COURSE TABLE OF CONTENTS

Selenium Grid 4 Distributed Test Automation

OEM: Selenium • Duration: 3 Days (18 hrs)

COURSE MODULES & TOPICS

Module 1: Introduction to Selenium Grid

- Overview of Selenium Automation Framework
- Need and importance of Selenium Grid
- Selenium WebDriver vs Selenium Grid
- Benefits of distributed test execution
- Selenium Grid architecture and components
- Introduction to Selenium Grid 4

Module 2: Selenium Grid Architecture

- Hub and Node architecture - traditional approach
- Selenium Grid 4 architecture
- Router, Distributor, Session Map, New Session Queue
- Event Bus and Node components
- Request and response flow
- Understanding Grid execution lifecycle

Module 3: Selenium Grid 4 Installation and Configuration

- Prerequisites: Java and Selenium
- Downloading Selenium Server
- Setting up Selenium Grid using standalone mode
- Starting Selenium Grid using command line
- Configuring Hub and Node
- Understanding Grid configuration files
- Accessing Selenium Grid Console
- Monitoring registered nodes and sessions

Module 4: Browser and Driver Configuration

- Chrome, Firefox and Edge browser configuration
- WebDriver and browser driver management
- Browser capabilities and browser options
- Platform and browser version configuration
- Running basic test cases through Selenium Grid

Module 5: Remote WebDriver

- Introduction to RemoteWebDriver
- Local WebDriver vs RemoteWebDriver
- Connecting test scripts to Selenium Grid
- Configuring Grid URL
- Creating remote browser sessions
- Managing browser sessions and timeouts

Module 6: Desired Capabilities and Options

- Introduction to browser capabilities
- ChromeOptions, FirefoxOptions and EdgeOptions
- Setting browser name and platform name
- Configuring browser versions
- Handling browser-specific configurations
- Using capabilities for node selection

Module 7: Parallel Test Execution

- Introduction to parallel testing
- Benefits of parallel execution
- Configuring parallel execution using TestNG
- Parallel execution at test, class and method levels
- Configuring thread count
- Running multiple browser sessions simultaneously
- Managing concurrent test execution
- Handling thread safety in WebDriver

Module 8: Maven and TestNG Integration

- Selenium Grid dependencies in Maven
- TestNG suite configuration
- Parameterization of browser and platform
- Cross-browser test execution
- Test execution using XML configuration
- Generating execution reports

Module 9: Advanced Selenium Grid Configuration

- Standalone, Hub-Node and fully distributed modes
- Dynamic node registration
- Configuring multiple nodes
- Configuring maximum concurrent sessions
- Customizing Grid configuration
- Managing node availability and session capacity
- Understanding Grid status and health checks

Module 10: Advanced Parallel and Cross-Browser Testing

- Executing tests across multiple browsers
- Cross-browser and cross-platform testing
- Parallel execution across multiple machines
- Browser and platform combinations
- Handling execution failures
- Retry mechanisms and test stability
- Managing browser session lifecycle

Module 11: Docker Integration with Selenium Grid

- Introduction to Docker for test automation
- Docker images for Selenium
- Setting up Selenium Grid using Docker
- Running Selenium Hub and Nodes using containers

- Docker Compose configuration
- Scaling browser nodes
- Running parallel tests using Docker-based Grid

Module 12: Monitoring, Troubleshooting and Best Practices

- Selenium Grid Console and monitoring
- Analyzing Grid logs
- Identifying node and session failures
- Debugging remote execution issues
- Managing resource utilization
- Selenium Grid security considerations
- Best practices for distributed test automation

Module 13: Hands-on Practical Project

- Configure Selenium Grid 4 environment
- Connect Java automation scripts using Remote WebDriver
- Execute TestNG test suites in parallel
- Perform Chrome and Firefox cross-browser testing
- Configure Docker-based Selenium Grid
- Generate and analyze test execution reports