

IEC 61850 edition 2 Server test procedures 2.0

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- **Background**

- Embedded engineering
- Software development

- **Consultant in the field of IEC 61850**

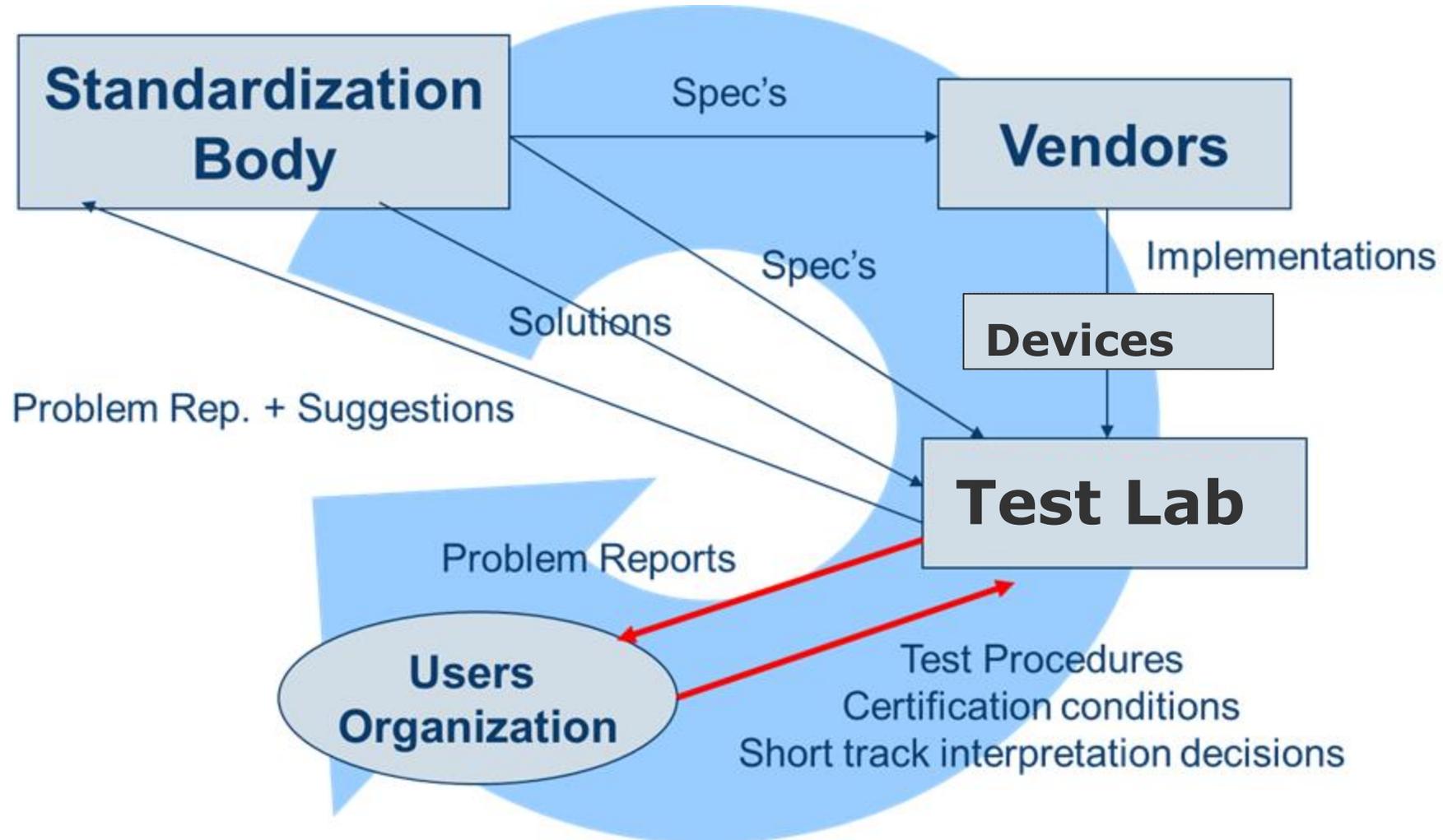
- Conformance tests for IEC 61850 and DNP3
- (Test tool developer)
- IEC 61850 trainer for manufacturers and utilities
- International business development
(Asia, Russia, etc.)



New UCAIug test procedures

- IEC 61850 and UCAIug
- Why do we need new test procedures?
- Where does the input come from?
- Short overview of changes
- Major change..
- What is to be expected in the coming years?

IEC 61850 conformance testing



Why are new test procedures necessary

- Lessons learned in standard
 - Standard gives many options, but are they all clearly defined?
 - Edition 1 to Edition 2:
 - Focus on SCL, reporting and control (state machines)
 - Less flexible datamodel
- Lessons learned in “real world”
 - Client forgets to enable trigger conditions, server just accepts and no reports send
 - Multiple clients use the same report control blocks
 - Engineering of GOOSE subscribe was not well defined and was clarified
- Lessons learned during testing
 - Interoperability tissues
 - Most issues are related to SCL problems

Differences in test procedures

- Minor changes in:
 - Documentation (added sDoc5)
 - Association(added sAss4)
 - Setting group(sSg6, sSg9, sSg11)
 - Reporting(sRp15/16 and for sBr15/16)
 - GOOSE(added sGop12, ldName)
 - Some server, and control changes
 - No more TPCL
- SCL
 - In the past we only had configuration and modelling
 - sCnfx is completely new with many test cases

IEC 61850-6:2009 clause 7:

An IED which is claimed to implement a server or client according to the IEC 61850 standard shall be accompanied by an ICD file, respectively by a tool capable of generating an ICD file, or a project specific IID file, respectively a tool capable of generating a project specific IID file for this IED



The configuration file test cases are performed on both the *ICD* and *SCD* as specified in clause 1.1 unless the test case explicitly specifies otherwise. In case the ICD and/or IID are generated by the IED tool it is not allowed to change these SCL files using for example a general XML editor.

Major change

- SCL can only be changed/generated with the device configuration tool
- **Why?**
 - During many projects, many problems appear with configuring devices and using the tools. With this approach we assure that an IED will be delivered with a working IED + configuration tool
- **Consequence?**
 - ‘Hacking’ of generated SCL with notepad is **no longer allowed!** ☹
 - IED can be reconfigured, but only with a final tool version
 - A test is failed if the configuration tool cannot generate a correct SCL for the IED.
 - If no configuration tool is available, **it is allowed to ‘Hack’** 😊

Future

- Ed 2.1 test procedures for:
 - Server
 - Client
 - Sampled values Publish & **subscribe**(IEC 61869-9)
 - Ratable GOOSE
 - IED configuration tool (ICT)
 - System configuration tool (SCT)

- Secure 61850 test procedures:
 - IEC 62351-4 for MMS server and client
 - IEC 62351-6 for GOOSE

Important questions about IEC 61850 certificates

- We performed a conformance test in 200x, is this certificate still acceptable to sell the device?
 - Depends on the utility, the test procedures are updated, hence a device from 200x will not pass a conformance test now. Hint: the utility should be strict enough in the tenders.
- We changed a small part of the software, can we modify the certificate?
 - No, it is a black box test, based on trust. We perform a test at that moment with a specific version (HW+SW), we cannot say anything if the software is modified after a test.
- What if we use windows embedded or linux embedded on different hardware, can we sell the IED/RTU with the same certificate?
 - No, every platform can have new issues, you only discover that by testing, so these are separate tests with separate certificates.