FU CHENG



FROM JAVA 21 TO 25



From Java 21 to Java 25

Upgrade to Java 25 LTS from Java 21 LTS

Fu Cheng

This book is available at https://leanpub.com/java21to25

This version was published on 2026-10-20



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Introduction

Java 25 was released on September 16, 2025. Java 25 is the next LTS version after Java 21. It's expected that users of Java 21 will gradually migrate to Java 25. This book summarizes all major changes from Java 21 to Java 25, so you can migrate with confidence.



If you are currently using Java 17, check out my book From Java 17 to Java 21 for upgrading from Java 17 to Java 21 first.

JEPs in Different Java Releases

Java Enhancement Proposal (JEP) is used to organize changes to OpenJDK. A Java release may contain a list of JEPs. Below are lists of JEPs added in each Java release from Java 22 to Java 25.

Java 22

Java 22 has 12 JEPs, see the table below.

Figure 1. JEPs in Java 22

Number	Name
423	Region Pinning for G1
447	Statements before super(...) (Preview)
454	Foreign Function & Memory API
456	Unnamed Variables & Patterns
457	Class-File API (Preview)
458	Launch Multi-File Source-Code Programs
459	String Templates (Second Preview)
460	Vector API (Seventh Incubator)
461	Stream Gatherers (Preview)

Number	Name
462	Structured Concurrency (Second Preview)
463	Implicitly Declared Classes and Instance Main Methods (Second Preview)
464	Scoped Values (Second Preview)

Java 23

Java 23 has 12 JEPs, see the table below.

Figure 2. JEPs in Java 23

Number	Name
455	Primitive Types in Patterns, instanceof, and switch (Preview)
466	Class-File API (Second Preview)
467	Markdown Documentation Comments
469	Vector API (Eighth Incubator)
473	Stream Gatherers (Second Preview)
471	Deprecate the Memory-Access Methods in sun.misc.Unsafe for Removal
474	ZGC: Generational Mode by Default
476	Module Import Declarations (Preview)
477	Implicitly Declared Classes and Instance Main Methods (Third Preview)
480	Structured Concurrency (Third Preview)
481	Scoped Values (Third Preview)
482	Flexible Constructor Bodies (Second Preview)

Java 24

Java 24 has 24 JEPs, see the table below.

Figure 3. JEPs in Java 24

Number	Name
404	Generational Shenandoah (Experimental)
450	Compact Object Headers (Experimental)
472	Prepare to Restrict the Use of JNI
475	Late Barrier Expansion for G1
478	Key Derivation Function API (Preview)
479	Remove the Windows 32-bit x86 Port
483	Ahead-of-Time Class Loading & Linking
484	Class-File API
485	Stream Gatherers
486	Permanently Disable the Security Manager
487	Scoped Values (Fourth Preview)
488	Primitive Types in Patterns, instanceof, and switch (Second Preview)
489	Vector API (Ninth Incubator)
490	ZGC: Remove the Non-Generational Mode
491	Synchronize Virtual Threads without Pinning
492	Flexible Constructor Bodies (Third Preview)
493	Linking Run-Time Images without JMODs
494	Module Import Declarations (Second Preview)
495	Simple Source Files and Instance Main Methods (Fourth Preview)
496	Quantum-Resistant Module-Lattice-Based Key Encapsulation Mechanism
497	Quantum-Resistant Module-Lattice-Based Digital Signature Algorithm
498	Warn upon Use of Memory-Access Methods in sun.misc.Unsafe
499	Structured Concurrency (Fourth Preview)
501	Deprecate the 32-bit x86 Port for Removal

Java 25

Java 25 has 18 JEPs, see the table below.

Figure 4. JEPs in Java 25

Number	Name
470	PEM Encodings of Cryptographic Objects (Preview)
502	Stable Values (Preview)
503	Remove the 32-bit x86 Port
505	Structured Concurrency (Fifth Preview)
506	Scoped Values
507	Primitive Types in Patterns, instanceof, and switch (Third Preview)
508	Vector API (Tenth Incubator)
509	JFR CPU-Time Profiling (Experimental)
510	Key Derivation Function API
511	Module Import Declarations
512	Compact Source Files and Instance Main Methods
513	Flexible Constructor Bodies
514	Ahead-of-Time Command-Line Ergonomics
515	Ahead-of-Time Method Profiling
518	JFR Cooperative Sampling
519	Compact Object Headers
520	JFR Method Timing & Tracing
521	Generational Shenandoah

Install Java 25

You can get Java 25 binaries from several different places. Since Java 25 is a LTS version, many vendors will provide Java 25 releases. For most users, Eclipse Temurin is the best choice.

- Download OpenJDK 25 build from jdk.java.net.
- Download Eclipse Temurin from Adoptium.
- Use SDKMAN to install, e.g. `sdk install java 25-tem` or `sdk install java 25-graalce`. You can get a list of JDK distributions using `sdk ls java | grep 25`.
- Use IDE to download. IntelliJ IDEA can download JDK.

Below is the output of `java -version` for Eclipse Temurin JDK 25 build.

Figure 5. Output of java -version

```
openjdk 25 2025-09-16 LTS
OpenJDK Runtime Environment Temurin-25+36 (build 25+36-LTS)
OpenJDK 64-Bit Server VM Temurin-25+36 (build 25+36-LTS, mixed mode)
```

Build Tools

When using Java 25 with build tools, Maven or Gradle, you may need to add the `--enable-preview` option to enable preview features. The following code shows an example of the configuration of Maven compiler plugin. `jdk.incubator.vector` is an incubating module, so it needs to be added explicitly using `--add-modules`.

Figure 6. Maven compiler plugin configuration

```
<plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-compiler-plugin</artifactId>
    <version>3.14.0</version>
    <configuration>
        <source>25</source>
        <target>25</target>
        <compilerArgs>
            <arg>--enable-preview</arg>
            <arg>--add-modules</arg>
            <arg>jdk.incubator.vector</arg>
        </compilerArgs>
    </configuration>
</plugin>
```

Source Code

Source code of this book can be found on GitHub.

Java Language

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instanceof

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switch

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Stable IntFunction

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Deprecated & Removed Features

32-bit x86 Port

The source code and build support for the 32-bit x86 port was removed, including Windows and Linux. The motivation is that the cost of maintaining 32-bit x86 port outweighs the benefits. Removing this port can unblock new features that require platform-specific support from having to implement 32-bit x86 fallbacks. The cost for implementing new features like virtual threads, Foreign Function & Memory API (FFM), Vector API, etc. on 32-bit x86 platform is very high.

There are multiple JEPs related to the deprecation and removal of 32-bit x86 port, see the table below.

Figure 7. JEPs related to 32-bit x86 Port

Number	Target	Name
449	21	Deprecate the Windows 32-bit x86 Port for Removal
479	24	Remove the Windows 32-bit x86 Port
501	24	Deprecate the 32-bit x86 Port for Removal
503	25	Remove the 32-bit x86 Port