

Extreme Java Performance Tuning

Course Name	Extreme Java Performance Tuning
Course Description	<p>This course covers everything there is to know about java performance with details and tips throughout the development lifecycle, from planning to development to profiling and tuning in the lab or in production.</p> <p>individual chapters will discuss memory management, garbage collection, just in time compiler, multithreading, collections, sdk tips, native memory, profiling, monitoring, analyzing heap dumps and thread dumps.</p>
Target Population	Experienced Java developers, performance engineers, consultants, and architects interested in improving the performance of their Java technology applications
Pre-requisites	good working knowledge of java
Course Objectives	<p>Upon completion of the course, participants will be able to:</p> <ul style="list-style-type: none"> • Understand how to approach performance problems • Understand the steps required to assure adequate performance throughout the development life cycle • Monitor Windows and Linux resource utilization • Monitor the JVM • Profile Java applications • Tune garbage collectors • Tune Just in Time (JIT) compilers • Java 11 new features and performance considerations upgrade path from earlier versions and best practices.
Course Topics	<p>Module 1 - Introduction to Performance</p> <ul style="list-style-type: none"> • Perceived performance • Developing high performance software • Capacity Planning • Performance KPIs • Performance Testing • Performance Testing tools • Coding for performance • Microbenchmarks <p>Module 2 – Monitoring the OS</p> <ul style="list-style-type: none"> • CPU • IO • Network • Windows • Linux • CPU And Java <p>Module 3 – Java Monitoring Tools</p> <ul style="list-style-type: none"> • JVisualVM • JMC • JFR • Linux command line

Module 4 – JIT Compiler

- Compiler Types
- Compiler Levels
- Compiler Flags
- Code cache
- Compilation thresholds
- OSR
- Optimizations
- Deoptimizations
- Monitoring compilation

Module 5 – Memory

- JVM Memory model
- Tuning Memory
- Heap Dumps
- Histograms
- Troubleshooting memory issues
- Canonical Objects
- Object Lifecycle
- Object Pools and Object Reuse
- Thread Local
- Reference API (Weak, Soft, Phantom)

Module 6 – JSE Performance

- Buffered IO
- Classloading
- Random
- Exceptions
- Strings
- Collection API

Module 7 – Garbage Collection

- In depth review of GC algorithms
- Batch VS Online
- GC Optimizations
- GC Flags
- Best Practices

Module 8 – Multithreading

- Thread Pools
- ForkJoinPool
- Automatic Parallelization
- Synchronization
- Compare And Swap
- Monitoring Threads

	<p>Module 9 – JEE Performance</p> <ul style="list-style-type: none"> • Web Container Performance • EJB 3 Session beans • XML & XML Validation • JSON • Factories <p>Module 10 – JDBC and DB Performance</p> <ul style="list-style-type: none"> • JDBC Driver Types • Prepared Statements • Statement pools • JDBC Connection Pools <p>Module 11 – Native Memory</p> <ul style="list-style-type: none"> • Basic Concepts • NMT (Native Memory Tracking)
Course Duration	03 days (24 hours)