

# Apache Tomcat 8 Preview

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# Agenda

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

# Introductions

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- **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

- **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

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- **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

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- **TBD features**

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

- **Dropped features**

- Overlays



## JSP 2.3

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- **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

- **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
  - `fact = n -> n==0? 1: n*fact(n-1); fact(5)` evaluates to 120

## ■ 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

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- **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

## ■ 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

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## ■ Resources

- Aliases
- VirtualDirContext / VirtualWebappLoader
- 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

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- **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

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

# Timescales

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- **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

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## ■ 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

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## ■ **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

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## ■ 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