

15. Understanding and Using Business Rules (XBRL Formulas and XBRL Functions)

[This section is a DRAFT until the XBRL Formulas and XBRL Functions specifications are made available. These specifications are anticipated to be complete by December 2006. Until that time, a proprietary implementation of business rules is shown in examples, etc. Fundamentally, they will achieve the same purposes, but likely with different syntax. But, the concepts are the same.]

One of the most interesting and potentially powerful features of XBRL is its business rules capabilities or "formulas" as they are called in the actual XBRL specification. We will use the term business rules.

The discussion of business rule can be quite technical, but it is worth wading through. Part of the reason it will be technical is to explain how and why business rules work. The reason this explanation is provided is to help readers see the impact on financial reporting of XBRL, basically opening the metadata and semantics of business reporting to computer applications.

We will explain three important concepts in order to help understand business rules: semantics, metadata, and business rules themselves.

We will then provide three specific examples of uses of business rules in financial reporting to help readers understand what business rules are by showing what they can be used for:

- Expressing financial reporting relationships,
- Expressing financial reporting ratios,
- Expressing a disclosure checklist.

Lastly, we will consolidate your understanding of business rules by thinking about how the process of financial reporting might change if a computer can guide a financial reporting professional through the process.

15.1. What are Business Rules?

In order to understand business rules, it is important to understand a few concepts, which we will cover now. The discussion will be somewhat technical in nature, but only to help readers grasp these important concepts. For those who don't care how things work, but only that they work; this section can be skipped. Just as it is not important to know how to build a car or even be a mechanic if you simply want to get in your car and drive; getting your hands a little greasy can be fun!

15.1.1. Semantics 101

The first building block for understanding business rules is understanding the concept of semantics. Fundamentally, XBRL is a method of expressing semantics, or semantic meaning. This semantic meaning is expressed using an XML syntax; but XBRL is more about semantic meaning.

For example, here is an XBRL concept as expressed in its XML form, in an XML Schema:

```
<xs:element name="CashAndCashEquivalents" periodType="instant" balance="debit" type="xbrli:monetaryItemType" />
```

The definition of the term "Cash and Cash Equivalents" is done in financial reporting standards such as IFRS or US GAAP. XBRL expresses that concept so that a computer application can read it using XML and XML Schema. XBRL also allows the following information to be expressed about that concept, such as:

- **References** such as "IAS 7 6" which defines cash and cash equivalents and "IAS 1 68 i" which indicates that cash and cash equivalents must be presented on the balance sheet,
- **Documentation**, which basically allows those creating a taxonomy to provide a definition for a concept within a taxonomy.
- **Labels** so humans can read the concept in a more familiar way such as "Cash and Cash Equivalents" in English or "Disponibilit  Liquide e Mezzi Equivalenti" in Italian. This is important, for example, if a user does not speak English.
- **Calculations** which the fact that "Cash and Cash Equivalents" is included in the calculation of "Assets, Total".
- **Presentation** which indicates that "Cash and Cash Equivalents" is the most liquid asset therefore is the last in the list of assets on an order of liquidity balance sheet.

All of this information is semantic meaning relating to the concept "Cash and Cash Equivalents". This semantic meaning is expressed using XML, XML Schema, XLink and other syntax, which make up the "funky looking" thing called XBRL, specified in the XBRL Specification so that software developers from around the world can all build compatible software which "speaks" XBRL.

And, also consider this. What if every company created their own definition of "Cash and Cash Equivalents", expressing that meaning in their company specific taxonomy or "dictionary/classification system of terms". Well, computers could read those terms and know what they are, but may not be able to figure out that the two different companies are actually talking about the same thing.

An alternative to everyone creating their own terms are to use standard definitions, such as IFRS and US GAAP. Each defines "Cash and Cash Equivalents". Now, the world would be a better place, perhaps, if there were only one definition; but that cannot occur until there is only one globally used set of financial reporting standards. IFRS exists because it was a problem having 80+ different sets of accounting standards around the world and trying to do business with one another. Now, there are only really two sets of accounting standards: IFRS and US GAAP, and those two sets of standards are converging. The IASB (International Accounting Standards Board, the folks who create IFRS) and the FASB (Financial Accounting Standards Board, the folks who create US GAAP) are working to converge the two sets of financial reporting standards.

So, for political reasons there may never be one set of financial reporting standards, but the two sets, IFRS and US GAAP, may have two concepts which mean the same thing, or similar enough, that a "mapping" can be created between the two concepts to indicate, to a computer, that they are the same thing. That is another piece of semantics.

Expand this to the 4,000 to 10,000 or so concepts used in financial reporting, or whatever can be agreed upon.

And can we agree on what concepts mean? Well, during the creation of the IFRS-GP taxonomy several things came to light about IFRS, which were written by humans. Humans make mistakes! There are inconsistencies in the documentation which makes up IFRS, and certain things are vague or simply left

out. For example, there is a requirement that "Finance Costs" be disclosed on the income statement under IFRS, but IFRS does not tell you what is include in "Finance Costs". Therefore accountants around the world have to figure out what goes into finance costs, and there are different interpretations, therefore less comparability in financial statements. This came up in the area of Financial Instruments, a very complicated and newer area of IFRS.

Eventually financial reporting standards can be less vague as the process of expressing the standards in XBRL contributes to making these inconsistencies and areas of vagueness in the financial reporting standards quite obvious, allowing for the meaning to be expressed more precisely. All this contributes to better financial reporting standards.

The bottom line is this. Semantics are defined for financial reporting by the financial reporting standards, IFRS and US GAAP being the most dominant standards globally. The XBRL specification is a rich set of tools and a global standard method of expressing that semantic meaning using the XML syntax so that computers can understand them. XBRL taxonomies are a way of creating agreeing on common semantics, rather than everyone creating their on.

Business rules are part of that semantic meaning.

15.1.2. Metadata 101

Metadata is a commonly understood term within information technology, not so common in business or financial reporting.

In short, metadata is data about data. Everyone knows what data is typically, but the meaning of metadata is a bit harder to grasp; however the concept is critical to understanding the benefits of XBRL.

You use metadata driven applications every day and you may not even realize it. A good example is Microsoft Excel or Word. These programs are "localized" for different languages. The metadata for the menus, dialog boxes, all the stuff you see in the application is changed by applying a specific local's language to Excel or Word, which drives the display of information in "English" if you are in the US or in "Japanese" if you are in Japan.

Consider an invoice. **Data** on the invoice might include:

- the invoice number, "I-10001"
- the invoice date, "July 1, 2005"
- the quantity of each line item, "500 boxes"
- the amount of each line item, "\$ 3000"
- the total amount of the invoice, "\$ 9000"

The **metadata** for the invoice, which is data which expresses the information the invoice must contain, might be things like:

- the invoice number must start with the letter "I", be followed by a dash, and must be a 5 digit number,
- the invoice MUST contain an invoice number, an invoice date, at least one line item, and a total
- the relationship on the invoice that the sum of the amounts of each line item must agree to the total amount of the invoice, "SUM (Amount for Line Item) = Total Amount"

If the metadata can be expressed in a consistent, standard way, it can then be read by a computer application and other applications can use it. The metadata can be exchanged automatically between applications along with the data being expressed, resulting in new and better ways to transform and evaluate data.

One advantage of metadata driven applications is that they can be updated more cost-effectively than "hard coded" applications. Computer programmers must change hard coded applications. Business users can update metadata driven applications. This makes updates faster (whenever the business user wants to update them, not having to wait for the programmers to get around to it) and it allows the business users to update the applications without having to communicate with the programmers and articulate the business problem, the business user can do this directly.

In terms of financial reporting, you will see applications driven by XBRL financial metadata (a standardized set of financial terms, or taxonomies). These XBRL taxonomies have already been developed for US GAAP financial reporting and IFRS (International Financial Reporting Standards).

Computers can do some VERY interesting things with the metadata and data.

First, if the metadata is communicated in a standard way, it can be exchanged by computer applications which understand that standard, reducing the need to build lots of individual proprietary solutions to the same fundamental problem.

Second, you can build a method of expressing and therefore use the expression of the semantic meaning which can be used to evaluate the data; but more importantly to drive the functionality and workflow of computer applications.

The fact that data can be defined in an organized way (structured) rather than unstructured, semantic meaning can be expressed as metadata, and XBRL is a global standard that allows for the creation of business reporting solutions which have functionality the likes of which have never been seen before. And at a relatively low cost because the applications are useful, flexible, and therefore used by so many.

A key to improving business reporting is metadata driven computer applications using open standards to express that metadata.

It is not the case that these types of applications have not existed before, they have. It is just that they were extremely expensive to create and therefore not really available to the masses. And they were not as beneficial as there was no global standard for the metadata.

The bottom line here is that the semantics expressed in XBRL taxonomies (see the previous section) is metadata.

15.1.3. Business Rules 101

Business rules can be defined in many ways, and rather than using just one definition here, we will provide several:

- The Business Rules Group (<http://www.businessrulesgroup.org>) defines business rules as "a statement that defines or constrains some aspect of the business which is intended to assert business structure, or to control or influence the behaviour of the business."
- Or, business rules can be thought of as a way of expressing the semantic meaning of data.
- Or another definition, "A formal and implementable expression of some user requirement".

- Or "The practices, processes, and policies by which an organization conducts its business."

Business rules exist in financial reporting, lots of them. To help you better understand business rules, we provide the following examples of some of the things which are considered business rules in financial reporting:

- Definitions such as "Assets = Liabilities + Equity"
- Calculations such as "Total Property, Plant and Equipment = Land + Buildings + Fixtures + IT Equipment + Other"
- Process oriented such as "If property, plant, and equipment exists; then a property, plant and equipment policy must exist and property, plant and equipment disclosures must exist."
- Regulations such as "The following is the set of ten things which MUST be reported if you have Property, Plant and Equipment on your balance sheet: depreciation method by class, useful life by class, ... (etc)"
- Instructions or documentation such as "Cash flow types must be either operating, financing, or investing."

What business rules are is quite important because they are extraordinarily useful for financial reporting. But what is even more important is HOW business rules were created and used in the past, and how they will be created and used in the future.

You may, or may not, remember the day when someone building a computer application had to also build a place to store the data which that application used. Well, those days are over with the advent of the standard relational database management system (RDBMS) and structured query language (SQL). Basically, the data is separate from the actual application and you can go buy a standard SQL database, rather than everyone building their own. This separation between the database and the application occurred in the 1980's.

Another separation which has taken place is the separation of the business rules which drive the processing of the application from the application itself. This is a bit more recent, occurring in the 1990's.

What is important to understand is the efficiencies and effectiveness which can be achieved with business rules separated from applications themselves:

- Rather than paying programmers to update rules (which is expensive and time consuming), business users who actually understand the rules can update them, saving both time and money.
- Rather than having programmers create validation for each thing they wish to validate (called one-to-one programmatic validation) a business rules engine can be used to do validation (many-to-many rules-based validation).

And what if the business rules are also in a global standard format? You can exchange the rules with others. You can, for example,

1. use the rules to explain the data you are collecting,
2. which data needs to be collected,
3. validate the data prior to it being submitted, and
4. which data collection forms should be used by the type or quality of entity submitting data.

All this promotes an understanding of business policies and procedures, facilitates consistent decision making, forces order to rules and policies because they are clearly expressed; all with increased flexibility because of the separation of the processing logic from the rules, the ability of the business users to control the processing logic easily without understanding programming.

15.2. Business Rules in Financial Reporting

Imagine the day when business rules can be expressed in a globally standard way making it very cost effective for business users to create rich expressions of semantic meaning and standard computer applications to evaluate the semantic meaning. Imagine all the possibilities.

Well, that day is here today with XBRL. Not only can business rules be created, but the business rules can be exchanged along with the data to (a) articulate how the data was created and (b) indicate that there are no errors in the data by having users validate the data against the rules you created. These rules are no longer locked inside a relational database or an Excel spreadsheet where they are both hard to reuse the business rules and easy to "hide" (unintentionally or intentionally, i.e. fraud) in the "murky" rows and cells of a spreadsheet someone else created.

The following are several examples of using business rules within financial reporting. We will provide brief sets of examples to show some of the areas where business rules can be useful.

15.2.1. A Simple General Example

We will start out by creating a simple example of a business rule, walking you through step-by-step so you get the big picture of what is going on. This sample exists in the files for this chapter; you can look at the example files for more detailed information.

In order to focus, we will simplify the example as much as possible, eliminating any distractions from the complexity of the problem; complexities will be introduced in subsequent examples. This example is about as simple as it exists:

Cash Flows from Financing Activities		
Additional Long Term Debt	-109,322	0
Repayment of Long Term Debt	99,438	0
	<hr/>	<hr/>
Cash Flow from Financing Activities, Net	-9,884	0
	<hr/>	<hr/>
Cash Flow, Net	0	10,000
Cash and Cash Equivalents, Beginning of Year	1,000	-9,000
	<hr/>	<hr/>
Cash and Cash Equivalents, End of Year	1,000	1,000
	<hr/>	<hr/>

What we have is the reconciliation of cash at the end of a cash flows statement: Cash Flow, Net + Cash and Cash Equivalents, Beginning of Year = Cash and Cash Equivalents, End of Year.

We are using two taxonomies here. This first taxonomy (gaap.xsd) simply has two concepts: "Cash and Cash Equivalents" and "Cash Flow, Net".

Prefix	Label /	Name	Data Type	Abstr...	Substitution Group	Balance	
gaap	Cash and Cash Equivalents	CashCashEquivalents	Monetary	False	xbri:item	Debit	I
gaap	Cash Flow, Net	CashFlowNet	Monetary	False	xbri:item	Debit	I

This would be equivalent to say the IFRS-GP or US GAAP taxonomy; here we have simply deleted all the things we are not using to keep things clear.

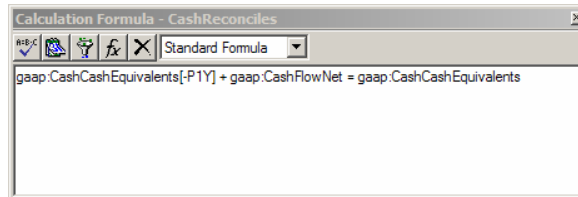
The second taxonomy contains the business rule we defined (Business Rules):

The screenshot shows a window titled "rules (Presentation)". It contains a tree view with "Presentation View" expanded, showing "Extended Link (Default Link)" and "Business Rules (Presentation)" which includes "Cash Reconciles". Below the tree is a table with columns: Prefix, Label, Name, Data Type, Abstract, Substitution Group, Balance, and Period Type. The table contains 4 rows of data.

Prefix	Label	Name	Data Type	Abstract	Substitution Group	Balance	Period Type
rules	Business Rules (Presentation)	BusinessRulesPresentation	String	True	xbri:item		Instant
gaap	Cash and Cash Equivalents	CashCashEquivalents	Monetary	False	xbri:item	Debit	Instant
gaap	Cash Flow, Net	CashFlowNet	Monetary	False	xbri:item	Debit	Duration
rules	Cash Reconciles	CashReconciles	Boolean	False	xbri:item		Instant

The taxonomy containing the business rules references the "GAAP" taxonomy, as those concepts are used in the business rule.

The business rule is created in the business rules taxonomy. The form for creating the rule looks like this; here you can see the rule:



Note that the business rule is associate with the concept "CashReconciles". The concept has a data type of Boolean (true/false). When the business rule is evaluated, it will either be "true" or it will be "false".

Next, we see the instance document (SimpleGeneralExample-Instance.xml):

The screenshot shows a window titled "Instance - ABCCompany-Instance". It contains a tree view with "ABCCompany-Instance" expanded, showing items 10 through 14. Below the tree is a table with columns: Sequence, Sou, Element, Context, P, D, Unit, IsNil, and Value. The table contains 5 rows of data.

Sequence	Sou	Element	Context	P	D	Unit	IsNil	Value
1	10	gaap:CashCashEquivalents	I-2004	0	U-Monetary	False		1000
2	11	gaap:CashCashEquivalents	I-2003	0	U-Monetary	False		1000
3	12	gaap:CashCashEquivalents	I-2002	0	U-Monetary	False		-9000
4	13	gaap:CashFlowNet	D-2004	0	U-Monetary	False		0
5	14	gaap:CashFlowNet	D-2003	0	U-Monetary	False		10000

You can see the fact values contained in the instance document.

When we load the instance document and evaluate the business rule, we get a report similar to the one below:

8 Context I-2002[at 2002-12-31 for ABC Company]						
9 (no unit)						
10	rules:Cash Reconciles (gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents)			(none)	formula	Formula: gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents Element: gaap:CashCashEquivalents[at 2001-12-31 for ABC Company] No value for this context
11 Context I-2003[at 2003-12-31 for ABC Company]						
12 (no unit)						
13	rules:Cash Reconciles (gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents)			True	formula	Formula: gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents Element: gaap:CashCashEquivalents[at 2002-12-31 for ABC Company] Execute: push -9000(unit=U-Monetary,precision=D 0) Result: -9000(unit=U-Monetary,precision=D 0) Element: gaap:CashFlowNet[at 2003-12-31 for ABC Company] Execute: + 10000(unit=U-Monetary,precision=D 0) Result: 1000(unit=U-Monetary,precision=D 0) Element: gaap:CashCashEquivalents[at 2003-12-31 for ABC Company] Execute: = 1000(unit=U-Monetary,precision=D 0) Result: True Value Expression: gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents
14 Context I-2004[at 2004-12-31 for ABC Company]						
15 (no unit)						
16	rules:Cash Reconciles (gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents)			True	formula	Formula: gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents Element: gaap:CashCashEquivalents[at 2003-12-31 for ABC Company] Execute: push 1000(unit=U-Monetary,precision=D 0) Result: 1000(unit=U-Monetary,precision=D 0) Element: gaap:CashFlowNet[at 2004-12-31 for ABC Company] Execute: + 0(unit=U-Monetary,precision=D 0) Result: 1000(unit=U-Monetary,precision=D 0) Element: gaap:CashCashEquivalents[at 2004-12-31 for ABC Company] Execute: = 1000(unit=U-Monetary,precision=D 0) Result: True Value Expression: gaap:CashCashEquivalents[-P1Y] + gaap:CashFlowNet = gaap:CashCashEquivalents

Notice that the report shows you the rule on the left and an evaluation of whether the rule is "true" or "false". Here, the rule is evaluated twice and true both times. If you look at row 10, you see the rule, but it is not being evaluated as there is not enough data. If you look at the human readable printout, you see a beginning balance for 2002 (for the period 2003), but there is no "Cash Flows, Net" or beginning balance (for 2002, which would be a value for 2001), therefore the formula cannot be calculated. To the right you see a lot of information about how the "true" values were determined. This can be helpful in finding and correcting errors.

One more thing is worth mentioning. Notice the XBRL instance document below (SimpleGeneralExample-Instance_bizRule.xml):

```
<?xml version="1.0" encoding="utf-8" ?>
<xbrl xmlns="http://www.xbrl.org/2003/instance" xmlns:link="http://www.xbrl.org/2003/linkbase"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:iso4217="http://www.xbrl.org/2003/iso4217" xmlns:gaap="http://www.fasb.org/us/gaap"
xmlns:rules="http://www.UBmatrix.com/rules">
  <link:schemaRef xlink:type="simple" xlink:href="gaap.xsd" />
  <link:schemaRef xlink:type="simple" xlink:href="BusinessRules.xsd" />
  <context id="I-2004">
    <entity>
      <identifier scheme="http://www.ABCCompany.com">ABC Company</identifier>
    </entity>
    <period>
      <instant>2004-12-31</instant>
    </period>
  </context>
  <context id="I-2003">
    <entity>
      <identifier scheme="http://www.ABCCompany.com">ABC Company</identifier>
    </entity>
    <period>
      <instant>2003-12-31</instant>
    </period>
  </context>
  <rules:CashReconciles contextRef="I-2004">true</rules:CashReconciles>
  <rules:CashReconciles contextRef="I-2003">true</rules:CashReconciles>
</xbrl>
```

This instance document was created when the business rules executed, it was dynamically generated. Business rules can be used to create information from other information, stringing the information together. Imagine stringing a series of business rules together in order to generate a set of financial statements. This is somewhat can be done with SQL sub-select statements, chaining many SQL statements together.

So again, the goal was to walk you through the steps, not actually create the rule or use the software. See Chapter 6, Exercise 5 for "Building a Business Rule" and Chapter 7, Exercise 5 for "Validating with a Business Rule" to actually walk through this using software.

15.2.2. Expressing Financial Reporting Relationships Using Business Rules

Now we take a single rule (as we showed above) and apply that concept to the entire Statement of Changes in Equity and show you in more detail what business rules can be used for.

The first obvious area where business rules are quite useful is in fundamentally expressing what the data is and how it relates. XBRL calculations to this to some degree, but they are not that flexible. A more flexible tool is business rules. For example, one of the limitations of XBRL calculations is the ability to express cross-context calculations. An example of cross-context calculations is something quite common to financial reporting, the movement analysis.

One example of a movement analysis is the Statement of Changes in Equity (we will use IFRS). In fact, the Statement of Changes in Equity is a quite large movement analysis. The basic set of business rules which can be expressed is the following:

$$\text{Beginning Balance} + \text{Changes} = \text{Ending Balance}$$

The fact is, however, that the Statement of Equity can even be more complex, for example if there is a prior period adjustment due to a change in accounting policy or a fundamental error:

$$\text{Originally Stated Balance} + \text{Prior Period Adjustments} = \text{Restated Beginning Balance} + \text{Changes} = \text{Ending Balance}$$

Neither of these relations can be expressed using XBRL calculations because the beginning and ending balances are in different contexts (different instants of time) and the changes are a different type of period altogether (a duration, rather than an instant like the beginning and ending balances).

In the files for this chapter there is an XBRL taxonomy which defines 24 business rules which "check" the Statement of Changes in Equity to see if the beginning balance plus changes equals the ending balance of each of the following possible movements in that statement:

- Issued Capital (Share Capital, Ordinary Shares; Share Capital, Preference Shares; Share Premium, Ordinary Shares; Share Premium, Preference Shares)
- Other Reserves (Capital Redemption Reserve, Merger Reserves, Option Reserves, Warrant Reserves, Proposed Dividend Reserves, Legal and Statutory Reserves, Reserves for General Banking Risks, Translation Reserves, Revaluation Reserves, Hedging Reserves, Available for Sale Reserves, Cumulative Income (Expense) Relating to Non Current Assets and Disposal Groups Held for Sale, Miscellaneous Other Reserves)

- Treasury Shares
- Retained Earnings (Accumulated Losses)
- Subscribed Capital
- Minority Interest
- Equity, Total

All of these business rules are basically the same, so we will only show one here so you get a sense of what the rules look like. The following is the business rule (note that this is expressed using a UBmatrix Proprietary Formulas specification syntax as the XBRL Formulas specification is not complete and no rules engines exist to process XBRL Formulas at this writing):

$$\text{ifrs-gp:ShareCapitalOrdinaryShares}[-P1Y] + \text{ifrs-gp:ChangesInShareCapitalOrdinaryShares} = \text{ifrs-gp:ShareCapitalOrdinaryShares}$$

The [-P1Y] means that the context is "one period less, and the period is a year" (again, the beginning balance as opposed to the ending balance). Not that we are NOT showing the restatement due to a prior period adjustment in this formula, just the basic movement.

So again, with this example, we expanded the first simple rule example, showing you that one type of rule can be used to evaluate all the movements within the Statement of Equity. Below is a printout of one page of business rules for the statement of equity:

Presentation Report					2/7/2006 8:00:18 AM		
ID	Bal	Per	Nil	Type	NS	Label/Formulas	Reference
1	D			(String)	ifrs-rules	IFRS Business Rules (Presentation)	
2	D			(String)	ifrs-rules	Statement of Equity Rules (Presentation)	
3	D			(String)	ifrs-rules	Issued Capital Rules (Presentation)	
4	I	T		Boolean	ifrs-rules	Reconciles-Share Capital, Ordinary Shares ifrs-gp:ShareCapitalOrdinaryShares[-P1Y] + ifrs-gp:ChangesInShareCapitalOrdinarySharesTotal = ifrs-gp:ShareCapitalOrdinaryShares	
5	I	T		Boolean	ifrs-rules	Reconciles-Share Capital, Preference Shares ifrs-gp:ShareCapitalPreferenceShares[-P1Y] + ifrs-gp:ChangesInShareCapitalPreferenceSharesTotal = ifrs-gp:ShareCapitalPreferenceShares	
6	I	T		Boolean	ifrs-rules	Reconciles-Share Premium, Ordinary Shares ifrs-gp:SharePremiumOrdinaryShares[-P1Y] + ifrs-gp:ChangesInSharePremiumOrdinarySharesTotal = ifrs-gp:SharePremiumOrdinaryShares	
7	I	T		Boolean	ifrs-rules	Reconciles-Share Premium, Preference Shares ifrs-gp:SharePremiumPreferenceShares[-P1Y] + ifrs-gp:ChangesInSharePremiumPreferenceSharesTotal = ifrs-gp:SharePremiumPreferenceShares	
8	D			(String)	ifrs-rules	Other Reserves Rules (Presentation)	
9	I	T		Boolean	ifrs-rules	Reconciles-Capital Redemption Reserves ifrs-gp:CapitalRedemptionReserves[-P1Y] + ifrs-gp:ChangesInCapitalRedemptionReservesTotal = ifrs-gp:CapitalRedemptionReserves	
10	I	T		Boolean	ifrs-rules	Reconciles-Merger Reserves ifrs-gp:MergerReserves[-P1Y] + ifrs-gp:ChangesInMergerReservesTotal = ifrs-gp:MergerReserves	
11	I	T		Boolean	ifrs-rules	Reconciles-Option Reserves ifrs-gp:OptionReserves[-P1Y] + ifrs-gp:ChangesInOptionReservesTotal = ifrs-gp:OptionReserves	
12	I	T		Boolean	ifrs-rules	Reconciles-Warrant Reserves ifrs-gp:WarrantReserves[-P1Y] + ifrs-gp:ChangesInWarrantReservesTotal = ifrs-gp:WarrantReserves	
13	I	T		Boolean	ifrs-rules	Reconciles-Proposed Dividend Reserves ifrs-gp:ProposedDividendReserves[-P1Y] + ifrs-gp:ChangesInProposedDividendReservesTotal = ifrs-gp:ProposedDividendReserves	
14	I	T		Boolean	ifrs-rules	Reconciles-Legal and Statutory Reserves ifrs-gp:LegalAndStatutoryReserves[-P1Y] + ifrs-gp:ChangesInLegalAndStatutoryReservesTotal = ifrs-gp:LegalAndStatutoryReserves	
15	I	T		Boolean	ifrs-rules	Reconciles-Reserves for General Banking Risks ifrs-gp:ReservesForGeneralBankingRisks[-P1Y] + ifrs-gp:ChangesInReservesForGeneralBankingRisksTotal = ifrs-gp:ReservesForGeneralBankingRisks	
16	I	T		Boolean	ifrs-rules	Reconciles-Translation Reserves ifrs-gp:TranslationReserves[-P1Y] + ifrs-gp:ChangesInTranslationReservesTotal = ifrs-gp:TranslationReserves	
17	I	T		Boolean	ifrs-rules	Reconciles-Revaluation Reserves ifrs-gp:RevaluationReserves[-P1Y] + ifrs-gp:ChangesInRevaluationReservesTotal = ifrs-gp:RevaluationReserves	
18	I	T		Boolean	ifrs-rules	Reconciles-Hedging Reserves ifrs-gp:HedgingReserves[-P1Y] + ifrs-gp:ChangesInHedgingReservesTotal = ifrs-gp:HedgingReserves	
19	I	T		Boolean	ifrs-rules	Reconciles-Available for Sale Reserves ifrs-gp:AvailableForSaleReserves[-P1Y] + ifrs-gp:ChangesInAvailableForSaleReservesTotal = ifrs-gp:AvailableForSaleReserves	

With in the IFRS-GP taxonomy there are 61 "movement analysis" types of calculations, each of which have one or more "movements". For example, the Property, Plant and Equipment movement analysis has 9 classes (Land, Building, etc) and a totals movement. The point here is that many movement analysis type patterns exist in the IFRS-GP, as well as other financial reporting taxonomies.

15.2.3. Expressing Financial Reporting Ratios Using Business Rules

Another type of business rules which can be created are ratios. There are common business ratios used in accounting. Below is a listing of some of these ratios which are used under IFRS:

Ratio	
Return on Equity	Profit / Total Equity
Return on Assets	Profit / Total Assets
Working Capital	Current Assets – Current Liabilities
Current Ratio	Current Assets / Current Liabilities

These ratios relate to concepts found in IFRS, and in the IFRS-GP taxonomy. We can define these ratios in terms of the IFRS-GP taxonomy. The following is a summary of some of these ratios, expressed in an XBRL taxonomy.

Presentation Report				2/7/2006 8:37:27 AM	
ID	Bal	Per Nil Type	NS	Label/Formulas	
1				Extended Link (Key IFRS Ratios)	
2	I	(String)	ifrs-ratios	IFRS Key Ratios	
3	I	(String)	ifrs-ratios	Operating Performance	
4	I	(String)	ifrs-ratios	Return on Investment	
5	I	T Decimal	ifrs-ratios	Return on Equity (ROE) NumberDecimals(ifrs-gp:ProfitLoss / ifrs-gp:EquityTotal, 3)	
6	I	T Decimal	ifrs-ratios	Return on Total Assets (ROTA) NumberDecimals(ifrs-gp:ProfitLossFromOperations / ifrs-gp:AssetsTotal, 3)	
7	I	(String)	ifrs-ratios	Operating Profit	
8	I	T Decimal	ifrs-ratios	Sales to Accounts Receivable NumberDecimals(ifrs-gp:RevenueTotalByFunction / ifrs-gp:TradeAndOtherReceivablesNetCurrent, 3)	
9	I	T Decimal	ifrs-ratios	Sales to Inventories NumberDecimals(ifrs-gp:RevenueTotalByFunction / ifrs-gp:Inventories, 3)	
10	I	T Decimal	ifrs-ratios	Sales to Fixed Assets NumberDecimals(ifrs-gp:RevenueTotalByFunction / ifrs-gp:PropertyPlantAndEquipmentNet, 3)	
11	I	T Decimal	ifrs-ratios	Inventory Days NumberDecimals((ifrs-gp:Inventories / ifrs-gp:RevenueTotalByFunction) * 365, 2)	
12	I	T Decimal	ifrs-ratios	Debtor Days NumberDecimals((ifrs-gp:TradeAndOtherReceivablesNetCurrent / ifrs-gp:RevenueTotalByFunction) * 365, 2)	
13	I	(String)	ifrs-ratios	Corporate Liquidity	
14	I	T Monetary	ifrs-ratios	Working Capital (WC) ifrs-gp:AssetsCurrentTotal - ifrs-gp:LiabilitiesCurrentTotal	
15	I	T Decimal	ifrs-ratios	Current Ratio NumberDecimals(ifrs-gp:AssetsCurrentTotal / ifrs-gp:LiabilitiesCurrentTotal, 2)	
16	I	T Decimal	ifrs-ratios	Quick Ratio NumberDecimals((ifrs-gp:AssetsCurrentTotal - ifrs-gp:Inventories) / ifrs-gp:LiabilitiesCurrentTotal, 2)	
17	I	T Decimal	ifrs-ratios	Working Capital to Sales NumberDecimals(ifrs-ratios:WorkingCapitalWC / ifrs-gp:RevenueTotalByFunction, 3)	
18	I	T Decimal	ifrs-ratios	Interest Cover NumberDecimals(ifrs-gp:ProfitLossFromOperations / ifrs-gp:InterestExpense, 3)	
19	I	T Decimal	ifrs-ratios	Debt to Equity Ratio (D/E) NumberDecimals((ifrs-gp:LiabilitiesCurrentTotal + ifrs-gp:InterestBearingBorrowingsNonCurrent + ifrs-gp:NonInterestBearingBorrowingsNonCurrent) / ifrs-gp:EquityTotal, 3)	

You can see this taxonomy in this chapter's subdirectory of the files which came with this book. Open the taxonomy "UBmatrix-ifrs-gp-Ratios-2005-05-15.xsd" in the subdirectory "Example-03-IFRS-Ratios". In that taxonomy, you will see a number of ratios.

If you validate the instance document "SampleCompany-2005-05-15.xml" in this sections subdirectory, the validation report "SampleCompany-2005-05-15_calctrace.html" contains the calculated ratios. The following is one line item from that report:

6	ifrs-ratios:Working Capital (WC) (ifrs-gp:AssetsCurrentTotal - ifrs-gp:LiabilitiesCurrentTotal)	D	0	1,343.000	formula	Formula: ifrs-gp:AssetsCurrentTotal - ifrs-gp:LiabilitiesCurrentTotal Element: ifrs-gp:AssetsCurrentTotal[at 2004-12-31 for SAMP] Execute: push 1694000(unit=U-Euros,precision=D 0) Result: 1694000(unit=U-Euros,precision=D 0) Element: ifrs-gp:LiabilitiesCurrentTotal[at 2004-12-31 for SAMP] Execute: - 351000(unit=U-Euros,precision=D 0) Result: 1343000(unit=U-Euros,precision=D 0) Value Expression: ifrs-gp:AssetsCurrentTotal - ifrs-gp:LiabilitiesCurrentTotal
---	---	---	---	-----------	---------	--

This shows the calculation of the ratio. Ratios are calculated for every opportunity where data exists. The calculations can be quite complex, involving getting the correct context, taking into consideration which data does and does not exist, considering a fact value's decimals value, and so forth.

In addition, these values are can be saved into an XBRL instance document and then further processed. See the file "SampleCompany-2005-05-15_bizRule.xml", an example of the concepts created, which represent the business rules expressed in the ratios taxonomy, is shown below:

```
<ifrs-ratios:CurrentRatio contextRef="Current_AsOf" unitRef="unit-5" decimals="2">4.83</ifrs-ratios:CurrentRatio>
<ifrs-ratios:CurrentRatio contextRef="Prior_AsOf" unitRef="unit-5" decimals="2">4.04</ifrs-ratios:CurrentRatio>
<ifrs-ratios:DebtorDays contextRef="Current_AsOf" unitRef="unit-5" decimals="2">137.58</ifrs-ratios:DebtorDays>
<ifrs-ratios:DebtorDays contextRef="Prior_AsOf" unitRef="unit-5" decimals="2">179.46</ifrs-ratios:DebtorDays>
<ifrs-ratios:InventoryDays contextRef="Current_AsOf" unitRef="unit-5" decimals="2">98.27</ifrs-ratios:InventoryDays>
<ifrs-ratios:InventoryDays contextRef="Prior_AsOf" unitRef="unit-5" decimals="2">53.23</ifrs-ratios:InventoryDays>
<ifrs-ratios:QuickRatio contextRef="Current_AsOf" unitRef="unit-5" decimals="2">3.83</ifrs-ratios:QuickRatio>
<ifrs-ratios:QuickRatio contextRef="Prior_AsOf" unitRef="unit-5" decimals="2">3.5</ifrs-ratios:QuickRatio>
<ifrs-ratios:ReturnOnEquityROE contextRef="Current_AsOf" unitRef="unit-5" decimals="3">0.352</ifrs-ratios:ReturnOnEquityROE>
<ifrs-ratios:ReturnOnEquityROE contextRef="Prior_AsOf" unitRef="unit-5" decimals="3">0.375</ifrs-ratios:ReturnOnEquityROE>
<ifrs-ratios:ReturnOnTotalAssetsROTA contextRef="Current_AsOf" unitRef="unit-5" decimals="3">0.252</ifrs-ratios:ReturnOnTotalAssetsROTA>
<ifrs-ratios:ReturnOnTotalAssetsROTA contextRef="Prior_AsOf" unitRef="unit-5" decimals="3">0.244</ifrs-ratios:ReturnOnTotalAssetsROTA>
<ifrs-ratios:SalesToAccountsReceivable contextRef="Current_AsOf" unitRef="unit-5" decimals="3">2.653</ifrs-ratios:SalesToAccountsReceivable>
<ifrs-ratios:SalesToAccountsReceivable contextRef="Prior_AsOf" unitRef="unit-5" decimals="3">2.034</ifrs-ratios:SalesToAccountsReceivable>
<ifrs-ratios:SalesToFixedAssets contextRef="Current_AsOf" unitRef="unit-5" decimals="3">2.407</ifrs-ratios:SalesToFixedAssets>
<ifrs-ratios:SalesToFixedAssets contextRef="Prior_AsOf" unitRef="unit-5" decimals="3">3</ifrs-ratios:SalesToFixedAssets>
<ifrs-ratios:SalesToInventories contextRef="Current_AsOf" unitRef="unit-5" decimals="3">3.714</ifrs-ratios:SalesToInventories>
<ifrs-ratios:SalesToInventories contextRef="Prior_AsOf" unitRef="unit-5" decimals="3">6.857</ifrs-ratios:SalesToInventories>
<ifrs-ratios:WorkingCapitalWC contextRef="Current_AsOf" unitRef="U-Euros" decimals="0">1343000</ifrs-ratios:WorkingCapitalWC>
<ifrs-ratios:WorkingCapitalWC contextRef="Prior_AsOf" unitRef="U-Euros" decimals="0">991000</ifrs-ratios:WorkingCapitalWC>
```

This data can be fed into an analysis model or other system to be processed. Those systems can flag data items which are outside acceptable parameters.

The formulas can be quite complex. The following is an example of a complex formula:

```
[((cc:RCFDA167[P0] / ((cc:RCFD8764[P0] + ((cc:RCFD8766[P0] * .005) + (cc:RCFD8767[P0] * .015) +
(cc:RCFD3812[P0] * .01) + (cc:RCFD8769[P0] * .05) + (cc:RCFD8770[P0] * .075) +
(cc:RCFD8771[P0] * .01) + (cc:RCFD8772[P0] * .05) + (cc:RCFD8773[P0] * .075) +
(cc:RCFD8774[P0] * .07) + (cc:RCFD8775[P0] * .07) + (cc:RCFD8776[P0] * .08) +
(cc:RCFD8777[P0] * .1) + (cc:RCFD8778[P0] * .12) + (cc:RCFD8779[P0] * .15) +
(cc:RCFDA000[P0] * .06) + (cc:RCFDA001[P0] * .08) + (cc:RCFDA002[P0] * .1))) >= .4 OR
(cc:RCFDA167[P0] / ((cc:RCFD8764[P0] + ((cc:RCFD8766[P0] * .005) + (cc:RCFD8767[P0] * .015) +
(cc:RCFD3812[P0] * .01) + (cc:RCFD8769[P0] * .05) + (cc:RCFD8770[P0] * .075) + (cc:RCFD8771[P0] * .01) +
(cc:RCFD8772[P0] * .05) + (cc:RCFD8773[P0] * .075) + (cc:RCFD8774[P0] * .07) + (cc:RCFD8775[P0] * .07) +
(cc:RCFD8776[P0] * .08) + (cc:RCFD8777[P0] * .1) + (cc:RCFD8778[P0] * .12) + (cc:RCFD8779[P0] * .15) +
(cc:RCFDA000[P0] * .06) + (cc:RCFDA001[P0] * .08) + (cc:RCFDA002[P0] * .1))) <= 10000) AND
(((cc:RCFDA167[P0] / ((cc:RCFD8764[P0] + ((cc:RCFD8766[P0] * .005) + (cc:RCFD8767[P0] * .015) +
(cc:RCFD3812[P0] * .01) + (cc:RCFD8769[P0] * .05) + (cc:RCFD8770[P0] * .075) +
(cc:RCFD8771[P0] * .01) + (cc:RCFD8772[P0] * .05) + (cc:RCFD8773[P0] * .075) +
(cc:RCFD8774[P0] * .07) + (cc:RCFD8775[P0] * .07) +
(cc:RCFD8776[P0] * .08) + (cc:RCFD8777[P0] * .1) + (cc:RCFD8778[P0] * .12) + (cc:RCFD8779[P0] * .15) +
(cc:RCFDA000[P0] * .06) + (cc:RCFDA001[P0] * .08) + (cc:RCFDA002[P0] * .1))) <= -10000)
```

The example above is a real business rule. As you can see, business rules can be quite powerful. In addition, since these rules are expressed in a global standard way, they can be shared with the data, or tested against publicly available taxonomies to see if reported data falls within certain parameters. Users of the data can use publicly available business rules, or proprietary rules why create, or a combination of the two.

15.2.4. Expressing a Disclosure Checklist Using Business Rules

A common task when creating a financial statement for external release, and even for internal use many times, is the creation of a disclosure checklist. The disclosure checklist usually takes the form of a piece of paper with three columns: Yes, No, and N/A. The following is a URL to a disclosure checklist:

<http://www.pwc.com/gx/eng/about/svcs/corporatereporting/Disclosure05.pdf>

But what if the disclosure checklist was in the form of a computer application, the relationships and expertise documented in a form which a computer can read? What if the computer application could guide the user through the completion of the checklist, and the financial statement.

Consider the following examples:

- Required: Certain pieces of information are always required such as the entity's name and the revenue recognition policy.
- If, then: If there is a line item in the balance sheet for "Property, Plant and Equipment", clearly there must be a set of "Property, Plant and Equipment Policies" and a set of "Property, Plant and Equipment Disclosures".
- If, then: Included in that set of "Property, Plant and Equipment" disclosures are, for each class of property, plant and equipment; the depreciation policy, useful lives (or depreciation rates), and depreciation method must be disclosed.
- Questionnaire: Sometimes the disclosure checklist is just to jog your memory to be sure something was not forgotten.

Probably not everything, but many things can be expressed electronically and read by a computer application, significantly enhancing the user experience.

15.3. Financial Reporting in the Future

Imagine if you had all of the following inside one application, the information readable by a computer application:

- All accounting literature you might use,
- Model financial statements or "templates" to show you examples of what things might look like
- Business rules which check everything which a computer was capable of checking, relieving us humans to deal with exceptions.
- The XBRL taxonomies which represent the "meta data" of financial reporting.
- And so forth...

Well, this is where things are actually moving to. These capabilities will likely be created by the most knowledgeable accountants making the complexities of financial reporting that much easier for those of us which don't have to deal with the "nooks and crannies" every day, but don't want to fall into them if they are there.

Analysis of the financial information will even be more interesting.