10. – 13.12.2018
Frankfurt am Main


Michael Vitz

# Java 10, 11, 12 und darüber hinaus

Große, kleine und noch nicht bestätigte Features

#ittage

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- JavaSPEKTRUM column owner
- ❤️Clojure

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# JDK Version

5
6 ||
7 |||
8 ||||
9 |||
10 ||
11 |?

# Usage

## Module (JPMS)

Ja ||| |
Nein

## Support

Ja |
Nein

# Vendor

Oracle
OpenJDK
IBM |
Azul
2
.
OSS

# JDK 10

https://pixabay.com/en/number-ad-yellow-color-asphalt-437928/

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**Workshop**

OpenJDK FAQ
Installing
Contributing
Sponsoring
Developers' Guide

Mailing lists
IRC · Wiki

Bylaws · Census
Legal

**JEP Process**

# JDK 10

JDK 10 is the open-source reference implementation of the Java SE 10 Platform as defined by JSR 383 in the Java Community Process.

JDK 10 reached General Availability on 20 March 2018. Production-ready binaries under the GPL are available from Oracle; binaries from other vendors will follow shortly.

The features and schedule of this release were proposed and tracked via the JEP Process, as amended by the JEP 2.0 proposal.

http://openjdk.java.net/projects/jdk/10/

# var

Cheat Sheet: https://snyk.io/blog/local-type-inference-java-cheat-sheet/
Style Guidelines: http://openjdk.java.net/projects/amber/LVTIstyle.html

## JEP286: Local-Variable Type Inference

http://openjdk.java.net/jeps/286

```
[1-9][0-9]*((\.0)*\.[1-9][0-9]*)*
```

## JEP322:Time-Based Release Versioning

http://openjdk.java.net/jeps/322

search

**Source code**
Mercurial
Bundles (6)

**Groups**
(overview)
2D Graphics
Adoption
AWT
Build
Compatibility & Specification Review
Compiler
Conformance
Core Libraries
Governing Board
HotSpot
Internationalization
JMX
Members

## Features

286: Local-Variable Type Inference
296: Consolidate the JDK Forest into a Single Repository
304: Garbage-Collector Interface
307: Parallel Full GC for G1
310: Application Class-Data Sharing
312: Thread-Local Handshakes
313: Remove the Native-Header Generation Tool (javah)
314: Additional Unicode Language-Tag Extensions
316: Heap Allocation on Alternative Memory Devices
317: Experimental Java-Based JIT Compiler
319: Root Certificates
322: Time-Based Release Versioning

http://openjdk.java.net/projects/jdk/10/

# More small enhancements

- `@summary`
  https://bugs.openjdk.java.net/browse/JDK-8173425
- 
  https://bugs.openjdk.java.net/browse/JDK-8146115
- `List#copyOf, Map#copyOf, Set#copyOf`
  https://bugs.openjdk.java.net/browse/JDK-8177290
- `Collectors#toUnmodifiableList/Set/Map`
  https://bugs.openjdk.java.net/browse/JDK-8184690
- `Optional::orElseThrow`
  https://bugs.openjdk.java.net/browse/JDK-8140281


# JDK 11

https://pixabay.com/en/pool-balls-billiard-eleven-eight-1003955/

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**Workshop**
OpenJDK FAQ
Installing
Contributing
Sponsoring
Developers' Guide

Mailing lists
IRC · Wiki

Bylaws · Census
Legal

**JEP Process**

search

**Source code**
Mercurial

# JDK 11

JDK 11 is the open-source reference implementation of version 11 of the Java SE 11 Platform as specified by by JSR 384 in the Java Community Process.

JDK 11 reached General Availability on 25 September 2018. Production-ready binaries under the GPL are available from Oracle; binaries from other vendors will follow shortly.

The features and schedule of this release were proposed and tracked via the JEP Process, as amended by the JEP 2.0 proposal. The release was produced using the JDK Release Process (JEP 3).

## Features

http://openjdk.java.net/projects/jdk/11/

```
<jaxb with="jdk11">
   <is provided="false" />
</jaxb>
```

# JEP320: Remove the Java EE and CORBA Modules

http://openjdk.java.net/jeps/320

```
HttpClient client = HttpClient.newHttpClient();
HttpRequest request = HttpRequest.newBuilder()
      .uri(URI.create("http://openjdk.java.net/"))
      .build();
client.sendAsync(request, ofString())
      .thenApply(HttpResponse::body)
      .thenAccept(System.out::println)
      .join();
```

http://openjdk.java.net/groups/net/httpclient/intro.html

# JEP321: HTTP Client

http://openjdk.java.net/jeps/321

```
(@Nonnull var x) -> process(x)
```

## JEP323: Local-Variable Syntax for Lambda Parameters

http://openjdk.java.net/jeps/323

```
javac Foo.java \
  && java Foo \
  && rm Foo.class
```

## JEP330: Launch Single-File Source-Code Programs

http://openjdk.java.net/jeps/330

**Source code**
Mercurial
Bundles (6)

**Groups**
(overview)
2D Graphics
Adoption
AWT
Build
Compatibility &
Specification
Review
Compiler
Conformance
Core Libraries
Governing Board
HotSpot
Internationalization
JMX
Members
Networking
NetBeans Projects
Porters
Quality
Security
Serviceability
Sound
Swing
Vulnerability
Web

**Projects**
(overview)

## Features

181: Nest-Based Access Control
309: Dynamic Class-File Constants
315: Improve Aarch64 Intrinsics
318: Epsilon: A No-Op Garbage Collector
320: Remove the Java EE and CORBA Modules
321: HTTP Client (Standard)
323: Local-Variable Syntax for Lambda Parameters
324: Key Agreement with Curve25519 and Curve448
327: Unicode 10
328: Flight Recorder
329: ChaCha20 and Poly1305 Cryptographic Algorithms
330: Launch Single-File Source-Code Programs
331: Low-Overhead Heap Profiling
332: Transport Layer Security (TLS) 1.3
333: ZGC: A Scalable Low-Latency Garbage Collector (Experimental)
335: Deprecate the Nashorn JavaScript Engine
336: Deprecate the Pack200 Tools and API

## Schedule

http://openjdk.java.net/projects/jdk/11/

# java.io

- java.io.FileReader(java.lang.String, java.nio.charset.Charset)
- java.io.FileWriter(java.lang.String, java.nio.charset.Charset)

- java.io.InputStream#nullInputStream
- java.io.OutputStream#nullOutputStream

- java.io.Reader#nullReader
- java.io.Writer#nullWriter

# java.lang.String

- `String::repeat(int)`
  https://bugs.openjdk.java.net/browse/JDK-8197594
- `String::lines`
  https://bugs.openjdk.java.net/browse/JDK-8200380
- `String::strip`, `String::stripLeading`, `String::stripTrailing`
  https://bugs.openjdk.java.net/browse/JDK-8200377
- `String::isBlank`
  https://bugs.openjdk.java.net/browse/JDK-8200436

# java.util.Optional/Predicate

- `Optional::isEmpty`
  https://bugs.openjdk.java.net/browse/JDK-8184693
- `Predicate#not`
  https://bugs.openjdk.java.net/browse/JDK-8050818

# java.nio.file.Files/Path

- `Files#isSameContent`
  https://bugs.openjdk.java.net/browse/JDK-8202302
- `Files#readString, Files#writeString`
  https://bugs.openjdk.java.net/browse/JDK-8202055
- `Path#of(URI), Path#of(String, String…)`
  https://bugs.openjdk.java.net/browse/JDK-8199485

# java.util.regex.Pattern

- `Pattern::asMatchPredicate`
  https://bugs.openjdk.java.net/browse/JDK-8201308

# java.lang.Thread

- `Thread::stop(Throwable), Thread::destroy`
  https://bugs.openjdk.java.net/browse/JDK-8204243

# Distribution
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# Java SE Development Kit 11 Downloads

Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications, and components using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

## Important changes in Oracle JDK 11 License

**With JDK 11 Oracle has updated the license terms on which we offer the Oracle JDK.**
The new Oracle Technology Network License Agreement for Oracle Java SE is substantially different from the licenses under which previous versions of the JDK were offered. Please review the new terms carefully before downloading and using this product.

Oracle also offers this software under the GPL License on jdk.java.net/11

https://www.oracle.com/technetwork/java/javase/downloads/jdk11-downloads-5066655.html

## Oracle JDK and OpenJDK builds from Oracle

Starting with Java SE 9, in addition to providing Oracle JDK for free under the BCL, Oracle also started providing builds of OpenJDK under an open source license (similar to that of Linux). Oracle is working to make the Oracle JDK and OpenJDK builds from Oracle interchangeable - targeting developers and organizations that do not want commercial support or enterprise management tools. Beginning with Oracle Java SE 11 (18.9 LTS), the Oracle JDK will continue to be available royalty-free for development, testing, prototyping or demonstrating purposes. As announced in September 2017, with the OracleJDK and builds of Oracle OpenJDK being interchangeable for releases of Java SE 11 and later, the Oracle JDK will primarily be for commercial and support customers and OpenJDK builds from Oracle are for those who do not want commercial support or enterprise management tools.

http://www.oracle.com/technetwork/java/eol-135779.html

jdk.java.net

**GA Releases**
JDK 11
JDK 10

**Early-Access Releases**
JDK 12
JDK 8
OpenJFX
Valhalla
JMC

**Reference Implementations**
Java SE 11
Java SE 10
Java SE 9
Java SE 8
Java SE 7

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# JDK 11 General-Availability Release

This page provides production-ready open-source builds of the Java Development Kit, version 11, an implementation of the Java SE 11 Platform under the GNU General Public License, version 2, with the Classpath Exception.

Commercial builds of JDK 11 from Oracle under a non-open-source license, for a wider range of platforms, can be found at the Oracle Technology Network.

## Documentation

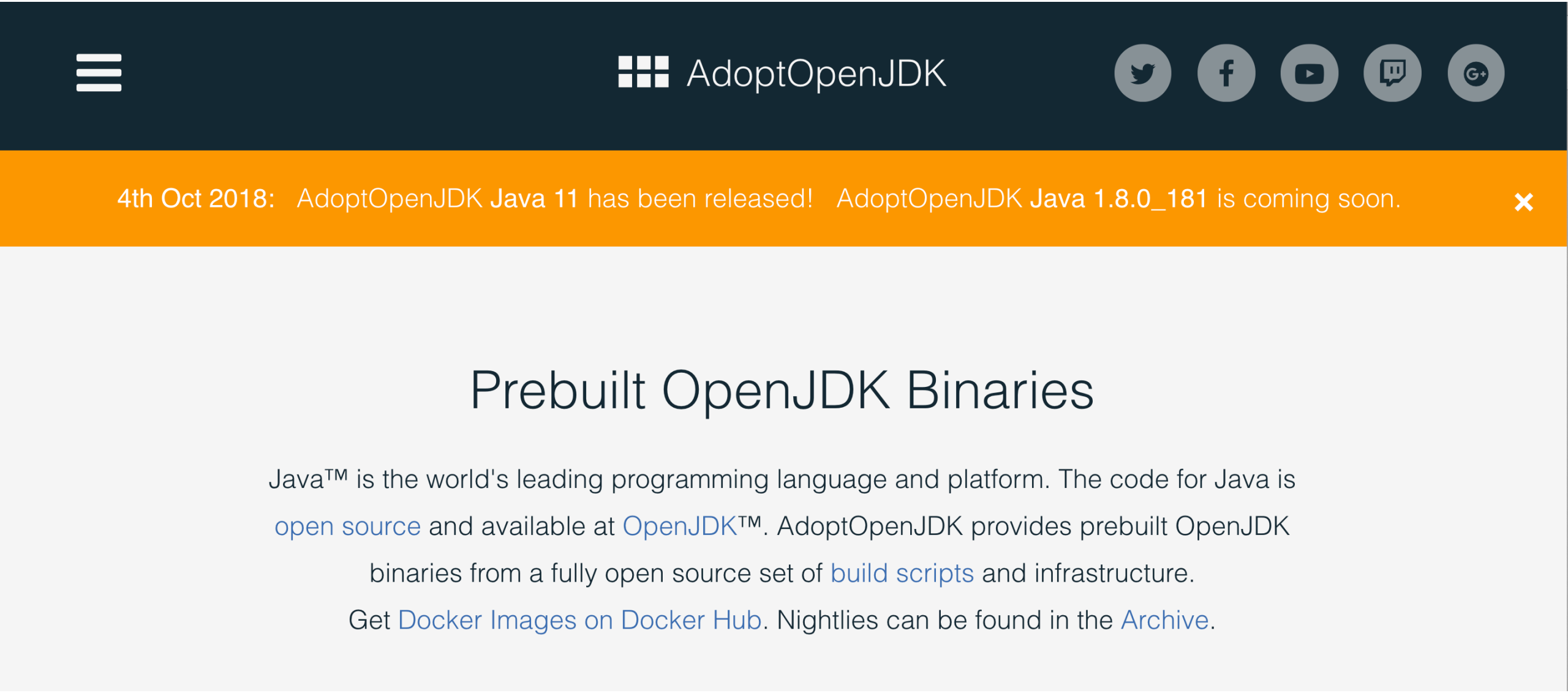
- Features
- Release notes
- API Javadoc
- Tool & command reference

## Downloads

| | | |
|---|---|---|
| **Linux/x64** | tar.gz (sha256) | 187611826 bytes |
| **macOS/x64** | tar.gz (sha256) | 182717049 |
| **Windows/x64** | zip (sha256) | 187396683 |

## Notes

http://jdk.java.net/11/




https://adoptopenjdk.net

# The future of Java and OpenJDK updates without Oracle support


By Andrew Haley September 24, 2018

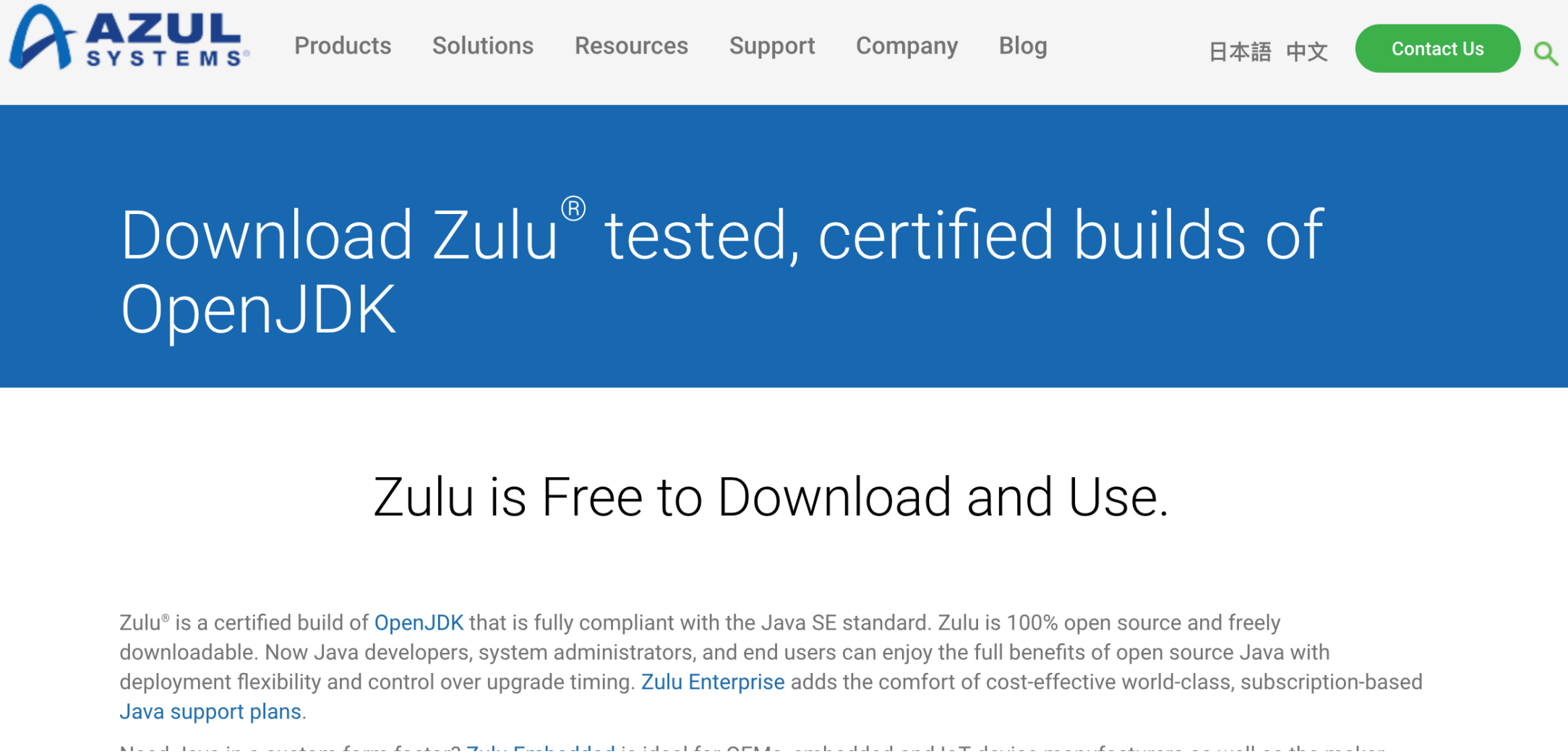
+13 rating, 13 votes

OpenJDK

Oracle recently announced that it would no longer supply free (as in beer) binary downloads for JDK releases after a six-month period, and neither would Oracle engineers write patches for OpenJDK bugs after that period. This has caused a great deal of concern among some Java users.

From my point of view, this is little more than business as usual. Several years ago, the OpenJDK 6 updates (jdk6u) project was relinquished by Oracle and I assumed leadership, and then the same happened with OpenJDK 7. Subsequently, Andrew Brygin of Azul took over the leadership of OpenJDK 6. The OpenJDK Vulnerability Group, with members from many organizations, collaborates on critical security issues. With the help of the wider OpenJDK community and my team at Red Hat, we have continued to provide updates for critical bugs and security vulnerabilities at regular intervals. I can see no reason why this process should not work in the same way for OpenJDK 8 and the next long-term support release, OpenJDK 11.

https://developers.redhat.com/blog/2018/09/24/the-future-of-java-and-openjdk-updates-without-oracle-support/




https://www.azul.com/downloads/zulu/

# Microsoft and Azul Systems bring free Java LTS support to Azure

Veröffentlicht am 25 September, 2018

Asir Selvasingh, Principal Program Manager, Azure Developer Experience

Java developers on Azure and Azure Stack can build and run production Java applications using Azul Systems Zulu Enterprise builds of OpenJDK without incurring additional support costs. If you're currently running Java apps on-premise or with other JDKs, consider moving it to Zulu on Azure for free support and maintenance. Go

# Amazon Corretto

No-cost, multiplatform, production-ready distribution of OpenJDK

Amazon Corretto is a no-cost, multiplatform, production-ready distribution of the Open Java Development Kit (OpenJDK). Corretto comes with long-term support that will include performance enhancements and security fixes. Amazon runs Corretto internally on thousands of production services and Corretto is certified as compatible with the Java SE standard. With Corretto, you can develop and run Java applications on popular operating systems, including Amazon Linux 2, Windows, and macOS. Amazon Corretto 8 is in Preview.

Visit our documentation to learn more.

Amazon Corretto 8 is in Preview

Download the Preview

## Installation Guides

Amazon Linux 2 Microsoft Windows macOS Docker

https://aws.amazon.com/corretto/


# JDK 12

https://pixabay.com/en/gate-wrought-iron-iron-number-3267016/

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OpenJDK FAQ
Installing
Contributing
Sponsoring
Developers' Guide

Mailing lists
IRC · Wiki

Bylaws · Census
Legal

**JEP Process**

search

**Source code**
Mercurial
Bundles (6)

**Groups**
(overview)
2D Graphics

# JDK 12

This release will be the Reference Implementation of version 12 of the Java SE Platform, as specified by JSR 386 in the Java Community Process.

## Status

The development repositories are open for bug fixes, small enhancements, and JEPs as proposed and tracked via the JEP Process.

## Schedule

| | |
|---|---|
| 2018/12/13 | Rampdown Phase One (fork from main line) |
| 2019/01/17 | Rampdown Phase Two |
| 2019/02/07 | Release-Candidate Phase |
| 2019/03/19 | General Availability |

http://openjdk.java.net/projects/jdk/12/

```
int numLetters = switch (day) {
    case MONDAY, FRIDAY, SUNDAY -> 6;
    case TUESDAY -> 7;
    case THURSDAY, SATURDAY -> 8;
    case WEDNESDAY -> 9;
};
```

## JEP325: Switch Expressions

http://openjdk.java.net/jeps/325

```
String query = ``
                 SELECT `EMP_ID`, `LAST_NAME` FROM `EMPLOYEE_TB`
                 WHERE `CITY` = 'INDIANAPOLIS'
                 ORDER BY `EMP_ID`, `LAST_NAME`;
               ``;
```

# JEP326: Raw String Literals

http://openjdk.java.net/jeps/326

## Summary

Enhance the G1 garbage collector to automatically return Java heap memory to the operating system when idle.

## Non-Goals

- Sharing of committed but empty pages between Java processes. Memory should be returned (uncommitted) to the operating system.
- The process of giving back memory does not need to be frugal with CPU resources, nor does it need to be instantaneous.
- Use of different methods to return memory other than available uncommit of memory.
- Support for other collectors than G1.

# JEP 346: Promptly Return Unused Committed Memory from G1

http://openjdk.java.net/jeps/346

2D Graphics
Adoption
AWT
Build
Compatibility & Specification Review
Compiler
Conformance
Core Libraries
Governing Board
HotSpot
Internationalization
JMX
Members
Networking
NetBeans Projects
Porters
Quality
Security
Serviceability
Sound
Swing
Vulnerability
Web

## Features

189: Shenandoah: A Low-Pause-Time Garbage Collector (Experimental)
230: Microbenchmark Suite
325: Switch Expressions (Preview)
326: Raw String Literals (Preview)
334: JVM Constants API
340: One AArch64 Port, Not Two
341: Default CDS Archives
344: Abortable Mixed Collections for G1
346: Promptly Return Unused Committed Memory from G1

Last update: 2018/12/6 23:21 UTC

http://openjdk.java.net/projects/jdk/12/

# API Changes

- `{@systemProperty}`
  https://bugs.openjdk.java.net/browse/JDK-5076751

- `Files#mismatch(Path, Path)`
  https://bugs.openjdk.java.net/browse/JDK-8202302

# Future

https://pixabay.com/en/binoculars-looking-man-discovery-1209011/

# Project Amber

https://pixabay.com/en/heart-amber-pendant-necklace-1202129/

# Project Amber

The goal of Project Amber is to explore and incubate smaller, productivity-oriented Java language features that have been accepted as candidate JEPs under the OpenJDK JEP process. This Project is sponsored by the Compiler Group.

## Status of JEPs

Currently in progress:

- JEP 302 Lambda Leftovers
- JEP 305 Pattern Matching
- JEP 325 Switch Expressions (preview, JDK 12)
- JEP 326 Raw String Literals (preview, JDK 12)
- JEP draft 8209434 Concise Method Bodies

Delivered:

- JEP 286 Local-Variable Type Inference (`var`) *(JDK 10)*
  See also:
  - Style Guidelines
  - Frequently Asked Questions
- JEP 323 Local-Variable Syntax for Lambda Parameters *(JDK 11)*

On hold:

- JEP 301 Enhanced Enums. See explanation.

## Documents

- Data Classes for Java *(February 2018)*
- Style Guidelines for Local Variable Type Inference *(March 2018)*
- Local Variable Type Inference: Frequently Asked Questions *(October 2018)*

```
BiFunction<Integer, String, String> biss =
    (i, _) -> String.valueOf(i);
```

```
Map<String, Integer> msi = ...
...
String key = computeSomeKey();
msi.computeIfAbsent(key, key -> key.length())
```

Optional: Better disambiguation for functional expression

# JEP302: Lambda Leftovers

http://openjdk.java.net/jeps/302

```
String formatted;
switch (obj) {
    case Integer i: formatted = String.format("int %d", i); break;
    case Byte b:    formatted = String.format("byte %d", b); break;
    case Long l:    formatted = String.format("long %d", l); break;
    case Double d:  formatted = String.format("double %f", l); break;
    case String s:  formatted = String.format("String %s", s); break;
    default:        formatted = obj.toString();
}
```

# JEP305: Pattern Matching

http://openjdk.java.net/jeps/305

```
//   -> is "single expression form"
int length(String s) -> s.length();

//   = is "method reference form"
int length(String s) = String::length;
```

## JEP draft 8209434: Concise Method Bodies

http://openjdk.java.net/jeps/8209434

# Project Loom

https://pixabay.com/en/craftsman-loom-craftsmanship-hands-1839920/

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OpenJDK FAQ
Installing
Contributing
Sponsoring
Developers' Guide

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# Loom

The goal of this Project is to explore and incubate Java VM features and APIs built on top of them for the implementation of lightweight user-mode threads (fibers), delimited continuations (of some form), and related features, such as explicit tail-call.

This Project is sponsored by the HotSpot Group.

http://openjdk.java.net/projects/loom/

# Project Valhalla

https://pixabay.com/en/tunnel-passage-underpass-light-965720/

OpenJDK

**Workshop**

OpenJDK FAQ
Installing
Contributing
Sponsoring
Developers' Guide

Mailing lists
IRC · Wiki

Bylaws · Census
Legal

**JEP Process**

# Valhalla

**NOTE:** See the **OpenJDK Wiki** for details and up-to-date information.

The goal of this Project is to provide a venue to explore and incubate advanced Java VM and Language feature candidates such as:

- Value Types
- Generic Specialization
- And possibly other related topics

This Project is sponsored by the HotSpot Group.

http://openjdk.java.net/projects/valhalla/

## Summary

Provide JVM infrastructure for working with immutable and reference-free objects, in support of efficient by-value computation with non-primitive types.

# JEP169: Value Objects

http://openjdk.java.net/jeps/169

```
class Box<T> {
}

new Box<int>();
```

## JEP218: Generics over Primitive Types

http://openjdk.java.net/jeps/218

## Summary

Define the process by which contributors in the OpenJDK Community produce time-based, rapid-cadence JDK feature releases.

# JEP3: JDK Release Process

http://openjdk.java.net/jeps/3

**Summary**

A preview language or VM feature is a new feature of the Java SE Platform that is fully specified, fully implemented, and yet impermanent. It is available in a JDK feature release to provoke developer feedback based on real world use; this may lead to it becoming permanent in a future Java SE Platform.

# JEP12: Preview Language and VM Features

http://openjdk.java.net/jeps/12

## Summary

Introduce a modernized general-purpose hash function into the JVM, usable by arbitrary classes and arrays.

Enable new classes to use it as a back-end for the standard `Object.hashCode` API.

Supply APIs for legacy types (including arrays and collections) to begin to make use of this hash code.

# JEP draft 8201462: Better hash codes

http://openjdk.java.net/jeps/8201462

```
private final static Logger LOGGER =
    Logger.getLogger(“com.foo.Bar");
```

## JEP draft 8209964: Lazy Static Final Fields

http://openjdk.java.net/jeps/8209964

# Thanks! Questions?

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www.innoq.com

https://www.innoq.com/de/talks/2018/12/java-10-11-12/

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