



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

Azul Zulu 11.50 (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	<p>Added more explanation about Azul Zulu dropping support for OpenJSSE and Legacy8uJSSE.</p> <p>In previous versions of the document, some OpenJDK bugs were erroneously marked as CPU bugs instead of PSU bugs. The error is corrected in this version.</p>

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.

Azul Zulu Version:	11.50.19 (11.0.12+7)
Release Date:	July 20, 2021
Based on Azul Zulu Version:	11.49 (11.0.11.0.101+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 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.

Known Issues

- When using Azul Zulu 11, you may get the following exception when an application is trying to establish a TLS connection with the ALPN extension enabled under a security manager.

```
Exception: access denied ("java.security.SecurityPermission"
"getProperty.jdk.tls.alpnCharset")
```

This happens because the 'org.openjsse' provider in Azul Zulu 11 does not have permissions to read the `getProperty.jdk.tls.alpnCharset` property.

As a workaround, grant the following permission in the

`<zulu_dir>/lib/security/default.policy` file:

```
grant codeBase "jrt:/org.openjsse" {
    // other permissions

    permission java.security.SecurityPermission
"getProperty.jdk.tls.alpnCharset";
}
```

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
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 20, 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-8241248	NullPointerException in sun.security.ssl.HKDF.extract(HKDF.java:93)	CPU
JDK-8268678	LetsEncryptCA.java test fails as Let's Encrypt Authority X3 is retired	PSU
JDK-8267721	Enable sun/security/pkcs11 tests for Amazon Linux 2 AArch64	PSU
JDK-8267641	[11u] 8227609 backport typo	PSU
JDK-8267599	Revert the change to the default PKCS12 macAlgorithm and macIterationCount props for 11u/8u/7u	PSU
JDK-8267561	Shenandoah: Reference processing not properly setup for outside of cycle degenerated GC	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-8266892	avoid maybe-uninitialized gcc warnings on linux s390x	PSU
JDK-8266802	Shenandoah: Round up region size to page size unconditionally	PSU
JDK-8266713	[AIX] Build failure after 11u backport of JDK-8247753	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8266293	Key protection using PBEWithMD5AndDES fails with "java.security.InvalidAlgorithmParameterException: Salt must be 8 bytes long"	PSU
JDK-8266220	keytool still prompt for store password on a password-less pkcs12 file if -storetype pkcs12 is specified	PSU
JDK-8265938	C2's conditional move optimization does not handle top Phi	PSU
JDK-8265784	[C2] Hoisting of DecodeN leaves MachTemp inputs behind	PSU
JDK-8265750	Fatal error in safepoint.cpp after backport of 8258414	PSU
JDK-8265718	Build failure after JDK-8258414 11u backport	PSU
JDK-8265690	Use the latest Ubuntu base image version in Docker testing	PSU
JDK-8265677	CMS: CardTableBarrierSet::write_ref_array_work() lacks storestore barrier	PSU
JDK-8265666	Enable AIX build platform to make external debug symbols	PSU
JDK-8265537	x86 version string truncated after JDK-8249672 11u backport	PSU
JDK-8265462	Handle multiple slots in the NSS Internal Module from SunPKCS11's Secmod	PSU
JDK-8265421	java/lang/String/StringRepeat.java test is missing a memory requirement	PSU
JDK-8265417	Backport of JDK-8249672 breaks Solaris x86 build	PSU
JDK-8265239	Shenandoah: Shenandoah heap region count could be off by 1	PSU
JDK-8265154	vinerti128 operand mix up for KNL platforms	PSU
JDK-8265099	Revert backport to 11u of 8236859: WebSocket over authenticating proxy fails with NPE	PSU
JDK-8264958	C2 compilation fails with assert "n is later than its clone"	PSU
JDK-8264923	PNGImageWriter.write_zTXt throws Exception with a typo	PSU
JDK-8264846	Regression ~5% in J2dBench.bimg_misc on Linux after JDK-8263142	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8264821	DirectIOtest fails on a system with large block size	PSU
JDK-8264786	[macOS] All Swing/AWT apps cause Allow Notifications prompt to appear when app is launched	PSU
JDK-8264640	CMS ParScanClosure misses a barrier	PSU
JDK-8264626	C1 should be able to inline excluded methods	PSU
JDK-8264360	Loop strip mining verification fails with "should be on the backedge"	PSU
JDK-8264328	Broken license in javax/swing/JComboBox/8072767/bug8072767.java	PSU
JDK-8264223	CodeHeap::verify fails extra_hops assertion in fastdebug test	PSU
JDK-8264190	Harden TLS interop tests	PSU
JDK-8264173	[s390] Improve Hardware Feature Detection And Reporting	PSU
JDK-8264151	ciMethod::ensure_method_data() should return false is loading resulted in empty state	PSU
JDK-8264096	slowdebug jvm crashes when StrInflatedCopy match rule is not supported	PSU
JDK-8264047	Duplicate global variable 'jvm' in libjavajpeg and libawt	PSU
JDK-8263846	Bad JNI lookup getFocusOwner in accessibility code on Mac OS X	PSU
JDK-8263676	AArch64: one potential bug in C1 LIRGenerator::generate_address()	PSU
JDK-8263558	Possible NULL dereference in fast path arena free if ZapResourceArea is true	PSU
JDK-8263557	Possible NULL dereference in Arena::destruct_contents()	PSU
JDK-8263504	Some OutputMachOpcodes fields are uninitialized	PSU
JDK-8263448	CTW: fatal error: meet not symmetric	PSU
JDK-8263425	AArch64: two potential bugs in C1 LIRGenerator::generate_address()	PSU
JDK-8263404	RsaPrivateKeySpec is always recognized as RSAPrivateCrtKeySpec in RSAKeyFactory.engineGetKeySpec	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8263361	Incorrect arraycopy stub selected by C2 for SATB collectors	PSU
JDK-8263311	Watch registry changes for remote printers update instead of polling	PSU
JDK-8263260	[s390] Support latest hardware (z14 and z15)	PSU
JDK-8262900	ToolBasicTest fails to access HTTP server it starts	PSU
JDK-8262837	handle split_USE correctly	PSU
JDK-8262829	Native crash in Win32PrintServiceLookup.getAllPrinterNames()	PSU
JDK-8262739	String inflation C2 intrinsic prevents insertion of anti-dependencies	PSU
JDK-8262726	AArch64: C1 StubAssembler::call_RT can corrupt stack	PSU
JDK-8262465	Very long compilation times and high memory consumption in C2 debug builds	PSU
JDK-8262461	handle wcstombsdmp return value correctly in unix awt_InputMethod.c	PSU
JDK-8262446	DragAndDrop hangs on Windows	PSU
JDK-8262298	G1BarrierSetC2::step_over_gc_barrier fails with assert "bad barrier shape"	PSU
JDK-8262295	C2: Out-of-Bounds Array Load from Clone Source	PSU
JDK-8262163	Extend settings printout in jcmd VM.metaspace	PSU
JDK-8262121	[11u] Redo 8244287: JFR: Methods samples have line number 0	PSU
JDK-8262110	DST starts from incorrect time in 2038	PSU
JDK-8262093	java/util/concurrent/tck/JSR166TestCase.java failed "assert(false) failed: unexpected node"	PSU
JDK-8261914	IfNode::fold_compares_helper faces non-canonicalized bool when running JRuby JSON workload	PSU
JDK-8261812	C2 compilation fails with assert(!had_error) failed: bad dominance	PSU
JDK-8261791	(sctp) handleSendFailed in SctpChannelImpl.c potential leaks	PSU
JDK-8261752	Multiple GC test are missing memory requirements	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8261730	C2 compilation fails with assert(store.find_edge(load) != -1) failed: missing precedence edge	PSU
JDK-8261649	AArch64: Optimize LSE atomics in C++ code	PSU
JDK-8261601	(sctp) free memory in early return in Java_sun_nio_ch_sctp_SctpChannelImpl_receive0	PSU
JDK-8261505	Test test/hotspot/jtreg/gc/parallel/TestDynShrinkHeap.java killed by Linux OOM Killer	PSU
JDK-8261481	Cannot read Kerberos settings in dynamic store on macOS Big Sur	PSU
JDK-8261447	MethodInvocationCounters frequently run into overflow	PSU
JDK-8261422	Adjust problematic String.format calls in jdk/internal/util/Preconditions.java outOfBoundsMessage	PSU
JDK-8261355	No data buffering in SunPKCS11 Cipher encryption when the underlying mechanism has no padding	PSU
JDK-8261354	SIGSEGV at MethodIteratorHost	PSU
JDK-8261262	Kitchensink24HStress.java crashed with EXCEPTION_ACCESS_VIOLATION	PSU
JDK-8261261	The version extra fields needs to be overridable in jib-profiles.js	PSU
JDK-8261235	C1 compilation fails with assert(res.vreg_number() == index) failed: conversion check	PSU
JDK-8261198	[macOS] Incorrect JNI parameters in number conversion in A11Y code	PSU
JDK-8261170	Upgrade to FreeType 2.10.4	PSU
JDK-8261167	print_process_memory_info add a close call after fopen	PSU
JDK-8261027	AArch64: Support for LSE atomics C++ HotSpot code	PSU
JDK-8261020	Wrong format parameter in create_emergency_chunk_path	PSU
JDK-8260926	Trace resource exhausted events unconditionally	PSU
JDK-8260925	URLConnection does not work with other JSSE provider.	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8260707	java/lang/instrument/PremainClass/InheritAgent0100.java times out	PSU
JDK-8260653	Unreachable nodes keep speculative types alive	PSU
JDK-8260616	Removing remaining JNF dependencies in the java.desktop module	PSU
JDK-8260432	allocateSpaceForGP in freetypeScaler.c might leak memory	PSU
JDK-8260426	awt debug_mem.c DMem_AllocateBlock might leak memory	PSU
JDK-8260420	C2 compilation fails with assert(found_sfpt) failed: no node in loop that's not input to safepoint	PSU
JDK-8260380	Upgrade to LittleCMS 2.12	PSU
JDK-8260284	C2: assert(_base == Int) failed: Not an Int	PSU
JDK-8260255	C1: LoopInvariantCodeMotion constructor can leave some fields uninitialized	PSU
JDK-8260236	better init AnnotationCollector _contended_group	PSU
JDK-8260030	Improve stringStream buffer handling	PSU
JDK-8259983	do not use uninitialized expand_ms value in G1CollectedHeap::expand_heap_after_young_collection	PSU
JDK-8259886	Improve SSL session cache performance and scalability	PSU
JDK-8259869	[macOS] Remove desktop module dependencies on JNF Reference APIs	PSU
JDK-8259843	initialize dli_fname array before calling dll_address_to_library_name	PSU
JDK-8259786	initialize last parameter of getpwuid_r	PSU
JDK-8259777	Incorrect predication condition generated by ADLC	PSU
JDK-8259729	Missed JNFInstanceOf ☒ IsInstanceOf conversion	PSU
JDK-8259710	Inlining trace leaks memory	PSU
JDK-8259662	Don't wrap SocketExceptions into SSLExceptions in SSLSocketImpl	PSU
JDK-8259651	[macOS] Replace JNF_COCOA_ENTER/EXIT macros	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8259585	[macOS] Bad JNI lookup error : Accessible actions do not work on macOS	PSU
JDK-8259343	[macOS] Update JNI error handling in Cocoa code.	PSU
JDK-8259276	C2: Empty expression stack when reexecuting tableswitch/lookupswitch instructions after deoptimization	PSU
JDK-8259232	Bad JNI lookup during printing	PSU
JDK-8259227	C2 crashes with SIGFPE due to a division that floats above its zero check	PSU
JDK-8259061	C2: assert(found) failed: memory-writing node is not placed in its original loop or an ancestor of it	PSU
JDK-8258753	StartTlsResponse.close() hangs due to synchronization issues	PSU
JDK-8258505	[TESTBUG] TestDivZeroWithSplitIf.java fails due to missing UnlockDiagnosticVMOptions	PSU
JDK-8258414	OldObjectSample events too expensive	PSU
JDK-8257988	Remove JNF dependency from libsaproc/MacosxDebuggerLocal.m	PSU
JDK-8257860	[macOS]: Remove JNF dependency from libosxkrb5/SCDynamicStoreConfig.m	PSU
JDK-8257858	[macOS]: Remove JNF dependency from libosxsecurity/KeystoreImpl.m	PSU
JDK-8257853	Remove dependencies on JNF's JNI utility functions in AWT and 2D code	PSU
JDK-8257828	SafeFetch may crash if invoked in non-JavaThreads	PSU
JDK-8257822	C2 crashes with SIGFPE due to a division that floats above its zero check	PSU
JDK-8257796	[TESTBUG] TestUseSHA512IntrinsicsOptionOnSupportedCPU.java fails on x86_32	PSU
JDK-8257621	JFR StringPool misses cached items across consecutive recordings	PSU
JDK-8257604	JNI_ArgumentPusherVaArg leaks valist	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8257580	Bump update version for OpenJDK: jdk-11.0.12	PSU
JDK-8257574	C2: "failed: parsing found no loops but there are some" assert failure	PSU
JDK-8257569	Failure observed with JfrVirtualMemory::initialize	PSU
JDK-8256523	Streamline Java SHA2 implementation	PSU
JDK-8256287	[windows] add loop fuse to map_or_reserve_memory_aligned	PSU
JDK-8256244	java/lang/ProcessHandle/PermissionTest.java fails with TestNG 7.1	PSU
JDK-8256037	[TESTBUG] com/sun/jndi/dns/ConfigTests/PortUnreachable.java fails due to the hard coded threshold is small	PSU
JDK-8255992	JFR EventWriter does not use first string from StringPool with id 0	PSU
JDK-8255763	C2: OSR miscompilation caused by invalid memory instruction placement	PSU
JDK-8255716	AArch64: Regression: JVM crashes if manually offline a core	PSU
JDK-8255625	AArch64: Implement Base64.encodeBlock accelerator/intrinsic	PSU
JDK-8255086	Update the root locale display names	PSU
JDK-8254717	isAssignableFrom checks in KeyFactorySpi.engineGetKeySpec appear to be backwards	PSU
JDK-8254631	Better support ALPN byte wire values in SunJSSE	PSU
JDK-8253948	Memory leak in ImageFileReader	PSU
JDK-8253923	C2 doesn't always run loop opts for compilations that include loops	PSU
JDK-8253572	[windows] CDS archive may fail to open with long file names	PSU
JDK-8253167	ARM32 builds fail after JDK-8247910	PSU
JDK-8252883	AccessDeniedException caused by delayed file deletion on Windows	PSU
JDK-8252779	compiler/graalunit/HotspotTest.java failed after JDK-8251525	PSU
JDK-8252311	AArch64: save two words in itable lookup stub	PSU
JDK-8252259	AArch64: Adjust default value of FLOATPRESSURE	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8251525	AArch64: Faster Math.signum(fp)	PSU
JDK-8251031	Some vmTestbase/nsk/monitoring/RuntimeMXBean tests fail with hostnames starting from digits	PSU
JDK-8250635	MethodArityHistogram should use Compile_lock in favour of fancy checks	PSU
JDK-8249875	GCC 10 warnings -Wtype-limits with JFR code	PSU
JDK-8249719	MethodHandle performance suffers from bad ResolvedMethodTable hash function	PSU
JDK-8249189	AArch64: more L2I conversions can be skipped	PSU
JDK-8249142	java/awt/FontClass/CreateFont/DeleteFont.sh is unstable	PSU
JDK-8248870	AArch64: I2L/L2I conversions can be skipped for masked positive values	PSU
JDK-8248568	compiler/c2/TestBit.java failed "RuntimeException: 'test' missing from stdout/stderr"	PSU
JDK-8248411	AArch64: Insufficient error handling when CodeBuffer is exhausted	PSU
JDK-8248043	Need to eliminate excessive i2l conversions	PSU
JDK-8247753	UIManager.getSystemLookAndFeelClassName() returns wrong value on Fedora 32	PSU
JDK-8247438	JShell: When FailOverExecutionControlProvider fails the proximal cause is not shown	PSU
JDK-8247432	Update IANA Language Subtag Registry to Version 2020-09-29	PSU
JDK-8247408	IdealGraph bit check expression canonicalization	PSU
JDK-8247354	AArch64: PopFrame causes assert(oopDesc::is_oop(obj)) failed: not an oop	PSU
JDK-8246274	G1 old gen allocation tracking is not in a separate class	PSU
JDK-8245511	G1 adaptive IHOP does not account for reclamation of humongous objects by young GC	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8244847	Linux/PPC: runtime/CompressedOops/CompressedClassPointers: smallHeapTest fails	PSU
JDK-8244205	HTTP/2 tunnel connections through proxy may be reused regardless of which proxy is selected	PSU
JDK-8244031	HttpClient should have more tests for HEAD requests	PSU
JDK-8243597	AArch64: Add support for integer vector abs	PSU
JDK-8243559	Remove root certificates with 1024-bit keys	PSU
JDK-8243452	JFR: Could not create chunk in repository with over 200 recordings	PSU
JDK-8243240	AArch64: Add support for MulVB	PSU
JDK-8243155	AArch64: Add support for SqrtVF	PSU
JDK-8242919	Paste locks up jshell	PSU
JDK-8242557	Add length limit for strings in PNGImageWriter	PSU
JDK-8242429	Better implementation for signed extract	PSU
JDK-8242010	Update IANA Language Subtag Registry to Version 2020-04-01	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-8241475	AArch64: Add missing support for PopCountVI node	PSU
JDK-8241372	Several test failures due to javax.net.ssl.SSLException: Connection reset	PSU
JDK-8241101	[s390] jtreg test failure after JDK-8238696: not conformant features string	PSU
JDK-8241087	Build failure with VS 2019 (16.5.0) due to C2039 and C2873	PSU
JDK-8241082	Upgrade IANA Language Subtag Registry data to 03-16-2020 version	PSU
JDK-8240848	ArrayIndexOutOfBoundsException buf for TextCallbackHandler	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8240487	Cleanup whitespace in .cc, .hh, .m, and .mm files	PSU
JDK-8239536	Can't use <code>java.util.List</code> object after importing <code>java.awt.List</code>	PSU
JDK-8239386	handle ContendedPaddingWidth in vm_version_aarch64	PSU
JDK-8239312	[macOS] javax/swing/JFrame/NSTexturedJFrame/NSTexturedJFrame.java	PSU
JDK-8238812	assert(false) failed: bad AD file	PSU
JDK-8238567	SoftMainMixer.processAudioBuffers(): Wrong handling of stoppedMixers	PSU
JDK-8238175	CTW: Class.getDeclaredMethods fails with assert(<code>k.is_subclass_of(SystemDictionary::Throwable_klass())</code>) failed: invalid exception class	PSU
JDK-8237804	sun/security/mscapi tests fail with "Key pair not generated, alias <nnnnnn> already exists"	PSU
JDK-8237743	test/langtools/jdk/jshell/FailOverExecutionControlTest.java fails No ExecutionControlProvider with name 'nonExistent' and parameter keys: []	PSU
JDK-8236992	AArch64: redundant load_klass in itable stub	PSU
JDK-8236859	WebSocket over authenticating proxy fails with NPE	PSU
JDK-8235368	Update BCEL to Version 6.4.1	PSU
JDK-8234355	Buffer overflow in jcmd GC.class_stats due to too many classes	PSU
JDK-8233948	AArch64: Incorrect mapping between OptoReg and VMReg for high 64 bits of Vector Register	PSU
JDK-8233185	HttpServer.stop() blocks indefinitely when called on dispatch thread	PSU
JDK-8233006	freetype incorrectly adjusts advances when emboldening rotated glyphs	PSU
JDK-8232591	AArch64: Add missing match rules for smaddl, smsubl and smnegl	PSU
JDK-8232084	HotSpot build failed with GCC 9.2.1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8231841	AArch64: debug.cpp help() is missing an AArch64 line for pns	PSU
JDK-8231713	x86_32 build failures after JDK-8226721 (Missing intrinsics for Math.ceil, floor, rint)	PSU
JDK-8231460	Performance issue (CodeHeap) with large free blocks	PSU
JDK-8230428	Cleanup dead CastIP node code in formssel.cpp	PSU
JDK-8227609	(fs) Files.newInputStream(...).skip(n) should allow skipping beyond file size	PSU
JDK-8227222	vmTestbase/jit/FloatingPoint/gen_math/Loops04/Loops04.java hits assert(!attributes.isUsesVl() (attributes.getVectorLen() == AVX_512bit) (!legacy_mode_vl) (attributes.isLegacyMode())) failed: XMM register should be 0-15	PSU
JDK-8227080	(fs) Files.newInputStream(...).skip(n) is slow	PSU
JDK-8226721	Missing intrinsics for Math.ceil, floor, rint	PSU
JDK-8226627	assert(t.isSingleton()) failed: must be a constant	PSU
JDK-8226374	Restrict TLS signature schemes and named groups	PSU
JDK-8225756	[testbug] compiler/loopstripmining/CheckLoopStripMining.java sets too short a SafepointTimeoutDelay	PSU
JDK-8225438	javax/net/ssl/TLSCommon/TestSessionLocalPrincipal.java failed with Read timed out	PSU
JDK-8225116	Test OwnedWindowsLeak.java intermittently fails	PSU
JDK-8225081	Remove Telia Company CA certificate expiring in April 2021	PSU
JDK-8223667	ASAN build broken	PSU
JDK-8223504	improve performance of forall loops by better inlining of "iterator()" methods.	PSU
JDK-8223444	Improve CodeHeap Free Space Management	PSU
JDK-8223020	aarch64: expand minL_rReg and maxL_rReg patterns into separate instructions	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8222412	AARCH64: multiple instructions encoding issues	PSU
JDK-8222302	test/hotspot/jtreg/compiler/intrinsics/sha/cli/TestUseSHAOptionOnUn supportedCPU.java fails on any other CPU	PSU
JDK-8220407	compiler/intrinsics/math/TestFpMinMaxIntrinsics.java timedout	PSU
JDK-8219586	CodeHeap State Analytics processes dead nmethods	PSU
JDK-8219142	Remove unused JIMAGE_ResourcePath	PSU
JDK-8218458	[TESTBUG] runtime/NMT/CheckForProperDetailStackTrace.java fails with Expected stack trace missing from output	PSU
JDK-8217918	C2: -XX:+AggressiveUnboxing is broken	PSU
JDK-8217561	x86: Add floating-point Math.min/max intrinsics	PSU
JDK-8217465	[REDO] - Optimize CodeHeap Analytics	PSU
JDK-8217348	assert(thread.is_Java_thread()) failed: just checking	PSU
JDK-8216314	SIGILL in CodeHeapState::print_names()	PSU
JDK-8216259	AArch64: Vectorize Adler32 intrinsics	PSU
JDK-8216184	CDS/appCDS tests failed on Windows due to long path to a classlist file	PSU
JDK-8215009	GCC 8 compilation error in libjli	PSU
JDK-8214922	AArch64: Add vectorization support for fmin/fmax	PSU
JDK-8214854	JDWP: Unforseen output truncation in logging	PSU
JDK-8214512	ARM32: Jtreg test compiler/c2/Test8062950.java fails on ARM	PSU
JDK-8214128	ARM32: wrong stack alignment on Deoptimization::unpack_frames	PSU
JDK-8213845	ARM32: Interpreter doesn't call result handler after native calls	PSU
JDK-8213794	ARM32: disable TypeProfiling, CriticalJNINatives, Serviceablity tests for ARM32	PSU
JDK-8213725	JShell NullPointerException due to class file with unexpected package	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8213483	ARM32: runtime/ErrorHandling/ShowRegistersOnAssertTest.java jtreg test fail	PSU
JDK-8213231	ThreadSnapshot::_threadObj can become stale	PSU
JDK-8209459	TestSHA512MultiBlockIntrinsics failed on AArch64	PSU
JDK-8208061	runtime/LoadClass/TestResize.java fails with "Load factor too high" when running in CDS mode	PSU
JDK-8207779	Method::is_valid_method() compares 'this' with NULL	PSU
JDK-8207404	MulticastSocket tests failing on AIX	PSU
JDK-8207247	AArch64: Enable Minimal and Client VM builds	PSU
JDK-8207160	ClassLoader::adjustMethodParams can potentially return null if the args list is empty	PSU
JDK-8199646	JShell tests: jdk/jshell/FailOverDirectExecutionControlTest.java failed with java.lang.UnsupportedOperationException	PSU
JDK-8196100	javax/swing/text/JTextComponent/5074573/bug5074573.java fails	PSU
JDK-8195841	PNGImageReader.readNullTerminatedString() doesnt check for non-null terminated strings with length equal to maxLen	PSU
JDK-8190763	Class cast exception on (CompoundEdit) UndoableEditEvent.getEdit()	PSU
JDK-8187450	JNI local refs exceeds capacity warning in NetworkInterface::getAll	PSU
JDK-8185734	[Windows] Structured Exception Catcher missing around gtest execution	PSU
JDK-8177068	incomplete classpath causes NPE in Flow	PSU
JDK-8171303	sun/java2d/pipe/InterpolationQualityTest.java fails on Windows & Linux	PSU
JDK-8153005	Upgrade the default PKCS12 encryption/MAC algorithms	PSU
JDK-8076190	Customizing the generation of a PKCS12 keystore	PSU
JDK-8073446	TimeZone getOffset API does not return a DST offset between years 2038-2137	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-7106851	Test should not use System.exit	PSU
JDK-6847157	java.lang.NullPointerException: HDC for component at sun.java2d.loops.Blit.Blit	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-26842	Test gtest/GTestWrapper.java crashes with SIGSEGV	PSU
ZULU-26449	Adjust FreeType's synthetic emboldening to mimic T2K	PSU
ZULU-26220	MSI Installer Should Update JAVA_HOME	PSU
ZULU-26031	New test compiler/intrinsics/Test8237524.java fails against Zulu 11 Arm32	PSU
ZULU-25949	Test sun/management/jmxremote/bootstrap/CustomLauncherTest.java bug: libjvmPath should be checked, not libPath	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 11.50.19 for Arm 64-bit provides the following bundles:

- Java Development Kit:

```
zulu11.50.19-ca-jdk11.0.12-linux_aarch64.tar.gz
```

Supported Platforms

Azul Zulu 11.50 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:

```
zulu11.50.19-ca-jdk11.0.12-linux_aarch64.tar.gz
```

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

```
$ tar -xzf zulu11.50.19-ca-jdk11.0.12-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 "11.0.12" 2021-07-20 LTS
OpenJDK Runtime Environment Zulu11.50+19-CA (build 11.0.12+7-LTS)
OpenJDK 64-Bit Server VM Zulu11.50+19-CA (build 11.0.12+7-LTS,
mixed mode)
```

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