Apache Tomcat 8 Preview

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Agenda

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

- Mark Thomas
- Apache Tomcat committer (markt)
- Other ASF
  - Infrastructure team
  - Security
  - Commons
  - Member
- Staff Engineer at VMware
  - Tomcat
  - Security
  - tc Server
  - support
Java EE 7
Java EE 7

- Servlet 3.1
- JSP 2.3
- Expression Language 3.0
- WebSockets 1.0

- 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

- Latest draft: January 2013 (public draft)

- New features
  - Non-blocking IO
  - HTTP upgrade
  - Change session ID on authentication

- Improvements
  - Clarified some ambiguities
  - Fixes some typos
Servlet 3.1

- **TBD features**
  - Protection for uncovered HTTP methods in security constraints
  - Almost certainly will be included

- **Dropped features**
  - Overlays
JSP 2.3

- There is no JSP expert group
- JSP 2.3 will be a maintenance release
- JSP 2.2 arrived very late in the Java EE 6 cycle
  - Expect JSP 2.3 to be the same

- Little to do in the JSP specification
  - Updates in light of EL specification changes

- Possible changes / clarifications
  - Should JSPs respond to all HTTP methods?
  - Just HEAD, GET, POST
EL 3.0

- I am part of the Expert Group

- Significant change

- Access to static methods and fields

- Lambda expressions
  - $((x,y)\rightarrow x+y)(3,4)$ evaluates to 7
  - $\text{fact} = n \rightarrow n==0? 1: n*\text{fact}(n-1); \text{fact}(5)$ evaluates to 120
EL 3.0

- **Collection operators**
  - Construction of Sets, Lists, Maps
  - Was going to provide Language INtegrated Query (LINQ) support
  - Will now align with Java SE 8

- **Other new operators**
  - String concatenation  +=
  - Assignment  =
  - Semicolon  ;
    - A;B  -> evaluate A & discard; evaluate B and return
  - Class  T(classname)
WebSocket 1.0

- I am part of the Expert Group

- Tomcat 7 already supports WebSocket
  - Uses own API

- Tomcat 8 will support new API
  - Tomcat 7 will probably support new API
  - Tomcat 7’s current API likely to be deprecated and excluded from Tomcat 8

- WebSocket 1.0 is for clients and servers
  - Will implement both
WebSocket 1.0

- **Additional features**
  - Encoding / decoding (lots of debate here)
  - 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 obviously 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

- **New resources implementation**
  - Much cleaner implementation
  - Overlays now simple to implement (but have been dropped from Servlet 3.1)
Tomcat specific changes

- 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

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

- **Code clean-up**
  - Reduce warnings
  - IDE, FindBugs, Javadoc, Checkstyle, etc
Timescales
Timescales

- **Java EE 7 final due Spring 2013**
  - unlikely to slip
  - features may be removed

- **Tomcat 8**
  - 8.0.0 release will be after Java EE 7 is final
  - no firm plan for how long after
  - need to implement all the features
  - need to pass the TCKs

- 8.0.0 may be preceded by some milestone releases
Progress to date

- **Servlet 3.1**
  - Non-blocking IO
    - Partially implemented by Filip Hanik (NIO only)
    - Some low level connector prerequisites implemented
    - Refactoring looking likely
  - HTTP upgrade
    - Done
  - Overlays
    - Hard part (refactoring) done but not required
  - Change session ID
    - Done
  - Protection for uncovered HTTP methods
    - Not started

- Reasonable amount of work left to do
Progress to date

- **WebSocket**
  - Mostly complete
  - Passes Autobahn test suite (BIO, NIO and APR/native)
  - Encoding/Decoding largest block of functionality left
  - Should be fairly quick

- **EL 3.0**
  - Not implemented
  - Significant effort required

- **JSP**
  - Not implemented
  - Should be very quick
Final thoughts
Final thoughts

- Java EE 7
  - not final
  - still a moving target

- Tomcat 8
  - depends on volunteer development effort
  - needs community agreement, particularly for big changes

- Help wanted
  - Coding (new features, bug fixes, clean-up, de-duplication, more tests)
  - documentation
  - testing
Questions