

# Features & Improvements CODESYS V3.5 SP11

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Runtime

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## Overview

- CODESYS 64 bit
- Security
  - X.509 Certificate Management
  - OPC UA Server
- Multi-core support **[beta]**
- CODESYS Control Win
- General improvements



## CODESYS 64 bit

Part of CODESYS Development System 64 bit setup:

- CODESYS Control Win 64 bit 
  - Parallel installation to 32 bit runtime possible
  - Running as single runtime process
- CODESYS Gateway 64 bit (server and client)
- CODESYS simulation 64 bit



## Security

- X.509 certificate management
  - Functional release with V3.5 SP10
  - New: Online interface for communication between runtime and development system
- OPC UA Server
  - Encryption of OPC UA communication based on X.509 certificates
  - OPC standard compliant (OPC test tool not yet available)



## Multi-core support [beta]

- Support of multi-core processors for CODESYS Runtime
- Beta release available on selected standard platforms
  - Activation via target setting
  - Delivery available on demand
- Main release planned for V3.5 SP12



## CODESYS Control Win

- Separation of installation and working directory
- Before:
  - Installation directory writable for all users
- Now:
  - Change of installation data only by administrators
- Installation directory  
C:\Program Files (x86)\3S CODESYS v3.5.11.0\GatewayPLC\  
C:\Program Files (x86)\3S CODESYS v3.5.11.0\GatewayPLC\
- Working directory  
C:\ProgramData\CODESYS\CODESYSControlWinV3\xxxxxxxx\



## General improvements

- Memory management
  - Infrastructure for definite handles at runtime
  - Generic hash table for runtime system
  - Performance improvements for garbage collector
    - Significant for „heap“ components like OPC UA stack
- PLC shell commands
  - Commands for read/write of real-time clock
- Runtime documentation
  - Code generator target settings: Sorting by plug-ins

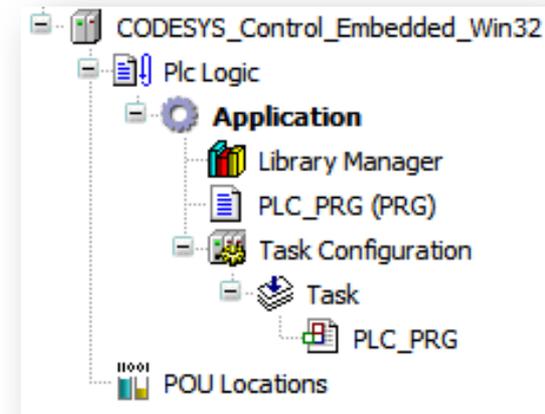
## Overview

- POU Location editor
- „SL“ control products
  - **\*New\*** CODESYS Control for IOT2000 SL
  - **\*New\*** CODESYS Control for PFC100 SL
  - CODESYS Control for Raspberry Pi SL
- Runtime update tool



## POU Location editor

- Support of multiple code areas (flash areas)
  - New application object „POU Locations“
- Display of current language model location
- Shift of POU's/libraries to new code areas



Items	Type	Current location	Configured location	Code size
<b>Application</b>		area_0, area_1	default	191039
IoConfigAfterTask_1	Function	area_0	default	224
IoConfigBeforeTask_0	Function	area_0	default	104
PLC_PRG	Program	area_0	default	34072
PLC_PRG_1	Program	area_1	area_1	136216
SystemPOUs	SystemPOU	area_0	default	2463
3slicense, 3.5.10.0 (3s - smart software solutions gmbh)	Library	area_0	default	9728
cmplog, 3.5.5.0 (system)	Library		default	
component manager, 3.5.9.0 (system)	Library		area_0	
iostandard, 3.5.10.0 (system)	Library	area_0	area_1	3192
standard, 3.5.5.0 (system)	Library	area_0	default	1296

## „SL“ Control Products

- New control products
  - CODESYS Control for IOT2000 SL
  - CODESYS Control for PFC100 SL
  
- CODESYS Control for Raspberry Pi SL
  - Support of Compute Model



Sales via [CODESYS Store](#)

## Runtime update tool

- General update tool for all Linux SL controls
  - New views and commands
  - Scan dialog
  - System information view

```

System information: pi@192.168.96.39
└─┬─ CPU Info
   │ processor      : 0
   │ model name     : ARMv7 Processor rev 4 (v7l)
   │ Bogomips       : 76.80
   │ Features       : half thumb fastmult vfp edsp neon vfpv3 tls vfpv4 idiva idivt vfpd32 lpae evtstrm crc32
   │ CPU implementer : 0x41
   │ CPU architecture: 7
   │ CPU variant    : 0x0
   │ CPU part       : 0x003
   │ CPU revision   : 4
   └─┬─ Network Info
      │ root
      │ eth0 Link encap:Ethernet HWaddr b8:27:eb:b2:26:ca
      │      inet addr:192.168.96.39 Bcast:192.168.183.255 Mask:255.255.248.0
      │      inet6 addr: fe80::84cc:65f9:7db5:15a9/64 Scope:Link
      │      UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
      │      RX packets:64125000 errors:0 dropped:3929072 overruns:0 frame:0
      │      TX packets:864594 errors:0 dropped:0 overruns:0 carrier:0
      │      collisions:0 txqueuelen:1000
      │      RX bytes:4259504368 (3.9 GiB) TX bytes:89822711 (85.6 MiB)
      └─┬─ Package Info
         │ root
         │ Desired=Unknown/Install/Remove/Purge/Hold
         │ | Status=Not/Inst/conf-files/Unpacked/half-inst/trig-avail/Trig-pend
         │ | / Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
         │ ||/ Name          Version      Architecture Description
         │ ---
         │ ii codesyscontrol 3.5.11.0   all          V3.5.11.0, Fr 5. Mai 06:08:35 CEST 2017
         └─┬─ Runtime Info
            │ Linux version 4.4.21-v7+ (dc4@dc4-XP513-9333) (gcc version 4.9.3 (crosstool-NG crosstool-ng-1.22.0-88-g8460611)) #911 SMP Thu
            │ Sep 15 14:22:38 BST 2016
            │ PlcStartRasPi[931]: fork child: ppid: 5512
            │ ***** CODESYScontrol DEMO VERSION - runs 2 hours*****
            │ PlcStart[290]: using /etc/CODESYScontrol.cfg as config file
            │ machine: armv7l
            │ timer resolution: 1msec
            │ SysFileGetSize_[254]: stat(/usr/mgmt08.csv):No such file or directory
            │ SysFileGetSize_[254]: stat(/usr/mgmt08.csv):No such file or directory
            └─ Refresh OK
  
```

```

Scan Raspberry PI
192.168.96.39 (B8:27:EB:B2:26:CA)
192.168.96.58 (B8:27:EB:60:45:8B)
192.168.99.6 (B8:27:EB:6E:30:53)
192.168.99.120 (B8:27:EB:AB:51:68)
192.168.99.126 (B8:27:EB:A4:8E:4C)
192.168.99.169 (B8:27:EB:F5:03:3A)
192.168.99.184 (B8:27:EB:85:8D:3C)
192.168.99.207 (B8:27:EB:B2:26:CA)
192.168.99.235 (B8:27:EB:6A:90:9E)
192.168.101.205 (B8:27:EB:11:CC:34)
192.168.101.234 (B8:27:EB:79:BE:F3)
192.168.101.251 (B8:27:EB:E9:A9:0E)
192.168.102.20 (B8:27:EB:FA:98:52)
OK Cancel
  
```

Raspberry PI

▲ Login credentials

Username

Password

▲ Select target

IPAddress

▲ Package

Version

Package directory

▲ System

▲ Runtime

Devices | POUs | Raspberry PI

## Overview

- CODESYS 64 bit
- Web-based online help
- Notification center
- Data breakpoints
- General improvements



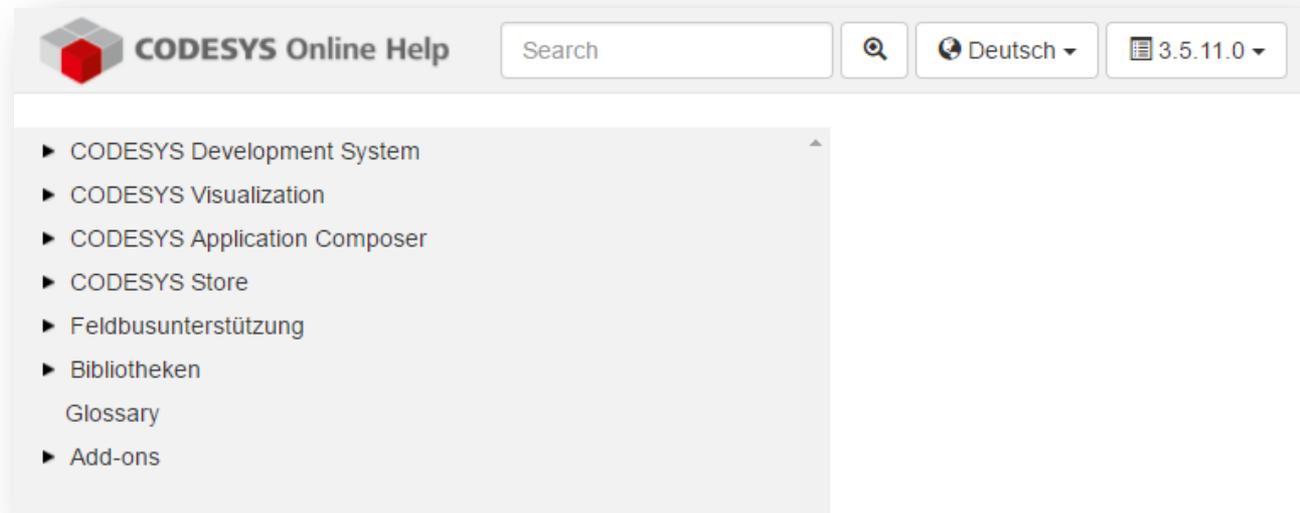


## CODESYS 64 bit

- 64 bit version of CODESYS Development System
  - Total usage of free random access memory
  - Time performance equal to 32 bit version
- Add-on compatibility
  - Unified add-on packages for installation on 32 bit and 64 bit CODESYS versions

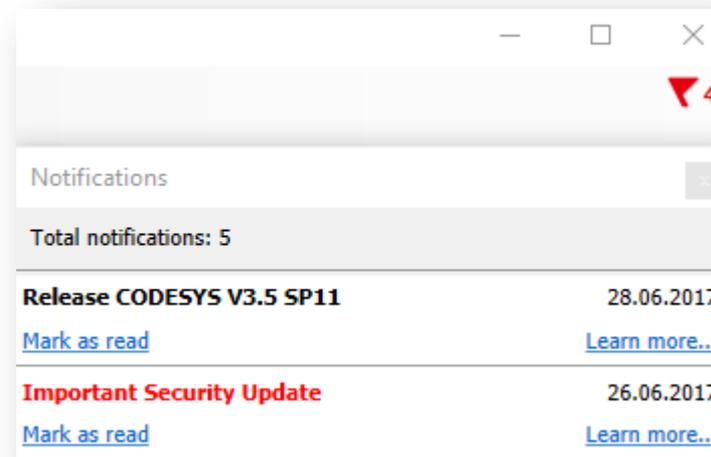
## Web-based online help

- Access to CODESYS online help via browser
- Usage of HTML technologies
  - Improved search functionality
  - Direct change of languages or CODESYS versions
- Existing online help available as offline fallback or permanent option



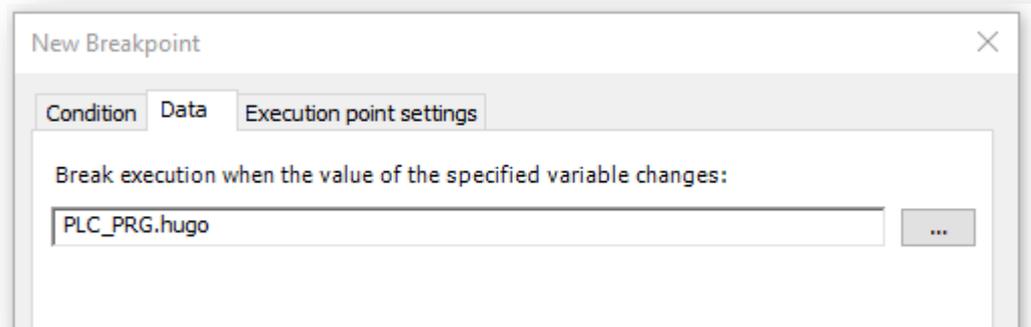
## Notification Center

- Information channel for important CODESYS messages like
  - security issues
  - release information
- No marketing channel



## Data breakpoints

- Breakpoints on value change
- Support for x86/Windows
  - CODESYS Control Win (32/64 bit)
  - CODESYS simulation



Breakpoints					
Application: Application [Device: PLC Logic]					
POU	Location	Instance path	Tasks	Condition	Hit count condition
<input type="radio"/> hugo	When variable 'PLC_PRG.hugo' changes		(any)	Break always	Break always

## General improvements

- Ladder
  - Multi-select support
  - Usage of boxes in OR branches
- CFC
  - Forcing of function block inputs
- Improvements in symbol configuration
  - New flag „execute“
  - Support of subrange types
  - Data build from precompile information
- Cross Reference View
  - Improved filtering by name or declaration

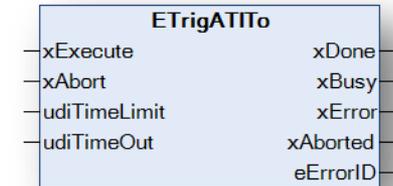
## Overview

- Application libraries
  - PLCopen Behaviour Model Library
  - Collection Library
- General improvements
  - CODESYS Application Composer
  - CODESYS Depictor



## Application Libraries

- New library: *Common Behaviour Model*
  - Library for creation of PLCopen-compliant function blocks
  - Release of specification by PLCopen: [Link](#)
- New library: *Element Collections*
  - Library for simplified object management
    - List
    - SortedList
    - Queue
    - Stack
    - Hashtables
    - LinkedList
    - TreeNode



+1.0 Common Behaviour Model, 3.5.11.0 (3S - Smart Software Solutions GmbH)  
 +1.0 Element Collections, 3.5.11.0 (3S - Smart Software Solutions GmbH)



## General improvements

- CODESYS Application Composer
  - Support of trend element
  - Persistence manager: generation of file instead of initialization code
- CODESYS Depictor
  - Material for objects
  - Demo mode
  - Alarm color ( controlled by Boolean)
  - Denavit-Hartenberg support for pose definition
  - STL support (3D data format)
  - PLY support (3D data format)

## Overview

- Touch control
- Trace element
- File transfer
- HMI SL
- General improvements



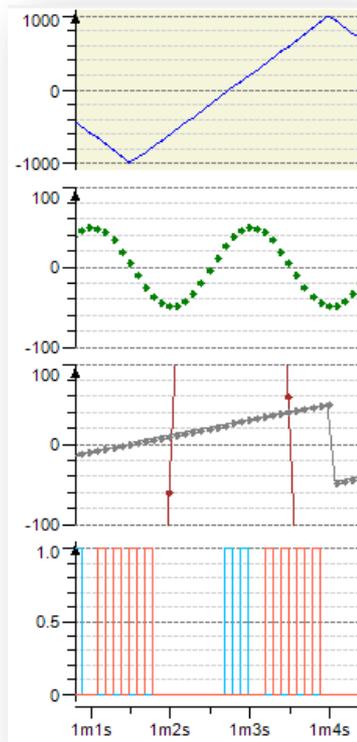
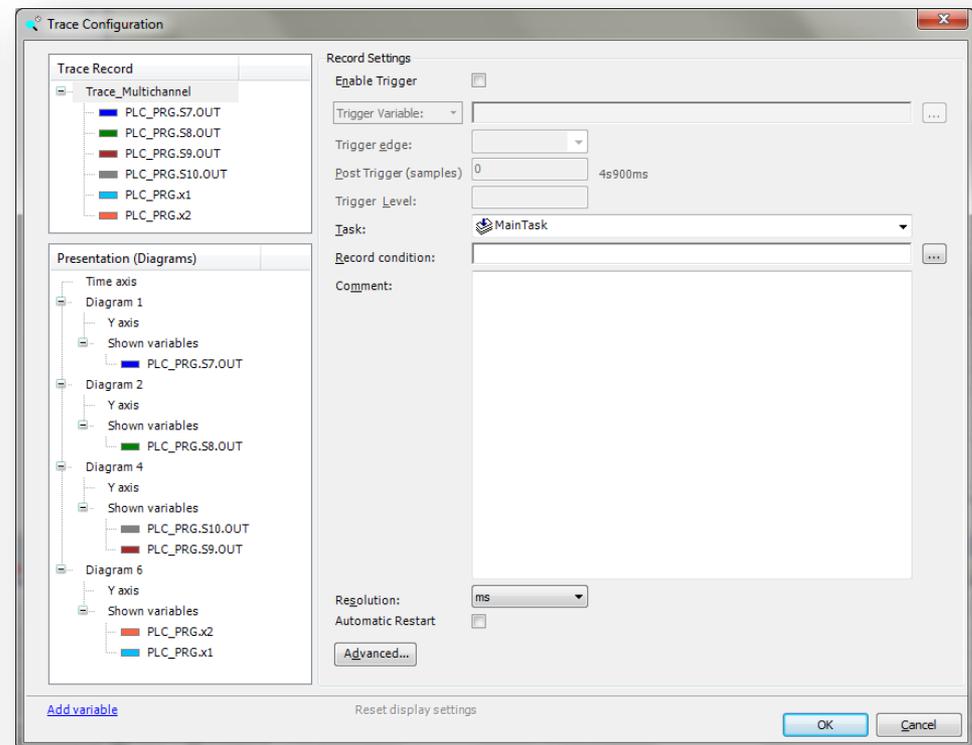


## Touch control

- Scrolling support for visualization elements
  - Frame
  - Tab control
  - Table
  - Combo box
  
- Support of momentum scrolling

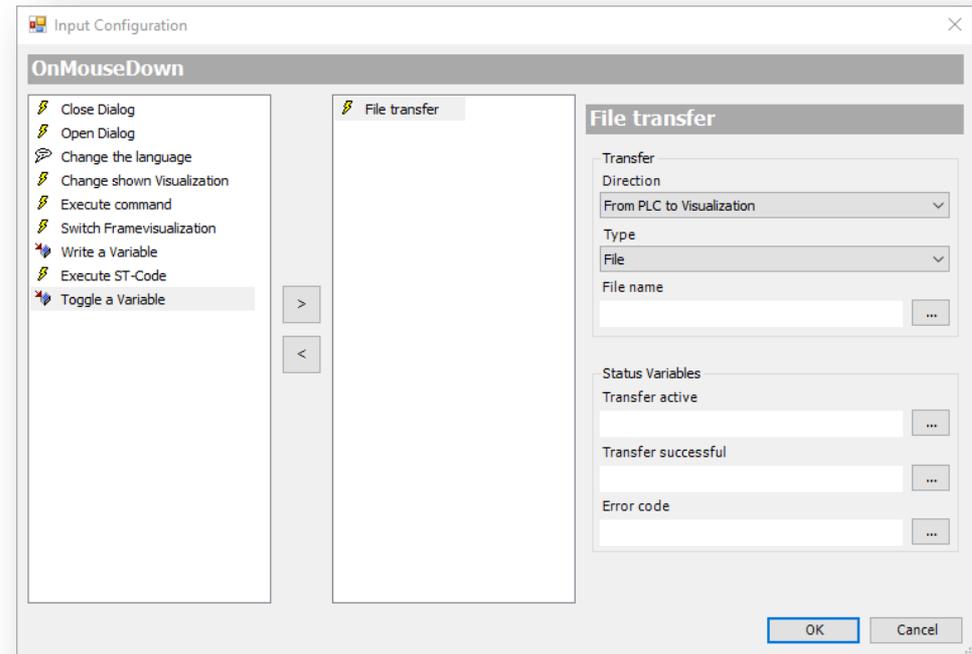
## Trace element

- Free variable distribution on multiple diagrams
  - Multiple diagrams with common time base
  - Multiple variables per diagram

## File transfer

- Transfer of files between PLC and visualization
- Support for remote TargetVisu and WebVisu
- Transfer of streaming data (from application)
- New input element
- New function in *VisuUtils*





## HMI SL

- Automatic renaming of mapped variables in arrays
- MapToExisting/CreateToExisting
  - Automatic change of variable types for sub types
- Offline browsing of symbol data (V2 and V3)
- Display of external traces



## General improvements

- Dialogs
  - Performance improvements for open dialogs
  - Scaling option
  - Opening of dialogs via IEC code (with *VisuUtils* library)
- Offline rotation of elements

## Overview

- Robotics
  - New function blocks
  - Improvements
- SoftMotion CNC





## Robotics

- New function blocks
  - MC\_GroupInterrupt/MC\_GroupContinue
  - MC\_GroupSetOverride
  - MC\_GroupSetPosition
- Improvements
  - New jogging mode (similar to CP orientation interpolation mode "Axis")
  - Performance improvement of low priority planning task



## SoftMotion CNC

- SoftMotion
  - Limit switch supervision by master
- CNC
  - Offline support for SMC\_SmoothMerge
  - AP interface for translation of own G-code dialects

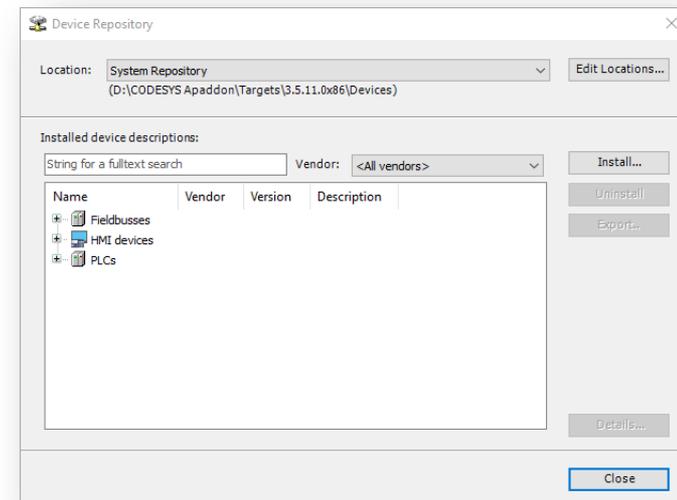
## Overview

- General improvements
- CANopen
- EtherCAT
- EtherNet/IP
- Modbus
- PROFINET



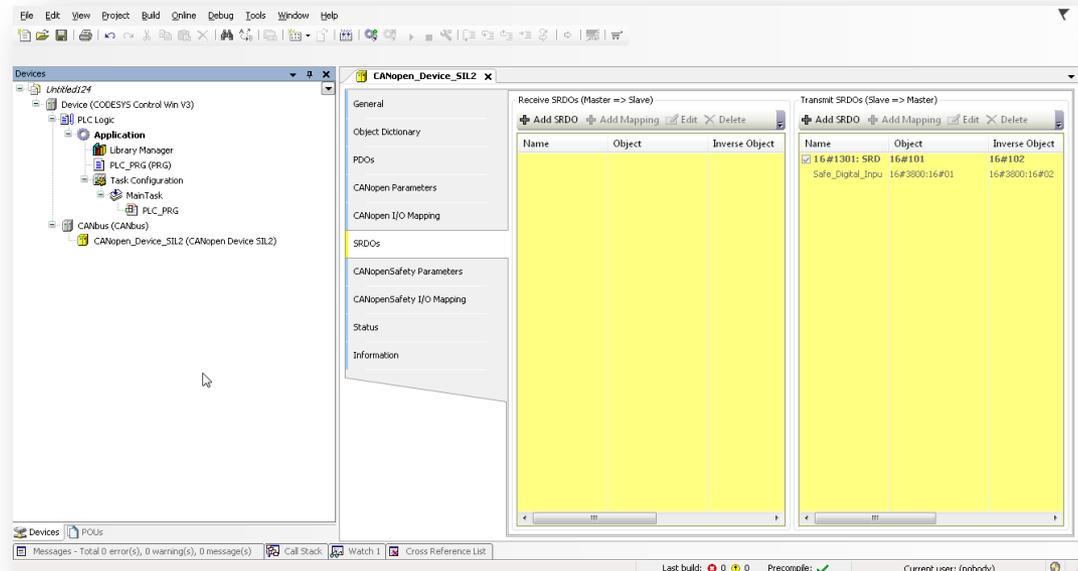
## General improvements

- Search, find and replace support for device configuration
- Search and filter option in device repository dialog
- Reduced initialization code size for task mapping lists
- Improved I/O configuration (when initial value of declaration and default value of configuration are different)



## CANopen

- CANopen Configurator
  - Improved update behavior
  - Evaluation of access rights for objects
  - Reduced code size of SDO list
- CANopen Safety Slave Configurator





## EtherCAT

- Change of modular device profile
  - I/O channels of modular devices (MDPs) located at modules
  - Connection of logical devices as modules  $\Rightarrow$  safety support for MDP devices
- I/O driver
  - AL status codes as text outputs
  - Parallel usage of EtherCAT and PROFINET
  - Elimination of possible priority inversion  $\Rightarrow$  new device description and library needed



## EtherNet/IP

- Support of device scanning
- Performance improvements
  - EtherNet/IP Configurator: insertion of devices in device tree
  - EtherNet/IP Scanner & Adapter: copy of I/O data
- EtherNet/IP Scanner (CIFX): rework of acyclic services



## Modbus

- Modbus Serial Master
  - Support of ASCII mode
- Modbus RTU Device
  - Adaptation of Modbus TCP features
  - Support of bit access functions
  - Data checks

## PROFINET

- Parallel usage of multiple PROFINET controllers or devices
- Support of reconfiguration at runtime
- PROFINET controller
  - Function blocks for scan, read and write of device parameters
  - Function blocks for read and write of identification and maintenance data
- PROFINET/IO-Link
  - Function block for simplified usage of I/O-Link devices
- Diagnostics
  - Function block for analyzing diagnostics data
- Documentation
  - Extended *CommFB* documentation and end user documentation for *ProfinetCommon* library



## Overview

- AS-i Support
  - ⇒ End of sales, care, integration and support (discontinuation - finished)
  
- Support of Windows XP and Windows Vista for
  - CODESYS Automation Platform SDK / CODESYS Development System
  - CODESYS OPC Server
  - CODESYS Gateway
  - CODESYS HMI
  - CODESYS Control Win
  - CODESYS RTE / CODESYS SoftMotion RTE
  - CODESYS RTE / CODESYS SoftMotion RTE (for Beckhoff CX)
  - ⇒ End of support (discontinuation - finished)



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