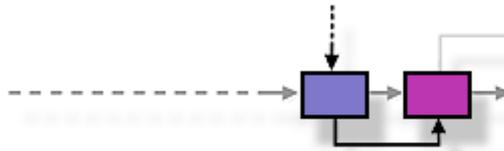




Java
Community
Process



JSR 310 Date and Time API

Jan 24th, 2014

Stephen Colebourne,

OpenGamma Ltd.

Roger Riggs,

Oracle Inc.



What is the scope of this JSR?



- **Comprehensive model for date and time**
- **Support for commonly used global calendars**
- **Immutable types work well with functional programming**
- **Type-safe**
 - avoid primitives where sensible
 - self documenting
 - IDE friendly
- **Interoperate with existing classes**
- **Designed to extend the JDK**

Business/marketing/ecosystem justification



- Why do this JSR?
 - The current APIs are hard to use
 - Reduce programming errors and lower maintenance costs
 - Add a contemporary style API
- What's the need?
 - Buggy and difficult current APIs
 - Performance
- How does it fit in to the Java ecosystem?
 - The new API will complement the JDK and be the preferred Date and Time API
- Is the idea ready for standardization?
 - Well past due

History



- List the significant dates in the history of the JSR.
 - Feb 12, 2007 – Approved for Development
 - Mar 28, 2010 – Early Draft Review
 - Sept 2011 – Oracle joined as Co-spec lead
 - Oct 14, 2012 – Early Draft Review 2
 - Dec 4, 2013 – Public Review
 - Jan 14, 2014 – Proposed Final Draft

Technical scope and features



- **java.time – ISO Core Calendar**
 - LocalTime, LocalDate, LocalDateTime, ZonedDateTime, ...
 - Clock, Instant, Duration, Period, ZoneId, Month, DayOfWeek, ...
- **java.time.format – Parsing and Formatting**
 - DateTimeFormat, DateTimeFormatBuilder, standard formats, patterns, styles, ...
- **java.time.chrono – Regional Calendars**
 - Chronology, Era, ChronoLocalDate, ChronoLocalDateTime, ChronoZonedDateTime, ...
 - Japanese, ThaiBuddhist, Minguo, Hijrah calendars
- **java.time.temporal – Framework**
 - Units, Fields, Adjusters, Temporal, TemporalAccessor, TemporalAmount, TemporalQuery, ...
- **java.time.zone – TimeZone**
 - ZoneRules, transitions, etc.

ISO Calendar Types



- **LocalDate** **2010-12-03**
- **LocalTime** **11:05:30**
- **LocalDateTime** **2010-12-03T11:05:30**
- **OffsetTime** **11:05:30+01:00**
- **OffsetDateTime** **2010-12-03T11:05:30+01:00**
- **ZonedDateTime** **2010-12-03T11:05:30+01:00 Europe/Paris**

- **Year** **2010**
- **YearMonth** **2010-12**
- **MonthDay** **-12-03**

- **Instant** **2576458258.266 seconds after 1970-01-01**

API Design Comparison



New java.time

vs. java.util.Calendar and Date

- **Fluent API**
- **Immutable instances**
- **Thread safe**
- **Strong types**
- **Fit for purpose types**

- **Not Fluent**
- **Mutable instances – clone needed**
- **Not Thread safe**
- **Weakly typed calendars**
- **One size fits all API**

The Expert Group – JCP Members



- **Corporate:**

- Oracle: Roger Riggs, Sherman Shen, Masayoshi Okutsu, Douglas Surber, Dan Chiba, Naoto Sato
- Google Inc.: Kevin Bourrillion,
- IBM: Toby Corbin
- RedHat: David Lloyd

- **Individuals**

- Steve Colebourne , Michael Nascimento Santos
- Adam Bien, Michael Buckley, Tom Crosman, Mikael Grev, Fabio Correia Kung, Clark D. Richey Jr.

Open Source Project Members



- **JUGs, individuals, open-source groups, academia, etc.**
 - London Java Group
 - Richard Warburton
 - James Gough
- **Other**
 - barend, Jesper Steen Møller, renjith4, fabfas, Benjamin Graf, Viktor Hedefalk, Mark Thorton

Open Source Project Tools



- **Java.net** – <https://java.net/projects/jsr-310>
 - Email archive Jan 2010 .. Dec 2010 – (2390 messages)
 - Svn repo – (1339 revisions)
- **SourceForge** – [Threeten home page](#)
 - Email threeten-develop (email archive Dec 2010 to present)
 - Svn - 2010-12-24 to 2011-06-10 – (1497 revisions)
 - Git - 2011-06-24 to 2011-06-24
- **Github** – [Threeten](#)
 - Github (documents repo history)
 - Source - 2011-06-24 to 2012-12-04
 - [Github Issue Tracker](#)
- **OpenJDK Sponsored** – [Threeten Project](#)
 - Email threeten-dev@openjdk.java.net – Nov 2012 .. Present (1457)
 - [Mercurial JDK forest](http://hg.openjdk.java.net/jdk8/tl/jdk) – <http://hg.openjdk.java.net/jdk8/tl/jdk>
 - JDK Bug track tracking – <http://bugs.openjdk.java.net>



Other deliverables



- Other than Spec, RI, and TCK delivered:
 - [Guide to the Specification](#)
 - [The Threeten Project](#)
 - Backport to JDK 1.7 – org.threeten.bp...

Publicity



- **JavaOne 2013**
 - [Introducing the Java Time API in JDK 8 - CON6064](#)
 - [Converting to the New Date and Time API in JDK 8 - CON6091](#)
- **JAX.de Mainz 2013**
- **Devoxx UK 2013**
- **UTC Colloquium Charlottesville 2013**
- **Presented at JavaOne 2008, 2010, 2012**
- **Paris JUG 2011**
- **JavaZone Oslo 2010**
- **Javapolis 2007**

Collaboration with other community groups



- **London Java Community**
<http://www.meetup.com/Londonjavacommunity>
- **LJC Adopt-a-JSR**
 - James Gough and Richard Warburton lead
 - <https://java.net/projects/ljc-london-jug/pages/JSR-310>
 - Contributed reviews, designs, tests, TCK tests, and participated actively in design discussions
- **July 10, 2012; LJC hosted**
 - [Java 8 Date & Time Hackday](#)
 - 25 Developers attended

Implementations



- The SE 8 RI implementation is the only conformant implementation
- A backport version was created in a separate package for use with JDK 7 and without JDK 8 features

Schedule



- **Dec 4, 2013 – Public Review**
- **Dec 10-23, 2013 – Public Review Ballot**
- **Jan 13, 2014 – Proposed Final Draft**
- **[February 2014 – Final Approval Ballot]**
- **[March 2014 – Final Release]**

IP flow



- Provide pointers to the licenses for the Spec, RI, and TCK.
 - JSR 310 spec licensed using JCP standard license
 - JSR RI and TCK licensed using the same license as SE 8
- How are you handling contributions from non JCP members?
 - Initial source contributions accepted under [JSR 310 Contributor Agreement](#) (essentially the same as Sun Contributor Agreement)
 - [JDK terms of use](#) for ThreeTen OpenJDK Project
- What Terms of Use apply to your collaboration tools?
 - Standard terms for java.net, github, OpenJDK
- Any legal issues or concerns?
 - Some Open Source participants could not get their companies to sign the OpenJDK agreement; participation dropped off

RI and TCK development



- How are you developing the RI and TCK?
 - Tests developed in sync with spec and RI
 - Tests are divided into TCK and unit tests
 - Both maintained in same repository as the RI
 - Oracle JCK team integrated TCK tests into JDK 8 JCK
 - Missing: skills and discipline of veteran TCK engineers
- If collaboratively (through an open-source project)
 - How many committers and who?
 - 5 – Richard Warburton, James Gough, Stephen Colebourne, Roger Riggs, Sherman Shen
 - How many apart from the Spec Lead (organization)?
 - 2 – Richard, and James (LJC members)

RI and TCK development



- Is the RI available for public download?
 - Some interim binaries
 - Integrated into JDK 8 Early Access Downloads
- Is the TCK available for public download?
 - No, but all tests are in the repository
 - Reviewable and runnable
- Do you have a source-code repository?
 - See slide 10; currently in OpenJDK 8 and 9

Participation and transparency



- Provide a pointer to the JSR page on JCP.org
<https://jcp.org/en/jsr/detail?id=310>
- Provide a pointer to the “JSR project website“
 - [OpenJDK Project ThreeTen](#)
 - [The Threeten Github Project](#)

Github Issue tracker (1/2)



- **Total number of issues? 346**
- **How many in each state: Open: 0, Closed: 346, deferred: 0**
- **Average number of issues logged per month?**
 - 8 per month; June 2010.. Jan 2014
- **Average number of issues resolved per month?**
 - 8 per month; June 2010.. Jan 2014
- **How many different people logged them?**
 - 28 People;
- **How does this break down between Spec Lead, EG members, and non-EG members?**
 - As expected, most by spec lead(s); then active participants and a long tail.

OpenJDK Issue tracker (2/2)



- **Total number of issues?**
 - 92
- **How many in each state:**
 - open: 0, resolved: 79,
deferred: 5 issues, 8 enhancements.
- **Average number of issues logged per month?**
 - 6 per month
- **Average number of issues resolved per month?**
 - 5
- **How many different people logged them?**
 - 8
- **How does this break down between Spec Lead, EG members, and non-EG members?**
 - 92 Spec lead, 1 other

Document archive

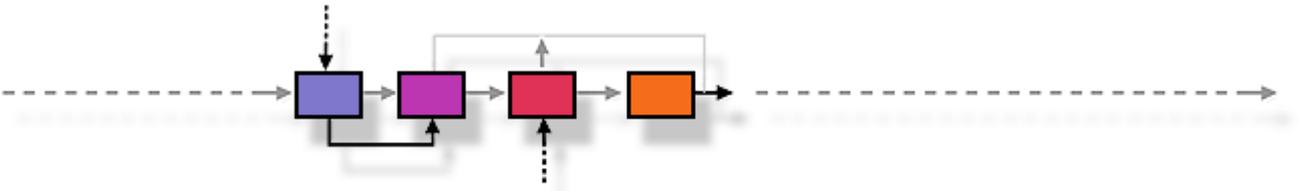


- Provide a pointer to your document archive.
 - N/A except for the source repository
- Are meeting minutes and materials published?
 - Via email in the archive
 - Most business conducted by email; no separate minutes
- What other materials are available for download?
 - N/A
- Total number of files available for download?
 - N/A except for the repository
- Average number of new files available for download each month?
 - Repository src java/time: 2580 Kb
 - Repository tests java/time: 3264 Kb





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Thank you!
<http://jcp.org>