

Primitives Used to Create Information Objects (Blocks)

Primitive Objects

A business report or financial report, which is a specialization of the more general business report, is constructed using the following set of primitive logical objects:

- Structure
 - Network
 - Hypercube
 - Network + Hypercube
- Dimension
- Member
- LineItems
- Abstract
- Concept

The following shows a reconciliation from primitive XBRL technical artifacts¹ to the good practices primitive logical artifacts defined and as used by the good practices based *Seattle Method*².

Technical Artifact Name	Technical Artifact Example	Logical Object Name
Network (an XLink extended link specialized by XBRL 2.1)	<pre><link:roleType xmlns:link="http://www.xbrl.org/2003/linkbase" roleURI="http://www.xbrl.com/seattlemethod/proof/role/BalanceSheet" id="BalanceSheet"> <link:definition>01-Balance Sheet</link:definition> <link:usedOn>link:presentationLink</link:usedOn> <link:usedOn>link:calculationLink</link:usedOn> <link:usedOn>link:definitionLink</link:usedOn> <link:usedOn>genericLink</link:usedOn> </link:roleType></pre>	Structure
Hypercube (an XML scheme element specialized by XBRL Dimensions as being a specific type of XBRL 2.1 artifact); Abstract XBRL Element	<pre><element id="proof_BalanceSheetHypercube" name="BalanceSheetHypercube" type="xbrli:stringItemType" substitutionGroup="xbrldt:hypercubeitem" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Hypercube]
Dimension (an XML scheme element specialized by XBRL Dimensions as being a specific type of XBRL 2.1 artifact); Abstract XBRL Element	<pre><element id="proof_ScenarioAxis" name="ScenarioAxis" type="xbrli:stringItemType" substitutionGroup="xbrldt:dimensionitem" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Dimension]
Member (an XML Schema element specialized by use of a specific type on an XBRL 2.1); Abstract XBRL Element	<pre><element id="proof_ActualMember" name="ActualMember" type="nonnum:domainItemType" substitutionGroup="xbrli:item" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Member]
Primary Items (an XML Schema element defined as being abstract specialized by US GAAP and IFRS use of the term "LineItems" in the name); Abstract XBRL Element	<pre><element id="proof_BalanceSheetLineItems" name="BalanceSheetLineItems" type="xbrli:stringItemType" substitutionGroup="xbrli:item" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Line Items]
Concept (an XML Schema element which specialized by XBRL 2.1 and not identifiable as any other technical artifact); Concrete XBRL Element	<pre><element id="proof_Assets" name="Assets" type="xbrli:monetaryItemType" substitutionGroup="xbrli:item" xbrli:periodType="instant" xbrli:balance="debit" nillable="true"/></pre>	Concept
Abstract (an XML Schema element defined as being abstract specialized by XBRL 2.1); Abstract XBRL Element	<pre><element id="proof_AssetsRollUp" name="AssetsRollUp" type="xbrli:stringItemType" substitutionGroup="xbrli:item" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Abstract]

¹ XBRL International, *XBRL Specifications*, <https://specifications.xbrl.org/specifications.html>

² XBRL Site.com, *Seattle Method*, <http://xbrl.com/seattlemethod/>

The following shows the permitted relations between the primitive technical/logical objects within XBRL presentation relations. (Note that these relations are not adequately specified by the XBRL technical specification)

		Parent						
		Network	Hypercube	Dimension	Member	Lineltms	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
	Lineltms	Disallowed	Permitted	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Abstract	Permitted	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed
	Concept	Disallowed	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed

Representing Structures in XBRL

The logical model of a business/financial report has the notion of a “Structure”. A Structure is an assembly of a set of primitive objects, effectively a container of information. When represented using XBRL, a Structure can be represented in one of three ways:

1. Using a unique XBRL network. (Networks must always be unique. This is only possible when an explicit hypercube is not required.)
2. Using a unique XBRL Dimensions defined Hypercube. (There is no requirement that an XBRL hypercube be unique.)
3. Using a unique XBRL network and a non-unique XBRL Dimensions hypercube.

Something to keep in mind is that there is no way to explicitly reference a structure unless a unique token or identifier can be derived. That unique token/identifier might use the network identifier and/or the name of the hypercube if one is defined.

Representing Hypercubes in XBRL

XBRL International provides guidance related to the use of XBRL Dimensions 1.0 to define dimensional information³. Best practices is to not mix a dimensional and nondimensional model.

The following are examples of the three ways to represent information using XBRL Dimensions defined hypercubes:

Isomorphic (unique) explicit hypercubes: (this is best/good practice; because a hypercube is explicitly provided, noncore dimensions can be added if necessary; because a hypercube always has a unique name which serves as a referenceable identifier, the information container can be explicitly and reliably referenced by software)

³ XBRL International, *Technical Considerations for the use of XBRL Dimensions 1.0*, <https://www.xbrl.org/WGN/dimensions-use/WGN-2015-03-25/dimensions-use-WGN-2015-03-25.html>

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

Implied hypercube: (when an explicit hypercube is not provided; a hypercube can be implied; however, with implied hypercubes no noncore dimensions can be provided and there is no unique hypercube name which can be used to identify the information container.

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

Polymorphic hypercube: (every hypercube always has the same name such as “Hypercube [Hypercube]”; because explicit hypercubes are used then noncore dimensions can always be used if necessary; because all hypercubes have the same name, the Network becomes the unique identifier of the information container and because Networks MUST always be unique, then the information container can be reliably used)

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

The following matrix outlines the logical, allowed, best/good practice relations between the primitive building blocks of a business/financial report:

		Parent						
		Network	Hypercube	Dimension	Member	Lineltms	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
	Lineltms	Disallowed	Permitted	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Abstract	Permitted	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed
	Concept	Disallowed	Disallowed	Disallowed	Disallowed	Permitted	Permitted	Disallowed

The matrix information is documented in the an XBRL definition linkbase⁴.

NOTE: It is possible to make a handful of these possible solutions permitted but not recommended.

NOTE: It is possible to automate the testing of an XBRL-based report model to see if it conforms to the matrix above such as using the provided XBRL definition linkbase with the machine-readable metadata.

Examples of primitive objects organized into a renderings:

Set, Arithmetic:

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

Roll up:

	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	

⁴ Model structure relations represented in XBRL definition linkbase, <http://xbrlsite.com/seattlemethod/cm/model-structure-rules-strict-def.xml>

Roll forward:

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

The Showcase of Reports⁵ shows many, many additional examples of primitive objects organized into complex or compound objects such as information blocks.

Axioms

The following is a summary of the logic that exists within each and every primitive object which can be used to represent an XBRL-based digital business/financial report model:

1. An XBRL-based report model can be logically broken down into the following primitive building blocks: Network, Hypercube, Dimension, Member, Lineltems, Abstract, Concept.
2. Lineltems is very similar to a Dimension; however, Lineltems can contain Abstracts and Concepts as contrast to Dimensions which contain Members.
3. An information block is uniquely identifiable.
4. An information block is a complex or compound object organized into an assembly of primitive technical artifacts physically and logically.
5. An information block is used to represent a disclosure within a report and all such information blocks are identifiable by software.
6. An information block can be identified as being a specific disclosure; i.e. an information block has a property which provides the name of the disclosure the information block is representing.
7. A report is a set of information blocks each of which can be identified as being a specific disclosure.
8. An information block is a set of primitives which has been logically assembled.
9. Primitive logical objects can be identified from their “signature” within an XBRL technical artifact.
10. Complex information blocks can be identified from their “signature” within an XBRL technical artifact⁶.
11. Use dimensions to distinguish facts when necessary (dimensions are not properties).
12. If a base taxonomy does not provide unique tokens or identifiers for each disclosure; such unique tokens/identifiers can be provided by supplementing or enhancing the base financial reporting scheme base taxonomy.

⁵ Showcase of Reports, http://www.xbrlsite.com/mastering/Part04_Chapter07.1_ShowcaseOfReports.pdf

⁶ Information Model Identification, <http://www.xbrlsite.com/mastering/InformationModelIdentification.pdf>

Reconciling primitive report model XBRL technical artifacts to logical artifacts

Technical Artifact Name	Technical Artifact Example	Logical Object Name
Network (an XLink extended link specialized by XBRL 2.1)	<pre><link:roleType xmlns:link="http://www.xbrl.org/2003/linkbase" roleURI="http://www.xbrl.com/seattlemethod/proof/role/BalanceSheet" id="BalanceSheet"> <link:definition>01-Balance Sheet</link:definition> <link:usedOn>link:presentationLink</link:usedOn> <link:usedOn>link:calculationLink</link:usedOn> <link:usedOn>link:definitionLink</link:usedOn> <link:usedOn>generic:link</link:usedOn> </link:roleType></pre>	Structure
Hypercube (an XML scheme element specialized by XBRL Dimensions as being a specific type of XBRL 2.1 artifact); Abstract XBRL Element	<pre><element id="proof_BalanceSheetHypercube" name="BalanceSheetHypercube" type="xbrli:stringItemType" substitutionGroup="xbrldt:hypercubeitem" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Hypercube]
Dimension (an XML scheme element specialized by XBRL Dimensions as being a specific type of XBRL 2.1 artifact); Abstract XBRL Element	<pre><element id="proof_ScenarioAxis" name="ScenarioAxis" type="xbrli:stringItemType" substitutionGroup="xbrldt:dimensionitem" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Dimension]
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Abstract (an XML Schema element defined as being abstract specialized by XBRL 2.1); Abstract XBRL Element	<pre><element id="proof_AssetsRollUp" name="AssetsRollUp" type="xbrli:stringItemType" substitutionGroup="xbrli:item" xbrli:periodType="duration" abstract="true" nillable="true"/></pre>	[Abstract]

Complex or Compound Objects; Assemblies of Primitive Objects

<http://www.xbrl.com/mastering/InformationModelIdentification.pdf>

#	Information Model Pattern (Concept Arrangement Pattern) ¹	XBRL Calculation Relations Exist?	Specific XBRL Formula Pattern Exists?	Member Arrangement Pattern ² Exists?	Specific Report Date Dimension Exists?	Specific Reporting Scenario Dimensions Exist?	Originally Stated Label Role ³ Exists in XBRL Presentation Relations?	Restated Label Role ⁴ Exists in XBRL Presentation Relations?	Period Start Label Role Exists in XBRL Presentation Relations?	Period End Label Role Exists in XBRL Presentation Relations?
1	Set	Never	Never	Optional	Never	Optional	Never	Never	Never	Never
2	Roll Up	Always	Never	Optional	Never	Optional	Never	Never	Never	Never
3	Roll Forward	Never	Always ⁵	Optional	Never	Never	Never	Never	Always	Always
4	Roll Forward Info	Never	Never	Optional	Never	Never	Never	Never	Always	Always
5	Adjustment	Never	Never	Never	Always	Never	Always	Always	Never	Never
6	Variance	Optional	Always ⁵	Always	Never	Always	Never	Never	Never	Never
7	Text Block	Never	Never	Optional	Never	Never	Never	Never	Never	Never
8	Member Aggregation	Optional	Always	Always ⁷	Never	Never	Never	Never	Never	Never
9	Arithmetic	Never	Always ⁸	Optional	Never	Optional	Never	Never	Never	Never

Information Container Logical Patterns

A container of information is described by the logical patterns of the information as defined by the primitive objects of the container of information. That logic is defined by the physical technical artifacts: (1) dimensions and members, (2) LineItems, Abstracts, and concepts. The following are the different logical patterns of information containers:

- Set
- Roll Up
- Roll Forward
- Arithmetic
- Adjustment (a.k.a. Restatement)
- Variance (a.k.a. Difference)
- Text Block (a.k.a. Prose)

- Roll Forward Info
- Member Aggregation
- Member Nonaggregation

Hypercube Strategies:

1. Permit but do not require (mixed model of explicit and implied hypercubes; XBRL International discourages this; not a best practice)
2. Require hypercubes. (Seattle Method does this)
3. Require use of one hypercube “Hypercube [Hypercube]” (FINREP does this)
4. Require unique hypercube names (isomorphic, COREP does this; Seattle Method does this))
5. Allow same hypercube to be used for different disclosures, (US GAAP and IFRS taxonomies does this, “Statement [Table]”

Additional Information:

http://www.xbrlsite.com/mastering/Part05_Chapter08.C_ReconciliationOfModels.pdf