



MICROEJ®

SOFTWARE-DEFINED
EVERYTHING

Faster, Cheaper and Safer Products



VEE

MICROEJ VEE: The Application Platform for Feature-Rich, Cost-Effective IoT Devices

With over 450 million MICROEJ VEEs sold, MicroEJ powers smart, affordable, and future-ready electronic products across industries such as energy, wearables, smart home, healthcare, and industrial automation.

MICROEJ VEE (Virtual Execution Environment) brings service-oriented development practices to the embedded world, combining speed, reliability, and affordability. It enables scalable software architectures that accelerate time-to-market x3 and significantly improve business agility for device makers.

Our vision is to provide the safest, most reliable, and most cost-efficient managed runtime for electronic product lines—empowering companies to launch smarter devices and new services, faster. By removing technical barriers, MicroEJ enables rapid innovation and scalable growth across all embedded markets.

Built by seasoned industry experts, MICROEJ VEE applies the same principles that power smartphones, tablets, PCs, and cloud platforms, now optimized for resource-constrained embedded systems. By simplifying embedded software development, it allows mainstream software engineers to contribute to IoT projects, expanding the available talent pool x10 and unlocking new innovation velocity for manufacturers.

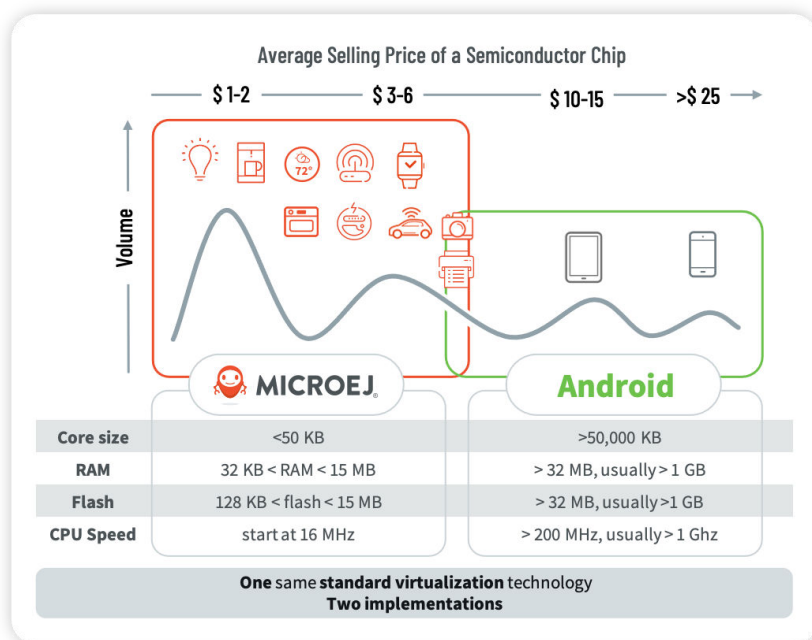
THE TINY SIBLING OF ANDROID

MicroEJ is often referred to as the “tiny sibling of Android”—offering a similar development experience and familiar tools, but optimized for resource-constrained electronic devices.

VEE provides an Android-inspired virtual container for the edge, bringing the flexibility of a service-oriented architecture with app components to environments with tight hardware constraints.

While Android typically requires over \$20 in hardware due to demands for gigabytes of memory and multi-GHz processors, MICROEJ VEE runs on devices starting at just \$1, with as little as 256KB of memory and a 50MHz CPU. It also scales seamlessly to more powerful MCUs and MPUs as needed.

This makes it ideal for embedded systems and edge computing—delivering the scalability, performance, and efficiency required by smart, cost-effective devices.



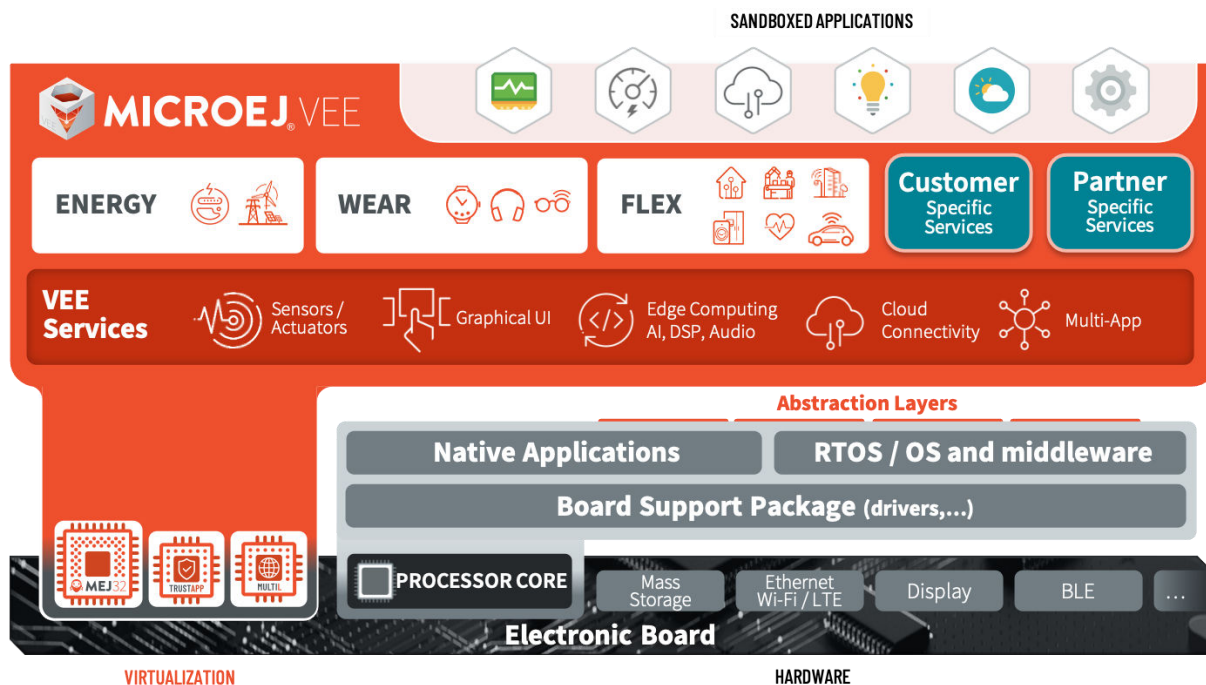
FACTUAL COMPARISON: ANDROID VS MICROEJ

Same tools, same engineers, but 1000 times lighter!

Feature	MICROEJ VEE	Google Android
Memory Requirement	50 KB	>=2GB RAM, 16GB ROM
Processor Requirement	50 MHz+ Any MCU, Any MPU	GHz range Multi-cores MPU only
Boot Time	< 25ms	> 15,000ms
Underlying Operating System	Any RTOS, Linux, QNX, or bare metal	Linux only
Power Consumption	Low	High
Hardware Cost	Low Supports \$1 MCUs and above	High >20\$ with advanced SoCs required
App Ecosystem	Yes (Lightweight and customizable)	Yes (Resource intensive)
IDE	Android Studio, IntelliJ IDEA, Visual Code, Eclipse, Command Line	Android Studio
Virtual Device	Yes	Yes
Android Compatibility	Yes, via Android Compatibility Kit	Yes

ARCHITECTURE & FEATURES

The architecture of MICROEJ VEE is composed of several key layers, each providing distinct services that contribute to the overall system flexibility and performance:



- **The Ground Layer:**
 - **MEJ32 Virtual Processor:** A lightweight 32/64 bit virtual processor that executes hardware agnostic instructions, supporting managed code, safe scheduling, and smart memory management. It forms the foundation of every MICROEJ VEE.
 - **TrustAPP:** An embedded software co-processor with strict security rules for application management. It enables sandboxed execution, ownership management, and resource protection (CPU, memory, I/O).
 - **MultiLang:** A powerful multi-language execution framework that supports C, Java, C++, Rust, JavaScript, Kotlin, and more. It ensures unified semantics, multi-heap support, and a consistent multi-threading model, enabling any native or legacy code to become managed.
- **The Native Layer:**
 - **Board Support Package & RTOS/OS:** Manages low-level asynchronous drivers for hardware peripherals on MCU and MPU-based boards. It ensures compatibility with a variety of real-time and general-purpose operating systems, including FreeRTOS, Zephyr, Linux, and others.
 - **Abstraction Layers and services stacks:** Most MCUs and MPUs are bundled with hardware abstraction layers (HALs) that simplify access to I/O and peripherals. These HALs work in sync with the OS/RTOS and may also include essential system services like Ethernet, Wi-Fi, BLE, and file systems.

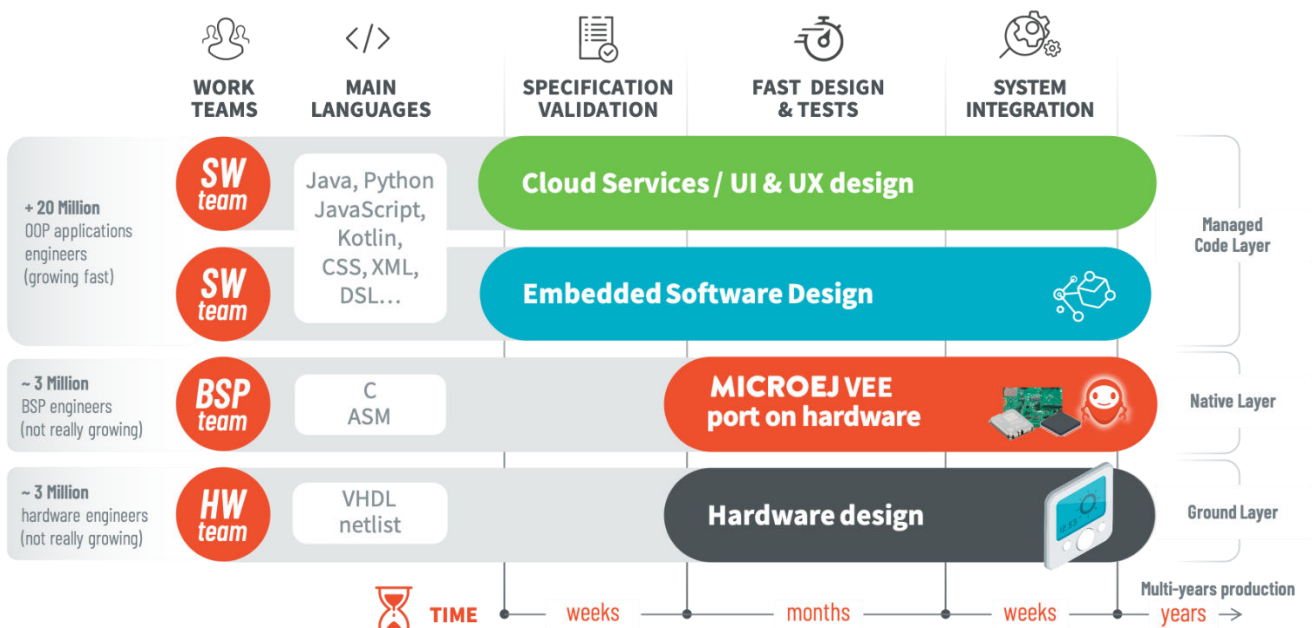
- **The Managed Code Layer**
 - **VEE Services:** A comprehensive and extensible set of services, largely based on open-source projects, supporting UI, networking, security, and more generally any business logic residing in electronic devices. All services are enabled with True Binary Portability (TBP) to ensure stable, consistent application behavior across hardware variants.
 - **Device Specific Logic & Applications:** Custom applications and service layers defined by OEMs for unique product features. These are also TBP-enabled, maximizing software assets reuse across a product family without modification or recompilation.

VALUE PROPOSITION

3x FASTER PRODUCT LAUNCHES WITH PARALLEL WORKFLOWS

MICROEJ VEE removes the traditional hardware/software interlock by enabling parallel development of application code, hardware, drivers (BSP), and cloud integration. This architectural decoupling reflects the proven digital strategies used in other industries, separating technical development from business and marketing planning to unlock innovation.

Thanks to this modularity, teams work concurrently across all parts of the product stack, drastically reducing dependencies and speeding up development cycles. Across hundreds of deployments, MICROEJ VEE has demonstrated an average 2.7x acceleration in product launch timelines (from specification to market) compared to tightly coupled hardware/software approaches.



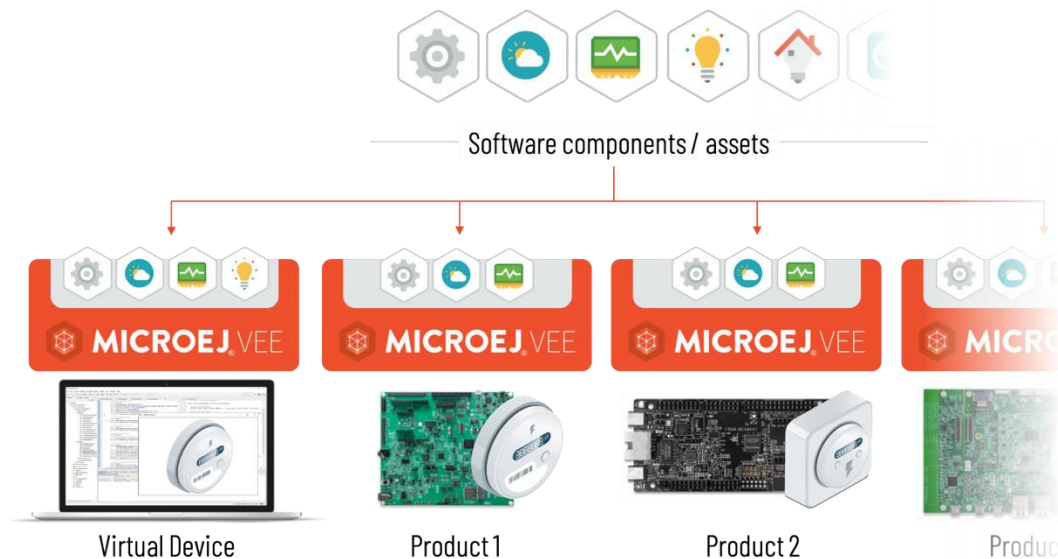
BUILD REUSABLE ASSETS WITH TRUE BINARY PORTABILITY

The most effective way to cut costs and speed up time-to-market is to reuse existing software assets—especially specialized business logic that required significant effort to build. With MicroEJ's service-oriented architecture and unique True Binary Portability, every software component can be reused without modification across multiple hardware platforms and product lines.

This enables the rapid launch of multiple product variants from a shared software base, each offering customized features for different sub-markets. It supports a modular development strategy, empowering teams to create and ship new product versions faster, while maintaining consistency and quality.

This approach also fosters:

- A fast feedback loop, where real-world data refines future iterations.
- Lower risk by spreading marketing and technical effort across more SKUs.
- A personalized experience for end users without increasing engineering costs.



UNLOCK FAST INCREMENTAL INNOVATION AND NEW MONETIZATION REVENUES

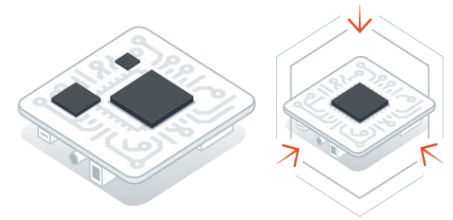
In addition, MICROEJ VEE supports dynamic application management, enabling small add-on apps and services to be loaded or updated after deployment. Devices can be upgraded in the field, extending their functionality and value over time.

This capability turns static products into recurring revenue platforms, allowing marketing teams to unlock new monetization strategies, increase ARPU, and sustain long-term engagement throughout the product lifecycle.



DECREASE BOM COSTS BY -25% TO -55% BY SWITCHING TO COST-EFFECTIVE HARDWARE

MICROEJ VEE is purpose-built for the embedded industry, where cost is a critical factor. It efficiently targets electronic boards with as little as 256KB of memory and a 50MHz processor, while scaling up to more powerful MPU systems.



With broad support for hundreds of MCUs and MPUs, as well as compatibility with most existing RTOS and Linux environments, MICROEJ VEE enables developers to match hardware specs precisely to product needs, avoiding unnecessary overengineering.

By leveraging app portability at the binary level, businesses are able to reuse software assets across hardware platforms, and safely transition from high-cost environments (like Linux or Android) to leaner, microcontroller-based designs, reducing BOM costs by 25% to 55% without compromising functionality. The result: faster, cheaper, and safer products.

VIRTUAL DEVICES TO ACCELERATE SOFTWARE DEVELOPMENT

Every MICROEJ VEE includes a Virtual Device: a software-based, functionally accurate replica of the target hardware. Engineers use it extensively to develop, validate, and test application code directly on a PC, long before physical prototypes are available.



Over 80% of embedded development can be performed on Virtual Devices, which simulate device I/O, sensors, algorithms, and network interfaces. Virtual Devices are created in just a few days and can be extended to support any custom peripheral, accelerating time-to-production while reducing dependency on physical labs.

STATE-OF-THE ART DEVELOPMENT TOOLS

MicroEJ SDK provides a rich, open ecosystem of customizable tools that support the entire development lifecycle, enabling OEMs and third-party developers to swiftly design, test, and deploy innovative applications.

- Develop on a functionally accurate virtual device with all inputs/outputs
- Reliable development environment
- IDE agnostic: VSCODE, IntelliJ IDEA, Android Studio, Eclipse or Command Line
- Modern build system with Gradle
- Support for multi-language for managed code design: C, Java, JavaScript, C++, Kotlin, Rust, etc.
- Trusted and secure app execution model via app sandboxing, enabling fine grain control over CPU, memory, and peripherals usages
- App life cycle management through dynamic loading and unloading

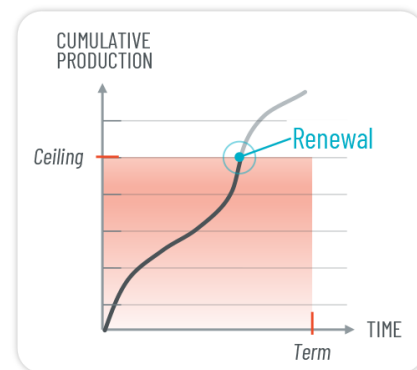


STRAIGHTFORWARD LICENSING

MicroEJ's licensing is designed for long term partnership. Through a CAPEX-based Multi-Year Contract (MYC), device makers gain unlimited access to MicroEJ's Ips (no per-unit royalties) with predictable costs that scale alongside product lines.

What you get:

- **Unlimited Deployment:** fixed-cost IP licensing with no unit tracking
- **Scalable Investment:** pay once, reuse across your entire portfolio
- **Bundled Discounts:** up to -48% for 5-core IP bundles
- **Co-Design Process:** from challenge diagnosis to co-launch, MicroEJ works closely with your teams to ensure tailored, validated outcomes
- **Ecosystem Integration:** our MYC model extends to partner IPs, building a rich, interconnected software ecosystem that drives collective value



FLEXIBLE LICENSING + SCALABLE SOFTWARE BUILDING BLOCKS

CORE IPS

- MEJ32 (Core IP): Provides virtualization and containerization for embedded systems
- TrustApp (Optional): Secure embedded software co-processor with dynamic app management and security rules that allows the creation of app ecosystems
- MultiLang (Optional): Multi-language core (C, C++, Java, JavaScript, Kotlin, Rust) with multi-threading and multi-app execution, enabling any code to become managed

Licensed under MYC, these form the foundation of scalable, app-driven devices.



COMMERCIAL SERVICES

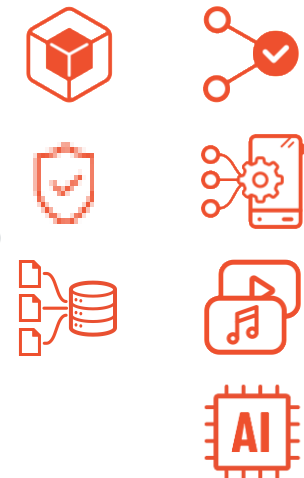
- UX/UI Engine – MicroUI, MicroVG, NLS, Raster Engine
- Hoka – REST & embedded web server
- LPFE (Facer.io) – 500,000+ watch faces for wearables
- DLMS – Secure metering communication stack

Commercial services are bundled into the MYC (CAPEX) at a discounted rate, optimizing costs while maintaining flexibility.



FREE, PRE-INTEGRATED SERVICES

- Core: B-ON (Extended profile features), EDC (Device configuration management), KF (Kernel and core features), SNI (Secure Native Interface).
- Connectivity: NET (TCP/IP, Wi-Fi, BLE), MQTT (MicroPaho), ECOM
- Security: cryptography, key management, SSL/TLS (secure communications)
- Device Management: WATCHDOG (CPU monitoring), TRACE (debugging), SP (real-time communication)
- Storage: Android-like File System
- Multimedia: AUDIO (Android-based embedded audio).
- AI: Neural network runtime for embedded NPUs



No hidden fees. No complex metrics. Just software freedom at scale.

POWERING MILLIONS OF IOT DEVICES

TRUSTED BY INDUSTRY LEADERS

MICROEJ VEE powers millions of award-winning smart devices worldwide. Our robust partnerships with renowned providers and silicon vendors create a dynamic ecosystem of possibilities in the industry.



ABOUT MICROEJ

MicroEJ is a software vendor of cost-driven solutions for embedded and IoT devices. We are focused on providing device manufacturers with secure products in markets where software applications require high performance, compact size, energy efficiency, and cost-effective development.

Today more than 120+ companies in the world with currently over 450 million products sold, have already chosen MicroEJ to design electronic product applications in a large variety of industries, including smart home, wearables, healthcare, industrial automation, retail, telecommunications, smart city, building automation, transportation, etc.

Learn more about VEE Core at:

<https://www.microej.com> or reach out to
hello@microej.com for more details.

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