Blueprint for Creating Zero-Defect XBRL-based Digital Financial Reports

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October 19, 2017 (Revised)

Information bearers and information receivers should have the same logical interpretation[1] of information exchanged. The creator of a financial report is an *information bearer*; the user of a financial report is an *information receiver*. XBRL is a knowledge media[2], a global standard technical syntax for exchanging information. Processes for creating such financial reports must be stable, must be capable, and must meet expectations of the bearer and receiver of the information.

As stated in the *XBRL-based Digital Financial Reporting Principles*[3], "Safe, reliable, predictable, automated reuse of reported financial information by machine-based processes is preferable to creating a guessing game." Prudence dictates that using financial information from an XBRL-based digital financial report should not be a guessing game. Further; safe, reliable, predictable automated machine-based processing is necessary to achieve capabilities where humans can be augmented by such automated tools[4].

While the AICPA's *Principles and Criteria for XBRL-Formatted Information*[5] lays a good foundation for thinking about how to create XBRL-based financial reports correctly, review a report that another has created, provide attestation services related to such a report, or providing agreed-upon consulting services; the AICPA's guidance state (emphasis added):

> "The quality of XBRL files is an important concern to users of these files. Errors in the XBRL files will have varying consequences. During the development of the XBRL principles and criteria, potential errors that could occur when preparing XBRL files were considered, and *it is believed* that the *criteria addresses many of these errors*. Further, the principles and criteria meet the requirements under AT section 101, as previously discussed in paragraphs .11-.13, and, thus are *considered suitable* for practitioners to perform an attestation engagement."

Clearly, those creating such XBRL-based reports need to **make sure no errors exist**. Accountants and auditors cannot "*believe*" that such a report is correct using a process that "*addresses many of these errors*". Accountants and auditors need to make sure no errors exist.

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[1] Wikipedia, *Interpretation (Logic)*, https://en.wikipedia.org/wiki/Interpretation_(logic)
[2] *Understanding that XBRL is a Knowledge Media*, http://xbrl.squarespace.com/journal/2017/1/16/understanding-that-xbrl-is-a-knowledge-media.html
[3] *XBRL-based Digital Financial Reporting Principles*, http://xbrl.squarespace.com/digital-financial-reporting-pr/
[4] *Getting Ready for the Digital Age of Accounting, Reporting and Auditing: a Guide for Professional Accountants*, http://xbrlsite.azurewebsites.net/2017/Library/GettingReadyForTheDigitalAgeOfAccounting.pdf
[5] American Institute of Certified Public Accountants, 2017, *Principles and Criteria for XBRL-Formatted Information*, https://www.aicpa.org/InterestAreas/FRC/AccountingFinancialReporting/XBRL/DownloadableDocuments/aicpa-principles-and-criteria-for-xbrl-formatted-information.pdf

What does a report creator need to do if they want to address all of the possible errors? What good is an XBRL-based financial report if you don't understand what errors it has of if you don't even know the nature of the errors that may exist[6]? How safe would it be to use such XBRL-based information? How do you specify what consulting services that you need performed to make sure your report is conveys information correctly? What is an acceptable error rate? How do you measure your error rate?

This document provides a blueprint for creating zero-defect XBRL-formatted digital financial reports. This document is not based on beliefs and opinions, it is based on observable evidence. This document does not address many errors, it addresses a comprehensive set of specific categories of errors so that you know definitively what types of errors are being detected using machine-based automated processes and therefore you also know what human-based manual processes must be performed to test everything else.

The information provided by this document comes from a deliberate and rigorous analysis of the complete set of XBRL-based public company financial reports undertaken over a period of about five years and creating software that successfully performs the machine-based automated verification checks.

Internal Control over Financial Reporting

In their document *Guide to Internal Control over Financial Reporting*[7], the Center for Audit Quality states:

> Preparing reliable financial information is a key responsibility of the management of every public company. The ability to effectively manage the company's business requires access to timely and accurate information. Moreover, investors must be able to place confidence in a company's financial reports if the company wants to raise capital in the public securities markets.
>
> Management's ability to fulfill its financial reporting responsibilities depends in part on the design and effectiveness of the processes and safeguards it has put in place over accounting and financial reporting. Without such controls, it would be extremely difficult for most business organizations — especially those with numerous locations, operations, and processes — to prepare timely and reliable financial reports for management, investors, lenders, and other users. While no practical control system can absolutely assure that financial reports will never contain material errors or misstatements, an effective system of internal control over financial reporting can substantially reduce the risk of such misstatements and inaccuracies in a company's financial statements.

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[6] *Understanding Logical, Mechanical, and Mathematical Accounting Relations in XBRL-based Digital Financial Reports*, http://xbrl.squarespace.com/journal/2016/12/15/understanding-logical-mechanical-and-mathematical-accounting.html

[7] Center for Audit Quality, *Guide to Internal Control Over Financial Reporting*, http://www.thecaq.org/sites/default/files/caq_icfr_042513.pdf

In no place in the statement of the importance of internal controls does it distinguish between paper-based information published for the consumption of humans and machine-readable information formatted for the consumption by computer based processes.

XBRL-formatted information is not part of an audit yet. But it seems to me that it also could be quite appropriate for auditors to include a point in their management representation letters for 10-K audit and 10-Q review engagements related to XBRL-formatted information. This is a very practical way for CPAs to educate their clients about XBRL, encourage their clients to get their XBRL right, and if nothing else it proves that they addressed this subject with their clients, that the clients are aware of SEC filing requirements and potential sanctions regarding XBRL (i.e. the XBRL is "filed" and is subject to SEC review and enforcement action if there are XBRL errors), and the auditors have no responsibility for the XBRL as it is not (yet) part of an audit.

CPA firms can use the management letter comments to initialize a dialog with management and the audit committee of their clients to ensure their clients have adequate internal controls over financial reporting (ICFR) in place related to XBRL. Further, this is a great way to offer their consulting services if internal controls and processes are lacking. This puts the burden of XBRL compliance (or lack thereof) squarely on the shoulders of public companies and their audit committees. They might take the XBRL more seriously.

Misconceptions Related to the "Audit of XBRL"

There are many misconceptions professional accountants, professional auditors, and others have about the "audit of XBRL". The first misconception is that XBRL is audited at all. XBRL is a technical format. The XBRL technical format can be verified 100% by automated software tests. That is the purpose of the XBRL International XBRL conformance suite tests. Those tests are used to build automated machine-based processes to be sure the XBRL technical syntax is right. But XBRL conformance suite tests do not, and cannot, check to see if the meaning conveyed by the XBRL-formatted information is correct.

Second, when one "audits" the financial information represented in the form of paper you are not auditing the paper you are auditing the information represented on the paper. In my document *Thoughts on Auditing XBRL-formatted Information*[8] I point out that the meaning conveyed by the XBRL-formatted information and the meaning conveyed by paper-based information including electronic forms of paper like HTML and PDF convey the exact same meaning.

Third, you don't need third party auditors to make sure you get things right. The purpose of an audit is to provide an independent third party opinion as to whether reported information about the financial condition and financial position of an economic entity is being represented fairly by the information provided in a financial report. The audit is about the *independent third party opinion* as to the fairness of that information. You can create financial information correctly even if the information is not audited. Most professional accountants can do that fine.

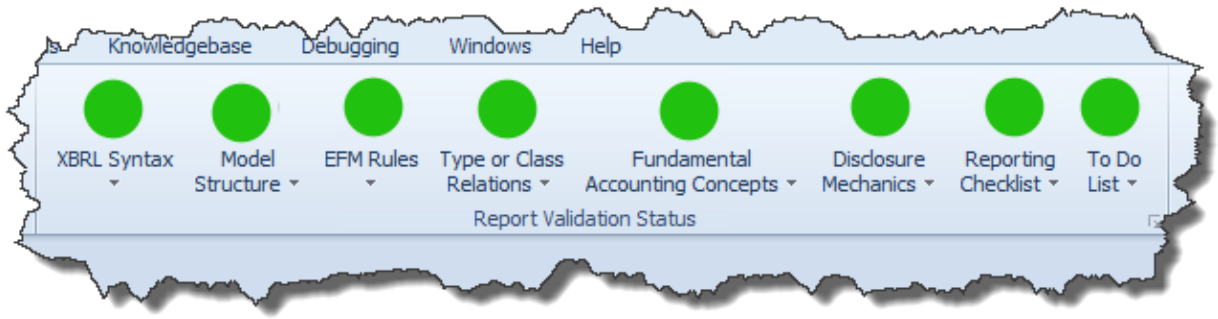
[8] *Thoughts on Auditing XBRL-formatted Information*, http://xbrlsite.azurewebsites.net/2017/Library/ThoughtsOnAuditingXBRLBasedInformation.pdf

Fourth, external financial reporting managers need to create true and fair representations of their financial information. The team that works with the external financial reporting manager needs to make sure the financial report is true and fair. Internal auditors that work for a company to make sure the external financial reporting manager is doing their job correctly need to make sure the information is true and fair. Finally, the CFO that signs off on the report needs to make sure the financial report information is true and fair. The point here is that there are lots of people who care that the information contained in a financial report is represented appropriately, not just auditors.

Comprehensive, Robust Verification Framework

So what is the appropriate quality level of an XBRL-based financial report and how do you achieve it?

What if the software that you used for creating XBRL-based financial reports provided you the following dashboard for understanding the validity of the information represented within that XBRL-formatted financial report:



The following is the description of the functionality of each of the report validation categories and data related to how XBRL-based public company financial reports submitted to the SEC fare for each of these categories where data is available:

- **XBRL technical syntax**: XBRL technical syntax rules include the rules of the XBRL International conformance suite for XBRL 2.1 and XBRL Dimensions 1.0 specifications. Today, XBRL-based filings to the SEC are 99.99+% consistent with these conformance suite tests.
- **Report specific mathematical relations**: XBRL-based financial reports contain numerous roll up relations, roll forward relations (beginning balance + changes = ending balance), adjustment relations (originally stated balance + adjustments = restated balance), member aggregations, and other such mathematical relations. The XBRL global standard offers XBRL calculations and XBRL Formulas as powerful tools for validation of such report specific mathematical relations. No accurate information is available as to how well SEC filings fare in this category. Report specific mathematical relations verification are part of XBRL technical syntax validation.
- **Model structure relations**: Model structure relations are defined as the relationship between XBRL presentation relation element categories including Networks, Hypercubes/Tables, Dimensions/Axis, Members, Primary Items/Line Items, Concepts and Abstracts. The model

structure relations of XBRL Definition relations and XBRL Calculation relations are both crystal clear and validated by XBRL and XBRL Dimensions rules and therefore covered by XBRL processors. As such, these relations tend to be near 100% consistent with expectations. However, the relations between these report element categories within the presentation relations are not covered by the XBRL technical specification. Today, 99.98% of these model structure relations are consistency with expectation for SEC filings.

- **EFM rules (EDGAR Filer Manual)**: Each system has rules that are specific to that system. The SEC EDGAR system specified those rules in the Edgar Filer Manual (EFM). Some of the rules are testable using automated processes, some are testable using only manual processes. Today, about 95% or more of XBRL-based public company filings are consistent with expectation, most violations relate to the XHTML in text blocks.
- **Type or class relations**: The concepts within an XBRL taxonomy can be grouped into classes or types. For example, "Assets" concepts are not the same as "Revenues" concepts. You would never use an assets concept to represent a revenues fact. There are two general types of relations between classes of concepts. "Type-of"[9] relations indicate that a concept is of a similar type, for example "Sales Revenue, Net" is a TYPE-OF "Revenues, Net". "Whole-part" relations indicate that some WHOLE is made up of a specific set of PARTS, no more, and no less. Today, there is no good measurement as to the consistency of XBRL-based public company financial reports with these relations.
- **Fundamental accounting concept continuity cross-check relations**: The fundamental accounting concept relations are basically universally applicable (i.e. not report specific) high-level continuity equations that cross-verify information to make sure commonly reported facts are reported consistent with one another. My tests of XBRL-based financial reports of U.S. public companies submitted to the SEC include about 22 rules that come in a variety of forms based on the reporting style of a company. The notion of reporting style can be understood by realizing that a bank reports differently than a software company so they need different sets of fundamental accounting concept relations rules. SEC filers can be grouped into about 200 different reporting styles, but 80% of all economic entities fit into the top 12 reporting styles. Today, approximately 98.96% of the fundamental accounting concept relations are consistent with XBRL-based public company financial reports. Approximately 88.2% of XBRL-based public company financial reports are consistent with all fundamental accounting concept relations continuity cross-checks[10].
- **Disclosure logical, structural, mechanical, mathematical rules**: Disclosures have patterns and disclosure mechanics rules specify those patterns. Disclosure mechanics rules specify the logical, mechanical, and mathematical relations within a specific disclosure and always hold true for that disclosure. For example, the disclosure of inventory components is *always* a Roll Up, the total concept is *always* "us-gaap:InventoryNet", the Level 3 Disclosure Text Block is *always* "us-gaap:ScheduleOfInventoryCurrentTableTextBlock", etc. Today, approximately 88% of

[9] Type-of relations are sometimes referred to as "Is-a" relation.

[10] *Quarterly XBRL-based Public Company Financial Report Quality Measurement*, http://xbrl.squarespace.com/journal/2017/9/1/quarterly-xbrl-based-public-company-financial-report-quality.html

disclosures are consistent with the disclosure mechanics rules based on a measurement of 65 common disclosures[11].

- **Statutory and regulatory compliance reporting checklist**: Some disclosures are always required to exist, for example significant accounting policies, basis of reporting, and revenues recognition policy. Other disclosures are required only if specific line items are reported. For example, if the line item "Property, Plant and Equipment, Net" is reported on the balance sheet then "Property, Plant, and Equipment Components" must be disclosed as well as the estimated useful lives of each class of property, plant and equipment. Other disclosures are required only if specific transactions, events, circumstances, or other phenomenon exist for an economic entity. Other relations exist between information which must be disclosed in order to comply with regulatory and statutory disclosure requirements. Many, but not all, of these reasons disclosures should be reported can be distilled into machine-readable business rules similar to today's "disclosure checklist" which today only serves as a human-readable, and therefore manual, "memory jogger". Today, there are no measurements as to how consistent XBRL-based public company financial reports are with the existing rules.
- **Manual verification (to-do list)**: Not all aspects of an XBRL-based public company financial report can be verified using automated machine-based processes. Subjective decisions which require the exercise of professional judgment will always be necessary. As such, it will always be the case that human-based manual verification tasks will be required when verifying XBRL-based digital financial reports. However, if a verification task can be created and is reliable; automated processes are preferable because they tend to be less costly. If a subjective option is turned into a policy, tasks can be automated.

You don't need to imagine this validation software. You can use the software and determine for yourself if it is helpful in the creation of XBRL-based financial reports. This software exists today and it is highly-likely other such software, even better, will exist in the near future. Using this software you can measure consistency with specified business rules and determines precisely the quality of the XBRL-based report, for example determine if the report has achieved sigma level 6[12] which is 99.99966% as expected.

Two different commercially available software products exist that allow humans augmented by machine-based processes[13] to make sure XBRL-based financial reports are created appropriately.

The next several sections describe each of the XBRL-based financial report validation criteria in additional detail and explain why each category of validation is necessary so that the reader can get a better idea exactly what each aspect of a report is covered by the validation category.

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[11] *XBRL-based Public Company Reports to SEC are 88% Correct Per One Measurement*, http://xbrl.squarespace.com/journal/2017/8/10/xbrl-based-public-company-reports-to-sec-are-88-correct-per.html

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

[13] *Getting Ready for the Digital Age of Accounting, Reporting and Auditing: a Guide for Professional Accountants*, http://xbrlsite.azurewebsites.net/2017/Library/GettingReadyForTheDigitalAgeOfAccounting.pdf

Is this all the rules that can possibly be represented in machine-readable form and validated using automated processes? No. Software is a bottomless pit of opportunity. What I have outlined is only the beginning. To understand the additional possibilities, I would suggest the document *Comprehensive Introduction to Problem Solving Logic*[14]. The capabilities of the XBRL format to represent business rules, the capabilities of the business rules processor problem solving logic and the existence of the rules themselves determine what is achievable.

[14] *Comprehensive Introduction to Problem Solving Logic*, http://xbrlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part01_Chapter02.5_ComprehensiveIntroductionToProblemSolvingLogic.pdf

XBRL Technical Syntax

XBRL International provides an XBRL conformance suite which is used to test the XBRL technical syntax of an XBRL-based digital financial report. The conformance suite has 578 test that relate to the base XBRL 2.1 specification[15] and 994 tests relating to the XBRL Dimensions 1.0 technical specification[16]. These validation tasks are uninteresting to professional accountants; the technical syntax just needs to be correct and managed by the software application but hidden from the business user that is making use of the software. The technical aspect needs to disappear into the background.

Besides, there is little hope that you could train the average professional accountant to understand the XBRL technical syntax. Nor should you need to. Professional accountants should simply expect that the tools that they use adhere to the XBRL global standard. And most software does.

Today, XBRL-based public company financial reports which are submitted to the SEC are 99.99% consistent with the XBRL 2.1 and XBRL Dimensions 1.0 technical syntax.

Report Specific Mathematical Relations

Included in the XBRL technical syntax validation is the validation of XBRL calculations or **roll up** computations. For example, below you see the roll up of the pieces that make up of total inventory:

Component: (Network and Table)		
Network	5040 - Disclosure - **Inventory Components**	
Table	Inventory Components [Table]	
Reporting Entity [Axis]	0000000001 http://www.sec.gov/CIK	
Legal Entity [Axis]	Consolidated Entity [Domain]	
	Period [Axis]	
Inventory Components [Line Items]	2016-12-31	2015-12-31
Inventory, Net [Roll Up]		
Finished Goods	1,000,000	1,000,000
Work in progress	1,000,000	1,000,000
Raw materials	1,000,000	1,000,000
Other	1,000,000	1,000,000
Total inventories, net	4,000,000	4,000,000

XBRL calculations can be used to represent and verify these roll up type mathematical computations. Financial reports generally contain numerous roll up type computations. It should never be the case that such a roll up computation is undocumented within an XBRL-based financial report and the information I the report be consistent with the XBRL calculation representation of such roll ups. Creators of XBRL-based financial reports should never be allowed to leave these roll up mathematical

[15] XBRL International, XBRL 2.1 base technical specification conformance suite, https://specifications.xbrl.org/work-product-index-group-base-spec-base-spec.html
[16] XBRL International, XBRL Dimensions 1.0 technical specification conformance suite, https://specifications.xbrl.org/work-product-index-group-dimensions-dimensions.html

relations undocumented. If they are documented, then XBRL processing can verify the consistency of information in the XBRL-based financial report with these roll ups documented by XBRL calculation relations.

But in addition to roll up validations; XBRL Formula[17] validation is used to overcome the limitations of XBRL calculations validation tasks which only works within one context. XBRL Formula is significantly more powerful in terms of problem solving logic related to mathematical computations. And just like the XBRL base specification and XBRL Dimensions, XBRL Formula has a conformance suite that can be used to test the XBRL Formula syntax using automated machine-based processes.

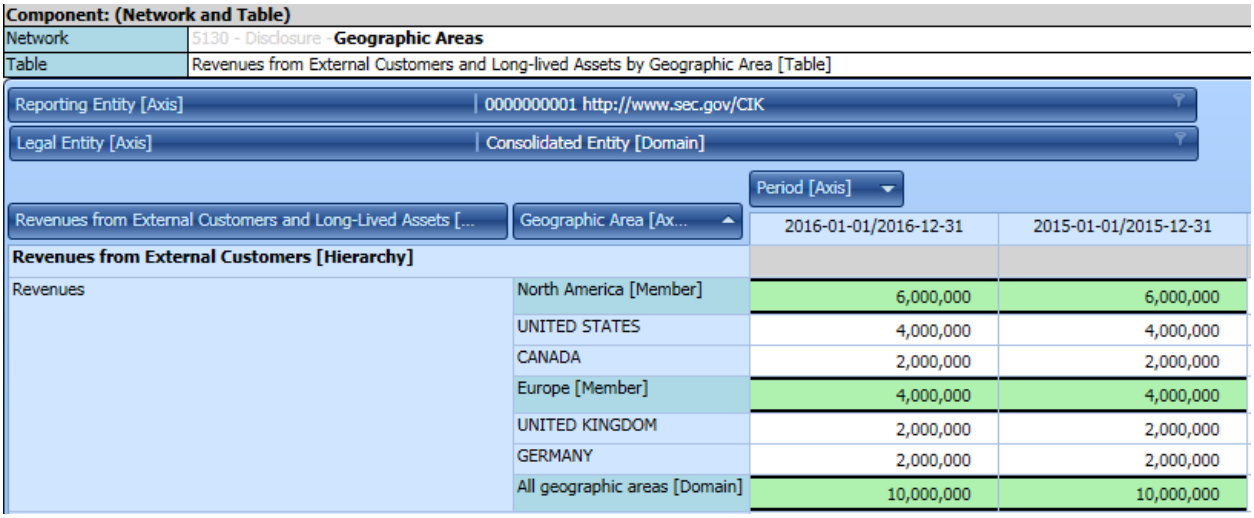
As professional accountants know financial reports contain many **roll forward** type mathematical relationships. However, roll forward relationships cannot be validated using XBRL calculation relations because roll forward cross contexts. A roll forward represents information across three different contexts; the beginning balance, the changes during the period of the roll up, and the ending balance of the roll up. For example:

Component: (Network and Table)		
Network	5070 - Disclosure - **Product Warranty Accrual**	
Table	Product Liability Contingency [Table]	
Reporting Entity [Axis]	0000000001 http://www.sec.gov/CIK	
Legal Entity [Axis]	Consolidated Entity [Domain]	
	Period [Axis]	
Product warranty accrual [Roll Forward]	2016-01-01/2016-12-31	2015-01-01/2015-12-31
Product warranty accrual [Roll Forward]		
Product warranty accrual, beginning balance	58,000,000	58,000,000
Provision for product warranties issued	7,000,000	7,000,000
Payments to satisfy claims	(6,000,000)	(6,000,000)
Currency translation	(1,000,000)	(1,000,000)
Product warranty accrual, ending balance	58,000,000	58,000,000

While the SEC does not allow XBRL Formulas to be submitted with an XBRL-based financial report that is filed with the SEC; the ability to verify the roll forward mathematical relations in such reports is critical to getting the reports created correctly. As such, XBRL Formulas rules can and should be created as part of the process of creating an XBRL-based report and simply not submitted to the SEC because the SEC does not currently allow XBRL Formula based business rules to be filed. However, 100% of all roll forwards can be verified to be correct per the XBRL Formula based roll forward business rules.

Another type of mathematical computation that XBRL calculations does not support but exists in financial reports is what I call a **member aggregations**. For example:

[17] XBRL International, XBRL Formula 1.0 specification and conformance suite, https://specifications.xbrl.org/work-product-index-formula-formula-1.0.html



Component: (Network and Table)

Network	5130 - Disclosure - **Geographic Areas**
Table	Revenues from External Customers and Long-lived Assets by Geographic Area [Table]

Reporting Entity [Axis]	0000000001 http://www.sec.gov/CIK		
Legal Entity [Axis]	Consolidated Entity [Domain]		
		Period [Axis]	
Revenues from External Customers and Long-Lived Assets [...	Geographic Area [Ax...	2016-01-01/2016-12-31	2015-01-01/2015-12-31
Revenues from External Customers [Hierarchy]			
Revenues	North America [Member]	6,000,000	6,000,000
	UNITED STATES	4,000,000	4,000,000
	CANADA	2,000,000	2,000,000
	Europe [Member]	4,000,000	4,000,000
	UNITED KINGDOM	2,000,000	2,000,000
	GERMANY	2,000,000	2,000,000
	All geographic areas [Domain]	10,000,000	10,000,000

A member aggregation is simply a roll up represented using a different XBRL technical syntax approach, XBRL Dimensions, than the general base XBRL approach which then uses XBRL calculation relations to document the mathematical relations. The semantics of a roll up and a member aggregation are completely identical in terms of the mathematical relationship itself. Member aggregations offer added semantics related to other areas because they leverage XBRL Dimensions and the multidimensional approach[18] to representing information. Likewise, there are many member aggregation type mathematical relations within an XBRL-based financial report such as revenues from external customers or long-lived assets by geographic area just to name two. And so, each of these member aggregation computations can be effectively represented by and validated using XBRL Formula.

A fourth type of mathematical relation not covered by XBRL calculations is the **adjustment** type relation where you have an originally stated balance, one or more adjustments to that original balance, and then a restated balance. An example of an adjustment type relation is a prior period adjustment due to an accounting error or the impact of a change in accounting policy:

[18] Charles Hoffman, *Introduction to the Multidimensional Model for Professional Accountants*, http://xbrl.squarespace.com/journal/2016/3/18/introduction-to-the-multidimensional-model-for-professional.html

Component: (Network and Table)	
Network	2009 - Statement - **Prior Period Adjustment**
Table	Changes in Stockholders' Equity [Table]

Reporting Entity [Axis]	0000000001 http://www.sec.gov/CIK
Legal Entity [Axis]	Consolidated Entity [Domain]
Period [Axis]	2015-12-31

Changes in Stockholders' Equity [Line Items]	Report Date [Axis]	Drop Column Fields Here Fact Value
Increase (Decrease) in Stockholders' Equity [Adjustment]		
Stockholders' equity, origionally stated	Origionally Stated Report Date [Member]	30,000,000
Correction of a prior period error	Restated Report Date [Domain]	12,000,000
Effect of mandatory change in accounting policy for adoption of FAS XXX	Restated Report Date [Domain]	(2,000,000)
Stockholders' equity, restated	Restated Report Date [Domain]	40,000,000

So as you can see above you have stockholders' equity as originally stated, two adjustments, and then the restated balance of stockholders' equity. Again, XBRL calculation relations cannot represent this information because the facts exist within different contexts; but XBRL Formula can easily represent information that reports adjustments. Adjustment type mathematical computations are rather rare in financial reports, but they do exist. And so, while not allowed by SEC filing rules, creating business rules to verify the accuracy of mathematical computations not covered by the feature of XBRL calculations are provided by XBRL Formula. And so, it is possible to represent 100% of adjustment type mathematical relations within an XBRL-based financial report and verify that those computations are consistent with that representation.

A fifth type of mathematical relation not covered by XBRL calculations is the **variance** type relation where you have a budgeted amount, an actual amount, and then a variance between the budgeted and actual amounts. Below is an example of this computation pattern:

Component: (Network and Table)	
Network	60000 - Unknown - **Variance Analysis**
Table	Variance Analysis [Table]

Reporting Entity [Axis]	SAMP http://www.SampleCompany.com
Legal Entity [Axis]	Consolidated Entity [Member]
Period [Axis]	2010-01-01/2010-12-31

Variance Analysis [Line Items]	Reporting Scenario [Axis] Budgeted [Member]	Variance [Member]	Actual [Member]
Variance Analysis [Hierarchy]			
Sales	5,000	1,000	6,000
Cost of Goods Sold	3,000	1,000	4,000
Contribution Margin	2,000	(1,000)	1,000
Distribution Costs	1,000	0	1,000

So as you can see above you have budgeted, variance, and, and actual facts for four different financial line items all of which are for the same period. Similar to this is the forecast, variance, and actual. Essentially what is going on is that two different reporting scenarios are being compared. Either way, the facts are in different contexts and therefore again XBRL calculations cannot be used to represent this type of information. But, XBRL Formula can be used. And again, this is a less common computation pattern but it does exist periodically. And so, it is possible to represent 100% of variance type mathematical relations within an XBRL-based financial report and verify that those computations are consistent with that representation.

A sixth and final mathematical relation pattern, or patterns, is again not covered by XBRL calculation relations. That computation pattern as I call it is basically classified as **complex computation** meaning "everything else". Here is an example, the earnings per share computation:

Component: (Network and Table)		
Network	70000 - Unknown - **Earnings Per Share Components**	
Table	Earnings Per Share Components [Table]	
Reporting Entity [Axis]	SAMP http://www.SampleCompany.com	
Legal Entity [Axis]	Consolidated Entity [Member]	
	Period [Axis]	
Earnings Per Share Components [Line Items]	2010-01-01/2010-12-31	2009-01-01/2009-12-31
Earnings Per Share Components [Hierarchy]		
Net Income (Loss)	10,000,000	20,000,000
Weighted Average Common Shares	100,000,000	100,000,000
Earnings Per Share	0.10	0.20

The mathematical formula is "Earnings per share = Net income (loss) / Weighted average common shares". Again, this is easily represented by and can be validated to be correct using XBRL Formula. And therefore, again, 100% of this other class of all other computations not covered by other patterns is likewise covered by XBRL Formula.

There is one other class of computation that is critically important to understand. I have pointed out above the patterns of mathematical computations that cannot be represented using XBRL calculations. Those limitations are clear. What is less clear is what is not covered by XBRL Formula. What I mean is that there could be some gap between mathematical computations that exist in real world financial reports and the problem solving logic or expressive power of XBRL Formula to represent mathematical computations that exist in the real world. At present, that gap is unknown. And therefore, there could be some limitation as to what can be represented by and verified to be correct using XBRL Formula. But currently, I cannot tell you what that gap is.

However, this is not a problem. In the section "Manual Verification" which is coming up; all mathematical relations that cannot be represented using XBRL calculation relations and XBRL Formula can be verified to be correct using manual processes. And therefore, one can conclude that it is completely possible to verify 100% of report specific mathematical relations using specific automated

machine-based processes and manual processes such that the complete set of report specific mathematical relations can be verified. And therefore, one can conceivably believe that with respect to these report specific mathematical relations can be guaranteed to contain zero defects.

Model Structure Relations

Model structure validation tests the relationships between categories of report elements within XBRL presentation relations. These presentation relations are not covered by XBRL validation because the relations are not specified by the XBRL technical syntax[19].

While XBRL calculation relations are checked as part of the base XBRL 2.1 technical syntax validation and XBRL definition relations are checked as part of the XBRL 2.1 technical syntax validation plus the additional XBRL Dimensions 1.0 technical syntax validation; the allowed and disallowed relationships between the different categories of report elements in the XBRL presentation relations are not covered by the XBRL technical specification. As such, supplemental automated validation was created to satisfy this need.

What is meant by the model structure relations is the relations between XBRL networks, hypercubes, dimensions, members, primary items, concrete concepts, and abstract concepts. For example, here is an example of XBRL presentation relations:

A pathological example will help you see my point. The following is completely valid per the XBRL technical specification:

[19] A really good question would be, "Could these relations be verified by XBRL technical syntax? The answer is yes, they could.

You should have two questions about the above representation. The first question is, "What does the representation mean?" The second question is, why would something like that be allowed per the XBRL technical specification?

While most XBRL presentation relations problems are not as pathological as the example provided above to make my point; some problems do exist today. The most common problems include using a [Member] as an [Abstract] or some similar problem. But even in the US GAAP XBRL Taxonomy, sometimes you see a [Table] that has another [Table] as a child. What exactly does that mean?

The model structure of an XBRL-based public company financial report is generally not disputed and today over 99.9% of all XBRL-based public company financial reports submitted to the SEC are consistent with supplemental automated rules specified[20].

The following matrix shows the valid and invalid relations between the pieces that make up the XBRL presentation relations model structure which include **Network**, **Table** (i.e. Hypercube), **Axis** (i.e. Dimensions), **Member**, **Line Items** (i.e. Primary Items), **Abstract**, and **Concept** report elements: (RED is enforced by the XBRL technical specification, ORANGE is not allowed, YELLOW is not advised, and GREEN is allowed)

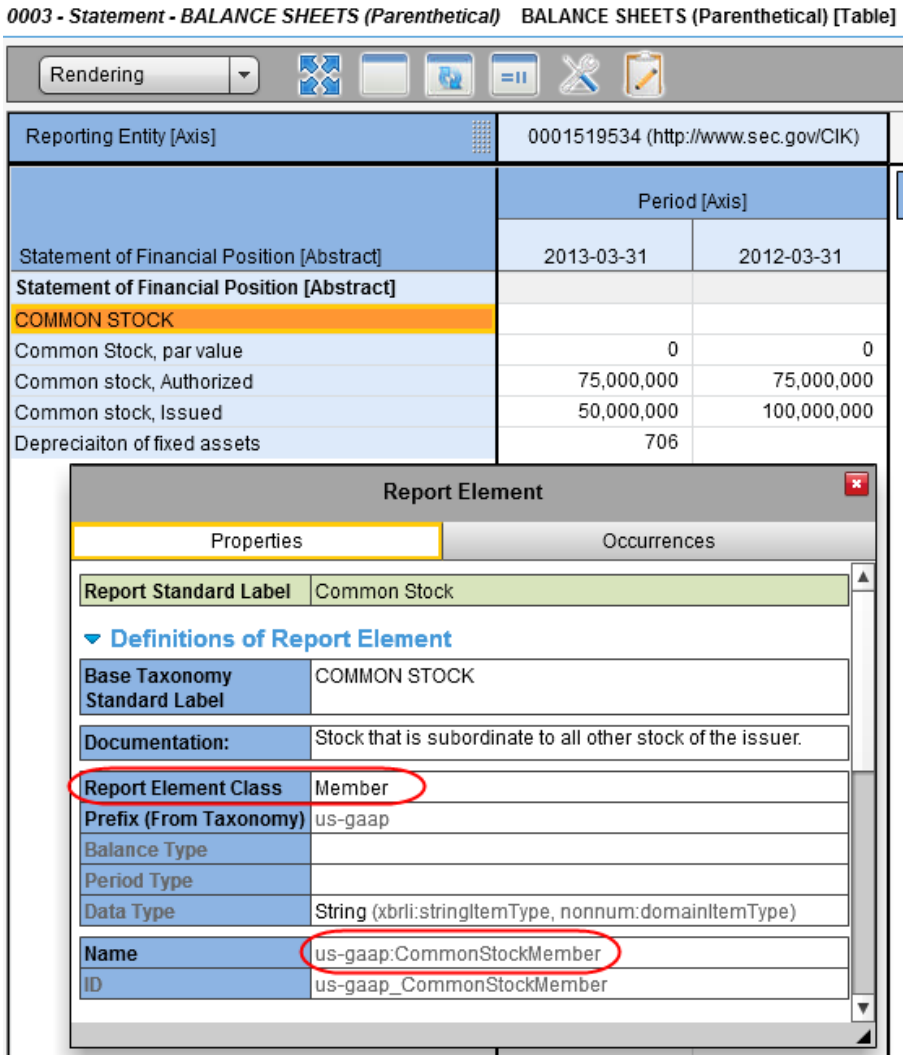
Child	Parent						
	Network	Table	Axis	Member	LineItems	Abstract	Concept
Network	0	0	0	0	0	0	0
Table	0	0	0	0	0	0	0
Axis	0	48	0	0	0	0	0
Member	0	0	48	44	0	0	0
LineItems	0	33	0	0	0	0	0
Abstract	0	0	0	0	40	20	0
Concept	0	0	0	0	6	205	0

[20] Model structure rules represented within XBRL definition relations, http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/model-structure/ModelStructure-rules-us-gaap-def.xml

While XBRL does not enforce the allowed and disallowed relations between the different categories of XBRL report elements; the existence of errors in XBRL-based public company financial reports shows why this automated validation process is necessary[21].

Two specific examples will help one understand the issue of representing the structure in illogical or ambiguous ways. In this first example this filer used a MEMBER, which is intended to be a part of an Axis, as a child of an Abstract concept.

http://www.sec.gov/Archives/edgar/data/1519534/000146970913000495/mssd-20130331.xml



In this case the meaning conveyed is not really impacted because the member was used to represent an Abstract concept which provides no value.

[21] One issue that I am not addressing is the consistence between the network identifies used to represent the XBRL presentation relations, XBRL calculation relations, and XBRL definition relations. Not having these match do not cause problems in terms of meaning of information represented. But having these consistent does make working with such networks and the fragments of a report represented by those fragments significantly easier.

In this second example, an [Axis] was used incorrectly. An [Axis] is supposed to be part of a [Table]. Here the [Axis] was used as an [Abstract] report element. Notice that you see no explicitly defined [Table].

http://www.sec.gov/Archives/edgar/data/318673/000109690613000418/snfca-20121231.xml

Label	Report Element Class	Period	Balance	Name
Note 2: Investments: Held-to-maturity Securities (Tables) [Table]				(Implied)
Tables/Schedules	[Abstract]			us-gaap:TableTextBlockSupplementAbstract
Scenario	[Axis]			us-gaap:StatementScenarioAxis
Scenario, Unspecified	[Member]			us-gaap:ScenarioUnspecifiedDomain
AsOfDecember312012Member	[Member]			fil:AsOfDecember312012Member
as of December 31, 2011	[Member]			fil:AsOfDecember312011Member
Held-to-maturity Securities	[Concept]	For Period		us-gaap:HeldToMaturitySecuritiesTextBlock

Model structure validation uses automated processes to detect these sorts of modeling errors.

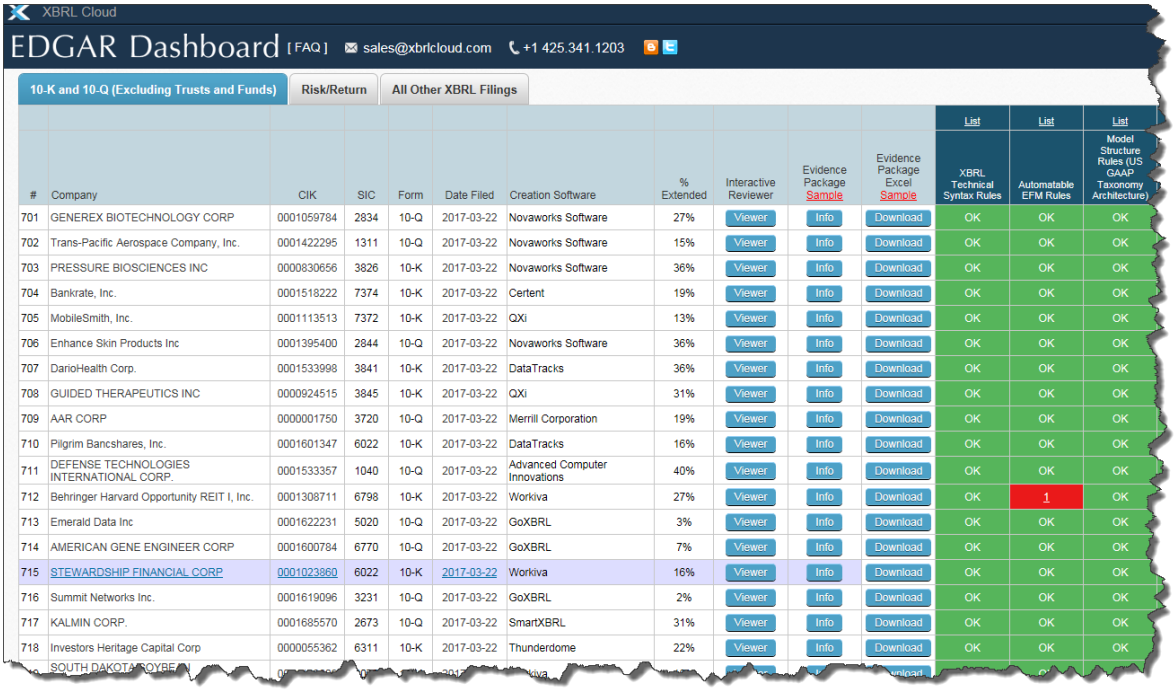
Edgar Filer Manual (EFM) Validation (System rules)

The SEC provides a manual, the EDGAR Filer Manual[22] or EFM, which is used to specify how an XBRL-based public company financial report is to be created. Many of the rules specified by the EFM can be tested using automated processes. The SEC provides the Interactive Data Public Test Suite[23] to help software vendors implement these automated checks.

Note that EFM rules where it is impossible to write a machine-readable business rule; then manual processes must be used to make sure the EFM rule is being followed. Basically, if a machine-readable rule cannot be written then manual processes are necessary to verify that the rule is being followed.

Today, consistency with EFM automatable rules is about 95% or higher with most of the inconsistencies related to EFM rules having to do with the formatting of HTML syntax within text blocks.

XBRL Cloud provides one of the better EFM validation services available[24]. The XBRL Cloud EDGAR Dashboard allows you to see that there are errors, but you must subscribe to their services to see the nature of specific errors:



XBRL Cloud

EDGAR Dashboard [FAQ] sales@xbrlcloud.com +1 425.341.1203

10-K and 10-Q (Excluding Trusts and Funds) | Risk/Return | All Other XBRL Filings

#	Company	CIK	SIC	Form	Date Filed	Creation Software	% Extended	Interactive Reviewer	Evidence Package Sample	Evidence Package Excel Sample	List: XBRL Technical Syntax Rules	List: Automatable EFM Rules	List: Model Structure Rules (US GAAP Taxonomy Architecture)
701	GENEREX BIOTECHNOLOGY CORP	0001059784	2834	10-Q	2017-03-22	Novaworks Software	27%	Viewer	Info	Download	OK	OK	OK
702	Trans-Pacific Aerospace Company, Inc.	0001422295	1311	10-Q	2017-03-22	Novaworks Software	15%	Viewer	Info	Download	OK	OK	OK
703	PRESSURE BIOSCIENCES INC	0000830656	3826	10-K	2017-03-22	Novaworks Software	36%	Viewer	Info	Download	OK	OK	OK
704	Bankrate, Inc.	0001518222	7374	10-K	2017-03-22	Certent	19%	Viewer	Info	Download	OK	OK	OK
705	MobileSmith, Inc.	0001113513	7372	10-K	2017-03-22	QXi	13%	Viewer	Info	Download	OK	OK	OK
706	Enhance Skin Products Inc	0001395400	2844	10-Q	2017-03-22	Novaworks Software	36%	Viewer	Info	Download	OK	OK	OK
707	DarioHealth Corp.	0001533998	3841	10-K	2017-03-22	DataTracks	36%	Viewer	Info	Download	OK	OK	OK
708	GUIDED THERAPEUTICS INC	0000924515	3845	10-K	2017-03-22	QXi	31%	Viewer	Info	Download	OK	OK	OK
709	AAR CORP	0000001750	3720	10-Q	2017-03-22	Merrill Corporation	19%	Viewer	Info	Download	OK	OK	OK
710	Pilgrim Bancshares, Inc.	0001601347	6022	10-K	2017-03-22	DataTracks	16%	Viewer	Info	Download	OK	OK	OK
711	DEFENSE TECHNOLOGIES INTERNATIONAL CORP.	0001533357	1040	10-Q	2017-03-22	Advanced Computer Innovations	40%	Viewer	Info	Download	OK	OK	OK
712	Behringer Harvard Opportunity REIT I, Inc.	0001308711	6798	10-K	2017-03-22	Workiva	27%	Viewer	Info	Download	OK	1	OK
713	Emerald Data Inc	0001622231	5020	10-Q	2017-03-22	GoXBRL	3%	Viewer	Info	Download	OK	OK	OK
714	AMERICAN GENE ENGINEER CORP	0001600784	6770	10-Q	2017-03-22	GoXBRL	7%	Viewer	Info	Download	OK	OK	OK
715	STEWARDSHIP FINANCIAL CORP	0001023860	6022	10-K	2017-03-22	Workiva	16%	Viewer	Info	Download	OK	OK	OK
716	Summit Networks Inc.	0001619096	3231	10-Q	2017-03-22	GoXBRL	2%	Viewer	Info	Download	OK	OK	OK
717	KALMIN CORP.	0001685570	2673	10-Q	2017-03-22	SmartXBRL	31%	Viewer	Info	Download	OK	OK	OK
718	Investors Heritage Capital Corp	0000055362	6311	10-K	2017-03-22	Thunderdome	22%	Viewer	Info	Download	OK	OK	OK
	SOUTH DAKOTA SOYBEAN												

As such, using manual and automated processes, it is possible to make sure there are zero defects related to XBRL-based financial reports. Clearly automated processes are preferred to manual processes due to the number of details involved and the cost of manual validation. Further, automated processes are more reliable.

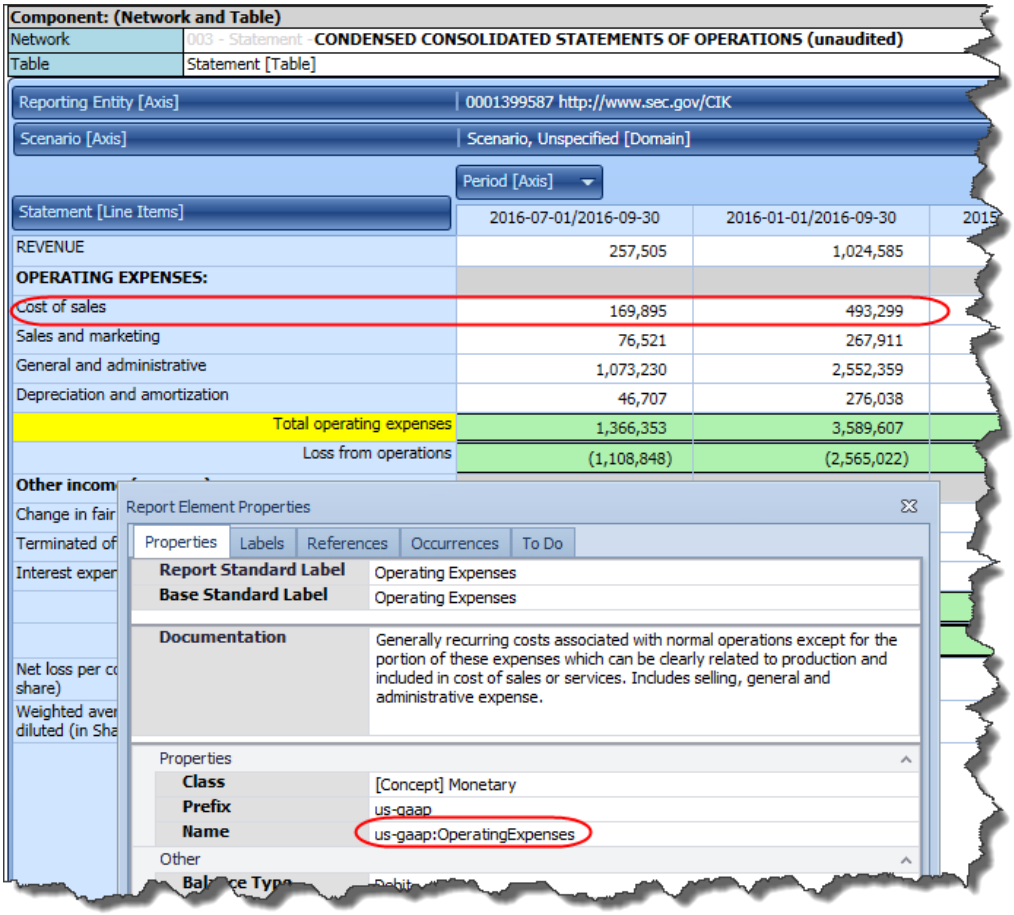
[22] Edgar Filer Manual, https://www.sec.gov/info/edgar/edmanuals.htm
[23] Interactive Data Public Test Suite, https://www.sec.gov/page/osdinteractivedatatestsuite
[24] XBRL Cloud EDGAR Dashboard, https://edgardashboard.xbrlcloud.com/edgar-dashboard/

Type or Class Relations

It is possible to be consistent with the XBRL technical syntax, consistent with the expectations of the Edgar Filer Manual (EFM), have the report specific mathematical computations all correct; but still have errors in your XBRL-based financial report. One such error is caused by violating type or class relations.

Type or class relations[25] validation has to do with the **proper use of a concept relative to another concept**. The best way to understand this is with an example of a common mistake. In this filing a public company represented the line item labeled "Total operating expenses" using the concept "us-gaap:OperatingExpenses". However, if you note from the income statement, the line item "Cost of Sales", represented using the concept "us-gaap:CostOfRevenue" which is used to represent direct operating expenses is included within the concept "us-gaap:OperatingExpenses" which is used to represent indirect operating expenses. What this filer should have done is to use the concept "us-gaap:CostsAndExpenses" which includes both direct and indirect operating expenses.

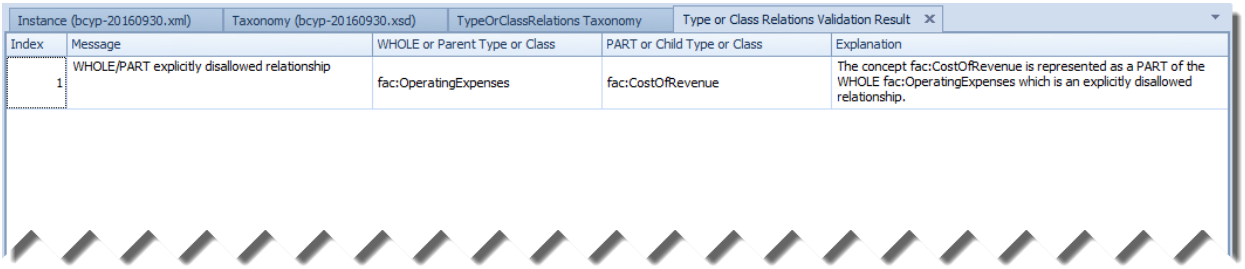
http://www.sec.gov/Archives/edgar/data/1399587/000118518516005694/0001185185-16-005694-index.htm



[25] Mereology is the theory of parthood relations: of the relations of part to whole and the relations of part to part within a whole. Stanford Encyclopedia of Philosophy, https://plato.stanford.edu/entries/mereology/

There are other similar types of relations related to the proper use of a concept relative to some other concept within an XBRL-based public company financial report. The tests of type or class relations are represented using XBRL definition relations[26]. If you load this XBRL instance and run Type of Class Relations validation you will be notified of this representation error within the XBRL-based digital financial report:

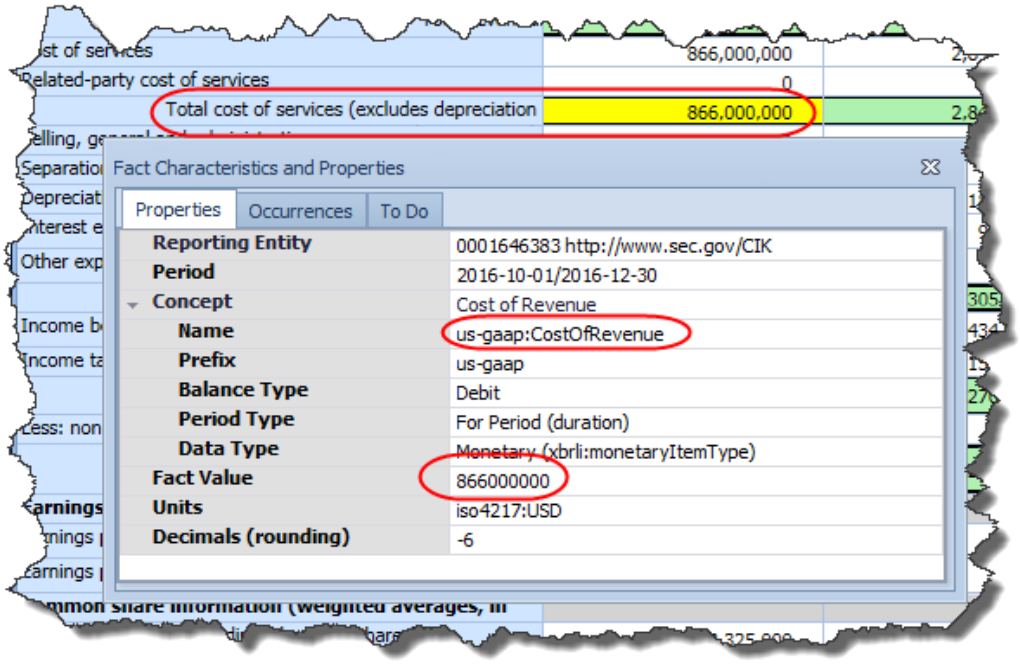
https://www.sec.gov/Archives/edgar/data/1399587/000118518516005694/bcyp-20160930.xml



A second example of the same situation will walk you through some additional details to help you better understand the nature of type or class validation and help you understand how to spot them. If you load this XBRL instance:

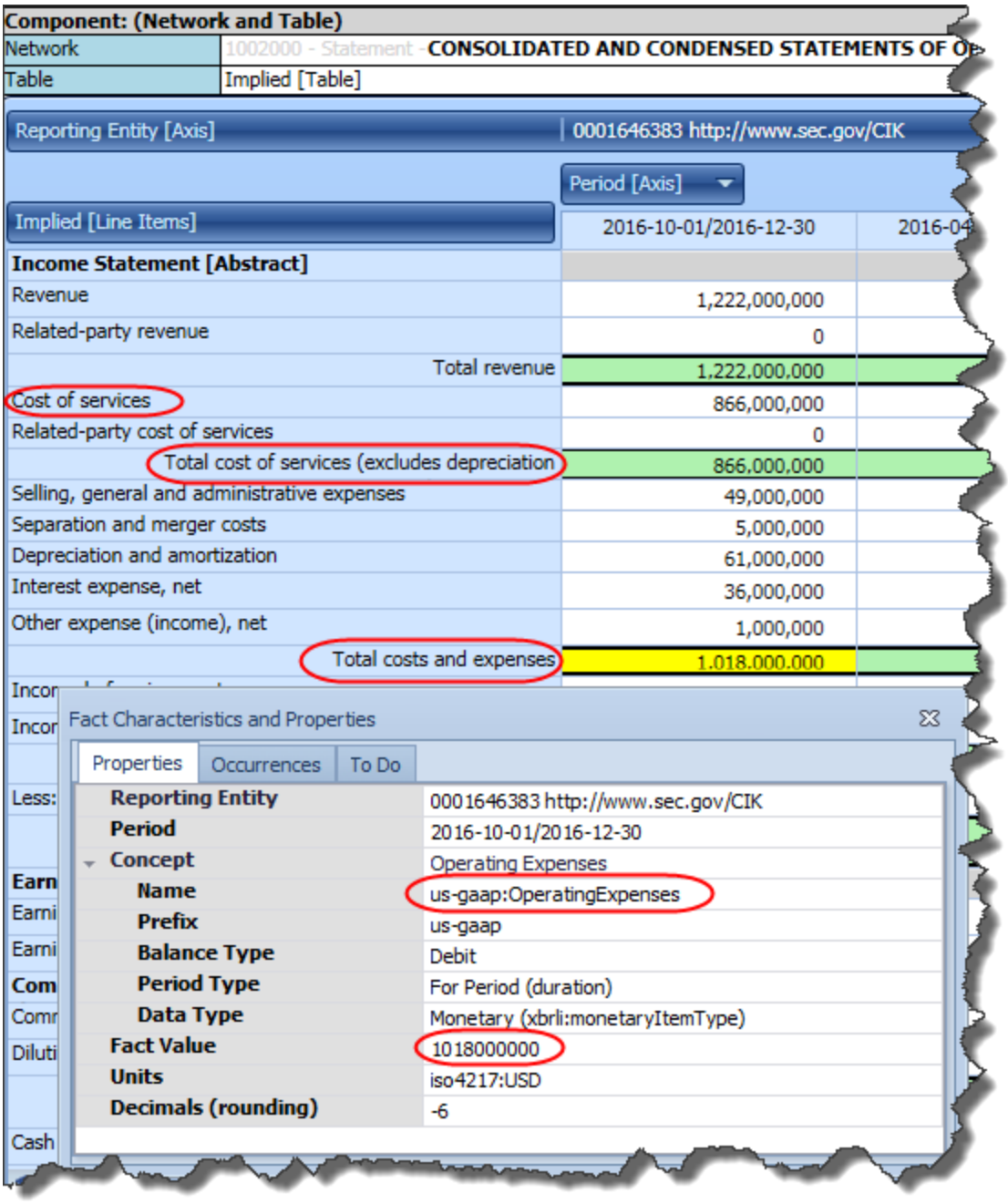
https://www.sec.gov/Archives/edgar/data/1646383/000164638317000014/csra-20161230.xml

If you examine the income statement you see the line item “Total cost of services”:

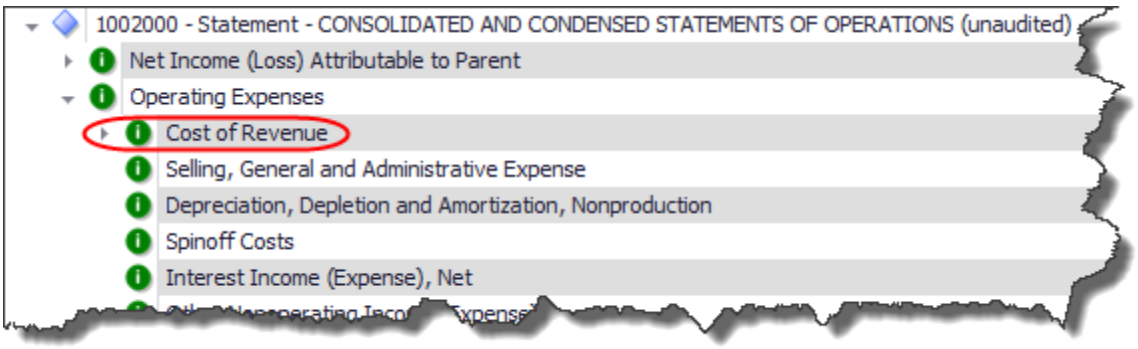


[26] Type or Class relations represented as XBRL definition relations, http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/type-class/TypeOrClassRelations-us-gaap.xsd

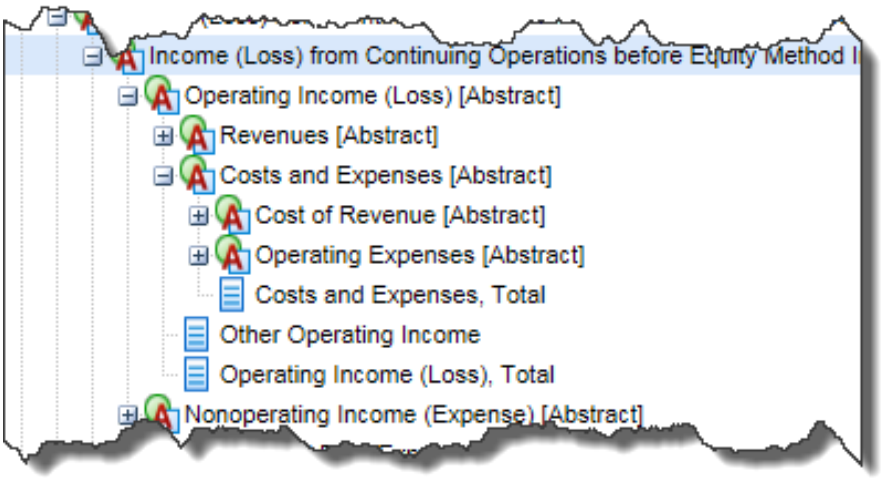
That line item seems fine and all report specific mathematical computations work fine; but when you examine the line item relative to other reported line items you can see the representation problem that exists in the income statement:



Examining the XBRL calculation relations that are shown below helps you see that in this financial report the concept “us-gaap:CostOfRevenue” is represented as being a PART OF “us-gaap:OperatingExpenses”.



When you examine the US GAAP XBRL Taxonomy, you can see the relative relationship between the concepts *us-gaap:CostOfRevenue* and *us-gaap:OperatingExpenses* by looking at operating income (loss)[27] on the income statement:



An even better indication of the relationship can be seen by examining the XBRL calculation relations for Costs and Expenses[28]. You can see that that the correct concept is *us-gaap:CostsAndExpenses* as opposed to *us-gaap:OperatingExpenses*.

Costs and Expenses

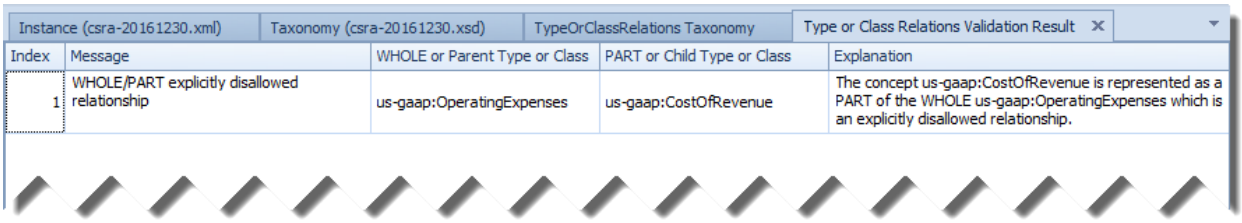
Calculations

124001 - Statement - Statement of Income

	Cost of Revenue	*Dr*
+	Operating Expenses	*Dr*
	Costs and Expenses	*Dr*

[27] US GAAP XBRL Taxonomy, Operating Income (Loss), https://goo.gl/7vMpnL
[28] US GAAP XBRL Taxonomy, Costs and Expenses, https://goo.gl/K9j2JV

As you can see by the Type or Class Relations Validation Report, this representation mistake is detected so that the creator of the digital financial report can correct this error:



And so, there are two ways to test for type or class relations that might be a problem. The best way is to test what is reported in specific XBRL-based public company financial reports against the expectations of the US GAAP XBRL Taxonomy. While this does work in many cases, the organization of the US GAAP XBRL Taxonomy is not appropriate for making sure you detect all of these sorts of issues.

However, specific known problems can be represented which overcome the limitations of the US GAAP XBRL Taxonomy representations. A combination of leveraging information that exists in the US GAAP XBRL Taxonomy and what is provided by supplemental lists of specifically inappropriate relationships can provide the necessary information to make sure that 100% of the type or class errors that might occur in a financial report are detected so that you have zero defects in your XBRL-based financial reports.

Fundamental Accounting Concept Relations

Another common error is in XBRL-based financial reports of public companies is to represent facts that conflict with, contradict, or is illogical relative to other reported facts or are inconsistent with the way other public companies report facts. You can think of these relations as **continuity cross-checks**. Again, none of these errors would be caught by XBRL technical syntax, report specific mathematical relations, model structure, or type/class relations validation. A simple example of a fundamental accounting concept relation continuity cross check is the accounting equation[29]: Assets = Liabilities and Equity.

These continuity cross checks are universal when applied to each reporting style used by public companies. While public companies can, and do, report differently; how companies report can be grouped into common patterns or **reporting styles**. For example, a financial institution uses interest-based revenues style for their income statement and unclassified balance sheets. While there can be a wide variety of reporting styles, 85% of all public companies use approximately only one of about 20 different reporting styles[30]. I have assigned codes to each reporting style. Here is summary information about reporting styles:

#	Reporting style	Filings Count	Filings With No Errors	Sum Errors (all filings)	Average Errors per Filing	Percent Without Error	Cum	Cum %
1	COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC6	1,947	1,645	454	.2	84%	1,947	31.2%
2	COMID-BSC-CF1-ISS-IEMIB-OILY-SPEC1	874	745	214	.2	85%	2,821	45.2%
3	COMID-BSC-CF1-ISS-IEMIB-OILY-SPEC2	786	692	127	.2	88%	3,607	57.8%
4	INTBX-BSU-CF1-ISS-IEMIX-OILN	480	426	71	.1	89%	4,087	65.5%
5	COMID-BSC-CF1-ISS-IEMIB-OILY	178	162	30	.2	91%	4,265	68.3%
6	COMID-BSC-CF1-ISM-IEMIX-OILY-PARK	163	149	18	.1	91%	4,428	70.9%
7	COMID-BSC-CF1-IS3-IEMIB-OILN	130	93	49	.4	72%	4,558	73.0%
8	COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC9	124	106	20	.2	85%	4,682	75.0%
9	COMID-BSC-CF1-IS6-IEMIX-OILN	108	92	24	.2	85%	4,790	76.7%
10	INSBX-BSU-CF1-ISS-IEMIX-OILN	95	87	9	.1	92%	4,885	78.2%
11	COMID-BSC-CF1-IS8-IEMIB-OILN	78	56	35	.4	72%	4,963	79.5%
12	COMID-BSC-CF1-ISM-IEMIT-OILY-SPEC6	65	44	27	.4	68%	5,028	80.5%
13	Limited2	64	64	0	.0	100%	5,092	81.6%
14	COMID-BSC-CF1-IS4-IEMIB-OILN	61	45	20	.3	74%	5,153	82.5%
15	COMID-BSU-CF1-ISS-IEMIB-OILY-SPEC1	60	48	19	.3	80%	5,213	83.5%
16	COMID-BSC-CF1-ISM-IEMIX-OILY-SPEC7	60	37	38	.6	62%	5,273	84.4%
17	Lim	58	58	0	.0	100%	5,331	85.4%
95	SECBX-BSC-CF1-ISS-IEMIB-OILN	1	1	0	.0	100%	6,240	[illegible]
96	SECBX-BSU-CF1-ISM-IEMIX-OILN-CITI	1	1	0	.0	100%	6,241	100.0%
97	COMID-BSC-CF1-ISM-IEMIT-OILN	1	0	3	3.0		6,242	100.0%
98	COMID-BSC-CF2-ISS-IEMIT-OILY	1	0	2	2.0		6,243	100.0%
99	COMID-BSU-CF2-IS6-IEMIX-OILN	1	0	1	1.0		6,244	100.0%
		6,244	5,249	1,463	.2			

Percent of all filings conforming to all FAC relations		84.1%
Total filings NOT conforming	995	
Total tests	137,368	100.00%
Total inconsistent	1,463	1.07%
Total consistent	**135,905**	**98.93%**

[29] Wikipedia, Accounting Equation, retrieved May 1, 2017, https://en.wikipedia.org/wiki/Accounting_equation

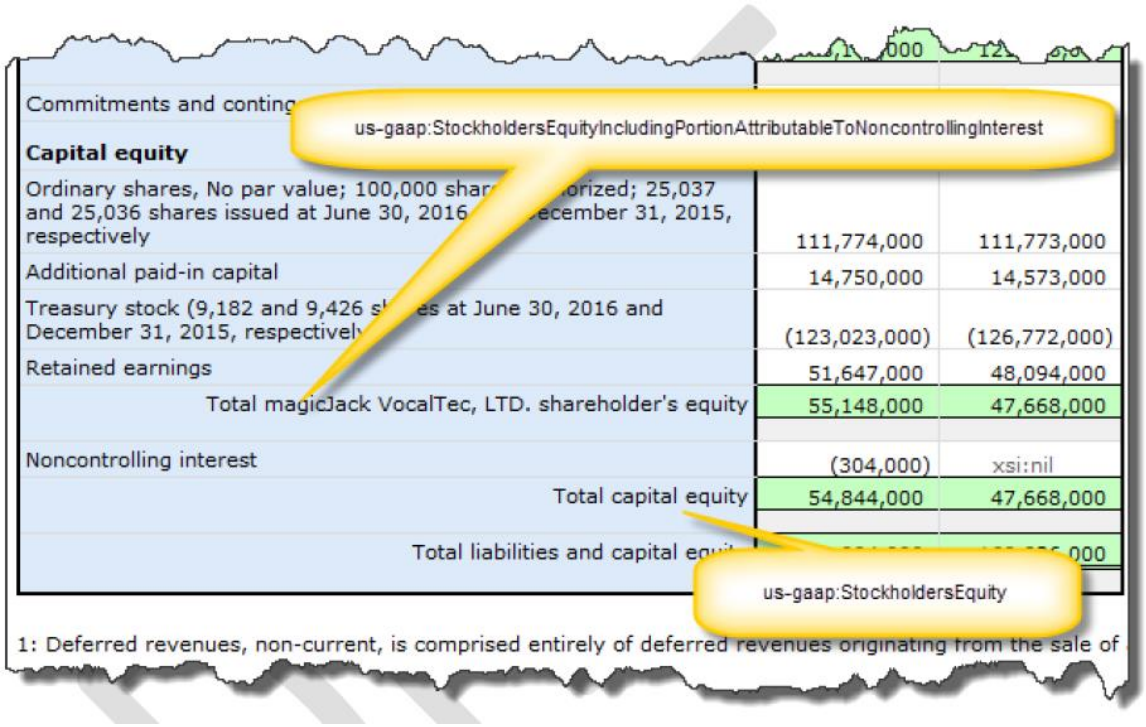
[30] Understanding Fundamental Accounting Concept Relations and Reporting Styles, http://xbrlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part02_Chapter05.6_UnderstandingFundamentalAccountingConceptRelationsAndReportingStyles.pdf

The fundamental accounting concept relations continuity cross-checks[31] verify the logical, mechanical, and mathematical accounting relationships between reported facts. Several documents I have created provide examples of common mistakes public companies make when creating their XBRL-based digital financial reports[32]. The fundamental accounting concept relations are universally applicable rather than report specific. Differences in the relations are managed by using reporting styles to group sets of fundamental accounting concept relations.

We will provide two examples here to help you better understand the essence of these fundamental accounting concept relations continuity cross-checks. We encourage you to have a look at the many examples[33] which document errors found by the fundamental accounting concept relations continuity cross-checks.

In this first example below, the public company reversed the equity concepts used. They reversed the concepts used to represent the line items "Equity attributable to parent" and "Equity" (parent + noncontrolling interest)

http://www.sec.gov/Archives/edgar/data/1005699/000117891316006153/0001178913-16-006153-index.htm



[31] Charles Hoffman, *Fundamental Accounting Concept Relations*, http://xbrl.squarespace.com/fundamental-accounting-concept/

[32] Charles Hoffman, *Understanding Logical, Mechanical, and Mathematical Accounting Relations in XBRL-based Digital Financial Reports*, http://xbrl.squarespace.com/journal/2016/12/15/understanding-logical-mechanical-and-mathematical-accounting.html

[33] Charles Hoffman, *High Quality Examples of Errors in XBRL-based Financial Reports*, http://xbrl.squarespace.com/journal/2017/4/29/high-quality-examples-of-errors-in-xbrl-based-financial-repo.html

In the next example the public company used an after-tax concept “us-gaap:IncomeLossFromContinuingOperations” to represent a before-tax line item. The concept that they should have used is “us-gaap:OperatingIncomeLoss”.

http://www.sec.gov/Archives/edgar/data/21510/000002151016000068/0000021510-16-000068-index.htm

Income Statement [Abstract]	Period [Axis]			
	2016-04-03 - 2016-07-02	2015-10-04 - 2016-07-02	2015-04-05 - 2015-07-04	2014-09-28 - 2015-07-04
Income Statement [Abstract]				
Net sales	218,767,000	608,924,000	188,502,000	592,838,000
Cost of sales	124,208,000	341,868,000	109,720,000	348,433,000
Gross profit	94,559,000	267,056,000	78,782,000	244,405,000
Operating expenses:				
Research and development	21,441,000	61,[illegible],000	21,270,000	61,467,000
Selling, general and administrative	46,256,000	[illegible],970,000	36,154,000	113,777,000
Impairment of investment	0	0	2,017,000	2,017,000
Amortization of intangible assets	574,000	1,975,000	647,000	2,009,000
Total operating expenses	68,271,000	187,481,000	60,088,000	179,270,000
Income from operations	26,288,000	79,575,000	18,694,000	65,135,000
Other income (expense):				
Interest and dividend income	351,000	854,000	183,000	440,000
Interest expense	(63,000)	(108,000)	(4,000)	(29,000)
Other—net	564,000	(1,896,000)	(787,000)	286,000
Total other income (expense), net	852,000	(1,150,000)	(608,000)	697,000
Income before income taxes	27,140,000	78,425,000	18,086,000	65,832,000
Provision for income taxes	8,490,000	21,708,000	4,822,000	16,725,000
Net income	18,650,000	56,717,000	13,264,000	49,107,000

us-gaap:IncomeLossFromContinuingOperations

While many of the fundamental accounting concept relations continuity cross checks can be understood by simply looking at one XBRL-based financial report; other errors are better understood when you examine many and even the entire set of about 7,000 such reports and compare/contract how different companies handle exactly the same reporting situation. Further, additional insight can be realized if you compare information across the set of reports submitted each period for a public company.

Existing public company filings provide evidence of both the correct way to represent fundamental accounting concept relations and the incorrect way to represent such information.

Next, we provide two sets of comparisons to help show the power of the fundamental accounting concept relations continuity cross-checks. The first set of comparisons show a period comparison for Microsoft over five consecutive fiscal periods. Note that 100% of the relations are consistent for all five reports for the fundamental accounting concept relations continuity cross-checks. This is seen by the green colored cells. Next, in the second set of comparisons a peer comparison is made between Microsoft and four of Microsoft peers that use the same reporting style as Microsoft. Again, you can see

that 100% of the fundamental accounting concept relations continuity cross-checks are consistent with expectation from the green colored cells.

Ask yourself a question: Why would this not be the case for every public company's XBRL-based financial report? Why would these relations not be consistent? Well, the answer is that they should be consistent. I have been measuring the fundamental accounting concept relations continuity cross-checks for several years[34]. There are nine software vendors/filing agents whose filings are 90% or greater consistent with 100% of these accounting relations. Overall, 98.6% of all public company financial reports are consistent with these relations. Only a minority of XBRL-based financial reports are not consistent with these fundamental accounting concept relations.

Recognize that the information that is shown in the entity comparisons and the period comparisons for an entity is normalized financial statement information. So for example, while it is the case that different entities report different line items on their balance sheets that are used to represent the details of *Current assets*; what is common to every entity which has the same reporting style is that each has the notion of *Current assets* and they either explicitly report that line item (which is the case for *Current assets*) or that line item can be easily derived from other reported information (which is the case for *Noncurrent assets* which is sometimes reported, but more often not explicitly reported).

So, it is this commonality or patterns of reporting that are leveraged to identify the fundamental accounting concept relations and test the continuity between each of the approximately 7,000 public companies to look for anomalies. An anomaly could mean that a public company is making an error or that perhaps a new reporting style could be necessary because there is some unique aspect of a specific report or some group of company's reports. Or, perhaps, an anomaly could mean an error in the US GAAP Financial Reporting XBRL Taxonomy. Creating the test rules is simply a matter of sorting all of these details out.

[34] Public Company Quality Continues to Improve, 9 Quality Leaders
http://xbrl.squarespace.com/journal/2016/11/28/public-company-quality-continues-to-improve-9-quality-leader.html

Period comparison for an entity

Fundamental accounting concept relations continuity cross checks, between periods for a specific entity, here you have five consecutive periods of Microsoft reports:

Component: (Network and Table)

Network	101 - Unknown - **General Information**
Table	General Information [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
General Information [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
General Information [Hierarchy]					
Entity Registrant Name	MICROSOFT CORPORATION	MICROSOFT CORPORATION	MICROSOFT CORPORATION	MICROSOFT CORPORATION	MICROSOFT CORPORATION
Entity Central Index Key	0000789019	0000789019	0000789019	0000789019	0000789019
Entity Filer Category	Large Accelerated Filer	Large Accelerated Filer	Large Accelerated Filer	Large Accelerated Filer	Large Accelerated Filer
Trading Symbol	MSFT	MSFT	MSFT	MSFT	MSFT
Fiscal Year End	--06-30	--06-30	--06-30	--06-30	--06-30
Fiscal Year Focus	2017	2017	2016	2016	2016
Fiscal Period Focus	Q2	Q1	FY	Q3	Q2
Document Type	10-Q	10-Q	10-K	10-Q	10-Q
Balance Sheet Date	2016-12-31	2016-09-30	2016-06-30	2016-03-31	2015-12-31

Component: (Network and Table)

Network	101 - Unknown - **Balance Sheet, Classified**
Table	Balance Sheet, Classified [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Balance Sheet [Line Items]	2016-12-31	2016-09-30	2016-06-30	2016-03-31	2015-12-31
Assets [Roll Up]					
Current Assets	144,949,000,000	157,909,000,000	139,660,000,000	128,421,000,000	127,812,000,000
Noncurrent Assets	79,661,000,000	54,615,000,000	54,034,000,000	53,448,000,000	52,286,000,000
Assets	224,610,000,000	212,524,000,000	193,694,000,000	181,869,000,000	180,098,000,000
Liabilities and Equity [Roll Up]					
Liabilities [Roll Up]					
Current Liabilities	70,787,000,000	58,810,000,000	59,357,000,000	44,354,000,000	42,643,000,000
Noncurrent Liabilities	85,014,000,000	83,342,000,000	62,340,000,000	62,709,000,000	60,675,000,000
Liabilities	155,801,000,000	142,152,000,000	121,697,000,000	107,063,000,000	103,318,000,000
Commitments and Contingencies	xsi:nil	xsi:nil	xsi:nil	xsi:nil	xsi:nil
Temporary Equity	0	0	0	0	0
Equity [Roll Up]					
Equity Attributable to Parent	68,809,000,000	70,372,000,000	71,997,000,000	74,806,000,000	76,780,000,000
Equity Attributable to Noncontrolling Interest	0	0	0	0	0
Equity	68,809,000,000	70,372,000,000	71,997,000,000	74,806,000,000	76,780,000,000
Liabilities and Equity	224,610,000,000	212,524,000,000	193,694,000,000	181,869,000,000	180,098,000,000

Component: (Network and Table)

Network	101.2 - Unknown - **Income Statement, Multi Step, With Operating Income, Special 6**
Table	Income Statement, Single Step [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Income Statement [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Income (Loss) [Roll Up]					
Income (Loss) from Continuing Operations After Tax [...]					
Income (Loss) from Continuing Operations Before Tax [...]					
Operating Income (Loss) [Roll Up]					
Gross Profit [Roll Up]					
Revenues	44,543,000,000	20,453,000,000	85,320,000,000	64,706,000,000	44,175,000,000
Cost of Revenue	17,745,000,000	7,844,000,000	32,780,000,000	24,801,000,000	17,079,000,000
Gross Profit	26,798,000,000	12,609,000,000	52,540,000,000	39,905,000,000	27,096,000,000
Operating Expenses	15,396,000,000	7,384,000,000	32,358,000,000	22,803,000,000	15,277,000,000
Operating Income (Loss)	11,402,000,000	5,225,000,000	20,182,000,000	17,102,000,000	11,819,000,000
Nonoperating Income (Loss) Plus Interest and Debt Expense Plus Income (Loss) from Equity Method Investments	286,000,000	100,000,000	(431,000,000)	(698,000,000)	(451,000,000)
Income (Loss) from Continuing Operations Before Tax	11,688,000,000	5,325,000,000	19,751,000,000	16,404,000,000	11,368,000,000
Income Tax Expense (Benefit)	1,798,000,000	635,000,000	2,953,000,000	2,728,000,000	1,750,000,000
Income (Loss) from Continuing Operations After Tax	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000
Income (Loss) from Discontinued Operations, Net of Tax	0	0	0	0	0
Extraordinary Items of Income (Expense), Net of Tax	0	0	0	0	0
Net Income (Loss)	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000

Component: (Network and Table)

Network	211 - Unknown - **Net Income (Loss) Breakdown**
Table	Net Income (Loss) Breakdown [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Net Income (Loss) Breakdown [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Income (Loss) [Roll Up]					
Net Income (Loss) Attributable to Parent	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000
Net Income (Loss) Attributable to Noncontrolling Interest	0	0	0	0	0
Net Income (Loss)	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000

Component: (Network and Table)

Network	212 - Unknown - **Net Income (Loss) Available to Common Breakdown**
Table	Net Income (Loss) Available to Common Breakdown [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Net Income (Loss) Available to Common Breakdown [Line I...	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Income (Loss) Available to Common Stockholders, Basic [Roll Up]					
Net Income (Loss) Attributable to Parent	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000
Preferred Stock Dividends and Other Adjustments	0	0	0	0	0
Net Income (Loss) Available to Common Stockholders, Basic	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000

Component: (Network and Table)

Network	301 - Unknown - **Statement of Comprehensive Income**
Table	Statement of Comprehensive Income (Loss) [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Statement of Comprehensive Income (Loss) [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Comprehensive Income (Loss) [Roll Up]					
Net Income (Loss)	9,890,000,000	4,690,000,000	16,798,000,000	13,676,000,000	9,618,000,000
Other Comprehensive Income (Loss)	(1,025,000,000)	144,000,000	(985,000,000)	(682,000,000)	(749,000,000)
Comprehensive Income (Loss)	8,865,000,000	4,834,000,000	15,813,000,000	12,994,000,000	8,869,000,000

Component: (Network and Table)

Network	311 - Unknown - **Comprehensive Income (Loss) Breakdown**
Table	Comprehensive Income (Loss) Breakdown [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Comprehensive Income (Loss) Breakdown [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Comprehensive Income (Loss) [Roll Up]					
Comprehensive Income (Loss) Attributable to Parent	8,865,000,000	4,834,000,000	15,813,000,000	12,994,000,000	8,869,000,000
Comprehensive Income (Loss) Attributable to Noncontrolling Interest	0	0	0	0	0
Comprehensive Income (Loss)	8,865,000,000	4,834,000,000	15,813,000,000	12,994,000,000	8,869,000,000

Component: (Network and Table)

Network	401 - Unknown - **Cash Flow Statement**
Table	Cash Flow Statement [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Cash Flow Statement [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Cash Flow [Roll Up]					
Net Cash Flow from Operating Activities [Roll Up]					
Net Cash Flow from Operating Activities, Continuing	17,842,000,000	11,549,000,000	33,325,000,000	24,861,000,000	14,192,000,000
Net Cash Flow from Operating Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Operating Activities	17,842,000,000	11,549,000,000	33,325,000,000	24,861,000,000	14,192,000,000
Net Cash Flow from Investing Activities [Roll Up]					
Net Cash Flow from Investing Activities, Continuing	(33,221,000,000)	(18,470,000,000)	(23,950,000,000)	(13,877,000,000)	(8,394,000,000)
Net Cash Flow from Investing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Investing Activities	(33,221,000,000)	(18,470,000,000)	(23,950,000,000)	(13,877,000,000)	(8,394,000,000)
Net Cash Flow from Financing Activities [Roll Up]					
Net Cash Flow from Financing Activities, Continuing	17,345,000,000	14,329,000,000	(8,393,000,000)	(9,364,000,000)	(4,146,000,000)
Net Cash Flow from Financing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Financing Activities	17,345,000,000	14,329,000,000	(8,393,000,000)	(9,364,000,000)	(4,146,000,000)
Exchange Gains (Losses)	(8,000,000)	10,000,000	(67,000,000)	(45,000,000)	(62,000,000)
Net Cash Flow	1,958,000,000	7,418,000,000	915,000,000	1,575,000,000	1,590,000,000

Component: (Network and Table)	
Network	411.1 - Unknown - **Net Cash Flow Breakdown**
Table	Net Cash Flow Breakdown [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Net Cash Flow Breakdown [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Cash Flow [Roll Up]					
Net Cash Flow, Continuing	1,966,000,000	7,408,000,000	982,000,000	1,620,000,000	1,652,000,000
Net Cash Flow, Discontinued	0	0	0	0	0
Exchange Gains (Losses)	(8,000,000)	10,000,000	(67,000,000)	(45,000,000)	(62,000,000)
Net Cash Flow	1,958,000,000	7,418,000,000	915,000,000	1,575,000,000	1,590,000,000

Component: (Network and Table)	
Network	420.1 - Unknown - **Continuing and Discontinued Net Cash Flow Breakdown**
Table	Cash Flow Statement [Table]

Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK				
	Period [Axis]				
Cash Flow Statement [Line Items]	2016-07-01/2016-12-31	2016-07-01/2016-09-30	2015-07-01/2016-06-30	2015-07-01/2016-03-31	2015-07-01/2015-12-31
Net Cash Flow, Continuing [Roll Up]					
Net Cash Flow from Operating Activities, Continuing	17,842,000,000	11,549,000,000	33,325,000,000	24,861,000,000	14,192,000,000
Net Cash Flow from Investing Activities, Continuing	(33,221,000,000)	(18,470,000,000)	(23,950,000,000)	(13,877,000,000)	(8,394,000,000)
Net Cash Flow from Financing Activities, Continuing	17,345,000,000	14,329,000,000	(8,393,000,000)	(9,364,000,000)	(4,146,000,000)
Net Cash Flow, Continuing	1,966,000,000	7,408,000,000	982,000,000	1,620,000,000	1,652,000,000
Net Cash Flow, Discontinued [Roll Up]					
Net Cash Flow from Operating Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Investing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Financing Activities, Discontinued	0	0	0	0	0
Net Cash Flow, Discontinued	0	0	0	0	0

These are the files for the ENTITY COMPARISON (Above):

http://www.sec.gov/Archives/edgar/data/789019/000156459017000654/msft-20161231.xml
http://www.sec.gov/Archives/edgar/data/789019/000119312516742796/msft-20160930.xml
http://www.sec.gov/Archives/edgar/data/789019/000119312516662209/msft-20160630.xml
http://www.sec.gov/Archives/edgar/data/789019/000119312516550254/msft-20160331.xml
http://www.sec.gov/Archives/edgar/data/789019/000119312516441821/msft-20151231.xml

These are the files for the PEER COMPARISON (Below):

http://www.sec.gov/Archives/edgar/data/858877/000085887717000004/csco-20170128.xml
http://www.sec.gov/Archives/edgar/data/320193/000162828017000717/aapl-20161231.xml
http://www.sec.gov/Archives/edgar/data/789019/000156459017000654/msft-20161231.xml
http://www.sec.gov/Archives/edgar/data/880807/000162828017000901/amsc-20161231.xml
http://www.sec.gov/Archives/edgar/data/796343/000079634317000031/adbe-20161202.xml

Peer comparison across entities with the same reporting style

Fundamental accounting concept relations continuity cross checks, compare entities with the same reporting style; here you have Microsoft contrast to four other public companies that report using the same reporting style:

Component: (Network and Table)	
Network	001 - Unknown - **General Information**
Table	General Information [Table]

Drop Filter Fields Here

	Period [Axis]	Reporting Entity [Axis]			
	2016-07-31/2017-01-28	2016-09-25/2016-12-31	2016-07-01/2016-12-31	2016-04-01/2016-12-31	2015-11-28/2016-12-02
General Information [Line Items]	0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
General Information [Hierarchy]					
Entity Registrant Name	CISCO SYSTEMS, INC.	APPLE INC	MICROSOFT CORPORATION	AMERICAN SUPERCONDUC...	ADOBE SYSTEMS INC
Entity Central Index Key	0000858877	0000320193	0000789019	0000880807	0000796343
Entity Filer Category	Large Accelerated Filer	Large Accelerated Filer	Large Accelerated Filer	Accelerated Filer	Large Accelerated Filer
Trading Symbol	CSCO	AAPL	MSFT	AMSC	0
Fiscal Year End	--07-29	--09-30	--06-30	--03-31	--12-02
Fiscal Year Focus	2017	2017	2017	2016	2016
Fiscal Period Focus	Q2	Q1	Q2	Q3	FY
Document Type	10-Q	10-Q	10-Q	10-Q	10-K
Balance Sheet Date	2017-01-28	2016-12-31	2016-12-31	2016-12-31	2016-12-02

Component: (Network and Table)	
Network	001 - Unknown - **Balance Sheet, Classified**
Table	Balance Sheet, Classified [Table]

Drop Filter Fields Here

	Period [Axis]	Reporting Entity [Axis]			
	2017-01-28	2016-12-31			2016-12-02
Balance Sheet [Line Items]	0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
Assets [Roll Up]					
Current Assets	83,392,000,000	103,332,000,000	144,949,000,000	64,260,000	5,839,774,000
Noncurrent Assets	42,856,000,000	227,809,000,000	79,661,000,000	45,981,000	6,867,340,000
Assets	126,248,000,000	331,141,000,000	224,610,000,000	110,241,000	12,707,114,000
Liabilities and Equity [Roll Up]					
Liabilities [Roll Up]					
Current Liabilities	22,708,000,000	84,130,000,000	70,787,000,000	38,364,000	2,811,635,000
Noncurrent Liabilities	39,722,000,000	114,621,000,000	85,014,000,000	8,084,000	2,470,644,000
Liabilities	62,430,000,000	198,751,000,000	155,801,000,000	46,448,000	5,282,279,000
Commitments and Contingencies	xsi:nil	xsi:nil	xsi:nil	xsi:nil	xsi:nil
Temporary Equity	0	0	0	0	0
Equity [Roll Up]					
Equity Attributable to Parent	63,811,000,000	132,390,000,000	68,809,000,000	63,793,000	7,424,835,000
Equity Attributable to Noncontrolling Interest	7,000,000	0	0	0	0
Equity	63,818,000,000	132,390,000,000	68,809,000,000	63,793,000	7,424,835,000
Liabilities and Equity	126,248,000,000	331,141,000,000	224,610,000,000	110,241,000	12,707,114,000

Component: (Network and Table)	
Network	201.7 - Unknown - **Income Statement, Multi Step, With Operating Income, Special 6**
Table	Income Statement, Single Step [Table]

Drop Filter Fields Here

Income Statement [Line Items]	Period [Axis] 2016-07-31/2017-01-28	Reporting Entity [Axis] 0000858877 http://www.sec.gov/CIK	Period [Axis] 2016-09-25/2016-12-31	Reporting Entity [Axis] 0000320193 http://www.sec.gov/CIK	Period [Axis] 2016-07-01/2016-12-31	Reporting Entity [Axis] 0000789019 http://www.sec.gov/CIK	Period [Axis] 2016-04-01/2016-12-31	Reporting Entity [Axis] 0000880807 http://www.sec.gov/CIK	Period [Axis] 2015-11-28/2016-12-02	Reporting Entity [Axis] 0000796343 http://www.sec.gov/CIK
Net Income (Loss) [Roll Up]										
Income (Loss) from Continuing Operations After Tax [Roll Up]										
Income (Loss) from Continuing Operations Before Tax [Roll Up]										
Operating Income (Loss) [Roll Up]										
Gross Profit [Roll Up]										
Revenues		23,932,000,000		78,351,000,000		44,543,000,000		59,000,000		5,854,430,000
Cost of Revenue		8,772,000,000		48,175,000,000		17,745,000,000		50,992,000		819,908,000
Gross Profit		15,160,000,000		30,176,000,000		26,798,000,000		8,008,000		5,034,522,000
Operating Expenses		9,390,000,000		6,817,000,000		15,396,000,000		28,562,000		3,540,920,000
Operating Income (Loss)		5,770,000,000		23,359,000,000		11,402,000,000		(20,554,000)		1,493,602,000
Nonoperating Income (Loss) Plus Interest and Debt Expense Plus Income (Loss) from Equity Method Investments		146,000,000		821,000,000		286,000,000		1,142,000		(58,464,000)
Income (Loss) from Continuing Operations Before Tax		5,916,000,000		24,180,000,000		11,688,000,000		(19,412,000)		1,435,138,000
Income Tax Expense (Benefit)		1,246,000,000		6,289,000,000		1,798,000,000		1,036,000		266,356,000
Income (Loss) from Continuing Operations After Tax		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000
Income (Loss) from Discontinued Operations, Net of Tax		0		0		0		0		0
Extraordinary Items of Income (Expense), Net of Tax		0		0		0		0		0
Net Income (Loss)		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000

Component: (Network and Table)	
Network	211 - Unknown - **Net Income (Loss) Breakdown**
Table	Net Income (Loss) Breakdown [Table]

Drop Filter Fields Here

Net Income (Loss) Breakdown [Line Items]	Period [Axis] 2016-07-31/2017-01-28	Reporting Entity [Axis] 0000858877 http://www.sec.gov/CIK	Period [Axis] 2016-09-25/2016-12-31	Reporting Entity [Axis] 0000320193 http://www.sec.gov/CIK	Period [Axis] 2016-07-01/2016-12-31	Reporting Entity [Axis] 0000789019 http://www.sec.gov/CIK	Period [Axis] 2016-04-01/2016-12-31	Reporting Entity [Axis] 0000880807 http://www.sec.gov/CIK	Period [Axis] 2015-11-28/2016-12-02	Reporting Entity [Axis] 0000796343 http://www.sec.gov/CIK
Net Income (Loss) [Roll Up]										
Net Income (Loss) Attributable to Parent		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000
Net Income (Loss) Attributable to Noncontrolling Interest		0		0		0		0		0
Net Income (Loss)		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000

Component: (Network and Table)	
Network	212 - Unknown - **Net Income (Loss) Available to Common Breakdown**
Table	Net Income (Loss) Available to Common Breakdown [Table]

Drop Filter Fields Here

Net Income (Loss) Available to Common Breakdown [Line I...	Period [Axis] 2016-07-31/2017-01-28	Reporting Entity [Axis] 0000858877 http://www.sec.gov/CIK	Period [Axis] 2016-09-25/2016-12-31	Reporting Entity [Axis] 0000320193 http://www.sec.gov/CIK	Period [Axis] 2016-07-01/2016-12-31	Reporting Entity [Axis] 0000789019 http://www.sec.gov/CIK	Period [Axis] 2016-04-01/2016-12-31	Reporting Entity [Axis] 0000880807 http://www.sec.gov/CIK	Period [Axis] 2015-11-28/2016-12-02	Reporting Entity [Axis] 0000796343 http://www.sec.gov/CIK
Net Income (Loss) Available to Common Stockholders, Basic [Roll Up]										
Net Income (Loss) Attributable to Parent		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000
Preferred Stock Dividends and Other Adjustments		0		0		0		0		0
Net Income (Loss) Available to Common Stockholders, Basic		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000

Component: (Network and Table)	
Network	301 - Unknown - **Statement of Comprehensive Income**
Table	Statement of Comprehensive Income (Loss) [Table]

Drop Filter Fields Here

Statement of Comprehensive Income (Loss) [Line Items]	Period [Axis] 2016-07-31/2017-01-28	Reporting Entity [Axis] 0000858877 http://www.sec.gov/CIK	Period [Axis] 2016-09-25/2016-12-31	Reporting Entity [Axis] 0000320193 http://www.sec.gov/CIK	Period [Axis] 2016-07-01/2016-12-31	Reporting Entity [Axis] 0000789019 http://www.sec.gov/CIK	Period [Axis] 2016-04-01/2016-12-31	Reporting Entity [Axis] 0000880807 http://www.sec.gov/CIK	Period [Axis] 2015-11-28/2016-12-02	Reporting Entity [Axis] 0000796343 http://www.sec.gov/CIK
Comprehensive Income (Loss) [Roll Up]										
Net Income (Loss)		4,670,000,000		17,891,000,000		9,890,000,000		(20,448,000)		1,168,782,000
Other Comprehensive Income (Loss)		(467,000,000)		(389,000,000)		(1,025,000,000)		(1,372,000)		(4,522,000)
Comprehensive Income (Loss)		4,203,000,000		17,502,000,000		8,865,000,000		(21,820,000)		1,164,260,000

Component: (Network and Table)	
Network	311 - Unknown - **Comprehensive Income (Loss) Breakdown**
Table	Comprehensive Income (Loss) Breakdown [Table]

Drop Filter Fields Here

Comprehensive Income (Loss) Breakdown [Line Items]	Period [Axis]: 2016-07-31/2017-01-28	2016-09-25/2016-12-31	2016-07-01/2016-12-31	2016-04-01/2016-12-31	2015-11-28/2016-12-02
	Reporting Entity [Axis]: 0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
Comprehensive Income (Loss) [Roll Up]					
Comprehensive Income (Loss) Attributable to Parent	4,195,000,000	17,502,000,000	8,865,000,000	(21,820,000)	1,164,260,000
Comprehensive Income (Loss) Attributable to Noncontrolling Interest	8,000,000	0	0	0	0
Comprehensive Income (Loss)	4,203,000,000	17,502,000,000	8,865,000,000	(21,820,000)	1,164,260,000

Component: (Network and Table)	
Network	401 - Unknown - **Cash Flow Statement**
Table	Cash Flow Statement [Table]

Drop Filter Fields Here

Cash Flow Statement [Line Items]	Period [Axis]: 2016-07-31/2017-01-28	2016-09-25/2016-12-31	2016-07-01/2016-12-31	2016-04-01/2016-12-31	2015-11-28/2016-12-02
	Reporting Entity [Axis]: 0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
Net Cash Flow [Roll Up]					
Net Cash Flow from Operating Activities [Roll Up]					
Net Cash Flow from Operating Activities, Continuing	6,502,000,000	27,056,000,000	17,842,000,000	(10,535,000)	2,199,728,000
Net Cash Flow from Operating Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Operating Activities	6,502,000,000	27,056,000,000	17,842,000,000	(10,535,000)	2,199,728,000
Net Cash Flow from Investing Activities [Roll Up]					
Net Cash Flow from Investing Activities, Continuing	(4,978,000,000)	(19,122,000,000)	(33,221,000,000)	357,000	(960,033,000)
Net Cash Flow from Investing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Investing Activities	(4,978,000,000)	(19,122,000,000)	(33,221,000,000)	357,000	(960,033,000)
Net Cash Flow from Financing Activities [Roll Up]					
Net Cash Flow from Financing Activities, Continuing	1,743,000,000	(12,047,000,000)	17,345,000,000	(3,657,000)	(1,090,706,000)
Net Cash Flow from Financing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Financing Activities	1,743,000,000	(12,047,000,000)	17,345,000,000	(3,657,000)	(1,090,706,000)
Exchange Gains (Losses)	0	0	(8,000,000)	(432,000)	(14,234,000)
Net Cash Flow	3,267,000,000	(4,113,000,000)	1,958,000,000	(14,267,000)	134,755,000

Component: (Network and Table)	
Network	411.1 - Unknown - **Net Cash Flow Breakdown**
Table	Net Cash Flow Breakdown [Table]

Drop Filter Fields Here

Net Cash Flow Breakdown [Line Items]	Period [Axis]: 2016-07-31/2017-01-28	2016-09-25/2016-12-31	2016-07-01/2016-12-31	2016-04-01/2016-12-31	2015-11-28/2016-12-02
	Reporting Entity [Axis]: 0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
Net Cash Flow [Roll Up]					
Net Cash Flow, Continuing	3,267,000,000	(4,113,000,000)	1,966,000,000	(13,835,000)	148,989,000
Net Cash Flow, Discontinued	0	0	0	0	0
Exchange Gains (Losses)	0	0	(8,000,000)	(432,000)	(14,234,000)
Net Cash Flow	3,267,000,000	(4,113,000,000)	1,958,000,000	(14,267,000)	134,755,000

Component: (Network and Table)	
Network	420.1 - Unknown - **Continuing and Discontinued Net Cash Flow Breakdown**
Table	Cash Flow Statement [Table]

Drop Filter Fields Here

Cash Flow Statement [Line Items]	Period [Axis]: 2016-07-31/2017-01-28	2016-09-25/2016-12-31	2016-07-01/2016-12-31	2016-04-01/2016-12-31	2015-11-28/2016-12-02
	Reporting Entity [Axis]: 0000858877 http://www.sec.gov/CIK	0000320193 http://www.sec.gov/CIK	0000789019 http://www.sec.gov/CIK	0000880807 http://www.sec.gov/CIK	0000796343 http://www.sec.gov/CIK
Net Cash Flow, Continuing [Roll Up]					
Net Cash Flow from Operating Activities, Continuing	6,502,000,000	27,056,000,000	17,842,000,000	(10,535,000)	2,199,728,000
Net Cash Flow from Investing Activities, Continuing	(4,978,000,000)	(19,122,000,000)	(33,221,000,000)	357,000	(960,033,000)
Net Cash Flow from Financing Activities, Continuing	1,743,000,000	(12,047,000,000)	17,345,000,000	(3,657,000)	(1,090,706,000)
Net Cash Flow, Continuing	3,267,000,000	(4,113,000,000)	1,966,000,000	(13,835,000)	148,989,000
Net Cash Flow, Discontinued [Roll Up]					
Net Cash Flow from Operating Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Investing Activities, Discontinued	0	0	0	0	0
Net Cash Flow from Financing Activities, Discontinued	0	0	0	0	0
Net Cash Flow, Discontinued	0	0	0	0	0

And so, again, the continuity cross checks point out errors that no other testing category will point out. The fundamental accounting concept relations continuity cross checks is somewhat of a type of class relation. However, this set of relations is unique enough to be put into its on category.

These continuity cross checks contribute to the creation of zero defect financial reports. It is the case that 100% of this testing can be automated using machine-based processes for at least 98% of reporting entities at this point. And so, somewhere in the neighborhood of 2% can either be further automated or would need to be checked using manual processes.

Finally, consider one additional point. Below you see a summary of my latest quarterly measurements of the fundamental accounting concept relations continuity cross checks[35]. Ask yourself why would it be that the "Percent Without Error" would be different for different software vendors/filing agents creating XBRL-based public company financial reports? And, ask yourself why some software vendors/filing agents can achieve 99% consistent with the fundamental accounting concept relations continuity cross checks and other software vendors/filing agents cannot?

August 31, 2017 (Last 10-K or 10-Q filed)

Generator	Filings Count	Filings With No Errors	Sum Errors (all filings)	Average Errors per Filing	Percent Without Error
SAP Disclosure Management	5	5	0	.0	100%
Merrill	406	402	4	.0	99%
Thunderdome (RDG Filings)	293	290	3	.0	99%
Donnelley Financial Solutions	792	783	10	.0	99%
DataTracks	263	260	4	.0	99%
IBM Cognos	43	42	1	.0	98%
EDGARfilings PROfile	107	104	6	.1	97%
Certent (was Rivet)	158	153	6	.0	97%
Compliance Xpressware	37	35	2	.1	95%
CompSci	69	61	12	.2	88%
Workiva (WebFilings)	2,141	1,874	347	.2	88%
S2 Filings	77	67	18	.2	87%
Ez-XBRL	304	263	63	.2	87%
P3 Data Systems	6	5	2	.3	83%
QXi	96	78	24	.3	81%
GoXBRL	260	198	94	.4	76%
Novaworks Software	688	516	281	.4	75%
Fujitsu	4	3	1	.3	75%
Advanced Computer Innovations	236	158	127	.5	67%
Vistalytics	9	5	7	.8	56%
Unknown	4	2	5	1.3	50%
SmartXBRL	17	3	42	2.5	18%
Zenhancer	0	0	0	.0	100%
NeoClarus	0	0	0	.0	100%
	6,015	5,307	1,059	.2	

Percent of all filings conforming to all FAC relations		88.2%
Total filings NOT conforming	708	
Total tests	132,330	100.00%
Total inconsistent	1,059	0.80%
Total consistent	**131,271**	**99.20%**

[35] Quarterly XBRL-based Public Company Financial Report Quality Measurement, http://xbrl.squarespace.com/journal/2017/9/1/quarterly-xbrl-based-public-company-financial-report-quality.html

Disclosure Logical, Structural, Mechanical, Mathematical Rules (Disclosure Mechanics)

A financial report is not one big thing. A financial report is really a combination of lots of smaller **fragments** which work together and make up the one complete report.

Patterns exist within the fragments of an XBRL-based financial report. Disclosures have patterns. The **disclosure mechanics rules** document those patterns[36]. Disclosure mechanics rules document the logical, mechanical, and mathematical relations within a specific disclosure in machine-readable form which enables automated machine-based processes to leverage that knowledge.

For example, the disclosure of the Level 4 Disclosure detail of inventory components is *always* a Roll Up, the total concept of that roll up is *always* the concept "us-gaap:InventoryNet", the Level 3 Disclosure Text Block which must be reported if that disclosure exists is *always* "us-gaap:ScheduleOfInventoryCurrentTableTextBlock", the Level 1 Note Text Block is usually the concept "us-gaap:InventoryDisclosureTextBlock" unless the reporting entity organized their notes with some different presentation, and the related Level 2 Policy Text Block is "us-gaap:InventoryPolicyTextBlock".

These relations are provable using empirical evidence from the XBRL-based financial reports created by public companies. These relations are true for *each* reporting entity[37]. These relations are true across reporting entities[38]. These relations are true for *each disclosure*[39].

The **disclosure mechanics rules** are articulated in the form of machine-readable business rules using the XBRL definition relations[40]. Those machine-readable XBRL-based rules can be translated into a controlled natural language syntax that helps accounting professionals read and understand the business rules on their terms. Here is the information from the XBRL definition relations of the inventory disclosure[41] articulated in the paragraph above about the inventory components disclosure using that natural language syntax:

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[36] Disclosure mechanics rules, http://xbrl.squarespace.com/journal/2016/11/16/updated-xbrl-based-machine-readable-financial-reporting-chec.html

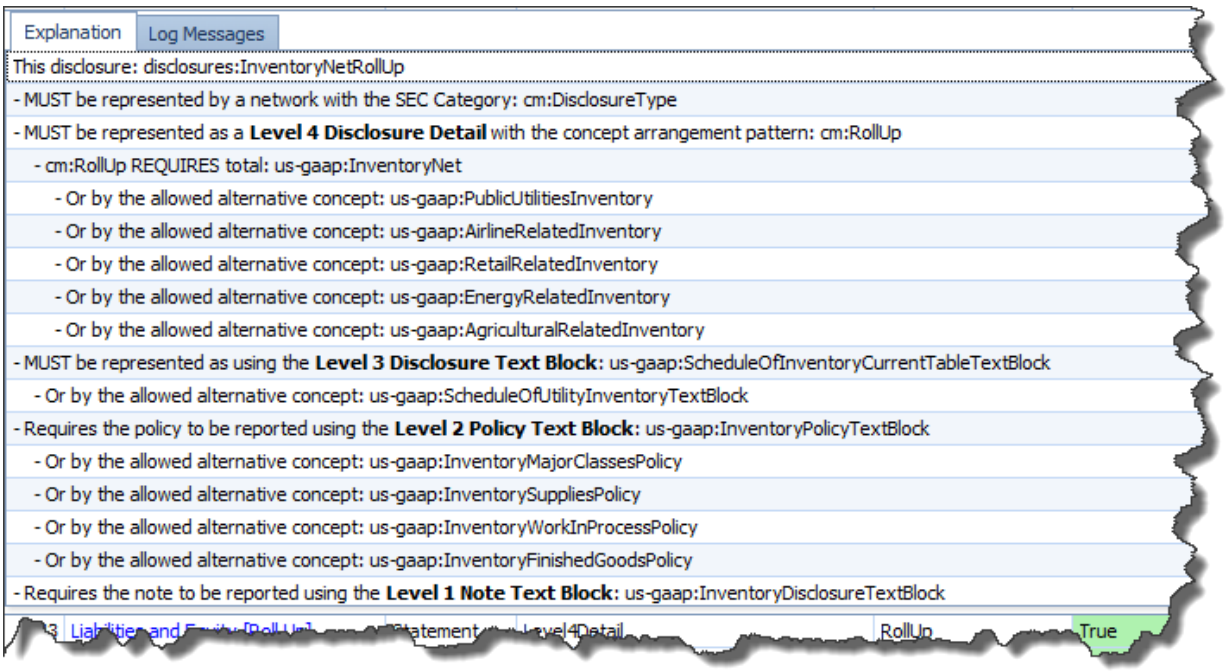
[37] SCOTTS LIQUID GOLD INC, http://www.xbrlsite.com/site1/2017/Prototypes/DisclosureAnalysis/All/0001564590-17-005736_517.html

[38] DISCLOSURE: disclosures:InventoryNetRollUp, http://www.xbrlsite.com/site1/2017/Prototypes/DisclosureAnalysis/All/Index_517_Consistent.html

[39] Disclosure Analysis Summary (work in progress), http://www.xbrlsite.com/site1/2017/Prototypes/DisclosureAnalysis/All/Index.html

[40] XBRL taxonomy which contains disclosure mechanics rules for approximately 65 disclosures, http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/disclosure-mechanics/Disclosures_BASE2.xsd

[41] XBRL definition relations for the inventory components disclosure, http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/disclosure-mechanics/517-rules-def.xml



Is there an alternative where a roll up is not required for the inventory components disclosure? Perhaps. If so, then another disclosure name would be created and new disclosure mechanics rules would be created. If, say, the FIFO inventory disclosure is different than the LIFO inventory disclosure; no problem, simply create a new disclosure name[42] and a new set of disclosure mechanics rules[43] for that disclosure.

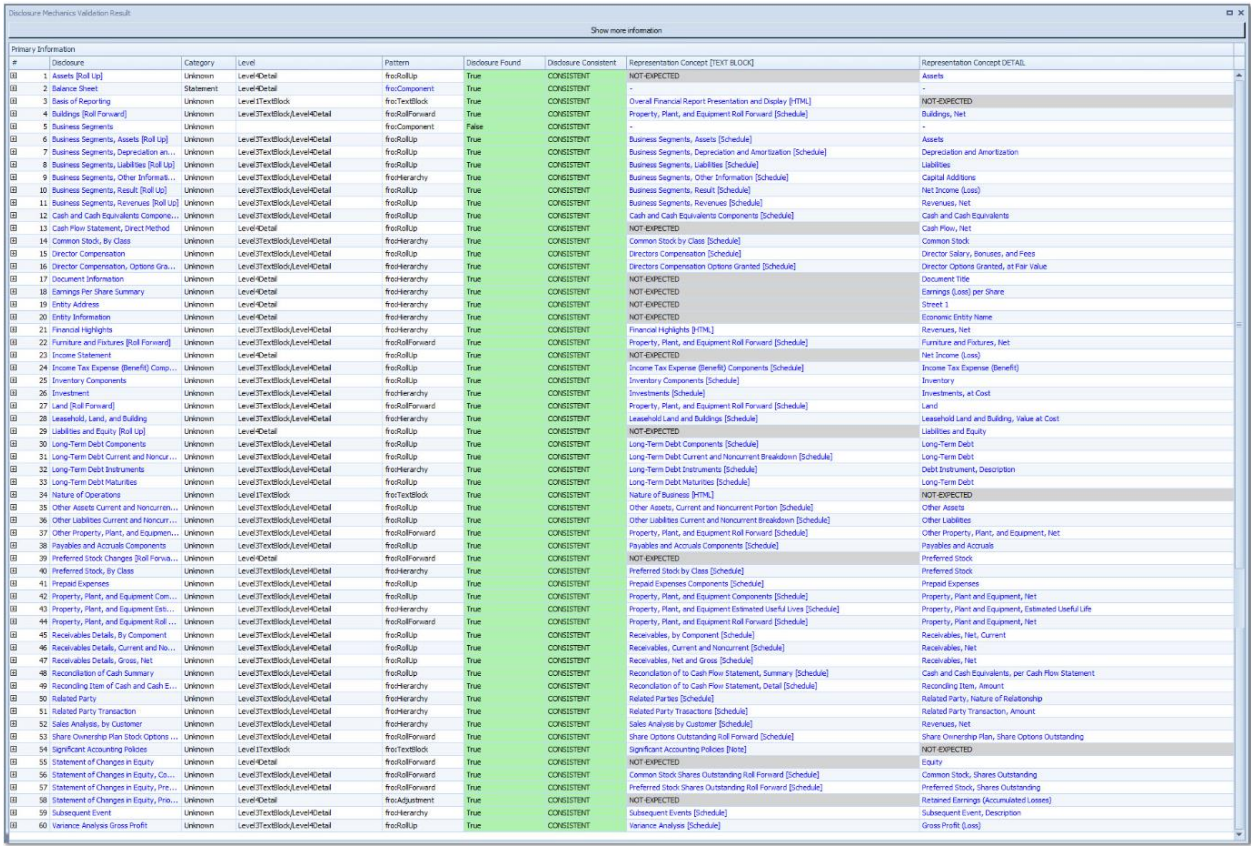
Two good resources for obtaining a more detailed understanding of the disclosure mechanics rules is the document *Understanding Disclosure Mechanics*[44] which provides a good overview of the concept and *Disclosure Creation Information*[45] which provides an initial analysis of the 10-Ks of approximately 6,000 public companies. There is still additional work that is necessary to tune existing rules and additional rules need to be added for other disclosures. However, the concept is proven to work and has been implemented in working commercial software.

An initial test of the 2016 fiscal year 10-Ks of 6,023 public companies[46] shows that on average about 88% of the 65 disclosures measured are consistent with the currently specified disclosure mechanics rules. There are two commercial software vendors that have the capabilities to process these XBRL-based

[42] Disclosures Viewer, http://www.xbrlsite.com/2015/fro/us-gaap/html/Disclosures/Detail/index.html
[43] Disclosure mechanics rules, http://xbrl.squarespace.com/journal/2016/11/16/updated-xbrl-based-machine-readable-financial-reporting-chec.html
[44] *Understanding Disclosure Mechanics*, http://xbrlsite.azurewebsites.net/2016/Analysis/UnderstandingDisclosureMechanics.pdf
[45] Disclosure Creation Information, http://xbrlsite.azurewebsites.net/2017/Library/DisclosureCreationInformation.pdf
[46] XBRL-based Public Company Reports to SEC are 88% Correct Per One Measurement, http://xbrl.squarespace.com/journal/2017/8/10/xbrl-based-public-company-reports-to-sec-are-88-correct-per.html

disclosure mechanics rules currently. While the rules for the current 65 disclosures need adjustment and while the initial set of 65 disclosures can only be considered a successful working proof of concept because there are likely somewhere between 2000 and 5000 disclosures and therefore more disclosure mechanics rules are necessary; the general concept has been proven to work successfully.

Take the example of one disclosure of inventory components, apply that idea to all disclosures reported within a financial report, and you get a validation summary that looks like the following for each fragment of the complete financial report[47]:



Disclosure Mechanics Validation Result

Show more information

Primary Information

#	Disclosure	Category	Level	Pattern	Disclosure Found	Disclosure Consistent	Representation Concept [TEXT BLOCK]	Representation Concept DETAIL
1	Assets [Roll Up]	Unknown	Level4Detail	froRollUp	True	CONSISTENT	NOT-EXPECTED	Assets
2	Balance Sheet	Statement	Level4Detail	froComponent	True	CONSISTENT	-	-
3	Basis of Reporting	Unknown	Level1TextBlock	froTextBlock	True	CONSISTENT	Overall Financial Report Presentation and Display [HTML]	NOT-EXPECTED
4	Buildings [Roll Forward]	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Property, Plant, and Equipment Roll Forward [Schedule]	Buildings, Net
5	Business Segments	Unknown		froComponent	False	CONSISTENT	-	-
6	Business Segments, Assets [Roll Up]	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Business Segments, Assets [Schedule]	Assets
7	Business Segments, Depreciation an...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Business Segments, Depreciation and Amortization [Schedule]	Depreciation and Amortization
8	Business Segments, Liabilities [Roll Up]	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Business Segments, Liabilities [Schedule]	Liabilities
9	Business Segments, Other Informati...	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Business Segments, Other Information [Schedule]	Capital Additions
10	Business Segments, Result [Roll Up]	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Business Segments, Result [Schedule]	Net Income (Loss)
11	Business Segments, Revenues [Roll Up]	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Business Segments, Revenues [Schedule]	Revenues, Net
12	Cash and Cash Equivalents Compone...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Cash and Cash Equivalents Components [Schedule]	Cash and Cash Equivalents
13	Cash Flow Statement, Direct Method	Unknown	Level4Detail	froRollUp	True	CONSISTENT	NOT-EXPECTED	Cash Flow, Net
14	Common Stock, By Class	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Common Stock by Class [Schedule]	Common Stock
15	Director Compensation	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Directors Compensation [Schedule]	Director Salary, Bonuses, and Fees
16	Director Compensation, Options Gra...	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Directors Compensation Options Granted [Schedule]	Director Options Granted, at Fair Value
17	Document Information	Unknown	Level4Detail	froHierarchy	True	CONSISTENT	NOT-EXPECTED	Document Title
18	Earnings Per Share Summary	Unknown	Level4Detail	froHierarchy	True	CONSISTENT	NOT-EXPECTED	Earnings (Loss) per Share
19	Entity Address	Unknown	Level4Detail	froHierarchy	True	CONSISTENT	NOT-EXPECTED	Street 1
20	Entity Information	Unknown	Level4Detail	froHierarchy	True	CONSISTENT	NOT-EXPECTED	Economic Entity Name
21	Financial Highlights	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Financial Highlights [HTML]	Revenues, Net
22	Furniture and Fixtures [Roll Forward]	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Property, Plant, and Equipment Roll Forward [Schedule]	Furniture and Fixtures, Net
23	Income Statement	Unknown	Level4Detail	froRollUp	True	CONSISTENT	NOT-EXPECTED	Net Income (Loss)
24	Income Tax Expense (Benefit) Comp...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Income Tax Expense (Benefit) Components [Schedule]	Income Tax Expense (Benefit)
25	Inventory Components	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Inventory Components [Schedule]	Inventory
26	Investment	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Investments [Schedule]	Investments, at Cost
27	Land [Roll Forward]	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Property, Plant, and Equipment Roll Forward [Schedule]	Land
28	Leasehold, Land, and Building	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Leasehold Land and Buildings [Schedule]	Leasehold Land and Building, Value at Cost
29	Liabilities and Equity [Roll Up]	Unknown	Level4Detail	froRollUp	True	CONSISTENT	NOT-EXPECTED	Liabilities and Equity
30	Long-Term Debt Components	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Long-Term Debt Components [Schedule]	Long-Term Debt
31	Long-Term Debt Current and Noncur...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Long-Term Debt Current and Noncurrent Breakdown [Schedule]	Long-Term Debt
32	Long-Term Debt Instruments	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Long-Term Debt Instruments [Schedule]	Debt Instrument, Description
33	Long-Term Debt Maturities	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Long-Term Debt Maturities [Schedule]	Long-Term Debt
34	Nature of Operations	Unknown	Level1TextBlock	froTextBlock	True	CONSISTENT	Nature of Business [HTML]	NOT-EXPECTED
35	Other Assets Current and Noncurren...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Other Assets, Current and Noncurrent Portion [Schedule]	Other Assets
36	Other Liabilities Current and Noncurr...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Other Liabilities Current and Noncurrent Breakdown [Schedule]	Other Liabilities
37	Other Property, Plant, and Equipmen...	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Property, Plant, and Equipment Roll Forward [Schedule]	Other Property, Plant, and Equipment, Net
38	Payables and Accruals Components	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Payables and Accruals Components [Schedule]	Payables and Accruals
39	Preferred Stock Changes [Roll Forwa...	Unknown	Level4Detail	froRollForward	True	CONSISTENT	NOT-EXPECTED	Preferred Stock
40	Preferred Stock, By Class	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Preferred Stock by Class [Schedule]	Preferred Stock
41	Prepaid Expenses	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Prepaid Expenses Components [Schedule]	Prepaid Expenses
42	Property, Plant, and Equipment Com...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Property, Plant, and Equipment Components [Schedule]	Property, Plant and Equipment, Net
43	Property, Plant, and Equipment Esti...	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Property, Plant, and Equipment Estimated Useful Lives [Schedule]	Property, Plant and Equipment, Estimated Useful Life
44	Property, Plant, and Equipment Roll ...	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Property, Plant, and Equipment Roll Forward [Schedule]	Property, Plant and Equipment, Net
45	Receivables Details, By Component	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Receivables, by Component [Schedule]	Receivables, Net, Current
46	Receivables Details, Current and No...	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Receivables, Current and Noncurrent [Schedule]	Receivables, Net
47	Receivables Details, Gross, Net	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Receivables, Net and Gross [Schedule]	Receivables, Net
48	Reconciliation of Cash Summary	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Reconciliation of to Cash Flow Statement, Summary [Schedule]	Cash and Cash Equivalents, per Cash Flow Statement
49	Reconciling Item of Cash and Cash E...	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Reconciliation of to Cash Flow Statement, Detail [Schedule]	Reconciling Item, Amount
50	Related Party	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Related Parties [Schedule]	Related Party, Nature of Relationship
51	Related Party Transaction	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Related Party Trasactions [Schedule]	Related Party Transaction, Amount
52	Sales Analysis, by Customer	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Sales Analysis by Customer [Schedule]	Revenues, Net
53	Share Ownership Plan Stock Options ...	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Share Options Outstanding Roll Forward [Schedule]	Share Ownership Plan, Share Options Outstanding
54	Significant Accounting Policies	Unknown	Level1TextBlock	froTextBlock	True	CONSISTENT	Significant Accounting Policies [Note]	NOT-EXPECTED
55	Statement of Changes in Equity	Unknown	Level4Detail	froRollForward	True	CONSISTENT	NOT-EXPECTED	Equity
56	Statement of Changes in Equity, Co...	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Common Stock Shares Outstanding Roll Forward [Schedule]	Common Stock, Shares Outstanding
57	Statement of Changes in Equity, Pre...	Unknown	Level3TextBlock/Level4Detail	froRollForward	True	CONSISTENT	Preferred Stock Shares Outstanding Roll Forward [Schedule]	Preferred Stock, Shares Outstanding
58	Statement of Changes in Equity, Pro...	Unknown	Level4Detail	froAdjustment	True	CONSISTENT	NOT-EXPECTED	Retained Earnings (Accumulated Losses)
59	Subsequent Event	Unknown	Level3TextBlock/Level4Detail	froHierarchy	True	CONSISTENT	Subsequent Events [Schedule]	Subsequent Event, Description
60	Variance Analysis Gross Profit	Unknown	Level3TextBlock/Level4Detail	froRollUp	True	CONSISTENT	Variance Analysis [Schedule]	Gross Profit (Loss)

And so, the logical and mechanical relationships that make up each disclosure can be validated using automated machine-based processes. If no machine-readable rules exist for a disclosure, or if there is some logical or mechanical relationship for which machine-readable rules cannot be created; then manual processes are used to verify the appropriateness of each disclosure. But clearly, automated machine-based processes are preferable because they are more reliable and cost less.

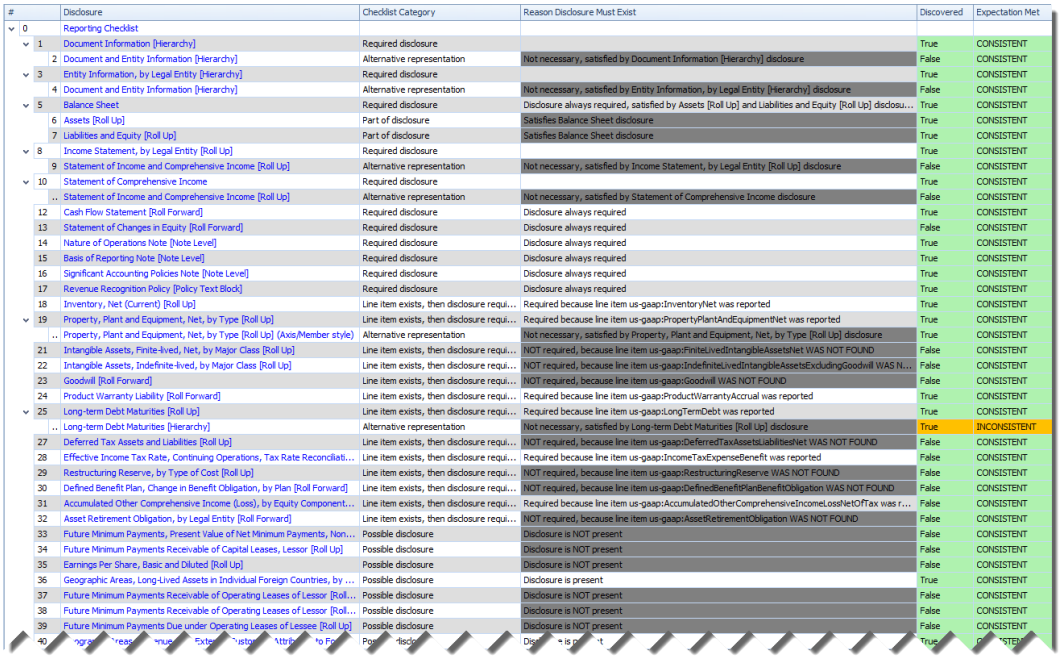
[47] Disclosure Mechanics validation results for Microsoft 2016 fiscal year 10-K, http://xbrlsite.azurewebsites.net/2017/Prototypes/DisclosureMechanicsExample/DisclosureMechanicsSummary.jpg

Statutory and Regulatory Compliance Reporting Checklist

Today, professional accountants use what they call a "disclosure checklist[48]" as a memory jogger during the process of creating a financial report. What if you can take that memory jogger which is written in a form readably only by humans and transformed it into a form readable by both humans and machine-based processes. What if a human augmented by a tool which could leverage that machine-readable information could work as a team to review a financial report?

Many, but not all, of these manual rules can be made machine-readable, leveraging knowledge representation techniques[49] and the structured nature of XBRL. And so with an XBRL-based reporting checklist[50] machine-based processes can take over the routine, repetitive, mechanical tasks of making sure a financial report is created correctly allowing professional accountants to focus on the subjective, non-routine, and other tasks that require professional judgement.

Some disclosures are always required. Other disclosures are required if specific line items are reported. Other disclosures are required only if specific transactions, events, circumstances, or other phenomenon exist for an economic entity. Here is the interface which a business professional would interact with which is generated by the machine-based reporting checklist[51]:



#	Disclosure	Checklist Category	Reason Disclosure Must Exist	Discovered	Expectation Met
0	Reporting Checklist				
1	Document Information [Hierarchy]	Required disclosure		True	CONSISTENT
2	Document and Entity Information [Hierarchy]	Alternative representation	Not necessary, satisfied by Document Information [Hierarchy] disclosure	False	CONSISTENT
3	Entity Information, by Legal Entity [Hierarchy]	Required disclosure		True	CONSISTENT
4	Document and Entity Information [Hierarchy]	Alternative representation	Not necessary, satisfied by Entity Information, by Legal Entity [Hierarchy] disclosure	False	CONSISTENT
5	Balance Sheet	Required disclosure	Disclosure always required, satisfied by Assets [Roll Up] and Liabilities and Equity [Roll Up] disclosu…	True	CONSISTENT
6	Assets [Roll Up]	Part of disclosure	Satisfies Balance Sheet disclosure	True	CONSISTENT
7	Liabilities and Equity [Roll Up]	Part of disclosure	Satisfies Balance Sheet disclosure	True	CONSISTENT
8	Income Statement, by Legal Entity [Roll Up]	Required disclosure		True	CONSISTENT
9	Statement of Income and Comprehensive Income [Roll Up]	Alternative representation	Not necessary, satisfied by Income Statement, by Legal Entity [Roll Up] disclosure	False	CONSISTENT
10	Statement of Comprehensive Income	Required disclosure		True	CONSISTENT
..	Statement of Income and Comprehensive Income [Roll Up]	Alternative representation	Not necessary, satisfied by Statement of Comprehensive Income disclosure	False	CONSISTENT
12	Cash Flow Statement [Roll Forward]	Required disclosure	Disclosure always required	True	CONSISTENT
13	Statement of Changes in Equity [Roll Forward]	Required disclosure	Disclosure always required	False	CONSISTENT
14	Nature of Operations Note [Note Level]	Required disclosure	Disclosure always required	True	CONSISTENT
15	Basis of Reporting Note [Note Level]	Required disclosure	Disclosure always required	True	CONSISTENT
16	Significant Accounting Policies Note [Note Level]	Required disclosure	Disclosure always required	True	CONSISTENT
17	Revenue Recognition Policy [Policy Text Block]	Required disclosure	Disclosure always required	True	CONSISTENT
18	Inventory, Net (Current) [Roll Up]	Line item exists, then disclosure requi…	Required because line item us-gaap:InventoryNet was reported	True	CONSISTENT
19	Property, Plant and Equipment, Net, by Type [Roll Up]	Line item exists, then disclosure requi…	Required because line item us-gaap:PropertyPlantAndEquipmentNet was reported	True	CONSISTENT
..	Property, Plant and Equipment, Net, by Type [Roll Up] (Axis/Member style)	Alternative representation	Not necessary, satisfied by Property, Plant and Equipment, Net, by Type [Roll Up] disclosure	True	CONSISTENT
21	Intangible Assets, Finite-lived, Net, by Major Class [Roll Up]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:FiniteLivedIntangibleAssetsNet WAS NOT FOUND	False	CONSISTENT
22	Intangible Assets, Indefinite-lived, by Major Class [Roll Up]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:IndefiniteLivedIntangibleAssetsExcludingGoodwill WAS N…	False	CONSISTENT
23	Goodwill [Roll Forward]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:Goodwill WAS NOT FOUND	False	CONSISTENT
24	Product Warranty Liability [Roll Forward]	Line item exists, then disclosure requi…	Required because line item us-gaap:ProductWarrantyAccrual was reported	True	CONSISTENT
25	Long-term Debt Maturities [Roll Up]	Line item exists, then disclosure requi…	Required because line item us-gaap:LongTermDebt was reported	True	CONSISTENT
..	Long-term Debt Maturities [Hierarchy]	Alternative representation	Not necessary, satisfied by Long-term Debt Maturities [Roll Up] disclosure	True	INCONSISTENT
27	Deferred Tax Assets and Liabilities [Roll Up]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:DeferredTaxAssetsLiabilitiesNet WAS NOT FOUND	False	CONSISTENT
28	Effective Income Tax Rate, Continuing Operations, Tax Rate Reconciliati…	Line item exists, then disclosure requi…	Required because line item us-gaap:IncomeTaxExpenseBenefit was reported	False	CONSISTENT
29	Restructuring Reserve, by Type of Cost [Roll Up]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:RestructuringReserve WAS NOT FOUND	False	CONSISTENT
30	Defined Benefit Plan, Change in Benefit Obligation, by Plan [Roll Forward]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:DefinedBenefitPlanBenefitObligation WAS NOT FOUND	False	CONSISTENT
31	Accumulated Other Comprehensive Income (Loss), by Equity Component…	Line item exists, then disclosure requi…	Required because line item us-gaap:AccumulatedOtherComprehensiveIncomeLossNetOfTax was r…	False	CONSISTENT
32	Asset Retirement Obligation, by Legal Entity [Roll Forward]	Line item exists, then disclosure requi…	NOT required, because line item us-gaap:AssetRetirementObligation WAS NOT FOUND	False	CONSISTENT
33	Future Minimum Payments, Present Value of Net Minimum Payments, Non…	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
34	Future Minimum Payments Receivable of Capital Leases, Lessor [Roll Up]	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
35	Earnings Per Share, Basic and Diluted [Roll Up]	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
36	Geographic Areas, Long-Lived Assets in Individual Foreign Countries, by …	Possible disclosure	Disclosure is present	True	CONSISTENT
37	Future Minimum Payments Receivable of Operating Leases of Lessor [Roll…	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
38	Future Minimum Payments Receivable of Operating Leases of Lessor [Roll…	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
39	Future Minimum Payments Due under Operating Leases of Lessee [Roll Up]	Possible disclosure	Disclosure is NOT present	False	CONSISTENT
40	[illegible]	[illegible]	[illegible]	True	[illegible]

[48] Charles Hoffman, *Automating Accounting and Reporting Checklists*, http://xbrl.squarespace.com/journal/2016/5/5/automating-accounting-and-reporting-checklists.html

[49] Charles Hoffman, *Introduction to Knowledge Engineering for Professional Accountants*, http://xbrlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part01_Chapter02.3_KnowledgeEngineeringBasicsForProfessionalAccountants.pdf

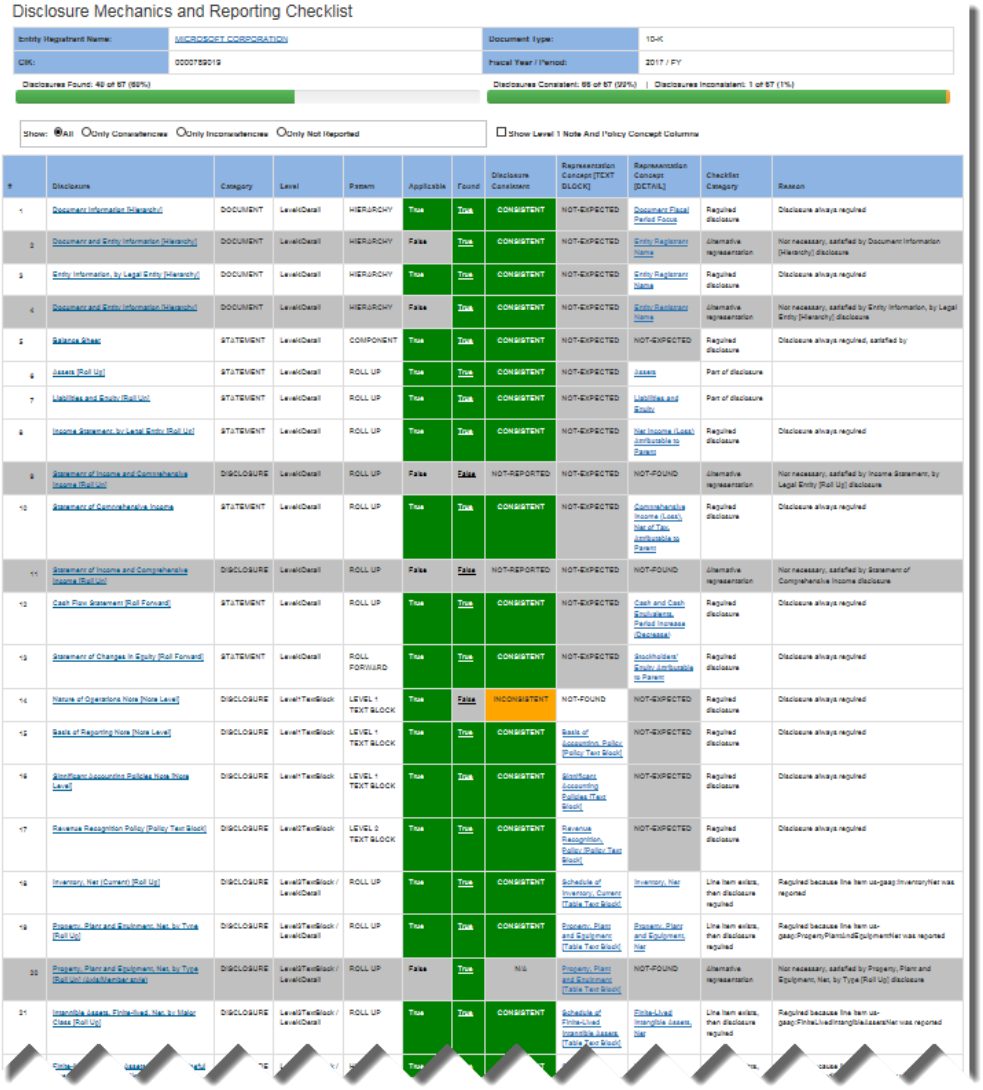
[50] Reporting checklist rules, http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/reporting-checklist/ReportingChecklist-us-gaap-strict-rules-def.xml

[51] Reporting checklist validation results for Microsoft, http://xbrlsite.azurewebsites.net/2017/Prototypes/DisclosureMechanicsExample/ReportingChecklistSummary.jpg

Areas of the report that might need further investigation by a human are highlighted in the color orange in the example. You can think of this as management by exception.

Again, 100% of all fragments of a report can be verified using a combination of machine-based and human-based processes. And again, machine-based processes are preferred due to higher reliability and lower cost.

Below is a combined reporting checklist and disclosure mechanics review and verification tool which is made available by XBRL Cloud[52]. (Note the footnote below which provides a link to a working version of this tool. Click on the links on the HTML page.)



Disclosure Mechanics and Reporting Checklist

Entity Registrant Name:	MICROSOFT CORPORATION	Document Type:	10-K
CIK:	0000789019	Fiscal Year / Period:	2017 / FY

Disclosures Found: 49 of 57 (86%) | Disclosures Consistent: 56 of 57 (99%) | Disclosures Inconsistent: 1 of 57 (1%)

Show: ◉All ○Only Consistencies ○Only Inconsistencies ○Only Not Reported ☐Show Level 1 Note And Policy Concept Columns

#	Disclosure	Category	Level	Pattern	Applicable	Found	Disclosure Consistent	Representation Concept [TEXT BLOCK]	Representation Concept [DETAIL]	Checklist Category	Reason
1	Document Information [Hierarchy]	DOCUMENT	LevelIDetail	HIERARCHY	True	True	CONSISTENT	NOT-EXPECTED	Document Fiscal Period Focus	Required disclosure	Disclosure always required
2	Document and Entity Information [Hierarchy]	DOCUMENT	LevelIDetail	HIERARCHY	False	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Alternative representation	Not necessary, satisfied by Document Information [Hierarchy] disclosure
3	Entity Information, by Legal Entity [Hierarchy]	DOCUMENT	LevelIDetail	HIERARCHY	True	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Required disclosure	Disclosure always required
4	Document and Entity Information [Hierarchy]	DOCUMENT	LevelIDetail	HIERARCHY	False	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Alternative representation	Not necessary, satisfied by Entity Information, by Legal Entity [Hierarchy] disclosure
5	Balance Sheet	STATEMENT	LevelIDetail	COMPONENT	True	True	CONSISTENT	NOT-EXPECTED	NOT-EXPECTED	Required disclosure	Disclosure always required, satisfied by
6	Assets [Roll Up]	STATEMENT	LevelIDetail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Assets	Part of disclosure	
7	Liabilities and Equity [Roll Up]	STATEMENT	LevelIDetail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Liabilities and Equity	Part of disclosure	
8	Income Statement, by Legal Entity [Roll Up]	STATEMENT	LevelIDetail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Net Income (Loss) Attributable to Parent	Required disclosure	Disclosure always required
9	Statement of Income and Comprehensive Income [Roll Up]	DISCLOSURE	LevelIDetail	ROLL UP	False	False	NOT-REPORTED	NOT-EXPECTED	NOT-FOUND	Alternative representation	Not necessary, satisfied by Income Statement, by Legal Entity [Roll Up] disclosure
10	Statement of Comprehensive Income	STATEMENT	LevelIDetail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Comprehensive Income (Loss), Net of Tax, Attributable to Parent	Required disclosure	Disclosure always required
11	Statement of Income and Comprehensive Income [Roll Up]	DISCLOSURE	LevelIDetail	ROLL UP	False	False	NOT-REPORTED	NOT-EXPECTED	NOT-FOUND	Alternative representation	Not necessary, satisfied by Statement of Comprehensive Income disclosure
12	Cash Flow Statement [Roll Forward]	STATEMENT	LevelIDetail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Cash and Cash Equivalents, Period Increase (Decrease)	Required disclosure	Disclosure always required
13	Statement of Changes in Equity [Roll Forward]	STATEMENT	LevelIDetail	ROLL FORWARD	True	True	CONSISTENT	NOT-EXPECTED	Stockholders' Equity Attributable to Parent	Required disclosure	Disclosure always required
14	Nature of Operations Note [Note Level]	DISCLOSURE	LevelITextBlock	LEVEL 1 TEXT BLOCK	True	False	INCONSISTENT	NOT-FOUND	NOT-EXPECTED	Required disclosure	Disclosure always required
15	Basis of Reporting Note [Note Level]	DISCLOSURE	LevelITextBlock	LEVEL 1 TEXT BLOCK	True	True	CONSISTENT	Basis of Accounting, Policy [Policy Text Block]	NOT-EXPECTED	Required disclosure	Disclosure always required
16	Significant Accounting Policies Note [Note Level]	DISCLOSURE	LevelITextBlock	LEVEL 1 TEXT BLOCK	True	True	CONSISTENT	Significant Accounting Policies [Text Block]	NOT-EXPECTED	Required disclosure	Disclosure always required
17	Revenue Recognition Policy [Policy Text Block]	DISCLOSURE	LevelOTextBlock	LEVEL 2 TEXT BLOCK	True	True	CONSISTENT	Revenue Recognition, Policy [Policy Text Block]	NOT-EXPECTED	Required disclosure	Disclosure always required
18	Inventory, Net [Current] [Roll Up]	DISCLOSURE	LevelOTextBlock / LevelIDetail	ROLL UP	True	True	CONSISTENT	Schedule of Inventory, Current [Table Text Block]	Inventory, Net	Line item exists, then disclosure required	Required because line item us-gaap:InventoryNet was reported
19	Property, Plant and Equipment, Net, by Type [Roll Up]	DISCLOSURE	LevelOTextBlock / LevelIDetail	ROLL UP	True	True	CONSISTENT	Property, Plant and Equipment [Table Text Block]	Property, Plant and Equipment, Net	Line item exists, then disclosure required	Required because line item us-gaap:PropertyPlantAndEquipmentNet was reported
20	Property, Plant and Equipment, Net, by Type [Roll Up] (Role Member only)	DISCLOSURE	LevelOTextBlock / LevelIDetail	ROLL UP	False	True	N/A	Property, Plant and Equipment [Table Text Block]	NOT-FOUND	Alternative representation	Not necessary, satisfied by Property, Plant and Equipment, Net, by Type [Roll Up] disclosure
21	Intangible Assets, Finite-lived, Net, by Major Class [Roll Up]	DISCLOSURE	LevelOTextBlock / LevelIDetail	ROLL UP	True	True	CONSISTENT	Schedule of Finite-Lived Intangible Assets [Table Text Block]	Finite-Lived Intangible Assets, Net	Line item exists, then disclosure required	Required because line item us-gaap:FiniteLivedIntangibleAssetsNet was reported

[52] XBRL Cloud Disclosure Mechanics and Reporting Checklist review tool, http://xbrlsite.azurewebsites.net/2017/Prototypes/DisclosureMechanicsExample/DisclosureMechanicsAndReportingChecklist.html

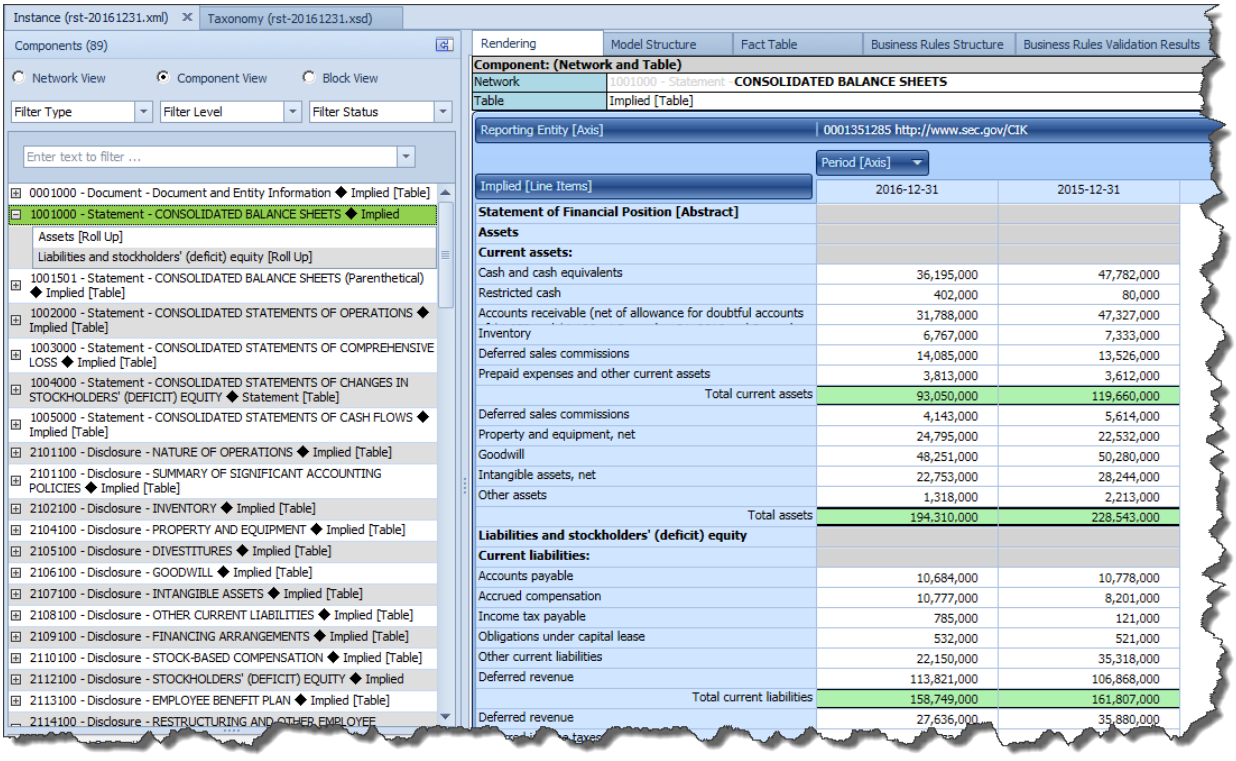
Manual Verification (To-do list)

And of course, not all aspects of an XBRL-based public company financial report can be verified using automated machine-based processes. Manual verification tasks will always be required. A "to do list" of sorts helps manage these manual review tasks. The following sections highlight the sorts of things that need to be verified using manual processes and what tools one would have available.

Report fragments

Each report is made up of a set of report fragments. Fragments come in different types and can be participated in different ways. XBRL has the notion of a "Network", but because networks are not unique they tend to not be as usable as you might think. Each "Network" can be separated into unique "Components". A component is always uniquely identified by a "Network" and a "Table" (or hypercube). A "Component" can be further participated into what is referred to as a "Block". Each "Block" is uniquely identifiable and has characteristics that help business professionals working with a digital business report.

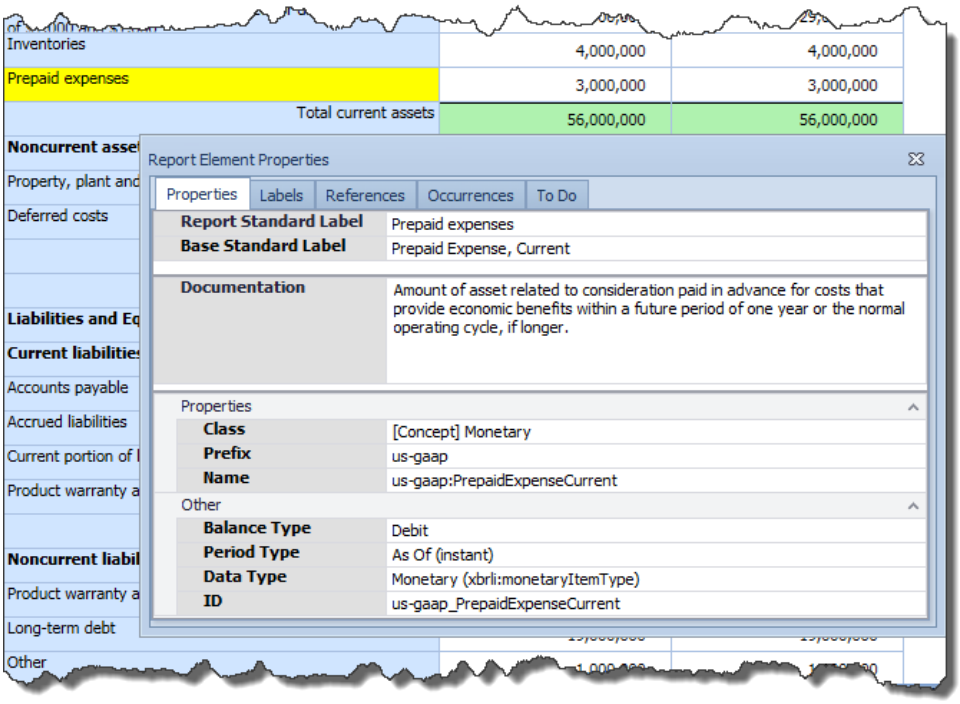
We won't spend more time explaining Blocks[53], but just realize that they provide utility when reviewing a report of otherwise working with the pieces of a digital financial report.



[53] For more deals on Blocks, please see, *Digging into Slots, Blocks and the Mechanics of a Business Report*, http://xbrlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part02_Chapter05.5_DiggingIntoSlotsBlocksAndOtherMechanicsOfDigitalFinancialReport.pdf

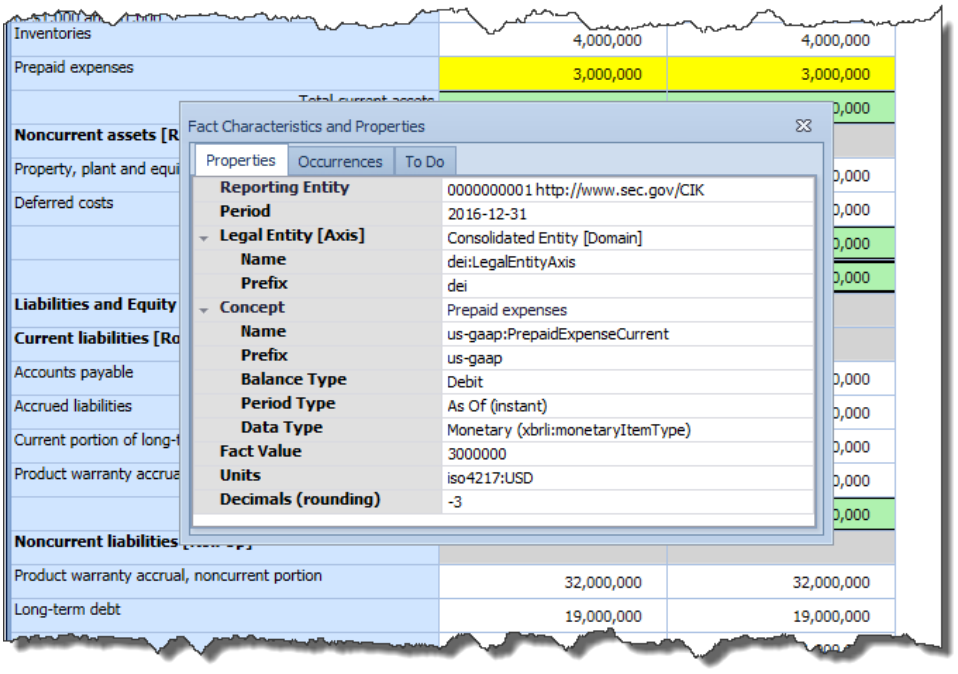
Report element properties

Every property of every report element is available for manual review.



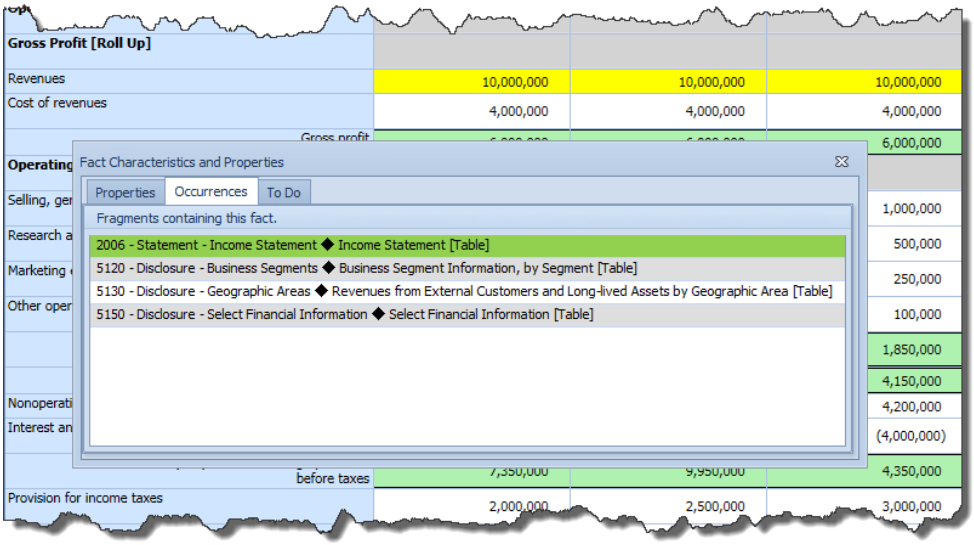
Fact properties

Every property of every fact is available for review.



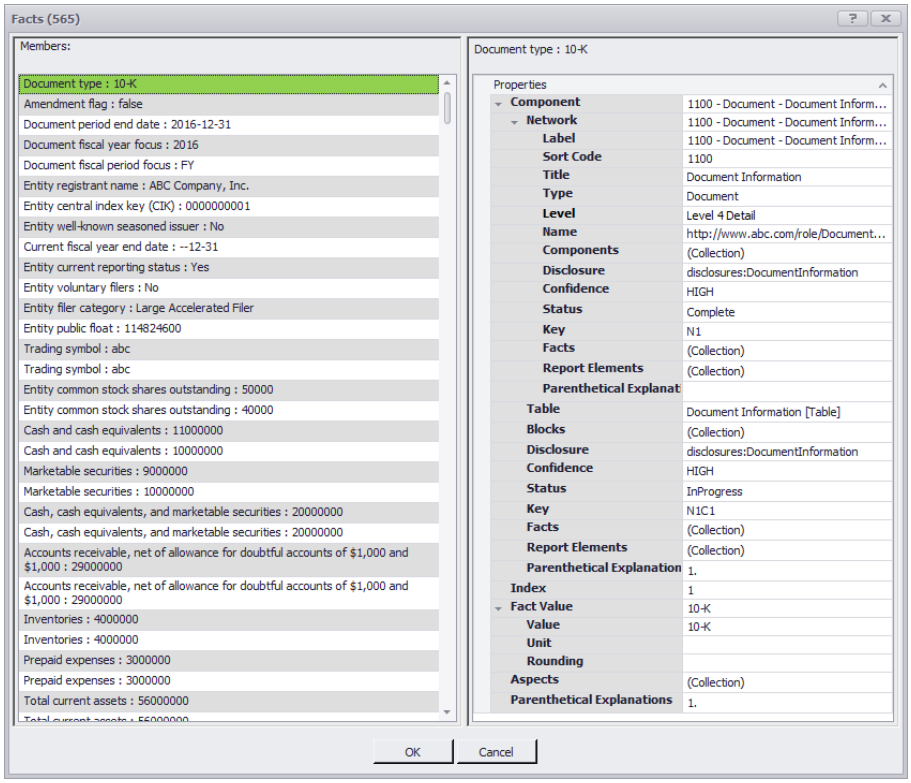
Fact intersections

The same fact may be used in multiple locations within a report. These occurrences, or intersections[54] of financial report fragments, are easy to see and review.



Collections

Easy to read collections of each report object, both semantic and syntactic, should be available for review and analysis. All information should be exportable to Excel for additional analysis flexibility.



[54] YouTube, *Intersections*, retrieved May 1, 2017, https://www.youtube.com/watch?v=lNPjwKy2Obs

Validation Framework Works for US GAAP, IFRS, and Generally

The validation categories explained are comprehensive and robust. Each category is necessary. It is highly-likely that additional categories will inevitably be added. For example, spell checking could be added. The highest value-add capabilities include those related to reporting checklist functionality which can help eliminate the possibility of regulation noncompliance.

While the specific validation above is being applied to XBRL-based financial reports which are being submitted to the SEC by public companies; the validation framework is not limited to SEC reporting or even US GAAP. In addition to the US GAAP implementation; two additional implementations exist. The first is for IFRS-based financial reporting and the second I call the "XASB working prototype sandbox".

The IFRS-based implementation is straight-forward. It is simply exactly the same thing that was implemented for US GAAP except that the business rules were changed to work with IFRS-based reports.

While the US GAAP-based implementation and the IFRS-based implementation were constrained by the fact that I could not change the US GAAP or IFRS XBRL taxonomies; that was not an issue for the XASB working prototype sandbox. The purpose of the XASB working prototype sandbox was to steal all the best ideas of the US GAAP, IFRS, and other XBRL taxonomy implementations and leverage those good ideas but not to be constrained by the less favorable ideas in these other taxonomies and report architectures.

The XASB working prototype sandbox is what I would consider a "perfect taxonomy". When I say "perfect taxonomy" I mean that it incorporates every best practice and if all of those best practices are followed, then a framework for creating zero-defect XBRL-based documents for financial reports or for any other business report is easier to achieve that XBRL-based financial reports that are typically submitted to the SEC.

The XASB working prototype sandbox can be seen as a proven, tested, general approach to creating XBRL-based business reports that leverage the best ideas of XBRL-based public company financial reports submitted to the SEC. You can think of this as an application profile.

While the XASB working prototype sandbox works, as well as the US GAAP and IFRS implementations, I still have one outstanding question: am I building business rules in a manner that provides maximum expressive power.

Frankly, I don't think that I am. However, the expressiveness that I have right now is vastly better than anyone else provides and because the current scheme for representing information is 100% machine readable; I am very confident that when I discover the precise mistake or mistakes that I am making I can transform my XBRL-based definition relation rules to an improved format.

The next step in trying to figure out how to properly represent business rules is to transform everything that I have today into RDF, OWL, and SHACL.

Zero-Defect XBRL-based Digital Financial Reports

Anarchy is defined as "a situation of confusion and wild behavior in which the people in a country, group, organization, etc., are not controlled by rules or laws." Rules prevent anarchy. Principle #3 of the *XBRL-based Digital Financial Reporting Principles*[55] points out that business rules prevent information anarchy.

This document summarizes a set of objective logical, structural, mechanical, and mathematical characteristics that an XBRL-based digital financial report must possess. The goal is interpretation of information conveyed as the creator of a report had intended.

A financial report is complex logical information. That information is an identifiable, definitive, discrete set of reported facts and relationships between those facts which includes business rules. Those facts and relations have an identifiable, definitive, discrete set of characteristics. Those facts and characteristics have an identifiable, definitive, discrete set of properties. These facts, characteristics, properties, and their relations must be clear, consistent, logically coherent, and unambiguous as opposed to vague, inconsistent, incoherent, and ambiguous.

While determining what must be reported and how it is reported can, many times, be subjective in nature and require significant professional judgment; once that judgment has been exercised and once the information is provided the facts, characteristics, relations, and properties of that reported information is in no way subjective and open to judgment. Rather, facts are judged using rules of logic, mechanical relations, structural relations, and mathematical computations. All facts, characteristics, relations, and properties can be identified; they are physical objects which can be observed.

The risk when creating a financial report is noncompliance. Compliance, or the antithesis noncompliance, can take many forms but can be generally summarized as follows:

- **Full inclusion**: All relevant facts, characteristics which describe facts, parenthetical explanations of facts, and relations between facts/characteristics are not included in the financial report.
- **False inclusion**: No facts, characteristics which describe facts, parenthetical explanations of facts, or relations between facts/characteristics which should not be included have been included.
- **Inaccuracy**: Property of a fact, characteristic, component, or relation is inaccurate.
- **Infidelity**: All facts, characteristics, parenthetical explanations, and relations *considered as a whole* do not possess the required fidelity when considered as a whole.
- **Integrity not intact**: Integrity between facts/characteristics is inappropriate.
- **Inconsistency**: The facts, characteristics, parenthetical explanations, relations and their properties expressed are inconsistent with prior reporting periods or inconsistent with peers of the reporting entity.

[55] XBRL-based Digital Financial Reporting Principles, Principle #3, http://xbrl.squarespace.com/digital-financial-reporting-pr/

- **Not presented fairly**: The financial report is not presented fairly, in all material respects, and are not a true and fair representation in accordance with the financial reporting framework applied.

There are exactly three approaches to verifying information contained in a financial report: manually, using automated machine-based processes, or a combination of manual and machine-based processes.

In the past, only manual processes were possible because the financial report was unstructured. Today, both automated machine-based processes, as well as manual human-based processes are possible. This is not an either-or proposition; rather it is a collaboration of man and machine. Machines have their strengths and weaknesses. Humans likewise have strengths and weaknesses.

Teaming humans and computers together and leveraging the strengths of each is how work will get done in the future[56].

Today there is a possibility to arrive at a zero-defect financial report in new ways[57], improving upon existing old-school financial report creation processes.

Defining "Quality"

Engineer and statistician W. Edwards Deming defined quality as "predictability," and called variance "the enemy of quality." To achieve an intended outcome, Deming thought it was important to plan for **common-cause variation**, which can be predicted, and **special-cause variation**, which cannot be predicted.

Harold F. Dodge, one of the principal architects of the science of statistical quality control, said, "You cannot inspect quality into a product." In other words, once the inspection takes place, it's too late. Rather, data from the quality inspection needs to be utilized to continually improve the process.

Management consultant Joseph Juran, who focused on management training and the human element of quality control for a variety of businesses, stated that quality is "a fitness for use."

Businessman Philip B. Crosby, who developed the concept of Zero Defects while working as senior quality engineer at aircraft manufacturer The Martin Company, defined quality as "a conformance to requirements." He warned against the **high cost of nonconformance** and said that the desired performance standard of zero defects could only be achieved through the **proper management system**.

[56] *Getting Ready for the Digital Age of Accounting, Reporting and Auditing: a Guide for Professional Accountants*, http://xbrlsite.azurewebsites.net/2017/Library/GettingReadyForTheDigitalAgeOfAccounting.pdf
[57] Charles Hoffman, *Changing Old School Financial Report Creation Processes*, http://xbrl.squarespace.com/journal/2017/2/14/changing-old-school-financial-report-creation-processes.html