Java Update

Java 24

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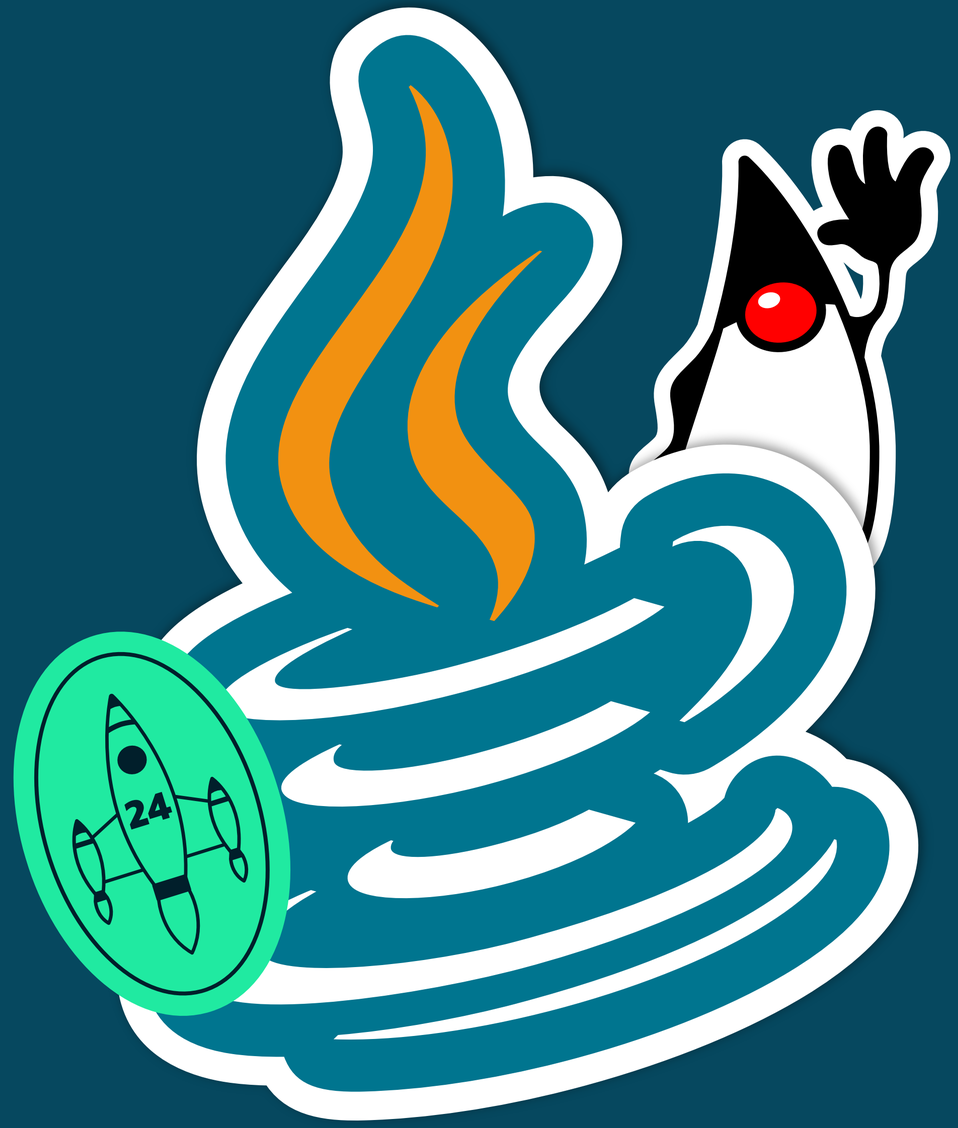
28-February



Println(“agenda”);

- State of the Union
- Java 24
- Java and AI
- Paving the Onramp
- Java for Business
- Java Ecosystem

State of the Union

"The Java renaissance continues"

Continued renaissance

30 years of innovation

Java continues to be an **important choice** for enterprises and developers

The Java technology **innovation pipeline** has never been richer

Java 24 available on March 18

#1

Language for today's Technology Trends

#1

Overall Enterprise/IT Organizational Use

63B

Active JVMs

41B

Cloud-based JVMs

* VDC 2023 study

Choosing what to work on

JDK expectations for compatibility, stability, security, and performance are extreme

- Evolving use-cases
- Improvements in hardware
- New programming paradigms
- New trends or hardware architectures
- Endeavor to understand problems
- Look to identify synergies
- Avoid attempting to shoehorn solutions
- Avoid the temptation to shortcut

THOUGHTFUL EVOLUTION

"Tip and Tail"

Conservatism

Compatibility

Don't alienate users

Innovation

Adapting to change

Fixing mistakes

Innovation out in the open

Project	Summary	Pain point	“Obvious” Competition
Loom	Lightweight concurrency	“Threads are too expensive, don’t scale”	Go, Elixir
ZGC	Sub-millisecond GC pauses	“GC pauses are too long”	C, Rust
Panama	Native code and memory interop SIMD Vector support	“Using native libraries is too hard” “Numeric loops are too slow”	Python, C
Amber	Right-sizing language ceremony	“Java is too verbose” “Java is hard to teach”	C#, Kotlin
Leyden	Faster startup and warmup	“Java starts up too slowly”	Go
Valhalla	Value types and specialized generics	“Cache misses are too expensive” “Generics and primitives don’t mix”	C, C#
Babylon	Foreign programming model interop	“Using GPUs is too hard”	LinQ, Julia

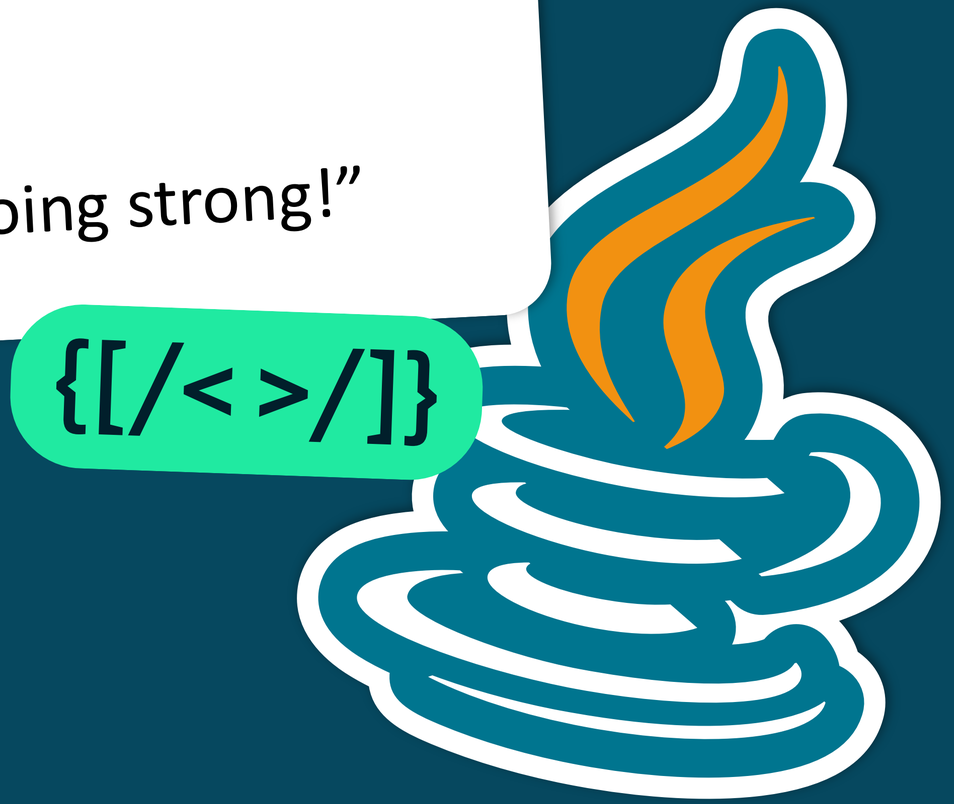
openjdk.org

Project Amber

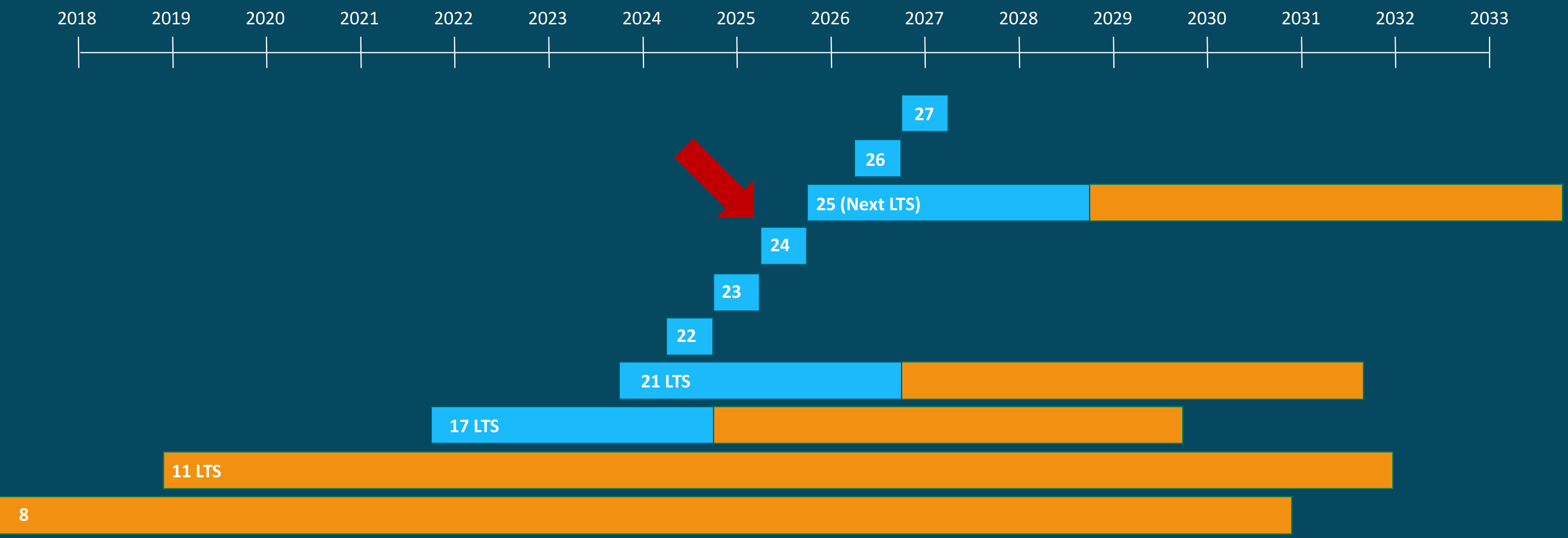
	Java 10	Java 11	Java 12	Java 13	Java 14	Java 15	Java 16	Java 17	Java 18	Java 19	Java 20	Java 21	Java 22	Java 23	Java 24
Local-Variable Type Inference - var	STANDARD	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Local-Variable Syntax for Lambda Parameters		STANDARD	→	→	→	→	→	→	→	→	→	→	→	→	→
Switch Expressions			Preview	2nd Preview	STANDARD	→	→	→	→	→	→	→	→	→	→
Text Blocks				Preview	2nd Preview	STANDARD	→	→	→	→	→	→	→	→	→
Records					Preview	2nd Preview	STANDARD	→	→	→	→	→	→	→	→
Pattern Matching for instanceof					Preview	2nd Preview	STANDARD	→	→	→	→	→	→	→	→
Pattern Matching for switch								Preview	2nd Preview	3rd Preview	4th Preview	STANDARD	→	→	→
Sealed Classes						Preview	2nd Preview	STANDARD	→	→	→	→	→	→	→
Record Patterns										Preview	2nd Preview	STANDARD	→	→	→
String Templates												Preview	2nd Preview	REMOVED	
Unnamed Patterns and Variables												Preview	→	→	→
Simple Source Files and Instance Main Methods												Preview	2nd Preview	3rd Preview	4th Preview
Flexible Constructor Bodies													Preview	2nd Preview	3rd Preview
Primitive Types in Patterns, instanceof, and switch														Preview	2nd Preview
Module Import Declarations														Preview	2nd Preview

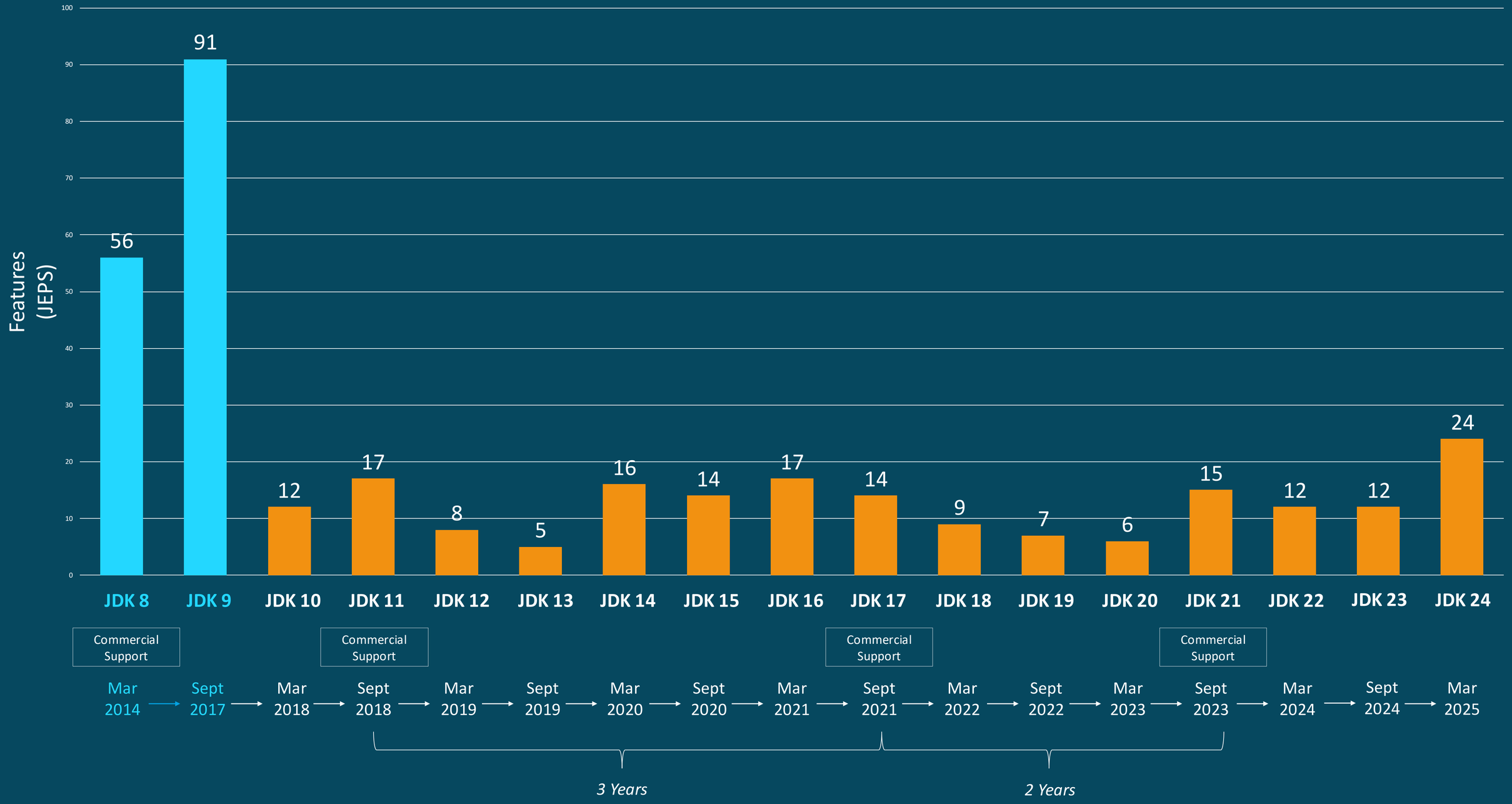
Java 24

“Six month release cadence is going strong!”



Oracle JDK releases





JDK 24

Language

- Primitive Types in Patterns, instanceof, and switch 2nd Preview [488]
- Flexible Constructor Bodies 3rd Preview[492]
- Module Import Declarations 2nd Preview [494]
- Simple Source Files and Instance Main Methods 4th Preview [495]

Libraries

- Stream Gatherers [485]
- Class File API [484]
- Scoped Values 4th Preview [487]
- Vector API 9th Incubator [489]
- Structured Concurrency 4th Preview [499]

Performance and Runtime

- Compact Object Headers Experimental [450]
- Late Barrier Expansion for G1 [475]
- Ahead-of-Time Class Loading & Linking [483]
- ZGC: Remove the Non-Generational Mode [490]
- Synchronize Virtual Threads without Pinning [491]

Security Libraries

- Key Derivation Function API Preview [478]
- Quantum-Resistant Module-Lattice-Based Key Encapsulation Mechanism [496]
- Quantum-Resistant Module-Lattice-Based Digital Signature Algorithm [497]

Prepare for Future Removals

- Prepare to Restrict the Use of JNI [472]
- Permanently Disable the Security Manager [486]
- Warn upon Use of Memory-Access Methods in sun.misc.Unsafe [498]

Source Code (*won't affect JDK binaries*)

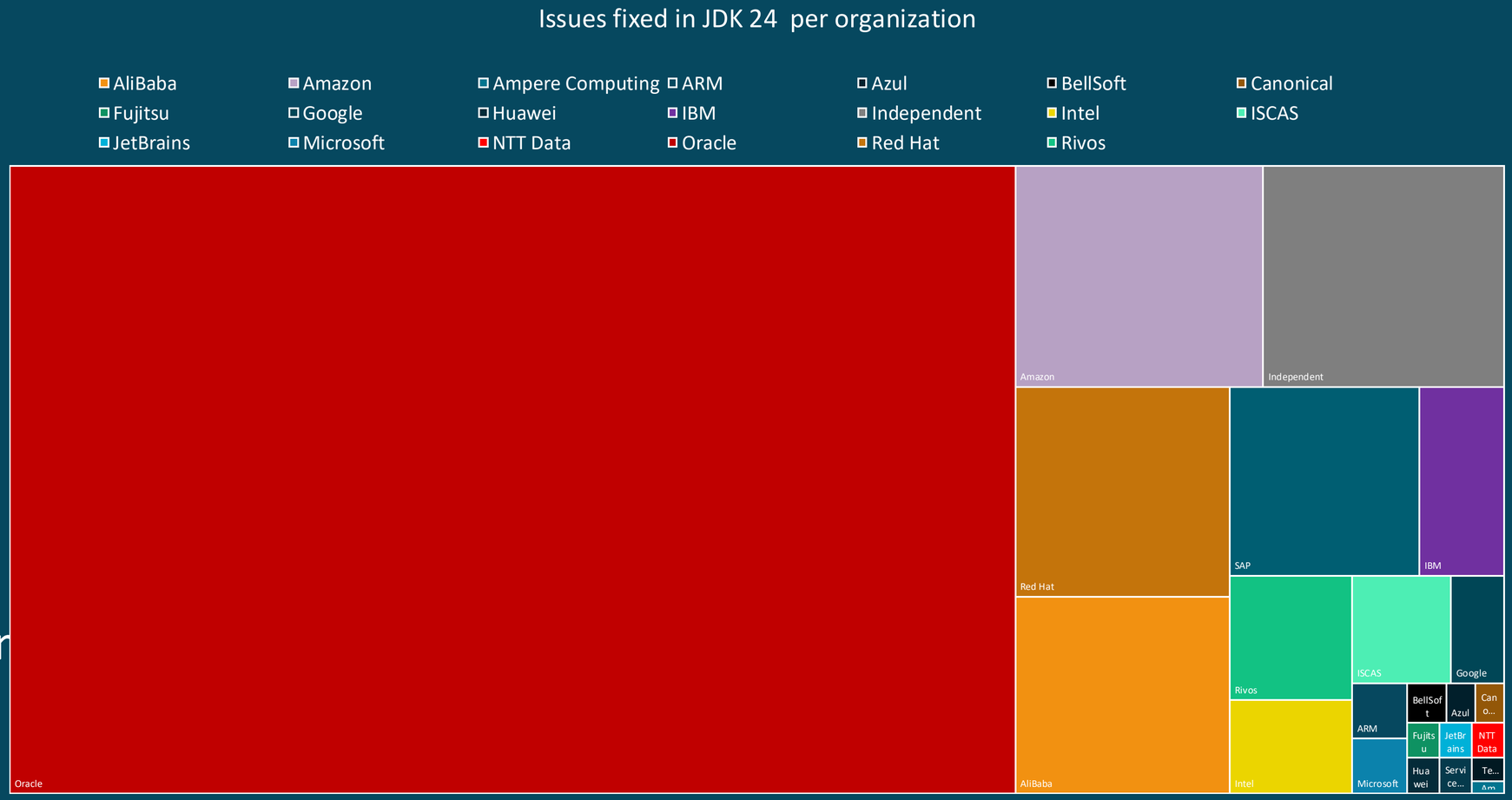
- Linking Run-Time Images without JMODs [493]
- Deprecate the 32-bit x86 Port for Removal [501]
- Generational Shenandoah (Experimental) [404]
- Remove the Windows 32-bit x86 Port [479]

Led by Oracle

Leading author & contributor of Java technology

Leading sponsor & steward of the Java ecosystem.

Leading driver of platform innovation



Java and AI

"Skating to where the puck is going"

{[/< >/]}

Oracle Java AI three-pronged strategy

Integrating with Enterprise Data and Cloud Services

Making the Java Platform even better for Native AI

Connecting Business Logic to Native AI Libraries

Oracle Java AI triple-play advantage

OCI AI Services and
OCI SDK For Java

Native Java Frameworks
such as **Tribuo,**
LangChain4j, CoreNLP

Integrate services with
business logic using
Panama & GraalPy

We continuously evolve Java to meet your **future app development** needs

Java has **30 years** of experience evolving with the latest tech trends

Data-centric World

Amber

Continuously improve developer productivity through evolution of the Java language.

ZGC

Create a scalable low-latency garbage collector capable of handling terabyte heaps.

Cloud-powered World

Loom

Massively scale lightweight threads, making concurrency simple again.

Leyden

Improve the start-up time and time to peak performance of cloud applications.

AI-driven World

Babylon

Extend the reach of Java including to machine learning models and GPUs

Panama

Safe and efficient interoperation with native libraries and native Java.

Valhalla

Unify primitives and classes to improve productivity and performance.

Paving the Onramp

"Bringing on the next generation of developers"

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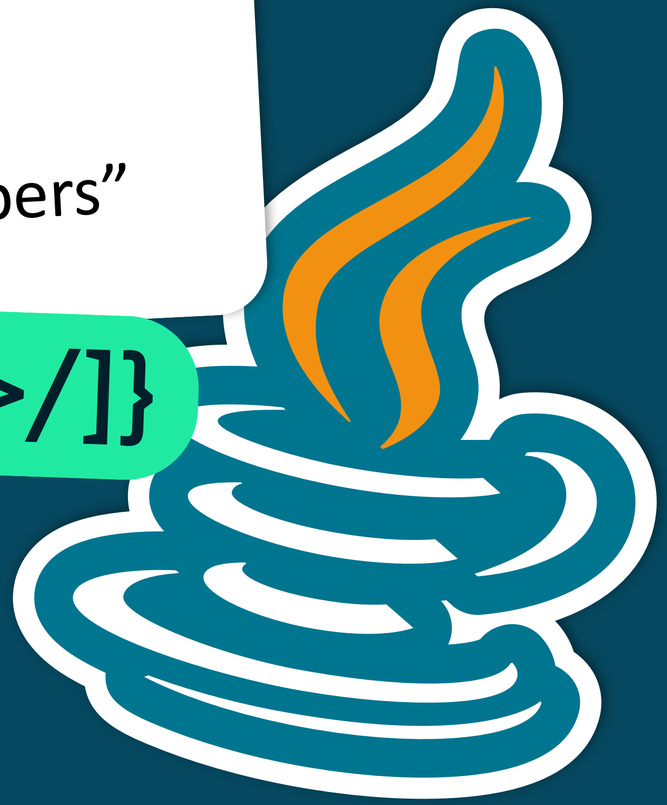


Paving the On-Ramp (JEP 495 | 4th Preview)

Before

```
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

- Classes for modeling and organization
- Static vs instance behavior
- Command line interaction, arrays
- Magic method name
- Access control
- Static fields

After

```
void main() {
    println(“Hello World!”);
}
```

Java plug-in for VS Code

~2.4M downloads (5.0 out of 5.0 rating)

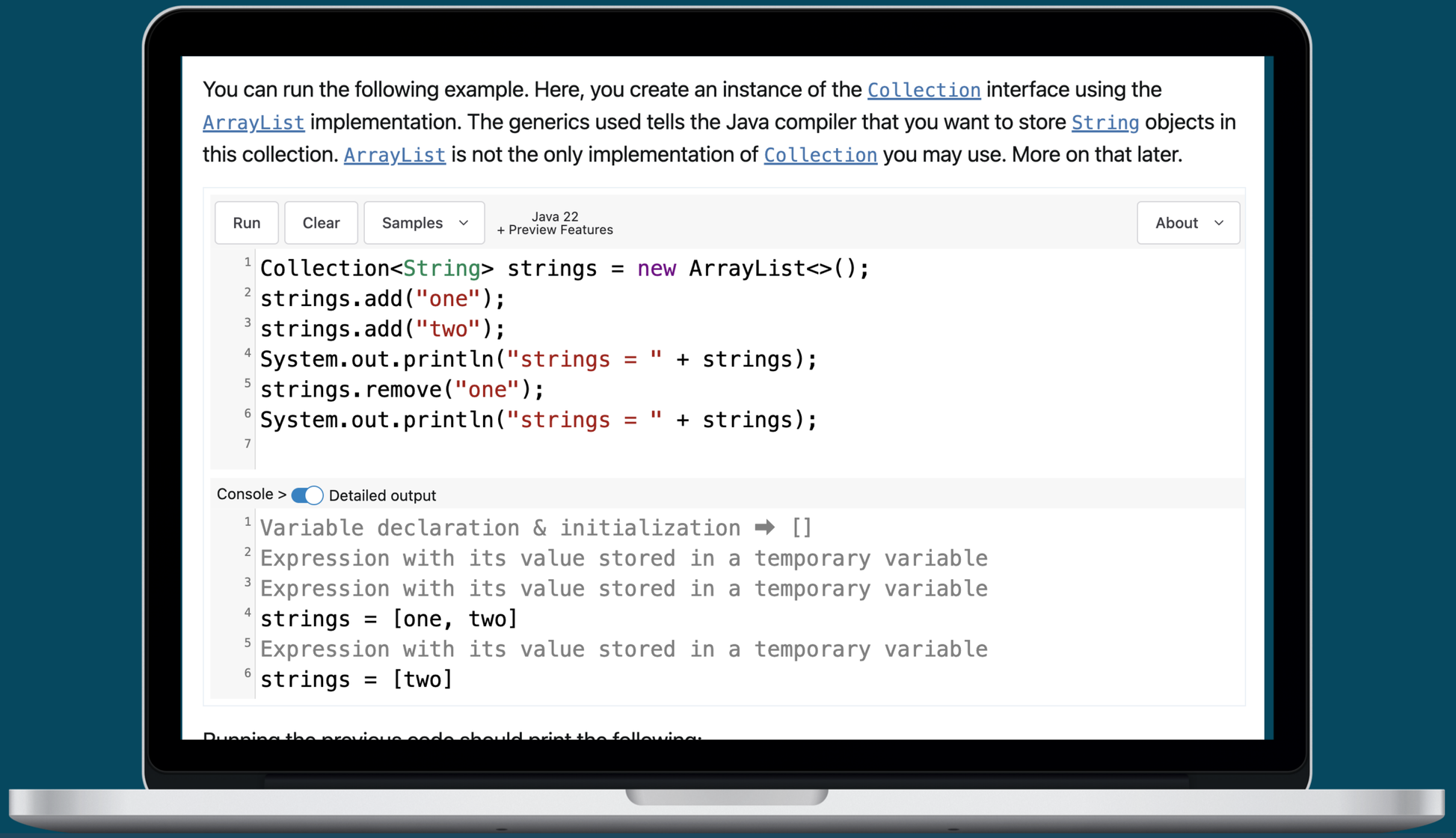
Java Platform plugin availability in the **VS Code marketplace**

Oracle's VS Code extension for Java is **based on the OpenJDK's `javac` compiler** for code editing and compilation and on the OpenJDK's debugger interface for debugging

Allows Oracle to offer VS Code IDE **support for new JDK features** as soon as they are introduced, even during Early Access of the JDK

Oracle’s VS Code extension **supports the current JDK releases as well as the next upcoming JDK version**

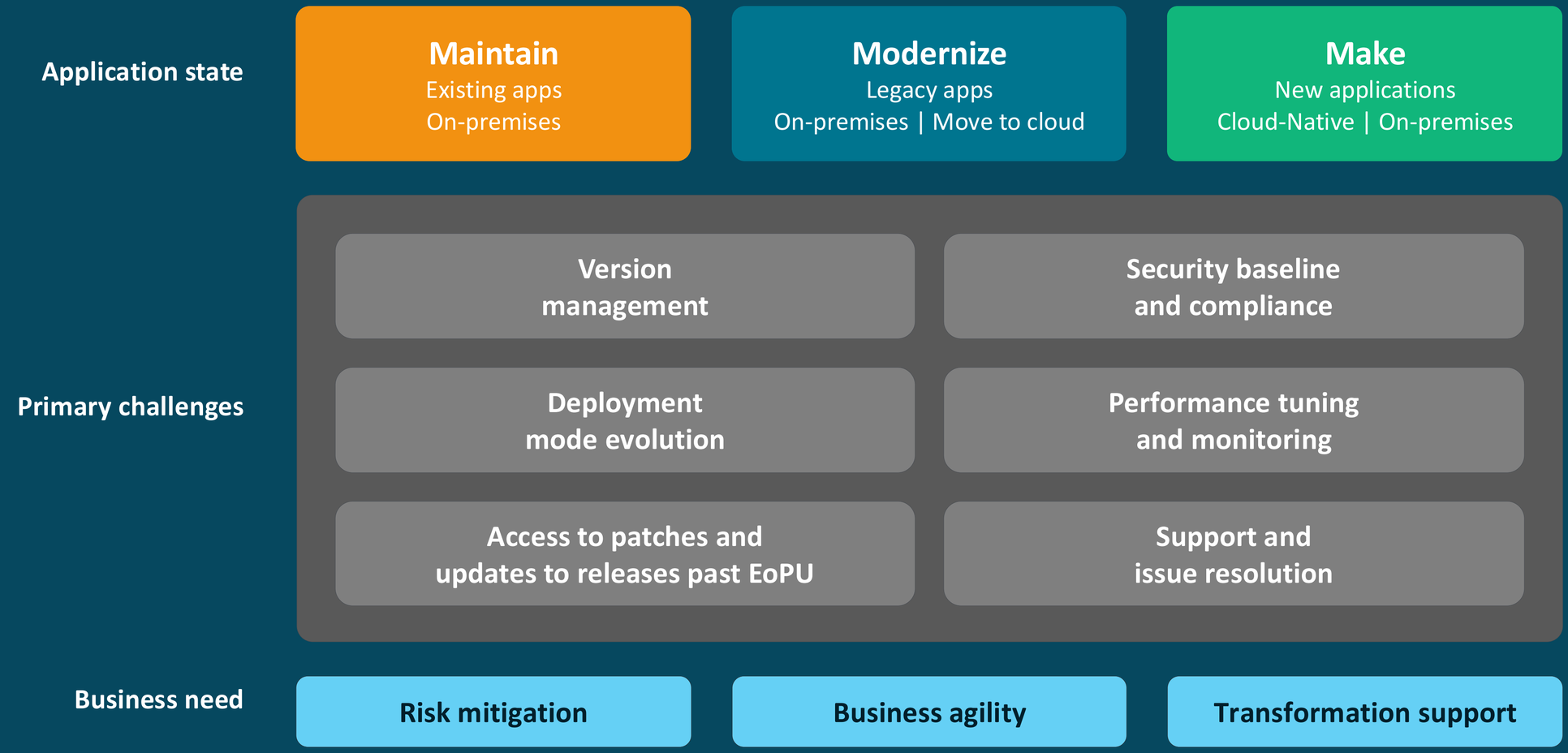
Playground at Dev.java



Java for Business

"Delivering enterprise-grade value"

Enterprises face growing application complexity



Subscription delivered value

All the benefits of the legacy Java SE Subscription products, **PLUS**:

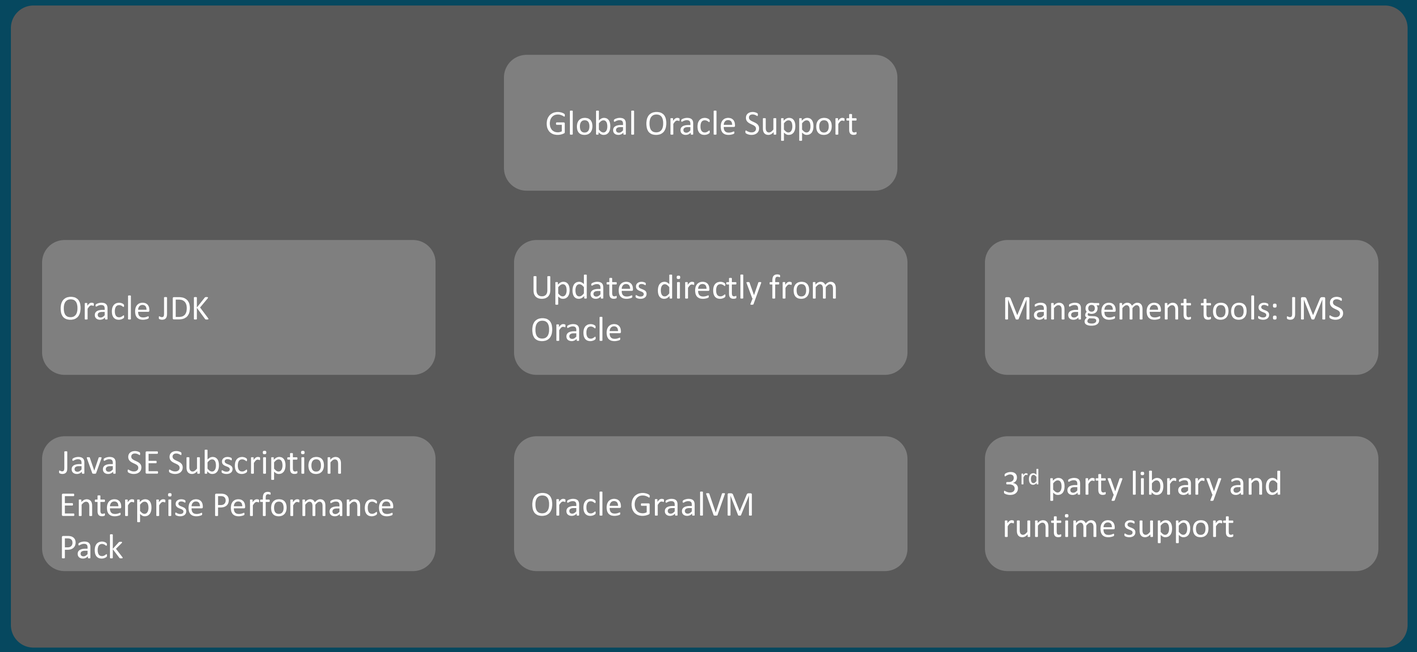
No more tedious counting of Processors and/or NUPS in most cases

Universal use rights including desktop, server and third-party cloud

Triage Support for your entire Java portfolio including third party libraries and runtimes

Priced by an **employee-based metric** starting at $15/month

Oracle Java SE Universal Subscription



Java Ecosystem

"The power of a globally engaged community"

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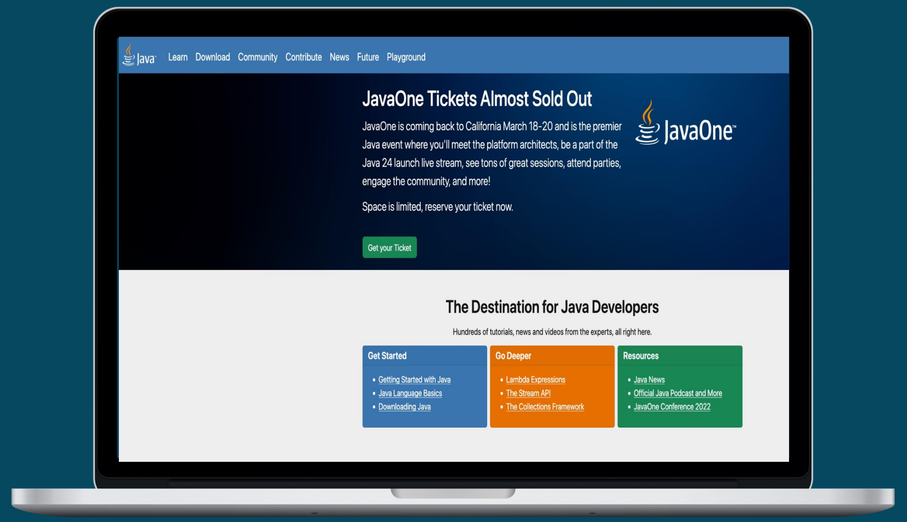
Foundational programs to learn, share, and collaborate

High quality **technical and community information** from the source

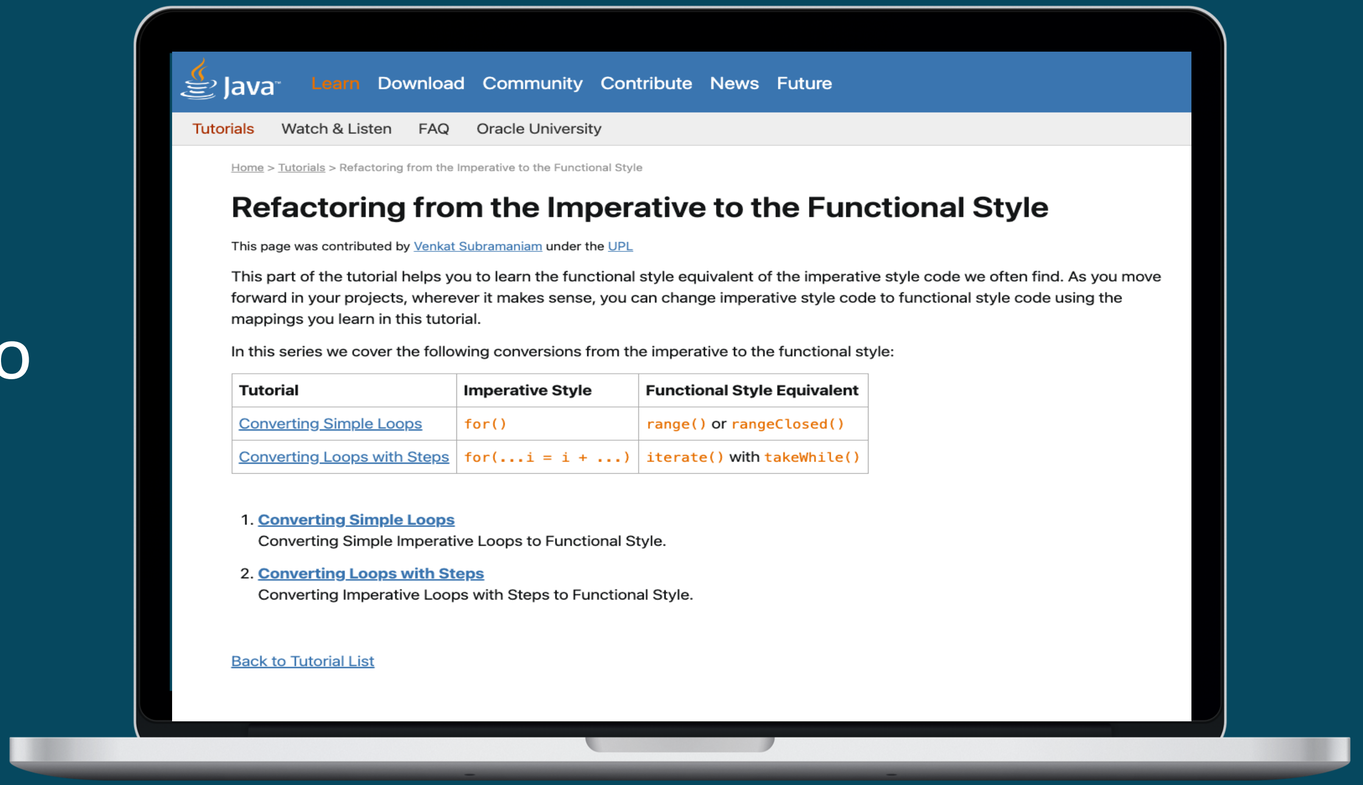


dev.java

inside.java

youtube.com/java

Community contributions to dev.java



JAVAONE'25

Analyst Pass

Tuesday March 18 – Thursday March 20

Oracle Conference Center
350 Oracle Parkway
Redwood Shores, CA