



**Azul Zulu builds of OpenJDK**  
**April 21, 2021 Update Release**

**Azul Zulu 8.54 (CA) for Arm 32-bit Hard-Float**

Document Version: 1.0

Updated: Apr 21, 2021

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# Revision History

Revision	Date	Description
1.0	April 21, 2021	Initial version of the document.

# What's New

## April 21, 2021 PSU Release

This section describes new features and changes in behavior introduced in April 21, 2021 Azul Zulu PSU Update Release.

<b>Azul Zulu Version:</b>	8.54.0.21 (8u292-b10)
<b>Release Date:</b>	April 21, 2021
<b>Based on Azul Zulu Version:</b>	8.53.0.12 (8u291-b01)

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
<a href="#">CVE-2021-2161</a>	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
<a href="#">CVE-2021-2163</a>	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
<a href="#">JDK-8261183</a>	Follow on to Make lists of normal filenames	CPU
<a href="#">JDK-8259633</a>	compiler/graalunit/CoreTest.java fails with NPE after JDK-8244543	CPU
<a href="#">JDK-8259428</a>	AlgorithmId.getEncodedParams() should return copy	CPU
<a href="#">JDK-8258247</a>	Couple of issues in fix for JDK-8249906	CPU
<a href="#">JDK-8257001</a>	Improve HTTP client support	CPU
<a href="#">JDK-8253799</a>	Make lists of normal filenames	CPU
<a href="#">JDK-8244543</a>	Enhanced handling of abstract classes	CPU
<a href="#">JDK-8244473</a>	Contextualize registration for JNDI	CPU

## OpenJDK Bug Fixes

The following table describes the OpenJDK changes implemented in April 21, 2021 Zulu release.

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8260356</a>	(tz) Upgrade time-zone data to tzdata2021a	CPU
<a href="#">JDK-8259048</a>	(tz) Upgrade time-zone data to tzdata2020f	CPU
<a href="#">JDK-8227467</a>	Better class method invocations	CPU
<a href="#">JDK-8035166</a>	Remove dependency on EC classes from pkcs11 provider	CPU
<a href="#">JDK-8264171</a>	Missing aarch64 parts of JDK-8236179 (C1 register allocation failure with T_ADDRESS)	PSU
<a href="#">JDK-8263008</a>	AARCH64: Add debug info for libsaproc.so	PSU
<a href="#">JDK-8262073</a>	assert(allocates2(pc)) failed: not in CodeBuffer memory	PSU
<a href="#">JDK-8261952</a>	Avoid converting path to vcruntime140.dll to short-style path	PSU
<a href="#">JDK-8261790</a>	(zipfs) Files.setPosixFilePermission does not work with CIFS share	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8261766</a>	[8u] hotspot needs to recognise cl.exe 19.16 to build with VS2017	PSU
<a href="#">JDK-8261231</a>	Windows IME was disabled after DnD operation	PSU
<a href="#">JDK-8260349</a>	Cannot programmatically retrieve Metaspace max set via JAVA_TOOL_OPTIONS	PSU
<a href="#">JDK-8259568</a>	PPC64 builds broken after JDK-8221408 8u backport	PSU
<a href="#">JDK-8259384</a>	CUP version wrong in THIRD_PARTY_README after JDK-8233548	PSU
<a href="#">JDK-8259312</a>	VerifyCACerts.java fails as soneraclass2ca cert will expire in 90 days	PSU
<a href="#">JDK-8258833</a>	Cancel multi-part cipher operations in SunPKCS11 after failures	PSU
<a href="#">JDK-8258430</a>	8u backport of JDK-8063107 missing test/javax/swing/JRadioButton/8041561/bug8041561.java changes	PSU
<a href="#">JDK-8258396</a>	SIGILL in jdk.jfr.internal.PlatformRecorder.rotateDisk()	PSU
<a href="#">JDK-8258241</a>	[8u] Missing doPrivileged() hunks from JDK-8226575	PSU
<a href="#">JDK-8257746</a>	Regression introduced with JDK-8250984 - memory might be null in some machines	PSU
<a href="#">JDK-8257242</a>	[macOS] Java app crashes while switching input methods	PSU
<a href="#">JDK-8257192</a>	Integrate AArch64 JIT port into 8u	PSU
<a href="#">JDK-8256682</a>	JDK-8202343 is incomplete	PSU
<a href="#">JDK-8256642</a>	[TEST_BUG] jdk/test/javax/sound/midi/MidiSystem/DefaultProperties.java failed	PSU
<a href="#">JDK-8256421</a>	Add 2 HARICA roots to cacerts truststore	PSU
<a href="#">JDK-8255937</a>	Better cleanup for test/jdk/javax/imageio/stream/StreamFlush.java	PSU
<a href="#">JDK-8255908</a>	ExceptionInInitializerError due to UncheckedIOException while initializing cgroupv1 subsystem	PSU
<a href="#">JDK-8255880</a>	UI of Swing components is not redrawn after their internal state changed	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8254854</a>	[cgroups v1] Metric limits not properly detected on some join controller combinations	PSU
<a href="#">JDK-8253932</a>	SSL debug log prints incorrect caller info	PSU
<a href="#">JDK-8253476</a>	TestUseContainerSupport.java fails on some Linux kernels w/o swap limit capabilities	PSU
<a href="#">JDK-8253368</a>	TLS connection always receives close_notify exception	PSU
<a href="#">JDK-8253015</a>	Aarch64: Move linux code out from generic CPU feature detection	PSU
<a href="#">JDK-8252470</a>	java/awt/dnd/DisposeFrameOnDragCrash/DisposeFrameOnDragTest.java fails on Windows	PSU
<a href="#">JDK-8251930</a>	AArch64: Native types mismatch in hotspot	PSU
<a href="#">JDK-8251397</a>	NPE on ClassValue.ClassValueMap.cacheArray	PSU
<a href="#">JDK-8250984</a>	Memory Docker tests fail on some Linux kernels w/o cgroupv1 swap limit capabilities	PSU
<a href="#">JDK-8250824</a>	AArch64: follow up for JDK-8248414	PSU
<a href="#">JDK-8249588</a>	libwindowsaccessbridge issues on 64bit Windows	PSU
<a href="#">JDK-8249183</a>	JVM crash in "AwtFrame::WmSize" method	PSU
<a href="#">JDK-8248532</a>	Every time I change keyboard language at my MacBook, Java crashes	PSU
<a href="#">JDK-8248414</a>	AArch64: Remove uses of long and unsigned long ints	PSU
<a href="#">JDK-8248336</a>	AArch64: C2: offset overflow in BoxLockNode::emit	PSU
<a href="#">JDK-8248219</a>	aarch64: missing memory barrier in fast_storefield and fast_accessfield	PSU
<a href="#">JDK-8247979</a>	aarch64: missing side effect of killing flags for clearArray_reg_reg	PSU
<a href="#">JDK-8246482</a>	Build failures with +JFR -PCH	PSU
<a href="#">JDK-8244621</a>	[macos10.15] Garbled FX printing plus CoreText warnings on Catalina when building with Xcode 11	PSU
<a href="#">JDK-8240353</a>	AArch64: missing support for -XX:+ExtendedDTraceProbes in C1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8239091</a>	Reversed arguments in call to strstr in freetype "debug" code.	PSU
<a href="#">JDK-8238579</a>	URLConnection drops the timeout and hangs forever in read	PSU
<a href="#">JDK-8237512</a>	AArch64: aarch64TestHook leaks a BufferBlob	PSU
<a href="#">JDK-8236500</a>	Windows ucrt.dll should be looked up in versioned WINSDK subdirectory	PSU
<a href="#">JDK-8233839</a>	aarch64: missing memory barrier in NewObjectArrayStub and NewTypeArrayStub	PSU
<a href="#">JDK-8230388</a>	Problemlist additional compiler/rtm tests	PSU
<a href="#">JDK-8229284</a>	[TESTBUG] jdk/internal/platform/cgroup/TestCgroupMetrics.java fails for - memory:getMemoryUsage	PSU
<a href="#">JDK-8229145</a>	Revert TemplateTable::bytecode() visibility change	PSU
<a href="#">JDK-8229124</a>	Revert disassembler.cpp changes	PSU
<a href="#">JDK-8229123</a>	Revert build fixes for aarch64/zero	PSU
<a href="#">JDK-8228770</a>	Revert development hsdisk changes	PSU
<a href="#">JDK-8228767</a>	Revert ResourceMark additions	PSU
<a href="#">JDK-8228747</a>	Revert "unused" attribute from test_arraycopy_func	PSU
<a href="#">JDK-8228725</a>	AArch64: Purge method call format support	PSU
<a href="#">JDK-8228718</a>	Revert incorrect backport of JDK-8129757 to 8-aarch64	PSU
<a href="#">JDK-8228716</a>	Revert InstanceKlass::print_on debug additions	PSU
<a href="#">JDK-8228593</a>	Revert explicit JDK 7 support additions	PSU
<a href="#">JDK-8228434</a>	jdk/net/Sockets/Test.java fails after JDK-8227642	PSU
<a href="#">JDK-8228406</a>	Superfluous change in chaitin.hpp	PSU
<a href="#">JDK-8228400</a>	Remove built-in AArch64 simulator	PSU
<a href="#">JDK-8227642</a>	[TESTBUG] Make docker tests podman compatible	PSU
<a href="#">JDK-8226899</a>	Problemlist compiler/rtm tests	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8225805</a>	Java Access Bridge does not close the logger	PSU
<a href="#">JDK-8224880</a>	AArch64: java/javac error with AllocatePrefetchDistance	PSU
<a href="#">JDK-8224851</a>	AArch64: fix warnings and errors with Clang and GCC 8.3	PSU
<a href="#">JDK-8224828</a>	aarch64: rflags is not correct after safepoint poll	PSU
<a href="#">JDK-8224671</a>	AArch64: mauve System.arraycopy test failure	PSU
<a href="#">JDK-8223186</a>	HotSpot compile warnings from GCC 9	PSU
<a href="#">JDK-8221658</a>	aarch64: add necessary predicate for ubfx patterns	PSU
<a href="#">JDK-8221408</a>	Windows 32bit build build errors/warnings in hotspot	PSU
<a href="#">JDK-8221220</a>	AArch64: Add StoreStore membar explicitly for Volatile Writes in TemplateTable	PSU
<a href="#">JDK-8219635</a>	aarch64: missing LoadStore barrier in TemplateTable::fast_storefield	PSU
<a href="#">JDK-8219011</a>	Implement MacroAssembler::warn method on AArch64	PSU
<a href="#">JDK-8218185</a>	aarch64: missing LoadStore barrier in TemplateTable::putfield_or_static	PSU
<a href="#">JDK-8217368</a>	AArch64: C2 recursive stack locking optimisation not triggered	PSU
<a href="#">JDK-8217338</a>	[Containers] Improve systemd slice memory limit support	PSU
<a href="#">JDK-8216989</a>	CardTableBarrierSetAssembler::gen_write_ref_array_post_barrier() does not check for zero length on AARCH64	PSU
<a href="#">JDK-8216987</a>	ciMethodData::load_data() unpacks MDOs with non-atomic copy	PSU
<a href="#">JDK-8216350</a>	AArch64: monitor unlock fast path not called	PSU
<a href="#">JDK-8215961</a>	jdk/jfr/event/os/TestCPUInformation.java fails on AArch64	PSU
<a href="#">JDK-8215951</a>	AArch64: jtreg test vmTestbase/nsk/jvmti/PopFrame/popframe005 segfaults	PSU
<a href="#">JDK-8214857</a>	"bad trailing membar" assert failure at memnode.cpp:3220	PSU
<a href="#">JDK-8213134</a>	AArch64: vector shift failed with MaxVectorSize=8	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8211233</a>	MemBarNode::trailing_membar() and MemBarNode::leading_membar() need to handle dying subgraphs better	PSU
<a href="#">JDK-8211064</a>	[AArch64] Interpreter and c1 don't correctly handle jboolean results in native calls	PSU
<a href="#">JDK-8209835</a>	AArch64: elide barriers on all volatile operations	PSU
<a href="#">JDK-8209420</a>	Track membars for volatile accesses so they can be properly optimized	PSU
<a href="#">JDK-8209415</a>	Fix JVMTI test failure HS202	PSU
<a href="#">JDK-8209414</a>	AArch64: method handle invocation does not respect JVMTI interp_only mode	PSU
<a href="#">JDK-8209413</a>	AArch64: NPE in clhsdb jstack command	PSU
<a href="#">JDK-8207838</a>	AArch64: Float registers incorrectly restored in JNI call	PSU
<a href="#">JDK-8207345</a>	AArch64: Trampoline generation code reads from uninitialized memory	PSU
<a href="#">JDK-8206179</a>	com/sun/management/OperatingSystemMXBean/GetCommittedVirtualMemorySize.java fails with Committed virtual memory size illegal value	PSU
<a href="#">JDK-8206163</a>	AArch64: incorrect code generation for StoreCM	PSU
<a href="#">JDK-8205421</a>	AArch64: StubCodeMark should be placed after alignment	PSU
<a href="#">JDK-8203699</a>	java/lang/invoke/SpecialInterfaceCall fails with SIGILL on aarch64	PSU
<a href="#">JDK-8203481</a>	Incorrect constraint for unextended_sp in frame:safe_for_sender	PSU
<a href="#">JDK-8202343</a>	Disable TLS 1.0 and 1.1	PSU
<a href="#">JDK-8198334</a>	java/awt/FileDialog/8003399/bug8003399.java fails in headless mode	PSU
<a href="#">JDK-8196221</a>	AArch64: Mistake in committed patch for JDK-8195859	PSU
<a href="#">JDK-8196136</a>	AArch64: Correct register use in patch for JDK-8195685	PSU
<a href="#">JDK-8195859</a>	AArch64: vtableStubs gtest fails after 8174962	PSU
<a href="#">JDK-8195685</a>	AArch64 cannot build with JDK-8174962	PSU
<a href="#">JDK-8193133</a>	Assertion failure because 0xDEADDEAD can be in-heap	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8191915</a>	JCK tests produce incorrect results with C2	PSU
<a href="#">JDK-8191129</a>	AARCH64: Invalid value passed to critical JNI function	PSU
<a href="#">JDK-8189170</a>	Add option to disable stack overflow checking in primordial thread for use with JNI_CreateJavaJVM	PSU
<a href="#">JDK-8187224</a>	aarch64: some inconsistency between aarch64_ad.m4 and aarch64.ad	PSU
<a href="#">JDK-8186325</a>	AArch64: jtreg test hotspot/test/gc/g1/TestJNIWeakG1/TestJNIWeakG1.java SEGV	PSU
<a href="#">JDK-8186090</a>	java.nio.Bits.unaligned() doesn't handle aarch64	PSU
<a href="#">JDK-8185934</a>	keytool and jarsigner shows "Signature algorithm: SHA1withECDSA, -1-bit key"	PSU
<a href="#">JDK-8182581</a>	aarch64: fix for crash caused by earlyret of compiled method	PSU
<a href="#">JDK-8179954</a>	AArch64: C1 and C2 volatile accesses are not sequentially consistent	PSU
<a href="#">JDK-8177661</a>	AArch64: Incorrect C2 patterns cause system register corruption	PSU
<a href="#">JDK-8173472</a>	AArch64: C1 comparisons with null only use 32-bit instructions	PSU
<a href="#">JDK-8172881</a>	AArch64: assertion failure: the int pressure is incorrect	PSU
<a href="#">JDK-8172404</a>	Tools should warn if weak algorithms are used before restricting them	PSU
<a href="#">JDK-8171537</a>	aarch64: compiler/c1/Test6849574.java generates guarantee failure in C1	PSU
<a href="#">JDK-8171410</a>	aarch64: long multiplyExact shifts by 31 instead of 63	PSU
<a href="#">JDK-8170873</a>	PPC64/aarch64: Poor StrictMath performance due to non-optimized compilation	PSU
<a href="#">JDK-8170188</a>	aarch64: jtreg test compiler/types/TestMeetIncompatibleInterfaceArrays.java causes JVM crash	PSU
<a href="#">JDK-8170100</a>	AArch64: Crash in C1-compiled code accessing References	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8168996</a>	C2 crash at postaloc.cpp:140 : assert(false) failed: unexpected yanked node	PSU
<a href="#">JDK-8168888</a>	AArch64 port of JDK-8160591	PSU
<a href="#">JDK-8168699</a>	Validate special case invocations [AArch64 support]	PSU
<a href="#">JDK-8167595</a>	AArch64: SEGV in stub code cipherBlockChaining_decryptAESCrypt	PSU
<a href="#">JDK-8167421</a>	AArch64: in one core system, fatal error: Illegal threadstate encountered	PSU
<a href="#">JDK-8167281</a>	IIOMetadataNode bugs in getElementByTagName and NodeList.item methods	PSU
<a href="#">JDK-8167200</a>	AArch64: Broken stack pointer adjustment in interpreter	PSU
<a href="#">JDK-8166607</a>	G1 needs klass_or_null_acquire	PSU
<a href="#">JDK-8165673</a>	AArch64: Fix JNI floating point argument handling	PSU
<a href="#">JDK-8164113</a>	AArch64: follow-up the fix for 8161598	PSU
<a href="#">JDK-8163363</a>	AArch64: Stack size in tools/launcher/Settings.java needs to be adjusted	PSU
<a href="#">JDK-8161190</a>	AArch64: Fix overflow in immediate cmp instruction	PSU
<a href="#">JDK-8161072</a>	AArch64: jtreg compiler/uncommontrap/TestDeoptOOM failure	PSU
<a href="#">JDK-8160748</a>	Inconsistent types for ideal_reg	PSU
<a href="#">JDK-8159063</a>	aarch64: optimise unaligned array copy long	PSU
<a href="#">JDK-8159052</a>	AArch64: Optimise unaligned copies in pd_disjoint_words and pd_conjoint_words	PSU
<a href="#">JDK-8158913</a>	aarch64: SEGV running Spark terasort	PSU
<a href="#">JDK-8158525</a>	Update a few java/net tests to use the loopback address instead of the host address	PSU
<a href="#">JDK-8157906</a>	aarch64: some more integer rotate instructions are never emitted	PSU
<a href="#">JDK-8157841</a>	aarch64: prefetch ignores cache line size	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8156731</a>	aarch64: java/util/Arrays/Correct.java fails due to _generic_arraycopy stub routine	PSU
<a href="#">JDK-8155653</a>	TestVectorUnalignedOffset.java not pushed with 8155612	PSU
<a href="#">JDK-8155627</a>	Enable SA on AArch64	PSU
<a href="#">JDK-8155617</a>	aarch64: ClearArray does not use DC ZVA	PSU
<a href="#">JDK-8155612</a>	Aarch64: vector nodes need to support misaligned offset	PSU
<a href="#">JDK-8155100</a>	AArch64: Relax alignment requirement for byte_map_base	PSU
<a href="#">JDK-8155015</a>	Aarch64: bad assert in spill generation code	PSU
<a href="#">JDK-8154739</a>	AArch64: TemplateTable::fast_xaccess loads in wrong mode	PSU
<a href="#">JDK-8154537</a>	AArch64: some integer rotate instructions are never emitted	PSU
<a href="#">JDK-8154413</a>	AArch64: Better byte behaviour	PSU
<a href="#">JDK-8153797</a>	aarch64: Add Arrays.fill stub code	PSU
<a href="#">JDK-8153713</a>	aarch64: improve short array clearing using store pair	PSU
<a href="#">JDK-8153172</a>	aarch64: hotspot crashes after the 8.1 LSE patch is merged	PSU
<a href="#">JDK-8152840</a>	aarch64: improve _unsafe_arraycopy stub routine	PSU
<a href="#">JDK-8152537</a>	aarch64: Make use of CBZ and CBNZ when comparing unsigned values with zero	PSU
<a href="#">JDK-8151775</a>	aarch64: add support for 8.1 LSE atomic operations	PSU
<a href="#">JDK-8151502</a>	aarch64: optimize pd_disjoint_words and pd_conjoint_words	PSU
<a href="#">JDK-8151340</a>	aarch64: prefetch the destination word for write prior to ldxr/stxr loops	PSU
<a href="#">JDK-8150652</a>	Remove unused code in AArch64 back end	PSU
<a href="#">JDK-8150394</a>	aarch64: add support for 8.1 LSE CAS instructions	PSU
<a href="#">JDK-8150313</a>	aarch64: optimise array copy using SIMD instructions	PSU
<a href="#">JDK-8150229</a>	aarch64: pipeline class for several instructions is not set correctly	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8150204</a>	(fs) Enhance java/nio/file/Files/probeContentType/Basic.java debugging output	PSU
<a href="#">JDK-8150082</a>	aarch64: optimise small array copy	PSU
<a href="#">JDK-8150045</a>	AArch64: arraycopy causes segfaults in SATB during garbage collection	PSU
<a href="#">JDK-8150038</a>	aarch64: Make use of CBZ and CBNZ when comparing narrow pointer with zero	PSU
<a href="#">JDK-8149907</a>	aarch64: use load/store pair instructions in call_stub	PSU
<a href="#">JDK-8149365</a>	aarch64: memory copy does not prefetch on backwards copy	PSU
<a href="#">JDK-8149080</a>	AArch64: Recognize disjoint array copy in stub code	PSU
<a href="#">JDK-8148948</a>	aarch64: generate_copy_longs calls align() incorrectly	PSU
<a href="#">JDK-8148783</a>	aarch64: SEGV running SpecJBB2013	PSU
<a href="#">JDK-8148328</a>	aarch64: redundant lsr instructions in stub code	PSU
<a href="#">JDK-8145320</a>	Create unsafe_arraycopy and generic_arraycopy for AArch64	PSU
<a href="#">JDK-8145051</a>	Wrong parameter name in synthetic lambda method leads to verifier error	PSU
<a href="#">JDK-8141457</a>	keytool default cert fingerprint algorithm should be SHA-256	PSU
<a href="#">JDK-8135018</a>	AArch64: Missing memory barriers for CMS collector	PSU
<a href="#">JDK-8132875</a>	AArch64: Fix error introduced into AArch64 CodeCache by commit for 8130309	PSU
<a href="#">JDK-8131779</a>	AArch64: add Montgomery multiply intrinsic	PSU
<a href="#">JDK-8130309</a>	Need to bailout cleanly if creation of stubs fails when codecache is out of space	PSU
<a href="#">JDK-8129626</a>	G1: set_in_progress() and clear_started() needs a barrier on non-TSO platforms	PSU
<a href="#">JDK-8081547</a>	Prepare client libs regression tests for running in a concurrent, headless jtreg environment	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8080911</a>	sun/security/krb5/auto/UseCacheAndStoreKey.java timed out intermittently	PSU
<a href="#">JDK-8078614</a>	WindowsClassicLookAndFeel : MetalComboBoxUI.getbaseLine fails with IllegalArgumentException	PSU
<a href="#">JDK-8078450</a>	Implement consistent process for quarantine of tests	PSU
<a href="#">JDK-8078024</a>	javac, several incorporation steps are silently failing when an error should be reported	PSU
<a href="#">JDK-8061777</a>	(zipfs) IllegalArgumentException in ZipCoder.toString when using Shift_JIS	PSU
<a href="#">JDK-8043264</a>	hdsis library not picked up correctly on expected paths	PSU
<a href="#">JDK-8041561</a>	Inconsistent opacity behaviour between JCheckBox and JRadioButton	PSU
<a href="#">JDK-8041464</a>	[TEST_BUG] CustomClassLoaderTransferTest does not support OS X	PSU
<a href="#">JDK-8038723</a>	Open up some PrinterJob tests	PSU
<a href="#">JDK-8035186</a>	j2se_jdk/jdk/test/java/lang/invoke/lambda/LogGeneratedClassesTest.java - assertion error	PSU
<a href="#">JDK-8031126</a>	java/lang/management/ThreadMXBean/ThreadUserTime.java fails intermittently	PSU
<a href="#">JDK-7185221</a>	[macosx] Regtest should not throw exception if a suitable display mode found	PSU
<a href="#">JDK-7131835</a>	[TEST_BUG] Test does not consider that the rounded edges of the window in Mac OS 10.7	PSU
<a href="#">JDK-7112454</a>	TEST_BUG: java/awt/Choice/PopdownGeneratesMouseEvents/PopdownGeneratesMouseEvents.html failed	PSU
<a href="#">JDK-7107012</a>	sun.jvm.hostspot.code.CompressedReadStream readDouble() conversion to long mishandled	PSU
<a href="#">JDK-7009641</a>	Don't use CodeCache for allocations if it is already full	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-6896810</a>	TEST_BUG: java/lang/ref/SoftReference/Pin.java fails with OOME during System.out.println	PSU
<a href="#">JDK-6345095</a>	regression test EmptyClipRenderingTest fails	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 8.54.0.21 for Arm 32-bit Hard-Float provides the following bundles:

- Java Development Kit:

```
zulu8.54.0.21-ca-jdk8.0.292-linux_aarch32hf.tar.gz
```

## Supported Platforms

Azul Zulu 8.54 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:

```
zulu8.54.0.21-ca-jdk8.0.292-linux_aarch32hf.tar.gz
```

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

```
$ tar -xzf zulu8.54.0.21-ca-jdk8.0.292-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_292"
OpenJDK Runtime Environment (Zulu 8.54.0.21-CA-linux_aarch32hf)
(build 1.8.0_292-b10)
OpenJDK Client VM (Zulu 8.54.0.21-CA-linux_aarch32hf) (build
25.292-b10, mixed mode)
```

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