Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

Applying Ontologies in Accreditation

Glimpse into the digital future: Ontologies in metrological services

Daniel Hutzschenreuter, Sascha Eichstädt, 2024-04-26, A4DT Webinar

Two major considerations

“But let us start at the beginning”

Digital Transformation*

Digitize → **Digitization** → **Digitalization**

paper → image, PDF file,…

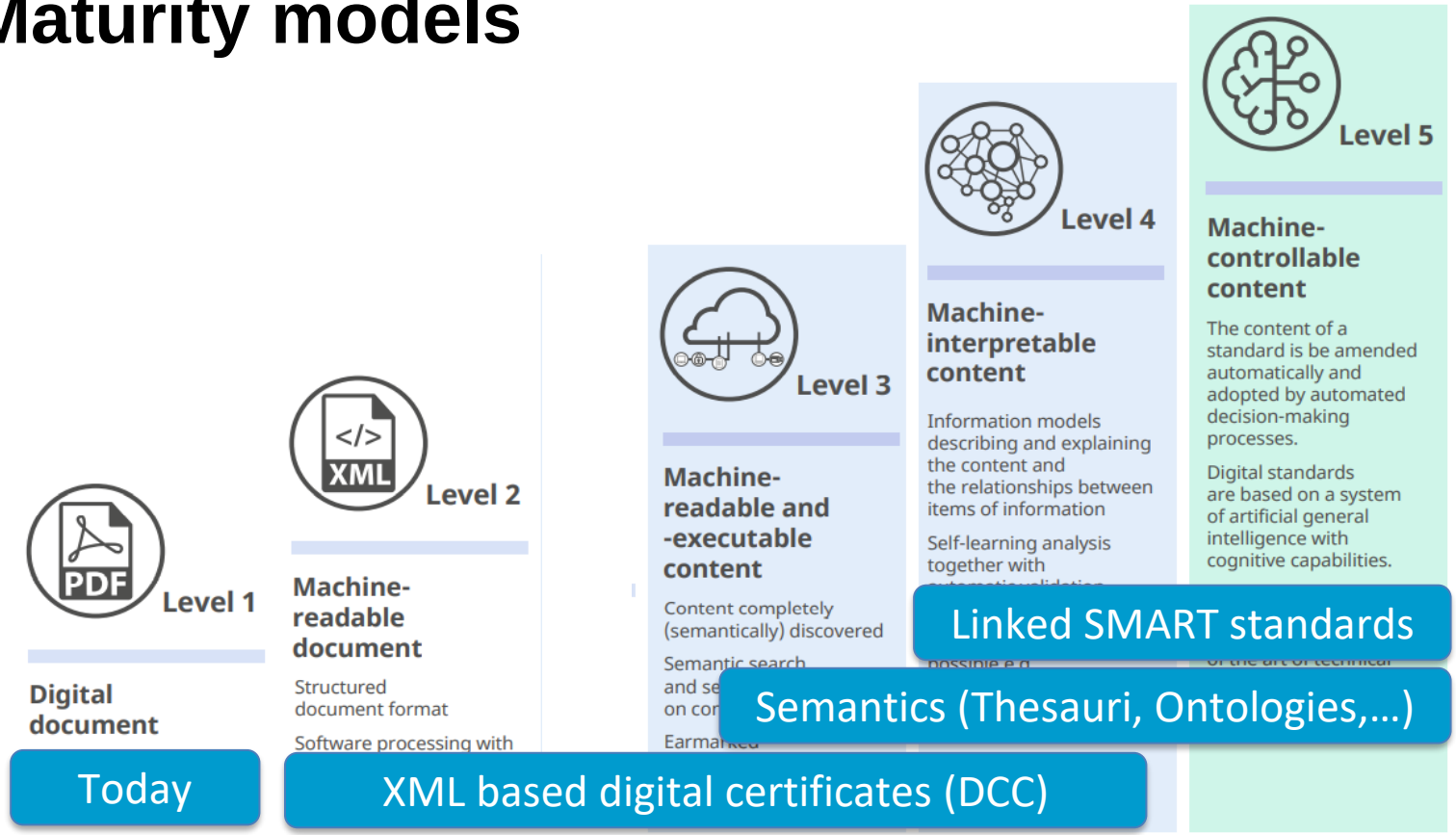
analogue process → digital form

digital technologies → change business models, new revenue

* terms Gartner IT glossary

CIPM Vision SI Digital Framework
Digital & FAIR certificate in metrology
Thesauri, Ontologies, …

Maturity models



from DIN/DKE IDiS whitepaper 2021

SMART standards development →

Change from files to distributed content

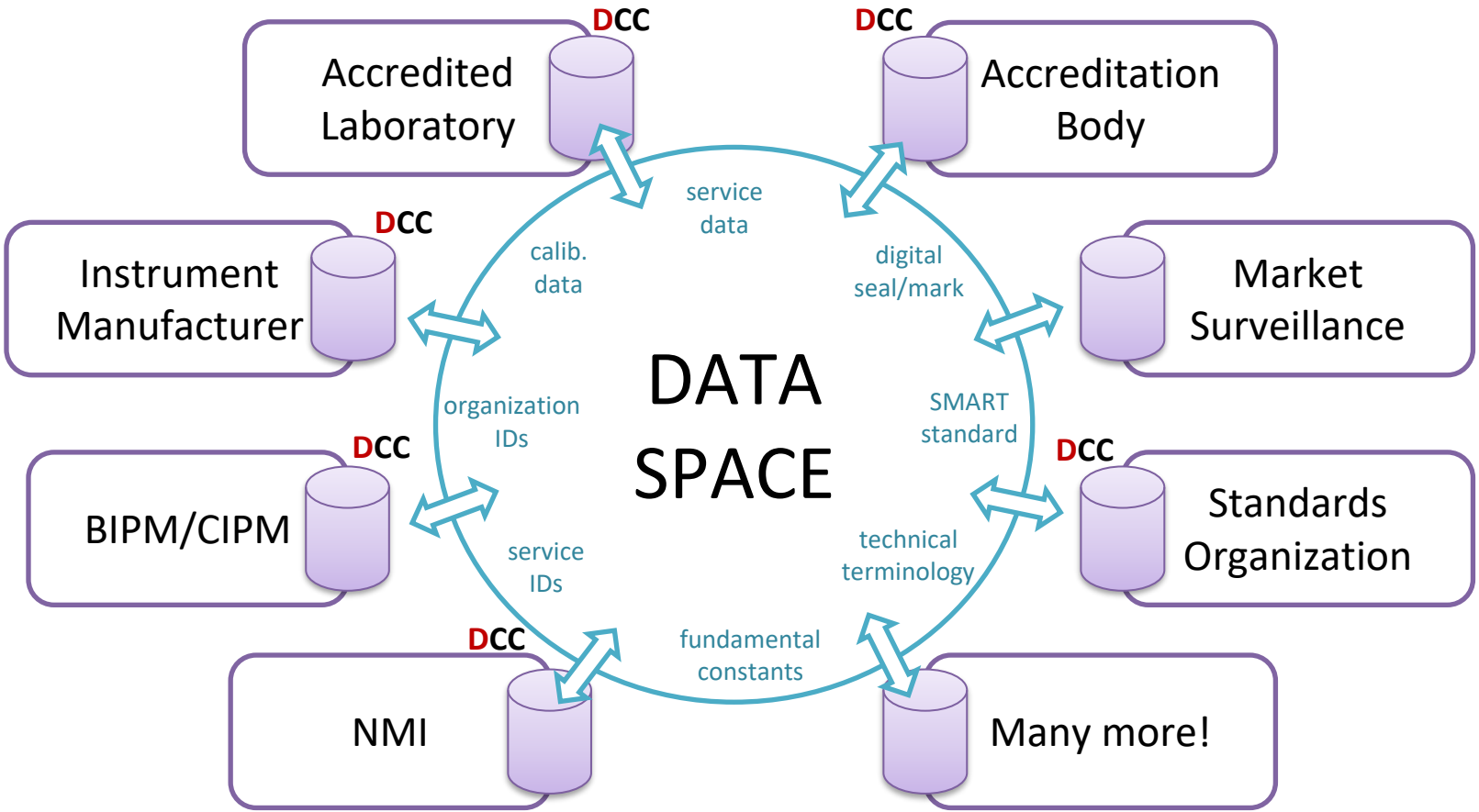
THE QUALITY INFRASTRUCTURE IN THE DIGITAL AGE: BEYOND MACHINE-READABLE DOCUMENTS

S. Eichstädt et al, M4Dconf2022, IMEKO TC6

In a digital world of interconnected systems and automated processes, the use of documents is not necessary.

An important aspect towards Level 5 is the shift from a document-based quality infrastructure to one where statements of conformity, traceability to national standards, and compliance with standardization requirements can be mutually accepted without a (electronically) signed document.

Distributed digital QI – level 3, 4,5,…



Ontologies in Digital Calibration Certificates

Digital vocabularies (technical terminology)

Identification of quantity kinds in D-SI

QUDT

Controlled vocabulary for common terms (refTypes)

TemaTres

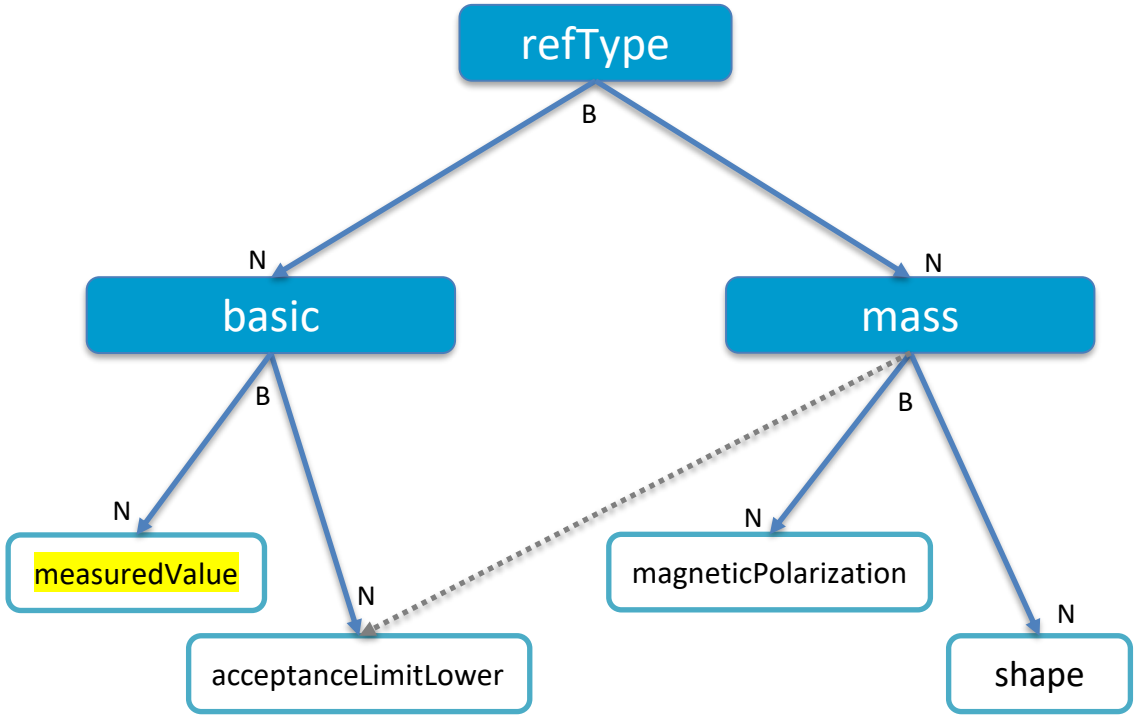
Manage, Publish, Share, Re-use

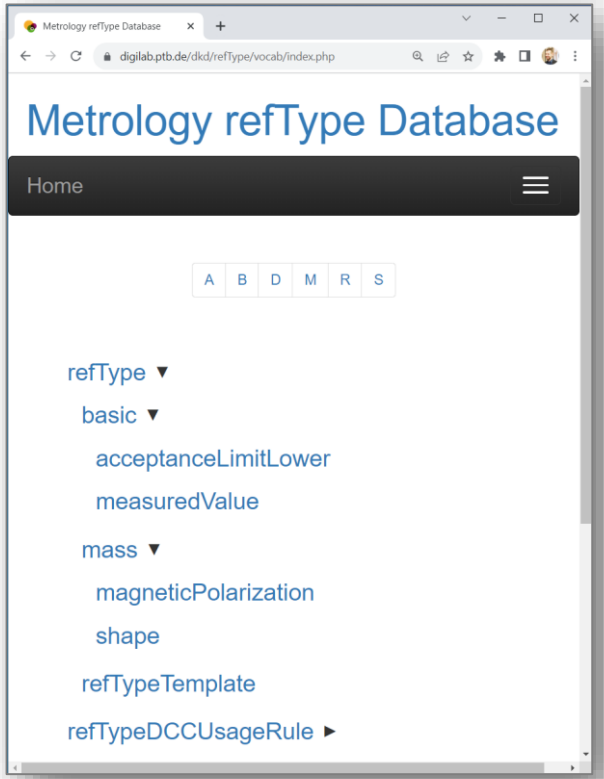
Ontologies | Taxonomies | Thesauri | Glossaries | list of values

The open source way to manage formal representations of knowledge

Example TemaTres – core structure

B .. broader term
N .. narrow term





Example TemaTres – accreditation

- Today: Terms structured by areas of metrology
- **Future: Additional high-level terms to advance ability of verification of DCC data**
  - refTypes by service categories, device types, calibration guides, …
  - refTypes by scopes of accreditation; flags for refTypes required by accreditation

Ontologies for accreditation

- Creators and users of calibration data are seeking innovation from more links to external content creating value beyond “single data file”.

- Suitable orchestrated **ontologies covering accreditation aspects** could help to foster
  - Automation of assessment
  - “Conformity by design” of developments

Beyond single XML data file for DCC

- Linking to data in a wider digital quality infrastructure
  - from NMIs, standardisation bodies, accreditation …
  - Domain, user, application specific sources

- Up to exchange of (larger fractions of) DCC data as by ontologies (*Web Ontology Language -OWL)*

Example national accreditation body DAkkS

- **eAttestation – digital accreditation symbol (signature)**
- **Accepting usage of DCC having**
  - standardised semantic structures,
  - e.g., provided by technical associations, and
  - gone through conformity assessment by DAkkS

    (no process yet)

https://www.dakks.de/de/digitales-akkreditierungssymbol-faq.html

Accreditation for ontologies

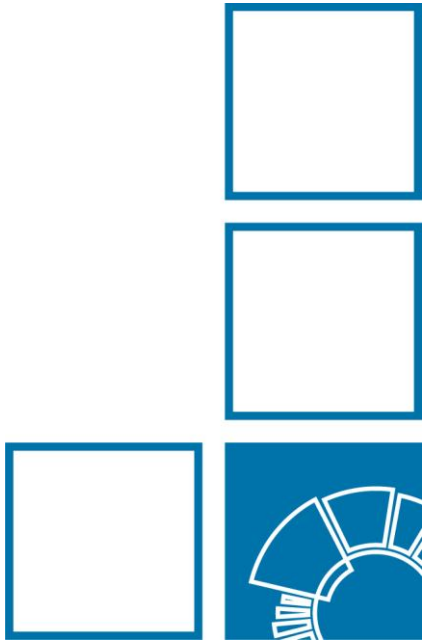
What requirements should ontologies fulfil, that are applied with data under accreditation?

Challenges

- Use of normative standards (ISO, BIPM, etc.) vs. community established standards (QUDT)
- High dynamics (ontology permanently developing)
- No clear standards for verification of ontologies and providers

Thank you


Ontologies for Accreditation
Accreditation for Ontologies
Call to action needed?



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