

Hard Rules and Soft Rules for XBRL

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Abstract—In January 2009, the SEC issued its final mandate for conversion to XBRL standards for financial statement reporting. However, the implementation has been painfully slow in the United States. In this article, I will investigate the factors impeding the XBRL conversion progress. I will recommend some available XBRL software for the “bolt-on,” “built-in,” and “deeply embedded” implementations. I will also try to help the readers understand all the major components of the XBRL taxonomy.

Keywords: the eXtensible Business Reporting Language, XBRL, Interactive Data Electronic Applications, IDEA, Taxonomy

I. INTRODUCTION

In January 2009, the Securities and Exchange Commission (SEC) issued its final mandate for eXtensible Business Reporting Language (XBRL) adoption and the firm conversion target dates ^[1]. However, as of today, the advancement has been painfully slow. In this article, I will try to assess the nation’s XBRL conversion progress. I will analyze some factors affecting the progress. I will also recommend some available XBRL software for three different implementation strategies. Then I will try to help the readers understand the formidable XBRL taxonomy, the core of the XBRL technology, by providing detailed discussions for all of the major components.

II. THE SEC DEADLINES

On January 30, 2009, the former SEC chairperson Mary Schapiro announced the agency’s final mandate for XBRL adoption ^[1]. The mandate aimed to have the 500 largest public companies file their financial statements in XBRL format by June 2009, medium-sized filers by June 2010, and the rest of the public filers by June 2011. Before this new mandate, there were 106 companies voluntarily filed their financial statements in XBRL format as of November 20, 2008. When the author checked the SEC website on July 15, 2009, there were only 141 filers. More interestingly, when the author checked again in December 2009, he could no longer find this information on the SEC website. The author sent an email to the SEC to request this information. One of the representatives replied that the agency has eliminated this webpage and would no longer provide the public the similar information.

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Concerned about the XBRL conversion progress, the author emailed the agency an inquiry again in the beginning of June 2010. A SEC representative replied on July 2nd, 2010 to state that as of that day, there were 535 issuers had filed their financial statements in the required XBRL format. Because this number was virtually the same as the statistics reported on RR Donnelley’s Web site ^[2], the author has since utilized this commercial XBRL printer’s report to monitor the XBRL conversion progress instead.

To help the readers to follow the XBRL conversion progress more easily, the author has prepared a set of tables containing all the relevant report dates and the associated filing due dates:

Table 1 -- Due Dates for Quarterly Reports (10-Q)

Quarter Ending	large Accelerated Issuers	Accelerated Issuers	Other Issuers
June 15	August 24	August 24	August 29
June 30	September 08	September 08	September 13
July 31	October 09	October 09	October 14
August 31	November 09	November 09	November 14

Table 2 -- Due Dates for Annual Reports (10-K)

Year Ending	large Accelerated Issuers	Accelerated Issuers	Other Issuers
June 15	September 13	September 28	October 13
June 30	September 28	October 13	October 28
July 31	October 28	November 14	November 29
August 31	November 29	December 14	December 29

Most of the registrants close their books on the last day of a calendar quarter or a calendar year. (e.g. [International Business Machines Corp](#) closes its first fiscal quarter on March 31 and its fiscal year on December 31). However, some of the registrants close their books on irregular days for some legitimate business reasons (e.g. [Macy’S, Inc.](#)

closes its first fiscal quarter on April 30 but its fiscal year on January 29). In any case, the above tables show that the latest possible deadline for XBRL conversion was December 29, 2011.

To help you understand these tables, let's look at an example: a small-cap Company A closes its books on the last day of the calendar quarter or calendar year. According to the SEC mandate, the first financial report the company was required to file with the SEC in XBRL format was its second quarter 10-Q, because that was the company's first applicable fiscal quarter ended after the June 15, 2011 cut-off day for small issuers. In Table 1 above, you can find the company's "Quarter Ending" date of June 30 and go across to find the due date of September 13, 2011 on the "Other Issuers" column. You can verify the due date by adding 45 standard allowable preparation days for small issuers and 30 "grace period" days to June 30, 2011.

Next, let's look at a different example: a small-cap Company B's fiscal year ends on May 31. Therefore, according to the SEC mandate, the first financial report the company was required to file with the SEC in XBRL format was its first quarter 10-Q, because that was the company's first applicable fiscal quarter ended after the June 15, 2011 cut-off day for small issuers. In Table 1, you can find the company's "Quarter Ending" date of August 31 and go across to find the due date of November 14, 2011 on the "Other Issuers" column.

Now we are ready to look at a more complicated situation: a small-cap Company B's fiscal year ends on August 31. Therefore, According to the SEC mandate, the first financial report the company was required to file with the SEC in XBRL format was its 2011 10-K, because that was both the company's first applicable fiscal quarter and also fiscal year ended after the June 15, 2011 cut-off day for small issuers. Thus, we need to use Table 2 above to find the applicable due date. You can find the company's "Year Ending" date of August 31 and go across to find the due date of December 29, 2011 on the "Other Issuers" column. You can verify the due date by adding 90 standard allowable preparation days for small issuers and 30 "grace period" days to August 31, 2011.

Although the tables above do not provide information for irregular day filers, we can calculate any applicable due dates by following the above discussions and examples with the similar logic. Also, for all the registrants—no matter they file their reports on regular days or irregular days, large accelerated issuers or other issuers, the latest possible XBRL conversion deadline is December 29, 2011.

III. THE CURRENT FILING STATUS

How has the United States fared in this XBRL conversion endeavor? The author has prepared the following table

by recording some relevant corporate filing data published on RR Donnelley's Web site: ^[2]

Table 3 -- Corporate Filing Data

Date	Companies	Filings
August 29, 2011	5,970	13,935
October 15, 2011	7,281	15,642
October 30, 2011	7,383	16,379
November 30, 2011	7,875	22,238
December 30, 2011	8,066	23,184
January 26, 2012	8,175	23,708
February 16, 2012	8,227	25,138
March 06, 2012	8,271	27,181
June 15, 2012	8,710	35,796
October 19, 2012	8,974	44,612
February 11, 2013	9,124	53,296
August 15, 2013	9,582	71,716
September 12, 2013	9,631	72,875
November 19, 2013	9,777	79,243
December 20, 2013	9,837	80,252
January 22, 2014	9,872	81,032
February 28, 2014	9,912	84,079
March 18, 2014	9,936	85,974

According to the SEC report ^[1], the agency estimates that there are about 500 large accelerated issuers, 1,000 accelerated issuers and 8,700 other issuers. That makes a total of 10,200 registrants. With only 8,066 companies successfully converted to the required XBRL filing format by December 29, 2011, we can hardly call that a win for the agency's XBRL conversion mandate. In fact, about 21% of the registrants have failed to convert to XBRL by the deadline.

IV. THE IMPEDING FACTORS

The author have recently read many XBRL related articles and talked with many of his fellow CPAs, college educators, and students. He has found that most companies and schools are still in the passive look-and-see mode. Because they are still feeling the impact of the sub-prime mortgage bubble and the sovereign debt crises, most businesses and colleges are reluctant to allocate financial and human resources for their XBRL projects and training programs. The result is very predictable: (1) Most schools have not invested enough resources to train their professors; therefore, there are not enough qualified accounting or IT educators to teach the subject to their students. (2) In addition to the problem regarding the availability of XBRL specialists, many companies have not invested enough resources to acquire the necessary computer programs and to train their XBRL specialists through other means (e.g. training sessions provided by their software vendors). However, the most important reason is that the SEC does not have a functional mechanism to enforce its mandates regarding the XBRL

conversion deadlines. For example, the penalty for violating the XBRL mandate is too soft.

The real trouble is that while we are dragging our feet, the rest of the world has been passing over us very rapidly. Just simply spend 10 minutes to visit XBRL International's website ^[3], one will see that many other countries (our competitors), have moved beyond XBRL for financial reporting (XBRL FR) onto XBRL Global Ledger (XBRL GL) which is being used for business process reengineering. This means our competitors will gain tremendous competitive advantages over us not only on efficiency for financial reporting, but also on business transaction processing.

V. SOME PRACTICAL REMEDIES

So what should we do now? For the companies that failed to meet the conversion deadlines, the fastest way to solve the imminent problem is to implement the bolt-on XBRL conversion approach ^[4]. For this implementation strategy, most people with sufficient accounting knowledge can convert a simple set of financial statements into a ready-to-file XBRL instance document in a few days. You will need to purchase one of the many off-the-shelf "Bolt-on" XBRL tagging software such as *Rivet Software's* Dragon Tag. With the bolt-on approach for XBRL conversion, a company only needs to export its financial statements to an Microsoft Excel worksheet. If you do not know how to setup the Microsoft Excel worksheet, Dragon Tag's user manual also includes instructions for typing up or exporting financial statements from an accounting application on a Microsoft Excel worksheet. After downloading a suitable taxonomy from the taxonomy link on XBRL International's website ^[3], look up the appropriate tag from the list, then drag it and tag it onto the intended line item on the financial statements. This tagging process is fairly mechanical. After running the data integrity check, you can upload your instance document to the SEC. If you need more help, please see step-by-step instructions on "Six Steps to XBRL ^[5]."

In the long run, however, we should develop a more systematic strategy. In the education front, business schools should start developing and offering dedicated course(s) to teach XBRL research and implementation. For the companies which have successfully converted to XBRL filing for financial statements, they should upgrade their accounting information systems to enable the built-in approach ^[6] if they have not done so yet. Better still, if possible, the author recommends the deeply embedded approach ^[7]. The beauty of this implementation method is that you can utilize XBRL not only to meet the regulatory financial reporting requirements, but also to drastically improve business transaction processing accuracy and efficiency. With the help of XBRL GL, most of the advanced ERP systems can markup financial data at the transaction level (e.g. sales journal) instead of the financial statement level. This not only effectively eliminates all the manual conversion processes: drag-and-tag for the bolt-on

approach, and data mapping for the built-in approach, but also make system audit ^[8] and all the other data and business process related operations more effective and efficient ^[9].

To successfully implement both the built-in approach and the deeply embedded approach, it is essential for both the accountants and the computer programmers to work together and to have an in-depth understanding of the XBRL taxonomy.

VI. XBRL TAXONOMY

In an earlier article, the author discussed some XBRL basics concepts ^[10]. He discussed that the SEC was going to replace the existing Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system with IDEA to provide investors more efficient financial data. XBRL is the necessary technical platform for IDEA because financial information is stored and processed at data element level rather than at document level that often associate with some older forms of electronic database systems such as EDGAR and all the paper filing systems. XBRL utilizes tags to mark-up or classify financial data so that the data can be processed by computers efficiently and accurately. Finally, AICPA, International Accounting Standards Board (IASB), SEC and other accounting organizations and government agencies have worked together to establish some XBRL standards or "taxonomies" to maintain necessary consistency and comparability for financial statements filed under the new system.

Although some might think that when the time comes, they can always throw enough money to acquire a high-end turn-key Enterprise Resource Planning systems (ERP) integrated with XBRL and let the software provider handle the whole XBRL adoption project, experience tells us that while the computer specialists can be very good at IT-related tasks, they often lack the required accounting and auditing knowledge to prepare a set of acceptable financial statements and incorporate all the necessary internal control procedures in the ERP. In the author's opinion, although most of our fellow practitioners will never need to handle any coding or mapping for XBRL translation and/or analysis, possessing enough XBRL knowledge is mandatory to work with the IT specialists, or in another venue, to give any of their clients the minimum confidence to grant them an XBRL translation engagement. If they do not remember the whole suite of XBRL taxonomies and data tags, knowing some technical jargons and concepts can always be helpful.

In the following section, the author will try to help you understand the formidable and often confusing XBRL taxonomies. These are the hard coded rules and the core of the XBRL technology. Only when we have a firm understanding of these rules, we can truly master this new financial reporting tool.

Now, let us first review the XBRL taxonomy hierarchical structure¹:

- Schema
- Element
- Linkbase
 - Presentation Linkbase
 - Calculation Linkbase
 - Definition Linkbase
 - Reference Linkbase
 - Label Linkbase
- Taxonomy Extension
- DTS
- Footnote
- Instance Document

A. Schema

An XBRL schema is a list of taxonomy elements and their references to various linkbase files (discussed below). By providing the names, IDs, and other attributes of the relevant elements, an XBRL schema provides computers with the necessary information as to how to process financial data according to all the governing accounting rules and regulations in order to generate financial reports tailored to specific business needs. Since there are many different taxonomies and schemas (e.g. U.S. GAAP, IFRS, etc.), some elements with the same names may have different accounting meanings under different standards. Therefore, it is very important to uniquely identify the schema. This is accomplished by employing namespaces, a popular naming practice used in the internet community. For example, we identify the US GAAP Commercial and Industrial Taxonomy as: <http://www.xbrl.org/us/fr/gaap/ci/2005-02-28>. Then we can define a prefix as:

US_GAAP=<http://www.xbrl.org/us/fr/gaap/ci/2005-02-28>

Now we can use the prefix instead of the whole long name whenever we have to refer to this particular taxonomy (for example <US_GAAP:Building/>). This shortcut referencing technique is very helpful because for any XBRL filing, we have to code for many elements; therefore, we need to refer to the taxonomy many times. By utilizing the prefix, we can save a great deal of time, and more importantly, generate more accurate codes.

The author likes to point out a widespread misconception here. Although it looks similar, the taxonomy file name is not a real World Wide Web Uniform Resource Locator (URL). The reason to use this file naming format, as mentioned above, is to ensure that the references are unique.

B. Element

¹ All taxonomy information and related material are obtained from: <http://www.xbrl.org>.

An XBRL element represents an accounting concept such as Sales, Depreciation Expenses, Total Current Assets, Accounts Receivable, Retained Earnings, etc. Again, in order for the computer to correctly process the data, we need to provide all the relevant attributes for each element. Let us try to learn some important rules by examining a snippet of XBRL codes for Inventory:

```
<element name="Inventory" id="Inventory"
periodType="instant" balance="debit" abstract="false"
substitutionGroup="item" type="monetaryItemType"/>
```

First we assign a unique name and ID to the element. Then we need to identify the element's *periodType*. In accounting terms, we categorize business activities in two broad groups: *balance sheet items* and *income statement items*. For any balance sheet items, we provide the balance of their economic resources at the *end* of a particular fiscal period; thus, we code the *periodType* as "instant." However, for income statement items, we like to know the accumulation of the business activities during a particular fiscal period; therefore, we code the *periodType* as "duration." In the next segment of the code, we indicate the *balance* type to enforce the double entry rule. All Assets (e.g. Inventory), Dividends and Expenses accounts normally carry debit balances. Conversely, all Liabilities (e.g. Accounts Payable), Equity and Revenue accounts normally carry credit balances. We set the *abstract* attribute to "false" to indicate that Inventory is not an abstract element. We use the *substitutionGroup* attribute to differentiate whether the element takes a single value or multiple values. In our example, "item" indicates that Inventory requires a single value in the report. If the element takes multiple values from a data table (e.g. interest rates), the attribute is set to "tuple."

The last important element characteristic is its *type*. In our example, since we usually present Inventory at its monetary value, we set the type attribute to "monetaryItemType." Nevertheless, financial statements usually contain other types of information such as footnotes (strings), profit margin (percent), numbers of shares outstanding (number), etc.

Once we have coded all the required elements and their attributes in a schema, we need to give the computer the information on how to work with other taxonomy resources, such as all the other linkbases, Taxonomy Extension, DTS, Footnote, and Instance Document.

C. Linkbases

There are five linkbases in XBRL: Presentation Linkbase, Calculation Linkbase, Definition Linkbase, Reference Linkbase, and Label Linkbase.

Business reports always follow some types of hierarchical structure to present the reporting elements. The main function of the Presentation Linkbase is to store all the hierarchical relationships between all the elements in some types of parent-

child format, so that relevant business information can be presented correctly in different kind of financial statements and in accordance with different governing reporting standards. For example, a Balance Sheet prepared under the US GAAP usually includes Assets, Liabilities, and Equity. Each section contains more and more detailed elements, such as how Assets are split to Current Assets and Non-Current Assets. Current Assets are further broken down to Cash, Accounts Receivable, Inventory, and so on. Thus, Assets is the parent of Current Assets, and Current Assets itself is the parent of Inventory.

Business reports also usually sum up the lower level elements into many sub-totals. These sub-totals, in turn, are further summed up to a higher level sub-totals or totals. A calculation is done to validate the data contained in an instance document (discussed below) to ensure the accuracy of the financial statements. This important task is handled by the Calculation Linkbase. By assigning the correct value ("1" or "-1") to the weight attribute of each element, the software will perform all the necessary addition and/or subtraction operations to verify the data. For example, when we assign "1" to the weight attribute of Accounts Receivable and "-1" to Allowance for Doubtful Accounts, the computer will net the two values provided in the instance document to validate the sub-total. If the result does not agree with the one provided in the instance document, the computer will generate an error message to warn the programmer.

Business reports often contain elements with different kinds of relationships. The Definition Linkbase helps taxonomy programmers record the existing defined relationships. Currently, there are four standard types:

1. General-special – to differentiate specific concepts from general ones (e.g. Postal Code is used worldwide but Zip Code is used only in the United States).
2. Essence-alias – to signify that two terms have similar meaning (e.g. some crude freighters like to call their ships oil tankers while others like to call them crude vessels).
3. Requires-element – to indicate the mandatory presentation of both elements (e.g. when a capital lease is presented, a footnote disclosure is required).
4. Similar-tuples – to facilitate database manipulations for tuples that have similar label or reference definitions but unequal XML content models. It is similar to Essence-alias, but it is only used for database records.

Business reports are usually prepared in conformity with some regulations or standards by various authorities. Reference Linkbase provides the means for clarifying the intended meaning of each taxonomy element by referencing the relevant paragraph and clause of a particular regulation or standard (e.g. Paragraph "12," Number "3," Name "IAS").

Therefore, XBRL taxonomies do not need to contain the full text of the regulations or standards.

XBRL is an international business reporting tool. It allows different taxonomies to present financial statements in many different languages. Label Linkbase make this possible by storing all the element labels and their links to different languages and purposes. For example, the following XBRL codes provide the definitions of English and German labels of an IFRS element of Inventory:

```
<label xlink:type="resource"
xlink:role=http://www.xbrl.org/2003/role/label
xlink:label="ifrs_Inventory"
xml:lang="en">Inventory</label>
```

```
<label xlink:type="resource"
xlink:role=http://www.xbrl.org/2003/role/label
xlink:label="ifrs_Inventory"
xml:lang="de">Inventory</label>
```

D. Taxonomy Extension

US_GAAP and IFRS and other public taxonomies define elements in accordance with the related regulations and standards. However, due to the diversification of the business world and/or new developments of business activities, we cannot always find an element in these public taxonomies that fits the exact meaning of a reporting item. Taxonomy Extension provides the necessary remedy for this problem.

When translating financial statements into XBRL format, a preparer should first use the elements provided in the relevant public taxonomy whenever possible. Although these are the "soft rules," Taxonomy Extension should be utilized for only two purposes: (1) a required element is not included in the public taxonomy; (2) a required relationship between elements is not defined in the public taxonomy. Building Taxonomy Extension is a fairly technical task which requires the preparer to be equipped with adequate XBRL knowledge. Among some coding rules, the most important one is to make absolutely sure not to alter the base taxonomy in any way. To protect the integrity of the base taxonomy, providers always set the computer file attribute of the taxonomy to "prohibited" when they post the files on their websites.

E. DTS

When preparing some complicated financial statements, a single base taxonomy is not enough to provide all the necessary elements, relationships and other functionalities. DTS, or Discoverable Taxonomy Set, contains two or more taxonomies with many schemas and linkbases to handle the various types of language requirements, presentation formats, relationship definitions, calculations and other operations. This is accomplished by setting up a DTS shell schema with a

main base schema. As the reporting needs increase, the shell will import and reference to additional schema and linkbases.

F. Instance Document

After setting up the taxonomy schema and linkbases, we assign the reporting value to each element in an XBRL Instance Document. In addition to the element values, an Instance Document also provides the information about reporting currency and its unit measure as well as the reporting period.

G. Footnote

Footnote is actually part of an Instance Document. Depending on the governing reporting regulations or standards, footnotes are prepared to provide in-depth explanations for some of the elements according to various disclosure requirements. Footnote elements usually contain blocks of text with linkages for the reporting elements to utilize their values and other attributes.

VII. SUMMARY

Almost five years have passed since the SEC mandate for XBRL for financial reporting. The progress for XBRL conversion has been shamefully slow in the United States. We ought to be quite embarrassed because XBRL was first developed by us more than fifteen years ago; however, we managed to let many of our competitors, big or small, pass by us in the utilization and the advancement of such a wonderful technology. As I explained before, you do not need to know much about XBRL to convert some simple financial statements into XBRL format if you use a suite of canned XBRL conversion software. After reading this article, I believe you have acquired enough basic knowledge to handle some entry-level integration to merge the XBRL reporting module with your existing AIS or ERP. You should also be able to convert the more complicated financial statements with the help of a XBRL specialist. For more detailed discussions, please visit <http://www.xbrl.org>.

The great success story of Fujitsu ought to provide us an encouraging incentive and a valuable example. Utilizing XBRL GL, this global IT giant reengineered its own IT systems. It was a huge project that revamped 63 different systems with about 1 million product codes and 1,200 interfaces through over 9,000 processes. The end result is a fully integrated global business processing and financial reporting platform that has helped to make Fujitsu's global operations more efficient and to drastically speed up management decisions as well as to improve the company's financial governance^[11].

In the future, the author will search for more ways to merge XBRL with some existing internet, database and other

computing technologies, such as ASP, data warehouse and artificial intelligence and cloud computing, to develop some powerful IDEAs. Utilizing financial information reported in the XBRL format at the data element level, these IDEAs will continuously test the limits of financial reporting, business analytics and data processing efficiencies.

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