Load Testing :

Load testing is performance testing technique using which **the response of the system is measured under various load conditions**. The load testing is performed for **normal and peak load conditions**.

Load testing helps **to determine the behavior of an application when large numbers of users access the application** simultaneously. It is a type of performance testing which identifies the maximum operating capacity of an application. This helps to know whether the existing infrastructure is capable to run the application or not. Load testing is conducted to determine the number of concurrent users that an application can support without deterioration in performance. This testing is usually performed for **client/server and web-based application**.

Load Testing Process:

The Load testing process will be completed in the following steps:

Step1: Test environment setup

- In the first step, we will set up the test environment **to execute the load testing to ensure the testing can be done appropriately.**
- And the test environment should be set up near to the production environment as likely in terms of **network, hardware, software specifications etc.**

Step2: Load the test scenario or specify the performance criteria

- In the next step, we will define the performance criteria, which contain the **response time, reasonable limits on throughput, and the load test transaction.**
- And then, we create the **load test scenarios**, which **ensure the success criteria are finalized**.
- In the load testing, transactions are decided for an application and data is set for each transaction.

Step3: Execution of test scenarios

- Once we successfully create the load test scenarios, we will execute the particular test scenarios.
- But before we execute the load test scenarios, we have to set the different configurations and matrices to collect the information.
- The load on the server is matched by consecutively several virtual users to complete the tasks concurrently.
- And we can execute the entire scenario in virtual user groups or individual virtual users.

Step4: Analysis of the test result

- After executing the load test scenarios, we will analyze the test results.
- The load test Scenario can be inspected with the help of **LoadRunner** online monitors like:
  - **System resource**
  - **Run-time transaction**
  - **Network delay**
  - **Web resource**

Step5: Re-test

- The last step of the load testing process depends on the test result because if the test fails, we have to perform the same process repeatedly until the test result is passed and all the issues and bottlenecks are fixed

Advantages of Load Testing

There are several advantages of load testing as listed below:

Improved scalability

Load testing helps **to identify the number of users the application** can support. This helps in determining the need for additional infrastructure in case there is a demand for scaling the application.

Reduction in system downtime

Load testing gives **a better picture of an application's limitation when it goes live.** The solution to high volume traffic problem can be made beforehand which reduces the system downtime considerably.

Reduction in cost due to failures

The failures during production **can cause significant cost due to unavailability of application or any other such problem**. With load testing, the defects can be prevented before they arise reducing cost implications of failure.

Improved customer satisfaction

With lesser number of system downtimes and ability to serve to a large number of users, the overall customer satisfaction with the application increases which causes users to revisit the site more often.

Load Testing Examples:

Some basic examples of load testing are:

- Testing a printer by transferring a large number of documents for printing
- Testing a mail server with thousands of concurrent users
- Testing a word processor by making a change in the large volume of data

How to do Load Testing?

Load testing can also be performed without the help of any load testing tools. The basic steps to do load testing for an application are listed below:

- The first step involves creating a dedicated test environment for load testing
- The next step includes determining the Load test scenarios
- Then we determine the load testing transactions for the application that include:
    - Preparing test data for each transaction
    - Predicting the number of users accessing the application
    - Determining the connection speeds
    - Determining the different browsers and operating systems on the user's end
    - Configuring web, application and DB servers
- Execute the test scenario and monitor the results by collecting various metrics
- Analyzing the results for making recommendations
- Tuning the system and retesting it