Gentle and Cheap Introduction to XBRL-based Digital Financial Reporting[1]

By Charles Hoffman, CPA (December 8, 2020)

This document helps professional accountants and auditors get an approachable, gentle, cheap, hands on introduction to XBRL-based digital financial reporting that serves as a foundation for expanding their knowledge about XBRL-based accounting, reporting, auditing, and analysis.

This introduction will evolve over time.

In this tutorial we will use two extremely simple and fundamental financial reporting artifacts to provide you with a solid big picture and the critically important details of XBRL-based financial reporting: the **accounting equation** and SFAC 6's ***Elements of Financial Statements***. Believe it or not, but you can easily get a rock-solid grounding using these two foundational artifacts of financial reporting. We will start with the accounting equation.

But first, let us quickly introduce a handful of important jargon we need in order to communicate some information effectively.

Logical Theory

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

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

- **Model**: A *model*[2] is a set of structures that are consistent with and permissible interpretations of that model.

- **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 to which the logical theory relates. There are four broad categories of statements:

  - **Terms**: Terms are statements that define ideas used by the logical theory such as "assets", "liabilities", "equity", and "balance sheet".

  - **Associations**: Associations are statements that describe permissible interrelationships between the terms such as "assets is part-of the balance

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[1] Gentle and Cheap Introduction to XBRL-based Financial Reporting, http://xbrlsite.azurewebsites.net/2020/introduction/index.html

[2] Wikipedia, *Model Theory*, https://en.wikipedia.org/wiki/Model_theory

sheet" or "operating expenses is a type-of expense" 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 is permissible per the logical system and other constraints. For example, "Assets = Liabilities + Equity" is an example of a consistency type rule.

- **Facts**: Facts are statements about the numbers and words that are provided by an economic entity within a business report. For example, the financial report, a type of business report, might state "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.

Fundamentally, a logical theory is a set of statements. Those statements can be represented in machine-readable form. Once in machine-readable form, those statements can be interrogated using software applications. To the extent that this can be done effectively; software tools can assist professional accountants and others working with those statements.

An XBRL-based financial report is a machine-readable version of what has historically been represented on paper. Humans can interpret that paper, computers cannot. A logical theory can be used to break up the pieces of a financial report into ideas that can be explained to humans (to see if they agree with the theory) and to computers (to see if they understand the financial report).

Don't worry about any more of an explanation about logical theories for now; we will get to that in latter documentation (i.e. not here). For now, focus on the **mechanical aspects** of the tasks you are performing. We will enhance the conceptual understanding later. The more a theory passes the test of use; the more seriously the theory can be taken over time. Or, the theory can be improved to make the theory better.

Accounting Equation

The double-entry accounting model and the accounting equation provide the very foundation of financial reporting. There are many different sources for the accounting equation, but I will use Wikipedia's version[3], of the accounting equation:

Assets = Liabilities + Equity

As Wikipedia points out, that fundamental accounting equation, also called the balance sheet equation, represents the relationship between the line items assets, liabilities, and equity of an economic entity. It is the foundation for the double-entry bookkeeping system. For each transaction, the total debits equal the total credits.

So, breaking the accounting equation down, what do we see? Well, we see the following:

- We have three **terms**: Assets, Liabilities, Equity.
- Those terms work together to create a **structure**, the Balance Sheet.
- We have a **rule** which explains the mathematical association between the three terms: "Assets = Liabilities + Equity".
- Economic entities use the terms (Assets, Liabilities, Equity), the structure (Balance Sheet), and rule (Assets = Liabilities + Equity) to report **facts** about their particular economic entity.

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[3] Wikipedia, Accounting Equation, https://en.wikipedia.org/wiki/Accounting_equation

- The *terms*, *structure*, *rule*, and *facts* work together to provide a financial **model** of the economic entity.
- That model is effectively used to represent a set of **logical statements** about the assets, liabilities, and equity of an economic entity at some point in time.

In the past, these logical statements about the financial information of some economic entity were represented on clay tablets, papyrus, paper. Now, in the information age, we can represent that same information in a computer readable form with the help of the XBRL structured format. The really good thing is that you need to understand exactly NOTHING about that XBRL technical format. Why? Because properly created software applications hide the technical details from you so that you can focus on the logic of representing financial information.

To understand how all this works, we will use a free, very basic software application to create a complete XBRL-based report for the accounting equation. We will be walking you through this using the software application called **Luca**[4]. You can use whatever software you might desire to use.

Download and install Luca or whatever software application you choose to make use of. We will walk you through the process using Luca, showing each step you will perform.

Representing the Accounting Equation Using XBRL

Before starting this tutorial, be sure to clear out any other information in the application by selecting "File", then "New", and then "Model" from the menu ribbon. Confirm that you want to delete the model information which will also delete all report information in the Luca application.

We are trying to keep this tutorial as simple as possible. We encourage you to follow each step exactly in order to get the most out of this tutorial. We will build on this foundation in further tutorials that increase in complexity.

As an alternative to using the Luca application, a Microsoft Access database application is provided for each example which can be used to generate the XBRL model and report. In this first example we will walk you through the example using Luca. In the second we will walk you through using the Microsoft Access database.
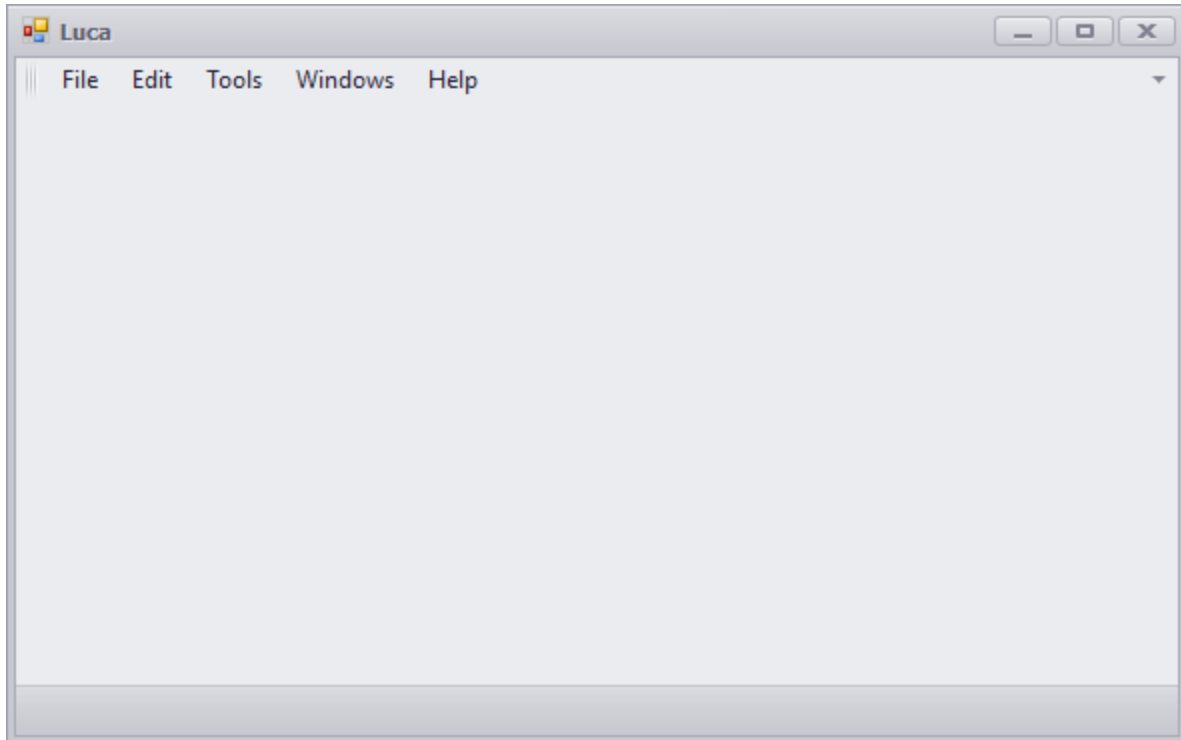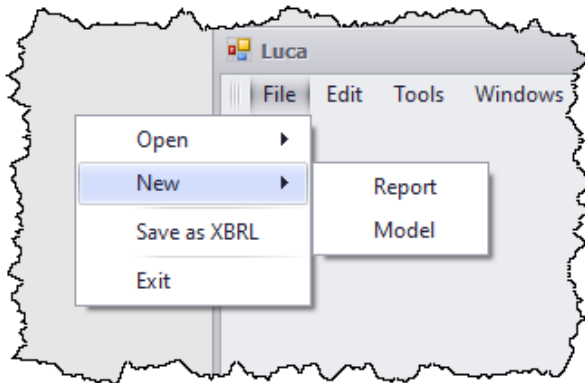
Here we go!

Step 1: Starting the application.
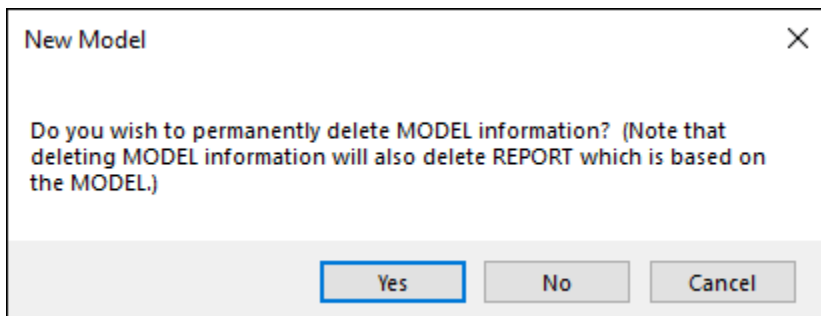
Open Luca. You should see the following.

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[4] Luca, http://xbrl.squarespace.com/journal/2020/9/15/luca.html

From the menu ribbon select "File", then "New", and then "Model".

A dialog box will appear and ask you to confirm that you want to delete any existing model which would also delete any reports that you have created. Select "Yes" to clear out what is stored in the application.

Step 1: Enter base information.

Select "Edit" and then "Base Information". The Base Information form will appear. Enter the base information that will be used by the XBRL taxonomy and XBRL report:

Base Information	
NamespaceIdentifier	http://www.xbrlsite.com/ae
NamespacePrefix	ae
TaxonomyDescription	Accounting Equation
TaxonomyFileNameBase	ae
UseXBRLDimensions	YES

Your information should look exactly as what appears above.

Step 2: Enter term information.

Select "Edit" and then "Terms". The Terms form will appear. Enter term information. When you begin, your form will look like this:

Category	Standard Label	Prefix	Name	Data Type	Balance Type	Period Type

After you have finished entering your terms for the accounting equation XBRL taxonomy, your term information for the accounting equation XBRL taxonomy should look like this:

Category	Standard Label	Prefix	Name	Data Type	Balance Type	Period Type
Concept	Assets	ae	Assets	Monetary	Debit	Instant
Concept	Liabilities	ae	Liabilities	Monetary	Credit	Instant
Concept	Equity	ae	Equity	Monetary	Credit	Instant
Abstract	Balance Sheet [Set]	ae	BalanceSheetSet			

Close the terms form by pressing the "x" in the upper right-hand corner.

Step 2: Enter label information.

Select "Edit" and then "Labels" from the menu ribbon. The Labels form will appear. We already entered the labels we need when we entered the terms above, note the "Standard Label" which is always required. So, we will skip entering any additional labels and move on.

Term	Language	Label Role	Label
▼			

Close the labels form.

Step 3: Enter structure information.

Select "Edit" and then "Structures" from the menu ribbon. The Structures form will appear. When you begin, your form will look like this:

Identifier	Title	Sequence

After you have finished entering your structures for the accounting equation XBRL taxonomy, your structure information for your accounting equation XBRL taxonomy should look like this:

Identifier	Title	Sequence
BalanceSheet	01 - Balance Sheet	1

Close the structures form.

Step 4: Enter associations information.

Select "Edit" and then "Associations" from the menu ribbon. The Associations form will appear. When you begin, your form will look like this:

Associations								✕
Drag a column header here to group by that column								
	Structure Type	Network Identifier	Association From Name	Association Role	Association To Name	Calculation Polarity	Preferred Label Role	Sequence
✱								

After you have finished entering your associations for the accounting equation XBRL taxonomy, your associations information for your accounting equation XBRL taxonomy should look like this:

Associations								✕
Drag a column header here to group by that column								
	Structure Type	Network Identifier	Association From N...	Association Role	Association To Name	Calculation Polarity	Preferred Label Role	Sequence
	Presentation	BalanceSheet	ae:BalanceSheetSet	Parent-Child	ae:Assets			1
	Presentation	BalanceSheet	ae:BalanceSheetSet	Parent-Child	ae:Liabilities			2
	Presentation	BalanceSheet	ae:BalanceSheetSet	Parent-Child	ae:Equity			3
▶								

Close the associations form.

Step 4: Enter rules information.

Select "Edit" and then "Rules" and then "Consistency" from the menu ribbon. The Rules form will appear. When you begin, your form will look like this:

Rules							✕
Drag a column header here to group by that column							
	Rule Type	Rule Code	Rule	Network	Concept	Sequence	Commentary
✱							

After you have finished entering your rules for the accounting equation XBRL taxonomy, your rules information for your accounting equation XBRL taxonomy should look like this:

Rules							✕
Drag a column header here to group by that column							
	Rule Type	Rule Code	Rule	Network	Concept	Sequence	Commentary
▶ ⊟	Consistency ▾	BS1	$Assets = $Liabilities + $Equity	BalanceSheet	ae:Assets	1	
	🔍 Variable Name						
	ae:Assets						
	ae:Liabilities						
▶	ae:Equity						
✱							

IMPORTANT NOTE!!! If you copy/paste the rule into the Luca application from the Excel spreadsheet, you will need to enter the three variables.

Close the rules form.

Step 5: Entering facts

Select "Edit" and then "Facts" from the menu ribbon. The Facts form will appear. When you begin, your form will look like this:

Facts							×
Save							
Reporting Entity Aspect	Calendar Period Aspect	ConceptAspect	Fact Value	Units	Rounding	Sequence	
✳							

After you have finished entering your facts for the accounting equation report, your facts information in your accounting equation REPORT should look like this:

Facts						×
Save						
Reporting Entity Aspect	Calendar Period Aspect	ConceptAspect	Fact Value	Units	Rounding	Sequence
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	ae:Assets	1000	iso4217:USD	-3	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	ae:Liabilities	500	iso4217:USD	-3	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	ae:Equity	500	iso4217:USD	-3	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	ae:Assets	10000	iso4217:USD	-3	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	ae:Liabilities	5000	iso4217:USD	-3	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	ae:Equity	5000	iso4217:USD	-3	
▶						

IMPORTANT NOTE!!! Notice the "Save" button above the facts that where entered. Be sure to press that "Save" button or the facts will not be saved by the application.

Step 5: Generate your XBRL taxonomy schema, XBRL linkbases, and XBRL instance.

Select "File" and then "Save as XBRL" then a standard Windows form will appear that will allow you to save your XBRL taxonomy files. Enter "ae.xsd" into the File name field:

Several XBRL files will be generated that contain the information that you entered into the Luca application. If you go to the subdirectory where you stored those files you should see the following:

Step 5: Verify your XBRL files.

Finally, we will want to verify that the XBRL taxonomy that we created was consistent with the XBRL technical specification. Luca does not perform XBRL validation. You can use any off-the-shelf XBRL processor to verify that your XBRL is correct. Arelle[5] is a free, open source, but rather technical XBRL processor. Below you can see what your XBRL taxonomy looks like in a technical oriented tool. Note that if you load the XBRL instance (i.e. the file ae.xbrl) the XBRL taxonomy files will be automatically loaded also.

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[5] Arelle.org, https://arelle.org/arelle/
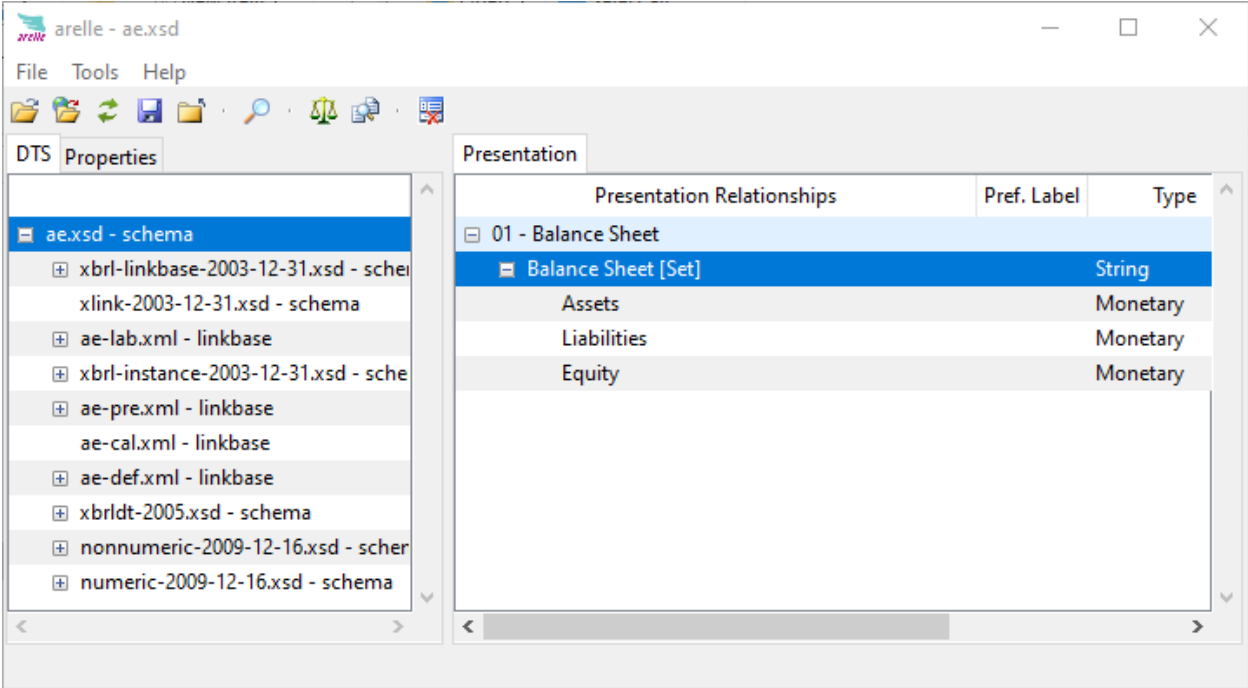
Step 6: Examining the End Result.

XBRL Cloud provides a handy mechanism for humans who need to work with XBRL-based financial reports on their terms. The XBRL Cloud Evidence Package is a set of HTML pages that you can use to investigate an XBRL-based report. Here is what the human readable version looks like[6]:

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

Try clicking on terms and numbers and notice how the XBRL Cloud Evidence Package works.

Another tool for working with XBRL-based reports is Pesseract[7]. Below you see the technical perspective of the XBRL taxonomy that you created for the accounting equation:

This is what your XBRL instance looks like:
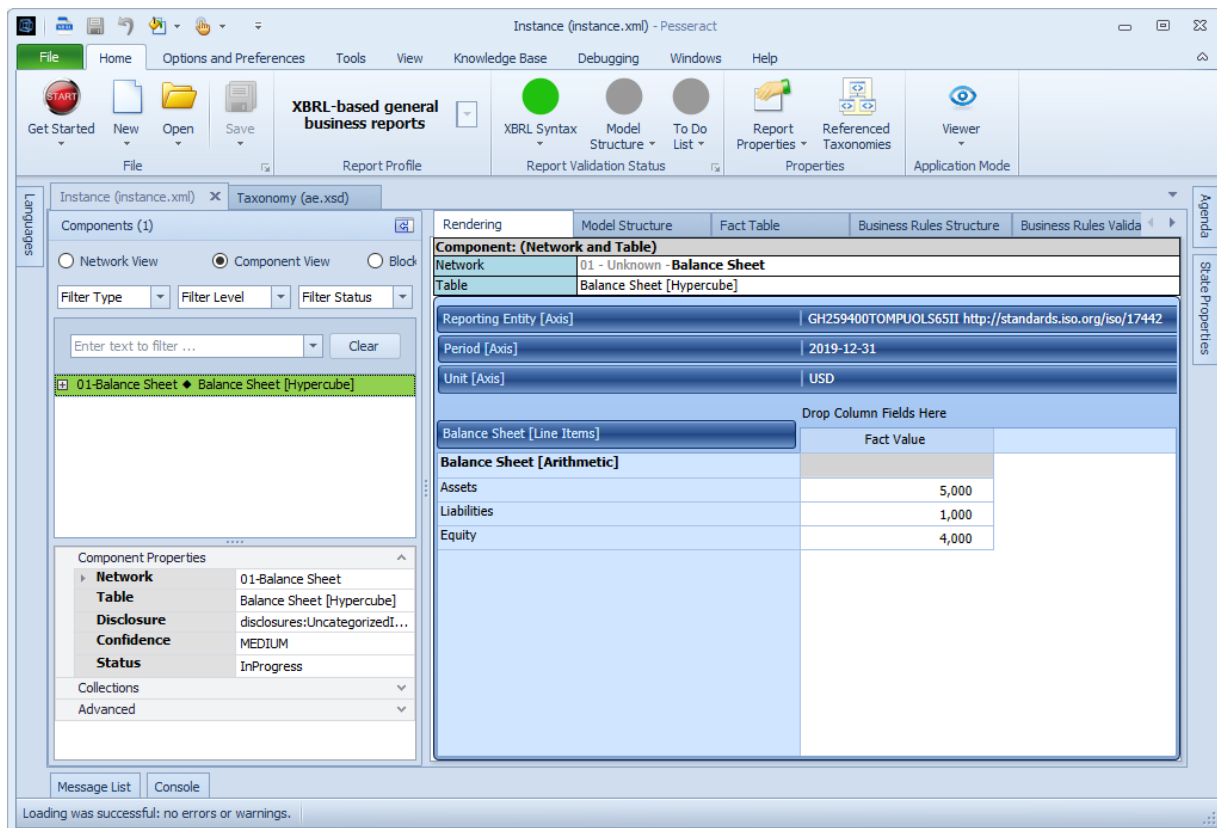
Notice how you can effectively use many different software tools to work with XBRL-based financial reports. This is because the XBRL technical syntax is a global standard supported by many different software vendors.

Terms and Rules

So, the notions of Terms and Rules should be pretty clear to you. As we pointed out; Assets, Liabilities, and Equity are three Terms we used in the accounting equation example. The rule "Assets = Liabilities + Equity" explains the mathematical association between the three terms.

As we will see next, Structures offer a mechanism for having flexibility.

Understanding Structures by Representing Net Assets

We want to introduce you to the notion of **structures** in more detail using another version of the accounting equation. As you know, not all economic entities us the rule: Assets = Liabilities + Equity.

Using the rules of mathematics, that rule can be change to: Equity = Assets - Liabilities. More commonly, the term "Net Assets" is used instead of "Equity" in this situation, and so we have another approach to representing the accounting equation:

Net Assets = Assets - Liabilities

To keep the two different sets of terms and rules apart which have different associations, we need some sort of mechanism. That mechanism is the Structure. A Structure is comprised of a set of logical statements which describe the Structure. Those statements are in the form of terms, associations between the terms, and rules.

While the terms Assets, Liabilities, and Equity are part of the **balance sheet structure**; the terms Assets, Liabilities, and Net Assets are part of the statement of **net assets structure**. We already pointed out the two different rules that represent the mathematical associations between the two different structures. An economic entity might use a balance sheet structure or perhaps a statement of net assets structure. Reporting economic entities tend to report either a balance sheet or a statement of net assets.

Building on our accounting equation example, we can add a second structure and get the following[8]:

Line	Label	Object Class	Period Type	Balance	Report ElementName
1	01-Balance Sheet	Network			http://www.xbrlsite.com/ae/role/BalanceSheet
2	Balance Sheet [Arithmetic]	Abstract			ae:BalanceSheetArithmetic
3	Assets	Concept (Monetary)	As Of	Debit	ae:Assets
4	Liabilities	Concept (Monetary)	As Of	Credit	ae:Liabilities
5	Equity	Concept (Monetary)	As Of	Credit	ae:Equity
6	02-Statement of Net Assets	Network			http://www.xbrlsite.com/ae/role/StatementOfNetAssets
7	Net Assets [Roll Up]	Abstract			ae:NetAssetsRollUp
8	Assets	Concept (Monetary)	As Of	Debit	ae:Assets
9	Liabilities	Concept (Monetary)	As Of	Credit	ae:Liabilities
10	Net Assets	Concept (Monetary)	As Of	Debit	ae:NetAssets

We are not going to work through constructing this example; you can work through that on your own if you like. This is very similar to the accounting equation except that you have two structures rather than one, the terms used are different, and the rules for each structure are different.

Important Subtle Difference Between Net Assets and Equity

There is a very subtle but important difference between the term Net Assets and the term Equity. While Equity is a CREDIT balance; Net Assets has the balance type of DEBIT. See the graphic above. This mimics how these two terms are used in the real world. Just be aware of this subtle difference.

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[8] Accounting Equation, Net Assets Approach, http://xbrlsite.azurewebsites.net/2020/introduction/ae-na/index.html

SFAC 6 Elements of Financial Statements

We are going to add a bit more complexity by moving to the FASB's SFAC 6[9] Elements of Financial Statements example. On page 12 you see the 10 elements that serve as the building blocks of financial statements: (i.e. **Terms**)

- Assets,
- Liabilities,
- Equity (or Net Assets),
- Revenues,
- Expenses,
- Gains,
- Losses,
- Investments by Owners,
- Distributions to Owners, and
- Comprehensive Income.

In addition, three **Rules** are explicitly or implicitly defined:

- Assets = Liabilities + Equity
- Comprehensive Income = Revenues - Expenses + Gains - Losses
- Ending Equity = Beginning Equity + Comprehensive Income + Investments by Owners - Distributions to Owners

Finally, three **Structures** are explicitly or implicitly defined:

- Balance sheet
- Income statement
- Statement of Changes in Equity

The final result you are working toward in the creation of this SFAC 6 representation in XBRL[10] provides a Microsoft Access database application that has all the terms, rules, and structures represented. You can examine that representation and/or work through the creation of the above information using Luca again. We will now walk you through completing this in Luca:

Step 1: Enter base information.

Select "Edit" and then "Base Information". The Base Information form will appear. Enter the base information that will be used by the XBRL taxonomy:

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[9] FASB, *Statement of Financial Accounting Concepts No. 6*, page 12, https://www.fasb.org/pdf/con6.pdf
[10] SFAC 6 representation, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/index.html

Base Information

NamespaceIdentifier	http://www.xbrlsite.com/sfac6
NamespacePrefix	sfac6
TaxonomyDescription	SFAC6
TaxonomyFileNameBase	sfac6
UseXBRLDimensions	YES

Step 2: Enter term information.

Select "Edit" and then "Terms". The Terms form will appear. Enter term information. When you begin, your form will look like this:

Terms

File

Drag a column header here to group by that column

Category	Standard Label	Prefix	Name	Data Type	Balance Type	Period Type
▼						

After you have finished entering your terms for the SFAC 6 XBRL taxonomy, your term information for the XBRL taxonomy should look like this:

Terms

Drag a column header here to group by that column

Category	Standard Label	Prefix	Name	Data Type	Balance Type	Period Type
Concept ▼	Assets	sfac6	Assets	Monetary	Debit	Instant
Concept	Liabilities	sfac6	Liabilities	Monetary	Credit	Instant
Concept	Equity	sfac6	Equity	Monetary	Credit	Instant
Concept	Comprehensive Income	sfac6	ComprehensiveIncome	Monetary	Credit	Duration
Concept	Investments by Owner	sfac6	InvestmentsByOwner	Monetary	Credit	Duration
Concept	Distributions to Owner	sfac6	DistributionsToOwner	Monetary	Debit	Duration
Concept	Revenues	sfac6	Revenues	Monetary	Credit	Duration
Concept	Expenses	sfac6	Expenses	Monetary	Debit	Duration
Concept	Gains	sfac6	Gains	Monetary	Credit	Duration
Concept	Losses	sfac6	Losses	Monetary	Debit	Duration
Abstract	Balance Sheet [Set]	sfac6	BalanceSheetSet			
Abstract	Comprehensive Income [Roll Up]	sfac6	ComprehensiveIncomeRollUp			
Abstract	Changes in Equity [Roll Forward]	sfac6	ChangesInEquityRollForward			
*						

Alternatively, you can copy information from Excel and then paste it into the TERMS form.

Step 3: Enter label information.

Select "Edit" and then "Labels" from the menu ribbon. Before you enter any information, the labels form will look as follows:

Labels				✕
Drag a column header here to group by that column				
Term	**Language**	**Label Role**	**Label**	
▸				

After you have finished entering your label information for the SFAC 6 XBRL taxonomy, your labels information for SFAC 6 should look like this:

Labels				✕
Drag a column header here to group by that column				
Term	**Language**	**Label Role**	**Label**	
sfac6:Equity	English	PeriodStart	Beginning Balance	
sfac6:Equity	English	PeriodEnd	Ending Balance	
sfac6:DistributionsToOwner	English	Negated	(Distributions to Owner)	
sfac6:Expenses	English	Negated	(Expenses)	
sfac6:Losses	English	Negated	(Losses)	
▸				

Again, alternatively this information can be copied and then pasted from Excel.

Step 3: Enter structure information.

Select "Edit" and then "Structures" from the menu ribbon. Before you enter any information, the structures form will look as follows:

Structures			✕
Drag a column header here to group by that column			
Identifier	**Title**	**Sequence**	
＊			

After you have finished entering your structures for the SFAC 6 XBRL taxonomy, your structure information for the XBRL taxonomy should look like this:

Identifier	Title	Sequence
▶ BalanceSheet	01-Balance Sheet	1
ComprehensiveIncome	03-Comprehensive Income	2
ChangesInEquity	07-Changes in Equity	3
✳		

Again, alternatively this information can be copied/pasted from Excel.

Step 4: Enter associations information.

Select "Edit" and then "Associations" from the menu ribbon. Before you enter any information, the associations form will look as follows:

Structure Type	Network Identifier	Association From Name	Association Role	Association To Name	Calculation Polarity	Preferred Label Role	Sequence
▶ ▾							

After you have finished entering your associations for the SFAC 6 XBRL taxonomy, your associations information for the XBRL taxonomy should look like this:

Structure Type	Network Identifier	Association From Name	Association Role	Association To Name	Calculation Polarity	Preferred Label Role	Sequence
▶ Presentation ▾	BalanceSheet	sfac6:BalanceSheetSet	Parent-Child	sfac6:Assets			1
Presentation	BalanceSheet	sfac6:BalanceSheetSet	Parent-Child	sfac6:Liabilities			2
Presentation	BalanceSheet	sfac6:BalanceSheetSet	Parent-Child	sfac6:Equity			3
Presentation	ComprehensiveIncome	sfac6:ComprehensiveIncomeRollUp	Parent-Child	sfac6:Revenues			4
Presentation	ComprehensiveIncome	sfac6:ComprehensiveIncomeRollUp	Parent-Child	sfac6:Expenses			5
Presentation	ComprehensiveIncome	sfac6:ComprehensiveIncomeRollUp	Parent-Child	sfac6:Gains			6
Presentation	ComprehensiveIncome	sfac6:ComprehensiveIncomeRollUp	Parent-Child	sfac6:Losses			7
Presentation	ComprehensiveIncome	sfac6:ComprehensiveIncomeRollUp	Parent-Child	sfac6:ComprehensiveIncome			8
Presentation	ChangesInEquity	sfac6:ChangesInEquityRollForward	Parent-Child	sfac6:Equity		PeriodStart	1
Presentation	ChangesInEquity	sfac6:ChangesInEquityRollForward	Parent-Child	sfac6:ComprehensiveIncome			2
Presentation	ChangesInEquity	sfac6:ChangesInEquityRollForward	Parent-Child	sfac6:InvestmentsByOwner			3
Presentation	ChangesInEquity	sfac6:ChangesInEquityRollForward	Parent-Child	sfac6:DistributionsToOwner			4
Presentation	ChangesInEquity	sfac6:ChangesInEquityRollForward	Parent-Child	sfac6:Equity		PeriodEnd	5
Calculation	ComprehensiveIncome	sfac6:ComprehensiveIncome	Total-Item	sfac6:Revenues	Add		1
Calculation	ComprehensiveIncome	sfac6:ComprehensiveIncome	Total-Item	sfac6:Expenses	Subtract		2
Calculation	ComprehensiveIncome	sfac6:ComprehensiveIncome	Total-Item	sfac6:Gains	Add		3
Calculation	ComprehensiveIncome	sfac6:ComprehensiveIncome	Total-Item	sfac6:Losses	Subtract		4
✳							

Again, alternatively this information can be copied/pasted from Excel.

Step 5: Enter rules information.

Select "Edit" and then "Rules" and then "Consistency" from the menu ribbon. Before you enter any information, the rules form will look as follows:

After you have finished entering your rules for the SFAC 6 XBRL taxonomy, your rules information for the XBRL taxonomy should look like this:

IMPORTANT NOTE!!! If you copy/paste the rule into the Luca application from the Excel spreadsheet, you will need to enter the three variables.

Close the rules form.

Step 6: Enter facts information.

Select "Edit" and then "Facts" from the menu ribbon. Before you enter any information, the facts form will look as follows:

After you have finished entering your facts the SFAC 6 report, your form should look like this:

Luca

File   Edit   Tools   Windows   Help

Facts

Save

Reporting Entity Aspect	Calendar Period Asp...	ConceptAspect	Fact Value	Units	Rounding	Sequence
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2019-12-31	sfac6:Assets	0	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	sfac6:Assets	3500	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2019-12-31	sfac6:Liabilities	0	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	sfac6:Liabilities	0	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2019-12-31	sfac6:Equity	0	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-12-31	sfac6:Equity	3500	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:Revenues	7000	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:Expenses	3000	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:Gains	1000	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:Losses	2000	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:DistributionsToOwner	500	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:InvestmentsByOwner	1000	iso4217:USD	INF	
⊞ GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2020-01-01 | 2020-1...	sfac6:ComprehensiveIncome	3000	iso4217:USD	INF	

IMPORTANT NOTE!!! Notice the "Save" button above the facts that where entered. Be sure to press that "Save" button or the facts will not be saved by the application.

Step 7: Generate your XBRL taxonomy schema, linkbases, and XBRL instance.

After you have successfully entered all your term, label, structure, association, and rule information; then you can generate your XBRL taxonomy. This will include the XBRL taxonomy schema and the XBRL linkbases that will support your report.

To generate the XBRL taxonomy information, from the menu ribbon select "File" and then "Save as XBRL". The following standard Windows dialog box will appear which will let you save your file.
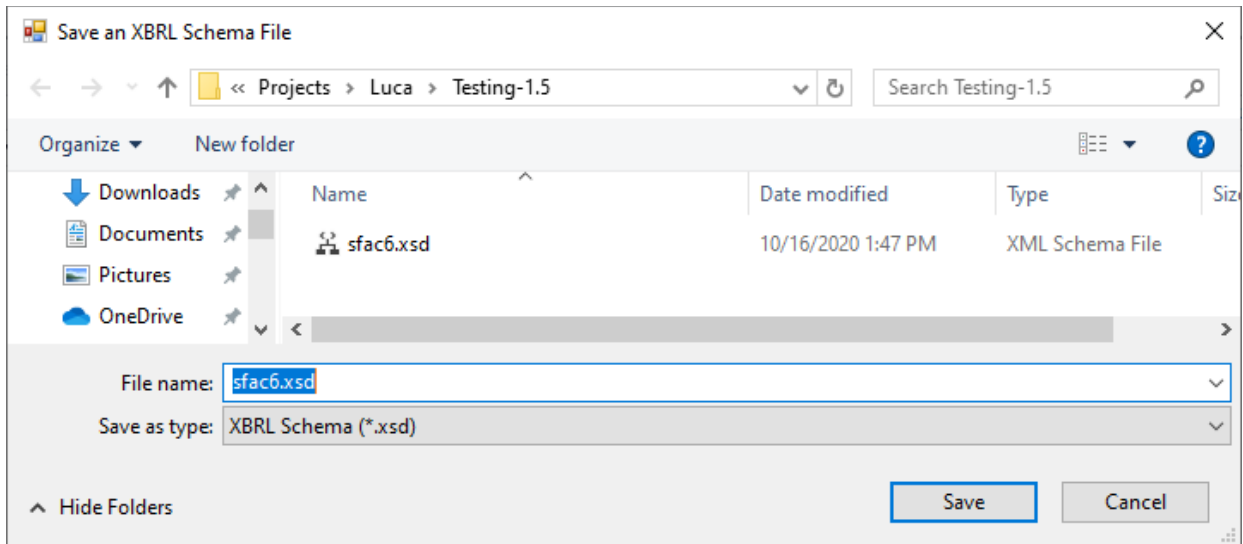
In the "File name:" text box of the form, enter "sfac6.xsd" which will be the name of your XBRL taxonomy schema file.

Step 7: Verify that your XBRL is correct.

Luca does not provide XBRL syntax verification. And so, to validate the XBRL taxonomy and XBRL instance that you created, you will have to use an XBRL processor that provides XBRL, XBRL dimensions, and XBRL Formula validation. As part of the representation we provide you as an end result is the validation result from XBRL Cloud's Evidence Package[11]:

If you validate the XBRL files using your favorite XBRL processor, you should see that you have no errors:

---

[11] XBRL Cloud Evidence Package validation result for SFAC 6,
http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/evidence-package/contents/index.html#ReportProperties.html

This is what the XBRL taxonomy looks like in Pesseract[12]:
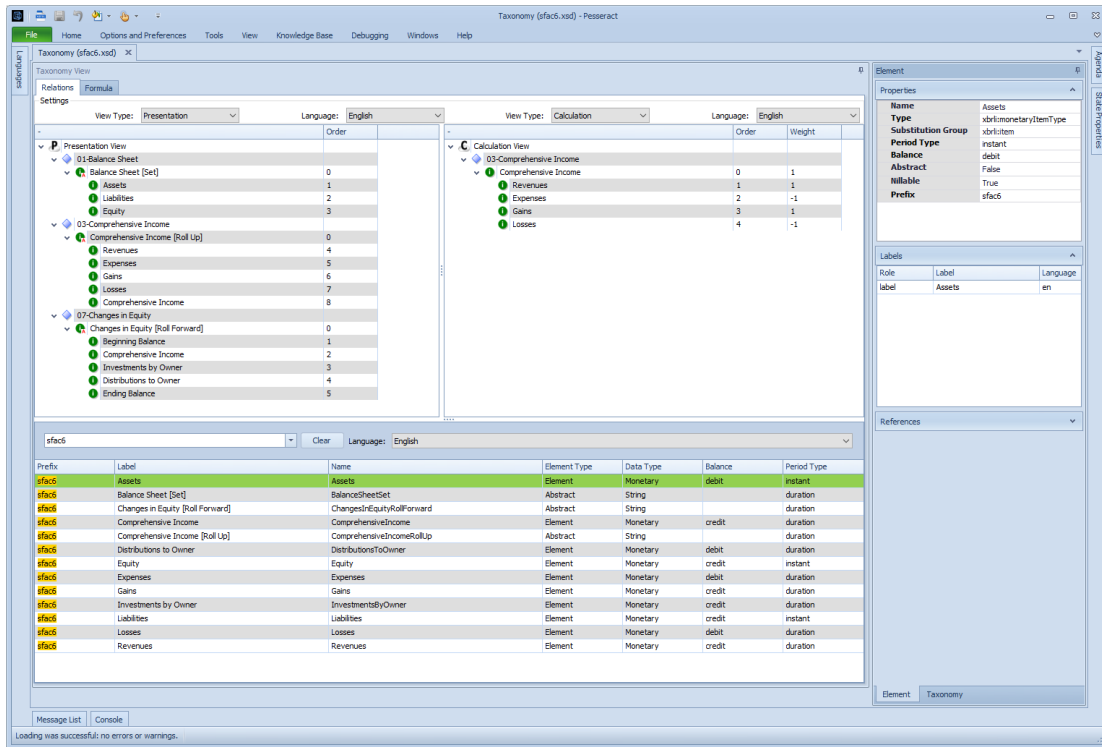
Here is what the XBRL instance looks like in Pesseract:

---
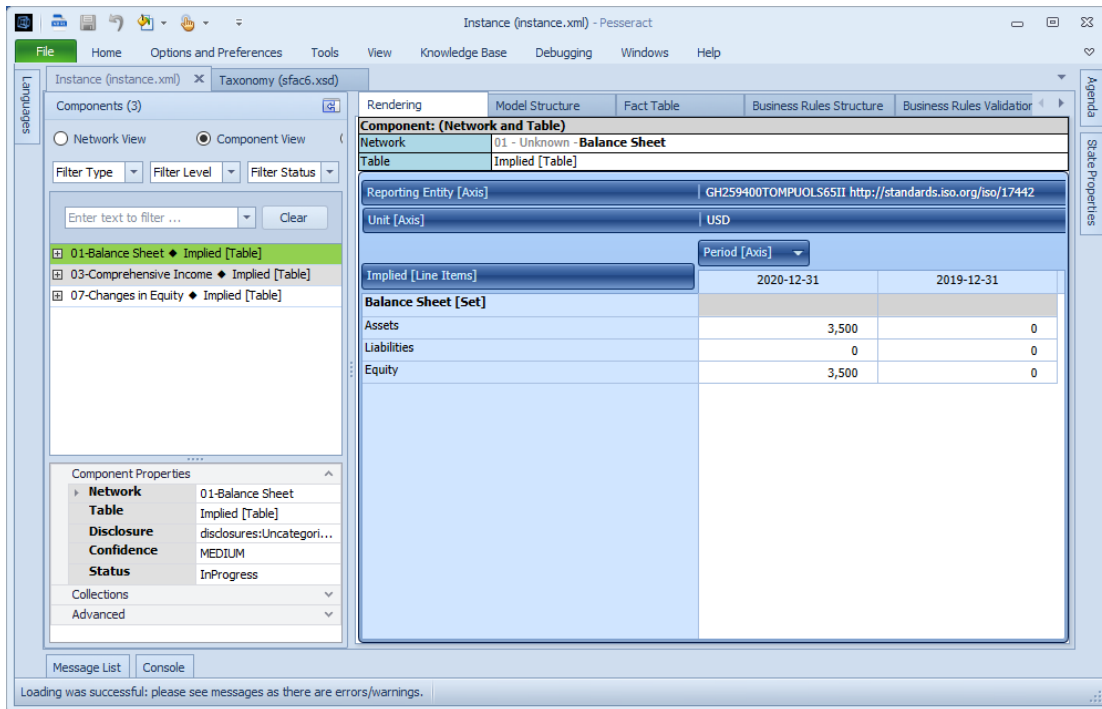
[12] Pesseract, http://pesseract.azurewebsites.net/

You can have a look at the completed SFAC 6 representation from the files we provide generated by XBRL Cloud[13]:

Introducing the Hypercube

We want to now introduce you to the notion of the Hypercube. A **Hypercube** is a mechanism for defining a structure in the XBRL technical syntax. Before now, we were using another mechanism for defining structures in XBRL, the **Network**. To round out the three different approaches to defining a structure there is also the approach of using a combination of a **Network and a Hypercube** to define a structure.

The first question you might have is, "Why three approaches?" That is a very good question but providing a good answer is harder. For now, don't worry about the answer to the question because creating XBRL-based reports using IFRS or US GAAP allows either approach. The "best approach" can be a matter of opinion.

Both a Hypercube and a Network are ways of connecting associations together to define a structure. Networks must always exist in XBRL-based reports. Hypercubes are optional until you need what only they can provide to structure information effectively.

Essentially, Networks and Hypercubes connect sets of associations and facts together. What we try and do is make the notion of a Network and Hypercube invisible to you and expose only the notion of the Structure itself. This is done by automatically generating the Network, Hypercube, or combination of Network + Hypercube by cleverly designing software.

But, lets forget about all that for now and look at a Hypercube. We do this by looking at the following structure of the SFAC 6 representation:

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[13] XBRL Cloud Evidence Package, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/evidence-package/

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)

	Period [Axis]
Comprehensive Income Statement [Line Items]	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

Notice the "Comprehensive Income Statement [Hypercube]" in the representation above. In this case whether the Hypercube does or does not exist changes nothing about the meaning of the information conveyed by the XBRL-based information provided.

We are going to cover Hypercubes more in a bit. But first, we need to Segway by looking at a pathological structure in order to better understand structures.

Pathological Structure

What you see below is four logical structures that have been represented as one physical structure within an XBRL-based report[14]:

	Period [Axis]
Structure [Line Items]	2020-01-01 - 2020-12-31
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000
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, Beginning Balance	0
Net Cash Flow	3,500
Assets, Ending Balance	3,500
Revenues	7,000
Comprehensive Income	3,000
Distributions to Owners	500

---

[14] Pathological structure, http://xbrlsite.azurewebsites.net/2020/introduction/pathological/evidence-package/

The best way to understand why the pathological representation is not elegant, lets look at a minor improvement to that pathological example which separates the structures better[15]:

Reporting Entity [Axis]	GH259400TOMPUOLS65II http:/
Period [Axis] ▼	
Implied [Line Items]	2020-01-01/2020-12-31
Block 1 [Abstract]	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000
Block 2 [Abstract]	
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
Block 3 [Abstract]	
Assets, Beginning Balance	0
Net Cash Flow	3,500
Assets, Ending Balance	3,500
Block 4 [Abstract]	
Revenues	7,000
Comprehensive Income	3,000
Distributions to Owners	500

While the above is a bit easier to read and understand because of the addition of four [Abstract] report elements which are used to separate the four structures; however, there is still room for improvement.

An even better representation of exactly the same information makes the information much clearer[16]:

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[15] Improved pathological representation, http://xbrlsite.azurewebsites.net/2020/introduction/patho-better/evidence-package/
[16] Best pathological representation, http://xbrlsite.azurewebsites.net/2020/introduction/patho-best/evidence-package/

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

Cash Flow Statement [Abstract]	Period [Axis]
	2020-01-01 - 2020-12-31
Cash Flow Statement [Abstract]	
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]	
Assets, Beginning Balance	0
Net Cash Flow	3,500
Assets, Ending Balance	3,500

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

Notice how the four structures (i.e. income statement which is a roll up, net cash flow roll up and assets roll forward which makes up the cash flow statement, and the unrelated set of facts which make up the financial highlights set) are significantly more understandable.

While it is true that all three versions of this same example convey exactly the same meaning and all drive the same Inline XBRL representation (see next page); it is likewise true that all things considered

the third representation that you see above is more explicit and tends to be easier to understand. Here is the same information represented using Inline XBRL[17]:

Statement of Comprehensive Income

ABC Company, Inc.
(See accompanying notes to the financial statements.)

(in US Dollars)	For period ended December 31, 2020
Comprehensive income:	
Revenue	$7,000
Expenses	(3,000)
Gains	1,000
Losses	(2,000)
Comprehensive income	$3,000

Cash Flow Statement

ABC Company, Inc.
(See accompanying notes to the financial statements.)

(in US Dollars)	For period ended December 31, 2020
Net cash flow:	
Net cash flow from operating activities	$1,500
Net cash flow from investing activities	1,000
Net cash flow from financing activities	1,000
Net cash flow	3,500
Assets, beginning balance	0
Assets, ending balance	$3,500

Financial Highlights

ABC Company, Inc.

(in US Dollars)	For period ended December 31, 2020
Financial highlights:	
Revenues	$7,000
Comprehensive income	3,000
Distributions to owners	500

---

[17] Inline XBRL of pathological representation,
http://xbrlsite.azurewebsites.net/2020/introduction/pathological/instance-RENDERED.html

Notice how the third representation is the most consistent with the Inline XBRL representation and note how a better model tends to yield a better automated rendering of information without the need for taking the time to create the Inline XBRL.

Proof Plus Representation Rounds Out Financial Report Model

While the SFAC 6 representation makes the point that there are different information patterns such as the "roll up" which is different than the "roll forward"; the SFAC 6 does not have a complete inventory of all information patterns you might run across.

The Proof Plus representation[18] does have that complete inventory. Here are three additional information patterns that XBRL-based financial reports must support:

Adjustment which reconciles an originally stated balance to a restated balance[19]:

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

Variance which reconciles a budget or forecast to an actual balance[20]:

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

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[18] Proof Plus Representation, http://xbrlsite.azurewebsites.net/2020/introduction/proof-plus/index.html
[19] Adjustment, http://xbrlsite.azurewebsites.net/2020/introduction/proof-plus/evidence-package/contents/index.html#Rendering-PriorPeriodErrors-proof_PriorPeriodErrorsHypercube.html
[20] Variance, http://xbrlsite.azurewebsites.net/2020/introduction/proof-plus/evidence-package/contents/index.html#Rendering-VarianceAnalysis-proof_VarianceAnalysisHypercube.html

Member aggregation which is similar to a roll up however is represented across a set of members of a dimension[21]:

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

Text block or prose[22]:

	Period [Axis]
	2020-01-01 - 2020-12-31
Policies [Line Items]	
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

There are a few additional information models that financial report fragments fit into. For a complete list, please refer to the Logical Theory Describing Financial Report[23] which is introduced in the intermediate discussion.

Back to Hypercubes, Networks, and Structures

We round out this introduction with some final pointers about structures and the networks and hypercubes used to represent them.

First, there are two reasons you create a new structure: (1) because you have to and (2) because you want to.

You have to create a new structure when a conflict occurs when you do not. For example, in the SFAC 6 representation there are two different roll up alternatives provided for Comprehensive income which we provide here:

Alternative 1[24]:

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[21] Member aggregation, http://xbrlsite.azurewebsites.net/2020/introduction/proof-plus/evidence-package/contents/index.html#Rendering-SegmentRevenues-proof_SegmentRevenuesHypercube.html
[22] Text block, http://xbrlsite.azurewebsites.net/2020/introduction/proof-plus/evidence-package/contents/index.html#Rendering-Policies-proof_PoliciesHypercube.html
[23] *Logical Theory Describing Financial Report*, http://www.xbrlsite.com/2020/Theory/Home.html
[24] Comprehensive Income Roll Up 1, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-Implied.html

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

Alternative 2[25]:

Comprehensive Income [Roll Up]	Period [Axis]
	2020-01-01 - 2020-12-31
Comprehensive Income [Roll Up]	
Income from Normal Activities of Entity	2,000
Income from Peripheral or Incidental Transactions of Entity	1,000
Comprehensive Income	3,000

It is literally impossible to represent both alternatives using the same physical structure, so two different structures are required.

But if you want to create another structure you can do that also. For example, you could represent the balance sheet and income statement within the same structure because each of those disclosures use completely separate terms, associations, and rules so you would not get a conflict if you did. Or, you could make the choice to use two separate structures. In this case, either approach works fine.

And so, when you create a new structure, we pointed out that there are three alternatives for doing so. Here we show each of those three approaches. We will contrast the income statement of the three approaches to help you differentiate the approaches.

Approach 1[26]: SFAC 6 Very Basic representation

In this first approach, note that neither the balance sheet, either income statement, nor changes in equity have hypercubes. In each case the Table (a.k.a. Hypercube) field says "(Implied)" which means that no explicit hypercube has been defined and therefore an imaginary hypercube that does not really exist is implied. Each network has a unique identifier and can be used to distinguish one structure from another.

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[25] Comprehensive Income Roll Up 2, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/evidence-package/contents/index.html#Rendering-ComprehensiveIncome2-Implied.html
[26] SFAC 6 Very Basic, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-basic/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-Implied.html

Component: (Network and Table)	
Network	**02-Comprehensive Income** (http://www.xbrlsite.com/sfac6/role/ComprehensiveIncome)
Table	(Implied)

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

Reporting Entity [Axis]	GH259400TOMPUOLS65II

	Period [Axis]
Comprehensive Income [Roll Up]	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

However, consider the following. What if you combined the Comprehensive Income [Roll Up] and the Balance Sheet [Set] into the same network. Could you use the Network to differentiate one structure from the other when they share the same network? The answer is no; you would need to provide additional information.

Approach 2[27]: SFAC 6 Introducing Hypercubes representation

In this second approach, notice that every structure provides a hypercube; the balance sheet, each income statement, and the changes in equity. But notice one important detail. Both of the income statements use the same hypercube name, "Comprehensive Income Statement [Hypercube]".

So, while each structure does contain a hypercube, because the hypercubes are not uniquely named, the hypercube cannot be used to distinguish or identify structures. While you can distinguish the balance sheet and statement of changes in equity; you cannot do the same with the two income statements that use the same hypercube.

Or, saying this another way; if each of the hypercubes did have a unique name, then the hypercube alone could be used to differentiate each structure.

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[27] SFAC 6 Introducing Hypercubes, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-dim/evidence-package/contents/index.html#Rendering-ComprehensiveIncome-sfac6_ComprehensiveIncomeStatementHypercube.html

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

	Period [Axis]
Comprehensive Income Statement [Line Items]	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

Approach 3[28]: SFAC 6 Alternative Hypercube Approach representation

In this alternative representation using hypercubes, the approach where one hypercube named "Hypercube [Hypercube]" is used to represent the balance sheet, each of the two income statements, and the changes in equity. See the first income statement here and look at the line below to see each of the others. Further note that the Line Items term, "Hypercube [Line Items]", is used in the representation of each hypercube.

Component: (Network and Table)		
Network	**02-Comprehensive Income** (http://www.xbrlsite.com/sfac6/role/ComprehensiveIncome)	
Table	Hypercube [Hypercube]	

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

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

	Period [Axis]
Hypercube [Line Items]	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

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[28] SFAC 6 Alternative Hypercube Approach, http://xbrlsite.azurewebsites.net/2020/introduction/sfac6-dim2/evidence-package/contents/index.html#Rendering-BalanceSheet-sfac6_HypercubeHypercube.html

What does sharing hypercubes and the same line items term between structures achieve? Well, first you save having to create a new hypercube and the line items terms; you simple have to create them once and use them many times which reduces the number of terms you must define.

Second, it forces one to use the network to physically identify the structure. Because each hypercube has the same name, it is useless in the identification of which structure you are referring to.

Third, because you use the same hypercube name the creator of XBRL taxonomies is forced to only use one hypercube per network. Why? If you only have one hypercube to use and you put them in the same network, then conflicts will occur when associations between terms are defined within a network for hypercubes that have the same name. The vast majority of XBRL-based reports already have only one hypercube her network; this forces every report to use this approach.

Fourth, when you do want to extract information from a report and you want to leverage a hypercube for doing so but each hypercube has the same name plus network identifiers are of no help because both the SEC and ESMA require reporting entities to define and use their own network identifiers (as contrast to each company having to use a network identifier defined by the FASB or IASCF or SEC or ESMA) how can you possibly extract information from a report for a specific structure?

Well, that is an excellent question! The answer to that important question is to use what is known as prototype theory[29] which is beyond the scope of this introduction. In a nutshell, you use the parts of a structure to identify the structure as contrast to a unique name that identifies each structure.

Best Approach for Representing Structures

And so this begs the question: What is the best approach for representing structures? Using Networks, Hypercubes, or both? Well, the answer to the question is not that simple and depends on your perspective.

In order to define a proper XBRL taxonomy for, say, US GAAP or IFRS; you would have to know 100% of the hypercubes in advance in order to use a hypercube to identify each possible disclosure structure. While that is possible, it is challenging.

Today, most quality creators of XBRL-based reports for the SEC are using hypercubes to represent all information in a report. For example, the Microsoft 10-K[30] has 128 Networks, 128 hypercubes (a.k.a. Tables), and 194 structures. Every structure is represented within a hypercube, but the hypercubes are not uniquely named (i.e. that hypercube us-gaap:StatementTable is used numerous times to identify numerous structures). Therefore, hypercubes are useless for extracting information.

Internally within the enterprise, I would speculate that people would find it easier to deal with unique hypercubes for each unique disclosure.

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[29] Understanding Prototype Theory, http://xbrl.squarespace.com/journal/2013/12/21/understanding-prototype-theory.html

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