Apache Tomcat 9

Early Preview

Mark Thomas, 18 November 2014
Introduction

• Apache Tomcat committer since December 2003
  – markt@apache.org

• Tomcat 8 release manager

• Member of the Servlet, WebSocket and EL expert groups

• Consultant Software Engineer @ Pivotal

• Currently focused on Apache Tomcat 9
Agenda

• Specification mandated new features
• Tomcat specific new features
• Tomcat features removed
• Internal changes
Specification changes
Specifications

• JavaEE 8
  - Java SE 8
• Servlet 4.0
• WebSocket 2.0?
• EL 3.1?
• JSP 2.4?
Specifications
JavaEE 8

• Key elements
  – HTML 5.0
  – HTTP 2.0
  – Simplification
  – Better integration for managed beans
  – Better infrastructure for the cloud
Specifications
Servlet 4.0

• Work is starting
• HTTP 2.0
  – a.k.a. SPDY
• HTTP 2.0 closest SPDY v4
• Tomcat has an initial SPDY v2 implementation
  – Most browsers have dropped SPDY v2 support
Specifications
WebSocket 2.0

• Work has not started

• Assuming 2.0
  – Could be 1.2

• Standardize extension support
  – Compression
  – Multiplexing
Specifications

EL 3.1

- Work has not started
- Nothing obvious to do here
- Java 8 lambda alignment?
- Most issues opened against UEL are implementation bugs
- Expect minor changes and clarifications
Specifications
JSP 2.4

• There is no JSP expert group
• Just an other maintenance release
• Issues to resolve with EL 3.0 and JSPs
  – Imports (definition and resolution)
Specifications

Other

• Tomcat 9 isn’t going to implement the web profile
  – Lack of demand
  – TomEE

• JASPIC
  – Very little demand
  – There are benefits to implementing it
  – In the nice to have category
Tomcat New Features
Tomcat New Features

- Server Name Indication (SNI) support
  - All HTTPS connectors
- Other possibilities
  - HTTP upgrade support for AJP
- Suggestions welcome
  - Suggestions with patches are even better ;)

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Removed Features
Removed Features
BIO HTTP and BIO AJP connectors

• Both WebSocket and Servlet 3.1 require non-blocking IO
• BIO connectors currently pretend to be non-blocking
  – Creates complexity
  – No scalability benefits
  – Opportunity for things to break
• Therefore decided to remove them
Removed Features

BIO HTTP and BIO AJP connectors

• NIO implementation remains the default
  – HTTP and AJP

• NIO2 introduced in Tomcat 8

• APR/native still available
  – Requires native library
Removed Features

Comet

- Proprietary interface for asynchronous I/O
- Users are moving (have moved) to WebSocket
- Adds complexity to all the connectors
- Therefore decided to remove it
Internal Changes
Internal Changes
Connectors

- HTTP 2.0 support is going to add complexity
- Connectors are already complex
- Connector code is fragile in some areas
- Aim to clean the code up before starting on HTTP 2.0
Internal Changes

Connectors

• Removed
  – BIO
  – Comet

• Implementation specific per connector code
  – Move to Endpoint

• Implementation specific per connection code
  – Move to SocketWrapper
Internal Changes

Connectors

• Reduce duplication
  – HTTP upgrade reduced to 3 classes from 12
  – Removed ~400 lines (of ~120,000)

• Similar refactoring possible for HTTP and AJP
  – Similar reductions in numbers of classes
  – Greater reduction in lines of code
Internal Changes

WebSocket

- Refactor I/O implementation
  - Direct to Tomcat’s I/O layer
  - Not via Servlet 3.1 non-blocking API

- Simpler

- Faster

- Extension support likely to require refactoring
Internal Changes

Other

• Remove use of system properties for configuration
  – Move to per Context / Host / Server / Connector
  – May keep the system property for one version as a default

• Make RFC 6265 CookieProcessor the default
  – Note UTF-8 extension
Get Involved
Get Involved

• Ask questions
  – users@tomcat.apache.org

• Report bugs
  – https://issues.apache.org/bugzilla

• Provide patches
  – https://issues.apache.org/bugzilla
  – GitHub pull request
Get Involved

• Development
  – https://svn.apache.org/repos/asf/tomcat/trunk (9.0.x)
  – dev@tomcat.apache.org

• Update the wiki
  – https://wiki.apache.org/tomcat

• You don’t need to be an expert

• Documentation needs patches too
Questions