

Methods and Tools for Management Information Systems

Lecture 1

1. April 2009



- *Times and Dates:*

Lecture: Every Tuesday, 11h15 - 12h45, room G29-427

Discussion: Every Tuesday, 13h15 - 14h45, starting April 15,
room G29-427

- *Office Hours:*

upon appointment



- *Questions/Comments:*

`graubitz@open-source-consultants.de`

- *Further Information (slides, exercises, etc.):*

`http://bauhaus.cs.uni-magdeburg.de`



■ *Literature:*

E. R. Harold, W. S. Means: XML in a Nutshell, O'Reilly, 2005

G. Rothfuss, C. Ried: Content Management mit XML - Grundlagen und Anwendungen, Springer, 2001 (*German*)

R. Widhalm, T. Mück: Topic Maps. Springer, 2002 (*German*)

A.-W. Scheer: ARIS - Vom Geschäftsprozeß zum Anwendungssystem, Springer, 1998 (*German*)

Lots of online references, see webpage for details.



The course introduces technical foundations of Management Information Systems (MIS) with a strong emphasis on information representation using XML and related technologies:

- Information representation and organisation:

- XML technologies: document type definition (DTD), namespaces, XML schema
- Semantic technologies: resource description framework (RDF), RDF schema, ontologies (OWL)
- Topic maps
- Classification, systematics
- Thesauri, catalogues
- Meta data

- Architecture of integrated information systems (ARIS):

- Business process (re-)engineering
- Business process model management and improvement
- Quality management



Extensible Markup Language (XML)

- Standard for structured, human *and* machine readable data streams
- Defines the syntax to create arbitrary yet similar markup languages (a. k. a. *XML applications*)
- *Idea*: strict separation between **data** and their **representation**



- XML in 10 points:

“[...] *And if you are giving a presentation on XML, why not start with these 10 points?*” (quoted from W3C)

1 XML is for structuring data ...

- *Set of rules* for designing text formats that let you structure your data
- XML makes it easy for a computer to generate data, read data, and ensure that the data structure is unambiguous
- XML is extensible, platform-independent, and it supports internationalization and localization



2 XML looks a bit like HTML ...

- XML makes use of tags and attributes
- XML uses tags only to delimit pieces of data
- XML does not provide the *meaning* of the tagged data (e. g., do not assume that XML data tagged with <p> represents a paragraph)
- Interpretation of the data is left to the application



3 XML is text, but isn't meant to be read . . .

- Text data allows user to inspect the files for debugging purposes
- Structure allows application to process the data automatically
- Specification explicitly forbids tolerating errors (e. g., as opposed to HTML)



4 XML is verbose by design . . .

- XML files are nearly always larger than comparable binary formats
- Advantages of a text format are evident (see point 3)
- Disadvantages can usually be compensated at a different level (e. g., at protocol level, application level, etc.)



5 XML is a family of technologies ...

- The “XML family” is a growing set of modules ...
 - XML 1.0 defines tags and attributes
 - XLink describes a standard way to add hyperlinks to an XML file
 - XPointer is a syntax in development for pointing to parts of an XML document
 - XML Schema helps developers to precisely define the structures of their own XML-based formats
 - CSS/XSL(T) for representation/transformation of XML data
 - DOM for manipulation of XML data



6 XML is new, but not that new ...

- Development of XML started in 1996
- W3C Recommendation since February 1998
- Technology is not very new—before XML there was SGML
- Designers of XML ...
 - Took the best part of SGML
 - Were guided by the experience with HTML
 - Produced something that is no less powerful than SGML, but vastly more regular and simple to use



7 XML leads HTML to XHTML ...

- XHTML, the successor of HTML, is an XML application
- XHTML has many of the same elements as HTML
- Syntax has been changed slightly to conform to the rules of XML
- It inherits the syntax from XML and restricts it in certain ways
- XHTML also adds meaning to the syntax



8 XML is modular ...

- XML allows you to define a new document format by combining and reusing other formats
- XML provides a namespace mechanism
- XML Schema is designed to support modularity at the level of defining XML document structures (e. g., it is possible to combine two schemas to produce a third one that covers a merged document structure)



9 XML is the basis for RDF and the Semantic Web ...

- *Resource Description Framework* (RDF) is an XML text format that supports resource description and metadata applications
- RDF provides tools to integrate more than documents, images, menu systems, and forms applications (like HTML), it makes the Web a little bit more into a *Semantic Web*
- *Ontologies* as formal descriptions of terms in a certain area (e. g., shopping or manufacturing) that allow machines to communicate effectively—*like an agreement on the meanings of the words people employ in their communication*



10 XML is license-free, platform-independent and well-supported ...

- Access to a large and growing community of tools and engineers experienced in the technology
- Opting for XML is a bit like choosing SQL for databases:
... you still have to build your own database and your own programs and procedures that manipulate it
... but there are many tools available and many people who can help you
- Software can be built without paying license fees
- Customers are not tied to a single vendor

“[...] XML isn't always the best solution, but it is always worth considering.”



- XML applications consist of 3 parts:
 - Structure
 - ... defines elements, attributes, etc., which may be used in corresponding XML documents, either in form of a *document type definition* (DTD) or as an *XML schema*
 - XML documents
 - ... contain the data
 - Processing directives
 - ... define how the data is presented, e. g. using *Cascading Style Sheets* (CSS) or *Extensible Stylesheet Language* (XSL)



- DTD (partial):

```
<!ELEMENT people ( person* )>
<!-- people is a (possibly empty) list of persons -->
  <!ELEMENT person ( name, firstname, birthdate, title? )>
  <!-- a person has name, firstname, birthdate and an
        optional title -->
    <!ELEMENT name ( #PCDATA )>
    <!-- name contains only text, nothing else -->
    <!ELEMENT firstname ( #PCDATA )>
    <!-- firstname contains only text, nothing else -->
    <!ELEMENT birthdate ( #PCDATA )>
    <!-- birthdate is represented as simple text -->
    <!ELEMENT title ( #PCDATA )>
    <!-- title contains
```



- XML document (partial):

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!DOCTYPE people SYSTEM "people.dtd">
<people>
  <person>
    <name>Miller</name>
    <firstname>Peter</firstname>
    <birthdate>12-12-1984</birthdate>
  </person>
  <person>
    <name>Smith</name>
    <firstname>John</firstname>
    <birthdate>10-10-1985</birthdate>
    <title>Dr.</title>
```



- Formatting rules (partial):
 - using CSS:

```
people { display:block; font-family:Helvetica;  
        font-size:18px; font-weight:bold;  
        color:green }
```



- using XSL:

```
<xsl:template match="/">
  <html><head></head><body style="font-family:Helvetica;
    font-size:18px; font-weight:bold; color:green">
    <xsl:value-of select="." />
  </body></html>
</xsl:template>
```



- Formatting rules have to be referenced in the XML document, e. g.:

```
<?xml-stylesheet type="text/css" href="people.css"?>
```

or

```
<?xml-stylesheet type="text/xsl" href="people.xsl"?>
```

