Where to start and what to do

XBRL Formula

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Agenda

• Objective und short introduction to XBRL formula
• User scenarios
Objective of this presentation:
- Provide guidance to prepares and filers
- Explain possible application areas of formula linkbase
- Examples are available at the overview section of the XBRL formulas spec website and www.IFRS.org website

XBRL formula is an extension to XBRL 2.1
- Build as an successor for the calculation linkbase to cover additional validation scenarios
  - Cross period validation
  - Cross instance validation
  - Multi dimensional validations
  - Allow more complex validations than plus minus

Requires an XBRL processor which does support formula specification
Introduction

background

- Formula is based on generic linkbase
  - Assertion
  - Formula
  - Variable
  - Filter
  - precondition

- Selection of XBRL semantics through so called “aspects”
  - Validation apply when all fact variables do contain values
  - Aspect selection through filters like conceptName, conceptPeriodType, EntityIdentifier, Period,…

- Example: percentage fact <= 1
  <gen:link xlink:type="extended" xlink:role="http://www.xbrl.org/2008/role/link">  
    <va:valueAssertion xlink:type="resource" xlink:label="loc" id="percentage" test="abs($percentage) le 1" aspectModel="dimensional" implicitFiltering="true"/>
    <variable:factVariable xlink:type="resource" xlink:label="loc_2" id="factVariable_25" bindAsSequence="false"/>
    <variable:variableArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/variable-set" xlink:from="loc_2" xlink:to="loc_2" priority="0" order="1.0" name="percentage"/>
    <cf:conceptDataType xlink:type="resource" xlink:label="loc_3" id="conceptDataType_2" strict="false">  
      <cf:type>  
        <cf:qname>num:percentItemType</cf:qname>
      </cf:type>
    </cf:conceptDataType>
    <variable:variableFilterArc xlink:type="arc" xlink:arcrole="http://xbrl.org/arcrole/2008/variable-filter" xlink:from="loc_2" xlink:to="loc_3" priority="0" order="1.0" cover="true" complement="false"/>
  </gen:link>
User scenarios

- Cross period validations
- Earnings per share validations
- Axis aggregation validations
- Fact equivalence validations
- Common accounting equivalence validations
- Positive / negative fact validations
- Percentage warning
## Cross period validations

<table>
<thead>
<tr>
<th>Aspect</th>
<th>20x2</th>
<th>Aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>6,863,545</td>
<td>Profit, 01.01.20x2 – 31.12.20x2</td>
</tr>
<tr>
<td>Cost of sales</td>
<td>(5,187,530)</td>
<td></td>
</tr>
<tr>
<td>Gross profit</td>
<td>1,685,015</td>
<td></td>
</tr>
<tr>
<td>Other income</td>
<td>88,850</td>
<td>Profit, 01.01.20x2 – 31.12.20x2</td>
</tr>
<tr>
<td>Distribution costs</td>
<td>(175,550)</td>
<td>Retained earnings, 01.01.20x2</td>
</tr>
<tr>
<td>Administrative expense</td>
<td>(810,230)</td>
<td></td>
</tr>
<tr>
<td>Other expenses</td>
<td>106,763</td>
<td>Dividends, 01.01.20x2 – 31.12.20x2</td>
</tr>
<tr>
<td>Finance costs</td>
<td>(26,366)</td>
<td></td>
</tr>
<tr>
<td>Profit before tax</td>
<td>654,956</td>
<td>Retained earnings, 31.12.20x2</td>
</tr>
<tr>
<td>Income tax expense</td>
<td>(270,250)</td>
<td></td>
</tr>
<tr>
<td>Profit for the year</td>
<td>384,706</td>
<td></td>
</tr>
<tr>
<td>Retained earnings at start of year</td>
<td>2,171,353</td>
<td></td>
</tr>
<tr>
<td>Dividends</td>
<td>(150,000)</td>
<td></td>
</tr>
<tr>
<td>Retained earnings at end of year</td>
<td>2,406,059</td>
<td></td>
</tr>
</tbody>
</table>
Earnings per share validations

• Scenario: 1 fact with numerator and denominator + single values also available

• Example:
  Basic earnings (loss) per share = Profit (loss), attributable to ordinary equity holders of parent entity / Weighted average number of shares

  Basic earnings (loss) per share 0.393
  Profit (loss), attributable to ordinary equity holders of parent entity 100.000
  Weighted average number of shares 254.155

• Rounding!
• $100.000 / 254.155 = 0.39346068…$
• $\text{Abs('Profit (loss), attrib. …' div 'Weighted average number of shares') – 'Basic earnings (loss) per share'} \leq \text{Threshold}$
Axis aggregation validations

## Definition linkbase

<table>
<thead>
<tr>
<th>Classes of PPE [axis]</th>
<th>Property, plant and equipment [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land and buildings [m]</td>
<td>800.000</td>
</tr>
<tr>
<td>Land [m]</td>
<td>450.000</td>
</tr>
<tr>
<td>Buildings [m]</td>
<td>350.000</td>
</tr>
<tr>
<td>Machinery [m]</td>
<td>106.000</td>
</tr>
<tr>
<td>Vehicles [m]</td>
<td>94.000</td>
</tr>
<tr>
<td>Ships [m]</td>
<td>57.000</td>
</tr>
<tr>
<td>Aircraft [m]</td>
<td>13.000</td>
</tr>
<tr>
<td>Motor vehicles [m]</td>
<td>34.000</td>
</tr>
</tbody>
</table>
Fact equivalence validations

- Dimensional vs. Non-dimensional
- Example:
  Aircraft = Aircraft [m] in Property, plant and equipment Axis with primary item „Property plant and equipment
Common accounting equivalence validations

- Common rules to improve quality
- Assets = Liabilities + Equity
- Assets (liabilities) = Equity
- Company specific rules
Positive Negative fact validations

- **Simple positive negative rules:**
  - Cost of sales has a debit so should be reported as positive number

- **Conditional positive / negative rules:**
  - Revenue should be positive unless qualified by ‘Elimination of intersegment amounts [m] of Operations segments [axis]

- **Other company specific rules:**
  - Certain concepts bigger as / smaller as
Percentage warning

- Reporting percentages require format 0.XX with unit type pure as defined by XBRL 2.1 spec (equivalent to XX %)
- Still a lot of instances report that wrong

- XBRL formula can also be used as indicator that something might be wrong but not necessarily has to be wrong
Percentage warning

- Websites to start XBRL Formula

- Taxonomy + formula linkbase + sample file
  - http://www.ifrs.org/XBRL/Resources/Resources.htm

- Formula spec documentation
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