

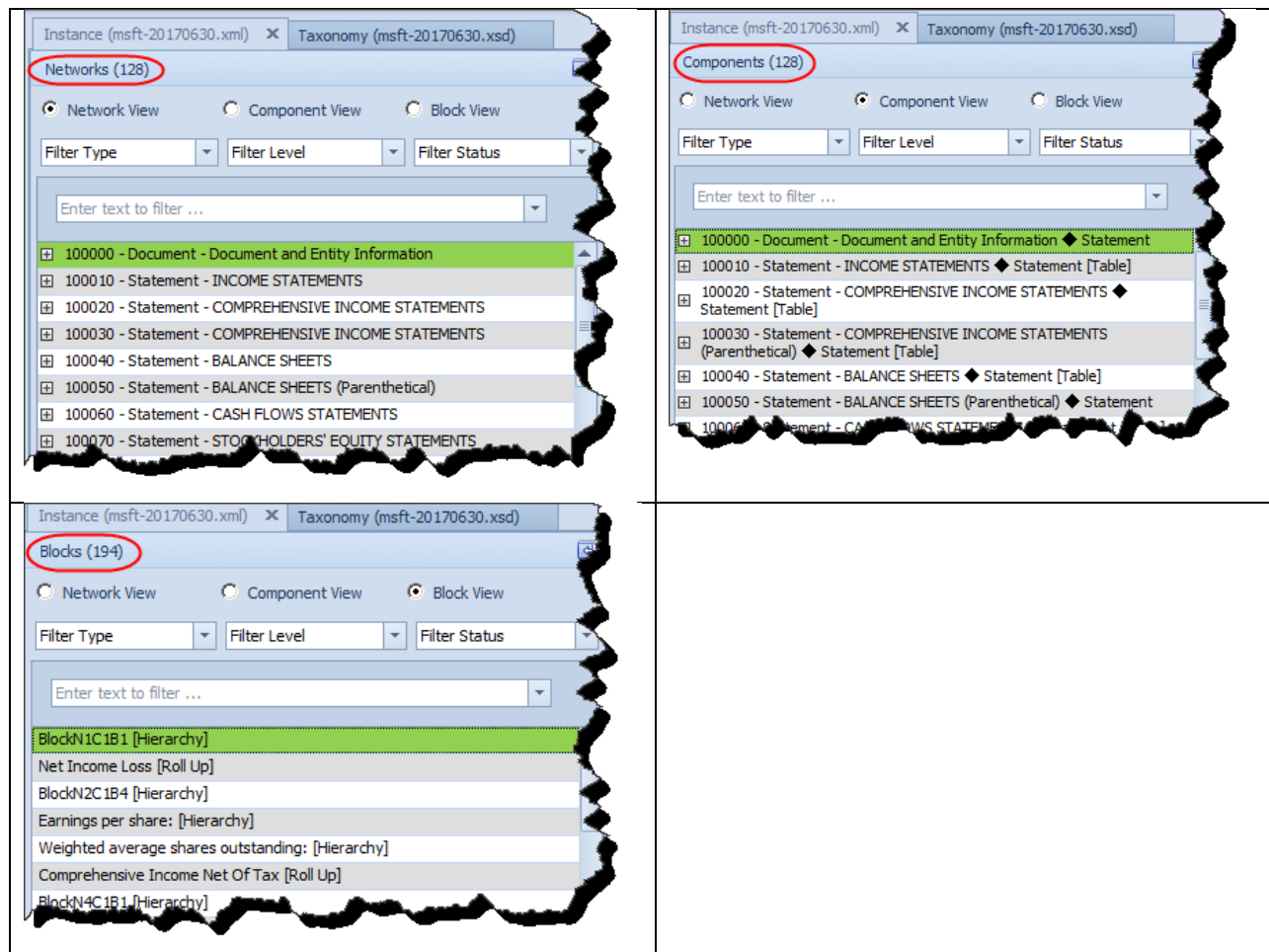
Process of Verifying Quality of an XBRL-based Financial Report

By Charles Hoffman

November 22, 2017

Imagine having a reliable, repeatable, predictable process that consistently yields financial reports that have a Six Sigma quality level¹, 99.99966% correct. The purpose of this document is to explain an efficient, effective, reliable, and repeatable process for verifying that an XBRL-based report is created correctly.

Consider the **Microsoft 10-K for 2017**². That report has 128 Networks, 128 Components, and 194 Blocks. You can see these in the screen shots below:



¹ Wikipedia, *Six Sigma, Sigma Levels*, https://en.wikipedia.org/wiki/Six_Sigma#Sigma_levels

² Microsoft 10-K for 2017, XBRL format, <http://www.sec.gov/Archives/edgar/data/789019/000156459017014900/msft-20170630.xml>

You most likely understand the notion of a Network which is an XBRL technical artifact. You may, or may not, be familiar with the notions of “Component” and “Block”. Those notions are completely explained in the conceptual model of an XBRL-based digital financial report³. We briefly describe what a network, component, and block are below:

- **Network** = XBRL network (many people incorrectly refer to this as a “group”)
- **Component** = XBRL network + an explicit or implicit [Table]
- **Block** = Network + an explicit or implicit [Table] + a concept arrangement pattern where a concept arrangement pattern is a “roll up” or “roll forward” or other arrangement of concepts within a set of [Line Items]⁴

We will leave the description of these three notions at that, if you want to understand this completely, please read the *Introduction to the Conceptual Model of a Digital Financial Report*.

The important notion is that of the **Block**. Every XBRL-based financial report that public companies create and subsequently submit to the SEC can be reduced to a set of Blocks which are used to represent the fragments that make up a financial report. We know this because we have loaded each and every such report, loaded it into a software application for the purpose of figuring out how to distinguish each of these report fragments in useful ways.

So, why is this important?

First, there is one other notion to understand before we get into that. The other notion is that of “SEC Level”. The SEC EFM breaks reports into four levels of disclosure:

- Level 1 Note Text Block
- Level 2 Policy Text Block
- Level 3 Disclosure Text Block
- Level 4 Disclosure Detail

We are ignoring the Level 1 Note Text Blocks for now because that Text Block is truly presentation oriented and arbitrary. We are also ignoring the Level 2 Policy Text Block for the most part. We will focus on the **Level 3 Disclosure Text Block** and the **Level 4 Disclosure Detail** mainly.

³ *Introduction to the Conceptual Model of a Digital Financial Report*,
http://xbrl.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part02_Chapter05.1_IntroductionToTheConceptualModelOfDigitalFinancialReport.pdf

⁴ *Understanding Concept Arrangement Patterns, Member Arrangement Patterns, and Report Fragment Arrangement Patterns*,
http://xbrl.azurewebsites.net/2017/IntelligentDigitalFinancialReporting/Part02_Chapter05.7_UnderstandingConceptArrangementPatternsMemberArrangementPatterns.pdf

Below we show two example disclosures. For each disclosure, the Level 3 Disclosure Text Block and the Level 4 Disclosure Detail are shown. Here are the two disclosures:

Inventory components [Roll Up]:

1039 - Disclosure - INVENTORIES (Tables) (Level 3 Disclosure Text Block)

Component: (Network and Table)																
Network	1039 - Disclosure - INVENTORIES (Tables)															
Table	Statement [Table]															
Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK															
Legal Entity [Axis]	Entity [Domain]															
Period [Axis]	2015-07-01/2016-06-30															
Drop Column Fields Here																
Statement [Line Items]	Fact Value															
Components of Inventories	<p>The components of inventories were as follows:</p> <p>(In millions)</p> <table border="1"> <thead> <tr> <th>June 30,</th> <th>2016</th> <th>2015</th> </tr> </thead> <tbody> <tr> <td>Raw materials</td> <td>\$ 612</td> <td>\$ 1,100</td> </tr> <tr> <td>Work in process</td> <td>158</td> <td>202</td> </tr> <tr> <td>Finished goods</td> <td>1,481</td> <td>1,600</td> </tr> <tr> <td>Total</td> <td>\$ 2,251</td> <td>\$ 2,902</td> </tr> </tbody> </table>	June 30,	2016	2015	Raw materials	\$ 612	\$ 1,100	Work in process	158	202	Finished goods	1,481	1,600	Total	\$ 2,251	\$ 2,902
June 30,	2016	2015														
Raw materials	\$ 612	\$ 1,100														
Work in process	158	202														
Finished goods	1,481	1,600														
Total	\$ 2,251	\$ 2,902														

1073 - Disclosure - Components of Inventories (Detail) (Level 4 Disclosure Detail)

Component: (Network and Table)																
Network	1073 - Disclosure - Components of Inventories (Detail)															
Table	Inventory, Current [Table]															
Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK															
Legal Entity [Axis]	Entity [Domain]															
	Period [Axis] ▼															
Inventory [Line Items]	<table border="1"> <thead> <tr> <th></th> <th>2016-06-30</th> <th>2015-06-30</th> </tr> </thead> <tbody> <tr> <td>Raw materials</td> <td>612,000,000</td> <td>1,100,000,000</td> </tr> <tr> <td>Work in process</td> <td>158,000,000</td> <td>202,000,000</td> </tr> <tr> <td>Finished goods</td> <td>1,481,000,000</td> <td>1,600,000,000</td> </tr> <tr> <td>Total</td> <td>2,251,000,000</td> <td>2,902,000,000</td> </tr> </tbody> </table>		2016-06-30	2015-06-30	Raw materials	612,000,000	1,100,000,000	Work in process	158,000,000	202,000,000	Finished goods	1,481,000,000	1,600,000,000	Total	2,251,000,000	2,902,000,000
	2016-06-30	2015-06-30														
Raw materials	612,000,000	1,100,000,000														
Work in process	158,000,000	202,000,000														
Finished goods	1,481,000,000	1,600,000,000														
Total	2,251,000,000	2,902,000,000														

Unrecognized Tax Benefits [Roll Forward]:

1045 - Disclosure - INCOME TAXES (Tables) (Level 3 Disclosure Text Block)

Component: (Network and Table)																																	
Network	1045 - Disclosure - INCOME TAXES (Tables)																																
Table	Statement [Table]																																
Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK																																
Legal Entity [Axis]	Entity [Domain]																																
Period [Axis]	2015-07-01/2016-06-30																																
Drop Column Fields Here																																	
Statement [Line Items]	Fact Value																																
Changes in Unrecognized Tax Benefits	<p>The aggregate changes in the balance of unrecognized tax benefits were as follows:</p> <p>(In millions)</p> <table border="1"> <thead> <tr> <th>Year Ended June 30,</th> <th>2016</th> <th>2015</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>Balance, beginning of year</td> <td>\$ 9,599</td> <td>\$ 8,714</td> <td>\$ 8,648</td> </tr> <tr> <td>Decreases related to settlements</td> <td>(201)</td> <td>(50)</td> <td>(583)</td> </tr> <tr> <td>Increases for tax positions related to the current year</td> <td>1,086</td> <td>1,091</td> <td>566</td> </tr> <tr> <td>Increases for tax positions related to prior years</td> <td>115</td> <td>94</td> <td>217</td> </tr> <tr> <td>Decreases for tax positions related to prior years</td> <td>(317)</td> <td>(144)</td> <td>(95)</td> </tr> <tr> <td>Decreases due to lapsed statutes of limitations</td> <td>(118)</td> <td>(105)</td> <td>(39)</td> </tr> <tr> <td>Balance, end of year</td> <td>\$ 10,164</td> <td>\$ 9,599</td> <td>\$ 8,714</td> </tr> </tbody> </table>	Year Ended June 30,	2016	2015	2014	Balance, beginning of year	\$ 9,599	\$ 8,714	\$ 8,648	Decreases related to settlements	(201)	(50)	(583)	Increases for tax positions related to the current year	1,086	1,091	566	Increases for tax positions related to prior years	115	94	217	Decreases for tax positions related to prior years	(317)	(144)	(95)	Decreases due to lapsed statutes of limitations	(118)	(105)	(39)	Balance, end of year	\$ 10,164	\$ 9,599	\$ 8,714
Year Ended June 30,	2016	2015	2014																														
Balance, beginning of year	\$ 9,599	\$ 8,714	\$ 8,648																														
Decreases related to settlements	(201)	(50)	(583)																														
Increases for tax positions related to the current year	1,086	1,091	566																														
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Decreases for tax positions related to prior years	(317)	(144)	(95)																														
Decreases due to lapsed statutes of limitations	(118)	(105)	(39)																														
Balance, end of year	\$ 10,164	\$ 9,599	\$ 8,714																														

1097 - Disclosure - Changes in Unrecognized Tax Benefits (Detail) (Level 4 Disclosure Detail)

Component: (Network and Table)	
Network	1097 - Disclosure - Changes in Unrecognized Tax Benefits (Detail)
Table	Income Tax Contingency [Table]
Reporting Entity [Axis]	0000789019 http://www.sec.gov/CIK
Legal Entity [Axis]	Entity [Domain]
Period [Axis]	
Income Tax Contingency [Line Items]	2015-07-01/2016-06-30 2014-07-01/2015-06-30 2013-07-01/2014-06-30
Balance, beginning of year	9,599,000,000 8,714,000,000 8,648,000,000
Decreases related to settlements	(201,000,000) (50,000,000) (583,000,000)
Increases for tax positions related to the current year	1,086,000,000 1,091,000,000 566,000,000
Increases for tax positions related to prior years	115,000,000 94,000,000 217,000,000
Decreases for tax positions related to prior years	(317,000,000) (144,000,000) (95,000,000)
Decreases due to lapsed statutes of limitations	(118,000,000) (106,000,000) (39,000,000)
Balance, end of year	10,164,000,000 9,599,000,000 8,714,000,000

Each of those two disclosures is represented in an XBRL-based financial report by both a Level 3 Disclosure Text Block and a Level 4 Disclosure Detail; thus two Blocks per disclosure.

Literally every fragment of a financial report can be broken down in this manner. In fact, this is quite easy if you are conscious of this and you are aware that there are advantages to doing so. Most public companies are not conscious of this, but some are more conscious than others. Consciously leveraging this pattern has provides advantages.

Suppose you identified each disclosure that was being represented by a set of Level 3 Disclosure Text Block and Level 4 Disclosure Detail. Well, I actually did that for about 65 disclosures, I call these my *Best Practice Examples of Disclosures for Campaign to Improve Disclosure Quality*⁵. I summarized information for each of these in a Disclosures Best Practices document⁶.

I also created rules for each of the 65 disclosures and represented those rules in machine readable form, XBRL definition relations. The rules describe how the disclosure is represented in an XBRL-based financial report. Here are the rules for the two disclosures shown above:

Inventory Components [Roll Up]:



⁵ *Best Practice Examples of Disclosures for Campaign to Improve Disclosure Quality*, <http://www.xbrlsite.com/site1/2017/Prototypes/DisclosureAnalysis/All/>

⁶ *Disclosures Best Practices*, <http://www.xbrlsite.com/site1/2017/Prototypes/DisclosureAnalysis/DisclosureBestPractices.pdf>

Unrecognized Tax Benefits [Roll Forward]:

Rules: disclosures:UnrecognizedTaxBenefitsExcludingAmountsPertainingToExaminedTaxReturnsRoll...

Disclosure mechanics validation for disclosure:
disclosures:UnrecognizedTaxBenefitsExcludingAmountsPertainingToExaminedTaxReturnsRollForward

Roll forward of details of changes in unrecognized tax benefits excluding amounts pertaining to examined tax returns.

This disclosure:

- **MUST** be represented by the networks with the SEC Category: **DISCLOSURE**
- **MUST** be represented as an **SEC Level 4 Disclosure Detail** with the concept arrangement pattern: **ROLL FORWARD**
 - ROLL FORWARD REQUIRES the beginning/ending balance concept: `us-gaap:UnrecognizedTaxBenefits`
- **MUST** be represented using the **SEC Level 3/2 Disclosure Text Block**: `us-gaap:ScheduleOfUnrecognizedTaxBenefitsExcludingAmountsPertainingToExaminedTaxReturnsRollForwardTableTextBlock`
 - or alternative concept: `us-gaap:SummaryOfPositionsForWhichSignificantChangeInUnrecognizedTaxBenefitsIsReasonablyPossibleTextBlock`
 - or alternative concept: `us-gaap:ScheduleOfUnrecognizedTaxBenefitsRollForwardTableTextBlock`
 - or alternative concept: `us-gaap:SummaryOfIncomeTaxContingenciesTextBlock`

Level3TextBlock / HIERARCHY True True INCONSISTENT (M) NOT-FOUND Restructuring Alternative

Below is what I call a **Disclosure Mechanics and Reporting Checklist**. This Disclosure Mechanics and Reporting Checklist contains about 70 sets of rules for about 65 or so different disclosures. The difference of 5 comes from the fact that some disclosures can be represented in different ways and a disclosure would not be represented both ways. So for example, “Long-term debt maturities” could be represented as a roll up which contains a total or a hierarchy which does NOT contain a total but would never include both of these representations.

On the next page you will see the beginning and the end of the XBRL Cloud implementation of this *Disclosure Mechanics and Reporting Checklist* with the middle cut out because the list is too long to include the entire checklist on one page and still be readable.

At this link⁷ you will see a complete version of that checklist which you can use to better understand the *Disclosure Mechanics and Reporting Checklist* better.

Disclosure Mechanics and Reporting Checklist

Entity Registrant Name:	MICROSOFT CORPORATION (SEC Filing Page)	Document Type:	10-K
CIK:	0000789019	Fiscal Year / Period:	2017 / FY
Disclosures Found: 48 of 70 (69%)		Disclosures Consistent: 68 of 70 (97%) Disclosures Inconsistent: 2 of 70 (3%)	

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

#	Disclosure	Category	Level	Pattern	Applicable	Found	Disclosure Consistent	Representation Concept [TEXT BLOCK]	Representation Concept [DETAIL]	Checklist Category	Reason
1	Document Information [Hierarchy]	DOCUMENT	Level4Detail	HIERARCHY	True	True	CONSISTENT	NOT-EXPECTED	Document Fiscal Period Focus	Required disclosure	Disclosure always required
2	Document and Entity Information [Hierarchy]	DOCUMENT	Level4Detail	HIERARCHY	False	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Alternative representation	Not necessary, satisfied by Document Information [Hierarchy] disclosure
3	Entity Information, by Legal Entity [Hierarchy]	DOCUMENT	Level4Detail	HIERARCHY	True	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Required disclosure	Disclosure always required
4	Document and Entity Information [Hierarchy]	DOCUMENT	Level4Detail	HIERARCHY	False	True	CONSISTENT	NOT-EXPECTED	Entity Registrant Name	Alternative representation	Not necessary, satisfied by Entity Information, by Legal Entity [Hierarchy] disclosure
5	Balance Sheet	STATEMENT	Level4Detail	COMPONENT	True	True	CONSISTENT	NOT-EXPECTED	NOT-EXPECTED	Required disclosure	Disclosure always required, satisfied by Assets [Roll Up] and Liabilities and Equity [Roll Up]
6	Assets [Roll Up]	STATEMENT	Level4Detail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Assets	Part of disclosure	Disclosure always required
7	Liabilities and Equity [Roll Up]	STATEMENT	Level4Detail	ROLL UP	True	True	CONSISTENT	NOT-EXPECTED	Liabilities and Equity	Part of disclosure	Disclosure always required
65	Other Liabilities, Noncurrent [Roll Up]	DISCLOSURE	Level3TextBlock / Level4Detail	ROLL UP	False	False	NOT-REPORTED	NOT-FOUND	NOT-FOUND	Possible disclosure	Disclosure is NOT present
66	Warrants or Rights Issued [Hierarchy]	DISCLOSURE	Level3TextBlock / Level4Detail	HIERARCHY	False	False	NOT-REPORTED	NOT-FOUND	NOT-FOUND	Possible disclosure	Disclosure is NOT present
67	Other Nonoperating Income (Expense) [Roll Up]	DISCLOSURE	Level3TextBlock / Level4Detail	ROLL UP	True	True	CONSISTENT	Schedule of Other Nonoperating Income (Expense) [Table Text Block]	Nonoperating Income (Expense)	Possible disclosure	Disclosure is present
68	Share-based Compensation, Restricted Stock Units Award Activity, Weighted Average Price [Roll Forward Info]	DISCLOSURE	Level3TextBlock / Level4Detail	ROLL FORWARD INFO	True	True	CONSISTENT	Disclosure of Share-based Compensation Arrangements by Share-based Payment Award [Table Text Block]	Share-based Compensation Arrangement by Share-based Payment Award, Equity Instruments Other than Options, Nonvested, Weighted Average Grant Date Fair Value	Possible disclosure	Disclosure is present
69	Share-based Compensation Arrangements, by Award [Roll Forward]	DISCLOSURE	Level3TextBlock / Level4Detail	ROLL FORWARD	True	True	CONSISTENT	Disclosure of Share-based Compensation Arrangements by Share-based Payment Award [Table Text Block]	Share-based Compensation Arrangement by Share-based Payment Award, Equity Instruments Other than Options, Nonvested, Number	Possible disclosure	Disclosure is present
70	Share-based Payment Award, Stock Options, Valuation Assumptions [Hierarchy]	DISCLOSURE	Level3TextBlock / Level4Detail	HIERARCHY	False	False	NOT-REPORTED	NOT-FOUND	NOT-FOUND	Possible disclosure	Disclosure is NOT present

And so again, I point out that there are about 65 disclosures covered by this checklist. Each of these sets of disclosure rules covers two Blocks of a report: (1) the Level 3 Disclosure Text Block and (2) the Level 4 Disclosure Detail.

⁷ *Disclosure Mechanics and Reporting Checklist*, <http://xbrl.azurewebsites.net/2017/Prototypes/Microsoft2017/Disclosure%20Mechanics%20and%20Reporting%20Checklist.html>

I said that the Microsoft 10-K for 2017 contains 194 Blocks. But I am only analyzing 65 disclosures. Why the difference? The difference is caused by the fact that I did not create rules for the other 129 disclosures that are represented (194 – 65 = 129).

But what if I created Disclosure Mechanics and Reporting Checklist rules and achieved 100% coverage of the **ENTIRE REPORT**? All 194 blocks. That would mean that I could verify 100% of the report fragments included in the report and be sure each fragment was created correctly using efficient, cost effective automated processes. This is as opposed to having to check each of these 194 report fragments with expensive human-based processes.

If you look at the report above, you notice that some items in the checklist were “NOT-REPORTED” and therefore were not found. This is because included in the set of 65 are some disclosures that are not reported by Microsoft.

What if you created a 1-to-1 correlation between the RULES used to verify that the report was correct and the REPORT FRAGMENTS that you were trying to represent and that you created the RULES for to make sure the representations were ALL CORRECT?

Think about that. You have a synchronization of the **RULES** and the **REPRESENTATION** which helped you to make sure 100% of the representations were correct. How useful would that be to filing agents that had to create hundreds of reports of software vendors who wanted to help their customers get their XBRL-based financial reports correct.

I say that the benefit would be huge!

Believe it or not, the organization of the rules is rather straight forward and simple. Here is the set of 65 rules:

http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/disclosure-mechanics/Disclosures_BASE2.xsd

```
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:type="simple" xlink:href="446-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="InventoryNetRollUp"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:type="simple" xlink:href="517-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="PropertyPlantAndEquipmentNetByTypeRollUp"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:type="simple" xlink:href="536-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="AccountsPayableAndAccruedLiabilitiesRollUp"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:type="simple" xlink:href="543-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="RestructuringChargesRollUp"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:type="simple" xlink:href="552-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
```


And here is an individual rule (one of these exists for each rule in the schema above):

<http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/disclosure-mechanics/517-rules-def.xml>

```

requiresConcept use="optional" order="3" xlink:from="us-gaap_InventoryNet"
xlink:to="us-gaap_InventoryNet"/>
</link:definitionLink>
- <link:definitionLink xlink:title=""
xlink:role="http://xbrlsite.azurewebsites.net/2016/us-
gaap/dm/role/DisclosureMechanics/InventoryNetRollUp"
xlink:type="extended">
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
gaap/2016/elts/us-gaap-2016-01-31.xsd#us-gaap_InventoryNet"
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<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
gaap/2016/elts/us-gaap-2016-01-31.xsd#us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"
xlink:label="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
<link:definitionArc xlink:type="arc"
xlink:arcrole="http://xbrlsite.azurewebsites.net/2016/conceptual-
model/drules-arcoles/arcrole/concept-allowedAlternativeConcept"
use="optional" order="3" xlink:from="us-gaap_InventoryNet" xlink:to="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
</link:definitionLink>
- <link:definitionLink xlink:title=""
xlink:role="http://xbrlsite.azurewebsites.net/2016/us-
gaap/dm/role/DisclosureMechanics/InventoryNetRollUp"
xlink:type="extended">
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
gaap/2016/elts/us-gaap-2016-01-31.xsd#us-gaap_InventoryNet"
xlink:label="us-gaap_InventoryNet"/>
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
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gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"
xlink:label="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
<link:definitionArc xlink:type="arc"
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use="optional" order="3" xlink:from="us-gaap_InventoryNet" xlink:to="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
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- <link:definitionLink xlink:title=""
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xlink:type="extended">
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xlink:label="us-gaap_InventoryNet"/>
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
gaap/2016/elts/us-gaap-2016-01-31.xsd#us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"
xlink:label="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
<link:definitionArc xlink:type="arc"
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model/drules-arcoles/arcrole/concept-allowedAlternativeConcept"
use="optional" order="3" xlink:from="us-gaap_InventoryNet" xlink:to="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
</link:definitionLink>
- <link:definitionLink xlink:title=""
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xlink:type="extended">
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
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xlink:label="us-gaap_InventoryNet"/>
<link:loc xlink:type="locator" xlink:href="http://xbrl.fasb.org/us-
gaap/2016/elts/us-gaap-2016-01-31.xsd#us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"
xlink:label="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
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model/drules-arcoles/arcrole/concept-allowedAlternativeConcept"
use="optional" order="3" xlink:from="us-gaap_InventoryNet" xlink:to="us-
gaap_InventoryNetOfAllowancesCustomerAdvancesAndProgressBillings"/>
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```

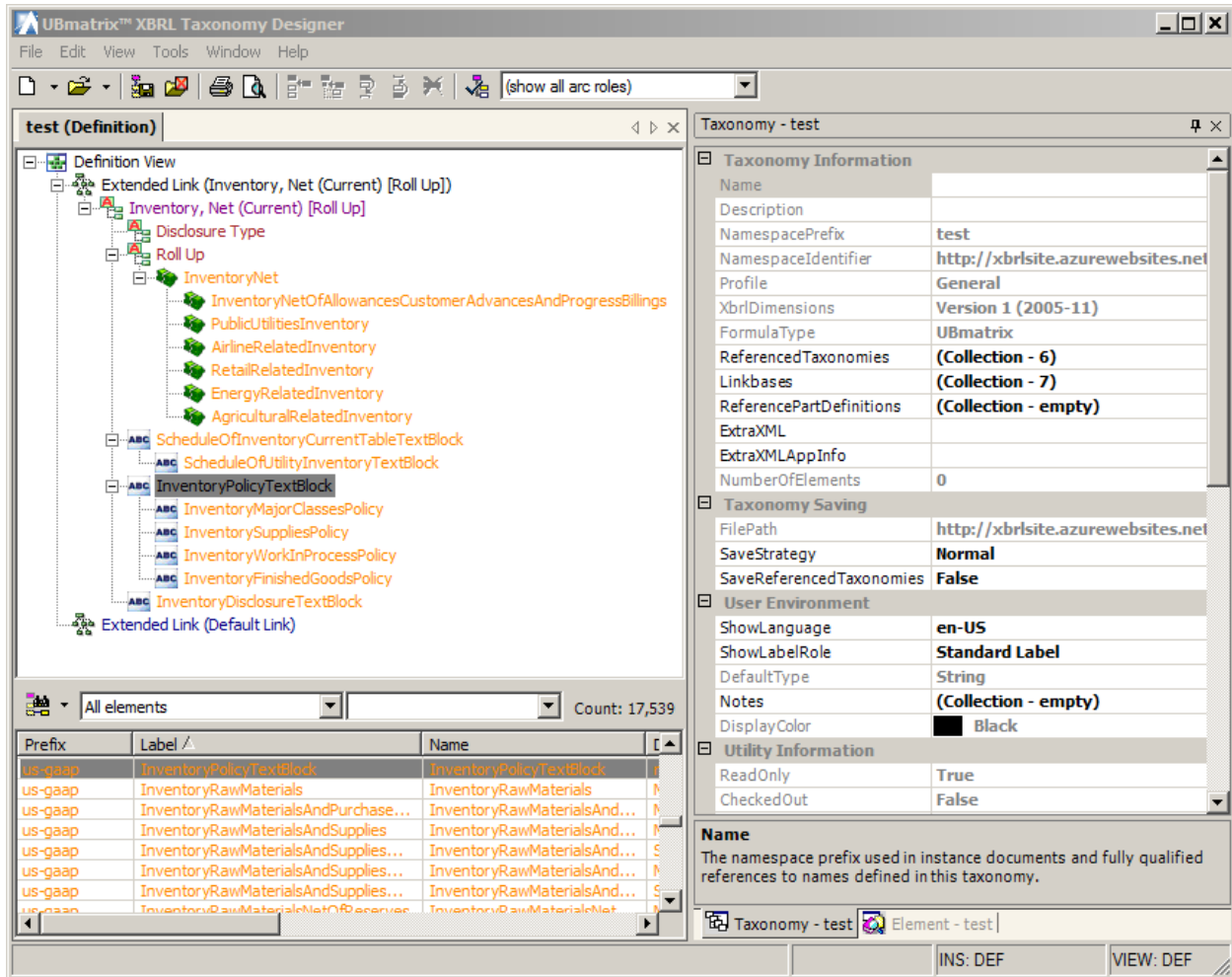
The XBRL definition relations look complicated, but they really are not that complicated at all.

Here is the database representation format of each of these rules for the Inventory Components Roll Up disclosure:

ID	DisclosureName	FromName	ArcRole	ToName	SortOrd
454	InventoryNetRollUp	fro:Thing	fro-arcoles:class-subClass	disclosures:InventoryNetRollUp	0
902	InventoryNetRollUp	disclosures:InventoryNetRollUp	rules-arcoles:disclosure-hasConceptArrangementPattern	fro:RollUp	1
678	InventoryNetRollUp	fro:RollUp	rules-arcoles:conceptArrangementPattern-requiresConcept	us-gaap:InventoryNet	2
3530	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:InventoryNetOfAllowancesCustomerAdvancesAndProgress	3
3419	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:PublicUtilitiesInventory	4
3420	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:AirlineRelatedInventory	5
3421	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:RetailRelatedInventory	6
3422	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:EnergyRelatedInventory	7
3423	InventoryNetRollUp	us-gaap:InventoryNet	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:AgriculturalRelatedInventory	8
1679	InventoryNetRollUp	disclosures:InventoryNetRollUp	rules-arcoles:disclosure-equivalentTextBlock	us-gaap:ScheduleOfInventoryCurrentTableTextBlock	9
3219	InventoryNetRollUp	us-gaap:ScheduleOfInventoryCurrentTableTextBlock	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:ScheduleOfUtilityInventoryTextBlock	10
3220	InventoryNetRollUp	disclosures:InventoryNetRollUp	rules-arcoles:disclosure-relatedPolicy	us-gaap:InventoryPolicyTextBlock	11
3221	InventoryNetRollUp	us-gaap:InventoryPolicyTextBlock	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:InventoryMajorClassesPolicy	12
3223	InventoryNetRollUp	us-gaap:InventoryPolicyTextBlock	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:InventorySuppliesPolicy	13
3224	InventoryNetRollUp	us-gaap:InventoryPolicyTextBlock	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:InventoryWorkInProcessPolicy	14
3225	InventoryNetRollUp	us-gaap:InventoryPolicyTextBlock	rules-arcoles:concept-allowedAlternativeConcept	us-gaap:InventoryFinishedGoodsPolicy	15
3227	InventoryNetRollUp	disclosures:InventoryNetRollUp	rules-arcoles:disclosure-relatedLevel1NoteTextBlock	us-gaap:InventoryDisclosureTextBlock	16

I maintain my rules for each disclosure in a fairly basic Microsoft Access database application and then simply generate the XBRL definition relations from the database. Adding, removing, or editing the rules is done by simply adding, removing, or editing rows from the table in the database. One could fairly easily create an interface that helped in the process of editing the rules.

Alternatively, the rules can be created and edited in an off-the-shelf XBRL taxonomy editor.



The rules can be modified using XBRL’s extension mechanisms to add new rules, to prohibit existing rules, etc.

The rules could even be maintained in an Excel spreadsheet.

The hard part of all this is not creating and maintaining the rules, the hard part is the processing of the rules which is performed by XBRL Cloud which offers *Disclosure Mechanics and Reporting Checklist* validation as a commercial product offering. Another software application, Pesseract⁸, also offers *Disclosure Mechanics and Reporting Checklist* validation using the same rules.

Creating the rules would be a basic part of the creation of the actual XBRL-based financial report. You could start with the set of 65 disclosure rules that are common to many filings. You

⁸ Pesseract, <http://pesseract.azurewebsites.net/>

can add to the set of 65 and supplement the common rules with rules that were unique to a specific filing.

You could then simply add the fundamental accounting concept relations⁹ for the reporting style of the public company which also contributes to verifying the correctness of an XBRL-based financial report.

And finally, while what I have pointed out is applicable to the Microsoft 10-K and other XBRL-based filings of public companies, this is not unique to US GAAP public company financial reports. This same process can be used for the IFRS reporting scheme or any other reporting scheme which might be represented using the XBRL technical syntax.

To be clear, you can only verify that an XBRL-based report is correct using automated processes to the extent that machine-readable business rules have been created and that a business rules engine exists to process those rules.

If you want to understand more about creating high-quality XBRL-based financial reports, please see *Blueprint for Creating Zero-Defect XBRL-based Digital Financial Reports*¹⁰.

⁹ Here are the fundamental accounting concept relations rules for the reporting style that are appropriate for the Microsoft 2017 10-K, http://www.xbrlsite.com/2016/fac/v3/ReportingStyles/COMID-BSC-CF1-ISM-IEMIB-OILY-SPEC6_schema.xsd

¹⁰ *Blueprint for Creating Zero-Defect XBRL-based Digital Financial Reports*, <http://xbrlsite.azurewebsites.net/2017/Library/BlueprintForZeroDefectDigitalFinancialReports.pdf>