



Zulu Release Notes

Zulu 8.50 (8u275) for Arm v8 64-bit

Release Date: October 20, 2020

Document Version: 1.5

Last Modified: November 17, 2020

Revision History

Revision	Date	Description
1.0	October 20, 2020	Initial version of the document.
1.1	October 21, 2020	Updated the description of the new property "jdk.jndi.ldap.mech-sAllowedToSendCredentials."
1.2	October 22, 2020	Updated the list of Notes in the CVE Fixes section.
1.3	October 30, 2020	Updated the description of CA builds. Increased the font size in the CVE table.
1.4	November 6, 2020	Added information to the What's New section: Azul Zulu 8 off-cycle updates released to align with OpenJDK off-cycle November 2020 updates.
1.5	November 17, 2020	Added information to the What's New section: JDK-8214440 to November 2020 OpenJDK Bug Fixes.

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Zulu Overview

Azul Systems® Zulu® is an implementation of the Java Standard Edition (SE) based on OpenJDK and optimized for embedded devices. Zulu includes Java Development Kit (JDK) that provides a collection of tools for application development.

What's New

November 6, 2020

Zulu 8.50.51.263 release

Summary

This Azul Zulu™ release is an alignment with the corresponding OpenJDK off-cycle update releases that are happening in November 2020. The primary motivation for these off-cycle OpenJDK updates is fixing a regression that introduced a crashing bug (in the C2 compiler, [JDK-8250861](#)) in the October OpenJDK update of the various projects.

The latest Azul Zulu™ builds that fix this regression are now available for download from regular locations including the Azul website. These builds contain all fixes and patches released on November 6, 2020, in coordination with OpenJDK.

The details of the released Zulu versions are specified in the following table:

Java SE Version	Java Update Type*	Zulu Version	JDK Version	Based on**	
				Zulu Version	JDK Version
8	PSU	8.50	8u275-b01	8.50	8u272-b17

*Java Update Type:

- **CPU** (Critical Patch Updates) contain fixes to security vulnerabilities and critical bug fixes. Zulu CPU releases are generally based on prior-cycle PSU releases, with only security fixes applied. They provide a low-risk vehicle for the potentially urgent deployment of security fixes when issues of sufficient severity arise. CPU releases are available in SA distributions.
- **PSU** (Patch Set Updates) incorporates all of fixes in the corresponding CPU, as well as additional non-security bug fixes. Zulu PSU releases incorporate both security fixes and other accumulated changes that align the release contents with the associated OpenJDK project quarterly release. PSU releases are available in SA and CA distributions.

****Based on:** Zulu CPU releases are based on prior-cycle PSU releases. Zulu PSU releases are based on the current-cycle CPU releases.

*****Includes Support for JavaFX Version:** Information is relevant for the builds that include JavaFX support.

Resolved Issues

OpenJDK Bug Fixes

OpenJDK Patch ID	Zulu Version	Synopsis	CPU/PSU
JDK-8214440	8.50	ldap over a TLS connection negotiate failed with "javax.net.ssl.SSLPeerUnverifiedException: hostname of the server " does not match the hostname in the server's certificate"	PSU
JDK-8236512	8.50	PKCS11 Connection closed after Cipher.doFinal and NoPadding	PSU
JDK-8249266	15.28	Bump release strings for JDK 15.0.1	PSU
JDK-8250861	15.28, 13.35, 11.43, 11.42, 8.50, 8.49	Crash in MiniNode::Ideal(PhaseGVN*, bool)	PSU + CPU
JDK-8255781	11.43	Bump patch update version for OpenJDK: jdk-11.0.9.1	PSU
JDK-8255933	13.35	Bump patch update version for OpenJDK: jdk-13.0.5.1	PSU

October 20, 2020

Zulu 8.50.0.259 release

Summary

Azul Zulu distribution types:

SA are tested, certified, and commercially supported Azul Zulu builds of OpenJDK whereby Azul ensures that software that uses the Accessible APIs of the product is not required to carry a specific license and that such use does not contaminate the code or intellectual property of such software with any license requirements.

CA are Azul Zulu builds of OpenJDK that are free to download and use.

The details of the released Zulu versions are specified in the following table:

Java SE Version	Java Update Type*	Zulu Version	JDK Version	Based on**	
				Zulu Version	JDK Version
8	PSU	8.50	8u272-b17	8.49	8u271-b09

*Java Update Type:

- **CPU** (Critical Patch Updates) contain fixes to security vulnerabilities and critical bug fixes. Zulu CPU releases are generally based on prior-cycle PSU releases, with only security fixes applied. They provide a low-risk vehicle for the potentially urgent deployment of security fixes when issues of sufficient severity arise. CPU releases are available in SA distributions.
- **PSU** (Patch Set Updates) incorporates all of fixes in the corresponding CPU, as well as additional non-security bug fixes. Zulu PSU releases incorporate both security fixes and other accumulated changes that align the release contents with the associated OpenJDK project quarterly release. PSU releases are available in SA and CA distributions.

****Based on:** Zulu CPU releases are based on prior-cycle PSU releases. Zulu PSU releases are based on the current-cycle CPU releases.

IANA time zone data version

This release of Zulu comes with IANA time zone data version 2020a. For more information, see [Timezone Data Versions in the JRE Software](#). Please note that Zulu with IANA time zone data version 2020b version or later will be delivered shortly.

New Features

Fallback option for the Zulu 8 users who require the legacy Base64 format for XML message signing

A new system property

`com.sun.org.apache.xml.internal.security.lineFeedOnly` was added to Zulu 8. Now, if you want to fallback to legacy Base64 encoded format, you can set this flag in one of the following ways:

As a command line option:

```
-Dcom.sun.org.apache.xml.internal.security.lineFeedOnly=true
```

Programmatically:

```
System.setProperty  
("com.sun.org.apache.xml.internal.security.lineFeedOnly",  
"true")
```

Note that later JDK family versions will only support the recommended property `com.sun.org.apache.xml.internal.security.ignoreLineBreaks`.

Additions and Changes in Behavior

JDK-8237990: New system and environment runtime property for LDAP context

Introduced in all Zulu versions.

The `jdk.jndi.ldap.mechsAllowedToSendCredentials` property sets the list of authentication mechanisms that are allowed to send credentials over a non-encrypted connection in the LDAP context. Possible values are:

- `all` allows all mechanisms
- (empty value) allows none
- `mech1, mech2, ..., mechN` allows the given authentication mechanisms

If the property is not set, all mechanisms are allowed. Note that "none" and "anonymous" authentication mechanisms are always allowed irrespective of the property value.

In previous versions, user credentials could be sent over an unencrypted connection.

JDK-8245417: New runtime properties to control TLS workflow

Introduced in all Zulu versions.

- The `jdk.tls.maxHandshakeMessageSize` property controls the maximum size limit for the handshake message. The default property value is 32768.
- The `jdk.tls.maxCertificateChainLength` property controls the maximum length for the certificate chain. The default property value is 10.

Note that when the corresponding data size exceeds the allowed value, an exception is thrown from various parts of the JDK. For example: `The size of the handshake message <actual size> exceeds the maximum allowed size <maxHandshakeMessageSize>`.

In previous versions, the maximum handshake messages size was limited to 2^{24} bytes, and there was no limit on the length of certificate chains.

JDK-8236862: New runtime property to control the number of interfaces allowed for Proxies

Introduced in all Zulu versions.

The `jdk.serialProxyInterfaceLimit` property sets the implementation limit on the number of interfaces allowed for Proxies. The property range is from 0 to 65535; the default value is 65535.

In previous versions, the maximum number of interfaces was 65535 and you couldn't set a lower value.

JDK-8233624: New mapping rules from a Java native method name to a C native library implementation function name

Introduced in all Zulu versions.

The JNI methods mapping rules have been changed, for details on new rules, see [Troubleshooting tips](#).

Note, if a Java class or package name for some reason begins with a digit "0", "1", "2", or "3", no native library search is performed, and the attempt to link the native method invocation throws `UnsatisfiedLinkError`.

To resolve compatibility issues, you can either set the `XX:+UseLegacyJNINameEscaping` runtime flag to skip the extra mapping check or notify your library provider to update the JNI names according to the new mapping rules and to reissue and redeploy the libraries.

Features and Supported Platforms

Supported Platforms

Zulu is delivered as binary builds of OpenJDK on Linux Kernel 3.10.x or higher. The following platforms are supported:

- Arm v8 CPU with 64-bit support.
- Linux Arm 64-bit EABI.

Supported Functionality

Hotspot Compilers

Zulu for Arm v8 64-bit architecture supports both server (C2) and client (C1) compilers in addition to the optimized template interpreter. The following command-line options can be used to switch between the implementations:

- `-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 - client compiler is used only, 4 - full tiered compilation to up C2).

Refer to the extended list of the [Advanced JIT Compiler Options](#), for more information about fine-tuning the compilation behavior. For example, you can tune the compilation thresholds in order to balance the startup time and execution performance.

Getting Started with Zulu

To start working with the Zulu, perform the following steps:

Extract the Installation Archive

- Download one of the installation archives and save it in a reasonable location on your system.
- Extract the downloaded archive:

```
$ tar -xzf zulu8.50.51.263-ca-jdk8.0.275-linux_
aarch64.tar.gz
```

- Copy the extracted directory into the following location:

```
/usr/lib/jvm
```

If you do not need debug symbols, skip this step.

Add Debug Symbols

- Download one of the archives with the debug symbols:
 - `zulu8.50.51.263-ca-dbg-jdk8.0.275-linux_
aarch64.zip`
- Copy the archive to `/usr/lib/jvm/zulu8.50.51.263-ca-
jdk8.0.275-linux_aarch64/jre`
- Extract the archive. For example,

```
$ unzip zulu8.50.51.263-ca-dbg-jdk8.0.275-linux_
aarch64.zip
```

Verify Java Version

- Run a simple Java command:

```
$ java -version
```

If needed, provide the fully qualified path. For example:

```
$ /usr/lib/jvm/zulu8.50.51.263-ca-jdk8.0.275-linux_
aarch64/bin/java -version
```

- Inspect the system response. Correct sample output should look as follows:

```
openjdk version "1.8.0_275"
```

```
OpenJDK Runtime Environment (Zulu 8.50.51.263-CA-linux_
aarch64) (build 1.8.0_275-b01)
```

```
OpenJDK 64-Bit Server VM (Zulu 8.50.51.263-CA-linux_
aarch64) (build 25.275-b01, mixed mode)
```

Zulu Resolved Issues

This section summarizes JDK Common Vulnerabilities and Exposure (CVE) fixes reflecting October, 2020 OpenJDK changes implemented for the following Zulu levels:

- Zulu 15
- Zulu 13
- Zulu 11
- Zulu 8

JDK Common Vulnerabilities and Exposure (CVE) Fixes

October, 2020 CVE Fixes

CVSS VERSION 3.0 RISK															
CVE #	Component	Protocol	Remote Exploit without Auth.	Base Score	Attack Vector	Attack Complex	Privs Req'd	User Interact	Scope	Confidentiality	Integrity	Availability	Supported Zulu Versions Affected	Modules Changed to Address CVE	Notes
CVE-2020-14803	Libraries	Multiple	Yes	5.3	Network	Low	None	None	Unchanged	Low	None	None	15, 13, 11	15, 13, 11: java.base	Note 1
CVE-2020-14792	Hotspot	Multiple	Yes	4.2	Network	High	None	Required	Unchanged	Low	Low	None	15, 13, 11, 8, 7, 6	15, 13, 11: hotspot 8, 7, 6: HOTSPOT	Note 2

October, 2020 CVE Fixes

CVSS VERSION 3.0 RISK															
CVE #	Component	Protocol	Remote Exploit without Auth.	Base Score	Attack Vector	Attack Complex	Privs Req'd	User Interact	Scope	Confidentiality	Integrity	Availability	Supported Zulu Versions Affected	Modules Changed to Address CVE	Notes
CVE-2020-14797	Libraries	Multiple	Yes	3.7	Network	High	None	None	Unchanged	None	Low	None	15, 13, 11, 8, 7	15, 13, 11: java.base 8, 7: JDK	Note 2
CVE-2020-14782	Libraries	Multiple	Yes	3.7	Network	High	None	None	Unchanged	None	Low	None	15, 13, 11, 8, 7	15, 13, 11: java.base 8, 7: JDK	Note 2
CVE-2020-14781	JNDI	Multiple	Yes	3.7	Network	High	None	None	Unchanged	Low	None	None	15, 13, 11, 8, 7, 6	15, 13, 11: java.naming 8, 7, 6: JDK	Note 2
CVE-2020-14779	Serialization	Multiple	Yes	3.7	Network	High	None	None	Unchanged	None	None	Low	15, 13, 11, 8, 7, 6	15, 13, 11: java.base 8, 7, 6: JDK JDK	Note 2

October, 2020 CVE Fixes

CVSS VERSION 3.0 RISK															
CVE #	Component	Protocol	Remote Exploit without Auth.	Base Score	Attack Vector	Attack Complex	Privs Req'd	User Interact	Scope	Confidentiality	Integrity	Availability	Supported Zulu Versions Affected	Modules Changed to Address CVE	Notes
CVE-2020-14798	Libraries	Multiple	Yes	3.1	Network	High	None	Required	Unchanged	None	Low	None	15, 13, 11, 8, 7	15, 13, 11: java.base 8, 7: JDK	Note 1
CVE-2020-14796	Libraries	Multiple	Yes	3.1	Network	High	None	Required	Unchanged	Low	None	None	15, 13, 11, 8, 7	15, 13, 11: java.base 8, 7: JDK	Note 1

Base and Impact Metric:

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	<p>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).</p>
2	<p>This vulnerability applies to client and server deployment of Java. This vulnerability can be exploited through untrusted code executed under Java sandbox restrictions. It can also be exploited by supplying data to APIs in the specified Component without using untrusted code executed under Java sandbox restrictions, such as through a web service.</p>

In-Depth Non-CVE Security Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8253019	Enhanced JPEG decoding	CPU
JDK-8249927	Specify limits of <code>jdk.serialProxyInterfaceLimit</code>	CPU
JDK-8248574	Improve jpeg processing	CPU
JDK-8248177	Improve XML support	CPU
JDK-8248171	Better query support	CPU
JDK-8245417	Improve certificate chain handling	CPU
JDK-8245412	Better class definitions	CPU
JDK-8245407	Enhance zoning of times	CPU
JDK-8244955	Additional Fix for JDK-8240124	CPU
JDK-8244479	Further constrain certificates	CPU
JDK-8243302	Advanced class supports	CPU
JDK-8240124	Better VM Interning	CPU
JDK-8236196	Improve string pooling	CPU
JDK-8233624	Enhance JNI Inkage	CPU

Other OpenJDK Bug Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8254937	Revert JDK-8148854 for 8u272	PSU
JDK-8254673	call for <code>JvmtiExport::post_vm_start()</code> was removed by the fix for JDK-8249158	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8253019	Enhanced JPEG decoding	CPU
JDK-8252886	[TESTBUG] sun/security/ec/TestEC.java : Compilation failed	PSU
JDK-8252573	8u: Windows build failed after 8222079 backport	PSU
JDK-8252497	Incorrect numeric currency code for ROL	PSU
JDK-8252084	Minimal VM fails to bootcycle: undefined symbol: AgeT-ableTracer::is_tenuring_distribution_event_enabled	PSU
JDK-8251546	8u backport of JDK-8194298 breaks AIX and Solaris builds	PSU
JDK-8251478	Backport TLSv1.3 regression tests to JDK8u	PSU
JDK-8251341	Minimal Java specification change	PSU
JDK-8251120	[8u] HotSpot build assumes ENABLE_JFR is set to either true or false	PSU
JDK-8251117	Cannot check P11Key size in P11Cipher and P11AEADCipher	PSU
JDK-8250876	Fix issues with cross-compile on macos	PSU
JDK-8250875	Incorrect parameter type for update_number in JDK_Version::jdk_update	PSU
JDK-8250755	Better cleanup for jdk/test/-javax/imageio/plugins/shared/CanWriteSequence.java	PSU
JDK-8250636	iso8601_time returns incorrect offset part on MacOS	PSU
JDK-8250627	Use -XX:+/-UseContainerSupport for enabling/disabling Java container metrics	PSU
JDK-8250582	Revert Principal Name type to NT-UNKNOWN when requesting TGS Kerberos tickets	PSU
JDK-8250546	Expect changed behaviour reported in JDK-8249846	PSU
JDK-8249927	Specify limits of jdk.serialProxyInterfaceLimit	CPU
JDK-8249610	Make sun.security.krb5.Config.getBooleanObject(String... keys) method public	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8249278	Revert JDK-8226253 which breaks the spec of AccessibleState.SHOWING for JList	PSU
JDK-8249251	[dark_mode ubuntu 20.04] The selected menu is not highlighted in GTKLookAndFeel	PSU
JDK-8249159	Downport test rework for SSLSocketTemplate from 8224650	PSU
JDK-8249158	THREAD_START and THREAD_END event posted in primordial phase	PSU
JDK-8248851	CMS: Missing memory fences between free chunk check and klass read	PSU
JDK-8248643	Remove extra leading space in JDK-8240295 8u backport	PSU
JDK-8248574	Improve jpeg processing	CPU
JDK-8248495	[macos] zerovm is broken due to libffi headers location	PSU
JDK-8248219	aarch64: missing memory barrier in fast_storefield and fast_accessfield	PSU
JDK-8247979	aarch64: missing side effect of killing flags for clearArray_reg_reg	PSU
JDK-8246384	Enable JFR by default on supported architectures for October 2020 release	PSU
JDK-8246330	Add TLS Tests for Legacy ECDSA curves	PSU
JDK-8246310	Clean commented-out code about ModuleEntry andPackageEntry in JFR	PSU
JDK-8246193	Possible NPE in ENC-PA-REP search in AS-REQ	CPU
JDK-8246094	[macos] Sound Recording and playback is not working	PSU
JDK-8245473	OCSP stapling support	PSU
JDK-8245471	Revert JDK-8148188	PSU
JDK-8245417	Improve certificate chain handling	CPU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8245412	Better class definitions	CPU
JDK-8245407	Enhance zoning of times	CPU
JDK-8245005	javax/net/ssl/compatibility/BasicConnectTest.java failed with No enum constant	PSU
JDK-8244955	Additional Fix for JDK-8240124	CPU
JDK-8244818	[macos] Java2D Queue Flusher crash while moving application window to external monitor	PSU
JDK-8244479	Further constrain certificates	CPU
JDK-8244225	stringop-overflow warning on strncpy call from compile_the_world_in	PSU
JDK-8244151	Update MUSCLE PC/SC-Lite headers to the latest release 1.8.26	PSU
JDK-8244136	Improved Buffer supports	CPU
JDK-8243489	Thread CPU Load event may contain wrong data for CPU time under certain conditions	PSU
JDK-8243321	Add Entrust root CA - G4 to Oracle Root CA program	PSU
JDK-8243320	Add SSL root certificates to Oracle Root CA program	PSU
JDK-8243302	Advanced class supports	CPU
JDK-8243138	Enhance BaseLdapServer to support starttls extended request	PSU
JDK-8243029	Rewrite javax/net/ssl/compatibility/Compatibility.java with a flexible interop test framework	PSU
JDK-8242695	Enhanced Buffer Support	CPU
JDK-8242685	Better Path Validation	CPU
JDK-8242680	Improved URI support	CPU
JDK-8242556	Cannot load RSASSA-PSS public key with non-null params from byte array	PSU
JDK-8241888	Mirror jdk.security.allowNonCaAnchor system property with a secur-	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
	ity one	
JDK-8241114	Better range handling	CPU
JDK-8240676	Meet not symmetric failure when running lucene on jdk8	PSU
JDK-8240295	hs_err elapsed time in seconds is not accurate enough	PSU
JDK-8240124	Better VM Interning	CPU
JDK-8239819	XToolkit: Misread of screen information memory	PSU
JDK-8238898	Missing hash characters for header on license file	PSU
JDK-8238388	libj2gss/NativeFunc.o "multiple definition" link errors with GCC10	PSU
JDK-8238386	(sctp) jdk.sctp/unix/native/libscpt/SctpNet.c "multiple definition" link errors with GCC10	PSU
JDK-8238380	java.base/unix/native/libjava/childproc.c "multiple definition" link errors with GCC10	PSU
JDK-8237995	Enhance certificate processing	CPU
JDK-8237990	Enhanced LDAP contexts	CPU
JDK-8237951	CTW: C2 compilation fails with "malformed control flow"	PSU
JDK-8236862	Enhance support of Proxy class	CPU
JDK-8236645	JDK 8u231 introduces a regression with incompatible handling of XML messages	PSU
JDK-8236464	SO_LINGER option is ignored by SSLSocket in JDK 11	PSU
JDK-8236196	Improve string pooling	CPU
JDK-8235325	build failure on Linux after 8235243	PSU
JDK-8235243	handle VS2017 15.9 and VS2019 in abstract_vm_version	PSU
JDK-8235153	[TESTBUG] [macos 10.15] java/awt/Graphics/DrawImageBG/SystemBgColorTest.java fails	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8234617	C1: Incorrect result of field load due to missing narrowing conversion	PSU
JDK-8233624	Enhance JNI Inkage	CPU
JDK-8233621	Mismatch in jsse.enableMFLNExtension property name	PSU
JDK-8233228	Disable weak named curves by default in TLS, CertPath, and Signed JAR	PSU
JDK-8233097	Fontmetrics for large Fonts has zero width	PSU
JDK-8231213	Migrate SimpleDateFormatConstTest to JDK Repo	PSU
JDK-8230711	ConnectionGraph::unique_java_object(Node* N) return NULL if n is not in the CG	PSU
JDK-8230303	JDB hangs when running monitor command	PSU
JDK-8229378	jdwp library loader in linker_md.c quietly truncates on buffer overflow	PSU
JDK-8228967	Trust/Key store and SSL context utilities for tests	PSU
JDK-8228835	Memory leak in PKCS11 provider when using AES GCM	PSU
JDK-8226809	Circular reference in printed stack trace is not correctly indented & ambiguous	PSU
JDK-8226806	[macOS 10.14] Methods of Java Robot should be called from appropriate thread	PSU
JDK-8226697	Several tests which need the @key headful keyword are missing it.	PSU
JDK-8226575	OperatingSystemMXBean should be made container aware	PSU
JDK-8225695	32-bit build failures after JDK-8080462 (Update SunPKCS11 provider with PKCS11 v2.40 support)	PSU
JDK-8224217	RecordingInfo should use textual representation of path	PSU
JDK-8222079	Don't use memset to initialize fields decode_env constructor in disassembler.cpp	PSU
JDK-8221658	aarch64: add necessary predicate for ubfx patterns	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8221569	JFR tool produces incorrect output when both --categories and --events are specified	PSU
JDK-8220674	[TESTBUG] MetricsMemoryTester failcount test in docker container only works with debug JVMs	PSU
JDK-8220555	JFR tool shows potentially misleading message when it cannot access a file	PSU
JDK-8220313	[TESTBUG] Update base image for Docker testing to OL 7.6	PSU
JDK-8220150	[macos] macos10.14 Mojave returns anti-aliased glyphs instead of aliased B&W glyphs	PSU
JDK-8219919	RuntimeStub's name lost with PrintFrameConverterAssembly	PSU
JDK-8219566	JFR did not collect call stacks when MaxJavaStackTraceDepth is set to zero	PSU
JDK-8218629	XML Digital Signature throws NAMESPACE_ERR exception on OpenJDK 11, works 8/9/10	PSU
JDK-8217878	ENVELOPING XML signature no longer works	PSU
JDK-8217647	JFR: recordings on 32-bit systems unreadable	PSU
JDK-8217606	LdapContext#reconnect always opens a new connection	PSU
JDK-8216283	Allow shorter method sampling interval than 10 ms	PSU
JDK-8214862	assert(proj != __null) at compile.cpp:3251	PSU
JDK-8211714	Need to update vm_version.cpp to recognise VS2017 minor versions	PSU
JDK-8211296	Remove HotSpot deprecation warning suppression for Mac/clang	PSU
JDK-8211163	UNIX version of Java_java_io_Console_echo does not return a clean boolean	PSU
JDK-8211049	Second parameter of "initialize" method is not used	PSU
JDK-8209113	Use WeakReference for lastFontStrike for created Fonts	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8203699	java/lang/invoke/SpecialInterfaceCall fails with SIGILL on aarch64	PSU
JDK-8203481	Incorrect constraint for unextended_sp in frame:safe_for_sender	PSU
JDK-8203357	Container Metrics	PSU
JDK-8202076	test/jdk/java/io/File/WinSpecialFiles.java on windows with VS2017	PSU
JDK-8198004	javax/swing/JFileChooser/6868611/bug6868611.java throws error	PSU
JDK-8194298	Add support for per Socket configuration of TCP keepalive	PSU
JDK-8193234	When using -Xcheck:jni an internally allocated buffer can leak	PSU
JDK-8193137	Nashorn crashes when given an empty script file.	PSU
JDK-8192953	sun/management/jmxremote/bootstrap/*.sh tests fail with error : revokeall.exe: Permission denied	PSU
JDK-8191678	[TESTBUG] Add keyword headful in java/awt and javax tests.	PSU
JDK-8184762	ZapStackSegments should use optimized memset	PSU
JDK-8183351	Better cleanup for jdk/test/- javax/im- ageio/spi/AppletContextTest/BadPluginConfigurationTest.sh	PSU
JDK-8183349	Better cleanup for jdk/test/- javax/imageio/plugins/shared/CanWriteSequence.java and WriteAfterAbort.java	PSU
JDK-8183341	Better cleanup for javax/imageio/AllowSearch.java	PSU
JDK-8182657	Make the required changes in Runtime code to build on OSX 10 + Xcode 8	PSU
JDK-8180197	Failing assert: id must be initialized	PSU
JDK-8178784	Revisit changes for making Serviceability Agent attach functionality optional	PSU
JDK-8177628	Opensource unit/regression tests for ImageIO	PSU
JDK-8177334	Update xmldsig implementation to Apache Santuario 2.1.1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8173300	[TESTBUG]compiler/tiered/NonTieredLevelsTest.java fails with compiler.whitebox.SimpleTestCaseHelper(int) must be compiled	PSU
JDK-8172012	[TEST_BUG] delays needed in javax/swing/JTree/4633594/bug4633594.java	PSU
JDK-8169925	Organize licenses by module in source, JMOD file, and run-time image	PSU
JDK-8168517	java/lang/ProcessBuilder/Basic.java failed with "java.lang.AssertionError: Some tests failed"	PSU
JDK-8167615	Opensource unit/regression tests for JavaSound	PSU
JDK-8167300	Scheduling failures during gcm should be fatal	PSU
JDK-8166015	[PIT][TEST_BUG] stray character in java/awt/Focus/ModalDialogActivationTest/ModalDialogActivationTest.java	PSU
JDK-8165996	PKCS11 using NSS throws an error regarding secmod.db when NSS uses sqlite	PSU
JDK-8161973	PKIXRevocationChecker.getSoftFailExceptions() not working	PSU
JDK-8160768	Add capability to custom resolve host/domain names within the default JNDI LDAP provider	PSU
JDK-8160217	JavaSound should clean up resources better	PSU
JDK-8156169	Some sound tests rarely hangs because of incorrect synchronization	PSU
JDK-8154313	Generated javadoc scattered all over the place	PSU
JDK-8153725	Problem list javax/sound/sampled/DirectAudio/bug6400879.java for Linux	PSU
JDK-8153583	Make OutputAnalyzer.reportDiagnosticSummary public	PSU
JDK-8152077	(cal) Calendar.roll does not always roll the hours during daylight savings changes	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8151788	NullPointerException from ntlm.Client.type3	PSU
JDK-8151678	com/sun/jndi/ldap/LdapTimeoutTest.java failed due to timeout on DeadServerNoTimeoutTest is incorrect	PSU
JDK-8148983	Fix extra comma in changes for JDK-8148916	PSU
JDK-8148916	Mark bug6400879.java as intermittently failing	PSU
JDK-8148915	Intermittent failures of bug6400879.java	PSU
JDK-8148854	Class names "SomeClass" and "LSomeClass;" treated by JVM as an equivalent	PSU
JDK-8148754	C2 loop unrolling fails due to unexpected graph shape	PSU
JDK-8145808	[PIT] test java/awt/Graph-ics2D/MTGraphicsAccessTest/MTGraphicsAccessTest.java hangs on Win. 8	PSU
JDK-8144539	Update PKCS11 tests to run with security manager	PSU
JDK-8137087	[TEST_BUG] Cygwin failure of java/awt/appletviewer/IOExceptionIfEncodedURLTest/IOExceptionIfEncodedURLTest.sh	PSU
JDK-8132745	TEST_BUG: minor cleanup of java/util/Scanner/ScanTest.java	PSU
JDK-8132376	Add @requires os.family to the client tests with access to internal OS-specific API	PSU
JDK-8132206	move ScanTest.java into OpenJDK	PSU
JDK-8080953	[TEST_BUG]Test java/awt/FontClass/DebugFonts.java fails due to wrongly typed bugid	PSU
JDK-8080462	Update SunPKCS11 provider with PKCS11 v2.40 support	PSU
JDK-8078880	Mark a few more intermittently failing security-libs tests	PSU
JDK-8078334	Mark regression tests using randomness	PSU
JDK-8076151	[TESTBUG] Test java/awt/FontClass/CreateFont/-	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
	fileaccess/FontFile.java fails	
JDK-8075774	Small readability and performance improvements for zipfs	PSU
JDK-8064319	Need to enable -XX:+TraceExceptions in release builds	PSU
JDK-8062947	Fix exception message to correctly represent LDAP connection failure	PSU
JDK-8061616	HotspotDiagnosticMXBean.getVMOption() throws IllegalArgumentException for flags of type double	PSU
JDK-8060721	Test runtime/SharedArchiveFile/LimitSharedSizes.java fails in jdk 9 fcs new platforms/compiler	PSU
JDK-8060027	Tests java/beans/XMLEncoder/Test4903007.java and java/beans/XMLEncoder/java_aws_GridBagLayout.java	PSU
JDK-8057003	Large reference arrays cause extremely long synchronization times	PSU
JDK-8048933	-XX:+TraceExceptions output should include the message	PSU
JDK-8039082	[TEST_BUG] Test java/awt/dnd/BadSerializationTest/BadSerializationTest.java fails	PSU
JDK-8036088	Replace strtok() with its safe equivalent strtok_s() in DefaultProxySelector.c	PSU
JDK-8031625	javadoc problems referencing inner class constructors	PSU
JDK-8030123	java/beans/Introspector/Test8027648.java fails	PSU
JDK-8026236	Add PrimeTest for BigInteger	PSU
JDK-8025886	replace [[and == bash extensions in regtest	PSU
JDK-8025430	[TEST_BUG] closed/- javax/swing/JEditorPane/5076514/bug5076514.java failed since jdk8b108	PSU
JDK-8023697	failed class resolution reports different class name in detail message for the first and subsequent times	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
JDK-8011541	[TEST_BUG] closed/- javax/swing/plaf/metal/MetalUtils/bug6190373.java fails NPE since 7u25b03	PSU
JDK-7188942	Remove support of pbuffers in OGL Java2d pipeline	PSU
JDK-6574989	TEST_BUG: javax/sound/sampled/Clip/bug5070081.java fails sometimes	PSU

Zulu Bug Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-19057	SPECjvm2008 sunflow and startup.sunflow regression	PSU
ZULU-19029	please fix key (randomness) for test/- java/nio/channels/DatagramChannel/AdaptDatagramSocket.java	PSU
ZULU-19021	[ppcspe] regression: Math.log() is broken	PSU
ZULU-19014	[ppcspe] JCK geom failures	PSU
ZULU-19011	[ppc64] JVM crashes at startup	PSU
ZULU-18893	Backout fix for JDK-8148854	PSU
ZULU-18667	SSL debug log prints incorrect caller info	PSU
ZULU-18552	JCK regression: rmi.activation.ActivationGroup in 8.49.0.13	CPU
ZULU-18524	Duplicated license info	PSU
ZULU-18503	Switch to OpenJSSE v1.1.5	PSU
ZULU-18286	SIGSEGV at JCK api/java_lang/Compiler	PSU
ZULU-18268	Fix hotspot/test/vmTestbase/gc/g1 tests	PSU
ZULU-18239	Fix Reserved space to be non rwx on zero_mac_arm64	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-18237	Initial support for xcode8+ for zulu8	PSU
ZULU-18234	Zulu Embedded 8 fails to build for all platforms	PSU
ZULU-18129	javac/java hangs on an intermediate C/RaM build	PSU
ZULU-18068	[REGRESSION] Tests for JVMTI event SingleStep and function GetPhase fail	PSU
ZULU-17965	[Missmerge] tools/launcher/Settings.java test defines run-TestOptionSystem() twice	PSU
ZULU-17870	Solaris build failures	PSU
ZULU-17809	Zulu failed with CompressedSharedArchiveFile after merge 8076475: Misuses of strncpy/strncat	PSU
ZULU-17385	Reenable detection of multiprocessor system	PSU
ZULU-17384	Disable Biased Locking for single core CPU	PSU
ZULU-17256	Remove obsolete code in AWTView.m	PSU
ZULU-17144	Build system preparation to macos on aarch64	PSU
ZULU-13915	Replace with parameter a hardcoded by mistake libnuma version	PSU
ZULU-13894	Change list of client enabled CustomizedTLSContext cipher suites	PSU
ZULU-13879	Remove NONEwithDSAinP1363Format from the default enabled set	PSU
ZULU-13878	Zrestore may appear unexpectedly exited	PSU
ZULU-13737	renaissance db-shootout: SIGSEGV on checkpoint	PSU
ZULU-13735	C/RaM: SIGSEGV for a JMH sample	PSU
ZULU-12929	Limit JIT CPU usage	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-12423	PrintCompilation have timestamps from checkpoint	PSU
ZULU-11622	SIGSEGV on checkpoint for a couple of SPECjvm2008 and Dacapo benchmarks	PSU
ZULU-4896	OpenJSSE should break configure in a case of problem	PSU

License Changes

Zulu incorporates third-party licensed software packages. Some of these have distribution restrictions and some have only reporting requirements.

The following table lists the third-party licensed software packages changes in all Zulu products released in October, 2020.

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MUSCLE PC/SC-Lite headers upgrade to the latest release 1.8.26	<p>Copyright (c) 1999-2003 David Corcoran <corcoran@linuxnet.com> Copyright (c) 2001-2011 Ludovic Rousseau <ludovic.rousseau@free.fr> All rights reserved.</p> <p>Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:</p> <ol style="list-style-type: none"> 1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. 2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. 3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission. <p>Changes to this license can be made only by the copyright author with explicit written consent.</p> <p>THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT</p>

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	DOCUMENT OR ANY PART THEREOF.
Apache Jakarta Regex dependency removal	The following line was removed from the TPL text: Apache Jakarta Regex 1.4.

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