Azul Zulu builds of OpenJDK

July 26, 2021 Update Release

Azul Zulu 8.56 (CA) for Arm 32-bit Hard-Float

Document Version: 1.0

Updated: Jul 26, 2021

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Revision History

Revision	Date	Description
1.0	July 26, 2021	Initial version of the document.

What's New

July 26, 2021 PSU Release

This section describes new features and changes in behavior introduced in July 26, 2021 Azul Zulu PSU Update Release.

Azul Zulu Version:	8.56.0.21 (8u302-b08)
Release Date:	July 26, 2021
Based on Azul Zulu Version:	8.55.0.14 (8u301-b02)

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	Confiden-tiality	Integrity	Availability	Azul Zulu Versions Affected	Notes
CVE-2021-2388	Hotspot	Multiple	Yes	7.5	Network	High	None	Required	Unchanged	High	High	High	16, 15, 13, 11, 8	Note 1
CVE-2021-2369	Library	Multiple	Yes	4.3	Network	Low	None	Required	Unchanged	None	Low	None	16, 15, 13, 11, 8, 7, 6	Note 1
CVE-2021-2432	JNDI	Multiple	Yes	3.7	Network	High	None	None	Unchanged	None	None	Low	7, 6	Note 2
CVE-2021-2341	Networking	Multiple	Yes	3.1	Network	High	None	Required	Unchanged	Low	None	None	16, 15, 13, 11, 8, 7, 6	Note 1
CVE-2021-29921	Oracle GraalVM Enterprise Edition: Python interpreter and runtime (CPython)	Multiple	Yes	9.8	Network	Low	None	None	Unchanged	High	High	High	None	
CVE-2020-28928	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
JDK-8264460	Improve NTLM support	CPU
JDK-8264079	Improve abstractions	CPU
JDK-8263111	Enhance String Conclusions	CPU
JDK-8262975	Upgrade Glib support	CPU
JDK-8262967	Improve Zip file support	CPU
JDK-8262477	Enhance String Conclusions	CPU
JDK-8262410	Enhanced rules for zones	CPU
JDK-8262403	Enhanced data transfers	CPU
JDK-8262380	Enhance XML processing passes	CPU
JDK-8260960	Signs of jarsigner signing	CPU
JDK-8260453	Improve Font Bounding	CPU
JDK-8256491	Better HTTP transport	CPU
JDK-8256157	Improve bytecode assembly	CPU
JDK-8160768	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 26, 2021 Zulu release.

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8264460	Improve NTLM support	CPU
JDK-8264079	Improve abstractions	CPU
JDK-8264066	Enhance compiler validation	CPU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8262967	Improve Zip file support	CPU
JDK-8262477	Enhance String Conclusions	CPU
JDK-8262410	Enhanced rules for zones	CPU
JDK-8262403	Enhanced data transfers	CPU
JDK-8262380	Enhance XML processing passes	CPU
JDK-8260967	Better jar file validation	CPU
JDK-8260960	Signs of jarsigner signing	CPU
JDK-8260453	Improve Font Bounding	CPU
JDK-8258432	Improve file transfers	CPU
JDK-8256491	Better HTTP transport	CPU
JDK-8256157	Improve bytecode assembly	CPU
JDK-8242565	Policy initialization issues when the denyAfter constraint is enabled	CPU
JDK-8241248	NullPointerException in sun.security.ssl.HKDF.extract(HKDF.java:93)	CPU
JDK-8141422	G1 eager reclaim card dirtying may dirty outside of allocated objects	CPU
JDK-8069034	gc/g1/TestEagerReclaimHumongousRegionsClearMarkBits.java nightly failure	CPU
JDK-8035134	JDK9 unix debug bundle manifest file list issue	CPU
JDK-8270533	AArch64: size_fits_all_mem_uses should return false if its output is a CAS	PSU
JDK-8269468	JDK-8269388 breaks the build on older GCCs	PSU
JDK-8269388	default build of jdk8 fails on newer GCCs with warnings as errors on format-overflow	PSU
JDK-8268444	keytool -v -list print is incorrect after backport JDK-8141457	PSU
JDK-8267689	[8u] [aarch64] Crash due to bad shift in indirect addressing mode	PSU
JDK-8267545	[8u] Enable Xcode 12 builds on macOS	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8267426	MonitorVmStartTerminate test timed out on Embedded VM	PSU
JDK-8267235	[macos_aarch64] InterpreterRuntime::throw_pending_exception messing up LR results in crash	PSU
JDK-8266929	Unable to use algorithms from 3p providers	PSU
JDK-8266723	JFR periodic events are causing extra allocations	PSU
JDK-8266191	Missing aarch64 parts of JDK-8181872(C1: possible overflow when strength reducing integer multiply by constant)	PSU
JDK-8265988	Fix sun/text/IntHashtable/Bug4170614 for JDK 8u	PSU
JDK-8265832	runtime/StackGap/testme.sh fails to compile in 8u	PSU
JDK-8265666	Enable AIX build platform to make external debug symbols	PSU
JDK-8265462	Handle multiple slots in the NSS Internal Module from SunPKCS11's Secmod	PSU
JDK-8264816	Weak handles leak causes GC to take longer	PSU
JDK-8264640	CMS ParScanClosure misses a barrier	PSU
JDK-8264562	assert(verify_field_bit(1)) failed: Attempting to write an uninitialized event field: type	PSU
JDK-8264509	jdk8u MacOS zipped debug symbols won't build	PSU
JDK-8263504	Some OutputMachOpcodes fields are uninitialized	PSU
JDK-8263061	copy wrong unpack200.diz to bin directory on linux after 8252395	PSU
JDK-8262864	No debug symbols in image for Windows --with-native-debug -symbols=external	PSU
JDK-8262730	Enable jdk8u MacOS external debug symbols	PSU
JDK-8262726	AArch64: C1 StubAssembler::call_RT can corrupt stack	PSU
JDK-8262446	DragAndDrop hangs on Windows	PSU
JDK-8262110	DST starts from incorrect time in 2038	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8261867	Backport relevant test changes & additions from JDK-8130125	PSU
JDK-8261355	No data buffering in SunPKCS11 Cipher encryption when the underlying mechanism has no padding	PSU
JDK-8261183	Follow on to Make lists of normal filenames	PSU
JDK-8260704	ParallelGC: oldgen expansion needs release-store for _end	PSU
JDK-8260484	CheckExamples.java / NoJavaLangTest.java fail with jtreg 4.2	PSU
JDK-8260356	(tz) Upgrade time-zone data to tzdata2021a	PSU
JDK-8260255	C1: LoopInvariantCodeMotion constructor can leave some fields uninitialized	PSU
JDK-8260236	better init AnnotationCollector _contended_group	PSU
JDK-8260029	aarch64: fix typo in verify_oop_array	PSU
JDK-8259886	Improve SSL session cache performance and scalability	PSU
JDK-8259619	C1: 3-arg StubAssembler::call_RT stack-use condition is incorrect	PSU
JDK-8259428	AlgorithmId.getEncodedParams() should return copy	PSU
JDK-8259271	gc/parallel/TestDynShrinkHeap.java still fails "assert(covered_region.contains(new_memregion)) failed: new region is not in covered_region"	PSU
JDK-8259048	(tz) Upgrade time-zone data to tzdata2020f	PSU
JDK-8258753	StartTlsResponse.close() hangs due to synchronization issues	PSU
JDK-8258669	fastdebug jvm crashes when do event based tracing for monitor inflation	PSU
JDK-8258419	RSA cipher buffer cleanup	PSU
JDK-8258247	Couple of issues in fix for JDK-8249906	PSU
JDK-8257999	Parallel GC crash in gc/parallel/TestDynShrinkHeap.java: new region is not in covered_region	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8257997	sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java again reports leaks after JDK-8257884	PSU
JDK-8257884	Re-enable sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java as automatic test	PSU
JDK-8257670	sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java reports leaks	PSU
JDK-8257039	[8u] GenericTaskQueue destructor is incorrect	PSU
JDK-8256818	SSLSocket that is never bound or connected leaks socket resources	PSU
JDK-8255734	VM should ignore SIGXFSZ on ppc64, s390 too	PSU
JDK-8255716	AArch64: Regression: JVM crashes if manually offline a core	PSU
JDK-8255086	Update the root locale display names	PSU
JDK-8254631	Better support ALPN byte wire values in SunJSSE	PSU
JDK-8253799	Make lists of normal filenames	PSU
JDK-8252883	AccessDeniedException caused by delayed file deletion on Windows	PSU
JDK-8250568	Less ambiguous processing	PSU
JDK-8249906	Enhance opening JARs	PSU
JDK-8249142	java/awt/FontClass/CreateFont/DeleteFont.sh is unstable	PSU
JDK-8247350	[aarch64] assert(false) failed: wrong size of mach node	PSU
JDK-8244543	Enhanced handling of abstract classes	PSU
JDK-8244473	Contextualize registration for JNDI	PSU
JDK-8243559	Remove root certificates with 1024-bit keys	PSU
JDK-8241960	The SHA3 message digests impl of SUN provider are not thread safe after cloned	PSU
JDK-8241829	Cleanup the code for PrinterJob on windows	PSU
JDK-8241649	Optimize Character.toString	PSU
JDK-8239400	[8u] clean up delete-non-virtual-dtor warnings in HotSpot	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8239053	[8u] clean up undefined-var-template warnings	PSU
JDK-8234011	(zipfs) Memory leak in ZipFileSystem.releaseDeflater()	PSU
JDK-8231949	[PPC64, s390]: Make async profiling more reliable	PSU
JDK-8231841	AArch64: debug.cpp help() is missing an AArch64 line for pns	PSU
JDK-8231631	sun/net/ftp/FtpURLConnectionLeak.java fails intermittently with NPE	PSU
JDK-8230428	Cleanup dead CastIP node code in formssel.cpp	PSU
JDK-8227467	Better class method invocations	PSU
JDK-8225116	Test OwnedWindowsLeak.java intermittently fails	PSU
JDK-8225081	Remove Telia Company CA certificate expiring in April 2021	PSU
JDK-8217348	assert(thread is_Java_thread()) failed: just checking	PSU
JDK-8217230	assert(t == t_no_spec) failure in NodeHash::check_no_speculative_types()	PSU
JDK-8214345	infinite recursion while checking super class	PSU
JDK-8209996	[PPC64] Fix JFR profiling.	PSU
JDK-8206243	java -XshowSettings fails if memory.limit_in_bytes overflows LONG.max	PSU
JDK-8205014	com/sun/jndi/ldap/DeadSSLLdapTimeoutTest.java failed with "Read timed out"	PSU
JDK-8203196	C1 emits incorrect code due to integer overflow in _tableswitch keys	PSU
JDK-8199265	java/util/Arrays/TimSortStackSize2.java fails with OOM	PSU
JDK-8196092	javax/swing/JComboBox/8032878/bug8032878.java fails	PSU
JDK-8191955	AArch64: incorrect prefetch distance causes an internal error	PSU
JDK-8190679	java/util/Arrays/TimSortStackSize2.java fails with "Initial heap size set to a larger value than the maximum heap size"	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8190332	PngReader throws NegativeArraySizeException/OOM error when IHDR width is very large	PSU
JDK-8183910	gc/arguments/TestAggressiveHeap.java fails intermittently	PSU
JDK-8180478	tools/launcher/MultipleJRE.sh fails on Windows because of extra-"	PSU
JDK-8178403	DirectAudio in JavaSound may hang and leak	PSU
JDK-8177809	File.lastModified() is losing milliseconds (always ends in 000)	PSU
JDK-8172188	JDI tests fail due to "permission denied" when creating temp file	PSU
JDK-8166724	gc/g1/TestHumongousShrinkHeap.java fails with OOME	PSU
JDK-8166046	[TESTBUG] compiler/stringopts/TestStringObjectInitialization.java fails with OOME	PSU
JDK-8159898	Negative array size in java/beans/Introspector/Test8027905.java	PSU
JDK-8151786	[TESTBUG] java/beans/XMLEncoder/Test4625418.java timed out intermittently	PSU
JDK-8138820	JDK Hotspot build fails with Xcode 7.0.1	PSU
JDK-8136592	[TEST_BUG] Fix 2 platform-specific closed regtests for jigsaw	PSU
JDK-8134883	C1 hard crash in range check elimination in Nashorn test262parallel	PSU
JDK-8134672	[TEST_BUG] Some tests should check isDisplayChangeSupported	PSU
JDK-8132709	[TESTBUG] gc/g1/TestHumongousShrinkHeap.java might fail on embedded	PSU
JDK-8132148	G1 hs_err region dump legend out of sync with region values	PSU
JDK-8130430	[TEST_BUG] remove unnecessary internal calls from javax/swing/JRadioButton/8075609/bug8075609.java	PSU
JDK-8130308	Too low memory usage in TestPromotionFromSurvivorToTenuredAfterMinorGC.java	PSU
JDK-8129511	PlatformMidi.c:83 uses malloc without malloc header	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8081764	[TEST_BUG] Test javax/swing/plaf/aqua/CustomComboBoxFocusTest.java fails on Windows, Solaris Sparcv9 and Linux but passes on MacOSX	PSU
JDK-8078855	[TEST_BUG] javax/swing/JComboBox/8032878/bug8032878.java fails in WindowsClassicLookAndFeel	PSU
JDK-8075071	[TEST_BUG] TimSortStackSize2.java: OOME: Java heap space: MaxHeap shrinked by MaxRAMFraction	PSU
JDK-8074836	Resolve disabled warnings for libosxkrb5	PSU
JDK-8074835	Resolve disabled warnings for libj2gss	PSU
JDK-8073446	TimeZone getOffset API does not return a DST offset between years 2038-2137	PSU
JDK-8071374	Native disassembler implementation may be not thread-safe	PSU
JDK-8066807	langtools/test/Makefile should use -agentvm not -samevm	PSU
JDK-8066508	JTReg tests timeout on slow devices when run using JPRT	PSU
JDK-8064909	FragmentMetaspace.java got OutOfMemoryError	PSU
JDK-8055754	filemap.cpp does not compile with clang	PSU
JDK-8047939	[TESTBUG] Rewrite test/runtime/8001071/Test8001071.sh	PSU
JDK-8042891	Format issues embedded in macros for two g1 source files	PSU
JDK-8037825	Fix warnings and enable "warnings as errors" in serviceability native libraries	PSU
JDK-8036095	RMI tests using testlibrary.RMID and testlibrary.JavaVM do not pass through vmoptions	PSU
JDK-8035287	gcc warnings compiling various libraries files	PSU
JDK-8035054	JarFacade.c should not include ctype.h	PSU
JDK-8034857	gcc warnings compiling src/solaris/native/sun/management	PSU
JDK-8034856	gcc warnings compiling src/solaris/native/sun/security/pkcs11	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8033289	clang: clean up unused function warning	PSU
JDK-8032050	TEST_BUG: Clean up for java/rmi/activation/Activatable/shutdownGracefully/ShutdownGracefully.java	PSU
JDK-8028618	[TEST BUG] javax/swing/JScrollBar/bug4202954/bug4202954.java fails	PSU
JDK-7106851	Test should not use System.exit	PSU
JDK-7059970	Test case: javax/imageio/plugins/png/ITXtTest.java is not closing a file	PSU
JDK-6990210	[TEST_BUG] EventDispatchThread/HandleExceptionOnEDT/HandleExceptionOnEDT.java fails on gnome	PSU
JDK-6878250	(so) IllegalBlockingModeException thrown when reading from a closed SocketChannel's InputStream	PSU

Zulu Bug Fixes

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

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-26149	.diz bundles contain incorrect paths	CPU
ZULU-25214	Flag -XX:+UseBCFIPS does not work on windows	CPU
ZULU-27870	qnx-arm32hf build fails: 'struct stat64' has no members named 'st_mtim' and 'st_atim'	PSU
ZULU-26949	Update OpenJSSE version to 1.1.7	PSU
ZULU-26940	Zulu installation fails on Debian Slim	PSU
ZULU-26220	MSI Installer Should Update JAVA_HOME	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-25949	Test sun/management/jmxremote/bootstrap/CustomLauncherTest.java bug: libjvmPath should be checked, not libPath	PSU
ZULU-25372	Bump LZ4 version to 1.9.3	PSU
ZULU-23831	[HSDIS] Fix HSDIS build scripts to make it work on embedded architectures	PSU
ZULU-22367	Swing classes are extremely slow when displaying Hebrew text	PSU
ZULU-22234	CRIU exec "iptables" message mis-labeled as error	PSU
ZULU-20055	Failure in tools/pack200/TimeStamp.java - jre/bin/unpack200 should exist and be executable	PSU
ZULU-13025	sun/jvmstat/monitor/MonitoredVm/MonitorVmStartTerminate.java timed out	PSU

About This Build

Azul Zulu for Arm 32-bit Hard-Float is a binary build of OpenJDK that Azul builds for the platforms based on the Arm 32-bit Hard-Float 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 8.56.0.21 for Arm 32-bit Hard-Float provides the following bundles:

- Java Development Kit:

```
zulu8.56.0.21-ca-jdk8.0.302-linux_aarch32hf.tar.gz
```

Supported Platforms

Azul Zulu 8.56 for Arm 32-bit Hard-Float is built for the platforms that meet the following requirements:

- Linux-based operating system with a kernel version of 3.10.x (or higher) and glibc 2.9.
- Arm v6k (and higher) CPU architecture with VFP.
- Linux hard-float 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)

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.

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:

     ```
     zulu8.56.0.21-ca-jdk8.0.302-linux_aarch32hf.tar.gz
     ```

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

   ```
   $ tar -xzf zulu8.56.0.21-ca-jdk8.0.302-linux_aarch32hf.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 "1.8.0_302"
   OpenJDK Runtime Environment (Zulu 8.56.0.21-CA-linux_aarch32hf)
   (build 1.8.0_302-b08)
   OpenJDK Client VM (Zulu 8.56.0.21-CA-linux_aarch32hf) (build
   25.302-b08, mixed mode)
   ```

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