

NEXT IT CAREER

Contact: 9392530568

7995138210

Duration: 75 days

Mode of Training: Online & Offline

PERFORMANCE TESTING COURSE

LOAD RUNNER WITH PROJECT



LOAD Runner

Chapter 1: Introduction of Software Testing

Module - I

1. Performance test life cycle

- Proof Of Concepts (POC)
- Statement Of Work (SOW)
- Non Functional Requirements gathering (NFR)
- Test Strategy / Test plan
- Work load model / Load Profiling
- Scripting
- Execution
- Analysis
- Reporting and recommendations

Module - II

2. Loadrunner Components

- **Virtual User Generator(Vugen)**
- **Controller**
- **Analysis**
- **Load generator**
- **Agent Process**

Virtual User Generator (Vugen)

- **Script recording and replay**
- **Scripting Enhancements**
- **Correlation**
- **Parameterization**
- **Check points**
- **C Functions usage**
- **Recording options**
- **Runtime Settings**

3.LR Protocols

- **Web (Http/Html)**
- **API Testing**
- **Web services**
- **Ajax TruClient**

4.Test data setup

- **Toad / My SQL (Theoretical overview)**

5.Data preparation tool

- **Virtual Table Server (VTS)**

6.Integration

- **GIT, ALM, Micro Focus PC Integration (Document overview)**

Module - III

8.Controller

- Manual scenario
- Goal oriented scenario
- PerfMon activities during load test
- Various types of graphs
- Controller Error Messages

9.Performance testing types

- Baseline
- Load test
- Stress test
- Endurance test
- Spike test
- Volume test
- Fail Over Test
- Capacity Test

10. Analysis - Client side analysis

- Test summary
- Running users
- Hits per second
- Throughput
- Average response time

Module - IV

9.Network traffic debugging tools

- Fiddler
- Developer tools (F12)
- HTTP watch

10. Analysis - server side analysis

- CPU Utilization of servers
- Memory utilization
- Connection distribution over servers
- DB Utilizations

11. Monitoring tools

- PerfMon
- Appdynamics
- Dynatrace

12. Profiling tools

- Jprofiler/Jvisual VM
- Eclipse MA

13. Bottle Necks

- Memory leakage
- Dead locks
- Load distribution

14. Data base monitoring

- AWR (Documental overview)

INCLUDING TRAINING:

1. Resume Preparation
2. Interview Questions
3. Mock Interviews
4. One Bank Project
5. Placement Assistance

NEXT IT CAREER

Contact: 9392530568

7995138210

Duration: 30 to 40 days

Mode of Training: **Online & Offline**

JMeter TESTING WITH PROJECT



Module 1 - PERFORMANCE TESTING

JMeter - Core2Advanced - Day Wise Topics

JMeter

JMeter - Core2Advanced - Day Wise Topics

BASICS

Day1:

- Basics of computer
- Keyboard short cuts
- Remove System & Browser history
- Introduction to Software Development & Software Testing
- Software Development Life Cycle (SDLC) & Phases
- Software Testing Life cycle (STLC) & Phases
- Types of Software Testing
- Functional Testing & Non-Functional Testing
- Tools Used in Functional & Non-Functional Testing
- Introduction to Performance Testing & JMeter
- Manual, Automation, Performance & Security Testing
- SDLC Methodologies
 - Water Fall model
 - V-Model
 - Agile Model - Jira Board & Confluence Real Time Explanation
- Terms used in Software Testing: - Defect, Bug, Bottlenecks,
- Vulnerabilities

- Defect/Bug Life Cycle
 - Defect life cycle phases
 - What is priority?
 - P1, P2, P3, P4
 - What is Severity?
 - S1, S2, S3, S4

Day2:

Basics of Performance Testing:

- Performance Testing technical definition
- Performance testing V/S engineering?
- Why Performance Testing Need for Performance Testing
- Symptoms of Application Slowness
- Examples of Loss occurred by many Brands due to poor Application performance
- Objectives of Performance Testing
- Why performance testing?
- Purpose of Performance Testing
- Which application should we performance test?
- Need for Performance Testing Tools
- Real Users & Virtual Users (or VUsers)
- What Performance Testing Tools Do?
- When Performance Testing can be Done?
- Tools used in performance testing?
- Why to Learn JMeter?
- RFI & RFP
- HTTP Request response Structure
- What is POD? And what is DC?
- Horizontal VS Vertical scaling
- Load Balancer
- Performance Testing Terminologies
- Performance Testing Pre-Requisites
- Types of Performance Tests
- Bench mark vs Base line testing

MODULE – 1

Note: All the below concepts will be explained with

real time documents

Day3:

- Proof of concept (POC)
- Statement of work (SOW)
- Performance testing environment setup

Day4:

- Non-Functional Requirements (NFR)
 - Competitor tool
 - General
 - Architectural
 - Business
- Entry & Exit Criteria

Day5:

- Test Strategy
- Test Plan
- MODULE - 2

Day6:

- JMeter Introduction, History, Versions, Protocols Supported & Its Features
- Which application should we performance test?
- Why performance tools came into picture?
- Understanding JMeter is Not a Browser
- How a Performance Testing Tool like JMeter Works?
- Need of Java Installation for JMeter
- Java (JDK & JRE) Installation
- Commands to Verify JDK & JRE Installation
- Which Java is Best to Use for JMeter?
- Java Environment/ System Variable (or Home Path) Setup
- How to Change Java in Use if multiple versions of Java is Installed in System?

- Pre-requisites to use JMeter
- JMeter Download & Launching on Windows OS
- JMeter 2 Launching Modes
- Importance of Launching JMeter from CLI or Non-GUI
- JMeter Directory Structure
- JMeter Application GUI/IDE Walkthrough
- JMeter Terminology
- Some other Points related to JMeter
- JMeter Download & Launching on MAC OS
- JMeter Download & Launching on Linux/ Unix/ Ubuntu OS

Day7:

- Core Concepts of Performance Testing:
- Servers & Its Types (web, App, DB)
- Protocol & Its Examples
- Performance Testing Life Cycle in JMeter
- Test Scenarios, Test Cases, Test Suite, Transactions, Recording, Enhancement, & Debugging
- Web protocol types
- URL Structure
- HTTP(s) Protocol: - Request, Response, Headers, Request Methods, & Response Codes
- Browser Developer Tool (F12), HTTP/HTML Requests, Embedded Resources
- Request, Response & Headers
- Types of HTTP Request Methods & CRUD Operations: - GET, POST, PUT & DELETE

Day8:

- Transaction (or User Action)
- Hits, Requests, Transactions, & Their Counts in Per Unit Time
- Cache, Cookies & User Session
- Server-Side & Client Side (or UI) Performance Testing
- Client-Server Application Architecture (1-Tier, 2-Tier, 3-Tier & N-Tier)
- Application Layers & Its Types (PL, BLL & DML)
- Web Server, App Server & DB Server & Their Functionality
- Web server, app server and DB server setup

- Thin Client & Thick (or Fat) Client Applications
- 2-Tier and 3-Tier Difference
- Why Application becomes Slow?
- Importance of Knowing the Application Architecture in Performance Testing

Day9:

- Terminologies in JMeter with respect to Performance Testing
- JMeter's 12 Major Elements (Or Components)
- Recording in JMeter, & Port & Proxy Server Setup
- Understanding Transaction, Request, Response, Headers, Request Methods,
- Response Codes, Protocol, URL, Port, Path, etc. in JMeter
- Different Views of Response in JMeter
- Transaction Controller, Transactions & Respective Requests, & Their view in View Results Tree
- Saving Recording Logs to a File & Use of Brushes
- Irrelevant Requests & Embedded Resources & Why to Filter Them?
- Port & Proxy Server Setup & Recording from Different Browsers
- How to Filter Irrelevant Requests & Embedded Resources?
- "Recording" Template of JMeter & Its Use
- What to Keep & Not to Keep?
- HTTP & HTTP(s)
- JMeter Certificate Installation in Different Browsers, Certificate Re-Generation, Domain Based Certificate Generation, & Steps for Certificate Re-Installation
- Use of Recording Controller in JMeter & Its uniqueness
- Use of Transaction Controller in JMeter & Its uniqueness

Day-10:

- JMeter 3rd Launching Mode, i.e. Proxy Mode
- Property Display (Non-Test) Element
- HTTP(s) Test Script Recorder Element, Its Attributes, & Its Best Practices Settings
- Best Practices for Recording in JMeter
- Why to record in Incognito mode Or with Cookies & Cache cleared in normal mode of Browser?

- Set of Approaches when Recording is Not Happening in JMeter
- Walk-through of JMeter's Directory: - Various Files & Folders
- How to Open a JMX file by Double Clicking It?
- JMeter's Properties Files
- Undo, Redo, & Backup Features in JMeter
- Increasing View Results Tree's Line Limitation
- Increasing JMeter Certificate's Expiry Time
- JMeter Plugin Manager, Plugin Installation & Uninstallation by 2 Ways
- Scenarios Identification & Documentation for Performance Testing of a Web Application (HTTP(s) Protocol)

Day-11:

- End to End Recording & Script Enhancement with Best Practices for above Scenario (Product Booking)
- Dynamic Values, Their Types, Importance & Functioning, & How & Why They Occur?
- Authorization/ Authentication Tokens (or Values) Examples
- JMeter Script Enhancement with Best Practices (continued)
- Where Dynamic Values May Occur in the Script?
- How to Identify Dynamic Values?
- Why & How to Handle Dynamic Values?
- Correlation & Parameterization
- Use of Regular Expression Extractor
- Use of Debug Sampler

Day-12

- JMeter Script Enhancement with Best Practices (continued)
- Correlation & Parameterization (continued)

Day-13

- JMeter Script Enhancement with Best Practices (continued)
- Correlation & Parameterization (continued)
- Redirection Concept (301, 302, 303, 304), etc.

Day-14

- JMeter Script Enhancement with Best Practices (continued)
- Correlation & Parameterization (continued)

- E.g. of Extracting a Value with Left Boundary but No Right Boundary
- Extracting Value from Response Header
- Use of Dummy Sampler
- Regular Expression Extractor's Attribute: - Default Value, Field to Check & Apply To
- HTTP Cookie Manager
- HTTP Cache Manager
- HTTP Protocol is Stateless Protocol
- How we make JMeter behave like a Real Browser? Ans: - 5 Settings
- Correlating Recording Log & Replay Log for a Request in case of any Failure

Day-15

- JMeter Script Enhancement with Best Practices (continued)
- Test Data Preparation & Use of CSV Data Set Config Element with my SQL
- Making Script more Realistic, Modular, Dynamic & Re-Usable
- Correlation & Parameterization (continued)
- Regular Expression Extractor's Attribute: - Match No.

Day-16

- JMeter Script Enhancement with Best Practices (continued)
- Correlation & Parameterization (continued)
- Test Data Preparation (continued)
- `__Random()` function
- `__RandomDate()` function
- `__RandomString()` function

Day-17

- JMeter Script Enhancement with Best Practices (continued)
- Adding Response Assertion with Best Practices
- Response Assertion & Its Attributes

Day-18

- JMeter Script Enhancement with Best Practices (continued)
- Adding Response Assertion with Best Practices (continued)

- Response Assertion & Its Attributes (continued)
- Think Time, Custom Think Time & Pacing in JMeter
- Use of User Defined Variable Element

Day-19

- JMeter Script Enhancement with Best Practices (continued)
- Think Time, Custom Think Time & Pacing in JMeter (continued)
- Error Handling using Result Status Action Handler element in JMeter
- Test Script Stabilization
- Thread Group's Attributes: - Users, RampUp, RampDown, Loop Count,
- Duration, Delay, etc.
- Deleting Or Disabling All Listeners & Unnecessary Elements
- Validate option
- Start No Pauses option

Day-20

- End to End Recording & Script Enhancement with Best Practices for
- another Scenario (User Registration)

Day-21

- End to End Recording & Script Enhancement with Best Practices for another Scenario (User Registration) (continued)
- __Random() function
- __RandomString() function
- End to End Recording & Script Enhancement with Best Practices for 3rd
- Scenario (Login)
- Use of Aggregate Report Listeners
- TimeStamp (or EpochTime) & Its Handling in JMeter
- __time() & __timeShift() function
- How to Generate a Never Repeating Random Number Or a Unique Number Or a Unique String in JMeter?

Day-22

- Regular Expression in JMeter: -
- Meta Characters in Regular Expression
- Writing a Regular Expression
- What is (.+?) & Why we Use It?
- Regular Expression Extractor & Its Attributes

Day-23

- Regular Expression in JMeter (continued)
- Regular Expression Extractor & Its Attributes (continued)
- Dynamic Values Extraction in JMeter with Realtime Use Cases Examples:
 - The General Expression
 - E.g. of Multiple Values Extraction by Ignoring Middle Values
 - E.g. of Escape Character
 - E.g. of Extracting a Value in Newline
 - E.g. of Extracting a Value with Left Boundary but No Right Boundary

Day-24

- Realtime Use Cases Examples of Dynamic Values Extraction in JMeter
- (continued): -
- E.g. of Extracting a Value with both Varying Left & Right Boundary
- E.g. of Extracting the Single Value in Response with No Left & No Right Boundary
- E.g. of Extracting Complete Response
- E.g. of Extracting Response (Status) Code
- E.g. of Extracting Response Message
- E.g. of Extracting a Value from Response Header
- E.g. of Extracting Complete Headers
- E.g. of Picking Value Sequentially (Or in a Pattern) by Each User
- E.g. of Capturing Last Dynamic Value
- __V() function

Day-25

- CSV Data Set Config & Random CSV Data Set Config
- Boundary, JSON, XPath & CSS Extractors
- Duration, Size & other Assertions

MODULE – 3

Day-26

- Test Execution with Best Practices Or Best Practices for Load Testing in
- JMeter: - Settings in Script, in “user. Properties” file & Heap Size
- JMeter Heap Size (or Java Memory)
- How & Why to Increase JMeter’s Heap Size?
- Understanding Impacts of Heap Size in functioning of JMeter
- Up to how much Memory can be increased?
- Factors affecting User Load generation by JMeter from a Single System
- How much User Load can JMeter generate from a Single System & How to find that value?
- Use of J-Visual VM to find memory consumption by JMeter

Day-27

- Test Execution & JTL file Generation from Non-GUI Mode
- Summarizer of Non-GUI Mode in Detail
- HTML Report Generation from Non-GUI Mode with Best Practices
- HTML Report with Transactions & Requests
- Understanding JMeter HTML Report
- HTML Report with Transactions, Requests & Embedded Resources

Day-28

- HTML Report with only Transactions
- HTML Report with only Needed Transactions & Requests
- Understanding Execution Commands with Best Practices
- Importance or Beauty of JTL file
- Use of View Results in Table Listeners
- Ignoring Embedded Resources Failures while Running the Test in JMeter
- Response Time Values in Seconds in HTML Report
- Decreasing the Summarizer Interval Time

- Disabling Embedded Resources Renaming as of Parent Request
- 70%, 80% & 90% in HTML Report & in Aggregate Report Listener

Day-29

- Stopping Test Execution in Non-GUI Mode
- Test Execution, JTL file Generation & HTML Report Generation from GUI Mode
- Use of Simple Data Writer Listener
- Saving Complete Request & Response of a Test while Test Execution to a File (JTL or XML)
- Saving Request & Response for Only Failed Requests of a Test while Test
- Execution to a File (JTL or XML)
- Test Execution Commands for Proxy Mode
- Understanding JMeter HTML Report (continued)
- APDEX in JMeter HTML Report
- 90% or 95% or 99% Response Time in Detail
- Why 90% Response Time is Used in Performance Testing?
- Graphs in JMeter HTML Report

Day-30

- HTTP Response Codes (or Status Codes)
- Types of Performance Testing
- Concurrent Users & Simultaneous Users
- Test Run, Analysis & Reporting
- Baseline, Bottlenecks & Benchmark
- Why Application becomes Slow?
- Importance of Knowing the Application Architecture in Performance Testing
- Latency, Bandwidth, Throughput, Response Time, Connect Time, Service Time, Queue Time, Standard Deviation
- Parameterizing Important Parameters Using `__P()` function & Why to Use this function?
- Passing Arguments from CLI in Non-GUI Execution
- Assigning Values from JMeter's "user.properties" File to Variables declared using `__P()` function & Using them in Non-GUI Test
- Creating Own Custom Properties File & Passing That Properties File from CLI in Non-GUI Execution

- Running 2 or More JMeter Test Scripts (or JMX Files) Sequentially in One Go in Non-GUI & GUI mode

Day-31

- Absolute & Relative Path Concept in JMeter
- Debugging of Script in JMeter: - 4 helpful options
- Log Viewer, Types of Log Level, & Example
- JMeter & Distributed Load Testing using Load Generators (LGs) (Master & Slave Concept Or Remote Testing): -
- Pre-Requisite Configuration (Or Requirements) to Do this Setup
- Making Communication Set-up b/w Master & Slave JMeters - 2 Ways
- Distributed Test Execution from GUI & Non-GUI Modes
- Limitations of Distributed Load Testing in JMeter
- Errors Related to Distributed Load Testing in JMeter
- Alternate Way of Distributed Load Testing in JMeter

Day-32

- JMeter & InfluxDB - Grafana Integration (with InfluxDB v1.x)
- Jmeter & Prometheus - Grafana Integration (with Prometheus)

Day-33

- JMeter & Jenkins Integration
- Running a JMeter Job in Jenkins
- Running a JMeter Job with Arguments in Jenkins & HTML Report Generation
- Running a JMeter Job with Integration of Jenkins Performance Plugin
- Running a Parametrized JMeter Job with Arguments in Jenkins

Day-34

- Test Suite Creation in JMeter OR Merging & Running Two or More Scenarios/Thread Groups in JMeter
- Understanding Simple Way to Create Test Suite
- Workload Modelling or User Load Distribution across different Scenarios
- Test Suite Execution & Its HTML Report Generation
- Use of Module Controller & Test Fragment to Create Test Suite

- Use of Include Controller to Create Test Suite

Day-35

- Scope of JMeter Elements & Variables
- Local & Global Variables
- Execution Order (or Presidency) of JMeter Elements
- 3 Ways to Take Help in JMeter for Its Elements & Functions
- JMX, JTL, CSV, XML, HTML: - Understanding Them
- BlazeMeter Organization, Plugins offered by It, & Execution in BlazeMeter Cloud
- JMeter Intro & Pro Certification
- 3rd Party Ways for Recording & Exporting to JMeter

Day-36

- 3rd Party Ways of Recording & Exporting to JMeter
- Custom Script Creation using cURL cmd & Importing to JMeter
- Custom Script Creation using HAR & Exporting to JMeter
- Capturing Traffics using Fiddler tool & Exporting to JMeter
- Recording using BlazeMeter Chrome Plugin & Exporting to JMeter
- Limitations of 3rd Party Ways for Recording

Day-37

- JMeter Elements, Their Sub-Elements & Their Attributes in Detail: -
- Test Plan Element of JMeter: -
- Non-Test Elements of JMeter: -
- Threads & Thread Group Elements of JMeter: -
- Thread Group
- Setup Thread Group
- TearDown Thread Group
 - Stepping Thread Group
 - Ultimate Thread Group
 - Concurrency Thread Group

Day-38

- Controller Elements of JMeter: -
- Recording Controller
- Transaction Controller

- Simple Controller
- Loop Controller
- Runtime Controller
- Random Controller
- Random Order Controller
- Interleave Controller
- Once Only Controller
- Parallel Controller
- Throughput Controller
- Switch Controller
- If Controller

Day-38

- While Controller
- Module Controller
- Include Controller
- ForEach Controller
- Critical Section Controller

Sampler Elements of JMeter: -

- HTTP Request
- Debug Sampler
- Dummy Sampler
- JDBC Request
- FTP Request
- WebDriver Sampler
- Access Log Sampler
- SMTP Sampler
- Mail Reader Sampler
- Flow Control Action
- BeanShell (& JSR223) Sampler
- OS Process Sampler

Day-39

- Config Elements of JMeter: -
- HTTP Header Manager
- HTTP Cookie Manager
- HTTP Cache Manager

- HTTP Request Defaults
- User Defined Variables
- CSV Data Set Config & Random CSV Data Set Config
- Counter Config Element
- Random Variable Config Element
- HTTP Authorization Manager
- Windows Authentication or Browser Pop Up Handling
- JDBC Connection Configuration
- FTP Request Defaults
- WebDriver Config
- Assertion Elements of JMeter: -
- Response Assertion
- Duration Assertion
- Size Assertion
- BeanShell (& JSR223) Assertion

Day-40

- Timer Elements of JMeter: -
- Constant Timer
- Uniform Random Timer
- Gaussian Random Timer
- Poisson Random Timer
- Think Time in JMeter

Day-41

- Synchronizing Timer
- Big Billion Day or Black Friday or Rendezvous Scenario
- Throughput in PT
- Constant Throughput Timer
- Pacing in JMeter
- Little's Law to Calculate Pacing, Think Time, Number of VUsers, etc.
- Listeners Elements of JMeter: -
- Pre-Processors Elements of JMeter: -
- Post-Processors Elements of JMeter: -

Day-42

- **JMeter & Bean Shell (or JSR223) & Understanding It w.r.t. Java with**
- **Realtime Use Cases Examples: -**
- **Introduction**
- **BeanShell (& JSR223) Sampler**
- **BeanShell (& JSR223) Pre-Processor**
- **BeanShell (& JSR223) Post-Processor**
- **BeanShell (& JSR223) Assertion**
- **Variables, Integers, Strings**
- **Logging/Printing Values in JMeter Log Viewer & JMeter Console: -
log.info(), print() & System.out.println()**
- **vars.put() & vars.get()**
- **Integer to String Conversion**

Day-42

- **Saving/Writing a Correlated Value to a File**
- **Saving/Writing multiple Correlated Values to a File**
- **Overwrite & Append operations**
- **JSR223 Element w.r.t. to Java**
- **Test Data Preparation & Saving/Writing User Credentials to a File**
- **Test Data Preparation & Saving/Writing User Credentials to a File
for only Success Transactions**
- **String Comparison**

Day-43

- **Saving/Writing User Credentials for Success Or Failed Users from
a Long List of Test Data to a File**
- **Saving/Writing Users with their Booked Order Details to a File**
- **Addition Or Other Mathematical Operations to a Number using
JMeter Functions Or Java Code**
- **String to Integer Conversion & Integer to String Conversion**

Day-44

- **Storing All Matches Or All Values Stored in an Array Variable to a
Single**
- **Variable, Shuffling, Removing Or Saving/Writing to a File**
- **Replacing or Removing a Character or Spaces from a Value**

- Trimming Start & End Spaces from a Value
- `prev.get` & `ctx.get`
- Saving Complete Response to a Variable
- Saving a Single Value in Response to a Variable
- Failing/Passing a Request based on certain Condition & Stopping User on
- Failure (E.g. of BeanShell Assertion)

Day-45

- Creating & Deleting Files & Folders: - All Files, Files with a Particular Extension, Clearing a Directory (or Folder)
- Passing a Value from One Thread Group to Another Thread Group:
_____setProperty(),.property() & props()
- Looping one or set of Transactions based on certain Condition (E.g. of While Controller)
- Booking an Order till a Particular Amount is Achieved in “Add to Cart” Transaction (E.g. of While Controller)
- Executing different Transactions based on certain Cases or Conditions
(E.g. of Switch Controller)
- Error Handling in JMeter

Day-46

- JMeter & FTP Server Testing (File Upload & Download)
- JMeter & HTTP(s) File Download Scenario
- JMeter & HTTP(s) File Upload Scenario

Day-47

- JMeter & REST API Testing
- API testing using Postman
- Use of JSON Extractor
- JMeter & SOAP API Testing

Day-48

- JMeter & Database (Queries) Testing

Day-49

- Server-Side Matrices
- JMeter & PerfMon for Server Monitoring
- Client-Side (or UI) Matrices
- Client-Side (or UI) Performance Testing Tools

Day-50

- JMeter & Selenium WebDriver Integration for Page Load Testing (or UI
- or Client Side or User Experience Testing)

Day-51

- JMeter & IP Spoofing (or Geo-Location Testing)
- JMeter & Network Speed Simulation to Test at Different Network Bandwidths (or Network Throttling)

Day-52

- JMeter Functions

MODULE - 4

Day-53

- Web vitals using Light House
- Load balancing techniques
- Thread dump
- Heap Dump
- Garbage Collection
- Dynatrace
- AppDynamics
- Eclipse-MAT
- J Visual-VM /J-Profiler

INCLUDING TRAINING:

- 1. Resume Preparation**
2. Interview Questions
- 3. Mock Interviews**
4. One Bank Project
- 5. Placement Assistance**