An Enterprise Resource View of Metrology Software Systems

Michael L. Schwartz
Over View

The Problem -
Current Station of Metrology Automation
  From the Problem Domain
Metrology Services Architecture
  Change the Paradigm
Interaction / Decoupling
How does this solve metrology problems
The Problem

Cal Lab Solutions Automation & Procedure Library
MET/CAL® - Largest Library of Complex Procedures
Microsoft.NET – Power Sensor Calibration
MUDCATS – Large Library of Data-Sheets
Lab View® / Rocky Mountain Basic / Other

Data has more value than software
Calibration Results is Data
Calibration Test Points is Data
Uncertainty Formulas / Calculation are Data

We had Major Problems
Islands of data Costs Time & Money
Support cost are multiplied
Cal Lab Solutions is about efficiencies
Where We are Today

Metrology Software & Life Cycle
20 Years or More
Industry < 5
IT wants to replace our software
It doesn’t run on our new computer

The world is Changing  ➔ FASTER
Mobile is taking over
We are moving into the Internet-of-Things

Recently
IBM announced – Building software for iPad
Microsoft will layoff 18,000 employees
Current State of Automation

- A Calibration Technician
- A Calibration Station
  - w/ Multiple Standards
- A Computer
- Some Software
- Perform 1 Calibration in Less time
Limitations of Automation

• All Standards have to be Connected
• Tech Runs the calibration from end to end.
• Inflexible
• Very Hardware Specific
• Uncertainty Calculations
• Only 1 UUT at a time
Business Efficiency?

• Better
• Cheaper
• Faster
What if we could?

• Move the UUT around the lab.
• Test UUT(s) is Parallel
• Be flexible in how we calibrate
  – Start / Stop / Retest
  – Allow Test Selection
  – Support multiple Configurations
• Detailed Uncertainty Calculations
• Develop Procedures Faster
• Test UUT’s Faster
• Integrate with Other Systems
The Islands of Metrology Software

- MET/CAL
- SureCal
- LabView
- Your Cal
- Rocky MT Basic
- Your Cal
Rethinking the Calibration Model

Each One of our Islands is an all in one Application

<table>
<thead>
<tr>
<th>Test Point(s)</th>
<th>Test Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>UUT Config</td>
<td>STD Config</td>
</tr>
<tr>
<td>Measurement(s)</td>
<td></td>
</tr>
<tr>
<td>Uncertainty Calculations</td>
<td></td>
</tr>
<tr>
<td>PASS/FAIL</td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
</tr>
</tbody>
</table>
Metrology NEEDS
Systems Unification

• Integration Strategy – Point of View
• Work w/ OLD and the NEW Technologies
  – Large Investment in Current Technologies
  – Library of UUT Procedures
• Migration Must be Incremental
  – Small Manageable chunks
• Upgrade Path Must be EASY for Labs
Decoupling or Software Metrology Services Bus

ANY Language
ANY Platform

Test Point(s)
Test Process
UUT Config
STD Config
Measurement(s)
Uncertainty Calculations
PASS/FAIL
Results
• A **Metrology Service** is an autonomous business object system that accepts one or more requests and returns one or more responses using well defined interface.

• A **Metrology Service Bus** is the business control layers that allows providers and Consumers to interact with each other.
Creating an Industry Standard

Common Messaging Interface
Systems of Systems need to Communicate
   We chose REST based Communications Standard
      w/ JSON formatted data in the payload
   -- This is an Industry Standard
Releasing the Metrology.NET® Standard Formats
to the Public Domain

Building Tools
We are building
   Microsoft.NET® Development Tools
   MET/CAL® Development Tools
Data Migration Tools

Partnering & Training
Creating Training
Releasing Units of Measure Tools for Microsoft.NET®
Looking for more Partners
Questions? / Comments

Michael L. Schwartz
Cal Lab Solutions
mschwartz@callabsolutions.com