Java SE State Of The Union



Gil Tene, CTO & co-Founder, Azul Systems @giltene



Agenda

- Brief introduction
- Some history
- Some more history & future speak
- Some obligatory "What's in Java 9?" stuff
- Let's chat



About me: Gil Tene

- co-founder, CTO @Azul Systems
- Have been working on "think different" GC approaches since 2002
- A Long history building Virtual & Physical Machines, Operating Systems, Enterprise apps, etc...
- I also depress people by pulling the wool up from over their eyes...
- JCP EC member, OpenJDK contributor...



* working on real-world trash compaction issues, circa 2004



Java SE State Of The Union



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A brief history of Java













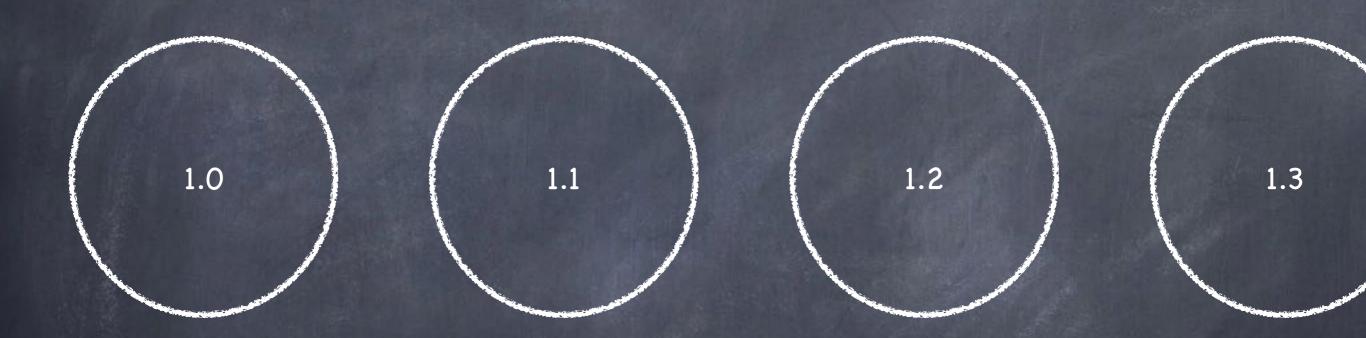


Java 1.X J2SE 1.X J2SE 5 Java SE X

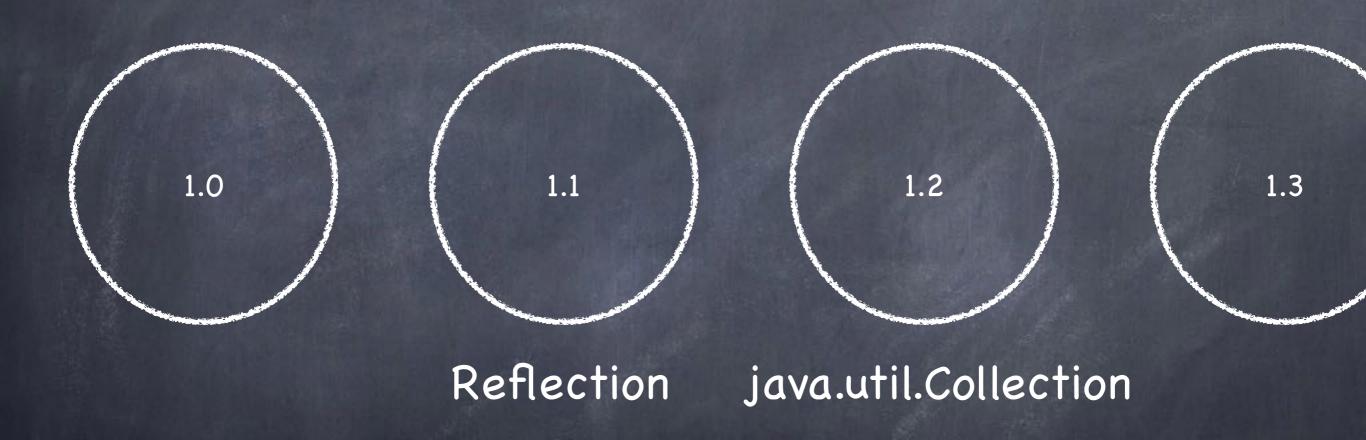








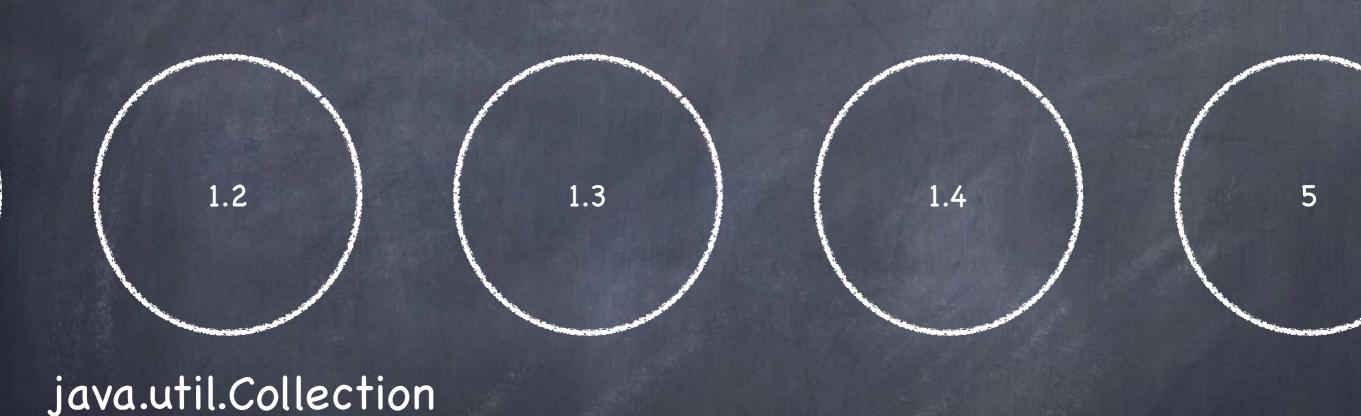




Swing

Weak refs

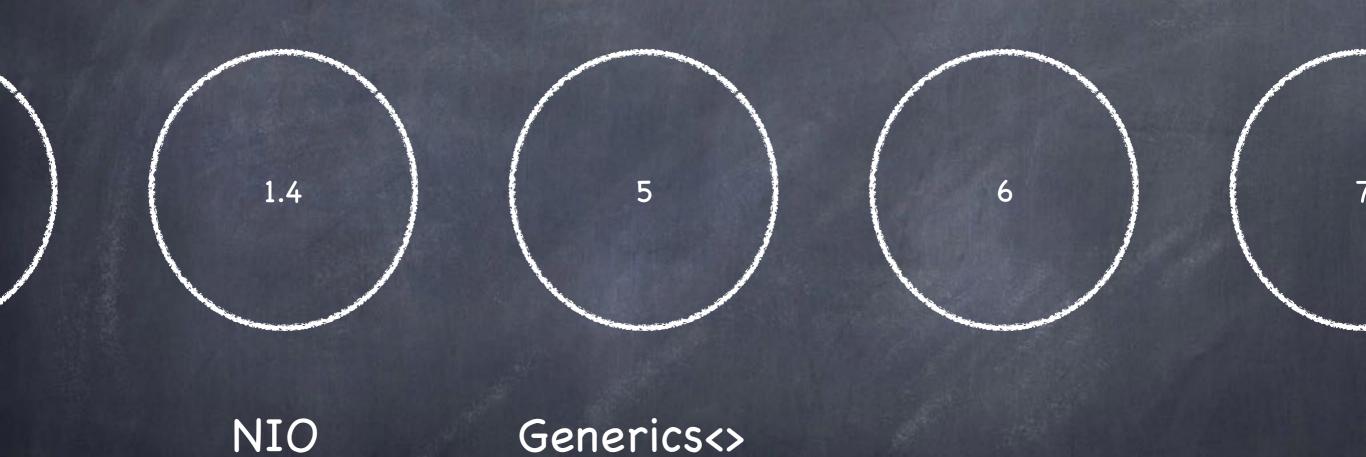




NIO

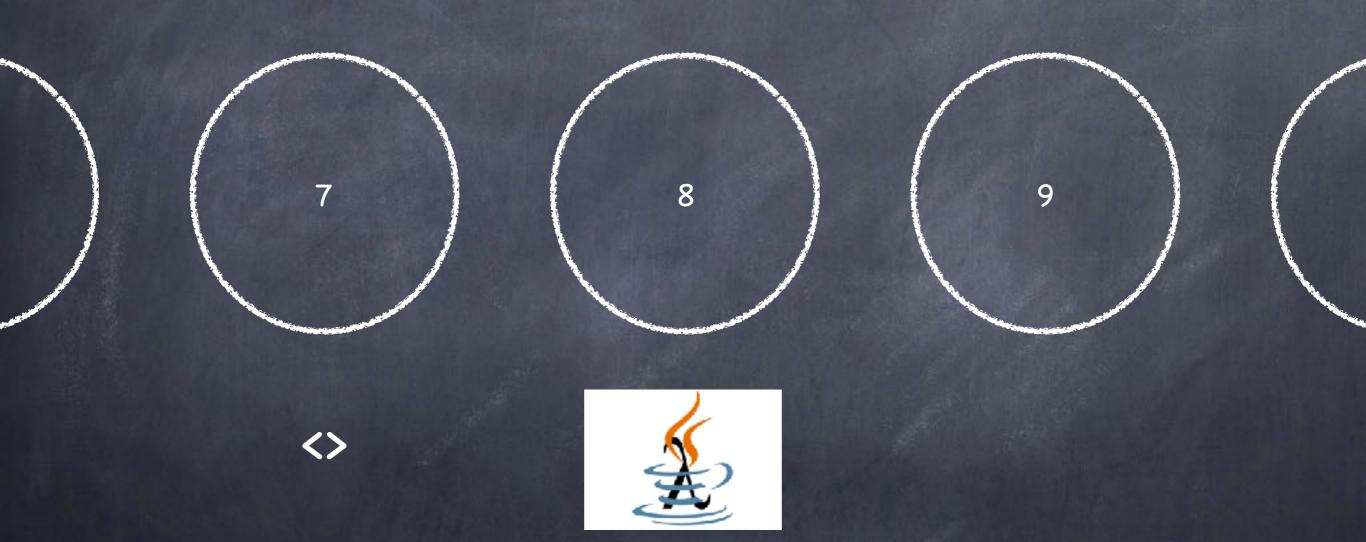


Weak refs



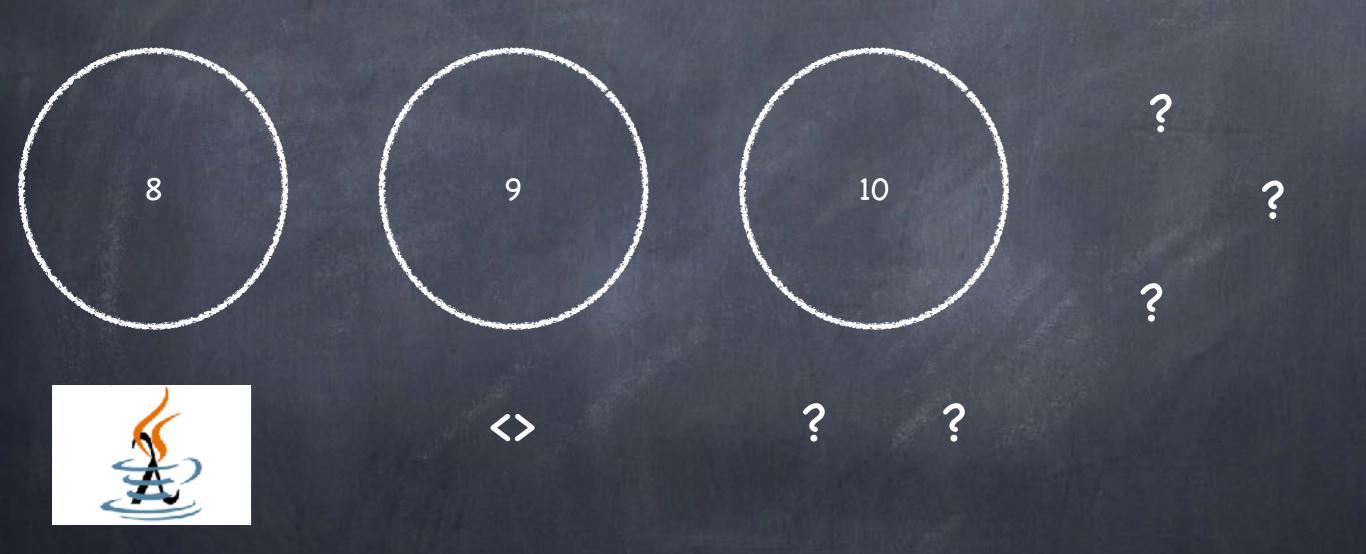
java.util.concurrent

AZUL



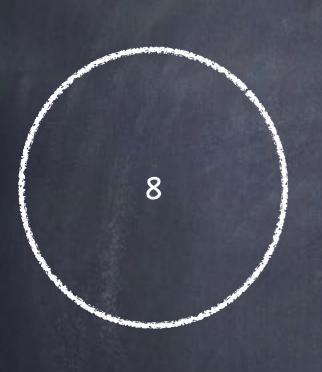
Stream API



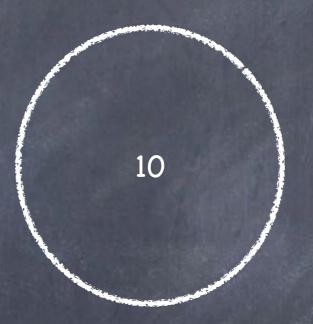


Stream API









val? var?

Arrays 2.0





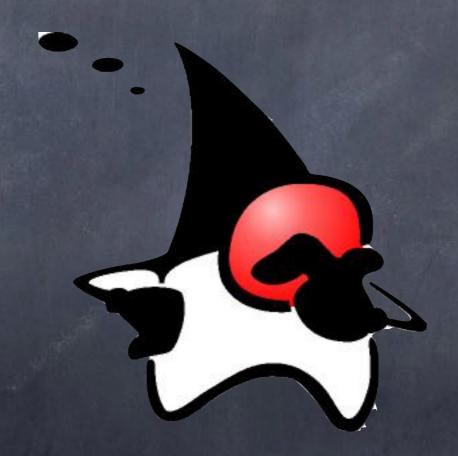
Jigsaw!

value types JNR/FFI

HashMap<int>

Stream API







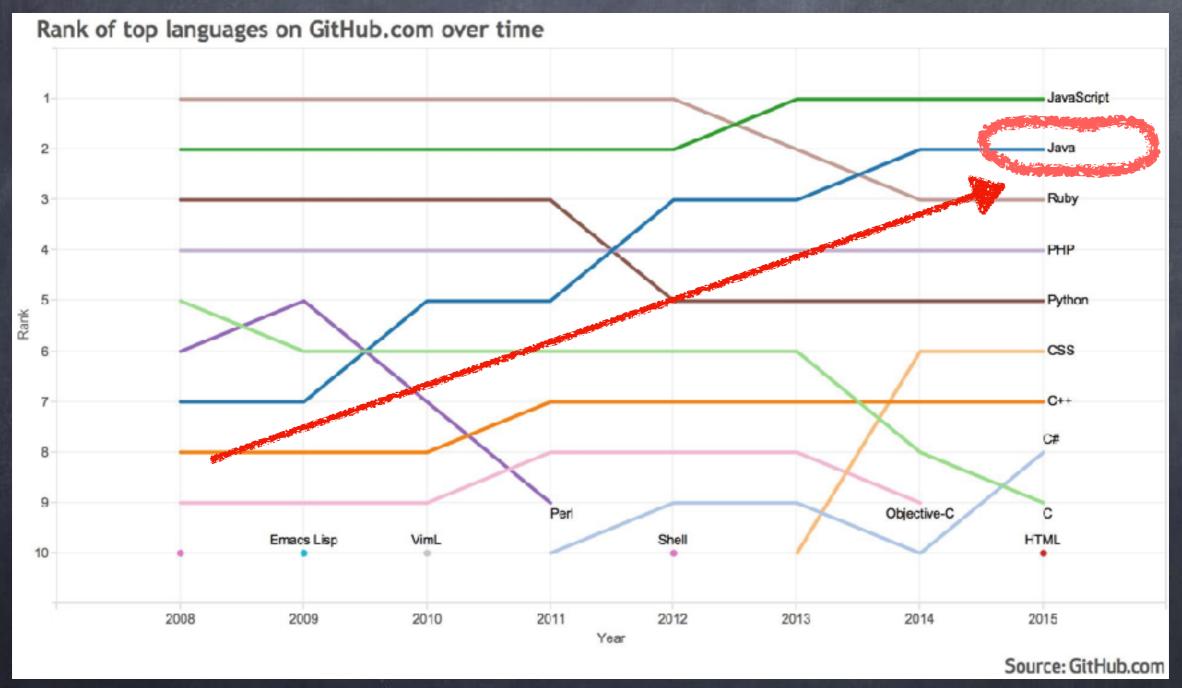
Is Java still popular?

Are other things cooler?

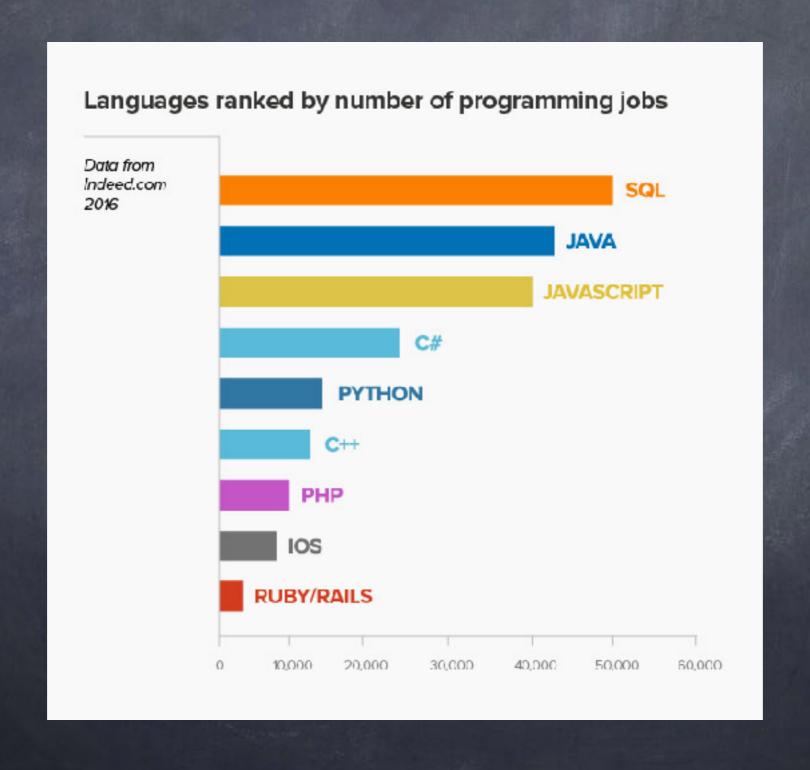
Is it trending away?



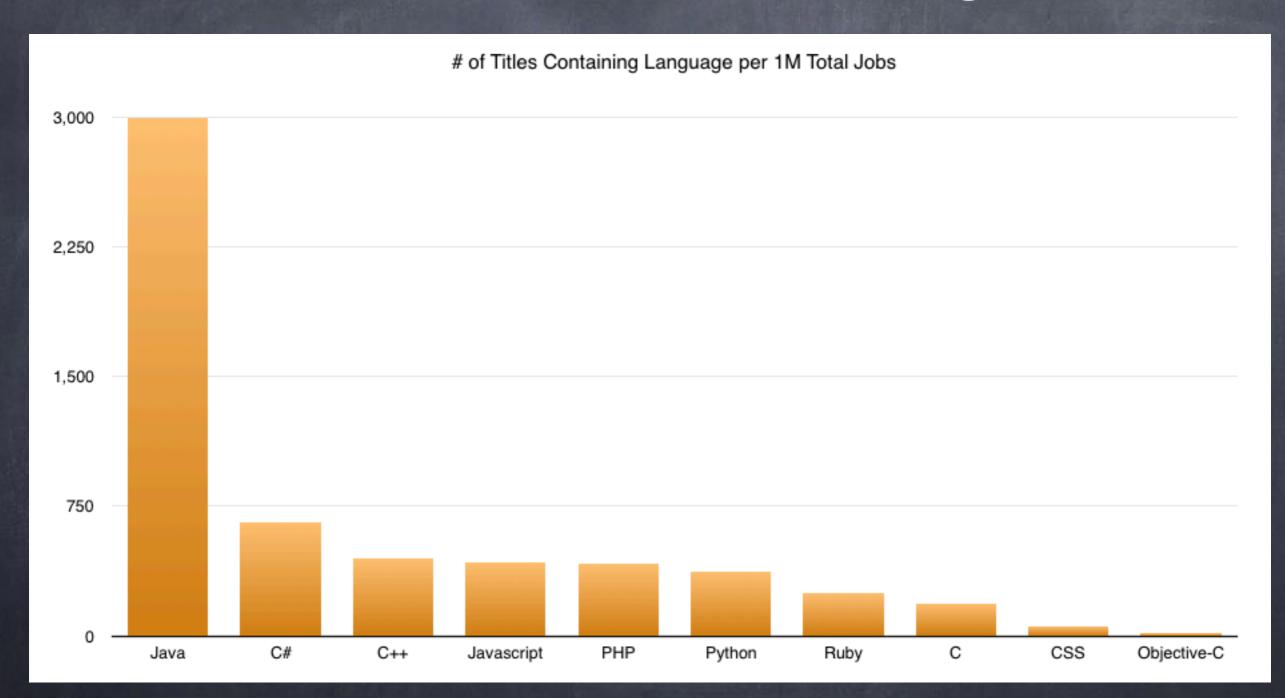














A different historical view: Java leaps and bounds





Java leaps and bounds

1995-2001: Server domination

2001-2010: Applications

2010-2016+: Infrastructure





1995-2001: Server domination

JDBC Pools Servlets JavaEE

2001-2010: Applications

WebLogic WebSphere JBoss Tomcat
Portals Web Services SOA Data Grids

2010-2016+: Infrastructure

Hadoop Cassandra Lucene/Solr/Elastic

Kafka Spark Storm Zookeeper



The state of the union is GOOD









Modules!





Modules!

and

some other stuff...





Modules

some other stuff...





Modules

some of the some o



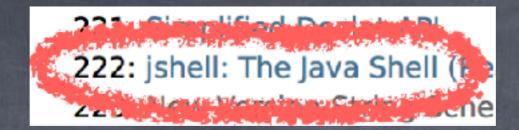


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110: HTTP 2 Client			Module Sy:	te Most Internal APIs	
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158: Unified JVM Logging			_		
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193: Variable Handles				ogging API and Service	
195. Variable Handles				phics Renderer	
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	229: Create PKCS12 Keystores by Default		Unified GC		
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	232: Improve Secure Application Performance			ed SecureRandom Implementations	
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256: BeanInfo Annotations

257: Update JavaFX/Media to Newer Version of GStreamer

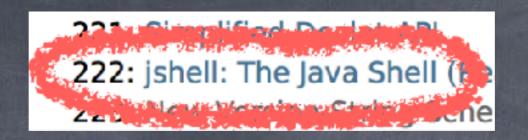




Java has a REPL!

(read... eval... print... loop...)



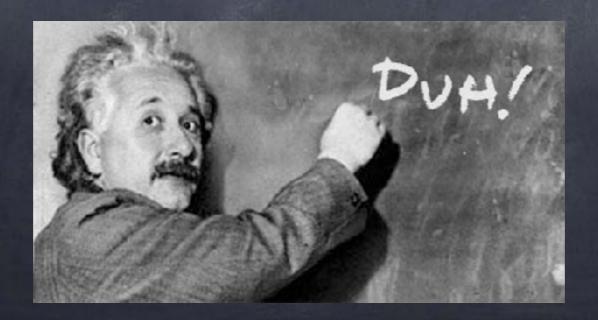


Java has a REPL!

Why is this important?

Because virtually every other modern environment has one...

***(where "modern" starts with "LISP")



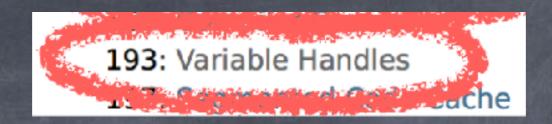


JEPs targeted to JDK 9, so far	258: HarfBuzz Font-Layout Engine
	259: Stack-Walking API
102: Process API Updates	260: Encapsulate Most Internal APIs
110: HTTP 2 Client	261: Module System
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158: Unified JVM Logging	263: HiDPI Graphics on Windows and Linux
	264: Platform Logging API and Service
193: Variable Handles	265: Marlin Graphics Renderer
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199: Smart Java Compilation, Phase Two	267: Unicode 8.0
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254: Compact Strings	
255: Merge Selected Xerces 2.11.0 Updates into	JAXP

256: BeanInfo Annotations

257: Update JavaFX/Media to Newer Version of GStreamer





VarHandles

"Define a standard means to invoke the equivalents of java.util.concurrent.atomic and sun.misc.Unsafe operations upon object fields and array elements."



Unsafe?



UHAFERAHER?



Safe Safe?

Unsafe Safe

Unsafe?

Safe Unsafe

Unsafe Unsafe



Safe Safe?

Unsafe Safe

Unsate

Safe Unsafe

Unsafe Unsafe



Unsafes

Is unsafe really going away?

No.





VarHandles

Also (finally) provides a fencing API

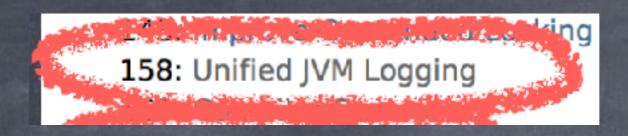
Supports ordering fences, but also:

```
try {
     <method body>
} finally {
     Reference.reachabilityFence(this);
}
```



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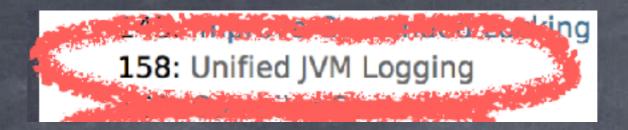
Unified JVM Logging

Current Logging stuff:

Logging Flags

```
-XX:+TraceClassResolution
                                            -XX:+TraceExceptions
      -XX:+TraceClassUnloading -XX:+PrintGCDetails
                                                -XX:+TraceMonitorInflation
               -XX:+PrintGC
                              -XX:+PrintVtables
    -XX:+TraceClassLoaderData
                                   -XX:+TraceVMOperation -XX:+PrintGCCause
                -XX:+TraceClassInitialization
                                                -XX:+TraceMonitorMismatch
-XX:+TraceDynamicGCThreads -XX:+TraceSafepoint -XX:+TraceRedefineClasses
         -XX:+VerboseVerification -XX:+TraceStartupTime
  -XX:+PrintCMSStatistics
                          -XX:+TraceDefaultMethods -XX:+PrintTaskQueue
            -XX:+TraceBiasedLocking
                                      -XX:+PrintCompressedOopsMode -XX:+PrintTLAB
    -XX:+PrintJNIGCStalls
                              -XX:+TraceReferenceGC
                -XX:+PrintPLAB
                                                       -XX:+TraceClassResolution
                            -XX:+TraceMonitorInflation
```





Unified JVM Logging

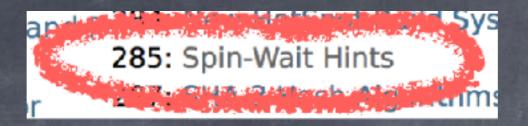
New world order for logging: -Xlog

Look up Marcus Larsson's excellent "Unified JVM Logging in JDK 9" from JavaOne 2016 [CON6225]



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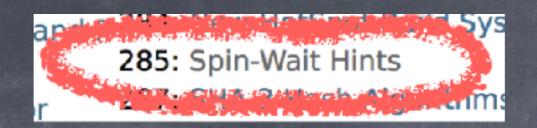




Spin-Wait Hints

My Favorite...





Spin-Wait Hints

Adds a single method to the JDK:

java.lang.Thread.onSpinWait()

Which does absolutely nothing...

but it does nothing faster...

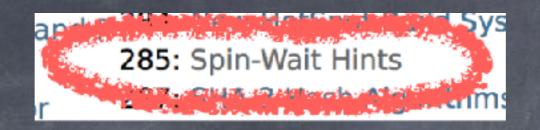




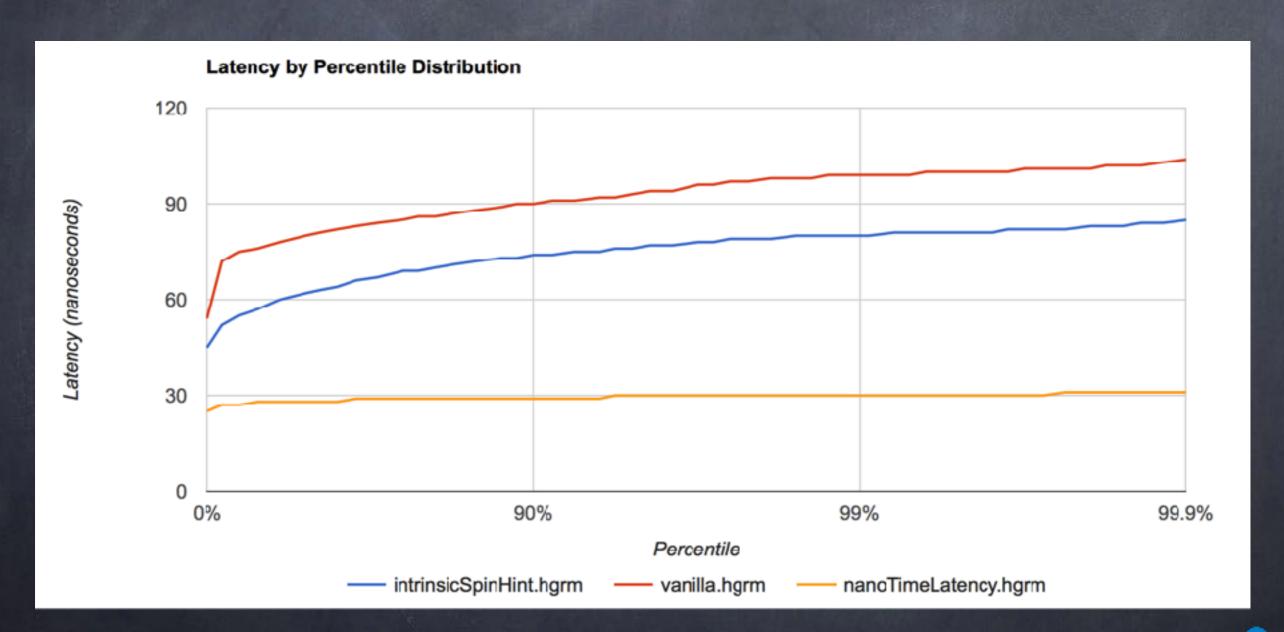
java.lang.Thread.onSpinWait()

```
while (spinData >= 0) {
    while ((spinData & 0x1) == 0) {
        // busy spin until ready to consume
        ThreadHints.onSpinWait();
    }
    spinData++; // consume
}
```





java.lang.Thread.onSpinWait()





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	255: Merge Selected Xerces 2.11.0 Updates into	JAXP	Maria Carlo Maria Maria Carlo
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JEPs targeted to JDK 9, so far 259: Stack-Walking API 102: Process API Updates 260: Encapsulate Most Internal APIs 261: Module System 110: HTTP 2 Client 262: TIFF Image I/O 158: Unified IVM Logging 263: HiDPI Graphics on Windows and Linux 264: Platform Logging API and Service 265: Marlin Graphics Renderer 199: Smart Java Compilation, Phase Two 267: Unicode 8.0 200: The Modular JDK 268: XMI Catalogs 201: Modular Source Code 269: Convenience Factory Methods for Collections 211: Elide Deprecation Wa 228: Add More Diagnostic Commands 270: Reserved Stack Areas for Critical Sections 212: Resolve Lint and Doci 229: Create PKCS12 Keystores by Default 271: Unified GC Logging 213: Milling Project Coin 231: Remove Launch-Time JRE Version Selection 272: Platform-Specific Desktop Features 214: Remove GC Combina 232: Improve Secure Application Performance 273: DRBG-Based SecureRandom Implementations 215: Tiered Attribution for 233: Generate Run-Time Compiler Tests Automat 274: Enhanced Method Handles 216: Process Import Stater 235: Test Class-File Attributes Generated by Java 275: Modular Java Application Packaging 217: Annotations Pipeline 236: Parser API for Nashorn 276: Dynamic Linking of Language-Defined Object Models 219: Datagram Transport l 237: Linux/AArch64 Port 277: Enhanced Deprecation 220: Modular Run-Time Im 238: Multi-Release JAR Files 278: Additional Tests for Humongous Objects in G1 40: Remove the JVM TI hprof Agent 279: Improve Test-Failure Troubleshooting 222: jshell: The Java Shell (41: Remove the jhat Tool 280: Indify String Concatenation 281: HotSpot C++ Unit-Test Framework ne43: lava-Level IVM Compiler Interface 244: TLS Application-Layer Protocol Negotiation 282: jlink: The Java Linker 225: Javadoc Search 245: Validate JVM Command-Line Flag Argument 283: Enable GTK 3 on Linux 226: UTF-8 Property Files 246: Leverage CPU Instructions for GHASH ar 285: Spin-Wait Hints 247: Compile for Older Platform Versions 248: Make G1 the Default Garbage Collector 288: Disable SHA-L Certificates 249: OCSP Stapling for TLS 289: Deprecate the Applet API 250: Store Interned Strings in CDS Archives 290: Filter Incoming Serialization Data 251: Multi-Resolution Images 292: Implement Selected ECMAScript 6 Features in Nashorn 252: Use CLDR Locale Data by Default 253: Prepare JavaFX UI Controls & CSS APIs for Modularization 254: Compact Strings 255: Merge Selected Xerces 2.11.0 Updates into JAXP 256: BeanInfo Annotations 257: Update JavaFX/Media to Newer Version of GStream

So... what cool feature will make people move to Java 9?





Q&A and

Open Discussion





Q&A and

OpenJDK?

JCP?

Valhala?

Panama?

Venezuela?

Open Discussion



