

Oracle Releases Java 24 with 24 JDK Enhancement Proposals

New Features Boost Productivity, AI Integration, and Post-Quantum Cryptography

Austin, Texas – March 18, 2025 – Oracle has officially released Java 24, the latest version of the world’s leading programming language and development platform. This release introduces 24 JDK Enhancement Proposals (JEPs), focusing on developer productivity, AI integration, enhanced security, and improved language capabilities. The new version ensures Java remains at the forefront of enterprise-grade, mission-critical applications.

A Milestone for Java

“As Java nears its 30th anniversary, it continues evolving to meet modern development needs, including AI-powered applications,” said Arnal Dayaratna, Vice President of Software Development at IDC. “Java 24’s enhancements improve developer efficiency, enabling the rapid delivery of high-performance applications.”

Oracle’s Georges Saab, Senior Vice President of Java Platform and OpenJDK Chair, added, “With more than 20 new features spanning every aspect of Java, this release equips developers with powerful tools to build AI-infused applications. Our six-month release cadence ensures Java remains innovative and robust.”

Key Language Enhancements

- **Primitive Types in Patterns, instanceof, and switch (JEP 488 - Second Preview)** – Enhances pattern matching by allowing primitive type patterns across all pattern contexts, benefiting AI and data processing applications.
- **Flexible Constructor Bodies (JEP 492 - Third Preview)** – Introduces structured prologue and epilogue phases in constructors, improving code reliability.
- **Module Import Declarations (JEP 494 - Second Preview)** – Simplifies module usage, making it easier to integrate AI libraries and third-party services.
- **Simple Source Files & Instance Main Methods (JEP 495 - Fourth Preview)** – Enhances Java’s learning curve by simplifying first-time programming experiences.

Library & Performance Improvements

- **Stream Gatherers (JEP 485)** – Extends the Stream API to support custom intermediate operations, enhancing data transformation efficiency.
- **Vector API (JEP 489 - Ninth Incubator)** – Boosts AI and machine learning performance by optimizing vector computations for modern CPU architectures.

- **Scoped Values (JEP 487 - Fourth Preview)** – Enhances thread-local data handling for improved application robustness.
- **Structured Concurrency (JEP 499 - Fourth Preview)** – Simplifies multi-threaded programming, reducing the risk of thread leaks and deadlocks.

Post-Quantum Cryptography and Security

- **Key Derivation Function API (JEP 478 - Preview)** – Strengthens cryptographic security against future quantum threats.
- **Quantum-Resistant Key Encapsulation (JEP 496)** – Implements Module-Lattice-Based Key Encapsulation Mechanisms (ML-KEM) for post-quantum encryption.
- **Quantum-Resistant Digital Signatures (JEP 497)** – Secures data integrity with Module-Lattice-Based Digital Signature Algorithm (ML-DSA), a NIST-standardized cryptographic method.

Enhanced Performance and Runtime

- **Compact Object Headers (JEP 450 - Experimental)** – Reduces memory overhead, improving deployment density.
- **Ahead-of-Time Class Loading & Linking (JEP 483)** – Optimizes startup times, enhancing Java's efficiency in serverless and cloud environments.
- **ZGC: Remove Non-Generational Mode (JEP 490)** – Streamlines garbage collection for better runtime efficiency.

Java 24 in the Cloud

Oracle Cloud Infrastructure (OCI) is among the first hyperscale clouds to support Java 24, offering Oracle Java SE, GraalVM, and the Java SE Subscription Enterprise Performance Pack at no additional cost. These optimizations allow businesses to reduce costs while boosting application performance.

Industry Reactions

Frank Greco, Chairman of NYJavaSIG, praised the Vector API, stating, "Its refinements will enhance both predictive and generative AI applications." Richard Fichtner, CEO of XDEV Software GmbH, highlighted Stream Gatherers as a game-changer for data transformations, eliminating previous workarounds.

Looking Ahead

With continuous innovation and support from the global Java community, Java 24 reinforces its position as a secure, high-performance development platform. Developers can explore Java 24's new features at JavaOne 2025 (March 18-20) in Redwood Shores, CA.

For more details, visit www.oracle.com/java24.