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LoadRunner Enterprise

Software version: 24.1

Quick Start

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Welcome to This Guide

Welcome to the OpenText™ LoadRunner Enterprise Quick Start.

LoadRunner Enterprise is a 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 LoadRunner Enterprise testing environment.

Note: This guide assumes that your LoadRunner Enterprise environment has been fully installed and configured, and that a domain and project have been set up. For details, contact your LoadRunner Enterprise administrator.

How This Guide is Organized

This guide contains the following lessons:

Lesson	Description
"Introducing LoadRunner Enterprise" on page 7	Provides an overview of LoadRunner Enterprise and the performance testing applications.
"Creating Vuser Scripts" on page 9	Describes the steps involved in recording Vuser scripts using Virtual User Generator.
"Creating and Designing Performance Tests" on page 15	Describes the steps involved in creating and designing performance tests.
"Running Performance Tests" on page 23	Describes the steps that are necessary before running a performance test, and how to begin test execution.

Lesson	Description
"Post-Run Analysis and Trending" on page 29	Describes how to analyze test run data using LoadRunner Analysis, and how to view performance improvements and regressions using the Trend Reports feature.

Introducing LoadRunner Enterprise

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

Notes:

- The Quick Start describes how to run a performance test with a single host functioning as both a Controller and a load generator (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 Virtual User Generator (VuGen) and LoadRunner Analysis are installed on your system.

In this lesson you will learn about:

- "[LoadRunner Enterprise Testing Process](#)" below
- "[Performance Testing Applications](#)" on the next page

LoadRunner Enterprise Testing Process

Using LoadRunner Enterprise, you create **performance tests** in which you define the events that occur during a testing session. During a test, LoadRunner Enterprise 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.

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 performance testing tool components. The components are as follows:

Application	Description
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.
LoadRunner Enterprise	Provides the central console from which you build, manage, and monitor a test.
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.

Creating Vuser Scripts

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

In this lesson you will learn about:

- ["Recording Vuser Scripts" below](#)

Recording Vuser Scripts

You record Vuser scripts using 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 11](#)
- ["How do I save the script?" on page 14](#)


How do I start recording user activity?

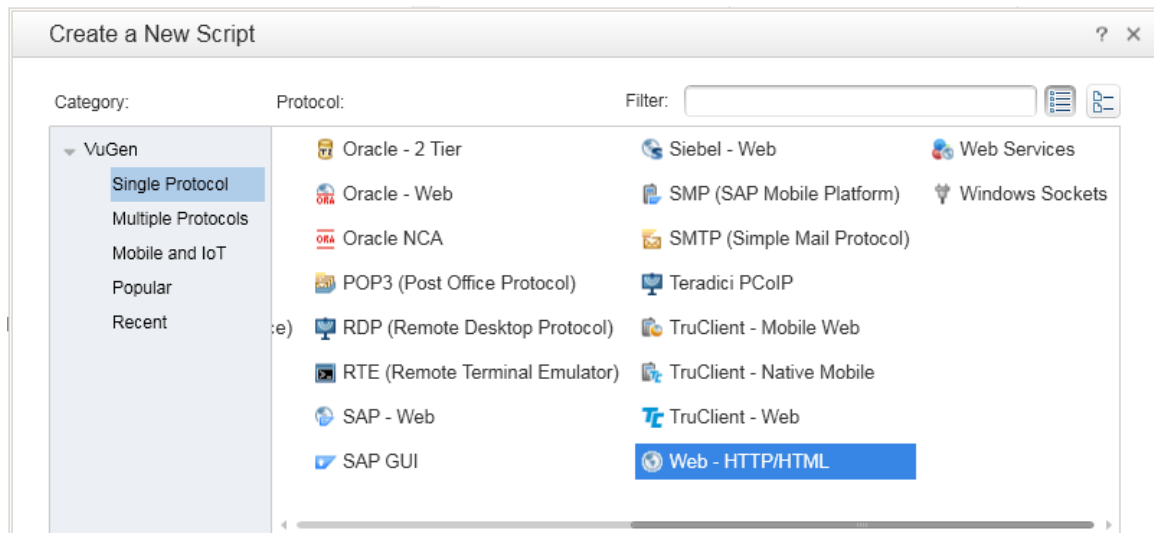
You begin by opening Vugen and creating a blank script.

1. Start VuGen.

Double-click the **Virtual User Generator**  shortcut icon on your desktop. The VuGen Start Page opens.

2. Create a blank Web script.

- a. In the toolbar above 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.


- 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 a protocol (example: for a Web-based application, 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 script. In this section, you will record a script.

Note: The following exercise explains how to record a scripts for a Web-based application (Web - HTTP/HTML).

1. Start recording.

- 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, enter the URL address on the Web application under test.
- e. Keep all other default settings.
- f. Click **Start Recording**. A new web browser opens and displays the Web application under test.


The floating Recording toolbar opens.



2. Record your script.

Navigate through your Web application.

3. Stop recording.

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

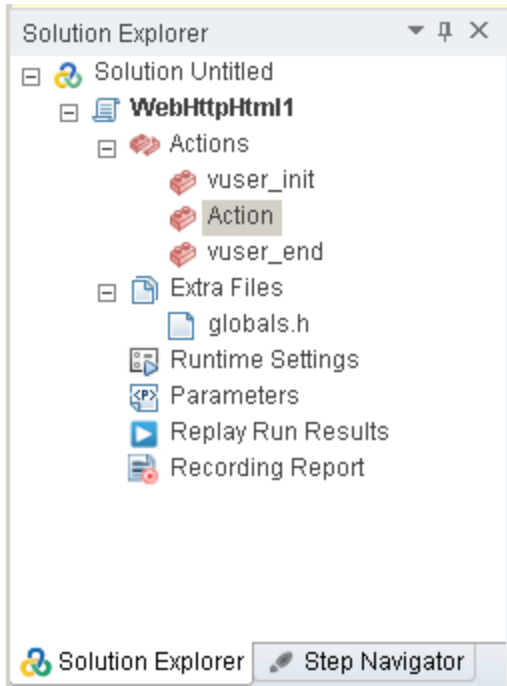
VuGen generates the required code and inserts the code into the Vuser script.

How do I view my script?

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.

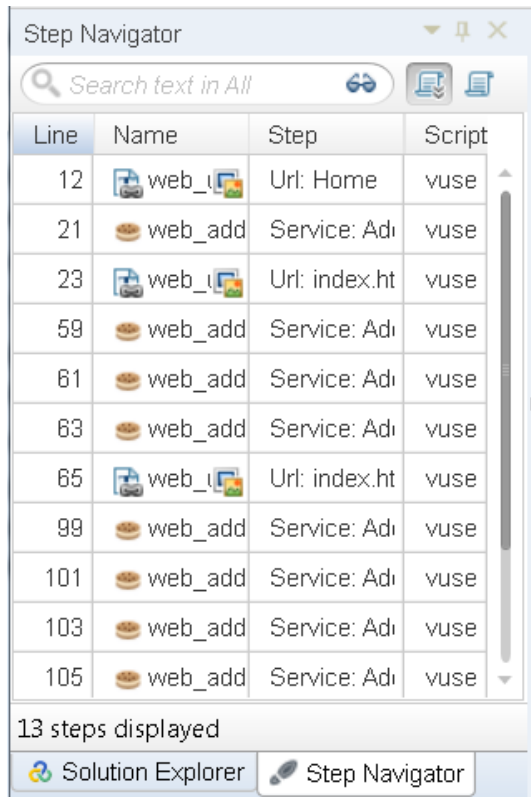
On the left side pane, make sure the **Solution Explorer** tab is selected.



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.



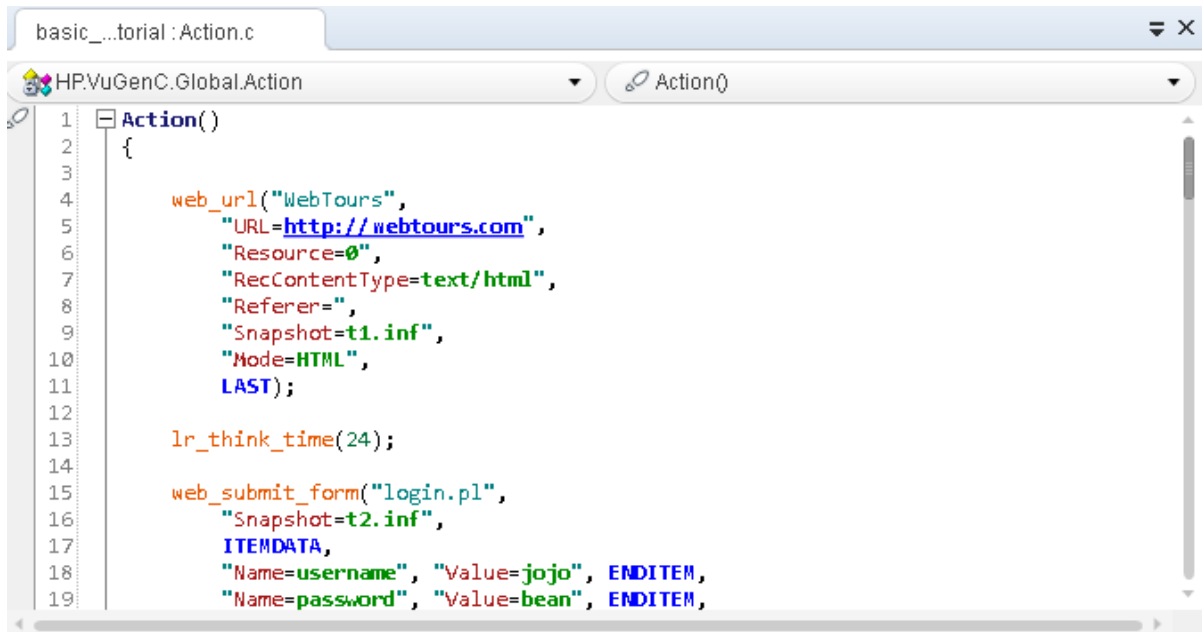
The Step Navigator displays an icon-based view of the script that lists the actions of the Vuser as steps. For each action you performed during recording, VuGen generated a corresponding step in the Step Navigator.

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

3. View a step in the VuGen Editor.

Make sure **Tools > Options > Editor > General > Show Class\Function Browser** is selected 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.

The image shows a screenshot of the HP VuGen C Global Action editor. The window title is "basic_...torial : Action.c". The editor displays a script for "Action0" with the following code:

```
1 Action()  
2 {  
3  
4     web_url("WebTours",  
5         "URL=http://webtours.com",  
6         "Resource=0",  
7         "RecContentType=text/html",  
8         "Referer=",  
9         "Snapshot=t1.inf",  
10        "Mode=HTML",  
11        LAST);  
12  
13    lr_think_time(24);  
14  
15    web_submit_form("login.pl",  
16        "Snapshot=t2.inf",  
17        ITEMDATA,  
18        "Name=username", "Value=jojo", ENDITEM,  
19        "Name=password", "Value=bean", ENDITEM,
```

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 enter 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, enter Scripts. The script file should be zipped. After you have created your performance test, you will upload the script to LoadRunner Enterprise.

Creating and Designing Performance Tests

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

In this lesson you will learn about:

- ["Logging in to LoadRunner Enterprise" below](#)
- ["Adding Vuser Scripts to LoadRunner Enterprise" on the next page](#)
- ["Monitoring Performance Tests" on page 17](#)
- ["Creating Performance Tests" on page 18](#)
- ["Designing Performance Tests" on page 19](#)

Logging in to LoadRunner Enterprise

You log into LoadRunner Enterprise as follows:

1. Open your web browser and enter the LoadRunner Enterprise Server URL
`http://<LoadRunner Enterprise server name>/loadtest.`

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

2. The LoadRunner Enterprise Login window opens.
If LoadRunner Enterprise was configured for external authentication (SSO), the **Login** and **Password** fields do not appear in this window and you should be redirected to your identity provider's login screen.
3. In the **Login** box, enter your user name.
4. In the **Password** box, enter 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 LoadRunner Enterprise to automatically log in to the last project in which you were working.
6. Click the **Authenticate** button. LoadRunner Enterprise verifies your user name and password and determines which domains and projects you can access. If you specified automatic login, LoadRunner Enterprise 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**. LoadRunner Enterprise opens.


Adding Vuser Scripts to LoadRunner Enterprise

The first step in your test design process is to add your Vuser script to LoadRunner Enterprise. 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 LoadRunner Enterprise, as follows:

1. Make sure the script is saved locally and is zipped.
2. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Management** (under **Testing**).
3. Create a script folder.
 - a. Select **Subject**.
 - b. Click  **New Folder**, and specify a name for the folder, for example, Scripts.
 - c. Click **OK** to add the folder.

4. On the module toolbar, click  **Upload Script**. The Upload Scripts dialog box opens.
5. In the **Select Folder** box, select the scripts folder you created above.
6. Click the **Select** button and go 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 LoadRunner Enterprise 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 LoadRunner Enterprise 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.

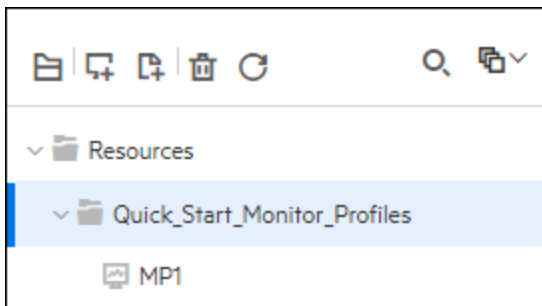
The following section shows you how to create a monitor profile and how to add a Windows Resource Monitor to it.



How do I create a monitor profile?

You create and configure monitor profile as follows:

1. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Monitors** (under **Assets**).

2. Create a folder for the monitor profile.
3. Select the folder, and click the **New Monitor Profile**  button. The New Monitor Profile dialog box opens, enabling you to add a new monitor profile.
4. Select **Monitor Profile**, and enter the required information and click **OK** to add the monitor profile to the folder.



5. In the Monitor Profile page, click **New Monitor** . In the Add New Monitor page that opens, you can select the monitors that you want to run.
6. Select the **Windows Resources** monitor type and click **Next**.
7. Enter the server details and then click **Get Counters** to display a list of available metrics and counters.
8. Select the measurements that you want to monitor, and then click  to add the counters to the **Selected Counters** table.
9. Click **Save**. The monitor is added to your monitor profile.



You 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. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Management** (under **Testing**).
2. In the test management tree, select the **Subject** root folder, click **New Folder** . Enter a folder name and click **OK**.
3. Select the folder from the tree.
4. Click **New Test** . Fill in the fields in the Create New Performance Test dialog box.

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:

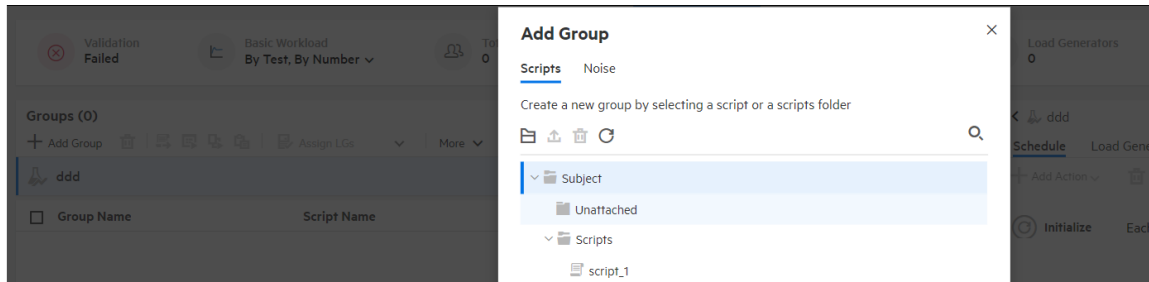
1. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Management** (under **Testing**).
2. Select the test you created above, and click the **Edit Test** button on the toolbar. The Performance Test Designer opens.

How do I design the performance test?

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

1. **Assign a Controller to the test.**
 - a. Click the dropdown arrow adjacent to the **Controller** box (in the Summary pane). 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.
2. **Add Vuser scripts.**

- a. In the Groups pane, click **Add Group** . The Add Group dialog box opens, displaying the Scripts tree with the script that you uploaded previously to LoadRunner Enterprise.



- b. Select the script and click **Add** to add it to the test. The script appears in the Groups pane.

Group Name	Script Name	Script Type	Vusers	# of LG
ddd	script_1	Web - HTTP/HTML	1	0

3. Add load generators.

- a. From the Groups pane toolbar, click **Assign LGs**.
The Assign Groups to Load Generators dialog box opens.
- b. In the **Groups** column, select the Vuser groups to use in the test.
- c. In the **Load Generators** column, 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.
- d. Click **Apply Assignment**.

4. 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 users simultaneously logging on to the same Web site.

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 right-side of the **Groups and Workload** tab, in the **Scheduler** pane, click in each of the schedule actions in the Actions grid and define them as follows:


- **Initialize.**

 Initialize	All Vusers simultaneously	Wait For	00:00:00	(HH:MM:SS) after initialization
--	---------------------------	----------	----------	---------------------------------

- **Start Vusers.**

 Start	All Vusers gradually	2	Vusers every	00:00:30	(HH:MM:SS)
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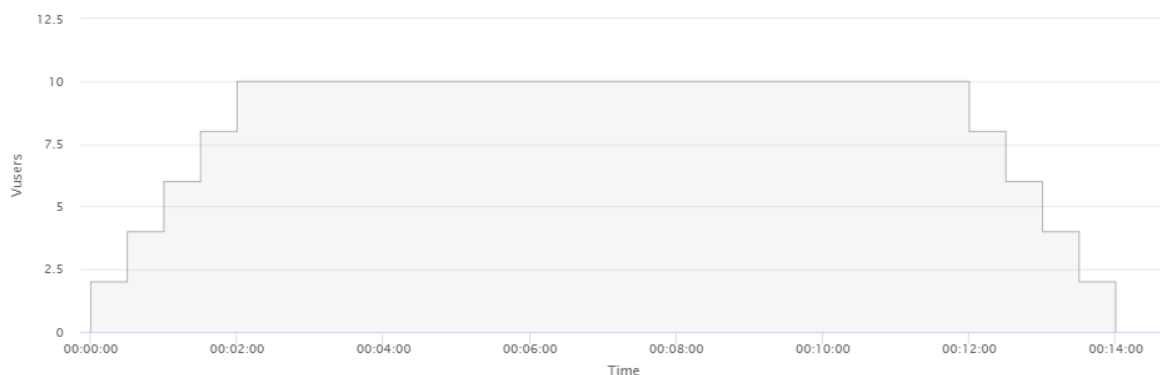
- **Duration.**

 Duration	Run for	00:00:10:00	(dd.HH:MM:SS)
---	---------	-------------	---------------

- **Stop Vusers.**


 Stop	All Vusers gradually	2	Vusers every	00:00:30	(HH:MM:SS)
--	----------------------	---	--------------	----------	------------

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 LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Management** (under **Testing**).
2. In the test management tree, select the test that you created in "[How do I create a performance test?](#)" on page 18 and click **Edit Test**.
3. In the Performance Test Designer window, click the **Assets** tab and select **Monitors**.
4. Click  **Assign Monitors**. From the Monitor tree, select the monitor profile and click **Select & Close** to add it to the test.

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 25](#)

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 Testing module, you organize the test execution by creating a test set, 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.

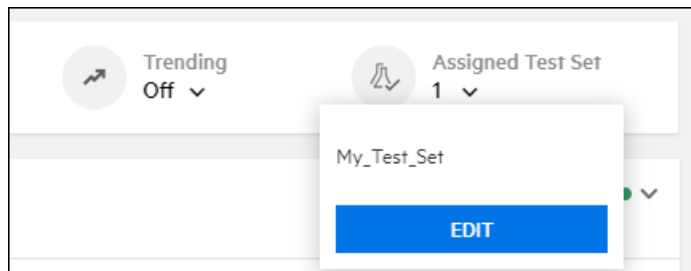
How do I create a test set?

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

1. **Create the test set.**
 - a. In the Performance Test Designer, click the **Save and Run** button in the upper-right side of the page. The Manage Test Sets dialog box opens.

Tip: You can also create or assign a test set from the Create New Performance Test dialog box. For details, see ["How do I create a performance test?" on page 18](#)


- b. Click the **Root** test set folder, and click the **New Folder**  button. Specify a name for the Test Set folder, for example, `Test_set_folder`.
2. **Assign the performance test to the test set.**
 - a. Select the folder you created above, and click the **New Test Set**  button.
 - b. Enter the test set name, for example, `My_Test_Set`. Click **Assign**. Your test is assigned to the test set.



Reserving Timeslots

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

How do I reserve a timeslot?

1. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Timeslots** (under **Resources**).
2. From the calendar or grid view, click  **New/Add Timeslot**. 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.
 - **Test/Test Instance.** Select the test you created and the test set instance to link 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 Action.** If the administrator did not set an action across the project (the options are available for selection), 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.

Add New Timeslot
Start: Automatically Manually

Name: Quick_Start_Timeslot

Test: Duplicate_graphs | Root\ts\ts1

Vusers: 30 + 2 = 32
Total Vusers

VUDs: 0 Out of 32

Duration: 0 Hours 30 Minutes

Start Time: Feb 22, 2022 11:42

End Time: Feb 22, 2022 12:12

Post Run Action: Collate

Description:

Host Allocation

Allocate LGs | Delete

Host Type	Host Name	# of Hosts
Controller	myd-hvm04224	-
Specific LG	myd-hvm04223	-

CALCULATE AVAILABILITY ✔ Timeslot can be reserved

Selected and available
 Selected and unavailable
 Unavailable

Feb 22, 2022: 11:00 (Selected and available) | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 | 22:00 | 23:00 | Feb 23, 2022: 00:00 | 01:00 | 02:00 | 03:00 | 04:00 | 05:00

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 **Add** 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. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Management** (under **Testing**).
2. Select your test in the test management tree.
3. Click the **Run Test** button. The Run Performance Test dialog box opens.
4. Click the **Reserved Timeslot** tab.
5. Select the timeslot you reserved, and click **Run**.

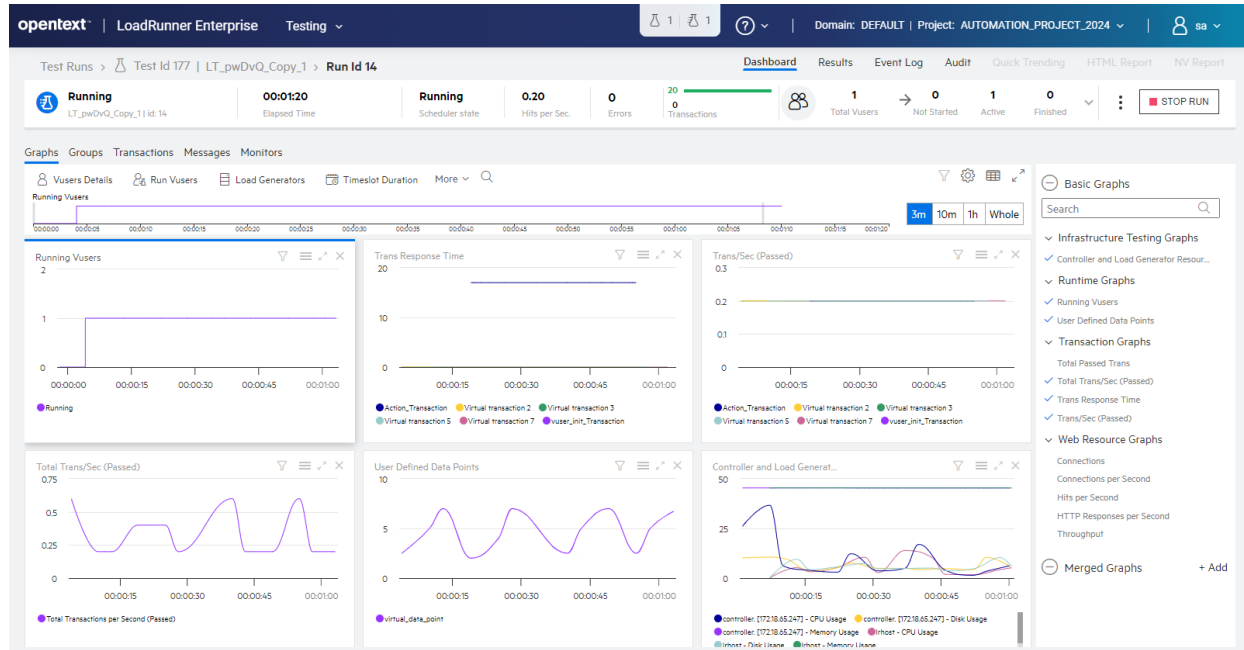
The Initializing Run page displays the performance test initialization steps performed by LoadRunner Enterprise, and the status for each step. If each step is completed successfully, the performance test starts running and the Performance Test Run page opens. The Test Run page enables you to manage and 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.


Quick Start

Running Performance Tests



The Performance Test Run page displays the following:

Pane/Tab	Description
Summary	The Summary pane at the top of the page displays a synopsis of the running performance test.

Pane/Tab	Description
Test run views	<p data-bbox="412 275 1338 344">Beneath the Summary pane is the Test Run Details area which provides four views:</p> <ul data-bbox="412 369 1414 1010" style="list-style-type: none"><li data-bbox="412 369 1414 554">• Graphs. This is the view displayed in the above image. This view displays 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.<li data-bbox="412 569 1414 638">• Groups. The Groups view displays the statuses of the Vusers in each Vuser group in the performance test.<li data-bbox="412 653 1414 722">• Transactions. The Transactions view displays how many transactions have been executed successfully or unsuccessfully.<li data-bbox="412 737 1414 848">• Messages. 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.<li data-bbox="412 863 1414 1010">• Monitors. The Monitors view displays monitors from all the monitor profiles and over firewall agents that are associated with the selected test. You can add new monitors to the test from this view.
Tabs	<p data-bbox="412 1041 1398 1152">On the right of the graphs pane, click More  and select Graphs. A list of the configured online graphs is displayed. You can select which graphs to display in the Graphs view.</p>

Post-Run Analysis and Trending

This lesson explains how to analyze test run data using 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 35](#)

Analyzing Performance Test Run Results

Now that you have completed running the performance test, you can use 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 view Analysis data for your actual performance test, you perform the following steps:
 - a. **Install Analysis**

You can download Standalone Analysis from the In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Download Applications > Standalone Analysis**.
 - b. **Collate and analyze the results for the test run.**
 - i. In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Test Runs**. Select the performance test you just ran in the test management tree, and click the **Runs** tab.

- ii. If the test run is in the **Before Collating Results** state, right-click the run, and select **Collate**. LoadRunner Enterprise collates the results for the test run
 - iii. When result collation has finished, and the test run is in the **Before Creating Analysis Data** state, right-click the run, and select **Analyze**.
 - iv. When LoadRunner Enterprise has finished analyzing the results, download the **Results_<#>.zip** file for the test run.
- c. Open the Analysis session file for your performance test.**
- i. In Analysis, select **File > Open**. The Open Existing Analysis Session dialog box opens.
 - ii. Click **File System**, and go to the **Results_<run_id>.zip** file for the instance of your performance test that you want to analyze.
 - iii. Double-click the **Results_<run_id>.zip** file. The Analysis session file is opened in Analysis.

For information about how to work within Analysis, see the [LoadRunner Professional Help Center](#).

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.

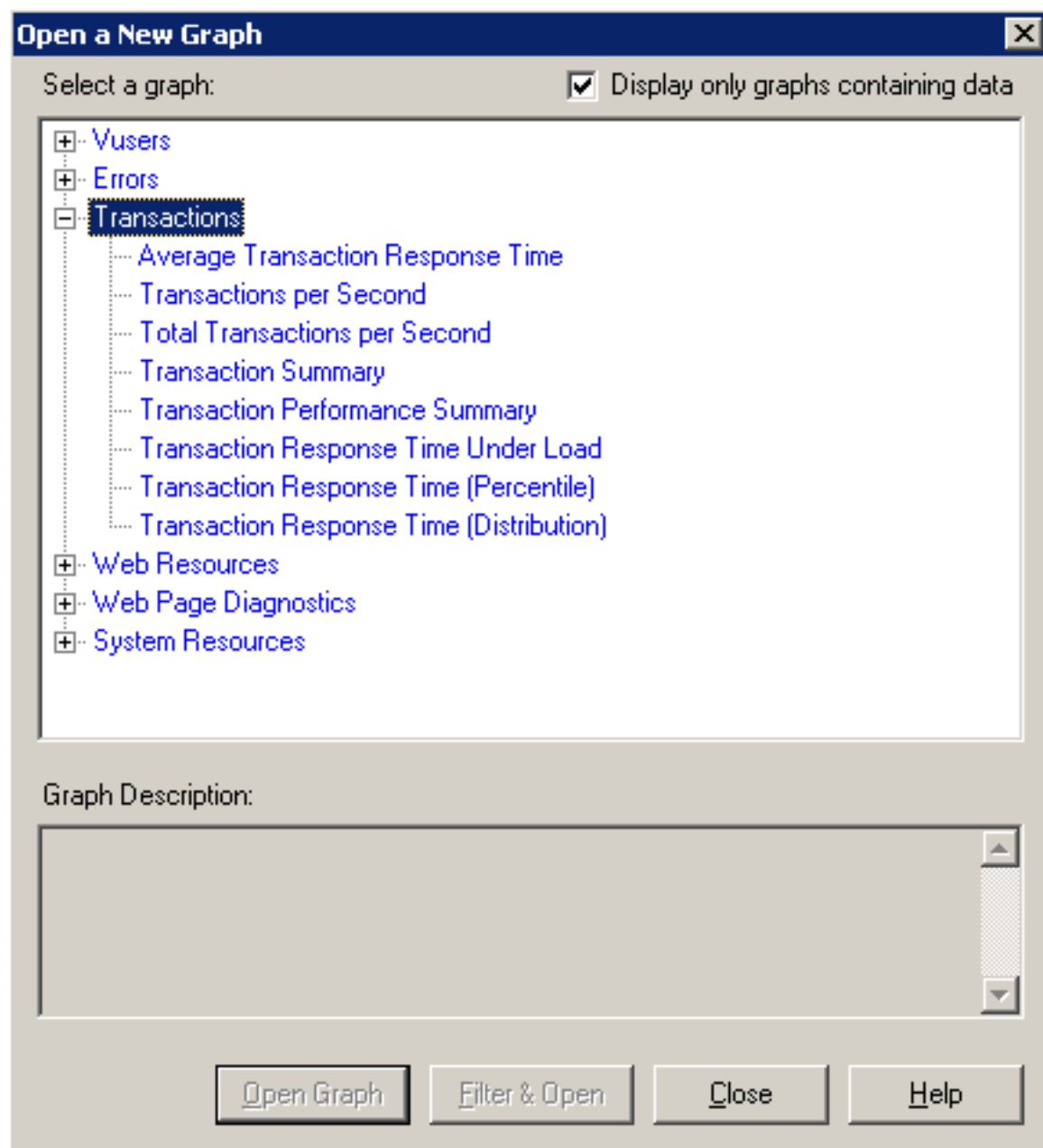
How can I view the graphs?

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, let's 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.

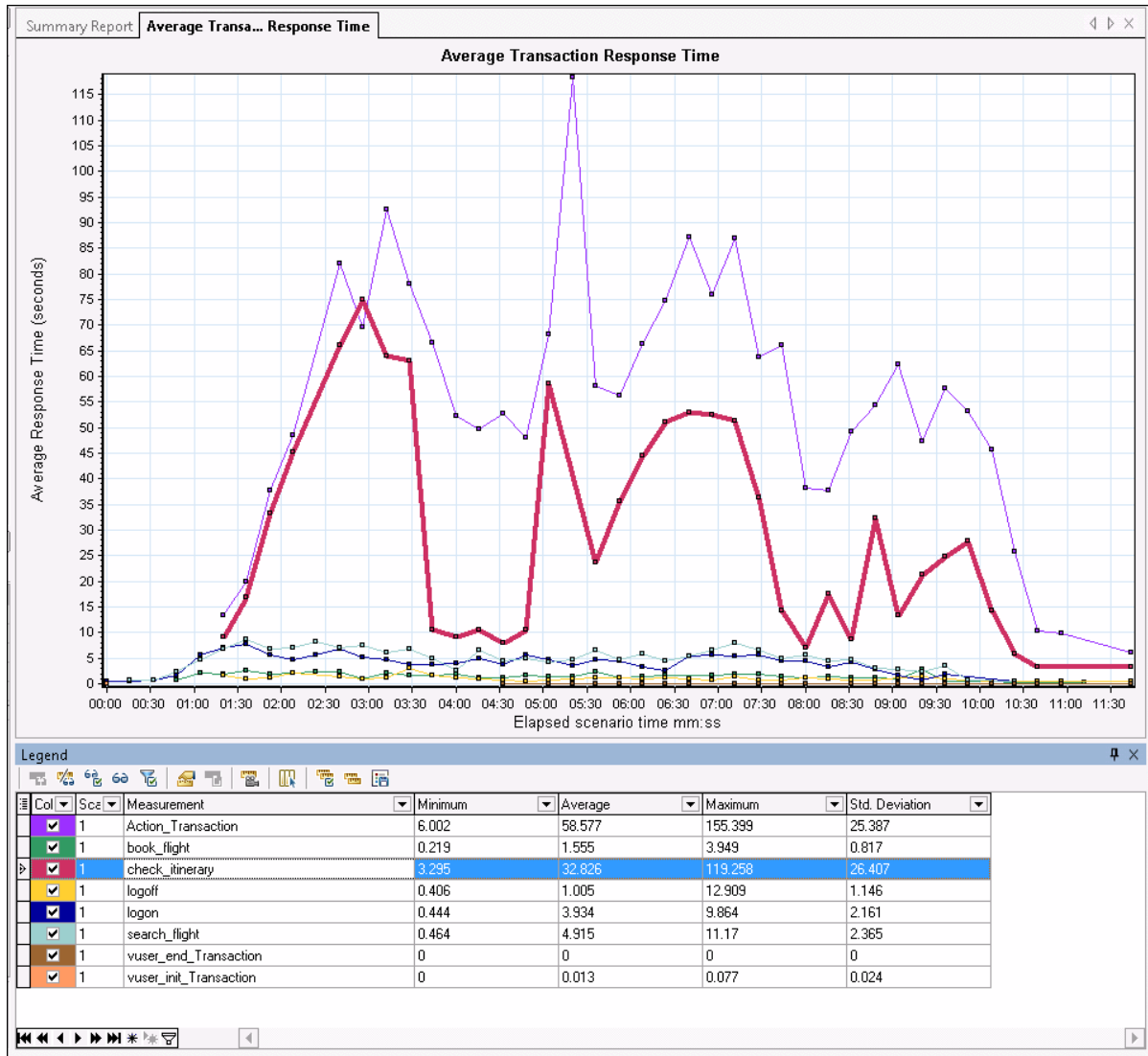
To open and analyze the Average Transaction Response Time graph:

1. Choose **Graph > Add New Graph**. 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.

Click **Close** to exit the Open a New Graph dialog box.




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

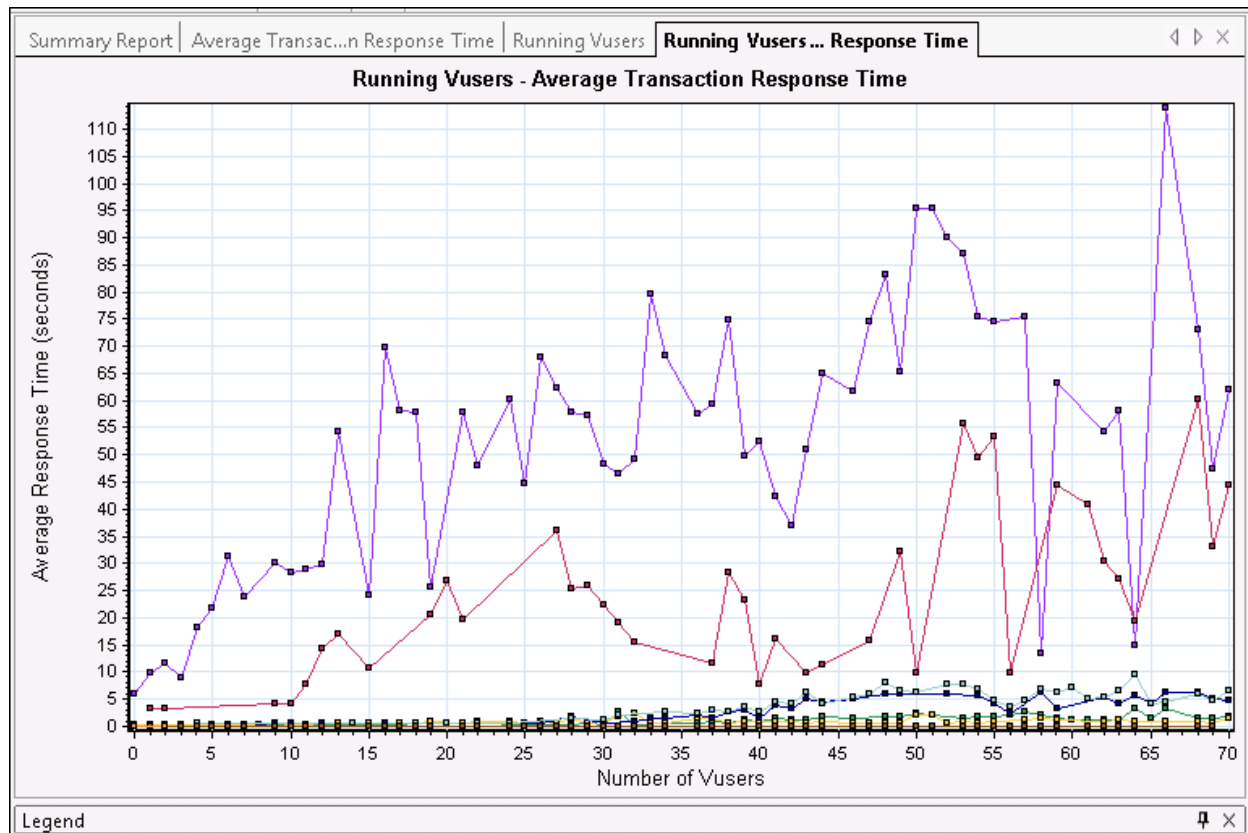
Notice how the average response time of the **check_itinerary** transaction fluctuates greatly compared to the other transactions at the bottom of the graph, which follow a more or less stable average response time.


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. Choose **Graph > Add New Graph**. 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. Click **Close** to exit the Open a New Graph dialog box.
4. Select the **Running Vusers** graph and click the **Merge Graphs** button  on the main toolbar.
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** (click ), 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 details about analyzing performance test results, refer to the LoadRunner Analysis User Guide.

Viewing Performance Improvements and Regressions

A trend report is a LoadRunner Enterprise 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.

In the LoadRunner Enterprise masthead, click the module name or the dropdown arrow and select **Performance Trending** (under **Analysis**).

2. Define a new trend report.

On the Performance Trending page, click the **Create Trend Report**  button. Enter a name and description for the report and click **Create**.

3. Add performance test run data to the report.

- a. Click **Add Runs** and select a project and test set. All analyzed instances of the performance test appear in the grid.
- b. Select the analyzed instances of the test that you want to add to the trend report.

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.

- c. By default, data collected from the whole test run is available for trending. To make only part of the test run available for trending, click **Time Range**, and select **Trend Part of Run**.

Select the part of the run to trend by entering the start and end times in the **Start Time** and **End Time** boxes, and click **OK**.

To revert back to the default setting, select **Trend complete run**.

- d. Click **Add** or **Add & Close**. LoadRunner Enterprise uploads the test runs from Analysis and adds them to the trend report. The trend report opens displaying the Trend Overview tab.

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 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			
		run 3 [Base]	run 4	run 5	run 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 faster response time than test run **3**, and therefore a performance improvement. The percentage difference between the two figures is displayed in parenthesis, in this case **-48.66%**.