



Dimensional Taxonomies

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Background

- XBRL largely designed around Financial reporting
 - Some consideration given to dimensional meta-data
 - Main focus on “chart of accounts” (i.e. concepts) dimension
 - Parallels early thinking in design of OLAP systems
 - Other dimensions all captured in “context”s (except “units”)
 - Parallels “point of view” in other multidimensional systems
 - By explicitly referring to “entity”, “segment” and “scenario” this perpetuates the financial reporting focussed architecture
 - Semantics for the “time” dimension addressed by XML schema mechanisms
 - But could still use some additional mechanisms such as Year to date, financial periods etc. – out of scope for this proposal

Motivation

- Financial reporting actually is a lot more than just primary financial statements
- Breaking down financial figures in many different ways essential for analysis (as evidenced by prevalence of OLAP systems, Star Schemas etc.)
- Non-financial reporting almost always multi-dimensional
- XBRL 2.1 is very open in how it allows dimensional meta-data to be expressed
- Therefore need a standard way to express dimensional meta-data

Inspiration

- Entity linkbase presentation by David von Kannon in Seattle – November 2003
 - Pointed out that the taxonomy structures we have already designed have the potential for reuse
 - Demonstrated possible modification to the spec to support such mechanisms
- Desire for any solution to leverage existing tooling as much as possible
- Practical need in the COREP project (European Banking) has raised the urgency to implement a standard approach
- OLAP systems (such as Essbase and Microsoft OLAP Services) provide mechanisms for performing calculations (e.g. roll-ups) across multiple dimensions

Addressing the requirements

- Need to use existing structures that have been provided in the XBRL 2.1, Specification
- Have to leverage the windows that have been left open in the XBRL 2.1, Specification

Open windows in XBRL instances

- Attributes from other namespaces on items and tuples
- anyURI in “scheme” attribute on <identifier> and token content
- Almost completely open content model for <segment> (subject to certain XBRL limitations on what namespace descendant elements may be from)
- Same for <scenario>

Open windows in XBRL taxonomies

- Ability to define and reference new linkbases
 - e.g. formula linkbase work
- Ability to define new roles

Maintaining dimensional separation

- Dimensions are orthogonal
 - A concept that exists in one dimension CANNOT exist in another
 - e.g. “Massachusetts” is in the Geography dimension, “Samuel Adams” is in the product dimension – “Massachusetts” MUST NOT be able to be confused with being a beer and “Samuel Adams” MUST NOT be able to be confused with being a country !
 - Therefore, if you are going to use an XBRL “taxonomy” as a dimensional taxonomy there must not be any possibility that it has any crossover/intersection with any other dimensional taxonomy
 - BUT – we want the extensibility that comes with XBRL

DDTS

- Discoverable Dimensional Taxonomy Set
- A DDTS is a DTS
 - Not from an instance in which it is being used as a DDTS
 - But it is a DTS “in itself”
 - Therefore could be used in another application as a DTS
- So any solution **MUST** ensure that a DDTS **DOES NOT** form part of the instance’s DTS
- Nor may it intersect with any other DDTS for that instance

Example

- Raw Data and Metadata (see [Soft Drinks Example.xls](#))
- Schema (see [products.xsd](#))
- Label Linkbase (see [products_label.xml](#))

Schema elements

- Used to identify the “members” (i.e. small “c” concepts) in a dimension
- nillable and periodType can have any value as long as it is consistent with the use of a dimensional taxonomy as a “regular” taxonomy
- If it is NEVER intended that the taxonomy be used as a “regular” taxonomy then their values are unimportant (nillable can be omitted, periodType cannot)
- type must be numeric if it is desired to be involved in a calculation link (see later discussion)
- Can be any item type if it is never intended to be used in a calculation link (see later discussion)

Leveraging the linkbases

- Dimensional taxonomies have linkbases just like any other
- Labels, Reference, Presentation and Definition – semantics self-evident – same as in XBRL
- Note that the likelihood of needing additional roles in the definition linkbase has now increased
 - More definitional relationships are likely to be necessary in a dimensional taxonomy
 - This is akin to the anticipated use of the Definition Linkbase for non-financial reporting in a traditional XBRL environment
- Calculation linkbase needs special attention

Calculation linkbase

- Calculations can occur across multiple different dimensions – [see soft drinks example](#)
- Need to provide semantics for summation-item when it is used in a dimensional taxonomy that provides this capability
- Intent is evident – defining it in English still needs to be done
- Could consider defining a new role other than summation-item
 - But maybe only if you never intend to use the taxonomy as a “regular” taxonomy

How to use dimensional taxonomies

- Having defined a dimensional taxonomy and its special features we now need to specify how it is to be used in an instance

Specifying the dimensional elements

- Use a QName (dimMem element)
- Namespace prefix in the QName identifies the dimension
- Local part of the QName identifies the member of that dimension to which the context applies
- Needs namespace prefix to be defined in the instance (on the <xbml> element) so as to be able to resolve it
- Lives in the segment or scenario element
 - Which one doesn't really matter
 - But need to be consistent
 - i.e. a dimension should not live vicariously – MUST be consistent as to whether it lives in segment or scenario
- Only one from any one dimension allowed in any one context

Example Instance

- See [sampleinstance-2004-10-20.xml](#)

Additional considerations

- Formal definition of the semantics of a calculation (summation-item) link in a dimensional taxonomy when applied to an instance
- Provide a mechanism to specify the order of multiple pass calculations across a number of dimensions
- Requirement to identify valid dimension intersections
- Implications for formula linkbases and cross dimensional calculations
- Pivoting dimensions



Thank you!!