Close collaboration IEC/SC 3D with eCl@ss to increase user experience on SEMANTIC master data dictionaries

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What can you expect during the next 35 min?

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Forum II

"Close collaboration IEC SC3D with eCl@ss to increase user experience on SEMANTIC master data dictionaries"

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Human interaction can be a problem…

Als ich gestern nach Hause kam, lag ein Zettel - geschrieben von meiner Freundin - mit folgender Anweisung auf dem Tisch: "Komme um 20.15 Uhr nach Hause. Stell um 19.30 Uhr den großen Topf auf Stufe 4, um 19.45 Uhr den kleinen auf Stufe 5." Hab ich dann gemacht... War auch wieder nicht richtig... 😞😞😞

Meine Frau schreibt mir eine SMS: „In der Küche stehen Kartoffeln. Schäle bitte die Hälfte und stelle sie auf den Herd“

SEMANTIC in general (daily) use by humans

Wie geht es Ihnen?

??? ☹

What did you say?

??? ☹

SEMANTIC in general (daily) use by humans

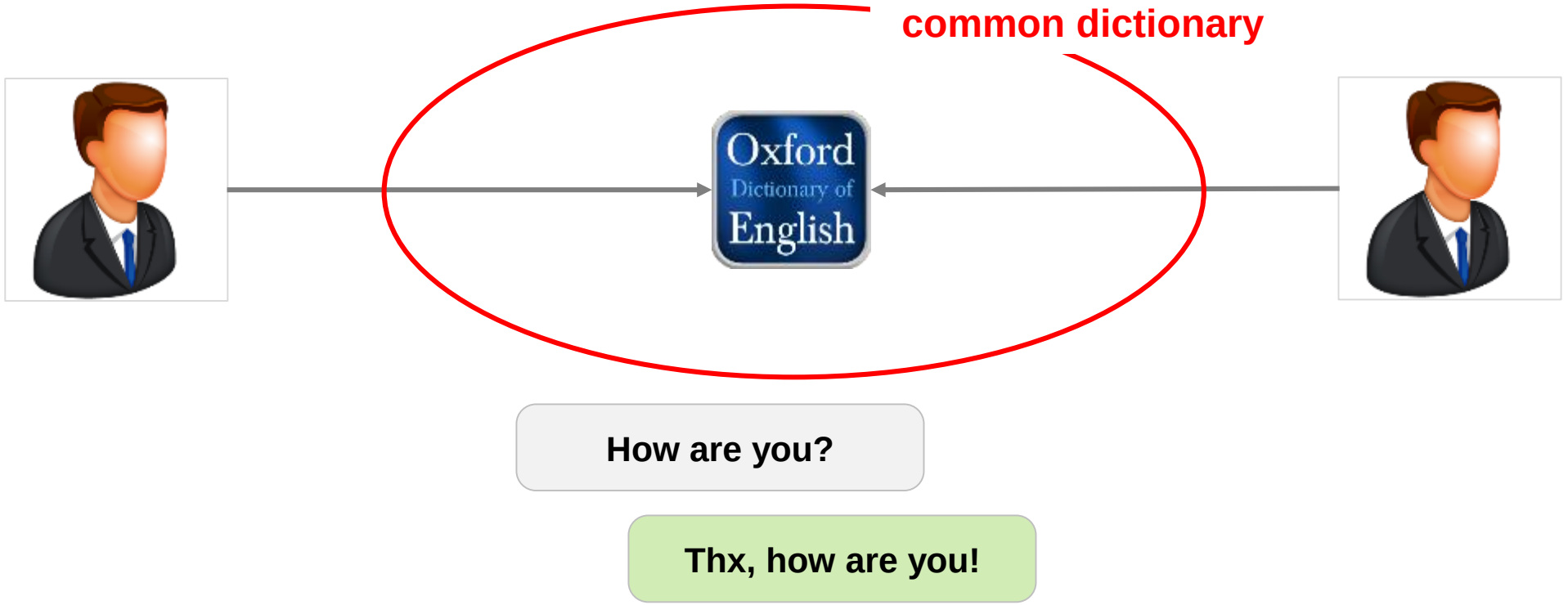
Wie geht es Ihnen?

How are you?

Thx. How are you?

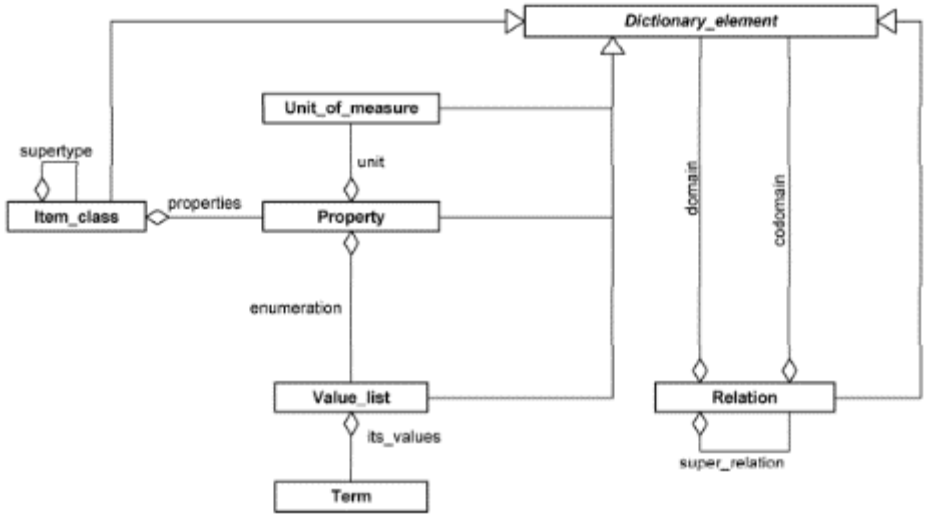
Danke gut! Und wie geht es Ihnen?

SEMANTIC in general (daily) use by humans

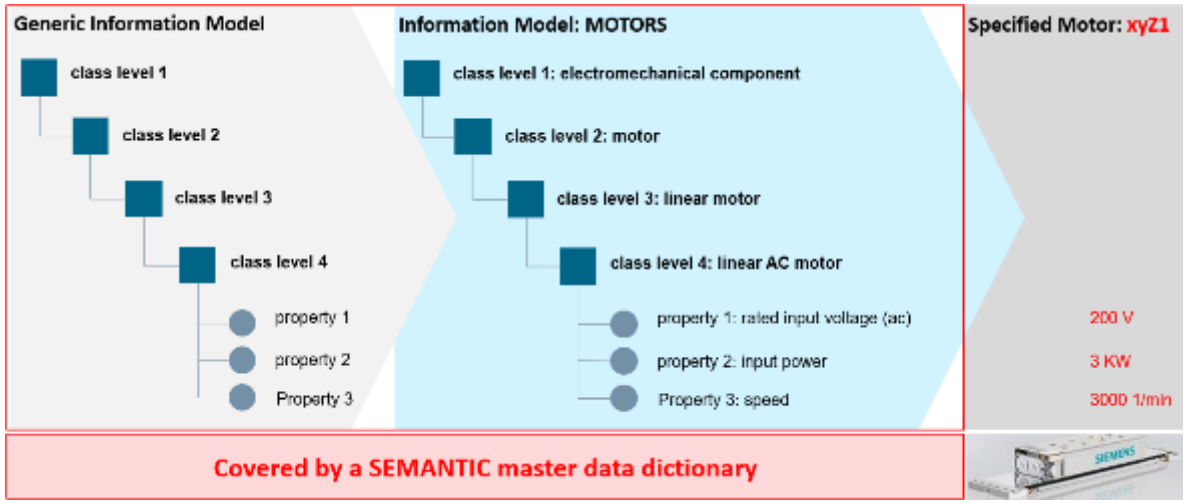


What is a SEMANTIC master data dictionary?

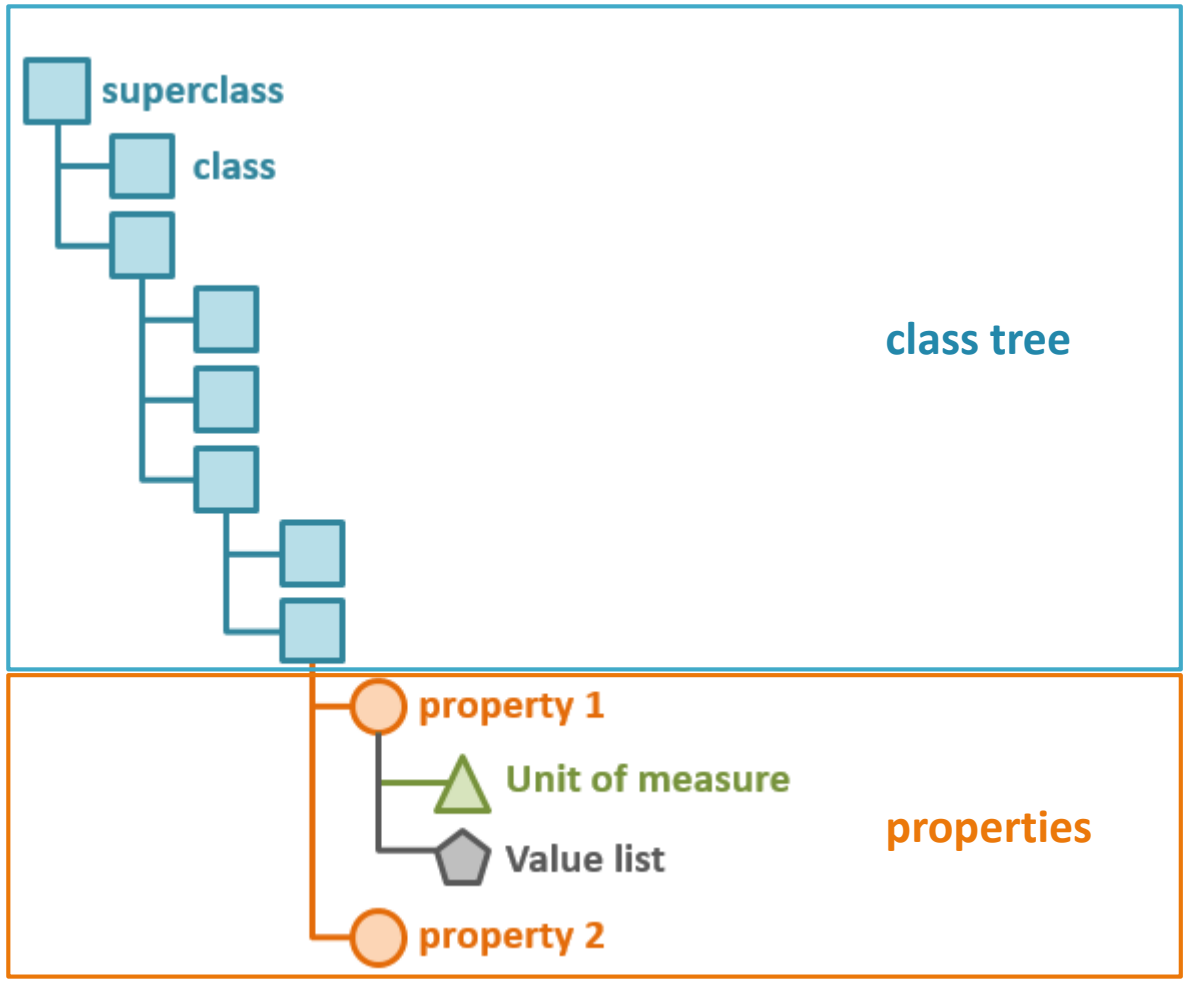
- A SEMANTIC master data dictionary provides data structures (based on an information model) to describe a product with its properties in a machine readable, unique form
- The two SEMANTIC master data dictionaries IEC CDD and eCl@ss are sharing the harmonized information model:
  + IEC CDD is based on IEC 61360
  + eCl@ss is based on ISO 13584-42



- SEMANTIC master data dictionaries are providing only data structures. Based on these data structures the SEMANTIC DATA for a specific product are created by the manufacturer or user.



The information model (IEC 61360 or ISO 13584-42) with the class tree and properties in “explorer view”



Each property has attributes like CODE/IRDI, Version/Revision, (Preferred) NAME, DEFINITION, UNIT OF MEASURE, VALUE (LIST), etc.

Code:	0112/2///61360_4#AAE184
Version:	001
Revision:	05
IRDI:	0112/2///61360_4#AAE184#001
Preferred name:	rated input voltage (ac)
Synonymous name:	
Symbol:	U_{ac}
Synonymous symbol:	
Short name:	U_ac
Definition:	nominal rms alternating voltage at the terminals of an ac motor
Note:	For polyphase supply, the line voltage is intended.
Remark:	
Primary unit:	V
Alternative units:	
Level:	nom
Data type:	LEVEL(NOM) OF REAL_MEASURE_TYPE
Format:	NR3..3.3ES2
Definition source:	IEC 60034-1 (9.1) (1983)

Why is a SEMANTIC master data dictionary enabling DIGITALIZATION and INDUSTRIE 4.0?

- **INTEROPERABILITY is one of the key enablers for digital transformation and SEMANITC DATA are <u>essential</u> to enable INTEROPERABILITY**
- **SEMANTIC master data dictionary provide the necessary data structures (based on an information model) for SEMANTIC DATA in machine readable, unique and understandable form**

Figure 1 – Facets of IoT interoperability

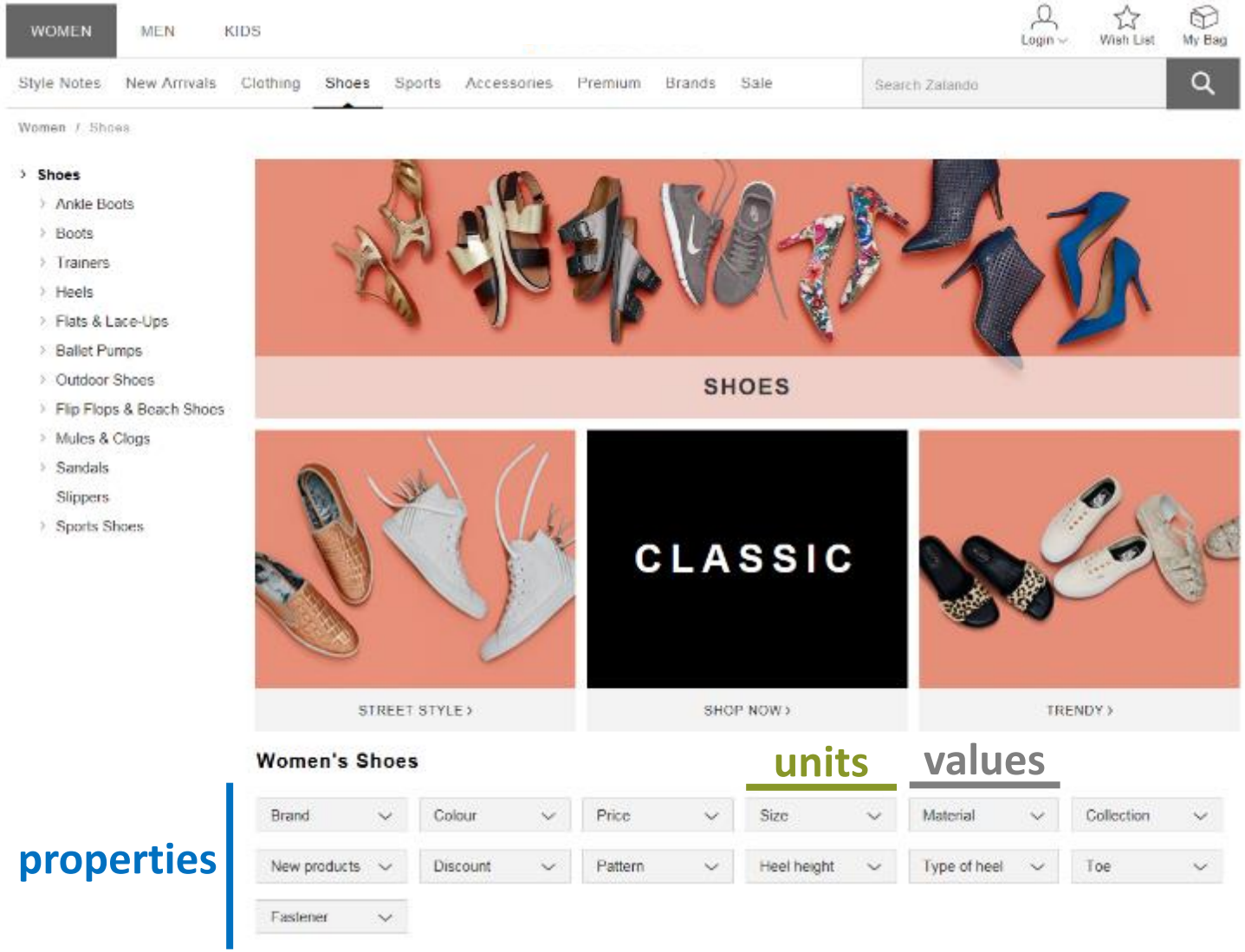
Source: ISO/IEC WD 21823-1:2017

Table 1 - Summary of different facets of Internet of Things interoperability

Facets	Aim	Objects	Requirements	Examples
Transport	Technically secure data transfer	Physical connections Signals	Protocols of data transfer	HTTP/S, MQTT
Syntactic	Receiving data in an understood format	Data	Standardized data exchange formats	JSON, XML, ASN.1
Semantic data	Receive data using an understood data information model	Programmatic interface	Common interpretation of data information model	Directories, data keys, ontologies
Behavioural	Obtain expected outcomes to interface operations	Information	Behavioural model(s) of the invoked IoT entity	UML models, pre and post conditions, constraint specifications
Policy	Assurance that interoperating systems follow applicable regulatory and organizational policies	Regulatory and organizational polices and interoperation context	Conditions and control for use and access	Security policies of IoT system stakeholders, restriction on cross-border data transfer, Regulations controlling PII

How is an information model used for SEMANTIC DATA and classification?

Example: Web shop

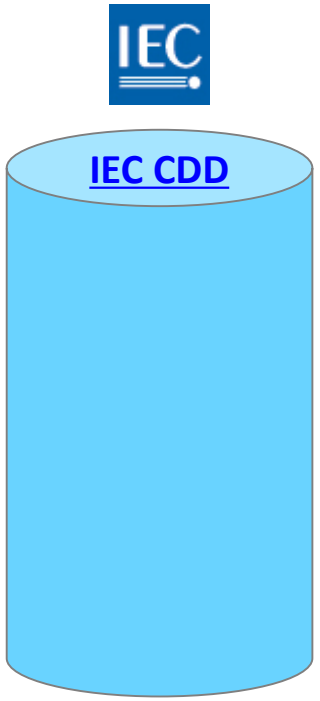


Introduction of the two important master data dictionaries: IEC CDD and eCl@ss

Common repository

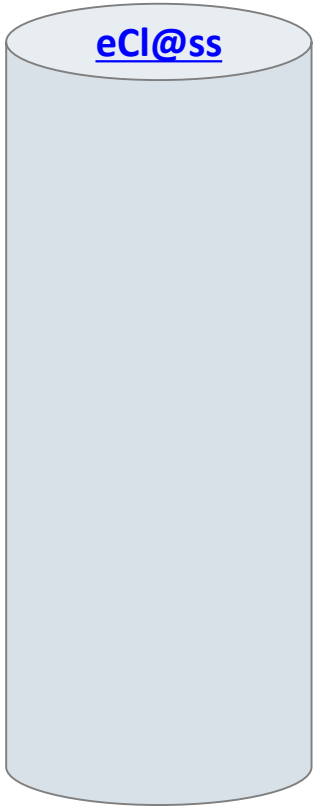
[based on intern. standards]

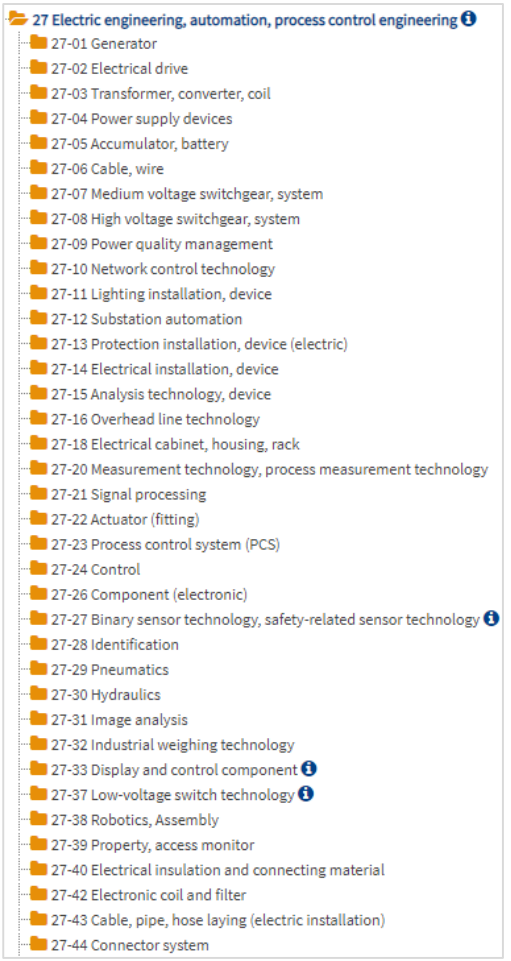
- **IEC SC3D** IEC61360-4 Electric/Electronic components
- **IEC SC3D** IEC62720 UNITS
- **IEC SC65E** IEC61987 Process automation
- **IEC SC121A** IEC62683 Low voltage switchgear
- **IEC TC65** Industrial-process measurement, control and automation
- **IEC TC59** Household and similar electrical appliances
- **ISO TC131** Fluidics
- **ISO TC172** Optics and photonics
- **ISO TC29** Cutting Tools
- **IEC TC85** Measuring equipment for electrical quantities
- **ISO TC184 SC4** Industrial data
- **IEC TC2** Electrical machines/motors
- **IEC TC22** Power converters/inverters



Domain/Company repository

[based on consortia standards]

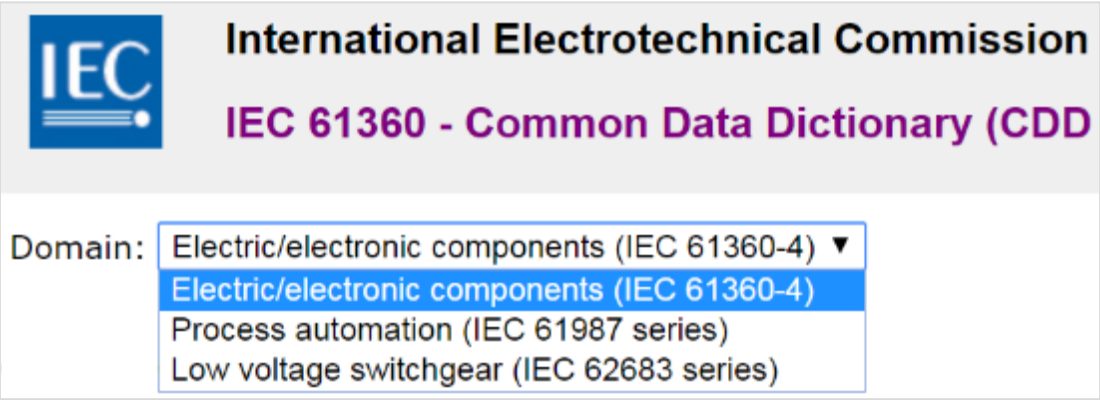




Comparison of fundamental structures for the two master data dictionaries IEC CDD and eCl@ss

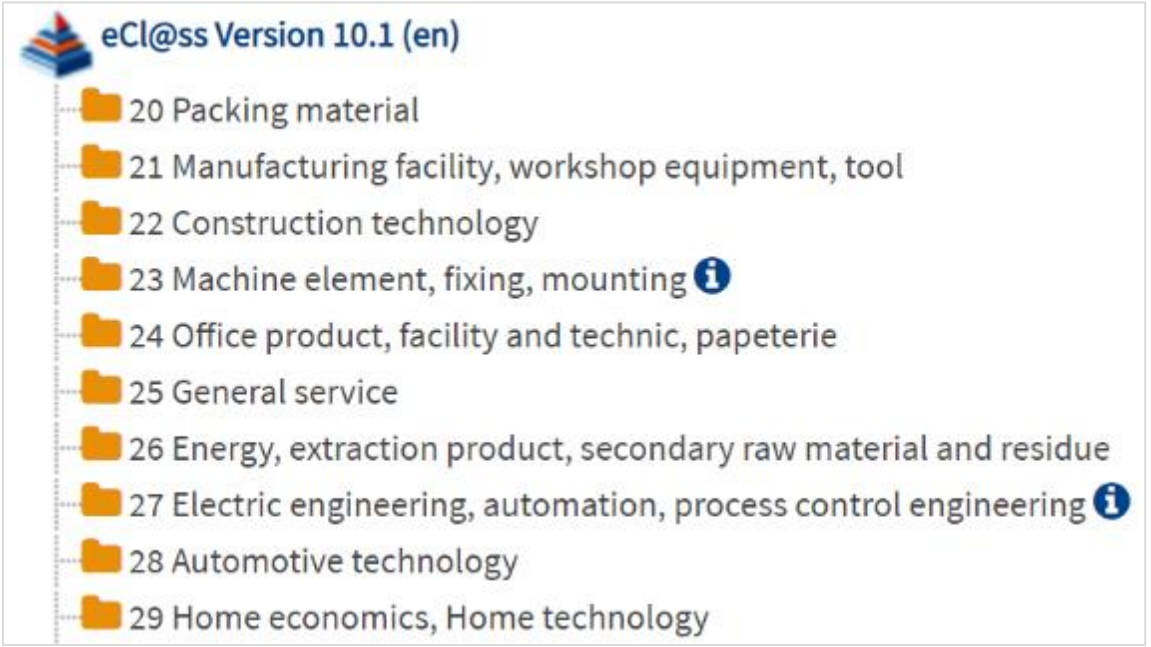
IEC CDD (maintained by IEC/SC 3D)

- Information-model according to IEC 61360
- Class tree is structured by standards
- Unlimited class levels; 1st level class is called domain
- Classification by SDOs based on international (ISO or IEC) standards → Responsible: TCs/SCs
- Share common aspects/features within IEC 61360-4



eCl@ss (maintained by eCl@ss e.V.)

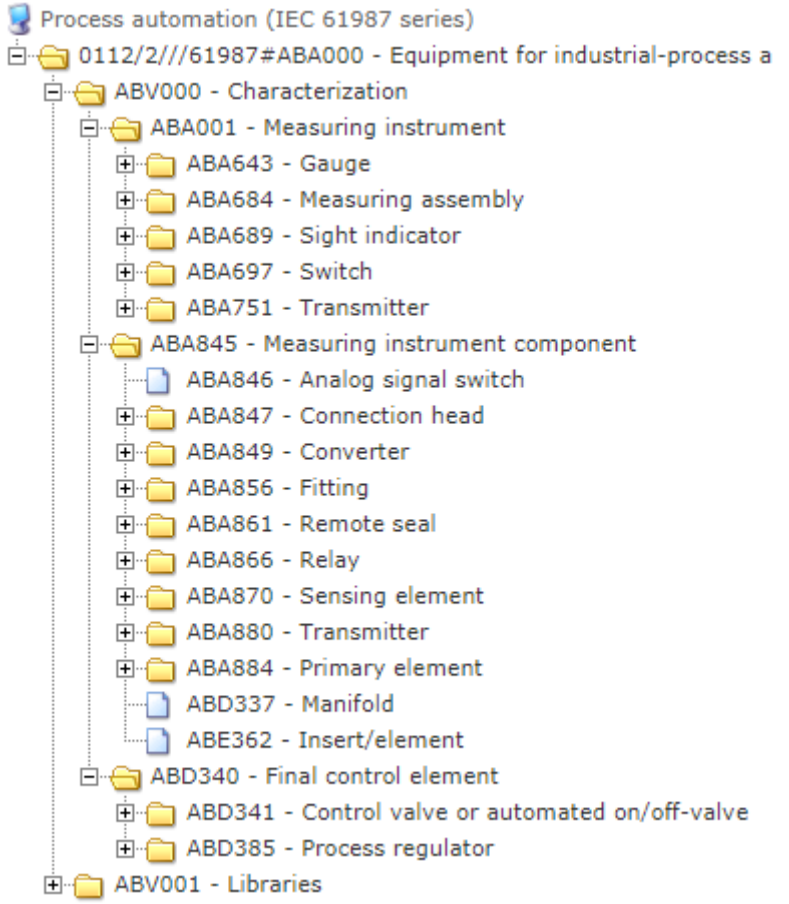
- Information-model according to ISO 13584-42
- Class tree is structured by technical areas
- 4 class levels: 3 classification classes + application class
- Classification by EG (Expert Groups) based on consortia standards → Responsible: EGs
- eCl@ss BASIC not appropriate for reference repository

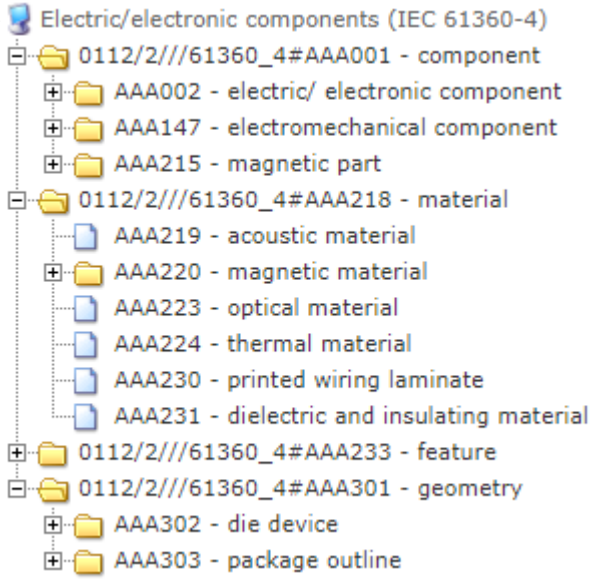


IEC CDD: Data structures (so-called CONTENT) <u>available</u>

Electric/electronic components (IEC 61360-4)
Process automation (IEC 61987 series)
Low voltage switchgear (IEC 62683 series)
Units of measurement (IEC 62720)

Stand: 09.2019

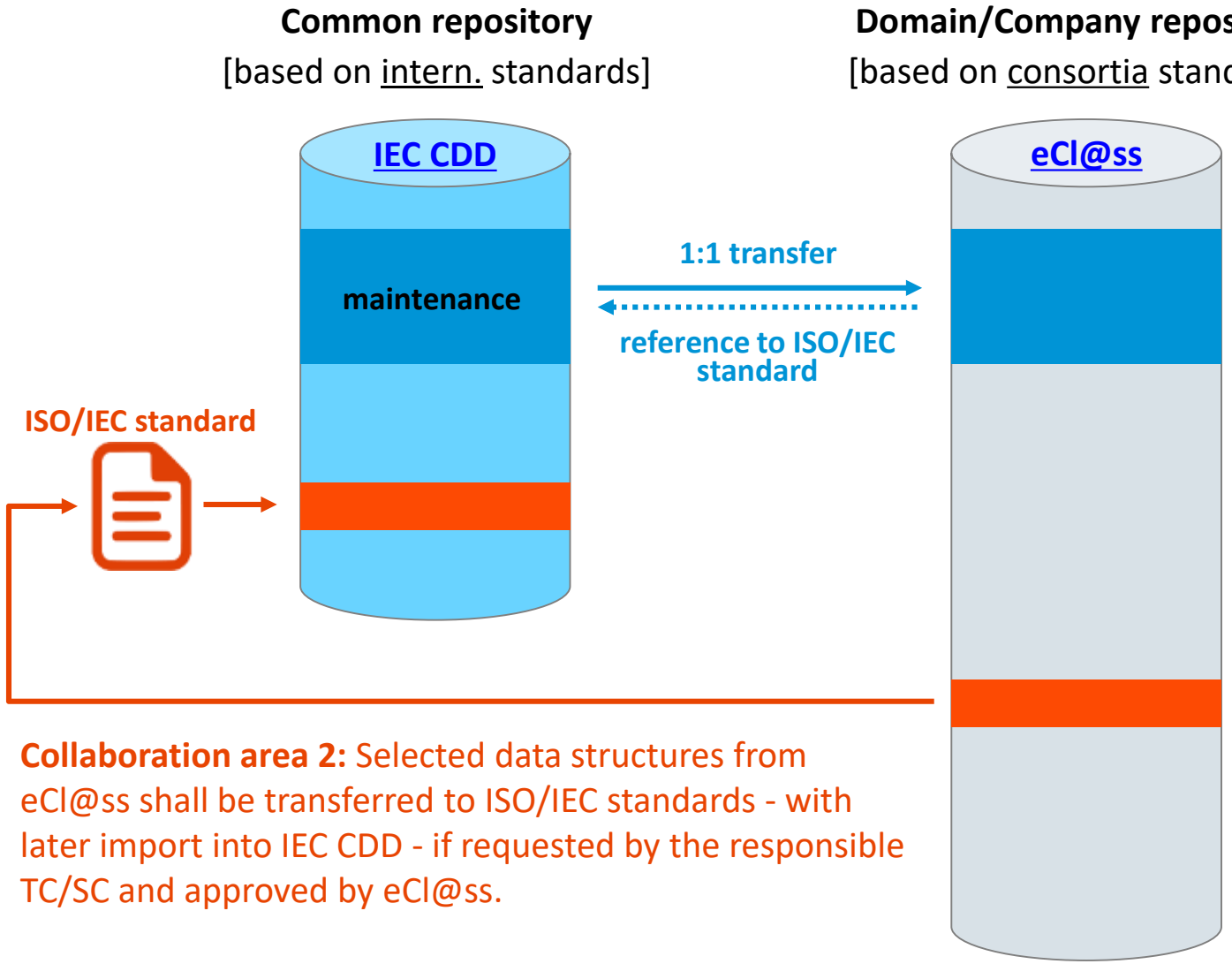




CONTENT derives from

- IEC side (based on IEC standards) → processed by IEC/SC 3D
- ISO side (based on ISO standards) → processed by ISO/IEC JWG24 (JWG between IEC/SC 3D and ISO/TC 184/SC 4)

Future collaboration between IEC CDD and eCl@ss
(based on liaison IEC/SC 3D with eCl@ss)



Collaboration area 1: All data structures based on ISO/IEC standards shall be maintained in IEC CDD with a 1:1 transfer into eCl@ss ADVANCED - if requested by eCl@ss and approved by responsible TC/SC.
Reference to IEC CDD is recommended.

Collaboration area 2: Selected data structures from eCl@ss shall be transferred to ISO/IEC standards - with later import into IEC CDD - if requested by the responsible TC/SC and approved by eCl@ss.

How does the future collaboration between IEC CDD and eCl@ss increase the user experience?

Benefits for the users

- High quality DATA STRUCTURES created and maintained by ISO/IEC TCs (with support by IEC/SC 3D) based on international consensus with the broad community of ISO/IEC experts
  → Reliable DATA STRUCTURES
- Accelerated closing of gaps for DATA STRUCTURES in IEC CDD and eCl@ss to support the urgent needs of users in INDUSTRIE 4.0 applications
  → Fully support of DATA STRUCTURES for all products and services in INDUSTRIE 4.0
- Identical DATA STRUCTURES in IEC CDD and eCl@ss, if based on ISO/IEC standards
  → Internationally accepted
- Download and re-use of DATA STRUCTURES from IEC CDD and eCl@ss
  → No need for users to decide where to download the DATA STRUCTURES
- Flexible/Accelerated new DATA STRUCTURES can be developed and downloaded via eCl@ss
  → eCl@ss is the preferred master data dictionary for accelerated DATA STRUCTURES

Take away

- **Is IEC CDD or eCl@ss is offering DATA STRUCTURES for <u>your</u> products and services?**
  → <u>If not</u>, please contact the eCl@ss office or IEC/SC 3D
- **Is your company already offering SEMANTIC DATA for your products and services?**
  → <u>If not</u>, please be aware that these SEMANTIC DATA are required to enable INDUSTRIE 4.0
- **Do you need further information?**
  → See a selection of further information on the next slide

Further information

A selection of further information on SEMANTIC master data dictionaries, SEMANTIC DATA, SEMANTIC interoperability and classification

- For the management and decision makers in SMEs:
  VDMA-Leitfaden “Interoperabilität durch standardisierte Merkmale” (Deutsch; English under preparation)
- For managements, experts and developers:
  IEC White Paper “Semantic interoperability - Challenges in the digital transformation age” (English)
- For INDUSTRIE 4.0 experts:
  “Details of the Asset Administration Shell (AAS) / Part 1 - The exchange of information between partners in the value chain of Industrie 4.0” (Deutsch; English)
- LINK to IEC CDD: https://cdd.iec.ch
- LINK to eCl@ss: https://eclass.eu