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JAVA EMBEDDED

Industry-leading Java SE PLATFORM for EMBEDDED DEVICES

KEY FEATURES

• New Java 8 language features to improve developer productivity

• Compact profiles & tools to create customized, space-optimized VMs

• Java SE 8 capable of 50% better performance than previous versions

• Great-looking GUI applications with GPU-accelerated JavaFX

• Tools for detailed runtime monitoring & after-the-fact incident analysis

• Scalable solution that supports devices with constrained resources to server-class systems

• Rich set of libraries and functionality, including power management and multi-core support

• Cross-platform portability maximizing Write Once Run Anywhere capability

• Enhanced development productivity through comprehensive tools and support

• Established ecosystem including over 9 million Java developers

KEY BENEFITS

• Complete solution - high-performance, comprehensive implementation of Java SE standards with free and easy to use development/ debugging tools

• Faster time-to-market – reference implementations for evaluation/ prototyping on industry leading standard device/chipset types

• A mature ecosystem – harnesses the advantages of an established ecosystem of Java developers and knowledgebase

• Secure software environment - Built on Java standards thus providing a cross platform, robust and secure environment that the applications and services on connected devices need

ORACLE JAVA SE EMBEDDED

Oracle Java Standard Edition (Java SE) Embedded is a full-featured implementation of the Java SE platform, optimized for embedded platforms. It enables you to develop highly functional, reliable and portable applications for today's more powerful embedded systems. The flexibility of the Java platform coupled with an established developer base enables you to develop secure, innovative products while achieving enhanced costs savings and benefitting from time-to-market advantages.

Innovative Internet of Things Applications with Java SE Embedded

Java SE Embedded, with its established heritage and history of deployments on a wide range of embedded products, provides a rich set of proven, mature and secure connectivity libraries that are essential for connecting devices to enterprise applications. This makes Java SE Embedded a good choice for Internet of Things applications, enabling creation of high-performance, portable, secure, robust cross-platform applications that run on a large range of embedded platforms without any changes.

Java SE for Embedded Devices Enables Developers to be more productive

Java provides a Write-Once-Run-Anywhere (WORA) capability that has distinct advantages in the embedded space. Not only does this allow you to develop and test on one platform and deploy to another, it also enables you to deploy your solution to multiple platforms with minimal development effort and hence benefit from time-to-market advantage.

How is Java SE Embedded functionally different from Java SE?

Java SE Embedded is derived from Java SE. It supports the same platforms and functionality as Java SE. Additionally, it provides specific features, optimizations and support for the embedded market. Enhancements specifically addressed by Java SE Embedded include support for embedded hardware platforms, small footprint JREs, headless configurations and memory optimizations. Examples of embedded specific optimizations include:

• Significantly smaller base Java runtime

• Tools that allow creation of customized, space-optimized JREs best suite for the target embedded platform

• Quicker download and startup

• Minimal JVM – Footprint reduced VM that strips out everything except essentials

• Optimization for low JIT compiler memory usage

• Performance improvements for ARM processor-based systems

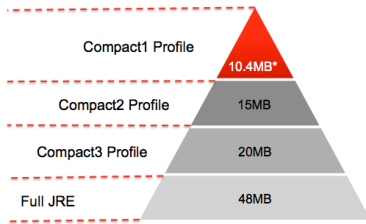All Java SE Embedded offerings are Java SE specification compliant.

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Figure 1: Approximate sizes of Compact Profile JREs for ARM v7, VFP Hard Float

Oracle is a leader in the embedded Java market, offering an extensive family of Java platforms which support a wide range of embedded environments with varying requirements in terms of memory constraints, chipsets, OS's and industry vertical specific requirements. The Java platforms are specifically designed to meet the needs of different classes of devices; Java Card (from 16Kb/8Kb ROM/RAM), Java ME Embedded (from 128 KB RAM) and Java SE (from 10.4 MB RAM). Oracle is also the number one embedded data- base vendor on the market, with C and Java databases for resource-constrained environments (Berkeley DB).

What are key highlights of Oracle Java SE Embedded?

Java SE Embedded 8 includes all the new benefits for developer productivity, performance improvements, security features, etc., that were introduced in the Java SE 8 platform. In addition, Oracle Java SE Embedded version 8 includes:

Compact Profiles

Compact Profiles simplify the creation of embedded applications that do not require the entire platform to be deployed and run on small devices. Since Compact Profiles are much smaller than the full Java SE Java Runtime Environment (JRE), they enable applications to be deployed on platforms with limited storage. The smallest of these runtimes is 11MB, which is more than 4 times smaller than the equivalent traditional Java SE runtime.

In addition, Compact Profiles offer a convergence of the Java ME CDC (Connected Device Configuration) product with Java SE 8. With full Java 8 language and API support, developers now have a single specification that will support the Java ME CDC class of devices under the Java SE umbrella.

Headless and Headful Support

Some solutions simply don't require support for interactive capability such as video, keyboard and mouse. Hence to address this there is a range of Java SE Embedded headless variants. Why incur the footprint overhead when you don't need it? The rest of Java SE functionality is still available including the underlying graphics support that enables printing and binary file generation. For embedded applications that need a rich interactive experience, Oracle Java SE Embedded 8 provides two options – the AWT/Swing graphics library and JavaFX graphics library. JavaFX is a next-generation graphics toolkit for Java that provides a lightweight, hardware-accelerated GUI platform for rich, expressive applications.

Advanced diagnostics & troubleshooting

Oracle Java SE Embedded 8 provides a complete tool chain to continuously collect low level and detailed runtime information enabling after-the-fact incident analysis for remote diagnostics, profiling and troubleshooting.

Minimal JVM

Oracle Java SE Embedded 8 introduces a new footprint reduced JVM, Minimal JVM, in addition to the client and server JVMs. The Minimal JVM is available in a static footprint to about 3 MB for ARM platforms, enabling deployment on a large range of resource-constrained devices. This reduction in footprint is achieved by stripping away non-essential features such as multiple garbage collectors (only Serial GC is supported in Minimal JVM), VM instrumentation support (JVMTI), and other VM serviceability and VM management features.

Performance optimizations for ARM processor-based systems

Java SE Embedded 8 employs a newer toolchain that generates faster native code for ARM processor-based systems. It leverages advanced instructions from ARM (e.g. ARM NEON) for improved concurrent performance of multiple floating-point array operations.

How is Oracle Java SE Embedded being used?

Oracle Java SE Embedded is already delivering value in a wide variety of embedded solutions. These all have demanding requirements in terms of flexibility, security and innovation. The following list some, but not complete, list of industries where Java SE Embedded is deployed:

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* Compact Profile sizes are cumulative

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- Home & Building Automation
- Industrial & Manufacturing Automation
- Smart Grid
- Retail Point of Sale

- Medical/Healthcare Devices
- Multifunction Digital Printers/Copiers
- Online Storage/NAS

The full strength of Oracle behind Java provides great benefits to companies using Java as part of their embedded development. Oracle's dedicated Java resources are able to provide assistance in areas such as:

- Architectural Design, Modeling Assistance and Lifecycle Management
- Future Insight (Insight of the market and how our technology maps to that/Future view of the technology and regular updates to the technology)
- Helping the OEM drive their business opportunity (Alignment with the larger Oracle business and customer reach)

Oracle Java SE Embedded Licensing

Oracle Java SE Embedded is available for free download and evaluation from Oracle Technology Network (otn.oracle.com). The commercial licensing model for Oracle Java SE Embedded has been specifically tailored to support the embedded market providing you a cost effective model to utilize Java in your solutions. Our dedicated team of Java Technology Representatives will work with you to guide you to the commercial model that best suits your business needs. If you are developing embedded solutions, please contact us to discuss licensing of Oracle Java SE Embedded.

Contact Us

For more information about Oracle Java SE Embedded, visit oracle.com/goto/javaembedded or call +1.800.ORACLE1 to speak to an Oracle representative. You can also email the Oracle Java Sales organization directly: javasales_ww@oracle.com.

Oracle is committed to developing practices and products that help protect the environment

Hardware and Software, Engineered to Work Together

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