XML Schema

Describing a “contract” as to what is acceptable XML.

http://en.wikipedia.org/wiki/Xml_schema

http://en.wikibooks.org/wiki/XML_Schema

XML Schema

- Description of the legal format of an XML document
- Expressed in terms of constraints on the structure and content of documents
- Often used to specify a "contract" between systems - "My system will only accept XML that conforms to this particular Schema."
- If a particular piece of XML meets the specification of the Schema - it is said to "validate"

http://en.wikipedia.org/wiki/Xml_schema

XML Validation

XML Document

XML Schema Contract

XML Validation

XML Document

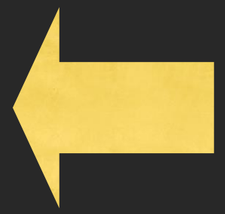
```
<person>
  <lastname>Severance</lastname>
  <age>17</age>
  <dateborn>2001-04-17</dateborn>
</person>
```

XML Schema Contract

```
<xs:complexType name=”person”>
 <xs:sequence>
  <xs:element name="lastname" type="xs:string"/>
  <xs:element name="age" type="xs:integer"/>
  <xs:element name="dateborn" type="xs:date"/>
 </xs:sequence>
</xs:complexType>
```

Many XML Schema Languages

- Document Type Definition (DTD)
  - http://en.wikipedia.org/wiki/Document_Type_Definition
- Standard Generalized Markup Language (ISO 8879:1986 SGML)
  - http://en.wikipedia.org/wiki/SGML
- XML Schema from W3C - (XSD)
  - http://en.wikipedia.org/wiki/XML_Schema_(W3C)



http://en.wikipedia.org/wiki/Xml_schema

XSD XML Schema (W3C spec)

- We will focus on the World Wide Web Consortium (W3C) version
- It is often called “W3C Schema” because “Schema” is considered generic
- More commonly it is called XSD because the file names end in .xsd

http://www.w3.org/XML/Schema

http://en.wikipedia.org/wiki/XML_Schema_(W3C)

XSD Structure

xs:element

xs:sequence

xs:complexType

```
<person>
  <lastname>Severance</lastname>
  <age>17</age>
  <dateborn>2001-04-17</dateborn>
</person>
```

```
<xs:complexType name=”person”>
 <xs:sequence>
  <xs:element name="lastname" type="xs:string"/>
  <xs:element name="age" type="xs:integer"/>
  <xs:element name="dateborn" type="xs:date"/>
 </xs:sequence>
</xs:complexType>
```

XSD Constraints

```
<xs:element name="person">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="full_name" type="xs:string"
          minOccurs="1" maxOccurs="1" />
      <xs:element name="child_name" type="xs:string"
          minOccurs="0" maxOccurs="10" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

```
<person>
  <full_name>Tove Refsnes</full_name>
  <child_name>Hege</child_name>
  <child_name>Stale</child_name>
  <child_name>Jim</child_name>
  <child_name>Borge</child_name>
</person>
```

http://www.w3schools.com/Schema/schema_complex_indicators.asp

XSD Data Types

```
<xs:element name="customer" type="xs:string"/>
<xs:element name="start" type="xs:date"/>
<xs:element name="startdate" type="xs:dateTime"/>
<xs:element name="prize" type="xs:decimal"/>
<xs:element name="weeks" type="xs:integer"/>
```

It is common to represent time in UTC/GMT, given that servers are often scattered around the world.

```
<customer>John Smith</customer>
<start>2002-09-24</start>
<startdate>2002-05-30T09:30:10Z</startdate>
<prize>999.50</prize>
<weeks>30</weeks>
```

http://www.w3schools.com/Schema/schema_dtypes_numeric.asp

ISO 8601 Date/Time Format

2002-05-30T09:30:10Z

Year-month-day

Time of day

Timezone - typically specified in UTC / GMT rather than local time zone.

http://en.wikipedia.org/wiki/ISO_8601

http://en.wikipedia.org/wiki/Coordinated_Universal_Time

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema elementFormDefault="qualified" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:element name="Address">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="Recipient" type="xs:string" />
        <xs:element name="House" type="xs:string" />
        <xs:element name="Street" type="xs:string" />
        <xs:element name="Town" type="xs:string" />
        <xs:element minOccurs="0" name="County" type="xs:string" />
        <xs:element name="PostCode" type="xs:string" />
        <xs:element name="Country">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="FR" />
              <xs:enumeration value="DE" />
              <xs:enumeration value="ES" />
              <xs:enumeration value="UK" />
              <xs:enumeration value="US" />
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

```
<?xml version="1.0" encoding="utf-8"?>
<Address
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="SimpleAddress.xsd">
  <Recipient>Mr. Walter C. Brown</Recipient>
  <House>49</House>
  <Street>Featherstone Street</Street>
  <Town>LONDON</Town>
  <PostCode>EC1Y 8SY</PostCode>
  <Country>UK</Country>
</Address>
```

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="shiporder">
 <xs:complexType>
  <xs:sequence>
   <xs:element name="orderperson" type="xs:string"/>
   <xs:element name="shipto">
    <xs:complexType>
     <xs:sequence>
      <xs:element name="name" type="xs:string"/>
      <xs:element name="address" type="xs:string"/>
      <xs:element name="city" type="xs:string"/>
      <xs:element name="country" type="xs:string"/>
     </xs:sequence>
    </xs:complexType>
   </xs:element>
   <xs:element name="item" maxOccurs="unbounded">
    <xs:complexType>
     <xs:sequence>
      <xs:element name="title" type="xs:string"/>
      <xs:element name="note" type="xs:string" minOccurs="0"/>
      <xs:element name="quantity" type="xs:positiveInteger"/>
      <xs:element name="price" type="xs:decimal"/>
     </xs:sequence>
    </xs:complexType>
   </xs:element>
  </xs:sequence>
  <xs:attribute name="orderid" type="xs:string" use="required"/>
 </xs:complexType>
</xs:element>
</xs:schema>
```

http://www.w3schools.com/Schema/schema_example.asp

Parsing XML in Python

Acknowledgements / Contributions

...

Initial Development: Charles Severance, University of Michigan School of Information

… Insert new Contributors here