Measurement Information Infrastructure (MII) & Automation – 2024-Jul-08

NCSL International Committee Week

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Serving the World of Measurement

Welcome and Opening Remarks

141 MII & Automation Committee Overview

Measurement information infrastructure (MII)—unambiguous data standards for computers to exchange machine-readable metrology documents without manual generation, transmission, reception, interpretation and use.

- Develop and define data structures, taxonomies and libraries to populate MII documents: accreditation scopes, instrument specifications, and certificates;
- Write the MII definition document(s);
- Assist member organizations with the MII to create and use MII-related products.

141 MII & Automation Committee Agenda

Introductions

Updates from the NCSLI Board

Minutes Review

Upcoming Events

Ongoing Projects

Open Discussion

Q1 Minutes Review

- Mark covered recent updates and the upcoming conference and modeling workshop.
- Mike Schwartz: Recent SoA-editor tutorial available, runs less than 1.5 h
- Pamela: The Navy has digitized ~600 measurement standard specifications. Mike Brown: Cubyt may eventually provide example or API access to its specs.
- Discussed DCC problems, potential modeling enhancements, etc.
- Blair Hall described the M-layer and its status in more detail.
- Brief coverage of the NCSLI MII wikidot and GitHub sites.

NCSLI MII Activity Highlights

- **M-Layer**: fundamental digital representations for quantities and units
- **Measurand taxonomy** of metadata for digital-document interoperability
- High-level **unified data models** for quality and metrology data & processes
  - Model **processes** and the associated **informational components** across the IQI, from the lowest to the highest level.
  - Document **technologically agnostic models** to facilitate different implementations and information exchange independent of data formats.
  - **Encourage** Forum-MD members to develop, support, and implement digital processes and data derived from **standardized models**.
  - Create and populate **FAIR reference-data systems** with the metadata, taxonomies, and entities required to support IQI processes.

141 MII & Automation Committee M-Layer Project

A digital information layer for metrology systems
Unambiguous digital quantity and unit representations
Consistent transformations and alternate expressions

Prototype registry and API now exists

Currently undergoing expansion and testing

Info and API available at mlayer.org

CCBY-SA open-source license

141 MII & Automation Committee Measurand Taxonomy Project

Metadata tags for metrology data in digital documents

Unambiguous identifiers: **Measure.Current.AC.Sinewave**

Taxonomy editor by Cal Lab Solutions on GitHub

Collaborating and covering the KCDB via a GitHub repository:

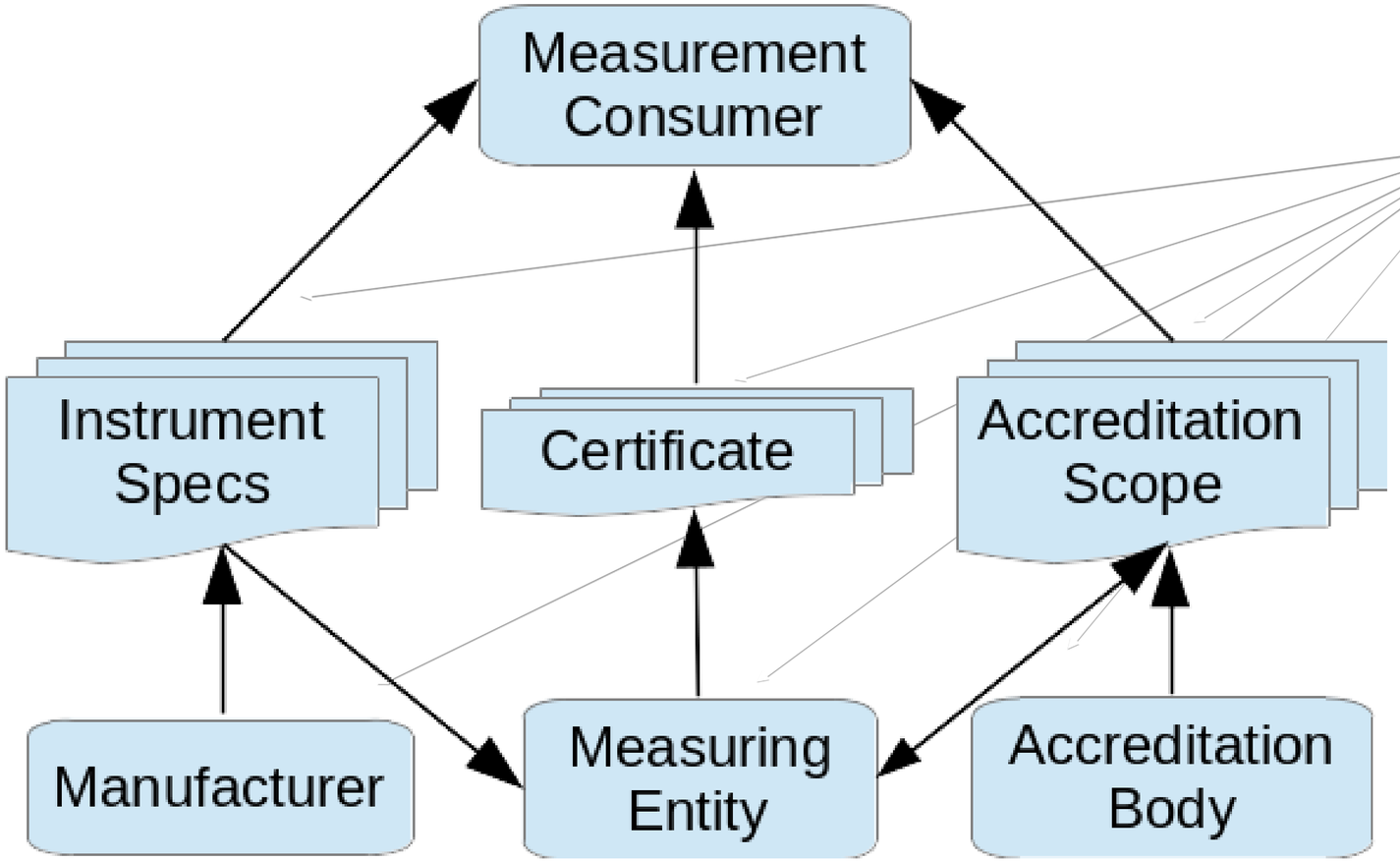
https://github.com/NCSLI-MII/measurand-taxonomy

Developing an open NCSLI specification document

CCBY-SA open-source license

The Measurement Economy

Data Modeling Principles



Standard Metrology Metadata

141 MII & Automation Committee Accreditation Scope Project

Digital document for CMCs using the taxonomy

SoA editor by Cal Lab Solutions on GitHub

Also on GitHub: XML schemas, quantities, units ...

Developing NCSLI specification document

Editor tutorials, webinars available

Cal Lab Solutions looking up SoA Unc in Metrology.NET

141 MII & Automation Committee Instrument Specs Project

Digital document for manufacturer specs

May extend the taxonomy:

Measure.Current.AC.Sinewave [ACCoupled? RearInput...]

Data model only at this point

Fluke Calibration developing a resource through Cubyt

141 MII & Automation Committee Calibration Certificate Project

Digital document for calibration results

Data model only at this point

Would use the extended taxonomy:

Measure.Current.AC.Sinewave [ACCoupled? RearInput...]

The DCC has taken the lead here (PTB), NIST involved now, many other NMIs and companies

141 MII & Automation Committee
Collaboration, Publication

Now a signatory: Joint Statement of Intent on DX

Interfaces: APMP, BIPM, CIPM, MSL, NRC, PTB, SIM

Recent presentations:

APMP, DCC2024, ILAC, JSIS, SciDataCon, NCSLI Tech Exchange, ...

Industry software suppliers

More info: https://miiknowledge.wikidot.com/

141 MII & Automation Committee
Expert Volunteers Required

Drafting, reviewing M-Layer and taxonomy documents
Contributing to the taxonomy
Chairing working groups (M-Layer, Taxonomies, SoA, etc.)
Liaisons to international orgs and other NCSLI committees
Modeling information and processes for implementation
Open-source library & commercial software development
Wiki management

Related Technical Sessions This Week

Tue, 1A: “The digital SI and its impact”

Tue, 1B:

- “Digitalization in the Metrology Quality Infrastructure”
- “CMS-NML's Experience in Digital Metrology: Applications to Machine-Tool Testing and Carbon-Emission Verification”

Wed, 7A:

- “Harmonizing Metrological Metadata: Leveraging Object-Relational Mapping for Digitalization in Metrology”
- “A Taxonomy of Electrical Measurands”
- “AI-Assisted Calibration and Digital Certificates: Transforming Industries”

Learning Labs & Panels This Week

Wed, 5E: “Digital Scope of Accreditation Editor”

Wed, 5F: “Digitally Transforming the International Quality Infrastructure”

Wed, 6F: “Metrology's Digital Transformation in Industry”

Artificial Intelligence

Tue, 2A: “Metrology for AI and AI for Metrology”

Wed, 5A: “Leveraging AI to Advance Metrology”

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Upcoming Events

Modeling for Digitalization

First Annual Workshop, Thursday, July 11, 2024

* Model-driven software development and metrology modeling
* Importance of service classifications in the quality infrastructure
* Building a robust digital description of measurement capabilities
* Contextualizing the measurement result
* Harmonizing provenance, attribution and identification of calibration reports, certificates, and measurement capabilities
* Group working activities, software demonstrations

https://ncsli.org/mpage/WSMW

Q &A

Region Meetings & *Metrology in Motion* Webinars
are **FREE** for Members!

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Upcoming Events

July 6-11, 2024

NCSLI & CPEM Conference

Gaylord Rockies Resort & Convention Center

Aurora, Colorado

For more info go to: www.ncsli.org/mpage/WS_2024