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 vun 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 <xbrl> 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!!