Mastering XBRL-based Digital Financial Report Logical Model

Incremental steps to understanding a proven and effective approach to implementing XBRL-based accounting, reporting, auditing, and analysis

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"Practice does not make perfect. Only perfect practice makes perfect." *Vince Lombardi*[1]

Executive summary:

- A financial report tends to be a large, complex set of facts described by terms and characteristics that have many sorts of associations between terms and mathematical associations between facts.
- But such financial reports are all logical and follow certain patterns. Reports should be logically consistent as opposed to inconsistent, there should be no logical contradictions, report information should be consistent with accounting and reporting rules and regulations and the fundamental rules of arithmetic.
- An analysis of about 6,000 US GAAP-based financial reports and about 400 IFRS-based financial reports submitted to the U.S. Securities and Exchange Commission (10-Ks, 10-Qs, 20-Fs) in the XBRL format using software applications revealed consistent pattens.
- This document helps the reader understand these fundamental logical patterns of any financial report. It does so by starting small and simple and working up to large and complex taking incremental steps to grow your understanding of the logical model of a financial report.

[1] BrainyQuote, Vince Lombardi, https://www.brainyquote.com/quotes/vince_lombardi_138158

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This document is a summary of information derived from analyzing the financial reports of about 6,000 public companies that submit US GAAP-based financial reports and 400 public companies that submit IFRS-based financial reports to the U.S. Securities and Exchange Commission between 2015 and 2019 in the XBRL format.

This document starts at the most fundamental aspect of financial reporting, the accounting equation, and builds up incrementally to the annual financial report of Microsoft that was formally submitted to the SEC in 2017 which I have analyzed in detail.

The terms used in this document to describe the logical system of a financial report is explained in simple terms to start. Then we point you to a narrative which describes a business report and financial report in logical terms that is detailed in the *Logical Theory Describing Financial Report*[2].

Each incremental step references an XBRL instance and XBRL taxonomy that describes the increment completely, proving that it is a properly functioning logical system. In this document we try and keep things brief, focusing on the essence and incremental changes between each step. Understanding each increment will help professional accountants become a master craftsman in the creation of XBRL-based financial reports and the meaning those reports convey.

Logical System Explained in Simple Terms

In order to discuss these financial reports precisely, we need to understand the terminology that is used. This section summarizes that terminology.

A **logical system**[3] enables a community of stakeholders trying to achieve a specific goal or objective or a range of goals/objectives to agree on important common models, structures, and statements for capturing meaning or representing a shared understanding of and knowledge in some universe of discourse.

A logical system is made up of a set of **models**, **structures**, **terms**, **associations**, **assertions**, and **facts**. In very simple terms,

- **Logical theory**: A logical theory is a set of *models* that are consistent with that logical theory.

[2] Charles Hoffman, *Logical Theory Describing Financial Report*, http://www.xbrlsite.com/2020/Theory/LogicalTheoryDescribingFinancialReport.pdf
[3] Charles Hoffman, CPA, *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

- **Model**: A model is a set of *structures*. A model is a permissible interpretation of a theory.
- **Structure**: A structure is a set of *statements* which describe the structure.
- **Statement**: A statement is a proposition, claim, assertion, belief, idea, or fact about or related to the universe of discourse. There are four broad categories of statements:
    - **Terms**: Terms are statements that define ideas used by the logical theory such as the ideas "assets", "liabilities", and "equity".
    - **Associations**: Associations are statements that describe permissible interrelationships between the terms such as "assets is part-of the balance sheet" or "assets = liabilities + equity" or "an asset is a 'debit' and is 'as of' a specific point in time and is always a monetary numeric value".
    - **Rules**: Rules are statements that describe what tend to be IF…THEN…ELSE types of relationships such as "IF the economic entity is a not-for-profit THEN net assets = assets - liabilities; ELSE assets = liabilities + equity"
    - **Facts**: Facts are statements about the numbers and words that are provided by an economic entity within their financial report. For example, "assets for the consolidated legal entity Microsoft as of June 20, 2017 was $241,086,000,000 expressed in US dollars and rounded to the nearest millions of dollars.

The statements within a logical system can be **consistent** or inconsistent or can contradict one another. A logical system can have high to low **precision** and high to low **coverage**. *Precision* is a measure of how precisely the information within a logical system has been represented as contrast to reality for the universe of discourse. *Coverage* is a measure of how completely information in a logical system has been represented relative to the reality for a universe of discourse. If a logical system is consistent, has high precision, and has high coverage it is said to be a properly functioning logical system.

Impediments to Creating Properly Functioning Logical System

A good way to understand how to create an effectively machine-readable XBRL-based financial report is to understand what gets in the way of creating such reports. The document *Distinguishing Between Properly and Improperly Functioning Logical Systems*[4] helps you understand the impediments to creating a proper XBRL-based financial report. Things like leaving out a rule, unreported high-level line items, improperly created extension concepts, and

[4] *Distinguishing Between Properly and Improperly Functioning Logical Systems*, http://xbrlsite.azurewebsites.net/2020/master/sfac6/SFAC6-Impediments.pdf

other such items and how they impact the financial reports that you create are brought into your consciousness.

Logical Theory Describing Financial Report

A logical theory can be used to describe a logical system. The *Logical System Describing Financial Report*[5] is a theory that, as its name states, describes the financial report logical system. I am not going to describe the complete logical theory, read the document to understand that. In particular, start with the narrative in section *3. Logical Description Narrative* on page 14. This logical conceptualization is being formally documented by the Object Management Group (OMG) in their forthcoming Standard Business Report Model (SBRM)[6].

Accounting Equation[7]

We are going to begin at the apex of any financial reporting scheme, the accounting equation. We will provide the most details with this simple example. The details can be carried forward to understand each incremental step.

The accounting equation[8] is the fundamental basis for financial accounting. By definition, every financial reporting scheme[9] has this high-level accounting equation model at its core. The accounting equation is:

"Assets = Liabilities + Equity"

The accounting equation defines three core **terms** of a financial report:

- Assets
- Liabilities
- Equity

The accounting equation defines those three terms and provides the mathematical relations (**rule**) between the three terms:

[5] Charles Hoffman, *Logical Theory Describing Financial Report*, http://www.xbrlsite.com/2020/Theory/LogicalTheoryDescribingFinancialReport.pdf
[6] OMG, *Standard Business Report Model (SBRM)*, https://www.omg.org/intro/SBRM.pdf
[7] Accounting Equation Representation Details, http://xbrlsite.azurewebsites.net/2020/master/ae/index.html
[8] Wikipedia, Accounting Equation, https://en.wikipedia.org/wiki/Accounting_equation
[9] Charles Hoffman, CPA, *Comparison of Financial Reporting Schemes High Level Concepts*, http://xbrlsite.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf

Assets = Liabilities + Equity

Depending upon how you read the definition of the accounting equation, it either explicitly defines or at least certainly implies the existence of a **structure**, the **Balance Sheet**, within which the three concepts exist.

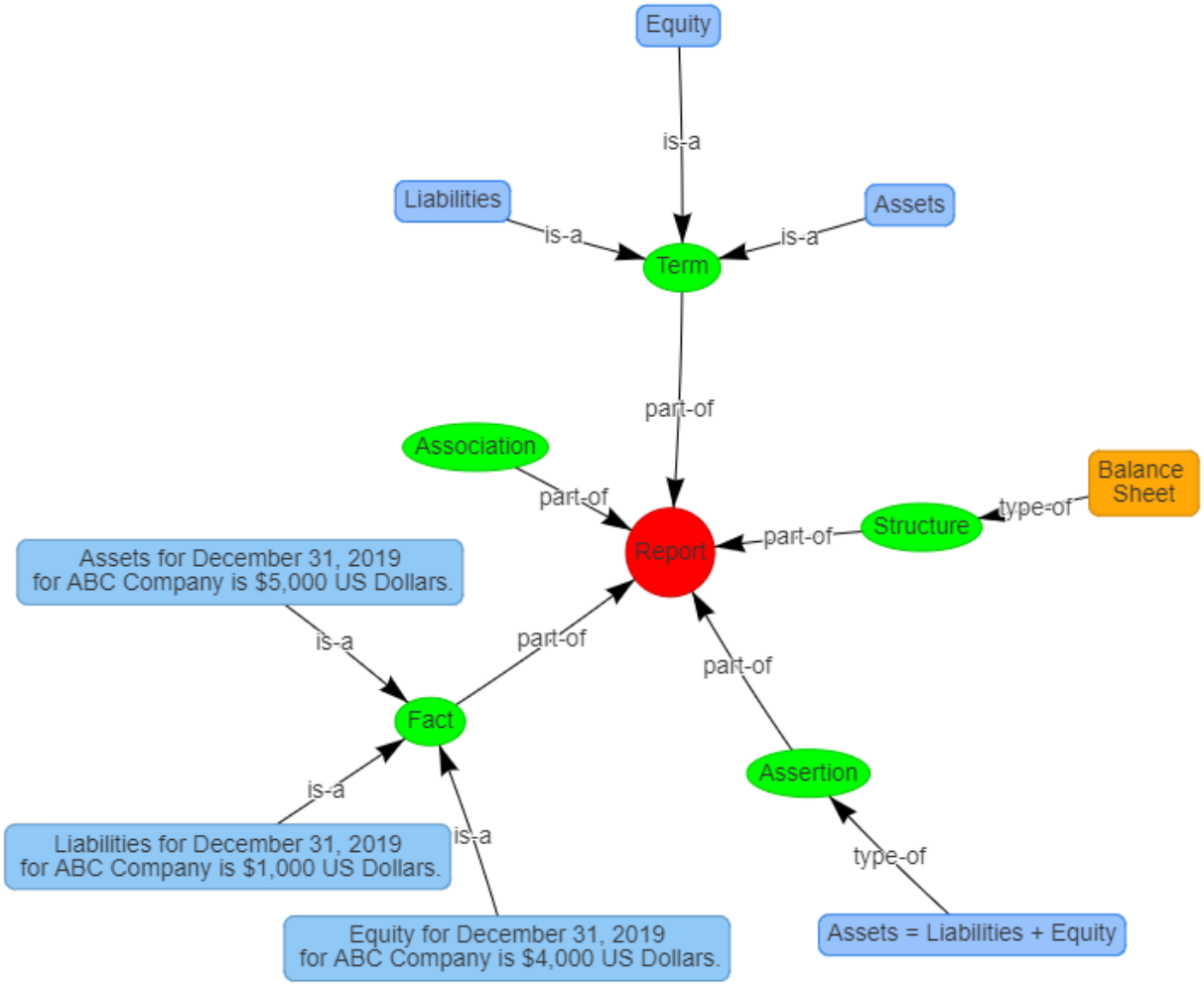
As such, the three terms, Assets, Liabilities, and Equity are **associated** with the Balance Sheet structure because they are part-of that structure.

With that information, an economic entity can create a financial statement that communicate **facts** about that economic entity. For example, the economic entity "ABC Company" might represent their assets, liabilities, and equity as of December 31, 2019:

- Assets = $5,000
- Liabilities = $1,000
- Equity = $4,000

And so, the information that has been explained above can be represented as the following set of vertices and edges using graph theory[10]:

[10] Wikipedia, *Graph Theory*, https://en.wikipedia.org/wiki/Graph_theory



The accounting equation is a simple man-made logical system.

Now, we will represent that accounting equation using the XBRL technical syntax. One specific thing to note is that additional details are being added to the simple explanation provided above. For example, above we defined "Assets". But now, we define "Assets" as being a data type of "monetary", being "as of" a specific point in time (i.e. instant), and being a "Debit". Computers need this precise representation to help humans achieve what they desire to achieve from this logical system. You probably were aware that Assets is a debit and as of a point in time and is a number.

TERMS[11,12]:

[11] Machine-readable terms, http://xbrlsite.azurewebsites.net/2020/core/master-ae/ae.xsd
[12] Human-readable terms, http://xbrlsite.azurewebsites.net/2020/core/master-ae/evidence-package/contents/ReportElements-Concepts.html

Three simple terms are defined for the accounting equation logical system: Assets, Liabilities, Equity.

#	Label	Data Type	Period Type	Balance Type	Prefix	Standard label, Documentation, References, Concept name	Count
1	Assets	Monetary	As Of (instant)	Debit	ae	*Filer label:* Assets *Documentation:* *References:* Publisher: FASB; Reference Name: SFAC; Reference Information: Paragraph: 25; URIDate: 2019-10-22; URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true; Number: 6 *Name:* ae:Assets	1
2	Equity	Monetary	As Of (instant)	Credit	ae	*Filer label:* Equity *Documentation:* *References:* Publisher: FASB; Reference Name: SFAC; Reference Information: Paragraph: 49; URIDate: 2019-10-22; URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true; Number: 6 *Name:* ae:Equity	1
3	Liabilities	Monetary	As Of (instant)	Credit	ae	*Filer label:* Liabilities *Documentation:* *References:* Publisher: FASB; Reference Name: SFAC; Reference Information: Paragraph: 35; URIDate: 2019-10-22; URI: https://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220132802&acceptedDisclaimer=true; Number: 6 *Name:* ae:Liabilities	1

STRUCTURES[13,14]

In addition to the three simple terms, one functional term is defined to represent the balance sheet structure: Balance Sheet [Hypercube]:

#	Label	Prefix	Standard label, Documentation, References, Concept name	Count
1	Balance Sheet [Hypercube]	ae	*Filer label:* Balance Sheet [Hypercube] *Documentation:* *References:* NONE *Name:* ae:BalanceSheetHypercube	1

ASSOCIATIONS[15,16]:

The association between the three terms and the balance sheet structure are provided. Some additional infrastructure report elements are provided to help organize the representation:

[13] Machine-readable structures, http://xbrlsite.azurewebsites.net/2020/core/master-ae/ae.xsd
[14] Human-readable structures, http://xbrlsite.azurewebsites.net/2020/core/master-ae/evidence-package/contents/ReportElements-Tables.html
[15] Machine-readable associations, http://xbrlsite.azurewebsites.net/2020/core/master-ae/ae-pre.xml
[16] Human-readable associations, http://xbrlsite.azurewebsites.net/2020/core/master-ae/evidence-package/contents/NetworkStructure-N0-RE6.html

#	Label	Report Element Class	Period Type	Balance	Name
1	**Balance Sheet [Hypercube]**	[Table]			ae:BalanceSheetHypercube
2	**Balance Sheet [Line Items]**	[Line Items]			ae:BalanceSheetLineItems
3	*Balance Sheet [Set]*	[Abstract]			ae:BalanceSheetSet
4	Assets	[Concept] Monetary	As Of	Debit	ae:Assets
5	Liabilities	[Concept] Monetary	As Of	Credit	ae:Liabilities
6	Equity	[Concept] Monetary	As Of	Credit	ae:Equity

RULES[17,18]:

The mathematical relationship between the terms Assets, Liabilities, and Equity are represented.

#	Label	Result	Rule
1	$Assets = ($Liabilities + $Equity) (CONSISTENCY_5)	Pass	$Assets = ($Liabilities + $Equity)

FACTS[19,20]:

We can create a set of facts to exercise the logical system. Facts representing Assets of $5,000, liabilities of $1,000, and equity of $4,000 were created.

#	Reporting Entity [Axis]	Period [Axis]	Concept	Fact Value	Unit	Rounding	Parenthetical Explanations
1	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Assets	5000	USD	INF	
2	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Liabilities	1000	USD	INF	
3	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)	2020-12-31	Equity	4000	USD	INF	

And so, the model above is used to explain the details of the human-readable representation that is also machine-readable below in the alternative Inline XBRL format[21]:

[17] Machine-readable assertions, http://xbrlsite.azurewebsites.net/2020/core/master-ae/Consistency-5-Code-BS01-formula.xml
[18] Human-readable assertions, http://xbrlsite.azurewebsites.net/2020/core/master-ae/evidence-package/contents/BusinessRulesSummary.html
[19] Machine-readable facts, http://xbrlsite.azurewebsites.net/2020/core/master-ae/instance.xml
[20] Human-readable facts, http://xbrlsite.azurewebsites.net/2020/core/master-ae/evidence-package/contents/NetworkFacts-N0-RE6.html
[21] Human-readable and machine-readable facts using Inline XBRL, http://xbrlsite.azurewebsites.net/2020/core/master-ae/instance.html

Inline XBRL Business Report

Component: (Network and Table)	
Network	**01-Balance Sheet** (http://www.xbrlsite.com/ae/role/BalanceSheet)
Table	Balance Sheet [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

Balance Sheet [Line Items]	Period [Axis] 2020-12-31
Balance Sheet [Set]	
Assets	5,000
Liabilities	1,000
Equity	4,000

This accounting equation logical system can be called **properly functioning** because all of the statements within the logical system are **consistent** with one another (i.e. there are no contradictions, there are no inconsistencies), it can be established that the logical system created **precisely** reflects the reality of the logical system (we just made the numbers up for ABC Company), and a **complete** set of statements seem to be included within the logical system.

A software application can take all of the statements made within the machine-readable version of this logical system and perform work. Below you see a human-readable rendering of a Balance Sheet that was created from the XBRL-based representation of the accounting equation logical system:

Balance Sheet [Line Items]	Period [Axis] 2020-12-31
Balance Sheet [Set]	
Assets	5,000
Liabilities	1,000
Equity	4,000

Result	Rule
Pass	$Assets = $Liabilities + $Equity

The logical system of the accounting equation is therefore *consistent*, *precise*, and *complete* because all the statements are consistent with one another within the logical system, the logical system reflects the formal truths we wish to convey precisely, and a complete set of statements describe the logical system.

Hello World! Representation[22]

The Hello World representation introduces nothing new. We will not spend a lot of time describing is Hello World representation other than to point you to a Very Basic XBRL Primer[23] example which will walk you through the steps of creating this representation using freely available software which you can download and use to create this representation. You can see the technical details and the logical details of this basic example. We are focusing on the logical details.

Here is what the Hello World representation looks like[24]:

Property, Plant and Equipment, Net [Roll Up]	Period [Axis]	
	2020-12-31	2019-12-31
Property, Plant and Equipment, Net [Roll Up]		
Land	5,347,000	1,147,000
Buildings, Net	244,508,000	366,375,000
Furnitures and Fixtures, Net	34,457,000	34,457,000
Computer Equipment, Net	4,169,000	5,313,000
Other Property, Plant and Equipment, Net	6,702,000	6,149,000
Property, Plant and Equipment, Net	295,183,000	413,441,000

This representation contains one structure, 7 terms, 14 facts, a number of associations between the terms, and one rule all of which are easy to identify and observe.

Again, there is nothing new introduced in this Hello World representation.

SFAC 6 Elements of Financial Statements Very Basic Example[25]

Like the accounting equation, we want to go into a bit of detail when discussing SFAC 6 because it contains critically important information that is so fundamental to financial reports.

The Financial Accounting Standards Board (FASB) in SFAC 6, *Elements of Financial Statements*[26], defines the building blocks of US GAAP financial reports. These elements of a financial report:

[22] Hello World Representation, http://xbrlsite.azurewebsites.net/2020/master/hello-world-db/
[23] Very Basic XBRL Primer, http://www.xbrlsite.com/mastering/Part00_Chapter01.B_XBRLPrimer.pdf
[24] Hello World Structure, http://xbrlsite.azurewebsites.net/2020/master/hello-world-db/evidence-package/contents/index.html#Rendering-HelloWorld-Implied.html
[25] SFAC 6 Very Basic, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic/
[26] FASB, SFAC 6, *Elements of Financial Statements*, Accounting Equation, https://www.fasb.org/pdf/con6.pdf

> "are the building blocks with which financial statements are constructed—the classes of items that financial statements comprise. The items in financial statements represent in words and numbers certain entity resources, claims to those resources, and the effects of transactions and other events and circumstances that result in changes in those resources and claims."

The *Elements of Financial Statements* is part of the conceptual framework[27] which defines the US GAAP financial reporting scheme[28] and has the accounting equation model at its core. The accounting equation defines the relation between "resources" (assets) and "claims" (liabilities, equity):

"Assets = Liabilities + Equity"

SFAC 6 defines 10 interrelated elements of US GAAP financial statements (**terms**) that are directly related to measuring performance and status of an economic entity and used in the preparation of a general purpose financial report:

- Assets
- Liabilities
- Equity
- Comprehensive income
- Investments by Owners
- Distributions to Owners
- Revenues
- Expenses
- Gains
- Losses

The FASB uses the analogy of a "photograph" and a "motion picture" to differentiate the two types of elements[29]. Three elements that are like a photograph are "Assets", "Liabilities" and "Equity" and are for a point in time. In XBRL terms, these "photograph" type elements or "stocks" are instants or "as of" a specific point in time. The others elements are like "motion pictures" or "flows" over a period of time, in XBRL terms they are durations or "for period".

[27] FASB, *Conceptual Framework*, https://www.fasb.org/jsp/FASB/Page/BridgePage&cid=1176168367774
[28] Charles Hoffman, CPA, *Comparison of Financial Reporting Schemes High Level Concepts*, http://xbrlsite.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf
[29] FASB, SFAC 6, page 21, paragraph 20

The FASB explicitly states the components of comprehensive income which include: revenues, expenses, gains, and losses[30].

Note that the balance types, "debit" or "credit", of each of the 10 elements of financial statements are not articulated by the FASB. However, professional accountants understand the balance type of the 10 elements which are the building blocks of a financial report. As such, these balance types can be implied without dispute. However, I am explicitly specifying the balance types explicitly in my XBRL representation which makes this crystal clear.

Note the term "interrelated". If you read the definitions you can implicitly understand the specific interrelations. The FASB uses the term "articulation" to describe the notion that financial statements are fundamentally interrelated[31]. They result in financial statements that are fundamentally interrelated and connected mathematically.

The following four equations (i.e. **rules**) articulate the fundamental relationships between all these elements of a financial report defined by the FASB in SFAC 6. First, as the FASB stated;

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

The equation above defines the relationship between comprehensive income and its components. The equation below defines the relations between the other concepts and uses the components of "Comprehensive Income" as defined above.

$$0 = (\text{Equity}^{T0} + \text{Revenue}^{P1} - \text{Expenses}^{P1} + \text{Gains}^{P1} - \text{Losses}^{P1} + \text{InvestmentsByOwners}^{P1} - \text{DistributionsToOwners}^{P1}) + \text{Liabilities}^{T1} - \text{Assets}^{T1}$$

The above rule can be condensed down to a basic roll forward of Equity as follows (the rule above is not really necessary and is replace by this equation):

$$\text{Equity}^{T1} = \text{Equity}^{T0} + \text{ComprehensiveIncome}^{P1} + \text{InvestmentsByOwners}^{P1} - \text{DistributionsToOwners}^{P1}$$

Finally, we add the accounting equation which is the basis of every financial reporting scheme and no professional accountant can dispute but this is not explicitly defined by the FASB in SFAC 6:

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

[30] FASB, SFAC 6, page 21, paragraph 20
[31] FASB, SFAC 6, page 21 and 22, paragraph 21

And so, using those three equations, the interrelationships between each of the elements that make up a financial statement is explicitly defined and crystal clear as long as you understand the balance type (debit, credit) of each of the core elements.

SFAC 6 states explicitly that economic entities creating financial reports will define their report line items based on these financial statement elements[32],

> "Particular economic things and events, such as cash on hand or selling merchandise, that may meet the definitions of elements are not elements as the term is used in this Statement. Rather, they are called ***items*** or other descriptive names. This Statement focuses on the broad classes and their characteristics instead of defining particular assets, liabilities, or other items."

While financial reports must fit within the elements of a financial report defined by a financial reporting scheme; financial reports are not forms. Specific variability in these items, subtotals, and totals is anticipated between reporting economies entities and allowed by financial reporting schemes such as US GAAP[33]. By far, the most variability that exists within a set of financial statements exists on the income statement. SFAC 6 discusses the notion of intermediate components[34] of comprehensive income:

> "Examples of intermediate components in business enterprises are *gross margin*, *income from continuing operations before taxes*, *income from continuing operations*, and *operating income*. Those **intermediate components** are, in effect, *subtotals* of comprehensive income and often of one another in the sense that they can be combined with each other or with the basic components to *obtain other intermediate measures* of comprehensive income."

Practices exist for determining the items, subtotals, and totals that make up a financial statement. Basically, variability can be caused by choosing to report different common subtotals or not or by choosing to report specific line items rather than other line items. I refer to these different totals, subtotals, and specific line items as the notion of **reporting styles**[35]. This variability is by no means random or completely arbitrary. There are common reporting style patterns. And all must ultimately be reducible to and consistent with the 10 elements of financial statements. Essentially, reporting styles are **models**.

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[32] FASB, SFAC 6, page 14, paragraph 5
[33] Charles Hoffman, CPA, *Comparison of Elements of Financial Statements*, http://xbrlsite.azurewebsites.net/2019/Core/ElementsOfFinancialStatements.pdf
[34] FASB, SFAC 6, page 47, paragraph 77.
[35] Open Framework for Implementing XBRL-based Financial Reporting, *Reporting Styles*, http://xbrlsite.azurewebsites.net/2019/Framework/Details/ReportingStyle.html

Of the four concepts "revenues", "expenses", "gains", and "losses" there are themes in the definitions of the terms. One theme is the notion of something related to an "entity's ongoing major or central operations" (i.e. revenues, expenses) and something "from peripheral or incidental transactions" (i.e. gains, losses). This notion is discussed in SFAC 6. These themes are used to, for example, distinguish operating from nonoperating report line items.

Finally, while not explicitly defined in SFAC 6, the FASB is certainly strongly implying the existence of "financial statements" that provide information about the "status" and "performance" of an economic entity and as we pointed out before that the status and performance are intertwined per the notion of articulation. This at least implies the structures:

- Balance sheet (i.e. status as of a point it times)
- Income statement (i.e. performance over a period of time)
- Changes in equity (i.e. connects the balance sheet to the income statement per the "Equity" account)

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

As such, in more visual terms and adding **facts** to instantiate these terms, **associations** of the terms to form **structures**, and **assertions** (a.k.a. rules) to be sure everything connects mathematically as expected into something that might represent the core of a set of financial statements you have the following:

Shell of a **balance sheet**[36] which measures status:

[36] Human readable rendering of balance sheet, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic/evidence-package/contents/index.html#Rendering-BalanceSheet-Implied.html

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

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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

Shell of a **comprehensive income** statement[37] which measures performance:

Component: (Network and Table)	
Network	**03-Comprehensive Income** (http://www.xbrlsite.com/role/ComprehensiveIncome)
Table	(Implied)

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

Comprehensive Income [Roll Up]	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

Shell of **changes in equity**[38] which connects the income statement to the balance sheet:

[37] Human readable rendering of comprehensive income statement, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-Implied.html

[38] Human readable rendering of changes in equity, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic/evidence-package/contents/index.html#Rendering-ChangesInEquity-Implied.html

Component: (Network and Table)	
Network	**07-Changes in Equity** (http://www.xbrlsite.com/role/ChangesInEquity)
Table	(Implied)

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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

The rules that show that everything ticks and ties numerically per the four rules represented. (Note that the balance sheet rule is executed twice, once for the beginning and again for the ending balance.)

id	satisfied	message
CONSISTENCY_5 (evaluation 1)	satisfied	$Assets=3500 = ($Liabilities=0 + $Equity=3500)
CONSISTENCY_5 (evaluation 2)	satisfied	$Assets=0 = ($Liabilities=0 + $Equity=0)
CONSISTENCY_6 (evaluation 1)	satisfied	$ComprehensiveIncome=3000 = ($Revenues=7000 - $Expenses=3000 + $Gains=1000 - $Losses=2000)
RollForward_1 (evaluation 1)	satisfied	$Equity_BalanceStart=0 + $ComprehensiveIncome=3000 + $InvestmentsByOwners=1000 - $DistributionsToOwners=500 = $Equity_BalanceEnd=3500
ASSERTION_SFAC6_CONCEPTUAL_FRAMEWORK_RECONCILATION (evaluation 1)	satisfied	0= (($Equity_BalanceStart=0 + (($Revenues=7000 - $Expenses=3000) + ($Gains=1000 - $Losses=2000)) + ($InvestmentsByOwners=1000 - $DistributionsToOwners=500)) + ($Liabilities_BalanceEnd=0 - $Assets_BalanceEnd=3500))

I am not going to provide a cash flow statement yet because SFAC 6 does not discuss the cash flow statement but we all know there are four primary financial statements rather than three. See the next iteration which will include the cash flow statement.

The four statement (we are using three of the four) model shows the explicitly created **articulation** or the interrelationships between the three primary financial statements defined by the FASB in SFAC 6. However, since net cash flow is not defined by SFAC 6 we can only represent the interrelationships of three of the four statements: balance sheet, income statement, and changes in equity. Three of the statements of the four statement model can be seen and understood visually as such:

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 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 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

All the information provided within the SFAC 6 representation is proven to be properly functioning because the information is consistent, complete, and precise per our definitions and can be summarized as shown below:

Consistent

Complete

Precise

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

Assets = Liabilities + Equity

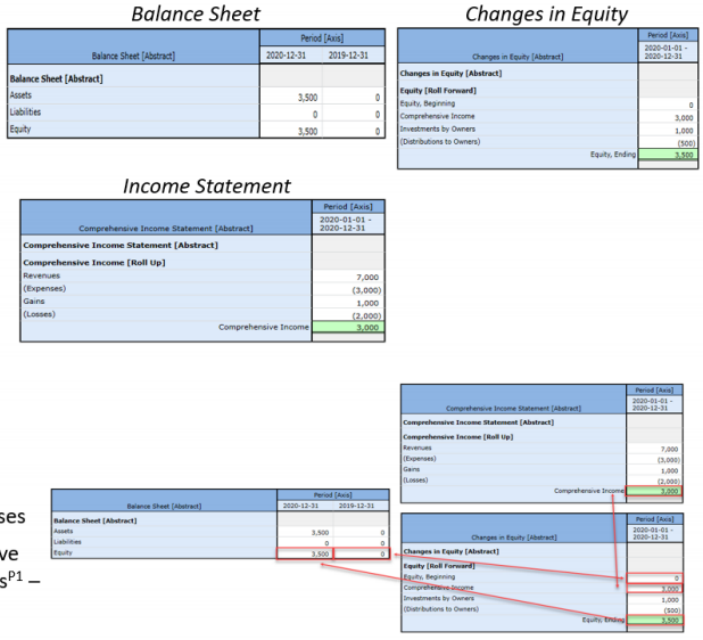
Comprehensive Income = Revenues - Expenses + Gains - Losses

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

Balance Sheet

Changes in Equity

Income Statement



A secondary takeaway is an expanding understanding of structures, how structures are used to adapt the models of the reports of economic entities to the allowed intermediate components (i.e. subtotals) of financial reports. Also, the important notion of articulation is introduced.

SFAC 6, Adds Net Assets and Statement of Net Assets[39]

This example makes one slight adjustment to the prior SFAC 6 representation in that it adds the notion of "Net Assets" and a new structure for "Statement of Net Assets".

SFAC 6 defines the term Equity but it also defines the term Net Assets as being equivalent to the term Equity. And so, fundamentally what the FASB is doing in SFAC 6 is to explain that there is another version, or model, of the accounting equation:

"Assets – Liabilities = Net Assets"

And so, we still have the balance sheet structure[40]:

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

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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

Now, we add an additional structure for a statement of net assets[41]:

Component: (Network and Table)	
Network	**02-Statement of Net Assets** (http://www.xbrlsite.com/role/StatementOfNetAssets)
Table	(Implied)

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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

[39] SFAC 6 Very Basic, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic2/
[40] SFAC 6 Balance Sheet, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic2/evidence-package/contents/index.html#Rendering-BalanceSheet-Implied.html
[41] SFAC 6 Statement of Net Assets, http://xbrlsite.azurewebsites.net/2020/master/sfac6-basic2/evidence-package/contents/index.html#Rendering-StatementOfNetAssets-Implied.html

The primary point we are making with this example is that you can add new structures to represent different associations and rules and reporting economic entities can pick which structure that they use within their report models. Essentially, flexibility is achieved in this manner.

Because we have a new structure in the statement of net assets we also have a new rule that is represented:

Net Assets = Assets - Liabilities

While in this representation we are providing both a balance sheet and statement of net assets; typically, a reporting entity would represent either one or the other and not both structures within their financial report model.

Finally, there is one additional point we want to make with this very basic SFAC 6 model. Notice the red arrows on the screen shots of the balance sheet and statement of net assets. We will discuss this within the next SFAC 6 example.

SFAC 6 Elements of Financial Statements, Adds Hypercubes (to first very basic example)[42]

We are continuing with the SFAC 6 examples by taking the first very basic example and making only one adjustment to the representation: adding hypercubes to describe each structure.

If you go back and look at each of the very basic SFAC 6 examples (with or without net assets) you will notice that each structure has the label "(Implied)" for the value of the field "Table" as such:

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

First, understand that the term "Table" and the term "Hypercube" are synonyms in US GAAP and IFRS XBRL based taxonomies. Table is the term the FASB and IASB have chosen to use to describe the notion of a Hypercube in XBRL. The terms mean exactly the same thing.

Second, no Hypercubes were defined to represent the structures within the two prior SFAC 6 examples. This is not a problem but it does point out a very important consideration. How do

[42] SFAC 6 Very Basic, http://xbrlsite.azurewebsites.net/2020/master/sfac6/

you identify a structure within a report if the structure does not have a name that identifies that structure?

You can point out that the Network identifies the balance sheet as being a balance sheet. However, when you recognize that in reports, the Network identifiers and titles are defined by the creator of the report and are therefore not that useful in identifying the structure of the report you want to locate.

You will better understand what is going on in a moment when you see the structures of this SFAC 6 examples which do contain explicitly defined structures using Hypercubes:

Balance sheet[43]

Component: (Network and Table)	
Network	**01-Balance Sheet** (http://www.xbrlsite.com/sfac6/role/BalanceSheet)
Table	Balance Sheet [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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[44]

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

[43] SFAC 6 balance sheet, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-BalanceSheet-sfac6_BalanceSheetHypercube.html
[44] SFAC 6 comprehensive income, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-sfac6_ComprehensiveIncomeStatementHypercube.html

Changes in equity[45]

Component: (Network and Table)	
Network	03-Changes in Equity (http://www.xbrlsite.com/sfac6/role/ChangesInEquity)
Table	Changes in Equity [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

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

Everything about the very first SFAC 6 example and this SFAC 6 example except for the fact that each of the represented structures is explicitly named because a Hypercube was created when the structure was defined.

This makes it possible to refer to any structure by the name of the explicitly defined hypercube that is used to describe the structure. By contrast, other approaches have to be used to locate and identify the structures of the first two SFAC 6 examples.

SFAC 6 PLUS[46]

We finish off with our final SFAC 6 example which combines the first basic example, adds the net assets element, adds the statement of changes in equity structure, adds hypercubes to each structure, and then adds a few additional terms and structures.

In this example, we add the terms and structures necessary to completely build out additional representations that would likely be made by a not for profit entity so that either a for profit or a not for profit can be represented. The structures for each type of reporting entity are organized into separate structures; entities can pick and chose which they would use in their report model to represent reported information. Again, we point out that typically it would never be the case that a report model would contain representations for both for profit and not for profit reporting entities.

[45] SFAC 6 changes in equity, http://xbrlsite.azurewebsites.net/2020/master/sfac6/evidence-package/contents/index.html#Rendering-ChangesInEquity-sfac6_ChangesInEquityHypercube.html
[46] SFAC 6 PLUS, http://xbrlsite.azurewebsites.net/2020/master/sfac6plus/

Again, all representations provide all rules necessary to both describe the mathematical relations of a report and verify such relations to be sure they are consistent with expectation.

Statement of Net Assets and Fund Balance[47]:

Component: (Network and Table)	
Network	**04-Net Assets** (http://www.xbrlsite.com/sfac6/role/NetAssets)
Table	Fund Balance [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

Fund Balance [Line Items]	Period [Axis] 2020-12-31	2019-12-31
Net Assets [Roll Up]		
Assets	3,500	0
(Liabilities)	0	0
Net Assets	3,500	0
Fund Balance [Roll Up]		
Fund Balance, Permanently Restricted	2,000	0
Fund Balance, Termporarily Restricted	1,000	0
Fund Balance, Unrestricted	500	0
Fund Balance	3,500	0

Changes in Fund Balance[48]:

Component: (Network and Table)	
Network	**05-Change in Fund Balance** (http://www.xbrlsite.com/sfac6/role/ChangeInFundBalance)
Table	Changes in Fund Balance [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

Changes in Fund Balance [Line Items]	Period [Axis] 2020-01-01 - 2020-12-31
Changes in Fund Balance [Roll Forward]	
Fund Balance, Beginning Balance	0
Change in Net Assets	3,000
Other Increases (Decreases) in Fund Balance	500
Fund Balance, Ending Balance	3,500

[47] SFAC 6 PLUS statement of net assets and fund balance, http://xbrlsite.azurewebsites.net/2020/master/sfac6plus/evidence-package/contents/index.html#Rendering-NetAssets-sfac6_FundBalanceHypercube.html

[48] SFAC 6 PLUS changes in fund balance, http://xbrlsite.azurewebsites.net/2020/master/sfac6plus/evidence-package/contents/index.html#Rendering-ChangeInFundBalance-sfac6_ChangesInFundBalanceHypercube.html

Changes in Net Assets[49]:

Component: (Network and Table)	
Network	**05-Change in Net Assets** (http://www.xbrlsite.com/sfac6/role/ChangeInNetAssets)
Table	Changes in Net Assets [Hypercube]

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II (http://standards.iso.org/iso/17442)

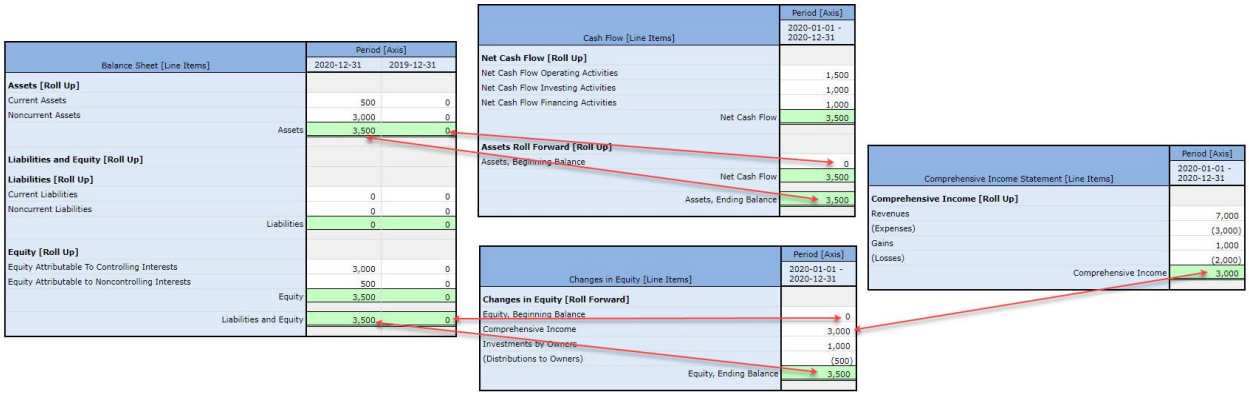
Changes in Net Assets [Line Items]	Period [Axis] 2020-01-01 - 2020-12-31
Changes in Net Assets [Roll Up]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Change in Net Assets	3,000

Common Elements of Financial Statements[50]

In this next representation we build upon the prior representations and best practices in representing XBRL-based financial reports to get something that looks a bit closer to a real financial statement that you would find. We are focusing on for profit economic entities for the time being to keep things as simple as possible.

One thing you might have noticed is that SFAC 6 did not address the cash flow statement so we want to add that so that we have a traditional four statement model including a balance sheet, income statement, cash flow statement, and changes in equity that are mathematically interrelated using the notion of articulation described by the FASB[51]:

[49] SFAC 6 PLUS changes in net assets, http://xbrlsite.azurewebsites.net/2020/master/sfac6plus/evidence-package/contents/index.html#Rendering-ChangeInNetAssets-sfac6_ChangesInNetAssetsHypercube.html
[50] SFAC 6 PLUS, http://xbrlsite.azurewebsites.net/2020/master/common/index.html
[51] Articulation and the Four Statement Model, http://xbrlsite.azurewebsites.net/2020/core/master-common/ArticulationFourStatementModel.jpg



Balance Sheet [Line Items]	Period [Axis] 2020-12-31	2019-12-31
Assets [Roll Up]		
Current Assets	500	0
Noncurrent Assets	3,000	0
Assets	3,500	0
Liabilities and Equity [Roll Up]		
Liabilities [Roll Up]		
Current Liabilities	0	0
Noncurrent Liabilities	0	0
Liabilities	0	0
Equity [Roll Up]		
Equity Attributable To Controlling Interests	3,000	0
Equity Attributable to Noncontrolling Interests	500	0
Equity	3,500	0
Liabilities and Equity	3,500	0

Cash Flow [Line Items]	Period [Axis] 2020-01-01 - 2020-12-31
Net Cash Flow [Roll Up]	
Net Cash Flow Operating Activities	1,500
Net Cash Flow Investing Activities	1,000
Net Cash Flow Financing Activities	1,000
Net Cash Flow	3,500
Assets Roll Forward [Roll Up]	
Assets, Beginning Balance	0
Net Cash Flow	3,500
Assets, Ending Balance	3,500

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

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 you examine the graphic above in detail, you will notice that every reported fact is some how related to some other reported fact mathematically in some way. Further, the four primary financial statements are all interlinked with one another.

It would literally be impossible to change one number in the report and not have the validation process used to make sure the report is properly functioning report a mistake. This is achieved per (a) the double-entry accounting model and (b) a well-defined set of elements and (c) clear information that indicates the relations between the well-defined set of elements used within a financial report.

As will be shown later, whether or not a standards setter or regulator does or does not do a good job at creating a financial reporting scheme; the internal models used by enterprises large or small that desire to automate certain tasks and processes related to creating a financial report can leverage these characteristics of financial reporting to maintain report quality.

Proof[52]

This Proof takes everything you will ever run across in an XBRL-based financial report, puts all those things together and makes sure all the parts interact with each other correctly. While this simple looking example appears simplistic to the untrained eye, a trained observer can see that this simple looking Proof representation documents the information patterns that exist in financial reports. Let me explain.

The *US GAAP Financial Reporting Taxonomy Architecture*[53] decomposes a report into "fragments" and "schedules" and finally into "facts". I have similarly decomposed the objects of a financial report into the smaller components that make up such reports. The following is a

[52] Proof, http://xbrlsite.azurewebsites.net/2020/master/proof/index.html

[53] FASB, *US GAAP Financial Reporting Taxonomy Architecture*, Figure 6. Many-to-Many Relationship Between Fragments and Facts, page 13, https://www.fasb.org/cs/ContentServer?c=Document_C&cid=1176163689810&d=&pagename=FASB%2FDocument_C%2FDocumentPage

comparison of the terms that I use reconciled to the terms the *US GAAP Financial Reporting Taxonomy Architecture* uses as best as possible:

Definition	My Term	US GAAP Financial Reporting Taxonomy Architecture Term
A **report** is information published by a reporting entity at some point in time for some purpose.	Report	Financial Report
A **fragment** is a set of one to many fact sets which go together for some specific purpose within a report.	Fragment	Report Fragment
A **fact set** is a set of facts which go together (tend to be cohesive and share a certain common nature) for some specific purpose within a report.	Fact Set	Schedule
A **fact** defines a single, observable, reportable piece of information contained within a report contextualized for unambiguous interpretation or analysis by one or more distinguishing aspects.	Fact	Fact

The automated analysis of a set of 6,023 XBRL-based financial reports (2016 10-Ks) submitted to the SEC by public companies revealed:

- Total reports: 6,023
- Total facts reported: 8,532,275
- Average number of facts per report: 1,416
- Total number of networks in all reports: 462,786
- Average number of networks per report: 77
- Total number of fact sets in all reports: **754,430**
- Average number of fact sets per report: 125
- Average number of fact sets per network: 1.6
- Average facts per network: 18
- Average facts per fact set: 11

So, the actual average size of the pieces of a report are quite small. Information is skewed a bit by the relatively large number of Level 1, Level 2, and Level 3 text blocks.

Networks are too big to work with because they can contain multiple hypercubes (a.k.a. [Table]s). Even hypercubes are too big to work with because those creating reports tend to construct the hypercubes in arbitrary ways. Facts themselves are too small to work with.

But there is a magical fragment unit that is just right. I call this magical unit of a financial report the "**Block**" or the "**Fact Set**". I will use the term Fact Set in this document. Each Fact Set can be described by what I call a **concept arrangement pattern**[54].

[54] Charles Hoffman, CPA, *Concept Arrangement Patterns*, http://www.xbrlsite.com/mastering/Part02_Chapter05.I_ConceptArrangementPatterns.pdf

Of the **754,430** Fact Sets found in the 6,023 reports that I interrogated using automated machine-based processes, there were:

- **Text Blocks**: 407,392 (54%) are text blocks (Level 1 Notes, Level 2 Policies, Level 3 Disclosures)
- **Sets**: 181,063 (24%) are sets (or hierarchies, no mathematical computations)
- **Roll Ups**: 120,708 (16%) are roll ups
- **Roll Forwards**: 37,721 (5%) are roll forwards
- Other (including **Roll Forward Info**, **Adjustment**, **Variance**): 7,546 (1%) are Roll Forward Infos or something else

But every fragment of every XBRL-based financial report can be described by its concept arrangement pattern of the Fact Set which makes up the fragment. The concept arrangement pattern is simply the pattern of the arrangement of the contents of the [Line Items] (a.k.a. primary items) of the report. Only Concepts or [Abstract]s can exist within a set of [Line Items].

What the **Proof** does is put all of those possible concept arrangement patterns into one XBRL taxonomy schema, set of XBRL linkbases, set of XBRL formulas, and XBRL instance and constructs a provably properly functioning logical system. The purpose of this task is to verify that each of the concept arrangement patterns have been created logically and interact with all other concept arrangement patterns within an XBRL-based digital financial report logically.

In this representation we add the following logical relationships to which you have not yet been exposed:

Adjustment[55]: (reconciles an originally stated balance to a restated balance per a change in accounting policy or correction of an accounting error between two different report dates)

Prior Period Errors [Line Items]	Report Date [Axis]	Period [Axis]
		2019-12-31
Prior Period Errors [Adjustment]		
Equity, Origionally Stated	Prior Report [Member]	2,000
Changes in Accounting Policy	Current Report [Member]	(1,500)
Correction of an Error	Current Report [Member]	(500)
Equity, Restated	Current Report [Member]	0

[55] Adjustment, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-PriorPeriodErrors-proof_PriorPeriodErrorsHypercube.html

Variance[56]: (reconciles an actual value to a budgeted value and computes the variance between the two different reporting scenarios)

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

Roll forward info[57]: (provides information about a roll forward but there is no mathematical relationship between reported values)

Weighted Average Grant Date Fair Value [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Weighted Average Grant Date Fair Value [Roll Forward Info]	
Nonvested Fair Value, Beginning Balance	32.72
Granted	41.51
Vested	30.92
Forfeited	35.93
Nonvested Fair Value, Ending Balance	36.92

Set[58]: (a set of facts that are reported together which could be numeric or nonnumeric that have no mathematical relation between the facts)

Financial Highlights [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
Financial Highlights [Set]	
Revenues	7,000
Comprehensive Income	3,000
Distributions to Owners	500

[56] Variance, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-VarianceAnalysis-proof_VarianceAnalysisHypercube.html
[57] Roll Forward Info, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-StockPlanActivity-proof_WeightedAverageGrantDateFairValueHypercube.html
[58] Set, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-FinancialHighlights-proof_FinancialHighlightsHypercube.html

Text block[59]: (a "block" of text or effectively prose that is reported as a single fact; could be an entire note, an entire disclosure, or a single disclosure)

Policies [Line Items]	Period [Axis] 2020-01-01 - 2020-12-31
Basis of Reporting [Text Block]	Duis fermentum. Nullam dui orci, scelerisque porttitor, volutpat a, porttitor a, enim. Sed lobortis. Maecenas scelerisque ullamcorper libero. Aliquam porta leo imperdiet pede. In semper, elit vel elementum auctor, lectus purus rhoncus arcu, lacinia sollicitudin justo odio et nunc. Phasellus sagittis fringilla risus. Curabitur iaculis sagittis orci. Ut malesuada libero nec nulla molestie vestibulum. Suspendisse lectus massa, ullamcorper at, tincidunt eget, bibendum vel, risus. Curabitur imperdiet. Suspendisse accumsan, arcu vel ornare interdum, magna tellus porta mauris, in porta mi lacus sodales felis. Pellentesque dapibus, leo non sollicitudin consequat, lectus orci fringilla felis, non interdum leo libero sed augue. Sed magna. Maecenas ante ipsum, congue ut, sodales a, pulvinar ut, dui. Suspendisse mauris massa, sollicitudin et, hendrerit eget, placerat id, orci. Donec molestie magna. Sed mauris. Nulla facilisi. Fusce tristique posuere ipsum. Nulla facilisi. Aliquam viverra risus vitae ante. Sed rhoncus mi in wisi. Nullam nibh dui, molestie vitae, imperdiet non, ornare at, elit. Aenean nec justo. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis sodales.
Nature of Operations [Text Block]	**Sed justo: Nibh, placerat** 20XX 20XX Sed dapibus dui quis lectus; Donec id sem. Integer sit amet 2% diam ac nibh consequat vestibulum; Sed eget augue malesuada quam adipiscing mattis XX,XXX XX,XXX Sed lobortis, Maecenas scelerisque ullamcorper libero, Aliquam porta $880 leo imperdiet pede XX,XXX - Nunc congue. Fusce venenatis. Maecenas tincidunt, ipsum in fringilla hendrerit, dolor metus eleifend neque, vel tincidunt mi nunc a purus - XX,XXX Fusce venenatis. Maecenas tincidunt, ipsum in fringilla $1,200 hendrerit, dolor metus eleifend neque, vel tincidunt mi nunc a purus XX,XXX XX,XXX Pellentesque XXX,XXX XXX,XXX
Revenue Recognition Policy [Text Block]	**Nature of business** Sed mauris. Nulla facilisi. Fusce tristique posuere ipsum. Nulla facilisi. Aliquam viverra risus vitae ante. Sed rhoncus mi in wisi. Nullam nibh dui, molestie vitae, imperdiet non, ornare at, elit. • Suspendisse accumsan, arcu vel ornare interdum, magna tellus porta mauris, in porta mi lacus sodales felis. • Phasellus eleifend, diam vitae dapibus pulvinar, erat ligula auctor dui, eget congue justo lorem hendrerit tellus. • Fusce gravida, ligula a placerat placerat, leo erat euismod lectus, et lacinia justo libero non pede. Fusce gravida, ligula a placerat placerat, leo erat euismod lectus, et lacinia justo libero non pede. Vivamus ac velit vel magna nonummy pretium. 1. Etiam ut augue 2. Aliquam erat volutpat

Member aggregation[60]: (similar to a roll up except that the roll up is for one concept that is used across a number of different dimensions)

Segment Revenues [Line Items]	Period [Axis] 2020-01-01 - 2020-12-31 Segments [Axis]			
	Segment Alpha [Member]	Segment Bravo [Member]	Segment Charlie [Member]	All Segments [Member]
Sgement Revenues [Set]				
Revenues	1,000	2,000	4,000	7,000

And so, again, all of the individual pieces or Fact Sets that make up the representation with each Fact set must be consistent and plus information between the different Fact Sets must likewise be consistent in order for the full report to be considered consistent. The Proof representation provides an example of each of the logical relationship types (i.e. concept

[59] Text block, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-Policies-proof_PoliciesHypercube.html
[60] Member aggregation, http://xbrlsite.azurewebsites.net/2020/master/proof/evidence-package/contents/index.html#Rendering-SegmentRevenues-proof_SegmentRevenuesHypercube.html

arrangement patterns) that you would ever run across within a financial report whether that report is human readable or machine readable. These patterns are a function of the information itself.

Trial Balance[61]

The trial balance representation starts to tie information in the accounting system with the information in a financial report. It also raises questions about how information is represented within an XBRL taxonomy given that line items might exist in two different roll forwards given that accounting is a double entry system. This helps you understand the links.

No new information patterns are introduced, this example is simply a set of roll ups and a set of roll forwards that are all interlinked. Roll ups are documented within the primary financial statements themselves and the change of each balance sheet account is summarized in a roll forward for that balance sheet line item. Now, all of these roll forwards are not required to be provided per an external financial report. But, the information is quite helpful in the process of creating a financial report.

Trial balance of accounts[62]:

Trial Balance [Roll Up]	Period [Axis]	
	2018-12-31	2017-12-31
Trial Balance [Roll Up]		
Cash and Cash Equivalents	4,000	3,000
Receivables	2,000	1,000
Inventories	1,000	1,000
Property, Plant and Equipment	6,000	1,000
Accounts Payable	(1,000)	(1,000)
Long-term Debt	(6,000)	(1,000)
Retained Earnings	(6,000)	(4,000)
Check Sum	0	0

Summary of changes[63]: (note that each of these changes is from one of the roll forwards, it is simply the case that roll forward beginning and ending balances for each account are not provided within this summary of changes)

[61] Trial Balance, http://xbrlsite.azurewebsites.net/2020/master/tb/index.html
[62] Trial balance of accounts, http://xbrlsite.azurewebsites.net/2020/master/tb/evidence-package/contents/index.html#Rendering-TrialBalance-Implied.html
[63] Summary of changes, http://xbrlsite.azurewebsites.net/2020/master/tb/evidence-package/contents/index.html#Rendering-Transactions-Implied.html

Changes Summary [Roll Up]	Period [Axis] 2018-01-01 - 2018-12-31
Changes Summary [Roll Up]	
Collection of Receivables	3,000
Payment of Accounts Payable	(2,000)
Additional Long-term Borrowings 2	6,000
Repayment of Long-term Borrowings 2	(1,000)
Capital Additions of Property, Plant and Equipment 2	(5,000)
Sales 2	4,000
Collection of Receivables 2	(3,000)
Additions to Allowance for Bad Debts	0
Bad Debts Written Off	0
Purchases of Inventory for Sale	2,000
Costs of Sales 2	(2,000)
Inventory Written Off	0
Capital Additions of Property, Plant and Equipment	5,000
Depreciation and Amortization 2	0
Property, Plant and Equipment Written Off	0
Purchases of Inventory for Sale 2	(2,000)
Payment of Accounts Payable 2	2,000
Additional Long-term Borrowings	(6,000)
Repayment of Long-term Borrowings	1,000
Net Income (Loss)	(2,000)
Check Sum Changes	0

As you think about this trial balance representation, think internal financial report process control rather than external financial report process control.

Not-for-Profit Taxonomy and Report[64]

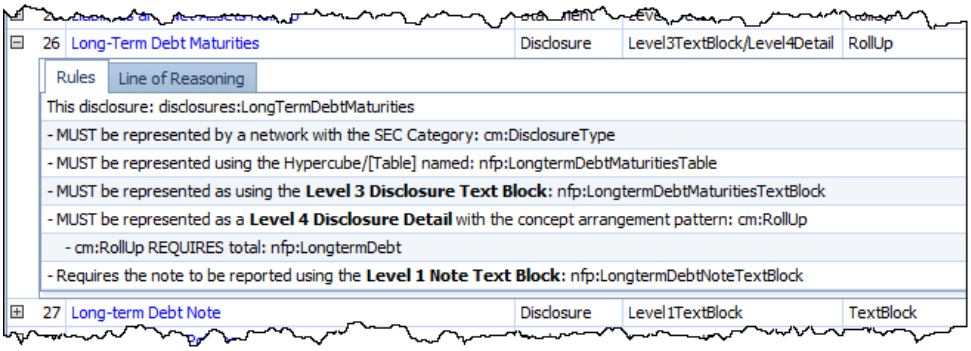
The not-for-profit taxonomy and report representation shows an XBRL taxonomy working prototype that has been created to represent financial reports of not-for-profit entities[65] and an XBRL-based financial report that has been created using that XBRL-based taxonomy. Both the taxonomy and report are held out as best practice that enable both reliable processes to be created and high-quality reports that result from those processes.

[64] Not-for-Profit Taxonomy and Report reference implementation, http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/index.html
[65] Not-for-profit XBRL Taxonomy working prototype, http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/documentation/Home.html

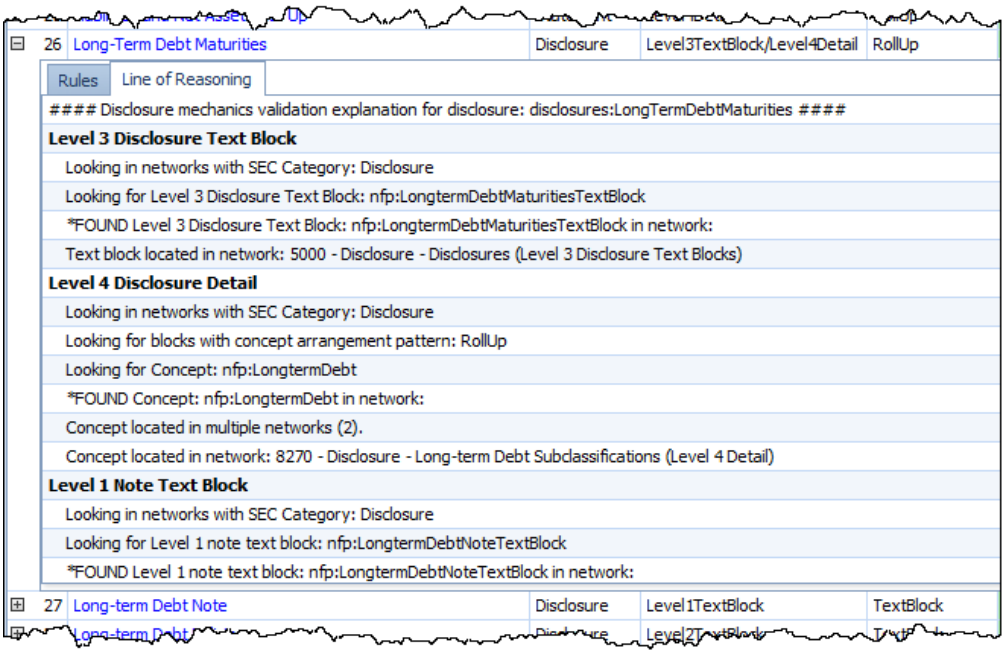
Again, no new information models are introduced; everything that you have covered this far in the previous examples help you understand every fragment of the not-for-profit financial report. Here you see all the report fragments within the report[66]:

What we do introduce in this example is the notion of using automated processes to verify that every fragment of the financial report has been created consistent with expectations documented in machine-readable rules. Every fragment has a rule, a line of reasoning to determine if the report is consistent with the rule, and an entry withing a dashboard to summarize report verification results.

Rule:

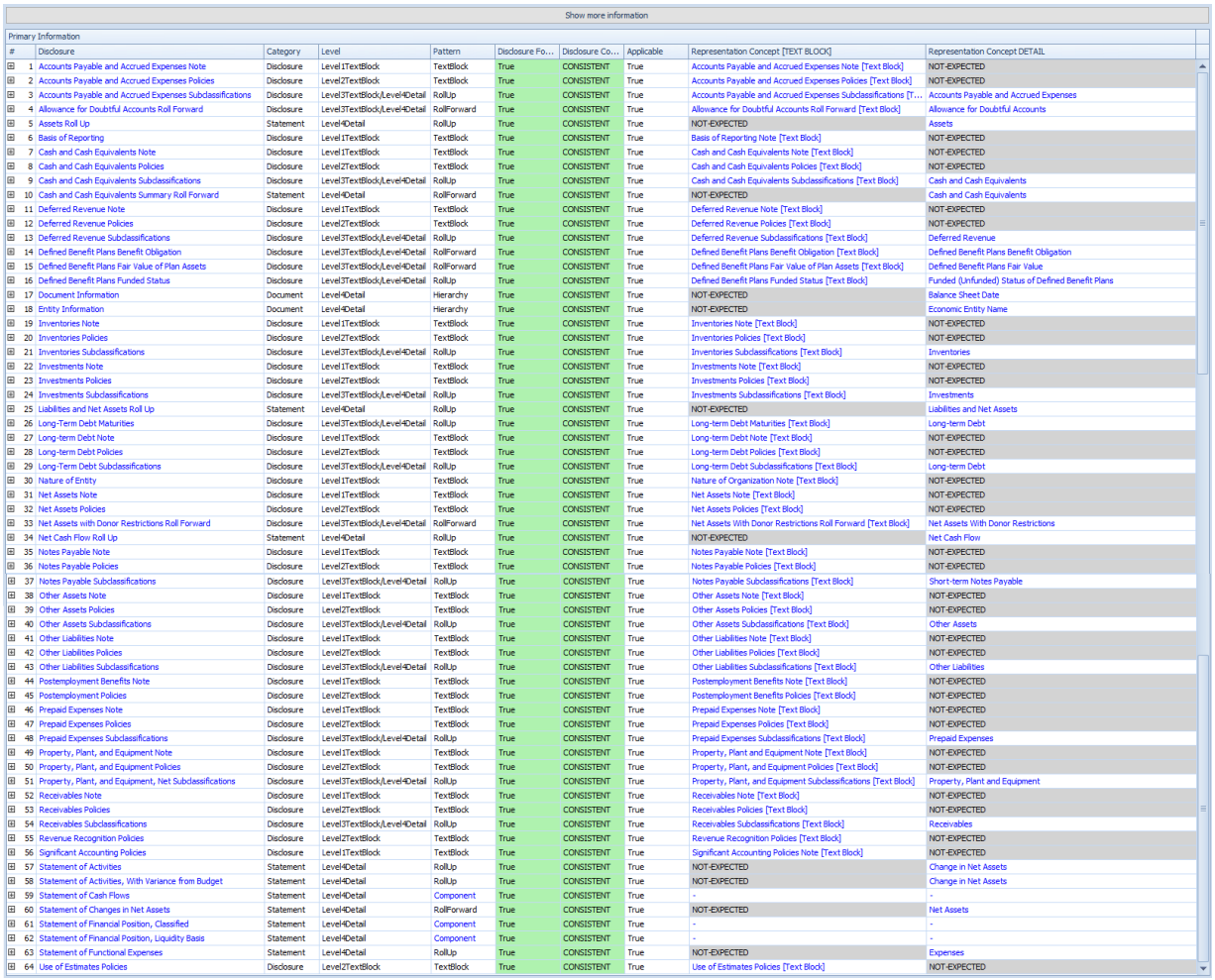


Line of reasoning:



[66] Report fragments, http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/evidence-package/

Report fragments (i.e. disclosures) verification dashboard[67]:



Show more information

Primary Information

#	Disclosure	Category	Level	Pattern	Disclosure Fo...	Disclosure Co...	Applicable	Representation Concept [TEXT BLOCK]	Representation Concept DETAIL
1	Accounts Payable and Accrued Expenses Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Accounts Payable and Accrued Expenses Note [Text Block]	NOT-EXPECTED
2	Accounts Payable and Accrued Expenses Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Accounts Payable and Accrued Expenses Policies [Text Block]	NOT-EXPECTED
3	Accounts Payable and Accrued Expenses Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Accounts Payable and Accrued Expenses Subclassifications [T...	Accounts Payable and Accrued Expenses
4	Allowance for Doubtful Accounts Roll Forward	Disclosure	Level3TextBlock/Level4Detail	RollForward	True	CONSISTENT	True	Allowance for Doubtful Accounts Roll Forward [Text Block]	Allowance for Doubtful Accounts
5	Assets Roll Up	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Assets
6	Basis of Reporting	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Basis of Reporting Note [Text Block]	NOT-EXPECTED
7	Cash and Cash Equivalents Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Cash and Cash Equivalents Note [Text Block]	NOT-EXPECTED
8	Cash and Cash Equivalents Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Cash and Cash Equivalents Policies [Text Block]	NOT-EXPECTED
9	Cash and Cash Equivalents Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Cash and Cash Equivalents Subclassifications [Text Block]	Cash and Cash Equivalents
10	Cash and Cash Equivalents Summary Roll Forward	Statement	Level4Detail	RollForward	True	CONSISTENT	True	NOT-EXPECTED	Cash and Cash Equivalents
11	Deferred Revenue Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Deferred Revenue Note [Text Block]	NOT-EXPECTED
12	Deferred Revenue Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Deferred Revenue Policies [Text Block]	NOT-EXPECTED
13	Deferred Revenue Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Deferred Revenue Subclassifications [Text Block]	Deferred Revenue
14	Defined Benefit Plans Benefit Obligation	Disclosure	Level3TextBlock/Level4Detail	RollForward	True	CONSISTENT	True	Defined Benefit Plans Benefit Obligation [Text Block]	Defined Benefit Plans Benefit Obligation
15	Defined Benefit Plans Fair Value of Plan Assets	Disclosure	Level3TextBlock/Level4Detail	RollForward	True	CONSISTENT	True	Defined Benefit Plans Fair Value of Plan Assets [Text Block]	Defined Benefit Plans Fair Value
16	Defined Benefit Plans Funded Status	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Defined Benefit Plans Funded Status [Text Block]	Funded (Unfunded) Status of Defined Benefit Plans
17	Document Information	Document	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Balance Sheet Date
18	Entity Information	Document	Level4Detail	Hierarchy	True	CONSISTENT	True	NOT-EXPECTED	Economic Entity Name
19	Inventories Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Inventories Note [Text Block]	NOT-EXPECTED
20	Inventories Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Inventories Policies [Text Block]	NOT-EXPECTED
21	Inventories Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Inventories Subclassifications [Text Block]	Inventories
22	Investments Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Investments Note [Text Block]	NOT-EXPECTED
23	Investments Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Investments Policies [Text Block]	NOT-EXPECTED
24	Investments Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Investments Subclassifications [Text Block]	Investments
25	Liabilities and Net Assets Roll Up	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Liabilities and Net Assets
26	Long-Term Debt Maturities	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Long-term Debt Maturities [Text Block]	Long-term Debt
27	Long-term Debt Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Long-term Debt Note [Text Block]	NOT-EXPECTED
28	Long-term Debt Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Long-term Debt Policies [Text Block]	NOT-EXPECTED
29	Long-Term Debt Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Long-term Debt Subclassifications [Text Block]	Long-term Debt
30	Nature of Entity	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Nature of Organization Note [Text Block]	NOT-EXPECTED
31	Net Assets Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Net Assets Note [Text Block]	NOT-EXPECTED
32	Net Assets Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Net Assets Policies [Text Block]	NOT-EXPECTED
33	Net Assets with Donor Restrictions Roll Forward	Disclosure	Level3TextBlock/Level4Detail	RollForward	True	CONSISTENT	True	Net Assets With Donor Restrictions Roll Forward [Text Block]	Net Assets With Donor Restrictions
34	Net Cash Flow Roll Up	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Net Cash Flow
35	Notes Payable Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Notes Payable Note [Text Block]	NOT-EXPECTED
36	Notes Payable Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Notes Payable Policies [Text Block]	NOT-EXPECTED
37	Notes Payable Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Notes Payable Subclassifications [Text Block]	Short-term Notes Payable
38	Other Assets Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Other Assets Note [Text Block]	NOT-EXPECTED
39	Other Assets Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Other Assets Policies [Text Block]	NOT-EXPECTED
40	Other Assets Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Other Assets Subclassifications [Text Block]	Other Assets
41	Other Liabilities Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Other Liabilities Note [Text Block]	NOT-EXPECTED
42	Other Liabilities Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Other Liabilities Policies [Text Block]	NOT-EXPECTED
43	Other Liabilities Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Other Liabilities Subclassifications [Text Block]	Other Liabilities
44	Postemployment Benefits Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Postemployment Benefits Note [Text Block]	NOT-EXPECTED
45	Postemployment Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Postemployment Benefits Policies [Text Block]	NOT-EXPECTED
46	Prepaid Expenses Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Prepaid Expenses Note [Text Block]	NOT-EXPECTED
47	Prepaid Expenses Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Prepaid Expenses Policies [Text Block]	NOT-EXPECTED
48	Prepaid Expenses Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Prepaid Expenses Subclassifications [Text Block]	Prepaid Expenses
49	Property, Plant, and Equipment Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Property, Plant and Equipment Note [Text Block]	NOT-EXPECTED
50	Property, Plant, and Equipment Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Property, Plant, and Equipment Policies [Text Block]	NOT-EXPECTED
51	Property, Plant, and Equipment, Net Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Property, Plant, and Equipment Subclassifications [Text Block]	Property, Plant and Equipment
52	Receivables Note	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Receivables Note [Text Block]	NOT-EXPECTED
53	Receivables Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Receivables Policies [Text Block]	NOT-EXPECTED
54	Receivables Subclassifications	Disclosure	Level3TextBlock/Level4Detail	RollUp	True	CONSISTENT	True	Receivables Subclassifications [Text Block]	Receivables
55	Revenue Recognition Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Revenue Recognition Policies [Text Block]	NOT-EXPECTED
56	Significant Accounting Policies	Disclosure	Level1TextBlock	TextBlock	True	CONSISTENT	True	Significant Accounting Policies Note [Text Block]	NOT-EXPECTED
57	Statement of Activities	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Change in Net Assets
58	Statement of Activities, With Variance from Budget	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Change in Net Assets
59	Statement of Cash Flows	Statement	Level4Detail	Component	True	CONSISTENT	True	-	-
60	Statement of Changes in Net Assets	Statement	Level4Detail	RollForward	True	CONSISTENT	True	NOT-EXPECTED	Net Assets
61	Statement of Financial Position, Classified	Statement	Level4Detail	Component	True	CONSISTENT	True	-	-
62	Statement of Financial Position, Liquidity Basis	Statement	Level4Detail	Component	True	CONSISTENT	True	-	-
63	Statement of Functional Expenses	Statement	Level4Detail	RollUp	True	CONSISTENT	True	NOT-EXPECTED	Expenses
64	Use of Estimates Policies	Disclosure	Level2TextBlock	TextBlock	True	CONSISTENT	True	Use of Estimates Policies [Text Block]	NOT-EXPECTED

The report has 81 individual Fact Sets. Some disclosures are shown twice; once as a Text Block and then again as a detailed disclosure. In all, there are 64 total disclosures. Rules provide information about the expectations for each disclosure. Software does the processing and outputs the line of reasoning. The line of reasoning results is summarized into the dashboard the user of the software application can see that the report is created consistent with all expectations for which rules are provided. If a rule is left out, then there is no way for software to evaluate the report per the missing rule because that information does not exist within the available knowledgebase of information.

So, we are leaving out a lot of deals about how all this works. Those details are covered elsewhere. The primary point that we are trying to show you is that if software has no rules to work with, then the software simply cannot perform the required work and therefore that work

[67] Disclosure verification results dashboard, http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/DisclosureMechanics.jpg

must be performed manually. The logic of the report is knowable whether a rule is provided in machine readable form or not. That logic must be consistent. How you prove that consistency is what is at issue; not whether the logic is machine-readable or not. The report needs to be a true and fair representation of the financial position and financial performance of the economic entity being represented.

Microsoft[68]

And now we get to a real XBRL-based financial report that has been submitted to the U.S. Securities and Exchange Commission (SEC). We will look at **two versions if this report**.

The **first version** is the actual report submitted to the SEC[69].

That Microsoft report, which is part of the 2017 10-K filing with the SEC, contains:

- 2,035 facts
- 128 Networks
- 128 Tables (or Hypercubes)
- 194 Fact Sets (or Blocks)

Of the 194 Fact Sets (or Blocks), the following is a breakdown of that total into a count of each of the categories each Fact Set can fit into (i.e. concept arrangement pattern):

- 58 Sets
- 32 Roll Ups
- 11 Roll Forwards
- 1 Roll Forward Info
- 92 Text Blocks; of that total
    - 22 Level 1 Note text blocks
    - 23 Level 2 Policy text blocks
    - 47 Level 3 Disclosure text blocks

In addition to the above, there are 29 member aggregations. Members could aggregate across a Set, a Roll Up, or a Roll Forward. (i.e. the 29 are included in the numbers above).

The SEC does not allow XBRL Formulas to be submitted to the EDGAR system and as such, Microsoft does not provide documentation of the 11 Roll Forwards, or the 29 Member Aggregation mathematical computations. Further, I only had documentation for the disclosure

[68] Microsoft, http://xbrl.squarespace.com/journal/2020/4/13/microsoft-xbrl-based-report-analysis.html
[69] Microsoft report information as actually submitted, http://xbrl.squarespace.com/journal/2020/4/13/microsoft-xbrl-based-report-analysis.html

mechanics rules for about 70 disclosures. And so, there were many missing rules that are not utilized to help check to make sure the report is created correctly. So, in my second version, I added those rules.

I was able to test all of the representations of associations to be sure they were correctly represented, which they were: (GREEN is good, RED and ORANGE are errors, YELLOW is allowable but not best practice)

Child	Parent						
	Network	Table	Axis	Member	LineItems	Abstract	Concept
[Network]	0	0	0	0	0	0	0
[Table]	0	0	0	0	0	128	0
[Axis]	0	229	0	0	0	0	0
[Member]	0	0	229	264	0	0	0
[LineItems]	0	128	0	0	0	0	0
[Abstract]	128	0	0	0	26	5	0
[Concept]	0	0	0	0	428	152	0

That is consistent with the patterns of the full set of 6,023 XBRL-based report was expressing associations: (GREEN is good, RED and ORANGE are errors, YELLOW is allowable but not best practice)

		Parent						
		Network	Table	Axis	Member	LineItems	Abstract	Concept
Child	Network	0	0	0	0	0	0	0
	Table	513	0	0	4	4	212,090	11
	Axis	0	430,549	0	0	0	3	0
	Member	0	0	503,078	857,390	3	13	0
	LineItems	29	212,570	0	0	30	104	0
	Abstract	483,334	18	0	2	101,932	141,774	314
	Concept	8	0	1	49	1,178,684	1,969,653	7,246

Fundamental accounting concept relations which are high level relations of reported financial statement line items were tested and found to be 100% consistent with expectation as can be seen by the following validation summary[70]:

[70] XBRL Cloud Evidence Package, Fundamental Accounting Concept Relations Validation results, http://xbrlsite.azurewebsites.net/2017/Prototypes/Microsoft2017/evidence-package/USFACRenderingSummary.html

Entity	Period	ID	Test	Result	Amount Of Inconsiste...	Evaluation
0000789019	2017-FY	FAC_CONSISTENCY_1	fac:Equity = (fac:EquityAttributableToParent + fac:EquityAttributableToNoncontrollingInterest)	True	0	fac:Equity[72,394,000,000] = (fac:EquityAttributableToParent[us-gaap:StockholdersEquity[72,394,000,000]] + fac:EquityAttributableToNoncontrollingInterest[0])
0000789019	2017-FY	FAC_CONSISTENCY_10	fac:NetCashFlowFromInvestingActivities = (fac:NetCashFlowFromInvestingActivitiesContinuing + fac:NetCashFlowFromInvestingActivitiesDiscontinued)	True	0	fac:NetCashFlowFromInvestingActivities[46,781,000,000] = (fac:NetCashFlowFromInvestingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInInvestingActivitiesContinuingOperations[46,781,000,000]] + fac:NetCashFlowFromInvestingActivitiesDiscontinued[0])
0000789019	2017-FY	FAC_CONSISTENCY_11	fac:NetCashFlowFromFinancingActivities = (fac:NetCashFlowFromFinancingActivitiesContinuing + fac:NetCashFlowFromFinancingActivitiesDiscontinued)	True	0	fac:NetCashFlowFromFinancingActivities[8,408,000,000] = (fac:NetCashFlowFromFinancingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInFinancingActivitiesContinuingOperations[8,408,000,000]] + fac:NetCashFlowFromFinancingActivitiesDiscontinued[0])
0000789019	2017-FY	FAC_CONSISTENCY_12	fac:GrossProfit = (fac:Revenues - fac:CostOfRevenue)	True	0	fac:GrossProfit[us-gaap:GrossProfit[55,689,000,000]] = (fac:Revenues[us-gaap:SalesRevenueNet[89,950,000,000]] - fac:CostOfRevenue[us-gaap:CostOfRevenue[34,261,000,000]])
0000789019	2017-FY	FAC_CONSISTENCY_13	fac:OperatingIncomeLoss = (fac:GrossProfit - fac:OperatingExpenses)	True	0	fac:OperatingIncomeLoss[us-gaap:OperatingIncomeLoss[22,326,000,000]] = (fac:GrossProfit[us-gaap:GrossProfit[55,689,000,000]] - fac:OperatingExpenses[33,363,000,000])
0000789019	2017-FY	FAC_CONSISTENCY_15	fac:IncomeLossFromContinuingOperationsBeforeTax = (fac:OperatingIncomeLoss + fac:NonoperatingIncomePlusInterestAndDebtExpensePlusIncomeFromEquityMethodInvestments)	True	0	fac:IncomeLossFromContinuingOperationsBeforeTax[us-gaap:IncomeLossFromContinuingOperationsBeforeIncomeTaxesMinorityInterestAndIncomeLossFromEquityMethodInvestments[23,149,000,000]] = (fac:OperatingIncomeLoss[us-gaap:OperatingIncomeLoss[22,326,000,000]] + fac:NonoperatingIncomePlusInterestAndDebtExpensePlusIncomeFromEquityMethodInvestments[823,000,000])
0000789019	2017-FY	FAC_CONSISTENCY_16	fac:IncomeLossFromContinuingOperationsAfterTax = (fac:IncomeLossFromContinuingOperationsBeforeTax - fac:IncomeTaxExpenseBenefit)	True	0	fac:IncomeLossFromContinuingOperationsAfterTax[21,204,000,000] = (fac:IncomeLossFromContinuingOperationsBeforeTax[us-gaap:IncomeLossFromContinuingOperationsBeforeIncomeTaxesMinorityInterestAndIncomeLossFromEquityMethodInvestments[23,149,000,000]] - fac:IncomeTaxExpenseBenefit[us-gaap:IncomeTaxExpenseBenefit[1,945,000,000]])
0000789019	2017-FY	FAC_CONSISTENCY_17	fac:NetIncomeLoss = (fac:IncomeLossFromContinuingOperationsAfterTax + fac:IncomeLossFromDiscontinuedOperationsNetOfTax + fac:ExtraordinaryItemsOfIncomeExpenseNetOfTax)	True	0	fac:NetIncomeLoss[21,204,000,000] = (fac:IncomeLossFromContinuingOperationsAfterTax[21,204,000,000] + fac:IncomeLossFromDiscontinuedOperationsNetOfTax[0] + fac:ExtraordinaryItemsOfIncomeExpenseNetOfTax[0])
0000789019	2017-FY	FAC_CONSISTENCY_18	fac:NetIncomeLoss = (fac:NetIncomeLossAttributableToParent + fac:NetIncomeLossAttributableToNoncontrollingInterest)	True	0	fac:NetIncomeLoss[21,204,000,000] = (fac:NetIncomeLossAttributableToParent[us-gaap:NetIncomeLoss[21,204,000,000]] + fac:NetIncomeLossAttributableToNoncontrollingInterest[0])
0000789019	2017-FY	FAC_CONSISTENCY_19	fac:NetIncomeLossAvailableToCommonStockholdersBasic = (fac:NetIncomeLossAttributableToParent - fac:PreferredStockDividendsAndOtherAdjustments)	True	0	fac:NetIncomeLossAvailableToCommonStockholdersBasic[21,204,000,000] = (fac:NetIncomeLossAttributableToParent[us-gaap:NetIncomeLoss[21,204,000,000]] - fac:PreferredStockDividendsAndOtherAdjustments[0])
0000789019	2017-FY	FAC_CONSISTENCY_2	fac:Assets = fac:LiabilitiesAndEquity	True	0	fac:Assets[us-gaap:Assets[241,086,000,000]] = fac:LiabilitiesAndEquity[us-gaap:LiabilitiesAndStockholdersEquity[241,086,000,000]]
0000789019	2017-FY	FAC_CONSISTENCY_20	fac:ComprehensiveIncomeLoss = (fac:ComprehensiveIncomeLossAttributableToParent + fac:ComprehensiveIncomeLossAttributableToNoncontrollingInterest)	True	0	fac:ComprehensiveIncomeLoss[20,098,000,000] = (fac:ComprehensiveIncomeLossAttributableToParent[us-gaap:ComprehensiveIncomeNetOfTax[20,098,000,000]] + fac:ComprehensiveIncomeLossAttributableToNoncontrollingInterest[0])
0000789019	2017-FY	FAC_CONSISTENCY_21	fac:ComprehensiveIncomeLoss = (fac:NetIncomeLoss + fac:OtherComprehensiveIncomeLoss)	True	0	fac:ComprehensiveIncomeLoss[20,098,000,000] = (fac:NetIncomeLoss[21,204,000,000] + fac:OtherComprehensiveIncomeLoss[(1,106,000,000)])
0000789019	2017-FY	FAC_CONSISTENCY_3	fac:Assets = (fac:CurrentAssets + fac:NoncurrentAssets)	True	0	fac:Assets[us-gaap:Assets[241,086,000,000]] = (fac:CurrentAssets[us-gaap:AssetsCurrent[159,851,000,000]] + fac:NoncurrentAssets[81,235,000,000])
0000789019	2017-FY	FAC_CONSISTENCY_4	fac:Liabilities = (fac:CurrentLiabilities + fac:NoncurrentLiabilities)	True	0	fac:Liabilities[us-gaap:Liabilities[168,692,000,000]] = (fac:CurrentLiabilities[us-gaap:LiabilitiesCurrent[64,527,000,000]] + fac:NoncurrentLiabilities[104,165,000,000])
0000789019	2017-FY	FAC_CONSISTENCY_5	fac:LiabilitiesAndEquity = (fac:Liabilities + fac:CommitmentsAndContingencies + fac:TemporaryEquity + fac:Equity)	True	0	fac:LiabilitiesAndEquity[us-gaap:LiabilitiesAndStockholdersEquity[241,086,000,000]] = (fac:Liabilities[us-gaap:Liabilities[168,692,000,000]] + fac:CommitmentsAndContingencies[us-gaap:CommitmentsAndContingencies[ ]] + fac:TemporaryEquity[0] + fac:Equity[72,394,000,000])
0000789019	2017-FY	FAC_CONSISTENCY_50	fac:NetCashFlow = (fac:NetCashFlowContinuing + fac:NetCashFlowDiscontinued + fac:ExchangeGainsLosses)	True	0	fac:NetCashFlow[us-gaap:CashAndCashEquivalentsPeriodIncreaseDecrease[1,153,000,000]] = (fac:NetCashFlowContinuing[1,134,000,000] + fac:NetCashFlowDiscontinued[0] + fac:ExchangeGainsLosses[us-gaap:EffectOfExchangeRateOnCashAndCashEquivalents[19,000,000]])
0000789019	2017-FY	FAC_CONSISTENCY_6	fac:NetCashFlow = (fac:NetCashFlowFromOperatingActivities + fac:NetCashFlowFromInvestingActivities + fac:NetCashFlowFromFinancingActivities + fac:ExchangeGainsLosses)	True	0	fac:NetCashFlow[us-gaap:CashAndCashEquivalentsPeriodIncreaseDecrease[1,153,000,000]] = (fac:NetCashFlowFromOperatingActivities[39,507,000,000] + fac:NetCashFlowFromInvestingActivities[46,781,000,000] + fac:NetCashFlowFromFinancingActivities[8,408,000,000] + fac:ExchangeGainsLosses[us-gaap:EffectOfExchangeRateOnCashAndCashEquivalents[19,000,000]])
0000789019	2017-FY	FAC_CONSISTENCY_7	fac:NetCashFlowContinuing = (fac:NetCashFlowFromOperatingActivitiesContinuing + fac:NetCashFlowFromInvestingActivitiesContinuing + fac:NetCashFlowFromFinancingActivitiesContinuing)	True	0	fac:NetCashFlowContinuing[1,134,000,000] = (fac:NetCashFlowFromOperatingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInOperatingActivitiesContinuingOperations[39,507,000,000]] + fac:NetCashFlowFromInvestingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInInvestingActivitiesContinuingOperations[46,781,000,000]] + fac:NetCashFlowFromFinancingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInFinancingActivitiesContinuingOperations[8,408,000,000]])
0000789019	2017-FY	FAC_CONSISTENCY_8	fac:NetCashFlowDiscontinued = (fac:NetCashFlowFromOperatingActivitiesDiscontinued + fac:NetCashFlowFromInvestingActivitiesDiscontinued + fac:NetCashFlowFromFinancingActivitiesDiscontinued)	True	0	fac:NetCashFlowDiscontinued[0] = (fac:NetCashFlowFromOperatingActivitiesDiscontinued[0] + fac:NetCashFlowFromInvestingActivitiesDiscontinued[0] + fac:NetCashFlowFromFinancingActivitiesDiscontinued[0])
0000789019	2017-FY	FAC_CONSISTENCY_9	fac:NetCashFlowFromOperatingActivities = (fac:NetCashFlowFromOperatingActivitiesContinuing + fac:NetCashFlowFromOperatingActivitiesDiscontinued)	True	0	fac:NetCashFlowFromOperatingActivities[39,507,000,000] = (fac:NetCashFlowFromOperatingActivitiesContinuing[us-gaap:NetCashProvidedByUsedInOperatingActivitiesContinuingOperations[39,507,000,000]] + fac:NetCashFlowFromOperatingActivitiesDiscontinued[0])

In addition, XBRL syntax validation, Edgar Filer Manual (EFM) rules were verified and found to be correct[71] Using XBRL Cloud's Evidence Package:

			List	List	List	List	List	List	List	List	List	List	List	List	List	List
All Components (Networks/Tables)	Status	Count of Relations	XBRL Technical Syntax Rules	EFM Rules	XBRL-US Consistency Suite Rules	Model Structure Rules (US GAAP Taxonomy Architecture)	US GAAP Domain Level Rules	Fundamental Accounting Concepts and Relations Rules	XBRL-US Data Quality	Notes Consistency	US GAAP Industry / Activity Specific Rules	Reporting Entity Specific Rules [a]	Reporting Entity Specific Roll Up Rules [b]	US GAAP Reportability Rules	Other Manual Review Tasks	Other Rules and Best Practice Tasks
Automated summary	Completed	1589	OK	OK	Subscribe	OK	Not Specified [c]	OK	OK	OK	Not Specified [c]	OK	OK	Not Specified [c]	Not Specified [c]	OK
Automated rules defined			**205**	**136**	**0**	**7**	**0**	**27**	**7**	**5**	**0**	**9**	**32**	**0**	**0**	**0**
Automated rules executed which PASSED			205	136	0	7	0	21	7	5	0	45	275	0	0	0
Automated rules executed which FAILED			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manual summary	Incomplete	1589	OK	OK	Subscribe	OK	Not Specified [c]	OK	1	OK	Not Specified [c]	4	20	Not Specified [c]	Not Specified [c]	OK
Manual rules defined			**0**	**24**	**0**	**0**	**0**	**27**	**7**	**5**	**0**	**9**	**32**	**0**	**0**	**59**
Manual rules executed which PASSED			0	24	0	0	0	0	0	0	0	0	0	0	0	59
Manual rules executed which FAILED			0	0	0	0	0	0	1	0	0	4	20	0	0	0

The **second version** of this Microsoft report is a version that I modified to include all the missing machine-readable rules that are used to verify that the report is correct[72]. That included roll forward and member aggregation rules and some consistency checks that were represented using XBRL Formula[73]:

[71] XBRL Cloud Evidence Package, Verification summary, http://xbrlsite.azurewebsites.net/2017/Prototypes/Microsoft2017/evidence-package/VerificationDashboard.html

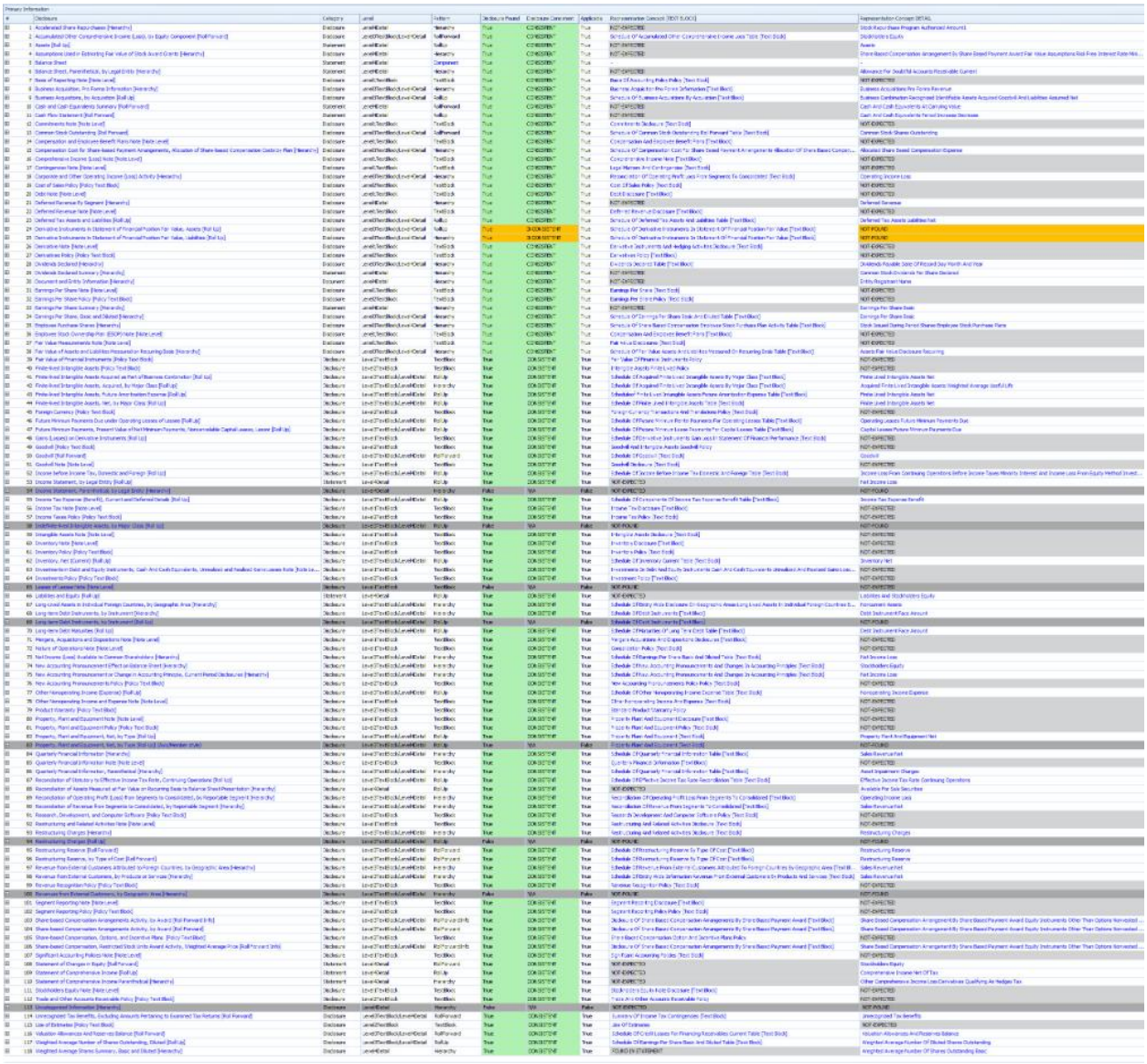
[72] Microsoft report modified to add missing machine-readable rules, http://xbrlsite.azurewebsites.net/2020/master/msft/index.html

[73] Human readable version of rules added, http://xbrlsite.azurewebsites.net/2020/master/msft/_XPE_instance.xml_Formula.html

MemberAggregation_MA09 (evaluation 1)	satisfied	$Total=6[illegible] eq sum($Each=[68[illegible] 1012[illegible] [illegible] 1287600[illegible]])
MemberAggregation_MA09 (evaluation 2)	satisfied	$Total=39961000000 eq sum($Each=[22819000000 8210000000 6854000000 2078000000])
MemberAggregation_MA09 (evaluation 3)	satisfied	$Total=36505000000 eq sum($Each=[19562000000 1595000000 8469000000 6879000000])
MemberAggregation_MA10a (evaluation 1)	satisfied	$Total=709000000 eq sum($Each=[239000000 470000000])
MemberAggregation_MA10a (evaluation 2)	satisfied	$Total=432000000 eq sum($Each=[59000000 373000000])
MemberAggregation_MA10b (evaluation 1)	satisfied	$Total=306000000 eq sum($Each=[0 306000000])
MemberAggregation_MA10c (evaluation 1)	satisfied	$Total=468000000 eq sum($Each=[367000000 101000000])
MemberAggregation_MA10d (evaluation 1)	satisfied	$Total=115000000 eq sum($Each=[36000000 79000000])
MemberAggregation_MA11_MAN (evaluation 1)	satisfied	$Total=8083000000 eq sum($Each=[2265000000 3607000000 2148000000 63000000])
MemberAggregation_MA11_MAN (evaluation 2)	satisfied	$Total=393000000 eq sum($Each=[2000000 30000000 0 361000000])
MemberAggregation_MA12 (evaluation 1)	satisfied	$Total=7887000000 eq sum($Each=[2148000000 3607000000 23000000 2109000000])
RollForward_AC01 (evaluation 1)	satisfied	$AccumulatedOtherComprehensiveIncomeLossNetOfTax_BalanceStart=1537000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1106000000 = $AccumulatedOtherComprehensiveIncomeLossNetOfTax_BalanceEnd=431000000
RollForward_AC02 (evaluation 1)	notSatisfied	$StockholdersEquity_BalanceStart=71997000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1106000000 = $StockholdersEquity_BalanceEnd=72394000000
RollForward_AC02 (evaluation 2)	notSatisfied	$StockholdersEquity_BalanceStart=80083000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-985000000 = $StockholdersEquity_BalanceEnd=71997000000
RollForward_AC02 (evaluation 3)	satisfied	$StockholdersEquity_BalanceStart=1537000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1106000000 = $StockholdersEquity_BalanceEnd=431000000
RollForward_AC02 (evaluation 4)	satisfied	$StockholdersEquity_BalanceStart=2522000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-985000000 = $StockholdersEquity_BalanceEnd=1537000000
RollForward_AC02 (evaluation 5)	satisfied	$StockholdersEquity_BalanceStart=3708000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1186000000 = $StockholdersEquity_BalanceEnd=2522000000
RollForward_AC02 (evaluation 6)	satisfied	$StockholdersEquity_BalanceStart=352000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-218000000 = $StockholdersEquity_BalanceEnd=134000000
RollForward_AC02 (evaluation 7)	satisfied	$StockholdersEquity_BalanceStart=590000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-238000000 = $StockholdersEquity_BalanceEnd=352000000
RollForward_AC02 (evaluation 8)	satisfied	$StockholdersEquity_BalanceStart=31000000 + $OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=559000000 = $StockholdersEquity_BalanceEnd=590000000

In addition, because I had only 70 disclosure mechanics rules for US GAAP, I had to add additional rules for the other disclosures that Microsoft made in their financial report which was about 124 disclosures. I added the difference[74]:

[74] Disclosure mechanics rules after adding all required for Microsoft, http://xbrlsite.azurewebsites.net/2020/Prototype/Microsoft/Microsoft2017_Discovery.jpg



Note that similar analysis was done for Apple, Facebook, Google, Amazon, and Salesforce[75]. Similar results were obtained for US GAAP[76] and IFRS[77] reports.

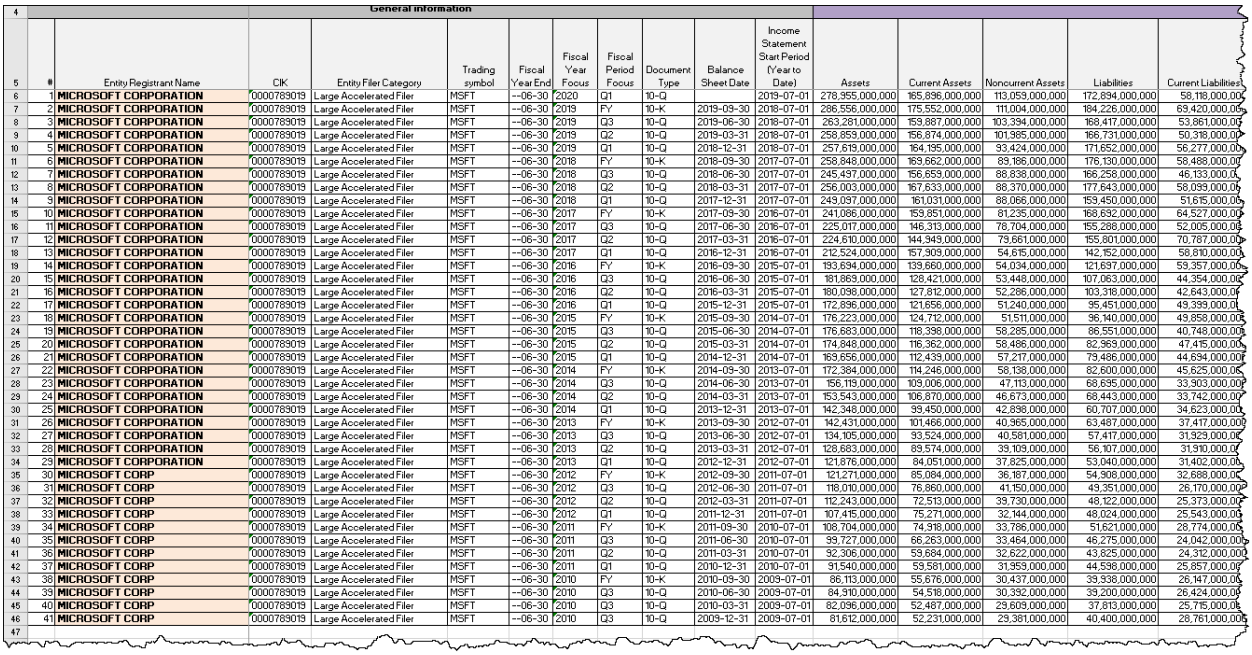
[75] Software Companies Analysis Prototype, http://xbrl.squarespace.com/journal/2020/4/2/software-companies-prototype.html

[76] US GAAP, http://xbrl.squarespace.com/journal/2018/7/28/us-gaap-test-data-2017-10-ks.html

[77] IFRS, http://xbrl.squarespace.com/journal/2018/7/14/updated-list-of-ifrs-filings.html

Analysis[78]

Ultimately, financial reports should be readable by automated machine-based processes which can effectively extract information from XBRL-based financial reports and make use of extracted information in some downstream process. A simple example of extracting information from reports is to use Microsoft Excel[79]. You can use that spreadsheet to extract high-level financial information from each XBRL-based financial report submitted to the SEC by Microsoft:



		General Information														
5	#	Entity Registrant Name	CIK	Entity Filer Category	Trading Symbol	Fiscal Year End	Fiscal Year Focus	Fiscal Period Focus	Document Type	Balance Sheet Date	Income Statement Start Period (Year to Date)	Assets	Current Assets	Noncurrent Assets	Liabilities	Current Liabilities
6	1	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2020	Q1	10-Q		2019-07-01	278,955,000,000	165,896,000,000	113,059,000,000	172,894,000,000	58,118,000,000
7	2	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2019	FY	10-K	2019-09-30	2018-07-01	286,556,000,000	175,552,000,000	111,004,000,000	184,226,000,000	69,420,000,000
8	3	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2019	Q3	10-Q	2019-06-30	2018-07-01	263,281,000,000	159,887,000,000	103,394,000,000	168,417,000,000	53,861,000,000
9	4	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2019	Q2	10-Q	2019-03-31	2018-07-01	258,859,000,000	156,874,000,000	101,985,000,000	166,731,000,000	50,318,000,000
10	5	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2019	Q1	10-Q	2018-12-31	2018-07-01	257,619,000,000	164,195,000,000	93,424,000,000	171,652,000,000	56,277,000,000
11	6	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2018	FY	10-K	2018-09-30	2017-07-01	258,848,000,000	169,662,000,000	89,186,000,000	176,130,000,000	58,488,000,000
12	7	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2018	Q3	10-Q	2018-06-30	2017-07-01	245,497,000,000	156,653,000,000	88,838,000,000	166,258,000,000	46,133,000,000
13	8	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2018	Q2	10-Q	2018-03-31	2017-07-01	256,003,000,000	167,633,000,000	88,370,000,000	177,643,000,000	58,099,000,000
14	9	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2018	Q1	10-Q	2017-12-31	2017-07-01	249,097,000,000	161,031,000,000	88,066,000,000	159,450,000,000	51,615,000,000
15	10	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2017	FY	10-K	2017-09-30	2016-07-01	241,086,000,000	159,851,000,000	81,235,000,000	168,692,000,000	64,527,000,000
16	11	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2017	Q3	10-Q	2017-06-30	2016-07-01	225,017,000,000	146,313,000,000	78,704,000,000	155,288,000,000	52,005,000,000
17	12	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2017	Q2	10-Q	2017-03-31	2016-07-01	224,610,000,000	144,349,000,000	79,661,000,000	155,801,000,000	70,787,000,000
18	13	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2017	Q1	10-Q	2016-12-31	2016-07-01	212,524,000,000	157,909,000,000	54,615,000,000	142,152,000,000	58,810,000,000
19	14	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2016	FY	10-K	2016-09-30	2015-07-01	193,694,000,000	139,660,000,000	54,034,000,000	121,697,000,000	59,357,000,000
20	15	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2016	Q3	10-Q	2016-06-30	2015-07-01	181,863,000,000	128,421,000,000	53,448,000,000	107,063,000,000	44,354,000,000
21	16	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2016	Q2	10-Q	2016-03-31	2015-07-01	180,098,000,000	127,812,000,000	52,286,000,000	103,318,000,000	42,643,000,000
22	17	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2016	Q1	10-Q	2015-12-31	2015-07-01	172,896,000,000	121,656,000,000	51,240,000,000	95,451,000,000	49,399,000,000
23	18	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2015	FY	10-K	2015-09-30	2014-07-01	176,223,000,000	124,712,000,000	51,511,000,000	96,140,000,000	49,858,000,000
24	19	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2015	Q3	10-Q	2015-06-30	2014-07-01	176,683,000,000	118,398,000,000	58,285,000,000	86,551,000,000	40,748,000,000
25	20	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2015	Q2	10-Q	2015-03-31	2014-07-01	174,848,000,000	116,362,000,000	58,486,000,000	82,969,000,000	47,415,000,000
26	21	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2015	Q1	10-Q	2014-12-31	2014-07-01	169,656,000,000	112,439,000,000	57,217,000,000	79,486,000,000	44,694,000,000
27	22	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2014	FY	10-K	2014-09-30	2013-07-01	172,384,000,000	114,246,000,000	58,138,000,000	82,600,000,000	45,625,000,000
28	23	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2014	Q3	10-Q	2014-06-30	2013-07-01	156,119,000,000	109,006,000,000	47,113,000,000	68,695,000,000	33,903,000,000
29	24	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2014	Q2	10-Q	2014-03-31	2013-07-01	153,543,000,000	106,870,000,000	46,673,000,000	68,443,000,000	33,742,000,000
30	25	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2014	Q1	10-Q	2013-12-31	2013-07-01	142,348,000,000	99,450,000,000	42,898,000,000	60,707,000,000	34,623,000,000
31	26	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2013	FY	10-K	2013-09-30	2012-07-01	142,431,000,000	101,466,000,000	40,965,000,000	63,487,000,000	37,417,000,000
32	27	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2013	Q3	10-Q	2013-06-30	2012-07-01	134,105,000,000	93,524,000,000	40,581,000,000	57,417,000,000	31,923,000,000
33	28	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2013	Q2	10-Q	2013-03-31	2012-07-01	128,683,000,000	89,574,000,000	39,109,000,000	56,107,000,000	31,910,000,000
34	29	MICROSOFT CORPORATION	0000789019	Large Accelerated Filer	MSFT	--06-30	2013	Q1	10-Q	2012-12-31	2012-07-01	121,876,000,000	84,051,000,000	37,825,000,000	53,040,000,000	31,402,000,000
35	30	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2012	FY	10-K	2012-09-30	2011-07-01	121,271,000,000	85,084,000,000	36,187,000,000	54,908,000,000	32,688,000,000
36	31	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2012	Q3	10-Q	2012-06-30	2011-07-01	118,010,000,000	76,860,000,000	41,150,000,000	43,351,000,000	26,170,000,000
37	32	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2012	Q2	10-Q	2012-03-31	2011-07-01	112,243,000,000	72,513,000,000	39,730,000,000	48,122,000,000	25,373,000,000
38	33	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2012	Q1	10-Q	2011-12-31	2011-07-01	107,415,000,000	75,271,000,000	32,144,000,000	48,024,000,000	25,543,000,000
39	34	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2011	FY	10-K	2011-09-30	2010-07-01	108,704,000,000	74,318,000,000	33,786,000,000	51,621,000,000	28,774,000,000
40	35	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2011	Q3	10-Q	2011-06-30	2010-07-01	99,727,000,000	66,263,000,000	33,464,000,000	46,275,000,000	24,042,000,000
41	36	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2011	Q2	10-Q	2011-03-31	2010-07-01	92,306,000,000	59,684,000,000	32,622,000,000	43,825,000,000	24,312,000,000
42	37	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2011	Q1	10-Q	2010-12-31	2010-07-01	91,540,000,000	59,581,000,000	31,959,000,000	44,538,000,000	25,857,000,000
43	38	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2010	FY	10-K	2010-09-30	2009-07-01	86,113,000,000	55,676,000,000	30,437,000,000	39,938,000,000	26,147,000,000
44	39	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2010	Q3	10-Q	2010-06-30	2009-07-01	84,310,000,000	54,518,000,000	30,392,000,000	39,200,000,000	26,424,000,000
45	40	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2010	Q3	10-Q	2010-03-31	2009-07-01	82,096,000,000	52,487,000,000	29,609,000,000	37,813,000,000	25,715,000,000
46	41	MICROSOFT CORP	0000789019	Large Accelerated Filer	MSFT	--06-30	2010	Q3	10-Q	2009-12-31	2009-07-01	81,612,000,000	52,231,000,000	29,381,000,000	40,400,000,000	28,761,000,000
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This blog post[80] provides a number of similar extraction tools that effectively pulls information from a total of 4,060 public company XBRL-based reports, about 68% of all public companies, using 13 different reporting styles (a.k.a. primary financial statement reporting models).

[78] Analysis, http://xbrlsite.azurewebsites.net/2020/master/explore/

[79] Extract information from all Microsoft reports, http://xbrlsite.azurewebsites.net/2017/Prototypes/Microsoft2017/Extract.zip

[80] Further Updated and Expanded XBRL-based Financial Report Extraction Tools, http://xbrl.squarespace.com/journal/2018/1/11/further-updated-and-expanded-xbrl-based-financial-report-ext.html

- COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC6: 1,642 public companies
- COMID-BSC-CF1-ISS-IEMIB-OILY-SPEC1: 714 public companies
- COMID-BSC-CF1-ISS-IEMIB-OILY-SPEC2: 653 public companies
- INTBX-BSU-CF1-ISS-IEMIX-OILN: 416 public companies
- COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC9: 143 public companies
- COMID-BSC-CF1-IS3-IEMIB-OILN: 83 public companies
- INSBX-BSU-CF1-ISS-IEMIX-OILN: 94 public companies
- COMID-BSC-CF1-IS6-IEMIX-OILN: 79 public companies
- COMID-BSC-CF1-IS4-IEMIB-OILN: 41 public companies
- **Total provided**: 3,865 public companies (65% of all public companies)
- COMID-BSC-CF1-ISS-IEMIT-OILY-SPEC2: 38 public companies
- COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC6-SCI2: 37 public companies
- COMID-BSC-CF1-ISS-IEMIB-OILY-SPEC2A: 64 public companies
- COMID-BSC-CF1-IS8-IEMIB-OILN: 56 public companies
- **Net total provided**: 4,060 public companies (68% of all public companies)

Explore![81] provides a Microsoft Access database application that points to 109,778 XBRL-based financial reports from 3,600 public companies that use 17 different US GAAP reporting styles to submit information to the SEC. Information is effectively extracted from each report.

Proof

LinkToXBRLInstance	Assets	LiabilitiesAndEquity	BalanceSheetBalances	DocumentPeriodEndDate_Value	DocumentPeriodEndDate_ContextEndDateValue	DPED_Consistency	EntityRegistrantName
https://www.sec.gov/Archives/edgar/data/1084869/000143774920009975/flws-20200329.xml	748629000	748629000	0	2020-03-29	2020-03-29	Consistent	1 800 FLOWERS COM INC
https://www.sec.gov/Archives/edgar/data/1084869/000143774920002005/flws-20191229.xml	826220000	826220000	0	2019-12-29	2019-12-29	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774919022111/flws-20190929.xml	664955000	664955000	0	2019-09-29	2019-09-29	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774919018360/flws-20190630.xml	606440000	606440000	0	2019-06-30	2019-06-30	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774919009426/flws-20190331.xml	614948000	614948000	0	2019-03-31	2019-03-31	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774919002107/flws-20181230.xml	685461000	685461000	0	2018-12-30	2018-12-30	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774918020205/flws-20180930.xml	540605000	540605000	0	2018-09-30	2018-09-30	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774918017027/flws-20180701.xml	570889000	570889000	0	2018-07-01	2018-07-01	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774918009561/flws-20180401.xml	570353000	570353000	0	2018-04-01	2018-04-01	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774918002143/flws-20171231.xml	648763000	648763000	0	2017-12-31	2017-12-31	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774917018857/flws-20171001.xml	512333000	512333000	0	2017-10-01	2017-10-01	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774917015969/flws-20170702.xml	552470000	552470000	0	2017-07-02	2017-07-02	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774917008869/flws-20170402.xml	539798000	539798000	0	2017-04-02	2017-04-02	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774917002102/flws-20170101.xml	619000000	619000000	0	2017-01-01	2017-01-01	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774916041919/flws-20161002.xml	602663000	602663000	0	2016-10-02	2016-10-02	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774916038804/flws-20160703.xml	506514000	506514000	0	2016-07-03	2016-07-03	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774916031049/flws-20160327.xml	536570000	536570000	0	2016-03-27	2016-03-27	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774916024828/flws-20151227.xml	635342000	635342000	0	2015-12-27	2015-12-27	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774915020024/flws-20150927.xml	605151000	605151000	0	2015-09-27	2015-09-27	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774915017184/flws-20150628.xml	501946000	501946000	0	2015-06-28	2015-06-28	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774915009451/flws-20150329.xml	513157000	513157000	0	2015-03-29	2015-03-29	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774915002005/flws-20141228.xml	594092000	594092000	0	2014-12-28	2014-12-28	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774914019974/flws-20140928.xml	314446000	314446000	0	2014-09-28	2014-09-28	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774914016921/flws-20140629.xml	267569000	267569000	0	2014-06-29	2014-06-29	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774914008519/flws-20140330.xml	260985000	260985000	0	2014-03-30	2014-03-30	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000143774914001715/flws-20131229.xml	283713000	283713000	0	2013-12-29	2013-12-29	Consistent	1 800 FLOWERS COM INC
http://www.sec.gov/Archives/edgar/data/1084869/000110465913082760/flws-20130929.xml	301679000	301679000	0	2013-09-29	2013-09-29	Consistent	1 800 FLOWERS COM INC

You can use the Explore! database application to extract the concepts "assets" and "liabilities and equity" from all 109,778 XBRL-based reports and get a difference of only $20. Why the difference? Read the Explore! documentation, that is explained.

[81] Explore!, http://xbrl.squarespace.com/journal/2020/6/14/explore.html

Compare and Contrast

This document focuses on one representation at a time and provides only certain specific information about each representation that is shown above. The following four documents focus on the terms[82], associations[83], structures[84], and rules[85] of each representation so that a reader can compare and contrast these different representations more effectively.

Testing

Testing of each of the representations shown was performed using four different software applications:

- Pesseract[86]
- XBRL Cloud[87]
- Pacioli (Logical Contracts)[88]
- XBRL Query[89]

[82] Terms, http://xbrlsite.azurewebsites.net/2020/master/Terms.pdf
[83] Associations, http://xbrlsite.azurewebsites.net/2020/master/Associations.pdf
[84] Structures, http://xbrlsite.azurewebsites.net/2020/master/Structures.pdf
[85] Rules, http://xbrlsite.azurewebsites.net/2020/master/Rules.pdf
[86] Pesseract, http://xbrlsite.azurewebsites.net/2020/master/Pesseract.html
[87] XBRL Cloud, http://xbrlsite.azurewebsites.net/2020/master/XBRLCloud.html
[88] Pacioli (Logical Contracts), http://xbrlsite.azurewebsites.net/2020/master/Pacioli.html
[89] XBRL Query, http://xbrlsite.azurewebsites.net/2020/master/XBRLQuery.html