JAVA DAYS ´99



XML in the Java™ Platform

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Agenda



- XML Overview
- XML Example
- XML and the Java Platform
- Java Platform technologies for XML
- Resources

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What‘s the interest in XML?



- **Information Mgmt**
  - representation
  - transformation
  - presentation
  - interpretation
  - interoperation
  - portability
  - reuse
  - internationalization
  - ...
- **Tradeoffs**
  - performance
    - latency
    - bandwidth
  - security
  - encapsulation
  - evolution
  - interoperability

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What is XML?



- eXtensible Markup metaLanguage
- Universal data format
- Decouples content and structure from processing
- Defines unlimited languages for specific industries or applications

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XML Evolution



- A simplified subset of SGML
- Addresses limitations of HTML
- XML effort began in 1996
  - Activity of the World Wide Web Consortium (W3C) organized and led by Jon Bosak of Sun Microsystems
  - XML 1.0 Recommendation in February 1998

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XML Features



- Platform-independent
- Extensible
- Reusable
- Unicode support
- Language neutral
- Open standard

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Application areas

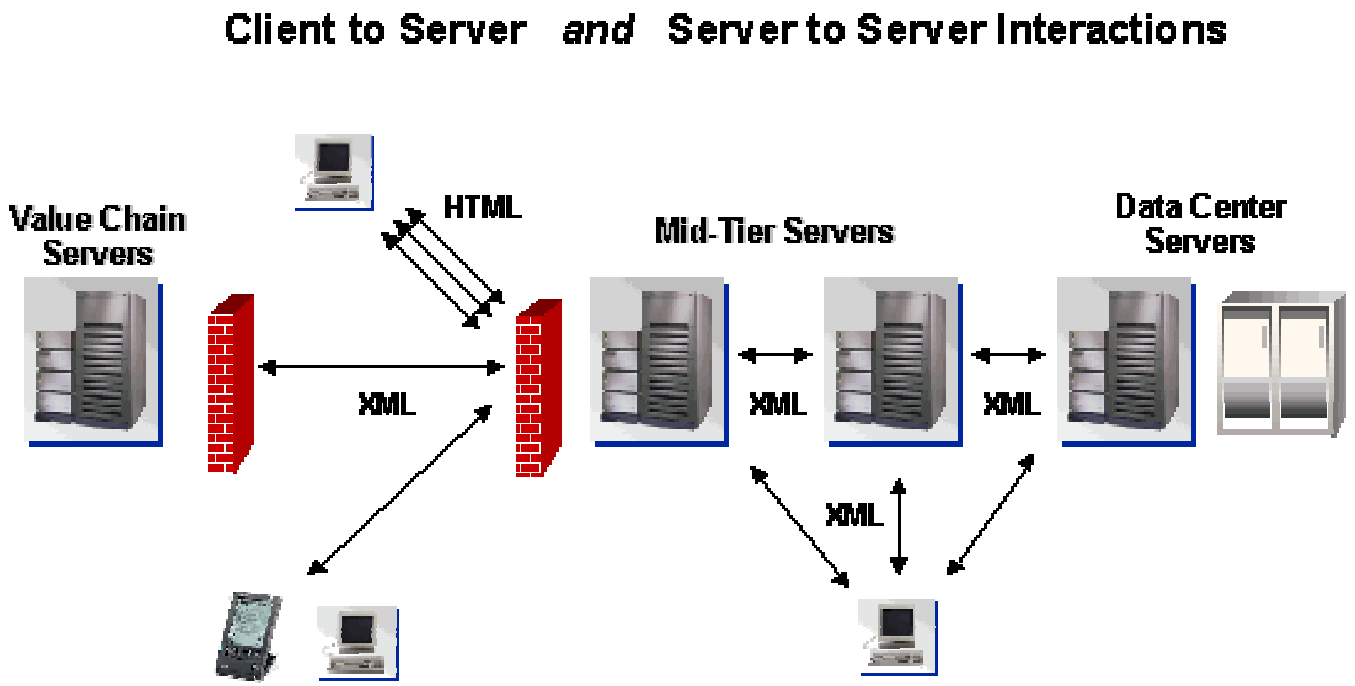


- **Web publishing**
  - **Media-independent and platform-independent**
- **Data-centric web applications**
  - **E-Commerce/EDI**
  - **Enterprise Application Integration**
  - **Structured Information Management and Retrieval**
  - **Client-side manipulation of views into data**

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XML Web Application Model



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XML Example



Elements

```
<ShoeOrder>
</ShoeOrder>
```


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XML Example

Elements

Text

```
<ShoeOrder>
  <color>Brown</color>
  <size>9 1/2</size>
  <width>AA</width>
</ShoeOrder>
```


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XML Example

Elements

Text

Attributes

```
<ShoeOrder id="4040458">
  <color>Brown</color>
  <size>9 1/2</size>
  <width>AA</width>
</ShoeOrder>
```


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XML Example



Elements

Text

Attributes

Links

```
<ShoeOrder id="4040458"
           style="Sandal">
  <color>Brown</color>
  <size>9 1/2</size>
  <width>AA</width>
</ShoeOrder>

<ShoeStyle id="Sandal">
  <gender>F</gender>
  <colors>Brown Black</colors>
</ShoeStyle>
```


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XML-related Standards



- XLink/Xpointer
  - Hyperlinks for XML documents
- XSL/T: Style Sheet/Transformation
  - Transformation and formatting objects
- XML Schema
  - Next generation DTDs
- XML Query
  - Queries to an XML document

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Key XML standards organization



- **World Wide Web (W3C)**
  - **Hosts the “XML Activity” and other standards related to XML**
- **OASIS**
  - **Non-profit corporation dedicated to XML interoperability and conformance**
- **XML.org**
  - **Initiative for open definition of XML languages**

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XML and the Java™ Platform



- Complementary technologies
- XML provides a universal syntax
- Java™ Platform provides universal semantics

XML is portable, reusable data
Java is portable, maintainable code

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Java Platform XML Initiatives



- Java Optional Package for XML Parsing
- XML Data Binding Facility
- Java™ 2 Platform, Enterprise Edition (J2EE)
- Other technologies using XML

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Java Optional Package for XML Parsing 1.0



- Focus on foundation-level XML functionality
- Development through the Java Community Process (JCP)
- Work with W3C and other XML technology creators to develop APIs

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Java Optional Package for XML Parsing 1.0



- **Ability to parse XML**
  - **Parser(s)**
  - **SAX 1.0**
  - **DOM Level 1 Core**
- **XML Namespaces**
  - **Support in parser(s)**

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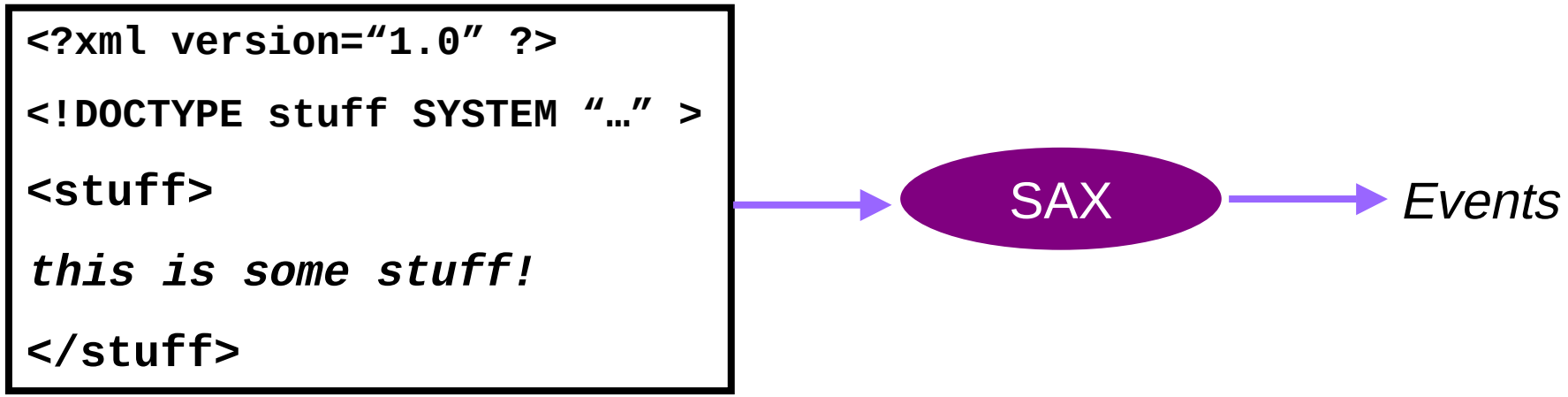
Simple API to XML (SAX)



- Event-driven API
- Serial access mechanism for reading and writing XML
- Developed by XML-DEV experts
- org.xml.sax.* package
- Download from: www.megginson.com/SAX/javadoc

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SAX ...



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Document Object Model (DOM)

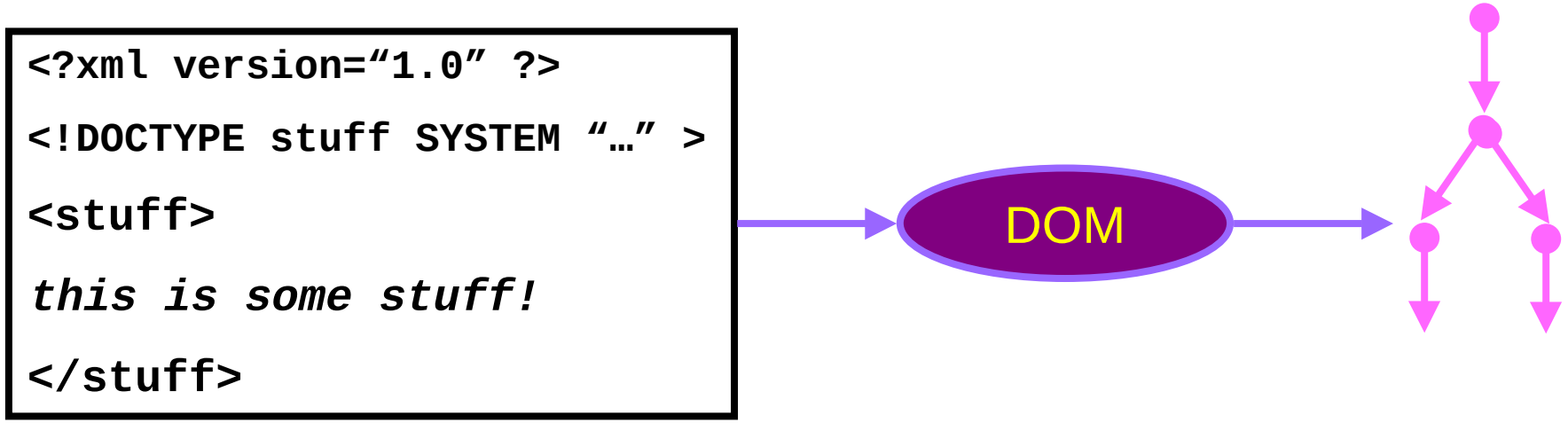


- In-memory “tree” of data objects
- Traverse and manipulate hierarchy of data objects
- Defines a Java programming language binding:
  - org.w3c.dom.* package
- W3C specification:
  - www.w3c.org/TR/1998/REC-DOM-Level-1-1998001

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DOM ...



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Namespaces



- Defines a distinct set of XML markup elements (DTD)
- Allows multiple vocabularies to be combined in a single document
- W3C Specification
  - www.w3c.org/TR/REC-xml-names

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Roadmap

- **Public draft of spec and alpha RI**
  - **October 1999**
- **Public release of spec and RI**
  - **Early Q1 2000**

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XML Data Binding



- Bind XML schemas to Java classes
- Facility will include
  - Marshalling/unmarshalling framework
  - XML schema compiler
- Development through Java Community Process

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XML Data Binding



- XML is data without meaning
- Schemas add meaning to XML
- Binding leverages schemas to make XML easy to use

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XML = Data Without Meaning




```
<ShoeOrder id="4040458"
           style="Sandal">
  <color>Brown</color>
  <size>9 1/2</size>
</ShoeOrder>
```

Are these identical?

```
<ShoeOrder id="4040458"
           style="Sandal"
           colour="Brown"
           size="42”>
</ShoeOrder>
```

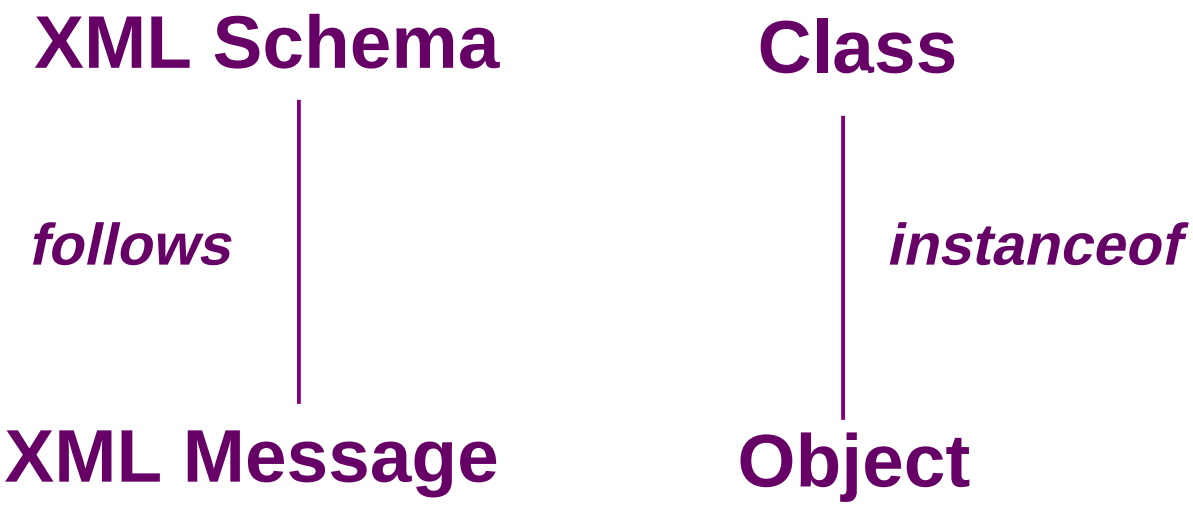

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What is a Schema?



Schema = Description of syntax & semantics of an XML message



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Schema Benefits



- **Constrain structure and content**
  - **Enables automatic validation**
- **Describe intended conceptual meaning**
  - **Aids human understanding**

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XML schema languages



- DCD
- DDML
- SOX
- XML-Data
- XML Schema (W3C proposed recommendation)

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Working with XML in Programs



- **Map message components to, and from, objects**



- **Requires**
  - **Classes for message components**
  - **Marshalling/unmarshalling code**

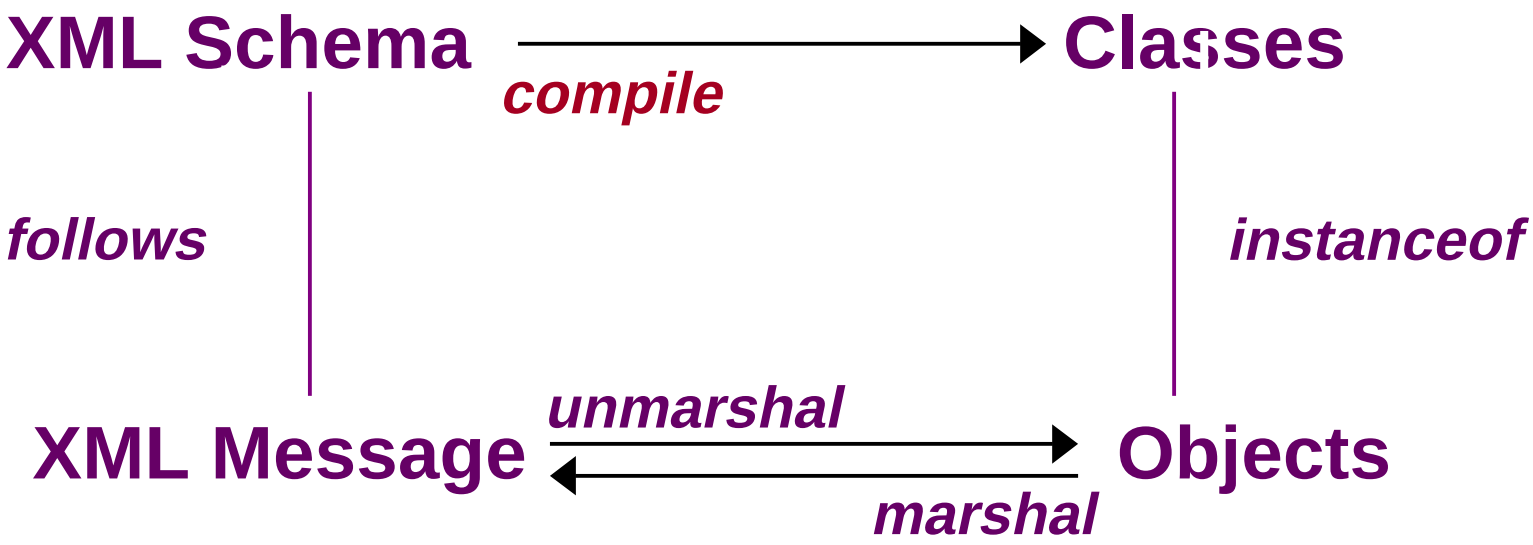
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Working with XML in Programs



Binding compiles schemas into classes



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Working with XML in Programs



- **Binding generates classes that contain:**
  - **Marshalling/unmarshalling code (full error and validity checking)**
  - **Component access methods (get/set)**
- **Do not need to deal with SAX or DOM**

Big win:* *Simplifies creation & maintenance of XML-enabled Java programs

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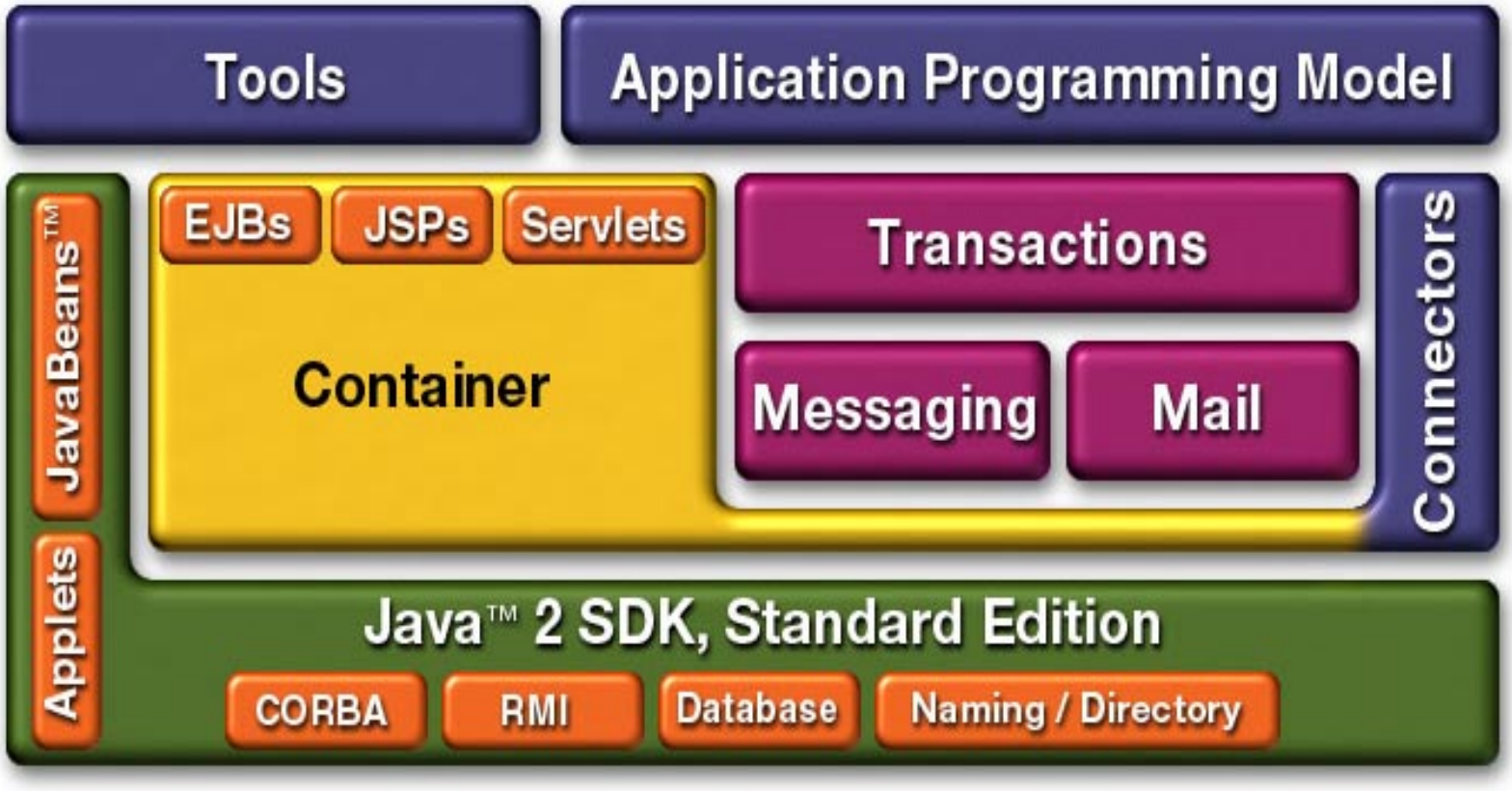
Exploring other uses of XML



- XSL/T and Xpath
  - Tranformation language and stylesheet support
- XML Query Language
  - Enabling searches of XML document
- XML Archiving
  - XML messages derived from classes

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J2EE Architecture



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Java 2 Platform, Enterprise Edition

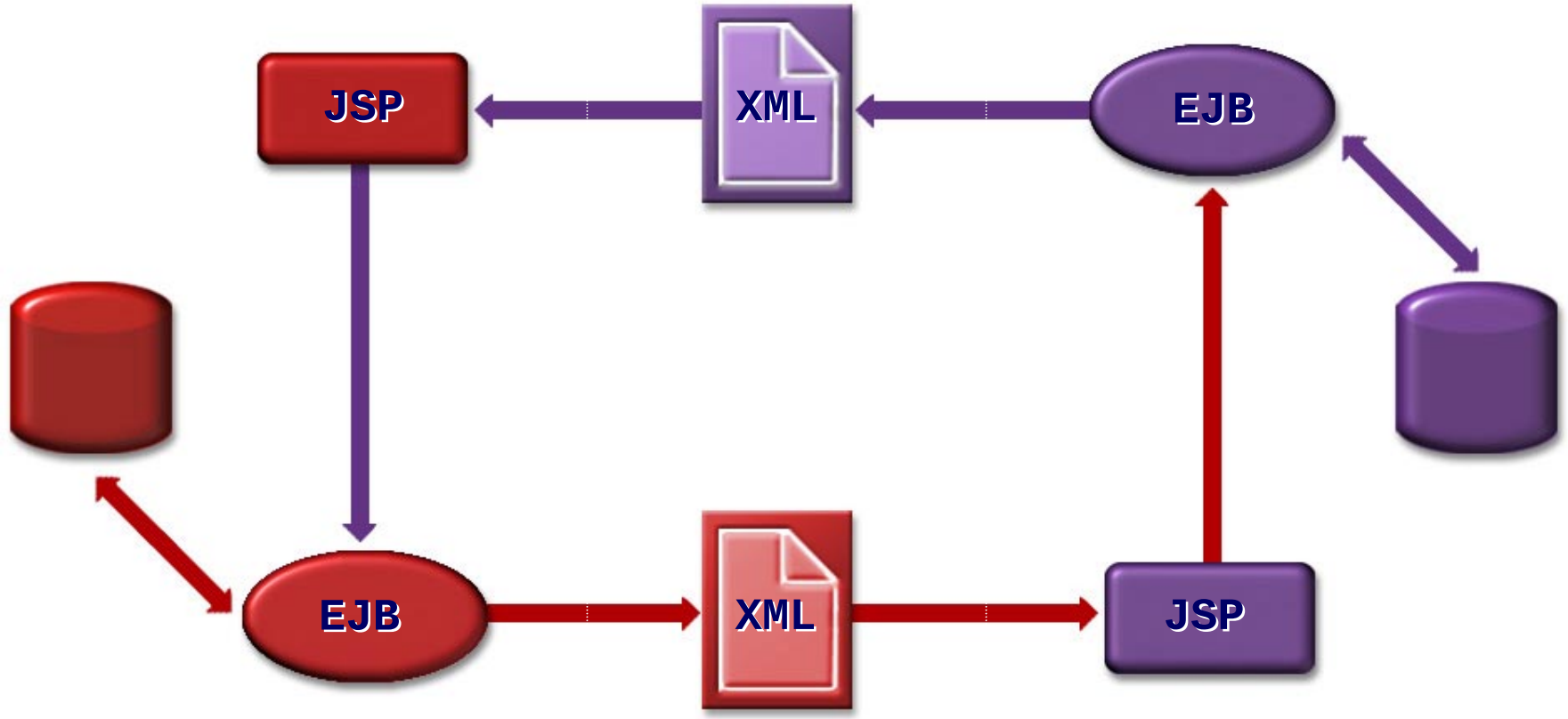


- Enterprise JavaBeans™ technology (EJB)
  - XML-based deployment descriptors
- J2EE Application Programming Model
  - Application integration
- JavaServer Pages™ software (JSP)
  - Generate/consume XML

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J2EE Web Application Model



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J2EE XML Futures



- **EJB**
  - **XML/Query usage**
- **Java Message Service (JMS)**
  - **Produce/consume XML messages**
- **JSP**
  - **XML syntax**
  - **Better support for producing/consuming XML**
  - **Pre/post filtering XSL/XSLT support**

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Other Java technologies using XML



- **JavaHelp™ API:**
  - **Help meta-information**
- **Project X**
  - **High performance XML parser with optional validation**
  - **Supports SAX, DOM, Utility classes**
  - **Free for commercial use**
  - **Download at: java.sun.com/xml/xml-side1.html**

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Summary



- **XML and Java**
  - **Complementary technologies for developing platform-independent web applications**
- **First class XML support in the Java platform**
  - **Eases development of XML-enabled Java programs**

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XML resources



- World Wide Web (W3C)
  - http://www.w3.org/XML
- Standards and drafts
  - http://www.w3.org/TR
- Markup technology in general
  - http://www.oasis-open.org/cover/
- XML.org: Schema repository and registry
  - http://www.xml.org

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XML and Java resources



- **XML Web site**
  - **http:// java.sun.com/xml**
- **Java Community Process**
  - **http://java.sun.com/jcp**
- **Feedback:**
  - **xml-feedback@java.sun.com**

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