



Real World Experiences with (Conformance) Testing

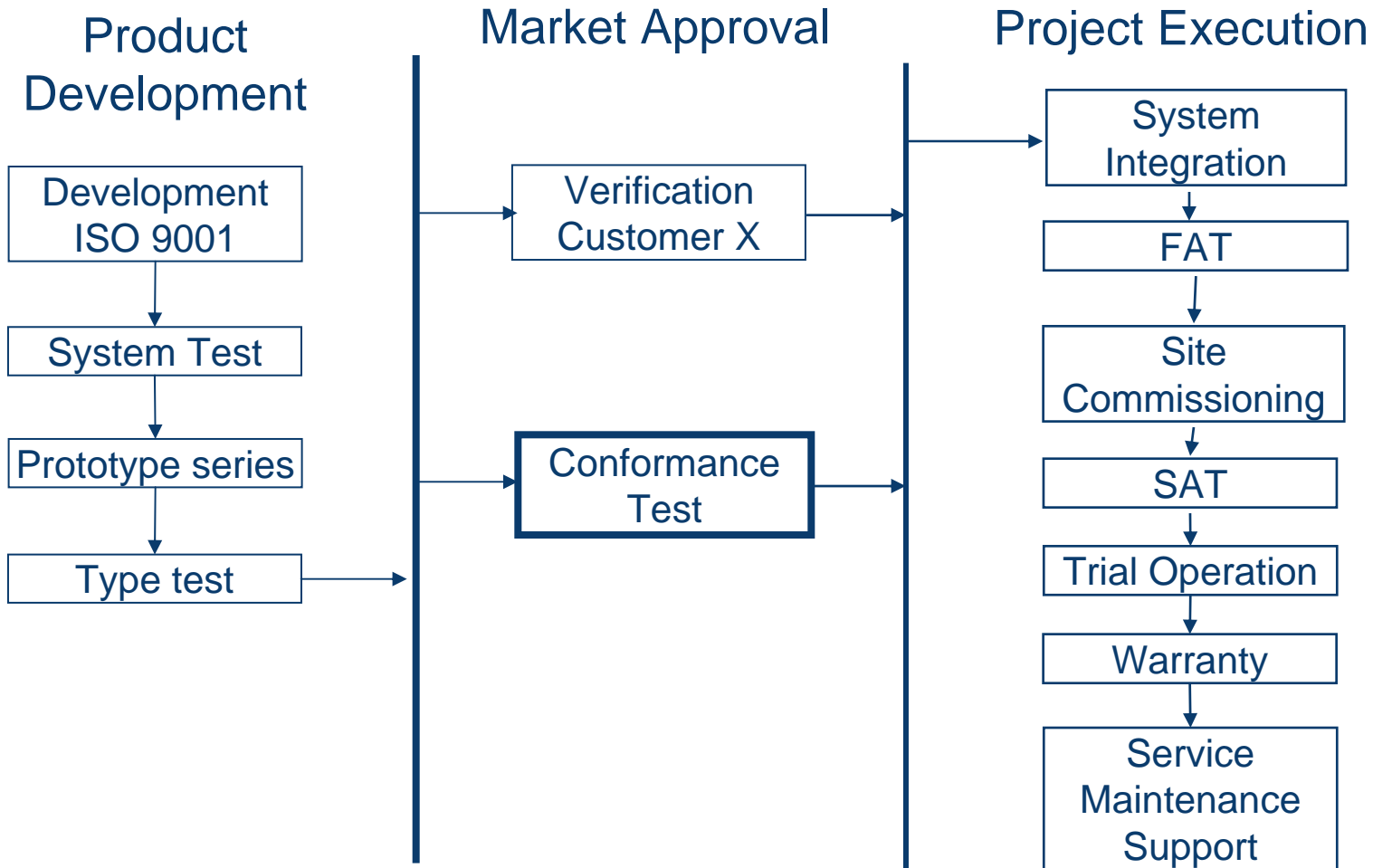
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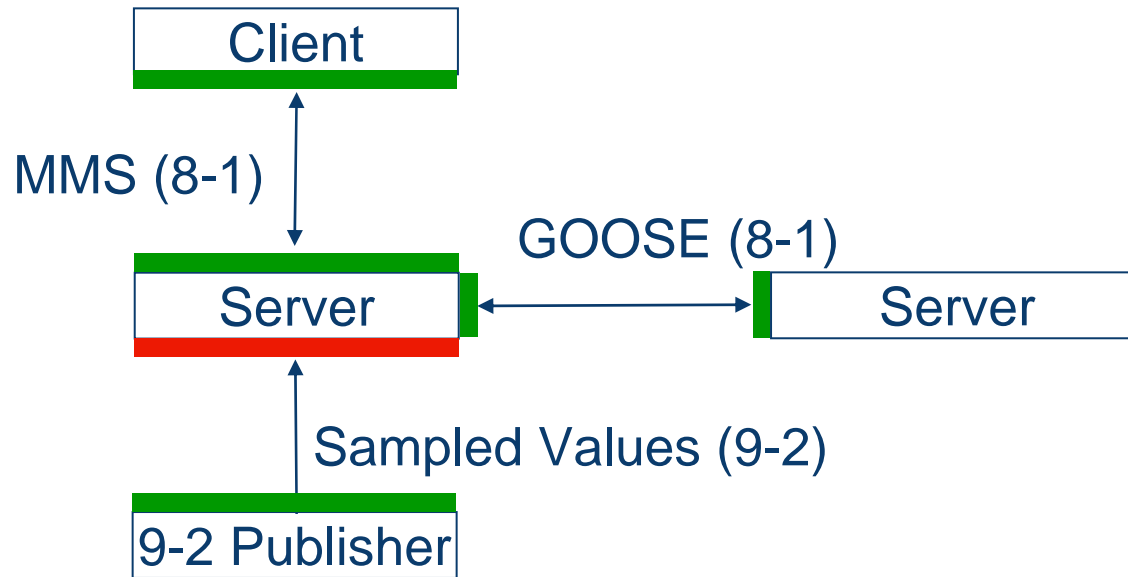
Experiences with Testing

- What kind of testing (Quality Assurance)
- Lessons learned
- Test results
- Typical failures
- Recommendations for manufacturers

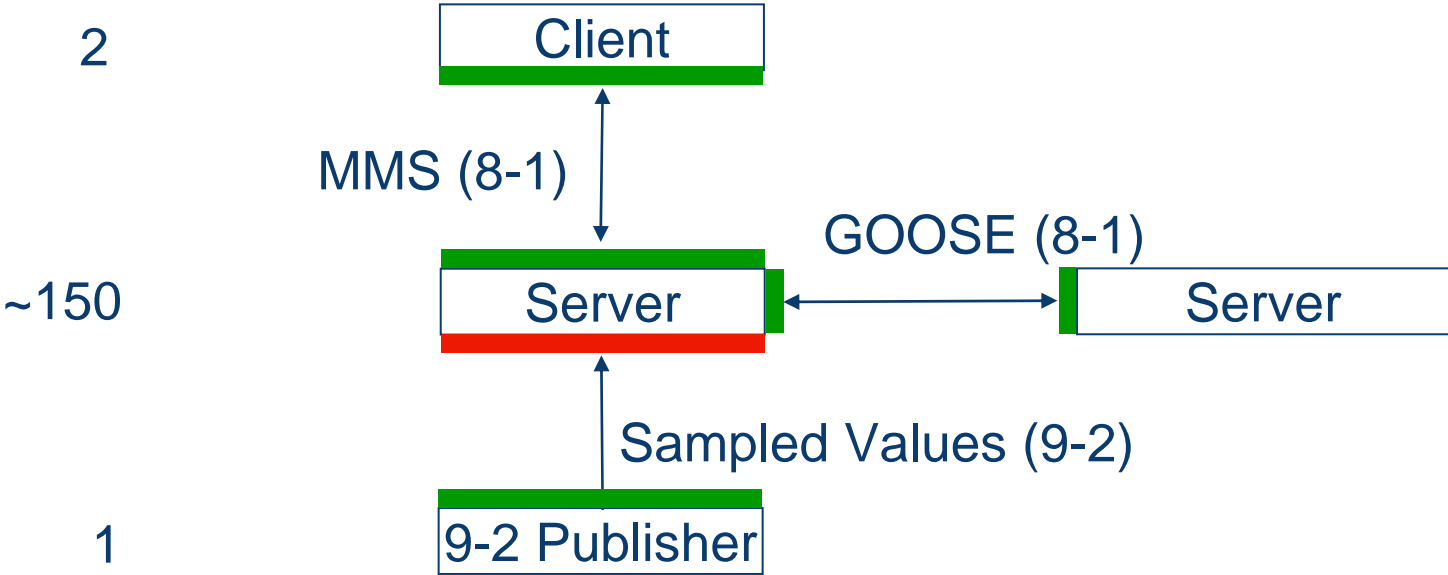
Quality Assurance Stages (IEC 61850-4)



What kind of IEC 61850 conformance testing



Number of certified devices



Certificates on internet

UCAIug Testing Quality Assurance Program - Microsoft Internet Explorer provided by KEMA

http://www.ucaiug.org/org/TechnicalO/Testing/UCAIug%20Testing%20Quality%20Assuran

UCA International Users Group

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UCAIug Testing Quality Assurance Program

Actions 1 - 100 View: All Documents

Type	Name	Modified	Modified By
Count = 155			
	07-0408-Certificate_Areva_P145	8/1/2008 4:49 PM	fred
	07-0410-Certificate_Areva_P442	8/1/2008 4:45 PM	System Account
	07-0412-Certificate_Areva_P443	8/1/2008 4:53 PM	System Account
	07-0414-Areva-P439-Certificate	8/1/2008 4:59 PM	System Account
	07-0416-Areva-P634-Certificate	8/1/2008 4:59 PM	System Account
	07-0418-Areva-P132-Certificate	8/1/2008 4:59 PM	System Account
	07-0420-Areva-P437-Certificate	8/1/2008 4:59 PM	System Account

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Lessons learned

- Need clear reference (IEC 61850 part 7-2 and 8-1)
- Make the test procedures unambiguous, if not:
 - Add a TISSUE
 - Add an entry in the Test Procedure Change List (TPCL)
- Updating the test procedures need to be coordinated with the manufacturers
 - QAP: Manufacturers have 12 months to implement changes resulting from new test procedures
- Server test procedures version 2.2, Oct 2007(!)
- Server TPCL version 1.1, March 2009

What can be improved

- Definition of file transfer in part 8-1
 - File or Folder?
 - Location of comtrade files
- Buffered reporting (tissue #453, Ed2)
- MMS Error codes (fixed in part 8-1 Ed2)
- Select followed by Select
- SCL Configuration of GOOSE subscription
- Should GOOSE publish be turned off by a client?

Typical failures (1)

- Error codes:
 - Writing URUCB/BRCB
- Control model – incorrect AddCause
- MX, ST, EX data should be read-only
- PICS and PIXIT documentation does not match with IED
 - GOOSE behavior on missing messages and missing/extra data in the message
 - use the UCAIUG templates!
- Implemented a “Ed2” TISSUE

Typical failures (2)

- SCL
 - Configured data objects not available in IED (extra data objects in IED are allowed)
 - IED-Services section does not match with PICS
 - Namespace (dataNs) only required for data objects not defined in IEC 61850-7-4
- Non existing enum value 0 for Mode, Behavior and Health

Recommendations for manufacturers

- Schedule a conformance pre-test during the development
 - Using the conformance test tools
 - By (independent) test lab
- Finish the development by a formal conformance test resulting in a certificate
- Conformance Test tools can be used for testing software updates and other products of the same platform
- Do not implement “Ed2” TISSUEs

Recommendations for utilities

- Require “certified” IEDs
 - according to the most recent test procedures version 2.2
- Check the firmware version on the certificate and the current firmware version
- Accept old/outdated certificate?
- The UCAIUG sharepoint has a list of all certificates

Thank you Questions?

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