

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT

**LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.**

www.theredhatsummit.com

Java - From OpenJDK to Red Hat Enterprise Linux and What Lies Ahead

Deepak Bhole
Sr. Software Engineer, Red Hat Inc.
May 5th 2011

SUMMIT

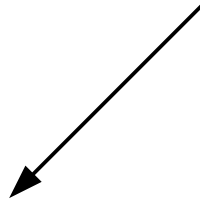
**JBoss
WORLD**

PRESENTED BY RED HAT



- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's role
- The future of Java
 - Version 7
 - Version 8
- Questions

Persistent index will always show current point



Agenda

This presentation is designed to be used with audio as a primary mode of content delivery. If you have downloaded it, see notes section for rough notes on applicable slides (draft quality). For pdf, it should be at the end of the slide deck.

SUMMIT

**JBoss
WORLD**

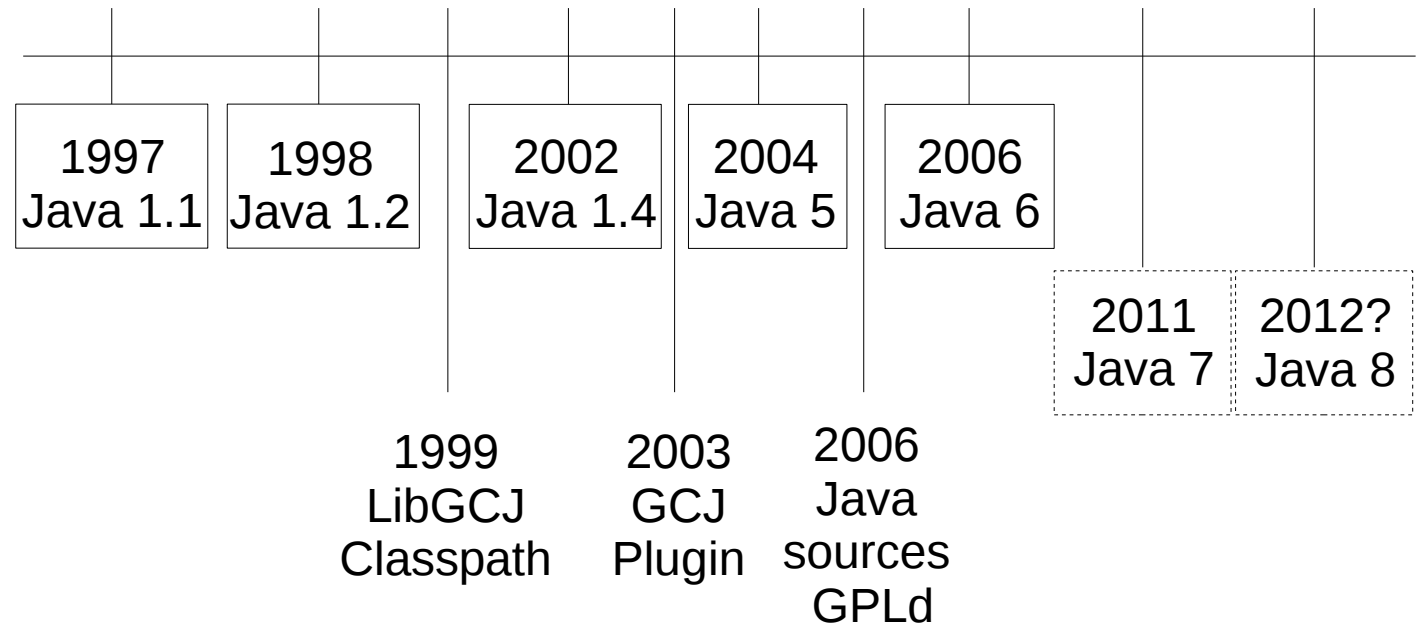
PRESENTED BY RED HAT



History of Java

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's role
- The future of Java
 - Version 7
 - Version 8
- Questions

- Timeline:



+ GCJ stands for **GNU Compiler for Java**

++ GPL stands for **GNU General Public License**

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK

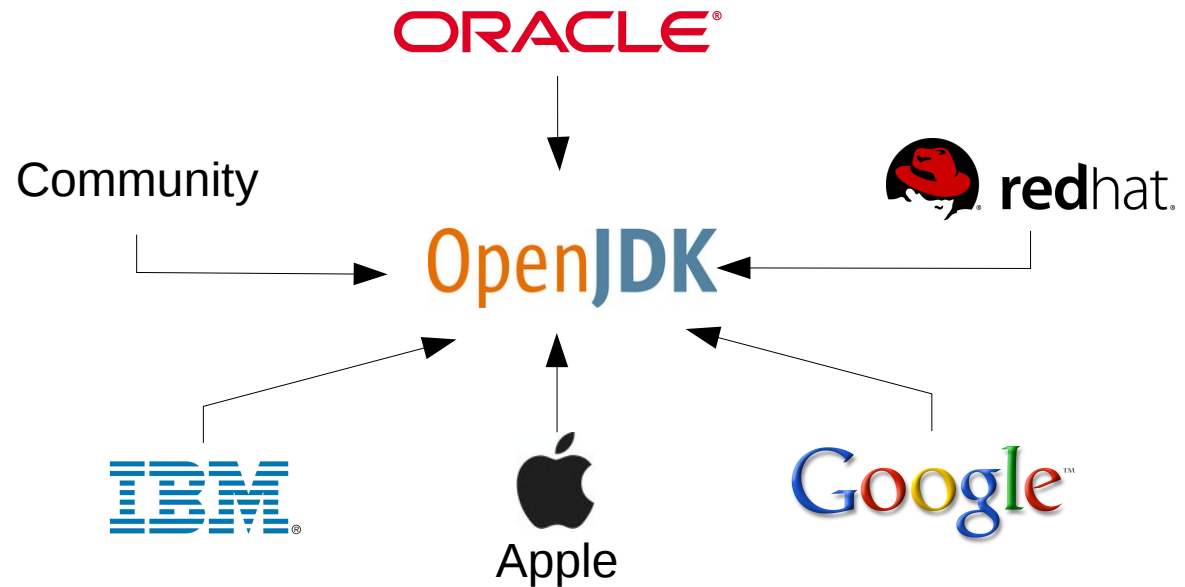
- OpenJDK/IcedTea

- History of Java
- OpenJDK
 - What?
 - vs JDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
- Version 8

- Questions



⁺JDK stands for **J**ava **D**evelopment **K**it

All company logos are copyright by their respective owners

SUMMIT

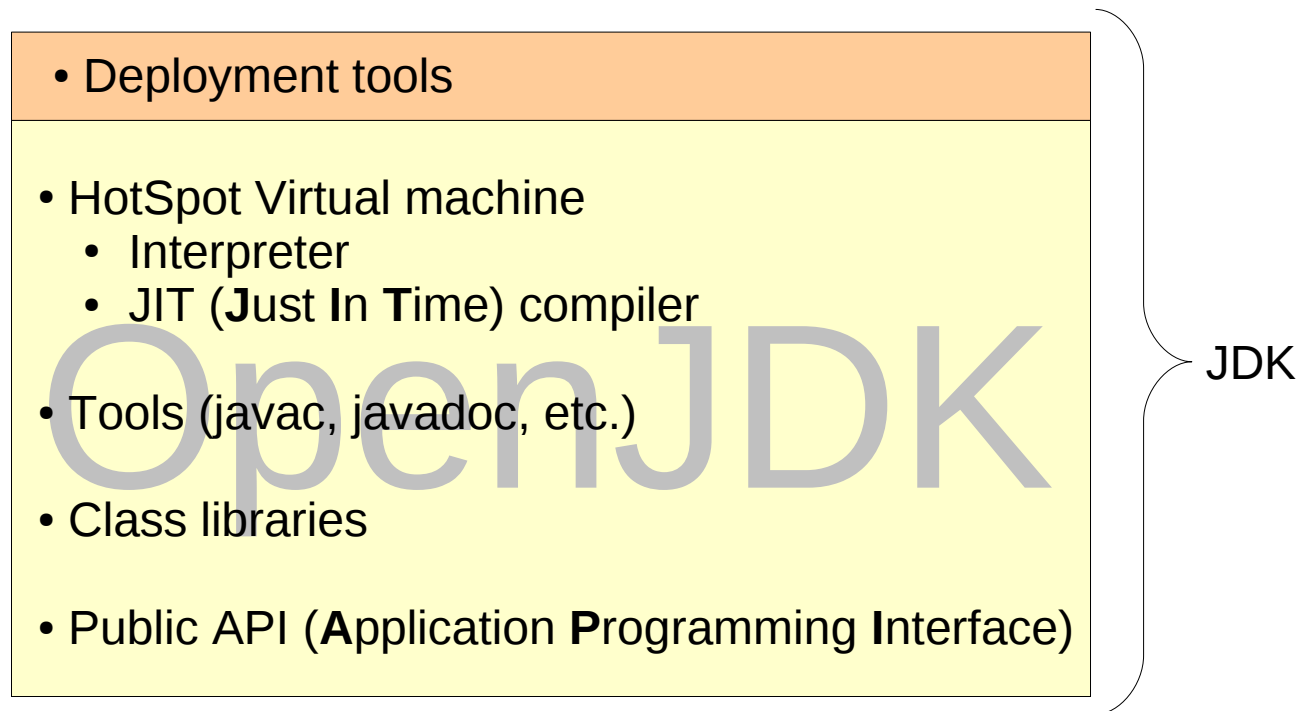
**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK vs JDK (current)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - What?
 - vs JDK
 - Current
 - Future
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK vs JDK (future)

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- What?

- vs JDK

- Current

- Future

- IcedTea

- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions

- Deployment tools
- Serviceability tools

- HotSpot Virtual machine
 - Interpreter
 - JIT compiler
- Tools (javac, javadoc, etc.)
- Class libraries
- Public API

JDK

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK6 vs JDK6

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- What?

- vs JDK

- 6

- 7

- IcedTea

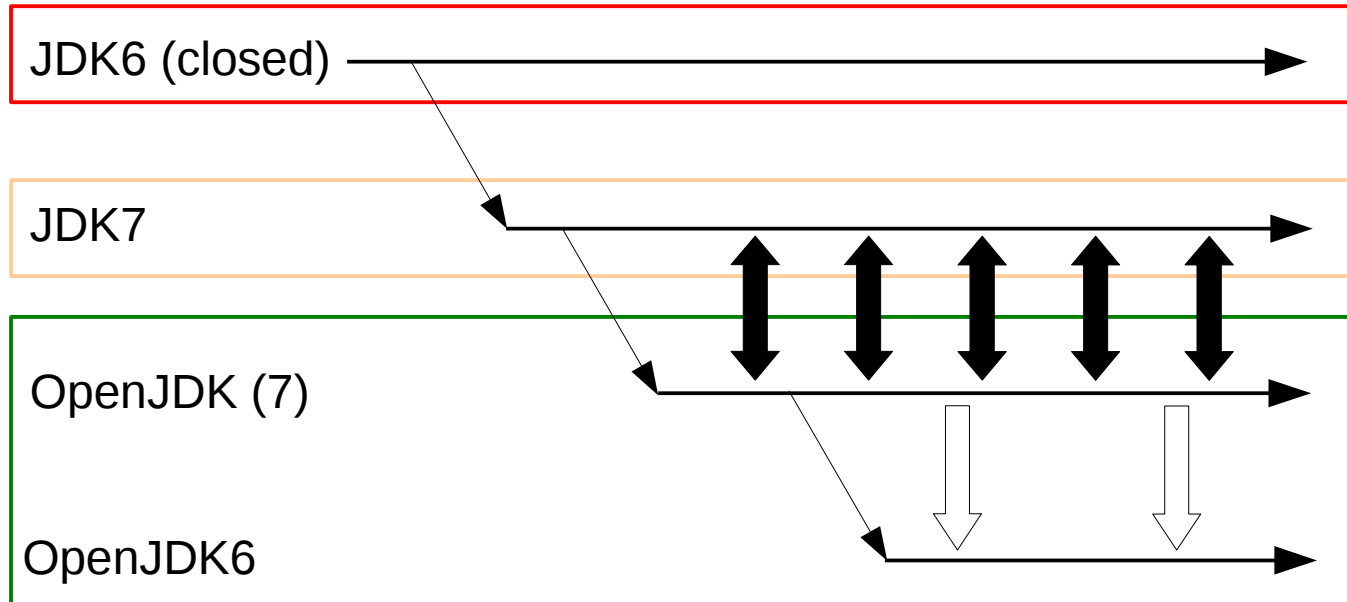
- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions



- Proprietary
- Semi-open (development in open + some proprietary patches)
- Open

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK7 vs JDK7

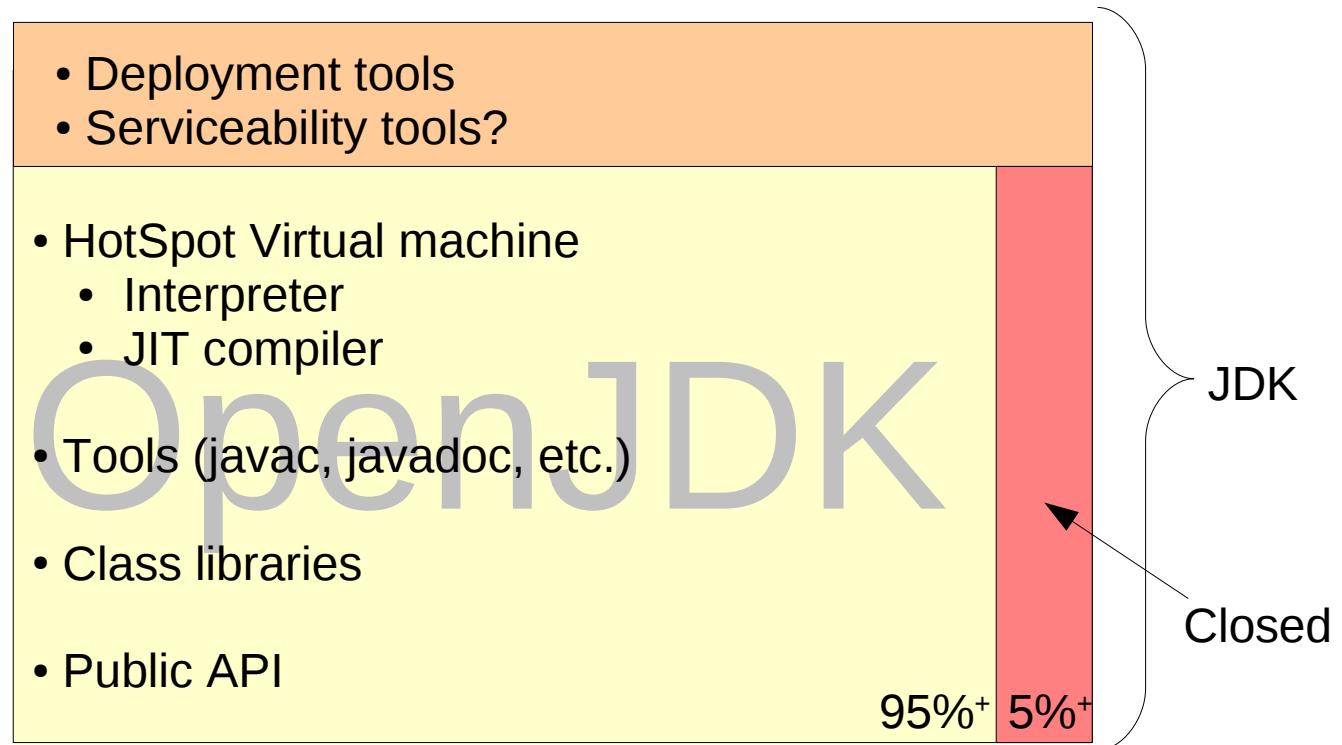
- OpenJDK/IcedTea

- History of Java
- OpenJDK
 - What?
 - vs JDK
 - 6
 - 7
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
- Version 8

- Questions



⁺ As heard at JavaOne

SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



What is IcedTea?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

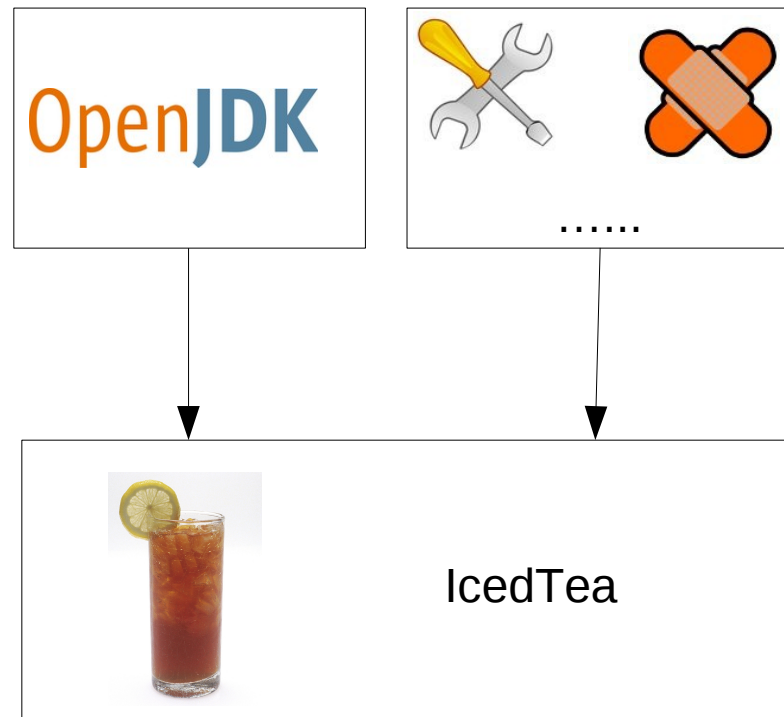


Image sources:

<http://www.openclipart.org/detail/22436>

<http://www.openclipart.org/detail/22712>

SUMMIT

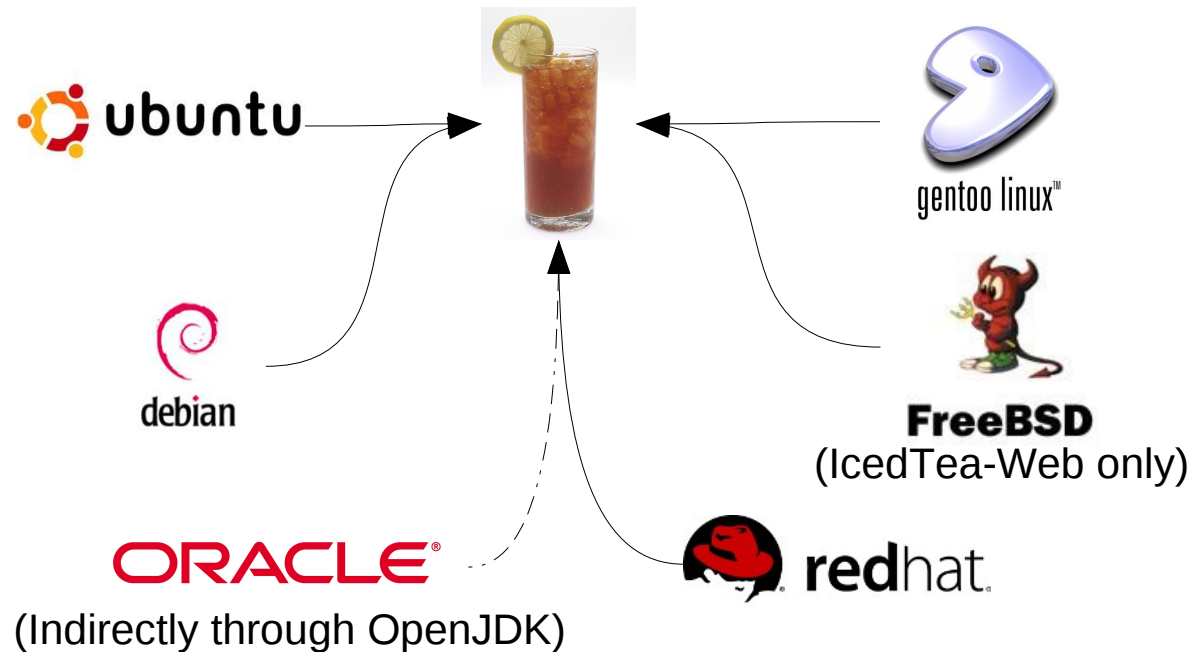
**JBoss
WORLD**

PRESENTED BY RED HAT



Some of the contributors...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Who is involved?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



All logos are copyright by their respective owners

SUMMIT

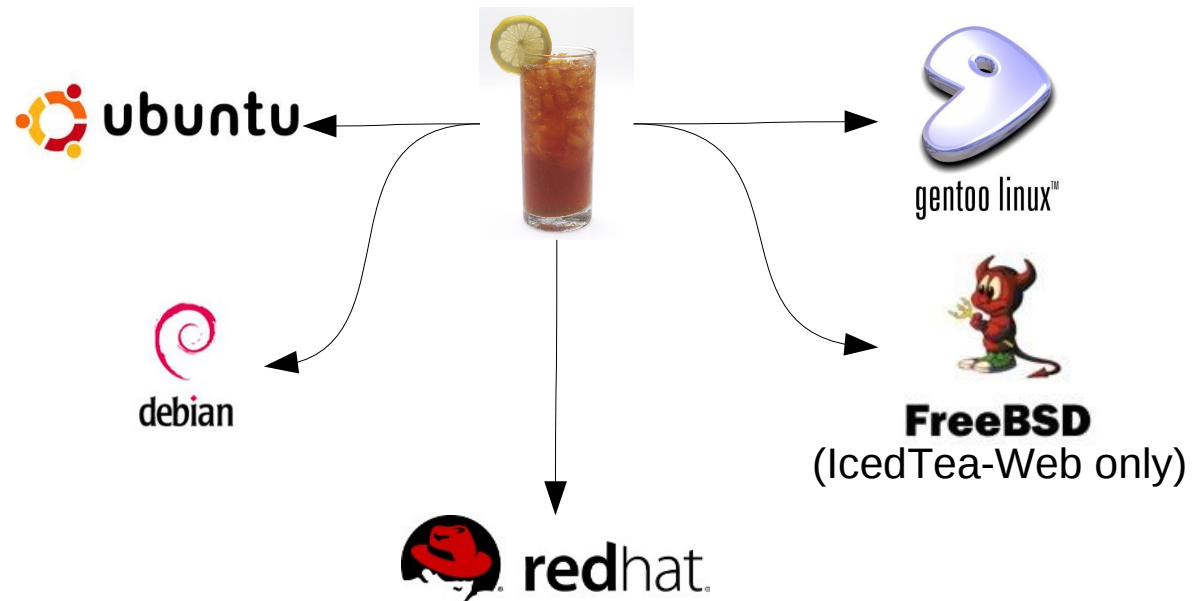
**JBoss
WORLD**

PRESENTED BY RED HAT



Some of the users...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Who is involved?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

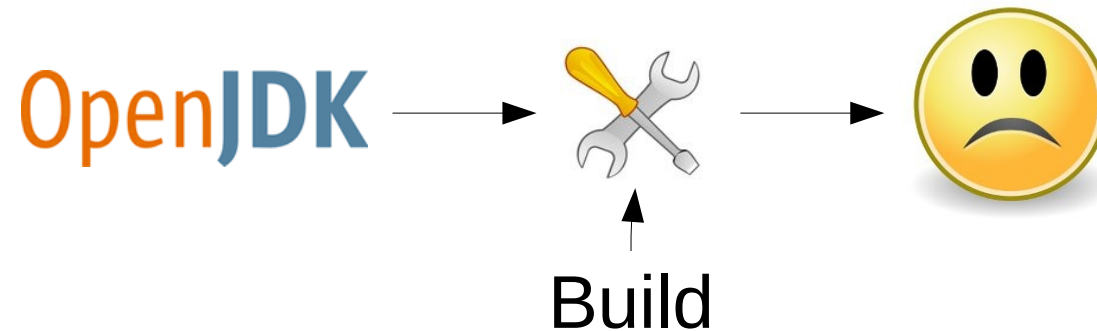
**JBoss
WORLD**

PRESENTED BY RED HAT



Why was IcedTea created?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



(For the first release...)

Image sources:
<http://www.openclipart.org/detail/30223>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



To fix the build...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



Image sources:
<http://www.openclipart.org/detail/30217>

SUMMIT

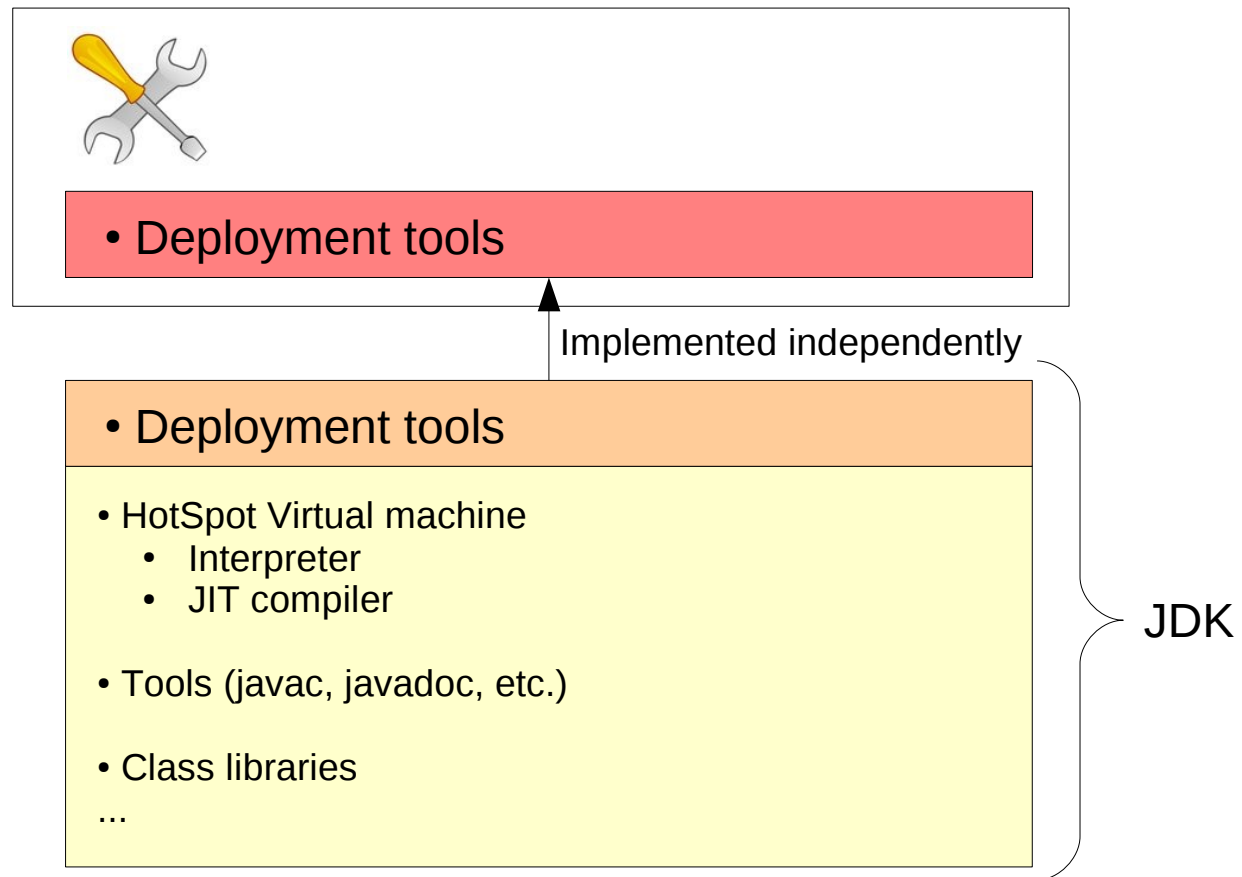
**JBoss
WORLD**

PRESENTED BY RED HAT



To fill what's missing...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

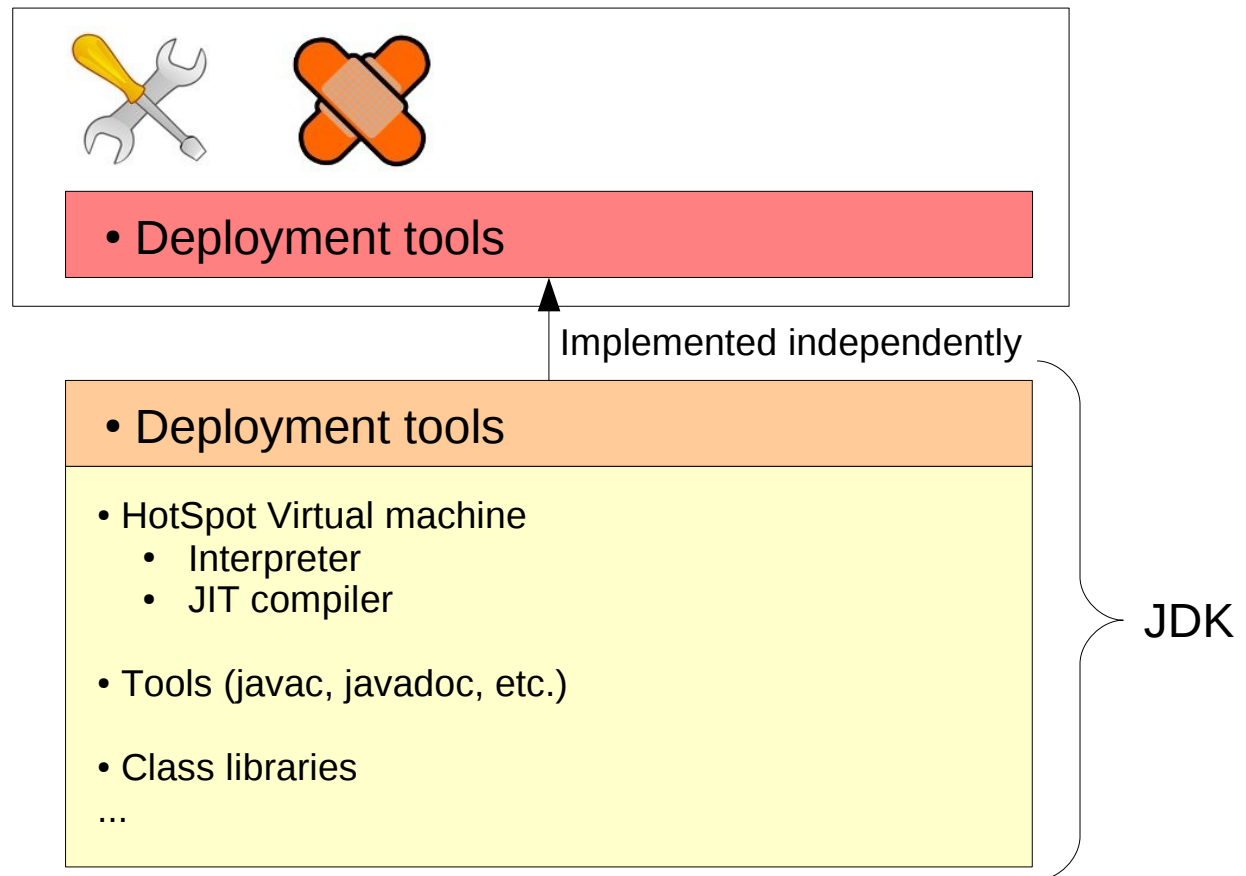
**JBoss
WORLD**

PRESENTED BY RED HAT



To back patch fixes...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



To support additional architectures...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

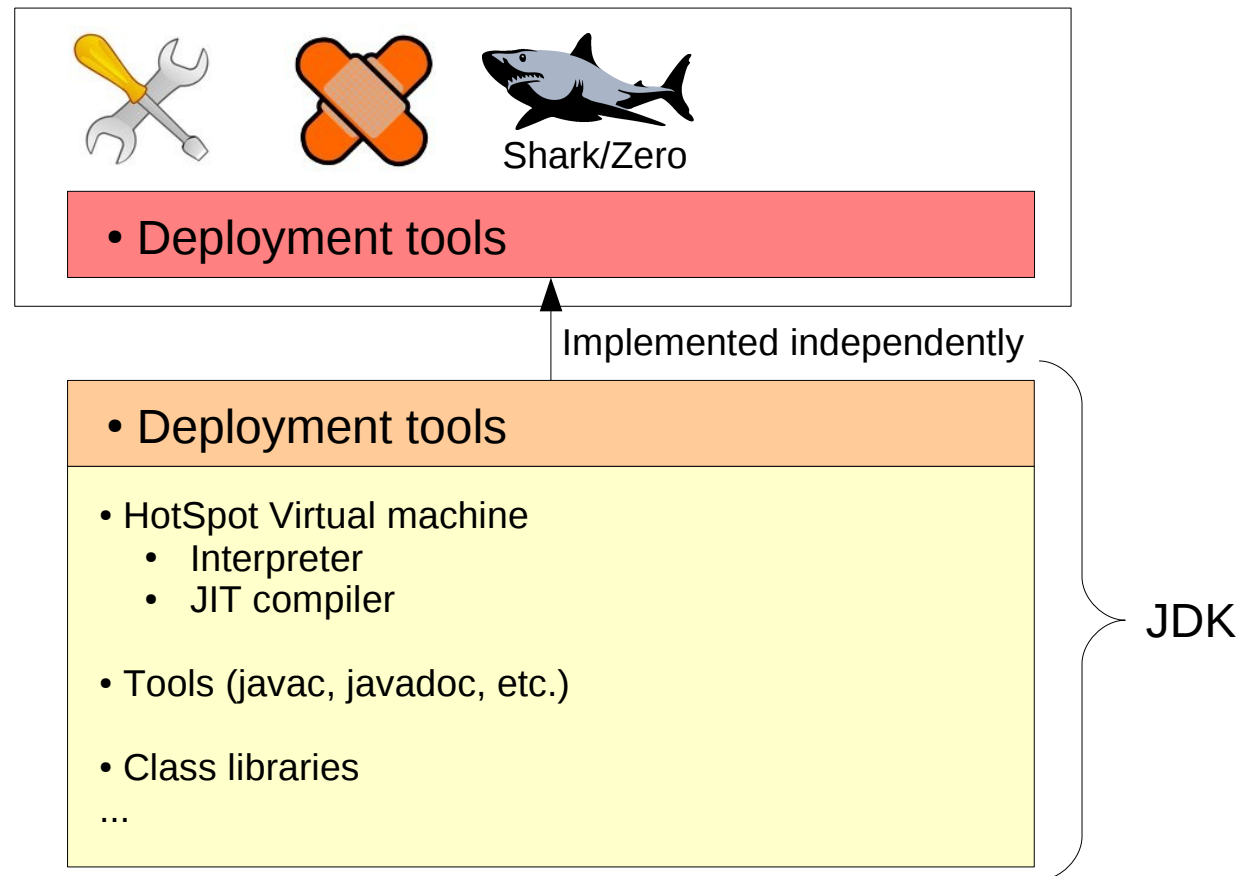


Image sources:

<http://www.openclipart.org/detail/132973>

SUMMIT

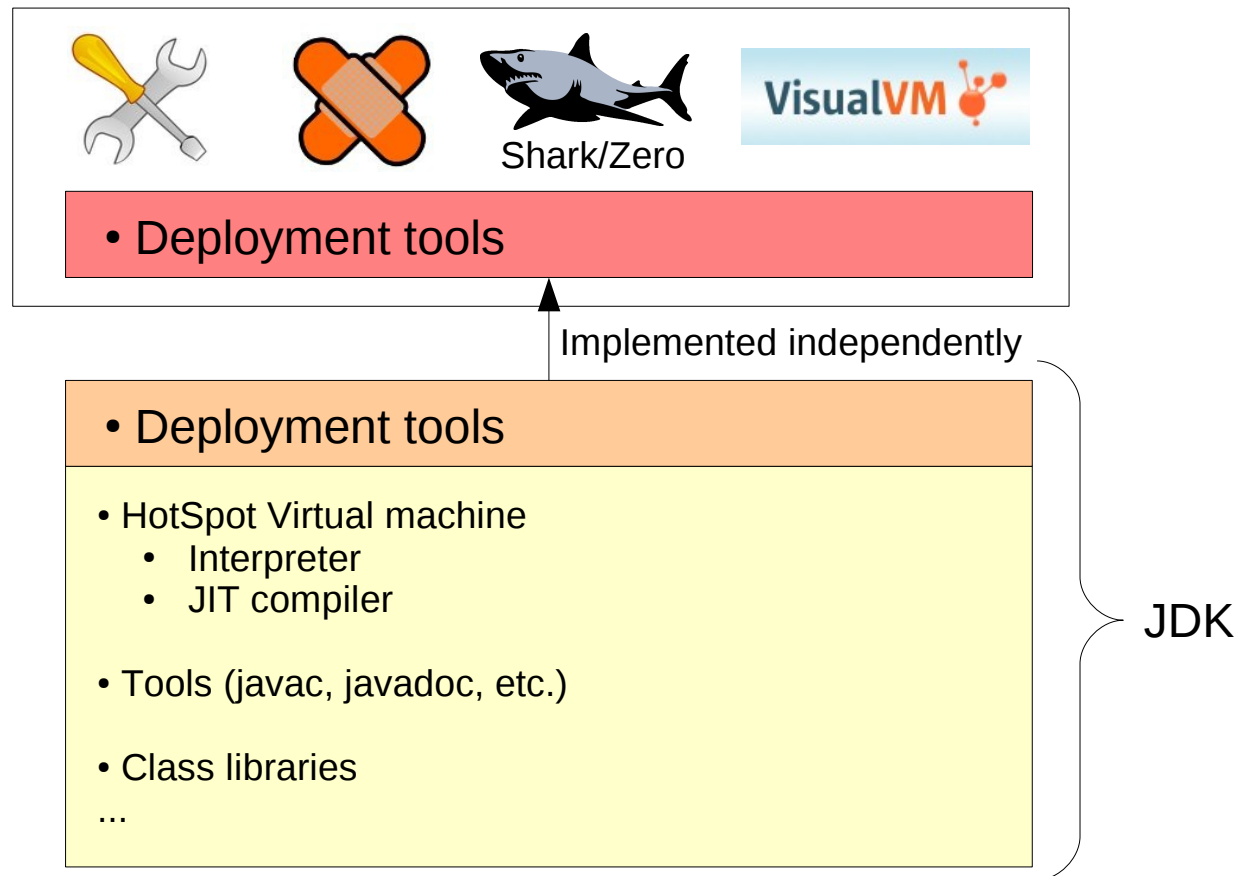
**JBoss
WORLD**

PRESENTED BY RED HAT



To support additional tools...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

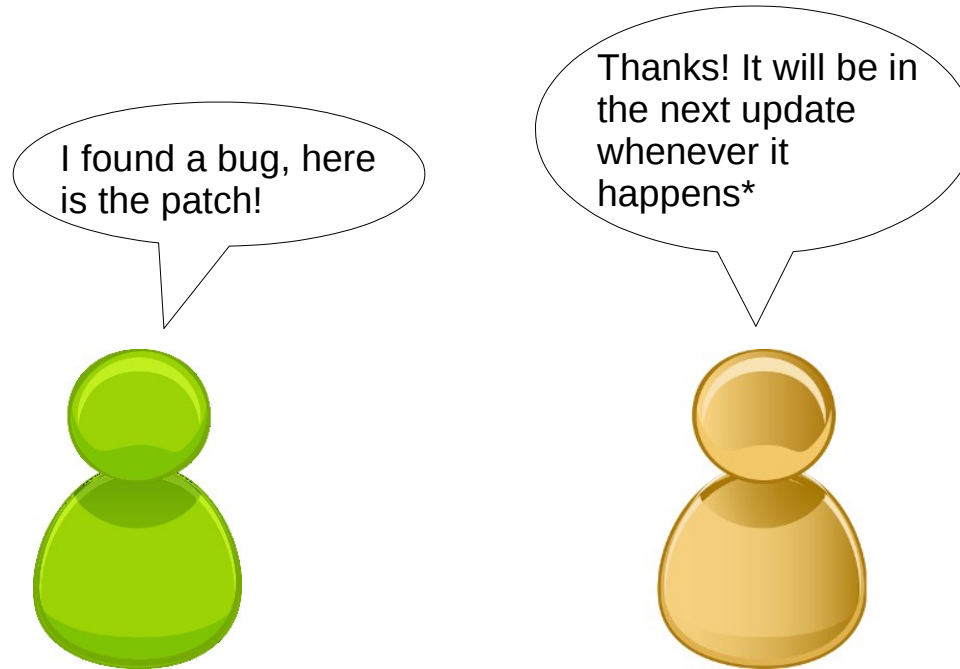
**JBoss
WORLD**

PRESENTED BY RED HAT



Fixes (with OpenJDK)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



** OpenJDK has a slower release cycle and it is not set in advance*

Image sources:
<http://www.openclipart.org/detail/34957>

SUMMIT

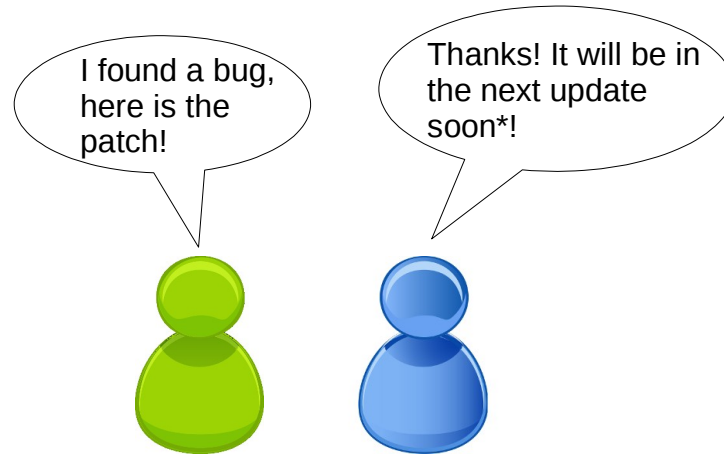
**JBoss
WORLD**

PRESENTED BY RED HAT



Fixes (with IcedTea)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



** IcedTea has a faster release cycle dictated by importance of fixes since last release*

SUMMIT

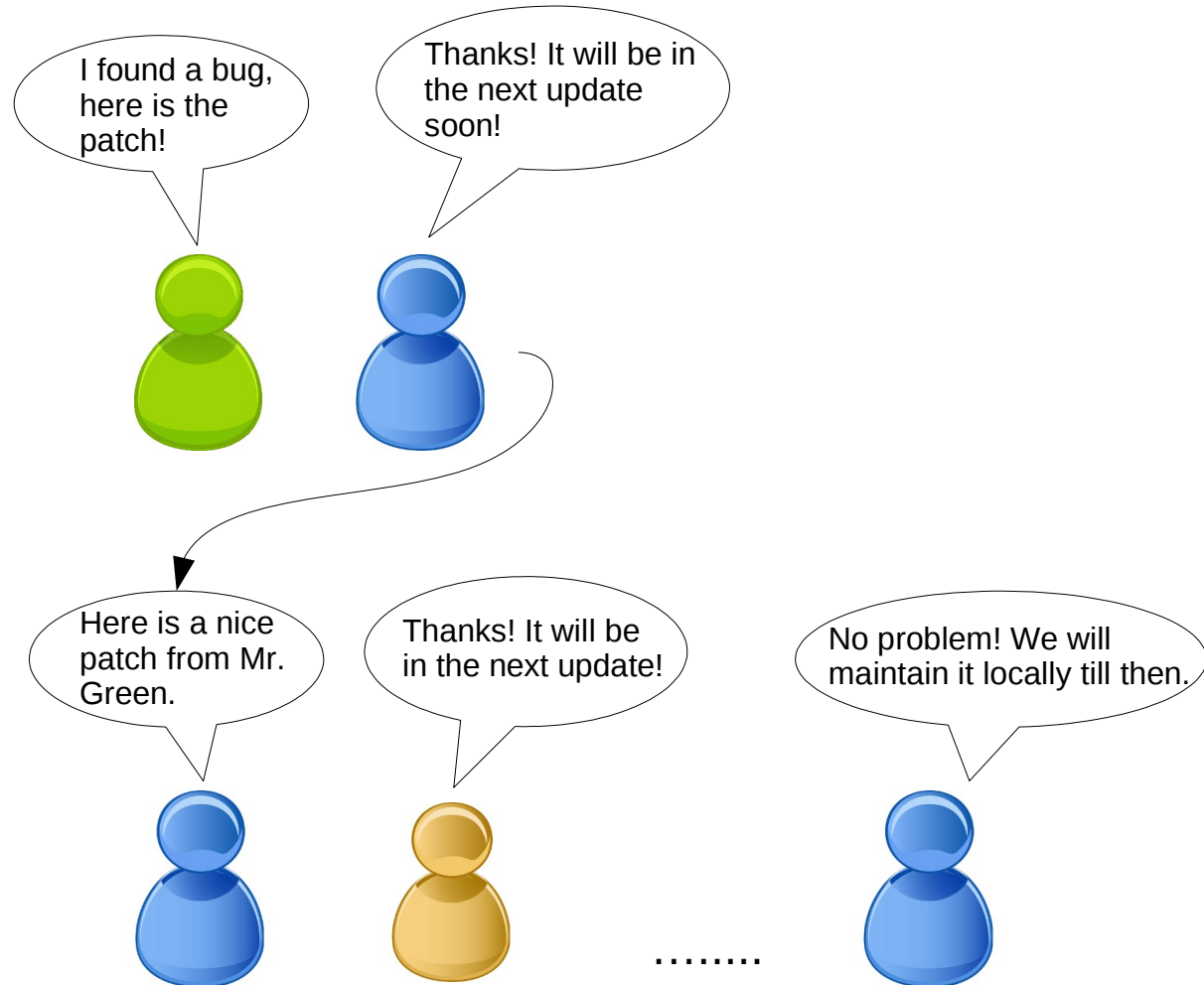
**JBoss
WORLD**

PRESENTED BY RED HAT



Fixes (with IcedTea)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

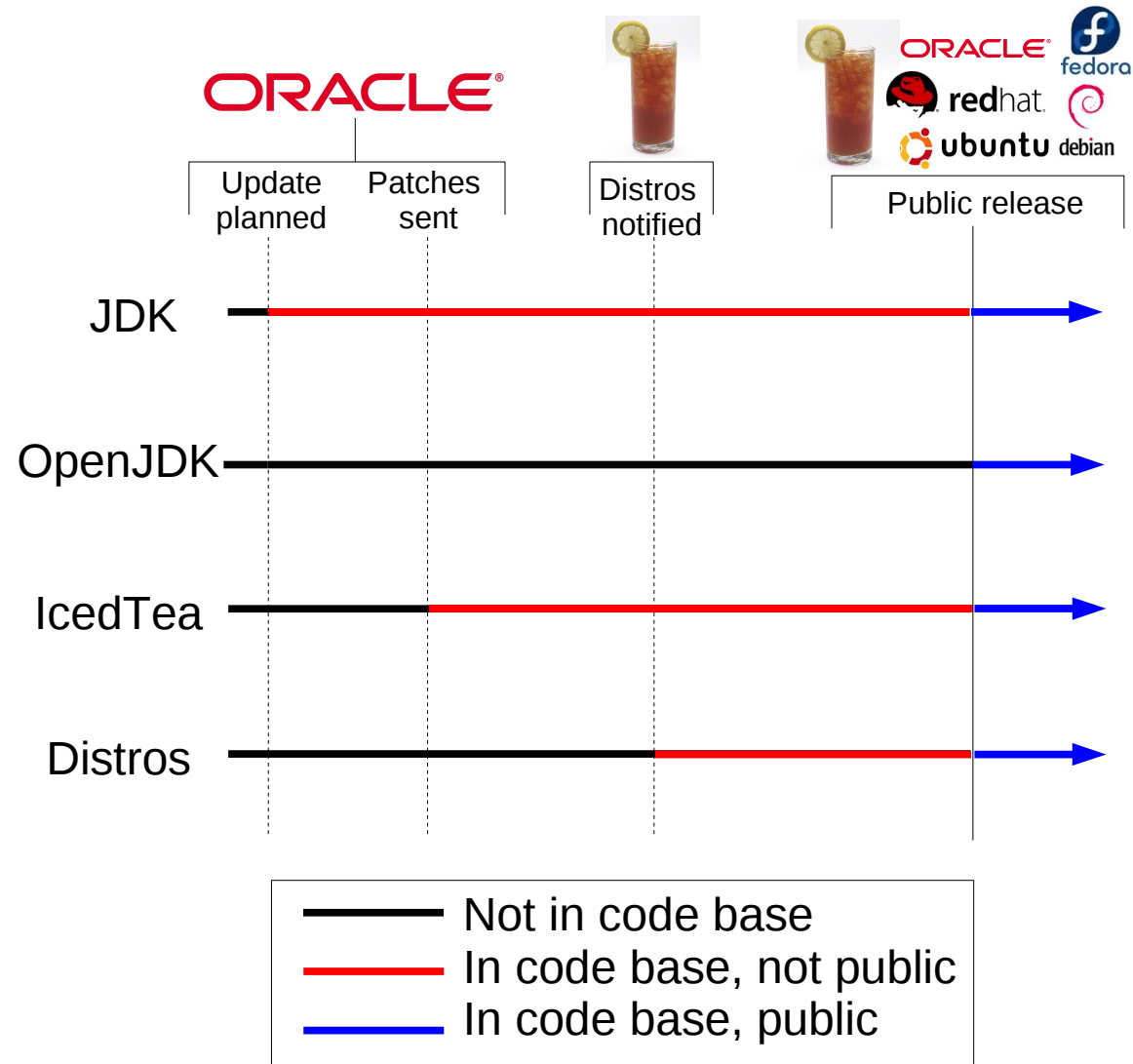
**JBoss
WORLD**

PRESENTED BY RED HAT



Co-ordinated security

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



All company logos are copyright by their respective owners

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



IcedTea-Web

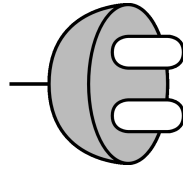
- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
 - What?
 - Why?
 - IcedTea-Web
- Red Hat's Role

- The future of Java

- Version 7
- Version 8

- Questions



Web Browser Plugin



Web Start (javaws)



Settings tool (itweb-settings)

Image sources:

<http://www.openclipart.org/detail/25999>

<http://www.openclipart.org/detail/86059>

<http://www.openclipart.org/detail/112249>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Fully Open Source

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



GPL



+

Classpath Exception

⁺ *GPL* stands for GNU **G**eneral **P**ublic **L**icense

⁺⁺ *LGPL* stands for GNU **L**esser **G**eneral **P**ublic **L**icense

Image source: <http://www.gnu.org/graphics/official%20gnu.svg>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Completeness

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
 - What?
 - Why?
 - IcedTea-Web
- Red Hat's Role



Plugin is almost fully complete

- The future of Java

- Version 7
- Version 8



Web Start is slightly lagging, but has support for all of the widely used features

- Questions

SUMMIT

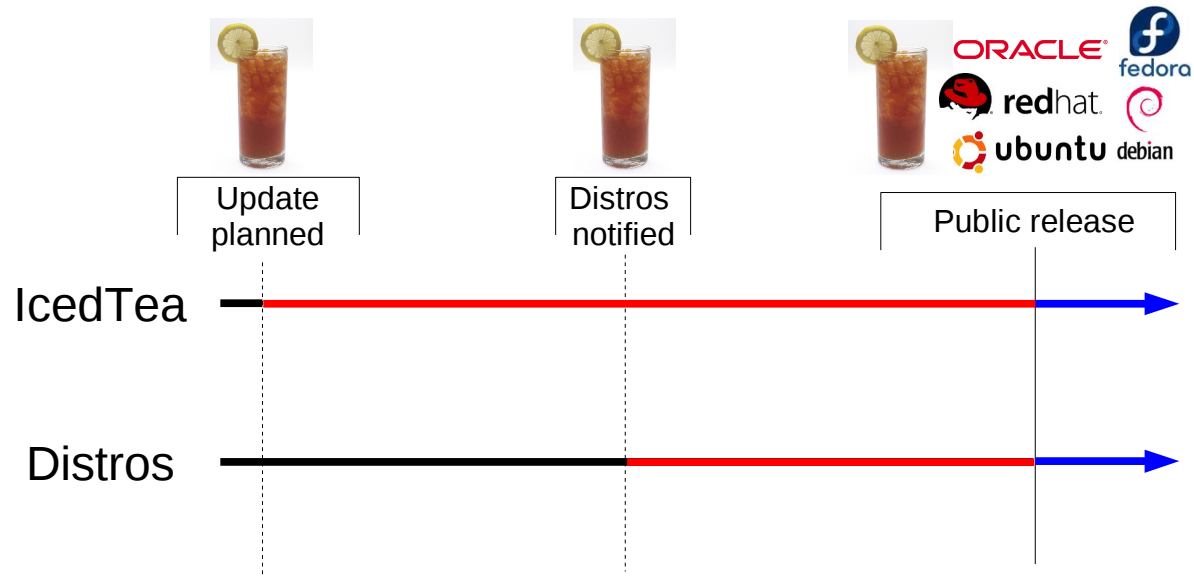
**JBoss
WORLD**

PRESENTED BY RED HAT



Co-ordinated security

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



— Not in code base
— In code base, not public
— In code base, public

SUMMIT

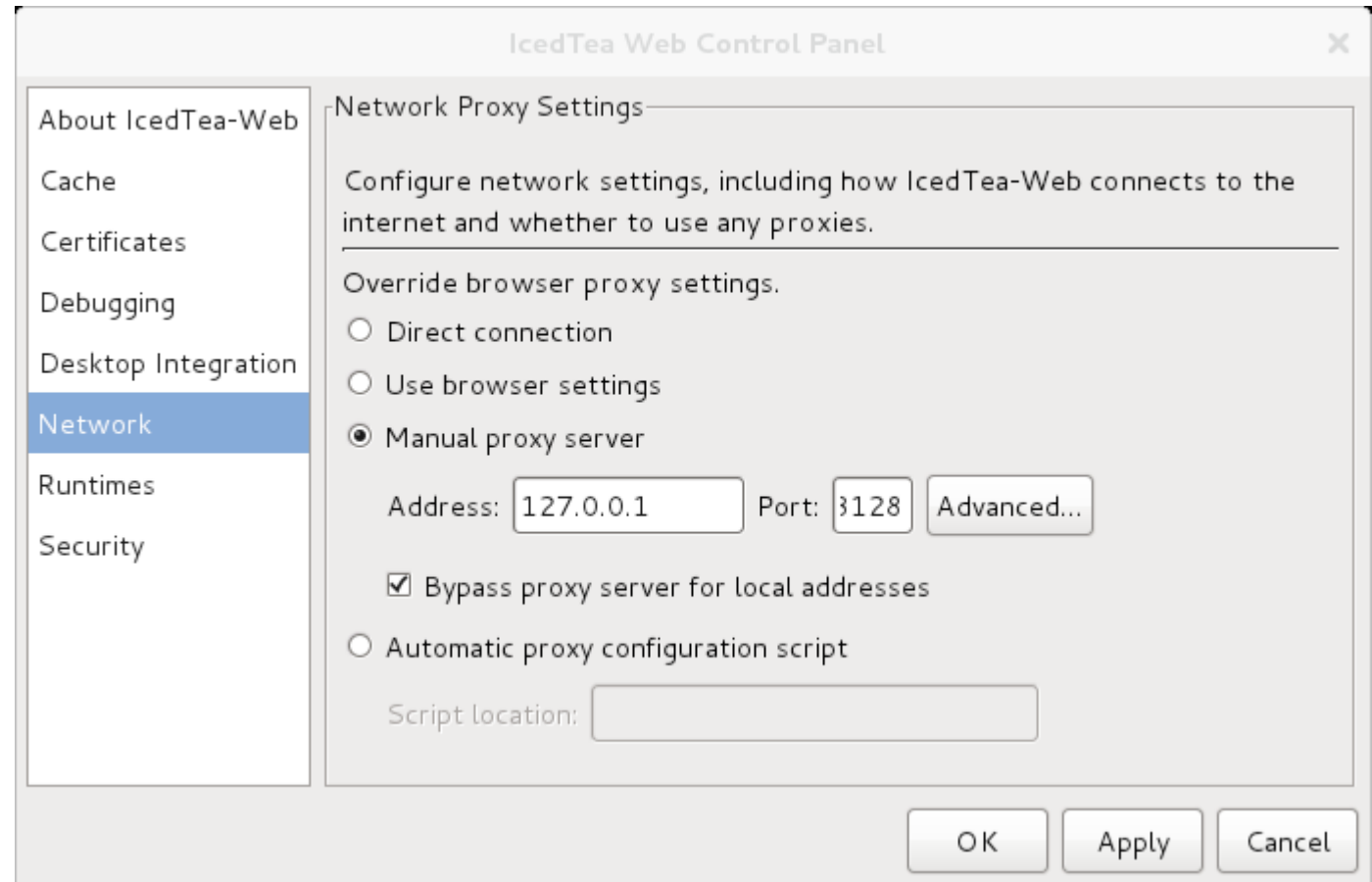
**JBoss
WORLD**

PRESENTED BY RED HAT



Settings configuration tool

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

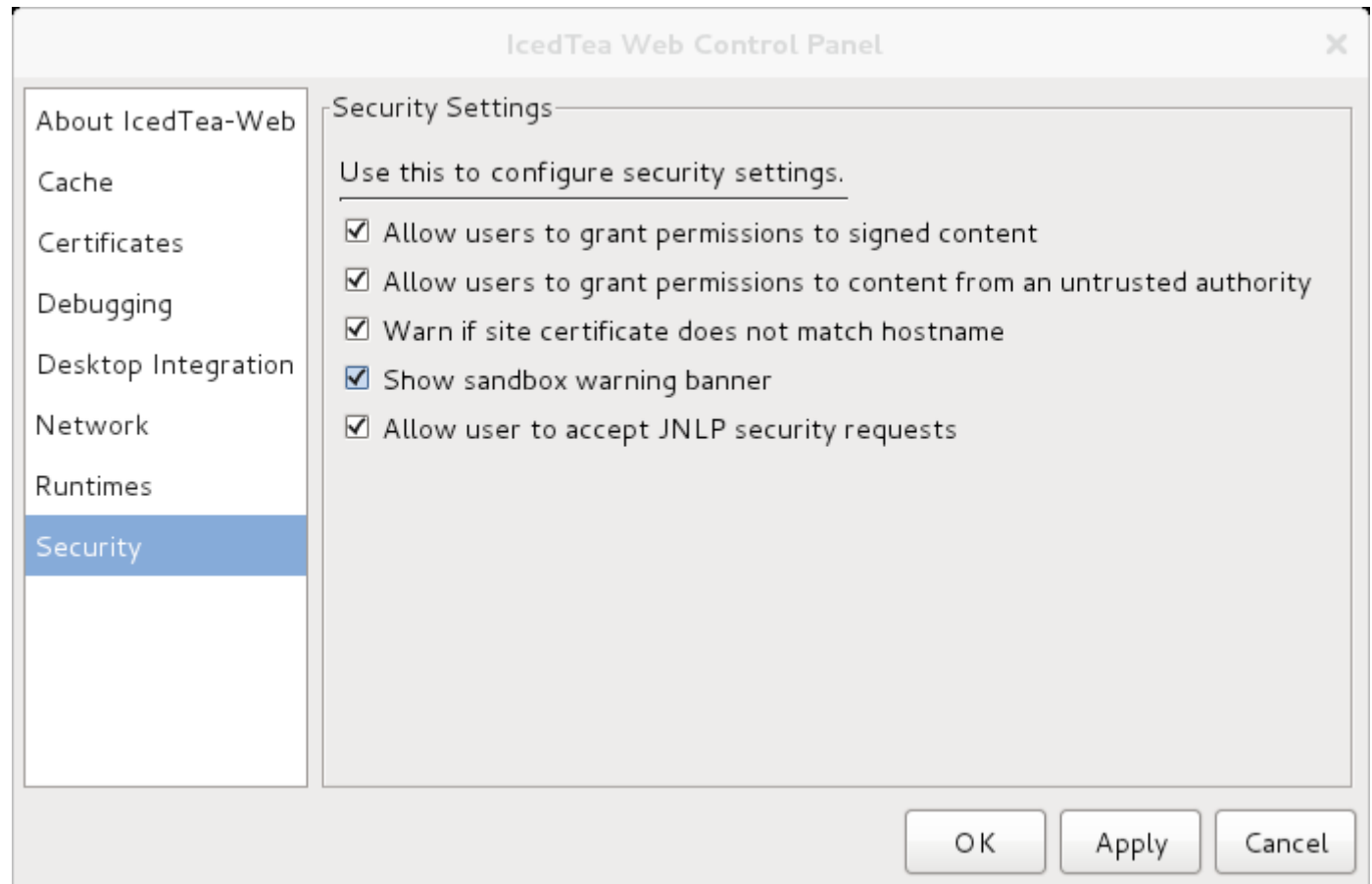
**JBoss
WORLD**

PRESENTED BY RED HAT



Settings configuration tool

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

**JBoss
WORLD**

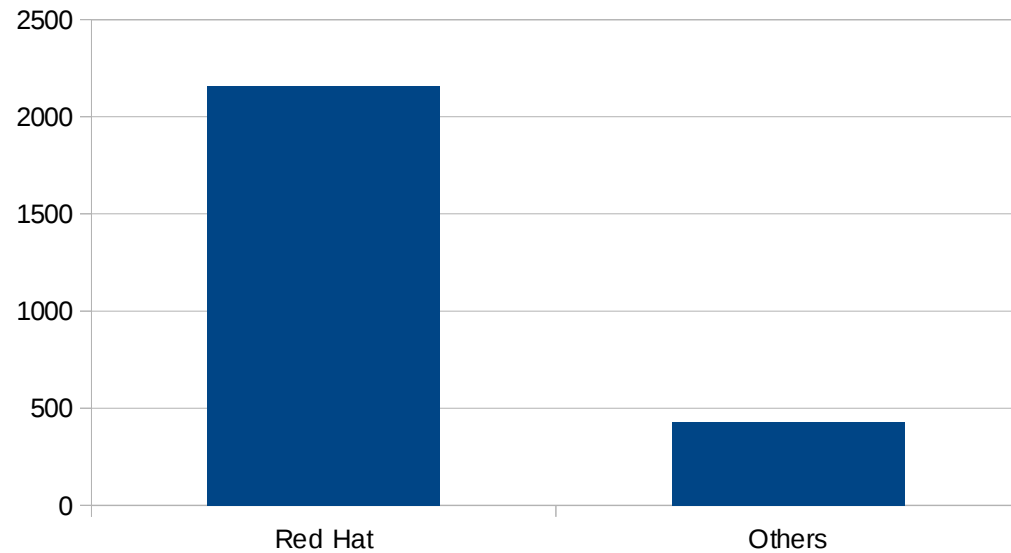
PRESENTED BY RED HAT



IcedTea6

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

IcedTea6 commits



*Total Red Hat commits: 2159 out of 2587**

** Approximate numbers as of 17:00 EDT on 2011-04-28*

SUMMIT

**JBoss
WORLD**

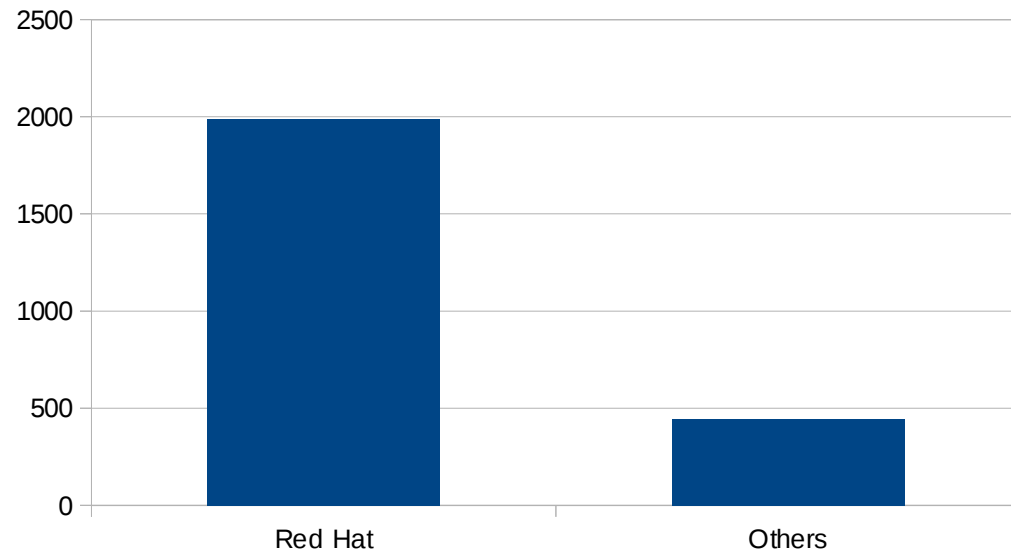
PRESENTED BY RED HAT



IcedTea (7)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

IcedTea (7) commits



*Total Red Hat commits: 1988 out of 2432**

** Approximate numbers as of 17:00 EDT on 2011-04-28*

SUMMIT

**JBoss
WORLD**

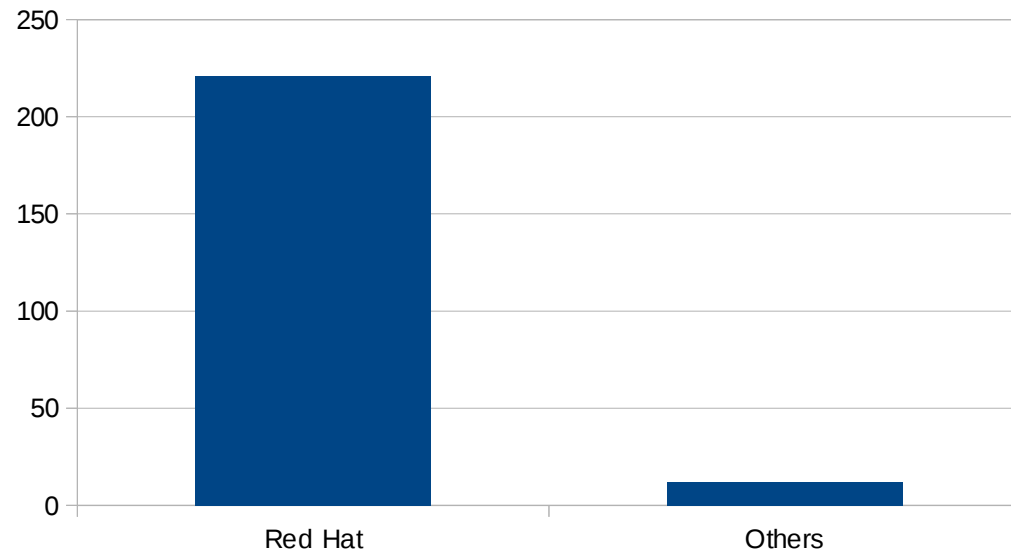
PRESENTED BY RED HAT



Role in IcedTea-Web

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

IcedTea-Web commits



*Total Red Hat commits: 223 out of 234**

** Approximate numbers as of 17:00 EDT on 2011-04-28*

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK6 contribution

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
 - The future of Java
 - Version 7
 - Version 8
 - Questions
- OpenJDK7 → OpenJDK6
 - Majority of OpenJDK6 commits are backports
 - The backport process
 - Red Hat is the primary backporter for OpenJDK6

SUMMIT

**JBoss
WORLD**

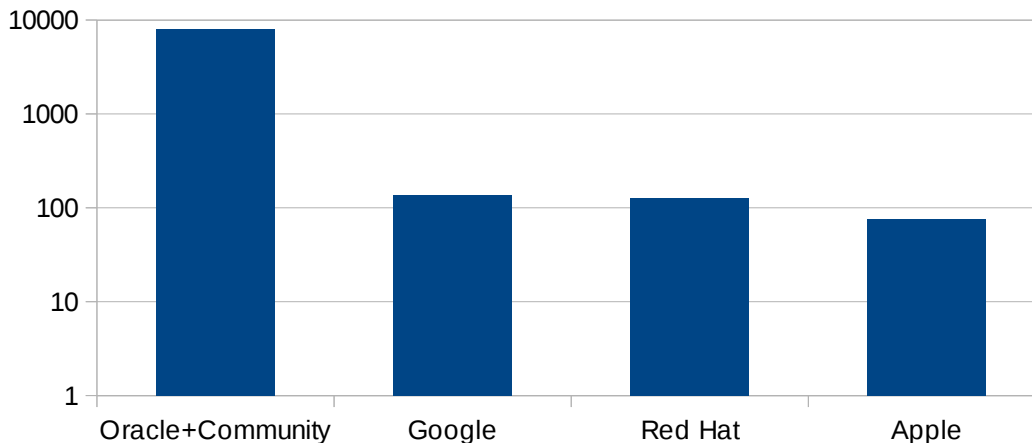
PRESENTED BY RED HAT



OpenJDK7 contribution

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

OpenJDK7 commits (Logarithmic)



As of 2011-04-28, 16:00 EDT*

Total:	8337
Oracle + community:	7998
Google:	136 (1.63%)
Red Hat:	127 (1.52%)
Apple:	76** (0.09%)

* Figures are approximate, and do not account for merge commits

** Apple's contributions have been normalized from 81/8889 (OSX port) to 76/8337

SUMMIT

**JBoss
WORLD**

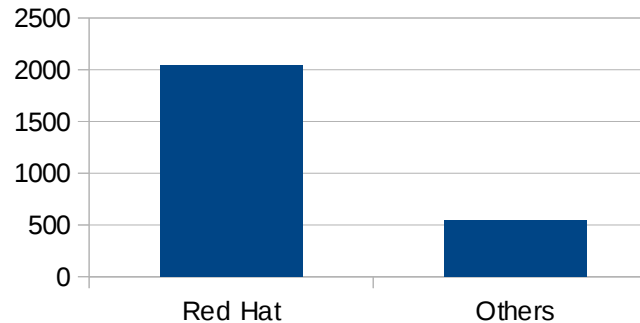
PRESENTED BY RED HAT



IcedTea* contribution

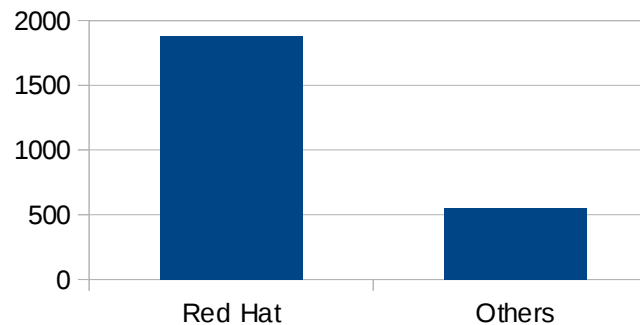
- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

IcedTea6 commits



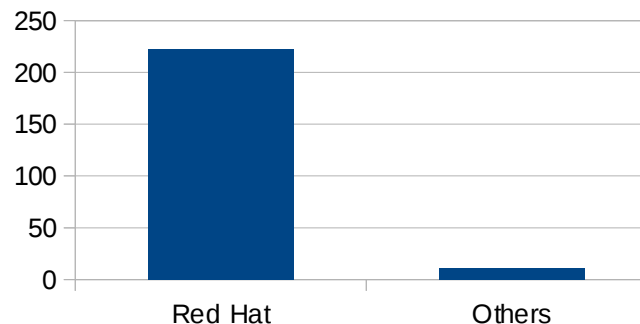
2159 out of 2587, 83.4%

IcedTea (7) commits



1988 out of 2431, 81.7%

IcedTea-Web commits



223 out of 234, 95.3%

SUMMIT

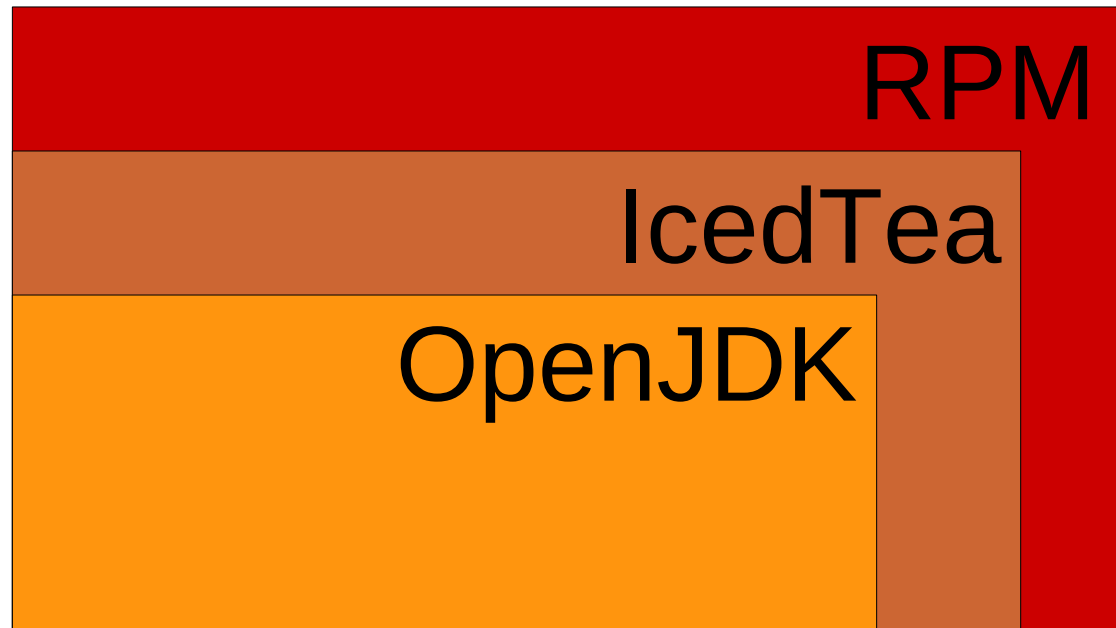
**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK RPM in RHEL

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions



⁺ *RPM stands for **RPM Package Manager***

SUMMIT

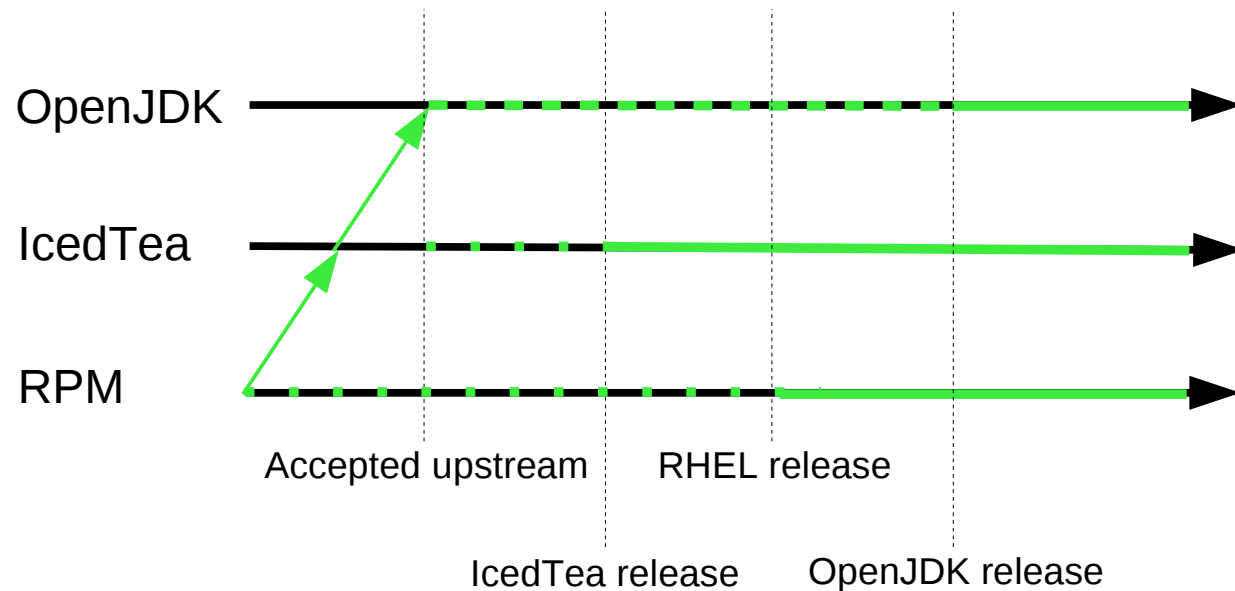
**JBoss
WORLD**

PRESENTED BY RED HAT



Upstream first policy

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
- Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions



Red Hat Enterprise Linux release is subject to results of:

- | | |
|-------------------------|----------------------|
| • TCK tests | (api, compiler, dev) |
| • Jtreg tests | (regression) |
| • Mauve tests | (class library) |
| • Spec* tests | (performance) |
| • Java2dBenchmark tests | (drawing perf.) |
| • JFCMark tests | (swing perf.) |

SUMMIT

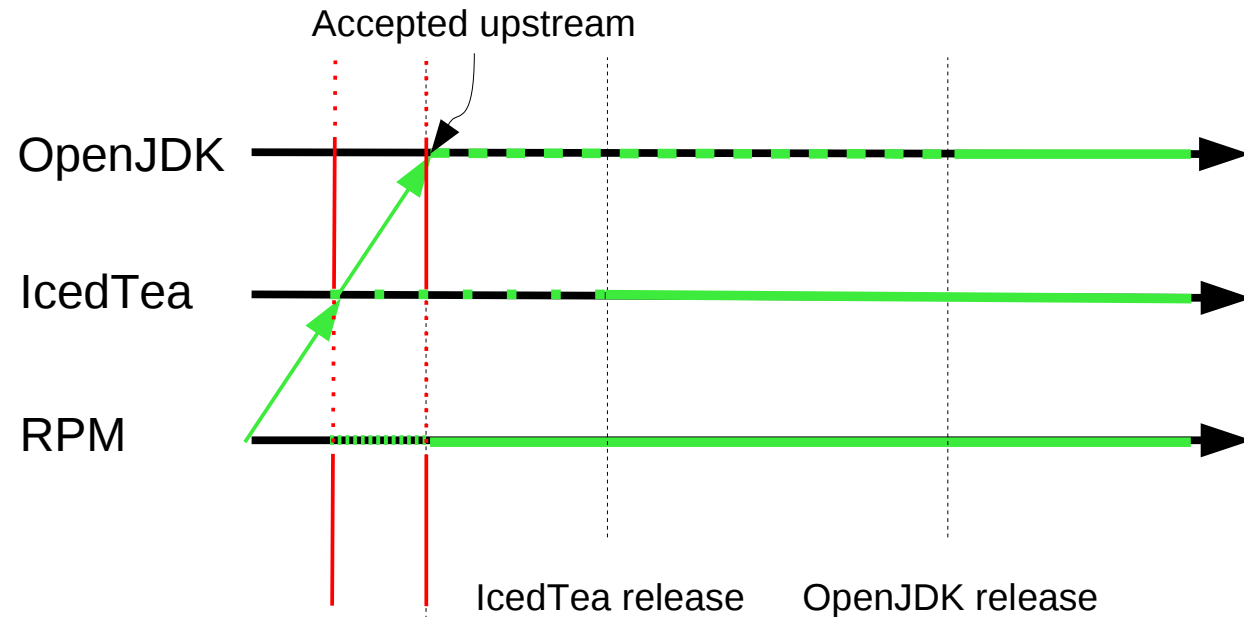
**JBoss
WORLD**

PRESENTED BY RED HAT



Prioritized release

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
- Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions



Release subject to results of:

- TCK (api, compiler, dev) tests
- JTreg (regression) tests
- Mauve (class library) tests
- Spec* (performance) tests
- Java2dBenchmark (drawing perf.) tests
- JFCMark (swing perf.) tests

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Links

I will be at Campground 3 from 2PM to 3PM today

OpenJDK:	http://openjdk.java.net/
IcedTea:	http://icedtea.classpath.org/
IcedTea-Web:	http://icedtea.classpath.org/wiki/IcedTea-Web
IcedTea Bugs:	http://icedtea.classpath.org/bugzilla/
RHEL/Fedora bugs:	http://bugzilla.redhat.com
Mailing List:	distro-pkg-dev@openjdk.java.net
IRC:	irc.oftc.net, #openjdk

Deepak Bhole
dbhole@redhat.com
dbhole on irc

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Java 7

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



JMX Enhancements

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....
- ManagementFactory.getAllPlatformMXBeanInterfaces()
- Everything inherits from PlatformManagedObject
- New MBeans
 - `java.lang.management.BufferPoolMXBean`
 - `java.lang.management.PlatformLoggingMXBean`

⁺ *JMX stands for **J**ava **M**anagement **E**xtensions*

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Switches in String

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public static void printFullMonthName(String month) {  
101  
102     if (month.equals("jan"))  
103         System.out.println("January");  
104     else if (month.equals("feb"))  
105         System.out.println("February");  
106     else if (month.equals("mar"))  
107         System.out.println("March");  
108     else if (month.equals("apr"))  
109         System.out.println("April");  
110         /* rest of the months */  
111     else  
112         System.out.println("Unknown month");  
113  
114 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Switches in String

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public static void printFullMonthName(String month) {
101
102     switch (month) {
103         case "jan":
104             System.out.println("January");
105             break;
106         case "feb":
107             System.out.println("January");
108             break;
109         case "mar":
110             System.out.println("January");
111             break;
112         case "apr":
113             System.out.println("January");
114             break;
115         /* rest of the months */
116         default:
117             System.out.println("Unknown month");
118             break;
119     }
120 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



try-with-resources – try1

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public void tryToDownload(URL u, String outFile) throws IOException {
101
102     Throwable recordedThrow;
103     InputStream in = null;
104     OutputStream out = null;
105
106     try {
107         in = u.openStream();
108         out = new FileOutputStream(outFile);
109
110         /* copy from in to out */
111
112     } catch (Throwable t) {
113         recordedThrow = t;
114     } finally {
115         if (in != null) in.close();
116         if (out != null) out.close();
117     }
118
119     // Rest of the code
120 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



try-with-resources – try2

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
```

```
public void tryToDownload(URL u, String outFile) throws IOException {

    Throwable recordedThrow;
    InputStream in = null;
    OutputStream out = null;

    try {
        in = u.openStream();
        out = new FileOutputStream(outFile);

        /* copy from in to out */

    } catch (Throwable t1) {
        recordedThrow = t1;
    } finally {
        try {
            if (in != null) in.close();
        } catch (Throwable t2) {
            recordedThrow = t2;
        } finally {
            if (out != null) out.close();
        }
    }

    // Rest of the code
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



try-with-resources – try3

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public void tryToDownload(URL u, String outFile) throws IOException {
101
102     Throwable recordedThrow;
103     InputStream in = null;
104     OutputStream out = null;
105
106     try {
107         in = u.openStream();
108         out = new FileOutputStream(outFile);
109
110         /* copy from in to out */
111
112     } catch (Throwable t1) {
113         recordedThrow = t1;
114     } finally {
115         try {
116             if (in != null) in.close();
117         } catch (Throwable t2) {
118             recordedThrow = t2;
119         } finally {
120             try {
121                 if (out != null) out.close();
122             } catch (Throwable t3) {
123                 recordedThrow = t3;
124             } finally {
125             }
126         }
127     }
128
129     // Rest of the code
130 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



try-with-resources in JDK7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public void tryToDownload(URL u, String outFile) throws IOException {
101     Throwable recordedThrow = null;
102
103     try {InputStream in = u.openStream();
104         OutputStream out = new FileOutputStream(outFile)} {
105
106         /* copy from in to out */
107
108     } catch (Throwable t){
109         recordedThrow = t;
110     }
111
112     // Rest of the code
113 }
114
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



What JDK7 does (approximately)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public void tryToDownload(URL u, String outFile) throws IOException {
101
102     Throwable recordedThrow = null;
103     InputStream in = null;
104     OutputStream out = null;
105
106     try {
107         in = u.openStream();
108         out = new FileOutputStream(outFile);
109
110         /* copy from in to out */
111
112     } catch (Throwable t1) {
113         recordedThrow = t1;
114     } finally {
115         try {
116             if (in != null) in.close();
117         } catch (Throwable t2) {
118             if (recordedThrow != null)
119                 recordedThrow.addSuppressed(t2);
120         } finally {
121             try {
122                 if (out != null) out.close();
123             } catch (Throwable t3) {
124                 if (recordedThrow != null)
125                     recordedThrow.addSuppressed(t3);
126             } finally {
127             }
128         }
129     }
130
131     // Rest of the code
132 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



The AutoCloseable Interface

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
public interface AutoCloseable {  
    /**  
     * JAVADOCs  
     *  
     * @throws Exception if this resource cannot be closed  
     */  
    void close() throws Exception;  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Diamond operator

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
public void foo() {  
    Map<String, Map<String, List<String>>> m1 =  
        new HashMap<String, Map<String, List<String>>>();  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Diamond operator

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - **Diamond operator**
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
public void foo() {  
    Map<String, Map<String, List<String>>> map = new HashMap<>();  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Diamond operator

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public class X<T> {  
101  
102     public X(T t) {}  
103  
104     public T get() { return null; }  
105  
106     public static int f(String s) { return 1; }  
107     public static int f(Object o) { return 2; }  
108  
109     public static void main(String[] args) {  
110         System.out.println(f(new X<>("").get())); // prints 1  
111         System.out.println(f(new X("").get()));    // prints 2  
112     }  
113  
114 }
```

Example posted to coin-dev list by Neal Gafter (neal@gafter.com)

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Binary Literals

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public class WindowProperties {
101
102     public static final int SHOW_STATUS = 1;
103     public static final int SHOW_MENU = 2;
104     public static final int SHOW_BORDER = 3;
105
106     private int properties = SHOW_STATUS|SHOW_MENU;
107
108     /* Rest of the code */
109 }
110
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Binary Literals

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public class WindowProperties {
101
102     public static final int SHOW_STATUS = 0b000000001;
103     public static final int SHOW_MENU   = 0b000000010;
104     public static final int SHOW_BORDER = 0b000000100;
105
106     private int properties = SHOW_STATUS | SHOW_MENU;
107
108     /* Rest of the code */
109
110 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Underscores in numeric literals

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public void foo() {
101     System.out.println(0b001000100001); // 545
102     System.out.println(0b001_0001_00001); // 545
103
104     System.out.println(0202122); // 66642
105     System.out.println(0_20_21_22); // 66642
106     System.out.println(020_21_22); // 66642
107
108     System.out.println(200201202); // 200201202
109     System.out.println(200_201_202); // 200201202
110
111     System.out.println(0xCAFE_BABE); // -889275714
112     System.out.println(0xCAFE_BABE); // -889275714
113 }
114
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Regular catch

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 public class DavesNotHere extends Exception {}
101 public class DavesSleeping extends Exception {}
102
103 public void askForDave() throws DavesNotHere,
104                               DavesSleeping {
105     try {
106         switch (state) {
107             case NOT_HERE:
108                 throw new DavesNotHere();
109             case SLEEPING:
110                 throw new DavesSleeping();
111             case HERE:
112                 getDave();
113                 break;
114         }
115     } catch (DavesNotHere e) {
116         log(e);
117         throw e;
118     } catch (DavesSleeping e) {
119         log(e);
120         throw e;
121     } catch (Throwable t) {
122         logUnexpected(t);
123     }
124 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Multi-catch in JDK 7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public class DavesNotHere extends Exception {}
101 public class DavesSleeping extends Exception {}
102
103 public void askForDave() throws DavesNotHere,
104                             DavesSleeping {
105     try {
106         switch (state) {
107             case NOT_HERE:
108                 throw new DavesNotHere();
109             case SLEEPING:
110                 throw new DavesSleeping();
111             case HERE:
112                 getDave();
113                 break;
114         }
115     } catch (DavesNotHere | DavesSleeping e) {
116         log(e);
117         throw e;
118     } catch (Throwable t) {
119         logUnexpected(t);
120     }
121 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Precise re-throw in JDK7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public class DavesNotHere extends Exception {}
101 public class DavesSleeping extends Exception {}
102
103 public void askForDave() throws DavesNotHere,
104                                DavesSleeping {
105     try {
106         switch (state) {
107             case NOT_HERE:
108                 throw new DavesNotHere();
109             case SLEEPING:
110                 throw new DavesSleeping();
111             case HERE:
112                 getDave();
113                 break;
114         }
115     } catch (Exception e) {
116         log(e);
117         throw e;
118     } catch (Throwable t) {
119         logUnexpected(t);
120     }
121 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public <T> void printAll(T... params) {
101     for (T t: params)
102         System.out.println(t);
103 }
104
105 public void foo(List<String> l1, List<String> l2) {
106
107     /* do something */
108
109     printAll(l1, l2);
110 }
```

With JDK6 (-Xlint:unchecked):

warning: [unchecked] unchecked generic array creation of type
java.util.List<java.lang.String>[] for varargs parameter

```
printAll(l1, l2);
           ^
```

With JDK7 (-Xlint:unchecked):

warning: [unchecked] Possible heap pollution from parameterized vararg type T

```
public <T> void printAll(T... params) {
                           ^
```

warning: [unchecked] unchecked generic array creation for varargs parameter of
type List<String>[]

```
printAll(l1, l2);
           ^
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 public <T> void printAll(T... params) {
101     for (T t: params)
102         System.out.println(t);
103 }
104
105 @SuppressWarnings("unchecked")
106 public void foo(List<String> l1, List<String> l2) {
107
108     /* do something */
109
110     printAll(l1, l2);
111 }
```

With JDK6 (-Xlint:unchecked):

No warnings

With JDK7 (-Xlint:unchecked):

warning: [unchecked] Possible heap pollution from parameterized vararg type T

```
public <T> void printAll(T... params) {
                        ^
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
100 @SuppressWarnings("unchecked")
101 public <T> void printAll(T... params) {
102     for (T t: params)
103         System.out.println(t);
104 }
105
106 @SuppressWarnings("unchecked")
107 public void foo(List<String> l1, List<String> l2) {
108
109     /* do something */
110
111     printAll(l1, l2);
112 }
```

With JDK6 (-Xlint:unchecked):
No warnings

With JDK7 (-Xlint:unchecked):
No warnings

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Safe var-args

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
100 @SafeVarargs
101 public final <T> void printAll(T... params) {
102     for (T t: params)
103         System.out.println(t);
104 }
105
106 public void foo(List<String> l1, List<String> l2) {
107     /* do something */
108
109     printAll(l1, l2);
110 }
111
```

With JDK6 (-Xlint:unchecked):
Error due to @SafeVarargs not being defined
Warning at line 110

With JDK7 (-Xlint:unchecked):
No warnings

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



NIO2

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



File actions

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....

- Actions provided by class **Files**
 - copy()
 - move()
 - delete()
 - create[Symbolic]Link()
 - walkFileTree()
 - etc.

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Attributes

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....

- *AttributeView(s)

File/Directory	
creation time access time modification time size isFile isDirectory isLink	Basic
getOwner setOwner	FileOwner
get/setPermissions get/setGroup	POSIX

SUMMIT

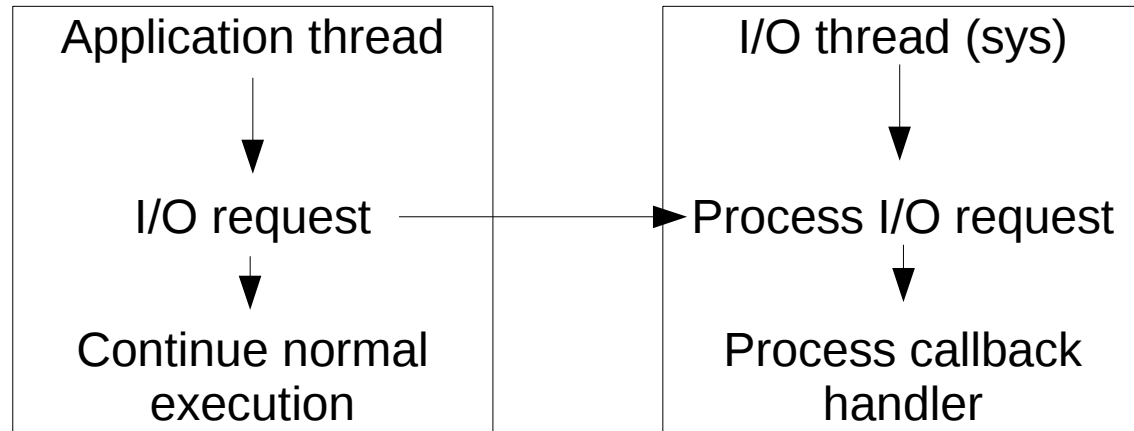
**JBoss
WORLD**

PRESENTED BY RED HAT

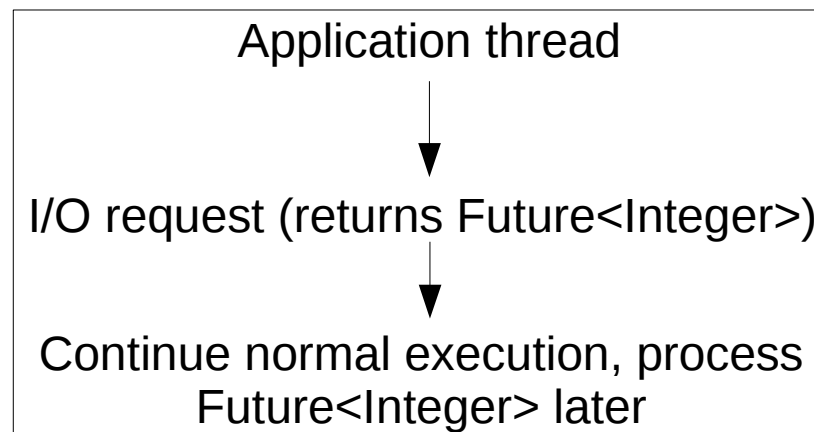


Asynchronous I/O

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....



... OR ...



SUMMIT

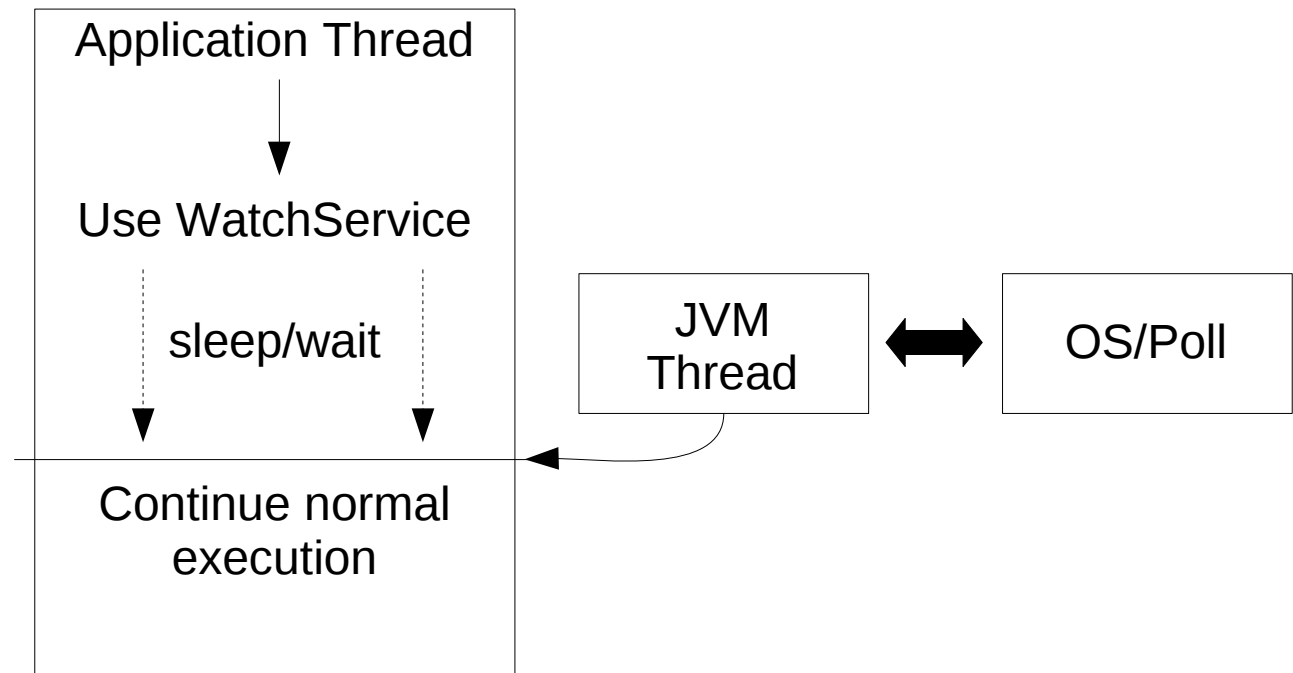
**JBoss
WORLD**

PRESENTED BY RED HAT



Change notification

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....



SUMMIT

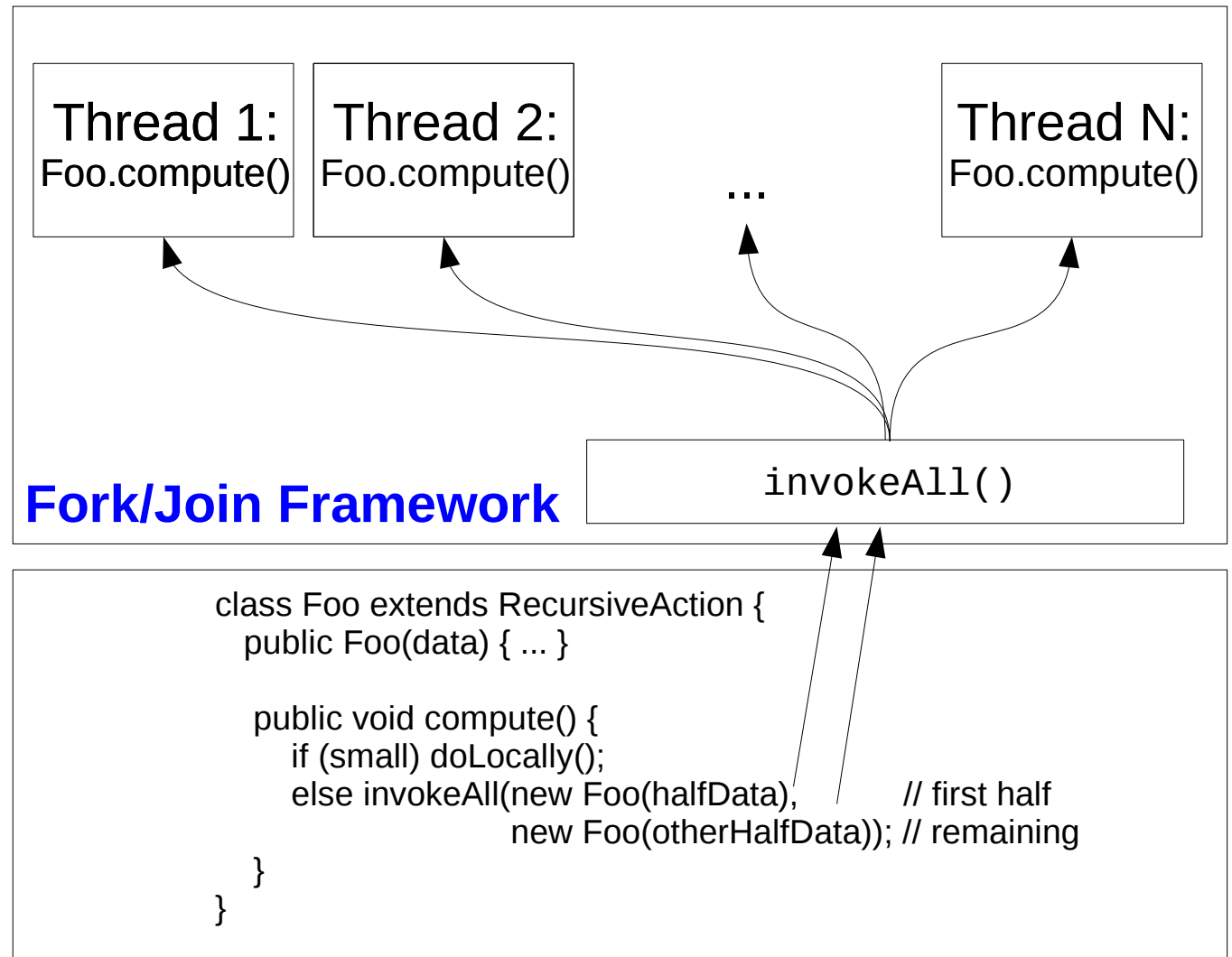
**JBoss
WORLD**

PRESENTED BY RED HAT



Fork/Join Framework

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Additional Java 7 features

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....
- JSR-292 (invokedynamic)
- JDBC 4.1
- Unicode 6.0
- Full list at <http://openjdk.java.net/projects/jdk7/features>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Java 8

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Jigsaw

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - The future of Java
 - Version 7
 - Version 8
 - Jigsaw
 - Lambda
 - Language changes
 - Questions.....
- JDK broken into modules based on functionality
 - No more CLASSPATH
 - New format to replace JAR files
 - RPM auto-dependency writing (would be done by distros)

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Lambda (Closures)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
 - Jigsaw
 - Lambda
 - Language changes
- Questions.....
- Not yet finalized
- Cleaner syntax and more scalable than Anonymous Inner Classes
- Defender methods

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Language Changes (Project Coin)

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7
- Version 8
 - Jigsaw
 - Lambda
 - Language changes

- Questions.....

- Collections enhancements

- Collection literals

- **final** `List<Integer> digits = [4, 3, 4];`
- **final** `Set<Integer> primes = { 2, 3, 5, 7 };`
- **final** `Map<Integer, String> platonicSolids =`
`{ 4 : "tetrahedron",`
`6 : "cube",`
`8 : "octahedron",`
`12 : "dodecahedron",`
`20 : "icosahedron" };`

- Numeric suffixes for byte(y/Y) and short (s/S)

- `byte b = 0xA0y;`
- `short s = 0xA0s;`

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Questions?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions.....

I will be at Campground 3 from 2PM to 3PM today

OpenJDK: <http://openjdk.java.net/>
IcedTea: <http://icedtea.classpath.org/>
IcedTea-Web: <http://icedtea.classpath.org/wiki/IcedTea-Web>

IcedTea Bugs: <http://icedtea.classpath.org/bugzilla/>
RHEL/Fedora bugs: <http://bugzilla.redhat.com>

Mailing List: distro-pkg-dev@openjdk.java.net

IRC: [irc.oftc.net](irc://irc.freenet.net/#openjdk) , #openjdk

Deepak Bhole
dbhole@redhat.com
dbhole on irc

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



LIKE US ON FACEBOOK

www.facebook.com/redhatinc

FOLLOW US ON TWITTER

www.twitter.com/redhatsummit

TWEET ABOUT IT

#redhat

READ THE BLOG

summitblog.redhat.com

GIVE US FEEDBACK

www.redhat.com/summit/survey

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



SUMMIT

**2021
WORLD**

PRESENTED BY RED HAT

**LEARN NETWORK
EXPERIENCE OPEN SOURCE.**

Join the #OpenSourceSummit

Java - From OpenJDK to Red Hat Enterprise Linux and What Lies Ahead

Deepak Bhole
Sr. Software Engineer, Red Hat Inc.
May 5th 2011



- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's role
- The future of Java
 - Version 7
 - Version 8
- Questions

Persistent index will always show current point

Agenda

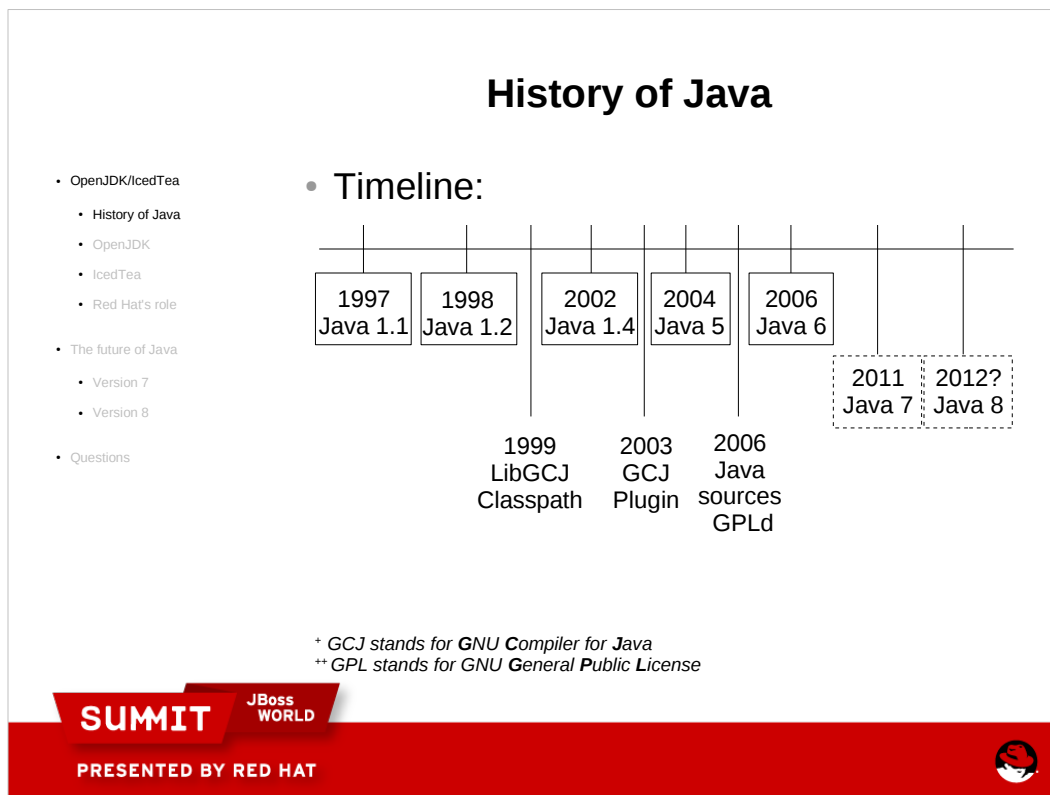
This presentation is designed to be used with audio as a primary mode of content delivery. If you have downloaded it, see notes section for rough notes on applicable slides (draft quality). For pdf, it should be at the end of the slide deck.

SUMMIT

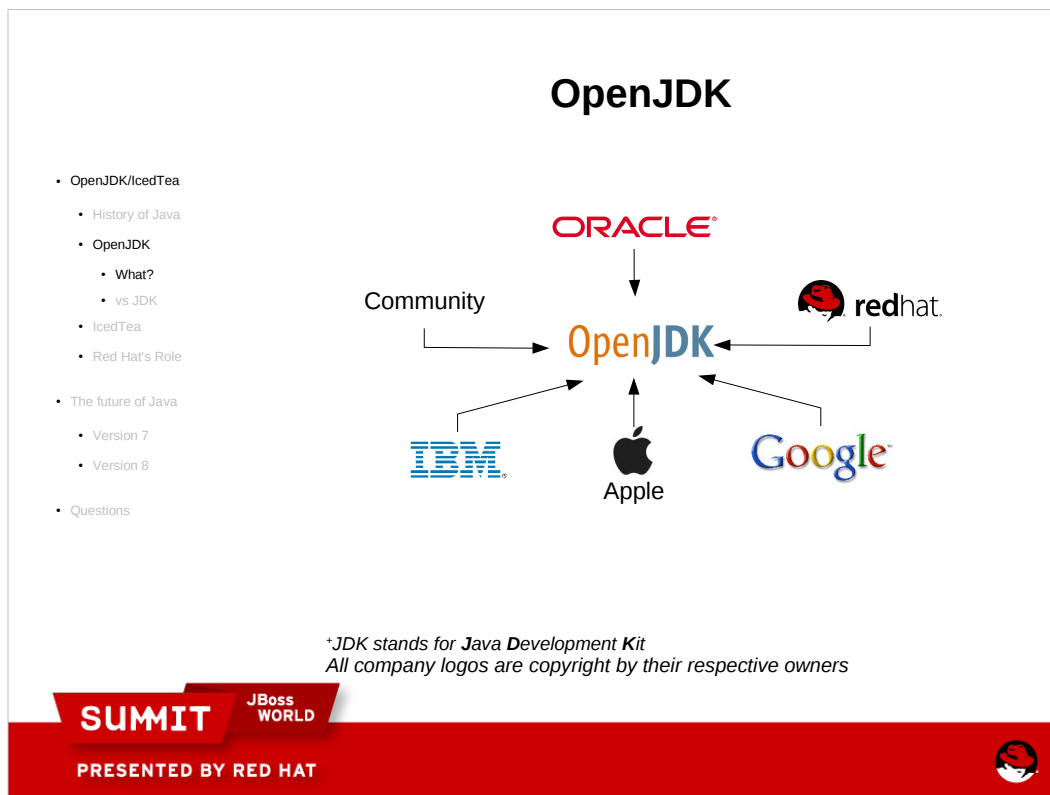
**JBoss
WORLD**

PRESENTED BY RED HAT





- Only critical releases mentioned:
 - 1.1 Feb 96
 - 1.2 in 98
 - 1.4 in 2002
 - Java 5 (Generics, major syntax changes) in 2004
 - Java 6 in 2006
- OSS dev continued with GCJ release in 1999 and classpath started picking up around then
- GCJ WebPlugin in 2003
- In Nov. 2006, Java/GPL announcement was made
No release since then, breaking the 2-yr cycle
- Java 7 set for July 28th, 2011
- Java for end of 2012



- This is where most of Java is now developed
- Oracle, Red Hat, Google, Apple, IBM and others contribute here
- Most of the code base is identical to that of proprietary JDK
- Certain things are missing, like the plugin, javaws and some other components

OpenJDK vs JDK (current)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - What?
 - vs JDK
 - Current
 - Future
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

- Deployment tools

- HotSpot Virtual machine
 - Interpreter
 - JIT (Just In Time) compiler
- Tools (javac, javadoc, etc.)
- Class libraries
- Public API (**A**pplication **P**rogramming **I**nterface)

JDK

SUMMIT JBoss WORLD
PRESENTED BY RED HAT

Current state:

- Class library, VM, compiler, etc. are open
- Same public API
- Deployment tools (plugin, webstart, etc.) will remain closed

OpenJDK vs JDK (future)

- OpenJDK/IcedTea
 - History of Java
- OpenJDK
 - What?
 - vs JDK
 - Current
 - Future
- IcedTea
- Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

- Deployment tools
- Serviceability tools

- HotSpot Virtual machine
 - Interpreter
 - JIT compiler
- Tools (javac, javadoc, etc.)
- Class libraries
- Public API

JDK

SUMMIT

**JBoss
WORLD**

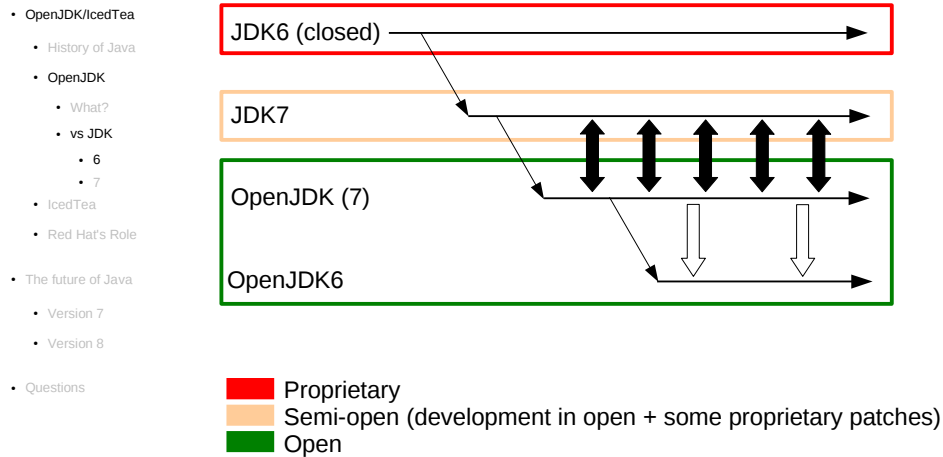
PRESENTED BY RED HAT



Future:

- Most of the items will stay open
- In addition to deployment tools, serviceability tools (e.g Mission Control), will stay closed
- JRockit-ported VM enhancements will be open

OpenJDK6 vs JDK6



SUMMIT

**JBoss
WORLD**

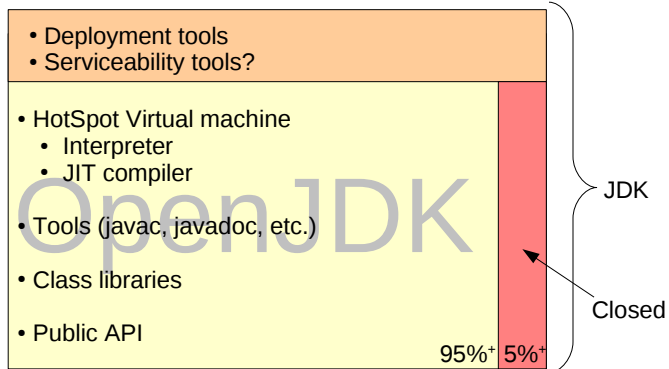
PRESENTED BY RED HAT



- JDK6 and OpenJDK6 development is not parallel, and hence the divergence
- OpenJDK6 was created from OpenJDK7 by removing the Java 7 specific parts
- OpenJDK6 gets backports from OpenJDK7

OpenJDK7 vs JDK7

- OpenJDK/IcedTea
 - History of Java
- OpenJDK
 - What?
 - vs JDK
 - 6
 - 7
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



⁺ As heard at JavaOne

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Siblings from same codebase
- Around 95% of the code base will be identical

What is IcedTea?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

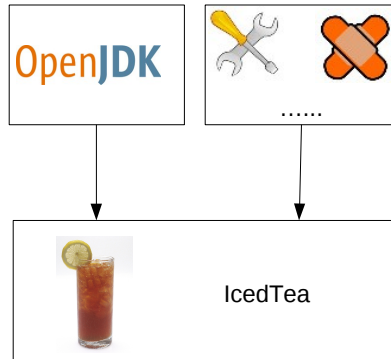


Image sources:
<http://www.openclipart.org/detail/22436>
<http://www.openclipart.org/detail/22712>

SUMMIT

**JBoss
WORLD**

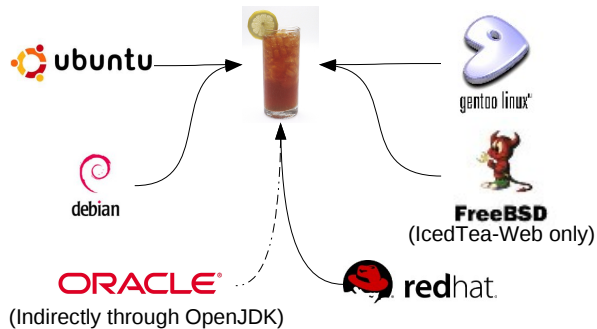
PRESENTED BY RED HAT



- OpenJDK Based
- Contains OpenJDK core, plus build scripts, plus patches, etc.

Some of the contributors...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Who is involved?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



All logos are copyright by their respective owners

SUMMIT

**JBoss
WORLD**

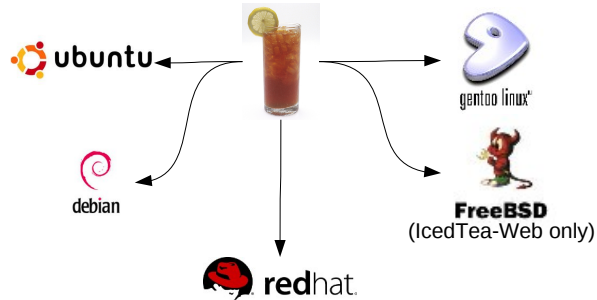
PRESENTED BY RED HAT



- Oracle is an indirect contributor via OpenJDK
- RedHat is biggest contributor to IcedTea
- Linux distros are not the only consumers

Some of the users...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
- IcedTea
 - What?
 - Who is involved?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

**JBoss
WORLD**

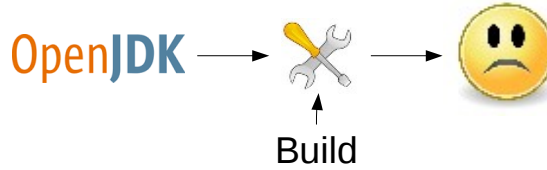
PRESENTED BY RED HAT



- Used by almost all major Linux distros: Fedora, RHEL, Ubuntu, Debian, SuSE, etc.
- IcedTea-Web runs on FreeBSD

Why was IcedTea created?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



(For the first release...)

Image sources:
<http://www.openclipart.org/detail/30223>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Initial OpenJDK drop did not build easily
- Needed proprietary JDK to build

To fix the build...

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



Image sources:
<http://www.openclipart.org/detail/30217>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- IcedTea was primarily created to fix the build issues and create a re-distributable JDK based on OpenJDK.

To fill what's missing...

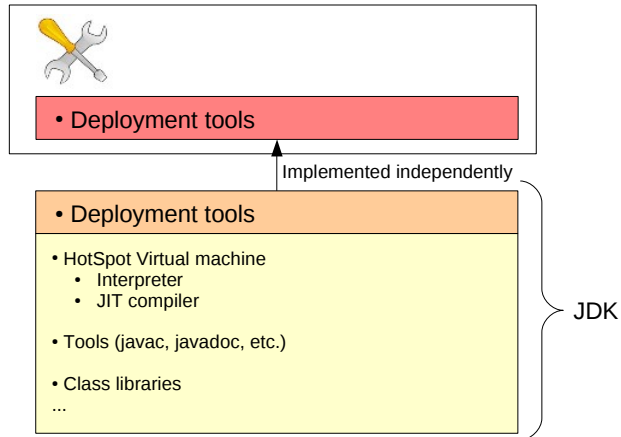
- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
 - What?
 - Why?
 - IcedTea-Web
- Red Hat's Role

- The future of Java

- Version 7
- Version 8

- Questions



SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



- IcedTea has gradually taken on other roles...
It provides missing components

To back patch fixes...

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- What?

- Why?

- IcedTea-Web

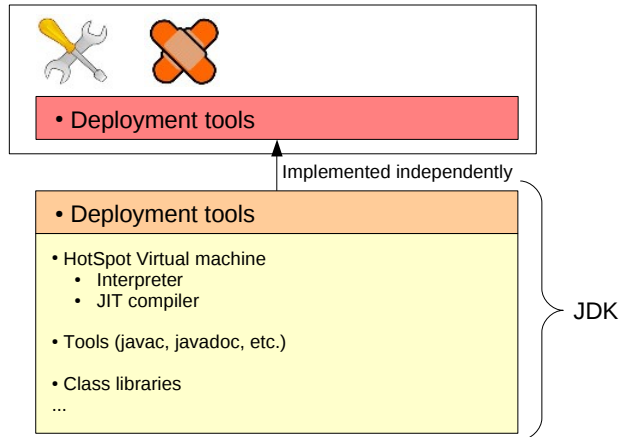
- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- It provides backward patch maintenance for up to n-2 releases

To support additional architectures...

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- What?

- Why?

- IcedTea-Web

- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions

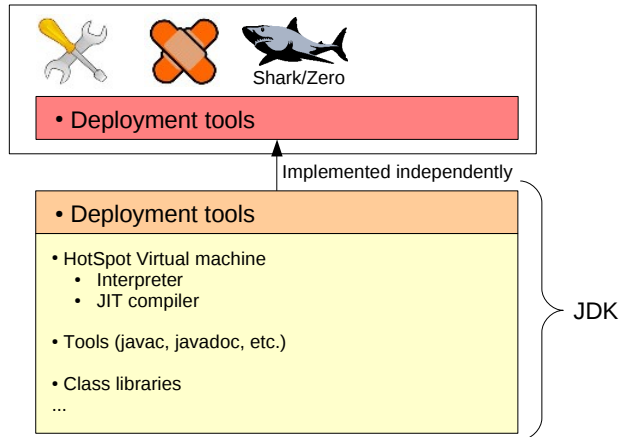


Image sources:
<http://www.openclipart.org/detail/132973>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- It provides additional runtime support. Most notably Shark/Zero so that OpenJDK can run on other platforms.
- Almost all of the Shark/Zero porting work was done by Red Hat.
- IcedTea also supports Cacao and JamVM (as an alternate to the HotSpot VM, with the OpenJDK class libraries)

To support additional tools...

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- What?

- Why?

- IcedTea-Web

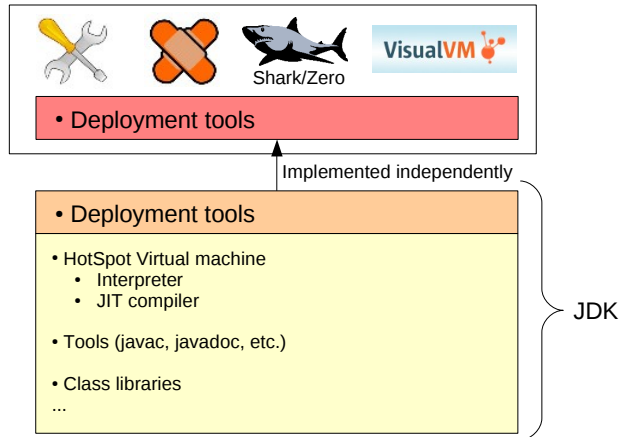
- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- It provides additional tooling support, like for VisualVM (now via a separate visualvm-harness project under the IcedTea umbrella)

Fixes (with OpenJDK)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

I found a bug, here is the patch!



Thanks! It will be in the next update whenever it happens*



** OpenJDK has a slower release cycle and it is not set in advance*

Image sources:
<http://www.openclipart.org/detail/34957>

SUMMIT

**JBoss
WORLD**

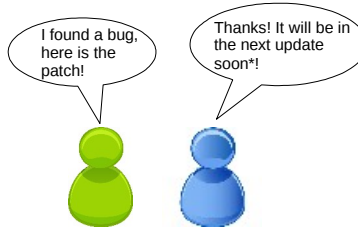
PRESENTED BY RED HAT



- Patches submitted to OpenJDK can take an arbitrary amount of time depending on when the next release happens.

Fixes (with IcedTea)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



** IcedTea has a faster release cycle dictated by importance of fixes since last release*

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Patches submitted to IcedTea have a faster turnaround as IcedTea releases more frequently, and depending on the severity of the issue, can do a more immediate release if needed.

Fixes (with IcedTea)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions

I found a bug, here is the patch!

Thanks! It will be in the next update soon!

Here is a nice patch from Mr. Green.

Thanks! It will be in the next update!

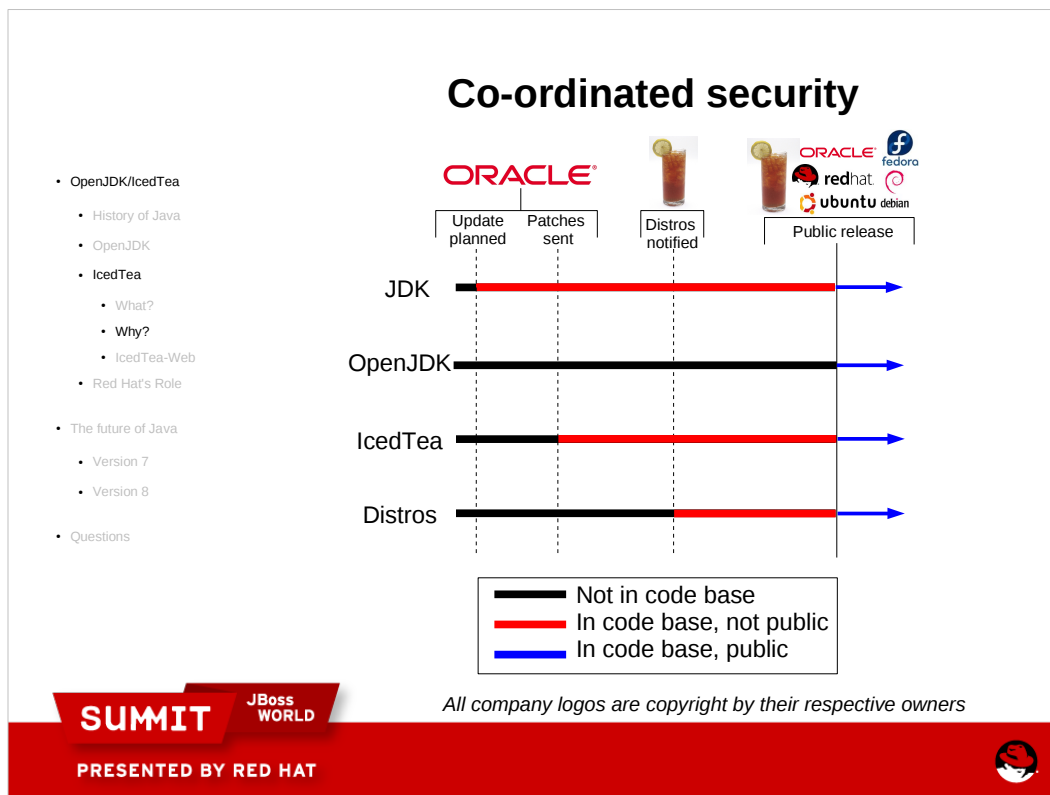
No problem! We will maintain it locally till then.

.....

SUMMIT
PRESENTED BY RED HAT

JBoss
WORLD

- Behind the scenes, IcedTea developers make sure that the patch is okay for OpenJDK, and then take on the responsibility of local patch maintenance until the next OpenJDK update (assuming it was accepted)
- Sometimes fixes are not accepted, in which case IcedTea will maintain them locally



- When a security update is planned, Oracle gets the patches ready and notifies Red Hat and select others.
- IcedTea developers then put together a release, and send a preview copy to trusted distro maintainers for testing.
- On a preset date and time, Oracle makes the vulnerabilities public and distros release updates thereafter

IcedTea-Web

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- What?

- Why?

- IcedTea-Web

- Red Hat's Role

- The future of Java

- Version 7

- Version 8

- Questions



Web Browser Plugin



Web Start (javaws)



Settings tool (itweb-settings)

Image sources:

<http://www.openclipart.org/detail/25999>

<http://www.openclipart.org/detail/86059>

<http://www.openclipart.org/detail/112249>

SUMMIT

**JBoss
WORLD**


PRESENTED BY RED HAT



- IcedTea-Web contains:
 - The plugin
 - Webstart
 - itweb-settings

Fully Open Source


- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
- IcedTea
 - What?
 - Why?
 - IcedTea-Web
- Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



GPL

+

Classpath Exception




⁺ GPL stands for GNU **General Public License**
^{**} LGPL stands for GNU **Lesser General Public License**
Image source: <http://www.gnu.org/graphics/official%20gnu.svg>

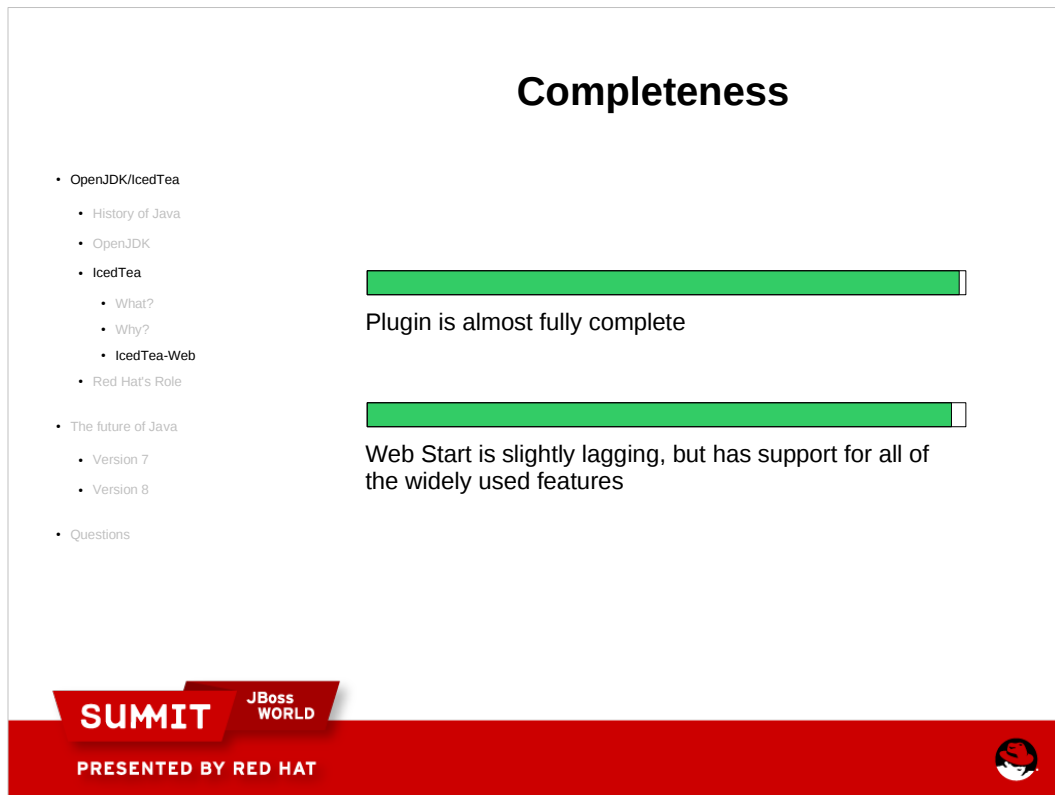
SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



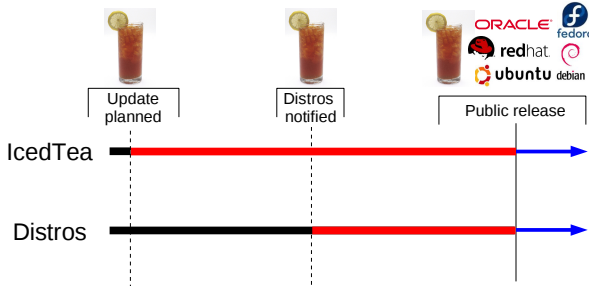
- All the code is IcedTea-Web is Open Source. Parts from NetX are under LGPL, the plugin/javaws is GPL+Classpath, while the settings tool is GPL



- Chart is more to show comparative completeness. WebStart is slightly lagging.
- However, both components contain the widely used features. Most of the missing features are obscure/not commonly seen in everyday applications

Co-ordinated security

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



— Not in code base
— In code base, not public
— In code base, public

SUMMIT

JBoss
WORLD

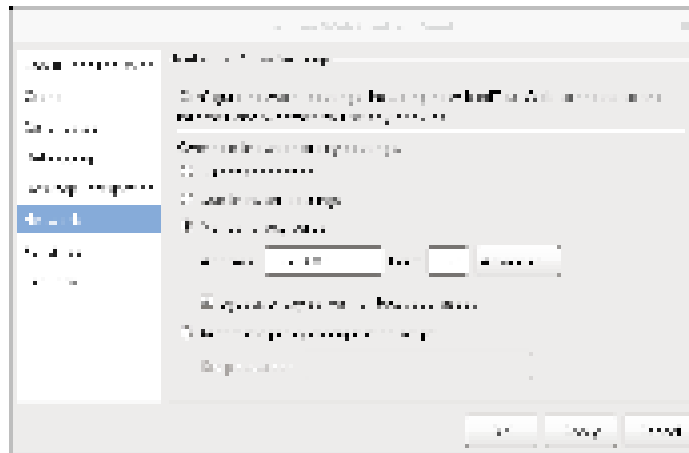
PRESENTED BY RED HAT



- As with IcedTea, when a security release is due, distros are notified earlier and sent an encrypted tarball so that they can test the fixes.

Settings configuration tool

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



SUMMIT

JBoss
WORLD

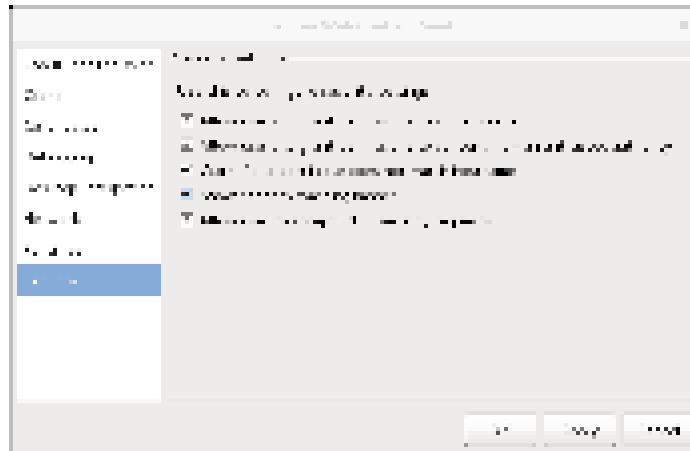
PRESENTED BY RED HAT



- Screenshot of settings tool showing proxy settings

Settings configuration tool

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - What?
 - Why?
 - IcedTea-Web
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions



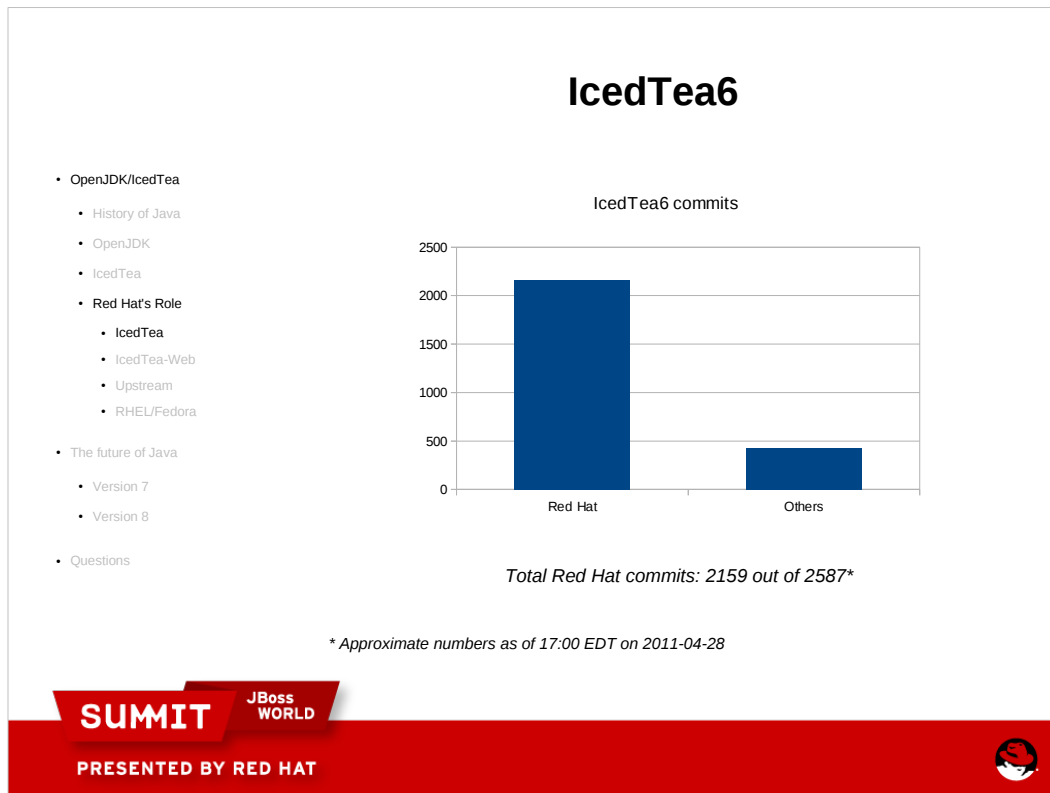
SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Screenshot of settings tool showing security configuration



```
#!/bin/bash
```

```
USERS="ahughes|aph|dbhole|fitzsim|fkung|gbenson|iivan|jon.vanalten|  
jsumali|keiths|kgallowa|langel|mwong|omajid|ptisnovs|jvanek|asu|  
dlila|mark@klomp.org"
```

```
TOTAL=`hg log | grep "user:" | grep -E "$USERS" | wc -l`  
TOTALCOMMITTS=`hg log | grep changeset | wc -l`
```

```
# Filter out Andrew's commits before he joined Red Hat  
ANDREWS_RH_COMMITTS=`hg log --date "2008-10-20 to 2011-04-28" | grep  
"user:" | grep andrew | grep -v redhat.com | wc -l`  
TOTAL=`echo $TOTAL + $ANDREWS_RH_COMMITTS | bc -l`
```

```
echo "Total: $TOTAL"  
echo "Total commits: $TOTALCOMMITTS"
```

IcedTea (7)

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- Red Hat's Role

- IcedTea

- IcedTea-Web

- Upstream

- RHEL/Fedora

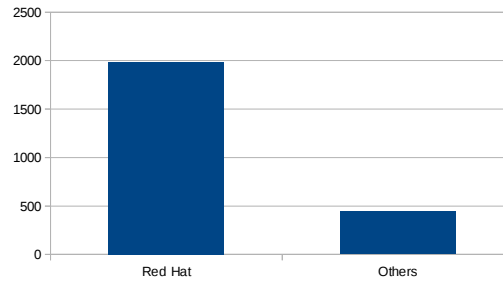
- The future of Java

- Version 7

- Version 8

- Questions

IcedTea (7) commits



Total Red Hat commits: 1988 out of 2432*

* Approximate numbers as of 17:00 EDT on 2011-04-28

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT

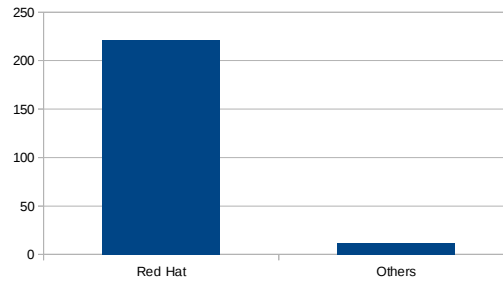


See notes for previous slide for counting script

Role in IcedTea-Web

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
- Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

IcedTea-Web commits



Total Red Hat commits: 223 out of 234*

* Approximate numbers as of 17:00 EDT on 2011-04-28

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



See notes for previous slide for counting script

OpenJDK6 contribution

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
 - The future of Java
 - Version 7
 - Version 8
 - Questions
- OpenJDK7 → OpenJDK6
 - Majority of OpenJDK6 commits are backports
 - The backport process
 - Red Hat is the primary backporter for OpenJDK6

SUMMIT

**JBoss
WORLD**

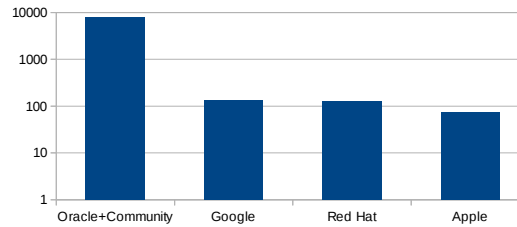
PRESENTED BY RED HAT



OpenJDK7 contribution

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions

OpenJDK7 commits (Logarithmic)



As of 2011-04-28, 16:00 EDT*

Total:	8337
Oracle + community:	7998
Google:	136 (1.63%)
Red Hat:	127 (1.52%)
Apple:	76** (0.09%)

* Figures are approximate, and do not account for merge commits

** Apple's contributions have been normalized from 81/8889 (OSX port) to 76/8337

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



```
#!/bin/bash
```

```
if [ "$1" == "redhat" ]; then
    USERS="langel aph andrew gbenson ptisnovs omajid dlila dbhole mwong"
elif [ "$1" == "google" ]; then
    USERS="ahe hiroshi jjb rasbold"
elif [ "$1" == "apple" ]; then
    USERS="astrange bino kmiller loefty rhoover swingler"
else
    USERS="$*"
fi

TEMP_FILE="/tmp/jdk.commits.log"
TOTAL=0
TOTALDUPLICATES=0
TOTALCOMMITTS=0
for dir in . corba hotspot jaxp jaxws jdk langtools; do
    hg log -v -R $dir | grep -E "^user:|^Reviewed-by|^Contributed-by:|summary:" | grep -vi merge |
    grep -E "user:|^Reviewed-by|^Contributed-by:" | tr '\n' ' ' | perl -p -e s/user:\/\\nuser:/g >
    $TEMP_FILE
    for uid in $USERS; do # for each user
        USERS_TO_EXCLUDE=`echo $USERS | sed -e s:$uid::g | sed -e s:"  ":" ":g -e s:"^ ":" :g -e s:"
        $:::g | tr ' ' '|`
        USERTOTAL=0
        COUNT=`grep " $uid" $TEMP_FILE | wc -l`
        DUPLICATED_USERS=`grep " $uid" $TEMP_FILE | grep -E " $USERS_TO_EXCLUDE" | wc -l`
        USERTOTAL=`echo $USERTOTAL + $COUNT | bc -l`
        TOTALDUPLICATES=`echo $TOTALDUPLICATES + $DUPLICATED_USERS | bc -l`
        TOTAL=`echo $TOTAL + $USERTOTAL | bc -l`
    done
    COMMITTS_IN_DIR=`wc -l $TEMP_FILE | awk '{print $1}`
    TOTALCOMMITTS=`echo $TOTALCOMMITTS + $COMMITTS_IN_DIR | bc -l`
done

rm -f $TEMP_FILE

# Account for commits by Chris Phillips after he started at Red Hat (2011-02-01+)
if [ "$1" == "redhat" ]; then
    TOTAL=`echo $TOTAL + 1 | bc -l`
fi

TOTAL=`echo $TOTAL - "($TOTALDUPLICATES/2)" | bc -l` # assume duplicates == max 2 users
echo "Total: $TOTAL"
echo "Total duplicates: $TOTALDUPLICATES"
echo "Total commits: $TOTALCOMMITTS"
```

IcedTea* contribution

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- Red Hat's Role

- IcedTea

- IcedTea-Web

- Upstream

- RHEL/Fedora

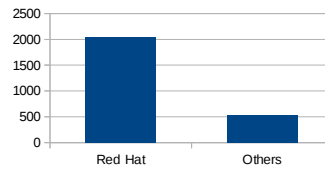
- The future of Java

- Version 7

- Version 8

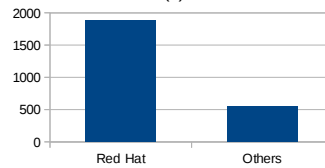
- Questions

IcedTea6 commits



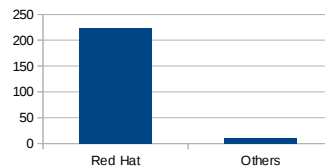
2159 out of 2587, 83.4%

IcedTea (7) commits



1988 out of 2431, 81.7%

IcedTea-Web commits



223 out of 234, 95.3%

SUMMIT

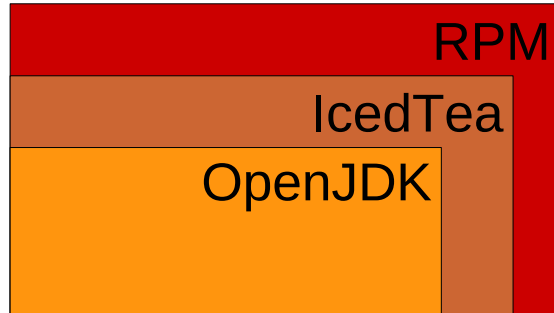
**JBoss
WORLD**

PRESENTED BY RED HAT



OpenJDK RPM in RHEL

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions



*RPM stands for *RPM Package Manager*

SUMMIT

**JBoss
WORLD**

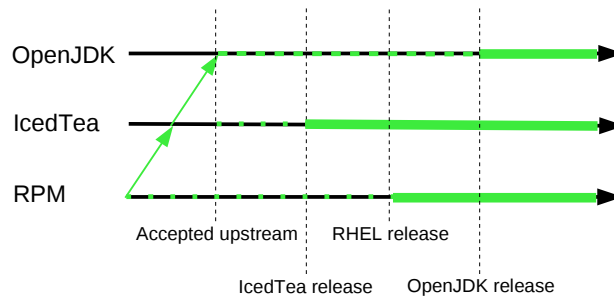
PRESENTED BY RED HAT



- RPM contains IcedTea which in turn contains OpenJDK

Upstream first policy

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
- Red Hat's Role
 - IcedTea
 - IcedTea-Web
 - Upstream
 - RHEL/Fedora
- The future of Java
 - Version 7
 - Version 8
- Questions



Red Hat Enterprise Linux release is subject to results of:

- TCK tests (api, compiler, dev)
- Jtreg tests (regression)
- Mauve tests (class library)
- Spec* tests (performance)
- Java2dBenchmark tests (drawing perf.)
- JFCMark tests (swing perf.)

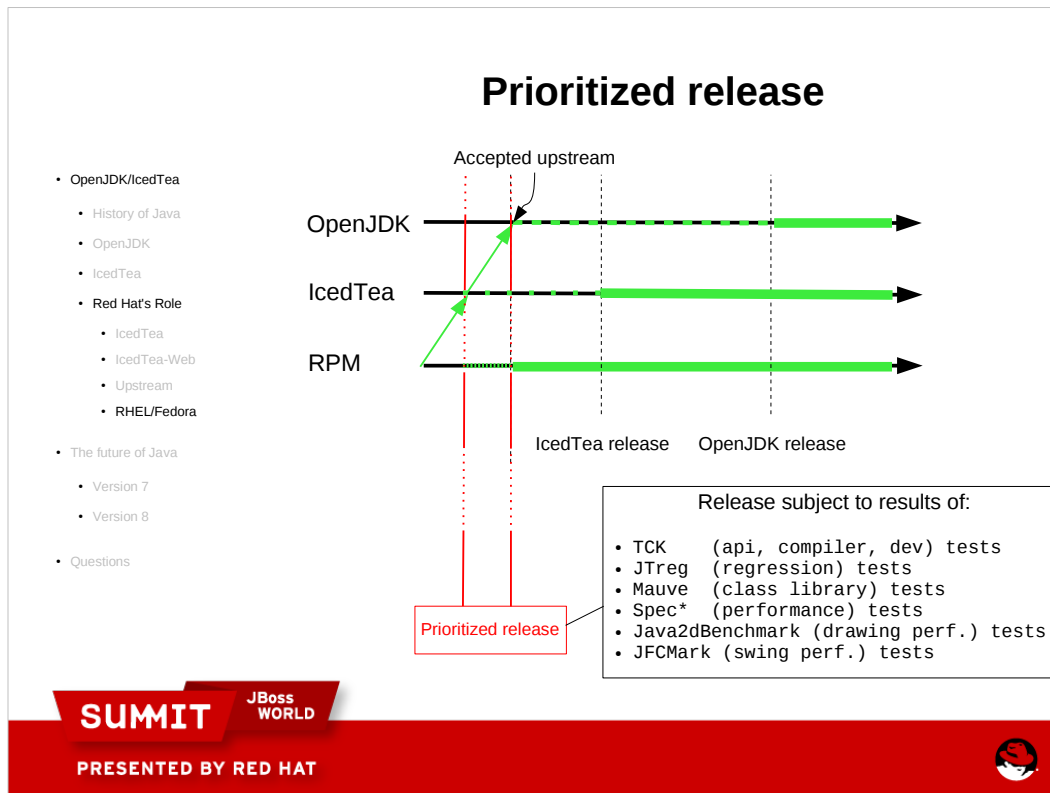
SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Upstream first policy
- Everything is well tested



- Upstream first policy
- Early backports into RPMs if needed
- All tests are rigorously run to ensure no regressions

Links

I will be at Campground 3 from 2PM to 3PM today

OpenJDK:	http://openjdk.java.net/
IcedTea:	http://icedtea.classpath.org/
IcedTea-Web:	http://icedtea.classpath.org/wiki/IcedTea-Web
IcedTea Bugs:	http://icedtea.classpath.org/bugzilla/
RHEL/Fedora bugs:	http://bugzilla.redhat.com
Mailing List:	distro-pkg-dev@openjdk.java.net
IRC:	irc.oftc.net, #openjdk

Deepak Bhole
dbhole@redhat.com
dbhole on irc

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Java 7

SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



JMX Enhancements

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....
- ManagementFactory.getAllPlatformMXBeanInterfaces()
- Everything inherits from PlatformManagedObject
- New MBeans
 - `java.lang.management.BufferPoolMXBean`
 - `java.lang.management.PlatformLoggingMXBean`

⁺ JMX stands for *Java Management Extensions*

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- BufferPoolMXBean:
 - getCount
 - getMemoryUsage
 - getName
 - getTotalCapacity
- PlatformLoggingMXBean:
 - getLoggerNames
 - getLoggerLevel
 - getParentLoggerName
 - setLoggerLevel

Switches in String

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements

- Language changes

- Strings in switch

- try-with-resources

- Diamond operator

- Numeric literals

- multi-catch

- @SafeVarArgs

- ...

- ...

- ...

```
10 public static void printFullMonthName(EnumMonth m) {
11     switch (m) {
12         case JANUARY:
13             System.out.println("January");
14         case FEBRUARY:
15             System.out.println("February");
16         case MARCH:
17             System.out.println("March");
18         case APRIL:
19             System.out.println("April");
20         case MAY:
21             System.out.println("May");
22         case JUNE:
23             System.out.println("June");
24         case JULY:
25             System.out.println("July");
26         case AUGUST:
27             System.out.println("August");
28         case SEPTEMBER:
29             System.out.println("September");
30         case OCTOBER:
31             System.out.println("October");
32         case NOVEMBER:
33             System.out.println("November");
34         case DECEMBER:
35             System.out.println("December");
36     }
37 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Currently doing switch on string is somewhat cumbersome

Switches in String

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```

1  # Create a new matrix with the same dimensions as the original
2  new_mat = matrix(0, nrow = nrow(mat), ncol = ncol(mat))
3
4  # Loop through each row and column
5  for (i in 1:nrow(mat)) {
6    for (j in 1:ncol(mat)) {
7      # Calculate the value for the new matrix
8      new_val = mat[i, j] * 2
9      # Assign the value to the new matrix
10     new_mat[i, j] = new_val
11   }
12 }
13
14 # Print the new matrix
15 print(new_mat)

```

SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



- Switches in string makes it cleaner
- String switches also use hashCode() first, so it is faster

try-with-resources – try1

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
try (InputStream is = new FileInputStream("test.txt")) {
    // ...
}

try (InputStream is = new FileInputStream("test.txt")) {
    // ...
}

try (InputStream is = new FileInputStream("test.txt")) {
    // ...
}

try (InputStream is = new FileInputStream("test.txt")) {
    // ...
}

try (InputStream is = new FileInputStream("test.txt")) {
    // ...
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Ensuring no resource leaks is tricky

try-with-resources – try2

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
try {
    // ...
} catch (IOException e) {
    // ...
}

// try-with-resources
try (Resource r = new Resource()) {
    // ...
}

// try-with-resources and multi-catch
try {
    // ...
} catch (IOException e) {
    // ...
} catch (SQLException e) {
    // ...
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Exceptions can occur during close too

try-with-resources – try3

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
try {
    // ...
} catch (IOException e) {
    // ...
}

try {
    // ...
} catch (IOException e) {
    // ...
}

try {
    // ...
} catch (IOException e) {
    // ...
}

try {
    // ...
} catch (IOException e) {
    // ...
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Many try/catches are needed to ensure no leaks

try-with-resources in JDK7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
60 public void tryToDownload(URL u, String outFile) throws IOException {
61     Throwable recordedThrow = null;
62     try {
63         OutputStream in = u.openStream();
64         OutputStream out = new FileOutputStream(outFile);
65         // copy from in to out
66     } catch (Throwable t) {
67         recordedThrow = t;
68     }
69     // Rest of the code
70 }
```

SUMMIT

**JBoss
WORLD**

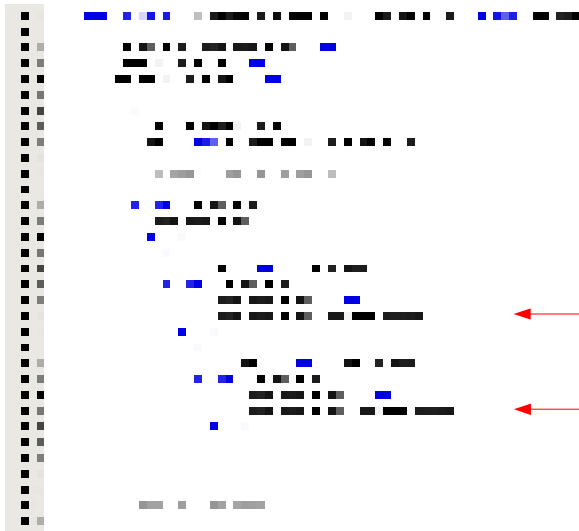
PRESENTED BY RED HAT



- With Java 7 the syntax is a lot cleaner, and the VM guarantees that nothing will leak

What JDK7 does (approximately)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Java 7 also records all exceptions, not just the first/last one

The AutoCloseable Interface

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
public interface AutoCloseable {  
    /**  
     * JAVADOCCS  
     *  
     * @throws Exception if this resource cannot be closed  
     */  
    void close() throws Exception;  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- The AutoCloseable interface must be implemented by all resources that want to work with try-with-resources
- Regularly used resource (File, Network, etc.) classes in JDK7 implement AutoCloseable

Diamond operator

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
public void foo() {  
    Map<String, Map<String, List<String>>> m1 =  
        new HashMap<String, Map<String, List<String>>>();  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Current syntax is messy

Diamond operator

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
public void foo() {  
    Map<String, Map<String, List<String>>> map = new HashMap<>();  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- The compiler already knows a lot.. Java 7 makes use of that knowledge

Diamond operator

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...
- ...
- ...

```
130 public class X<T> {
131     public X(T t) {}
132     public T get() { return null; }
133
134     public static int #string s() { return 1; }
135     public static int #object o() { return 2; }
136
137     public static void main(String[] args) {
138         System.out.println("#raw X<T>().get()"); // prints 1
139         System.out.println("#raw X<T>().get()"); // prints 2
140     }
141 }
```

Example posted to coin-dev list by Neal Gafter (neal@gafter.com)

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Diamond operator and raw types are not the same despite type erasure. Avoid raw types!

Binary Literals

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
60 public class WindowProperties {
61
62     public static final int SHOW_STATUS = 1;
63     public static final int SHOW_MENU = 2;
64     public static final int SHOW_BORDER = 3;
65
66     private int properties = SHOW_STATUS | SHOW_MENU;
67
68     /* Rest of the class */
69 }
70 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Binary Literals

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

• ...

• ...

• ...

```
109 public class WindowProperties {
110
111     public static final int WINDOW_SIZE = 0x00000000;
112     public static final int WINDOW_TITLE = 0x00000000;
113     public static final int WINDOW_ICON = 0x00000000;
114
115     private int properties = WINDOW_SIZE | WINDOW_TITLE | WINDOW_ICON;
116
117     // Best of the new ~?
118 }
119 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Binary syntax makes errors less likely in cases like above

Underscores in numeric literals

- OpenJDK/IcedTea

- History of Java

- OpenJDK

- IcedTea

- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements

- Language changes

- Strings in switch
- try-with-resources
- Diamond operator
- Numeric literals
- multi-catch
- @SafeVarArgs

• ...

- ...

- ...

```
100 public void foo() {
101     System.out.println("000100010001"); // 343
102     System.out.println("0001 0001 0001"); // 343
103
104     System.out.println("0001122"); // 00042
105     System.out.println("0 20 21 22"); // 00042
106     System.out.println("020 21 22"); // 00042
107
108     System.out.println("200201202"); // 200201202
109     System.out.println("200 201 202"); // 200201202
110
111     System.out.println("0x04FF4EE"); // 000273714
112     System.out.println("0x04FF 4EE"); // 000273714
113 }
114 }
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Underscores make things easy to read

Regular catch

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs
 - ...
 - ...
 - ...

```
try {  
    ...  
} catch (Exception e) {  
    ...  
}  
  
try {  
    ...  
} catch (Exception e) {  
    ...  
}  
  
try {  
    ...  
} catch (Exception e) {  
    ...  
}
```

SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



Multi-catch in JDK 7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

- ...

- ...

- ...

```
try {  
    // ...  
} catch (IOException | SQLException e) {  
    // ...  
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Java 7 can catch multiple disjunctive exceptions at once

Precise re-throw in JDK7

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
try {
    // ...
} catch (IOException e) {
    // ...
}

try {
    // ...
} catch (IOException e) {
    // ...
}

try {
    // ...
} catch (IOException e) {
    // ...
}
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- The re-throws are also precise, and there is an implicit assumption that exceptions in the catch block are final.

Safe var-args

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java

```
130 public <T> void printAll(T... params) {
131     for (T t: params)
132         System.out.println(t);
133 }
134
135 public void foo(List<String> l1, List<String> l2) {
136     /* do something */
137     printAll(l1, l2);
138 }
139
```

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

With JDK6 (-Xlint:unchecked):

```
warning: [unchecked] unchecked generic array creation of type
java.util.List<java.lang.String>[] for varargs parameter
printAll(l1, l2);
      ^
```

With JDK7 (-Xlint:unchecked):

```
warning: [unchecked] Possible heap pollution from parameterized vararg type T
public <T> void printAll(T... params) {
                        ^
```

```
warning: [unchecked] unchecked generic array creation for varargs parameter of
type List<String>[]
printAll(l1, l2);
      ^
```

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Java 7 also detects possible heap pollution

Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
60 public <T> void printAll(T... params) {  
61     for (T t: params) {  
62         System.out.println(t);  
63     }  
64 }  
65 @SuppressWarnings("unchecked")  
66 public void foo(List<String> l1, List<String> l2) {  
67     // do something  
68     printAll(l1, l2);  
69 }  
70 }
```

With JDK6 (-Xlint:unchecked):
No warnings

With JDK7 (-Xlint:unchecked):
warning: [unchecked] Possible heap pollution from parameterized vararg type T
public <T> void printAll(T... params) {
 ^

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Suppressing warnings works

Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
190: @SuppressWarnings("unchecked")
191: public void printAll(... Barazs) {
192:     for (Barazs barazs)
193:         System.out.println(barazs);
194: }
195:
196: @SuppressWarnings("unchecked")
197: public void foo(List<String> l1, List<String> l2) {
198:     /* do something */
199:     printAll(l1, l2);
200: }
```

With JDK6 (-Xlint:unchecked):
No warnings

With JDK7 (-Xlint:unchecked):
No warnings

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Compiler output is clean, but api user shouldn't have to suppress warning related to code they did not write (target method)

Safe var-args

- OpenJDK/IcedTea

- History of Java
- OpenJDK
- IcedTea
- Red Hat's Role

- The future of Java

- Version 7

- JMX enhancements
- Language changes
 - Strings in switch
 - try-with-resources
 - Diamond operator
 - Numeric literals
 - multi-catch
 - @SafeVarArgs

```
103 @SafeVarArgs
104 public void printAll(String... params) {
105     for (String p : params)
106         System.out.println(p);
107 }
108
109 public void foo(List<String> l1, List<String> l2) {
110     // do something
111     printAll(l1, l2);
112 }
```

With JDK6 (-Xlint:unchecked):
Error due to @SafeVarArgs not being defined
Warning at line 110

With JDK7 (-Xlint:unchecked):
No warnings

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- SafeVarArgs lets method writer tell the compiler that anyone can safely call it

NIO2

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



File actions

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....
- Actions provided by class **Files**
 - copy()
 - move()
 - delete()
 - create[Symbolic]Link()
 - walkFileTree()
 - etc.

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Many file operations are now available

Attributes

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- *AttributeView(s)

- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....

File/Directory	
creation time	Basic
access time	
modification time	
size	
isFile	
isDirectory	FileOwner
isLink	
getOwner	FileOwner
setOwner	
get/setPermissions	POSIX
get/setGroup	

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Basic file views are available for all systems, and additional ones based on filesystem are available too.
- Extendable via SPI

Asynchronous I/O

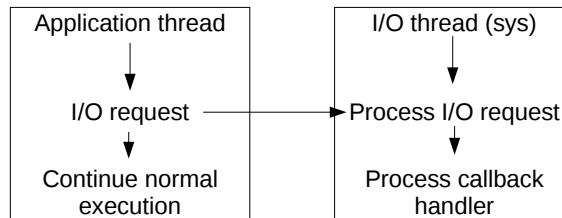
- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

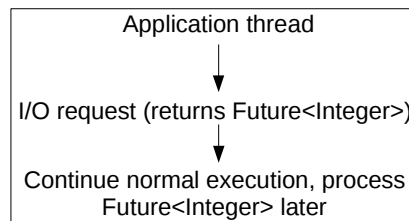
- Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..

- Version 8

- Questions.....



... OR ...



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



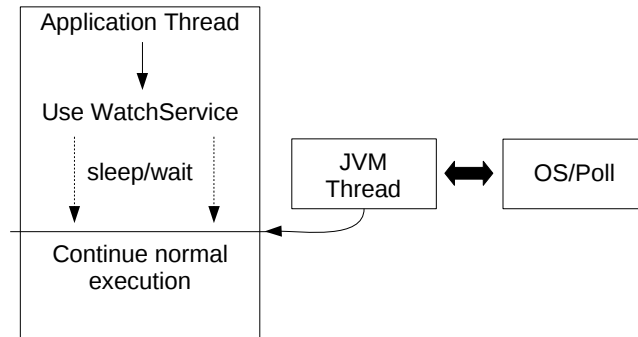
- The I/O can be done via Java's preset I/O threads or be processed locally later after placing the I/O call

Change notification

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
- Version 8
- Questions.....



SUMMIT

**JBoss
WORLD**

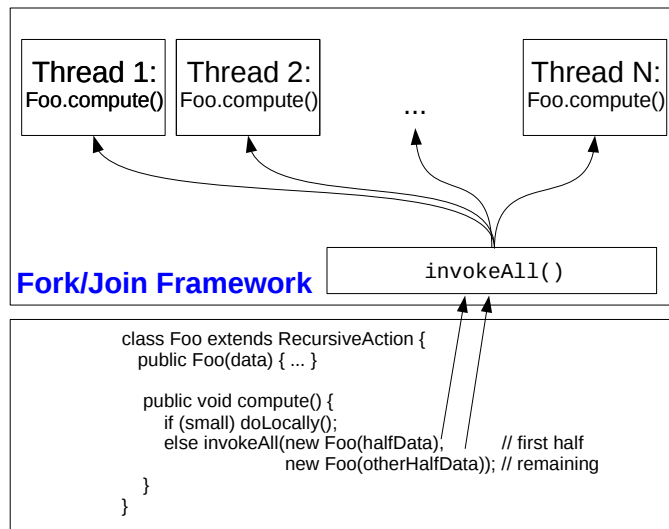
PRESENTED BY RED HAT



- JVM can also do file change notifications. OS method is used if available, polling otherwise

Fork/Join Framework

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
 - Version 8
- Questions.....



SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Fork/Join is good for divide and conquer algorithms

Additional Java 7 features

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role

- The future of Java

- Version 7
 - JMX enhancements
 - Language changes
 - nio2
 - Fork/Join framework
 - Rest..
- Version 8
- Questions.....

- JSR-292 (invokedynamic)

- JDBC 4.1

- Unicode 6.0

- Full list at

<http://openjdk.java.net/projects/jdk7/features>

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



Java 8

SUMMIT

JBoss
WORLD

PRESENTED BY RED HAT



Jigsaw

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
 - Jigsaw
 - Lambda
 - Language changes
- Questions.....
- JDK broken into modules based on functionality
- No more CLASSPATH
- New format to replace JAR files
- RPM auto-dependency writing (would be done by distros)

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- JDK is too big, especially for embedded devices
JigSaw will break it down
- A new module-info.java file will supply what the project exports, and what it needs. Thus CLASSPATH will no longer be needed
- A new, more enhanced format will replace JAR. Optimized for fast reading and will have content specific compression
- RPMS can take advantage of the dependency info to auto-generate REQs

Lambda (Closures)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
 - Jigsaw
 - Lambda
 - Language changes
 - Questions.....
- Not yet finalized
- Cleaner syntax and more scalable than Anonymous Inner Classes
- Defender methods

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- Will be finalized in September 2011
- Anonymous inner classes are bulky and have limitations (non-final vars not in scope, transparency issues, etc.)
- Defender methods extend interfaces. They provide default implementations for cases when implementations don't provide it. Linkage error if 2 interfaces provide the same default

Language Changes (Project Coin)

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
 - Jigsaw
 - Lambda
 - Language changes
 - Questions.....
- Collections enhancements
 - Collection literals
 - **final** **List**<Integer> digits = [4, 3, 4];
 - **final** **Set**<Integer> primes = { 2, 3, 5, 7 };
 - **final** **Map**<Integer, String> platonicSolids =
 { 4 : "tetrahedron",
 6 : "cube",
 8 : "octahedron",
 12 : "dodecahedron",
 20 : "icosahedron" };
 - Numeric suffixes for byte(y/Y) and short (s/S)
 - **byte** b = 0xA0y;
 - **short** s = 0xA0s;

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



- These were originally slated for 7 and are now in Limbo. They are not guaranteed to be in 8.

Questions?

- OpenJDK/IcedTea
 - History of Java
 - OpenJDK
 - IcedTea
 - Red Hat's Role
- The future of Java
 - Version 7
 - Version 8
- Questions.....

I will be at Campground 3 from 2PM to 3PM today

OpenJDK: <http://openjdk.java.net/>
IcedTea: <http://icedtea.classpath.org/>
IcedTea-Web: <http://icedtea.classpath.org/wiki/IcedTea-Web>

IcedTea Bugs: <http://icedtea.classpath.org/bugzilla/>
RHEL/Fedora bugs: <http://bugzilla.redhat.com>

Mailing List: distro-pkg-dev@openjdk.java.net

IRC: <irc.oftc.net> , #openjdk

Deepak Bhole
dbhole@redhat.com
dbhole on irc

SUMMIT

**JBoss
WORLD**

PRESENTED BY RED HAT



LIKE US ON FACEBOOK

[www.facebook.com/ukrainskyi](#)

FOLLOW US ON TWITTER

[@ukrainskyi](#)

TWEET ABOUT IT

[#ukrainskyi](#)

READ THE BLOG

[www.ukrainskyi.com](#)

GIVE US FEEDBACK

[www.ukrainskyi.com/contact-us](#)

UKRAINE

[www.ukrainskyi.com](#)

