Digitally Transforming the International Quality Infrastructure Panel Discussion

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Section 1

Introduction

Today's Topics

1. Introduction
2. Metrology DX Background
3. BIPM
4. PTB
5. NRC
6. Machine Learning
7. Open Discussion, Q&A

Section 2

Metrology DX Background

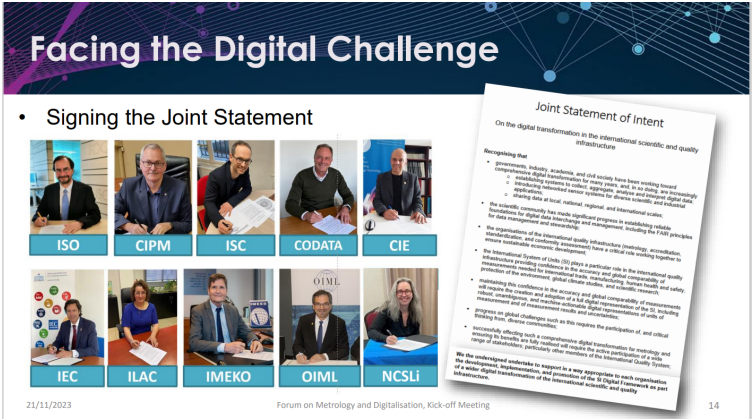
Acronyms & Buzzwords

- API—application programming interface
- BIPM—International Bureau of Weights and Measures
- CMC—calibration and measurement capability
- DCC—digital calibration certificate
- DCR—digital calibration request
- FAIR—findable, accessible, interoperable, reusable
- KCDB—key comparison database
- M-Layer—metrology information layer to support measurement systems
- NCSLI—NCSL International
- NMI—national metrology institute
- PID—persistent identifier
- SoA—scope of accreditation
- WMD—world metrology day

MII (measurement information infrastructure)

set of normative standards that unambiguously define data structures, taxonomies, service protocols and security for locating, communicating and sharing measurement information

Joint Statement of Intent on DX in the IQI



Courtesy of Joachim Ullrich, Forum-MD Chair

World-Wide Digitalization in Metrology

- WMD 2022: Joint Intent Statement on Digital Transformation, the Signatories:
  - BIPM, CODATA, ILAC, ISO, NCSLI, OIML, ISC, CIE, IEC, IMEKO
- Success ultimately depends on value-added industry innovation.
  - Software providers
  - Instrument manufacturers
  - Calibration & testing labs
  - Accreditation bodies
  - ...
- BUT...that requires a common infrastructure
  - standardized process and information models
  - FAIR reference-data systems
- March 6, 2024: Conceptualize, model and implement!

Principles

- FAIR use of reference data
- Customer use cases
  - What problems do we solve?
  - What value do we add?
- Conceptualization
  - Step back from current practice.
  - Return to concepts and rethink implementation.
  - Ask why, why, why; don't emulate.
- Models
  - Focus on abstractions (integrated essentials)
  - that unite concrete differences (pressure as against voltage).

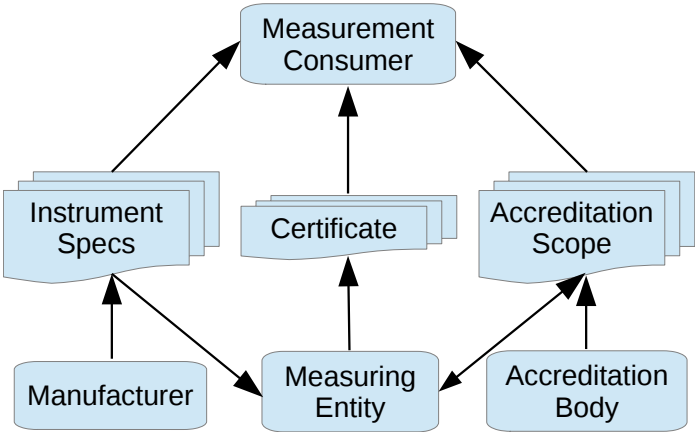
Automated Information Flow in the Measurement Economy

1. Proven modeling principles
2. Standardized metrology metadata
3. $\Rightarrow$ Interoperable measurement data and services

Spec: `Source.Voltage.DC`

SoA: `Measure.Voltage.DC`

Cert: `Source.Voltage.DC`



Panelists

- Panelists will briefly present digitalization projects and progress from each of their organizations' perspectives.
  - Anna Cypionka
    International Bureau of Weights and Measures (BIPM), Sèvres, France
  - Siegfried Hackel
    Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany
  - Ryan White
    National Research Council (NRC), Ottawa, Canada
  - Frédéric Tessier
    National Research Council (NRC), Ottawa, Canada
- Audience questions and discussion

Section 3

BIPM

Section 4

PTB

Section 5

NRC

Section 6

Machine Learning

Section 7

Open Discussion, Q&A

Acknowledgments

Many thanks go to

- Today's panelists
- NCSL International Committee members for their MII development work
- NCSL International for its MII support
- Cherine-Marie Kuster

And Thank You for your time!

Collaboration opportunities? Please bring your expertise!