Java 2 Enterprise Edition and Web Services

Object Management Group
Web Services Workshop
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Agenda

- Java Standards
- Web Services Stack
- Java, XML, and Web Services
- Conclusions

Which Java?

- We address Web services standards and technology for all three Java platforms
  - Java 2 Enterprise Edition [J2EE]
  - Java 2 Standard Edition [J2SE]
  - Java 2 Micro Edition [J2ME]
- We concentrate on J2EE.
- Key technologies for this discussion
  - Servlets
  - Deployment mechanisms, Toolkits
  - Enterprise Java Beans
  - Java Messaging Service

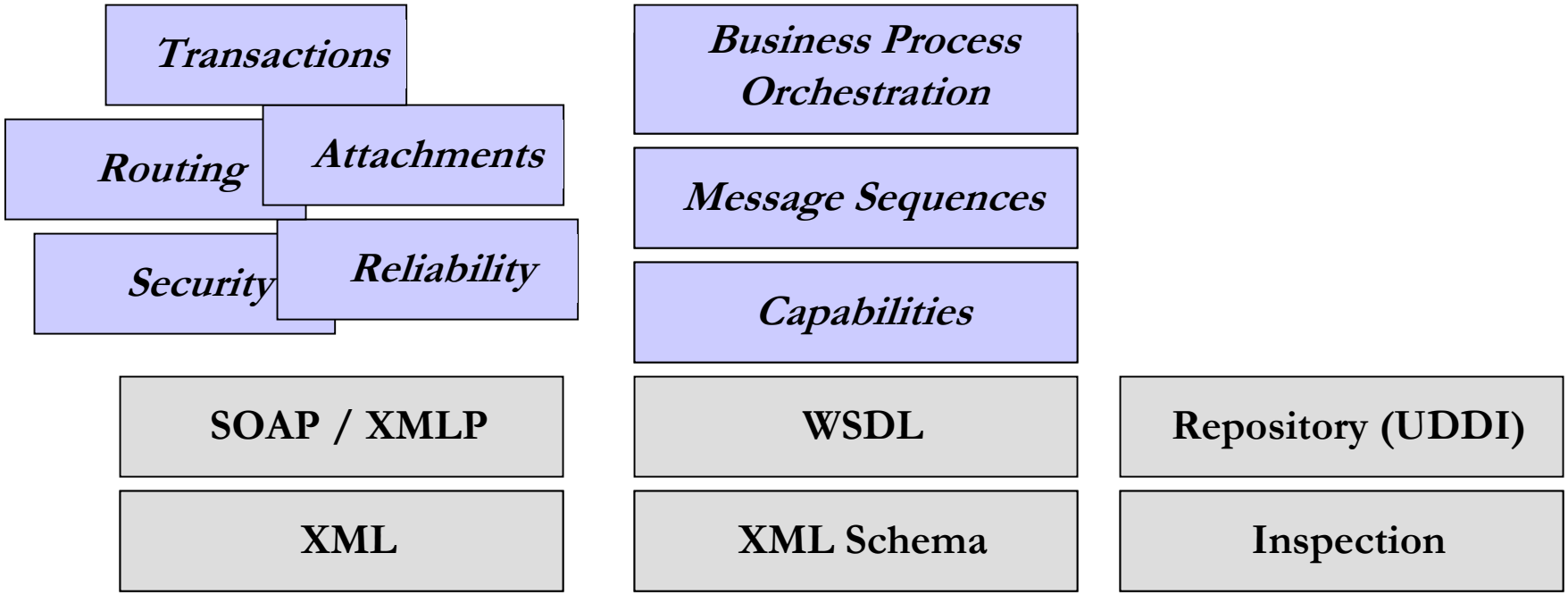
Java Standards

- Java Community Process
  - Current version is 2.5
- Java Executive Committees
  - One for J2EE and J2SE
  - One for J2ME
- Over 200 JSRs to date, roughly half have completed
- Specification Lead responsible for JSR
- Expert Group contributes to work on the JSR
- Community Review and Public Review Drafts before Final Release

Java Standards (continued)

- Web site http://www.jcp.org
- All Java Specification Requests and resultant specifications are on the JCP.org site.
  - Full lists of JSRs are at
  - For example, StAX, the Streaming API for parsing XML, JSR 173, is at http://jcp.org/en/jsr/detail?id=173
- Not all Java specifications are at that site
  - Pre-JCP portions are at http://java.sun.com/

The Web Services "Stack"



Modification and redrawing of W3C architecture diagram courtesy of Talking Blocks

Plus Security, Transactions, and Administration/Management/Monitoring across all

“Wire level” is XML and SOAP

- SOAP 1.1
- SOAP 1.2 (w3c XML Protocol)
- XML Language

Description

- WSDL 1.1
- WSDL 1.2 in process
- Also XML Schema
  - From W3C architecture

Discovery

- Repository
  - UDDI is usually described as the Web Services Repository
  - ebXML Registry/repository may be implemented in UDDI, and vice versa
- Inspection

Five Levels of Description

- In this talk we break the “Wire” level into two parts, giving four levels:
  1) XML Infrastructure (including XML Schema)
  2) Wire packaging (SOAP versions)
  3) Description (WSDL versions)
  4) Discovery (UDDI, ebXML Reg/Rep, etc)
  5) Additional Capabilities using or extending Web services
     - For example, Web Services Remote Portlet, Web Services Security, Transactions
- We discuss standardization and technologies in the Java 2 platforms for each level

The Base— XML Infrastructure

- XML Language
- XML Schema
- Java Processing for XML (JAXP) JSR 63
  - Final Release 2 10 Sept 2002
- Streaming API for XML Parsing JSR 173
- Java Binding for XML (JAXB) JSR 31
  - Final Approval Ballot 27 Jan 2003
- JDOM JSR 102

Wire—SOAP

- JAX-RPC JSR 101
  - Final Release 11 June 2003
- Enterprise Web Services JSR 109
  - First Maintenance Draft 11 November 2002
- Java API for XML Messaging (JAXM) and SOAP with Attachments API for Java (SAAJ) JSR 67
  - Final Release 2 12 June 2002

Description—WSDL

- Java API for WSDL JSR 110
  - Proposed Final Draft 26 November 2002

Discovery— Registries and Repositories

- JAXR (Java API for XML Registries) JSR 93
  - Final Release 11 June 2002
  - Covers UDDI and ebXML core functions

Additional Capabilities

- Security
  - XML Trust Service APIs JSR 104
  - XML Digital Signature JSR 105
  - XML Digital Encryption APIs JSR 106
  - Web Services Security Assertions JSR 155
  - Web Services Message Security JSR 183
- Metadata
  - A Metadata Facility for the Java Platform JSR 175
  - Web Services Metadata for the Java Platform JSR 181

Additional Capabilities
(continued)

- XML Transactioning API for Java (JAXTX) JSR 156
- J2ME Web Services Specification JSR 172
- Web Services Remote Portlet and Java Portlet Specification (JSR 168)—*Talk on Tuesday*

Note: 9 of 19 Web Services/XML JSRs are finished or nearly so, half of the others are progressing

Connecting Web Services to J2EE Technologies

- Toolkits
- Some Toolkits support
  - JMS queues and topics
  - EJBs (usually stateless session beans)
  - Database access via JDBC
- Most support
  - Publishing of certain Java Classes as Web Services
- Some support WSDL-to-Java mapping

Toolkits—Java-Specific Technology Bridging

- JMS (Java Message Service)
  - Generally not interoperable across vendors
  - Many implementations have XML message type
  - BEA has been advocating Web services interoperability for JMS
- EJBs (Enterprise Java Beans)
  - Control/bridge in WebLogic Workshop
  - Automated wrapping/deployment common
- Database Access via JDBC
  - Control/bridge in WebLogic Workshop, others

Toolkits—Development and Deployment

- Little in the way of automatic wrapping for JMS or Database access
- Typically automated for EJBs or Java Classes
- Deployment may be automatic/assisted
  - Special cases can be made easy

Toolkits—Target

- Target is either
  - A servlet container (not necessarily J2EE certified)
    - Often Apache, other generic servlet containers
  - A specific J2EE Container (or several), as in
    - WebLogic Workshop
    - Cape Clear CapeConnect
    - IBM alphaWorks, others targeting WebSphere
    - Iona XMLBus
    - Systinet WASP

Some Toolkits

- Apache AXIS
- BEA WebLogic Workshop
- IBM Web Services Toolkits
- Iona XML Bus, WS Integration Platform
- Java Web Services Developer Pack (Sun)
- Microsoft SOAP Toolkit
- The Mind Electric Glue
- Systinet WASP

Conclusions: Java and Web Services

- Java is the strongest enterprise execution environment today
- Java is supported by products from many companies
- Java is well-supported by open source projects
- Java standards (JSRs) allow consistent Web services usage in the Java platform; many JSRs for XML and Web Services, some complete and deployed
- Java is closest to an open standard
- Toolkits and development environments are a ripe area for competition