



Dr.-Ing. Rainer Drath, ABB Forschungszentrum, AutomationML Plugfest 14.-15.10.2015

Semantic variety

AutomationML in a heterogeneous tool landscape

AutomationML

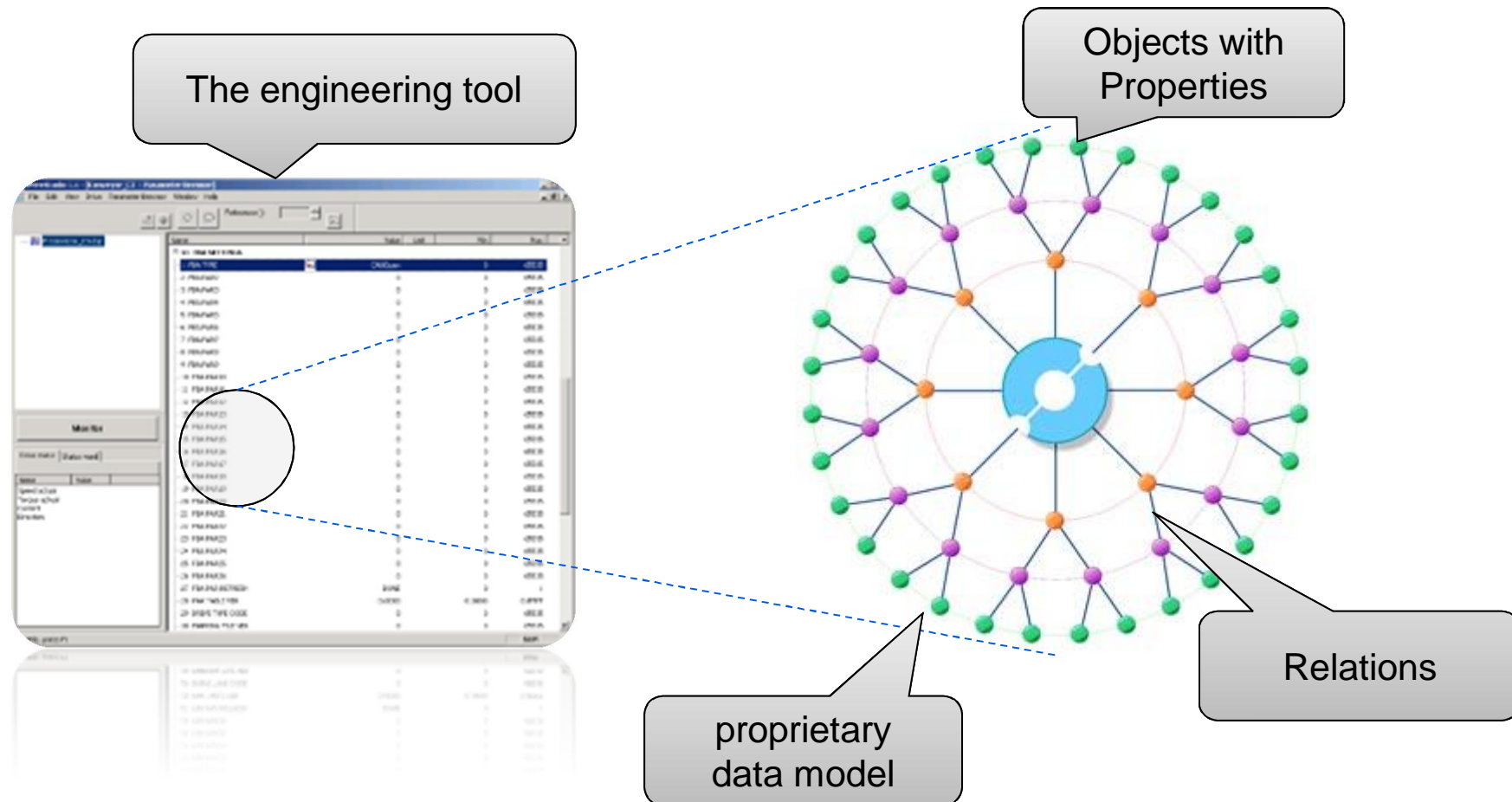
The remaining gap



Domain	Syntax	Semantics
Geometrie: COLLADA (closed data model)	X	X
Logic: PLCOpen XML (closed data model)	X	X
Object structures: CAEX (meta model)	X	?

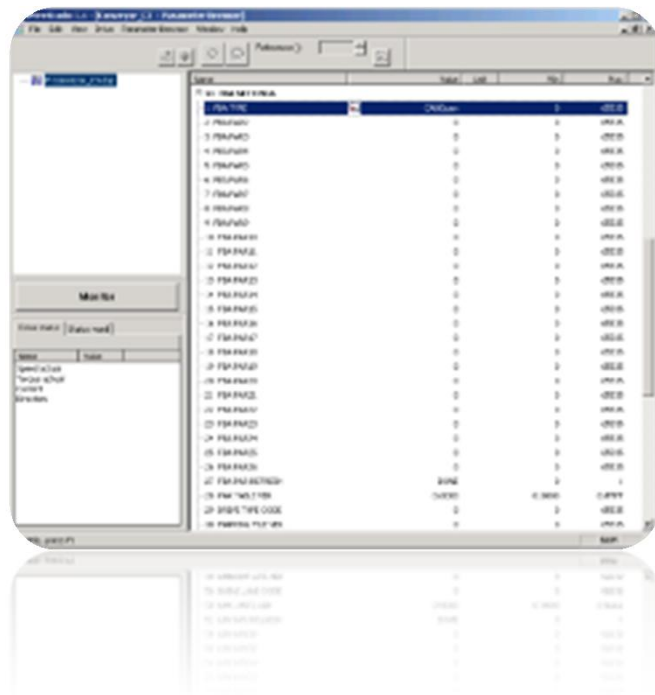
What are we talking about

Every tool has a data model behind



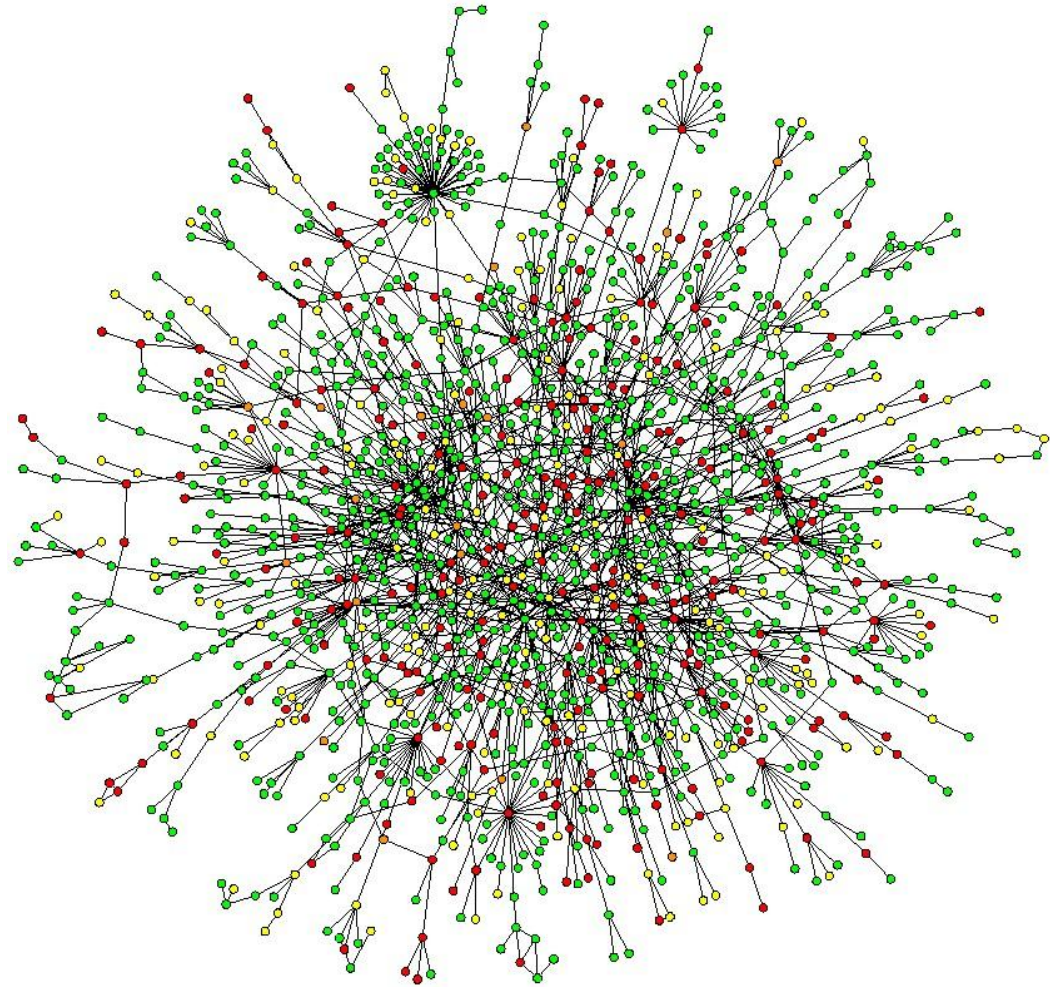
What are we talking about

A data model: The reality



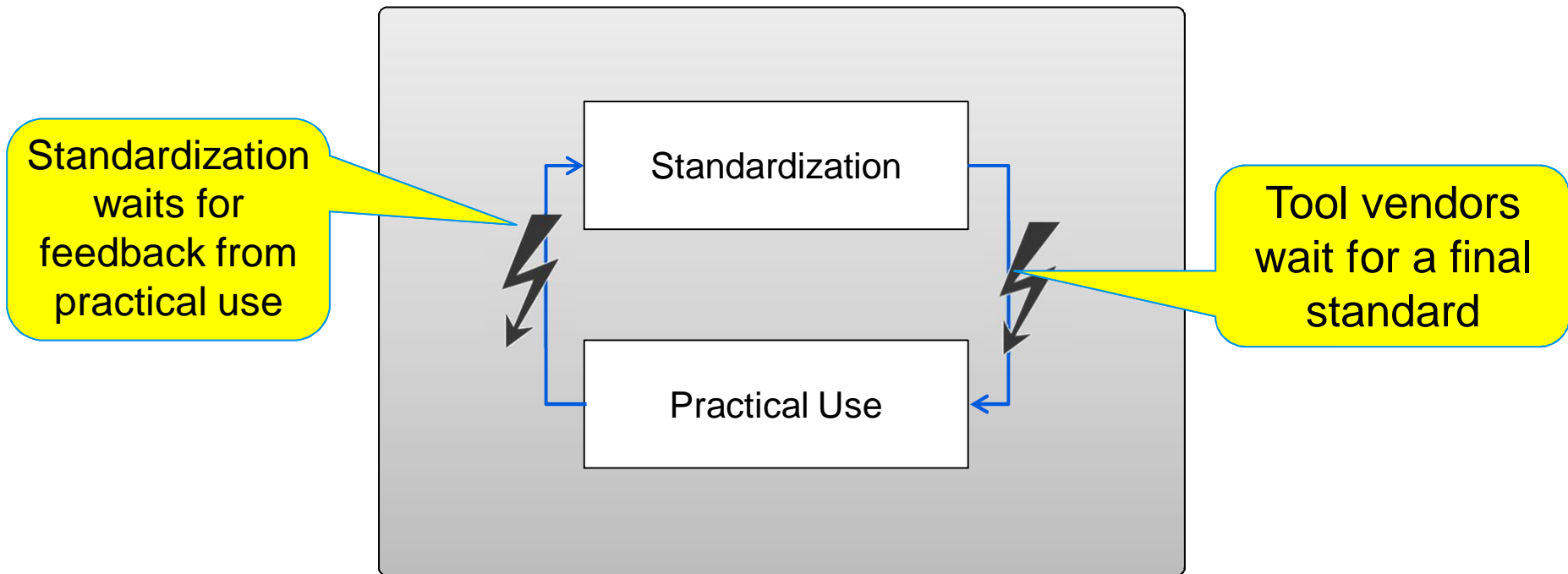
The screenshot shows the ABB PowerLine software interface. The main window displays a table with the following columns: ID, Name, and Value. The table contains a list of data points, including various power line components and their associated values.

ID	Name	Value
1	PSA-TIME	0.000
2	PSA-TIME	0.000
3	PSA-TIME	0.000
4	PSA-TIME	0.000
5	PSA-TIME	0.000
6	PSA-TIME	0.000
7	PSA-TIME	0.000
8	PSA-TIME	0.000
9	PSA-TIME	0.000
10	PSA-TIME	0.000
11	PSA-TIME	0.000
12	PSA-TIME	0.000
13	PSA-TIME	0.000
14	PSA-TIME	0.000
15	PSA-TIME	0.000
16	PSA-TIME	0.000
17	PSA-TIME	0.000
18	PSA-TIME	0.000
19	PSA-TIME	0.000
20	PSA-TIME	0.000
21	PSA-TIME	0.000
22	PSA-TIME	0.000
23	PSA-TIME	0.000
24	PSA-TIME	0.000
25	PSA-TIME	0.000
26	PSA-TIME	0.000
27	PSA-TIME	0.000
28	PSA-TIME	0.000
29	PSA-TIME	0.000
30	PSA-TIME	0.000



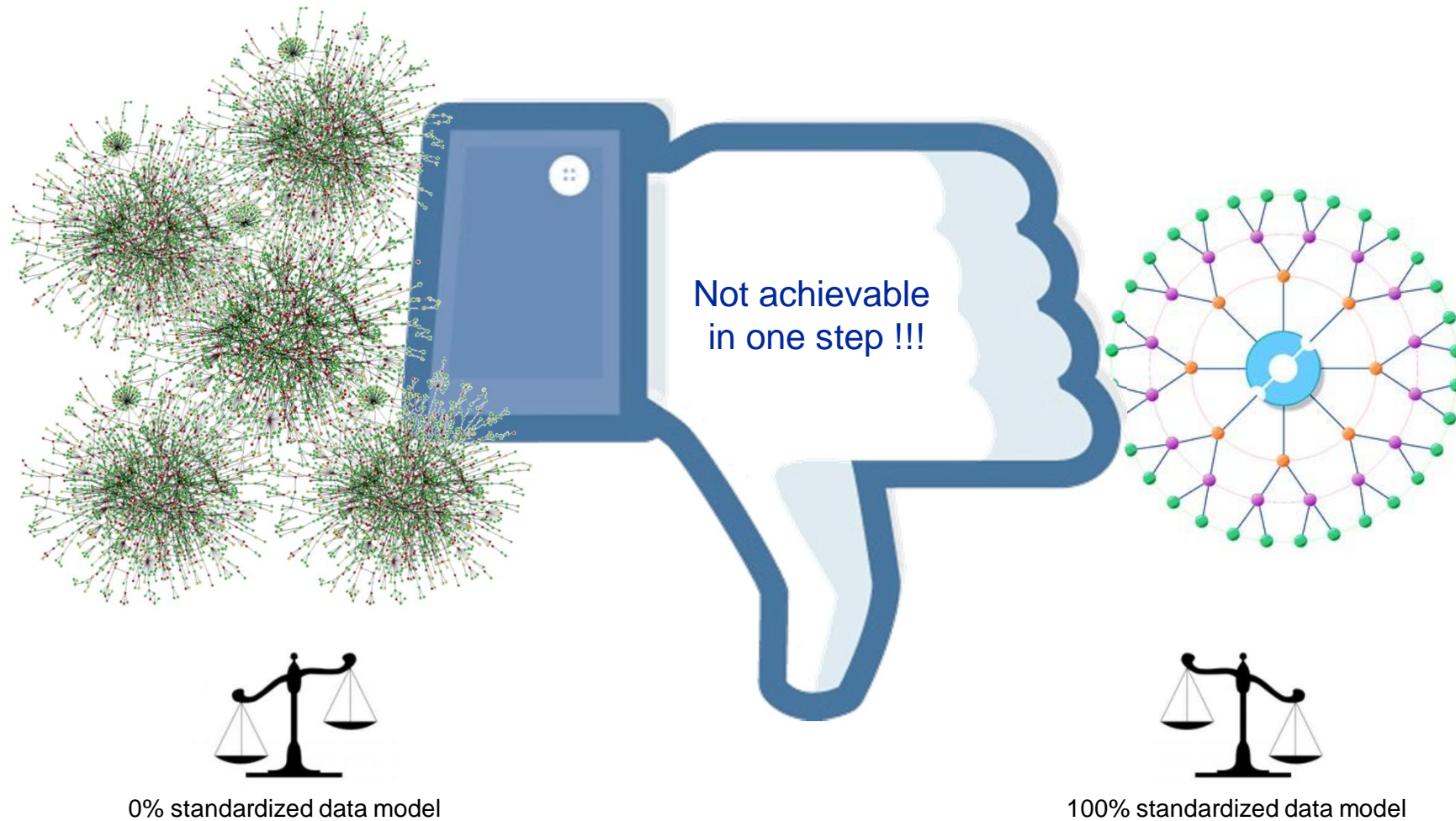
Semantic standardization does not work today

Why?



The challenge

The engineering world model



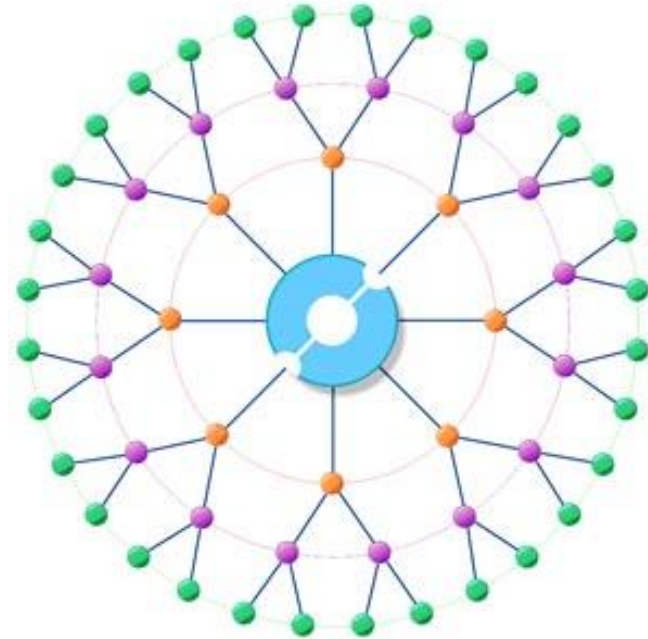
The idea

The idea

A smooth path from proprietary to neutral data models



Standardization level = 0 %



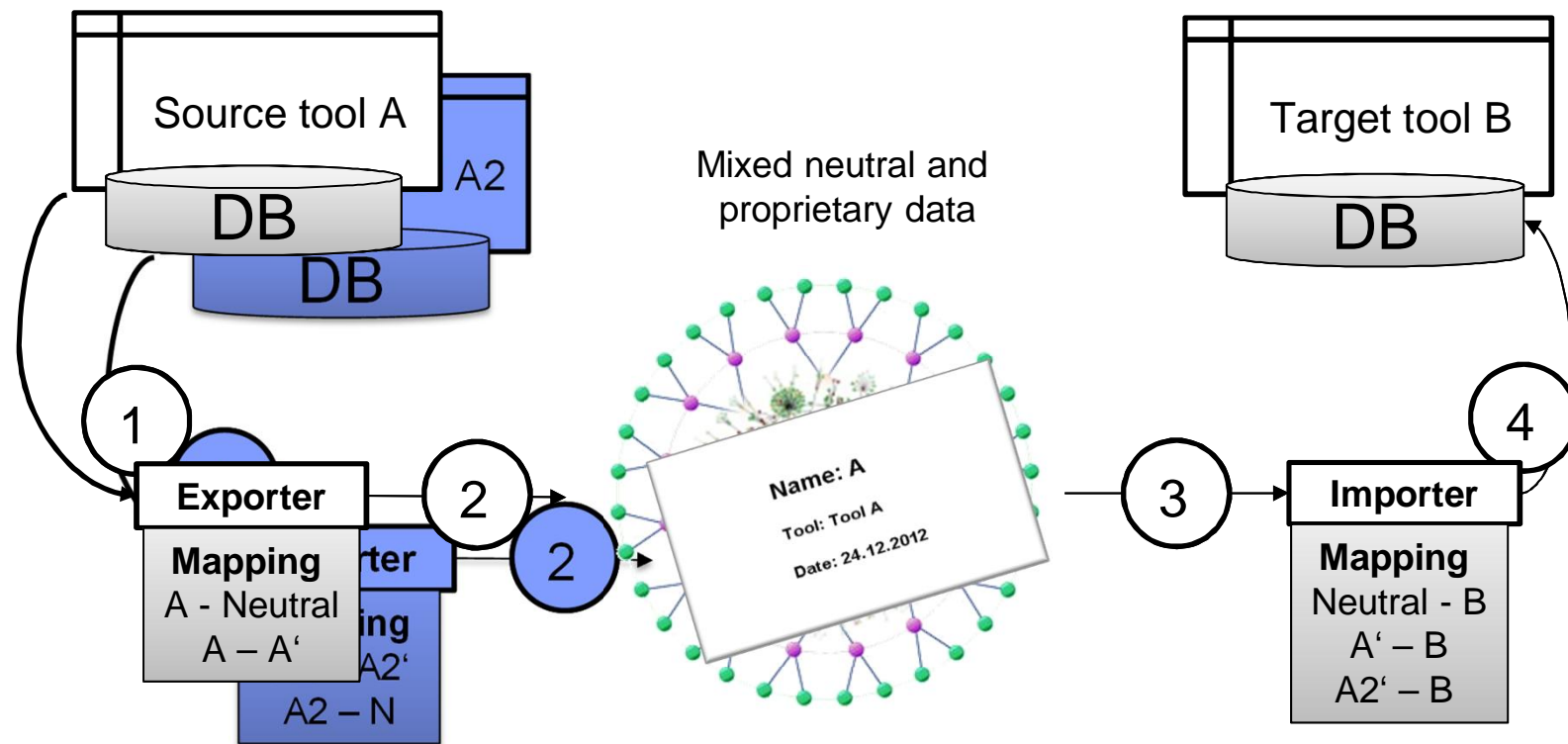
0% < Standardization level < 100%



Standardization level = 100%

General concept

AutomationML allows mixed neutral/proprietary data models



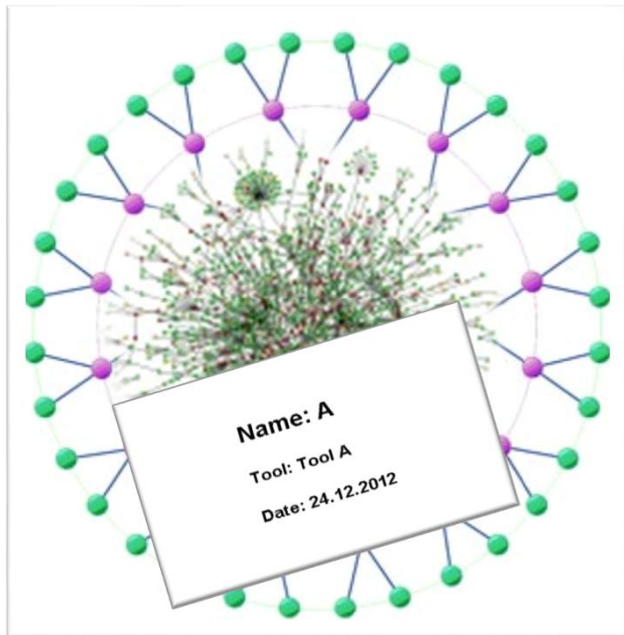
This means...



AutomationML supports data exchange of proprietary object models even if no semantic standard is available

The trick: AutomationML provides "labelling"

This features eliminates the deadlock



XML tag name	Example
WriterName	"a Source Tool"
WriterID	"a Source Tool"
WriterVendor	"a company"
WriterVendorURL	"www.acompany.com"
WriterVersion	"1.0"
WriterRelease	"1.0.1"
LastWritingDateTime	"2012-02-01T16:23:00"
WriterProjectTitle	"eCarproduction"
WriterProjectID	"eCarproduction_LinePLC.prj"

Create a Label

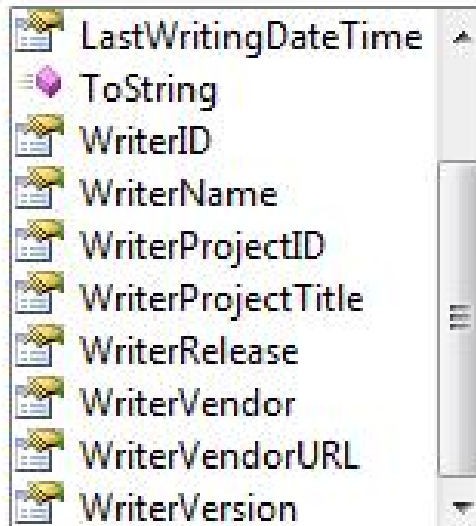
```
MetaInformation m = new MetaInformation();
```

```
myDoc.CAEXFile.SetMetaInformation(m);
```

Read a label

```
MetaInformation m = myDoc.CAEXFile.GetMetaInformation().First();
```

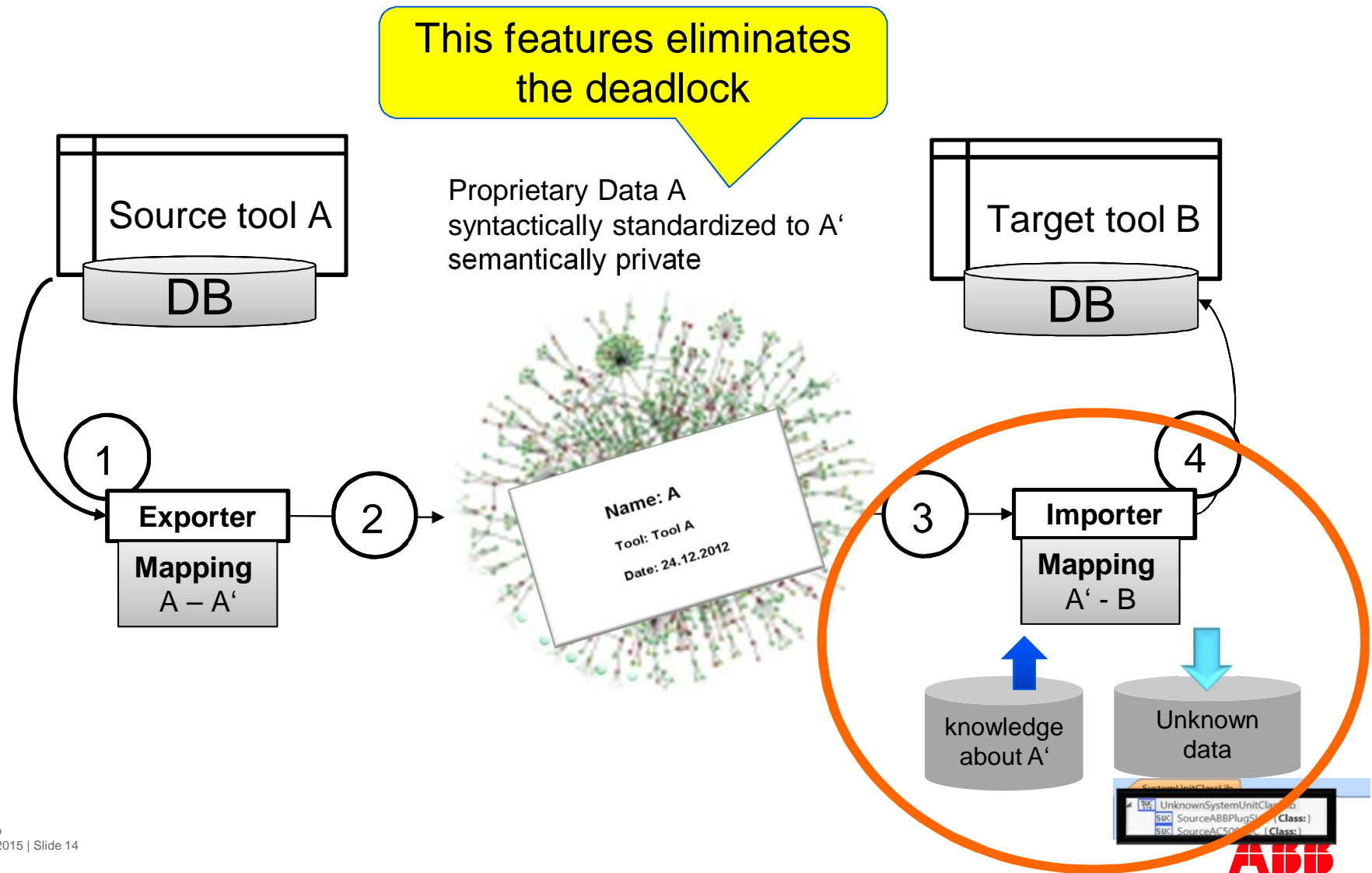
m.



- LastWritingDateTime
- ToString
- WriterID
- WriterName
- WriterProjectID
- WriterProjectTitle
- WriterRelease
- WriterVendor
- WriterVendorURL
- WriterVersion

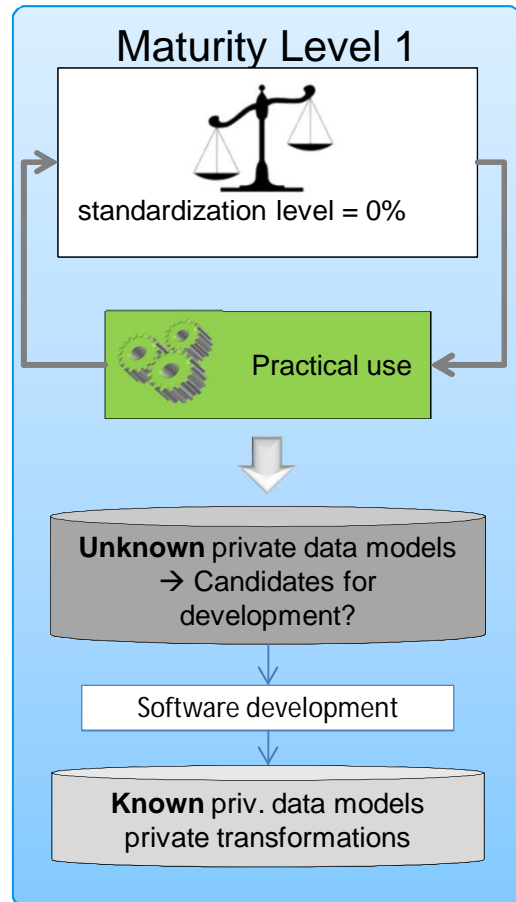
Data exchange between engineering tools

Maturity level 1: 100% proprietary semantics



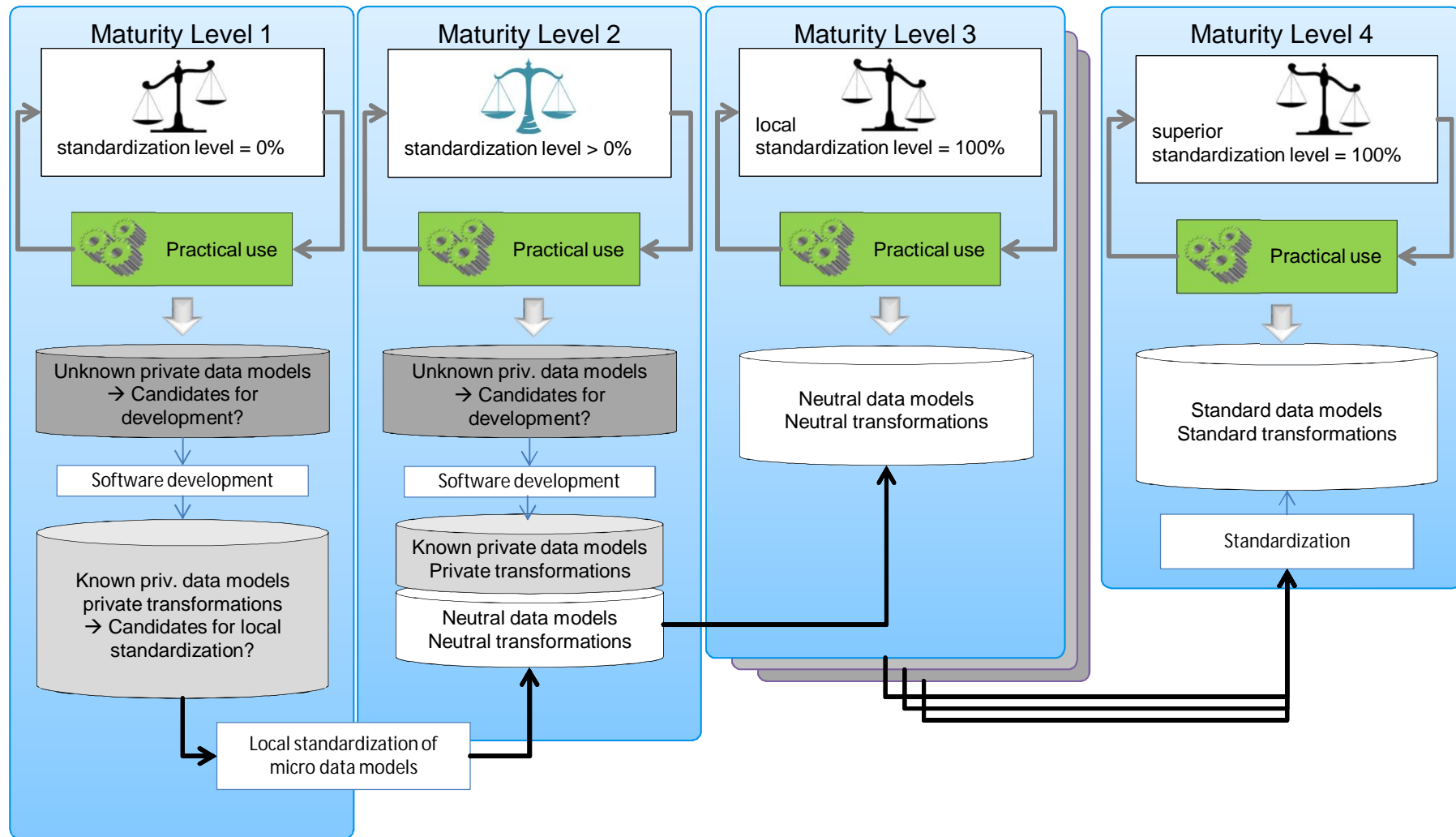
Standardization feedback loop

Maturity level 1 reanimates the feedback loop



- Closing the standardization feedback loop
 - New: Allows performing data exchange without waiting on standards **immediately**
 - New: Makes data models explicitly „visible“
 - Simplifies comparison between A and B
 - New: Allows **automatic derivation** of development needs (software requirement specification)
 - Simplifies exporter/importer development

Standardization feedback loop



Summary



Don't wait on semantic standards.

Power and productivity
for a better world™

