LMDQL – Link–based and Multidimensional Query Language

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Introduction

- XML
  - Heterogeneity
    - Semantic
    - Syntactic
    - Structural
- XML Schema
- XLink
- Data Warehouse (DW) for XML Data
- OLAP for XML Data
- XLink for representing XML Data
- LMDQL Requirements
XLDM

- XLink Based Data Metamodel
- Formalization
- Changes made based on XBRL Dimensions
  - Additions
  - Removals
  - Modified files
    - Instance Schema
    - Linkbase Schema
## XPath+

### Syntax

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/***/</code></td>
<td>Selects arcs among all the instance elements</td>
</tr>
<tr>
<td><code>/&lt;element&gt;/**</code></td>
<td>Selects all the arcs of an element</td>
</tr>
<tr>
<td><code>///</code></td>
<td>Selects arcs which the destination is the context node</td>
</tr>
<tr>
<td>link-destination::</td>
<td>Selects arcs which the source is the context node</td>
</tr>
<tr>
<td>...</td>
<td>Selects arcs which the source is the context node</td>
</tr>
<tr>
<td>link-source::</td>
<td>Selects the x-th element of a node list</td>
</tr>
<tr>
<td><code>[[x]]</code></td>
<td>Selects the x-th element of a node list</td>
</tr>
</tbody>
</table>
Query Statement
($VARIABLE variable_specification)?
(WITH formula_specification)?
SELECT axis_specification_list
FROM cube_specification
(WHERE slice_specification)?
(CELL PROPERTIES cell_props)?
$VARIABLE \ [e] = \ [assetsBanks] \ | \\
\ [assetsBanks] \.[privateBank] \ | \\
\ [assetsBanks] \.[governmentBank]

WITH MEMBER \[Measure\].[totalAssets] AS ‘SUM ([e].Members)’
SELECT \{[Measure].[totalAssets] ON Axis(0)\}
FROM FinancialCube
LMDQL Operators

- OperatorDefinition
- HAnalysis
- VAnalysis
- Separatrix
- Cross
- NNearestValues
LMDQL Processor Architecture
LMDQQL Implementation Aspects

SQL Query

SQL - XQuery Translation
- Syntactic Tree Generation
- Joins Tree Creation
- Joins Tree Processing
- XQuery Query Creation

XQuery Query

XML Repository
Conclusion

- Multidimensional queries in XML documents that make use of XLink
- Creation of operator libraries for specific domains
- Concise queries
- Implementation possible in OLAP servers based on MDX and SQL – driver `jdbc4dwXmlXlink`