At your side worldwide: The Lenze company.
eCl@ss CONGRESS 2019
Cologne 18th and 19th September 2019
Agenda

Digitalization at Lenze
Requirements, goals and solutions

1. About Lenze
2. Requirements and expectations
   • The challenge
   • The data model
   • Different requirements of the consumers
3. Interfaces to the Consumers
   • Mapping structures and values
4. The actual status
The Lenze family business – from local trading company to global player and provider of drive and automation technologies
1947 – 2018
More than seven decades of experience in the technology industry

1947
The Alquist winder marks the first step into winding technology.

1950
Hans Lenze takes over what is now Lenze SE

1957
The first frequency inverter is introduced to the market.

1977
Construction of the plant in Extertal

1996
The first site outside of Europe

1999
Drive Based Automation

2000
Modular machine control using FAST software modules

2009
Founding of Encoway

2011
From Lenze AG to SE

2012
Continuation of growth with the 2020+ strategy

2017
Logicline

2018
Continuation of growth with the 2020+ strategy
Lenze 2020+
Our strategy is based on three pillars

**Mechatronics**
"We rely on mechatronic products and packages for continued growth in our core business."

**Systems**
"We accelerate our growth by using innovative automation systems."

**Digital**
"We make the most of digitisation opportunities for our own and our customers' profit."

>1 billion in revenue among the TOP 5 providers in our focus industries

Target revenue of ≥ € 850 million + digitisation opportunities = € 1 billion in revenue among the TOP 5 providers in our focus industries
As a strong partner at the side of our customers

- 10 development, production & logistics centres
- Around 50 Lenze companies
- Sales and after-sales service in more than 60 countries
- Sales, engineering support, services and training as core offerings of all subsidiaries and partners
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The Beginning 2014/2015: Data structures & -models
This picture shows 12 different data models (5 on supplier; 7 on customer view)

- Consumers (tools) have different data models depending on the function
- Data management needs an independent data model
- Interfaces for the input
- Interfaces for the output
- The delivery differs according to
  - data elements and
  - different organization data and keys.
Our basic idea
The flow of goods and the to do’s

- Decoupling the data models
- Normalized & standardized data model
- Import & export data from/to partners
Data Suppliers
- Portfolio Management
- Product Management
- Engineering Hardware Inverters
- Engineering Software Inverters

Data Management Landscape

The flow of data

Data Management
- Normalized and standardized data model
- Quality Management
- Release Management
- Terminology Management
- Language Management

Data Consumers
- Lenze internal
  - different XML formats
- external
  - Standards:
    - eCl@ss Basic
    - eClass Advanced
    - ETIM
  - Semi Standards:
    - EPLAN

Terminology
Management

Language
Management

Structure & Data

XML format

Lenze internal

EPLAN

Standards:
The main steps
our Journey to a complete solution

1. Design the internal data model
   • Independent of data models of suppliers and buyers
   • Standardized and normalized without redundancies

2. Deliver the data to the Consumers
   • Standard formats like ETIM, eCl@ss, …
   • CAX Tools (e.g. internal DSD; external EPLAN; …)
   • Editorial system (TIM)

4. Optimize the Data input by an WEB-UI
   • User-specific optimized data view (following the user data model)
   • Responsive design
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The data model
Fulfil different requirements

- Contains extensive technical truth
- Complex hierarchical structure using references and multi used Knowledge
- No redundancy

**Master Data Model**

**Java Script Business Rules**

**Basic Data**

**SAP Product Data**

**CAX Data**
technical Systems
- eClass advanced
- Editorial System
- Lenze Drive Simulation System

**Marketing Statements**

- Crating Basic Data by Rules
- Not maintaining Data only derivation
- Redundancy accepted

**Basic Data**
search and find
- eClass basic, ETIM, ...
- internal and external shop Systems
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## Requirements of data consumers

**Tasks of the data consumers and their requirements**

<table>
<thead>
<tr>
<th>Data consumers and their tasks</th>
<th>Data supply requirements</th>
</tr>
</thead>
</table>
| **Logistic & ERP systems:**  | - Detail depth: +  
- Structure: flat  
- Standard: eCl@ss basic, ETIM |
| • Search and retrieve products | |
| • Support the commercial process | |
| (ordering, delivery goods in) | |
| **Shop systems:**           | - Detail depth: ++  
- Structure: flat  
- Standard: eCl@ss basic, ETIM |
| • Help the customer to find the right product | |
| • Show technical data | |
| • **Present marketing highlights** | |
| **Editorial system:**       | - Detail depth: +++  
- Structure: fix tree structure 5 levels  
- Standard: proprietary |
| • Technical documentation | |
| • Catalogs & help systems | |
| for PDF and HTML documents | |
| **CAx systems:**            | - Detail depth: +++++  
- Structure: tree structure x levels  
- Standard: eCl@ss advanced  
StepXML, proprietary(EPLAN) |
| • CAD systems (mechanical & switchgear) | |
| • Simulation of electrical drive systems | |
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Data flow – functions and rules
Generate the Exports by interfaces from one Data Source
The Mapping has to be done on several Levels

The Mapping works as Pull Method
(the eCl@ss Value is pulled from the Lenze Value - Source)

<table>
<thead>
<tr>
<th>Level</th>
<th>Target</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapping Systems</td>
<td>eCl@ss 10.1</td>
<td>Lenze Portfolio</td>
</tr>
<tr>
<td>Mapping Classes</td>
<td>27-02-32-01: Servo Controller</td>
<td>DST_LIV_INV_TYPE</td>
</tr>
<tr>
<td>Mapping Attributes</td>
<td>0173-1#02-AAD239#006: Supply Voltage</td>
<td>LIV_MAINS</td>
</tr>
<tr>
<td>Mapping Attribute Values</td>
<td>0173-1#07-BAB807#001: 440 V up to 480 V ...</td>
<td>3AC_400_480V: 3 AC 400/480 V</td>
</tr>
</tbody>
</table>
Mapping Attributes
Mapping by functions and rules

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>short Description</th>
<th>Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calculation</td>
<td>Transfer value with conversion</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>ID to ID</td>
<td>Mapping Between List of Values (LOV)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Transfer to Value</td>
<td>Transfer value without transformation</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Set Constant ID</td>
<td>Set fix ID (of LOV)</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Set Constant Value</td>
<td>Set fix Value</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Substring (pos, length) to Value</td>
<td>Transfer part of an string</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>Mapping Table Value to Value</td>
<td>Mapping between values if both (source and target)</td>
<td>No but</td>
</tr>
<tr>
<td></td>
<td></td>
<td>attributes are without a value list</td>
<td>LookupTable</td>
</tr>
<tr>
<td>8</td>
<td>Numerical Range to ID or Value</td>
<td>Mapping a Range into LOV-ID'</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Discrete Value to ID</td>
<td>Mapping of a value to a value ID in the target attribute</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Value Mapping and Substring</td>
<td>Mapping between part of source value with value list</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Transfer Single Value to Range</td>
<td>Creating a value range with the help of a single value</td>
<td>Yes</td>
</tr>
</tbody>
</table>
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The actual Status
Transform Data to Consumers

Function Set
Structure Transfer

Lenze Master to Editorial System

Lenze Master to Lenze Flat

Lenze Master to eCl@ss Advanced

Generic Rules

Master Data Model

Basic Data

SAP Commercial Class System

Function Set
Mapping Attributes and Values

Attributes to eCl@ss, ETIM, ...

Values to eCl@ss, ETIM, ...

Attributes to eCl@ss

Values to eCl@ss

Generic Rules

Lenze DSD (Simulate Drive Systems)

Lenze Editorial System

Lenze Shops

create BMEcat including eCl@ss Basic, ETIM, ...

create BMEcat including eCl@ss Advanced
Thank you for your attention.

Lenze Drives GmbH

Presenter: Dieter Schöneberg
Department: PPS
Address: Hans-Lenze-Straße 1 | 31855 Aerzen | GERMANY
Phone: +49 5154 82-2414
Fax: +49 5154 82-1114
E-mail: Dieter.Schoeneberg@lenze.com

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