Use of Java / JVM at Twitter

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#JCP EC Twitter reps

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#Twitter
#Twitter: the short version

#Platform
#RealTime
**#Twitter**: services

- A **huge** distributed system
  - huge number of machines running a huge number of JVMs
  - multiple data centers
  - services communicate with other services via RPC
  - typically, many JVMs per service

- Most services run on
  - CentOS Linux distribution (x64)
  - OpenJDK distribution (TwitterJDK)
  - Mesos (data center scheduling)
  - Finagle (async RPC for Scala / Java)
#Twitter: programming languages

**server-side**

- Scala (most used by far)
- Java
- Ruby (moving away from it…)
- C/C++ (a bit)
- Python (a bit)
#Twitter : Java libraries

- We rely heavily on
  - NIO
  - collections
  - concurrent collections
  - concurrent utilities
  - etc.
#TwitterJDK
#TwitterJDK : vm team

- Infrastructure Org
- Responsible for releasing, maintaining, customizing, improving
  - TwitterJDK
- Developer support
  - consultancy
  - troubleshooting
  - education
Why deploy our own JDK?

• Commercial support wouldn't work for us
  • too expensive
  • too slow

• OpenJDK development is slow
  • dreadfully slow process
  • change turnaround feels like eternity
    • current development repo is JDK 9, months / years away
    • backports to JDK 8: slow turnaround

• We believe we can support ourselves best
#TwitterJDK: pushing the limits

- We push the JVM's limits more than most
  - large heaps
  - huge scale
  - strict latency requirements
- Optimize for our stack
  - Scala, Finagle, CentOS, x64, etc.
- Optimize for our workloads
  - quite different vs. most other JVM workloads I’m familiar with
#TwitterJDK: release

hg.openjdk.java.net

OpenJDK Repos

corba
hotspot
jdk
...

Twitter

Twitter Repos

corba
hotspot (+changes)
jdk (+changes)
...

git

hg-git

Build

TwitterJDK
#TwitterJDK: release

• Based on OpenJDK
  • Synced up to the latest update release
    • leverage all OpenJDK testing
  • Plus our own changes
    • which we'll be happy to contribute back BTW…
  • Plus (small number of) additional patches (e.g., security / critical fixes)
• Monthly releases
• Current main release
  • JDK 8 / Tiered Compilation / 64-bit / CentOS
#TwitterJDK: enhancements

- Heap Profiling
- Binary Logging Framework (JVM + Java tracepoints)
- Intermediate Generation(s) for G1 GC
- Misc Bug / Performance Fixes
- Mostly in HotSpot + a few small patches to the JDK libraries
#Questions