Java Leaders Summit
Java SE

Staffan Friberg
Product Manager

Java Platform Group
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Introduction

Staffan Friberg

• Product Manager in the Java Platform Group at Oracle
• Responsible for the JVMs – HotSpot and JRockit
• Background as performance lead for JRockit
Agenda

- JDK 7 recap
- JDK 7 update releases
- JVM convergence update
- JDK 8
JDK 7
JDK 7 – Feature Recap

InvokeDynamic

• GE Energy Uses InvokeDynamic to Bring Magik to the JVM

• JAX 2012 - Invokedynamic: You ain't seen nothing yet

• How invokedynamic just might save dynamic languages on the JVM
JDK 7 – Feature Recap

NIO.2

• Five ways to maximize Java NIO and NIO.2

• New in Java 7: the NIO.2 API

• What's new in Java 7 - The (Quiet) NIO File Revolution
  – 2012-01-20 - http://codingjunkie.net/java7-file-revolution/
JDK 7 – Feature Recap

Fork-Join Framework

• Simple introduction to Fork-Join Framework in Java 7

• An Introduction to the Fork / Join Framework

• Java 7 Fork/Join Framework
JDK 7 – Feature Recap

Project Coin

• @SafeVarargs, Diamond Operator, Multi-catch, Improved Literals, Strings in Switch, Try-with-resources

• Java 7: Project Coin in code examples

• NetBeans 7 and Project Coin

• Project Coin Rocks!
JDK 7 – Feature Recap

• Security
  – Native ECC, TLS 1.2
  – ASLR, DEP

• Internationalization
  – Unicode 6.0, IETF BCP47, UTR 35
JDK 7

Where to find the info…

• On the JDK 7 Release notes
  – http://www.oracle.com/technetwork/java/javase/jdk7-relnotes-429209.html

• Where to find:
  – Search JDK 7
  – Choose the Java SE Downloads
  – Release Notes
  – Release notes for 1.7.0
## JDK 7 Releases

<table>
<thead>
<tr>
<th>Release</th>
<th>What’s new</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Initial GA release</td>
</tr>
<tr>
<td>7u1</td>
<td>Security Fixes</td>
</tr>
</tbody>
</table>
| 7u2     | Solaris 11  
Firefox updates  
JavaFX 2.0.2 (Windows)  
Deployment updates |
| 7u3     | Security Fixes |
| 7u4     | Mac OS X 10.7 (JDK)  
G1  
JavaFX 2.1 (Mac OS X)  
Update JAXP and Java DB |
| 7u5     | Security Fixes |

<table>
<thead>
<tr>
<th>Release (cont)</th>
<th>What’s new</th>
</tr>
</thead>
</table>
| 7u6             | Mac OS X 10.7 (JRE)  
Linux ARM (JDK)  
JavaFX 2.2 (Linux)  
Access Bridge on JRE  
Alternative Hash |
| 7u7             | Security Alert – Security Fixes |
| 7u8             | N/A Number skipped to keep Sec Fixes Odd |
| 7u9             | Security Fixes |
| 7u10            | Mac OS X 10.8  
Windows 8  
Windows Server 2012  
Security Enhancements |
| 7u11            | Security Alert – Security Fixes |
Java Critical Patch Updates

Every 4 months

7 GA  7u1  7u2  7u3  7u4  7u5  7u6  7u9
CPU  Non CPU  CPU  Non CPU  CPU  Non CPU  CPU

Rules for Java CPUs

- Main release for security vulnerability fixes
- Covers all families (7, 6, 5.0, 1.4.2)
- CPU release update the security baseline which triggers auto-update
- Dates published 12 months in advance
- Based off the previous (non-CPU) release
- Released simultaneously on java.com and OTN
- Security Alerts are released as necessary
JDK Releases
Update schedule and Security Baseline

7 GA
CPU

7u1
Non
CPU

7u2
CPU

7u3
Non
CPU

7u4
CPU

7u5
Non
CPU

7u6
CPU

7u7
Non
CPU

Sec Alert
CPU

7u9
Non
CPU

7u10
CPU

Security Baseline
7u10

New security features

- Option to centrally disable plugin
- Hard-coded best-before date
- User-configurable security levels for accessing the JRE through a browser
What to expect

• Linux ARM v6/v7 Hard-Float ABI
• Better Packing tool for Mac OS X App files
• Performance Optimizations
  NumberFormat/DecimalFormat(double...)
• Updated Security Dialogs
• Commercial Feature:
  – Java Mission Control (JMC) included on Oracle’s JDK
JVM CONVERGENCE
PROGRESS UPDATE
<table>
<thead>
<tr>
<th>Feature</th>
<th>Delivered on</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>JDK 7u4</td>
<td>Oracle JDK/HotSpot performance is on par or better compared to JRockit and JDK 6 for most (&gt;90%) of the Oracle applications. Outages found will be treated as bugs by the performance team.</td>
</tr>
<tr>
<td>Diagnostic Commands</td>
<td>JDK 7u4</td>
<td>Diagnostic Commands back-end and most important commands</td>
</tr>
<tr>
<td>JMX Agent Improvements</td>
<td>JDK 7u4</td>
<td>Enable start/stop and port configuration to enable firewall compatibility</td>
</tr>
</tbody>
</table>
## JVM Convergence Project

**JRockit ➔ Hotspot – In progress**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Incremental deliveries on</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Debug Symbols</td>
<td>JDK 7u4, 7u6, 7u+</td>
<td>Faster debugging for Support and Sustaining Engineering.</td>
</tr>
<tr>
<td>Java Flight Recorder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Java Mission Control</td>
<td>JDK 7u4, 7u+</td>
<td>Support for WLDF in 7u4. Will increase number of events in later releases.</td>
</tr>
<tr>
<td>No PermGen</td>
<td>JDK 8</td>
<td>Remove artificial memory limitation. Both a convergence and a general HotSpot improvement.</td>
</tr>
</tbody>
</table>
# JVM Convergence Project

**JRockit ➔ Hotspot – Planned**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Memory Tracking</td>
<td>Track JVM internal allocation.</td>
</tr>
<tr>
<td>Remote Diagnostic Commands</td>
<td>Allow remote execution of diagnostic commands and not just via command line tool.</td>
</tr>
<tr>
<td>Java Discovery Protocol</td>
<td>Detect remote Java processes running on the local network.</td>
</tr>
<tr>
<td>Compiler Control and Logging</td>
<td>Allow better insight into what the compiler did with the code, and enable SE/Support to avoid issues by removing optimizations steps.</td>
</tr>
</tbody>
</table>
## JVM Convergence Project

### JRockit ➔ Hotspot – Pending

<table>
<thead>
<tr>
<th>Feature</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>More Diagnostic Commands</td>
<td>Extend commands to be on par with the general JRockit Diagnostic Commands. Commands for specific features will be managed as part of those features.</td>
</tr>
<tr>
<td>JRockit Memleak</td>
<td>Needs a new communication protocol for better security, and how we can manage the multiple GC available in HotSpot.</td>
</tr>
<tr>
<td>Improved Verbose Logging</td>
<td>A unified logging framework.</td>
</tr>
<tr>
<td>JRRT Replacement</td>
<td>In discussion with GC team on available solutions</td>
</tr>
</tbody>
</table>
Java Mission Control
Java Mission Control
Java Mission Control
JAVA IN THE ENTERPRISE
Challenges for Java in the Enterprise
More than 90% of all enterprises use Java

- Older Java versions continue to live on
- Older (EoPU) releases need security fixes
- IT systems rapidly change, providing loopholes for hackers
- Incompatibility issues with changes in IT environments
## Enterprise-Grade Java SE

**Commercial Offerings Designed To Meet Enterprise Needs**

<table>
<thead>
<tr>
<th>24x7 access to updates for any supported Java version family</th>
<th>Two leading VMs – HotSpot &amp; JRockit – in a single package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced profiling and diagnostics tools for production environments</td>
<td>Advanced JRE features for low latency requirements</td>
</tr>
<tr>
<td>Significantly lowered security risk for older (EoPU) releases</td>
<td>Enterprise usage tracking of Java deployments. Simplified control of Java updates</td>
</tr>
</tbody>
</table>
Java SE Commercial Products

Java SE Advanced
Java SE Platform enhanced with enterprise-grade features for monitoring, manageability, and analytics.

- Monitor, manage, and profile Java applications without performance overhead
- Leverage a “time-machine” for back-in-time root cause analysis and profiling
- Enterprise JRE features i.e. usage tracking

Java SE Support
Oracle Premier Support for Java SE.

- 24x7 support, offered in 27 local languages
- Security updates on older and current releases
- Only source for Java SE 6 updates after Feb 2013

Java SE Suite
Java SE Platform hardened for mission critical applications having extreme and predictable performance needs.

- Soft real-time deterministic garbage collector for mission critical applications
- Memory leak server for dynamic memory leak detection on mission critical production systems
ROADMAP
Java SE Roadmap

**7u6**
- JRE on Mac complete
- JavaFX 2.2 integration
- Linux ARM V6/V7
- JavaFX on Mac
- JavaFX on Linux

**7u10**
- Java Client Security Enhancements

**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
- 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

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**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

**Scene Builder 3.0**
- JavaFX 9 support
JDK 8
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
- ResourceBundle
- BCP47 locale matching
- Globalization & Accessibility

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

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

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

Innovation & Core Libraries
- Lambda aka Closures
- Profiles for constrained devices
- Parallel operations for core collections APIs

Java for Everyone & General Goodness
- Profiles for constrained devices
- Unicode 6.2
- JVM enhancements

Tools & Security
- Compiler control & logging
- App Store Bundling tools
- Limited doPrivilege
for (Shape s : shapes) {
    if (s.getColor() == BLUE) {
        s.setColor(YELLOW);
    }
}
shapes.forEach(s -> {
    if (s.getColor() == BLUE) {
        s.setColor(YELLOW);
    }
});
interface Collection<T> {
    default void forEach(Block<T> action) {
        for (T t : this) {
            action.apply(t);
        }
    }
}
shapes.forEach(s -> {
    if (s.getColor() == BLUE) {
        s.setColor(YELLOW);
    }
});
shapes.filter(s -> s.getColor() == BLUE)
.forEach(s -> { s.setColor(YELLOW); });
shapes.parallel().filter(s -> s.getColor() == BLUE)
  .forEach(s -> { s.setColor(YELLOW); });
COMPACT PROFILES
JDK 8 News!

• Nashorn is now open source on OpenJDK
  – 2012-12-21 - http://openjdk.java.net/projects/nashorn
  – 2012-12-21 - https://blogs.oracle.com/nashorn/entry/open_for_business

• First EA of JDK 8 for Linux ARM available on java.net
  – Include JavaFX
  – Works on Raspberry Pi

• Netbeans EA with support for Lambda has been released
  – 2012-12-14 - http://wiki.netbeans.org/JDK8
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
LOOKING FORWARD
To Java SE 9 and Beyond!

- Project Sumatra – Java for GPUs
- Lang Enhancements
- Resource Management
- Optimizations
- Multi-Tenancy Support
- Jigsaw
- Improved Integration with Native
- Cloud
- OpenJFX
- Self Tuning JVM
- Generic Lang Interoperability
- Ease of use
- Unified Type System
- Data Structure Optimizations
- Penrose
- Ports: Power PC/AIX