Red Hat build of OpenJDK 21

Release notes for Red Hat build of OpenJDK 21.0.4

Last Updated: 2024-07-23

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Legal Notice

Abstract

The Release notes for Red Hat build of OpenJDK 21.0.4 document provides an overview of new features in Red Hat build of OpenJDK 21 and a list of potential known issues and possible workarounds.

Table of Contents

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 **Create** creates and routes the issue to the appropriate documentation team.

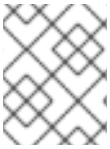
MAKING OPEN SOURCE MORE INCLUSIVE

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:

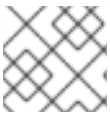
- FIPS support. Red Hat build of OpenJDK 21 automatically detects whether RHEL is in FIPS mode and automatically configures Red Hat build of OpenJDK 21 to operate in that mode. This change does not apply to Red Hat build of OpenJDK builds for Microsoft Windows.
- Cryptographic policy support. Red Hat 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 21.0.4 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.

-XshowSettings launcher option includes a security category

In Red Hat build of OpenJDK 21.0.4, the **-XshowSettings** launcher option includes a security category, which allows the following arguments to be passed:

Argument	Details
-XshowSettings:security or **-XshowSettings:security:all**	Show all security settings and continue.
-XshowSettings:security:properties	Show security properties and continue.
-XshowSettings:security:providers	Show static security provider settings and continue.
-XshowSettings:security:tls	Show TLS-related security settings and continue.

If third-party security providers are included in the application class path or module path, and configured in the **java.security** file, the output includes these third-party security providers.

See JDK-8281658 (JDK Bug System).

GlobalSign R46 and E46 root certificates added

In Red Hat build of OpenJDK 21.0.4, the **cacerts** truststore includes two GlobalSign TLS root certificates:

Certificate 1

- Name: GlobalSign
- Alias name: globalsignr46
- Distinguished name: CN=GlobalSign Root R46, O=GlobalSign nv-sa, C=BE

Certificate 2

- Name: GlobalSign

- Alias name: globalsigne46
- Distinguished name: CN=GlobalSign Root E46, O=GlobalSign nv-sa, C=BE

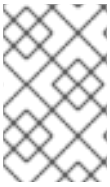
See JDK-8316138 (JDK Bug System).

Fallback option for POST-only OCSP requests

JDK-8175903, which was introduced in Red Hat build of OpenJDK 17, added support for using the HTTP **GET** method for Online Certificate Status Protocol (OCSP) requests. This feature was enabled unconditionally for small requests.

The Internet Engineering Task Force (IETF) RFC 5019 and RFC 6960 explicitly allow and recommend the use of HTTP **GET** requests. However, some OCSP responders do not work well with these types of requests.

Red Hat build of OpenJDK 21.0.4 introduces a JDK system property, **com.sun.security.ocsp.useget**. By default, this property is set to **true**, which retains the current behavior of using **GET** requests for small requests. If this property is set to **false**, only HTTP **POST** requests are used, regardless of size.



NOTE

This fallback option for **POST**-only OCSP requests is a non-standard feature, which might be removed in a future release if the use of HTTP **GET** requests with OCSP responders no longer causes any issues.

See JDK-8328638 (JDK Bug System).

RPATH preferred over RUNPATH for $ORIGIN runtime search paths in internal JDK binaries

Native executables and libraries in the JDK use embedded runtime search paths (rpaths) to locate required internal JDK native libraries. On Linux systems, binaries can specify these search paths by using either **DT_RPATH** or **DT_RUNPATH**.

If a binary specifies search paths by using **DT_RPATH**, these paths are searched *before* any paths that are specified in the **LD_LIBRARY_PATH** environment variable. If a binary specifies search paths by using **DT_RUNPATH**, these paths are searched only *after* paths that are specified in **LD_LIBRARY_PATH**. This means that the use of **DT_RUNPATH** can allow JDK internal libraries to be overridden by any libraries of the same name that are specified in **LD_LIBRARY_PATH**.

In earlier releases, the type of runtime search path used was based on the default search path for the dynamic linker. In Red Hat build of OpenJDK 21.0.4, to ensure that **DT_RPATH** is used, the **--disable-new-dtags** option is explicitly passed to the linker.

See JDK-8326891 (JDK Bug System).

Jpackage tool resolves symbolic links before passing file paths to dpkg

On Debian and Ubuntu systems, the **jpackage** tool uses the **dpkg -S** command to check which package provides a specific file. However, on newer Debian and Ubuntu systems, the **dpkg -S** command does not resolve symbolic links.

In Red Hat build of OpenJDK 21.0.4, **jpackage** resolves symbolic links before passing the real file path to **dpkg**.

See JDK-8295111 (JDK Bug System).

G1 garbage collector ignores existing eden regions for heap resizing during the Remark phase

To comply with **-XX:MinHeapFreeRatio** and **-XX:MaxHeapFreeRatio** settings, the Garbage-First (G1) garbage collector adjusts the Java heap size during the **Remark** phase of garbage collection, keeping the number of free regions within these limits.

In earlier releases, eden regions were considered to be occupied or full for the purpose of calculating Java heap size. This meant the heap size was dependent on the eden occupancy at the time the **Remark** phase was run. However, after the next garbage collection, these eden regions were empty.

In Red Hat build of OpenJDK 21.0.4, eden regions are considered to be empty or free during the **Remark** phase calculation. This enhancement means that the G1 garbage collector now expands the Java heap less aggressively and more deterministically, because the number of free regions does not vary as much. This enhancement also aligns Java heap sizing with the full garbage collection heap sizing. However, this might potentially lead to more frequent garbage collection.

See JDK-8314573 (JDK Bug System).

Fix for long garbage collection pauses due to imbalanced iteration during the Code Root Scan phase

The **Code Root Scan** phase of garbage collection finds references to Java objects within compiled code. To speed up this process, a cache is maintained within each region of the compiled code that contains references into the Java heap.

On the assumption that the set of references was small, previous releases used a single thread per region to iterate through these references. This single-threaded approach introduced a scalability bottleneck, where performance could be reduced if a specific region contained a large number of references.

In Red Hat build of OpenJDK 21.0.4, multiple threads are used, which helps to remove any scalability bottleneck.

See JDK-8315503 (JDK Bug System).

Fix for long garbage collection pauses in Stop-the-World collectors

In early releases of Red Hat build of OpenJDK 21, applications could experience long pause times during stop-the-world (STW) garbage collection. This issue affected various phases of the collection pauses, including **Class Unloading**, **Root Scanning**, and **CodeCache Unloading**, in all types of STW garbage collectors, such as the Serial, Parallel, and G1 collectors.

Red Hat build of OpenJDK 21.0.4 resolves these performance issues in STW collectors.

See JDK-8333832 (JDK Bug System).

Change in behavior for AWT headless mode detection on Windows

In earlier releases, unless the **java.awt.headless** system property was set to **true**, a call to **java.awt.GraphicsEnvironment.isHeadless()** returned **false** on Windows Server platforms.

From Red Hat build of OpenJDK 21.0.4 onward, unless the **java.awt.headless** property is explicitly set to **false** and if no valid monitor is detected on the current system at runtime, a call to **java.awt.GraphicsEnvironment.isHeadless()** returns **true** on Windows Server platforms. A valid monitor might not be detected, for example, if a session was initiated by a service or by PowerShell remoting.

This change in behavior means that applications running under these conditions, which previously expected to run in a headful context, might now encounter unexpected **HeadlessException** errors being thrown by Abstract Window Toolkit (AWT) operations.

You can reinstate the old behavior by setting the **java.awt.headless** property to **false**. However, if applications are running in headful mode and a valid display is not available, these applications are likely to continue experiencing unexpected issues.

See JDK-8185862 (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-2024:4571
- RHSA-2024:4572
- RHSA-2024:4573

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