```
<talk>
  title="XML"
  <presenter>
     name="Tom Cargill"
     url="www.sni.net/~cargill"
  </presenter>
  location="FRUUG"
  date="09.09.1999"
</talk>
```

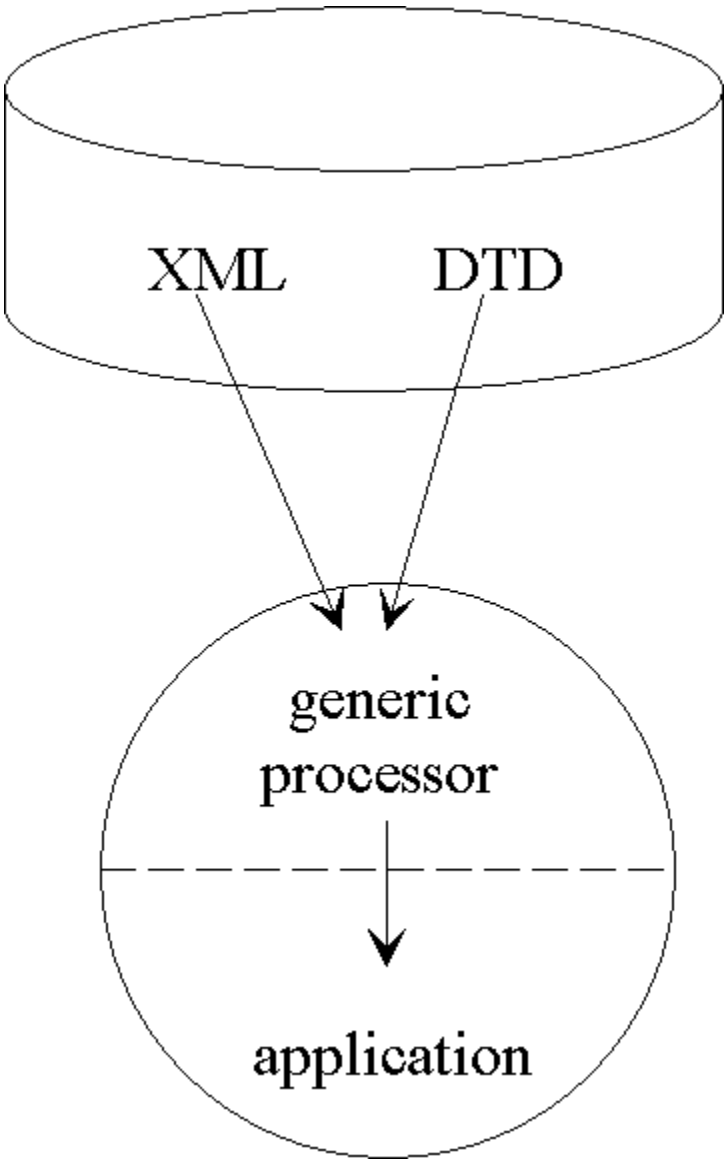

Outline

- DTD
- Applications
  - SVG
- DOM
- SAX
- Editors
- Demos

- Single best URL
  - metalab.unc.edu/xml/

XML Processing

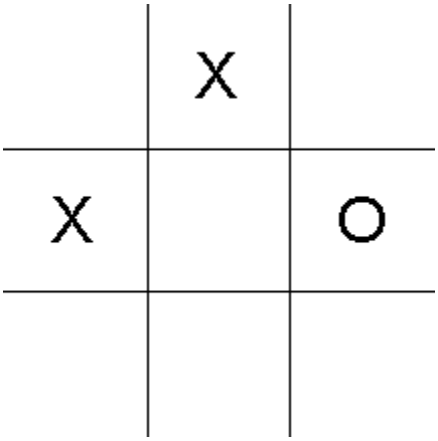
- The basic information flow:



- The disk represents generalized storage, inclu
- DTD is Document Type Definition.

Tiny Example

- A familiar domain:



- The following XML document combines a semantic transcript of a human dialog.
- A Tic-tac-toe game is modeled as a sequence of
- Each play element has a player and a position
- Each play element also contains the player s co data.

```
<game>
  <play player="X" position="2">
    One of Kasparov s favorite openings.
  </play>
  <play player="O" position="6">
    Not since Deep Blue used this response.
  </play>
  <play player="X" position="4">
    Notice how I preserve my corner symmetry.
  </play>
</game>
```


DTD Example

- A game element is composed of a sequence of pl
- A play element has a player attribute that mus
- A play element has a position attribute that s
  token.
- A play element is composed of character data.
- The DTD is:

```
<!DOCTYPE game [

  <!ELEMENT game (play*) >
  <!ELEMENT play (#PCDATA) >

  <!ATTLIST play
    player (X|O) #REQUIRED
    position NMTOKEN #REQUIRED
  >

]>
```

- Don t worry about the syntax.

  A DTD is not described as XML elements – this
- Creating a DTD effectively creates a new XML-b
  language, in this case a language for describi

Some XML Languages

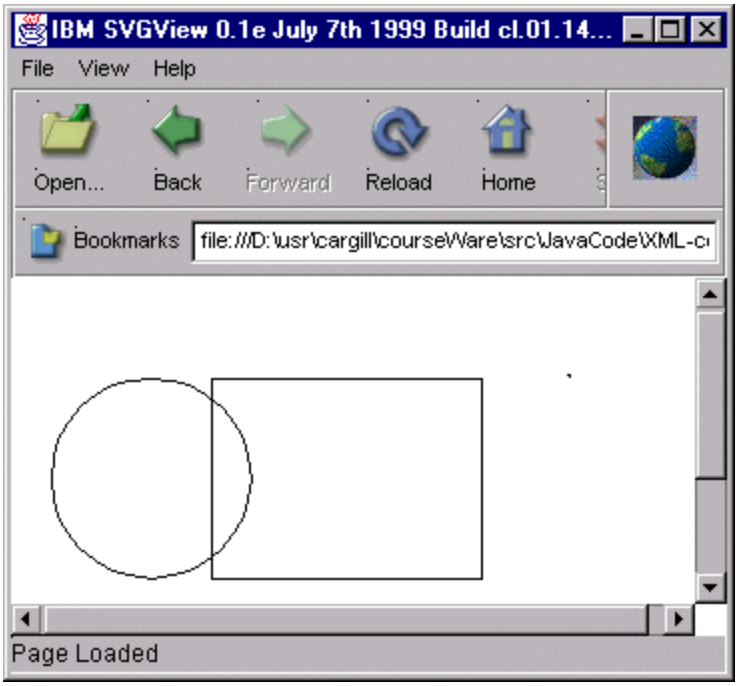
- Genealogical Data (GedML) http://home.iclweb.com/icl2/mhk
- Mathematical Markup Language (MathML) http://www.w
- Music Markup Language (MusicML) http://195.108.47.160/
- Weather Observation Markup Format (OMF)
  http://zowie.metnet.navy.mil/%7Espawar/JMV-TNG/XML/OMF.html
- Extensible Logfile Format (XLF) http://www.docuverse.
- Extensible Mail Transport Protocol (XMTP)
  http://jabr.ne.mediaone.net/documents/xmtp.htm
- Personalized Information Description Language
  http://www.w3.org/TR/NOTE-PIDL
- HTML in XML (XHTML) http://www.w3.org/TR/xhtml1/
- Scalable Vector Graphics (SVG) http://www.w3.org/TR/WI

Example: SVG

- Scalable Vector Graphics document:

```
<?xml version="1.0" standalone="yes"?>

<!DOCTYPE svg SYSTEM "svg.dtd" >

<svg width="350" height="250">
  <g style="stroke:black; fill:none;">

    <circle cx="70" cy="100" r="50" />
    <rect x="100" y="50" width="135" height="100" />

  </g>
</svg>
```

- Rendered (by IBM Alphaworks SVG Viewer tool):



DOM

- The Document Object Model.

  http://www.w3.org/DOM/

- An abstract API for accessing the contents of within a program.

- The abstractions are tree-centric.

  It provides access to an object representing
  The application traverses the tree, stepping
  extracting data from the nodes as needed.
  Constraint: the whole tree must fit in a sing

- For each language, a concrete API must be defi

- For example, the Java package org.w3c.dom.

  A Java-specific, but still abstract API.
  Using the Java interface mechanism.

- Each language-specific interface must be imple

- For example, the Java package com.ibm.xml.par

  From IBM s Alphaworks program.

Package org.w3c.dom

_ Some of the org.w3c.dom interfaces:

  Node
  Document extends Node
  NodeList
  Element extends Node

_ The tree is a hierarchy of Node objects, roote

_ A NodeList iterates over the subordinates of a

_ Each XML element is represented as an Element

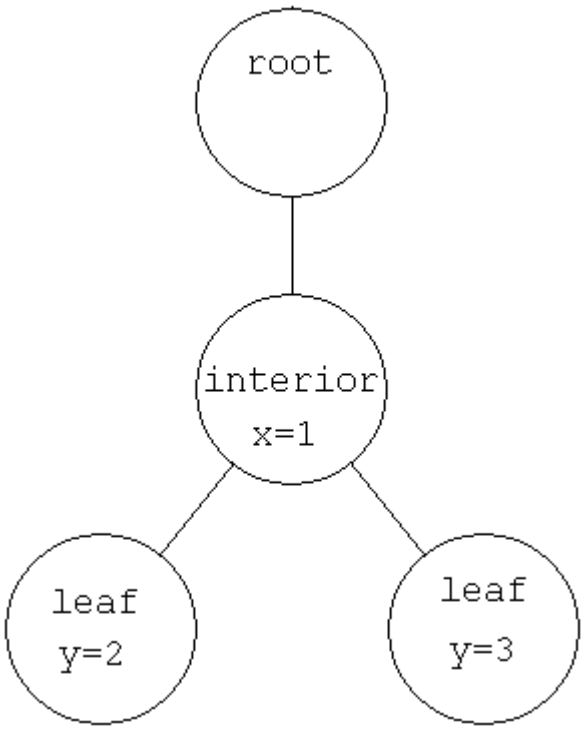
_ Each attribute is a Node subordinate to an Ele

Trivial Input for DOM Example

_ The file BasicDom.xml:

```
<?xml version='1.0'?>

<root>
  <interior x="1">
    <leaf y="2"/>
    <leaf y="3"/>
  </interior>
</root>
```

_ Logically, the XML text represents the followi



DOM Example

```
import org.w3c.dom.Document;
import org.w3c.dom.NamedNodeMap;
import org.w3c.dom.Node;
import org.w3c.dom.NodeList;
import org.w3c.dom.Element;
import com.ibm.xml.parsers.NonValidatingDOMParser;

public
class BasicDom {

public
static
void main(String[] argv )throws Exception {
  NonValidatingDOMParser dp =
    new NonValidatingDOMParser();
  dp.parse("BasicDom.xml");
  traverse(dp.
    getDocument().
      getDocumentElement(), "");
}

private
static void traverse(Element e, String indent) {
  System.out.print(indent + e.getTagName());
  NamedNodeMap nnm = e.getAttributes();
  for( int i=0; i<nnm.getLength(); ++i ) {
    Node a = nnm.item(i);
    System.out.print(" "+a.getNodeName());
    System.out.print("="+a.getNodeValue());
  }
  System.out.println();
  NodeList nl = e.getChildNodes();
  for( int i=0; i<nl.getLength(); ++i )
    if( nl.item(i) instanceof Element ) {
      Element sub = (Element) nl.item(i);
      traverse(sub, indent+"  ");
    }
}
}

<outputs>

root
  interior x=1
    leaf y=2
```


leaf y=3

SAX

Simple API for XML

http://www.megginson.com/SAX/

- An event-based abstract API.

  As the parser reads a document it makes incre
  application code, reporting each element a
  GOF s Builder design pattern.

- The Java interfaces are in package org.xml.sax

- The key interface is DocumentHandler, which de
  callback methods used by the parser.

- An example implementation is
  com.ibm.xml.parsers.SAXParser

  Again from IBM Alphaworks.

WIP Speakers

- Wally Wedel, Sun
- John Meier, Freshtech
- Ron Schwiekert, Avitek/BEA
- Bruce Haddon, Sun
- Dick Hackathorn, WebFarming

XML as a Testing Language

- Context

  Need to test a complex framework.
  Applications based on the framework don t yet
  Even if they did, that would be an ineffectiv

- Build a test harness and test specification lar

- Q: What s the language?

- A: XML

```
<test-case>
  <configuration>
    ...
  </configuration>
  <scenario>
    <stimulus>...
    <response>...
    <stimulus>...
    <response>...
    ...
  </scenario>
</test-case>
```

