Java Standards' role

in the Internet of Things

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Standards & Internet of Things: Oracle Perspective

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BY THE YEAR 2020, THERE WILL BE

50,000,000,000 connected devices, creating and sharing

40,000,000,000,000 GB

worth of data across the Internet of Things.

Standards Development

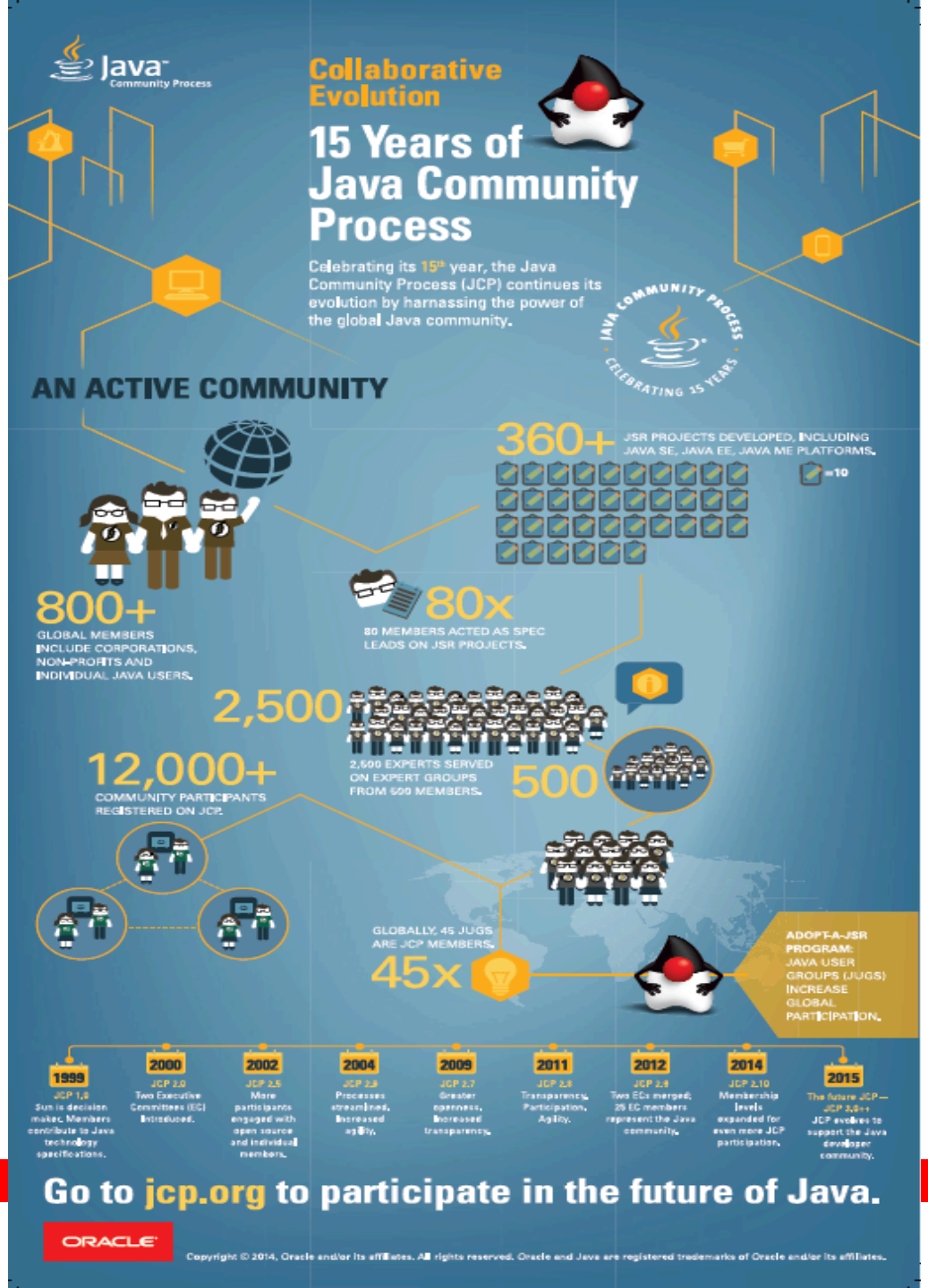
- Evolutionary…don't always know where it's leading
- Time-consuming…takes years, many false starts
- Collaborative/competitive…vendor & user goals
- Want widely accepted, used, & supported (enforced?)
- Requires
  - Accepted Ontology, Reference Implementation, Use cases, Active Promotion
- Use Case in point: Java => Jini => IoT
  - "Internet of Things" – Kevin Ashton, 1999
  - Java (1995), Jini (1998)
- "Been there, done that…" (Sun Microsystems => Oracle)
  - …but not the end, of course!

Java, Jini, IoT Ontology & Reference Architecture Development

- Required
  - Device & service definitions, relations, capabilities
    - Taxonomy = classification; “is a”; hierarchy/tree
    - Ontology = relations; web of connections
  - Device & service discovery & self-registration
    - capability advertisement
    - context awareness: time/space, data format
    - net accessible object stores (e.g. JavaSpaces)
  - Language definition
    - APIs, syntax, development tools
    - Concurrent efforts, e.g. Sensor Modeling Language
- Desirable
  - Leverage existing developer experience, implementations, communities, educational resources, vendor support

For Example

- Java Community Process
  - 25 Executive Committee Members:
    - ARM, Eclipse Foundation, Fujitsu, HP, IBM, Intel, Oracle, Red Hat, …
  - Large, active contributing membership
  - http://www.oracle.com/us/corporate/citizenship/java-community-process-2406987.pdf
- Results
  - Java 8 ME Embedded
    - (128 KB RAM, 1 MB Flash/ROM), for IoT, M2M
  - Java 8 SE Embedded
    - SDKs & Emulators, Reference Implementations, …


Java Community Process
Collaborative Evolution
15 Years of Java Community Process
Celebrating its 15th year, the Java Community Process (JCP) continues its evolution by harnessing the power of the global Java community.
JAVA COMMUNITY PROCESS
CELEBRATING 15 YEARS
AN ACTIVE COMMUNITY
800+
GLOBAL MEMBERS INCLUDE CORPORATIONS, NON-PROFITS AND INDIVIDUAL JAVA USERS.
360+
JSR PROJECTS DEVELOPED, INCLUDING JAVA SE, JAVA EE, JAVA ME PLATFORMS.
=10
80x
80 MEMBERS ACTED AS SPEC LEADS ON JSR PROJECTS.
2,500
2,500 EXPERTS SERVED ON EXPERT GROUPS FROM 500 MEMBERS.
500
12,000+
COMMUNITY PARTICIPANTS REGISTERED ON JCP.
GLOBALLY, 45 JUGS ARE JCP MEMBERS.
45x
ADOPT-A-JSR PROGRAM: JAVA USER GROUPS (JUGS) INCREASE GLOBAL PARTICIPATION.
1999
JCP 1.0 Sun is decision maker. Members contribute to Java technology specifications.
2000
JCP 2.0 Two Executive Committees (EC) Introduced.
2002
JCP 2.5 More participants engaged with open source and individual members.
2004
JCP 2.8 Processes streamlined. Increased agility.
2009
JCP 2.7 Greater openness. Increased transparency.
2011
JCP 2.8 Transparency. Participation. Agility.
2012
JCP 2.9 Two ECs merged; 25 EC members represent the Java community.
2014
JCP 2.10 Membership levels expanded for even more JCP participation.
2015
The future JCP—JCP 3.0++ JCP evolves to support the Java developer community.
Go to jcp.org to participate in the future of Java.
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Some Useful Reading…

- *Java and IoT: The Intelligent Platform for the Connected Vehicle*, Oracle White Paper, Jan 2015; http://www.oracle.com/us/solutions/internetofthings/java-iot-connected-vehicle-wp-2401533.pdf
- *Java and the Internet of Things: Automating the Industrial Economy*, Oracle White Paper, Feb 2015; http://www.oracle.com/us/solutions/internetofthings/java-iot-industrial-automation-2430562.pdf
- *Oracle and IoT*: http://www.oracle.com/us/solutions/internetofthings/overview/index.html
- *Jini (now Apache River) Device Architecture Specification*; http://river.apache.org/doc/specs/html/devicearch-spec.html

…and, to be fair:

- *IBM: IoT Foundation Java Client Library*; https://developer.ibm.com/iot/recipes/iot-foundation-java-client-library-recipe/

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IoT gains value through data…Big Data, which also needs ontology, standards, reference architecture(s), use cases, tools, …