



## Zulu Release Notes

Zulu 11.43 (11.0.9) for Arm v8 64-bit

Release Date: October 20, 2020

Document Version: 1.3

Last Modified: October 30, 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 23, 2020	Updated In-Depth Non-CVE Security Fixes table.
1.3	October 30, 2020	Updated the description of CA builds. Increased the font size in the CVE table.

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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

October 20, 2020

**Zulu 11.43.88 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
11	PSU	11.43	11.0.9+11	11.42	11.0.8.0.101+5

### \*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

### Shenandoah garbage collector included in Zulu

Now both Zulu 11 and Zulu 15 PSU releases include Shenandoah as a product feature. Please note, it is disabled by default in runtime. To enable Shenandoah in runtime, use `-XX:+UseShenandoahGC` flag. Please note that the product may not be mature enough for production use and should be pre-tested with your application.

## 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 zulu11.43.88-ca-jdk11.0.9-linux_
aarch64.tar.gz
```

- Copy the extracted directory into the following location:

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

## Add Debug Symbols

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

- Download one of the archives with the debug symbols:

```
zulu11.43.88-ca-dbg-jdk11.0.9-linux_aarch64.zip
```

- Copy the archive to:

```
/usr/lib/jvm/zulu11.43.88-ca-jdk11.0.9-linux_aarch64
```

- Extract the archive. For example,

```
$ unzip zulu11.43.88-ca-dbg-jdk11.0.9-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/zulu11.43.88-ca-jdk11.0.9-linux_
aarch64/bin/java -version
```

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

```
openjdk version "11.0.9" 2020-10-20 LTS
```

```
OpenJDK Runtime Environment Zulu11.43+88-CA (build
11.0.9+11-LTS)
```

```
OpenJDK 64-Bit Server VM Zulu11.43+88-CA (build
11.0.9+11-LTS, 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
<a href="#">CVE-2020-14803</a>	Libraries	Multiple	Yes	5.3	Network	Low	None	None	Unchanged	Low	None	None	15, 13, 11	15, 13, 11: java.base	Note 1
<a href="#">CVE-2020-14792</a>	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
<a href="#">CVE-2020-14797</a>	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
<a href="#">CVE-2020-14782</a>	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
<a href="#">CVE-2020-14781</a>	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
<a href="#">CVE-2020-14779</a>	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
<a href="#">CVE-2020-14798</a>	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
<a href="#">CVE-2020-14796</a>	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	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).
2	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.

## In-Depth Non-CVE Security Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8253019</a>	Enhanced JPEG decoding	CPU
<a href="#">JDK-8249927</a>	Specify limits of <code>jdk.serialProxyInterfaceLimit</code>	CPU
<a href="#">JDK-8248574</a>	Improve jpeg processing	CPU
<a href="#">JDK-8248177</a>	Improve XML support	CPU
<a href="#">JDK-8248171</a>	Better query support	CPU
<a href="#">JDK-8245417</a>	Improve certificate chain handling	CPU
<a href="#">JDK-8245412</a>	Better class definitions	CPU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8245407</a>	Enhance zoning of times	CPU
<a href="#">JDK-8244955</a>	Additional Fix for JDK-8240124	CPU
<a href="#">JDK-8244479</a>	Further constrain certificates	CPU
<a href="#">JDK-8243302</a>	Advanced class supports	CPU
<a href="#">JDK-8240124</a>	Better VM Interning	CPU
<a href="#">JDK-8236196</a>	Improve string pooling	CPU
<a href="#">JDK-8233624</a>	Enhance JNI Inkage	CPU

## Other OpenJDK Bug Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8253813</a>	Backout JDK-8244287 from 11u: it causes several crashes	PSU
<a href="#">JDK-8253283</a>	[11u] Test build/translations/VerifyTranslations.java failing after JDK-8252258	PSU
<a href="#">JDK-8253134</a>	JMM_VERSION should remain at 0x20020000 (JDK 10) in JDK 11	PSU
<a href="#">JDK-8253050</a>	jfr disassemble command processes --max-chunks incorrectly	PSU
<a href="#">JDK-8253019</a>	Enhanced JPEG decoding	CPU
<a href="#">JDK-8252804</a>	[test] Fix 'ReleaseDeflater.java' test after downport of 8234011	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8252497</a>	Incorrect numeric currency code for ROL	PSU
<a href="#">JDK-8252258</a>	[11u] JDK-8242154 changes the default vendor	PSU
<a href="#">JDK-8252157</a>	JDK-8231209 11u backport breaks jmm binary compatibility	PSU
<a href="#">JDK-8252120</a>	compiler/oracle/TestCompileCommand.java misspells "occured"	PSU
<a href="#">JDK-8251487</a>	Shenandoah: missing detail timing tracking for final mark cleaning phase	PSU
<a href="#">JDK-8251469</a>	Better cleanup for test/jdk/javax/imageio/SetOutput.java	PSU
<a href="#">JDK-8251451</a>	Shenandoah: Remark ObjectSynchronizer roots with I-U	PSU
<a href="#">JDK-8251354</a>	Shenandoah: Fix JFR test failures	PSU
<a href="#">JDK-8251117</a>	Cannot check P11Key size in P11Cipher and P11AEADCipher	PSU
<a href="#">JDK-8250844</a>	Make sure {type,obj}ArrayOopDesc accessors check the bounds	PSU
<a href="#">JDK-8250827</a>	Shenandoah: needs to reset/finish StringTable's dead count before/after parallel walk	PSU
<a href="#">JDK-8250826</a>	jhsdb does not work with coredump which comes from Substrate VM	PSU
<a href="#">JDK-8250787</a>	Provider.put no longer registering aliases in FIPS env	PSU
<a href="#">JDK-8250784</a>	Shenandoah: A Low-Pause-Time Garbage Collector	PSU
<a href="#">JDK-8250755</a>	Better cleanup for jdk/test/javax/imageio/plugins/shared/CanWriteSequence.java	PSU
<a href="#">JDK-8250636</a>	iso8601_time returns incorrect offset part on MacOS	PSU
<a href="#">JDK-8250627</a>	Use -XX:+/-UseContainerSupport for enabling/disabling Java container metrics	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8250609</a>	C2 crash in IfNode::fold_compares	PSU
<a href="#">JDK-8250582</a>	Revert Principal Name type to NT-UNKNOWN when requesting TGS Kerberos tickets	PSU
<a href="#">JDK-8249953</a>	Shenandoah: gc/shenandoah/mxbeans tests should account for corner cases	PSU
<a href="#">JDK-8249927</a>	Specify limits of jdk.serialProxyInterfaceLimit	CPU
<a href="#">JDK-8249801</a>	Shenandoah: Clear soft-refs on requested GC cycle	PSU
<a href="#">JDK-8249560</a>	Shenandoah: Fix racy GC request handling	PSU
<a href="#">JDK-8249278</a>	Revert JDK-8226253 which breaks the spec of AccessibleState.SHOWING for JList	PSU
<a href="#">JDK-8249277</a>	TestVerifyIterativeGVN.java is failing with timeout in OpenJDK 11	PSU
<a href="#">JDK-8249255</a>	Build fails if source code in cygwin home dir	PSU
<a href="#">JDK-8249251</a>	[dark_mode ubuntu 20.04] The selected menu is not highlighted in GTKLookAndFeel	PSU
<a href="#">JDK-8249215</a>	JFrame::setVisible crashed with -Dfile.encoding=UTF-8 on Japanese Windows.	PSU
<a href="#">JDK-8249159</a>	Downport test rework for SSLSocketTemplate from 8224650	PSU
<a href="#">JDK-8248987</a>	AOT's Linker.java seems to eagerly fail-fast on Windows.	PSU
<a href="#">JDK-8248851</a>	CMS: Missing memory fences between free chunk check and klass read	PSU
<a href="#">JDK-8248574</a>	Improve jpeg processing	CPU
<a href="#">JDK-8248495</a>	[macos] zerovm is broken due to libffi headers location	PSU
<a href="#">JDK-8248385</a>	[testbug][11u] Adapt TestInitExceptions to jtreg 5.1	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8248348</a>	Regression caused by the update to BCEL 6.0	PSU
<a href="#">JDK-8248219</a>	aarch64: missing memory barrier in fast_storefield and fast_accessfield	PSU
<a href="#">JDK-8248214</a>	Add paddings for TaskQueueSuper to reduce false-sharing cache contention	PSU
<a href="#">JDK-8247979</a>	aarch64: missing side effect of killing flags for clearArray_reg_reg	PSU
<a href="#">JDK-8247874</a>	Replacement in VersionProps.java.template not working when --with-vendor-bug-url contains '&'	PSU
<a href="#">JDK-8247824</a>	CTW: C2 (Shenandoah) compilation fails with SEGV in SBC2Support::pin_and_expand	PSU
<a href="#">JDK-8247615</a>	Initialize the bytes left for the heap sampler	PSU
<a href="#">JDK-8247502</a>	PhaseStringOpts crashes while optimising effectively dead code	PSU
<a href="#">JDK-8247350</a>	[aarch64] assert(false) failed: wrong size of mach node	PSU
<a href="#">JDK-8247246</a>	[JVMCI] `ResolvedJavaType.getDeclaredMethod()` can throw NoClassDefFoundError.	PSU
<a href="#">JDK-8246453</a>	TestClone crashes with "all collected exceptions must come from the same place"	PSU
<a href="#">JDK-8246330</a>	Add TLS Tests for Legacy ECDSA curves	PSU
<a href="#">JDK-8246203</a>	Segmentation fault in verification due to stack overflow with -XX:+VerifyIterativeGVN	PSU
<a href="#">JDK-8246196</a>	javax/management/MBeanServer/OldMBeanServerTest fails with AssertionError	PSU
<a href="#">JDK-8246193</a>	Possible NPE in ENC-PA-REP search in AS-REQ	PSU
<a href="#">JDK-8246153</a>	TestEliminateArrayCopy fails with -XX:+StressReflectiveCode	PSU
<a href="#">JDK-8246094</a>	[macos] Sound Recording and playback is not working	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8246027</a>	Minimal fastdebug build broken after JDK-8245801	PSU
<a href="#">JDK-8245981</a>	Upgrade to jQuery 3.5.1	PSU
<a href="#">JDK-8245880</a>	Shenandoah: check class unloading flag early in concurrent code root scan	PSU
<a href="#">JDK-8245832</a>	JDK build make-static-libs should build all JDK libraries	PSU
<a href="#">JDK-8245801</a>	StressRecompilation triggers assert "redundant OSR recompilation detected. memory leak in CodeCache!"	PSU
<a href="#">JDK-8245714</a>	"Bad graph detected in build_loop_late" when loads are pinned on loop limit check uncommon branch	PSU
<a href="#">JDK-8245616</a>	Bump update version for OpenJDK: jdk-11.0.9	PSU
<a href="#">JDK-8245417</a>	Improve certificate chain handling	CPU
<a href="#">JDK-8245412</a>	Better class definitions	CPU
<a href="#">JDK-8245407</a>	Enhance zoning of times	CPU
<a href="#">JDK-8245283</a>	JFR: Can't handle constant dynamic used by Jacoco agent	PSU
<a href="#">JDK-8245151</a>	jarsigner should not raise duplicate warnings on verification	PSU
<a href="#">JDK-8244955</a>	Additional Fix for JDK-8240124	CPU
<a href="#">JDK-8244818</a>	[macos] Java2D Queue Flusher crash while moving application window to external monitor	PSU
<a href="#">JDK-8244763</a>	Update --release 8 symbol information after JSR 337 MR3	PSU
<a href="#">JDK-8244729</a>	Shenandoah: remove resolve paths from SBSA::generate_shenandoah_lrb	PSU
<a href="#">JDK-8244719</a>	CTW: C2 compilation fails with "assert(!VerifyHashTableKeys    _hash_lock == 0) failed: remove node from	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
	hash table before modifying it"	
<a href="#">JDK-8244703</a>	"platform encoding not initialized" exceptions with debugger, JNI	PSU
<a href="#">JDK-8244479</a>	Further constrain certificates	CPU
<a href="#">JDK-8244287</a>	JFR: Methods samples have line number 0	PSU
<a href="#">JDK-8244225</a>	stringop-overflow warning on strncpy call from compile_the_world_in	PSU
<a href="#">JDK-8244196</a>	adjust output in os_linux	PSU
<a href="#">JDK-8244164</a>	AArch64: jaotc generates incorrect code for compressed OOPs with non-zero heap base	PSU
<a href="#">JDK-8244151</a>	Update MUSCLE PC/SC-Lite headers to the latest release 1.8.26	PSU
<a href="#">JDK-8244136</a>	Improved Buffer supports	CPU
<a href="#">JDK-8244087</a>	2020-04-24 public suffix list update v ff6fcea	PSU
<a href="#">JDK-8243925</a>	Toolkit#getScreenInsets() returns wrong value on HiDPI screens (Windows)	PSU
<a href="#">JDK-8243489</a>	Thread CPU Load event may contain wrong data for CPU time under certain conditions	PSU
<a href="#">JDK-8243470</a>	[macos] bring back O2 opt level for unsafe.cpp	PSU
<a href="#">JDK-8243453</a>	java --describe-module failed with non-ASCII module name under non-UTF8 environment	PSU
<a href="#">JDK-8243389</a>	enhance os::pd_print_cpu_info on linux	PSU
<a href="#">JDK-8243326</a>	Cleanup use of volatile in taskqueue code	PSU
<a href="#">JDK-8243321</a>	Add Entrust root CA - G4 to Oracle Root CA program	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8243320</a>	Add SSL root certificates to Oracle Root CA program	PSU
<a href="#">JDK-8243302</a>	Advanced class supports	CPU
<a href="#">JDK-8243138</a>	Enhance BaseLdapServer to support starttls extended request	PSU
<a href="#">JDK-8243029</a>	Rewrite javax/net/ssl/compatibility/Compatibility.java with a flexible interop test framework	PSU
<a href="#">JDK-8242793</a>	Incorrect copyright header in ContinuousCallSiteTargetChange.java	PSU
<a href="#">JDK-8242695</a>	Enhanced Buffer Support	CPU
<a href="#">JDK-8242685</a>	Better Path Validation	CPU
<a href="#">JDK-8242680</a>	Improved URI support	CPU
<a href="#">JDK-8242556</a>	Cannot load RSASSA-PSS public key with non-null params from byte array	PSU
<a href="#">JDK-8242283</a>	Can't start JVM when java home path includes non-ASCII character	PSU
<a href="#">JDK-8242184</a>	Default signature algorithm for an RSASSA-PSS key	PSU
<a href="#">JDK-8241750</a>	x86_32 build failure after JDK-8227269	CPU
<a href="#">JDK-8241574</a>	Shenandoah: remove ShenandoahAssertToSpaceClosure	PSU
<a href="#">JDK-8241478</a>	vmTestbase/gc/gctests/Steal/steal001/steal001.java fails with OOME	PSU
<a href="#">JDK-8241319</a>	WB_GetCodeBlob doesn't have ResourceMark	PSU
<a href="#">JDK-8241138</a>	http.nonProxyHosts=* causes StringIndexOutOfBoundsException in DefaultProxySelector	PSU
<a href="#">JDK-8241130</a>	com.sun.jndi.ldap.EventSupport.removeDeadNotifier: java.lang.NullPointerException	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8241114</a>	Better range handling	CPU
<a href="#">JDK-8241086</a>	Test runtime/NMT/HugeArenaTracking.java is failing on 32bit Windows	PSU
<a href="#">JDK-8241065</a>	Shenandoah: remove leftover code after JDK-8231086	PSU
<a href="#">JDK-8241007</a>	Shenandoah: remove ShenandoahCriticalControlThreadPriority support	PSU
<a href="#">JDK-8240676</a>	Meet not symmetric failure when running lucene on jdk8	PSU
<a href="#">JDK-8240295</a>	hs_err elapsed time in seconds is not accurate enough	PSU
<a href="#">JDK-8240169</a>	javadoc fails to link to docs with non-matching modularity	PSU
<a href="#">JDK-8240124</a>	Better VM Interning	CPU
<a href="#">JDK-8239385</a>	Support the 'canonicalize' setting (krb5.conf) in the Kerberos client	PSU
<a href="#">JDK-8239083</a>	C1 assert(known_holder == NULL    (known_holder->is_instance_class() && (!known_holder->is_interface()    ((ciInstanceKlass*)known_holder)->has_nonstatic_concrete_methods())), "should be non-static concrete method");	PSU
<a href="#">JDK-8238710</a>	LingeredApp doesn't log stdout/stderr if exits with non-zero code	PSU
<a href="#">JDK-8238448</a>	RSASSA-PSS signature verification fail when using certain odd key sizes	PSU
<a href="#">JDK-8238388</a>	libj2gss/NativeFunc.o "multiple definition" link errors with GCC10	PSU
<a href="#">JDK-8238386</a>	(sctp) jdk.sctp/unix/native/libscpt/SctpNet.c "multiple definition" link errors with GCC10	PSU
<a href="#">JDK-8238380</a>	java.base/unix/native/libjava/childproc.c "multiple definition" link errors with GCC10	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8238284</a>	[macos] Zero VM build fails due to an obvious typo	PSU
<a href="#">JDK-8238270</a>	java.net HTTP/2 client does not decrease stream count when receives 204 response	PSU
<a href="#">JDK-8237995</a>	Enhance certificate processing	CPU
<a href="#">JDK-8237990</a>	Enhanced LDAP contexts	CPU
<a href="#">JDK-8237977</a>	Further update javax/net/ssl/compatibility/Compatibility.java	PSU
<a href="#">JDK-8237888</a>	security/infra/java/security/cert/CertPathValidator/certification/LuxTrustCA.java fails when checking validity interval	PSU
<a href="#">JDK-8237182</a>	Update copyright header for shenandoah and epsilon files	PSU
<a href="#">JDK-8236862</a>	Enhance support of Proxy class	CPU
<a href="#">JDK-8236617</a>	jtest containers/docker/TestMemoryAwareness.java fails after 8226575	PSU
<a href="#">JDK-8236548</a>	Localized time zone name inconsistency between English and other locales	PSU
<a href="#">JDK-8236464</a>	SO_LINGER option is ignored by SSLSocket in JDK 11	PSU
<a href="#">JDK-8236196</a>	Improve string pooling	CPU
<a href="#">JDK-8235846</a>	Improve WindbgDebuggerLocal implementation	PSU
<a href="#">JDK-8234687</a>	change javap reporting on unknown attributes	PSU
<a href="#">JDK-8234541</a>	C1 emits an empty message when it inlines successfully	PSU
<a href="#">JDK-8234535</a>	Cross compilation fails due to missing CFLAGS for the BUILD_CC	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8234385</a>	[TESTBUG] java/awt/EventQueue/6980209/bug6980209.java fails in linux nightly	PSU
<a href="#">JDK-8234347</a>	"Turkey" meta time zone does not generate composed localized names	PSU
<a href="#">JDK-8234149</a>	[TESTBUG]Several swing regression tests do not dispose Frame at end	PSU
<a href="#">JDK-8234058</a>	runtime/CompressedOops/CompressedClassPointers.java fails with 'Narrow class base: 0x0000000000000000' missing from stdout/stderr	PSU
<a href="#">JDK-8234011</a>	(zipfs) Memory leak in ZipFileSystem.releaseDeflater()	PSU
<a href="#">JDK-8233958</a>	Memory retention due to HttpURLConnection finalizer that serves no purpose	PSU
<a href="#">JDK-8233829</a>	javac cannot find non-ASCII module name under non-UTF8 environment	PSU
<a href="#">JDK-8233741</a>	AES Countermode (CTR) optimization using AVX512 + VAES instructions	PSU
<a href="#">JDK-8233686</a>	XML transformer uses excessive amount of memory	PSU
<a href="#">JDK-8233624</a>	Enhance JNI Inkage	CPU
<a href="#">JDK-8233452</a>	java.math.BigDecimal.sqrt() with RoundingMode.FLOOR results in incorrect result	PSU
<a href="#">JDK-8233386</a>	Initialize NULL fields for unused decorations	PSU
<a href="#">JDK-8233228</a>	Disable weak named curves by default in TLS, CertPath, and Signed JAR	PSU
<a href="#">JDK-8233027</a>	OopMapSet::all_do does oms.next() twice during iteration	PSU
<a href="#">JDK-8232855</a>	jshell missing word in /help help	PSU
<a href="#">JDK-8232161</a>	Align some one-way conversion in MS950 charset with Windows	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8232083</a>	Minimal VM is broken after JDK-8231586	PSU
<a href="#">JDK-8231968</a>	getCurrentThreadAllocatedBytes default implementation s/b getThreadAllocatedBytes	PSU
<a href="#">JDK-8231953</a>	Wrong assumption in assertion in oop::register_oop	PSU
<a href="#">JDK-8231586</a>	enlarge encoding space for OopMapValue offsets	PSU
<a href="#">JDK-8231209</a>	[REDO] JDK-8207266 ThreadMXBean::getThreadAllocatedBytes() can be quicker for self thread	PSU
<a href="#">JDK-8230870</a>	(zipfs) Add a ZIP FS test that is similar to test/jdk/java/util/zip/EntryCount64k.java	PSU
<a href="#">JDK-8230767</a>	FlightRecorderListener returns null recording	PSU
<a href="#">JDK-8230402</a>	Allocation of compile task fails with assert: "Leaking compilation tasks?"	PSU
<a href="#">JDK-8230094</a>	CCE in createXMLEventWriter(Result) over an arbitrary XMLStreamWriter	PSU
<a href="#">JDK-8230010</a>	Remove jdk8037819/BasicTest1.java	PSU
<a href="#">JDK-8230002</a>	javax/xml/jaxp/unittest/transform/SecureProcessingTest.java runs zero test	PSU
<a href="#">JDK-8230000</a>	some httpclients testing tests run zero test	PSU
<a href="#">JDK-8229815</a>	Upgrade Jline to 3.12.1	PSU
<a href="#">JDK-8229378</a>	jdwp library loader in linker_md.c quietly truncates on buffer overflow	PSU
<a href="#">JDK-8228967</a>	Trust/Key store and SSL context utilities for tests	PSU
<a href="#">JDK-8228448</a>	Jconsole can't connect to itself	PSU
<a href="#">JDK-8227595</a>	keytool/fakegen/DefaultSignatureAlgorithm.java fails due to "exitValue = 6"	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8227269</a>	Slow class loading when running with JDWP	CPU
<a href="#">JDK-8227059</a>	sun/security/tools/keytool/DefaultSignatureAlgorithm.java timed out	PSU
<a href="#">JDK-8226848</a>	jline/terminal/impl files missing classpath exception clause in license header	PSU
<a href="#">JDK-8226809</a>	Circular reference in printed stack trace is not correctly indented & ambiguous	PSU
<a href="#">JDK-8226697</a>	Several tests which need the @key headful keyword are missing it.	PSU
<a href="#">JDK-8226575</a>	OperatingSystemMXBean should be made container aware	PSU
<a href="#">JDK-8226536</a>	Catch OOM from deopt that fails rematerializing objects	PSU
<a href="#">JDK-8225625</a>	AES Electronic Codebook (ECB) encryption and decryption optimization using AVX512 + VAES instructions	PSU
<a href="#">JDK-8225037</a>	java.net.JarURLConnection::getJarEntry() throws NullPointerException	PSU
<a href="#">JDK-8224234</a>	compiler/codegen/TestCharVect2.java fails in test_mulc	PSU
<a href="#">JDK-8224184</a>	jshell got IOException at exiting with AIX	PSU
<a href="#">JDK-8223940</a>	Private key not supported by chosen signature algorithm	PSU
<a href="#">JDK-8223777</a>	In posix_spawn mode, failing to exec() jspawnhelper may not result in an error	PSU
<a href="#">JDK-8223688</a>	JShell: crash on the instantiation of raw anonymous class	PSU
<a href="#">JDK-8222769</a>	[TESTBUG] TestJFRNetworkEvents should not rely on hostname command	PSU
<a href="#">JDK-8222079</a>	Don't use memset to initialize fields decode_env constructor in disassembler.cpp	PSU
<a href="#">JDK-8222074</a>	Enhance auto vectorization for x86	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8221918</a>	runtime/SharedArchiveFile/serviceability/ReplaceCriticalClasses.java fails: Shared archive not found	PSU
<a href="#">JDK-8221759</a>	Crash when completing "java.io.File.path"	PSU
<a href="#">JDK-8221658</a>	aarch64: add necessary predicate for ubfx patterns	PSU
<a href="#">JDK-8220150</a>	[macos] macos10.14 Mojave returns anti-aliased glyphs instead of aliased B&W glyphs	PSU
<a href="#">JDK-8219712</a>	code_size2 (defined in stub_routines_x86.hpp) is too small on new Skylake CPUs	PSU
<a href="#">JDK-8218948</a>	SimpleDateFormat :: format - Zone Names are not reflected correctly during run time	PSU
<a href="#">JDK-8216974</a>	HttpConnection not returned to the pool after 204 response	PSU
<a href="#">JDK-8216021</a>	RunTest.gmk might set concurrency level to 1 on Windows	PSU
<a href="#">JDK-8215438</a>	jshell tool: Ctrl-D causes EOF	PSU
<a href="#">JDK-8215354</a>	x86_32 build failures after JDK-8214074 (Ghash optimization using AVX instructions)	PSU
<a href="#">JDK-8215244</a>	jdk/jshell/ToolBasicTest.java testHistoryReference failed	PSU
<a href="#">JDK-8215243</a>	JShell tests failing intermitently with "Problem cleaning up the following threads:"	PSU
<a href="#">JDK-8214797</a>	TestJmapCoreMetaspace.java timed out	PSU
<a href="#">JDK-8214491</a>	Upgrade to JLine 3.9.0	PSU
<a href="#">JDK-8214074</a>	Optimize Ghash using AVX instructions	PSU
<a href="#">JDK-8213703</a>	LambdaConversionException: Invalid receiver type not a subtype of implementation type interface	PSU
<a href="#">JDK-8213574</a>	Deadlock in string table expansion when dumping lots of CDS classes	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8213275</a>	runtime/SharedArchiveFile/serviceability/ReplaceCriticalClasses.java fails with ClassNotFoundException: jdk.internal.vm.PostVMInitHook	PSU
<a href="#">JDK-8213214</a>	Set -Djava.io.tmpdir= when running tests	PSU
<a href="#">JDK-8213182</a>	Minimal VM build failure after JDK-8212200 (assert when shared java.lang.Object is redefined by JVMTI agent)	PSU
<a href="#">JDK-8212807</a>	tools/jar/multiRelease/Basic.java times out	PSU
<a href="#">JDK-8212665</a>	com/sun/jdi/DeferredStepTest.java: jj1 (line 57) - unexpected. lastLine=52, minLine=52, maxLine=55	PSU
<a href="#">JDK-8212629</a>	[TEST] wrong breakpoint in test/jdk/com/sun/jdi/DeferredStepTest	PSU
<a href="#">JDK-8212200</a>	assert(on_stack()) failed when shared java.lang.object is redefined by JVMTI agent	PSU
<a href="#">JDK-8211694</a>	JShell: Redeclared variable should be reset	PSU
<a href="#">JDK-8211292</a>	[TEST] convert com/sun/jdi/DeferredStepTest.sh test	PSU
<a href="#">JDK-8210977</a>	jdk/jfr/event/oldobject/TestThreadLocalLeak.java fails to find ThreadLocalObject	PSU
<a href="#">JDK-8210760</a>	[TEST] rewrite com/sun/jdi shell tests to java version - step4	PSU
<a href="#">JDK-8210748</a>	[TESTBUG] lib.jdb.Jdb.waitForPrompt() should clarify which output is the pending reply after a timeout	PSU
<a href="#">JDK-8210725</a>	com/sun/jdi/RedefineClearBreakpoint.java fails with waitForPrompt timed out after 60 seconds	PSU
<a href="#">JDK-8210560</a>	[TEST] convert com/sun/jdi redefineClass-related tests	PSU
<a href="#">JDK-8210527</a>	JShell: NullPointerException in jdk.jshell.Eval.translateExceptionStack	PSU
<a href="#">JDK-8210422</a>	runtime/modules/ModuleStress/ExportModuleStressTest.java - assertion failed: address not aligned:	CPU

OpenJDK Patch ID	Synopsis	CPU/PSU
	0x00000008baadbabe	
<a href="#">JDK-8210243</a>	[TEST] rewrite com/sun/jdi shell tests to java version - step3	PSU
<a href="#">JDK-8210155</a>	Lock ClassLoaderDataGraph	CPU
<a href="#">JDK-8210131</a>	vmTestbase/nsk/jvmti/scenarios/allocation/AP10/ap10t001/TestDescription.java failed with ObjectFree: GetCurrentThreadCpuTimerInfo returned unexpected error code	PSU
<a href="#">JDK-8209821</a>	Make JVMTI GetClassLoaderClasses not walk CLDG	CPU
<a href="#">JDK-8209608</a>	Problem list com/sun/jdi/BreakpointWithFullGC.java	PSU
<a href="#">JDK-8209605</a>	com/sun/jdi/BreakpointWithFullGC.java fails with ZGC	PSU
<a href="#">JDK-8209604</a>	[TEST] rewrite com/sun/jdi shell tests to java version - step2	PSU
<a href="#">JDK-8209517</a>	com/sun/jdi/BreakpointWithFullGC.java fails with timeout	PSU
<a href="#">JDK-8209378</a>	Fix Minimal VM after JDK-8208677 Move inner metaspace cleaning out of class unloading	CPU
<a href="#">JDK-8209343</a>	Test javax/swing/border/TestTitledBorderLeak.java should be marked as headful	PSU
<a href="#">JDK-8209342</a>	Problemlist SA tests on Solaris due to Error attaching to process: Can't create thread_db agent!	PSU
<a href="#">JDK-8209332</a>	[TEST] test/jdk/com/sun/jdi/CatchPatternTest.sh is incorrect	PSU
<a href="#">JDK-8209109</a>	[TEST] rewrite com/sun/jdi shell tests to java version - step1	PSU
<a href="#">JDK-8208677</a>	Move inner metaspace cleaning out of class unloading	CPU
<a href="#">JDK-8208281</a>	java/nio/channels/AsynchronousSocketChannel/Basic.java timed out	PSU

OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8206309</a>	Tier1 SA tests fail	PSU
<a href="#">JDK-8205534</a>	Remove SymbolTable dependency from serviceability agent	PSU
<a href="#">JDK-8204994</a>	SA might fail to attach to process with "Windbg Error: WaitForEvent failed"	PSU
<a href="#">JDK-8203928</a>	[Test] Convert non-JDB scaffolding serviceability shell script tests to java	PSU
<a href="#">JDK-8203393</a>	com/sun/jdi/JdbMethodExitTest.sh and JdbExprTest.sh fail due to timeout	PSU
<a href="#">JDK-8203382</a>	Rename SystemDictionary::initialize_wk_klass to resolve_wk_klass	PSU
<a href="#">JDK-8203281</a>	[Windows] JComboBox change in ui when editor.setBorder() is called	PSU
<a href="#">JDK-8203026</a>	java.rmi.NoSuchObjectException: no such object in table	PSU
<a href="#">JDK-8202117</a>	com/sun/jndi/ldap/RemoveNamingListenerTest.java fails intermittently: Connection reset	PSU
<a href="#">JDK-8193367</a>	annotated type variables bounds crash javac	PSU
<a href="#">JDK-8172404</a>	Tools should warn if weak algorithms are used before restricting them	PSU
<a href="#">JDK-8160768</a>	Add capability to custom resolve host/domain names within the default JNDI LDAP provider	PSU
<a href="#">JDK-8151678</a>	com/sun/jndi/ldap/LdapTimeoutTest.java failed due to timeout on DeadServerNoTimeoutTest is incorrect	PSU
<a href="#">JDK-8134599</a>	TEST_BUG: java/rmi/transport/closeServerSocket/CloseServerSocket.java fails intermittently with Address already in use	PSU
<a href="#">JDK-8067354</a>	com/sun/jdi/GetLocalVariables4Test.sh failed	PSU
<a href="#">JDK-8062947</a>	Fix exception message to correctly represent LDAP connection failure	PSU



OpenJDK Patch ID	Synopsis	CPU/PSU
<a href="#">JDK-8022535</a>	[TEST BUG] javax/swing/text/html/parser/Test8017492.java fails	PSU
<a href="#">JDK-6949753</a>	[TEST BUG]: java/awt/print/PageFormat/PDialogTest.java needs update by removing a infinite loop	PSU
<a href="#">JDK-6532025</a>	GIF reader throws misleading exception with truncated images	PSU

## Zulu Bug Fixes

OpenJDK Patch ID	Synopsis	CPU/PSU
ZULU-18668	missing part of JDK-8213250 backport	CPU

# 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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individuals. For exact contribution history, see the revision history
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====

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*****
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Published October 20, 2020

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