





# Java: inevitable evolution

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@gigabel



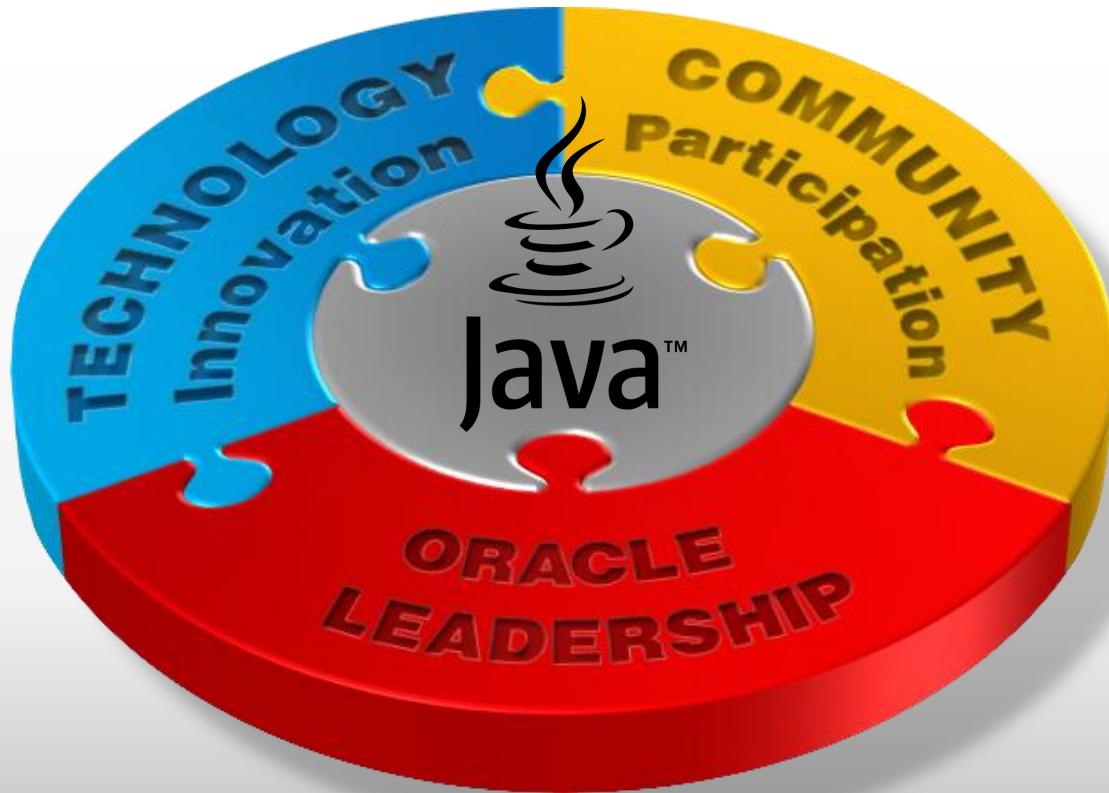
MAKE THE  
FUTURE  
JAVA

ORACLE®

# Make the Future Java



- Platform Completeness
- Modernization and Innovation
- Developer Productivity
- Open and Transparent Evolution
- Active Community Involvement
- Quality and Security



# Java Scorecard 2012

## Technology - Results



<b>Java SE</b>	<ul style="list-style-type: none"><li>Added OS X and Linux ARM</li><li>Seven update releases with more than 300 enhancements</li></ul>
<b>JavaFX</b>	<ul style="list-style-type: none"><li>JavaFX 2.2 for Windows, OS X, and Linux</li><li>JavaFX 1.0 SceneBuilder for Windows and OS X</li><li>Open sourcing of JavaFX, providing new opportunities for the community</li></ul>
<b>Java ME/ Embedded</b>	<ul style="list-style-type: none"><li>Introduced Java Embedded Suite – middleware stack for embedded</li><li>Introduced Java ME Embedded for Java on microcontrollers</li><li>Java ME/SE alignment planned for ME/SE 8 in CY2013</li><li>Java ME 8 JSR submission being prepared in JCP</li></ul>
<b>Java EE</b>	<ul style="list-style-type: none"><li>2 GlassFish releases</li><li>Java EE 7 specification plan re-calibrated and due in CY2013</li><li>Java EE 7 with HTML5 simplification</li></ul>

# Java Scorecard 2012

## Community - Results



### OpenJDK

- New projects: Penrose, OpenJFX, PowerPC/AIX ports, Sumatra GPU support
- Governance updates: Andrew Haley elected, and Doug Lea reelected
- 68 new OpenJDK contributors, including CBOE, SUSE, Taobao and numerous accomplished individuals

### JCP

- JCP.next: Greater transparency, Merge two ECs, Revised JSPA
- Adopt a JSR program initiated by London Java Community and SouJava
- 21 JSRs started since JavaOne 2011

### JUGs

- 25% increase in JUGs worldwide (from 157 to 197)
- 20+ new JUGs added this year, and growing
- 36% increase in JUG visits (from 50 to 68)

# Java Scorecard 2012

## Oracle Leadership - Results



### Ongoing Investment

- Continued growth of Oracle investment
- 4 regional JavaOne events with over 5,000 attendees

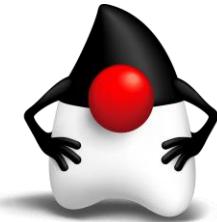
### Community Outreach

- Launched Java Magazine: 120K subscribers in first 12 months
- 17% increase in Java Developers Days (from 46 to 54)
- Evangelism outreach touched more than 500k developers WW

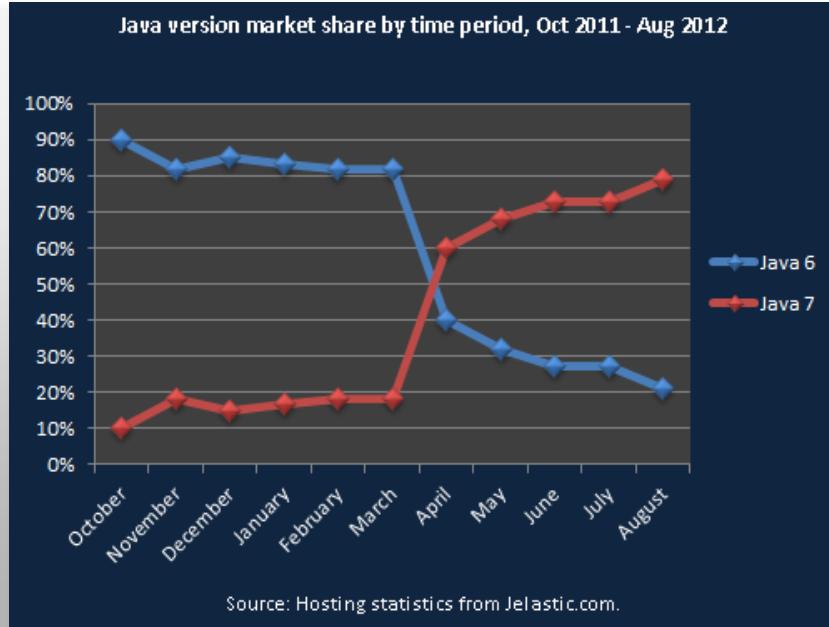
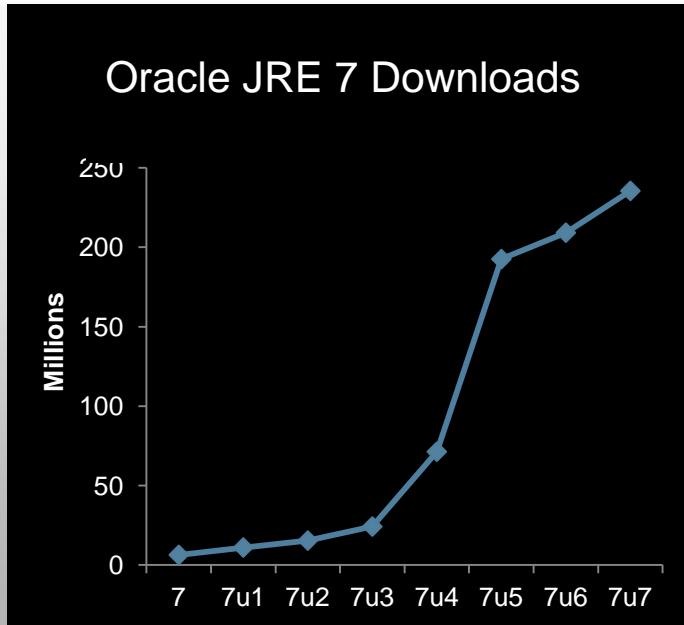
### Validation

- 17% increase in Java.net registered users (from 700K to 820K)
- 8% increase in active NetBeans users (1.1M to 1.22M)

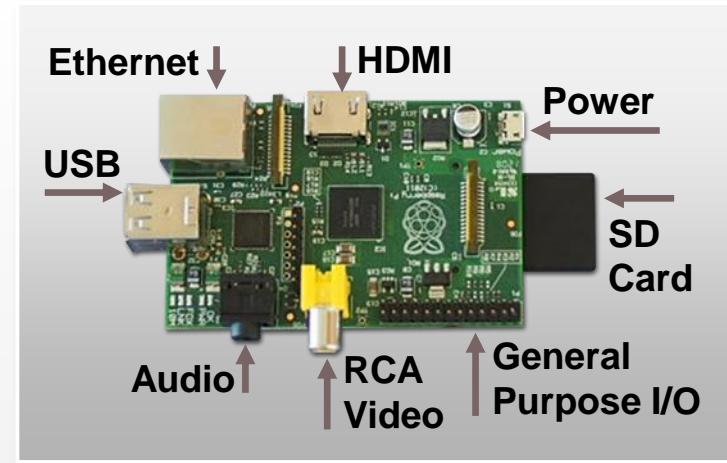
# Java SE



# Java SE 7 Uptake



# Java 7 on OS X and Linux/ARM



*Image source: Boston Ltd., UK*

# JDK 8

Lambdas?

In *my* Java?



# JDK 8

```
1  for (Method m : enclosingInfo.getEnclosingClass().getDeclaredMethods()) {  
2      if (m.getName().equals(enclosingInfo.getName())) {  
3          Class<?>[] candidateParamClasses = m.getParameterTypes();  
4          if (candidateParamClasses.length == parameterClasses.length) {  
5              boolean matches = true;  
6              for(int i = 0; i < candidateParamClasses.length; i++) {  
7                  if (!candidateParamClasses[i].equals(parameterClasses[i])) {  
8                      matches = false;  
9                      break;  
10                 }  
11             }  
12  
13             if (matches) { // finally, check return type  
14                 if (m.getReturnType().equals(returnType))  
15                     return m;  
16             }  
17         }  
18     }  
19 }  
20  
21 throw new InternalError("Enclosing method not found");
```

# JDK 8

```
1  return Arrays.stream(enclosingInfo.getEnclosingClass().getDeclaredMethods())
2      .filter(m -> Objects.equals(m.getName(), enclosingInfo.getName()))
3      .filter(m -> Arrays.equals(m.getParameterTypes(), parameterClasses))
4      .filter(m -> Objects.equals(m.getReturnType(), returnType))
5      .findFirst()
6      .getOrDefault(() -> new InternalError("Enclosing method not found"));
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
```

# JDK8

## Project Lambda

### **State of the Lambda by Brian Goetz**

- <http://cr.openjdk.java.net/~briangoetz/lambda/sotc3.html>

### **JSR 335**

- <http://jcp.org/en/jsr/detail?id=335>

### **Project Lambda repository**

- <http://hg.openjdk.java.net/lambda/lambda>

# JDK 8



## Innovation

- Lambda aka Closures
- Language Interop
- Nashorn



## Core Libraries

- Parallel operations for core collections APIs
- Improvements in functionality
- Improved type inference



## General Goodness

- JVM enhancements
- No PermGen limitations
- Performance Improvements



## Java for Everyone

- Profiles for constrained devices
- JSR 310 - Date & Time APIs
- Non-Gregorian calendars
- Unicode 6.2.0
- ResourceBundle.
- BCP47 locale matching
- Globalization & Accessibility



## Client

- Deployment enhancements
- JavaFX 8
- Public UI Control API
- Java SE Embedded support
- Enhanced HTML5 support
- 3D shapes and attributes
- Printing



## Tools

- Compiler control & logging
- JSR 308 - Annotations on Java Type
- Native app bundling
- App Store Bundling tools



## Security

- Limited doPrivilege
- NSA Suite B algorithm support
- SNI Server Side support
- DSA updated to FIPS186-3
- AEAD JSSE CipherSuites



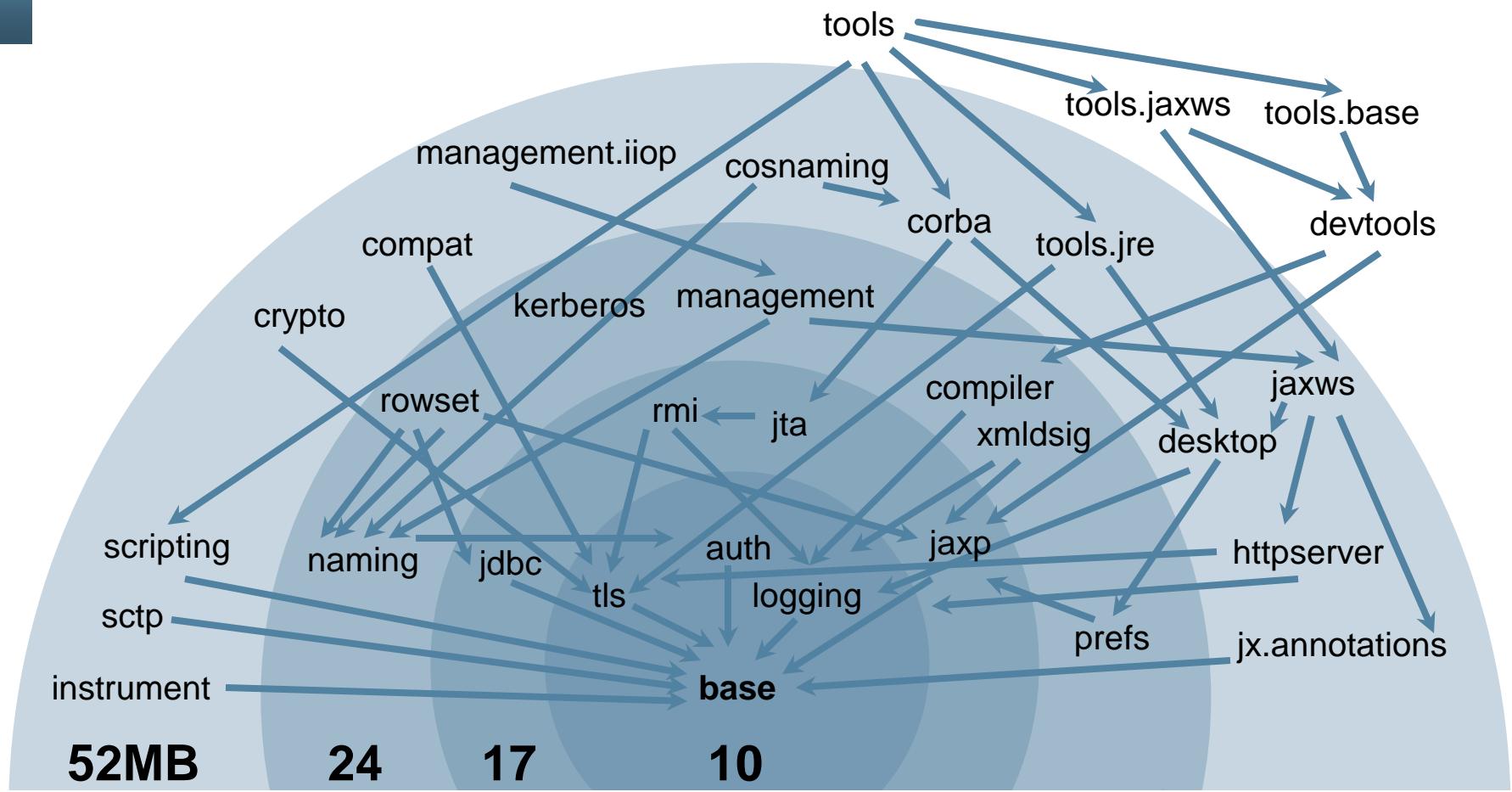
# Project Nashorn



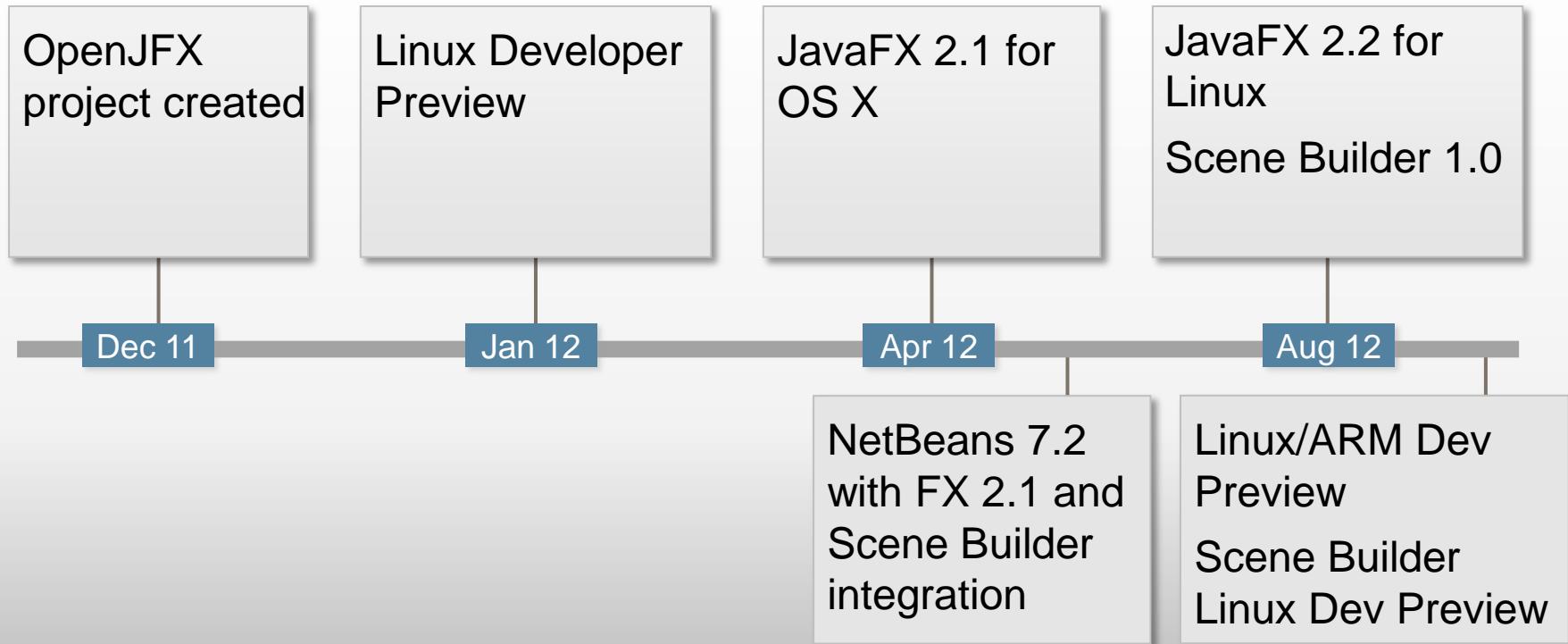
**NetBeans**

# OpenJDK





# JavaFX Update



# JavaFX 2.2 and Beyond

Embedded

Writable Image

Pagination

**Scene Builder**  
for Linux

3D

Rich Text

Canvas

Performance

HTTP Live Streaming

Printing

Mac

SWT

3<sup>rd</sup> Party Controls



SwingNode

Linux

Multi-Touch

1080p

ComboBox

Advanced Cells

h.264

Complex Text

i18n

Native Deployment

Snapshot

Accessibility

ColorPicker

ARM

# New deployment approach



Cross-platform JavaFX application  
JAR, Applet, JNLP, Self-contained

# JavaFX Deployments



*health*  
**CONNECT**  
ICT EXPERTISE THAT CARES

**QuantCell**  
RESEARCH

**celer** 

**navis®**  
Part of Cargotec Corporation

# To Java SE 9 and Beyond!

Project Sumatra – Java for GPUs

Lang Enhancements

Resource Management

**Optimizations**

Multi-Tenancy Support

**Jigsaw**

**Ports:** Power PC/AIX



Penrose

Improved Integration with Native

Cloud

OpenJFX

Self Tuning JVM

Generic Lang Interoperability

**Ease of use**

Unified Type System

Data Structure Optimizations

# Roadmap

## Java SE

### 7u6

- JRE on Mac complete
- JavaFX 2.2 integration
- Linux ARM V6/V7
- JavaFX on Mac and Linux

### Major Serviceability improvements

- Java Flight Recorder in JDK
- Native memory tracking
- Java Discovery Protocol
- App Stores Packaging tools
- Last Public Release of JDK 6

### JDK 8

- Lambda
- Complete JVM Convergence
- JavaScript Interop
- JavaFX 8
  - Public UI Control API
  - Java SE Embedded support
  - Enhanced HTML5 support

### JDK 9

- Jigsaw
- Interoperability
- Optimizations
- Cloud
- Ease of Use
- JavaFX JSR

2012

2013

2014

2015

### NetBeans IDE 7.2

- Support for JDK 7 on Mac
- Support for JavaFX on Mac and Linux

### Scene Builder 1.0

- Windows and Mac

### NetBeans IDE 7.3

- Scene Builder 1.1 support
- Scene Builder 1.1
- Linux support

### NetBeans IDE 8

- JDK 8 support
- Scene Builder 2.0 support

### Scene Builder 2.0

- JavaFX 8 support
- Enhanced Java IDE support

### NetBeans IDE 9

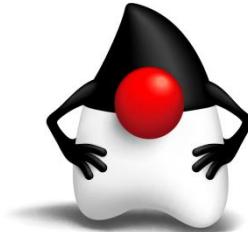
- JDK 9 support
- Scene Builder 3.0 support

### SceneBuilder 3.0

- JavaFX 9 support

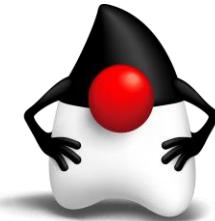
# Test Pilots Wanted

Java SE and JavaFX

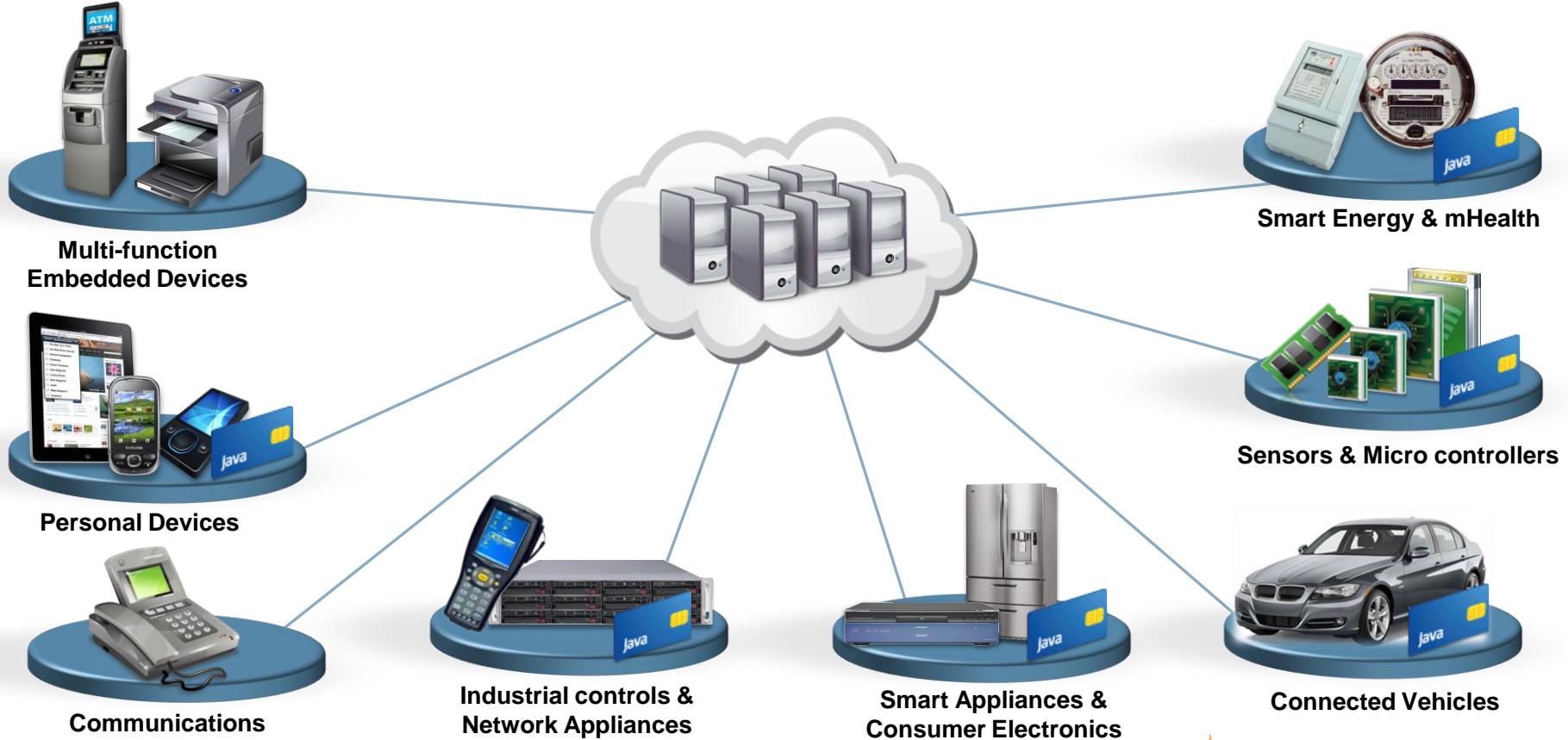


- Feature complete for JDK 8 in January of 2013, developer preview in February
  - Schedule on <http://openjdk.java.net/projects/jdk8>
- JDK 8 builds with many features already available
  - Try out Lambda and check out JavaFX 8
  - Early access on <http://jdk8.java.net/>
- Jigsaw builds also available from Java.net

# Java ME & Embedded

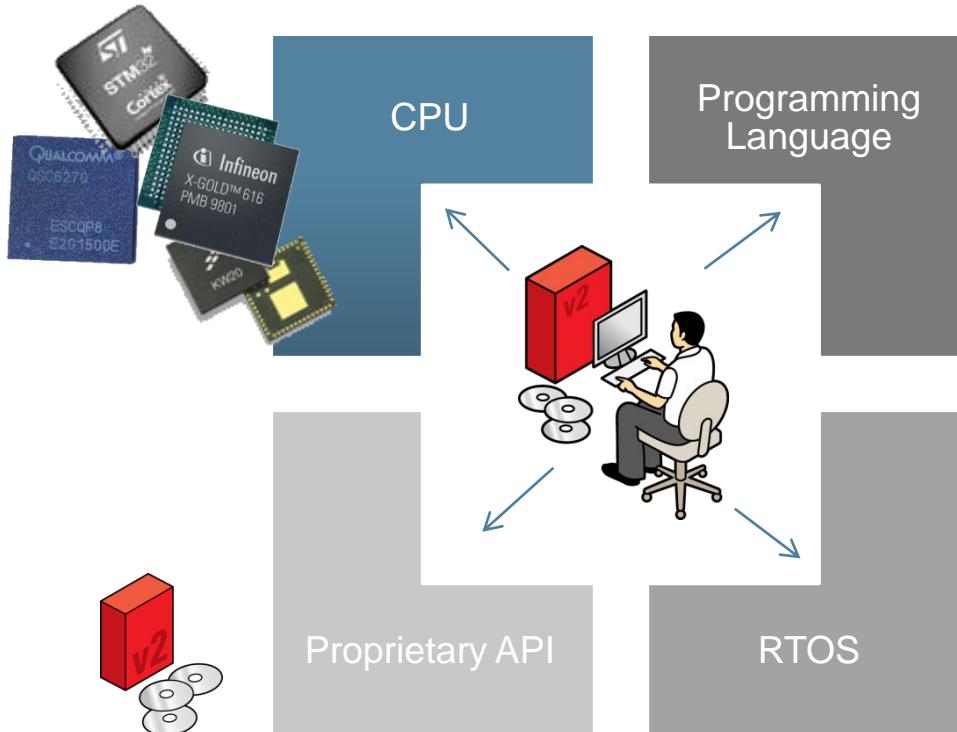


# Java Embedded



# Microcontroller S/W Development must adapt

Complexity of integration and maintainance

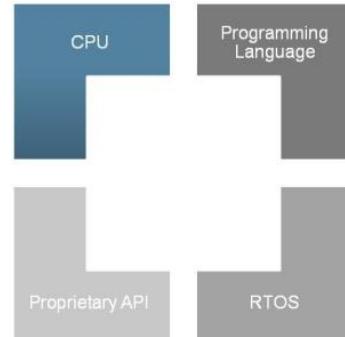


# Java lets You focus on the Customer Solution

Stop reinventing and reintegrating the plumbing



Java provides a common platform



# Oracle Java Embedded Offering Today



# New Embedded Releases

## Java ME Embedded 3.2

Runtime for small embedded devices: Microcontroller class platforms



EDGE DEVICES

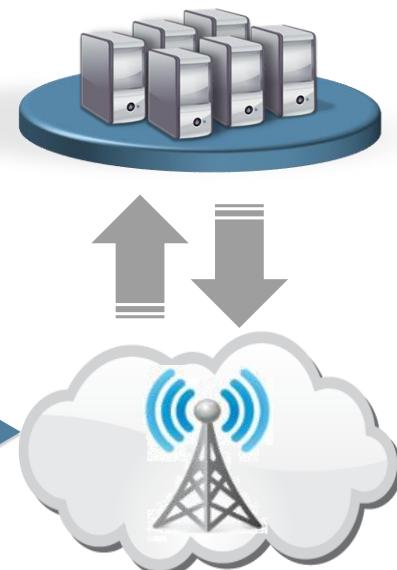
## Java Embedded Suite 7.0

Pre-integrated full featured Java Embedded Platform



GATEWAYS/CONCENTRATORS

## Enterprise Data & Applications



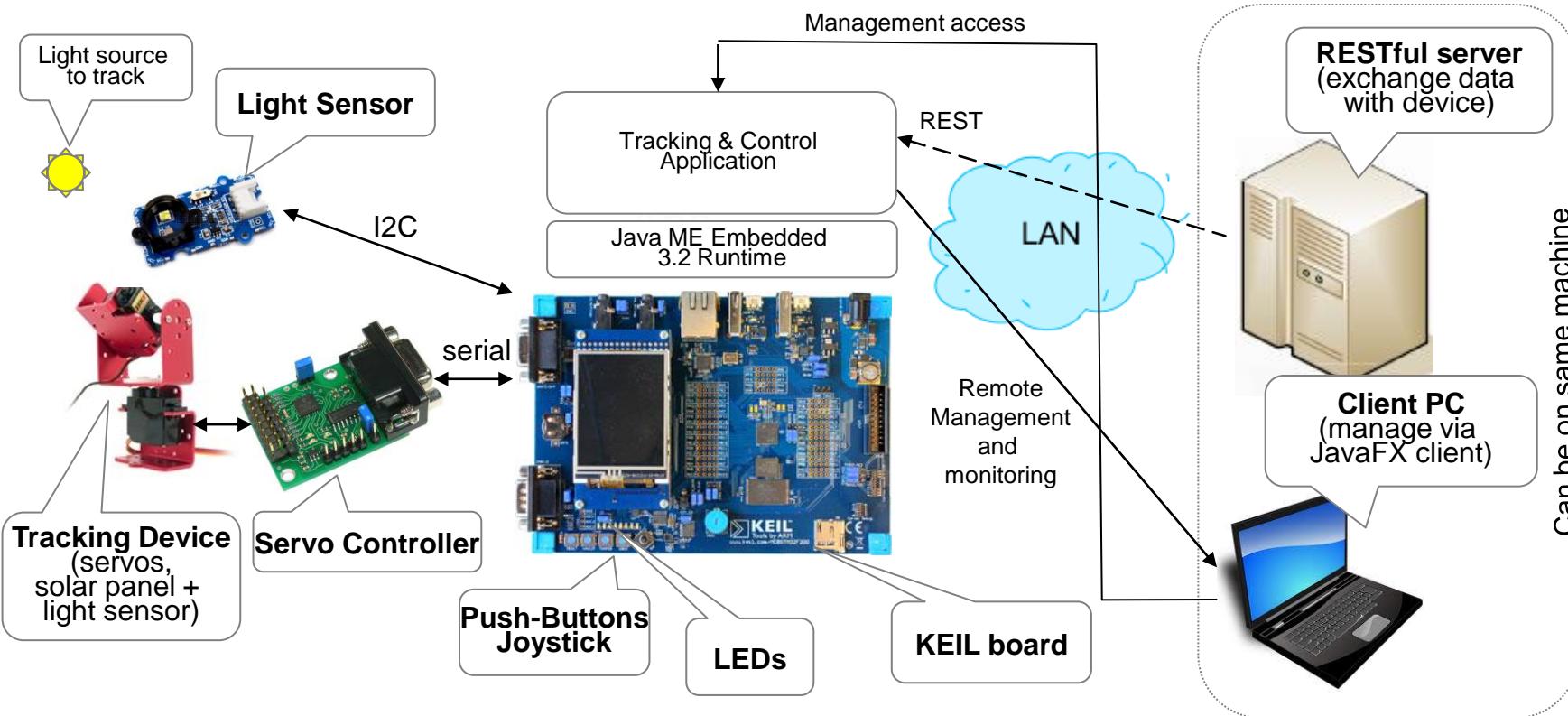
# Embedded H/W Evaluation Platform

Easy evaluation and prototyping

- Evaluation Board: Keil MCBSTM32F200
  - Based on ARM Cortex-M3 STM32F20X SOC
  - 120 MHz MCU clock, 2 MB RAM, 8 MB Flash
  - Readily available through distributors worldwide
- Peripherals supported by Java ME Embedded 3.2 release
  - Headless (no graphics)
  - Network (Ethernet TCP/IP)
  - SD card (file)
  - Serial port communications
  - Devices attached via I2C bus, SPI bus, GPIO, memory-mapped I/O

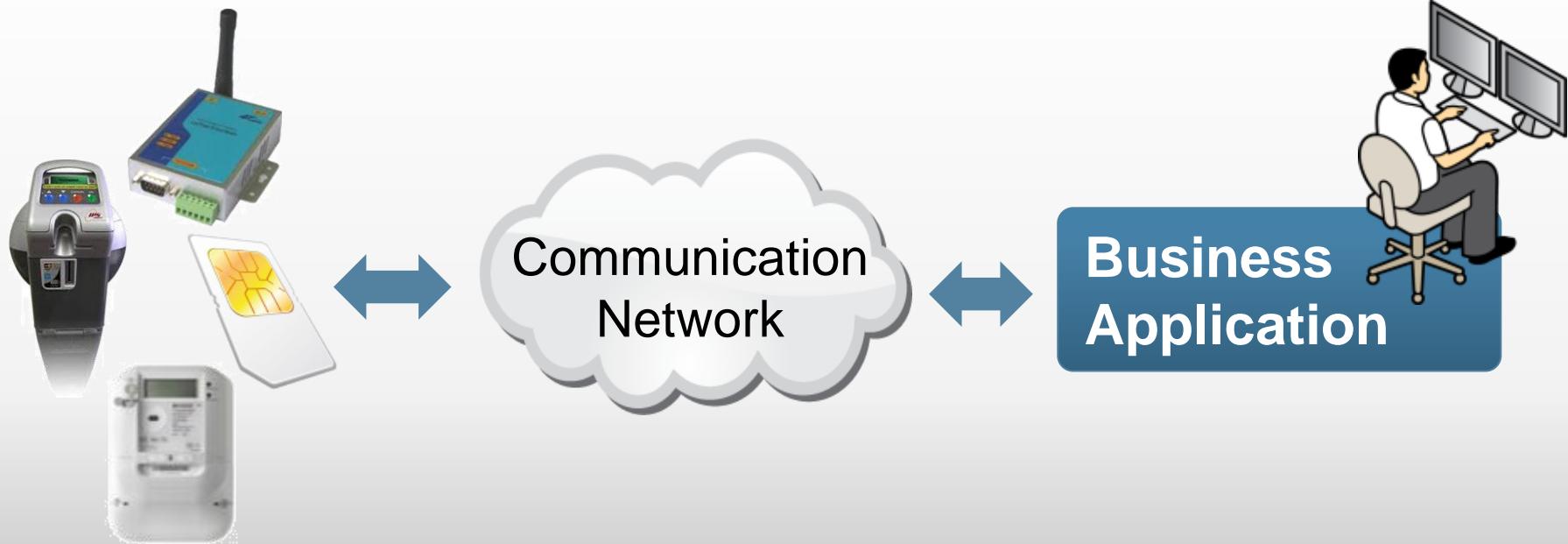


# Example Application: Smart Solar Tracking System



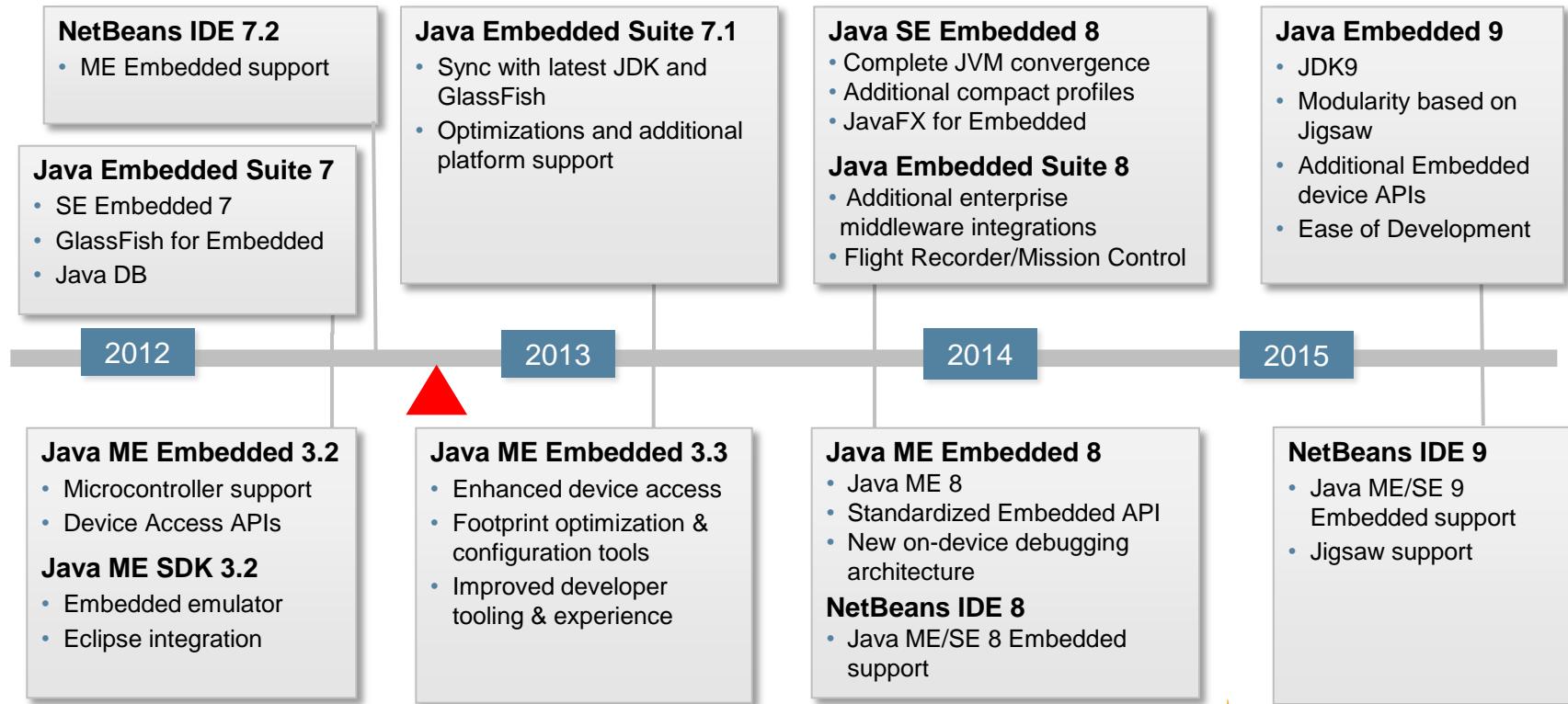
# Java Card

Building block for Embedded Security



# Roadmap

## Embedded Java

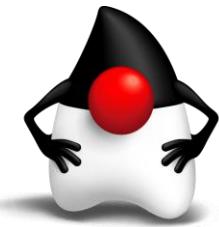


# Call to Action

Find out more about Embedded Java

- Download the latest releases and try Java Embedded
  - <http://www.oracle.com/technetwork/java/embedded/downloads>
- Join the Java Embedded community on Java.net

# Java EE



# Java EE Focus and Direction

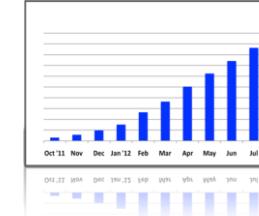


**Standard:** For Developing Enterprise Applications

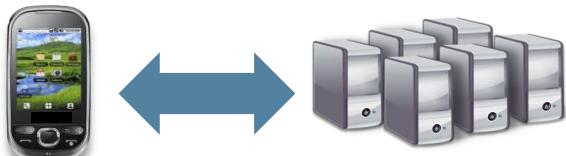
**Productivity:** For Enterprise Java Developers



**Portability:** Across vendors, across clouds



**Extensibility:** Embracing innovation



**Modularity:** Supporting modular design

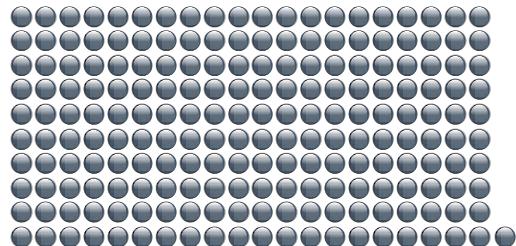
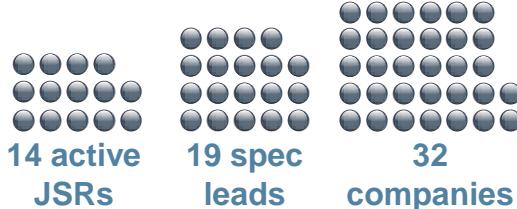
# Java EE Community



Java  
Community  
Process

Java EE 7

## 1 HUGE COMMUNITY



201 experts



Java EE 7



23 active projects, active  
and transparent mailing lists



GlassFish



51 promoted builds

# Java EE 6 Everywhere



?



# Feedback on Java EE 7

Java EE is **already 90% cloud ready** due to its focus on clear packaging, deployment and portability ...When it comes to the last 10% of unmet cloud needs, we are **clearly in a time of experimentation, not yet a time of standardization...** Vendors innovate, collectively we standardize. We are not done innovating in this space.



*David Blevins, Apache TomEE, Geronimo*

...it is a **brave and honest decision** of the EG to realign Java EE 7 to the community needs and make a second try on Cloud and PaaS with the Java EE 8 Platform release scheduled for the spring of 2015...



*Markus Eisele, Java EE Consultant  
<http://blog.eisele.net/>*



Java EE 7 Cloud features likely to be delayed until 2015 – your view?

Right call. Cloud standardization is a bad move with the market changing so much



52%

Speaking as a Java EE implementer, we (Red Hat) are **very much in support of this**. We've long advocated that we, the Java EE community **are not ready to standardize cloud yet**, and feel this is proven by OpenShift, our Java EE cloud offering, which is working well with Java EE 6.



*redhat. Pete Muir, Redhat*

# Java EE Past, Present, & Future

Simplicity  
& HTML5



Enterprise Java Platform		Robustness	Web Services	Ease of Development	Lightweight	Java EE 7
JPE Project	J2EE 1.2 Servlet, JSP, EJB, JMS RMI/IOP	J2EE 1.3 CMP, Connector Architecture	J2EE 1.4 Web Services Mgmt, Deployment, Async Connector	Java EE 5 Ease of Development, Annotations, EJB 3.0, JPA, JSF, Updated Web Services	Java EE 6 Pruning, Extensibility Ease of Dev, CDI, JAX-RS	JMS 2.0, Batch, JCache, TX Interceptors
May 1998	Dec 1999 10 specs	Sep 20110 13 specs	Nov 2003 20 specs	May 2006 23 specs	Web Profile Servlet 3.0, EJB 3.1 Lite	HTML5: WebSocket, JSON
					Web Profile JAX-RS 2.0	Q2 2013 33+ specs

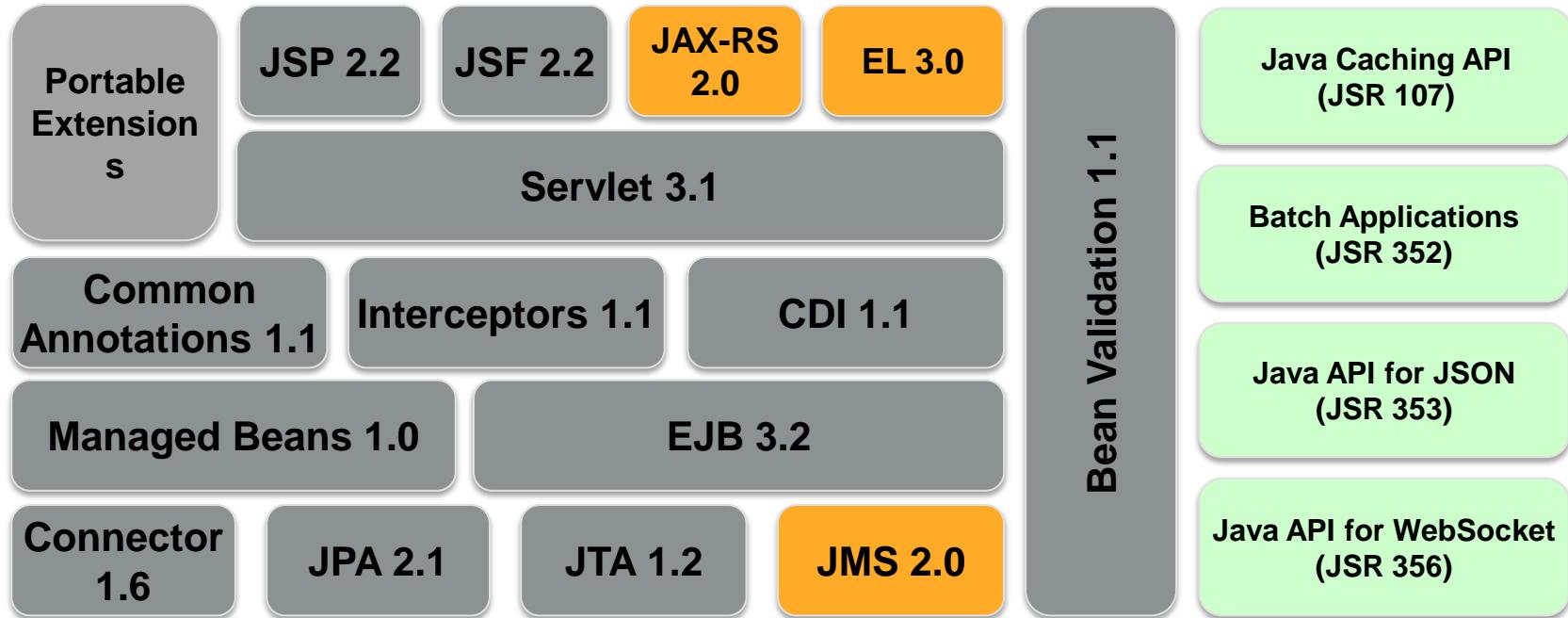
# Java EE 7 revised scope

## Productivity & HTML5

- Higher Productivity
  - Less Boilerplate
  - Richer Functionality
  - More Defaults
- HTML5 Support
  - WebSocket
  - JSON
  - HTML5 Forms



# Java EE 7 – JSR candidates

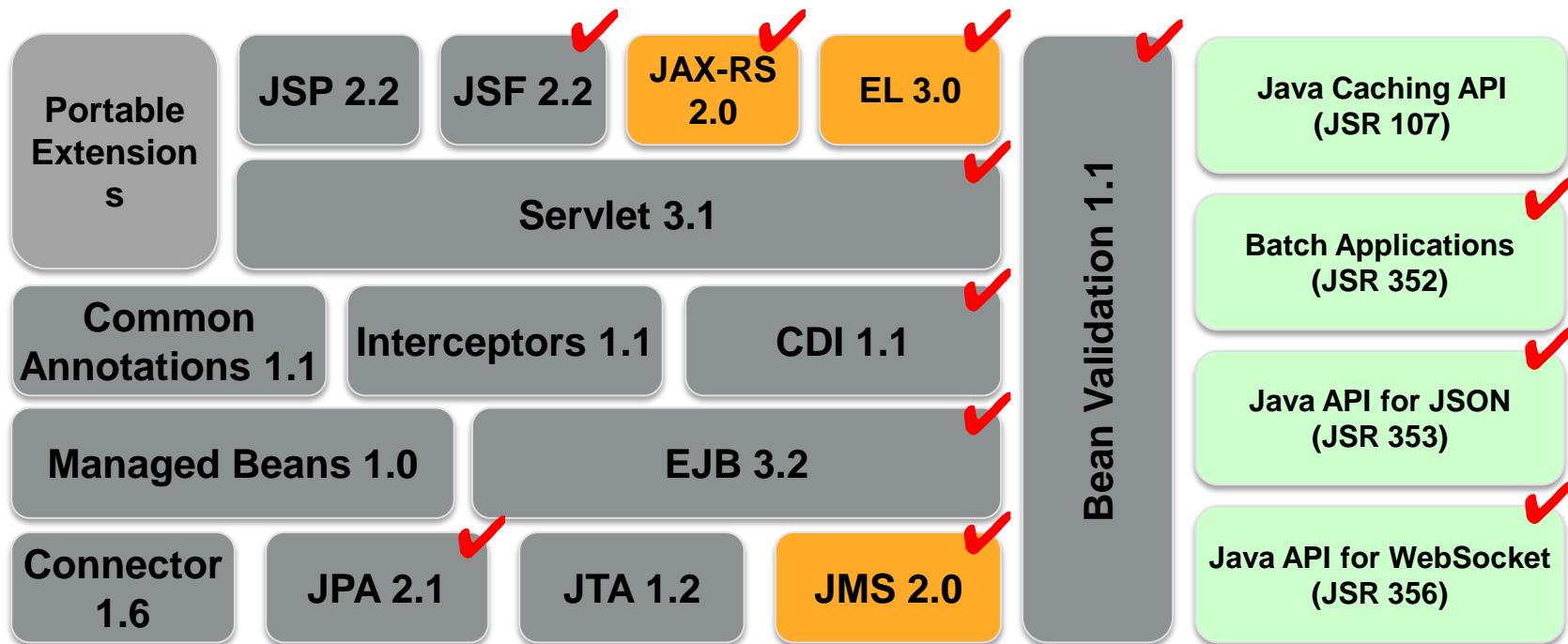


New

Major Release

Updated

# Java EE 7 – state



✓ Early/Public Drafts Available

# Java EE 7 reference implementation



[download.java.net/glassfish/4.0/promoted/](http://download.java.net/glassfish/4.0/promoted/)

# Java EE Persistence for NoSQL

- No existing NoSQL standard yet
- EclipseLink NoSQL – JPA Style
  - MongoDB
  - Oracle NoSQL
  - Cassandra planned
  - And more coming
- Feedback wanted!



```
@Entity  
@NoSql(dataFormat=MAPPED)  
public class Order {  
  
    @Id  
    @Field(name="_id")  
    private String id;
```

# Java EE 8 and beyond

Standards-based cloud programming model

- Deliver cloud architecture
- Multi tenancy for SaaS applications
- Incremental delivery of JSRs
- Modularity based on Jigsaw (SE 9)

