

HP Business Availability Center

for the Windows and Solaris operating systems

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Real User Monitor Administration

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Welcome to This Guide

This guide provides detailed instructions on how to install, configure, and administer the HP Real User Monitor data collector.

Note: If you are an HP Software-as-a-Service customer, you must contact an HP Software Support representative to receive connection information that enables you to work with HP Real User Monitor.

This chapter includes:

- ▶ How This Guide Is Organized on page 7
- ▶ Who Should Read This Guide on page 8
- ▶ Getting More Information on page 8

How This Guide Is Organized

The guide contains the following chapters:

Part I HP Real User Monitor Introduction and System Requirements

Introduces HP Real User Monitor and the platform system requirements, and explains how HP Real User Monitor works.

Part II Installing HP Real User Monitor

Explains how to install and uninstall the HP Real User Monitor engine. Also explains how to install one or more HP Real User Monitor probes.

Part III Configuring and Administering HP Real User Monitor

Explains how to configure an HP Real User Monitor probe by changing the default settings as well as how to configure and administer the HP Real User Monitor engine and how to administer HP Real User Monitor's MySQL database. Also provides guidelines for hardening HP Real User Monitor.

Who Should Read This Guide

This guide is intended for the following users of HP Business Availability Center:

- HP Business Availability Center administrators
- HP Business Availability Center data collector administrators

Readers of this guide should be knowledgeable about enterprise system administration and HP Business Availability Center data collectors.

Getting More Information

For a complete list of all online documentation included with HP Business Availability Center, additional online resources, information on acquiring documentation updates, and typographical conventions used in this guide, see the *HP Business Availability Center Deployment Guide* PDF.

Part I

HP Real User Monitor Introduction and System Requirements

1

Introducing HP Real User Monitor Administration

This chapter introduces HP Real User Monitor and explains how it works.

This chapter includes:

- Overview of HP Real User Monitor on page 11
- How the HP Real User Monitor Works on page 12
- Ports and Types of Communication Used by HP Real User Monitor on page 15
- Overview of HP Real User Monitor Performance Measurements on page 17
- Installing and Administering HP Real User Monitor on page 25

Overview of HP Real User Monitor

HP Real User Monitor monitors both user and system initiated network traffic between client machines and servers and between servers, collecting network and server performance and availability data in real time. This enables administrators to pinpoint the cause of delays and quantify the business impact of detected performance issues related to end users. When performance and availability exceed specified thresholds, HP Business Availability Center proactively alerts application managers who, using the HP Real User Monitor reports, analyze the collected data in order to isolate the root cause of detected problems.

How the HP Real User Monitor Works

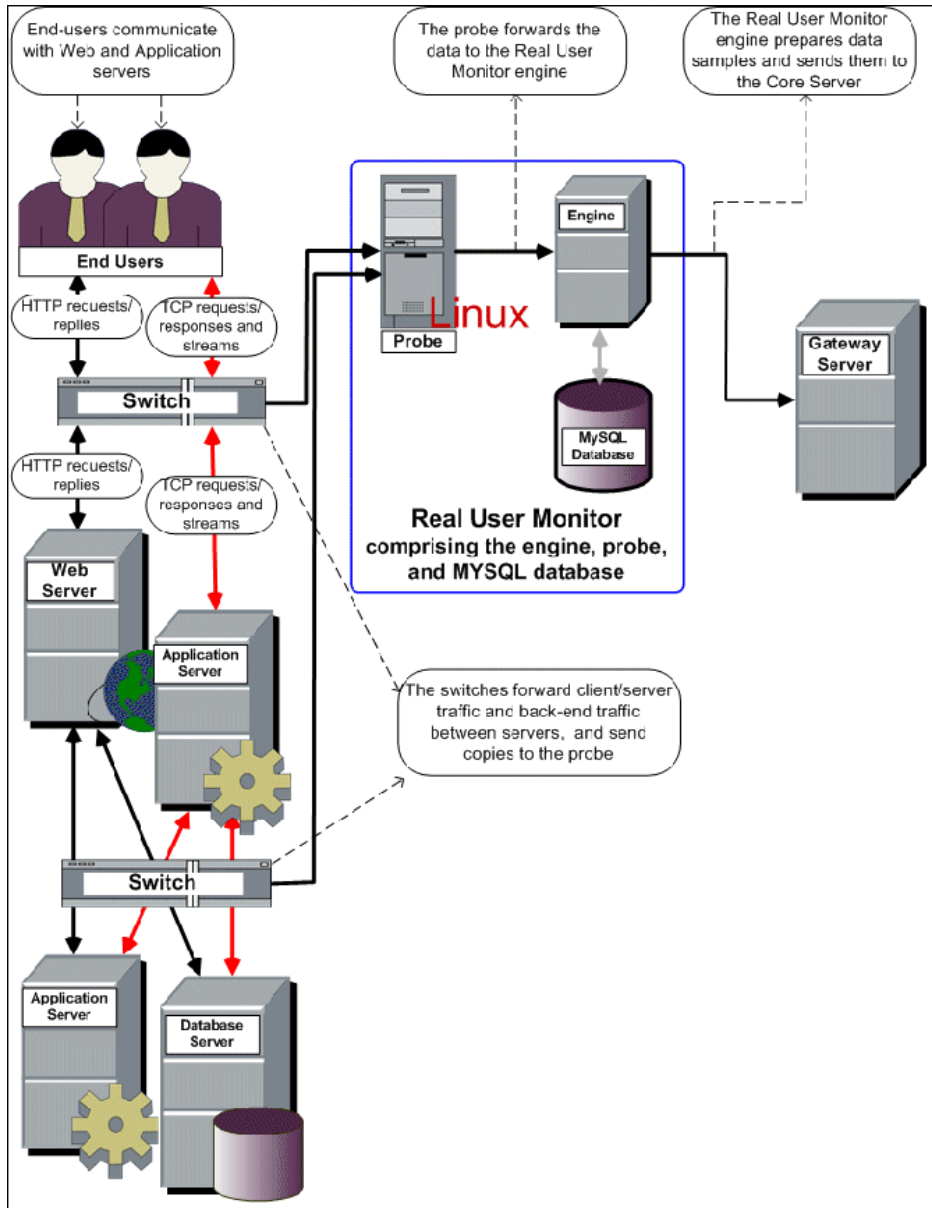
HP Real User Monitor consists of three major components: the probe, the engine, and the MySQL database.

- ▶ The **probe** is a non-intrusive, passive listening device that is subject to the same traffic the server receives. It is plugged into a network tap that is connected to a monitored server. As end-user traffic passes through the tap, the probe listens to requests and responses sent to and from the server. In this way, data is tracked all the way from the end-user's IP address to the server handling the request.
- ▶ The **engine** receives the data collected by the probe and assembles this data according to the configuration specifications it receives from HP Business Availability Center, that have been configured in End User Management Administration. The engine transmits the page, transaction, end-user, and server data samples it creates to the HP Business Availability Center Gateway Server. The HP Business Availability Center Gateway Server then distributes the data to the relevant HP Business Availability Center components, which create HP Real User Monitor alerts, reports, and Dashboard views.

Note: If the HP Real User Monitor engine fails or is temporarily unavailable, or is unable to copy data from the HP Real User Monitor probe, the HP Real User Monitor probe continues to collect data. The last two hours worth of data is saved on the HP Real User Monitor probe in files located in the `/var/spool/beatbox/channels` subdirectories. This data is copied by the HP Real User Monitor engine when it becomes available again.

- ▶ The **MySQL database** acts as HP Real User Monitor's repository for data that the HP Real User Monitor engine does not forward to HP Business Availability Center immediately, or at all. The MySQL database stores the HP Real User Monitor engine's configuration settings, session click-streams (pages and snapshots included in a session), and the open sessions summary.

The following diagram shows how HP Real User Monitor receives client/server and server/server traffic and passes it on to HP Business Availability Center.

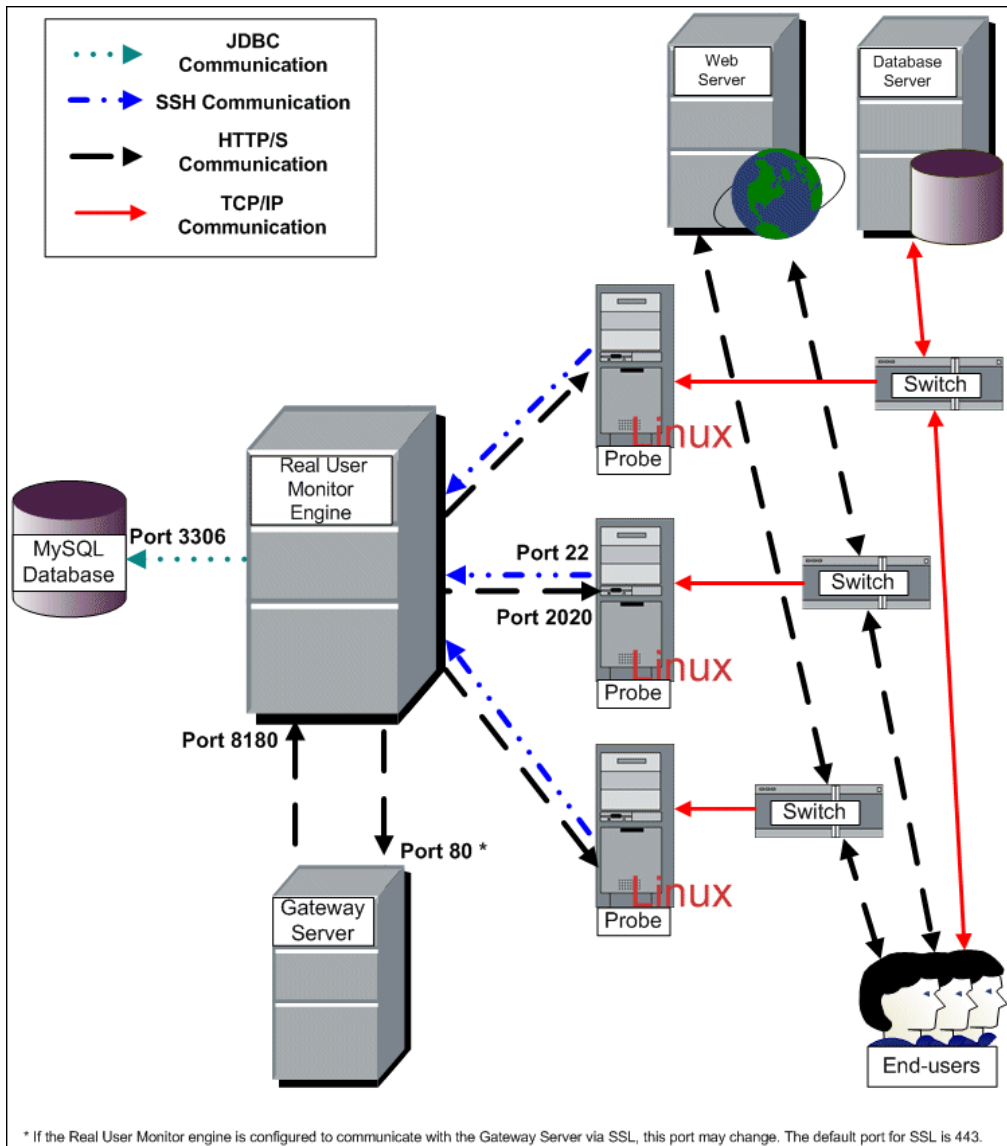


Use the HP Real User Monitor reports to analyze network and application performance and availability data for the servers, applications, pages, transactions, events, and end users that you configure for monitoring, as well as general statistics that are collected and sent by the probes to the engine. When notified by an alert that a certain performance or availability threshold has been exceeded, you can examine the issue in the appropriate reports and try to pinpoint the cause of the problem and the time at which the problem occurred. For detailed information on HP Real User Monitor reports, see “Real User Monitor Reports User Interface” in *Using End User Management*.

In addition, HP Real User Monitor data is included in Dashboard. For information on displaying HP Real User Monitor data in Dashboard, see “About Real User Monitor Views” in *Using End User Management*.

Ports and Types of Communication Used by HP Real User Monitor

The following diagram shows the various ports and type of communications used by HP Real User Monitor, both internally and externally.



Note:

- ▶ The HP Business Availability Center Gateway Server initiates a connection to the Real User Monitor engine on port 8180 for retrieving various types of data.
 - ▶ The Real User Monitor engine initiates a connection to the HP Business Availability Center Gateway Server on port 80 (default) for sending samples.
 - ▶ The Real User Monitor engine initiates a connection to the Real User Monitor probe on port 2020 for https (which is the default type of communication in Real User Monitor version 7.0 and later) and http, and on port 22 for SSH.
 - ▶ The Real User Monitor probe does not initiate a connection to any other server in the system.
 - ▶ There is no direct connection from HP Business Availability Center to the Real User Monitor probe.
 - ▶ By default, the Snapshot Replay applet retrieves data to a user's machine via an HP Business Availability Center server. You can configure the applet to retrieve data directly from the Real User Monitor engine, in which case the connection is made on port 8180. For details on configuring from where the Snapshot Replay applet retrieves data, see "Customize Real User Monitor Reports" in *Using End User Management*.
-

Overview of HP Real User Monitor Performance Measurements

This section describes the measurements provided by HP Real User Monitor for the data that it monitors.

This section includes the following topics:

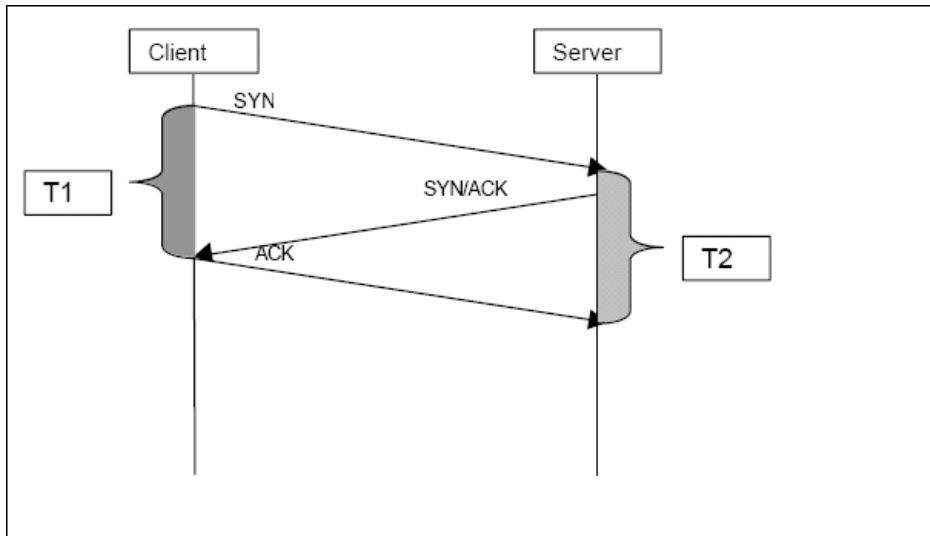
- “Introduction to Performance Measurements” on page 17
- “TCP Request-Response Measurements” on page 19
- “HTTP Measurements” on page 19
- “End User Measurements” on page 25

Introduction to Performance Measurements

To understand HP Real User Monitor performance measurements, a basic knowledge of TCP/IP is beneficial. The following are some of the TCP/IP and HTTP terms used in describing performance measurements:

- **SYN.** A request for connection
- **ACK.** Acknowledgement response
- **GET.** A request for data

Performance measurements are aimed at measuring real-user experience, that is, the end-to-end user experience. To measure both client-side and server-side measurements, the Parallel Technique is used, in which it is assumed that measuring the event on the server side is a close approximation of the event's measurement on the client side. All HP Real User Monitor measurements are performed on the server side, but provide end-to-end data. The following diagram shows that since the lines are parallel, it is assumed that T1 (client-side measurement)=T2 (server-side measurement).



TCP Request-Response Measurements

It is important to understand the following TCP Request-Response measurements, as they form an integral part of the TCP Request-Response data reported by HP Real User Monitor:

- **Average Response Time.** The time from the first packet of the request, until client acknowledgement of the last packet of the response. Average download time is the sum of average server time and average network time.
- **Average Server Time.** By understanding the TCP protocol, HP Real User Monitor determines which time intervals were spent on server processing (either server application processing time or server kernel processing time). These intervals are incorporated into the average server time. This measurement is better than server time to first buffer as it considers all of the response time.
- **Average Network Time.** The time intervals that were spent by the server waiting for client acknowledgement to arrive are incorporated into the average network time.

HTTP Measurements

HTTP measurements are used by HP Real User Monitor to report page and transaction data to HP Business Availability Center.

This section includes the following topics:

- “Page Performance Measurements” on page 20
- “Component Measurements” on page 21
- “Page Measurements” on page 22
- “Transaction Measurements” on page 24

Page Performance Measurements

The following table describes the performance measurements of pages that appear in HP Real User Monitor reports:

Measurement	How it is Calculated	Why it Matters
Page Time	The end-to-end time it took to download the whole page.	Enables you to discover which pages are slow (exceed their threshold).
Page Server Time	The time spent on the servers to create the response.	Enables you to track server performance issues.
Page Network Time	The time spent on the network to send the response.	Enables you to isolate network delays.
Page Client Time	The time spent on the client side.	Enables you to understand the client's effect on performance.
Page Hits	There are separate counters for available and unavailable hits. Unavailable hits are defined by events and errors configured in End User Management Administration.	N/A
Network Latency	Network latency (round trip) per domain.	Enables you to determine whether there is a network problem.
Server Availability	Server is up or down, and the service (application) is up or down, as a percentage of available HTTP requests.	Enables you to determine whether there is a server availability problem.

Component Measurements

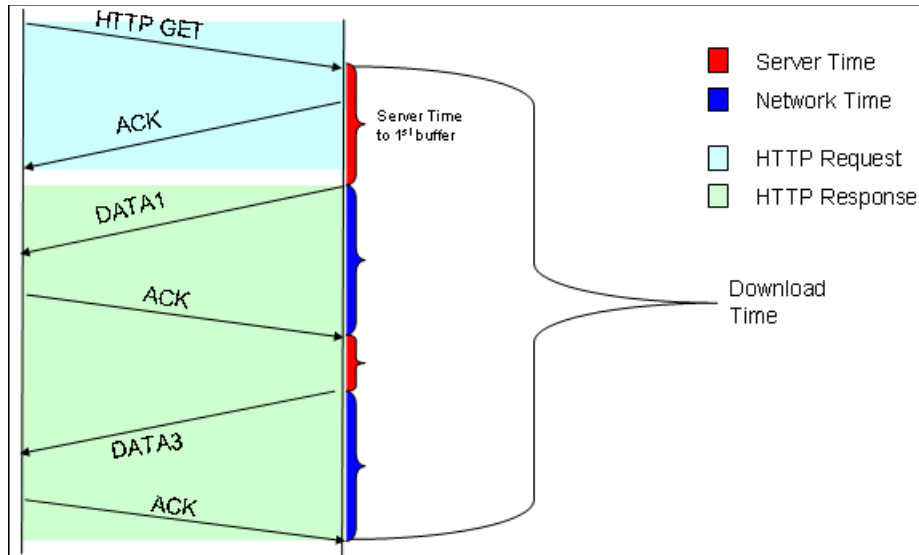
While component measurements are not reported to HP Business Availability Center, it is important to understand them as they form an integral part of page and transaction measurements.

An HTTP component is a single request response couple.

The following component measurements are used in HP Real User Monitor:

- ▶ **Component Download Time.** The time from the first packet of the request, until client acknowledgement of the last packet of the response. Component download time is the sum of component server time and component network time.
- ▶ **Component Server Time.** By understanding the TCP protocol, HP Real User Monitor determines which time intervals were spent on server processing (either server application processing time or server kernel processing time). These intervals are incorporated into the component server time. This measurement is better than server time to first buffer as it considers all of the response time.
- ▶ **Component Network Time.** The time intervals that were spent by the server waiting for client acknowledgement to arrive are incorporated into the component Network time.

The following diagram shows how component download time is calculated from the component server and network times:



Page Measurements

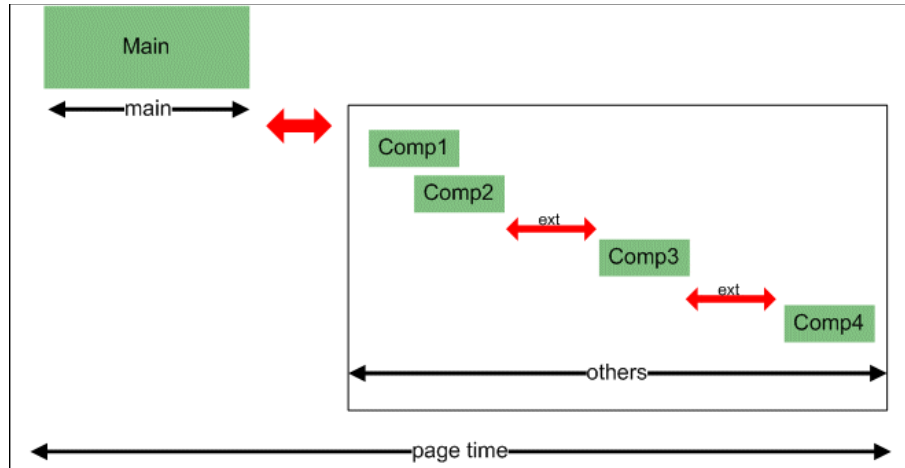
Each HTML page can contain sub-components (such as GIFs, JPGs, and so forth). HP Real User Monitor correlates the main component (the HTML) and the sub-components and calculates the download time for the whole page.

The following page measurements are used in HP Real User Monitor:

- **Page time.** The time from the first packet of the first component's request to the client ack for the last packet of the last component's response. Page time comprises page client/external time, page network time and page server time.

Because a single page might be downloaded over several connections, which means two or more components might be downloaded simultaneously, and since there might also be time gaps in the page time in which no component is being downloaded, the total page time might not necessarily equal the sum of all the components' download time.

The following diagram shows how several components server time or network time might overlap (Comp1 and Comp2). This makes it difficult to define what portion of the page time is server time and what portion is network time. To overcome this, HP Real User Monitor uses relative measurements for page breakdown:



- ▶ **Page client/external time.** A collection of all the time intervals in the page time in which no component was downloaded. These gaps, which are shown in red in the above diagram, are usually caused by client application processing (such as JavaScript).
- ▶ **Page Server Time.** The relative part of the Page Time that was spent on server processing. The formula used to calculate this is:

$$\frac{\sum \text{ComponentServerTime}}{\sum \text{ComponentDownloadTime}} \cdot (\text{PageTime} - \text{PageExternalTime})$$

- ▶ **Page network time.** The relative part of the page time that was spent on network transportation. The formula used to calculate this is:

$$\frac{\sum \text{ComponentNetworkTime}}{\sum \text{ComponentDownloadTime}} \bullet (\text{PageTime} - \text{PageExternalTime})$$

Transaction Measurements

An HP Real User Monitor transaction consists of a series of pages. A transaction is matched when HP Real User Monitor has monitored all the pages in the series in the correct order.

The following transaction measurements are used in HP Real User Monitor:

- ▶ **Transaction Total Time.** The time from the beginning of the download of the first page until the end of the download of the last page.
- ▶ **Transaction Net Time.** The portion of the total time that was actually spent downloading the pages. This calculation excludes gaps between the pages, which are considered as user think time. Transaction net time comprises the following measurements:
 - ▶ **Transaction Server Time.** The relative part of net time that was spent on server processing. This is calculated considering the server time of the pages. Server time is counted only once for pages that have overlapping sever time. Transaction server time = net transaction time * (total server time / total download time).
 - ▶ **Transaction Network Time.** The relative part of net time that was spent on network transportation. This is calculated considering the network time of the pages. Network time is counted only once for pages that have overlapping network time. Transaction network time = net transaction time * (total network time / total download time).
 - ▶ **Transaction Client/External Time.** The relative part of net time during which no server processing or network transportation took place (that is, the gaps between components), usually due to client processing. This is calculated considering the client time of the pages. Client time is counted only once for pages that have overlapping client time. Transaction client time = net transaction time * (total client time / total download time).

The following example shows the applicable times for a transaction comprising two pages:

	Start Time	End Time	Download Time	Server Time	Client Time	Network Time	Total Time
Page 1	0	10	10	4	4	2	
Page 2	8	18	10	2	4	4	
Net Transaction Time			18	5.4	7.2	5.4	18

End User Measurements

End User Latency is the average RTT (round trip time) for a packet between the server and the client. This calculation is made only for packets that were not delayed because of server or client processing, as server time and client time are not part of the latency measurement.

Installing and Administering HP Real User Monitor

To begin using HP Real User Monitor, you must perform the following steps (once you have installed HP Business Availability Center):

1 Install the HP Real User Monitor engine.

For information on installing the HP Real User Monitor engine and setting up the engine to connect to the Gateway Server, see “Installing the HP Real User Monitor Engine” on page 37.

2 Create and connect to the MySQL database.

You can create and connect to the MySQL database either as part of the HP Real User Monitor engine installation procedure or separately, at a later time. For details on creating the MySQL database as part of the HP Real User Monitor engine installation procedure, see “Installing the HP Real User Monitor Engine” on page 37. For details on creating the MySQL database at a later time, see “Overview of the MySQL Database” on page 199.

3 Install one or more HP Real User Monitor probes.

For information on installing an HP Real User Monitor probe and setting it up to report real-user activity data to the engine, see “Installing the HP Real User Monitor Probe” on page 49.

4 If necessary, reconfigure the connection between the HP Real User Monitor and HP Business Availability Center.

If connection parameters (such as SSL, proxy, and authentication) have changed since the installation of HP Business Availability Center, use the HP Real User Monitor engine’s Web console to reconfigure the connection between the HP Real User Monitor and HP Business Availability Center. For detailed information, see “Using the HP Real User Monitor Web Console” on page 76.

5 Configure HP Real User Monitor in HP Business Availability Center End User Management Administration.

In End User Management Administration, you add the HP Real User Monitor engine you installed to the monitor tree. You then add one or more probes to the engine and configure the probes to collect data from specific servers. In addition, you configure the specific pages, transactions, events, and end users you want to monitor. For more information, see “Real User Monitor Administration User Interface” in *Using End User Management*.

Note: You can create Real User Monitor alerts if you want to be notified of certain occurrences while monitoring real-user data. You can view reports of the data collected by HP Real User Monitor in the End User Management application. For information on configuring alerts, see “Event-Based Alerts” in *Alerts*. For information on viewing Real User Monitor reports, see “Real User Monitor Reports User Interface” in *Using End User Management*.

2

Reviewing System Requirements

This section describes the recommended system requirements for running HP Real User Monitor.

This chapter includes:

- ▶ HP Real User Monitor Engine Requirements on page 28
- ▶ HP Real User Monitor Repository (MySQL Database) Requirements on page 28
- ▶ Requirements for Installing the HP Real User Monitor Engine and Repository (MySQL Database) on the Same Machine on page 29
- ▶ HP Real User Monitor Probe Requirements on page 30

HP Real User Monitor Engine Requirements

	Minimum	Recommended
Computer/Processor	Dual-CPU Xeon 3.0 GHz Server	Dual-CPU Xeon 3.0 GHz Dual-Core Server
Operating System	<p>Windows:</p> <p>Windows 2000 Server/Advanced Server, Service Pack 4</p> <p>Windows 2003 Server standard/enterprise editions (SP1, SP2)</p>	<p>Windows:</p> <p>Windows 2000 Server/Advanced Server, Service Pack 4</p> <p>Windows 2003 Server standard/enterprise editions (SP1, SP2)</p>
Memory	2 GB	4 GB
Hard Drive	70 GB	70 GB
Network Card	Gigabit network adaptor	2 Gigabit network adaptors (one for database connectivity and one for probe connectivity)

HP Real User Monitor Repository (MySQL Database) Requirements

	Minimum	Recommended
Computer/Processor	Dual-CPU Xeon 3.0 GHz Server	Dual-CPU Xeon 3.0 GHz Dual-Core Server
Operating System	<p>Windows:</p> <p>Windows 2000 Server/Advanced Server, Service Pack 4</p> <p>Windows 2003 Server standard/enterprise editions (SP1, SP2)</p>	<p>Windows:</p> <p>Windows 2000 Server/Advanced Server, Service Pack 4</p> <p>Windows 2003 Server standard/enterprise editions (SP1, SP2)</p>

	Minimum	Recommended
Memory	2 GB	4 GB
Hard Drive	200 GB fast hard drive	400 GB SCSI disks RAID 0 (RAID 0 + 1 for high availability)
Network Card	Gigabit network adaptor	Gigabit network adaptor
MySQL Version	5.1 (installed by the HP Real User Monitor installation program)	5.1 (installed by the HP Real User Monitor installation program)

Requirements for Installing the HP Real User Monitor Engine and Repository (MySQL Database) on the Same Machine

	Minimum	Recommended
Computer/Processor	Quad-CPU Xeon 3.0 GHz Server	Quad-CPU Xeon 3.0 GHz Server
Operating System	Windows: Windows 2000 Server/Advanced Server, Service Pack 4 Windows 2003 Server standard/enterprise editions (SP1, SP2)	Windows: Windows 2000 Server/Advanced Server, Service Pack 4 Windows 2003 Server standard/enterprise editions (SP1, SP2)
Memory	4 GB	4 GB

	Minimum	Recommended
Hard Drive	2 Disks: <ul style="list-style-type: none"> ▶ 70 GB for the Real User Monitor engine installation ▶ 200 GB fast hard drive for the Real User Monitor repository 	2 Disks: <ul style="list-style-type: none"> ▶ 70 GB for the Real User Monitor engine installation ▶ 400 GB SCSI disks RAID 0 (RAID 0 + 1 for high availability) for the Real User Monitor repository.
	<p>Note: It is important not to install the Real User Monitor engine on the same disk as the Real User Monitor repository. You must select a different disk for the Real User Monitor repository during the installation.</p>	
Network Card	Gigabit network adaptor	Gigabit network adaptor

HP Real User Monitor Probe Requirements

Hardware and Operating System Requirements

	Minimum	Recommended
Computer/Processor	Dual-CPU Xeon 3.0 GHz Server	Dual-CPU Xeon 3.0 GHz Server
Operating System	Red Hat Enterprise Linux version 5.0 (RHEL5), 4.0 (RHEL4) – 32 bit versions.	Red Hat Enterprise Linux version 5.0 (RHEL5), 4.0 (RHEL4) – 32 bit versions.
Memory	2 GB	4 GB

	Minimum	Recommended
Hard Drive	70 GB IDE/SATA	150 GB SCSI SCSI required for high traffic levels of more than 15 MB. Large disk space required for more than one page back on Snapshot on Error (SSOE).
	Note: It is recommended to allocate most of the disk space to the <code>/var/spool/beatbox</code> directory, as this directory contains the majority of the probe data. It is sufficient to allocate 1 GB of space each to the <code>/var/log/beatbox</code> and <code>/etc/beatbox</code> directories.	

	Minimum	Recommended
Network Card	<p>For connecting port mirrored cable: 1 Intel Pro/1000 (10/100/1000 auto-sensing)</p> <p>For connecting to management port (used by RUM engine): 1 Intel Pro/100 (10/100 auto-sensing) set for full duplex</p> <p>For copper connections, MT type card required.</p> <p>For fiber optic connections, MF type card required.</p>	<p>For connecting tap: 2 Intel Pro/1000 (10/100/1000 auto-sensing)</p> <p>Note: Two network cards are required if the TAP to which the Real User Monitor probe is connected uses different ports for transmitting and receiving data. You can also use two network cards to monitor traffic from two separate sources, providing bandwidth restrictions are not exceeded.</p> <p>For connecting to management port (used by RUM engine): 1 Intel Pro/100 (10/100 auto-sensing) set for full duplex</p> <p>For copper connections, MT type card required.</p> <p>For fiber optic connections, MF type card required.</p>
PCI Slot		1 free 133/100/66 MHz 64 bit PCI slot

Environment and System Requirements

Requirement	Description
Perl	Perl must be installed with the following libraries: <ul style="list-style-type: none"> ➤ LWP::UserAgent ➤ URI::URL
ssh daemon	<ul style="list-style-type: none"> ➤ Port 22 must be open ➤ xinetd daemon must be up and listening to SSH clients
beatbox user	A user called beatbox is automatically created during installation, but you must manually configure a password for this user. When entering the HP Real User Monitor probe user and password in End User Management Administration, you must use either the root or beatbox user (for details, see “New/Edit Real User Monitor Engine Page” in <i>Using End User Management</i>).
Probe console port	Port 2020 is the default port used for accessing the HP Real User Monitor probe console. If you want to use SSL for accessing the HP Real User Monitor probe console, you use Apache Web Server as a proxy, limit port 2020 to localhost connections only and open port 443 on the Apache Web Server. For details, see “Using SSL to Access the HP Real User Monitor Probe Web Console” on page 66.
Permissions	The following directories must have 2770 permissions, be owned by beatbox and belong to the beatbox group: <ul style="list-style-type: none"> ➤ /var/spool/beatbox (and subdirectories) ➤ /etc/beatbox ➤ /var/log/beatbox

Part II

Installing HP Real User Monitor

3

Installing the HP Real User Monitor Engine

To monitor real user activity, you must first install the HP Real User Monitor engine on a Windows platform.

You download the HP Real User Monitor engine installation file from the Downloads page, which you access from the Setup and Maintenance tab in Platform Administration.

The HP Real User Monitor installation procedure installs both the HP Real User Monitor engine and the MySQL database. You can install both the engine and the database on the same machine, or on different machines. To install the engine and database on different machines, install the MySQL database first and then install the engine and connect it to the database.

This chapter includes:

- ▶ Installing the HP Real User Monitor Engine on page 38

Installing the HP Real User Monitor Engine

For details on the system requirements for installing the HP Real User Monitor engine, see “HP Real User Monitor Engine Requirements” on page 28.

Tip: For better performance, it is recommended to install the HP Real User Monitor engine and the HP Real User Monitor probe on the same local area network (LAN).

To install the HP Real User Monitor engine on a Windows Platform:

- 1 Click the **HP Real User Monitor Engine for Windows** link on the Downloads page to download the **HPRUMSetup_win.exe** file to the machine on which you want to install the engine.
-

Note: For the HP Real User Monitor engine setup file to be available on the Downloads page, it must first be installed to HP Business Availability Center. For details on installing HP Business Availability Center components setup files, see “Installing Component Setup Files” in the *HP Business Availability Center Deployment Guide* PDF.

If you prefer, you can copy the HP Real User Monitor engine setup program directly from the Data Collectors and Components directory on the HP Business Availability Center DVD, for versions delivered on DVD.

- 2 On this machine, navigate to the downloaded file and double click **HPRUMSetup_win.exe**. The HP Real User Monitor Engine Setup begins.
- 3 When the Setup Welcome screen is displayed, click **Next**.
- 4 Accept the terms of the license agreement and click **Next**.
- 5 Select the path of the directory in which you want to install the HP Real User Monitor engine. Accept the default path, or click **Browse** to select a different directory. Click **Next**.

6 Select the type of installation you want to perform, **Typical** or **Custom**.

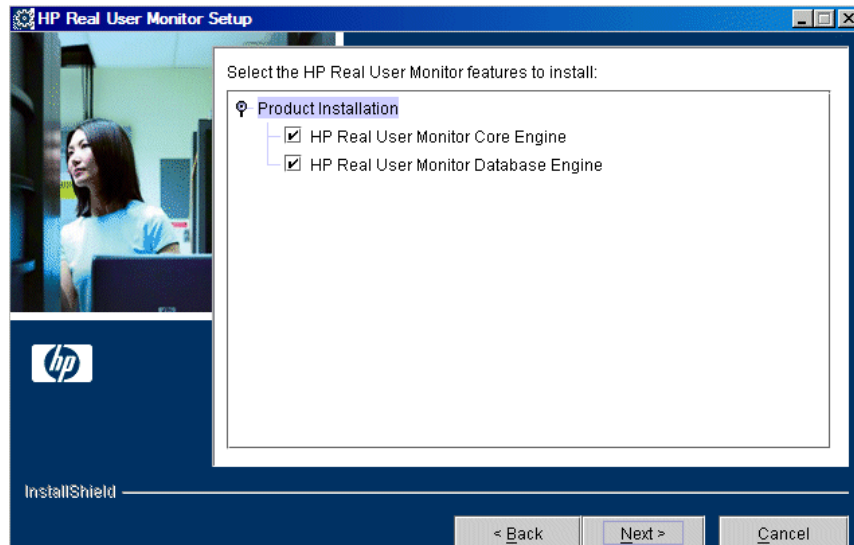
A typical installation installs both the HP Real User Monitor engine and the MySQL database.

In a custom installation, you can choose whether to install the HP Real User Monitor engine, the MySQL database, or both.

Click **Next**.

If you chose **Typical** installation, skip to step 8 on page 40 to continue.

7 If you chose **Custom** installation, select the features you want to include by checking the box to the left of the required feature. You can select one, or both of the features.



Click **Next**.

Note:

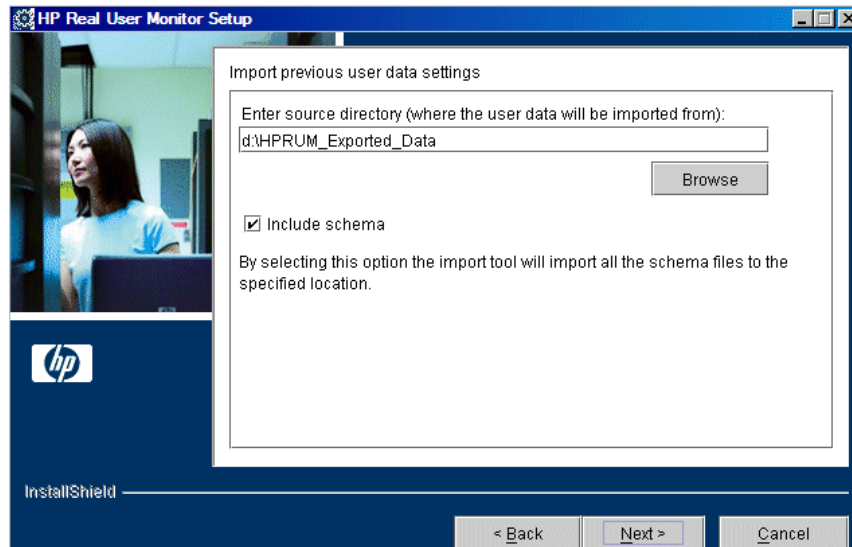
If you choose **HP Real User Monitor Database Engine** only, the MySQL database is installed in the specified location, but no database schema is created.

If you choose **HP Real User Monitor Core Engine** only and do not connect to a database, you are unable to configure connection settings to HP Business Availability Center during the installation. You can configure connection settings to HP Business Availability Center later via the HP Real User Monitor Web console (for details, see “BAC Connection Settings” on page 116).

- 8** Read the summary information. If it is correct, click **Next** to continue with the installation. If it is not correct, click **Back** to correct the information you previously provided.
- 9** Select the drive on which to install the MySQL database data directory, or select the default drive. Click **Next**.
- 10** Choose whether you want to import user data settings from a previous HP Real User Monitor installation. Click **Next**.

If you chose not to import data, continue with step 12 on page 41.

- 11** Enter the source directory from which to import the backup data, or select the default directory, and choose whether or not to include the MySQL schema.



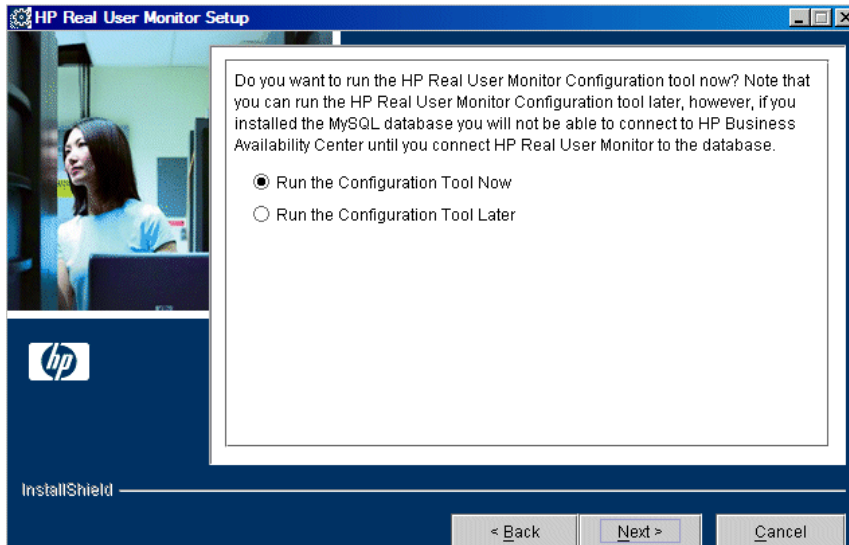
Click **Next**.

Note:

- ▶ If you are installing the HP Real User Monitor engine only (that is, without the MySQL database), you are not prompted to choose whether to include the MySQL schema.
 - ▶ If you choose to include the MySQL schema, the directory you choose from which to import the backup data must be on the same partition on which HP Real User Monitor is being installed.
-

- 12** If necessary, Setup prompts you to reboot the machine on which you are installing HP Real User Monitor. Select whether to reboot now, or at a later stage. Click **Next**.

- 13 Select whether you want to run the HP Real User Monitor Configuration tool. You can choose to run the Configuration tool at a later time, but you cannot work with HP Real User Monitor until you have configured the MySQL database settings and have connected the HP Real User Monitor engine to the database. For details of running the Configuration tool at a later time, see “Creating and Connecting to the MySQL Database” on page 200.



Click **Next**.

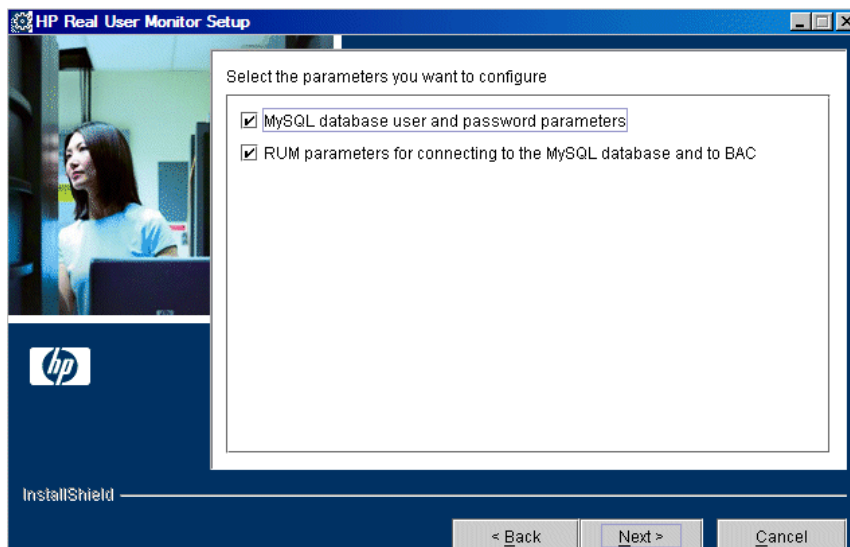
- 14 Click **Finish** to exit the Setup wizard.

If you chose to run the Configuration tool, continue with the following steps, but note that to configure database and connection settings you must have both an HP Real User Monitor engine installed and access to an existing MySQL database.

- 15** When the Configuration tool Welcome screen is displayed, click **Next**.

If you chose **Custom installation > HP Real User Monitor Core Engine** only, skip to step 18 on page 44 to continue. Otherwise, continue with the next step.

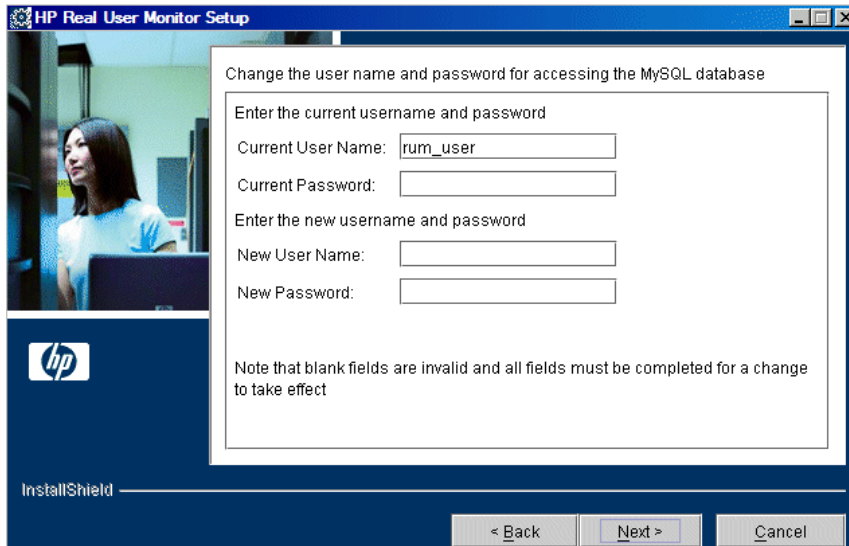
- 16** Select the parameters you want to configure. You can configure the MySQL database parameters (the user name and password for connecting to the database), the parameters used by the HP Real User Monitor engine to connect to the MySQL database and to HP Business Availability Center, or both.



Click **Next**.

If you chose to configure the parameters used by the HP Real User Monitor engine to connect to the MySQL database and to HP Business Availability Center only, skip to step 18 on page 44 to continue, otherwise proceed with the next step.

- 17 Enter the user name and password for accessing the MySQL database, or accept the defaults (rum_user and rum_password). If you change the default settings, note that blank fields are invalid and all fields must be completed for a change to take effect.



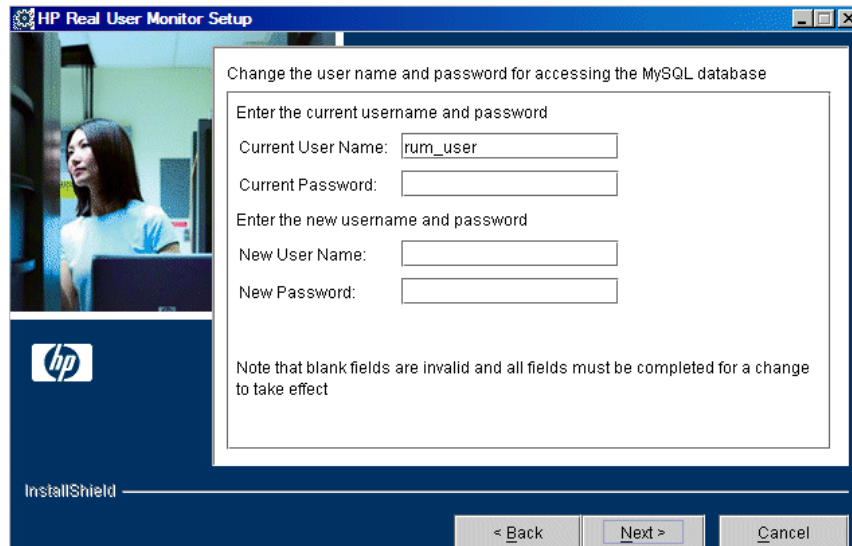
Click **Next**.

If you chose to configure the MySQL database parameters only, skip to step 23 on page 48, otherwise proceed with the next step.

- 18 Select whether you want to create a new user schema for the MySQL database, or connect to an existing user schema. Click **Next**.

Note: If you are upgrading from an earlier version of Real User Monitor, select the option to connect to an existing database.

- 19** Configure the MySQL database settings. You can configure the host name of the machine where the MySQL database resides, as well as the port number for accessing this machine, or you can accept the default settings as they appear below. Enter the user name and password for connecting to the MySQL database machine (rum_user and rum_password by default, or the updated user and password configured in step 17 on page 44. In the **Schema Name** field, you specify the name for the MySQL database schema.



The screenshot shows a window titled "HP Real User Monitor Setup" with a blue border. Inside, there is a white dialog box with the following text and fields:

Change the user name and password for accessing the MySQL database

Enter the current username and password

Current User Name:

Current Password:

Enter the new username and password

New User Name:

New Password:

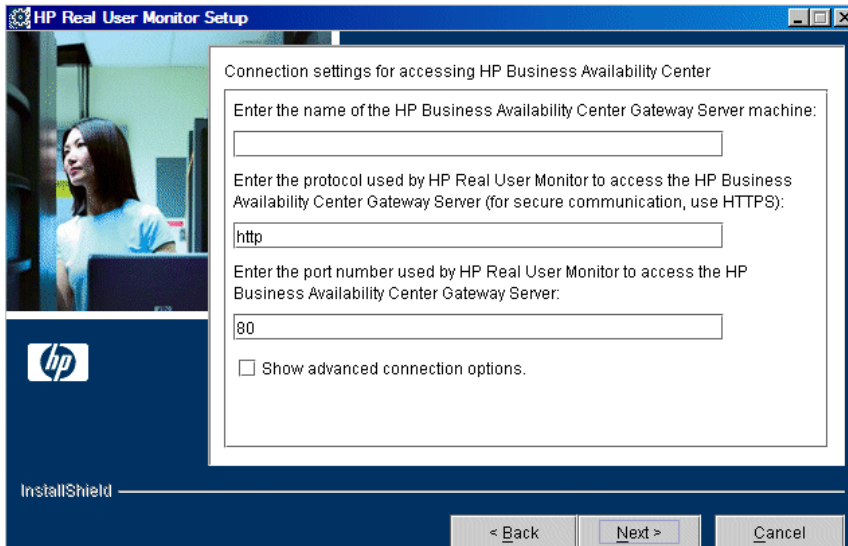
Note that blank fields are invalid and all fields must be completed for a change to take effect

At the bottom of the dialog box are three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted. The background of the setup window shows a woman at a computer and the HP logo.

Click **Next**.

If you chose **Custom installation > HP Real User Monitor Database Engine** skip to step 23 on page 48, otherwise proceed with the next step.

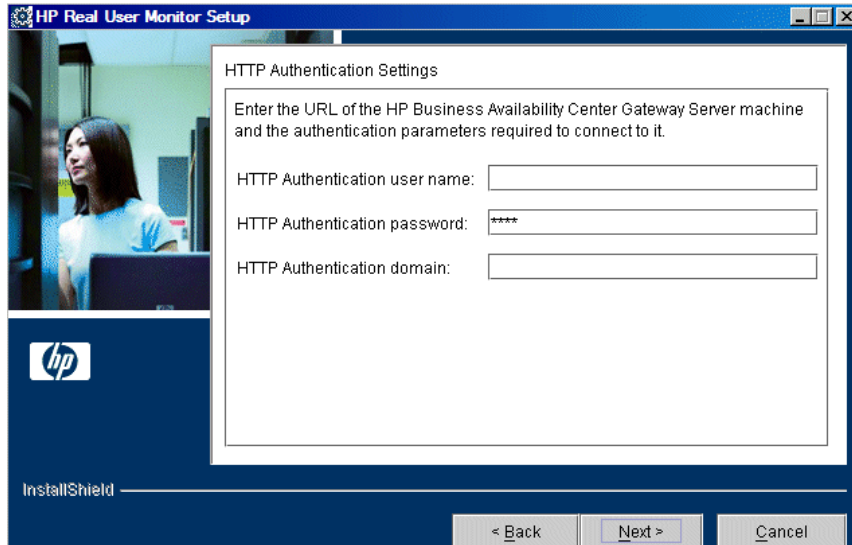
- 20** In the HP Real User Monitor Connection Settings dialog box, select the protocol (HTTP or HTTPS) the HP Real User Monitor engine should use to connect to the HP Business Availability Center Gateway Server. (For details on configuring a reverse proxy or SSL, see “BAC Connection Settings” on page 116.) Enter the Gateway Server machine name and the port number through which you want the HP Real User Monitor engine to communicate with the Gateway Server. Note that by default, the port number is 80. Select the **Show advanced options** box to configure HTTP authentication or reverse proxy settings.



Click **Next**.

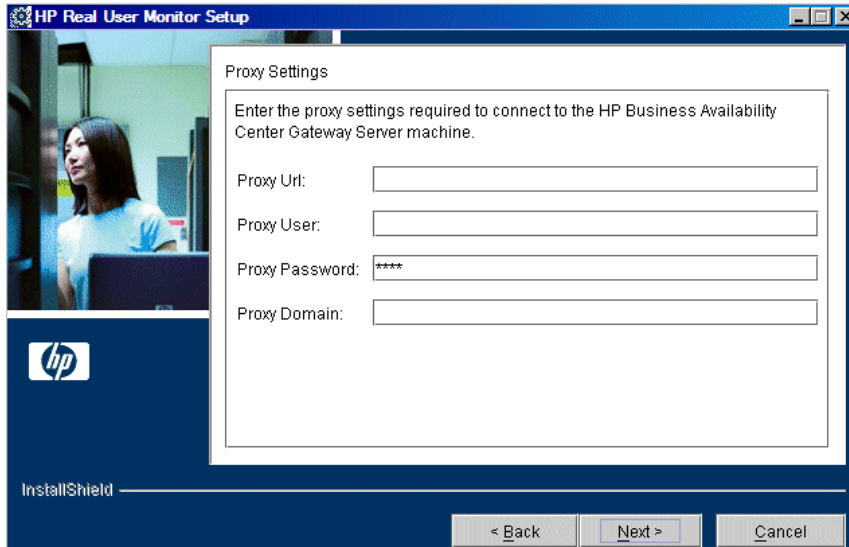
If you selected the **Show advanced options** box, continue with the next step for additional connection settings. Otherwise, skip to step 23 on page 48 to continue.

- 21 In the first advanced connection settings screen, enter the HTTP Authentication user name and password for connecting to the Gateway Server as well as the URL of the machine on which the Gateway Server is installed. For details on configuring basic authentication, see “BAC Connection Settings” on page 116.



Click **Next**.

- 22** In the second advanced connection settings screen, enter the proxy settings required for connecting to the Gateway Server. For details on configuring a reverse proxy or SSL, see “BAC Connection Settings” on page 116.



Click **Next**.

- 23** After the HP Real User Monitor engine is installed, click **Finish** to exit the wizard.

After successfully installing the HP Real User Monitor engine and connecting the engine to the MySQL database, start HP Real User Monitor on the machine on which it is installed.

Start HP Real User Monitor by selecting **Start > Programs > HP Real User Monitor > Administration > Enable HP Real User Monitor**.

You can stop HP Real User Monitor by selecting **Start > Programs > HP Real User Monitor > Administration > Disable HP Real User Monitor**.

For additional information on starting and stopping HP Real User Monitor, see “Administering HP Real User Monitor” on page 74.

4

Installing the HP Real User Monitor Probe

After installing the HP Real User Monitor engine, you must install at least one HP Real User Monitor probe. You must then set up the probe to collect real-user data and report this data to the engine.

This chapter includes:

- Physically Connecting the Probe on page 49
- Installing the Probe on page 51
- Stopping and Starting the Probe on page 53
- Installing an nCipher Card on the HP Real User Monitor Probe on page 54

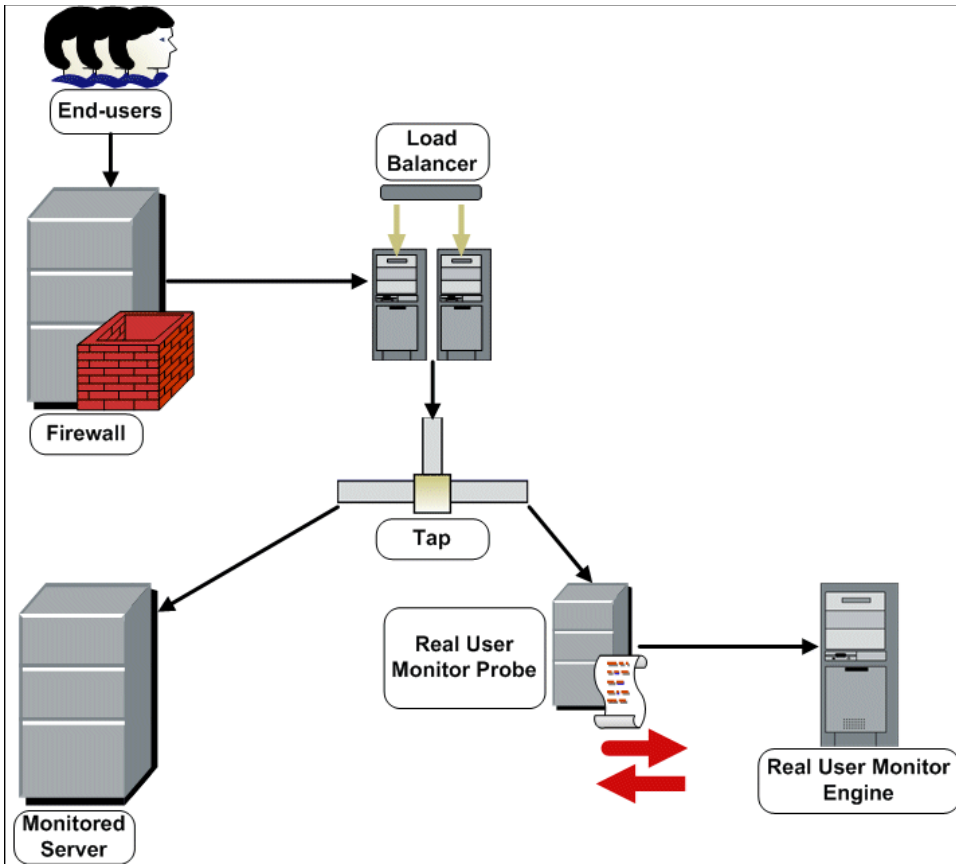
Physically Connecting the Probe

This section describes how to physically connect the HP Real User Monitor probe to the network.

The HP Real User Monitor probe runs on a Linux machine and uses two network interfaces; one assigned to sniffing and the other assigned to management (which the HP Real User Monitor engine uses to connect to the probe machine). The interface used for sniffing should not have an IP address assigned to it. For details on the system requirements for the HP Real User Monitor probe, see “HP Real User Monitor Probe Requirements” on page 30.

Chapter 4 • Installing the HP Real User Monitor Probe

Using taps or port spanning, the sniffer interface listens to the traffic on the servers you are monitoring.



Note:

- ▶ If you are using a load balancer, it is recommended to place the network tap behind the load balancer
 - ▶ Load balancers should be configured to use the **x-forward-for** header to preserve end-user IP addresses for use by HP Real User Monitor.
 - ▶ For small installations with a low amount of network traffic, instead of using a network tap, an Ethernet port of the HP Real User Monitor probe can be connected to a switch that is configured for port mirroring for the monitored server.
-

Installing the Probe

This section describes how to install the probe on a Linux machine.

The HP Real User Monitor probe is installed on a machine running the Linux operating system. For details on the system requirements for the HP Real User Monitor probe, see “HP Real User Monitor Probe Requirements” on page 30.

Tip: For better performance, it is recommended to install the HP Real User Monitor engine and the HP Real User Monitor probe on the same local area network (LAN).

Download the HP Real User Monitor probe installation file from the **Downloads** page, which you access from **Admin > Platform > Setup and Maintenance**.

Note: The HP Real User Monitor probe installation must be carried out as the root user.

To install the HP Real User Monitor probe:

- 1** Click **HP Real User Monitor probe** on the Downloads page to download the **HPRUMProbeSetup_linux.bin** file to the **/var/tmp** directory on the machine on which you want to install the probe. Note that if you cannot download this file directly to the Linux machine on which you are installing the probe, make sure that you download the file to a machine from which you can later FTP (in binary mode) the file to the Linux machine.

Note: For the HP Real User Monitor probe setup file to be available on the Downloads page, it must first be installed to HP Business Availability Center. For details on installing HP Business Availability Center components setup files, see “Installing Component Setup Files” in the *HP Business Availability Center Deployment Guide* PDF.

If you prefer, you can copy the HP Real User Monitor probe setup program directly from the Data Collectors and Components directory on the HP Business Availability Center DVD, for versions delivered on DVD.

- 2** Run the installation script with the following commands:
 - **cd /var/tmp**
 - **HPRUMProbeSetup_linux.bin**
- 3** Change the sshd daemon to work with xinetd by running the script **/etc/beatbox/configure_ssh.sh**.
- 4** It is recommended to set the network configuration automatically by running the script **/usr/bin/bb_netconfig.pl**.
- 5** Start the HP Real User Monitor probe with the command **/etc/init.d/beatbox-capture start**.

- 6 Verify that the HP Real User Monitor probe has successfully started with the command `/etc/init.d/beatbox-capture status`. The following is displayed:

```
[root@beatboxrnd rum-pages]
# /etc/init.d/beatbox-capture status
BeatBox is responding properly.
[root@beatboxrnd rum-pages]#
```

Stopping and Starting the Probe

When installed on the Linux machine, the HP Real User Monitor probe is started automatically each time the Linux machine is started. You can also manually start and stop the HP Real User Monitor probe.

To start the HP Real User Monitor probe manually:

- 1 Log in to the HP Real User Monitor probe machine as the root user.
- 2 Start the HP Real User Monitor probe with the command `/etc/init.d/beatbox-capture start`.

To stop the HP Real User Monitor probe manually:

- 1 Log in to the HP Real User Monitor probe machine as the root user.
- 2 Stop the HP Real User Monitor probe with the command `/etc/init.d/beatbox-capture stop`.

Installing an nCipher Card on the HP Real User Monitor Probe

You can install an nCipher card on the HP Real User Monitor Probe to enable the probe to use high level security when monitoring SSL encrypted traffic. For details on installing and configuring the nCipher card, refer to the nCipher documentation.

This section describes:

- “Prerequisites for Installing an nCipher Card” on page 54
- “Verifying an nCipher Card with Apache Web Server” on page 55
- “Customizing the HP Real User Monitor Probe” on page 55
- “Troubleshooting” on page 57

Prerequisites for Installing an nCipher Card

Note the following before installing an nCipher card on the HP Real User Monitor Probe:

- nCipher currently supports JRE/JDK version 1.4.x.
- To work with nCipher’s KeySafe product, Sun Java runtime environment version 1.5, or the equivalent developer kit, must be installed on the HP Real User Monitor Probe machine.
- It is recommended to install the Sun Java runtime environment on the HP Real User Monitor Probe machine prior to installing the nCipher components.
- The Java executable must be included in the environment path of the HP Real User Monitor Probe machine.

Verifying an nCipher Card with Apache Web Server

Once you have installed a nCipher card on the HP Real User Monitor Probe machine, it is recommended that you check that the card works with the Apache Web Server. For details on integrating the nCipher components with the Apache Web Server installation on the HP Real User Monitor Probe, refer to the instructions on the nCipher Web site (<http://www.ncipher.com/en/Resources/~/media/Files/Integration%20Guides/Apache22x.ashx>).

Customizing the HP Real User Monitor Probe

To customize HP Real User Monitor to work with the nCipher card, you must configure the HP Real User Monitor Engine and Probe machines and send the updated HP Real User Monitor Engine configuration to the HP Real User Monitor Probe.

To configure the HP Real User Monitor Engine machine:

Edit the `<HP Real User Monitor root directory>\conf\configurationmanager\Beatbox_Default_Const_Configuration.xml` file and make the following additions:

- Under the **global** heading in the **static_global_params** section, add the line **ssl_hardware chil**. For example:

```
<static_global_params>
<![CDATA[
[global]
max_field_length 2048
collect_server_stats false
collect_website_stats false
ssl_hardware chil
]]>
</static_global_params>
```

- Under the **collector** heading in the **collector** section, add the path and name of the **PEM** file created by nCipher. This file contains the name of a key that is protected by the nCipher security world. For example:

```
<collector>
<![CDATA[
[collector]
device      all
servers     0.0.0.0/0.0.0.0 80
ssl_servers 192.168.81.96 444 /root/nCipherpem_file.pem
]]>
</collector>
```

To configure the HP Real User Monitor Probe machine:

- 1 Add the environment variable definition for **LD_LIBRARY_PATH** to the file `/etc/bashrc`:

```
LD_LIBRARY_PATH=/opt/nfast/toolkits/hwcrhk;export LD_LIBRARY_PATH
```

- 2 Restart the probe with the following command:

```
/etc/init.d/beatbox-capture restart
```

To send the updated HP Real User Monitor Engine configuration to the HP Real User Monitor Probe:

Force an update of the HP Real User Monitor Probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

Troubleshooting

If the Apache Web Server is configured for SSL, but is unable to access pages after the nCipher card is installed, change the **LD_ASSUME_KERNEL** parameter to use Linux Kernel version 2.4.1. To change the LD_ASSUME_KERNEL parameter, use the following commands from the command line prompt on the HP Real User Monitor Probe machine's console:

- `$ echo LD_ASSUME_KERNEL=2.4.1 >> /etc/nfast.conf`
- `$ echo export LD_ASSUME_KERNEL >> /etc/nfast.conf`

Restart the nCipher hardserver for the new setting to take effect.

5

Uninstalling HP Real User Monitor

If you no longer want to use HP Real User Monitor, you can uninstall the engine.

Note: To uninstall the probe, you need only disconnect it from the network, or shut down the probe machine.

This chapter includes:

- Uninstalling HP Real User Monitor on a Windows Platform on page 59

Uninstalling HP Real User Monitor on a Windows Platform

To uninstall the HP Real User Monitor engine:

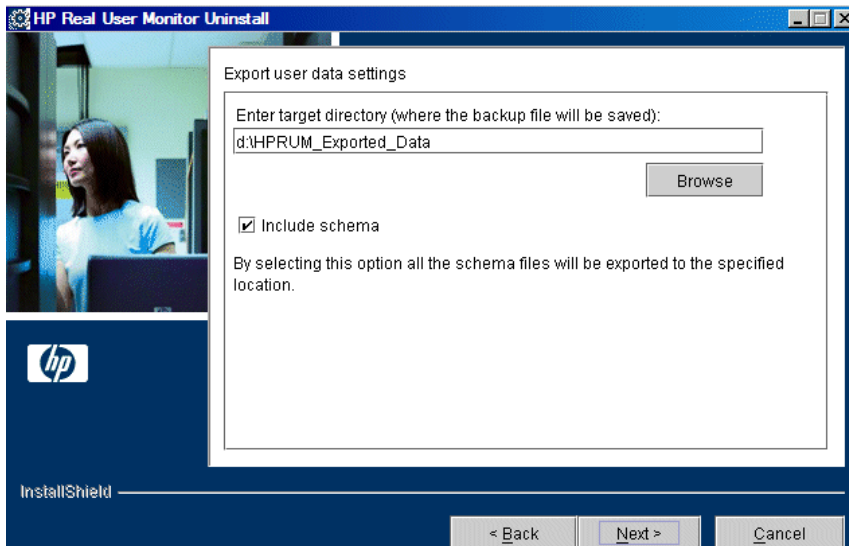
- 1** If HP Real User Monitor is running, stop it by disabling it from the Start menu (**Start > Programs > HP Real User Monitor > Administration > Disable HP Real User Monitor**).
- 2** On the machine from which you are uninstalling HP Real User Monitor:
 - a** Select **Start > Settings > Control Panel**.
 - b** Select **Add/Remove Programs**.
 - c** Select **HP Real User Monitor**.
 - d** Click **Change/Remove**.
 - e** Click **Next**.

- 3 When the Setup Welcome screen is displayed, click **Next**.
- 4 Choose whether you want to export user data settings, to save your HP Real User Monitor configuration for later use. Click **Next**.

If you chose not to export the data, continue with step 6.

Note: You can only export user data settings for installations that include a MySQL database. When uninstalling a Real User Monitor engine only installation, select the **Do not export** option for this step.

- 5 Enter the target directory in which to save the backup data, or select the default directory, and choose whether or not to include the MySQL schema.



Click **Next**.

Note:

- ▶ If you are uninstalling the HP Real User Monitor engine only (that is, the MySQL database is installed on a different machine), you are not prompted to choose whether to include the MySQL schema.
 - ▶ If you are uninstalling HP Real User Monitor engine version 7.00 or later, you are not prompted to choose whether to include the MySQL schema.
 - ▶ The directory you choose in which to save the backup data must not already exist.
 - ▶ If you choose to include the MySQL schema, the directory you choose in which to save the backup data must be on the same partition on which HP Real User Monitor is installed.
-

- 6** Read the summary information. If it is correct, click **Next** to continue with the uninstallation. If it is not correct, click **Back** to correct the information you previously provided.
 - 7** If prompted, choose whether you want the uninstall process to reboot the machine for you automatically when the uninstall process is complete, or to restart it yourself manually at a later time. Click **Next**.
 - 8** Once the HP Real User Monitor engine has been uninstalled, click **Finish** to exit the uninstall process.
-

Note: If you delete the MySQL database only, the HP Real User Monitor engine does not work without the MySQL database.

Part III

Configuring and Administering HP Real User Monitor

6

Configuring the HP Real User Monitor Probe

You can configure the HP Real User Monitor probe by changing the default settings and adding additional configuration settings.

This chapter includes:

- ▶ Using SSL to Access the HP Real User Monitor Probe Web Console on page 66
- ▶ Limiting WebConsole Resources on page 68
- ▶ Configuring the HP Real User Monitor Probe for I18N on page 69
- ▶ Masking URL Parameters on page 71

Using SSL to Access the HP Real User Monitor Probe Web Console

By default, the connection to the Real User Monitor probe Web console is made using the SSL protocol. To enable the browser on a client machine to communicate with the probe machine using SSL, you must install a client certificate in the browser. You can manually configure the probe to use the HTTP protocol instead of SSL.

Note: Default access to the probe Web console is via HTTP communications if:

- ▶ You are using a version of HP Real User Monitor or HP Business Availability Center that is earlier than version 8.00.
 - ▶ You upgrade to HP Real User Monitor version 8.00 from an earlier version.
-

This section includes the following topics:

- ▶ “Installing the Client Certificate” on page 66
- ▶ “Accessing the HP Real User Monitor Web Console” on page 67

Installing the Client Certificate

To enable the browser on a client machine to communicate with the probe machine using SSL, you must install the **rum-probe-c.p12** certificate from the **/etc/beatbox** directory on the probe machine into the browser on the client machine.

To install a certificate in Internet Explorer:

- 1** Select **Tools > Options**.
- 2** In the **Content** tab, click **Certificates**.
- 3** Click **Import** and use the wizard to enter the certificate location and file name and import the certificate. When prompted for a password, use the default password **mercurypw**.

To install a certificate in FireFox:

- 1** Select **Tools > Options > Advanced**.
- 2** In the **Certificates** section, click **Manage Certificates**.
- 3** Click **Import** and select the certificate file.
- 4** Continue as prompted to import the certificate. When prompted for a password, use the default password **mercurypw**.

Accessing the HP Real User Monitor Web Console

After installing the **rum-probe-c.p12** certificate in the browser on a client machine, you access the HP Real User Monitor Web console by entering the following URL in the browser:

https://<probe machine IP>:2020/stats.xml

Note: If using the HTTP protocol to access the probe Web console, in the URL use **http** instead of **https**.

You can manually configure the protocol used to access the probe Web console.

To manually configure the protocol:

- 1** In the **<HP Real User Monitor root directory>\conf\probes\probe.default.properties** file on the HP Real User Monitor engine, in the **RUM Engine Probe HTTP Connection Parameters** section, set the **connection.http.ssl** parameter to **true** for SSL or **false** for HTTP. For example:


```
#      RUM Engine Probe HTTP Connection Parameters #
#####
connection.http.port=2020
connection.http.ssl=false
```
- 2** In the **/etc/beatbox/bbsecurity.conf** file on the probe machine, uncomment the **use_ssl** parameter and change its value to **true** for SSL (which is the default setting) or **false** for HTTP.
- 3** Restart the Real User Monitor engine.

Limiting WebConsole Resources

For security reasons, the WebConsole resources of the HP Real User Monitor probe are limited by default, so that only configuration updates and general statistics are available. You can remove this limitation for troubleshooting so that all resources are available.

Note: It is recommended to reset the limitation after you have finished troubleshooting.

To change the availability of WebConsole resources:

- 1** Edit the `/etc/beatbox/bbsecurity.conf` file on the probe machine.
- 2** In the `webconsole` section of the file, change the setting of the `restrict_webconsole` parameter to `true` (to impose the limitation) or `false` (to remove the limitation).
- 3** Save the file.
- 4** Restart the HP Real User Monitor probe.

Configuring the HP Real User Monitor Probe for I18N

By default, HP Real User Monitor uses the UTF-8 character set when monitoring data. To enable HP Real User Monitor to support non Unicode encodings, you can configure the HP Real User Monitor probe to use a different character set.

To change the character set used by the HP Real User Monitor probe when monitoring data:

In the <HP Real User Monitor root directory>\conf**configurationmanager\Beatbox_Default_Const_Configuration.xml** file on the HP Real User Monitor engine, under the **[global]** section, add the following lines:

```
enable_i18n <false/true>
contant_charset_search_len <length>
charset <name>
```

where:

- ▶ **<false/true>**. Set to **true** to enable HP Real User Monitor to support I18N by using character sets other than UTF-8. The default setting is **false**.
- ▶ **<length>**. The number of bytes in the page content in which HP Real User Monitor searches for a character set. By default, HP Real User Monitor does not search the page content for a character set and only searches the page header. The maximum permissible length is 1024 characters.
- ▶ **<name>**. The default character set to use, if HP Real User Monitor does not locate a character set in either the page header or content. Valid character sets are those that are by default supported by the ICU library.

The following example shows the additional lines added to the **[global]** section in the <HP Real User Monitor root directory>\conf\configurationmanager\Beatbox_Default_Const_Configuration.xml file on the HP Real User Monitor engine:

```
<static_global_params>
<![CDATA[
[global]
max_field_length 2048
collect_server_stats false
collect_website_stats false
enable_i18n true
contant_charset_search_len 1024
]]>
```

Masking URL Parameters

By default, URL parameters configured as sensitive data for an application in End User Management Administration are displayed as asterisks (*). You can configure the HP Real User Monitor probe to mask all URL parameters. If you configure the HP Real User Monitor probe to do this, all URL parameters are displayed as asterisks, except for those that are configured as sensitive data for an application in End User Management Administration, which are then displayed in full. For details on configuring applications, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.

To enable masking of all URL parameters except for those configured as sensitive data in an application:

In the <HP Real User Monitor root directory>\conf\
configurationmanager\Beatbox_Default_Const_Configuration.xml file on
the HP Real User Monitor engine, under the [global] section, add the
following line:

```
reverse_omit_parameters true
```

Note: The default setting is **false**.

7

Configuring and Administering the HP Real User Monitor Engine

You configure and administer the HP Real User Monitor engine via the Web and JMX consoles, which allow you to configure the engine, monitor system health, and use a number of diagnostic tools.

This chapter includes:

- Administering HP Real User Monitor on page 74
- Using the HP Real User Monitor Web Console on page 76
- Using the HP Real User Monitor JMX Console on page 155
- URL Correlation Parameters on page 163
- Configuring Meaningful Page Names on page 167
- Unifying Frames on page 194
- HP Real User Monitor Logs on page 197

Administering HP Real User Monitor

You administer HP Real User Monitor by using the Start menu and task bar icon that are installed during a Windows installation of HP Real User Monitor.

HP Real User Monitor Windows Start Menu

To access the HP Real User Monitor Start menu that is added to the Windows machine on which the HP Real User Monitor engine is installed, select **Start > Programs > HP Real User Monitor**. The menu includes the following options:

Administration

The Administration menu option includes the following options:

Option	Description
RUM Configuration Tool	Runs the HP Real User Monitor Configuration Tool, which enables you to create a MySQL database schema, and to connect HP Real User Monitor to a MySQL database. For details, see “Creating and Connecting to the MySQL Database” on page 200.
Database (only if the MySQL database has been installed)	Opens a submenu with options for starting and stopping the MySQL database on the machine on which it is installed.
Disable HP Real User Monitor	Stops HP Real User Monitor on the specific machine, and disables it from being run automatically whenever the machine is started.
Enable HP Real User Monitor	Starts HP Real User Monitor on the specific machine, and sets it to run automatically whenever the machine is started.

Open HP Real User Monitor Web Console

Selecting this option opens the HP Real User Monitor Web console used for administering HP Real User Monitor. For details, see “Using the HP Real User Monitor Web Console” on page 76.

HP Real User Monitor Windows Task Bar Icon



The task bar icon installed with HP Real User Monitor provides a menu with options for the HP Real User Monitor Agent service. The HP Real User Monitor Agent service is responsible for launching HP Real User Monitor and managing the processes used by it. The supervisor process manages and monitors the other processes used by HP Real User Monitor.

When HP Real User Monitor is first enabled, the icon appears with two yellow stars only. When the HP Real User Monitor application server has successfully started, the stars change to grey and a green tick appears above them. If there is an error during startup, or an error with the jboss process after startup, the green tick in the above icon changes to a red X until the problem is rectified.



The menu, which you access by right-clicking the icon, includes the following options:

Option	Description
About	Displays informational data about the HP Real User Monitor Agent service.
View Log	Displays the supervisor log, which includes information about the various processes being used by HP Real User Monitor.
Settings	Displays the processes in use by HP Real User Monitor, and their current settings.
Close	Stops HP Real User Monitor and closes the HP Real User Monitor Agent service.

Note:

Changing any of the process settings can cause HP Real User Monitor to malfunction and should not be done without consulting HP Software Support.

Do not use **Close** to stop HP Real User Monitor. Stop HP Real User Monitor by using the **Disable HP Real User Monitor** option from the **Administration** menu in the HP Real User Monitor Start menu only.

Using the HP Real User Monitor Web Console

Once the HP Real User Monitor engine has been installed and started, you can use the HP Real User Monitor Engine Web console to view and configure the connection between HP Real User Monitor and HP Business Availability Center, view other HP Real User Monitor engine settings, monitor the health of HP Real User Monitor components, and use HP Real User Monitor diagnostic tools.

This section includes the following topics:

- ▶ “Accessing the HP Real User Monitor Engine Web Console” on page 77
- ▶ “Monitoring the Health of HP Real User Monitor Components” on page 82
- ▶ “HP Real User Monitor Configuration and Settings” on page 116
- ▶ “HP Real User Monitor Diagnostic Tools” on page 125

Accessing the HP Real User Monitor Engine Web Console

Use the HP Real User Monitor Engine Web console to monitor the health of HP Real User Monitor components. You can also use a number of configuration tools to configure the HP Real User Monitor engine, as well as view and configure the connection parameters between HP Real User Monitor and HP Business Availability Center. In addition, the HP Real User Monitor Web console includes diagnostic tools that you can use in resolving HP Real User Monitor problems.

When you start the HP Real User Monitor engine after installation, you can access the HP Real User Monitor Engine Web console by launching a Web browser and entering the following URL:

http://<HP Real User Monitor engine machine name or IP>:8180

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

Note: On a Windows machine on which the HP Real User Monitor engine is installed, you can also access the HP Real User Monitor Engine Web console by selecting **Start > Programs > HP Real User Monitor > Open Real User Monitor Web Console**.

This section includes the following topics:

- ▶ “Logging In” on page 78
- ▶ “Logging Out” on page 78
- ▶ “Changing Login Parameters” on page 78
- ▶ “Changing the Language of the Real User Monitor Web Console User Interface” on page 80

Logging In

When you access the HP Real User Monitor Engine Web console, the login page opens.

Enter the login parameters (login name and password) of a user defined in HP Real User Monitor, and click **Log In**. After logging in, the user name appears at the top right, in the title bar.

Initial access can be gained using the default superuser login parameters: Login Name=**admin**, Password=**admin**. It is recommended that the system superuser change this password immediately to prevent unauthorized entry. For details on changing the password, see “Changing Login Parameters” on page 78.

The HP Real User Monitor Engine Web console opens, displaying the top menu bar that enables navigation to the configuration, health, tools, and help pages, as well as the **Logout** button.

Logging Out

When you complete your session, it is recommended that you log out of the Web site to prevent unauthorized entry, by clicking **Logout** at the top of the page.

Note: You are automatically logged out of the HP Real User Monitor Web console after twenty minutes of inactivity.

Changing Login Parameters

You can add, change, and delete HP Real User Monitor users by editing the **<HP Real User Monitor root directory>\conf\rumwebconsole\users.xml** file. In this file, there is a line for each user in the following format:

```
<user name="Administrator" login="admin" password="admin"  
"encryptedPassword="" />
```

Note: It is recommended that the system superuser limit access to the <HP Real User Monitor root directory>\conf\rumwebconsole\users.xml file.

To add an HP Real User Monitor user:

- 1** Open the <HP Real User Monitor root directory>\conf\rumwebconsole\users.xml file in a text editor.
- 2** Duplicate the entry for one of the existing users.
- 3** In the duplicate line, enter the **user name**, **login**, and **password** parameters for the new user. Ensure that the **encryptedPassword** parameter is blank.
- 4** Save the file.

To change an HP Real User Monitor user:

- 1** Open the <HP Real User Monitor root directory>\conf\rumwebconsole\users.xml file in a text editor.
- 2** In the appropriate line, change the **user name** and **login** parameters as required.
- 3** To change a user's password, enter the new password in the **password** parameter and ensure that the **encryptedPassword** parameter is blank.
- 4** Save the file.

To delete an HP Real User Monitor user:

- 1** Open the HPRUM\conf\rumwebconsole\users.xml file in a text editor.
- 2** Delete the appropriate line.
- 3** Save the file.

Note:

- ▶ When deleting users, ensure that there is at least one user configured in the users file, or you are unable to access the HP Real User Monitor Web console.
 - ▶ Changes to the **HPRUM\conf\rumwebconsole\users.xml** file only take effect when the HP Real User Monitor engine is restarted. When the HP Real User Monitor engine is started, user passwords in the **password** parameter are encrypted and removed, and the encrypted passwords are stored in the **encryptedPassword** parameter.
-

Changing the Language of the Real User Monitor Web Console User Interface

In Real User Monitor 8.00 and later, the Real User Monitor Web console user interface can be viewed in the following languages in your Web browser:

Language	Language Preference in Web Browser
Chinese	Chinese (China) [zh-cn]
English	English (United States) [en-us]
French	French (France) [fr]
Japanese	Japanese [ja]
Korean	Korean [ko]

Use the language preference option in your browser to select how to view the Real User Monitor Web console. The language preference chosen affects only the user's local machine and not the Real User Monitor machines or any other user accessing the same Real User Monitor Web console. The language is determined when you log in to the Real User Monitor Web console; changing the language preference in your browser once you have logged in has no affect until you log out and log back in.

To view the Real User Monitor Web console in a specific language using Internet Explorer:

- 1** Select **Tools > Internet Options** and click **Languages**. The Language Preference dialog box opens.
- 2** Highlight the language in which you want to view the Real User Monitor Web console.

If the language you want is not listed in the dialog box, click **Add** to display the list of languages. Select the language you want to add and click **OK**.

- 3** Click **Move Up** to move the selected language to the first row.
- 4** Click **OK** to save the settings.
- 5** Refresh the page: the Real User Monitor Web console user interface is displayed in the selected language.

Note:

- ▶ Starting from Real User Monitor version 7.0, there is no language pack installation. All translated languages are integrated into the Real User Monitor Multilingual User Interface.
 - ▶ Data stays in the language it was entered in, even if the language of the Web browser changes. Changing the language of the Web browser on your local machine does not change the language of Real User Monitor definitions and configurations.
 - ▶ If a user selects a language not supported by the Real User Monitor Multilingual User Interface, the Real User Monitor Web console user interface appears in English.
-

Monitoring the Health of HP Real User Monitor Components

The Health drop-down menu on the HP Real User Monitor Engine Web console menu bar includes the following options:





- ▶ **System Status** on page 82. Used to display the status of the main HP Real User Monitor components.
- ▶ **Capture Log Files** on page 115. Used to create a zip file of the HP Real User Monitor resource and log files for use by HP Software Support.

System Status

You use the System Status option to display the status of the main HP Real User Monitor components. When you select this option, the System Health page opens. You can refresh the data displayed on the System Health page by clicking the **Refresh** button at the top, right hand side of the page.



For each component displayed on the System Health page, there are four possible statuses:

	OK
	Minor
	Critical
	No status

You can drill down to see the status of the entities that comprise the HP Real User Monitor component by clicking the component name.

For each entity displayed, apart from the columns included in the tables below, there is a column called **Value (Value Since Startup)**. If an entity is configured to display a value, it is displayed in this column either as an absolute value (for example, the number of pages handled), or as a ratio showing a value for a given time period (for example, the number of session events per second). An additional absolute value might be displayed in brackets, which is the accumulated value of the entity since the HP Real User Monitor engine was last started.

Note: Entities using ratios have no status until the System Health page has been automatically updated twice by the HP Real User Monitor engine. This can take several moments (by default, up to six minutes).

The following table lists the components and their entities and describes the meaning of the different statuses:

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Configuration Retrieval from BAC server	Connection to Business Availability Center server	Status of the connection to the HP Business Availability Center Gateway Server for retrieving the HP Real User Monitor engine and probe configurations	Connection to BAC server is operational	N/A	Connection to BAC server is not operational
	Data type <type name> retrieval	Status of the last attempt to retrieve data type <type name> configuration from the HP Business Availability Center Gateway Server	Configuration of data type <type name> successfully retrieved from BAC server	N/A	Errors while trying to retrieve configuration data type <type name> from BAC server

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Database	Database connectivity	Status of the connectivity between the HP Real User Monitor engine and the MySQL database	Connection to database OK	N/A	Connection to database not working
	Database free space	Percentage of free space (including free space in the tablespace) on the disk on which the MySQL database is installed	More than 4% is free.	3–4% is free.	Less than 3% is free.
	Database Response Time	Status of the response time between the HP Real User Monitor engine and the MySQL database	Database response time is normal	Database response time is below normal	Database response time is slow

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Database	Database Session Purging Time	The length of time taken to purge old sessions from the database	Purging time is normal	Purging time is slow	N/A
	Number of stale queries	The number of database queries that were aborted because they were stale (running for too long a period)	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Active Connections	The number of active TCP connections currently monitored by the HP Real User Monitor probe	The number of active TCP connections is below the internal permitted number	The number of active TCP connections is close to the internal permitted number	The number of active TCP connections has exceeded the internal permitted number
	Active Sessions	The number of sessions currently monitored by the HP Real User Monitor probe	The number of active sessions is below the internal permitted number	The number of active sessions is close to the internal permitted number	The number of active sessions has exceeded the internal permitted number
	Channel "connections" Status	Status of the last attempt to connect to the channel	The HP Real User Monitor engine has successfully connected to this probe channel	The HP Real User Monitor engine experienced problems while connecting to this probe channel	The HP Real User Monitor engine has failed to connect to this probe channel more than three consecutive times
	Channel "missing components" Status	Status of the last attempt to connect to the channel	The HP Real User Monitor engine has successfully connected to this probe channel	The HP Real User Monitor engine experienced problems while connecting to this probe channel	The HP Real User Monitor engine has failed to connect to this probe channel more than three consecutive times

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Channel "pages" Status	Status of the last attempt to connect to the channel	The engine has successfully connected to this probe channel	The engine experienced problems while connecting to this probe channel	The engine has failed to connect to this probe channel more than three consecutive times
	Channel "poorRequests" Status	Status of the last attempt to connect to the channel	The HP Real User Monitor engine has successfully connected to this probe channel	The HP Real User Monitor engine experienced problems while connecting to this probe channel	The HP Real User Monitor engine has failed to connect to this probe channel more than three consecutive times
	Channel "sessions" Status	Status of the last attempt to connect to the channel	The HP Real User Monitor engine has successfully connected to this probe channel	The HP Real User Monitor engine experienced problems while connecting to this probe channel	The HP Real User Monitor engine has failed to connect to this probe channel more than three consecutive times

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Configuration to Probe	Status of the last attempt to send the configuration to the HP Real User Monitor probe	Probe was configured successfully	N/A	Errors during probe configuration process
	Connection to Probe	Status of the HTTP connection from the HP Real User Monitor engine to the HP Real User Monitor probe	The connection is successful	N/A	There is no connection
	Disk Utilization for	The HP Real User Monitor probe disk utilization on a specific partition	Free disk space is sufficient	Free disk space is nearing its limit	Free disk space is insufficient
	HTTP Bytes Received	The total number of HTTP bytes received by the Web servers from clients	The current load of HTTP received traffic is normal	N/A	The current load of HTTP received traffic is too high for a single HP Real User Monitor probe

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	HTTP Bytes Sent	The total number of HTTP bytes sent by the Web servers to clients	The current load of HTTP sent traffic is normal	N/A	The current load of HTTP sent traffic is too high for a single HP Real User Monitor probe
	HTTP Packets	The total number of HTTP packets processed by the HP Real User Monitor probe	The HTTP packet rate is normal	N/A	The HTTP packet rate is too high for a single HP Real User Monitor probe
	HTTPS Bytes Received	The total number of HTTPS bytes received by the Web servers from clients	The current load of HTTPS received traffic is normal	N/A	The current load of HTTPS received traffic is too high for a single HP Real User Monitor probe
	HTTPS Bytes Sent	The total number of HTTPS bytes sent by the Web servers to clients	The current load of HTTPS sent traffic is normal	N/A	The current load of HTTPS sent traffic is too high for a single HP Real User Monitor probe
	HTTPS Packets	The total number of HTTPS packets processed by the HP Real User Monitor probe	The HTTPS packet rate is normal	N/A	The HTTPS packet rate is too high for a single HP Real User Monitor probe

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Incomplete Transactions	The percentage of incomplete packets (that is, requests without responses). A high number can indicate a problem with a switch, or with a probe's network configuration.	N/A	N/A	N/A
	Packet Queue Work	The current number of packets collected from the network devices, but not yet processed	The packet rate is normal	The packet rate is nearing the limit for normal processing	The packet rate is too high

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Packets Lost	The total number of packets that the HP Real User Monitor probe has recognized as missing	The network is stable and packets are being processed normally	Possible network problems which could lead to data loss	The network is bad and the HP Real User Monitor probe might lose some data
	Pages Cached	The number of page views currently being cached to the HP Real User Monitor probe's memory	The page rate is stable	The page rate is nearing the limit for normal caching	The page rate is too high
	Probe and Engine Time Difference	Displays the status of the time synchronization between the HP Real User Monitor engine and probe	The HP Real User Monitor engine and probe are in sync	The HP Real User Monitor engine and probe are slightly out of sync	The HP Real User Monitor engine and probe are grossly out of sync
	Probe Channel Components Guarantee Delivery Files Total Size	The total size of component channel files on the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Channel rum-components Total Guarantee Delivery Files	The number of guaranteed delivery files for the components channel waiting to be read by the Real User Monitor engine	The number of component channel files is normal	The number of component channel files is high, indicating that the Real User Monitor engine might be processing less data than the Real User Monitor probe is producing	N/A
	Probe Channel rum-connections Guarantee Delivery Files Total Size	The total size of connection channel files on the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Channel rum-connections Total Guarantee Delivery Files	The number of guaranteed delivery files for the connections channel waiting to be read by the Real User Monitor engine	The number of connection channel files is normal	The number of connection channel files is high, indicating that the Real User Monitor engine might be processing less data than the Real User Monitor probe is producing	N/A
	Probe Channel rum-pages Guarantee Delivery Files Total Size	The total size of page channel files on the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Channel rum-pages Total Guarantee Delivery Files	The number of guaranteed delivery files for the pages channel waiting to be read by the Real User Monitor engine	The number of page channel files is normal	The number of page channel files is high, indicating that the Real User Monitor engine might be processing less data than the Real User Monitor probe is producing	N/A
	Probe Channel rum-poor-requests Guarantee Delivery Files Total Size	The total size of poor-request channel files on the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Channel rum-poor-requests Total Guarantee Delivery Files	The number of guaranteed delivery files for the poor-requests channel waiting to be read by the Real User Monitor engine	The number of poor-request channel files is normal	The number of poor-request channel files is high, indicating that the Real User Monitor engine might be processing less data than the Real User Monitor probe is producing	N/A
	Probe Channel rum-sessions Guarantee Delivery Files Total Size	The total size of session channel files on the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Channel rum-sessions Total Guarantee Delivery Files	The number of guaranteed delivery files for the sessions channel waiting to be read by the Real User Monitor engine	The number of session channel files is normal	The number of session channel files is high, indicating that the Real User Monitor engine might be processing less data than the Real User Monitor probe is producing	N/A
	Probe Channels Data Flow	Status of retrieving data from the HP Real User Monitor probe	Data from the probe successfully retrieved	Probe has not produced new data for some time	N/A
	Probe Connections Published	The number of connections recorded by the HP Real User Monitor probe	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Connections Processed by Engine	The number of connections that the HP Real User Monitor engine has started to process	N/A	N/A	N/A
	Probe Page Hits	The number of page hits recorded by the HP Real User Monitor probe	N/A	N/A	N/A
	Probe Page Hits Processed by Engine	The number of page hits that the HP Real User Monitor engine has started to process	N/A	N/A	N/A
	Probe Process CPU Utilization	The current percentage of probe utilization of the probe process	Probe utilization is normal	Probe utilization is nearing the limit for a single HP Real User Monitor probe	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Process Memory	The total amount of non-swapped, physical memory used by the HP Real User Monitor probe, in kilobytes	Always	N/A	N/A
	Probe Process Memory Utilization	The total amount of non-swapped physical memory used by the probe process, out of the total amount of physical system memory, in kilobytes	Memory utilization is normal	Memory utilization is high	Memory utilization is nearing the maximum permissible value
	Probe Storage ccomps Number of Errors	The number of non critical errors for components that occurred when working with the database	N/A	N/A	N/A
	Probe Storage ccomps Number of Total Records	The total number of records for components in the database	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Storage ccomps Status	The current status of the database for components	Database status is normal	N/A	Database status is bad
	Probe Storage mainpagedb Number of Errors	The number of non critical errors for main pages that occurred when working with the database	N/A	N/A	N/A
	Probe Storage mainpagedb Number of Total Records	The total number of records for main pages in the database	N/A	N/A	N/A
	Probe Storage mainpagedb Status	The current status of the database for main pages	Database status is normal	N/A	Database status is bad
	Probe Storage pcapnetwork Number of Errors	The number of non critical errors for network captures that occurred when working with the database	N/A	N/A	N/A
	Probe Storage pcapnetwork Number of Total Records	The total number of records for network captures in the database	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	Probe Storage pcapnetwork Status	The current status of the database for network captures	Database status is normal	N/A	Database status is bad
	Received Bytes on Network Device	The total number of bytes received per specific NIC, in bits per second	Network device load is normal	Network device load is nearing the probe's limit	N/A
	Total Memory	The total amount of physical system memory, in kilobytes	Always	N/A	N/A
	SSL Transactions Dropped	The percentage of SSL transactions that could be decrypted	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Real User Monitor Probe	XFF over NAT	Value can be 0 or 1. If 1, the value of "x-forwarder-for" HTTP header has different values within the same connection. Can indicate differences between HTTP and TCP reports on the same application.	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	Aggregation Manager	Click Aggregation Manager to see the entities that comprise the Aggregation Manager component. For details, see the Aggregation Manager component in this table.			
	Application Session Count	The total number of open application sessions	Always	N/A	N/A
	Application Transaction Count	The total number of open application transactions	Always	N/A	N/A
	BBRetriever hold time due to load on Entry Topic	The time (in milliseconds) that the BBRetriever was stopped due to JMS load on the Entry topic	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	BBRetriever hold time due load on RawEntry Topic	The time (in milliseconds) that the BBRetriever was stopped due to JMS load on the RawEntry topic	N/A	N/A	N/A
	BBRetriever hold time due to load on TCP Entry Topic	The time (in milliseconds) that the BBRetriever was stopped due to JMS load on the TCP Entry topic	N/A	N/A	N/A
	BBRetriever hold time due load on TCP RawEntry Topic	The time (in milliseconds) that the BBRetriever was stopped due to JMS load on the TCP RawEntry topic	N/A	N/A	N/A
	BBRetriever Thrown Objects	The total number of objects thrown by the BBRetriever	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	BBRetriever Total Connections Handled	The number of connections being handled by the BBRetriever in the HP Real User Monitor engine	The number of connections being handled is normal	The number of connections being handled is above average	The number of connections being handled is high
	BBRetriever Total Pages Handled	The number of pages being handled by the BBRetriever in the HP Real User Monitor engine	The number of pages being handled is normal	The number of pages being handled is above average	The number of pages being handled is high
	BBRetriever Total Poor Requests Handled	The number of Poor requests handled by the BBRetriever in the HP Real User Monitor engine	N/A	N/A	N/A
	Data Access Layer	Click Data Access Layer to see the entities that comprise the Data Access Layer component.			

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	Free Memory	The free memory available for the HP Real User Monitor engine	The free memory is sufficient for the HP Real User Monitor engine to run under the current load	The free memory is nearing the limit for the HP Real User Monitor engine to run under the current load	The free memory is not sufficient for the HP Real User Monitor engine to run under the current load
	JMS Entry topic size	The number of messages in the <entity> queue	The number of messages in the queue is normal	The number of messages in the queue is above normal	The number of messages in the queue is abnormal
	JMS Integration Entry topic size				
	JMS Publisher topic size				
	JMS Raw Entry topic size				
	JMS Samples topic size				
	JMS TCP Entry topic size				
	JMS TCP Raw Entry topic size				
Login Maps Size per Name	The total number of login names mapped to sessions	Always	N/A	N/A	

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	Login Maps Size per Session	The total number of sessions mapped to login names	Always	N/A	N/A
	Partition Manager	Click Partition Manager to see the entities that comprise the Partition Manager component. For details, see the Partition Manager component in this table.			
	Poor Request Network Captures Retrieved	The number of Poor request capture files retrieved by the HP Real User Monitor engine	N/A	N/A	N/A
	Poor Request Network Captures Thrown	The number of Poor request capture files thrown by the HP Real User Monitor engine	N/A	N/A	N/A
	Poor Requests with Network Captures	The number of Poor requests that have a network capture file	N/A	N/A	N/A
	Publisher Chunks in Memory	The number of sample chunks (not yet sent to Business Availability Center) stored in memory	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	Publisher Chunks in Queue	The total number of sample chunks waiting to be sent to Business Availability Center	N/A	N/A	N/A
	Resolver End User DNS Cache size	The size of the end user DNS cache	N/A	N/A	N/A
	Resolver Ignored Sessions Cache Size	The size of the ignored sessions cache	Cache size is normal	N/A	Cache size has exceeded the permissible limit
	Resolver Server DNS Cache size	The size of the server DNS cache	N/A	N/A	N/A
	Snapshot Jobs Alive Count	The total number of open snapshot jobs waiting to be processed	HP Real User Monitor can process all the open snapshots	The number of open snapshots waiting to be processed is nearing the limit for HP Real User Monitor under the current load	HP Real User Monitor might not be able to process all the snapshots

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
RUM Engine	Snapshot Jobs Submit Denials	The total number of submit requests for snapshot failures	Always	N/A	N/A
	Snapshot Relevant Events	The total number of events that should trigger snapshot creation	Always	N/A	N/A
	Snapshot Sessions Map Size	The total number of open sessions for which at least one snapshot was created	The number of current sessions is normal	The number of current sessions is nearing the permissible limit	The number of current sessions has exceeded the permissible limit
	Statistics Total Aggregation Size	The number of aggregation buckets in memory	The number of aggregation buckets is normal	The number of aggregation buckets is nearing the permissible limit	The number of aggregation buckets has exceeded the permissible limit
	Statistics Total Messages Ignored	The number of entities filtered out by the statistics manager	Always	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Samples to BAC server	Connection to BAC server	Status of the connection between the HP Real User Monitor engine and the HP Business Availability Center Gateway Server for publishing samples	HP Real User Monitor is successfully sending samples to HP Business Availability Center	N/A	HP Real User Monitor has failed in sending data to HP Business Availability Center
	Publisher burst state	Indication if any samples were delayed during the last attempt to publish data to HP Business Availability Center	All HP Real User Monitor samples are being sent to HP Business Availability Center. No samples are delayed	N/A	HP Real User Monitor is delaying samples so as not to overload HP Business Availability Center

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Samples to BAC server	Publisher Samples Created for <entity>	The number of <entity> samples created since the last Real User Monitor engine restart	N/A	N/A	N/A
	Publisher Samples Thrown	The total number of samples thrown	Always	N/A	N/A
	Publisher Total Samples Created	The total number of samples created (for all <entities>) since the last Real User Monitor engine restart	N/A	N/A	N/A
	Publisher Total Samples Sent	The total number of samples sent from the Publisher module of the Real User Monitor engine to HP Business Availability Center since the last Real User Monitor engine restart	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Aggregation Manager To Access: Click Aggregation Manager in RUM Engine monitors	Average Duration for aggregation	The average execution time for each task	N/A	N/A	N/A
	AvgAffected Rows for aggregation	The average number of affected rows for aggregations done since the last Real User Monitor engine restart	N/A	N/A	N/A
	LastDuration for aggregation	The last execution time for each task	N/A	N/A	N/A
	MaxAffected Rows for aggregation	The maximum number of affected rows for aggregations done since the last Real User Monitor engine restart	N/A	N/A	N/A
	MaxDuration for aggregation	The maximum execution time for each task	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Data Access Layer To Access: Click Data Access Layer in RUM Engine monitors	Average response time for <entity>	The amount of time taken to write the <entity> objects to the database	Response time of database is normal	Response time of database is high, which might indicate a database problem	Response time of database is very high, which might indicate a database problem
	DAL Active	Whether the Data Access Layer is active or not. In some instances, when free disk space on the database server is running low, the Data Access Layer stops sending data to the database.	The Data Access Layer is active	N/AS	The Data Access Layer is not active
	Number of cache misses in <entity> lookup table cache	The number of queries to the <entity>'s cache for which data was not available, but should have been	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Data Access Layer To Access: Click Data Access Layer in RUM Engine monitors	Number of files in <entity> cache	The size of the cache for each <entity> type	There is no backlog	A backlog of objects to be sent to the database exists, which could indicate a database problem or a temporary load peak	A large backlog of objects to be sent to the database exists, which could indicate a database problem or a temporary load peak
	Number of futile queries to <entity> lookup table cache	The number of queries to the <entity>'s cache for which data was not available	N/A	N/A	N/A
	Number of <entity> objects sent	The number of <entity> objects sent to the database since startup	N/A	N/A	N/A
	Number of queries to <entity> lookup table cache	The total number of queries to the <entity>'s cache	N/A	N/A	N/A
	Size of <entity> lookup table cache	The size of the <entity> lookup table in the memory cache	N/A	N/A	N/A

Component	Entity	Description	OK Status (Green)	Minor Status (Yellow)	Critical Status (Red)
Partition Manager To Access: Click Partition Manager in RUM Engine monitors	Average Task Execution Time	The average execution time of the scheduled task	Partition Manager average performance is normal	Partition Manager average task performance has exceeded the warning threshold	Partition Manager average performance has exceeded the error threshold and might cause locks in the database during execution
	Last Task Execution Status	The status of the last executed task	Partition Manager is running normally	N/A	Partition Manager task failed during last execution
	Max Task Execution Time	The maximum execution time of the scheduled task	Partition Manager task performance is normal	Partition Manager task performance has exceeded the warning threshold	Partition Manager task performance has exceeded the error threshold and might cause locks in the database during execution

Capture Log Files

You use this option to create a **.ZIP** file of the current status of the HP Real User Monitor for support purposes.

Click **Capture** and specify the name and location of the file.

HP Real User Monitor Configuration and Settings

The **Configuration** drop-down menu on the HP Real User Monitor Engine Web console menu bar includes the following options:

- ▶ **BAC Connection Settings** on page 116. Used to view and configure the connection parameters between HP Real User Monitor and HP Business Availability Center.
- ▶ **Probe Management** on page 118. Used to configure communication settings with the HP Real User Monitor probe.
- ▶ **Set Engine IP** on page 124. Used to set the IP address of the HP Real User Monitor engine machine.
- ▶ **Advanced Settings** on page 124. Provides links to specific areas of the HP Real User Monitor JMX console for configuring parameters and settings for individual HP Real User Monitor modules.
- ▶ **System Info** on page 124. Provides general system information about the HP Real User Monitor.

BAC Connection Settings

This page displays the current connection settings for the communication channel between HP Real User Monitor and HP Business Availability Center, which you can update. The page contains the following panes:

General

The General pane includes a field that contains the hostname of the HP Business Availability Center Gateway Server, a field for the port number used in communicating with the Gateway Server (80 by default), and a field for the communication protocol used (HTTP by default, or HTTPS if SSL is used for communicating with the Gateway Server).

Note: If you are an HP Software-as-a-Service user, contact an HP Software Support representative to receive the hostname or URL to enter.

Authentication

To instruct HP Real User Monitor to use basic authentication in communicating with HP Business Availability Center, select the **Use authentication** check box. Enter the user name, password, and domain name of a user recognized by the Gateway Server in the relevant fields.

For more information on using basic authentication in HP Business Availability Center, see “Using Basic Authentication in HP Business Availability Center” in the *HP Business Availability Center Hardening Guide* PDF.

Proxy

To instruct HP Real User Monitor to access the Gateway Server through a reverse proxy server, select the **Use proxy** check box. Enter the user name, password, domain name, and URL for the reverse proxy server. For information on using a reverse proxy server with HP Business Availability Center, see “Using a Reverse Proxy in HP Business Availability Center” in the *HP Business Availability Center Hardening Guide* PDF.

SSL

If HP Real User Monitor has been configured to use the SSL channel in communicating with the Gateway Server, you configure the following parameters in this pane:

- ▶ **Keystore path.** The path to the Keystore file, which is a file on the HP Real User Monitor engine machine that contains the private key and client-side certificate used for client authentication in SSL
- ▶ **Private Key password.** The password used for accessing the Private Key file
- ▶ **Keystore password.** The password used for accessing the Keystore file

In addition, you can select the following options by checking the box to the left of the required option:

- ▶ Validate host names on server certificates
- ▶ Validate that the server certificates are trusted
- ▶ Validate that the server certificates are not expired

For information on configuring the HP Real User Monitor and HP Business Availability Center to work with SSL, see “Using SSL in HP Business Availability Center” in the *HP Business Availability Center Hardening Guide* PDF.

Note: If you change the configuration, click the **Save Configuration** button to save the configuration and update the HP Real User Monitor engine.

Probe Management

The Probe Management page displays a list of the HP Real User Monitor probes that are connected to the engine, and also allows you to set probe configuration parameters for the following:

- “SSL Keystore Management” on page 119
- “Interface Configurations” on page 120
- “Data Collection Settings” on page 121
- “SSH Console” on page 123

When the Probe Management page is accessed, the following information is displayed for each probe:

- **Probe Name.** The name of the HP Real User Monitor probe as configured in End User Management Administration. For information on configuring the probe in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.
- **Probe IP.** The IP address of the HP Real User Monitor probe as configured in End User Management Administration.
- **Enabled.** This value denotes whether the probe is enabled in End User Management Administration or not.
- **Configurable.** This value denotes whether the HP Real User Monitor engine can internally configure the HP Real User Monitor probe. If the probe is not configurable, the engine does not attempt to retrieve the probe’s version and the Probe Version field is empty.

- **Probe Version.** The version of the HP Real User Monitor probe that is installed.

Note: If the HP Real User Monitor probe is either disabled or not configurable, the SSL Keystore Management, Interface Configurations, and Collector Editor pages are disabled.

SSL Keystore Management



You use the SSL Keystore Management page to manage the keys used by HP Real User Monitor probes to monitor SSL encrypted traffic. To access the SSL Keystore Management page, click the **SSL Keystore Management** button on the Probe Management page. The Keystore Management page contains two panes – SSL Keystore Administration and SSL Statistics.

The SSL Keystore Administration pane displays a list of all the configured keys, and for each one shows the number of servers on which the key was used to decipher traffic.

To add a key:

- 1 Click **Add Key**. The Keystore Management page opens.
- 2 In the Keystore Management page, enter the following:
 - **Key Format.** The format of the key – either PEM or PKCS12.
 - **Key Name.** The name you want to give to the key.
 - **File.** The path and name of the file containing the key. You can click **Browse** to navigate to the relevant file.
 - **Key Password.** An optional password for the key.
 - **New Password.** An optional password for the key if you want to change the existing one, or add a new one.
 - **Validate New Password.** Validation of the new password by entering it again.
- 3 Click **Submit** to save the key and exit, or **Cancel** to exit without saving.

Note: If no new password is entered, the existing one is used to encrypt the key. If there is no existing password for the key, a new one must be entered.

To delete a key:

- 1 Select the check box to the left of the keys you want to delete.
- 2 Click the **Delete** button at the bottom of the pane, or at the end of the row of the selected key.



Note: You can select all, clear all, or invert your selection using the **Select** buttons.



The SSL Statistics pane displays the amount of encrypted traffic as a percentage of the entire traffic monitored from each server. To refresh the information in this pane, click the **Refresh** button.



Interface Configurations

Use the Interfaces Configuration page to list and select a probe's Ethernet devices used to monitor server traffic. To access the Interfaces Configuration page, click the **Interfaces Configuration** button on the Probe Management page. For each Ethernet device, the following information is displayed:



- **Sniff.** Check box to select the device to monitor server traffic.
- **Name.** The logical name of the Ethernet device.
- **Up.** Whether the device is running or not.
- **Sniffable.** Whether the device can be used to listen to Ethernet traffic.
- **Hardware.** The hardware details of the device.
- **Driver.** The name of the driver used for the device.
- **IP.** The IP address assigned to the device, if any.

Click **Interface Details** for a device to display link, driver, other settings, and statistics information.

To select a device to be used by the probe for monitoring server traffic, use one of the following options:

- ▶ Select the **Sniff** check box to the left of the device you want to use.
- ▶ Select the **Probe Auto Select** check box to configure the HP Real User Monitor probe to listen to all available devices automatically.

Note: This differs from selecting all the devices manually, as the HP Real User Monitor probe only listens to available devices and not to all devices.

- ▶ Click **Restore to Current** to select the devices currently configured for monitoring.
- ▶ Click **Recommended Selection** to have the HP Real User Monitor engine select the devices it considers to be the most suitable to use.

When you have made your selection, click **Save and Upload Configuration** to save the configuration and send it to the HP Real User Monitor probe.

Note: You can select all, clear all, or invert your selection using the **Select** buttons.



Data Collection Settings

The HP Real User Monitor probe filters the traffic that it monitors. By default, the filter is set to monitor all traffic from port 80. You can override the default filter by setting filters for specific IP addresses or ranges, and for specific ports.



You use the Data Collection Settings page to list and configure the filters to be used for monitoring server traffic. To access the Data Collection Settings page, click the **Data Collection Settings** button on the Probe Management page. For each server range, the following information is displayed:

- ▶ **Servers.** The range or mask of servers to be monitored.
- ▶ **Ports.** The ports of the servers included in the range to be monitored.
- ▶ **Clients.** By default, a filter applies for all clients accessing the servers.

To display the current data collection filters, click **Reload Current Configuration** at the bottom of the page.

You can add new filters, and delete or edit existing filters. After adding, deleting, or changing a filter, click **Save and Upload Configuration** to save the configuration and send it to the HP Real User Monitor probe.

To add a new filter:

- 1** Click **New Definition**. The Edit Data Collection Settings page opens.
- 2** In the Edit Data Collection Settings page, enter the following:
 - ▶ **Servers.** Select the type of server filter you are adding and enter the required data:
 - ▶ **Single IP.** Enter a single IP address.
 - ▶ **IP Range.** Enter the starting and ending IP addresses of the range.
 - ▶ **IP Mask.** Enter the network address and applicable IP mask.
 - ▶ **Ports.** Select the type of port filter you are adding and enter the required data:
 - ▶ **Single Port.** Enter a single port number.
 - ▶ **Port Range.** Enter the starting and ending port numbers of the range.
- 3** Click **Submit** to save the filter and exit, or **Cancel** to exit without saving.

To delete a filter:



Click the **Delete** button in the row of the filter you want to delete.

To edit a filter:



- 1 Click the **Edit** button in the row of the filter you want to edit. The Edit Data Collection Settings page opens.
- 2 In the Edit Data Collection Settings page, edit the information displayed. See "To add a new filter" on page 122 for an explanation of the filter's fields.
- 3 Click **Save** to save the filter and exit, or **Cancel** to exit without saving.

SSH Console



You use SSH Console to connect to the HP Real User Monitor probe's console using Secure Shell, which provides strong authentication and secure communications over insecure channels. To access SSH Console, click the **SSH Console** button on the Probe Management page.

The first time you access SSH Console, a wizard installs some required files on your machine. Accept the default settings, or change them as required. Each time you access SSH Console, accept the certificate displayed, and in the console window, enter the user and password for the HP Real User Monitor probe, as configured in End User Management Administration. You are now connected to the HP Real User Monitor probe's console. (For information on configuring the probe in End User Management Administration, see "New/Edit Real User Monitor Engine Page" in *Using End User Management*.)

In the HP Real User Monitor probe console, you use regular Linux commands on the command line. There is also a menu providing assorted utilities for working in SSH Console. To access the menu, right-click the mouse while holding down the CTRL key. One of the utilities is a convenient graphical user interface for SFTP, which you use to transfer files to and from the HP Real User Monitor probe machine via secured FTP. To access the SFTP tool from the menu, select **Plugins > SFTP File Transfer**.

Set Engine IP

The first time that the HP Real User Monitor engine is started, it saves the IP address of the machine on which it is running. This option allows you to change the stored IP address in the event that the machine's actual IP address has changed (for example, if it connected to a different network and was allocated a different IP address). The stored IP address is displayed, followed by a list of all the current IP addresses of the network cards installed in the HP Real User Monitor engine machine. You can select one of the IP addresses from the list, or enter a different address of your choice in the **Other** field. Click **Submit** to accept the change.

Advanced Settings

This option displays HP Real User Monitor modules and provides direct links to specific pages in the HP Real User Monitor JMX console for viewing and configuring the module settings. Each module listed can have any of the following links associated with it:

- ▶ **Main Module Page.** Links to general settings for the module name and status.
- ▶ **Configuration Page.** Links to settings for the configuration of the HP Real User Monitor module retrieved from HP Business Availability Center.
- ▶ **Settings Page.** Links to settings for the configuration of the HP Real User Monitor module in the HP Real User Monitor engine.

For details on working with the JMX console, see “Using the HP Real User Monitor JMX Console” on page 155.

System Info

This option shows general system information about the HP Real User Monitor, which is displayed in the following panes:

- ▶ **Real User Monitor Server - General.** Includes the host name, host IP address, total memory, and the number of available processors for the HP Real User Monitor server.
- ▶ **Real User Monitor Server - OS.** Includes the name and version of the operating system of the HP Real User Monitor server.

- ▶ **Real User Monitor Database - General.** Includes the host name and port number of the HP Real User Monitor database, as well as the name of the database schema.

HP Real User Monitor Diagnostic Tools

The **Tools** drop-down menu on the HP Real User Monitor Engine Web console menu bar includes the following tools:

- ▶ **Traffic Discovery** on page 126. Used to enable the HP Real User Monitor probe to automatically discover the servers and domains being accessed by the traffic to which it is listening.
- ▶ **Session ID Detection** on page 131. Used to automatically discover application session IDs in monitored traffic. Helps to configure applications in End User Management Administration. (For information on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- ▶ **Monitoring Configuration Information** on page 135. Displays general configuration data of the applications, end users, pages, probes, transactions, and engine that have been configured for monitoring by HP Real User Monitor in End User Management Administration.
- ▶ **JMX Console** on page 144. Provides a link to the HP Real User Monitor JMX console for configuring HP Real User Monitor parameters, such as URL correlation parameters. (For details on URL correlation, see “Correlating Collected Data with Configured Pages” in *Using End User Management*.)
- ▶ **IP Translator** on page 144. Used to convert the internal number used by the engine to represent an IP address, to the actual IP address it represents, and vice versa.
- ▶ **Time Converter** on page 144. Used to convert a date and time to an internal number used by the engine machine to represent this value. You can also convert the number used by the engine machine to the date and time it represents.
- ▶ **Current Captured Sessions** on page 145. Displays the Open Sessions report that can be used by advanced users to study open session raw data.

- ▶ **Page Name Cache** on page 152. Used to manage the Page Name cache of meaningful page names and to delete such names that are no longer relevant.
- ▶ **Page Statistics** on page 154. Displays page and server time statistics for the pages you have configured in End User Management Administration, as well as for pages to which HP Real User Monitor has assigned a meaningful name.

Traffic Discovery

You use the Traffic Discovery tool to instruct the HP Real User Monitor probe to automatically detect and report the domains and servers that are accessed by the traffic to which it is listening. You can use the information obtained from the Traffic Discovery tool to help you configure servers and applications to be monitored by HP Real User Monitor, in End User Management Administration. For information on configuring HP Real User Monitor in End User Management Administration, see “Real User Monitor Administration User Interface” in *Using End User Management*.

When the Traffic Discovery option is selected from the Tools menu, the Traffic Discovery page opens. On the Traffic Discovery page, the following information is displayed for each HP Real User Monitor probe that is connected to the HP Real User Monitor engine:

- ▶ **Probe Name.** The name of the HP Real User Monitor probe as configured in End User Management Administration. For information on configuring the probe in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.
- ▶ **Probe IP.** The IP address of the HP Real User Monitor probe as configured in End User Management Administration.
- ▶ **Enabled.** This value denotes whether the probe is enabled in End User Management Administration or not.
- ▶ **Configurable.** This value denotes whether the HP Real User Monitor engine can internally configure the HP Real User Monitor probe.
- ▶ **Start Time.** The time that Traffic Discovery was started for the probe.
- ▶ **Start Discovery.** Click the **Start Discovery** button to start Traffic Discovery for the probe.

- ▶ **Stop Discovery.** Click the **Stop Discovery** button to stop Traffic Discovery for the probe.
- ▶ **View Current Results.** Click **View Current Results** to view the current Traffic Discovery results for the probe. The button is enabled only when Traffic Discovery has been started and is running.
- ▶ **View Saved Results.** Click **View Saved Results** to view previously saved Traffic Discovery results for the probe. The button is enabled only if there are saved results to display.



You can refresh the data displayed on the Traffic Discovery page by clicking the **Refresh** button at the bottom of the page.

Note:

- ▶ The **Start Discovery** and **Stop Discovery** buttons are not enabled simultaneously. When one is enabled, the other is disabled.
 - ▶ When an HP Real User Monitor probe runs in Traffic Discovery mode, it is dedicated to Traffic Discovery and does not collect regular data for reporting to the HP Real User Monitor engine and HP Business Availability Center.
-

Viewing Traffic Discovery Results

To view Traffic Discovery results, click **View Current Results** or **View Saved Results** for the relevant HP Real User Monitor probe. The Traffic Discovery Statistics page opens. Traffic Discovery statistics are displayed in the following tabs:

- ▶ **Summary View.** Displays a pie chart in which each slice represents a different, discovered protocol and the slice size is determined by the percentage of the total protocol traffic out of the total traffic for all the protocols. Click the slice representing the HTTP protocol to display the Domain view. Click on any other slice to display the Server view.
- ▶ **Domain View.** For each discovered protocol, the statistics are grouped by domain names or IP addresses. For each port in the domain, the IP address of each server that connected to the domain is listed, further grouped by the port through which they connected to the domain.
- ▶ **Server View.** For each discovered protocol, the statistics are grouped by server IP addresses. For each server, the IP addresses of all the domains to which the server connected are listed, further grouped by the port through which the domain connected to the server.

Filters at the top of the page enable you to filter the data displayed by:

- ▶ filtering the data by the type of servers to be displayed. Select **Servers on Private IPs**, **Servers on Non Private IPs**, or **both** from the drop-down list in the **Server Type** filter.
- ▶ searching for domains and servers that match a specific pattern or IP address. Enter the search pattern in the Search filter located at the top left of the page, and click **Search Domain** or **Search Filter**.

Note:

- ▶ When using the search feature in the **Domain View** tab, you can enter alpha-numeric characters, the asterisk (*) wild card character, and use partial strings for matching. The search filters domain names that include the search string.
 - ▶ In the **Server View** tab, you can only enter valid IP addresses in the search field. The search filters server IP addresses that exactly match the search string.
-

The data is redisplayed according to the records matching the search criteria.

In the **Domain** and **Server** tabs, the following information is displayed for all the domains or servers included in the page:

- ▶ **Peak Total Traffic.** The peak number of megabytes transmitted to and from all the domains or servers included in the page, for all the discovered protocols.
- ▶ **Peak Pages/sec.** The peak number of pages per second for all the domains or servers included in the page, for all the discovered protocols.
- ▶ **Sampled from.** The date and time that the displayed statistics were retrieved are displayed. From this, you can determine whether the statistics are current, or whether they were loaded from a saved file.

For each domain or server in the page, the following information is displayed:

- ▶ **% Avg. Traffic.** The percentage of average traffic for a specific protocol out of the average traffic for all protocols.
- ▶ **Avg. Traffic (Mb/s).** The average number of megabytes transmitted to and from the domain or server, for a specific protocol.
- ▶ **% Peak Traffic.** The percentage of peak traffic for a specific protocol out of the peak traffic for all protocols.

- ▶ **Peak Traffic (Mb/s).** The peak number of megabytes transmitted to and from the domain or server, for a specific protocol.
- ▶ **Peak Pages/sec.** The peak number of pages per second for the domain or server, for a specific protocol.
- ▶ **Compressed.** Ticked if any of the traffic sent and received by the domain or server was compressed.
- ▶ **Encrypted.** Ticked if any of the traffic sent and received by the domain or server was compressed.
- ▶ **Server Info.** The name of the server, if available.
- ▶ **More Details.** Reserved for future use.



If the statistics data is displayed on more than one page, you can move to different pages using the page buttons located at the upper left part of the screen.

At the top right of the Auto Discovery Statistics page, are buttons that you click to:



- ▶ Refresh the display with the most up to date statistics.



- ▶ Save the current statistics to a file on the HP Real User Monitor probe machine.

Note: Only one file can be saved per probe. Saving statistics data to a file, overwrites any previously saved data.



- ▶ Reset the current statistics data. Resetting data initializes Traffic Discovery statistics.

You can start and stop Traffic Discovery by clicking **Start Discovery** and **Stop Discovery** at the bottom of the Traffic Discovery page. When you click **Stop Discovery**, you are prompted to save the current results.

Session ID Detection

Use the Session ID Detection tool to instruct the HP Real User Monitor probe to detect Session IDs in the traffic it monitors, for applications configured in End User Management Administration. For information on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.

To configure applications in End User Management Administration, you use the Traffic Discovery and Session ID Detection tools in the following sequence:

- 1 Run the Traffic Discovery tool to identify applications on monitored servers.
- 2 Configure the discovered applications in End User Management Administration, without session ID parameters.
- 3 Run the Session ID Detection tool to identify the relevant session IDs for the applications.
- 4 Configure the session ID parameters for the applications in End User Management Administration.

When the Session ID Detection option is selected from the Tools menu, the Session ID Detection page opens. On the Session ID Detection page, the following information is displayed for each configurable and enabled HP Real User Monitor probe that is connected to the HP Real User Monitor engine:

- ▶ **Probe IP.** The IP address of the HP Real User Monitor probe as configured in End User Management Administration. For information on configuring the probe in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.
- ▶ **Last Completed Collection Time.** The last time that the Session ID Detection tool finished collecting data for session ID analysis.
- ▶ **Remaining Collection Time.** Shows the amount of remaining time for collecting data for session ID analysis.

Refresh the data displayed on the Session ID Detection page by clicking the **Refresh** button at the top right of the page.



For each HP Real User Monitor probe listed, there are buttons that enable you to do one of the following:



- ▶ Start data collection.



- ▶ Stop data collection.



- ▶ Abort the data collection process.

When you start data collection, a dialog box opens in which you specify the amount of time for data collection to run, and whether you want to collect raw data for a specific end-user IP address, in addition to the data collected for all end-user IP addresses.

The **View Report** link displays the Session ID Detection report for the probe. The link is only enabled once the data collection process has been run and has completed.

Note: You can only run the data collection process for one HP Real User Monitor probe at a time.

Session ID Detection Report

For each application configured for the probe in End User Management Administration, the Session ID Analysis report shows the following information:

- ▶ **Application Name.** The application name, as defined in End User Management Administration. For applications not been defined in End User Management Administration, the application name is **Default Website**. For information on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.
- ▶ **Application Components.** The total number of hits in the application.
- ▶ **Application Pages.** The total number of pages in the application.
- ▶ **Application Clients.** The total number of clients that accessed the application.

- ▶ **Application Connections.** The total number of connections to the application.
- ▶ **All Session IDs Coverage.** The percentage of hits in the application that contain a discovered session ID key.
- ▶ **Session ID Key.** The session ID key name of the session ID discovered for the application.
- ▶ **Type.** Where the session ID key is located – cookie, query, or cookie and query.
- ▶ **Regular Expression.** The regular expression that uniquely defines the session ID key. The same regular expression should be used in the **Scan for** field in session identification advanced criteria, when configuring an application in End User Management Administration. For information on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.
- ▶ **Specific Session ID Coverage.** The percentage of traffic collected for the application by the data collection process, containing the specific session ID key.
- ▶ **Specific Session ID Correctness.** The probability that HP Real User Monitor gives the located key of being a real session ID key.

You can display data for a specific application only, display detailed information for a specific session ID key, and view raw data for a single end-user IP address.

To display data for a specific application only:

Select the application in the **Filter By Application Name** filter, located at the top-left of the report.

To display detailed information for a specific session ID key:

Click a specific key in the **Session ID Key** column. The **Session ID Detection Detailed** report is displayed, and shows the following information for the session ID key:

- ▶ **Session ID Properties:**
 - ▶ **Application Name.** The application name, as defined in End User Management Administration.
 - ▶ **Session ID Key.** The session ID key name.
 - ▶ **Type.** Where the session ID key is located – cookie, query, or cookie and query.
 - ▶ **Regular Expression.** The regular expression that uniquely defines the session ID key. The same regular expression should be used in the **Scan for** field in session identification advanced criteria, when configuring an application in End User Management Administration.
 - ▶ **Object Retrieve Phrase.** The phrase representing the specific objects to be retrieved from the regular expression. The same phrase should be used in the **retrieve** field in session identification advanced criteria, when configuring an application in End User Management Administration.
 - ▶ **Specific Session ID Coverage.** The percentage of traffic collected for the application by the data collection process, containing the specific session ID key.
 - ▶ **Specific Session ID Correctness.** The probability that HP Real User Monitor gives the located key of being a real session ID key.
 - ▶ **First Page Number.** The page in which the session ID first appeared.
Note: The first page number is shown only if you chose to collect raw data for a specific end-user IP address when starting session ID capturing.
- ▶ **Examples.** Displays a few examples of the session ID key and the value located in the key.
- ▶ **Set Cookie Params.** If the session ID key is located in a cookie, or in a cookie and query, the path and domain, which are optional parameters sent from the server when setting a cookie for the client, are displayed.

- **Reasons For Not Locating Session ID Keys in Collected Data.** Displays the percentage of traffic collected by the data collection process, not containing the specific session ID key, and for which a reason can be given.
- **Reasons For Incomplete Session ID Correctness.** The reasons why HP Real User Monitor gives the located key a probability of less than 100 percent of being a real session ID key.

To display raw data for a single end-user IP address:

Note: The **View Raw Data** button is only enabled if raw data was collected for a single end-user IP address.

Click **View Raw Data**. The **Session ID Detection Raw Data** report is displayed, and shows the following information for the end-user IP address:

- **#.** A sequential number indicating the row number in the report.
- **URI.** The URI of the page or component.
- **Page/Component.** Indicates whether the data displayed in the row refers to a page or a component.
- **Referrer.** For a page, the referrer is the calling page; for a component, the referrer is the page in which the component is included.
- **Client Port.** The port number of the client's machine on which the data was collected.
- **Set Cookie.** The cookie sent from the server to the client, containing the session ID key.
- **Cookies.** The content of the cookie included in the URL POST parameters.
- **Query.** The content of the query.

Monitoring Configuration Information

The Engine Configuration page displays general configuration data of the applications, end-users, events, pages, probes, transactions, and engine that have been configured for monitoring by HP Real User Monitor in End User Management Administration.

Sync All Configurati

At the top of the Engine Configuration page is the **Sync All Configuration** button, which you click to force the HP Real User Monitor engine to reload the HP Real User Monitor configuration from HP Business Availability Center.

You display the data type you wish to see by selecting it from the drop-down menu located at the top left corner of the page and clicking **Generate**.

Applications

When you select applications as the data type to be displayed, the following information about the configured applications is displayed:

Column	Description
ID	An internal ID number allocated by HP Business Availability Center.
Is Application enabled	True or False – as configured in End User Management Administration.
Name	The name of the application as configured in End User Management Administration.
Type	The application type as configured in End User Management Administration.
Probes which monitor the application	The IP addresses and names of the probes configured in End User Management Administration to monitor the application.

You can filter the data displayed on the **Name** column. The filter is case sensitive.

For information on configuring applications for monitoring, see “New/Edit Web or SOAP Application Page” and “New/Edit TCP Application Page” in *Using End User Management*.

End Users

When you select end users as the data type to be displayed, the following information about the configured end users is displayed:

Column	Description
ID	An internal ID number allocated by HP Business Availability Center.
Is End User enabled	True or False – as configured in End User Management Administration.
Name	The name of the end-user group as configured in End User Management Administration.
Description	The description of the end-user group as configured in End User Management Administration.
Is Monitored (for collection)	True or False – use host name resolution as configured in End User Management Administration.

You can filter the data displayed on the **Name** column. The filter is case sensitive.

For information on configuring end-user groups for monitoring, see “New/Edit End-User Group Page” in *Using End User Management*.

Events

When you select events as the data type to be displayed, the following information about the configured events is displayed:

Column	Description
ID	An internal ID number allocated by HP Business Availability Center.
Is Event enabled	True or False – as configured in End User Management Administration.
Name	The name of the event as configured in End User Management Administration.

Column	Description
Event type	The event type as configured in End User Management Administration.
Report As Error	True or False – as configured in End User Management Administration.
Create Snapshot	True or False – as configured in End User Management Administration.
Collection Session Snapshot	True or False – as configured in End User Management Administration.

You can filter the data displayed on the **Name** column. The filter is case sensitive.

For information on configuring events for monitoring, see “Real User Monitor Administration User Interface” in *Using End User Management*.

Pages

When you select pages as the data type to be displayed, the following information about the configured pages is displayed:

Column	Description
Page ID	An internal ID number allocated by HP Business Availability Center.
Is Page Enabled	True or False – as configured in End User Management Administration.
Page Name	The name of the page as configured in End User Management Administration.
Application	The name of the application in which the page is included.
Description	The description of the page as configured in End User Management Administration.

Column	Description
Monitored Type	The monitoring condition as configured in End User Management Administration. The possible conditions are: 1 = Always 2 = Never 3 = Only as part of a transaction
Page Type	Currently not used
Page Time Threshold	The page time threshold, in milliseconds, as configured for the page in End User Management Administration.
Server Time Threshold	The server time threshold, in milliseconds, as configured for the page in End User Management Administration.
Availability Threshold	The availability threshold, in percent, configured for the page in End User Management Administration.
Timeout	The amount of time, in milliseconds, after which the page is considered to have timed out, as configured for the page in End User Management Administration.
Page URL	The URL of the page as configured in End User Management Administration.

You can filter the data displayed on the **Page Name** column. The filter is case sensitive.

For information on configuring pages for monitoring, see “New/Edit Page” in *Using End User Management*.

Probes

When you select probes as the data type to be displayed, the following information about the configured probes is displayed:

Column	Description
ID	An internal ID number allocated by HP Business Availability Center.
Is probe enabled	True or False – as configured in End User Management Administration.
IP	The IP address of the probe as configured in End User Management Administration.
Login username	The user name for logging in to the probe as configured in End User Management Administration.
Name	The name of the probe as configured in End User Management Administration.
Description	The description of the probe as configured in End User Management Administration.

You can filter the data displayed on the **Name** column. The filter is case sensitive.

For information on configuring probes for monitoring, see “New/Edit Probe Page” in *Using End User Management*.

Transactions

When you select transactions as the data type to be displayed, the following information about the configured transactions is displayed:

Column	Description
Trx ID	An internal ID number allocated by HP Business Availability Center.
Is Trx Enabled	True or False – as configured in End User Management Administration.

Column	Description
Trx Name	The name of the transaction as configured in End User Management Administration.
Application	The name of the application in which the transaction is included.
Description	The description of the transaction as configured in End User Management Administration.
Transaction report page	The name of the page which, if reached, causes the transaction to be reported as unavailable, in the event of a transaction error or timeout within a session.
Refresh behavior	The page instance that is measured in case of a refresh, as configured in End User Management Administration. The possible instances are: 0 = First page 1 = Last page
Timeout	The amount of time, in milliseconds, of inactivity since the last page download in a transaction, that causes the transaction to time out, as configured for the transaction in End User Management Administration.
Gross Time Threshold	The total transaction time threshold (download time + think time), in milliseconds, as configured for the transaction in End User Management Administration.
Net Time Threshold	The net transaction time threshold, in milliseconds, for the pages included in the transaction, as configured in End User Management Administration.
Server Time Threshold	The server time threshold, in milliseconds, as configured for the transaction in End User Management Administration.

Column	Description
Availability Threshold	The availability threshold, in percent, as configured for the transaction in End User Management Administration.
Trx pages	The names of the pages included in the transaction, as configured in End User Management Administration.

You can filter the data displayed on the **Trx Name** column. The filter is case sensitive.

For information on configuring transactions for monitoring, see “New/Edit Transaction Page” in *Using End User Management*.

Engine Settings

When you select engine settings as the data type to be displayed, the following information about the configured engine is displayed:

Column	Description
Engine Name	Name of the engine as configured in End User Management Administration.
Profile ID	Internal HP Business Availability Center profile ID.
Profile Name	Internal HP Business Availability Center profile name.
Engine ID	Internal HP Business Availability Center engine ID.
Customer Name	Always default client .
Snapshot on Error Enabled	True or False – as configured in End User Management Administration.
Snapshot page number	Number of pages for which to collect snapshot on error, as configured in End User Management Administration.

Column	Description
Is monitoring default application	The applications that are monitored by the engine, as configured in End User Management Administration. 0 = configured applications only 1 = all applications
Default Application Name	Name of default application (for all applications not configured in End User Management Administration).
Default HTTP Port	Default HTTP port of engine machine.
Default HTTPS Port	Default HTTPS port of engine machine.
Default Application ID	Internal HP Business Availability Center application ID.

For information on configuring engine settings, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.

Transaction Snapshot Mode

When you select transaction snapshot mode as the data type to be displayed, the following information about the transaction snapshot mode is displayed:

Column	Description
Name	The application name.
ID	Internal HP Business Availability Center application ID.
Snapshot mode on	True or False – as configured in End User Management Administration.

For information on configuring transaction snapshot settings, see “Snapshot Settings” in *Using End User Management*.

JMX Console

This option provides a link to the HP Real User Monitor JMX console, which you use to view and configure HP Real User Monitor parameters, for example, URL correlation parameters. For details on configuring URL correlation parameters, see “Correlating Collected Data with Configured Pages” in *Using End User Management*. For details on working with the JMX console, see “Using the HP Real User Monitor JMX Console” on page 155.

IP Translator

You use the IP Translator tool to convert an IP address into different formats. The formats to which the IP data is translated are:

- ▶ **Host name.** The name of the machine to which the IP address is assigned.
- ▶ **Signed integer.** An internal, signed number used in HP Real User Monitor data samples.
- ▶ **Unsigned integer.** An internal, unsigned number used in HP Real User Monitor data samples.
- ▶ **Dotted-format IP address.** The standard, dotted-decimal notation for the IP address.

You select one of the formats and enter the source data you want to convert to the other formats, or you select the **Resolve Engine host** option to use the IP address of the current HP Real User Monitor engine machine as the source data.

Click **Submit** to translate the source data to all the other formats.

Time Converter

You use the Time Converter tool to convert a time into different formats. The formats to which the time is converted are:

- ▶ the number of milliseconds since January 1, 1970 – an internal number used by the HP Real User Monitor engine.
- ▶ time in Greenwich Mean Time.
- ▶ time in the time zone set for the HP Real User Monitor engine machine.

You select one of the formats and enter the source data you want to convert to the other formats, or you select the **Current time** option to use the current time as the source data for conversion.

Click **Submit** to convert the source data to all the other formats.

Current Captured Sessions

The Current Captured Sessions option displays the Current Captured Sessions report that includes raw data of the open sessions that are still stored in the HP Real User Monitor database. This report is useful when troubleshooting problems of session definitions in applications, and can help you understand why configured applications might not be reported as defined.

The Current Captured Sessions report comprises three main panes, as well as a line that indicates whether all selected sessions are currently being displayed, or which individual session is currently being displayed. Click a link in this indicator line to redisplay the relevant information (for example, if an individual session is currently displayed, click **Current Captured Sessions** to redisplay all the sessions that were originally selected for the report).

The main panes in the Current Captured Sessions report are:

- ▶ **Current Captured Sessions.** Used to filter the data displayed.
- ▶ **Summary.** Shows a summary line of information of all the data displayed in the Breakdown pane.
- ▶ **Sessions.** Shows information for individual items that are selected according to the filter settings.

Current Captured Sessions (filter) Pane

In the filter pane, you can set a filter for selecting the open sessions displayed according to the following criteria:

- ▶ **End User IP.** The IP address of an end user.
- ▶ **User Name.** The login name of an end user. You can also enter part of a name and HP Real User Monitor searches for all records with login names that include the entered text.

- ▶ **Probe GUID.** A unique identifier number allocated to each new session by the HP Real User Monitor probe.
- ▶ **By Time.** For details on specifying a time range, see “Time Range and Granularity Bar” in *Reports*.

When you have set the filter, click **Generate** to generate the report.

Summary Pane

The Summary pane displays one line of summary information for all the lines displayed in the Breakdown pane. When viewing all physical sessions, the summary is of all the sessions selected by the filters and when viewing a specific physical session, the summary is of all the application sessions within the physical session. The summary line includes the following fields:

- ▶ **Total Sessions.** The total number of application sessions, as configured in End User Management Administration, that were included in all the HP Real User Monitor probe sessions displayed in the Breakdown pane. (For details on configuring sessions for applications, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- ▶ **Total Bytes.** The total size (in bytes) of all the sessions displayed in the Breakdown pane.
- ▶ **Total Hits.** The total number of page hits for all the sessions displayed in the Breakdown pane.
- ▶ **Available Pages Time.** The average time (in seconds) for which pages were available in all the sessions displayed in the Breakdown pane.
- ▶ **Unavailable Pages Time.** The average time (in seconds) for which pages were unavailable in all the sessions displayed in the Breakdown pane.
- ▶ **HTTP Errors.** The total number of HTTP errors that occurred in all the sessions displayed in the Breakdown pane.
- ▶ **Application Errors.** The total number of application events reported as errors, as configured in End User Management Administration, that occurred in all the sessions displayed in the Breakdown pane. (For details on configuring events for applications in End User Management Administration, see “Real User Monitor Administration User Interface” in *Using End User Management*.)

- ▶ **Info Events.** The total number of application events, as configured in End User Management Administration, that occurred in all the sessions displayed in the Breakdown pane. (For details on configuring applications in End User Management Administration, see “Real User Monitor Administration User Interface” in *Using End User Management*.)
- ▶ **Performance Events.** The total number of times that a sample exceeded its threshold, as configured in End User Management Administration, in all the sessions displayed in the Breakdown pane. (For details on configuring thresholds in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.)

Sessions Pane

The Sessions pane displays individual data for each session selected. The data is displayed in two tabs – General and Advanced.

The **General** tab displays the following information for each session listed:

- ▶ **Probe GUID.** A unique identifier number allocated to the session by the HP Real User Monitor probe.
- ▶ **Total Sessions.** The total number of application sessions, as configured in End User Management Administration, that were included in the HP Real User Monitor probe session displayed. (For details on configuring sessions for applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- ▶ **User IP.** The IP address of the user who initiated the session.
- ▶ **User Name.** The login name of the user who initiated the session.
- ▶ **User Host.** The name of the host machine on which the user initiated the session.
- ▶ **Start Time.** The time that the session was started.
- ▶ **End Time.** The time that the session ended.
- ▶ **Total Bytes.** The total size (in bytes) of the session.
- ▶ **Total Hits.** The total number of pages hit in the session.

The **Advanced** tab displays the following information for each session listed:

- **Probe GUID.** A unique identifier number allocated to the session by the HP Real User Monitor probe.
- **Total Sessions.** The total number of application sessions, as configured in End User Management Administration, that were included in the HP Real User Monitor probe session displayed. (For details on configuring sessions for applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- **User IP.** The IP address of the user who initiated the session.
- **User Name.** The login name of the user who initiated the session.
- **Start Time.** The time that the session was started.
- **Last Hit Time.** The time that the last page in the session was hit.
- **Available Pages Time.** The average time (in seconds) for which pages were available in the session.
- **Unavailable Pages Time.** The average time (in seconds) for which pages were unavailable in the session.
- **HTTP Errors.** The total number of HTTP errors that occurred in the session.
- **Application Errors.** The total number of application events reported as errors, as configured in End User Management Administration, that occurred in the session. (For details on configuring events for applications in End User Management Administration, see “Real User Monitor Administration User Interface” in *Using End User Management*.)
- **Info Events.** The total number of application events, as configured in End User Management Administration, that occurred in the session. (For details on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- **Performance Events.** The total number of times that a sample exceeded its threshold, as configured in End User Management Administration, in all the sessions displayed in the Breakdown pane. (For details on configuring thresholds in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.)

Within either tab, click an individual Probe GUID to display information for that session, in two tabs – General and Advanced.

The **General** tab displays the following information

- **Probe GUID.** A unique identifier number allocated to the session by the HP Real User Monitor probe.
- **App ID.** The HP Real User Monitor internal ID number for the application configured in End User Management Administration. (For details on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- **User IP.** The IP address of the user who initiated the session.
- **User Host.** The name of the host machine on which the user initiated the session.
- **User Name.** The login name of the user who initiated the session.
- **Start Time.** The time that the session was started.
- **End Time.** The time that the session ended.
- **Session ID.** The HP Real User Monitor internal ID number for the application session configured in End User Management Administration. (For details on configuring sessions for applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- **Probe IP.** The IP address of the HP Real User Monitor probe that monitored the session.
- **Protocol.** The protocol used by the session (HTTP or HTTPS).
- **User Legacy Name.** The name of the end-user group, as configured in End User Management Administration, to which the user who initiated the session belongs, and the range of IP addressees included in the end-user group. (For details on configuring end-user groups in End User Management Administration, see “New/Edit End-User Group Page” in *Using End User Management*.)

The **Advanced** tab displays the following information

- ▶ **Probe GUID.** A unique identifier number allocated to the session by the HP Real User Monitor probe.
- ▶ **App ID.** The HP Real User Monitor internal ID number for the application configured in End User Management Administration. (For details on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- ▶ **User IP.** The IP address of the user who initiated the session.
- ▶ **User Name.** The login name of the user who initiated the session.
- ▶ **Start Time.** The time that the session was started.
- ▶ **Last Hit Time.** The time that the last page in the session was hit.
- ▶ **Page Hits.** The total number of pages hit in the session.
- ▶ **Total Bytes.** The total size (in bytes) of the session.
- ▶ **Available Pages Time.** The average time (in seconds) for which pages were available in the session.
- ▶ **Unavailable Pages Time.** The average time (in seconds) for which pages were unavailable in the session.
- ▶ **HTTP Errors.** The total number of HTTP errors that occurred in the session.
- ▶ **Application Errors.** The total number of application events reported as errors, as configured in End User Management Administration, that occurred in the session. (For details on configuring events for applications in End User Management Administration, see “Real User Monitor Administration User Interface” in *Using End User Management*.)
- ▶ **Info Events.** The total number of application events, as configured in End User Management Administration, that occurred in the session. (For details on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
- ▶ **Performance Events.** The total number of times that a sample exceeded its threshold, as configured in End User Management Administration, in all the sessions displayed in the Breakdown pane. (For details on configuring thresholds in End User Management Administration, see “New/Edit Real User Monitor Engine Page” in *Using End User Management*.)

When an individual session is displayed, click the Probe GUID to display the click-stream for the session (that is, the pages included in the session). The click-stream displays two panes of information. The first pane includes the details for the session as displayed in the General and Advanced tabs of the **Sessions** pane of the report, and the second pane comprises two tabs that display the following information for each page included in the session:

The **General** tab includes:

- ▶ **Hit ID.** The sequence number of the page in the session.
- ▶ **URL.** The URL of the page, including the GET/POST data. If a URL is too long to be displayed in full, it is partially displayed and includes three dots (...). Click the URL to open a window displaying the entire URL.
- ▶ **Page Name (ID).** The name of the page, as configured in End User Management Administration, and HP Real User Monitor's internal ID number for the page. (For details on configuring pages for applications in End User Management Administration, see "New/Edit Page" in *Using End User Management*.)
- ▶ **Application Name (ID).** The name of the application, as configured in End User Management Administration, in which the page is included, and HP Real User Monitor's internal ID number for the application. (For details on configuring applications in End User Management Administration, see "New/Edit Web or SOAP Application Page" in *Using End User Management*.)
- ▶ **Timestamp.** The date and time that the page was hit.
- ▶ **Server Name.** The name of the server on which the page was located.
- ▶ **Server IP.** The IP address of the server on which the page was located.
- ▶ **Page Time.** The total time (in milliseconds) that the page was active.

The **Advanced** tab includes:

- ▶ **Hit ID.** The sequence number of the page in the session.
- ▶ **URL.** The URL of the page, including the GET/POST data. If a URL is too long to be displayed in full, it is partially displayed and includes three dots (...). Click the URL to open a window displaying the entire URL.

- ▶ **Page Name (ID).** The name of the page, as configured in End User Management Administration, and HP Real User Monitor's internal ID number for the page. (For details on configuring pages for applications in End User Management Administration, see "New/Edit Page" in *Using End User Management*.)
- ▶ **Timestamp.** The date and time that the page was hit.
- ▶ **Session ID.** The HP Real User Monitor internal ID number for the application session configured in End User Management Administration. (For details on configuring sessions for applications in End User Management Administration, see "New/Edit Web or SOAP Application Page" in *Using End User Management*.)
- ▶ **HTTP Method.** The HTTP method used to access the page.
- ▶ **# of Components.** The number of components included in the page.
- ▶ **Is Stopped.** Whether the page was stopped.
- ▶ **HTTP Response Code.** The response code received for the page request.
- ▶ **Client Port.** The port number of the client machine that initiated the request.
- ▶ **Page Time.** The total time (in milliseconds) that the page was active.



Note: You can refresh the click-stream data displayed by clicking the **Refresh** button at the top, right hand side of the page.

Page Name Cache

You use the Page Name Cache tool to display applications and the meaningful page names that have been created for pages included in the application. You can delete meaningful page names that are no longer relevant (for example, if you have changed the meaningful page name rules for an application so that new and different meaningful page names are created) and thereby reduce the amount of data stored in the Real User Monitor database. For details on configuring meaningful names, see "Configuring Meaningful Page Names" on page 167.

When you select the Page Name Cache tool, the **Application Selection** page opens, listing all the applications that you configured for the HP Real User Monitor engine in End User Management Administration. For information on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.

For each application, you can perform the following actions:



- ▶ Click the **Delete** button to delete all the meaningful page names for the application.



- ▶ Click the **Drilldown** button to display the **Application Cached Page Names** page (for details, see below) on which you can see all the meaningful page names for the application and delete them selectively.

Note: The buttons are disabled for applications that do not have any meaningful page names assigned to them.

Application Cached Page Names Page

The **Application Cached Page Names** page lists all the meaningful page names that have been created for an application. To delete pages, select the check box next to the pages you want to delete and click the **Delete** button.



Note: You can select all page names, clear all page names, or invert your selection using the **Select** buttons.



Click the **Back** link at the top of the page to return to the **Application Selection** page.



From either the Application Selection page or the Application Cached Page Names page, click the **Refresh** button to redisplay the pages.

Page Statistics

The Page Statistics option displays page and server time statistics for the pages that you have configured in End User Management Administration, as well as for the pages that have been assigned a meaningful name by HP Real User Monitor. For information on configuring pages for monitoring, see “New/Edit Page” in *Using End User Management*. For details on configuring meaningful names, see “Configuring Meaningful Page Names” on page 167.

The Page Statistics page includes the following filters at the top of the page, by which you can filter the data that is displayed:

- ▶ **Time range.** Select a custom view from the drop-down list in the **View** field, or set the start and end dates as required. For further details on selecting a time range, see “Common Report Elements” in *Reports*.
- ▶ **Page Name.** Enter a page name to select all pages that match the entered name. You can use the asterisk (*) wild card to represent any string of characters. If left blank, all the pages that you configured in End User Management Administration are displayed.

The data is displayed according to the records matching the filter criteria. For each page, the following information is displayed:

- ▶ **Page Name.** The page name you configured in End User Management Administration, or the meaningful name assigned to the page.
- ▶ **Configured.** Denotes whether or not the page is configured in Real User Monitor Administration. For details on configuring pages, see “New/Edit Page” in *Using End User Management*.
- ▶ **Total Hits.** The total number of requests that the page received.
- ▶ **Average Page Time.** The average amount of time, in seconds, it took for the page to download.
- ▶ **Page Time Standard Deviation.** The standard deviation of the page download time.
- ▶ **Minimum Page Time.** The minimum amount of time, in seconds, it took for the page to download.
- ▶ **Maximum Page Time.** The maximum amount of time, in seconds, it took for the page to download.

- **Average Server Time.** The average amount of time, in seconds, that it took the server to process the requests for the page.
- **Server Time Standard Deviation.** The standard deviation of the server time.
- **Minimum Server Time.** The minimum amount of time, in seconds, that it took the server to process a request for the page.
- **Maximum Server Time.** The maximum amount of time, in seconds, that it took the server to process a request for the page.

Using the HP Real User Monitor JMX Console

You use the HP Real User Monitor Engine JMX Console to view and configure HP Real User Monitor settings.

This section includes the following topics:

- “Accessing the JMX Console” on page 155
- “Setting URL Correlation Parameters” on page 156
- “Configuring HP Real User Monitor Aggregation” on page 157
- “Configuring HP Real User Monitor Reporting” on page 159
- “Configuring the Samples Rate” on page 161
- “Configuring the Amount of Unsent Sample Data to Store in Real User Monitor” on page 162

Accessing the JMX Console

Via the JMX console, you can view and configure HP Real User Monitor parameters, view statistics for HP Real User Monitor modules and services, and view and configure jboss components.

Once you start the HP Real User Monitor engine after installation, you can access the HP Real User Monitor Engine JMX Console by launching the HP Real User Monitor Engine Web console and choosing **JMX Console** from the **Configuration** drop-down menu. To access a specific area of the JMX Console for an individual HP Real User Monitor module, select **Advanced Settings** from the **Configuration** drop-down menu in the HP Real User

Monitor Engine Web console and then click the links for the module you wish to view. For details on the HP Real User Monitor Engine Web console, see “Using the HP Real User Monitor Web Console” on page 76.

When you access the JMX console, you are prompted for a user name and password. Enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

Note: You can access the HP Real User Monitor Engine JMX Console from a different machine by launching a Web browser and typing the following:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

Important: Changing any of the JMX configuration settings can cause HP Real User Monitor to malfunction. It is recommended not to change any of these settings.

Setting URL Correlation Parameters

You can configure a number of parameters used by HP Real User Monitor when correlating recorded URLs with URLs you have configured for monitoring. For details on URL correlation, see “Correlating Collected Data with Configured Pages” in *Using End User Management*. For details on configuring URLs for monitoring, see “Real User Monitor Administration User Interface” in *Using End User Management*.

Some of the URL correlation parameters are set using the HP Real User Monitor JMX console. For details on changing URL correlation parameters via the HP Real User Monitor JMX console, see “Setting URL Correlation Parameters Via the JMX Console” on page 163.

Configuring HP Real User Monitor Aggregation

HP Real User Monitor pre-aggregates a number of the data samples it sends to HP Business Availability Center. For details on HP Business Availability Center aggregation, see “Data Aggregation” in *Reference Information*. For details on HP Real User Monitor pre-aggregation, see “Aggregating Real User Monitor Data” in *Using End User Management*.

You can change the HP Real User Monitor default aggregation periods via the JMX console. The following table shows the data sample types that are pre-aggregated by HP Real User Monitor, the JMX service in which they are configured, their attribute and parameter names, and the default aggregation time period:

Data Sample Type	JMX Console Rum.modules Service Name	Attribute in JMX Service	Parameter Name	Default Aggregation Period
Page	StatisticsMgr Conf	Properties	aggregator.definedPages.interval	300,000 milliseconds
Slow Domain			aggregator.domains.interval	300,000 milliseconds
Missing Component			aggregator.Missing Components.interval	300,000 milliseconds
Server			aggregator.Servers.interval	300,000 milliseconds
Slow Page			aggregator.SlowPages.interval	300,000 milliseconds
Page with Most Errors			aggregator.pageerrorevent.interval	300,000 milliseconds
Top Domain			aggregator.TopDomains.interval	3,600,000 milliseconds
Top Page			aggregator.TopPages.interval	3,600,000 milliseconds

Data Sample Type	JMX Console Rum.modules Service Name	Attribute in JMX Service	Parameter Name	Default Aggregation Period
Domain	SessionMgr Statistics Settings	EndUsers Aggregation Interval	N/A	300 seconds
Sessions		Application Aggregation Interval	N/A	300 seconds

To change the HP Real User Monitor default aggregation periods via the JMX console:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click the applicable service (**service=StatisticsMgrConf** or **service=SessionMgrStatisticsSettings**).
- 3 Change the aggregation period as required.
 - In the **StatisticsMgrConf** service, to change parameter values in the **Properties** attribute, enter the parameter name and the aggregation period (in milliseconds) you want to change under the commented lines (the lines beginning with #) in the format:

`attribute name=aggregation period`

For example, to change the aggregation period of the Server sample type to 10 minutes, enter:

`aggregator.Servers.interval=600000`

- ▶ In the **SessionMgrStatisticsSettings** service, enter the aggregation period (in seconds) for the attribute you want to change. For example, to change the aggregation period of the Session sample type to 10 minutes, enter 600 as the attribute value for the **ApplicationAggregationInterval** attribute.

4 Click the **Apply Changes** button to save the change.

5 Activate the change.

- ▶ In the **StatisticsMgrConf** service, click the **Invoke** button for the **deployConfiguration** operation.
- ▶ In the **SessionMgrStatisticsSettings** service, click the **Invoke** button for the **deploySettingsChanges** operation.

Note: Changing the default aggregation periods can significantly affect the amount of data sent by HP Real User Monitor to HP Business Availability Center. It is recommended not to change the default aggregation periods.

Configuring HP Real User Monitor Reporting

By default, HP Real User Monitor reports data to HP Business Availability Center for all end users, both those configured in end-user groups in End User Management Administration and those who are not configured. (For details on configuring end users in End User Management Administration, see “New/Edit End-User Group Page” in *Using End User Management*.) You can configure HP Real User Monitor to report data only for configured end users.

Note: HP Business Availability Center includes a list of predefined end-user names and domains to give meaningful names to end users in HP Real User Monitor reports. If you configure HP Real User Monitor to report data only for configured end users, data for end users in the predefined list are not reported to HP Business Availability Center. For details of HP Real User Monitor reports, see “Real User Monitor Reports User Interface” in *Using End User Management*.

To configure HP Real User Monitor to report data for configured end users only:

- 1** Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2** In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=StatisticsMgrConf**.
- 3** In the **ShouldReportUndefinedDomains** parameter, change the value to **false**.
- 4** Click the **Apply Changes** button to save the change.
- 5** Click the **Invoke** button for the **deployConfiguration** operation to activate the change.

Configuring the Samples Rate

The maximum burst rate controls the number of samples per second that the HP Real User Monitor engine can send to HP Business Availability Center. The default setting is 150. You can increase the maximum burst rate to allow more samples to be sent per second, provided that HP Business Availability Center is capable of handling the increased number. You can see the state of the flow of samples between HP Real User Monitor and HP Business Availability Center by looking at the **Publisher burst state** in Real User Monitor system health. For details on Real User Monitor system health, see “Monitoring the Health of HP Real User Monitor Components” on page 82.

To configure the maximum burst rate:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=PublisherSettings**.
- 3 In the **BurstControlMaxSamples** parameter, change the value to the maximum number of samples required.
- 4 Click the **Apply Changes** button to save the change.
- 5 Click the **Invoke** button for the **applyAttributeChanges** operation to activate the change.

Configuring the Amount of Unsent Sample Data to Store in Real User Monitor

By default, 1000 chunks of samples data are stored in HP Real User Monitor for sending to HP Business Availability Center. You can increase the number of chunks of data stored (providing you have sufficient disk space) to avoid data loss when HP Business Availability Center cannot receive data from HP Real User Monitor. For example, you might want to increase the amount of data stored by HP Real User Monitor during a planned downtime in HP Business Availability Center. Bear in mind that when a lot of data has been stored in HP Real User Monitor, it can take a long time for all of it to be sent to HP Business Availability Center, which might cause a delay in seeing real time data. If you increase the number of data chunks to store, you should reset it to the original number once HP Business Availability Center is running and all the stored data has been transmitted to it.

To increase the maximum number of data chunks stored:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).
- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=PublisherSettings**.
- 3 In the **MaxChunksInQueue** parameter, change the value to the maximum number of chunks required.
- 4 Click the **Apply Changes** button to save the change.
- 5 Click the **Invoke** button for the **applyAttributeChanges** operation to activate the change.

URL Correlation Parameters

After the HP Real User Monitor engine has been installed and started, you can configure a number of parameters to determine how the HP Real User Monitor correlates recorded URLs with Web pages you have configured for monitoring in End User Management Administration.

This section includes the following topics:

- ▶ “Setting URL Correlation Parameters Via the JMX Console” on page 163
- ▶ “Correlating Session ID Parameters” on page 165

Setting URL Correlation Parameters Via the JMX Console

You can change the default setting of a number of parameters used by HP Real User Monitor when correlating recorded URLs with URLs you have configured for monitoring. For details on URL correlation, see “Correlating Collected Data with Configured Pages” in *Using End User Management*. For details on configuring URLs for monitoring, see “Real User Monitor Administration User Interface” in *Using End User Management*.

You can configure the following parameters for URL correlation in the JMX console:

- ▶ **adaptIndexurl**. By default, HP Real User Monitor considers URLs with a suffix of **index.html** (and other suffixes that are configured in the **urlIndexStrings** parameter) to be same as the root URL. For example, **http://www.hp.com/index.html** is considered to be the same as **http://www.hp.com/**. To instruct HP Real User Monitor to consider all suffixes as being different from the root URL, change this parameter to **False**.
- ▶ **urlIndexStrings**. URL suffixes configured in this parameter are considered to be the same as the root URL, if the **adaptIndexurl** parameter is set to **True**. For example, if the suffix **index.html** is configured, then **http://www.hp.com/index.html** is considered to be the same as **http://www.hp.com/**. By default, the suffix **index.html** is configured in this parameter. To add additional suffixes, add them to the string separated by a semicolon (;). The last suffix in the string must also be followed by a semicolon. For example, **;/index.html;/index.aspx;**

Note:

- ▶ For the **urlIndexStrings** parameter to be active, the **adaptIndexurl** parameter must be set to **true**.
 - ▶ The index strings in the **urlIndexStrings** parameter are considered as being identical for all URLs. For example, if **;/index.html;** is configured in the **urlIndexStrings** parameter then **http://www.hp.com/** and **http://www.hp.com/index.html** are considered as being identical, **http://www.hp-int.com/** and **http://www.hp-int.com/index.html** are considered as being identical, and so forth.
 - ▶ Changing the **urlIndexStrings** parameter requires the HP Real User Monitor Engine Resolver to be restarted. For details, see “To restart the HP Real User Monitor Engine Resolver:” on page 165.
-

- ▶ **adaptCaseSensitive.** By default, HP Real User Monitor URL correlation is case-insensitive, so that a recorded URL such as **http://www.hp.com/rumEnginePage.html** is correlated with the configured URL **http://www.hp.com/rumenginepage.html**. To instruct HP Real User Monitor to use case-sensitive URL correlation (for all but the host and protocol parts of a URL), you set this parameter to **False**.
- ▶ **basicAuthentication.** By default, HP Real User Monitor ignores basic authentication when performing URL correlation. For example, the recorded URL **http://bob:my_password@www.hp.com** is correlated with the configured URL **http://www.hp.com**. To instruct the HP Real User Monitor to consider basic authentication when performing URL correlation, you set this parameter to **False**.

To change the default setting of a URL correlation parameter in the JMX console:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=ResolverURLMConfig**.
- 3 In the relevant parameter, change the setting to the required value.
- 4 Click the **Apply Changes** button.

To restart the HP Real User Monitor Engine Resolver:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

http://<HP Real User Monitor engine machine name>:8180/jmx-console

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=Resolver**.
- 3 Scroll down to the **restart** operation and click **Invoke**.

Correlating Session ID Parameters

You can configure specific parameters in recorded URLs to be ignored by HP Real User Monitor when correlating recorded URLs with URLs you have configured for monitoring in End User Management Administration. For details on URL correlation, see “Correlating Collected Data with Configured Pages” in *Using End User Management*. For details on configuring URLs for monitoring, see “Real User Monitor Administration User Interface” in *Using End User Management*.

If you set a parameter to be ignored by HP Real User Monitor, and the parameter is included in a recorded URL, the HP Real User Monitor replaces the contents of that parameter with an asterisk (*). For example, if you set HP Real User Monitor to ignore the **BV_SessionID** and **BV_EngineID** parameters in the following URL:

```
http://www.hp.com/~anand/Ticket_Confirm.jsp?BV_SessionID=@@@@1812057630.1043567934@@@@&BV_EngineID=cccdadchgidfmlmcefecehidfhdfk.0&value=0000144976
```

The URL is translated as follows:

```
http://www.hp.com/~anand/Ticket_Confirm.jsp?BV_SessionID=*&BV_EngineID=*&value=0000144976
```

The parameters to be ignored are defined per application server.

To configure session ID parameters to be ignored:

- 1** Open the `<HP Real User Monitor root directory>\conf\configurationmanager\Application_Server_Types_configuration.xml` file in a text editor.
- 2** Locate the application server type for which you are configuring the parameters to be ignored. This appears in the format `<AppServer name="app_server_name">`, where `app_server_name` is the name of the application server type. For example, for a Broadvision application server, the entry is:

```
<AppServer name="BroadVision">
```
- 3** Under the application server name, in the section beginning with the `<DiscardParameters>` tag, is a list of the most common session ID parameters for that application server. You can add and delete parameters to create a list of all the parameters you want HP Real User Monitor to ignore during correlation. Parameters are entered in the format `<parameter>parameter_name</parameter>`, where `parameter_name` is the name of the parameter. For example, for a parameter called `BV_EngineID`, the entry is.

```
<parameter>BV_EngineID</parameter>
```

- 4 If you want HP Real User Monitor to consider the parameters you enter as a regular expression instead of a string (which is the default), you add **type="regEx"** to the **<DiscardParameters>** tag. For example, **<DiscardParameters type="regEx">**
- 5 Under the application server name, in the line:
<attribute name="enabled">false</attribute>
change **false** to **true**.
- 6 Save the file and exit the editor.

Configuring Meaningful Page Names

You can configure HP Real User Monitor to change the URLs of recorded pages that are not configured in End User Management Administration to more meaningful names for use in HP Real User Monitor reports. For information on configuring pages for monitoring, see “New/Edit Page” in *Using End User Management*. For information on HP Real User Monitor reports, see “Real User Monitor Reports User Interface” in *Using End User Management*.

This section includes the following topics:

- “About Meaningful Page Names” on page 168
- “Formatting Tags” on page 169
- “Rules Tags” on page 179
- “Sample XML File” on page 183
- “Validating Meaningful Name XML Files” on page 190
- “Adding and Deleting Meaningful Name XML Files” on page 191
- “Changing Meaningful Name XML Files” on page 192
- “Viewing Meaningful Page Statistics” on page 192

About Meaningful Page Names

For each application configured in End User Management Administration, you can create an XML file to be used to give meaningful names to pages that are recorded as part of the application, but that are not configured as pages in End User Management Administration. For information on configuring applications for monitoring, see “New/Edit Web or SOAP Application Page” in *Using End User Management*. For information on configuring pages for monitoring, see “New/Edit Page” in *Using End User Management*.

If an XML file has been created and an application linked to it, when a page that is not configured in End User Management Administration is recorded as part of the application, the page’s URL is compared to the rules in the XML file. If matches are found, the page is given a new name for use in HP Real User Monitor reports. If no matches are found, or if no XML file has been created and linked to the application, the page’s URL as recorded is used in HP Real User Monitor reports. For information on HP Real User Monitor reports, see “Real User Monitor Reports User Interface” in *Using End User Management*.

The XML file must be created in the **\<HP Real User Monitor root directory>\conf\resolver\meaningful_pages** directory on the HP Real User Monitor engine machine. For convenience, it is recommended that the file name is the same as the application name. For example, an XML file created for an application called **myapplication** is:

```
\<HP Real User Monitor root directory>\conf\resolver\meaningful_pages\  
myapplication.xml
```

Note: HP Real User Monitor includes two default XML files for the PeopleSoft 8.1 and Siebel 7.5 applications.

The XML file contains the following main sections:

- **Formatting.** Contains the formatting commands for changing a URL into a meaningful name.
- **Rules.** Contains the rules that determine whether or not a page's URL is changed to a meaningful name.

Tip: It is recommended to create the rules before the formats.

Formatting Tags

The first main section in the XML file is the formatting section, which contains the XML tags that are used to format parts of a page's URL, which are then used to create a meaningful name for the page.

Note: All parts of a page's URL are converted by HP Real User Monitor to lower case for matching and formatting.

The following formatting tags can be used. For the XML schema to be validated (for details, see "Validating Meaningful Name XML Files" on page 190), the tags must appear in the XML file in the order in which they are listed below:

URLDecoder

The URLDecoder tag is used to decode a source string using a specified decoder.

Syntax	<URLDecoder Name=" Command_Name " EncodingScheme=" Scheme "/>
Explanation	Command_Name. The name of the Substring formatting tag that can be used in Rule tags. Scheme. The decoding scheme to be used.

Example	<pre><URLDecoder Name="DecodeUTF-8" EncodingScheme="UTF-8"/></pre> <p>When the DecodeUTF-8 formatting command is referenced in a rule, the string is decoded using the UTF-8 decoding scheme.</p>
Note	<p>If the URLDeocder tag is used, but no encoding scheme is specified, the UTF-8 scheme is used by default.</p>

Rename

The Rename tag is used to replace the entire contents of a source string.

Syntax	<pre><Rename Name="Command_Name" NewName="Rename_String"/></pre>
Explanation	<p>Command_Name. The name of the Rename formatting tag that can be used in Rule tags.</p> <p>Rename_String. The string to be substituted for the source string.</p>
Example	<pre><Rename Name="RenameToABC123" String="HP"</pre> <p>When the RenameToABC123 formatting command is referenced in a rule, the entire source string is renamed to HP.</p>

Substring

The Substring tag is used to extract a sub string from the source string.

Syntax	<SubString Name=" Command_Name " BeginIndex=" Start_Char_Index " Count=" Length "/>
Explanation	<p>Command_Name. The name of the Substring formatting tag that can be used in Rule tags.</p> <p>Start_Char_Index. The position in the source string of the starting character of the substring to be extracted. The first position in the source string is the zero index.</p> <p>Length. The number of characters from the Start_Char to be extracted. If the number used is greater than the number of characters from the Start_Char to the end of the source string, the entire string from the Start_Char to the end of the source string is extracted.</p>
Example	<p><Substring Name="ExtractTenToTwelve" BeginIndex="10" Count="3"/></p> <p>When the ExtractTenToTwelve formatting command is referenced in a rule, the tenth, eleventh, and twelfth characters of the source string are extracted.</p>

ExtractStrToStr

The ExtractStrToStr tag is used to extract a string between two given strings from the source string.

Syntax	<ExtractStrToStr Name=" Command_Name " fromString=" Start_String " fromInclude=" Include_Start_String " fromOccurrences=" Occurrences_Start_String " toString=" End_String " toInclude=" Include_End_String " toOccurrences=" Occurrences_End_String "/>
---------------	---

<p>Explanation</p>	<p>Command_Name. The name of the ExtractStrToStr formatting tag that can be used in Rule tags.</p> <p>Start_String. The starting string from which the required string is to be extracted.</p> <p>Include_Start_String. Whether to include the starting string as part of the extracted string. Valid options are:</p> <ul style="list-style-type: none"> ▶ True. Include the starting string as part of the extracted string. This is the default used if nothing is specified. ▶ False. Do not include the starting string as part of the extracted string. <p>Occurrences_Start_String. The occurrence number of the starting string at which to start the extraction of the required string. Valid options are 1-100 or last.</p> <p>End_String. The ending string up to which the required string is to be extracted.</p> <p>Include_End_String. Whether to include the ending string as part of the extracted string. Valid options are:</p> <ul style="list-style-type: none"> ▶ True. Include the ending string as part of the extracted string. This is the default used if nothing is specified. ▶ False. Do not include the ending string as part of the extracted string. <p>Occurrences_End_String. The occurrence number of the ending string at which to end the extraction of the required string. Valid options are 1-100 or last.</p>
<p>Example</p>	<pre><ExtractStrToStr Name="ExtractBetweenABCandXYZ" fromString="ABC" fromInclude="true" fromOccurrences="2" toString="XYZ" toInclude="false" toOccurrences="1"/></pre> <p>When the ExtractBetweenABCandXYZ formatting command is referenced in a rule, the string between the second occurrence of ABC and the first occurrence of XYZ in the source string is extracted. The starting string of ABC is also included at the beginning of the extracted string.</p>

ExtractIndexToStr

The ExtractIndexToStr tag is used to extract a string between a given starting position and a given ending string in the source string.

Syntax	<pre><ExtractIndexToStr Name="Command_Name" fromIndex="Start_Char_Index" toString="End_String" toInclude="Include_End_String" toOccurrences="Occurrences_End_String"/></pre>
Explanation	<p>Command_Name. The name of the ExtractIndexToStr formatting tag that can be used in Rule tags.</p> <p>Start_Char_Index. The character number from which to start extracting the required string. The first position in the source string is the zero index.</p> <p>End_String. The ending string up to which the required string is to be extracted.</p> <p>Include_End_String. Whether to include the ending string as part of the extracted string. Valid options are:</p> <ul style="list-style-type: none"> ▶ True. Include the ending string as part of the extracted string. This is the default used if nothing is specified. ▶ False. Do not include the ending string as part of the extracted string. <p>Occurrences_End_String. The occurrence number of the ending string at which to end the extraction of the required string. Valid options are 1-100 or last.</p>
Example	<pre><ExtractIndexToStr Name="ExtractBetween3andXYZ" fromIndex="3" toString="XYZ" toInclude="false" toOccurrences="1"/></pre> <p>When the ExtractBetween3andXYZ formatting command is referenced in a rule, the string between the third index of the source string and the first occurrence of XYZ in the source string is extracted.</p>

ExtractStrToCount

The ExtractStrToCount tag is used to extract a string of a specified number of characters starting at a given string in the source string.

<p>Syntax</p>	<pre><ExtractStrToCount Name="Command_Name" fromString="Start_String" fromInclude="Include_Start_String" fromOccurrences="Occurrences_Start_String" count="Length" /></pre>
<p>Explanation</p>	<p>Command_Name. The name of the ExtractStrToCount formatting tag that can be used in Rule tags.</p> <p>Start_String. The starting string from which the required string is to be extracted.</p> <p>Include_Start_String. Whether to include the starting string as part of the extracted string. Valid options are:</p> <ul style="list-style-type: none"> ▶ True. Include the starting string as part of the extracted string. This is the default used if nothing is specified. ▶ False. Do not include the starting string as part of the extracted string. <p>Occurrences_Start_String. The occurrence number of the starting string at which to start the extraction of the required string. Valid options are 1-100 or last.</p> <p>Length. The number of characters from the Start_String to be extracted. If the number used is greater than the number of characters from the Start_String to the end of the source string, the entire string from the Start_String to the end of the source string is extracted.</p>
<p>Example</p>	<pre><ExtractStrToCount Name="ExtractBetweenABCfor5" fromString="ABC" fromInclude="false" fromOccurrences="1" count="5"/></pre> <p>When the ExtractBetweenABCfor5 formatting command is referenced in a rule, a string comprising the five characters after the first occurrence of the string ABC in the source string is extracted.</p>

Insert

The Insert tag is used to insert a string into a source string at a specified position.

Syntax	<pre><Insert Name="Command_Name" String="Insert_String" ToIndex="Start_Char_Index" CountFromBeginning="Direction"/></pre>
Explanation	<p>Command_Name. The name of the Insert formatting tag that can be used in Rule tags.</p> <p>Insert_String. The string to be inserted in the source string.</p> <p>Start_Char_Index. The character number at which to insert the Insert_String in the source string. The first position in the source string is the zero index.</p> <p>Direction. Whether to start counting the Start_Char index position from the start of the source string (that is, from left to right) or from the end of the source string (that is, from right to left). The valid options are:</p> <ul style="list-style-type: none"> ➤ True. Start counting the Start_Char index position from the start of the source string (that is, from left to right). This is the default used if no direction is specified. ➤ False. Start counting the Start_Char index position from the end of the source string (that is, from right to left).
Example	<pre><Insert Name="InsertABCAfterOrder" String="ABC" ToIndex="5"/></pre> <p>When the InsertABCAfterOrder formatting command is referenced in a rule, the string ABC is inserted in the source string, starting at the fifth index (that is, the letter A becomes the fifth character in the source string).</p>

ChangeCase

The ChangeCase tag is used to change the case of a string.

Syntax	<ChangeCase Name=" Command_Name " Type=" Case_Type " BeginIndex=" Start_Char_Index " Count=" Length "/>
Explanation	<p>Command_Name. The name of the ChangeCase formatting tag that can be used in Rule tags.</p> <p>Case_Type. The type of conversion to be carried out. The valid options are:</p> <ul style="list-style-type: none"> ➤ UpperCase. Lower case to upper case. This is the default if no type is specified. ➤ LowerCase. Upper case to lower case. ➤ OppositeCase. Switches the case of characters. <p>Start_Char_Index. The position in the source string of the starting character to be converted. The first position in the source string is the zero index.</p> <p>Length. The number of characters from the Start_Char to be converted.</p>
Example	<pre><ChangeCase Name="UpperCaseFirstChar" Type="UpperCase" BeginIndex="0" Count="1"/></pre> <p>When the UpperCaseFirstChar formatting command is referenced in a rule, the first character of the source string is converted to upper case.</p>
Note	If Length is not specified, the ChangeCase conversion is carried out from the Start_Char to the end of the source string.

Remove

The Remove tag is used to remove all occurrences of a specified string from a source string.

Syntax	<Remove Name=" Command_Name " String=" Remove_String "/>
Explanation	Command_Name. The name of the Remove formatting tag that can be used in Rule tags. Remove_String. The string to be removed from the source string.
Example	<Remove Name="Removeabc" String="abc"/> When the Removeabc formatting command is referenced in a rule, the string abc is removed from the source string.

RemoveNonAlpha

The RemoveNonAlpha tag is used to remove all non-alpha characters from a source string.

Syntax	<RemoveNonAlpha Name=" Command_Name ">
Explanation	Command_Name. The name of the RemoveNonAlpha formatting tag that can be used in Rule tags.
Example	<Remove Name="RemoveAllNonAlpha"/> When the RemoveAllNonAlpha formatting command is referenced in a rule, all non-alpha characters are removed from the source string.

Replace

The Replace tag is used to replace all occurrences of a sub string within a source string.

Syntax	<Replace Name=" Command_Name " Old=" Old_String " New=" New_String "/>
Explanation	<p>Command_Name. The name of the Replace formatting tag that can be used in Rule tags.</p> <p>Old_String. The sub string within the source string to be replaced.</p> <p>New_String. The string that replaces Old_String.</p>
Example	<p><Replace Name="ReplaceabcWithXYZ" Old="abc" New="XYZ"/></p> <p>When the ReplaceabcWithXYZ formatting command is referenced in a rule, all occurrences of abc in the source string are replaced with XYZ.</p>

Alias

The Alias tag is used to replace all occurrences of an alphanumeric sub string within a string with an assigned alias.

Syntax	<pre><Alias Name="Command_Name"> <Pair Name="Source_String" Alias="Assigned_Alias"/> </Alias></pre>
Explanation	<p>Command_Name. The name of the Alias formatting tag that can be used in Rule tags.</p> <p>Source_String. The alphanumeric string to which you are assigning an alias.</p> <p>Assigned_Alias. The alias you are assigning to replace the Source_String.</p>
Example	<pre><Alias Name="RelateLettersToCategory"> <Pair Name="fi" Alias="Fish"/> </Alias></pre> <p>When the RelateLettersToCategory formatting command is referenced in a rule, all occurrences of the string fi are replaced with the alias Fish.</p>
Note	<p>You can include multiple Pair tags within the same Alias tag. Each Alias replacement is carried out on the output string from the previous Alias replacement – that is, there is only one output string at the end.</p>

Rules Tags

The second main section in the XML file is the rules section, which contains the logic for assigning a meaningful name to a page. The rules section is responsible for matching a page to a single rule and then using the formatting tags included in the rule to assign a meaningful name to the page. Matching is carried out on the different parts of the URL – URL protocol, URL path, URL host, and parameters (both the GET and POST parameters of a page).

Rules are prioritized, so that if a page's URL matches more than one rule, the rule that has the highest priority is the single rule that is applied to the page.

The rules section uses a default string delimiter of a space (" "), but you can specify a different delimiter by including it in the **Rules** tag that begins the rules section. For example, to set a default delimiter of a right, square bracket:

```
<Rules DefaultDelimiter="]">
```

Individual rules can use a different delimiter than the general default, if specified within the specific rule.

Rules are written in the following format:

```
<Rule Priority="Priority" Name="Rule_Name">
  <Path Name="URL_Path">
  <Host Name="URL_Host">
  <Protocol Type="URL_Protocol">
  <Parameters>
    <Param Key="Param_Name" Value="Param_Value">
      <Formatter Index="Index_Number">Format_Name1</Formatter>
      <Formatter Index="Index_Number">Format_Name2
Format_Name3</Formatter>
      <Formatter Index="Index_Number"></Formatter>
    </Param>
  </Parameters>
</Rule>
```

where:

- **Priority.** The priority in which the rule should be applied. If more than one rule matches the source string, the rule with the highest priority is the one that is applied. 0 is the highest priority, 1 is the second, and so forth.

If more than one rule has the same priority, the last one that appears in the XML file is the rule that is applied.

Tip: When assigning priorities to rules, you can use increments greater than 1. For example, you can assign priorities of 10, 20, 30, and so forth. This allows flexibility for inserting new rules at a later time.

- **Rule_Name.** The name of the rule.
- **URL_Path.** The URL path that is required for the rule to be applied.
- **URL_Host.** The URL host that is required for the rule to be applied. This option does not support the use of a wildcard.
- **URL_Protocol.** The URL protocol that is required for the rule to be applied. This option does not support the use of a wildcard.
- **Param_Name.** The key (name) of a parameter in the URL that is required for the rule to be applied.
- **Param_Value.** The value in the Param_Name parameter that is required for the rule to be applied. Use "" to denote an empty parameter value.
- **Index_Number.** The position that the formatted string occupies in the meaningful name to be created.
- **Format_Name.** The name of the format to be used on the selected string to format it into a string that is used as part of the created meaningful name for a page. The format name must be one of the formats defined in the formatting section of the XML file (for details, see “Formatting Tags” on page 169). If no format name is specified, no formatting is applied to the input string, resulting in an identical output string that is used as part of the created meaningful name for a page.

Note: URL_Path, URL_Host, URL_Protocol, Param_Name, and Param_Value are always in lower case.

The following points apply to rules:

- Not all parts of a rule need to exist, but at least one rule should be defined and it should contain a **Formatter** tag.
- If a **Formatter** tag is placed directly under a **Param** tag, the formatting is carried out on the parameter value. If a **Formatter** tag is placed directly under a **Path** tag, the formatting is carried out on the URL path.

- ▶ If an asterisk (*) or question mark (?) character is included in a URL path, parameter name, or parameter value, you can specify whether to treat the character as a literal (that is, purely as an asterisk or question mark), or to treat it as a wildcard character. By default, the character is treated as a literal. To treat the character as a wildcard character, you add the setting **CompareMethod="Wildcard"** at the end of the rule tag in which the character appears. For example:

```
<Param Key="myparam" Value="*" CompareMethod="Wildcard">
```

To use an asterisk or question mark character as a literal within a wildcard value, precede the character with a backslash (\). For example, the wildcard value **my*str*** matches the value **my*str123**, but does not match the value **my123str123**.

Note:

- ▶ The asterisk wildcard represents any combination of characters, whereas the question mark wildcard represents a single character only.
 - ▶ Using the wildcard comparison on page parameters creates significant overhead on the HP Real User Monitor engine and should be used only when absolutely necessary.
-
- ▶ You can apply multiple format names to a Path or Param tag. If the format names are placed in individual Formatter tags one under the other, each format name is applied to the original path or parameter value and each format name produces its own output for inclusion in the meaningful name. If the format names are included in the same Formatter tag, each format name is applied to the resulting value from the previous format name and only one result is created for inclusion in the meaningful name.

Example of multiple formatting commands in separate Formatter tags:

```
<Path Name="/mypath/home">  
  <Formatter Index="1">Format_Name1</Formatter>  
  <Formatter Index="2">Format_Name2</Formatter>  
  <Formatter Index="3">Format_Name3</Formatter>  
</Path>
```

Each of the format names is applied to the path **/mypath/home**.

Example of multiple formatting commands in the same Formatter tag:

```
<Path Name="/mypath/home">
  <Formatter Index="1">Format_Name1 Format_Name2</Formatter>
</Path>
```

Format_Name1 is applied to the path **/mypath/home**; Format_Name2 is applied to the output from Format_Name1.

Sample XML File

The following examples show an XML file with formatting and rule tags defined, and various examples of URLs and the meaningful names created for them based on the formatting and rule tags in the sample XML file.

XML File

```
<?xml version="1.0"?>
<Meaningful_Pages xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="./meaningfulpages.xsd">
  <Formatting>
    <Rename Name="RenameToWelcome" NewName="Welcome"/>
    <Rename Name="RenameToSignIn" NewName="Sign In"/>
    <Rename Name="RenameToStoreEntrance" NewName="Store Entrance"/>
    <Rename Name="RenameToEditAccount" NewName="Edit Account"/>
    <Rename Name="RenameToProduct" NewName="Product"/>
    <Rename Name="RenameToCheckOut" NewName="Check Out"/>
    <Rename Name="RenameToOrderSubmitted" NewName="Order
Submitted"/>
    <Rename Name="RenameToSignOut" NewName="Signed Out"/>
    <SubString Name="ExtractTwoFirstLetters" BeginIndex="0" Count="2"/>
    <SubString Name="ExtractItem" BeginIndex="20" Count="4"/>
    <SubString Name="ExtractUpdate" BeginIndex="16" Count="6"/>
    <SubString Name="ExtractCart" BeginIndex="22" Count="4"/>
    <SubString Name="ExtractQuantities" BeginIndex="26" Count="10"/>
    <Insert Name="AppendCategory" String="Category " ToIndex="0"/>
    <Insert Name="AppendAddItemPrefix" String="Add Item " ToIndex="0"/>
    <Insert Name="AppendToCartSuffix" String=" to Cart" ToIndex="0"
CountFromBeginning="false"/>
```

```

    <Insert Name="AppendRemoveItemPrefix" String="Remove Item "
ToIndex="0"/>
    <Insert Name="AppendFromCartSuffix" String=" from Cart" ToIndex="0"
CountFromBeginning="false"/>
    <Insert Name="InsertSpaceAfterOrder" String=" " ToIndex="5"/>
    <Insert Name="InsertSpaceAfterConfirm" String=" " ToIndex="7"/>
    <Insert Name="InsertNotAfterOrder" String="Not " ToIndex="6"/>
    <ChangeCase Name="UpperCaseFirstChar" Type="UpperCase"
BeginIndex="0" Count="1"/>
    <ChangeCase Name="UpperCaseAll" Type="UpperCase"
BeginIndex="0"/>
    <ChangeCase Name="UpperCaseSixthLetter" Type="UpperCase"
BeginIndex="6" Count="1"/>
    <ChangeCase Name="UpperCaseEighthLetter" Type="UpperCase"
BeginIndex="8" Count="1"/>
    <Remove Name="RemoveNew" String="/jpetstore/shop/new"/>
    <Remove Name="RemoveSHTML" String=".shtml"/>
    <Replace Name="ReplaceNewWithConfirm" Old="/jpetstore/shop/new"
New="Confirm"/>
    <Alias Name="RelateLettersToCategory">
        <Pair Name="FI" Alias="Fish"/>
        <Pair Name="K9" Alias="Dogs"/>
        <Pair Name="RP" Alias="Reptiles"/>
        <Pair Name="FL" Alias="Cats"/>
        <Pair Name="AV" Alias="Birds"/>
    </Alias>
    <Alias Name="RelateProductIdToProductName">
        <Pair Name="FI-FW-01" Alias=""Koi""/>
        <Pair Name="FI-FW-02" Alias=""Goldfish""/>
        <Pair Name="FI-SW-01" Alias=""Angelfish""/>
        <Pair Name="FI-SW-02" Alias=""Tiger Shark""/>
        <Pair Name="K9-BD-01" Alias=""Bulldog""/>
        <Pair Name="K9-CW-01" Alias=""Chihuahua""/>
        <Pair Name="K9-DL-01" Alias=""Dalmation""/>
        <Pair Name="K9-PO-02" Alias=""Poodle""/>
        <Pair Name="K9-RT-01" Alias=""Golden Retriever""/>
        <Pair Name="K9-RT-02" Alias=""Labrador Retriever""/>
        <Pair Name="RP-LI-02" Alias=""Iguana""/>
        <Pair Name="RP-SN-01" Alias=""Rattlesnake""/>

```



```

<Pair Name="FL-DLH-02" Alias=""Persian""/>
<Pair Name="FL-DSH-01" Alias=""Manx""/>
<Pair Name="AV-CB-01" Alias=""Amazon Parrot""/>
<Pair Name="AV-SB-02" Alias=""Finch""/>
</Alias>
<Alias Name="RelateItemNameToItemDesc">
  <Pair Name="EST-28" Alias=""Adult Female Golden Retriever""/>
  <Pair Name="EST-27" Alias=""Adult Female Chihuahua""/>
  <Pair Name="EST-26" Alias=""Adult Male Chihuahua""/>
  <Pair Name="EST-25" Alias=""Adult Female Labrador Retriever""/>
  <Pair Name="EST-24" Alias=""Adult Male Labrador Retriever""/>
  <Pair Name="EST-23" Alias=""Adult Female Labrador Retriever""/>
  <Pair Name="EST-22" Alias=""Adult Male Labrador Retriever""/>
  <Pair Name="EST-21" Alias=""Adult Female Goldfish""/>
  <Pair Name="EST-20" Alias=""Adult Male Goldfish""/>
  <Pair Name="EST-19" Alias=""Adult Male Finch""/>
  <Pair Name="EST-18" Alias=""Adult Male Amazon Parrot""/>
  <Pair Name="EST-17" Alias=""Adult Male Persian""/>
  <Pair Name="EST-16" Alias=""Adult Female Persian""/>
  <Pair Name="EST-15" Alias=""With tail Manx""/>
  <Pair Name="EST-14" Alias=""Tailless Manx""/>
  <Pair Name="EST-13" Alias=""Green Adult Iguana""/>
  <Pair Name="EST-12" Alias=""Rattleless Rattlesnake""/>
  <Pair Name="EST-11" Alias=""Venomless Rattlesnake""/>
  <Pair Name="EST-10" Alias=""Spotted Adult Female Dalmation""/>
  <Pair Name="EST-9" Alias=""Spotless Male Puppy Dalmation""/>
  <Pair Name="EST-8" Alias=""Male Puppy Poodle""/>
  <Pair Name="EST-7" Alias=""Female Puppy Bulldog""/>
  <Pair Name="EST-6" Alias=""Male Adult Bulldog""/>
  <Pair Name="EST-5" Alias=""Spotless Koi""/>
  <Pair Name="EST-4" Alias=""Spotted Koi""/>
  <Pair Name="EST-3" Alias=""Toothless Tiger Shark""/>
  <Pair Name="EST-2" Alias=""Small Angelfish""/>
  <Pair Name="EST-1" Alias=""Large Angelfish""/>
</Alias>
</Formating>
<Rules DefaultDelimiter=" ">
  <Rule Priority="0" Name="Welcome">
    <Path Name="/jpetstore/">

```

```

        <Formatter Index="1">RenameToWelcome</Formatter>
    </Path>
</Rule>
<Rule Priority="1" Name="Welcome">
    <Path Name="/jpetstore/index.html">
        <Formatter Index="1">RenameToWelcome</Formatter>
    </Path>
</Rule>
<Rule Priority="2" Name="Sign In">
    <Path Name="/jpetstore/shop/signonForm.shtml">
        <Formatter Index="1">RenameToSignIn</Formatter>
    </Path>
</Rule>
<Rule Priority="3" Name="Store Entrance">
    <Path Name="/jpetstore/shop/signon.shtml">
        <Formatter Index="1">RenameToStoreEntrance</Formatter>
    </Path>
</Rule>
<Rule Priority="4" Name="Category [any]">
    <Path Name="/jpetstore/shop/viewCategory.shtml"/>
    <Parameters>
        <Param Key="categoryId" Value="*" CompareMethod="WildCard">
            <Formatter Index="1">UpperCaseAll AppendCategory</Formatter>
        </Param>
    </Parameters>
</Rule>
<Rule Priority="5" Name="Edit Account">
    <Path Name="/jpetstore/shop/editAccountForm.shtml">
        <Formatter Index="1">RenameToEditAccount</Formatter>
    </Path>
</Rule>
<Rule Priority="6" Name="Any Product [product]">
    <Path Name="/jpetstore/shop/v*Product.shtml"
CompareMethod="WildCard"/>
    <Parameters>
        <Param Key="productId" Value="*" CompareMethod="WildCard">
            <Formatter Index="1">ExtractTwoFirstLetters
RelateLettersToCategory</Formatter>
            <Formatter Index="2">RenameToProduct</Formatter>
            <Formatter Index="3">RelateProductIdToProductName</Formatter>
        </Param>
    </Parameters>
</Rule>

```

```

        </Param>
    </Parameters>
</Rule>
<Rule Priority="7" Name="Item [any]">
    <Path Name="/jpetstore/shop/viewItem.shtml">
        <Formatter Index="1">ExtractItem UpperCaseFirstChar</Formatter>
    </Path>
    <Parameters>
        <Param Key="itemId" Value="" CompareMethod="WildCard">
            <Formatter Index="2">RelateItemNameToItemDesc</Formatter>
        </Param>
    </Parameters>
</Rule>
<Rule Priority="8" Name="Add Item [any] To Cart">
    <Path Name="/jpetstore/shop/addItemToCart.shtml"/>
    <Parameters>
        <Param Key="workingItemId" Value="" CompareMethod="WildCard">
            <Formatter Index="1">RelateItemNameToItemDesc
AppendAddItemPrefix AppendToCartSuffix</Formatter>
        </Param>
    </Parameters>
</Rule>
<Rule Priority="9" Name="Update Cart">
    <Path Name="/jpetstore/shop/updateCartQuantities.shtml">
        <Formatter Index="1">ExtractUpdate
UpperCaseFirstChar</Formatter>
        <Formatter Index="2">ExtractCart UpperCaseFirstChar</Formatter>
        <Formatter Index="3">ExtractQuantities
UpperCaseFirstChar</Formatter>
    </Path>
</Rule>
<Rule Priority="10" Name="Remove Item [any] From Cart">
    <Path Name="/jpetstore/shop/removeItemFromCart.shtml"/>
    <Parameters>
        <Param Key="workingItemId" Value="" CompareMethod="WildCard">
            <Formatter Index="1">RelateItemNameToItemDesc
AppendRemoveItemPrefix AppendFromCartSuffix</Formatter>
        </Param>
    </Parameters>
</Rule>
<Rule Priority="11" Name="Check Out">
    <Path Name="/jpetstore/shop/checkout.shtml">

```

```

        <Formatter Index="1">RenameToCheckOut</Formatter>
    </Path>
</Rule>
<Rule Priority="12" Name="Order Form">
    <Path Name="/jpetstore/shop/newOrderForm.shtml">
        <Formatter Index="1">RemoveNew InsertSpaceAfterOrder
RemoveSHTML UpperCaseFirstChar UpperCaseSixthLetter</Formatter>
    </Path>
</Rule>
<Rule Priority="13" Name="Order Submitted">
    <Path Name="/jpetstore/shop/newOrder.shtml">
        <Formatter Index="1">RenameToOrderSubmitted</Formatter>
    </Path>
    <Parameters>
        <Param Key="confirmed" Value="true"/>
    </Parameters>
</Rule>
<Rule Priority="14" Name="Order Not Submitted">
    <Path Name="/jpetstore/shop/newOrder.shtml">
        <Formatter Index="1">RenameToOrderSubmitted
InsertNotAfterOrder</Formatter>
    </Path>
    <Parameters>
        <Param Key="confirmed" Value="false"/>
    </Parameters>
</Rule>
<Rule Priority="15" Name="Confirm Order">
    <Path Name="/jpetstore/shop/newOrder.shtml">
        <Formatter Index="1">ReplaceNewWithConfirm
InsertSpaceAfterConfirm RemoveSHTML UpperCaseEighthLetter</Formatter>
    </Path>
</Rule>
<Rule Priority="16" Name="Sign Out">
    <Path Name="/jpetstore/shop/signoff.shtml">
        <Formatter Index="1">RenameToSignOut</Formatter>
    </Path>
</Rule>
</Rules>
</Meaningful_Pages>

```

Examples of Meaningful Names for URLs

URL	Meaningful Name
http://pluto:8080/jpetstore/	Welcome
http://pluto:8080/jpetstore/index.html	Welcome
http://pluto:8080/jpetstore/shop/signonForm.shtml	Sign In
http://pluto:8080/jpetstore/shop/signon.shtml	Store Entrance
http://pluto:8080/jpetstore/shop/viewCategory.shtml?categoryId=CATS	Category CATS
http://pluto:8080/jpetstore/shop/editAccountForm.shtml	Edit Account
http://pluto:8080/jpetstore/shop/viewProduct.shtml?productId=FI-FW-01	Fish Product 'Koi' (FI=Fish, K9=Dogs, RP=Reptiles, FL=Cats, AV=Birds)
http://pluto:8080/jpetstore/shop/viewItem.shtml?itemId=EST-4	Item 'Spotted Koi'
http://pluto:8080/jpetstore/shop/addItemToCart.shtml?workingItemId=EST-6	Add Item 'Male Adult Bulldog' to Cart
http://pluto:8080/jpetstore/shop/updateCartQuantities.shtml	Update Cart Quantities
http://pluto:8080/jpetstore/shop/removeItemFromCart.shtml?workingItemId=EST-6	Remove Item 'Male Adult Bulldog' from Cart
http://pluto:8080/jpetstore/shop/checkout.shtml	Check Out
http://pluto:8080/jpetstore/shop/newOrderForm.shtml	Order Form
http://pluto:8080/jpetstore/shop/newOrder.shtml	Confirm Order

URL	Meaningful Name
http://pluto:8080/jpetstore/shop/newOrder.shtml?confirmed=true	Order Submitted
http://pluto:8080/jpetstore/shop/newOrder.shtml?confirmed=false	Order Not Submitted
http://pluto:8080/jpetstore/shop/signoff.shtml	Signed Out

Validating Meaningful Name XML Files

You can validate a meaningful name XML file against a predefined XML schema to ensure that the structure and format of the file are valid. The validation is made using the xerces-j 2.8.0 XML parser.

The schema file against which the XML file is validated is:

```
\<HP Real User Monitor root directory>\conf\resolver\
meaningfulpages.xsd
```

To validate a meaningful XML file:

- 1 Insert the following line at the beginning of the XML file:

```
<Meaningful_Pages xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:noNamespaceSchemaLocation="./meaningfulpages.xsd"
```

Note: If this line is omitted from the XML file and the validation is run, a message that the validation was successful is displayed, but no validation is actually done.

- 2 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

```
http://<HP Real User Monitor engine machine name>:8180/jmx-console
```

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 3 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=ResolverMeaningfulPagesConfig**.
- 4 In the **validateConfiguration** option, enter the full name of the XML file you want to validate and click **Invoke**. The XML file is validated against the predefined schema file.
- 5 Any errors encountered are displayed, or a message that the validation was successful is displayed.

Note: The Formatting tags must be included in the XML file in a specific order (for details, see “Formatting Tags” on page 169). If the Formatting tags are not in the correct order, a validation error message is displayed, but no indication of the order mismatch is given.

Adding and Deleting Meaningful Name XML Files

If you add or delete a meaningful name XML file in an application in End User Management Administration and would like to apply the change immediately, you can force HP Real User Monitor to reread the End User Management Administration configuration. For information on configuring applications for monitoring, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.

To force HP Real User Monitor to reread the End User Management Administration configuration:

- 1 Access the HP Real User Monitor Web console (for details, see “Accessing the HP Real User Monitor Engine Web Console” on page 77).
- 2 From the **Configuration** menu, select **Engine Configuration Per Data Type**. The Engine Configuration Page opens.
- 3 Click the **Sync All Configuration** button to force the HP Real User Monitor engine to reload the HP Real User Monitor configuration from HP Business Availability Center.

Changing Meaningful Name XML Files

If you change the content of an existing meaningful page XML file that is used by an application, you must force HP Real User Monitor to reload the configuration for the specific application. For information on configuring applications for monitoring, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.

To force HP Real User Monitor to reload the configuration for an application:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

http://<HP Real User Monitor engine machine name>:8180/jmx-console

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).
- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=ResolverMeaningfulPagesConfig**.
- 3 In the **reloadConfiguration** option, enter the application name (as defined in End User Management Administration) by which the XML file is being used and click **Invoke**. The application’s configuration is reloaded in HP Real User Monitor.

Note: To reload the configuration for all applications, click **Invoke** for the **reloadCurrentConfigurations** option.

Viewing Meaningful Page Statistics

You can view a table showing statistical information for each application that uses a meaningful page XML file.

To view meaningful page statistics:

- 1** Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in your Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2** In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=ResolverMeaningfulPagesConfig**.
- 3** In the **viewStatistics** option, click **Invoke**. The Meaningful Pages Statistics table opens, showing the following data:
 - **Application name.** The name of the application as defined in End User Management Administration. (For details on configuring applications in End User Management Administration, see “New/Edit Web or SOAP Application Page” in *Using End User Management*.)
 - **Configuration file name.** The name of the meaningful page XML file used by the application.
 - **Handled pages.** The total number of pages monitored in the application that were submitted to the meaningful pages module.
 - **Successful pages.** The total number of pages that were successfully processed by the meaningful pages module.
 - **Unmatched pages.** The total number of pages successfully processed by the meaningful pages module, but for which no meaningful name was assigned as no match was found.
 - **Failed pages.** The total number of pages that were not successfully processed by the meaningful pages module.

Unifying Frames

By default, the HP Real User Monitor probe reports each frame as a separate page for statistical purposes. However, when replaying a session in the Session Analyzer report, the pages of some frames are listed as sub components of other pages in the hierarchal tree and are displayed accordingly.

HP Real User Monitor uses a default configuration that contains the rules for determining if a page is considered as a parent or a child page. You can change the default settings and can also create new settings for specific pages.

You configure frames to be unified by HP Real User Monitor in the `frame_unification.xml` file on the HP Real User Monitor engine machine.

To change the default settings for frame unification:

- 1 Edit the `<HP Real User Monitor root directory>\conf\configurationmanager\frame_unification.xml` file on the HP Real User Monitor engine machine.
- 2 Locate the **DefaultPage** entry, which is as follows:

```
<DefaultPage>
  <TimeoutMS>500</TimeoutMS>
  <InnerFrames maxInnerFrames="-1" />
  <CanBeInnerFrame>true</CanBeInnerFrame>
  <MatchInnerFramesReferrer>true</MatchInnerFramesReferrer>
</DefaultPage>
```

- 3 Change the settings for your system, where:
 - ▶ **TimeoutMS.** The amount of time it takes a frame to load after the previous frame has finished loading. Within this time, if the frame matches the other parameters, such as the referring URL, it is considered as a child of the previous frame, otherwise it is considered as a parent frame.
 - ▶ **InnerFrames maxInnerFrame.** The maximum number of children that a parent frame can contain. Use `-1` for an unlimited number.

- **CanBeInnerFrame.** Set to **true** to enable frames to be considered as children. Set to **false** to consider all frames as parents, unless specific page settings have been defined which are applicable to a frame.
 - **MatchInnerFramesReferrer.** Set to **true** to allow child frames to be matched to parent frames by URLs (if specific page settings have been configured), or **false** to use only the TimeoutMS setting to create child pages.
- 4** Save the file and exit.

Note: There can be only one **DefaultPage** entry.

To create frame unification settings for specific pages:

- 1** Edit the <HP Real User Monitor root directory>\conf\configurationmanager\frame_unification.xml file on the HP Real User Monitor engine machine.
- 2** After the **DefaultPage** entry, create a new **Page** section in the following format:

```
<Page>
  <Pattern>http://www.host.com/.*/</Pattern>
  - <InnerFrames maxInnerFrames="3">
    <Pattern>http://www.host.com/inner1\..*/</Pattern>
    <Pattern>http://www.host.com/inner2.</Pattern>
  </InnerFrames>
  <TimeoutMS>500</TimeoutMS>
  <CanBeInnerFrame>false</CanBeInnerFrame>
  <MatchInnerFramesReferrer>true</MatchInnerFramesReferrer>
</Page>
```

where:

- ▶ **Pattern.** A regular expression for the URL pattern to be matched when HP Real User Monitor determines if a frame is to be considered as a parent or child. The first **Pattern** setting at the top of the section determines if the rule is applicable for the frame being matched and is also used as the parent pattern for any matching children. Subsequent **Pattern** settings, within **InnerFrames**, are used to determine if the frame can be considered as a child.
 - ▶ **InnerFrames maxInnerFrame.** The maximum number of children that the parent frame can contain. Use **-1** for an unlimited number.
 - ▶ **TimeoutMS.** The amount of time it takes a frame to load after the previous frame has finished loading. Within this time, the frame is considered as a child of the parent frame that matches the first **Pattern** setting, otherwise it is considered as a parent frame itself.
 - ▶ **CanBelInnerFrame.** Set to **true** to enable a frame whose URL matches the first **Pattern** setting to be considered as a child, or **false** to consider all frames that match the first **Pattern** setting as parents.
 - ▶ **MatchInnerFramesReferrer.** Set to **true** to allow child frames to be matched to the parent frame by the URLs configured in the **Pattern** settings, or **false** to use only the TimeoutMS setting to create child pages.
- 3 Repeat step 2 to create additional page settings as required.
 - 4 Save the file and exit.

Note:

- ▶ If a page's URL matches the Pattern of more than one Page definition, the first matching Page definition in the file is applied.
 - ▶ Missing parameters in a Page definition section inherit the DefaultPage setting for that parameter.
-

HP Real User Monitor Logs

You use HP Real User Monitor logs to troubleshoot problems and to provide information about the system's operations. The log files are located in the **<HP Real User Monitor root>\log** directory on the Real User Monitor engine machine. For details on the HP Real User Monitor logs, see “Real User Monitor Logs” in *Reference Information*.

8

Administering the MySQL Database

For HP Real User Monitor to work, it must be connected to a MySQL database that has been created and started.

This chapter includes:

- ▶ Overview of the MySQL Database on page 199
- ▶ Creating and Connecting to the MySQL Database on page 200
- ▶ Starting and Stopping the MySQL Database on page 201
- ▶ Maintaining the MySQL Database on page 202

Overview of the MySQL Database

The MySQL database is the HP Real User Monitor's data repository. The data that is stored in the MySQL database is data that is either not forwarded at all to HP Business Availability Center, or that is only sent on request.

Data that is not forwarded at all to HP Business Availability Center is HP Real User Monitor configuration data. Data that is sent to HP Business Availability Center on request is open session data and session click-stream data (data and snapshots of pages included in sessions). Click-stream data accounts for the majority of the data stored in the MySQL database.

The MySQL database can be installed on the same machine as the HP Real User Monitor engine or on its own machine. For system requirements for the MySQL database, see "Reviewing System Requirements" on page 27.

Creating and Connecting to the MySQL Database

The HP Real User Monitor engine MySQL database is created during the HP Real User Monitor engine installation process, if that option is selected. When the MySQL database is created during the installation process, the HP Real User Monitor engine is connected to it, and the MySQL database is started automatically. The MySQL database to which the HP Real User Monitor engine is connected must be started for the HP Real User Monitor engine to work.

You can create a new MySQL database schema and connect the HP Real User Monitor engine to it, or connect the HP Real User Monitor engine to a different, existing MySQL database completely, if required.

Note: The HP Real User Monitor engine can only be connected to one MySQL database.

To create schemas and connect to MySQL databases on an HP Real User Monitor Windows installation:

On the machine on which the HP Real User Monitor engine is installed, select **Start > Programs > HP Real User Monitor > Administration > RUM Configuration Tool**. The HP Real User Monitor Configuration tool starts. For details on working with the HP Real User Monitor Configuration tool, see step 15 on page 43 in “Installing the HP Real User Monitor Engine” on page 38.

Starting and Stopping the MySQL Database

When the MySQL database is created during HP Real User Monitor installation, it is started automatically as part of the process. You can start and stop the MySQL database manually if required.

To start the MySQL database on an HP Real User Monitor Windows installation:

On the machine on which the HP Real User Monitor engine is installed, select **Start > Programs > HP Real User Monitor > Administration > Database > Start Real User Monitor Database**.

To stop the MySQL database on an HP Real User Monitor Windows installation:

On the machine on which the HP Real User Monitor engine is installed, select **Start > Programs > HP Real User Monitor > Administration > Database > Stop Real User Monitor Database**.

Maintaining the MySQL Database

For details on maintaining the MySQL database, including strategies and procedures for backing up and restoring the database, refer to the Database Administration chapter in the MySQL Reference Manual on the MySQL Web site (<http://dev.mysql.com/doc/refman/5.0/en/database-administration.html>).

Purging MySQL Binary Log Files

The MySQL binary log contains all statements that updated data in the MySQL database.

The purpose of the binary log is to help update the database to the most current status during a restore operation, as it contains all updates made since the last backup. For details on MySQL binary log files and restoring databases, refer to the Database Administration chapter in the MySQL Reference Manual on the MySQL Web site (<http://dev.mysql.com/doc/refman/5.0/en/database-administration.html>).

HP Real User Monitor purges the MySQL binary log files on a daily basis, by deleting all the log files older than five days. You can change the default number of days for which to keep the MySQL binary log files.

To change the default number of days for which to keep MySQL binary log files:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in you Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=MaintenanceDBConfigurationJMX**.
- 3 In the **MySQLBinaryLogsDaysCount** parameter, change the setting to the required number of days.
- 4 Click the **Apply Changes** button.

Purging Session Click-Stream Data

The majority of the data stored in the MySQL database is session click-stream data. This data comprises the details and snapshots of pages included in sessions and is sent to HP Business Availability Center on request.

Session click-stream data is kept in the MySQL database for a default period of 14 days, after which it is automatically purged from the database. The amount of time for which session click-stream data is stored in the MySQL database can be changed to any number of days between 7 and 100.

To change the period for which session click-stream data is stored in the database:

- 1 Access the JMX console by choosing **JMX Console** from the Configuration drop-down menu in the HP Real User Monitor Web console, or by using the following URL in you Web browser:

`http://<HP Real User Monitor engine machine name>:8180/jmx-console`

When prompted, enter the JMX Console authentication credentials (if you do not have these credentials, contact your system administrator).

- 2 In the JMX Agent View, scroll down to the **RUM.modules** section and click **service=MaintenanceDBConfigurationJMX**.
- 3 In the **PurgingDaysCounter** parameter, change the setting to the required number of days (between 7 and 100).
- 4 Click the **Apply Changes** button.

Note: By increasing the number of days for which session click-stream data is stored, you might significantly increase the size of the database, which might necessitate additional disk capacity.

9

Hardening HP Real User Monitor

You can harden the HP Real User Monitor platform so that it can be part of a secure architecture, and can therefore meet the challenge of dealing with security threats to which it could potentially be exposed.

This chapter includes:

- ▶ Hardening the HP Real User Monitor Probe on page 205
- ▶ Securing Connections to the HP Real User Monitor Engine on page 212

Note: For details on securing connections between HP Real User Monitor and HP Business Availability Center, see the *HP Business Availability Center Hardening Guide* PDF.

Hardening the HP Real User Monitor Probe

You can harden the HP Real User Monitor probe by changing users and creating passwords for them, disabling non-SSH access, limiting the SSH version that can be used, and by securing the HTTP connection to the probe.

This section includes the following topics:

- ▶ “Changing the Probe’s User and Password” on page 206
- ▶ “Disabling Non-SSH Access to the Probe” on page 207

- “Limiting the SSH Version” on page 207
- “Securing the HTTP Connection to the Probe” on page 207

Changing the Probe’s User and Password

When the HP Real User Monitor probe is installed, a user called **beatbox** is automatically created, which has access to the probe channels only. This user does not have a password and you should configure one for it.

By default, the Real User Monitor probe is run under the **root** user. It is recommended to run the probe process under the **beatbox** user, or another specially created user, rather than the **root** user.

To change the user that runs the probe process:

- 1 Log on to the probe as the **root** user.
- 2 Change the user running the probe process by executing the command:

```
bb_user.pl <USER>
```

where <USER> is the name of the user with which you want to run the probe process.

To configure a password for a user:

- 1 Log on to the probe as the **root** user.
- 2 Define a password for the user by executing the command:

```
passwd <USER>
```

where <USER> is the name of the user for which you are defining the password. For example, to configure a password for the **beatbox** user, execute the command:

```
passwd beatbox
```

- 3 Follow the on-screen prompts.

Disabling Non-SSH Access to the Probe

The Real User Monitor probe uses the SSH server through xinetd, for stability reasons. During the probe installation, the xinetd service is activated automatically. Since the xinetd service allows different methods of access to the probe, you should disable all protocols apart from SSH.

To disable all non-SSH protocols in the xinetd service:

- 1** On the Real User Monitor probe machine, execute the command:

```
ls /etc/xinetd.d/
```
- 2** Edit each file in the displayed list, except for the **ssh** file, and change or add the following line:

```
Disable = yes
```
- 3** Restart the xinetd service with the following command:

```
/etc/init.d/xinetd restart
```

Limiting the SSH Version

By default, the probe accepts both SSH 1 and SSH 2 connections. To increase security, it is recommended to configure the probe to accept SSH 2 connections only.

To configure the probe to accept SSH 2 connections only:

On the Real User Monitor probe machine, edit the `/etc/ssh/sshd_config` file and change the line:

```
#Protocol 2,1
```

```
to
```

```
Protocol 2
```

Securing the HTTP Connection to the Probe

You can secure the HTTP connection to the probe by using both basic authentication and HTTPS connections.

This section includes the following topics:

- “Using Basic Authentication” on page 208
- “Using HTTPS” on page 209

Using Basic Authentication

To work with basic authentication, you must configure both the Real User Monitor probe and engine.

To configure the Real User Monitor probe:

- 1 Log on to the probe machine and edit the `/etc/beatbox/bbsecurity.conf` file.
- 2 Uncomment, edit or add the following line:

```
user <USERNAME> <PASSWORD> ALL
```

where <USERNAME> and <PASSWORD> are those required for basic authentication.

- 3 Restart the probe machine with the command:

```
/etc/init.d/beatbox-capture restart
```

To configure the Real User Monitor engine:

- 1 On the engine machine, edit the `\<HP Real User Monitor root directory>\conf\probes\probe.<PROBE IP>.properties` file, where <PROBE IP> is the IP address of the probe machine for which you are configuring basic authentication. If this file does not exist, create it.
- 2 Uncomment, edit or add the following lines:

```
connection.http.authentication.username=<USERNAME>
```

```
connection.http.authentication.password=<PASSWORD>
```

where <USERNAME> and <PASSWORD> are those required for basic authentication.

- 3 Force an update of the probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

Using HTTPS

In HP Real User Monitor version 7.0 and later, the Real User Monitor engine by default connects to the probe via an HTTPS connection, using default sever and client certificates. In some instances (for example, after upgrading an earlier version of HP Real User Monitor) it might be necessary to manually configure HP Real User Monitor to use HTTPS.

This section describes how to manually set an HTTPS connection to the probe, as well as how to replace the default, generic, server and client certificates that are included in the probe.

To manually set an HTTPS connection to the probe:

- 1 Log on to the probe machine and edit the `/etc/beatbox/bbsecurity.conf` file.

- 2 Uncomment, edit or add the following line:

```
use_ssl    true
```

- 3 Restart the probe with the command:

```
/etc/init.d/beatbox-capture restart
```

- 4 On the engine machine, edit the `\<HP Real User Monitor root directory>\conf\probes\probe.<PROBE IP>.properties` file, where `<PROBE IP>` is the IP address of the probe machine for which you are configuring basic authentication. If this file does not exist, create it.

- 5 Uncomment, edit or add the following line:

```
connection.http.ssl=true
```

- 6 Force an update of the probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

To replace the default server certificate:

- 1 Convert the new server certificate and private key to PEM (base64) format, unencrypted (that is, without a password) and copy them to the probe machine.
- 2 Log on to the probe machine and edit the `/etc/beatbox/bbsecurity.conf` file.

- 3 Uncomment, edit or add the following lines:

```
ssl_key <PRIVATE_KEY_FILE>  
ssl_cert <SERVER_CERTIFICATE>
```

Note: The certificate and private key can be included in the same file. In such cases, both lines should refer to that file.

- 4 Restart the probe with the command:

```
/etc/init.d/beatbox-capture restart.
```

- 5 Copy the server certificate (without the private key) to the engine machine.
- 6 Import the certificate into a new or existing keystore with the command:

```
\<HP Real User Monitor root directory>\JRE\bin\keytool -import -alias  
rum_probe_cert -keystore <KEYSTORE_FILE> -file <CERTIFICATE_FILE>
```

Note: The Real User Monitor engine should be configured to trust the imported certificate.

- 7 Edit the \<HP Real User Monitor root directory>\conf\probes\probe.<PROBE IP>.properties file. If this file does not exist, create it.

- 8 Uncomment, edit or add the following lines:

```
connection.http.ssl.truststore.file=<KEYSTORE_FILE>  
connection.http.ssl.truststore.password=<KEYSTORE_PASSWORD>
```

- 9 Force an update of the probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

To replace the default client certificate:

- 1 On the engine machine, generate a new private key and certificate into a new, or existing keystore with the command:

```
\<HP Real User Monitor root directory>\JRE\bin\keytool -genkey -alias
rum_probe_client_cert -keyalg RSA -keystore <KEYSTORE_FILE>
```

- 2 Enter the details of the certificate and when prompted, approve them.

Note: If you choose a different password for the private key than the keystore password you must also specify this password when configuring the engine to use the keystore (see no. 3).

- 3 Edit the \<HP Real User Monitor root directory>\conf\probes\probe.<PROBE IP>.properties file. If this file does not exist, create it.

- 4 Uncomment, edit or add the following lines:

```
connection.http.ssl.keystore.file=<KEYSTORE_FILE >
```

```
connection.http.ssl.keystore.password=<KEYSTORE PASSWORD>
```

If you chose a different password for the private key in step 2 on page 211, edit or add the following line:

```
connection.http.ssl.keystore.PrivateKeypassword=<KEY PASSWORD>
```

- 5 Export the client certificate with the command:

```
\<HP Real User Monitor root directory>\JRE\bin\keytool -export -rfc -alias
rum_probe_client_cert -keystore <KEYSTORE_FILE> -file
<CERTIFICATE_FILE>
```

- 6 Copy the certificate file to the probe machine

- 7 Log on to the probe and edit the /etc/beatbox/bbsecurity.conf file

- 8 Uncomment, edit or add the following line:

```
ssl_ca_file <CLIENT_CERTIFICATE_FILE>
```

- 9 Restart the probe with the command:

```
/etc/init.d/beatbox-capture restart
```

- 10 Force an update of the probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

Securing Connections to the HP Real User Monitor Engine

You can access HP Real User Monitor engine by different HTTP access points, for the following purposes:

- RUM Web console
- RUM JMX console
- RUM Gateway/Proxy Server (for HP Business Availability Center and the replay applet)

You can secure access to the HP Real User Monitor engine by using authentication and HTTPS connections.

This section includes the following topics:

- “Using Authentication” on page 212
- “Using HTTPS” on page 213

Using Authentication

All HTTP access points on the HP Real User Monitor engine are protected via authentication mechanisms. The two main authentication mechanisms used are:

- **User and password protection.** Used for access to the HP Real User Monitor engine Web and JMX consoles.
- **Basic authentication.** Used for all other access points to the HP Real User Monitor engine.

You can add users for access to the Web console and change passwords for users to access both the Web and JMX consoles. For details on adding, changing, and deleting users to access the Web console, and changing their passwords, see “Using the HP Real User Monitor Web Console” on page 76.

To change the password for a user to access the JMX console:

- 1** On the engine machine, edit the `\<HP Real User Monitor root directory>\EJBContainer\server\mercury\conf\rumusers.properties` file.
- 2** In the following line (which is usually the first line in the file), change the value of `<admin password>` to the new password:
`admin=<admin password>`
- 3** Save the file and restart the engine.
- 4** Force an update of the probe configuration by accessing the HP Real User Monitor Web console and selecting **Tools > Monitoring Configuration Information > Sync All Configuration**. For details on working with the HP Real User Monitor Web console, see “Using the HP Real User Monitor Web Console” on page 76.

Using HTTPS

When you configure the HP Real User Monitor engine to work with HTTPS, all connections to the engine are affected. This means that HP Business Availability Center must also be configured to communicate with the HP Real User Monitor engine using HTTPS. For details on hardening HP Business Availability Center, including creating, configuring, and trusting client and server certificates, see the *HP Business Availability Center Hardening Guide* PDF.

In HP Business Availability Center, when viewing session details in Real User Monitor reports, you can view snapshots of pages and replay a session. By default, the Session Replay applet retrieves data from the Real User Monitor engine via the HP Business Availability Center Gateway Server, but can be configured to retrieve data directly from the Real User Monitor engine (for details, see “Customize Real User Monitor Reports” in *Using End User Management*). If the Session Replay applet is configured to retrieve data directly from the Real User Monitor engine and the Real User Monitor engine is configured to require a client certificate, you must copy and import the necessary certificate on the client machine running the Session Replay applet.

To copy and import a client certificate on a machine running the Session Replay applet:

- 1 Export the certificate from the keystore on the Real User Monitor engine with the command:

```
\<HP Real User Monitor root directory>\JRE\bin\keytool -export -rfc -alias rum_client_cert -keystore <KEYSTORE_FILE> -file <CERTIFICATE_FILE>
```

- 2 For each client machine on which the Session Replay applet is run:

- a Copy the certificate exported in step 1 to the client machine.
- b Import the certificate to the default HP Business Availability Center truststore with the command:

```
<Latest JRE home>\bin\keytool -import -alias rum_client_cert -keystore > -keystore <Latest JRE home>\JRE\lib\security\cacerts" -file <CERTIFICATE_FILE>
```

- c Restart the browser.

Note: HP recommends to configure the Session Replay applet to retrieve data from the Real User Monitor engine via the HP Business Availability Center Gateway Server, when the Real User Monitor engine is configured to require a client certificate.

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