**Apache Jmeter:**

* Jmeter is a pure java application designed **load test functional behavior** and **measure performance**.
* Can be use JMeter to analyze and measure performance of web application or variety of services.
* Can also be used for a functional test, database server test, API testing, web services etc.
* Performance testing means testing a web application against heavy load, multiple and concurrent user traffic.
* It can be used to simulate a heavy load on a server, network or object to test its strength or analyze overall performance under different load types.

Advantages:

* Open source.
* GUI and non-GUI mode.
* Platform independent.
* Multi-threading framework-
* Visualize test results
* Highly extensible
* Support multi-protocol.
* Unlimited testing capabilities.

Step 1: Check for java is installed on system. > For Jmeter we need java version 7 or higher.

Step 2: Download Apache Jmeter / Binaries .zip file

Step 3: Unzip and keep in any location

Step 4:

For window > jmeter/bin>jmeter.bat file. For mac>open terminal> goto jmeter/bin>sh jmeter.sh

First to start the Jmeter/ got bin folder and click jmeter.bat file.

**Components/Elements in Jmeter:**

* Thread Group
* Samplers
* Logic Controllers
* Listeners
* Configuration Elements
* Assertions
* Timers
* Processor

**Sub Elements**:

Request. Publisher. Record Controller. Module Controller. Report. Graph. Http. FTP. TCP. Response Assertion. Size Assertions. Constant. Uniform. Pre-Processor. Post-Processor.

1. **Thread Group**: (**is set of threads, each thread represents a user, each thread simulates real user request to Server**).

* Is a collection of threads. Each thread represents on user using the application under test.
* Basically, each thread simulates one real user request to the Server.
* Controllers of thread group allows to set the number of threads for each group.

1. **Samplers**: (**represents different types of request send by the thread/user, http request, etc.**).

* Are different types of request sent by the Thread group.
* The user request could be Http request, FTP request, JDBC request, etc.

1. **Logic Controller**: (**used to handle order of processing Samplers/requests in a thread)**.

* used to handle order of processing Samplers/Request in a Thread.
* Logic Controller will decide, when and how to send request to Web Server.

1. **Listeners**: (**shows the results of the test execution in different formats**).

* Shows the results of the test execution.
* Can be in different formats, tree, graph, table, etc.

1. **Configurations Elements**: (**used to defaults variable used by Samplers**).

* used for setting the default variables. For each use by samplers.

Eg:- cvs data set configuration, Http cookies manager, Http request defaults, etc.

1. **Assertions**: (**helps to verify that Server under test returns the expected results**).

* helps to verify that Server under test returns the expected results.

1. **Timers**: (**used to apply waits between each sample requests)**.

* By default, Timer sends requests without applying any delay between each Sampler/Request.
* If we perform load/stress testing on server without delay, it can be overloaded. Then it won’t be able to give realistic results and fail to simulate real world traffic experience.
* Timers are the solutions for this problem.
* Timers element can be added n test plan to apply waits between each Sampler request.

1. **Processors**:

**In JMeter Test**: Test case is Test plan ( **.jmx** is extension of Test plan)

Test plan: is a container contains all elements of JMeter (also called as project).

* Thread group (users). [ number of users]
* Add Sampler (http – type of request)
* Add Listener (results of test execution)
* Run Test plan
* Save Test plan

**Types of Assertations:**

1. Response Assertion 2. Size Assertion 3.Duration Assertion 4. HTML Assertion 5. XML Assertion 6. XML schema assertion 7. Xpath Assertion 8. JSON Assertion

1.Response

[Note: we need to add Listener for assertions]

**Types of Timers in JMeter:**

1. Constant Timer 2.Uniform Timer 3.Gaussin Random Timer 4.Beanshell Timer 5.BSF Timer 6. JSR233 Timer.

[Note: we can add Timers in Thread group level, Sampler level, Request level.]

**Types of Controllers**:

1. Critical Section Controller 2. ForEach Controller 3.If Controller 4. Include Controller 5.Interleave Controller 6. Loop Controller 7. Module Controller 8. Random Controller etc.

**Integrating Selenium Script with JMeter:**

**First way:**

* **Options > Add plugin >JMeter > plugin Manager > Selenium/WebDriver Support.**

In order to do this, we need to download Selenium/WebDriver support .jar file and in JMeter/lib folder.

[Note: in order to get JMeter plugin Manager option, download JMeter plugin Manager .jar file to JMeter/ bin folder]

**Second way:**

**Test plan:** is a container and **contains test elements** which need to perform tests.

**Workbench**: is place we can keep elements temporarily.

Test plan > Sampler >add thread group> name it as users

Thread properties > number of users used for the particular test.

Thread properties > ramp up period > 20 second one user being added

Thread properties > number of loops / we can give forever.

Thread properties > schedulers

* Again new > add > new samplers > httprequest (rename this request) for web application > give site name (no need to give http:) and choose method GET
* Then we need to get reports, so we need add> view results in table and also add results in tree.
* Then start > if we want re-use the test then we have to save.

To check the response, it can be response, response code, or check text in the response, duration of response.

Goto Users > and add Response Assertion

Then Apply to > Then Response field to test. Here we can select > response code add > 200 code

To get better view we can add > assertion Results.

We can duration Assertion > to find the response duration> we need to specify the response time.

* How to UI(web) Test. > web test plan.

Workbench > add HTTP(S) Test Script Recorder

or

We use Tools badboy software is only for windows> to record and playback tool and download the software.

Perform some action on website and export to Jmeter > save it>

Then to jmeter > new test plan > and open the saved file.

* Blazemeter is similar tool to use on both windows and mac> it is chrome plugin we need to add to the plugin.it is also used for record and play.

**How to run Jmeter command line:**

Step 1 > got jmeter/bin folder

Step 2> command to execute test script in command line

* Jmeter -n -t [location of jmeter test script] – l [location of log the results ]

-n means non GUI

-t means location of the test script

-l means location to log the results

* Jmeter -h 🡪 help for all commands
* Jmeter -? 🡪 help for all the commands

Note: if it on mac then use sh before jmeter