HPE ALM Performance Center

Software Version: 12.50

Quick Start

Hewlett Packard Enterprise

Document Release Date: May 2016 | Software Release Date: May 2016

Legal Notices

Warranty

The only warranties for Hewlett Packard Enterprise Development LP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HPE shall not be liable for technical or editorial errors or omissions contained herein.

The information contained herein is subject to change without notice.

Restricted Rights Legend

Confidential computer software. Valid license from HPE required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Copyright Notice

© Copyright 2002 - 2016 Hewlett Packard Enterprise Development LP

Trademark Notices

Adobe™ is a trademark of Adobe Systems Incorporated.

Microsoft® and Windows® are U.S. registered trademarks of Microsoft Corporation.

UNIX® is a registered trademark of The Open Group.

Oracle and Java are registered trademarks of Oracle and/or its affiliates.

Contents

HPE ALM Performance Center 1

Welcome to This Guide 5
How This Guide is Organized 5

Chapter 1: Introducing Performance Center 7
Performance Center Testing Process 7
What is the testing process? 7
Performance Testing Applications 8
Sample Application - HP Tours 8

Chapter 2: Creating Vuser Scripts 9
Recording Vuser Scripts 9
How do I start recording user activity? 9
How do I record a script? 10
How do I view my script? 13
How do I save the script? 16

Chapter 3: Creating and Designing Performance Tests 17
Logging in to Performance Center 17
Adding Vuser Scripts to Performance Center 18
How do I upload the Vuser Script? 19
Monitoring Performance Tests 20
What is a monitor profile? 21
How do I create a monitor profile? 21
Creating Performance Tests 21
How do I create a performance test? 21
Designing Performance Tests 22
How do I open the Performance Test Designer? 22
How do I design the performance test? 22
How do I add the monitor profile to the test? 26

Chapter 4: Running Performance Tests 27
Creating Test Sets 27
What is a test set? 27
How do I create a test set? 27
Reserving Timeslots 28
How do I reserve a timeslot? 28
Running Performance Tests 29

How do I run the performance test? 29
What does the Performance Test Run page display? 30

Chapter 5: Post-Run Analysis and Trending 33
Analyzing Performance Test Run Results 33
How do I view Analysis information? 33
Did I reach my goals? 35
How can I view the graphs? 35
How can I compare data from different graphs? 37
How can I sort graph data? 38
How can I publish my findings? 39
Viewing Performance Improvements and Regressions 39
What steps are involved in working with trend reports? 39
Creating the Trend Report 39
Viewing Trend Report Data 41

Send Us Feedback 43

Welcome to This Guide

Welcome to the HP ALM Performance Center Quick Start. Performance Center is HP's Web-enabled global performance testing tool, designed to streamline the testing process and increase the test efficiency for multiple concurrent performance tests across multiple geographic locations.

This Quick Start is a self-paced guide designed to lead you through the process of creating, running, and analyzing a performance test, and to introduce you to the Performance Center testing environment.

> **Note:** This guide assumes that your Performance Center environment has been fully installed and configured, and that a domain and project have been set up. For more information, contact your Performance Center administrator.

How This Guide is Organized

This guide contains the following lessons:

Lesson	Description
"Introducing Performance Center" on page 7	Provides an overview of Performance Center and the performance testing applications.
"Creating Vuser Scripts" on page 9	Describes the steps involved in recording Vuser scripts using HPE Virtual User Generator.
"Creating and Designing Performance Tests" on page 17	Describes the steps involved in creating and designing performance tests.
"Running Performance Tests" on page 27	Describes the steps that are necessary before running a performance test, and how to begin test execution.
"Post-Run Analysis and Trending" on page 33	Describes how to analyze test run data using HPE LoadRunner Analysis, and how to view performance improvements and regressions using the Trend Reports feature.

Chapter 1: Introducing Performance Center

This lesson provides a brief overview of Performance Center, and of the applications that are involved in the testing process.

> **Note:**
> - The Quick Start describes how to run a performance test with a single host functioning as both a load generator and a Controller (C+LG). However, due to possible heavy load on the Controller and load generator hosts during a performance test, it is best practice to assign these functions to separate host machines.
> - Ensure that the latest standalone versions of HP Virtual User Generator (VuGen) and HP LoadRunner Analysis are installed on your system.

In this lesson you will learn about:

- "Performance Center Testing Process" below
- "Performance Testing Applications" on the next page

Performance Center Testing Process

Using ALM Performance Center, you create **performance tests** in which you define the events that occur during a testing session. During a test, ALM Performance Center replaces human users at physical machines with virtual users, or **Vusers**. These Vusers create load on your system by emulating actions of typical users in a repeatable and predictable manner.

Suppose you are testing a Web-based travel agency application that enables users to book flights online. Your goal as the performance tester is to determine how the application behaves when multiple users try to perform the same transaction at the same time. Using ALM Performance Center, you can run a test in which 1,000 Vusers, emulating 1,000 travel agents, would simultaneously try to book a flight on the application.

What is the testing process?

The testing process consists of the following basic processes:

- **Creating the script**. Capturing typical end-user business processes performed on your application.
- **Designing the performance test.** Setting up the test environment by defining events that occur during the testing session.
- **Preparing to run the performance test.** Adding the performance test to a test set and reserving a timeslot for the test.
- **Running the performance test.** Driving, managing, and monitoring the test.
- **Analyzing the results and viewing performance trends.** Analyzing the performance data generated during the test run, and viewing trending information which identifies performance improvements and regressions over time.

These processes are explained in more detail in the lessons that follow.

Performance Testing Applications

Each step in the testing process is carried out by one of the HP load testing tool components. The components are as follows:

Application	Description
HP Virtual User Generator (VuGen)	Creates the script and generates virtual users, or **Vusers.** VuGen does this by capturing actions that typical end-users would perform on your application, and then records these actions into automated Vuser scripts. These Vuser scripts form the foundation of a performance test.
HP ALM Performance Center	Provides the central console from which you build, manage, and monitor a test.
HP Analysis	Analyzes the performance test and provides graphs and reports with in-depth performance analysis information. Using these graphs and reports, you can pinpoint and identify the bottlenecks in your application and determine what changes need to be made to your system to improve its performance.

Sample Application - HP Tours

To illustrate the testing process, this Quick Start uses a sample Web-based travel agency application called HP Tours.

During the course of this Quick Start, you will go through the basic steps of creating, running, and analyzing a performance test. The test will emulate 10 travel agents simultaneously connecting to the HP Tours Web server and performing various flight reservation actions, for example logging on, searching for flights, purchasing flights, checking itineraries, and logging off.

Chapter 2: Creating Vuser Scripts

This lesson explains the steps involved in recording Vuser scripts using HPE Virtual User Generator.

In this lesson you will learn about:

- "Recording Vuser Scripts" below

Recording Vuser Scripts

You record Vuser scripts using HP Virtual user Generator (VuGen). A Vuser script is a record of a typical end-user business process. VuGen works on a record-and-playback principle. As you walk through a business process on your application, VuGen records your actions into an automated script which later forms the foundation of the performance test.

This section includes:

- "How do I start recording user activity?" below
- "How do I record a script?" on the next page
- "How do I view my script?" on page 13
- "How do I save the script?" on page 16

How do I start recording user activity?

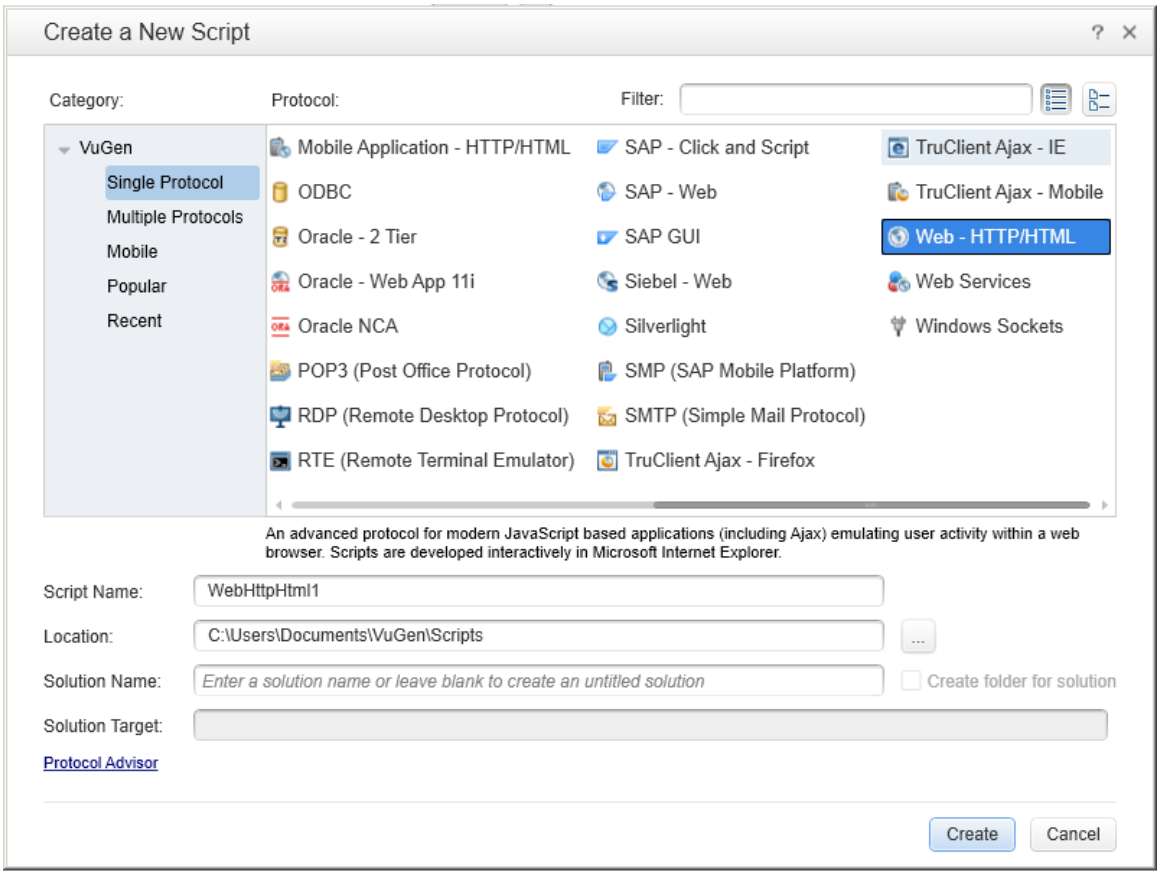
You begin by opening Vugen and creating a blank script.

1. **Start VuGen.**

   Double-click the **Virtual User Generator** shortcut icon on your desktop.

2. **Create a blank Web script.**

   a. On the VuGen Start Page, click the **Add New Script** button . The **Create a New Script** dialog box opens.



A protocol is the language that your client uses to communicate with the back end of the system. HP Tours is a Web-based application, so you will create a Web virtual user script.

b. Make sure the **Category** type is **Single Protocol**. VuGen displays a list of the protocols that are available for a single-protocol script.

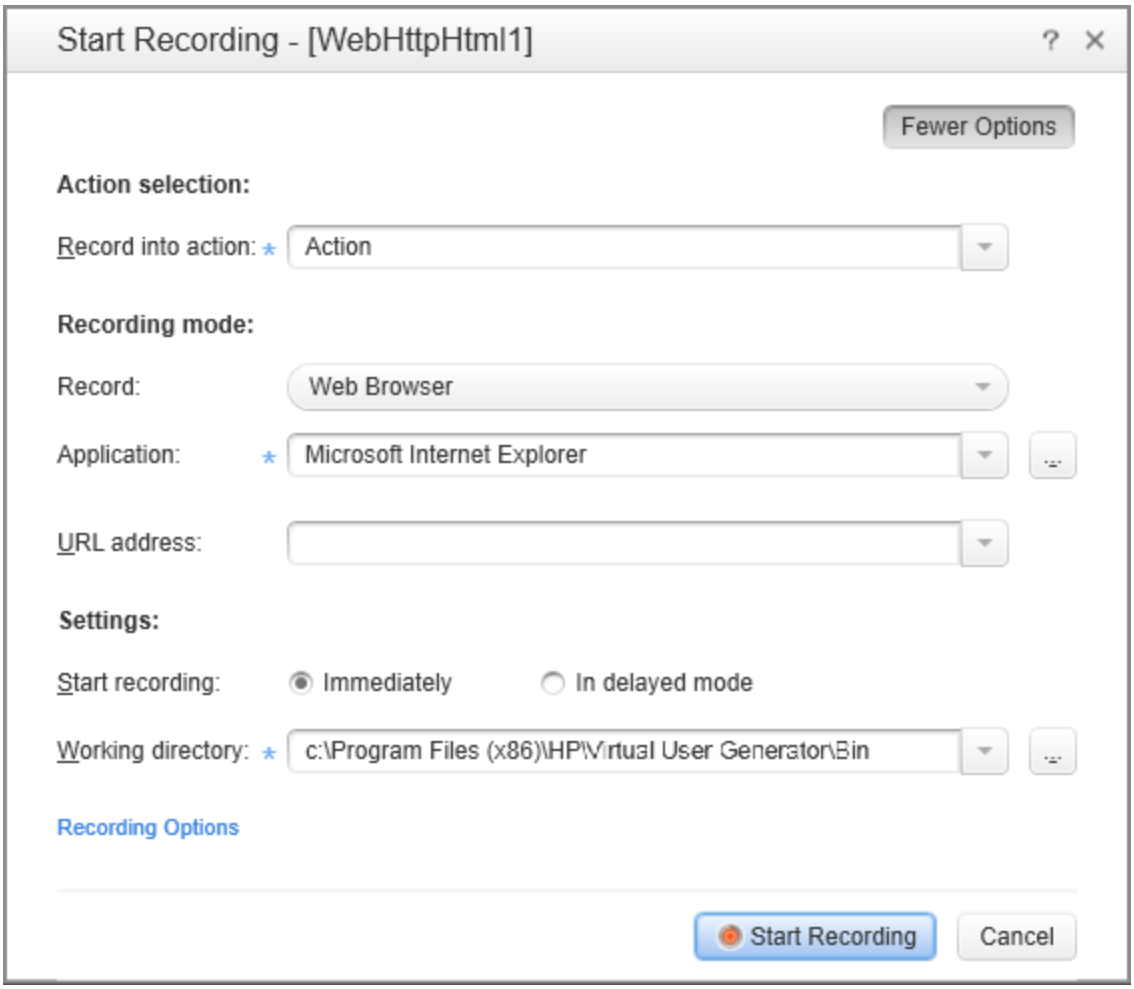
c. From the list of available protocols, select **Web - HTTP/HTML** and click **Create**. VuGen creates a blank Vuser script and displays the script in the VuGen Editor.

How do I record a script?

The next stage in creating user emulation is recording the events performed by a real user. In the previous section, you created an empty Web script. In this section, you will track the events of one passenger reserving a flight from Denver to Los Angeles and then check the itinerary.

1. **Start recording on the HP Web Tours site.**

   a. Click the **Record** button on the VuGen toolbar. The Start Recording dialog box opens.



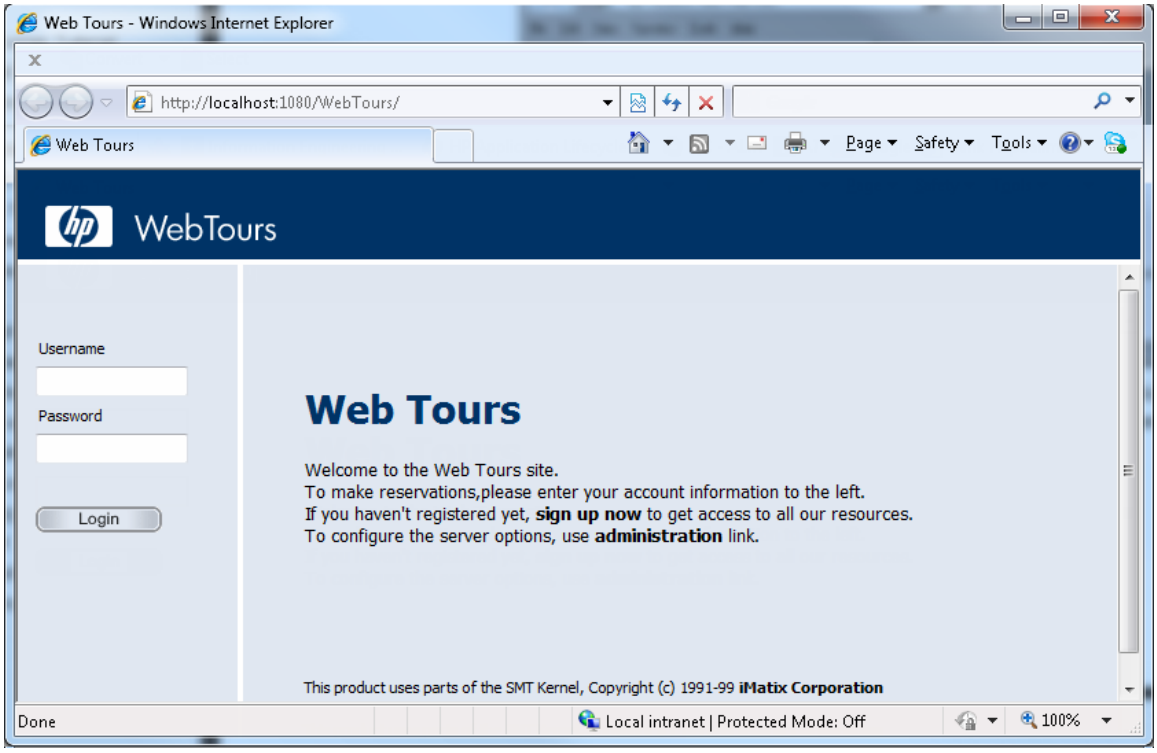
   b. In the **Record into action** box, select **Action**.

   c. In **Record**, select **Web Browser**.

   d. In the **URL address** box, type `http://localhost:1080/WebTours`.

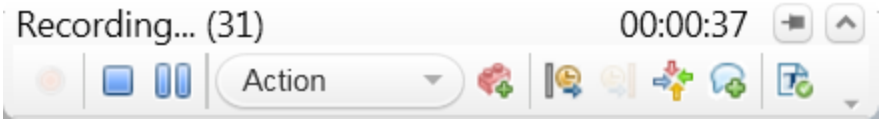
   e. Keep all other default settings.

   f. Click **Start Recording**. A new web browser opens and displays the HP Web Tours site.



> **Note:** If there is an error opening the site, make sure that the Web server is running. To start the server, select **Start > All Programs > HP LoadRunner > Samples > Web > Start Web Server**.

The floating Recording toolbar opens.



2. **Log on to the HP Web Tours site.**
   a. On the HP Web Tours home page, type the user credentials:
      - For the **Username** type `jojo`.
      - For the **Password** type bean.
   b. Click **Login**. A welcome page opens.
3. **Enter flight details.**
   a. Click **Flights**. The Find Flight page opens.
   b. Define the following flight criteria:
      - **Departure City**: Denver (default)
      - **Departure Date:** Keep the default, current date

- **Arrival City:** Los Angeles
- **Return Date:** Keep the default, tomorrow's date

c. Keep the rest of the default settings and click **Continue**. The search results appear.

4. **Select a flight.**

   Click **Continue** to accept the default flight selection. The Payment Details page opens.

5. **Enter payment information and book flight.**

   a. In the **Credit Card** box enter `12345678`.

   b. In the **Exp Date** box enter `01/16` in the **Exp Date** box.

   c. Click **Continue**. The Invoice page opens, displaying your invoice.

6. **Check the itinerary.**

   In the left pane, click **itinerary**. The Itinerary page opens displaying the itinerary for flight you booked above.

7. **Log off the HP Web Tours Site**

   In the left pane, click **Sign Off**.

8. **Stop recording.**

   Click the **Stop** button on the floating toolbar to stop the recording process.

   VuGen generates the required code and inserts the code into the Vuser script.

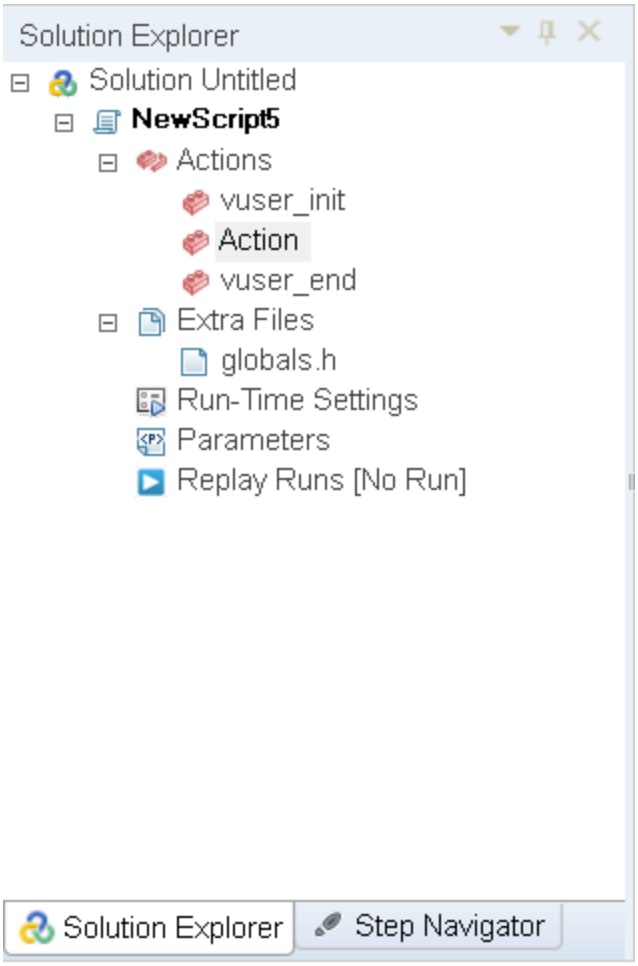
   If the Design Studio opens, click **Close** to close the Design Studio.

How do I view my script?

You have now recorded a travel agent logging in, booking a flight, checking the itinerary, and logging off. VuGen recorded your steps from the moment you clicked the **Start Recording** button to the moment you clicked the **Stop Recording** button. You can now use VuGen to view the script.

1. **Display the Solution Explorer tab.**

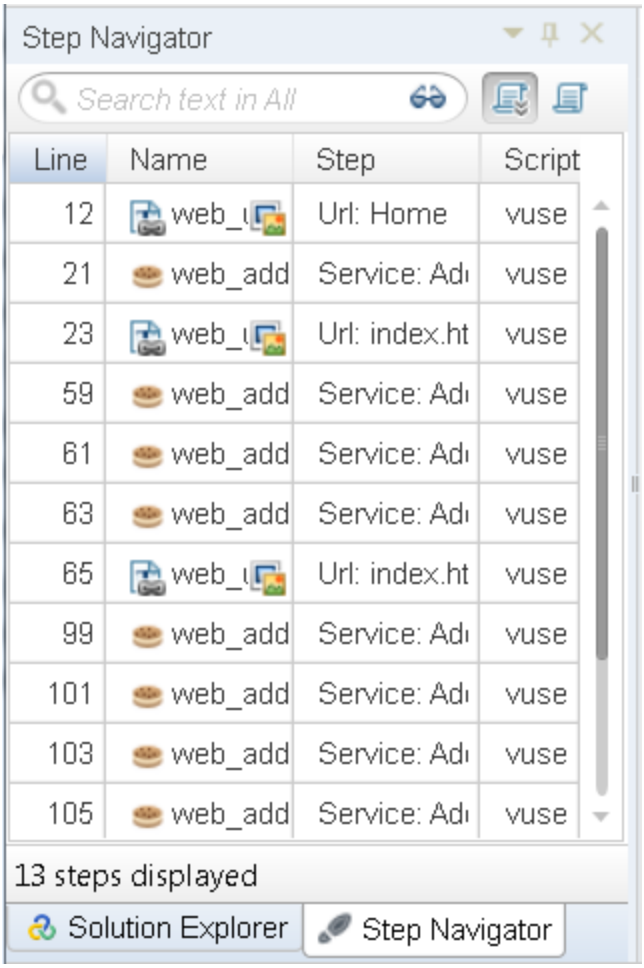
   On the left side pane, make sure the **Solution Explorer** tab is selected.



This tab provides you structured access to the various parts of a Vuser script, as well as to a number of files that are associated with the Vuser script.

2. **Display the Step Navigator tab.**

   Click the **Step** Navigator tab.

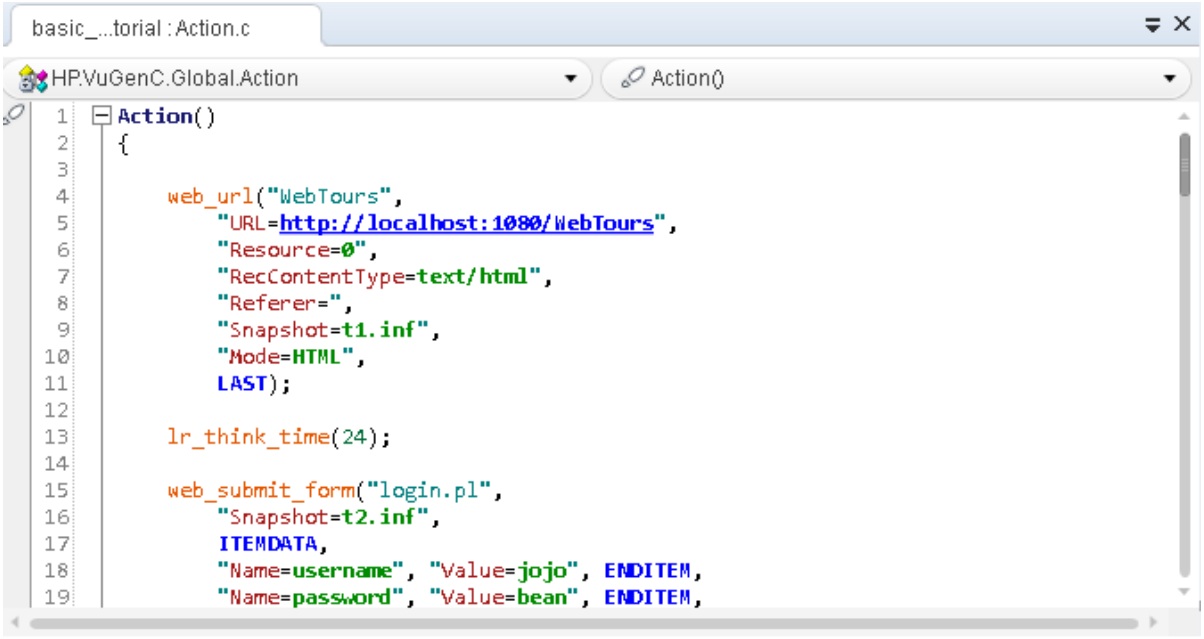


The Step Navigator displays an icon-based view of the script that lists the actions of the Vuser as steps. For each action you performed during recording, VuGen generated a corresponding step in the Step Navigator.

The Step Navigator displays a snapshot icon to indicate that a specific step contains a snapshot.

3. **View a step in the VuGen Editor.**

   Double-click any step in the Step Navigator to display the corresponding function in the VuGen Editor. The Editor displays a text-based view of the script.



In the Editor, the actions of the Vuser are listed as API functions. VuGen uses color-coding to show the functions and their argument values in the script. You can type C or API functions, as well as control flow statements, directly into the script.

How do I save the script?

Select **File > Save Script As** and save the script locally on your desktop. For example, type `Scripts`. The script file should be zipped. After you have created your performance test, you will upload the script to ALM Performance Center.

Chapter 3: Creating and Designing Performance Tests

This lesson explains how to manage test assets in ALM, and the steps involved in creating and designing a performance test.

In this lesson you will learn about:

- "Logging in to Performance Center" below
- "Adding Vuser Scripts to Performance Center" on the next page
- "Monitoring Performance Tests" on page 20
- "Creating Performance Tests" on page 21
- "Designing Performance Tests" on page 22

Logging in to Performance Center

You log into Performance Center as follows:

1. Choose one of the following:

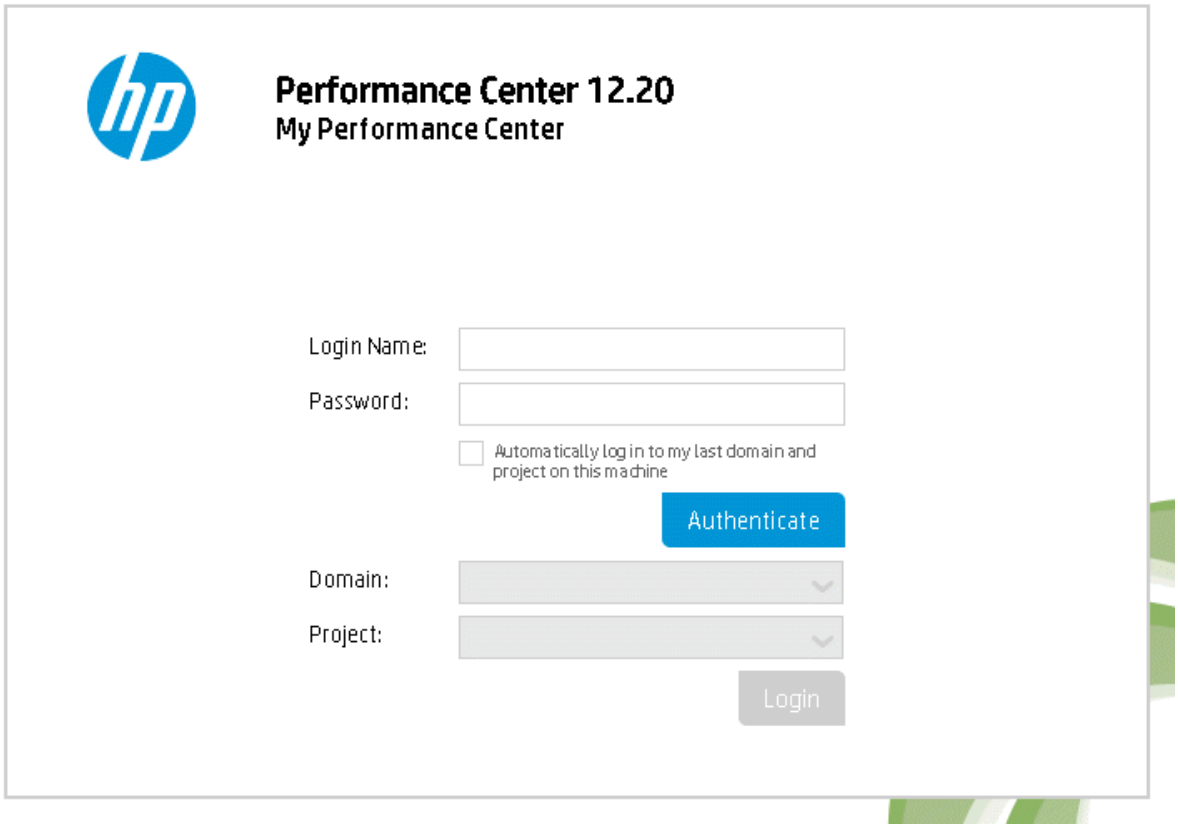
   From Performance Center: Open your web browser and type the Performance Center Server URL `http://<PCS server name>/loadtest`.

   > **Note:** If more than one Performance Center server is installed in your system together with a load balancer, you should access My Performance Center by entering the load balancer's URL. Alternatively, you can also enter the server's defined internal URL.

   From ALM: Open your Web browser and type your ALM URL `http://<ALM server name/IP address>[<:port number>]/qcbin`. The HPE Application Lifecycle Management Options window opens. Click **My Performance Center**.

   > **Note:** Contact your system administrator if you do not have the correct URL.

2. The My Performance Center Login window opens.



If Performance Center was configured for external authentication, the **Login Name** and **Password** fields do not appear in this window. For more details on external authentication, see the *HP ALM External Authentication Configuration Guide*

3. In the **Login Name** box, type your user name.
4. In the **Password** box, type the password assigned to you by your site administrator.
5. Select the **Automatically log in to my last domain and project on this machine** check box if you want Performance Center to automatically log in to the last project in which you were working.
6. Click the **Authenticate** button. Performance Center verifies your user name and password and determines which domains and projects you can access. If you specified automatic login, Performance Center opens.
7. In the **Domain** list, select a domain. By default, the last domain in which you were working is displayed.
8. In the **Project** list, select a project. By default, the last project in which you were working is displayed.
9. Click **Login**. Performance Center opens.

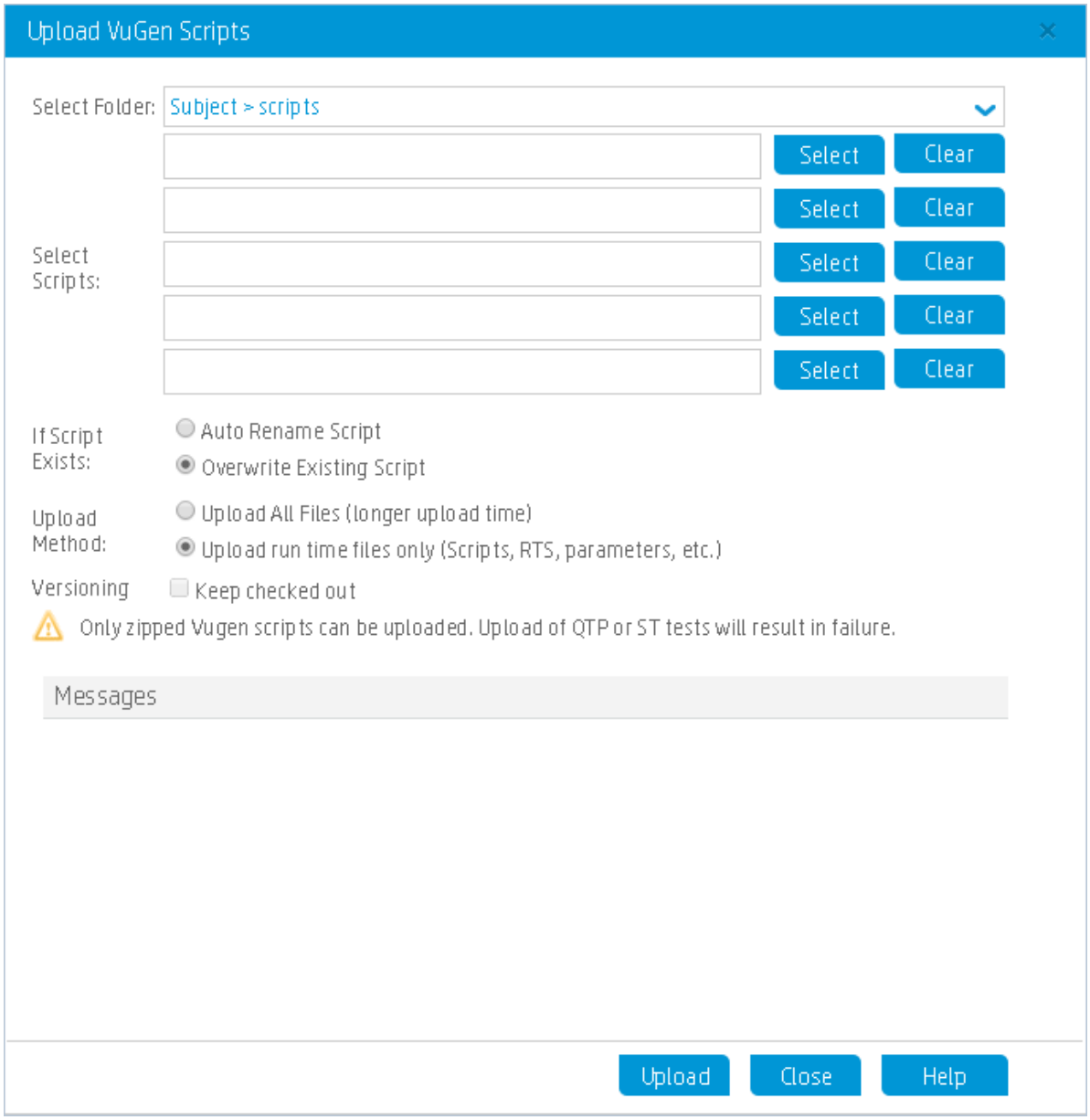
Adding Vuser Scripts to Performance Center

The first step in your test design process is to add your Vuser script to Performance Center. Adding the script involves two steps: Creating a scripts folder, and uploading the script to the folder.

How do I upload the Vuser Script?

You upload the script from within Performance Center, as follows:

1. Make sure the script is saved locally and is zipped.
2. On the My Performance Center navigation bar, select **Test Management > Test Plan**.
3. **Create a script folder.**
   a. Select **Subject**.
   b. Click the **New Folder** button, and specify a name for the folder, for example, `Scripts`.
   c. Click **OK** to add the folder.
4. On the module toolbar, click the **Upload Script** button. The Upload VuGen Scripts dialog box opens.



5. In the **Select Folder** box, select the scripts folder you created above.
6. Click one of the **Select** buttons and navigate to the location of the zipped script file.
7. Click **Upload** to upload the script.

Monitoring Performance Tests

You monitor performance test execution using the ALM Performance Center online monitors.

For example, you use the System Resource monitors to monitor a machine's system resource usage during a performance test and identify server performance bottlenecks.

A primary factor in a transaction's response time is its system resource usage. Using the ALM Performance Center resource monitors, you can monitor the Windows Resource usage on a machine during a test run, and determine why a bottleneck occurred on a particular machine.

What is a monitor profile?

To monitor server resources during the test, you select the type of monitors to run and the servers whose resources you want to monitor. You then add the measurements to monitor for each server. These monitor settings can be saved as a monitor profile which can be used by any performance test in your project.

The following section will show you how to create a monitor profile and how add a Windows Resource Monitor to it.

How do I create a monitor profile?

You create and configure monitor profile as follows:

1. On the My Performance Center navigation bar, select **Resources > Test Resources**.
2. Create a folder for the monitor profile.
3. Select the folder, and click the **New Monitor Profile** button. The Create New Monitor Profile dialog box, enabling you to add a new monitor profile.
4. Enter the required information and click **OK** to add the monitor profile to the folder.
5. In the Monitor Profile page, click the **Add Monitor** button **.** In the Add New Monitor page that opens, select the monitor that you want to run.
6. Select **Windows Resources**. The Edit Monitor dialog box opens, enabling you to select the Windows Resources counters you want to monitor.
7. Enter the desired information, and click **Save**. The monitor is added to your monitor profile.

You will add the monitor profile to the test as part of the test design process.

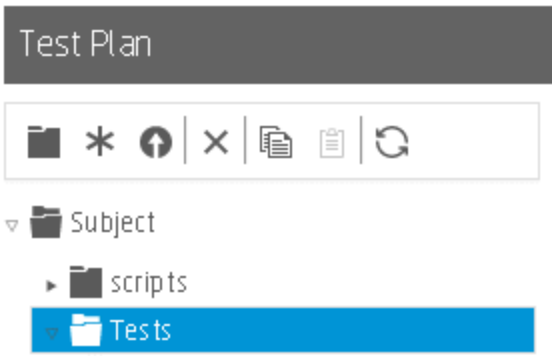
Creating Performance Tests

To create a test, you begin by creating a test folder, and then creating the test and adding it to the folder. In the next section, you will learn how to design the test in the Test Designer.

How do I create a performance test?

You create the test as follows:

1. On the My Performance Center navigation bar, select **Test Management > Test Plan**.
2. Select **Subject**. Click the **New Folder** button, and specify a name for the folder, for example, `Tests`. Click **OK** to add the folder.



3. Select the folder, and click the **New Test** button. The Create New Performance Test dialog box opens.
4. Enter the test name and click **OK**. The Performance Test Designer opens.

Designing Performance Tests

You design your performance test in the Performance Test Designer.

How do I open the Performance Test Designer?

You open the test designer as follows:

1. On the My Performance Center navigation bar, select **Test Management > Test Plan**.
2. Select the test you created above, and click the **Edit Test** button on the toolbar. The Performance Test Designer opens.

How do I design the performance test?

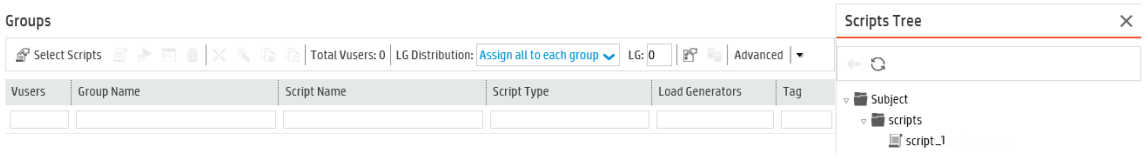
From the **Groups & Workload** view in the Performance Test Designer, you perform the basic test design steps. You design the test as follows:

1. **Select a workload type for the test.**

   When the Performance Test Designer opens, you will be prompted to select a workload type for the test. Accept the default, **Basic Schedule, by test, by number**.

2. **Assign a Controller to the test.**
   a. Click the browse button adjacent to the **Controller** box. The Select Controller dialog box opens.
   b. Select **Specific**.
   c. Select from the list the host machine that has been assigned the Controller and Load Generator (C+LG) purpose.
3. **Add Vuser scripts.**
   a. If the Scripts Tree pane is not displayed on the right, click the **Select Scripts** button on the toolbar to open it. The Scripts Tree displays the script that you uploaded previously to

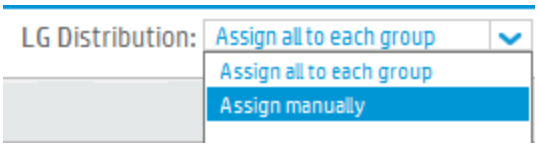
Performance Center.



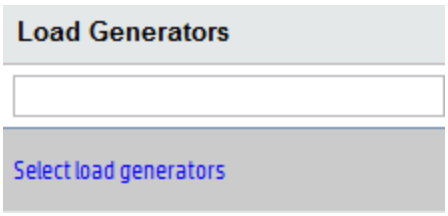
b. In the Scripts Tree, select the script and click the left arrow to add it to the test. The script appears in the Groups pane.

4. **Add load generators.**

a. On the Groups pane toolbar, in the **LG Distribution** box, click the arrow and select **Assign manually.**



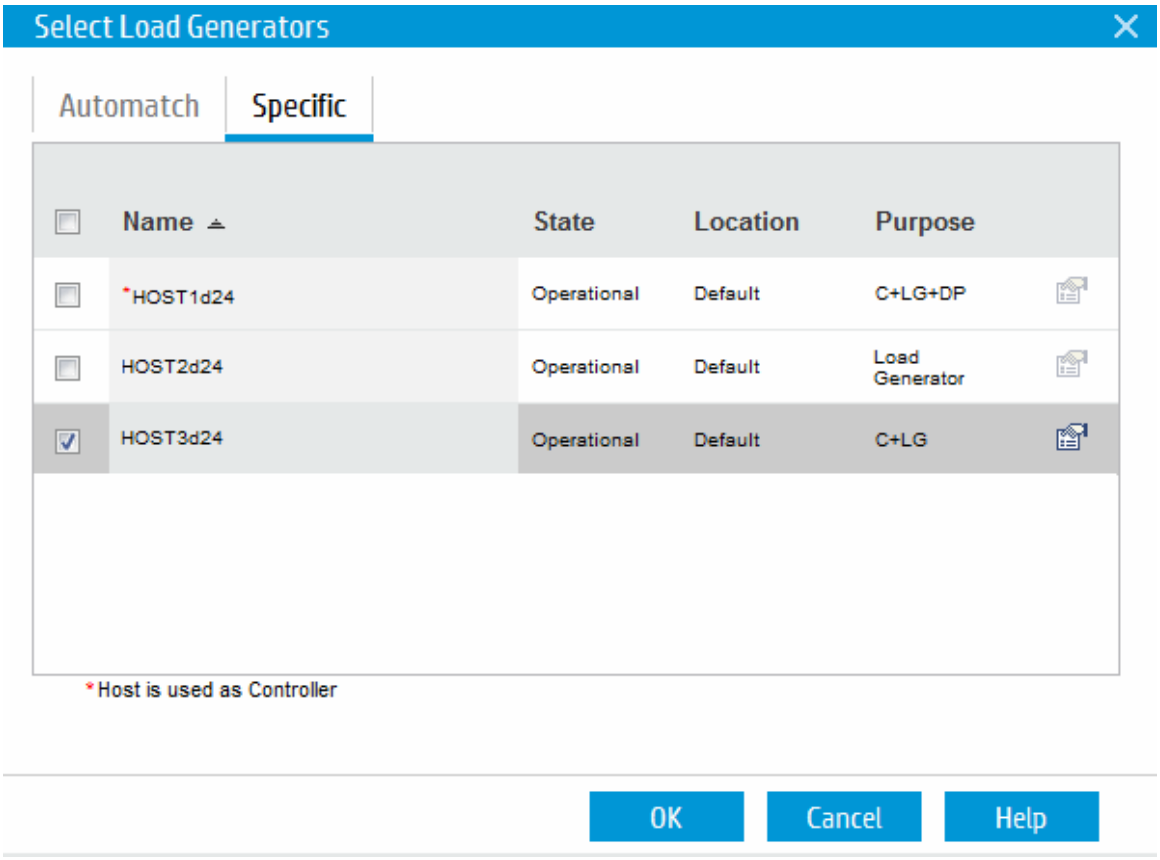
b. In the Groups Pane, in the **Load Generators** column, click the **Select load generators** link.



The Select Load Generators dialog box opens.

c. Select the **Specific** tab, and from the list that appears, select the host machine that has been

assigned the Controller and load generator (C+LG) purpose.



5. **Configure the schedule settings.**

   A schedule defines the actions of the Vusers for the performance test run, for example the behavior of 10 Vusers emulating 10 travel agents simultaneously logging on to HP Tours, booking flights, checking itineraries, and so on.

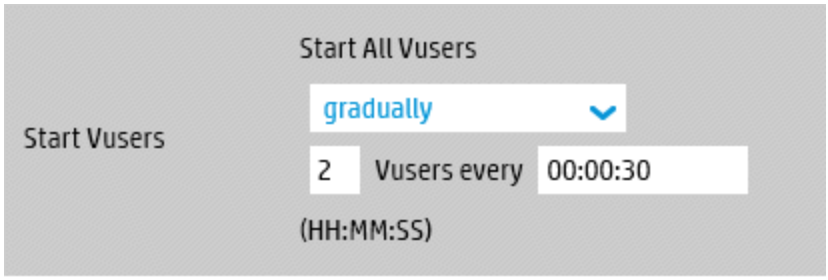
   Because typical users do not perform the same action simultaneously, the Scheduler allows you to schedule a performance test according to a more realistic portrayal of typical user behavior.

   Define the schedule as follows:

   In the lower area of the **Groups & Workload** tab, in the **Global Schedule** pane, click in each of the schedule actions in the Actions grid and define them as follows:

   - **Initialize.**

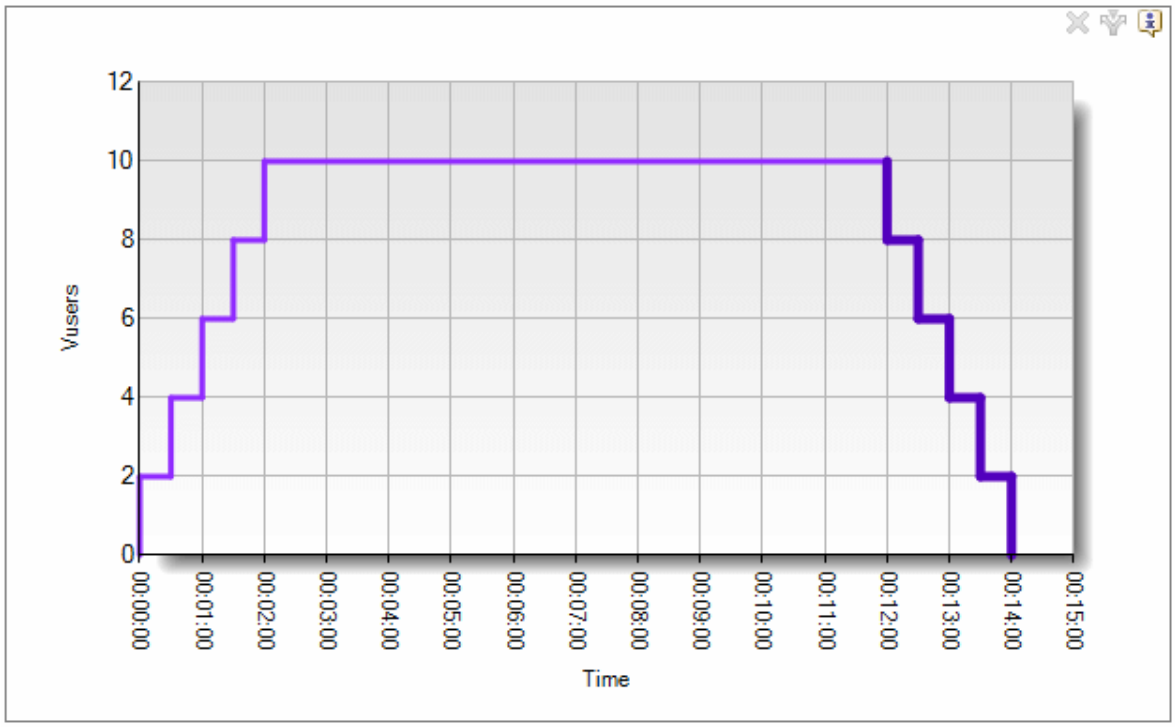
   - **Start Vusers.**



- **Duration.**

- **Stop Vusers.**

The schedule graph displays a graphical representation of the defined schedule. The lines in the graph correspond to the actions defined in the Actions grid.



How do I add the monitor profile to the test?

You add the monitor profile to the test as follows:

1. In the Performance Test Designer, select the **Monitors** view.
2. On the toolbar, click **Add Monitor Profile**. The Monitor Profiles pane opens on the right, displaying the available monitor profiles.
3. In the Monitor Profiles Tree, select the monitor profile and click the left arrow to add it to the test.

Chapter 4: Running Performance Tests

This lesson explains the steps that are necessary before you run the performance test, and how to begin test execution.

In this lesson you will learn about:

- "Creating Test Sets" below
- "Reserving Timeslots" on the next page
- "Running Performance Tests" on page 29

Creating Test Sets

The next step in the performance testing process is the creation of a performance test set.

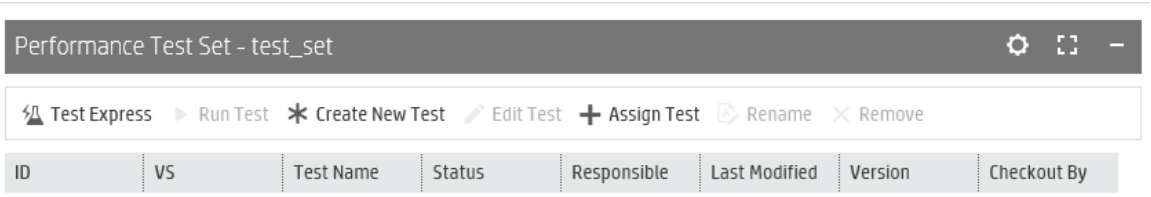
What is a test set?

After you design the performance test in the Test Plan module, you organize the test execution by creating a test set in the Test Lab module and adding an instance of the test to the test set. The purpose of a test set is to enable you to group together tests that were created for similar goals.

How do I create a test set?

You create the test set and add the test to it as follows:

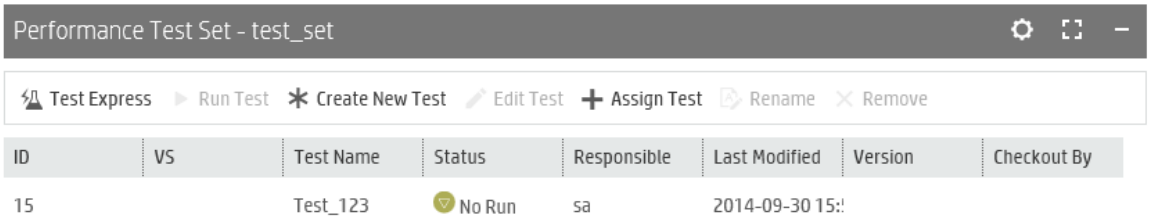
1. **Create the test set.**
   a. On the My Performance Center navigation bar, select **Test Management > Test Lab**.
   b. Click the Manage Test Sets button, and specify a name for the Test Set folder, for example, `Test_set_folder`.
   c. Click **OK** to add the folder.
   d. Select the folder you created above, and click the **New Test Set** button. The Create New Performance Test Set dialog box opens.
   e. Enter the test set name. Click **OK**. The test name is added to the tree.
   f. Select the test set and click **OK**.



2. **Assign the performance test to the test set.**

a. Click the Assign Test button. The Assign Test to Test Set dialog box opens.

b. Select your test and click **OK**.

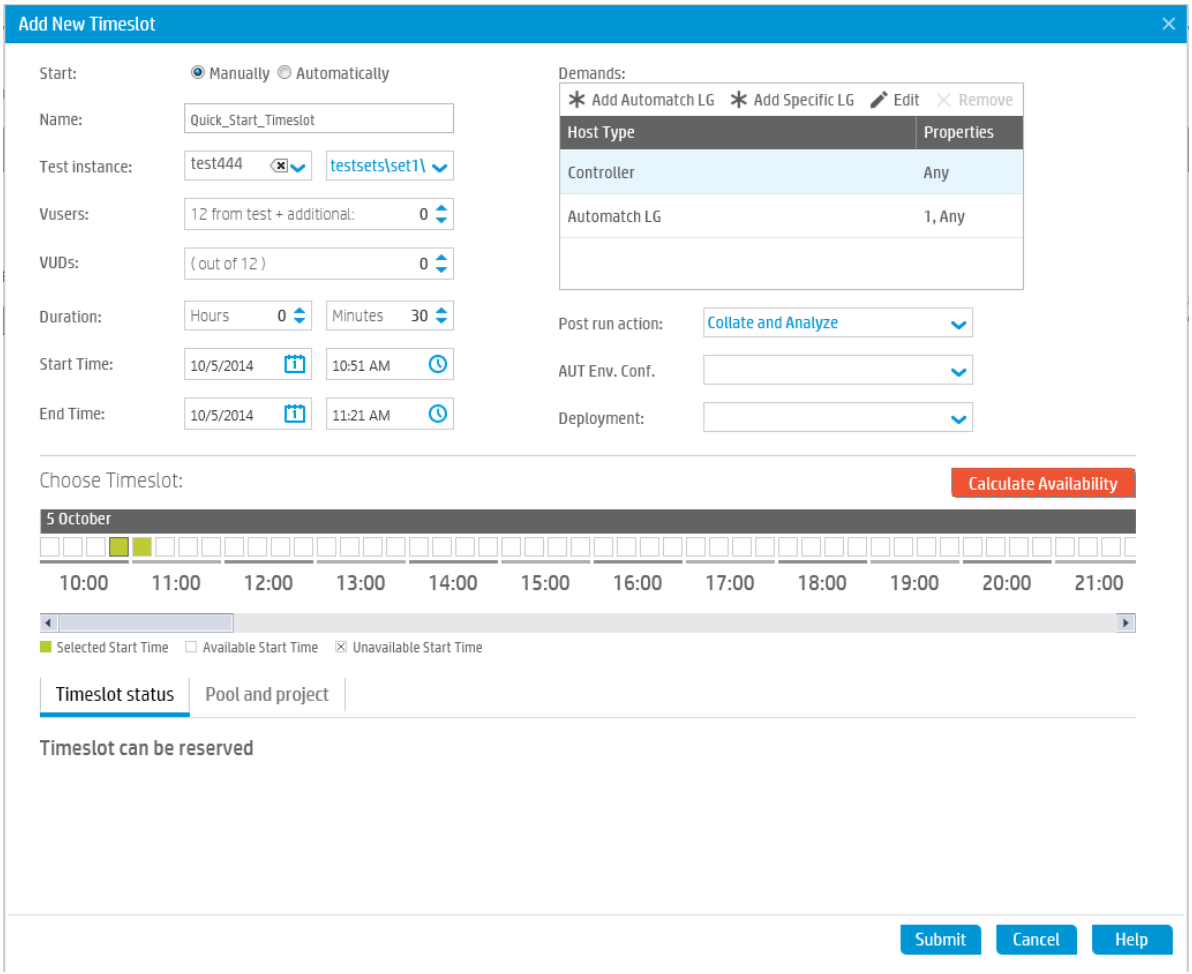


Reserving Timeslots

Before you run the test, you reserve a timeslot to ensure that the resources needed will be available for the duration of the test.

How do I reserve a timeslot?

1. On the My Performance Center navigation bar, select **Resources > Timeslots**.
2. Click the **New Timeslot** button. The Add New Timeslot dialog box opens.
3. Define the following information:
   - **Start.** Choose **Manually** as the method for executing tests. The timeslot reservation reserves testing resources only.
   - **Name.** Enter a name for the timeslot.
   - **Select a test instance.** Navigate to the test set you created above, and select the test to link it to the timeslot. The number of Vusers and hosts that were defined as part of the test design process are automatically displayed.
   - **Duration.** Set the start time, and enter a duration for the test.
   - **Post-Run.** Select **Collate and Analyze**.
4. Click **Calculate Availability**. The availability of the requested resources during the selected timeslot is calculated. The results of this calculation are displayed in the Timeslot Status tab and graphically on the time chart.



> **Note:** If the timeslot cannot be reserved, reselect your resources or adjust the start time, taking into account the reasons displayed in the Timeslot Status tab.

5. When you find a valid timeslot, click **Submit** to save the timeslot.

Running Performance Tests

Now that you have designed the performance test, added an instance of the test to a test set, and reserved a timeslot for the test, you are ready to run the test and observe how your application performs under load.

How do I run the performance test?

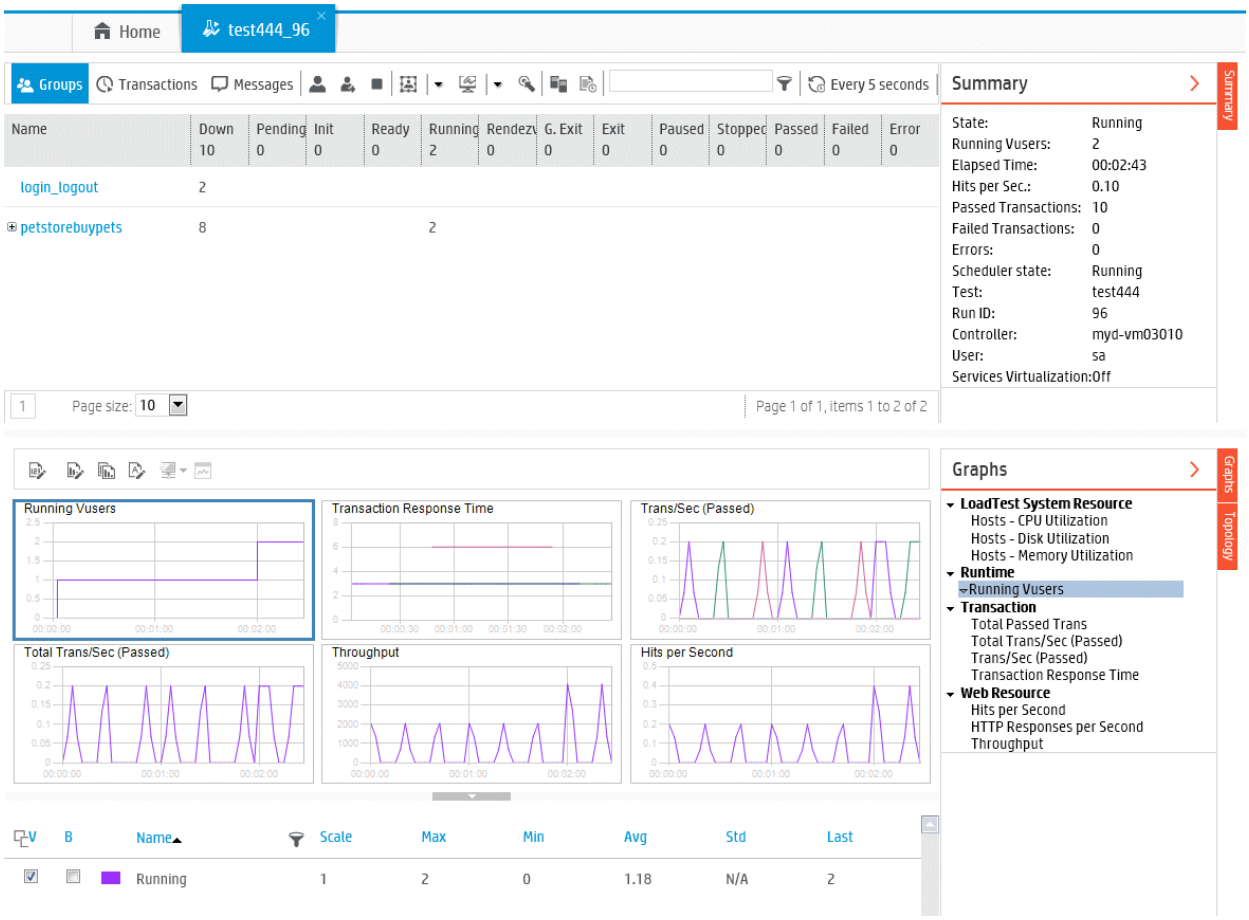
You run the performance test as follows:

1. On the My Performance Center navigation bar, select **Test Management > Test Lab.**
2. Select your test from the Performance Test Set pane.

3. Click the ▶ Run Test button. The Run Performance Test dialog box opens.
4. Click **Run**. The Initializing Run page displays the performance test initialization steps performed by Performance Center, and the status for each step. If each step is completed successfully, the performance test starts running and the Performance Test Run page opens. The Test Run page enables you to manage and monitor the test as it runs.

What does the Performance Test Run page display?

The Performance Test Run page is the control center from which the test run is managed and monitored.



The Performance Test Run page displays the following:

Pane	Description
Performance Test Details	The Performance Test Details Pane at the top of the page provides three views: • **Groups View.** This is the view displayed in the above image. The Groups view displays the statuses of the Vusers in each Vuser group in the performance test. • **Transactions View.** The Transactions view displays how many transactions have been executed successfully or unsuccessfully. • **Messages View.** The Messages view displays error, warning, debug, and output messages that are sent to the Controller by the Vusers and load generators during a test run.
Summary	The Summary pane displays a synopsis of the running performance test.
Online Graphs	The online monitor graphs display performance measurements for those resources being monitored in the test. This enables you to monitor how the application under test is performing in real time and identify where potential bottlenecks exist.
Topology	Displays any defined topologies for the test.

Chapter 5: Post-Run Analysis and Trending

This lesson explains how to analyze test run data using HPE LoadRunner Analysis, and how to view performance improvements and regressions using the Trend Report feature.

In this lesson you will learn about:

- "Analyzing Performance Test Run Results" below
- "Viewing Performance Improvements and Regressions" on page 39

Analyzing Performance Test Run Results

Now that you have completed running the performance test, you can use HP LoadRunner Analysis to analyze the performance data generated during the test run. Analysis gathers the performance data into detailed graphs and reports. Using these graphs and reports, you can pinpoint and identify the bottlenecks in the application, and determine what changes need to be made to the system to improve its performance.

How do I view Analysis information?

To provide for more interesting results, a sample analysis session is provided, which is based on a performance test similar to the one you ran.

To open the sample Analysis session:

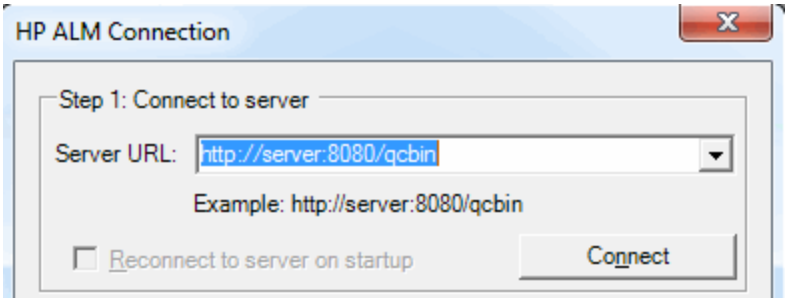
1. Double-click the **Analysis** shortcut icon on your desktop.
2. Select **File > Open**. The Open Existing Analysis Session File dialog box opens.
3. Navigate to the <*Analysis Standalone Installation*>**Tutorial** folder.
4. Select **analysis_session** and click **Open**. Analysis opens the session file in the Analysis window.

The data contained in this sample session is examined in more detail in the sections that follow.

To open the Analysis session for the test you ran:

To view Analysis data for your actual performance test, you perform the following steps:

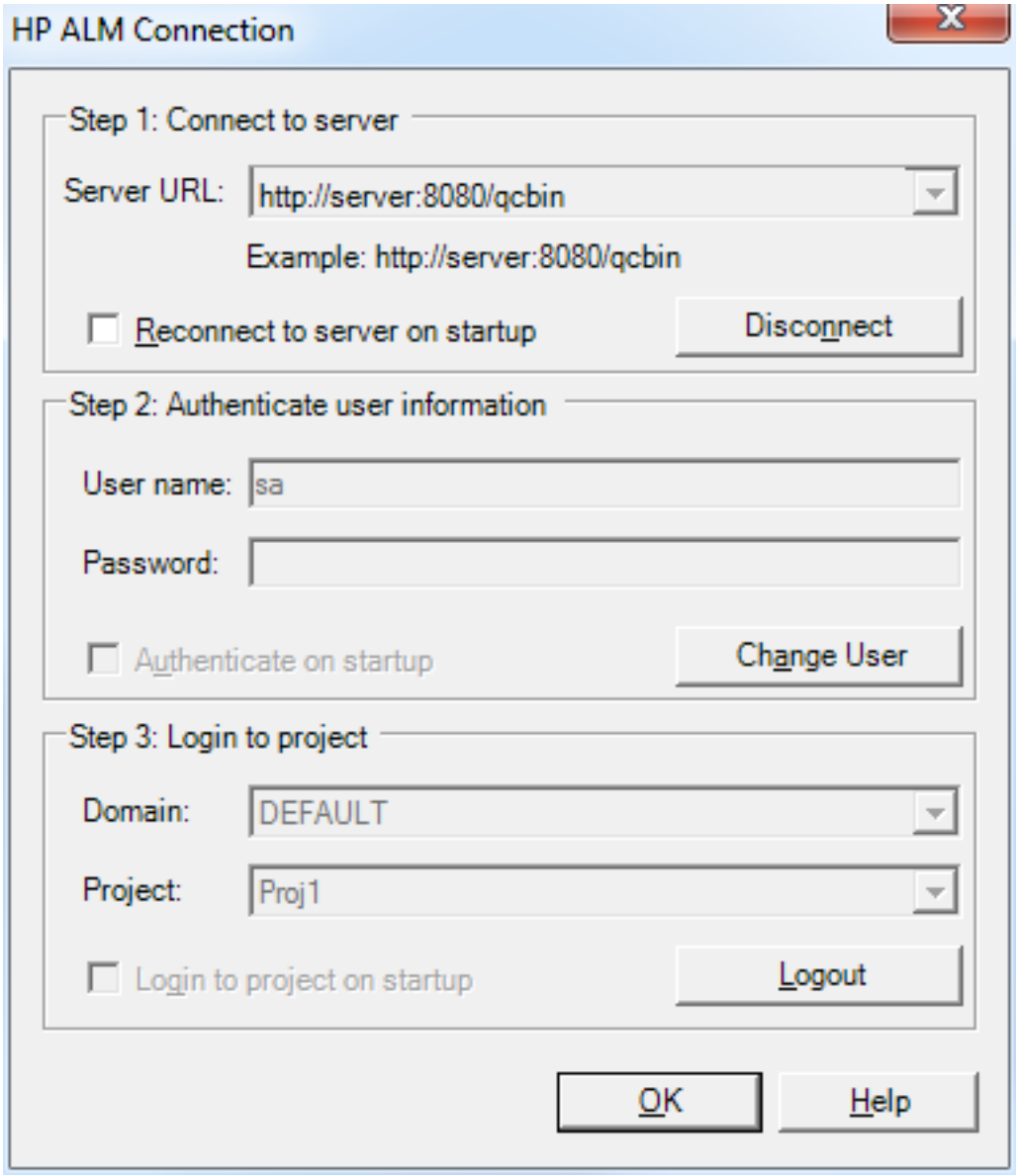
1. **Connect Analysis to ALM Performance Center.**
   a. In Analysis, select **Tools > HP ALM Connection**. The HP ALM Connection dialog box opens.



b. Enter the ALM Platform URL, for example, `http://server:8080/qcbin`, and click **Connect**.

c. Under Step 2: Authenticate User Information, enter your ALM user credentials, and click **Authenticate**.

d. Select your domain and project and click **Login.** The dialog box should look as follows:



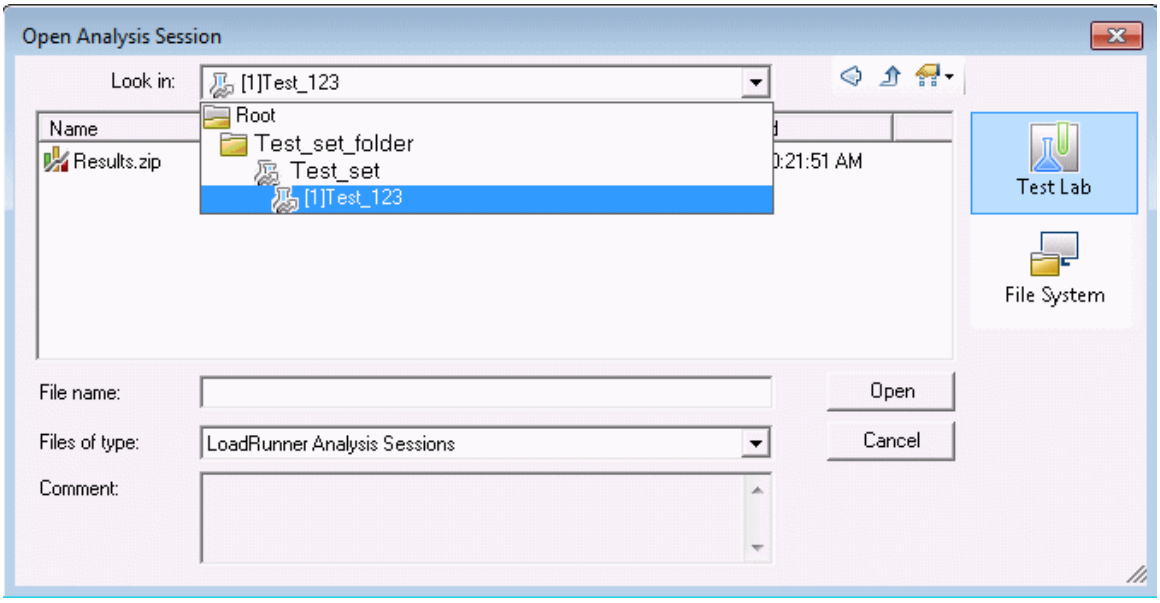
e. Click **Close.**

2. **Open the Analysis session file for your performance test.**

a. Select **File > Open**. The Open Analysis Session dialog box opens.

b. Select **Test Lab**. The test sets in the project are displayed.

c. Navigate to the **Results.zip** file for the instance of your performance test that you want to analyze.



d. Double-click the **Results.zip** file. The analysis session file is downloaded from Performance Center and is opened in Analysis.

Did I reach my goals?

Analysis opens displaying the Summary Report. The Summary Report provides general information about the performance test run. In the **Statistics Summary** of the report, you can see how many Vusers ran in the test and view other statistics such as the total/average throughput, and the total/average hits. The **Transaction Summary** of the report lists a summary of the behavior of each transaction.

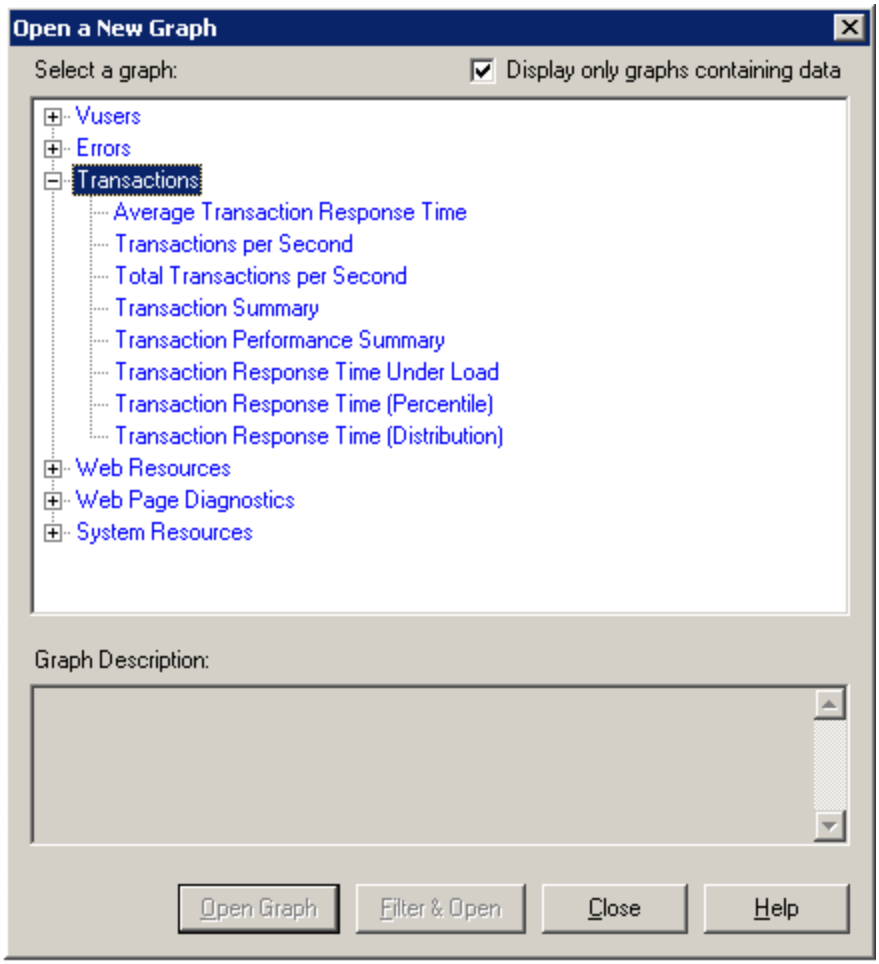
How can I view the graphs?

The **graph tree** in the left pane of the Analysis window shows the graphs that are open for viewing. From the graph tree, you can choose to open new graphs and remove graphs that you no longer want to view. The graphs are displayed in the **graph viewing area** in the right pane of the Analysis window. You can view data from the selected graphs in the **graph legend** in the lower pane of the window.

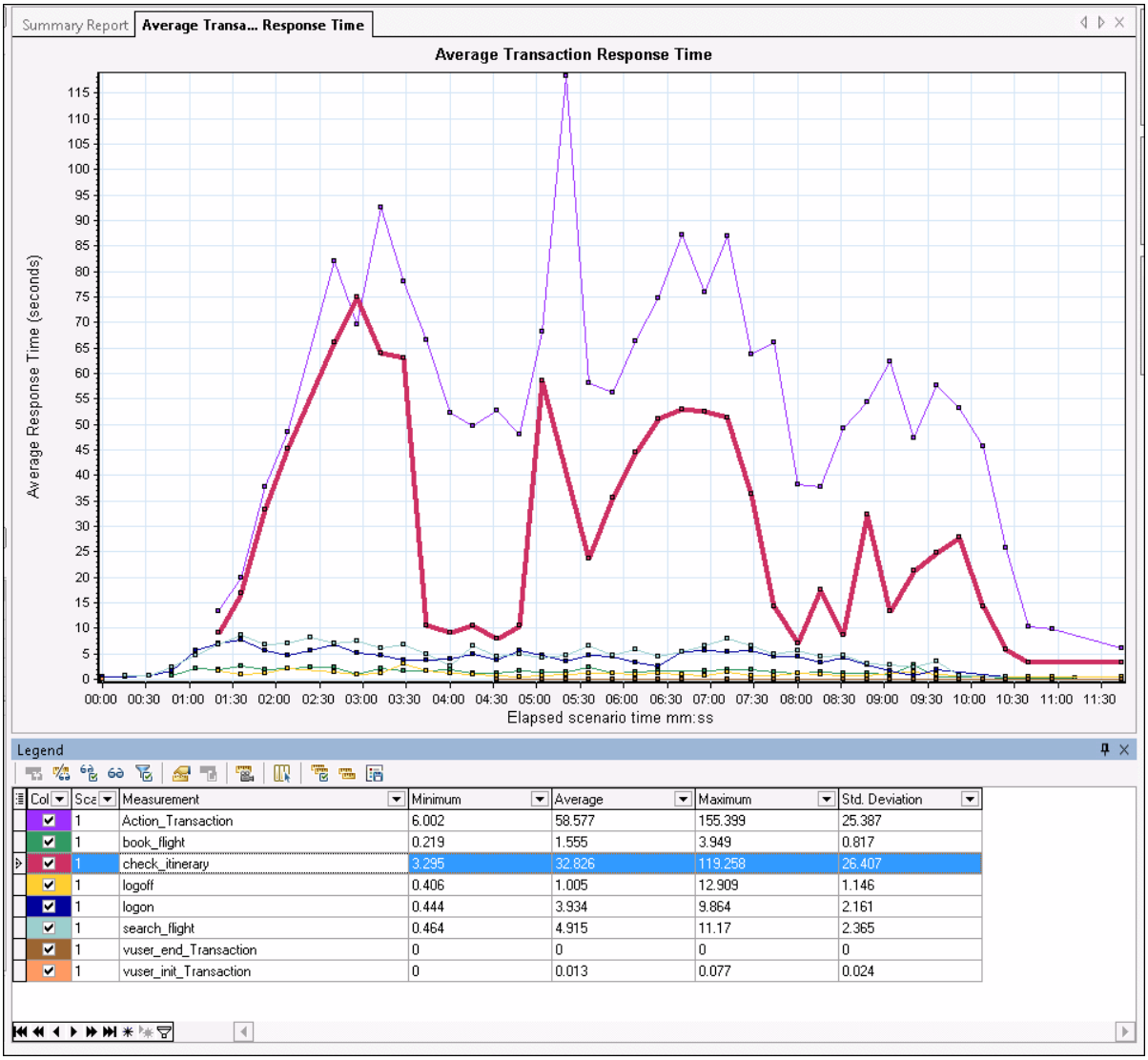
As an example, we will now analyze the Average Transaction Response Time graph. Using this graph, you can view the behavior of the problematic transactions during each second of the performance test run. In this section, you view the behavior of the **check_itinerary** transaction.

To open and analyze the Average Transaction Response Time graph:

1. Click the **Add New Graph** button . The Open a New Graph dialog box opens.
2. Under **Transactions**, select **Average Transaction Response Time**.



3. Click **Open Graph**. The Average Transaction Response Time graph opens in the graph viewing area.



Col	Sce	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	Action_Transaction	6.002	58.577	155.399	25.387
	1	book_flight	0.219	1.555	3.949	0.817
	1	check_itinerary	3.295	32.826	119.258	26.407
	1	logoff	0.406	1.005	12.909	1.146
	1	logon	0.444	3.934	9.864	2.161
	1	search_flight	0.464	4.915	11.17	2.365
	1	vuser_end_Transaction	0	0	0	0
	1	vuser_init_Transaction	0	0.013	0.077	0.024

4. In the legend, click **check_itinerary**. The **check_itinerary** transaction is highlighted in the graph and in the legend below the graph.

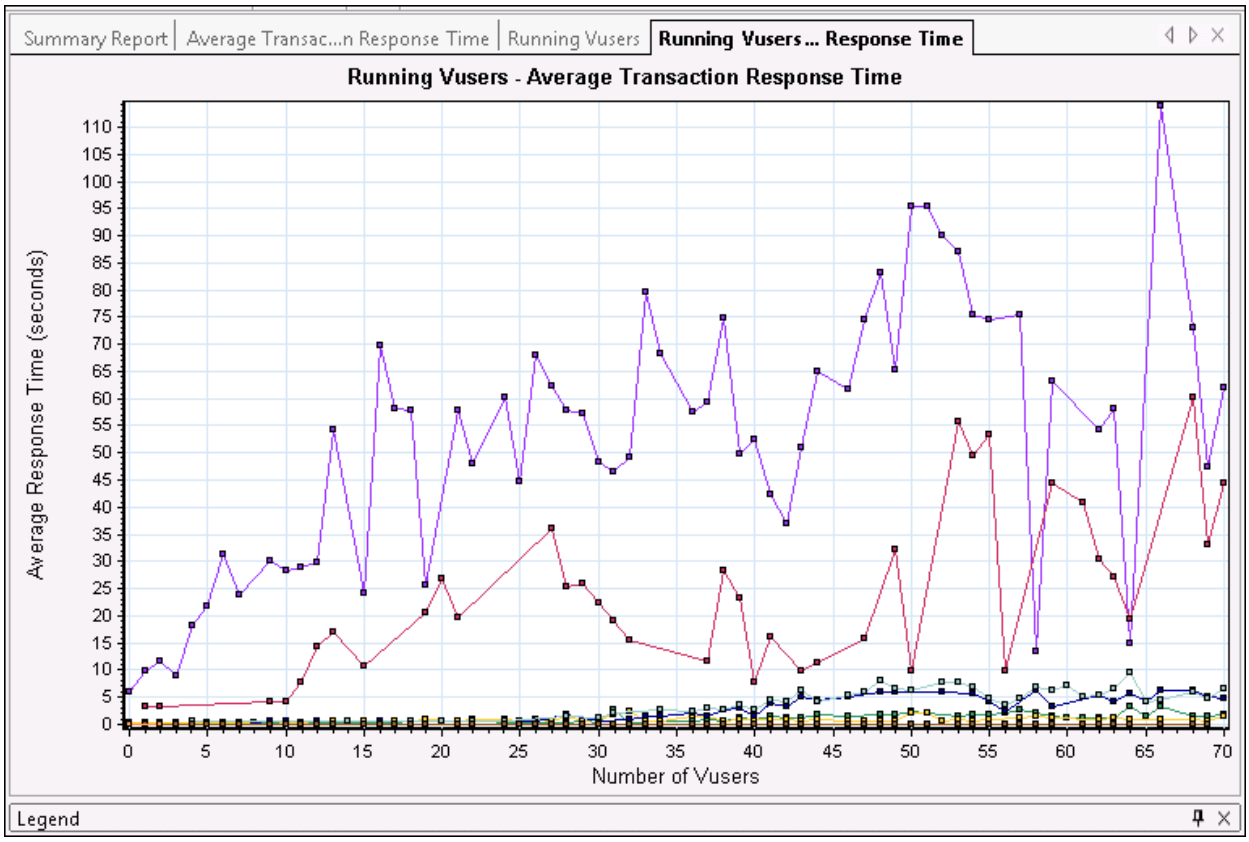
   Notice how the average response time of the **check_itinerary** transaction fluctuates greatly compared to the other transactions at the bottom of the graph, which follow a more or less stable average response time.

How can I compare data from different graphs?

You can join two graphs together to see the effect of one graph's data upon another graph's data. This is called **correlating two graphs**. For example, you can correlate the Running Vusers graph with the Average Transaction Response Time graph to see the effect of a large number of Vusers on the average response time of the transactions.

1. Click the **Add New Graph** button . The Open a New Graph dialog box opens.
2. Under **Vusers**, select **Running Vusers**.
3. Click **Open Graph**. The Running Vusers graph opens in the graph viewing area.
4. Select the **Running Vusers** graph and click the **Merge Graphs** button .
5. From the **Select graph to merge with** list, select **Average Transaction Response Time**.
6. In the **Select type of merge** area, select **Correlate**, and click **OK**.

The Running Vusers and Average Transaction Response Time graphs are now represented by one graph which opens in the graph viewing area.



Another Analysis tool, **Auto Correlate**, merges all graphs containing data that could have had an effect on a given transaction. Correlations of the transaction with each element are displayed, allowing you to deduce which elements had the greatest effect on the given transaction.

How can I sort graph data?

You can filter graph data to show fewer transactions for a specific segment of the performance test, and you can sort graph data to show the data in more relevant ways. For example, you can filter the Average Transaction Response Time graph to display only the **check_itinerary** transaction.

1. Click **Average Transaction Response Time** in the graph tree to open the graph.
2. Select the graph and click the **Set Filter/Group by** button .
3. In the **Transaction Name** value box, select **check_itinerary** and click **OK**.

The filtered graph displays only the **check_itinerary** transaction and hides all the other transactions.

How can I publish my findings?

You can publish the findings from your analysis session in an HTML or Microsoft Word report. The HTML report can be opened and viewed in any browser. The Word report is more comprehensive than the HTML report, enabling you to include general information about the performance test and to format the report to include your company's name, logo, and the author's details.

For more information about analyzing performance test results, refer to the HPE LoadRunner Analysis User Guide.

Viewing Performance Improvements and Regressions

A trend report is an Performance Center feature that allows you to view changes in performance from one performance test to another, or across several performance tests. By analyzing these changes, you can easily identify improvements or regressions in the measurement's performance.

For example, if you would like to analyze the performance trend of the average transaction response time measurement of **Transaction X**, then the trend report would display the changes in the response time from one test to the next, clearly indicating whether this measurement improved (where the response time decreased) or regressed (where it increased).

What steps are involved in working with trend reports?

The process of creating and viewing a trend report involves the following steps:

- **Step 1 - Creating the trend report**. Creating the basic trend report by defining its name, description and selecting a template.
- **Step 2 - Adding test runs to the trend report.** Extracting test run data from Analysis to the trend report.
- **Step 3 - Viewing trend report data.** Opening the trend view and analyzing the trending information.

Creating the Trend Report

You create the trend report from the main Trend Reports page.

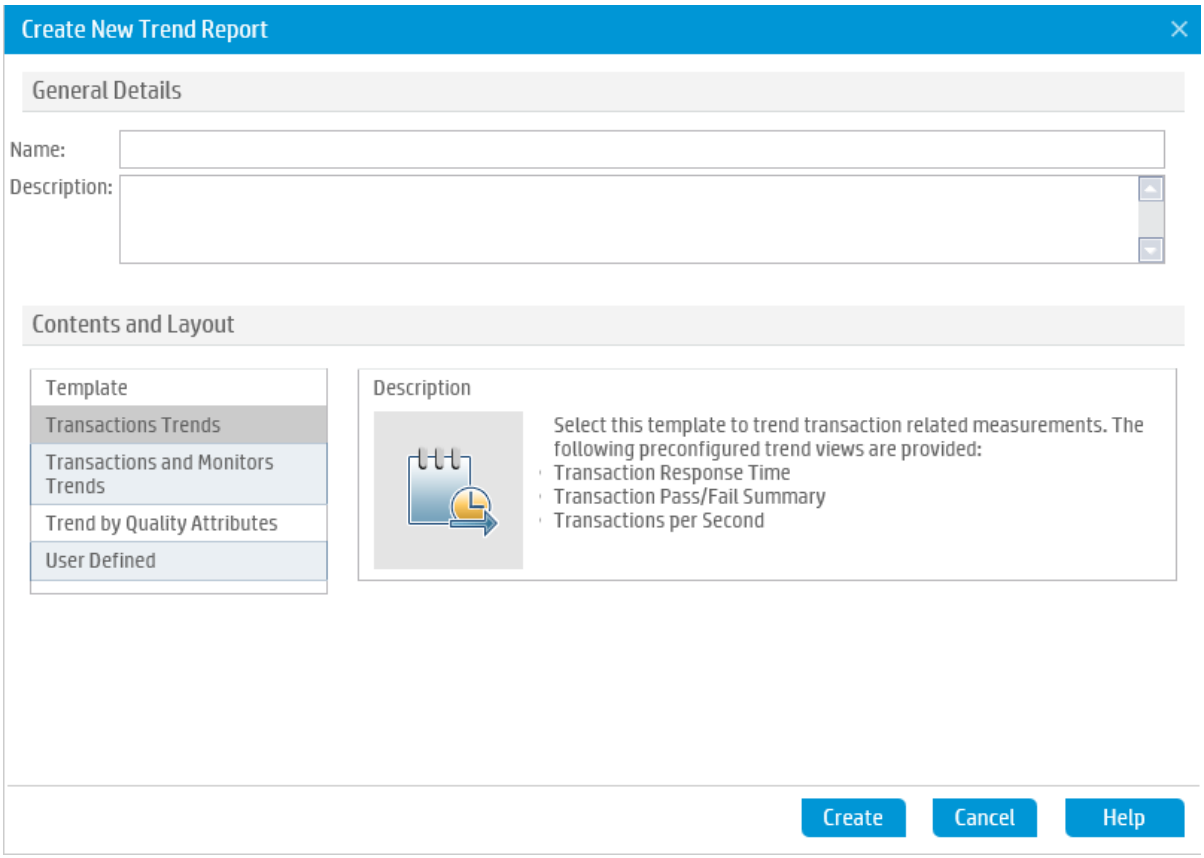
To create the trend report:

1. **Open the main Performance Trending page.**

   On the My Performance Center navigation bar, select **Runs & Analysis > Trending**.

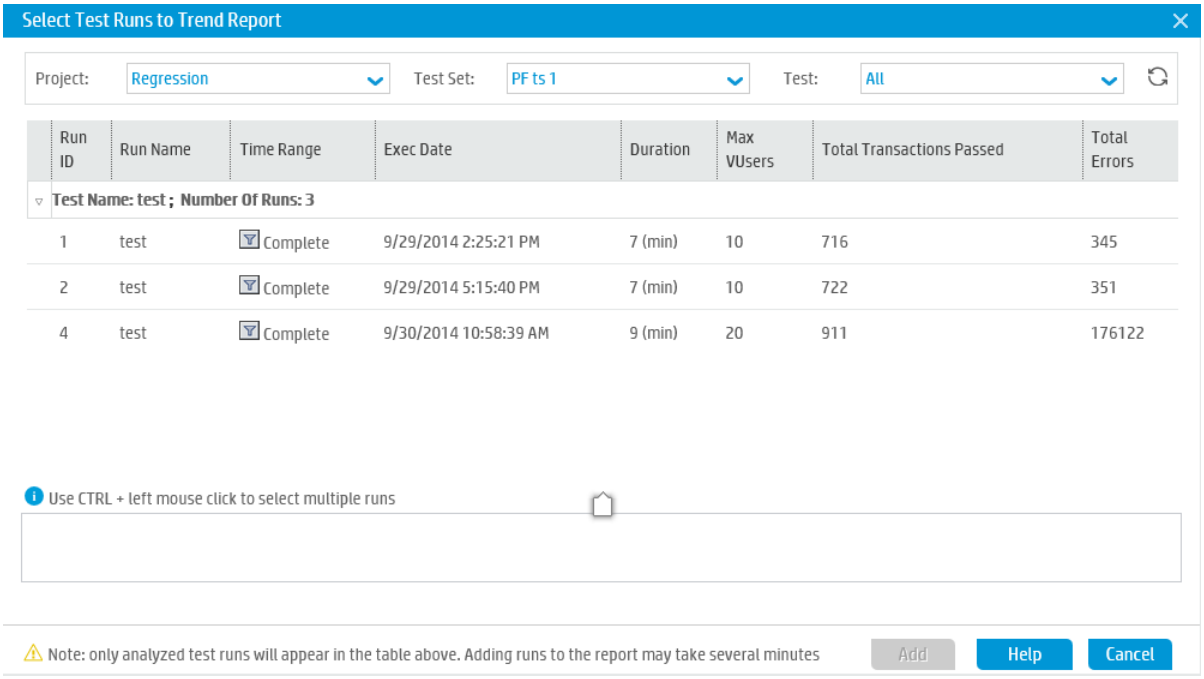
2. **Open the Trend Report Creation page.**

   On the Performance Trending page, click the ✱ New Trend Report button . The Create New Trend Report page opens.



3. **Define the General Details and Content and Layout settings.**
   a. In the Create New Trend Report page, define the following information:
      - In the **General Details** pane, enter a name and description for the trend report.
      - In the **Contents and Layout** pane, select the **Transaction Trends** template.
   b. Click **Create** to create the trend report. The Select Test Runs to Trend Report dialog box superimposes on the Trend Overview tab.
4. **Add Performance Test Runs to the Trend Report.**

   From the **Project**, **Test Set** and **Test** lists respectively, select the performance test that you want to trend. All analyzed instances of the performance test appear in the table.



Select those analyzed instances of the test that you want to add to the trend report, and click **Add**. Performance Center uploads the test runs from Analysis and adds them to the trend report. The trend report opens displaying the Trend Overview tab.

> **Note:**
> - To add test runs to the trend report, there must be a data processor in your project's host pool. For details, contact the Administrator.
> - The process whereby Performance Center extracts the performance test data from Analysis is very labor intensive on the data processor and may take anywhere from several minutes to over an hour. For best results, use a data processor dedicated for this purpose.

Viewing Trend Report Data

In the following section, we will look at trending information for the average transaction response time measurement only.

To view trending information:

On the trend report, click the **Performance** tab.

In the trend view that opens, you will see a table that displays the transactions that were present in the test run, as well as the average transaction response times for each selected instance of the test run.

By comparing these average transaction response time figures, you can identify if the performance of the transaction improved or regressed from one test run to the next.

The following example illustrates this point.

Transaction Response Time(Compare to baseline)

Name	Type	Average			
		6/24/2012 (3[Base])	6/24/2012 (4)	6/24/2012 (5)	6/24/2012 (6)
All	TRT	4.567	1.22 (-73.29%)	2.32 (-49.2%)	12.455 (+172.72%)
TRX_01	TRT	2.045	4.073 (+99.17%)	2.035 (-0.49%)	1.05 (-48.66%)
TRX_02	TRT	1.045	2.07 (+98.09%)	1.015 (-2.87%)	1.051 (+0.57%)
TRX_03	TRT	3.053	3.067 (+0.46%)	2.009 (-34.2%)	2.654 (-13.07%)
TRX_04	TRT	6.055	6.868 (+13.43%)	5.011 (-17.24%)	7.05 (+16.43%)

In the trend view shown above, four transactions (**TRX_01**, **TRX_02**, **TRX_03**, and **TRX_04**) are displayed and their average Transaction Response Time measurement is being trended from four performance test runs: **3**, **4**, **5**, and **6**.

Test run **3** has been automatically defined as the baseline run, (as indicated by the word **Base** in brackets). This means that the average transaction response times contained in the other tests are compared to test run **3** only.

In test run **3**, the average transaction response time for **TRX_01** was **2.045**. The average transaction response time for the same transaction in test run **4** was **4.073**, which represents a slower response time and therefore a regression in the performance of this measurement. The percentage difference between the two figures is displayed in parenthesis, in this case **+99.17%**.

In test run **6**, the average transaction response time for **TRX_01** was **1.05**, which represents a a faster response time that test run **3**, and therefore a performance improvement. The percentage difference between the two figures is displayed in parenthesis, in this case **-48.66%**.

Send Us Feedback

Let us know how we can improve your experience with the Quick Start.

Send your email to: docteam@hpe.com

Hewlett Packard
Enterprise
Java™
COMPATIBLE