

COMPSCI 732

Updates in NXDs

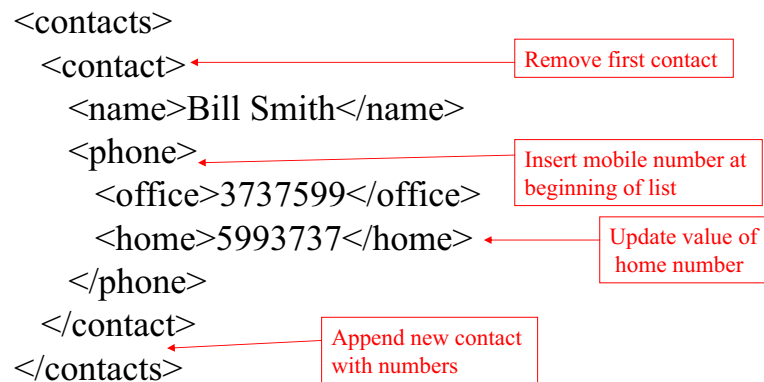
Need for an update language

“eXist does not currently provide an advanced update mechanism.” [1]

“Update abilities are likely to remain fragmented in the near future, as this is an area still being addressed by industry and academia.” [2]

A number of NXDs support the XUpdate language, proposed by XML:DB Initiative. [3]

Kinds of operations



XUpdate

An update in the XUpdate language is expressed as a well-formed XML document.

XUpdate makes extensive use of the expression language defined by XPath for selecting elements for updating and for conditional processing.

XUpdate: Modifications

An update is represented by an *xupdate:modifications* element in an XML document.

The *xupdate:modifications* element may contain the following types of elements:

- *xupdate:insert-before*
- *xupdate:insert-after*
- *xupdate:append*
- *xupdate:update*
- *xupdate:remove*
- *xupdate:rename*
- *xupdate:variable*
- *xupdate:value-of*
- *xupdate:if*

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XUpdate: Insert

xupdate:insert inserts a node in the XML tree.

XPath is used to select a node, and *insert-before* (*insert-after*) are used to insert before (after) the selected node.

The *xupdate:insert-before* and *xupdate:insert-after* element may contain the following types of elements:

- *xupdate:element*
- *xupdate:attribute*
- *xupdate:text*
- *xupdate:processing-instruction*
- *xupdate:comment*

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Example: Insert element

For example,

```
<xupdate:insert-after
  select="/person[contains(name,'Gill')]/phone" >
  <xupdate:element name="address">
    <town>San Francisco</town>
  </xupdate:element>
</xupdate:insert-after>
```

would insert the element address

```
<person>
  <name> Gill</name>
  <phone>3737599</phone>
  <address>
    <town>San Francisco</town>
  </address>
</person>
```

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Example: Insert attribute

For example,

```
<xupdate:insert-before
  select="/person[contains(name,'Gill')]/address[2]">
  <xupdate:element name="address">
    <xupdate:attribute name="id">2</xupdate:attribute>
  </xupdate:element>
</xupdate:insert-before>
```

would create the element with an attribute

```
<person>
  <name> Gill</name>
  <address>
    <town>San Francisco</town>
  </address>
  <address id="2"/>
  <address>
    <town>Los Angeles</town>
  </address>
</person>
```

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XUpdate: Update

The *xupdate:update* element can be used to update the content of existing nodes.

Update →

```
<xupdate:update select="/addresses/address[2]/town">
  New York
</xupdate:update>
```

<pre><addresses> <address> <town>Los Angeles</town> </address> <address> <town>San Francisco</town> </address> </addresses></pre>	Original	<pre><addresses> <address> <town>Los Angeles</town> </address> <address> <town>New York</town> </address> </addresses></pre>	Result
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XUpdate: Append

The *xupdate:append* element allows a node to be created and appended as a child of the context node. Must specify context node and position where node is to be appended.

Example: Append element

For example,

```
<xupdate:append select="/addresses" child="last()">
  <xupdate:element name="address">
    <town>San Francisco</town>
  </xupdate:element>
</xupdate:append>
```

would append the new address element as the last child of addresses

```
<addresses>
<address>
  <town>Los Angeles</town>
</address>
<address>
  <town>San Francisco</town>
</address>
</addresses>
```

XUpdate: Remove

xupdate:remove removes the selected node from the XML tree.

Update

```
<xupdate:remove select="/addresses/address[1]"/>
```

```
<addresses>
<address>
  <town>Los Angeles</town>
</address>
<address>
  <town>New York</town>
</address>
</addresses>
```

Original

```
<addresses>
<address>
  <town>New York</town>
</address>
</addresses>
```

Result

XUpdate: Rename

The *xupdate:rename* element allows an attribute or element node to be renamed after its creation.

```
<xupdate:rename select="/addresses/address/town">
  city
</xupdate:rename>
```

```
<addresses>
  <address>
    <city>New York</city>
  </address>
</addresses>
```

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XUpdate: Variables

A *variable* is a name that may be bound to a *value*. The *value* to which a *variable* is bound (the value of the variable) can be an object of any of the types that can be returned by expressions.

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Example: Variables

```
<xupdate:variable name="town" select="/addresses/address[0]/town"/>
<xupdate:append select="/addresses">
  <xupdate:element name="address">
    <xupdate:value-of select="$town"/>
  </xupdate:element>
</xupdate:append>
```

binds the selected object to the variable named *town* and uses the value of this variable to append a new address record.

```
<xupdate:append select="/addresses">
  <xupdate:element name="address">
    <xupdate:value-of select="/addresses/address[0]/town"/>
  </xupdate:element>
</xupdate:append>
```

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Summary

There is a heading for “Conditional Processing” but no content. How would this be useful?

Are all the update elements necessary? If not, why have them?

An update in the XUpdate language is expressed as a well-formed XML document. There are various elements defined for updating elements, attributes, comments, text and processing instructions.

For more information, see [3].

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References

- [1] eXist: an Open Source Native XML Database, Wolfgang Meier. In: Akmal B. Chaudri, Mario Jeckle, Erhard Rahm, Rainer Unland (Eds.): Web, Web-Services, and Database Systems. NODe 2002 Web- and Database-Related Workshops, Erfurt, Germany, October 2002. Springer LNCS Series, 2593. <http://exist-db.org/webdb.pdf>
- [2] XML and Databases, Ronald Bourret.
<http://www.rpbouret.com/xml/XMLAndDatabases.htm>
Last updated January, 2003.
- [3] XML:DB Initiative: XUpdate – XML Update Language, Andreas Laux, Lars Martin.
<http://xmldb-org.sourceforge.net/xupdate/xupdate-wd.html>
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