Java 2 Enterprise Edition and Web Services

Object Management Group
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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

• Not all Java specifications are at that site
  – Pre-JCP portions are at http://java.sun.com/
The Web Services “Stack”

- **Transactions**
- **Routing**
- **Security**
- **Attachments**
- **Reliability**
- **Business Process Orchestration**
- **Message Sequences**
- **Capabilities**
- **SOAP / XMLP**
- **WSDL**
- **Repository (UDDI)**
- **XML**
- **XML Schema**
- **XML**

**Wire**
**Description**
**Discovery**

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