EUROTECH
Imagine. Build. Succeed.

EVERYWARE® SOFTWARE FRAMEWORK

Open Source Developer Toolkit Lets OEMs Bring Highly Differentiated Applications to Market Quickly

Whitepaper

By Arlen Nipper

Benefits:

- Faster time to market with ESF, using Equinox framework
- Interoperability of apps and services based on OSGi technology
- Flexibility in hardware choice – ESF runs on different Eurotech hardware platforms

Abstract

The Everyware® Software Framework (ESF) lets Open Source Developers bring products built on Eurotech embedded platforms to market as quickly as possible.

Eurotech has always delivered application-ready platforms, from device drivers through the operating system.

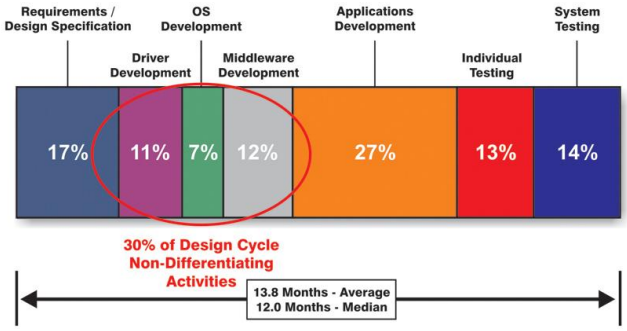
With ESF, we take that model a step further. ESF puts a middleware layer between the OS and the OEM application, with industry-standard interfaces that shorten OEM development time, simplify coding, and allow the software to port from one Eurotech hardware platform to another. This same middleware offers extensions to enterprise commutations protocols that allow a device to become part of, not just an interface to, the enterprises IT environment.

The extensible ESF lets OEMs modify, reconfigure and maintain their application over time, so it evolves as the market demands change. Adaptability and flexibility to meet market requirements gives OEMs a huge competitive advantage over static, fixed functionality software applications. Manage risk through ESF, by selecting the framework that lets you adjust quickly, easily, and inexpensively.

Could This Get Any Easier?®.

Proven Savings

Embedded system development has been extensively studied, and Eurotech developed ESF to specifically address elements of embedded system design that are not core to the OEM's value proposition. We let OEMs focus on their application, we handle the non-differentiated, commodity spec portion of the device design. The firm VDC (Venture Development Corporation) has studied this in depth.



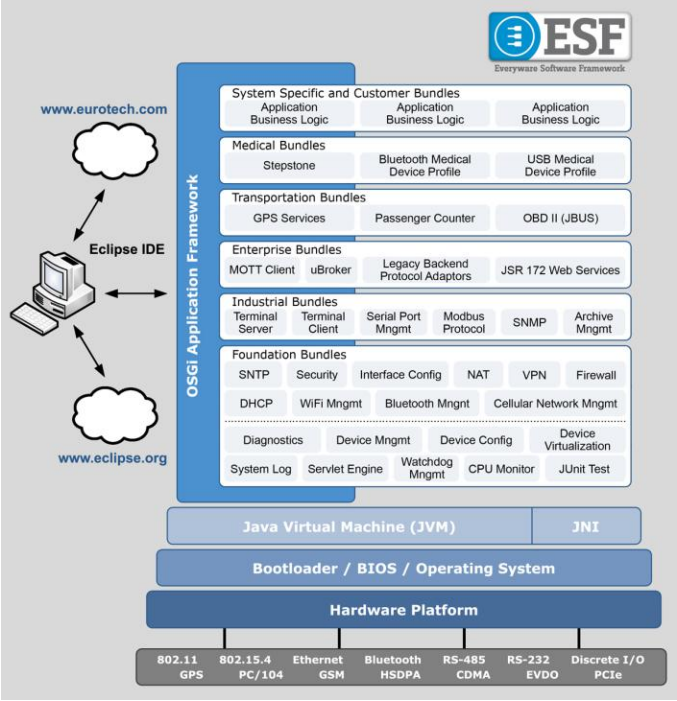
Source: VDC, Embedded Systems Market Statistics

According to VDC, those non-differentiating phases of device development count for as much as 30 percent of the entire development cycle. But the time spent on this non-value added layers for successful projects is just part of the cost. Other industry studies show that 70% of the embedded system projects started never create a product. This could be because the task of driver development, OS and middleware development, while easy to specify, is not so easy to do. For example, a commodity specification like "USB" or "Bluetooth" is backed by stacks of documentation, rigorous approval standards, test and certification labs and licensing authorities. The OEMs customer may want to specify this USB function with a word (actually just an acronym), but very few OEMs are staffed to tooled up to develop, test and certify to a USB, or many other, commodity standards.

ESF takes this work off the OEMs plate; the OEM specifies the industry standard, Eurotech delivers it.

ESF Overview

The "Everyware Software Framework" represents a collection of cohesive software components ported to a specific hardware platform providing the customer with a complete and functioning board level or ready to use product with associated application
development tools. Graphically, ESF looks like this:



It all starts with a verified, certifiable OS

All ESF certified Eurotech hardware platforms are based on fit for purpose BIOS/Bootloader and Operating Systems that have been ported and qualified by Eurotech. Since the overall performance
and reliability of any application platform relies on a solid foundation it is important to know that Eurotech has complete knowledge and control of the overall system.

We have chosen Intel/Wind River Linux 3.0. for the OS; this assures you product of broad industry acceptance and for those who need it, close coordination with the Intel CPU roadmap.

1.2 Billion Cell Phones Can't be Wrong!

Embedded Java is Ready for Prime Time

The majority of our new system projects and products have been based on writing the application code in Java. The primary advantages of embedded applications written in Java are:

- Java runs across all Operating Systems (code reuse across platforms).
- Java applications run in a "virtual machine" sandbox. In the 7 years Eurotech has been using Java we have yet to have an application error crash an embedded system.
- Java is a "type safe" interpreted application language. It is the "perfect" application tool to give to customers to eliminate collateral damage to the OS.
- Network Centric (Sun leveraged the Internet connectivity extensively when creating Java)
- IT Centric (All major IT companies use Java)
- True Object Orientated Programming Language
- Native Multithreading Support
- Junit Testing
- Built in memory management
- Built in self documentation (JavaDocs)
- Rapid code development from a huge repository of existing code

The current JVM component used for ESF is the Java ME (Java Micro Edition) J9 JVM from IBM. This Java has bee used

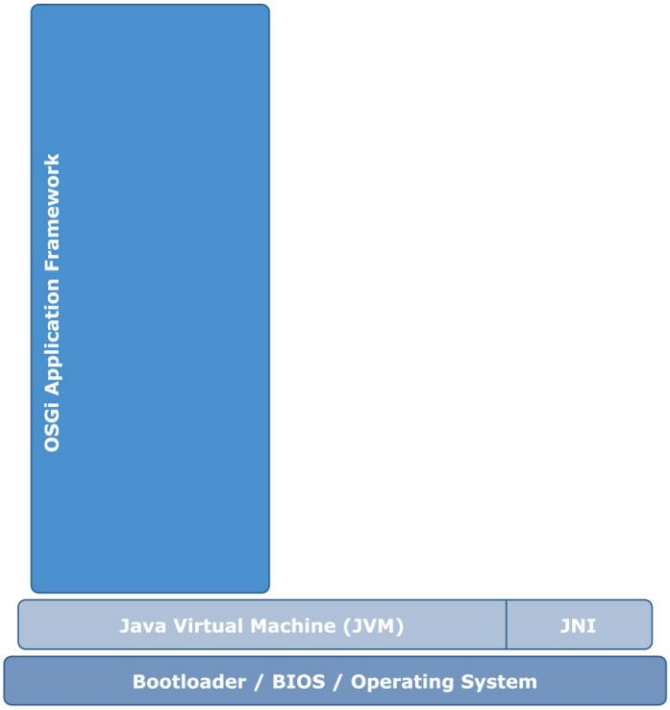
in embedded systems for a decade, it is tested against standards and is included as part of ESF. Our ability to provide world class Java at Quantity 1 pricing is perhaps unique in the industry.

Most open source engagements with Java involve substantial one time licensing or development fees.

OSGi: The Application Framework

OSGi originally stood for Open Services Gateway initiative and was design as a services gateway for set top boxes. In the 10 years of its existence it has become broadly adopted by many industries and is now just referred to as "OSGi".

OSGi is a 'component model' and an 'application life cycle management' model. By itself, OSGi provides the required components to develop applications within a uniform framework.



Some companies spend man years of effort writing "application frameworks" to try to do what OSGi already does for them. With ESF the OSGI "framework" allows system to be able to:

- Install an application
- Start the application
- Stop the application
- Update the application

All of the functions can be performed dynamically on a running system without having to restart the system AND while other applications within the framework are still running! Further, all of the framework features can be done remotely over any network connection, making OSGi perfect for embedded devices.

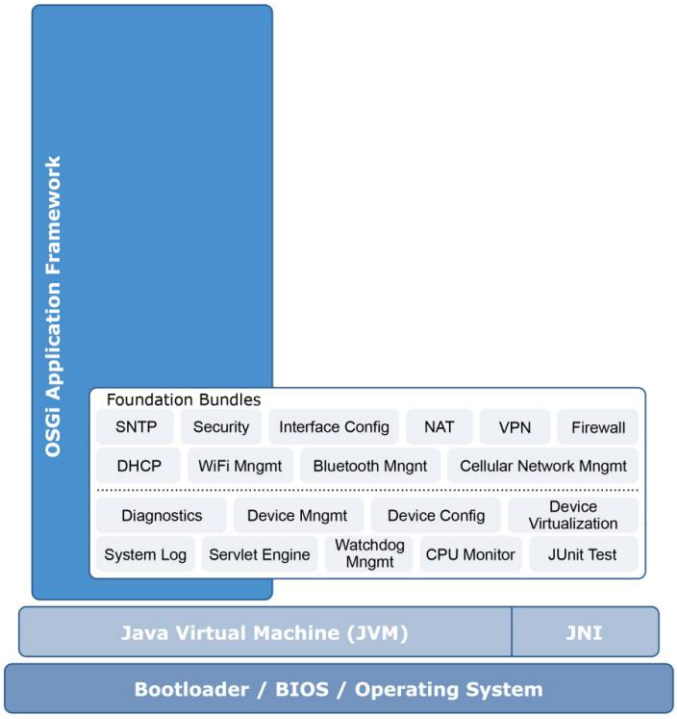
The OSGi implementation that Eurotech use for ESF is obtained from the Eclipse Foundation. The implementation is called "Equinox" and is the very same OSGi implementation that is running on millions of Eclipse IDE runtimes used by IBM, Oracle, Apple, Adobe, Wind River, BEA, Cisco, and Intel just to name a

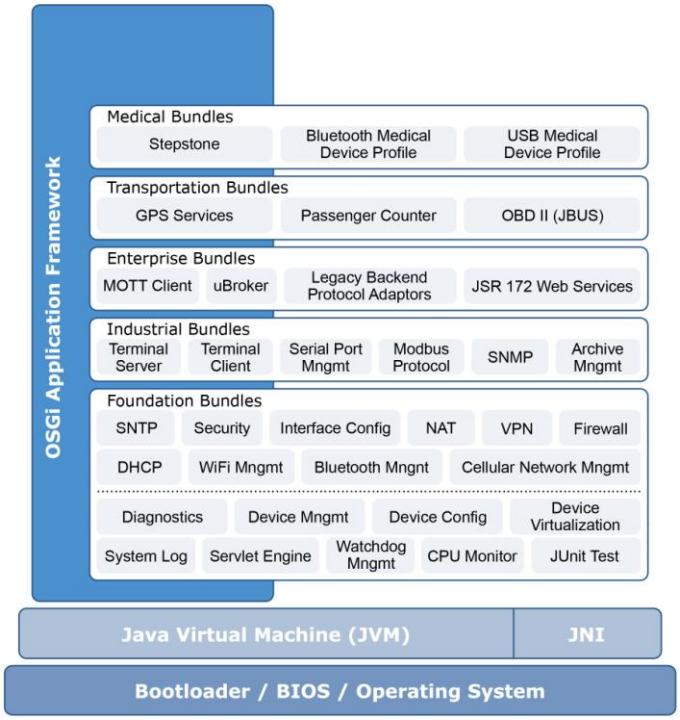
few. You'll probably have OSGi components running on your desktop right now.

Adding Application Bundles

The ESF Foundation bundles provide the core functionality and hardware virtualization that a OEM would need to get started writing their application (Business Logic) on day one. This includes:

- Hardware virtualization (Code written to the ESF is the same for a DuraCor or a Catalyst EC or a Zywan… A GPS is GPS is GPS)
- Device Configuration
- System logger
- Platform management (Watchdog, CPU Temp, CPU Throttling, Sleep modes, etc)
- Management of all available network devices the Platform has to offer





For a generic application, this foundations layer should be everything a OEM would need to start writing an application in Java and using the ESF API's accomplish a very sophisticated, managed, and robust network connected device in a very short
amount of time.

Eurotech is extending ESF to industry specific Vertical Market Bundles

As customer requirements expand beyond the basic Foundation set of bundles, Eurotech can offer targeted vertical market ESF bundles that can provide additional functions and features according to the requirements of the customer. Currently we are targeting Industrial (SCADA), Enterprise connect (IBM), Transportation, and Medical segments. This is not just software; Eurotech is associated with many of the alliances such as Continua (Medical Devices) that are developing these standards.

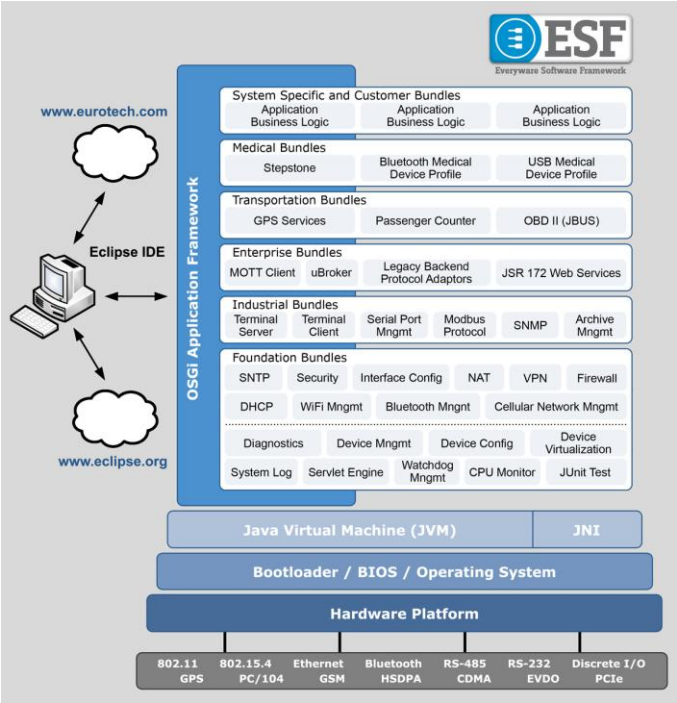
The OEM Value Add – Applications Business Logic

With ESF, the OEM can design, code, test and deploy his applications logic leveraging off of millions of lineless of proven code. All of this code has been developed by, and is maintained by, the open source community, Wind River, Intel, Eurotech and others. By leveraging this effort, the OEM can get to market more quickly, and build his own applications in a modular, maintainable and scalable manner.

Summary

ESF is an Extendable Architecture that will get the OEM to market faster, with a more robust and maintainable

product. It is built completely on mainstream open source technologies, and as a result is rock solid yet viable for decades into the future.



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