



Oracle XML Tools & Features

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XML In Oracle

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An Expert's Guide to Oracle
<http://blogs.ittoolbox.com/oracle/guide>

An expert is a person who has made all the mistakes that can be made in a very narrow field. - Niels Bohr (1885 - 1962)

Topics

- A little background
- XDK
- XSU
- XSQL
- XDB
- XPath
- XMLType
- SQLX
- XSLT
- XQuery

It's like X acronym nerdvanna!

History of XML in Oracle

- Beta XDK in 8i for Java, C and PL/SQL
- Migrated to XDK in 9i
- Migration to SQLX
- XMLTypes and XDB (With WebDAV)

XML is like violence – If it doesn't solve the problem, you aren't using enough of it.

XDK

- XDK is a set of XML APIs
 - Java
 - C
 - PL/SQL (Deprecated in favor of XDB APIs)
- API Support for:
 - DOM
 - SAX
 - JAXB
 - XPath
- XSQL
- XSU
- XSLT

XDK Example

create or replace procedure domsample(dir varchar2, infile varchar2,
errfile varchar2) is

```
p xmlparser.parser;  
doc xmldom.DOMDocument;
```

```
begin
```

```
-- new parser
```

```
p := xmlparser.newParser;
```

```
-- set some characteristics
```

```
xmlparser.setValidationMode(p, FALSE);  
xmlparser.setErrorLog(p, dir || '/' || errfile);  
xmlparser.setBaseDir(p, dir);
```

```
-- parse input file
```

```
xmlparser.parse(p, dir || '/' || infile);
```

```
-- get document
```

```
doc := xmlparser.getDocument(p);
```

XSU

- XML SQL Utility
- Available since 8i
- Example

```
declare
  queryCtx DBMS_XMLQuery.ctxType;
  result CLOB;
begin
  -- set the query context.
  queryCtx := DBMS_XMLQuery.newContext('select * from employees');

  DBMS_XMLQuery.setRowTag(queryCtx,'EMP');      -- sets the row tag name
  DBMS_XMLQuery.setRowSetTag(queryCtx,'EMPSET'); -- sets rowset tag name

  result := DBMS_XMLQuery.getXML(queryCtx);     -- get the result

  printClobOut(result); -- print the result..!
  DBMS_XMLQuery.closeContext(queryCtx);        -- close the query handle;
end;
```

XSQL

- Template Driven, Dynamic Web Pages
- Combines XML, XSLT, SQL and HTTP
- Hides XDK and XSU
- Handles Select, Insert, Delete and Update
- Can be very simple or very sophisticated

XSQL Example

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="FlightList.xsl"?>
<xsql:query connection="demo" bind-params="City"
  xmlns:xsql="urn:oracle-xsql">

  SELECT Carrier, FlightNumber, Origin,
  TO_CHAR(ExpectedTime,'HH24:MI') Due
  FROM FlightSchedule
  WHERE TRUNC(ArrivalTime) = TRUNC(SYSDATE)
  AND Destination = ?
  ORDER BY ExpectedTime

</xsql:query>
```

XPath

- XPath is how you address a part of XML
- `<data><addr1>123 abc
st</addr1><city>New Orleans</city></data>`
- The city element is accessed by `/data/city`
- The value of city is accessed by `/data/city/text()`
- XPath is a huge, robust language
- With XPath, you can access siblings, children, parents, etc
- I'll be showing examples of XPath

XDB

- Native XML support for highly performant XML storage and retrieval
- XML operations on SQL data
- XML shredding
- FTP, HTTP(s), WebDAV
- XML Repository (file/folder paradigm)
- XMLType is the key
- XML Tables and Views
- XDB supersedes the older XDK PL/SQL APIs

XMLType

- A true SQL type, can be used as a table type, column type and can be used in PL/SQL
- Built-in methods and supporting APIs
- XMLType elements can be indexed!
- XPath access
- Built-in XSLT
- Stored as CLOBs or Shredded, you chose
- Optimized by Oracle – This is the key to XML in the database going forward

SQLX

- SQLX is more properly called SQL/XML
- Oracle supports all of the INCITS SQL/XML:2005 standard
- SQLX is a set based way of creating and accessing XML data
- SQLX is the way to add XML to your queries
- SQLX adds about 15 new functions to SQL

SQLX Functions

- SQLX adds:
- XMLAGG, XMLCDATA, XMLCOLATTVAL, XMLCOMMENT, XMLCONCAT, XMLELEMENT, XMLFOREST, XMLPARSE, XMLPI, XMLQUERY, XMLROOT, XMLSEQUENCE, XMLSERIALIZE, XMLTABLE, XMLTRANSFORM

XSLT

- XSLT is the eXtensible Stylesheet Language for Transformation
- XSLT uses XPath to access XML and a scripting language to transform that XML into other forms of XML
- An example would be to transform an XML document into an xHTML page
- XSLT is supported by XMLType, the XDK and XQuery

XQuery

- XQuery is a non-relational, functional language designed to query XML data
- Like SQL, PL/SQL or Java, XQuery is a language
- XQuery uses XPath to address data
- XQuery can be used to replace XSLT
- SQLX functions XMLTable and XMLQuery combine the power of SQL and XQuery
- I have yet to find a use for it

XQuery Example

```
SELECT XMLQuery( 'for $e in
                  doc("/public/emp.xml")/emp/emp
                  let $d := doc("/public/depts.xml")//dept[@deptno =
                  $e/@deptno]/@dname
                  where $e/@salary > 100000
                  order by $e/@empno
                  return <emp ename="{ $e/@ename}" dept="{ $d}"/>'
RETURNING CONTENT) xml_data
FROM DUAL;
```

XML_DATA

```
<emp ename="Jack" dept="Administration" /> <emp
ename="Jill" dept="Marketing" />
```

What do you need to learn?

- Learn the basics of XML
 - What is valid XML
 - How to create XML
 - SQLX
- Learn XML Schema
 - The language that describes XML
 - Replaces the DTD
 - Or learn Relax NG
- Learn XPath
 - It all gets easier if you understand XPath
- After these, learn what you need for your job

Thank you!

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Sometimes a rather thin, syntax-oriented, semantically vacuous layer of commonality is all that is needed to simplify things dramatically. C. M. Sperberg-Mcqueen

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