Introduction to NE 100 Interface in CAE systems and to the LOP technology

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Welcome

- **Dr. Peter Zgorzelski**, works in the Process Management Technology staff unit at Bayer Technology Services GmbH and is Office Manager of PROLIST® INTERNATIONAL. He is active in NAMUR, eCl@ss, DKE and IEC working groups.

Key benefits through use of the LOP technology:
- Simplifying the engineering process
- Raising the plant documentation quality
- Reducing the costs in engineering and procurement
Contents

1. Engineering and procurement workflows today and the ones using Lists of Properties (LOP)
2. Structure of an LOP
3. What does one need in a CAE system for implementing the NE 100 interface
4. NE 100 and its international standardization
5. Benefits using LOP technology
Engineering workflow yesterday and today

Supplier site

- handled paper documents

Product database

Catalogue

Research & development

Sales

Offer

Fax

Customer site

Phone lines

Procurement

Requirement

Master data

CAE

Planning engineer

Plant engineer

Plant documentation

Maintenance data

Materials Mgmt.

Product data

Catalogue

Fax

Inquiry

Order

Fax

PCS engineer

- handled paper documents

Product database

Catalogue

Research & development

Sales

Offer

Fax

Procurement

Requirement

Master data

CAE

Planning engineer

Plant engineer

Plant documentation

Maintenance data

Materials Mgmt.
Engineering Workflow

Question:
Can we still afford the costs of this expenditure?

The answer of PROLIST:
- No.
- We want to reduce engineering and transaction costs for procurement and sales in the area of process control technology.
- To achieve this objective we need international standards concerning LOP technology as well as processes with standardized workflows using XML.
Engineering workflow tomorrow

Supplier site

Web (Internet)

Customer site

Research & Development

Product database

Sales

Offer (with CAE-relevant data)

Procurement Framework contracts

Order

Inquiry

Supplier y

Supplier x

Device data

Comparison

Product data

Materials Mgmt

Plant documentation

CAE

PCS engineer

Order

Device data

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Supplier y

Plant engineer

- XML transaction file handled electronically

October 7, 2009
Dr. Zgorzelski, Bayer Technology Services, PROLIST Office Manager
Use of the Lists of Properties (considering live cycle)

Manufacturer /Supplier

Internet

Customer

Sell system

Planning system

Further orders

Equipment data as delivered

Equipment data as delivered

Equipment data

Development system

After sales service

Equipment data

Equipment data

Equipment data as delivered

Equipment data as delivered

Equipment data

- Operating LOP
- Device LOP (in inquiry view)
- Device LOP (with all properties)

LOP – List of Properties
Interpretation of a block of properties

LOP "Control valve"
- Material
- Colour
- Weight
- Geometry

Property block "Geometry"
- Length
- Width
- Height

LOP "Control valve"
- Material
- Colour
- Weight
- Geometry

Interpretation

Property block consists_of

Material

Colour

Weight

Geometry

Length

Width

Height
Illustration of cardinality

Structural data

- LOP "Control valve"
  - Material
  - Colour
  - Weight
  - Geometry
  - Number of Process connections
  - Process connection 1
    - Process connection n

- Process connection consists of

  Property block "Process connection"
  - Designation
  - Nom. size
  - Schedule

Transaction data

- LOP "Control valve"
  - Material
  - Colour
  - Weight
  - Geometry
  - Number of Process connections
    - Process connection 1
      - Designation
    - Process connection 2
      - Designation

Interpretation

depends_on

value

value
### A List of Properties with block structure

#### Device list of characteristics of flowmeter (mass, Coriolis)

<table>
<thead>
<tr>
<th>Device data</th>
</tr>
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<tbody>
<tr>
<td>Equipment labeling/tag</td>
</tr>
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<table>
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<tr>
<th>Identification</th>
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<td>Manufacturer</td>
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<td>Supplier</td>
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<tr>
<td>Product name</td>
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<td>Product type</td>
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<td>Article number</td>
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<tr>
<td>EAN code</td>
</tr>
<tr>
<td>ERP system inventory number</td>
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<tr>
<td>Software version</td>
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<tr>
<td>Hardware version</td>
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<td>Serial number</td>
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<tr>
<td>Electronic insert</td>
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<td>Device labeling/tag</td>
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<td>Nameplate language</td>
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<th>Function and system design</th>
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<td>Measuring principle</td>
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<tr>
<td>System architecture</td>
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<tr>
<td>Parameterization software</td>
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<tr>
<td>Communication and data processing</td>
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<table>
<thead>
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<th>Digital communication</th>
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<tr>
<td>Protocol type</td>
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<tr>
<td>Communication interface</td>
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<tr>
<td>Maximum signal cable length</td>
</tr>
<tr>
<td>Signal cable shielding</td>
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</table>
Prerequisite for gaining the benefits

• The LOPs technology can be implemented in tools like CAE systems
• The most important precondition for achieving all of the benefits for process control equipment on the user side is to have a CAE system with an implemented NE 100 interface

• Note: Nobody who uses LOPs needs to know how the LOPs are structured. He/she merely requires an appropriate tool.
NE 100 and its international standardization

- PROLIST INTERNATIONAL creates LOPs for process control equipment and publishes them in the NAMUR recommendation NE 100
- The contents of NE 100 has been channeled into an international standardization process.
- The first standards are introduced in the standard series IEC 61987: „Industrial-Process Measurement and Control - Data Structures and Elements in Process Equipment Catalogues”
  - Part 10: “Lists of Properties (LOPs) for Industrial-Process Measurement and Control for Electronic Data Exchange - Fundamentals”
    - has FDIS status, till end of 2009 will be IS
    - has CD status (August 2009)
- Next standards will follow
PROLIST INTERNATIONAL members

October 7, 2009
Dr. Zgorzelski, Bayer Technology Services, PROLIST Office Manager
### CAE Systems’ Forms

#### Operating parameters

<table>
<thead>
<tr>
<th>Supplier / Manufacturer</th>
<th>Device specification</th>
</tr>
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<tbody>
<tr>
<td>OLOP</td>
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<tr>
<td>DLOP</td>
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#### General Information

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<th>Area Classification</th>
<th>Location</th>
<th>Line No.</th>
<th>Line Size</th>
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<th>Pipe Material</th>
<th>Equipment No.</th>
<th>Pipe Class</th>
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#### Fluid Information

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<td>Pulsating Flow</td>
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<td>Vibrations</td>
<td>Required Accuracy</td>
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<td>Construction Type</td>
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<td>Face/face Dimension</td>
<td>Flansch DIN</td>
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<td>Max.</td>
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<td>Power Supply</td>
<td>Signal/Load Power Consump.</td>
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</table>
Specification Sheets (ISA) and Lists of Properties (PROLIST)

ISA TR20

NE 100

Operating Parameters:

Device Specification:

The same philosophy!
CAE relevant data for implementation of the NE 100

- Automatic transfer of description and designation of the terminals from the LOP to the loop sheet
## Generation of the intrinsic safety confirmation document

### CAE system

### PRO-SPEC

<p>| | | | | | | | | | |</p>
<table>
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<td>µH</td>
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<td>µH</td>
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<td>Maximum der Induktivität/Widerstandswiderstand (R0)</td>
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</table>
What does one need in a CAE system for implementing the NE 100 interface?

Visualization of the entire LOP sent to and received from supplier in SPI

A mapping tool is needed for the implementation of the NE 100 interface

(only for a subset of the received LOP)
Availability of LOPs and appropriate tools

- CAE systems with implemented NE 100 interface:
  - PRODOK
  - SmartPlant Instrumentation (in progress)
  - Comos (in progress)
  - other CAE system manufacturers are already talking with PROLIST

- Other available tools for the handling of LOPs
  - PRO-SPEC (creating, reading and comparing of LOPs in XML files and other functions)
  - PRO-VIEW (only reading of LOPs in XML files)
Which LOPs are already available?

- 51 Sensor types
- 17 Actuator types
- 37 Types of interface devices
Which LOPs are already available?

1 complete Low Voltage Switchgear

2 types of electrical motors (covering ca. 75% of the motors that are used in the chemical industry)

Projected: Frequency converter
Main benefits for equipment users by utilizing PROLIST Lists of Properties

• Optimization of the integration of data from planning, purchasing, and commissioning through to maintenance

• Streamlining the engineering process

• No need to enter master data into your own CAE system

• Reduction of transaction costs (5 - 15%)

• Major improvement in data quality, i.e. virtually error-free device data (no manually caused input errors)

• Reduction of effort as regards creation (investment) and maintenance of the plant documentation (maintenance)

• Improved comparability of device data in offers
Review of Key Points

• We have shown how through the use of the LOP technology
  – the engineering process can be simplified,
  – the plant documentation quality can be raised and
  – the costs in engineering and procurement can be reduced

• Major benefits:
  – simple integration of process control equipment data in one’s own
    CAE system
  – avoidance of expensive, inflexible and error-prone manual data input

• The key benefits has been proven:
  – Simplifying the engineering process
  – Raising the plant documentation quality
  – Reducing the costs in engineering and procurement
Q & A

• Any questions about the topics covered?
Back up slides
Core engineering workflow of PROLIST

**Supplier y**

- Inquiry:
  - ALOP - Administrative List of Properties
  - OLOP - Operating List of Properties
  - DLOP - Device List of Properties
  - CLOP - Commercial List of Properties

**Supplier x**

- Technical offer: Automatically or semi automatically

- (with CAE related data)

**Internet**

- XML

**Customer b**

- Process technology data
- Power supply
- Ambient conditions
- Function

**Customer a**

- CAE system
- Install. diagr.
- Wiring diagram
- Loop sheet

**Bottom**

- ERP
- Other DB

**Right**

- Product database
- Sales

- Technical offer:
  - ALOP
  - OLOP
  - DLOP
  - CLOP

**Left**

- ALOP - Administrative List of Properties
- OLOP - Operating List of Properties
- DLOP - Device List of Properties
- CLOP - Commercial List of Properties

Dr. Zgorzelski, Bayer Technology Services, PROLIST Office Manager
Key role of CAE systems

- For the practical applications of LOPs according to IEC 61987-10, CAE systems play a decisive role on the customer side. They support and increase the efficiency of the work.

- One important condition is that all documents in the form of a transmission files, for example, should be capable of being exported from and imported to the system. It should also be possible to import CAE-relevant data such as terminal designations. The CAE systems should be capable of automatically accepting the master data of a new device type. Another important factor is the ability to compare the technical device data from several offers in the same CAE system.