

# Zulu® Embedded:

## Customizable, open source Java Virtual Machines for IoT and embedded solutions based on OpenJDK™

### ZULU EMBEDDED BENEFITS

- **100% Open Source**  
Zulu Embedded builds are based on the OpenJDK open source project and licensed under GPLv2 with Classpath Exception. They meet the Java SE (Standard Edition) specifications for versions 8, 7 and 6.
- **Certified & Verified**  
All Zulu Embedded binaries are certified Java SE compliant by passing the OpenJDK Community Technology Compatibility Kit (TCK) which provides additional IP protection and are also verified 100% open source by Azul, so no additional licenses are required.
- **Extended Product Life Cycles**  
Zulu Embedded versions are actively up-dated and maintained for at least ten years for each major Java SE release (e.g. Java 6), providing extended product life cycles for your most important embedded use cases.
- **World-class Support**  
Azul's support and engineering teams have the deep Java domain expertise to provide the commercial support services, including root-cause analysis and out-of-cycle patches that embedded teams need to ensure their Java applications keep running smoothly, despite Java bugs or regressions.
- **Customizable**  
Zulu Embedded can be customized to meet any device requirements, including operating system, CPU architecture (x86, ARM, PPC), bitness (32- or 64-bit), Java patch level, and disk and memory sizes.
- **Ease of Migration**  
OpenJDK is the reference implementation of Java SE and Zulu Embedded builds are available at specific patch levels (7u45 is one example) and packages (.MSI) to make migration from existing Java runtimes seamless.

### INTRODUCING ZULU® EMBEDDED

Zulu Embedded is a fully certified, completely customizable and 100% open source Java Virtual Machine for embedded devices. Zulu Embedded binaries are based on source code from the OpenJDK project (openjdk.java.net) and are designed to allow companies to leverage the latest advances in Java SE (Standard Edition) for embedded use cases. With extended support for multiple Java versions (e.g. 8, 7 and 6), Zulu Embedded is ideal for devices that require regular Java updates (e.g. bug fixes and security patches), including older or end-of-life versions of Java. Zulu Embedded can be customized to meet the specific needs of your embedded device, including operating system, CPU architecture (x86, ARM, PPC), bitness (32 or 64-bit), Java patch level, and disk and memory sizes (Compact Profiles).

### FULLY CERTIFIED STANDARDS COMPLIANT

Each Zulu Embedded binary is verified compliant with the Java SE specifications using the OpenJDK Community Technology Compatibility Kit (TCK) licensed from Oracle. The TCK is a suite of more than 12K unit tests which ensures that each binary build of OpenJDK meets all the specifications of the individual JSRs (Java Specification Requests) for a given version of Java SE (e.g. Java 8). Each Zulu Embedded binary carries additional protection granted by passing the TCKs as defined by the Java Specification Participation Agreement and provides extensive intellectual property rights to compatible and specification compliant implementations. Azul issues a certificate of No License Restriction for every production supported binary.

### OPEN SOURCE LICENSED VERIFIED

Every Zulu Embedded binary is verified to be pure open source and licensed under GPLv2 with Classpath Exception. Through the use of proprietary tools, Azul scans more than 7 million lines of OpenJDK sources (including dynamically generated files) to verify that Classpath Exception (CPE) tags are in all appropriate source files and that all accessible Java APIs have corresponding CPE tags. License verification ensures that a customer's Java code is never contaminated by GPL or other licenses that could require placing extra restrictions on their code or purchasing third party licenses.

### TIMELY MAINTENANCE UPDATES

Azul provides Zulu Embedded subscribers with continuous access to the latest Java CPUs (Critical Patch Updates) for all supported Zulu versions (currently 8, 7, and 6, with 9 planned.) These CPUs contain both Java SE bug fixes as well as security patches. Depending on the severity of the vulnerability, as defined by NIST Common Vulnerability Scoring System version 3 (CVSS v3), Azul offers different technical support packages, including Platinum Support, which can provide Zulu Embedded updates on the same day that CPUs are made available to the OpenJDK project.

### 24x7x365 SUPPORT OFFERINGS

While Java is a mature language, the Java runtime is a complex piece of code with no guarantees that it's completely bug free or secure. As such, Azul offers companies and their embedded teams timely access to out-of-cycle patches to ensure their embedded applications are always running. Azul support offerings include a dedicated support team that can I) triage Java problems, II) identify offending code and perform root cause analysis and III) issue temporary patches or security fixes without any dependency on any other company.

With more than 13 years delivering mission-critical support for Global 1000 accounts, Azul has the dedicated teams and deep Java domain expertise to provide the commercial support that embedded teams need to ensure their Java applications keep running smoothly, despite random Java platform bugs and regressions.

## Zulu Embedded Features

- Verified 100% free and open source and based on OpenJDK
- Java SE compliant as certified by OpenJDK Community TCKs
- Performance parity with the leading JVM, including JIT compilation
- Customizable packaging from JDK to JRE to Compact Profiles
- Multiplatform support:
  - Java 8, 7, and 6, with 9 planned in 2017
  - Windows, Linux and Mac OS X
  - X86-32, X86-64, ARM32, ARM64, PPC
- Continuous access to Java CPUs and security patches
- Extended product life cycles and access to preview versions (Java 9)

## Hardware

- Intel/AMD X86-32, X86-64, ARM v6,v7,v8

Cortex 32-bit, ARM v8, Cortex 64-bit PowerPC

## Platform/OS

- Linux: 32/64-bit
  - RHEL 6 & 7 or later
  - SLES 12 SP1, 11 SP4
  - CentOS 6 & 7 or later
  - Ubuntu 16.04, 14.04, 12.04
  - Debian Jessie, Wheezy
  - Wind River Linux
  - Oracle Linux, Raspbian Linux, Alpine Linux, Angstrom Linux
- Windows: 32/64-bit
  - 7, 8, 8.1, 10/IoT 2008 R2, 2012, 2012 R2
- Mac OS X
- Hypervisors: VMware, Hyper-V, KVM
- Cloud: Azure, AWS, Google, Snappy, Docker
- CoreOS

## Java Versions

- Java 8, 7, 6 plus Java 9 early access
- All Java patch levels

## Packaging

- Standard packages:
  - ZIP, MSI, RPM and DEB
  - Custom packages upon request

## Bundles

- Full JDK, headful JRE, headless JRE, Compact Profiles 3, 2, and 1.
- Memory sizing from 11 MB to 250+ MB
- Security, device APIs, fonts extras

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## Use Cases for Zulu Embedded

- Internet of Things (IoT)
- Home & Building Automation
- Healthcare
- Manufacturing Automation
- Networking Equipment
- Smart Grids
- Automotive
- Online Storage/NAS
- Consumer Electronics
- Home Gateways
- Point of Sale (POS) Systems

## About Azul Systems

Azul Systems, the industry's only company exclusively focused on Java and the Java Virtual Machine (JVM), builds fully supported, standards-compliant Java runtime solutions for global enterprises, ISVs and OEMs. Azul is a member of the Executive Committee of the Java Community Process (JCP) and the Eclipse Foundation. Azul has been a Sun/Oracle Java Licensee since 2002.