HP Business Process Monitor

Software Version: 9.25

Business Process Monitor Administration Guide

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Chapter 1: Business Process Monitor Overview

Business Process Monitor (BPM) is one of the HP Business Service Management (BSM) data collectors. BPM proactively monitors enterprise applications in real time, identifying performance and availability problems before users experience them. It enables you to monitor sites from various locations, emulating the end-user experience, and so assess site performance from different client perspectives.

This chapter includes:

- "BPM Operations" below

- "BPM Installation" on the next page

- "Configuration, Administration, and Troubleshooting" on the next page

- "Setting Up BPMs" on page 11

- "Changing the Time on the BPM Machine" on page 11

- "BPM Admin" on page 11

BPM Operations

The BPM service performs the following operations:

- Collecting transaction performance data (application response time and availability) from various points, as well as from external locations.

- Retrieving business process configuration information (including applications, business transaction flows, transactions, and recorded scripts) from the profile databases via the BSM Gateway Server.

- Performing the work defined in the applications and business transaction flows (including running transaction monitor scripts and WebTraces).

- Monitoring the task and aggregates relevant data, performing all necessary calculations.

- Reporting error information during the execution of tasks.

BPM sends the collected data to BSM, where you can use the applications to view and analyze the data, in order to monitor the performance of your business applications and infrastructure.

BPM Installation

You install BPM on host machines on your local network or on the Internet. Once installed, BPM runs independently as a service on the host machine. You generally deploy BPMs on multiple host machines, but you can also use each BPM installed on a host machine as the basis for many logical BPM instances. For example, you may want to use each instance on the host machine to run tests for a different division of your organization, or use duplicate instances during the staging period for BSM upgrade to communicate with the different BSM versions.

Each instance can be connected to a different BSM platform, or there may be several instances connected to a single BSM platform (using a unique logical host name for each).

After installing BPM on a machine, the machine is added to the list of data collectors in EUM Administration. Each additional BPM instance that you define is also added to the list of available data collectors. Each BPM can then be designated as a host for your business process applications and business transaction flows, which are defined in EUM Administration. For details on creating and managing applications and business transaction flows, see "Business Process Monitor Administration User Interface" in the BSM Application Administration Guide.

You can install BPM on a Windows or Linux operating system. For system requirements, see "System Requirements" in the Business Process Monitor Deployment Guide.

Configuration, Administration, and Troubleshooting

In general, BPMs do not require configuration and administration. Where configuration, administration, or troubleshooting is required, you generally access the web-based BPM Admin console (for details, see "How to Access BPM Admin" on page 28). In addition, certain configuration changes can be made directly in the BPM files, as described in "BPM Configuration Files" on page 146.

BPM Directories

BPM is installed in and uses a number of main directories, which are referred to extensively throughout this documentation. The following table lists these directories, showing the name used in the documentation, their default path, and a description of what they include:

Directory Name (as used in the documentation)	Description	Operating System	Default Path	Configurable
\<BPM installation directory>	The directory in which the BPM application is installed.	Windows	C:\HP\BPM\	Yes

Directory Name (as used in the documentation)	Description	Operating System	Default Path	Configurable
\<BPM data directory\>	The directory containing BPM configuration data.	Windows	C:\ProgramData\HP\BPM	No
\<BPM root directory\>	Contains both the BPM installation and the BPM configuration data. (This is similar to a combination of the \<BPM installation directory\> and the \<BPM data directory\> for Windows.)	Linux	/opt/HP/BPM	No
\<BPM workspace directory\>	BPM working directory	Windows Linux	**Windows:** \<BPM application directory\>\workspace **Linux:** \<BPM root directory\>/workspace	Yes

Note: Users require read-write access to these directories.

Users Without Admin Privileges

Users can log into BPM without Administrator privileges, however they need read-write access to the following directories:

- **Configuration Directory** (by default \<BPM application directory\>\config)

- **Tomcat Directory** (by default \<BPM application directory\>\Tomcat)

- **Workspace Directory** (by default \<BPM application directory\>\workspace)

- **BPM Installation directory** (by default C:\HP\BPM\)

Setting Up BPMs

For a description of the process required to set up and use BPM to collect data on the performance of specific business processes, see "How to Set up Business Process Monitors" in the BSM User Guide. BPM saves detailed log entries for every executed task, and for general BPM operation.

Changing the Time on the BPM Machine

BPM synchronizes time with the BSM Gateway Server once an hour (default Time Poll Interval setting). If you change the time on the BPM machine, the BPM reports may contain incorrect times until BSM is next polled for time synchronization. To avoid this, you should restart BPM/the relevant BPM instance (see "How to Restart BPM" on page 28), or change the Time Poll Interval setting for an instance to a value smaller than 60 minutes (see "Business Service Management Registration Properties Area" on page 58).

> **Note:** BPM saves persistency information after registration with BSM, and after each job update, enabling work to continue even if the Gateway Server is temporarily unavailable.

BPM Admin

You use the web-based BPM Admin for managing and monitoring all BPM instances on a machine, and for customizing BPM settings. BPM Admin is installed on the host machine during BPM installation.

You can use BPM Admin to:

- Manage the run of BPM on the host machine

- Configure new instances, and then modify settings and view activity for each BPM instance

- View transaction and page component breakdown for web based scripts

- View transaction and component breakdown for non-web based (TCP) scripts

- View reports for WebTrace requests

All BPM Admin events are reported to a log file.

Chapter 2: General and Administration

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- View transaction and component breakdown for non-web based (TCP) scripts

- View reports for WebTrace requests

All BPM Admin events are reported to a log file.

Learn About

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- "How to Restart BPM" on page 28

- "How to Change the Language of the BPM User Interface" on page 29

Troubleshooting and Limitations

Unable to Access BPM Admin Console

If you are unable to access the BPM Admin console via SSL, check the following log files:

- **catalina.<current date>.log** files located in:

  - **Windows:**
    <BPM application directory>\Tomcat\logs
    <BPM application directory>\ServletContainer\temp\logs

  - **Linux:**
    <BPM root directory>/ServletContainer/temp/logs

- **bpm_nanny.log** file located in:

  - **Windows:** <BPM installation directory>\yajsw\log

  - **Linux:** <BPM root directory>/yajsw/log

Supported Recording Tools

BPM 9.25 supports scripts recorded using the following HP tools.

- **HP QuickTest Professional** / **Unified Functional Testing** (run on Windows platforms only)

- **HP Virtual User Generator** (VuGen)

You must install QTP/UFT on the BPM machine before BPM can run scripts recorded with that tool.

For the supported versions, see "Compatibility Matrixes" on page 15.

BPM supports the same client protocol versions as those supported by its compatible version of VuGen.

> **Note:** You cannot use HP WinRunner scripts with BPM. All WinRunner scripts should be converted to QTP/UFT scripts.

Snapshot on Error Option

When recording scripts with HP Virtual User Generator (VuGen), QuickTest Professional (QTP), or HP Unified Functional Testing (UFT), you can enable the Snapshot on Error option.

After the Snapshot on Error option is enabled, during a script run, BSM saves a snapshot of a page as it appears when an error occurs during the script run. The snapshots can be viewed in the EUM Error Log and in the Triage Raw Data report. For details, see "Snapshot on Error" in Analysis Reports and Triage Raw Data Report in the BSM User Guide.

You can configure BPM to send snapshots to BSM or to store them locally on the BPM machine, and you can also configure how long to keep the locally saved snapshots.

Note: In Internet Explorer, the snapshot resolution is based on the screen resolution of the machine running TruClient. This means that there will be different results if the script is run with different screen resolutions.

Learn About

Enabling the Snapshot on Error Option

For details on enabling Snapshot on Error in VuGen, QTP, or UFT, refer to the relevant VuGen, QTP, or UFT documentation set.

List HP Virtual User Generator Protocols

The list of HP Virtual User Generator protocols for which BSM supports Snapshot on Error is configured in the **SnapshotSupportedProtocols** parameter in the **agent1.cfg** file. For details, see "Parameters in agent1.cfg" on page 155.

Note: When BSM records a snapshot for scripts recorded using one of the web protocols, it saves only HTML code; resources such as images and JavaScript are not saved. This means that errors that occur due to missing resources may be difficult to trace from the snapshot, especially in cases where the missing resource problem has been fixed. For example, if an image resource is missing during a script run, causing an error to be recorded, but the missing image problem is later fixed, the image will still be present when you open the snapshot of the page.

Tasks

How to Configure If Snapshots Are Sent to BSM

1. Edit the **SendSOEToBAC** parameter in the **[general]** section of the **<BPM application directory>\config\agent1.cfg** file. The possible values for the parameter are:

   - 1 = Never send Snapshot on Error data to BSM.

   - 2 = Always send Snapshot on Error data to BSM.

- 3 = Use the script configuration to determine where to send Snapshot on Error data (see step 2 below). This is the default option that is used if the **SendSOEToBAC** parameter has not been set.

2. If the BPM has been configured to use the script configuration to determine where to send Snapshot on Error data (that is, the **SendSOEToBAC** parameter has a value of 3), then once a script has been saved, edit the **SendSnapshotDataToBAC** parameter in the **[WEB]** section of the **default.cfg** file of the script. The possible values for the parameter are:

- 0 = Do not send Snapshot on Error data to BSM.

- 1 = Send Snapshot on Error data to BSM.

Troubleshooting and Limitations

The VuGen SOAP (Web Services) Protocol (WS_SOAP) Does not Support Snapshot on Error
Workaround: Convert scripts to HTTP/web.

1. Convert the LoadRunner SOAP script to an HTTP/web script, using web_custom_requests and placing your XML into the body argument.

2. You will see normal snapshots in BSM if you insert web_reg_find_statements before your request and activate Snapshot on Error in VuGen.

Compatibility Matrixes

This section includes the following matrixes for various environments and components supported by BPM versions:

- "BPM Compatibility Matrix" below

- "BPM-QuickTest Professional (QTP)/Unified Functional Testing (UFT) Compatibility Matrix" on the next page

- "BPM Protocol Support Matrix" on page 17

- "Compatibility with VuGen" on page 18

- "BPM/VuGen - Citrix Compatibility Matrix " on page 18

In the tables below, ✓ = "supported", and **X** = "not supported".

BPM Compatibility Matrix
For each BPM version, the latest supported HP Virtual User Generator (VuGen) version is mentioned.

All previous versions, with the exception of VuGen 11.04, are also supported.

Note: BSM 9.01 is not supported.

Compatibility Matrix	HP Business Service Management 9.1 and Later	HP Business Availability Center 8.x
BPM 9.25 (LR Replay 12.02)	✓ (Recommended)	✓
BPM 9.24 IP1 (LR Replay 12.01)	✓ (Recommended)	✓
BPM 9.24 (LR Replay 12.00)	✓ (Recommended)	✓
BPM 9.23 (LR Replay 11.50 SP 2)	✓ (Recommended)	✓
BPM 9.22 (LR Replay 11.50 SP 1)	✓ (Recommended)	✓
BPM 9.13 (LR Replay 11 SP 3)	✓ (Recommended)	✓
BPM 9.03 (LR Replay 11 SP 3)	✓ (Recommended)	✓
BPM 9.02 (LR Replay 11 SP 1)	✓ (Recommended)	✓

BPM-QuickTest Professional (QTP)/Unified Functional Testing (UFT) Compatibility Matrix

Compatibility Matrix	BPM 9.25	BPM 9.24 IP1	BPM 9.24	BPM 9.23	BPM 9.22
UFT 12.02	✓ (recommended, see notes below)	X	X	X	X
UFT 12.01	✓	✓ (see note below)	✓	X	X
UFT 12.00	✓	✓	✓	X	X
UFT 11.50 SP2	✓	✓	✓	✓	X
QTP 11.0 with patches 00944, 00994, and 00699	✓	✓	✓	✓	✓

Note:

- BPM 9.25 with UFT 12.02 requires patch UFT_00123. This patch is available from the HP Software Support Site.

- Performance issues occur when running UFT 12.02 scripts in BPM 9.25 on Windows 7 32 bit

- BPM 9.24 IP1 does not work with Unified Functional Testing (UFT) 12.01 on Microsoft Windows Server 2012 R2.

BPM Protocol Support Matrix

Protocol	Windows	Linux
.NET	✓	✗
Ajax - Click and Script	✓	✗
C VUser	✓	✓
Citrix	✓	✗
COM/DCOM	✓	✗
DNS (Domain Name Resolution)	✓	✗
Flex	✓	✗
FTP	✓	✗
IMAP	✓	✗
JAVA over HTTP	✓	✗
JAVA Record\Replay	✓	✗
Java Vuser	✓	✗
LDAP (Listing Directory Service)	✓	✗
MAPI (Microsoft Exchange)	✓	✗
Mobile Application (HTML/HTTP)	✓	✓
MMS (Media Player)	✓	✗
MMS (Multimedia messaging Service)	✓	✗
ODBC	✓	✗
Oracle (2-tier)	✓	✗
Oracle NCA	✓	✓

Protocol	Windows	Linux
Oracle - Web	✓	✓
POP 3 (Post Office Protocol)	✓	✗
RDP	✓	✗
RTE (Remote Terminal Emulator)	✓	✗
SAP Click and Script	✓	✗
SAP GUI	✓	✗
SAP Web	✓	✓
Siebel – Web	✓	✗
Silverlight	✓	✗
SMTP	✓	✗
SOAP (Web Services)	✓	✗
TruClient - Firefox	✓	✗
TruClient - Internet Explorer	✓	✗
TruClient - Mobile Web	✓	✗
Web [HTTP/HTML]	✓	✓
Windows sockets	✓	✗

Note:

Some of the protocols require the installation of additional software components and therefore are platform dependent.

BPM also supports all the protocols available through add-ins for the supported versions of QTP and UFT.

Compatibility with VuGen

BPM 9.25 can only coexist with VuGen 12.02. You must uninstall any previous versions of VuGen before installing BPM.

BPM/VuGen – Citrix Compatibility Matrix

LoadRunner 12.02 / BPM 9.25 (Citrix ICA with Receiver for Windows)

Supported Client Version	Supported Server
12.x	Citrix XenApp 5.5, 5.6, 6.0, 6.5, 7.0, 7.5
13.x	Citrix XenDesktop 7.0
14.x	Citrix XenDesktop 7.5
14.x	Citrix XenDesktop 7.6
	Citrix Access Gateway (with Receiver 13.x and above)

Requirements and Limitations for Running Tasks

BPM has the following requirements and limitations when running scripts and WebTrace:

- "General" below

- "HP Virtual User Generator Scripts" on the next page

- "QuickTest Professional (QTP) and Unified Functional Testing (UFT) Scripts" on page 22

- "Citrix Script Failing" on page 21

- "WinRunner Scripts" on page 23

General

> **Note:** Refer to the LoadRunner/VuGen documentation to determine the proper configuration for running a specific script.

- We recommend that you run scripts for all protocols (with the exception of web protocols) with the BPM instance/whole BPM set to run as a specific user.

- If there is a problem with a script (for example, due to a missing client installation, a download failure, corruption in the script, and so forth), the script may fail to initialize. In this case, the application or business transaction flow containing the script also fails to initialize, with the result that none of the application or business transaction flow scripts, or WebTraces, is run on BPM.

- When a script in an application or business transaction flow is run, but for some reason does not finish successfully (that is, it does not end with a status of **Finished properly** or **Finished (errors occurred)**), samples for transactions that were part of the script, but were not run, are sent to BSM for inclusion in the Triage report. For details on the Triage report, see "Triage Report" in the BSM User Guide.

- If the BPM server minimum disk space threshold is breached, BPM stops running scripts and

WebTraces until the minimum buffer above the BPM server minimum disk space threshold is reached. For details about these thresholds, see "Parameters in topaz_agent_ctrl.cfg" on page 148. To change parameter values within configuration files, see "How to Change Parameter Values Within a Configuration File" on page 147.

- Scripts that include an HTML replay mode cannot download Active-X components.

- BPM is not case sensitive to transaction names, so you should ensure that each transaction within the same business transaction flow has a unique name. Two transactions that have the same name, but with case-sensitive differences, are handled as a single transaction by BPM. BPM reports both transactions to BSM using a single transaction ID, and the reports show results for only one transaction.

- In Linux, if a script or application name contains a space, dollar sign ($), or grave accent (`), the script or application does not run correctly. You should not use these symbols in the names of scripts or applications intended to be run on a Linux platform.

- Page component breakdown is supported only for certain VuGen protocols.

- WebTrace does not support the use of domain names that begin with a digit, for example, www.1800hp.com. An error message is displayed. Instead, use the IP address for the destination.

- Scripts of inactive applications or business transaction flows are still downloaded to BPM, so that if the application or business transaction flow is made active, the BPM does not need to download the scripts. To avoid overload problem, you should remove BPM from the relevant application or business transaction flow configurations.

- If you encounter a problem replaying a TruClient - Internet Explorer script in BPM, but the script replays successfully in VuGen, replay the script while running BPM as a process.

  To run BPM as a process, open a command prompt and run the following commands:

  ```
  > CD <BPM installation directory>/BPM/ServletContainer/bin
  ```

  ```
  > catalina.bat run
  ```

HP Virtual User Generator Scripts

- If you are running scripts recorded with VuGen that include protocols which require a client to run (for example, Oracle Client or RealPlayer), you must have the protocol's client installed on the BPM machine.

- Citrix recording and playback is supported only on Windows platforms.

- LoadRunner requires the installation of a Citrix registry patch to record and replay scripts on Citrix client version 10.0 and later. The first time a Citrix script runs on a BPM machine, LoadRunner prompts you to install the Citrix registry patch on that machine. When prompted, click **OK** to accept the installation.

- BPM supports VuGen scripts for all Oracle NCA protocols. If you run an Oracle NCA protocol task, you can view transaction breakdown data for tasks that use http or Servlet connection methods (breakdown data for Socket communication is not supported).

- For successful Java Over HTTP script runs, install one of the following versions of Java (Oracle JDK, 32 Bit):

  - 1.5.x

  - 1.6.x

  - 1.7.x (recommended)

- Before running a TruClient script recorded in VuGen versions earlier than VuGen LR11.50 SP1, open the script in VuGen LR11.50 SP2 and save it.

- If you have added jars or classes to the classpath in VuGen and are running a java based protocol in BPM, you must perform one of the following actions to ensure that the script can locate the jars:

  - Remove the jar names from the **run-time-settings > classpath** list and place the jar files in the script folder (where the **.usr** file is). The script searches for all jars in the script folder and automatically adds them to the classpath.

  - Specify a full path to the jar in the **run-time-settings > classpath** list. For example:

    ```
    <BPM workspace directory>\agent1\Site1\BPM_SANITY_
    1bdf936f0f747829f519ff44808577b4\13\JPetStore_TABLE_Param\wlclient.jar
    ```

Citrix Script Failing

If Citrix scripts consistently fail, the version of Citrix on the client may not be compatible with the version of Citrix on the server (including required patches).

To test if this is the problem, manually run the script using the Command Prompt. If you have incompatible versions of Citrix, you will receive an error message similar to the following:

You should also confirm that a separate users session is not running the Citrix Connection Center, outside of BPM. To resolve this issue, close all instances of concenter.exe and other citrix processes for all users.

To prevent the Citrix Connection Center from starting automatically:

In the Windows Registry, set the ConnectionCenter registry key to an empty value (""). This key can be found at:

- **32-bit systems:** HKEY_LOCAL_
MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run

- **64-bit systems:** HKEY_LOCAL_
MACHINE\SOFTWARE\Wow6432Node\Microsoft\Windows\CurrentVersion\Run

QuickTest Professional (QTP) and Unified Functional Testing (UFT) Scripts

For tips and recommendations on recording scripts in QTP or UFT to run on BPM, see "Guidelines for Working with QuickTest Professional and Unfitied Functional Testing" in the BSM User Guide.

- UFT scripts refer to the scripts for UFT GUI tests.

- As of BPM 9.23, BPM must run as a service for executing QTP/UFT scripts. Therefore, no special BPM startup is needed.

- If BPM is installed on Windows Server 2008 R2 or Windows 7 64 bit, do the following configuration steps before running QTP/UFT scripts:

  a. Stop BPM from the Start menu.

  b. Disable Data Execution Prevention (DEP).

  c. Disable Interactive Services Detection.

    Note: For details on the above steps, refer to the Microsoft web site, or other reference sources.

  d. Start BPM.

- Ensure that QTP/UFT is closed on the computer before running a QTP/UFT in BPM.

- QTP/UFT cannot run tests on a computer that is logged off, locked, or running QTP/UFT as a non-interactive service.

- The last step (may also be multiple last steps) in a QTP/UFT script should close the application being tested, as well as any child processes that are running. This cleanup step enables the next run of the script to open the application again.

  However, if a script fails before it finishes running, it does not run the last step. From version 6.1, BPM supports a special close application mechanism that automatically closes the application being tested, when a QTP/UFT script fails. This mechanism is intended for fallback purposes only.

Although the mechanism closes the application being tested, it does not necessarily release all of the tested application's resources. Also, any unsaved data is lost.

This mechanism is enabled by default. If required, you can disable it for a specific test, as described in "How to Disable the Close Application Mechanism" on page 183.

- BPM does not support QTP/UFT scripts that require access to external resources (such as shared object repository, function library, external Data Table, external actions, and so forth). Scripts that require external resources may fail to run on BPM. (However, if the resource can be found on the network, QTP/UFT uses it.)

- BPM can run only one QTP/UFT script at a time. Make sure there are not multiple applications or business transaction flows with QTP/UFT scripts set to run concurrently, or an application or business transaction flow with more than one QTP/UFT script set to run in Concurrent run mode. (For information on run modes, see "Run Modes" on page 140.)

- Transaction breakdown is not supported for transaction files recorded with QTP/UFT.

- You cannot use the **ResultDir** QTP/UFT environment variable when running a script in BPM.

- If BPM is installed on Windows Server 2008 or Windows 7, ensure the following when you record the script:

  - In the **Record And Run** Setting (in the Automation/Record section), select the **Record and run on any open browser** option.

  - The first line of the script opens a browser and the last line of the script closes the browser. For example:

```
SystemUtil.Run "URL to open"
Script content
Browser("script browser name").Close
```

WinRunner Scripts

You cannot use WinRunner scripts with BPM. You should convert all WinRunner scripts to QuickTest Professional scripts.

Non-English Language Limitations

Virtual User Generator (VuGen) 12.0 has the following known limitations when working with non-English character sets such as Cyrillic or Japanese:

- **Script Names with Non-English Characters** - In VuGen 12.02 you cannot include non-English characters in script names or re-save scripts that were created with earlier versions of VuGen that

include non-English characters in the name. BPM can still run scripts with non-English characters in the script name that were created with VuGen 11.51.

For a solution to this problem, see "Workarounds" below.

- **Script Parameters** - BPM cannot run scripts that have non-English parameters.

  For a solution to this problem, see "Script Parameters" below.

- **Transaction Name** - BPM cannot run scripts that have a transaction name that includes Japanese characters. BPM can run scripts with Russian or German characters in the transaction name.

- **Files** - Scripts cannot contain files with non-English characters.

For a complete list of limitations, see the VuGen Help file in the section **VuGen Help > Advanced Topics > Non-English Language Support > Foreign Languages - Troubleshooting and Limitations**.

Workarounds

Script Names with Non-English Characters

If there are script names with non-English characters, if you have VuGen 11.51 or earlier installed, open the script in VuGen and save the script with a new name using only English Characters.

If you do not have an earlier version of VuGen, you can create a new script name with English characters and transfer the old transactions to the new script.

1. In BSM, select **Admin > End User Management > Monitoring** and select a business transaction flow in the Tree that appears in the left pane.

2. In the Scripts area, add a new script that contains the same transaction names as the old script.

3. Delete the old script that had non-English characters in the name.

Script Parameters

If you have script parameters that include non-English names, use the following procedures to create new parameters:

1. In BSM, create a backup file of relevant parameters (if required):

   a. Select **Admin > End User Management > Monitoring > Search and Replace**.

   b. Select **Entity type - Script Monitor Parameter**.

   c. Click **Search**.

    d. Select the relevant parameters.

    e. Click **Export to Excel** to create a backup file in Excel format.

2. In VuGen 12.02, rename the script parameters using English characters.

    a. Open the script in Vugen 12.02

    b. Open the Parameter List wizard.

    c. Delete the old parameters, and create new parameters with English names.

    d. Replace the parameters in the script with the new parameters.

3. If there are script names with non-English characters, update the script names:

    a. Update the script names. For details, see "Script Names with Non-English Characters" on the previous page.

    b. Continue with step 5 below.

4. If script names have English characters, upload the revised script:

    a. Select **Admin > End User Management > Script Repository**.

    b. Select the old script and check it out.

    c. Upload the new script that you created in step 2 above.

5. Update parameters (if required):

    a. Select **Admin > End User Management > Monitoring > Search and Replace**.

    b. And update the new parameters values.

Planning BPM Capacity

The main factors that influence the load you can assign a BPM are:

- The hardware of the BPM machine (in terms of the processor, memory speed, processor L2 cache memory, and so forth).

- The operating system. Since BPM uses services provided by the operating system, differences between operating systems may impact BPM performance.

- The total number of concurrently running scripts on the BPM machine.

For details on hardware and operating system requirements, see "BPM System Requirements" in the Business Process Monitor Deployment Guide.

Example of a Simple Configuration With no Concurrent Script Runs

An example of a simple configuration where all the scripts included in the configuration run sequentially is a BPM running a single application that uses the default application schedule of 15 minutes and that includes 15 scripts that each take one minute to complete. In this configuration there will always be a single script running, but no script will run concurrently with another.

Changes to the configuration or its environment may cause scripts to run concurrently. For example, if a script run time lasts longer than one minute due to slow performance.

Automatic Distribution of Concurrent Script Runs

When a BPM has more than one application or business transaction flow configured on it, a special mechanism ensures that the distribution of concurrent running scripts is kept as low as possible.

To allow an even distribution of the BPM's use of resources (such as CPU, memory, and network), the BPM assigns each application or business transaction flow (that has its own schedule) an offset. By using this offset, BPM tries to reduce the number of concurrent script runs by staggering their start time. The offset mechanism is applied whenever a new configuration is assigned to the BPM.

Factors Causing Concurrent Script Runs

Some of the main factors that may cause scripts to run concurrently are:

- The work load assigned to the BPM. This includes:

  - The number of instances configured for the BPM.

  - The number of applications and business transaction flows (run units) per instance.

  - The number of scripts per run unit.

  - The number of transactions per script.

- The scheduled interval configured for run units.

- The average time it takes for a script or run unit to finish a single run.

- The availability and performance of monitored applications. Unavailable or slow applications result in slower script runs.

- The type of the scripts. Some protocols may take a longer time to finish than others (for example, if there is a need to work with FAT client that needs to be initialized).

- The unit run modes (classic, sequential, and so forth). Some modes (such as the stepped mode with a step value of zero) enable you to run scripts concurrently. For details on run modes, see "Run Modes" on page 140.

> **Note:** Changing the default unit run mode overrides the automatic mechanism that distributes script runs. This reduces the load that can be assigned to a BPM. It is strongly recommend that you do not change the default offset in high volume environments.

BPM Configuration Tips

This section describes tips and recommendations for configuring BPM:

- BPM must run on a dedicated machine.

- Use the default run unit mode

- If you do not use one of the tried configuration sizes, use the following method to check your BPM capacity.

To check Business Process Monitor capacity for a new configuration:

1. Load the BPM with the new configuration using a rump up method (cycles). In each cycle, assign only a part of the configuration and check that the BPM's capacity is not breached (that is, a very high usage of system resources).

   After a BPM is assigned a new configuration, it needs to readjust its scheduling mechanism to the new work load. This readjustment phase (during which the BPM still runs the existing configuration) may take a few minutes, depending on the work load of the existing configuration and the amount of new work required by the new configuration. During the readjustment phase, the BPM's CPU consumption may increase, but should return to normal once the readjustment is complete.

   > **Note:** When changing a configuration, there may be a delay in transaction reports and in some cases, transaction runs may be skipped. This applies to currently running scripts.

2. Wait until the readjustment phase stabilizes before applying additional parts of the new configuration.

How to Run BPM

Once BPM is active on a host machine, it can continue running indefinitely. When BPM starts, it automatically starts each BPM instance.

When you install BPM on a host machine, **HP Business Process Monitor Service** is added as a service on the host. HP Business Process Monitor Service automatically starts BPM whenever the host machine is started.

To Start BPM

Windows: Select **Start** > **Programs** > **HP Business Process Monitor** > **Start Business Process Monitor Service**.

Linux: Run **/opt/HP/BPM/bin/startBpmDaemon.sh**.

To Stop BPM

Windows: Select **Start** > **Programs** > **HP Business Process Monitor** > **Stop Business Process Monitor Service**.

Linux: Run **/opt/HP/BPM/bin/stopBpmDaemon.sh**.

How to Access BPM Admin

You access BPM Admin via a web browser on any computer connected to your intranet or to the Internet. The BPM Admin console uses Java applet technology for which you must install JRE on each client machine.

To access BPM Admin, use one of the following options:

- **Windows:** On the BPM host machine, you can select **Start** > **Programs** > **HP Business Process Monitor** > **Business Process Monitor Admin**. BPM Admin opens in a browser window.

- **Linux:** In a browser window, enter the URL **http://<host machine>:2696**, for example, `http://cats:2696`.

- In BSM:

  a. Access the **Admin** > **End User Management** > **Settings** > **BPM Agents** page.

  b. Click the **Open a Business Process Monitor Agent's Console** button. A BPM host opens the BPM Admin for that host in a new browser window. (You must have the necessary permissions to view and manage BPM agents in BSM. For details on permissions, see "Permissions" in the BSM Platform Administration Guide.)

> **Note:** The default port for BPM Admin is 2696. You can configure a new port if required. For details, see .

How to Restart BPM

The **Restart** option enables you to restart BPM. When you select this option, BPM Admin restarts all BPM instances on the host machine. Note that it may take a minute or longer for BPM Admin to reconnect to BPM.

> **Note:** When multiple run units (applications and business transaction flows) are running on a host, BPM generates start offset values to distribute script runs optimally over time. Restarting BPM prompts the recalculation of the start offset values.
>
> If you create or delete applications and business transaction flows in End User Management Administration, you can restart BPM to reset the automatic distribution of script runs. For more information on the automatic distribution feature, see "Start Offset" on page 139.

How to Change the Language of the BPM User Interface

In BPM 7.00 and later, you can view the BPM user interface 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 BPM Admin. The language preference chosen affects only the user's local machine and not the BPM machine or any other user accessing the same BPM. The language is determined when you first open BPM Admin. Changing the language preference in your browser when you are working in BPM Admin has no affect until you close and reopen BPM Admin.

Notes and Limitations

- Starting from BPM version 7.0, there is no language pack installation. All translated languages are integrated into BPM Multi-lingual User interface (MLU).

- 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 BPM definitions and configurations.

- If a user selects a language which is not supported by the BPM Multi-lingual User interface, the BPM Admin user interface appears in English.

- Virtual User Generator (VuGen) 12.02 has limitations when working with non-English character sets. For further information see "Non-English Language Limitations" on page 23.

Notes and Limitations for BPM on Windows

This section includes notes and limitations for BPM when it is installed on Windows Server 2008 or Windows 7.

User Type

Business Process Monitor on Windows Server 2008 R2, Windows Server 2012 R2, or Windows 7 must run under a user that has **Administrator** privileges.

Disabling User Account Control

To run Business Process Monitor on Windows Server 2008 R2, Windows Server 2012 R2, or Windows 7, **User Account Control (UAC)** must be disabled for users with **Administrator** privileges.

Manual Procedure Before Installing BPM on Windows Server 2008 R2 64 Bit Platforms

You must carry out the following procedure before installing BPM on a Windows Server 2008 R2 64-bit platform:

1. Open Server Manager (**Start** > **Administrative Tools** > **Server Manager**).

2. Click **Features** in the left tree and then click **Add Features** in the right panel.

3. Select the **.NET Framework 3.5.1 Features** check box and follow the online instructions.

4. After .NET Framework 3.5.1 is installed, restart the computer and start the BPM installation.

Chapter 3: BPM Agents

BPM agents are the BPM data collectors registered in BSM.

To access

To open the Agent Manager dialog box, in the BPM Admin console, go to **Tools** > **Agent Manager**.

Learn About

Agent Manager Option

The Tools menu contains the **Agent Manager** option, which you use to add additional BPM agents to the BPM Tree. Adding additional agents to the tree enables you to view and administer multiple BPM agents from the same BPM Admin console. When you add a BPM host in the Agent Manager, the host is displayed in the BPM Tree and the configuration is persistent (that is, if you close the browser and then reopen BPM Admin, the BPM hosts that were added in the Agent Manager still appear).

Task

How to Add and Configuring an Agent

In the Agent Manager dialog box, click the **Add Agent** button. The Add Agent dialog box opens. For details, see "Add Agent Dialog Box" on the next page.

How to Delete an Agent

In the Agent Manager dialog box, select the agent and click the **Delete Agent** button.

How to Refresh the List of Agents

In the Agent Manager dialog box, click the **Refresh** button.

UI Description

Agent Manager Dialog Box

User interface elements are described below:

UI Element	Description
Content Pane	
✳	**Add Agent.** Opens the Add Agent dialog box, where you configure an agent to add to the BPM Tree.
	Note: You should configure hosts using their fully qualified domain name (FQDN) or their IP address. If you add the same host twice, once with the FQDN and once without, these are considered as separate hosts and multiple entries are created in the hierarchical BPM Tree. The same behavior occurs if you configure the same host twice, once with an IP address and once with FQDN.
🖊	**Edit Agent.** Opens the Edit Agent dialog box, where you modify the settings of the selected agent.
✖	**Delete Agent.** Removes a selected agent from the BPM Tree.
🔄	**Refresh.** Refreshes the list of agents that have been added to the BPM Tree.
<Agents>	A list of the BPM agents that have been added to the BPM Tree.
Agent Details Pane	
Protocol	The communications protocol used to communicate with the selected BPM agent—**http** or **https**.
Host	The host name of the selected BPM agent.
Port	The port number used to communicate with the selected BPM agent.
Basic authentication user name	The user name for the agent machine's Tomcat basic authentication, if used.
Server status	The current connection status of the selected BPM agent's host machine.

Add Agent Dialog Box

User interface elements are described below:

UI Element	Description
Protocol	The communications protocol used to communicate with the BPM agent you are adding—**http** or **https**. **Default value:** http
Host name	The host name of the selected BPM agent you are adding. **Note:** Use a fully qualified domain name (FQDN).
Port	The port number used to communicate with the BPM agent you are adding. **Default value:** 2696
Basic authentication user name	The user name for the agent machine's Tomcat basic authentication, if used.
Basic authentication password	The password for the agent machine's Tomcat basic authentication, if used.

Chapter 4: BPM Entities

The following BPM entities can be assigned to BPM instances on the host machine:

- Applications

- Business transaction flows

- Business transactions

- Profiles (only for instances that connect to BSM systems earlier than version 9.00)

BPM instances and entities are represented by entity icons in a hierarchical tree called the BPM Tree, which appears in the Browse tab. For information about the BPM Tree, see "Browse Tab" on the next page. For information about entity icons, see "Entity Icons" on page 36.

To access

To access the BPM Tree pane, open the BPM Admin console. For details, see "How to Access BPM Admin" on page 28.

Learn About

- "BPM Instances" on page 44

- "BPM Applications" on page 65

- "Business Transaction Flows" on page 75

- "Business Transactions" on page 88

Tasks

How to View Information About an Entity

In the BPM Tree, hold the cursor over an entity to display its type and full name. Click an entity to display and configure its settings in the right-hand pane of the BPM Admin console.

How to Search for an Entity

To search for an entity, enter a string in the **Entity name** field in Search tab. For details, see "Search Tab" on the next page.

How to Refresh the BPM Tree

To refresh the BPM Tree, click the **Refresh Tree** ⟳ button in the Browse tab tool bar.

UI Description

Browse Tab

The Browse tab appears in the left pane of the BPM Admin console. The BPM Tree appears in the Browse tab.

The following is an example of the BPM Tree:
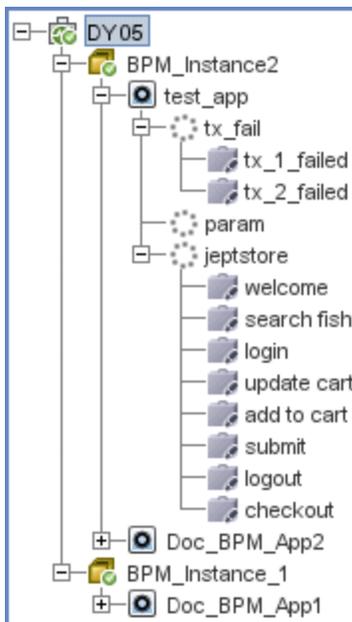
Clicking an entity in the BPM Tree displays the entities details in the right pane of the BPM Admin console. You can configure relevant settings for the selected entity.

Search Tab

In the Search tab, you can search for entities whose name contains a specified string. The search tab includes the following areas:

- ### Search Definition Area

  This area enables you to specify the string to search for in the entity names.

  User interface elements are described below:

UI Element	Description
Entity name	Enter the string for which to search.
Search	Click **Search** to run the search.
Clear	Click **Clear** to clear the string in the **Entity name** element.

- ### Search Results Area

  This area appears after running a search. It enables you to view the search results (that is, the entities whose name include the specified string).

  User interface elements are described below:

UI Element	Description
	Display in Business Process Monitor Tree. Displays the selected entity in the hierarchical tree in the **Browse** tab. For details, see "Browse Tab" on the previous page.
Entity name	The entity name. **Note:** You can filter the list of search results by entering a string in the filter at the top of this column.
Entity type	The type of entity. **Note:** You can filter the list of search results by selecting a specific entity type to display from the drop-down list in the filter at the top of this column.

Entity Icons

An icon is displayed for each entity in the tree, enabling you to identify the entity type. The following icons are used:

Icon	Represents
	BPM Host

Icon	Represents
	Instance – registration data received (from BSM or from persistence files), and no errors occurred for this instance. **Note:** The displayed instance status is the status received in the last communication from BSM.
	Instance – problem occurred (for example, connectivity to BSM failed, or failed to create a specific user for that instance). **Note:** The displayed instance status is the status received in the last communication from BSM.
	Application
	Business Transaction Flow
	Business Transaction
	Profile **Note:** Profiles are shown only for instances that connect to BSM systems earlier than version 9.00.

Action Buttons

The tool bar of action buttons for BPM hosts and instances is located at the top of the Browse tab. Only the actions that are applicable to the entity selected in the tree are enabled.

For details on host actions, see "Host Action Buttons" on page 41.

For details on instance actions, see "Instance Action Buttons" on page 47.

The **Refresh** button, which you click to refresh the BPM Tree, is enabled for all entities.

Note: You can also access actions for a selected entity in the BPM Tree by right-clicking the entity to display a Shortcut menu of applicable actions.

Chapter 5: BPM Host Machine

The BPM Host page displays basic information about the BPM installation and the host machine on which it is installed.

To access

To access the Host page, select the host entity in the BPM Tree displayed in the left pane of the BPM Admin console. The host entity is the entity at the top of the tree. For details about the BPM Tree, see "Browse Tab" on page 35.

Learn About

Setting user credentials

By default, BPM is set to run as a system user. You can set BPM to run as a specific user (recommended) so that all BPM-related processes, as well as all tasks defined for all BPM instances, run as that user. Running it as a specific user limits access to resources, settings, and applications located on the local machine. (This may not be true for resources located on remote machines, where a specific user may have different privileges than the local system user.)

For details on setting user credentials, see "How to set user credentials" on the next page.

You can set BPM to run as a specific user during BPM installation, or set an individual BPM instance to run as a specific user (as described in "Run as a Specific User Area" on page 60).

> **Caution:** If you want to run QuickTest Professional (QTP) or Unified Functional Testing (UFT) tests, do not set BPM (or a relevant BPM instance) to run as a specific user.

> **Tip:** We recommend that you run tests or scripts for all protocols (with the exception of QTP/UFT protocols and web protocols) with the BPM instance/whole BPM set to run as a specific user.

Tasks

How to view information about the BPM host machine

See "How to View Information About an Entity" on page 34.

How to run a Page Component Breakdown report

See "How to Run a Page Component Breakdown Report" on page 91.

How to run WebTrace reports

See "How to Run WebTrace Reports" on page 109.

How to set user credentials

Note: If you have enabled BPM integration with QTP/UFT, do not set specific user credentials for either an individual instance of BPM or the whole BPM.

1. Stop BPM.

2. If you are setting the whole BPM to run as a specific user, ensure that no individual BPM instances are set to run as a specific user.

3. Set full control permissions for the user as follows:

   - **Windows:** See "How to set full user permissions on a Windows platform" below.

   - **Linux:** In the **/opt/HP directory**.

4. In the Actions menu, select the Set User Credentials option. The Set User Credentials on Agent dialog box opens.

5. In the Set User Credentials on Agent dialog box, select **Other user**. For details, see "Set User Credentials on Agent Dialog Box" on page 43.

How to set full user permissions on a Windows platform

1. Browse to the user Temp folder of the default user or the user that runs the BPM. The usual path of the Temp folder is C:\Users\<User name>\AppData\Local\Temp

2. In the Temp directory, perform the following actions:

   a. Right-click and select **Properties**. The Temp Properties dialog box opens.

   b. In the Temp Properties dialog box, select the **Security** tab.

   c. Select the user in the **Name** area.

   d. In the **Permissions** area select the **Allow** check box for **Full Control**.

   e. Click **OK** to save your changes and close the dialog box.

3. Browse to the Temp directory in the Windows installation folder (usual path **C:\<Windows installation folder>\Temp**) and repeat the actions described in step 2 of this procedure.

4. Browse to the default workspace directory for BPM and repeat the actions described in step 2 of

this procedure.

5. Browse to the default application directory for BPM and repeat the actions described in step 2 of this procedure.

> **Note:** For details on the default application directory, see "How a Silent Installation Assigns Values" in the Business Process Monitor Deployment Guide.

6. Browse to the default configuration directory (usual path **<BPM application directory>\config**) and repeat the actions described in step 2 of this procedure.

7. If you have enabled BPM integration with QTP/UFT, browse to the **<BPM application directory>\config\agent1.cfg** file and repeat the actions starting from step 2 of this procedure for the user specified in the **QtpUserName** parameter.

8. **(Windows Server 2008 R2 and 2012 R2 platforms)** Assign the user the logon right **Allow log on locally**. (For details, see http://technet.microsoft.com/en-us/library/cc756809(WS.10).aspx.)

How to create troubleshooting files

The **Create Troubleshooting File** option enables you to create a zip file of various BPM directories and files for analysis or support purposes. When you select this option, the Create Troubleshooting File dialog box opens in a new window where you can select the following options:

- **Zip BPM Config and Workspace directories.** Select this to zip the entire contents of the Workspace and Config directories.

- **Include script directories.** The zip file is created by default without the script directories, minimizing the file size and enabling you to keep the script contents confidential. If the script directories are required, select this option to include them in the file, but note that this may considerably increase the size of the zip file.

> **Note:** This option is enabled only when you select the Zip BPM Config and Workspace directories option.

- **Zip BPM client log files.** These are files generated by the BPM Admin GUI on the client machine and give information to assist in troubleshooting the application GUI.

By default, a file called **BPM-<host name>-<date>-<time>.zip** is created, but you can specify a different file name and also select the location in which to save the file.

UI Description

BPM Tree

See "Browse Tab" on page 35.

Host Action Buttons

When a BPM host is selected, the following action buttons are enabled in the Browse tab of the BPM Tree pane:

Button	Description	For details, see the relevant help section below
✳	**Create New Instance.** Opens the Create New Instance wizard, which you use to create a new instance on a BPM host. **Note:** You can create a maximum of 16 instances on a BPM host.	"How to Create an Instance" on page 45
👓 ▾	**Browse.** Opens a menu with the following browse options:	
	Browse Workspace	"How to Browse the Workspace Directory" on page 125
	Browse Configuration Folder	"How to Browse the Configuration Folder" on page 146
▶ ▾	**Run.** Opens a menu with the following run options:	
	Run Page Component Breakdown	"How to Run a Page Component Breakdown Report" on page 91
	Run WebTrace	"How to Run WebTrace Reports" on page 109
📄	**Create Troubleshooting File.**	"How to create troubleshooting files" on the previous page
👤	**Set User Credentials.** Sets the user used to run the BPM.	"How to set user credentials" on page 39

Button	Description	For details, see the relevant help section below
	Restart BPM. Restarts the BPM. **Note:** Restarting BPM causes the loss of any data that has not yet been reported by BPM to BSM.	"How to Run BPM" on page 27

Note: You can also right-click a selected host in the BPM Tree to display a Shortcut menu of the applicable actions.

Business Process Monitor Host Page

User interface elements are described below:

UI Element	Description
Business Process Monitor name	The name of the BPM. The name is automatically assigned during installation and is derived from the name of the host machine on which the BPM is installed.
Health	The health of the BPM. The valid health statuses are: • **OK** • **Agent Launch Failed** • **The agent was killed, failed to set a timer for restarting it** • **Run as specific user – failed to switch to user** • **Run as specific user – invalid password**
Business Process Monitor operating system	The operating system of the host machine on which the BPM is installed.
Configuration directory	The BPM configuration directory. **Default value:** <BPM application directory>\config Users require read-write access to this directory.
Workspace directory	The BPM workspace directory, which you configure during the installation of BPM. **Default value:** <BPM application directory>\workspace Users require read-write access to this directory.

UI Element	Description
Number of scripts	The total number of scripts configured in all of the host's instances, and the number of those whose configuration status in EUM Administration is set to **Active**.
Number of WebTraces	The total number of WebTraces configured in all of the host's instances, and the number of those whose configuration status in EUM Administration is set to **Active**.
Number of transactions	The total number of transactions configured in all of the host's instances, and the number of those whose configuration status in EUM Administration is set to **Active**.

Set User Credentials on Agent Dialog Box

User interface elements are described below:

UI Element	Description
System user	Select this radio button to configure BPM to run as the system user.
Other user	Select this radio button to configure BPM to run as a specific user and enter the following information: • **Name.** The specific user name. • **Password.** The password for the specific user. • **Domain.** The domain of the specific user.

Chapter 6: BPM Instances

A single BPM installation can communicate with multiple BSM installations, each with its own tasks. Each such connection is called an instance.

You can view details about an instance in the BPM Instance page.

To access

To access the BPM Instance page, select an instance entity in the BPM Tree displayed in the left pane of the BPM Admin console. For details about the BPM Tree, see "Browse Tab" on page 35.

Learn About

Multiple BPM Instances

Your BPM installation can be used as the basis for multiple BPM instances on the host machine. For example, you may require additional instances on the host machine to work with different BSM Gateway Servers. Each instance runs its own tasks and reports independently to the relevant server. Multiple instances can also serve the same BSM installation with different logical host names.

Host Names

Each instance is assigned a unique host alias, referred to as the host name. This host alias is used when designating hosts to run transactions for your applications in EUM Administration. (Note that the host name does not imply the host machine name.)

Location Names

You define a location name for each instance, used to help identify the instance in EUM Administration and in EUM reports. The same location name can be used for multiple instances, and does not need to be the location of the BPM host machine. Changing a location name in the Location Manager in BSM overrides the location configured for the instance in BPM Admin.

Authentication Schemes

For each instance, you specify server authentication, SSL, and proxy server information, as necessary. BPM supports basic and NTLM authentication schemes. (If you receive an error message when the server tries to communicate with the instance, check which authentication scheme is in use, and that the correct authentication and proxy information is defined for the instance.) For required parameter settings when configuring NTLM authentication, see "Parameters in sconn.cfg" on page 169.

> **Note:** You are required to specify the authentication user name and password parameters when creating or editing an instance.

Tasks

How to Create an Instance

You create an instance by using the Create New Instance wizard. To open this wizard, select a BPM

host machine in the BPM Tree and click the **Create New Instance** button in the Browse tab tool bar. For details on using the Create New Instance wizard, see "Create New Instance Wizard" on page 48.

After creating a new BPM instance, the host name for the instance is added to the list of available data collectors for running applications and business transaction flows in EUM Administration. For details on specifying hosts for applications and business transaction flows, see the BSM Application Administration Guide.

> **Note:**
>
> - The initial installation of BPM on the host machine automatically creates the first BPM instance in BPM Admin. For details, see "Deploying Business Process Monitor" in the Business Process Monitor Deployment Guide.
>
> - You can create a maximum of 16 instances on a BPM host.

How to Delete an Instance

Select an instance in the BPM Tree and click the **Remove Instance** button in the Browse tab tool bar.

How to Configure Instance Settings

Select an instance in the BPM Tree and click the Configuration tab in the Instance page. For details, see "Configuration Tab" on page 57.

How to Configure Forward Proxy Settings

See "Proxy Settings Area" on page 64.

How to Configure Authentication Parameters for a BPM Instance

See "Security Settings Area" on page 62.

How to Browse Instance Files

Select an instance in the BPM Tree and click the **Browse** ⟨6⊝⟩ ▾ button. In the drop-down menu, select the Browse Instance Files option. The Browse Instance Files dialog box opens in a new window that includes the following areas:

- **Left pane.** Displays a tree of the files included in the instance's **Site(n)** directory (the root entry in the tree), where **(n)** is an internal number assigned by BPM Admin to the instance. The files included are configuration and script files.

  > **Note:** The following files are not included in the instance directory:
  >
  > - Log files for retrieving configurations from BSM
  >
  > - Log files for sending samples to BSM
  >
  > - Log files for BSM business logic

- **Right pane.** Displays the contents of the file you select in the tree in the left pane. If the selected file is empty, the right pane also remains empty.

  > **Note:**
  >
  > - You cannot edit the files from BPM Admin, only view the file contents.
  >
  > - Use CTRL+F to find a specific string in a file.

How to Update Changes Made in EUM Admin to the BPM Instance

Click the **Request Configuration Update** ⟨G⟩ button in the Browse tab tool bar. For details, see "Instance Action Buttons" on the next page.

How to Purge Samples

Select an instance in the BPM Tree and click the **Purge Samples** ⟨🗑⟩ button. All task reports waiting to be relayed to the BSM Gateway Server is removed from the queue.

> **Caution:** When you click the **Purge Samples** button, all waiting data is purged from the BPM memory and cannot be retrieved.

How to Run a BPM Instance as a Specific User

In addition, you can configure the BPM instance to run as a specific user, so that all tasks defined for the instance run as a specific user. Running the BPM instance as a specific user may be necessary to solve access permission problems on your network.

You can also set all BPM instances on the machine to run as a specific user, as described in "How to set user credentials" on page 39.

UI Descriptions

- "Instance Action Buttons" below

- "Create New Instance Wizard" on the next page

- "Status Tab" on page 55

- "Configuration Tab" on page 57

Troubleshooting/Limitations

Limitation

A BPM instance does not run applications or business transaction flows when you change a host name.

Instance Action Buttons

When you select a BPM instance, the following action buttons are enabled in the Browse tab tool bar:

Button	Description
✖	**Remove Instance.** Deletes the selected instance.
👓 ▾	**Browse.** Opens a drop-down menu. Click the Browse Instance Files option. The instance log files appear in a new window. For details, see "How to Browse Instance Files" on the previous page.
🔄	**Request Configuration Update.** Updates changes made in EUM Administration (in BSM) to the BPM instance. Clicking this button enables you to manually prompt BPM to poll for changes. BPM also automatically polls for updates, according to the defined job poll interval for the instance (default value: 2 minutes).
🗑	**Purge Samples.** Removes all task reports waiting to be relayed to the BSM Gateway Server from the queue. **Note:** When you click the **Purge Samples** button, all waiting data is purged from the BPM memory and cannot be retrieved.

> **Note:** You can also right-click a selected instance in the BPM Tree to display a Shortcut menu of the applicable actions.

Create New Instance Wizard

The elements included in the wizard pages are the same as the corresponding elements in the Instance page, where you can view and edit an existing instance's settings.

This wizard contains the following pages:

- "Define Identification Parameters Page" below

- "Run Instance as User Page" on page 50

- "Proxy Connection Settings Page" on page 52

- "Security Settings Page" on page 53

Define Identification Parameters Page

This page enables you to configure the connection settings to the BSM Gateway server.

> **Note:** The display, host, and location names must be entered in English. If you use non-English strings in any of the names, BPM must be installed on an operating system that supports these characters.

User interface elements are described below:

UI Element	Description
Display name	The display name defined for the instance in BPM Admin. This name is only used within BPM Admin to identify the instance in the BPM Tree.
	Syntax rules:
	- Can be up to 50 characters.
	- Can include the following characters: **0-9**, **a-z**, **A-Z**, hyphen (**-**), underscore (**_**).
	- Cannot start or end with a hyphen (**-**) or an underscore (**_**).

UI Element	Description
Gateway Server URL	The full URL of the **BSM Default Virtual Gateway Server for Data Collectors** as defined in BSM Platform settings, to which this instance sends collected data. The URL must be in the following format: http (or https)://<Gateway Server name or IP address>:<port number>. If you do not specify a port number, the default port is used (80 for http and 443 for https). **Note:** • The URL is case sensitive. • The URL cannot contain non-English characters. BPM does not support International Domain Names for the Gateway Server URL.
Host name	The host name defined for the instance. The host name is used to identify the instance in EUM Administration and reports in BSM. The host name must be unique within the BSM environment. If you change the host name for an instance, BSM assigns a new HostID value to the BPM instance. As a result, the BPM instance does not run applications or business transaction flows (or profiles for systems earlier than BSM version 9.00) that use the original host name. To enable applications and business transaction flows (or profiles) to run correctly after changing the host name, you must update your applications and business transaction flows (or profiles) in EUM Administration to use the new instance host name. **Syntax rules:** • Do not use special characters if these characters are not supported in BSM. Unsupported characters are blocked by BPM Admin. • Can be up to 50 characters. • Can include the following characters: **0-9**, **a-z**, **A-Z**, **` ~ ! @ # $ % ^ & * ( ) _ - + = [ ] { }	/ ? . , " ' : ; < > (space)**.

UI Element	Description
Location name	The location defined for the instance. **Note:** Do not change the location for a BPM instance that is designated as the host for a profile, when the database for the profile is down. Doing so removes the mapping from the profile to the instance, with no recovery. **Syntax rules:** • Can be up to 50 characters. • Can include the following characters: **0-9**, **a-z**, **A-Z**, **` ~ ! @ # $ % ^ & * ( ) _ - + = [ ] { }	/ ? . , : ; (space)**.
Job poll interval (minutes)	The defined frequency (in minutes) with which BPM polls for assigned tasks (for example, running scripts or WebTrace) and changes to application configurations. This is a positive integer of up to 4 digits. **Default value:** 2
Time poll interval (minutes)	The defined frequency (in minutes) with which BPM polls BSM for time synchronization. This is a positive integer of up to 4 digits. **Default value:** 60 **Note:** If a time change is made on the BSM Gateway Server, for example, for daylight saving time, then the time poll interval value should be changed to a value smaller than the default of 60 minutes, for each BPM instance. If this is not done, it may take up to an hour for BPM to be synchronized with the time change in BSM, and during this period the BPM samples are reported with the wrong time stamp.

Run Instance as User Page

By default, each BPM instance runs on the host machine as the system user, unless you configured the whole BPM to run as a specific user (as described in "How to set user credentials" on page 39).

This page enables you to configure an individual instance (and not the whole BPM) to run as a specific user. Running an instance as a specific user limits access to resources, settings, and applications located on the local machine. (This may not be true for resources located on remote machines, where a specific user may have different privileges than the local system user.)

Note: If you want to run QuickTest Professional/Unified Functional Testing scripts as a specific user, it is recommended that you set each relevant BPM instance to run as a specific user before assigning the QuickTest Professional/Unified Functional Testing scripts.

After running QuickTest Professional/Unified Functional Testing scripts as the system user, if you then set the BPM instance to run as a specific user, the script may fail. In this case, restart the BPM machine.

User interface elements are described below:

UI Element	Description
User name	The specific user name. **Syntax rules:** • Can be up to 24 characters. • Cannot include spaces, non-Latin letters (such as Greek or Cyrillic), or any of the following characters: **(; : " <> * + = \ | ? ,)**.
Group	The user group. **Note:** This field is for BPM on Linux only.
Password	The password for the user. **Note:** This field is for BPM on Windows only.
Domain	The domain of the user. **Note:** This field is for BPM on Windows only. **Syntax rules:** • Can be up to 67 characters long. • Can include the following characters: **0-9**, **a-z**, **A-Z**, hyphen (**-**). • Cannot start or end with a hyphen (**-**), nor can it include spaces.

If you are running a BPM instance as a specific user without administrator permissions on the local machine, you need to set additional permissions for the user.

Windows

Set additional permissions for a specific user without administrator permissions:

1. Assign Read & Execute permissions to the BPM installation directory.

2. Assign Full Control permissions to the relevant directory for the instance. For example, the first instance must have access rights to the **..\Workspace\agent1\site1** directory.

3. Assign Write permissions to the **..\Workspace\agent1\data\snapshots** directory.

4. Assign Write permissions to the default user temp directory. All MDRV based programs in the system use this directory for certain processes, for example when using a script with parameters. The directory is usually located under:

- Windows Server 2003

  C:\Documents and Settings\Default User\Local Settings\Temp

- Windows Server 2008 and Windows 7

  C:\Users\<User name>\AppData\Local\Temp

Linux

Enable the instance Run as User feature for Linux:

1. Open the **/etc/sudoers** file with a dedicated editor (for example, sudoedit).

2. Replace the line `Defaults requiretty` with `Defaults !requiretty`.

3. Replace the line `root ALL=(ALL) ALL` with `root ALL=(ALL:ALL) ALL`.

4. At the end of the **Defaults env_keep** definition section add:

   Defaults env_keep += "PATH M_LROOT QTLIB QTINC PRODUCT_DIR"

   Note: If there is no line beginning with `Defaults env_keep=` already in the file, then add the line:

   Defaults env_keep = "PATH M_LROOT QTLIB QTINC PRODUCT_DIR" (there is no plus sign before the equals sign)

5. Save.

Proxy Connection Settings Page

On this page, you configure forward proxy settings if the BPM machine requires a proxy server for access to external servers (for example, a BSM virtual server such as the BSM Gateway Server or a load balancer/reverse proxy in front of a BSM Gateway Server).

Note:

- To configure access to BSM through a reverse proxy, do not use these proxy settings, but configure the reverse proxy server URL instead of the Gateway Server URL in "Define Identification Parameters Page" on page 48.

- If you create an instance with proxy settings and the instance gives errors and does not function properly, delete the instance, recreate it without proxy settings, and then add the required proxy settings to the recreated instance.

- You cannot connect a forward proxy configured for NTLM authentication to a BSM server configured for SSL.

User interface elements are described below:

UI Element	Description
Proxy user name	The user name for the proxy server. **Note:** To configure a user name, you must also configure the proxy server URL.
Proxy password	The password for the user.
Proxy domain	The domain of the user.
Proxy URL	The URL for the proxy server. **Note:** The proxy URL must be in the following format: http (or https)://<host name or IP address>:<port number>/URI path.
Proxy authentication type	The type of authentication—**Basic** or **NTLM**. **Default value:** Basic

Security Settings Page

On this page, you configure authentication parameters for the BPM instance to support the authentication scheme in use by the BSM Virtual Gateway Server for Data Collectors (basic or NTLM authentication). It also enables you to define SSL settings if the BPM instance is communicating with BSM using SSL.

For more information on using basic authentication in BSM, see the BSM Hardening Guide.

For more information on supporting SSL communication, see "How to Communicate Using SSL" on page 173.

> **Note:**
>
> - To define basic authentication requirements for accessing BPM Admin, see "How to Configure Authentication for the BPM Admin Tool" on page 176.
>
> - For required parameter settings when configuring NTLM authentication, see "Parameters in sconn.cfg" on page 169.

User interface elements are described below:

UI Element	Description
Authentication Settings	
Authentication user name	The name of the user (recognized by the BSM Gateway Server) for authentication.

UI Element	Description
Authentication password	The password for the configured user.
Authentication domain	The domain for the configured user.
Authentication type	The type of authentication—**Basic** or **NTLM**. **Default value:** Basic
SSL Settings For details on obtaining a CA root certificate, see "How to Obtain a Certificate Authority Root Certificate and Establish Trust" on page 173.	
Truststore path	The full path and file name of the truststore file containing the trusted root certificates. The truststore file must be a java keystore file (JKS). **Note:** Configure this field only if you do not want to use the default JRE truststore (**/opt/HP/BPM/JRE/lib/security/cacerts**).
Truststore type	The type of truststore file. BPM supports **PKCS#12** and **JKS** truststore types. We recommend using **JKS**.
Truststore password	The password for the truststore file.
Keystore path	The full path and file name of the keystore file containing the client certificate and its private key. The keystore file must be either a java keystore file (JKS) or PKCS#12 type file. **Note:** • Configure this field only if BSM connection requires a client certificate. • Request a client certificate from your CA with keys marked as exportable.
Keystore type	The type of keystore file—JKS or PKCS#12.
Keystore password	The password for the keystore file.
Private key password	The password for the private key located in the keystore file.
Validate that the server certificates are trusted	Select this check box to validate that the authority that issued the BSM server certificate is trusted by BPM (that is, the certificate of the issuing authority has been imported to the BPM truststore).

UI Element	Description
Validate host names on server certificates	Select this check box to validate that the configured BSM server host name matches the name in the server certificate.
Validate that the server certificates are not expired	Select this check box to validate that the certificate is current.

Status Tab

The Status tab displays general information about the instance, its monitoring status, and the run units included in the instance. The status tab includes the following areas:

- "General Information Area" below

- "Monitoring Status Area" on the next page

- "Run Units Area" on the next page

General Information Area

This area enables you to view general information about the instance.

User interface elements are described below:

UI Element	Description
Display name	The display name defined for the instance in BPM Admin. This name is used within BPM Admin only to identify the instance in the BPM tree displayed in the left pane of the BPM Admin console.
Health	The communication status for the instance with BSM. If an error is displayed, click the details link to display the original error message in its raw format.
Instance ID	BPM internal ID for the instance. **Tip:** The ID may help you identify relevant folders in the BPM workspace.
Last update configuration request	The last time that BPM polled for changes made in EUM Administration to BPM. **Note:** BPM also automatically polls for updates, according to the defined job poll interval (default value: 2 minutes).
Last configuration update	The time of the last change made to the instance configuration.

Monitoring Status Area

This area displays information on the tasks for the instance.

User interface elements are described below:

UI Element	Description
Number of applications	The total number of applications associated with the instance, and the number of those whose status in EUM Administration is **Active**.
Number of scripts	The total number of scripts associated with the instance, and the number of those whose status in EUM Administration is **Active**.
Number of WebTraces	The total number of WebTraces associated with the instance, and the number of those whose status in EUM Administration is **Active**.
Number of transactions	The total number of transactions associated with the instance, and the number of those whose status in EUM Administration is **Active**.
Pending samples	The number of task reports (for completed runs of script transactions, WebTraces, and so forth) waiting to be relayed to the BSM Gateway Server. **Note:** There are no limitations to the size of the queue except for the amount of free disk space available.

Run Units Area

This area displays details of the run units included in the instance. Run units are applications, or business transaction flows with their own schedule. For details on run units, see "Run Units" on page 136.

Note: An inactive business transaction flow that is part of an active application is considered to have its own schedule and is therefore considered as a separate run unit.

User interface elements are described below:

UI Element	Description
Type	The run unit type—application or business transaction flow.

UI Element	Description
Run Unit Name	The run unit name (that is, the application or business transaction flow name). **Tooltip:** The run unit's schedule. **Note:** • Click the name to select the application or business transaction flow in the BPM tree and display the relevant page for it. For details on the Application page, see "BPM Applications" on page 65 and for details on the business transaction flow page, see "Business Transaction Flows" on page 75. • This column is not visible when working in BPM versions earlier than 9.00.
Last Run Start Time	The start time of the last run of the run unit on this instance, according to the local time on the BPM machine.
Last Run Duration	The time, in seconds, it took to execute the last run of the run unit.
Status	The current status of the run unit. Valid options are: • **Currently running.** The run unit is currently running tasks. • **Idle.** The run unit is running, but has no tasks running at this time. • **Stopped.** The run unit is stopped. • **Not initialized.** The run unit has not yet started its initial run. **Note:** If the status is Not initialized, the run unit is in the process of getting ready to run—creating the schedules, downloading the required scripts. If there is a problem (for example, if the script does not download or if there is an incorrect schedule definition) the run unit remains at this status and an error `"failed to initialize profile X ..."` is written in the **bpm_bsm_comm.log** file.
Application	The application name. If the run unit is an application, the run unit name and application are the same. If the run unit is a business transaction flow, this is the name of the application that includes the business transaction flow.

Configuration Tab

The Configuration tab enables you to view and change the instance settings.

The Configuration tab includes the following areas:

- "Business Service Management Registration Properties Area" below

- "Run as a Specific User Area" on page 60

- "Proxy Settings Area" on page 64

- "Security Settings Area" on page 62

Business Service Management Registration Properties Area

This area displays, and enables you to edit, the connection settings to the Business Service Management Gateway server.

Important information	The display, host, and location names must be entered in English. If you use non-English strings in any of the names, BPM must be installed on an operating system that supports these characters.

User interface elements are described below:

UI Element	Description
Display name	The display name defined for the instance in BPM Admin. This name is only used within BPM Admin to identify the instance in the BPM tree displayed in the left pane of the BPM Admin console. **Syntax rules:** - Can be up to 50 characters. - Can include the following characters: **0-9**, **a-z**, **A-Z**, hyphen (**-**), underscore (**_**). - Cannot start or end with a hyphen (**-**) or an underscore (**_**).
Gateway Server URL	The full URL of the **BSM Default Virtual Gateway Server for Data Collectors** as defined in BSM Platform settings, to which this instance sends collected data. The URL must be in the following format: http (or https)://<Gateway Server name or IP address>:<port number>. If you do not specify a port number, the default port is used (80 for http and 443 for https). **Note:** - The URL is case sensitive. - The URL cannot contain non-English characters. BPM does not support International Domain Names for the Gateway Server URL.

UI Element	Description
Host name	The host name defined for the instance. The host name is used to identify the instance in EUM Administration and reports in BSM. The host name must be unique within the BSM environment. If you change the host name for an instance, BSM assigns a new HostID value to the BPM instance. As a result, the BPM instance does not run applications or business transaction flows (or profiles for systems earlier than BSM version 9.00) that use the original host name. To enable applications and business transaction flows (or profiles) to run correctly after changing the host name, you must update your applications and business transaction flows (or profiles) in EUM Administration to use the new instance host name. **Syntax rules:** • Do not use special characters if these characters are not supported in BSM. Unsupported characters are blocked by BPM Admin. • Can be up to 50 characters. • Can include the following characters: **0-9**, **a-z**, **A-Z**, **` ~ ! @ # $ % ^ & * ( ) _ - + = [ ] { }	/ ? . , " ' : ; < > (space)**.
Location name	The location defined for the instance. **Note:** • This field is displayed only for instances that include profiles. That is, instances that are configured for HP Business Availability Center (installations earlier than BSM 9.00). • Do not change the location for a BPM instance that is designated as the host for a profile, when the database for the profile is down. Doing so removes the mapping from the profile to the instance, with no recovery. **Syntax rules:** • Can be up to 50 characters. • Can include the following characters: **0-9**, **a-z**, **A-Z**, **` ~ ! @ # $ % ^ & * ( ) _ - + = [ ] { }	/ ? . , : ; (space)**.
Job poll interval (minutes)	The defined frequency (in minutes) with which BPM polls for assigned tasks (for example, running scripts or WebTrace) and changes to application configurations. This is a positive integer of up to 4 digits. **Default value:** 2

UI Element	Description
Time poll interval (minutes)	The defined frequency (in minutes) with which BPM polls BSM for time synchronization. This is a positive integer positive of up to 4 digits. **Default value:** 60 **Note:** If a time change is made on the BSM Gateway Server, for example, for daylight saving time, then the time poll interval value should be changed to a value smaller than the default of 60 minutes, for each BPM instance. If this is not done, it may take up to an hour for BPM to be synchronized with the time change in BSM, and during this period the BPM samples are reported with the wrong time stamp.

Run as a Specific User Area

By default, each BPM instance runs on the host machine as the system user, unless you configured the whole BPM to run as a specific user (as described in "How to set user credentials" on page 39).

This area enables you to configure an individual instance (and not the whole BPM) to run as a specific user. Running an instance as a specific user limits access to resources, settings, and applications located on the local machine. (This may not be true for resources located on remote machines, where a specific user may have different privileges than the local system user.)

> **Note:** If you want to run QuickTest Professional/Unified Functional Testing scripts as a specific user, it is recommended that you set each relevant BPM instance to run as a specific user before assigning the QuickTest Professional/Unified Functional Testing scripts.
>
> After running QuickTest Professional/Unified Functional Testing scripts as the system user, if you then set the BPM instance to run as a specific user, the script may fail. In this case, restart the BPM machine.

User interface elements are described below:

UI Element	Description
User name	The specific user name. **Syntax rules:** • Can be up to 24 characters. • Cannot include spaces, non-Latin letters (such as Greek or Cyrillic), or any of the following characters: **(; : " <> * + = \ | ? ,)**.

UI Element	Description
Group	The user group. **Note:** This field is for BPM on Linux only.
Password	The password for the user. **Note:** This field is for BPM on Windows only.
Domain	The domain of the user. **Note:** This field is for BPM on Windows only. **Syntax rules:** • Can be up to 67 characters long. • Can include the following characters: **0-9**, **a-z**, **A-Z**, hyphen (**-**). • Cannot start or end with a hyphen (**-**), nor can it include spaces.

If you are running a BPM instance as a specific user without administrator permissions on the local machine, you need to set additional permissions for the user.

Windows

Set additional permissions for a specific user without administrator permissions:

1. Assign Read & Execute permissions to the <BPM installation directory>.

2. Assign Full Control permissions to the relevant directory for the instance. For example, the first instance must have access rights to the **..\Workspace\agent1\site1** directory.

3. Assign Write permissions to the **..\Workspace\agent1\data\snapshots** directory.

4. Assign Write permissions to the default user temp directory. All MDRV based programs in the system use this directory for certain processes, for example when using a script with parameters. The directory is usually located under:

   ▪ Windows Server 2003

     C:\Documents and Settings\Default User\Local Settings\Temp

   ▪ Windows Server 2008 and Windows 7

     C:\Users\<User name>\AppData\Local\Temp

Linux

Enable the instance Run as User feature for Linux:

1. Open the **/etc/sudoers** file with a dedicated editor (for example, sudoedit)

2. Replace the line `Defaults requiretty` with `Defaults !requiretty`

3. Replace the line `root ALL=(ALL) ALL` with `root ALL=(ALL:ALL) ALL`

4. At the end of the **Defaults env_keep** definition section add:

    Defaults env_keep += "PATH M_LROOT QTLIB QTINC PRODUCT_DIR"

    Note: If there is no line beginning with `Defaults env_keep=` already in the file, then add the line:

    Defaults env_keep = "PATH M_LROOT QTLIB QTINC PRODUCT_DIR" (there is no plus sign before the equals sign)

5. Save

Security Settings Area

This area enables you to configure authentication parameters for the BPM instance to support the authentication scheme in use by the BSM Virtual Gateway Server for Data Collectors (basic or NTLM authentication). It also enables you to define SSL settings if the BPM instance is communicating with BSM using SSL.

For more information on using basic authentication in BSM, see the BSM Hardening Guide, part of the HP Business Service Management Documentation Library.

For more information on supporting SSL communication, see "How to Communicate Using SSL" on page 173.

> **Note:**
>
> - To define basic authentication requirements for accessing BPM Admin, see "How to Configure Authentication for the BPM Admin Tool" on page 176.
>
> - For required parameter settings when configuring NTLM authentication, see "Parameters in sconn.cfg" on page 169.

User interface elements are described below:

UI Element	Description
Authentication Settings	
Authentication user name	The name of the user (recognized by the BSM Gateway Server) for authentication.

UI Element	Description
Authentication password	The password for the configured user.
Authentication domain	The domain for the configured user.
Authentication type	The type of authentication—**Basic** or **NTLM**. **Default value:** Basic
SSL Settings For details on obtaining a CA root certificate, see "How to Obtain a Certificate Authority Root Certificate and Establish Trust" on page 173.	
Truststore path	The full path and file name of the truststore file containing the trusted root certificates. The truststore file must be a java keystore file (JKS). **Note:** Configure this field only if you do not want to use the default JRE truststore (**/opt/HP/BPM/JRE/lib/security/cacerts**).
Truststore type	The type of truststore file. BPM supports **PKCS#12** and **JKS** truststore types. We recommend using **JKS**.
Truststore password	The password for the truststore file.
Keystore path	The full path and file name of the keystore file containing the client certificate and its private key. The keystore file must be either a java keystore file (JKS) or PKCS#12 type file. **Note:** • Configure this field only if BSM connection requires a client certificate. • Request a client certificate from your CA with keys marked as exportable.
Keystore type	The type of keystore file—JKS or PKCS#12.
Keystore password	The password for the keystore file.
Private key password	The password for the private key located in the keystore file.
Validate that the server certificates are trusted	Select this check box to validate that the authority that issued the BSM server certificate is trusted by BPM (that is, the certificate of the issuing authority has been imported to the BPM truststore).

UI Element	Description
Validate host names on server certificates	Select this check box to validate that the configured BSM server host name matches the name in the server certificate.
Validate that the server certificates are not expired	Select this check box to validate that the certificate is current.

Proxy Settings Area

This area enables you to configure forward proxy settings, if the BPM machine requires a proxy server for access to external servers (for example, a BSM virtual server such as the BSM Gateway Server or a load balancer/reverse proxy in front of a BSM Gateway Server).

Important information	• To configure access to BSM through a reverse proxy, do not use these proxy settings, but configure the reverse proxy server URL instead of the Gateway Server URL in "Business Service Management Registration Properties Area" on page 58. • If you create an instance with proxy settings and the instance gives errors and does not function properly, delete the instance, recreate it without proxy settings, and then add the required proxy settings to the recreated instance. • You cannot connect a forward proxy configured for NTLM authentication to a BSM server configured for SSL.

User interface elements are described below:

UI Element	Description
Proxy user name	The user name for the proxy server. **Note:** To configure a user name, you must also configure the proxy server URL.
Proxy password	The password for the user.
Proxy domain	The domain of the user.
Proxy URL	The URL for the proxy server. **Note:** The proxy URL must be in the following format: http (or https)://\<host name or IP address>:\<port number>/URI path.
Proxy authentication type	The type of authentication—**Basic** or **NTLM**. **Default value:** Basic

Chapter 7: BPM Applications

You can view the details of applications configured in EUM Administration on the BPM Application page. The Application page appears in the right pane of the BPM Admin console.

To access

To access the Application page:

1. Open BPM Admin. For details, see "How to Access BPM Admin" on page 28.

2. Select an application in the BPM Tree that appears in the left pane of the BPM Admin console. For details about the BPM Tree, see "Browse Tab" on page 35.

Learn About

Setting a Log Level

Many scripts (for example, HP LoadRunner scripts and HP Virtual User Generator scripts for web-based protocols) include runtime settings that determine the extent of the information logged to the output when the script is run. There are three settings for logging: **Disabled**, **Brief**, and **Extended**. By default, BPM runs the scripts using the Disabled log level. This means that only minimum information is logged to the **mdrv** log for each run of the script.

You can change the log level for a specific script run when you invoke a single run of the script in the Business Transaction Flow page. Changing the log level to Brief or Extended introduces extra overhead in the **mdrv** log files, and may slow down the run of the script (so affecting the measured run times). An Extended log is helpful for debugging a script, but is otherwise not recommended.

For task details, see "How to Run a Task (Script or WebTrace)" on the next page.

Tasks

How to Configure Applications in EUM Admin

You configure applications in EUM Admin.

When you configure applications, application names (as well as the names of the included transactions and scripts):

- Must be entered in the same language that is set for the operating system on which BPM is installed

- Must contain only characters that are supported by the operating system on which BPM is installed

For more details on configuring applications in EUM Administration, see "Business Process Monitor Application Configuration Wizard" in the BSM Application Administration Guide.

How to View Application Status Information

See "Monitoring Status Area" on page 68.

How to Run a Task (Script or WebTrace)

In the Monitoring Status area:

1. Select a task and click the **Run Task** button. The Run Script dialog box opens showing details of the run.

2. In the Log level field, select a log level (Disabled, Brief, or Extended) to determine the extent of the information logged to the output for the script run. For details about log levels, see "Setting a Log Level" on the previous page.

3. Enter additional command line parameters.

4. Enter a timeout value, in minutes. This value determines how long BPM attempts to retrieve the web page component data before timing out. The default timeout value is 15 minutes.

5. Click **Run**.

Note: These settings are applicable only to this run of the script. The task run data is not sent to BSM. The task run does not affect the run unit's regular scheduling in BPM, or the run of any other run unit in BPM.

How to Browse Scripts

In the Monitoring Status area, select a task and click the **Browse Script** button. The Browse Script dialog box opens. If an MDRV log file exists, it is selected automatically. For details on log files, see "Log Files" on page 128.

Note: This button is disabled for all WebTraces and for scripts for which there is no Last Run Status data.

UI Description

- "General Information Area" on the next page

- "Schedule List Area" on the next page

- "Monitoring Status Area" on the next page

- "Business Transaction Flows Overriding Application Schedule Area" on page 70

- "Script Properties Window" on page 83

- "WebTrace Properties Window" on page 85

General Information Area

This area enables you to view general information about the application.

User interface elements are described below:

UI Element	Description
Display name	The name of the application as configured in EUM Administration in BSM.
Status	The current status of the application in BSM—**Active**, **Inactive**, or **Downtime**.
Location name	The location defined for the instance. **Note:** - The location name represents the name set by the Location Manager. For details, see Location Manager in the BSM Platform Administration Guide. - The location name may be overridden by the Location Manager in BSM.

Schedule List Area

This area enables you to view the schedules configured for the application.

User interface elements are described below:

UI Element	Description
Schedule Description	The schedule for running the application on this BPM instance, as configured in EUM Administration. If the application has multiple schedules, all schedules are shown. (For more information, see "Run Units" on page 136.)
Time Zone	The time zone to use for the BPM instance, as configured in EUM Administration.
Start Offset	The start offset, which specifies the delay between the application schedule time and the actual run time. (For information on how the start offset is calculated, see "Start Offset" on page 139.)

Monitoring Status Area

This area enables you to view general information about the application, as well as the running order and dependencies of the selected application's tasks.

User interface elements are described below:

UI Element	Description
<General Information>	
Number of tasks	The number of tasks included in the application run unit.
Status	The application run unit status. Valid options are: • **Not initialized** – The run unit has not yet been initialized. • **Running** – The run unit is currently running on this BPM instance. • **Idle** – The run unit is not currently running on this instance and is waiting for the next scheduled run. • **Downtime** – The run unit is not currently running on this instance.
Last start time	The time that the run unit was last run.
Last run duration	The duration of the run unit's last run.
Run mode	The run mode configured for the application. For details on run modes, see "Run Modes" on page 140.
<Tasks>	
	Task Properties. Opens a new window showing the script or WebTrace properties. For details, see "Script Properties Window" on page 83 and "WebTrace Properties Window" on page 85.
	Browse Script. Displays the script log file (in case of error during last, run the **mdrv** log file) for the last run of the task. For details on log files, see "Log Files" on page 128. **Note:** This element is disabled for all WebTraces and for scripts for which there is no Last Run Status data.
	Run Task. Runs a selected task. Details of the run are reported in a new window.

UI Element	Description
Run Order	The order in which the tasks are run. This is determined by the run mode configured for the BPM in EUM Administration. For details on run modes, see "Run Modes" on page 140.
Name	The script or WebTrace name.
Type	The type of task—**script**, **WebTrace**, or **single URL**.
BTF	The business transaction flow in which the task is included, as configured in EUM Administration. **Note:** • WebTraces configured directly for the application are not included in a business transaction flow and in such cases, this cell displays **n/a**. • Click a business transaction flow link to select the business transaction flow in the BPM Tree and display the relevant page.
Status	The current status of the task. Valid options are: • **Not initialized** – The task has not yet been initialized. • **Running** – The task is currently running on this BPM instance. • **Idle** – The task is not currently running on this instance.
Version	The script version.

UI Element	Description
Last Run Status	The status of the last run. Valid options are: • **Finished properly** – The task finished running with no errors. • **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports (for example, the traceroute server may report "progress aborted" for a WebTrace request). Check the **network.txt** and **webtrace.txt** files in the **workspace\webtrace** folder. For details of browsing the workspace folder, see "How to Browse the Workspace Directory" on page 125. • **Failed to start** – The task failed to start running. • **Terminated unexpectedly** – The task failed during the run. • **Error: Aborted** – The task was aborted. • **Aborted (timeout)** – The task timed-out and stopped running. • **End status is not set** – The task has not run yet, therefore no end status is available. • **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The duration of the last run.

Business Transaction Flows Overriding Application Schedule Area

This area enables you to view general information about business transaction flows that are part of the application, but which have their own schedules, so are considered as separate run units.

User interface elements are described below:

UI Element	Description
BTF Name	The business transaction flow name.
Last Run Start Time	The time that the run unit was last run.
Last Run Duration	The duration of the last run of the run unit.

UI Element	Description
Status	The current status of the business transaction flow. Valid options are: • **Not initialized** – The run unit has not yet been initialized. • **Running** – The run unit is currently running on this BPM instance. • **Idle** – The run unit is not currently running on this instance.

Script Properties Window

This window displays general details about a script and its included transactions.

To access the Script Properties window for a selected script, click the **Task Properties** ⬚ button in the Tasks area or Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area.

User interface elements are described below:

UI Element	Description
General Information	
Name	The script name, as configured in EUM Administration.
Script Repository Version	The version of the script used.

UI Element	Description
Last Run Status	The status of the last run. Valid options are: ● **Finished properly** – The task finished running with no errors. ● **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports. Check the mdrv.log file for further information on the errors encountered. ● **Failed to start** – The task failed to start running. ● **Terminated unexpectedly** – The task failed during the run. ● **Error: Aborted** – The task was aborted. ● **Aborted (timeout)** – The task timed-out and stopped running. ● **End status is not set** – The task has not run yet, therefore no end status is available. ● **Not supported by OS** – The task's protocol is not supported by the operating system. ● **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.
Last Run Duration	The duration of the last run.
Transactions—lists the transactions included in the script and displays the following data for them:	
Name	The transaction name as used in the script.
Original Name	The original transaction name. **Note:** If you change the name of a Business Transaction CI in EUM Administration, the transaction name in existing scripts is not changed. Elsewhere, however, (for example, in Service Health, reports, and EUM Administration) the transaction name is changed and persistent data for the CI is preserved.
OK	The response time threshold below which the transaction's status is OK, as configured in EUM Administration.
Minor	The response time thresholds between which the transaction's status is Minor, as configured in EUM Administration.

UI Element	Description
Critical	The response time threshold above which the transaction's status is Critical, as configured in EUM Administration.
Outlier	The response time threshold above which the transaction is considered to be an Outlier, as configured in EUM Administration. Outliers are transactions whose response time exceeds a defined time range.
Availability	The availability threshold configured for the transaction in EUM Administration.
Parameters—lists the parameters used in the script and displays the following data for them:	
Name	The parameter name.
Value	The parameter value.

WebTrace Properties Window

This window displays general details about a WebTrace.

To access the WebTrace Properties window for a selected WebTrace, click the **Task Properties** button in the Tasks area or Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area.

User interface elements are described below:

UI Element	Description
URL	The URL accessed by the WebTrace.
Port	The port for the URL accessed by the WebTrace.

UI Element	Description
Last Run Status	The status of the last run. Valid options are: • **Finished properly** – The task finished running with no errors. • **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports (for example, the traceroute server may report "progress aborted" for a WebTrace request). Check the relevant WebTrace log files for further information on the errors encountered. For details on log files, see "Log Files" on page 128. • **Failed to start** – The task failed to start running. • **Terminated unexpectedly** – The task failed during the run. • **Error: Aborted** – The task was aborted. • **Aborted (timeout)** – The task timed-out and stopped running. • **End status is not set** – The task has not run yet, therefore no end status is available. • **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.
Last Run Duration	The duration of the last run.

Chapter 8: Business Transaction Flows

A business transaction flow is a logical user flow in an application.

The BPM Admin Business Transaction Flow page enables you to view details of a business transaction flow configured in EUM Administration to which an instance is assigned. There are slight differences in the Business Transaction Flow page depending on whether the business transaction flow uses its parent application's schedule or has its own overriding schedule.

To access

To access the Business Transaction Flow page:

1. Open BPM Admin. For details, see "How to Access BPM Admin" on page 28.

2. Select a business transaction flow in the BPM Tree that appears in the left pane of the BPM Admin console.

The Business Transaction Flow page appears in the right pane of the BPM Admin console.

Learn About

Example

In a human resources application you may have a business transaction flow for registering a new employee. You assign a script to the business transaction flow (you can assign more than one script, although it it is recommended to assign only one) that contains individual transactions. The script for the business transaction flow for registering a new employee may include transactions for logging in to the applicattion, entering the new employee's personal details, marking a check list to ensure that all necessary documents have been received from the new employee, and logging out of the system.

Business Transaction Flow Schedules and Run Modes

By default, a business transaction flow uses the same schedules and run modes as its parent application, but you can configure different schedules and run modes specifically for a business transaction flow. If a business transaction flow has its own schedule, it is not included in the application run on the BPM instance, but is run as an independent unit. For details on run units, see "Run Units" on page 136.

Connecting to an HP BAC System Earlier Than Version 9.00

When a BPM instance connects to an HP Business Availability Center system earlier than version 9.00, profiles are included in the BPM Tree displayed in the left pane of the BPM Admin console, instead of applications and business transaction flows. To access the BPM Profile page, select a profile in the BPM tree. The Profile page user interface is similar to the Business Transaction Flow page

user interface for business transaction flows that have their own schedule (that is, business transaction flows that are independent run units). For details, see "UI Description " on the next page.

Setting a Log Level

Many scripts (for example, HP LoadRunner scripts and HP Virtual User Generator scripts for web-based protocols) include runtime settings that determine the extent of the information logged to the output when the script is run. There are three settings for logging: **Disabled**, **Brief**, and **Extended**. By default, BPM runs the scripts using the Disabled log level. This means that only minimum information is logged to the **mdrv** log for each run of the script.

You can change the log level for a specific script run when you invoke a single run of the script in the Business Transaction Flow page. Changing the log level to Brief or Extended introduces extra overhead in the **mdrv** log files, and may slow down the run of the script (so affecting the measured run times). An Extended log is helpful for debugging a script, but is otherwise not recommended.

For task details, see "How to Run a Task (Script or WebTrace)" below.

Tasks

How to Configure Business Transaction Flow Schedules

You configure business transaction flows in EUM Administration.

When you configure business transaction flows, business transaction flow names (as well as the names of the included transactions and scripts):

- Must be entered in the same language that is set for the operating system on which BPM is installed

- Must contain only characters that are supported by the operating system on which BPM is installed

For more details on configuring business transaction flows in EUM Administration, see "Business Transaction Flow Configuration Wizard" in the BSM Application Administration Guide.

How to Browse Scripts

In the Tasks area, select a task and click the **Browse Script** 📖 button. The Browse Script dialog box opens. If an **mdrv** log file exists, it is selected automatically. For details on log files, see "Log Files" on page 128.

> **Note:** This button is disabled for all WebTraces and for scripts for which there is no Last Run Status data.

How to Run a Task (Script or WebTrace)

In the Tasks area:

1. Select a task and click the **Run Task** ▷ button. The Run Script dialog box opens showing details of the run.

2. In the Log level field, select a log level (Disabled, Brief, or Extended) to determine the extent of the information logged to the output for the script run. For details about log levels, see "Setting a Log Level" on the previous page.

3. Enter additional command line parameters.

4. Enter a timeout value, in minutes. This value determines how long BPM attempts to retrieve the page component data before timing out. The default timeout value is 15 minutes.

5. Click **Run**.

Note: These settings are applicable only to this run of the script. The task run data is not sent to BSM. The task run does not affect the run unit's regular scheduling in BPM, or the run of any other run unit in BPM.

UI Description

- "General Information Monitor" on the next page

- "Schedule List Area" on the next page

- "Monitoring Status Area" on page 79

- "Tasks Area" on page 79

- "Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area" on page 81

- "Script Properties Window" on page 83

- "WebTrace Properties Window" on page 85

- "Run Script Dialog Box" on page 86

- "Browse Script Dialog Box" on page 86

General Information Monitor

This area enables you to view general information about the business transaction flow.

User interface elements are described below:

UI Element	Description
Display name	The name of the business transaction flow as configured in EUM Administration in BSM.
Status	The current status of the business transaction flow in BSM—**active** or **inactive**. **Note:** A message is displayed if the business transaction flow is active, but its parent application is inactive.

Schedule List Area

This area enables you to view the schedules configured for the business transaction flow.

User interface elements are described below:

UI Element	Description
Schedule Description	The schedule for running the business transaction flow on this BPM instance, as configured in EUM Administration. If the business transaction flow has multiple schedules, all schedules are shown. (For more information, see "Run Unit Schedules" on page 138.)
Time Zone	The time zone to use for the BPM instance, as configured in EUM Administration.
Start Offset	The start offset, which specifies the delay between the business transaction flow schedule time and the actual run time. (For information on how the start offset is calculated, see "Start Offset" on page 139.)
Source	The schedule source. Valid options are: • **Own Schedule.** The business transaction flow has its own schedule and is therefore an independent run unit (that is, it is not included in its parent application's run unit). • **Application Schedule.** The business transaction flow is included in its parent application's run unit and uses its parent application's schedule.

Monitoring Status Area

This area enables you to view the general status and configuration of the business transaction flow.

Note: This area appears only for business transaction flows that have their own schedule and therefore, their own run unit.

User interface elements are described below:

UI Element	Description
Number of tasks	The number of tasks included in the business transaction flow run unit.
Status	The current status of the business transaction flow run unit. Valid options are: • **Not initialized** – The run unit has not yet been initialized. • **Currently running** – The run unit is currently running on this BPM instance. • **Idle** – The run unit is not currently running on this BPM instance.
Last start time	The start time of the last run.
Last run duration	The duration of the last run.
Run mode	The run mode configured for the business transaction flow. For details on run modes, see "Run Modes" on page 140.

Tasks Area

This area enables you to view the tasks configured for the business transaction flow and to run them.

Note: This area is displayed only for business transaction flows that have their own schedule and therefore, their own run unit. For details on business transaction flows that use their parent application's schedule, see "Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area" on page 81.

User interface elements are described below:

UI Element	Description
	Task Properties. Opens a new window showing the script or WebTrace properties. For details, see "Script Properties Window" on page 83 and "WebTrace Properties Window" on page 85.
	Browse Script. Displays the BPM script folder in a new window. (If an **mdrv** log file exists, it is selected automatically.) For details on log files, see "Log Files" on page 128. **Note:** This element is disabled for all WebTraces and for scripts for which there is no Last Run Status data.
	Run Task. Runs a selected task. Details of the run are reported in a new window. When you run a script, the Run Script dialog box opens, where you can set the log level (Disabled, Brief, or Extended) to determine the extent of the information logged to the output for the script run, and add additional command line parameters. Note that these changes are applicable only to this run of the script. The task run data is not sent to BSM. The task run does not affect the run unit's regular scheduling in BPM, or the run of any other run unit in BPM.
Run Order	The order in which the tasks are run. This is determined by the run mode configured for the business transaction flow in EUM Administration. For details on run modes, see "Run Modes" on page 140.
Name	The task name, as configured in EUM Administration.
Type	**The type of task—**Script, WebTrace, or Single URL.

UI Element	Description
Last Run Status	The status of the last run. Valid options are: • **Finished properly** – The task finished running with no errors. • **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports (for example, the traceroute server may report "progress aborted" for a WebTrace request). Check the relevant log files for further information on the errors encountered. For details on the log files, see "Log Files" on page 128. • **Failed to start** – The task failed to start running. • **Terminated unexpectedly** – The task failed during the run. • **Error: Aborted** – The task was aborted. • **Aborted (timeout)** – The task timed-out and stopped running. • **End status is not set** – The task has not run yet, therefore no end status is available. • **Not supported by OS** – The task's protocol is not supported by the operating system. • **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.
Status	The current status of the task. Valid options are: • **Not initialized** – The task has not yet been initialized. • **Running** – The task is currently running on this BPM instance. • **Idle** – The task is not currently running on this instance.

Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area

This area enables you to view the scripts and WebTraces configured for the business transaction flow, as well as the scripts and WebTraces configured for the business transaction flow's parent application. You can also run a script or WebTrace.

Note: This area is displayed only for business transaction flows that are included in their parent application's run unit (that is, business transaction flows that do not have their own schedule).

User interface elements are described below:

UI Element	Description
🖳	**Task Properties.** Opens a new window showing the script or WebTrace properties. For details, see "Script Properties Window" on the next page and "WebTrace Properties Window" on page 85.
📄	**Browse Script.** Displays the BPM script folder in a new window. (If an **mdrv** log file exists, it is selected automatically.) For details on log files, see "Log Files" on page 128. **Note:** This element is disabled for all WebTraces and for scripts for which there is no Last Run Status data.
▷	**Run Task.** Runs a selected task. Details of the run are reported in a new window. When you run a script, the **Invoke Script** dialog box opens, where you can set the log level for the script run and add additional command line parameters. For details on setting log levels, see "Setting a Log Level" on page 76. Note that these changes are only applicable to this run of the script. **Note:** • The task run data is not sent to BSM. • The task run does not affect the run unit's regular scheduling in BPM, or the run of any other run unit in BPM.
Included in Selected BTF	A check mark denotes that the script or WebTrace is included in the selected business transaction flow and not in its parent application.
Run Order	The order in which the tasks are run. This is determined by the run mode configured for the business transaction flow's parent application in End User Management Administration. For details on run modes, see "Run Modes" on page 140.
Name	The task name, as configured in EUM Administration.
Type	**The type of task—**Script, WebTrace, or Single URL.
BTF	The name of the BTF in which the script or WebTrace is included.

UI Element	Description
Status	The current status of the task. Valid options are: • **Not initialized** – The task has not yet been initialized. • **Running** – The task is currently running on this BPM instance. • **Idle** – The task is not currently running on this BPM instance.
Last Run Status	The status of the last run. Valid options are: • **Finished properly** – The task finished running with no errors. • **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports (for example, the traceroute server may report "progress aborted" for a WebTrace request). Check the relevant log files for further information on the errors encountered. For details on the log files, see "Log Files" on page 128. • **Failed to start** – The task failed to start running. • **Terminated unexpectedly** – The task failed during the run. • **Error: Aborted** – The task was aborted. • **Aborted (timeout)** – The task timed-out and stopped running. • **End status is not set** – The task has not run yet, therefore no end status is available. • **Not supported by OS** – The task's protocol is not supported by the operating system. • **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.

Script Properties Window

This window displays general details about a script and its included transactions.

To access the Script Properties window for a selected script, click the **Task Properties** ▣ button in the Tasks area or Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area.

User interface elements are described below:

UI Element	Description
General Information	
Name	The script name, as configured in EUM Administration.
Script Repository Version	The version of the script used.
Last Run Status	The status of the last run. Valid options are: ● **Finished properly** – The task finished running with no errors. ● **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports. Check the mdrv.log file for further information on the errors encountered. ● **Failed to start** – The task failed to start running. ● **Terminated unexpectedly** – The task failed during the run. ● **Error: Aborted** – The task was aborted. ● **Aborted (timeout)** – The task timed-out and stopped running. ● **End status is not set** – The task has not run yet, therefore no end status is available. ● **Not supported by OS** – The task's protocol is not supported by the operating system. ● **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.
Last Run Duration	The duration of the last run.
Transactions—lists the transactions included in the script and displays the following data for them:	
Name	The transaction name as used in the script.

UI Element	Description
Original Name	The original transaction name. **Note:** If you change the name of a Business Transaction CI in EUM Administration, the transaction name in existing scripts is not changed. Elsewhere, however, (for example, in Service Health, reports, and EUM Administration) the transaction name is changed and persistent data for the CI is preserved.
OK	The response time threshold below which the transaction's status is OK, as configured in EUM Administration.
Minor	The response time thresholds between which the transaction's status is Minor, as configured in EUM Administration.
Critical	The response time threshold above which the transaction's status is Critical, as configured in EUM Administration.
Outlier	The response time threshold above which the transaction is considered to be an Outlier, as configured in EUM Administration. Outliers are transactions whose response time exceeds a defined time range.
Availability	The availability threshold configured for the transaction in EUM Administration.
Parameters—lists the parameters used in the script and displays the following data for them:	
Name	The parameter name.
Value	The parameter value.

WebTrace Properties Window

This window displays general details about a WebTrace.

To access the WebTrace Properties window for a selected WebTrace, click the **Task Properties** 🖻 button in the Tasks area or Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area.

User interface elements are described below:

UI Element	Description
URL	The URL accessed by the WebTrace.
Port	The port for the URL accessed by the WebTrace.

UI Element	Description
Last Run Status	The status of the last run. Valid options are: • **Finished properly** – The task finished running with no errors. • **Finished (errors occurred)** – The task finished running; however, there may be some errors in the task reports (for example, the traceroute server may report "progress aborted" for a WebTrace request). Check the relevant WebTrace log files for further information on the errors encountered. For details on log files, see "Log Files" on page 128. • **Failed to start** – The task failed to start running. • **Terminated unexpectedly** – The task failed during the run. • **Error: Aborted** – The task was aborted. • **Aborted (timeout)** – The task timed-out and stopped running. • **End status is not set** – The task has not run yet, therefore no end status is available. • **n/a** – Run status is not applicable for the task, for example, if the application is inactive.
Last Run Time	The time of the last run.
Last Run Duration	The duration of the last run.

Run Script Dialog Box

When you run a script, the Run Script dialog box opens, where you can set the log level for the script run and add additional command line parameters.

For details on setting log levels, see "How to Configure Log Files Logging Level" on page 127.

Note: The task run data is not sent to BSM. The task run does not affect the run unit's regular scheduling in BPM, or the run of any other run unit in BPM.

Browse Script Dialog Box

The Browse Script dialog box displays the script log file (in case of error during last run then **mdrv** log file) for the last run of the task. For details on log files, see "Log Files" on page 128.

Note: This element is disabled for all WebTraces and for scripts for which there is no Last Run Status data.

Chapter 9: Business Transactions

The BPM Admin Business Transaction page enables you to view details of a transaction included in business transaction flow's script, as configured in EUM Administration, to which an instance is assigned.

To access

To access the Business Transaction page:

1. Open BPM Admin. For details, see "How to Access BPM Admin" on page 28.

2. Select a business transaction in the BPM Tree that appears in the left pane of the BPM Admin console. For details about the BPM Tree, see "BPM Entities" on page 34.

Task

How to Configure Business Transactions in EUM Admin

For details on configuring applications in EUM Administration, see "Business Process Monitor Application Configuration Wizard" in the BSM Application Administration Guide.

When you configure transactions in a script or in EUM Administration, the names of transactions:

- Must be entered in the same language that is set for the operating system on which BPM is installed.

- Must contain only characters that are supported by the operating system on which BPM is installed.

UI Description

General Information Area

This area enables you to view general information about the transaction.

User interface elements are described below:

UI Element	Description
Display name	The name of the transaction as configured in EUM Administration in BSM.

Thresholds Area

This area enables you to view the thresholds configured for the transaction. For details on configuring transaction thresholds in EUM Administration, see "Business Transaction Business Process Monitor Configuration Page" in the BSM Application Administration Guide.

User interface elements are described below:

UI Element	Description
OK	The response time threshold below which the transaction's status is OK, as configured in EUM Administration.
Minor	The response time thresholds between which the transaction's status is Minor, as configured in EUM Administration.
Critical	The response time threshold above which the transaction's status is Critical, as configured in EUM Administration.
Outlier	The response time threshold above which the transaction is considered to be an Outlier, as configured in EUM Administration. Outliers are transactions whose response time exceeds a defined time range.
Availability	The availability threshold configured for the transaction in EUM Administration.

Script Area

This area enables you to view the transaction name used in the script, as well as the scripts in which the transaction is included.

User interface elements are described below:

UI Element	Description
Name in script	The name of the transaction as used in the script. **Note:** If you change the name of a Business Transaction CI in EUM Administration, the transaction name in existing scripts is not changed. Elsewhere, however, (for example, in Service Health, reports, and EUM Administration) the transaction name is changed and persistent data for the CI is preserved.
Included in scripts	The scripts in which the transaction is included, within the same business transaction flow.

Chapter 10: Page Component Breakdown Reports

The Page Component Breakdown (PCBD) report displays a breakdown of transaction response times (in milliseconds) for each component of a web page. You use the report to analyze network, server, and client health in real time. It can help you identify:

- Problematic elements of a web page for web based transactions (for example, images that download slowly, or broken links) .

- Problematic TCP activity for non-web based (TCP) transactions (for example, failed connections to the server).

- Where along the network problems are occurring (for example, during DNS Resolution, or during Time to First Buffer).

Web based transactions consist of web components; TCP based transactions consist of TCP requests.

For scripts set to collect component breakdown data, BPM measures response time for each specific transaction in the script, and collects breakdown data—information about client, network, and server activity during the transaction—for each component of every web page accessed in web based transactions, and for each component (request) in non-web based (TCP) transactions. This information enables you to assess whether transaction response times were affected. For example, in web based transactions, a page content may affect response times; in non-web based transactions, request size or the number of requests may affect response times.

> **Note:**
>
> - Component breakdown is supported only for certain HP Virtual User Generator protocols.
>
> - For non-web (TCP) based protocols, the page name has no relevance in breakdown reports.

Learn About

- "Understanding Web Based Transaction Breakdown Reports" on page 92

- "Understanding Non-Web Based TCP Transaction Breakdown Reports" on page 95

- "Calculating Transaction Breakdown from Component Breakdown" on page 100

Tasks

How to Run a Page Component Breakdown Report

You can run a Page Component Breakdown report by performing one of the following tasks:

- Invoking scripts from the **Tasks** area of the **Business Transaction Flow** page. For details, see "Tasks Included in the Business Transaction Flow and its Parent Application's Run Unit Area" on page 81.

  > **Note:** When invoking scripts, page component breakdown data is shown only if the script was recorded using one of the configured protocols.

- Performing an on-demand page component breakdown of any web page using the **Run Page Component Breakdown** action on the **Host** page. For details, see "How to Run the Run Page Component Breakdown Option" below.

How to Run the Run Page Component Breakdown Option

The Run Page Component Breakdown option enables you to run an on-demand page component breakdown (PCBD) request for any web page. BPM measures response time while running the request, and collects breakdown data for each component of the accessed web page. This information enables you to assess whether the response time was affected by page content. The data collected is reported only to BPM Admin (not to BSM).

When you select this option, the Run Page Component Breakdown dialog box opens. User interface elements are described "Run Page Component Breakdown Dialog Box" on page 104.

UI Description

- "Transaction Report" on page 101

- "Run Page Component Breakdown Dialog Box" on page 104

- "Invoke Script Dialog Box" on page 104

- "Summary Report" on page 105

Understanding Web Based Transaction Breakdown Reports

The web based protocols for which BPM can perform transaction breakdown are configured in the **BdSupportedProtocols** setting in the **agent1.cfg** file on the BPM machine. For details on the **agent1.cfg** file, see "Agent1 Directory" on page 128. If a script for which BPM is configured to collect transaction breakdown data contains multiple protocols, and one of the protocols is a web based protocol configured in the **BdSupportedProtocols** configuration setting, web based breakdown is used.

> **Note:**
>
> - Transaction breakdown is not supported by BPMs running scripts recorded in WinINet mode in HP Virtual User Generator.
>
> - Page component breakdown does not function for streaming objects, such as Java Applets, sounds, and movies. This is because the engine that runs the page component breakdown uses technology that handles only components that can be parsed directly from the HTML code (for example, images).

This section includes the following topics:

- "Understanding Transaction Breakdown Categories" below

- "Understanding Download Time" on page 94

Understanding Transaction Breakdown Categories

The transaction breakdown component in PCBD reports displays a breakdown of average transaction response times (in milliseconds) over time, for the selected time frame. Response times are broken down by retry time, DNS resolution time, connection time, network time to first buffer, server time to first buffer, download time, and client time. If your site uses SSL authentication, SSL handshaking time is also displayed.

The main transaction breakdown components are as follows:
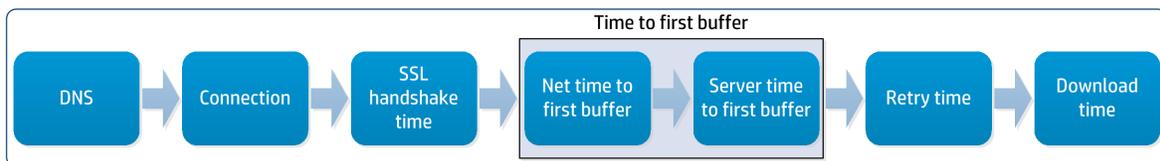
The diagram below illustrates in more detail the relationship between the component's main breakdown categories (shown along the bottom of the diagram) and client/server activity during transaction execution.
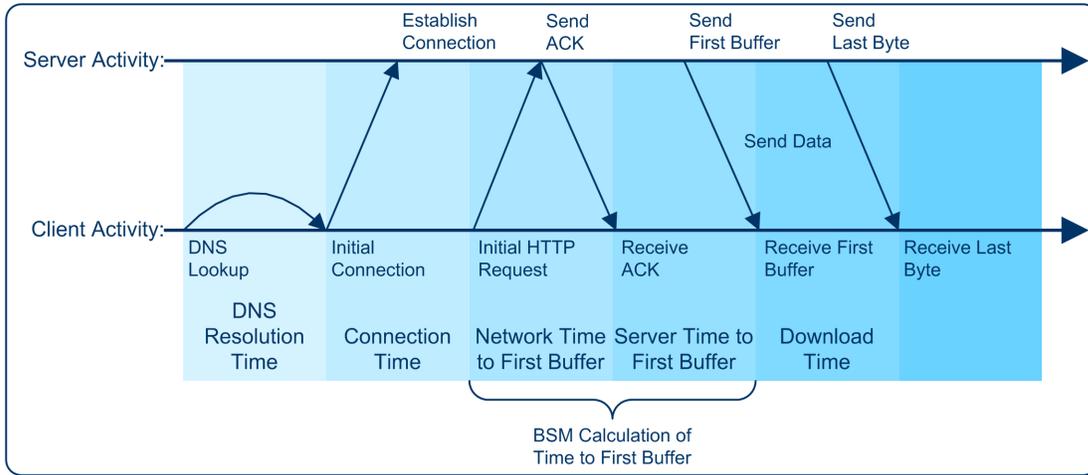
The following table describes the component's breakdown categories. Times are calculated by taking the average of all transaction runs within the specified time period.

Name	Description
Retry Time	Displays the overall amount of time that passes from the moment an http request is started until the moment an http or TCP error message is returned. Retry time only relates to http or TCP errors that execute a retry after the error.
DNS Resolution	Displays the average amount of time needed to resolve the DNS name to an IP address, using the closest DNS server. The DNS Lookup measurement is a good indicator of slow DNS resolution or other problems with the DNS server.
Connect Time	Displays the average amount of time needed to establish an initial connection with the web server performing the transaction. The connection measurement is a good indicator of problems along the network or whether the server is responsive to requests.
SSL Handshake Time	Displays the average amount of time taken to establish an SSL connection (includes the client hello, server hello, client public key transfer, server certificate transfer, and other—partially optional—stages). After this point, all the communication between the client and server is encrypted. **Note:** The SSL handshaking measurement is applicable only for https communications.
Network Time to First Buffer	Displays the average amount of time that passes from the moment the first http request is sent until receipt of ACK. The network measurement is a good indicator of network quality (look at the time/size ratio to calculate download rate).

Name	Description
Server Time to First Buffer	Displays the average amount of time that passes from the receipt of ACK of the initial http request (usually GET) until the first buffer is successfully received back from the web server. Server Time to First Buffer is a good indicator of web server delay. **Note:** Because server time to first buffer is being measured from the client, network time may influence this measurement if there is a change in network performance from the time the initial http request is sent until the time the first buffer is sent.
Download Time	Displays the time from the receipt of the first buffer until the last byte arrives. Download time is a combination of server and network time, since the server typically sends data over multiple connections, and therefore is usually working while data is being transmitted over the network. For more details, see "Understanding Download Time" below.
Client Time	Displays the average amount of time that passes while a request is delayed on the client machine. Client-related delays can include browser think time, CPU think time, HTML page processing time, time needed to open sockets, application delays caused by heavy applets, and so on. **Note:** Client time is calculated by subtracting all other measured times from the total transaction time.

Note: In certain circumstances, for example, when the BPM is using a proxy server, the transaction breakdown mechanism cannot differentiate between server time to first buffer and network time to first buffer. In these cases, the report displays the time between initial http request and receipt of first buffer as Time to First Buffer.

Understanding Download Time

When a BPM running a script communicates with a web server (specified by the URLs in the script), communication is carried out, by default, over four connections simultaneously.

As the web page is retrieved, its various components (images, applets, and so on) travel in data packets from server to client across these multiple connections.

As a result, at any point along the time line after the server sends the first buffer until the client receives the last byte for the page, data packets may be traveling over the network through some of the connections while others are being processed by the server through the remaining connections. The download time in the report represents the sum total of the time when network resources and server resources are in use at the same time, between the time the client receives the first buffer and the last byte.

Understanding Non-Web Based TCP Transaction Breakdown Reports

The non-web based (TCP) protocols for which BPM can perform transaction breakdown are configured in the **AdvancedTcpBdSupportedProtocols** setting in the **agent1.cfg** file on the BPM machine. For details on the **agent1.cfg** file, see "Parameters in agent1.cfg" on page 155. If a script for which BPM is configured to collect transaction breakdown data contains multiple protocols, and none of the web protocols is configured in the **BdSupportedProtocols** configuration setting, and at least one of the TCP protocols is defined in the **AdvancedTcpBdSupportedProtocols** configuration setting, TCP breakdown is used.

> **Note:**
>
> - Non-web based (TCP) transaction breakdown is supported on Windows only.
>
> - Supported protocols must be TCP request/response based protocols.
>
> - Non-web based (TCP) transaction breakdown cannot be used with VuGen Speed Simulation.

This section includes the following topics:

- "Understanding How BSM Breaks Down Transaction Response Times" below

- "Understanding Transaction Breakdown Categories for Non-Web Based (TCP) Transactions" on the next page

- "Understanding Time to First Buffer and Download Time for Non-Web Based (TCP) Transactions" on page 98

- "Understanding Breakdown Report Data for Non-Web Based (TCP) Transactions" on page 98

- "Notes and Limitations for Non-Web Based (TCP) Protocols" on page 99

Understanding How BSM Breaks Down Transaction Response Times

When BSM runs a BPM script and measures response time for a specific transaction, BSM collects breakdown data—information about TCP activities during the transaction—for each request (component) of the transaction. A TCP request (component) represents a sequence of measurements starting with a DNS resolution, TCP Connect operation, or a Send operation on an open connection and ending with the last Receive operation for the relevant starting operation.

Because some TCP based protocols can use multiple connections, at any given moment in time there can be an overlap in the various breakdown categories.

Understanding Transaction Breakdown Categories for Non-Web Based (TCP) Transactions

The transaction breakdown reports display a breakdown of average transaction response times (in milliseconds) over time, for the selected time frame. Response times are broken down by DNS resolution time, connection time, time to first buffer, download time, and client time.

The diagram below illustrates the relationship between the report's main breakdown categories (shown along the bottom of the diagram) and TCP client/server activity during transaction execution. In the diagram, there are two sequential TCP requests included in the same connection.

Note that client time is not shown in this diagram and is described in the breakdown category table. For details, see "Client Time" in the table below.
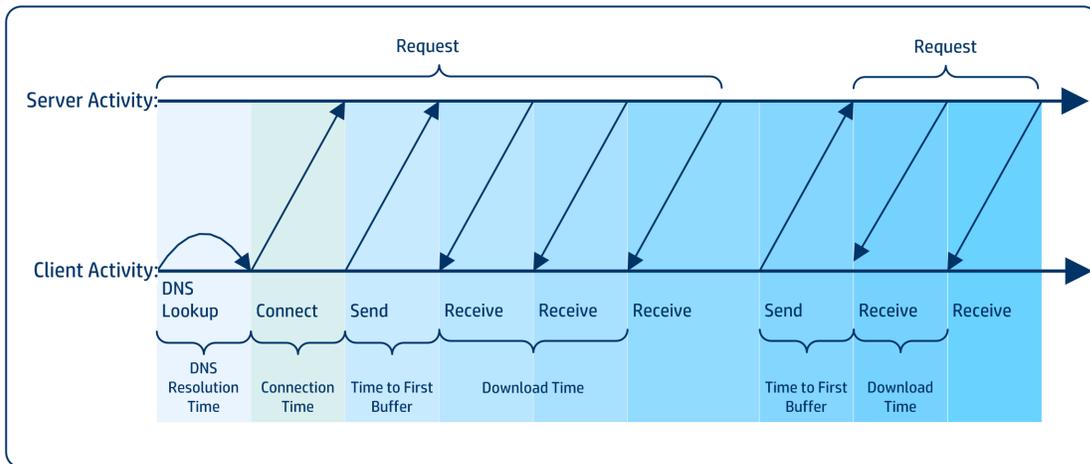
The following table describes the report's breakdown categories, which comprise a TCP request. Times are calculated by taking the average of all transaction runs within the specified time period.

Name	Description
DNS Resolution	Displays the average amount of time needed to resolve the DNS name to an IP address, using the closest DNS server. The DNS Lookup measurement is a good indicator of slow DNS resolution or other problems with the DNS server.
	Note: If the DNS resolution is adjacent to a Connect for the same IP address, it is considered part of the request (component) and its time is displayed in the breakdown reports. Otherwise, the DNS resolutions of one or more hosts without an adjacent Connect are considered as a separate request (component). In such cases, only the DNS Resolution time is displayed for that request and for all other measurements, a minus sign (**-**) is displayed.

Name	Description
Connect Time	Displays the average amount of time needed to establish an initial connection with the TCP server performing the transaction. The connection measurement is a good indicator of problems along the network or whether the server is responsive to requests. **Note:** If a connection did not occur within a request's (component's) context, a minus sign (**-**) is displayed for the connection time in the breakdown reports.
Time to First Buffer	Displays the average amount of time that passes from the first TCP Send up to and including the first Receive of a component. This measurement includes both network time and server time that are required for handling the first TCP buffer. It is a good indicator of both network quality and server delay. **Note:** This measurement is shown only if both Sends and Receives are included in the request (component). If there are no Sends or Receives within a request (component), a minus sign (**-**) appears in the breakdown reports.
Network Time to First Buffer	Displays the time from the first Send up to and including the last Send. This measurement is a good indicator of network quality. **Note:** This measurement is shown only if there are Sends included in the request (component), but no Receives. If there are no Sends or Receives within a request (component), a minus sign (**-**) is displayed in the breakdown reports.
Server Time to First Buffer	Displays the average amount of time that passes from the receipt of ACK of the initial http request (usually GET) until the first buffer is successfully received back from the web server. The server time to first buffer measurement is a good indicator of web server delay. **Note:** Because server time to first buffer is being measured from the client, network time may influence this measurement if there is a change in network performance from the time the initial http request is sent until the time the first buffer is sent. This measurement is shown only if there are Sends included in the request (component), but no Receives. A minus sign (**-**) is displayed in the breakdown reports.
Download Time	Displays the time from the receipt of the second TCP buffer up to and including receipt of the last byte. Download time usually only includes network time and is influenced by both network quality and component size. For more details, see "Understanding Time to First Buffer and Download Time for Non-Web Based (TCP) Transactions" on the next page. **Note:** If a download did not occur within a request's (component's) context, a minus sign (**-**) is displayed for the download time in the breakdown reports.

Name	Description
Client Time	Displays the average amount of time that passes while a request is delayed on the client machine. Client-related delays can include CPU think time, processing time, time needed to open sockets, time between the last Receive of a request and the first Send of the next request in the same connection, and so on. **Note:** Client time is calculated by subtracting all other measured times from the total transaction time.

Note: Either Time to First Buffer or Network Time to First Buffer and Server Time to First Buffer are displayed.

Understanding Time to First Buffer and Download Time for Non-Web Based (TCP) Transactions

Time to First Buffer includes both network time (for sending the packet) and server time (for processing the packet), whereas Download time usually includes only network time (for downloading the rest of the reply packets). This means that if both Time to First Buffer and Download times increase, it is a good indicator of network quality problems and if only Time to First Buffer increases, it is usually a good indicator of server delay problems.

Understanding Breakdown Report Data for Non-Web Based (TCP) Transactions

The same breakdown reports are used to display web based breakdown data and non-web based (TCP) breakdown data, but the following differences apply when viewing non-web based (TCP) breakdown data:

- The **Page** column (which displays page names for web based transactions) is not applicable for non-web based transactions and a minus sign (**-**) is displayed in this column for all non-web based components.

- The **Retry Time** and **SSL Handshake Time** columns are not applicable for non-web based transactions and a minus sign (**-**) is displayed in these columns for all non-web based components.

- In the **Component/Request** column (which displays URLs for web based breakdown data), the name of the TCP request (component) is displayed. The name can be one of the following:

  - **TCP_BdwnDns<nnn>.** For DNS only components (for example, a DNS component that does not have an adjacent Connect component correlated to the same IP address). The number in the display is sequentially incremented for each component entry. For such entries, only the DNS Resolution time is displayed and for all other measurements, a minus sign (**-**) is displayed.

  - **TCP_BdwnReq<nnn>.** For TCP request components. The number in the display is sequentially incremented for each component entry.

- For non-web based (TCP) components, there is no tooltip available for the **Page** column.

- You cannot click a non-web based (TCP) component to drill down to further information about it.

Notes and Limitations for Non-Web Based (TCP) Protocols

The following table lists the TCP protocols for which breakdown data can be displayed, together with special notes and limitations where applicable:

Protocol	Notes and Limitations
SAP GUI	Multi-threaded protocol. The BPM Agent must run in Process mode. Service mode is not supported.
SMTP	N/A
POP3	The communication in a POP3 script usually starts with a server's greeting message. Consequently, the first TCP breakdown component (request) in the script is usually reported with valid DNS and Connect times, whereas the Download time is reported as 0 and all other time measurements are not applicable and are shown with a minus (**-**) sign in the reports.
IMAP	The communication in an IMAP script usually starts with a server's greeting message. Consequently, the first TCP breakdown component (request) in the script is usually reported with valid DNS and Connect times, whereas the Download time is reported as 0 and all other measurements are not applicable and are shown with a minus (**-**) sign in the reports.
Oracle 2-Tier	Some of the steps in an Oracle 2-Tier script end with data being sent by the client, without receiving any response. Consequently, there are TCP breakdown components reported with a Network Time to First Buffer value >= 0 and with all other measurements not applicable and shown with a minus (**-**) sign in the reports.
ODBC	N/A
FTP	Both FTP passive and FTP active modes are supported.
LDAP	The last step in an LDAP script (which terminates the connection to the server) usually ends with data being sent by the client, without receiving any response. Consequently, there is a corresponding TCP breakdown component reported with a Network Time to First Buffer value >= 0 and with all other measurements not applicable and shown with a minus (**-**) sign in the reports.
EJB	Multi-threaded protocol.
Java Record/Replay	• A protocol which supports and combines the following Java protocols–RMI, CORBA, JMS, JACADA, and Custom Hooks. TCP breakdown is supported only when the script is recorded using RMI protocol calls. If the script includes other protocol calls, TCP breakdown results are not defined.

Protocol	Notes and Limitations
	• Multi-threaded protocol. • Both RMI over IIOP and RMI over JRMP are supported. • Some Java applications which use the RMI protocol send many ping requests between application-driven RMI calls. Consequently, the TCP breakdown reports many components with a small Time to First Buffer value and with a Download size of approximately 1 byte. • The last step in a Java Record/Replay script (which terminates the connection to the server) sometimes ends with data being sent by the client, without receiving any response. Consequently, there is a corresponding TCP breakdown component reported with a Network Time to First Buffer value >= 0 and with all other measurements not applicable and shown with a minus (**-**) sign in the reports.
Java Vuser	Supports RMI Java
Oracle NCA	If the script works over http communications, you can run it using web breakdown (which is the default). If the protocol is run using TCP socket communications instead of http, web breakdown is not applicable and you can run it using TCP breakdown instead, providing that: • The script is recorded in such a way so that the Active Types with which the script is recorded are Oracle NCA only (that is, the script does not include WEB (http/html)). • You move the Oracle NCA protocol from the **BdSupportedProtocols** list to the **AdvancedTcpBdSupportedProtocols** list in the **agent1.cfg** file on the BPM machine.

Calculating Transaction Breakdown from Component Breakdown

BSM uses a weighted algorithm to display the breakdown data that it collects. Every breakdown category for every element of the connection requests is taken into consideration, and weight is given to the element according to its value relative to the other elements in the concurrent time period. For example, the Connect time for each request in the connection is collected, weighted, and then displayed under the Connect time category.

Transaction Report

Note: This section is applicable for web based transactions. For the differences in breakdown reports for non-web based (TCP) transactions, see "Understanding Breakdown Report Data for Non-Web Based (TCP) Transactions" on page 98.

The Transaction reports included in the Page Component Breakdown report enable you to assess whether transaction response times and service availability are being affected by page content. There is a separate report for each transaction included in the script and you display the report for a specific transaction by selecting the transaction in the Context pane.

The report displays general data about the transaction run, summary response time breakdown data for all of the components in the transaction, transaction response time breakdown data for each component in the transaction, and error data. For details of the breakdown categories, see "Understanding Transaction Breakdown Categories" on page 92.
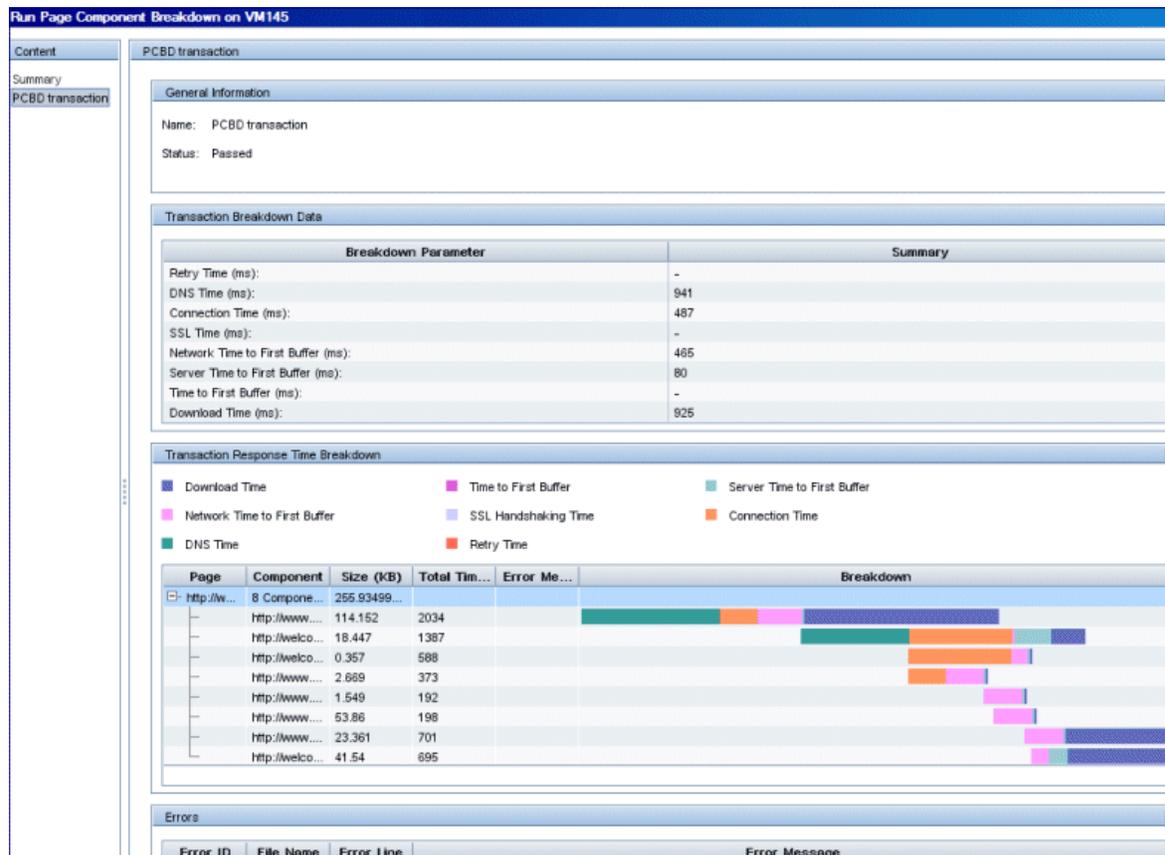
The Transaction reports included in the Page Component Breakdown report include the following areas:

- "General Information Area" below

- "Transaction Breakdown Data Area" below

- "Transaction Response Time Breakdown Area" on the next page

- "Errors Area" on page 104

General Information Area

User interface elements are described below:

UI Element	Description
Name	The transaction name. **Note:** For on-demand component breakdown, there is one default transaction called PCBD transaction.
Status	The status of the transaction run. Valid statuses are: - **Pending.** The transaction is waiting to run. - **Passed.** The transaction ran successfully. - **Failed.** The transaction did not run successfully. - **No data arrived.** The transaction ran successfully, but no data was received or the script containing the transaction did not run. - **Timeout.** BPM was unable to retrieve page component data within the configured timeout period.

Transaction Breakdown Data Area

User interface elements are described below:

UI Element	Description
Breakdown Parameter	The transaction breakdown category name. For details of the breakdown categories, see "Understanding Transaction Breakdown Categories" on page 92.
Summary	The weighted time, in milliseconds, of all the components included in the transaction, for the breakdown category. For details on weighting, see "Understanding How BSM Breaks Down Transaction Response Times" on page 95.

Transaction Response Time Breakdown Area

User interface elements are described below:

UI Element	Description
<Legend>	Describes the color coding used in the report.
Page	The URLs of the web pages accessed in the transaction. **Tooltip:** Hold the cursor over the name of a page to show the full name. **Note:** Click the plus (**+**) sign to expand a page and display its components.
Component	The URLs of the components included in an accessed web page. **Tooltip:** Hold the cursor over the name of a component to show the full name. **Note:** If the parent web page is not expanded to display its components, this column displays the total number of components included in the page.
Size (KB)	The total size, in kilobytes, of the page or component.
Total Time (ms)	The total time of the component, in milliseconds.
Error Message	If applicable, an error message related to the specific component.
Breakdown	A bar that shows the total component time in milliseconds. The color-coded segments enable you to differentiate between the various breakdown categories for the component, with each colored segment representing the total time for its corresponding measurement. For example, you can view the overall DNS time for the component. (For explanations of the breakdown categories, see "Understanding Transaction Breakdown Categories" on page 92.) **Tooltip:** • Hold the cursor over a colored segment to view the breakdown category name and the total time for that category. • Hold the cursor over the white space to the left of a component's colored bar to show a tooltip with the offset time for that component. The offset time for a specific component is the time that passes from the start time of the first component on the page until the start time of the specific component. **Note:** Gaps in time between components (time between one component finishing and the next one starting) represent processing time—client-side delays caused by browser think time, CPU think time, HTML page processing time, time needed to open sockets or threads, and so forth.

Errors Area

User interface elements are described below:

UI Element	Description
Error ID	The error ID number
File Name	The name of the file in which the error occurred.
Error Line	The line number in the file on which the error occurred.
Error Message	The error message.

Run Page Component Breakdown Dialog Box

UI Element	Description
Address	The address for the target web page. This may be: • The name of a server on the local network • A web address • The full URL for the page, for example: `http://www.hp.com/`
Authentication user name	If the destination requires authentication, type the name of a recognized user.
Authentication password	The password for the authentication user name (or leave empty if the URL requires a blank password).
Timeout	A timeout value, in minutes. This value determines how long BPM attempts to retrieve the page component data before timing out. **Default value:** 15 minutes
Run	Click to run the page component breakdown. The Invoke PCBD window opens, displaying the page component breakdown report.

Invoke Script Dialog Box

The Page Component Breakdown report is displayed in the Invoke Script dialog box, which is divided into the following two panes:

- **The Context (left) pane.** Displays the different reports that comprise the Page Component Breakdown report. These include a summary report for the entire script and individual reports for each transaction included in the script.

  Note: When you run an on-demand page component breakdown for a web page, a default transaction called **PCBD transaction** is created for the report.

- **The main (right) pane.** Displays the content for the report selected in the Context pane—the summary, or a specific transaction.

Summary Report

Note: This section is applicable for web based transactions. For the differences in breakdown reports for non-web based (TCP) transactions, see "Understanding Breakdown Report Data for Non-Web Based (TCP) Transactions" on page 98.

The summary of the Page Component Breakdown report includes general information about the script run, the run status of the transactions included in the script, and aggregated component data for each of the transactions included in the script.
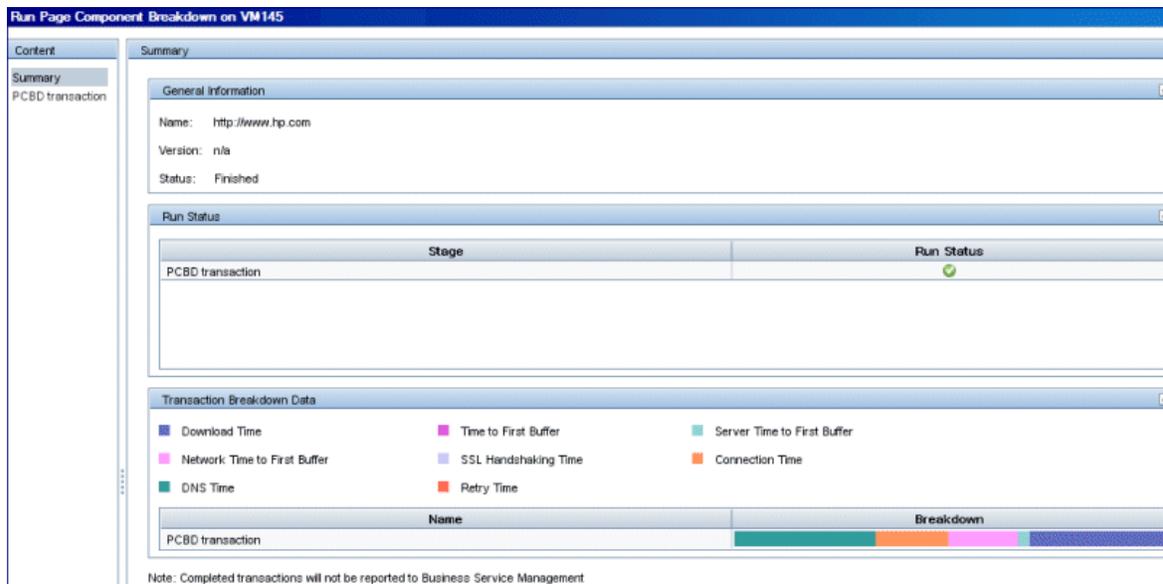
The summary of the Page Component Breakdown report includes the following areas:

- "General Information Area" on the next page

- "Run Status Area" on the next page

- "Transaction Breakdown Data Area" on page 107

General Information Area

User interface elements are described below:

UI Element	Description
Name	The name of the invoked script, or for on-demand page component breakdown, the name of the accessed web page.
Version	The script version number. **Note:** This is not relevant for on-demand page component breakdown.
Status	The status of the script run. Valid statuses are: • Running • Finished

Run Status Area

This area contains a line for each transaction included in the script, or for on-demand component breakdown, one line for the default transaction.

User interface elements are described below:

UI Element	Description
Stage	The transaction name.
Run Status	The run status of the transaction. Valid options are: • **Pending.** The transaction is waiting to run. • **Passed.** The transaction ran successfully. • **Failed.** The transaction did not run successfully. • **No data arrived.** The transaction ran successfully, but no data was received or the script containing the transaction did not run. • **Timeout.** BPM was unable to retrieve page component data within the configured timeout period. **Note:** The default timeout is 15 minutes. When you run an on-demand page component breakdown you can configure the timeout value.

Transaction Breakdown Data Area

This area contains a line for each transaction included in the script, showing aggregated transaction breakdown data for all the components in the transaction.

User interface elements are described below:

UI Element	Description
<Legend>	A legend describing the color coding used in the report.
Name	The transaction name.
Breakdown	A bar that shows the total transaction time in milliseconds. The color-coded segments enable you to differentiate between the various breakdown categories for the transaction, with each colored segment representing the total time for its corresponding measurement. For example, you can view the overall DNS time for the transaction. (For explanations of the breakdown categories, see "Understanding Transaction Breakdown Categories" on page 92.) **Tooltip:** Hold the cursor over a colored segment to view the breakdown category name and the total time for that category. **Tip:** You can correlate the breakdown summary data with transaction response time information to assess whether poor transaction response times are being caused by DNS resolution or connection problems, network latency or server delay, or client delay.

Chapter 11: WebTrace Reports

WebTrace is a network diagnostics tool that provides traceroute information to a specified destination. WebTrace records the route through the Internet from your host machine to the destination web server.

The WebTrace report provides information on network performance, which helps you analyze application performance issues. For each destination, the WebTrace report breaks down route time from the host machine to the destination machine.

Run WebTrace

End time:	28/10/2009 17:19:43
Reachable:	Yes
Destination name:	www.hp.com
Destination IP:	74.747.74.74
Source IP:	29.29.29.29
Round trip time:	218
Retries:	2
Number of hops:	25

Hop Name	Hop IP	Hop Reachable	Hop Retries	Round Trip Time
-	144.144.44.44	Yes	0	0
212.199.249.77.static....	214.199.277.77	Yes	0	0
core-1.pt-susita-vl22....	214.199.39.39	Yes	0	0
-	-	No	2	0
EDGE.LON-02-RE1-s...	80.809.805.80	Yes	0	78
-	62.629.628.62	Yes	0	78

Learn About

Communication Protocols That Support WebTrace

BPM supports WebTrace over TCP, UDP, and ICMP. By default, it is set to use TCP. For details on changing the protocol, see "How to Run a WebTrace to a Destination Web Site" on the next page.

Maximum Number of Hops When Using WebTrace

BPM is set to access a maximum of 30 hops when using WebTrace to reach a site. If 30 hops are not enough to reach the site, it is reported as unreachable. For details on changing the maximum number of hops, see "How to Change the Maximum Number of Hops for WebTrace" on page 110.

Run WebTrace Option

The Run WebTrace option enables you to run a WebTrace to a destination web site and view the resulting report. The WebTrace report provides information on network performance, which helps you analyze application performance issues.

The data collected is reported only to BPM Admin (not to BSM).

To run this option, see "How to Run a WebTrace to a Destination Web Site" below.

> **Note:** BPM cannot run WebTrace concurrently for more than 40 addresses, including both configured and on demand WebTraces.

Tasks

How to Run a WebTrace to a Destination Web Site

1. In the BPM Tree, select a host entity.

2. Click the **Run** button and select **Run WebTrace**. The Run WebTrace dialog box opens. For details, see "Run WebTrace Dialog Box (to a Destination Website)" on page 111.

How to Run WebTrace Reports

Use one of the following:

- Select **Application page** > **Monitoring Status area**. Select a WebTrace and click the **Run Task** button.

- Select **Business Transaction Flow page** > **Tasks area** (or **Tasks Included...** area). Select a WebTrace and click the **Run Task** button.

- Select a host in the Business Process Monitor tree, click the **Run** button, and then click the **Run WebTrace** button.

In the Run WebTrace dialog box, enter the destination address, port number, and timeout and then click **Run**. For details, see "Run WebTrace Dialog Box (to Run WebTrace Reports)" on page 111.

How to Change the Communication Protocol Used by WebTrace

1. On the BPM machine, open the **<BPM application directory>/config/agent1.cfg** file in a text editor.

> **Note:** For Windows Server 2008 R2, Windows Server 2012 R2, and Windows 7, copy the file to the user temp directory (%temp%), edit it there, and then copy it back to the original directory.

2. Look for:

```
[WEBTrace]
;; Options are: tcp (default), icmp, udp
DefaultProtocol=tcp
;; Only IPv4 is supported
ProtocolVersion=IPv4
```

3. Change the value for **DefaultProtocol** to the required protocol.

4. Save your changes.

5. Restart BPM for the change to take effect.

How to Change the Maximum Number of Hops for WebTrace

1. On the BPM machine, in a text editor, open the webtrace.ini file located in:

   Windows: C:\HP\LoadGenerator\dat

   > **Note:** For Windows Server 2008 and Windows 7, you must copy the file to the user temp directory (%temp%), edit it there, and then copy it back to the original directory.

   Linux: /opt/HP/HP_LoadGenerator/dat

2. Look for:

```
[Request]
DefaultMaxTTL=30
```

3. Change the value for **DefaultMaxTTL** to the required number of hops.

4. Save your changes.

5. Restart BPM for the change to take effect.

UI Description

Run WebTrace Dialog Box (to a Destination Website)

User interface elements are described below:

UI Element	Description
WebTrace address	The destination web address. Do not include the string **http://** or **https://** when typing the server address. For example: `www.hp.com`
Port	The port to access the web address. If BPM is accessing the Internet through a proxy server, or if the destination address requires access via https, specify port 443. **Default value:** 80
Timeout	A timeout value, in minutes. This value determines how long Business Process Monitor attempts to access the web address before timing out. **Default value:** 15 minutes
Run	Click to run the WebTrace. The Run WebTrace window opens, displaying the WebTrace report.

Run WebTrace Dialog Box (to Run WebTrace Reports)

- General WebTrace Information Area

  User interface elements are described below:

UI Element	Description
End time	The time that the WebTrace finished.
Reachable	Whether it was possible to reach the destination address.
Destination name	The destination web address.
Destination IP	The IP address of the destination machine.
Source IP	The IP address of the BPM host machine.

UI Element	Description
Round trip time	The time it takes, in milliseconds, for a packet of data to be sent from the host machine to the destination web site.
Retries	The number of times a data packet tries, but fails, to reach its destination due to timeout, network difficulty, and so forth.
Number of hops	The number of intermediate servers the data packet encounters before it reaches its destination.

- Hop Information Table

  User interface elements are described below:

UI Element	Description
Hop Name	The name of the intermediate server.
Hop IP	The IP address of the intermediate server.
Hop Reachable	Whether it was possible to reach the specific hop.
Hop Retries	The number of times a data packet tries, but fails, to reach an intermediate server due to timeout, network difficulty, and so forth.
Round Trip Time	The time, in milliseconds, from the source to the specific hop and back.

Chapter 12: BPM Real Device Monitoring

This chapter describes BPM Real Device Monitoring

Learn About

- "What is BPM Real Device Monitoring?" below

- "Configuration" on page 116

- "BPM Real Device Monitoring Best Practices" on page 118

- "Troubleshooting" on page 118

What is BPM Real Device Monitoring?

BPM Real Device Monitoring displays the availability and performance of mobile applications, installed on devices in multiple locations.

BPM Real Device Monitoring enables you to record applications on real mobile devices, play the recording from BPM, and report the measurements to BSM.

BPM Real Device Monitoring measures mobile application performance to identify trends over time. This enables you to identify spikes or sudden changes in performance. Changes in mobile application performance can be isolated to a specific time, location, carrier, device type, or mobile operating system.

For an evaluation version of BPM Real Device Monitoring, contact mobilehelp@hp.com

BPM Real Device Monitoring System Architecture

BPM Real Device Monitoring requires each mobile device to be connected to a HP Mobile Center server in each location from which you want to monitor.
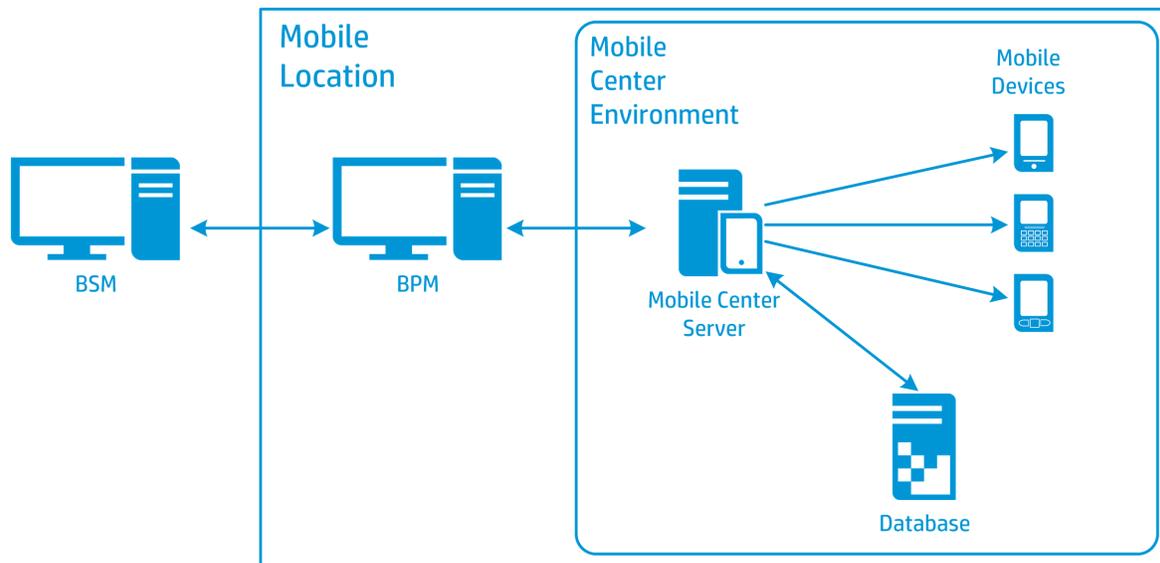
Requirements

BPM Real Device Monitoring has the following requirements at each location:

- Windows server with BPM 9.25 and VuGen 12.02

- Dedicated physical server or virtual machine, with Red Hat Enterprise Linux 6.5 minimal workstation 64 bit, running HP Mobile Center.
  For HP Mobile Center requirements, search for "Server Requirements" in
  http://mobilecenterhelp.saas.hp.com

  Note: The server must be connected to the network by a cable and not Wi-Fi.

- Android or iOS mobile devices

  For a complete list of supported devices, search for "Supported devices" in
  http://mobilecenterhelp.saas.hp.com

Limitations

Following are known BPM Real Device Monitoring limitations:

- The server must be connected to the network by cable and not Wi-Fi.

- Mobile Center only supports Android and iOS on a real device.

- Snapshot on Error is not supported for iOS apps.

- If you upload more than one app version to Mobile Center, BPM Real Device Monitoring will only use latest version.

- The real device must be active and unlocked.

- If you need to use the actions **Swipe**, **pressBack**, **pressHome**, or **pressMenu**, the actions must be added manually to the script in TruClient, they cannot be recorded.

  To manually add these actions in TruClient, from the Toolbox, drag and drop **Generic Device Action** onto the script and then select the required action.

Installation

Installing BPM Real Device Monitoring involves the following steps:

- Install BPM 9.25, for details see the BPM Deployment Guide.

  > **Note:** After installation, verify that file **TC4Mobile.lrp** was copied from **ScriptRepositoryFilters.zip** to **<BSM Installation directory>/dat/protocols**.

- Install VuGen 12.02, for details see the VuGen documentation.

- Install and configure Red Hat. For details, see "Install and Configure Red Hat" below.

- Install and configure HP Mobile Center server, for details, see http://mobilecenterhelp.saas.hp.com

For installation troubleshooting, see "Installation Errors" on page 122.

Install and Configure Red Hat

This section describes how to install and configure Red Hat so that it will work most efficiently with BPM Real Device Monitoring.

1. Insert the Red Hat Server 6.5 disk and follow the installation wizard.

   > **Note:** If a text-based Red Hat installation wizard opens instead of the normal graphical interface, cancel the installation and increase RAM to at least 4 GB.

2. During installation, select the following options:

   - Minimal

   - PostgreSQL Database Client

3. After installation, run the following command to confirm that the server is accessible:

```
ping -c 1 'hostname'
```

Configuration

You need to configure mobile devices and the HP Mobile Center.

1. Set up the mobile devices. For details, search for "Set up your mobile lab" in
   http://mobilecenterhelp.saas.hp.com

   > **Note:** If you are using a virtual machine on Windows, make sure that the USB is mounted.

2. Check that the devices are connected:

   a. Log in as user **hpmc**.

   b. Run the following command:

      ```
      adb devices
      ```

      The command prompt displays a list of the connected devices with their IDs

      > **Note:** If instead of the device ID you receive an "unauthorized" message, see "Device is not Listed in the Mobile Center Server" on page 119.

Configure Mobile Devices

You need to configure each mobile device connected to the HP Mobile Center server. For details search for "Connect devices to HP Mobile Center" in http://mobilecenterhelp.saas.hp.com

Recording Scripts

Recording a script is done using VuGen TruClient Native Mobile protocol. This protocol supports the following hard coded parameters:

- **MobileApp** – The full name of the mobile application, for example com.hp.app

- **MobileDevice** – Identifier of the mobile device that will be used to monitor the application.

- **MobileServerURL** – The URL or IP address of the Mobile Center server, followed by the port, in the format <IP>:<port>

- **MobileServerUserName** – The user name to access the Mobile Center server.

- **MobileServerPassword** – The password to access the Mobile Center server.

These parameters are created automatically when creating a new TruClient Native Mobile script.

> **Note:** If you have BSM 9.24 or earlier, use the script template to create new TruClient Native protocol scripts. This allows the BSM machine to read the default parameters.
>
> 1. Open the following file:
>
>   **<BPM installation directory>/resources/TruClientNativeMobile_TemplateForBPM.zip**
>
> 2. Extract the contents of this file to the Scripts folder on the VuGen machine.
>
> 3. In VuGen, click **Open** and select the template.
>
> 4. Click **Save script as…** and give the script a new name.
>
> 5. If required, set the script to create extended logs by selecting: **Replay** > **Run-time Settings** > **General** > **Log** > **Extended Log**.

For details of how to record a TruClient script, search for "LoadRunner on HP Mobile Center" in http://mobilecenterhelp.saas.hp.com

After Recording the Script

After you have recorded the script do the following:

1. Delete, edit, and add transactions to the script as required.

   > **Note:** If the script includes entering credentials, the password field will not be saved by the Mobile Center server. You need to open the corresponding TruClient step and edit the password field, replace ******** with the real password.

2. In TruClient, click the play button to test the script.

3. Take note of the application and MobileDevice identifiers. You should save the name of these identifiers as they will be needed for script parameters.

   - The Application Identifier is displayed in the Select Application window, click the arrow next to the version name to view the application Identifier.

   - The Mobile ID is displayed in the Select Device window.

4. Once you have made the necessary changes to the script, save the script and close the TruClient interface.

5. From VuGen export the script to a zip file. Select **File** > **Manage Zip Files** > **Export to zip File…** > **runtime files only**.

Deploying Scripts

To deploy a script, you need to upload the script to BSM, and for each location assign the BPM Mobile locations and the script parameters.

1. Upload the recorded scripts to BSM, create an application that will run the scripts, update the application thresholds, and assign the application to the required BPM Mobile locations.

   Note: Mobile scripts take longer to run than regular scripts, so you should increase the thresholds.

2. Click to update the script parameters for each location.

   Note: Without this step the script will not run since it expects the parameters to be correct for each location. In each mobile location set the Mobile Center server URL, device ID, application ID, user name, and password.

BPM Real Device Monitoring Best Practices

Recommended naming conventions in BSM

The location name should contain all the parameters that you want to differentiate in each location. For example, if you are monitoring different devices and multiple carriers in the same city, you should include the carrier and device name in the location name. For example **LosAngeles_Verizon_ GalaxyS4**.

Troubleshooting

This section contains tips to address some of the common issues with BPM Real Device Monitoring.

Manually Installing the HP Agent

If the HP Agent is not installed automatically by the server, you need to configure it manually. For details, see the troubleshooting section under "Connect Android mobile devices" in http://mobilecenterhelp.saas.hp.com

APK Files (Android Mobile Apps)

You need to upload APK files to the Mobile Center server.

If APK is already installed on your device, it must be the same APK that you upload to Mobile Center.

You do not need to manually install APK on your device; Mobile Center does it automatically.

In TruClient you can control the APK settings in **General settings** > **Mobile**. The following options control the application flow:

- Restart

- Install (default)

- Un-install

BSM Does not Display Script Parameters

If BSM does not display the script parameters, there may be an incorrect name for the script .prm file, which contains descriptions of the parameters.

To fix this problem:

1. Remove the script from BSM.

2. Extract the script zip.

3. Open the script folder.

4. Rename the file **TC4MParams.prm** to **<script name>.prm**

5. Open the file **<script name>.usr** and update the **ParameterFile** property value to be **<script name>.prm**.

6. Save the file.

7. Create a zip file from the script folder.

8. Upload the script to BSM.

Device is not Listed in the Mobile Center Server

If you do not see your device on the Mobile Center server, run the following command to confirm that the device is connected.

```
adb devices
```

A list of connected devices and their IDs is displayed.

The following error message indicates that the abd command does not have the required permissions:

```
[hpmc@localhost ~]$
```

```
List of devices attached
????????????   no permissions
```

To resolve this problem, set root permissions to the adb command:

On the Mobile Center server, log in as root and run the following commands:

```
cd /opt/hpmc_3rd_party/android-sdk-linux/platform-tools
```

```
chown root:hpmc adb
```

```
chmod 4550 adb
```

```
./adb kill-server
```

If the USB on the Virtual Machine is not automatically set, you will need to mount the USB device again.

Unauthorized Device ID

If instead of a device ID there is the phrase "unauthorized", check that the mobile device is set to allow the connection. There may have been an alert message on the mobile device screen asking to authorize the HP Agent.

The HP Agent on the mobile device should show the values:

- **Server URL:** http://<Linux_VM_IP_Address>:8080/hp4m-connector/rest/device

- **username:** hpmc

- **password:** hpmc

- **HP Agent is running**

- **Status:** Connected to <above URL>/register

Other Common Problems

- If the application closes immediately when you start to record, it means that the accessibility options for the HP agent is off. To resolve this problem, on the mobile device, open **Settings** > **Accessibility** > **HP Agent** and set it to **ON**.

- A Lock icon on the device indicates that it is used by Mobile Center, not that the device is locked. You can press the Lock icon to unlock the device and make it available in Mobile Center.

- If you are having network problems, use the following command to enable networking:

```
sed -i s/ONBOOT=no/ONBOOT=yes/ /etc/sysconfig/network-scripts/ifcfg-eth0
service network restart
```

Common Error Messages

This section describes common error messages you may encounter in TruClient or on the server when working with BPM Real Device Monitoring.

HP Agent not installed or UIAutomatorReplayAgent.jar

If the log contains an exception that the HP Agent is not installed, or failed actions with the file **UIAutomatorReplayAgent.jar**, it probably means that the server failed to copy the to the device.

To resolve this issue, see the Troubleshooting section in "Connect Android mobile devices" in http://mobilecenterhelp.saas.hp.com.

Unsupported major.minor version 51.0

If the Mobile Center server fails to load and displays "Unsupported major.minor version 51.0", the version of Java installed on the server may be lower than Java 1.7.

To check the installed Java version run the following command:

```
Java -version
```

If the installed Java version is lower than 1.7, install Java 1.7.

Unable to connect to the server

If you get the following error message in TruClient

```
Unable to connect to the server.
Verify that the server is up and/or the IP
Address is correct
```

The error may be because the server IP is not configured correctly in the Settings tab or that the Linux Virtual Machine does not have a valid IP.

To test the connection to the Mobile Center server, open a browser and enter the following URL:

http://<MC Server IP>:8080

AUT isn't installed

This error message means that the application is not installed on the mobile device. To resolve this issue, in the server settings, select the **Install** checkbox.

Server Error Messages

Following are common server error messages:

- **Check that a record or replay service is running**

  The error indicates that an accessibility service is not running.

- **Failed to create job: Test creation failure, failed to lock device .... Please check your server settings match the one previously saved in the script.**

  This error indicates that the device is already locked and you cannot use it.

- **Failed to start VNC on device**

  This error indicates that TruClient was unable to access the remote desktop.

Installation Errors

Following are some of the errors that you may encounter during HP Mobile Center installation.

java.net.UnknownHostException or "Server not Known"

If the Mobile Center server installation fails with the following error:

```
Caused by: java.net.UnknownHostException: xyz: xyz: Name or service not known
at java.net.InetAddress.getLocalHost(Unknown Source)
```

The problem is that the host name of this server is not recognized by the network.

To resolve this issue:

1. Open a command prompt and run the following command to obtain the IP address of the host name.

   ```
   hostname
   ```

2. Open the **/etc/hosts** file and add the IP address of the host name to the **localhost** line.

3. Log in as hpmc user.

4. Open a command prompt and run the following command to obtain the IP address of the host name.

   ```
   cd /opt/hpmc/Schema/ ; java -jar hp4m-database-jar-with-dependencies.jar -u
   postgres -p password -i -ux 2 ; cd —
   ```

5. run the following command to start hpmc:

   ```
   server hpmc start
   ```

Setting Virtualization

If you are using Oracle VirtualBox to create the Linux Virtual Machine, and there are no 64 bit guest OS available for creation, try enabling Virtualization in the machine's BIOS.

This option is available under one of the following options:

- Virtualization Technology

- VT-x/AMD-V hardware acceleration

Chapter 13: BPM Workspace Directory

The workspace directory consists of log files and other files that relate to BPM operations. The log files document event information and errors for BPM and its instances. For information on the contents of the log files, see "Log Files" on page 128.

The BPM workspace directory includes the following three sub-directories:

- **agent1.** Includes all the BPM instance data (applications, scripts, and so forth). For details, see "Agent1 Directory" on page 128.

- **archive.** Includes all the archive directories. For details, see "File Archiving" on page 130.

- **logs.** Includes all the BPM log files. For details, see "Log Files" on page 128.

By default, the workspace directory is located in the <BPM application directory>. To change the workspace directory location, see "How to Change the Workspace Directory Location" below.

Learn About

- "Agent1 Directory" on page 128

- "Log Files" on page 128

- "Log Entry Format" on page 130

- "File Archiving" on page 130

- "File System Management" on page 133

Tasks

How to Change the Workspace Directory Location

> **Note:** If you relocate the workspace to a network drive, you must carry out additional steps as described in "How to Enable Access to Windows Mapped Network Resources Within a Script" on page 183.

1. Stop BPM.

2. In the **<BPM installation directory>/BPM/yajsw/conf/wrapper.conf** file, configure the

parameter **-Dbpm.workspace** to point to the new workspace location.

3. Open the following file under **<BPM installation directory>/BPM/ServletContainer/bin**:

   - **Windows:** catalina.bat

   - **Linux:** catalina.sh

4. Configure the parameter **-Dbpm.workspace** to point to the new workspace location.

5. In the file **<BPM application directory>/BPM/config/topaz_agent_ctrl.cfg**, configure the **Workspace** property (under the [General] section) to point to the new workspace location.

6. Start BPM.

How to Move Workspace Logs

To move the workspace logs to another location, change the workspace directory location. For details, see "How to Change the Workspace Directory Location" on the previous page.

How to Browse the Workspace Directory

The **Browse Workspace** option enables you to view the files stored in the workspace directory.

To browse the workspace directory, in the BPM Admin console select a host, click the **Browse** button and select **Browse Workspace**. The Browse Workspace dialog box opens in a new window, comprising the following areas:

- **Left pane.** Displays a hierarchical tree of the folders, subfolder, and files included in the Workspace directory (the root entry in the tree).

- **Right pane.** Displays the contents of the file you select in the tree in the left pane. If the selected file is empty, the right pane also remains empty.

> **Note:**
>
> - You cannot edit the files from BPM Admin, only view the file contents.
>
> - Use CTRL+F to find a specific string in a file.
>
> - If your log files contains non-English data, you must open them in a viewer that supports UTF-8 format parsing, for example, Notepad.

How to Configure Log Files Replacement Frequency

By default, the replacement frequency for log files is set to daily (except for the **bpm_all.log** file, which is set to hourly).

To change the log file replacement frequency:

1. Open the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file.

2. Locate the section for the specific log (search for the log name).

3. To configure the frequency unit (day, hour, or minute), change the frequency date pattern in the **filePattern** parameter inside the **RollingFile** tag, as follows:

Frequency unit	filePattern parameter
Day	%d{yyyy-MM-dd}
Hour	%d{yyyy-MM-dd_HH}
Minute	%d{yyyy-MM-dd_HH:mm}

4. To configure the number of units, change the **interval** parameter inside the **TimeBasedTriggeringPolicy** tag, where interval="1" means that the log files are replaced once every frequency unit, interval="2" means that log files are replaced once every two frequency units, and so on.

In the following example, the **bpm_communication.log** file is set to a daily frequency:

```
<!-- ################ BpmCommunicationAppender ############################# -->
<RollingFile name="BpmCommunicationAppender" fileName="${sys:bpm.workspace}/logs/bpm_
communication.log" filePattern="${sys:bpm.workspace}
/archive/shortTerm/logs/communication/bpm_communication_%d{yyyy-MM-dd}_%i.log">
        <PatternLayout>
            <pattern>%d{dd/MM/yyyy HH:mm:ss} %-5p [%t] [%c{1}] %m%n</pattern>
        </PatternLayout>
        <Policies>
            <OnStartupTriggeringPolicy />
            <TimeBasedTriggeringPolicy interval="1" modulate="true"/>
            <SizeBasedTriggeringPolicy size="5 MB"/>
        </Policies>
        <DefaultRolloverStrategy max="50"/>
</RollingFile>
```

In the following example, the **bpm_communication.log** file is set to a frequency of once every three hours:

```
<!-- ################ BpmCommunicationAppender ############################# -->
<RollingFile name="BpmCommunicationAppender" fileName="${sys:bpm.workspace}/logs/bpm_
communication.log" filePattern="${sys:bpm.workspace}
/archive/shortTerm/logs/communication/bpm_communication_%d{yyyy-MM-dd_HH}_%i.log">
        <PatternLayout>
            <pattern>%d{dd/MM/yyyy HH:mm:ss} %-5p [%t] [%c{1}] %m%n</pattern>
        </PatternLayout>
        <Policies>
            <OnStartupTriggeringPolicy />
            <TimeBasedTriggeringPolicy interval="3" modulate="true"/>
            <SizeBasedTriggeringPolicy size="5 MB"/>
        </Policies>
        <DefaultRolloverStrategy max="50"/>
    </RollingFile>
```

In the following example, the **bpm_communication.log** file is set to a frequency of once every two minutes:

```
<!-- ################ BpmCommunicationAppender ############################# -->
<RollingFile name="BpmCommunicationAppender" fileName="${sys:bpm.workspace}/logs/bpm_
communication.log" filePattern="${sys:bpm.workspace}
/archive/shortTerm/logs/communication/bpm_communication_%d{yyyy-MM-dd_HH:mm}_%i.log">
        <PatternLayout>
            <pattern>%d{dd/MM/yyyy HH:mm:ss} %-5p [%t] [%c{1}] %m%n</pattern>
        </PatternLayout>
        <Policies>
            <OnStartupTriggeringPolicy />
            <TimeBasedTriggeringPolicy interval="2" modulate="true"/>
            <SizeBasedTriggeringPolicy size="5 MB"/>
        </Policies>
        <DefaultRolloverStrategy max="50"/>
    </RollingFile>
```

How to Configure the Log Files Replacement Pattern Based on Size

Change the size parameter inside **SizeBasedTriggeringPolicy** tag. The size can be specified in bytes (KB, MB or GB).

1. Open the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file.

2. Locate the section for the specific log.

3. Change the **size** parameter inside the **SizeBasedTriggeringPolicy** tag.

In the following example, log files are rotated upon reaching 100 bytes:

```
<Policies>
            <OnStartupTriggeringPolicy />
            <TimeBasedTriggeringPolicy interval="2" modulate="true"/>
            <SizeBasedTriggeringPolicy size="100"/>
        </Policies>
```

In the following example, log files are rotated upon reaching 5 MB:

```
<Policies>
            <OnStartupTriggeringPolicy />
            <TimeBasedTriggeringPolicy interval="2" modulate="true"/>
            <SizeBasedTriggeringPolicy size="5 MB"/>
        </Policies>
```

How to Configure Log Files Logging Level

By default, the logging level for log files is set to Info.

To change the log files logging level:

1. Open the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file.

2. Locate the section for the specific log and find the appender name for the log.

   In the following example, the appender name for the **bpm_communication.log** is BpmCommuncationAppender.

```
<!-- ################# BpmCommunicationAppender ############################### -->
    <appender name="BpmCommunicationAppender"
class="org.apache.log4j.rolling.RollingFileAppender">
            <param name="File" value="${bpm.workspace}/logs/bpm_communication.log"/>
```

3. In the **Loggers definitions** section, change the **level value** to the required log level in all the logger sections for the selected appender name (there can be multiple logger sections for the same appender name). In the following example, the level value for one of the BpmCommunicationAppender logger sections is set to **info**:

```
<logger name="com.hp.bsm.bpm.communication" additivity="true">
        <level value="info" />
        <appender-ref ref="BpmCommunicationAppender" />
    </logger>
```

Note: If you change the log level to **debug**, you must also change the replacement frequency to **hourly** to avoid the log files growing too big.

Agent1 Directory

The Agent1 directory contains a sub directory for each BSM instance. The name of the sub directory is SiteX, with X representing an internal instance number automatically assigned by BPM.

Each SiteX directory contains an application directory for each application in the instance. The application directory name comprises the first 12 characters of the application name (if the application name is shorter than 12 characters, it is padded with underscores), an underscore, the BSM internal application ID, an underscore, and a counter. For example: `MyApplicatio_AB567687697890C_2`.

Each application directory contains a script directory for each script configured for the application. The script directory name comprises the first 12 characters of the script name (or less if the name is shorter than 12 characters). For example: `MyScript`.

Each script directory contains a sub directory that contains the script content. The directory name comprises the internal script ID, an underscore, and a counter. For example: `25_1`.

Log Files

By default, log files are stored in the **<BPM application directory>/workspace/logs** directory. The following are the log files used by BPM:

- **bpm_all.log.** Holds all log entries from all the other logs, except for entries from the bpm_ communication_layer.log.

- **bpm_archive.log.** Holds all log entries relevant to the archive mechanism.

- **bpm_audit.log.** Hold the log entries relevant to instance creation, updates, deletion, and for sample purging.

- **bpm_bsm_comm.log.** Holds all the log entries of the communication between BPM and BSM.

- **bpm_communication.log.** Currently always empty (future use is for BPM WebServices communication log entries).

- **bpm_communication_layer.log.** Holds all the log entries of the communication between BPM and BSM produced by the lower level communication layer.

- **bpm_configuration.log.** Holds all log entries relevant to the BPM configuration mechanism.

- **bpm_model.log.** Holds all the log entries produced by the BPM instances and jobs model.

- **bpm_sample_sender.log.** Holds all the log entries produced by the BPM samples mechanism.

- **bpm_scheduling.log.** Holds all the log entries produced by the BPM scheduling mechanism.

- **bpm_servlets.log.** Currently always empty (future use is for BPM servlets activities),

- **bpm_tasks_execution.log.** Holds all the log entries produced by the Run-Unit execution mechanism,

- **cluster.** Currently not supported:

    - **bpm_cluster.log**

    - **bpm_cluster_communication.log**

    - **bpm_cluster_scheduling.log**

    - **bpm_cluster_servlets.log**

- **<BPM installation directory>/installation/logs/bpm_install.log.** Holds post-installation logs.

- **<BPM application directory>/BPM/Tomcat/logs/catalina.<current date>.log.** Holds the BPM's web server log entries.

- **<BPM installation directory>BPM/yajsw/log/bpm_nanny.log.** Holds all the BPM service log entries.

By default, the **bpm_all.log** file is replaced automatically once an hour, or upon reaching 10 MB capacity. All the other log files are replaced automatically once a day, or upon reaching 5 MB capacity. The default values for each log can be edited in the **<BPM installation**

directory>/ServletContainer/lib/log4j2.xml file. When a log file is replaced, it is sent to the short term archive. For details, see "File Archiving" below.

> **Note:** By default, log files include data from automatic transactions. If VuGen is set to create automatic transactions (Run-Time Settings > General > Replay > Automatic Transactions), and you do not want these automatic transactions included in the mdrv.log file, in the mdrv.dat file, in the **[bpm]** section, in the **ExtCmdLine** parameter, set **MsgClassReportAllTrans** to **0**.

Log Entry Format

The following are examples of log entries:

```
29/04/2013 11:01:53 INFO  [BpmTaskRunner-46] [GeneralTaskExecutor] Running script: myscript
```

```
29/04/2013 11:03:00 ERROR [SampleSenderThread-1] [WtCreateSample9] WebTrace arrived with 0
hops. Ignoring.
```

Each line starts with the date and time, then the level of the message. BPM uses the following log levels for events:

- Fatal

- Error

- Warning

- Info

- Debug

- Trace

By default, BPM is set to log only entries of level `Info` and higher (meaning that `Debug` events are not included). You can change the default setting (to show a different level and higher) in the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file. For details, see "How to Configure Log Files Logging Level" on page 127.

File Archiving

The archive manager, which is launched when BPM is started, controls all the archiving activities—adding, zipping, and deleting archive files. Archiving parameters are configured in the **<BPM application directory>/config/archive.cfg** file.

BPM data files are automatically saved in archives when BPM needs to replace them or has finished using them. There are seven different categories of archives:

- **logs.** All log files

- **input_job.** The last application configurations and jobs received from BSM.

- **model_persistency.** Complete application configurations and jobs received from BSM.

- **samples.** Sample data.

- **samples_quarantine.** Bad sample data.

- **scripts_results.** Executed scripts results.

- **webtraces.** Executed WebTraces results.

Each archive category is further subdivided into:

- A short term archive, that stores the files in their original format.

- A long term archive, that stores the files in a zipped format.

For each archive category, you configure a **shortTerm**, **longTerm**, and **longTermCritical** policy. Each policy determines how long an archive file is kept in the relevant folder. You can select the following time periods:

Parameter	Description	Format (n=positive integer)
HOUR	The number of hours to keep the files in the archive.	n HOUR
DAY	The number of days to keep the files in the archive.	n DAY
WEEK	The number of weeks to keep the files in the archive.	n WEEK
MONTH	The number of months to keep the files in the archive.	n MONTH
YEAR	The number of years to keep the files in the archive.	n YEAR
ALWAYS	Files are kept forever. They are not moved or deleted by the archive process.	ALWAYS
SAME_ DAY	Files are kept only for the duration of the date they were created and are deleted or moved at midnight.	SAME_DAY
MINIMUM	Files are moved or deleted each time the archive process runs.	MINIMUM
NEVER	Files are not saved in the relevant archive at all.	NEVER

You can also configure the **MinimumFreeDiskSpaceThresholdInMB** parameter, which determines the minimum free disk space threshold. If this threshold is breached, all the short term archives are zipped and moved to the long term archive and the long term archive is managed according to the **longTermCritical** policy.

The archive process policy (configured in the [ArchiveProcess] section) determines how often the archive process runs for each folder. You configure the process policy for each archive folder and can use the following time periods:

Parameter	Description	Format (n=positive integer)
HOUR	The number of hours between process runs.	n HOUR
DAY	The number of days between process runs.	n DAY
WEEK	The number of weeks between process runs.	n WEEK
MONTH	The number of months between process runs.	n MONTH
YEAR	The number of years between process runs.	n YEAR
ALWAYS	Run the process each hour.	ALWAYS
SAME_DAY	Run the process each day at 00:00.	SAME_DAY
MINIMUM	Run the process each hour.	MINIMUM
NEVER	Never run the process (that is, files are never moved/deleted).	NEVER

Each time the process runs, it moves or deletes files that are older than the configured policy. For example, if the archive process is configured to run once an hour, a file for which a policy of 1 HOUR is configured and that has been archived for 59 minutes will not be moved/deleted when the archive process is run and will be moved or deleted only during the next run, by which time the file has been in the archive for 1 hour and 59 minutes (even though the policy was configured as 1 HOUR).

The archive manager moves log files to the short term archive and replaces them with new log files in the following cases:

- BPM is restarted.

- The minimum disk space threshold configured in the **archive.cfg** file has been breached.

- It is time for the log files to be replaced, as configured in the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file.

When multiple log files are moved to the short term archive, they are renamed with numbered extensions (log.1, log.2,...) in the order in which they were archived.

Example: If three log files were moved to the short term archive on August 22, 2013, they appear as:

- **bpm_all_2013-08-22_1.log**

- **bpm_all_2013-08-22_2.log**

- **bpm_all_2013-08-22_3.log**.

In the **<BPM installation directory>/ServletContainer/lib/log4j2.xml** file, you can configure the number of log files which the short term archive can hold, up to a maximum of 50 log files. When this maximum is exceeded, the oldest log files are deleted to make room for the new archived log files. You can configure the maximum for each category of log file separately in the line: `<DefaultRolloverStrategy max="50"/>`.

Short term archives are zipped and moved to the long term archive, and the long term archive is managed according to the **longTermCritical** policy, in the following cases:

- The BPM machine's free disk space breaches the minimum disk space threshold configured in the **archive.cfg** file.

- The archive file's minimum disk space threshold is lower than the BPM machine's minimum disk space threshold, and the BPM machine's minimum disk space threshold is breached.

> **Note:** We recommend that the value of the BPM machine's minimum disk space threshold be less than the value of the archive file's minimum disk space threshold.

File System Management

For each BSM instance to which a BPM is connected, BPM maintains a data folder that holds all the script run results before they are processed and turned into samples, as well as all the samples byte array data before it has been sent to BSM.

BPM maintains a specific data folder for each BSM instance. This data folder is located in the BPM workspace directory (for example **<BPM workspace directory>\agent1\Site2\data**). Within the data folder, sub-folders are automatically created for each sample type (trans_t, SOA, and WebTrace), as well as a sub-folder for the samples byte array data that is about to be sent to BSM (encoded_ samples). In each of these sub-folders, the results data for each script run is stored either as a further sub-folder or as a file.

When a BPM has a heavy work load and is running many scripts per minute, or when one of the BSM machines to which the BPM is reporting is not available, files will accumulate in the data folder. File system management enables you to control the maximum number of sub-folders and files, as well as the maximum sub-folder size under the data folder. This mechanism automatically creates sub-folders and saves files as they are accumulated, until a configured maximum number of sub-folders/files or a maximum sub-folder size is reached. When the maximum file number or folder size has been reached, the system cannot copy or create new script results under the data folder and a warning message is written to the <BPM application directory>\workspace\logs\bpm_tasks_execution.log file. The system retries the unsuccessful action after a few seconds, which may eventually cause the BPM to stop running scripts for that instance until space in the folder is freed up.

You can configure the maximum number of sub-folders or files and the maximum sub-folder size using the following parameters in the **General** section of the **topaz_data_server.cfg** file (for details, see):

- **MaxFilesNumberUnderDataSubFolder** – The maximum number of sub-folders or files that can be created under a data sub-folder.

Default: 1000

- **ApproximateMaxSizeOfDataSubFolderInMB** – The maximum permitted sub-folder size.

    Default: No limit

Example

If the maximum number of sub-folders or files is configured as two, the following directory structure can exist:

data

- encoded_samples

    - temporary sub-folder1 (created automatically)

        - file1 for a script's run data

        - file2 for a script's run data

    - temporary sub-folder2 (created automatically)

        - file1 for a script's run data

        - file2 for a script's run data

- trans_t

    - temporary sub-folder1 (created automatically)

        - sub_folder1 for a script's run data

        - sub_folder2 for a script's run data

    - temporary sub-folder2 (created automatically)

        - sub_folder1 for a script's run data

        - sub_folder2 for a script's run data

- soa

    - temporary sub-folder1 (created automatically)

        - sub_folder1 for a script's run data

        - sub_folder2 for a script's run data

- temporary sub-folder2 (created automatically)

  - sub_folder1 for a script's run data

  - sub_folder2 for a script's run data

- webtrace

  - temporary sub-folder1 (created automatically)

    - file1 for a WebTrace's run data

    - file2 for a WebTrace's run data

  - temporary sub-folder2 (created automatically)

    - file1 for a WebTrace's run data

    - file2 for a WebTrace's run data

Chapter 14: Run Units

A run unit is an application, or a business transaction flow, with its own schedule, and all the entities contained within it. By default, business transaction flows are included in their parent application's run unit (using the same schedule and run mode), but you can configure different schedules and run modes for individual business transaction flows. If a business transaction flow has its own schedule, it is not included in the application run on the BPM instance, but is run as an independent unit.

Learn About

Tasks

UI Description

Instance page status tab
See .

Schedule List area
See .

Example – Run Units

The following diagram shows the run units for a BPM instance that includes two applications. The first application (Application 1) includes one application level WebTrace and three business transaction flows (BTF1, BTF2, BTF3). BTF1 includes one script and one WebTrace, BTF2 includes one script and has its own schedule, and BTF3 contains one script and one WebTrace. Since BTF2 has its own schedule, it is considered as a separate run unit from the application.

The second application (Application 2) includes two business transaction flows (BTF4 and BTF5). BTF4 and BTF5 each include one script, and BTF5 has its own schedule. Since BTF5 has its own schedule, it is considered as a separate run unit from the application.

Since each application is a separate run unit, there are a total of four run units in the Business Process Monitor instance—Application 1, BTF2, BTF5, and Application 2.

Run Unit Schedules

Each run unit (an application or business transaction flow) running on a BPM instance runs according to a schedule defined in End User Management Administration (for details, see "Business Process Monitor Administration User Interface" in the BSM Application Administration Guide). Each application or business transaction flow can also have multiple schedules defined for it, as described in "Multiple Schedules" on the next page.

The schedule defines the frequency of iterations of the run unit after its first run. The actual run time of the run unit is determined by the start offset value configured for it, which specifies the delay between the run unit schedule time and the run time, as described in "Start Offset" below.

Note that if a run unit run overruns the scheduled time for the next run iteration, then BPM skips the missed iteration and continues with the next scheduled iteration. For example, if an application schedule is set to run every 5 minutes, and the application run actually takes 6 minutes, then BPM runs iteration 1, skips iteration 2, and continues with iteration 3 (10 minutes after the first iteration).

Information on skipped runs is logged in the **agent.txt** log for the BPM instance.

Multiple Schedules

In EUM Administration, you can define multiple schedules for an application or business transaction flow running on a specific BPM instance. This enables you to have the application or business transaction flow run on BPM using different schedules at different times. For example, you can have an application run every 15 minutes during the working week and every hour during weekends.

When a run unit has multiple schedules defined for it, each schedule (and its start offset value) is shown in the **Schedule List** area on the corresponding Application or Business Transaction Flow page.

> **Note:** If the multiple schedules for a run unit overlap, then BPM runs the run unit according to both schedules. If a run unit run (initiated according to one of the schedules) overruns the scheduled time of a run iteration according to the second schedule, then BPM skips the second iteration, and continues with the next scheduled iteration. Information on skipped runs is logged in the **bpm_tasks_execution.log** log for the BPM instance.

Start Offset

BSM enables you to apply an offset to the start time of each run of a run unit (application or business transaction flow). This enables the optimal distribution of script runs over time, and minimizes the parallel running of many scripts (when there are different BPM hosts running the same run unit). Staggering the runs provides a more even distribution of the workload, avoiding overload on the monitored server and excessive bandwidth demand, and enabling better utilization of machine CPU and memory.

> **Note:** It is recommended not to change the default start offset as this may reduce BPM performance and adversely affect the optimal distribution of tasks.

The start offset value, displayed in the **Schedule List** area on the Application or Business Transaction Flow page, specifies the delay between the run unit schedule time and the actual run time, for each run of the run unit. The start offset for each application can be calculated automatically by BPM, or can be user-defined; you determine the method and value when defining the application or business transaction flow schedule. When the start offset is configured manually, you can avoid the possibility that run units running on more than one BPM run at the same time.

After the initial run, BPM continues to run the run unit according to the original schedule defined for the application or business transaction flow (in EUM Administration), and reapplies the start offset for every run of the run unit.

For example, an application has a start offset value of 120 seconds, and a schedule of every 15 minutes, every day from 10:00 to 16:00. Each day, the first run of the application begins after the start offset, at 10:02 AM. The next run is 15 minutes later, at 10:17 AM, and repeats every 15 minutes after that till the end of the day's schedule.

> **Note:**
>
> - For schedules that run all day, all week, the start offset is applied from 00:00 AM, so that for a schedule of 15 minutes and start offset of 120 seconds, the run unit (application or business transaction flow) runs at 15 minute intervals from 00:02 AM.
>
> - If you define multiple schedules to run an application or business transaction flow on a single BPM, a different start offset value may be used for each schedule. For more information, see "Multiple Schedules" on the previous page.
>
> - When you configure offsets for running applications or business transaction flow on BPMs in different locations, you must take into consideration the time zone setting for each location.

Run Modes

The **Monitoring Status** area of the Application or business transaction flow page shows the running dependencies for the scripts and WebTraces in the application or business transaction flow. This identifies the order that BPM uses when executing each script and WebTrace in the run unit, during each run on the BPM instance.

The order and timing for running the tasks (scripts and WebTraces) within the run unit are determined by the application or business transaction flow run mode. The application or business transaction flow run mode determines how BPM runs the tasks in a run unit when it begins an iteration. Some of the run modes run the tasks in a specific order according to predefined criteria; in this case, the scripts run in the order defined in the application or business transaction flow.

Both the run mode and the script order are defined for the application or business transaction flow in EUM Administration (see "Business Process Monitor Administration User Interface" in the BSM Application Administration Guide).

> **Note:** It is recommended to change the default run modes only when specifically needed. Some non-default run mode configurations can adversely affect BPM performance.

The following run modes are supported and the examples shown are based on the following run unit configuration:

Application 1			
Application Level WebTraces	**Business Transaction Flows**		
WT1	**BTF1**	**BTF2**	**BTF3**
WT2	WT3	WT5	WT6
	WT4	Script 4	Script 5
	Script 1		Script 6
	Script 2		
	Script 3		

Classic

All scripts in the run unit run sequentially, according to the order defined in EUM Administration. All WebTrace schemes in a business transaction flow start running concurrently with the first script of the business transaction flow. Application level WebTraces start running concurrently with the first script of the first business transaction flow.

Run Order Example

Each column (from left to right) represents the next stage in the running order.

1	2	3	4	5	6
BTF1 and Application Level WebTraces			**BTF2**	**BTF3**	
Script 1	Script 2	Script 3	Script 4	Script 5	Script 6
WT1			WT5	WT6	
WT2					
WT3					
WT4					

The tasks included in a business transaction flow start running, regardless of whether previously run WebTraces have finished running. For example, BTF2 (Script 4 and WT5) starts running after Script 3 finishes running, regardless of whether the WebTraces (WT1-WT4) have finished running.

Dialup

If a run unit has two or more scripts, the first script begins running when the run unit begins an iteration. When the first script completes its run, all WebTrace schemes and scripts, excluding the first and last scripts, run in Classic mode. When all tasks stop running, the last script runs. If a run unit has fewer than two scripts, it runs in Classic mode.

> **Note:**
>
> - If the first script in the run unit (the connect script) does not complete its run successfully, the rest of the scripts in the unit will not run.
>
> - If the first script completes its run, the last script always runs.
>
> - An application running in dialup mode must contain a business transaction flow that includes only a hang up script (that is, it must not include any other scripts or WebTraces). This business transaction flow must be the last one in the application.

Run Order Example

Each column (from left to right) represents the next stage in the running order.

1	2	3	4	5	6
BTF1			**BTF2**	**BTF3**	
First Application Script					Last Application Script
Script 1	Script 2	Script 3	Script 4	Script 5	Script 6
	WT1		WT5	WT6	
	WT2				
	WT3				
	WT4				

Sequential

All run unit tasks run sequentially (with only one task running at a time). The script tasks run according to the order defined in EUM Administration. WebTrace tasks run after the last script is completed, with an undefined (though consistent) order.

Run Order Example

Each column (from left to right) represents the next stage in the running order.

1	2	3	4	5	6	7	8	9	10	11	12
BTF1			**BTF2**	**BTF3**		**All WebTraces (application and business transaction flow levels)**					
Script 1	Script 2	Script 3	Script 4	Script 5	Script 6	WT 1	WT2	WT3	WT4	WT5	WT6

Concurrent

All tasks begin running simultaneously when the run unit begins an iteration. (This is the same as selecting Stepped run mode and setting the Step value as 0.)

Run Order Example

Each column (from left to right) represents the next stage in the running order.

1
BTF1
BTF2
BTF3
All WebTraces (application and business transaction flows)
Script 1
Script 2
Script 3
Script 4
Script 5
Script 6
WT1
WT2
WT3
WT4
WT5
WT6

Stepped

Each task begins running after a defined time period (step) has passed from the time the previous task started. In this case, the **Running Dependencies** column in the BPM Admin Application or Business Transaction Flow page displays, for example: `5 seconds after the beginning of the following task: X_transaction`, meaning that the task runs only after a step of 5 seconds has elapsed since X_ transaction task started running. The scripts run according to the order defined in EUM Administration. All WebTrace tasks (on both application and business transaction flow levels) also run in stepped mode after the last script has started, in an undefined (though consistent) order.

Run Order Example

How to Apply a Start Offset

There are two methods for staggering the run start time:

User-Defined Start Offset

When defining an application or business transaction flow schedule (in EUM Administration), you have the option to select User defined for the start offset, and enter a start offset value.

The start offset value is saved as part of the application or business transaction flow schedule data, and applied by each BPM that handles the run unit. If a BPM is restarted, the same offset value is applied again for the run unit.

If you define the start offset value as 0, then no offset is applied for the run unit in BPM; the run unit run starts at the time specified in the application or business transaction flow schedule.

Note: It is recommended not to override the default setting in general, and specifically not to set an offset of 0, as this can impact BPM performance and adversely affect the distribution of script runs.

Start Offset Determined by Business Process Monitor

BPM is able to generate start offset values for run units, so enabling staggered run times for the run units. Start offset values are allocated to all applications and business transaction flows that have **BPM default** defined for their schedule start offset in EUM Administration.

BPM uses a uniform distribution algorithm to calculate the dispersal rate, and to allocate start offset values to the run units in a balanced manner. The random factor means that when there are two or more BPM instances running the same application or business transaction flow with the same schedule, each instance runs the run unit at a different time. (If there was no random factor, each BPM instance would run the run unit at exactly the same time.) The random factor does not change the order that the applications or business transaction flows run, and the interval between each run of the run unit on each BPM instance remains constant. For example, on BPM A an application may run at 10:05, 10:20, 10:35, and on BPM B it may run at 10:10, 10:25, 10:40.

How to Create a Schedule

See "Schedule Dialog Box" in the BSM Application Administration Guide.

Chapter 15: BPM Configuration Files

The BPM configuration files define default parameter values that are used for BPM functioning. Some of these values can be changed within the configuration files, while other parameter values should only be changed using BPM Admin, or should not be changed at all. Not all of the parameters automatically appear in the configuration files, but can be added manually if you want to override the default value used by BPM.

To access

The BPM configuration files are located in the **<BPM application directory>/config** directory.

For details on how to browse the configuration folder, see "How to Browse the Configuration Folder" below.

Learn About

- "Parameters in topaz_agent_ctrl.cfg" on page 148

- "Parameters in archive.cfg" on page 151

- "Parameters in agent1.cfg" on page 155

- "Parameters in topaz_data_server.cfg" on page 162

- "Parameters in sconn.cfg" on page 169

- "Parameters in encryption.properties" on page 171

- "Parameters in seed.properties" on page 172

Tasks

How to Browse the Configuration Folder

The **Browse Configuration Folder** option enables you to view the files stored in the config directory. The config directory consists of configuration files that contain the options defined for BPM.

When you select the Browse Configuration Folder option, the Browse Configuration Folder dialog box opens in a new window. For details, see "Browse Configuration Folder Dialog Box" on page 148.

Note:

- You cannot edit the files from Business Process Monitor Admin, only view the file contents.

- Use CTRL+F to find a specific string in a file.

How to Change Parameter Values Within a Configuration File

1. Stop BPM.

2. Open the configuration file in a text editor.

3. Modify the value of the parameter, as required.

4. Save the file and restart BPM.

Note: When working on a Windows platform in languages other than English, do not edit and save configuration files in Notepad. Saving configuration files in UTF-8 format in Notepad may cause severe functionality problems in BPM.

How to Add or Override HTTP Request Headers

To add or override headers to the http request sent by BPM to BSM, you define the parameters **HeaderName** and **HeaderValue** in the **sconn.cfg** file, as described in "Parameters in sconn.cfg" on page 169.

Note the following guidelines:

- To add/change more than one header, use HeaderName2 for the second name, HeaderName3 for the third, and so forth. Follow the same principle for the **HeaderValue** parameter.

- The number of header names must match the number of header values. Otherwise all header names and values are ignored.

- The first header should be configured with the original parameter names (no index). BPM only reads additional headers if they are sequentially numbered. For example, if the following information is added to the **sconn.cfg** file, only the first two headers are handled. **HeaderName4** and **HeaderValue4** are ignored:

```
[Site1]
AuthDomain=""
ProxyPasswd=""
ProxyName=""
SSLClientCert=""
```

```
SSLHostNameValidate="1"
AuthDelay="0"
ProxyUrl=""
SSLServerCert=""
SSLPVK=""
ProxyDomain=""
SSLServerValidate="1"
SSLPVKPasswd=""
HeaderValue="Mozilla/4.0 (compatible; MSIE 5.5; Windows NT 5.0)"
HeaderName="User-Agent"
HeaderName2="Content-Type"
HeaderValue2="application/x-www-form-urlencoded;charset=UTF-8"
HeaderName4="Content-length"
HeaderValue4="100"
```

UI Description

Browse Configuration Folder Dialog Box

The Browse Configuration Folder dialog box comprises the following areas:

- **Left pane.** Displays a tree of the files included in the config directory (the root entry in the tree).

- **Right pane.** Displays the contents of the file you select in the tree in the left pane. If the selected file is empty, the right pane also remains empty.

Parameters in topaz_agent_ctrl.cfg

The **<BPM application directory>/config/topaz_agent_ctrl.cfg** file, which controls communication between the Gateway Server and BPM, contains the following parameters:

Section: HTTPSender

Parameter	Description	Default Value	Validation Type	Can be Changed?
HTTPSender TimeoutSec	The timeout, in seconds, for http requests to BSM. Not supported.	300 seconds	Positive integer	No

Section: General

Parameter	Description	Default Value	Validation Type	Can be Changed?
TopazAgentHome	The file path to the BPM installation.	Not defined	String	No

Parameter	Description	Default Value	Validation Type	Can be Changed?
SelfURL	The BPM URL.	Not defined	String	No.
ScriptZipRatioLimit	Not supported.	30	Positive integer	Yes
BPMProduct	The following value is available: HP Business Process Monitor.	HP Business Process Monitor	String	No
BuildNum	The BPM build number.	Not defined	Positive integer	No
Workspace	The directory in which the BPM work files are stored. If you change this value, only some of the log files under the Workspace directory are moved to the new path (logs in commcenter and agent1 directories), not all.	Not defined	String	Yes, see "How to Change the Workspace Directory Location" on page 124.
RegistrationHour Interval	The interval at which BPM communicates with BSM to re-register itself.	12 hours	Positive integer	No
ClusterMode	Not supported.	0	Boolean	Yes
HostVersion	The version of BPM installed on the machine.	<BPM version>	String	No.
SecureAccess	Enable/disable secure access to BPM. For details, see "Restricting Access to BPM Admin" on page 179. The following two options are available: • 0 – secure access is disabled • 1 – secure access is enabled	0	Boolean	Yes
LoadGeneratorHome	The location of the load generator.	Not defined	String	No
UICpuThreshold	The CPU threshold of the BPM machine. This parameter affects the threshold display only; it does not affect the operation of BPM.	70%	Positive integer	Yes
UIMemoryThreshold	The memory threshold of the BPM machine. This parameter affects the threshold display only; it does not affect the operation of BPM.	80%	Positive integer	Yes
InvocationFolders DeleteIntervalIn Minutes	Defines how long to keep manually invoked scripts before they are deleted.	60 minutes	Positive integer	Yes
BSMInstances MaxValue	Defines the maximum number of BSM instances that you can create in BPM Admin. You can enter values between 1 and 100.	50 instances	Positive Integers between 1 and 100	Yes.
ServerMinimumFree DiskSpace ThresholdInMB	Defines the minimum free disk space threshold of the BPM server. When this threshold is breached, the BPM server stops running scripts and WebTraces. For details, see "Requirements and Limitations for Running Tasks" on page 19.	500 MB	Positive integer	Yes Minimum allowed value: 0

Parameter	Description	Default Value	Validation Type	Can be Changed?
	We recommend that this value be less than the value of the MinimumFreeDiskSpaceThresholdInMB parameter in **archive.cfg**.			
ServerStartWorking BufferAbove MinimumThreshold InMB	Defines the minimum buffer threshold above the value of the ServerMinimumFreeDiskSpaceThresholdInMB. When this buffer threshold is reached, the BPM server resumes running scripts and WebTraces. For details, see "Requirements and Limitations for Running Tasks" on page 19.	100 MB	Positive integer	Yes Minimum allowed value: 0

Section: Site#

Parameter	Description	Default Value	Can be Changed?
SiteURL	The BSM URL.	<HP Business Service Management URL>	The value can be changed in BPM Admin.
JobPoll	The interval, in minutes, between requests to BSM for job updates.	2 minutes	The value can be changed in BPM Admin.
SiteVersion	The BSM version.	<HP Business Service Management version>	No
UserPasswd	The encrypted password of the user that is to run the instance's transactions, if these are to be run by a specific user.		The value can be changed in BPM Admin.
UserDomain	The domain of the user that is to run the instance's transactions, if these are to be run by a specific user.		The value can be changed in BPM Admin.
HostLocation	The location defined for the host machine. This is a logical location that is used by BPM for registration to BSM. The default value is the name of the BPM host machine.	<Business Process Monitor machine location>	You can override the location using the Location Manager in BSM. Once overridden, this value is redundant.
UserName	The name of the user that is to run the instance's transactions, if these are to be run by a specific user.		The value can be changed in BPM Admin.
DisplayName	The name of the default instance displayed in the BPM Admin table and tree.		The value can be changed in BPM Admin.
TimePoll	The interval, in minutes, between requests to the Gateway Server to retrieve BSM's time.	60 minutes	The value can be changed in BPM Admin.
HostId	The ID allocated by BSM for this specific BPM instance.	<BPM machine ID>	No

Parameter	Description	Default Value	Can be Changed?
Pause Communication	Instructs BPM to stop communication to BSM. When the value of this parameter is 0, communication with BSM is enabled; when the value is 1, communication is stopped.	0 (no pause)	Yes
HostName	The name defined for the host machine. This is a logical name that is used by BPM for registration to BSM. The default value is the actual name of the BPM host machine.	<BPM machine name>	The value can be changed in BPM Admin.
LocationId	The ID allocation by the Location Manager in BSM for this specific BPM instance.	<BPM machine location ID>	No
Pause Measurements	Instructs BPM to stop running transactions and WebTrace schemes. The following two options are available: **0** – no pause, **1** – pause	0 (no pause)	No
TimeDelta	The difference, in milliseconds, between Gateway Server site time and BPM time.	<time difference>	Do not change this value.
HostIPFor Registration	Not supported.	<BPM machine default IP address>	
CommandLine Additions		<BPM machine default IP address>	

Section: Agent1

Section	Parameter	Description	Default Value	Can be Changed?
Agent1	Not supported.	The communication protocol used by WebTrace	TCP	
Agent1	Not supported.	The name of the BPM machine.	<BPM machine name>	

Section: Agents

Section	Parameter	Description	Default Value	Can be Changed?
Agents	Not supported.	The list of BPM instances.	<site1, site2,...>	

Parameters in archive.cfg

For details on file archiving, see "File Archiving" on page 130. The **<BPM application directory>/config/archive.cfg** file contains the following parameters:

Section: DiskSpace

Parameter	Description	Default Value	Validation Type	Can be Changed?
MinimumFree DiskSpace Threshold InMB	Defines the minimum free disk space threshold. When this threshold is breached, the **archive.cfg** file starts to run according to the longTermCritical policy. We recommend that this value be greater than the value of the ServerMinimumFreeDiskSpaceThresholdInMB parameter in the **topaz_agent_ctrl.cfg file**.	750 MB	Positive integer	Yes. Minimum allowed value: 0

Section: logs

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: input_job

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: model_persistency

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: samples

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: samples_quarantine

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: scripts_results

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: webtraces_results

Parameter	Description	Default Value	Validation Type	Can be Changed?
shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Section: ArchiveProcess

Parameter	Description	Default Value	Validation Type	Can be Changed?
logs_process_shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
logs_process_longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
logs_process_longTerm Critical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
input_job_process_ shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
input_job_process_ longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
input_job_process_ longTerm Critical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
model_persistency_ process_ shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
model_persistency_ process_ longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
model_persistency_ process_ longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_process_ shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_process_ longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_process_ longTerm Critical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_quarantine_ process_ shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_quarantine_ process_ longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
samples_quarantine_ process_ longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
scripts_results_process_ short Term	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
scripts_results_process_ long Term	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
scripts_results_process_ long TermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
webtraces_results_ process_ shortTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
webtraces_results_ process_ longTerm	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes
webtraces_results_ process_ longTermCritical	The following values are available: Hour, Day, Week, Year, Same Day, Always, Minimum, Never.	Minimum	String validation from specific list	Yes

Parameters in agent1.cfg

The **<BPM application directory>\config\agent1.cfg** file, which controls BPM behavior, contains the following parameters:

Section: General

Parameter	Description	Default Value	Validation Type	Can be Changed?
TaskTimeoutMinutes	Not supported.	15 minutes	Positive integer	
Concurrent Profiles	Determines the number of profiles that can be run concurrently. The following options are available: • **0** – An unlimited number of profiles can run concurrently. • **A value other than 0** – The number specified is the maximum number of profiles that can run concurrently.	0 An unlimited number of profiles can run concurrently.	Positive integer	Yes
GlobalRunHandler	The run mode BPM allocates when the run mode is not previously defined for the profile. The run mode determines how BPM runs the tasks in a profile when the profile begins an iteration. The following options are available: • Classic • Concurrent • Dialup • Sequential	Classic	String	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
	• Stepped Not supported.			
TopazAgentHome	The path to the BPM installation directory.	Not defined	String	
WebreplayConcurrent ConnectionBackward Compatible	Determines the WebReplay behavior for the VuGen scripts. The following options are available: • Auto • Always • Never Not supported.	Auto	String	Yes
AdjustScheduleToDST	Not supported.	**1** or **true**	Boolean	
SaveHistoricLRWFiles	If a script is configured to generate a logfilewrite log, this parameter determines whether to save only the current logfilewrite log file for the script, or to save previous logfilewrite log files as well. The following options are available: • **1** – historical files are saved. • **0** – historical files are not saved. Historical logfilewrite log files must be deleted manually. To avoid unnecessary use of disk space, delete old files and reset the parameter to 0 when not needed. Not supported.	0	String	Yes.
SendSOEToBAC	Determines whether to send Snapshot on Error data to BSM, or to store it locally on the BPM machine. The following options are available: • **1** – never send snapshots to BSM. • **2** – always send snapshots to BSM. • **3** – use the script configuration to determine whether or not to send snapshots to BSM.	3	String	Yes.
SendRumBeacon	Adds a special header to network requests created by scripts with protocols from the **ColoringSupportedProtocols** parameter. The header enables the Real User Monitor probe to distinguish between synthetic user data and real user data.	False	Boolean	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
createSnapshotWhileContinueOnError	Determines how BPM processes Snapshot on Error for scripts with multiple transactions: • **0** – BPM behaves as follows: ▪ If *Continue on Error* is enabled, BPM does not generate any snapshots on error. ▪ If *Continue on Error* is disabled, the first time that a transaction fails, BPM stops running the script and generates a snapshot on error, when possible. Only one snapshot on error is generated, not a separate snapshot for each error. This is the default functionality in BPM 9.23 and later. • **1** – The *Continue on Error* and *Snapshot on Error* options are independent of each other. If both *Continue on Error* and *Snapshot on Error* are enabled, BPM generates a snapshot on error for each transaction failure, when possible. This was the functionality in BPM version 9.22 and earlier.	0	Boolean	
AbnormalTransactionTime	Determines whether transactions with an inactive time longer than the transaction time should be reported to BSM. The following options are available: • **O** – do not report these transactions. • **1** – report transaction with a duration of 0. • **2** – report transaction as failed (not recommended)	0	String	

Section: OffsetDistributer

Parameter	Description	Default Value	Validation Type	Can be Changed?
OffsetDistPeriodSec	Not supported.	3600 seconds	Positive integer	

Section: agent

Parameter	Description	Default Value	Validation Type	Can be Changed?
DisableSubLogs	Instructs BPM on whether to create the agent_Site#.txt logs for the instance. The following two options are available: • **0** – the logs are created. • **1** – the logs are not created. Not supported.	0		Yes
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<BPM application directory>\ Workspace\ agent1\agent.txt** file. The following levels exist: • Fatal • Error • Warning • Flow • Debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow	String	Yes
LogBackupOnOpen	Instructs BPM to back up the existing **agent.txt** log file when opening a new log file. Not supported.	True	Boolean	Yes
LogBackupOnMaxSize	Instructs BPM to back up the **agent.txt** log file when it reaches its defined maximum size. Not supported.	True	Boolean	Yes
LogMaxSize	Determines the maximum **agent.txt** log file size (in kilobytes). Not supported.	5120 kilobytes	Positive integer	Yes
LogBackupDuration	Determines the duration (in hours) for which the backups of the **agent.txt** log file are kept. Not supported.	168 hours	Positive integer	Yes
LogNumOfBackups	Determines the number of log history files to keep. Not supported.	5	Positive integer	Yes

Section: ScriptLauncher

Parameter	Description	Default Value	Validation Type	Can be Changed?
ScriptLauncherUseTCP	Determines the protocol through which BPM communicates with the scripts. The following options are available: • **1** – TCP protocol • **0** – shared memory Not supported.	0	String	No
ScriptLauncherSyncEnd	Determines whether the end of a script run is synchronized with the end of a BPM process. The following options are available: • **1** – there is synchronization. • **0** – there is no synchronization. Not supported.	0	String	No

Section: Agent_Site#

Parameter	Description	Default Value	Can be Changed?
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<Business Process Monitor application directory>\ Workspace\ agent1\agent_Site#.txt** file. The following levels exist: • fatal • error • warning • flow • debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow	Yes
LogBackupOnOpen	Instructs BPM to back up the existing **agent_Site#.txt** log file when opening a new log file. Not supported.	True	Yes
LogBackupOnMaxSize	Instructs BPM to back up the **agent_Site#.txt** log file when it reaches its defined maximum size. Not supported.	True	Yes
LogMaxSize	Determines the maximum **agent_Site#.txt** log file size (in kilobytes). Not supported.	5120 kilobytes	Yes

Parameter	Description	Default Value	Can be Changed?
LogBackupDuration	Determines the duration (in hours) for which the backups of the **agent_Site#.txt** log file are kept. Not supported.	168 hours	Yes

Section: Protocols

Parameter	Description	Default Value	Chan be Changed?
BdSupportedProtocols	List of web based protocols that BPM can run with the breakdown option. BPM runs a script with the breakdown option provided the script type is included in this setting. If a script contains multiple protocols, it runs with the breakdown option provided that one of the protocols is included in this setting.	A list of applicable protocols	No.
LFWSupportedProtocols	List of protocols supported by agent that run with the LogFileWrite option.		Yes
SnapshotSupported Protocols	Determines for which protocols BSM supports Snapshot on Error.	A list of the applicable VuGen protocols	Yes
ColoringSupported Protocols	Determines for which protocols BPM transactions are colored for requests sent to an application monitored by HP Diagnostics or TransactionVision. If the protocol replay run by the BPM is changed, and contains an http-based protocol that is not included in this parameter, the protocol can be added to the list, separated by a comma. There should be no reason to remove protocols from the list.	A list of all the web-based VuGen protocols (that is, those using http)	Yes
AdvancedTcpBd SupportedProtocols	List of non-web based protocols that BPM installed on Windows can run with the TCP advanced breakdown option. BPM runs a script with the TCP advanced breakdown option provided the script type is included in this setting. If a script contains multiple protocols, it runs with the TCP advanced breakdown option provided that one of the protocols is included in this setting and none of the protocols is included in the **BdSupportedProtocols** setting (in which case, the regular breakdown option is used). **Note:** For notes and limitations about the non-web based protocols, see "Notes and Limitation for Non-Web Based (TCP) Protocols" in "Understanding Non-Web Based TCP Transaction Breakdown Reports" on page 95.	A list of applicable protocols	Yes
AdvancedTcpBd SupportedProtocols Linux	List of non-web based protocols that BPM installed on Linux can run with the TCP advanced breakdown option. BPM runs a script with the TCP advanced breakdown option provided the script type is included in this setting. If a script contains multiple protocols, it runs with the TCP	A list of applicable protocols	Yes

Parameter	Description	Default Value	Chan be Changed?
	advanced breakdown option provided that one of the protocols is included in this setting and none of the protocols is included in the **BdSupportedProtocols** setting (in which case, the regular breakdown option is used). **Note:** For notes and limitations about the non-web based protocols, see "Notes and Limitation for Non-Web Based (TCP) Protocols" in "Understanding Non-Web Based TCP Transaction Breakdown Reports" on page 95.		
LinuxCompatible Protocols	List of protocols supported by LoadRunner and BPM on Linux.		No

Section: WebTrace

Parameter	Description	Default Value	Validation Type
DefaultProtocol	The following values are available: • tcp • icmp • udp	tcp	String
ProtocolVersion	The following value is available: IPv4	IPv4	String

Section: QTP

Parameter	Description	Default Value	Validation Type
QtpUserName	The QTP/UFT user name.	Not defined	String
QtpDomainName	The QTP/UFT domain name.	Not defined	String
QtpLogBackupPerRuns	Number of QTP/UFT executions that trigger a back up.	100	Positive integer
QtpLogMaxSize	Maximum QTP/UFT log size that triggers a back up (in MB).	5	Positive integer
DisableEndProcesses OnFailKey	Determines whether the **-EndProcessesOnFail** flag is used with a command line to execute QTP/UFT scripts. By default, when BPM runs a QTP/UFT script, it calls mdrv.exe with a -EndProcessesOnFail flag. Running a QTP/UFT script with this flag can cause csrss.exe system process critical termination (blue screen) in some cases. • **True** - The **EndProcessesOnFail** key is not called. • **False** - The **EndProcessesOnFail** key is called.	False	Boolean

Parameters in topaz_data_server.cfg

The **<BPM application directory>\config\topaz_data_server.cfg** file, which controls the transmission of data from BPM to the Gateway Server, contains the following parameters:

Section: data_depot

Parameter	Description	Default Value	Validation Type	Can be Changed?
ReportAnd Forget	Determines whether failed reports are resent to BSM. The following two options are available: • **True** – Failed reports are ignored and not resent to BSM. • **False** – BPM tries to resend failed reports to BSM.	False	Boolean	No
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<Business Process Monitor application directory>\ Workspace\ agent1\data\ data_depot.txt** file. The following levels exist: • fatal • error • warning • flow • debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow		Yes
LogBackup OnOpen	Instructs BPM to back up the existing **data_depot.txt** log file when opening a new log file. Not supported.	True		Yes
LogBackup OnMaxSize	Instructs BPM to back up the **data_depot.txt** log file when it reaches its defined maximum size. Not supported.	True		Yes
LogMaxSize	Determines the maximum **data_depot.txt** log file size (in kilobytes). Not supported.	5120 kilobytes		Yes
LogBackup Duration	Determines the duration (in hours) for which the backups of the **data_ depot.txt** log file are kept. Not supported.	168 hours		Yes
LogNumOf Backups	Determines the number of log history files to keep. Not supported.	5		Yes

Section: transdata

Parameter	Description	Default Value	Validation Type	Can be Changed?
MaxSnapshot Size	Determines the maximum size of the snapshot HTML file reported to Business Availability Center 4.5.2 and earlier.	60 kilobytes	Positive integer	Yes
MaxSnapshot SizeAM5	Maximum snapshot on error size in KB for instances working with AM version 5.0 and above.	256 kilobytes	Positive integer	Yes
NumberofSaved SnapshotDays	Defines the number of days for which saved snapshots are kept. Not supported.	5 days	Positive integer	Yes
MaxTxError Amount	Limits maximum errors amount per transaction	100	Positive integer	Yes
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<Business Process Monitor Workspace directory>\agent1\ data\ clients\transdata.txt** file. The following levels exist: ● fatal ● error ● warning ● flow ● debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow	String	Yes
LogBackupOn Open	Instructs BPM to back up the existing **transdata.txt** log file when opening a new log file. Not supported.	True	Boolean	Yes
LogBackupOn MaxSize	Instructs BPM to back up the **transdata.txt** log file when it reaches its defined maximum size. Not supported.	True	Boolean	Yes
LogMaxSize	Determines the maximum **transdata.txt** log file size (in kilobytes). Not supported.	5120 kilobytes	Positive integer	Yes
LogBackup Duration	Determines the duration (in hours) for which the backups of the **transdata.txt** log file are kept. Not supported.	168 hours	Positive integer	Yes
LogNumOf Backups	Determines the number of log history files to keep. Not supported.	5	Positive integer	Yes
ScriptEnd StatusTime	Determines the behavior for transactions that were not run when a script ends with a status of **END_STATUS_TIMED_OUT**. The	default	String validation	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
Out	following are the valid options: • **default** – For each transactions that was not run, a sample with a status of 6 (NOT_RUN_STATUS) is sent. • **force_no_transdata** – For the first transaction that was not run, a sample with a status of 1 (LR_FAIL) is sent. For all the other transactions that were not run, no data is sent. • **force_fail_status** – a sample with a status of 1 (LR_FAIL), and with the relevant error, is sent for each transaction that was not run.		from specific list	

ScriptEnd StatusError	Determines the behavior for transactions that were not run when a script ends with a status of **END_STATUS_ERROR**. The following are the valid options:
	
	• **default**
	
	   ▪ If the script is configured to continue running after the failed transaction, relevant samples are sent accordingly.
	
	   ▪ If the script is configured not to continue running after the failed transaction, then no data is sent for any of the subsequent transactions.
	
	• **force_fail_status**
	
	   ▪ If the script is configured to continue running after the failed transaction, relevant samples are sent accordingly.
	
	   ▪ If the script is configured not to continue running after the failed transaction, then a sample with a status of 1 (LR_FAIL), and with the relevant error, is sent for each subsequent transaction.
		default	String validation from specific list	Yes

Section: PCBD

Parameter	Description	Default Value	Validation Type	Can be Changed?
Policy	Determines the page component breakdown reporting policy. The following two options are available: • **PCB_POLICY_RUNNUM** – Data is automatically reported after the specified number of runs. • **PCB_POLICY_THRESHOLD** – Data is only reported if during the transaction run, the threshold status changes to the **Poor** (red) status (because the previous run was less than the higher threshold, and the current run is over that threshold) and not when it changes from red status. The transaction thresholds are defined as part of the business process profile properties within End User	PCB_POLICY_ RUNNUM **Note:** The default policy value for HP Software-as-a-Service is PCB_ POLICY_ THRESHOLD.	String	Yes

Parameter	Description	Default Value	Validation Type	Can be Changed?
	Management Administration.			
Runnum	Determines the number of runs after which BPM reports page component breakdown data (applicable when the value of the Policy parameter is **Runnum**).	4 runs	Positive integer	Yes

Section: txhttp

Parameter	Description	Default Value	Validation Type	Can be Changed?
WakeupMinutesTime	Determines the amount of time, in minutes, after which all the transaction samples in the queue are reported. After this amount of time has elapsed, the transaction samples in the queue are reported, regardless of the number of samples in queue.	1 minute	Positive integer	Do not change this value without consulting HP Software Support.
WakeupCount	Determines the number of transaction samples that must be collected before all the transaction samples in the queue are reported. After this number of transaction samples are collected, all the transaction samples in the queue are reported, regardless of the amount of time that has elapsed since the last report.	40 samples	Positive integer	Do not change this value without consulting HP Software Support.
MaxChunk	Determines the maximum number of transaction samples that can be sent in one http request.	100 samples	Positive integer	Do not change this value without consulting HP Software Support.
Priority	Not supported.	5	Positive integer	

Section: wthttp

Parameter	Description	Default Value	Validation Type	Can be Changed?
Wakeup Minutes Time	Determines the amount of time, in minutes, after which all the WebTrace samples in the queue are reported. After this amount of time has elapsed, the WebTrace samples in the queue are reported, regardless of the number of samples in queue.	1 minute	Positive integer	Do not change this value without consulting HP Software Support.

Parameter	Description	Default Value	Validation Type	Can be Changed?
Wakeup Count	Determines the number of WebTrace samples that must be collected before all the WebTrace samples in the queue are reported. After this number of WebTrace samples are collected, all the transaction samples in the queue are reported, regardless of the amount of time that has elapsed since the last report.	40 samples	Positive integer	Do not change this value without consulting HP Software Support.
MaxChunk	Determines the maximum number of WebTrace samples that can be sent in one http request.	1 sample	Positive integer	Do not change this value without consulting HP Software Support.
Priority	Not supported.	5	Positive integer	

Section: soadata

Parameter	Description	Default Value	Validation Type	Can be Changed?
Wakeup MinutesTime	Determines the amount of time, in minutes, after which all the SOA samples in the queue are reported. After this amount of time has elapsed, the SOA samples in the queue are reported, regardless of the number of samples in queue.	1 minute	Positive integer	Do not change this value without consulting HP Software Support.
Wakeup Count	Determines the number of SOA samples that must be collected before all the SOA samples in the queue are reported. After this number of SOA samples are collected, all the transaction samples in the queue are reported, regardless of the amount of time that has elapsed since the last report.	40 samples	Positive integer	Do not change this value without consulting HP Software Support.
MaxChunk	Determines the maximum number of SOA samples that can be sent in one http request.	100 samples	Positive integer	Do not change this value without consulting HP Software Support.
Priority	Not supported.	5	Positive integer	

Parameter	Description	Default Value	Validation Type	Can be Changed?
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<Business Process Monitor application directory>\ Workspace\ agent1\data\ clients\soadata.txt** file. The following levels exist: • fatal • error • warning • flow • debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow		Yes
LogBackup OnOpen	Instructs BPM to back up the existing **soadata.txt** log file when opening a new log file. Not supported.	True		Yes
LogBackup OnMaxSize	Instructs BPM to back up the **soadata.txt** log file when it reaches its defined maximum size. Not supported.	True		Yes
LogMaxSize	Determines the maximum **soadata.txt** log file size (in kilobytes). Not supported.	5120 kilobytes		Yes
LogBackup Duration	Determines the duration (in hours) for which the backups of the **soadata.txt** log file are kept. Not supported.	168 hours		Yes
LogNumOf Backups	Determines the number of log history files to keep. Not supported.	5		Yes

Section: HTTPSender

Parameter	Description	Default Value	Validation Type	Can be Changed?
HTTPSender TimeoutSec	The timeout, in seconds, for sending BPM samples to BSM. Not supported.	300 seconds	Positive integer	Do not change this value without consulting HP Software Support.

Parameter	Description	Default Value	Validation Type	Can be Changed?
LogLevel	Instructs BPM to log only entries of the specified level or higher in the **<Business Process Monitor Workspace directory>\ agent1\ data\ clients\wtdata.txt** file. The following levels exist: • fatal • error • warning • flow • debug If this parameter is set to **debug**, all entries are logged; if the parameter is set to **flow**, all entries aside from debug are logged; if the parameter is set to **warning**, both the flow and debug entries are not logged, and so forth. Not supported.	Flow		Yes
LogBackup OnOpen	Instructs BPM to back up the existing **wtdata.txt** log file when opening a new log file. Not supported.	True		Yes
LogBackup OnMaxSize	Instructs BPM to back up the **wtdata.txt** log file when it reaches its defined maximum size. Not supported.	True		Yes
LogMaxSize	Determines the maximum **wtdata.txt** log file size (in kilobytes). Not supported.	5120 kilobytes		Yes
LogBackup Duration	Determines the duration (in hours) for which the backups of the **wtdata.txt** log file are kept. Not supported.	168 hours		Yes
LogNumOf Backups	Determines the number of log history files to keep. Not supported.	5		Yes

Section: General

Parameter	Description	Default Value	Validation Type	Can be Changed?
ApproximateMax SizeOfDataSub FolderInMB	The maximum permitted sub-folder size.	Not defined - no limit		Yes
MaxFilesNumber UnderDataSubFolder	The maximum number of files allowed under a data sub-folder.	1000		Yes
TopazAgentHome	The file path to the BPM installation.	Not defined	String	No

Parameter	Description	Default Value	Validation Type	Can be Changed?
UpdateLogLevelTo DisabledOnScript DownloadComplete	Instructs BPM to change the log level to LogDisabled in the default.cfg file for a downloaded script. Valid options are: **True** – Change the log level to LogDisabled. **False** – Do not change the log level.	True	Boolean	Yes

Section: soahttp

Parameter	Description	Default Value	Validation Type	Can be Changed?
WakeupMinutes Time	Not supported.	1 minute		Do not change this value without consulting HP Software Support.
WakeupCount	Not supported.	40 samples		Do not change this value without consulting HP Software Support.
MaxChunk	Not supported.	100 samples		Do not change this value without consulting HP Software Support.
Priority	Not supported.			

Parameters in sconn.cfg

The **<BPM application directory>\config\sconn.cfg** file, which controls the configuration options pertaining to the communication between BPM and the Gateway Server, contains the following parameters:

Section: Site#

Parameter	Description	Default Value	Can be Changed?
AuthUser	Determines the user name to be used for basic authentication, if required by BSM.	"" (not defined)	The value can be changed in BPM Admin.
AuthDomain	Determines the domain name to be used for basic authentication, if required by BSM.	"" (not defined)	The value can be changed in BPM Admin.
AuthPasswd	Determines the encrypted password to be used for basic authentication, if required by BSM.	"" (not defined)	The value can be changed in BPM Admin.
HandleBinary ContentType	Determines whether to change the content type in the http header of requests sent by the BPM, when the post buffer is binary. The content type in such a case is **application/octet-stream** (and not **application/x-www-form-urlencoded**). The following two options are available: • `0` – do not change content type • `1` – change content type	0 (do not change)	Do not change this value without consulting HP Software Support.

Parameter	Description	Default Value	Can be Changed?
HeaderName	Determines the name of the header which should be added or changed, in order to add or override headers to the http request sent by BPM to BSM. For more information,see "How to Add or Override HTTP Request Headers" on page 147. If this parameter is empty (or does not exist), it is ignored and no addition or change is made to the header.	"" (not defined)	Yes
HeaderValue	Determines the value of the header (as defined by parameter **HeaderName**, above) which should be added or changed.	"" (not defined)	Yes
ProxyName	Determines the user name to be used to connect to the proxy server, if you are connecting to BSM using a proxy server.	"" (not defined)	The value can be changed in BPM Admin
ProxyDomain	Determines the domain name to be used to connect to the proxy server, if you are connecting to BSM using a proxy server.	"" (not defined)	The value can be changed in BPM Admin.
ProxyPasswd	Determines the encrypted user password to be used to connect to the proxy server, if you are connecting to BSM using a proxy server.	"" (not defined)	The value can be changed in BPM Admin.
ProxyUrl	Determines the proxy server URL to be used if you are connecting to BSM using a proxy server.	"" (not defined)	The value can be changed in BPM Admin.
Reset Connection OnFailure	Reset the caching data saved for the BPM connection to BSM in case of a communication failure. Determines whether to re-open a new communication session to BSM in case of an http, TCP or SSL connectivity failure. This enables communication caching data (such as SSL or DNS cached data) to be saved. The following options are available: • `0` – Do not open a new communication session when there is a connectivity failure. • `1` (default behavior) – Open a new communication session when there is a connectivity failure. • `No value` – The default option is used and a new communication session is opened when there is a connectivity failure.	1	Yes
SSLClientCert	Determines the SSL client certificate file to be used if SSL client authentication is required by BSM. Note that this file must be in PEM format.	"" (not defined)	The value can be changed in BPM Admin.
SSLServer Cert	Determines the SSL authority certificate file to be used if the SSL protocol is required for BPM to communicate with BSM. Note that this file must be in PEM format.	"" (not defined)	The value can be changed in BPM Admin.
SSLPVK	Determines the SSL private key file used as the pair key of the public key in the SSL client certificate file. This file is required if SSL client authentication is required by BSM. Note that this file must be in PEM format.	"" (not defined)	The value can be changed in BPM Admin.

Parameter	Description	Default Value	Can be Changed?
SSLPVK Passwd	Determines the encrypted SSL private key password to be used if SSL client authentication is required by BSM.	"" (not defined)	The value can be changed in BPM Admin.
SSLServer Validate	If you defined an SSL authority certificate file, this parameter determines whether to validate the certificate received in the SSL handshake. By default, the certificate is validated. If you do not want the certificate to be validated, set this parameter to 2.	1 (validate)	Do not change this value without consulting HP Software Support.
SSLHostName Validate	This parameter determines how the host name in the server certificate is validated. The following options are available: • 1 – Full validation. • 2 – Validates the existence of the host name only. • 3 – Skips host name validation.	1 (full validation)	Do not change this value without consulting HP Software Support.
UseNTLMAuth	**Note:** This parameter is currently not in use.	0	Yes
UseNTLM ProxyAuth	**Note:** This parameter is currently not in use.	0	Yes

Parameters in encryption.properties

The **<BPM application directory>/config/encryption.properties** file, which controls the configuration options pertaining to the encryption of all sensitive data in BPM, contains the following parameters:

> **Note:** This file is read-only and you should not change any of the values.

Parameter	Description	Default Value	Can be Changed?
crypt.secret.key.active.id	Determines the value of the active key id.	1	Do not change this value without consulting HP Software Support.
crypt.secret.key	Determines the encrypted secret key (encrypted by the **seed** key from the **seed.properties** file) to be used to encrypt/decrypt all sensitive data in BSM. **Note:** The secret key is generated automatically.	"" (not defined)	The value is generated once for each installation or upgrade.
crypt.conf.active.id	Determines the value of the configuration id.	1	Do not change this value without consulting HP Software Support.

Parameter	Description	Default Value	Can be Changed?
crypt.conf.1	Determines the value of the encryption algorithm to be used to encrypt/decrypt all sensitive data in BSM.	AES/ECB/NoPadding	Do not change this value without consulting HP Software Support.
crypt.conf.2	Determines the value of the encryption algorithm to be used to encrypt/decrypt all sensitive data in BSM.	DESede/ECB/PKCS5Padding	Do not change this value without consulting HP Software Support.
crypt.generated.key.size	Determines the value of the generated key size to be used to generate new secret key.	256	Do not change this value without consulting HP Software Support.
mac.verification.algorithm	Determines the value of the mac algorithm to be used to verify all encrypted data.	HmacSHA256	Do not change this value without consulting HP Software Support.

Parameters in seed.properties

The **<BPM application directory>/config/seed.properties** file, which controls the configuration options pertaining to the encryption of all sensitive data in BPM, contains the following parameters:

> **Note:** This file is read-only and you should not change any of the values.

Parameter	Description	Default Value	Can be Changed?
crypt.seed.conf	Determines the value of the encryption algorithm to be used to generate a new seed secret key	AES/ECB/NoPadding	Do not change this value without consulting HP Software Support.
crypt.seed.key	Determines the seed secret key to be used to encrypt/decrypt the **crypt.secret.key** in the **encryption.properties** file.	"" (not defined)	The value is generated once for each installation or upgrade.
crypt.generated.key.size	Determines the value of the generated seed key size to be used to generate a new seed secret key.	256	Do not change this value without consulting HP Software Support.
mac.verification.algorithm	Determines the value of the mac algorithm to be used to verify an encrypted secret key.	HmacSHA256	Do not change this value without consulting HP Software Support.

Chapter 16: Configuring BPM to Run Over a Secure Connection

When you connect to BPM Admin from a remote machine using a browser, information is sent using http. This means that the data that you configure in BPM Admin, including passwords (for example, when adding/configuring a BPM instance), is sent "as is", in plain text. The passwords are encrypted only after arriving at the BPM Admin machine.

If you want this data to be sent encrypted, it is possible to configure BPM Admin to work with SSL. This enables all communication between the remote browser and BPM Admin to be encrypted.

Learn About

Tasks

How to Communicate Using SSL

You can configure BPM to support https communication with the Gateway Server over the SSL channel and can also configure SSL support for BPM Admin.

For details on configuring https communication with the Gateway Server, see the BSM Hardening Guide.

How to Obtain a Certificate Authority Root Certificate and Establish Trust

To obtain a CA root certificate:

1. Obtain the root certificate authority certificate (and any intermediate authority certificates if applicable).

2. Establish trust for each certificate in the chain by running the following commands:

```
cd /opt/HP/BPM/JRE/bin
keytool -import -trustcacerts -alias <your CA> -keystore <truststore path> -file <path
to CA root certificate>
```

How to Configure SSL Support for BPM Admin

1. Obtain or create the server certificate in one of the following methods:

   Note: The server certificate must include an **Enhanced Key Usage** field with the value **Server Authentication**.

   Option 1: Obtain the server certificate from your corporate Certificate Authority in **.pfx (PKCS12)** format and skip to "Modify the server.xml:" on the next page.

   Option 2: Create a java keystore with the server certificate as follows (replace the string `changeit` below with your password):

   a. Generate a keystore with a private key:

   Windows:

   ```
   keytool -genkeypair -validity 1065 -keysize 2048 -keyalg rsa -keystore <BPM
   installation directory>\JRE\lib\security\cacerts -storepass changeit -alias
   myserver.mydomain
   ```

   Linux:

   ```
   keytool -genkeypair -validity 1065 -keysize 2048 -keyalg rsa -keystore
   /opt/HP/BPM/JRE/lib/security/cacerts -storepass changeit -alias myserver.mydomain
   ```

   where validity (in days) and keysize depend on your certificate authority requirements.

   b. Generate a server certificate request to have it signed by your internal certificate authority

   ```
   keytool -keystore mykeystore -storepass changeit -alias myserver.mydomain  -certreq
   -file CERTREQFILE.csr
   ```

   c. Download the signed server certificate **cert_signed.cer** from your certificate authority.

   d. Obtain the root authority certificate **CA.crt** (and any intermediate authority certificates if applicable).

   e. Import the root certificate authority certificate (and any intermediate authority certificates if applicable) into the keystore created earlier in this procedure.

   ```
   keytool -import -trustcacerts -keystore mykeystore -storepass changeit -alias
   myRootCA -file CA.crt
   ```

   f. Import the signed certificate into the same keystore under the original alias using the following command:

○ **Windows:**

```
<BPM installation directory>\JRE\bin\keytool -import -v -alias myserver.mydomain
-file cert_signed.cer -keystore <BPM installation
directory>\JRE\lib\security\cacerts -keypass changeit -storepass changeit
```

○ **Linux:**

```
keytool -import -v -alias myserver.mydomain -file cert_signed.cer -keystore
/opt/HP/BPM/JRE/lib/security/cacerts -keypass changeit -storepass changeit
```

g. Verify that the keystore contains at least two entries: **Trusted Cert Entry** and **Private Key Entry**:

Windows:

```
keytool -list -keystore <BPM installation directory>\JRE\lib\security\cacerts
```

Linux:

```
keytool -list -keystore /opt/HP/BPM/JRE/lib/security/cacerts
```

2. Modify the server.xml:

a. Open the **<BPM installation directory>\ServletContainer\conf\server.xml** file in a text editor.

b. Uncomment the section with Connector port="8443":

```
<--!
<Connector port="8443" protocol="HTTP/1.1" SSLEnabled="true"
maxthreads="150" scheme="https" secure="true"
clientAuth="false" sslProtocol="TLS" />
-->
```

c. Add information about your keystore (location, password, type). If your server certificate is in PKCS12 format, the keystore type should be **"PKCS12"**. Otherwise, it should be **"JKS"**. For example:

```
keystoreFile="/opt/mykeystore" keystoreType="JKS"
keystorePass="myprivatekeypassword"
```

The section should now look similar to this:

```
<Connector port="8443" protocol="HTTP/1.1" SSLEnabled="true"
maxthreads="150" scheme="https" secure="true"
clientAuth="false" sslProtocol="TLS"
keystoreFile="/opt/mykeystore" keystoreType="JKS"
keystorePass="myprivatekeypassword"
```

```
/>
```

    d. Save your changes.

3. Import the root authority certificate into the truststore used by BPM using the following command:

- **Windows:**

```
cd <BPM installation directory>\JRE\bin
> keytool -import -alias <myCA> -file c:\myCArootcert.cer -keystore
..\lib\security\cacerts -trustcacerts -storepass changeit
```

- **Linux:**

```
cd <BPM root directory>/JRE/bin
> keytool -import -alias <myCA> -file ~/myCArootcer.cer -keystore
../lib/security/cacerts -trustcacerts -storepass changeit
```

4. Restart BPM.

5. Verify that you can open the BPM Admin console using the secure connection:

```
https://<BPM server FQDN>:8443
```

6. When you have succeeded in connecting securely, close the unsecure port in the server.xml by commenting out the section with Connector port="2696".

7. Restart BPM.

8. On the BPM server, modify the shortcut to the BPM Admin Console to use the secure URL.

9. In EUM Administration in BSM, modify the **BPM console URL** to use the secure connection. For details, see "Edit Business Process Monitor Properties Dialog Box" in the BSM Application Administration Guide.

If it is still impossible to access the BPM Admin console via SSL, see "Unable to access the BPM Admin console using SSL" on page 178.

How to Configure Authentication for the BPM Admin Tool

Authentication settings (user, domain/group, password) define the web users permitted to access the BPM Admin tool using basic authentication.

This can be set during installation in the Server Authentication page of the BPM Configuration wizard, or set manually using the procedures below.

Caution:

- If authentication is not set, all users will be able to access the Admin interface in BPM without secure authentication.

- We recommend using SHA-512 which is stronger than the default algorithm. SHA-512 authentication cannot be set during the wizard and must be configured manually. For details, see the note at the end of the procedures below.

Note: If you configure basic authentication for the BPM Admin console, you cannot use the following utilities in the EUM application in BSM:

- BPM Page Component Breakdown on Demand

- BPM WebTrace on Demand

- BPM Transaction Invocation

To manually set basic authentication after installation:

1. Stop BPM and make sure that all processes are stopped.

2. Open the following file in a text editor:
   <BPM installation directory>\ServletContainer\conf\web.xml

3. Uncomment the section **Security Constraint and Login Configuration** and save the file.

4. Open the following file in a text editor:
   <BPM installation directory>\ServletContainer\conf\tomcat-users.xml

5. Add the list of allowed users for BPM. All users must be assigned **roles="bpm_admin"**.

   To store passwords in a secure manner, encrypt the password prior to setting it in the **tomcat-users.xml** using the following procedure:

   a. Edit the REALM in the **<BPM installation directory>\ServletContainer\conf\server.xml** and if it is not already set, add the attribute **digest="sha"**.

   b. Execute the following command to generate the HASH of the password:

   ```
   <BPM installation directory>\ServletContainer\bin\digest.bat -a sha password
   ```

   Note:

   ○ If you receive notification that the CATALINA_HOME environment variable is not defined correctly, set **CATALINA_
   HOME=<BPM installation directory>/ServletContainer**

   ○ If you receive notification about an undefined Java environment, set
   JRE_HOME=<BPM installation directory>/JRE

c. Set the password in **tomcat-users.xml**.

For example, the line:

```
<user username="user1" password="encrypted_password" roles="bpm_admin"
/>
```

adds a user called "user1" with a password of "password" to the users who are allowed to access BPM Admin.

> **Note:** We recommend using a strong password with at least eight characters including both capital and lower case letters and numbers or special characters.

d. If there are other users defined in **tomcat-users.xml**, repeat steps b and c for each user's password.

6. Save the file and Restart BPM.

> **Note:** There is an option to use a stronger algorithm to store passwords using SHA-512:
>
> - In step 5 above, replace steps a and b with the following:
>
> a. Edit the REALM in the **<BPM installation directory>\ServletContainer\conf\server.xml** and if it is not already set, add the attribute **digest="sha-512"**
>
> b. Execute the following command to generate the HASH of the password:
>
> ```
> <BPM installation directory>\ServletContainer\bin\digest.bat -a sha-512
> password
> ```

UI Description

See "Security Settings Page" on page 53.

Troubleshooting/Limitations

Unable to access the BPM Admin console using SSL

If it is still impossible to access the BPM Admin console after configuring SSL, check the following files:

- **Linux:** /opt/HP/BPM/workspace/logs/bpm_bsm_comm.log

- **Windows:** Check the latest **catalina.<current date>.log** file located in
  C:\ProgramData\HP\BPM\Tomcat\logs

BPM cannot create a connection to BSM

If a signed server certificate has expired or has been changed, BPM may not be able to create a connection to BSM.

Solution: Import a new server certificate and restart BPM.

Restricting Access to BPM Admin

You can configure secured access for BPM Admin, thereby controlling who can access the BPM Admin user interface.

When secured access is activated, access to BPM Admin is limited to:

- Local users (that is, those users who connect to BPM Admin on the actual BPM machine using the URL http://localhost:2696).

- Users who access a BPM Admin from BSM (select **Admin** > **End User Management** > **Settings** > **BPM Agents**, select a BPM and click the **Open a Business Process Monitor Agent's Console** button) sending the configured authentication.

Any other attempt to access BPM Admin fails.

When you access BPM Admin from BSM, a secured token is included in the URL sent by BSM, which is decrypted and validated by BPM. Only successful validation of the token enables access to BPM Admin.

The secured access mechanism uses HP LW-SSO to generate and validate the secured token that is passed between BSM and BPM. For details on working with LW-SSO, refer to the BSM Platform Administration Guide.

Task

How to Configure BPM for Secure Access

1. In BSM, select **Admin > Platform > Users and Permissions > Authentication Management**.

2. Copy the value of the **Token Creation Key (initString)** property.

3. On the BPM machine, paste the copied value in the **initString** parameter in the **<BPM**

installation directory>\ServletContainer\webapps\ROOT\WEB-INF\classes\lwssofmconf.xml file. For example:

```
<lwssoValidation id="ID000001">
                    <domain></domain>
                    <crypto cipherType="symmetricBlockCipher"
directKeyEncoded="false" directKeyEncoding="Hex"
                            encodingMode="Base64Url" engineName="AES"
initString="<copied value from BSM>"   keySize="256" paddingModeName="CBC"/>
                </lwssoValidation>
```

4. On the BPM machine, edit the **<BPM application directory>\config\topaz_agent_ctrl.cfg** file and in the **General** section, change the setting for the **SecureAccess** parameter to **1**.

> **Note:** If this parameter does not exist, add it to the file.

Troubleshooting/Limitations

Limitations

- Secured access is only applicable to BPM versions 9.22 and later, and BSM versions 9.21 and later.

- BSM sends the secured token to all BPM 9.22 or later installations, regardless of whether the BPM is configured for secured access. For BPM installations earlier than version 9.22, BSM sends the regular URL without a secured token.

- The request generated by the BSM is valid for only one minute.

- If BPM Admin is open in a browser tab, after having been securely accessed, access to the same BPM in other browser tabs is also possible as the session has already been validated.

- A BPM can only be configured for secure access with one BSM system, but a BSM system can securely access multiple BPMs.

- The BSM URL configured for the BSM site in BPM (topaz_agent_ctrl.cfg file > specific site section > SiteUrl parameter) must be exactly the same (without port numbers) as the BSM URL that is sent by BSM for secured access with BPM.

Chapter 17: Advanced Configuration Options

This chapter includes:

-

-

-

-

-

How to Change the Default Port

By default, BPM Admin uses port 2696 on the host machine. If required, you can change the port. Use the new port value in the URL when accessing BPM Admin from a browser window.

To change the default port:

On Windows:

1. Select **Start** > **Programs** > **HP Business Process Monitor**, then right-click the **Business Process Monitor Admin** link. Select **Properties** from the displayed menu to open the BPM Admin Properties dialog box.

2. If the Business Process Monitor Admin Properties dialog box contains a **Web Document** tab, open the tab and change the port in the **URL** box to the new port value, then click **Apply**. Skip to .

   If the Business Process Monitor Admin Properties dialog box does not contain a Web Document tab, continue with the next step.

3. Open the **General** tab and find the **Location** field. Open a Windows Explorer window and browse to the path that appears in the **Location** field (for example, `C:\Documents and Settings\All Users\Start Menu\Programs\HP Business Process Monitor`).

4. Delete the BPM Admin shortcut from the folder.

5. Select **File > New > Shortcut**. The first page of the Create Shortcut Wizard is displayed.

6. In the **Type the location of the item** box, enter the BPM Admin URL using the new port number: `http://localhost:<new port value>/`.

7. Click **Next**.

8. In the **Type a name for this shortcut** box, enter Business Process Monitor Admin.

9. Click **Finish**.

10. Check that a new Internet shortcut has been created in the folder.

11. Select **Start** > **Programs** > **HP Business Process Monitor**, right-click the **Business Process Monitor Admin** link, and select **Properties**. In the displayed Business Process Monitor Admin Properties dialog box, access the **Web Document** tab and check that the new port value is now displayed in the **URL** box.

12. Restart BPM.

On Linux:

1. Stop BPM and make sure that all processes are stopped.

2. Open **<BPM root directory>\ServletContainer\conf\server.xml** in a text editor.

3. Look for the XML element **Connector** with an attribute scheme set to **http** or **https**. Change the attribute port to the required port value, and save the file.

4. Restart BPM.

How to Run Tomcat as a Specific User

BPM Admin uses Tomcat (Catalina) as its web server. To improve security, we recommend not running Tomcat:

- As a system user

- As a user with administrator/root permissions

By default, Tomcat runs under the same user to which BPM is configured—the system user (default setting). You can configure Tomcat to run as a specific user as follows:

Configuring Tomcat to Run as a Specific User During Installation

When installing BPM, in the **Configuration Wizard > Run as User** page, select the **Run as specific user** option and enter the relevant credentials.

Configuring Tomcat to Run as a Specific User After Installation

If BPM is already installed and has been configured to run as the system user (default setting):

1. Access the Set User Credentials on Agent dialog box using one of the following in the BPM web console:

   - Select the host in the BPM tree and then click the **Set User Credentials** button.

   - Right-click the host in the BPM Tree to display a Shortcut menu and select **Set User**

Credentials.

2. In the Set User Credentials on Agent dialog box:

   ■ Select the **Other user** option and enter the relevant credentials.

   ■ Save the changes and restart BPM.

      ○ **Windows:** Click the **Set and Restart BPM** button.

      ○ **Linux:** Click the **Set** button and then manually restart BPM.

How to Disable the Close Application Mechanism

The mechanism to automatically close the application being tested when running QTP/UFT scripts (described in "QuickTest Professional (QTP) and Unified Functional Testing (UFT) Scripts" in "Requirements and Limitations for Running Tasks" on page 19) is enabled by default for scripts run on BPM.

If required, you can disable the mechanism for a specific script.

To disable the mechanism:

1. Browse to the script folder and open the **default.cfg** file in a text editor.

2. In the **General** section, add the following:

   ```
   DisableEndProcessesOnFail=1
   ```

   > **Note:** To re-enable the mechanism, delete the statement.

3. Save the file. The mechanism no longer closes an application being tested if the QTP/UFT script fails before it runs the last step (which closes the application).

How to Enable Access to Windows Mapped Network Resources Within a Script

1. Open the **wrapper.conf** file (located under **<BPM installation directory>/yajsw/conf**).

2. Uncomment the following line by removing the # symbol:
   ```
   #wrapper.app.pre.script=scripts/mapNetworkDrive.gv
   ```

3. Open the **mapNetworkDrive.gv** script file (located under **<BPM installation directory>/yajsw/scripts**).

4. Update the drive mapping command.

> **Examples:**
>
> - 'net use k: \\\\myserver\\$c'.execute().text
>
> - 'net use J: \\\\myserver\\c$ /USER:username password /PERSISTENT:no'.execute().text
>
> - 'net use J: \\\\myserver\\ /USER:username password /PERSISTENT:no'.execute().text

> **Note:** Currently, you are unable to use mapped network resources on Linux.

How to Change the QTP/UFT User

If you have enabled BPM integration with QTP/UFT and want to change the user name that runs tests:

1. Stop BPM.

2. Go to the **<BPM application directory>\config\agent1.cfg** file and change the following parameters accordingly:

   - **QtpUserName**

   - **QtpDomainName**

3. Start BPM.

Chapter 18: Password Encryption

In Business Process Monitor 9.25, an AES (256-Bit) encryption algorithm enables you to use passwords with strong encryption.

- A UI application (aes_crypt_tool_gui.exe) enables you to encrypt plain text passwords, re-encrypt existing passwords, or decrypt AES passwords.

- A command line application (aes_crypt_tool_cmd.exe) enables you to:
  - Generate encryption keys for each machine

  - Encrypt passwords

  - Decrypt encrypted passwords

  - Re-encrypt previously old encrypted passwords

  - Convert AES encrypted passwords to old encrypted passwords

- A dll (aes_crypt.dll) enables BPM and VuGen scripts to use newly encrypted passwords.

Learn About

Files Location

The utilities used for encrypting passwords and running the scripts that use them are located in the following directories:

- **BPM** (for running scripts that use encrypted passwords) - **<LoadGeneratorHome>\bin**
  Where the <LoadGeneratorHome> directory lies in the following path:
  <BPM installation directory> \..\LoadGenerator\bin.

- **VuGen** (for creating and testing scripts that use encrypted passwords) - **<VuGen installation directory>.**

The following utilities are used:

- **aes_crypt_tool_gui.exe** - The GUI utility for password encryption.

- **aes_crypt_tool_cmd.exe** - The command line utility for password encryption.

- **aes_crypt.dll** - the library for running scripts that use encrypted passwords.

You can copy these files to other BPM and VuGen machines as necessary.

Tasks

How to Generate and Deploy Encryption Keys

To generate and deploy encryption keys:

1. On one of the BPM or VuGen machines, select **Start > Run > cmd** to open the Command Prompt tool.

2. Move to the <BPM or VuGen installation directory>\bin folder.

3. Type the following command: **aes_crypt_tool_cmd.exe 1** <the number of BPM and VuGen machines for which you need keys>. For example, if you need keys for 20 machines the command is: aes_crypt_tool_cmd.exe 1 20

4. The **EncryptionKeysFile.txt** file is created in the same directory. The file contains a row with 2 keys for each machine, separated by commas. The first key is the VuGen key and the second is the machine key.

5. On each machine, in the **<LoadGeneratorHome>\config** and **<VuGen installation directory>\config** directories, create the following sub folders:
   a. VugenConf

   b. MachineConf

6. On each of the machines, in the **VugenConf** folder created in step 5, create a file named **VugenInitConf.txt** that contains the key generated in the VuGen Key column of the **EncryptionKeysFile.txt**.

7. On each of the machines, in the **MachineConf** folder created in step 5, create a file named **MachineInitConf.txt** that contains the corresponding key generated in the Machine Key column of the **EncryptionKeysFile.txt**.

Note for SaaS customers: If you want to have different encryption keys for each customer, repeat the steps 1– 7 above for each customer and create the VugenConf and MachineConf folders in step 5 under the **config\<Customer Id>** folder instead of the config\ folder. For example, for customer ID 10, create the VugenConf folder with the following path: <LoadGeneratorHome>\config\10\VugenConf and <VuGen installation directory>\config\10\VugenConf.

How to Use aes_crypt_tool_cmd.exe

Once you have generated and deployed the encryption keys, you can start encrypting and decrypting passwords and using them in scripts.

The aes_crypt_tool_cmd.exe enables you to:

- Generate encryption keys as described above.

- Encrypt passwords (command option 2). For example, to encrypt the password MyPass:

  ```
  aes_crypt_tool_cmd.exe 2 MyPass
  ```

- Decrypt passwords (command option 3). For example, to decrypt the encrypted password ab34fg:

  ```
  aes_crypt_tool_cmd.exe 3 ab34fg
  ```

- Re-encrypt old encrypted passwords (command option 4). For example, to re-encrypt the old encrypted password ad424f:

  ```
  aes_crypt_tool_cmd.exe 4 ad424f
  ```

- Convert AES encrypted passwords to old encrypted passwords (command option 5). For example, to convert the AES encrypted password af32d424f:

  ```
  aes_crypt_tool_cmd.exe 5 af32d424f
  ```

How to Use the aes_crypt_tool_gui.exe GUI Tool

This tool has a graphic user interface and enables you to:

- Encrypt passwords. When you enter a password and click **Encrypt Plain Text and Copy**, the password is encrypted and copied to the clipboard.

- Encrypt old passwords (that is, passwords that are already encrypted by the old encryption in VuGen). When you enter the old password and click **Encrypt Old Password and Copy**, the password is encrypted and copied to the clipboard.

- Decrypt passwords. When you enter the encrypted password and click **Decrypt Password and Copy**, the password is decrypted and copied to the clipboard.

How to Use Encrypted Passwords in Scripts:

Follow this procedure to use encrypted passwords in scripts:

1. Declare the encryption/decryption functions you want to use in the script. The declaration must be done before the start of **vuser_init()** or **Action()** functions. The declaration is necessary as LoadRunner requires a declaration for every external function that returns a value other than **int**. The following example shows the declaration of both the available functions:

   ```
   extern char * convertAESPass2Old (char *, int);

   extern char * decryptAES(char *, int);
   ```

2. Before using the functions you must load the dll that handles the encryption/decryption (aes_crypt.dll). This dll is located in the \bin directory on the BPM and VuGen machines. The loading

must be done in the **vuser_init()** or **Action()** funtions. The following is an example of how to load
the dll:

```
lr_load_dll("aes_crypt.dll");
```

3. You can now call the functions. There are 2 functions as follow:
   a. **convertAESPass2Old("<The AES encrypted password>", <customer ID>)** – this
      function gets the AES encrypted password as a parameter and converts it to an old encrypted
      password. The second parameter is the customer ID (the customer ID is used for SaaS
      customers. For non-SaaS customers, the default ID is -1).

      Use this function when the script requires a password encrypted in the old way as a
      parameter. The following is an example of this function:

      ```
      convertAESPass2Old("ab855cd354", -1) ;
      ```

   b. **decryptAES ("<The AES encrypted password>", <customer ID>)** – this function gets the
      AES encrypted password as a parameter and converts it to plain text (that is, unencrypted).
      The second parameter is the customer ID (the customer ID is used for SaaS customers. For
      non-SaaS customers, the default ID is -1).

      Use this function when the script requires a password in plain text as a parameter. The
      following is an example of this function:

      ```
      decryptAES ("ab855cd354", -1) ;
      ```

How to Enter Passwords not Using Functions:

In some cases, you may need to enter passwords in a script, but cannot use functions.

1. The following is an example of a script that cannot use functions and requires a plain text
   password:

```
web_edit_field("PASSWORD",
      "Snapshot=t2.inf",
      DESCRIPTION,
      "Type=password",
      "Name=PASSWORD",
      ACTION,
      "SetValue=myPlainTextPassword",
      LAST);
```

Use the following command to store the password in a parameter:

```
lr_save_string(decryptAES("ab855cd354", -1), "prmPassword");
```

Then use the parameter in the script

```
web_edit_field("PASSWORD",
              "Snapshot=t2.inf",
              DESCRIPTION,
              "Type=password",
              "Name=PASSWORD",
              ACTION,
              "SetValue={prmPassword}",
              LAST);
```

2. The following is an example of a script that cannot use functions and requires a password that uses the old VuGen encryption:

```
web_edit_field("PASSWORD",
              "Snapshot=t2.inf",
              DESCRIPTION,
              "Type=password",
              "Name=PASSWORD",
              ACTION,
              " SetEncryptedValue=myEncryptedPassword",
              LAST);
```

Use the following command to convert the password to the required encryption and store it in a parameter:

```
lr_save_string(convertAESPass2Old ("ab855cd354", -1), "prmPassword");
```

Then use the parameter in the script:

```
web_edit_field("PASSWORD",
              "Snapshot=t2.inf",
              DESCRIPTION,
              "Type=password",
              "Name=PASSWORD",
              ACTION,
              " SetEncryptedValue={prmPassword}",
              LAST);
```

How to Enter Passwords Using the Script Parameterization Feature (integrated in BSM EUM Admin and VuGen)

If you want to enter passwords in a script using the Script Parameters feature which is integrated in BSM and VuGen, you must:

1. Convert the script parameter to a VuGen String object.

2. Decrypt it using one of the two decryption functions.

In the following example, a parameter called **PrmPassword2** is converted to a String object using the **lr_eval_string** function, decrypted using the **decryptAES** function, and then saved as another

parameter for later use using the **ls_save_string** function. Finally, the new parameter that includes the decrypted password **PrmPassword** is used in the **web_submit_form** function.

```
lr_save_string(decryptAES(lr_eval_string("{PrmPassword2}"), -1),  "PrmPassword");
            web_submit_form("login.pl",
                            "Snapshot=t9.inf",
                            ITEMDATA,
                            "Name=username", "Value=jojo", ENDITEM,
                            "Name=password", "Value={PrmPassword}", ENDITEM,
                            "Name=login.x", "Value=59", ENDITEM,
                            "Name=login.y", "Value=13", ENDITEM,
                            LAST);
```

For more information on the script parameterization feature in BSM, refer to the "Script Parameter Management Overview" section in the the BSM User Guide.

For more information on the script parameterization feature in VuGen, refer to the "Parameter Overview" section in the VuGen User guide.

- **Example of Script Using Two Functions:**

  The following is an example of the Action section of a script in which the two functions are used:

  ```
  extern char *convertAESPass2Old(char *, int);
  extern char *decryptAES(char *, int);

  Action()
  {
          lr_load_dll("aes_crypt.dll");
          lr_message("New 2 Old Pass ='%s'", convertAESPass2Old
  ("96862f667ed76e1cd0a7d30fd1124efa", -1));
          lr_message("decrypt New Pass to plain text='%s'", decryptAES
  ("96862f667ed76e1cd0a7d30fd1124efa", -1));
          return 0;
  }
  ```

- **Example of Script Using Parameters:**

  The following is an example of the Action section of a script in which one of the functions uses parameters:

  ```
  extern char *convertAESPass2Old(char *, int);

  Action()
  {
  lr_load_dll("aes_crypt.dll");
  lr_save_string(convertAESPass2Old("d0a7d30fd1124efa ", -1),  "prmPassword");

          web_edit_field("PASSWORD",
                  "Snapshot=t2.inf",
                  DESCRIPTION,
  ```

```
                    "Type=password",
                    "Name=PASSWORD",
                    ACTION,
                    "SetEncryptedValue={prmPassword}",
                    LAST);
          return 0;
    }
```

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