Taxonomies for a Metrology Information Infrastructure

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Abstract

What if your organization's measurement, analysis and management computing systems spoke a shared language with other world-wide measurement-related systems? How would that affect your business? How would it ease your *ISO/IEC 17025* compliance challenges? Imagine a set of normative standards that define data structures, taxonomies, service protocols and security for locating, communicating and sharing measurement information. Those standards comprise what we call a measurement information infrastructure, or MII. In 2017, the NCSLI MII & Automation Committee presented the MII Vision and held discussion on its progress. This year's open discussion panel session focuses on the taxonomies required to implement an MII and highlight how you may participate in the real-world benefits it will create and the efforts underway to realize them. The session will also demonstrate some MII-aware software under development.

Learning Objectives

By participating in the session, attendees will

1. Gain insight into MII opportunities and benefits,
2. See an open-source MII software demo,
3. Learn how to contribute to MII development, and
4. View the proposed standard measurement data model and taxonomy.

1. Background

What do we mean by the Measurement Information Infrastructure (MII)? Technically, we currently define an MII as a set of normative standards that unambiguously define data structures, taxonomies, service protocols and security for locating, communicating and sharing measurement information. By that we mean a standard language that everyones measurement computing systems might speak to each other without any manual data processing, interpretation, transcription, etc. What computing systems? Your calibration and test stations, lab management software, enterprise management systems, uncertainty analysis or statistical software, etc.

Okay, so where did this concept come from? We might say the MII began decades ago, conceptually at least. Metrologists and other measurement professionals have long thought about, developed, and thrown about ideas for automating measurements and intelligently using that electronic data. The NCSLI *Metrologist* began a regular column in January

2013 to explore this and related ideas and soon discovered and covered many past and present related efforts. Along the way, we developed high-level data models that showed how we might capture machine-readable measurement information in the typical metrology documents we currently process by hand: instrument specifications (spec sheets), scopes of accreditation (SoAs), and certificates.

The column has since engendered ideas, discussion and activity among both pioneers of similar concepts and newly excited participants. Conferences in 2015, 2016, 2017 and 2018 now have held MII presentations and discussions and a development team headed by Cal Lab Solutions and Qualer has produced and vetted data formats and demonstration software for MII SoAs, quantities, and measurement units.

2. The MII Vision and Motivation

In concert with the measurement community, we intend to

- Create a globally standardized infrastructure for creating, locating, communicating and processing measurement information.
- Replace manually-processed documents with unambiguous machine-readable data.
- Augment static web sites with smart web services.
- Open new automation horizons and empower developers to take measurement-related software to whole new levels.
- Lower the information barriers between testing & calibration labs, instrument manufacturers, vendors, accreditation bodies and measurement consumers.

Such an MII would eliminate ambiguity from our human-readable documents, streamline many tedious and error-prone tasks, engender new service opportunities and value streams, improve traceability, and enhance measurement quality throughout the measurement economy. Some obvious examples include:

- No more tediously searching for the right instruments and service vendors
- No more manually writing, sending, interpreting documents
- No more transcribing, entering and updating information
- Our computers do it all unambiguously and automatically.

The technology already exists; we've only to harness it.

3. Topics

The panel will briefly present the MII concept and measurement taxonomy, and demonstrate the features developed to date before opening the floor for any and all questions and discussion on related topics, including:

- Ontologies and taxonomies
- Participation, getting involved

- Software development
- Benefits and challenges
- Development strategies
- Document models
- Data formats
- Supporting standards
- Communication protocols
- Spin-offs
- Related efforts

4. Acknowledgments

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