

# 1. US GAAP Taxonomy Meta Patterns

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

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

The Business Use Cases in a later section comprise many of the different components of business reports, use cases, which exist in financial reporting. There are approximately 30 use cases in that set. The set of 30 use cases was derived during and from creating the IFRS (International Financial Reporting Standards) XBRL taxonomy and the US GAAP XBRL taxonomy.

The 30 use cases were distilled down to their essence, a set of what I call meta patterns. These meta patterns are described in this section and are summarized here:

- **Hierarchy:** A hierarchy of concepts with no numeric relations.
- **Roll Up:** What is commonly referred to a "roll up", basically  $A + B = D$ , with all concepts being in the same context and there can be any number of concepts adding up to the total.
- **Roll Forward:** What is commonly referred to a "roll forward" or "movement analysis", beginning balance + changes = ending balance. A Roll Forward reconciles two instants between two *Calendar Time [Measure]s*.
- **Adjustment:** Similar to a roll forward in that it is a reconciliation, however rather than the *Calendar Time [Measure]* changing, it is the report date which changes: originally reported + adjustment = restated.
- **Variance:** Analysis between two *Reporting Scenarios [Measure]*, for example: actual - budget = variance.
- **Other Relations:** Some other numeric type computation relation which is too complex to articulate using XBRL calculations and is not one of the other meta patterns. For example, the computation of earnings per share or weighted average common shares is an Other Relations meta pattern.

[CSH: I am not 100% convinced that the Variance is a meta pattern. I am seeing signs that it might not be.]

Meta patterns allow for two things. First, they help define what I am calling the Information Model of a set of Concepts which make up a set of Member Relations (or Measure Relations). This allows for the consistent creation of both base XBRL taxonomies and extension XBRL taxonomies. Second, meta patterns allow XBRL syntax to be pushed into the background, business users deal with XBRL at a higher and easier to use level of abstraction.

Don't find a meta pattern that you believe exists in this list? No problem, just add it. By definition, everything will fit into that list. This is because anything can be defined as a Hierarchy. Unless it fits into one of the other meta patterns, then it is a Hierarchy.

Information models have logical points where the information model can be extended. These are called extension points. By contrast, there are points in an information model

which are illogical to extended the information model. For example, it is illogical for a Roll Up to have, say, two total concepts.

Extension points on an information model of a meta pattern provide clarity as to exactly where a extension taxonomy can extend a base taxonomy. An extension taxonomy must only extend a base taxonomy at logical extension points. As such, defining information models makes XBRL's extensibility work because it clearly defines where a base taxonomy may be extended.

You can obtain example XBRL instances and XBRL taxonomies and other information for each of these meta patterns here:

<http://www.xbrlsite.com/Metapatterns/2010-08-01/Matrix.html>

We now provide additional information about each of these meta patterns.

## **1.1. [Table] Container Meta Pattern**

The *Hierarchy* meta pattern models a hierarchy or a tree of information. A Hierarchy meta pattern has no computations (i.e. no XBRL calculations or XBRL Formulas relating to relations between numeric values, see *Other Relations* meta pattern for that).

[http://www.xbrl.org/2010-08-01/Matrix.html](http://www.xbrl.org/2010/08-01/Matrix.html)

## 1.2. Hierarchy Meta Pattern

The *Hierarchy* meta pattern models a hierarchy or a tree of information. A Hierarchy meta pattern has no computations (i.e. no XBRL calculations or XBRL Formulas relating to relations between numeric values, see *Other Relations* meta pattern for that).

<http://www.xbrlsite.com/Metapatterns/2010-08-01/Matrix.html>

### 1.2.1. Visual Example

Sample Company  
December 31, 2010

#### Accounting Policies

The financial statements have been prepared on the historical cost basis, except for the revaluation of land and buildings and certain financial instruments. The principal accounting policies adopted are set out below.

##### Inventories

Inventories are stated at the lower of cost and net realisable value. Cost comprises direct materials and, where applicable, direct labour costs and those overheads that have been incurred in bringing the inventories to their present location and condition. Cost is calculated using the weighted average method. Net realisable value represents the estimated selling price less all estimated costs to completion and costs to be incurred in marketing, selling and distribution. Inventories are comprised of raw materials and work in progress.

##### Financial Instruments

Financial assets and liabilities are recognised on the Group's balance sheet when the Group has become a party to the contractual provisions of the investment.

##### Trade receivables

Trade receivables are stated at their nominal value as reduced by appropriate allowances for estimated irrecoverable amounts.

##### Investments in securities

Investments in securities are recognised on a trade-date basis and are initially measured at cost.

##### Bank borrowings

Interest-bearing bank loans and overdrafts are recorded at the proceeds received, net of direct issue costs. Finance charges, including premiums payable on settlement or redemption, are accounted for on an accrual basis and are added to the carrying amount of the instrument to the extent that they are not settled in the period in which they arise.

##### Provisions

Provisions are recognised when the Group has a present obligation as a result of a past event which it is probable will result in an outflow of economic benefits that can be reasonably estimated.

### 1.2.2. Description

The visual example shows a *Hierarchy* of accounting policies. If you are familiar with something like the outline feature of Microsoft Word then you know exactly what a hierarchy is. There are no real explicit relationship types between concepts within this type of information model because XBRL most taxonomies don't generally distinguish between the types of relations. They could, but they currently do not. As such, we make no distinction between types of relations. Again, by definition everything is a *Hierarchy* unless it is something else.

A *Hierarchy* can always be identified by a software application by the fact that there are no XBRL calculations or XBRL Formulas within the information model.

### 1.2.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for a *Hierarchy* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the *Hierarchy*

### 1.3. Roll Up Meta Pattern

The *Roll Up* meta pattern models what is commonly referred to as a roll up. A roll up is simply two or more concepts which add up to a third concept: Concept A + Concept B = Concept C.

<http://www.xbrlsite.com/Metapatterns/2010-08-01/Matrix.html>

#### 1.3.1. Visual Example

Sample Company  
December 31,  
(thousands of dollars)

	2010	2009
<b>ASSETS</b>		
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
	<hr/>	<hr/>
Property, Plant and Equipment, Net, Total	295,183	413,441

#### 1.3.2. Description

The *Roll Up* in the example above simply five concepts which add up to a sixth concept: Land + Buildings, Net + Furniture and Fixtures, Net + Computer Equipment, Net + Other Property, Plant and Equipment, Net = Property, Plant and Equipment, Net, Total. A *Roll Up* can have other Roll Ups within, what amount to sub totals.

A *Roll Up* can always be identified by a software application as it has a set of XBRL Calculations within the XBRL taxonomy.

#### 1.3.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for an *Roll Up* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the concepts being rolled up (i.e. a new total concept cannot be added, that would require an entirely new Roll Up); for example, adding "Airplanes" to the Roll Up above

## 1.4. Roll Forward Meta Pattern

The *Roll Forward* meta pattern shows how to model a very common information model found in financial reporting: the roll forward or sometimes called a movement analysis. A roll forward is beginning balance + changes to the balance = ending balance.

<http://www.xbrlsite.com/Metapatterns/2010-08-01/Matrix.html>

### 1.4.1. Visual Example

Sample Company December 31, (thousands of dollars)		
	2010	2009
<b>Roll Forward of Land</b>		
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

### 1.4.2. Description

The *Roll Forward* above reconciles the beginning balance of Land to the ending balance of Land. The XBRL instance provides Facts for two Roll Forwards, 2010 and 2009. Land, Beginning Balance + Additions – Disposals + Translation Difference = Land, Ending Balance. A *Roll Forward* may have a Roll Up for the total changes between the beginning and ending balance. In this XBRL taxonomy example for this meta pattern; Additions – Disposals + Translation Difference = Total Changes; which is such a *Roll Up*.

A *Roll Forward* can be identified by the XBRL Formula which must be used to verify the computation of the reconciliation, beginning balance + changes = ending balance with a changing Calendar Time [Measure] (i.e. context period).

### 1.4.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for an *Roll Forward* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the *Roll Up* of changes
- Add a new *Roll Up* of changes
- Add new business rules to set of relations

## 1.5. Adjustment Meta Pattern

The *Adjustment* meta pattern shows how to model an adjustment to a prior period financial statement for a change in accounting policy or correction of an error as defined by financial reporting standards. This same approach can be used for making adjustments to other beginning balances not related to financial reporting.

[http://www.xbrlsite.com/Patterns/2010-08-01/BUC34-Adjustment/Adjustment\\_Landing.html](http://www.xbrlsite.com/Patterns/2010-08-01/BUC34-Adjustment/Adjustment_Landing.html)

### 1.5.1. Visual Example

Sample Company December 31, (thousands of dollars)		2010	2009
<b>Changes in Equity</b>			
<i>Prior Period Adjustment</i>			
Retained Earnings (Accumulated Losses), Originally Stated 2009	4,000		
Change in Accounting Policy	3,000		
Correction of an Error	<u>-1,000</u>		
Retained Earnings (Accumulated Losses), Restated 2009 Beginning Balance	<u>6,000</u>		
<i>Changes in Equity</i>			
Retained Earnings (Accumulated Losses), Beginning Balance	6,000	0	
Net Income (Loss)	7,000	5,000	
Dividends	<u>-1,000</u>	<u>-1,000</u>	
Retained Earnings (Accumulated Losses), Ending Balance	<u>12,000</u>	<u>4,000</u>	

### 1.5.2. Description

The example *Adjustment* above reconciles the Retained Earnings (Accumulated Losses), Originally Stated in 2009 to its Restated 2009 Beginning Balance via the Prior Period Adjustments which make up the change. An *Adjustment* is different from a *Roll Forward* in that the *Adjustment* reconciles two report dates, different by the *Report Date [Measure]*, where a *Roll Up* reconciles between two different points in time, differentiated by the *Calendar Time [Measure]*.

An *Adjustment* can be identified by software applications by the XBRL Formula which computes the adjustment, originally stated + adjustment = restated balance over a changing *Report Date [Measure]*.

### 1.5.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for an *Adjustment* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the hierarchy
- Add new business rules to set of relations

## 1.6. Variance Meta Pattern

The *Variance* business use case models how to articulate different business reporting scenarios for the same reported concept.

[http://www.xbrlsite.com/Patterns/2010-08-01/BUC29-Variance/Variance\\_Landing.html](http://www.xbrlsite.com/Patterns/2010-08-01/BUC29-Variance/Variance_Landing.html)

### 1.6.1. Visual Example

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

### 1.6.2. Description

A *Variance* reconciles two different reporting scenarios differentiated using the *Reporting Scenarios [Measure]*, in the case here *Actual [Member]* and *Budgeted [Member]*, the difference being the *Variance*, or *Reporting Scenarios [Domain]*.

A *Variance* can be identified by software applications by the XBRL Formula which computes the variance,  $Actual [Member] + Budgeted [Member] = Reporting Scenario [Domain]$ , all within the *Reporting Scenario [Measure]*.

[CSH: The Reporting Scenario [Domain] as the variance seems odd to me.]

### 1.6.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for an *Variance* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the hierarchy
- Add new business rules to set of relations



## 1.7. Other Relations Meta Pattern

The *Other Relations* meta pattern models how to articulate information which has other types of relations or very complex computations.

<http://www.xbrlsite.com/Metapatterns/2010-08-01/Matrix.html>

### 1.7.1. Visual Example

Sample Company  
For Period Ended December 31,

	2010	2009
<b>OTHER INFORMATION</b>		
<b>Earnings Per Share Components</b>		
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

### 1.7.2. Description

An *Other Relations* meta pattern is in essence a *Hierarchy* meta pattern with *Business Rules* which express complex relations between numeric values contained in that hierarchy. In the example above, Earnings Per Share is expressed in relation to Net Income and Weighted Average Common Shares. The Weighted Average Common Shares computation is also expressed as a Business Rule. The Business Rules are expressed as XBRL Formulas.

An *Other Relations* meta pattern can always be identified by software as it does not fit into any other meta pattern category. It will have some XBRL Formula, but it will not match any of the other XBRL Formulas patterns.

### 1.7.3. Extension Points and Extensibility Rules

The following are extension points and extensibility rules for an *Other Relations* meta pattern:

- Add new dimension (measure)
- Add new domain or member to dimension
- Add new concepts to the hierarchy
- Add new business rules to set of relations