

# JMeter



Apache JMeter is a Java-based open source load testing tool that can be used to analyse a system's functional behaviour and measure its performance during a load test. A load test will simulate end-user behaviour that pushes an application's specifications to their limits. To test a system's strength, Apache JMeter can be used to simulate varying or heavy loads on single or multiple servers, networks, or objects.

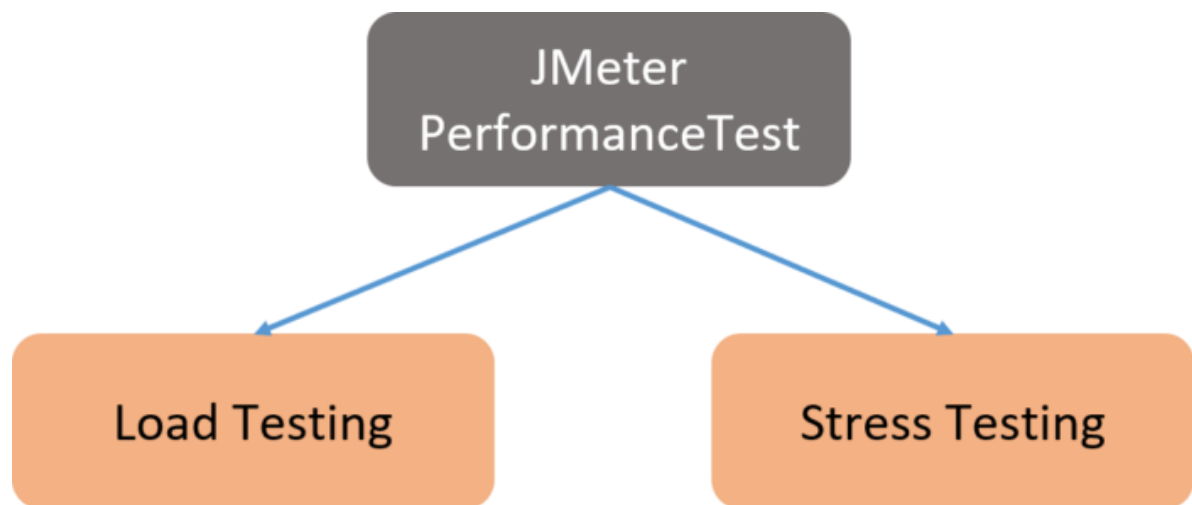
JMeter simulates groups of users sending requests to a server or network, then returns statistics to the user in the form of visual diagrams. Although Apache JMeter's user interface resembles that of a browser, it is unable to render HTML pages or the JavaScript contained within them in the same way that a browser would.

## Uses for JMeter

Performance, spike, and unit testing can all be done with Apache JMeter. The process of determining the speed, responsiveness, and stability of a computer, network, software programme, or device under load is known as performance testing. Spike testing is a type of load testing in which the load is rapidly increased and decreased in short bursts before returning to an average load.

## Benefits of JMeter

- Offline analysis of test results is supported.
- Test results can be displayed in a variety of ways, including graphs, trees, tables, and log files.
- Graphical user interface that is easy to use (GUI).
- All types of performance testing such as load Testing, stress testing, and stability testing.



**Load Testing:**

Simulating multiple users accessing Web services at the same time to model expected usage.

**Stress Testing:**

Every web server has a limit to how much capacity it can handle. When the load exceeds the limit, the web server becomes slower and generates errors. The primary objective of stress testing is to determine the web server's maximum load capacity.

## Elements of JMeter

1. Thread Group
  - Each thread represents 1 user request
2. Samplers
  - HTTP Request: let's you send an http or https request to a web server.
3. Listeners

Shows results of the test execution, they can show results in different format such as a:

Graph: displays server response times on a graph

Table: summary of a test result in table format

Tree: shows user request in basic html format

Log: summary of a test result in the text file

4. Assertions
  - Assertion checks that the server you're testing is returning the expected results.

Types of Assertions:

- Duration Assertion:  
The Duration Assertion verifies that each server response received within a specified time frame. Any response that takes longer than the specified number of milliseconds is considered a failed response.
- HTML Assertion:  
Allows the user to verify the response data's HTML syntax. It means that the HTML syntax for the response data must be followed.
- Response Assertion:  
Pattern strings can be added to the response assertion and compared against various fields of the server response.
- Size Assertion:  
Verifies that each server response has the correct number of bytes. You can make the size equal to, greater than, less than, or not equal to a specific number of bytes.

## Canary, red/blue (blue/green) testing

Canary testing:

Entails distributing new code to a small group of real users who are usually unaware that they are using it. This allows us to see how our code performs in real-world situations while also limiting the impact of any bugs to a small group of users.

Red/blue (blue/green) testing:

Ensure that you have two production environments that are different but as identical each other as possible. One of them, let's say blue, is active at any given time. You do your final stage of testing in the green environment as you prepare a new release of your software. When the software is working in the green environment, you switch the router so that all incoming requests are directed to the green environment, leaving the blue one idle.

Blue-green deployment also allows for a quick rollback if something goes wrong: simply switch the router back to the blue environment.

