9. Relations between Financial Report Model Elements

A list of report elements, by itself, is not sufficient to describe a model for a digital financial report. A digital financial report contains both things that exist within that model (things that exist, report elements) and relationships between those report elements (how they interact with one another).

In the prior section, Financial Report Model Elements, we discussed the elements which make up the digital financial report model. In this section we discuss the relations between those report elements in additional detail.

9.1. Overview or relations between report elements

As pointed out in the previous section, digital financial reports are made up of the following report elements: networks, tables, axes, members, line items, concepts, facts.

These report elements can be related:

- **Concept relations**: relations between concepts
- **Member aggregations**: relations between the members of a domain
- **Business rules**: relations between facts
- **Flow or sequence**: relations between financial report components
- **Integrity**: relations between concepts which exist within numerous components
- **Intersections**: general relation between report elements which may exist in more than one component and therefore can be leveraged for navigating between components of the digital financial report

All of these types of relations are important and we cover each in this section.

9.2. Concept relation metapatterns

The world is full of patterns and information technology engineers and architects leverage these patterns when trying to get a computer to do something effectively and efficiently for humans. Understanding the patterns which exist can help make both building and using software easier.

Business reports, including financial reports, have patterns. Another way of saying this is that financial reports are not random. There are not an infinite number of patterns in financial reporting.

The next section, *Business Reporting Use Cases*, introduces a set of approximately 30 financial reporting use cases collected over a number of years. That set of 30 business use cases was condensed from many, many different financial reporting use cases examined in order to understand how to model financial information using XBRL. These business use cases were also used within the USFRTF Patterns Guide which was created in order to help understand how to construct the US GAAP Taxonomy.

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These 30 business use cases were distilled down further, basically to their essence. This distilled version is referred to here as a metapattern. Basically, every financial reporting use case follows one or a combination of these metapatterns. While it is hard to say if these metapatterns will cover 100% of all financial reporting use cases, it is hard to dispute that any of these 9 metapatterns.

The US GAAP Taxonomy Architecture refers to these metapatterns as *compact pattern definitions* and documents a number of these metapatterns in what it refers to as style guides. These style guides were never released publicly but they are referred to in the US GAAP Taxonomy Architecture. Everything within the US GAAP Taxonomy fits into one or a combination of these metapatterns.

Metapatterns explain the business semantics within a modelling of information expressed as an XBRL taxonomy. As such, these metapatterns can be said to express information models.

The following is a summary of the identified financial reporting metapatterns.

9.2.1.Hierarchy

A **hierarchy** information model denotes a hierarchy of concepts with no numeric relations. If no numeric relations exist, then the information model of the component is a hierarchy. Basically, anything can be modelled as a hierarchy. It is the addition of additional relations, typically mathematical computations, which turns a hierarchy into some other metapattern.

Sample Company
December 31, 2010

Basis of Reporting

Praesent fringilla feugiat magna. Suspendisse et lorem eu risus convallis placerat. Suspendisse potenti. Donec malesuada lorem id mi. Nunc ut purus ac nisl tempus accumsan.

Trade receivables
Sed magna felis, accumsan a, fermentum quis, varius sed, ipsum. Nullam leo. Donec eros.

Inventories

Inventory valuation method
Cost

Description of components
Proin elit sem, ornare non, ullamcorper vel, sollicitudin a, lacus. Mauris tincidunt cursus est. Nulla sit amet nibh. Sed elementum feugiat augue. Nam non tortor non leo porta bibendum. Morbi eu pede.

Cost method
FIFO

Investments in securities
Etiam ipsum orci, gravida nec, feugiat ut, malesuada quis, mauris. Etiam porttitor. Ut venenatis, velit a accumsan interdum, odio metus mollis mauris, non pharetra augue arcu eu felis.

Bank borrowings
Ut ut risus nec nibh dictum posuere. Phasellus eleifend, diam vitae dapibus pulvinar, erat ligula auctor dui, eget congue justo lorem hendrerit tellus.

Provisions
Suspendisse vestibulum augue eu justo. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

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9.2.2. Roll up

A **roll up** information model computes a total from a set of other concepts. This information model is commonly referred to a "roll up", or the equation A + B = C. All concepts involved in this information model have the same set of characteristics and all must be numeric.

Sample Company
December 31,
(thousands of dollars)

	2010	2009
Property, Plant, and Equipment, Net		
Land	5,347	1,147
Buildings, Net	244,508	366,375
Furniture and Fixtures, Net	34,457	34,457
Computer Equipment, Net	4,169	5,313
Other Property, Plant, and Equipment, Net	6,702	6,149
Property, Plant and Equipment, Net, Total	295,183	413,441

9.2.3. Roll forward

A **roll forward** information model reconciles the balance of a concept between two points in time. This information model is commonly referred to a "roll forward" or "movement analysis" or the equation: beginning balance + changes = ending balance. In this equation period [Axis] is as of two different points in time and the changes occur during the period between those two points in time.

Sample Company
December 31,
(thousands of dollars)

	2010	2009
Roll Forward of Land		
Land, Beginning Balance	1,147	1,147
Additions	1,992	400
Disposals	-193	-200
Translation difference	2,401	-200
Land, Ending Balance	5,347	1,147

9.2.4. Adjustment

An **adjustment** information model reconciles an originally stated balance to a restated balance, the adjustment being the total change, between two different report dates. An adjustment is similar to a roll forward in that it is a reconciliation,

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however rather than the period [Axis] changing; it is the *Report Date [Axis]* which changes: originally reported balance + adjustment = restated balance.

Sample Company
December 31,
(thousands of dollars)

	2010	2009
Prior Period Adjustment		
Retained Earnings (Accumulated Losses), Originally Stated 2009	4,000	
Change in Accounting Policy	3,000	
Correction of an Error	-1,000	
Retained Earnings (Accumulated Losses), Restated 2009 Beginning Balance	6,000	

9.2.5. Variance

A **variance** information model reconciles some reporting scenario with another reporting scenario, the variance between reporting scenarios being the variance or changes. For example, a sales analysis which reconciles the concept sales for the reporting scenarios of actual and budgeted is a variance. The equation is: actual – budget = variance.

Sample Company
For Period Ending December 31, 2010

Concept	Actual	Budgeted	*Variance*
Sales	6,000	5,000	*1,000*
Cost of Goods Sold	4,000	3,000	*1,000*
Contribution Margin	1,000	2,000	*-1,000*
Distribution Costs	1,000	1,000	*0*

9.2.6. Complex computation

A **complex computation** information model can be thought of as a hierarchy plus a set of commutations between different concepts within that hierarchy which are challenging to model as the parent/child relations of a graph. The type of computations can vary significantly, thus the challenging in modelling. For example, the computation of earnings per share is a complex computation.

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Sample Company
For Period Ended December 31,

	2010	2009
OTHER INFORMATION		
Earnings Per Share Components		
Net Income (Loss)	10,000,000	20,000,000
Weighted Average Common Shares	100,000,000	100,000,000
Earnings Per Share	0.10	0.20

9.2.7. Text block

A **text block** information model is an information model which contains, by definition, only one concept and that concept expresses what amounts to a narrative or prose as escaped HTML within that one concept. For example, the narrative associated with a set of accounting policies expressed as a list or a table presentation format is a text block. As there is only one concept, there can be no relations within the information model.

Duis fermentum

Sed mauris. Nulla facilisi. Fusce tristique posuere ipsum. Nulla facilisi. Aliquam viverra risus vitae ante. Sed rhoncus mi in wisi. Nullam nibh dui, molestie vitae, imperdiet non, ornare at, elit.

- Suspendisse accumsan, arcu vel ornare interdum, magna tellus porta mauris, in porta mi lacus sodales felis.
- Phasellus eleifend, diam vitae dapibus pulvinar, erat ligula auctor dui, eget congue justo lorem hendrerit tellus.
- Fusce gravida, ligula a placerat placerat, leo erat euismod lectus, et lacinia justo libero non pede.

DONEC PULVINAR NONUMMY ERAT

Etiam porttitor. Ut venenatis, velit a accumsan interdum, odio metus mollis mauris, non pharetra augue arcu eu felis. Ut eget felis. Mauris leo nulla, sodales et, pharetra quis, fermentum nec, diam.

9.2.8. Grid (not really a metapattern)

A **grid** information model is a pseudo metapattern which uses the presentation characteristics of the columns and rows of a table to model information. Because the grid models presentation information and not business semantics, it cannot be considered a metapattern. However, the grid is included in this list because the US GAAP Taxonomy uses a grid information model to model the statement of changes in equity.

Sample Company
December 31,
(thousands of dollars)

	Common Stock	Additional Paid-in Capital	Retained Earnings (Accumulated Deficit)	Equity
Balance at December 31, 2009	150,000	50,000	200,000	400,000
Net Income (Loss)			200,000	200,000
Dividends			-100,000	-100,000
Common Stock Issued	25,000	25,000		50,000
Balance at December 31, 2010	175,000	75,000	300,000	550,000

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9.2.9. Compound fact (not really a metapattern)

A **compound fact** information model is characterized by the fact that some set of other concepts or some other information model exists for a set of characteristics expressed by one or more [Axis]. For example, the salary information for the directors of an entity is a compound fact. The salary information is made up of salary, bonuses, director fees which roll up into total salary and this set of compound facts can be expressed for any number of directors, the director being the characteristic or axis of the compound fact.

Sample Company
For Period Ending December 31, 2010

Director	Salary	Bonus	Director Fee	Options Granted, at Fair Value
pattern:JohnDoeMember	1,000	1,000	1,000	1,000
pattern:JaneDoeMember	1,000	1,000	1,000	1,000
frm:DirectorsAllMember	2,000	2,000	2,000	2,000

9.3. Member aggregation models

Domain partition aggregation models or member aggregation models explain how the members which make up a domain partition aggregate or how one member relates to another member. This section explains the different types of aggregation models. First we will help you understand exactly what we mean by a domain partition aggregation model.

9.3.1. Recall that Domains are Sets of Members

A **domain** is a cohesive set of members. For example, consider the screen shot below:

Sample Company
For Period Ending December 31,
(thousands of dollars)

	2010	2009	2008
Sales, all Business Segments, all Geographic Areas	32,038	35,805	32,465
Breakdown by Business Segment:			
Pharmaceuticals	20,181	18,150	15,275
Generics	2,433	1,973	1,823
Consumer Health	6,675	6,514	5,752
Other Segments	2,749	9,168	9,615

The screen shot shows a breakdown of sales by business segment and a total for sales for all business segments. This is an example of a domain partition aggregation. The concept "Sales" is part of a table which has the axis "Business Segments" with the member "All Business Segments" which represents a total of the other members Pharmaceuticals, Generics, Consumer Health, and Other Segments.

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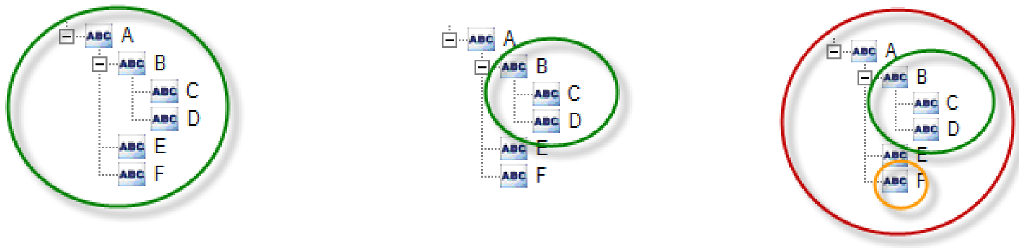
Consider the more general example:

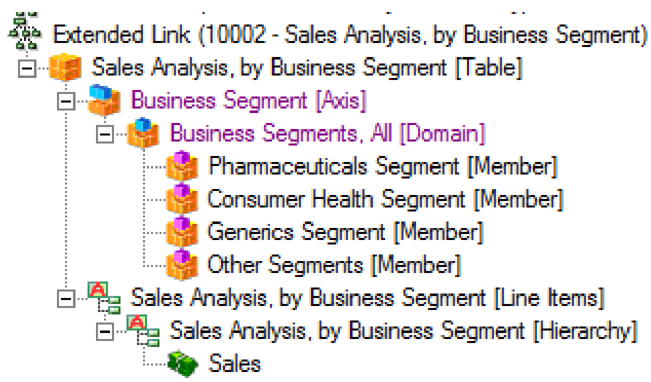


Assume that the above trees are the [Member]s of an [Axis]. In the diagram, A is a domain with members A, B, E, F, C and D. Also, B is a domain with the members B, C and D. And I also believe that F is a domain with the only member being itself.

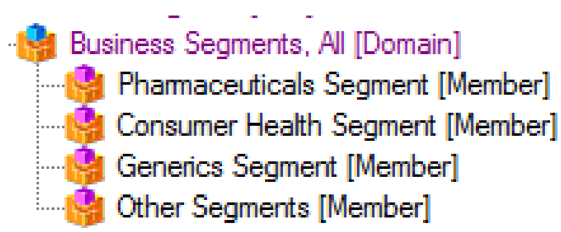
9.3.2.Recall that Domains have Partitions

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. Domains always has at least one partition and may have many partitions.

Referring back to the business segment breakdown example, the table might be modelled something like the following:



Looking specifically at the Business Segment [Axis] you see the following:



The Business Segment [Axis] has one partition or one breakdown of its set of members. It could have other breakdowns which would be expressed as another domain partition.

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9.3.3. Aggregation

Intuitively, it is not a huge jump to make to believe that the sum of the [Member]s should add up to the total of all business segments, modelled above as the "Business Segments, All [Domain]." However, the breakdown is modelled in an XBRL taxonomy using business rules expressed as XBRL Formulas to articulate this aggregation to a software application.

The XBRL Dimensions specification does not address dimensional aggregation. As you can see by looking at the specification, there is no section in the XBRL Dimensions specification (http://www.xbrl.org/Specification/XDT-REC-2006-09-18+Corrected-Errata-2009-09-07.htm) which addresses dimensional aggregation.

9.3.4. Domain Partition Aggregation Models

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:

Model	Description	Example
Partial set (or no aggregation)	A partial set is a set which is incomplete so it can never aggregate or a set which describes non-numeric concepts which could never aggregate. A set of numeric concepts which could be aggregated but the aggregated value is illogical or never used is considered a partial set.	A partial set of the classes of cash, a set which describes the accounting policies such as the depreciation method of useful lives of each class. Subsequent events (which are never aggregated) are a partial set. The aggregate value of the useful lives of PPE (a numeric value) is a partial set as the value is illogical.
Complete flat set	A complete flat set is a set which is both complete and characterizes a numeric concept which can be mathematically aggregated. A complete flat set is similar to a [Roll Up] information model. 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 a complete flat set.
Complete hierarchical set	A complete hierarchical 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 set	A complex set is a set which has some other set of complex relations or set of subdomains expressed within a business rule.	Some complex disclosure.

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

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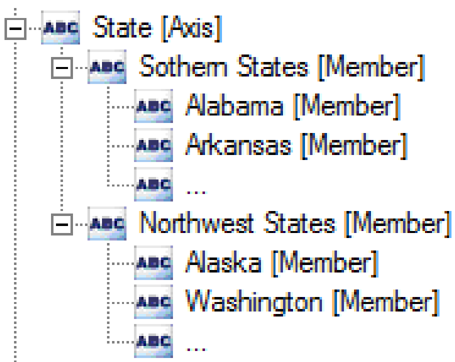
aggregation scheme and can also be used to validate XBRL instances against that scheme. XBRL Formulas can handle quite complex models.

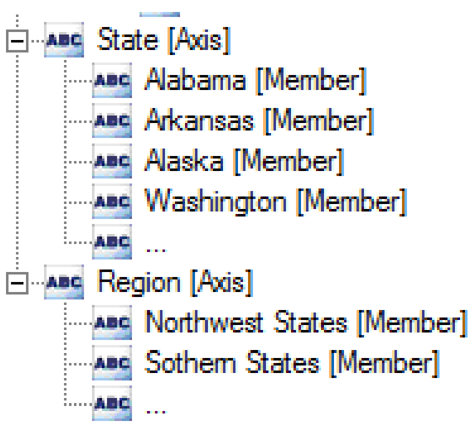
But, since the SEC does not allow XBRL Formulas to be submitted with an SEC XBRL filing, these filings can have aggregation schemes which are inconsistent with aggregation schemes you may come up with or different than how you might interpret the XBRL taxonomy. SEC XBRL filers can still create a valid scheme of aggregation, test any XBRL instances created against it in their SEC XBRL filing but not submit that XBRL Formula set with their SEC XBRL 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.

9.3.5. Modelling Options Impact Aggregation Models

How things are modelled impacts the aggregation models. An example will help your understanding. Consider how one might model the domain of US states:



An alternate approach to modelling this information is to not use one axis as was done above, but rather to use two [Axis], one for the state and another for the region:



There is not necessarily one right or wrong answer here; how you would model your business use case depends on the dynamics of what it is you are modelling. The primary point I am making here is that if there are multiple ways to model the same information; then what criteria do you use to determine the most appropriate modelling approach?

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Generally at this point it is wise to try and stay away of nested or complex hierarchies like the first example, unless you provide an XBRL Formula which explains the aggregation model. The second example results in flat hierarchies.

9.4. Component flow models

Flow is the notion of relations between networks and/or [Table]s for the purpose of ordering or sequencing information contained in a digital financial report. Creating schemes for generating the desired flow of information contained by a digital financial report can be impacted by metadata available.

While there are many possible approaches for articulating flow metadata, the approaches considered are those which do not add new approaches to articulating required metadata; rather only approaches which use existing metadata or standard forms of expressing metadata are considered.

Also "pixel perfect" formatting of information is not the target. The target is the organization of groups or fact tables of information.

9.4.1.Metadata Constraints Impacting Ordering

Certain metadata is required by the XBRL technical syntax. Other metadata is determined by how a taxonomy is expressed. The following is a summary of the constraints imposed by approaches used to express metadata within a taxonomy and how those constraints impact ordering.

- **Networks** – Networks are always required to be unique so as such, networks can always be used to order a taxonomy. However, if networks alone are used many times not enough granularity is achievable. Also networks cannot be articulated within a hierarchy.
- **Networks plus Non-unique Tables** – Tables can be used with networks to order information. However, depending on whether the tables are expressed are unique governs the role a network must play in allowing a table to be specifically identified.
- **Unique Tables** – If every table within a taxonomy is unique, then networks no longer need to be relied upon to uniquely identify and locate a table, the table alone will allow such identification.

9.4.2.Ordering/sequencing Examples

The following are a number of ordering/sequencing examples which provide details about available options.

9.4.3.Networks with numbers and categories

One example of using networks to order or sequence the contents of a digital financial report can be seen in how the SEC achieves sequencing. Consider the following example:

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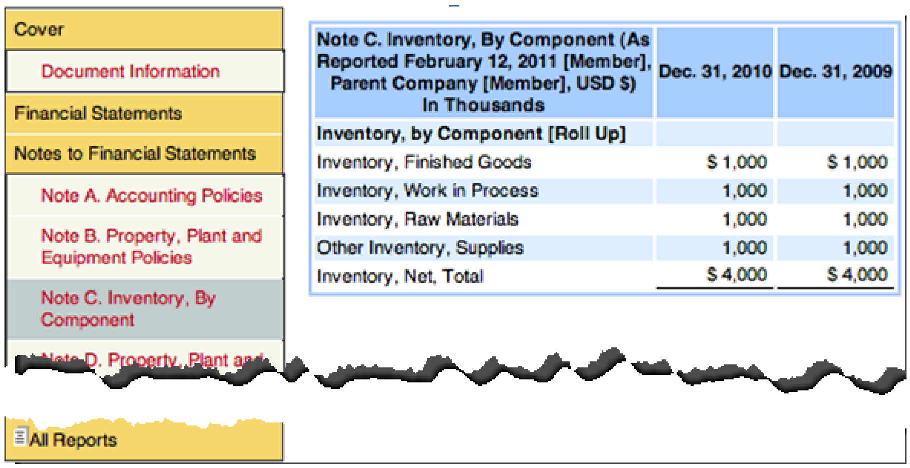
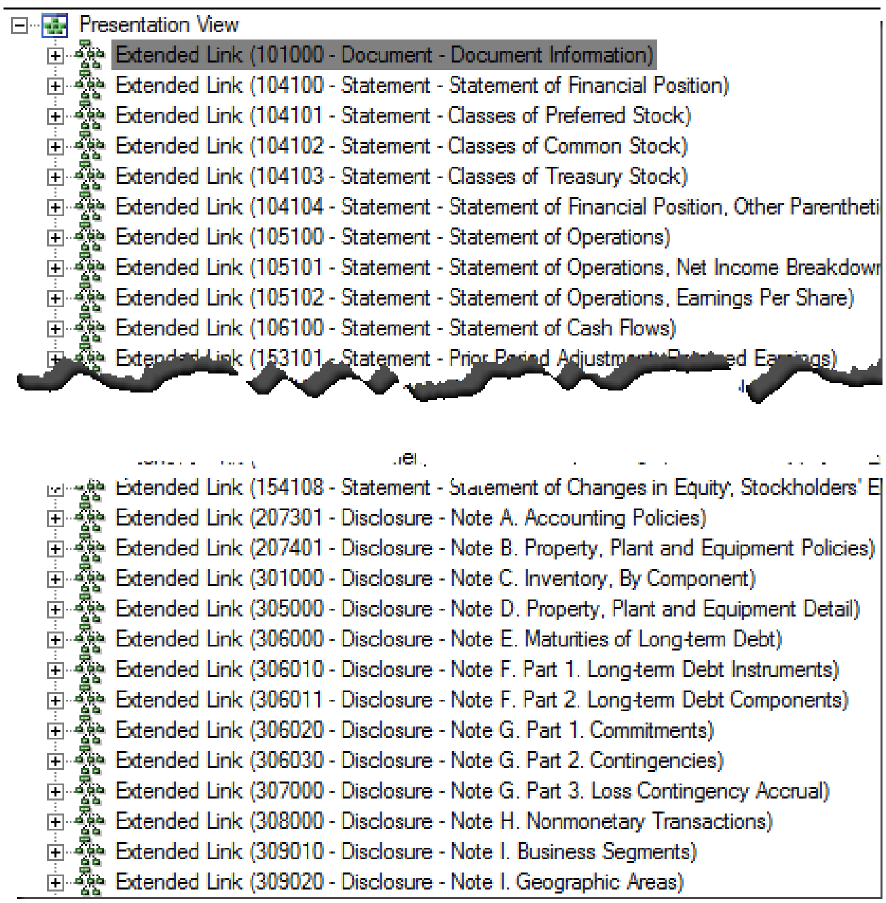


The above is a fragment of a model financial report rendered within the SEC interactive data previewer. This is the taxonomy which drives that view will each network collapsed so that you are looking at a list of the networks in the taxonomy:



Each network can be broken into three components which drive the sequencing of the rendering framework:

- **Number** such as "101000" within the first network.

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- **Category** such as "Document", "Statement" or "Disclosure"
- **Description** or other part of the networks definition.

The category is used to put the different networks into one of the yellow categories in the SEC example, the number determines the order within the category, and the balance of the description is the label that a user sees.

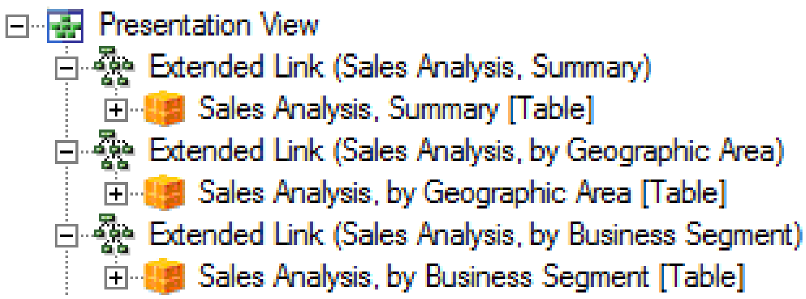
This approach is workable, but it means that all information must be broken out by network and anything smaller than the network itself cannot be broken out any further. For example, table information is not used for rendering information at all.

You can examine this in more detail by examining the reference or model implementation of an SEC XBRL financial filing.

9.4.4. Tables organized into a list

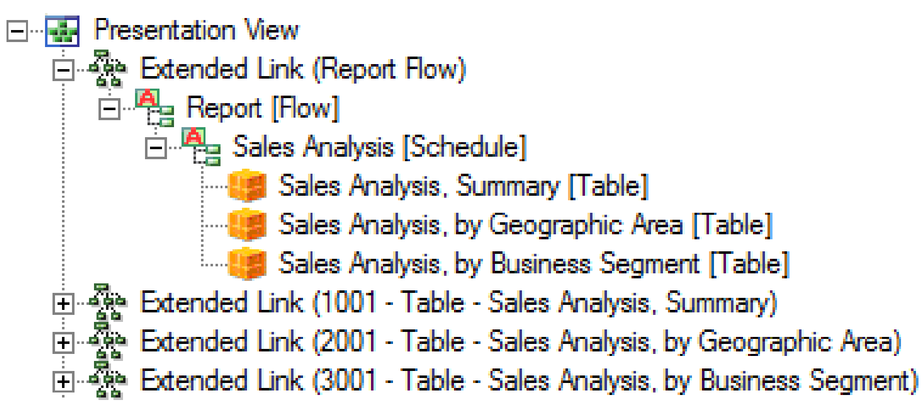
Another approach to articulating sequencing information can be seen by comparing the *Pivot Table* business use case with the *Flow* business use case.

Consider the screen shot below of the Pivot Table business use case:



There are three networks with three tables. Each network and table is unique. Suppose you wanted to articulate the ordering you would prefer for working with this information, how would you do that? You could request the information in the physical order in which it exists within the XBRL taxonomy or you could request the information in alphabetical order, that is about all the options you might have.

Now consider the *Flow* business use case below. The this taxonomy has a network called "Report Flow". Within that network, a hierarchy of the [Table]s which exist in the taxonomy for this financial report is provided.



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As such, a software application can read that hierarchy and use it within the application to show the summary first, the geographic table second, and the business segment third.

Alternatively, the numbering of the network could be used to achieve the same goal as with the SEC example.

The [Table]s alone can be used, and the networks totally ignored, because each table is unique. By contrast, if each table were called "Sales Analysis, Summary [Table]", then to identify which [Table] you were looking for, you would also need to rely on the network.

9.4.5.Notion of the "Implied [Table]"

In the section which discusses the report elements which make up a digital financial report we explain that everything within a digital financial report exists within a [Table], be that [Table] explicitly articulated using the "[Table]" report element, or the table is implied.

Basically, everything expressed within a network which is not contained within some explicit [Table] can be thought of existing within a pseudo or implicit table called "No Table [Table]". Because you might have more than one "No Table [Table]", you must rely on the network to uniquely identify which "No Table [Table]" you would like to work with. As such, using implicit tables requires you to work with tables just as though you created non-unique tables.

9.4.6.The "Statement [Table]"

Another approach to defining [Table]s can be seen by examining the "Statement [Table]" within the US GAAP Taxonomy or even better, the "Hypercube [Table]" of the FINREP taxonomy.

The FINREP taxonomy took the most extreme route using one [Table] and one [Table] only throughout their entire taxonomy. They did this to specifically push all semantics of the meaning of a group of information onto the network which contains the hypercube. One can be sure that the network describes the information 100% of the time because (a) each [Table] is called exactly the same thing and (b) because each network could only possibly contain one [Table] because using the same [Table] name within a network would cause modelling conflicts (and remember, all [Table]s have the same name). The bottom line here is that the network carries all semantics for describing the information, there is no confusion.

By contrast, the US GAAP Taxonomy has the "Statement [Table]" which is used on the balance sheet, the income statement, the cash flow statement, and the statement of changes in equity. As such, one can only know which "Statement [Table]" you are working with by using the network.

Further, most but not all other [Table]s in the US GAAP Taxonomy are unique. What is more, not everything is modelled as an explicit [Table] and therefore there are many "No Table [Table]s" (see the preceding section).

9.4.7.Which Approach is Best?

All this distils down into three possible options:

- **Use explicit unique [Tables]**. This option works well, and in fact it is the option which I believe is the most reasonable. By taking this approach you

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can ignore networks altogether, relegating networks to the role of syntax needed only for avoiding modelling conflicts. And because you can ignore the network, you can be sure the [Table] describes the information set and each [Table] being unique, each information set is unique.

- **Use explicit but only one [Table] for everything**. This option works well also because it is clear that the network carries all semantics for describing a set of information. The down side is that you have to create metadata such as the "number" and "category" used by the SEC to help organize those networks.
- **Mixed model**. If [Tables] are not unique and if [Table]s are not explicit (i.e. you have "No Table [Table]"s), you have to rely on both networks and tables to identify which information you need to work with. This can be both cumbersome for software and for users. A mixed model such as this does not appear to make much sense and should be avoided, all things considered.

There are no real benefits of having [Table]s names which can be used in more than one place, yet there are significant benefits of unique [Table] names.

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9.5. Integrity models

Relations exist *within* a [Table], for example a set of concepts can roll up into some total, information models describe these types of relationships within one [Table]. But relations can also exist *between* [Table]s.

Integrity models express the semantic relations between the components of one [Table] and the components of another [Table]. [Table]s within an information set, be that information set within one financial report or across many financial reports you are comparing have relations. Proper relations makes things easier, improper relations make things harder. Modeling business information with these relations intact give your financial report the proper integrity.

Many times when modelers think they have modeling choices, you actually don't have as many choices as you might believe you have. The way a modeler thinks that XBRL might work has no bearing in the process of modeling business information. XBRL works as XBRL works, no one can change that. If you could, then what good what that type of standard be? Decisions on how to model information must be based on the model which already surrounds the information you are modeling, the other model components the information you are modeling must relate to, the business rules (XBRL Formulas) which prove the model works, and other such considerations. Not providing the business rules and then believing the model works is a far too common mistake.

While the metapatterns and business use cases are helpful in that they are small, focused examples of specific modeling situations, it is also necessary to understand how one [Table] relates to another [Table]. The purpose of the comprehensive example is to do just that. See the next section.

Note that this discussion is *not* about where information needs to be presented from a financial reporting perspective, that is not relevant to this discussion. This discussion is about how information is related.

9.5.1. Facts only exist in fact tables

A fact table is simply defined as a set of facts which go together. A fact can only exist within the framework of a fact table, facts never exist in isolation. There are two mechanisms for grouping facts into a fact table: networks and [Table]s.

The XBRL technical syntax defines the notion of a fact. An XBRL instance is "a bag of facts". All facts have a context. The XBRL technical syntax allows facts to be filtered using the mechanism of a network. The XBRL Dimensions technical specification defines another method of establishing a set of facts, the hypercube which we are referring to as a [Table].

There are never conflicts between networks and hypercubes. Hypercubes filter facts using dimensions. The entity and period dimensions are not filtered by hypercubes.

9.5.2. Notion of relations between [Table]s

The following is a list of the spectrum of how one [Table] can be related to another [Table] within a digital financial report:

- **[Table]s which are unrelated** – a [Table] has no relation to any other [Table].

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- **[Table]s related by [Line Items]** – a [Table] shares one or more [Line Items] concept with another [Table].
- **[Table]s related by [Axis]** – a [Table] shares one or more [Axis] with another [Table].
- **[Table]s related by both [Line Items] an and by [Axis]** – a [Table] shares both [Line Items] and [Axis] with another [Table].

Examples which will be provided in a moment will make the differences between the categories on the list easier to see.

9.5.3. Notion of summary and detail related [Table]s

[Table]s which are related could fall into one of the following categories:

- **Summary [Table]s** – concepts within summary [Table]s are aggregates of information or totals.
- **Detail [Table]s** – concepts within detail [Table]s provide a number of the same concepts, differentiated using either concepts or by using [Member]s of an [Axis].

9.5.4. Domain partition aggregation models

Recall from the prior section which discussed domain partition aggregation models which explains how information aggregates across an [Axis]. How things aggregate is not necessarily relevant in this discussion which is more about the general ways information relates.

9.5.5. Pulling relations and summary/detail together using examples

Examples help show the differences between the different permutations and combinations of relationships between [Table]s. Here we show such examples.

9.5.5.1. No relations

An example of no relations is the document information of the comprehensive example. The relations can be seen here:

1041	**VA, Part 1: Document Information**	[Network]		
1042	**Document Information [Table]**	[Table]		
1043	**Legal Entity [Axis]**	[Axis]		
1044	Consolidated Entity [Member]	[Member]		
1045	**Report Date [Axis]**	[Axis]		
1046	Reported as of March 18, 2011 [Member]	[Member]		
1047	**Document Information [Line Items]**	[Line Items]		
1048	Document Information [Hierarchy]	[Abstract]		
1049	Document Title	[Concept] Text/String	For Period	
1050	Document Date	[Concept] Date	For Period	
1051	Document Identifier	[Concept] Text/String	For Period	
1052	Document Description	[Concept] Text/String	For Period	
1053	Document Creator	[Concept] Text/String	For Period	
1054	Document Language	[Concept] Text/String	For Period	

While the Document Information [Table] is related to other [Table]s via the Legal Entity [Axis] and the Report Date [Axis] it does point out the notion of no relations. The [Line Items] of the Document Information [Table] are found in no other place in the comprehensive example digital financial report.

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The Document Information [Table] has two other [Axis] where it is related to other tables: the Reporting Entity [Axis] and the Period [Axis], both of which are required on all [Table]s. Going further with this is an advanced discussion which we will not get into here. Just realize that this relation exists.

9.5.5.2. Detail/summary related using [Line Items]

Consider the following balance sheet fragment followed by the disclosure of the details of Cash and Cash Equivalents in the notes to the financial statement:

	As of December 31,	
	2010	2009
ASSETS		
Current Assets		
Cash and Cash Equivalents	1,000	1,000
Receivables, Net of allowance of 1,000 and 1,000 in 2010 and 2009, respectively	1,000	1,000
Inventory	1,000	1,000
Prepaid Expenses	500	500
Investments, at Cost	500	500
Other Assets, Current	1,000	1,000

Details of Cash and Cash Equivalents

	As of December 31,	
	2010	2009
Cash, Unrestricted	250	250
Cash, Restricted	250	250
Petty Cash	250	250
Other Cash and Cash Equivalents	250	250
Total	1,000	1,000

The balance sheet can be seen as the summary table which contains the aggregate of Cash and Cash Equivalents. The disclosure which provides a breakdown of the components of Cash and Cash Equivalents is the detail. The intersection between these two items is the total of Cash and Cash Equivalents which appears on both the summary and in the detailed breakdown.

Here is a modelling of Cash and Cash Equivalents on the balance sheet followed by a modelling of the detailed breakdown from the disclosures:

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16	BA, Part 1: Balance Sheet	[Network]		
17	Balance Sheet [Table]	[Table]		
18	Legal Entity [Axis]	[Axis]		
19	Consolidated Entity [Member]	[Member]		
20	Report Date [Axis]	[Axis]		
21	Reported as of March 18, 2011 [Member]	[Member]		
22	Reporting Scenario [Axis]	[Axis]		
23	Actual [Member]	[Member]		
24	Balance Sheet [Line Items]	[Line Items]		
25	Assets [Roll Up]	[Abstract]		
26	Assets, Current [Roll Up]	[Abstract]		
27	Cash and Cash Equivalents	[Concept] Monetary	As Of	Debit
28	Receivables, Net, Current	[Concept] Monetary	As Of	Debit
29	Inventory	[Concept] Monetary	As Of	Debit
30	Prepaid Expenses	[Concept] Monetary	As Of	Debit
31	Investments, at Cost	[Concept] Monetary	As Of	Debit
32	Other Assets, Current	[Concept] Monetary	As Of	Debit
33	Documentation for Shares	[Concept] Monetary	As Of	Debit
34	Assets, Noncurrent [Roll Up]	[Abstract]		

1	JB, Part 2: Cash and Cash Equivalents, Details	[Network]		
2	Cash and Cash Equivalents, Details [Table]	[Table]		
3	Legal Entity [Axis]	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	Report Date [Axis]	[Axis]		
6	Reported as of March 18, 2011 [Member]	[Member]		
7	Reporting Scenario [Axis]	[Axis]		
8	Actual [Member]	[Member]		
9	Cash and Cash Equivalents, Details [Line Items]	[Line Items]		
10	Cash and Cash Equivalents [Roll Up]	[Abstract]		
11	Cash, Unrestricted	[Concept] Monetary	As Of	Debit
12	Cash, Restricted	[Concept] Monetary	As Of	Debit
13	Petty Cash	[Concept] Monetary	As Of	Debit
14	Other Cash and Cash Equivalents	[Concept] Monetary	As Of	Debit
15	Cash and Cash Equivalents, Total	[Concept] Monetary	As Of	Debit

Note that Cash and Cash Equivalents is not only a concept in both locations, but it is actually the same concept which shows up in both [Table]s. Note that the [Axis] of both tables are the same.

You can get more information about this modelling approach by examining the *Simple Roll Up* business use case.

What is going on in this example may not yet seem obvious. However, when it is compared to the next approach what we are trying to explain will become more clear.

9.5.5.3. Detail/summary related using [Member]s of an [Axis]

Consider the following balance sheet fragment which shows Property, Plant and Equipment, Net:

Noncurrent Assets		
Property, Plant and Equipment, Net		
Land	1,000	1,000
Buildings, Net	1,000	1,000
Furniture and Fixtures, Net	1,000	1,000
Other Property, Plant, and Equipment, Net	1,000	1,000
Property, Plant, and Equipment, Net	4,000	4,000
Investment in Affiliates	0	0
Other Assets, Noncurrent	3,000	1,000

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One approach to modelling this information is to follow the approach used in the section above, modelling each class of Property, Plant and Equipment, Net as a concept as shown below:

19	Assets, Non... t [Roll Up]	[Abstract]		
20	Property, Plant, and Equipment, Net [Roll Up]	[Abstract]		
21	Land	[Concept] Monetary	As Of	Debit
22	Buildings, Net	[Concept] Monetary	As Of	Debit
23	Furniture and Fixtures, Net	[Concept] Monetary	As Of	Debit
24	Other Property, Plant, and Equipment, Net	[Concept] Monetary	As Of	Debit
25	Property, Plant, and Equipment, Net, Total	[Concept] Monetary	As Of	Debit
26	Investments in Affiliates	[Concept] Monetary	As Of	Debit

However, an alternative approach is to model each class of Property, Plant, and Equipment as a [Member] of an [Axis] which can be seen below:

1	Property, Plant, and Equipment, by Component	[Network]		
2	Property, Plant and Equipment, by Component [Table]	[Table]		
3	Legal Entity [Axis]	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	Class of Property, Plant and Equipment [Axis]	[Axis]		
6	All Classes of Property, Plant and Equipment [Member]	[Member]		
7	Land [Member]	[Member]	For Period	
8	Buildings [Member]	[Member]	For Period	
9	Furniture and Fixtures [Member]	[Member]	For Period	
10	Computer Equipment [Member]	[Member]	For Period	
11	Other Property, Plant and Equipment [Member]	[Member]	For Period	
12	Property, Plant and Equipment, by Component [Line Items]	[Line Items]		
13	Property, Plant and Equipment, Net [Hierarchy]	[Abstract]		
14	Property, Plant and Equipment, Net	[Concept] Monetary	As Of	Debit

Above you can see that each class of Property, Plant and Equipment is modelled as a [Member] of the [Axis] Class of Property, Plant and Equipment [Axis].

You can examine this model more closely by taking a look at the business use case *Classes*. Contrast that to the business use case *Simple Roll Up*.

Continuing on with the examples will further reveal the pros and cons of different alternative modelling options.

9.5.5.4. Related by [Axis] and [Members]

The following two fragments of policies and disclosures will help understand one very significant difference between modelling details using [Line Items] and concepts as contrast to modelling details leveraging an [Axis] and [Member]s. Consider these policies and disclosures of Property, Plant and Equipment:

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Property, Plant and Equipment Policies

Class	Valuation Basis	Depreciation Method	Estimated Useful Life
Land	Mauris tincidunt cursus est	NA	NA
Buildings	Sed dapibus venenatis ipsum	Etiam porttitor	20 years
Furniture and Fixtures	Nunc congue	Maecenas tincidunt	10 years
Computer Equipment	Suspendisse potenti	Maecenas tincidunt	5 years
Other	Phasellus eleifend	Maecenas tincidunt	5 years

Property, Plant, and Equipment, Net, Components

	2010	2009
Land	5,347	1,147
Buildings, Net	244,508	366,375
Furniture and Fixtures, Net	34,457	34,457
Computer Equipment, Net	4,169	5,313
Other Property, Plant, and Equipment, Net	6,702	6,149
Property, Plant and Equipment, Net, Total	295,183	413,441

Here you can see two things. First, Property, Plant and Equipment has multiple sets of information expressed in different areas of a financial report and second, that the presentation of the information looks different.

Here is the modelling of both the polices and breakdown of Property, Plant and Equipment:

1	**Property, Plant, and Equipment, Policies**	[Network]		
2	**Property, Plant and Equipment, Policies [Table]**	[Table]		
3	**Legal Entity [Axis]**	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	**Class of Property, Plant and Equipment [Axis]**	[Axis]		
6	All Classes of Property, Plant and Equipment [Member]	[Member]		
7	Land [Member]	[Member]		
8	Buildings [Member]	[Member]		
9	Furniture and Fixtures [Member]	[Member]		
10	Computer Equipment [Member]	[Member]		
11	Other Property, Plant and Equipment [Member]	[Member]		
12	**Property, Plant and Equipment, Policies [Line Items]**	[Line Items]		
13	Property, Plant and Equipment, Policies [Hierarchy]	[Abstract]		
14	Valuation Basis	[Concept] Text/String	For Period	
15	Depreciation Method	[Concept] Text/String	For Period	
16	Estimated Useful Life	[Concept] Text/String	For Period	

1	**Property, Plant, and Equipment, by Component**	[Network]		
2	**Property, Plant and Equipment, by Component [Table]**	[Table]		
3	**Legal Entity [Axis]**	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	**Class of Property, Plant and Equipment [Axis]**	[Axis]		
6	All Classes of Property, Plant and Equipment [Member]	[Member]		
7	Land [Member]	[Member]		
8	Buildings [Member]	[Member]		
9	Furniture and Fixtures [Member]	[Member]		
10	Computer Equipment [Member]	[Member]		
11	Other Property, Plant and Equipment [Member]	[Member]		
12	**Property, Plant and Equipment, by Component [Line Items]**	[Line Items]		
13	Property, Plant and Equipment, Net [Hierarchy]	[Abstract]		
14	Property, Plant and Equipment, Net	[Concept] Monetary	As Of	Debit

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Common between the two models is the Class of Property, Plant and Equipment [Axis]. That [Axis] can be used to "glue" the two [Table]s together, using both the disclosure of the balances of each class of Property, Plant and Equipment and the policies.

If only [Line Items] were used to model both the balances and disclosures, basically not using the [Axis], one would simply repeat the [Line Item] for each class; for example creating "Land, Valuation Basis", "Buildings, Valuation Basis", and so on. Two things would result. First, a much larger taxonomy and second, no connection between for example, "Buildings, Valuation Basis", "Buildings, Depreciation Method", "Buildings, Estimated Useful Life", and "Buildings, Net". They may seem connected to a human due to the common term "Buildings"; but a computer could not formally make this connection. Hacks could be employed to attempt to create a connection using the common term "Buildings", but it would be exactly that, a hack.

To examine the detailed taxonomies and instances in more detail, see the *Class Properties* business use case.

9.5.5.5. Detail/summary related using [Members] of an [Axis] with properties

We want to now bring the concept of "properties" into clearer focus. Consider this example of information about the classes of common stock:

Classes of Common Stock

Class	Par Value	Share Subscriptions	Shares Authorized	Shares Issued	Shares Outstanding	Amount 2010	Amount 2009
company:ClassACommonStockMember	1	10000	10000	10000	3000	500	500
company:ClassBCommonStockMember	1	10000	10000	10000	3000	500	500
				Total all Classes	6000	1,000	1,000

A number of important points can be made by looking at the set of information above. First, information is not commonly presented to the user in this way. Commonly this information is presented on the balance sheet as shown below:

Class A Preferred Stock; $1 par value, authorized 20,000 shares; 20,000 shares issued; 6,000 shares outstanding; liquidation preference	2,000	1,000
Class A Common Stock; $1 par value, authorized 10,000 shares; 10,000 shares issued; 3,000 shares outstanding	500	500
Class B Common Stock; $1 par value, authorized 10,000 shares; 10,000 shares issued; 3,000 shares outstanding	500	500
Additional Paid in Capital	2,000	1,000
Retained Earnings (Accumulated Losses)	1,000	1,000

The information for each class is presented as part of the balance sheet line item as compared to the tabular format. Second, the total is not presented on the balance sheet. Further, if the shares outstanding were different between the current and prior period, that fact would need to be presented in the line item description. Finally, as pointed out in the prior examples, which say Cash and Cash Equivalents has no additional "properties" associated with them, Property, Plant and Equipment can as can the disclosures for a class of stock.

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9.5.5.6. Detail/summary with only one detailed item

This example focuses on one specific point. As you can see in the screenshot below of information about classes of preferred stock and common stock; the common stock has two classes whereas the preferred stock has only one:

Classes of Preferred Stock

Class	Par Value	Share Subscriptions	Shares Authorized	Shares Issued	Shares Outstanding	Amount 2010	Amount 2009
company:ClassAPreferredStockMember	1	20000	20000	20000	6000	2,000	1,000
				Total all Classes	6000	2,000	1,000

Classes of Common Stock

Class	Par Value	Share Subscriptions	Shares Authorized	Shares Issued	Shares Outstanding	Amount 2010	Amount 2009
company:ClassACommonStockMember	1	10000	10000	10000	3000	500	500
company:ClassBCommonStockMember	1	10000	10000	10000	3000	500	500
				Total all Classes	6000	1,000	1,000

How would or should having only one [Member] in a breakdown impact the modelling of information? The question should not really be about whether one specific company has one class of two or more classes of something; but rather modelling should be driven by the possibility of ever having either only one or one-to-many [Member]s of some class of information.

The point here is that an entity could have more than one class of preferred stock and a class of preferred stock can have a number of properties. Both the details of the class and the total of all classes, in the case shown above the total and the class are the same because there is only one member within the class; however, the total and the amount for each class are two different pieces of information.

9.5.5.7. Master/detail by [Axis] and [Member]s

The notion of "master/detail" is commonly communicated using the example of an invoice which has information applicable to the entire invoice such as the invoice number and date; and detail information which is associated with the line items of the invoice such as the product number, the quantity and the amount. An invoice always has one number and date, but it can have one or many line items.

A similar pattern occurs within a financial report as shown by the related party and related party transactions disclosure below:

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NOTE 16. RELATED PARTY TRANSACTIONS

The following is a summary of related party of the company and transactions with those related parties:

Related Parties

Name of Related Party	Type of Relationship	Nature of Relationship
company:RelatedParty1Member	Parent	This is other descriptive information about the relationship.
company:RelatedParty2Member	JointVenture	This is other descriptive information about the relationship.

Transactions with Related Parties

Party	Transaction Description	Pricing Policy	Amount
company:RelatedParty1Member	Transaction 1 description	Cost	1000
company:RelatedParty1Member	Transaction 2 description	Cost	1000
company:RelatedParty2Member	Transaction 1 description	Cost	1000
company:RelatedParty2Member	Transaction 2 description	Cost	1000

This disclosure shows two related parties and a total of four related party transactions, two each for the two related parties.

This information can be modelled as shown below in first the modelling of the related parties and the then the modelling of the related party transactions.

1	**Related Parties**	[Network]		
2	**Related Parties [Table]**	[Table]		
3	**Legal Entity [Axis]**	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	**Related Party Name [Axis]**	[Axis]		
6	Related Party 1 [Member]	[Member]	For Period	
7	Related Party 2 [Member]	[Member]	For Period	
8	**Related Parties [Line Items]**	[Line Items]		
9	Related Party [Hierarchy]	[Abstract]		
10	Related Party, Type of Relationship	[Concept]	For Period	
11	Related Party, Nature of Relationship	[Concept] Text/String	For Period	

1	**Related Party Transactions**	[Network]		
2	**Related Party Transactions [Table]**	[Table]		
3	**Legal Entity [Axis]**	[Axis]		
4	Consolidated Entity [Member]	[Member]		
5	**Related Party Name [Axis]**	[Axis]		
6	Related Party 1 [Member]	[Member]	For Period	
7	Related Party 2 [Member]	[Member]	For Period	
8	**Related Party Transaction Type [Axis]**	[Axis]		
9	Related Party Transaction Type, All [Member]	[Member]	For Period	
10	Agency Arrangements with Related Party [Member]	[Member]	For Period	
11	Leasing Arrangements with Related Party [Member]	[Member]	For Period	
12	Purchase or Sale of Goods with Related Party [Member]	[Member]	For Period	
13	Purchase or Sale of Property or Other Assets with Related Party [Member]	[Member]	For Period	
14	**Related Party Transaction [Line Items]**	[Line Items]		
15	Related Party Transaction [Hierarchy]	[Abstract]		
16	Related Party Transaction, Description	[Concept] Text/String	For Period	
17	Related Party Transaction, Pricing Policy	[Concept] Text/String	For Period	
18	Related Party Transaction, Amount	[Concept] Monetary	For Period	Debit

Common between the two tables is the Related Party Name [Axis]. It is that [Axis] which connects the related party disclosure with the transactions for each related party.

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While in this case there is no aggregation which connects the two [Table]s, the two [Table]s are connected. The related party transactions [Table] has another [Axis] used to differentiate the different transactions associated with a related party.

For more detailed information, see the *Nested Compound Fact* business use case.

9.5.6. Don't mix modelling approaches

If one is not conscious of what they are modelling, there is a good probability that you switch between alternative modelling approaches within the same [Table] and don't even realize it. Arbitrarily shifting from one modelling approach to another modelling approach in the same [Table] simply will not work.

For example, if a balance sheet is modelled using concepts throughout the entire balance sheet, and then you choose to add detail which is supposed to show up on the balance sheet but express that detail using [Member]s of an [Axis] the balance sheet will likely not work correctly in some area; either the calculation relations expressed will not foot, the business rules will not work or will seem inconsistent with other similar types of rules, it will not render correctly or some other problem may occur.

As such, be conscious, create all components, and if all the components work correctly all things considered, your modelling is fine.

9.5.7. Choosing between alternative modelling approaches

Many times a modeller has no choice as to which approach to use to break down details. For example, if the Property, Plant and Equipment details were shown on the face of the balance sheet, then the [Line Items] approach must be used because otherwise the details would not render on the balance sheet and the balance sheet would not foot. As such, the details must be modelled as additional [Line Items].

Whereas, if a modeller needs to connect additional properties to a concept to communicate relationships between concepts, creating an [Axis] and articulating the a breakdown using [Member]s of that [Axis] has advantages.

Modelling information can involve trade-offs. Establishing and following a set of principles and communicating those principles followed to users of a taxonomy can be helpful to users of that taxonomy.

9.5.8. US GAAP taxonomy examples

To better understand the different types of relations the US GAAP Taxonomy can be of help. The following are a few examples which help you understand the differences between the different categories of [Table] relations:

- Nonmonetary Transactions [Table] is not related to any other [Table] in the entire US GAAP taxonomy nor in any SEC XBRL financial filing; it ties to nothing. It is stand alone.
- Subsequent Events [Table]. Likewise unrelated.
- Balance Sheet [Table] and the Property, Plant and Equipment Components [Table] are related in that the total of PPE is on the balance sheet and that total PPE also serves as the intersection to the detailed breakdown, whether these concepts are expressed using [Member]s of an [Axis] or if they are expressed as concepts (XBRL items) within [Line Items].

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- Property, Plant and Equipment Components [Table] and the Property, Plant and Equipment Estimated Useful Lives [Table] are related by the Class of Property, Plant and Equipment [Axis].
- Income statement [Table] is related to the Business Segment Breakdown [Table] and the Geographic Areas Breakdown [Table].

9.6. Intersections

Intersections are general relations between report elements which may exist in more than one component and therefore can be leveraged for navigating between components of the digital financial report. For example,

- A characteristic such as "Legal Entity [Axis]" might be shared by every component within a digital financial report
- A characteristic such as "Property, Plant and Equipment Type [Axis]" might exist on a component which describes the accounting policies of property, plant and equipment and another which describes the amounts of property, plant and equipment and so someone using that digital financial report can reconfigure the report in order to work with this information together. Basically, users of information are not constrained by how the creator modeled the information, only by the available intersections available within the digital financial report
- An analyst can easily search on any concept and quickly locate that fact within the digital financial report without having to manually scour through the entire document; basically software does the work for you

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