1. ATL Transformation Example: Table to SVGBarChart

The Table to SVGBarChart example describes a transformation from a Table model to a SVG file containing several bar chart representations.

1.1. Transformation Overview

The aim of this transformation is to generate a SVG file from the input data contained in a Table model. This file can next be read with an SVG viewer or recent Internet browser.

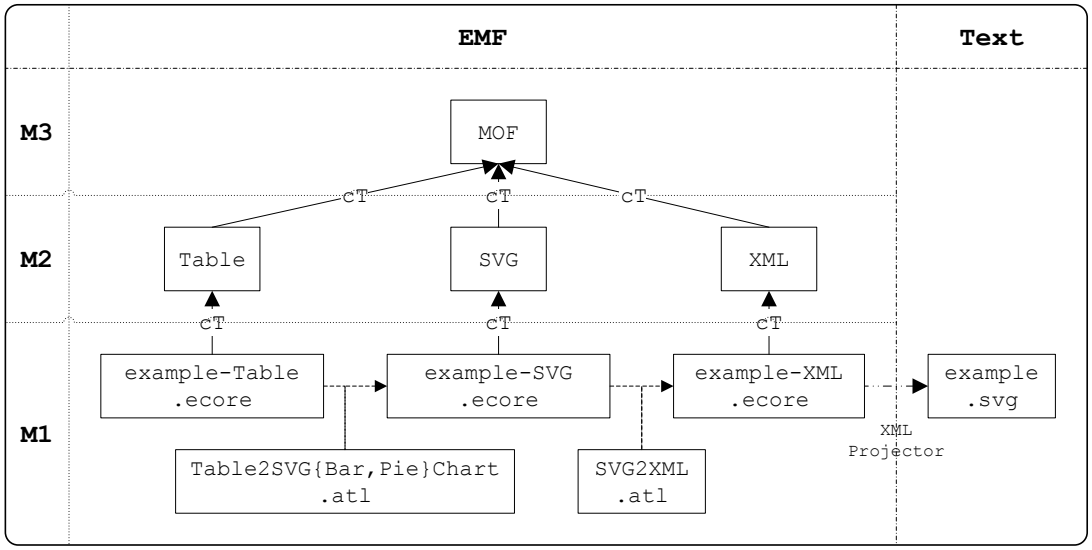

Figure 1: Overview of the transformation

The generation of the output SVG file is realized by a first transformation from Table to SVG, followed by the usage of a projector. The projector consists in a transformation from SVG to XML and the predefined XML extractor (SVG is a XML-like language). The output .svg file contains SVG bar charts for each metric.

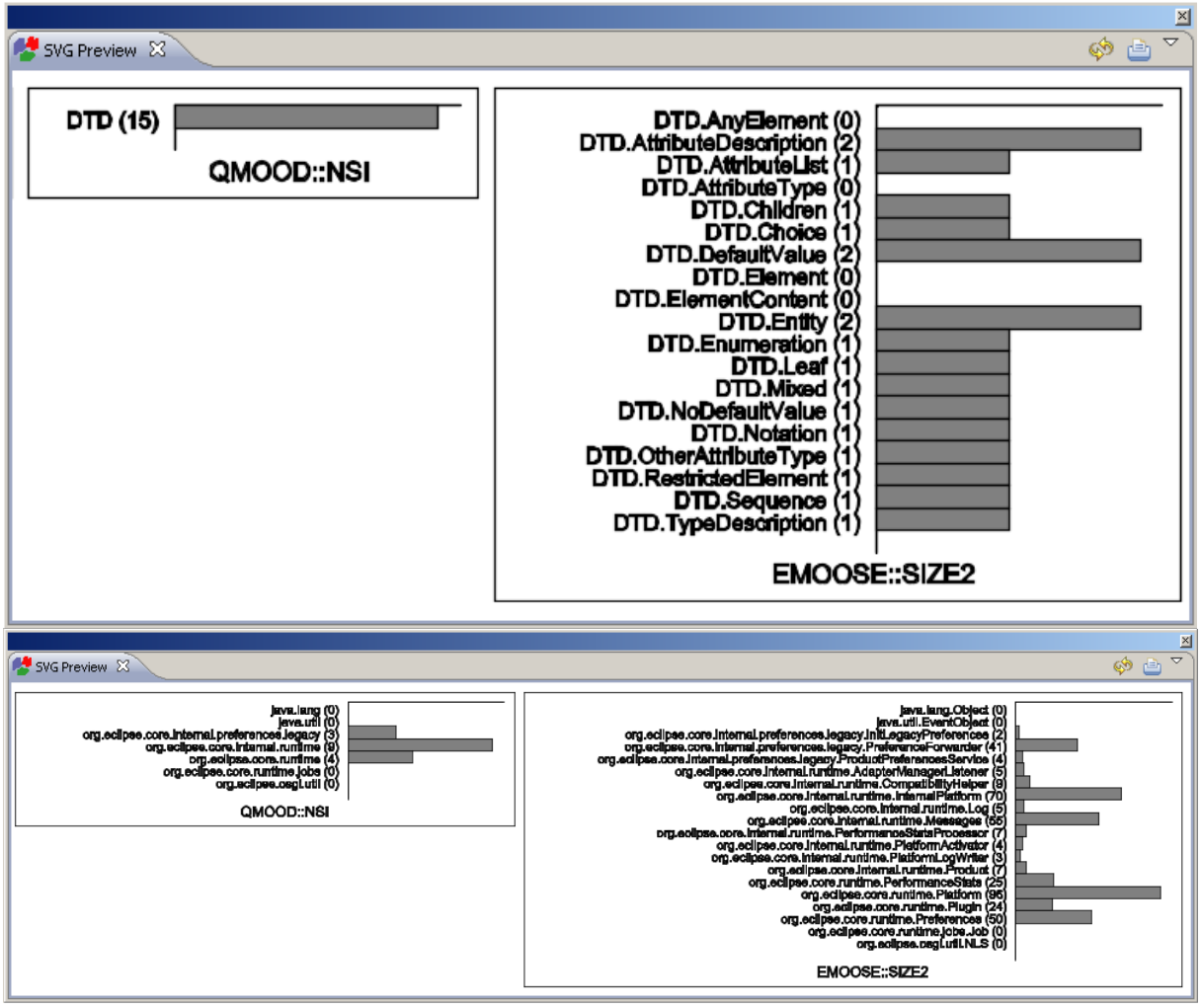

Figure 2: Samples of output SVG file with bar charts

2. Metamodels

2.1. Table

The source metamodel of Table is described in Figure 3 and can be found in the Atlantic Zoo **Error! Reference source not found.**.

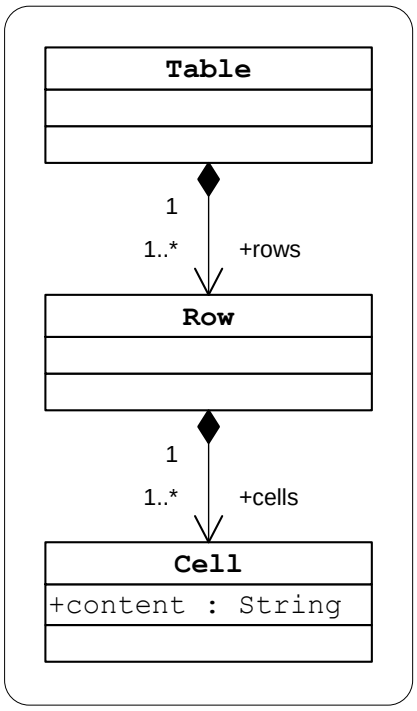

Figure 3: Table Metamodel

Within this metamodel, a Table is associated with a Table element. Such an element is composed of several Rows that, in their turn, are composed of several Cells.

2.2. SVG

This transformation uses only a subset of the SVG metamodel which represents the SVG language. The SVG metamodel can be found in the Atlantic Zoo [2].

3. Transformation from Table to SVGBarChart

3.1. Rules specification

These are the rules to transform a Table model to a SVG model containing bar charts.

- For the whole model, the following elements are created:
  - A SvgFile element composed of a Svg element.
  - A Svg element, linked to the SvgFile element, composed of a Dimension element. The attribute "namespace" is set to "http://www.w3.org/2000/svg" and the attribute "version" to "1.1".
  - Dimension element, linked to the Svg element. Which "width" and "height" attributes are calculated according to the entry data.
- For each Table element, the following elements are created:
  - A G element, linked to the unique Svg element, composed of a Rect, Translate, Scale, Path and Text elements, is created.
  - A Rect element, linked to the G element, is created.
  - A Dimension, AbsoluteCoord and Translate elements, linked to the Rect element, are created. The values of their attributes are calculated according to the entry data.
  - A Text element, linked to the G element, is created.
  - An AbsoluteCoord element, linked to the Text element, is created. The values of his attributes are calculated according to the entry data.
  - A Path element, linked to the G element, is created. The values of their attributes are calculated according to the entry data.
- For each Row element, the following elements are created:
  - A G element, linked to the G element created for the Table element, composed of a Rect and Text elements, is created.
  - A Rect element, linked to the G element, is created.
  - A Dimension and AbsoluteCoord elements, linked to the Rect element, are created. The values of their attributes are calculated according to the entry data.
  - A Text element, linked to the G element, is created.

- An AbsoluteCoord element, linked to the Text element, is created. The values of his attributes are calculated according to the entry data.

3.2. ATL code

This ATL code for the Table2SVGBarChart transformation consists in 16 helpers and 3 rules.

The helper *scale*, *barPattern*, *barMaxWidth*, *fill*, *stroke*, *margin*, *titleFontSize*, *fontSize* and *barHeight* are used to configure the bar chart representation.

The attribute helper *svgFile* is used to store the SvgFile tag for the whole document.

The helper *maxSizeName* is used determinates the width for the display of a name of the first cell of a row.

The helpers *boundingBoxWidth* and *boundingBoxHeight* are used for each table and encloses a bar chart.

The helper *prevWidth* is used to store the last width for all already processed tables.

The helper *scaleFactor* is used to adjust the width of a bar of a chart.

The helper *allValidTables* is used to stores the tables that can be represented as bar chart.

The entrypoint rule SvgFile() allocates the structure of the SVG file. The rule creates a SvgFile element (“svgFile”) is composed of a Svg element (“svg”). The Svg element is composed of a Dimension element (“svgSize”) and his attributes “namespace” and “version” are respectively set to “http://www.w3.org/2000/svg” and “1.1”.

In the do block, the SvgFile element created is associated to the attribute helper svgFile; the viewBox attribute of the SvgFile is set to the max width and height for all valid tables.

The lazy rule Table2BarChart allocates a G for each Table element. The rule creates a G element (“g”) which is composed of Rect (“boundingBox”), Text (“textTitle”) and Path (“axis”) elements. The Rect element is composed of a Dimension (“boundingBoxSize”), AbsoluteCoord (“boundingBoxCoord”) and Translate (“boundingBoxTransl”) elements. The Text is also composed of an AbsoluteCoord element (“txtTitleCoord”). All the values of the attributes of these elements are calculated with the helpers.

This lazy rule is used to draw a scaled frame with a title, and position them in comparison of the other charts.

The lazy rule Row2Bar allocates a G for each Row element. The rule creates a G element (“g”) which is composed of a Rect (“bar”) and Text (“textCaption”) elements. The Rect element is composed of a Dimension (“barSize”) and AbsoluteCoord (“barCoord”)

elements. The Text is also composed of an AbsoluteCoord element ("txtCaptionCoord"). All the values of the attributes of these elements are calculated with the helpers.

This lazy rule is used to draw a bar of the chart, with a name and the value, and is call for each Row element of a Table element.

4. ATL Library TableHelpers

4.1. ATL code

This ATL code for the TableHelpers library consists in 9 helpers.

The helpers *isInteger*, *isReal* and *isPercentage* format a raw value.

The helpers *value* are used to format the value of a cell (adding a unit for a percentage value, truncating a too long real, etc…).

The helper *realValue* is used to convert a percentage value into a real (remove the '%' unit and a real between 0 and 1).

The helper *seqWithoutFirst* returns a sequence without the first element.

The helper *allValidTables* returns only tables that can be represented as a bar chart.

The helper *valueNotNull* is used to check if the content of a cell (converted as a real) is null or not.

5. SVG Projector

The SVG projector is a transformation from SVG to XML followed by the predefined XML extractor.

This can be done in this way, because SVG is a XML-like language.

The SVG element is mapped to the XML Root element.

Other SVG mark-up are mapped to XML Element element.

Each attribute of a SVG mark-up is mapped as a XML Attribute element.

6. References

[1] ATLAS (ATLantic dAta Systems) Official Webpage: http://www.sciences.univ-nantes.fr/lina/ATLAS/

[2] The Atlantic Zoo: http://www.eclipse.org/gmt/am3/zoos/atlanticZoo/