The JVM Universe
Java and the IoT Big Bang

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Program Agenda

1. Anatomy
2. Platforms 101
3. OpenJDK
4. IoT
5. Q & A
Anatomy Of The Platform
JVM, JRE, JDK And All That
Anatomy Of The Platform
Experts Coming Together To Define, Refine And Implement Specifications
Anatomy Of The Platform
At A Glance

Java SE Technologies
The following conceptual diagram illustrates the components of Oracle's Java Platform Products:

Jave SE Platform at a Glance
Platforms 101
Java Card, Java ME, Java SE, Java EE
Platform 101
Java Card, Java ME, Java SE, Java EE

• Java Platform, Enterprise Edition
• Java Platform, Standard Edition
• Java Platform, Micro Edition
  – Robust, flexible environment for mobile & embedded applications
  – Built-in network protocols and security
• Java Card
  – Secure environment for applications on smart cards and very small devices
  – Deploy multiple applications on a single card or add new ones even after card is issued
The Role Of OpenJDK

Putting The „Source“ In „Open Source“

• The place to collaborate on an open-source implementation of the Java Platform, Standard Edition and related projects.
The Role Of OpenJDK


In a Nutshell, OpenJDK...

- has had 24,821 commits made by 316 contributors representing 5,403,296 lines of code

- is mostly written in Java with a well-commented source code

- has a well established, mature codebase maintained by a very large development team with stable Y-O-Y commits

- took an estimated 1,635 years of effort (COCOMO model) starting with its first commit in December, 2007 ending with its most recent commit 10 days ago

Languages

- Java: 73%
- C++: 11%
- XML: 5%
- 18 Other: 11%

Lines of Code

- Code
- Comments
- Blanks

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The Role Of OpenJDK

Feedback, Discussions, Planning, Transparency
The Role Of OpenJDK

Neither A Floor Wax Nor Dessert Topping

• No binaries
  – Open source
  – Binaries may be provided by third parties, or just build your own
  – With one exception: RI binary

• Only open source licensed source code
  – GNU General Public License v2

• Home to open source projects - not products
  – No products like Oracle Java SE Embedded, Oracle Java ME Embedded, etc.
  – No support other than community support
Java & IoT
Java on very small & small devices
Java & IoT

Gotta Connect Them All

• Billions of devices out there
  – More billions of devices to come!

• Millions of developers out there
  – More millions of developers to come?

• Embedded C/C++ & Assembler development is hard & error-prone
  – Security can be hard to get right (e.g. buffer overflows, use-after-free, double-free)
  – Performance can be hard as well (e.g. manual memory management leading to leaks)
  – No longer a very attractive platform for students & teachers
Java & IoT

Java vs. C/C++

• Major language and API updates in years rather than decades
• Specifications accompanied by open source reference implementations
• Compatibility matters
  – Backwards compatibility matters as well
• Concurrency
• Portability by design
• Excellent tooling
• Strong community
Java & IoT

OpenJDK vs. GNU Compiler Collection

Contributors per Month

OpenJDK

gcc
Java & IoT

Duke to the rescue

Java 8 Now Available
Q & A
Hardware and Software
Engineered to Work Together