

Building a Machine Readable Standardized SoA Database

Metrology Information Infostructure

Metrology Data Exchange Standards

The 21st Century is here But Metrology isn't measuring up!

While the business world is running on data standards
the best metrology has is PDFs.

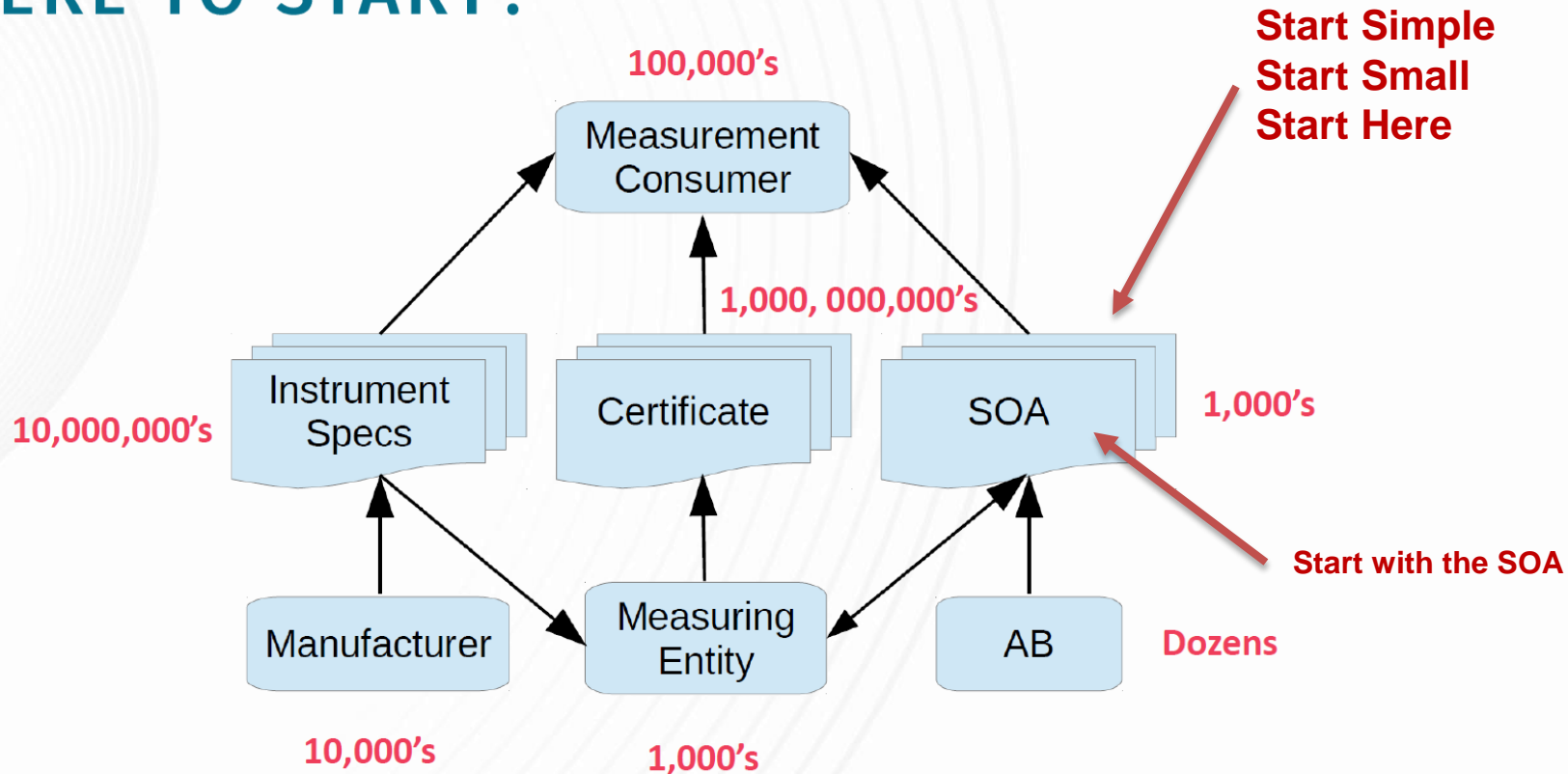
RIGHT NOW.... The Technology and Infostructure is available

- Businesses already use the technologies
- They are proven safe & secure
- We just need to use them

So let's create a set of Metrology Data Exchange Standards
and bring the World of Metrology Together!



WHERE TO START?



Joining the Team?

This team will define, test, and validate a machine readable XML based standard for storing and communicating with a lab's CMCs (Calibration Measurement Capabilities).

We already have!

- A Great Programming Team**
- Created a Solid beta version**
- Created a Search tool**
- Open Sourced the Technology**



We Need!

- People who are motivated**
- Excited to Define a Standard**
- Have SOA or Metrology Knowledge**
- Can Work with the Group**

Let's Stop the Maddness!



We copy results from our Excel calculations into the Word document we send to the Accreditation body to get back a PDF document.

Accredited Capabilities are 100% disconnected from:

- our original uncertainty calculations, and
- our daily calibration product.

What is needed is a way to tie all this data together!

Unusable / Impractical / Broken Search

Liquid-In-Glass Thermometers ³	32 °F	0.6 °F	Comparison to digital thermometer in water bath at fixed point (32 °F)
	(68 to 662) °F	0.52 °F	Dry block calibrator

**“Dry well” Calibration Search
Using Key Words**

**This format is
Completely
Unusable!**

Type J,K,T,E,R,S,C,U,N	32 °F	0.61 °F	Ice bath/precision thermometer CMART 25 calibrator, Fluke 5502A
Type J	(91) °F to (660) °F	0.43 °F	Fluke metrology well CMART 25 calibrator Fluke 5502A
Type K	(91) °F to (660) °F	0.43 °F	
Type T	(91) °F to (400) °F	0.43 °F	
Type R	(91) °F to (662) °F	0.43 °F	
Type S	(91) °F to (662) °F	0.43 °F	
Type E	(91) °F to (662) °F	0.43 °F	
Type C			
Type U			
Type N			
Indirect Verification of Rockwell Hardness Testers ³	Rockwell and Portable Rockwell	HRA: (60.5 to 69) HRA (70 to 79) HRA (80 to 92) HRA HRBW: (0 to 59) HRBW (60 to 79) HRBW	0.42 HRA 0.41 HRA 0.29 HRA 1.5 HRBW 0.92 HRBW
			Indirect verification per ASTM E18, E110

Better Search

Demo <http://beagledev.azurewebsites.net/>

Select Electrical

Select Voltage

Enter Voltage "95.545"

Press Search

Enter CNC Limit ".001"

Press Search

* The Search tools work!

Project Beagle

Home

Files

API

Welcome to project Beagle

Select Parameter Category

electrical

Select Quantity Measured

voltage

Data Point

96.545

Enter CMC

Q

Measuring Entity	Techniques	Quantities	Ranges	CMC	Assertion	
Acme Calibration Labratory	Measure.Voltage.DC.LowVoltage.4Wire	voltage	11 .. 110	0.001	Resolution = 6-1/2 digit	<div>Download</div>
	Measure.Voltage.DC.LowVoltage.4Wire	voltage	11 .. 110	0.01	Resolution = 5-1/2 digit	
	Measure.Voltage.DC.LowVoltage.4Wire	voltage	11 .. 110	0.1	Resolution = 4-1/2 digit	
Acme Calibration Labratory	Measure.Voltage.AC.LowVoltage	voltage	11 .. 110	0.002	Resolution = 6-1/2 digit Connection = 4 Wire	<div>Download</div>
	Measure.Voltage.AC.LowVoltage	voltage	11 .. 110	0.003	Resolution = 6-1/2 digit Connection = 4 Wire	
	Measure.Voltage.AC.LowVoltage	voltage	11 .. 110	0.02	Resolution = 5-1/2 digit Connection = 4 Wire	
	Measure.Voltage.AC.LowVoltage	voltage	11 .. 110	0.03	Resolution = 5-1/2 digit	

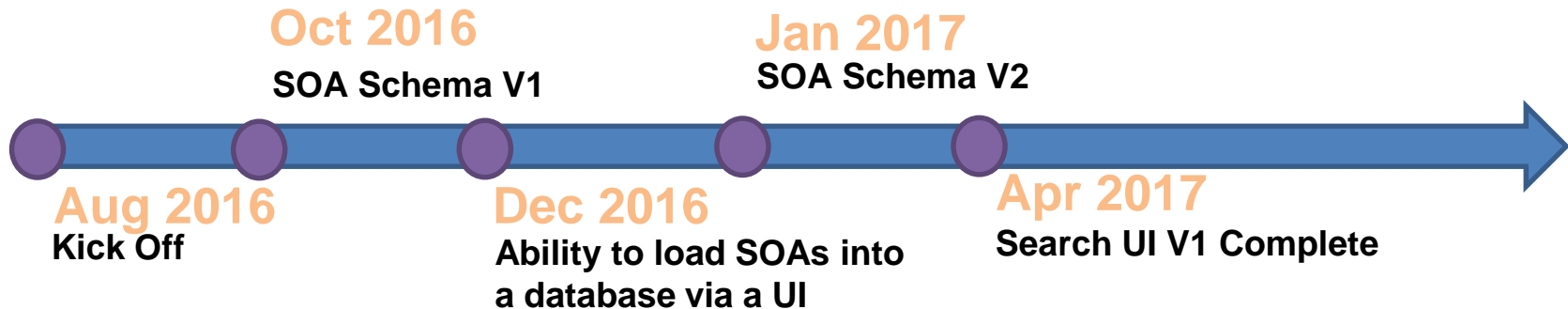
Open Source Project (GPL-3 License)

https://github.com/CalLabSolutions/Metrology.NET_Public

There is a Measurement Information Infrastructure (MII) Group that has been meeting once a week for the last 9 months.

Our Goals are as follows:

- Build a FREE SoA Editor for calibration labs and accreditation bodies
- Create a standard XML Schema for storing and exchanging SoA data
- Demonstrate the power of search tools
- Demonstrate how to verify uncertainties against SoA on every calibration
- Create a distributed database with tons of SoAs



Find Specific SoA CMC Calculation

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
DC Voltage – Generate	(0 to 220) mV	4.2 $\mu\text{V/V}$ + 0.4 μV	Source.Volts.DC (Fluke 5720A)
	(220 to 2.2) V	2.3 $\mu\text{V/V}$ + 0.7 μV	
	(2.2 to 11) V	1.1 $\mu\text{V/V}$ + 2.5 μV	
	(11 to 22) V	1.1 $\mu\text{V/V}$ + 4 μV	
	(22 to 220) V	2.2 $\mu\text{V/V}$ + 40 μV	
	(220 to 1000) V	3.2 $\mu\text{V/V}$ + 400 μV	

Comments are Defined
and usable in the Schema

Volts =

-220e-3 to +220e-3

-2.2 to +2.2

-11 to +11

-22 to +22

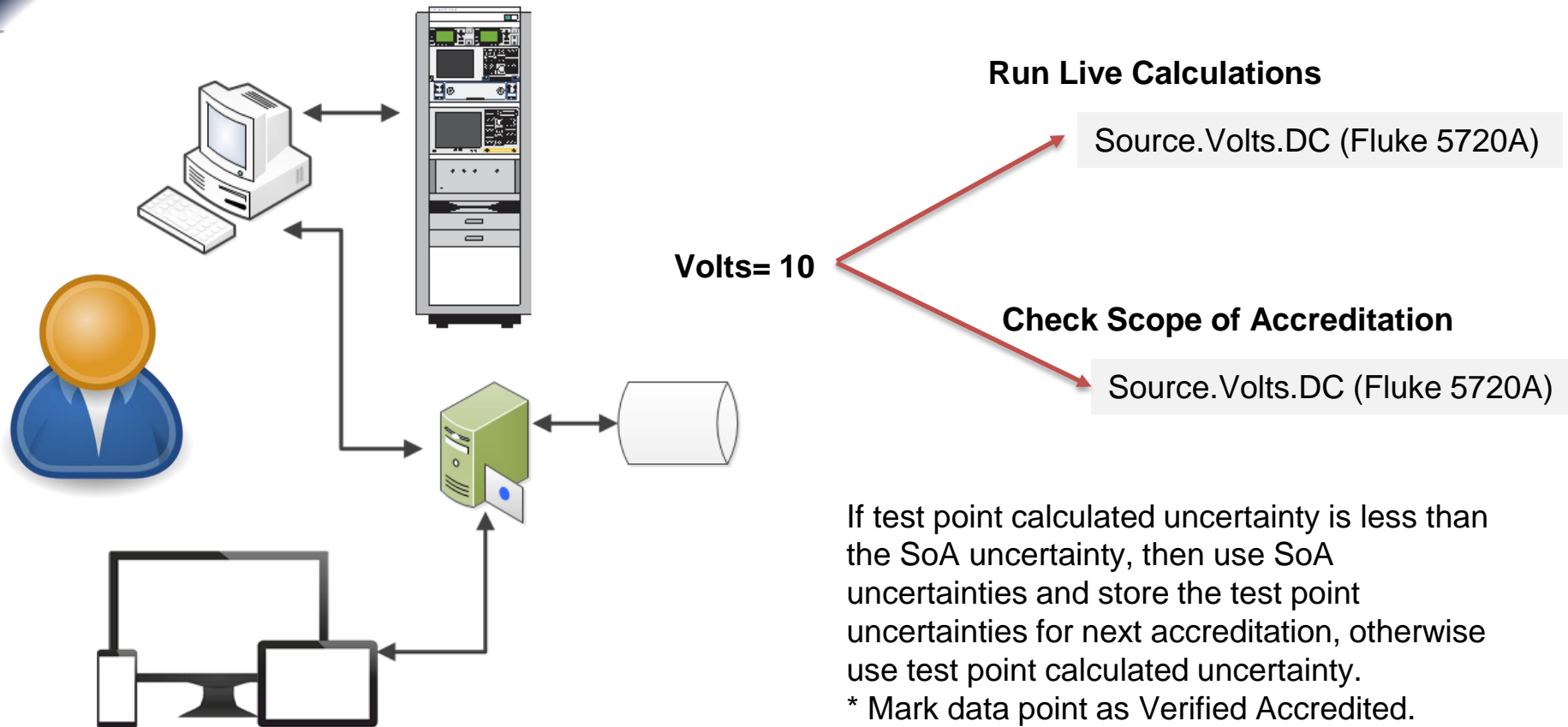
-220 to +220

-1000 to +1000

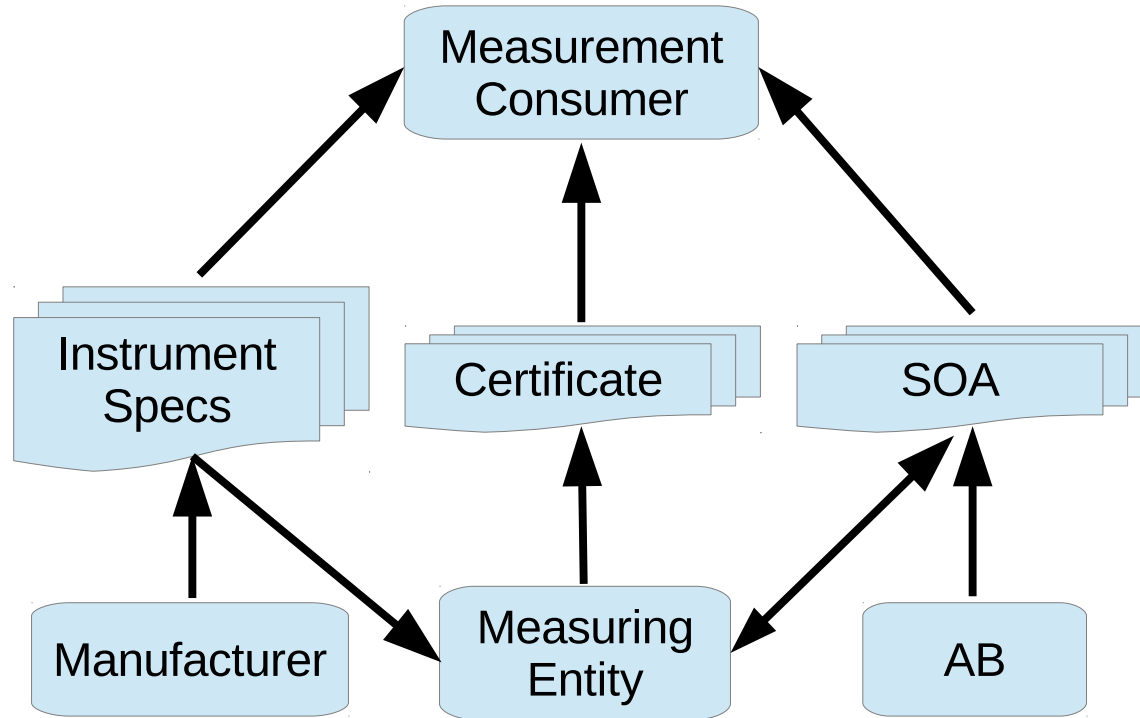
NOTE: This SOA tells me they can't source voltage below 0 Volts.

** This is not machine readable

Uncertainty Check On Every Test Point



Calibrate Our Project Goals



**We are NOT trying to
Convert the industry's software**

**We DON'T need every
Accreditation Body on board**

**We DON'T need every
Calibration Lab either**

**The technology
Will Speak for Itself**

**The team is dedicated to
Moving the technology forward**

**We are accepting new members
Who see the vision
Who add value to the team**

Join the Team Today

**Do you have what it takes to
create a Metrology Standard?**

The Clock is Ticking!

- Over 1500 SOAs are Being Migrated
- Editor Tool Release - Q3 2017
- Search Tools Release - Q4 2017
- Demo at NCSLI in August
- Education & Training Begins in 2018

SPARK KALİBRASYON HİZMETLERİ
CALIBRATION SERVICES



CALLAB
SOLUTIONS
Fusing Software With Metrology



Questions



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SOA / MII Editor

Editor Features

- Colors are skinned and changeable
- AB Brand able
- AB Logo & Signature
- Supports Multiple Address

Windows Desktop Applications

Open Source Project

github.com/CalLabSolutions/Metrology.NET_Public

The screenshot shows the 'SoA XML Editor' application window. The title bar includes standard Windows window controls and the text 'SoA XML Editor'. The menu bar contains 'File', 'Edit', and 'Help'. The main interface is divided into two panes. The left pane, titled 'Company Info', contains a tree view with expandable items: 'Measure.Voltage.AC' and 'Measure.Time.Interval.SingleChannel'. The right pane, titled 'Company Information', displays a form with the following fields: 'AB ID:', 'Scope ID:', 'Effective Date:' (with value '3/29/2017'), 'Statement:', 'AB Logo-Signature:', 'Criteria:', 'Expiration Date:' (with value '3/29/2018'), 'Name:' (with value 'Acme Calibration Laboratory'), 'Address' (a section header), 'Location ID:', 'Street:' (with value '1234 Metrology Ave'), 'City:' (with value 'Accura'), 'State:' (with value 'Ohio'), 'Zip:' (with value '31416'), 'Contact Name:' (with value 'Al P. Pie'), and 'Contact Info:' (with value 'SOA.DataAccessLibrary.Soa.ContactInfo'). In the top right corner of the application window, the text 'METROLOGY.NET' is displayed. A black arrow points from the 'Editor Features' list towards the 'Company Information' form.

SOA / MII Editor

Editor Features

- Entry for each CMC Line
- Range & Limits
- Live Calculations
 - Constant Values
 - Parameter Values

Beta Version Ready for Testing
Q4 - 2018

Sign Up For Beta Release & Testing

SoA XML Editor

File Edit Help

METROLOGY.NET

Company Info

- Measure.Voltage.AC
 - Measure.Voltage.AC.LowVoltage
 - Measure.Voltage.AC.LowVoltage.HighVoltage
 - 6-1/2 digit 4 Wire
 - 5-1/2 digit 4 Wire
 - 4-1/2 digit 4 Wire
 - 6-1/2 digit 2 Wire
 - 5-1/2 digit 2 Wire
 - 4-1/2 digit 2 Wire
 - Measure.Time.Interval.SingleChannel

	Min	Max
frequency	60	60
nominal	0	11
k_nominal	0.0001	
k_range	0.0002	
k_nominal * nominal + k_range * range	0.0120	0.0131
frequency	60	60
nominal	11	110
k_nominal	0.0003	
k_range	0.0004	
k_nominal * nominal + k_range * range	0.0273	0.0570
frequency	400	400