Automation Testing

TECHNOLOGY

Load Testing with JMeter

simplilearn

A Day in the Life of a Full Stack Developer

Alex has decided to use an open-source JMeter tool to test the load of his new applications.

To complete his test, he must first develop a load test plan. The JMeter interface will be used to check the load test scripts. Load testing is used to verify the quality of online applications, whether they are responsive, progressive, or standard.

To achieve the above, he will learn a few concepts in this lesson that will help him come up with a solution.

Learning Objectives

By the end of this lesson, you will be able to:

- Analyze the application's load
- Describe the components and properties of a thread group
- Discuss scheduler configurations
- Implementation and analysis of a load test
- Enumerate ultimate thread group plugins

What Is Peak Load?

Peak Load

A peak load test determines how the system performs under real-life conditions. During high loads, it determines if a system, piece of software, or computing device is capable of handling high loads, given a high demand from end-users.

Why Load Testing?

01 Estimates the maximum operating capacity of an application

02 Ensures the current infrastructure can support the application

03 Analyzes the sustainability of the application concerning the peak user load

04 Provides scalability to support more users and a high number of concurrent users

Plan the Load Test

Load Test RoadMap

Load testing can be performed by following the steps listed below one by one:

Create Test Plan **Add Thread Group** **Add HTTP Requests** **Analysis and Result**

Create JMeter Test Plan

The steps to create a test plan are as follows:

01

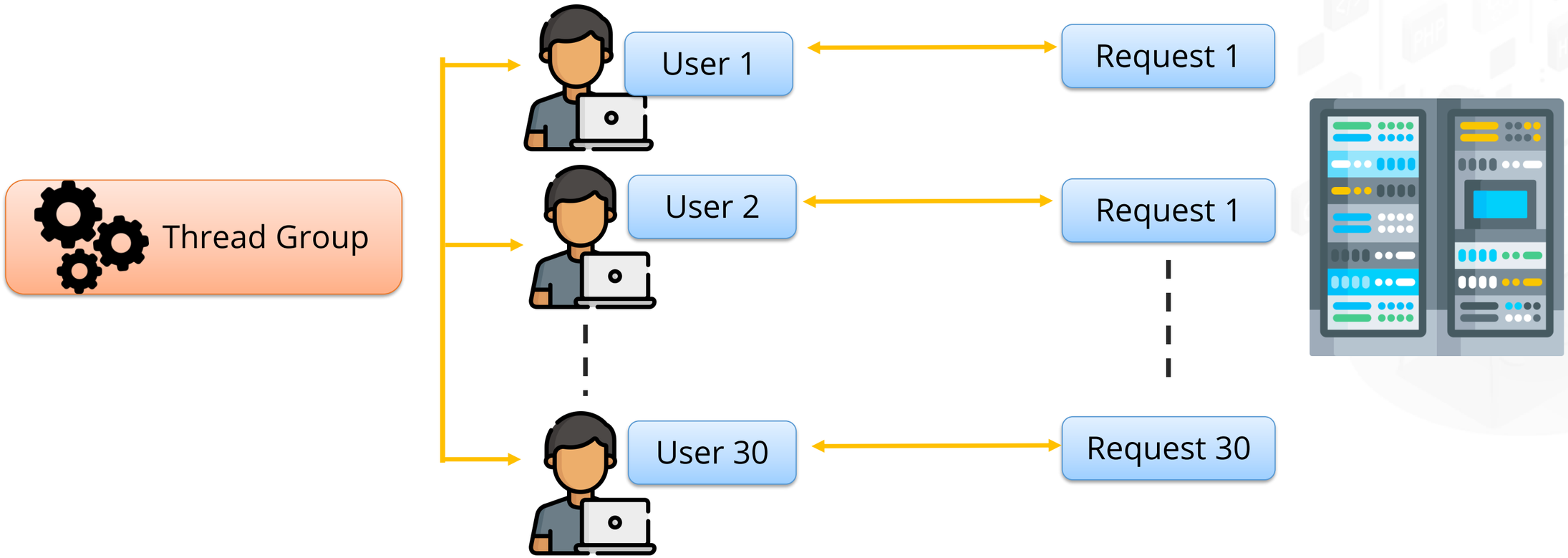
Click **File** at the top-left corner of the screen to create a new test plan.

02

Select **New** and a new test plan will appear on the screen.

Thread Group

A thread group is the first step in any test plan. The thread refers to the number of users.



Build a Thread Group

The steps to build a thread group are as follows:

01

Right-click on the **Test Plan** under the Tree view window.

02

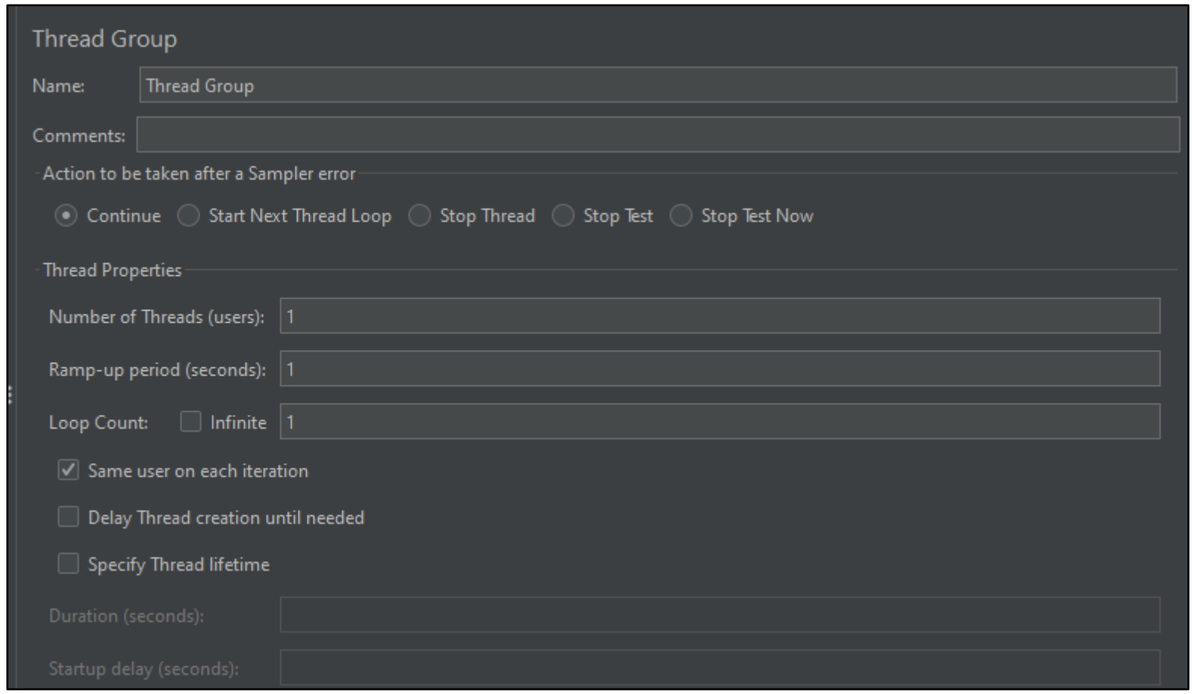
Select **Add** from the menu.

03

Hover over the **Threads (Users)** and select the **Thread Group.**

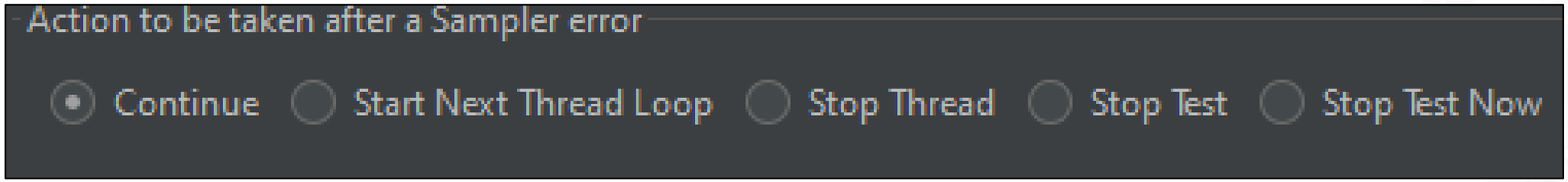
Thread Group Output Window

The output window will look like this:



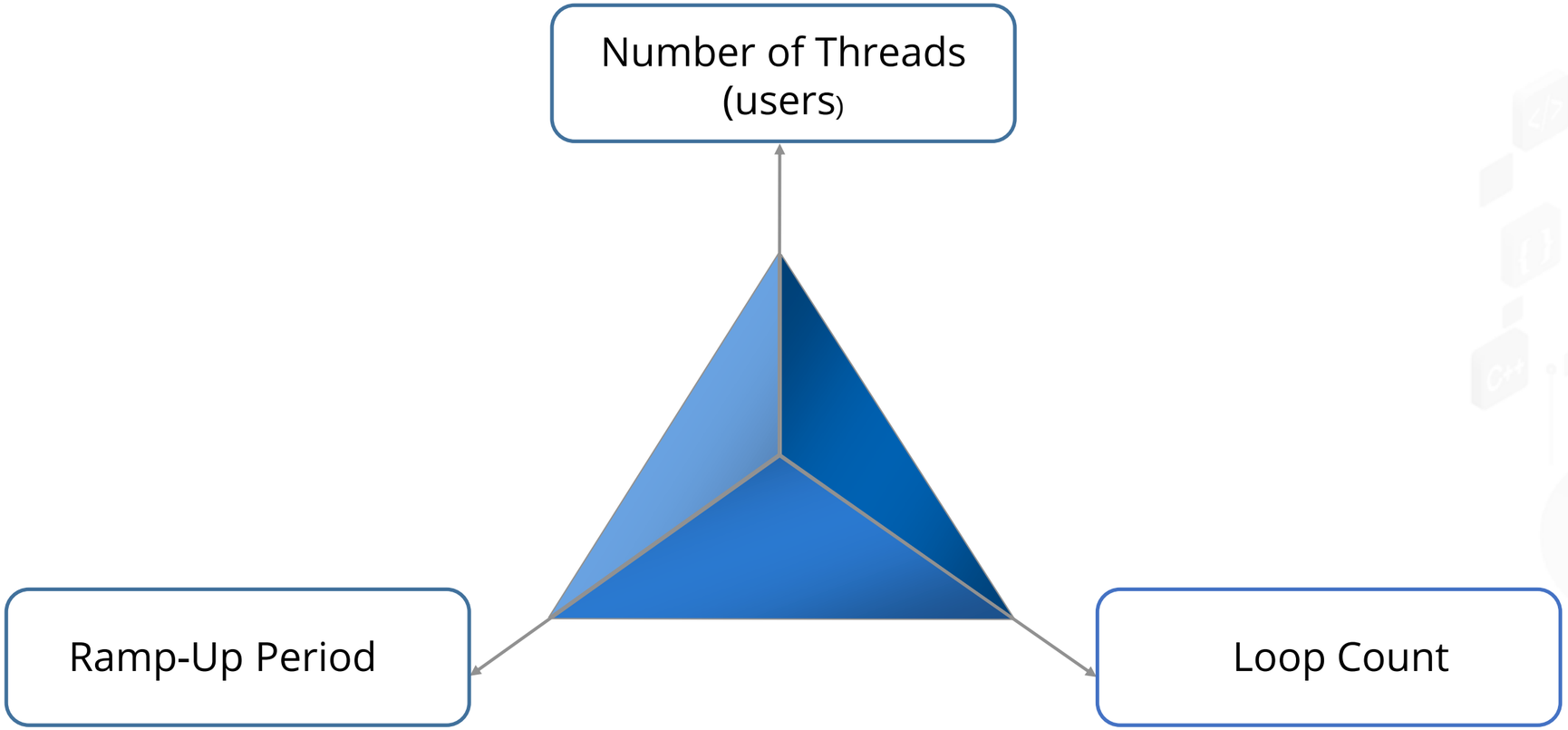
Components of Thread Elements

The thread group panel holds the following options:



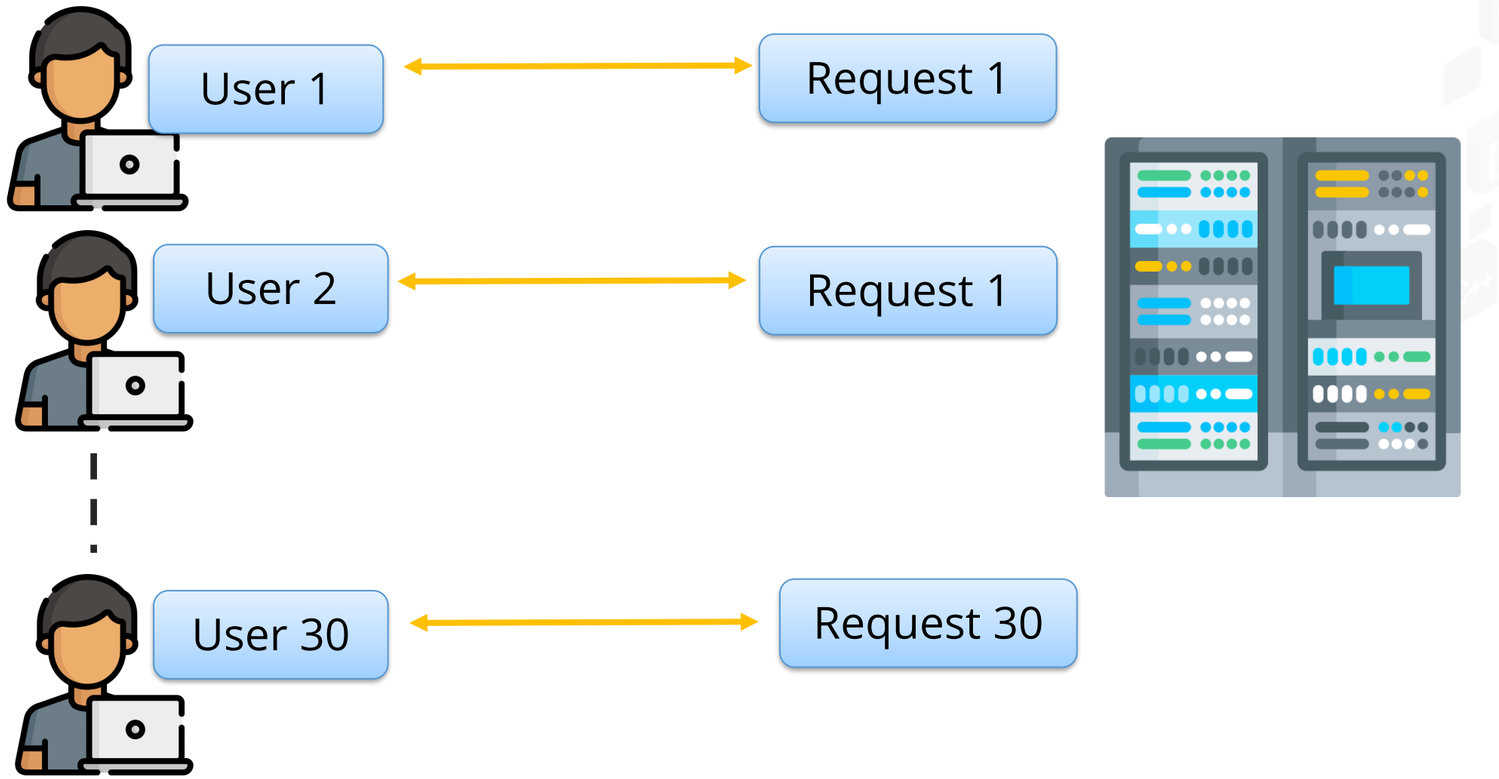
Thread Properties

An Apache JMeter thread has three properties:



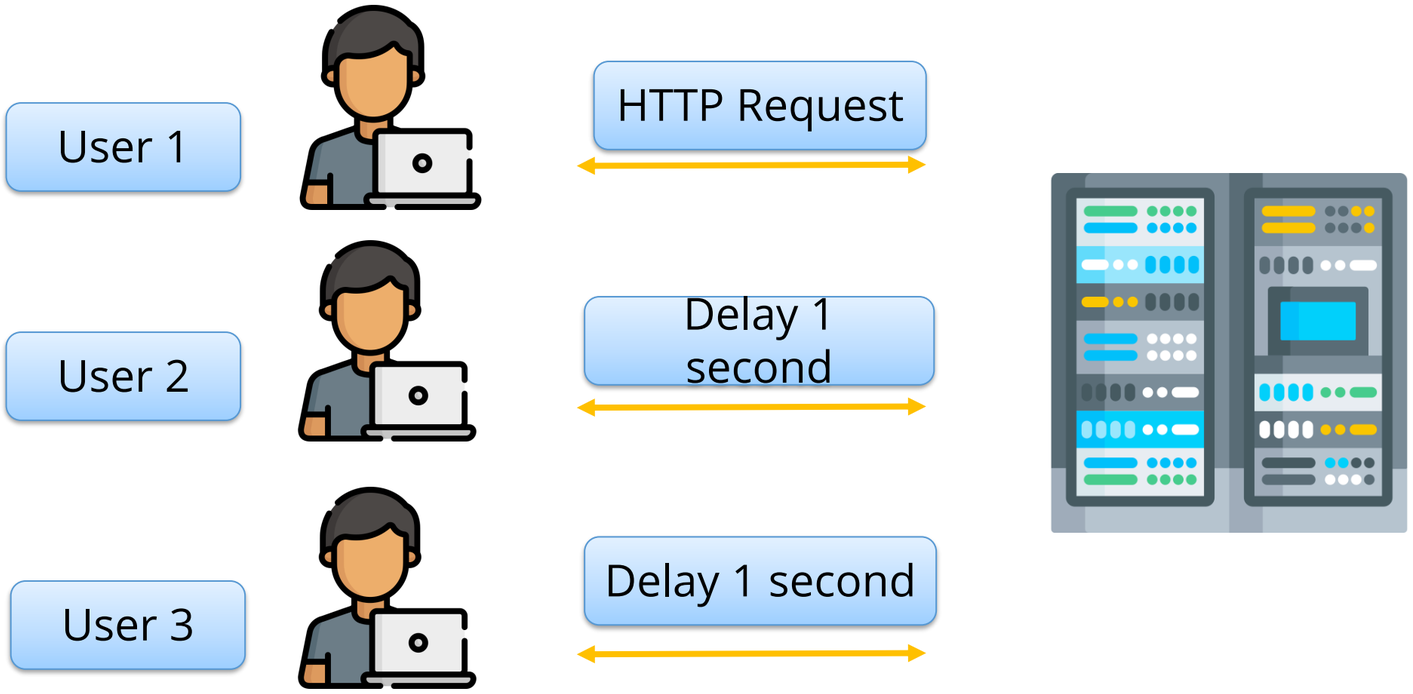
Number of Threads (Users)

It provides an estimate of how many users or connections are present on the server.



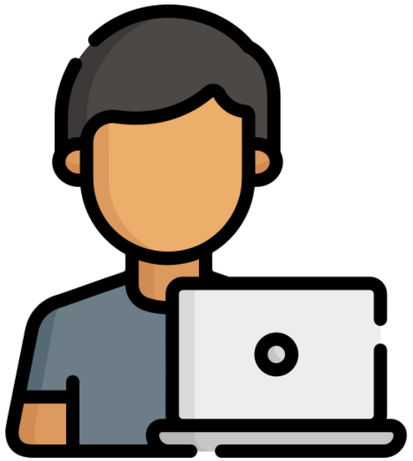
Ramp-Up Period

The Ramp-Up period indicates how long JMeter will take to ramp up to the maximum number of threads.



Loop Count

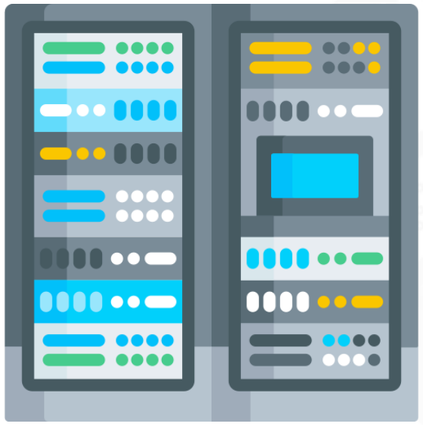
The loop count determines how many times the test will run. Select the “Infinite" check box if the test needs to run forever.



Connect 1st Time

Connect 2nd Time

Connect 3rd Time



Increase the Load

Users can increase load during testing by changing the number of threads, ramp-up period, and loop count.

Scheduler Configuration

Schedule Configuration

The scheduler option in the Thread Group element in JMeter allows users to schedule tests. With the scheduler option in Test Plan, the user can set the specified thread duration and delay.

Duration

Start-Up Delay

Duration

One of the options in scheduler configuration is duration:

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- A duration parameter instructs JMeter to run the test for a specific duration.
- If the duration is set to 60 secs, JMeter will run the test for 60 seconds and then stop it once the time is elapsed.

Schedule Configuration

Another option in scheduler configuration is start-up delay:

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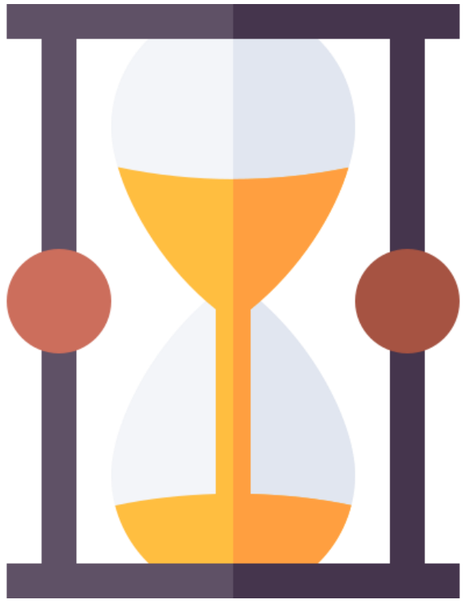


- When the test is started, JMeter will wait for **Startup Delay** (seconds) before starting the threads of the thread group.
- It will run for the configured duration (seconds) time.

Schedule Configuration

The output window looks like this:

Add HTTP Requests

Add HTTP Request

To add Sampler, the user must follow these steps:

01

Right-click on the **Thread Group** under the **Test Plan** window.

02

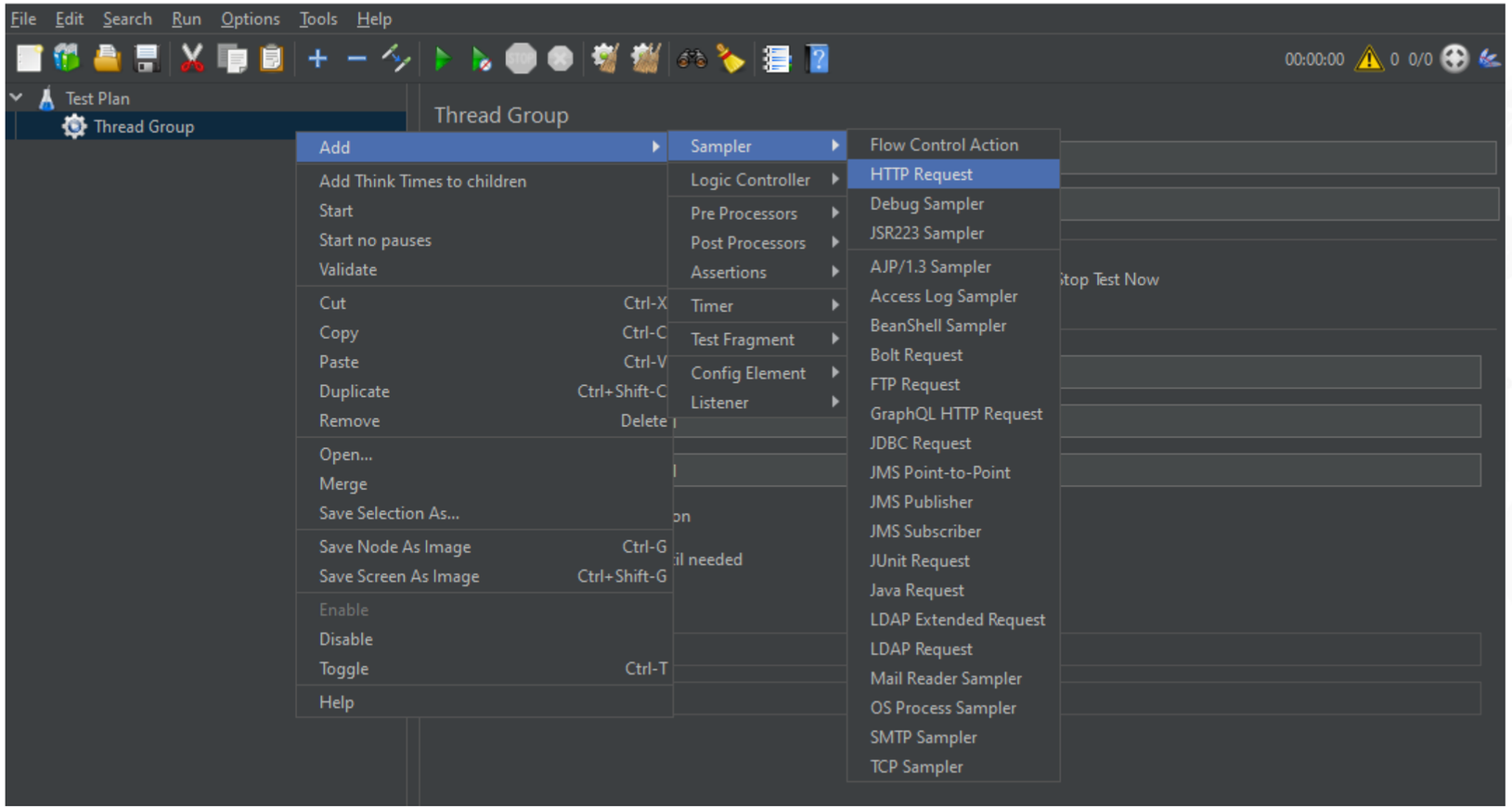
Select **Add** from the menu.

03

Hover over the **Samplers** and select the **HTTP Request.**

HTTP Window

The output window looks like this:



HTTP Request Details

In the HTTP Request Control Panel, the user needs to add the request name in the Name field, enter the URL where the request will be sent in Server or IP field, and add the port number in the Port field.

Details 01

Name

Enter the name of the HTTP Request.

Details 02

Server or IP

Enter the server's name or Internet protocol(IP) address.

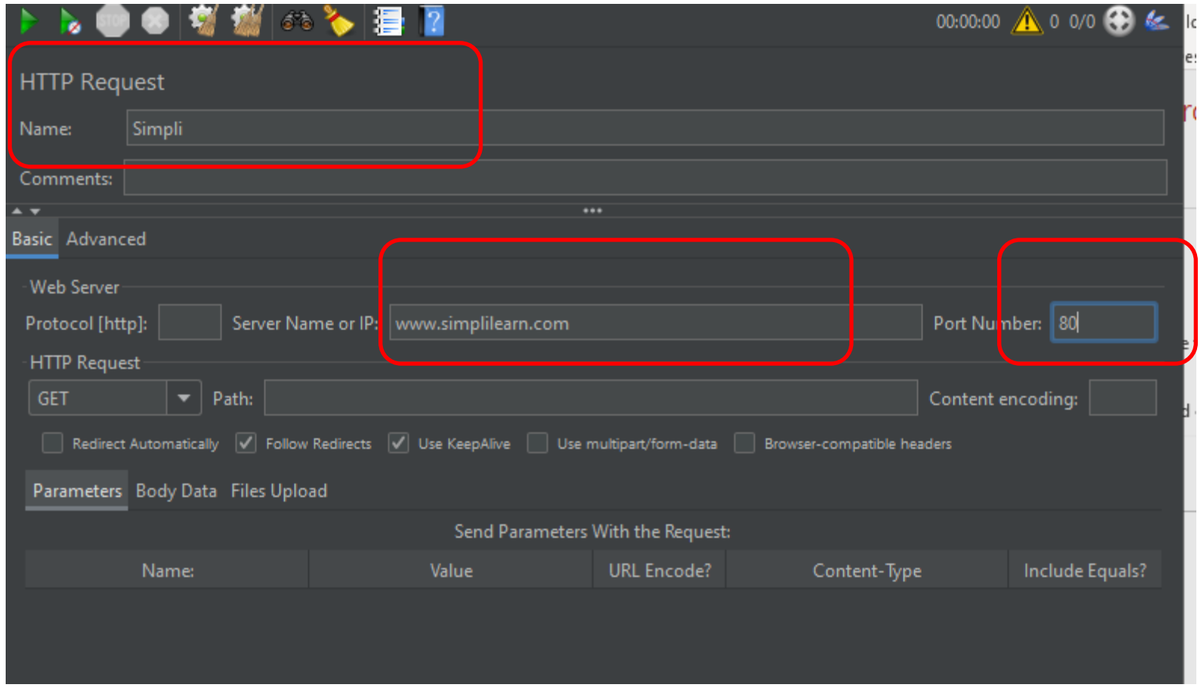
Details 03

Port Number

Enter the port number.

HTTP Request Window

The HTTP request window looks like this:



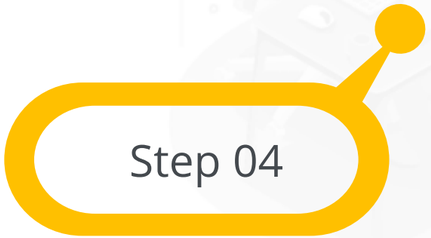
Multiple HTTP Request

In JMeter, users can test every website page by making multiple HTTP requests. The procedure for adding multiple pages will remain the same.

Right-click on the **Thread Group**

Click on **Add**

Hover over **Sampler**



Add **HTTP Requests**

Add Listeners

Result Window

JMeter results can be collected and interpreted in so many ways. The results provide a variety of metrics, including graphs, charts, tables, HTML reports, and others. Using Listeners, results can be displayed. In JMeter, there are multiple listeners.

Add Listeners

To add Listeners, the user must follow these steps :

01

Right-click on the **Thread Group** under the **Test Plan**.

02

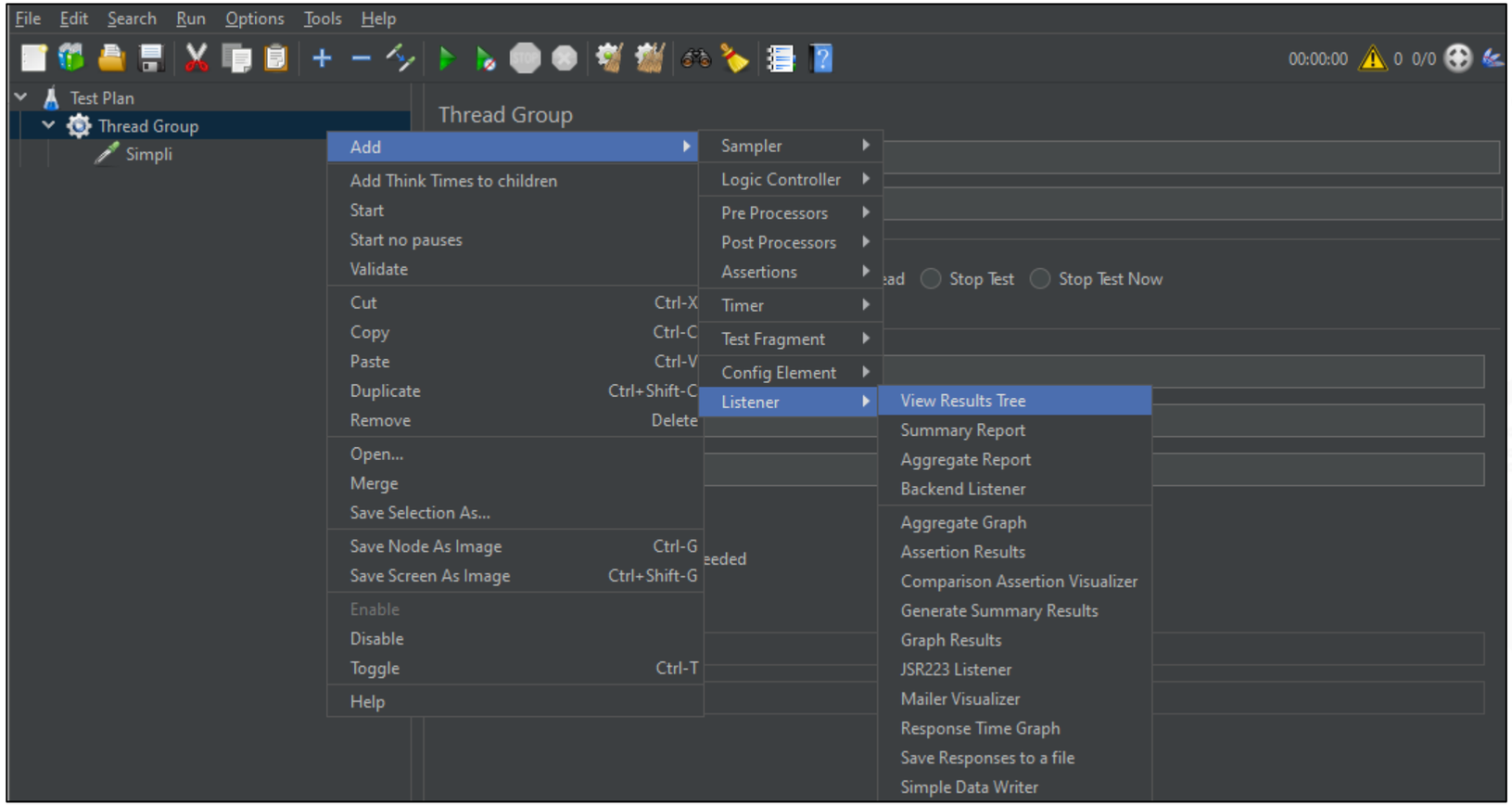
Select **Add** from the menu.

03

Hover over the **Listener** and select the **View Results Tree.**

Listener Output Window

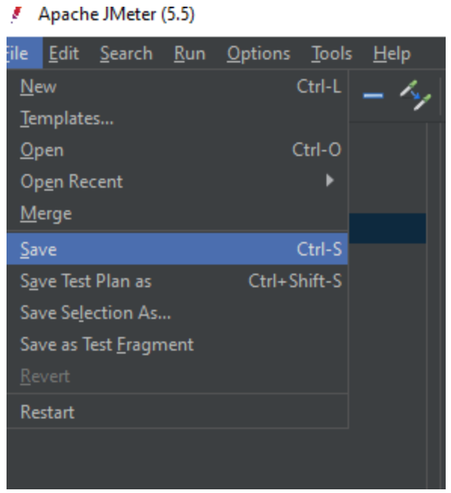
The listener output window will look like this:

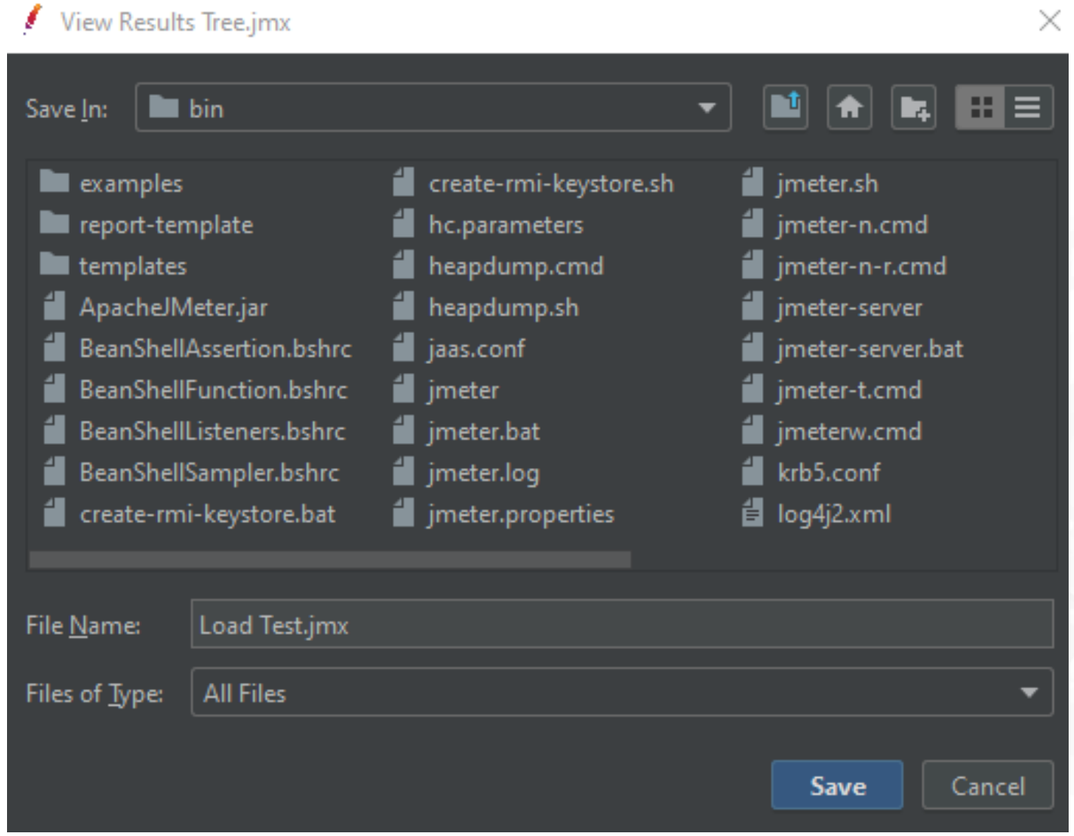


Save and Run the Test

Save the Test

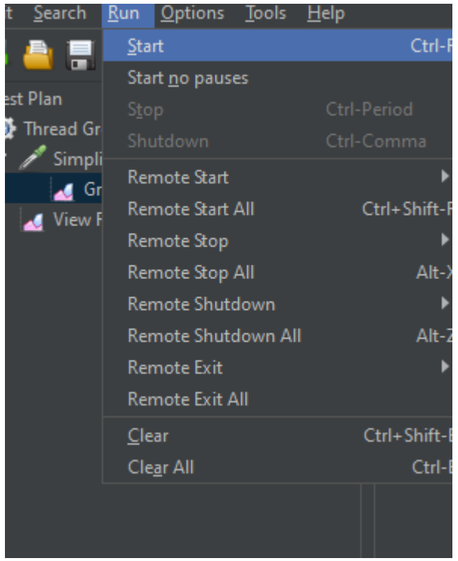
Ensure that the test has been saved after completing all the steps.





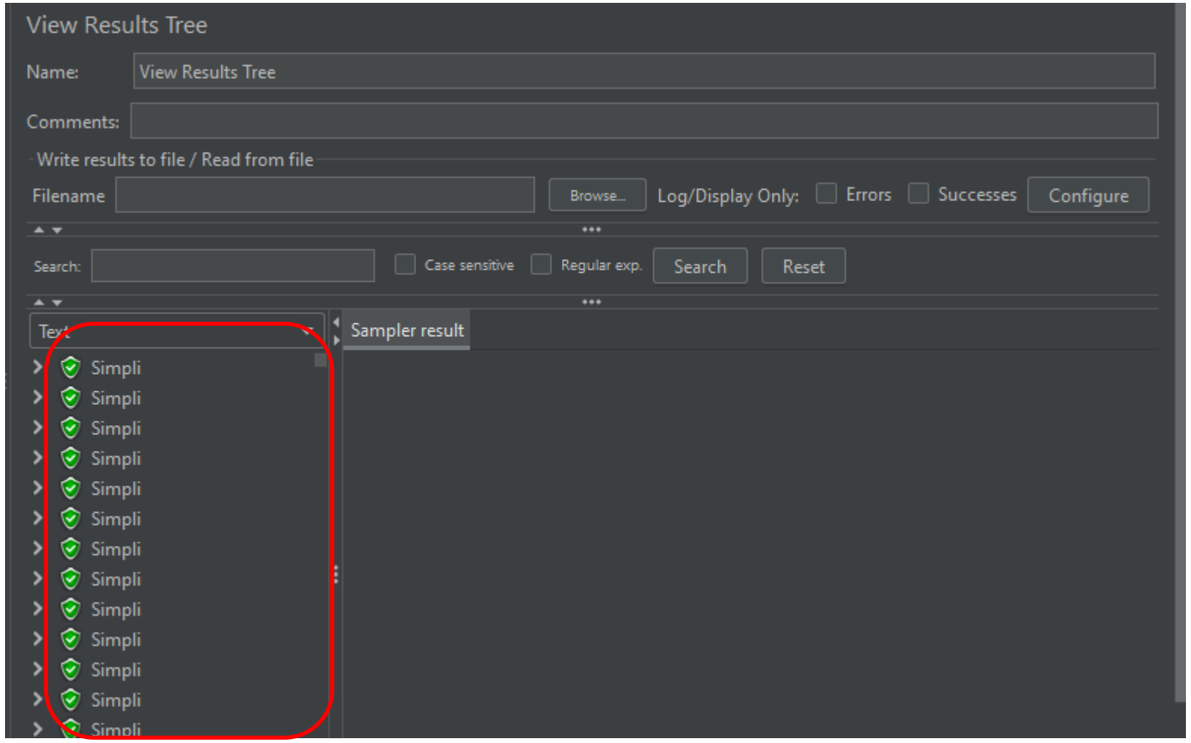
Run the Test

It's now time to run the test after completing all the steps. The user can either select Run or press the green triangle button in the menu bar.



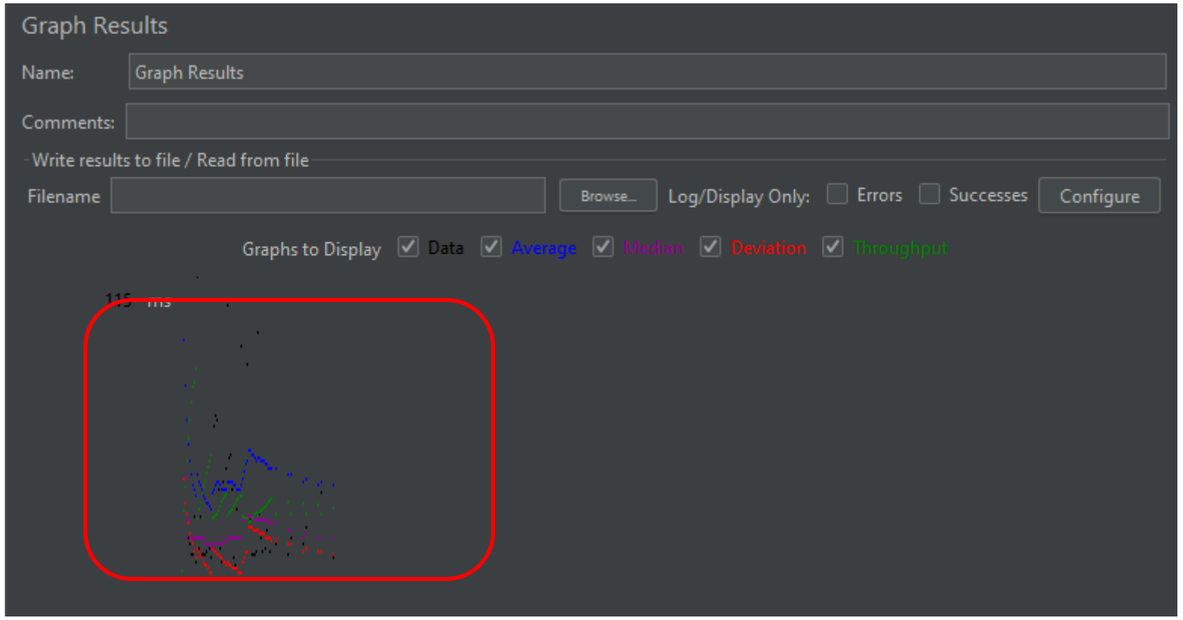
View Result Tree

Here is a screenshot of the result tree of 10 users who accessed the website www.simplilearn.com:



Graph Result

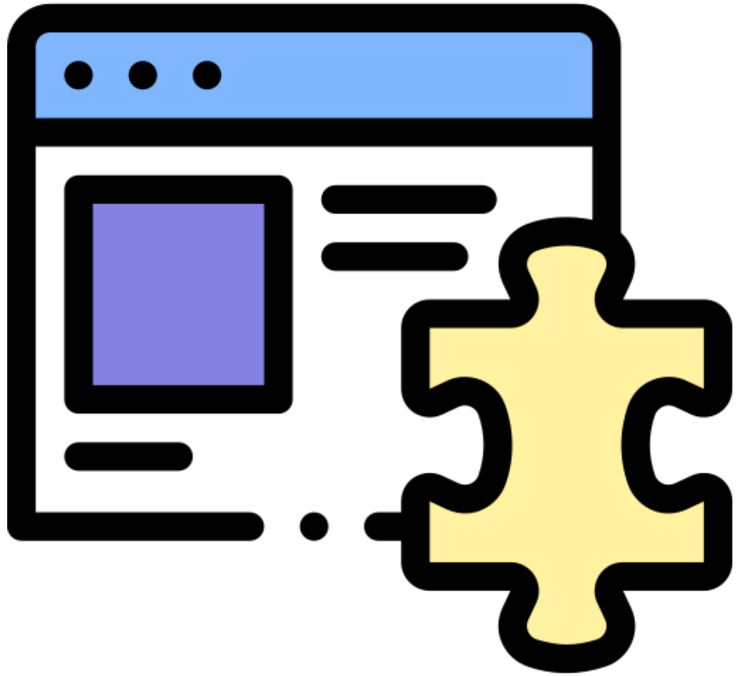
Here is a screenshot of the result tree of 10 users who accessed the website www.simplilearn.com:



Thread Group Plugins

Thread Group Plugins

JMeter's 'Ultimate Thread Group' plugin is one of the external plugins used to design spike test and workload models. The “Ultimate Thread Group” allows conditional loads to be applied to the server.



Add Plugins

JMeter plugins can be added using the following steps:

Open **JMeter**

Click on **Options**

Go to **Plugins Manager**

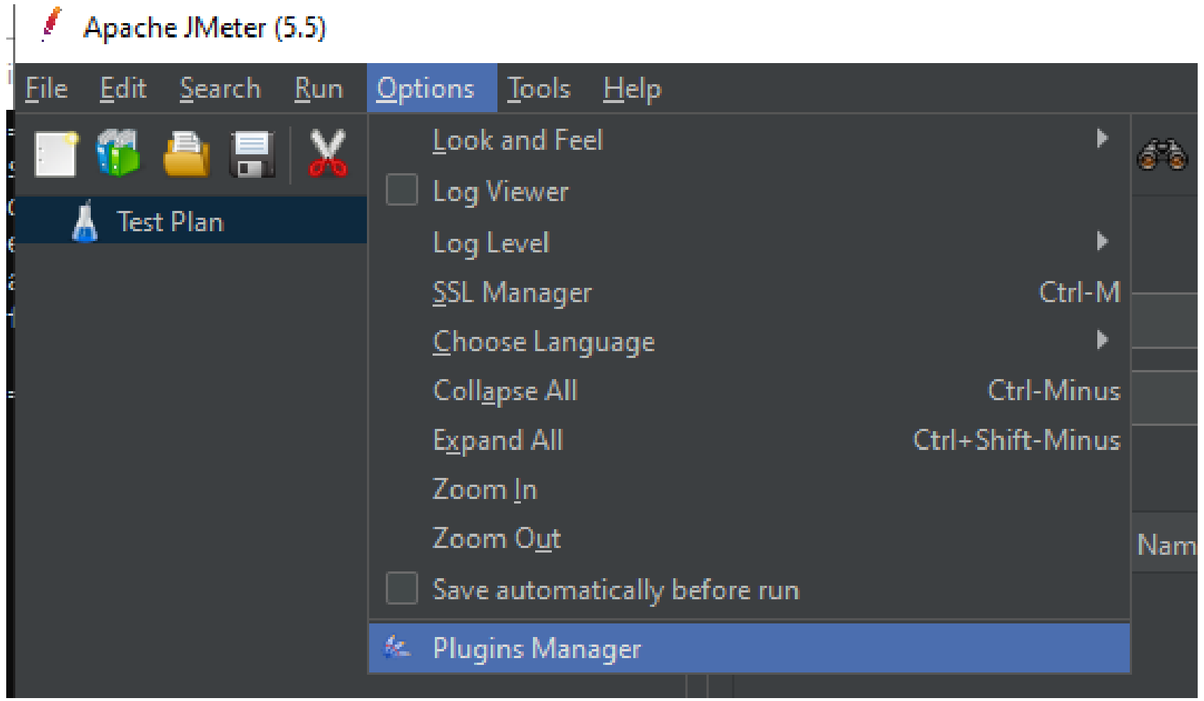
Select **Available Plugins** and type **Thread** in the search bar

Select **Custom Thread Groups**

Click on **Apply Changes and Restart JMeter**

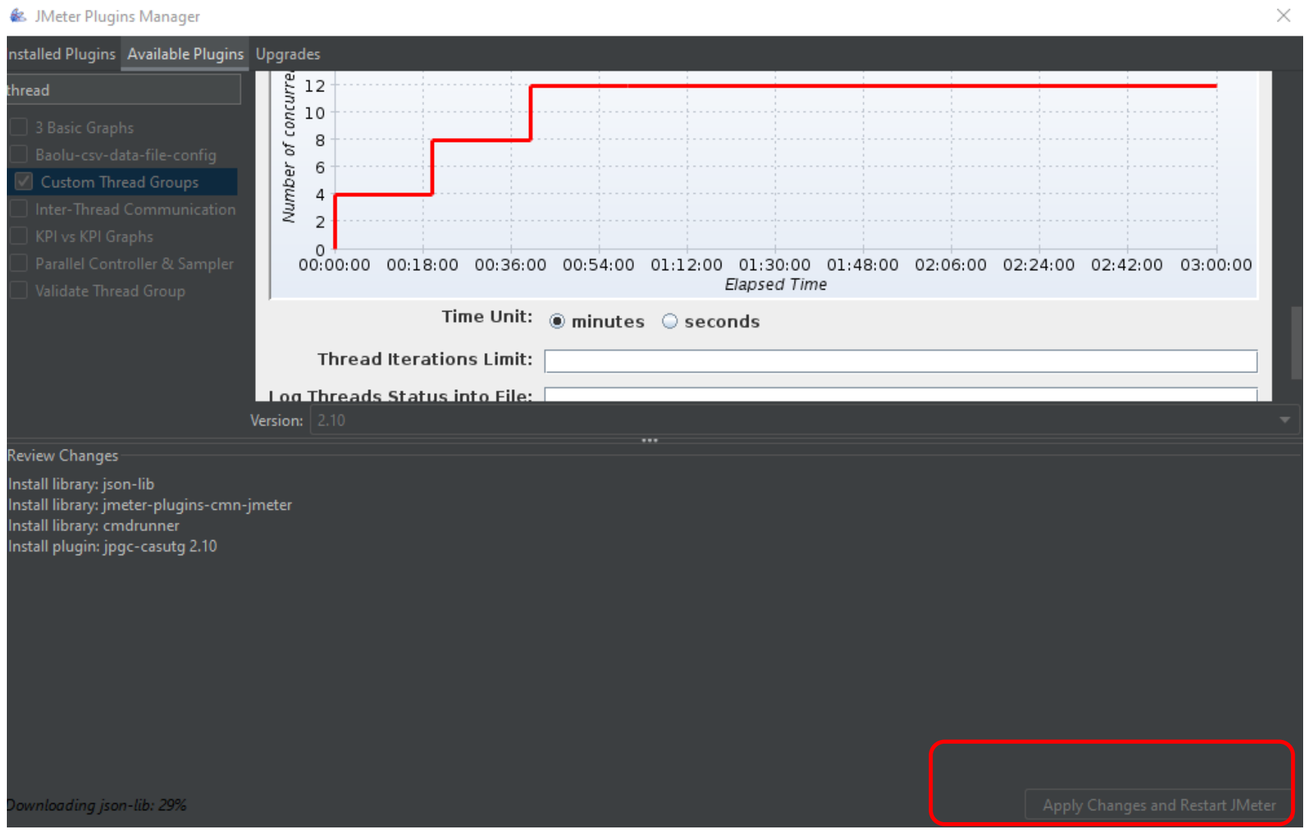
Add Plugins

The Plugins Manager output window looks like this:



Add Plugins

The output window will look like this:



Steps to Install Ultimate Thread Group Plugins

The following steps will guide a user through the installation of “Ultimate Thread Group Plugins:

01 Click on the link to download the Ultimate Thread Group JMeter Plugin.

02 Unzip the folder.

03 Copy the file jmeter-plugins-cmn-jmeter-<version>.jar to lib folder of Apache Jmeter.

Steps to Install Ultimate Thread Group Plugins

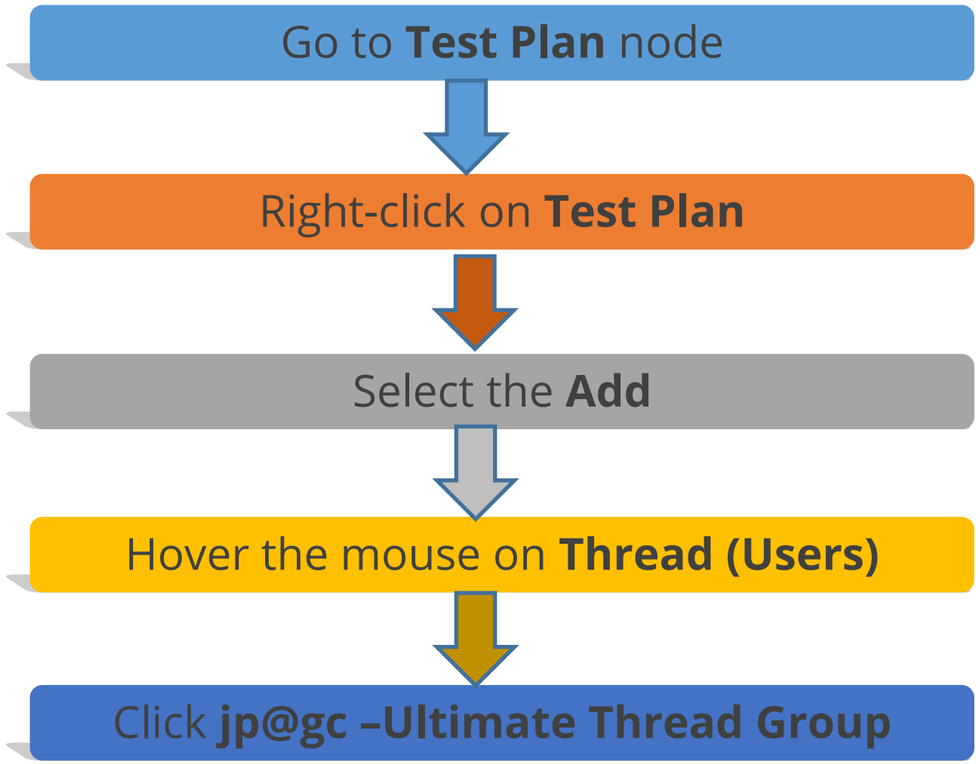
The following steps will guide a user through the installation of Ultimate Thread Group Plugins:

04 Copy the files jmeter-plugins-casutg-<version>.jar and jmeter-plugins-manager-<version>.jar to ext folder of Apache JMeter

05 Launch the JMeter in Graphical User Interface mode

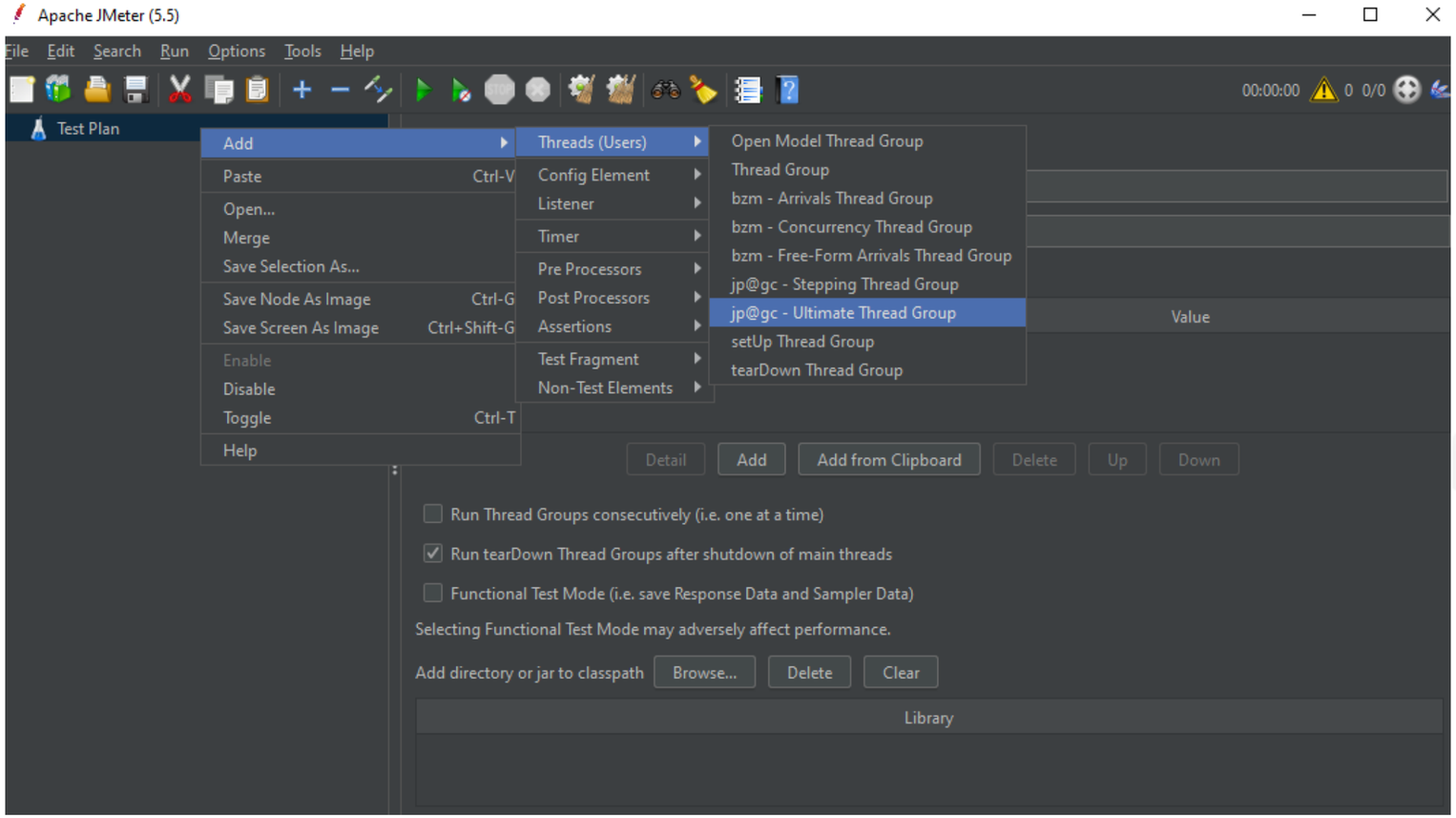
Add Thread Group Plugins In Test Script

A user can add plugins to test scripts using the following steps:



Add Thread Group Plugins In Test Script Output

The output window will look like this:



Key Takeaways

- In JMeter, Peak-Load Tests determine how the system performs in real-life conditions and determines whether a system, piece of software, or computing device can handle high loads under high demands.
- In JMeter, the thread group specifies the number of users, ramp-up period, loop count, and scheduler configuration, which specifies the time for automated testing.
- The results from JMeter can be gathered and interpreted in various ways using listeners. Multiple metrics are provided, including graphs, charts, tables, and HTML reports.
- In JMeter, external plug-ins provide the option of creating the desired workload, which is used to build spike tests and workload models.