



60 Minutes on CIP Safety™

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ODVA

October 10, 2018

- ODVA Conformance Policy Updates
- CIP Safety Conformance Test Software Update
- Overview of Safety Week at ODVA TTC (Oct 22-26)
- Wrap-up and Questions

ODVA Conformance Policy Updates

ODVA Conformance Policy Updates

- Test By Vendor (TBV) for CIP Safety on EtherNet/IP
 - PUB00008R4 *ODVA Policy Regarding Compliant Products*
- Requirement for SIL and SC3 per IEC-61508
 - PUB00261R2 *Technology Management for Conformance Policy*

ODVA Conformance Policy Updates

- ODVA PUB00008R6



POLICY REGARDING COMPLIANT PRODUCTS

Effective September 1, 2018

1) INTRODUCTION

- Purpose of the Policy. ODVA seeks to ensure, to the greatest extent practicable, that products implementing ODVA's technical specifications and technical standards (collectively, the "Specifications") comply with the Specifications and interoperate in multi-vendor systems. The purpose of the Policy Regarding Compliant Products ("Policy") is to provide clear rules regarding the rights and obligations of all Licensed Vendors of ODVA technologies to produce Compliant Products, and obtain and maintain a Declaration of Conformity issued by ODVA. This relates to the Specifications, Conformance and adjunct testing, Declarations of Conformity and Advisory Declarations in order to promote the widest possible deployment of ODVA technologies by industry by helping to ensure that product implementations of ODVA technologies comply with the Specifications and that Compliant Products interoperate in multi-vendor systems.
- Scope of the Policy. This document is the complete and exclusive statement of the ODVA Policy Regarding Compliant Products. All Licensed Vendors shall be subject to this Policy and it shall operate in concert with their Terms of Usage Agreements.
- Good Faith and Fair Dealing Requirement. All Vendors and other Persons involved in ODVA activities are

ODVA Conformance Policy Updates

- ODVA PUB00261R2



Technology Management for Conformance Policy

Effective Date: May 7, 2014, Revised November 1, 2017

1 Introduction

This document supplements the ODVA Policy Regarding Compliant Products (PUB00008R4). Throughout this document the ODVA Policy Regarding Compliant Products will be referred to as PUB00008. This will reference the most current version of the policy. If there are any discrepancies between this document and PUB00008, PUB00008 will prevail.

ODVA Conformance Policy Updates

- Pub 8 Appendix A defines Test By Vendor “TbV” option

APPENDIX A

Maintenance of Declaration of Conformity: Qualification for Partial Conformance Test by Licensed Vendor Following Modifications to a Compliant Product for which the Licensed Vendor Seeks an Amended and Restated DOC

In accordance with its Terms of Usage Agreement for an ODVA technology, a Licensed Vendor is required to “obtain” and “maintain” the Declarations of Conformity (“DOC”) for its Compliant Products. Maintaining the DOC requires that the Licensed Vendor, following modifications to a product previously determined to be compliant, resubmit the product for Conformance Testing and that the product again receives a verdict of “pass” on the Conformance Test.

ODVA Conformance Policy Updates

- Pub 261 section 7.2 defines additional requirements related to DOCs for implementations of CIP Safety

7.2 Devices and Modules, CIP SAFETY

All Safety Network technologies:

To receive a DOC, a CIP Safety product shall follow this sequence:

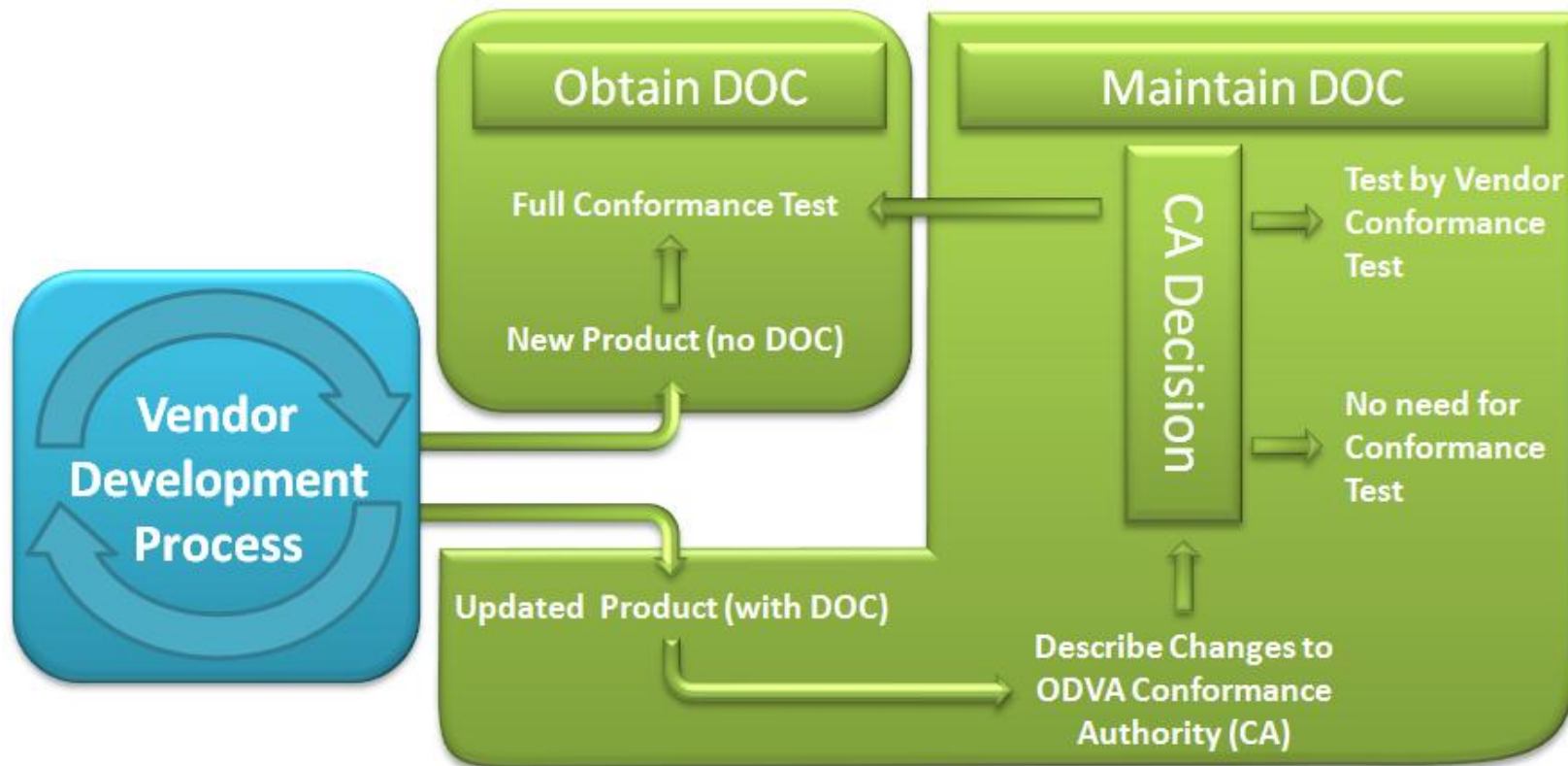
- Test of the product at an ODVA TSP
- Provide test report to an ODVA-authorized Third-Party Competent Body, currently TÜV Rheinland
- Obtain Certificate of Compliance to IEC 61508 issued by TÜV Rheinland
- Provide TÜV Rheinland certificate to ODVA

Additional certification requirements, to allow Declaration of Conformity for CIP Safety products certified to less than SIL3, are contained in Edition 2.16 (or later) of The CIP Safety Specification.

ODVA Conformance Policy Updates – CIP Safety TBV

- ODVA PUB00008R2 (Sept 1, 2018)
- Appendix A - Requirements for Test By Vendor (TBV) for CIP Safety
 - The implementation is on EtherNet/IP
 - The minimum version of CT recorded on the DOC shall be CT9.
 - The Licensed Vendor shall provide to ODVA Conformance Authority an Evaluation of Modifications Report from an ODVA-authorized Third-Party Competent Body assessing the impact of the modifications according to IEC 61508.
 - The ODVA DOC for a CIP Safety product is contingent on a valid Certificate of Compliance to IEC 61508 from an ODVA-authorized Third-Party Competent Body.
- These are in addition to the requirements for standard TBV

Test By Vendor Process



ODVA Conformance Policy Updates – SIL/SC

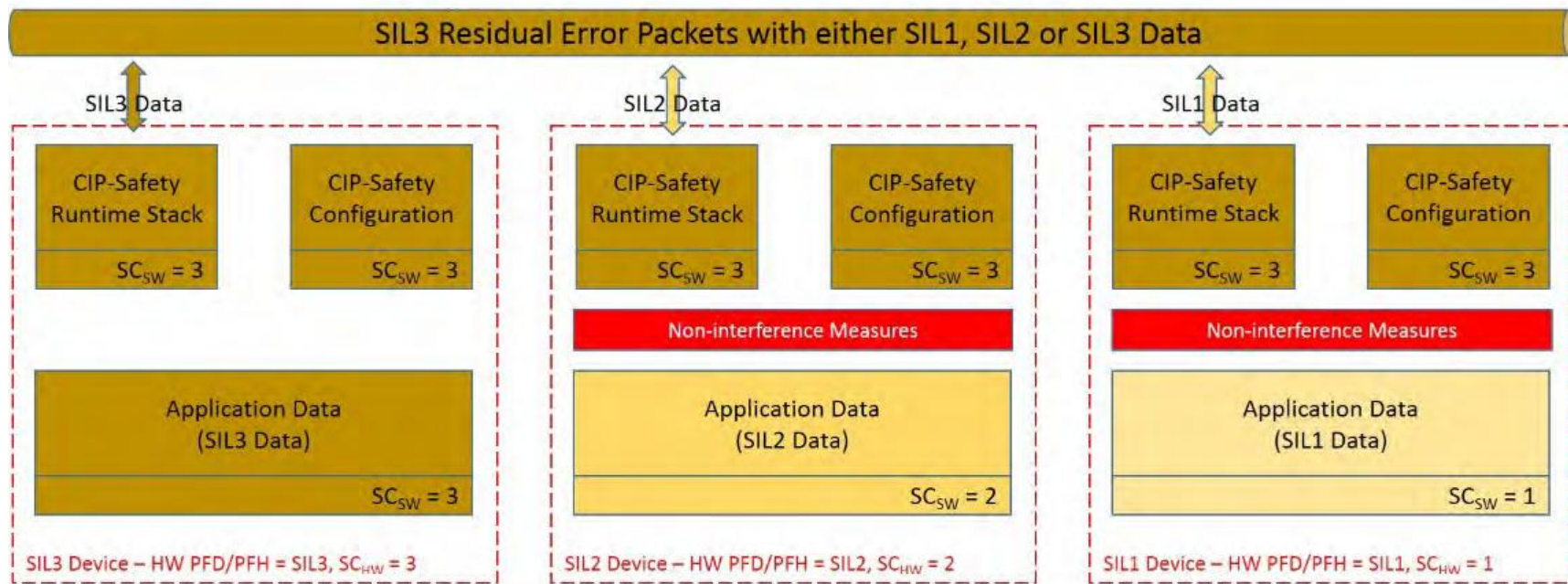
- PUB00261R2 (November 1, 2017)
 - Section 3.2 (CIP Devices – modular and non-modular)
 - Section 7.2 (Third-party certifications)
- Previously SIL3 was required for all CIP Safety devices
- As of Volume 5 Edition 2.16 and PUB00261R2, lower SILs allowed
- Section 7.2 added requirements related to Systematic Capability
- Either SIL3 or SC3 according to IEC 61508-3:2010 must be certified
 - SC3 is a requirement for SIL3
 - If SIL less than SIL3, then SC3 must be assessed

ODVA Conformance Policy Updates – SIL/SC

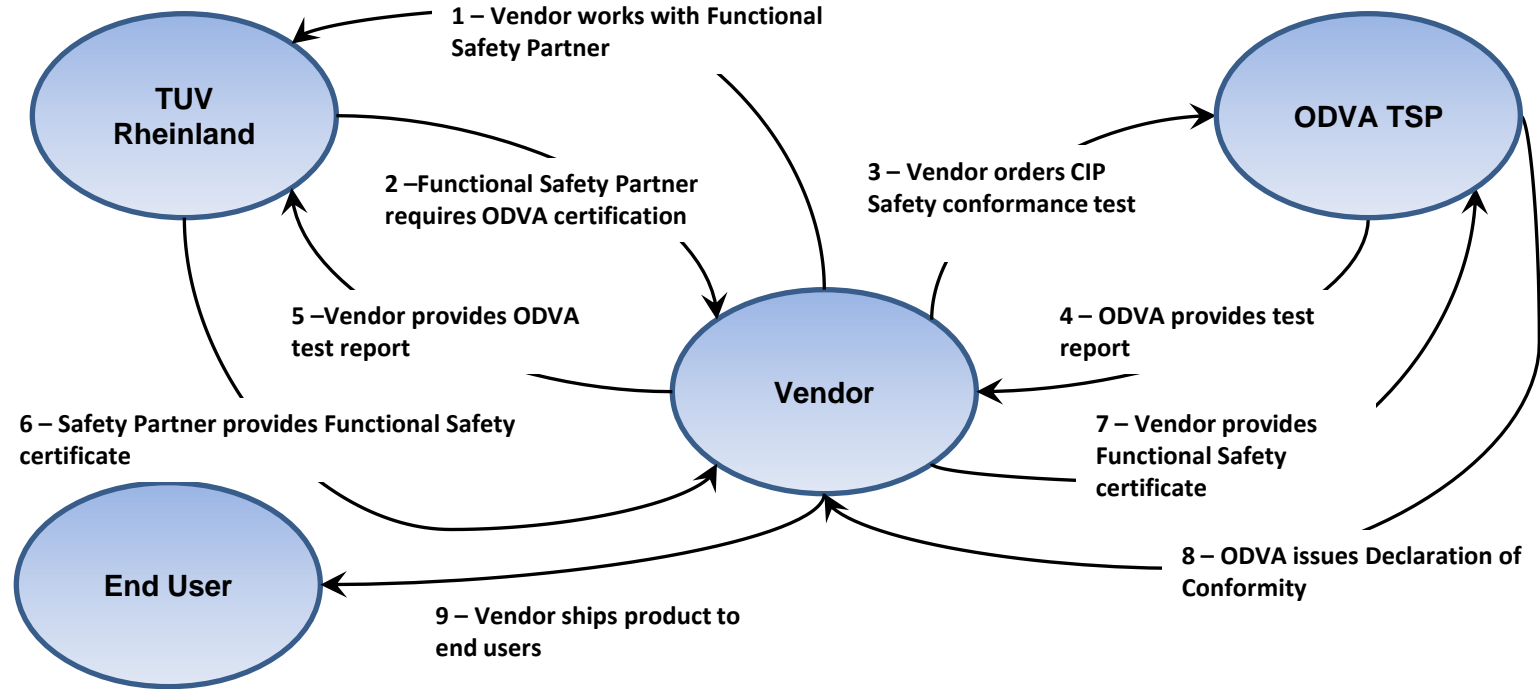
- The CIP Networks Library Volume 5 Edition 2.16 Section 2-2.1
 - “The assessment of the systematic capability, SIL level requirements, and appropriate non-interference measures is carried out by the safety certification body.”
 - “All implementations of CIP Safety technology shall use a safety certifying agency to ensure that the design and implementation of the CIP Safety protocol (safety-related communication software) provides a Systematic Capability of SC3 according to IEC 61508.”
 - “The CIP Safety protocol must be considered as part of a complete device, and the integration of the CIP Safety protocol into the device must be done to achieve/maintain SC3.
 - “For example, a Vendor cannot use a separately certified CIP Safety stack (one that does provide SIL3 and SC3) in their product without regard to the need to provide SC3 for the integration of the safety communication software in the integrated product.”

Safety Architectures for CIP Safety

Off-line CIP-Safety
Configuration Tool



CIP Safety Conformance Process

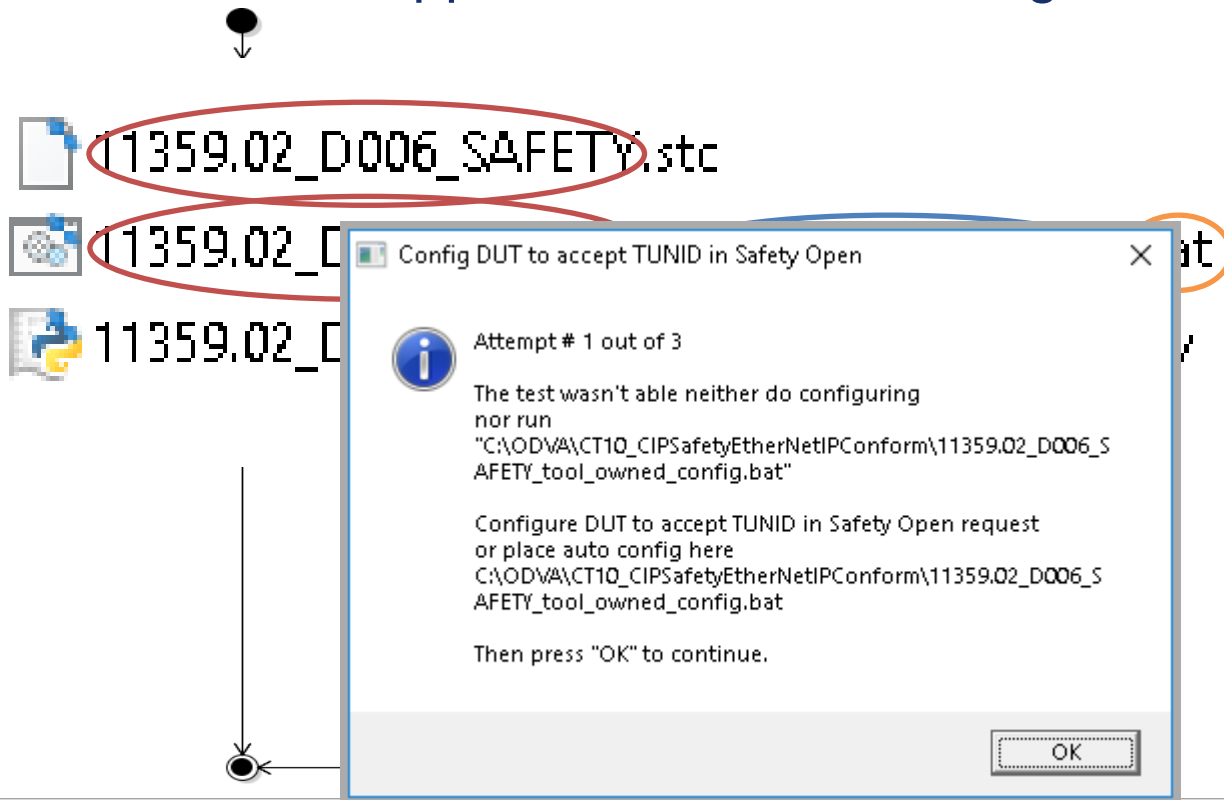


CIP Safety Conformance Test Software Update

CIP Safety Conformance Test Software Update

- Updates in CT9 CIP Safety on EtherNet/IP Release (March 2018)
 - Improvements related to Originator DUTs
 - Expanded test coverage for non-SNCT devices
 - CT14 based
- Planned for upcoming CIP Safety on EtherNet/IP Release (November 2018)
 - CT16 based
 - Added support for external configuration scripts
 - Large/small safety connections defined in one STC file
 - Increased number of tests with auditable milestone CRCs
- Plans for next software subscription update (Fall 2019)
 - Address existing gaps and known defects
 - E.g., Add coverage for Safety Motion objects
 - Support ongoing specification enhancements

Non-SNCT support and external configuration scripts



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Large/Small connection defined

Safety Characteristics ? X

Device Behavior

☒ Input ☒ Controller ☐ Safety Reset Switch

☒ Output ☐ Bridge

Safety Connection Type(s)

Originator

☐ Single Cast Producer

☐ Single Cast Consumer

☐ Multi - Cast Consumer

Target

☒ Single Cast Producer

☒ Single Cast Consumer

☐ Multi - Cast Producer

System Unique Identifiers

DUT UNID

SNN Date: 4

SNN Time: 100

NodeID: 0xc0a80178

Test UNID

SNN Date: 4

SNN Time: 4

NodeID: 0xc0a80715

Safety Protocol Version

2.0

Safety Network Configuration Tool (SNCT)

☐ Originator ☒ Target Config File

Target Configuration Data File

odva_target@192.168.0.4

Safety Open Application Path(s)

	Config	Small I/O Consumed	Large I/O Produced		Type 1 (Config)	Type 2 (SCID)	Type 2 (SCID=0)
Class:	4						
Instance:	0			TSCP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Null				TSCC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Instance:	199			TMCP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Attribute:				OSCP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Connection				OSCC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Point:				OMCC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Safety I/O Data

Consumed Size: Produced Size: Max Consumers:

RPI Min: RPI Max: RPI Tick:

Active Safety Data:

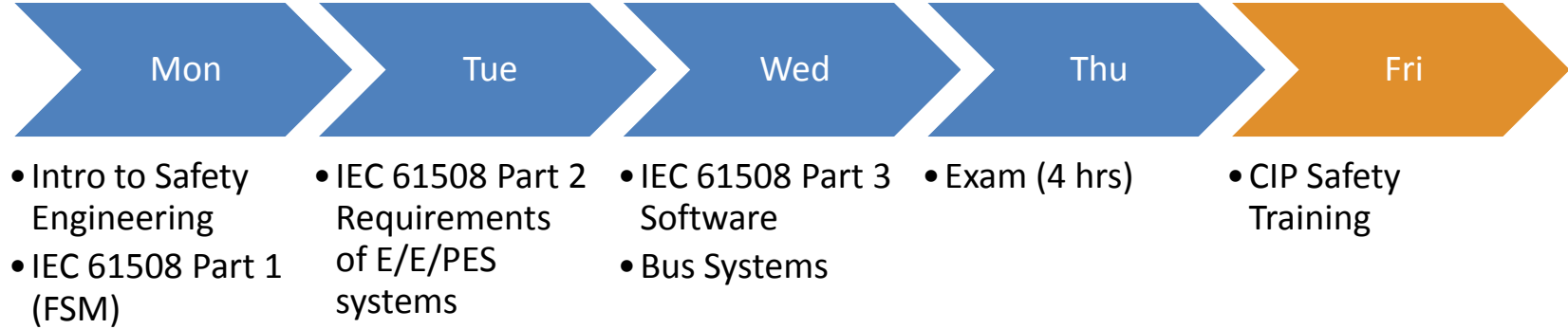
OK Cancel

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Overview of Safety Week at ODVA TTC (Oct 22-26)

Overview of Safety Week at ODVA TTC



Hardware/Software Design According to IEC61508

- Conducted by TÜV Rheinland
- Application of IEC 61508 Parts 1, 2 and 3
- Qualified participants can sit for optional examination to obtain the *Functional Safety Engineer (TÜV Rheinland)* certificate

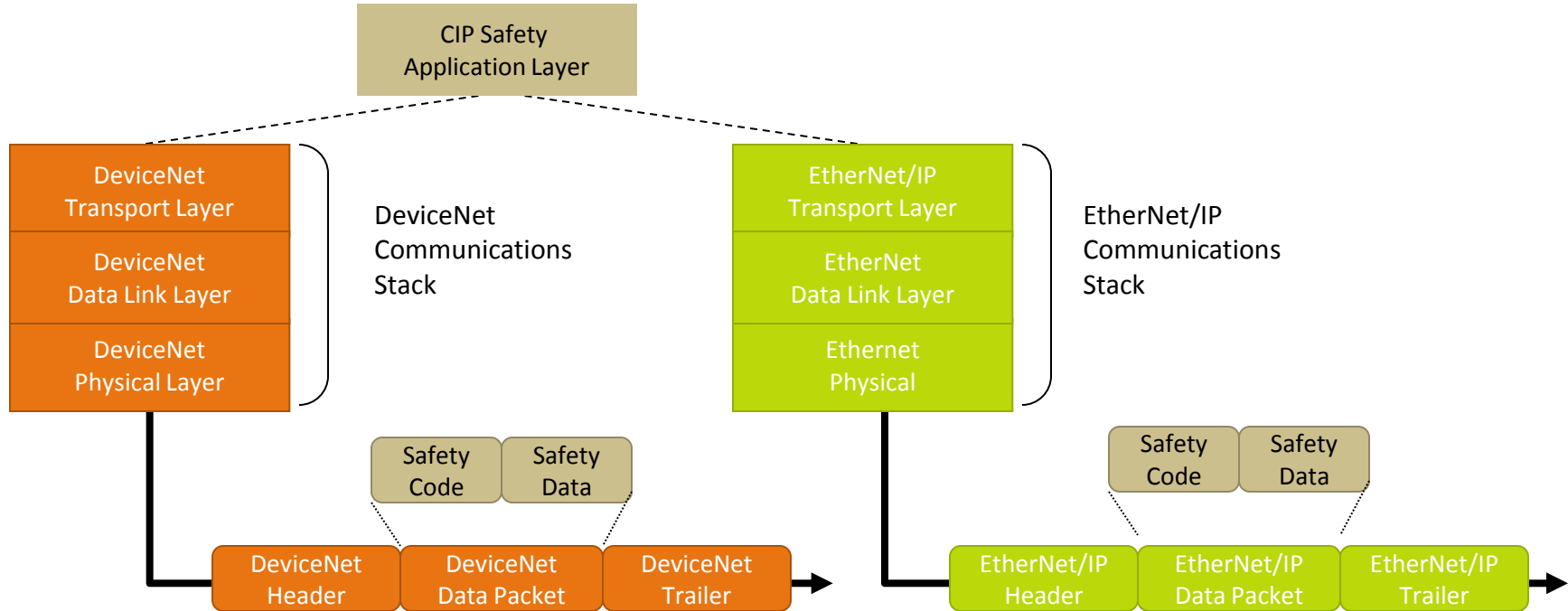
Overview of Safety Week at ODVA TTC

CIP Safety Training Overview

- Overview of Functional Safety and Safety Networks
- CIP Network Architecture
- CIP Safety Features
- CIP Safety I/O Concepts
- CIP Safety Objects
- CIP Safety Configuration
- Implementation Strategies
- Conformance Testing
- Specification Enhancement

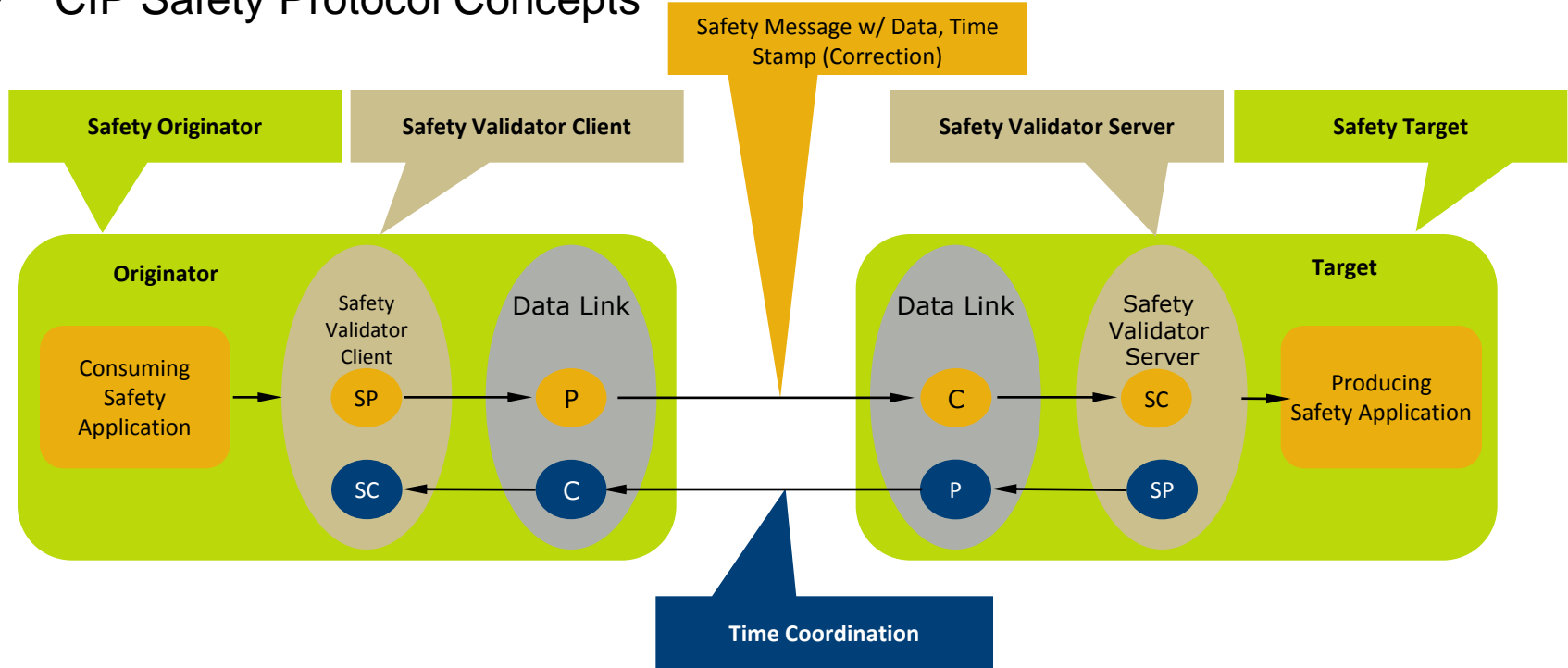
Overview of Safety Week at ODVA TTC, cont'd

Application Layer - Network Independent



Overview of Safety Week at ODVA TTC, cont'd

- CIP Safety Protocol Concepts



Overview of Safety Week at ODVA TTC, cont'd

- Errors and Measures

Errors	Measures				Diverse Measures
	Time expectation via a timestamp	ID for send and receive	Safety CRC	Redundancy	
Message Repetition	X		X		
Message Loss	X		X		
Message Insertion	X	X	X		
Incorrect Sequence	X		X		
Message Corruption			X	X	
Message Delay	X				
Coupling of safety & safety data		X			
Coupling of safety & standard data	X	X	X	X	
Increased age of data in bridge or router	X				

Overview of Safety Week at ODVA TTC, cont'd

<https://odva.org>

Overview of Safety Week at ODVA TTC, cont'd



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TECHNOLOGY & STANDARDS

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OPTIMIZATION 4.0

HAPPENINGS

KNOW-HOW HUB

CONTACT ODVA

Events Calendar and Registration

Hardware/Software Design According to IEC61508 + Training on CIP Safety (Ann Arbor, Mich., USA)

Start Date/Time:

Monday, October 22, 2018 8:00 AM (UTC-05:00) Eastern Time (US & Canada)

End Date/Time:

Friday, October 26, 2018 5:00 PM (UTC-05:00) Eastern Time (US & Canada)

Recurring Event:

One time event

Description:

Technical Track
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Wrap-up and Questions

Wrap-up and Questions

For more information

- <https://odva.org>
 - KNOW-HOW HUB
- conformance@odva.org
 - Get answers to conformance-related questions via email
 - Monitored by members of the Conformance Authority

Wrap-up and Questions



THANK YOU