

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

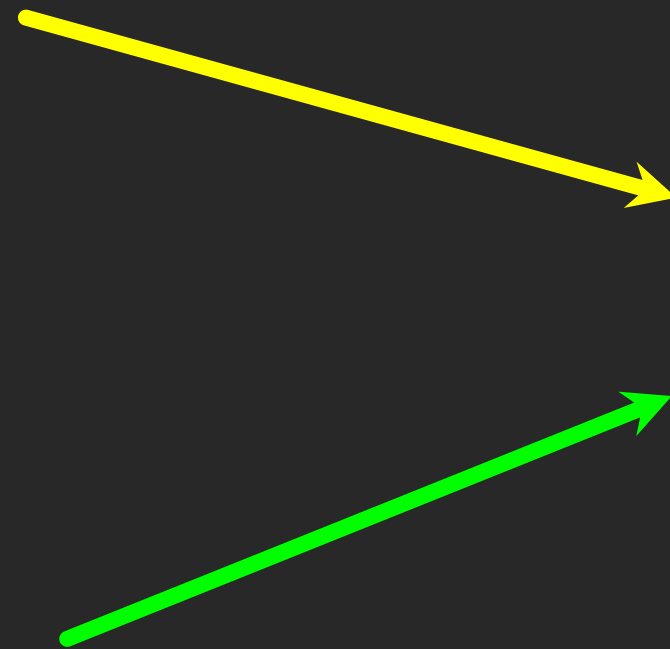
- Description of the **legal format** of an XML document
- Expressed in terms of constraints on the structure and content of documents
- Often used to specify a “**contract**” between systems - “My system will only accept XML that conforms to this particular Schema.”
- If a particular piece of XML meets 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 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>
```

XML Validation

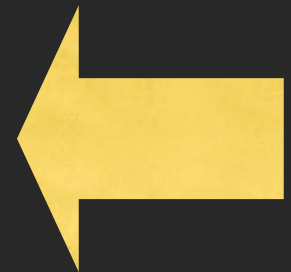


Validator

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_(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_\(W3C\)](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>
```



```
<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"/>
```

XSD Data Types

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>
```

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



These slides are Copyright 2010- Charles R. Severance (www.dr-chuck.com) of the University of Michigan School of Information and open.umich.edu and made available under a Creative Commons Attribution 4.0 License. Please maintain this last slide in all copies of the document to comply with the attribution requirements of the license. If you make a change, feel free to add your name and organization to the list of contributors on this page as you republish the materials.

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

... Insert new Contributors here