



**Azul Zulu builds of OpenJDK  
July 20, 2021 Update Release**

**Azul Zulu 13.42 (CA) for Arm 64-bit**

Document Version: 1.1

Updated: Jul 23, 2021

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# Revision History

Revision	Date	Description
0.1	July 20, 2021	Initial version of the document.
1.0	July 20, 2021	Added information about the CVEs fixed in this release.
1.1	July 23, 2021	Added more explanation about Azul Zulu dropping support for OpenJSSE and Legacy8uJSSE. In previous versions of the document, some <a href="#">OpenJDK bugs</a> were erroneously marked as CPU bugs instead of PSU bugs. The error is corrected in this version.

# What's New

## July 20, 2021 PSU Release

This section describes new features and changes in behavior introduced in July 20, 2021 Azul Zulu PSU Update Release.

<b>Azul Zulu Version:</b>	13.42.17 (13.0.8+5)
<b>Release Date:</b>	July 20, 2021
<b>Based on Azul Zulu Version:</b>	13.41 (13.0.7.0.101+1)

A CPU (Critical Patch Update) release incorporates critical bug fixes and security vulnerability fixes. Azul Zulu CPU releases are based on the prior PSU release and are available commercially.

A PSU (Patch Set Updates) release is based on the current CPU release, i.e. it includes all bug fixes that have been fixed in the CPU release, and a number of [non-security bug fixes](#).

## IANA time zone data version

This release does not contain any changes to the time zone data.

## What's New

### Third Party Licenses documents now combine licenses for CPU and PSU bundles

Starting with this release, Azul will provide third party licenses for CPU and PSU bundles in a single document, which contains the superset of the licenses. See <https://docs.azul.com/core/tpl>.

## Notice of Upcoming Changes

- Azul Zulu 8 is dropping support for OpenJSSE and Legacy8uJSSE by January 2022.

[OpenJSSE](#) is a JSSE provider that was ported from Java 11 to add support for TLS 1.3, because OpenJDK 8 did not support TLS 1.3 at the time. Later, OpenJSSE became part of OpenJDK 8u272. [Legacy8uJSSE](#) is a JSSE provider that falls back to legacy TLS 1.2 protocol implementation. It was added to Azul Zulu 8 for compatibility reasons.

Since support for TLS 1.3 was integrated into OpenJDK 8 (and became part of Java SE 8 specification), both OpenJSSE and Legacy8uJSSE are no longer needed and will be removed from Azul Zulu.

## Fixed Issues

### JDK Common Vulnerabilities and Exposure (CVE) Fixes

This section summarizes Common Vulnerabilities and Exposure (CVE) fixes of the July 2021 OpenJDK release.

CVE #	Component	Protocol	Remote Exploit w/o Auth.	Base Score	Attack Vector	Attack Complex	Privileges Req'd	User Interact	Scope	Confidentiality	Integrity	Availability	Azul Zulu Versions Affected	Notes
<a href="#">CVE-2021-2388</a>	Hotspot	Multiple	Yes	7.5	Network	High	None	Required	Unchanged	High	High	High	16, 15, 13, 11, 8	Note 1
<a href="#">CVE-2021-2369</a>	Library	Multiple	Yes	4.3	Network	Low	None	Required	Unchanged	None	Low	None	16, 15, 13, 11, 8, 7, 6	Note 1
<a href="#">CVE-2021-2432</a>	JNDI	Multiple	Yes	3.7	Network	High	None	None	Unchanged	None	None	Low	7, 6	Note 2
<a href="#">CVE-2021-2341</a>	Networking	Multiple	Yes	3.1	Network	High	None	Required	Unchanged	Low	None	None	16, 15, 13, 11, 8, 7, 6	Note 1
<a href="#">CVE-2021-29921</a>	Oracle GraalVM Enterprise Edition: Python interpreter and runtime (CPython)	Multiple	Yes	9.8	Network	Low	None	None	Unchanged	High	High	High	None	
<a href="#">CVE-2020-28928</a>	Oracle GraalVM Enterprise Edition: LLVM Interpreter (musl libc)	None	No	5.5	Local	Low	Low	None	Unchanged	None	None	High	None	

#### Notes:

ID	Notes
1	This vulnerability applies to Java deployments that load and run untrusted code (e.g., code that comes from the internet) and rely on the Java sandbox for security. This vulnerability does not apply to Java deployments, typically in servers, that load and run only trusted code (e.g., code installed by an administrator).

ID	Notes
2	This vulnerability applies to Java deployments that load and run untrusted code (e.g., code that comes from the internet) and rely on the Java sandbox for security. This vulnerability can also be exploited by using APIs in the specified Component, e.g., through a web service which supplies data to the APIs.

## Non-CVE Security Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8264460</a>	Improve NTLM support	CPU
<a href="#">JDK-8264079</a>	Improve abstractions	CPU
<a href="#">JDK-8263111</a>	Enhance String Conclusions	CPU
<a href="#">JDK-8262975</a>	Upgrade Glib support	CPU
<a href="#">JDK-8262967</a>	Improve Zip file support	CPU
<a href="#">JDK-8262477</a>	Enhance String Conclusions	CPU
<a href="#">JDK-8262410</a>	Enhanced rules for zones	CPU
<a href="#">JDK-8262403</a>	Enhanced data transfers	CPU
<a href="#">JDK-8262380</a>	Enhance XML processing passes	CPU
<a href="#">JDK-8260960</a>	Signs of jarsigner signing	CPU
<a href="#">JDK-8260453</a>	Improve Font Bounding	CPU
<a href="#">JDK-8256491</a>	Better HTTP transport	CPU
<a href="#">JDK-8256157</a>	Improve bytecode assembly	CPU
<a href="#">JDK-8160768</a>	Add capability to custom resolve host/domain names within the default JNDI LDAP provider	CPU

## OpenJDK Bug Fixes

The following table describes the OpenJDK changes implemented in July 20, 2021 Zulu release.

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8264460</a>	Improve NTLM support	CPU
<a href="#">JDK-8264079</a>	Improve abstractions	CPU
<a href="#">JDK-8264066</a>	Enhance compiler validation	CPU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8262967</a>	Improve Zip file support	CPU
<a href="#">JDK-8262477</a>	Enhance String Conclusions	CPU
<a href="#">JDK-8262410</a>	Enhanced rules for zones	CPU
<a href="#">JDK-8262403</a>	Enhanced data transfers	CPU
<a href="#">JDK-8262380</a>	Enhance XML processing passes	CPU
<a href="#">JDK-8260967</a>	Better jar file validation	CPU
<a href="#">JDK-8260960</a>	Signs of jarsigner signing	CPU
<a href="#">JDK-8260453</a>	Improve Font Bounding	CPU
<a href="#">JDK-8258432</a>	Improve file transfers	CPU
<a href="#">JDK-8256491</a>	Better HTTP transport	CPU
<a href="#">JDK-8256157</a>	Improve bytecode assembly	CPU
<a href="#">JDK-8241248</a>	NullPointerException in sun.security.ssl.HKDF.extract(HKDF.java:93)	CPU
<a href="#">JDK-8267235</a>	[macos_aarch64] InterpreterRuntime::throw_pending_exception messing up LR results in crash	PSU
<a href="#">JDK-8265837</a>	Update version .jcheck/conf in jdk13u to be 13.0.8	PSU
<a href="#">JDK-8264821</a>	DirectIOtest fails on a system with large block size	PSU
<a href="#">JDK-8264786</a>	[macOS] All Swing/AWT apps cause Allow Notifications prompt to appear when app is launched	PSU
<a href="#">JDK-8264640</a>	CMS ParScanClosure misses a barrier	PSU
<a href="#">JDK-8264108</a>	Update version .jcheck/conf in jdk13u-dev to be 13.0.8	PSU
<a href="#">JDK-8264107</a>	Bump update version for OpenJDK: jdk-13.0.8	PSU
<a href="#">JDK-8263846</a>	Bad JNI lookup getFocusOwner in accessibility code on Mac OS X	PSU
<a href="#">JDK-8263676</a>	AArch64: one potential bug in C1 LIRGenerator::generate_address()	PSU
<a href="#">JDK-8262829</a>	Native crash in Win32PrintServiceLookup.getAllPrinterNames()	PSU
<a href="#">JDK-8262110</a>	DST starts from incorrect time in 2038	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8261585</a>	Restore HandleArea used in Deoptimization::uncommon_trap	PSU
<a href="#">JDK-8261397</a>	try catch Method failing to work when dividing an integer by 0	PSU
<a href="#">JDK-8261198</a>	[macOS] Incorrect JNI parameters in number conversion in A11Y code	PSU
<a href="#">JDK-8261170</a>	Upgrade to FreeType 2.10.4	PSU
<a href="#">JDK-8260616</a>	Removing remaining JNF dependencies in the java.desktop module	PSU
<a href="#">JDK-8260380</a>	Upgrade to LittleCMS 2.12	PSU
<a href="#">JDK-8259869</a>	[macOS] Remove desktop module dependencies on JNF Reference APIs	PSU
<a href="#">JDK-8259651</a>	[macOS] Replace JNF_COCOA_ENTER/EXIT macros	PSU
<a href="#">JDK-8259585</a>	[macOS] Bad JNI lookup error : Accessible actions do not work on macOS	PSU
<a href="#">JDK-8259343</a>	[macOS] Update JNI error handling in Cocoa code.	PSU
<a href="#">JDK-8259312</a>	VerifyCACerts.java fails as soneraclass2ca cert will expire in 90 days	PSU
<a href="#">JDK-8259232</a>	Bad JNI lookup during printing	PSU
<a href="#">JDK-8257988</a>	Remove JNF dependency from libsaproc/MacosxDebuggerLocal.m	PSU
<a href="#">JDK-8257860</a>	[macOS]: Remove JNF dependency from libosxkrb5/SCDynamicStoreConfig.m	PSU
<a href="#">JDK-8257858</a>	[macOS]: Remove JNF dependency from libosxsecurity/KeystoreImpl.m	PSU
<a href="#">JDK-8257853</a>	Remove dependencies on JNF's JNI utility functions in AWT and 2D code	PSU
<a href="#">JDK-8256682</a>	JDK-8202343 is incomplete	PSU
<a href="#">JDK-8256633</a>	Fix product build on Windows+Arm64	PSU
<a href="#">JDK-8256501</a>	libTestMainKeyWindow fails to build with Xcode 12.2	PSU
<a href="#">JDK-8256421</a>	Add 2 HARICA roots to cacerts truststore	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8256359</a>	AArch64: runtime/ReservedStack/ReservedStackTestCompiler.java fails	PSU
<a href="#">JDK-8255880</a>	UI of Swing components is not redrawn after their internal state changed	PSU
<a href="#">JDK-8255845</a>	Memory leak in imageFile.cpp	PSU
<a href="#">JDK-8255716</a>	AArch64: Regression: JVM crashes if manually offline a core	PSU
<a href="#">JDK-8254790</a>	SIGSEGV in string_indexof_char and stringL_indexof_char intrinsics	PSU
<a href="#">JDK-8252883</a>	AccessDeniedException caused by delayed file deletion on Windows	PSU
<a href="#">JDK-8251549</a>	Update docs on building for Git	PSU
<a href="#">JDK-8251456</a>	[TESTBUG] compiler/vectorization/TestVectorsNotSavedAtSafepoint.java failed OutOfMemoryError	PSU
<a href="#">JDK-8249608</a>	Vector register used by C2 compiled method corrupted at safepoint	PSU
<a href="#">JDK-8248552</a>	C2 crashes with SIGFPE due to division by zero	PSU
<a href="#">JDK-8248043</a>	Need to eliminate excessive i2l conversions	PSU
<a href="#">JDK-8247763</a>	assert(outerOutcnt() == 2) failed: 'onlyphis' failure in LoopNode::verify_strip_mined()	PSU
<a href="#">JDK-8247753</a>	UIManager.getSystemLookAndFeelClassName() returns wrong value on Fedora 32	PSU
<a href="#">JDK-8247502</a>	PhaseStringOpts crashes while optimising effectively dead code	PSU
<a href="#">JDK-8247432</a>	Update IANA Language Subtag Registry to Version 2020-09-29	PSU
<a href="#">JDK-8245981</a>	Upgrade to jQuery 3.5.1	PSU
<a href="#">JDK-8244853</a>	The static build of libextnet is missing the JNI_OnLoad_extnet function	PSU
<a href="#">JDK-8244154</a>	Update SunPKCS11 provider with PKCS11 v3.0 header files	PSU
<a href="#">JDK-8244151</a>	Update MUSCLE PC/SC-Lite headers to the latest release 1.8.26	PSU
<a href="#">JDK-8244088</a>	[Regression] Switch of Gnome theme ends up in deadlocked UI	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8244087</a>	2020-04-24 public suffix list update v ff6fcea	PSU
<a href="#">JDK-8243452</a>	JFR: Could not create chunk in repository with over 200 recordings	PSU
<a href="#">JDK-8242184</a>	Default signature algorithm for an RSASSA-PSS key	PSU
<a href="#">JDK-8242010</a>	Update IANA Language Subtag Registry to Version 2020-04-01	PSU
<a href="#">JDK-8241948</a>	enhance list of environment variables printed in hs_err file	PSU
<a href="#">JDK-8241829</a>	Cleanup the code for PrinterJob on windows	PSU
<a href="#">JDK-8241082</a>	Upgrade IANA Language Subtag Registry data to 03-16-2020 version	PSU
<a href="#">JDK-8240487</a>	Cleanup whitespace in .cc, .hh, .m, and .mm files	PSU
<a href="#">JDK-8235368</a>	Update BCEL to Version 6.4.1	PSU
<a href="#">JDK-8234691</a>	Potential double-free in ParallelSPCleanupTask constructor	PSU
<a href="#">JDK-8232084</a>	HotSpot build failed with GCC 9.2.1	PSU
<a href="#">JDK-8231118</a>	ARM32: Math tests failures	PSU
<a href="#">JDK-8230010</a>	Remove jdk8037819/BasicTest1.java	PSU
<a href="#">JDK-8230002</a>	javax/xml/jaxp/unittest/transform/SecureProcessingTest.java runs zero test	PSU
<a href="#">JDK-8229396</a>	jdeps ignores multi-release when generate-module-info used on command line	PSU
<a href="#">JDK-8229243</a>	SunPKCS11-Solaris provider tests failing on Solaris 11.4	PSU
<a href="#">JDK-8227609</a>	(fs) Files.newInputStream(...).skip(n) should allow skipping beyond file size	PSU
<a href="#">JDK-8227080</a>	(fs) Files.newInputStream(...).skip(n) is slow	PSU
<a href="#">JDK-8225773</a>	jdeps --check produces NPE if there is any missing module dependence	PSU
<a href="#">JDK-8225081</a>	Remove Telia Company CA certificate expiring in April 2021	PSU
<a href="#">JDK-8225072</a>	Add LuxTrust certificate that is expiring in March 2021 to list of allowed but expired certs	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8216012</a>	Infinite loop in RSA KeyPairGenerator	PSU
<a href="#">JDK-8202343</a>	Disable TLS 1.0 and 1.1	PSU
<a href="#">JDK-8073446</a>	TimeZone getOffset API does not return a DST offset between years 2038-2137	PSU

## Zulu Bug Fixes

The following table describes the Azul Zulu bug fixes implemented in this release.

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-26940	Zulu installation fails on Debian Slim	PSU
ZULU-26220	MSI Installer Should Update JAVA_HOME	PSU
ZULU-23831	[HSDIS] Fix HSDIS build scripts to make it work on embedded architectures	PSU

# About This Build

Azul Zulu for Arm 64-bit is a binary build of OpenJDK that Azul builds for the platforms based on the Arm 64-bit architecture. Azul Zulu binary builds are distributed as bundles. A bundle is a package that includes specific components of the binary build (e.g. headless JRE, Compact Profiles, specific CPU types, etc.). This section details the target platforms and the bundles included with this Azul Zulu build.

Azul Zulu 13.42.17 for Arm 64-bit provides the following bundles:

- Java Runtime Environment:

```
zulu13.42.17-ca-jre13.0.8-linux_aarch64.tar.gz
```

- Java Development Kit:

```
zulu13.42.17-ca-jdk13.0.8-linux_aarch64.tar.gz
```

## Supported Platforms

Azul Zulu 13.42 for Arm 64-bit is built for the platforms that meet the following requirements:

- Linux-based operating system with a kernel version of 3.10.x and higher.
- Arm v8 CPU with 64-bit support.
- Linux Arm 64-bit EABI.

## Supported Functionality

### HotSpot Compilers

In addition to the optimized template interpreter, Azul Zulu includes the following HotSpot just-in-time (JIT) compiler(s):

- Client Compiler (C1)
- Server Compiler (C2)

Use the following command-line options to change compilation behavior:

- `-Xint` – Runs the application in interpreted-only mode.
- `-Xcomp` – Enforces compilation of methods on first invocation.
- `-Xbatch` – Disables background compilation so that compilation of all methods proceeds as a foreground task until completed.
- `-XX:[+/-]TieredCompilation` – Enables or disables the tiered compilation (enabled by default). When the tiered compilation is disabled, only the server compiler is used.
- `-XX:TieredStopAtLevel=X` – Limits the compilation level (0 - interpreted, 1 - only the client compiler is used, 4 - full tiered compilation up to C2).

For more information on how to fine-tune compilation behavior, refer to the extended list of [Advanced JIT Compiler Options](#).

# Getting Started with Azul Zulu

To start using Azul Zulu, follow the steps given below.

1. Extract the installation archive to a dedicated directory. The name of the installation archive depends on the type of bundle:

- JDK bundle:

```
zulu13.42.17-ca-jdk13.0.8-linux_aarch64.tar.gz
```

- JRE bundle:

```
zulu13.42.17-ca-jre13.0.8-linux_aarch64.tar.gz
```

You can extract the archive by running the following command in the terminal:

```
$ tar -xzf zulu13.42.17-ca-jdk13.0.8-linux_aarch64.tar.gz
```

The command will create a new directory named after the archive but without the extension (`.tar.gz`). This directory contains all the files of your Azul Zulu bundle.

We will refer to this directory as `<ZULU_HOME>`.

2. Verify the Java version of your Azul Zulu installation.

Run `<ZULU_HOME>/bin/java -version` command and verify that the output is similar to the example below:

```
$ <ZULU_HOME>/bin/java -version
openjdk version "13.0.8" 2021-07-20
OpenJDK Runtime Environment Zulu13.42+17-CA (build 13.0.8+5-MTS)
OpenJDK 64-Bit Server VM Zulu13.42+17-CA (build 13.0.8+5-MTS, mixed
mode)
```



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