Java Performance Tuning – Course Outline

1 Duration

- 12.5 hours

2 Objectives

At end of this workshop, participants will able to :

- Understand the basic principles of Java Performance Tuning and how it affects the overall system performance
- Identify performance issues, measure and analyze performance characteristics, and apply various techniques to enhance the performance of Java applications
- Gain insights into memory allocation and garbage collection, threading and synchronization
- Get knowledge on performance monitoring tools and methods, and understanding and resolving common performance problems

3 Audience

- Attendees should be experienced Java developers who are interested to learn how to monitor, analyze and optimize the Java application performance

4 Pre-requisite

- Good knowledge on Java programming

5 Hardware & Network Requirements

- Desktop/Laptop with minimum 8GB RAM
- Open Internet connection (minimum 5 Mbps per user) and Local Admin Access

6 Software Requirements

- Windows / Linux / Mac OS
- Java 17
- Eclipse 4.8+ / STS 4+ / Intellij IDE
- Git 2.3+
- Maven 3.8+

7 Outline

Day 1 (4 hrs)

Module-1: Intro to Performance Tuning

- Introduction to Performance Tuning
- Java Platform Overview
- JVM Architecture and Internals

Module-2: Performance Bottlenecks, Analysis and Monitoring Tools

- Potential Performance Bottlenecks
    - Memory Leaks
    - High CPU Utilization
    - Thread Concurrency Issues
    - Garbage Collection Overhead
    - Network Latency/Timeouts
- Management and Monitoring Tools Overview
    - Java VisualVM
    - JConsole
- Detecting Memory Leaks - Heap Dump Analysis
- Detecting reasons for High CPU Utilization

Day 2 (4 hrs)

Module-3: Detecting Performance Bottlenecks and Profiling Tools

- Profiling
    - Memory Profiling
    - CPU Profiling
- Profiling Tools
    - Java VisualVM
    - Java Mission Control
    - JProfiler
    - YourKit
- Detecting Garbage Collection Overhead - GC Log Analyzer
- Detecting Concurrency Issues - Thread Dump Analysis

Day 3 (4.5 hrs)

Module-4: Tuning of Java Applications

- JVM Tuning
    - Memory Tuning
    - GC Tuning
    - JIT Tuning
- Code Optimization
- Caching - EhCache, MemCache, Redis, etc
- Load Balancing
- Distributed Computing