AGENDA

Combined Training Java 17, 21 & 25 – Compact: Records, Virtual Threads, Stream Gatherers & All New Features from Java 12 to 25

5 days · Individual date · On-site or online · German / English · Customizable agenda · Certificate of completion

Part 1: Java 12-17

Major Features:

- `switch` Expressions
- Text Blocks
- Records
- Pattern Matching for `instanceof`
- Sealed Classes
- Strongly Encapsulate JDK Internals

Additional Enhancements:

- Helpful `NullPointerExceptions`
- Hidden Classes
- Warnings for value-based classes
- Context-specific deserialization filters
- Unix-domain socket channels

API Improvements:

- New `String` methods
- New `Stream` methods
- `Files.mismatch()`
- New `ByteBuffer` methods
- The Teeing collector
- Hex formatting and parsing utility
- Enhanced pseudo-random number generators
- `InstantSource`
- Compact number formatting

Garbage Collection:

- Improvements to G1 and Parallel GC
- ZGC and Shenandoah production-ready
- Elastic Metaspace

Performance:

- Default and dynamic CDS archives
- Non-volatile mapped byte buffers
- Specialized `TreeMap` implementations
- Decoupling of Compressed Oops and Compressed Class Pointers

Tools:

- JFR event streaming
- Packaging tool

Deprecations & Removals:

- `Thread.suspend()` and `resume()`: deprecated for removal
- `ThreadGroup`: `stop()`, `destroy()`, `isDestroyed()`, `setDaemon()`, and `isDaemon()`
- Biased locking
- Security Manager: deprecated for removal
- Removed: CMS garbage collector
- Removed: Nashorn JavaScript engine
- Removed: Pack200
- Removed: RMI Activation
- Removed: experimental AOT and JIT compiler (Graal)
- And more...

Part 2: Java 18-21

Major Features:

- Virtual Threads
- Sequenced Collections
- Record Patterns
- Pattern Matching for `switch`

Additional Features:

- UTF-8 by default
- Simple web server
- Code snippets in Java API documentation
- Internet-address resolution SPI
- New system properties for `System.out` and `System.err` encoding
- Compiler warnings for lossy conversions in compound assignments
- Key Encapsulation Mechanism API
- Alternative fast-locking scheme (experimental)

Bugfixes:

- `IdentityHashMap`'s `remove()` and `replace()` methods use object identity

API Enhancements:

- New methods for `String`, `StringBuilder`, and `StringBuffer`
- New methods for `Character`
- New methods for `Math`
- `HashMap.newHashMap()` and related factory methods
- Additional date-time formats

Garbage Collection:

- String deduplication for ZGC, SerialGC, ParallelGC
- G1 enhancements
- Generational ZGC

Deprecations & Removals:

- Deprecate finalization for removal
- `Locale` constructors
- `URL` constructors
- `Thread.stop(), suspend(), resume()`
- `ThreadGroup`
- Prepare to disallow the dynamic loading of agents

Part 3: Java 22-25

Major Features:

- Unnamed Variables & Patterns
- Foreign Function & Memory API
- Markdown Documentation Comments
- Stream Gatherers
- Synchronize Virtual Threads without Pinning
- Scoped Values
- Compact Source Files and Instance Main Methods
- Flexible Constructor Bodies

Other New Features:

- Module Import Declarations
- Launch multi-file source-code programs
- Console methods with explicit `Locale`
- Class-File API
- Key Derivation Function API
- Linking run-time images without JMODs

API Enhancements:

- `Locale`-dependent list patterns
- Support for `Duration` until another `Instant`

Garbage Collection:

- G1 GC improvements
- ZGC: Generational mode by default
- Generational Shenandoah

Performance / Memory Footprint:

- Compact Object Headers
- Ahead-of-Time Class Loading & Linking
- Ahead-of-time command-line ergonomics
- Ahead-of-time method profiling
- Relax alignment of array elements
- Change LockingMode default from `LM_LEGACY` to `LM_LIGHTWEIGHT`

Java Flight Recorder:

- JFR cooperative sampling
- JFR method timing & tracing
- JFR CPU-time profiling (experimental)

Deprecations & Removals:

- `Thread.countStackFrames()`
- Old core reflection implementation
- Deprecations and removals in `sun.misc.Unsafe`
- `Thread.suspend(), resume()` and `ThreadGroup.suspend(), resume(), stop()`
- Security Manager

Looking Ahead:

- Primitive Types in patterns, `instanceof`, and `switch`
- Lazy Constants (formerly Stable Values)
- Vector API
- Structured Concurrency