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Oracle Java ME Embedded 8

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JAVA EMBEDDED

Oracle Java ME Embedded 8 is a complete Java runtime client, optimized for ARM architecture-based connected microcontrollers and other resource-constrained systems. The product provides dedicated embedded functionality and is targeted for low-power, limited memory devices requiring support for a range of network services and I/O interfaces.

AN OPEN AND CROSS-INDUSTRY PLATFORM FOR THE 'INTERNET OF THINGS' (IOT)

KEY FEATURES

- Best-in-class Java Virtual Machine, including advanced multi-tasking capabilities, tuned for efficiency, footprint and robustness
- Support for Java ME 8 specifications and Java 8 platform alignment
- Headless operation including software provisioning and management
- Pre-integrated APIs for standard services; Access to peripheral devices through easy to use Device I/O APIs
- Dedicated embedded functionality such as long-running execution, application auto-start and recovery, versatile connectivity
- Highly portable, configurable, and extensible Java runtime to support a wide range of target devices and use cases
- Support for ARM-based processors such as ARM Cortex-M3/-M4, ARM9, and ARM11
- Memory requirements optimized for resource-constrained devices with memory footprint starting at 128 KB RAM and 1 MB ROM (see note)

KEY BENEFITS

Java Platform, Micro Edition (Java ME) - the most broadly deployed application platform for resource constrained devices

Oracle Java ME Embedded 8 is designed to meet the needs of intelligent and connected services on resource constrained devices, such as those found in Wireless Modules, Building and Industrial Controllers, Smart Meters, Tracking Systems, Environmental Monitors, Healthcare, Home Automation devices, Vending Machines, and more.

Built on an optimized implementation of the Java ME 8 standard, Oracle Java ME Embedded 8 enables a robust and proven application platform supporting in-field software updates and system management without compromising on system integrity and extending the value of the device.

What are the key highlights of Oracle Java ME Embedded 8?

As detailed in figure 1 below, Oracle Java ME Embedded version 8 includes:

- **Platform-independent, standards-based, and efficient software environment for embedded devices -** enables the rapid development and deployment of intelligent applications across a wide range of device/OS combinations.
- **Java runtime based on Java ME Connected Limited Device Configuration (CLDC) 8 -** features alignment with the Java SE platform for increased development efficiency and code portability, a robust and efficient multi-tasking implementation, advanced tooling, and more.
- **Java ME Embedded Profile (MEEP) 8 -** modern, flexible embedded application platform built on CLDC 8 supports advanced security functionality, enhanced connectivity including cellular, and highly configurable to scale across a wide range of target device.
- **Software Provisioning and Management Functionality -** enables remote software provisioning, updatability, and management
- **Optimized for Embedded -** full headless operation, long-running operation, fine-grain security, auto-start, monitoring, and recovery, and power management
- **Device I/O APIs –** easy access to peripherals as GPIO, I2C, SPI, AT channel, serial/UART, ADC/DAC, Pulse Counter, PWM, SD Card, and more

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- Complete solution - high-performance, comprehensive implementation of Java ME 8 standards with free and easy to use development tools
- Faster time-to-market - reference implementations for evaluation and prototyping on industry standard device/chipset types
- Efficient embedded software model – rapid development and deployment of cross-platform software intelligence
- Robust and secure software environment
- A mature ecosystem – harnesses the advantages of an established ecosystem of Java developers and knowledgebase

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 16 KB/8 KB ROM/RAM), Java ME Embedded (from 128 KB RAM) and Java SE (from 11 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).

- **RESTful Web Services APIs–** ready-to-use HTTP Client, JSON, OAuth 2.0
- **Support for standard services APIs** – File I/O (JSR 75), Wireless Messaging (JSR 120), Web Services (JSR 172), Security and Trust Services Subset (SATSA – JSR 177), Location (JSR 179), XML (JSR 280)

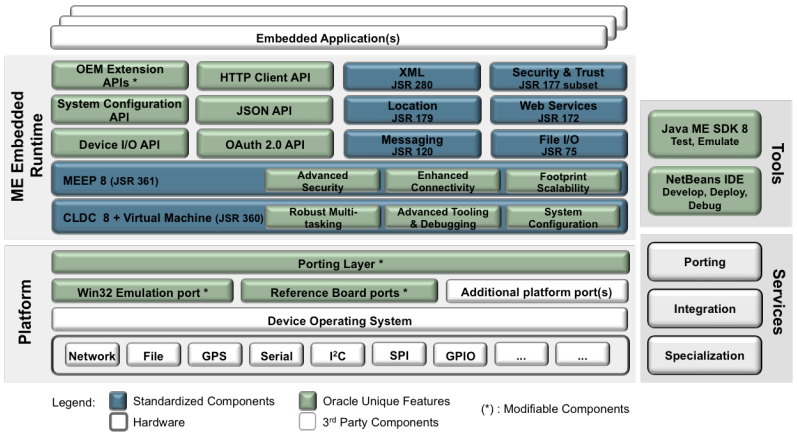

Figure 1. Oracle Java ME Embedded Product Stack

Supported device platforms

Oracle Java ME Embedded 8 is a cross-industry and cross-platform product providing support for chipsets based on the ARM architectures. The following implementations of the product are available:

- **ARM Cortex-M3/-M4 with RTOS** – complete reference implementation for Freescale Kinetis K70 development platform using MK70F chipset family
- **ARM11/Linux –** complete reference implementation for Raspberry Pi Model B development board using BCM2835 chipset
- **ARM9/Brew MP –** complete reference implementation for Qualcomm IoE development platform using the QSC6270T chipset
- **x86/Windows emulation –** complete development environment available for NetBeans IDE via Java ME SDK

Additional platforms – can be enabled and supported by Oracle Engineering Services and Oracle Partners. Oracle Java ME Embedded has an extensible and portable architecture to address the needs of diverse embedded markets

Capable of being used on a range of devices

Oracle Java ME Embedded 8 has a blend of functionality and configurability to address a range of embedded systems with the following typical characteristics:

- Systems based on ARM architecture systems on a chip (SOC)
- Footprint requirements starting at 128 KB RAM, and 1 MB ROM[1].
- Always-on devices
- Requiring support for I/O over a variety of interfaces
- Built-in network connectivity: Wired/wireless, always or intermittently connected
- Devices without a UI (thus requiring headless operations)
- Having very simple embedded kernel, or a more capable embedded OS/RTOS

[1] Footprint numbers for MEEP 8 Minimal Profile Set, optimized for single-function device. Actual footprint will vary based on target device and use case.

Comprehensive tool-chain improves developer productivity

Oracle's Java ME Software Development Kit (SDK) 8, together with provided plugins for popular IDEs such as NetBeans and Eclipse, delivers a complete development environment for embedded application development. With these tools, developers can develop, deploy, test, and debug their applications on Windows desktops using embedded device emulators and built-in support for profiling and network monitoring. Also provided is the ability to deploy, debug (at Java source level) and test the applications directly on the target hardware, thus enabling developers to produce better quality, higher performance applications.

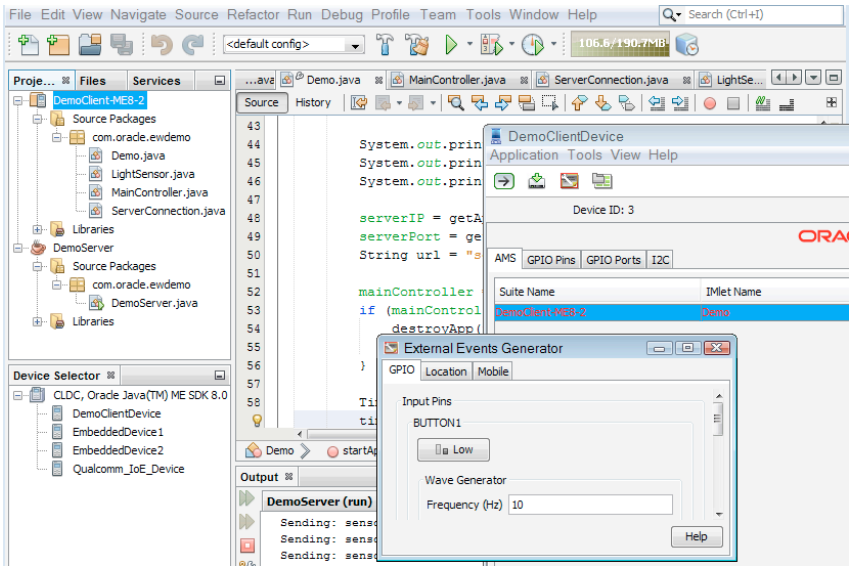

Figure 2. Oracle Java ME SDK 8 delivers an integrated and complete embedded tool chain.

KEY SUPPORTED JAVA SPECIFICATIONS

The following table lists the Java Specification Requests (JSRs) supported by Oracle Java ME Embedded 8 (either as mandatory or optional parts of the product stack):

JSR 360 – Java ME Connected Limited Device Configuration (CLDC) 8	Defines a standard core Java runtime platform for small, resource-constrained and connected devices, aligned with the Java SE 8 language, virtual machine, and key APIs
JSR 361 – Java ME Embedded Profile (MEEP) 8	Defines a modern, flexible embedded application platform building on CLDC 8, including software provisioning and management, software services and modularization, enhanced security, advanced connectivity, and configurability to scale across a wide range of target platform footprints
JSR 075 – File I/O	An optional API package for access to device file systems
JSR 120 – Wireless Messaging API (WMA)	An optional API package for wireless messaging such as SMS
JSR 172 – Web services	An optional API package for client-side web services
JSR 177 – Security and Trust Services API (SATSA)	An optional API package for security and trust services
JSR 179 – Location API	An optional API package for location-based services
JSR 280 – XML API	An optional API package for general-purpose XML handling

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