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Deploying the BIG-IP LTM with the Cacti Open Source Network Monitoring System

Version 1.0

Archived

Deploying F5 with Cacti Open Source Network Monitoring System

Welcome to the F5 and Cacti deployment guide. This guide provides detailed procedures for configuring F5 devices with the Cacti Open Source Network Monitoring System.

Network Management Systems (NMS) provide insight to device and application performance, system stability, network trouble spots and a host of other items that affect a company's ability to provide computer network services. Recent advances in automated event correlation, data storage and retrieval, as well as open source systems that allow greater integration, have greatly improved today's Network Management Systems.

Cacti is a complete network graphing solution designed to harness the power of RRDTool's data storage and graphing functionality. Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. All of this is wrapped in an intuitive, easy to use interface that makes sense for LAN-sized installations up to complex networks with hundreds of devices.

For more information on the Cacti project, see <http://www.cacti.net/>.

For further Cacti resources and information, see <http://cactiez.cactiusers.org/>.

For more information on F5 devices described in this guide, see <http://www.f5.com/products/big-ip/>.

To provide feedback on this deployment guide or other F5 solution documents, contact us at solutionsfeedback@f5.com.

Prerequisites and configuration notes

The following are prerequisites and configuration notes about this deployment:

- ◆ The BIG-IP LTM system must be running v9.0 or later. We highly recommend using v9.4 or later. Examples shown in this document are from a v10.0 system.
- ◆ While many versions of Cacti exist, examples shown in this document are from a CactiEZ v0.8.7c deployment. As with many open source projects, development is ongoing and Cacti v0.8.7d was recently released. There have been no changes to the user interface between releases that would affect information contained in this guide.
- ◆ This document is written with the assumption that the reader is familiar with BIG-IP LTM systems, open source tools, Linux server systems administration and the Cacti monitoring platform.
- ◆ Additionally, the system administrator should be familiar with the basic concepts of the Simple Network Management Protocol (SNMP). For more information on configuring these products, consult the appropriate documentation.

Product versions and revision history

Product and versions tested for this deployment guide:

Product Tested	Version Tested
BIG-IP Local Traffic Manager (LTM)	v10.0
Cacti Network Graphing Solution	v0.8.7c
SNMP	v2c

Revision history:

Document Version	Description
1.0	New deployment guide

Configuration example

The BIG-IP LTM system is used to add high availability and traffic management to a pool of servers providing network services and enterprise applications such as web (HTTP) traffic. Many network administrators deploy management solutions on a dedicated network to monitor and managed their hardware. A typical deployment of a monitored BIG-IP LTM is shown in the following illustration.

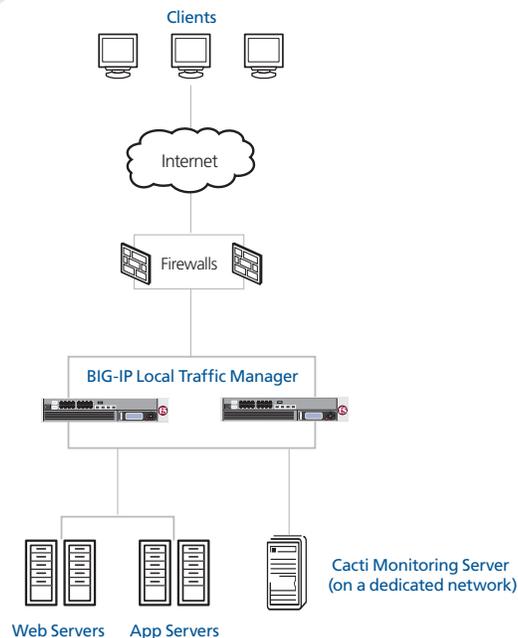


Figure 1 Logical configuration example

Configuring the BIG-IP LTM for monitoring with the Cacti Network Graphing Solution

This deployment guide is divided into the following sections:

- *Performing the initial configuration tasks*, on page 3
- *Importing existing Cacti templates*, on page 7
- *Adding the F5 devices to the Cacti configuration*, on page 10
- *Configuring the Cacti Monitoring Server to display monitored data collected from the BIG-IP LTM*, on page 13

We recommend you save your existing BIG-IP configuration before you begin the procedures in this Deployment Guide. For information on backing up or restoring a BIG-IP LTM configuration, refer to the BIG-IP LTM manual appropriate to your version, available on [Ask F5](#).

Performing the initial configuration tasks

In this section, we configure the BIG-IP LTM with the required SNMP settings to allow communication from the Cacti monitoring server. This section contains the following procedures:

- *Configuring SNMP*, on this page
- *Configuring the community name strings*, on page 4

Configuring SNMP

The first procedure in this deployment is allow the BIG-IP LTM system to accept requests and reply with data to specific SNMP requests from the monitoring system.

To allow SNMP Communication

1. On the Main tab, expand **System**, and then click **SNMP**.
The SNMP configuration screen opens.
2. In the **Contact Information** box, type the name of the person who administers the SNMP service for this system. In our example, we type **BIG-IP System Administrator**.
3. In the Machine Location box, type the location of this device. In our example, we type **East Coast Data Center**.
4. From the Client Allow List section, in the **Address** box, type the address of your Cacti server, and then click the **Add** button.

Note: You may want to enter the entire monitoring network IP address range in this step. This is useful if you have additional monitoring systems on the management network that are also monitoring the BIG-IP LTM. To provide a more secure environment the administrator may wish to add only individual IP addresses. Examples of both conditions are shown in Figure 2.

5. Click the **Update** button.

Figure 2 Configuring SNMP information on the BIG-IP LTM

Configuring the community name strings

Next, we need to set the community name strings to allow the SNMP agent on the BIG-IP LTM to communicate with the Cacti server. The community name strings are essentially passwords used to authenticate an SNMP Get request.

To configure the community name strings

1. On the Main tab, expand **System**, and then click **SNMP**.
The SNMP configuration screen opens.
2. From the Menu bar, point your mouse at **Agent**, and then click **Access (v1, v2c)**.
3. Click the **Create** button.
The New Access Record page opens.
4. In the **Community** box, type a name for the community. In our example, we type **private**.

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5. In the **Source** box, type the IP address of the Cacti monitoring server. In our example, we type **10.10.50.136**.
 6. In the **OID** box, type the start of the object identifier (OID) you want to monitor. You must at least type **.1** in this box (which is the first portion of any OID string).
 7. From the Access list, select the appropriate access level. In our example, we select **Read Only**.
 8. Click the **Finished** button.

The screenshot shows a web-based configuration window titled "System » SNMP : Agent : Access (v1, v2c) » New Access Record...". Below the title bar is a "Record Properties" section with a table of input fields:

Type	IPv4
Community	private
Source	10.10.50.136
OID	.1
Access	Read Only

At the bottom of the form are three buttons: "Cancel", "Repeat", and "Finished".

Figure 3 Creating a new access record

This concludes the initial configuration tasks.

Manually creating Cacti templates for the BIG-IP system

The Cacti platform uses a series of templates to build sets of data collections and graphs that are specific to a network device type. Creating monitoring templates allows system administrators to collect the same data across several similar devices. Additionally, when a new device is deployed in the managed environment, an existing template can be applied to monitor that device. There are three types of templates that are used to populate the data tables; **Data Templates**, **Graph Templates** and **Host Templates**. The information the templates collect is used for monitoring thresholds, and graphing.

You can either manually create the templates, or import existing templates (see the following section). It is outside the scope of this document to reproduce the Cacti documentation for manually creating Cacti templates. For specific information on creating Cacti templates, see Chapter 13, *Templates*, in **The Cacti Manual** (<http://www.cacti.net/downloads/docs/html/templates.html>). You can also visit the Cacti forums, where users contribute additional templates and make them available for download.

If you decide to manually create Cacti templates for the BIG-IP system, BIG-IP version 10.0 and later offers a dashboard view of various performance metrics. You can use these metrics for a number of purposes including observing system performance, monitoring throughput, capacity planning, or troubleshooting network problems. To replicate the collected dashboard data in your Cacti system, you can use the BIG-IP OIDs when creating new templates for your environment. See the **Collecting Performance Data** section in Chapter 17, *Configuring SNMP* of the *TMOS Management Guide for BIG-IP Systems*, available on Ask F5 (For versions 10.0 and 10.0.1: https://support.f5.com/kb/en-us/products/big-ip_ltm/manuals/product/tmos_management_guide_10_0_0/tmos_snmp.html#1042852).

Importing existing Cacti templates

As mentioned in the previous section, the Cacti user community provides a number of monitoring templates. Templates for basic SNMP monitoring of a number of devices can be found on the Cacti web site. The templates for F5 devices can be found on F5's DevCentral site.

Appendix A: F5 MIB, on page 15 includes information about the F5 MIBs.

To Import a template on the Cacti Server

1. Download and unzip the F5 template file to a temp directory on the Cacti device (such as `/var/tmp`). The template is located at <http://devcentral.f5.com/wiki/default.aspx/AdvDesignConfig/CactiF5HostTemplate.html>.

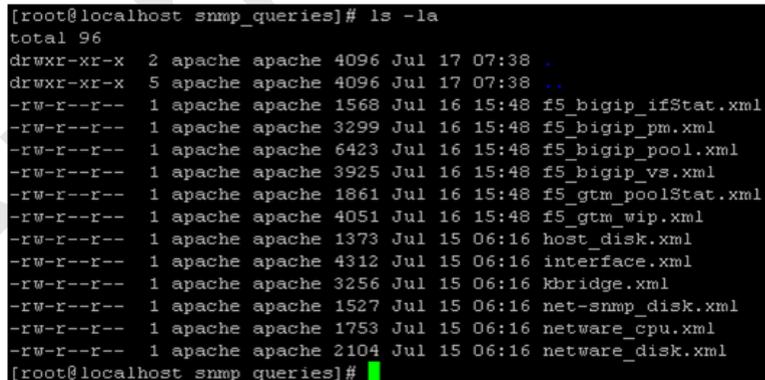
2. Copy the files that support the BIG-IP template, using the following commands:

```
cp f5_*.xml /var/www/html/resource/snmp_queries
```

```
cp f5_*.pl /var/www/html/scripts/
```

3. Verify the group and owner for the files you moved in step 3 are set to **apache**. If the files do not have the apache group or owner, we recommend you change them using the following commands:

```
chown apache:apache f5_*
```



```
[root@localhost snmp_queries]# ls -la
total 96
drwxr-xr-x  2 apache apache 4096 Jul 17 07:38 .
drwxr-xr-x  5 apache apache 4096 Jul 17 07:38 ..
-rw-r--r--  1 apache apache 1568 Jul 16 15:48 f5_bigip_ifStat.xml
-rw-r--r--  1 apache apache 3299 Jul 16 15:48 f5_bigip_pm.xml
-rw-r--r--  1 apache apache 6423 Jul 16 15:48 f5_bigip_pool.xml
-rw-r--r--  1 apache apache 3925 Jul 16 15:48 f5_bigip_vs.xml
-rw-r--r--  1 apache apache 1861 Jul 16 15:48 f5_gtm_poolStat.xml
-rw-r--r--  1 apache apache 4051 Jul 16 15:48 f5_gtm_wip.xml
-rw-r--r--  1 apache apache 1373 Jul 15 06:16 host_disk.xml
-rw-r--r--  1 apache apache 4312 Jul 15 06:16 interface.xml
-rw-r--r--  1 apache apache 3256 Jul 15 06:16 kbridge.xml
-rw-r--r--  1 apache apache 1527 Jul 15 06:16 net-snmp_disk.xml
-rw-r--r--  1 apache apache 1753 Jul 15 06:16 netware_cpu.xml
-rw-r--r--  1 apache apache 2104 Jul 15 06:16 netware_disk.xml
[root@localhost snmp_queries]#
```

Figure 4 Verifying the file permissions and ownership

4. Next, move the scripts file. Here we need to change not only the ownership of the file we've copied, but the permission sets to allow execution of the script in this directory. Use the following commands:

```
chown apache:apache f5_bigip_cpu.pl
```

```
chmod 755 f5_bigip_cpu.pl
```

```
[root@localhost scripts]# ls -la
total 236
drwxr-xr-x  2 apache apache 4096 Jul 16 15:50 .
drwxr-xr-x 13 apache apache 4096 Jul 16 01:00 ..
-rwxr-xr-x  1 apache apache  197 Jul 15 06:16 3com_cable_modem.pl
-rwxr-xr-x  1 apache apache  534 Jul 15 06:16 conncount.pl
-rwxr-xr-x  1 apache apache  256 Jul 15 06:16 diskfree.pl
-rwxr-xr-x  1 apache apache   92 Jul 15 06:16 diskfree.sh
-rw-r--r--  1 root   root   1409 Jul 16 15:50 f5_bigip_cpu.pl
-rwxr-xr-x  1 apache apache  174 Jul 15 06:16 linux_memory.pl
-rwxr-xr-x  1 apache apache  282 Jul 15 06:16 loadavg_multi.pl
-rwxr-xr-x  1 apache apache  401 Jul 15 06:16 loadavg.pl
-rwxr-xr-x  1 apache apache 5608 Jul 15 06:16 network.php
-rwxr-xr-x  1 apache apache  331 Jul 15 06:16 ping.pl
-rwxr-xr-x  1 apache apache 4692 Jul 15 06:16 query_host_cpu.php
-rwxr-xr-x  1 apache apache 3770 Jul 15 06:16 query_host_partitions.php
-rwxr-xr-x  1 apache apache  843 Jul 15 06:16 query_unix_partitions.pl
-rwxr-xr-x  1 apache apache  604 Jul 15 06:16 sql.php
-rwxr-xr-x  1 apache apache 2580 Jul 15 06:16 ss_fping.php
-rwxr-xr-x  1 apache apache 4969 Jul 15 06:16 ss_host_cpu.php
-rwxr-xr-x  1 apache apache 6481 Jul 15 06:16 ss_host_disk.php
-rwxr-xr-x  1 apache apache  610 Jul 15 06:16 ss_poller.php
-rwxr-xr-x  1 apache apache 1192 Jul 15 06:16 ss_sql.php
-rwxr-xr-x  1 apache apache  123 Jul 15 06:16 unix_processes.pl
-rwxr-xr-x  1 apache apache  283 Jul 15 06:16 unix_tcp_connections.pl
-rwxr-xr-x  1 apache apache  264 Jul 15 06:16 unix_users.pl
-rwxr-xr-x  1 apache apache  849 Jul 15 06:16 weatherbug.pl
-rwxr-xr-x  1 apache apache  231 Jul 15 06:16 webhits.pl
-rwxr-xr-x  1 apache apache 2835 Jul 15 06:16 win_services.php
-rwxr-xr-x  1 apache apache 1828 Jul 15 06:16 wmi-script.php
[root@localhost scripts]# chown apache:apache f5*
[root@localhost scripts]#
```

Figure 5 Verifying the ownership and permissions on the script directory

5. Log on to the Cacti server user interface (GUI) as an administrator.
6. From the Navigation pane, under Import/Export, click **Import Templates** (see Figure 6 on the following page).
7. In the Import Template from Local File section, click the **Browse** button, and navigate to the location you saved the F5 template.
8. Click the **Save** button. You see a report on the success of the import (see Figure 7 on the following page).

For further information on templates, please refer to the Cacti reference pages

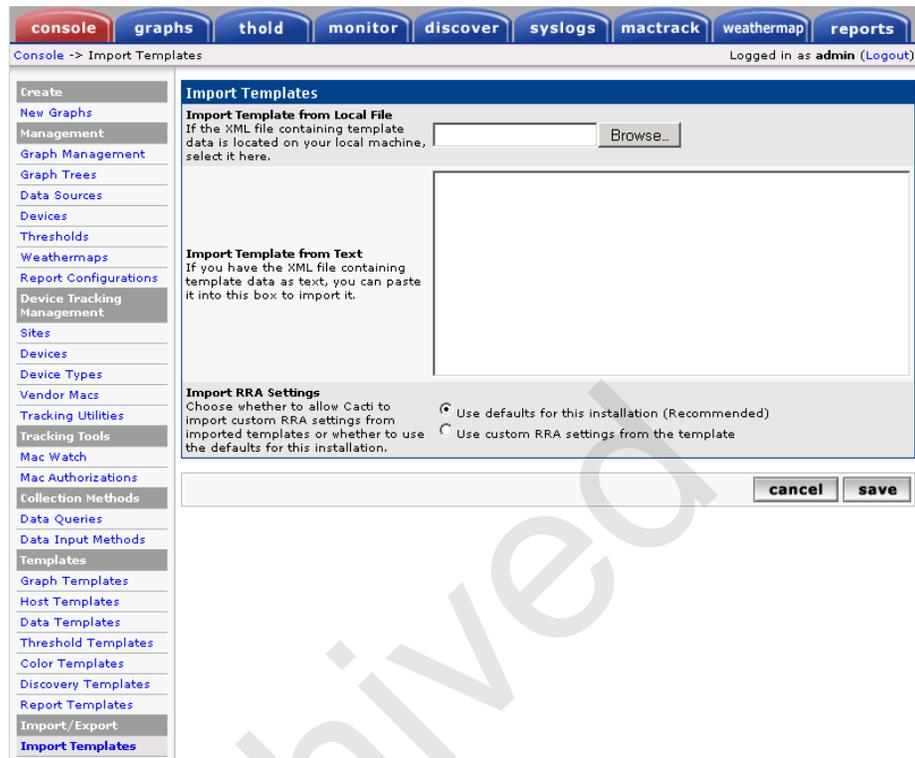


Figure 6 Importing a template from the Cacti server

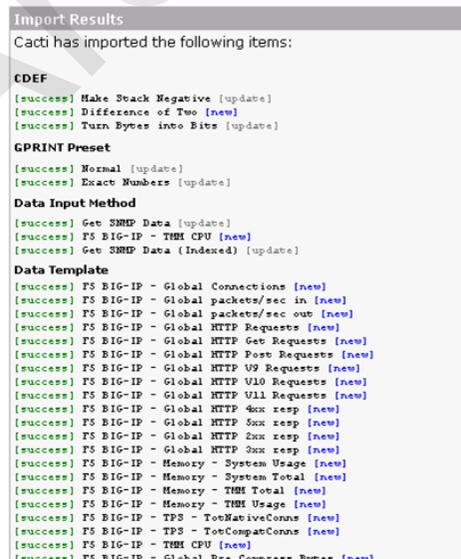


Figure 7 Results of the import in the Cacti UI (truncated)

Adding the F5 devices to the Cacti configuration

Now that the BIG-IP LTM has been set up to be monitored and the monitoring templates are available in the Cacti deployment, the BIG-IP device can be added to the monitored device lists. Once added, the Cacti server will begin polling the BIG-IP at the intervals defined in the crontab file of the Cacti server.

To add a monitored device

1. Log on to the Cacti server user interface (GUI) as an administrator.
2. From the Navigation pane, under Management, click **Devices**. The Devices page opens.
3. From the right side of the Devices screen, click **Add**.
4. In the **Description** box, type a meaningful description. In our example, we type **BIG-IP1**.
5. In the **Hostname** box, type the IP address of the BIG-IP device. You should use IP address, or edit the local hosts table to include this device. Your configuration should not be dependent on additional devices such as remote DNS servers in order to monitor the network hardware. In our example, we type **10.10.50.135**.
6. In the **Host Template** list, select the name of the template you imported in the previous procedure. In our example, we select **F5 BIG-IP**.
7. In the Monitor Host row, check the **Monitor Host** box.
8. In the **Down Host Message** box, type a message to send when the host is down. In our example, we type **BIG-IP v10 is not responding**.
9. In the SNMP Options section, verify your SNMP community name strings are correct and agree with what you configured on the BIG-IP device previously.
10. Click the **Create** button (see Figure 8).
11. To verify the BIG-IP has been properly added, from the left navigation pane, under Management, click Devices. You should see the device you just added, with a Status of **UP**.
12. Repeat this procedure for any additional BIG-IP devices you want to monitor.

Devices [new]

General Host Options

Description
Give this host a meaningful description.

Hostname
Fully qualified hostname or IP address for this device.

Host Template
Choose what type of host, host template this is. The host template will govern what kinds of data should be gathered from this type of host.

Disable Host
Check this box to disable all checks for this host. Disable Host

Monitor Host
Check this box to monitor this host on the Monitor Tab. Monitor Host

Down Host Message
This is the message that will be displayed when this host is reported as down.

Availability / Reachability Options

Downed Device Detection
The method Cacti will use to determine if a host is available for polling.
NOTE: It is recommended that, at a minimum, SNMP always be selected.

Ping Timeout Value
The timeout value to use for host ICMP and UDP pinging. This host SNMP timeout value applies for SNMP pings.

Ping Retry Count
The number of times Cacti will attempt to ping a host before failing.

SNMP Options

SNMP Version
Choose the SNMP version for this device.

SNMP Community
SNMP read community for this device.

SNMP Port
Enter the UDP port number to use for SNMP (default is 161).

SNMP Timeout
The maximum number of milliseconds Cacti will wait for an SNMP response (does not work with php-snmp support).

Maximum OID's Per Get Request
Specified the number of OID's that can be obtained in a single SNMP Get request.

Additional Options

Notes
Enter notes to this host.

WMI Account Options

WMI Authentication Account
Choose an account to use when Authenticating via WMI.

Figure 8 Adding the BIG-IP LTM to the Cacti configuration

Creating graphs for a specific host

Now that we have added devices as well as the graphing and polling templates, we can add specific items we would like to graph for a particular host.

To create graphs for a host

1. From the Navigation column on the left, click Devices, then click the host for which you want to add the graphs.
2. Click ***Create Graphs for this Host**, found on the right side of the page.
3. Select the graphs you want to add by clicking the check boxes on the right hand side and click **Create**.

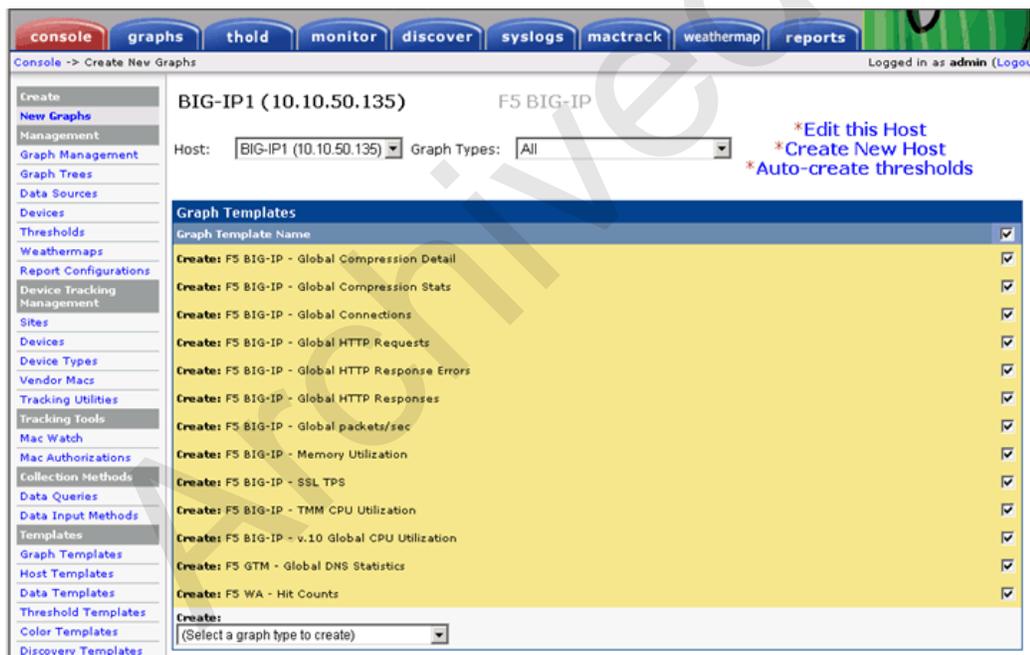


Figure 9 Selecting the templates for graphing

Configuring the Cacti Monitoring Server to display monitored data collected from the BIG-IP LTM

After adding the monitored devices and the specific data collections to populate the database, the next task is to display the collected information. The primary method, made easy with the Cacti server, is through the graphing tool.

To add graphs to your environment

1. Log on to the Cacti server user interface (GUI) as an administrator.
2. From the Navigation pane, under Management, click **Graph Trees**. The Graph Trees page opens.
3. On the right side of the page, click **Add**.
4. In the Name box, type a useful name for this graph. In our example, we type **BIG-IP1**.
5. From the **Sorting Type** list, select **Manual Ordering (No Sorting)**.
6. Click the **Create** button. The Tree Items section appears.
7. On the right side of the Tree Items box, click **Add**.
8. From the **Parent Item** list, select a parent item. In our example, we leave this at the default, **root**.
9. From the Tree Item Type list, select an item type. In our example, we select **Graph**.
10. From the Graph list, select a graph to add to the tree. In our example, we select **BIG-IP1 - Memory Utilization**.
11. From the Round Robin Archive list, select a time frame to control how this graph displays. In our example, we select **Hourly (1 minute Average)**.

Tree Items	
Parent Item Choose the parent for this header/graph.	[root] ▾
Tree Item Type Choose what type of tree item this is.	Graph ▾
Tree Item Value	
Graph Choose a graph from this list to add it to the tree.	BIG-IP1 - Memory Utilization ▾
Round Robin Archive Choose a round robin archive to control how this graph is displayed.	Hourly (1 Minute Average) ▾
<input type="button" value="cancel"/> <input type="button" value="create"/>	

Figure 10 Creating the Tree Items

12. Click the **Create** button.

To view the graphs, click the Graphs tab at the top of Cacti main page:

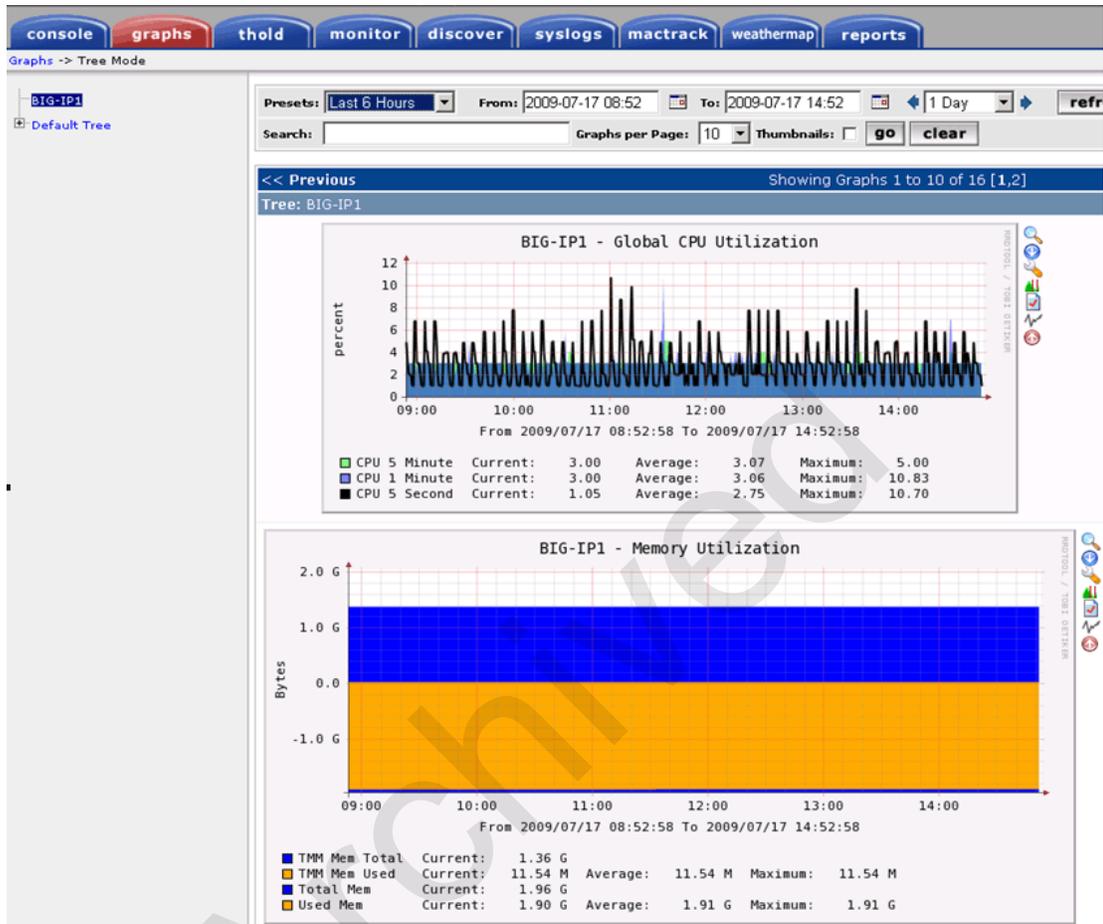


Figure 11 Example of BIG-IP LTM graphs

Conclusion

Open source monitoring tools provide the platform to collect and display performance and available data based on the administrators' preference. F5 provides the means to identify and collect specific data elements from their devices through their SNMP MIB. Together, long term performance data and information useful for troubleshooting network problems can be made available.

This completes the BIG-IP LTM and Cacti Monitoring Server deployment guide. To provide feedback on this deployment guide or other F5 solution documents, contact us at solutionsfeedback@f5.com.

Appendix A: F5 MIB

The F5 MIB is available for download directly from the Welcome Screen of the BIG-IP Configuration Utility (you can return to the Welcome screen by expanding **Overview** in the left navigation pane, and then clicking **Welcome**). The link to the F5 MIBs is in the Downloads box on the lower right, in the SNMP MIBS section (**Download F5 MIBs (mibs_f3.tar.gz)**). The NET-SNMP MIB is also available from this location. The NET-SNMP MIB is an extensible MIB that provides hardware monitoring of the platform, for example temperature, CPU utilization, and so on. The F5 MIB contains specific Application delivery variables.

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Appendix B: Additional Resources

The following are additional resources:

DevCentral Wiki page for the F5 Host Template:

<http://devcentral.f5.com/wiki/default.aspx/AdvDesignConfig/CactiF5HostTemplate.html>

Example of Creating a Cacti Graph Template:

<http://devcentral.f5.com/Default.aspx?tabid=63&articleType=ArticleView&articleId=346>

Example of creating an SNMP Indexed Data Template:

<http://devcentral.f5.com/Default.aspx?tabid=63&articleType=ArticleView&articleId=2314>

For more information on the Cacti project, see <http://www.cacti.net/>.

For further Cacti resources and information, see

<http://cactiez.cactiusers.org/>.

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