



INTERNET & WEB
APPLICATION DEVELOPMENT
SWE 444

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Module 4 (IX): Other XML Related Standards: XLink , XPointer and XQuery

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Objectives/Outline

• Objectives

- Understand the role of XLink and XPointer
- Learn how to use them

• Outline

- Links in HTML Documents
 - Limitations
- What are XLink and XPointer?
- XLink Example
- XPointer Example
- Defining Links: Simple and Complex
- Browser support for XLink & XPointer
- XML vs Database
 - XQuery

Links in HTML Documents

- Power of Web lies in the links
- How are HTML links specified?
 - ``
 - Clicking on contents replaces document.
 - Support for going to a specific part of that document.
 - ``
 - ``
 - ``
 - Image data retrieved and rendered.
 - `<link>`
 - Used in document head for stylesheets, etc.

Limitations

- What are the limitations of HTML linking?
 - Unidirectional
 - Requires write permission to create a named anchor
 - Semantics predefined by link type
 - Existence of link implied by element name
 - No way to add linking as a capability of linking to other elements

What are XLink and XPointer?

- XLink - the XML Linking Language
 - defines a standard way of creating hyperlinks in XML documents.
- XPointer - the XML Pointer Language
 - allows the hyperlinks to point to more specific parts (fragments) in the XML document
 - E.g., link to the third item in a particular list, or to the second sentence of the fifth paragraph.
- Both are W3C Recommendations
 - XLink became W3C Recommendation in 27 June 2001.
 - XPointer became W3C Recommendation in 25 March 2003.
- The browser support for XLink and XPointer is minimal
 - some XLink support in Mozilla 0.98+, Netscape 6.02+, and Internet Explorer 6.0.
 - Earlier versions of all of these browsers have no XLinks support at all

XLink Example

- Here is a simple example showing how to use XLink to create links in an XML document

```
<?xml version="1.0"?>  
<homepages xmlns:xlink="http://www.w3.org/1999/xlink">  
  <homepage xlink:type="simple"  
    xlink:href="http://www.w3schools.com">Visit W3Schools  
  </homepage>  
  <homepage xlink:type="simple"  
    xlink:href="http://www.w3.org" xlink:show="new">  
    Visit W3C  
  </homepage>  
</homepages>
```

XLink namespace

means "click from here to go there"

Where to open

XPointer Example

- Here is a simple example showing how to use XPointer
 - points to the fifth item in a list with a unique id "rock"
`href="http://www.example.com/cdlist.xml#id('rock').child(5,item)"`
 - You can also use XPath and add XPointer expressions at the end of any URL using "#xpointer"
`xlink:href="http://dog.com/dogbreeds.xml#xpointer(id('Rottweiler'))"`
- Or use the shorthand form
`xlink:href="http://dog.com/dogbreeds.xml#Rottweiler"`

Defining link

- XLink developer's came up with the following:
 - Explicit relationship between resources or portions of resources
 - What is the significance of "explicit"?
 - Are links in HTML explicit?
 - Now what?
 - Define relationship.
 - Define resources.
 - Define portion.

Defining relationship

- What kinds of relationships might we want to capture with a link?
 - One to one
 - A links to B
 - A is linked from B
 - A links to B and vice versa
 - Many to one
 - One to many
 - Many to many

Defining Resource

- How are resources identified on the Web?
 - URI / URL's
- How about portions?
 - Need a way to address part of parts of a web resource.
 - What might we do with XML?
 - XPointer is a language for specifying these kinds of addresses.

Implementing links

- We know what we want to do, how do we do it?
 - Invent a set of tags that specify links.
 - Is there a better way?
 - Think back to definition of a link:
 - Explicit relationship between resources or portions of resources.
 - Links are properties of something within a document.
 - Source data for an image.
 - Destination of a hyperlink.

XLink

- Namespace URI:
 - <http://www.w3.org/1999/xlink>
- Defines a set of *attributes* which have specific linking semantics
 - type, href, role, arcrole, title, show, actuate, label, from, to
- The type attribute is required
 - simple, extended, locator, arc, resource, title
- Other attributes are either required, optional, or non-sensical depending on type.

Simple Links

- `type="simple"`
 - Indicates that the element where this attribute is specified is associated with a simple link.
 - Unidirectional
- Meaning of other attributes:
 - `href`: URI of link target.
 - `show`: Indicates how a link should be displayed.
 - Valid values: `new`, `replace`, `embed`, `other`, or `none`.
 - `actuate`: Indicates when a link should be displayed
 - Valid values: `onLoad`, `onRequest`, `other`, or `none`

Comparing with HTML

- In HTML:
`Link to ESPN`
- With XLink:
`<a xmlns:xlink="http://www.w3.org/1999/XLink" xlink:type="simple" xlink:href="http://www.espn.com" xlink:show="replace" xlink:actuate="onRequest">`

Comparing with HTML

➤ In HTML:

```

```

➤ With XLink:

```
<img xmlns:xlink="http://www.w3.org/1999/XLink"  
xlink:type="simple"      xlink:href="file.jpg"  
xlink:show="embed"    xlink:actuate="onLoad">
```

Advantages over HTML

- Can add linking capabilities to any element (not just `<a>` and `` like in HTML)
- Can specify different combinations of show and actuate to get different behavior
 - No longer a single behavior associated with the specific element type

Extended Links

- The XLink specification supports not only simple links but also extended links
 - xlink:type = “extended”
- Advanced features of XLink is in extended link types
- Extended links allow multiple resources, either remote or local, to be connected by multiple arcs
 - Arcs are explicitly unidirectional — they only define traversal in a single direction.
- By grouping resources with labels and using one or more arcs, an extended link can achieve specific traversal pathways among the resources

Resource

- xlink:type = “resource”
- Identifies a local resource that may be involved in an extended link
- Other attributes that go along:
 - xlink:title Human readable tag/title.
 - xlink:label Used by arcs.

Locator

- xlink:type="locator"
- Identifies a remote resource that may be involved in an extended link
- Other attributes that go along:
 - xlink:title Human readable tag/title.
 - xlink:label Used by arcs.
 - xlink:href Location of resource (required)

Arc

- xlink:type="arc"
- Connects two resources
- Associated attributes:
 - xlink:from Label of starting resource
 - xlink:to Label of ending resource
 - xlink:show Governs display
 - xlink:actuate Governs when to display

Browser support for XLink

- Currently extremely limited
 - Netscape 6 supports simple links
 - Amaya supports simple links
 - Several experimental “link processor” and “linkbase” products based on XLinks.

Addressing Document Portions

- Didn't talk about addressing portions of document.
- XPointer is a language for addressing a portion of a document.
 - Allows you to construct “expressions” which identify portions or ranges of XML documents.
 - Example:
 - `booklist.xml#xpointer(/booklist/book[3]/title/text())`

XML vs Database

- When would we want to store info. as a collection of XML documents instead of in a database?
 - Info is structured but not regular
 - Need/want to be document-centric
 - Need extensibility
- What do we give up by not having a database?
 - Query language

XMLQuery

- Provide database like query facilities to collections of XML data.
- Relatively new effort by W3C
 - Still being defined.
 - Uses XPath to address into document structure
- Demo: <http://xqueryservices.com>

Q & A



References

- Some useful links with examples and other resources:
 - W3School XLink and XPointer Tutorial
 - <http://www.w3schools.com/xlink/default.asp>
 - W3School XQuery Tutorial
 - <http://www.w3schools.com/xquery/default.asp>