\<AutomationML/\>

The Glue for Seamless Automation Engineering

**Best Practice Recommendation:
Units in AutomationML**

Document Identifier: BPR Units, V 1.0.0

State: August 2018

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Preface

AutomationML provides the basis for an efficient data exchange within the engineering process of production systems. The AutomationML standard series IEC 62714 "Engineering data exchange format for use in industrial automation systems engineering" already contains many use cases and guidelines of how system engineering information is modelled.

In order to specify these definitons with examples, to apply them to specific use cases, and to facilitate the first steps with AutomationML, specific issues for the modelling of data in AutomationML are illustrated in Best Practise Recommendations (BPR).

In addition, the BPR shall provide a consistent realisation for specific use cases and shall thus, complement the AutomationML standard documents.

1   Motivation for specifying the representation of units in AutomationML

An important aspect of the data exchange within the engineering process is the exchange of quantities. A quantity consists of a number – e.g. as a result of a measurement - and a unit of measurement. Units play an important role, since they give the context of how the number must be interpreted.

Different systems of units are available, which standardize one set of base units as well as derived units. IEC 62714-1 recommends to use the International System of Units (SI). Firstly, it only provides the semantical definition, not a syntactical one. But syntax is needed to unambiguously represent a unit in a machine readable manner.

Secondly, the International System of Units (SI) is not sufficient for the scope of AutomationML. Sales, packaging, shipping, transportation, or information technology units are not considered: e.g. dimensionless quantities like pieces, lots, or boxes.

To overcome both problems, this BPR recommends using the UNECE Recommendation N°20 "Codes for Units of Measure Used in International Trade".

2   Realisation

The UNECE Recommendation N°20 "Codes for Units of Measure Used in International Trade" provides a comprehensive set of quantities. Additionally, each quantity has an unambiguous identifier, called "common code". Instead of using the unit itself, the common code shall be used. This shall be stored in the standard header attribute "Unit" of the CAEX element "Attribute". This specification is applicable to IEC 62714 ED1 and ED2.

3 Example

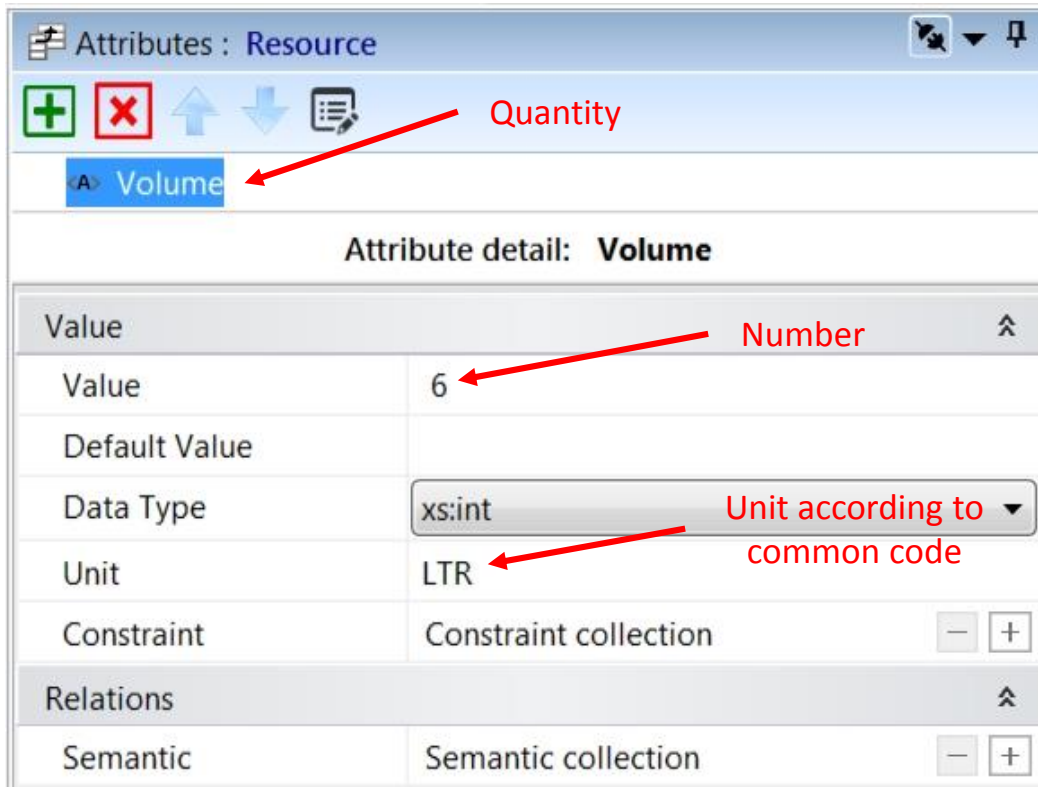Figure 1 and Figure 2 show the implementation with the AML-Editor and the corresponding XML text.

Figure 1 – Unit attribute with the AML-Editor

Figure 2 – XML text of unit attribute

4 References

UNECE Recommendation N°20 "Codes for Units of Measure Used in International Trade" (Available at < http://www.unece.org/fileadmin/DAM/cefact/recommendations/rec20/rec20_Rev7e_2010.zip>)

IEC 62424 ED1, Representation of process control engineering – Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools

IEC 62424 ED2, Representation of process control engineering – Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools