XML, XSD, XJC, JAXB & REST

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Outline

About

Purpose

- Messaging
- WebServices (SOAP, REST)

Learn

- XML namespaces
- XML schemas
- Generate Java classes
- Parse & build XML in Java
- Build REST webservice

  Show `sample.xml`

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XML
Namespaces 1/3

Consists of

- URL → http://foo.org/
- (optional) Prefix → foo**:**
- (optional) Schema → foo.xsd

Usage   **xmlns**="http://foo.org/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://foo.org/ foo.xsd"

QName   { "http://www.w3.org/2001/XMLSchema-instance",
"schemaLocation" }

XML
Namespaces 2/3

Purpose

- Compartimentalize
- Uniquely identify elements
- Validate XML instance

Example

```
<soap:Envelope>
    <soap:Header>
      . . .
    </soap:Header>
    <soap:Body>
       <foo:bar baz="qux">
         . . .
       </foo:bar>
    </soap:Body>
</soap:Envelope>
```

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Example
```
<xsl:for-each select="//person">
    <h1>
        <xsl:value-of select="@name">
    </h1>
</xsl:for-each>
```

Example
```
<foo:bar xsi:type="Baz">

Add namespaces to sample.xml
```

XSD
Define XML Schema 1/2

Constrain instance document

Consists of

- Root element
- Complex types $\rightarrow$ element & attribute declarations
- Simple types

Root element   xs:element

Type   xs:simpleType, xs:complexType

Child elements   xs:sequence, xs:choice, minOccurs, maxOccurs

Attributes   xs:string, use="required"

```
Create sample.xsd
```

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XSD
Define XML Schema 2/2

Enum   xs:simpleType, xs:restriction, xs:enumeration

Inheritance xs:complexContent, xs:extension, xsi:type

Comments   xs:annotation

Update sample.xsd, sample.xml

XJC
XML Java Binding Compiler

Example `xjc -d src sample.xsd`

Result

- http://portavita.eu/cda → package **eu.portavita.cda**
- *xs:complexType* Observation → **class Observation**
- *xs:simpleType* ClassCode → **enum ClassCode**
- *xs:element* code → **get-/setCode()**
- *xs:attribute* moodCode → **get-/setMoodCode()**

Vice versa `schemagen Document.java`

`Compile sample.xsd; show result`

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JAXB
Annotation

is   Java XML Binding

Class   **@XmlType**(name = "Observation")
       @XmlRootElement(name = "ClinicalDocument")

Members   **@XmlElement**(required = true)
       @XmlAttribute(name = "classCode", required = true)

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JAXB
Marshal, unmarshal

Definition

- Unmarshal: XML $\rightarrow$ Objects
- Marshal: Objects $\rightarrow$ XML
- Validate: XML $\rightarrow$ errors

```
Unmarshal sample.xml
```

```
Create & marshal ClinicalDocument
```

```
Marshal 10,000 documents
```

```
Marshal JSON
```

REST
Paradigm

is	REpresentational State Transfer Make WebServices (alternative: SOAP)
Model	Everything is a resource Resources are part of collections
CRUD	

- Create
- Retreive
- Update
- Delete

Hyperlinked	Embed links in result sets

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REST
Implementation

Protocol   HTTP

URL   **Collection**
http://localhost:7777/document/
Resource
http://localhost:7777/document/12345/

	Collection	**Resource**
GET	List	Retreive
POST	Create	-
PUT	Replace	Update
DELETE	Delete	Delete

Method appears to the left of the Method rows.

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REST

Jersey

Main HttpServer

```
Create HTTP server
```

Create

- @Path
- @POST
- @FormParam

```
Create collection class
```

REST
Jersey

List

- @GET
- @Produces $\rightharpoonup$ media type

```
Add collection list method
```

Retreive

- @GET
- @PathParam
- @Produces $\rightharpoonup$ media type

```
Create resource class
```

Closing

Thanks for your time!

References

XML

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