# XML Schema

PB138

# What is XML Schema

- XML document

  <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  >

# How to validate

- Use example people.xsd to validate people.xml

```
xmllint --schema mySchema.xsd neco.xml
```

# Basic XML Schema assigns types

<xs:element name=”XXX” type=”YYY” />

Basic builtin types

- Type “xs:string”
- Type “xs:anyType”

# Basic XML Schema assigns types

<xs:element name=”XXX” type=”YYY” />

Create an xsd that validates, that people.xml has root element “name”

# How to write schema

1. Define **data types**
2. Assign **data types** to **nodes**

# Defining Data Types

- Nodes in XML have **data types**
- Attrs or Elements **may be of** Simple Type <xs:simpleType
  - contain only text
  - contain numbers
  - contain regex restrictioned
- Element **may be of** Complex Type <xs: complexType
  - contain other elements
  - contain attributes
  - contain text

# Defining Data Types

<xs:complexType name=”XXXXX”>

# Data type of element with elements

```
<xs:complexType name=”XXX”>
  <xs:sequence minOccurs=”X”
               maxOccurs=”Y”>
```

- all
- choice

# How to define “any element”

```
<xs:complexType name=”XXX”>
  <xs:sequence minOccurs=”X”
               maxOccurs=”Y”>
    <xs:any processContents="skip"/>
```

# Complex Types

- <xs:complexType name="....">
- may contain **sequence** of elements **(all, choice....)**
  - minOccurs
  - maxOccurs
- After the **sequence, all, choice** you can declare attrs:

```
<xs:attribute name="name"
              type="xs:string"/>
```

# Simple Types

- We may specify precisely by inheritance
  - name is special type of string
  - date is special type of string
  - positive integer is special type of string

<xs:simpleType name=”XXX”>

<xs:restriction **base="xs:string>**

**.....**

# Simple Types Enumeration

```
<xs:simpleType name=”XXX”>
  <xs:restriction base="xs:string>
    <xs:enumeration value="xyz"/>
```

# Simple Types Enumeration

- Create an enumeration for phone codes: “+421; +420”

# Enrich People XML and write XSD

- Add attribute BirthDate with regex format “MM-DD-YYYY”
- Write XSD schema for people.xml

# Elements just with Attributes

- Complex type, simple content

```
<xs:complexType>
    <xs:simpleContent>
        <xs:extension base="xs:string">
            <xs:attribute
            <xs:attribute
```

# Elements just with Attributes

- Finish schema for <phone>

# xs:unique

Must be inside <xs:element>!

```
<xs:element name="people" >
        <xs:unique name="myUniq">
            <xs:selector xpath="./ns:person"/>
            <xs:field xpath="@id"/>
            <xs:field xpath="xxxx"/>
        </xs:unique>
...
```

# xs:key

Must be inside <xs:element>!

```
<xs:element name="people" >
        <xs:key name="myPk">
            <xs:selector xpath="./ns:person"/>
            <xs:field xpath="@id"/>
            <xs:field xpath="xxxx"/>
        </xs:key>
...
```

# xs:keyref

```
<xs:keyref name="parentId"
                          refer="myPk">
 <xs:selector xpath="./ns:person"/>
      <xs:field xpath="@parentId"/>

...
```

# What else is XML schema?

- Namespaces
- Defining uniqueness (we need XPath)
- Element/Attribute groups
- Unions
- References
- Includes/Imports
- Annotations