1. Rules of Thumb

Please be sure that you have worked your way through the *Platinum Examples of XBRL-based Digital Financial Reports*[1] and *Essentials of XBRL-based Digital Financial Reporting*[2] prior to using this document.

The following are a set of “rules of thumb” or recommendations for those who are trying to represent a financial report, financial report model or a base financial reporting scheme model using the XBRL technical syntax.

The rules of thumb use precise terminology and specific examples to help the reader accurately understand the dynamics at play in XBRL-based digital financial reports. Please be sure that you are familiar with this terminology. If you are not, please refer to Logical Systems[3] which will help the reader get the most out of this document.

For each rule of thumb, examples and reasoning will be provided to help the reader understand the rule of thumb and why it is a best practice.

Each of the examples provide are part of the XBRL-based digital financial reporting conformance suite[4] and has been heavily tested. Additional information is also provided to help the reader analyze the example thoroughly. Examples focus on precise details to help the reader understand specific dynamics addressed by each rule of thumb.

Human readable renderings are provided using Auditchain Suite’s Luca cloud based XBRL report creation tool and Pesseract. Each example can be loaded into Arelle which is an open source fully conformant XBRL processor.

Note that in this document the formal XBRL terms “Hypercube” (a.k.a. Table) and “Dimension (a.k.a. Axis) are used. Similarly, the US GAAP and IFRS term “Line Items” (a.k.a. Primary Items is the formal XBRL dimensions term) is used.

What follows is a number of “rules of thumb” that are helpful to those creating XBRL-based reports, report models, or financial reporting schemes used by those creating reports or report models. If one discusses each of these issues in a food faith-based way using evidence, answers will emerge. (WORK IN PROGRESS)

1.1. *Always Use Explicit, Closed Hypercubes*

Every fact reported within a report should be associated with a concept which is associated with an explicit closed hypercube represented in the report model. Preferably, each explicit closed hypercube is unique which enables querying information from a report and report model using hypercubes.

Reasoning: Best practices published by XBRL International[5] specifies that, "*Where a taxonomy makes use of dimensions, all concepts should be associated with at least*

[1] Platinum Examples, http://www.xbrlsite.com/mastering/Part04_Chapter07.G3_PlatinumExamples.pdf

[2] Essentials of XBRL-based Digital Financial Reporting (version being revised), http://www.xbrlsite.com/seattlemethod/platinum/EssentialsOfXBRL_PLATINUM.pdf

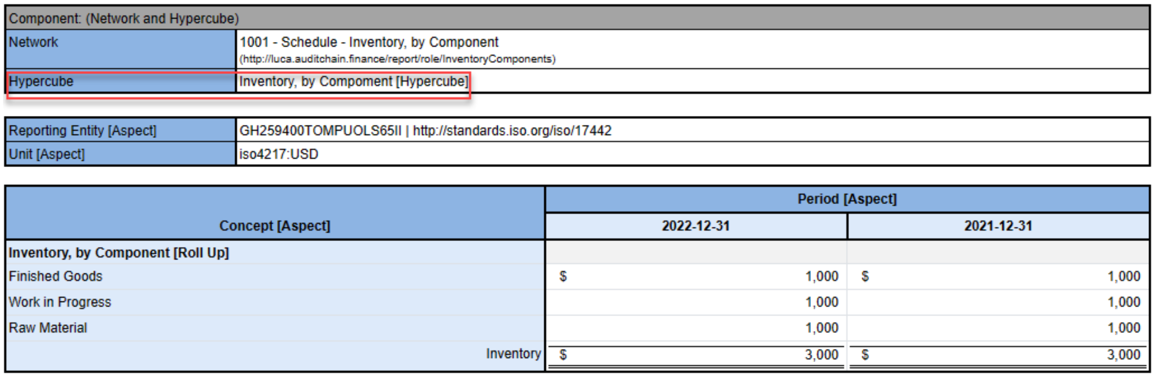
[3] *Logical Systems*, http://www.xbrlsite.com/mastering/Part02_Chapter05.A_LogicalSystems.pdf

[4] XBRL-based Digital Financial Reporting Conformance Suite, Rules of Thumb, http://www.xbrlsite.com/seattlemethod/platinum-testcases/index-rules-of-thumb.xml

[5] XBRL International, *Technical Considerations for the use of XBRL Dimensions 1.0*, Section 3.5 bullet point 3, http://www.xbrl.org/WGN/dimensions-use/WGN-2015-03-25/dimensions-use-WGN-2015-03-25.html

one hypercube, even if that hypercube has no associated dimensions." Given that both US GAAP and IFRS XBRL base financial reporting scheme taxonomies make use of XBRL dimensions, it follows that report models created using those XBRL taxonomies should make use of XBRL dimensions. The XBRL Dimensions conformance suite makes it clear that a hypercube can exist without any dimensions.

The following is an example of an explicit, closed hypercube (Hypercube Explicit[6], 99.10-TestCase-hypercube-explicit[7])



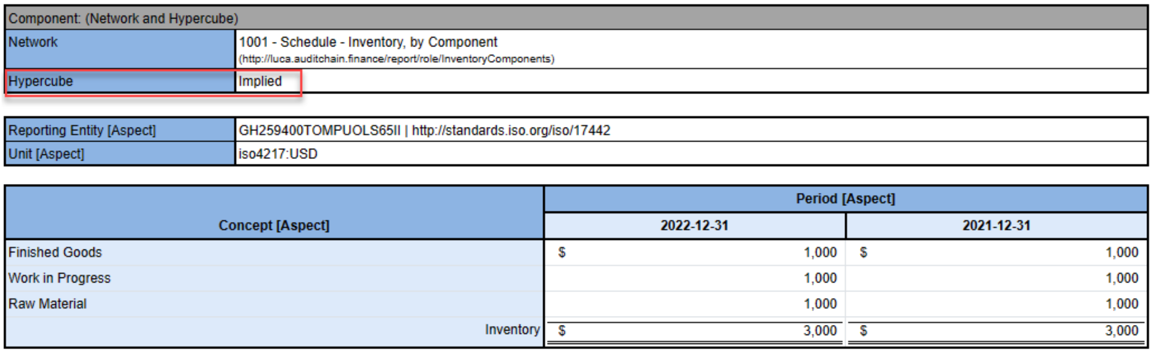
Component: (Network and Hypercube)	
Network	1001 - Schedule - Inventory, by Component (http://luca.auditchain.finance/report/role/InventoryComponents)
Hypercube	Inventory, by Component [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Inventory, by Component [Roll Up]		
Finished Goods	$ 1,000	$ 1,000
Work in Progress	1,000	1,000
Raw Material	1,000	1,000
Inventory	$ 3,000	$ 3,000

Note that the hypercube is explicitly named and therefore can be explicitly identified by software applications.

The following is a contra example which shows the ramifications of not providing an explicit hypercube (Hypercube Implied[8], 99.11-TestCase-hypercube-implied[9])



Component: (Network and Hypercube)	
Network	1001 - Schedule - Inventory, by Component (http://luca.auditchain.finance/report/role/InventoryComponents)
Hypercube	Implied

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Finished Goods	$ 1,000	$ 1,000
Work in Progress	1,000	1,000
Raw Material	1,000	1,000
Inventory	$ 3,000	$ 3,000

Effectively, if a hypercube is not explicitly provided in an XBRL-based report it is implied that facts reported exist within an implied hypercube. In essence, you can think of there being an explicit hypercube named "Implied [Hypercube]". What the lack of a hypercube means is that there is no way for software applications to specifically identify a disclosure and so there is no way software can extract information leveraging the hypercube.

[6] Hypercube Explicit, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/hypercube-explicit/index.html

[7] 99.10-TestCase-hypercube-explicit.xml, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.10-TestCase-hypercube-explicit.xml

[8] Hypercube Implied, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/hypercube-implied/index.html

[9] 99.11-TestCase-hypercube-implied.xml, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.11-TestCase-hypercube-implied.xml

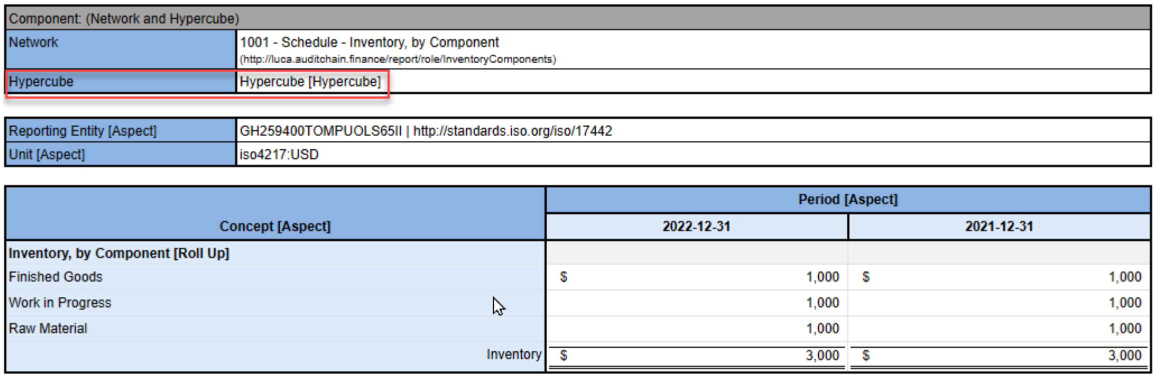
The next rule of thumb expands on this idea and helps the reader understand why hypercubes should be unique.

1.2. Explicit Hypercubes Provided Should Always Be Unique

Hypercubes provided should be unique.

Reasoning: Non-unique or polymorphic hypercubes are not effectively useable by software applications as they do not enable specific identification as to the nature of a specific disclosure which has been represented.

The following example helps to make this rule of thumb clear: (Hypercube Polymorphic[10], 99.12-TestCase-hypercube-polymorphic[11])



Component: (Network and Hypercube)	
Network	1001 - Schedule - Inventory, by Component (http://luca.auditchain.finance/report/role/InventoryComponents)
Hypercube	Hypercube [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Inventory, by Component [Roll Up]		
Finished Goods	$ 1,000	$ 1,000
Work in Progress	1,000	1,000
Raw Material	1,000	1,000
Inventory	$ 3,000	$ 3,000

In the above example you see that the name of the hypercube is "Hypercube [Hypercube]". Suppose a second hypercube was added to this example report and the same identification is used, "Hypercube [Hypercube]". How could software differentiate between the first use of the hypercube identifier and the second use of the hypercube identifier?

So, it is possible to identify and differentiate each use of a hypercube identifier but it involves two additional steps. First, information needs to be provided to help software differentiate between the use of the same hypercube identifier to specify two different fragments of a report. Second, prototype theory[12] would then be used by software to perform the identification. An explanation of prototype theory is beyond the scope of this document.

The "Hypercube [Hypercube]" example above is similar to the use of "us-gaap:StatementTable in the US GAAP XBRL Taxonomy. For example, Microsoft used the hypercube "us-gaap:StatementTable to represent 128 different disclosures in its 2017 10-K XBRL-based report[13].

[10] Hypercube Polymorphic, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/hypercube-polymorphic/index.html

[11] 99.12-TestCase-hypercube-polymorphic, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.12-TestCase-hypercube-polymorphic.xml

[12] Wikipedia, *Prototype Theory*, https://en.wikipedia.org/wiki/Prototype_theory

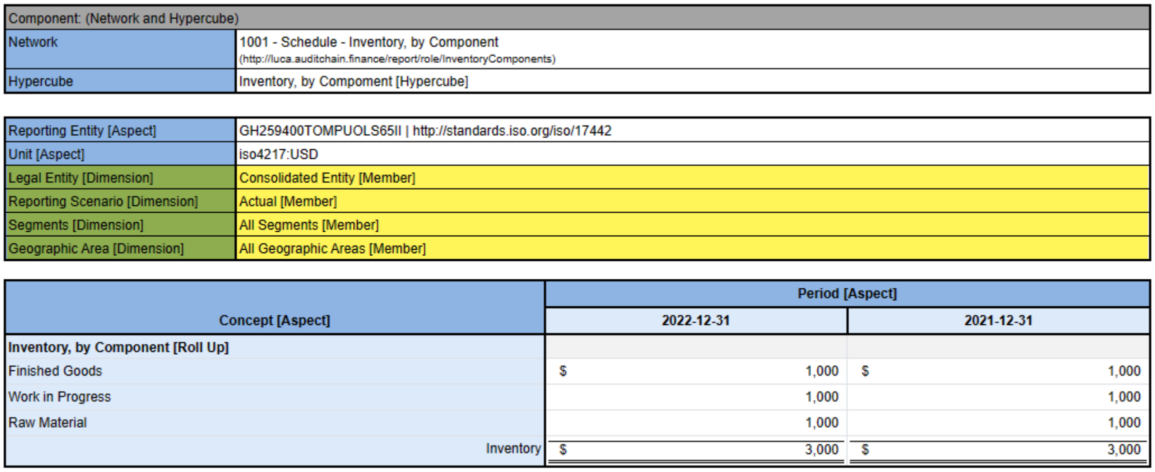
[13] Microsoft XBRL-based Report Analysis, http://xbrl.squarespace.com/journal/2020/4/13/microsoft-xbrl-based-report-analysis.html

1.3. *Select Dimensions Carefully*

If a dimension is added to a fact and the fact value does not change then do not add the dimension to the report model. If a dimension can be removed from a fact and the fact value stays the same then the dimension should be removed from the report model.

Reasoning: If a dimension is not helpful in terms of distinguishing one fact from another fact; then the dimension is not necessary for querying information effectively.

Two examples will make the above statements clear. The first example shows an excessive use of XBRL dimensions (Excess Dimensions[14], 99.01-TestCase-excess-dimensions[15])



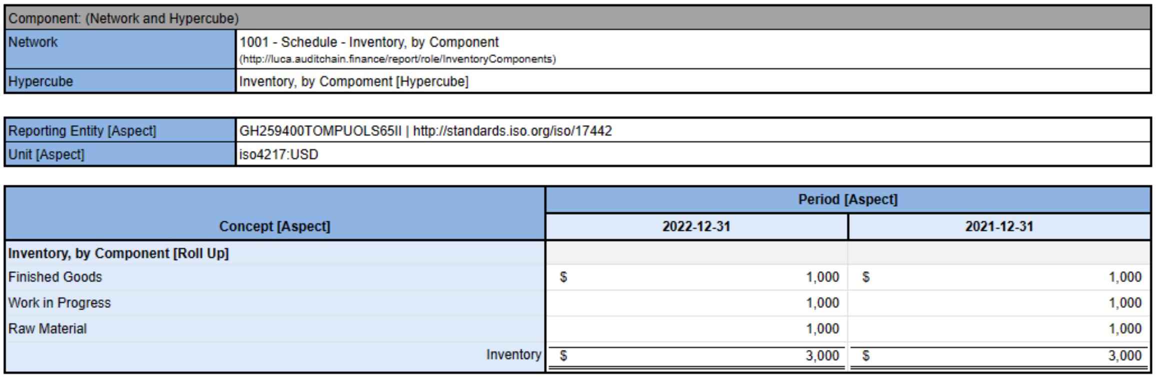
Component: (Network and Hypercube)	
Network	1001 - Schedule - Inventory, by Component (http://luca.auditchain.finance/report/role/InventoryComponents)
Hypercube	Inventory, by Component [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD
Legal Entity [Dimension]	Consolidated Entity [Member]
Reporting Scenario [Dimension]	Actual [Member]
Segments [Dimension]	All Segments [Member]
Geographic Area [Dimension]	All Geographic Areas [Member]

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Inventory, by Component [Roll Up]		
Finished Goods	$ 1,000	$ 1,000
Work in Progress	1,000	1,000
Raw Material	1,000	1,000
Inventory	$ 3,000	$ 3,000

Above you see the explicit inclusion of the Legal Entity [Dimension], the Reporting Scenario [Dimension], the Segments [Dimension], and the Geographic Area [Dimension] in a report model.

Contrast the above to a second example (Appropriate Dimensions, 99.02-TestCase-appropriate-dimensions[16])



Component: (Network and Hypercube)	
Network	1001 - Schedule - Inventory, by Component (http://luca.auditchain.finance/report/role/InventoryComponents)
Hypercube	Inventory, by Component [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Inventory, by Component [Roll Up]		
Finished Goods	$ 1,000	$ 1,000
Work in Progress	1,000	1,000
Raw Material	1,000	1,000
Inventory	$ 3,000	$ 3,000

[14] Excess Dimensions, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/excess-dimensions/index.html

[15] 99.01-TestCase-excess-dimensions, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.01-TestCase-excess-dimensions.xml

[16] 99.02-TestCase-appropriate-dimensions, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.02-TestCase-appropriate-dimensions.xml

To be crystal clear, the only difference between the two reports and report models is that in the first example four dimensions are explicit provided in the report model and in the second example they are not.

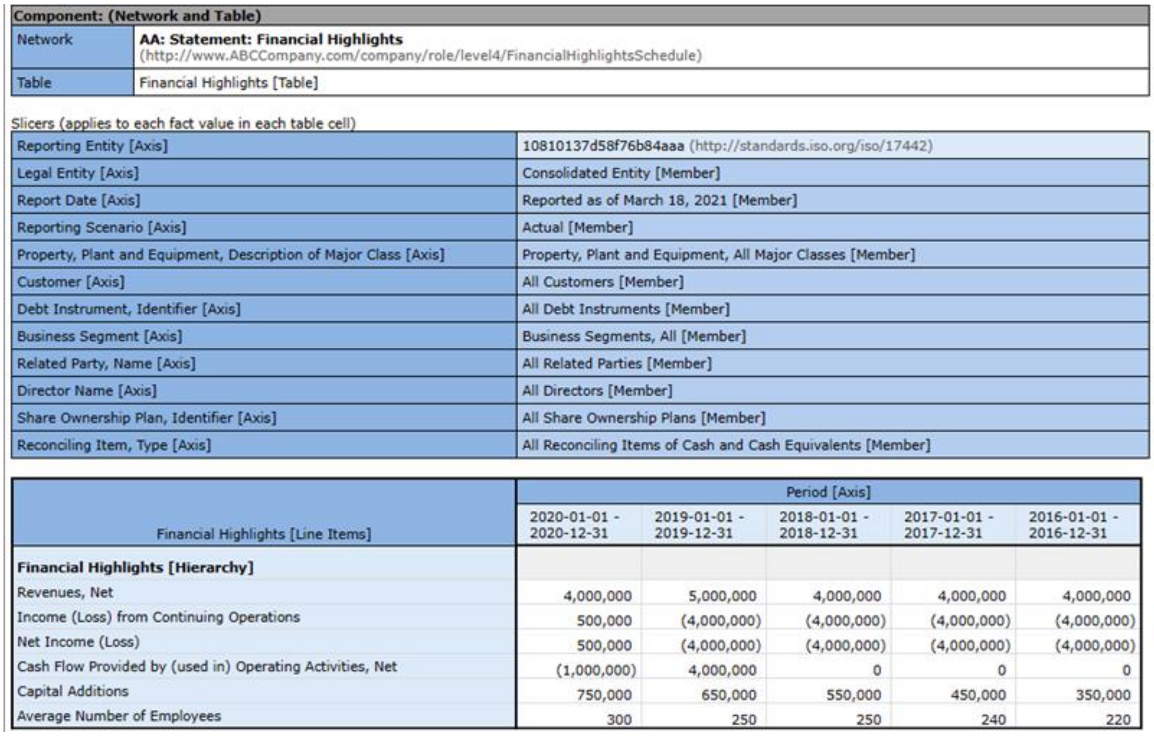
And so, ask yourself a question: What is the difference of the logic of the first and second reports?

One interpretation might be that the logic is exactly the same because the consolidated entity, actual values, all business segments, and all geographic areas are assumed in the second example but explicitly provided in the first.

So, if this assumption is explicitly stated by a base financial reporting XBRL taxonomy or in some sort of official or formal documentation; then different software vendors can all make the same assumption and then software applications would then be expected to behave consistently when they came across the first and second examples and would.

But on the other hand, making such an assumption might be very risky because the assumption might not be correct.

The following extreme (pathological) example shows excessive use of dimensions to represent the information in a report fragment[17]:



Component: (Network and Table)	
Network	**AA: Statement: Financial Highlights** (http://www.ABCCompany.com/company/role/level4/FinancialHighlightsSchedule)
Table	Financial Highlights [Table]

Slicers (applies to each fact value in each table cell)

Reporting Entity [Axis]	10810137d58f76b84aaa (http://standards.iso.org/iso/17442)
Legal Entity [Axis]	Consolidated Entity [Member]
Report Date [Axis]	Reported as of March 18, 2021 [Member]
Reporting Scenario [Axis]	Actual [Member]
Property, Plant and Equipment, Description of Major Class [Axis]	Property, Plant and Equipment, All Major Classes [Member]
Customer [Axis]	All Customers [Member]
Debt Instrument, Identifier [Axis]	All Debt Instruments [Member]
Business Segment [Axis]	Business Segments, All [Member]
Related Party, Name [Axis]	All Related Parties [Member]
Director Name [Axis]	All Directors [Member]
Share Ownership Plan, Identifier [Axis]	All Share Ownership Plans [Member]
Reconciling Item, Type [Axis]	All Reconciling Items of Cash and Cash Equivalents [Member]

	Period [Axis]				
Financial Highlights [Line Items]	2020-01-01 - 2020-12-31	2019-01-01 - 2019-12-31	2018-01-01 - 2018-12-31	2017-01-01 - 2017-12-31	2016-01-01 - 2016-12-31
Financial Highlights [Hierarchy]					
Revenues, Net	4,000,000	5,000,000	4,000,000	4,000,000	4,000,000
Income (Loss) from Continuing Operations	500,000	(4,000,000)	(4,000,000)	(4,000,000)	(4,000,000)
Net Income (Loss)	500,000	(4,000,000)	(4,000,000)	(4,000,000)	(4,000,000)
Cash Flow Provided by (used in) Operating Activities, Net	(1,000,000)	4,000,000	0	0	0
Capital Additions	750,000	650,000	550,000	450,000	350,000
Average Number of Employees	300	250	250	240	220

This brings us to the next rule of thumb that tries to informally address this issue when the issue has not been explicitly addressed in official/formal documentation.

[17] Excessive use of dimensions, http://xbrlsite.azurewebsites.net/2021/essentials/Dimensions/dimensions-many/evidence-package/

1.4. Assume Facts need to be Uniquely Identifiable Across All Reports in a System

A base financial reporting XBRL taxonomy and report models created that make use of such base financial reporting XBRL taxonomies should be designed so that an XBRL fact is uniquely identifiable across all reports.

Reasoning: Prudence dictates that making effective use of an XBRL-based report should not be a guessing game.

So, imagine the SEC EDGAR system. Imagine taking every reported fact in that system and then putting all of those facts into one single XBRL instance document. Duplicate facts are removed. And now you want to query that one single XBRL instance that has all the fact values of every reporting public company. Imagine that you query for one common fact, let's call it "query:Revenue".

Now there is one additional step that must be dealt with. Using the US GAAP XBRL Taxonomy as an example, there are many different concepts that might have been used by a reporting entity to report the one fact that we seek, "query:Revenue", from the set of reports that we have combined into one big XBRL instance. For example, in the US GAAP XBRL Taxonomy some of the following might have been used:

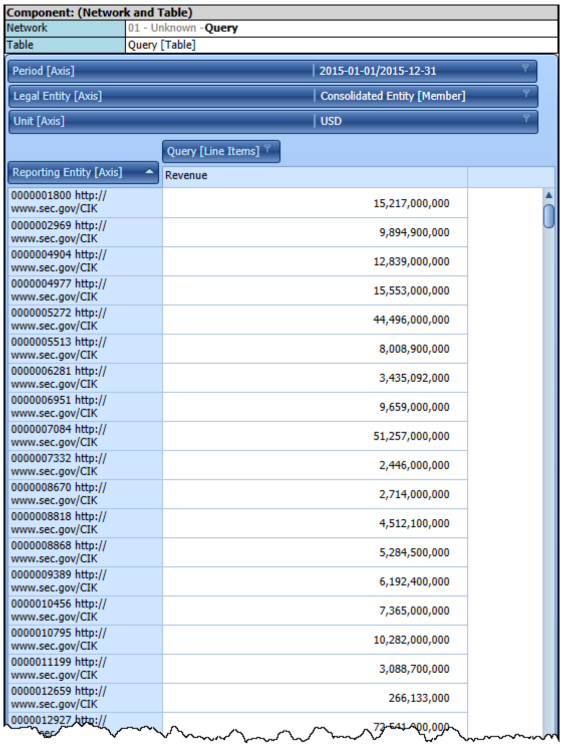
us-gaap:Revenues, us-gaap:RevenueFromContractWithCustomerExcludingAssessedTax, us-gaap:RevenueFromContractWithCustomerIncludingAssessedTax, us-gaap:SalesRevenueNet, us-gaap:SalesRevenueServicesNet, us-gaap:SalesRevenueGoodsNet, us-gaap:RevenuesNetOfInterestExpense, us-gaap:RealEstateRevenueNet, us-gaap:InterestAndDividendIncomeOperating, us-gaap:RevenueMineralSales, us-gaap:OilAndGasRevenue, us-gaap:FinancialServicesRevenue

But let us ignore that issue of using different concepts to report exactly the same value and focus only on dimensional information. We want to compare consolidated revenue, actual revenue as contrast to forecasted, revenue for all business segments, and revenue for all geographic areas.

The following example makes this point (Many Entities[18], 07-TestCase-many-entities.xml[19])

[18] Many Entities, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/many-entities/index.html

[19] 07-TestCase-many-entities.xml, http://www.xbrlsite.com/seattlemethod/platinum-testcases/07-TestCase-many-entities.xml



Component: (Network and Table)	
Network	01 - Unknown - **Query**
Table	Query [Table]

Period [Axis] | 2015-01-01/2015-12-31

Legal Entity [Axis] | Consolidated Entity [Member]

Unit [Axis] | USD

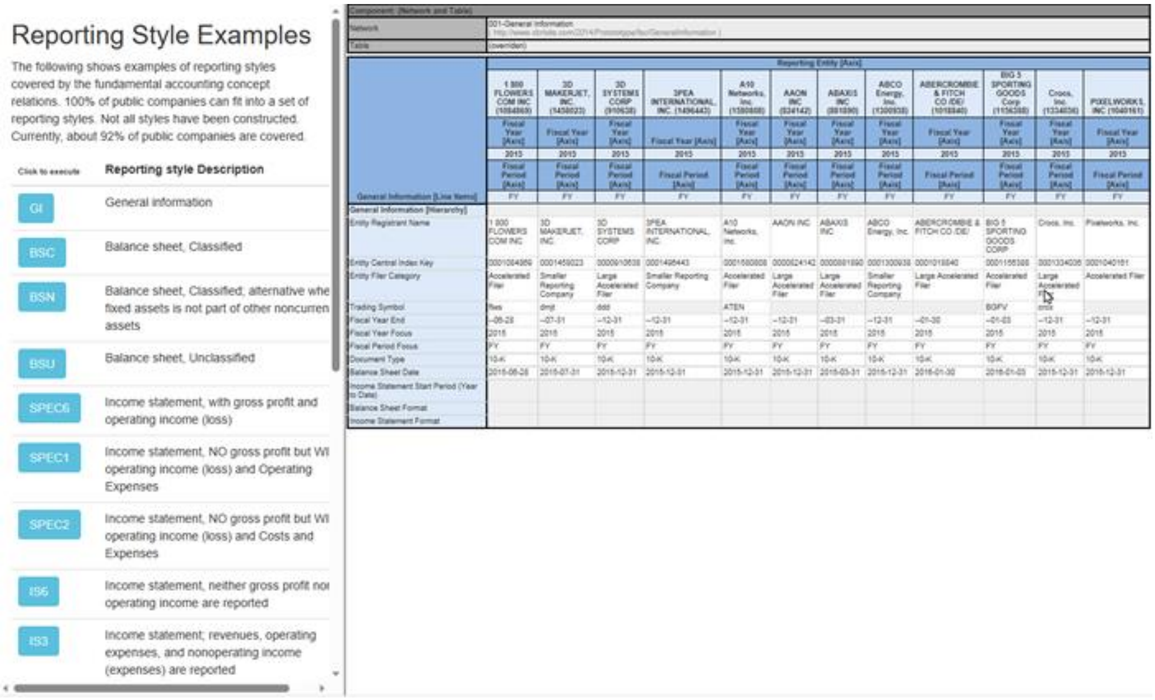
Query [Line Items]

Reporting Entity [Axis]	Revenue
0000001800 http://www.sec.gov/CIK	15,217,000,000
0000002969 http://www.sec.gov/CIK	9,894,900,000
0000004904 http://www.sec.gov/CIK	12,839,000,000
0000004977 http://www.sec.gov/CIK	15,553,000,000
0000005272 http://www.sec.gov/CIK	44,496,000,000
0000005513 http://www.sec.gov/CIK	8,008,900,000
0000006281 http://www.sec.gov/CIK	3,435,092,000
0000006951 http://www.sec.gov/CIK	9,659,000,000
0000007084 http://www.sec.gov/CIK	51,257,000,000
0000007332 http://www.sec.gov/CIK	2,446,000,000
0000008670 http://www.sec.gov/CIK	2,714,000,000
0000008818 http://www.sec.gov/CIK	4,512,100,000
0000008868 http://www.sec.gov/CIK	5,284,500,000
0000009389 http://www.sec.gov/CIK	6,192,400,000
0000010456 http://www.sec.gov/CIK	7,365,000,000
0000010795 http://www.sec.gov/CIK	10,282,000,000
0000011199 http://www.sec.gov/CIK	3,088,700,000
0000012659 http://www.sec.gov/CIK	266,133,000
0000012927 http://	72,541,000,000

The example above was manually created from a set of 300 reporting entities using an automated process to literally put facts from those 300 reporting entities together into one XBRL instance. This is somewhat of an example of a query that is returned as an XBRL instance and the format of the query is specified using an XBRL taxonomy schema and XBRL linkbases.

Another example of this same idea is provided by actual queries from an actual database of XBRL-based reports submitted to the SEC by public companies[20].

[20] Entity and Period Comparisons, http://www.xbrlsite.com/2016/fac/v3/Examples/Index.html



Reporting Style Examples

The following shows examples of reporting styles covered by the fundamental accounting concept relations. 100% of public companies can fit into a set of reporting styles. Not all styles have been constructed. Currently, about 92% of public companies are covered.

Click to execute	Reporting style Description
GI	General information
BSC	Balance sheet, Classified
BSN	Balance sheet, Classified; alternative whe fixed assets is not part of other noncurren assets
BSU	Balance sheet, Unclassified
SPEC6	Income statement, with gross profit and operating income (loss)
SPEC1	Income statement, NO gross profit but WI operating income (loss) and Operating Expenses
SPEC2	Income statement, NO gross profit but WI operating income (loss) and Costs and Expenses
IS6	Income statement, neither gross profit nor operating income are reported
IS3	Income statement; revenues, operating expenses, and nonoperating income (expenses) are reported

Component: (Network and Table)	
Network	001-General Information (http://www.xbrlsite.com/2014/Prototype/fac/GeneralInformation)
Table	(overriden)

	Reporting Entity [Axis]											
	1 800 FLOWERS COM INC (1084869)	3D MAKERJET, INC. (1459023)	3D SYSTEMS CORP (910638)	3PEA INTERNATIONAL, INC. (1496443)	A10 Networks, Inc. (1580808)	AAON INC (824142)	ABAXIS INC (881890)	ABCO Energy, Inc. (1300938)	ABERCROMBIE & FITCH CO /DE/ (1018840)	BIG 5 SPORTING GOODS Corp (1156388)	Crocs, Inc. (1334036)	PIXELWORKS, INC (1040161)
	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]	Fiscal Year [Axis]
	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015
	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]
General Information [Line Items]	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY
General Information [Hierarchy]												
Entity Registrant Name	1 800 FLOWERS COM INC	3D MAKERJET, INC.	3D SYSTEMS CORP	3PEA INTERNATIONAL, INC.	A10 Networks, Inc.	AAON INC	ABAXIS INC	ABCO Energy, Inc.	ABERCROMBIE & FITCH CO /DE/	BIG 5 SPORTING GOODS CORP	Crocs, Inc.	Pixelworks, Inc.
Entity Central Index Key	0001084869	0001459023	0000910638	0001496443	0001580808	0000824142	0000881890	0001300938	0001018840	0001156388	0001334036	0001040161
Entity Filer Category	Accelerated Filer	Smaller Reporting Company	Large Accelerated Filer	Smaller Reporting Company	Accelerated Filer	Large Accelerated Filer	Large Accelerated Filer	Smaller Reporting Company	Large Accelerated Filer	Accelerated Filer	Large Accelerated Filer	Accelerated Filer
Trading Symbol	flws	dmjt	ddd		ATEN					BGFV	crox	
Fiscal Year End	--06-28	--07-31	--12-31	--12-31	--12-31	--12-31	--03-31	--12-31	--01-30	--01-03	--12-31	--12-31
Fiscal Year Focus	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015
Fiscal Period Focus	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY
Document Type	10-K	10-K	10-K	10-K	10-K	10-K	10-K	10-K	10-K	10-K	10-K	10-K
Balance Sheet Date	2015-06-28	2015-07-31	2015-12-31	2015-12-31	2015-12-31	2015-12-31	2015-03-31	2015-12-31	2016-01-30	2016-01-03	2015-12-31	2015-12-31
Income Statement Start Period (Year to Date)												
Balance Sheet Format												
Income Statement Format												

The point here is this. The purpose of XBRL-based reports is to enable the effective extraction of information from the provided reports and automated reuse of such information. Sure, additional work needs to be done such as mappings and normalizations of information. But, this fundamental task of creating entity comparisons and period comparisons is a fundamental use case of XBRL. As such, such comparisons should be fundamentally possible. And so as such, the assumption that facts should be uniquely identifiable across all reports seems reasonable.

1.5. All Concepts Defined Should Be Included in at Least One Hypercube

Every concept that is defined in a base financial reporting scheme XBRL taxonomy or within a report model should be included within at least one Hypercube. Note that Hypercubes are not required to have any Dimensions other than Line Items.

Reasoning: There is no such thing as a fact that just "floats in space".

[CSH: This should be changed from "Concept" to "Report Elements" in general. The rule is also true for Dimensions, and Members. Line Items are effectively a dimension.]

1.6. Dimension Defaults Specified by a Base Financial Reporting Scheme Taxonomy Should Never Change

The "root member" or what XBRL Dimensions refers to as a "dimension-default"[21] must always be the same for a specified dimension, therefore must be consistent throughout a base financial reporting XBRL taxonomy, and must never be changed when creating a report model. The term "dimension-default" is a misnomer. The function of a

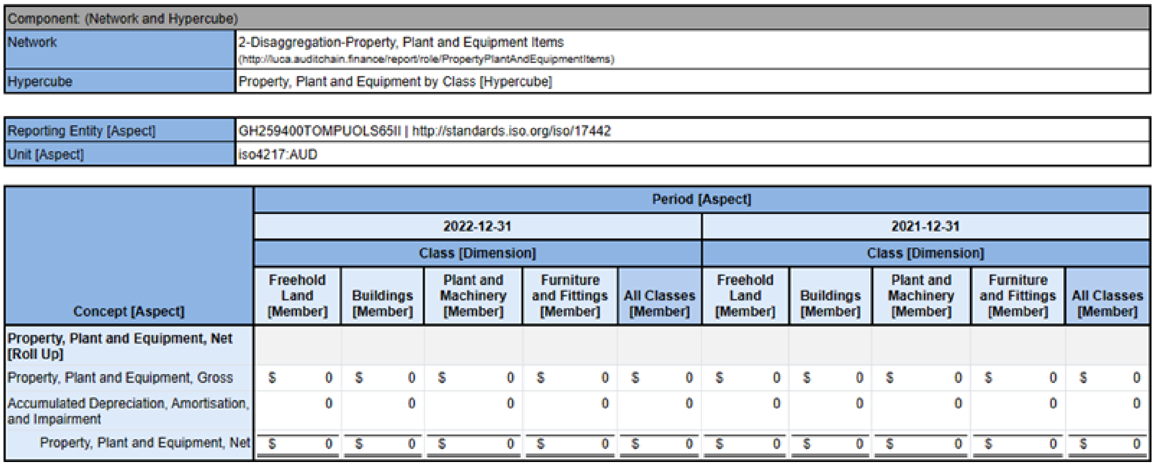
[21] XBRL International, XBRL Dimensions 1.0, 2.7 Default Values for Dimensions, https://www.xbrl.org/specification/dimensions/rec-2012-01-25/dimensions-rec-2006-09-18+corrected-errata-2012-01-25-clean.html#sec-default-values-for-dimensions

dimension-default is not to "default" a dimension. The purpose is to facilitate the intersection of hypercubes and to provide for a technical approach to representing XBRL facts within an XBRL instance without the need to duplicate facts. Explaining the nature of intersections is beyond the scope of this document, see this video, Intersections[22], which explains the notion of an intersection.

Dimension defaults must not be changed from how they are published within a base XBRL taxonomy. Published dimension defaults within a base financial reporting scheme taxonomy must not be changed between versions of such XBRL taxonomies.

Reasoning: If the root member or dimension-default changes then different reporting entities can represent information such that comparisons between reports becomes impossible.

The following example shows the intersections enabled by dimension defaults between a balance sheet which contains the line item "Property, Plant, and Equipment, Net", a disaggregation of the components of the total "Property, Plant, and Equipment, Net", and a roll forward of the movements of each component of "Property, Plant, and Equipment, Net" (Intersections[23], 13-TestCase-intersections[24])



Component: (Network and Hypercube)	
Network	2-Disaggregation-Property, Plant and Equipment Items (http://luca.auditchain.finance/report/role/PropertyPlantAndEquipmentItems)
Hypercube	Property, Plant and Equipment by Class [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:AUD

	Period [Aspect]									
	2022-12-31					2021-12-31				
	Class [Dimension]					Class [Dimension]				
Concept [Aspect]	Freehold Land [Member]	Buildings [Member]	Plant and Machinery [Member]	Furniture and Fittings [Member]	All Classes [Member]	Freehold Land [Member]	Buildings [Member]	Plant and Machinery [Member]	Furniture and Fittings [Member]	All Classes [Member]
Property, Plant and Equipment, Net [Roll Up]										
Property, Plant and Equipment, Gross	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Accumulated Depreciation, Amortisation, and Impairment	0	0	0	0	0	0	0	0	0	0
Property, Plant and Equipment, Net	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

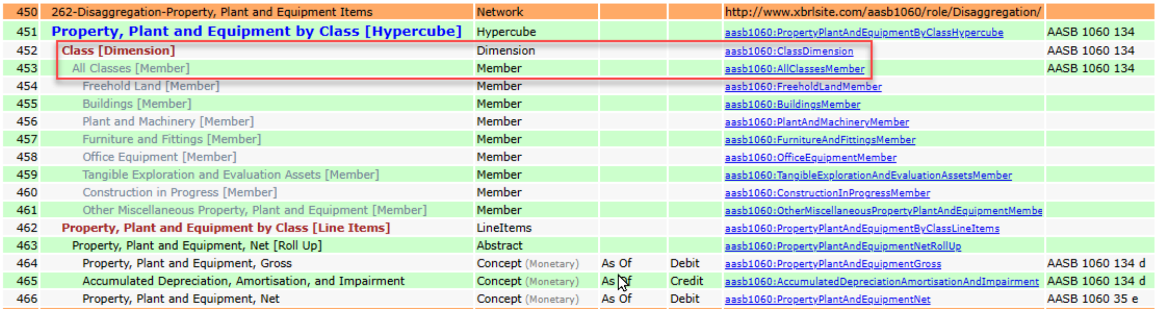
Note that if you examine the base financial reporting scheme XBRL taxonomy used for that financial reporting scheme, my AASB 1060 working prototype[25], you will note that the "root member" or "dimension-default" is always the same for each use of the dimension.

[22] YouTube.com, *Intersections*, https://youtu.be/lNPjwKy2Obs

[23] Intersections, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/intersections/index.html

[24] 13-TestCase-intersections, http://xbrlsite.com/seattlemethod/platinum-testcases/13-TestCase-intersections.xml

[25] AASB 1060 Financial Reporting Scheme (Prototype), http://xbrlsite.azurewebsites.net/2021/reporting-scheme/aasb1060/base-taxonomy/aasb1060_ModelStructure2.html



450	262-Disaggregation-Property, Plant and Equipment Items	Network			http://www.xbrlsite.com/aasb1060/role/Disaggregation/	
451	Property, Plant and Equipment by Class [Hypercube]	Hypercube			aasb1060:PropertyPlantAndEquipmentByClassHypercube	AASB 1060 134
452	Class [Dimension]	Dimension			aasb1060:ClassDimension	AASB 1060 134
453	All Classes [Member]	Member			aasb1060:AllClassesMember	AASB 1060 134
454	Freehold Land [Member]	Member			aasb1060:FreeholdLandMember	
455	Buildings [Member]	Member			aasb1060:BuildingsMember	
456	Plant and Machinery [Member]	Member			aasb1060:PlantAndMachineryMember	
457	Furniture and Fittings [Member]	Member			aasb1060:FurnitureAndFittingsMember	
458	Office Equipment [Member]	Member			aasb1060:OfficeEquipmentMember	
459	Tangible Exploration and Evaluation Assets [Member]	Member			aasb1060:TangibleExplorationAndEvaluationAssetsMember	
460	Construction in Progress [Member]	Member			aasb1060:ConstructionInProgressMember	
461	Other Miscellaneous Property, Plant and Equipment [Member]	Member			aasb1060:OtherMiscellaneousPropertyPlantAndEquipmentMembe	
462	Property, Plant and Equipment by Class [Line Items]	LineItems			aasb1060:PropertyPlantAndEquipmentByClassLineItems	
463	Property, Plant and Equipment, Net [Roll Up]	Abstract			aasb1060:PropertyPlantAndEquipmentNetRollUp	
464	Property, Plant and Equipment, Gross	Concept (Monetary)	As Of	Debit	aasb1060:PropertyPlantAndEquipmentGross	AASB 1060 134 d
465	Accumulated Depreciation, Amortisation, and Impairment	Concept (Monetary)	As Of	Credit	aasb1060:AccumulatedDepreciationAmortisationAndImpairment	AASB 1060 134 d
466	Property, Plant and Equipment, Net	Concept (Monetary)	As Of	Debit	aasb1060:PropertyPlantAndEquipmentNet	AASB 1060 35 e

1.7. Core Information Pattern Models Should Be Understood, Respected, and Always Followed

When representing information within a report model or base financial reporting scheme model; the known and well understood core information patterns should be consistent with and always follow the logic specified by best practice model of that pattern in the XBRL technical physical implementation of the information pattern.

Reasoning: The representation of information within an XBRL-based report is not "random". Nor is the information represented. Known logical patterns exist. For example: roll up, roll forward, set, and so forth. The technical artifact that are used to represent each pattern are knowable and observable. That physical technical implementation of each and every fragment of a report should be consistent and complete. Software can enforce this consistency and completeness.

Further note that the representation of one fragment of information should not be inconsistent with or contradict some other representation of another fragment of information. Every Block of information should both stand on its own and be consistent with every other Block of information within a report.

The following is an indisputable list of known logical patterns of information which appears in XBRL-based financial reports per empirical evidence from observing thousands and thousands of such reports[26]:

- Set
- Roll up
- Roll forward
- Arithmetic
- Member aggregation
- Member non-aggregation
- Variance (a.k.a. Difference)
- Adjustment (a.k.a. Restatement)
- Text block
- Roll forward info

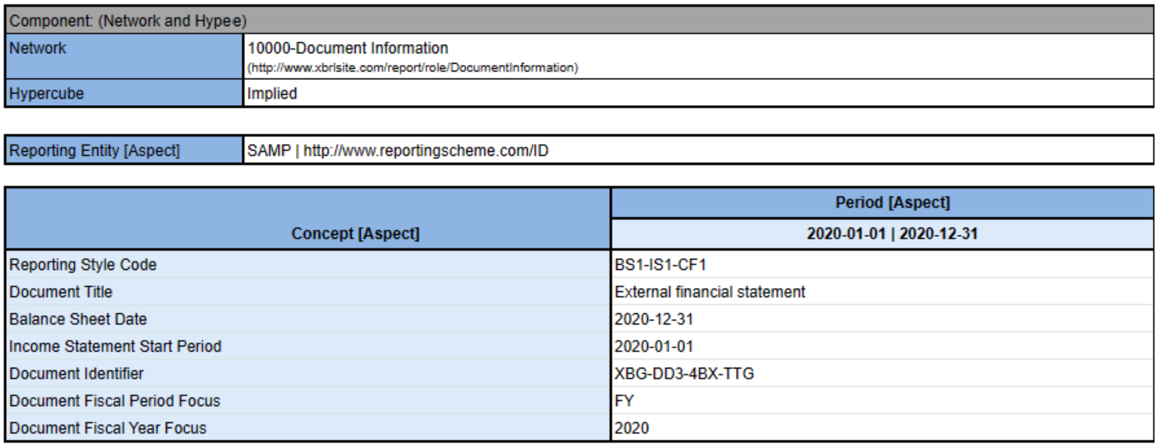
[26] Analysis of 6,751 10-Ks, http://www.xbrlsite.com/mastering/Part05_Chapter08.F_AnalysisOf675110Ks.pdf

I refer to the above information patterns, which are identifiable by software applications[27], as *Concept Arrangement Patterns*[28] for how Concepts and Abstracts are represented with a set of Line Items and *Member Arrangement Patterns*[29] for how the Member of a Dimension are represented within a Hypercube. The combination of a concept arrangement pattern and member arrangement pattern make up an information model.

Note that a Hypercube must always have exactly one Concept Arrangement Pattern and may have zero to many Member Arrangement Patterns.

Explaining all of the information patterns[30] is beyond the scope of this resource and they are each explained in detail by other referenced resources. But, two information patterns will be described in order to help the reader understand how to understand these information patterns.

The first information pattern is a Set concept arrangement pattern which has no member arrangement pattern because only core dimensions are used meaning that no additional noncore explicit dimensions have been added to the report model: (Set[31], 21-TestCase-set[32])



Component: (Network and Hypee)	
Network	10000-Document Information (http://www.xbrlsite.com/report/role/DocumentInformation)
Hypercube	Implied

Reporting Entity [Aspect]	SAMP | http://www.reportingscheme.com/ID

Concept [Aspect]	Period [Aspect]
	2020-01-01 | 2020-12-31
Reporting Style Code	BS1-IS1-CF1
Document Title	External financial statement
Balance Sheet Date	2020-12-31
Income Statement Start Period	2020-01-01
Document Identifier	XBG-DD3-4BX-TTG
Document Fiscal Period Focus	FY
Document Fiscal Year Focus	2020

Fundamentally, every concept arrangement pattern is a set. What you see above is such a set. There are no mathematical associations between the facts reported within the set and there are no other sorts of associations. The above is simply a set of facts that go together for some reason. This set of facts represents what I refer to as a Block[33] or a "block of information".

In the example above, an explicit hypercube was intentionally not used. Because of the lack of an explicit hypercube, think about how you would have software identify the set or what disclosure is represented by the set within a financial report. If you

[27] Information Model Identification, http://www.xbrlsite.com/mastering/InformationModelIdentification.pdf

[28] Concept Arrangement Patterns, http://www.xbrlsite.com/mastering/Part02_Chapter05.I_ConceptArrangementPatterns.pdf

[29] Member Arrangement Patterns, http://www.xbrlsite.com/mastering/Part02_Chapter05.J_MemberArrangementPatterns.pdf

[30] Full set of information patterns, http://www.xbrlsite.com/seattlemethod/platinum-testcases/index-patterns.xml

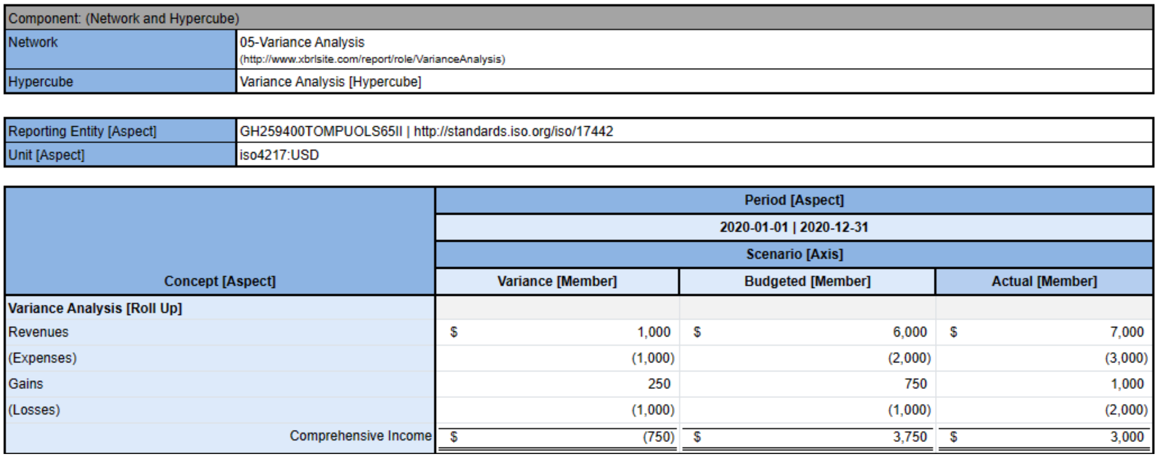
[31] Set, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/set/index.html

[32] 21-TestCase-set, http://www.xbrlsite.com/seattlemethod/platinum-testcases/21-TestCase-set.xml

[33] Block, http://www.xbrlsite.com/mastering/Part02_Chapter05.E2_Blocks.pdf

think about it, there is not even an identifiable name of a disclosure that you could tell the software to go get; unless, of course, you went through the trouble to define such a fragment of information, maybe "DocumentInformation". If you physically provide some name for some disclosure and then describe the information that makes up that disclosure in a manner that is understandable by software, then you could identify this set above as the DocumentInformation (the name you came up with) disclosure.

Contrast the Set above with the second information pattern which I called a Variance (but what is probably better referred to as a Difference because that term is more general) that adds two dynamics to the fundamental set. The first dynamic is a mathematical association between the reported facts of the set, in this case a roll up, and a noncore explicit dimension that must be added to differentiate the (Variance[34], 27-TestCase-variance[35])



Component: (Network and Hypercube)	
Network	05-Variance Analysis (http://www.xbrlsite.com/report/role/VarianceAnalysis)
Hypercube	Variance Analysis [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

	Period [Aspect]		
	2020-01-01 | 2020-12-31		
	Scenario [Axis]		
Concept [Aspect]	Variance [Member]	Budgeted [Member]	Actual [Member]
Variance Analysis [Roll Up]			
Revenues	$ 1,000	$ 6,000	$ 7,000
(Expenses)	(1,000)	(2,000)	(3,000)
Gains	250	750	1,000
(Losses)	(1,000)	(1,000)	(2,000)
Comprehensive Income	$ (750)	$ 3,750	$ 3,000

There are differences between the first example and this second example which I will explain to provide contrast and help you understand how to think about information blocks.

The variance is a set, but it expands on the notion of a set by adding a mathematical computation, in this case a roll up of items to a total, within the set. Specifically, "Revenues – Expenses + Gains – Losses = Comprehensive Income". Basically, the information block "foots" as accountants say.

In addition, the information block also "cross casts" or adds up horizontally. For each line item such as "Revenues"; the "Actual = Budgeted + Variance". The "Actual [Member]" must be the root member or dimension-default as we discussed because this variance analysis wound need to intersect with a comprehensive income statement if it was provided.

Further, note that an explicit Hypercube was provided. First know that the creator of this report model has no choice but to add an explicit Hypercube. Why? Because you can only add dimensions to a block of information if there is a hypercube to connect the dimension to. Secondly, an XBRL Formula is used to represent the mathematical relationship between the members "Actual [Member]", "Budgeted [Member]", and "Variance [Member]" resulting in an aggregation of members.

[34] Variance, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/variance/index.html

[35] 27-TestCase-variance, http://www.xbrlsite.com/seattlemethod/platinum-testcases/27-TestCase-variance.xml

There are other aspects of this information block which could be discussed, but we will leave our discussion now and move on. For additional information please refer to the referenced materials.

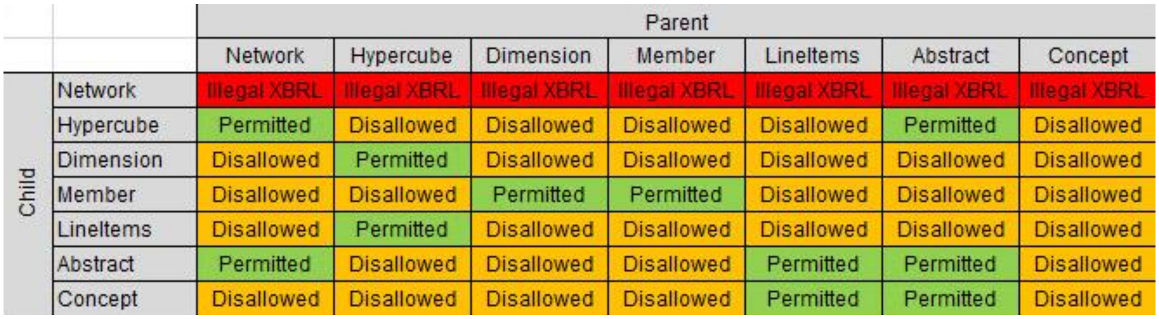
1.8. Understand and Respect Logical Relations Between Report Element Categories

While not clearly defined by the XBRL technical specification; XBRL does define some of and infers the following categories[36] of artifacts for representing information within an XBRL report and defining a report model or a base financial reporting scheme:

- Network
- Hypercube (a.k.a. Table)
- Dimension (a.k.a. Axis)
- Member
- Line Items (a.k.a. Primary Items)
- Abstract
- Concept

Reasoning: Just because the XBRL technical specification does not clearly and explicitly define each of these categories of artifacts and because the US GAAP XBRL Taxonomy and the XBRL technical specifications use different terms al la "Table" and "Axis" instead of "Hypercube" and "Dimension" does NOT mean that (a) some list can be created and (b) software cannot use that list to enforce the permitted and disallowed associations between these categories of report elements.

Further, there are very obvious but unpublished logical and pathological (a.k.a. illogical) associations between these categories of XBRL technical artifacts that represent the logical pieces of a fragment of a report. This matrix summarizes these permitted and disallowed associations:



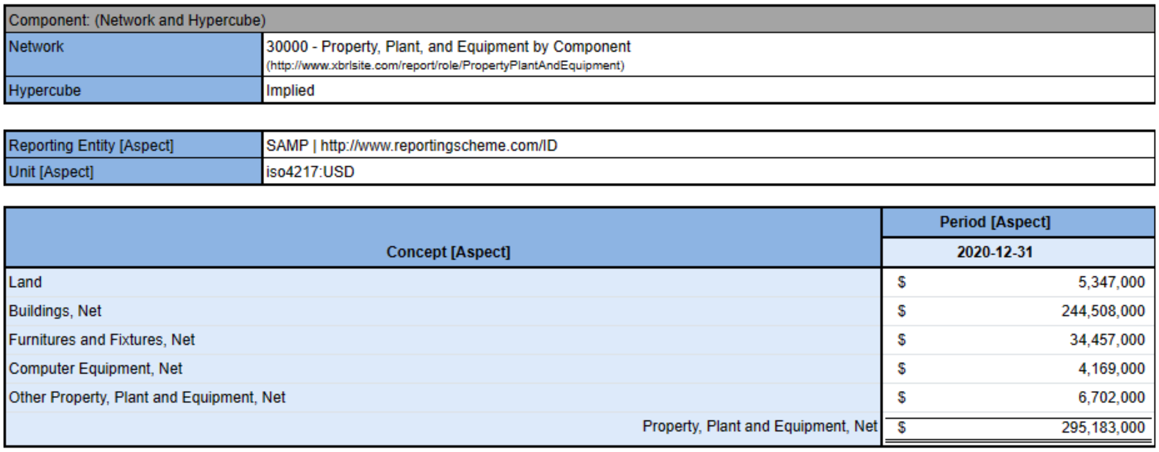
		Parent						
		Network	Hypercube	Dimension	Member	LineItems	Abstract	Concept
Child	Network	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL
	Hypercube	Permitted	Disallowed	Disallowed	Disallowed	Disallowed	Permitted	Disallowed
	Dimension	Disallowed	Permitted	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Member	Disallowed	Disallowed	Permitted	Permitted	Disallowed	Disallowed	Disallowed
	LineItems	Disallowed	Permitted	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Abstract	Permitted	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed
	Concept	Disallowed	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed

Now, 95% or more of these specified permitted and disallowed associations are not disputed. Further, 99% of the associations of SEC XBRL-based reports follow these prescribed associations. The XBRL technical specification only enforces the idea that a network cannot contain another network within it. That notion is both illogical and it is enforced by the XBRL technical specification and so this idea cannot really be disputed.

[36] Terms, http://www.xbrlsite.com/mastering/Part02_Chapter05.C_Terms.pdf

But why is it that the XBRL technical specification does not specify 100% of these permitted and disallowed associations? XBRL International certainly could because I personally can as you see above in human readable form above, and have also specified this information in machine readable form[37]. Currently, neither XBRL International, the FASB, the SEC, the IFRS Foundation, the ESMA, nor anyone else that I am aware of have formally specified (a) a clear list of these categories of artifacts and (b) the permitted and disallowed associations between the artifacts.

An example shows why this is important (Model Structure Flaw[38], 93-TestCase-model-structure-flaw[39])

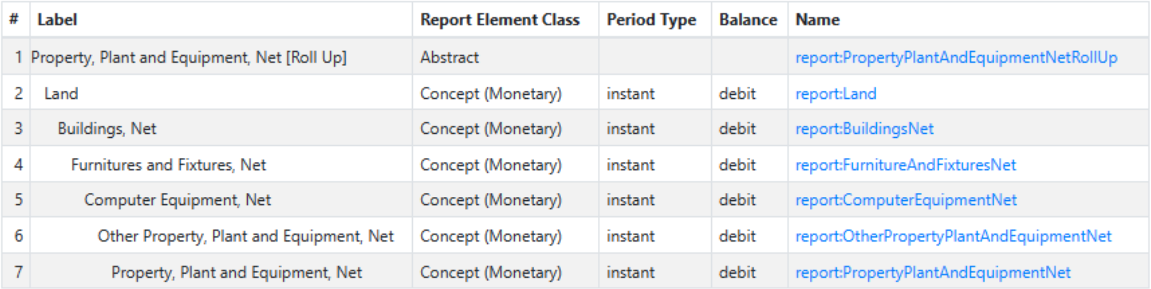


Component: (Network and Hypercube)	
Network	30000 - Property, Plant, and Equipment by Component (http://www.xbrlsite.com/report/role/PropertyPlantAndEquipment)
Hypercube	Implied

Reporting Entity [Aspect]	SAMP | http://www.reportingscheme.com/ID
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2020-12-31	
Land	$	5,347,000
Buildings, Net	$	244,508,000
Furnitures and Fixtures, Net	$	34,457,000
Computer Equipment, Net	$	4,169,000
Other Property, Plant and Equipment, Net	$	6,702,000
Property, Plant and Equipment, Net	$	295,183,000

The example above shows a straight forward "roll up" information model. It looks fine. It is a little odd because the currency sign exists in a few places that it should not in the rendering of the information. But if one looks at the modeling of the report, you see something completely absurd[40]:



#	Label	Report Element Class	Period Type	Balance	Name
1	Property, Plant and Equipment, Net [Roll Up]	Abstract			report:PropertyPlantAndEquipmentNetRollUp
2	Land	Concept (Monetary)	instant	debit	report:Land
3	Buildings, Net	Concept (Monetary)	instant	debit	report:BuildingsNet
4	Furnitures and Fixtures, Net	Concept (Monetary)	instant	debit	report:FurnitureAndFixturesNet
5	Computer Equipment, Net	Concept (Monetary)	instant	debit	report:ComputerEquipmentNet
6	Other Property, Plant and Equipment, Net	Concept (Monetary)	instant	debit	report:OtherPropertyPlantAndEquipmentNet
7	Property, Plant and Equipment, Net	Concept (Monetary)	instant	debit	report:PropertyPlantAndEquipmentNet

Notice how each of the line items of property, plant, and equipment are indented in the report model. This is obviously a pathological representation in order to make a point. Each concept is a "child" of the concept above it rather than a "sibling".

[37] Model Structure Rules, http://xbrlsite.com/seattlemethod/cm/model-structure-rules-strict-def.xml

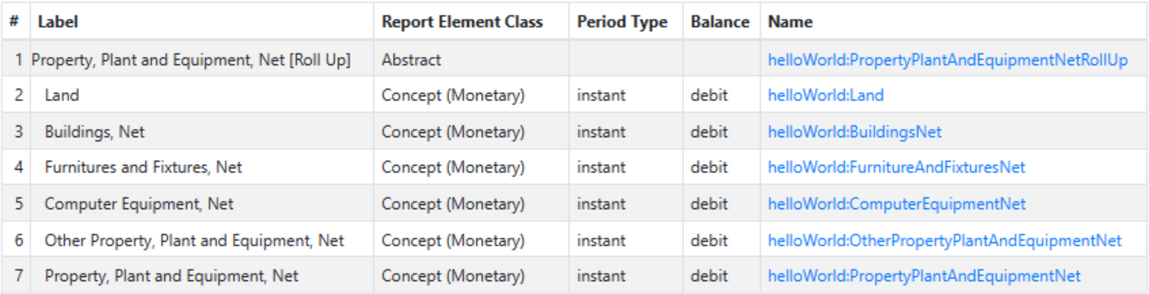
[38] Model Structure Flaw, http://www.xbrlsite.com/site1/seattlemethod/platinum-testcases/model-structure-flaw/index.html

[39] 93-TestCase-model-structure-flaw, http://www.xbrlsite.com/seattlemethod/platinum-testcases/93-TestCase-model-structure-flaw.xml

[40] Model Structure (Flaw), https://auditchain.infura-ipfs.io/ipfs/QmRJB7biJ9XJDFkSEgyvYUxodeotKumBVB6aR2YbH1nTV4/b3097fe0ecdcbf8c4bf2.html#01b61be9ca8c16acbdc9

Note that the software processing this pathological representation is aware of this sort of issue and overcomes this flawed model structure when it generates the rendering.

To better understand the flaw, here is an appropriate report model for this same information[41]:



#	Label	Report Element Class	Period Type	Balance	Name
1	Property, Plant and Equipment, Net [Roll Up]	Abstract			helloWorld:PropertyPlantAndEquipmentNetRollUp
2	Land	Concept (Monetary)	instant	debit	helloWorld:Land
3	Buildings, Net	Concept (Monetary)	instant	debit	helloWorld:BuildingsNet
4	Furnitures and Fixtures, Net	Concept (Monetary)	instant	debit	helloWorld:FurnitureAndFixturesNet
5	Computer Equipment, Net	Concept (Monetary)	instant	debit	helloWorld:ComputerEquipmentNet
6	Other Property, Plant and Equipment, Net	Concept (Monetary)	instant	debit	helloWorld:OtherPropertyPlantAndEquipmentNet
7	Property, Plant and Equipment, Net	Concept (Monetary)	instant	debit	helloWorld:PropertyPlantAndEquipmentNet

Now while the pathological representation is very obviously a flaw and few people would dispute this observation; it is the case that some would dispute the rule that a "Concept" being a child of another "Concept" should be disallowed. Why?

So again; the XBRL technical specification does not enforce what category of report model artifact can be associated with another category of report model artifact. It does not even define the notion of each of the categories of report artifacts. To overcome this neglected rule, I personally specified the matrix that I provided earlier, I convinced three separate software developers to support this (XBRL Cloud, Pesseract, Auditchain Pacioli, Auditchain Luca) validation. In addition, one software developer that created Auditchain Luca, enforces these rules during the creation of an XBRL-based report per that matrix and forces those creating reports to get this 100% correct 100% of the time within that software.

This same idea can be used by creation software using many of these other rules of thumb. It is being used by one software application already so I know this works.

1.9. *Properly Separate Information Blocks*

Information blocks, or logical fragments of a financial report, should be properly separated to maximize the ability of a user of a report to consume information from the report.

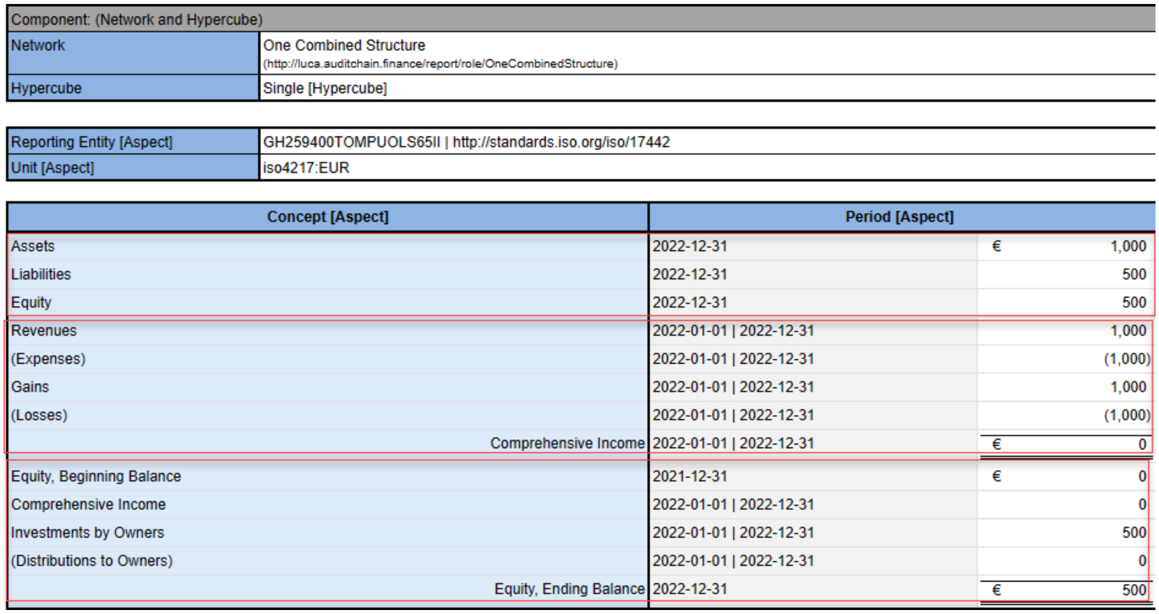
Reasoning: Using information from an XBRL-based report should not be a guessing game.

The following is an example of a report where the reported information is not effectively separated into logical sets of information (Run Together Blocks[42], 91-TestCase-run-together-blocks[43])

[41] Model Structure (Hello World, no flaw), https://auditchain.infura-ipfs.io/ipfs/QmQASf7xC17zZY8ndCYMG1gMRhq3R1wkNjyR4LdsXsr1dW/242b88db1b81a44d4ef0.html#1a234d908a4d0ac2ed9a

[42] Run Together Blocks, http://www.xbrlsite.com/seattlemethod/platinum-testcases/run-together-blocks/index.html

[43] 91-TestCase-run-together-blocks, http://www.xbrlsite.com/seattlemethod/platinum-testcases/91-TestCase-run-together-blocks.xml



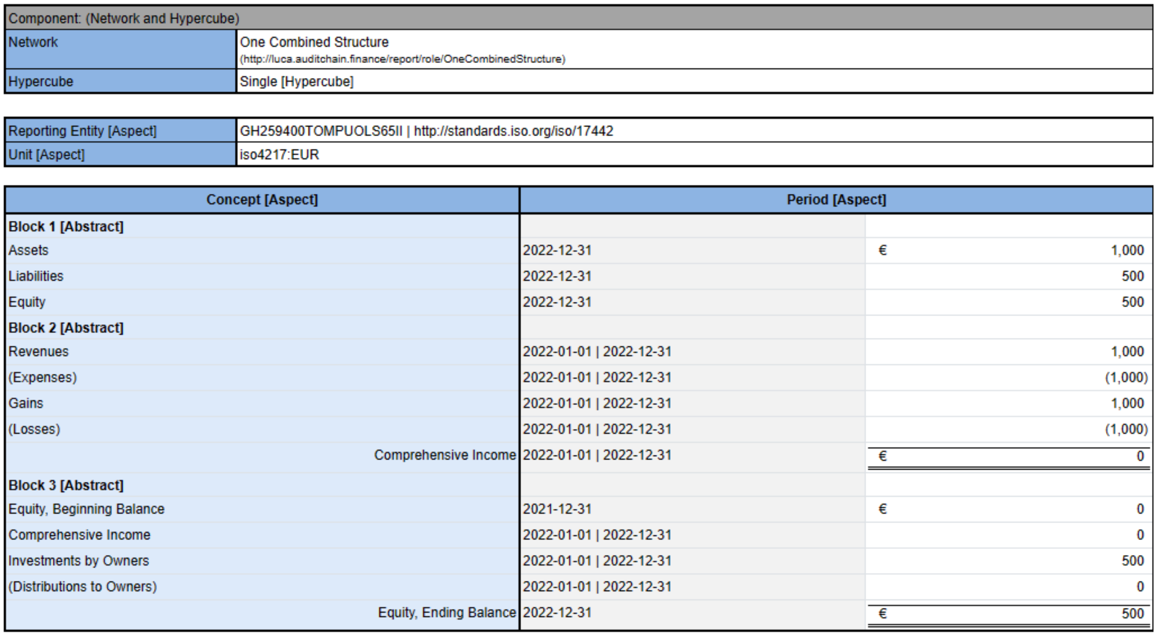
Component: (Network and Hypercube)	
Network	One Combined Structure (http://luca.auditchain.finance/report/role/OneCombinedStructure)
Hypercube	Single [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]		
Assets	2022-12-31	€	1,000
Liabilities	2022-12-31		500
Equity	2022-12-31		500
Revenues	2022-01-01 | 2022-12-31		1,000
(Expenses)	2022-01-01 | 2022-12-31		(1,000)
Gains	2022-01-01 | 2022-12-31		1,000
(Losses)	2022-01-01 | 2022-12-31		(1,000)
Comprehensive Income	2022-01-01 | 2022-12-31	€	0
Equity, Beginning Balance	2021-12-31	€	0
Comprehensive Income	2022-01-01 | 2022-12-31		0
Investments by Owners	2022-01-01 | 2022-12-31		500
(Distributions to Owners)	2022-01-01 | 2022-12-31		0
Equity, Ending Balance	2022-12-31	€	500

What you see above is an all-to-common and can be seen as a flaw and certainly is not best practice. What is going on is that three separate blocks of information "run together" because the person creating the report model did nothing to keep the information blocks separate. Software can overcome this problem. But it is better if information is represented more appropriately.

Here is a basic fix that adds [Abstract] report elements that logically breaks up the information blocks (Run Together Blocks Fixed,)



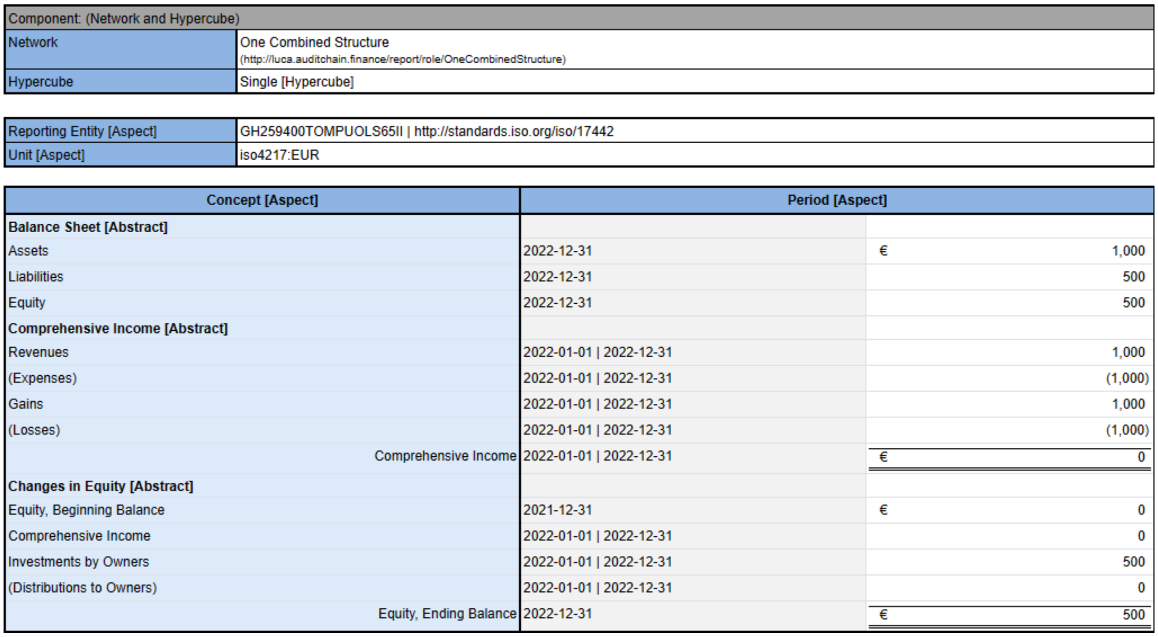
Component: (Network and Hypercube)	
Network	One Combined Structure (http://luca.auditchain.finance/report/role/OneCombinedStructure)
Hypercube	Single [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]		
Block 1 [Abstract]			
Assets	2022-12-31	€	1,000
Liabilities	2022-12-31		500
Equity	2022-12-31		500
Block 2 [Abstract]			
Revenues	2022-01-01 | 2022-12-31		1,000
(Expenses)	2022-01-01 | 2022-12-31		(1,000)
Gains	2022-01-01 | 2022-12-31		1,000
(Losses)	2022-01-01 | 2022-12-31		(1,000)
Comprehensive Income	2022-01-01 | 2022-12-31	€	0
Block 3 [Abstract]			
Equity, Beginning Balance	2021-12-31	€	0
Comprehensive Income	2022-01-01 | 2022-12-31		0
Investments by Owners	2022-01-01 | 2022-12-31		500
(Distributions to Owners)	2022-01-01 | 2022-12-31		0
Equity, Ending Balance	2022-12-31	€	500

Above you can see the big difference that occurs if you simply put some sort of abstract concept in the report model to separate the information blocks.

But an even more optimal fix would be to add more meaningful abstract report elements to separate the information blocks. Here is an improved representation which makes that point (Run Together Blocks Best,)



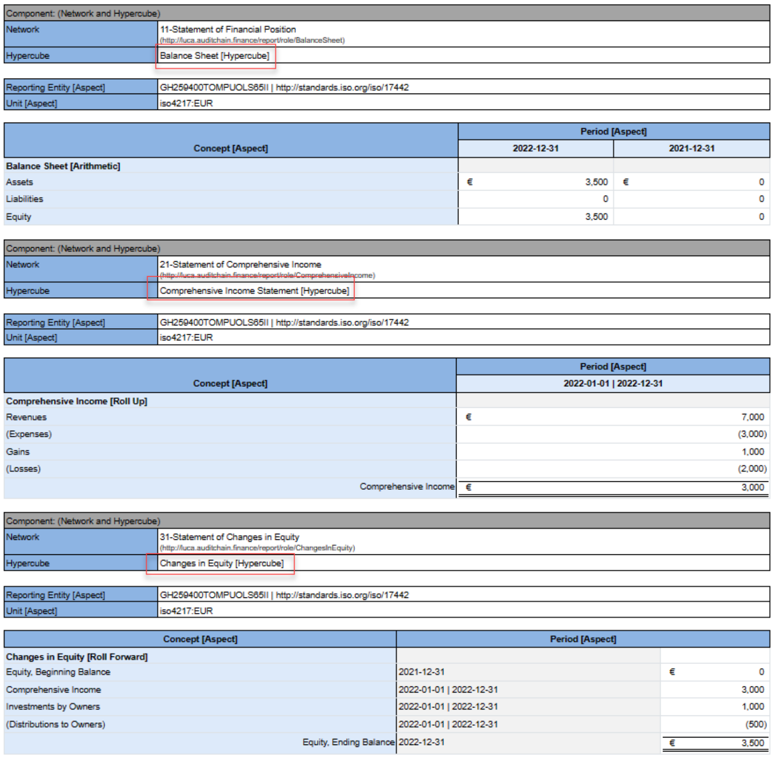
Component: (Network and Hypercube)	
Network	One Combined Structure (http://luca.auditchain.finance/report/role/OneCombinedStructure)
Hypercube	Single [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]		
Balance Sheet [Abstract]			
Assets	2022-12-31	€	1,000
Liabilities	2022-12-31		500
Equity	2022-12-31		500
Comprehensive Income [Abstract]			
Revenues	2022-01-01 | 2022-12-31		1,000
(Expenses)	2022-01-01 | 2022-12-31		(1,000)
Gains	2022-01-01 | 2022-12-31		1,000
(Losses)	2022-01-01 | 2022-12-31		(1,000)
Comprehensive Income	2022-01-01 | 2022-12-31	€	0
Changes in Equity [Abstract]			
Equity, Beginning Balance	2021-12-31	€	0
Comprehensive Income	2022-01-01 | 2022-12-31		0
Investments by Owners	2022-01-01 | 2022-12-31		500
(Distributions to Owners)	2022-01-01 | 2022-12-31		0
Equity, Ending Balance	2022-12-31	€	500

As you might agree, meaningful names and labels help the reader of the report understand the information.

Finally, one could also separate each of the fragments of information into separate hypercubes such as is shown in the SFAC 6 example (SFAC6-BS1-IS1, asdf)



Component: (Network and Hypercube)	
Network	11-Statement of Financial Position (http://luca.auditchain.finance/report/role/BalanceSheet)
Hypercube	Balance Sheet [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]			
	2022-12-31		2021-12-31	
Balance Sheet [Arithmetic]				
Assets	€	3,500	€	0
Liabilities		0		0
Equity		3,500		0

Component: (Network and Hypercube)	
Network	21-Statement of Comprehensive Income (http://luca.auditchain.finance/report/role/ComprehensiveIncome)
Hypercube	Comprehensive Income Statement [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]	
	2022-01-01 | 2022-12-31	
Comprehensive Income [Roll Up]		
Revenues	€	7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income	€	3,000

Component: (Network and Hypercube)	
Network	31-Statement of Changes in Equity (http://luca.auditchain.finance/report/role/ChangesInEquity)
Hypercube	Changes in Equity [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]		
Changes in Equity [Roll Forward]			
Equity, Beginning Balance	2021-12-31	€	0
Comprehensive Income	2022-01-01 | 2022-12-31		3,000
Investments by Owners	2022-01-01 | 2022-12-31		1,000
(Distributions to Owners)	2022-01-01 | 2022-12-31		(500)
Equity, Ending Balance	2022-12-31	€	3,500

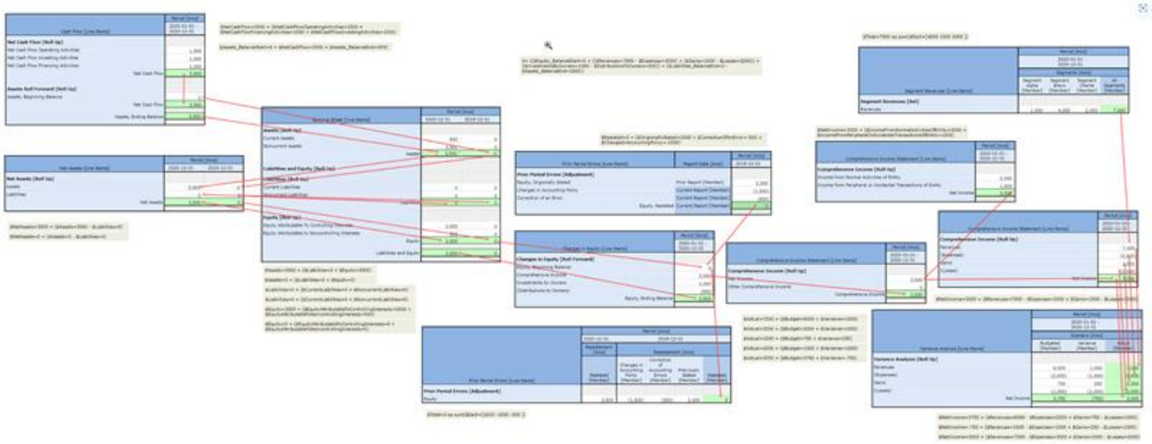
1.10. Understand and Clearly Represent Articulation in Base Financial Reporting Schemes and Respect Articulation in Report Models

A base financial reporting scheme XBRL taxonomy should represent articulation clearly and effectively and report models and reports created should be consistent with such universal articulation rules.

Reasoning: Articulation is the notion that the primary financial statements (balance sheet, income statement, comprehensive income, cash flow statement, statement of changes in equity) are consciously interconnected mathematically. Both the conceptual frameworks of US GAAP and IFRS specifically make mention of this notion and both of those base financial reporting schemes explicitly subscribe to this notion. Further, many disclosures within the disclosure notes mathematically disaggregate or roll forward line items of the core information provided within the primary financial statements.

Those creating XBRL taxonomies for base financial reporting schemes should be aware of and represent this information in such XBRL taxonomies, those creating reports should provide reports that are consistent with this articulation, and those analyzing information from reports should understand this articulation, verify that reports are consistent with such articulation, and leverage this articulation when analyzing such financial reports.

This screen shot helps the reader understand what is meant by articulation[44]: (click on the link for a larger version of the screen shot shown)



Notice the core mathematical connections that exist between the primary financial statements in this prototype, focusing on the mathematics:

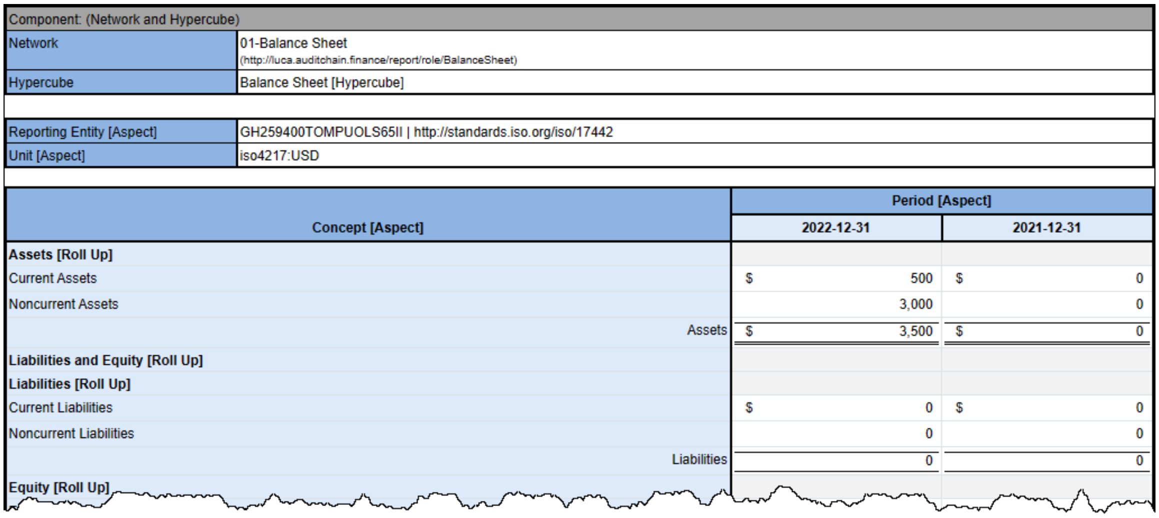
- Assets = Liabilities + Equity (connects the two roll ups that make up the balance sheet)
- Net Income = Revenues – Expenses + Gains - Losses (disaggregation of net income)
- Net Cash Flows = Net Cash Flows from Operating Activities + Net Cash Flows from Investing Activities + Net Cash Flows from Financing Activities

[44] Articulation, https://www.xbrlsite.com/seattlemethod/platinum/proof/PROOF_Articulation.jpg

- Comprehensive Income = Net Income + Other Comprehensive Income
- Equity = Equity Attributable to Controlling Interests + Equity Attributable to Noncontrolling Interests
- Ending Equity = Beginning Equity + Comprehensive Income + Investments by Owners - Distributions to Owners
- Ending Assets = Beginning Assets + Net Cash Flow

Notice that the associations represented in this prototype appear simplistic, and many accountants might get distracted by the apparent simplicity. But this would be missing the main point. The prototype is simple in order to make the point, not show the actual accounting associations of US GAAP or IFRS. Similar rules exist for US GAAP and IFRS and every financial reporting scheme, or should. It is these associations, this articulation, that forms the foundation of accounting and reporting, explicitly designed by accounting professionals in 1211 by Italian banks to detect errors and differentiate error from fraud[45]. This articulation is a consciously designed tool of professional accountants that should be in the fore front of every accountant's mind when creating a base financial reporting scheme or report using such a financial reporting scheme.

To further understand this information, here is an example of the report behind that screenshot: (Articulation, 99.41-TestCase-articulation[46])



Component: (Network and Hypercube)	
Network	01-Balance Sheet (http://luca.auditchain.finance/report/role/BalanceSheet)
Hypercube	Balance Sheet [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]	
	2022-12-31	2021-12-31
Assets [Roll Up]		
Current Assets	$ 500	$ 0
Noncurrent Assets	3,000	0
Assets	$ 3,500	$ 0
Liabilities and Equity [Roll Up]		
Liabilities [Roll Up]		
Current Liabilities	$ 0	$ 0
Noncurrent Liabilities	0	0
Liabilities	0	0
Equity [Roll Up]		

The screen shot shows the beginning of a much longer report that contains all of the mathematically interconnected disclosures including all of the mathematical rules represented using XBRL Formula. Further, this example shows that each of the information model patterns interacts with each other pattern correctly and that the logic of the information within the report is correct.

[45] Charles Hoffman, CPA, *Essence of Accounting*, http://xbrlsite.azurewebsites.net/2020/Library/EssenceOfAccounting.pdf

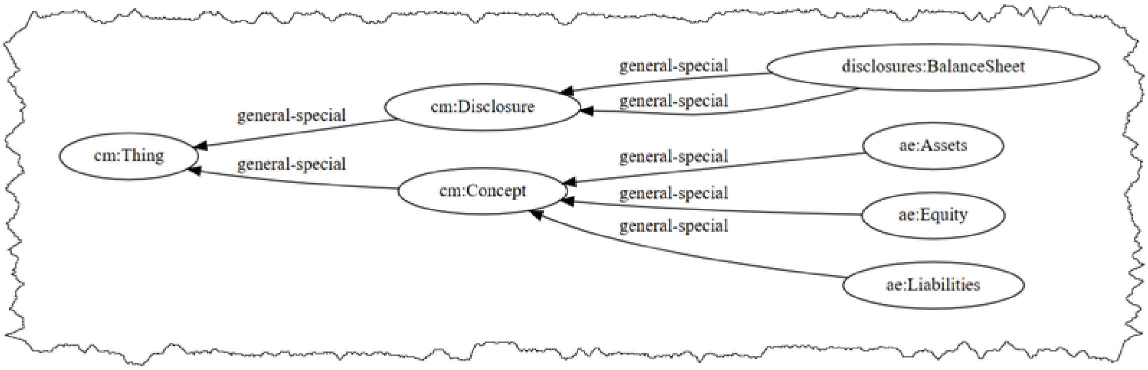
[46] 99.41-TestCase-articulation, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.41-TestCase-articulation.xml

1.11. Intermediate Components Should Be Managed Using Anchoring and Wider-Narrower Associations

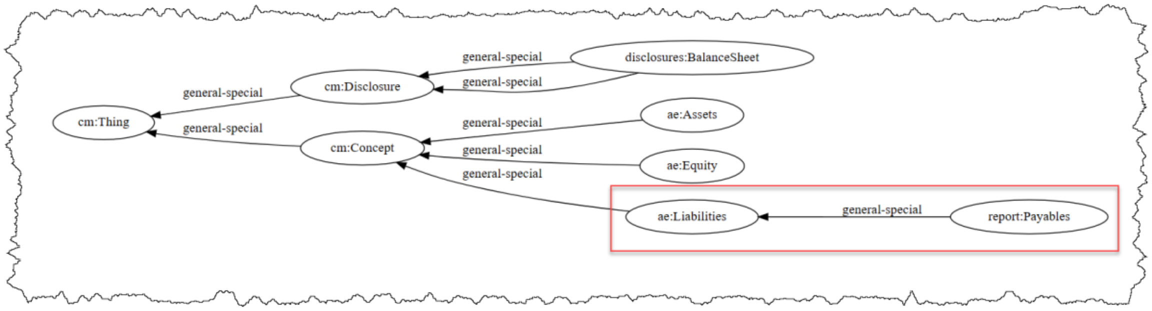
Intermediate components defined by a report model should be "anchored" to a base financial reporting scheme XBRL taxonomy using "wider-narrower" or "general-special" and/or "has-part" and/or "instance-inflow" and/or "instance-outflow" and other such logical information to explain the report model created. This implies that base financial reporting schemes must create the initial concepts and knowledge graph which serves as the foundation for this mechanism.

Reasoning: The only way for analysts to understand the information being extracted from a report when reporting economic entities are permitted to modify report models is for such reports to explicitly provide that information.

Consider this extremely simple financial reporting scheme knowledge graph which explains the relations between all the concepts used int that base financial reporting scheme:



Now imagine that a reporting economic entity desires to report the line item "Payables" and they do so by "anchoring" the extension concept "Payables" to "ae:Liabilities" such: (AE State 7[47], 95.6-TestCase-ae-state7a[48])

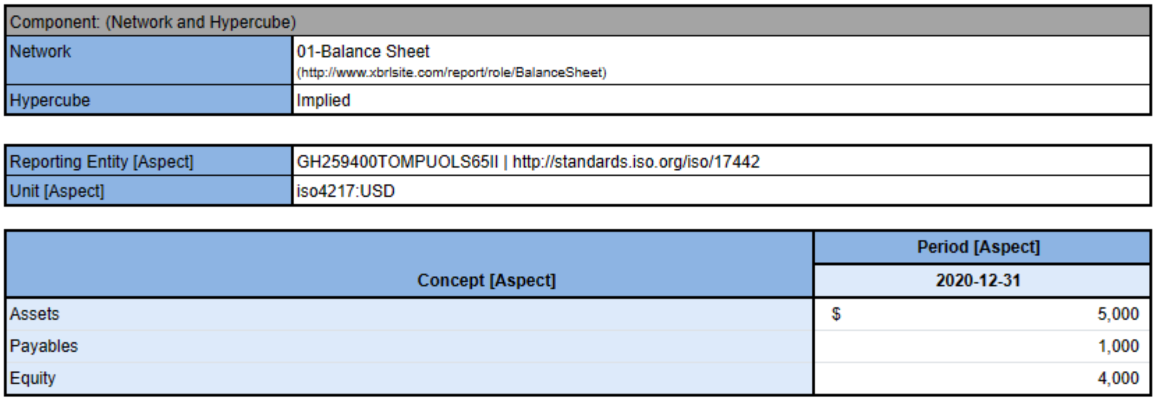


This simple example shows the mechanism that would be fundamentally used for each and every extension concept created by a reporting entity. There are a significant number of details to be fleshed out; but fundamentally, this is the mechanism that would be used.

The following is an example of the actual report:

[47] AE State 7, https://xbrlsite.com/seattlemethod/platinum-testcases/ae-state7/index.html

[48] 95.6-TestCase-ae-state7a, http://xbrlsite.com/seattlemethod/platinum-testcases/95.7-TestCase-ae-state7a.xml



Component: (Network and Hypercube)	
Network	01-Balance Sheet (http://www.xbrlsite.com/report/role/BalanceSheet)
Hypercube	Implied

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]
	2020-12-31
Assets	$ 5,000
Payables	1,000
Equity	4,000

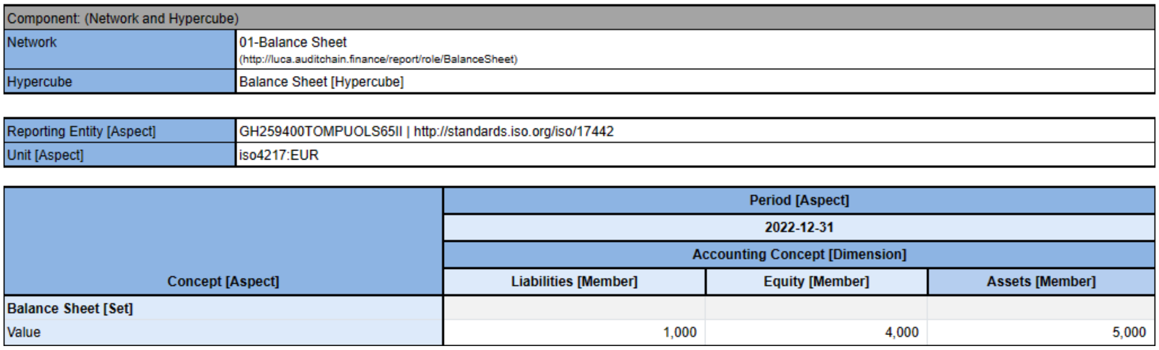
Note the extension concept "Payables" used. Software would be able to understand that Payables is a type of Liability per the anchoring to that concept using an arcrole defined for such.

1.12. Accounting Concepts Should Never Be Included in Dimensions

Accounting concepts should always be represented as Concepts that are part of a set of Line Items. Accounting concepts should never be included as Members of a Dimension. If a Member can be a DEBIT or a CREDIT; then that Member is represented incorrectly.

Reasoning: There are two approaches to representing information: (1) Line Items/Concept; (2) Dimension/Member. When to use each approach should be clearly in order to have consistent representations between reporting economic entities.

Here is an example of accounting concepts being represented dimensionally, an example of what should be avoided: (Accounting Concepts Dimensional[49], 99.23-TestCase-accounting-concepts-dimensional[50])



Component: (Network and Hypercube)	
Network	01-Balance Sheet (http://luca.auditchain.finance/report/role/BalanceSheet)
Hypercube	Balance Sheet [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

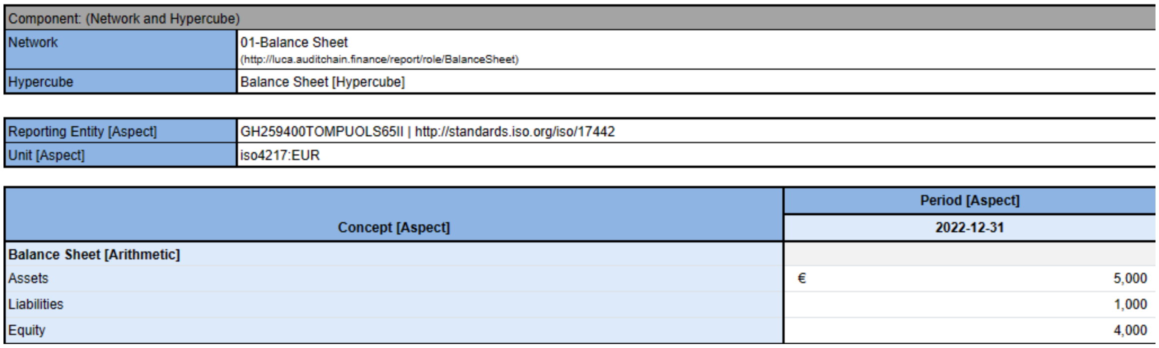
Concept [Aspect]	Period [Aspect]		
	2022-12-31		
	Accounting Concept [Dimension]		
	Liabilities [Member]	Equity [Member]	Assets [Member]
Balance Sheet [Set]			
Value	1,000	4,000	5,000

Notice that the concepts "Assets", "Liabilities", and "Equity" have been represented as Members of the Dimension "Accounting Concept [Dimension]".

[49] Accounting Concepts Dimensional, http://www.xbrlsite.com/seattlemethod/platinum-testcases/accounting-concepts-dimensional/index.html

[50] 99.23-TestCase-accounting-concepts-dimensional, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.23-TestCase-accounting-concepts-dimensional.xml

This representation above is both logical and the logical meaning (the semantics) is identical to the representation that you see below: (Accounting Concepts Lineitems[51], 99.24-TestCase-accounting-concepts-lineitems[52])



Component: (Network and Hypercube)	
Network	01-Balance Sheet (http://luca.auditchain.finance/report/role/BalanceSheet)
Hypercube	Balance Sheet [Hypercube]

Reporting Entity [Aspect]	GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:EUR

Concept [Aspect]	Period [Aspect]	
	2022-12-31	
Balance Sheet [Arithmetic]		
Assets	€	5,000
Liabilities		1,000
Equity		4,000

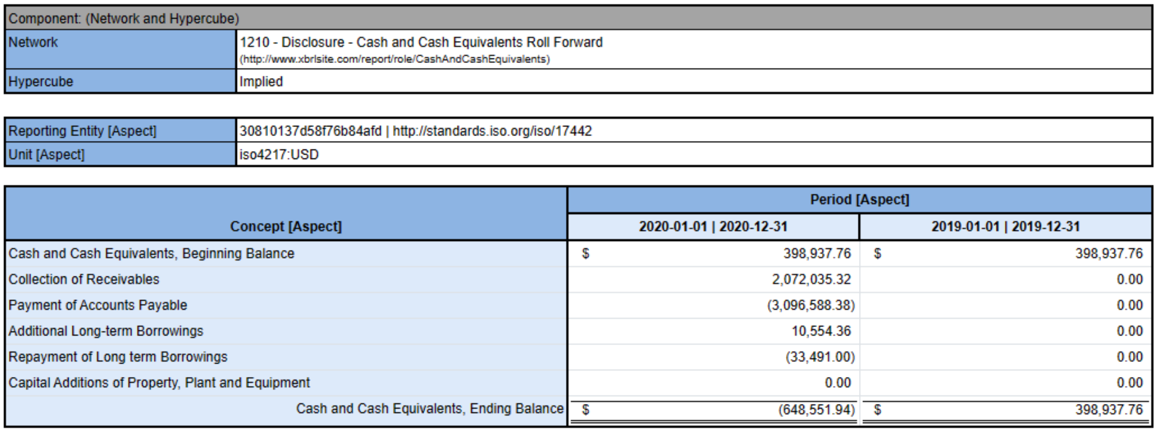
This example shows the proper approach to representing accounting concepts, as Concepts within a set of Line Items. Dimensions can be used do differentiate subclasses of such accounting concepts.

1.13. Always Represent Roll Forward Computations as Line Items

A roll forward should not be modeled using a dimension; rather, roll forwards should consistently be represented using Line Items.

Reasoning: All (the vast majority of) roll forwards in the US GAAP and IFRS XBRL taxonomies are consistently represented using line items.

Here is an example of a roll forward properly represented as a set of Line Items: (Roll Forward, TO DO)



Component: (Network and Hypercube)	
Network	1210 - Disclosure - Cash and Cash Equivalents Roll Forward (http://www.xbrlsite.com/report/role/CashAndCashEquivalents)
Hypercube	Implied

Reporting Entity [Aspect]	30810137d58f76b84afd | http://standards.iso.org/iso/17442
Unit [Aspect]	iso4217:USD

Concept [Aspect]	Period [Aspect]			
	2020-01-01 | 2020-12-31		2019-01-01 | 2019-12-31	
Cash and Cash Equivalents, Beginning Balance	$	398,937.76	$	398,937.76
Collection of Receivables		2,072,035.32		0.00
Payment of Accounts Payable		(3,096,588.38)		0.00
Additional Long-term Borrowings		10,554.36		0.00
Repayment of Long term Borrowings		(33,491.00)		0.00
Capital Additions of Property, Plant and Equipment		0.00		0.00
Cash and Cash Equivalents, Ending Balance	$	(648,551.94)	$	398,937.76

For contrast, here is an example of a roll forward that is logically equivalent to the roll forward you see above but represented where the changes are represented as the members of a dimension rather than as concepts within a set of line items: (Roll Forward Dimensional, Test Case)

[51] Accounting Concepts Lineitems, http://www.xbrlsite.com/seattlemethod/platinum-testcases/accounting-concepts-lineitems/index.html

[52] 99.24-TestCase-accounting-concepts-lineitems, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.24-TestCase-accounting-concepts-lineitems.xml

[Coming Soon, need to figure out exactly how to do this]

1.14. Never Define Facts in Multiple Ways (needs fixing)

There should not be multiple approaches to defining a fact, using both a Line Items based approach and a Dimensions based approach. For example, consider the concept "xasb:AssetsInTheUnitedStates" (as a Line Item) and "xasb:Assets" and having a location dimension such as "xasb:Location" with the member "xasb:UnitedStates". An XBRL fact should not have multiple ways of being defined.

Saying this another way; it should be clear when reporting entities are creating report models as to whether a Line Items based approach should be used or whether a Dimensional approach should be used when representing facts.

[Examples forthcoming]

1.15. Dimensions used in the Representation of a Fact Do Not Represent Properties

Dimensions are not used to communicate properties of a Concept; dimensions represent aspects of a Fact that are used to differentiate one reported Fact from another reported Fact. Do not use dimensions on a fact to capture the properties (a.k.a. traits, qualities, attributes) of a Concept.

Reasoning: First, it is important to understand that properties (a.k.a. traits, qualities, attributes) of a Concept tend to be universal and therefore tend to be represented at the level of a base financial reporting scheme rather than at the level of an economic entities report model. Second, properties should be consistently created using XBRL definition relations rather than XBRL dimensions.

Properties such as whether a Concept is "current" as opposed to "noncurrent" or "operating" as opposed to "nonoperating" or other such ideas are properties that should be provided in a base financial reporting scheme taxonomy rather than individually represented by economic entities in their individual report models.

Properties (a.k.a. traits, qualities, attributes) of a concept should be properly associated with the concepts of a financial reporting scheme (generally) and not with a specific report model use of a concept.

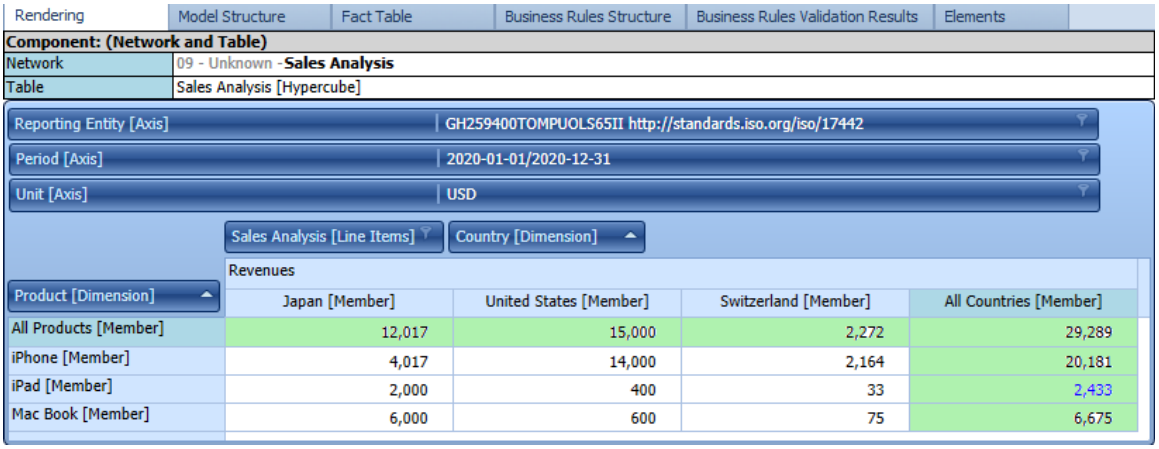
[Examples forthcoming]

1.16. Dependent Dimensions Should Not be Used

Dependent dimensions should not be used (should be avoided) and no reported facts should include dependent dimensions. Consequently, no hypercube should define dependent dimensions; all dimensions should be independent of one another.

A detailed explanation of the difference between dependent and independent dimensions is beyond the scope of this document, see this document[53] for more information.

The following example show independent dimensions: (Dimensions Independent[54], 99.31-TestCase-dimensions-independent[55])



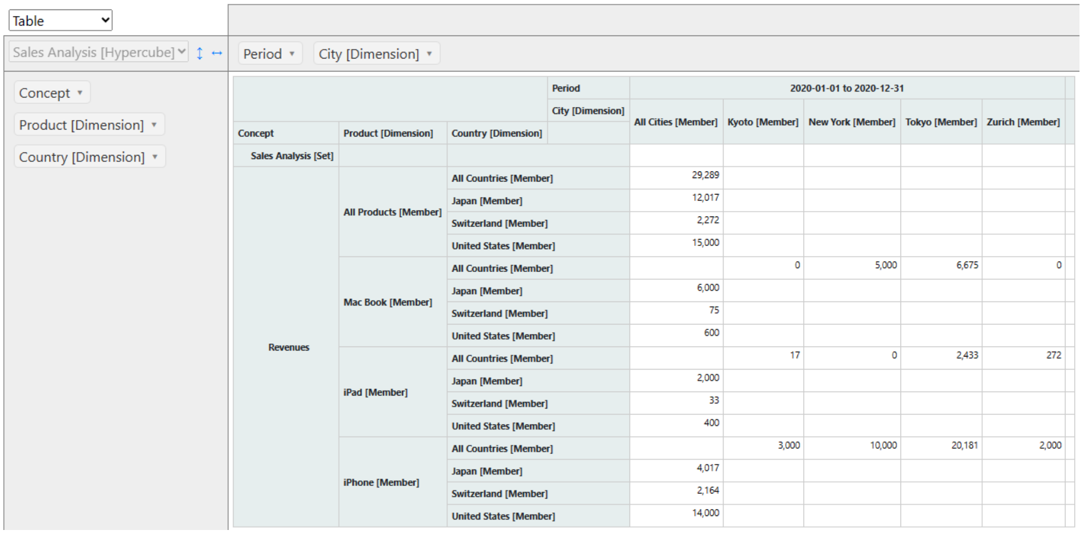
Component: (Network and Table)	
Network	09 - Unknown - **Sales Analysis**
Table	Sales Analysis [Hypercube]

Reporting Entity [Axis]: GH259400TOMPUOLS65II http://standards.iso.org/iso/17442
Period [Axis]: 2020-01-01/2020-12-31
Unit [Axis]: USD

	Revenues			
Product [Dimension]	Japan [Member]	United States [Member]	Switzerland [Member]	All Countries [Member]
All Products [Member]	12,017	15,000	2,272	29,289
iPhone [Member]	4,017	14,000	2,164	20,181
iPad [Member]	2,000	400	33	2,433
Mac Book [Member]	6,000	600	75	6,675

Notice how each of the Members of the Product [Dimension] is completely independent from the Members of the Country [Dimension].

Contrast the above independent dimensions with the dependent dimensions below: (Dimensions Dependent[56], 99.32-TestCase-dimensions-dependent[57])



			Period	2020-01-01 to 2020-12-31				
			City [Dimension]	All Cities [Member]	Kyoto [Member]	New York [Member]	Tokyo [Member]	Zurich [Member]
Concept	Product [Dimension]	Country [Dimension]						
Sales Analysis [Set]								
Revenues	All Products [Member]	All Countries [Member]		29,289				
		Japan [Member]		12,017				
		Switzerland [Member]		2,272				
		United States [Member]		15,000				
	Mac Book [Member]	All Countries [Member]			0	5,000	6,675	0
		Japan [Member]		6,000				
		Switzerland [Member]		75				
		United States [Member]		600				
	iPad [Member]	All Countries [Member]			17	0	2,433	272
		Japan [Member]		2,000				
		Switzerland [Member]		33				
		United States [Member]		400				
	iPhone [Member]	All Countries [Member]			3,000	10,000	20,181	2,000
		Japan [Member]		4,017				
		Switzerland [Member]		2,164				
		United States [Member]		14,000				

[53] Dependent and independent dimensions, https://docs.google.com/document/d/165E7pc6rAPR-cY_7a8sjDqWzDxZ5yfO8c3JX-WdYZnQ/edit

[54] Dimensions Independent, http://www.xbrlsite.com/seattlemethod/platinum-testcases/dimensions-independent/index.html

[55] 99.31-TestCase-dimensions-independent, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.31-TestCase-dimensions-independent.xml

[56] Dimensions Dependent, https://www.xbrlsite.com/seattlemethod/platinum-testcases/dimensions-dependent/index.html

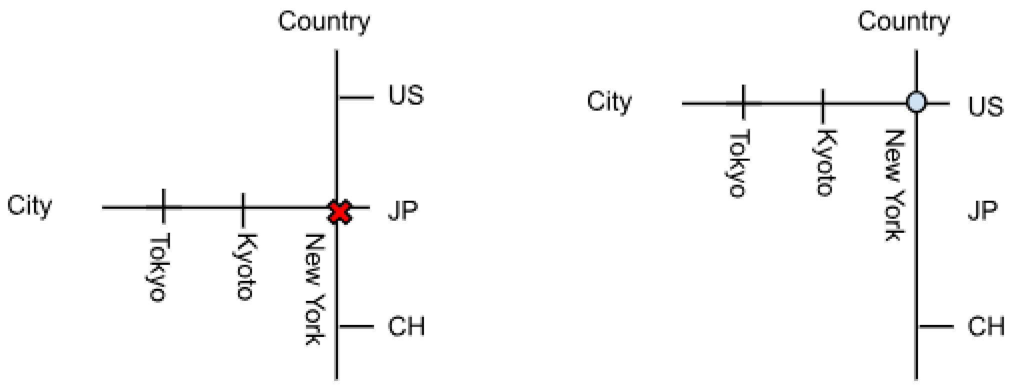
[57] 99.32-TestCase-dimensions-dependent, http://www.xbrlsite.com/seattlemethod/platinum-testcases/99.32-TestCase-dimensions-dependent.xml

[This is a work in progress]

The graphic below shows the potential problem with dependent dimensions. "New York" is not a city in the country Japan. Nor are Tokyo and Kyoto cities in the United States:

(this graphic is a placeholder, an XBRL instance and taxonomy will be created)

Figure 3. Dependent Dimensions on the Same Table



Notice how the City [Dimension] Members are dependent on the Country [Dimension] Members. A better approach for representing this information is to have a separate representation of the relationship between countries and cities.

1.17. Use Typed Members to Define an Indefinite Series

Typed members should be used to define an infinite series such as time and integers, or a series where the complete set of domain members cannot be known by the taxonomy creator.

Typed members should not be used to define a constrained domain set that remains constant between taxonomy releases such as countries or continents.

This does not apply to the idea of an allocation of an amount across a chart of accounts such as a balance sheet location dimension.

[Examples forthcoming]

1.18. Extensible Enumerations Should Be Used to Represent Facts Associated with Dimensions with a Single Member

If a concept only has one fact associated with a single dimension member then remove the dimension member and use an extensible enumeration to capture the attribute of the concept. I.e. all Revenue is Royalty Revenue. Where an axis is provided to disaggregate revenue by product type then revenue type extensible enumeration element should be used, or use royalty revenue element if it is defined.

[Don't understand this. Please provide example.]

1.19. Properties (a.k.a. traits, qualities, attributes) Should be Represented using XBRL Definition Relations using the Trait Arcrole

Property references should be used to capture string and date information. A qname should not appear as a property value. Qname properties should be represented using a trait arc-role.

[Examples forthcoming]

1.20. Atemporal Concepts Should Be Durations with a Period Type of Forever

Concepts that are atemporal (The value is not impacted by the passage of time) should have a period type of duration and associated facts should use the forever period.

[Examples forthcoming]

1.21. Facts Representing Specific Transaction Details Should have Period Type Value of Forever

Concepts defining specific transaction details should be defined as forever facts. I.e the acquisition date of a company or the price paid for the acquisition. This only applies where the value is constrained by an acquisition axis or similar transaction axis.

1.22. Report Element Names and Properties Must Never Be Changed in a Base Financial Reporting Scheme XBRL Taxonomy

Report element names (the local name) are identifiers and must never be changed between versions of a base financial reporting XBRL taxonomy. Further, the properties of a report element likewise must never change between versions, rather a new version of a report element should be created with a different name and updated property values should be created.

Concept properties should not change from one taxonomy to another. (Excludes labels and references)

Reasoning: Changing report element names and report element property values between versions of XBRL taxonomies impacts query results and comparisons of information across different periods which impacts query results returned and therefore interpretation of information.

[Examples forthcoming]

1.23. Transactions from Beginning of Time to Some End Date are Considered Instants (not Durations)

A concept that represents the value of transactions from the beginning of time to an end date is an instant. (Cost price of Assets) A concept that represents all transactions from a start date into the future is also an instant. (Fair Value of Assets) Everything else is a duration.

[Examples forthcoming]

2. Platinum Business Use Cases, Test Cases, Conformance Suite

For those needing or wanting more details, see the set of *Platinum Business Use Cases, Test Cases, and Conformance Suite*[58]. This information is particularly useful to software engineers building software.

Also, please use the newest version of *Essentials of XBRL-based Digital Financial Reporting*[59] that is a refactored version of the older version.

Of particular interest are an explanation of the fundamental information patterns[60], information about detecting those patterns using software[61], a comparison of how those information patterns were implemented in different software applications[62], a detailed explanation of the fundamental things that can go wrong[63], and videos that show what you can make software do if this implementation approach is used[64].

This is the best information for training yourself or for training others.

[58] *Platinum Business Use Cases, Test Cases, Conformance Suite*, https://digitalfinancialreporting.blogspot.com/2023/07/platinum-business-use-cases-test-cases.html

[59] *Essentials of XBRL-based Digital Financial Reporting (Platinum),* http://www.xbrlsite.com/seattlemethod/platinum/EssentialsOfXBRL_PLATINUM.pdf

[60] *Fundamental Information Patterns*, http://www.xbrlsite.com/seattlemethod/platinum-testcases/FoundationalInformationPatterns.pdf

[61] Information Model Identification, http://www.xbrlsite.com/mastering/InformationModelIdentification.pdf

[62] *Comparison of Renderings for Concept Arrangement Patterns*, http://www.xbrlsite.com/seattlemethod/platinum-testcases/ComparisonOfConceptArrangementPatternRenderings.pdf

[63] XBRL: Understanding What Can Go Wrong, http://www.xbrlsite.com/seattlemethod/platinum-testcases/UnderstandingWhatCanGoWrong.pdf

[64] World's First Expert System for Creating Financial Reports (video playlist), https://www.youtube.com/playlist?list=PL80qjzvfqwtNuTekdlRy0rhaHEDIXkOh3