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Automating Data Exchange

Technical Overview of XBRL – Including XBRL vs. XML

Technologies and integrated solutions enabling automated data exchange, validation & analysis

Agenda

- XBRL Taxonomies
- XBRL Instance Documents
- Comparison of XBRL versus XML

Taxonomies

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ADOBE SYSTEMS INCORPORATED
CONSOLIDATED BALANCE SHEETS
(In thousands, except per share data)

	December 2, 2005	December 3, 2004
ASSETS		
Current assets:		
Cash and cash equivalents	$ 420,818	$ 259,061
Short-term investments	1,280,016	1,054,160
Trade receivables, net of allowances for doubtful accounts of $5,376 and $6,191, respectively	173,245	141,945
Other receivables	31,504	25,495
Deferred income taxes	58,710	51,751
Prepaid expenses and other assets	44,285	18,617
Total current assets	2,008,578	1,551,029
Property and equipment, net	103,549	99,675
Goodwill	118,683	110,287
Purchased and other intangibles, net	16,477	15,513
Investment in lease receivable	126,800	126,800
Other assets	66,228	55,328
	$ 2,440,315	$ 1,958,632

Taxonomy

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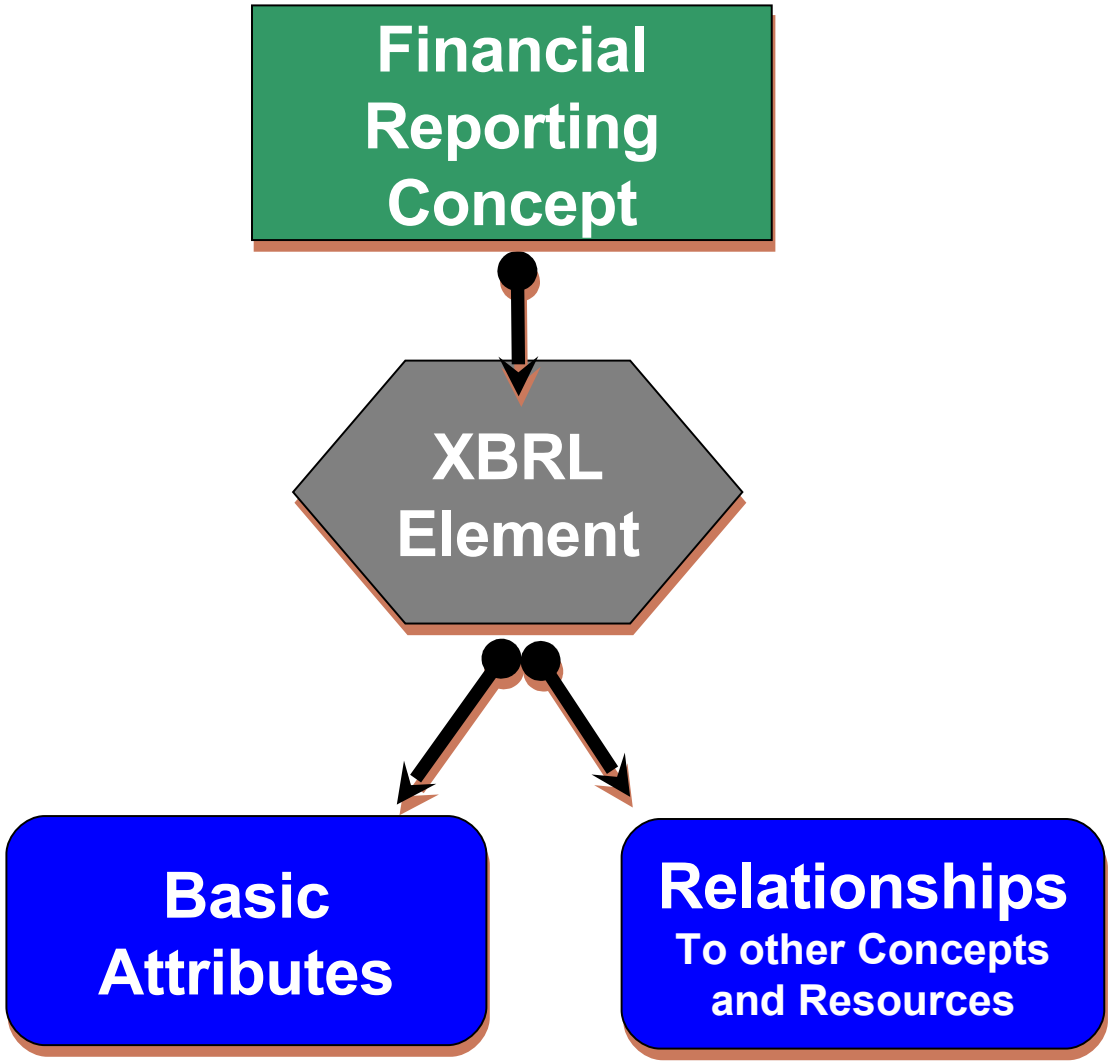
- **Defines the *concepts* to be reported**

Current assets:	
Cash and cash equivalents	$ 420,818
Short-term investments	1,280,016
Trade receivables, net of allowances for doubtful accounts of $5,376 and $6,191, respectively	173,245
Other receivables	31,504
Deferred income taxes	58,710
Prepaid expenses and other assets	44,285
Total current assets	2,008,578

  - **Concepts are defined as XBRL *elements***
    - ***Basic attributes***
    - ***Relationships***
  - **A taxonomy is a *metadata repository*. XBRL provides a model designed for financial reporting**

Taxonomy



Taxonomy

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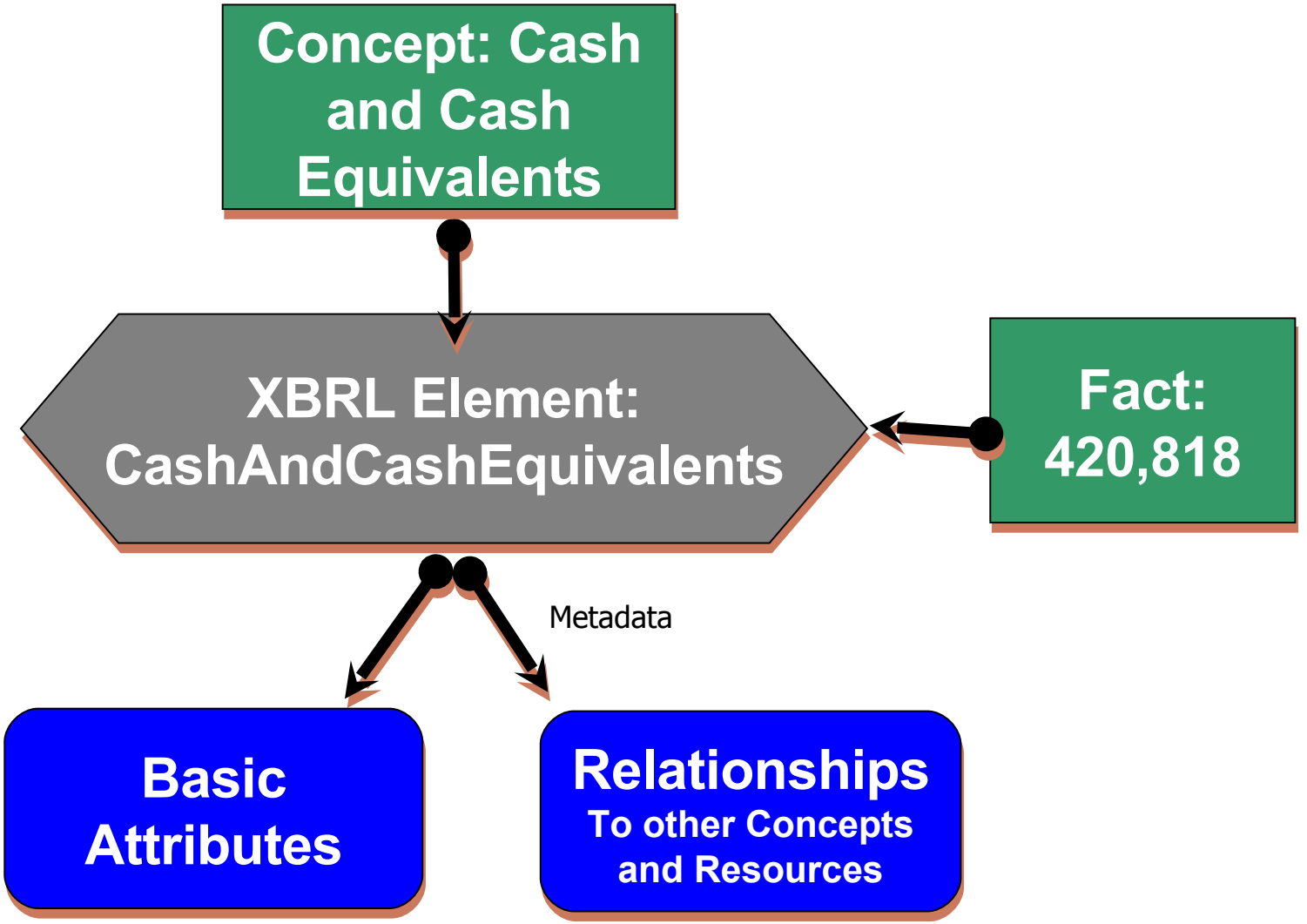

Simplest XBRL Taxonomy

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- **Consists of taxonomy "schema"**
  - Schema contains definitions of concepts, and links to additional taxonomy resources (if any)
    - Have the .XSD file extension
    - A concept definition with some of its basic attributes looks like this:

```
<xsd:element
   name="CashAndCashEquivalents"
   id="adobe_2004_ CashAndCashEquivalents"
   type="xbrli:monetaryItemType"
   substitutionGroup="xbrli:item"
   nillable="true"
   xbrli:periodType="duration" />
```

Anatomy of a Taxonomy Element

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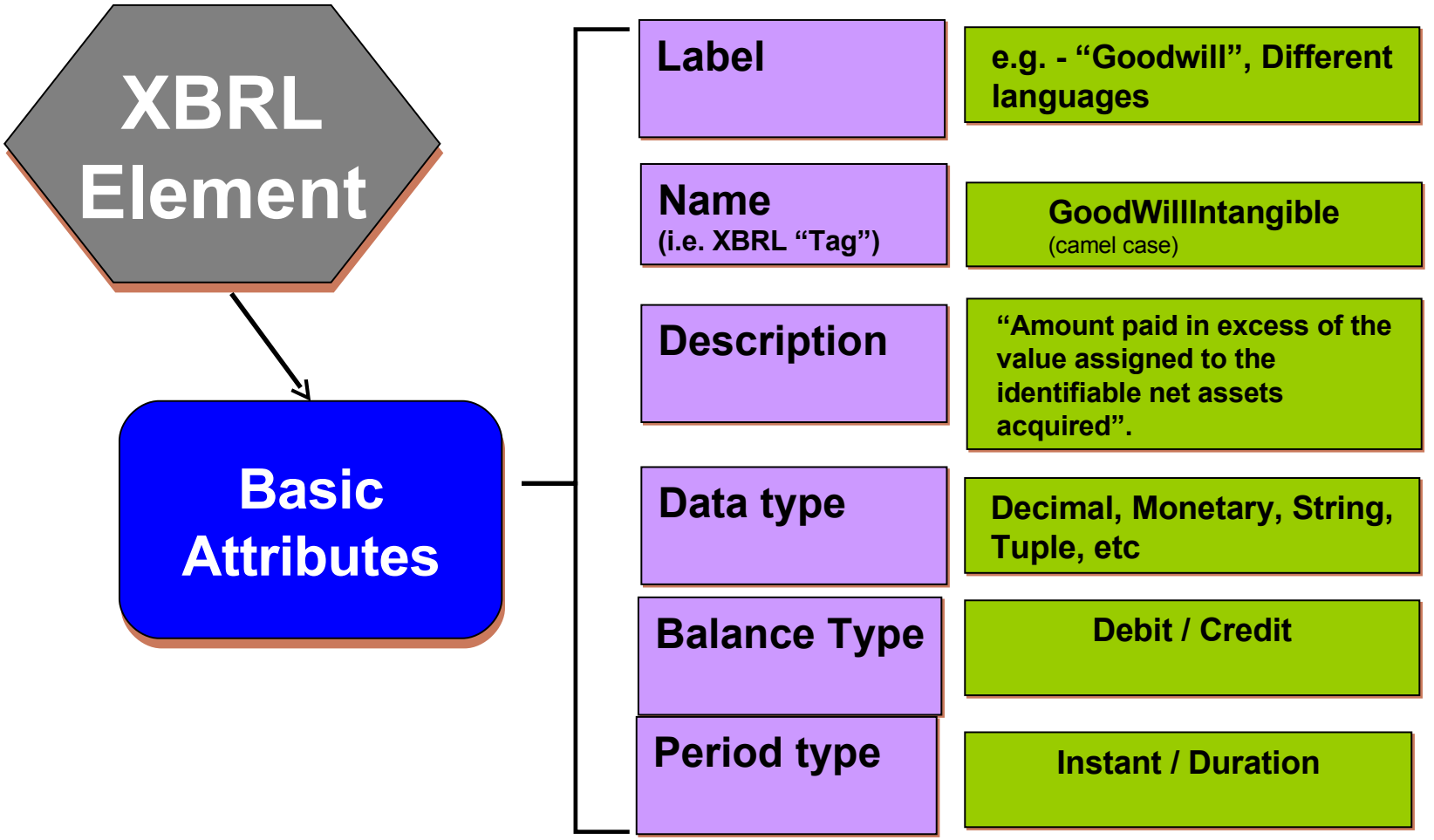

“Richer” Taxonomy

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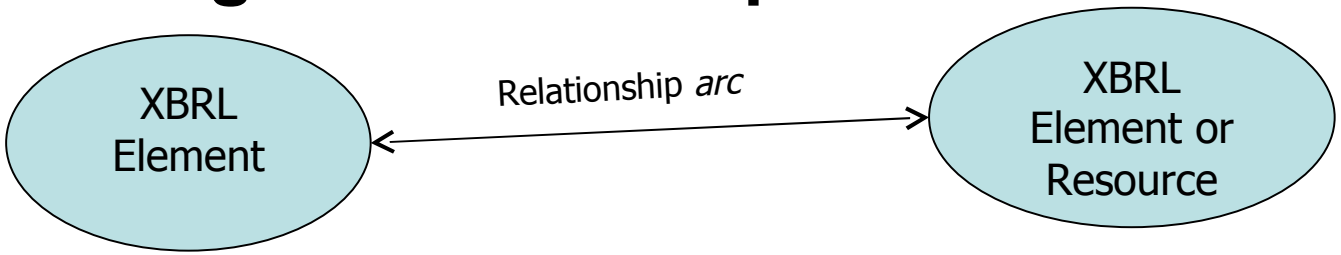
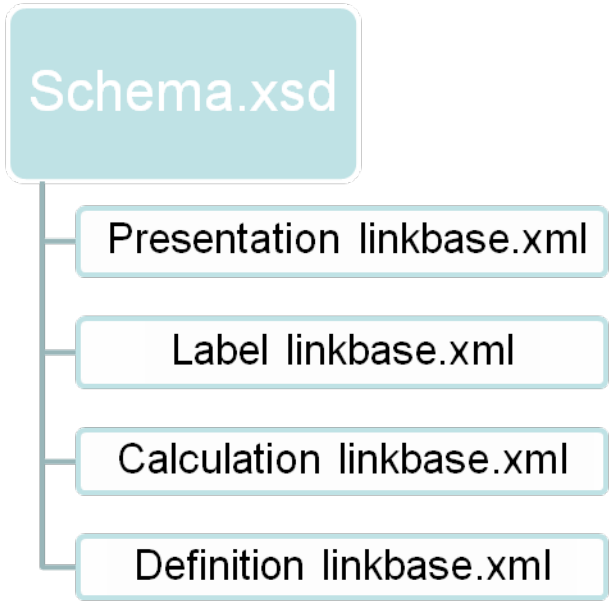
- **XBRL metadata model provides for the modelling of relationships**



  - **Connects an element to another element or to a resource**
    - **Connect elements that have a summation relationship**
    - **Connect an element to a resource such as a label or documentation**
  - **XBRL refers to this declaration as an *arc***

Linkbases

- Linkbases are repositories of arcs, that is, repositories of declared relationships.
  - Linkbases have the .XML file extension
  - Linkbase types: presentation, definition, label, calculation
  - File relationships:



Relationships

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- **Label** - provides human readable labels for the element names. Instructions and captions are label linkbases
  - Can be in multiple languages
- **Reference** - provides the means to link the element to "additional information", including authoritative references
- **Presentation** - describes the hierarchical order of the elements in a report
- **Definition** - describes how the elements relate to each other. Describes the parent child relationship. The accounting concept relationships
- **Dimensions** – data cube view, like a Pivot Table in Excel
- **Calculation** - defines calculations between two or more elements
- **Formula** – business rules and complex computations

Common Relationships

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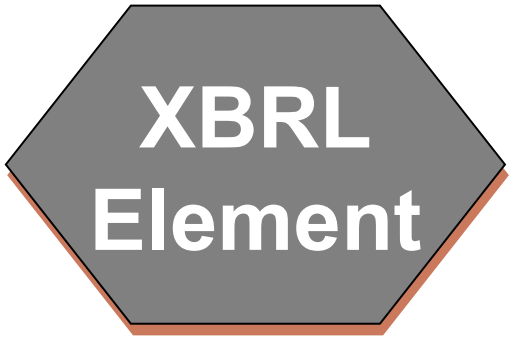

Relate a concept to…

Relationships
To other Elements or Resources

Label

"Cash", "Open Cash Balance", "Closing Cash Balance", "Total Cash"

"Instructions: To complete this section of the report please refer policy number FDI349 Part 29"

Presentation

Assets
- Cash & cash equivalents
- Property plant & equipment
- Goodwill

Total Assets

Calculation

Net Goodwill = Goodwill – Accumulated Amortization

Other Relationship

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XBRL Element

Relate a reporting concept to a resource (documentation)

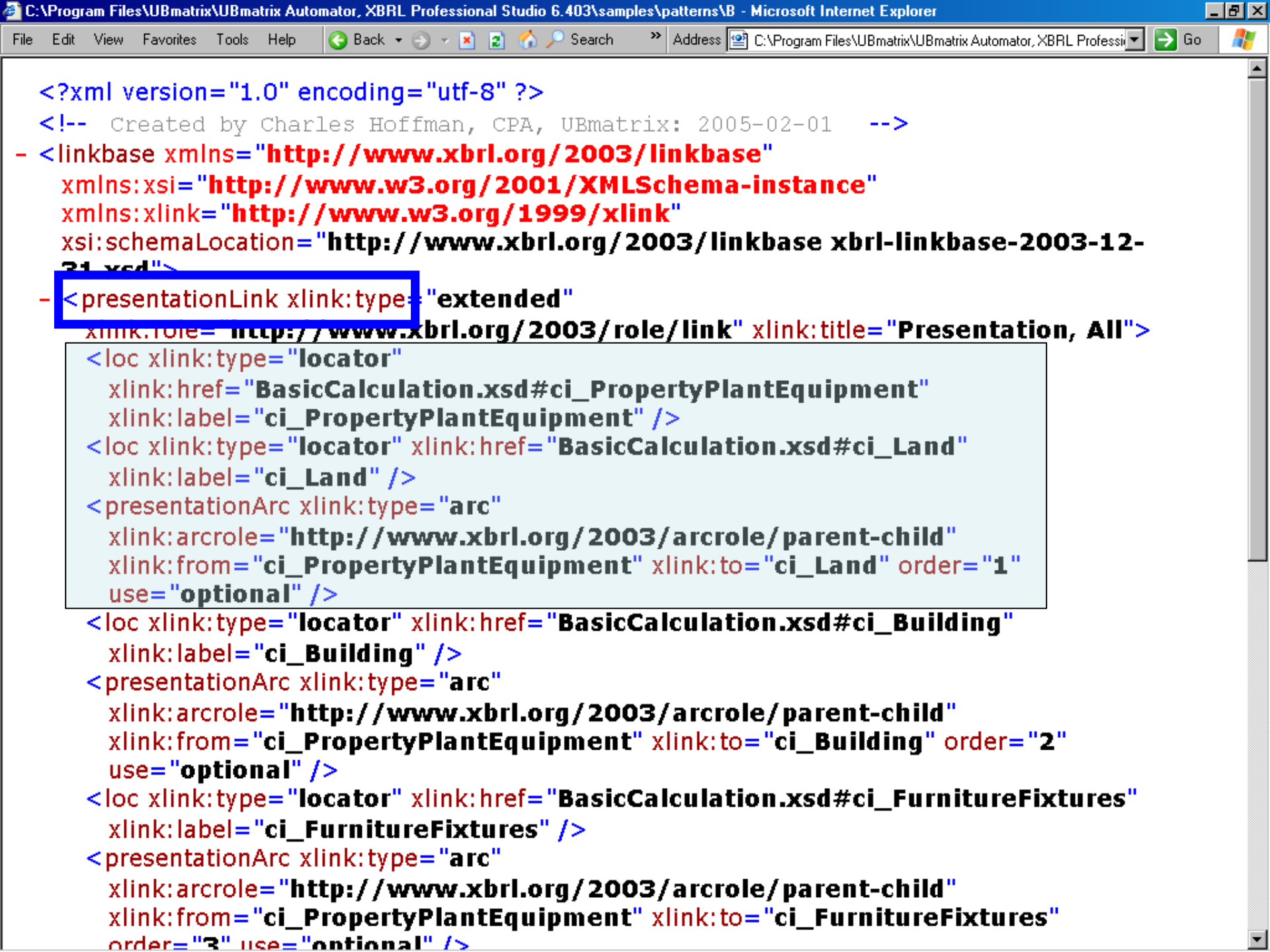
Relationships
To other Elements & Information (Linkbases)

Reference

Publisher : FASB
Name : Statement of Financial Accounting Stand.
Number : 142
Paragraph : 23
URI :
http:/www.fasb.org/pdf/fas142.pdf
URIDate : 2005-08-01

Definition

"Total All Regions" is the total of all regions, and the region breakdown includes "US and Canada", "Europe", "Asia", and "Other".


C:\Program Files\UBmatrix\UBmatrix Automator, XBRL Professional Studio 6.403\samples\patterns\B - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search
Address C:\Program Files\UBmatrix\UBmatrix Automator, XBRL Professi
Go
<?xml version="1.0" encoding="utf-8" ?>
<!-- Created by Charles Hoffman, CPA, UBmatrix: 2005-02-01 -->
- <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 xbrl-linkbase-2003-12-
- <presentationLink xlink:type="extended"
xlink:role="http://www.xbrl.org/2003/role/link" xlink:title="Presentation, All">
<loc xlink:type="locator"
xlink:href="BasicCalculation.xsd#ci_PropertyPlantEquipment"
xlink:label="ci_PropertyPlantEquipment" />
<loc xlink:type="locator" xlink:href="BasicCalculation.xsd#ci_Land"
xlink:label="ci_Land" />
<presentationArc xlink:type="arc"
xlink:arcrole="http://www.xbrl.org/2003/arcrole/parent-child"
xlink:from="ci_PropertyPlantEquipment" xlink:to="ci_Land" order="1"
use="optional" />
<loc xlink:type="locator" xlink:href="BasicCalculation.xsd#ci_Building"
xlink:label="ci_Building" />
<presentationArc xlink:type="arc"
xlink:arcrole="http://www.xbrl.org/2003/arcrole/parent-child"
xlink:from="ci_PropertyPlantEquipment" xlink:to="ci_Building" order="2"
use="optional" />
<loc xlink:type="locator" xlink:href="BasicCalculation.xsd#ci_FurnitureFixtures"
xlink:label="ci_FurnitureFixtures" />
<presentationArc xlink:type="arc"
xlink:arcrole="http://www.xbrl.org/2003/arcrole/parent-child"
xlink:from="ci_PropertyPlantEquipment" xlink:to="ci_FurnitureFixtures"

Instance Document

XBRL Instance Document

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- **Contains the *facts***

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Total current assets	2,008,578	1,551,029

- **Reporting context (e.g., December 2, 2005)**
- **Link to the taxonomy**

Relationship to Taxonomy

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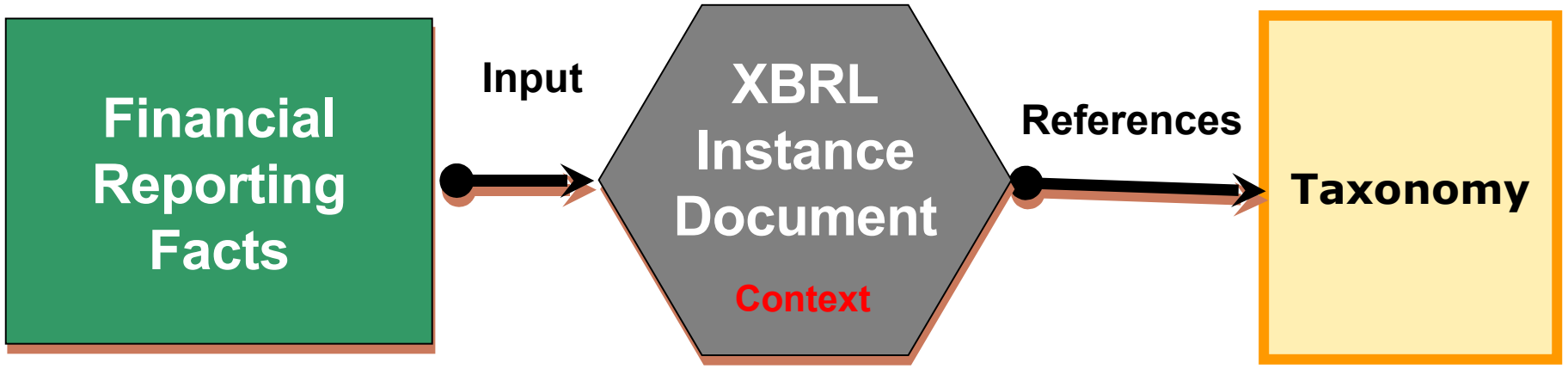
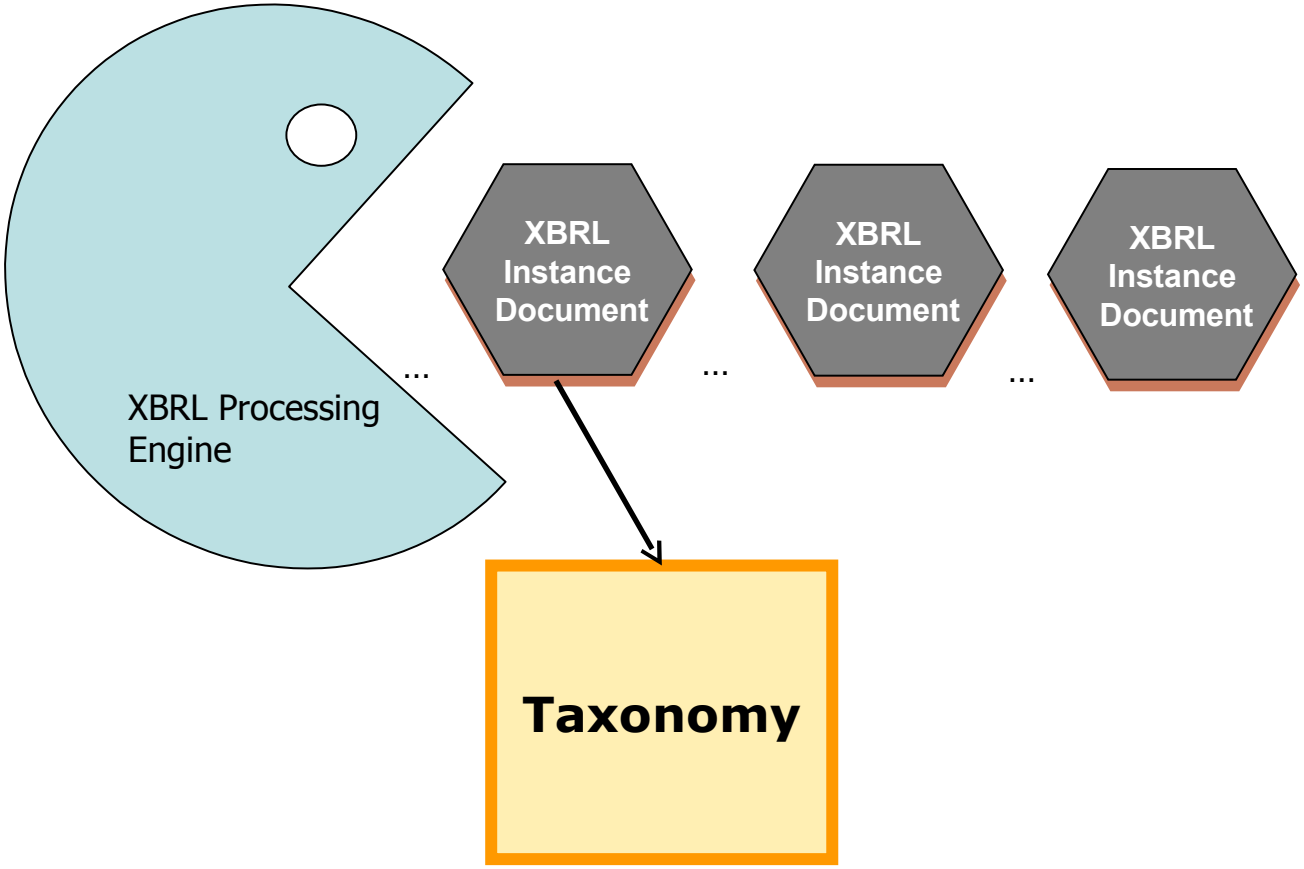
- The facts are constrained by the taxonomy
- Subject to robust internal checking by a validation process via an XBRL Processing Engine

Instance Document

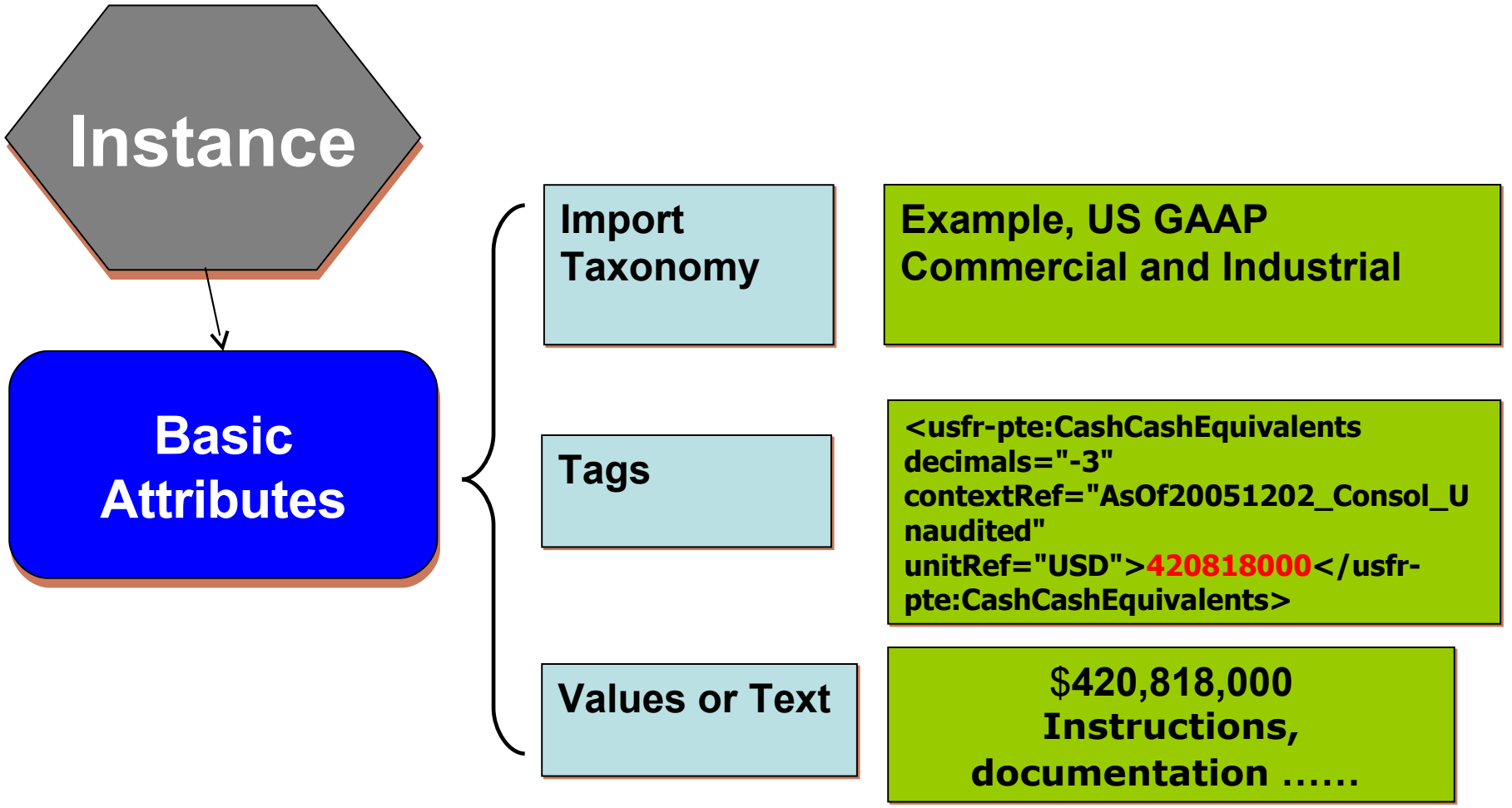



```
<adobe-2004-balance:TotalCurrentAssets
  contextRef="I2005-Consolidated"
  unitRef="units-monetary"
  decimals="0">2008578
  </adobe-2004-balance:TotalCurrentAssets >
```

Instance Document Validation



Anatomy of a Instance Document



Anatomy of an Fact

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UNIT

- Measure
  - Currency: USD, EUR, Shares, EPS

Precision

- Decimal or ~~Precision~~
  - Number of significant figures
  - Number of decimal places

Contexts

- Period
  - Instant: As of 12/31/05
  - Start/End: 1/31/04 – 12/31/05
- Entity
  - Adobe, Systems Inc.
- Segment
  - Headquarters, Midland, Mi., Asia, Europe, North America
- Scenario
  - Audited, Pro-forma, Restated, Unaudited

Footnotes

(2) In 2005, gain on sale of building $2.7 million, net of taxes $0.9 million.

Financial Facts

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Financial Reporting Facts

- **Two types of financial facts (concepts):**
  - **Items, which represent individual facts**
  - **Tuples, which group items**
- **Items must**
  - **State their precision, if numeric**
  - **Refer to a unit of measure, if numeric**
  - **Refer to a context**

Scale is a presentation issue and is not defined in an instance document

Financial Facts - Tuples

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Financial Reporting Facts

- **Two types of financial facts (concepts):**
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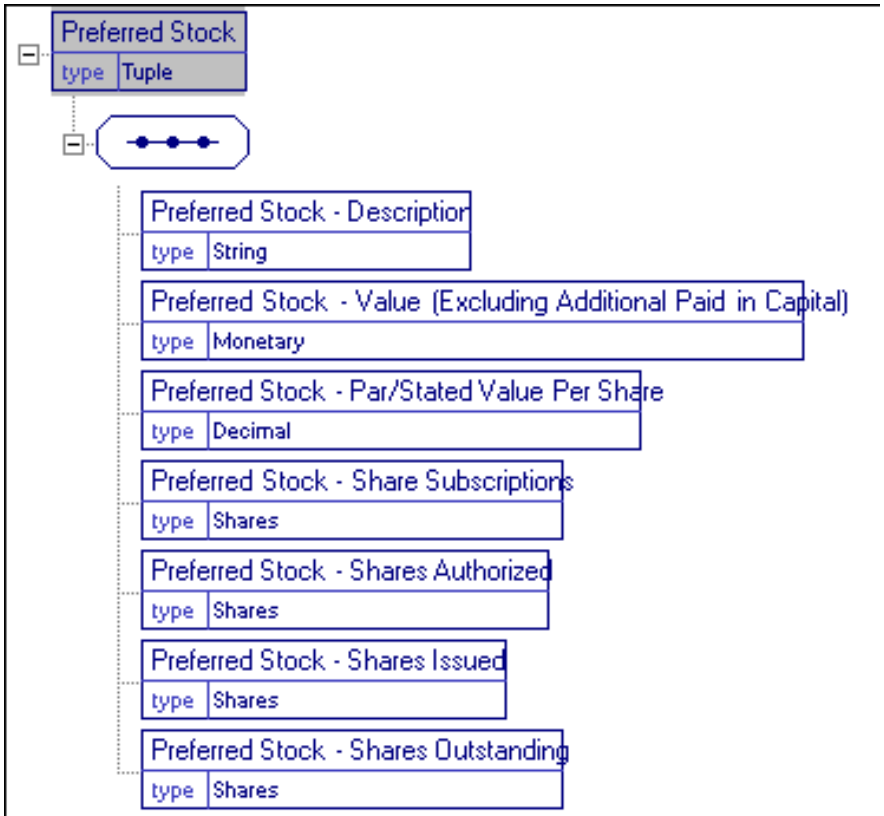

```
      <instant>2004-12-31</instant>
    </period>
  </context>
- <unit id="units-monetary">
    <measure>iso4217:EUR</measure>
  </unit>
  <ifrs-gp:CashAndBalancesWithCentralBanks contextRef="I-2004-AllSectorsAllRegions"
    unitRef="units-monetary" decimals="0">1000</ifrs-
    gp:CashAndBalancesWithCentralBanks>
  <ifrs-gp:CashAndBalancesWithCentralBanks contextRef="I-2004-Belgium"
    unitRef="units-monetary" decimals="0">500</ifrs-
    gp:CashAndBalancesWithCentralBanks>
  <ifrs-gp:CashAndBalancesWithCentralBanks contextRef="I-2004-OtherEMU"
    unitRef="units-monetary" decimals="0">300</ifrs-
    gp:CashAndBalancesWithCentralBanks>
  <ifrs-gp:CashAndBalancesWithCentralBanks contextRef="I-2004-OtherWorld"
    unitRef="units-monetary" decimals="0">200</ifrs-
    gp:CashAndBalancesWithCentralBanks>
  <ifrs-gp:FinancialAssetsHeldForTradingTotal contextRef="I-2004-AllSectorsAllRegions"
    unitRef="units-monetary" decimals="0">1000</ifrs-
    gp:FinancialAssetsHeldForTradingTotal>
  <ifrs-gp:FinancialAssetsHeldForTradingTotal contextRef="I-2004-Belgium"
    unitRef="units-monetary" decimals="0">500</ifrs-
    gp:FinancialAssetsHeldForTradingTotal>
  <ifrs-gp:FinancialAssetsHeldForTradingTotal contextRef="I-2004-OtherEMU"
    unitRef="units-monetary" decimals="0">300</ifrs-
    gp:FinancialAssetsHeldForTradingTotal>
  <ifrs-gp:FinancialAssetsHeldForTradingTotal contextRef="I-2004-OtherWorld"
    unitRef="units-monetary" decimals="0">200</ifrs-
```

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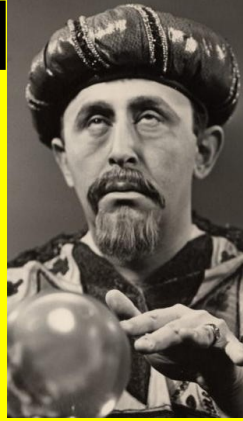
Other assets	66,228	55,328
	$ 2,440,315	$ 1,958,632

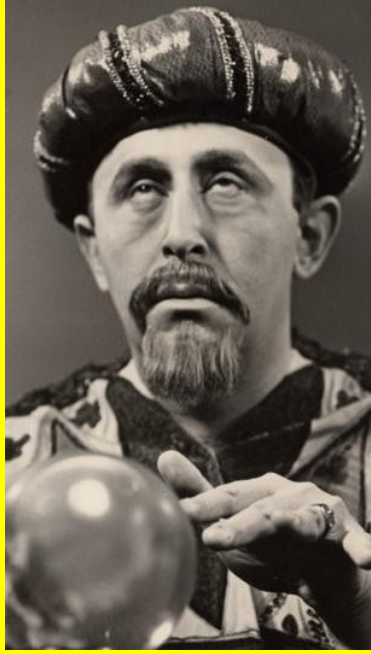
Professor X. Barrel wants to know?



BASED ON ADOBE's Financial Statement

- What would be in schema document and what is its file extension?
- What parts of the statement are attributed to UPC?
- What is UPC?
- Of these linkbases label, presentation, calculation, reference, definition which would you except for the Adobe financial statement?
- What parts make up a context for Adobe?
- Do you see any tuples in that part of the financial statement?
- What is a tuple?
- What is scale and how is defined and where?
- How are entities identified?

Professor X. Barrel wants to know?



- What is a XBRL taxonomy?
- Why are people working hard to use XBRL taxonomies and instance documents?
- What does Nillable and IsNil mean?

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Why does XML not meet the need of business reporting?

XBRL is based on XML

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XBRL is an XML-based markup language for defining business report structure and authoring business information.

Markup languages: XML

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The purpose of XML is:

- To provide a means to communicate the content of a “page” in a system independent manner.
- To provide a means to locate and retrieve information in XML pages

```
<welcomeMsg target=“investor”>Dear Investor!</welcomeMsg>
<welcomeMsg target=“analyst”>Dear Researcher!</welcomeMsg>
<introPar language=“EN”>Welcome to our XBRL.Net website.
            We provide access to the …</introPar>
<report>
        <entity name=“Internation Business Machines”>IBM<entity>
        <assets>40,822,000,000,000</assets>
        <currency >USD</currency>
       <assets>40,700,000,000,000</assets>
                <currency>EUR</currency>
        <year> 2001 </year>
</report>
```

XML Schema and Instance documents

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- For an application to locate certain information
- Needs to know first if information is contained in a particular type (e.g. a financial statement based on the USGAAP) of XML document.
  - The content structure is declared by the document definition
  - The technology used for this is the DDML (Document Definition Markup Language, formerly XSchema)
- For an application to retrieve information from a XML document an instance document must use the tags defined in the DDML document that goes with it.

Why only XBRL fits the bill?

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- There are two big problems with regular XML XSchema and Instance documents from a reporting perspective:
  1. XSchema document structures are fixed. You cannot add “your own” tags to the document structure.
  2. XSchema only provides syntactic validation
- XBRL specification enables creating and extending document structures while providing syntactic validation.
- The XBRL specification enables declaration of semantics and business rules validation.

XML provides the right basis but
is insufficient as an end-to-end solution platform

Why does a markup language need to be flexible from a business reporting point of view?

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- The XML language defines its document structures by means of the XSchema standard which defines these structure implicitly both with respect to the content and the “hierarchy”.
- If we take the financial statements as a reporting example:

	2005 € '000	2004 € '000
Land	5,347	1,147
Buildings	244,508	366,375
Furnitures and Fixtures	34,457	34,457
Computers and Equipment	4,169	5,313
Other	6,702	6,149
Total	295,183	413,441

	2005 € '000	2004 € '000
Land	5,347	1,147
Buildings	244,508	366,375
Furnitures and Fixtures	34,457	34,457
Computers	2,069	3,113
Equipment	2,100	2,200
Other	6,702	6,149
Total	295,183	413,441

- Same “information but different representation of the information”

Regular XML XSchema **DOES NOT ALLOW THIS** flexibility

Why does a markup language need to be flexible from a business reporting point of view?

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Land	5,347	1,147
Buildings	244,508	366,375
Furnitures and Fixtures	34,457	34,457
Computers	2,069	3,113
Servers	1,850	1,600
Desktops	216	1,513
Equipment	2,100	2,200
Other	6,702	6,149
Total	295,183	413,441

- Same “information but with more deta

Regular XML XSchema DOES NOT ALLOW THIS flexibility

Examples of XML syntax validation.

- The structure is validated in the first example where the order of two lines is switched. This would render the document invalid
- The format of the reported value is invalid for Furniture… in the second example
- The Computers breakdown items are not part of the Universe of Discourse and can't be reported about.

	2005	2004
	€ '000	€ '000
Land	5,347	1,147
Buildings	244,508	366,375
Computers and Equipment	4,169	5,313
Furnitures and Fixtures	34,457	34,457
Other	6,702	6,149
Total	295,183	413,441

Land	5,347	1,147
Buildings	244,508	366,375
Furnitures and Fixtures	34,457	many thousands
Computers	2,069	3,113
Servers	1,850	1,600
Desktops	216	1,513
Equipment	2,100	2,200
Other	6,702	6,149
Total	295,183	#VALUE!

This is not sufficient for automated data exchange

What is needed is semantic & business - rule validation

Semantic validation

- **The attentive reader will notice that the first column doesn't add up to the reported total.**
- **The syntax is correct; structure, data types etc are all used correctly but the reported information is "not valid".**
- We **EXPECTED** **the rows to add up to the reported total value and it doesn't.**

	2005	2004
	€ '000	€ '000
Land	5,347	1,147
Buildings	244,508	366,375
Furnitures and Fixtures	34,457	34,457
Computers and Equipment	5,169	5,313
Other	6,702	6,149
Total	**290,836**	413,441

This brings up an important question!

Why did we expect the rows to add up to the reported total in the first place?

How does XBRL solve these problems?

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The fundamental difference between XBRL and XML is that XBRL makes the associations between concepts explicit.

Providing Unlimited Extensibility of Semantics

Of the Language Markup

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Questions ?