

1. Intermediate Level XBRL Technical Syntax Primer

The purpose of this section is to explain in a bit more detail technically what XBRL is, how it works, the mechanisms that exist in XBRL, etc.

If you want to use this section to better understand the technical details, you would be well served to read the more basic XBRL technical primer in the prior section. If you found that the basic technical explanation was enough or if that overwhelmed you; then you might want to skip this entire section. This section is more for business professionals that are curious about the technical details of software engineers that need to understand the technical details. If you don't find this satisfying, I would point you to Ghislain Fourny's book, *The XBRL Book: Technical, Simple, and Precise*¹.

1.1. Terminology

XBRL, like other things, has its jargon. Understanding this jargon makes it easier to understand XBRL. The following is important terminology which will be used throughout this document:

Term	Definition
Concept	By concept what is meant is a financial reporting concept which has been defined in an XBRL taxonomy as an XML Schema element which has a substitution group of "item" or "tuple".
Fact value	By fact value what is meant is an XML element/concept as used within an instance document. The instance element is from an XBRL taxonomy and is an XBRL concept. The concept has a value which is expressed for that concept for a specific context and expressed within a specific unit.
Instance document	Database of fact values. An instance document is a physical XML file or "in memory" or "virtual" which contains fact values which are related to XBRL concepts defined in one or more XBRL taxonomies.
Taxonomy document	Dictionary of concepts. A taxonomy usually comprises a number of physical XML files which define XBRL concepts. This information is supplemented by additional information contained in linkbases. Resource type linkbases contain additional information, such as labels or references. Relation type linkbases contain relation information, such as presentation, calculation, or definition type information. Concepts in taxonomies are used by instance documents to communicate fact values.
Extended Link	A network of relations. An extended link is used to partition relations into different networks if needed for processing of say calculations or for the convenience of the taxonomy creator to make the taxonomy more visually appealing.
Discoverable Taxonomy Set (DTS)	A set of all taxonomies used by an instance document.

¹ Ghislain Fourny's book, *The XBRL Book: Technical, Simple, and Precise*, <http://ghislainfourny.github.io/the-xbrl-book/>

Context	Which entity, period, and scenario information which relates to fact values contained in instance documents.
Units	Which units such as "US Dollars", "Japanese Yen", etc. which relates to numeric fact values contained in instance documents.
Calculation links	Expresses XBRL calculation relationships between concepts.
Presentation links	Expresses XBRL presentation relationships between concepts.
Definition links	Expresses XBRL definition relationships between concepts. Each definition relationship has a specific arcRole which provides additional information for the relationships.
XBRL Formulas	Expresses mathematical and other relations that go beyond the capabilities of the XBRL calculation relations.
Labels	Label resources for an XBRL concept. Each label has a specific role.
References	Reference resources for an XBRL concept. Each reference has a specific role.
Formulas (or business rules)	Formula resources for an XBRL concept. Each formula has a specific role.
Footnote	Footnote resources used within instance documents.
Parent	Parent portion of a parent-child relationship.
Child	Child portion of a parent-child relationship.
Sibling	Sibling relationship.
Inline XBRL	A human-readable XHTML document that is also machine-readable. Sometimes called iXBRL.

1.2. High Quality Examples

Often people like to learn using examples. Here is a set of hundreds of high-quality example XBRL instances and related XBRL taxonomies including many XBRL Formulas linkbases². Each of the examples has been validated using five different XBRL processors and XBRL formula processors. Every effort has been made to make these examples as good as possible.

1.3. Overview of XBRL Basics

Below is a high level overview of XBRL key concepts and fundamentals. The purpose of this overview is not to explain XBRL in detail, but rather to provide broad brushstrokes in order to set the context for additional discussions which will fill in more information about what XBRL is and how it works.

Please keep in mind that this is a beginning to intermediate guide to understanding XBRL. For an advanced understanding or for the definitive specification, the best resource at this time is the XBRL 2.1 Specification and the XBRL 2.1 conformance suite.

The following is a summary of some of the key beginning/intermediate level concepts relating to XBRL:

1. XBRL **taxonomies** define concepts. A taxonomy is much like a dictionary which expresses concepts in a specified format, in this case, XBRL. Taxonomies define the meta-data which will be reported.

² *Digital Financial Reporting Conformance Suite (Positive)*,
<http://xbrlsite.azurewebsites.net/2019/Prototype/conformance-suite/rss.xml>

2. **Linkbases** are optional, but can be used to extended the information, or meta-data, about concepts. Resource type linkbases (labels, references) provide additional information. Relation type linkbases (calculation, presentation, definition) express relationships between concepts.
3. **Extended links** partition linkbases into different networks of relationships. Extended links of the same type, with the same extended link role. XBRL and XLink defines extended links slightly differently, the distinction is important to understand.
4. XBRL **instance documents** report fact values for concepts that have been defined in XBRL taxonomies. Instance documents are similar to a database which contains information. The instance document "database" uses the format specified by the XBRL specification.
5. There are two basic building blocks used within taxonomies: **items** and **tuples**. Items express name/value pairs for unrelated concepts. Tuples "bind together" parts that consist of compound facts. Tuples contain items or other tuples.
6. **Contextual information** relating to fact values of concepts (such as entity, period, scenario) is expressed in instance documents that contain the fact values, not in taxonomies that express concept definitions. Contextual information is typically dimensional in nature.
7. Numeric information has additional contextual-type information; **decimals** (and precision) and **units** are important for numeric information that are defined in instance documents, not in taxonomies. Unit information is typically not dimensional in nature.
8. The **FRTA** provides additional constraints on taxonomies above and beyond the constraints required by XBRL itself in order to maximize interoperability, consistency and comparability within the domain of financial reporting particularly within "open systems".
9. The **FRIS** provides additional constraints on instance documents above and beyond the constraints required by XBRL itself in order to maximize interoperability, consistency and comparability within the domain of financial reporting particularly within "open systems".
10. There is a fundamental difference **between "data" and "presentation"**. The focus of XBRL and this document is data. However, how information is presented may provide clues as to how information is expressed as XBRL concepts within a taxonomy.
11. While formatting/styling XBRL instance document information can be challenging, for the same reason this formatting is more challenging, **extracting data from an instance document** is easy.
12. **Inline XBRL** add an additional layer to an XBRL instance. Essentially, special elements are defined and placed into an XHTML document very similar to micro formats.

1.4. Taxonomies

An XBRL taxonomy is a description and classification system for the model and contents of financial statements and other business reporting documents. It is a

dictionary of terms. Taxonomies are created by domain experts, industry groups, and individual companies.

Taxonomies describe the meta-data of the business information which is exchanged. For financial reporting, taxonomies contain the financial and non-financial concepts which must be presented in the face of the financial statements or disclosed in the explanatory disclosures.

The IFRS-GP taxonomy is a starting point, or base taxonomy. Individual jurisdictions which use IFRS will likely create extension taxonomies which supplement or perhaps even alter what financial information must be presented and/or disclosed within a jurisdiction. For example, a jurisdiction may supplement IFRS disclosures with corporate governance disclosures required within a specific jurisdiction.

Additional extension taxonomies may be created, for example to meet the unique needs of a reporting entity.

1.4.1. How Taxonomies Work

Taxonomies define concepts used by fact values in instance documents. Taxonomies are created in such a manner that computers can understand information in the taxonomy. Taxonomies are meta-data used in financial reporting, or "data about data used in financial reporting". For example, the concept "Cash and Cash Equivalents" might be a concept defined in a taxonomy.

XBRL uses features of XML Schema and XLink to define taxonomies for XBRL. XBRL could have "reinvented" the functionality of XML Schema and XLink, but rather, leveraged everything about those standards which it could so it would not have to reinvent things which were already global standards.

XBRL adds to XML Schema a few things which XML Schema does not provide. It uses features of XML and XML Schema to do this. XBRL also uses XLink features to extend the meta-data provided about XML Schema elements, which are XBRL concepts.

XBRL is organized somewhat like what is known in computer technology as a star schema. The concepts in the XML Schema are the hub and the linkbases are the nodes projecting from the hub. There can be an unlimited number of projections from the hub. This offers a tremendous amount of extensibility, but in a prescribed way.

Although XBRL taxonomies may seem complicated to humans, they actually can be read, but it is rare that humans will ever be reading taxonomies. Taxonomies are intended to be read by XBRL processors which specialize in reading, using, and connecting taxonomies to instance documents.

The most important thing to understand is that computers can interact with the information contained in taxonomies very effectively.

1.4.2. Concepts

Taxonomies contain concepts. Concepts are expressed as XML Schema elements and their attributes in an XSD file, a schema file. XBRL adds a few attributes, but not many.

There are two fundamental types of contexts in XBRL: the **item** and the **tuple**. Fundamentally, all taxonomies are constructed of items and tuples. Tuples are

constructed of items and other tuples. A tuple is expressed as XML Schema "complexType".

1.4.2.1. XML Schema "Element" Element Attributes

The following are the XML Schema attributes of the "**element**" element which are part of an XML Schema element which makes up an XBRL concept.

- The element "**name**" attribute. This is required. This is a unique name for every XBRL concept. For example, "PropertyPlantAndEquipment" is an element name. This is typically auto-generated from entering a label in most XBRL tools.
- The element "**id**" attribute. This is required. This is a unique ID for every XBRL concept. For example, "ifrs-gp_PropertyPlantAndEquipment" is an id. This is needed for XLink, and may seem redundant; but it is not redundant. The id attribute is typically auto-generated by XBRL tools from the name.
- The element "**type**" attribute. This is required. This is basically the data type assigned to the concept. This is like adding a data type to a database such as "String" or "Integer". XBRL defines its own data types which are all based on XML Schema types. An example of a type might be "xbrli:monetaryItemType", but the user interface may show simply "Monetary". These types need to be assigned by the user. A complete list of types is provided in the appendix. Custom types can also be created using XML Schema features.
- The element "**substitutionGroup**" attribute. This is required. The substitutionGroup is an XML Schema attribute, but the substitutionGroup attribute value is what makes an XML Schema element an XBRL concept. The substitutionGroup attribute value must eventually be resolved to the value of xbrli:item or xbrli:tuple. Items and tuples will be discussed in a moment. There are many, many interesting things you can do with substitutionGroups, but these are beyond the scope of this book. XML Schema provides these features.
- The element "**nillable**" attribute. The nillable attribute allows the "nil" feature of XML Schema to be used in instance documents. All XBRL concepts should have a value of "true", except in special cases. XBRL tools normally default this value to "true".

1.4.2.2. XBRL Attributes Added to XML Schema "Element" Element

The XBRL Specification adds two attributes to the XML Schema "**element**" element. One is required, the other is optional.

- The "**xbrli:periodType**" attribute. A required attribute, the periodType attribute is used on each taxonomy concept to identify the concept as being either an "instant", meaning the value is as of a specific instant in time such as the values on a balance sheet, or "duration", meaning that the value is true over a period of time, such as the values on an income statement. Accountants use the term "as at" or "as of" for the balance sheet, instances are "as at" a specific time. Accountants use the term "For the period ended" or "For the period ending", which expresses a duration.

- The "**xbrli:balance**" attribute. This attribute is optional. It is only used on monetary-type concepts where the term "debit" or "credit" apply. For example, debit applies to the balance sheet concept "Property, Plant and Equipment". The term debit or credit does not apply to the concept "Depreciation Method". Some monetary type concepts do not require a balance attribute.

So this covers some fundamental building blocks of XBRL, and keep in mind, we will be going over these again by actually building XBRL taxonomies. This hands on will cover additional details and help you tune your understanding of these fundamental building blocks of XBRL.

1.4.2.3. Items

In XBRL, an item contains data. The items can either be text or numeric. Examples of a single text item are a paragraph of text that explains an accounting policy or a single word that describes an accounting policy such as "FIFO". An example of a numeric item is something like the number of employees of an entity or the depreciation expense of buildings.

Simple text or numeric items are not associated with any other fact and are not grouped in any way; they stand on their own. Facts are differentiated from other facts by assigning values to context information such as entity information or period information in an instance document, making that fact unique for a particular period and/or a particular entity.

Below is an example of a simple item from an XBRL taxonomy:

```
<element name="PropertyPlantAndEquipment" id="ifrs-gp_PropertyPlantAndEquipment"  
type="xbrli:monetaryItemType" substitutionGroup="xbrli:item" nillable="true"  
xbrli:balance="debit" xbrli:periodType="instant">
```

We won't show these angle brackets much, but we show them here to help you grasp the concepts at a technical level, if you desire that level of understanding.

1.4.2.4. Tuples

Tuples connect data to create "compound" or "complex" data structures. Tuples can basically be thought of as a complex data type or "set" of items and/or other tuples. A tuple is used to indicate that two or more facts are associated, such as the association between fields in a row of a database table.

For example, consider the concepts "Name" and "Salary" in a taxonomy. A tuple is used to connect the "Name" and the "Salary" as the salary fact on its own is not of interest or value, it needs always to be linked to a name. The tuple provides the linkage mechanism. So, "John Doe" and the salary "\$50,000" is not confused with the name "Jane Doe" and the salary "\$100,000". In addition, who are Jane Doe and John Doe? Are they employees? Or directors?

By using a tuple called "Director" which has item elements "Name" and "Salary", each "Director" tuple connects the "Name" with correct "Salary" element.

Tuples contain items, or they can contain other tuples. For example, a company may have a number of related parties which are described using certain items. Each related party may have multiple transactions which are described by different items. The tuple "Related Parties" contain the nested tuple "Related Party Transactions."

The following is an example of a tuple:

```
<element id="ci_Director" name="Director" substitutionGroup="xbrli:tuple" nillable="true" >
  <complexType>
    <complexContent>
      <restriction base="anyType">
        <sequence>
          <element ref="ci:Name" />
          <element ref="ci:Salary" />
        </sequence>
        <attribute name="id" type="ID" use="optional" />
      </restriction>
    </complexContent>
  </complexType>
</element>

<element name="Name" id="ci_Name" type="xbrli:stringItemType" substitutionGroup="xbrli:item"
nillable="true" xbrli:periodType="duration" />
<element name="Salary" id="ci_Salary" type="xbrli:monetaryItemType" substitutionGroup="xbrli:item"
nillable="true" xbrli:periodType="duration" />
```

There is some stuff we will not go into here, but basically you can see a complexType which binds two concepts together. There are a lot of other XML Schema things which we not discuss as they are beyond the scope of this book, but this will give you an idea of what a tuple looks like.

This will be clearer when we look at tuples from within an instance document.

1.4.3. Infrastructure

XBRL, in common with other technologies, has a certain infrastructure which applies. This infrastructure will be discussed in this section. This section is likely a bit technical. We are trying to stick to the terminology of the XBRL Specification as there is no official "watered-down, less technical" terminology at this point.

This terminology may be a bit new to accountants at this point, and this is regretful. In later versions of this book we will try and make this explanation less technical. Perhaps some less technical standard terminology will arise.

It is beyond the scope of this discussion to explain XLink and how XLink works.

1.4.3.1. Linkbases

Linkbases, which is an XML term, are used to add supplemental information to XBRL. In FRTA some of these linkbases are required, in "plain vanilla" XBRL, none of these are required.

There are two types of linkbases:

- **Resource type linkbases** which add additional information to concepts. For example, the "Label" type linkbase is a resource linkbase, it adds labels to concepts.
- **Relation type linkbases** which express relations between concepts. For example, the "Calculation" type linkbase is a relation linkbase, it adds information between the relations of one concept to another concept.

There are linkbases which come with XBRL. In addition, XBRL is built to allow other proprietary linkbases to be easily added and if those linkbases are built correctly, an XBRL processor will be able to use those proprietary linkbases in conjunction with the base XBRL. This is a very powerful extensibility mechanism of XBRL, but is beyond the scope of this discussion.

Additionally, XBRL International is creating a specification for generic linkbases which can be used to create other types of linkbases for whatever purpose. The generic linkbases are discussed in the "Advanced" section later.

1.4.3.2. Extended Links

Extended links is a mechanism to partition components of the same type of linkbase. Sometimes this partitioning is required, say, so as to not create calculations which conflict. Other times the partitioning is for the taxonomy creator's convenience or for usability.

Each set of extended links acts together as a "network", and only things in that network can work together.

Extended links contain three things:

- **Locators** which point to things inside a linkbase or outside a linkbase,
- **Arcs** which connect locators with other locators or locators with resources,
- **Resources** which contain additional information.

These are all XLink terms and are more precisely explained in the XLink specification if you are interested in additional information.

1.4.3.3. Extended Link Roles

Extended links are defined by their extended link role. All extended links with the same role are in the same network. Of course, extended links with the same role, but in a different linkbase type, such as presentation and calculation, can never work together. Extended links which are of the same type can work together in a network. Different types of linkbases are not ever part of the same network.

1.4.3.4. Arcroles

Arcroles provide information about the arc of a linkbase. For example, calculation relations have only one type of arcrole, "summation-item". Definition relations have several different types of arcroles: "essence-alias", "special-general", "requires-element", "similar-tuple".

Arcroles are most meaningful on relations type linkbases. Users can also add new arcroles that provide specific meaning.

1.4.3.5. Resource Roles

Resource roles are used to more specifically identify different types of resources. For example, a label linkbase contains multiple "label resources" which are the actual labels. Resource roles can allow a taxonomy creator to differentiate, say, a "standard" label from a "beginning balance" label and a "ending balance" label.

1.4.4. Resource Type Linkbases

Resource type linkbases add additional information to concepts. The several types of resource linkbases are explained in the following paragraphs.

Resource type linkbases may not be prohibited by extension taxonomies.

1.4.4.1. Label Resources

Label resources add labels to concepts. For example, "Cash and Cash Equivalents" is the label for the concept "ifrs-gp:CashAndCashEquivalents". Labels can be identified by language such as "en" for English or "en-uk" to more specifically identify the label as being UK English.

Labels can also be more specifically identified using resource roles. There are several different types of labels in the IFRS-GP taxonomy. See the discussion later in this book.

1.4.4.2. Reference Resources

Reference resources add reference type information to concepts. For example, "IFRS 1, paragraph 5, subparagraph (a), clause (iv)" is a reference to the IFRS Bound Volume.

Reference are broken into parts, for example name, paragraph, subparagraph, and clause. FRTA requires the use of specific parts, these will be used throughout this book.

Taxonomy creators may add new parts if FRTA parts so not meet their needs.

References can also be more specifically identified using resource roles. There are several different types of resource roles in the IFRS-GP taxonomy. See the discussion later in this book.

1.4.4.3. Formula Resources

Formulas resources add formulas type information to a concept. For example, "ifrs-gp:AssetsTotal = (ifrs-gp:EquityTotal + ifrs-gp:LiabilitiesTotal)" is a formula which says that total assets must equal total equity plus total liabilities.

1.4.4.4. Other Resources

One of the most powerful features of XBRL is that other linkbases can be added to XBRL concepts. Some of these other linkbases may become standards, others may always remain proprietary and perhaps used by one company, or groups of entities, etc. This advanced feature is beyond the scope of this book.

XBRL International even created a special linkbase, the Generic Linkbase³, that can be used to represent all sorts of relations.

1.4.5. Relation Type Linkbases

The second type of linkbase is a relations type linkbase which expresses relations between one concept and another. The order of these relations may be specified, the priority may be specified. The relations may be prohibited by relations added in an extension taxonomy.

³ XBRL International, *XBRL Generic Links 1.0*, <http://www.xbrl.org/Specification/gnl/REC-2009-06-22/gnl-REC-2009-06-22.html>

1.4.5.1. Networks of Relationships

Networks of relationships is not terminology common to accounting or financial reporting, it is an information technology term. However, networks and relationships do exist in financial reporting.

It is important to understand networks or what is sometimes referred to as tree hierarchies or more appropriately graphs in XBRL. Understanding the basics of networks will help in understanding XBRL.

We will not learn everything about networks here, but rather we will introduce concepts relating to networks of relationships as we use the concepts. However, we do want to briefly lay a foundation of understanding.

- Networks are separate by definition. Two networks do not exist together, if that were the case it would actually be one network. Fundamentally, by definition, networks separate things.
- Networks use the term "parent" and "child" and "sibling". The use of these terms, which is similar to their use in genealogy, is discussed later.
- Cycles is a networks term. There are direct cycles and indirect cycles. Some cycles are good, some are bad. Cycles have to do with the type of relationship or relationships between parents and children. Again, we will discuss cycles more as we use the concept.

1.4.5.2. Presentation Relations

Presentation relations are used to express simple presentation hierarchies (a better term is actually "graphs") of XBRL concepts. These presentation relations, which are sometimes referred to as "graphs", may have a "preferred label" associated with them, meaning that when the relation is viewed, it is "preferred" that the specified preferred label is used for the relation.

A lot of people confuse the presentation relations linkbase with creating a human readable rendering of a financial statement. The presentation linkbase is more for looking at the taxonomy than rendering a financial statement presentation intended for humans. The presentation linkbase can help render human readable presentations of financial information, but it cannot do everything which is needed.

1.4.5.3. Calculation Relations

Calculation relations are used to express simple calculation hierarchies (again, the term graphs is the better technical term, if you know what a graph is then you will know what is meant).

For example, "ifrs-gp:PropertyPlantAndEquipment" = "ifrs-gp:Land" + "ifrs-gp:Buildings" + "ifrs-gp:FurnitureAndFittings" and so forth to get express the relation between PPE and the classes of PPE.

Looks a lot like formulas, right? Well, it does not look this way in the calculations linkbase. Also, calculations in XBRL are rather weak, almost to the point of where they can be considered somewhat impotent. But for expressing basic calculations, they work fine.

Every calculation relation has a "weight" assigned, for example a weight may be "1" or "-1". A good way to understand this that to take the fact value, multiple it by the

weight, and that is the value which is contributed from the child of a calculation relation to the parent in that calculation relation.

Now, weights can be other values in the range from 1 to -1. In the IFRS-GP taxonomy, only weights of 1 and -1 are used. Very briefly, weights other than 1 or -1 allow the allocation of only a portion of a child's value.

Calculations can be prohibited by extension taxonomy, and they can be "rewired".

We will discuss calculations more as we actually build calculation relations later in this book. The important this to know now is that they exist and some very basics as to how they work.

1.4.5.4. Definition Relations

Definition relations allow for other types of relations to be expressed between two concepts. The type of relation is limitless. This is a very powerful feature of XBRL which is not understood well by most people as there are not many creative definition linkbases at this point. The IFRS-GP taxonomy does not provide a definition linkbase.

While all the other relation type linkbases only have one arcrole, definition linkbases have several different arcroles defined by the XBRL specification. These arcroles are:

- **general-special** – which allows the definition of a relationship where a child concept is specialization of some general parent concept,
- **essence-alias** – which allows the definition of a relationship where one concept has the same meaning of a second concept,
- **similar-tuples** – which allows the definition of a relationship where one tuple is deemed to have a similar meaning as another tuple (this is used in extending tuples),
- **requires-element** – which allows the definition of a relationship where if one concept exists in an instance document, the other concept must also exist.

For now, we will cease discussing the definition linkbase. We will explore it more later in this book. Keep in the back of your mind this powerful component of XBRL, its value can be hard to see.

1.4.5.5. Other Relations

As with resource type linkbases, other types of relation type linkbases can be created. These custom relation linkbases are beyond the scope of this book.

1.4.6. Extensibility

As mentioned briefly earlier, XBRL has various types of extensibility functionality, or "the ability to extend". This extensibility functionality is one of the compelling features of XBRL which centers on the ability to add new XBRL concepts and relations and prohibit existing relations. Concepts cannot be prohibited. This extensibility functionality is robust where it needs to be and well thought out.

While XBRL allows for the prohibition of resource type relations, FRTA does not.

1.4.6.1. Extension

Extension is simply adding new taxonomy concepts to the taxonomy, but using or referencing another taxonomy as the base.

1.4.6.2. Prohibition

XBRL allows you to not only extend other taxonomies by adding additional concepts and relations, but you can also prohibit something which exists in another taxonomy by prohibiting the relation. Concepts cannot be prohibited.

You are not altering the taxonomy you are prohibiting at all, but rather, in your taxonomy where the prohibition exists, you are actually creating an additional relation stating that the relation expressed in the base taxonomy you are extending "is null and void". You own that prohibition. You do not impact the base taxonomy at all, other taxonomies are free to use the base as it existed and ignore your prohibition. Or, they can use the base and your extension taking advantage of your prohibition. The point is, you prohibiting another taxonomy does not impact that taxonomy in any way.

The way this is achieved is simply prohibiting the link in your taxonomy. This actually creates a relation in your taxonomy, but the relation has a "use" of prohibit. A "priority" attribute specifies the priority of a relation or resource.

Also, it is important to be sure you sent the priority of your links higher than the priority of the relations you are prohibiting.

Again, I will point out that we are only covering the basic concepts here, we will get our hands dirty and learn more later. Now, it is only important that we realize that this functionality exists and the basics of how it works.

1.4.7. Discoverable Taxonomy Set (DTS)

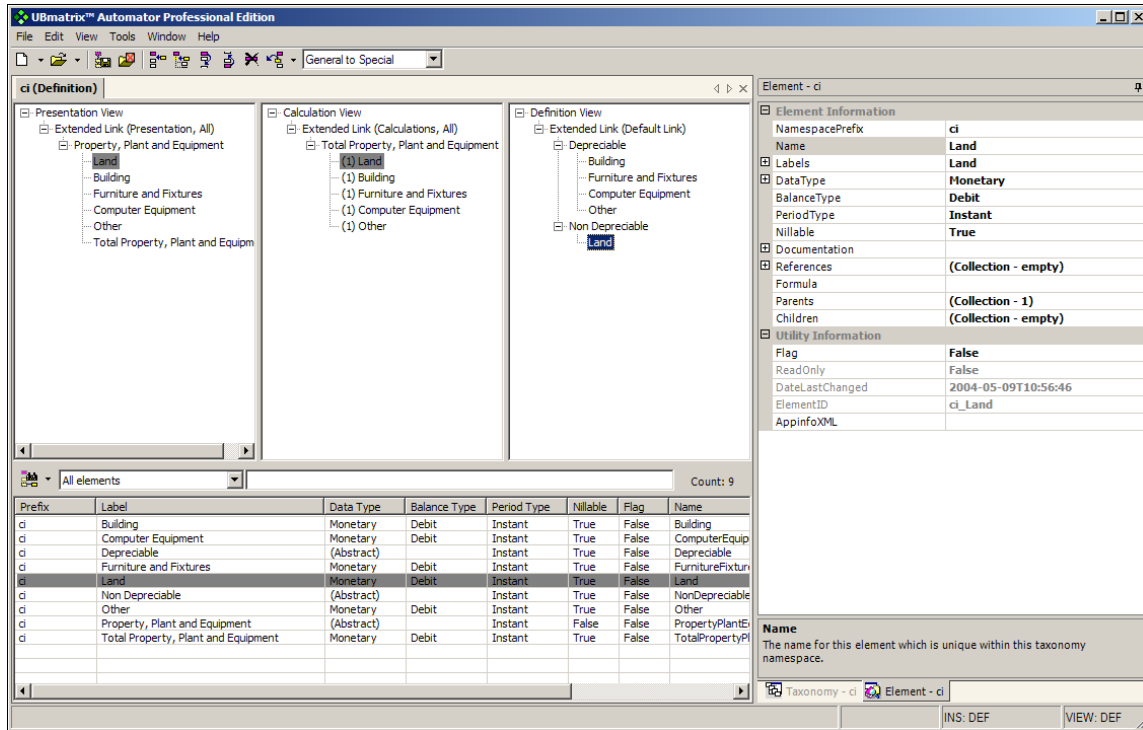
A discoverable taxonomy set or DTS is the set of all components of a taxonomy or an instance document and its set of taxonomies. This includes the taxonomy itself and other taxonomy components used by that taxonomy, directly or indirectly because a taxonomy used by a selected taxonomy also uses other taxonomy components. A taxonomy also includes all linkbases referenced by that taxonomy schema.

A DTS basically is an organization of all the pieces which declare concepts and information about concepts used by or intended to be used by an instance document.

1.4.8. Wrapping Taxonomies in Software

All this may seem overwhelming at this point. Through working on some actual examples of using XBRL, pieces will start falling together more and more. Also, a lot of XBRL is buried inside XBRL processors and tools which are built specifically for building XBRL taxonomies and instance documents.

Just to give a sense of what a these tools might look like, take a quick look at a GUI tool for editing taxonomies:



This screen shows the three relationship panes in the middle (presentation, calculation, definition), the concepts in the lower part of the screen, and the properties of the highlighted taxonomy concept to the right.

Keep in mind that software for making use of XBRL is relatively immature. You probably need more skills relating to the inter-workings of XBRL now than you ever will. As software matures, the software will do more and more of this XBRL "stuff" behind the scenes.

1.4.9. Building Base Versus Extension Taxonomies

It is more difficult to create a base taxonomy such as the IFRS-GP, which contains thousands of concepts, than it is to create an extension to the IFRS-GP, which may contain only a few concepts. While very sophisticated extensions may need to be created, most extensions will not be that complicated and for the most part, will be relatively easy to create.

This is not the case with a large base taxonomy. This type of taxonomy is actually very complicated to create and authors of this type of taxonomy need certain skills and hundreds of hours of experience, especially today as software is immature.

The knowledge within this book is necessary to create taxonomies like the IFRS-GP, but it is not sufficient, even for an IFRS expert. The following is a list of what is needed in order to build a taxonomy similar to the IFRS-GP. It is provided to give a sense of other things which are needed in order to create these larger base taxonomies. So, in order to create a FRTA compliant, quality taxonomy similar in scope to the IFRS-GP taxonomy the reader would probably need:

1. 8 hours of basic training on some taxonomy development tool, learning the basic operation of the tool (most of this is covered in this book).

2. 8 to 16 hours of training on that tool to learn advanced procedures such as using extended links, custom data types, substitutionGroups, etc. (not covered in this book)
3. 8 to 16 hours course on "taxonomy patterns" (which is covered in this book)
4. 100 to 500 hours of using the taxonomy tool to actually build taxonomies similar to the IFRS-GP taxonomy. In fact, a good exercise would be to recreate that taxonomy from scratch. This probably could be achieved in one to two weeks. This process would greatly accelerate ones ability to create quality taxonomies.
5. A good understanding of financial reporting, or you would also have to learn that
6. A good understanding of managing meta-data.
7. A good understanding of XML Schema features (in particular the stuff in XML Schema Part 2: Datatypes) will allow the use of more complex features of XBRL/XML Schema.

Clearly this varies by individual; if you have a knack for this sort of thing it will be easier, and if you don't it will take more time. Also, you cannot put a round peg into a square hole. Certain people simply will never be cut out for building complex meta-data.

1.5. Instance documents

An XBRL instance document is an XML file that contains business reporting information as XML elements and represents a collection of XBRL fact values using concepts from one or more taxonomies. Instance documents are like databases of fact values which are based on specific taxonomy concepts. Instance documents are created by financial statement/business report preparers

In order to build proper taxonomies, it is critical to understand XBRL instance documents. Many taxonomy development errors result from a lack of understanding of the features available when creating instance documents.

While taxonomies can be thought of as providing the definition of concepts or "dictionaries of terms", instance documents are more like "databases" that report fact values based on concepts defined in taxonomies.

Instance documents provide mechanisms to describe contextual information about these fact values. As such, it is important this contextual information not be defined in a taxonomy. For example, the entity and period for the fact should generally not be described in a taxonomy; instance documents express this information.

XBRL instance documents are explained by the XBRL Specification 2.1. Other sources of information to understand instance documents are also available. Users of this document are assumed to have a good understanding of instance documents.

However, this brief explanation will help users of this document to refresh their knowledge as to what information should be expressed within a taxonomy and what information should be expressed within an instance document. It is not a comprehensive explanation of instance documents, only a refresher to help set the perspective for building taxonomies.

Instance documents provide mechanisms for describing contextual information for numeric and non-numeric fact values, and unit and decimal/precision information relating to numeric fact values.

Instance documents can also contain footnotes which are similar to comments. XBRL footnotes are not related to the "notes" of a financial statement. Footnotes basically provide additional information about information or ad hoc relations between information in an instance document.

1.5.1. How Instance Documents Work

Instance documents are like little databases which contain financial information in the form of fact values. Each of the fact values has a concept from a taxonomy or DTS used by that instance document. In addition to the concept, fact values need to have a context which describes contextual-type information about the fact value such as the entity reporting the fact value, the period for which the fact value is valid, and the reporting scenario such as "actual" or "budgeted". In addition to contexts, numeric type fact values have a units associated with it to indicate if the fact value is reported, say, in US Dollars, Euros, or Yen. Also, numeric values have a decimals attribute which communicates the numeric precision of the value, such as accurate to 2 decimal places or only accurate to the nearest millions of dollars.

Instance documents are physically connected to taxonomies using mechanisms defined by XBRL. It is important that the DTS be available when using an instance document; otherwise the information in the instance document really cannot be understood.

1.5.2. Use of Taxonomies

Instance documents must use one or more taxonomies to explain the fact values used in the instance document. The taxonomies used are referred to in the instance document. Also, an instance document may use linkbases which may or may not be connected to any taxonomy.

The combined discoverable taxonomy set or DTS comprises all the taxonomies used by an instance document.

This is an example of a schemaRef which points to a taxonomy in an instance document:

```
<?xml version="1.0" encoding="utf-8"?>
<xbrl xmlns="http://www.xbrl.org/2003/instance"
      xmlns:xlink="http://www.w3.org/1999/xlink"
      xmlns:link="http://www.xbrl.org/2003/linkbase"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:ci="http://www.UBmatrix.com/Patterns/BasicCalculation"
      xmlns:iso4217="http://www.xbrl.org/2003/iso4217"
      >

  <link:schemaRef xlink:type="simple" xlink:href="BasicCalculation.xsd" />
```

The instance document above uses the "BasicCalculation.xsd" taxonomy as the starting point for loading the DTS information. There may, or may not, be other taxonomies referred to by the starting point taxonomy.

1.5.3. Contexts

Contexts contain information which describes the entity, entity segment, period, and scenario a fact value is associated with. Every fact value in an XBRL instance document must have a context associated with it.

This is an example of a context from an XBRL instance document:

```
<context id="I-2003">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    <segment>
      <segments:ReportingSegments><segments:Group /></segments:ReportingSegment>
    </segment>
  </entity>
  <period>
    <instant>2003-12-31</instant>
  </period>
  <scenario>
    <scenarios:ReportingScenario><scenarios:Actual /></scenarios:ReportingScenario>
  </scenario>
</context>
```

So, this is what the XML looks like, the following describes these pieces of an XBRL context.

1.5.3.1. Entity

The entity context portion describes the entity that the fact is about. For example a company, a subsidiary within a company, a department within a subsidiary, or even an employee of a department. The entity portion includes an identifier and a scheme which describes where the identifier came from.

```
<entity>
  <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  <segment>
    <segments:ReportingSegments><segments:Group /></segments:ReportingSegment>
  </segment>
</entity>
```

1.5.3.2. Entity Segments

The entity element may contain a segment portion which further describes the entity which can be used when the entity identifier is insufficient detail to differentiate the information.

1.5.3.3. Periods

The period context portion describes the period to which the fact value relates. Examples include a specific instant in time (such as "as at December 31, 2003") or duration of time (such as "For the year ended December 31, 2003").

```
<period>
  <instant>2003-12-31</instant>
</period>
```

1.5.3.4. Scenarios

The scenario context portion is used to associate terms such as "actual", "budgeted", "pro forma", "restricted", "unrestricted", and so forth, to a reported fact value.

```
<scenario>
```



```
<scenarios:ReportingScenario><scenarios:Actual /></scenarios:ReportingScenario>  
</scenario>
```

1.5.4. Units

The unit describes the unit of measurement associated with a reported fact value. Only numeric-type fact values require units information. For example, it commonly explains the currency used, such as "USD" for US Dollars" or "EUR" for Euros", to express a monetary fact.

The following is an example of an XBRL units element:

```
<unit id="U-Monetary">  
  <measure>iso4217:EUR</measure>  
</unit>
```

For the most part, units are fairly straight forward. There are complexities relating to compound units, fractions, and pure units. These will be explained as they are used.

1.5.5. Fact Values

Fact values within an instance document actually contain the data being expressed. The following is an item from an instance document:

```
<ifrs-gp:PropertyPlantAndEquipment contextRef="I-2003" unitRef="U-Monetary"  
decimals="INF">123456</ifrs-gp:PropertyPlantAndEquipment>
```

The components of items will be discussed below.

1.5.5.1. Concept from Taxonomy

Each fact value is associated with a concept from a taxonomy. In the example above, the concept "ifrs-gp:PropertyPlantAndEquipment" comes from a taxonomy.

1.5.5.2. Context/ContextRef

Each fact value is associated with a context using the contextRef attribute, which contains the value of the ID of some context element in the instance document.

1.5.5.3. Unit/UnitRef

Each fact value which is of a numeric data type must have a unitRef attribute, which contains the value of the ID of some unit element in the instance document. This is very similar to the way context works.

Non-numeric concepts do not have unitRef attributes.

1.5.5.4. Decimals

Each fact value which is of a numeric data type must have a decimal attribute. XBRL actually allows either a decimals attribute or a precision attribute, however the FRIS limits the attribute to decimals for financial reporting type instance documents, and that is what will be covered here.

Decimals helps a computer read the fact value. It tells the computer, for numeric values, what is the decimal accuracy of the value. For example:

- decimals="2" means two decimal points of accuracy,

- decimals="0" means there is no values past the decimal point,
- decimals="-3" means accurate to the nearest thousands,
- decimals="INF" means basically "what you see is what you get".

This will be discussed in more detail later.

1.5.5.5. Tuples in Instance Documents

The discussion so far has been in relation to an individual item in an instance document. So, what does a tuple look like? See below for an example of two tuples:

```
<ifrs-gp:Director>
  <ifrs-gp:Name contextRef="I-2003">Joe</ifrs-gp:Name>
  <ifrs-gp:Salary contextRef="I-2003" unitRef="U-Monetary" decimals="INF">100</ifrs-gp:Director>
</ifrs-gp:Director>

<ifrs-gp:Director>
  <ifrs-gp:Name contextRef="I-2003">Larry</ifrs-gp:Name>
  <ifrs-gp:Salary contextRef="I-2003" unitRef="U-Monetary" decimals="INF">200</ifrs-gp:Director>
</ifrs-gp:Director>
```

Now, tuples really don't contain value, or rather, they contain the values of all the items within the tuple. The first tuple for the director named "Joe" has a salary of "100", and the second director named "Larry" has a salary of "200". See how the tuple keeps the name and salary together?

1.5.5.6. Footnotes

Footnotes simply provide an ad hoc mechanism for including information in an instance document. See the following:

```
<ci:Land id="Item-01" contextRef="I-2003" unitRef="U-Monetary" decimals="INF">5347000</ci:Land>
<ci:Building id="Item-02" contextRef="I-2003" unitRef="U-Monetary"
decimals="INF">244508000</ci:Building>
<ci:FurnitureFixtures id="Item-03" contextRef="I-2003" unitRef="U-Monetary"
decimals="INF">34457000</ci:FurnitureFixtures>

<link:footnoteLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link"
xmlns:link="http://www.xbrl.org/2003/linkbase">
  <link:loc xlink:type="locator" xlink:href="#Item-01" xlink:label="FactSet-01" />
  <link:loc xlink:type="locator" xlink:href="#Item-02" xlink:label="FactSet-01" />
  <link:loc xlink:type="locator" xlink:href="#Item-03" xlink:label="FactSet-01" />
  <link:footnoteArc xlink:type="arc" xlink:arcrole="http://www.xbrl.org/2003/arcrole/fact-footnote"
xlink:from="FactSet-01" xlink:to="Footnote-01" />
  <link:footnote xlink:type="resource" xlink:role="http://www.xbrl.org/2003/role/footnote"
xlink:label="Footnote-01" xml:lang="en">This is a footnote discussing Land, Buildings, and Furniture
and fixtures for 2003.</link:footnote>
</link:footnoteLink>
```

Some things to note are the following:

- Every item referred to by a footnote must have an XML ID attribute. See the first item `ci:Land id="Item-01"` noting the ID.
- The actual footnote looks very much like the label linkbase or the references linkbase, footnotes are resources. A big difference is that the linkbase is inside the instance document.

1.5.6. Wrapping Instance Documents in Software

Just like software is used for taxonomy creation, instance document creation will be done with software used to create instance documents. Consider the following screen shot:

The screenshot shows a Microsoft Excel spreadsheet titled "Microsoft Excel - FRTA-TaxonomyPatterns-Samples-2004-09-12.xls". The spreadsheet contains a table with the following data:

	A	B	C	D	E	F	G
1							
2							
3							
4				Basic Calculation			
5							
6					2003	2002	
7					€'000	€'000	
8				Land	5,347	1,147	
9				Buildings	244,508	366,375	
10				Furniture and Fixtures	34,457	34,457	
11				Computer Equipment	4,169	5,313	
12				Other	6,702	6,149	
13				Total	295,183	413,441	
14							
15							
16							
17							

OK, so why show Excel as an instance document creation tool? Well, accountants use Excel to create financial statements. Why would they not use them to create XBRL instance documents which express the financial data they wish to exchange? Well, they probably will.

Add-in functionality for using Excel to create instance documents is pretty obvious; several XBRL software vendors have already done this. Microsoft has also, with an older version of XBRL (which has not been updated to XBRL 2.1).

Other tools could also be used. Also, Excel by it self is really not sufficient. There is still a need to validate the XBRL which is output to ensure the XBRL is compliant to the XBRL specification, validate the calculations to be sure they are accurate and ensure a valid taxonomy has been referenced.

Other possible instance document creation tools might be:

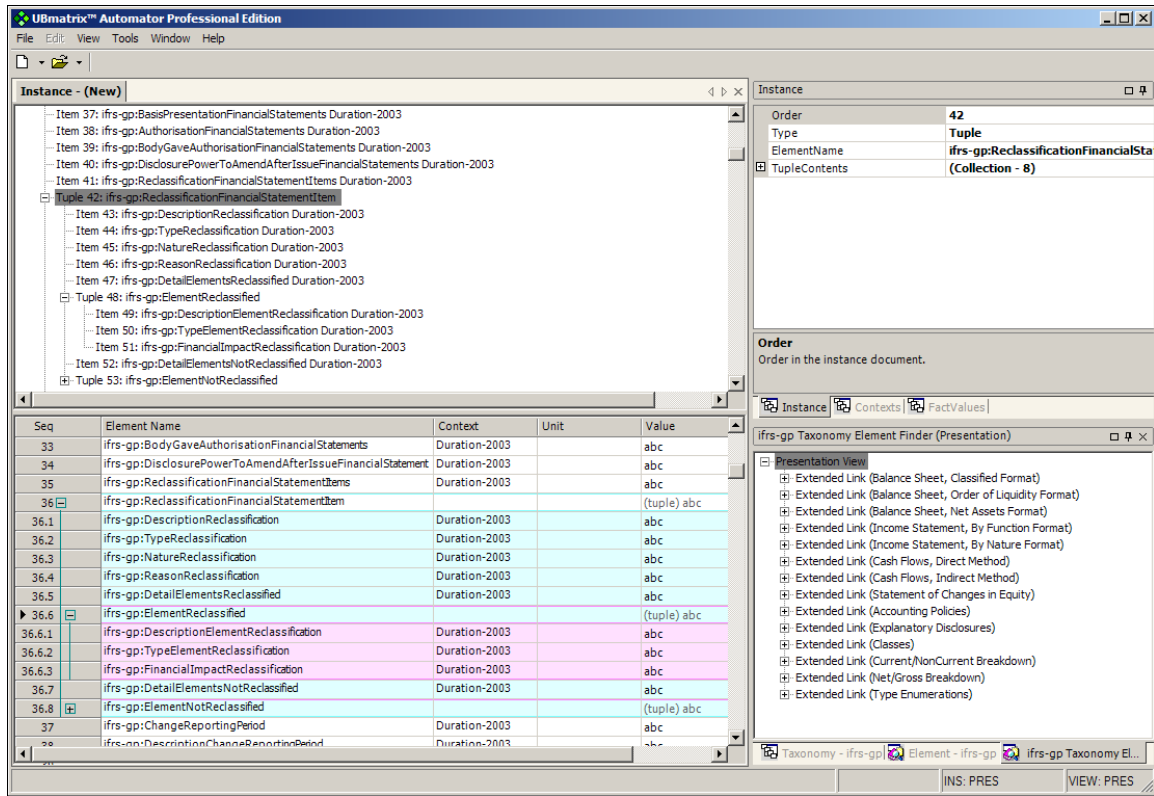
- Robust, stand alone tools specifically for creating XBRL instance documents.
- PDF forms,
- Applications such as TurboTax which allow fixed forms to be filled out.
- Applications such as TurboTax which also provided an interface for creating new forms; plus TurboTax-type functionality to allow completion of the form.
- Filling out a web page form.

- Auto-generating instance documents from the information contained in a database, therefore no real interface is created, but rather, XBRL is "exported" from an existing tool such as an accounting system such as Quickbooks, Microsoft Great Plains or SAP.

It is likely that all these applications will exist and be enabled with support for the next generation of XBRL, and maybe even be able to import XBRL information.

1.5.7.Future Probable XBRL Software Functionality

Below is a bare bones instance document creation tool:



Although technically correct and full featured in terms of validation, etc., using the tool can be difficult as there is no context to visualize the data. Financial reporting data can be quite complex. It is important for the creators of financial information, as well as users, to be able to read the data they are working with in a format which is useful. While a tool like this is useful as a utility tool, for creating and editing a financial statement of 100 pages which likely contains thousands of individual concepts, using such a utility tool would be unlikely.

Today many financial statements are created using tools such as word processors like Microsoft Word. While these are fantastic presentation tools, the tools know nothing about financial statements.

XBRL will likely change the types of tools used for creating financial statements, and perhaps even the format of financial statements themselves; time will tell.

Future tools for creating instance documents in the future might likely have the following types of features:

- Incorporates the ability to integrate accounting literature within the tool. For example, the IFRS/IAS standards exist in an XML format already. Incorporating those standards directly into a tool for creating financial statements will be quite useful. Tools might even access these standards directly from, say, the IASCF web site, where the standards are available. The tool user might subscribe to the service. By navigating through a taxonomy, which is connected to the standards via the references, could help navigate someone to the standards.
- Wizards, agents, and other software applications will help walk through the process of creating a financial statement. These tools act less like word processors and are more like expert systems. For example, an XBRL tool could be built which understands that a cash flow statement or disclosures:
 - Has three sections: Operating cash flows, financing cash flows, and investing cash flow,
 - It would know which concepts go into each section
 - It will likely also understand that the cash flow statement has two periods: current and prior periods
 - It will likely know how to, at the press of a button perhaps, move the current period to the prior period to create the template for the current year financial statements based on the prior years, populating the data correctly
 - If certain things appear on the cash flow statement (or if certain line items appear on the balance sheet, income statement, or in the disclosures) the expert type system would act much like an automated "disclosure checklist" which could be completed to ensure the accuracy of the financial statement.
 - "Templates" for disclosures, much like in the US what is called "Accounting Trends and Techniques" or the thousands of filings on the US SEC EDGAR database which are used to figure out how to create a complex disclosure; why reinvent the wheel? If someone has already created a disclosure, leverage what they have created.
 - Publishers of paper resources such as *Miller International Accounting Standards Guide* or *Wiley IAS Interpretations and Applications* will likely publish their guides in a manner that they can be integrated in tools for creating financial statements; in XML or XBRL.
 - Publishers of such things as *Key Management Ratios* by Ciaran Walsh and *Magic Numbers: the 33 key ratios that every investor should know* by Peter Temple will likely express these ratios as XBRL formula linkbases tied directly to the IFRS-GP taxonomy, making them available for analysis purposes as a web service.
 - Validation services will be available as web services, much like the FDIC submission process in the US; entities cannot submit their data and have it received until it passes through several different types of XBRL, numeric calculation checks, business rule checks, or other automated checks which ensure the accuracy of the data.

- Work flow systems which help attorneys and accountants work together easier to create these complex documents, using sophisticated work flow software tools which greatly improve accuracy of the financial statement.
- Financial statements will be perhaps less like the "flat" two-dimensional and therefore limited paper formats, but rather leverage all the capability of computers to do multi-dimensional presentations of information with drill down capabilities, etc.

None of the discussion above relates to changing WHAT is reported in any way, although that may also change. This is more about leveraging the fact that all the financial concept meta-data (XBRL taxonomies of financial concepts used by IFRS) are in a form that is readable by computers; people will figure out all sorts of useful tools to take advantage of this.

This will be particularly true when clever ways to use the definition linkbase are figured out. For example, to mark high audit risk and low audit risk concepts; etc.

1.6. Key Difference between Taxonomy and Instance Information

At this juncture there is a need to point out the difference between what goes into a taxonomy and what goes into an instance document. The key point to remember from this discussion is that, in general, the contextual information expressed in instance documents should not be contained in taxonomies.

There are exceptions to these rules. For example, a taxonomy for a tax return that requires information for the current period and prior period might contain concepts only for the current period and both concepts and contextual information for the prior period.

If taxonomy creators consciously violate these best practices to achieve a desired result in a specific circumstance, that would be acceptable practice. However, not being conscious of certain information relating to how instance documents work can cause problems for users desiring to use information contained in instance documents.

Putting this contextual information in taxonomies creates comparability problems and is the equivalent of "hard coding" information within a taxonomy.

2. Understanding and Using XBRL Dimensions

This section explains XBRL Dimensions (which includes the Aggregator-Contributor Specification; when XBRL Dimensions is stated, that includes the Aggregator-Contributor Specification) in terms of how dimensions are used in financial reporting and how dimensions are expressed using XBRL. Dimension is not an accounting term, but rather an IT technical term. However, dimensions are used in financial reporting. Other technical terms relating to dimensions might be multidimensional analysis, hypercubes or cube, measure, OLAP, etc.

These technical terms do relate to financial reporting, but in financial reporting terms such as "drill down" and "pivot table" and "line item" are used. Here we will try and reconcile the technical terms and the financial reporting terms relating to dimensions as they relate to XBRL.

A common form of dimension in financial reporting is the segmental breakdown. Dimensions are used in both external and internal financial reporting. Some examples of dimensions include:

- A group and the business segments and/or geographic segments of a group,
- A class of sales and the breakdown of that class of sales by product or by region,
- A breakdown of the components of profit and loss by the continuing and discontinuing portions,
- A comparison of the "actual", "budgeted", and the "variance" between the actual and budgeted figures.

There are many other use cases for XBRL Dimensions, but the examples above should provide a grounding in the basic ideas of what is intended to be covered by the XBRL Dimensions specification, and therefore what we will cover here.

2.1. *Brief Explanation of Multidimensional Analysis*

This section endeavors to briefly explain multidimensional analysis. If one does not understand multidimensional analysis concepts, understanding XBRL dimensions is far more difficult and their need and value will be harder to see.

The following is a definition of multidimensional analysis (http://en.wikipedia.org/wiki/Multidimensional_analysis):

In statistics, econometrics, and related fields, multidimensional analysis is a data analysis process that groups data into two basic categories: data dimensions and measurements.

Fundamentally, multidimensional analysis is about "slicing and dicing" data. To do this effectively, the dimensions need to be expressed and the relations between the dimensions need to be expressed.

2.1.1. Simple Use Case

A simple use case will help explain the components of multidimensional analysis. We will explain the fundamentals of XBRL dimensions using a simple use case. Consider the following analysis:

Analysis

Breakdown by product, by region

Product	Region	2003 €000	2002 €000	2001 €000
Pharmaceuticals	Asia	2,864	2,471	2,009
	Europe	5,317	4,732	4,233
	US and Canada	5,568	5,527	4,578
	Other Regions	1,147	1,715	1,690
	Total	14,896	14,445	12,507
Generics	Asia	807	634	503
	Europe	1,816	1,383	1,359
	US and Canada	1,508	1,680	1,378
	Other Regions	489	890	918
	Total	4,420	4,587	4,158
Consumer Health	Asia	1,457	1,263	1,025
	Europe	2,834	2,592	2,462
	US and Canada	2,765	3,074	2,570
	Other Regions	767	1,340	1,365
	Total	7,823	8,270	7,421
Other	Asia	895	1,398	1,315
	Europe	1,790	2,746	2,626
	US and Canada	1,873	3,225	3,038
	Other Regions	540	1,154	1,200
	Total	4,899	8,523	8,379
Grand Total		32,038	35,805	32,465

Breakdown by region, by product

Region	Product	2003 €000	2002 €000	2001 €000
US and Canada	Consumer Health	2,765	3,074	2,570
	Generics	1,508	1,680	1,378
	Pharmaceuticals	5,568	5,527	4,578
	Other	1,873	3,225	3,038
	Total	11,515	13,486	11,562
Europe	Consumer Health	2,834	2,592	2,462
	Generics	1,816	1,383	1,359
	Pharmaceuticals	5,317	4,732	4,233
	Other	1,790	2,746	2,626
	Total	11,557	11,453	10,679
Asia	Consumer Health	1,457	1,263	1,025
	Generics	807	634	503
	Pharmaceuticals	2,864	2,471	2,009
	Other	895	1,398	1,315
	Total	6,023	5,768	4,852
Other Regions	Consumer Health	767	1,340	1,365
	Generics	489	890	918
	Pharmaceuticals	1,147	1,715	1,690
	Other	540	1,154	1,200
	Total	2,943	5,101	5,173
Grand Total		32,038	35,805	32,465

The analysis above shows a breakdown of sales by product, with a further breakdown by region; and another breakdown by region, with a further breakdown by product. Note that the "Grand Total" of both sections of the analysis are the same.

There is only one measure (or **primary item**) in this use case, "Sales". There are several **dimensions**: region, product and period. The period is somewhat of a

special type of dimension, basically everyone uses this dimension. All of the data in the above use case is expressed in Euros. So, this is also somewhat of a dimension, in this case it is static, meaning it never changes. For example, sales could be presented also in US Dollars.

Domain members of the regions dimension are: US and Canada, Europe, Asia, and Other Regions. Members of the products dimension are: consumer health, generics, pharmaceuticals, and other.

2.1.2.Pivot Tables

The analysis above is presented "on paper"; it is static and hard to change. The analysis can be presented in another way, the pivot table, which allows a user to dynamically "pivot" the data across dimensions. Many business people are familiar with the "pivot table". Take a look at the screen shot of a Microsoft Excel pivot table which expresses the data shown above:

Analysis (With Breakdown)					
Entity	Sample Company				
Units	Euros				
Concept	Sales				
Sum of Value		Period			
Product	Region	2001	2002	2003	
Consumer Health	Asia	1,025	1,263	1,457	
	Europe	2,462	2,592	2,834	
	Other Regions	1,365	1,340	767	
	US and Canada	2,570	3,074	2,765	
Consumer Health Total		7,421	8,270	7,823	
Generics	Asia	503	634	807	
	Europe	1,359	1,383	1,616	
	Other Regions	918	890	489	
	US and Canada	1,378	1,660	1,508	
Generics Total		4,158	4,567	4,420	
Other	Asia	1,315	1,398	895	
	Europe	2,826	2,746	1,790	
	Other Regions	1,200	1,154	540	
	US and Canada	3,038	3,225	1,673	
Other Total		8,379	8,523	4,899	
Pharmaceuticals	Asia	2,009	2,471	2,864	
	Europe	4,233	4,732	5,317	
	Other Regions	1,690	1,715	1,147	
	US and Canada	4,576	5,527	5,568	
Pharmaceuticals Total		12,507	14,446	14,896	
Grand Total		32,465	35,805	32,038	

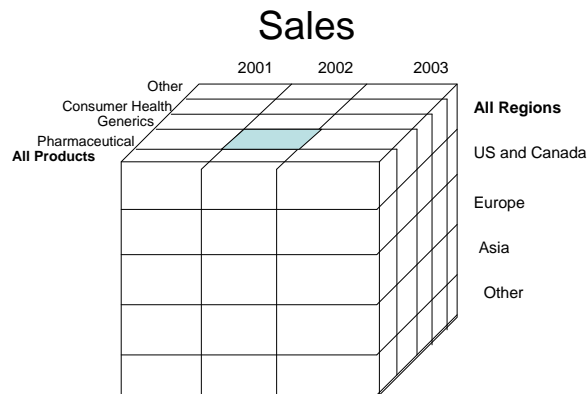
The pivot table looks slightly different than the actual printed analysis due to the auto-formatting of the pivot table. If you note the grand totals, you can see that the data is the same, only presented slightly differently. You have, again, a breakdown of sales by product, then by region for the periods 2001, 2002, and 2003. The nice thing about pivot tables is that you can easily "pivot" the data to show it by region, by product, as is shown below: (All the data is for the entity "Sample Company" and the data is in Euros.)

Analysis (With Breakdown)					
Entity	Sample Company				
Units	Euros				
Concept	Sales				
Sum of Value		Period			
Region	Product	2001	2002	2003	
Asia	Consumer Health	1,025	1,263	1,457	
	Generics	503	634	807	
	Pharmaceuticals	2,009	2,471	2,864	
	Other Segments	1,315	1,398	895	
Asia Total		4,852	5,766	6,023	
Europe	Consumer Health	2,462	2,592	2,834	
	Generics	1,359	1,383	1,616	
	Pharmaceuticals	4,233	4,732	5,317	
	Other Segments	2,826	2,746	1,790	
Europe Total		10,879	11,453	11,557	
Other Regions	Consumer Health	1,365	1,340	767	
	Generics	918	890	489	
	Pharmaceuticals	1,690	1,715	1,147	
	Other Segments	1,200	1,154	540	
Other Regions Total		5,173	5,101	2,943	
US and Canada	Consumer Health	2,570	3,074	2,765	
	Generics	1,378	1,660	1,508	
	Pharmaceuticals	4,576	5,527	5,568	
	Other Segments	3,038	3,225	1,673	
US and Canada Total		11,562	13,486	11,515	
Grand Total		32,465	35,805	32,038	

While it is difficult to get the full experience of a pivot table using static paper as we need to do here, the value is that data can be "pivoted" across different dimensions, presenting the data in different ways to meet different needs. The dimensions we see here are the region and product; but also the period is a dimension, the entity is a dimension and the concept "sales" is also a dimension. Some people view the units to be a dimension, others do not. Here, as everything is shown in one set of units, we don't really consider the units a dimension.

2.1.3. Cubes/Multidimensional Analysis

While data can be presented on paper which is static or using an Excel pivot table which is dynamic; we will now look at a more abstract for of what is going on. Consider the diagram below:



The diagram, called "Sales", is an abstraction which will be used to explain some concepts. The "cube" is a common way of looking at multidimensional information. You may recall from school that there are three axes being shown and are commonly referred to as the "X" axis (along the bottom), the "Y" axis (along the left side), and the "Z" axis (front to back). In the cube above; the X axis is the periods 2001, 2002, and 2003; they Y axis are the regions "All Regions", "US and Canada", "Europe", "Asia", and "Other".

"Europe", etc.; and the Z axis is products such as "All Products", "Pharmaceuticals", "Generics", etc.

A cube simply allows you to visually comprehend the relationship between the data, it is only an abstraction. If you were to introduce more axes, you would need more "dimensions" which would be hard to express in a graphic. As such, sometimes dimensions are "locked" or held constant to make data fit into an understandable cube form. In this case, the entity and units are being held constant.

The large cube can be broken down into smaller cubes. Each smaller cube is an intersection between a period, a region, and a product for the concept "Sales". The shaded (blue) above represents sales for the period 2002, the product pharmaceuticals, for all regions. That "cell" might be expressed by a "fact value" in an XBRL instance document. That fact value would have a context which indicates the entity, period, region, and product.

Below is a screenshot of what the actual data might look like:

Entity	Units	Concept	Product	Region	Period	Value
Sample Company	Euros	Sales	Pharmaceuticals	US and Canada	2003	4,036
Sample Company	Euros	Sales	Pharmaceuticals	Europe	2003	3,532
Sample Company	Euros	Sales	Pharmaceuticals	Asia	2003	2,018
Sample Company	Euros	Sales	Pharmaceuticals	Other Regions	2003	505
Sample Company	Euros	Sales	Generics	US and Canada	2003	487
Sample Company	Euros	Sales	Generics	Europe	2003	426
Sample Company	Euros	Sales	Generics	Asia	2003	243
Sample Company	Euros	Sales	Generics	Other Regions	2003	61
Sample Company	Euros	Sales	Consumer Health	US and Canada	2003	1,335
Sample Company	Euros	Sales	Consumer Health	Europe	2003	1,168
Sample Company	Euros	Sales	Consumer Health	Asia	2003	668
Sample Company	Euros	Sales	Consumer Health	Other Regions	2003	167
Sample Company	Euros	Sales	Other	US and Canada	2003	550
Sample Company	Euros	Sales	Other	Europe	2003	481
Sample Company	Euros	Sales	Other	Asia	2003	275
Sample Company	Euros	Sales	Other	Other Regions	2003	69
Sample Company	Euros	Sales	Pharmaceuticals	US and Canada	2002	3,630
Sample Company	Euros	Sales	Pharmaceuticals	Europe	2002	3,176
Sample Company	Euros	Sales	Pharmaceuticals	Asia	2002	1,815
Sample Company	Euros	Sales	Pharmaceuticals	Other Regions	2002	454
Sample Company	Euros	Sales	Generics	US and Canada	2002	395
Sample Company	Euros	Sales	Generics	Europe	2002	345
Sample Company	Euros	Sales	Generics	Asia	2002	197
Sample Company	Euros	Sales	Generics	Other Regions	2002	49
Sample Company	Euros	Sales	Consumer Health	US and Canada	2002	1,303
Sample Company	Euros	Sales	Consumer Health	Europe	2002	1,140
Sample Company	Euros	Sales	Consumer Health	Asia	2002	651
Sample Company	Euros	Sales	Consumer Health	Other Regions	2002	163
Sample Company	Euros	Sales	Other	US and Canada	2002	1,834
Sample Company	Euros	Sales	Other	Europe	2002	1,604
Sample Company	Euros	Sales	Other	Asia	2002	917
Sample Company	Euros	Sales	Other	Other Regions	2002	229
Sample Company	Euros	Sales	Pharmaceuticals	US and Canada	2001	3,055
Sample Company	Euros	Sales	Pharmaceuticals	Europe	2001	2,673
Sample Company	Euros	Sales	Pharmaceuticals	Asia	2001	1,528
Sample Company	Euros	Sales	Pharmaceuticals	Other Regions	2001	382
Sample Company	Euros	Sales	Generics	US and Canada	2001	365
Sample Company	Euros	Sales	Generics	Europe	2001	319
Sample Company	Euros	Sales	Generics	Asia	2001	182
Sample Company	Euros	Sales	Generics	Other Regions	2001	46
Sample Company	Euros	Sales	Consumer Health	US and Canada	2001	1,150
Sample Company	Euros	Sales	Consumer Health	Europe	2001	1,007
Sample Company	Euros	Sales	Consumer Health	Asia	2001	575
Sample Company	Euros	Sales	Consumer Health	Other Regions	2001	144
Sample Company	Euros	Sales	Other	US and Canada	2001	1,923
Sample Company	Euros	Sales	Other	Europe	2001	1,683
Sample Company	Euros	Sales	Other	Asia	2001	962
Sample Company	Euros	Sales	Other	Other Regions	2001	240

The data above has had all its presentation information removed, this is what the data might look like in a database. Note that no total information exists in the data. Totals are computed "on the fly" by summing the data in various ways. Data in this format is very flexible, allowing it to be "pivoted" in, say, an Excel pivot table; showing products by regions by product; etc.

But to express the information as desired, certain relationships, which you may take for granted if you understand the information must be expressed. Computers do not intuitively understand this information or semantic meaning. But if computers COULD understand these relationships, powerful and useful applications can be built which take advantage of the understanding of this meaning.

2.1.4. Enter XBRL Dimensions

XBRL Dimensions does just that, allows a computer application to understand these sorts of relationships. And not only does XBRL Dimensions express this information; it expresses dimensional information using a global standard which will eventually be transferable across different software applications. Currently there are software products which express this type of information, but they use proprietary methods.

XBRL Dimensions expresses semantic meaning relating to the relationships between information. For example:

- Indicating that "Total All Products" is the total of all products, and the product breakdown includes "Pharmaceuticals", "Generics", "Consumer Health" and "Other".
- Indicating that "Total All Regions" is the total of all regions, and the region breakdown includes "US and Canada", "Europe", "Asia", and "Other".
- This breakdown is appropriately used for "Sales", but it might not be appropriate for "Income Tax Expense" which applies only to the Group as a whole.

So, the above hopefully leaves you with an understanding of some of the basic concepts of dimensions and helps you see some of the basics of what XBRL Dimensions are intended to achieve; fundamentally to express relationships.

2.1.5. XBRL Dimensions Features/Requirements

Above a fairly simple example is shown to help explain the basis of XBRL dimensions. But, there are a few things which should be considered in terms of multidimensional analysis type features/requirements which are the realities of business reporting. Not all users demand all of these features/requirements; but others do.

XBRL Dimensions does not necessarily support all required features or functionality, but the features it does support are very robust. This robust set of features can make XBRL Dimensions daunting to comprehend.

The following provides insight as to some of the features which may be required to effectively express semantic meaning underlying your business data. Still considering the cube diagram shown above:

- What if information is not required (or should not be provided) for one of the "cells" of the cube. There needs to be a way to exclude the possibility of expressing the value for a specific "cell" in the cube. Those "gray boxes" in a table of information need to be provided for.
- What if the list of dimension members were quite large or possibly not known (you know that there is a list, but users may have a different list). There is a need for dimensions to be explicit (such as the explicit lists above for products and regions) or implicitly when the list is quite long or not known.

- Sometimes the dimensions may have unique combinations of relationships. For example, "use a member of this domain OR this domain, but not both" or "any of the following is acceptable".
- Domain members can be related in different ways. Sometimes there are calculation relationships between domain members, other times there are not. The calculations may be positive or negative.
- Hypercubes may be nested.
- Multiple languages, extensibility of dimensions information, assigning references to dimensional information, assigning a presentation structure to dimensional information, etc.

This gives you a general idea of the use cases that XBRL dimensions are trying to provide for.

2.2. Overview of XBRL Dimensions

XBRL Dimensions specification (and again, as a reminder this includes the Aggregator-Contributor Specification) is created by XBRL International. XBRL Dimensions is a module of XBRL 2.1; it provides optional incremental functionality to XBRL 2.1. XBRL Dimensions is a global standard way of expressing multidimensional information which may exist in business information. This specification allows for the communication of this semantic information, using a global standard, so that these relations can be understood by computer applications.

From an XBRL perspective, what dimensions facilitate is the ability to express relationships between XBRL contexts. XBRL 2.1 calculations are limited in that calculations can only be expressed and therefore validated within the same context. Using XBRL Dimensions and the Aggregator-Contributor specification, however, relations can be expressed across contexts. XBRL Dimensional information will also be used by XBRL Formulas (business rules).

2.2.1. Workflow/Process

Dimensional information is expressed using an XBRL taxonomy which has been extended by the XBRL Dimensions schema (xbrldt-2005.xsd) to support features of the XBRL dimensions specification. Within the XBRL taxonomy the schema defines concepts and definition links and calculation links express dimensional relationships.

Presentation links, labels, references and other features can also be used with this other dimensional information, but none of these are changed by the XBRL Dimensions specification.

The goal in expressing relationships is basically to provide continuity between the building blocks used to construct dimensions. Note that each of the building blocks will be explained later. The building blocks of dimensions are:

- Primary items
- Hypercubes
- Dimensions
- Domains

- Domain members

The dimensional information expressed in taxonomies is used within XBRL instance documents which are extended by the dimensional schema for instances (xbrldi-2005.xsd). That schema basically specifies how dimensional information is to be expressed within the scenario or segment element of an XBRL instance document.

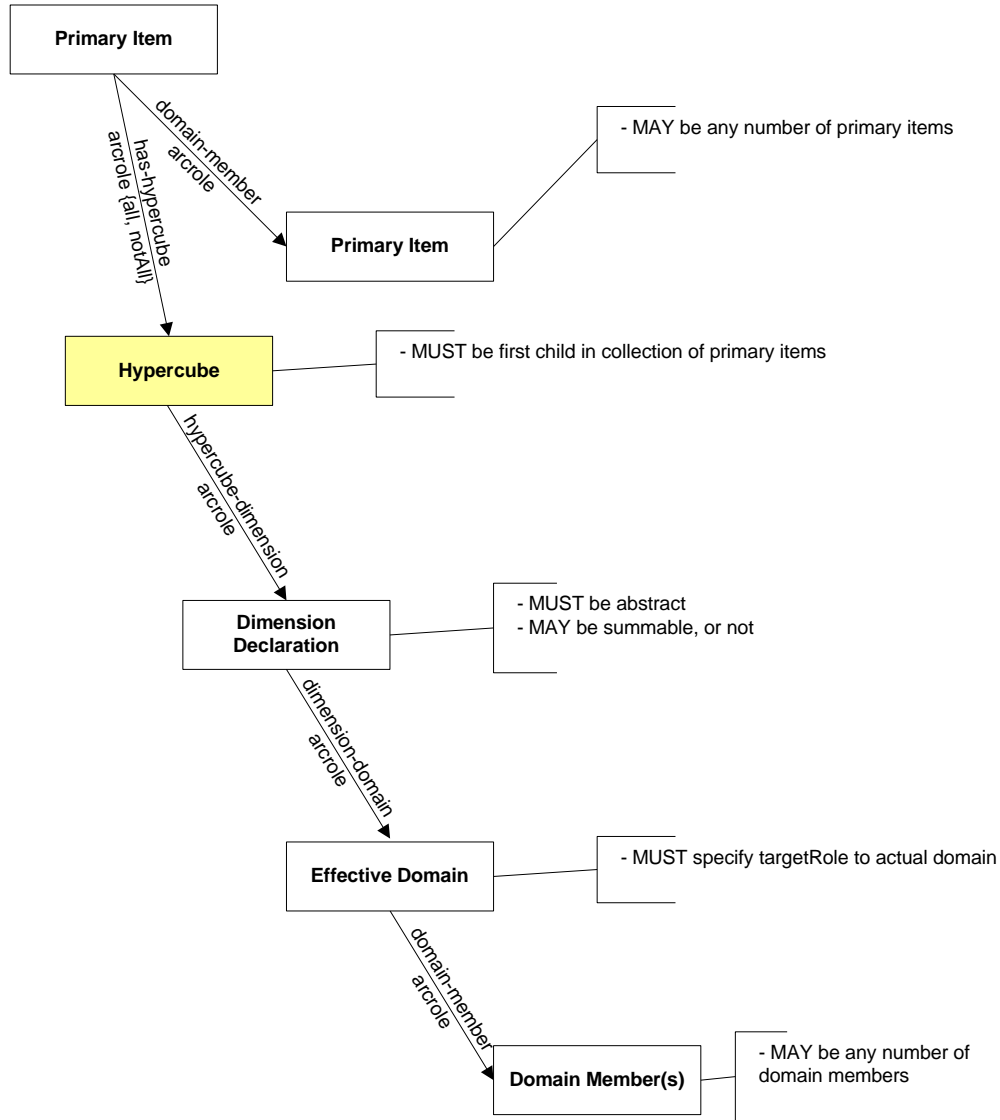
The aggregator-contributor calculation arcrole is specified by the Aggregator-Contributor Specification (xbrlta-2005.xsd). It specifies calculation relations between domain members.

An XBRL processor which supports XBRL Dimensions can then use this additional information provided in taxonomies and instance documents to perform additional processing expressed by the dimensional information. An XBRL processor which does not support dimensions will still be able to read the XBRL taxonomies and instance documents (they will still be XBRL valid), however, as the application does not understand the XBRL Dimensions specification, that application will not know what the information means and will ignore that information. The main point here is that XBRL taxonomies and instance document with dimensional information are still XBRL 2.1 valid, and dimensional information can either be used or ignored.

Again, dimensions or multidimensional analysis is not unique to XBRL or to business reporting, but rather has far broader use. The XBRL Dimensions specification simply is XBRL's way of expressing multidimensional type information in a global standard way. It does not define new concepts relating to multidimensional analysis or change them; it simply expresses them in a standard way.

And don't get hung up on syntax. The most important feature is the expressing of the relationships, the syntax will some day be irrelevant altogether, when good software hides the syntax and lets users achieve what they need to achieve.

The following is a graphical representation of the components of XBRL Dimensions and relationships as they relate to explicit dimensions:



The following sections will explain these terms and the relationships between the terms shown in the graphic above, this graphic is just your first exposure to the big picture of how XBRL Dimensions work. Examples will also be provided which walk you through the use of these components so you can effectively express relationships you wish to express in taxonomies, and use that information correctly within XBRL instance documents.

2.2.2. Dimensions Example 1 – Sales (Not Modular)

With this document a set of sample XBRL files is provided which show how dimensional information looks in its XML form. Below, we provide copies of the XSD file, the definition linkbase, the calculation linkbase, and an instance document to show what the XBRL looks like. For more technical users, it helps make understanding dimensions easier. These files can be reverse engineered to learn how to build this dimension information. We will also point out a few things to note about each of these files. For those not comfortable with angle brackets, simply ignore that information if you so choose.

Further we want to point out that the first sample we will look at is a single taxonomy (XSD) file (Company.xsd). It is not modularized to maximize reuse in any way; it is created as one file to make understanding the information in the files a bit easier. When we actually build and then use dimensional information later, we will modularize the taxonomies as they will likely exist in real life. The single file simply helps see how things fit together.

2.2.2.1. Explanation of Sample

The sample taxonomy and instance document express the dimensional information shown in the diagram below (see file Sales-Pattern.xls or Sales-Pattern.pdf):

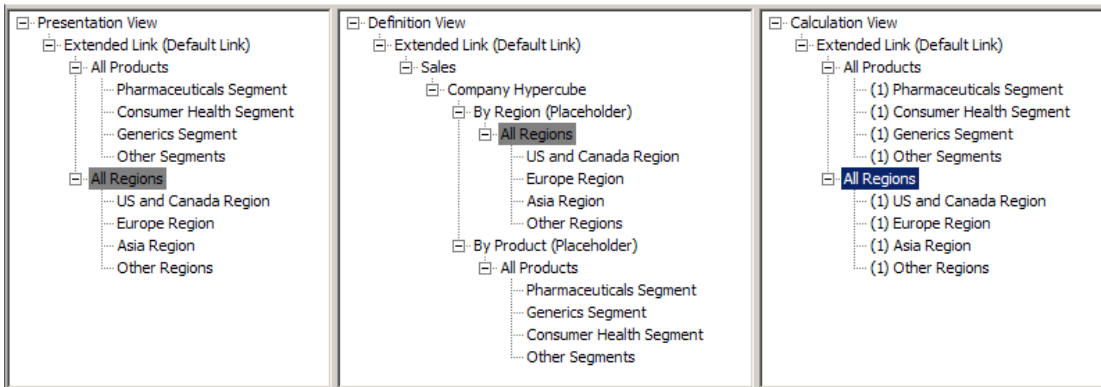
Sales Analysis

	2003 €'000	2002 €'000	2001 €'000
Sales, Total All Segments, All Regions	32,038	35,805	32,465
Breakdown by Segment			
Pharmaceuticals Segment	20,181	18,150	15,275
Generics Segment	2,433	1,973	1,823
Consumer Health Segment	6,675	6,514	5,752
Other Segments	2,749	9,168	9,615
Total	<u>32,038</u>	<u>35,805</u>	<u>32,465</u>
Breakdown by Region			
US and Canada	10,214	12,649	10,137
Europe	11,901	10,374	10,396
Asia	5,639	4,371	3,210
Other Regions	4,284	8,411	8,722
Total	<u>32,038</u>	<u>35,805</u>	<u>32,465</u>

Basically, what is shown is a breakdown of sales by segment and by region for three periods.

2.2.2.2. Sample's Taxonomy File (XSD)

The following is a screen shot of what the taxonomy for the sample might look in an XBRL taxonomy editor. Note the presentation, calculation, and definition relationship views on the top and the list of elements on the bottom of the screenshot.



MASTERING XBRL-BASED DIGITAL FINANCIAL REPORTING – PART 5: TECHNICAL DETAILS – INTERMEDIATE LEVEL XBRL
 TECHNICAL SYNTAX PRIMER – CHARLES HOFFMAN, CPA

Prefix	Label	Name	Data Type	Abstr...	Substitution Group	Balance	Period Type
company	All Products	AllProducts	Monetary	False	xbri:item		Duration
company	All Regions	AllRegions	Monetary	False	xbri:item		Duration
company	Asia Region	AsiaRegion	Monetary	False	xbri:item		Duration
company	By Product (Placeholder)	ByProductPlaceholder	String	True	xbri:dimensionItem		Duration
company	By Region (Placeholder)	ByRegionPlaceholder	String	True	xbri:dimensionItem		Duration
company	Company Hypercube	CompanyHypercube	String	True	xbri:hypercubeItem		Duration
company	Consumer Health Segment	ConsumerHealthSegment	Monetary	False	xbri:item		Duration
company	Europe Region	EuropeRegion	Monetary	False	xbri:item		Duration
company	Generics Segment	GenericsSegment	Monetary	False	xbri:item		Duration
company	Other Regions	OtherRegions	Monetary	False	xbri:item		Duration
company	Other Segments	OtherSegments	Monetary	False	xbri:item		Duration
company	Pharmaceuticals Segment	PharmaceuticalsSegment	Monetary	False	xbri:item		Duration
company	Sales	Sales	Monetary	False	xbri:item		Duration
company	US and Canada Region	USAndCanadaRegion	Monetary	False	xbri:item		Duration

Below is the XSD file for the sample (Company.xsd):

```
<?xml version="1.0" encoding="utf-8"?>
<schema
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xbri="http://www.xbrl.org/2003/instance"
  xmlns:link="http://www.xbrl.org/2003/linkbase"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:company="http://www.SampleCompany.com/Company"
  xmlns:xbri:dt="http://xbrl.org/2005/xbri:dt"
  targetNamespace="http://www.SampleCompany.com/Company"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <annotation>
    <appinfo>
      <link:linkbaseRef xlink:type="simple" xlink:href="Company-label.xml"
xlink:role="http://www.xbrl.org/2003/role/labelLinkbaseRef"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:title="Label Links, all" />
      <link:linkbaseRef xlink:type="simple" xlink:href="Company-definition.xml"
xlink:role="http://www.xbrl.org/2003/role/definitionLinkbaseRef"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:title="Definition Links, all" />
      <link:linkbaseRef xlink:type="simple" xlink:href="Company-presentation.xml"
xlink:role="http://www.xbrl.org/2003/role/presentationLinkbaseRef"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:title="Presentation Links, all" />
      <link:linkbaseRef xlink:type="simple" xlink:href="Company-calculation.xml"
xlink:role="http://www.xbrl.org/2003/role/calculationLinkbaseRef"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase" xlink:title="Calculation Links, all" />
    </appinfo>
  </annotation>
  <import namespace="http://www.xbrl.org/2003/instance" schemaLocation="http://www.xbrl.org/2003/xbri-instance-2003-12-31.xsd" />
  <import namespace="http://xbrl.org/2005/xbri:dt" schemaLocation="../xbri:dt-2005.xsd" />
  <!--Primary Item-->
  <element id="company_Sales" name="Sales" type="xbri:monetaryItemType" substitutionGroup="xbri:item"
xbri:periodType="duration" nillable="true" />
  <!--Explicit Dimensions-->
  <element id="company_ByProductPlaceholder" name="ByProductPlaceholder" type="xbri:stringItemType"
substitutionGroup="xbri:dt:dimensionItem" xbri:periodType="duration" abstract="true" nillable="true" />
  <element id="company_ByRegionPlaceholder" name="ByRegionPlaceholder" type="xbri:stringItemType"
substitutionGroup="xbri:dt:dimensionItem" xbri:periodType="duration" abstract="true" nillable="true" />
  <!--Hypercube-->
  <element id="company_CompanyHypercube" name="CompanyHypercube" type="xbri:stringItemType"
substitutionGroup="xbri:dt:hypercubeItem" xbri:periodType="duration" abstract="true" nillable="true" />
  <!--Products Domain-->
  <element id="company_AllProducts" name="AllProducts" type="xbri:monetaryItemType" substitutionGroup="xbri:item"
xbri:periodType="duration" nillable="true" />
  <element id="company_ConsumerHealthSegment" name="ConsumerHealthSegment" type="xbri:monetaryItemType"
substitutionGroup="xbri:item" xbri:periodType="duration" nillable="true" />
  <element id="company_GenericsSegment" name="GenericsSegment" type="xbri:monetaryItemType"
substitutionGroup="xbri:item" xbri:periodType="duration" nillable="true" />
  <element id="company_PharmaceuticalsSegment" name="PharmaceuticalsSegment" type="xbri:monetaryItemType"
substitutionGroup="xbri:item" xbri:periodType="duration" nillable="true" />
  <element id="company_OtherSegments" name="OtherSegments" type="xbri:monetaryItemType"
substitutionGroup="xbri:item" xbri:periodType="duration" nillable="true" />
  <!--Regions Domain-->
  <element id="company_AllRegions" name="AllRegions" type="xbri:monetaryItemType" substitutionGroup="xbri:item"
xbri:periodType="duration" nillable="true" />
```

```
<element id="company_AsiaRegion" name="AsiaRegion" type="xbrli:monetaryItemType" substitutionGroup="xbrli:item"
xbrli:periodType="duration" nillable="true" />
<element id="company_EuropeRegion" name="EuropeRegion" type="xbrli:monetaryItemType"
substitutionGroup="xbrli:item" xbrli:periodType="duration" nillable="true" />
<element id="company_USAndCanadaRegion" name="USAndCanadaRegion" type="xbrli:monetaryItemType"
substitutionGroup="xbrli:item" xbrli:periodType="duration" nillable="true" />
<element id="company_OtherRegions" name="OtherRegions" type="xbrli:monetaryItemType"
substitutionGroup="xbrli:item" xbrli:periodType="duration" nillable="true" />
</schema>
```

There are two main things to note about the XSD file above. First, note the import of the dimensions taxonomy schema. Second, note the use of the substitution group `xbrldt:DimensionItem` and `xbrldt:HypercubeItem`. These will be explained below. The remainder of the schema file should be familiar to someone who understands XBRL.

2.2.2.3. Sample's Definition Linkbase

Below is the definition linkbase for the sample (Company-definition.xml):

```
<?xml version="1.0" encoding="utf-8"?>
<linkbase xmlns="http://www.xbrl.org/2003/linkbase" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xbrldt="http://xbrl.org/2005/xbrldt"
xmlns:xbrldta="http://xbrl.org/2005/xbrldta" xsi:schemaLocation=" http://www.xbrl.org/2003/linkbase
http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd http://xbrl.org/2005/xbrldt ../xbrldt-2005.xsd
http://xbrl.org/2005/xbrldta ../xbrldta-2005.xsd">
  <arcroleRef xlink:type="simple" xlink:href="../xbrldt-2005.xsd#hypercube-dimension"
arcroleURI="http://xbrl.org/int/dim/arcrole/hypercube-dimension" />
  <arcroleRef xlink:type="simple" xlink:href="../xbrldt-2005.xsd#dimension-domain"
arcroleURI="http://xbrl.org/int/dim/arcrole/dimension-domain" />
  <arcroleRef xlink:type="simple" xlink:href="../xbrldt-2005.xsd#domain-member"
arcroleURI="http://xbrl.org/int/dim/arcrole/domain-member" />
  <arcroleRef xlink:type="simple" xlink:href="../xbrldt-2005.xsd#all"
arcroleURI="http://xbrl.org/int/dim/arcrole/all" />
  <definitionLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <loc xlink:type="locator" xlink:href="Company.xsd#company_Sales" xlink:label="company_Sales" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_CompanyHypercube"
xlink:label="company_CompanyHypercube" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_ByRegionPlaceholder"
xlink:label="company_ByRegionPlaceholder" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AllRegions" xlink:label="company_AllRegions" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_USAndCanadaRegion"
xlink:label="company_USAndCanadaRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_EuropeRegion" xlink:label="company_EuropeRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AsiaRegion" xlink:label="company_AsiaRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_OtherRegions" xlink:label="company_OtherRegions" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_ByProductPlaceholder"
xlink:label="company_ByProductPlaceholder" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AllProducts" xlink:label="company_AllProducts" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_PharmaceuticalsSegment"
xlink:label="company_PharmaceuticalsSegment" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_GenericsSegment" xlink:label="company_GenericsSegment"
/>
    <loc xlink:type="locator" xlink:href="Company.xsd#company_ConsumerHealthSegment"
xlink:label="company_ConsumerHealthSegment" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_OtherSegments" xlink:label="company_OtherSegments" />
  </definitionLink>
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/all" xlink:from="company_Sales"
xlink:to="company_CompanyHypercube" order="1" use="optional" xbrldt:targetRole="http://www.xbrl.org/2003/role/link"
xbrldt:contextElement="scenario" xbrldta:summable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/hypercube-dimension"
xlink:from="company_CompanyHypercube" xlink:to="company_ByRegionPlaceholder" order="1" use="optional"
xbrldta:summable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/dimension-domain"
xlink:from="company_ByRegionPlaceholder" xlink:to="company_AllRegions" order="1" use="optional"
xbrldt:targetRole="http://www.xbrl.org/2003/role/link" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllRegions" xlink:to="company_USAndCanadaRegion" order="1" use="optional" xbrldt:usable="true"
/>
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllRegions" xlink:to="company_EuropeRegion" order="2" use="optional" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllRegions" xlink:to="company_AsiaRegion" order="3" use="optional" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllRegions" xlink:to="company_OtherRegions" order="4" use="optional" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/hypercube-dimension">
```

```

xlink:from="company_CompanyHypercube" xlink:to="company_ByProductPlaceholder" order="2" use="optional"
xbrldta:summable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/dimension-domain"
xlink:from="company_ByProductPlaceholder" xlink:to="company_AllProducts" order="1" use="optional"
xbrldt:targetRole="http://www.xbrl.org/2003/role/link" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllProducts" xlink:to="company_PharmaceuticalsSegment" order="1" use="optional"
xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllProducts" xlink:to="company_GenericsSegment" order="2" use="optional" xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllProducts" xlink:to="company_ConsumerHealthSegment" order="3" use="optional"
xbrldt:usable="true" />
  <definitionArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/domain-member"
xlink:from="company_AllProducts" xlink:to="company_OtherSegments" order="4" use="optional" xbrldt:usable="true" />
</definitionLink>
</linkbase>
    
```

The thing to note relating to the definition linkbase is the definition and use of several new arcroles and attributes defined by the XBRL Dimensions taxonomy which are used on those arcs.

2.2.2.4. Sample's Calculation Linkbase

Below is the calculation linkbase for the sample (Company-calculation.xml):

```

<?xml version="1.0" encoding="utf-8"?>
<linkbase
  xmlns="http://www.xbrl.org/2003/linkbase"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xsi:schemaLocation=" http://www.xbrl.org/2003/linkbase http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd">
  <arcroleRef xlink:type="simple" xlink:href="http://www.xbrl.org/2003/xbrl-linkbase-2003-12-31.xsd#aggregator-contributor"
  arcroleURI="http://xbrl.org/int/dim/arcrole/aggregator-contributor" />
  <calculationLink xlink:type="extended" xlink:role="http://www.xbrl.org/2003/role/link">
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AllProducts" xlink:label="company_AllProducts" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_PharmaceuticalsSegment"
  xlink:label="company_PharmaceuticalsSegment" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_ConsumerHealthSegment"
  xlink:label="company_ConsumerHealthSegment" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_GenericsSegment" xlink:label="company_GenericsSegment"
  />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_OtherSegments" xlink:label="company_OtherSegments" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AllRegions" xlink:label="company_AllRegions" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_USAndCanadaRegion"
  xlink:label="company_USAndCanadaRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_EuropeRegion" xlink:label="company_EuropeRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_AsiaRegion" xlink:label="company_AsiaRegion" />
    <loc xlink:type="locator" xlink:href="Company.xsd#company_OtherRegions" xlink:label="company_OtherRegions" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllProducts" xlink:to="company_PharmaceuticalsSegment" order="1" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllProducts" xlink:to="company_ConsumerHealthSegment" order="2" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllProducts" xlink:to="company_GenericsSegment" order="3" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllProducts" xlink:to="company_OtherSegments" order="4" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllRegions" xlink:to="company_USAndCanadaRegion" order="1" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllRegions" xlink:to="company_EuropeRegion" order="2" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllRegions" xlink:to="company_AsiaRegion" order="3" weight="1" use="optional" />
    <calculationArc xlink:type="arc" xlink:arcrole="http://xbrl.org/int/dim/arcrole/aggregator-contributor"
  xlink:from="company_AllRegions" xlink:to="company_OtherRegions" order="4" weight="1" use="optional" />
  </calculationLink>
</linkbase>
    
```

Note that the calculation linkbase uses "aggregator-contributor" arcroles rather than "summation-item" arcroles on calculation arcs.

2.2.2.5. Sample's Presentation and Labels Linkbases

These files are the same as any other XBRL presentation and label linkbase, therefore they are not shown.

2.2.2.6. Sample's Instance document

Below is the instance document for the sample (Sample-Instance.xml):

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Created by Charles Hoffman, CPA, UBmatrix: 2005-09-19 -->
<xbrl xmlns="http://www.xbrl.org/2003/instance"
  xmlns:xbrli="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:xbrldi="http://xbrl.org/2005/xbrldi"
  xmlns:company="http://www.SampleCompany.com/Company"
  xmlns:iso4217="http://www.xbrl.org/2003/iso4217"
  xsi:schemaLocation="http://xbrl.org/2005/xbrldi xbrldi-2005.xsd">

  <link:schemaRef xlink:type="simple" xlink:href="Company.xsd" />

  <!--All-->
  <context id="D-2003-All">
    <entity>
      <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
      <startDate>2003-01-01</startDate>
      <endDate>2003-12-31</endDate>
    </period>
    <scenario>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
  </context>
  <context id="D-2002-All">
    <entity>
      <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
      <startDate>2002-01-01</startDate>
      <endDate>2002-12-31</endDate>
    </period>
    <scenario>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
  </context>
  <context id="D-2001-All">
    <entity>
      <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
      <startDate>2001-01-01</startDate>
      <endDate>2001-12-31</endDate>
    </period>
    <scenario>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
      <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
  </context>

  <!--Pharmaceuticals-->
  <context id="D-2003-Pharm">
    <entity>
      <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
      <startDate>2003-01-01</startDate>
```

```

        <endDate>2003-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:PharmaceuticalsSegment</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2002-Pharm">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2002-01-01</startDate>
        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:PharmaceuticalsSegment</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-Pharm">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:PharmaceuticalsSegment</xbrldi:explicitMember>
    </scenario>
</context>

<!--Generics-->
<context id="D-2003-Gen">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2003-01-01</startDate>
        <endDate>2003-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:GenericsSegment</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2002-Gen">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2002-01-01</startDate>
        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:GenericsSegment</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-Gen">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:GenericsSegment</xbrldi:explicitMember>
    </scenario>
</context>

```

```

</period>
<scenario>
  <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
  <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:GenericsSegment</xbrldi:explicitMember>
</scenario>
</context>

<!--Consumer Health-->
<context id="D-2003-ConHealth">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2003-01-01</startDate>
    <endDate>2003-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:ConsumerHealthSegment</xbrldi:explicitMember>
  </scenario>
</context>
<context id="D-2002-ConHealth">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2002-01-01</startDate>
    <endDate>2002-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:ConsumerHealthSegment</xbrldi:explicitMember>
  </scenario>
</context>
<context id="D-2001-ConHealth">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2001-01-01</startDate>
    <endDate>2001-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:ConsumerHealthSegment</xbrldi:explicitMember>
  </scenario>
</context>

<!--Other Segments-->
<context id="D-2003-OtherSeg">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2003-01-01</startDate>
    <endDate>2003-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:OtherSegments</xbrldi:explicitMember>
  </scenario>
</context>
<context id="D-2002-OtherSeg">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2002-01-01</startDate>

```

```

        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:OtherSegments</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-OtherSeg">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AllRegions</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:OtherSegments</xbrldi:explicitMember>
    </scenario>
</context>

<!--US And Canada-->
<context id="D-2003-US">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2003-01-01</startDate>
        <endDate>2003-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:USAndCanadaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2002-US">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2002-01-01</startDate>
        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:USAndCanadaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-US">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:USAndCanadaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>

<!--Europe-->
<context id="D-2003-Europe">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2003-01-01</startDate>
    </period>

```

```

        <endDate>2003-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:EuropeRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2002-Europe">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2002-01-01</startDate>
        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:EuropeRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-Europe">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:EuropeRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>

<!--Asia-->
<context id="D-2003-Asia">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2003-01-01</startDate>
        <endDate>2003-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AsiaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2002-Asia">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2002-01-01</startDate>
        <endDate>2002-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AsiaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>
<context id="D-2001-Asia">
    <entity>
        <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
    </entity>
    <period>
        <startDate>2001-01-01</startDate>
        <endDate>2001-12-31</endDate>
    </period>
    <scenario>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AsiaRegion</xbrldi:explicitMember>
        <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
    </scenario>
</context>

```



```

</period>
<scenario>
  <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:AsiaRegion</xbrldi:explicitMember>
  <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
</scenario>
</context>

<!--Other Regions-->
<context id="D-2003-OtherRegions">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2003-01-01</startDate>
    <endDate>2003-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:OtherRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
  </scenario>
</context>
<context id="D-2002-OtherRegions">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2002-01-01</startDate>
    <endDate>2002-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:OtherRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
  </scenario>
</context>
<context id="D-2001-OtherRegions">
  <entity>
    <identifier scheme="http://www.SampleCompany.com">SAMP</identifier>
  </entity>
  <period>
    <startDate>2001-01-01</startDate>
    <endDate>2001-12-31</endDate>
  </period>
  <scenario>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByRegionPlaceholder">company:OtherRegions</xbrldi:explicitMember>
    <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#company_ByProductPlaceholder">company:AllProducts</xbrldi:explicitMember>
  </scenario>
</context>

<unit id="U-Monetary">
  <measure>iso4217:EUR</measure>
</unit>

<!--Total-->
<company:Sales contextRef="D-2003-All" unitRef="U-Monetary" decimals="INF">32038000</company:Sales>
<company:Sales contextRef="D-2002-All" unitRef="U-Monetary" decimals="INF">35805000</company:Sales>
<company:Sales contextRef="D-2001-All" unitRef="U-Monetary" decimals="INF">32465000</company:Sales>

<!--By Segment-->
<company:Sales contextRef="D-2003-Pharm" unitRef="U-Monetary" decimals="INF">20181000</company:Sales>
<company:Sales contextRef="D-2002-Pharm" unitRef="U-Monetary" decimals="INF">18150000</company:Sales>
<company:Sales contextRef="D-2001-Pharm" unitRef="U-Monetary" decimals="INF">15275000</company:Sales>

<company:Sales contextRef="D-2003-Gen" unitRef="U-Monetary" decimals="INF">2433000</company:Sales>
<company:Sales contextRef="D-2002-Gen" unitRef="U-Monetary" decimals="INF">1973000</company:Sales>
<company:Sales contextRef="D-2001-Gen" unitRef="U-Monetary" decimals="INF">1823000</company:Sales>

<company:Sales contextRef="D-2003-ConHealth" unitRef="U-Monetary" decimals="INF">6675000</company:Sales>
<company:Sales contextRef="D-2002-ConHealth" unitRef="U-Monetary" decimals="INF">6514000</company:Sales>
    
```

```

<company:Sales contextRef="D-2001-ConHealth" unitRef="U-Monetary" decimals="INF">5752000</company:Sales>

<company:Sales contextRef="D-2003-OtherSeg" unitRef="U-Monetary" decimals="INF">2749000</company:Sales>
<company:Sales contextRef="D-2002-OtherSeg" unitRef="U-Monetary" decimals="INF">9168000</company:Sales>
<company:Sales contextRef="D-2001-OtherSeg" unitRef="U-Monetary" decimals="INF">9615000</company:Sales>

<!--By Region-->
<company:Sales contextRef="D-2003-US" unitRef="U-Monetary" decimals="INF">10214000</company:Sales>
<company:Sales contextRef="D-2002-US" unitRef="U-Monetary" decimals="INF">12649000</company:Sales>
<company:Sales contextRef="D-2001-US" unitRef="U-Monetary" decimals="INF">10137000</company:Sales>

<company:Sales contextRef="D-2003-Europe" unitRef="U-Monetary" decimals="INF">11901000</company:Sales>
<company:Sales contextRef="D-2002-Europe" unitRef="U-Monetary" decimals="INF">10374000</company:Sales>
<company:Sales contextRef="D-2001-Europe" unitRef="U-Monetary" decimals="INF">10396000</company:Sales>

<company:Sales contextRef="D-2003-Asia" unitRef="U-Monetary" decimals="INF">5639000</company:Sales>
<company:Sales contextRef="D-2002-Asia" unitRef="U-Monetary" decimals="INF">4371000</company:Sales>
<company:Sales contextRef="D-2001-Asia" unitRef="U-Monetary" decimals="INF">3210000</company:Sales>

<company:Sales contextRef="D-2003-OtherRegions" unitRef="U-Monetary" decimals="INF">4284000</company:Sales>
<company:Sales contextRef="D-2002-OtherRegions" unitRef="U-Monetary" decimals="INF">8411000</company:Sales>
<company:Sales contextRef="D-2001-OtherRegions" unitRef="U-Monetary" decimals="INF">8722000</company:Sales>

</xbrl>
    
```

The primary thing you will notice about the instance document is the large number of contexts, basically one for each "cell" of data. Also, within the scenario element you will note the dimension information relating to each context.

2.2.3.XBRL Dimensions Terminology

Again, dimensions are not unique to XBRL. What XBRL Dimensions do is express something which is common in business reporting using XBRL in a global standard way. The syntax used to do this may be new, but what is being expressed is common to multidimensional analysis.

The following is a summary of terminology which is important to understand in order to grasp XBRL Dimensions functionality. If you are familiar with multidimensional analysis, then you likely already understand many or most of these terms already. If you use Microsoft Excel pivot tables, then you probably understand these concepts, although you may not explicitly use these specific terms.

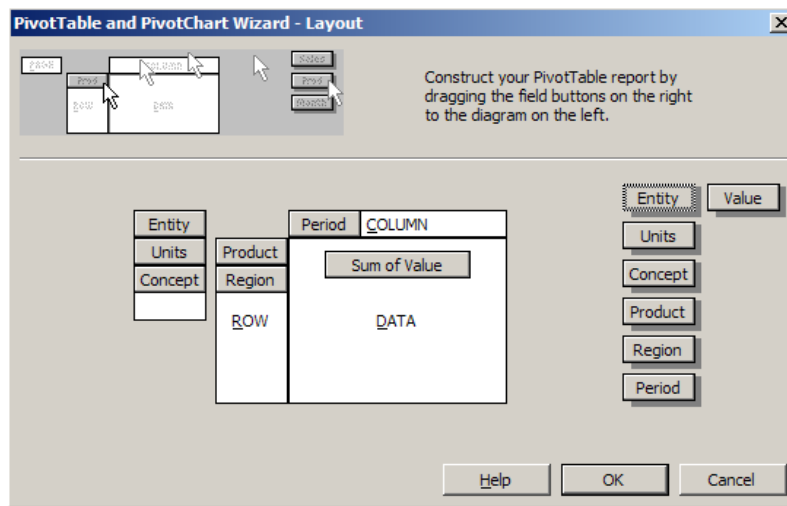
We will define terms so they are meaningful to those understanding multidimensional analysis, those who understand pivot tables, and those who are trying to understand XBRL Dimensions.

First, the following are the terms which are used to define the building blocks of dimensional relations:

Term	Explanation
Primary item	A primary item are the concepts defined in an XBRL taxonomy which are part of the xbrli:item substitution group. Tuples are not allowed in dimensions. Some examples of primary items might be concepts such as "Sales", "Assets", and "Cash Flows from Operations".
Hypercube	A hypercube is a collection of one or more possible dimensions. For example the hypercube "Geographical Breakdown" would have the "Region" dimension. Note that hypercubes are XBRL elements with the substitution group value of "xbrldt:hypercubeItem".

Term	Explanation
Dimension	A dimension is each different way which a primary item may be characterized. For example the primary item "Sales" can be characterized by the dimensions "Region", "Product", etc. A dimension must have at least one domain. Note that dimensions are XBRL elements with the substitution group value of "xbrldt:dimensionItem".
Domain	A domain is the set of all domain members which are used to express a dimension. For example, the "Regions" domain is "Total for All Regions", "Europe", "USA", "Asia", "Africa", "Australia" would be a domain.
Domain member	A domain member is one of the members of the domain. For example, for the "Regions" domain, "Europe" would be member of the domain.

Now we will explain these terms which might be used in a pivot table. A hypercube is like the pivot table. The dimensions/domains are the things which are pivoted, and the primary items are the data which is being reported in the pivot table. The following is this information as it would appear within an Excel pivot table wizard:



These are other important terms which are important to understand in order to understand how dimensions work:

Term	Explanation
Aggregator	The aggregator is the domain member which represents the result of adding all the other domain members. For example, "Total for All Regions" is the aggregator of the "Regions" dimension. It is used to express the sum of the domain members "Europe", "USA", "Asia", "Africa", "Australia".
Explicit Dimension	Dimensions where the domain explicitly defines each possible member. For example, the "Regions" dimension above is an explicit dimension as its members; "Europe", "USA", "Asia", "Africa", "Australia"; are explicitly defined.

Term	Explanation
Implicit Dimensions	Dimensions where, for example, the number of members is impractically large to explicitly define. For example, the dimension "Longitude and Latitude" would be a good use for implicit dimensions as the domain longitude is an infinite number of numbers between 180 and -180.
all/notAll Composers	These composers are used to constrain XBRL contexts so that only appropriate dimension information can be within a context which is used on a specific concept. all – All of the dimensions must be present. notAll – Negated version of "All" (These composers work similar to XML Schema composers.)

Note that dimensional information is always expressed within the <scenario> or <segment> element of an XBRL context. The default, and when in doubt as to which to use, is the <scenario> element of a context.

2.2.4. Building Blocks

Expressing dimensional information in taxonomies is somewhat like using building blocks, like the familiar "Lego's" to build what you desire to express. This section describes these building blocks and what they allow users to express in taxonomies.

Keep in the back of your mind that at times modularity to allow reuse of dimensional components is important. However, we are not necessarily going to build the first basic samples of using dimensions considering modularity as they make understanding dimensions more difficult.

All the dimensional information in this first example will be constructed in one XBRL extended link. We will use multiple taxonomies to express this information. Again, modularity issues are an advanced topic and will not be addressed by us here.

So, in order to express your dimensional information, the steps which would get you there, expressed in a logical way would be:

1. Create primary item(s) (tuples are not allowed to be used in dimensions).
2. Create hypercube which will be used to organize and express the dimensions you wish to express.
 - a. Create role of all/notAll relation between hypercube and primary item
 - b. Specify the ContextElement (<segment> or <scenario>) which will hold the dimensional information in the instance document.
 - c. Indicate whether the hypercube is summable
 - d. Indicate whether the hypercube is closed (can be extended, optional).
3. Create the dimensions of the hypercube
 - a. Create arcrole (which may only be hypercube-dimension)
 - b. Set value of summable attribute to indicate if calculations can be used in the hypercube
4. Create each domain.

- a. Create arcrole (which may only be dimension-domain)
- 5. Create concepts which will make up the domain members
 - a. Create arcrole (which may only be domain-member)
 - b. Express the calculation relationships for domain members

Note that creating the dimension information does not necessarily need to be performed in the order indicated above, however all the components must be expressed to correctly express the dimension relationships. If the dimensional information crosses extended links, the targetRole is used to "point" to the appropriate extended link.

Building blocks of dimensions are expressed in the form or relations in an XBRL definition linkbase. The relations (arcs) have different purposes (arcroles). The different arcroles have different attributes. These building blocks are summarized in the following table. These building blocks are shown by arcrole with the attributes of the arcrole shown below each arcrole:

Building block	Building Block Type	Explanation
Has-Hypercube arcrole	arcrole	Takes forms: all, notAll
<i>targetRole</i>	Attribute	Points to the extended link role which holds the dimension information
<i>summable</i>	Attribute	Is the hypercube summable?
<i>contextElement</i>	Attribute	Explains which instance element will hold the dimensions, <segment> or <scenario>.
<i>Closed</i>	Attribute	Indicates whether the dimension is closed.
Dimension-Hypercube arcrole	arcrole	Connects a dimension to a hypercube. Requires you to specify if a hypercube is summable
<i>targetRole</i>	Attribute	Points to the extended link role which holds the dimension information
<i>summable</i>	Attribute	Is the hypercube summable?
<i>Closed</i>	Attribute	Indicates whether the dimension is closed.
Dimension-Domain arcrole	arcrole	Connects a domain to a dimension
<i>targetRole</i>	Attribute	Points to the extended link role which holds the dimension information
<i>summable</i>	Attribute	Is the hypercube summable?
Domain-Member arcrole	arcrole	Connects a domain member to a domain.
<i>Usable</i>	Attribute	Indicates if the domain member may be used in an instance document.
<i>targetRole</i>	Attribute	Points to the extended link role

which holds the dimension
information

Note that the order, prohibited, required, and priority attributes are not explained. These XBRL attributes work the same way as prescribed by the XBRL specification.

2.3. Dimensions Example 2 – Sales (Modular)

In the first example, we explained dimensions to you, we did not build anything. In this second example, we will actually build the same thing we walked through in the first example. The only difference is that now we will take a modular approach to creating the taxonomies. We will walk through creating all aspects of a taxonomy which expresses one primary concept and dimensions and an instance document which uses those dimensions. We will focus on dimensions by reporting only one concept, "Sales", but in multiple dimensions. From an accountant's perspective, this can be seen as reporting financial highlights for only one line item, Sales, with breakdowns of the information by segment and by product.

This example does not use many of the advanced use cases of dimensions in order to focus on covering the use case which will be used by the vast majority of those using dimensions. More advanced features are discussed later in this document. A full explanation of, and an explanation of how to use, all dimensions features is beyond the scope of this document.

Whereas the case explained above shows all dimensional information expressed in one XSD file, this case will show the creation of modular taxonomies. This will help you get a feel for how this will most likely work in the real world.

2.3.1. Explanation of the Use Case

The following is an explanation of the use case. Note that this use case is similar to, but not the same as data used when first explaining dimensions. These differences exist for two reasons. First, it reduces the amount of data required for the example. Second and more importantly, for financial reporting, it is not the case that a breakdown by product segment also requires a further breakdown by region; or that the region breakdown requires a further breakdown by product segment.

In this case study, a company "Sample Company" reports financial highlights for "Sales" for three periods, breaking sales down by business segments (or products) "Pharmaceuticals", "Generics", "Consumer Health" and "Other" segments. It also breaks sales down by regions including "US and Canada", "Europe", "Asia" and "Other".

This type of breakdown is very common in IFRS, breaking down segmental information by business and/or by geographic segment.

Sales Analysis

	2003	2002	2001
	€'000	€'000	€'000
Sales, Total All Segments, All Regions	32,038	35,805	32,465
Breakdown by Segment			
Pharmaceuticals Segment	20,181	18,150	15,275
Generics Segment	2,433	1,973	1,823
Consumer Health Segment	6,675	6,514	5,752
Other Segments	2,749	9,168	9,615
Total	<u>32,038</u>	<u>35,805</u>	<u>32,465</u>
Breakdown by Region			
US and Canada	10,214	12,649	10,137
Europe	11,901	10,374	10,396
Asia	5,639	4,371	3,210
Other Regions	4,284	8,411	8,722
Total	<u>32,038</u>	<u>35,805</u>	<u>32,465</u>

Next, we will create the taxonomies and instance document. But first, we will discuss the data used in this exercise.

2.3.2.Data Used

The following is a summary of the data to be used for this exercise:

Label/Name	2003	2002	2001
Sales	32038000	35805000	32465000
Breakdown by Segment			
Pharmaceuticals Segment	20181000	18150000	15275000
Generics Segment	2433000	1973000	1823000
Consumer Health Segment	6675000	6514000	5752000
Other Segments	2749000	9168000	9615000
Total	<u>32038000</u>	<u>35805000</u>	<u>32465000</u>
Breakdown by Region			
US and Canada	10214000	12649000	10137000
Europe	11901000	10374000	10396000
Asia	5639000	4371000	3210000
Other Regions	4284000	8411000	8722000
Total	<u>32038000</u>	<u>35805000</u>	<u>32465000</u>

Note that all values are presented in thousands of Euros but actual values are entered into the instance document.

2.3.3. Steps to Express Relationships in Taxonomies

The following are the steps to build the taxonomies which will be used to express the dimensional relationships. We will build a simple primary concept taxonomy which contains only one concept. We will then build two dimensions taxonomies (product and region) to express the dimensions. We will then hook all this together in a company taxonomy and build the hypercube and other dimensional infrastructure to express the relations we desire to express.

2.3.3.1. Primary Taxonomy

The first thing you need to either have or create is the primary taxonomy which contains the concepts for which data is expressed. Examples of primary taxonomies would be the IFRS-GP taxonomy or the US GAAP taxonomies.

In this case, our primary taxonomy will be very simple and will contain only one concept, "Sales". This is a very simple example, but it will serve our needs. To do this:

1. Create a new taxonomy.

Name	Value
NamespacePrefix:	ci
NamespaceIdentifier:	http://www.UBmatrix.com/Patterns/Sales
Filename:	Sales.xsd

2. Add the concept "Sales" which is a monetary data type, a credit, and has a period type of duration.

Element Label	Element Name (Auto Created)	Data Type	Balance Type	Period Type
Sales	Sales	Monetary	Credit	Duration

3. Save the taxonomy. The taxonomy has no presentation, calculation, or definitions relationships as there is only one concept, therefore no possibility of a relationship.

So now you have a primary taxonomy containing one concept, "Sales". This concept is an item which will be used in instance documents to report the value for sales.

2.3.3.2. Dimensions Taxonomies

The next step is to express the domains which will be used in our dimensions taxonomy. Our first domain is the products segments. The second domain is regions. We will create these as separate taxonomies. We will first create the product segments taxonomy. To do this:

1. Create a new taxonomy using the following information:

Name	Value
NamespacePrefix:	products
NamespaceIdentifier:	http://www.SampleCompany.com/Products
Filename:	Products.xsd

We need to import the XBRL Dimensions schema to enable dimensions in this taxonomy.

2. Add the following concepts to the taxonomy:

Element Label	Element Name (Auto Created)	Data Type	Balance Type	Period Type
All Products	AllProducts	Monetary		Duration
Pharmaceuticals Segment	PharmaceuticalsSegment	Monetary		Duration
Generics Segment	GenericsSegment	Monetary		Duration
Consumer Health Segment	ConsumerHealthSegment	Monetary		Duration
Other Segments	OtherSegments	Monetary		Duration

Note that domains are expressed using a normal XBRL taxonomy. Some of the information in the taxonomy is not used, such as the period type. The period type is required, therefore it must be set to something. Setting the period type to duration does NOT limit the use of the domain on only concepts with duration type. Some of the information for normal taxonomies is irrelevant for dimensional taxonomies. But because dimensions taxonomies uses normal XBRL taxonomies, this is the way it has to be. Down the road, it is likely a "dimensionType" is created in XBRL to differentiate XBRL items from XBRL concepts used only for dimensions.

The next task is to express the domain member relationships in the taxonomy using the definition linkbase.

Element Label	Definition arcrole
All Products	(none, this is a root concept)
Pharmaceuticals Segment	domain-member
Generics Segment	domain-member
Consumer Health Segment	domain-member
Other Segments	domain-member

And finally, we will express the calculation information for the domain. This is done using the calculation linkbase but with a special calculation arcrole, "Aggregator-Contributor" which is defined by the XBRL Dimensions specification, to express the calculation relationships.

Element Label	Calculation Relationship	Weight
All Products	(none, this is a root concept)	
Pharmaceuticals Segment	aggregator-contributor	1
Generics Segment	aggregator-contributor	1
Consumer Health Segment	aggregator-contributor	1
Other Segments	aggregator-contributor	1

Basically, those are the steps to creating the product segment domain. That domain has members such as the "Pharmaceuticals Segment", etc. Each of these members is expressed in the form of a definition relationship with a "domain-member" arcrole on the definition relation.

When you are done building the presentation, calculation, and definition linkbases, your taxonomy will look like this:

Prefix	Label /	Name	Data Type	Abstr...	Substitutio...	Balance	Period Type
products	All Products	AllProducts	Monetary	False	xbri:item		Duration
products	Consumer Health Segment	ConsumerHealthSegment	Monetary	False	xbri:item		Duration
products	Generics Segment	GenericsSegment	Monetary	False	xbri:item		Duration
products	Other Segments	OtherSegments	Monetary	False	xbri:item		Duration
products	Pharmaceuticals Segment	PharmaceuticalsSegment	Monetary	False	xbri:item		Duration

Save your taxonomy.

Next, we will repeat this process for the regions domain. Below we will provide all the information you need to build this taxonomy to express these dimensional relationships but we will not walk through the process, it is the same as the first.

Taxonomy information:

Name	Value
NamespacePrefix:	regions
NamespaceIdentifier:	http://www.SampleCompany.com/regions
Filename:	Regions.xsd

We need to import the XBRL Dimensions schema to enable dimensions in this taxonomy.

Concepts to add:

Element Label	Element Name (Auto Created)	Data Type	Balance Type	Period Type
All Regions	AllRegions	Monetary		Duration
US and Canada Region	USAndCanadaRegion	Monetary		Duration
Europe Region	EuropeRegion	Monetary		Duration
Asia Region	AsiaRegion	Monetary		Duration
Other Regions	OtherRegions	Monetary		Duration

Calculation linkbase information:

Element Label	Calculation arcrole	Weight
All Regions	(none, this is a root concept)	
US and Canada Region	aggregator-contributor	1
Europe Region	aggregator-contributor	1
Asia Region	aggregator-contributor	1
Other Regions	aggregator-contributor	1

Definition linkbase information:

Element Label	Definition arcrole
All Regions	(none, this is a root concept)
US and Canada Region	domain-member
Europe Region	domain-member
Asia Region	domain-member

Element Label	Definition arcrole
Other Regions	domain-member

After entering the concepts and creating the presentation, calculation, and definition relationships, your regions taxonomy looks like this:

Prefix	Label /	Name	Data Type	Abstr...	Substitutio...	Balance	Period Type
regions	All Regions	AllRegions	Monetary	False	xbri:item		Duration
regions	Asia Region	AsiaRegion	Monetary	False	xbri:item		Duration
regions	Europe Region	EuropeRegion	Monetary	False	xbri:item		Duration
regions	Other Regions	OtherRegions	Monetary	False	xbri:item		Duration
regions	US and Canada Region	USAndCanadaRegion	Monetary	False	xbri:item		Duration

So, you can see that the regions domain looks very similar to the products domain. Each domain has an aggregator ("All Products" and "All Regions") and domain members. No new extended links were created for these two taxonomies. As you can see, so far there is not much of a difference between creating dimensions taxonomy and a regular XBRL primary taxonomy.

2.3.3.3. Company Taxonomy

Next, we will bring all of the primary taxonomy and domain taxonomies together and build the infrastructure to express our multi-dimensional relationships which will be used to validate information contained in our instance document. After all, being able to validate the information contained in an instance document is the reason for going through the trouble to express this information in the first place.

To begin, we create another taxonomy which will import the other taxonomies we created so we can work with them as a set. Then, in that new taxonomy, we will create the dimensional information. This company taxonomy we will create can be considered equivalent to an extension taxonomy a company might create.

So, the first step is to create a new taxonomy using the following information:

Name	Value
NamespacePrefix:	company
NamespaceIdentifier:	http://www.SampleCompany.com/Company
Filename:	Company.xsd

Next, we will link the previously created taxonomies to the company's taxonomy. All of the following should be connected to the company taxonomy using XML Schema import elements in the taxonomy you just created:

- The taxonomy which contains the primary items (or in this case a single XBRL item concept), "Sales.xsd".
- The taxonomy which expresses the products domain information, "Products.xsd"

- The taxonomy which expresses the regions domain information, "Regions.xsd"
- And finally, the XBRL Dimensions schema itself to enable dimensions from within this taxonomy.

Now, we need to add a few XBRL concepts which we will use in expressing the dimensional relations. Add these concepts to the "Company.xsd" taxonomy:

Element Label	Element Name (Auto Created)	Data Type	Substitution Group	Abstract	Balance Type	Period Type
Company Hypercube	CompanyHypercube	String	xbrldt:hypercubeltem	True		Duration
By Product (Placeholder)	ByProductPlaceholder	String	xbrldt:dimensiontem	True		Duration
By Region (Placeholder)	ByRegionPlaceholder	String	xbrldt:dimensiontem	True		Duration

Note that each of the three concepts defined above are abstract. These concepts would never actually appear in an instance document, but rather are used to organize dimensional information.

Next, we need to create two XBRL extended links which we will use to hold relations we are going to express. Add the following two extended links to your "Company.xsd" taxonomy:

Extended link Role	Description	Used On
http://www.SampleCompany.com/Hypercube	Hypercube	Definition
http://www.SampleCompany.com/PrimaryConcepts	Primary Concepts	Definition

What you have thus far is a taxonomy which contains three concepts, two extended links we will make use of in the definition linkbase, and import elements which import three taxonomies (two domain definitions and the primary items) and an import of the XBRL Dimensions schema.

Next, we begin building the dimensional information. In summary, we will do the following:

- Hook the domains "Products" and "Regions" to the hypercube to explain the group of dimensions which make up the hypercube.
- Hook the hypercube to the primary items, in this case just one concept "Sales" to express that this concept has dimensions.
- Do some other wiring to express other details of our dimensional relationships.

In the following table, the information which will be entered is summarized. Keep in mind that we will be segregating the information into different extended links to facilitate reuse. But, this table summarizes the end result of what we will enter:

Element Label	Arcrole	Attribute values and other info
Sales		
Company Hypercube	xbrldt:all	summable=true; contextElement=scenario
By Region (Placeholder)	hypercube-dimension	
All Regions	dimension-domain	summable=true
US and Canada Region	domain-member	
European Region	domain-member	
Asia Region	domain-member	
Other Regions	domain-member	
By Product (Placeholder)	hypercube-dimension	
All Products	dimension-domain	summable=true

Element Label	Arcrole	Attribute values and other info
Pharmaceuticals Segment	domain-member	
Generics Segment	domain-member	
Consumer Health Segment	domain-member	
Other Segments	domain-member	

When default values are used, these attributes are not shown. First we will build the hypercube. To build the hypercube, we perform the following steps. All this is achieved in the definition view of the taxonomy:

1. Add the concept named "CompanyHypercube" to the extended link with the description "Hypercube". This starts your hypercube.
2. Add the concept "ByRegionPlaceholder" as a child of the concept "CompanyHypercube" using a "**hypercube-dimension**" arcrole. The attribute "**xbrldt:summable**" should be set to "True" as this dimension is summable. This step adds a necessary placeholder component to the hypercube so that the regions dimension can be added to your hypercube. Note that the summable attribute is used to indicate that the hypercube is intended to be used for dimensional calculations.
3. Add the concept "AllRegions" as a child of the placeholder concept "ByRegionPlaceholder" using a "**dimension-domain**" arcrole. The attribute "targetRole" should be set to "http://www.xbrl.org/2003/role/link". This points to the dimension "Regions" which will be used by the by region dimension. The targetRole attribute points to the extended link which contains the list of domain members, in this case the default XBRL extended link.
4. We will now repeat this same process to set up the "Products" dimension within the hypercube. Add the placeholder concept "ByProductPlaceholder" as a child of the "CompanyHypercube" using a "**hypercube-dimension**" arcrole, setting the "**xbrldt:summable**" attribute to "True".
5. Add the concept "AllProducts" as a child of the placeholder "ByProductPlaceholder" using a "**dimension-domain**" arcrole, setting the "targetRole" to "http://www.xbrl.org/2003/role/link" which contains the list of domain members for that domain.

Next we assign the hypercube to the primary items (in this case single concept), we perform the following steps:

1. Add the concept "Sales" to the extended link "Primary Concepts".
2. Add the concept "CompanyHypercube" as a child of the "Sales" concept using an "**xbrldt:all**" arcrole. The "**xbrldt:contextElement**" attribute should be set to "Scenario" indicating that these concepts will have the dimension information within the scenario portion of a context (as opposed to segment). The "**xbrldt:summable**" attribute should be set to "true" as this will be summable. The "**xbrldt:targetRole**" attribute should have a value of "http://www.SampleCompany.com/Hypercube".

Basically what you are doing here is specifying a set of concepts which can use the hypercube.

It might seem as though it would be better to add the concepts to the hypercube (rather than the hypercube to the concepts as we have done) but this would limit the

use of the hypercube. Any number of concepts can use a hypercube. The XBRL processor needs to be able to resolve the tree and figure out which can be used. Any tree can be built using abstract or concrete concepts to organize the tree if desired. Hypercubes apply to any ancestor concept along the has-hypercube axis.

The following is a summary of what you have achieved with all these operations:

- An XBRL processor can now perform calculations across contexts in order to check relationships between fact values in an instance document along the dimensions expressed in the hypercube.
- An XBRL processor can check to be sure you have placed the proper dimension members within the contexts used on the fact values in the instance document.

The following is a screenshot which shows what your company taxonomy should look like after the steps above have been completed:

Prefix	Label	Name	Data Type	Abstr...	Substitutio...	Balance	Period Type	Nilable	Flag	D
products	All Products	AllProducts	Monetary	False	xbrli:item		Duration	True	False	2
regions	All Regions	AllRegions	Monetary	False	xbrli:item		Duration	True	False	2
regions	Asia Region	AsiaRegion	Monetary	False	xbrli:item		Duration	True	False	2
company	By Product (Placeholder)	ByProductPlaceholder	String	True	xbrld:dime...		Duration		False	2
company	By Region (Placeholder)	ByRegionPlaceholder	String	True	xbrld:dime...		Duration		False	2
company	Company Hypercube	CompanyHypercube	String	True	xbrld:hype...		Duration		False	2
products	Consumer Health Segment	ConsumerHealthSegment	Monetary	False	xbrli:item		Duration	True	False	2
xbrldt	dimensionItem	dimensionItem	String	True	xbrli:item		Duration		False	2
regions	Europe Region	EuropeRegion	Monetary	False	xbrli:item		Duration	True	False	2
products	Generics Segment	GenericsSegment	Monetary	False	xbrli:item		Duration	True	False	2
xbrldt	hypercubeItem	hypercubeItem	String	True	xbrli:item		Duration		False	2
regions	Other Regions	OtherRegions	Monetary	False	xbrli:item		Duration	True	False	2
products	Other Segments	OtherSegments	Monetary	False	xbrli:item		Duration	True	False	2
products	Pharmaceuticals Segment	PharmaceuticalsSegment	Monetary	False	xbrli:item		Duration	True	False	2
ci	Sales	Sales	Monetary	False	xbrli:item	Credit	Duration	True	False	2
regions	US and Canada Region	USAndCanadaRegion	Monetary	False	xbrli:item		Duration	True	False	2

Note that you can see what is contained in each of the different taxonomies by looking at the Prefix (on the left lower area of the screen shot above or on each concept in the relations view).

Also, although the components of the dimensional information is segregated into different extended links, by looking at the "targetRole" attribute of the arcoles, the flow if information is the same as if it were expressed in a single extended link.

So there you have it, a dimensional taxonomy which expresses dimensional information for your data. Next, we will create an instance document and actually use this information.

2.3.3.4. Understanding All, Not All

At this point it is worth taking time to better explain the has-hypercube relations composers.

The "**xbrldt:all**" (one form of the three possible has-hypercube relations) arcrole defined between the primary item "Sales" and the hypercube could actually be one of three different options, or composers. This is worth looking at a bit more closely. The three possible options, depending on the functionality which is needed of the hypercube are:

- **All** – If **xbrldt:all** were used, that indicates that ALL of the dimensions specified in the hypercube must be present. For example, in the case above BOTH the "Products" and the "Regions" dimensions must exist in the <scenario> portion of a context used in an instance document. Also, they must appear in the order defined in the hypercube.
- **Not All** – If **xbrldt:notAll** were used, that indicates the opposite of ALL of the dimensions specified in the hypercube must be present. It is the negated version of all.

The all and notAll composers provide control over dimensions uses within an instance document.

2.3.4. Steps to Use the Dimensions within an Instance Document

Now we will use the dimensional information we have created above within an instance document. In summary, we will do the following:

- Create a new instance document (Sales-Instance.xml).
- Connect the XBRL Dimensional schema for instance documents to the instance document so it can be used.
- Connect the "Company.xsd" taxonomy to the instance document, which will in turn connect the "Regions.xsd" and "Products.xsd" taxonomies. This is our DTS (Discoverable Taxonomy Set).
- Add the required units information.
- Add the required contexts, including assigning the dimensional information, based on the XBRL Dimensions specification, to the <scenario> portion of each context.
- Enter the fact values into the instance document.
- Validate the instance document and check for calculation inconsistencies based on the dimensional information.

2.3.4.1. Create an Instance Document

Use the following steps to create a new instance document:

1. Create new instance document.

2. Attach the schema "xbrldi-2005.xsd" so that the instance document will be XBRL Dimensions specification aware.
3. Attach the "Company.xsd" DTS/taxonomy starting point which contains dimensional information and concepts expressed as fact values within the instance.

This step only gets things started. This is instance document information needed:

Name	Value
Filename:	Sales-Instance.xml

2.3.4.2. Add Units

Next, we add the required units; we will use Euros for this example:

Name	Value
Units ID:	U-Monetary
Measure	iso4217:EUR

2.3.4.3. Add Contexts

Next, we need to add all the contextual information to the instance document. Most of this is done in the normal way of assigning contexts. XBRL Dimensions adds one additional step.

Dimensions can be added to either the <segment> portion of a context or to the <scenario> portion. Both work in the same way.

What you don't want to do is have some dimensional information on one element, and other dimensional information of the same type on the other. The taxonomy specifies which element should contain dimensional information. In our taxonomy we stated that dimensional information must be included in the <scenario> element.

So, how does this work?

The XBRL specification states that basically any form of XML can be used in the <segment> or <scenario> elements EXCEPT for elements defined in the XBRL specification. Yet we expressed the dimensional information using an XBRL taxonomy. How can this be?

Well, the XBRL Dimensions specification plays a clever "trick" on XBRL. It actually does not USE XBRL elements within the <segment> or <scenario> elements, it POINTS to elements.

The XBRL Dimensions instance schema defines the "explicitMember" element which is used in either <scenario> or <segment> to contain dimensional information. The XBRL Dimensions instance schema does not reference the XBRL 2.1 instance schema, therefore it is NOT an XBRL taxonomy, it is simply an XML Schema.

Within an XBRL <segment> or <scenario> element, the contents would look like this:

```

<scenario>
  <xbrldi:explicitMember xlink:type="simple"
xlink:href="Company.xsd#ID_Concept">regions:AllRegions</xbrldi:explicitMember>
```



```
<xbrldi:explicitMember xlink:type="simple"  
xlink:href="Company.xsd#ID_Concept">products:AllProducts</xbrldi:explicitMember>  
<scenario>
```

This is what is going on. The example above shows one scenario element from a context with two dimension members. Any number of dimension members could be shown, but all would basically take the same format. Lets focus our discussion on the first.

The expression of the dimension information has several components:

- First, the element `<xbrldi:explicitMember>` is used to contain all of the dimension information. This is a non-XBRL element, as required by the XBRL specification.
- Second, the element `<xbrldi:explicitMember>` has two required attributes:
 - The `xlink:type` attribute which states that this element is going to be expressing a link and that link will be a simple link. This is very similar to a hyperlink used in HTML which most people are fairly familiar with using, but may not be familiar how to actually express.
 - Next is the link information itself expressed in the `xlink:href` attribute. This attribute points to a specific XBRL taxonomy, in the case above the taxonomy `Company.xsd` and a specific XML ID within that document, in the case above `ID_Concept`. The "#" symbol is just the syntax of doing this: `documentName#ID`.
- Finally, the element has a value. The value is the QName of the element within the XBRL taxonomy which is the domain member of the dimension of the context.

So, two things are important to keep in the back of your mind. First, the vast majority of what is going on here will be hidden behind a graphical user interface; what is being explained is how it works for those who happen to be interested in such information.

Secondly, this "clever trick" has some pros and cons associated with it. The pros are that the XBRL Dimensions is leveraging a great deal from XBRL taxonomies such as labels, references, etc. This is a very positive thing. If these features were not leveraged, the XBRL Dimensions specification would have to itself express them.

However, because the XBRL Dimensions specification is leveraging XBRL taxonomies, and because the XBRL Dimensions specification could not modify XBRL 2.1, it has to live with certain characteristics. These characteristics are in the category of "nuisance". All this will likely be tidied up then it is possible to modify the XBRL 2.1 specification. Currently, XBRL International is keeping XBRL 2.1 stable, not allowing modifications.

So now that we have explained why you are doing certain things which may appear a bit funky; we will now do those funky things.

The vast majority of the contextual information is the standard XBRL context information. The only thing that is added for the dimensions functionality is the content of the `<scenario>` element.

Below is the context information for our case study, the values of the different portions of the contexts in the instance document. Note that all of the contexts are

shown and that the scenario element’s contents are shown in its actual XML form. This is to provide a sense for that is going on:

Context ID	Entity ID	Entity Scheme	Date Start	Date End	Scenario Element Contents
D-2003-All	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2002-All	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2001-All	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2003-Pharm	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:PharmaceuticalsSegment</xbrldi:explicitMember>
D-2002-Pharm	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:PharmaceuticalsSegment</xbrldi:explicitMember>
D-2001-Pharm	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:PharmaceuticalsSegment</xbrldi:explicitMember>
D-2003-Gen	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:GenericsSegment</xbrldi:explicitMember>
D-2002-Gen	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:GenericsSegment</xbrldi:explicitMember>
D-2001-Gen	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:GenericsSegment</xbrldi:explicitMember>
D-2003-ConHealth	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:ConsumerHealthSegment</xbrldi:explicitMember>
D-2002-ConHealth	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:ConsumerHealthSegment</xbrldi:explicitMember>
D-2001-ConHealth	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:ConsumerHealthSegment</xbrldi:explicitMember>

Context ID	Entity ID	Entity Scheme	Date Start	Date End	Scenario Element Contents
D-2003-OtherSeg	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:OtherSegments</xbrldi:explicitMember>
D-2002-OtherSeg	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:OtherSegments</xbrldi:explicitMember>
D-2001-OtherSeg	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AllRegions</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:OtherSegments</xbrldi:explicitMember>
D-2003-US	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:USAndCanadaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2002-US	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:USAndCanadaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2001-US	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:USAndCanadaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2003-Europe	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:EuropeRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2002-Europe	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:EuropeRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2001-Europe	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:EuropeRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2003-Asia	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AsiaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2002-Asia	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AsiaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2001-Asia	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:AsiaRegion</xbrldi:explicitMember> <xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>

Context ID	Entity ID	Entity Scheme	Date Start	Date End	Scenario Element Contents
D-2003-OtherRegions	SAMP	http://www.SampleCompany.com	2003-01-01	2003-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:OtherRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2002-OtherRegions	SAMP	http://www.SampleCompany.com	2002-01-01	2002-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:OtherRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>
D-2001-OtherRegions	SAMP	http://www.SampleCompany.com	2001-01-01	2001-12-31	<xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByRegionPlaceholder">regions:OtherRegions</xbrldi:explicitMember><xbrldi:explicitMember xlink:type="simple" xlink:href="Company.xsd#company_ByProductPlaceholder">products:AllProducts</xbrldi:explicitMember>

As you can see there are a lot of contexts. Basically, there is one context for each "cell" of data. This excludes the totals which are presented a number of times, but the data of the total only appears once in the instance document.

Again, keep in mind that what is being shown is something which the computer will see, but the interface for users will make this far, far easier to work with. The details are being shown so that those who want to, can see what is going on.

Here are a few considerations when entering dimension information into contexts. The dimensions should be put into the <segment> or <scenario> element consistently or XBRL processors will report errors in your instance document. For example, in the contexts above region information is first, followed by product information. This is done consistently for all dimensions expressed. Also, only one member from each domain should be put into the context; for example don't put two "Regions" and no "Products" dimension or only one "Region" and no "Product" dimension.

2.3.4.4. Add Fact Values

This is all the fact value information which should be used in the instance document:

Element Name	Context Ref	Unit Ref	Decimals	Value
ci:Sales	D-2003-All	U-Monetary	INF	32038000
ci:Sales	D-2002-All	U-Monetary	INF	35805000
ci:Sales	D-2001-All	U-Monetary	INF	32465000
ci:Sales	D-2003-Pharm	U-Monetary	INF	20181000
ci:Sales	D-2002-Pharm	U-Monetary	INF	18150000
ci:Sales	D-2001-Pharm	U-Monetary	INF	15275000
ci:Sales	D-2003-Gen	U-Monetary	INF	2433000
ci:Sales	D-2002-Gen	U-Monetary	INF	1973000
ci:Sales	D-2001-Gen	U-Monetary	INF	1823000
ci:Sales	D-2003-ConHealth	U-Monetary	INF	6675000
ci:Sales	D-2002-ConHealth	U-Monetary	INF	6514000
ci:Sales	D-2001-ConHealth	U-Monetary	INF	5752000
ci:Sales	D-2003-OtherSeg	U-Monetary	INF	2749000
ci:Sales	D-2002-OtherSeg	U-Monetary	INF	9168000
ci:Sales	D-2001-OtherSeg	U-Monetary	INF	9615000
ci:Sales	D-2003-US	U-Monetary	INF	10214000
ci:Sales	D-2002-US	U-Monetary	INF	12649000

ci:Sales	D-2001-US	U-Monetary	INF	10137000
ci:Sales	D-2003-Europe	U-Monetary	INF	11901000
ci:Sales	D-2002-Europe	U-Monetary	INF	10374000
ci:Sales	D-2001-Europe	U-Monetary	INF	10396000
ci:Sales	D-2003-Asia	U-Monetary	INF	5639000
ci:Sales	D-2002-Asia	U-Monetary	INF	4371000
ci:Sales	D-2001-Asia	U-Monetary	INF	3210000
ci:Sales	D-2003-OtherRegions	U-Monetary	INF	4284000
ci:Sales	D-2002-OtherRegions	U-Monetary	INF	8411000
ci:Sales	D-2001-OtherRegions	U-Monetary	INF	8722000

So, note that the fact values use the contexts and units information provided in the other sections.

Looking at this data as it might be seen in a user interface with no presentation (just a list), it might look like this:

Sequence	Source	Element	Context	P	D	Unit	IsNil	Value
1	31	ci:Sales	D-2003-All		INF	U-Monetary	False	32038000
2	32	ci:Sales	D-2002-All		INF	U-Monetary	False	35805000
3	33	ci:Sales	D-2001-All		INF	U-Monetary	False	32465000
4	34	ci:Sales	D-2003-Pharm		INF	U-Monetary	False	20181000
5	35	ci:Sales	D-2002-Pharm		INF	U-Monetary	False	18150000
6	36	ci:Sales	D-2001-Pharm		INF	U-Monetary	False	15275000
7	37	ci:Sales	D-2003-Gen		INF	U-Monetary	False	2433000
8	38	ci:Sales	D-2002-Gen		INF	U-Monetary	False	1973000
9	39	ci:Sales	D-2001-Gen		INF	U-Monetary	False	1823000
10	40	ci:Sales	D-2003-ConHealth		INF	U-Monetary	False	6675000
11	41	ci:Sales	D-2002-ConHealth		INF	U-Monetary	False	6514000
12	42	ci:Sales	D-2001-ConHealth		INF	U-Monetary	False	5752000
13	43	ci:Sales	D-2003-OtherSeg		INF	U-Monetary	False	2749000
14	44	ci:Sales	D-2002-OtherSeg		INF	U-Monetary	False	9168000
15	45	ci:Sales	D-2001-OtherSeg		INF	U-Monetary	False	9615000
16	46	ci:Sales	D-2003-US		INF	U-Monetary	False	10214000
17	47	ci:Sales	D-2002-US		INF	U-Monetary	False	12649000
18	48	ci:Sales	D-2001-US		INF	U-Monetary	False	10137000
19	49	ci:Sales	D-2003-Europe		INF	U-Monetary	False	11901000
20	50	ci:Sales	D-2002-Europe		INF	U-Monetary	False	10374000
21	51	ci:Sales	D-2001-Europe		INF	U-Monetary	False	10396000
22	52	ci:Sales	D-2003-Asia		INF	U-Monetary	False	5639000
23	53	ci:Sales	D-2002-Asia		INF	U-Monetary	False	4371000
24	54	ci:Sales	D-2001-Asia		INF	U-Monetary	False	3210000
25	55	ci:Sales	D-2003-OtherRegions		INF	U-Monetary	False	4284000
26	56	ci:Sales	D-2002-OtherRegions		INF	U-Monetary	False	8411000
27	57	ci:Sales	D-2001-OtherRegions		INF	U-Monetary	False	8722000
*								

2.3.4.5. Validate

The next step in the process is to validate the instance document syntax and check for calculation inconsistencies. The following is an example of a fragment of a validation report:

Line	Label	W	B	D-P	Value	Source	Message
1	Context period from 2001-01-01 to 2001-12-31 for SAMP						
2	U-Monetary						
3	company:ByProduct//products:AllProducts						
4	ci:Sales[...., company:ByRegion//regions:AllRegions]		C	INF	32,465,000	both	OK
5	ci:Sales[...., company:ByRegion//regions:USAndCanadaRegion]	1	C	INF	10,137,000	inst	
6	ci:Sales[...., company:ByRegion//regions:EuropeRegion]	1	C	INF	10,396,000	inst	
7	ci:Sales[...., company:ByRegion//regions:AsiaRegion]	1	C	INF	3,210,000	inst	
8	ci:Sales[...., company:ByRegion//regions:OtherRegions]	1	C	INF	8,722,000	inst	
9	company:ByRegion//regions:AllRegions						
10	ci:Sales[...., company:ByProduct//products:AllProducts]		C	INF	32,465,000	both	OK
11	ci:Sales[...., company:ByProduct//products:PharmaceuticalsSegment]	1	C	INF	15,275,000	inst	
12	ci:Sales[...., company:ByProduct//products:GenericsSegment]	1	C	INF	1,823,000	inst	
13	ci:Sales[...., company:ByProduct//products:ConsumerHealthSegment]	1	C	INF	5,752,000	inst	
14	ci:Sales[...., company:ByProduct//products:OtherSegments]	1	C	INF	9,615,000	inst	
15	Context period from 2002-01-01 to 2002-12-31 for SAMP						
16	U-Monetary						
17	company:ByProduct//products:AllProducts						
18	ci:Sales[...., company:ByRegion//regions:AllRegions]		C	INF	35,805,000	both	OK
19	ci:Sales[...., company:ByRegion//regions:USAndCanadaRegion]	1	C	INF	12,649,000	inst	
20	ci:Sales[...., company:ByRegion//regions:EuropeRegion]	1	C	INF	10,374,000	inst	
21	ci:Sales[...., company:ByRegion//regions:AsiaRegion]	1	C	INF	4,371,000	inst	
22	ci:Sales[...., company:ByRegion//regions:OtherRegions]	1	C	INF	8,411,000	inst	
23	company:ByRegion//regions:AllRegions						
24	ci:Sales[...., company:ByProduct//products:AllProducts]		C	INF	35,805,000	both	OK
25	ci:Sales[...., company:ByProduct//products:PharmaceuticalsSegment]	1	C	INF	18,150,000	inst	
26	ci:Sales[...., company:ByProduct//products:GenericsSegment]	1	C	INF	1,973,000	inst	
27	ci:Sales[...., company:ByProduct//products:ConsumerHealthSegment]	1	C	INF	6,514,000	inst	
28	ci:Sales[...., company:ByProduct//products:OtherSegments]	1	C	INF	9,168,000	inst	
29	Context period from 2003-01-01 to 2003-12-31 for SAMP						

We show the actual data here again for your convenience. Note how what is on line 4 in the validation report ties to what is presented in the data for 2001 by product breakdown, and line 10 ties to the by region breakdown. This is repeated for line 18 and 25 which shows 2002:

Label/Name	2003	2002	2001
Sales	32038000	35805000	32465000
Breakdown by Segment			
Pharmaceuticals Segment	20181000	18150000	15275000
Generics Segment	2433000	1973000	1823000
Consumer Health Segment	6675000	6514000	5752000
Other Segments	2749000	9168000	9615000
Total	32038000	35805000	32465000
Breakdown by Region			
US and Canada	10214000	12649000	10137000
Europe	11901000	10374000	10396000
Asia	5639000	4371000	3210000
Other Regions	4284000	8411000	8722000
Total	32038000	35805000	32465000

So, one concept, yet there are calculations. Also, as you can see each cell is in a different context, yet you can perform cross-contexts calculations, which are not allowed in calculations that use the **summation-item** arcrole initially released in XBRL 2.1. Yet, the **aggregator-contributor** arcrole does allow cross context calculations. Thus, the value of the XBRL Dimensions specification can be seen.

2.3.4.6. Summary

In this example we have shown how to build a set of explicit dimensions to express the relationship between domain members. We have also created an instance document which makes use of the dimensional information and validated the instance document using the dimensional information.

This functionality certainly exists in many software products, but each of those software products implements the expression of multidimensional information in a manner proprietary to that specific piece of software. XBRL expresses multidimensional information in the form of a global standard. Further, many software products do not have the robust features of the XBRL Dimensions specification.

Any XBRL processor which supports XBRL Dimensions will be able to process the taxonomies and instance documents which express this information, thus making this information usable across applications.

This case study shows only a very simple use case for XBRL Dimensions. Its purpose was to communicate the basic concepts about how XBRL Dimensions work. Additional use cases which show additional features of XBRL Dimensions is shown in the next section.

2.4. Additional Dimensional Use Cases

We provided a detailed explanation of building a simple dimensional taxonomy above. Next, we will provide information for several other use cases. We will not walk through building each. See the sample files provided which have all the taxonomy and instance files for each of these additional dimensional use cases.

2.4.1. Sector Breakdown

One common use case to financial reporting is the sector breakdown of summary balance sheet, income statement, cash flows and other information. In the set of files, see the subdirectory "UseCase-03-Sectors". The following screen shot shows the presentation of such information, commonly contained in the notes to a financial statement:

MASTERING XBRL-BASED DIGITAL FINANCIAL REPORTING – PART 5: TECHNICAL DETAILS – INTERMEDIATE LEVEL XBRL
TECHNICAL SYNTAX PRIMER – CHARLES HOFFMAN, CPA

Sample Company, Inc.
Sectorial Breakdown
(in Euros)

	Pharmaceuticals		Generics		Consumer Health		CIBA Vision		Animal Health		Corporate		Total Continuing Sectors		Discontinued Sectors		Group	
	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003
Primary business segments:																		
Sales to external customers	20,181	18,150	2,433	1,973	6,675	6,514	1,787	1,392	962	1,083	-	-	32,038	29,112	0	6,693	32,038	35,805
Sales to other sectors	230	245	203	170	29	42	17	8	15	-	-494	-465	-	-	-	-	-	-
Revenues for primary segment	20,411	18,395	2,636	2,143	6,704	6,556	1,804	1,400	977	1,083	-494	-465	32,038	29,112	0	6,693	32,038	35,805
Result	5,677	5,401	281	242	920	869	174	100	138	179	87	-64	7,277	6,727	-	1,156	7,277	7,883
Share of profit (loss) from equity accounted investments																		
Finances (costs) income, net	190	104	2	1	-14	-7	-	-1	-	-	-39	-	139	97	-	1	139	98
Profit (loss) before tax	-	-	-	-	-	-	-	-	-	-	-	-	-1,067	-1,216	-	125	-1,067	-1,091
Income taxes	-	-	-	-	-	-	-	-	-	-	-	-	8,485	8,040	-	1,052	8,485	9,072
Profit (loss)	-	-	-	-	-	-	-	-	-	-	-	-	1,440	1,564	-	316	1,440	1,920
Profit (loss) attributable to minority interest	-	-	-	-	-	-	-	-	-	-	-	-	7,043	6,536	-	716	7,043	7,252
Profit (loss) attributable to equity holders of parent	-	-	-	-	-	-	-	-	-	-	-	-	19	25	-	17	19	42
Research and development	-3,447	-3,311	-169	-170	-181	-186	-98	-67	-93	-88	-201	-189	7,024	6,511	-	699	7,024	7,210
Depreciation	-578	-622	-126	-115	-105	-101	-96	-86	-14	-12	-20	-32	-939	-968	-	-221	-939	-1,189
Amortisation	-306	-62	-87	-58	-45	-38	-102	-32	-15	-12	-9	-3	-564	-205	-	-104	-564	-309
Impairment loss recognised in income	-242	-2	-	-	-4	-	-	-	-	-	-	-	-246	-2	-	-5	-246	-7
Restructuring costs	-	42	-	16	21	2	-	41	-	-	-	-	21	101	-	-	21	101
Total assets	18,631	16,887	3,362	2,575	4,686	4,426	2,909	3,169	735	842	96,462	30,297	66,785	58,196	-	-	66,785	58,196
Total liabilities	-5,487	-4,477	-740	-636	-2,168	-2,142	-599	-824	-163	-198	-15,289	-12,979	-24,436	-21,256	-	-	-24,436	-21,256
Total Equity	13,144	12,410	2,622	1,939	2,528	2,284	2,310	2,345	572	644	21,173	17,318	42,349	36,940	-	-	42,349	36,940
Property, plant and equipment	5,897	5,770	1,081	974	893	880	579	648	73	72	537	686	9,060	9,030	-	-	9,060	9,030
Accrual based capital additions for sector	617	534	209	241	129	122	153	120	19	20	224	142	1,351	1,179	-	174	1,351	1,353
Investment in equity accounted investments	1,554	1,375	7	5	-	2	-	5	-	-	5,154	144	6,715	1,531	-	-	6,715	1,531
Number of employees at end of year	41,256	38,397	7,230	5,712	12,824	12,949	6,797	7,644	1,997	1,975	1,012	976	71,116	67,653	-	-	71,116	67,653

The above is a sector breakdown by business segment. Additionally, the business segments are broken down into continuing operations and discontinuing operations. You also have to consider the "Corporate" column, which are basically consolidation eliminations.

Note that in this example, there is only one discontinued sector, the agribusiness sector. While in the presentation view of this information there is only one column of information; there are actually two sets of information in the instance document, both with the same values basically. Both the agribusiness sector and the total discontinued sectors need to be in the instance document for the calculations to work correctly.

2.4.2. Discontinuing, Continuing Operations

This example shows how continuing, discontinued, and total operations are broken out in an income statement. This use case is in the set of files, see the subdirectory "UseCase-04-DiscontinuedOperations":

Sample Company, Inc.
 Consolidated Income Statements
 (in Euros)

	2004			2003		
	Continuing Operations	Discontinued Operations	Total	Continuing Operations	Discontinued Operations	Total
Revenues						
Sales	164,475	42,196	206,671	128,431	46,628	175,059
Renting of services	32,487	0	32,487	28,456	0	28,456
Rental income	695	0	695	676	0	676
Total revenue	197,657	42,196	239,853	157,563	46,628	204,191
Cost of sales	-157,739	-38,146	-195,885	-126,538	-39,449	-165,987
Gross profit	39,918	4,050	43,968	31,025	7,179	38,204
Other operating income	2,262	0	2,262	530	0	530
Distribution costs	-14,334	-2,387	-16,721	-10,175	-4,196	-14,371
Administrative expenses	-14,707	-2,263	-16,970	-10,830	-3,543	-14,373
Other operating expenses	-1,903	0	-1,903	-1,610	0	-1,610
Profit (loss) from operations	11,236	-600	10,636	8,940	-560	8,380
Finance (costs)/income	-298	86	-212	-768	30	-738
Share of profit from equity accounted investments	355	0	355	255	0	255
Profit (loss) before tax	11,293	-514	10,779	8,427	-530	7,897
Income tax (expense) income	-3,565	-417	-3,982	-3,022	94	-2,928
Profit (loss) after tax from continuing operations	7,728	-931	6,797	5,405	-436	4,969
Profit (loss) from discontinued operations, net of tax	0	-2,317	-2,317	0	0	0
Profit (loss)	7,728	-3,248	4,480	5,405	-436	4,969
Attributable to:						
Minority interests	249	0	249	52	0	52
Equity holders of parent	7,479	-3,248	4,231	5,353	-436	4,917
Profit (loss)	7,728	-3,248	4,480	5,405	-436	4,969

The above show an income statement for two years. Each year's income statement is broken down into the continuing, discontinued, and the total which is the sum of continuing and discontinued. Each line item on the income statement, in this case, is broken down into these three categories.

2.4.3. Excluding Specific Dimensions

Sometimes, certain combinations of dimensions or "cell intersections" are not allowed. This use case is such an example. Dimensions can be used to explicitly exclude these combinations:

Impairment	Code A	Additions	Reversals	Total
		005	010	015
Impairment losses on financial assets not measured at fair value through profit or loss	100	220	60	160
Financial assets measured at cost (unquoted equity and related derivatives)	110 +	40		40
Available for sale financial assets measured at fair value through equity	120	60	20	40
Loans and receivables measured at amortized cost (including finance leases)	130	60	20	40
Held to maturity investments measured at amortized cost	140	60	20	40
Impairment on	200	430	230	200
Property, plant and equipment	210	115	65	50
Investment properties	220	35	5	30
Intangible assets	230	160	120	40
Goodwill	240	12		12
Other	250	148	120	28
Investments in associates and joint ventures accounted for using the equity method	260	60	20	40
Other	270	60	20	40
Total	299	650	290	360

In the above table, note that reversals cannot be shown for two line items. This can be achieved by excluding these two combinations in the dimensions definition. Just as the presentation information above forbids these values by showing the cells in red, an XBRL dimensions hypercube can exclude certain line items from showing within an analysis.

The following example is provided in the sample files which takes the simple "Sales" example we worked with earlier and makes it so "Other Segments" may not be reported. See the following screenshot:

Sales Analysis

	2003 €'000	2002 €'000	2001 €'000	
Sales, Total All Segments, All Regions	32,038	35,805	32,465	
Breakdown by Segment				
Pharmaceuticals Segment	20,181	18,150	15,275	
Generics Segment	2,433	1,973	1,823	
Consumer Health Segment	9,424	15,682	15,367	
Other Segments	0	0	0	<< Not allowed
Total	32,038	35,805	32,465	
Breakdown by Region				
US and Canada	10,214	12,649	10,137	
Europe	11,901	10,374	10,396	
Asia	5,639	4,371	3,210	
Other Regions	4,284	8,411	8,722	
Total	32,038	35,805	32,465	

In the sample files, two instance documents are provided; one is valid and the other is invalid against the constraint of not reporting the "Other Segments" dimension.

The sample taxonomy shows, in the definition linkbase, a new hypercube which is created to exclude this dimension from being reported.

2.4.4. Implicit or Typed Dimensions

All the examples thus far have shown explicit dimensions, meaning the domain-members are explicitly defined. There are occasions where the number of domain members is known, but so large that it would be impractical to list all domain members. For example,

- Each ZIP code in the US.
- Longitudes, which span from 180 to -180.

The XBRL Dimensions specification provides a mechanism to express these types of dimensions. The XBRL Dimensions specification calls implicit dimensions "typed" dimensions.

For example, consider the following sample provided:

Sales Breakdown by Customer	
	2003
	€'000
Sales, all customers	100,000
Sales by Customer ID	
ABC1	10,000
ABC2	20,000
ABC3	70,000
Total	100,000

Sales are provided by customer, and we really don't want to have to create a domain member for every new customer we create. As such, we use an implicit or typed dimension. See the samples provided for more information.

2.5. Dimensions Impact on IFRS-GP Taxonomy

The IFRS-GP taxonomy was created prior to the creation of the XBRL Dimensions Specification. As such, the current version of that taxonomy (2005-05-15) does not make use of dimensions within the taxonomy. It is highly likely that future versions of the IFRS-GP taxonomy will make use of dimensions.

This does not mean that dimensions cannot be used with the IFRS-GP today. Anyone desiring to use dimensions can simply create the dimensions information as an extension of the IFRS-GP taxonomy.

However, it does mean that certain things which were constructed in one manner in the taxonomy would have been constructed differently had XBRL Dimensions been available at the time the taxonomy was created.

The following is a summary of several areas of the taxonomy which will likely be reconstructed taking dimensions into consideration.

- It is highly likely that the segment information disclosures will be redone taking dimensions into consideration. This is one clear opportunity to leverage XBRL dimensions. For example, in the following consider line ID number 3979. As the "Primary Segment" can be explicitly expressed and as the relationship between the segments can be expressed using dimensions, this would be an appropriate adjustment to the IFRS-GP taxonomy.

Presentation Report						5/5/2005 10:16:48 AM	
ID	Bal	Per	Nil	Type	NS	Label	Reference
3976	D	T		String	ifrs-gp	Primary Segment Revenue Information	IAS 14 51 (Pres)
3977	C	D	T	Monetary	ifrs-gp	Sales to External Customers for Segment	IAS 14 51 (Pres)
3978	C	D	T	Monetary	ifrs-gp	Sales from Transactions with Other Segments for Segment	IAS 14 51 (Pres)
3979	C	D	T	Monetary	ifrs-gp	Revenue for Primary Segment, Total	IAS 14 51 (Pres)
3980	D	T		String	ifrs-gp	Primary Segment Result Information	IAS 14 52 (Pres)
3981	C	D	T	Monetary	ifrs-gp	Result for Primary Segment	IAS 14 52 (Pres)
3982	C	D	T	Monetary	ifrs-gp	Share of Profit (Loss) from Equity-Accounted Investments for Primary Segment	IAS 14 64 (Pres)
3983	C	D	T	Monetary	ifrs-gp	Other Result Component for Primary Segment	IAS 14 59 (Pres)
3984	I	T		String	ifrs-gp	Primary Segment Balance Sheet Information	IAS 14 (Pres)
3985	D	I	T	Monetary	ifrs-gp	Assets for Primary Segment	IAS 14 55 (Pres)
3986	D	I	T	Monetary	ifrs-gp	Investments in Equity-Accounted Investments for Primary Segment	IAS 14 66 (Pres)
3987	C	I	T	Monetary	ifrs-gp	Liabilities for Primary Segment	IAS 14 56 (Pres)
3988	D	T		String	ifrs-gp	Other Financial Information for Primary Segment	IAS 14 (Pres)
3989	D	T		Monetary	ifrs-gp	Accrual-Based Capital Additions for Primary Segment	IAS 14 57 (Pres)
3990	D	T		String	ifrs-gp	Significant Non-Cash Items for Primary Segment	IAS 14 61 (Pres)
3991	D	D	T	Monetary	ifrs-gp	Amortisation for Primary Segment	IAS 14 58 (Pres)
3992	D	D	T	Monetary	ifrs-gp	Depreciation for Primary Segment	IAS 14 58 (Pres)
3993	D	D	T	Monetary	ifrs-gp	Depreciation and Amortisation for Primary Segment	IAS 14 58 (Pres)
3994	D	D	T	Monetary	ifrs-gp	Impairment Loss Recognised in Income Statement for Primary Segment	IAS 36 129 a (Pres)
3995	D	D	T	Monetary	ifrs-gp	Impairment Loss Recognised Directly into Equity for Primary Segment	IAS 36 129 a (Pres)
3996	C	D	T	Monetary	ifrs-gp	Reversal of Impairment Loss in Income Statement for Primary Segment	IAS 36 129 b (Pres)
3997	C	D	T	Monetary	ifrs-gp	Reversal of Impairment Loss in Equity for Primary Segment	IAS 36 129 b (Pres)
3998	D	T		Monetary	ifrs-gp	Other Significant Non-Cash Items Other than Depreciation for Primary Segment	IAS 14 61 (Pres)
3999	C	D	T	Monetary	ifrs-gp	Restructuring Charges for Primary Segment	IFRS-CP (Pres)

- And as the concept "Primary Segment", "Geographic Segment Breakdown", "Business Segment Breakdown" are clearly defined IFRS concepts (domains), these can be defined by the IFRS taxonomy framework. However, the actual breakdowns (the domain-members) are unique to each organization reporting using IFRS; and these, therefore, would be created by reporting entities and wired to the domains in company extension taxonomies.
- Certain class breakdowns could use dimensions, rather than explicitly creating concepts in the IFRS-GP taxonomy, particularly if there is a low-level of agreement of what the proper class breakdown should be.
- Basically, any place where there is a breakdown using items or tuples can be reconsidered and perhaps dimensions may be more appropriate. In many cases what exists is appropriate, but in other cases this new options may prove superior.

There are a few other areas where the IFRS-GP taxonomy framework could enhance comparability by creating clearly defined concepts/components which can be used for cross company comparisons.

For example, creating the dimensions "Actual", "Budgeted" and "Variance" may, or may not, be appropriate. But where it is appropriate, this type of comparability enhancement would be quite useful by having the base taxonomy actually define this information.

2.6. Dimensions and Tuples: Opportunities and Issues

There is a bit of a potential conflict between dimensions and tuples because they can both be used to perform similar tasks in some cases. In fact, one could ask the

question, "Should XBRL get rid of tuples?" XBRL certainly should not get rid of tuples, however, it is the case that:

- At times it is clear when dimensions should be used, at times it is clear when tuples should be used, and at times you are in a "gray" area where it is less clear whether the use of tuples or dimensions is the most appropriate.
- Sometimes this decision can boil down a desire to make writing applications which work with XBRL easier to create; not having to deal with tuples (basically making everything in instance documents and taxonomies items and contexts/dimensions). This is a very appropriate choice, one which was used for the COREP taxonomy.

A typical Excel user would have an easier time making use of XBRL if tuples did not exist. It may be appropriate that an XBRL specification be created, similar to the FRTA which constrains XBRL for financial reporting purposes, which excludes the use of tuples. Somewhat of an XBRL Forms type specification. While users of XBRL are free to do this now, this type of specification might make it easier to exchange XBRL based information.

Several things should be kept in the back of your mind when deciding when to use tuples and when to use dimensions:

- When tuples are being used, because all concepts in XBRL are global, it is the case that it is impossible to constrain the number of occurrences of a specific tuple. For example, if you wish to collect data for, say, types of related parties; using tuples you cannot express that you want one tuple only for all related party transactions with the parent, one tuple only for subsidiaries, one tuple only which summarizes information with key employees, etc. Basically, you cannot constrain the number of times a tuple appears in an instance document.
- When tuples are used, sometimes it is more difficult to express the calculations you desire to express.
- Dimensions provide a nice way of "enumerating" the values which can appear, and the enumerations are extensible. This cannot be done effectively using tuples and there really is no standard, agreed upon way to achieve this using tuples.
- Dimensions do not appear in a taxonomy in a way where it makes it apparent what data a taxonomy desires to collect. For example, you don't "see" the dimensions in the taxonomy in a manner where you know that a specific concept requires that, say, 5 specific dimensions of that concept are to be reported in an instance document.
- Dimensional calculations have the same issues as normal XBRL calculations. The "no imputed values" (no value creation by an XBRL processor) still applies with dimensions; XBRL processors are not allowed to impute values.
- There are issues relating to using concepts both with the expression of dimensional information and also not expressing dimensional information. For example, say "Assets, Total" is used on the balance sheet. There are, say, 20 other items on the balance sheet which add up to "Assets, Total", so the concept "Assets, Total" and the other 20 concepts adding up to assets need to be in the same context. However, "Assets, Total" is also used in the sectorial breakdown, disclosing assets by geographic segment or business

segment, and these are expressed using dimensional information within contexts. Basically, where fact values/concepts reported which use dimensional information must interact with fact values/concepts which do NOT use dimensional information, conflicts can arise.

There are other decisions which need to be made when using dimensions. The following will give you an idea of these issues:

- Consider the concept "Property, Plant and Equipment, Net" in the IFRS-GP taxonomy.
- Classes of "Property, Plant and Equipment, Net" could be expressed in a taxonomy in a number of different ways, each approach having a distinct set of pros and cons:
 - Items can be used to express information for each class, but this results in a rather large taxonomy. Also, if you don't desire to use that set of classes, all those items really should be prohibited.
 - Tuples can be used to express this information, basically wrapping each class within a tuple. But with this approach, nothing prevents the class, say, "Land" from being in an instance document twice.
 - Dimensions can be used to express the class information for "Property, Plant and Equipment, Net"; however, if you look at a taxonomy which uses this approach, it is not apparent that you must disclose information for classes of "Property, Plant and Equipment, Net".
- If different extension taxonomies to the IFRS-GP taxonomy used different approaches, then comparison of financial information would be more challenging.

The point of all this is that there are sometime no definitive right or wrong answers to many of these issues. However, it is important that agreement be achieved or using XBRL could be more challenging than it needs to be.

2.7. Conclusion

So, as you can see XBRL dimensions adds a necessary, and a very powerful, feature to XBRL: the ability to articulate, in a global standard way, what is typically seen as "drill down" information for an reporting entity. Having this information expressed as a global standard facilitates the exchange of this information between different software applications, rather than locking users into one software application whose information cannot be exchanged effectively with others without human intervention.

The more the dimensional taxonomies are shared by reporting entities, the better the comparability between reporting entities. Therefore, it makes sense for some taxonomy frameworks, such as the IFRS taxonomy framework or the US taxonomy framework, to create some of this dimensional information which is common to entities using those frameworks.

The XBRL Dimensions feature set is robust, covering common use cases of financial reporting. There may be some obscure use cases which have not been discovered by this specification.

Some taxonomies created prior to the existence of the XBRL Dimensions specification will need to be adjusted to take its functionality into consideration. However, that

does not mean that those taxonomies cannot be used with other taxonomies which express information today.

The XBRL Formulas Linkbase will be XBRL Dimensions aware.