

Analyzing Performance Test Results

User's Guide



Version 6.0

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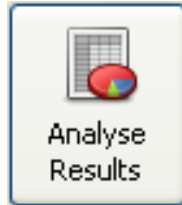
Introduction

This user guide explains how you can analyze the results of a performance test – both whilst a test is in progress and at a later time.

StressTester™ is designed to allow you to obtain the information you need, in the format you require, and for this reason everything displayed in the analysis screens are fully customizable. However this user guide does not deal with customizing the workspace – please refer to the [Customizing the Analysis Screens](#) user guide for details on how to achieve this.

Analyze Results Workspace

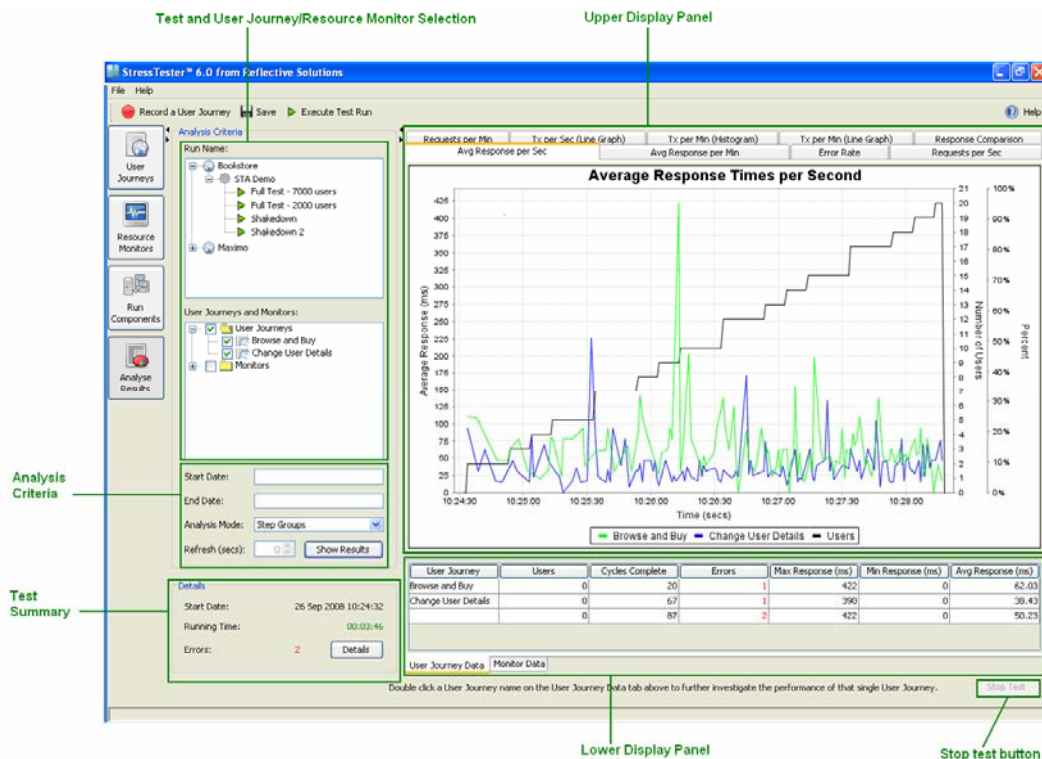
All tasks related to analysing the results of performance tests are performed in the Analyze Results workspace.



To access this workspace, simply click the “Analyze Results” button on the left hand side of the StressTester™ user interface.

Workspace Overview

The Results Analysis workspace consists on a number of different areas as shown in the diagram below.



The remainder of this user guide explains how to use these various areas of the screen to obtain the information you require in the format you want.

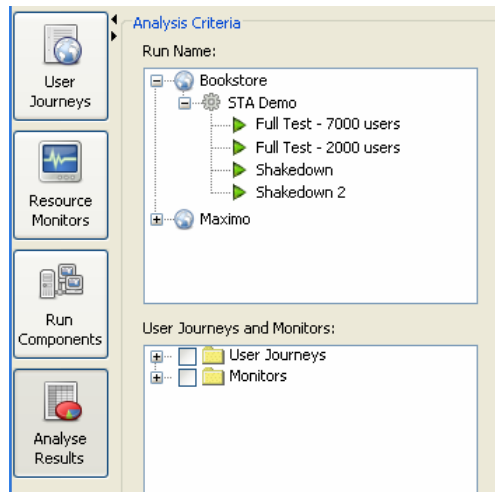
Workspace Navigation Trees

The workspace has two navigation trees: the first allows you to choose the performance test you wish to analyze, the second the User Journeys and Resource Monitors within the test to display in the graphs and data tables.

When the workspace is entered, the navigation trees are contracted with no selections, and an introduction page is displayed in the main area of the screen.

Note: It is highly recommended that you read the introduction page the first time you use the workspace – it contains valuable information.

By expanding an application node in the “Run Name” tree, you will see all of the Test Run Configurations for that application. If you expand a Test Run Configuration node, you will see all the performance tests that have been executed using the configuration.



In the screen shot shown, the application “Bookstore” has one Test Run Configuration “STA Demo” which has four sets of results.

Right-Click Menus

The only right-click menu for navigation trees in this workspace is on the performance test node.

Menu Item	Description
Delete	Deletes the results of this performance test from the StressTester™ database.

User Journeys and Resource Monitors

The second set of trees in the navigation panel allow you to select the User Journeys and Resource Monitors you wish to display on the analysis graphs and data tables.

The first tree in this area lists the User Journeys in alphabetical order – simply select the ones of interest.

The second tree lists the Resource Monitors that were running during the performance test in two groupings: by the server that the Resource Monitors were monitoring, and by the type of Resource Monitor (e.g. all the Monitors related to the Oracle database system are grouped together).

Again, select the Resource Monitors you wish to display. Obviously, as each Monitor appears in both trees, (de)selecting it in one will automatically (de)select it in the other.

Analysis Criteria

As well as the navigation trees, this workspace also has analysis criteria fields – the values of which affect the information that will be shown in the upper and lower display panels.

The analysis criteria fields are described on the following page:

Field	Description
Start Date	<p>The time and date before which performance test data should be ignored.</p> <p>The date can have any of the following formats:</p> <ul style="list-style-type: none">• DD/MM/YYYY• DD/MM/YYYY HH:MM• TODAY• NOW• TODAY-X[d h m]• NOW-X[d h m] <p>Where DD is a numeric day, MM a numeric month, YYYY the year, HH a number 24-hour clock hour, and MM the minutes.</p> <p>TODAY represents 00:00 on the current date, where as NOW represents the current date and time.</p> <p>Using the format [TODAY NOW]-[time] allows you to generate a date (and time) relevant to either TODAY or NOW.</p>
End Date	<p>The time and date after which performance test data should be ignored.</p> <p>The format is the same as for Start Date above.</p>
Analysis Mode	<p>See the Analysis Mode Explained section below.</p>
Refresh (sec)	<p>This field is only active when the selected performance test is in progress.</p> <p>It allows the displayed information to be regularly updated in real-time.</p>

Analysis Mode Explained

StressTester™ can display information analyzed at two levels of granularity.

All Steps

The results of every step (requests against the application) are used in the analysis.

Step Groups

The results of every step within a Step Group, for every iteration of the User Journey, for each simulated user, are summed and then analysis is performed using these group values.

For web applications, Step Groups are usually synonymous with whole web pages and for this reason it is the default Analysis Mode. However, there are often occasions where you will want to analyze all steps individually.

Test Summary

The test summary area of the workspace provides high-level summary information for the selected performance test.

This information includes:

- The date and time the performance test started
- The duration of the test
- The number of errors that occurred during the test

The “Details” button in this workspace opens a pop-up window showing information about the errors that occurred during the test and is described in the next section.

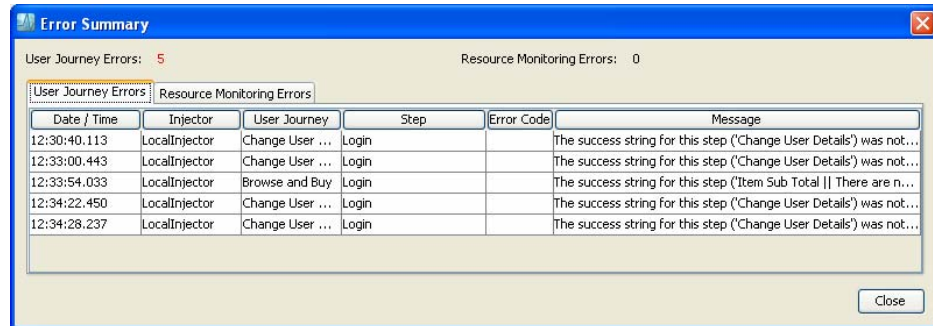
Error Summary Window

The error summary window allows you to understand the cause for errors that occurred during the performance test.

This data is updated in real-time during a performance test; therefore if an application starts failing under load you can understand exactly why and, if appropriate, stop the test.

The display has two tabs. One displays errors occurring within the User Journeys whilst the other displays errors occurring as a result of retrieving Resource Monitor values. The error counts at the top of the page indicate which, if any, tabs contain errors.

User Journey Errors



The columns within the User Journey Errors window are as follows:

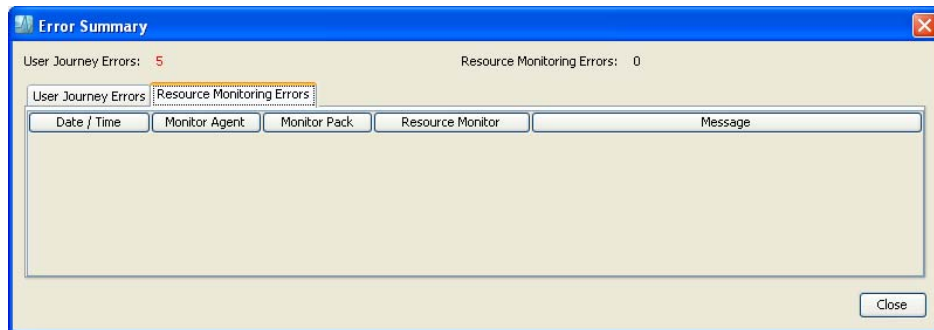
Column	Description
Date/Time	The date and time – to second resolution – in which the error was detected.
Injector	The Injector (location) at which the error was detected.
User Journey	The User Journey against which the error occurred.
Step	The step within the User Journey against which the error occurred.
Error Code	If the error was caused by the underlying protocol, this column lists the error code (e.g. the HTTP error code when the error is an HTTP error).
Message	The error message.

All columns are resizable (by dragging the dividers between column headings) and can be sorted – clicking a heading once sorts the column in alphabetically ascending order, clicking again reverses the sort order.

This means that you can easily see if the errors occurred just in one period of time, are affecting only one or a subset of the Injectors, one or more User Journeys, steps, etc.

In addition, if you hover the mouse over a Message, the full message will be displayed in a pop-up balloon.

Resource Monitoring Errors



The columns within the Resource Monitoring Errors window are as follows:

Column	Description
Date/Time	The date and time – to second resolution – in which the error was detected.
Monitor Agent	The Monitor Agent at which the error was detected.
Monitor Pack	The name of the Monitor Pack that contained the Resource Monitor that experienced the error
Resource Monitor	The name of the Resource Monitor that experienced the error
Message	The error message.

The same resizing, sorting and hover options are available on this tab as on the one for User Journey errors.

Upper and Lower Display Panels

The main area of the analysis workspace is dedicated to the display of the results – either in graphical or tabular data format.

The content of these panels is fully customizable; graphs can appear in one or both panels as can tabular data.

To understand what a tab is displaying, hover your mouse over the tab and a description of the graph or data table will be displayed.

It is possible to customize your StressTester™ installation, changing the graphs and tables displayed here in order that you may obtain the exact information you require, in the format you want. Please refer to the [Customizing the Analysis Screens](#) user guide for details on how to do this.

Refreshing Displayed Information

The information in a graph or data table is updated when one of the following occurs:

- the “Refresh” or “Show Results” button (depending on whether the test is in progress or not) is clicked, or
- an automatic refresh (due to the value of the Refresh field being greater than zero) occurs

When a refresh occurs, all the opened graphs and table tables are updated.

Multiple Window Display

It will be common for you to want to see the results of the performance test in a variety of “views”.

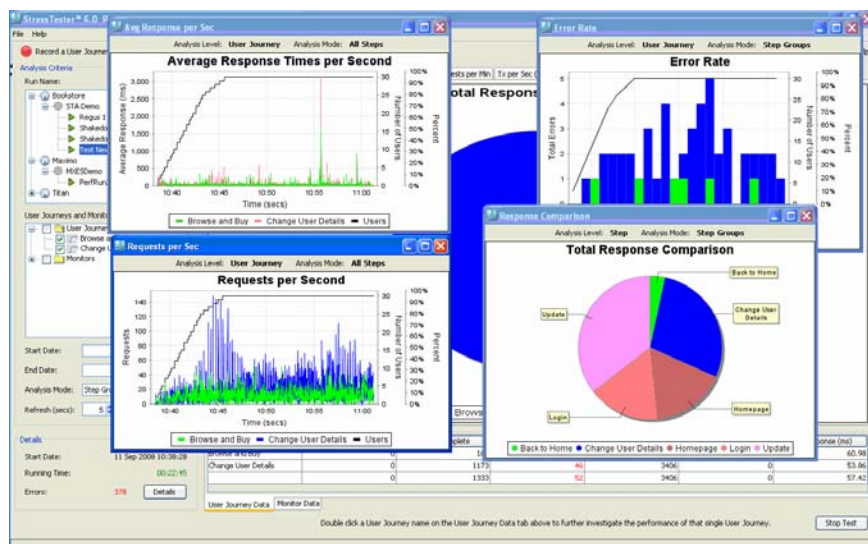
For example, whilst looking at the response times plotted against Resource Monitor information, you may also wish to understand how steps within a key User Journey are performing, and also the web server throughput in request per seconds.

Alternatively, you may wish to see a number of metrics at different levels of granularity e.g. response times averaged per second, minute and hour.

The above and much more are very easy to view in StressTester™. Simply display the graph or data table you wish to see and then right-click on the graph or data table tab and choose “Open in New Window”.

This will create a new child window containing the selected graph or data table.

There is no limit on the number of child windows you can have; although opening over a certain number will warn you that StressTester™ limits the concurrent access to the results database and hence refreshes of the information in the open windows may not occur concurrently but may be queued. This is not normally a problem.



The example screen shot above shows, during a performance test, that:

- the Average Response times of all steps are being monitored and compared with
- the number of Request per second, whilst
- the error rate of the two User Journeys selected for analysis are compared, and
- the total response times for the Step Groups within a single User Journey are compared with each other – the “update” step

having taken the most time at the point this screen shot was created.

Analysis Levels

Performance test results can be analyzed at one of two levels: all User Journeys compared together or a single User Journey analyzed on its own.

The second (single User Journey) level allows you to understand which steps or Step Groups are performing the best (and worse), and compare such with each other.

Multi-User Journey Analysis

This level of analysis is the default when you enter the workspace.

At this level, you can display information about many User Journeys and Resource Monitors.

It is the ideal level to understand at a medium level of granularity how an application performed, whether some User Journeys performed or scaled better than others, and if any of the Resource Monitors detected problems with underlying system resources.

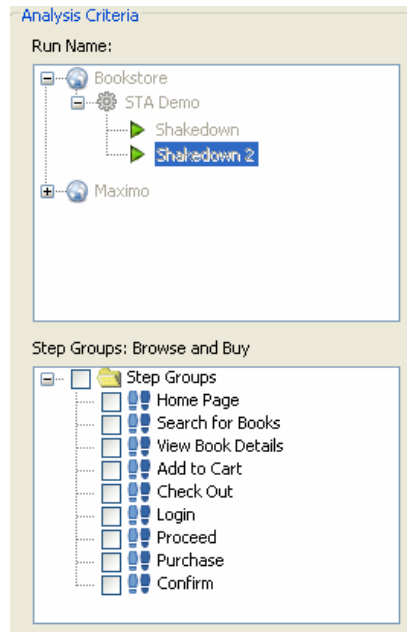
However, if at this level you detect that a User Journey is not performing as desired, you can drill-down to analyze just that one User Journey at a much finer granularity.

To switch to single User Journey analysis level, double click on any row within a data table that contains the column “User Journey”. This will switch to the single User Journey analysis mode for the selected User Journey.

Single User Journey Analysis

When you switch into this level, you may see that the tabs in the display panels change – this is because StressTester™ allows you to have different graphs and data tables configured for different levels of analysis (and for different Analysis Modes as well).

In addition, the top tree in the navigation panel is now read-only, and the User Journey/Resource Monitor tree has been replaced with one showing the steps or Step Groups (depending on the selected Analysis Mode) in the User Journey.



In the screen shot shown, the User Journey “Browse and Buy” is being analyzed and contains nine Step Groups.

When you select the steps or Step Groups of interest, and click “Refresh Now” or “Show Results”, the graphs and data tables will display information for the selected steps.

Note: To revert back to the multi User Journey analysis level, click on the “User Journey Analysis” button below the summary section.

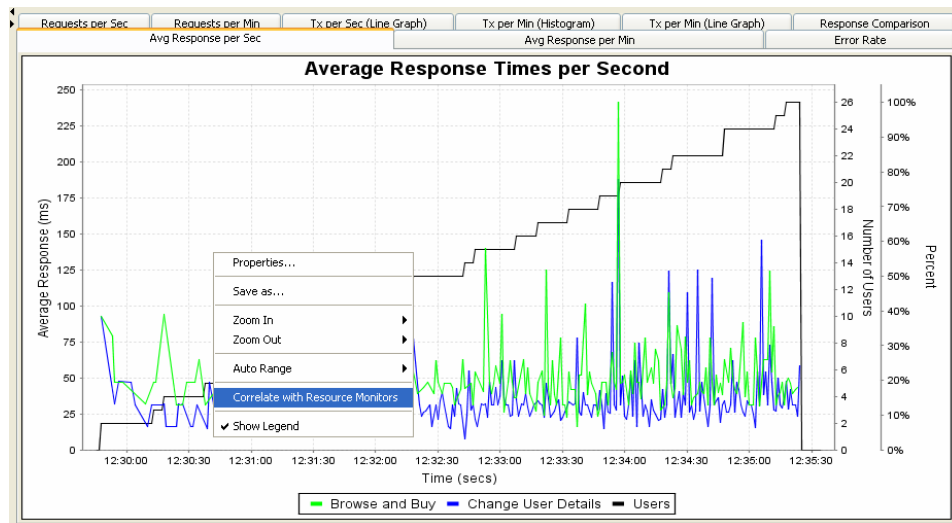
Correlate with Resource Monitors

When configuring any Resource Monitor, part of that configuration allows you to specify what represents an acceptable limit for the metric.

Please refer to the [Monitoring Underlying System Resources](#) user guide for details on how to create Resource Monitors with configured limits.

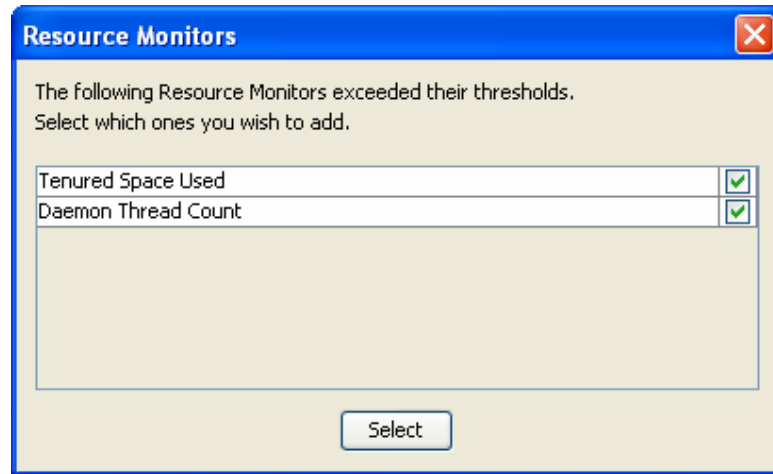
When analysing at any level, it is possible to request that StressTester™ locate those Resource Monitors that returned results outside of their “normal” range for the time period shown within the graph.

On any graph, right-click and select the “Correlate with Resource Monitors” option.



StressTester™ will search within the shown region of the graph for Resource Monitors that are outside their configured limits in that region.

If any Resource Monitors have recorded one or more values that breach their defined limit, a pop-up window similar to that shown below will appear.



By default, StressTester™ selects all the Resource Monitors detected. You can select or unselect Resource Monitors as you like and, on clicking “Select”, the selected Monitors will shown in both the graphs and data tables.

This facility avoids the need for manual searching through potentially hundreds of Resource Monitors looking for those with abnormal measurements.

Graph Functions

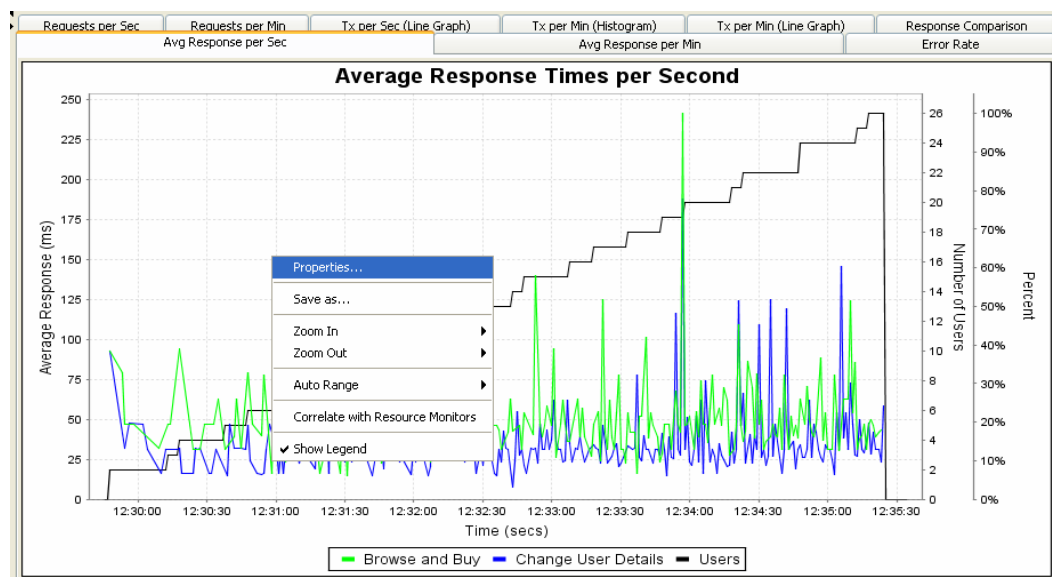
StressTester™ can display information in 7 graphical formats:

- Lines plotted against time
- Scatter charts plotted against time
- Lines plotted against groupings of time (e.g. hours of the day)
- Scatter charts plotted against groupings of time
- Histogram plotted against time
- Histogram plotted against groupings of time
- Pie Charts

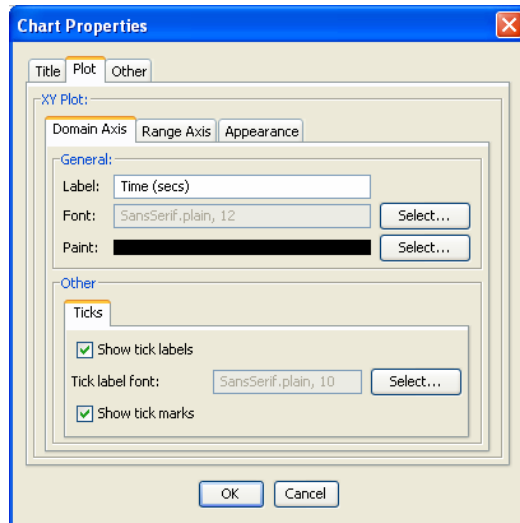
Display Customization

Each of these graphs can be further customized within StressTester™ to create the exact format you require.

To customize a graph, right-click anywhere within the graph and choose the “Properties” option.



The pop-up then shown will depend on the graph type – the screen shown below shows the properties for the graph type of lines plotted against time.

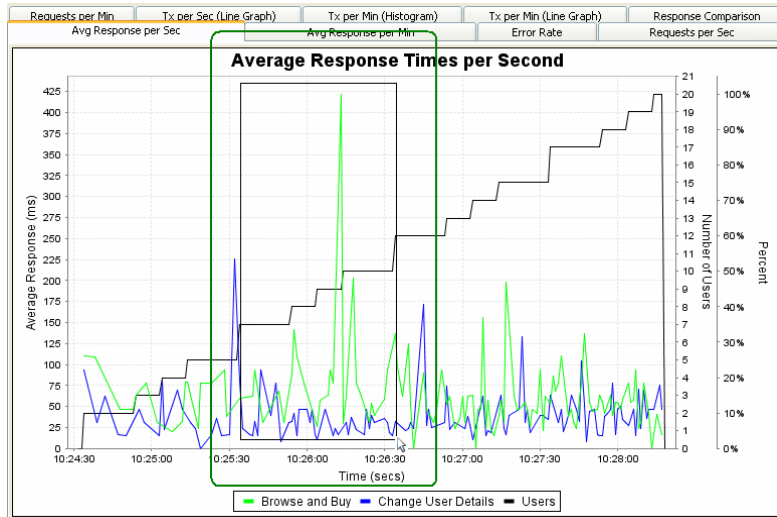


There are many options for customizing the displayed graph and you are encouraged to investigate the graph properties further.

Zooming

You can zoom in both axis on a graph (apart from the Pie Chart type) by simply clicking a point in the graph and then, with your left mouse button still depressed, dragging your mouse to draw a rectangle around the area you wish to zoom in on.

When you release your mouse button, StressTester™ will redisplay the graph showing the area you selected.



Note that zooming using this method does not re-compute the table values shown below the graph. If you wish to view tabular data for a specific time range, use the “Start Date” and “End Date” fields to define the time period of interest.

Removing / Displaying Legends

All graph types have legends – the names at the bottom of the graph that describe what each line, bar or part of the graph represents.

Sometimes, you may wish to hide these –to make the graph larger (although you could also achieve this by resizing the display panel or opening the graph in a new window) or for another reason.

To hide legends, right-click on the graph and unselect the “Show Legends” option.

To show legends, select the “Show Legends” option.

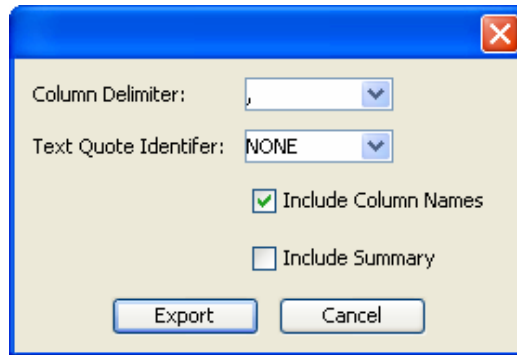
Saving a Graph

When you are happy with the graph displayed, right-click on the graph and choose the “Save” option.

This will save the graph in Portable Network Graphics (PNG) format – which is readable on every operating system and can be used in all presentation, document and email programs.

Saving the Table Data

If you wish to export table data in character-delimited format, right-click on the table and the following pop-up will be presented.



The fields in this pop-up are as follows:

Column	Description
Column Delimiter	The character to use to separate the individual fields in the export file
Text Quote Identifier	The character, if any, to use to quote the textual elements
Include Column Names	When checked, an initial line - defining the name of each column - will be produced in the output file.
Include Summary	When checked, a final line - containing the summary data - will be produced in the output file.

Data Table Functions

Resizing Columns

The columns within any table displayed within StressTester™ can be resized by placing your mouse between two column headings, selecting the displayed divider, and dragging it to resize the columns.

If a column is narrowed to such a point that its heading can no longer be displayed in full, the heading name will be truncated and will end with “...” indicating such.

If a column is narrowed to such a point that some of its data can no longer be displayed in full, the data cells that cannot be displayed in full will be replaced with “...”.

Sorting Column Values

Analysis data tables can be sorted by clicking the column heading name. To reverse the sort order, simply click the column heading again.

Therefore, to identify the User Journey that has the slowest average response time, click the heading “Avg Response (ms)” on the data table supplied with StressTester™ at the multi User Journey analysis level.

Note: A special column named “Step Order” is displayed on the data tables provided by StressTester™ for the single User Journey analysis level. This column allows the steps to be sorted into their User Journey order after this order has been disrupted by a sort on another column.