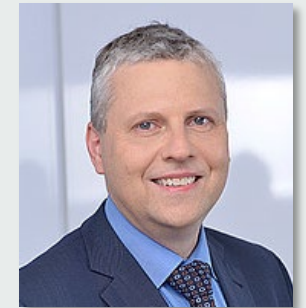


CODESYS applications protected and licensed

How to protect and license
your CODESYS applications

SECURITY
LICENSING

PERFECTION IN PROTECTION



Stefan Bamberg

Senior Key Account & Partner Manager, Wibu-Systems

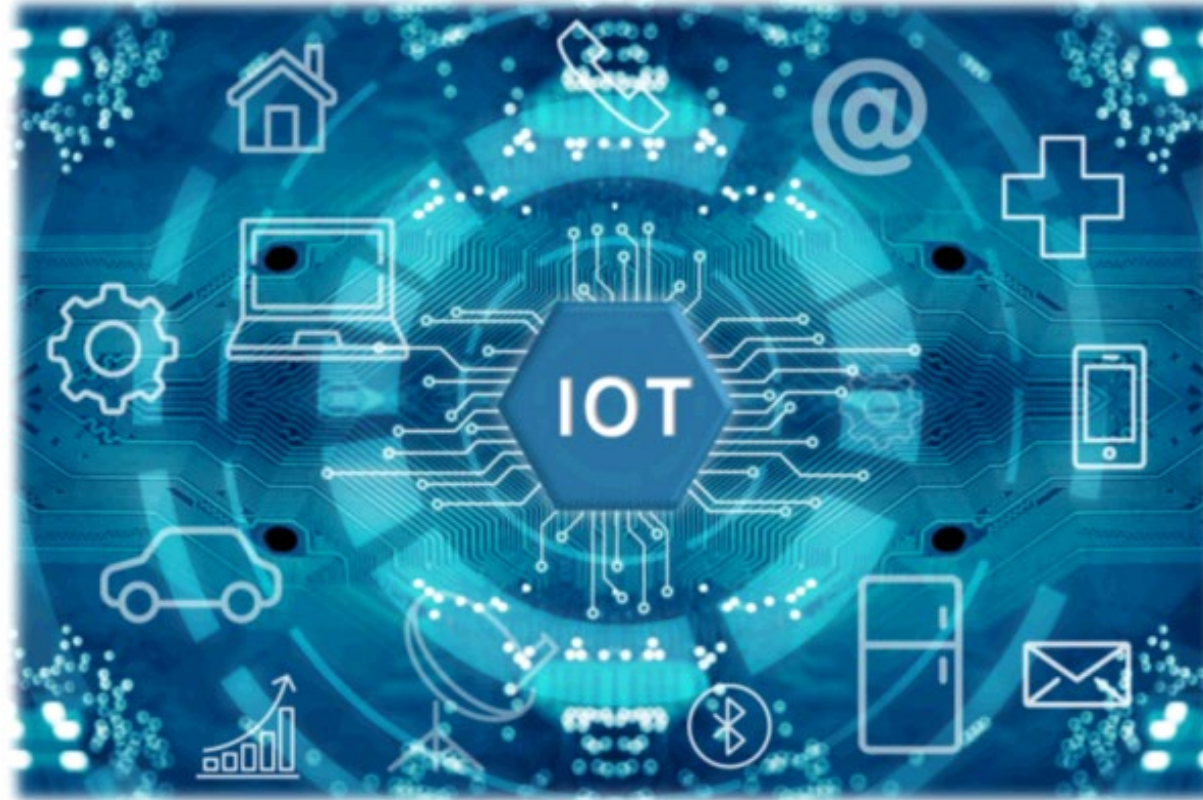
Roland Wagner

Head of Product Marketing, CODESYS

To access the on-demand replay of this masterclass, please visit

www.wibu.com/wibu-systems-webinars/2021/your-codesys-applications-protected-and-licensed/access.html

Security



Monetization

- Human misconduct and sabotage
- Introducing malware
- Social engineering and phishing
- Infection with malware via the Internet/Intranet
- Technical mishaps and force majeure
- (D)DoS attacks
- Compromising extranet and cloud components
- Break-ins via remote maintenance accesses
- Internet-connected control components
- Compromised smartphones in the production environment ...



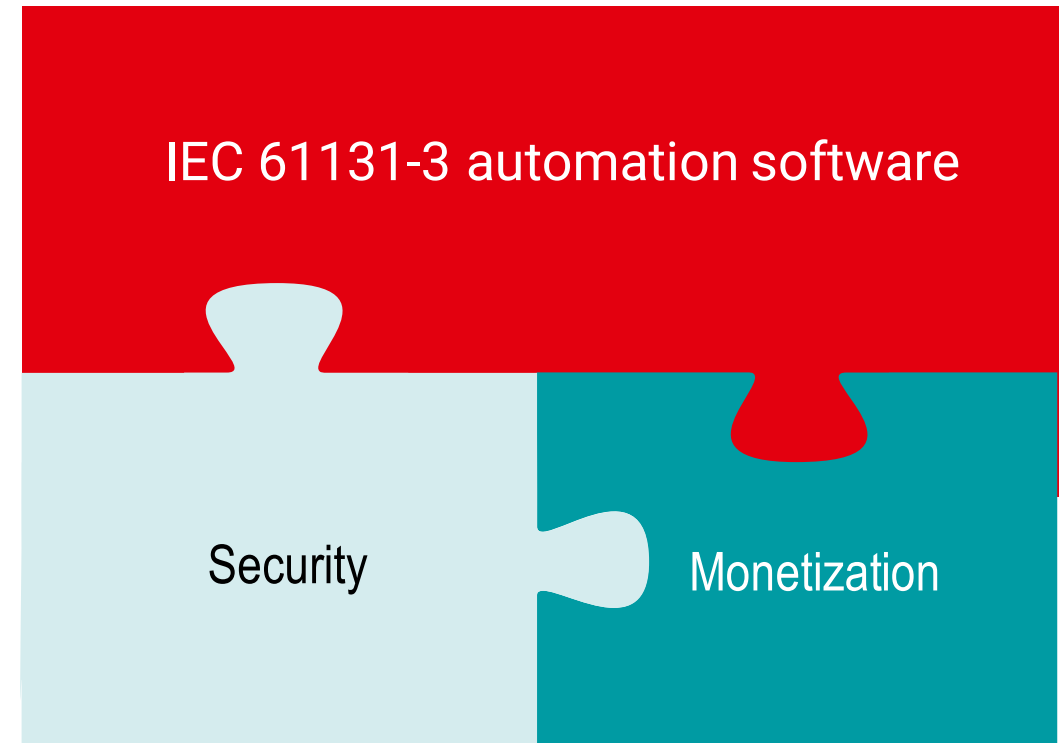
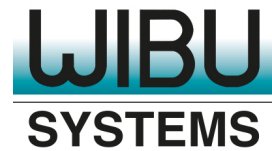
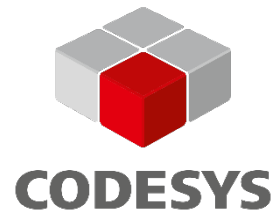
- **IEC 62443 standard** (International Electrotechnical Commission, Geneva)
 - A family of standards focused on the security of “Industrial Automation and Control Systems” (IACS) that covers all the necessary topics, from protection to technical configurations and compliance
 - Structured in four levels:
 - General principles
 - Security requirements for operators and service providers (also connected to ISO 27000)
 - Security requirements for automated systems (production and process automation)
 - Security requirements for automated components (product development processes)
 - Guidelines published by VDMA: [Guide IEC 62443 for mechanical and plant engineering](#) [Link]

- Software-based features of devices
 - Features-on-demand
 - Pay-per-Use
 - Subscription plans
- Services and (predictive) maintenance
- Monetization of device or customer specific control parameters / output values
- Cloud connected functionalities



Solution

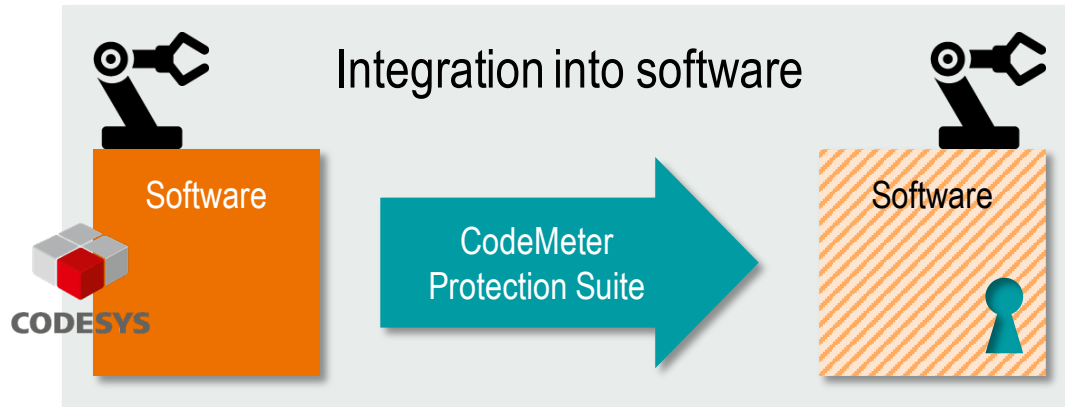
- CodeMeter technology integrated with CODESYS V3.51 and higher
- Project protection
- Application protection
- CodeMeter library included for customer specific implementations
- Access authentication and monetization available



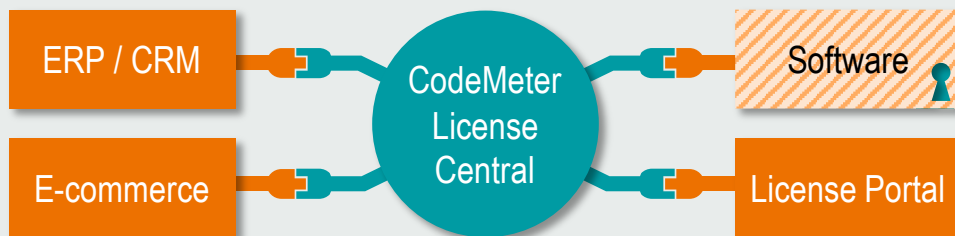
CodeMeter®

Protection & Licensing
Technical Background

Integrate Once

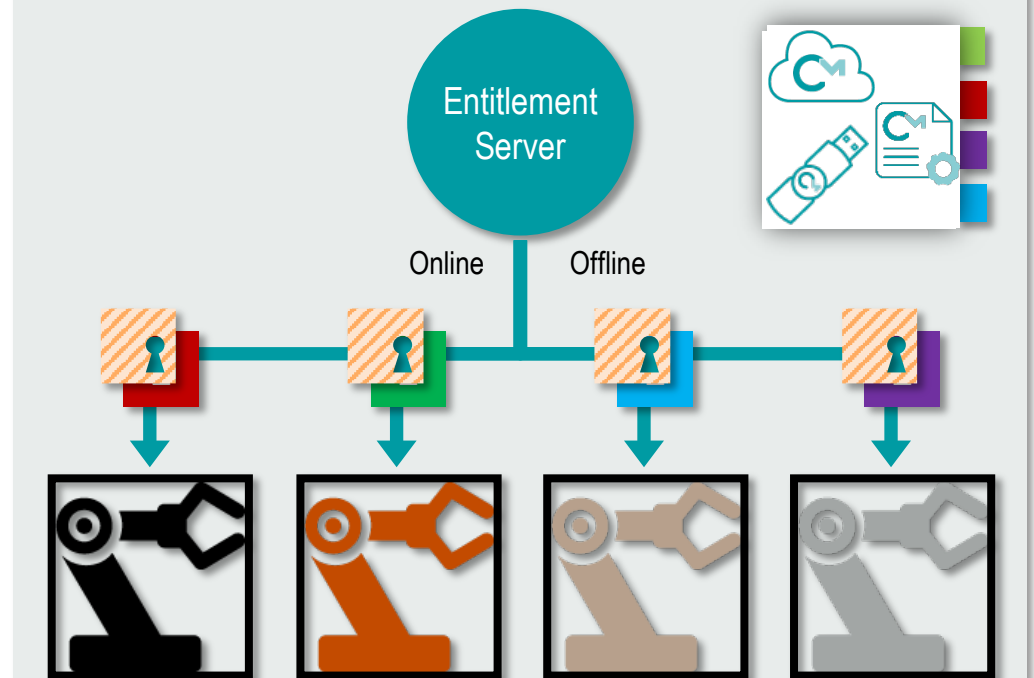


Integration into processes



Deliver Many

Delivery to the endpoints



...Integrate Once – Deliver Many (Examples)



Software



License

- Feature-on-Demand

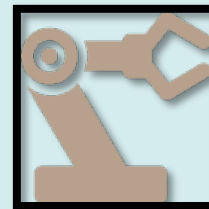


Software



License

- Subscription plan

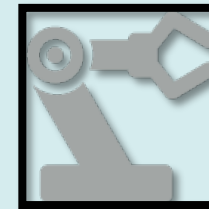


Software



License

- Network licenses



Software



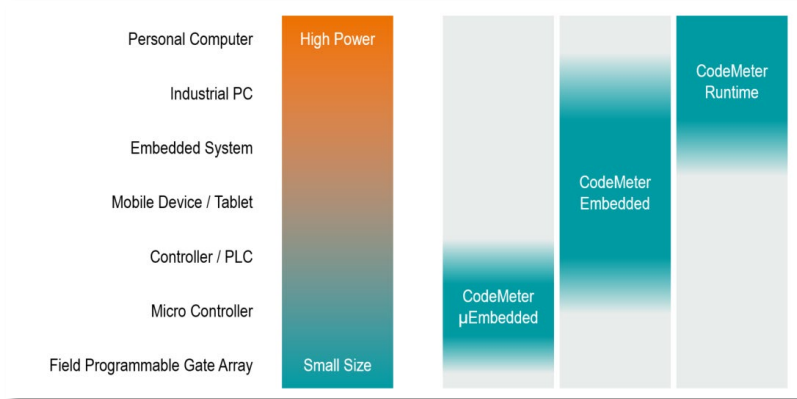
License

- Pay-per-Use

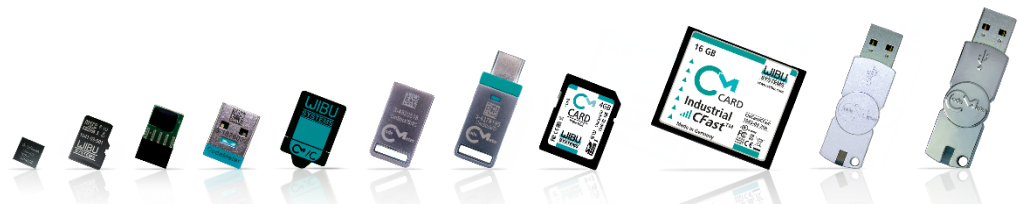
CodeMeter Protection Suite

Machine Code (PC, IPC)			Machine Code (Embedded Devices)			Bytecode		Script Language			
AxProtector Windows	AxProtector macOS	AxProtector Linux	AxProtector CmE Linux	AxProtector CmE Android	ExProtector	ExProtector XMC 400	AxProtector .NET / .NET Standard	AxProtector Java	AxProtector Python	AxProtector JavaScript / TypeScript	
Optional	Optional	Optional	Optional	Optional			Optional	Optional	Optional	Optional	Code Moving
Optional	Optional	Optional	Optional	Optional			Optional	Optional	Optional	Optional	IP Protection Mode
✓	✓	✓	✓	✓			✓	✓	✓	✓	CmCloudContainer
✓	✓	✓			✓	✓	✓	✓	✓	✓	CmActLicense
✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	CmDongle
Optional	Optional	Optional	Optional	Optional			Optional	Optional	Optional	Optional	Modular Licensing (IxProtector)
✓	✓	✓	✓	✓			✓	✓	✓	✓	Protection on function level
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Integrity Protection
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Anti-Debug Methods
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Automatic License Checks
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Automatic Protection

CodeMeter: One Technology Fits All



Supported Platforms

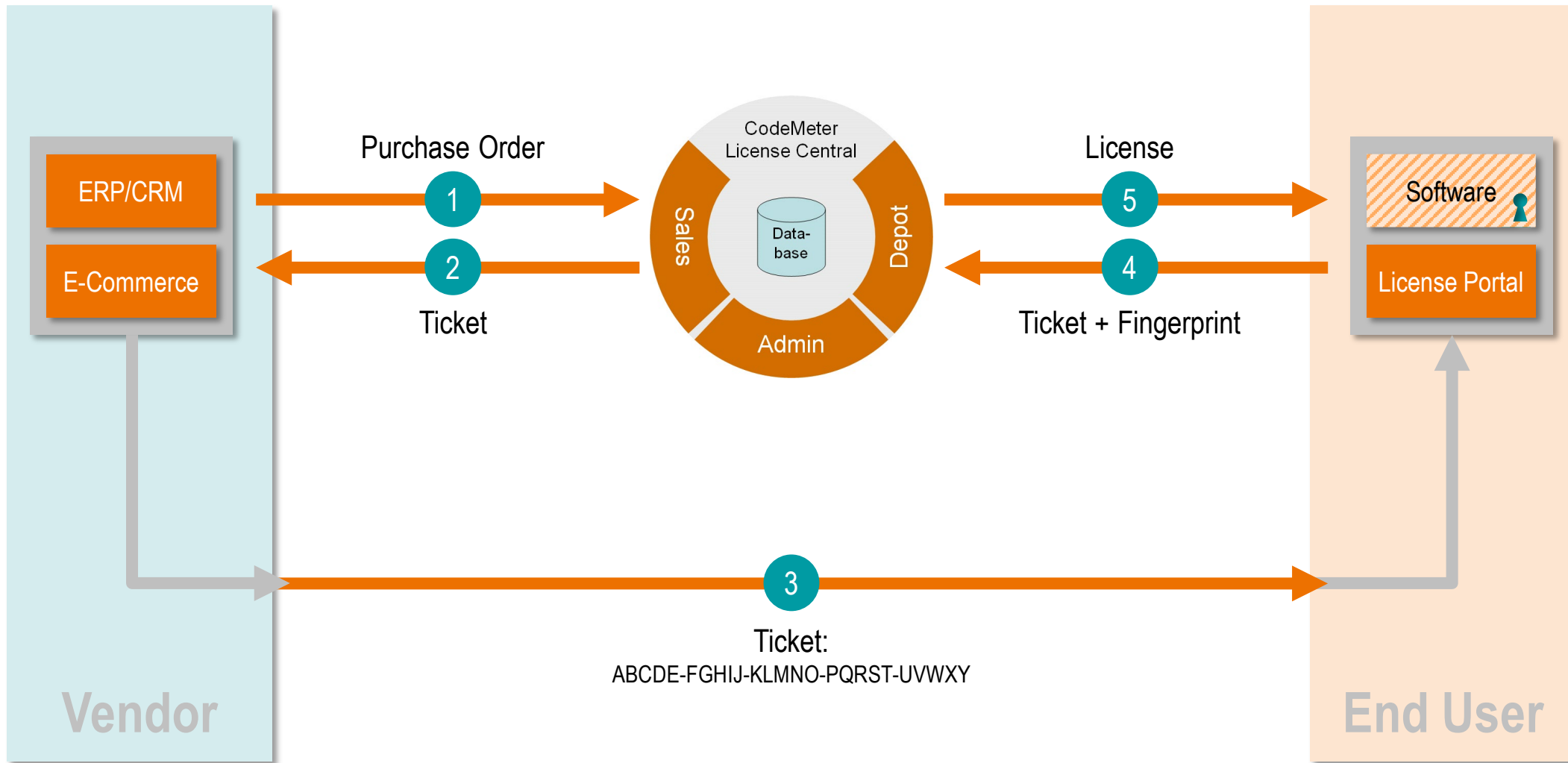


Form Factors



Entitlement Management
Integration in backoffice systems

CodeMeter License Central – Licenses across the Product Lifecycle



Thank you very much!



Europe: +49-721-931720
USA: +1-425-7756900
China: +86-21-55661790
Japan: +81-45-5659710

<https://www.wibu.com>

info@wibu.com



SECURITY and MONETIZATION

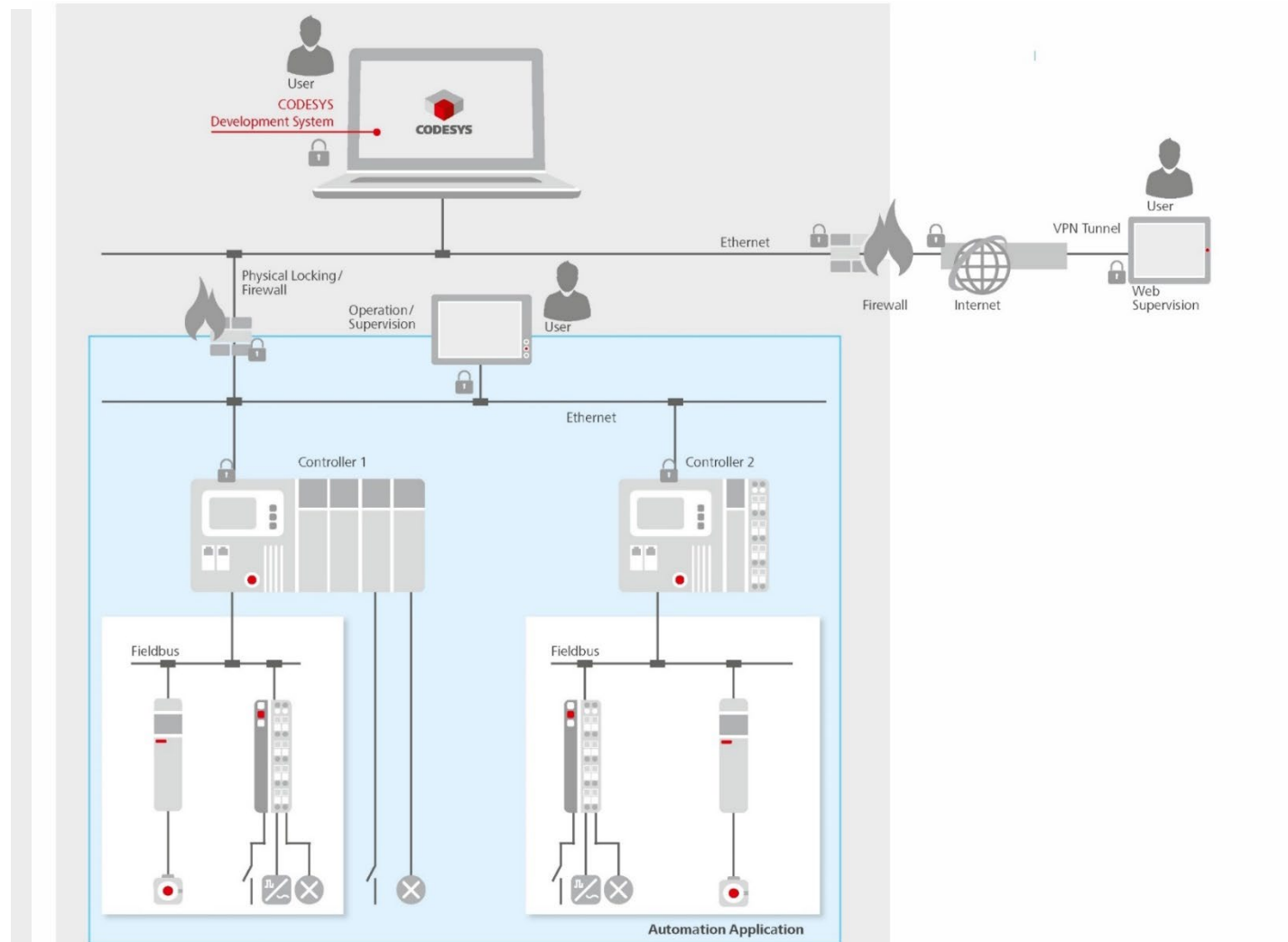
How to benefit from CodeMeter® Technology in CODESYS

Wibu Webinars 25/08/2021

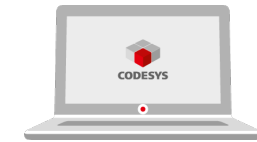
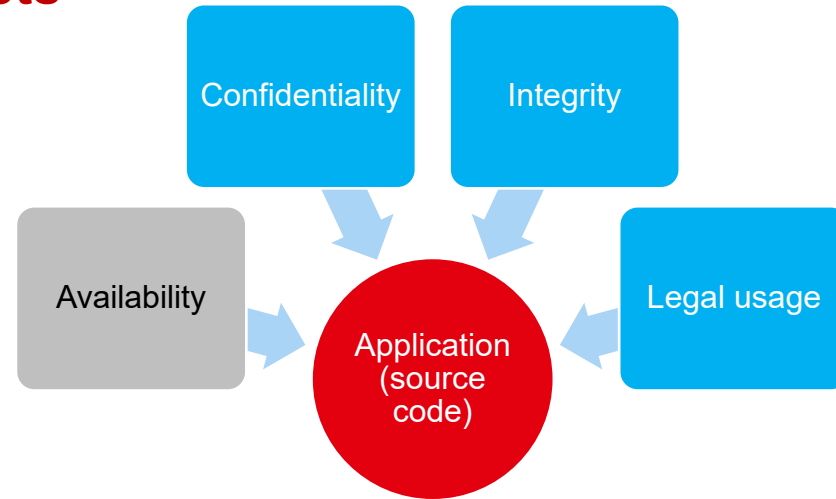
Roland Wagner, Head of Product Marketing CODESYS Group

1**Security and monetization in automation****2****CodeMeter® technology in CODESYS****3****How to benefit****4****Outlook and conclusion**

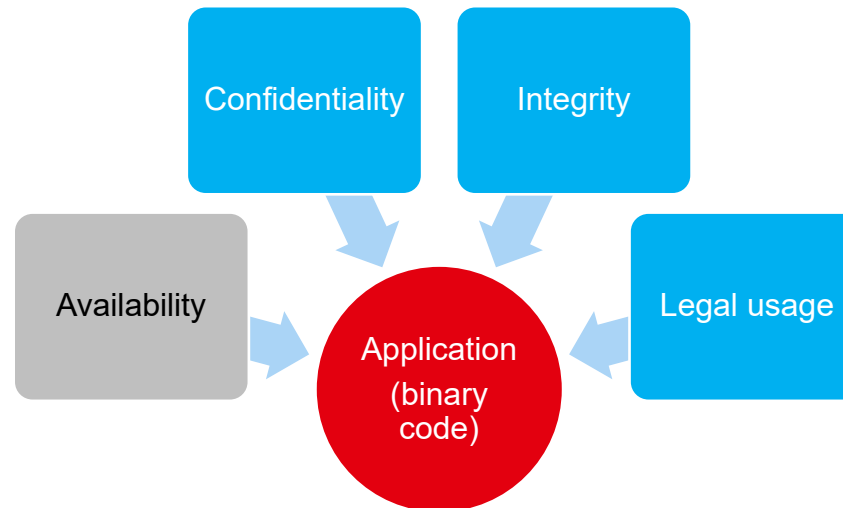
From control cabinets to Industry 4.0



Security: Assets / protection targets



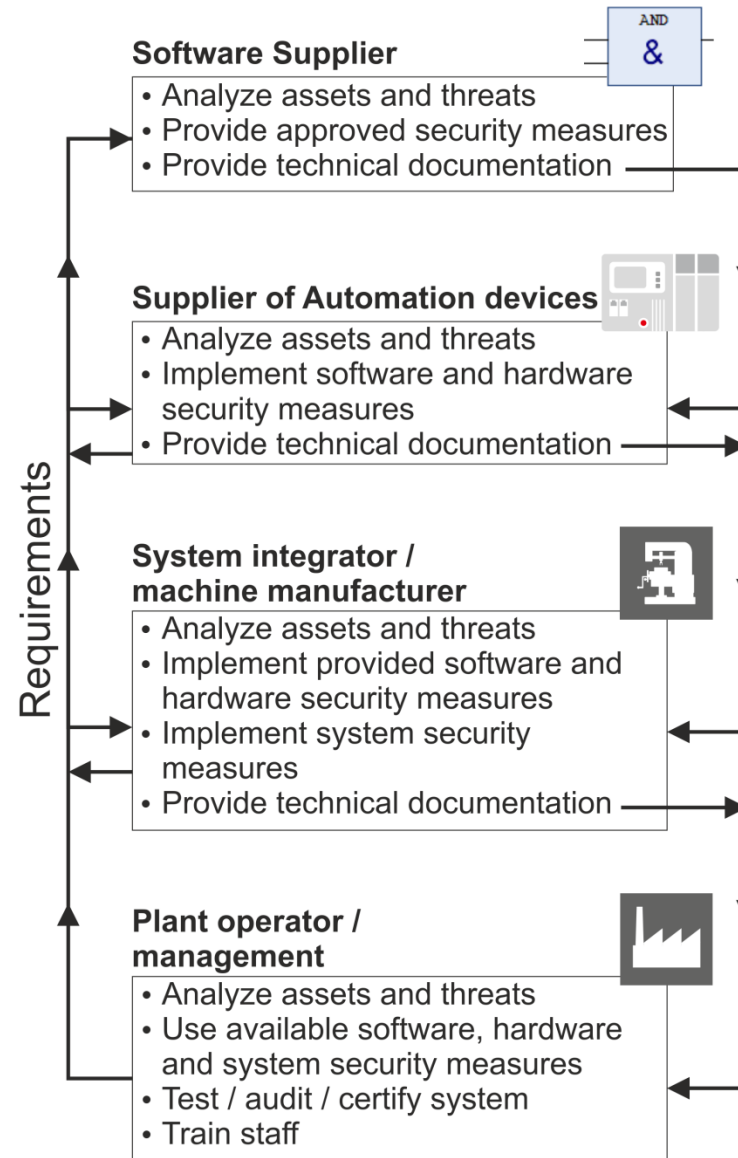
Engineering



Runtime



Security: Responsibilities



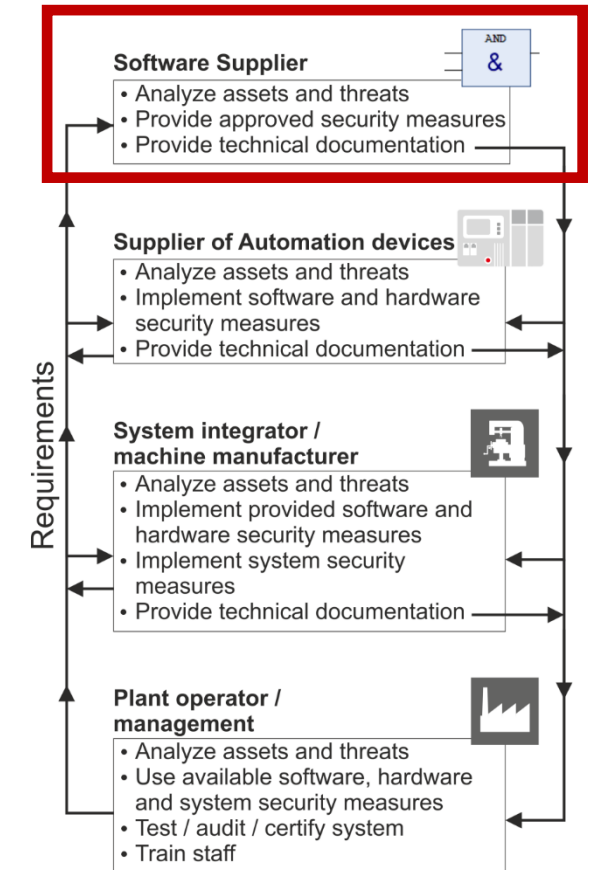
Security: Measures in CODESYS

- **Native possibilities**

→ Whitepaper “Security” at

https://www.codesys.com/fileadmin/data/custom_ers/security/CODESYS-Security-Whitepaper.pdf

- **Use CodeMeter[®] technology – seamlessly integrated**



Monetization: Your know-how / intellectual property is worth it

- **Independent from open source activities**
- **Possible assets:**
 - Generic software algorithms available as libraries
 - Special software services / functions only necessary in special use cases
 - Special corporate competence / know-how (Intellectual Property)
 - Realization of Pay-per-use models
 - Realization of Software-as-a-Service (SaaS) products directly within the PLC application

1**Security and monetization in automation****2****CodeMeter[®] technology in CODESYS****3****How to benefit****4****Outlook and conclusion**

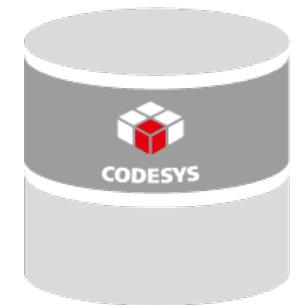
Integration

- **In the IDE (CODESYS Development System)**
 - Protection of source code
 - License management
- **In the runtime system (CODESYS Control) of**
 - devices from CODESYS customers
 - native SoftPLCs
 - Protection of application code
 - License management



Integration

- **Container used for storing unique access code**
 - CODESYS Key (→ USB dongle)
 - CmActContainer (→ Software container) firmly connected to the specific device
 - Universal Firm Code (UFC) container (so far for latest SoftPLC CODESYS Control for ARM Linux SL only)
- **Comparison of software and hardware container**
<https://www.codesys.com/the-system/licensing.html>

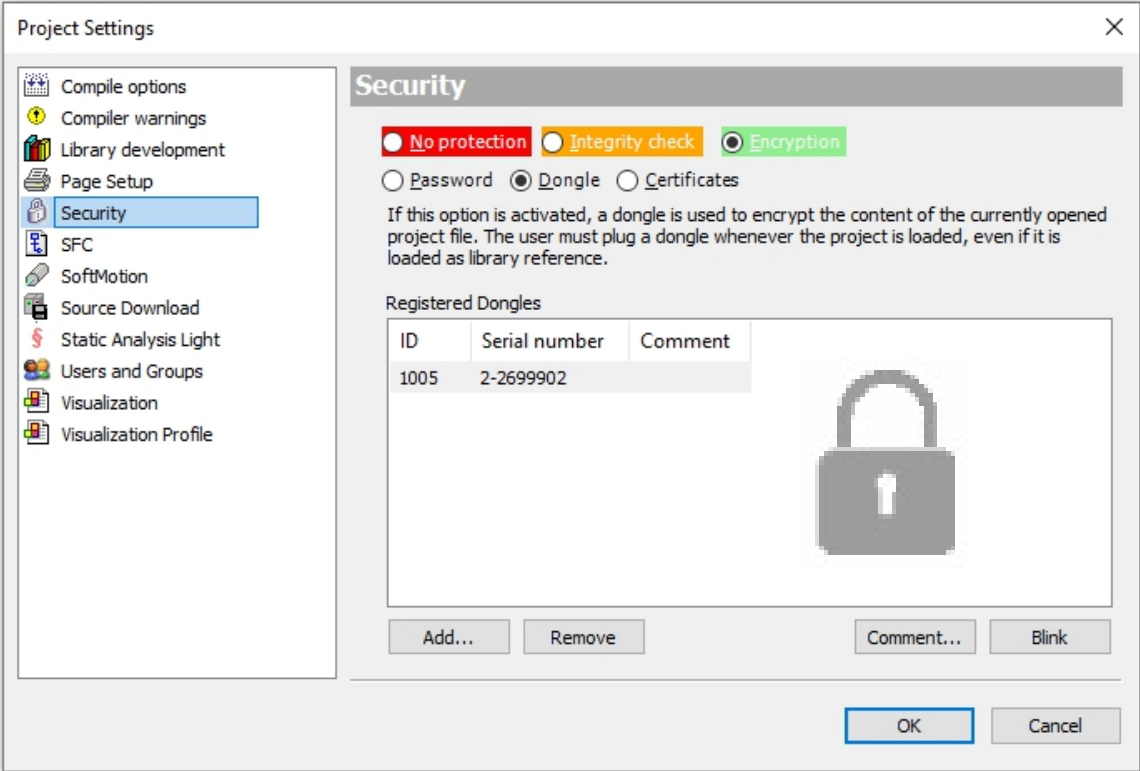


1**Security and monetization in automation****2****CodeMeter[®] technology in CODESYS****3****How to benefit****4****Outlook and conclusion**

Use case: Protection of source code know-how

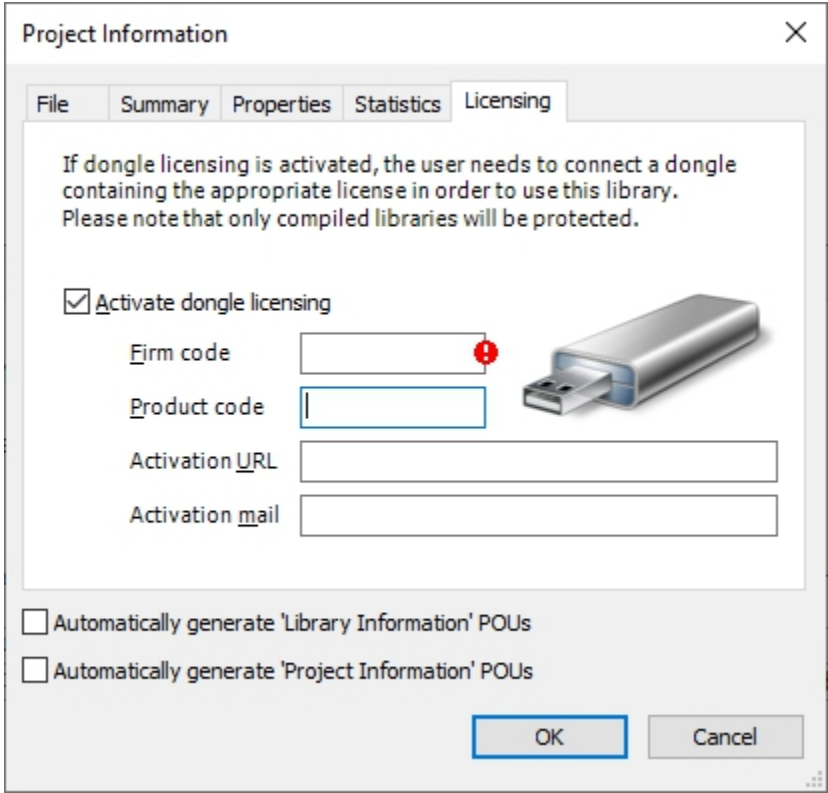
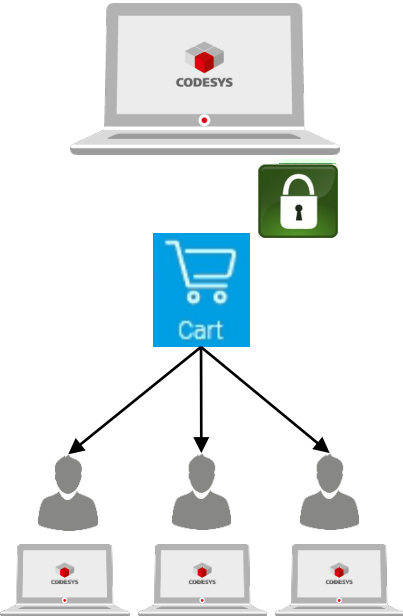
- **Encryption of source code**
 - ➔ Open CODESYS project file only with previously registered dongle plugged into the **workstation PC**

Recommendation:
Use more than 1 dongle!
➔ **Backup in case of damage/loss**



Use case: Authorization / monetization of libraries

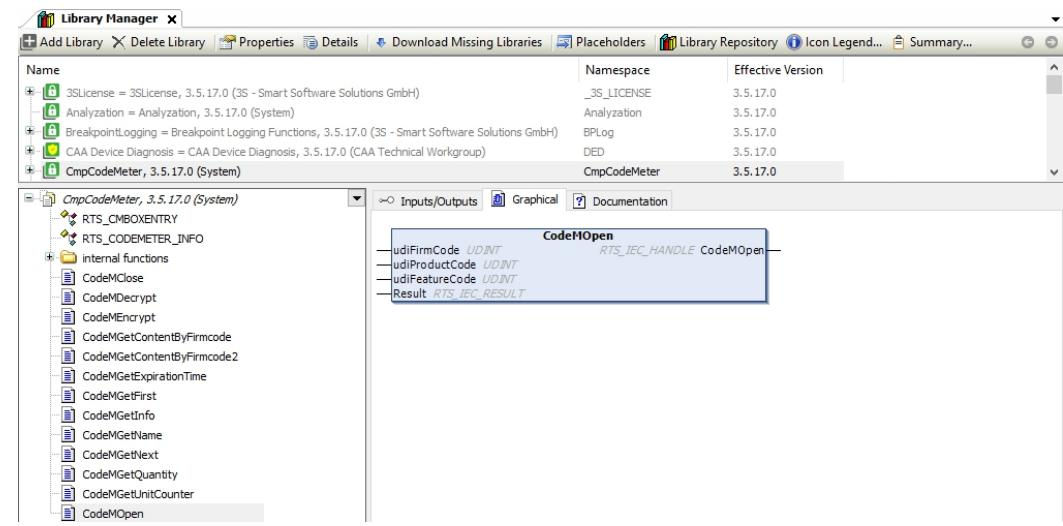
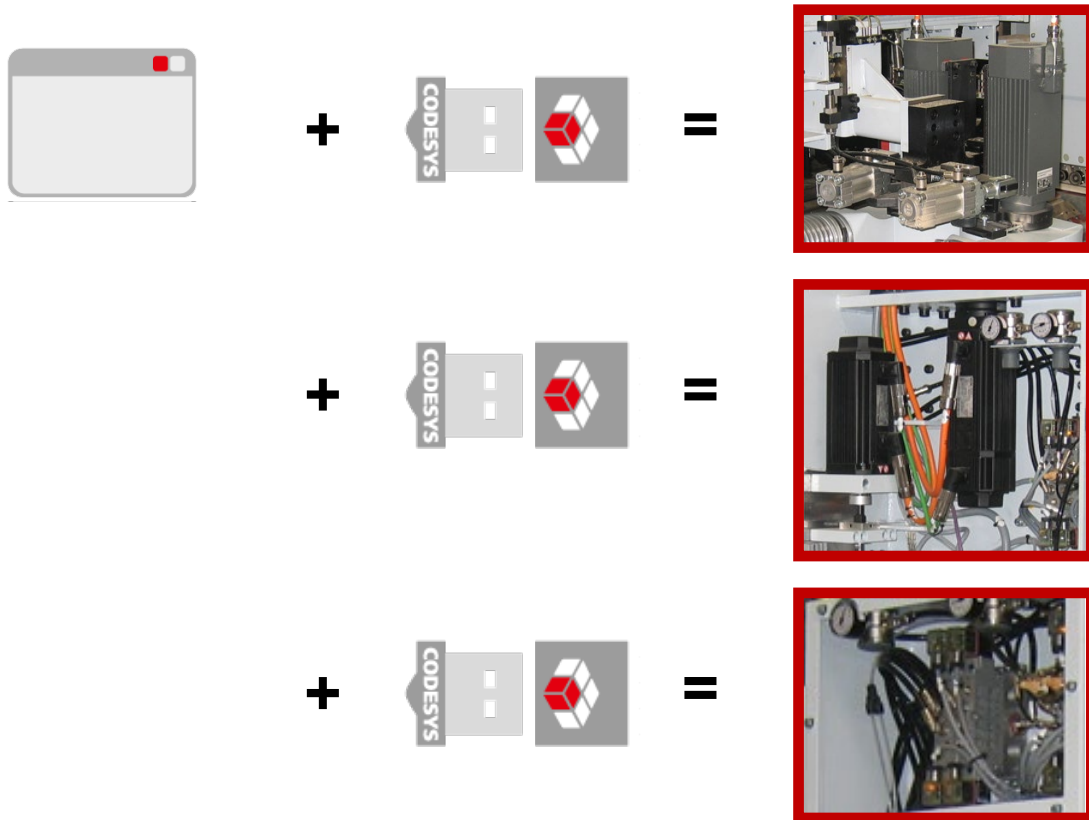
- **Licensing option for CODESYS libraries**
 - ➔ Sale of licenses via the CODESYS Store (via CODESYS Firm code) with CODESYS Activation URL / mail
 - ➔ Purchase of licenses via own Firm code requires CodeMeter® Toolkit and self-provided Activation URL / mail



Use case: Authorization / monetization of functions / services

- Library for accessing license information

- ➔ Dongle with additional functionality, e. g. to calibrate a machine
- ➔ Resell library functions to 3rd parties, e.g. via the CODESYS Store



Use case: Protect concrete parameters/data in the source code

- **Interface for encryption/decryption of concrete source code in a project**
 - ➔ Source data protected against unauthorized access
 - ➔ Decryption by means of license / product code

The screenshot shows the CODESYS IDE interface. On the left, a project tree for 'CmpCodeMeter, 3.5.17.0 (System)' is visible, with 'CodeMEncrypt' selected under 'internal functions'. The main window displays the function declaration for 'CodeMEncrypt (FUN)'. The function signature is 'FUNCTION CodeMEncrypt : RTS_IEC_RESULT' with the description 'Encrypt data'. Below this, an 'InOut' table lists the parameters and their return values.

CodeMEncrypt (FUN)

FUNCTION CodeMEncrypt : RTS_IEC_RESULT

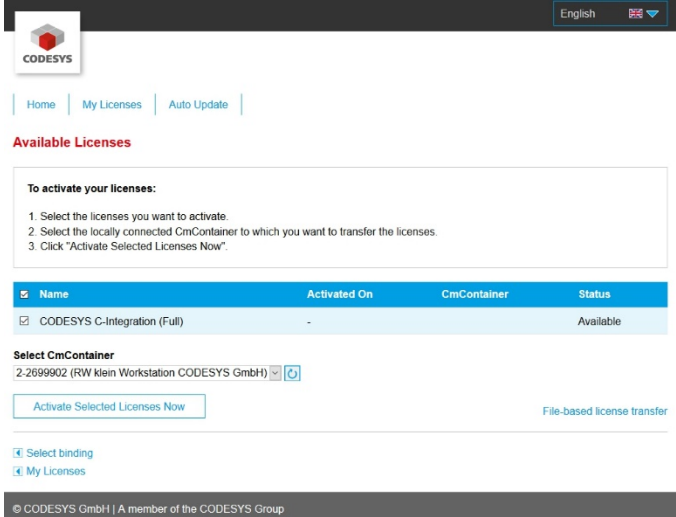
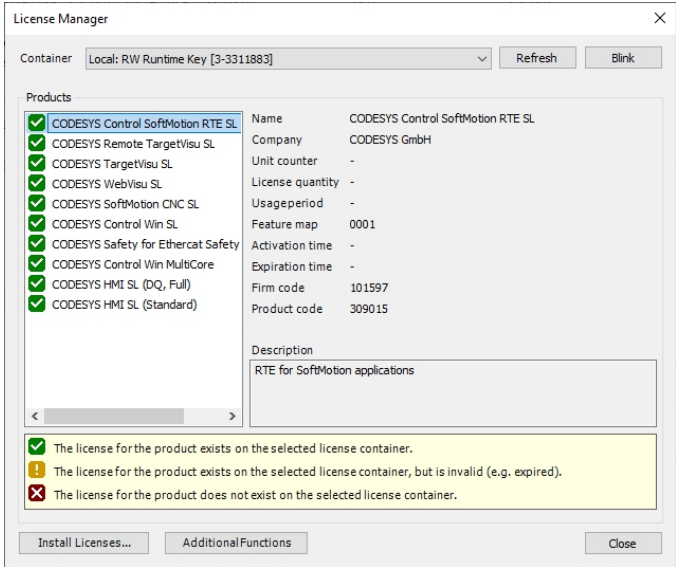
Encrypt data

InOut:

Scope	Name	Type	Comment
Return	CodeMEncrypt	RTS_IEC_RESULT	Error code (see CmpErrors2 Interfaces Library) or ERR_OK if succeeded
Input	hCodeMeter	RTS_IEC_HANDLE	Handle to the CodeMeter license container retrieved by CodeMOpen().
	udiEncryptionCode	UDINT	Encryption code
	pbyData	POINTER TO BYTE	Pointer to plain text data to encrypt
	nDataLen	__XWORD	Length of data to encrypt
Inout	uICRC	UDINT	Returns CRC of the encrypted data

Use case: Easy licensing of product options from software vendor

- Licensing directly in the IDE
See <https://youtu.be/-5t4kN1Gn9Y>
- Licensing via special website
<http://license.codesys.com>
- Cloud-based licensing for bulk operation within the CODESYS Automation Server



1**Security and monetization in automation****2****CodeMeter® technology in CODESYS****3****How to benefit****4****Outlook and conclusion**

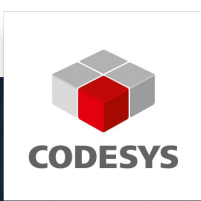
Future use cases (Roadmap)

- **Pay-per-use monetization with license counter**
 - ➔ **Extension of the library possibilities (SP18)**
- **Network licenses for SoftPLCs add-ons (e.g. for fieldbus, visualization, OPC UA)**
- **Network licenses for workstation add-ons (e.g. Static Analysis, Profiler, UML, Git)**
- **Cloud licenses**
 - SoftContainer on virtual machines respectively Server with dongles
 - Network licenses
- **Scalable licenses (e.g. depending on IEC 61131-3 code size, number of tasks)**
- **Encryption of SoftPLCs via AxProtector**
 - ➔ Execution depending CodeMeter® runtime
 - ➔ Guaranteed integrity of SoftPLCs

CodeMeter® in CODESYS

- **Proven technology at your fingertips**
- **Flexible application in different common use cases**
- **Easy handling due to**
 - seamless integration
 - pre-programmed licenses
- **One platform for different targets and functions**

➔ Added value for the security and monetization of your know-how



Thank you for your attention!

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