

1. Query and Analysis of XBRL-based Digital Financial Reports

The purpose of this section is to provide examples of and issues with querying information from and analysis of that information extracted from an XBRL-based digital financial report.

This section covers the basics of querying and analysis of XBRL-based digital financial reports. In this section we will use a free tool for making use of all that XBRL-based public company financial information submitted to the SEC. We will cover only the basics to give the reader a sense of how to do this.

1.1. Importance of Data Analytics

Many things go into the successful operation of a business. This notion is not new to professional accountants; they have been managing financial and nonfinancial information of organizations. There are intricate reasons behind the successes and failures of companies. It is important to dig into the subtleties and nuances of information looking for correlations and causal relationships, patterns, trends which contribute to success or failure. Data analysis tools are increasing in functionality and sophistication. The volume of information available has never been greater and the amount continues to grow each year.

1.2. Financial analysis use cases

These are the general use cases for making use of information reported in XBRL-based public company financial reports provided to the SEC or elsewhere:

- **Analysis of a single report.** Analysis of one financial report from one reporting entity.
- **Time series analysis for a reporting entity.** Two or more financial reports from the same reporting entity.
- **Comparative analysis across reporting entities.** Two or more financial reports from different reporting entities using different subsets of information.
- **Ratio analysis.** An analysis of a single report, a time series analysis, or a comparative analysis using ratios.

1.3. Repository of machine-readable facts (fact database)

The purpose of this section is to set your perspective and expectations. Imagine a machine-readable repository of information. Imagine that you want to query that repository and get the value of two concepts for every economic entity in that repository: *Assets* and *Liabilities and Equity*. In order to extract that information from any XBRL-based financial report using a machine-based process the following process needs to be followed:

1. Software MUST locate each report you want to query. You want to be sure you have the correct report. For example, if a report is amended, you need the most current report.

2. The report MUST be valid XBRL technical syntax. If the technical syntax is invalid, you may or may not get the correct results.
3. Software MUST locate the appropriate reporting units (currency). In the case of public company financial reports, 99% of entities report using US Dollars. However, 1% use other currencies as the reporting units.
4. Software MUST appropriately identify the root reporting entity in the report, we don't want business segment information. Generally, this is the consolidated entity but it could be a parent holding company or some other accounting entity.
5. Software MUST appropriately locate the current balance sheet date. Generally you want information about the current balance sheet data and not the prior balance sheet, both are provided in the same report.
6. Software MUST find the appropriate US GAAP concept used to express *Assets* which is us-gaap:Assets.
7. Software MUST find appropriate US GAAP concept for *Liabilities and Equity*. This is a little harder because there are multiple possible concepts: us-gaap:LiabilitiesAndStockholdersEquity or us-gaap:LiabilitiesAndPartnersCapital.
8. Software MUST check the returned information to assure that it is consistent with what is expected, the business domain rule that "Assets = Liabilities and Equity".

That is an overview of the workflow/process to obtain a basic set of information from the repository of XBRL-based public company financial filings. And here are the results of that query for every financial report from the SEC EDGAR system of XBRL-based public company financial reports:

xbrl:Entity	Legal Entity	Fiscal Period	Fiscal Year	Assets	Liabilities and Equity	Units	Difference in Value
All CIK numbers	Root economic entity	FY	2001	280	280	iso4217:USD	0
All CIK numbers	Root economic entity	FY	2009	31,586,555,000	31,586,555,000	iso4217:USD	0
All CIK numbers	Root economic entity	FY	2010	23,061,516,000	23,061,516,000	iso4217:CAD	0
All CIK numbers	Root economic entity	FY	2010	8,833,200,000	8,833,200,000	iso4217:GBP	0
All CIK numbers	Root economic entity	FY	2010	33,205,444,569,755	33,235,543,477,631	iso4217:USD	30,098,907,876
All CIK numbers	Root economic entity	FY	2011	45,216,467	45,216,467	iso4217:AUD	0
All CIK numbers	Root economic entity	FY	2011	110,885,000	110,885,000	iso4217:BRL	0
All CIK numbers	Root economic entity	FY	2011	28,708,716,218	28,708,716,218	iso4217:CAD	0
All CIK numbers	Root economic entity	FY	2011	1,226,733,000	1,226,733,000	iso4217:EUR	0
All CIK numbers	Root economic entity	FY	2011	7,938,800,000	7,938,800,000	iso4217:GBP	0
All CIK numbers	Root economic entity	FY	2011	1,565,000	1,565,000	iso4217:ILS	0
All CIK numbers	Root economic entity	FY	2011	46,395,324,314,234	46,165,763,878,111	iso4217:USD	(229,560,436,123)
All CIK numbers	Root economic entity	FY	2012	49,066,850	49,066,850	iso4217:AUD	0
All CIK numbers	Root economic entity	FY	2012	32,470,161,238	32,470,161,238	iso4217:CAD	0
All CIK numbers	Root economic entity	FY	2012	1,303,349,000	1,303,349,000	iso4217:EUR	0
All CIK numbers	Root economic entity	FY	2012	10,504,300,000	10,504,300,000	iso4217:GBP	0
All CIK numbers	Root economic entity	FY	2012	47,493,211,088,244	47,307,285,874,940	iso4217:USD	(185,925,213,304)
All CIK numbers	Root economic entity	FY	2013	54,642,443	54,642,443	iso4217:AUD	0
All CIK numbers	Root economic entity	FY	2013	39,919,462,935	39,919,385,738	iso4217:CAD	(77,197)
All CIK numbers	Root economic entity	FY	2013	13,120,000	13,120,000	iso4217:EUR	0
All CIK numbers	Root economic entity	FY	2013	48,909,115,040,682	48,735,740,980,605	iso4217:USD	(173,374,060,077)
All CIK numbers	Root economic entity	FY	2014	342,493,649,881	342,493,649,881	iso4217:USD	0
				176,531,415,952,227	175,972,655,073,402		(558,760,878,825)
							-0.3%

The results¹ show that most of the balance sheets balance, *Assets = Liabilities and Equity*. Some are inconsistent with what you would expect. The total inconsistency is .3% which is not too bad. However, the information needs to be 100% consistent in order to not get humans involved to figure out exactly what is causing the inconsistencies.

What needs to be considered when querying other facts from a repository works in exactly the same way as this basic query.

1.4. Extracting Information Using Excel

Excel can be used to both understand how to extract information from an XBRL-based report or to build models that utilize XBRL-based information from reports. Here are some examples that will help you learn to extract information from XBRL-based reports.

This ZIP file contains three Excel spreadsheets². We will walk you through extracting information from each of these three spreadsheets. Note that all the spreadsheets are pre-populated but if you run the provided macro, the spreadsheet will repopulate.

1.4.1. Extracting from one report at a time (Extract_ONE_REPORT.xlsm)

This Excel spreadsheet allows you to extract information from one XBRL-based report at a time and verify that the information is consistent with your expectation. All you need to do is open the spreadsheet, press the button “Extract Information and Validate”, and the spreadsheet will populate with the information for the report you selected:

¹ Query and results provided by SECXBRL.info which is a commercial software application, see <http://app.secxbml.info/>

² Extract.zip, <http://xbmlsite.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Extract.zip>

Link to XBRL instance: (Paste URL to XBRL instance or full path and file name of local file)	
https://www.sec.gov/Archives/edgar/data/789019/000156459019037549/msft-10q_20190930.htm.xml	
Fact Concept	Value
Entity Registrant Name	MICROSOFT CORPORATION
CIK	0000789019
Entity Filer Category	Large Accelerated Filer
Trading symbol	MSFT
Fiscal Year End	--06-30
Fiscal Year Focus	2020
Fiscal Period Focus	Q1
Document Type	10-Q
Balance Sheet Date	ERROR
Income Statement Start Period (Year to Date)	2019-07-01
Balance sheet:	
Assets	278,955,000,000
Current Assets	165,896,000,000
Noncurrent Assets	113,059,000,000
Liabilities	172,894,000,000
Current Liabilities	58,118,000,000
Noncurrent Liabilities	114,776,000,000
Commitments and Contingencies	0
Temporary Equity	0
Equity Attributable to Parent	106,061,000,000
Equity Attributable to Noncontrolling Interest	0
Equity	106,061,000,000
Liabilities and Equity	278,955,000,000
Income Statement:	
Revenues	33,055,000,000
Cost of Revenues	10,406,000,000
Gross Profit	22,649,000,000
Operating Expenses	9,963,000,000
Other Operating Income	0

If you go to the workbook "Sample XBRL Instances to Use" you can pick any one of 1642 XBRL instances to extract information from. All should work because they are all of the same reporting style. Notice the validation results section of the spreadsheet:

Key Financial Ratios	
Return on Equity (ROE)	0.101
Return on Assets (ROA)	0.038
Return on Sales (ROS)	0.323
Sustainable Growth Rate (SGR)	0.112
Validation Errors (All these should be ZERO):	
BS1	0
BS2	0
BS3	0
BS4	0
BS5	0
IS1	0
IS2	0
IS3	0
IS4	0
IS5	0
IS6	0
IS7	0
IS8	0
IS9	0
IS10	0
CF1	0
CF2	0
CF3	0
CF4	0
CF5	0
CF6	0
Other Information:	
Link to XBRL instance:	https://www.sec.gov/Archives/edgar/data/789019/000156459019037549/msft-10q_20190930.htm.xml
Link to XBRL Cloud Viewer:	https://edgardashboard.xbrlcloud.com/f/789019/000156459019037549/msft-10q_20190930.htm.xml

When you extract information and validate it, the application also creates a text file called "LineOfReasoning.txt" and puts it as the same subdirectory as the Excel workbook. That text file shows you the line of reasoning used to get information from the report.

1.4.2.Extracting information from all reports for one entity (Extract_ALL_REPORTS_Comparison.xlsm)

This spreadsheet extracts information from all 41 reports submitted to the SEC by Microsoft. A fragment of the results looks as follows:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
		Compare all in List Spreadsheet																			
		General Information											Balance Sheet								
		Entity/Report Name	Entity File Category	Trading Symbol	Fiscal Year End	Fiscal Year	Fiscal Period	Document Type	Balance Sheet Date	Income Statement Date	Assets	Current Assets	Noncurrent Assets	Liabilities	Current Liabilities	Noncurrent Liabilities	Commitments and Contingencies	Temporary Equity	Equity Attributable to Common	Equity Attributable to Noncontrolling Interest	Equity
5	1	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2020	Q1	MS-Q1	2020-03-31	2020-03-31	2020-03-31	238,955,000,000	95,496,000,000	143,459,000,000	122,894,000,000	56,180,000,000	66,719,000,000			108,041,000,000		108,041,000,000
6	2	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2020	Q2	MS-Q2	2020-06-30	2020-06-30	2020-06-30	266,902,000,000	105,492,000,000	161,410,000,000	144,246,000,000	63,403,000,000	78,009,000,000			92,528,000,000		92,528,000,000
7	3	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2020	Q3	MS-Q3	2020-09-30	2020-09-30	2020-09-30	283,201,000,000	105,587,000,000	177,614,000,000	153,394,000,000	65,417,000,000	84,956,000,000			98,464,000,000		98,464,000,000
8	4	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2020	Q4	MS-Q4	2020-12-31	2020-12-31	2020-12-31	294,855,000,000	105,674,000,000	189,181,000,000	166,731,000,000	65,338,000,000	98,411,000,000			92,528,000,000		92,528,000,000
9	5	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2021	Q1	MS-Q1	2021-03-31	2021-03-31	2021-03-31	293,455,000,000	94,796,000,000	208,659,000,000	173,482,000,000	66,277,000,000	95,795,000,000			95,967,000,000		95,967,000,000
10	6	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2021	Q2	MS-Q2	2021-06-30	2021-06-30	2021-06-30	298,848,000,000	93,662,000,000	205,186,000,000	175,130,000,000	64,688,000,000	107,641,000,000			92,738,000,000		92,738,000,000
11	7	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2021	Q3	MS-Q3	2021-09-30	2021-09-30	2021-09-30	294,497,000,000	96,619,000,000	207,878,000,000	177,843,000,000	66,028,000,000	109,544,000,000			92,279,000,000		92,279,000,000
12	8	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2021	Q4	MS-Q4	2021-12-31	2021-12-31	2021-12-31	298,000,000,000	97,633,000,000	200,367,000,000	188,732,000,000	66,730,000,000	107,854,000,000			92,390,000,000		92,390,000,000
13	9	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2022	Q1	MS-Q1	2022-03-31	2022-03-31	2022-03-31	293,077,000,000	93,071,000,000	200,006,000,000	185,046,000,000	65,490,000,000	112,055,000,000			92,647,000,000		92,647,000,000
14	10	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2022	Q2	MS-Q2	2022-06-30	2022-06-30	2022-06-30	297,077,000,000	92,524,000,000	204,553,000,000	184,896,000,000	65,802,000,000	112,755,000,000			92,775,000,000		92,775,000,000
15	11	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2022	Q3	MS-Q3	2022-09-30	2022-09-30	2022-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
16	12	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2022	Q4	MS-Q4	2022-12-31	2022-12-31	2022-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
17	13	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2023	Q1	MS-Q1	2023-03-31	2023-03-31	2023-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
18	14	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2023	Q2	MS-Q2	2023-06-30	2023-06-30	2023-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
19	15	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2023	Q3	MS-Q3	2023-09-30	2023-09-30	2023-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
20	16	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2023	Q4	MS-Q4	2023-12-31	2023-12-31	2023-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
21	17	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2024	Q1	MS-Q1	2024-03-31	2024-03-31	2024-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
22	18	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2024	Q2	MS-Q2	2024-06-30	2024-06-30	2024-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
23	19	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2024	Q3	MS-Q3	2024-09-30	2024-09-30	2024-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
24	20	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2024	Q4	MS-Q4	2024-12-31	2024-12-31	2024-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
25	21	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2025	Q1	MS-Q1	2025-03-31	2025-03-31	2025-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
26	22	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2025	Q2	MS-Q2	2025-06-30	2025-06-30	2025-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
27	23	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2025	Q3	MS-Q3	2025-09-30	2025-09-30	2025-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
28	24	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2025	Q4	MS-Q4	2025-12-31	2025-12-31	2025-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
29	25	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2026	Q1	MS-Q1	2026-03-31	2026-03-31	2026-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
30	26	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2026	Q2	MS-Q2	2026-06-30	2026-06-30	2026-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
31	27	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2026	Q3	MS-Q3	2026-09-30	2026-09-30	2026-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
32	28	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2026	Q4	MS-Q4	2026-12-31	2026-12-31	2026-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
33	29	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2027	Q1	MS-Q1	2027-03-31	2027-03-31	2027-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
34	30	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2027	Q2	MS-Q2	2027-06-30	2027-06-30	2027-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
35	31	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2027	Q3	MS-Q3	2027-09-30	2027-09-30	2027-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
36	32	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2027	Q4	MS-Q4	2027-12-31	2027-12-31	2027-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
37	33	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2028	Q1	MS-Q1	2028-03-31	2028-03-31	2028-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
38	34	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2028	Q2	MS-Q2	2028-06-30	2028-06-30	2028-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
39	35	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2028	Q3	MS-Q3	2028-09-30	2028-09-30	2028-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
40	36	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2028	Q4	MS-Q4	2028-12-31	2028-12-31	2028-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
41	37	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2029	Q1	MS-Q1	2029-03-31	2029-03-31	2029-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
42	38	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2029	Q2	MS-Q2	2029-06-30	2029-06-30	2029-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
43	39	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2029	Q3	MS-Q3	2029-09-30	2029-09-30	2029-09-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
44	40	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2029	Q4	MS-Q4	2029-12-31	2029-12-31	2029-12-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
45	41	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2030	Q1	MS-Q1	2030-03-31	2030-03-31	2030-03-31	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,000			92,775,000,000		92,775,000,000
46	42	MICROSOFT CORPORATION	Large Accelerated Filers	MSFT	06-30-2030	Q2	MS-Q2	2030-06-30	2030-06-30	2030-06-30	297,426,000,000	92,596,000,000	204,830,000,000	185,051,000,000	65,801,000,000	112,755,000,0					

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4	5	6	General information										Income Statement				20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
---	---	---	---------------------	--	--	--	--	--	--	--	--	--	------------------	--	--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1.5. *Extracting Information from 68% of Reports Using Excel*

I did an information extraction experiment³. For the experiment, I created 13 Excel spreadsheets similar to the last extraction example above. Those 13 Excel spreadsheets cover reports that use 13 different reporting styles where 100% of the rules were satisfied (i.e. there are no inconsistencies). That added up to 4,060 company XBRL-based reports, about 68% of all reports.

The Excel spreadsheets all look similar to and work similar to the three prior examples in the previous section.

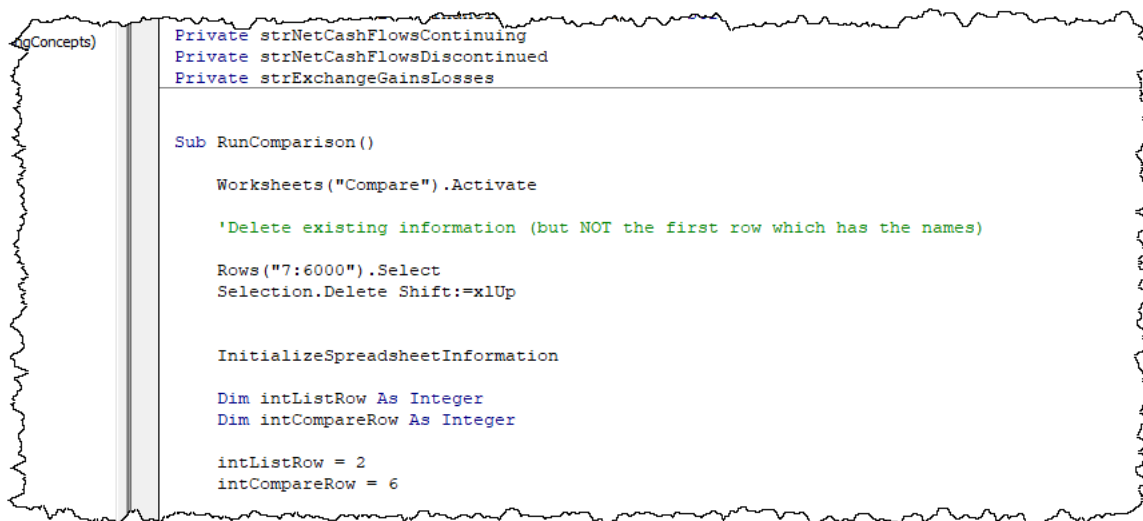
This is what they look like:

[illegible]

Again, all the spreadsheets can be re-run and you will get the same results that I got when I ran the VBA macros for extracting information.

If you understand VBA, you can reverse-engineer the Excel spreadsheet and understand how it works. The starting point can be found by right clicking on the button, going to the "Assign Macro" property, and then clicking on "Edit". This is the starting point of the Excel VBA algorithms.

³ Further Updated and Expanded XBRL-based Financial Report Extraction Tools, <http://xbrl.squarespace.com/journal/2018/1/11/further-updated-and-expanded-xbrl-based-financial-report-ext.html>



Remember, this is not intended to be an example of excellent programming techniques, it is simply to point out the steps. Also, note that the business rules are hard-coded into Excel. That is clearly not the way to go, rather machine readable rules should be used⁴.

1.6. Query language

As you use the example queries provided in this section, have a look at the syntax of the URLs that are used to execute the queries⁵.

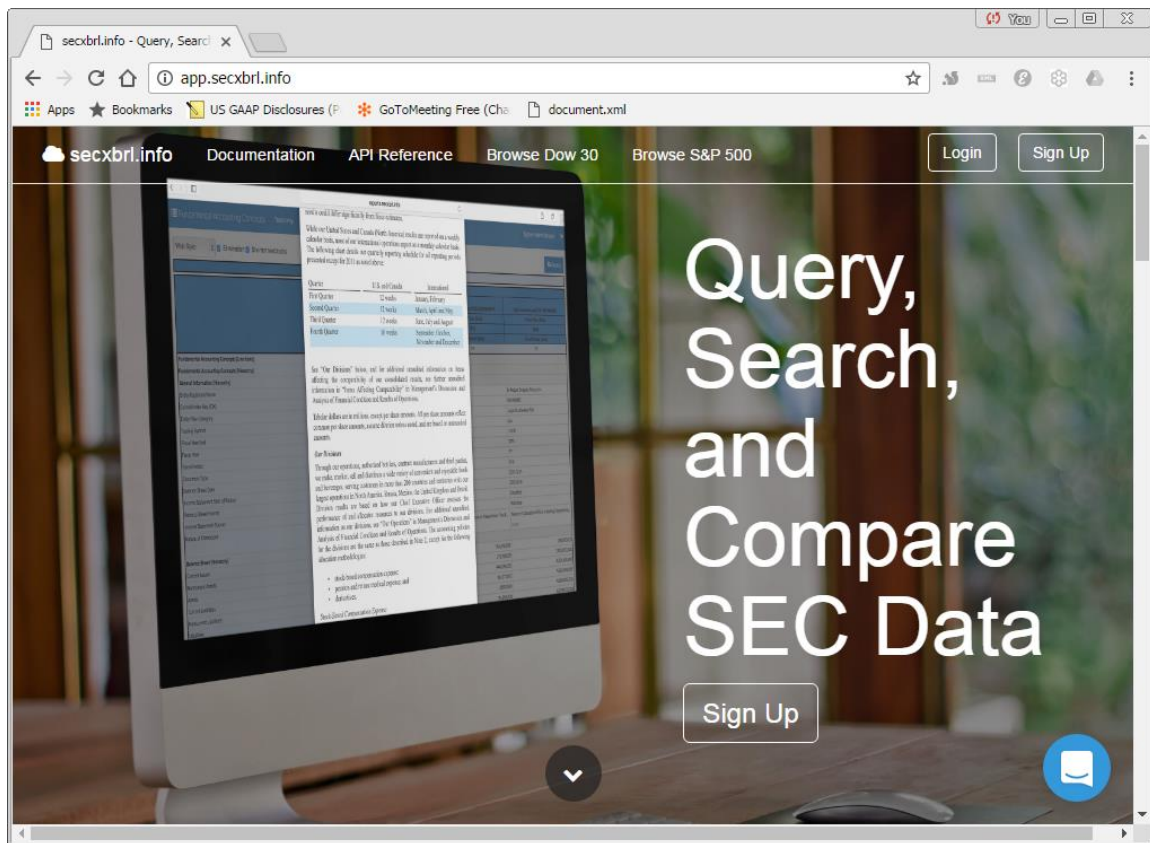
1.7. SECXBRL.info (Note that this is no longer available)

28msec created and made available a free database of public company financial information. You can find that database at the following URL:

<http://app.secxbri.info/>

⁴ Here are the machine readable rules for the US GAAP reporting styles, <http://xbrlsite.azurewebsites.net/2020/reporting-scheme/us-gaap/documentation/ReportingStyles.html>

⁵ API reference, <http://28msec.github.io/cellstore-pro/api-ref-queries.html>



There is no need to sign up or sign in. Also, realize that while I will be walking you through examples provided as HTML pages on this information repository web site, the same information that I am showing you can also be retrieved as a web service that returns XML, JSON, CSV, or Excel formatted information.

This ZIP archive contains an Excel workbook application that has a bunch of sample queries which populate Excel spreadsheets:

http://www.xbrlsite.azurewebsites.net/2016/Library/SECXBRL-2016-12-31_BasicExamples.zip

This reference material is helpful in creating queries:

<http://28msec.github.io/cellstore-pro/api-ref-queries.html>

1.7.1. List of entities

If you simply click on the “Browse DOW 30” button on the top of the screen above or if you paste the URL below into your browser, you will get a list of the companies that make up the DOW 30:

<http://secxbrl.28.io/v1/queries/public/api/entities.jq?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&format=html&tag=DOW30>

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Cell Store REST API

secxbri.28.io/v1/_queries/public/api/entities.jq?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&forma

Apps Bookmarks US GAAP Disclosures (F) GoToMeeting Free (Cha) document.xml

Archives	EIDs	CompanyName	CompanyType	CIK	IsTrust	SIC	SICDescription	SIC
Link	http://www.sec.gov/CIK/0000066740	3M CO	Corporation	0000066740	false	3841	SURGICAL & MEDICAL INSTRUMENTS & APPARATUS	10
Link	http://www.sec.gov/CIK/0000004962	AMERICAN EXPRESS CO	Corporation	0000004962	false	6199	FINANCE SERVICES	7
Link	http://www.sec.gov/CIK/0000732717	AT&T INC.	Corporation	0000732717	false	4813	TELEPHONE COMMUNICATIONS (NO RADIOTELEPHONE)	11
Link	http://www.sec.gov/CIK/0000012927	BOEING CO	Corporation	0000012927	false	3721	AIRCRAFT	5
Link	http://www.sec.gov/CIK/0000018230	CATERPILLAR INC	Corporation	0000018230	false	3531	CONSTRUCTION MACHINERY & EQUIP	10
Link	http://www.sec.gov/CIK/0000093410	CHEVRON CORP	Corporation	0000093410	false	2911	PETROLEUM REFINING	4
Link	http://www.sec.gov/CIK/0000858877	CISCO SYSTEMS, INC.	Corporation	0000858877	false	3578	COMPUTER COMMUNICATIONS EQUIPMENT	3
Link	http://www.sec.gov/CIK/0000021944	COCA COLA CO	Corporation	0000021944	false	2080	BEVERAGES	9
Link	http://www.sec.gov/CIK/0000030554	DUPONT E I DE NEMOURS & CO	Corporation	0000030554	false	2820	PLASTIC MATERIAL, SYNTH RESIN/RUBBER, CELLULOS (NO GLASS)	6
Link	http://www.sec.gov/CIK/0000034088	EXXON MOBIL CORP	Corporation	0000034088	false	2911	PETROLEUM REFINING	4

If you simply change "format=html" to "format=xml", XML is returned by the database rather than a formatted HTML page:

```
<xml version='1.0' encoding='UTF-8'>
<!--Generated by 28.10.19 for information see http://www.28.10.srbf (2017-01-03:270:47, 23:38:22)-->
<!--http://secchr.28.10.v1/_queries/public/api/entities.js?token=c3049752-4d35-43da-82a2-f89f1b06f74&format=xml&tag=DOW30-->
<-Entities: NumEntities: 30, TotalNumEntities: 13040-->
<-Entities>
  <-Entity>
    <-Archives> http://secchr.28.10.v1/_queries/public/api/archives?token=c3049752-4d35-43da-82a2-f89f1b06f74&eid=http%3A%2F%2Fwww.sec.gov%2FCIK%20000006740&format=xml&profile-name=sec&language=en-US&archiveFiscalYear=ALL&archiveFiscalPeriod=ALL </Archives>
  <-EIDs>
    <-EID> http://www.sec.gov/CIK 000006740 </EID>
  <-EIDS>
    <-Source> Feed </Source>
  <-Profile name= SEC">
    <Company Name> 3M CO </Company Name>
    <Company Type> Corporation </Company Type>
    <CIK-000006740 / CIK>
      IsTrust = false </IsTrust>
    SIC = 3841 </SIC>
    SICDescription = SURGICAL & MEDICAL INSTRUMENTS & APPARATUS </SICDescription>
    SICGroup = 10 </SICGroup>
    Taxonomy = ci </Taxonomy>
    Sector = Measuring/Analyzing/Photographic/Control/Medical Instruments </Sector>
  <-Tickers>
    <-TICKER mnm = TICKER>
  <-Tags>
    <-Tag FORTUNE100 </Tag>
    <-Tag DOW30 </Tag>
    <-Tag RUSSELL1000 </Tag>
    <-Tag SPS500 </Tag>
  <-Tags>
    <-EntityName> 3M CO </EntityName>
    <-EntityRegistrantName> 3M CO </EntityRegistrantName>
  </Profile>
<-Entity>
  <-Archives> http://secchr.28.10.v1/_queries/public/api/archives?token=c3049752-4d35-43da-82a2-f89f1b06f74&eid=http%3A%2F%2Fwww.sec.gov%2FCIK%20000004962&format=xml&profile-name=se&language=en-US&archiveFiscalYear=ALL&archiveFiscalPeriod=ALL </Archives>
  <-EIDs>
```

1.7.2. List of reports for an entity

If you click on the "Archives" column on the far left "Link" or use the URL below, you can get a list of reports that were submitted to the SEC by the entity:

<http://secxbrl.28.io/v1/queries/public/api/archives?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&eid=http%3A%2F%2Fwww.sec.gov%2FCIK%200000667408&format=html&profile-name=sec&language=en-US&archiveFiscalYear=ALL&archiveFiscalPeriod=ALL>

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Cell Store REST API x

secxbrl.28.io/v1/_queries/public/api/archives?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&eid=htt

Apps ★ Bookmarks US GAAP Disclosures (P) GoToMeeting Free (Ch) document.xml

AID	Entity	Components	Sections	NumSections	NumFacts	NumFootnotes	NumReportElements	NumHypercubes	NumDimensions	NumMembers	NumLineItems
0001558370-15-007105	http://www.sec.gov/CIK/0000066740	Link	Link	74	1282	0	663	23	28	115	24
0001558370-15-008059	http://www.sec.gov/CIK/0000066740	Link	Link	111	2713	0	1160	31	39	226	32
0001558370-15-005213	http://www.sec.gov/CIK/0000066740	Link	Link	74	940	0	649	23	28	118	23
0001558370-16-003162	http://www.sec.gov/CIK/0000066740	Link	Link	111	2711	0	1159	31	39	226	32
0001558370-15-002024	http://www.sec.gov/CIK/0000066740	Link	Link	70	1344	0	655	22	28	137	22
0001104859-15-054810	http://www.sec.gov/CIK/0000066740	Link	Link	105	1497	0	1285	29	37	300	30
0001104859-15-032226	http://www.sec.gov/CIK/0000066740	Link	Link	105	1104	0	1279	29	37	296	30
0001104859-15-009590	http://www.sec.gov/CIK/0000066740	Link	Link	105	3393	0	1270	29	37	294	30
0001104859-14-075312	http://www.sec.gov/CIK/0000066740	Link	Link	105	1562	0	1237	29	35	283	30
0001104859-14-055556	http://www.sec.gov/CIK/0000066740	Link	Link	104	1527	0	1211	29	35	281	29
0001104859-14-039325	http://www.sec.gov/CIK/0000066740	Link	Link	104	3508	0	1193	29	35	275	29
0001104859-14-033499	http://www.sec.gov/CIK/0000066740	Link	Link	104	1097	0	1195	29	35	275	29
0001104859-14-009773	http://www.sec.gov/CIK/0000066740	Link	Link	104	3508	0	1193	29	35	275	29
0001104859-13-079583	http://www.sec.gov/CIK/0000066740	Link	Link	71	1499	0	820	25	27	165	25
0001104859-13-058961	http://www.sec.gov/CIK/0000066740	Link	Link	71	1478	0	836	25	28	166	25
0001104859-13-042408	http://www.sec.gov/CIK/0000066740	Link	Link	104	3595	0	1316	30	34	300	29
0001104859-13-036580	http://www.sec.gov/CIK/0000066740	Link	Link	69	1099	0	829	24	28	180	24

1.7.3. List of reports for an entity

If you click on the “Components” column the “Link” will provide you with a list of components within the report, or you can use the URL below:

http://secxbrl.28.io/v1/_queries/public/api/components?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&aid=0001558370-16-007105&format=html&profile-name=sec&validate=true&language=en-US

Archive	Section	Hypercube
0001558370-16-007105	00000 - Document - Document and Entity Information	Implied Table [Table]
0001558370-16-007105	00100 - Statement - Consolidated Statement of Income	Implied Table [Table]
0001558370-16-007105	00200 - Statement - Consolidated Statement of Comprehensive Income	Implied Table [Table]
0001558370-16-007105	00300 - Statement - Consolidated Balance Sheet	Implied Table [Table]
0001558370-16-007105	00305 - Statement - Consolidated Balance Sheet (Parenthetical)	Implied Table [Table]
0001558370-16-007105	00500 - Statement - Consolidated Statement of Cash Flows	Implied Table [Table]
0001558370-16-007105	10101 - Disclosure - Significant Accounting Policies	Implied Table [Table]
0001558370-16-007105	10201 - Disclosure - Acquisitions and Divestitures	Implied Table [Table]
0001558370-16-007105	10301 - Disclosure - Goodwill and Intangible Assets	Implied Table [Table]
0001558370-16-007105	10401 - Disclosure - Restructuring Actions	Implied Table [Table]
0001558370-16-007105	10601 - Disclosure - Supplemental Equity and Comprehensive Income Information	Implied Table [Table]
0001558370-16-007105	10801 - Disclosure - Income Taxes	Implied Table [Table]
0001558370-16-007105	10901 - Disclosure - Marketable Securities	Implied Table [Table]
0001558370-16-007105	11001 - Disclosure - Long-Term Debt and Short-Term Borrowings	Implied Table [Table]
0001558370-16-007105	11101 - Disclosure - Pension and Postretirement Benefit Plans	Implied Table [Table]
0001558370-16-007105	11201 - Disclosure - Derivatives	Implied Table [Table]
0001558370-16-007105	11301 - Disclosure - Fair Value Measurements	Implied Table [Table]

1.7.4. Rendering of a component

If you click on the “Spreadsheet” column the “Link” will provide you a rendering of the report component which you selected, or again you can use the URL below:

http://secxbrl.28.io/v1/_queries/public/api/spreadsheet-for-component?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&aid=0001558370-16-007105&format=html§ion=http%3A%2F%2Fwww.mmm.com%2Frole%2FStatementConsolidatedStatementOfIncome&hypercube=xbrl28%3AImpliedTable&profile-name=sec&eliminate=true&validate=true&language=en-US

CellStore Manager				
secxbrl.28.io/manager/rendering/http://secxbrl.28.io:80/v1/_queries/public/api/sprea				
Apps Bookmarks US GAAP Disclosures (P) GoToMeeting Free (Ch) document.xml				
CellStore Manager				
00100 - Statement - Consolidated Statement of Income				EXPORT
Component: (Network and Table)				
Network	00100 - Statement - Consolidated Statement of Income (http://www.mmm.com/role/StatementConsolidatedStatementOfIncome)			
Table	Implied Table [Table]			
Reporting Entity [Axis]	3M CO (66740)			
Archive [Axis]	0001558370-16-007105			
Archive Fiscal Period Focus [Axis]	Q2			
Archive Fiscal Year Focus [Axis]	2016			
Legal Entity [Axis]	Default Legal Entity [Member]			
Consolidated Statement of Income	Period [Axis]			
	From January 1, 2015 to June 30, 2015	From April 1, 2015 to June 30, 2015	From January 1, 2016 to June 30, 2016	From April 1, 2016 to June 30, 2016
Net sales	15,264,000,000	7,686,000,000	15,071,000,000	7,662,000,000
Operating expenses				
Cost of sales	7,679,000,000	3,858,000,000	7,477,000,000	3,799,000,000
Selling, general and administrative expenses	3,114,000,000	1,550,000,000	3,053,000,000	1,560,000,000
Research, development and related expenses	901,000,000	438,000,000	887,000,000	437,000,000
Total operating expenses	11,694,000,000	5,846,000,000	11,417,000,000	5,796,000,000
Operating income	3,570,000,000	1,840,000,000	3,654,000,000	1,866,000,000
Interest expense and income				
Interest expense	66,000,000	35,000,000	85,000,000	38,000,000
Interest income	11,000,000	7,000,000	12,000,000	7,000,000
Total interest expense - net	-55,000,000	-28,000,000	-73,000,000	-31,000,000
Income before income taxes	3,515,000,000	1,812,000,000	3,581,000,000	1,835,000,000
Provision for income taxes	1,011,000,000	509,000,000	1,010,000,000	542,000,000
Net income including noncontrolling interest	2,504,000,000	1,303,000,000	2,571,000,000	1,293,000,000
Less: Net income attributable to noncontrolling interest	5,000,000	3,000,000	5,000,000	2,000,000
Net income attributable to 3M	2,499,000,000	1,300,000,000	2,566,000,000	1,291,000,000
Weighted average 3M common shares outstanding - basic (in shares)	633,800,000	631,300,000	607,200,000	606,900,000
Earnings per share attributable to 3M common shareholders - basic (in dollars per share)	3.94	2.06	4.23	2.13
Weighted average 3M common shares outstanding - diluted (in shares)	646,100,000	643,000,000	621,100,000	620,900,000
Earnings per share attributable to 3M common shareholders - diluted (in dollars per share)	3.87	2.02	4.13	2.08
Cash dividends paid per 3M common share (in dollars per share)	2.05	1.025	2.22	1.11

1.7.5. Normalized comparison of information for entity across periods

Using the query string below you can do a normalized comparison of information for an entity across multiple periods:

http://secxbrl.28.io/v1/_queries/public/api/spreadsheet-for-report.iq?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&report=IncomeStatementSingleStep_Special2&fiscalYear=2015&fiscalYear=2014&fiscalYear=2013&fiscalYear=2012&fiscalYear=2011&fiscalPeriod=FY&validate=true&format-indent=yes&labels=false&format=html&cik=0000066740

The screenshot shows the CellStore Manager interface. The main title is "201.6-Income Statement, Single Step, With Operating Income, Special 2 (Costs and Expenses)". There is an "EXPORT" button. Below the title, there is a table with the following structure:

Component: (Network and Table)					
Network	201.6-Income Statement, Single Step, With Operating Income, Special 2 (Costs and Expenses)				
Table	Income Statement, Single Step [Table]				
Unit [Axis]	USD				
Fiscal Period Type [Axis]	YTD, Instant				
Income Statement [Line Items]	Fiscal Year [Axis]				
	2011	2012	2013	2014	2015
	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]	Fiscal Period [Axis]
	FY	FY	FY	FY	FY
	Reporting Entity [Axis]	Reporting Entity [Axis]	Reporting Entity [Axis]	Reporting Entity [Axis]	Reporting Entity [Axis]
	3M CO (66740)	3M CO (66740)	3M CO (66740)	3M CO (66740)	3M CO (66740)
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]					
Revenues	29,611,000,000	29,904,000,000	30,871,000,000	31,821,000,000	30,274,000,000
Costs and Expenses	23,433,000,000	23,421,000,000	24,205,000,000	24,686,000,000	23,328,000,000
Operating Income (Loss)	6,178,000,000	6,483,000,000	6,666,000,000	7,135,000,000	6,946,000,000
Nonoperating Income (Loss) Plus Interest and Debt Expense Plus Income (Loss) from Equity Method Investments	-147,000,000	-132,000,000	-104,000,000	-109,000,000	-123,000,000
Income (Loss) from Continuing Operations Before Tax	6,031,000,000	6,351,000,000	6,562,000,000	7,026,000,000	6,823,000,000
Income Tax Expense (Benefit)	1,674,000,000	1,840,000,000	1,841,000,000	2,028,000,000	1,982,000,000
Income (Loss) from Continuing Operations After Tax	4,357,000,000	4,511,000,000	4,721,000,000	4,998,000,000	4,841,000,000
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)	4,357,000,000	4,511,000,000	4,721,000,000	4,998,000,000	4,841,000,000

1.7.6. Normalized comparison of information across entities for a period

Using the query string below you can do a normalized comparison of information across entities for a period:

http://secxbrl.28.io/v1/_queries/public/api/spreadsheet-for-report.jq?token=c3049752-4d35-43da-82a2-f89f1b06f7a4&report=IncomeStatementSingleStep_Special2&fiscalYear=2015&fiscalPeriod=FY&validate=true&format-indent=yes&labels=false&format=html&cik=0000066740&cik=27904&cik=1048911&cik=934612&cik=100885&cik=15511&cik=70318&cik=92380&cik=230211&cik=18926

201.6-Income Statement, Single Step, With Operating Income, Special 2 (Costs and Expenses)										
Component: (Network and Table)										
Network	201.6-Income Statement, Single Step, With Operating Income, Special 2 (Costs and Expenses)									
Table	Income Statement, Single Step (Table)									
Unit (Axis)	USD									
Fiscal Period Type (Axis)	YTD, Instant									
	Fiscal Year (Axis)									
	2015									
	Fiscal Period (Axis)									
	FY									
	Reporting Entity (Axis)									
Income Statement (Line Items)	3M CO (66740)	BNSF RAILWAY CO (15511)	BURLINGTON NORTHERN SANTA FE, LLC (934612)	CENTURYLINK, INC (18926)	DELTA AIR LINES INC /DE/ (27904)	FEDERAL EXPRESS CORP (230211)	FEDEX CORP (1048911)	SOUTHWEST AIRLINES CO (92380)	TENET HEALTHCARE CORP (70318)	UNION PACIFIC CORP (100885)
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]										
Revenues	30,274,000,000	21,401,000,000	21,967,000,000	17,900,000,000	40,704,000,000	26,094,000,000	47,453,000,000	19,820,000,000	20,111,000,000	21,813,000,000
Costs and Expenses	23,328,000,000	13,634,000,000	14,243,000,000	15,295,000,000	32,902,000,000	25,775,000,000	45,586,000,000	15,704,000,000	19,055,000,000	13,761,000,000
Operating Income (Loss)	6,946,000,000	7,767,000,000	7,724,000,000	2,605,000,000	7,802,000,000	319,000,000	1,867,000,000	4,116,000,000	1,056,000,000	8,052,000,000
Nonoperating Income (Loss) Plus Interest and Debt Expense Plus Income (Loss) from Equity Method Investments	-128,000,000	76,000,000	-949,000,000	-1,289,000,000	-645,000,000	-140,000,000	-240,000,000	-697,000,000	-912,000,000	-396,000,000
Income (Loss) from Continuing Operations Before Tax	6,823,000,000	7,843,000,000	6,775,000,000	1,316,000,000	7,157,000,000	179,000,000	1,627,000,000	3,419,000,000	144,000,000	7,656,000,000
Income Tax Expense (Benefit)	1,982,000,000	2,928,000,000	2,527,000,000	438,000,000	2,631,000,000	35,000,000	577,000,000	1,298,000,000	68,000,000	2,884,000,000
Income (Loss) from Continuing Operations After Tax	4,841,000,000	4,915,000,000	4,248,000,000	878,000,000	4,526,000,000	144,000,000	1,050,000,000	2,181,000,000	76,000,000	4,772,000,000
Income (Loss) from Discontinued Operations, Net of Tax	0	0	0	0	0	0	0	0	2,000,000	0
Extraordinary Items of Income (Expense), Net of Tax	0	0	0	0	0	0	0	0	0	0
Net Income (Loss)	4,841,000,000	4,915,000,000	4,248,000,000	878,000,000	4,526,000,000	144,000,000	1,050,000,000	2,181,000,000	78,000,000	4,772,000,000

HINT: You can compare as many entities as you want this way. I have done up to about 200 entities!

1.8. *Commercially available analysis products*

There are many different commercial software applications which make use of XBRL-based financial information reported by public companies to the SEC and available from the EDGAR system. These software applications take different approaches and different things can be learned from different applications.

Querying an XBRL instance document and the related taxonomy is possible, but it is not recommended because the information is not structured for meaning, it is simply structured as XBRL technical syntax. This makes querying information significantly more challenging.

If you do want to explore extracting information directly from an XBRL instance, this ZIP archive contains an Excel based application that you can reverse engineer:

http://xbrlsite.azurewebsites.net/2016/Analysis/InterestBasedRevenues/Analysis_IN_TBX-BSU-CF1-ISS-IEMIX-OILN.zip

1.8.1.28msec SECXBRL.info

As mentioned, 28msec⁶ provides a free repository of public company financial information reported by public companies to the SEC via its SECXBRL.info repository⁷. Financial information is available for the DOW 30 companies with no signup at all. You can sign up for free and get access to all reported information. An API is provided. For those willing to roll up their sleeves and get their hands a little dirty, there is a lot that can be learned about where digital financial reporting and more generally digital business reporting is going.

1.8.2.XBRL Cloud

XBRL Cloud mainly focuses on validation services for public companies that provide XBRL-based financial reports to the SEC⁸. However, XBRL Cloud offers an API also. That API, the EDGAR Report Information Web Service⁹, is unfortunately not publically available. But, the API is rather inexpensive. If you are serious about learning about digital financial reporting, paying for the API is worth the price.

XBRL Cloud provides some of the best renderings of XBRL-based information.

1.8.3.FinDynamics XBRL Analyst

XBRL Analyst is described as “XBRLAnalyst delivers real-time financial data to Excel” by its creator FinDynamics¹⁰. XBRLAnalyst is an Excel plugin. A free trial is available which allows you to explore the software before you purchase it. An API is also available.

⁶ 28msec, <http://www.28.io/>

⁷ SECXBRL.info, <http://app.secxbri.info/>

⁸ XBRL Cloud EDGAR Dashboard, <https://edgardashboard.xbrlcloud.com/edgar-dashboard/>

⁹ XBRL Cloud Edgar Report Information Web Service, <https://www.xbrlcloud.com/home/edgar-report-information/eridev.html>

¹⁰ FinDynamics, <https://findynamics.com/>

2. Good Practices Model for Implementing XBRL-based Reporting System

The purpose of this document is to provide a good practices-based model for implementing an XBRL-based reporting system where those reporting within the system are permitted to modify the report model of information being reported and the quality of the information collected must be high.

This good practices-based model is grounded in over 20 years of experience with XBRL¹¹, a background of being an auditor, and the “poking and prodding” of existing systems which attempted to implement such systems to understand where those systems were succeeding and where they came up short in meeting the needs of regulators that implemented such systems.

While most people tend to look at those specifying financial reporting schemes, those creating financial reports, and those analyzing information from those reports as separate silos; I strive to look at this exchange of complex financial information as a system. Further, that system needs to work effectively in order to be useful.

The *Data Point Methodology*¹² is an ISO standard which leverages the global standard XBRL syntax and is appropriate when representing information using a *standardized forms approach*. This approach is appropriate in certain specific situations.

The good practices model I will describe, which is based on the *Seattle Method*¹³, is used when a *customizable reporting approach* is permitted.

The difference between these two reporting approaches will be explained later in this document.

To help the reader understand the difference between a standardized forms approach and what we are trying to achieve using a customizable reporting approach it is important to understand the objectives of the system.

2.1. Principles and Objectives

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

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

¹¹ Charles Hoffman, CPA, *XBRL Projects Resume*,
http://www.xbrlsite.com/2022/library/Resume-2022-12-01_XBRLProjects.pdf

¹² ISO, *ISO 5116-1:2021 Improving transparency in financial and business reporting — Harmonization topics — Part 1: European data point methodology for supervisory reporting*,
<https://www.iso.org/standard/80873.html>

¹³ Charles Hoffman, CPA, *Seattle Method*,
<http://xbrlsite.com/seattlemethod/SeattleMethod.pdf>

Foundational to arriving at harmony is having a common conceptual framework including a set of consistent principles or assumptions or world view for thinking about the system. For example, accounting and financial reporting have such a conceptual framework including principles/assumptions such as “materiality” and “going concern” and “conservatism”.

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

A system enables a community of stakeholders trying to achieve a specific goal or objective or a range of goals/objectives to agree on important common models, structures, and statements for capturing meaning or representing a shared understanding of and knowledge in some area of knowledge (a.k.a. universe of discourse, area of interest). A system can be explained using a theory.

A theory enables a community of stakeholders trying to achieve a specific goal or objective or a range of goals/objectives to agree on important details related to that system. A theory describes a system in the form of logical statements about that system.

The principles and objectives relating to such a specific system should be clear to all stakeholders of the system.

2.2. Need for Clarity

One key aspect of a reporting system is the reporting scheme used by the reporting system. For the type of system we are concerned with for our good practices based model; reporting schemes tend to be financial reporting schemes.

A financial reporting scheme represented digitally using an XBRL taxonomy which is then used to represent a report model for a report created by an economic entity in machine readable form serves multiple purposes and must serve all system stakeholders. The purposes tend to be:

- **Description:** The financial reporting scheme should be clearly described. That description must be clear and should be a complete description of a report model (specification of what is permitted in a report); created by standards setters or regulators or anyone else specifying a report. Obviously, that clear and complete description should represent accounting and reporting rules precisely and accurately.
- **Construction:** The financial reporting scheme should enable the construction of reports using that report model. The financial reporting scheme is a guide to the creation of a report based on that permitted report model description whereby a human can be assisted by software applications utilizing that machine readable description of permitted report models.
- **Verification:** The report model created can be verified against the prescribed financial reporting scheme. The actual report constructed can be verified against the clear, complete description assisted by software applications utilizing that machine readable version of that description.
- **Extraction:** Report information can be effectively and reliably extracted from the provided report and report model. Information can be effectively

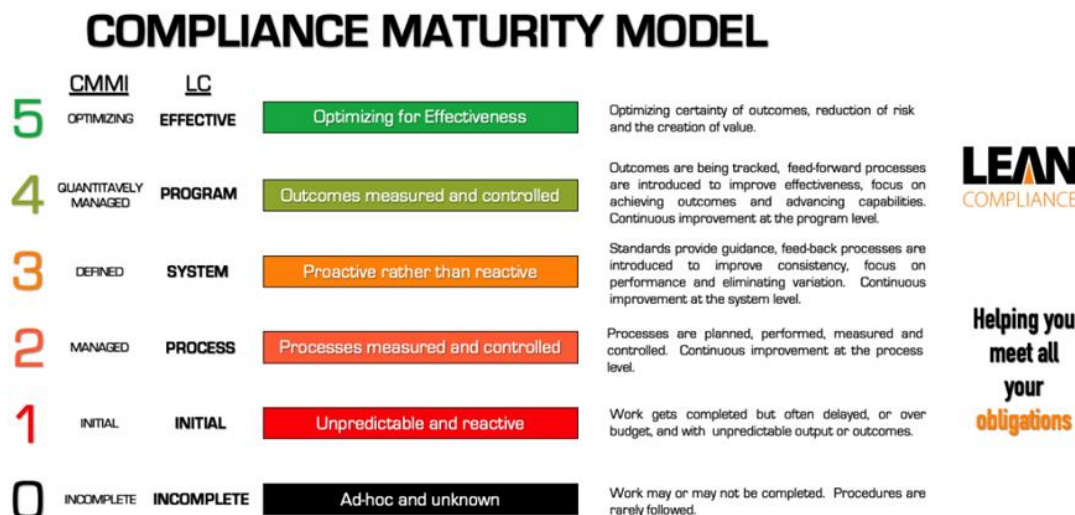
extracted from machine readable reports and report models assisted by software utilizing that machine readable clear and complete description.

None of these purposes will be satisfied “auto-magically”. Rather, the creators of the system must carefully and clearly prove to themselves that the purposes are being satisfied and that the needs of each system stakeholder or group of stakeholders are being met, that system harmony is maximized, that system dissonance is minimized, and that the principles and objectives are being met by the system that has been created to satisfy the system stakeholders.

Such a system that meets the goals and objectives of system stakeholders is thus useful to those stakeholders.

2.3. Compliance Maturity Model

A good practices based financial reporting system can, and should, fit into the *Compliance Maturity Model*¹⁴ which is an application of the *Capabilities Maturity Model*¹⁵. Using the *Seattle Method* is a conscious and deliberate choice which is intended to raise the functionality level of the reporting system from lower levels of the Compliance Maturity Model to a higher level of a “process” (level 2) or “system” (level 3) and ultimately as the system matures to that of a “program” (level 4) and ultimately to “effective” (level 5) through measurement and feedback.



A kluge is a term from the engineering and computer science world, it refers to something that is convoluted and messy but gets the job done. Anyone can create something that is complex, convoluted, and messy. Anyone can create a kluge. But it is hard work to create something that is simple and elegant.

If a system that is created rises to the level of being simple and elegant, considering the entirety of the system and needs of all system stakeholders rather than a

¹⁴ LinkedIn, Raimund Laqua, PMP, Peng, *Compliance Maturity Model*, <https://www.linkedin.com/pulse/capabilities-maturity-model-compliance-raimund-laqua-pmp-peng/>

¹⁵ Wikipedia, *Capabilities Maturity Model*, https://en.wikipedia.org/wiki/Capability_Maturity_Model

collection of individual silos with perhaps one dominant silo that are then perhaps then interconnected; then something quite useful might be the result.

The benefits of such a simple and elegant system to system stakeholders can be profound.

2.4. Automation

Automation is about removing friction, driving costs down, speeding processes up, and improving efficiency and productivity. Automation is about improving processes in order to deliver goods and services that are better for less cost.

Old technologies are making it increasingly difficult to keep up with today's fast paced financial information exchange. New technologies such as structured information, artificial intelligence, digital distributed ledgers offer significant and compelling opportunities to make accounting, reporting, auditing, and analysis tasks and processes more efficient and effective.

The change that is occurring is being packaged into many different terms or "buzzwords" that effectively tend to refer to the same thing. Here is a summary of some of those terms/buzzwords:

- MIT refers to this as **Algorithmic Business Thinking**¹⁶
- Carnegie Mellon University refers to this as **Computational Thinking**¹⁷
- Harvard University refers to this as **Regulation, the Internet Way**¹⁸
- Vanderbilt University refers to this as **Regulation 2.0**¹⁹
- The Data Coalition calls this **Smart Regulation**²⁰
- Tim O'Reilly Founder and CEO O'Reilly Media Inc. calls it **Algorithmic Regulation**²¹
- Deloitte refers to this as "**The Finance Factory**" and **Digital Finance**²²
- Robert Kugel of Ventana Research calls it "**Digital Finance**"²³

¹⁶ MIT, Accelerating Digital Transformation with Algorithmic Business Thinking, <https://executive.mit.edu/course/accelerating-digital-transformation-with-algorithmic-business-thinking/a056g00000URaaQAAT.html>

¹⁷ Carnegie Mellon Center for Computational Thinking, <https://www.cs.cmu.edu/~CompThink/>

¹⁸ Harvard University, Regulation, the Internet Way, <https://datasmart.ash.harvard.edu/news/article/white-paper-regulation-the-internet-way-660>

¹⁹ SSRN, Regulation 2.0: The Marriage of New Governance and Lex Informatica, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2746229

²⁰ Smart Regulation, <http://xbrl.squarespace.com/journal/2012/11/12/smart-regulation-graphic-shows-the-big-picture.html>

²¹ Tim O'Reilly Founder and CEO O'Reilly Media Inc., Open Data and Algorithmic Regulation, <https://beyondtransparency.org/chapters/part-5/open-data-and-algorithmic-regulation/>

²² Deloitte, Finance 2025: Digital transformation in finance
Our eight predictions about digital technology for CFOs,
<https://www2.deloitte.com/us/en/pages/finance-transformation/articles/finance-digital-transformation-for-cfos.html>

²³ Robert Kugel, The Rising Expectations for Finance Analytics,
<https://www.linkedin.com/pulse/rising-expectations-finance-analytics-robert-kugel/>

- The government of Norway calls this “**Nordic Smart Government and Business**”²⁴
- I have referred to all this as **Computational Professional Services**²⁵.

Other terms are also used such as “continuous accounting”, “continuous reporting”, “continuous auditing” and other such terms/buzzwords.

Imagine a set of high-quality knowledge graphs organized into the form of a knowledge portal²⁶. Imagine that the knowledge portal is enhanced by blockchain technology. Imagine that the knowledge graphs physical syntax is based on global standards and that the information within those knowledge graphs are also based on standards.

Imagine a system that is simple and elegant to use, rather than a poorly thought-out kludge.

Now let’s take a closer look at the difference between a **standardized** reporting approach versus a **customized** reporting approach in order to better understand what it takes to make a customized reporting approach work appropriately.

2.5. Reporting Approaches

The paper *Critical Reflection on XBRL: A “Customisable Standard” for Financial Reporting?*²⁷, breaks reporting into two approaches: standardized reporting and customized reporting.

I modified this breakdown slightly breaking customized reporting into two distinct approaches, “freeform customization” and “controlled customization”. I then reflected the three approaches in the following graphic which I created which was heavily inspired by the original graphic in the referenced paper²⁸:

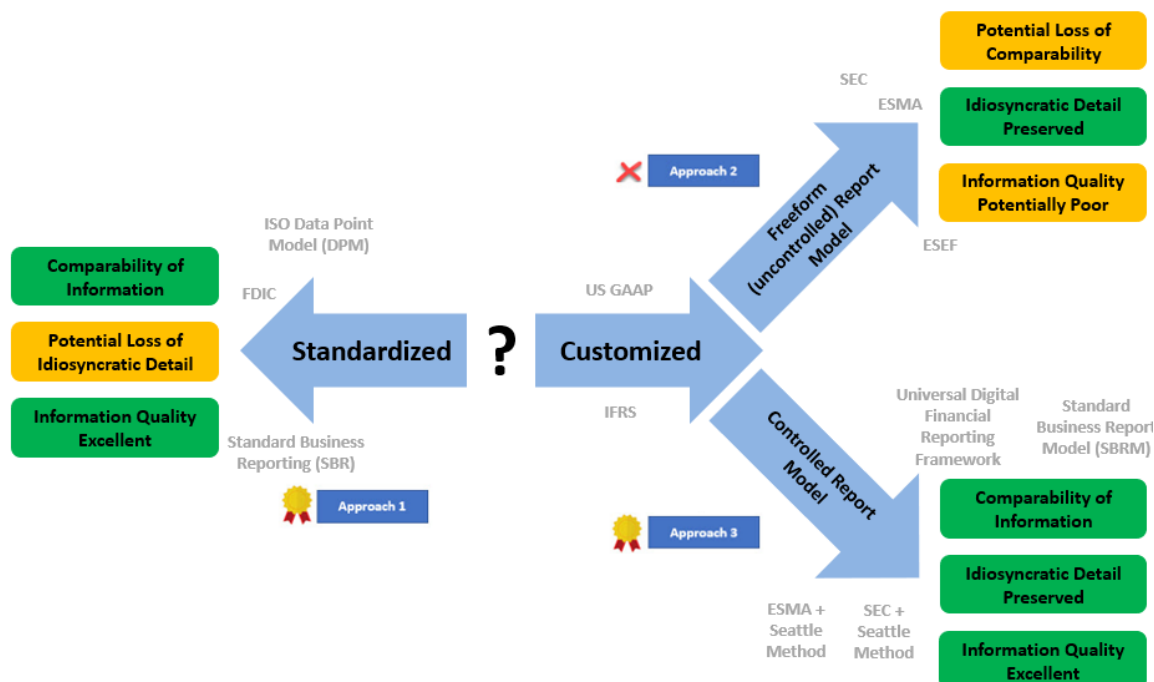
²⁴ Nordic Smart Government and Business, <https://nordicsmartgovernment.org/>

²⁵ Computational Professional Services, http://www.xbrlsite.com/mastering/Part00_Chapter01.A1_ComputationalProfessionalServices.pdf

²⁶ Data Science Central, Kurt Cagle, *From Knowledge Graphs To Knowledge Portals*, <https://www.datasciencecentral.com/from-knowledge-graphs-to-knowledge-portals/>

²⁷ Reporting Approaches + XBRL Approaches + Implementation Approaches, <http://xbrl.squarespace.com/journal/2021/12/30/reporting-approaches-xbrl-approaches-implementation-approach.html>

²⁸ Taxonomy creation approaches, <http://xbrlsite.azurewebsites.net/2022/library/TaxonomyApproachesSeattleMethod.jpg>



This yields three distinct reporting system modeling approaches which I summarize as follows:

- **(#1) Standard form model:** No modifications are allowed to the report model.
- Customized form model:
 - **(#2) Freeform, Uncontrolled customization model:** Modifications are permitted to report model, but those modifications are not controlled. As such there is no differentiation between permitted and unpermitted modifications to the model because what is permitted is not articulated with clarity.
 - **(#3) Controlled customization model:** Modifications are permitted to report model and a mechanism is provided to control report model modifications; permitted and unpermitted report model modifications are clearly delineated and control mechanisms keep report model modification within the boundaries of what is permitted.

Effectively, uncontrolled customization of report models simply will not work.

The ISO Data Point Methodology is a standard form model.

What the SEC and ESMA have implemented at this point is closer to freeform, uncontrolled customization model because the control mechanisms are not complete.

But if you take what the SEC and ESMA have prescribed and further constrain and control permitted modifications using the principles and techniques of the Seattle Method then you have what is closer to a controlled customization model.

If one focuses on the level of the final result of the report itself, other opportunities for automation can be missed. Think for a moment about the complete record to report process of an enterprise.

2.6. Overcoming Other Reporting Hurdles

An accounting information system of an enterprise can be a complex accumulation of pieces collected and created over years. Consider the following realities of such accounting and reporting systems:

- **Complex disparate systems trap information:** The reality of many if not most finance processes is many dissimilar systems making information integration complex. Often, complexity is self-inflicted such as an incorrectly set up chart of accounts or a less than adequate mapping between the chart of accounts and a report writer or audit lead schedules. *The fix?* Take the time to set up your accounting information systems correctly.
- **Missing metadata:** Far too often information necessary to flow data through a system is entered into the system at the end of a process instead of at the beginning of a process. This missing metadata makes it literally impossible to automate processes. *The fix?* Establish standard metadata, enter that metadata as early in the process as possible, enable information to flow through the process where possible.
- **Missing information:** Far too often, information necessary for a system to be automated is not available to the system and therefore information is supplemented by manually created spreadsheets. *The fix?* Bring more and more tasks and processes into core systems and avoid supplementing information using spreadsheets.
- **Overly manual process control mechanisms:** Process control mechanisms today tend to be overworked accounting professionals that have to manually control process output quality within systems that push far too much work to the end of the process. This manual approach is expensive, not reliable enough letting errors slip through the systems, and cause more important work to be delayed or simply left undone and more money needs to be spent to fix mistakes. *The fix?* Augment manual processes with automated processes and let machines help overworked humans get work done. Leverage Lean Six Sigma philosophies and techniques.
- **Communications issues:** The typical professional accountant does not really grasp the possibilities that technology offers to improve processes accurately. Computer scientists do not tend to understand important nuances of accounting, reporting, auditing, and analysis and therefore cannot build systems precisely or set priorities effectively. Most accountants focus on getting work done allocating little to no effort towards process improvement. *The fix?* It will take far less time for a professional accountant to learn what is necessary to communicate effectively with computer scientists than it would for a computer scientist to understand the important subtleties and nuances of accounting, reporting, auditing, and analysis. Take the time to improve your skills. If you don't want to make the investment, then hire a good consultant that has made that investment.



2.7. Best Practices

A best practice is a method or technique that has been generally accepted as superior to any other known alternatives because it produces results that are superior to those achieved by other means or because it has become a standard way of doing things.

A best practice (a.k.a. good practices) based method that I am calling the *Seattle Method*²⁹ was created in order to effectively create XBRL-based financial reports that are provably properly functioning logical systems.

Using this method, enterprises can reliably and effectively stream a high-quality machine-readable XBRL-based global standard knowledge graph of a complete, consistent, and provably correct general purpose financial statement. Further, an entire record-to-report process can be automated effectively. This method provides both the flexibility and the control necessary to effectively hit this target within an enterprise.

The next section helps the reader understand this good practices-based model.

2.8. Good Practices Model Example

In this section we will provide the reader with an example of the good practices model. To the untrained observer, this example might appear to look like a toy. But to the trained observer, this example will be seen for what it actually is which is a highly sophisticated testing tool that can be used to prove the effectiveness in meeting the objectives of this system.

²⁹ Charles Hoffman, CPA, Seattle Method,
<http://xbrlsite.com/seattlemethod/SeattleMethod.pdf>

As a quick reminder, the overarching objective is the effective exchange of complex financial information when the creators of a report are permitted to modify (a.k.a. customize) the report model. The three sub-objectives are:

1. Effective comparability of information.
2. Preservation of idiosyncratic detail of information.
3. Excellent information quality.

Taking a lesson from Steven Covey's *The Seven Habits of Highly Effective People*, habit 2 which is "Begin with the End in Mind"; we will start at the end and work our way to the beginning. So we will start with the end result which is a set of reports that has been submitted to an information repository which is then available to others that wish to extract financial information from that information repository.

2.9. Repository of XBRL-based Reports

Below you see a screen shot of a repository of XBRL-based reports that have been created using the *Seattle Method*³⁰. Each of the reports use the same financial reporting scheme and were verified against the same eight verification criteria successfully.

[CSH: Note that I need to create a better example that adds the capability to see a cross period comparison for one reporting entity and a cross entity comparison for a specific period. Further, it would be better if the PROOF was used in order to better demonstrate all of the information patterns even though that is not necessary to prove that the system works effectively.]

Reporting Scheme Autogenerated Dashboard (Prototype) Documentation Repository RSS Feed Seattle Method

Report Repository Good Practices Prototype

This is a prototype dashboard of a repository of XBRL-based financial reports created per some reporting scheme. For more information see [Seattle Method](#).

Search...

	Report #	Entity Date	Entity Identifier	Economic Entity Name	View Report	Checked By	Double Check	XBRL Technical Syntax	XBRL Calculations	XBRL Formulas	Report Model Structure	FAC Consistency Crosschecks	Type/Subtype Associations	Disclosure Mechanics	Reporting Checklist
1	2020-12-31	ENTITY001	ABC Company	Report											
2	2020-12-31	ENTITY003	ACME, Inc.	Report											
3	2020-12-31	ENTITY002	XYZ Company	Report											

The point here is to show two dynamics.

First, each report provided in the repository is proven to be a properly functioning logical system. Therefore, the information in the report is guaranteed to be consistent, complete, and precise.

Second, specific complexities are provided within the set of three reports in order to demonstrate the realities of extracting information from such reports.

³⁰ *Report Repository Good Practices Prototype*,
<http://www.xbrlsite.com/seattlemethod/golden/reports/repository/Dashboard.html>

To understand the repository of financial reports we will first help the reader understand what can go wrong when creating such report and how to prevent the impediments to a properly functioning financial report.

2.10. Impediments to a Properly Functioning Financial Report

The first step in being able to effectively extract information from an XBRL-based financial reports is to create properly functioning financial reports. The best way to explain how to create properly functioning financial reports is to show the reader what can go wrong within such reports.

To demonstrate what can go wrong in such reports all we need to do is focus on one fragment of a report and walk you through everything that can go wrong when representing that specific fragment. What can go wrong with the other report fragments is similar, there are patterns of impediments.

Then, the task of those creating financial reports that would ultimately end up in such a repository of XBRL-based financial reports is simply to prevent each of the impediments from occurring. The result of preventing each of the impediments from existing is a properly functioning financial report.

To provide examples of impediments to a properly functioning financial report, a well understood report fragment will be used: the accounting equation.

An explanation of³¹ and examples of testing³² for each of these impediments is available and beyond the scope of our discussion here and readers are encouraged to explore this information for a comprehensive explanation of the impediments.

The following list provides a summary from that explanation and testing:

- **State 1:** Baseline. Example of a properly functioning financial report.
- **State 2:** Leaving out a rule of report model, "Assets = Liabilities + Equity".
- **State 3:** An error in a reported fact.
- **State 4:** Unreported line item without providing a derivation rule to derive missing high-level report line item.
- **State 4':** Unreported line item but with derivation rule included which uses deductive reasoning to derive unreported line item.
- **State 5:** Unreported line item and consistency rule not provided.
- **State 6:** Fact reported incorrectly, rule provided is incorrect, verification results are incorrect because both fact and rule are incorrect.
- **State 7:** Fact reported using extension concept but extension is not "anchored" to existing known concept.
- **State 7':** Fact reported using extension concept that is properly anchored to existing concept allows proper interpretation of fact.

³¹ Understanding What Can Go Wrong,
[http://www.xbrlsite.com/seattlemethod/golden/reports/ae/UnderstandingWhatCanGoWrong.p
df](http://www.xbrlsite.com/seattlemethod/golden/reports/ae/UnderstandingWhatCanGoWrong.pdf)

³² Testing impediments,
http://www.xbrlsite.com/seattlemethod/golden/reports/ae/Testing_Impediments.pdf

- **State 8:** Similar to State 7 but concept used from base taxonomy (e.g. rather than extension) is not interpretable because it is not anchored to any other concept.
- **State 9:** Similar to State 7 but rather than an extension concept, an extension disclosure is not anchored to some existing disclosure.
- **State 10:** Report model is “wired together” illogically.
- **State 11:** Report physical technical syntax is inconsistent with the XBRL technical specification.

The essence of what is being said here is that (a) all of the fragments of every report in the repository is properly functioning and (b) everything that could go wrong is represented by the set of impediments that is outlined.

If some impediment is missing from the list of impediments provided then (a) that impediment can be added and (b) a rule can be provided to detect the impediment.

In this way, reports can be controlled and therefore can be free from impediments that cause financial reports in a repository not to function properly.

2.11. Inherent Variability Caused by Intermediate Components

The document *Essence of Accounting*³³ has a comprehensive discussion of the notion of the inherent variability within financial reports which is caused by different intermediate components provided within financial reports.

Three examples will help the reader understand these ideas.

First, by intermediate components think of subtotals and totals that are used to describe information in financial reports. A financial report may, or may not, include the line item “Gross Profit (Loss)” depending on the reporting practices of specific industries or the policies of a specific reporting economic entity.

Second, while every reporting entity which provides a classified balance sheet has the notion of “Noncurrent assets” it is often the practice of reporting entities to not explicitly provide that line item within a financial report. Other reporting entities might explicitly report that line item.

Third, while the accounting equation of a for-profit entity might be “Assets = Liabilities + Equity”; other reporting entities might use a different version of the accounting equation such as “Net Assets = Assets – Liabilities”.

Providing for the variability of just these three contributors to report variability help the reader understand the dynamics of reporting financial information and also the extraction of information from such financial reports. Consider the following graphic:

³³ Charles Hoffman, CPA, *Essence of Accounting*,
<http://xbrlsite.azurewebsites.net/2020/Library/EssenceOfAccounting.pdf>

#	Balance Sheet				Income Statement			Changes in Equity		
Report #1		Period	2020-12-31	2019-12-31		Period	2020-01-01 to 2020-12-31		Period	2020-01-01 to 2020-12-31
	Concept				Concept			Concept		
	Balance Sheet [Arithmetic]				Comprehensive Income [Roll Up]			Changes in Equity [Roll Forward]		
	Assets		3,500	0	Revenues		7,000	Equity, Beginning Balance		0
	Liabilities		0	0	(Expenses)		(3,000)	Comprehensive Income		3,000
	Equity		3,500	0	Gains		1,000	Investments by Owners		1,000
					(Losses)		(2,000)	(Distributions to Owners)		(500)
				Comprehensive Income		3,000	Equity, Ending Balance		3,500	
Report #2		Period	2020-12-31	2019-12-31		Period	2020-01-01 to 2020-12-31		Period	2020-01-01 to 2020-12-31
	Concept				Concept			Concept		
	Net Assets [Roll Up]				Changes in Net Assets [Roll Up]			Changes in Fund Balance [Roll Forward]		
	Assets		3,500	0	Revenues		7,000	Fund Balance, Beginning Balance		0
	Liabilities		0	0	(Expenses)		(3,000)	Change in Net Assets		3,000
	Net Assets		3,500	0	Gains		1,000	Other Increases (Decreases) in Fund Balance		500
					(Losses)		(2,000)	Fund Balance, Ending Balance		3,500
				Change in Net Assets		3,000				
Report #3		Period	2020-12-31	2019-12-31		Period	2020-01-01 to 2020-12-31		Period	2020-01-01 to 2020-12-31
	Concept				Concept			Concept		
	Balance Sheet [Arithmetic]				Comprehensive Income [Roll Up]			Changes in Equity [Roll Forward]		
	Assets		3,500	0	Income from Normal Activities of Entity		2,000	Equity, Beginning Balance		0
	Liabilities		0	0	Income from Peripheral or Incidental Transactions of Entity		1,000	Comprehensive Income		3,000
	Equity		3,500	0	Comprehensive Income		3,000	Investments by Owners		1,000
								(Distributions to Owners)		(500)
							Equity, Ending Balance		3,500	

The graphic shows three reports, one report in each row: Report #1, Report #2, Report #3. Each report has three fragments shown in each column of the above graphic: Balance Sheet, Income Statement, and Changes in Equity. Close scrutiny of the three reports shows:

- Reports #1 and #3 use the same balance sheet format but Report #2 has a different balance sheet format.
- Each report uses a different income statement total and/or set of line items that make up the income statement total.
- Reports #1 and #3 use the same changes in equity format but Report #2 has a different changes in equity format.

These intermediate components and the inherent variability cause additional steps to be necessary when attempting to extract information from such financial reports.

Please note that this inherent variability and intermediate components is a feature of financial reports, this is not a bug. It is the inherent variability and intermediate components that enable reporting economic entities to articulate their unique idiosyncratic details effectively and one of the more powerful but misunderstood features of XBRL-based financial reporting.

2.12. Effective Extraction of Report Information

The cornerstone of this good practices model is the ability to see that the overarching objective and the three subobjectives can be effectively realized.

In this section I will show you a very simple Excel spreadsheet that is used to extract information from the three XBRL-based financial reports that exist in this model repository and help you understand the realities of effectively extracting such information.

You can download the Excel application and examine the VBA code to see exactly how the application works³⁴.

As you examine this very basic Excel application for this good practices model repository, consider that, say, US GAAP financial reports are more complicated but follow exactly the same pattern as this very basic model. I have provided other Excel extraction tools that pull information from actual XBRL-based reports submitted to the SEC³⁵. What is special about this very basic Excel spreadsheet is that it follows the exact same pattern for extracting information; it only focuses on specific moving parts and keeps those moving parts easy to understand in order to enhance understanding of the specific issues that I wish to help the reader understand with clarity.

General Information				Balance Sheet				Income Statement				Changes in Equity		Rules		
#	Economic Entity Name	URI	Balance Sheet Date (Year to Date)	Income Statement Start Period	Assets	Liabilities	Equity	Liabilities and Equity	Revenues	Gains	Expenses	Losses	Comprehensive Income	Investments by Owners	Distributions to Owners	Link to XBRL Instance
1	ABC Company	GH4594001GHMPUCX.SIF	2019-12-31	2019-01-01	3,500	0	3,500	3,500	7,800	1,000	3,000	2,000	3,000	1,000	0	http://www.xbrl-site.com/exammethod/goldenreports/instance001-15/instance.xml
2	PVT Company	GH4594001GHMPUCX.SIF	2019-12-31	2019-01-01	3,500	0	3,500	3,500	2,800	1,000	0	0	3,000	1,000	0	http://www.xbrl-site.com/exammethod/goldenreports/instance001-15/instance.xml
3	ACME, Inc.	GH4594001GHMPUCX.SIF	2019-12-31	2019-01-01	3,500	0	3,500	3,500	7,800	1,000	3,000	2,000	3,000	0	0	http://www.xbrl-site.com/exammethod/goldenreports/instance001-15/instance.xml

To help the reader see the situation that must be dealt with clearly, I will walk you through several examples of the issues that must be dealt with properly.

For the first situation, please consider the balance sheets of Report #1 and Report #2.

Report #1 has a balance sheet that contains three line items:

- Assets, Liabilities, Equity.

Report #2 also has three line items but one line item is different:

- Assets, Liabilities, Net Assets

How is this difference handled? A first thought might simply be to have an IF...THEN statement to deal with the different concepts. And that was my first approach when began working with this XBRL-based information.

However, that became increasingly complicated and to make a long story short; rather than creating a bunch of sequential code using lots of IF...THEN statements, a completely new approach was used.

The approach that I used ended up being a forward chaining engine that read declarative rules.

³⁴ Documentation,

<http://www.xbrl-site.com/seattlemethod/golden/reports/repository/Documentation.zip>

³⁵ Further Updated and Expanded XBRL-based Financial Report Extraction Tools,

<http://xbrl.squarespace.com/journal/2018/1/11/further-updated-and-expanded-xbrl-based-financial-report-ext.html>

#	Balance Sheet		
Report #1	Period	2020-12-31	2019-12-31
	Concept		
	Balance Sheet [Arithmetic]		
	Assets	3,500	0
	Liabilities	0	0
	Equity	3,500	0
Report #2	Period	2020-12-31	2019-12-31
	Concept		
	Net Assets [Roll Up]		
	Assets	3,500	0
	Liabilities	0	0
	Net Assets	3,500	0
	Period		

The Excel spreadsheet is really a better example of the problem rather than the ultimate solution which I cannot show you because I am not a good enough software developer to create the correct solution by myself.

But understanding what I did wrong can help understand how to address this situation correctly.

I am not going to discuss my code; you can just go look at that. But I will tell you what I did wrong and how I fixed that problem. What I did wrong was hard code rules within code:

```
'Equity
strEquity = IIf(strEquity = "NOT-FOUND", GetFactValue("sfac8:NetWorth", "Instant"), strEquity)
strEquity = IIf(strEquity = "NOT-FOUND", GetFactValue("sfac8:NetAssets", "Instant"), strEquity)
strEquity = IIf(strEquity = "NOT-FOUND", GetFactValue("sfac8:Equity", "Instant"), strEquity)
strEquity = IIf(strEquity = "NOT-FOUND", "0", strEquity)
```

A better approach is to separate the rules from the code. And that is what this good practices model does which (a) enables business professionals to maintain the rules, (b) enables software engineers to maintain the code, and (c) provides a massive increase in flexibility in how to process the inherent variability and intermediate subtotals in financial reporting schemes such as US GAAP and IFRS.

The bottom line here is that the notion of Reporting Styles and Fundamental Accounting Concepts and Derivation Rules and Mapping Rules are all used to deal with the intermediate subtotals and inherent variability rather than ignoring the issue or using the knee jerk reaction of writing a bunch of IF...THEN code.

A second example is worth mentioning because it points to an entirely new notion: the disclosure.

The income statement is the report fragment that has the most variability of the three primary financial statements (balance sheet, income statement, cash flow statement). The variability of the income statement is an order of magnitude greater than the other two primary financial statements.

Consider the three income statements in the reports of this good practices repository model. There are three reports and each report has a different income statement.

Two income statements have the same TOTAL line item, "Comprehensive Income". Two income statements have the same detailed items (Revenues, Expenses, Gains, Losses) but then add up to two different total concepts (Comprehensive Income, Changes in Net Assets).

The point here is this. What is actually going on in these examples?

1. Is this one disclosure with lots of variability, or
2. Is this different disclosures?

The answer to the question is less important than understanding that you can ask this question about any two fragments of an XBRL-based financial report.

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

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

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

What is important is to understand that there are patterns in reports and those patterns can be leveraged. Rather than simply looking at the fragments that are being disclosed as separate things, if you give the things names and if you can worked with those named things, in this case I call them disclosures, you can work with financial reports in powerful new ways.

This leads to the notion of the disclosure mechanics rule and the reporting checklist rule.

2.13. Type-subtype (Anchoring and Wider-Narrower)

The ESMA introduced the notion of “anchoring” and the SEC introduced the notion of “wider-narrower” associations. These are not new ideas. The “general-special” relation in XBRL is similar, as is the general notion of “type-subtype”. For the purpose of this good practices model I am using the term “type-subtype” and this idea is used to understand two very important notions:

1. Everything a type of some other thing.
2. Never use something that is intended to be one specific type of thing as some other thing.

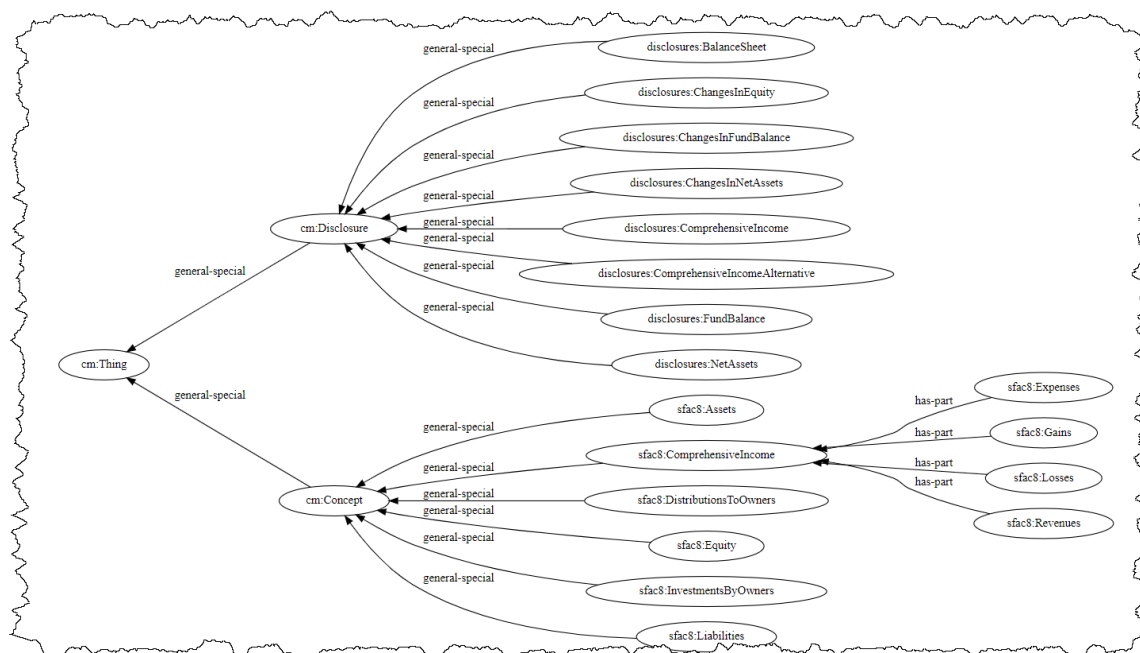
Looking at the three report fragments (Balance Sheet, Income Statement, Changes in Equity); you can see how these two notions are applied:

#	Balance Sheet				Income Statement			Changes in Equity		
Report #1		Period	2020-12-31	2019-12-31		Period	2020-01-01 to 2020-12-31		Period	2020-01-01 to 2020-12-31
	Concept				Concept			Concept		
	Balance Sheet [Arithmetic]				Comprehensive Income [Roll Up]			Changes in Equity [Roll Forward]		
	Assets		3,500	0	Revenues		7,000	Equity, Beginning Balance		0
	Liabilities		0	0	(Expenses)		(3,000)	Comprehensive Income		3,000
	Equity		3,500	0	Gains		1,000	Investments by Owners		1,000
					(Losses)		(2,000)	(Distributions to Owners)		(500)
					Comprehensive Income		3,000	Equity, Ending Balance		3,500

The three fragments communicate the following things:

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

While not articulated explicitly, you can see and your understanding of accounting might help you understand that the thing “Revenues” is intended to be used on the Income statement, and not on the Balance Sheet or the Changes in Equity. There are many, many different associations that are permitted or which describe the proper use of the ten “things” defined above. Here is one explicit representation:



The point is that these “type-subtype” associations can be clearly and explicitly articulated and such information contributes to clarity.

2.14. Summary of Good Practices Model

We first explained why we need to articulate a good practices model for representing XBRL-based financial reports. We then provided a very basic example of such a good practices model in as simple a form as possible. In this section we provide a succinct summary of a good practices model.

2.14.1. Verification Categories (fundamentally necessary)

While the potential for categories of verification of an XBRL-based report is essentially endless, the following verification categories are necessary in order to create effective XBRL-based financial reports:

1. Proper physical XBRL technical syntax format used to represent logic
2. Proper mathematical associations between reported facts
3. Proper XBRL presentation relations associations (i.e. proper report model structure)
4. Proper use of a type or subtype of line item to represent report model
5. Consistent high-level reported information (a.k.a. fundamental accounting concepts)
6. Proper mechanical structure of disclosures
7. Proper set of disclosures provided within report

These verification categories can be implemented in software applications slightly differently. These verification categories are the very minimum of what must be

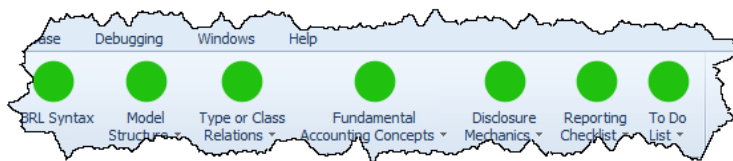
used to create a properly functioning financial report. Additional verification categories can be added to supplement this fundamentally necessary set of verification categories.

Below are several implementations of these verification categories in a number of different software applications:

Auditchain:

#	Verification Category	Result
1	XBRL Technical Syntax Verification	
2	Report Mathematical Computations Verification (XBRL Calculations)	
3	Report Mathematical Computations Verification (XBRL Formulas)	
4	Report Model Structure Verification	
5	Fundamental Accounting Concept Consistency Crosschecks Verification	
6	Type-subtype (wider-narrower) Associations Verification	
7	Disclosure Mechanics Verification	
8	Report Disclosure Checklist Verification	
9	Other	

Pesseract:



XBRL Cloud:

Verification Summary		
	A	M
XBRL Technical Syntax Rules		
Model Structure Rules		
Business Rules		
Roll Up Rules		
Other Manual Review Tasks	NS	NS
Other Rules and Best Practice Tasks		

2.15. Good Practices Repository for PROOF

The good practices repository for PROOF expands slightly on the prior example, providing 10 reports rather than the three reports in the SFAC 8 model repository of XBRL based reports³⁶.

³⁶ Report Repository Good Practices Prototype (PROOF),
<http://www.xbrlsite.com/seattlemethod/golden/repository/dashboard.html>

Report Repository Good Practices Prototype (PROOF)

This is a prototype dashboard of a repository which contains a collection of XBRL-based financial reports created per some reporting scheme. For more information see [Seattle Method](#).

Search...

#	Report Date	Entity Identifier	Economic Entity Name	Report (Instance)	Checked By	Double Check	XBRL Technical Syntax	XBRL Calculations	XBRL Formulas	Report Model Structure	FAC Consistency Crosschecks	Type/Subtype Associations	Disclosure Mechanics	Reporting Checklist
1	2021-12-31	ENTITY01	Entity01	Report			OK	OK	OK	OK	OK	OK	OK	OK
2	2020-12-31	ENTITY01	Entity01	Report			OK	OK	OK	OK	OK	OK	OK	OK
3	2021-12-31	ENTITY02	Entity02	Report			OK	OK	OK	OK	OK	OK	OK	OK
4	2021-12-31	ENTITY03	Entity03	Report			OK	OK	OK	OK	OK	OK	OK	OK
5	2021-12-31	ENTITY04	Entity04	Report			OK	OK	OK	OK	OK	OK	OK	OK
6	2020-12-31	ENTITY05	Entity05	Report			OK	OK	OK	OK	OK	OK	OK	OK
7	2020-12-31	ENTITY06	Entity06	Report			OK	OK	OK	OK	OK	OK	OK	OK
8	2020-12-31	ENTITY07	Entity07	Report			OK	OK	OK	OK	OK	OK	OK	OK
9	2020-12-31	ENTITY08	Entity08	Report			OK	OK	OK	OK	OK	OK	OK	OK
10	2020-12-31	ENTITY09	Entity09	Report			OK	OK	OK	OK	OK	OK	OK	OK

Each report in the PROOF repository is consistent with each eight categories of rules which are used to verify that the information within each report is consistent with expectations and that the reports are properly functioning logical systems.

An extraction tool is provided (see the documentation) which helps the reader understand the basics of extracting information from reports contained in this repository example.

General information					Balance Sheet				Income Statement					Changes in Equity		Rules		
#	Economic Entity Name	Identifier	Balance Sheet Date	Income Statement Period Start (Year to Date)	Assets	Liabilities	Equity	Liabilities and Equity	Revenues	Gains	Expenses	Losses	Comprehensive Income	Investments by Owners	Distributions to Owners	BS1	BS4	IS1
1	Entity01	ENTITY01	2021-12-31	2021-01-01	3,000	2,000	1,000	3,000	5,000	1,000	3,000	1,000	2,000	1,000	3,000	0	0	0
2	Entity02	ENTITY02	2021-12-31	2021-01-01	3,000	2,000	1,000	3,000	1,000	1,000	0	0	2,000	1,000	3,000	0	0	0
3	Entity03	ENTITY03	2021-12-31	2021-01-01	3,000	2,000	1,000	3,000	5,000	1,000	3,000	1,000	2,000	1,000	3,000	0	0	0
4	Entity04	ENTITY04	2021-12-31	2021-01-01	3,000	2,000	1,000	3,000	1,000	1,000	0	0	2,000	1,000	3,000	0	0	0
5	Entity05	ENTITY05	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	1,000	3,000	2,000	3,000	1,000	500	0	0	0
6	Entity06	ENTITY06	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	1,000	3,000	2,000	3,000	1,000	500	0	0	0
7	Entity07	ENTITY07	2020-12-31	2020-01-01	3,500	0	3,500	3,500	4,000	-1,000	0	0	3,000	1,000	500	0	0	0
8	Entity08	ENTITY08	2020-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	1,000	3,000	2,000	3,000	1,000	500	0	0	0
9	Entity09	ENTITY09	2020-12-31	2020-01-01	3,500	0	3,500	3,500	4,000	-1,000	0	0	3,000	1,000	500	0	0	0
10	Entity01	ENTITY01	2020-12-31	2020-01-01	3,000	2,000	1,000	3,000	5,000	1,000	3,000	1,000	2,000	1,000	3,000	0	0	0

2.16. Comparison with SEC and ESMA Repositories

The following is a comparison of the good practices XBRL report repository with the SEC XBRL-based report repository and the ESMA XBRL-based report repository:

	Good Practices XBRL Report Repository	SEC XBRL-based Reports Repository	ESMA XBRL-based Reports Repository
Machine readable list of reports available in repository.	http://www.xbrlsite.com/seattlemethod/golden/reports/repository/rss.xml	https://www.sec.gov/Archives/edgar/monthly/	https://filings.xbrl.org/index.json
Machine readable list of reporting styles used by economic entities submitting reports.	http://www.xbrlsite.com/seattlemethod/golden/sfac8/fac/reporting-styles-cm-ref.xml	Not provided	Not provided
Machine readable list of permitted type-subtype associations (a.k.a. wider-narrower) which must be followed.	http://www.xbrlsite.com/seattlemethod/golden/sfac8/typeSubtype-rules-def.xml	Not provided	Not provided
Machine readable list of disclosures in reports.	http://www.xbrlsite.com/seattlemethod/golden/sfac8/disclosures.xsd	Not provided	Not provided
Machine readable list of high-level fundamental accounting concepts and relations between concepts continuity cross checks which must be followed by reports.	http://www.xbrlsite.com/seattlemethod/golden/sfac8/fac/fac.xsd	Not provided	Not provided
Machine readable rules which must be followed by each disclosure represented in a report.	http://www.xbrlsite.com/seattlemethod/golden/sfac8/dm.xsd	Not provided	Not provided
Machine readable rules which must be followed by each report model created by reporting economic entity.	http://xbrlsite.com/seattlemethod/cm/model-structure-rules-strict-def.xml	Not provided	Not provided

The document *Testing of Fundamental Accounting Concepts Consistency Crosscheck Rules*³⁷ provides several subsets of XBRL-based reports that have been submitted to the SEC. These subsets have only been tested against the fundamental accounting concepts rules which is only ONE of EIGHT verification categories of the good practices repository. But this will give you an idea of what is possible.

³⁷ Charles Hoffman, CPA, *Testing of Fundamental Accounting Concepts Consistency Crosscheck Rules*, <http://www.xbrlsite.com/2022/library/TestingFAC.pdf>

2.17. Technical

The following is specific technical information related to this good practices model of an XBRL-based information collection system.

2.17.1. Repository Dashboard

Reports that are submitted to a system are shown here. Provides all of the technical artifacts.

<http://www.xbrlsite.com/seattlemethod/golden/reports/repository/Dashboard.html>

Report #	Report Date	Entity Identifier	Economic Entity Name	View Report	Checked By	Double Check	XBRL Technical Syntax	XBRL Calculations	XBRL Formulas	Report Model Structure	FAC Consistency Crosschecks	Type/Subtype Associations	Disclosure Mechanics	Reporting Checklist
1	2020-12-31	ENTITY001	ABC Company	Report	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	2020-12-31	ENTITY003	ACME, Inc.	Report	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	2020-12-31	ENTITY002	XYZ Company	Report	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

2.17.2. Reporting Scheme (Base XBRL Taxonomy)

Base XBRL taxonomy, used by the system, all supplemental rules can be obtained from this web page, see the top of the page:

http://www.xbrlsite.com/seattlemethod/golden/sfac8/sfac8_ModelStructure.html

Line		Report Element Category	Period Type	Balance	Report Element Name
1	11-Statement of Financial Position	Network			http://xbrlsite.com/seattlemethod/sfac8/role/BalanceSheet
2	Balance Sheet [Hypercube]	Table			sfac8:BalanceSheetHypercube
3	Balance Sheet [Line Items]	LineItems			sfac8:BalanceSheetLineItems
4	Balance Sheet [Arithmetic]	Abstract			sfac8:BalanceSheetArithmetic
5	Assets	Concept (Monetary)	As Of	Debit	sfac8:Assets
6	Liabilities	Concept (Monetary)	As Of	Credit	sfac8:Liabilities
7	Equity	Concept (Monetary)	As Of	Credit	sfac8:Equity
8	12-Statement of Net Assets	Network			http://xbrlsite.com/seattlemethod/sfac8/role/NetAssets
9	Fund Balance [Hypercube]	Table			sfac8:FundBalanceHypercube
10	Fund Balance [Line Items]	LineItems			sfac8:FundBalanceLineItems
11	Net Assets [Roll Up]	Abstract			sfac8:NetAssetsRollUp
12	Assets	Concept (Monetary)	As Of	Debit	sfac8:Assets
13	(Liabilities)	Concept (Monetary)	As Of	Credit	sfac8:Liabilities
14	Net Assets	Concept (Monetary)	As Of	Debit	sfac8:NetAssets
15	Fund Balance [Roll Up]	Abstract			sfac8:FundBalanceRollUp
16	Fund Balance, With Donor Restrictions	Concept (Monetary)	As Of	Credit	sfac8:FundBalanceWithDonorRestrictions
17	Fund Balance, Without Donor Restrictions	Concept (Monetary)	As Of	Credit	sfac8:FundBalanceWithoutDonorRestrictions
18	Fund Balance	Concept (Monetary)	As Of	Credit	sfac8:FundBalance
19	21-Statement of Comprehensive Income	Network			http://xbrlsite.com/seattlemethod/sfac8/role/ComprehensiveIncomeStatement
20	Comprehensive Income Statement [Hypercube]	Table			sfac8:ComprehensiveIncomeStatementHypercube
21	Comprehensive Income Statement [Line Items]	LineItems			sfac8:ComprehensiveIncomeStatementLineItems
22	Comprehensive Income [Roll Up]	Abstract			sfac8:ComprehensiveIncomeRollUp
23	Revenues	Concept (Monetary)	For Period	Credit	sfac8:Revenues
24	(Expenses)	Concept (Monetary)	For Period	Debit	sfac8:Expenses
25	Gains	Concept (Monetary)	For Period	Credit	sfac8:Gains
26	(Losses)	Concept (Monetary)	For Period	Debit	sfac8:Losses

2.17.3. Extraction Tool

This is an extremely basic Excel software application that enables information to be extracted from reports in the repository. Purpose is to communicate basic ideas.

<http://www.xbrlsite.com/seattlemethod/golden/reports/repository/Documentation.zip>

General Information				Balance Sheet				Income Statement				Changes in Equity		Totals			
#	Economic Entity Name	Identifier	Income Statement Period Start (Year to Date)	Assets	Liabilities	Equity	Liabilities and Equity	Revenues	Gains	Expenses	Losses	Comprehensive Income	Investments by Owners	Distributions to Owners	BS1	BS4	IS1
1	ABC Company	ENTITY001	2019-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	1,000	3,000	2,000	3,000	1,000	500	0	0
2	XYZ Company	ENTITY002	2019-12-31	2020-01-01	3,500	0	3,500	3,500	2,000	1,000	0	0	3,000	1,000	500	0	0
3	ACME, Inc.	ENTITY003	2019-12-31	2020-01-01	3,500	0	3,500	3,500	7,000	1,000	3,000	2,000	3,000	500	0	0	0

2.18. Learning More about XBRL

Any other documentation that might be helpful is generally provided in this set of links or within the documents provided at this link:

<http://xbrl.squarespace.com/mastering-xbrl/>

2.19. Start here

Not sure where to start? Then I would suggest starting here:

<http://xbrl.squarespace.com/journal/2022/4/4/the-end-start-here.html>