1. Member Arrangement Patterns

1.1. Member arrangement patterns

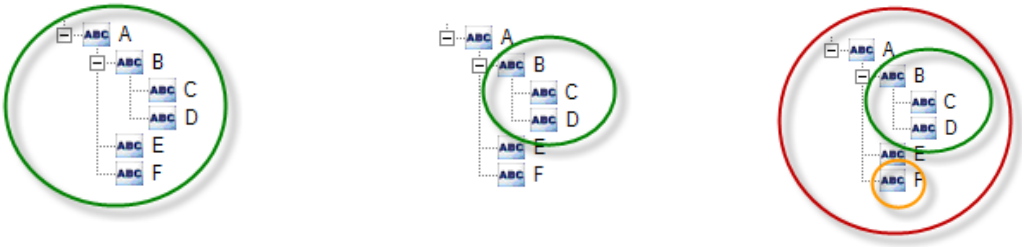
Member arrangement patterns explain how a set of [Member]s relate to one another within an [Axis][1].

Before we explain the member arrangement patterns, we need to clarify some terminology which is often confused or used incorrectly.

A **domain** is a cohesive set of members. Something important to note is that in the US GAAP XBRL Taxonomy the way [Domain] is used is different than the standard definition of domain (i.e. a set of members).

The way [Domain] is used in the US GAAP XBRL Taxonomy is to define the root [Member] of a set of [Member]s that make up a domain.

Consider the more general example:



Assume that the above trees are the [Member]s of an [Axis]. In the diagram, each circle represents a domain. In the graphic on the left, A is the root member of a domain with members A, B, C, D, F, E and F. The middle graphic, the circle shows a domain with the members B, C and D. The graphic on the right shows three different domains; the RED circle from the graphic on the right, the GREEN circle from the graphic in the middle, and another domain which has only one member F.

Domains have partitions. A partition is collectively exhaustive and mutually exclusive set of members within a domain. Partitions do not overlap. Give a set X, a partition is a division of X into non-overlapping and non-empty "parts" or "blocks" or "cells" that cover all of X. More formally, these "cells" are both collectively exhaustive and mutually exclusive with respect to the set being partitioned. A domain always has at least one partition and may have many partitions.

While above we provided a very basic example to help you become familiar with the ideas which we want to discuss, aggregation is a bit more complex. Here is the spectrum of domain partition or member aggregation models:

- **Flat non-aggregating set (Is-a)**: A flat non-aggregating set is a set which is (a) incomplete so it can never aggregate or (b) a set which describes non-numeric concepts which could never aggregate or (c) a set of numeric concepts which could be aggregated but the aggregated value is illogical or

[1] Member arrangement patterns examples, http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/MemberArrangementPatterns/2017-05-07/

never used. An example of a non-aggregating set is a subsequent events disclosure which is comprised of one or more subsequent events. Subsequent events are never aggregated; they are simply a list of events that a non-aggregating set describes.

- **Complete flat aggregating set (Whole-part)**: A complete flat aggregating set is a set which is both complete and characterizes a numeric concept which can be mathematically aggregated. A complete flat set is semantically equivalent to a [Roll Up] concept arrangement pattern. The aggregation scheme is that the members of the list aggregate to the parent of those members. A complete flat set has no subdomains. A value of all classes of property, plant and equipment and the value of each class of property, plant and equipment is an example of a complete flat aggregating set.
- **Complete hierarchical aggregating set (Whole-part)**: A complete hierarchical aggregating set is a set comprised of a collection of complete flat sets, basically a domain which has one or more subdomains. A business rule will always describe the aggregation scheme. A breakdown of revenues by geographic area whereby the domain of geographic areas has a hierarchy of geographic regions such as "North America" which makes up one hierarchy and countries such as "United States" and "Canada" which comprise a second hierarchy nested within the first hierarchy.
- **Complex aggregating set (Whole-Part)**: A complex set is a set which has some other set of complex relations or set of subdomains expressed within a business rule.

The reason for providing this list of possible member aggregation models is that there is no standard way to represent such relations using the XBRL technical syntax. The relations can be represented, for example using XBRL Formula, but there is no agreed upon standard approach. There is no "standard" XBRL terminology at this time for these types of relations, all the terminology is taxonomy specific. This is because XBRL Dimensions does not address aggregation of domain members.

However, although XBRL Dimensions does not define how members of a domain aggregate or if they aggregate at all, you can use XBRL Formulas to clearly define such aggregation if they exist. This XBRL Formulas definition both articulates the aggregation scheme and can also be used to validate XBRL instances against that scheme. XBRL Formulas can handle quite complex models.

But, since the SEC does not allow XBRL Formulas to be submitted with an XBRL-based public company financial filing to the SEC, these filings can have aggregation schemes which are inconsistent with aggregation schemes you may come up with or different than how you might interpret the XBRL taxonomy. Public companies creating XBRL-based digital financial reports which will be submitted to the SEC can still create a valid scheme of aggregation, test any XBRL instances created against it in their XBRL-based financial report but not submit that XBRL Formula set with their XBRL-based financial filing. One way or another, SEC XBRL filers should prove that their XBRL instances do in fact follow their defined scheme by validating their XBRL instance.

1.1.1.Whole-part

A **whole-part** member arrangement pattern is semantically equivalent to the roll up concept arrangement pattern. Recall that the concept arrangement pattern computes a total, or roll up, from a set of other concepts. This concept arrangement pattern is commonly referred to a "roll up", or the equation A + B = C. All concepts involved in this concept arrangement pattern have the same set of characteristics and all must be numeric.

The whole-part member arrangement pattern represents the same roll up relationship; however, what is being rolled up is each of the [Member]s of an [Axis]. And so, it is the [Member] of the [Axis] which changes, the Concept characteristic is constant for all facts.

Component: (Network and Table)						
Network	1123 - Disclosure - **Revenue Classified by Major Geographic Areas (Detail)**					
Table	Geographic Information [Table]					
Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK					
Legal Entity [Axis]	Entity [Domain]					
	Period [Axis]	Geographical [Axis]				
	2015-07-01/2016-06-30			2014-07-01/2015-06-30		
Geographic Information [Line Items]	United States	Other Countries	Geographical [Domain]	United States	Other Countries	Geographical [Domain]
Revenues	40,578,000,000 [1]	44,742,000,000	85,320,000,000 [2]	42,941,000,000 [1]	50,639,000,000	93,580,000,000

Characteristics can represent a whole or some part of a whole. Parts may be related in different ways. The following is a summary of subclasses of whole-part types of relations which may, or may not, be applicable to financial reporting. Other subclasses of whole-part relations may exist.

- **Component-integral object**: Indicates that a component contains some integral object. For example, the component handle is part of the integral object cup; wheels are a component part of a car; a refrigerator is a component of a kitchen.
- **Member-collection**: Indicates that some member is part of some collection. For example a ship is part of a fleet. Or, a subsidiary is part of an economic entity.
- **Portion-mass**: Indicates that some portion is part of some mass. For example a slice is part of a pie.
- **Stuff-object**: Indicates that some "stuff" is part of some object. For example steel is part of a car.
- **Feature-activity**: Indicates that some feature is part of some activity. For example the feature "paying" is part of the activity "shopping".
- **Place-area**: Indicates that some physical place is part of some area. For example the place "Everglades" is part of the area "Florida".

The primary point of these examples is to point out that similar type of whole-part relations can be provided for financial reporting.

1.1.2.Is-a

An **Is-a** member arrangement pattern simply describes and uniquely identifies a fact so that one fact can be distinguished from another fact. An Is-a member arrangement pattern is semantically equivalent to a [Hierarchy] in that it has no mathematical relations. However, rather than one single concept describing a fact, both a Concept and a [Member] is used to describe a fact.

Component: (Network and Table)	
Network	**Subsequent Events**
Table	Subsequent Events [Table]

Reporting Entity [Axis]	SAMP http://www.SampleCompany.com	
Legal Entity [Axis]	Consolidated Entity [Member]	
Period [Axis]	2010-01-01/2010-12-31	
	Subsequent Event [Axis]	
Subsequent Event [Line Items]	Uncollected Receivable [Member]	Purchase of Business [Member]
Subsequent Event [Hierarchy]		
Subsequent Event, Description	Description of subsequent event number 1 which relates to the loss of an uncollectable receivable and occurred on January 16, 2011.	Description of subsequent event number 2 which relates to the purchase of a business and occurred on February 1, 2011.
Subsequent Event, Date	2011-01-16	2011-02-01