



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

**Azul Zulu 11.48 (CA) for Arm 32-bit Soft-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>	11.48 (11.0.11+9)
<b>Release Date:</b>	April 21, 2021
<b>Based on Azul Zulu Version:</b>	11.47 (11.0.10.0.101+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 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-8263069</a>	Exclude some failing tests from security/infra/java/security/cert/CertPathValidator	PSU
<a href="#">JDK-8262018</a>	Wrong format in SAP copyright header of OsVersionTest	PSU
<a href="#">JDK-8261920</a>	[AIX] jshell command throws java.io.IOException on non English locales	PSU
<a href="#">JDK-8261912</a>	Code IfNode::fold_compares_helper more defensively	PSU
<a href="#">JDK-8261829</a>	Exclude tools/jlink/JLinkReproducibleTest.java in 11u	PSU
<a href="#">JDK-8261753</a>	Test java/lang/System/OsVersionTest.java still failing on BigSur patch versions after JDK-8253702	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8261585</a>	Restore HandleArea used in Deoptimization::uncommon_trap	PSU
<a href="#">JDK-8261534</a>	Test sun/security/pkcs11/KeyAgreement/IllegalPackageAccess.java fails on platforms where no nsslib artifacts are defined	PSU
<a href="#">JDK-8261522</a>	[PPC64] AES intrinsics write beyond the destination array	PSU
<a href="#">JDK-8261413</a>	Shenandoah: Disable class-unloading in I-U mode	PSU
<a href="#">JDK-8261397</a>	try catch Method failing to work when dividing an integer by 0	PSU
<a href="#">JDK-8261334</a>	NMT: tuning statistic shows incorrect hash distribution	PSU
<a href="#">JDK-8261310</a>	PPC64 Zero build fails with 'VMError::controlled_crash(int)::FunctionDescriptor functionDescriptor' has incomplete type and cannot be defined	PSU
<a href="#">JDK-8261251</a>	Shenandoah: Use object size for full GC humongous compaction	PSU
<a href="#">JDK-8261231</a>	Windows IME was disabled after DnD operation	PSU
<a href="#">JDK-8261209</a>	isStandalone property: remove dependency on pretty-print	PSU
<a href="#">JDK-8261089</a>	[TESTBUG] native library of test TestCheckedReleaseCriticalArray.java fails to compile with gcc 4.x	PSU
<a href="#">JDK-8261022</a>	Fix incorrect result of Math.abs() with char type	PSU
<a href="#">JDK-8260704</a>	ParallelGC: oldgen expansion needs release-store for _end	PSU
<a href="#">JDK-8260632</a>	Build failures after JDK-8253353	PSU
<a href="#">JDK-8260502</a>	[s390] NativeMovRegMem::verify() fails because it's too strict	PSU
<a href="#">JDK-8260497</a>	Shenandoah: Improve SATB flushing	PSU
<a href="#">JDK-8260378</a>	[TESTBUG] DcmdMBeanTestCheckJni.java reports false positive	PSU
<a href="#">JDK-8260349</a>	Cannot programmatically retrieve Metaspace max set via JAVA_TOOL_OPTIONS	PSU
<a href="#">JDK-8260338</a>	Some fields in HaltNode is not cloned	PSU
<a href="#">JDK-8260308</a>	Update LogCompilation junit to 4.13.1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8260029</a>	aarch64: fix typo in verify_oop_array	PSU
<a href="#">JDK-8259954</a>	gc/shenandoah/mxbeans tests fail with -Xcomp	PSU
<a href="#">JDK-8259949</a>	x86 32-bit build fails when -fcf-protection is passed in the compiler flags	PSU
<a href="#">JDK-8259849</a>	Shenandoah: Rename store-val to IU-barrier	PSU
<a href="#">JDK-8259773</a>	Incorrect encoding of AVX-512 kmovq instruction	PSU
<a href="#">JDK-8259707</a>	LDAP channel binding does not work with StartTLS extension	PSU
<a href="#">JDK-8259706</a>	C2 compilation fails with assert(vtable_index == Method::invalid_vtable_index) failed: correct sentinel value	PSU
<a href="#">JDK-8259619</a>	C1: 3-arg StubAssembler::call_RT stack-use condition is incorrect	PSU
<a href="#">JDK-8259580</a>	Shenandoah: uninitialized label in VerifyThreadGCState	PSU
<a href="#">JDK-8259451</a>	Zero: skip serviceability/sa tests, set vm.hasSA to false	PSU
<a href="#">JDK-8259446</a>	runtime/jni/checked/TestCheckedReleaseArrayElements.java fails with stderr not empty	PSU
<a href="#">JDK-8259339</a>	AllocateUninitializedArray C2 intrinsic fails with void.class input	PSU
<a href="#">JDK-8259319</a>	Illegal package access when SunPKCS11 requires SunJCE's classes	PSU
<a href="#">JDK-8259312</a>	VerifyCACerts.java fails as soneraclass2ca cert will expire in 90 days	PSU
<a href="#">JDK-8259271</a>	gc/parallel/TestDynShrinkHeap.java still fails "assert(covered_region.contains(new_memregion)) failed: new region is not in covered_region"	PSU
<a href="#">JDK-8259231</a>	Epsilon: improve performance under contention during virtual space expansion	PSU
<a href="#">JDK-8259049</a>	Uninitialized variable after JDK-8257513	PSU
<a href="#">JDK-8259007</a>	This test printed a blank page	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8258884</a>	[TEST_BUG] Convert applet-based test open/test/jdk/javax/swing/JMenuItem/8031573/bug8031573.java to a regular java test	PSU
<a href="#">JDK-8258836</a>	JNI local refs exceed capacity getDiagnosticCommandInfo	PSU
<a href="#">JDK-8258833</a>	Cancel multi-part cipher operations in SunPKCS11 after failures	PSU
<a href="#">JDK-8258805</a>	Japanese characters not entered by mouse click on Windows 10	PSU
<a href="#">JDK-8258534</a>	Epsilon: clean up unused includes	PSU
<a href="#">JDK-8258471</a>	"search codecache" clhsdb command does not work	PSU
<a href="#">JDK-8258419</a>	RSA cipher buffer cleanup	PSU
<a href="#">JDK-8258396</a>	SIGILL in jdk.jfr.internal.PlatformRecorder.rotateDisk()	PSU
<a href="#">JDK-8258373</a>	Update the text handling in the JPasswordField	PSU
<a href="#">JDK-8258077</a>	Using -Xcheck:jni can lead to a double-free after JDK-8193234	PSU
<a href="#">JDK-8257999</a>	Parallel GC crash in gc/parallel/TestDynShrinkHeap.java: new region is not in covered_region	PSU
<a href="#">JDK-8257997</a>	sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java again reports leaks after JDK-8257884	PSU
<a href="#">JDK-8257910</a>	[JVMCI] Set exception_seen accordingly in the runtime.	PSU
<a href="#">JDK-8257884</a>	Re-enable sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java as automatic test	PSU
<a href="#">JDK-8257798</a>	[PPC64] undefined reference to Klass::vtable_start_offset()	PSU
<a href="#">JDK-8257746</a>	Regression introduced with JDK-8250984 - memory might be null in some machines	PSU
<a href="#">JDK-8257707</a>	Fix incorrect format string in Http1HeaderParser	PSU
<a href="#">JDK-8257670</a>	sun/security/ssl/SSLSocketImpl/SSLSocketLeak.java reports leaks	PSU
<a href="#">JDK-8257633</a>	Missing -mmacosx-version-min=X flag when linking libjvm	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8257594</a>	C2 compiled checkcast of non-null object triggers endless deoptimization/recompilation cycle	PSU
<a href="#">JDK-8257575</a>	C2: "failed: onlyphis" assert failure in loop strip mining verification	PSU
<a href="#">JDK-8257565</a>	epsilonBarrierSet.hpp should not include barrierSetAssembler	PSU
<a href="#">JDK-8257561</a>	Some code is not vectorized after 8251925 and 8250607	PSU
<a href="#">JDK-8257547</a>	Handle multiple prereqs on the same line in deps files	PSU
<a href="#">JDK-8257513</a>	C2: assertconstant_addr - _masm.code()␣const()␣start( == con.offset())	PSU
<a href="#">JDK-8257436</a>	AArch64: Regressions in ArrayCopyUnalignedDst.testByte/testChar for 65-78 bytes when UseSIMDForMemoryOps is on	PSU
<a href="#">JDK-8257423</a>	[PPC64] Support -XX:-UseInlineCaches	PSU
<a href="#">JDK-8257414</a>	Drag n Drop target area is wrong on high DPI systems	PSU
<a href="#">JDK-8257408</a>	Bump update version for OpenJDK: jdk-11.0.11	PSU
<a href="#">JDK-8257083</a>	Security infra test failures caused by JDK-8202343	PSU
<a href="#">JDK-8256888</a>	Client manual test problem list update	PSU
<a href="#">JDK-8256818</a>	SSLSocket that is never bound or connected leaks socket resources	PSU
<a href="#">JDK-8256810</a>	Incremental rebuild broken on MacOSx	PSU
<a href="#">JDK-8256807</a>	C2: Not marking stores correctly as mismatched in string opts	PSU
<a href="#">JDK-8256806</a>	Shenandoah: optimize shenandoah/jni/TestPinnedGarbage.java test	PSU
<a href="#">JDK-8256757</a>	Incorrect MachCallRuntimeNode::ret_addr_offset() for CallLeafNoFP on x86_32	PSU
<a href="#">JDK-8256751</a>	Incremental rebuild with precompiled header fails when touching a header file	PSU
<a href="#">JDK-8256682</a>	JDK-8202343 is incomplete	PSU
<a href="#">JDK-8256633</a>	Fix product build on Windows+Arm64	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8256501</a>	libTestMainKeyWindow fails to build with Xcode 12.2	PSU
<a href="#">JDK-8256489</a>	Make gtest for long path names on Windows more resilient in the presence of virus scanners	PSU
<a href="#">JDK-8256488</a>	AArch64: Use ldpq/stpq instead of ld4/st4 for small copies in StubGenerator::copy_memory	PSU
<a href="#">JDK-8256421</a>	Add 2 HARICA roots to cacerts truststore	PSU
<a href="#">JDK-8256387</a>	Unexpected result if patching an entire instruction on AArch64	PSU
<a href="#">JDK-8256359</a>	AArch64: runtime/ReservedStack/ReservedStackTestCompiler.java fails	PSU
<a href="#">JDK-8256290</a>	javac/lambda/T8031967.java fails with StackOverflowError on x86_32	PSU
<a href="#">JDK-8256264</a>	Printed GlyphVector outline with low DPI has bad quality on Windows	PSU
<a href="#">JDK-8256258</a>	some missing NULL checks or asserts after CodeCache::find_blob_unsafe	PSU
<a href="#">JDK-8256220</a>	C1: x86_32 fails with -XX:UseSSE=1 after JDK-8210764 due to mishandled lir_neg	PSU
<a href="#">JDK-8256187</a>	[TEST_BUG] Automate bug4275046.java test	PSU
<a href="#">JDK-8256061</a>	RegisterSaver::save_live_registers() omits upper halves of ZMM0-15 registers	PSU
<a href="#">JDK-8256056</a>	Deoptimization stub doesn't save vector registers on x86	PSU
<a href="#">JDK-8256025</a>	AArch64: MachCallRuntimeNode::ret_addr_offset() is incorrect for stub calls	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
<a href="#">JDK-8255845</a>	Memory leak in imageFile.cpp	PSU
<a href="#">JDK-8255742</a>	PrintInlining as compiler directive doesn't print virtual calls	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8255734</a>	VM should ignore SIGXFSZ on ppc64, s390 too	PSU
<a href="#">JDK-8255681</a>	Print callstack in error case in runAWTLoopWithApp	PSU
<a href="#">JDK-8255559</a>	Leak File Descriptors Because of ResolverLocalFilesystem#engineResolveURI()	PSU
<a href="#">JDK-8255544</a>	Create a checked cast	PSU
<a href="#">JDK-8255479</a>	AArch64: assert(src->section_index_of(target) == CodeBuffer::SECT_NONE) failed: sanity	PSU
<a href="#">JDK-8255401</a>	Shenandoah: Allow oldval and newval registers to overlap in cmpxchg_oop()	PSU
<a href="#">JDK-8255387</a>	Japanese characters were printed upside down on AIX	PSU
<a href="#">JDK-8255368</a>	Math.exp() gives wrong result for large values on x86 32-bit platforms	PSU
<a href="#">JDK-8255351</a>	Add detection for Graviton 2 CPUs	PSU
<a href="#">JDK-8255058</a>	C1: assert(is_virtual()) failed: type check	PSU
<a href="#">JDK-8254799</a>	runtime/ErrorHandling/TestHeapDumpOnOutOfMemoryError.java fails with release VMs	PSU
<a href="#">JDK-8254748</a>	Bad Copyright header format after JDK-8212218	PSU
<a href="#">JDK-8254734</a>	"dead loop detected" assert failure with patch from 8223051	PSU
<a href="#">JDK-8254104</a>	MethodCounters must exist before nmethod is installed	PSU
<a href="#">JDK-8253756</a>	C2 CompilerThread0 crash in Node::add_req(Node*)	PSU
<a href="#">JDK-8253702</a>	BigSur version number reported as 10.16, should be 11.nn	PSU
<a href="#">JDK-8253681</a>	closed java/awt/dnd/MouseEventAfterStartDragTest/MouseEventAfterStartDragTest.html test failed	PSU
<a href="#">JDK-8253644</a>	C2: assert(skeleton_predicate_has_opaque(iff)) failed: unexpected	PSU
<a href="#">JDK-8253524</a>	C2: Refactor code that clones predicates during loop unswitching	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8253476</a>	TestUseContainerSupport.java fails on some Linux kernels w/o swap limit capabilities	PSU
<a href="#">JDK-8253409</a>	Double-rounding possibility in float fma	PSU
<a href="#">JDK-8253404</a>	C2: assert(C2::live_nodes() < C2::max_node_limit()) failed: Live Node limit exceeded limit	PSU
<a href="#">JDK-8253368</a>	TLS connection always receives close_notify exception	PSU
<a href="#">JDK-8253353</a>	Crash in C2: guarantee(n != NULL) failed: No Node	PSU
<a href="#">JDK-8253274</a>	The CycleDMLmagetest brokes the system	PSU
<a href="#">JDK-8253220</a>	Epsilon: clean up unused code/declarations	PSU
<a href="#">JDK-8251992</a>	VM crashed running TestComplexAddrExpr.java test with -XX:UseAVX=X	PSU
<a href="#">JDK-8251944</a>	Add Shenandoah test config to compiler/gcbarriers/UnsafeIntrinsicsTest.java	PSU
<a href="#">JDK-8251925</a>	C2: RenaissanceStressTest fails with assert(!had_error): bad dominance	PSU
<a href="#">JDK-8251359</a>	Shenandoah: filter null oops before calling enqueue/SATB barrier	PSU
<a href="#">JDK-8251255</a>	[linux] Add process-memory information to hs-err and VM.info	PSU
<a href="#">JDK-8250911</a>	[windows] os::pd_map_memory error detection broken	PSU
<a href="#">JDK-8249867</a>	XML declaration is not followed by a newline	PSU
<a href="#">JDK-8249787</a>	Make TestGCLocker more resilient with concurrent GCs	PSU
<a href="#">JDK-8249749</a>	modify a primitive array through a stream and a for cycle causes jre crash	PSU
<a href="#">JDK-8249588</a>	libwindowsaccessbridge issues on 64bit Windows	PSU
<a href="#">JDK-8249543</a>	(bf) Force DirectBufferAllocTest to run with -ExplicitGCInvokesConcurrent	PSU
<a href="#">JDK-8248901</a>	Signed immediate support in ../share/assembler.hpp is broken.	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8248865</a>	Document JNDI/LDAP timeout properties	PSU
<a href="#">JDK-8248336</a>	AArch64: C2: offset overflow in BoxLockNode::emit	PSU
<a href="#">JDK-8247766</a>	AArch64: guarantee(val < (1U << nbits)) failed: Field too big for insn	PSU
<a href="#">JDK-8247200</a>	AArch64: assert((unsigned)fpargs < 32)	PSU
<a href="#">JDK-8246709</a>	sun/security/tools/jarsigner/TsacertOptionTest.java compilation failed after JDK-8244683	PSU
<a href="#">JDK-8246707</a>	(sc) SocketChannel.read/write throws AsynchronousCloseException on closed channel	PSU
<a href="#">JDK-8245512</a>	CRC32 optimization using AVX512 instructions	PSU
<a href="#">JDK-8245026</a>	PsAdaptiveSizePolicy::_old_gen_policy_is_ready is unused	PSU
<a href="#">JDK-8245005</a>	javax/net/ssl/compatibility/BasicConnectTest.java failed with No enum constant	PSU
<a href="#">JDK-8244683</a>	A TSA server used by tests	PSU
<a href="#">JDK-8244573</a>	java.lang.ArrayIndexOutOfBoundsException thrown for malformed class file	PSU
<a href="#">JDK-8244340</a>	Handshake processing thread lacks yielding	PSU
<a href="#">JDK-8244154</a>	Update SunPKCS11 provider with PKCS11 v3.0 header files	PSU
<a href="#">JDK-8244088</a>	[Regression] Switch of Gnome theme ends up in deadlocked UI	PSU
<a href="#">JDK-8243670</a>	Unexpected test result caused by C2 MergeMemNode::Ideal	PSU
<a href="#">JDK-8243618</a>	compiler/rtm/cli tests can be run w/o WhiteBox	PSU
<a href="#">JDK-8242565</a>	Policy initialization issues when the denyAfter constraint is enabled	PSU
<a href="#">JDK-8242030</a>	Wrong package declarations in jline classes after JDK-8241598	PSU
<a href="#">JDK-8241911</a>	AArch64: Fix a potential issue about register allocation effect rule in reduce_add2I	PSU
<a href="#">JDK-8241770</a>	Module xxxAnnotation() methods throw NCDFE if module-info.class found as resource in unnamed module	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8241649</a>	Optimize Character.toString	PSU
<a href="#">JDK-8241598</a>	Upgrade JLine to 3.14.0	PSU
<a href="#">JDK-8240795</a>	[REDO] 8238384 CTW: C2 compilation fails with "assert(store != load.find_exact_control(load.in(0))) failed: dependence cycle found"	PSU
<a href="#">JDK-8240751</a>	Shenandoah: fold ShenandoahTracer definition	PSU
<a href="#">JDK-8240704</a>	ProcessBuilder/checkHandles/CheckHandles.java failed "AssertionError: Handle use increased by more than 10 percent."	PSU
<a href="#">JDK-8240353</a>	AArch64: missing support for -XX:+ExtendedDTraceProbes in C1	PSU
<a href="#">JDK-8239355</a>	(dc) Initial value of SO_SNDBUF should allow sending large datagrams (macOS)	PSU
<a href="#">JDK-8237495</a>	Java MIDI fails with a dereferenced memory error when asked to send a raw 0xF7	PSU
<a href="#">JDK-8237483</a>	AArch64 C1 OopMap inserted twice fatal error	PSU
<a href="#">JDK-8237392</a>	Shenandoah: Remove unreliable assertion	PSU
<a href="#">JDK-8237369</a>	Shenandoah: failed vmTestbase/nsk/jvmti/AttachOnDemand/attach021/TestDescription.java test	PSU
<a href="#">JDK-8235351</a>	Lookup::unreflect should bind with the original caller independent of Method's accessible flag	PSU
<a href="#">JDK-8235324</a>	Dying objects are published from users of CollectedHeap::object_iterate	PSU
<a href="#">JDK-8234796</a>	Refactor Handshake::execute to take a more complex type than ThreadClosure	PSU
<a href="#">JDK-8234742</a>	Improve handshake logging	PSU
<a href="#">JDK-8234508</a>	VM_HeapWalkOperation::iterate_over_object reads non-strong fields with an on-strong load barrier	PSU
<a href="#">JDK-8233912</a>	aarch64: minor improvements of atomic operations	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8233910</a>	java/awt/ColorClass/AlphaColorTest.java is failing intermittently in nightly Linux-x64 system	PSU
<a href="#">JDK-8233164</a>	C2 fails with assert(phase%C%get_alias_index(t) == phase%C%get_alias_index(t_adr)) failed: correct memory chain	PSU
<a href="#">JDK-8232905</a>	JFR fails with assertion: assert(t%unflushed_size() == 0) failed: invariant	PSU
<a href="#">JDK-8232225</a>	Rework the fix for JDK-8071483	PSU
<a href="#">JDK-8229474</a>	Shenandoah: Cleanup CM::update_roots()	PSU
<a href="#">JDK-8229396</a>	jdeps ignores multi-release when generate-module-info used on command line	PSU
<a href="#">JDK-8226810</a>	Failed to launch JVM because of NullPointerException occurred on System.props	PSU
<a href="#">JDK-8225805</a>	Java Access Bridge does not close the logger	PSU
<a href="#">JDK-8225773</a>	jdeps --check produces NPE if there is any missing module dependence	PSU
<a href="#">JDK-8223186</a>	HotSpot compile warnings from GCC 9	PSU
<a href="#">JDK-8222785</a>	aarch64: add necessary masking for immediate shift counts	PSU
<a href="#">JDK-8222518</a>	Remove unnecessary caching of Parker object in java.lang.Thread	PSU
<a href="#">JDK-8221995</a>	AARCH64: problems with CAS instructions encoding	PSU
<a href="#">JDK-8221584</a>	SIGSEGV in os::PlatformEvent::unpark() in JvmtiRawMonitor::raw_exit while posting method exit event	PSU
<a href="#">JDK-8218550</a>	Add test omitted from JDK-8212043	PSU
<a href="#">JDK-8218482</a>	sun/security/krb5/auto/ReplayCachePrecise.java failed - no KrbException thrown	PSU
<a href="#">JDK-8217848</a>	[Graal] vmTestbase/nsk/jvmti/ResourceExhausted/resexhausted003/TestDescription.java fails	PSU
<a href="#">JDK-8215687</a>	[Graal] unit test CheckGraalIntrinsics failed after 8212043	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8214741</a>	docs/index.html has no title or copyright	PSU
<a href="#">JDK-8214230</a>	Classes generated by SystemModulesPlugin.java are not reproducible	PSU
<a href="#">JDK-8214223</a>	tools/jdeps/listdeps/ListModuleDeps.java failed due to missing Lib2 file	PSU
<a href="#">JDK-8214180</a>	Need better granularity for sleeping	PSU
<a href="#">JDK-8213909</a>	jdeps --print-module-deps should report missing dependences	PSU
<a href="#">JDK-8213116</a>	javax/swing/JComboBox/WindowsComboBoxSize/WindowsComboBoxSizeTest.java fails in Windows	PSU
<a href="#">JDK-8212218</a>	[TESTBUG] runtime/ErrorHandling/TestHeapDumpOnOutOfMemoryErrorInMetaspace.java timed out	PSU
<a href="#">JDK-8212043</a>	AArch64: Add floating-point Math.min/max intrinsics	PSU
<a href="#">JDK-8211825</a>	ModuleLayer.defineModulesWithXXX does not setup delegation when module reads automatic module	PSU
<a href="#">JDK-8211150</a>	G1 Full GC not purging code root memory and hence causing memory leak	PSU
<a href="#">JDK-8211057</a>	Gensrc step CompileProperties generates unstable CompilerProperties output	PSU
<a href="#">JDK-8211051</a>	jdeps usage of --dot-output doesn't provide valid output for modular jar	PSU
<a href="#">JDK-8210578</a>	AArch64: Invalid encoding for fmlsvs instruction	PSU
<a href="#">JDK-8210413</a>	AArch64: Optimize div/rem by constant in C1	PSU
<a href="#">JDK-8209447</a>	vmTestbase/vm/mlvm/indy/func/jvmti/mergeCP_none2indy_b/TestDescription.java timed out	PSU
<a href="#">JDK-8209193</a>	Fix aarch64-linux compilation after -Wreorder changes	PSU
<a href="#">JDK-8206925</a>	Support the certificate_authorities extension	PSU
<a href="#">JDK-8205992</a>	jhsdb cannot attach to Java processes running in Docker containers	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8202343</a>	Disable TLS 1.0 and 1.1	PSU
<a href="#">JDK-8180837</a>	SunPKCS11-NSS tests failing with CKR_ATTRIBUTE_READ_ONLY and CKR_MECHANISM_PARAM_INVALID	PSU
<a href="#">JDK-8168869</a>	jdeps: localized messages don't use proper line breaks	PSU
<a href="#">JDK-8086003</a>	Test fails on OSX with java.lang.RuntimeException 'Narrow klass base: 0x0000000000000000, Narrow klass shift: 3' missing	PSU
<a href="#">JDK-7146776</a>	Deadlock between URLStreamHandler.getHostAddress and file.Handler.openConnection	PSU
<a href="#">JDK-7107012</a>	sun.jvm.hostspot.code.CompressedReadStream readDouble() conversion to long mishandled	PSU

# About This Build

Azul Zulu for Arm 32-bit Soft-Float is a binary build of OpenJDK that Azul builds for the platforms based on the Arm 32-bit Soft-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 11.48 for Arm 32-bit Soft-Float provides the following bundles:

- Java Development Kit:

```
zululu11.48.21-ca-jdk11.0.11-linux_aarch32sf.tar.gz
```

## Supported Platforms

Azul Zulu 11.48 for Arm 32-bit Soft-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 version 5TE and above, excluding ARMv5TEv8. Arm v6k (and higher) CPU architecture with or without VFP. Azul Zulu doesn't support v8 architectures that are not backward-compatible with v7k.
- Linux soft-float EABI. If FPU is present and available, it will be used to speed up floating point operations.

## 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:

```
zulu11.48.21-ca-jdk11.0.11-linux_aarch32sf.tar.gz
```

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

```
$ tar -xzf zulu11.48.21-ca-jdk11.0.11-linux_aarch32sf.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 "11.0.11" 2021-04-20 LTS
OpenJDK Runtime Environment Zulu11.48+21-CA (build 11.0.11+9-LTS)
OpenJDK Client VM Zulu11.48+21-CA (build 11.0.11+9-LTS, mixed mode)
```

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