



Red Hat build of OpenJDK 21

Release notes for Red Hat build of OpenJDK 21.0.3

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Abstract

The Release notes for Red Hat build of OpenJDK 21.0.3 document provides an overview of new features in Red Hat build of OpenJDK 21 and a list of potential known issues and possible workarounds.

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PREFACE

Open Java Development Kit (OpenJDK) is a free and open source implementation of the Java Platform, Standard Edition (Java SE). The Red Hat build of OpenJDK is available in four versions: 8u, 11u, 17u, and 21u.

Packages for the Red Hat build of OpenJDK are made available on Red Hat Enterprise Linux and Microsoft Windows and shipped as a JDK and JRE in the Red Hat Ecosystem Catalog.

PROVIDING FEEDBACK ON RED HAT BUILD OF OPENJDK DOCUMENTATION

To report an error or to improve our documentation, log in to your Red Hat Jira account and submit an issue. If you do not have a Red Hat Jira account, then you will be prompted to create an account.

Procedure

1. Click the following link to [create a ticket](#).
2. Enter a brief description of the issue in the **Summary**.
3. Provide a detailed description of the issue or enhancement in the **Description**. Include a URL to where the issue occurs in the documentation.
4. Clicking **Submit** creates and routes the issue to the appropriate documentation team.

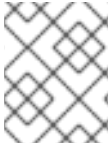
MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see [our CTO Chris Wright's message](#).

CHAPTER 1. SUPPORT POLICY FOR RED HAT BUILD OF OPENJDK

Red Hat will support select major versions of Red Hat build of OpenJDK in its products. For consistency, these versions remain similar to Oracle JDK versions that are designated as long-term support (LTS).

A major version of Red Hat build of OpenJDK will be supported for a minimum of six years from the time that version is first introduced. For more information, see the [OpenJDK Life Cycle and Support Policy](#).



NOTE

RHEL 6 reached the end of life in November 2020. Because of this, Red Hat build of OpenJDK is not supporting RHEL 6 as a supported configuration..

CHAPTER 2. DIFFERENCES FROM UPSTREAM OPENJDK 21

Red Hat build of OpenJDK in Red Hat Enterprise Linux contains a number of structural changes from the upstream distribution of OpenJDK. The Microsoft Windows version of Red Hat build of OpenJDK attempts to follow Red Hat Enterprise Linux updates as closely as possible.

The following list details the most notable Red Hat build of OpenJDK 21 changes:

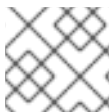
- FIPS support. Red Hat build of OpenJDK 21 automatically detects whether RHEL is in FIPS mode and automatically configures Red Hat build of OpenJDK 21 to operate in that mode. This change does not apply to Red Hat build of OpenJDK builds for Microsoft Windows.
- Cryptographic policy support. Red Hat build of OpenJDK 21 obtains the list of enabled cryptographic algorithms and key size constraints from the RHEL system configuration. These configuration components are used by the Transport Layer Security (TLS) encryption protocol, the certificate path validation, and any signed JARs. You can set different security profiles to balance safety and compatibility. This change does not apply to Red Hat build of OpenJDK builds for Microsoft Windows.
- The **src.zip** file includes the source for all of the JAR libraries shipped with Red Hat build of OpenJDK.
- Red Hat build of OpenJDK on RHEL uses system-wide timezone data files as a source for timezone information.
- Red Hat build of OpenJDK on RHEL uses system-wide CA certificates.
- Red Hat build of OpenJDK on Microsoft Windows includes the latest available timezone data from RHEL.
- Red Hat build of OpenJDK on Microsoft Windows uses the latest available CA certificates from RHEL.

Additional resources

- See, [Improve system FIPS detection \(RHEL Planning Jira\)](#)
- See, [Using system-wide cryptographic policies \(RHEL documentation\)](#)

CHAPTER 3. RED HAT BUILD OF OPENJDK FEATURES

The latest Red Hat build of OpenJDK 21 release might include new features. Additionally, the latest release might enhance, deprecate, or remove features that originated from previous Red Hat build of OpenJDK 21 releases.



NOTE

For all the other changes and security fixes, see [OpenJDK 21.0.3 Released](#).

Red Hat build of OpenJDK enhancements

Red Hat build of OpenJDK 21 provides enhancements to features originally created in previous releases of Red Hat build of OpenJDK.

Java compiler aligns with the Java Language Specification by rejecting **final** keyword in record patterns

The Java 21 release enhanced the Java language with pattern matching for switch statements. However, Red Hat build of OpenJDK 21 provides a **javac** compiler that allows use of the **final** keyword before a record pattern (for example, **case final R(...) ->**). This use of the **final** keyword violates the Java Language Specification.

In Red Hat build of OpenJDK 21.0.3, the **javac** compiler is aligned with the Java Language Specification. This enhancement means that any program that includes the **final** keyword in a switch statement now fails to compile. In this situation, to ensure that the program compiles successfully, you must remove the **final** keyword.

See [JDK-8317300 \(JDK Bug System\)](#).

XML Security for Java updated to Apache Santuario 3.0.3

In Red Hat build of OpenJDK 21.0.3, the XML signature implementation is based on Apache Santuario 3.0.3.

This enhancement introduces the following four SHA-3-based RSA-MGF1 **SignatureMethod** algorithms:

- **SHA3_224_RSA_MGF1**
- **SHA3_256_RSA_MGF1**
- **SHA3_384_RSA_MGF1**
- **SHA3_512_RSA_MGF1**

Because the **javax.xml.crypto.dsig.SignatureMethod** API cannot be modified in update releases to provide constant values for the new algorithms, use the following equivalent string literal values for these algorithms:

- **<http://www.w3.org/2007/05/xmldsig-more#sha3-224-rsa-MGF1>**
- **<http://www.w3.org/2007/05/xmldsig-more#sha3-256-rsa-MGF1>**
- **<http://www.w3.org/2007/05/xmldsig-more#sha3-384-rsa-MGF1>**
- **<http://www.w3.org/2007/05/xmldsig-more#sha3-512-rsa-MGF1>**

See [JDK-8319124 \(JDK Bug System\)](#).

TrimNativeHeapInterval option available as a product switch

Red Hat build of OpenJDK 21.0.3 provides the **-XX:TrimNativeHeapInterval=*ms*** option as an official product switch. This enhancement enables the JVM to trim the native heap at specified intervals (in milliseconds) on supported platforms. Currently, the only supported platform for this enhancement is Linux with **glibc**.

You can disable trimming by setting **TrimNativeHeapInterval=0**. The trimming feature is disabled by default.

See [JDK-8325496 \(JDK Bug System\)](#).

SystemTray.isSupported() method returns false on most Linux desktops

In Red Hat build of OpenJDK 21.0.3, the **java.awt.SystemTray.isSupported()** method returns **false** on systems that do not support the **SystemTray** API correctly. This enhancement is in accordance with the **SystemTray** API specification.

The **SystemTray** API is used to interact with the taskbar in the system desktop to provide notifications. **SystemTray** might also include an icon representing an application. Due to an underlying platform issue, GNOME desktop support for taskbar icons has not worked correctly for several years. This platform issue affects the JDK's ability to provide **SystemTray** support on GNOME desktops. This issue typically affects systems that use GNOME Shell 44 or earlier.



NOTE

Because the lack of correct **SystemTray** support is a long-standing issue on some systems, this API enhancement to return **false** on affected systems is likely to have a minimal impact on users.

See [JDK-8322750 \(JDK Bug System\)](#).

Certainly R1 and E1 root certificates added

In Red Hat build of OpenJDK 21.0.3, the **cacerts** truststore includes two Certainly root certificates:

Certificate 1

- Name: Certainly
- Alias name: certainlyroot1
- Distinguished name: CN=Certainly Root R1, O=Certainly, C=US

Certificate 2

- Name: Certainly
- Alias name: certainlyroot1
- Distinguished name: CN=Certainly Root E1, O=Certainly, C=US

See [JDK-8321408 \(JDK Bug System\)](#).

Precise parallel scanning of large object arrays for young collection roots

During the collection of young generation objects, the Parallel Garbage Collector (GC) partitions old generation objects into 64 kB stripes to scan for references to the young generation. These stripes are assigned to worker threads to perform scanning in parallel.

Previous releases of Red Hat build of OpenJDK 21 did not constrain the worker threads to their own stripe. This lack of constraint imposed limits on parallelism. For example, if a large object started in a stripe that was allocated to a specific worker thread, this thread could end up scanning an object with thousands of references across multiple stripes.

Red Hat build of OpenJDK 21.0.3 constrains each worker thread to its allocated stripe. Each thread now processes only the interesting parts of large object arrays. When large object arrays are present, pauses for the Parallel GC are now similar to pauses for the Garbage-First (G1) collector. In some cases, this enhancement helps to reduce the length of pauses by 75–80%. For example, a 100-millisecond pause in earlier releases could be reduced to a 20-millisecond pause in this release.

See [JDK-8310031 \(JDK Bug System\)](#).

Fixed potential JVM failures when using ZGC and a non-default `ObjectAlignmentInBytes` value

In earlier releases of Red Hat build of OpenJDK 21, if you ran the JVM with the `-XX:+UseZGC` option and a non-default value for `-XX:ObjectAlignmentInBytes`, the JVM could fail or malfunction. This issue occurred because `ZBarrierSet::clone_obj_array` ignored padding at the end of an object array.

Red Hat build of OpenJDK 21.0.3 resolves this issue to ensure that you can successfully run the JVM when using the Z Garbage Collector (ZGC) and non-default values for Java object alignment when running the JVM.

See [JDK-8325074 \(JDK Bug System\)](#).

CHAPTER 4. ADVISORIES RELATED TO THIS RELEASE

The following advisories are issued to document bug fixes and CVE fixes included in this release:

- [RHSA-2024:1826](#)
- [RHSA-2024:1827](#)
- [RHSA-2024:1828](#)

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