

# Java Performance Tuning Course Contents (5 days)

By Dr. Vishwanath Rao

## Day 1: Introduction to Java Performance Tuning

- Understanding performance tuning fundamentals and methodologies
- Importance of performance optimization in Java applications
- Overview of common performance issues and challenges
- Introduction to performance measurement and profiling tools

## Day 2: JVM Internals and Garbage Collection Tuning

- Understanding JVM architecture and memory management
- Overview of JVM internals: heap, stack, metaspace
- Garbage collection fundamentals and algorithms
- Analyzing garbage collection logs and performance metrics
- Techniques for tuning garbage collection parameters

## Day 3: Profiling and Performance Analysis

- Profiling techniques and tools (e.g., VisualVM, YourKit, JProfiler)
- Analyzing CPU, memory, and I/O usage
- Identifying performance bottlenecks using profilers
- Thread analysis and optimization strategies
- Memory leak detection and resolution

## Day 4: JVM Tuning and Optimization

- JVM flags and command-line options for performance tuning
- Memory management optimization: heap sizing, generational garbage collection
- JIT compiler optimizations and HotSpot internals
- Classloading optimization and reducing class metadata footprint
- Tuning for low-latency and high-throughput applications

## Day 5: Advanced Topics and Best Practices

- Performance tuning for specific application types (e.g., web applications, microservices)
- Performance testing methodologies and best practices

- Tuning for concurrency and parallelism
- Distributed systems performance considerations
- Real-world case studies, best practices, and optimization strategies