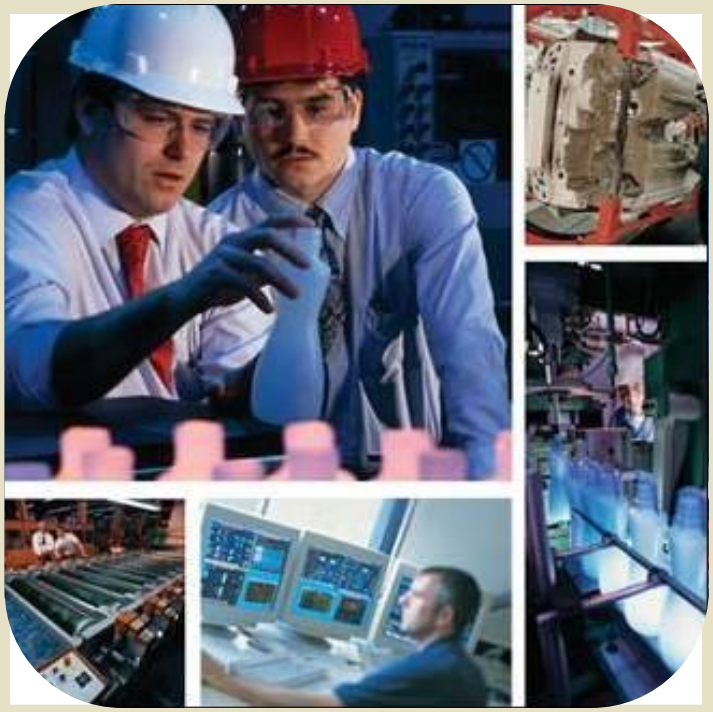
LISTEN.
THINK.
SOLVE.®



Practical Issues in Electronic Cataloging for a Global Manufacturing Company

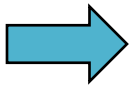
D. Carnahan. P.E.
Advanced Technology

(Confidential – For Internal Use Only)

Allen-Bradley • Rockwell Software

Rockwell Automation

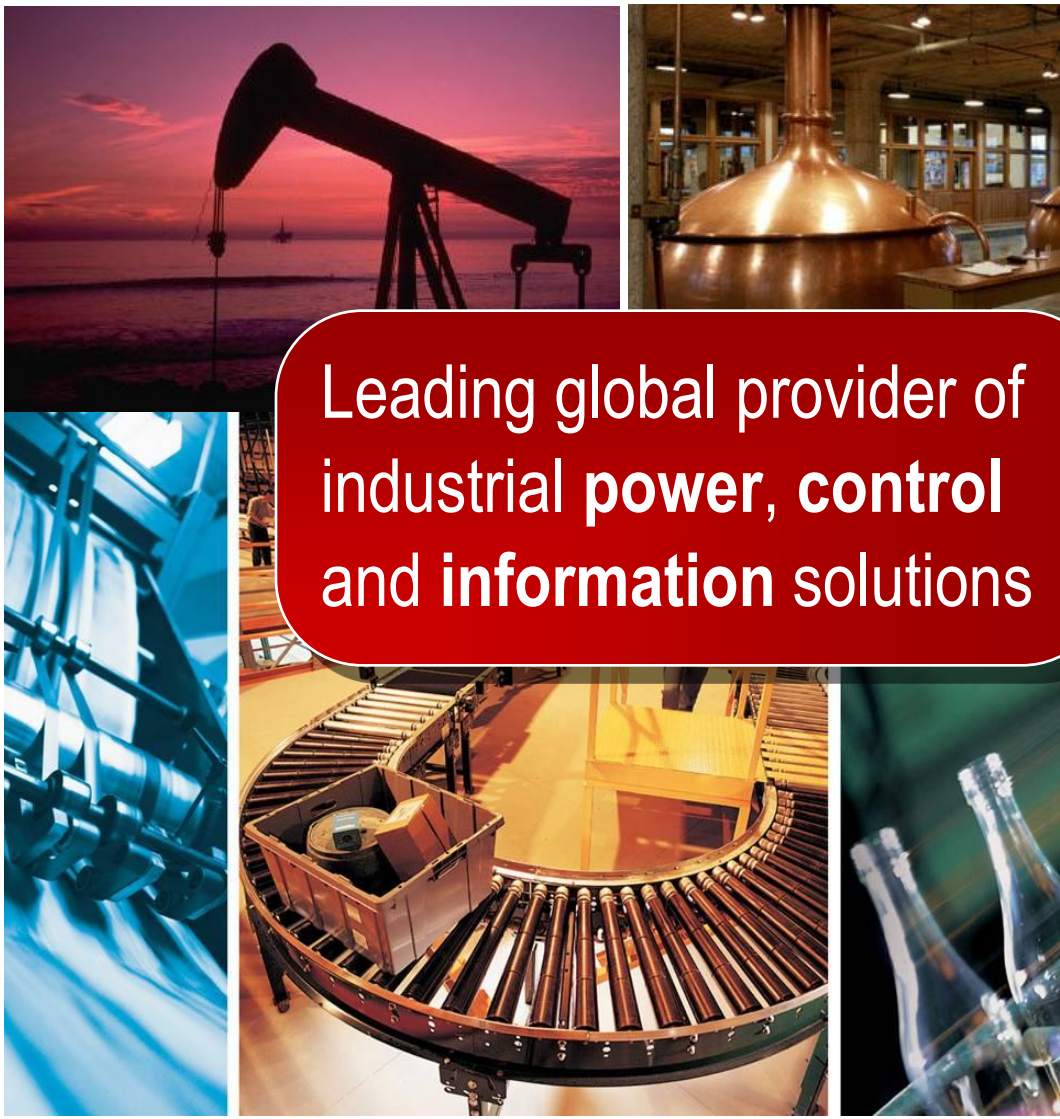
Agenda



- Company background & perspective
- Drivers for improved data descriptions
- Role of standards
- Practical examples for electronic catalogs
- Summary

Rockwell Automation At A Glance

- Fiscal 2010 Sales:
  Approximately $4.9 billion
- Employees: About 19,000
- Serving customers in
  80+ countries
  -- emerging markets over
  20% of total sales
- World Headquarters:
  Milwaukee, Wisconsin, USA
- Trading Symbol: ROK



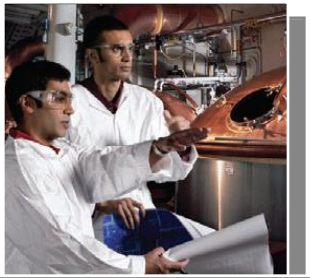
Consumer-Driven Industries Include…

Consumer Packaged Goods

Automotive

Increase flexibility & responsiveness while reducing costs & improving quality.

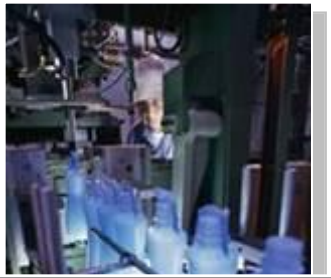
- Bridgestone
- DaimlerChrysler
- Ford
- GM
- Goodyear
- Hyundai
- JCI
- Lear
- Magna
- Michelin
- Toyota



Food & Beverage

Satisfy consumer demand, while reducing costs, minimizing waste & improving asset performance.

- Anheuser-Busch
- Coca-Cola
- Kellogg
- Kraft/Nabisco
- M&M Mars
- Nestlé
- PepsiCo/Frito-Lay
- SABMiller



Household & Personal Care

Meet regulatory challenges & improve quality, consistency, flexibility & time-to-market.

- 3M
- Beiersdorf
- Colgate-Palmolive
- DuPont
- Henkel
- Kimberly-Clark
- L'Oréal
- Procter & Gamble
- Unilever

Life Sciences

Reduce costs while meeting the demands of ever-changing regulations.

- Abbott Laboratories
- Johnson & Johnson
- Merck
- Pfizer
- Sanofi
- Wyeth-Ayerst

Heavy, Resource-Driven Industries Include…

Water / Wastewater

Achieve low long-term cost & on-demand engineering expertise with scalable solutions.

- A & E Firms
- Consultants
- Design Engineer Firms
- Design Institutes (Asia)
- Global Municipalities
- Privatizers (Europe)
- Pump OEMs
- System Integrators

Mining / Metals / Cement

Execute real-time control & maintain critical process parameters to respond to customer demands.

- Alcoa
- BHP Billiton
- CEMEX
- Holcim
- Lafarge
- Rio Tinto
- US Gypsum
- Vulcan

Oil & Gas

React to changing production conditions while maintaining operations at peak efficiency.

- BP
- Chevron
- ConocoPhillips
- ExxonMobil
- Shell

Semiconductor / Electronics

Increase yields while reducing risk & total cost of ownership by using a single automation control & information infrastructure.

- Agilent
- Applied Materials
- ATS Automation
- Axcelis
- IDC / CH2M
- KLA-Tencor
- Novellus
- Praxair
- Seagate

Who we are…

Today's ROK

Historic ROK

NCAGE	NAME	COUNTRY	CITY
01121	ROCKWELL AUTOMATION INC.	UNITED STATES	MILWAUKEE
4H047	ROCKWELL AUTOMATION INC.	UNITED STATES	CLEVELAND
[illegible]	ROCKWELL AUTOMATION LTD	UNITED KINGDOM	MILTON KEYNES
EA890	ROCKWELL AUTOMATION NZ LTD	NEW ZEALAND	AUCKLAND
ELV26	ROCKWELL AUTOMATION NZ LTD	NEW ZEALAND	
58DB0	ROCKWELL MECHANICAL LLC	UNITED STATES	MILWAUKEE
94357	DELTA POWER TOOL DIV OF ROCKWELL MFG CO	UNITED STATES	MILWAUKEE
1KKV4	DONALD ROCKWELL DBA R.R UNLIMITED SERVICES	UNITED STATES	
4B224	NORTH AMERICAN ROCKWELL CO	UNITED STATES	COLUMBUS
5NPA3	ROCKWELL BUILDING SYSTEMS, INC.	UNITED STATES	ROCKWELL
461L8	ROCKWELL CITY OF INC	UNITED STATES	ROCKWELL CITY
6U346	ROCKWELL COLLINS AEROSPACE & ELECTRONICS INC. DBA RC HEADS UP GUIDANCE DIV DIV FLIGHT DYNAMICS	UNITED STATES	CEDAR RAPIDS
0N7J7	ROCKWELL CONSTRUCTION CORP	UNITED STATES	POMPANO BEACH
5NN00	ROCKWELL CONSULTING INC	UNITED STATES	COLORADO SPRINGS
1FNC2	ROCKWELL INTL CREDIT CORP	UNITED STATES	CEDAR RAPIDS
0XAN4	ROCKWELL INTL TACTICAL SYSTEMS DIV	UNITED STATES	HUNTSVILLE
0RUT3	ROCKWELL LASER INDUSTRIES INC.	UNITED STATES	CINCINNATI
9M329	ROCKWELL LUMBER CO DBA ROCKWELL BROS & CO	UNITED STATES	BIG SPRING
5LUA8	ROCKWELL LUMBER CO., INC.	UNITED STATES	GREENCASTLE
5QZZ9	ROCKWELL MANOR APARTMENTS	UNITED STATES	FAIRFIELD
0HKB1	ROCKWELL MEDICAL SUPPLIES INC	UNITED STATES	CARSON
8Z355	ROCKWELL TELECOMMUNICATIONS INC SWITCHING SYSTEMS DIV SUB ROCKWELL INTERNATIONAL CORP	UNITED STATES	DOWNERS GROVE
4SMW9	ROCKWELL TRADING INC	UNITED STATES	AUSTIN
37WE5	ROCKWELL WILLIAM W	UNITED STATES	TOWNSEND
5DKA3	ROCKWELL, TOWN OF!DIV ROCKWELL POLICE DEPT!DBA POLICE DEPARTMENT	UNITED STATES	ROCKWELL

Focusing on Plant-Wide Automation

Smart, Safe, Sustainable Manufacturing

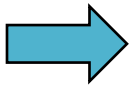
Product examples…

Process Automation Controllers

Human Machine Interface & Machine Interface

Communications and Power Control

Agenda



- Company background & perspective
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21st Century Smart Manufacturing
- Workshop Report -

Implementing 21st Century Smart Manufacturing
Workshop Summary Report - June 2011

- Effectively collecting, storing, reconciling, and using ***data*** across the manufacturing enterprise is a key aspect of smart manufacturing systems and successful deployment of operational models.
- Collection and use of ***engineering data*** in manufacturing facilities today is relatively inefficient due ***to the lack of standardized, easily usable data systems***.
- Significant improvements are needed in today's data management systems and methods for mining intelligence from ***manufacturing data***. This includes better data protocols and interfaces, and communication standards.

Many who deal with large-scale data believe we are in the fourth stage of the information age

…Hardware ->Software ->Communications ->Data….

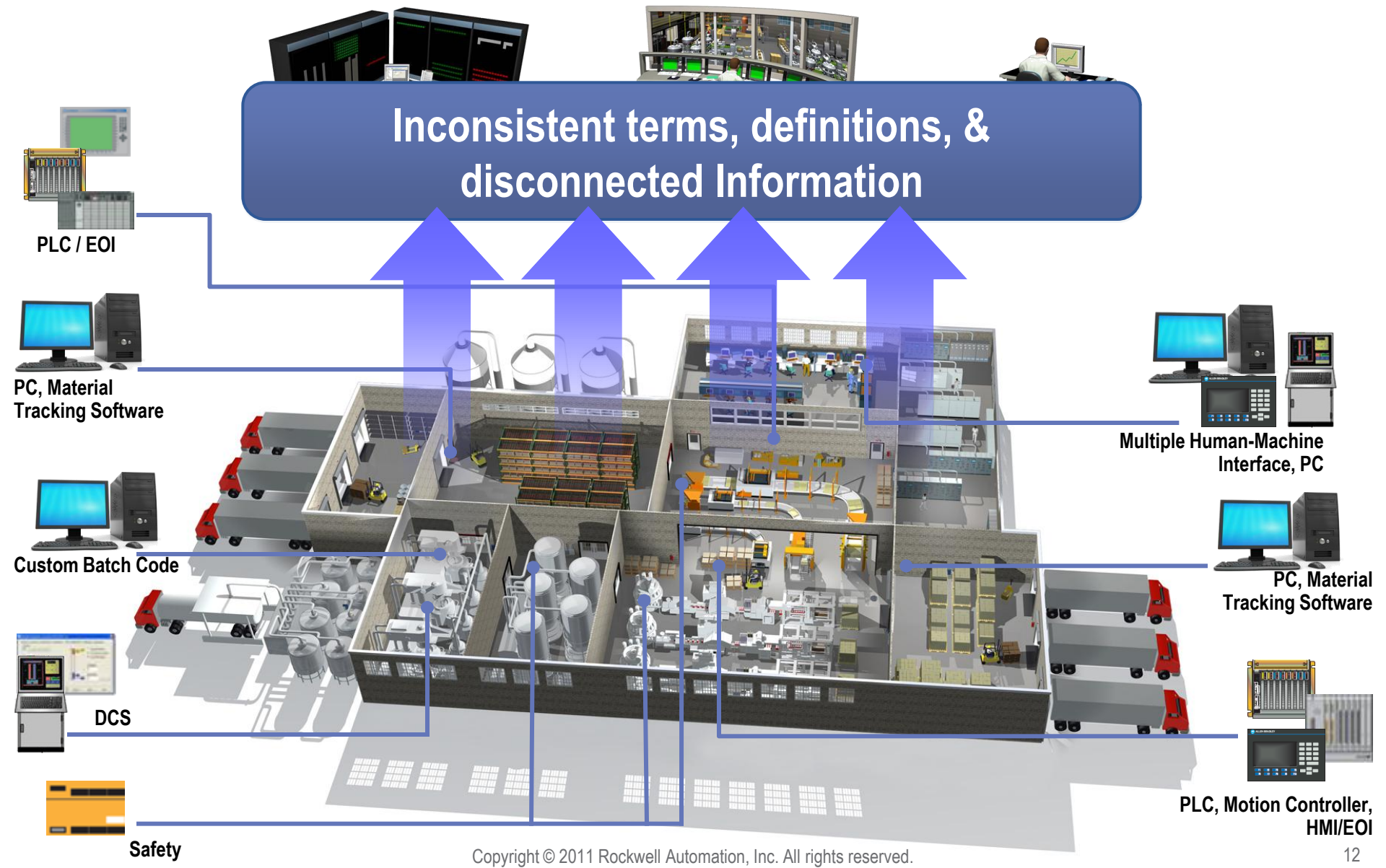
Source: D. Grier, IEEE Computer Society, October 2011

Key Driver - A Manufacturer's perspective…

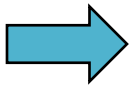
- **CUSTOMER SERVICE**
  - Customers can be distributors, or OEMs or End Users or Maintenance or....
  - but the issue is always the same
- **1000+ different product LINES with hundreds of thousands of items**
  - many of which are Configured To Order....Customers need to get the right part, quickly and efficiently...It is a competitive advantage.
- **ISO standards enable multiple enterprises to interact WITHOUT HUMAN INTERVENTION....**
  - that is the big deal here
  - Transition from the model where we need a TSR to intervene in the transactions.
- **Procuring system knows what it wants...and the delivering system should be able to match that request without human understanding.**

A BIG transition for eCommerce...and a HUGE efficiency gain.

Productivity Obstacles – Data ambiguity



Agenda



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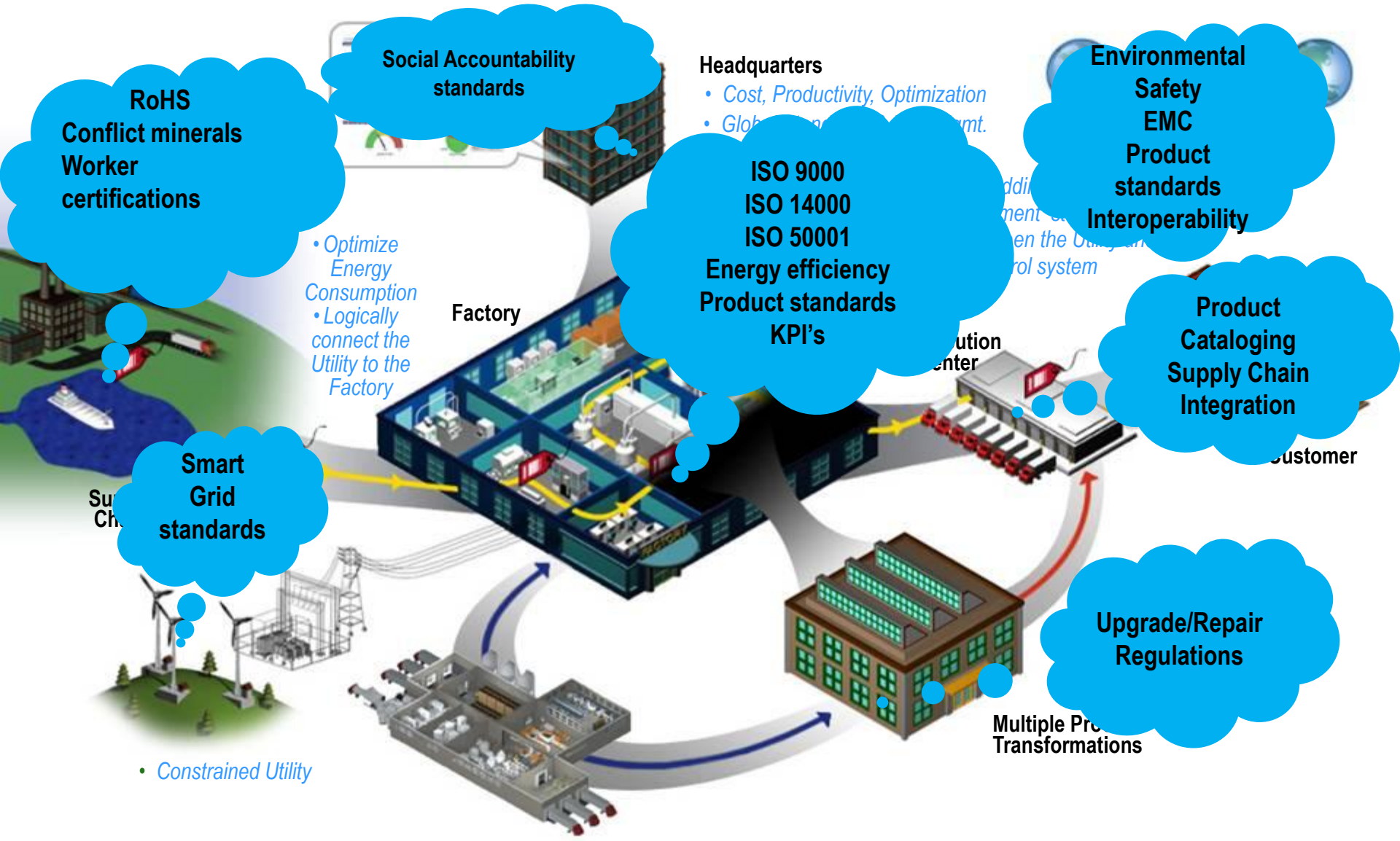
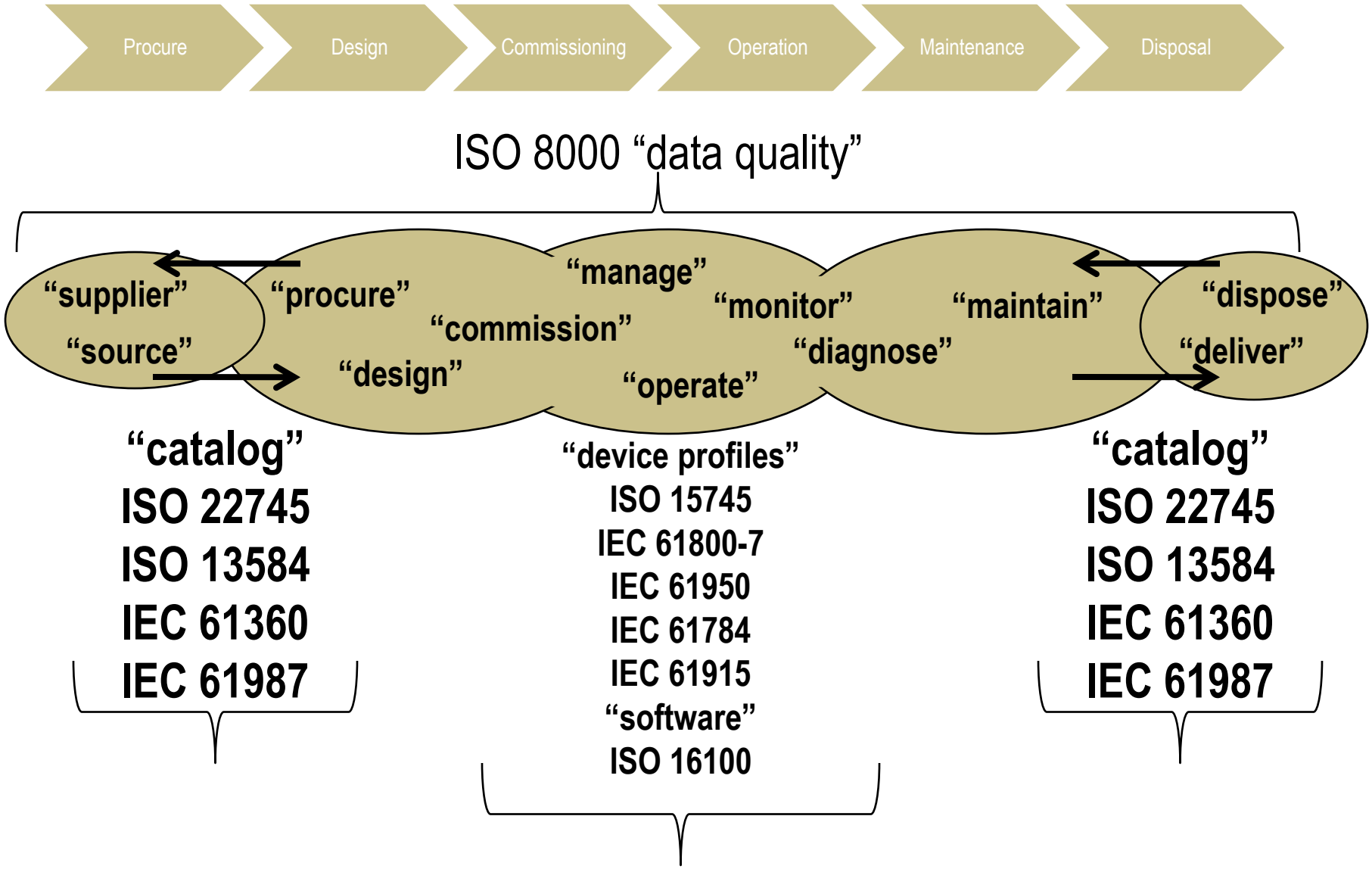
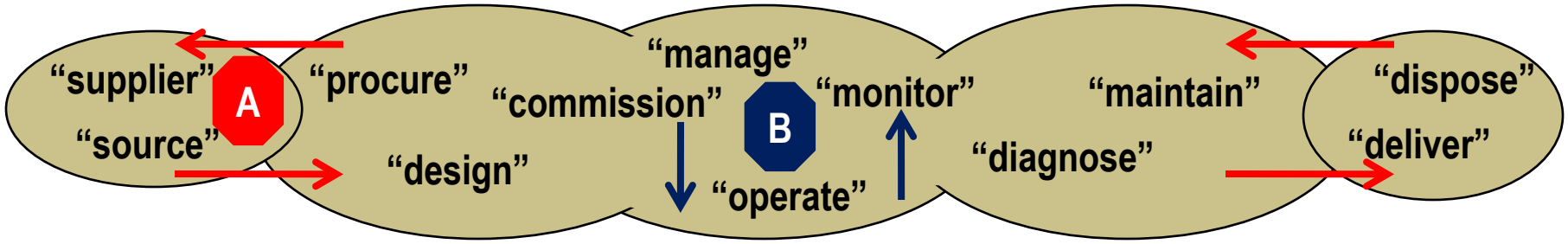
Standards in all aspects of the supply chain…



Supply Chain - Product Cataloging & Device Properties in the Digital Enterprise Context



What type of product information is needed?



A **Customer -> Supplier query…**

- How big is it?
- What voltage?
- How to connect to it?
- What is it compatible with?
- What standards does it meet?
- How much power does it use?
- Does it have a touch screen?
- Is it color or monochrome?
- What communications does it support?
- How much does it cost?
- When will it arrive?
- .Are there any hazardous materials?
- .
- .

B **Integrated applications/ system information…**

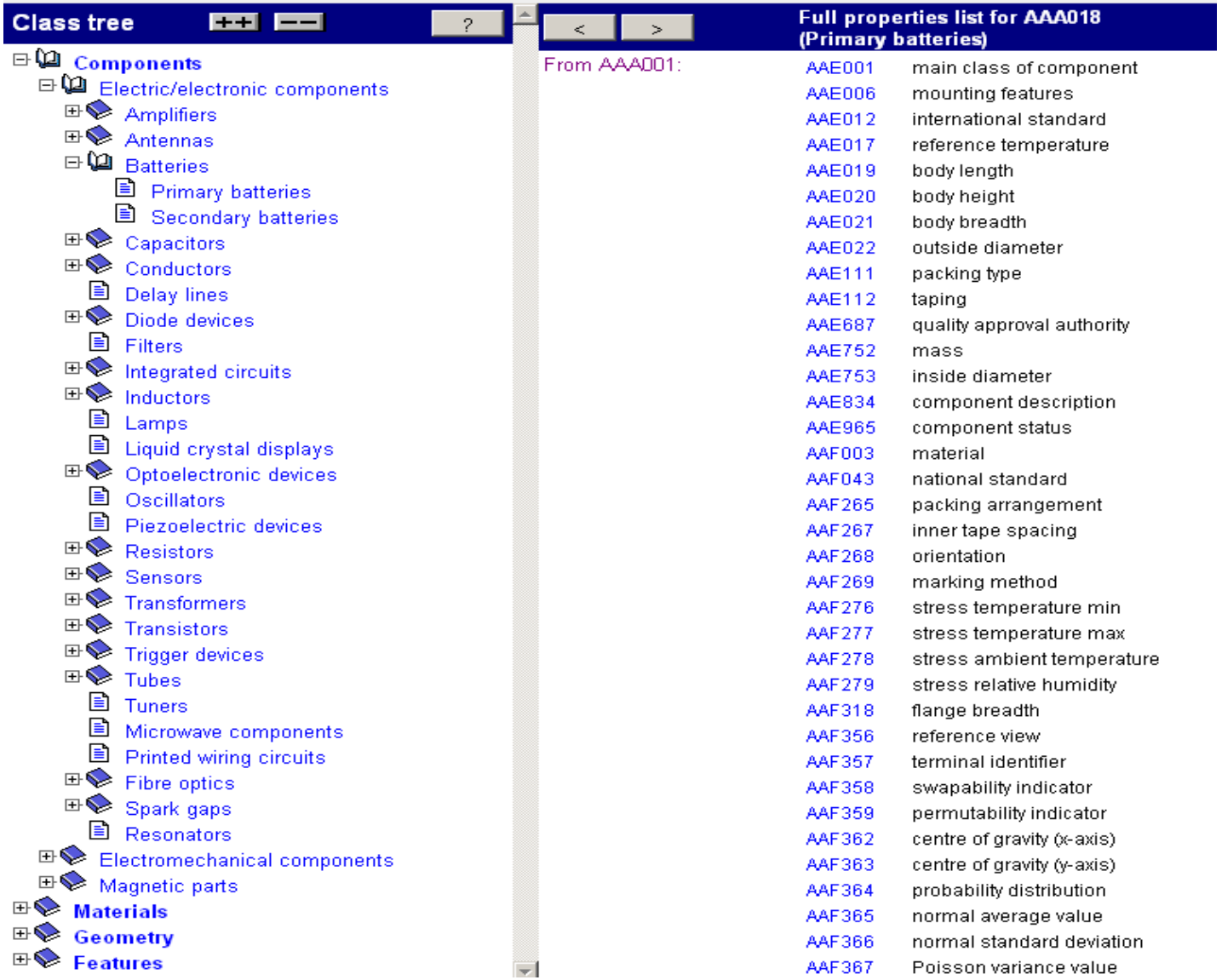
- What devices are connected?
- Are they ready for commissioning?
- Have they been configured?
- Is the system running?
- How much power is it consuming?
- What is the device status?
- Is there an application loaded?
- .
- .
- .

Product Data Activities in the International Standardization

IEC/ISO	**Guide IEC/ISO JWG1 77-1**
IEC SC3D	**Data Model IEC 613601/2 and ISO 13584-42 (identical)**
IEC CO	**IEC 61360 Data Base**
ISO TC37	**Standardization of Product Classification ISO 22274**
IEC SC3D	**Components IEC 61360-4/5**
IEC SC65E	**Sensors IEC 61987-11/xx**
IEC SC65B	**Actuators Planning**
IEC 22G	**Drives in Planning**
ISO 4000	**Standard Parts e.g. ISO 4000 (Screws)**
ISO TC 172	**Optic and Optical Systems ISO 13399**
IEC SC65E	**Engineering Process using Product Data IEC 61987-10**
IEC TC184	**ISO 8000 Data Quality, ISO 22745 OTD & information exchange**

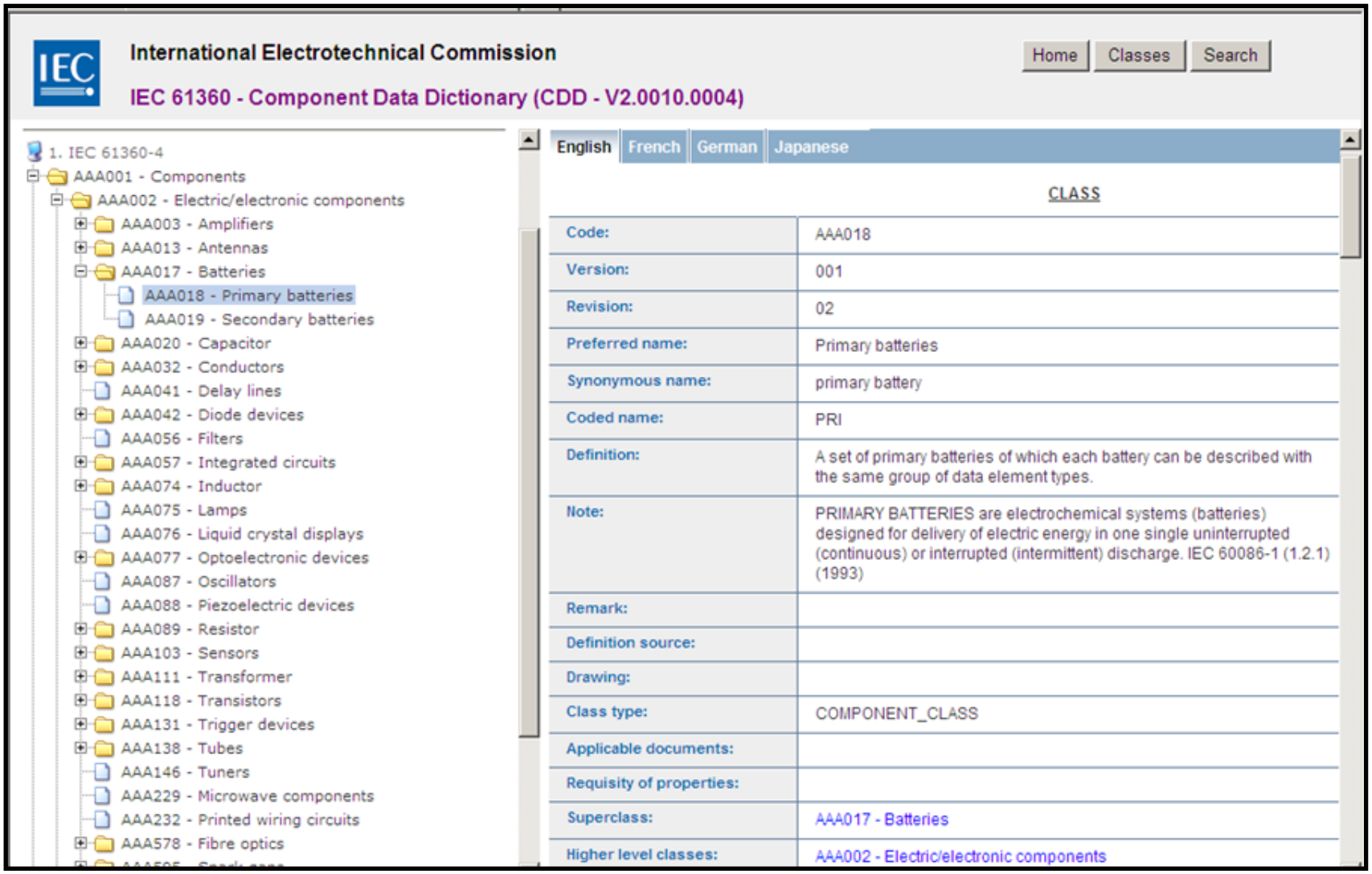
[Source: IEC TC 3]

IEC 61360 Data Dictionary



[Source: http://std.iec.ch/cdd/iec61360/

IEC 61360 Component data dictionary



[Source: http://std.iec.ch/cdd/iec61360/

Property Definition according to IEC 61360 1/2 and ISO 13584-42

m/o/c	Attribute	Example
m	Code	AAE254
m	Version number	005
m	Revision number	02
m	Value format	NR3 S..3.3ES2
m	Data element type class	E01
m	Preferred name	LOW-state output current
o	Synonymus name	output sink
m	Definition	The minimum guaranteed LOW-state dc output current (in A) of a digital function of an IC .....
o	Source document of data element type definition	IEC748-2 (III.5.3.1)(1985)
o	Unit of measure	A
o	Formula	.....
o	Figure	.....
	.....	.....

[Source: IEC TC 3]

Example: Product Data of a Transmitter Device

Mechanical and Constructive Properties

- Length of the Sensor Cell
- Diameter of the Sensor Cell
- Sensor Cell Material
- Weight of the Sensor
- Dimension of the Housing (length, wide, high)
- Material of the Housing
- Vibration Protection
- Local Display
- Local Operator Panel

etc.

Function Properties

- Threshold Level
- Event Signalling
- Linearisation Curve
- Compensating Function
- Time Stamp Function
- Self Calibration
- Fail Safe Mode
- etc.

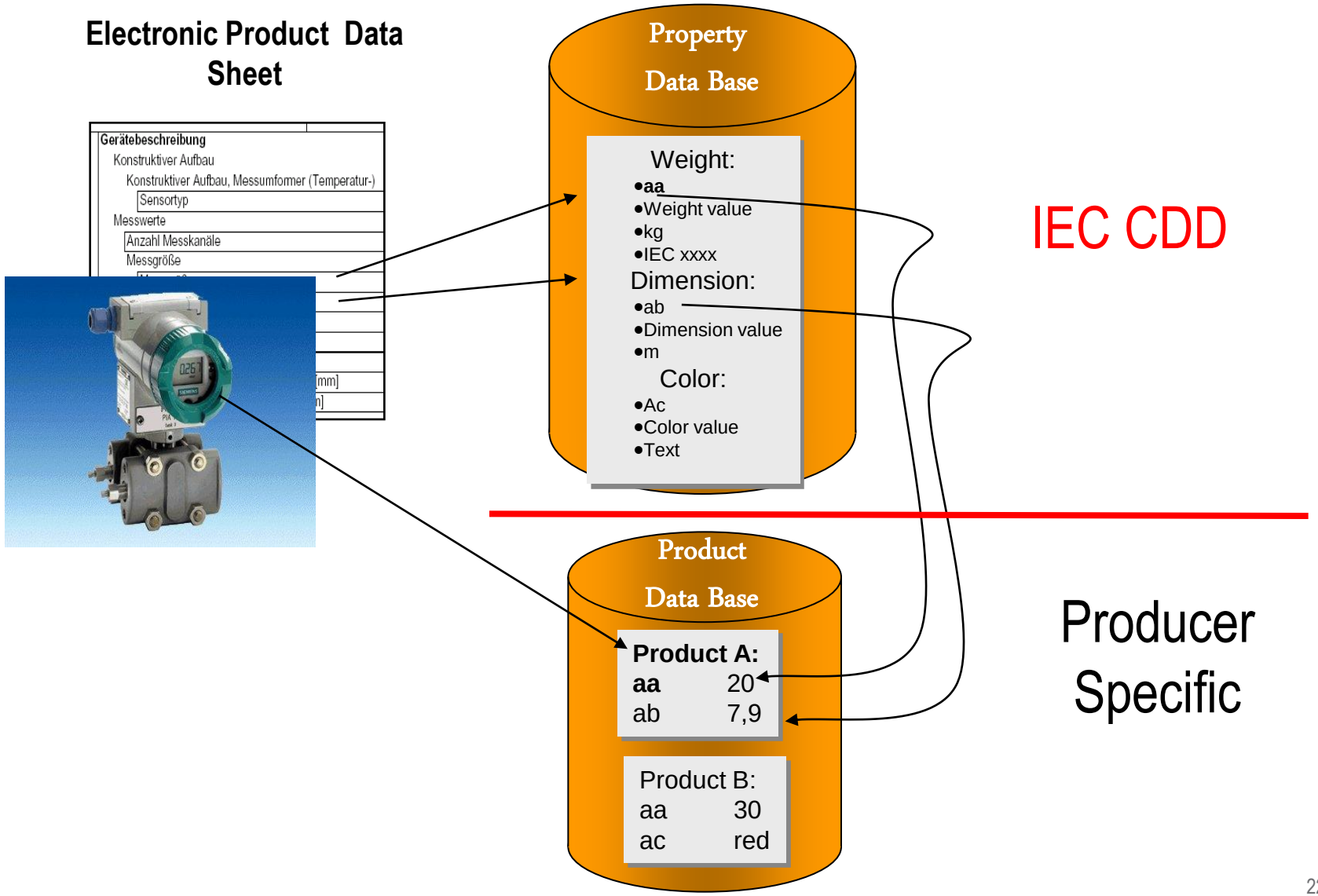
Resulting Properties

- Units
- Range
- Measuring Limits
- Span
- Scale
- Cycle Time
- Filter Time
- Communication Interface

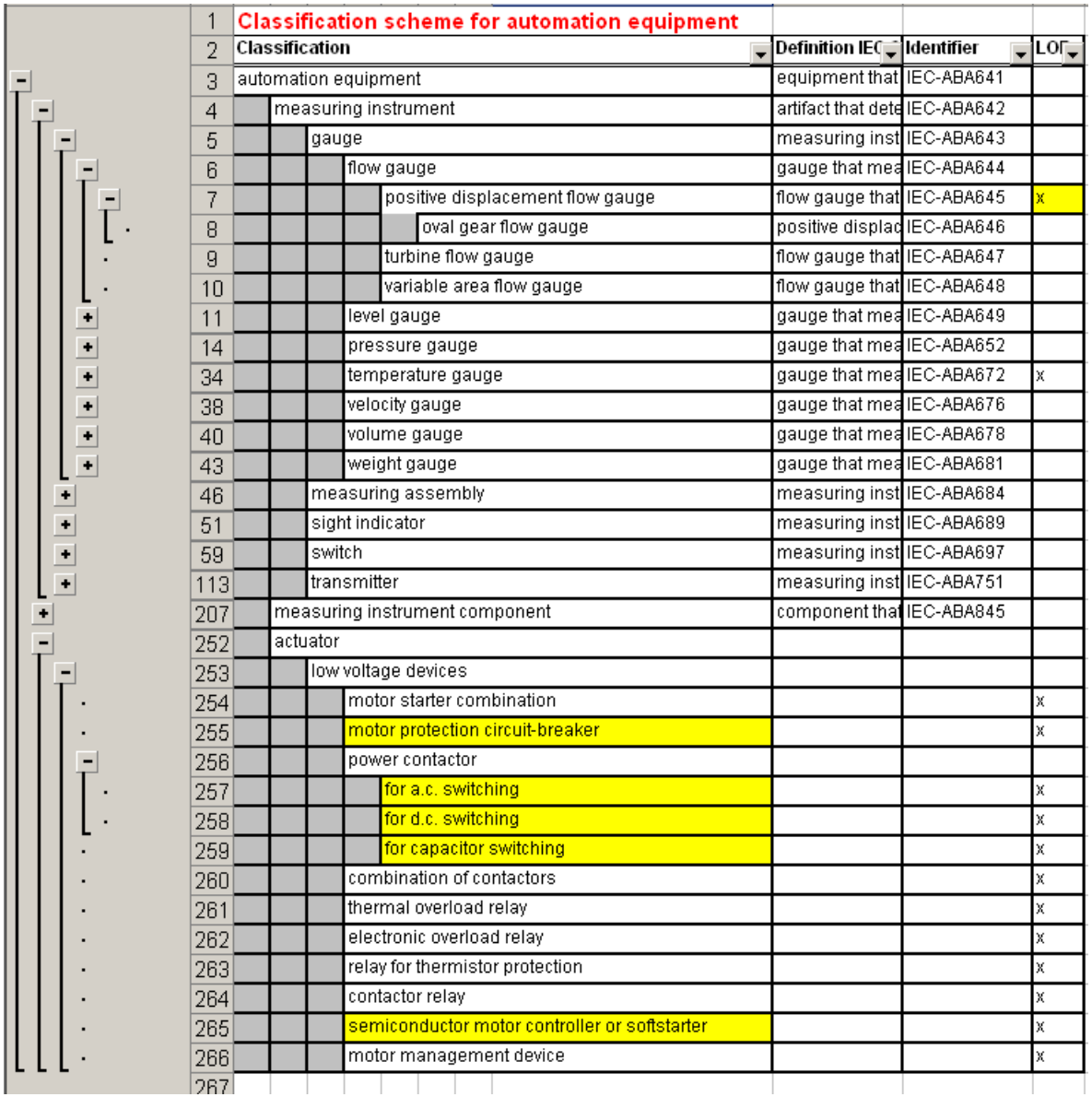
etc.

[Source: IEC TC 3]

From an Data Sheet to an electronic Data Base (Product Producer)



Domain „Automation“ in IEC CDD



	Classification scheme for automation equipment			
2	Classification	Definition IEC	Identifier	LOI
3	automation equipment	equipment that	IEC-ABA641	
4	measuring instrument	artifact that dete	IEC-ABA642	
5	gauge	measuring inst	IEC-ABA643	
6	flow gauge	gauge that mea	IEC-ABA644	
7	positive displacement flow gauge	flow gauge that	IEC-ABA645	x
8	oval gear flow gauge	positive displac	IEC-ABA646	
9	turbine flow gauge	flow gauge that	IEC-ABA647	
10	variable area flow gauge	flow gauge that	IEC-ABA648	
11	level gauge	gauge that mea	IEC-ABA649	
14	pressure gauge	gauge that mea	IEC-ABA652	
34	temperature gauge	gauge that mea	IEC-ABA672	x
38	velocity gauge	gauge that mea	IEC-ABA676	
40	volume gauge	gauge that mea	IEC-ABA678	
43	weight gauge	gauge that mea	IEC-ABA681	
46	measuring assembly	measuring inst	IEC-ABA684	
51	sight indicator	measuring inst	IEC-ABA689	
59	switch	measuring inst	IEC-ABA697	
113	transmitter	measuring inst	IEC-ABA751	
207	measuring instrument component	component that	IEC-ABA845	
252	actuator			
253	low voltage devices			
254	motor starter combination			x
255	motor protection circuit-breaker			x
256	power contactor			
257	for a.c. switching			x
258	for d.c. switching			x
259	for capacitor switching			x
260	combination of contactors			x
261	thermal overload relay			x
262	electronic overload relay			x
263	relay for thermistor protection			x
264	contactor relay			x
265	semiconductor motor controller or softstarter			x
266	motor management device			x
267				

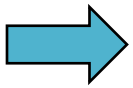
[Source: IEC TC 3]

Agenda

Company background & perspective

Drivers for improved data descriptions

Role of standards



Practical examples for electronic catalogs

Summary

Example: PanelView Standard Terminal

http://www.ab.com/en/epub/catalogs/12762/2181376/1239781/1670480/1681260/index.html

Example: PanelView Standard Terminal Configure To Order Parts

2711 PanelView Terminal
Product Configuration Assistant

Enter the order code for the desired 2711 PanelView Terminal...

2711-K3A10L1

OR, make the selections for the product that you need using the interactive selection chart.

Accept | Validate | Cancel | Reset | Undo | Redo

Representative Photo Only

PANELVIEW DATA

Display	3" Monochrome Transflective *128x64 pixel resolution. Available in Keypad or Keypad without numeric entry. Limited communications options. (DC Only)*
Input Method	Keypad
Communication Options	DeviceNet Communication & RS-232 Printer Port
Other Options	Standard Terminal with DC Power

ACCESSORY ITEMS

Accessories	• (1) ✓ Memory Cards

Communication Options

- ○ DH-485 Communication Ports
- ◉ DeviceNet Communication & RS-232 Printer Port
- ○ RS-232 (DF1) Communication Port
- ○ RS-232 (DH-485) Communication Port

MESSAGES

Example: PanelView Standard Terminal

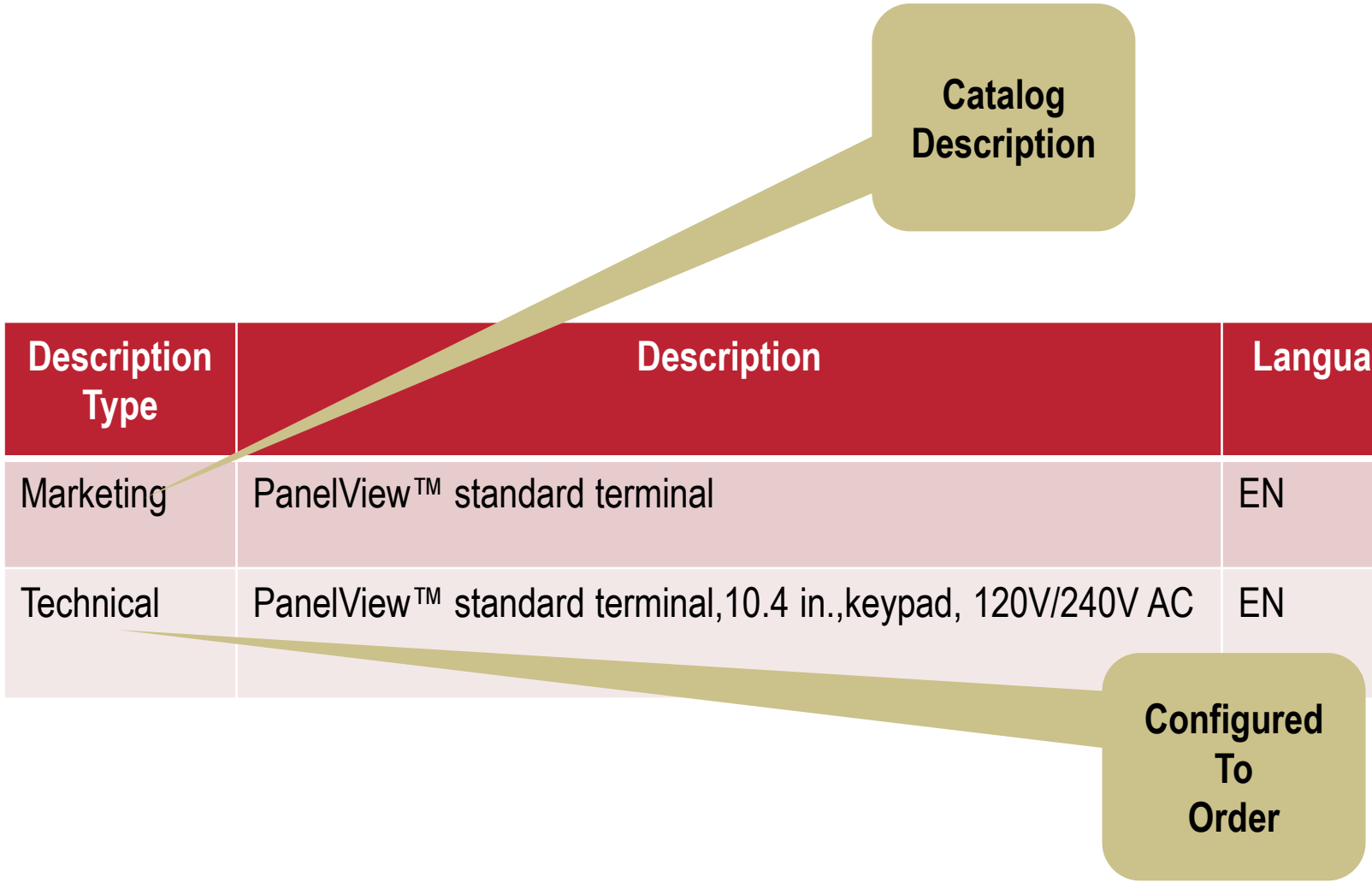
Description	Cat. No. Keypad ✶
DH-485 Communication Ports ❄	2711-K3A2L1
RS-232 (DH-485) Communication Port ❄	2711-K3A5L1
RS-232 (DH-485) Communication Port, Conformal Coated ❄	2711-K3A5L1K
DeviceNet Communication & RS-232 Port	2711-K3A10L1
RS-232 (DF1) Communication Port ‡	2711-K3A17L1

http://www.ab.com/en/epub/catalogs/12762/2181376/1239781/1670480/1681260/tab4.html

NATO Stock Number

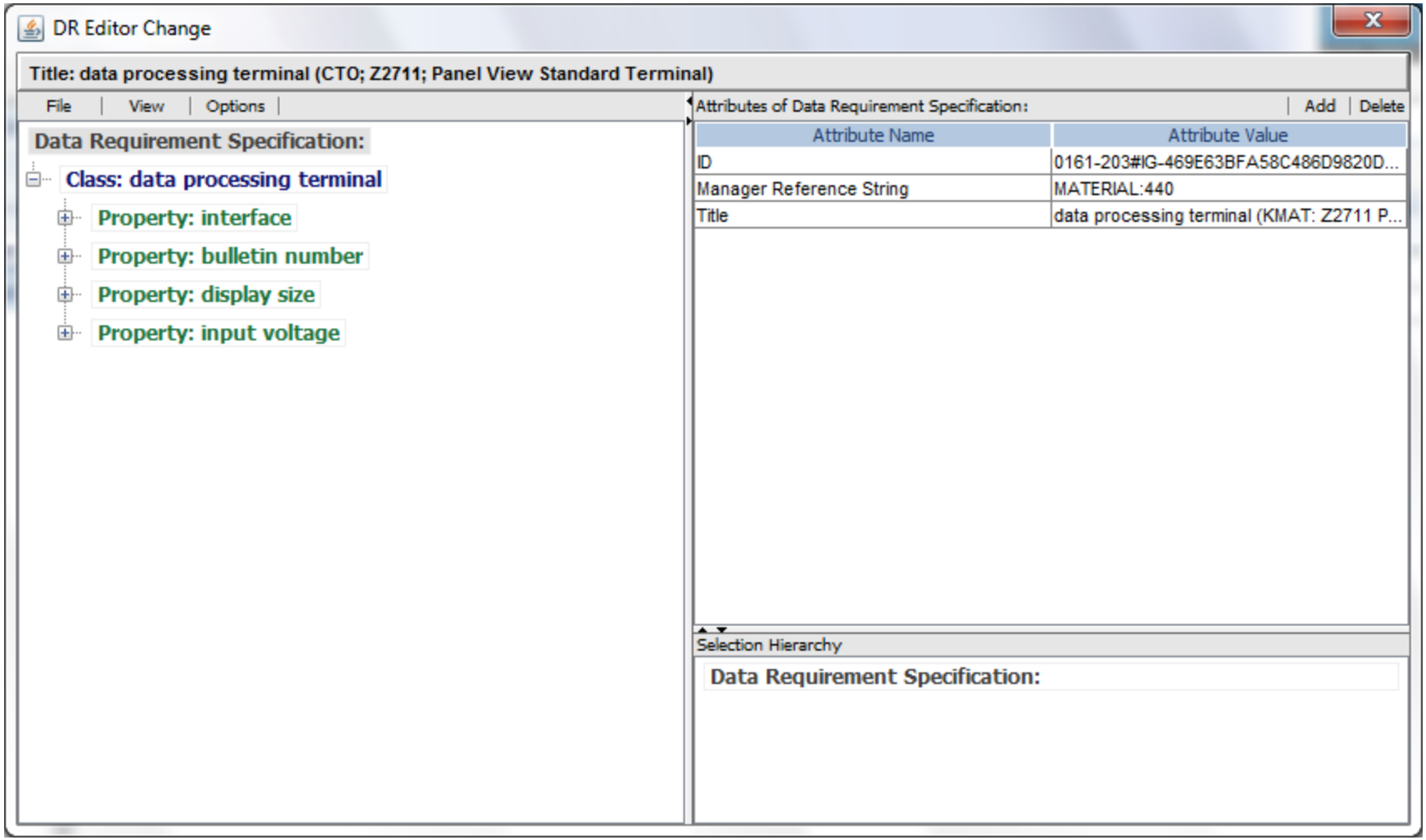
NSN	Item Name (Seg A)	NCage	Reference Number
7025015101279	DISPLAY UNIT	4H047	2711-K10C15
7025015167309	TOUCHSCREEN,DATA EN	01121	2711-T10C16L1
7025015182123	TERMINAL,DATA PROCE	01121	2711-T5A15L1
7025015320679	MEMORY CARD,PERSONA	4H047	2711-NM13
7025015476602	TOUCHSCREEN,DATA EN	01121	2711P-T7C4D1
7025015497089	TOUCHSCREEN,DATA EN	4H047	2711-T10C20L1
7025015500658	TERMINAL,DATA PROCE	01121	2711-T6C15L1
7025015509610	MEMORY UNIT,DATA ST	4H047	2711PRC4
7025015617603	DISPLAY UNIT	01121	2711-B5A20L1
7025015640995	MEMORY CARD,PERSONA	4H047	2711NM232
7025015738031	DISPLAY UNIT	01121	2711P-T10C4A7
7030015667923	SOFTWARE KIT	01121	2711-ND3/E
7030015717686	SOFTWARE KIT	4H047	2711P-RW3
7050015246202	COMPUTER SUBASSEMBL	01121	2711P-RN6
7050015455687	COMPUTER SUBASSEMBL	4H047	2711P-K15C4D2
7050015460129	PANEL,CONTROL,ELECT	01121	2711P-K4M20A

Example: PanelView Standard Terminal Description

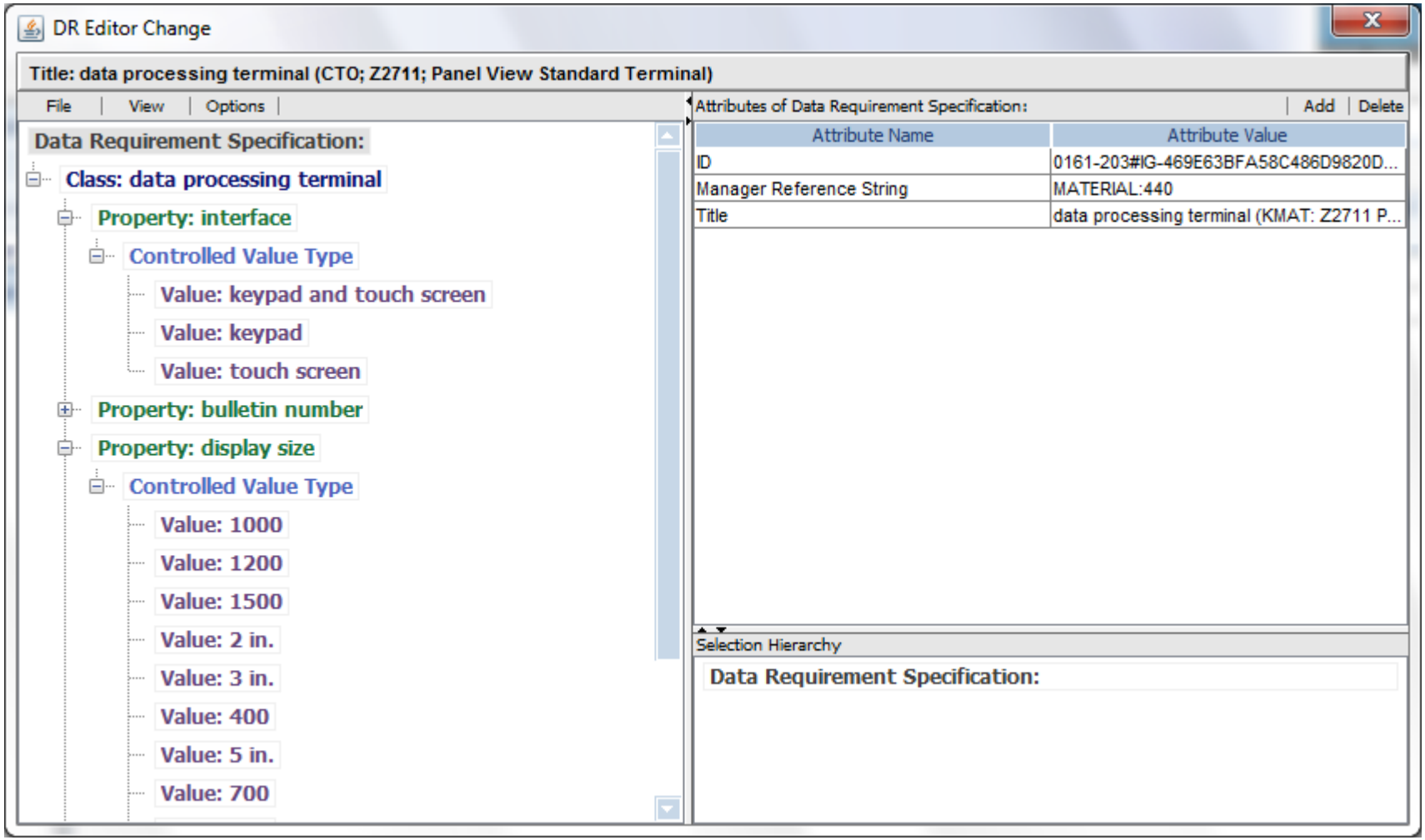


Description Type	Description	Language
Marketing	PanelView™ standard terminal	EN
Technical	PanelView™ standard terminal,10.4 in.,keypad, 120V/240V AC	EN

Example: PanelView Standard Terminal Data Requirements

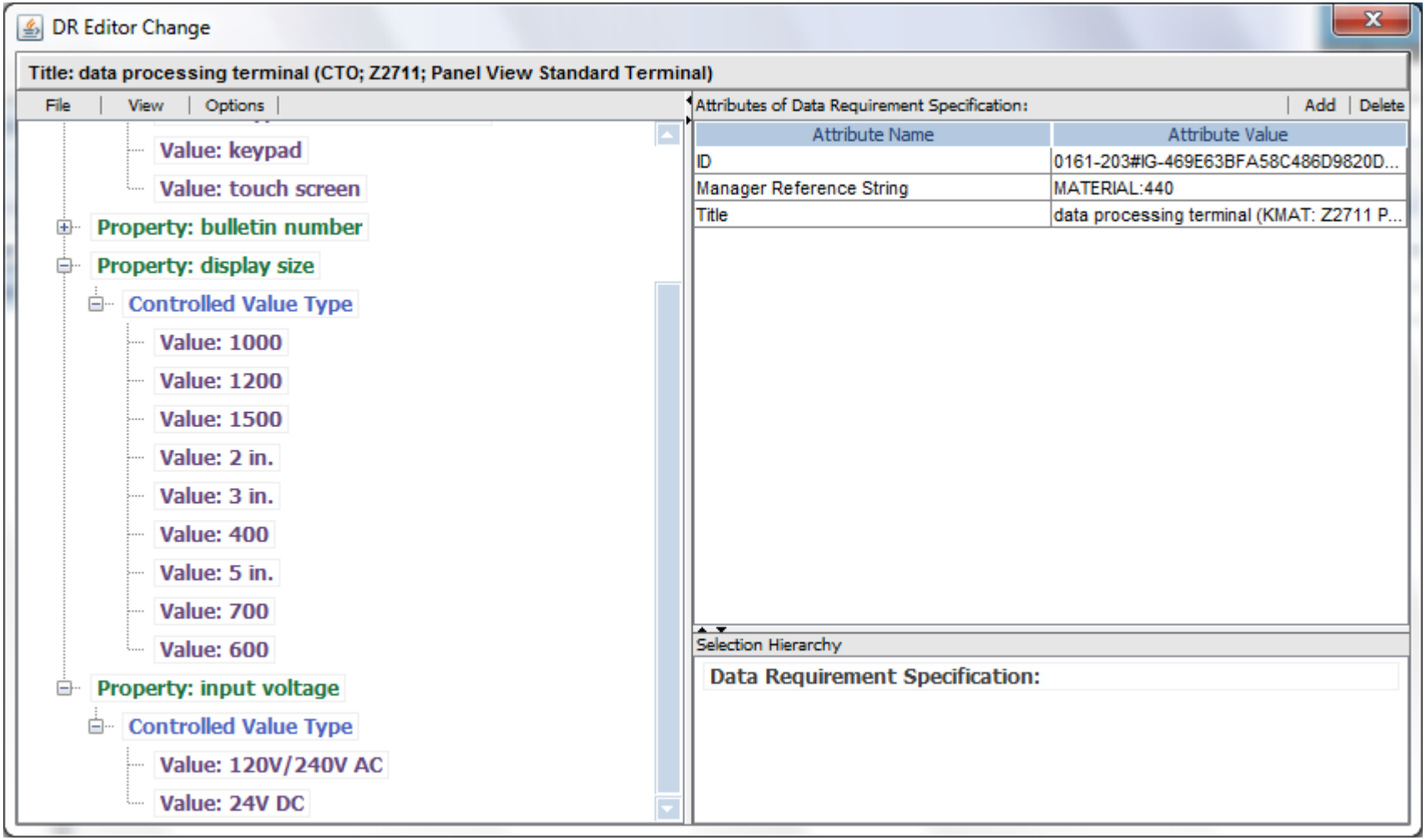


Example: PanelView Standard Terminal Data Requirements



Example: PanelView Standard Terminal Data Requirements

- Some property – value pairs are constrained by Class (enumerated…)



Example: PanelView Standard Terminal Master Data: XML File

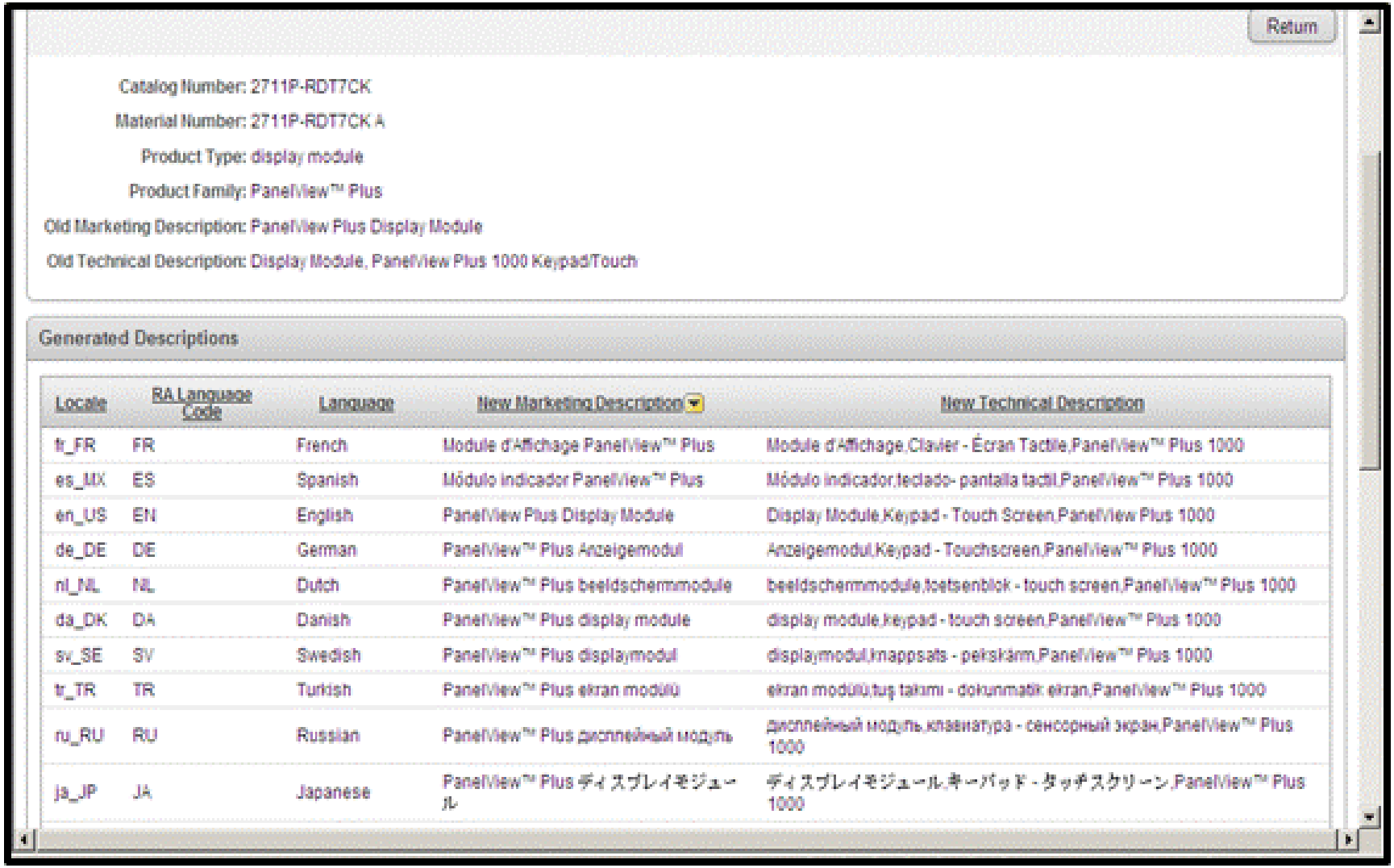
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<catalogue xmlns="urn:iso:std:iso:ts:29002:-10:ed-1:tech:xml-schema:catalogue"
xmlns:bas="urn:iso:std:iso:ts:29002:-4:ed-1:tech:xml-schema:basic" xmlns:cat="urn:iso:std:iso:ts:29002:-10:ed-
1:tech:xml-schema:catalogue" xmlns:id="urn:iso:std:iso:ts:29002:-5:ed-1:tech:xml-schema:identifier"
xmlns:val="urn:iso:std:iso:ts:29002:-10:ed-1:tech:xml-schema:value">
  <cat:item class_ref="0161-1#01-1072335#1">
    <cat:property_value property_ref="0161-1#02-090780#1">
      <val:controlled_value value_ref="0161-1#07-284151#1"/>
    </cat:property_value>
    <cat:property_value property_ref="0161-1#02-090972#1">
      <val:controlled_value value_ref="0161-1#07-283937#1"/>
    </cat:property_value>
    <cat:property_value property_ref="0161-1#02-090727#1">
      <val:controlled_value value_ref="0161-1#07-292311#1"/>
    </cat:property_value>
    <cat:property_value property_ref="0161-1#02-090775#1">
      <val:controlled_value value_ref="0161-1#07-291458#1"/>
    </cat:property_value>
  </cat:item>
</catalogue>
```

Compliant with international standards for master data quality (ISO 8000-110 and ISO 22745-40)

Example: PanelView Standard Terminal Additional Data

Keypad		
Keypad Description	Stainless steel domed membrane	
Function Keys	4 (F1…F4)	**8 (F1…F8)**
Actuation Rating, Keys	2 000 000 presses	
Electrical		
Communication ports	RS-232 (DH-485), RS-232 (DF1)	DeviceNet, DH-485, RS-232 (DH-485), RS-232 (DF1)
RS-232 Printer Port	—	1200, 2400, 9600, 19 200 K✶
Input Voltage, AC	—	—
Power Consumption, AC	—	—
Input Voltage, DC	11…30V DC	18…32V DC
Power Consumption, DC	2.5 W max (0.105 A @ 24V DC)	10 W max (0.42 A @ 24V DC)

Language rendering…



Return

Catalog Number: 2711P-RDT7CK

Material Number: 2711P-RDT7CK A

Product Type: display module

Product Family: PanelView™ Plus

Old Marketing Description: PanelView Plus Display Module

Old Technical Description: Display Module, PanelView Plus 1000 Keypad/Touch

Generated Descriptions

Locale	RA Language Code	Language	New Marketing Description	New Technical Description
fr_FR	FR	French	Module d'Affichage PanelView™ Plus	Module d'Affichage,Clavier - Écran Tactile,PanelView™ Plus 1000
es_MX	ES	Spanish	Módulo indicador PanelView™ Plus	Módulo indicador,teclado- pantalla tactil,PanelView™ Plus 1000
en_US	EN	English	PanelView Plus Display Module	Display Module,Keypad - Touch Screen,PanelView Plus 1000
de_DE	DE	German	PanelView™ Plus Anzeigemodul	Anzeigemodul,Keypad - Touchscreen,PanelView™ Plus 1000
nl_NL	NL	Dutch	PanelView™ Plus beeldschermmodule	beeldschermmodule,toetsenblok - touch screen,PanelView™ Plus 1000
da_DK	DA	Danish	PanelView™ Plus display module	display module,keypad - touch screen,PanelView™ Plus 1000
sv_SE	SV	Swedish	PanelView™ Plus displaymodul	displaymodul,knappsats - pekskärm,PanelView™ Plus 1000
tr_TR	TR	Turkish	PanelView™ Plus ekran modülü	ekran modülü,tuş takımı - dokunmatik ekran,PanelView™ Plus 1000
ru_RU	RU	Russian	PanelView™ Plus дисплейный модуль	дисплейный модуль,клавиатура - сенсорный экран,PanelView™ Plus 1000
ja_JP	JA	Japanese	PanelView™ Plus ディスプレイモジュール	ディスプレイモジュール,キーパッド - タッチスクリーン,PanelView™ Plus 1000

Rockwell Automation ISO 8000 Product Catalog

CATALOG NUMBER : 1760-IB12XOW4IOF

Class ID: 0161-1#01-1071961#1

Property ID	Concept ID
0161-1#02-090874#1	0161-1#07-289348#1
0161-1#02-090875#1	0161-1#07-288866#1
0161-1#02-091154#1	0161-1#07-285906#1
0161-1#02-090851#1	0161-1#07-286345#1
0161-1#02-090937#1	0161-1#07-287453#1
0161-1#02-091253#1	0161-1#07-286871#1

eOTD
ECCMA Open Technical Dictionary

Class Name: Module

Property term	Value
Product Family	PicoGFX™
Product Type	module
Input	12
Output	4 relay
Type	DC input/output
Special Features	analog input/output

Rendering guide

Marketing Description

PicoGFX™ DC Input/Output Module

Technical Description

Module,12 Inputs,4 Relay Outputs,DC Input/Output,Analog Input/Output

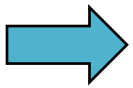
Agenda

Company background & perspective

Drivers for improved data descriptions

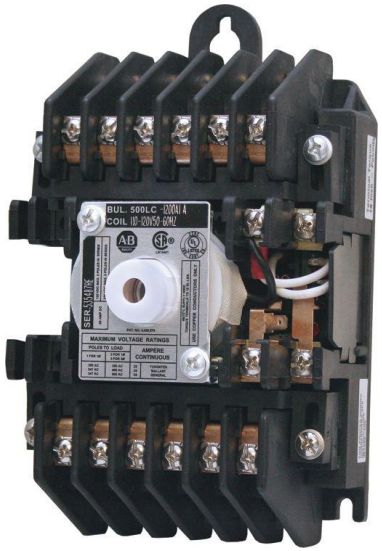
Role of standards

Practical examples for electronic catalogs



Summary

Better and better descriptions

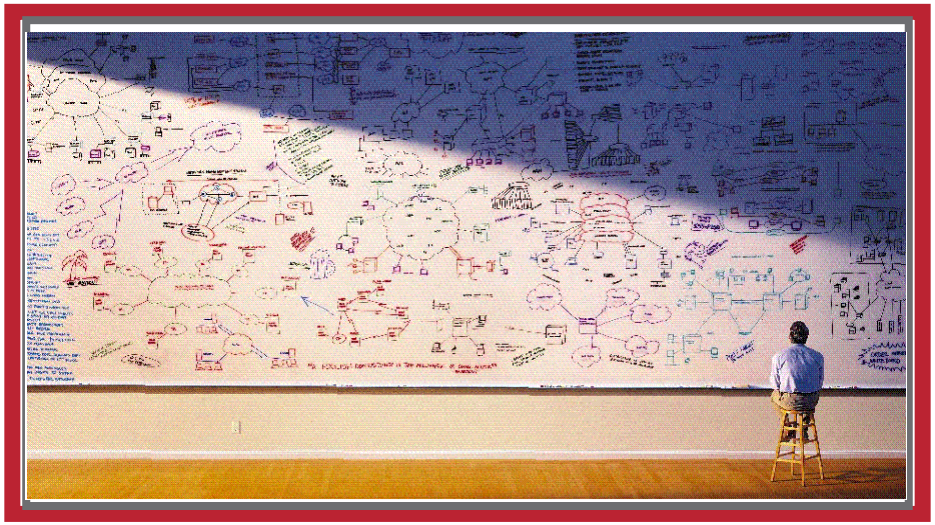


Easier to find
Easier to integrate
Easier to order

Summary

- **CUSTOMER SERVICE** will improve with electronic cataloging standards
- **DATA QUALITY** standards are key to developing good data descriptions
- **DIGITAL ENTERPRISE & FACTORY** need electronic product information as basic building blocks
- **CUSTOMERS** will need to access this information for many different activities throughout the digital enterprise supply chain
- **STANDARDS** will reduce the ambiguity of the information and improve the quality of the information
- **PARTICIPATION** and support for the development & use of data quality and cataloging standards enables organizations to prepare for new requirements

Questions?



Rockwell Automation
Advanced Technology

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