Theme 10.2

other XML Technology and Web service

Applications of XML

- XML is often used as a base for a variety of mark-up language
- These languages are design with one specific use in mind
  - Geographic information, medical information, etc.
- But they all share syntax rule of XML and is often associated with a schema.

KML

- **KML** = **K**eyhole **M**arkup **L**anguage.

- KML is a file format used to display geographic data in an Earth browser such as Google Earth.

- Although developed for Google Earth but is often used in many map-related apps (including Google Maps).

- You can create KML files to pinpoint locations, add image overlays, and expose rich data in new ways.

ODF and OOXML

- **ODF** and **OOXML** are file formats that use XML...

- ...to describe office productivity documents.

Each format is a compressed archive (a file packaging specfication)...

- ...that contains binary files (e.g. images), and XML docs.

- Moving from proprietary formats (e.g. DOC, XLS) to open XML formats...

- ...allows for platform independence and better external app support.

ODF and OOXML

OOXML	ODF
Open Office XML	Stands for **O**pen **D**ocument **F**ormat.
Microsoft Zip Compression	StarDivision / Sun Microsystems Jar Compression
XML Schema (W3C) (XSD) RELAX NG (ISO/IEC 19757-2)	RELAX NG (ISO/IEC 19757-2)
Open Packaging Conventions (ISO/IEC 29500-2:2012)	ODF Package
docx, docm, xlsx, xlsm, pptx, pptm	odt, ods, odp, odg, odf

RSS

- Another practical use of XML is **RSS**.

- **RSS** = **R**eally **S**imple **S**yndication.

- RSS is a **custom XML language**.

- It describes **content updates** (e.g. news headlines).

- Another name for an RSS document is a **feed**.

RSS

- A news website may, e.g., have an RSS feed.

- Each time there's a news **update** on the website...
- ...the RSS feed is also updated.

- Users can **subscribe** to the RSS feed...
- ...to see these headlines without visiting the website.

RSS Aggregators

- You can view an RSS feed in any modern browser.

- Can also subscribe to multiple feeds with an **aggregator**.
    - It is an online or offline app.
    - Each time a feed is updated, it retrieves the new feed.
    - It displays the content updates in an easy-to-read manner.

- A popular RSS aggregator is **Feedly**.

Publishing an RSS Feed

- As a web designer, you can create or generate...

- ...an RSS feed for your website.

- It must first be **validated** using the RSS schema.

- Then you must **upload** it to your web server...

- ...and place an icon/**link** to it on your website, e.g.:

Publishing an RSS Feed

- You can then **register** your feed…

- …so that aggregators can find it.

- You must keep your feed **up to date**…

- …either manually, or using an automatic feed generator.

I'm a RSS

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<rss version="2.0">

<channel>
  <title>CNN News</title>
  <link>http://www.cnn.com</link>
  <description>Is that really the site</description>
      <item>

            <title> Bat Eats Man </title>

            <link> http://www.cnn.com/new/14223<link>

            <description> … </description>

      </item>
</channel>
</rss>
```

SOAP

- Simple Object Access Protocol (SOAP) is a **lightweight protocol** intended for **exchanging structured information** in a **decentralized**, **distributed** environment.

- It uses **XML technologies** to define an extensible **messaging framework** providing a message construct that can be exchanged over a **variety** of **underlying protocols**.

- The framework has been designed to be **independent** of any particular programming model and other implementation specific semantics.

SOAP

- **The process:**

- One networked device initiates a **remote procedure call**…

- A **SOAP request** is sent to the receiving device over HTTP…

- The receiver sends back a **SOAP response**.

- Generally is generated from the web services when called.

SOAP Example

A SOAP request (an XML doc with an HTTP header):

```
POST /InStock HTTP/1.1
Host: www.example.org
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0" ?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
    soap:encodingStyle="http://www.w3.org/2003/05/soap-encoding">

        <soap:Body xmlns:m="http://www.example.org/stock">
                <m:GetStockPrice>
                        <m:StockName>IBM</m:StockName>
                </m:GetStockPrice>
        </soap:Body>

</soap:Envelope>
```

Soap Building blocks

- An **Envelope** element that identifies the XML document as a SOAP message.
- A **Header** element that contains header information
  - This can contain additional information needed to carry out the request.
    - E.g. Authentication information
- A **Body** element that contains call and response information
  - Contain the actual data sent in the Request
- A **Fault** element containing errors and status information

SOAP Example

A SOAP response:

```
HTTP/1.1 200 OK
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0" ?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
    soap:encodingStyle="http://www.w3.org/2003/05/soap-encoding">

        <soap:Body xmlns:m="http://www.example.org/stock">
                <m:GetStockPriceResponse>
                        <m:Price>34.5</m:Price>
                </m:GetStockPriceResponse>
        </soap:Body>

</soap:Envelope>
```

Compared to what we know…

- While SOAP and REST share similarities over the **HTTP** protocol

- SOAP has a more rigid structure compare to REST…
- …this rigid structure provide SOAP with a form of standardization.

Other considerations

- Difficulty Depends on Programming Language
  - Structure of responses can become complex
  - Few languages might require you to create request from scratch
  - Works very will with WSDL (later in the slide)

- Built-In Error Handling
  - Provide a way to test request errors
  - Error reporting tool provide standard tools to automate error handling

- Additional support for SMTP

WSDL

- SOAP provides a communication service to web services.

- A **WSDL** doc provides a library of possible procedure calls.
  - It is also a **custom XML language**.

- Gives technical info of the service to the requesting device, for...

- ...easier, more automated and more reliable exchanges.

WSDL

- A client app connecting to a web service…

- …can read the WSDL doc to see…

- …what procedures/functions are available on the server.

- The client then calls a function listed in the WSDL doc…

- …using **SOAP** to communicate.

How to WSDL

- **<types>**
  - Defines the data types used by the web service

- **<message>**
  - Defines the data elements for each operation

- **<portType>**
  - Describes the operations that can be performed and the messages involved.

- **<binding>**
  - Defines the protocol and data format for each port type

How to WSDL

```
<definitions>

        <types> This is an XML Schema </types>
    <message name="getTermRequest">
      <part name="term" type="xs:string"/>
    </message>

    <message name="getTermResponse">
      <part name="value" type="xs:string"/>
    </message>

    <portType name="glossaryTerms">
      <operation name="getTerm">
        <input message="getTermRequest"/>
        <output message="getTermResponse"/>
      </operation>
    </portType>
```

How to WSDL

```
<wsdl:binding name="EndorsementSearchSoapBinding"
              type="es:GetEndorsingBoarderPortType">
  <wsdl:operation name="GetEndorsingBoarder">
    <wsdl:input>
      <soap:body use="literal" namespace="schema"/>
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal"namespace="schema"/>
    </wsdl:output>
  </wsdl:operation>
 </wsdl:binding>
</definitions>
```

SOAP and WSDL vs REST

SOAP and WSDL	REST
Strong emphasis on standards	Standard HTTP communication
Security is first class citizen	REST is easier to scale
Service definition via a standard WSDL document	Lightweight because there is no protocol overhead
Best suited for large Enterprise projects	Large Developers community, as many are public facing apis
Best suited for stateful communications	Stateless, works on cache

IMY 210: Advance Mark UP Languages I

TO BE CONTINUED IN

IMY 220!

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