

Method of Implementing XBRL-based Digital Financial Report Explained in Simple Terms

Using XBRL and OMG's Standard Business Report Model (SBRM) to Automate Financial Reporting Processes

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ABSTRACT: This document strives to illuminate the structure and dynamics of a financial report for software engineers and professional accountants. This document outlines an open source method of implementing a standard digital financial report using the XBRL technical syntax leveraging the extensibility features of XBRL which follow the forthcoming OMG *Standard Business Report Model* (SBRM)¹. The intent of this document is to summarize know-how. This know-how, when documented in the form of a useful method, eliminates the need for others to re-invent the wheel. Rather than re-inventing the wheel; others can simply leverage a well-thought-through, world-class approach that has been designed, created, rigorously tested, and carefully engineered leveraging approaches that have been proven to work results. These best practice approaches and techniques that has been generally demonstrated as superior to any known alternatives because the techniques produce results that are superior to those achieved by other means or because it has become a standard way of doing things are documented in this resource.

¹ OMG, Standard Business Report Model (SBRM), <https://omgwiki.org/SBRM/doku.php>

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One type of practical knowledge is **know-how**; how to accomplish something. This document explains how to accomplish something in simple terms.

Per Wikipedia, a **methodology**² is defined as the systematic, theoretical analysis of the *methods* applied to a field of study.

A **method** is an approach or procedure to achieving or accomplishing something.

A **best practice** is a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means or because it has become a standard way of doing things, e.g., a standard way of complying with legal or ethical requirements.

This document explains a proven, best practices based open source method for creating a high-fidelity, XBRL-based digital business report with verifiably high-quality when the extensibility features of XBRL are utilized. It also describes how to effectively specify a reporting scheme and how to consume information from such reports effectively. This method leverages the Standard Business Report Model (SBRM) logical conceptualization of a business report and the XBRL technical syntax.

It is assumed that the reader of this document is familiar with XBRL³, SBRM⁴, the basics of financial reporting⁵, logical system theory basics⁶, the logical conceptualization of a financial report⁷, and has a basic understanding of how computers work⁸.

This document is not intended for the average professional accountant, rather it is intended for motivated professional accountants that desire to master XBRL-based financial reporting, software engineers creating software in support of digital financial reporting, and XBRL taxonomy architects that want to avoid common problems.

Deriving this Method

The creation of this method is an engineering design process exercise, not a philosophical exercise, political discussion, or religious debate. This method was consciously and deliberately derived by taking the best practices of many implementations of XBRL related to financial

² Wikipedia, *Methodology*, <https://en.wikipedia.org/wiki/Methodology>

³ XBRL Technical Primer,

http://xbrl.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part00_Chapter01.2_XBRLPrimer.pdf

⁴ Standard Business Report Model (SBRM), <http://xbrl.azurewebsites.net/2019/Prototype/sbrm/Home.html>

⁵ FASB's SFAC 6, Elements of Financial Statements, <http://xbrl.azurewebsites.net/2020/core/master-sfac6/>

⁶ Explanation of a Financial Report Logical System in Simple Terms,

<http://xbrl.squarespace.com/journal/2019/11/1/explanation-of-a-financial-report-logical-system-in-simple-t.html>

⁷ Charles Hoffman, CPA, and Rene van Egmond, *Financial Report Semantics and Dynamics Theory*,

<http://xbrl.azurewebsites.net/2016/Library/Theory-2017-06-26.pdf>

⁸ Charles Hoffman, CPA, *Computer Empathy*,

<http://xbrl.azurewebsites.net/2018/Library/ComputerEmpathy.pdf>

reporting, take the practices that are proven to be superior to other practices, avoiding practices that are found to cause undesirable results or other issues, and combining all known, proven, and tested best practices into this one implementation method. This method can be effectively used for XBRL-based reporting using the US GAAP and IFRS reporting schemes to the SEC or IFRS reporting to the ESMA. This method is also safe and reliable for implementation within individual economic entities for accounting process automation and the automation of reporting processes.

After examining literally thousands of XBRL-based financial reports, discovering and documenting patterns, and meticulously figuring out what was causing problems⁹; this best practice method was deliberately put together to avoid issues and problems others were encountering.

Overview of the Logical Conceptualization of a Financial Report

A financial report is an allowed interpretation of an expression of the financial position and financial performance of an economic entity per some set of statutory and regulatory rules. Here-to-for, that expression has been in a form that is only readable by humans. However, XBRL and other machine-readable formats change that, making those expressions readable by both humans and by machine-based processes.

Single-entry accounting is how ‘everyone’ would do accounting. In fact, that is how accounting was done before double-entry accounting was invented. Double-entry accounting was the invention of medieval merchants and was first documented by the Italian mathematician and Franciscan Friar Luca Pacioli.

Double-entry accounting adds an additional important property to the accounting system, that of a clear strategy to identify errors and to remove the errors from the system. Even better, double-entry accounting has a side effect of clearly firewalling errors as either accident or fraud¹⁰. This then leads to an **audit strategy**. Double-entry accounting is how professional accountants do accounting.

Accounting is a mathematical model¹¹. You have journals, ledgers, trial balances, and an organized progression and flow of information. The accounting equation, “Assets = Liabilities +

⁹ Mastering XBRL-based Digital Financial Reporting, <http://xbrl.squarespace.com/journal/2020/2/26/mastering-xbrl-based-digital-financial-reporting.html>

¹⁰ Ian Grigg, *Triple Entry Accounting*, https://iang.org/papers/triple_entry.html

¹¹ David Ellerman, *The Mathematics of Double Entry Bookkeeping*, http://www.ellerman.org/wp-content/uploads/2012/12/DEB-Math-Mag.CV_.pdf

Equity”, is the cornerstone of every financial reporting scheme. Every financial reporting scheme defines a set of elements of financial statements¹² that is defined relative to the accounting equation. Every financial reporting is a logical system¹³.

An XBRL-based digital financial report¹⁴ is not only a machine-readable format; it also is a machine-readable logical system and has the potential to be a well-defined and fully expressed logical system. A well-defined logical system, when fully expressed, will be properly functioning and demonstrably consistent, complete, and precise. These properties can be leveraged to offer a systematic **audit strategy for XBRL-based digital financial reports**¹⁵.

Essentially, a financial report is a set of declarative statements. Those declarative statements are laid out in the *Logical Theory Describing Financial Report*¹⁶. That set of statements can be represented in the global standard XBRL technical syntax or any other logic programming syntax supported by software applications such as Prolog, Datalog, Clips, and Answer Set Programming. Such software can provide feedback as to whether these statements in that financial report logical system are consistent, complete, precise and otherwise properly functioning.

Understanding the Problem and the Solution

XBRL-based financial reports are a modern approach to solving an old problem: exchanging information about the financial condition and financial performance of an economic entity.

A general purpose financial report is a high-fidelity, high-resolution, high-quality information exchange mechanism. The report is a compendium of complex logical information required by statutory requirements and regulatory rules plus whatever management of an economic entity wants to voluntarily disclose. The report represents quantitative and qualitative information about the financial condition and financial performance of an economic entity. There are a

¹² Elements of Financial Statements,
<http://xbrl.azurewebsites.net/2019/core/ElementsOfFinancialStatements.pdf>

¹³ Understanding the Financial Report Logical System,
https://www.youtube.com/playlist?list=PLqMZRUzQ64B7EWamzDP-WaYbS_W0RL9nt

¹⁴ Charles Hoffman, CPA, *Narrative Explaining Logical Conceptualization of a Financial Report*,
<http://xbrl.azurewebsites.net/2019/Framework/NarrativeConceptualization.pdf>

¹⁵ Charles Hoffman, CPA, *Auditing XBRL-based Financial Reports*,
<http://xbrl.azurewebsites.net/2019/Library/AuditingXBRLBasedFinancialReports.pdf>

¹⁶ Charles Hoffman, CPA, *Logical Theory Describing Financial Report*, <http://xbrl.squarespace.com/logical-theory-financial-rep/>

number of different financial reporting schemes¹⁷: US GAAP, IFRS, IPSAS, GAS, FAS, FRF for SMEs, etc.

Financial reports are not uniform. Financial reports are not fixed forms, they have variability¹⁸. This consciously allowed variability is an essential, characteristic trait of robust reporting schemes such as US GAAP, IFRS, and others. This allowed variability contributes to the richness, high-fidelity, and high-resolution of reported financial information that is unique to an industry sector, a style of reporting, or an economic entity. This variability is a feature of such reporting schemes. Different reporting styles¹⁹, different subtotals used to aggregate details, and using some specific approach given a set of allowed alternatives are examples of variability. Variability does not mean “arbitrary” or “random”. There are known identifiable patterns.

Consider this scenario:

Two public companies, A and B, each have knowledge about their financial position and financial performance. They must communicate their knowledge to an investor who is making investment decisions which will make use of the combined information so as to draw some conclusions. All three parties are using a common set of basic logical principles (facts known to be true, deductive reasoning, inductive reasoning, etc.) and common financial reporting standards (i.e. US GAAP, IFRS, etc.), so they should be able to communicate this information fully, so that any inferences which, say, the investor draws from public company A's input should also be derivable by public company A using basic logical principles and common financial reporting standards, and vice versa; and similarly for the investor and public company B.

This method uses machine-readable rules to “channel” and therefore control variability, keeping the variability within standard limits and permissible alternatives. That keeps quality where it needs to be. Rules enable things like preventing a user from using a concept meant to represent one thing from unintentionally being used to represent something different. The discipline of describing something in a form a computer algorithm can understand also assists you in understanding the world better; weeding out flaws in your understanding, myths, and misconceptions about accounting and reporting standards.

Considering all of the above, there are three key ideas here to highlight:

- Standards setter, regulator, or enterprise describe and **specify** information about some reporting scheme.

¹⁷ *Comparison of Financial Reporting Schemes High Level Concepts*, <http://xbrlsite.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf>

¹⁸ YouTube.com, *Intermediate Components*, https://youtu.be/jqZWI_Tmhag

¹⁹ YouTube.com, *Reporting Styles*, <https://youtu.be/SfvEeKlgAxs>

- Producers of financial reports must create such reports such that they are permissible per that defined **specification**.
- Consumers of financial report information should be able to do so leveraging that **specification**.

That specification can be communicated in human-readable terms or in machine-readable terms. The rules provided by that specification are the “orchestra leader” that enables the harmony (i.e. mitigates dissonance) and prevents anarchy (i.e. enabling effective information exchange).

Objective of this Method

The objective of this method is to describe the approach and process for creating XBRL-based digital financial reports when the extensibility features of XBRL are leveraged is to be able to create a financial report maximizing the use of automated machine-based processes, maximize the ability to analyze reported information reliably and safely using machine-based processes, and maximize the verifiable quality of reported information such that the information providers and the information consumers derive maximum benefit using machine-base processes.

This method is appropriate for general purpose financial reports and special purpose financial reports. This method is appropriate for internal financial reports and external financial reports.

Intended Scope of this Method

To reiterate in more detail to be sure it is clear, this method is about controlling and verifying the structural, mechanical, mathematical, and logical dynamics of the financial report itself. Structure, mechanics, mathematics, and logic are all objective in nature and relate to the financial report itself and not what goes into the financial report.

What information goes into a financial report, how that information is measured, and where that information is presented many times can be subjective; open to interpretation and professional judgement of the accountants creating the report. Facts reported can never be verified as being free from error or fraud simply by using this method. Should financial reports be true and fair representations of information; free from errors and/or fraud? Absolutely. However, this is not the intended purpose of this method.

The functionality of XBRL-based financial reports enable professional accountants and auditors reviewing reports to do so thoroughly and completely maximizing the use of machine-based automated processes and using this method will contribute to that end. However, while this method is helpful and perhaps you can even say necessary to verify the structural, mechanical, mathematical, and logical dynamics of a financial report; it is not sufficient to guarantee that

mandated reporting rules are being followed, the report is free from error, or that the financial report is free from fraud. Many tasks will required to be performed by humans and will require the judgement of a knowledgeable professional accountant.

Principles

Principles help you think about something thoroughly and consistently. Overcoming disagreements between stakeholders and even within groups of stakeholders is important. Agreement between stakeholder groups and within stakeholder groups contributes to harmony. Lack of agreement contributes to dissonance. Principles help in the communications process.

A "stakeholder" is anyone that has a vested interest. Another term for stakeholder is "constituent". A "constituent" is a component part of something.

Foundational to arriving at harmony is having a common conceptual framework including a set of consistent principles or assumptions or world view for thinking about the system.

This "framework for agreeing" helps the communications process which increases harmony and decreases dissonance. This is about bringing the system into balance, consciously creating the appropriate equilibrium/balance.

The following is a set of principles which those stakeholders (i.e. those that create the financial report specification, those that create financial reports, those that consume financial report information) using this method agree to use to understand their perceptions, positions, and risks when it comes to creating a financial report or reporting scheme which applies this method.

1. Prudence dictates that using information from an XBRL-based digital financial report should not be a guessing game.
2. A near zero defect report is useful; a defective financial report is not trustworthy and therefore not useful. The goal is to achieve the quality level of Six Sigma²⁰.
3. Rules prevent anarchy. Rules guide, control, suggest, or influence behavior. Rules cause things to happen, prevent things from happening, or suggest that it might be a good idea if something did or did not happen.
4. The only way to achieve a meaningful exchange of information without disputes is with the prior existence of and agreement as to a standard set of technical syntax rules, business logic rules, and workflow rules.
5. Explicitly stated information or reliably derived information is preferable to implicit information. Forcing software engineers to imply information is to be avoided. Derived and implied are not the same things.

²⁰ Wikipedia, *Six Sigma*, Sigma Levels, https://en.wikipedia.org/wiki/Six_Sigma#Sigma_levels

6. Many, but not all, aspects of financial reports can be guaranteed to be defect free using automated machine-based processes to the extent that machine-readable rules exist which software can leverage.
7. When possible to effectively create, machine-based automated processes tend to be more desirable than human-based manual processes because machine processes tend to be more reliable, faster, and cost less. However, it is impossible to completely eliminate human involvement from the process of creating a financial report. Financial report creation processes will be a collaboration of machine-based processes and human-based processes. Machines should perform tasks that machines do best; humans should perform tasks that humans do best.
8. Complexity cannot be removed from a system, but complexity can be moved.
9. Maximize consistency. Only allow inconsistency of approach when there is a justifiable reason for allowing such an inconsistency.

Overview of Method

The following is an overview of this particular method for creating XBRL-based digital financial reports. The purpose of this overview is to provide a big picture view of this method. Details of this method will be provided within subsequent sections of this document. This method will cover:

- the **specification** of a reporting scheme,
- the **creation of a report** using that reporting scheme specification,
- and the **consumption of report information** from reports created using that reporting scheme specification.

This method will be explained by way of example. We will use the FASB's SFAC 6 *Elements of Financial Statements*²¹ as the reporting scheme that will be specified. This small example provides 100% of the tasks that need to be performed but is small enough for someone to get their heads around.

One objective of this method is success. The following is a summary of the criteria for effective information exchange:

- **Physical problem:** physical mechanism
 - Syntax=Extensible Business Reporting Language (XBRL)
- **Semantics problem:** meaning being conveyed
 - Business report logical model = OMG's Standard Business Report Model (SBRM)

²¹ XBRL Representation of SFAC 6 *Elements of Financial Statements*,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/index.html>

- Financial reporting logical model (i.e. a type of business report)
 - Double-entry accounting model
 - Accounting equation
 - Elements of financial statements
 - Intentionally allow flexible information models within permissible boundaries (i.e. richness)
- Properly functioning logical system: **consistent, complete, precise**
- **Effectiveness problem:** does it actually work
 - A logical system enables a *community of stakeholders* trying to achieve a specific goal or objective or a range of goals/objectives to agree on important common logical models for capturing meaning or representing a shared understanding of and knowledge in some universe of discourse.

Achieving an effective exchange of information distills down to sound engineering and agreement. The fundamental approach is:

- Decide on a structure representation strategy and create all structures consistent with that strategy.
- Construct each structure consistent with the information model patterns provided by SBRM.
- Provide either a prototype of each disclosure structure or rules that provide a specification that describes each disclosure.
- Provide a complete set of type-subtype relations.

Software applications handle the vast majority of the details by implementing the logical conceptualization of a business report within the software so that business professionals always get the technical details right. Business professionals only need to be concerned with the logic of what they are representing.

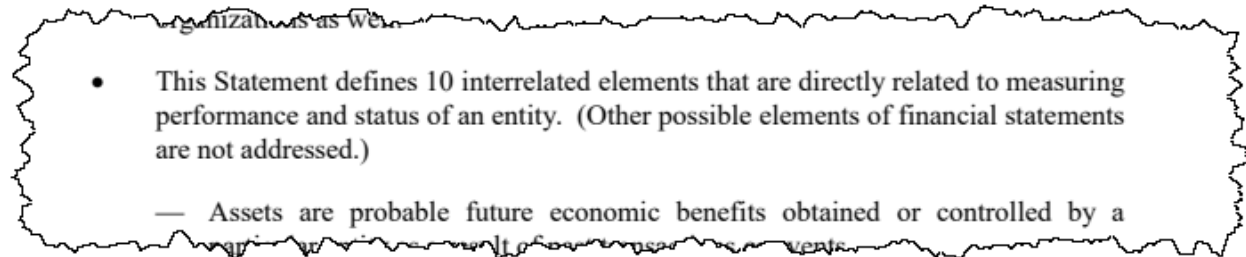
Specification of Reporting Scheme

Step 1 of specifying a reporting scheme is to understand the nature of the reporting scheme. In the case of FASB's SFAC 6 *Elements of Financial Statements*, it is not a complete reporting scheme. However, SFAC 6 has all the "stuff" that needs to be represented and therefore can be used as an effective example of representing an entire financial reporting scheme which is simply more "stuff".

The nature of a reporting scheme is defined by the terms, structures, associations, and rules that are used to make statements about that financial reporting scheme.

Terms

SFAC 6²² defines 10 interrelated elements (i.e. **terms**) that are used to measure the performance and status of an economic entity (page 9) as can be seen:



Note that additional terms are defined for not-for-profit entities which we will ignore for this description. As such, the following is a name, label, and documentation created for each SFAC 6 term:

ReportElementName	Label	Documentation
Assets	Assets	Assets are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events.
Liabilities	Liabilities	Liabilities are probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events.
Equity	Equity	Equity or net assets is the residual interest in the assets of an entity that remains after deducting its liabilities. In a business enterprise, the equity is the ownership interest.
InvestmentsByOwners	Investments by Owners	Investments by owners are increases in equity of a particular business enterprise resulting from transfers to it from other entities of something valuable to obtain or increase ownership interests (or equity) in it. Assets are most commonly received as in
DistributionsToOwners	Distributions to Owners	Distributions to owners are decreases in equity of a particular business enterprise resulting from transferring assets, rendering services, or incurring liabilities by the enterprise to owners. Distributions to owners decrease ownership interest (or equity)
ComprehensiveIncome	Comprehensive Income	Comprehensive income is the change in equity of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by
Revenues	Revenues	Revenues are inflows or other enhancements of assets of an entity or settlements of its liabilities (or a combination of both) from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major or central
Expenses	Expenses	Expenses are outflows or other using up of assets or incurrences of liabilities (or a combination of both) from delivering or producing goods, rendering services, or carrying out other activities that constitute the entity's ongoing major or central opera
Gains	Gains	Gains are increases in equity (net assets) from peripheral or incidental transactions of an entity and from all other transactions and other events and circumstances affecting the entity except those that result from revenues or investments by owners.
Losses	Losses	Losses are decreases in equity (net assets) from peripheral or incidental transactions of an entity and from all other transactions and other events and circumstances affecting the entity except those that result from expenses or distributions to owners.

²² FASB, SFAC 6 *Elements of Financial Statements*, <https://www.fasb.org/pdf/con6.pdf>

Structures

Next, we want to identify the **structures** defined by SFAC 6. Scouring the documentation, we find that three structures are defined:

- Balance sheet
- Comprehensive income statement
- Changes in equity statement

Again, other structures are defined for not-for-profit entities but they are not in scope for our task and so they will be left out.

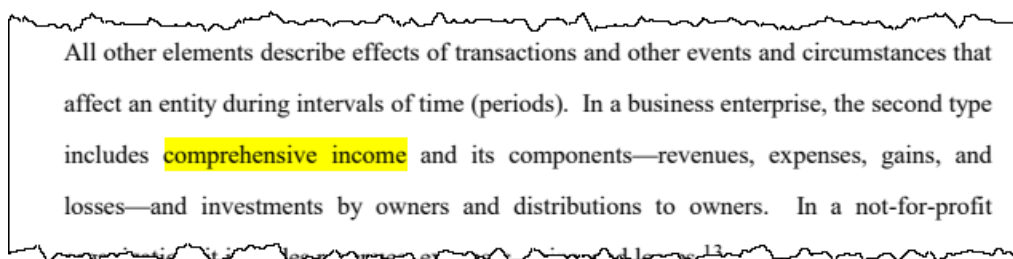
Rules (a.k.a. Assertions)

Next, we want to identify any **rules** (a.k.a. assertions) that have been defined. Again, scouring the documentation we find that either explicitly or implicitly three rules have been defined that specify the interrelationship between the 10 terms:

- $\text{Assets} = \text{Liabilities} + \text{Equity}$
- $\text{Comprehensive income} = \text{Revenues} - \text{Expenses} + \text{Gains} - \text{Losses}$
- $\text{Equity}^{T1} = \text{Equity}^{T0} + \text{Comprehensive Income}^{P1} + \text{Investments by Owners}^{P1} - \text{Distributions to Owners}^{P1}$

Associations

Next, we want to identify any **associations** (a.k.a. relations) that exist between the terms. Once again, going to the SFAC 6 documentation (which is not as explicit as it could be) we find that either explicitly or implicitly the associations are defined (see this example from page 21)



All other elements describe effects of transactions and other events and circumstances that affect an entity during intervals of time (periods). In a business enterprise, the second type includes **comprehensive income** and its components—revenues, expenses, gains, and losses—and investments by owners and distributions to owners. In a not-for-profit

Those associations are summarized as follows:

- Assets is PART OF the Balance Sheet
- Liabilities is PART OF the Balance Sheet
- Equity is PART OF the Balance Sheet
- Revenues is PART OF the Comprehensive Income Statement
- Expenses is PART OF the Comprehensive Income Statement

- Gains is PART OF the Comprehensive Income Statement
- Losses is PART OF the Comprehensive Income Statement
- Comprehensive Income is PART OF the Comprehensive Income Statement
- Equity is PART OF the Changes in Equity Statement
- Investments by Owners is PART OF the Changes in Equity Statement
- Distributions to Owners is PART OF the Changes in Equity Statement
- Comprehensive Income is PART OF the Changes in Equity Statement

Note that these associations could have been expressed in reverse, for example “Changes in Equity Statement HAS PART Comprehensive Income”.

The next step is to decide on a **structure representation strategy**. There are essentially four effective strategies for representing structures:

1. Explicitly define a **unique hypercube** to identify each structure.
2. Explicitly define a **unique network** to identify each structure (with all structures using the same hypercube).
3. Explicitly define a **specification** to describe each structure (with neither a hypercube nor a network explicitly describing the structure).
4. Explicitly define a structure using **either a unique hypercube or unique network and also define a specification** for each structure.

Either of the four approaches will work effectively. Each approach has pros and cons and it is beyond the scope of this document to describe each approach, see the document *Hypercubes*, section 3 *Structure Representation Strategy*²³ for that information.

The approach we will use is #4 and we will explicitly define each structure using a hypercube and we will also define a specification for each structure. This is overkill, but it will provide all the information you need to use either of the four approaches. It is highly recommended that the hypercube approach be used.

Facts

Next, we will create **facts** using the specification we have created. While a reporting scheme does not actually create reports, there are two very good reasons to also specify facts as part of specifying a reporting scheme. The first reason is to test the specification of the reporting scheme to make sure it is working effectively. The second reason is to provide examples of the proper use of the specified reporting scheme.

²³ *Hypercubes*, section 3, *Structure Representation Strategy*,
http://xbrlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part01_Chapter02.8_Hypercubes.pdf

With that information, an economic entity can create a financial statement that communicate **facts** about that economic entity. For example, I will use the imaginary economic entity “ABC Company” and represent their facts as follows:

- Assets= \$0 as of December 31, 2019; \$3,500 as of December 31, 2020
- Liabilities= \$0 as of December 31, 2019; \$0 as of December 31, 2020
- Equity= \$0 as of December 31, 2019; \$3,500 as of December 31, 2020
- Comprehensive income = \$3,000 for the period January 1, 2020 to December 31, 2020
- Investments by Owners = \$1,000 for the period January 1, 2020 to December 31, 2020
- Distributions to Owners = \$500 for the period January 1, 2020 to December 31, 2020
- Revenues = \$7,000 for the period January 1, 2020 to December 31, 2020
- Expenses = \$3,000 for the period January 1, 2020 to December 31, 2020
- Gains = \$1,000 for the period January 1, 2020 to December 31, 2020
- Losses = \$2,000 for the period January 1, 2020 to December 31, 2020

XBRL Representation

The following provides an overview of the representation of the above using the XBRL technical syntax and the SBRM logical conceptualization of a business report. The representation was created using a Microsoft Access database application which can be downloaded²⁴. If you are not familiar with Microsoft Access, you can watch this video²⁵ which describes the database application used to generate this XBRL representation.

Terms

Each **term** is represented as being one of the following report element categories defined by SBRM: Network, Hypercube, Dimension, Member, Line Items, Abstract, or Concept. Here are the terms that have been represented:

Prefix	ReportElementName	ReportElementCategory	Datatype	BalanceType	CalendarPeriodType	StandardLabel
sfac6	BalanceSheetHypercube	Hypercube				Balance Sheet [Hypercube]
sfac6	BalanceSheetLineItems	LineItems				Balance Sheet [Line Items]
sfac6	BalanceSheetSet	Abstract				Balance Sheet [Arithmetic Expression]
sfac6	Assets	Concept	Monetary	Debit	Instant	Assets
sfac6	Liabilities	Concept	Monetary	Credit	Instant	Liabilities
sfac6	Equity	Concept	Monetary	Credit	Instant	Equity
sfac6	ComprehensiveIncomeStatementHypercube	Hypercube				Comprehensive Income Statement [Hypercube]
sfac6	ComprehensiveIncomeStatementLineItems	LineItems				Comprehensive Income Statement [Line Items]
sfac6	ComprehensiveIncomeRollUp	Abstract				Comprehensive Income [RollUp]
sfac6	Revenues	Concept	Monetary	Credit	Duration	Revenues
sfac6	Expenses	Concept	Monetary	Debit	Duration	Expenses
sfac6	Gains	Concept	Monetary	Credit	Duration	Gains
sfac6	Losses	Concept	Monetary	Debit	Duration	Losses
sfac6	ComprehensiveIncome	Concept	Monetary	Credit	Duration	Comprehensive Income
sfac6	InvestmentsByOwners	Concept	Monetary	Credit	Duration	Investments by Owners
sfac6	DistributionsToOwners	Concept	Monetary	Debit	Duration	Distributions to Owners
sfac6	ChangesInEquityHypercube	Hypercube				Changes in Equity [Hypercube]
sfac6	ChangesInEquityLineItems	LineItems				Changes in Equity [Line Items]
sfac6	ChangesInEquityRollForward	Abstract				Changes in Equity [Roll Forward]

²⁴ SFAC 6 Elements of Financial Statements, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/index.html>; see the bullet point “Download Creation Tool (Microsoft Access Database)” to download database

²⁵ YouTube.com, SFAC 5 Elements of Financial Statements, Video, <https://youtu.be/AygNxbQhJqw>

Note that a few additional terms have been added to provide infrastructure necessary to represent structures using hypercubes. Terms are represented using an XBRL taxonomy schema²⁶. Supporting terms are human readable labels²⁷ and references²⁸ to authoritative literature.

Structures

Each **structure** in our case is represented using a hypercube. However, the way XBRL work each hypercube needs to exist within an XBRL network. As such, we first construct the networks which will be used to hold the hypercubes.

Networks			
NetworkIdentifier	NetworkTitle	Sequence	
BalanceSheet	01-Balance Sheet	1	
ComprehensiveIncome	02-Comprehensive Income	2	
ChangesInEquity	03-Changes in Equity	3	

In addition to the networks, hypercubes need to be physically created, a container for line items needs to be created, and a container for each concept arrangement pattern (information model) within a hypercube is also created. The end result of one of the structures will help you understand. Below you see the comprehensive income statement structure containers: network, hypercube, line items, and information model:

Component: (Network and Table)					
Network	02-Comprehensive Income (http://www.xbrlsite.com/sfac6/role/ComprehensiveIncome)				
Table	Comprehensive Income Statement [Hypercube]				
#	Label	Report Element Class	Period Type	Balance	Name
1	Comprehensive Income Statement [Hypercube]	[Table]			sfac6:ComprehensiveIncomeStatementHypercube
2	Comprehensive Income Statement [Line Items]	[Line Items]			sfac6:ComprehensiveIncomeStatementLineItems
3	Comprehensive Income [Roll Up]	[Abstract]			sfac6:ComprehensiveIncomeRollUp
4	Revenues	[Concept] Monetary	For Period	Credit	sfac6:Revenues
5	(Expenses)	[Concept] Monetary	For Period	Debit	sfac6:Expenses
6	Gains	[Concept] Monetary	For Period	Credit	sfac6:Gains
7	(Losses)	[Concept] Monetary	For Period	Debit	sfac6:Losses
8	Comprehensive Income	[Concept] Monetary	For Period	Credit	sfac6:ComprehensiveIncome

As such, we add the additional report elements (terms) to the XBRL taxonomy for these pieces of the structures.

Associations

Structures are defined using sets of **associations**. Or said another way, a structure is a set of associations. In XBRL there are two sets of associations used to define structures, XBRL presentation relations²⁹ and XBRL definition relations³⁰. The XBRL technical specification has explicit rules for defining the associations between the report elements that are used to

²⁶ XBRL Terms, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6.xsd>

²⁷ XBRL Labels, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6-lab.xml>

²⁸ XBRL References, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6-ref.xml>

²⁹ XBRL Presentation Relations, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6-pre.xml>

³⁰ XBRL Definition Relations, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6-def.xml>

represent the XBRL definition relations to represent structural information so XBRL validation makes sure those relations are appropriate.

XBRL presentation relations do not specify proper and improper relations between report elements in that structure definition. As such, SBRM has defined the allowed and unallowed relations which are represented in the form of an XBRL definition relations linkbase³¹. The following graphic provides a visualization of the same information:

		Parent						
		Network	Table	Axis	Member	Line Items	Abstract	Concept
Child	Network	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL
	Table	OK	Disallowed	Disallowed	Disallowed	Disallowed	OK	Disallowed
	Axis	Disallowed	OK	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Member	Disallowed	Disallowed	OK	OK	Disallowed	Disallowed	Disallowed
	Line Items	Disallowed	OK	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Abstract	OK	Disallowed	Disallowed	Disallowed	OK	OK	Disallowed
	Concept	Disallowed	Disallowed	Disallowed	Disallowed	OK	OK	Disallowed

Rules (a.k.a. Assertions)

Mathematical relations between facts that are described in part by terms are represented using XBRL Formula. Our SFAC 6 representation has three rules. The following database interface is used to capture information that describes two of the three mathematical rules which are *roll ups* which are expressed using XBRL Formula^{32,33}:

Consistency_Tests				
Key	RuleCode	Rule	Network	Concept
5	BS01	\$Assets = (\$Liabilities + \$Equity)	BalanceSheet	sfac6:Assets
VariableName				
13	sfac6:Assets			
14	sfac6:Liabilities			
18	sfac6:Equity			
14	IS01	\$ComprehensiveIncome = (\$Revenues - \$Expenses + \$Gains - \$Losses)	ComprehensiveIncome	sfac6:ComprehensiveIncome
VariableName				
46	sfac6:Revenues			
47	sfac6:Expenses			
48	sfac6:Gains			
49	sfac6:Losses			
50	sfac6:ComprehensiveIncome			

³¹ XBRL definition relations that define allowed and disallowed XBRL presentation relations, <http://xbrlsite.azurewebsites.net/2020/Prototype/sbrm/sbrm-structure-rules-strict-def.xml>

³² Roll up rule, BS01, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Consistency-Code-BS01-formula.xml>

³³ Roll up rule, IS01, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Consistency-Code-IS01-formula.xml>

The following database interface is used to capture information that describes the third mathematical rule which is a *roll forward* which is likewise represented using XBRL Formula³⁴:

Rules_RollForward				
Key	RuleCode	Rule	Network	InstanceConcept
3	SHE01	\$Equity_BalanceStart + \$ComprehensiveIncome + \$InvestmentsByOwners - \$DistributionsToOwners = \$Equity_BalanceEnd	ChangesInEquity	sfac6:Equity
Key	VariableName	Sequence	Flag	Click to Add
10	sfac6:Equity		<input type="checkbox"/>	
9	sfac6:ComprehensiveIncome		<input type="checkbox"/>	
8	sfac6:InvestmentsByOwners		<input type="checkbox"/>	
7	sfac6:DistributionsToOwners		<input type="checkbox"/>	

Note that while the SFAC 6 example has only two patterns of mathematical rules; there are a total of seven different rule patterns, each with its own specific interface for ease of rule creation.

Alternatively, roll up relations can be expressed using XBRL calculation relations³⁵.

Disclosure Mechanics Rules

In order to make certain that XBRL-based reports are represented correctly per the financial reporting scheme specification, a disclosure mechanics rule is provided for each disclosure to make explicit how that disclosure is to be constructed. Disclosure mechanics rules are created for the balance sheet³⁶, comprehensive income statement³⁷, and statement of changes in equity and are represented using XBRL definition relations:

	Arcrole	Order
Definition View		
Balance Sheet		0
Balance Sheet [Hypercube]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-requiresHypercube	1
[Hierarchy]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-hasConceptArrangementPattern	2
Assets	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/conceptArrangementPattern-requiresConcept	3
Liabilities	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-requiresConcept	4
Equity	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-requiresConcept	5
Changes in Equity		
Changes in Equity		0
Changes in Equity [Hypercube]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-requiresHypercube	1
[RollForward]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-hasConceptArrangementPattern	2
Equity	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/conceptArrangementPattern-requiresConcept	3
Comprehensive Income		
Comprehensive Income		0
Comprehensive Income Statement [Hypercube]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-requiresHypercube	1
[RollUp]	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/disclosure-hasConceptArrangementPattern	2
Comprehensive Income	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arroles/arcrole/conceptArrangementPattern-requiresConcept	3

³⁴ Roll Forward rule, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-RollForward-Code-SHE01-formula.xml>

³⁵ Comprehensive income rule, XBRL calculations, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/sfac6-cal.xml>

³⁶ Balance sheet disclosure mechanics rules, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-BalanceSheet-rules-def.xml>

³⁷ Comprehensive income statement disclosure mechanics rules, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-ComprehensiveIncome-rules-def.xml>

³⁸ Changes in equity disclosure mechanics rules, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-ChangesInEquity-rules-def.xml>

Disclosure Rules

Disclosure rules (a.k.a. reporting checklist) specify when a disclosure is required to be included within a financial report. Here are the disclosure rules for SFAC 6 which are expressed using XBRL definition relations³⁹:

Arcrole		Order
Definition View		
Reporting Checklist		
[Thing]		0
[FinancialReport]		1
Balance Sheet	http://xbrlsite.azurewebsites.net/2016/conceptual-model/arcrrole/class-equivalentClass	1
Comprehensive Income	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arcrroles/arcrrole/financialReport-requiresDisclosure	2
Changes in Equity	http://xbrlsite.azurewebsites.net/2016/conceptual-model/drules-arcrroles/arcrrole/financialReport-requiresDisclosure	3
		4

The disclosure rules above specify that the balance sheet, comprehensive income statement, and changes in equity statement are always required to be reported. Other constraints can be expressed such as a disclosure being required if a specific line item is reported.

Type-subtype rules

Type-subtype rules specify what many refer to as “wider-narrower” or “general-special” relations between concepts. Because the SFAC 6 financial reporting scheme really has no depth, no such type-subtype rules have been expressed.

Consistency cross check rules

Consistency cross check rules help to make sure that financial reports contain no inconsistencies or contradictions. They check both with a structure and between structures to make sure a report does not say something in one part of the report that contradicts another part of the report. Here is an example of a consistency crosscheck rule represented in XBRL formula⁴⁰:

ASSERTION_CORE_CONCEPTUAL_FRAMEWORK_RECONCILIATION (evaluation 1)	satisfied	0= ((\$Equity_BalanceStart=0 + ((\$Revenues=7000 - \$Expenses=3000) + (\$Gains=1000 - \$Losses=2000)) + (\$InvestmentsByOwners=1000 - \$DistributionsToOwners=500)) + (\$Liabilities_BalanceEnd=0 - \$Assets_BalanceEnd=3500))
--	-----------	--

Derivation rules

It may, or may not, be appropriate to not report certain specific high-level line items per a financial reporting scheme. For example, per US GAAP, the line item Noncurrent Assets is often not explicitly reported. However, such high-level line items are still used in analysis. As such, information about whether it is appropriate to not report such high-level line items is necessary and if allowed, then it may be appropriate to provide rules that are useful in deriving such line items by using other explicitly reported line items. For example, say the line item Liabilities

³⁹ Disclosure rules, XBRL definition relations, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/dr-rules-def.xml>

⁴⁰ Consistency cross check rule, XBRL formula, <http://xbrlsite.azurewebsites.net/2019/core/core-sfac6/core-formula.xml>

could go unreported and the following rule was provided to derive the that line item should it not be explicitly reported:

IF exists (Assets) and exists (Equity) and (Liabilities eq null); THEN Liabilities = Assets - Equity

That information can be represented in XBRL formula to indicate how to derive Liabilities⁴¹, Equity⁴², or Assets⁴³ should they not be explicitly reported.

Facts

Again, for testing purposes we represented facts within this specification of a reporting scheme in order to demonstrate the reporting scheme and to make certain that the reporting scheme representation was functioning correctly. Here is a human readable representation of the facts which are expressed within an XBRL instance⁴⁴:

Component: (Network and Table)							
Network	01-Balance Sheet (http://www.xbrlsite.com/sfac6/role/BalanceSheet)						
Table	Balance Sheet [Hypercube]						
#	Reporting Entity [Axis]	Period [Axis]	Concept	Fact Value	Unit	Rounding	Parenthetical Explanations
1	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Assets	0	USD	INF	
2	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Assets	3500	USD	INF	
3	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Liabilities	0	USD	INF	
4	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Liabilities	0	USD	INF	
5	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Equity	0	USD	INF	
6	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Equity	3500	USD	INF	

Component: (Network and Table)							
Network	02-Comprehensive Income (http://www.xbrlsite.com/sfac6/role/ComprehensiveIncome)						
Table	Comprehensive Income Statement [Hypercube]						
#	Reporting Entity [Axis]	Period [Axis]	Concept	Fact Value	Unit	Rounding	Parenthetical Explanations
1	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Revenues	7000	USD	INF	
2	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Expenses	3000	USD	INF	
3	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Gains	1000	USD	INF	
4	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Losses	2000	USD	INF	
5	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Comprehensive Income	3000	USD	INF	

Component: (Network and Table)							
Network	03-Changes in Equity (http://www.xbrlsite.com/sfac6/role/ChangesInEquity)						
Table	Changes in Equity [Hypercube]						
#	Reporting Entity [Axis]	Period [Axis]	Concept	Fact Value	Unit	Rounding	Parenthetical Explanations
1	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2019-12-31	Equity	0	USD	INF	
2	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Equity	3500	USD	INF	
3	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Comprehensive Income	3000	USD	INF	
4	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Investments by Owners	1000	USD	INF	
5	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-01-01 - 2020-12-31	Distributions to Owners	500	USD	INF	

⁴¹ Derive Liabilities, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Derivation-Code-BS-Impute-01-formula.xml>

⁴² Derive Equity, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Derivation-Code-BS-Impute-02-formula.xml>

⁴³ Derive Assets, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Derivation-Code-BS-Impute-03-formula.xml>

⁴⁴ XBRL instance, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/instance.xml>

Alternatively, facts could be represented using unformatted autogenerated Inline XBRL⁴⁵:

Concept Aspect	Period Aspect	Fact Value
sfac6:Assets	2019-12-31	0
sfac6:Assets	2020-12-31	3,500
sfac6:Liabilities	2019-12-31	0
sfac6:Liabilities	2020-12-31	0
sfac6:Equity	2019-12-31	0
sfac6:Equity	2020-12-31	3,500
sfac6:Revenues	2020-01-01 2020-12-31	7,000
sfac6:Gains	2020-01-01 2020-12-31	1,000
sfac6:Expenses	2020-01-01 2020-12-31	3,000
sfac6:Losses	2020-01-01 2020-12-31	2,000
sfac6:DistributionsToOwners	2020-01-01 2020-12-31	500
sfac6:InvestmentsByOwners	2020-01-01 2020-12-31	1,000
sfac6:ComprehensiveIncome	2020-01-01 2020-12-31	3,000

Alternatively, facts could be represented using formatted autogenerated Inline XBRL⁴⁶: (only a portion of the report is shown)

Component: (Network and Table)	
Network	02-Comprehensive Income (http://www.xbrlsite.com/sfac6/role/ComprehensiveIncome)
Table	Comprehensive Income Statement [Hypercube]
Slicers (applies to each fact value in each table cell)	
Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)
Comprehensive Income Statement [Line Items]	
Period [Axis]	
2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Finally, a manually or automatically mapped “pixel perfect” XHTML file could be created (not shown).

⁴⁵ Unformatted autogenerated Inline XBRL, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/instance-generated.html>

⁴⁶ Formatted autogenerated Inline XBRL, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/instance.html>

Validation of Properly Functioning Financial Report

To test the specification of the reporting scheme an XBRL instance is created, verified to be consistent with the specified rules, and a determination is made as to whether the specified reporting scheme and the report are consistent, complete, precise and therefore a properly functioning logical system.

The following is a human readable version of the SFAC 6 financial reporting scheme report⁴⁷:

Automated Verification Summary by Component

This matrix provides detail about the verification status of the individual components which make up the financial report.

Component (Network/Table)	Status	Count of Relations	XBRL Technical Syntax Rules	Model Structure Rules	Business Rules ^(a)	Roll Up Rules ^(b)	Other Manual Review Tasks	Other Rules and Best Practice Tasks
01-Balance Sheet Balance Sheet [Hypercube]	Completed	6	OK	OK	OK	OK	OK	OK
02-Comprehensive Income Comprehensive Income Statement [Hypercube]	Completed	8	OK	OK	OK	OK	OK	OK
03-Changes in Equity Changes in Equity [Hypercube]	Completed	8	OK	OK	OK	OK	OK	OK
(Component not specified)	Completed	0	OK	OK	OK	OK	OK	OK

The following are the results of verifying the mathematical relations of the report⁴⁸:

Summary

Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	4	6	6	0

Assertion Report

Value Assertions

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
Arithmetic_BS01 (evaluation 2)	satisfied	\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)
Arithmetic_IS01 (evaluation 1)	satisfied	\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)
RollForward_SHE01 (evaluation 1)	satisfied	\$Equity_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity_BalanceEnd=3500
CONSISTENCY_AccountingEquation (evaluation 1)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
CONSISTENCY_AccountingEquation (evaluation 2)	satisfied	\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)

⁴⁷ XBRL Cloud Evidence Package, SFAC 6 report, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#VerificationDashboard.html>

⁴⁸ XBRL Formula validation result, http://xbrlsite.azurewebsites.net/2020/master/sfac6/ XPE_instance.xml Formula.html

The following is verification of the mathematical relations in context of the structures in which the facts exist:

Balance sheet⁴⁹:

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Comprehensive income statement⁵⁰:

Comprehensive Income Statement [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Changes in equity⁵¹:

Changes in Equity [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
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

Here, a different application is used to verify the disclosure mechanics rules; note that all three structures are consistent with the specification:

⁴⁹ Human readable, Balance Sheet, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-BalanceSheet-sfac6_BalanceSheetHypercube.html

⁵⁰ Human readable, Comprehensive income statement, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-sfac6_ComprehensiveIncomeStatementHypercube.html

⁵¹ Human readable, Changes in equity, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-ChangesInEquity-sfac6_ChangesInEquityHypercube.html

Primary Information									
#	Disclosure	Category	Level	Pattern	Discosu...	Disclosure Consistent	Applicable	Representation Concept [TEXT BL...	Representation Concept DETAIL
1	Balance Sheet	Unknown	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Assets
<div>Rules</div> <div>Line of Reasoning</div> This disclosure: disclosures:BalanceSheet <ul style="list-style-type: none"> - MUST be represented using the Hypercube/[Table] named: sfac6:BalanceSheetHypercube - MUST be represented as a Level 4 Disclosure Detail with the concept arrangement pattern: cm:Hierarchy - cm:Hierarchy REQUIRES concept: sfac6:Assets - The Hierarchy MUST contain the Level 4 Detailed Concept: sfac6:Liabilities - The Hierarchy MUST contain the Level 4 Detailed Concept: sfac6:Equity 									
2	Changes in Equity	Unknown	Level4Detail	RollFor...	True	CONSISTENT	True	NOT-EXPECTED	Equity
<div>Rules</div> <div>Line of Reasoning</div> This disclosure: disclosures:ChangesInEquity <ul style="list-style-type: none"> - MUST be represented using the Hypercube/[Table] named: sfac6:ChangesInEquityHypercube - MUST be represented as a Level 4 Disclosure Detail with the concept arrangement pattern: cm:RollForward - cm:RollForward REQUIRES beginning/ending balance: sfac6:Equity 									
3	Comprehensive Income	Unknown	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Comprehensive Income
<div>Rules</div> <div>Line of Reasoning</div> This disclosure: disclosures:ComprehensiveIncome <ul style="list-style-type: none"> - MUST be represented using the Hypercube/[Table] named: sfac6:ComprehensiveIncomeStatementHypercube - MUST be represented as a Level 4 Disclosure Detail with the concept arrangement pattern: cm:RollUp - cm:RollUp REQUIRES total: sfac6:ComprehensiveIncome 									

Here the disclosure rules (a.k.a. reporting checklist) provides information that the report is consistent with the specification of what disclosures are to be included within the report:

#	Disclosure	Checklist Category	Reason Disclosure Must Exist	Discovered	Expectation Met	Link to Disclosure Mechanics
0	Reporting Checklist					
1	Balance Sheet	Required disclosure	Disclosure always required	True	CONSISTENT	Balance Sheet
2	Comprehensive Income	Required disclosure	Disclosure always required	True	CONSISTENT	Comprehensive Income
3	Changes in Equity	Required disclosure	Disclosure always required	True	CONSISTENT	Changes in Equity

Creation of Report per Specification

Financial reports are created per the specification of what must be contained within that financial report per some financial reporting scheme. The method of creating terms, structures, associations, rules, and facts is identical to the method used by a standards setter, regulator, or enterprise might specify a reporting scheme.

Terms

In this case we will add no additional terms; all are provided by the reporting scheme.

Structures

In this case we will add no additional structures; all are provided by the reporting scheme.

Associations

Because there are no additional terms or structures, there would be no additional associations.

Rules (a.k.a. Assertions)

In this case we will add no assertions structures; all are provided by the reporting scheme.

Facts

With the information from the financial reporting scheme specification an economic entity can create a financial statement that communicate **facts** about that economic entity per that specified reporting scheme. All the rules should be followed unless the reporting economic entity makes permissible additions or manipulations that are consistent with that specification.

For example, I will use the same imaginary economic entity “ABC Company” and represent their facts as follows as was used in the specification of the reporting entity:

- Assets= \$0 as of December 31, 2019; \$3,500 as of December 31, 2020
- Liabilities= \$0 as of December 31, 2019; \$0 as of December 31, 2020
- Equity= \$0 as of December 31, 2019; \$3,500 as of December 31, 2020
- Comprehensive income = \$3,000 for the period January 1, 2020 to December 31, 2020
- Investments by Owners = \$1,000 for the period January 1, 2020 to December 31, 2020
- Distributions to Owners = \$500 for the period January 1, 2020 to December 31, 2020
- Revenues = \$7,000 for the period January 1, 2020 to December 31, 2020
- Expenses = \$3,000 for the period January 1, 2020 to December 31, 2020
- Gains = \$1,000 for the period January 1, 2020 to December 31, 2020
- Losses = \$2,000 for the period January 1, 2020 to December 31, 2020

XBRL Representation

The XBRL representation in the case we specified would be identical to the test report provided in the specification of reporting scheme section. There is no reason to repeat that information here; everything is identical.

Consumption of Report per Specification

One of the purposes of representing a financial report in machine readable form is to enable the financial report to be readable and understandable by automated machine-based processes that extract and use information from the report and effectively use that information to automate some down stream process.

To that end, the same terms, structures, rules, associations, and facts are important to consumers of information. Below is a screenshot of a simple prototype information extraction tool which you can download and explore⁵²:

General information				Income Statement										Changes in Equity		Rules		
#	Economic Entity Name	LEI	Balance Sheet Date	Income Statement Start Period	Assets	Liabilities	Equity	Liabilities and Equity	Revenues	Expenses	Gains	Losses	Comprehensive Income	Investments by Owners	Distributions to Owners	BS1	BS4	IS1
1	ABC Company	GH259400TOMPULS558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0
2	Company Has Errors	GH259400TOMPULS558	2020-12-31	2020-01-01	8,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	5,000	0	0
3	XYZ Company	GH259400TOMPULS558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0
4	Company not reporting liabilities	GH259400TOMPULS558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0
5	Company not reporting assets	GH259400TOMPULS558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0
6	Microsoft	000078909	2017-12-31	2017-01-01	241,086,000,000	168,632,000,000	72,394,000,000	241,086,000,000	\$9,950,000,000	\$9,563,000,000	\$23,000,000	1,106,000,000	20,098,000,000	0	19,701,000,000	0	0	0

The information extraction tool demonstrates the fundamental process of extracting information from an XBRL-based report.

Terms

In order to extract information, the software application must understand what terms to look for when extracting information. In the extraction example, the term “Liabilities and Equity” is sought by the extraction tool which is a reasonable assumption. However, to achieve this a rule must be created in order to derive the value “Liabilities and Equity” from other information that exists.

Structures

In order to extract information for an entire structure that structure must be identifiable. As mentioned earlier, there are four strategies for representing structures. How information must be extracted from a structure is determined by the representation approach used.

For example, if structures are not named at all it might be necessary to (a) obtain a list of disclosures⁵³; (b) use that list to determine which structure you are looking for; (c) use a list of specifications for disclosures (disclosure mechanics rules)⁵⁴; (d) use those specifications to find the disclosure you are looking for (i.e. balance sheet⁵⁵, comprehensive income statement⁵⁶, changes in equity statement⁵⁷).

⁵² SFAC 6 reporting scheme information extraction tool,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/Extraction-sfac6.zip>

⁵³ List of disclosures represented as XBRL taxonomy schema,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/disclosures.xsd>

⁵⁴ List of specifications for identifying disclosure (i.e. disclosure mechanics rules),
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm.xsd>

⁵⁵ Balance sheet disclosure mechanics rules, XBRL definition relations,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-BalanceSheet-rules-def.xml>

⁵⁶ Comprehensive income statement disclosure mechanics rules,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-ComprehensiveIncome-rules-def.xml>

⁵⁷ Changes in equity statement disclosure mechanics rules,
<http://xbrlsite.azurewebsites.net/2020/master/sfac6/dm-ChangesInEquity-rules-def.xml>

Further, although used mainly for financial report creation, the disclosure rules may be helpful for the consumption of financial report information⁵⁸. Perhaps a combination of disclosure rules and disclosure mechanics rules provide the specification necessary to extract information from a report.

Rules (a.k.a. Assertions)

Information will generally not be used blindly. Rather, software attempting to consume information from a report will query information, compare that information with other information to be sure the information is consistent with provided rules, and then consume the information if no exceptions are encountered. For example, in the extraction prototype an error is induced in one XBRL instance⁵⁹ which results in a reported error:

General information					Income Statement										Changes in Equity			Rules		
#	Economic Entity Name	LEI	Balance Sheet Start Period (Year to Date)	Income Statement Start Period (Year to Date)	Assets	Liabilities	Equity	Liabilities and Equity	Revenues	Expenses	Gains	Losses	Comprehensive Income	Investments by Owners	Distributions to Owners	BS1	BS4	ISI		
1	ABC Company	GH259400TOMPUOL5558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	2,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0		
2	Company Has Errors	GH259400TOMPUOL5558	2020-12-31	2020-01-01	8,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	5,000	0	0		
3	XYZ Company	GH259400TOMPUOL5558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0		
4	Company not reporting liabilities	GH259400TOMPUOL5558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0		
5	Company not reporting assets	GH259400TOMPUOL5558	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	3,000	1,000	2,000	3,000	1,000	500	0	0	0		
6	Microsoft	0000783019	2017-12-31	2017-01-01	241,086,000,000	168,632,000,000	72,394,000,000	241,086,000,000	89,950,000,000	89,563,000,000	823,000,000	1,106,000,000	20,098,000,000	0	19,701,000,000	0	0	0		

The error is detected by the automated extraction process only because of the consistency cross check rule that is provided⁶⁰. Should that rule not exist, the error would remain undetected.

Associations

Suppose an economic entity creating a report chose to present their balance sheet using an allowed, but not provided, term “Net Assets”. Using type-subtype rules (i.e. wider-narrower or general-special associations); if the reporting economic entity created an association between the concept “Equity” and the equivalent concept “Net Assets” in this case using the XBRL “essence-alias⁶¹” relation, then consuming software applications would be able to figure out how to process the extension element encountered. Further, a rule should be also created to represent the relationship between Assets, Liabilities, and Net Assets to assist consuming software applications.

For example, the structure below shows the extension concept “Net Assets” being used as part of the balance sheet structure with the new concept being represented using an XBRL presentation relation. It is just as important to provide the XBRL definition relation that

⁵⁸ Disclosure rules, XBRL definition relations, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/dr-rules-def.xml>

⁵⁹ SFAC 6 XBRL instance with error, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/extract-instance-witherror.xml>

⁶⁰ Consistency cross check rule, XBRL Formula, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/Rule-Consistency-Code-BS01-formula.xml>

⁶¹ XBRL Technical Specification, Essence-alias arcs, <http://www.xbrl.org/Specification/XBRL-2.1/REC-2003-12-31/XBRL-2.1-REC-2003-12-31+corrected-errata-2013-02-20.html# 5.2.6.2.2>

indicates that Net Assets is equivalent to the concept Equity (i.e. “essence-alias” relation) and the rule that “Net Assets = Assets - Liabilities”. Otherwise, automated processes would stumble when they encounter this information without the rule and without the association information.

	Period [Axis]	
	2020-12-31	2019-12-31
Net Assets [Roll Up]		
Assets	3,500	0
(Liabilities)	0	0
Net Assets	3,500	0

XBRL Representation

Again, the XBRL representation in the case we specified would be identical to the test report provided in the specification of reporting scheme section. There is no reason to repeat that information here; everything is identical.

Impediments to Properly Functioning Logical System

In the subsequent sections I want to make some adjustments to the properly functioning logical system above which will make the SFAC 6 logical system either *inconsistent*, *incomplete*, and/or *imprecise* and explain why the system is then not a properly functioning logical system. You should be able to follow the changes because of the relatively small size of the SFAC 6 logical system and (a) see the impact on the SFAC 6 logical system and (b) understand how to avoid such errors in other larger logical systems.

Before we get to the improperly functioning logical systems, let’s take one final look at the properly functioning logical system so that you can compare and contrast the properly functioning and improperly functioning logical systems.

State 1: Properly Functioning SFAC 6 Logical System

For completeness, I want to start by mentioning again our properly functioning SFAC 6 logical system which is *consistent*, *complete*, and *precise*. It can be helpful to contrast other improperly functioning states to this properly functioning state to understand the difference between properly functioning logical systems and improperly functioning systems.

Consistent	Assets = 3,500 ^{T1} ; 0 ^{T0}
	Liabilities = 0 ^{T1} ; 0 ^{T0}
	Equity = 3,500 ^{T1} ; 0 ^{T0}
Complete	Revenues = 7,000
	Expenses = 3,000
	Gains = 1,000
Precise	Losses = 2,000
	Comprehensive income = 3,000
	Investments by Owners = 1,000
	Distributions to Owners = 500
	<i>Assets = Liabilities + Equity</i>
	<i>Comprehensive Income =</i> <i>Revenues - Expenses + Gains - Losses</i>
	<i>Equity^{T1} = Equity^{T0} + Comprehensive</i> <i>Income^{P1} + Investments by Owners^{P1} –</i> <i>Distributions to Owners^{P1}</i>

Balance Sheet

Balance Sheet [Abstract]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Abstract]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity

Changes in Equity [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Changes in Equity [Abstract]	
Equity [Roll Forward]	
Equity, Beginning	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Equity, Ending	3,500

Income Statement

Comprehensive Income Statement [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income Statement [Abstract]	
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

This is considered a properly functioning logical system because (a) all the statements within the system are **consistent**; (b) the set of statements that describe the system is **complete**; and (c) the information conveyed by the system is **precise** in its representation of reality. Further, we are formally declaring this “reality”⁶² to be our base understanding.

The structures are constructed correctly within the XBRL representation. When representing information within XBRL presentation relations, the following report element relation patterns are used when you create your representation⁶³. We will not be covering this in the document but wanted to include this for the sake of completeness.

⁶² YouTube, Reality, <https://youtu.be/eq2Jw6waaCI>

⁶³ XBRL definition relations to represent structure rules for report element organization within XBRL presentation relations, <http://xbrlsite.azurewebsites.net/2020/prototype/sbrm/sbrm-structure-rules-strict-def.xml>

		Parent						
		Network	Table	Axis	Member	Line Items	Abstract	Concept
Child	Network	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL	Illegal XBRL
	Table	OK	Disallowed	Disallowed	Disallowed	Disallowed	OK	Disallowed
	Axis	Disallowed	OK	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Member	Disallowed	Disallowed	OK	OK	Disallowed	Disallowed	Disallowed
	Line Items	Disallowed	OK	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
	Abstract	OK	Disallowed	Disallowed	Disallowed	OK	OK	Disallowed
	Concept	Disallowed	Disallowed	Disallowed	Disallowed	OK	OK	Disallowed

Also, we need to be explicit. We defined 10 terms in the SFAC 6 system: Assets, Liabilities, Equity, Comprehensive Income, Investments by Owners, Distributions to Owners, Revenues, Expenses, Gains, Losses.

Now, you may know what those 10 terms are; but a computer does not. You have to define what you work with relative to something that you know. Imagine our system defines four terms, “fac:Assets”, “fac:Liabilities”, “fac:Equity”, and “fac:LiabilitiesAndEquity”⁶⁴. You understand your system but you have to map every external system into your system⁶⁵. Your internal system understands more than the SFAC 6 system (i.e. you have LiabilitiesAndEquity). You have to be able to compute that value based on some other system’s information⁶⁶. It is perfectly reasonable for our system to create a concept LiabilitiesAndEquity and compute that value even though the SFAC 6 logical system does not have that explicit value.

The point is that different economic entities have different internal report models; but all models of a financial reporting scheme are reconcilable from/to one another in some manner⁶⁷.

State 2: Incomplete Coverage by Rules

The logical system #2 below is intended to show exactly the same information as our #1 properly functioning logical system, except that #2 leaves out the rule “Assets = Liabilities and Equity” and the rule “EquityT1 = Equity T0 + ComprehensiveIncomeP1 + InvestmentsByOwnersP1 - DistributionsToOwnersP1” which are showed as grayed out (i.e. because it is assumed to be missing from the logical system).

⁶⁴ Fundamental accounting concepts, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/fac.xsd>

⁶⁵ Mapping from SFAC 6 to fundamental accounting concepts in our system, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/fac-mapping-definition.xml>

⁶⁶ XBRL Formula to derive the value for LiabilitiesAndEquity, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/fac-ImputeRule-LiabilitiesAndEquity-formula.xml>

⁶⁷ Charles Hoffman, CPA, *Special Theory of Machine-based Automated Communication of Semantic Information of Financial Statements*, <http://xbrl.squarespace.com/journal/2019/12/30/special-theory-of-machine-based-automated-communication-of-s.html>

Coverage is a measure of how well you do or can represent a domain of information within a logical system. “Do” is about using the tools you have correctly and effectively. “Can” is about the capabilities of the tools you are using to represent the rule.

For example, if your logical system neglects to include the rule “Assets = Liabilities + Equity” or “Equity^{T1} = Equity^{T0} + ComprehensiveIncome^{P1} + InvestmentsByOwners^{P1} - DistributionsToOwners^{P1}” or if your tools don’t provide the capabilities to allow you to represent that rule; then there is the possibility that the facts being represented to be represented incorrectly and the system will not detect the inconsistency. As such, that logical system has **incomplete coverage**.

Consistent	Assets = 3,500 ^{T1} ; 0 ^{T0}
	Liabilities = 0 ^{T1} ; 0 ^{T0}
	Equity = 3,500 ^{T1} ; 0 ^{T0}
Incomplete	Revenues = 7,000
	Expenses = 3,000
	Gains = 1,000
Precise	Losses = 2,000
	Comprehensive income = 3,000
	Investments by Owners = 1,000
	Distributions to Owners = 500
	<i>Assets = Liabilities + Equity</i>
	<i>Comprehensive Income = Revenues - Expenses + Gains - Losses</i>
	<i>Equity^{T1} = Equity^{T0} + Comprehensive Income^{P1} + Investments by Owners^{P1} - Distributions to Owners^{P1}</i>

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

While this specific state #2 does have the Assets, Liabilities, and Equity facts consistent with the absent rule; the system is still **incomplete** because the coverage can be improved by adding the missing rule. If that missing rules were added back to the system, then the logical system can be considered complete again.

State 3: Inconsistent and Imprecise

All the statements in the system must be **consistent** for the logical system to be considered properly functioning. If statements are inconsistent, the logical system is not properly functioning. In this system #3 the value for Assets in 2020 was changed from \$3,500 to \$8,500,

and therefore the values for Assets, Liabilities, and Equity are inconsistent with the rule “Assets = Liabilities + Equity”. This inconsistency is detected by the rule “Assets = Liabilities + Equity”:

id	satisfied	message
CONSISTENCY_5 (evaluation 1)	notSatisfied	\$Assets=8500 = (\$Liabilities=0 + \$Equity=3500)
CONSISTENCY_5 (evaluation 2)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)

From looking at the information provided, it is impossible to know exactly which of the three facts are incorrect; it is only possible to understand that the statements made within the logical system is inconsistent. It could be the case that the rule is incorrect.

But, because we are assuming that in our reality, state #1 has the proper results; we can know that the statement “Assets=\$8,500” is inconsistent with the rule “Assets = Liabilities + Equity”

Inconsistent Complete Imprecise	Assets = 8,500^{T1} ; 0 ^{T0}
	Liabilities = 0 ^{T1} ; 0 ^{T0}
	Equity = 3,500 ^{T1} ; 0 ^{T0}
	Revenues = 7,000
	Expenses = 3,000
	Gains = 1,000
	Losses = 2,000
	Comprehensive income = 3,000
	Investments by Owners = 1,000
	Distributions to Owners = 500
<i>Assets = Liabilities + Equity</i>	
<i>Comprehensive Income = Revenues - Expenses + Gains - Losses</i>	
<i>Equity^{T1} = Equity^{T0} + Comprehensive Income^{P1} + Investments by Owners^{P1} - Distributions to Owners^{P1}</i>	

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	8,500	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

And so, given that we know from state #1 that the value for Assets is \$3,500 and not \$8,000; the facts in this system is imprecise because the fact for Assets does not reflect reality. And so, the system is made consistent by correcting the fact for Assets for the 2020 balance sheet.

State 4: Unreported Facts

In state #4, the situation is that the economic entity representing information in their report neglected to include the fact for Assets. Whether it is the case that a fact can, or cannot, be left unreported is a decision that can be made by the stakeholders of the system.

If it is the case that it is decided that the fact “Assets” can be omitted if both Liabilities and Equity are reported; then you must provide a rule to derive the value of Liabilities when that fact Assets is not reported. In our system, if the fact Assets is not reported then the machine-readable rule assumes that the value of the missing fact Assets is 0. As such, the rule indicates that the facts are not consistent with the rule:

id	satisfied	message
CONSISTENCY_5 (evaluation 1)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
CONSISTENCY_5 (evaluation 2)	notSatisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=3500)

Because the information is incomplete, users of the information have to make assumptions about the value of a missing fact. This same situation could exist for any fact, for example Liabilities, Equity, or some other fact could go unreported.

Consistent

Incomplete

Precise

$$\text{Assets} = 0^{T0}$$

$$\text{Liabilities} = 0^{T1}; 0^{T0}$$

$$\text{Equity} = 3,500^{T1}; 0^{T0}$$

$$\text{Revenues} = 7,000$$

$$\text{Expenses} = 3,000$$

$$\text{Gains} = 1,000$$

$$\text{Losses} = 2,000$$

$$\text{Comprehensive income} = 3,000$$

$$\text{Investments by Owners} = 1,000$$

$$\text{Distributions to Owners} = 500$$

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

$$\text{Comprehensive Income} = \text{Revenues} - \text{Expenses} + \text{Gains} - \text{Losses}$$

$$\text{Equity}^{T1} = \text{Equity}^{T0} + \text{Comprehensive Income}^{P1} + \text{Investments by Owners}^{P1} - \text{Distributions to Owners}^{P1}$$

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]
	2020-12-31 2019-12-31
Balance Sheet [Arithmetic Expression]	
Assets	0
Liabilities	0
Equity	3,500

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Below in state #4' you see that the system has been adjusted to add the rule "IF Liabilities exists and if Equity exists; THEN Assets = Liabilities + Equity"⁶⁸.

Consistent Complete Precise	Assets = 0 ^{T0}
	Liabilities = 0 ^{T1} ; 0 ^{T0}
	Equity = 3,500 ^{T1} ; 0 ^{T0}
	Revenues = 7,000
	Expenses = 3,000
	Gains = 1,000
	Losses = 2,000
	Comprehensive income = 3,000
	Investments by Owners = 1,000
	Distributions to Owners = 500
	<i>Assets = Liabilities + Equity</i>
	<i>Comprehensive Income = Revenues - Expenses + Gains - Losses</i>
	<i>Equity^{T1} = Equity^{T0} + Comprehensive Income^{P1} + Investments by Owners^{P1} – Distributions to Owners^{P1}</i>
	<i>IF Liabilities exists and if Equity exists; THEN Assets = Liabilities + Equity</i>

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

If it were likewise true that either Liabilities⁶⁹ or Equity⁷⁰ could also be left unreported, similarly derivation rules could be created for each of those facts. Note that XBRL Formula chaining⁷¹ can be used to physically derive unreported facts if any one of these three facts remain unreported. Note that it is impossible to derive missing information if any two of the facts remain unreported. Adding the derivation rule makes the system complete.

Allowing certain line items of a report to go unreported specifies the need to create rules to derive missing information. Or saying this another way, omitting the possibility of unreported facts negates the need for creating derivation rules.

⁶⁸ Here is the impute or derivation rule that would be added to the SFAC6 logical system for this situation, <http://xbrl.azurewebsites.net/2020/core/master-sfac6/ImputeRule-Key-3-Code-BS-Impute-03-formula.xml>

⁶⁹ XBRL Formula rule for deriving Liabilities, <http://xbrl.azurewebsites.net/2020/core/master-sfac6/ImputeRule-Key-1-Code-BS-Impute-01-formula.xml>

⁷⁰ XBRL Formula rule for deriving Equity, <http://xbrl.azurewebsites.net/2020/core/master-sfac6/ImputeRule-Key-2-Code-BS-Impute-02-formula.xml>

⁷¹ Deriving Facts Using XBRL Formula Chaining (Example), <http://xbrl.squarespace.com/journal/2019/4/24/deriving-information-using-xbri-formula-chaining-example.html>

A second downside of allowing unreported facts is that you lose the parity check or cross check if facts can go unreported. Said another way, it would be considered best practice to not leave important high-level financial report line items to go unreported.

State 5: Incomplete

Similar to state #4, in state #5 the logical system is incomplete because both (a) the fact Assets is unreported and also (b) the consistency rule “Assets = Liabilities + Equity” is missing from the logical system.

Because **both** a fact and the rule are missing from the logical system, it would be impossible to derive the value of Assets in this case. There is simply not enough information in the logical system to allow Assets to be derived. Because both the fact is missing and the rule is missing, the XBRL processing software does not notify the user that there is an issue related to the logical system:

#	Label	Result	Rule
1	\$Equity_BalanceStart + \$ComprehensiveIncome + \$InvestmentsByOwners - \$DistributionsToOwners = \$Equity_BalanceEnd (RollForward_1)	Pass	\$Equity_BalanceStart + \$ComprehensiveIncome + \$InvestmentsByOwners - \$DistributionsToOwners = \$Equity_BalanceEnd
2	\$ComprehensiveIncome = (\$Revenues - \$Expenses + \$Gains - \$Losses) (CONSISTENCY_6)	Pass	\$ComprehensiveIncome = (\$Revenues - \$Expenses + \$Gains - \$Losses)

Here you see the information for state #5:

Consistent

Incomplete

Precise

$$\text{Assets} = 3,500^{T1}; 0^{T0}$$

$$\text{Liabilities} = 0^{T1}; 0^{T0}$$

$$\text{Equity} = 3,500^{T1}; 0^{T0}$$

$$\text{Revenues} = 7,000$$

$$\text{Expenses} = 3,000$$

$$\text{Gains} = 1,000$$

$$\text{Losses} = 2,000$$

$$\text{Comprehensive income} = 3,000$$

$$\text{Investments by Owners} = 1,000$$

$$\text{Distributions to Owners} = 500$$

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

$$\text{Comprehensive Income} = \text{Revenues} - \text{Expenses} + \text{Gains} - \text{Losses}$$

$$\text{Equity}^{T1} = \text{Equity}^{T0} + \text{Comprehensive Income}^{P1} + \text{Investments by Owners}^{P1} - \text{Distributions to Owners}^{P1}$$

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets		0
Liabilities		0
Equity	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

At a minimum, both a consistency crosscheck rule⁷² plus the derivation rule to impute Assets⁷³ would be necessary to be added to the system, or the fact could be added to the system without the impute rule to derive the value of Assets. Again, consistent with state #4; Liabilities and Equity would require similar rules if they could be omitted from a report and there would be no parity check of reported information.

State 6: Imprecise

A logical system is a true and fair representation of some agreed upon realism. **Precision** is a measure of how precisely you do or can represent the information of a domain within a logical theory. The reality that we formalized in state #1 indicates that “Assets = Liabilities + Equity”. Yet, here in the state #6 example, the rule “Assets = Liabilities” was provided instead of the rule per state \$1. Further, the values of Assets and Liabilities are, in fact, consistent with the rule that has been provided.

⁷² XBRL Formula consistency crosscheck rule Assets = Liabilities + Equity, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/Consistency-5-Code-BS01-formula.xml>

⁷³ XBRL Formula derivation rule to impute Assets, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/ImputeRule-Key-3-Code-BS-Impute-03-formula.xml>

#	Label	Result	Rule
1	\$Equity_BalanceStart + \$ComprehensiveIncome + \$InvestmentsByOwners - \$DistributionsToOwners = \$Equity_BalanceEnd (RollForward_1)	Pass	\$Equity_BalanceStart + \$ComprehensiveIncome + \$InvestmentsByOwners - \$DistributionsToOwners = \$Equity_BalanceEnd
2	\$ComprehensiveIncome = (\$Revenues - \$Expenses + \$Gains - \$Losses) (CONSISTENCY_6)	Pass	\$ComprehensiveIncome = (\$Revenues - \$Expenses + \$Gains - \$Losses)
3	\$Assets = (\$Liabilities + \$Equity) (CONSISTENCY_5)	Pass	\$Assets = \$Liabilities
4	\$Assets = (\$Liabilities + \$Equity) (CONSISTENCY_5)	Pass	\$Assets = \$Liabilities

Here is the logical system where you see that the information is consistent and complete, but not precise:

Consistent Complete Imprecise	Assets = $0^{T1}; 0^{T0}$
	Liabilities = $0^{T1}; 0^{T0}$
	Equity = $3,500^{T1}; 0^{T0}$
	Revenues = 7,000
	Expenses = 3,000
	Gains = 1,000
	Losses = 2,000
	Comprehensive income = 3,000
	Investments by Owners = 1,000
	Distributions to Owners = 500
<div>Assets = Liabilities</div> <div>Comprehensive Income = Revenues - Expenses + Gains - Losses</div> <div>Equity^{T1} = Equity^{T0} + Comprehensive Income^{P1} + Investments by Owners^{P1} - Distributions to Owners^{P1}</div>	

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	0	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
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

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

Remember that in state #1 we formalized our truth to be that “Assets = Liabilities + Equity”. As such, this logical system can be described as being imprecise. To make this logical system precise, all that needs to be done is to fix the imprecise rule.

State 7: Extension Concept

In state #7, what we are trying to convey is that the economic entity reported the fact for Equity using the extension concept “Net Assets” that it had created. If a fact is represented using an extension concept created by a reporting entity; then a “general-special” or “wider-narrower” or “class-equivalentClass” association must be created to indicate to software applications of the relationship so that information can be used correctly.

Consistent

Incomplete

Precise

Assets = 3,500^{T1}; 0^{T0}

Liabilities = 0^{T1}; 0^{T0}

Net Assets = 3,500^{T1}; 0^{T0}

Revenues = 7,000

Expenses = 3,000

Gains = 1,000

Losses = 2,000

Comprehensive income = 3,000

Investments by Owners = 1,000

Distributions to Owners = 500

Assets = Liabilities + Equity

Comprehensive Income =

Revenues - Expenses + Gains - Losses

*Equity^{T1} = Equity^{T0} + Comprehensive
Income^{P1} + Investments by Owners^{P1} –
Distributions to Owners^{P1}*

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Net Assets	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Changes in Equity [Roll Forward]		
Net Assets, Beginning Balance		0
Comprehensive Income	3,000	
Investments by Owners	1,000	
(Distributions to Owners)	(500)	
Net Assets, Ending Balance		3,500

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues	7,000	
(Expenses)	(3,000)	
Gains	1,000	
(Losses)	(2,000)	
Comprehensive Income		3,000

State #7' below, the rule "Net Assets is equivalent to the term Equity" has been added to the logical system which allows the system to operate effectively⁷⁴. Also, the rules would need to be adjusted to use the extension concept Net Assets rather than Equity because the base taxonomy has no knowledge of the extension concept that was created by the reporting economic entity.

⁷⁴ XBRL Definition relations showing example of a mapping rule,
<http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/fac-mapping-definition.xml>

Consistent

Complete

Precise

Assets = 3,500^{T1}; 0^{T0}

Liabilities = 0^{T1}; 0^{T0}

Net Assets = 3,500^{T1}; 0^{T0}

Revenues = 7,000

Expenses = 3,000

Gains = 1,000

Losses = 2,000

Comprehensive income = 3,000

Investments by Owners = 1,000

Distributions to Owners = 500

Net Assets = Assets + Liabilities

Comprehensive Income =
Revenues - Expenses + Gains - Losses

Net Assets^{T1} = Net Assets^{T0} + Comprehensive
Income^{P1} + Investments by Owners^{P1} -
Distributions to Owners^{P1}

Net Assets is equivalent to the term
Equity

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Net Assets	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 -	2020-12-31
Changes in Equity [Roll Forward]		
Net Assets, Beginning Balance		0
Comprehensive Income		3,000
Investments by Owners		1,000
(Distributions to Owners)		(500)
Net Assets, Ending Balance		3,500

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 -	2020-12-31
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

State 8: Base Taxonomy Wider/Narrower Concept Use

State #8' on the left below is similar to state #7 in that a different concept is used to report a fact; but while state #7 focuses on using an extension concept; state #8' points out that using a wider or narrower base taxonomy concept gives exactly the same result and is just as important.

Now, our base state #1 does not have the concept "Net Assets"; but let's assume for a moment that it does have the concept "Net Assets". Also suppose that there was no information in the base logical system indicating the relationship between "Net Assets" and any other concept. If a fact is represented using a BASE TAXONOMY CONCEPT by a reporting entity; then a "general-special" or "wider-narrower" or "class-equivalentClass" association must exist in that base taxonomy to indicate that some concept is a permissible alternative for some other concept.

State #8' below shown below adds the rule "Net Assets is equivalent to the term Equity"⁷⁵ and assumes this was included in the BASE TAXONOMY in addition to the concept Equity. Further, all rules have been adjusted and would also be included in addition to the other existing rules.

⁷⁵ XBRL Definition relations showing example of a mapping rule,
<http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/fac-mapping-definition.xml>

Consistent

Complete

Precise

Assets = $3,500^{T1}; 0^{T0}$

Liabilities = $0^{T1}; 0^{T0}$

Net Assets = $3,500^{T1}; 0^{T0}$

Revenues = 7,000

Expenses = 3,000

Gains = 1,000

Losses = 2,000

Comprehensive income = 3,000

Investments by Owners = 1,000

Distributions to Owners = 500

Net Assets = Assets + Liabilities

*Comprehensive Income =
Revenues - Expenses + Gains - Losses*

*Net Assets^{T1} = Net Assets^{T0} + Comprehensive
Income^{P1} + Investments by Owners^{P1} –
Distributions to Owners^{P1}*

***Net Assets is equivalent to the term
Equity***

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Net Assets	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Changes in Equity [Roll Forward]		
Net Assets, Beginning Balance		0
Comprehensive Income	3,000	
Investments by Owners	1,000	
(Distributions to Owners)	(500)	
Net Assets, Ending Balance		3,500

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues	7,000	
(Expenses)	(3,000)	
Gains	1,000	
(Losses)	(2,000)	
Comprehensive Income		3,000

State 9: Defining a Completely New Structure

State #9 below on the left focuses on the **structure** as contrast all the prior examples which focused on the terms and rules. If a new structure is created, the new structure must be referenced to the base taxonomy and the new structure needs to be explained using machine-readable rules⁷⁶. Even base taxonomy structures need to be defined in order to be referred to⁷⁷. When you say “Balance Sheet” you know what that means. But a machine does not know what a Balance Sheet is unless you tell it.

A base taxonomy should (a) provide all necessary structures separately, not intermingle different models in the same set of associations and (b) define what each structure must look like. Remember, computers are like babies and need to be led by the hand in order to understand the details you need them to understand.

Balance Sheet

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

$Assets = Liabilities + Equity$

Consistent

Complete

Precise

Assets = 3,500^{T1}; 0^{T0}
Liabilities = 0^{T1}; 0^{T0}
Net Assets = 3,500^{T1}; 0^{T0}

Revenues = 7,000
Expenses = 3,000
Gains = 1,000
Losses = 2,000

Comprehensive income = 3,000
Investments by Owners = 1,000
Distributions to Owners = 500

$Net\ Assets = Assets + Liabilities$

$Comprehensive\ Income = Revenues - Expenses + Gains - Losses$

$Net\ Assets^{T1} = Net\ Assets^{T0} + Comprehensive\ Income^{P1} + Investments\ by\ Owners^{P1} - Distributions\ to\ Owners^{P1}$

Net Assets is equivalent to the term Equity

Statement of Net Assets

Net Assets [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Net Assets [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Net Assets	3,500	0

Changes in Equity

Changes in Equity [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Changes in Equity [Roll Forward]		
Net Assets, Beginning Balance		0
Comprehensive Income		3,000
Investments by Owners		1,000
(Distributions to Owners)		(500)
Net Assets, Ending Balance		3,500

Income Statement

Comprehensive Income Statement [Line Items]	Period [Axis]	
	2020-01-01 - 2020-12-31	
Comprehensive Income [Roll Up]		
Revenues		7,000
(Expenses)		(3,000)
Gains		1,000
(Losses)		(2,000)
Comprehensive Income		3,000

Information about which concepts should be used to represent the structure must be provided as well as any other information helpful to those that must create such structures.

Finally, in our case we have only three disclosure, Balance Sheet, Income Statement, and Changes in Equity. In our case, the Balance Sheet, Income Statement and Changes in Equity are always required to be reported per this logical system. As such, that rule is stated in a machine-readable reporting checklist⁷⁸. Other logical systems with more disclosures will have more rules

⁷⁶ XBRL Definition relations used to represent structure rules, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/dm-ChangesInEquity-rules-def.xml>

⁷⁷ XBRL taxonomy schema used to define “Balance Sheet”, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/disclosures.xsd>

⁷⁸ XBRL Definition relations used to represent a reporting checklist or disclosure rules, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/reporting-checklist-rules-def.xml>

relating to when a disclosure is required to be provided in a report. Rules can also be specified relating to which disclosures are required when certain specific line items are reported.

State 10: Organizing Disclosures Using Topics

State #10 points out that while the SFAC 6 logical system has only three structures, the Balance Sheet, Income Statement, and Changes in Equity; ultimately if a complete financial reporting scheme were represented one might have hundreds or even thousands of disclosures.

Disclosures can be organized into topics⁷⁹. Then, rather than having one flat list of disclosures, they can be organized into a handy hierarchy⁸⁰ which makes the information more manageable to users of the logical system.

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
Balance Sheet [Arithmetic Expression]		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Changes in Equity [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Changes in Equity [Roll Forward]	
Net Assets, Beginning Balance	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Net Assets, Ending Balance	3,500

Comprehensive Income Statement [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

More Complex Examples

While the SFAC 6 logical system is small, it can be used to demonstrate incredibly sophisticated functionality. To see more sophisticated examples, see my *Modern Approach to Creating Financial Reporting Scheme* examples⁸¹ and the document *Proving Financial Reports are*

⁷⁹ XBRL taxonomy schema used to represent topics, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/topics.xsd>

⁸⁰ XBRL definition relations used to create a hierarchy of disclosures, <http://xbrlsite.azurewebsites.net/2020/core/master-sfac6/disclosures-with-topics-def.xml>

⁸¹ *Modern Approach to Creating a Financial Reporting Scheme*, <http://xbrl.squarespace.com/journal/2019/12/19/modern-approach-to-creating-a-financial-reporting-scheme.html>

*Properly Functioning Logical Systems*⁸² which starts with the accounting equation logical system, then models the slightly larger SFAC 6 elements of a financial statement logical system, the common elements of a financial report logical system, a MINI financial reporting scheme logical system, and then contrasts that to the Microsoft 10-K financial report logical system.

Conclusion

Ultimately, “the proof is in the pudding” as is said. The “effectiveness problem” is solved if the stakeholders that desire to exchange information can effectively do so to the extent that their goals/objectives prescribe.

Remember that computers are dumb beasts that need to be led by the hand like a baby. Don’t be fooled by what might look like simplicity of the SFAC 6 financial reporting scheme representation. All financial reporting scheme have similar functionality characteristics. The issues which I point out in this document are not issues for one financial reporting scheme; they are issue for every financial reporting scheme.

There are a few mathematical and non-mathematical oriented information models that are not covered by the SFAC 6 example, but these information models are covered by other example representations but are only additional possible patterns of these same terms, associations, structures, rules, and facts. All the important notions that need to be covered by this method can be demonstrated using the simple and small SFAC 6 financial report logical model.

To get a better idea of the things that can go wrong and therefore must be addressed in every financial reporting scheme represented in machine-readable form, see the summary of impediments to the SFAC 6 logical system⁸³. That provides a non-technical explanation of the things that can go wrong and how each of those impediments can be mitigated using terms, structures, rules, associations, and facts correctly.

To understand that larger reporting schemes are simply more of the same terms, structures, associations, rules and facts; consider this more voluminous financial reporting scheme⁸⁴. For example, here is a more comprehensive set of disclosure mechanics rules:

⁸² *Proving Financial Reports are Properly Functioning Logical Systems*, <http://xbrlsite.azurewebsites.net/2019/Library/ProvingFinancialReportAreProperlyFunctioning.pdf>

⁸³ Distinguishing Between Properly and Improperly Functioning Logical Systems, <http://xbrlsite.azurewebsites.net/2020/master/sfac6/SFAC6-Impediments.pdf>

⁸⁴ XASB Financial Reporting Scheme, <http://xbrlsite.azurewebsites.net/2020/reporting-scheme/xasb/documentation/Home.html>

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Primary Information									
#	Disclosure	Category	Level	Pattern	Disclosure Fo...	Disclosure Co...	Applicable	Representation Concept [TEXT BLOCK]	Representation Concept DETAIL
1	Assets [Roll Up]	Unknown	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Assets
2	Balance Sheet	Unknown	Level4Detail	Component	True	CONSISTENT	True	-	-
3	Basic of Reporting	Unknown	Level1TextBlock	TextBlock	True	CONSISTENT	True	Overall Financial Report Presentation and Display [HTML]	NOT-EXPECTED
4	Buildings [Roll Forward]	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Property, Plant, and Equipment Roll Forward [Schedule]	Buildings, Net
5	Business Segments, Revenues [Roll Up]	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Business Segments, Revenues [Schedule]	Revenues, Net
6	Cash and Cash Equivalents Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Cash and Cash Equivalents Components [Schedule]	Cash and Cash Equivalents
7	Cash Flow Statement, Direct Method	Unknown	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Cash Flow, Net
8	Common Stock, By Class	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Common Stock by Class [Schedule]	Common Stock
9	Director Compensation	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Directors Compensation [Schedule]	Director Salary, Bonuses, and Fees
10	Director Compensation, Options Granted	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Directors Compensation Options Granted [Schedule]	Director Options Granted, at Fair Value
11	Document Information	Unknown	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Document Title
12	Earnings Per Share Summary	Unknown	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Earnings (Loss) per Share
13	Entity Address	Unknown	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Street 1
14	Entity Information	Unknown	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Economic Entity Name
15	Financial Highlights	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Financial Highlights [HTML]	Revenues, Net
16	Furniture and Fixtures [Roll Forward]	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Property, Plant, and Equipment Roll Forward [Schedule]	Furniture and Fixtures, Net
17	Income Statement	Unknown	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Net Income (Loss)
18	Income Tax Expense (Benefit) Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Income Tax Expense (Benefit) Components [Schedule]	Income Tax Expense (Benefit)
19	Inventory Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Inventory Components [Schedule]	Inventory
20	Investment	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Investments [Schedule]	Investments, at Cost
21	Land [Roll Forward]	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Property, Plant, and Equipment Roll Forward [Schedule]	Land
22	Leasehold, Land, and Building	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Leasehold Land and Buildings [Schedule]	Leasehold Land and Building, Value at Cost
23	Liabilities and Equity [Roll Up]	Unknown	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Liabilities and Equity
24	Long-Term Debt Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Long-Term Debt Components [Schedule]	Long-Term Debt
25	Long-Term Debt Current and Noncurrent Portions	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Long-Term Debt Current and Noncurrent Breakdown [Schedule]	Long-Term Debt
26	Long-Term Debt Instruments	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Long-Term Debt Instruments [Schedule]	Debt Instrument, Description
27	Long-Term Debt Maturities	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Long-Term Debt Maturities [Schedule]	Long-Term Debt
28	Nature of Operations	Unknown	Level1TextBlock	TextBlock	True	CONSISTENT	True	Nature of Business [HTML]	NOT-EXPECTED
29	Other Assets Current and Noncurrent Portions	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Other Assets, Current and Noncurrent Portion [Schedule]	Other Assets
30	Other Liabilities Current and Noncurrent Breakdown	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Other Liabilities Current and Noncurrent Breakdown [Schedule]	Other Liabilities
31	Other Property, Plant, and Equipment [Roll Forward]	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Property, Plant, and Equipment Roll Forward [Schedule]	Other Property, Plant, and Equipment, Net
32	Payables and Accruals Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Payables and Accruals Components [Schedule]	Payables and Accruals
33	Preferred Stock Changes [Roll Forward]	Unknown	Level4Detail	RollForward	True	CONSISTENT	True	NOT-EXPECTED	Preferred Stock
34	Preferred Stock, By Class	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Preferred Stock by Class [Schedule]	Preferred Stock
35	Prepaid Expenses	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Prepaid Expenses Components [Schedule]	Prepaid Expenses
36	Property, Plant, and Equipment Components	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Property, Plant, and Equipment Components [Schedule]	Property, Plant and Equipment, Net
37	Property, Plant, and Equipment Estimated Useful Lives	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Property, Plant, and Equipment Estimated Useful Lives [Schedule]	Property, Plant and Equipment, Estimated Useful Life
38	Property, Plant, and Equipment Roll Forward	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Property, Plant, and Equipment Roll Forward [Schedule]	Property, Plant and Equipment, Net
39	Receivables Details, By Component	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Receivables, by Component [Schedule]	Receivables, Net, Current
40	Receivables Details, Current and Noncurrent	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Receivables, Current and Noncurrent [Schedule]	Receivables, Net
41	Receivables Details, Gross, Net	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Receivables, Net and Gross [Schedule]	Receivables, Net
42	Reconciliation of Cash Summary	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Reconciliation of Cash Flow Statement, Summary [Schedule]	Cash and Cash Equivalents, per Cash Flow Statement
43	Reconciling Item of Cash and Cash Equivalents	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Reconciliation of Cash Flow Statement, Detail [Schedule]	Reconciling Item, Amount
44	Related Party	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Related Parties [Schedule]	Related Party, Nature of Relationship
45	Related Party Transaction	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Related Party Transactions [Schedule]	Related Party Transaction, Amount
46	Sales Analysis, by Customer	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Sales Analysis by Customer [Schedule]	Revenues, Net
47	Share Ownership Plan Stock Options Outstanding	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Share Options Outstanding Roll Forward [Schedule]	Share Ownership Plan, Share Options Outstanding
48	Significant Accounting Policies	Unknown	Level1TextBlock	TextBlock	True	CONSISTENT	True	Significant Accounting Policies [Note]	NOT-EXPECTED
49	Statement of Changes in Equity	Unknown	Level4Detail	RollForward	True	CONSISTENT	True	NOT-EXPECTED	Equity
50	Statement of Changes in Equity, Common Stock by Class	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Common Stock Shares Outstanding Roll Forward [Schedule]	Common Stock, Shares Outstanding
51	Statement of Changes in Equity, Preferred Stock by Class	Unknown	Level3TextBlock,Level4Detail	RollForward	True	CONSISTENT	True	Preferred Stock Shares Outstanding Roll Forward [Schedule]	Preferred Stock, Shares Outstanding
52	Statement of Changes in Equity, Prior Period Adjustments	Unknown	Level4Detail	Adjustment	True	CONSISTENT	True	NOT-EXPECTED	Retained Earnings (Accumulated Losses)
53	Subsequent Event	Unknown	Level3TextBlock,Level4Detail	Hierarchy	True	CONSISTENT	True	Subsequent Events [Schedule]	Subsequent Event, Description
54	Variance Analysis Gross Profit	Unknown	Level3TextBlock,Level4Detail	RollUp	True	CONSISTENT	True	Variance Analysis [Schedule]	Gross Profit (Loss)

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