**Performance Testing with JMeter**

1. **Apache JMeter**

Apache JMeter is an open source software, a 100% pure Java application designed to load test functional behaviour and measure performance. It was originally designed for testing Web Applications but has since expanded to other test functions.

1. **Features of Apache JMeter**

Ability to load and performance test many different applications/server/protocol types: Web - HTTP, HTTPS, SOAP / REST Webservices, FTP, Database via JDBC, LDAP,Mail- SMTP, POP, IMAP and Native commands or shell scripts, TCP.

1. **Bandwidth**

The amount of data can be transmitted through a channel over a period of time. Example If we say bandwidth is 4 Mbps that means 4 Megabytes of data can be transmitted in one second.

1. **Connection Time**

It is the time taken by the request to reach from client to server.

1. **Response Time**

It comprises of three parts – Time taken by the request to reach from client to server + the time taken by the server to process the request + the time taken the response to reach back to client.

Response time= Latency + Processing time.

1. **Processing Time**

It is the time taken by the server to process the request received from the client. Processing a request means – take the input, apply the computation logic and generate the result.

1. **Latency Time**

It is the time taken by the request to reach the server + the time taken by the response to reach the client.

1. **Throughput Time**

It the number of request that can be serve/executed by the server in per unit time. For example – 5 request/sec.

1. **Bottleneck**

Used to describe a single part of a system that prevents further processing or significantly degrades the performance of the system as a whole.

1. **Concurrency**

It is the number of transactions/requests that can be executed at the same time.

1. **Key Performance Indicators/Benchmark**

The set of parameters which set the expected performance targets within the Production system. These include Page/API response time, throughput values, user/transaction/request concurrency, underlying infrastructure behaviour (e.g. Maximum Average CPU used, Minimum Free Memory Available, thresholds for remaining physical storage /disk usage, logging space etc).

**Components of JMeter:**

**The three most important components of JMeter are -**

1. **Thread Group**

In this component we define the No. of threads/virtual users, Ramp Up time and other details.

Ramp up time is the time taken by the JMeter to execute all the threads.

If No of Threads- 10 and Ramp Up Period is – 20 sec then each thread will take 20/10= 2 sec for execution.

1. **Sampler**

Using this component, we define/create the request which we need to test. For example- HTTP request, FTP request, SMTP request, LDAP request, JDBC request etc.

The most commonly used sampler is HTTP Request.

1. **Listener**

Using this component, we can view the performance test results of our requests. View Results Tree are some of the examples of the listener.