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Apache Tomcat 8

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Agenda

• Introductions
• Java EE 7
• Tomcat specific changes
• Timescales
• Final thoughts
• Questions
Introductions

- markt at the Apache Software Foundation
- Apache Tomcat committer
- Developed the majority of Tomcat 7 and Tomcat 8
- ASF security team member
- ASF infrastructure volunteer
- Consultant Software Engineer at Pivotal
- Member of Servlet, WebSocket and EL expert groups
- Pivotal security team lead
Java EE 7
Java EE 7

- Servlet 3.1
- JSP 2.3
- Unified Expression Language 3.0
- WebSocket 1.0
Java EE 7

• Little / no demand for other Java EE 7 components in Tomcat
  – Java Authentication SPI for Containers (JASPIC JSR 196) Servlet profile

• Web container – Apache TomEE

• J2EE container – Apache Geronimo
Servlet 3.1

• I am part of the Expert Group

• New features
  – Non-blocking IO
  – HTTP upgrade
  – Change session ID on authentication
  – Protection for uncovered HTTP methods
Servlet 3.1

- Improvements
  - Clarified some ambiguities
  - Fixes some typos

- Dropped features
  - Multi-tenant
  - Overlays
JSP 2.3

- There is no JSP expert group
- JSP 2.3 is a maintenance release

Changes
- Updates in light of EL specification changes
- JSPs should only respond to HEAD, GET or POST
UEL 3.0

- I am part of the Expert Group
- Significant changes
- Changed direction a few times
- Make sure anything you refer to is written based on the final version
UEL 3.0

- Access to static methods and fields
- Lambda expressions
  - \( ((x,y)\rightarrow x+y)(3,4) \) evaluates to 7
  - \( \text{fact} = n \rightarrow n==0? 1 : n\times\text{fact}(n-1) \); fact(5) evaluates to 120
- Collection operators
  - filter, map, sorted, forEach, …
- Constructors
- Assignment
WebSocket 1.0

- I am part of the Expert Group
- Tomcat 7 already supported WebSocket
  - Uses own API
- Tomcat 8 supports the new API
- Tomcat 7 (as of 7.0.43)
  - Supports the new API
  - The old API has been deprecated
- WebSocket 1.0 is for clients and servers
WebSocket 1.0

- Additional features compared to the old Tomcat 7 API
  - Encoding / decoding
  - Annotations

- Differences
  - Tomcat 7’s implementation is blocking within a Frame
  - WebSocket 1.0 is non-blocking although some writes do block

- Non-blocking
  - Works with the BIO connector but is not really non-blocking
  - Fundamentally changes the API
Tomcat Specific Changes
Tomcat Specific Changes

• Resources
  – Aliases
  – VirtualDirContext / VirtualWepappLoader
  – External repositories for the WebappClassLoader
  – Servlet 3.0 resource JARS

• Tomcat 7 implements each of these slightly differently
  – Very fragile
  – Servlet 3.1 overlays were going to be difficult
Tomcat Specific Changes

• New resources implementation
  – Much cleaner implementation
  – Overlays now simple to implement (but have been dropped)
  – Still some areas for possible further work (class loader)

• NIO connector is now the default

• Additional diagnostic information in the Manager
  – SSL ciphers
  – May be back-ported to Tomcat 7
  – Ideas for additional features
Tomcat Specific Changes

• API changing clean-up
  – Remove duplicated functionality
  – Move Manager, Loader and Resources from Container to Context
  – Move Mapper from Connector to Service

• Code clean-up
  – Reduce warnings
  – IDE, FindBugs, Javadoc, Checkstyle, etc
Tomcat Specific Changes

- Commons DBCP 2.x / Pool 2.x
  - Much better performance on multi-core systems
  - Exposes some information on pool state via JMX
Progress

- Servlet 3.1 – Complete
- JSP 2.3 – Complete
- UEL 3.0 – Complete
- WebSocket 1.0 – Complete
Timescales

- Tomcat 8.0.0-RC1 released 6 August 2013
- Tomcat 8.0.0-RC3 vote happening as I type this slide
  - 8.0.0-RC2 not released
- 8.0.0 expected fairly soon (month or two)
- The first stable 8.0.x release?
- Best guess: Q2 2014
Final Thoughts

• Speed of progress to stability depends on the community

• Help wanted!
  – Download the latest 8.0.x release and test it
  – Comment on the discussions on the user and dev lists
  – Report any bugs you find
  – Bug reports with patches especially welcome
  – Coding (new features, bug fixes, clean-up, de-duplication, unit tests)
  – Documentation
Questions
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