Security in Automation –
possible threats and integrated measures in CODESYS

CODESYS Users Conference 2017

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Agenda

1. What is Security?
2. Situation in Industrial Security
3. Security Measures within CODESYS

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What is Security?

Safety

VS.

Security

Protect humans

„Keep crazy people from doing stupid things“

- Restricted complexity
- Failure prediction
- Availability is not central

Protect investments

„Keep smart people from doing clever things“

- Constantly growing complexity
- Prediction of threat situation is not possible
- Availability has top priority

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What is Security?

„Keep smart people from doing clever things!“

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Situation in Industrial Security

Vulnerabilities incidents in industrial security:

- RISI 2010 (ICSJWG Spring Conference):
  - 162 incidents since 2000
  - 78% unintended (handling or device errors, viruses)
  - 22% intentional, 53% of which by insiders (employees) and 47% by externals (including suppliers)

Vulnerabilities in products (ICS):

- ICS-Cert Advisories
  - 44 vulnerabilities in different products from January until May 2013
  - Are systematically searched for by security consultants (service providers)

Remarkable:

The incidents have nothing to do with the vulnerabilities.

Known, targeted attack on an application

- StuxNet

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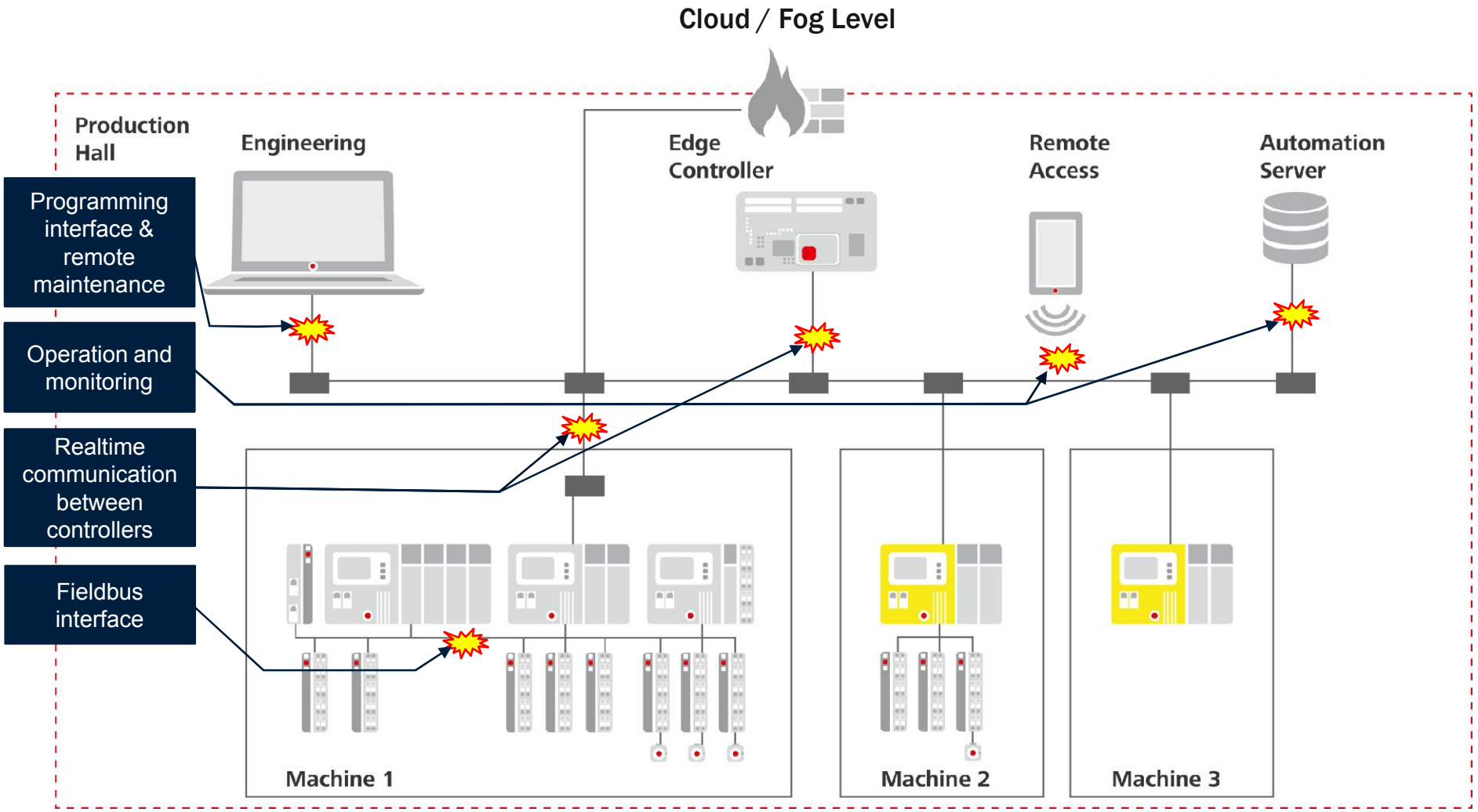
Situation in Industrial Security

Vulnerabilities



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IEC 62443 protection level

- **Level 1:** Occasional and accidental threat
  - Example: Hard disk failure
  - Example: Operating error
- **Level 2:** Intentional threat by simple means
  - Example: Password guessed correctly
- **Level 3:** Intentional threat by highly-developed means
  - Example: Hacker tools
- **Level 4:** Intentional threat by highly-developed means and extended resources
  - Example: Specific development
  - Example: Knowledge of the application
  - Example: Corruption of insiders

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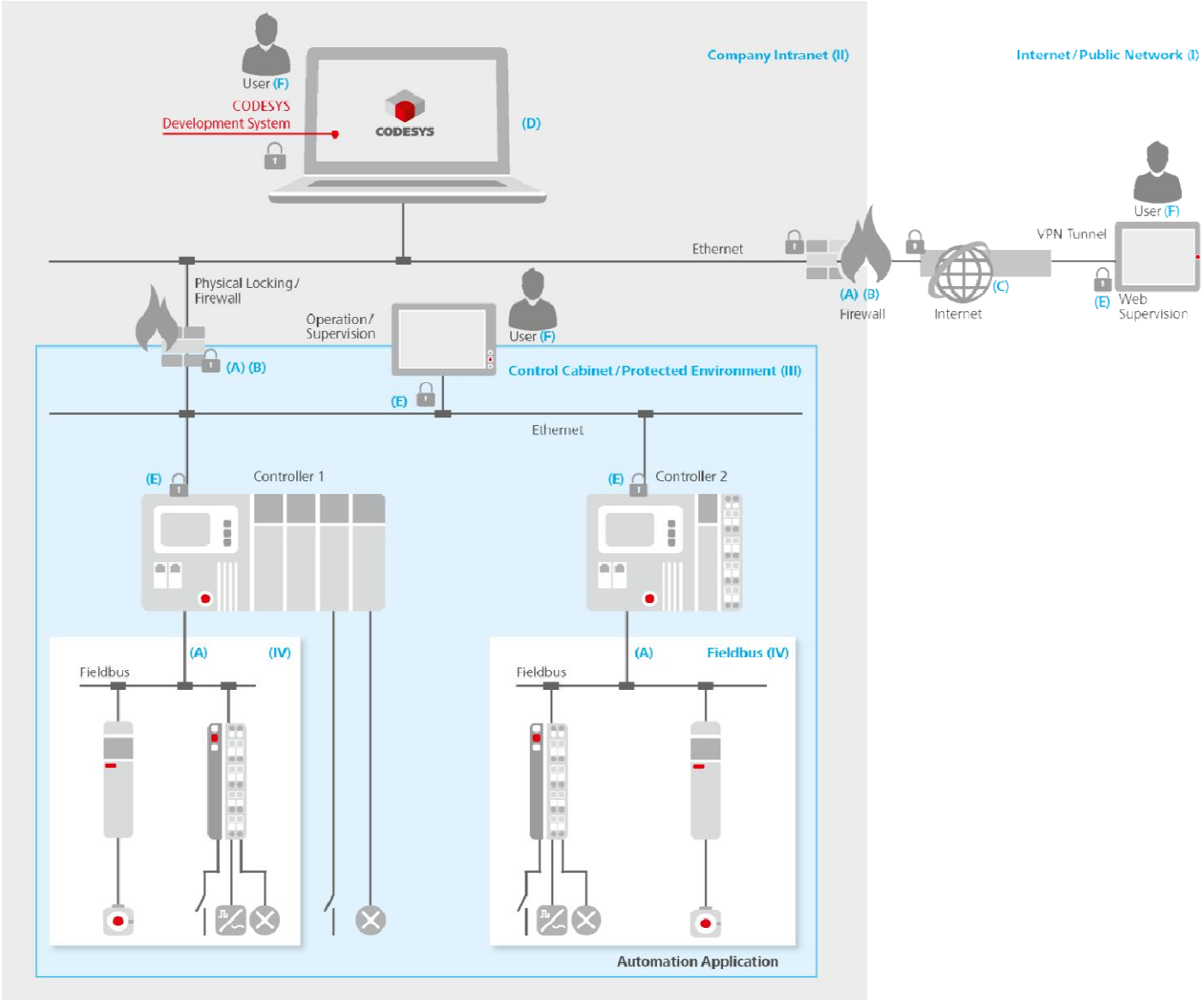
Situation in Industrial Security



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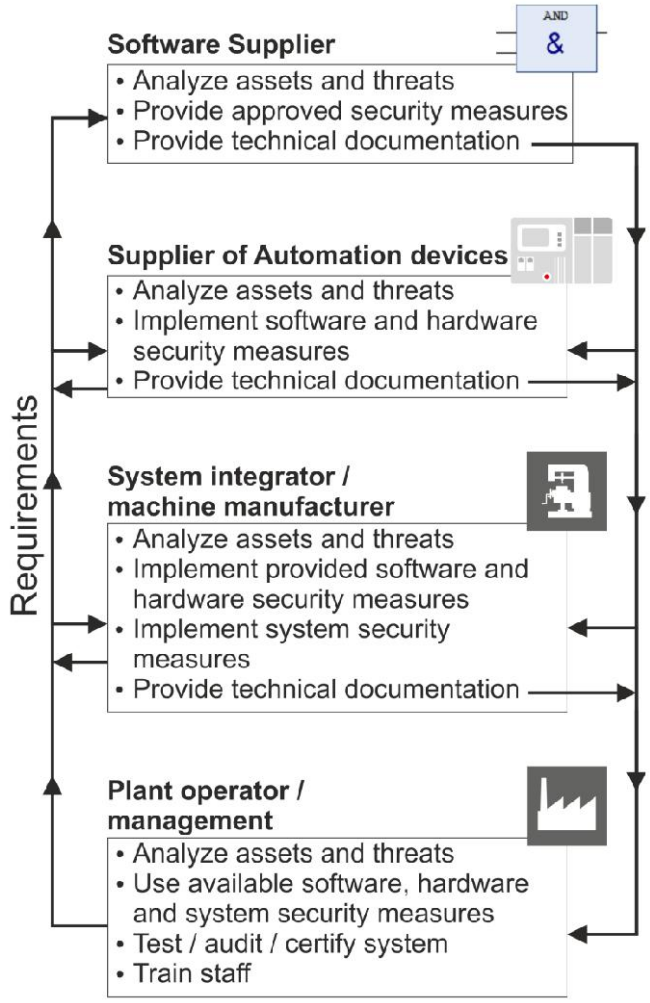
Situation in Industrial Security

Security responsibilities in industrial control applications



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Security measures within CODESYS

Security Whitepaper

- Guidline for OEMs, System Integrators and Operators
- Introduction in security subjects in industrial automation
  - Involved parties
  - Definition of the security level
  - Available tools in CODESYS to achieve the desired security level
  - Dealing with detected security vulnerability

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Security measures within CODESYS

CODESYS Development System

Measure	Whitepaper Section	Measure relevant for			Suitable measure against
		Suppliers of automation components	System integrators / machine builders	Operator	
Encryption of the source code of the application	5.1.1 (10)		X		Occasional / unintentional threats and attacks
User administration on project level	5.1.2 (11)		X		Occasional / unintentional threats and attacks

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Security measures within CODESYS

CODESYS Runtime System

Measure	Whitepaper Section	Measure relevant for			Suitable measure against
		Suppliers of automation components	System integrators / machine builders	Operator	
Access to the runtime system with authentication / permission management	5.2.1 (11)	X	X	X	Occasional / unintentional threats and attacks
Encryption and signing of the executable application code	5.2.2 (11)	X	X		Attacks
Controller operation mode	5.2.3 (12)		X		Occasional / unintentional threats and attacks
Interactive login	5.2.4 (12)	X	X		Occasional / unintentional threats
Disaster recovery	5.2.5 (12)	X	X	X	Occasional / unintentional threats
Communication encryption between the IDE and the controller	5.2.6 (12)	X	X	X	Attacks

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Security measures within CODESYS

IEC 61131-3 Application code

Measure	Whitepaper Section	Measure relevant for			Suitable measure against
		Suppliers of automation components	System integrators / machine builders	Operator	
Access restrictions out of the application / library	5.3.1 (13)	X	X		Occasional / unintentional threats and attacks
Unlocking additional functions	5.3.2 (13)	X	X		Occasional / unintentional threats and attacks

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Security measures within CODESYS

CODESYS Visualization

Measure	Whitepaper Section	Measure relevant for			Suitable measure against
		Suppliers of automation components	System integrators / machine builders	Operator	
Visualization User Management	5.4.1 (13)		X	X	Occasional / unintentional threats and attacks
Communication encryption for the CODESYS WebVisu	5.4.2 (13)	X	X	X	Attacks

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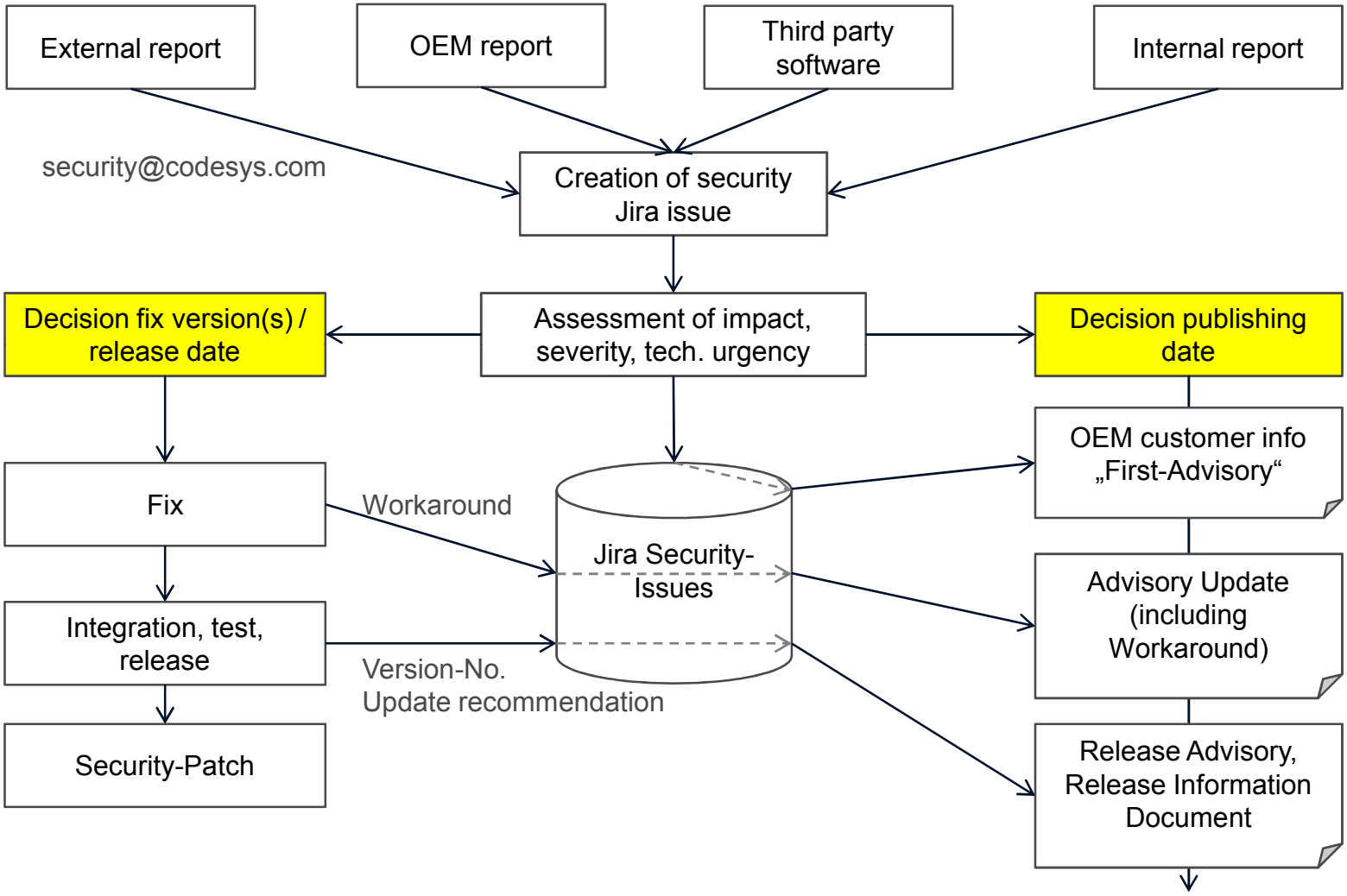
Security measures within CODESYS

Handling of security vulnerabilities in CODESYS



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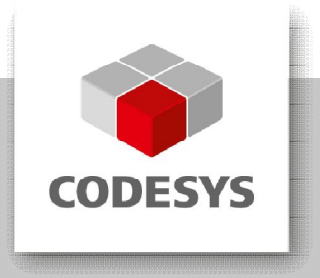

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