XBRL – Dimensional Taxonomies

Digital Accounting Research Conference
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XBRL Overview

- XBRL Taxonomies: Concepts dictionary
- 5 XBRL Linkbases:
  - Presentation
  - Calculation
  - Definition
  - Labels
  - References
- XBRL Documents refers to XBRL Taxonomies
Multidimensional information

- How many dimensions exist?
- At least 3 in space
- 4 if we add the time dimension
- Or even more (11?) if you trust the physics that explains the quantum theories...
- But real business may have more than 11 dimensions

Types of dimensions

- Explicit dimensions
  - You know exactly what are the dimension members
  - There is a finite (manageable) number of members
  - Example: the product dimension

- Typed dimensions
  - You don’t know the values, but you know enough to define the members.
    - XML schema aware data, customer codes, latitude and longitude coordinates
    - There is an infinite (unmanageable) number of elements

XBRL Instance: where the information lies
**XBRL dimensional taxonomies**

- Defined the content of the segment and/or scenario elements
- Allows detection of invalid members combinations
- Explicit dimensions members must be defined
  - Calculations using dimension members
  - Labels for the dimension members
  - Presentation structures of the dimension members
  - References
  - ...
  - This sounds familiar to me. What do you think?

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**Defining dimensional taxonomies**

1. The concepts already exist in existing taxonomies. These members are part of an explicit domain. 1st step is to define the elements in a new taxonomy. They MAY have references, labels etc. For convenience it is good to create one separate “domain” taxonomy. And one taxonomy per domain.

2. These are the dimensional elements they MUST be defined in a taxonomy. 2nd step is to define the dimensional elements in a new “template” taxonomy. In that taxonomy we will link the concepts with the dimensions.

3. Every row of data contains a dimension member combination associated with the financial concepts. The definition of valid member combinations and what financial concepts are linked with what dimensions is done using “hypercubes”.
The hypercube definition

- Hypercubes are concepts not usable in XBRL instances but they exist in taxonomies.
- They are linked to concepts in taxonomies and linked to “dimensional elements”

Hypercube Operations

- Multiple hypercubes MAY be linked to a primary concept
- Boolean algebra drivers the hypercubes to primary item relationships
- Operations defined are ALL, ANY, CHOICE and negated versions of those operations.
  - ALL: means all hypercubes MUST be valid
  - ANY: means at least one hypercube MUST be valid
  - CHOICE: means just one hypercube MUST be valid
- It is not legal to combine hypercubes using two different operations.
Example 1:

- Two Hypercubes

Valid combinations:

<table>
<thead>
<tr>
<th>Product</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>200</td>
</tr>
<tr>
<td>C</td>
<td>100</td>
</tr>
<tr>
<td>C</td>
<td>200</td>
</tr>
</tbody>
</table>

Invalid combinations:

<table>
<thead>
<tr>
<th>Product</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>200</td>
</tr>
</tbody>
</table>

Example 2:

- Two Hypercubes

Valid combinations:

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The XBRL Dimensional Specification

- Uses the Definition linkbase
  - Define interim elements needed to group building structures
    - Domain members
    - Dimensions
    - Hypercubes
  - Define member to member relationships to allow applications to know the member role

Conclusion

- “Dimensional Taxonomies” is an XBRL module addition
  - DOES NOT alter the base specification
- That allows internal reporting
  - Based on existing taxonomies
- Helps in the consolidation process
- Helps in real Business Reporting
- Provides input for sophisticated data analysis (e.g. OLAP)
- Provides sophisticated mechanisms to specify valid dimension combinations for any fact
- Supports context validation
- Based on already defined XBRL tools
¿Questions?