



# CHAPTER 14

## Monitoring Your Network

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The ACE Device Manager Monitor function allows you to monitor key areas of system usage. The following functionality is provided under the Monitor tab:

- [Using Dashboards to Monitor the ACE System and Virtual Contexts, page 14-2](#)
- [Error Monitoring, page 14-14](#)
- [Monitoring Resource Usage, page 14-16](#)
- [Monitoring Traffic, page 14-20](#)
- [Monitoring Load Balancing, page 14-22](#)
- [Monitoring Application Acceleration, page 14-28](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)
- [Setting Up Virtual Contexts Statistics Collection, page 14-32](#)
- [Displaying Network Topology Maps, page 14-33](#)
- [Testing Ping, page 14-35](#)



### Note

To troubleshoot problems related to the ACE appliance, use the **debug** and **show** commands supported in the command line interface (CLI). For a list of the ACE appliance **show** commands, see the *Command Reference, Cisco ACE Application Control Engine*. For more detailed descriptions of hardware and software show commands, see the *Administration Guide, Cisco ACE Application Control Engine*.

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### Note

When you use the ACE CLI to configure named objects (such as a real server, virtual server, parameter map, class map, health probe, and so on), consider that the Device Manager (DM) supports object names with an alphanumeric string of 1 to 64 characters, which can include the following special characters: underscore (\_), hyphen (-), dot (.), and asterisk (\*). Spaces are not allowed.

If you use the ACE CLI to configure a named object with special characters that the DM does not support, you may not be able to configure the ACE using DM.

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### Prerequisite

Before using the Monitoring functions, you must:

- Enable monitoring on the virtual contexts or servers (see [Setting Up Virtual Contexts Statistics Collection, page 14-32](#) and [Monitoring Load Balancing on Probes, page 14-26](#) or the *Administration Guide, Cisco ACE Application Control Engine*).

- Ensure that you allow the SNMP protocol and enter the v2c community string in the **Config > System > Primary Attributes** page.
- Select the virtual context you want to monitor. This step is reflected in the monitoring procedures as part of selecting your task; such as **Monitor > Virtual Contexts > context > Load Balancing**.

## Using Dashboards to Monitor the ACE System and Virtual Contexts

DM dashboards allow for faster and more accurate assessment and analysis of the ACE system and virtual context health and usage, as well as performance. Corresponding monitoring views allow for quick access to details for further investigation into potential problems highlighted in the dashboards. Graphs, as well as monitoring screens, allow you to view historical data and compare the performance with the peer objects.



### Note

All client browsers require that you enable Adobe Flash Player 9 to properly display the monitoring graphs provided in DM.

Dashboards in DM provide:

- A central location for you to view monitoring highlights.
- Emphasis on potential issues that require your attention.
- Quick access to relevant DM pages for more detailed monitoring data.

In each dashboard, there are a relevant set of dashboard panes. The dashboard panes are moveable element inside the dashboard that can be minimized/maximized, moved, and, if desired, removed from view. You can also display a larger (full) window view for a dashboard window.



### Note

Changes made to dashboard layout or pane selections are only applicable for the current session. Those changes are not maintained by DM the next time you access an DM dashboard.

The dashboard tables and graphs autorefresh at each sync. If desired, you can disable autofreshing by clicking the Pause Autofresh button in the upper-right corner of the dashboard.



### Note

All dashboard contents are under Role-Based Access Control (RBAC). Options will be grayed or not displayed if proper permission has not been granted to the logged in user by the administrator. See the [“Controlling Access to the Cisco ACE Appliance” section on page 15-3](#) for more information about RBAC in DM.

This section includes the following topics:

- [ACE System Dashboard, page 14-3](#)
- [ACE Virtual Context Dashboard, page 14-10](#)

## ACE System Dashboard

The ACE System Dashboard displays the information related to the ACE appliance. You access the ACE System Dashboard by selecting **Monitor > Virtual Contexts > Dashboard > System Dashboard**.

To enhance your viewing of the monitoring information in the ACE System Dashboard, you can perform the following actions:

- Click and drag an individual dashboard pane to move it to another location within the ACE System Dashboard.
- Use the Collapse/Expand buttons at the top right side of each dashboard pane to minimize/maximize a pane within the ACE System Dashboard.
- Click the **Remove** button to remove a dashboard pane from the ACE System Dashboard. Click the **Refresh Now** button at the top of the ACE System Dashboard to open the closed dashboard pane.



**Note** When you close any of the panes in a dashboard by clicking the Remove button, all of the headers in the other dashboard panes turn black to indicate that a pane has been closed. To return the dashboard panes to normal, click the **Refresh Now** button to reload the removed dashboard pane.

- Click the **Screen View (Full)/Screen View (Normal)** buttons to display a larger (full) window view for the ACE Dashboard.

Changes made to dashboard layout or pane selections are only applicable for the current session. Those changes are not maintained by DM the next time you access the ACE System Dashboard.

The components of the individual ACE System Dashboard panes are described in the following sections.

- [Device Information Table](#), page 14-4
- [License Status Table](#), page 14-4
- [High Availability Table](#), page 14-5
- [Device Configuration Summary Table](#), page 14-5
- [Context With Denied Resource Usage Detected Table](#), page 14-6
- [Device Resource Usage Graph](#), page 14-7
- [Top 10 Current Resources Table](#), page 14-8
- [Control Plane CPU/Memory Graphs](#), page 14-9

## Device Information Table

The Device Information table lists the details that will identify the status of the selected ACE. It includes the following fields:

- **Host Name**—Host name of the ACE appliance.
- **Device Status**—Device reachability status through SNMP and XML connectivity (Up or Down).
- **Device Type**—ACE device specifics for the ACE appliance.
- **Management IP**—Management IP address of the admin virtual context.
- **Number of Contexts**—Number of configured contexts, including the Admin context and configured user contexts.
- **Software Version**—Release software version of the ACE appliance.
- **Last Boot Reason**—Reason for the last reboot of the ACE (if available).
- **Uptime**—Length of time that the ACE has been up and running.

The data shown in this table is collected during device discovery as well as during periodic monitor polling. The timestamp shown in the status bar is from the last polled time of the Admin virtual context.

## License Status Table

The License Status table lists the license status of the ACE appliance. DM uses the ACE **show license status** CLI command to obtain the license details. The timestamp shown in the status bar is from the last polled time of the Admin virtual context.

## High Availability Table

The HA Peer Information table lists the details of the HA peer, if configured in HA mode. It includes the following information:

- HA/FT Interface State—State of the local ACE. See the [“High Availability Polling” section on page 11-2](#).
- My IP Address—IP address of the local ACE.
- Peer IP Address—IP address of the peer ACE.
- Software Compatibility—Status of whether the software version of the local ACE and the software version of the peer ACE are compatible. Possible states are the INIT, COMPATIBLE, or INCOMPATIBLE state.
- License Compatibility—Status of whether the license of the local ACE and the license of the peer ACE are compatible. Possible states are the INIT, COMPATIBLE, or INCOMPATIBLE state.
- Number of FT Groups—Number of configured FT groups.
- Number of Heartbeats Transmitted—Total number of heartbeat packets transmitted.
- Number of Heartbeats Received—Total number of heartbeat packets received.

This data is collected during periodic monitoring polling. The timestamp shown in the status bar is from the last polled time of the Admin virtual context.

## Device Configuration Summary Table

The Device Configuration Summary table displays the following information:

- Virtual Servers—Total count of virtual servers configured in all contexts and the count of virtual servers that are in the In Service or Out of Service state. DM also identifies virtual servers that have a Status Not Available state (due to polled failing, polled disable, and so on) and have a Status Not Supported state (due to a lack of SNMP support on the ACE appliance). A hyperlink enables you to view load balancing virtual server monitoring information based on the identified state (see the [“Monitoring Load Balancing on Virtual Servers” section on page 14-22](#)). For example, if you click the In Service hyperlink, you will see only the virtual servers that are currently in service.
- Real Servers—Total count of real servers configured in all contexts and the count of real servers that are in In Service and Out of Service. A hyperlink enables you to view load balancing real server monitoring information based on the identified state (see the [“Monitoring Load Balancing on Real Servers” section on page 14-24](#)). For example, if you click the In Service hyperlink, you will see only the real servers that are currently in service.
- Probes—Total count of probes configured in all contexts and the count of probes that are in the In Service and Out of Service state. A hyperlink enables you to view load balancing probe monitoring information based on the identified state (see the [“Monitoring Load Balancing on Probes” section on page 14-26](#)). For example, if you click the In Service hyperlink, you will see only the probes that are currently in service.
- Gigabit Ethernets—Total count of Gigabit Ethernet physical interfaces configured on the ACE appliance based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the [“Monitoring Traffic” section on page 14-20](#)). For example, if you click the Up hyperlink, you will see only the Gigabit Ethernet physical interfaces that currently have an operational status of Up.

- VLANs—Total count of VLANs configured and the count of VLANs based on operational status - Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the “[Monitoring Traffic](#)” section on page 14-20). For example, if you click the Up hyperlink, you will see only the VLAN interfaces that currently have an operational status of Up.
- Port Channels—Total count of port channels configured on the ACE appliance based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the “[Monitoring Traffic](#)” section on page 14-20). For example, if you click the Up hyperlink, you will see only the port channels that currently have an operational status of Up.
- BVIs—Total count of BVI interfaces and the count of BVI interfaces based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the “[Monitoring Traffic](#)” section on page 14-20). For example, if you click the Up hyperlink, you will see only the BVI interfaces that currently have an operational status of Up.
- Certificates—Total count of SSL certificates and the count of SSL certificates that are expiring beyond 30 days, expired, or that are expiring within 30 days. A hyperlink accesses a popup window for you to view the SSL certificates list based on the selection, displaying the certificate name, device name, days to expire, expiration date, and the date it was evaluated for you to determine the days to expire. Certificates are considered expired if their expiration date is within the next day (rounded down the next day). A hyperlink in the device name allows you to navigate to the context-based SSL Certificate configuration page (see the “[Using SSL Certificates](#)” section on page 9-6).

This data is collected during discovery as well as during periodic monitoring polling. The timestamp shown in the status bar indicates a varying poll time; that is, different virtual contexts were polled and those context had different time stamps. The earliest time stamp of the polled virtual contexts is displayed in the status bar.

All counts shown in the Device Configuration Summary table are based on the operational status of the monitored objects listed above.

- Out Of Service—Indicates any status other than In Service (for example, Out Of Service, Failed, or Disabled).
- Status not available—Indicates that DM was unable to poll the operational status of this object. The display of this operational status could be due to polling errors or the device was unreachable. Also, if a poll was recently initiated, this operational status could indicate that DM is in the process of collecting data.
- Status not supported—Indicates that the device does not have the capability to provide an operational status of this object. The display of this operational status could be due to missing SNMP instrumentation on the ACE appliance.

## Context With Denied Resource Usage Detected Table

The Context With Denied Resource Usage Detected table lists all contexts for which the resource request is denied after reaching the maximum limit. An increase in the deny count (that is, the deny rate) results in the relevant context resource type appearing in this table. DM obtains the count information by using the ACE **show resource usage** CLI command, which collects the information from the following MIBs: `crIResourceLimitReqsDeniedCount` and `crIRateLimitResourceReqsDeniedCount`.

This table includes the following information:

- Context—Name of the configured context that contains a denied resource.
- Resource Type—Type of system resource in the context.

- Denies/Second—Number of denied resources (per second) as a result of oversubscription or resource depletion.
- Total Deny Count—Number of denied uses of the resource since the resource statistics were last cleared.
- Last Polled Count—Date and time of the last time that DM polled the device to display the current values.

**Note**

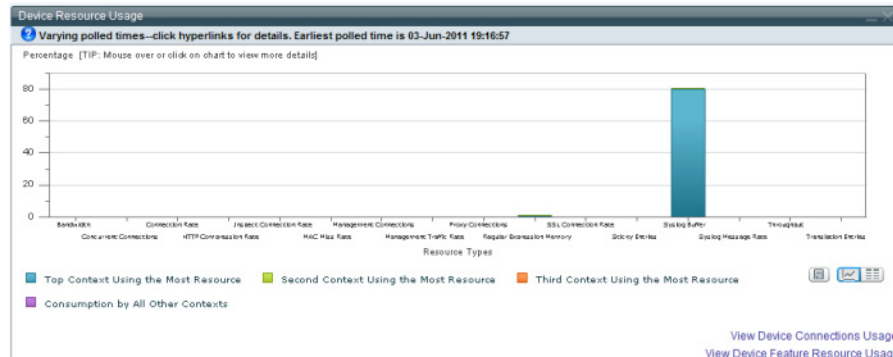
The Context With Denied Resource Usage Detected table does not display the sticky denied resource count because this count does not increment when the ACE sticky resources are exhausted. The ACE sticky table can hold a maximum of four million entries (four million simultaneous users). When the table reaches the maximum number of entries, additional sticky connections cause the table to wrap and the first users become unstuck from their respective servers.

A hyperlink allows you to access the Resource Usage monitoring page to view a detailed list of resources used and denied counts (see the “[Monitoring Resource Usage](#)” section on page 14-16).

## Device Resource Usage Graph

For each resource type, the ACE System Dashboard displays the Top 3 virtual contexts that consume the resources in the Device Resource Usage graph (Figure 14-1). A tooltip is added to display the Top 3 context names and their consumption, consumption of the resource by rest of the contexts and the total consumption by all contexts. This data is collected by DM by using the ACE **show resource usage** CLI command. The timestamp shown in the status bar indicates a varying poll time; that is, different virtual contexts were polled and those context had different time stamps. The earliest time stamp of the polled virtual contexts is displayed in the status bar.

**Figure 14-1** Device Resource Usage Graph



To toggle the display of the Device Resource Usage graph in the monitoring window:

- Click **View As Chart** to display the object data as a graph.
- Click **View As Grid** to display the object data as a numerical line grid.

**Note**

If you want to save the graph as a JPEG file for archive or other purposes, click the **Show As Image** button. When you mouse over the graph, the Image Toolbar appears. From the Image Toolbar, you can save the graph as a JPEG or send it in an email. You can also print the graph if desired.

If you want to export object data to Microsoft Excel for archive or other purposes, click the **Export to Excel** link in the View As Grid object display.

Hyperlinks allow you to access the individual resource usage page for more details (see the “[Monitoring Resource Usage](#)” section on page 14-16).

**Note**

ACL Memory and Application Acceleration for the ACE appliance do not appear in the Device Resource Usage graph. To view the detailed counters, click the hyperlink to access individual resource usage page.

## Top 10 Current Resources Table

The Top 10 Resource Usage table ([Figure 14-2](#)) displays the Top 10 resource types that have been evaluated for high resource utilization. The resource with highest utilization appears at the top. This data is collected by DM by using the ACE **show resource usage** CLI command.

**Figure 14-2** Top 10 Current Resources Table—ACE Dashboard

Last Hour	Resource Name	Used By	Current Usage	Avg.	Max.	Last Polled Time
	Syslog Buffer Size (Bytes)	Global Pool	80.664% (845824/1048576)	77.486%	80.664%	03-Jun-2011 19:16:57
	ACL Memory (Bytes)	Global Pool	2.448% (1195264/48824320)	2.448%	2.448%	03-Jun-2011 19:16:57
	Regular Expression Memory (Bytes)	Global Pool	1.150% (12061/1048576)	1.150%	1.150%	03-Jun-2011 19:16:57
	Management Connection Rate (Connections)	Admin	0.550% (28/5095)	0.546%	0.707%	03-Jun-2011 19:16:57
	Syslog Message Rate (Messages/Sec)	Global Pool	0.004% (4/100000)	0.002%	0.004%	03-Jun-2011 19:16:57
	Concurrent Connections (Connections)	Admin	0.002% (2/100095)	0.002%	0.002%	03-Jun-2011 19:16:57
	Application Acceleration (Connections)	Global Pool	0.000% (0/105)	0.000%	0.000%	03-Jun-2011 19:16:57
	Bandwidth (Bytes/Sec)	Global Pool	0.000% (0/24432000)	0.000%	0.000%	03-Jun-2011 19:16:57
	Concurrent Connections (Connections)	Global Pool	0.000% (0/1899905)	0.000%	0.000%	03-Jun-2011 19:16:57
	Connection Rate (Connections/Sec)	Global Pool	0.000% (0/119900)	0.000%	0.000%	03-Jun-2011 19:16:57

This table includes the following information:

- Last Hour—Plot of high resource utilization during the past hour.
- Resource Name—Type of system resource in the context.
- Used By—Name of the virtual context that is placing the high demands on the resource. The Global Pool usage is critical in the setup where one or more contexts are configured to make use of the global pool once their reserved resource are depleted and resource is free in the global pool. In this situation, if the global pool is depleted, multiple contexts may be starved for resource.

**Note**

Contexts configured to make use of the global pool will not be evaluated for the Top 10 Resource Usage table.

- Current Usage—Active concurrent instances or the current rate of the resource.
- Average—Average value of resource usage (based on the last hour).
- Max.—Highest value of resource usage (based on the last hour).
- Last Polled—Date and time of the last time that DM polled the device to display the current values.

Hyperlinks allow you to access the individual resource usage page for more details (see the “[Monitoring Resource Usage](#)” section on page 14-16).



## Control Plane CPU/Memory Graphs

The Control Plane CPU/Memory graphs (Figure 14-3) show the utilization of the ACE CPU. This data consists of two graphs:

- The Control Plane CPU Usage graph shows the utilization of the ACE CPU as a percentage.
- The Control Plane Memory graph displays the consumed memory on Kbytes. A tooltip is added to display the Cache Memory, Total Memory, Shared Memory, Buffer Memory, and Free Memory usage as a percentage.

To toggle the display of the Control Plane CPU/Memory graph in the monitoring window:

- Click **View As Chart** to display the object data as a graph.
- Click **View As Grid** to display the object data as a numerical line grid.

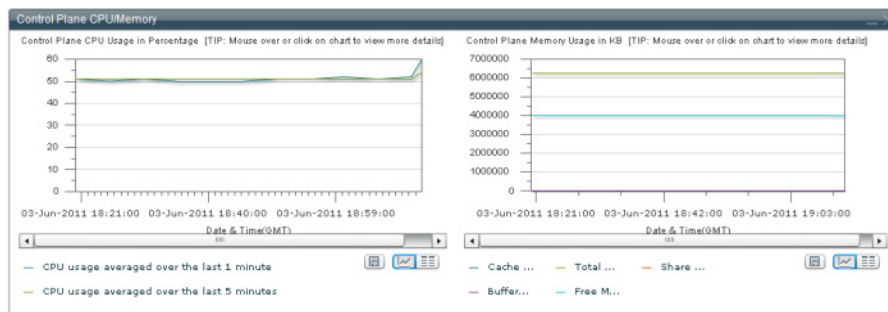


### Note

If you want to save the graph as a JPEG file for archive or other purposes, click the **Show As Image** button. When you mouse over the graph, the Image Toolbar appears. From the Image Toolbar, you can save the graph as a JPEG or send it in an email. You can also print the graph if desired.

If you want to export object data to Microsoft Excel for archive or other purposes, click the **Export to Excel** link in the View As Grid object display.

**Figure 14-3** Control Plane CPU/Memory Graphs



## ACE Virtual Context Dashboard

The ACE Virtual Context Dashboard displays monitoring information for an ACE virtual context selected from the device tree. You access the ACE Virtual Context Dashboard by selecting **Monitor > Virtual Contexts > Context Dashboard**.

To enhance your viewing of the monitoring information in the ACE Virtual Context Dashboard, you can perform the following actions:

- Click and drag an individual dashboard pane to move it to another location within the ACE Virtual Context Dashboard.
- Use the Collapse/Expand buttons at the top right side of each dashboard pane to minimize/maximize a pane within the ACE Virtual Context Dashboard.
- Click the **Remove** button to remove a dashboard pane from the ACE Virtual Context Dashboard. Click the **Refresh Now** button at the top of the ACE Virtual Context Dashboard to open the closed dashboard pane.



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**Note** When you close any of the panes in a dashboard by clicking the Remove button, all of the headers in the other dashboard panes turn black to indicate that a pane has been closed. To return the dashboard panes to normal, click the **Refresh Now** button to reload the removed dashboard pane.

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- Click the **Screen View (Full)/Screen View (Normal)** buttons to display a larger (full) window view for the ACE Dashboard.

Changes made to dashboard layout or pane selections are only applicable for the current session. Those changes are not maintained by DM the next time you access the ACE Virtual Context Dashboard.

The components of the individual ACE Virtual Context Dashboard panes are described in the following sections.

- [Device Configuration Summary Table, page 14-11](#)
- [Context With Denied Resource Usage Detected Table, page 14-12](#)
- [Context Resource Usage Graph, page 14-13](#)
- [Load Balancing Servers Performance Graphs, page 14-13](#)

## Device Configuration Summary Table

The Device Configuration Summary table displays the following information:

- **Virtual Servers**—Total count of virtual servers configured in all contexts and the count of virtual servers that are in the In Service and Out of Service state. DM also identifies virtual servers that have a Status Not Available state (due to polled failing, polled disable, and so on) and have a Status Not Supported state (due to a lack of ACE SNMP support). A hyperlink enables you to view load balancing virtual server monitoring information based on the identified state (see the [“Monitoring Load Balancing on Virtual Servers” section on page 14-22](#)). For example, if you click the In Service hyperlink, you will see only the virtual servers that are currently in service.
- **Real Servers**—Total count of real servers configured in all contexts and the count of real servers that are in In Service and Out of Service. A hyperlink enables you to view load balancing real server monitoring information based on the identified state (see the [“Monitoring Load Balancing on Real Servers” section on page 14-24](#)). For example, if you click the In Service hyperlink, you will see only the real servers that are currently in service.
- **Probes**—Total count of probes configured in all contexts and the count of probes that are in the In Service and Out of Service state. A hyperlink enables you to view load balancing probe monitoring information based on the identified state (see the [“Monitoring Load Balancing on Probes” section on page 14-26](#)). For example, if you click the In Service hyperlink, you will see only the probes that are currently in service.
- **Gigabit Ethernet**s—Total count of Gigabit Ethernet physical interfaces configured on the ACE appliance based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the [“Monitoring Traffic” section on page 14-20](#)). For example, if you click the Up hyperlink, you will see only the Gigabit Ethernet physical interfaces that currently have an operational status of Up.
- **VLAN**s—Total count of VLANs configured and the count of VLANs based on operational status - Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the [“Monitoring Traffic” section on page 14-20](#)). For example, if you click the Up hyperlink, you will see only the VLAN interfaces that currently have an operational status of Up.
- **Port Channels**—Total count of port channels configured on the ACE appliance based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the [“Monitoring Traffic” section on page 14-20](#)). For example, if you click the Up hyperlink, you will see only the port channels that currently have an operational status of Up.
- **BVI**s—Total count of BVI interfaces and the count of BVI interfaces based on their operational status of Up and Down. A hyperlink enables you to view traffic summary information based on the identified state (see the [“Monitoring Traffic” section on page 14-20](#)). For example, if you click the Up hyperlink, you will see only the BVI interfaces that currently have an operational status of Up.

- **Certificates**—Total count of SSL certificates and the count of SSL certificates that are expiring beyond 30 days, expired, or that are expiring within 30 days. A hyperlink accesses a popup window for you to view the SSL certificates list based on the selection, displaying the certificate name, device name, days to expire, expiration date, and the date it was evaluated for you to determine the days to expire. Certificates are considered expired if their expiration date is within the next day (rounded down the next day). A hyperlink in the device name allows you to navigate to the context-based SSL Certificate configuration page (see the [“Using SSL Certificates”](#) section on page 9-6).

Counts are based on the selected ACE virtual context and not for all ACE virtual contexts.

This data is collected during discovery as well as during periodic monitoring polling. The timestamp shown in the status bar indicates a varying poll time; that is, different virtual contexts were polled and the contexts had different time stamps. The earliest time stamp of the polled virtual contexts is displayed in the status bar.

All counts shown in the Device Configuration Summary table are based on the operational status of the monitored objects listed above.

- **Out Of Service**—Indicates any status other than In Service (for example, Out Of Service, Failed, or Disabled).
- **Status not available**—Indicates that DM was unable to poll the operational status of this object. The display of this operational status could be due to polling errors or the device was unreachable. Also, if a poll was recently initiated, this operational status could indicate that DM is in the process of collecting data.
- **Status not supported**—Indicates that the device does not have the capability to provide an operational status of this object. The display of this operational status could be due to missing SNMP instrumentation on the ACE appliance.

## Context With Denied Resource Usage Detected Table

The Context With Denied Resource Usage Detected table lists all contexts for which the resource request is denied after reaching the maximum limit. An increase in the deny count (that is, the deny rate) will result in the relevant context resource type to appear in this table. This data is collected by DM by using the ACE **show resource usage** CLI command.

This table includes the following information:

- **Context**—Name of the configured context that contains a denied resource.
- **Resource Type**—Type of system resource in the context.
- **Denies/Second**—Number of denied resources (per second) as a result of oversubscription or resource depletion.
- **Total Deny Count**—Number of denied uses of the resource since the resource statistics were last cleared.
- **Last Polled**—Date and time of the last time that DM polled the device to display the current values.



### Note

This information is collected from the following MIBs: `crlResourceLimitReqsDeniedCount` and `crlRateLimitResourceReqsDeniedCount`.

A hyperlink allows you to access the Resource Usage monitoring page to view a detailed list of resources used and denied counts (see the [“Monitoring Resource Usage”](#) section on page 14-16).

## Context Resource Usage Graph

The Context Resource Usage graph displays the details of each resource type utilized by the selected contexts. For each resource type, the graph includes the following monitoring statistics: Used, Global Available, and Guaranteed. This data is collected by DM by using the ACE **show resource usage** CLI command.

To toggle the display of the Context Resource Usage graph in the monitoring window:

- Click **View As Chart** to display the object data as a graph.
- Click **View As Grid** to display the object data as a numerical line grid.

**Note**

If you want to save the graph as a JPEG file for archive or other purposes, click the **Show As Image** button. When you mouse over the graph, the Image Toolbar appears. From the Image Toolbar, you can save the graph as a JPEG or send it in an email. You can also print the graph if desired.

If you want to export object data to Microsoft Excel for archive or other purposes, click the **Export to Excel** link in the View As Grid object display.

Hyperlinks allow you to access the individual resource usage page for more details (see the [“Monitoring Resource Usage”](#) section on page 14-16).

**Note**

ACL Memory and Application Acceleration for the ACE appliance do not appear in the Device Resource Usage graph. To view the detailed counters, click the hyperlink to access individual resource usage page.

## Load Balancing Servers Performance Graphs

The Load Balancing Servers Performance graphs (Figure 14-4) include:

- **Top 5 Virtual Servers**—Displays the top five virtual servers in the selected virtual context. You can select from server statistics (such as High Connection Rate, Dropped Connection Rate, and so on) that are collected by DM polling for top performance evaluation.
- **Top 5 Real Servers**—Displays the top five real servers in the selected virtual context. You can select from server statistics (such as High Connection Rate, Dropped Connection Rate, and so on) that are collected by DM polling for top performance evaluation.

You select the statistic from the Select Statistics drop-down list.

To toggle the display of a Load Balancing Servers Performance graph in the monitoring window:

- Click **View As Chart** to display the object data as a graph.
- Click **View As Grid** to display the object data as a numerical line grid.

**Note**

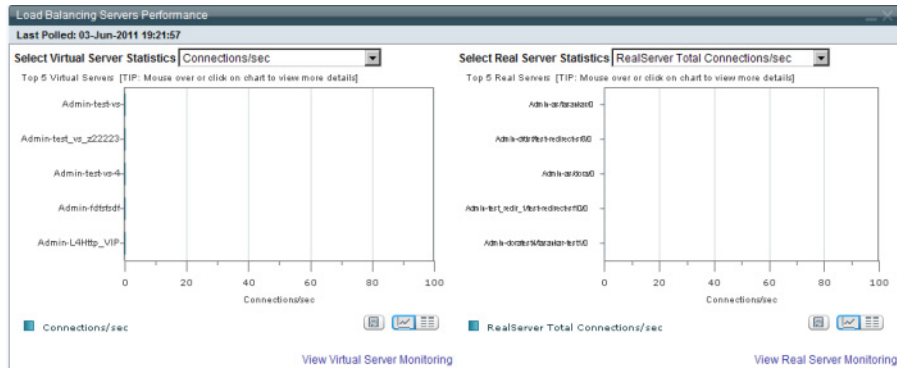
If you want to save the graph as a JPEG file for archive or other purposes, click the **Show As Image** button. When you mouse over the graph, the Image Toolbar appears. From the Image Toolbar, you can save the graph as a JPEG or send it in an email. You can also print the graph if desired.

If you want to export object data to Microsoft Excel for archive or other purposes, click the **Export to Excel** link in the View As Grid object display.

Hyperlinks allow you to access the corresponding monitoring screens for more details:

- [Monitoring Load Balancing on Virtual Servers, page 14-22](#)
- [Monitoring Load Balancing on Real Servers, page 14-24](#)

**Figure 14-4** Load Balancing Servers Performance Graphs



## Error Monitoring

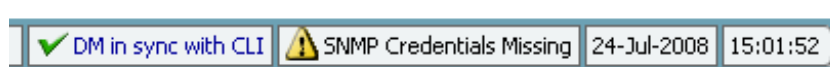
Error monitoring displays virtual context-specific runtime polling state error messages in the bottom right status bar of the DM GUI (see [Figure 14-5](#)). [Table 14-1](#) lists the polling states and actions required to resolve them. Device Manager and CLI synchronization status messages also display in this same location for the active context.



### Note

Time values are displayed using a fixed time zone (GMT). The Device Manager automatically converts the timezone setting of the ACE appliance to GMT and displays the GMT string adjacent to the current time.

**Figure 14-5** Polling State Message Location



**Table 14-1** Polling Error States

Polling States	Action Required
Polling Started	No action required. Everything is working properly. Polling states will display activity. This state is not displayed in the interface.
SNMP Credentials Missing	SNMP credentials are not configured for this virtual context; therefore, statistics are not collected. Add the SNMP v2c credentials to fix this error.

**Table 14-1** Polling Error States

Polling States	Action Required
Polling Timed Out	SNMP polling has timed out. This may occur if the wrong credentials were configured or may be caused by an internal error (such as SNMP protocol configured incorrectly or destination is not reachable). Verify that SNMP credentials are correct. If the problem persists, enable the SNMP collection again.
Polling Failed	SNMP polling failed due to some internal error. Try enabling the SNMP collection again.
Not Polled	SNMP polling has not started. This happens when the virtual context is first created from ACE Device Manager and the SNMP credentials are not configured. Add the SNMP v2c credentials to fix this error.
Unknown	SNMP polling is not working due to one of the above-mentioned conditions. Check the SNMP v2c credential configuration.

These states are only applicable for the SNMP polling done per virtual context. Statistics collected for the ACE Device Manager processes (shown under Admin > Device Management) are not collected via SNMP.

#### Related Topics

- [Monitoring Your Network, page 14-1](#)
- [Viewing Virtual Context Synchronization Status, page 4-77](#)
- [Monitoring ACE Module Statistics, page 15-35](#)

## Monitoring Resource Usage

DM provides resource usage so that you can easily determine if you need to reallocate resources to a particular virtual context, view traffic usage in your contexts, or determine available usage for your contexts. There are three modes in which DM provides resource usage for ACEs:

- Virtual-context based resource usage—You must choose **Monitor > Virtual Contexts > Resource Usage > Resource Usage** and select a virtual context from the top-right drop-down menu to view resource usage specific to the context (see the “[Monitoring Virtual Context Resource Usage](#)” section on page 14-16).
- System-wide resource usage—You must choose **Monitor > Virtual Contexts > Resource Usage** to view system-wide information and to display the following options:
  - Connections—Displays traffic resource usage information. See the “[Monitoring System Traffic Resource Usage](#)” section on page 14-18.
  - Features—Displays non-connection based resource usage information. See the “[Monitoring System Non-Connection Based Resource Usage](#)” section on page 14-19.
- Dashboard usage—You can choose either **Monitor > Virtual Contexts > Context Dashboard** or **Monitor > Virtual Contexts > System Dashboard**. See the “[Using Dashboards to Monitor the ACE System and Virtual Contexts](#)” section on page 14-2.

See the “Configuring Virtualization” chapter of the *Virtualization Guide, Cisco ACE Application Control Engine* for the maximum resource usage value for each attribute.

## Monitoring Virtual Context Resource Usage

DM displays resource usage for virtual contexts as explained in the following steps.

See the “Configuring Virtualization” chapter in the *Cisco 4700 Series Application Control Engine Appliance Virtualization Configuration Guide* for the maximum resource usage value for each attribute.

### Procedure

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**Step 1** Choose **Monitor > Virtual Contexts > Resource Usage > Resource Usage**.

**Step 2** Use the object selector to view resource usage specific to the context.

The information in [Table 14-2](#) is displayed.




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**Note** There might be a slight delay because the resource usage information is gathered real-time from the ACE appliance.

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Table 14-2 Context Resource Usage Fields

Field	Description
Resource	<p>List of resources which can be:</p> <ul style="list-style-type: none"> <li>• acc-connections—Number of acceleration connections</li> <li>• acl-memory—Memory space allocated for ACLs</li> <li>• bandwidth—Context throughput in bytes per second. The total bandwidth rate of a context consists of the following two resource usage fields: <ul style="list-style-type: none"> <li>– throughput—Displays through-the-ACE traffic. This is a derived value (you cannot configure it directly) and it is equal to the bandwidth rate minus the mgmt-traffic rate for the 1-Gbps and 2-Gbps licenses.</li> <li>– mgmt-traffic—Displays management (to-the-ACE) traffic in bytes per second. To guarantee a minimum amount of management traffic bandwidth, you must explicitly allocate a minimum percentage to management traffic using the rate mgmt-traffic parameter. When you allocate a minimum percentage of bandwidth to management traffic, the ACE subtracts that value from the maximum available management traffic bandwidth for all contexts in the ACE.</li> </ul> </li> <li>• conc-connections—Number of simultaneous connections</li> <li>• connection rate—Number of connections of any kind per second</li> <li>• http-comp rate—Compression rate for HTTP-based traffic in connections per second</li> <li>• inspect-conn rate—Number of application protocol inspection connections per second for FTP and RTSP only</li> <li>• mac-miss rate—To-the-ACE traffic sent to the control plane when the encapsulation is not correct in bytes per second</li> <li>• mgmt-connections—Number of management (to-the-ACE) connections</li> <li>• mgmt-traffic rate—Management to-the-ACE traffic in bytes per second</li> <li>• proxy-connections—Number of proxy connections</li> <li>• regexp—Amount of regular expression memory</li> <li>• ssl-connections rate—Number of SSL connections per second</li> <li>• sticky—Displays the resource usage for the sticky entries.</li> </ul> <p><b>Note</b> If a context has fewer sticky resources than the configured Allocation Minimum, the ACE displays the Actual Minimum value that you can assign to the context.</p> <ul style="list-style-type: none"> <li>• syslog buffer—Number of syslog buffers</li> <li>• syslog rate—Number of syslog messages per second</li> <li>• xlates—Number of network and port address translations entries</li> </ul>
Current	Displays the current resource usage.
Guaranteed Available	Indicates resource units that are guaranteed to be available to each context.
Shared Available	Indicates number of resource units that might be available to each context and are shared among all contexts from the oversubscription pool.
Denied	Number of denied resources because of oversubscription or resource depletion.

- Step 3** Click **Poll Now** to instruct DM to poll the devices and display the current values, and click **OK** when prompted if you want to poll the devices for data now.
- Step 4** Click **Graph** to display a historical trend graph of resource data for the virtual context (see the “[Configuring Historical Trend and Real Time Graphs for VirtualContexts](#)” section on page 14-30 for details).

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#### Related Topics

- [Monitoring System Traffic Resource Usage, page 14-18](#)
- [Monitoring System Non-Connection Based Resource Usage, page 14-19](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

## Monitoring System Traffic Resource Usage

DM displays system-wide traffic resource usage as explained in the following steps. See the “[Configuring Virtualization](#)” chapter in the *Virtualization Guide, Cisco ACE Application Control Engine* for the maximum resource usage value for each attribute.

#### Procedure

- Step 1** Choose **Monitor > Virtual Contexts > Resource Usage > Connections**.

The current resource usage information appears as shown in [Table 14-3](#).



**Note** There might be a slight delay because the resource usage information is gathered in real-time.

**Table 14-3** System Resource Usage Connections Field Descriptions

Field	Description
Context	Name of the virtual context
Conc. Conn. %	Number of simultaneous connections
Mgmt. Conn. %	Number of management connections
Proxy Conn. %	Proxy connections
Bandwidth (Bytes/S) %	Bandwidth in bytes per second
Throughput (Bytes/S)	Throughput in bytes per second
Conn. Rate (Conn./S) %	Connections per second
SSL Conn. Rate (Trans./S) %	SSL (Secure Sockets Layer) connections per second
Mgmt. Traffic Rate (Conn./S) %	Management traffic connections per second
MAC Miss Rate (Conn./S) %	MAC miss traffic punted to CP packets per second
Insp. Conn. Rate (Conn./S) %	RTSP/FTP inspection connections per second
App. Acc. Conn. %	Number of application acceleration connections.
HTTP-Comp Rate %	HTTP compression rate.

**Note**

If any of the percentages that display in the Resource Usage Connections table exceed 100 percent, this is an indication that a license on the ACE was recently installed or uninstalled using either DM or the CLI. To correct the display problem, manually synchronize the Admin context of the ACE with the CLI (see the “[Synchronizing Virtual Context Configurations](#)” section on page 4-76).

**Step 2** Click **Poll Now** to instruct DM to poll the devices and display the current values.

**Step 3** Click **OK** when asked if you want to poll the devices for data now.

**Related Topics**

- [Monitoring Virtual Context Resource Usage, page 14-16](#)
- [Monitoring System Non-Connection Based Resource Usage, page 14-19](#)

## Monitoring System Non-Connection Based Resource Usage

DM displays system-wide, non-connection-based resource usage as explained in the following steps.

**Step 1** Choose **Monitor > Virtual Contexts > System Resource Usage > Features**.

The current resource usage information appears shown in [Table 14-4](#).

**Note**

There might be a slight delay because the resource usage information is gathered real-time.

**Table 14-4** *System Resource Usage Features Field Descriptions*

Field	Description
Context	Name of the virtual context
Translation Entries %	Current number of network and port address translations
ACL Memory (Bytes) %	ACL memory usage in bytes
RegEx Memory (Bytes) %	Regular expressions memory usage in bytes
Syslog Buffer Size (Bytes) %	Syslog message buffer size in bytes
Syslog Message Rate (Messages/S) %	Syslog messages per second

**Step 2** Click **Poll Now** to instruct DM to poll the devices and display the current values.

**Step 3** Click **OK** when asked if you want to poll the devices for data now.

**Related Topics**

- [Monitoring Virtual Context Resource Usage, page 14-16](#)
- [Monitoring System Traffic Resource Usage, page 14-18](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

# Monitoring Traffic

DM determines traffic information for your ACE appliance by calculating the delta traffic values since the last polling cycle and displays the resulting values. You can view traffic summary information as provided in the following steps.

## Procedure

- Step 1** Choose **Monitor > Virtual Contexts > Traffic Summary**.
- Step 2** Use the object selector to view the traffic information for all contexts or a specific context.
- The information shown in [Table 14-5](#) appears in the Traffic Summary page.



**Note** You can click on any column heading to sort the table by that column.

**Table 14-5** Traffic Summary Fields

Field	Description
Context	Name of the context. This field is displayed when the object selector is *All.*
Interface	Name of the interface. Click the interface hyperlink to get traffic data polled directly as shown in <a href="#">Table 14-5</a> .
Admin Status	User-specified status, which can be one of the following states: <ul style="list-style-type: none"> <li>• Up</li> <li>• Down</li> <li>• Testing, which indicates that no operational packets can be passed.</li> </ul>
Operational Status	Current operational status, which can be one of the following states: <ul style="list-style-type: none"> <li>• Up</li> <li>• Down</li> <li>• Testing, which indicates that no operational packets can be passed</li> <li>• Unknown</li> <li>• Dormant, which indicates the interface is waiting for external actions (such as a serial line waiting for an incoming connection)</li> <li>• Not present, which indicates the interface has missing components</li> </ul>
Packets In / Sec	Per second, the number of packets delivered by this sub-layer to a higher (sub-)layer, which were not addressed to a multicast or broadcast address at this sub-layer.
Packets Out / Sec	Per second, the total number of packets that higher-level protocol requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.
Bytes In / Sec	Number of octets received, including framing characters, per second.
Bytes Out / Sec	Number of octets per second transmitted out of the interface, including framing characters.
Errors In / Sec	Number of inbound packets discarded per second because they contained errors or because of an unknown or unsupported protocol.

**Table 14-5** Traffic Summary Fields (continued)

Field	Description
Errors Out / Sec	Number of outbound packets discarded per second because they contained errors or because of an unknown or unsupported protocol.
Last Polled	Date and time of the last time that DM polled the device to display the current values.

- Step 3** Click **Poll Now** to instruct DM to poll the ACE and display the current values and click **OK** when prompted if you want to poll the ACE for data now.
- Step 4** Click **Graph** to display a historical trend graph of traffic information (see the “[Configuring Historical Trend and Real Time Graphs for VirtualContexts](#)” section on page 14-30 for details).

**Related Topic**

- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

# Monitoring Load Balancing

DM monitors load balancing and allows you to view the information associated with virtual servers, real servers, probes, and load balancing statistics.

This section includes the following topics:

- [Monitoring Load Balancing on Virtual Servers, page 14-22](#)
- [Monitoring Load Balancing on Real Servers, page 14-24](#)
- [Monitoring Load Balancing on Probes, page 14-26](#)
- [Monitoring Load Balancing Statistics, page 14-27](#)

## Monitoring Load Balancing on Virtual Servers

DM monitors load balancing and allows you to display the associated virtual server information as shown in the following steps.



### Note

You can display additional load-balancing information about real servers, such as the number of servers that are functioning properly, and probes, such as viewing if an excessing number of probes are failing, by clicking the hyperlink in the respective columns in [Table 14-6](#).

### Procedure

**Step 1** Choose **Monitor > Virtual Contexts > Load Balancing > Virtual Servers**.

Depending on the virtual context that you selected in the object selector, the information described in [Table 14-6](#) appears.

**Table 14-6** Load Balancing Virtual Server Monitoring Information

Field	Description
Virtual Server	<p>Name of the virtual server.</p> <p><b>Note</b> If a virtual server is associated with primary and backup server farms, two entries appear in the table: One for the primary server farm and one for the backup server farm.</p> <p>To view statistics for a selected virtual server, click the virtual server hyperlink. The Virtual Server Details popup window appears containing the individual statistic, associated counter value, and a description of the statistic. Click <b>OK</b> to close the popup window.</p>
IP Address:Protocol:Port	<p>IP address, protocol and port number of the virtual server. Protocol the virtual server supports, which can be:</p> <ul style="list-style-type: none"> <li>• any—Indicates the virtual server is to accept connections using any IP protocol.</li> <li>• tcp—Indicates that the virtual server is to accept connections that use TCP.</li> <li>• udp—Indicates that the virtual server is to accept connections that use UDP.</li> </ul>
Service Policy	Policy map applied to the device.

**Table 14-6** Load Balancing Virtual Server Monitoring Information (continued)

Field	Description
Admin Status	User-specified status of the virtual server, which can be: <ul style="list-style-type: none"> <li>• In Service—Indicates the server is in service.</li> <li>• Out of Service—Indicates the server is out of service.</li> </ul>
Operational Status	The state of the server, which can be: <ul style="list-style-type: none"> <li>• Inservice—Indicates the server is in service.</li> <li>• Out of Service—Indicates the server is out of service.</li> </ul>
DWS	Operating state of the Dynamic Workload Scaling feature for the associated server farm, which can be: <ul style="list-style-type: none"> <li>• N/A—Not applicable; the virtual server's server farm is not configured for Dynamic Workload Scaling.</li> <li>• Local—The server farm is configured for Dynamic Workload Scaling, but the ACE is load-balancing traffic to the local VM Controller VMs only.</li> <li>• Expanded—The server farm is configured for Dynamic Workload Scaling and the ACE is sending traffic to the local and remote VM Controller VMs.</li> </ul>
Current Connections	Current number of connections.
Conns/Sec.	Number of connections per second that the device receives.
Dropped Conns/Sec.	Number of connections per second that the ACE discarded.
Server Farm	Name of the server farm associated with the virtual server.
Action	Indicates if the device is functioning as a primary server (Primary) or a backup server (Backup).
Algorithm	Type of predictor algorithm specified on the load balancer, which can be: <ul style="list-style-type: none"> <li>• Roundrobin</li> <li>• Leastconn</li> <li>• Hash URL</li> <li>• Hash Address</li> <li>• Hash Cookie</li> <li>• Hash Header</li> </ul>
# Rservers Up	Number of real servers that are up of the real servers configured on the virtual server. For example, when 3 out of 10 real servers are up, 3/10 is displayed.
# Probes Failed	Number of probes that have failed of the probes configured on the virtual server.. For example, when 10 out of 21 probes fail, 10/21 is displayed.
Last Polled	Date and time of the last time that DM polled the device to display the current values.

**Step 2** (Optional) Use the function buttons described in [Table 14-7](#) to update the virtual server information displayed, view graph information, or view the topology map.

**Table 14-7 Virtual Server Monitoring Window Function Buttons**

Function Button	Description
Poll Now	Instructs DM to poll the devices and display the current values. Choose one or more virtual servers and click <b>Poll Now</b> .
Graph	Displays a historical trend graph of virtual server information for a specific virtual server. Choose 1 to 4 virtual servers and click <b>Graph</b> .
Topology	Displays the network topology map for a specific virtual server. Choose a virtual server and click <b>Topology</b> .  The Topology window appears, displaying the virtual server and associated network nodes. For information about using the topology map, see the <a href="#">“Displaying Network Topology Maps”</a> section on page 14-33.

**Related Topics**

- [Monitoring Load Balancing on Real Servers, page 14-24](#)
- [Monitoring Load Balancing on Probes, page 14-26](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

## Monitoring Load Balancing on Real Servers

DM monitors load balancing and allows you to view the associated real server information.

**Procedure**

**Step 1** Choose **Monitor > Virtual Contexts > Load Balancing > Real Servers**.

Depending on the virtual context that you selected from the object selector, the information described in [Table 14-8](#) appears.

**Table 14-8 Load Balancing Real Server Monitoring Information**

Field	Description
Context	Name of the context. This field is displayed when the object selector is *All.*
Real Server	Name of the real server. To view statistics for a selected real server, click the real server hyperlink. The Real Server Details popup window appears containing the individual statistic, associated counter value, and a description of the statistic. Click <b>OK</b> to close the popup window.
IP Address	IP address of the real server. This field appears only for real servers specified as hosts.
Port	Port number used for the server port address translation (PAT).
Server Farm	Primary server farm to use for load balancing.



**Table 14-8** Load Balancing Real Server Monitoring Information (continued)

Field	Description
Admin Status	<p>The specified state of the server, which can be:</p> <ul style="list-style-type: none"> <li>• Inservice—Indicates the server is in service.</li> <li>• Out of Service—Indicates the server is out of service.</li> <li>• In Service Standby—Indicates the server is a backup server and remains inactive unless the primary server fails. If the primary server fails, the backup server becomes active and starts accepting connections.</li> </ul>
Operational Status	<p>The state of the server, which can be:</p> <ul style="list-style-type: none"> <li>• Inservice—Indicates the server is in service.</li> <li>• Out of Service—Indicates the server is out of service.</li> <li>• Inservice Standby—Indicates the server is a backup server and remains inactive unless the primary server fails. If the primary server fails, the backup server becomes active and starts accepting connections.</li> <li>• Probe Failed—Indicates that DM did not receive a response to a health probe that it sent to the server.</li> </ul>
VM	<p>Indicator that the real server is, or is not, a VMware virtual machine as follows:</p> <ul style="list-style-type: none"> <li>• – (dash)—The real server is not a VMware VM.</li> <li>• Yes—The real server is a VMware VM. To view details about the VM, click <b>Yes</b>. The Virtual Machine Details pop-up window appears and provides the following information about the VM: <ul style="list-style-type: none"> <li>– Full path—Full path to the VM.</li> <li>– DNS Name—DNS name of the VM.</li> <li>– IP Address—VM IP address.</li> <li>– State—Operating state of the VM (for example, poweredOn).</li> <li>– Guest OS—Guest operating system (for example, Red Hat Enterprise Linux 5 (32-bit)).</li> <li>– Host—Host IP address.</li> <li>– Memory (MB)—Amount of memory.</li> <li>– CPU (MHz)—CPU frequency.</li> <li>– Triggered Alarms—Number of recorded triggered alarm conditions.</li> </ul> </li> </ul> <p>Click <b>OK</b> to close the Virtual Machine Details pop-up window.</p>
Weight	Weight assigned to the real server.
Locality	<p>Locality also requires that you have the ACE configured for Dynamic Workload Scaling (see the <a href="#">“Configuring Dynamic Workload Scaling”</a> section on page 6-14).</p> <p>Possible values for real server locality are as follows:</p> <ul style="list-style-type: none"> <li>• N/A—Not available; the ACE cannot determine the real server location (local or remote). A possible cause for this issue is that Dynamic Workload Scaling is not configured correctly.</li> <li>• Local—The real server is located in the local network.</li> <li>• Remote—The real server is located in the remote network. The ACE bursts traffic to this server when the local real server's CPU and/or memory usage reaches the specified maximum threshold value.</li> </ul>

**Table 14-8** Load Balancing Real Server Monitoring Information (continued)

Field	Description
Current Conns	Number of current connections to this server. If this field indicates <i>N/A</i> , the database does not have any information about current connections. If this field is 0, the database received an SNMP response of 0.
Conns/Sec	Connections per second.
Dropped Conns/Sec	Dropped connections per second.
Last Polled	Date and time of the last time that DM polled the device to display the current values.

**Step 2** (Optional) Use the function buttons described in [Table 14-9](#) to update or change the real server information displayed.

**Table 14-9** Real Server Monitoring Window Function Buttons

Function Button	Description
<b>Poll Now</b>	Instructs DM to poll the devices and display the current values. Choose one or more real servers and click <b>Poll Now</b> . Click <b>OK</b> when asked if you want to poll the devices for data now.
<b>Graph</b>	Displays a historical trend graph of real server information for the specified real servers. Choose 1 to 4 real servers and click <b>Graph</b> . Choosing multiple real servers allows you to compare information.  For more information, see the “ <a href="#">Configuring Historical Trend and Real Time Graphs for VirtualContexts</a> ” section on page 14-30.
<b>Topology</b>	Displays the network topology map for the specified real server. Choose a real server and click <b>Topology</b> .  The Topology window appears, displaying the real server and associated network nodes. For information about using the topology map, see the “ <a href="#">Displaying Network Topology Maps</a> ” section on page 14-33.

**Related Topics**

- [Monitoring Load Balancing, page 14-22](#)
- [Monitoring Load Balancing on Probes, page 14-26](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

## Monitoring Load Balancing on Probes

To check the health and availability of a real server, the ACE periodically sends a probe to the real server. If you notice an excessive number of probes failing, you can view the monitoring information as shown in the following steps.

**Procedure**

**Step 1** Choose **Monitor > Virtual Contexts > Load Balancing > Probes**.

Depending on the virtual context that you selected from the object selector, the probe information described in [Table 14-10](#) appears.

**Table 14-10** Load Balancing Probes Monitoring Information

Field	Description
Context	Name of the context. This field is displayed when the object selector is *All.*
Probe	Name of the probe. To view statistics for a selected probe, click the probe hyperlink. The Probe Details popup window appears containing the following probe statistics: <ul style="list-style-type: none"> <li>Failed Probes—Total number of failed probes.</li> <li>Health of Probes—Health of the probe. Possible values are PASSED or FAILED.</li> <li>Probes Passed—Total number of passed probes.</li> </ul> Click <b>OK</b> to close the Probe Details popup window.
Type	Type of probe. For a complete list of probe types and their descriptions, see <a href="#">Table 6-9</a> .
Real Server	Name of the real server that the probe is associated with.
Server Farm	Name of the server farm that the probe is associated with.
Port	Port number that the probe uses. By default, the probe uses the port number based on its type.
IP Address of Probe	Destination or source address for the probe.
Probed Port	Source of the probe port number.
Probe Health	Health of the probe. Possible values are PASSED or FAILED.
Passed Rate	Rate of passed probes
Failed Rate	Rate of failed probes
Last Polled	Date and time of the last time that DM polled the device to display the current values.

**Step 2** Click **Poll Now** to instruct DM to poll the devices and display the current values.

**Step 3** Click **OK** when asked if you want to poll the devices for data now.

#### Related Topics

- [Monitoring Load Balancing, page 14-22](#)
- [Monitoring Load Balancing Statistics, page 14-27](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

## Monitoring Load Balancing Statistics

You can monitor load balancing on your ACE as shown in the following procedure.

#### Procedure

**Step 1** Choose **Monitor > Virtual Contexts > Load Balancing > Statistics**.

Depending on the virtual context that you selected from the object selector, the Load Balancing Statistics Monitoring Information window displays the information described in [Table 14-11](#).

**Table 14-11** Load Balancing Statistics Monitoring Information

Field	Description
Context	Name of the context. This field is displayed when the object selector is *All.*
L4 Policy Conn	Number of Layer 4 policy connections
L7 Policy Conn	Number of Layer 7 policy connections
Failed Conn	Number of failed connections
Dropped L4 Policy Conn	Number of dropped Layer 4 policy connections
Dropped L7 Policy Conn	Number of dropped Layer 7 policy connections
Rejected Conn Due To No Policy Match	Number of connections rejected because they did not match policies
Rejected Conn Due To No Configured Policy	Number of connections rejected because there are no configured poliicy
Rejected Conn Due To ACL Deny	Number of connections rejected due to ACL parameters
Rejected Conn Due To L7 Config Changes	Number of rejected connections due to Layer 7 configuration changes
Conn Timed Out	Number of times the connection timed out.
Last Polled	Date and time of the last time that DM polled the device to display the current values.

- Step 2** Click **Poll Now** to instruct DM to poll the devices and display the current values and click **OK** when prompted if you want to poll the devices for data now.
- Step 3** Click **Graph** to display a historical trend graph of load balancing statistics (see the “[Configuring Historical Trend and Real Time Graphs for VirtualContexts](#)” section on page 14-30 for details).

#### Related Topic

- [Monitoring Load Balancing on Probes, page 14-26](#)
- [Configuring Historical Trend and Real Time Graphs for VirtualContexts, page 14-30](#)

## Monitoring Application Acceleration

If you have configured application acceleration functions on the ACE, you can monitor the optimization statistics as shown in the following steps.

- Step 1** Choose **Monitor > Virtual Contexts > Application Acceleration**.

Depending on the virtual context that you selected from the object selector, the Application Acceleration information appears as shown in [Table 14-12](#).

**Note**

For connection-based syslogs, the following additional parameters are displayed: Source IP, Source Port, Destination IP, Destination Port, and Protocol Information. This allows you to sort and filter on these fields if desired.

**Table 14-12** Application Acceleration Monitoring View

Field	Statistic	Description
Condenser Information	Total HTTP Unoptimized Requests Received	Total number of end-user HTTP request the condenser has received that cannot be optimized
	Accumulated Bytes Received	Accumulated size (in bytes) of each end-user requested object
	Total Responses in Bytes	Accumulated size (in bytes) of responses, both for condensable and non-condensable end-user HTTP requests
	Total Abandons of Delta Optimization	Total number of abandons of delta optimization requests
Cacheable Objects Statistics	Total Objects Served from Cache	Total number of cacheable objects served from the cache, excluding the not-modified replies
	Accumulated Bytes Served	Accumulated size (in bytes) of the cacheable objects served from the cache, excluding not-modified replies
	Total Objects Not Found in Cache	Total number of cacheable objects not found in the cache
	Accumulated Bytes Not Found	Accumulated size (in bytes) of the cacheable objects not found in the cache
	Total IMS Requests for Valid Cache	Total number of IMS requests for valid copies of objects in the cache
	Total Missed IMS Requests	Total number of IMS request for objects that either do not exist or are stale in the cache
	Total Non-Cacheable Object Requests	Total number of non-cacheable object requests
	Total Requests with Not Modified Responses	Total number of requests for stale objects that have the response from the origin server as not modified
Flash Forward Objects Statistics	Successful Transformations	Total number of successful transformations for FlashForward objects
	Unsuccessful Transformations	Total number of unsuccessful transformations for FlashForward objects
	Total HTTP Requests	Total number of HTTP requests (excluding the IMS requests) for the transformed FlashForward objects
	Total IMS Requests	Total number of IMS requests for transformed FlashForward objects

**Step 2** Click **Poll Now** to instruct DM to poll the devices and display the current values.

**Step 3** Click **OK** when asked if you want to poll the devices for data now.

**Related Topic**

[Configuring Application Acceleration and Optimization, page 13-1](#)

# Configuring Historical Trend and Real Time Graphs for VirtualContexts

DM allows you to store historical data for a selected list of statistics calculated over the last hour, 2-hour, 4-hour, 8-hour, 24-hour, or month interval. You can view this historical data as a statistical graph from specific Monitor > Virtual Contexts monitoring screens. For each monitoring page, default statistics are defined and the graph drawn for the selected object(s) from the page. DM also allows you to display real time statistical information related to the selected monitoring window.

**Note**

All client browsers require that you enable Adobe Flash Player 9 to properly display the monitoring graphs provided in DM.

Historical graphs are available from the following Monitor > Virtual Contexts monitoring windows:

- Traffic Summary window
- Load Balancing > Virtual Server window
- Load Balancing > Real Server window
- Load Balancing > Statistics window
- Context Resource Usage

In each monitoring view window, click the **Graph** button to view the Graph page. From this page you can view up to a maximum of four individual graphs of object data. Tooltips appears within each graph to allow you to see the datapoint values used for plotting.

If you choose, you can overlay multiple objects for comparison on the same graph. Each graph grid provide a comma-separated list of select statistics.

DM supports a maximum of four lines per historical graph. The number of lines in a graph indicates the number of combinations of statistics and the objects (which can be a virtual server, real server, virtual context, and so on). For example, if you select two statistics and two real servers, then the number of possible combination that can be displayed in a graph is four.

**Note**

The time displayed in all graphs is shown in DM server time not in client time.

**Procedure**

- Step 1** Choose the specific monitoring window from which you want to display historical data graphs for a selected list of items.

**Table 14-13** *Selecting a Monitoring Window*

To Access....	Select...
Resource Usage window	<b>Monitor &gt; Virutal Contexts &gt; Context Resource Usage</b>
Traffic Summary window	<b>Monitor &gt; Virutal Contexts &gt; Traffic Summary</b>

**Table 14-13** *Selecting a Monitoring Window*

To Access....	Select..
Virtual Servers window	<b>Monitor &gt; Virutal Contexts &gt; Load Balancing &gt; Virtual Servers</b>
Real Servers window	<b>Monitor &gt; Virutal Contexts &gt; Load Balancing &gt; Real Servers</b>
Statistics window	<b>Monitor &gt; Virutal Contexts &gt; Load Balancing &gt; Statistics</b>

**Step 2** Check the check box of the objects in the selected monitoring window that you want to view and click **Graph**.

The graph window appears.

DM supports a maximum selection of up to four objects. DM updates the monitoring window with the graph of the selected objects.

At any point, if you want to add a graph to the selected monitoring window, click **Add Graph**.



**Note** DM supports a maximum of four objects that you can select in a specific Monitor > Virtual Contexts monitoring window.

**Step 3** To enhance your viewing of the graphs, use the Collapse/Expand buttons to minimize or maximize a graph in the monitoring window.

**Step 4** To toggle the display of an object graph in the monitoring window, do the following:

- Click **View As Chart** to display the object data as a graph.
- Click **View As Grid** to display the object data as a numerical line grid.



**Note** If you want to save the graph as a JPEG file for archive or other purposes, click the **Show As Image** button. When you mouse over the graph, the Image Toolbar appears. From the Image Toolbar, you can save the graph as a JPEG or send it in an email. You can also print the graph if desired.

If you want to export object data to Microsoft Excel for archive or other purposes, click the **Export to Excel** link in the View As Grid object display.

**Step 5** To add one or more objects to a graph in the monitoring window to compare the performance of one object with its peer for the selected stats, do the following:

- a. In the Selected {Object} line in the graph of the object that you want to replace, click the **Select** button.

The Objects Selector pop-up window appears.

- b. From the Objects Selector pop-up window, choose a different object and click **OK**.

The selected object replaces the existing object graph in the monitoring window.



**Note** DM supports a maximum of four lines to be drawn per historical graph.

- Step 6** To select multiple statistics for display in a graph in the monitoring window, perform the following steps:
- a. In the Selected Stat(s) line in the graph of the object that you want to add statistics, click the **Select** button within the graph.  
The Select Stats pop-up window appears.
  - b. From the Select Stats pop-up window, choose one or more statistics to add to the graph and click **OK**.  
You can choose up to four statistics for display in a graph and the object statistics must be of the same unit of measure (for example, bytes/sec.). The selected statistics appear in the existing object graph in the monitoring window.
- Step 7** To modify the time interval for the accumulated statistics displayed in a graph, click the **Time** drop-down list to display the list of time interval options.
- Time interval choices include the average data calculated during the last hour, 2-hour, 4-hour, 8-hour, 24-hour, or 30-day (last month) interval. The time choices also include the Real Time option, which at most displays 3 minutes of data at 10 second intervals (not configurable).
- Note the following usage considerations for the time interval for accumulated statistics:
- When you specify to view average data calculated during the last hour, 2-hour, 4-hour, or 8-hour interval, raw data points collected by DM within the selected time period will be displayed. For example, in the case of the last 1 hour, if DM has been collecting data for over an hour at a default 5-minute interval, you will see 12 data points on the graph.
  - When you specify to view average data calculated during the last 24-hour interval, consolidated hourly data points will be displayed. For example, if DM has been collecting data for more than 24 hours, you will see 24 data points on the graph.
  - When you specify to view average data calculated during the last 30-day interval, consolidated daily data points will be displayed. For example, if DM has been collecting data for over 30 days, you will see 30 data points on the graph.
- Step 8** To exit the display of graphs, click **Exit Graph**.
- 

## Setting Up Virtual Contexts Statistics Collection

Use the procedure to enable data collection for the virtual contexts you select. Configuration changes are not saved after an appliance reboot; default settings are restored.

For more information about ACE appliance hardware statistics such as CPU, disk, and memory usage, see [Monitoring ACE Module Statistics, page 15-35](#).

### Procedure

- 
- Step 1** Select **Monitor > Virtual Contexts > Statistics Collection**. Depending on the virtual context that you selected from the object selector, the Statistics Collection screen appears.
  - Step 2** In the Polling Stats field, select **Enable** to start background polling or **Disable** to stop background polling.
  - Step 3** In the Background Polling Interval field, select the polling interval appropriate for your networking environment. The interval range is from one minute to six hours.
  - Step 4** Click **Deploy Now** to save your entries.





**Note** These settings are not saved if you reboot your appliance. The system defaults will be restored.

#### Related Topics

- [Control Plane CPU/Memory Graphs, page 14-9](#)
- [Monitoring Load Balancing on Real Servers, page 14-24](#)
- [Monitoring Load Balancing on Probes, page 14-26](#)

## Displaying Network Topology Maps

This section shows how to display and use the network topology maps that display the nodes on your network based on the virtual or real server that you select.

**Table 14-14** Network Topology Map Components

Component	Description
Topology map tool bar	<p>Located above the topology map, the tool bar contains the following tools:</p> <ul style="list-style-type: none"> <li>• <b>Layout</b>—Changes the direction in which the network map appears. Choose one of the following options from the drop-down list: Top to Bottom or Left to Right.</li> <li>• <b>Zoom</b>—Modifies the size of the network map. Click and drag the slide bar pointer to adjust the map size.</li> <li>• <b>Magnifier</b>—Toggle button that enables or disables the magnifier tool. When enabled, moving your mouse over the the topology map magnifies the area that the mouse is over.</li> <li>• <b>Fit Content</b>—Fits the topology map to the window.</li> <li>• <b>Overview</b>—Toggle button that enables or disables the Overview Window tool (see <a href="#">Overview Window</a>).</li> <li>• <b>Undo</b>—Sets the network node icons back to their previous positions.</li> <li>• <b>Redo</b>—Redoes the changes that you made before you clicked Undo.</li> <li>• <b>Print</b>—Sends the topology map to the network printer.</li> <li>• <b>Exit</b>—Closes the topology map and returns to the previous window.</li> </ul>

**Table 14-14** Network Topology Map Components (continued)

Component	Description
Topology Map	<p>Displays network node mapping.</p> <p>The node icons display the following information related to the node:</p> <ul style="list-style-type: none"> <li>• Name</li> <li>• IP address (virtual and real servers only)</li> <li>• Port (real servers only)</li> <li>• Operational state (virtual and real servers only)</li> </ul> <p>When you hover over a network node icon, the node type appears, for example ACE Virtual Server, Server Farm, or Real Server. Other possible operations when you hover over a network node icon are as follows:</p> <ul style="list-style-type: none"> <li>• Real servers only—When you have an ACE configured for Dynamic Workload Scaling and you mouseover an associated real server icon, information appears that identifies which data center the real server is located in: local or remote. A timestamp also appears that specifies when the information was obtained.</li> <li>• Server farms only—When you mouseover a server farm icon, the following Dynamic Workload Scaling status information appears: <ul style="list-style-type: none"> <li>– Local—The ACE is using the server farm’s local real servers only for load balancing. A timestamp specifies when the information was obtained.</li> <li>– Burst—The ACE is bursting traffic to the server farm’s remote real servers because the load of the local real servers has exceeded the specified usage threshold (based on the average CPU and/or memory usage). A timestamp specifies when the information was obtained.</li> <li>– N/A—Not applicable (Dynamic Workload Scaling is not available).</li> </ul> </li> </ul> <p>For more information about Dynamic Workload Scaling, see the <a href="#">“Dynamic Workload Scaling Overview” section on page 6-4</a>.</p> <p>To view details about a network node, right-click on the node and choose <b>Show Details</b> from the pop-up menu. To reposition a node in the map, click and drag the node icon to a new position. The node interconnect lines move with the node.</p>
Overview Window	<p>Provides a combined functionality of the scroll bars and zoom tool as follows:</p> <ul style="list-style-type: none"> <li>• Position tool (a)—Click and drag the shaded box to move around the topology map.</li> <li>• Zoom tool (b)—Click and drag the shaded box handle (located in lower right corner) and to zoom in or out of the topology map.</li> </ul> <p>Click the Overview toggle button in the map tool bar to display or hide the Overview window (see <a href="#">Topology map tool bar</a>).</p>

### Procedure

- Step 1** Do one of the following:
- Display the list of virtual servers by choosing **Monitor > Virtual Contexts > Loadbalancing > Virtual Servers**.
- The Virtual Servers window appears with the table of configured virtual servers.

- Display the list of real servers, choose **Monitor > Virtual Contexts > Loadbalancing > Real Servers**.

The Real Servers window appears with the table of configured virtual servers.

**Step 2** From the servers table, check the check box next to the server whose topology map you want to display.

**Step 3** From the servers window, click **Topology**.

The DM Topology window displays the topology map for the selected virtual or real server. For information about using the topology map tools, see [Table 14-14](#).

**Step 4** (Optional) To close the topology map and return to the previous window, from the DM Topology window, click **Exit**.

## Testing Ping

Use the following steps to verify the **ping** command on a device.

### Procedure

**Step 1** Select **Monitor > Virtual Contexts > context > Ping**.

**Step 2** Enter the information shown in [Table 14-15](#).

**Table 14-15 Ping Fields**

Field	Description
IP Address Type	Select either IPv4 or IPv6 for the address type of the real server.
IP Address	Enter the IP address of the real server to which you want to ping.
Elapsed Time	Elapsed time before the ping request is declared a failure.
Repeat	Enter how many times to repeat the test.
Datagram Size	Enter a value for the argument size (size of the packet) of the ping command. Range is between 36 and 452.

**Step 3** Click **Start** to run the connectivity test.

If ping fails, it may take up to 30 seconds before an error is returned. A future release will have a Cancel button.

**Step 4** After the test completes, the results are displayed. Click:

- **New** to enter new parameters and create a new ping test. After selecting New, the Start New Test page displays. You may click Results if you want to review the results of the test you just performed.
- **Restart** to rerun the connectivity test.

### Related Topics

- [Setting Up Virtual Contexts Statistics Collection, page 14-32](#)
- [Monitoring Load Balancing on Real Servers, page 14-24](#)

- [Monitoring Load Balancing on Probes, page 14-26](#)