AdoptOpenJDK

Migrating to AdoptOpenJDK
from Oracle Java

Version 0.7 - 15th Feb 2019

What is AdoptOpenJDK?

AdoptOpenJDK started in late 2017 as a vendor-neutral community-guided project who produces rock-solid, release quality OpenJDK binaries that are drop-in alternatives to Oracle's Java. It is backed by a wide array of technology vendors including *Amazon*, *GoDaddy*, *IBM*, *jClarity*, *Microsoft*, *Pivotal*, *Red Hat* as well as the broader Java developer community.

AdoptOpenJDK focuses on LTS releases (e.g. Java 8 and 11) and provides two VM options:

1. **HotSpot** - from the OpenJDK Hotspot.
2. **OpenJ9** - from the Eclipse OpenJ9[1].

> *"AdoptOpenJDK's mission is to provide free binaries for the ecosystem as long as the OpenJDK and OpenJ9 upstream projects continue to be maintained."*

What is OpenJDK?

OpenJDK is the open source project which is the Reference Implementation (RI) for the Java SE standard, which has been used as the basis of Oracle's Java since Java 7. As well as Oracle, there are other providers who provide OpenJDK based binaries which are drop-in replacements for Oracle's Java.

Oracle's Java Support Has Changed

As of January 2019, Oracle will no longer be providing free updates for commercial use of Oracle's Java 8.

As of March 2019, Oracle will no longer be providing free updates for commercial use of Oracle's Java 11 (LTS).

If you wish to continue getting security and stability fixes from Oracle for either Oracle Java 8 or Oracle Java 11, you will need to have a subscription plan and pay a fee for it.

If that is not your preferred option, then there is a strong alternative. AdoptOpenJDK is the OpenJDK provider that the Java ecosystem is collaborating around including organizations such as Amazon, IBM, jClarity, Microsoft, Pivotal, Red Hat, GoDaddy and many more.

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[1] To learn about the differences between HotSpot and OpenJ9, see New to OpenJ9?

What's Happening with updates to 8 and 11?

As part of the standard OpenJDK handover process, Oracle has passed on the leadership of the OpenJDK 8 and OpenJDK 11 projects to Red Hat. Red Hat along with all of the other OpenJDK players will continue to update OpenJDK 8 and OpenJDK 11 with security and bug fixes and will likely follow the same release cycle and versioning scheme as Oracle does for its Java.

Which Platforms Are Supported By AdoptOpenJDK?

AdoptOpenJDK supports the widest range of any OpenJDK provider including the following major platforms:

1. Linux x86
2. Mac OS X
3. Windows x64

And a wide host of other platforms including Solaris, AArch64, Arm32, Windows x86, AIX, PPC and many more. See the AdoptOpenJDK Support page for a full listing.

How Can I Install AdoptOpenJDK?

Please see the AdoptOpenJDK Installation page for installation instructions for your O/S.

There is also Official AdoptOpenJDK Docker images and HomeBrew support for Mac OS X.

21st Feb 2019: The project has beta versions of native installers for the various O/S's including *.msi* for Windows, *.pkg/.dmg* for Mac OS X and *.rpm/.deb* for the relevant Linux distros.

Who Can I Contact For Commercial Support?

AdoptOpenJDK is currently supported commercially by two companies.

1. IBM is a core contributor to Eclipse OpenJ9 and employs several of the founders of AdoptOpenJDK and key engineers on the AdoptOpenJDK project. See IBM Runtimes for Business for more details.

2. jClarity have contributors to OpenJDK and employs several of the founders of AdoptOpenJDK and key engineers on the AdoptOpenJDK project. See jClarity's AdoptOpenJDK Support for more details.

How Does (Adopt)OpenJDK differ from OracleJDK?

During the development of Java 6, Sun Microsystems announced the open-sourcing of the Java platform. Due to the advanced stage of the Java 6 release train, it was not possible to deliver an open-source-based Java 6 in time for the initial release. Later on, the OpenJDK 6 project delivered an open-source Java 6 implementation, but it was never the basis of Sun's Java 6.

Instead, from a very early beta in the release train, OpenJDK became the baseline for all Sun (later Oracle) releases from Java 7 onwards. The OpenJDK project is hosted at https://openjdk.java.net and all new Java features are developed and prototyped within OpenJDK before being released as production builds.

Over time, the small differences between OpenJDK and Oracle's JDK have shrunk away to almost nothing (e.g. some proprietary font rendering software that Oracle could not open source). As of 2019, OpenJDK binaries (in particular AdoptOpenJDK provided binaries) should be considered a drop-in replacement for the vast majority of Java applications.

The following table illustrates the proprietary components that can be found in an Oracle JDK 8 and the alternative technologies that are either planned or available to replace them. Click on the links to learn more.

Oracle JDK 8 proprietary component	Alternative component	(Adopt)OpenJDK8	(Adopt)OpenJDK11
WebStart / browser plugin	IcedTea-Web	✘ (coming soon)	✘ (coming soon)
JavaFX	OpenJFX	✘ (coming soon)	✘ (coming soon)
T2K font rendering engine	Freetype	✔	✔
Monotype Lucida fonts	Relicensed Lucida fonts	✘ (coming soon)	✘ (coming soon)
Ductus 2D renderer	Pisces/Marlin	✔ (Pisces)	✔ (Marlin)
Kodac Color Matching System (KCMS) library	LCMS	✔	✔
SNMP	Use JMX (or SNMP4J)	✔ (not bundled)	✔ (not bundled)
Native sound drivers	Use Windows sound drivers	✔ (not bundled)	✔ (not bundled)
Java Flight Recorder (JFR)	Java Flight Recorder	✘(coming soon)	✔
Java Mission Control (JMC)	Use JDK Mission Control	✘(coming soon)	✘ (coming soon)

✎ JavaFX, JFR, and JMC were all contributed by Oracle to the OpenJDK project for releases after Java 8.

IcedTea-Web

AdoptOpenJDK is working on a project to provide IcedTea-web as an open source replacement for Webstart and Java plugin technology. This feature will be available via an installer option in AdoptOpenJDK binaries.

OpenJFX

Back in 2017, JavaFX was decoupled from the Oracle JDK and contributed to the OpenJDK community. The OpenJFX community is focused on OpenJFX 11+ and AdoptOpenJDK is working with the OpenJFX community to provide it via an installer option in AdoptOpenJDK binaries.

✎ OpenJFX 8 is no longer being actively maintained. If you need this capability, we recommend upgrading to OpenJFX 11.

Freetype font rendering library

OpenJDK uses the open source FreeType font rendering library instead of the proprietary T2K font library.

Relicensed Lucida fonts

The Lucida fonts that are available in Oracle JDK 8 have a proprietary 3rd party license. AdoptOpenJDK intends to provide relicensed Lucida fonts. Work is ongoing to minimize any display issues when these fonts are rendered by Freetype and are expected to complete in 2Q 2019.

Pisces and Marlin

Oracle JDK 8 uses a proprietary 2D graphics renderer called Ductus, whereas OpenJDK uses an open-source renderer called Pisces. From OpenJDK 9, the Marlin renderer is in use. Work is planned at AdoptOpenJDK to either backport Marlin to OpenJDK 8 and/or minimize any display issues between the two. The outlook for completion is in Q2 2019.

LCMS

OpenJDK uses the Little Color Matching System (LCMS) open source library instead of the proprietary Kodac CMS library.

JMX

The proprietary SNMP package shipped with Oracle JDK 8 is not present in OpenJDK. Use JMX as an alternative, or SNMP4J. These packages are not bundled with the AdoptOpenJDK binaries.

Windows sound drivers

Oracle JDK provides native sound drivers for Java 8 on Windows, which are not present in OpenJDK. Use the sound drivers that are available with Microsoft Windows instead.

Java Flight Recorder

Java Flight Recorder (JFR) was decoupled from the Oracle JDK and contributed to the OpenJDK community. Work is underway to backport JFR from OpenJDK 11 to OpenJDK 8. When this work is complete, AdoptOpenJDK will include JFR in OpenJDK 8 binaries.

JDK Mission Control

Java Mission Control (JMC) is being open sourced under the OpenJDK [JDK Mission Control project](). When available, JMC will be able to receive JFR events from OpenJDK 11 and eventually OpenJDK 8, when that backport is complete.

Where Can I Find Additional Resources?

Join the [AdoptOpenJDK Community Slack]() or start at the [Technical Steering Committee]() documentation set.