph pull-down menu located on the top right of the graph.

Window Tools Area

The top-right corner of a performance graph contains available tools buttons. All buttons are described in [Table 7-4](#).

Table 7-4 Performance Graphs—Window Tools Buttons

Icon	Meaning	Described in...
	Exports the current tabular display to a PDF file.	Exporting Displays to a File, page 7-9
	Opens a printer-friendly version for printing.	Printing Displays, page 7-10
	Opens the Operations Manager online help.	Using Help, page 1-16

Working with Graphs

Performance graphing provides real-time information through the use of graphs. There are three types of graphs that you can use:

- Line Graph
- Bar Graph
- Area Chart

These topics explain how to work with graphs:

- [Viewing a Graphical Display, page 7-8](#)
- [Exporting Displays to a File, page 7-9](#)
- [Printing Displays, page 7-10](#)

Viewing a Graphical Display

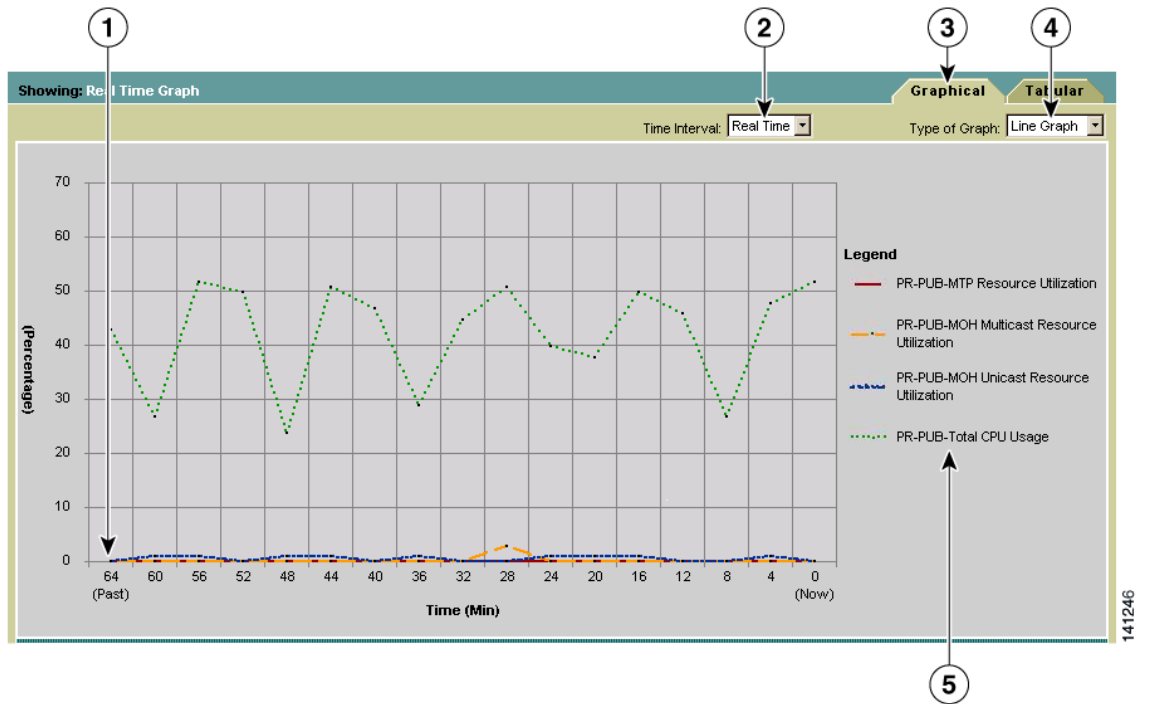
Performance graphs open with the line graph displayed. (For details on how to view performance graphs, see [Viewing a Performance Graph, page 7-5](#).) To view different types of graphs for the same metrics, from the Type of Graph pull-down menu located on the top right of the graph, select a different graph to display.

If you are viewing the tabular display and want to switch to the graphical display for the current metrics, select the Graphical tab located at the top right of the page, under the window tools area.

By default the graphical display shows the current (real time) view. If you want to view the historical information, use the Time Interval pull-down menu to change how far back in time you want to go.

All the graphs have the same layout. The only difference is the actual graph type. [Figure 7-2](#) shows an example of a line graph.

Figure 7-2 Line Graph



1	Y axis. The metrics the graph is based on. X axis. The time interval.	4	Type of Graph. Choose the type of graph you want displayed.
2	Time Interval pull-down menu. Changes the time interval of the graph.	5	Legend. Lists each device and its designation on the graph.
3	Graphical and Tabular tabs. Changes between the two types of displays.		

Exporting Displays to a File

Both the graphical and tabular displays can be exported as PDF files. Only tabular displays can be exported as comma separated values (CSV) files.



Note

To open a PDF file, you must have Adobe Acrobat Reader 4.0 or higher installed on your client system. However, you can save a file as a PDF file even if you do not have Acrobat Reader on your system.

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- Step 1** From the performance graph, click the Export to File icon. For details, see [Understanding the Layout of a Performance Graph, page 7-6](#).
- If you are exporting a tabular display, an Exporting To dialog box appears. Select either the **PDF** or **CSV** radio button for the file format, and click **Select**.
 - If you are exporting a graphical display, go to the next step.
- Step 2** In the Windows Save As page, enter the filename and the location where you want to save the file.
- Step 3** Click **Save**.
- Step 4** In the Download Complete dialog box, click **Close**.
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Printing Displays

The information in a performance graph can be reformatted into a print-friendly format, and then printed from your browser.

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- Step 1** From a performance graph, click the Printer icon. For details, see [Understanding the Layout of a Performance Graph, page 7-6](#).
- The graph is reformatted into a print-friendly format, and is displayed in a new browser window.
- Step 2** Use the print function on your browser to print the display.
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Working with Tabular Displays for Performance Graphs

The performance metrics can be displayed in a tabular format. The tabular display can be printed or exported to a file. For information on printing, see [Printing Displays, page 7-10](#). For information on exporting to a file, see [Exporting Displays to a File, page 7-9](#).

[Figure 7-3](#) shows an example of a tabular display.

Figure 7-3 Tabular Display

Showing: Real Time Table		Graphical																Tabular															
#	Device-Metric Pair (Units)		Minutes																														
			0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64														
1.	PR-PUB-MTP Resource Utilization (Percentage)	Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
		Avg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
		Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
2.	PR-PUB-MOH Multicast Resource Utilization (Percentage)	Max	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0														
		Avg	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0														
		Min	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0														
3.	PR-PUB-MOH Unicast Resource Utilization (Percentage)	Max	0	1	0	0	1	1	1	0	0	1	0	1	1	0	1	1	0														
		Avg	0	1	0	0	1	1	1	0	0	1	0	1	1	0	1	1	0														
		Min	0	1	0	0	1	1	1	0	0	1	0	1	1	0	1	1	0														
4.	PR-PUB-Total CPU Usage (Percentage)	Max	52	48	27	46	50	38	40	51	45	29	47	51	24	50	52	27	43														
		Avg	52	48	27	46	50	38	40	51	45	29	47	51	24	50	52	27	43														
		Min	52	48	27	46	50	38	40	51	45	29	47	51	24	50	52	27	43														

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Viewing the Tabular Display

By default, when you select a view, the performance metrics are displayed in a line graph. (For details on viewing performance graphs, see [Viewing a Performance Graph, page 7-5](#).) To view the tabular display for the same metrics, select the Tabular tab located at the top right of the page, under the window tools area. For performance graphs layout information, see [Understanding the Layout of a Performance Graph, page 7-6](#).

Troubleshooting Performance Graphing

This section contains information that will help you if you encounter problems generating performance graphs.

If you encounter an error, it will likely appear either when you select Performance Graphing from the menu, or when Operations Manager is checking for the data file to graph.

In the first case (when selecting Performance Graphing), you will see an error message that describes the problem and an action to take.

In the second case (when Operations Manager is checking for the data file), an error message saying something like *No data file is available* appears.

[Table 7-5](#) describes the errors and their possible causes, for both of these types of situations.

The following error messages indicate that a device is experiencing communication problems. Possible causes for the errors provide a starting point for you to investigate and take corrective action.

**Note**

If you are not able to collect performance data and you do not see an error message (either a pop-up message, or a message in the log file) indicating the problem, you should verify the status of the device. To verify the status of the device, use the View/Rediscover/Delete Devices page (see, [Verifying Device Import, page 15-14](#)). If the device is in the Unreachable state, verify that the device's credentials are correct and rediscover the device (see, [Performing Inventory Collection on Devices, page 15-17](#)).

Table 7-5 Troubleshooting Performance Graphing Errors

Error	Possible Causes
Cannot collect data.	<ul style="list-style-type: none"> • Account and credentials are not the same on all Cisco CallManagers in the cluster—if required—See Determining the Media Server Account to Use for Cisco CallManager Access, page 15-24. • HTTP server problems: <ul style="list-style-type: none"> – HTTP server on the device is down. – HTTP server is operational, but the Cisco CallManager is down. • Device unreachable due to a network problem. • Performance Monitor process on the media server is down. • The Cisco CallManager that the MGCP gateway is registered to is not in Operations Manager inventory. • Device capability is not supported. (Performance graphing supports the following: Cisco Unity, Cisco Unity Express, Cisco CallManager, Cisco CallManager Express, SRST, H.323 devices, and Voice Mail Gateways.) • Device is suspended or deleted. • Device platform is not support. <p>For device support information, see <i>Supported Device Table for IP Communications Operations Manager</i> on Cisco.com at http://cisco.com/en/US/partner/products/ps6535/products_device_support_table_09186a0080552d07.html.</p>
<p>Cannot collect data because of the following:</p> <ul style="list-style-type: none"> • The username or password for the device is empty. • The system has the wrong credentials for the device. • The device does not have credential information. 	<ul style="list-style-type: none"> • No credentials in Operations Manager. • Incorrect credentials in Operations Manager. <p>Note To add credentials, see Editing Device Configuration and Credentials, page 15-15.</p>

Table 7-5 Troubleshooting Performance Graphing Errors (continued)

Error	Possible Causes
<p>Cannot collect data from the device because of the following:</p> <ul style="list-style-type: none"> • A processing error occurred. • Parsing or processing errors occurred. • Internal initialization errors occurred. • Initialization problems occurred in the device data collector. 	<p>Incorrect Cisco CallManager version. Check the following:</p> <ul style="list-style-type: none"> • The version of the Cisco CallManager that is running on the device. • The Cisco CallManager version number that is stored in Operations Manager. For instructions, see Viewing Device Details, page 15-18. <p>Note If the Cisco CallManager version number that is stored in Operations Manager is incorrect, re-add the device. See Understanding the Device and Credentials Repository, page 15-3.</p> <p>For device support information, see <i>Supported Device Table for IP Communications Operations Manager</i> on Cisco.com at http://cisco.com/en/US/partner/products/ps6535/products_device_support_table_09186a0080552d07.html.</p>
<p>Incomplete data collected because an error occurred in communicating with the device.</p>	<p>Incorrect Cisco CallManager version. Check the following:</p> <ul style="list-style-type: none"> • The version of the Cisco CallManager that is running on the device. • The Cisco CallManager version number that is stored in Operations Manager. For instructions, see Viewing Device Details, page 15-18. <p>Note If the Cisco CallManager version number that is stored in Operations Manager is incorrect, re-add the device. See Understanding the Device and Credentials Repository, page 15-3.</p> <p>For device support information, see <i>Supported Device Table for IP Communications Operations Manager</i> on Cisco.com at http://cisco.com/en/US/partner/products/ps6535/products_device_support_table_09186a0080552d07.html.</p>
<p>Cannot collect data because of the following:</p> <ul style="list-style-type: none"> • The device returned no data from a required MIB. • The device received no MIB data. 	<ul style="list-style-type: none"> • No data from a required MIB. • A required MIB is not populated on the device. • No MIBs returned data. • Device is unreachable due to a network problem. • Device credentials do not contain a valid SNMP community read string. • SNMP response slow; data collection timed out.
<ul style="list-style-type: none"> • The rate of queries on the Cisco CallManager exceeds the limit. • An error has occurred in the data processing stage. 	<p>Too many queries on a Cisco CallManager 4.0 or later.</p> <p>Note Check the polling settings (see Viewing Polling Parameters, page 17-12); they should not be less than three minutes.</p>
<ul style="list-style-type: none"> • The Cisco CallManager did not have enough time to handle the query requests. • An error has occurred in the data processing stage. 	<p>Query exceeded time limit on Cisco CallManager 4.0 or later.</p>

