



Next Level Java 9 Programming | Intermediate Java 9

Explore Jigsaw, JShell, Performance Enhancements, Migrating, Monitoring, Optimizing & More

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Course Snapshot

- **Course: Next Level Java 9 Programming | Intermediate Java (TT2209)**
- **Duration:** 4 days
- **Audience & Skill-Level:** This is an **intermediate level** Java programming course geared for experienced Java developers seeking to improve their Java applications using the newest features in Java 9.
- **Version:** This course is also available for Java 8, Java 11 or current Java versions. Please inquire for details.
- **Hands-on Learning:** This course is approximately **50% hands-on**, combining expert lecture, real-world demonstrations and group discussions with machine-based practical labs and exercises. Student machines are required.
- **Delivery Options:** This course is available for **onsite private classroom presentation, live online virtual presentation**, or can be presented in a **flexible blended learning format** for combined onsite and remote attendees. Please also ask about our **Self-Paced / Video / QuickSkills or Mini-Camp Flex Hours / Short Course** options.
- **Public Schedule:** This course has active dates on our live-online open enrollment **Public Schedule**.
- **Customizable:** This course agenda, topics and labs can be further adjusted to target your specific training skills objectives, tools and learning goals. Please inquire for details.

Overview

Next Level Java 9 Programming is a four-day, hands-on fast-track course geared for experienced developers who have prior working knowledge of basic Java 8 or Java 9 who want to take advantage of the newest features of Java 9 that can help them improve performance and functionality of their Java 9 applications. Students will explore and learn how to leverage Modules, scale applications into multi-core environments, improve performance, and become a more effective Java 9 developer.

Learning Objectives

Students will leave this course armed with the required skills to improve their Java applications using sound coding techniques and best practices.

This “skills-centric” course is about **50% hands-on lab and 50% lecture**, designed to train attendees in advanced development skills, coupling the most current, effective techniques with the soundest industry practices. Working in a hands-on learning environment, guided by our expert team, attendees will learn to:

- Develop modular applications in Java
- Utilize the tooling that is provided in Java 9 to migrate, monitor and optimize applications
- Use the new JShell tool to quickly test java constructs
- Understand how the implementation of the String class has been updated to decrease the memory footprint
- Use the enhancements made to the Concurrency API, working with CompletableFuture instance of Thread pools

Specific Java 9 features that are covered in the course include:

- The Java Module System (project Jigsaw)
- JShell
- Updated try-with-resources
- Performance enhancements in Java 9
- Multi-Release Jar files

Need different skills or topics? If your team requires different topics or tools, additional skills or custom approach, this course may be further adjusted to accommodate. We offer additional Java, JEE and Java for Web application development, design, testing, services, application security and other related topics that may be blended with this course for a track that best suits your needs. Our team will collaborate with you to understand your needs and will target the course to focus on your specific learning objectives and goals.

Audience & Pre-Requisites

This is an **intermediate level** Java development course geared for students experienced with Java 8 or later programming essentials who wish to quickly get up and running with advanced Java skills. This course does not cover Java programming fundamentals.

Take Before: Students should have practical skills equivalent to or should have received training in the following topic(s) as a pre-requisite:

- TT2100-J9 Introduction to Java 9 Programming for OO Experienced Developers
- TT2120-J9 Java 9 Programming Basics for Developers new to OO

Take After: Our core Java training courses provide students with a solid foundation for continued learning based on role, goals, or their areas of specialty. Our object oriented, Java developer learning paths offer a wide variety of follow-on courses such as:

- Continued Java & JEE training: Intermediate to Advanced Java, JEE Essentials, Java for Web, Spring / Spring Boot, Microservices / Web Services / REST, RxJava, Tuning, Patterns & More
- TDD / Test Driven Development, JUnit / Unit Testing, Agile development training
- Secure Java Coding / Java Security and secure application development training
- Mobile developer / Android training
- Please contact us for recommended next steps tailored to your longer-term education, project, role or development objectives.

Enhanced Learning Services: Please also ask about our **Pre-Training Class OnRamp & Prep / Primer** offerings, **Skills Gap Assessment Services, Case Studies, Knowledge Check Quizzes, Skills Immersion Programs & Camps, Collaborative Mentoring Services and Extended Learning Support & Post Training** services.

Course Topics / Agenda

Please note that this list of topics is based on our standard course offering, evolved from typical industry uses and trends. We'll work with you to tune this course and level of coverage to target the skills you need most. Topics, agenda and labs are subject to change, and may adjust during live delivery based on audience skill level, interests and participation.

Session: Java 9 Updates

interfaces (Java 8)

- Private methods in interfaces (Java 9)

Lesson: Review of What is New in Java 9

- Overview of 'smaller' Java 9 topics
- Java versioning
- The JDK/JRE file structure
- Deprecation
- The jdepscan tool
- Multi-Release JAR Files
- HTML 5 compliant JavaDoc

Session: The Java Module system (Jigsaw)

Lesson: Why Jigsaw?

- Problems with Classpath
- Encapsulation and the public access modifier
- Application memory footprint
- Java 8's compact profile
- Using internal JDK APIs

Lesson: Milling Project Coin

- Changes made to the language since Java 6
- Multi-catch
- Using effectively final variables in try-with-resources
- Suppressed Exceptions
- Binary literals
- Reserved underscore (Java 9)
- Type inference in anonymous classes (Java 9)
- @SafeVargs (updates in Java 9)
- Default and static methods in

Lesson: Introduction to the Module System

- Introduce Project Jigsaw
- Classpath and Encapsulation
- The JDK internal APIs
- Java 9 Platform modules
- Defining application modules
- Define module dependencies
- Implicit dependencies
- Implied Readability
- Exporting packages

Lesson: The Module Descriptor

- Define module requirements
- Explain qualified exports
- Open modules for reflection
- Use ServiceLoader
- The provides and uses keywords

Lesson: Working with Modules

- Being backwards compatible
- The ModulePath and ClassPath
- Unnamed Modules
- Automatic Modules
- The JLink tool

Session: JShell

Lesson: JShell

- Introduction to JShell
- Running Expressions in JShell
- Importing packages
- Defining methods and types
- Using the JShell editor
- Save and loading state

Session: More Java 9**Lesson: Other New Java 9 Features**

- Enhancements on the Optional class
- Improvements made in the Process API
- The Stack-Walking API
- The HTTP2 Client
- The Multi-Resolution API

Lesson: Performance Optimizations

- Performance in Java 9
- Compact Strings
- String deduplication
- Ahead-Of-Time Compilation
- Hotspot Diagnostic commands
- The G1 Garbage collector
- Variable and Method Handles

Lesson: Memory Management (Optional)

- Understand memory management in Java
- Discuss the various garbage collectors
- The Garbage-First (G1) Garbage Collector

Session: Multithreading and Concurrency**Lesson: Multithreading**

- Principles of Multithreading
- Creating a Threaded Class
- Basic Features of the Thread Class
- Thread Scheduling
- Thread Synchronization

Lesson: Concurrent Java

- Concurrent Locks are Explicit and Flexible
- Executor Interfaces Provide Thread Management
- Challenges for Concurrent Use of Collections
- Concurrent Collections
- Atomic Variables Avoid Synchronization

Lesson: Java 8 Concurrency Updates

- The common thread pool
- Atomic variables
- LongAdder and LongAccumulator
- CompletableFuture
- Non-blocking asynchronous tasks

Session: Reflection and References**Lesson: Introspection and Reflection**

- Reflection classes
- Introspection
- Dynamic invocation of methods
- Using annotations
- Type annotations
- Receiver parameter

Lesson: Reference Objects

- List the kinds of object references available in Java
- Introduce Weak, Soft and PhantomReference
- Explain the ReferenceQueue

Session: Effective Java**Lesson: Objects, Declarations, and Initializations**

- Abstraction and Responsibilities
- Low Coupling
- Programming principles
- Inheritance

Lesson: Exceptions

- Proper use of Exceptions
- Managing state in exceptional situations
- Checked vs. Unchecked Exceptions

Session: Writing High-Performance Applications**Lesson: Profiling and Benchmarking**

- List and describe the two types of benchmarks
- Describe the criteria that should be considered when constructing a benchmark plan

- Name the three most useful targets for profiling
- List four common tools/techniques for profiling
- Describe two strategies for improving performance as a result of profiling data
- List and explain the five most common problem areas for good performance with Java

Lesson: Profiling Tools

- Use the JDK to collect runtime profiling data
- Successfully read the profiling data generated by the JDK to detect performance bottlenecks
- Instrument your own code to collect method execution time

Lesson: Code Optimization Techniques

- List three potential problems with strings
- List two ways to optimize loops
- Describe the advantages of private and final methods
- List two advantages of collections over vectors and hashtables
- List 4 other code and system optimizations

Lesson: Code Optimization Myths

- Debunk several myths of Java performance tuning
- Synchronization trade-offs
- Setting methods to be final
- String is not always bad
- Revisit the fundamentals of Java code performance
- How to detect a performance myth

Lesson: Design Optimization Techniques

- List five ways to optimize Java program design

Course Materials: Each student will receive a **Student Guide** with course notes, code samples, software tutorials, step-by-step written lab instructions, diagrams and related reference materials and links (as applicable). Students will also receive the project files (or code, if applicable) and solutions required for the hands-on work.

Hands-on Setup Made Simple! Our dedicated tech team will work with you to **ensure your student machines and learning environment is setup, tested and ready to go** well in advance of the course delivery date, ensuring a smooth start to class and seamless hands-on experience for your students. We offer several flexible student machine setup options including **guided manual set up** for simple installation directly on student machines, or **cloud based / remote hosted lab solutions** where students can log in to a complete separate lab environment minus any installations, or we can supply **complete turn-key, pre-loaded equipment** to bring ready-to-go student machines to your students or in-person facility. Please inquire for details.

For More Information

Need dedicated training? All courses can be presented **onsite** or **online**, or in a **combined / flex / blended learning format**, tailored to target your specific audience, needs and learning goals. We also offer focused, flexible **short courses, self-paced learning options, recorded sessions** and more. We train beginner to advanced skills in all areas we cover, and offer **New Hire / Cohort Training, Boot Camps, Skills Immersion Programs, Reskilling Programs, Skills Migration & Transition Programs**, and more. We collaborate with you to ensure all courses are truly targeted to meet your specific needs and learning skills, maximizing your valuable training time, as well as your important budget.

Please also visit our extensive **Public Training Schedule** for training for smaller groups or individuals. Please contact us for course details, **Corporate Rates** and **Special Discount Offers**.

For more information about our dedicated training services, collaborative mentoring services, courseware licensing options, courseware development services, public course schedule, training management services, partner and reseller programs, or to see our complete list of course offerings and special offers please visit us at www.triveratech.com, email Info@triveratech.com or call us toll free at **844-475-4559**. Our pricing and services are always satisfaction guaranteed.

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