PERFORMANCE TESTING

What is performance testing?
It is a type of non-functional testing .
It helps us in determining the speed , responsiveness and stability of a computer , network , software which is subjected to a certain load.

Why are we choosing jmeter as a tool for performance testing?

- Firstly it is open source software.
- As jmeter is a pure java application it is platform independent.
- It has a friendly GUI.
- It has full multithreading framework which allows concurrent execution of threads(users).
- It has an ability to test different protocols,applications and servers like web-http,https , database via JDBC , TCP , Mail -SMTP, IMAP , POP3.

Jmeter installation
Link: https://jmeter.apache.org/download_jmeter.cgi

Files in jmeter folder:
/bin -- contains jmeter script for starting
/docs -- contains documentation files
/lib -- java library

Major components of jmeter

https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2017/08/JmeterFlowDiagram.jpg

Test Plan

This consists of all steps which execute the script and this execution happens in a sequential manner from top to bottom
The test plan must be saved before running

Thread Group

Thread Group is a collection of threads. Each thread represents one real user request to the server.

Samplers

This tellsJMeter to send requests to a server and wait for a response. There are different types of samplers. Few of them are FTP Request, HTTP Request , JDBC Request, Mail request, TCP request

Listeners

These elements gather information about the performance test.This is used to view results or metrics of the test. Elements involve View results in tree, View results in Table, Aggregate Report, Summary Report , .

There are several other elements of jmeter.

Jmeter serves as http proxy.

What is a proxy?
A proxy server is a program that acts as an intermediary between your client PC and server on the internet.

Ramp-up period-- delay between two threads

Preprocessor elements

This executes some action prior to a sampler request being made
Postprocessor elements

This executes some action after a sampler request has been made.

Execution order of the jmeter
0-- configuration elements.
1-- preprocessor elements
2-- timers
3--samplers
4--post processors
5--assertions
6--listeners

A JMeter test script is a collection of user activities that have been pre-recorded using a proxy. (Stored in the XML format with .jmx extension)

Steps to record a test script:

1)Firstly, create a new test plan. A test plan describes what JMeter should do when we run a test script.

2)Next, right-click on the newly created test plan and add a thread group. (Add->Threads (Users)->Thread Group) A thread group is used to simulate users for testing an application.

3)Add an instance of the HTTP(S) Test Script Recorder the add sub-menu accessed by right-clicking on the test plan. (Add->Non-Test Elements->HTTP(S) Test Script Recorder)

4)In the recorder instance created in the previous step, set the Target Controller field to the newly created Thread Group. This field can be accessed in the Test Plan Creation tab.

5)Thereafter, configure the port field to an unused port on your system.

6)We must instruct the recorder to bypass recording the loading of static elements like images. To do this, go to the request tab in the recorder

instance created earlier, and click on the Add Suggested Excludes button to add default static files' extensions. This can be modified as per convenience.

7)Since a user may pause for a while between successive requests, the need to add think time to our test script is evident. JMeter provides various timers. We will use a Uniform Random Timer here. With each timer, we associate some parameters. For a Uniform Random Timer, these are Random Delay Maximum and Constant Delay Offset. This timer samples a point from a Uniform Probability Distribution such that it lies between 0 and the Random Delay Maximum value. Thereafter, it adds the Constant Delay Offset to it. To modify the Constant Delay Offset value, use ${T} in the corresponding field.

8)JMeter would now act as an HTTP proxy and would listen to all the incoming and outgoing requests on the configured port.

9)Now, we configure the proxy settings in the browser to send requests to the JMeter proxy.

10)Click on the Start button available in the State tab in the recorder instance to start the recording.

11)Note that the JMeter Root CA certificate must be installed in the web browser to record encrypted web requests.

12)To do this,go to the bin directory in the JMeter directory to locate the file named ApacheJMeterTemporaryRootCA, and install it in the system as well as the browser being used for recording the test script. In Firefox, for example, one needs to go to the options page, move to the Privacy and Security tab, click on the View Certificates button, and then click on the Import button to add the JMeter's self-signed certificate.

13)Once the recording starts, execute the test scenario.

14)Thereafter, click on the Stop button in the Transaction Controller to stop the recording.

HTTP Cookie Manager

This has the same feature as a web browser. If you have an HTTP Request and the response contains a cookie, this automatically stores that cookie and will use it for all future requests to that particular website.

Useful listeners

1)View Results Tree

It contains all sample responses, allowing you to view the response for any sample along with the response codes.

2)Aggregate Report

It contains various fields like which tells number of samples ran, the Average time for a set of results, the median -this indicates not more than 50% of samples took more than this time, similarly we have 90%line, 95% line,99% line , Min - the shortest time for the samples with the same label , Max - The longest time for the samples with the same label, the error percentage, throughput ,sent and received kb/sec.

3)Summary Report

This is also similar to aggregate report except that it uses less memory.

References

https://jmeter.apache.org/usermanual/

https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2017/08/JmeterFlowDiagram.jpg