



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

Azul Zulu 13.40 (CA) for Arm 64-bit

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Revision History

Revision	Date	Description
0.1	April 20, 2021	Initial version of the document.
1.0	April 20, 2021	Added information about CVEs fixed in this release.

What's New

April 20, 2021 PSU Release

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

Azul Zulu Version:	13.40 (13.0.7+5)
Release Date:	April 20, 2021
Based on Azul Zulu Version:	13.39 (13.0.6.0.101+2)

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 of Azul Zulu comes with IANA time zone data version 2021a. For more details, see <https://data.iana.org/time-zones/tzdb-2021a/NEWS>.

New Features and Enhancements

TLS 1.0 and 1.1 is turned off

TLS 1.0 and 1.1 is turned off in the PSU builds in this release.

Fixed Issues

JDK Common Vulnerabilities and Exposure (CVE) Fixes

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

CVE #	Component	Protocol	Remote Exploit without Auth.	Base Score	Attack Vector	Attack Complexity	Privileges Required	User Interaction	Scope	Confidentiality	Integrity	Availability	Supported Zulu Versions Affected	Modules Changed to Address CVE	Notes
CVE-2021-2161	Libraries	Multiple	Yes	5.9	Network	High	None	None	Unchanged	None	High	None	6, 7, 8, 11, 13, 15, 16	6, 7, 8: JDK 11, 13, 15, 16: java.base	Note 1
CVE-2021-2163	Libraries	Multiple	Yes	5.3	Network	High	None	Required	Unchanged	None	High	None	6, 7, 8, 11, 13, 15, 16	6, 7, 8: JDK 11, 13, 15, 16: java.base	Note 2
CVE-2021-23841	Oracle GraalVM Enterprise Edition: Node (OpenSSL)	HTTPS	Yes	7.5	Network	Low	None	None	Unchanged	None	None	High	N/A	N/A	

CVE #	Component	Protocol	Remote Exploit without Auth.	Base Score	Attack Vector	Attack Complexity	Privileges Required	User Interaction	Scope	Confidentiality	Integrity	Availability	Supported Zulu Versions Affected	Modules Changed to Address CVE	Notes
CVE-2021-3450	Oracle GraalVM Enterprise Edition: Node (Node.js)	HTTPS	Yes	7.4	Network	High	None	None	Unchanged	High	High	None	N/A	N/A	

Metrics	Values
Attack Vector	Network (N), Adjacent (A), Local (L), and Physical (P)
Attack Complexity	Low (L) and High (H)
Privileges Required	None (N), Low (L), and High (H)
User Interaction	None (N) and Required (R)
Scope	Unchanged (U) and Changed (C)
Confidentiality Impact	High (H), Low (L), and None (N)
Integrity Impact	High (H), Low (L), and None (N)
Availability Impact	High (H), Low (L), and None (N)

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. It can also be exploited by supplying untrusted data to APIs in the specified Component.
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.

Non-CVE Security Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8261183	Follow on to Make lists of normal filenames	CPU
JDK-8259633	compiler/graalunit/CoreTest.java fails with NPE after JDK-8244543	CPU
JDK-8259428	AlgorithmId.getEncodedParams() should return copy	CPU
JDK-8258247	Couple of issues in fix for JDK-8249906	CPU
JDK-8257001	Improve HTTP client support	CPU
JDK-8253799	Make lists of normal filenames	CPU
JDK-8244543	Enhanced handling of abstract classes	CPU
JDK-8244473	Contextualize registration for JNDI	CPU

OpenJDK Bug Fixes

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

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8260356	(tz) Upgrade time-zone data to tzdata2021a	CPU
JDK-8259048	(tz) Upgrade time-zone data to tzdata2020f	CPU
JDK-8263996	Fix build on 13u after JDK-8234779 backport	PSU
JDK-8263425	AArch64: two potential bugs in C1 LIRGenerator::generate_address()	PSU
JDK-8262726	AArch64: C1 StubAssembler::call_RT can corrupt stack	PSU
JDK-8261483	jdk/dynalink/TypeConverterFactoryMemoryLeakTest.java failed with "AssertionError: Should have GCd a method handle by now"	PSU
JDK-8261022	Fix incorrect result of Math.abs() with char type	PSU
JDK-8260308	Update LogCompilation junit to 4.13.1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8259949	x86 32-bit build fails when -fcf-protection is passed in the compiler flags	PSU
JDK-8259707	LDAP channel binding does not work with StartTLS extension	PSU
JDK-8259619	C1: 3-arg StubAssembler::call_RT stack-use condition is incorrect	PSU
JDK-8259221	Bump update version for OpenJDK: jdk-13.0.7	PSU
JDK-8258396	SIGILL in jdk.jfr.internal.PlatformRecorder.rotateDisk()	PSU
JDK-8257746	Regression introduced with JDK-8250984 - memory might be null in some machines	PSU
JDK-8257633	Missing -mmacosx-version-min=X flag when linking libjvm	PSU
JDK-8257414	Drag n Drop target area is wrong on high DPI systems	PSU
JDK-8256809	Annotation processing causes NPE during flow analysis	PSU
JDK-8255908	ExceptionInInitializerError due to UncheckedIOException while initializing cgroupv1 subsystem	PSU
JDK-8255625	AArch64: Implement Base64.encodeBlock accelerator/intrinsic	PSU
JDK-8253476	TestUseContainerSupport.java fails on some Linux kernels w/o swap limit capabilities	PSU
JDK-8253409	Double-rounding possibility in float fma	PSU
JDK-8251257	NMT: jcmd VM.native_memory scale=1 crashes target VM	PSU
JDK-8250911	[windows] os::pd_map_memory error detection broken	PSU
JDK-8249251	[dark_mode ubuntu 20.04] The selected menu is not highlighted in GTKLookAndFeel	PSU
JDK-8249215	JFrame::setVisible crashed with -Dfile.encoding=UTF-8 on Japanese Windows.	PSU
JDK-8249176	jdk jtreg test security/infra/java/security/cert/CertPathValidator/certification/GlobalSignR6CA.java fails	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8248987	AOT's Linker.java seems to eagerly fail-fast on Windows.	PSU
JDK-8246707	(sc) SocketChannel.read/write throws AsynchronousCloseException on closed channel	PSU
JDK-8246027	Minimal fastdebug build broken after JDK-8245801	PSU
JDK-8245801	StressRecompilation triggers assert "redundant OSR recompilation detected. memory leak in CodeCache!"	PSU
JDK-8245283	JFR: Can't handle constant dynamic used by Jacoco agent	PSU
JDK-8244819	hsdis does not compile with binutils 2.34+	PSU
JDK-8244573	java.lang.ArrayIndexOutOfBoundsException thrown for malformed class file	PSU
JDK-8243925	Toolkit#getScreenInsets() returns wrong value on HiDPI screens (Windows)	PSU
JDK-8243559	Remove root certificates with 1024-bit keys	PSU
JDK-8243389	enhance os::pd_print_cpu_info on linux	PSU
JDK-8243321	Add Entrust root CA - G4 to Oracle Root CA program	PSU
JDK-8243320	Add SSL root certificates to Oracle Root CA program	PSU
JDK-8243290	Improve diagnostic messages for class verification and redefinition failures	PSU
JDK-8242283	Can't start JVM when java home path includes non-ASCII character	PSU
JDK-8242030	Wrong package declarations in jline classes after JDK-8241598	PSU
JDK-8241598	Upgrade JLine to 3.14.0	PSU
JDK-8241478	vmTestbase/gc/gctests/Steal/steal001/steal001.java fails with OOME	PSU
JDK-8241458	[JVMCI] add mark value to expose CodeOffsets::Frame_Complete	PSU
JDK-8241319	WB_GetCodeBlob doesn't have ResourceMark	PSU
JDK-8241086	Test runtime/NMT/HugeArenaTracking.java is failing on 32bit Windows	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8240711	TestJstatPort.java failed due to "ExportException: Port already in use."	PSU
JDK-8240295	hs_err elapsed time in seconds is not accurate enough	PSU
JDK-8239497	SEGV in EdgeUtils::field_name_symbol(Edge const&)	PSU
JDK-8238710	LingeredApp doesn't log stdout/stderr if exits with non-zero code	PSU
JDK-8237977	Further update javax/net/ssl/compatibility/Compatibility.java	PSU
JDK-8237950	C2 compilation fails with "Live Node limit exceeded limit" during Conv12L::Ideal optimization	PSU
JDK-8236772	Fix build for windows 32-bit after 8212160 and 8234331.	PSU
JDK-8236124	Minimal VM slowdebug build failed after JDK-8212160	PSU
JDK-8235846	Improve WindbgDebuggerLocal implementation	PSU
JDK-8235829	graal crashes with Zombie.java test	PSU
JDK-8235584	UseProfiledLoopPredicate fails with assert(!_phase.get_loop(c) == loop) failed: have to be in the same loop	PSU
JDK-8235456	Minimal VM is broken after JDK-8212160	PSU
JDK-8235218	Minimal VM is broken after JDK-8173361	PSU
JDK-8234779	Provide idiom for declaring classes noncopyable	PSU
JDK-8234687	change javap reporting on unknown attributes	PSU
JDK-8234662	Sweeper should keep current nmethod alive before yielding for ICStub refills	PSU
JDK-8234541	C1 emits an empty message when it inlines successfully	PSU
JDK-8234058	runtime/CompressedOops/CompressedClassPointers.java fails with 'Narrow class base: 0x0000000000000000' missing from stdout/stderr	PSU
JDK-8233880	Support compilers with multi-digit major version numbers	PSU
JDK-8233027	OopMapSet::all_do does oms.next() twice during iteration	PSU
JDK-8232905	JFR fails with assertion: assert(t.unflushed_size() == 0) failed: invariant	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8232083	Minimal VM is broken after JDK-8231586	PSU
JDK-8231586	enlarge encoding space for OopMapValue offsets	PSU
JDK-8229815	Upgrade Jline to 3.12.1	PSU
JDK-8227275	Within native OOM error handling, assertions may hang the process	PSU
JDK-8226810	Failed to launch JVM because of NullPointerException occurred on System.props	PSU
JDK-8222079	Don't use memset to initialize fields decode_env constructor in disassembler.cpp	PSU
JDK-8221823	Requested JDialog width is ignored	PSU
JDK-8216324	GetClassMethods is confused by the presence of default methods in super interfaces	PSU
JDK-8212160	JVMTI agent crashes with "assert(_value != 0LL) failed: resolving NULL _value"	PSU
JDK-8204994	SA might fail to attach to process with "Windbg Error: WaitForEvent failed"	PSU
JDK-8198540	Dynalink leaks memory when generating type converters	PSU
JDK-8196969	JTreg Failure: serviceability/sa/ClhsdbJstack.java causes NPE	PSU
JDK-8173658	JvmtiExport::post_class_unload() is broken for non-JavaThread initiators	PSU
JDK-8173361	various crashes in JvmtiExport::post_compiled_method_load	PSU
JDK-7185258	[macosx] Deadlock in SunToolkit.realSync()	PSU
JDK-7146776	Deadlock between URLStreamHandler.getHostAddress and file.Handler.openConnection	PSU
JDK-6532025	GIF reader throws misleading exception with truncated images	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 13.40 for Arm 64-bit provides the following bundles:

- Java Runtime Environment:

```
zulu13.40.15-ca-jre13.0.7-linux_aarch64.tar.gz
```

- Java Development Kit:

```
zulu13.40.15-ca-jdk13.0.7-linux_aarch64.tar.gz
```

Supported Platforms

Azul Zulu 13.40 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:

```
zulu13.40.15-ca-jdk13.0.7-linux_aarch64.tar.gz
```

- JRE bundle:

```
zulu13.40.15-ca-jre13.0.7-linux_aarch64.tar.gz
```

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

```
$ tar -xzf zulu13.40.15-ca-jdk13.0.7-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 "13.0.7" 2021-04-20
OpenJDK Runtime Environment Zulu13.40+15-CA (build 13.0.7+5-MTS)
OpenJDK 64-Bit Server VM Zulu13.40+15-CA (build 13.0.7+5-MTS, mixed
mode)
```

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