TIA Portal V15

Technical Slides

www.siemens.de/tia-portal

TIA Portal – Highlights of TIA Portal V15

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Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink: Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

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Hardware Configuration – CPU 1518(F)-4 PN/DP MFP – Configuration of multifunctional platform

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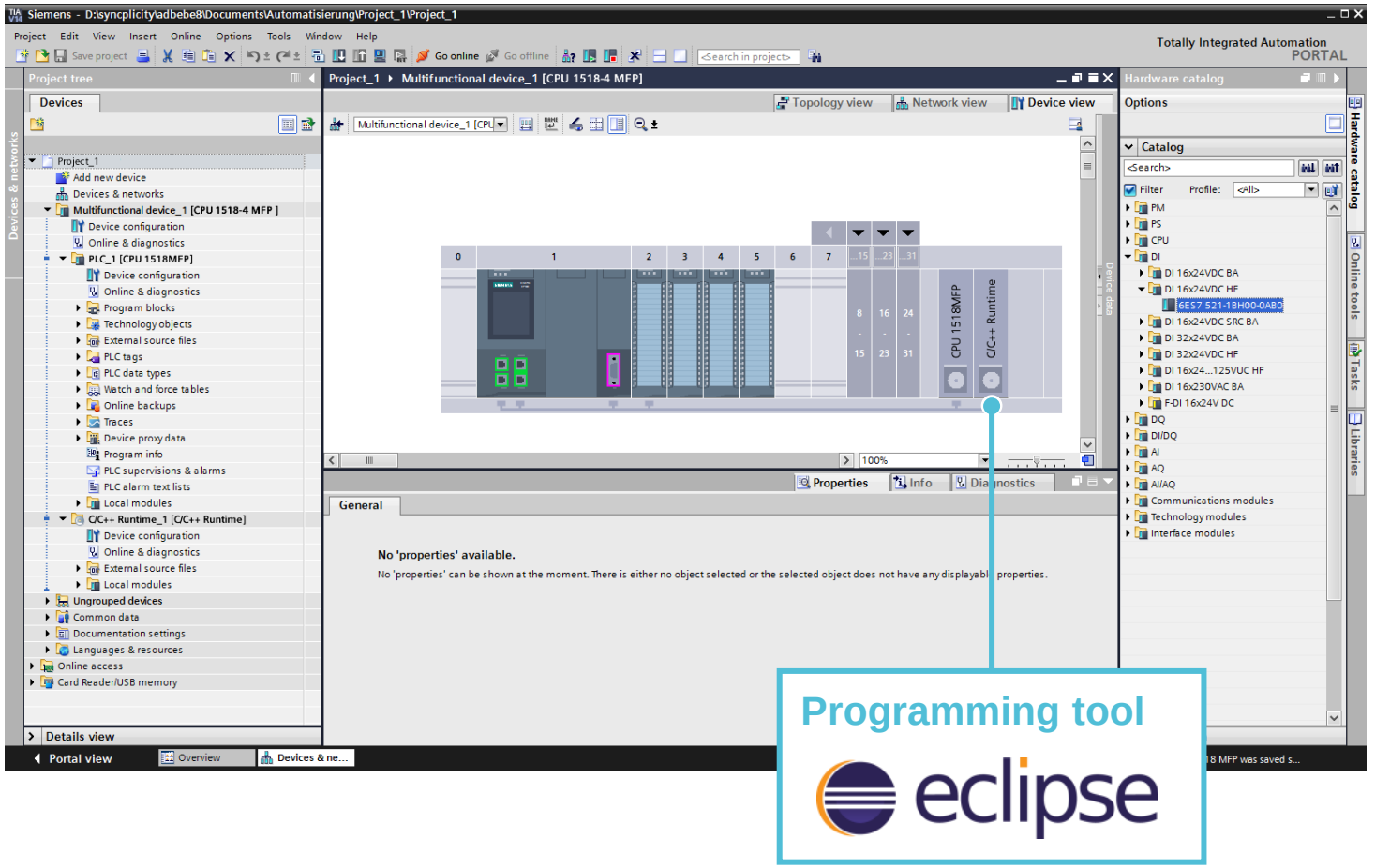
High End CPU 1518(F)-4 PN/DP MFP

- Performance of CPU 1518
- Independent runtime environment for C/C++ code on the CPU
- Reuse of existing technological know-how in C/C++ code: **Synchronously and asynchronously** with the STEP 7 program
- Automatic generation of PLC code from Simulink® models via Target 1500S

Application area

Merging of IPC and PLC in an MFP → Reduced space requirement, robustness



Hardware Configuration – CPU 1518(F)-4 PN/DP MFP – Classification of multifunctional platform

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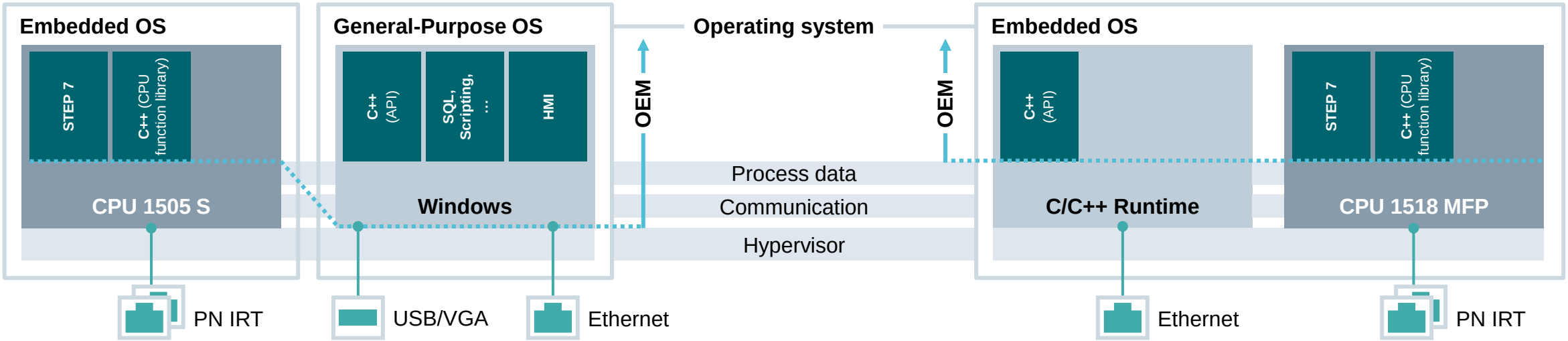
IPC, Open Controller: Open for Windows applications

- No restriction in operating system (OS) concerning HMI, applications, drivers, …
- Standard PC interfaces (USB, VGA, PCI, …)
- Hardware replacement with operating system image
- But: Update and maintenance of OS (Microsoft Security Updates, Patches) by OEM

CPU 1518 MFP: Robust for embedded applications

- Preconfigured embedded operating system with stable programming interface (API)
- Typical controller interfaces
- Hardware replacement without engineering
- OS support on Siemens side incl. security updates



Hardware Configuration – Overview of SIMATIC S7-1500 – The right CPU for every application

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	Compact CPUs				Standard-CPUs				Technology CPUs				MFP
CPU types	**1511C-1 PN**	**1512C-1 PN**	**1511F-1 PN**	**1513F-1 PN**	**1515F-2 PN**	**1516F-3 PN/DP**	**1517F-3 PN/DP**	**1518F-4 PN/DP**	**1511TF-1 PN**	**1515TF-2 PN**	**1516TF-3 PN/DP**	**1517TF-3 PN/DP**	**1518F-4 PN/DP MFP**
Interfaces	1 1	1 1	1 1	1 1	1 2 1	1 2 1	1 2 1	1 2 1 3	1 1	1 2 1	1 2 1	1 2 1	1 2 1 3
Program/ data storage	175 KB 1 MB	250 KB 1 MB	150/ 225 KB 1 MB	300/ 450 KB 1.5 MB	500/ 750 KB 3 MB	1/ 1.5 MB 5 MB	2/3 MB 8 MB	4/6 MB 20 MB	225/ 225 KB 1 MB	750/ 750 KB 3 MB	1.5/ 1.5 MB 5 MB	3/3 MB 8 MB	4/6 MB 20 MB 50 MB[1]
Bit-performance	60 ns	48 ns	60 ns	40 ns	30 ns	10 ns	2 ns	1 ns	60 ns	30 ns	10 ns	2 ns	1 ns
Max. number of connections	96	128	96	128	192	256	320	384	96	192	256	320	384
Positioning axes													
• **Typical[2]**	5	5	5	5	7	7	70	128	5	7	65	70	128
• **Maximum[2]**	10	10	10	10	30	30	128	128	10	30	80	128	128
Width	85 mm	110 mm	35 mm	35 mm	70 mm	70 mm	175 mm	175 mm	35 mm	70 mm	175 mm	175 mm	175 mm
											New		New

1 Additional 50 MB memory for ODK applications; **2** For 4ms Servo/IPO cycle

Hardware Configuration – Hardware detection of PROFINET IO devices

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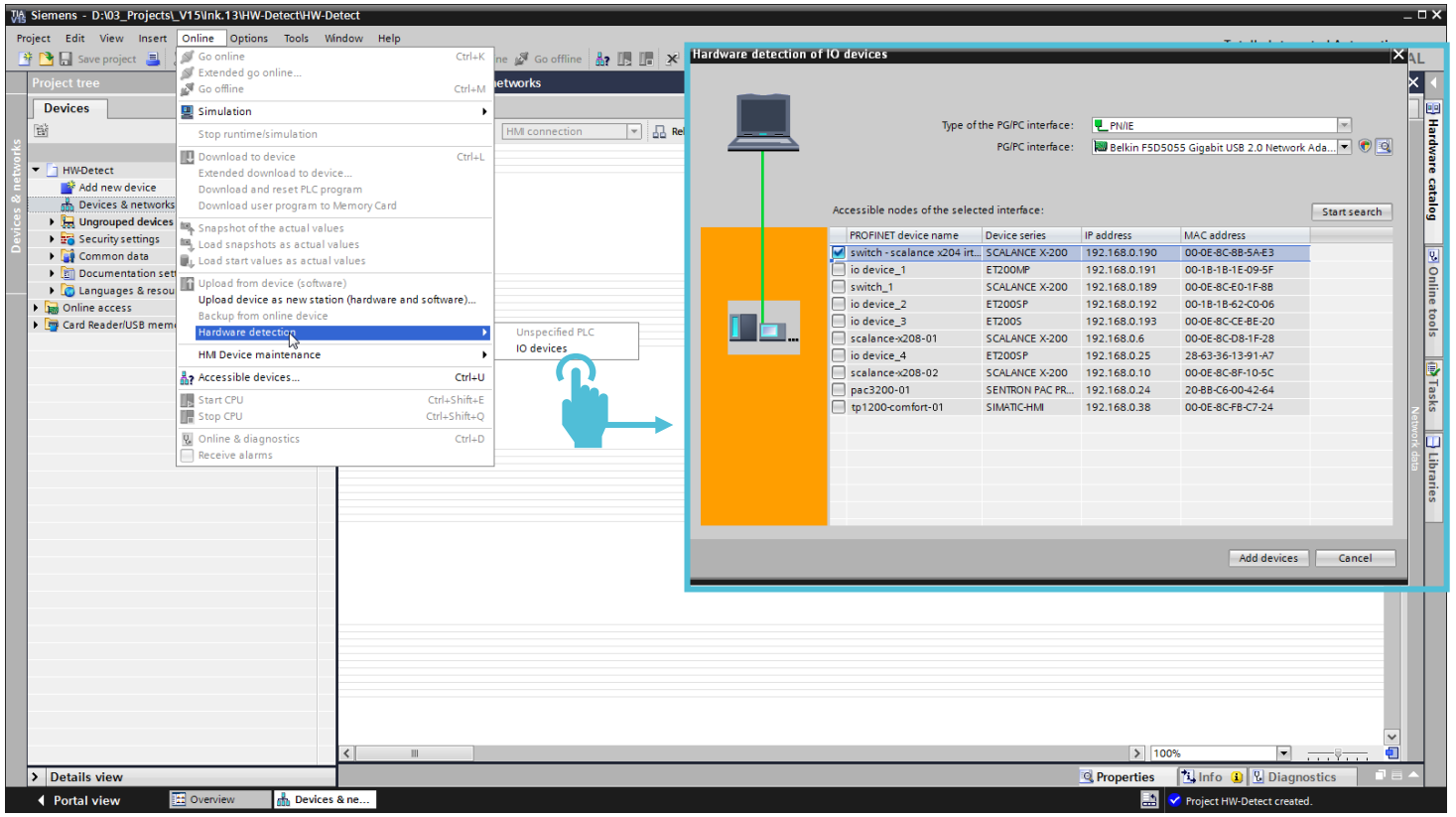
Hardware detection of PROFINET IO devices

- Time savings through automatic detection of IO devices
- Instead of manual configuration from the hardware catalog, insertion of IO devices including modules from the system/machine in the project by means of **hardware detection**



Hardware Configuration
Default-Gateway for IO-Devices separate from IO-Controller

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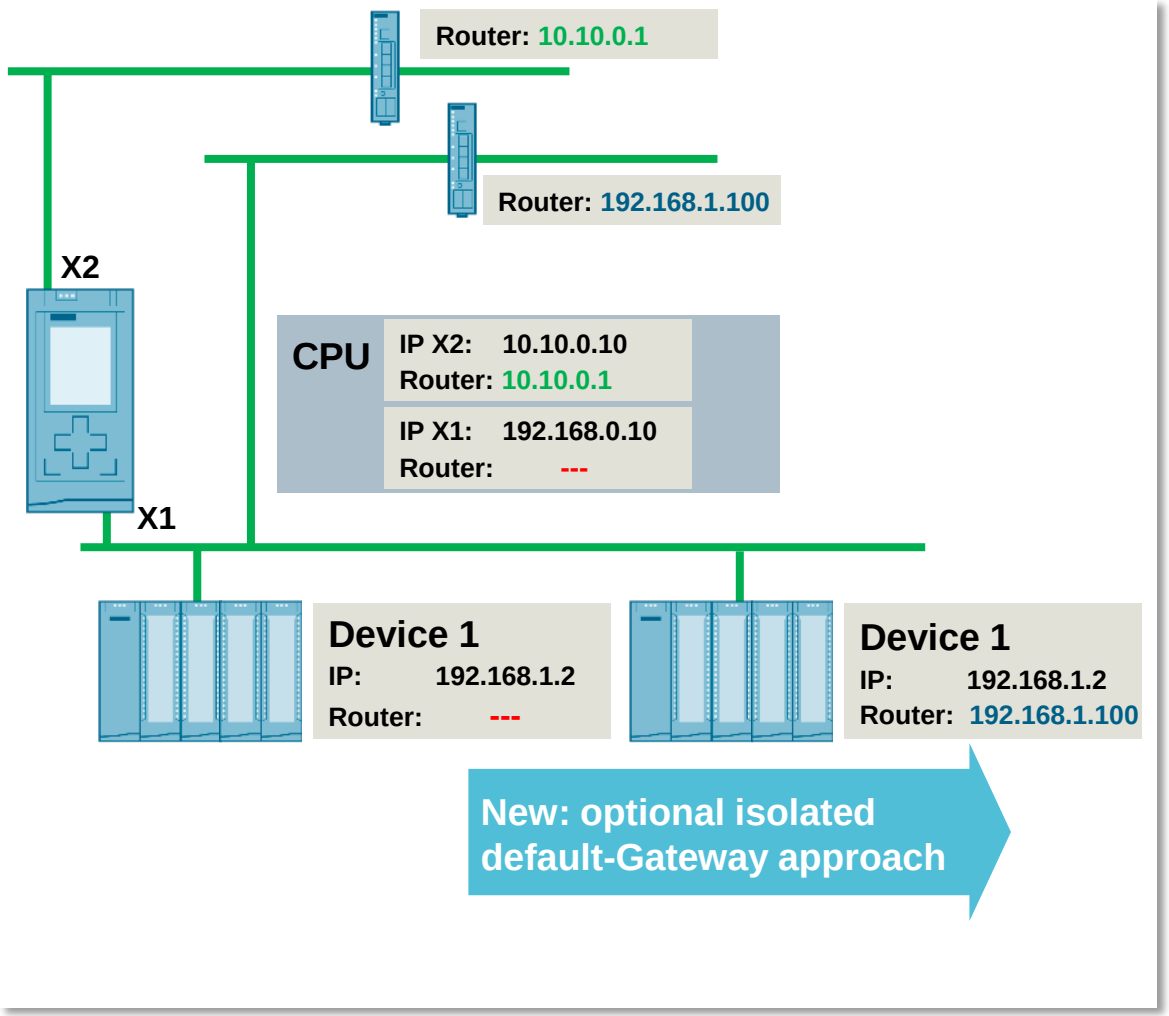
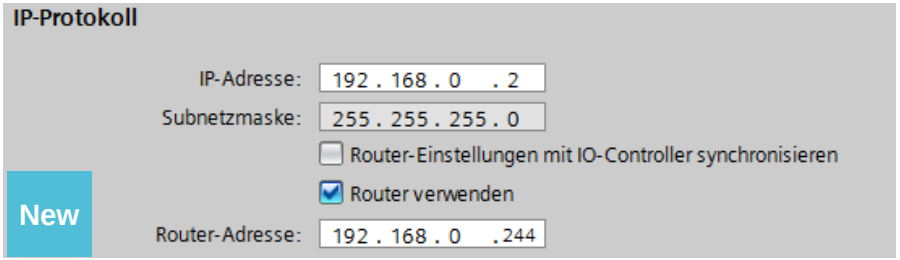


Default-Gateway for devices

- Default-Gateway of devices is derived from the controller:
  A default gateway can be used for the interface of CPU (here X1).

New

Each device can (optional) have their one default-gateway.



Area of operations

Isolated integration of devices for remote access, e.g. for diagnosis.

Hardware Configuration – “Go to device view” for tags in the PLC tag table

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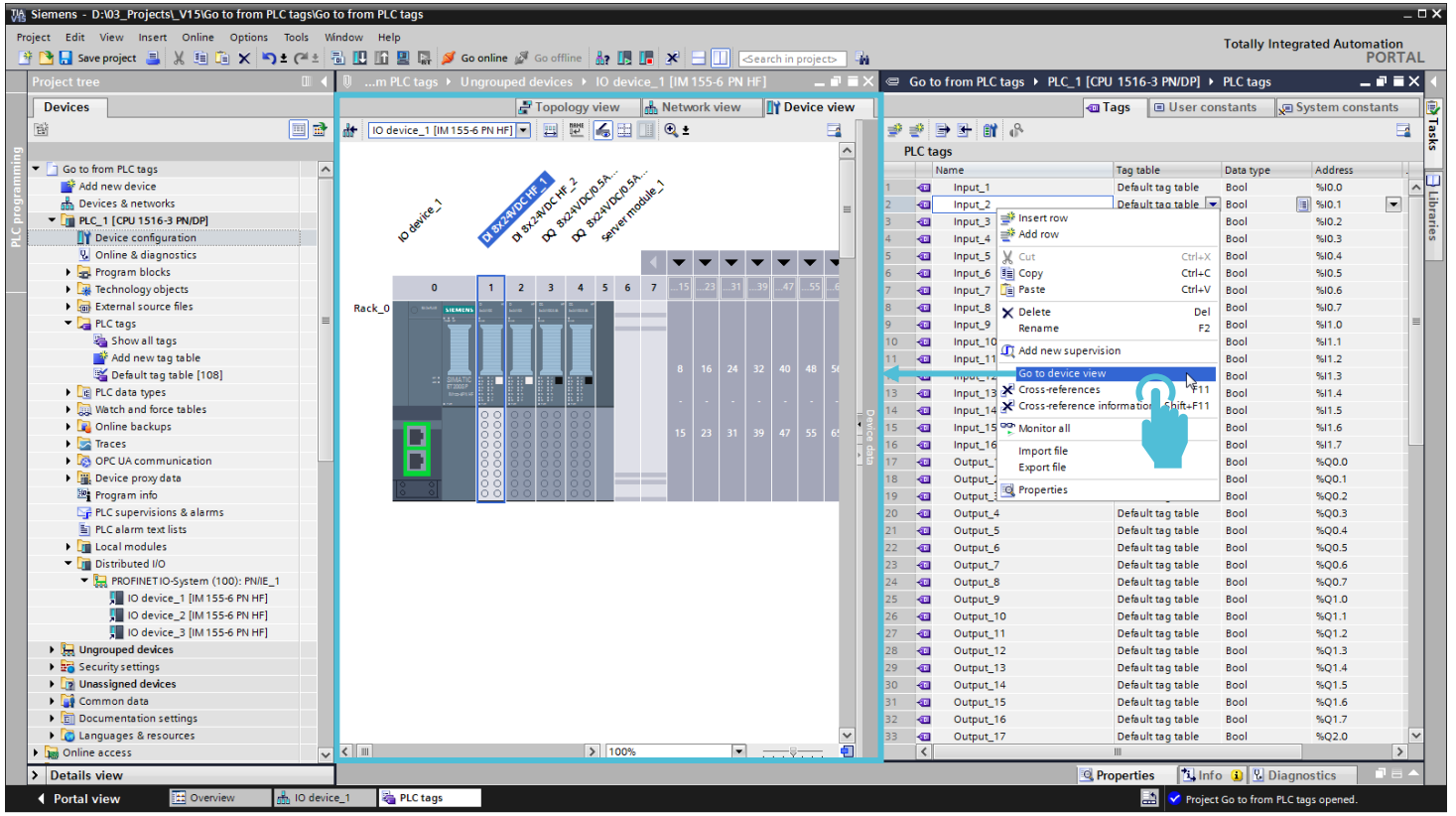
Go to device view of tags from the PLC tag table

Rapid locating of hardware associated with the tag using the **“Go to device view”** function in the PLC tag table



Hardware Configuration – Layout function for network and topology view

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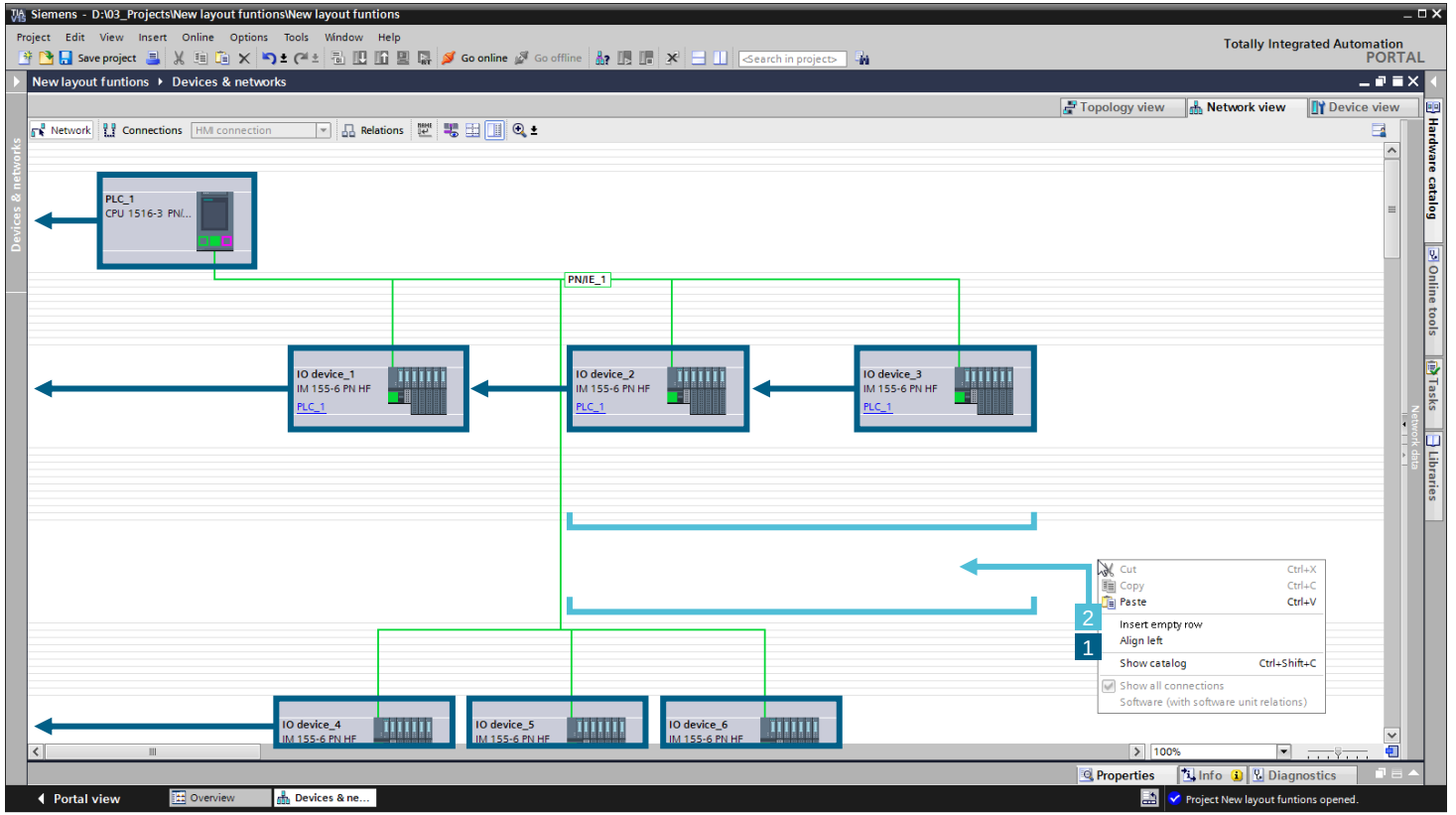
Layout functions for network and topology view

- Layout adjustment based on left-justified alignment of all devices via the context menu (1)
- Simple expansion of project by inserting an empty row via the context menu (2)



Hardware Configuration – Innovated alarm display with filter function

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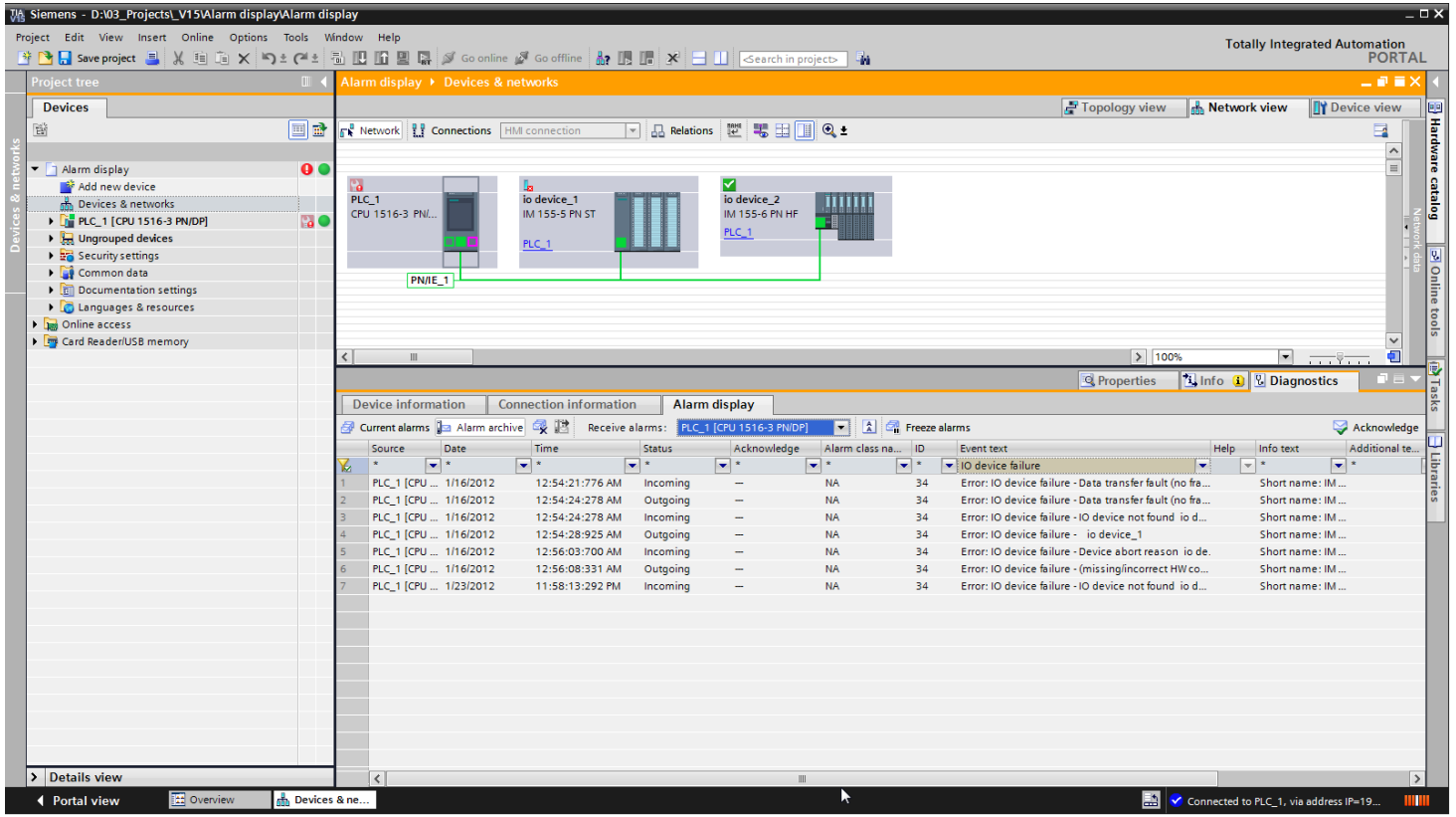
Optimized alarm display user interface with filter function

Rapid locating of alarms in the alarm display with new filter function and optimized user interface



Hardware Configuration – Consistent display of HW identifiers in the device properties

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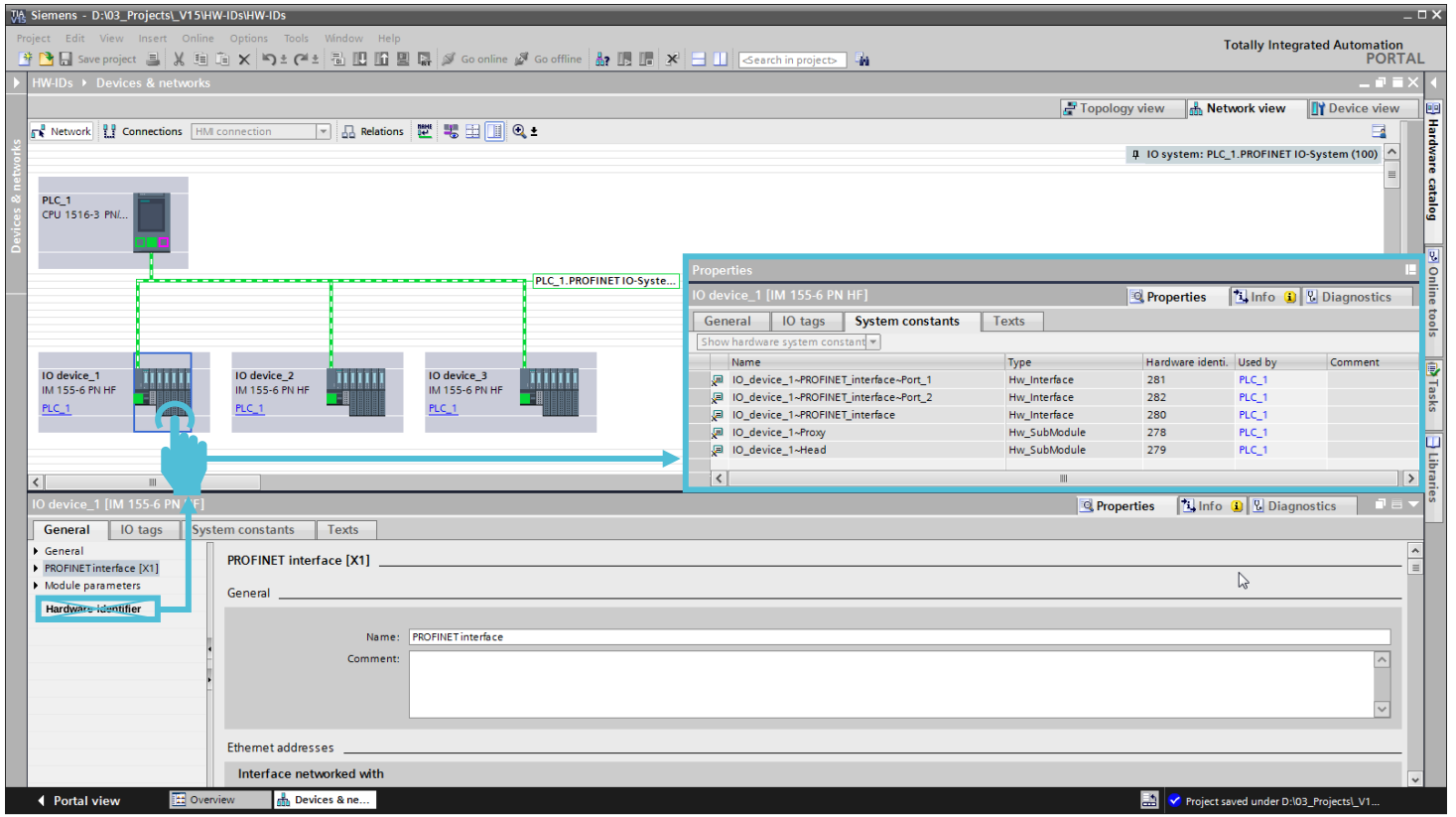
Consistent display of system constants in the device properties

- All hardware IDs are now shown consistently on the “Properties” > “System constants” tab
- Filtering of system constants on the basis of the selected objects in the graphic view (station, IO device, interface, etc.)



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STEP 7 Innovations – Breakpoints on the CPU S7-1500

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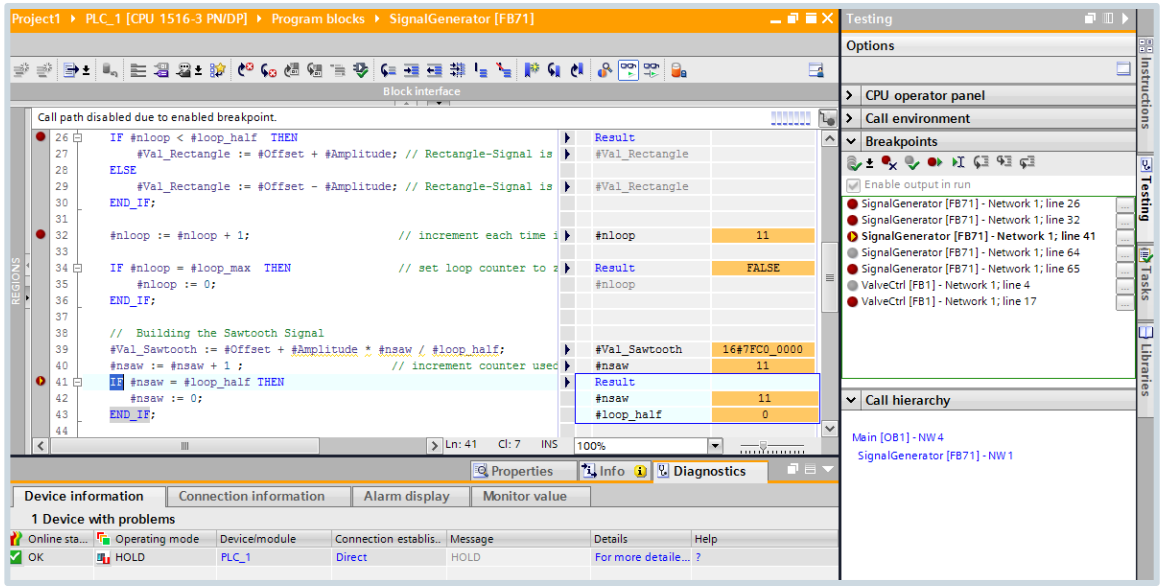
S7-1500 ✓ | S7-1200 ✗ | S7-300/400/WinAC ✓

Function

- Setting of breakpoints in SCL/STL programs (also possible in mixed LAD/FBD blocks)
- Maximum number of active breakpoints per CPU:
  - ≤CPU 1516/CPU 1515SP PC: 8
  - ≥CPU 1517/CPU 1507S/S7-PLCSIM: 20
- From firmware version V2.5 of CPU S7-1500

Customer benefits

- Testing of SCL and STL program code with the aid of breakpoints
- Step-by-step isolation of errors
- Simple and fast analysis of complex programs in the office **before** actual startup



When a breakpoint is reached, the CPU enters **hold** mode

STEP 7 Innovations – Motion control – Kinematics for handling tasks 1/2

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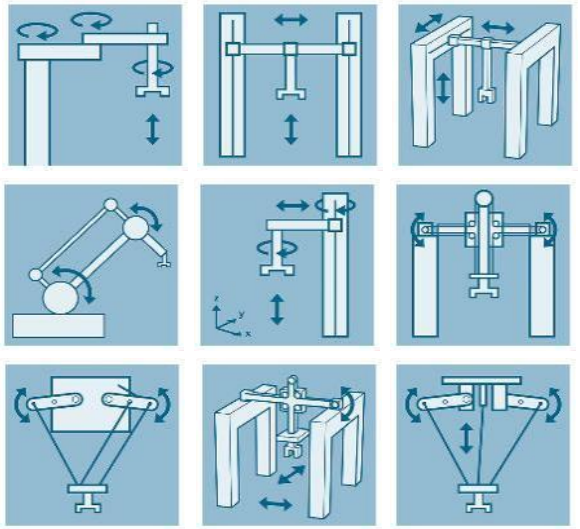
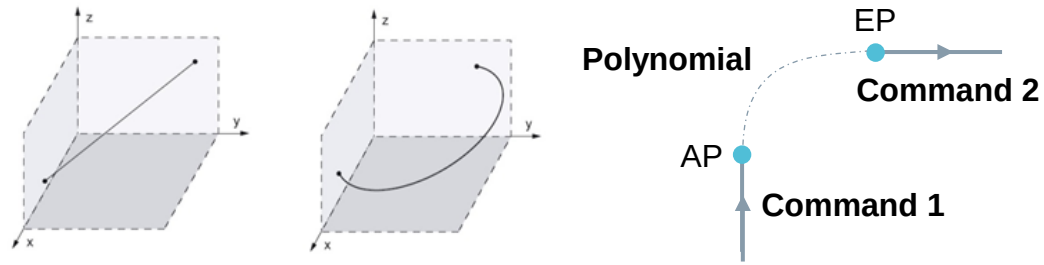
S7-1500T ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

- Technology object kinematics (TO kinematics) for simple interconnection of positioning axes to form a **kinematic unit**
- Predefined 4D kinematics for simple use of standard kinematics (SCARA, Portal, Articulated Arm, Roll Picker, Delta Picker, Cylindrical Robot, Tripod)
- User transformation as function block for integrating user-defined kinematics



- 4D interpolation, linear and circular movement with geometric blending including **orientation guidance** (e.g. rotation of the gripper)
- **Motion queue programming** for advance motion processing with dynamic adaptation



STEP 7 Innovations – Motion control – Kinematics for handling tasks 2/2

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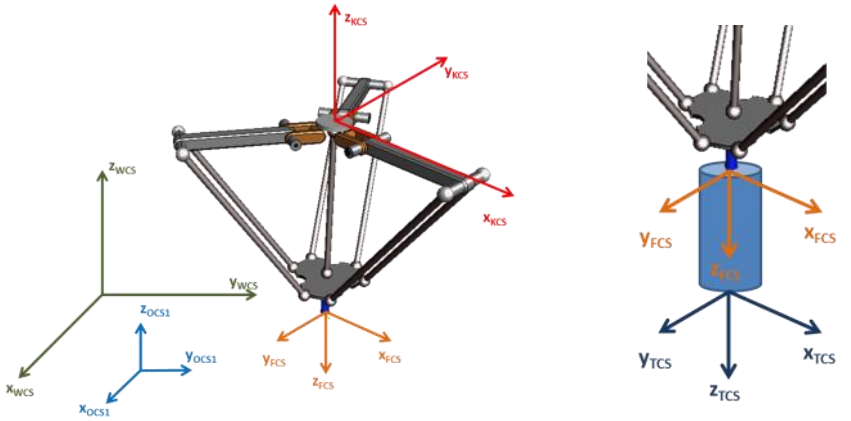
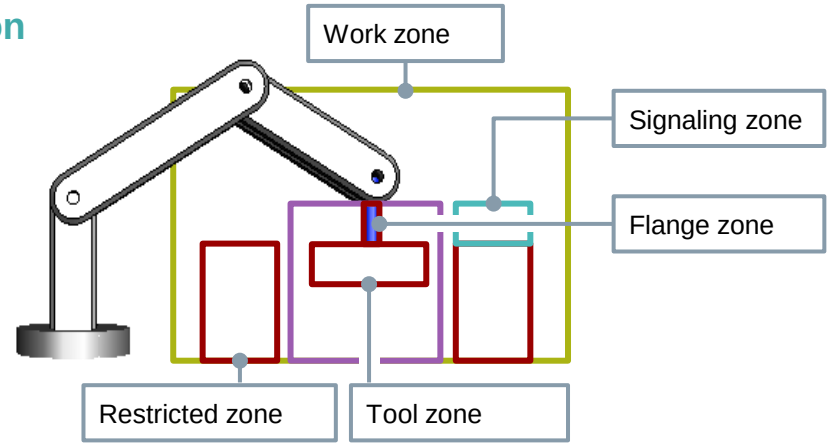
- Different coordinate systems for describing the position of kinematics and objects in the work zone
- Tool frame to allow for expansion of the tool (description of the position of the tool relative to the flange)



- Avoidance of mechanical kinematics parts (flange, tool) colliding with installations in the work zone
- Signaling zone for triggering actions (e.g. open/close gripper) depending on the spatial position of the tool and/or flange

Zone supervision



STEP 7 Language Innovations – References 1/2

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S7-1500[1] ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

References – Pointer to tags of the same data type

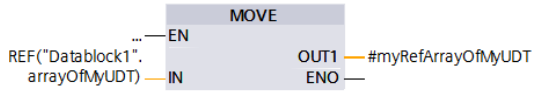
- REF_TO: Declaration of references in FCs and FBs[2] to a specific data type[3]
- REF(<tag>): Creates a reference to a tag/array of the same data type. Prerequisite: Referenced tag is in an optimized storage area
- <Reference>^ : Access to the value of the referenced tag
- Assignment attempt (?=): Assign reference to a parameter of data type VARIANT
- Comparison with NULL to check whether a reference is assigned to a tag

Declare references

myReferences

		Name	Data type
4		Static	
5		Temp	
6		myRefByte	REF_TO Byte
7		myRefInt	REF_TO Int
8		myRefLReal	REF_TO LReal
9		myRefString	REF_TO String
10		myRefDateTime	REF_TO Date_And_Time
11		myRefType	REF_TO "myUDT"
12		myRefArrayOfMyUDT	REF_TO Array[0..3] of "myUDT"

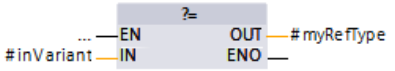
Reference



Dereference

Transfer reference as parameter

Assignment attempt



1 From FW2.5

2 Permitted sections in FCs: In, Out, Temp, Return; permitted sections in FBs: Temp; Array_Of References is not permitted; 3 UDTs, SDTs, basic data types with the exception of bools

STEP 7 Language Innovations – References 2/2

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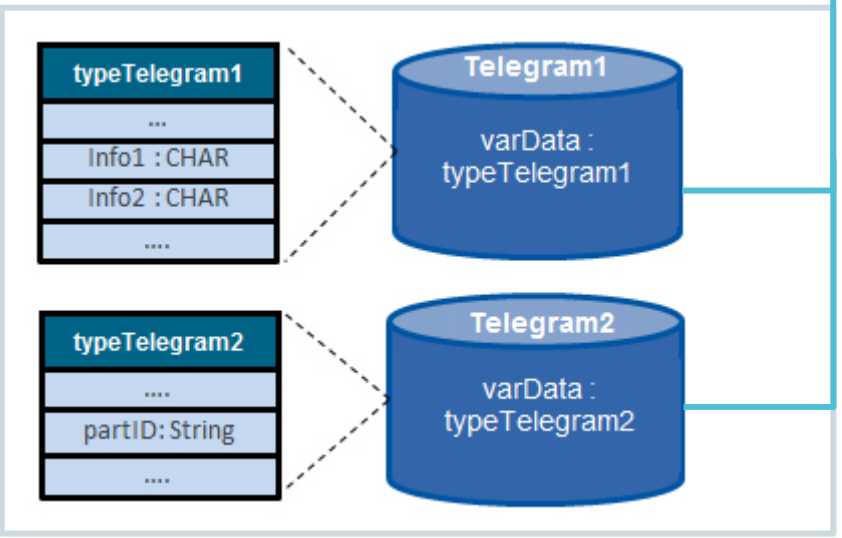
S7-1500 ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

Sample application

- Generic access to different data records
- Fully symbolic access to referenced tags without prior recopying to intermediate tag



Example without references

	Name	Data type
1	Input	
2	Output	
3	InOut	
4	telegram	Variant
5	Static	
6	Temp	
7	tempTelegram1	"typeTelegram1"
8	tempTelegram2	"typeTelegram2"
9	Constant	

```
1
2  CASE TypeOf(#telegram) OF
3    typeTelegram1:
4      VariantGet(SRC := #telegram,    // copy data to "Temp"
5                 DST => #tempTelegram1);
6
7      #tempTelegram1.Info1 := 'T';
8      #tempTelegram1.Info2 := 'W';
9
10     VariantPut(SRC := #tempTelegram1,// copy back to "Inout"
11                DST := #telegram);
12
13   typeTelegram2:
14     VariantGet(SRC := #telegram,    // copy data to "Temp"
15                DST => #tempTelegram2);
16
17     #tempTelegram2.partID := 'RE2346';
18
19     VariantPut(SRC := #tempTelegram2,// copy back to "Inout"
20                DST := #telegram);
21 END_CASE;
```

Example with references

	Name	Data type
1	Input	
2	Output	
3	InOut	
4	telegram	Variant
5	Static	
6	Temp	
7	refTelegram1	REF_TO "typeTelegram1"
8	refTelegram2	REF_TO "typeTelegram2"
9	Constant	

```
1
2  CASE TypeOf(#telegram) OF
3    typeTelegram1:
4      #refTelegram1 ?= #telegram;   // AssignmentAttempt
5      #refTelegram1^.Info1 := 'T';  // Dereference by using
6      #refTelegram1^.Info2 := 'W';  // a succeeding caret ^
7
8    typeTelegram2:
9      #refTelegram2 ?= #telegram;  // AssignmentAttempt
10     #refTelegram2^.partID:='RE2346';
11 END_CASE;
12
```

STEP 7 Language Innovations – New statements – FileReadC/FileWriteC

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S7-1500 ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

Function

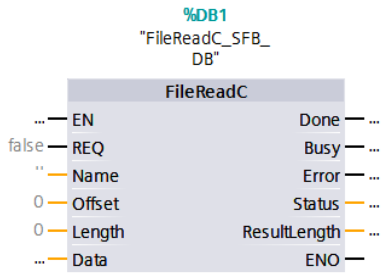
- Read data from an ASCII file from the SIMATIC memory card
- Write data to an ASCII file on the SIMATIC memory card

Customer benefits

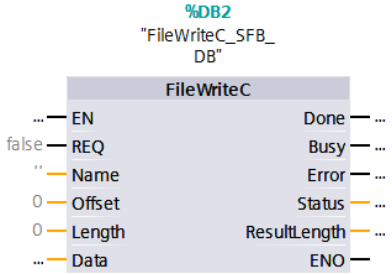
Complex file structures are used in free ASCII format on the SIMATIC memory card, for example to

- Import recipes in cases where CSV is not flexible enough
- Import complex parameterizations or configuration files
- Output complex files for documentation

FileReadC



FileWriteC



STEP 7 Language Innovations – New statements for PID control

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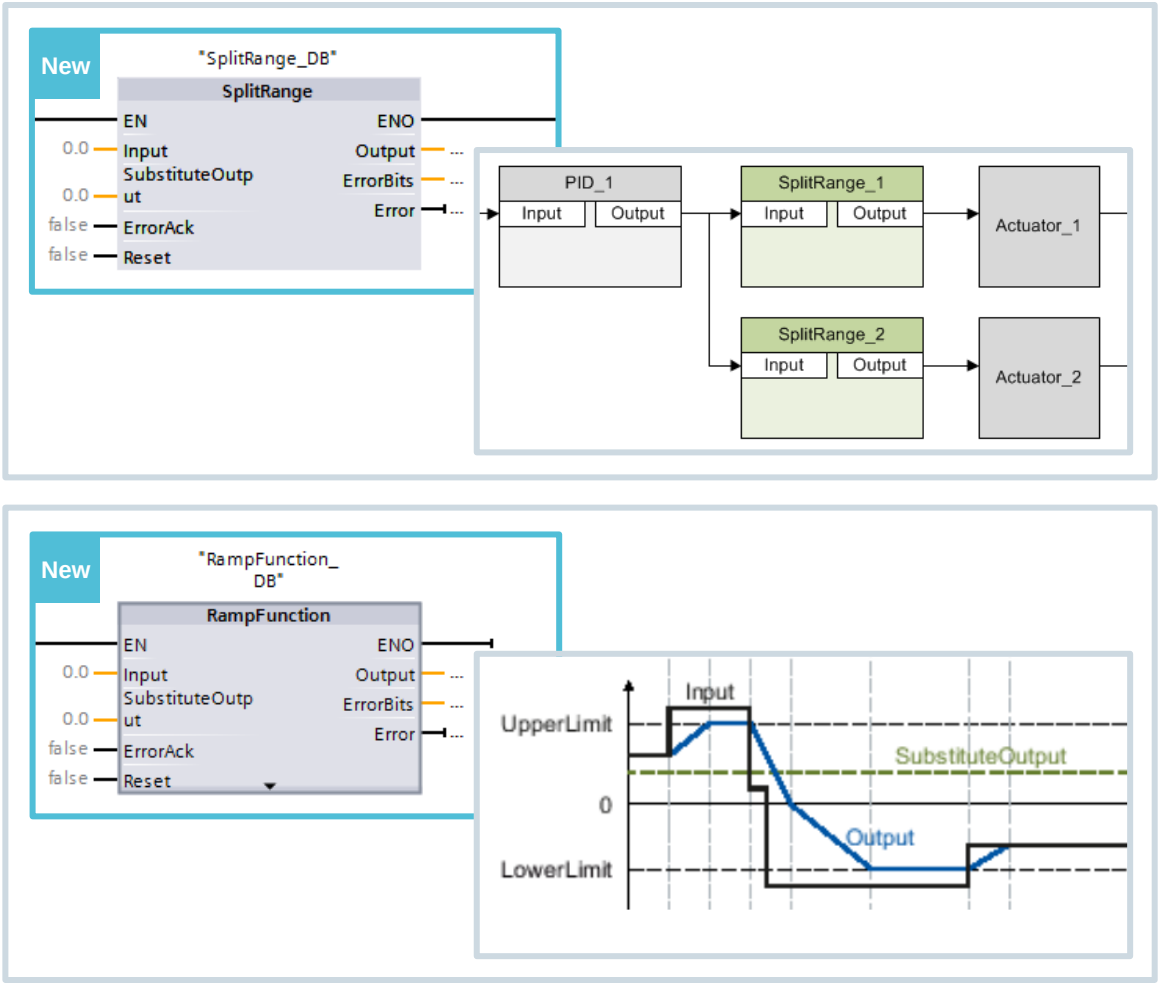
S7-1500[1] ✓ S7-1200[2] ✓ S7-300/400/WinAC ✗

Function

- **SplitRange**
  - Distribution of the controller actuating variable to a number of actuators
- **RampFunction**
  - Limiting the rate of change and the limit values of a signal
  - Different gradients for positive/ negative/rising/falling signals

Customer benefits

- Less effort for programming regulations and controls
- Simpler transfer of applications with modular PID control



1 From FW2.0 for S7-1500; **2** From FW4.2 for S7-1200

STEP 7 Language Innovations – New statements – EQ_TypeOfDB (TypeOfDB in SCL)

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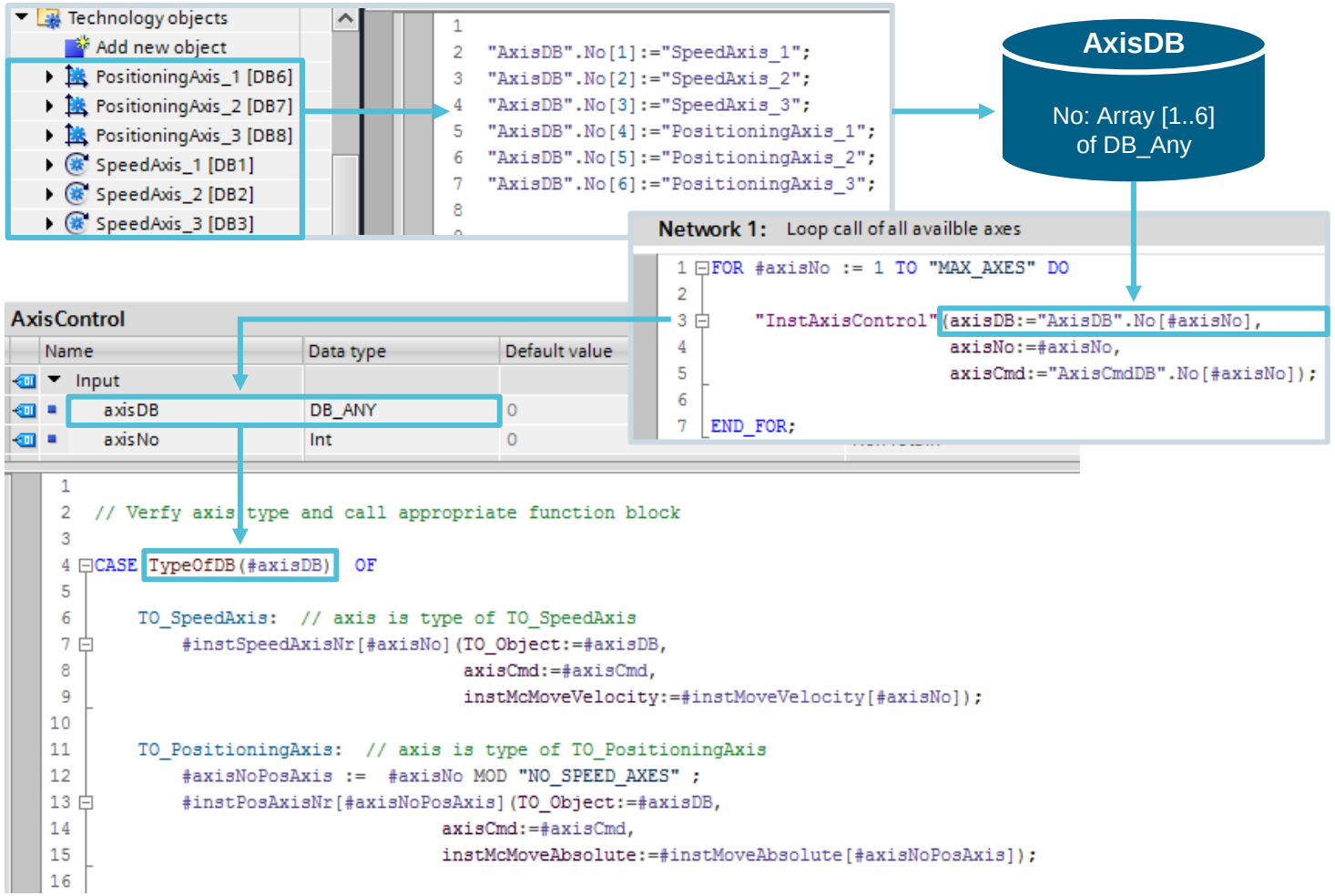
S7-1500[1] ✓ | S7-1200[2] ✓ | S7-300/400/WinAC ✗

Function

- EQ_TypeOfDB data block can be used to establish the data type of a data block, which can be addressed via a DB_Any tag
- The statement compares a DB_Any tag with a specific data type (UDT, SDT, TO axes) or with a different instance tag

Sample application

Creation of generic functions for handling different DB types, for example DBs for speed and positioning axes



1 From FW2.0 ; **2** From FW4.2

STEP 7 Language Innovations – New statements – Scatter/Gather

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Ingenuity for life

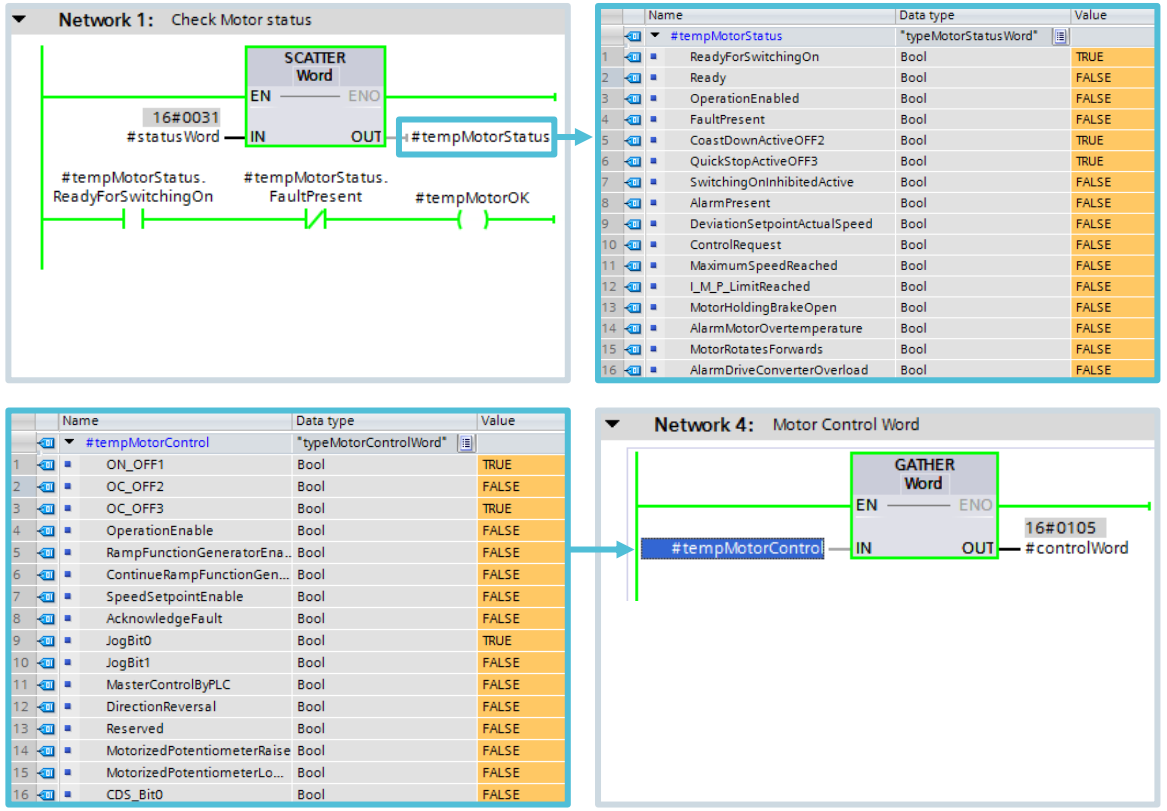
S7-1500[1] ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

Convert data for further processing

- SCATTER decomposes bit sequences (Byte, Word, etc.) into a bit array
- GATHER assembles a bit array to form a bit sequence
- SCATTER_BLK/GATHER_BLK for decomposing/assembling bit
- **Support for STRUCT and PLC data types with exclusively boolean elements** — New in V15

Sample application

Decompose, process or also simply assemble control and status words



1 From FW2.1

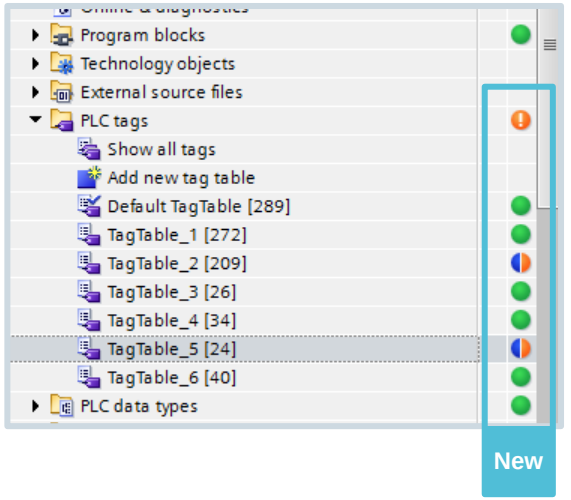
STEP 7 Innovations – Download/upload for PLC tag tables

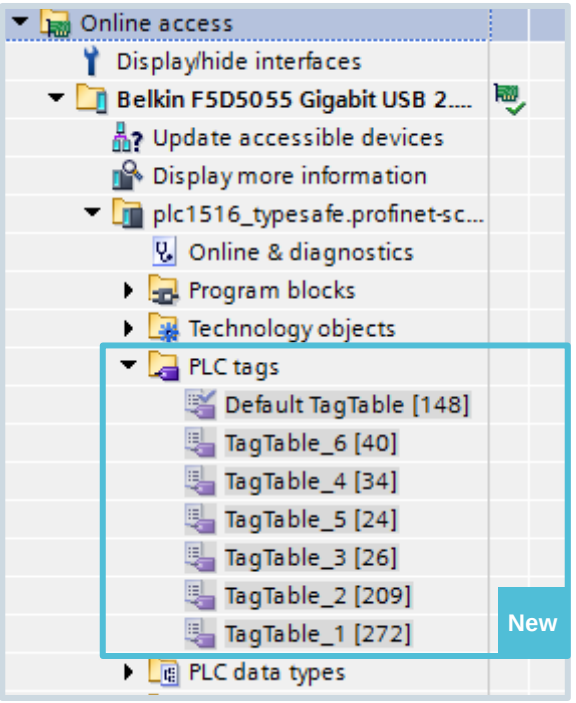
SIEMENS
Ingenuity for life

S7-1500 ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

Function

- Download PLC tag tables to the CPU
- Display PLC tag tables also under “Accessible devices” and on the memory card (incl. opening)
- Online status at **granular tag level**
- Uploading of individual or all PLC tag tables into the predefined structure





Customer benefits

- Tracking of changes done by other user on the CPU
- Quick overview of the online status of the CPU
- Improved team engineering on the CPU

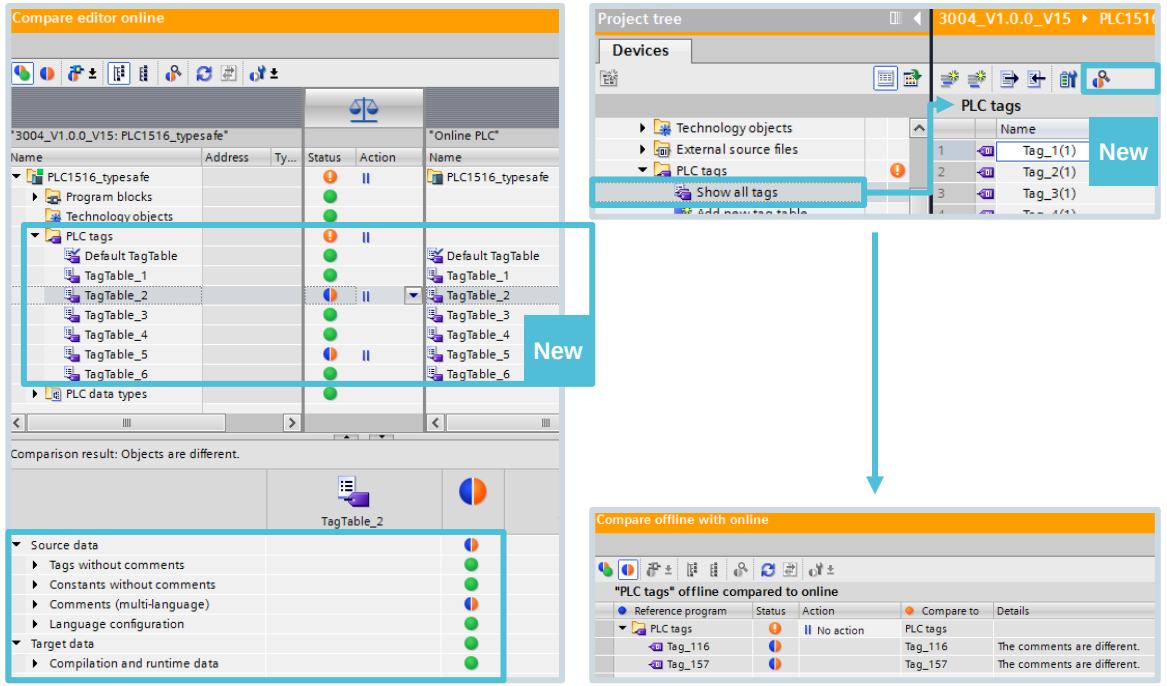
STEP 7 Innovations – Online/offline comparison for PLC tag tables

SIEMENS
Ingenuity for life

S7-1500 ✓ | S7-1200 ✗ | S7-300/400/WinAC ✗

Function

- Online/offline comparison at tag table level
- Detailed comparison for individual PLC tag tables
- Detailed comparison for all tags
- Checksum-based comparison for
  - Tags
  - Constants
  - Comments
  - Language configuration



Customer benefits

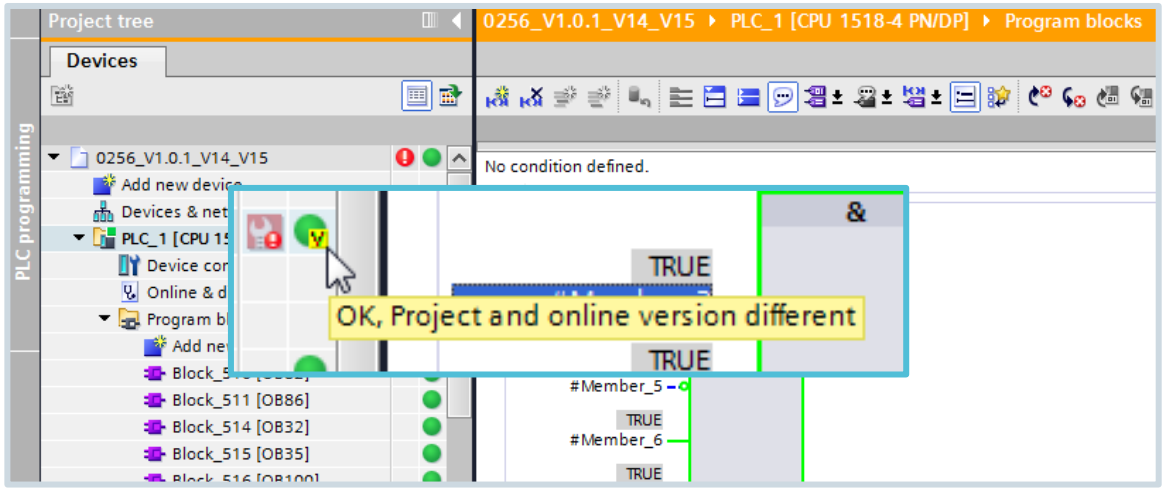
Complete overview of all online/offline information

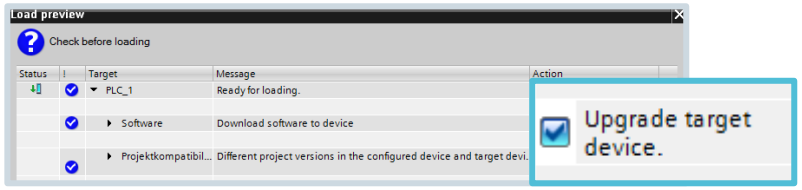
STEP 7 Innovations – Online compatibility

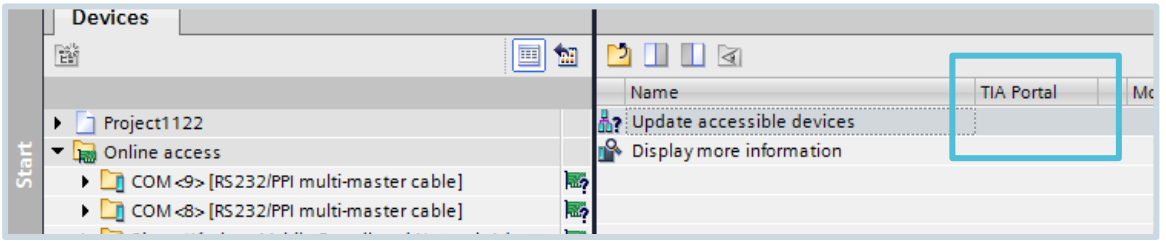
SIEMENS
Ingenuity for life

Function

- All online functions (e.g. block supervision, online/offline comparison, ...) directly after upgrading the project
- Display of project version in the life list (details)
- Upgrading of online CPU in **run**
  - For software changes
  - Only if no F program is available
  - Complete download in **run** since all blocks have to be “upgraded”
- Precondition: CPU was loaded with STEP 7 V14 or higher







Customer benefits

- No system downtime following project upgrade
- Troubleshooting possible during operation with new TIA Portal version

STEP 7 Innovations – Local processing of project texts

SIEMENS
Ingenuity for life

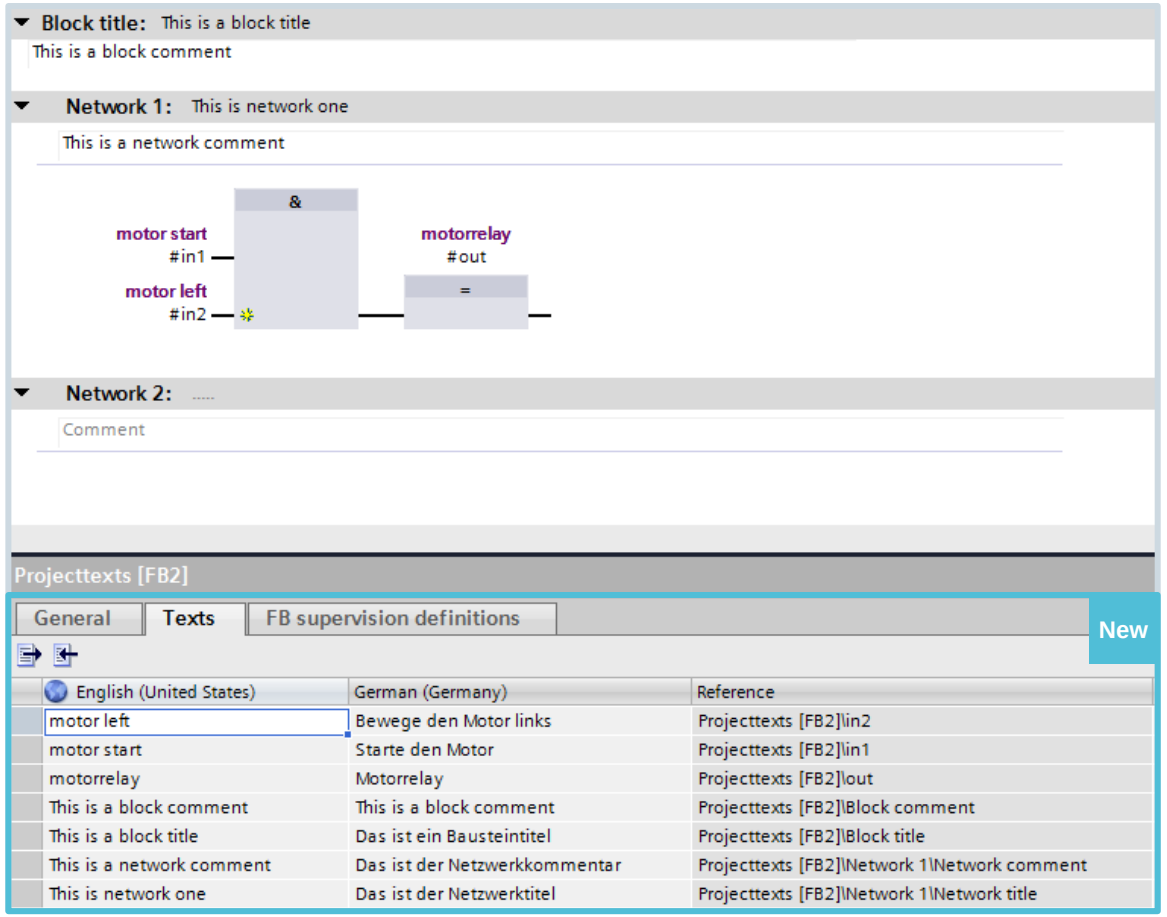
S7-1500 ✓ S7-1200 ✓ S7-300/400/WinAC ✓

Function

- Display and editing of multilingual comments
- Supported editors
  - PLC tag table
  - Programming editors
  - Data blocks
  - PLC data types
- Context-sensitive text display
- Import/export displayed texts with .xlsx file

Customer benefits

Context-related translation of project texts



STEP 7 Innovations – Mathematics functions for trace

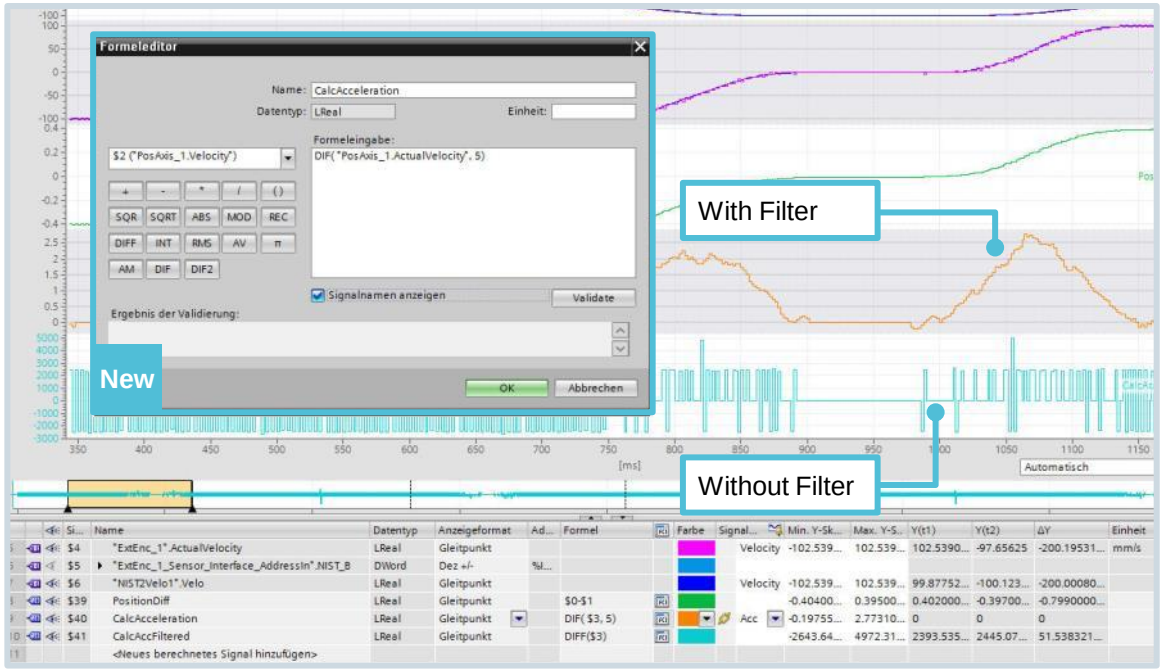
SIEMENS
Ingenuity for life

Function

- Calculation of new signals from the recorded signals based on mathematical formulas
- Fundamental arithmetic operations
- Amount, root, square, 1/X, modulo
- Integral, differentiation
- Various filter functions
- Calculation of mean value, effective value, integral in the range of the measuring cursor

Customer benefits

- Generation of unavailable information
- Subsequent preparation of measurements
- Measurement of signal paths (e.g. mean value)



STEP 7 Innovations – PLCSIM V15 – Slider for analog values and pushbutton for boolean values

SIEMENS
Ingenuity for life

Slider for analog values

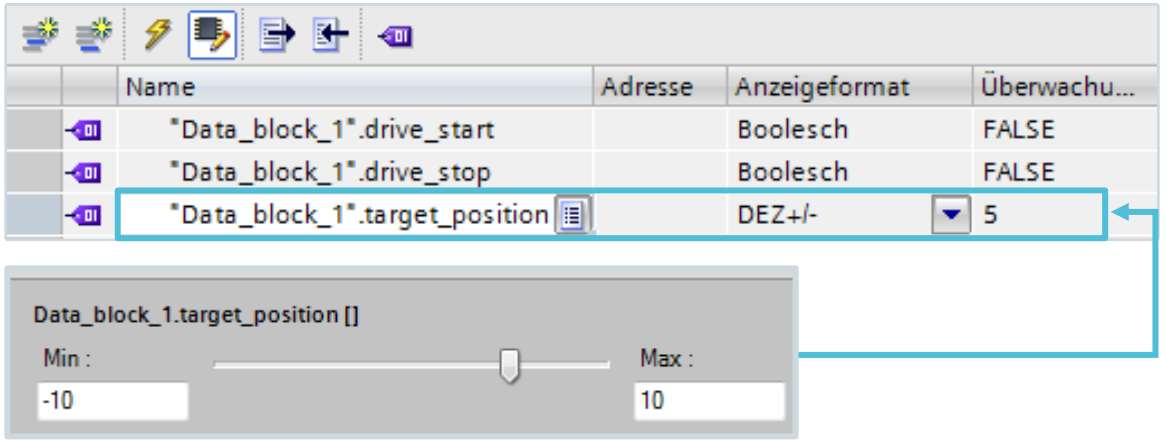
If you select an analog value in the SIM table, you can manipulate it with the aid of a slider

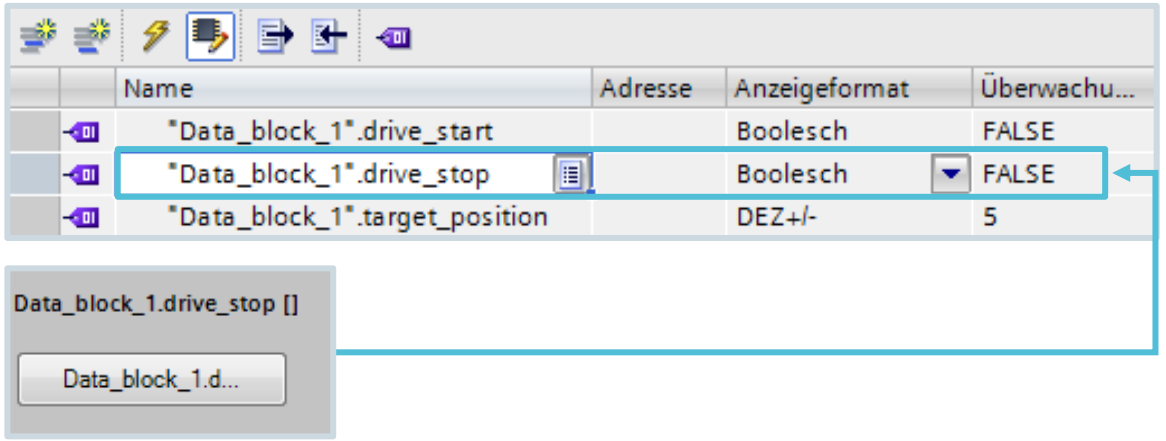
Pushbutton for boolean values

If you select a boolean value in the SIM table, you can manipulate it with the aid of a pushbutton

Customer benefits

Simple modification of values within the SIM table for quickly testing the STEP 7 user program





STEP 7 Innovations – PLCSIM V15 – Collection of useful functional enhancements

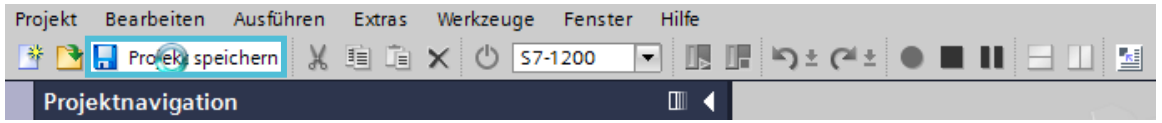
SIEMENS
Ingenuity for life

Parallel installation of PLCSIM and PLCSIM Advanced

PLCSIM V15 and PLCSIM Advanced V2.0 can be installed on the same PC. Simultaneous use of both simulation tools is however not possible

Visual display of project saving process

When you click **“Save project”**, a small rotating wheel appears briefly as a mouse pointer to indicate that the project is being saved successfully



Simulation of know-how protected blocks

Know-how protected blocks of a 1500 CPU can be simulated with PLCSIM V15
(1200 CPUs are not supported at present)

STEP 7 Innovations – Collection of useful functional enhancements

SIEMENS
Ingenuity for life

Trace: Support for time variables

- During recording
- As a trigger condition
- Supported data types
  - TIME, LTIME
  - ToD, LToD
  - DATE, LDT

Trace: Advanced properties for measurements

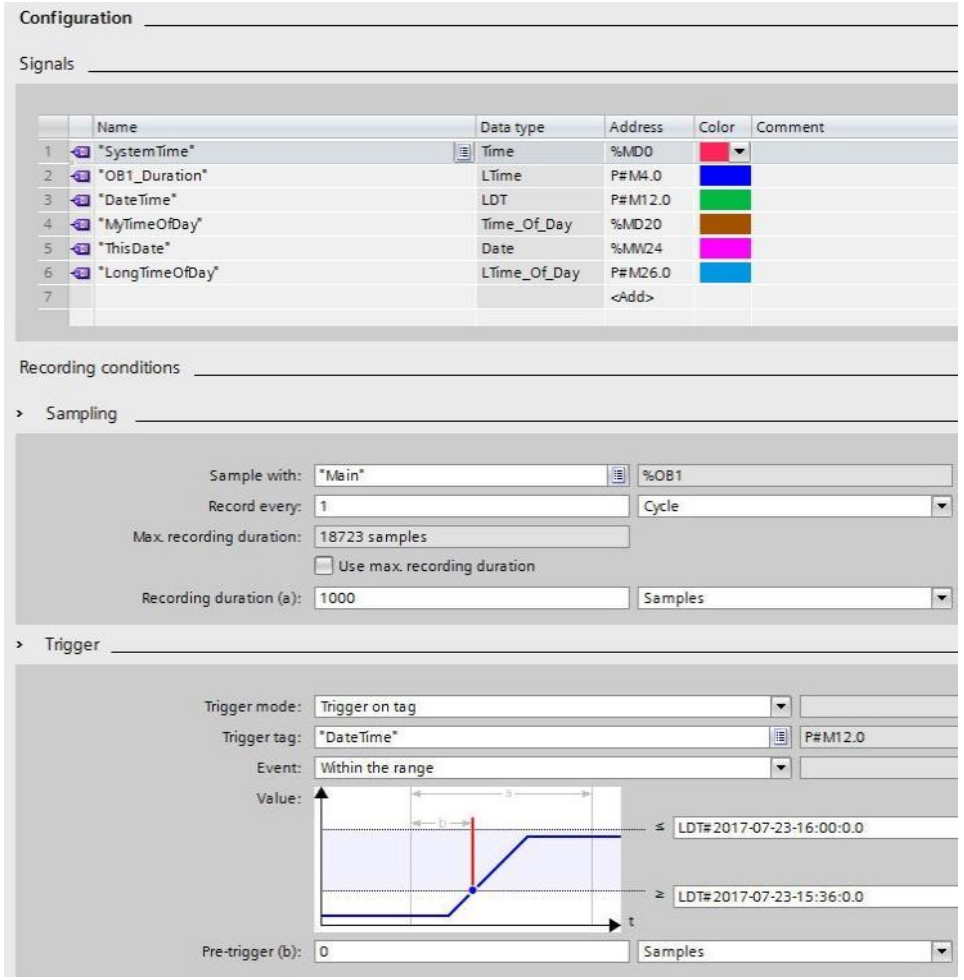
All relevant timestamps

Trace: Overlaid measurements

Import/Export as *.ttcbmx or *.csv-file

Trace: Moving the cursor using the arrow keys

- Precise positioning on the measuring points
- Startup without mouse

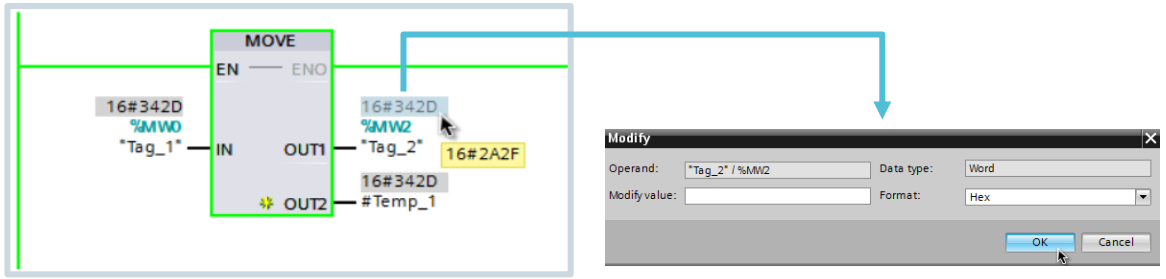


STEP 7 Innovations – Collection of useful functional enhancements

SIEMENS
Ingenuity for life

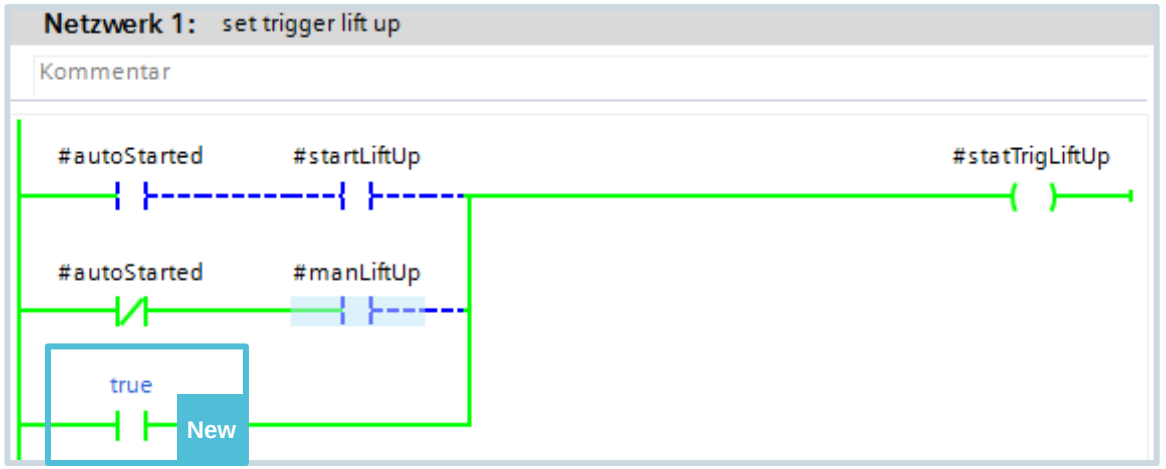
“Control operand” by simply double-clicking the observed value

- Boolean process values can therefore be toggled very quickly
- Non-boolean process values can be changed really easily in the “Modify” dialog
- Objects supported:
  Global tags or tags in DB



Boolean constants can also be used for statements

Simple testing or bridging of current paths

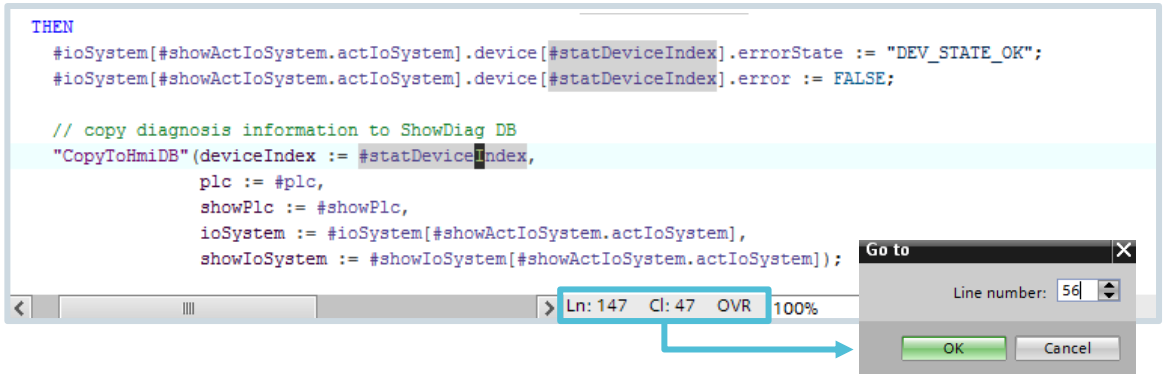


STEP 7 Innovations – Collection of useful functional enhancements

SIEMENS
Ingenuity for life

SCL: Extension of status line

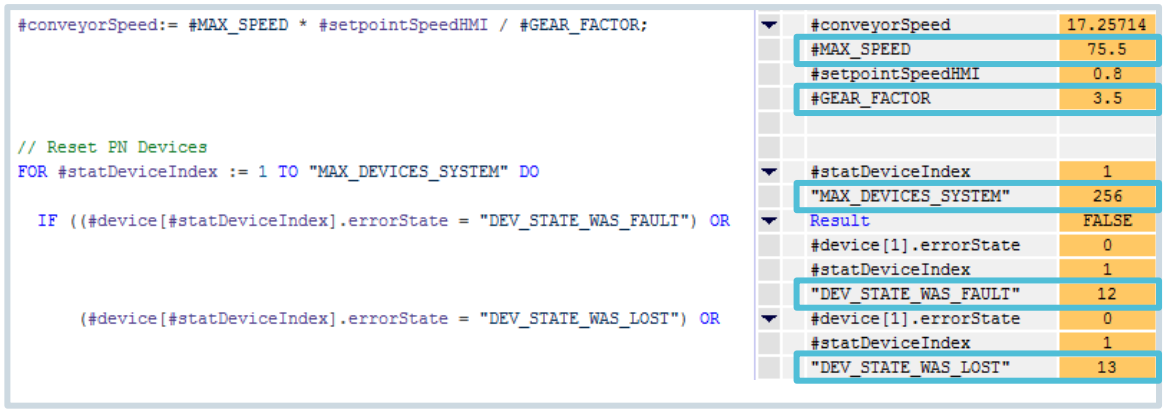
- Fields for displaying the current cursor position (line/column number)
  Double-click the line number to open the “Go to” dialog
- Display the current edit mode (insert/overwrite).
  Switch the current edit mode by double-clicking in the display field



SCL: Constants are displayed in monitor column

The values of global/local constants are also displayed when monitoring blocks

→ The maximum number of loop iterations, mathematical calculations or output of error and status words can therefore be reproduced more easily



TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

Details

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink: Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

WinCC Innovations – Provision of Images

SIEMENS
Ingenuity for life

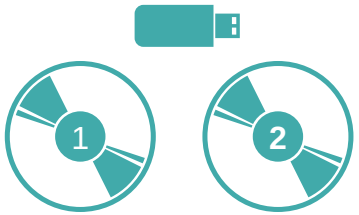
… up to WinCC V14 SP1

DVD1

Installation of all Images and Runtime for **all** supported operator devices

DVD2

Support Tools and OSS



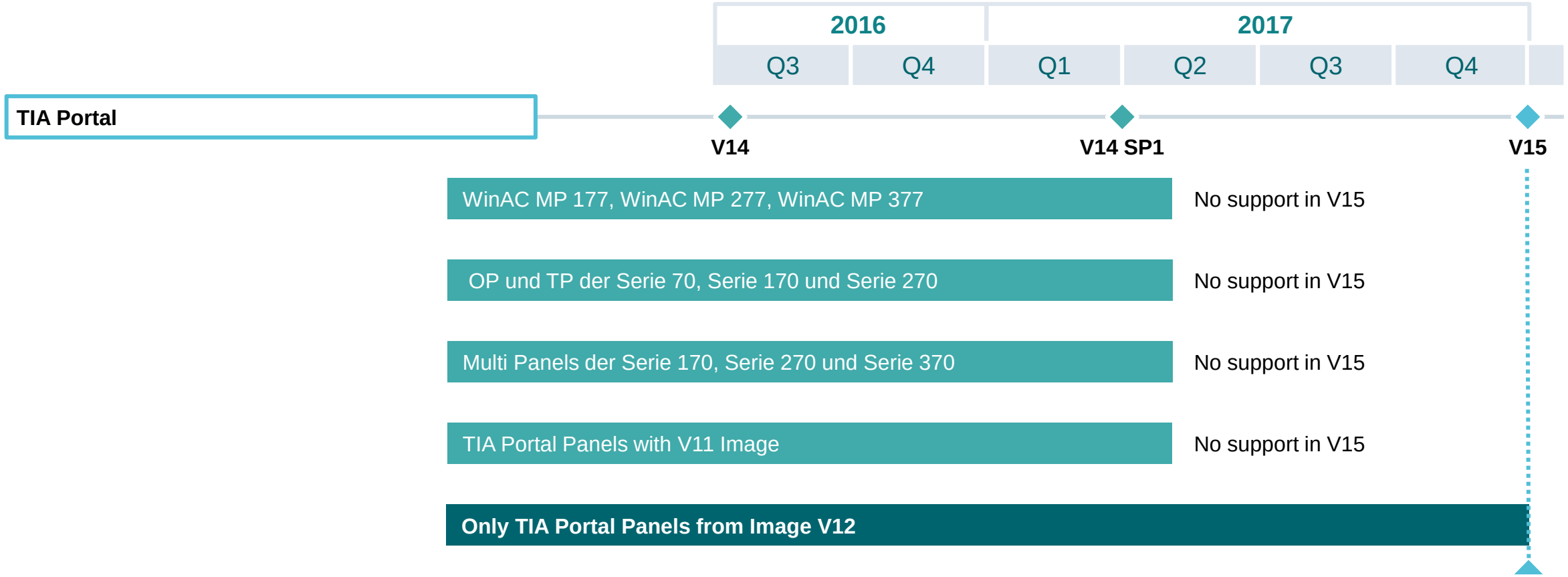
… with WinCC V15

To minimize the installation overhead, the following measures have been implemented

- Reduction in the number of Panels supported **(details on next slide)**
- Selection of Images/Runtime installed **(details on next slide)**

WinCC Innovations –
New approach for supported devices

SIEMENS
Ingenuity for life



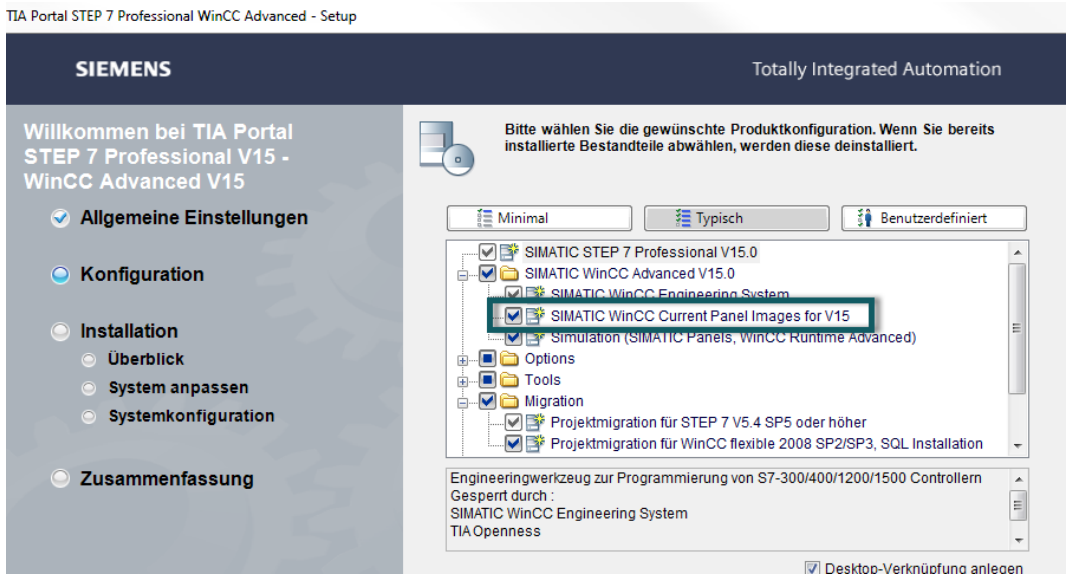
In order to maintain panels with images up to V11 in WinCC V15, they have to be upgraded before.

WinCC Innovations – Delivery of Panel Images

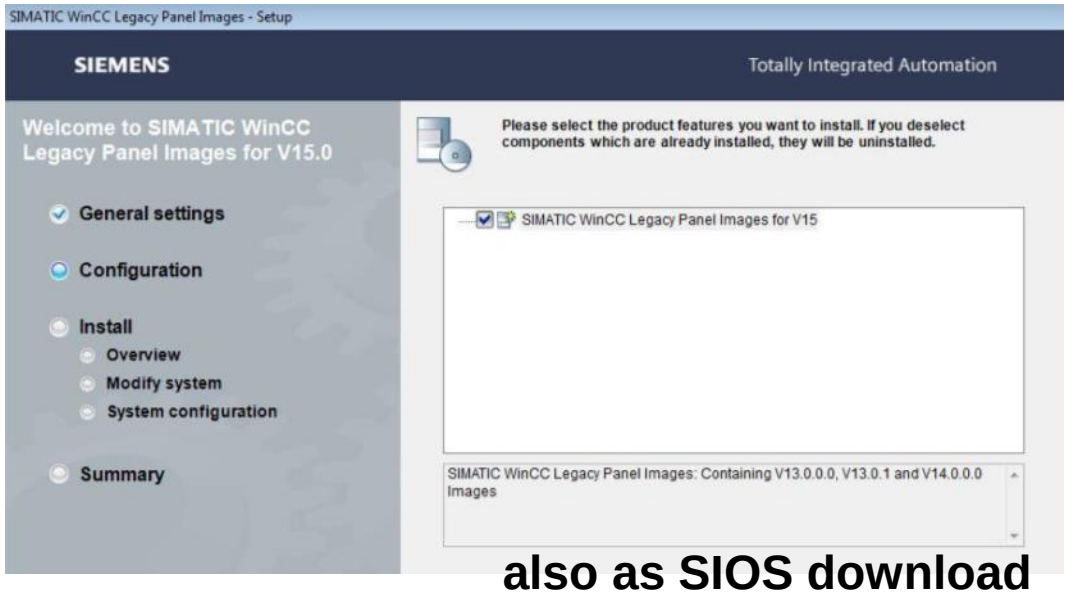
SIEMENS
Ingenuity for life

The delivery of Images was changed with TIA Portal V15

DVD1: SIMATIC WinCC / STEP 7 Professional Current Panel Images for V15 **(V12.0, V14.1, V15.0)**



DVD3: SIMATIC WinCC Legacy Panel Images for V15.0 **(V13.0, V13.1 and V14.0)**



also as SIOS download

Note: The Panels can be configured, created and simulated in the TIA Portal even if the Image/Runtime is not installed. These are required however for downloading the device or the ProSave functions

WinCC Innovations – SIMATIC HMI PRO operator devices

SIEMENS
Ingenuity for life

Advantages

- **Excellent ease of use** thanks to new scratchproof glass front (single- or multi-touch)
- **Attractive design, fully IP65- protected**
- **Flexible option for installation directly on the machine** with mounting on a support arm/pedestal
- **Fast startup** with simple service access
- **Optimum flexibility** thanks to simple enhancement options with extension units

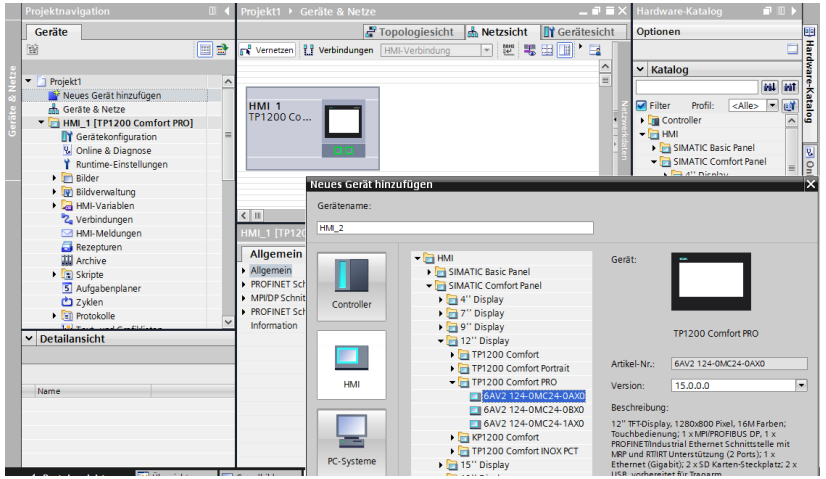
UL-Zulassung

WinCC Innovations – SIMATIC HMI PRO operator devices

SIEMENS
Ingenuity for life

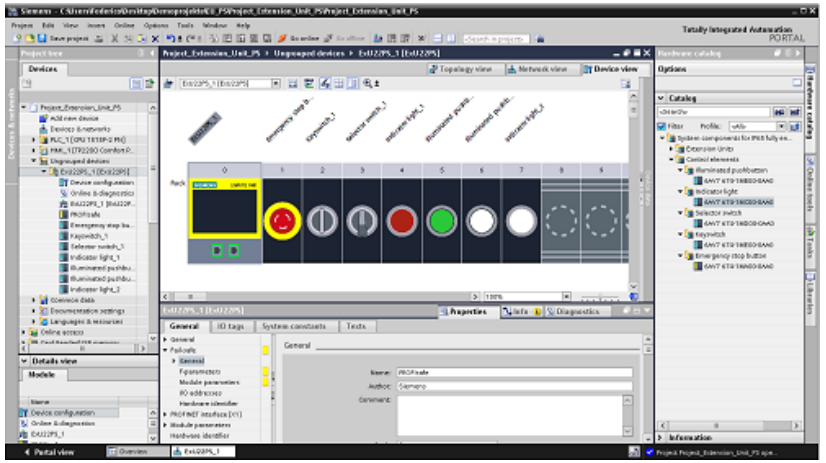
Configuration of Comfort PRO

Add new Comfort PRO in TIA Portal



Configuration of extension units

- **Download of the HSP for the extension unit**
  Online Support: **109749645**
- **Configuration of PROFINET and PROFISAVE**



WinCC Innovations – User login with RFID card reader

SIEMENS
Ingenuity for life

SIMATIC RF1060R

Local user management

Free application in Online Support: **99808171**
User login with RFID card reader,
SIMATIC RF1060R for

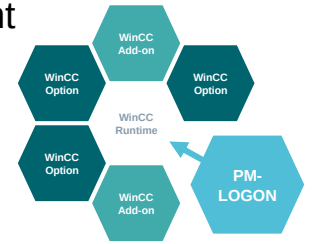
- SIMATIC Comfort Panels
- SIMATIC IPC
- SIMATIC HMI PRO Devices
- Ab WinCC Advanced V14 SP1

https://support.industry.siemens.com/cs/ww/en/view/99808171

Central user management

Chargeable premium add-on PM-LOGON for user login, for example with RFID (SIMATIC RF1060R, Admitto, Omnikey) with central user management

- SIMATIC Comfort Panels
- WinCC RT Professional and Advanced
- WinCC V7.X and PCS 7



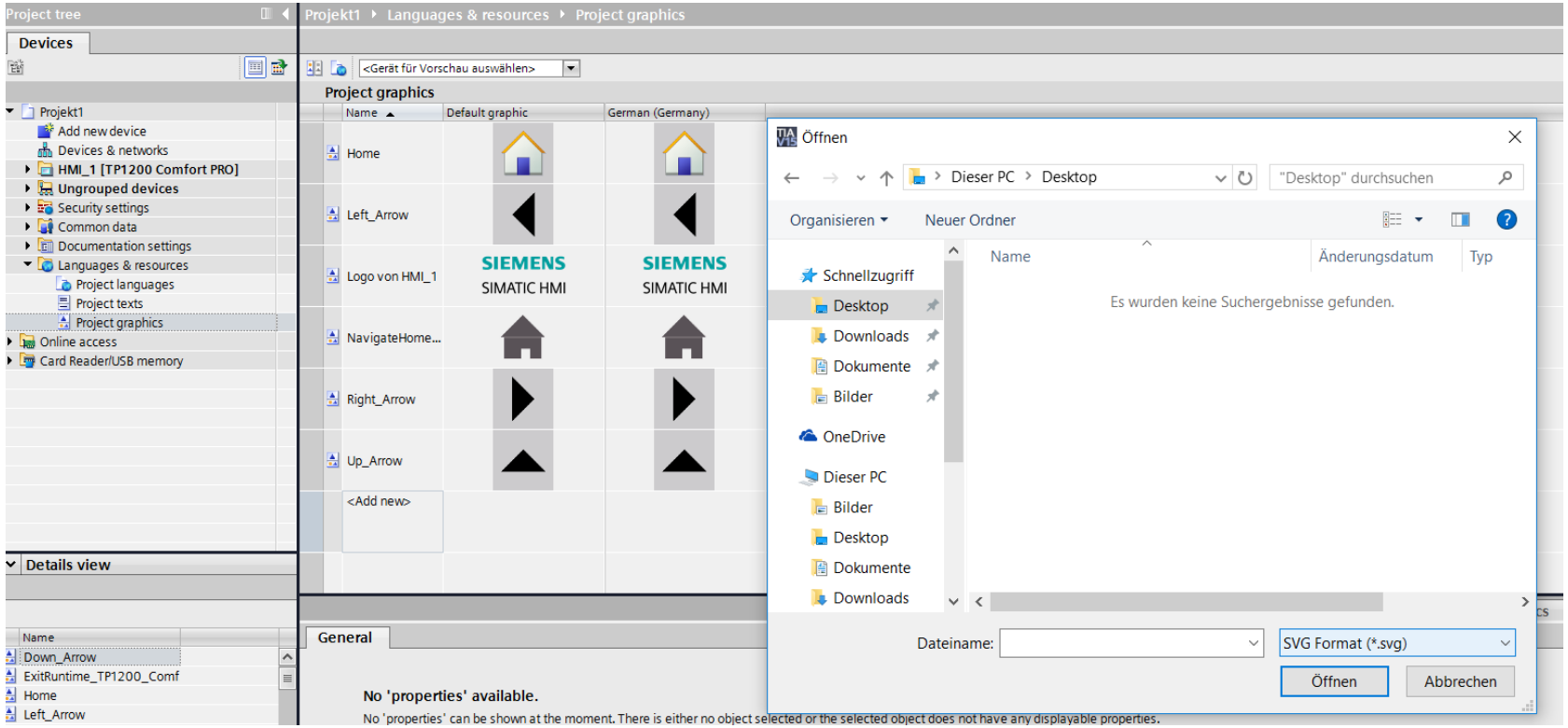
https://www.siemens.de/industrysolutions/de/en/wincc/products/pm-logon/pages/default.aspx

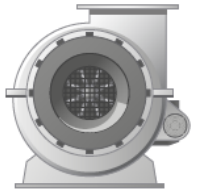
WinCC Innovations – Functional improvements (graphic elements)

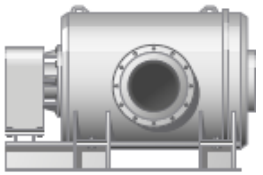
SIEMENS
Ingenuity for life

Support for static SVG (Scalable Vector Graphic)

Scalability without losing the image quality







WinCC Innovations – Communication connections with WinCC RT Professional

SIEMENS
Ingenuity for life

Larger number of connections to S7-1500/S7-1200 PLCs

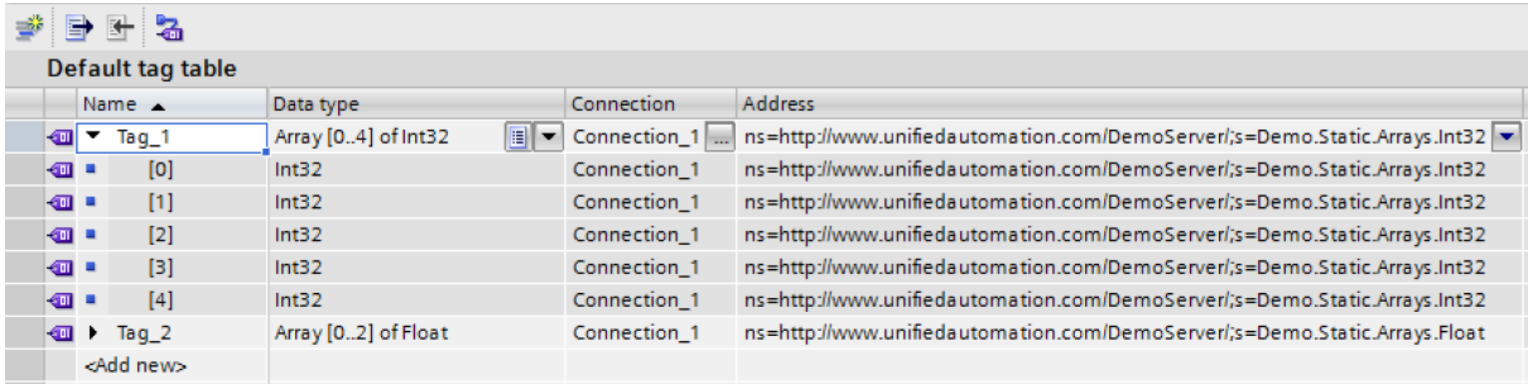
- Runtime Professional supports up to 128 connections
- Max. 128 S7-1500/S7-1200 can communicate with a RT Professional
- Max. 64 S7-300/400 can communicate with a RT Professional
- Sample configurations
  - 128x S7-1500s
  - 70x S7-1500s and 58x S7-1200s
  - 64x S7-300s and 64xS7-1500s
  - 100x S7-1500s and 28x OPC UA Clients

WinCC Innovations – Communication connections with WinCC RT Professional

SIEMENS
Ingenuity for life

Functional enhancement of OPC UA Client

- Security improvements through support for authorization parameters (user and password)
- Support for array data types



TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

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- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

Details

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
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- Mathematical functions for trace

System Functions

- Local administration of users/user groups
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- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
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TIA Portal Options

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SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

Startdrive –
Support of SINAMICS S120, G130, G150, S150 and MV

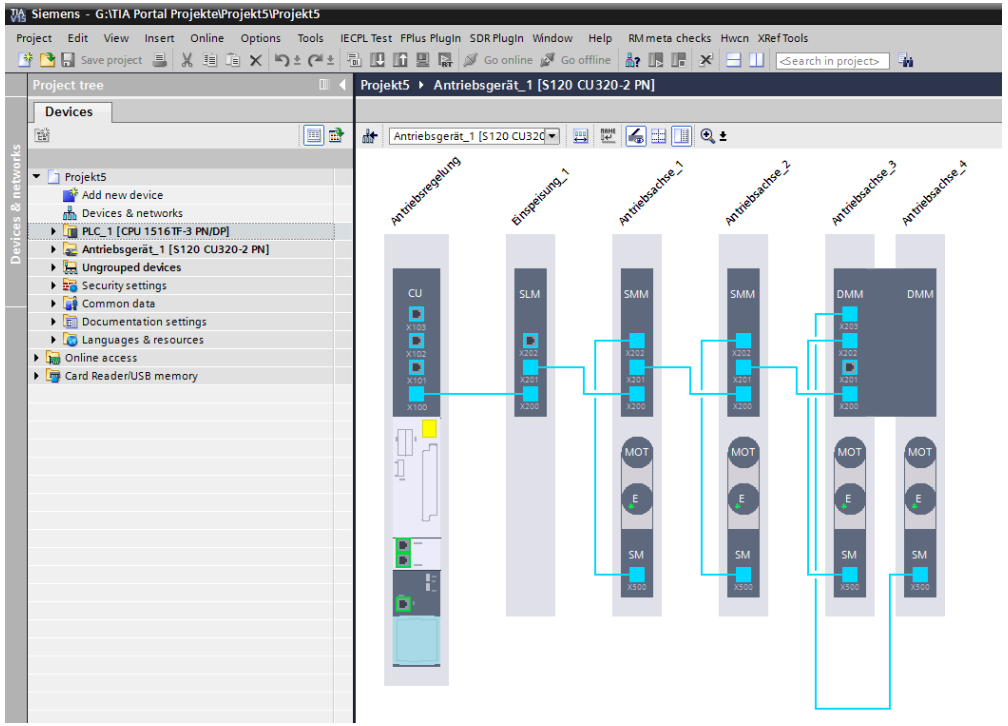
SIEMENS
Ingenuity for life

Support of other drive units

Support of SINAMICS G130, G150, S150 and MV

Expanded support for S120 (CU320-2)

- Support of chassis and cabinet modules (not block size modules)
- Support of SIMOTICS asynchronous motors and 3rd motors
- Vector control
- Parameter comparison (online/offline, against factory setting)
- Source-side BiCo connections
- Upload from the list of accessible devices



Startdrive – Supported hardware for drives based on CU320-2

SIEMENS
Ingenuity for life

Integrated hardware

Topic	Feature		Effect	
SINAMICS drives	S120	✓	Motion control drives and large drives	New
	G130, G150, S150, MV	✓		
Control unit (CU)	CU320-2	✓	• Sinamics firmware ≥V4.8 • All Sinamics drives based on CU320-2 • CBE20 only as a Sinamics link	
	CU310-2	✗		
Infeed and power units	Booksize (compact)	✓	• Single- and multi-axis drive systems incl. chassis/cabinet • Protection category IP20 (control cabinet) • 3AC power supply	New
	Blocksize (e.g. PM240-2)	✗		
	Chassis/cabinet	✓		
Applicable SIMATIC controllers	S7-1500/1500T/ET200SP	✓	Only with S7-1500/1500T/ET200SP CPU	
	Open/software controller	✗		
	S7-1200	✗		
	S7-300 and S7-400	✗		
Applicable motors	SIMOTICS	✓	All SIMOTICS motors and 3rd motors (with the exception of SIMOGEAR and linear motors)	New
	External motors	✓		

Startdrive – Supported functions for drives based on CU320-2

SIEMENS
Ingenuity for life

Integrated functions

Topic	Feature		Effect
Drive control	Servo	✓	All drive control modes (servo, vector and U/f) New
	Vector	✓	
SAFETY functions	Basic	✓	• STO, SS1, SBC • SS2, SOS, SBT, SLS, SSM, SDI, SLP, SP
	Extended	✓	
Communications	PROFINET	✓	• PN with IRT (clock-synchronized communications) • PROFINET only
	PROFIBUS	✗	
Telegrams	PROFIdrive telegrams	✓	All telegram configurations
	PROFIsafe	✓	
	Siemens telegrams	✓	
	Telegram extension	✓	
Additional functions	EPos	✓	Central and decentral motion control possible
	DCC	✗	

Startdrive – Extensions for the SINAMICS G120 family

SIEMENS
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Functions

- Support of SINAMICS firmware version 4.7, Service Pack 9
- Addition optimization and expansion of commissioning assistants
  - Configuration of the motor brake
  - Cancel online option
  - CU250D-2: SSI encoder as motor encoder
- PROFINET name assignment without the reboot of the G120 control unit also in the list of the accessible devices
- Support of CU240D-2/CU250D-2 with polymeric optical fiber (POF)

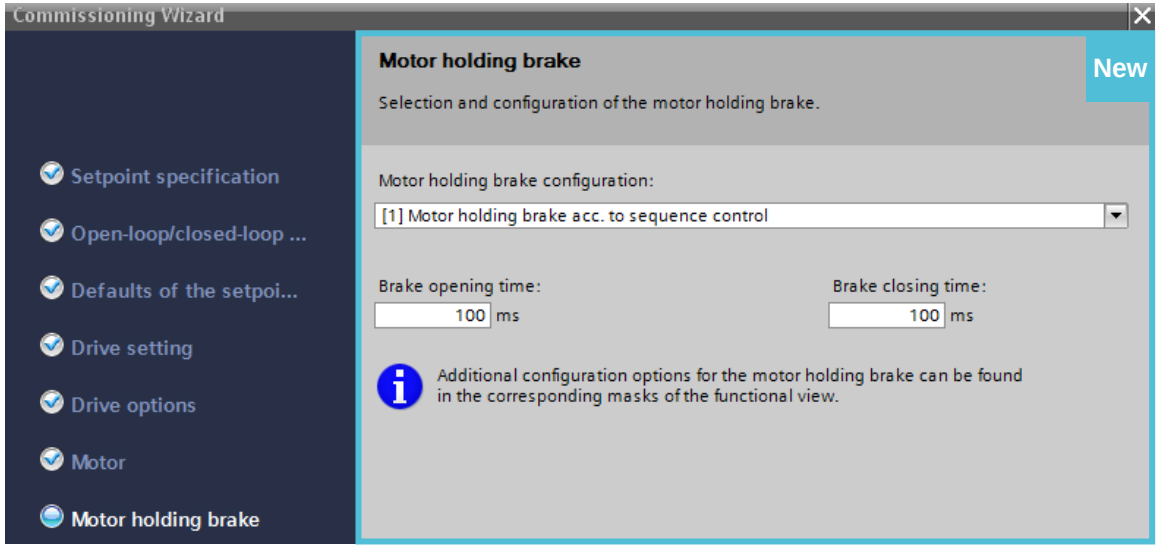
Startdrive –
Extensions for the SINAMICS G120 family

SIEMENS
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Further optimization and expansion of the commissioning assistant

- Configuration of the motor brake
- Cancel online option
- CU250D-2: SSI encoder as motor encoder



Startdrive – Access to drive settings via TIA Portal Openness

SIEMENS
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Function

- Adding of drive units and components
- Setting of selected drive parameters (offline and online, reading and writing)
- Telegram configuration
- Download to a device (no uploads)
- Usable for the SINAMICS G120 family and CU320-2-based drive units (SINAMICS S120, G130, G150, S150 and MV)

Customer benefits

→ Flexible Startdrive extensions to meet customer-specific requirements

→ Integration into customer-specific and automated workflows

→ Stable Openness interface across TIA Portal versions

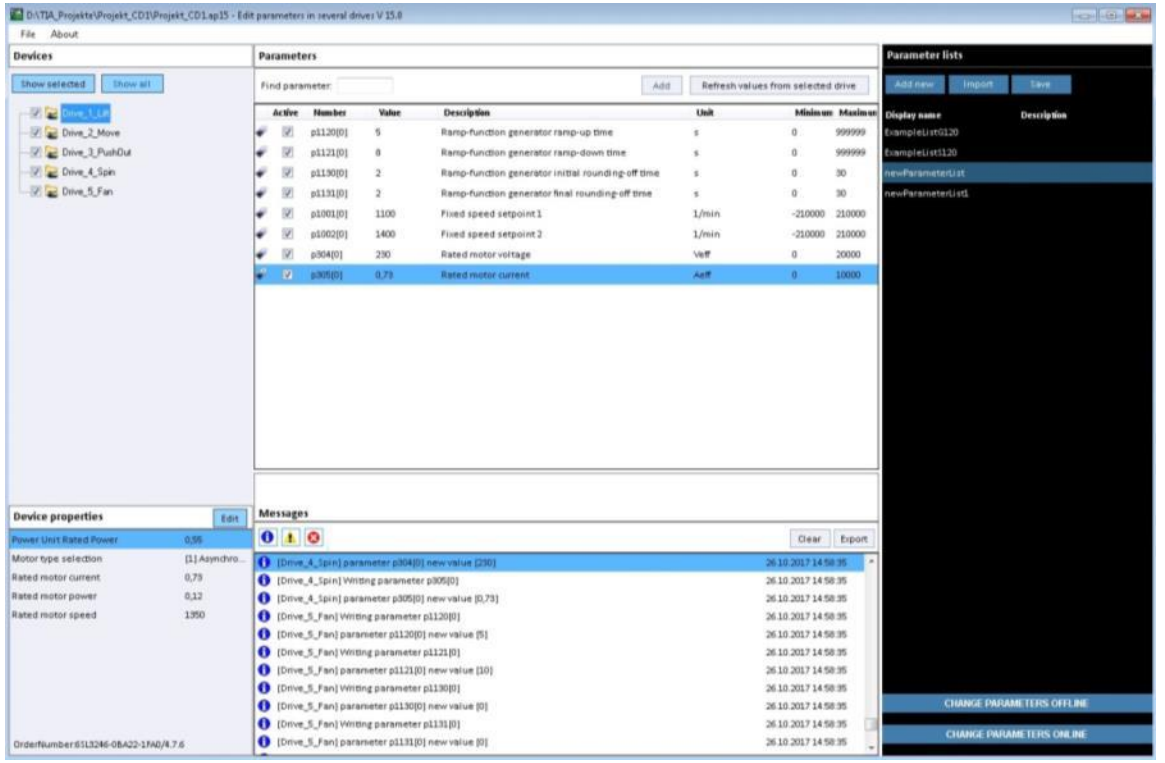
Startdrive –
Startdrive app “Edit parameters in several drives”

SIEMENS
Ingenuity for life

G120 ✓ CU320-2 based drives ✓

Application

- User-defined settings in many drives in a project at once
- TIA Portal external application
- Simple and intuitive to use
- Usable for the SINAMICS G120 family and CU320-2 based drive units (SINAMICS S120, G130, G150, S150 and MV)
- Is provided with V15



Customer benefits

→ Efficient mass data operation

→ Open source example for use of Openness interface for drive settings

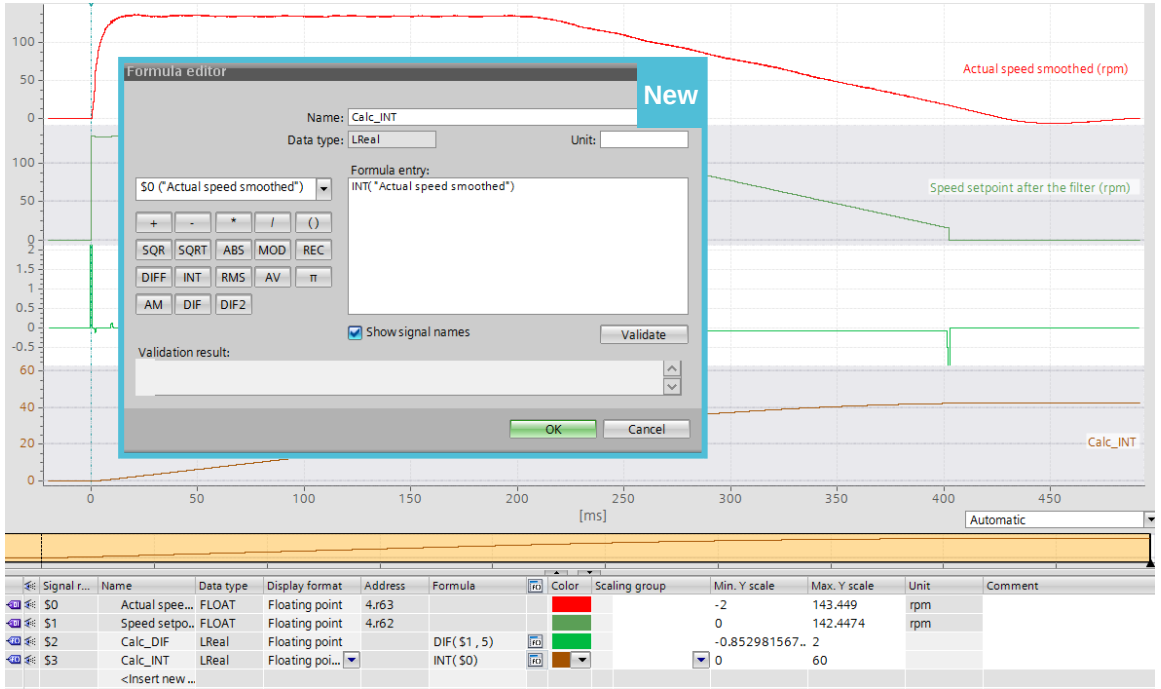
Startdrive – Mathematic functions for drive trace

SIEMENS
Ingenuity for life

G120 ✓ CU320-2 based drives ✓

Function

- Calculation of new signals from recorded signals on the basis of mathematic formulas
- Basic calculating operations
- Sum, root, square, 1/X, modulo
- Integral, differentiation
- Various filter functions
- Calculation of the mean, effective value, integral in the area of measurement cursor



Customer benefits

→ Generation of unavailable information

→ Retroactive processing of measurements

→ Measurement of signal curves (e.g., mean)

Startdrive –
License for Startdrive Advanced

SIEMENS
Ingenuity for life

Function

- Introduction of the Startdrive Advanced license for use of additional engineering functions with a high amount of added value
- Only a license key is required, no additional installation
- Trial license is free of charge without a license key (21 days)
- Functions in V15: Safety acceptance test for the G120 family
  - Managed acceptance test assistant for all safety-integrated functions (basic and extended safety)
  - Automatic and safety-function-specific creation of traces
  - Generation of an acceptance protocol as an Excel file

Startdrive Advanced – Safety acceptance test

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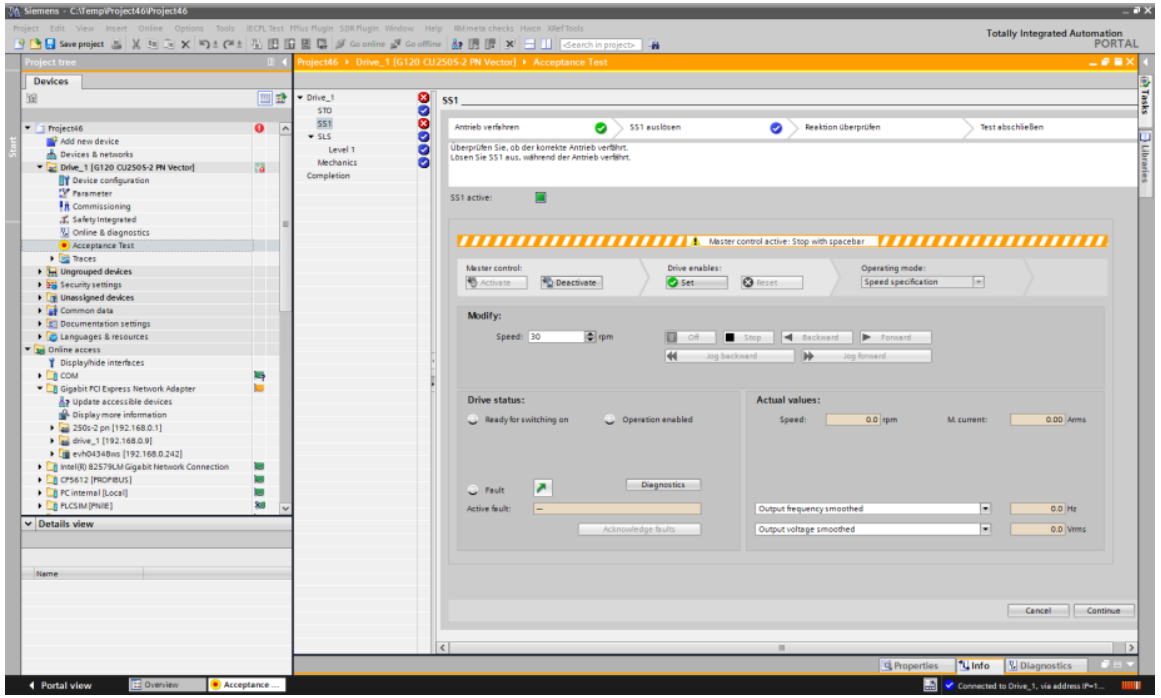
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Function

- Managed acceptance test assistant for all drive-based, safety-integrated functions (basic and extended safety)
- Automatic and safety-function-specific creation of traces
- Generation of an acceptance protocol as an Excel file
- In addition to integration into TIA, the acceptance test offers the following new features
  - Series acceptance (transfer of results to other drives)
  - Available for G110M, G120, G120C, G120D, G120P



Customer benefits

→ Efficient execution and documentation of the safety acceptance test

→ Support with compliance with machinery regulations

Startdrive Advanced – Safety acceptance test

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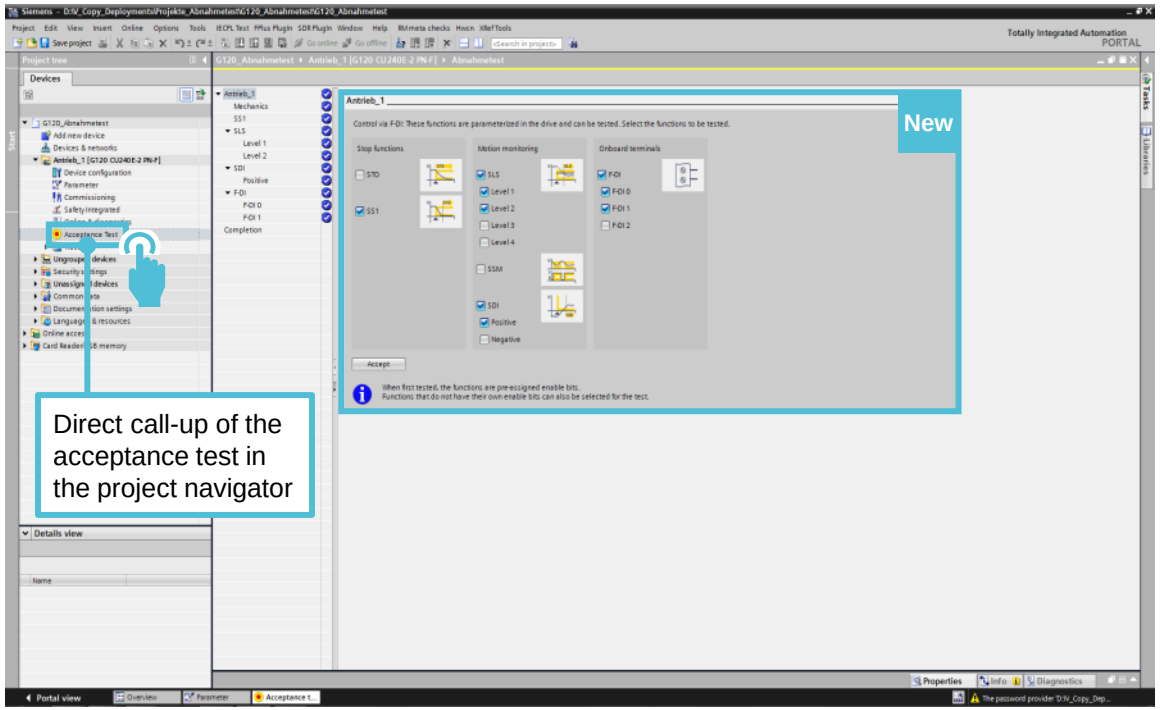
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Step 1: Selection of functions

Select functions for the acceptance test

- The safety functions parameterized in the drive will be displayed
- The safety functions approved in the drive are pre-selected
- In the function selection system, the user determines which functions will be tested
- The selection can be done offline and requires a consistent project



Startdrive Advanced – Safety acceptance test

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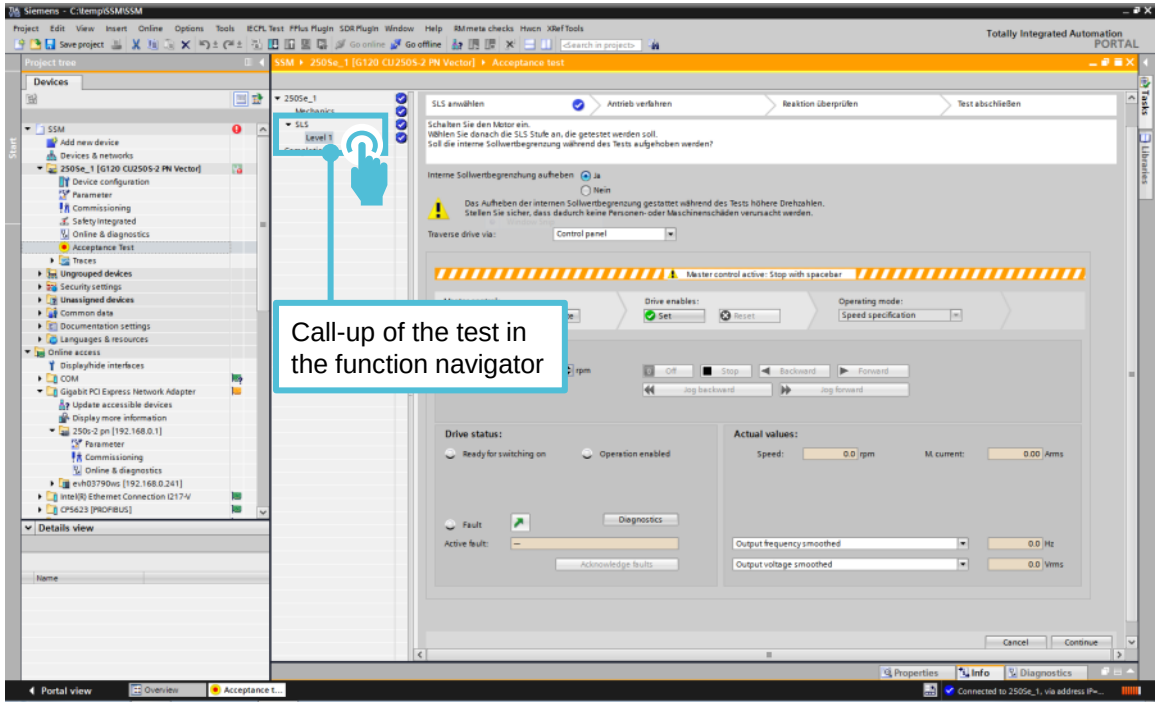
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Step 2: Carrying out the test

Test assistant with integrated workflow

- Start the test (the execution of the test requires an online connection)
- Select the safety function
- Operate drive (with the integrated control panel or via the user program)
- Trigger safety function (e.g., STO) or exceed thresholds (e.g., SLS)
- Analyze the result with Trace
- Conclude the test



Startdrive Advanced – Safety acceptance test

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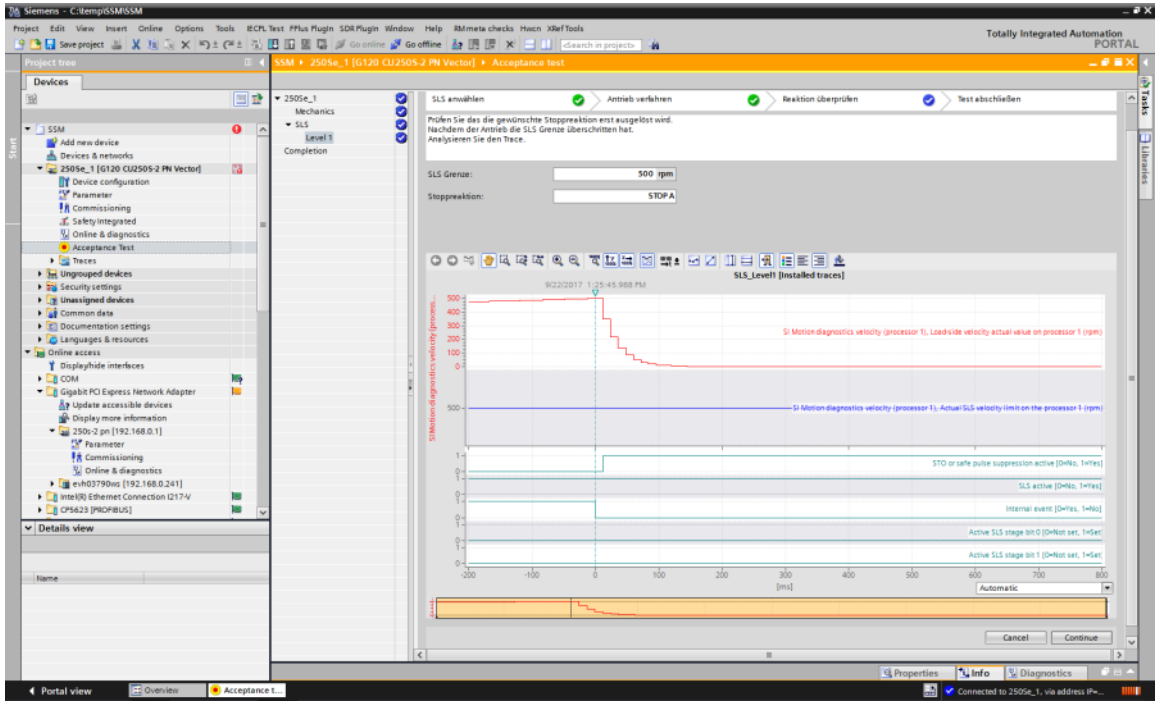
G120 ✓ | CU320-2 based drives ✗

Step 2: Carrying out the test

Automated Trace setting

- The Trace will automatically create safety in a functional-specific manner
- Supports analysis of machine behavior during the test



Startdrive Advanced – Safety acceptance test

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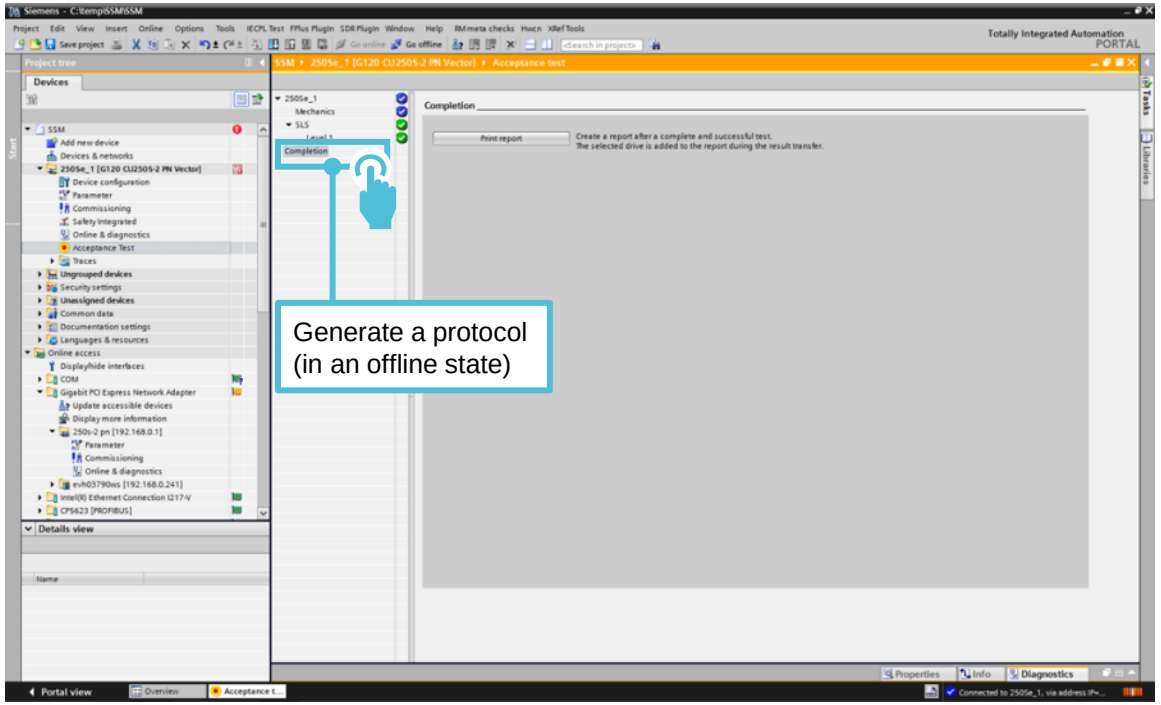
G120 ✓ | CU320-2 based drives ✗

Step 3: Documentation

Generate a protocol (in an offline state)



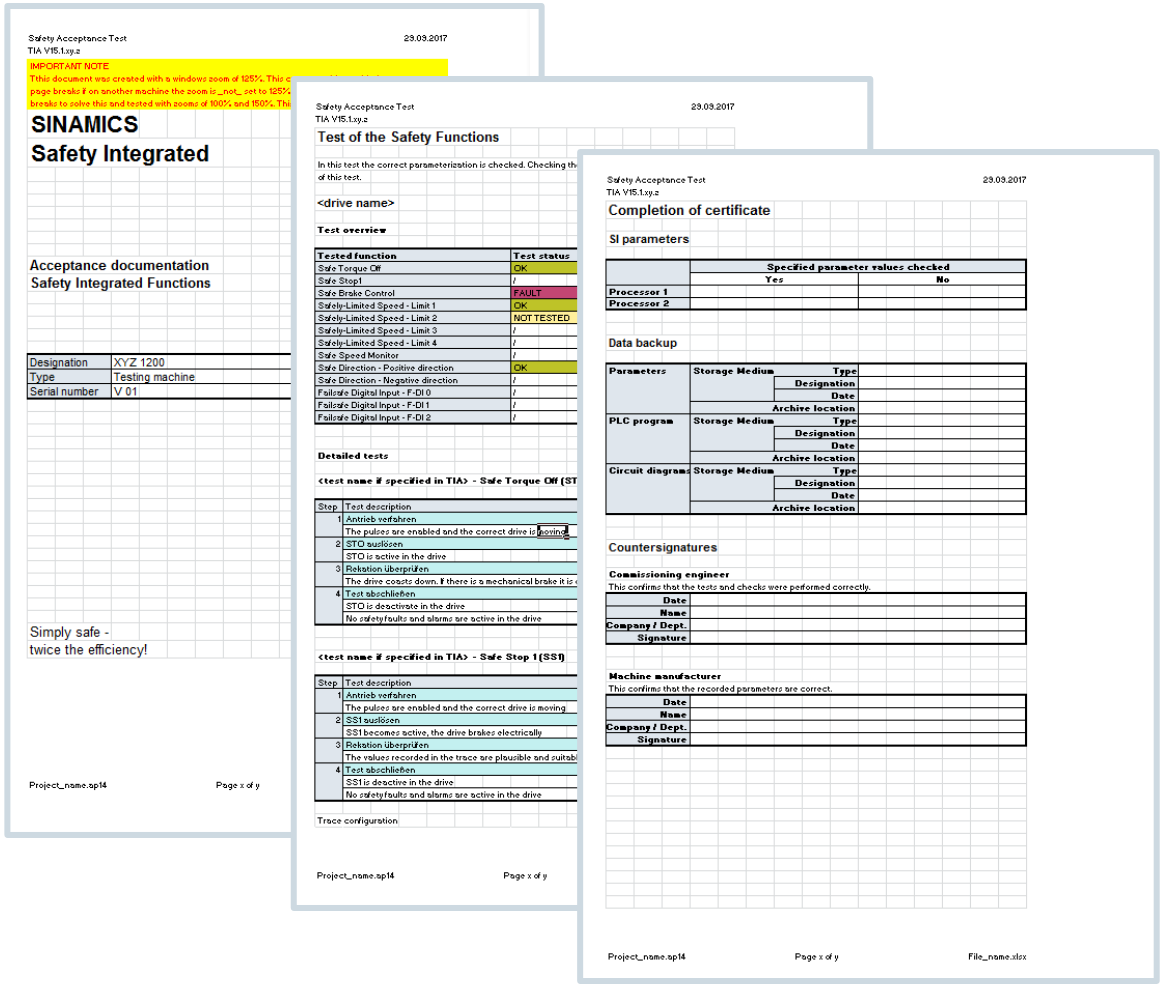
Startdrive Advanced – Safety acceptance test

SIEMENS
Ingenuity for life

G120 ✓ | CU320-2 based drives ✗

Step 3: Documentation

- The protocol will contain all necessary data (cover sheet, test data, drive parameters, checksums, signatures)
- The protocol is ready for filing in the machine
- The format is optimized for Microsoft Excel (but can be used with OpenOffice as well)



TIA Portal – Highlights of TIA Portal V15

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Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
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TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink: Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

Details

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

System Functions – Local management of users/user groups

SIEMENS
Ingenuity for life

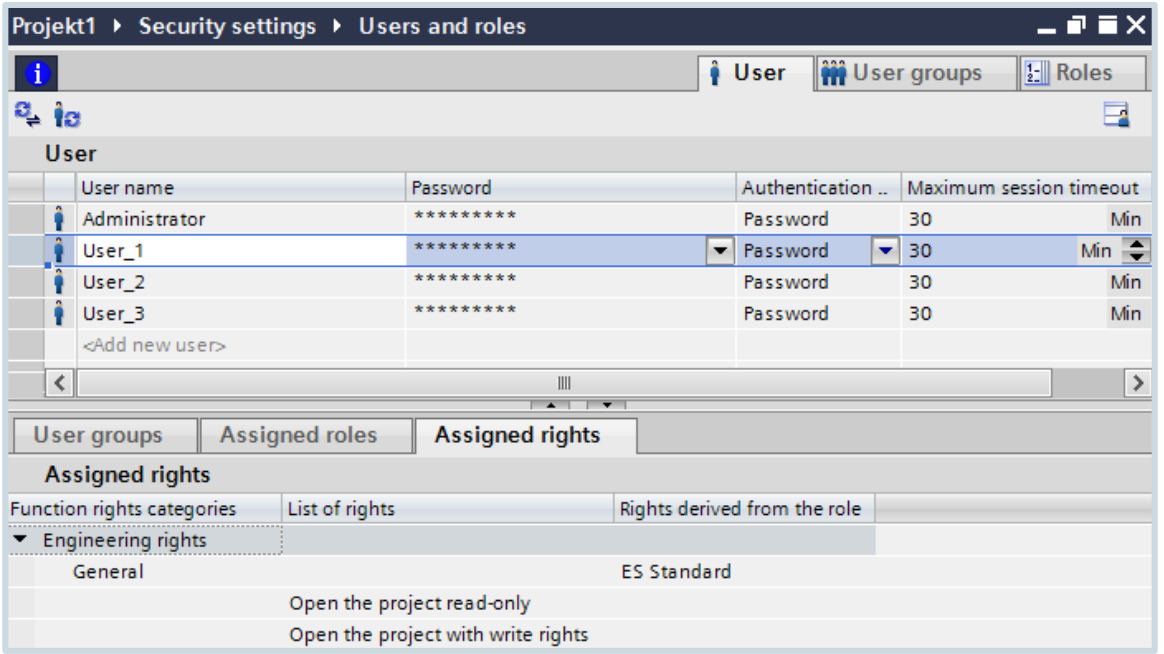
Functions

New

- Maintenance of project users
- Maintenance of roles from ES/RT product rights
- Assignment of project users to roles
- Secured storage of user/role data

Customer benefits

- Maintenance of project users only once in the project, not multiply on local product basis
- Maintenance of roles only once in the project, not multiply on local product basis
- Assignment of roles to project users in the project, not multiply on local product basis
- Basis for efficient administration of personalized security



System Functions – TIA Portal Openness – SCL in XML

SIEMENS
Ingenuity for life

XML export/import of SCL blocks

New

- Interface for calling the SCL block export
- XML representation in file
- Interface for calling the XML import

Customer benefits

- Completion: All blocks can be processed by machine via XML
- LAD/FUP blocks with SCL networks can now also be exported/imported
- Now possible: XML comparison of SCL blocks in versioning systems

```
#myString := 'Hello world';
```

```
<Access Scope="LiteralConstant">
<Constant>
<ConstantValue>Hello world</ConstantValue>
<ConstantTypeInformative="true">STRING</ConstantType>
</Constant>
</Access>
```

System Functions – TIA Portal Openness – PLC download

SIEMENS
Ingenuity for life

Download PLC

New

- Interface for calling the PLC download
- Download to standard PLC
- Handling of passwords

Customer benefits

- Automatic download to machines is possible
- Development of simple tool interfaces for PLC down-load for persons without knowledge of TIA Portal
- Automated input of protection level and binding passwords

System Functions – Display cross-references for statements used

Filter options

Sample use case

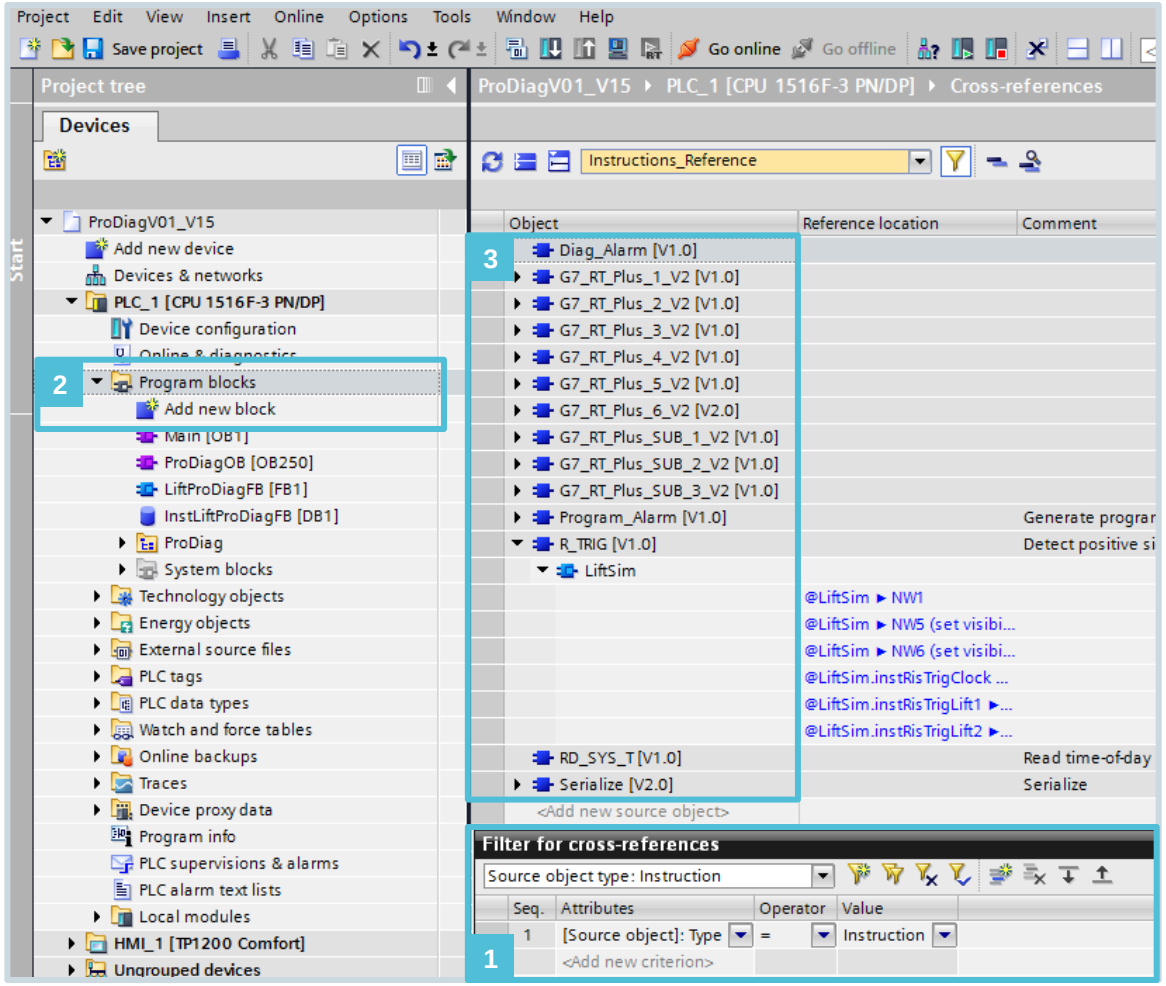
As a user, I would like to establish the statements used in a CPU

Workflow

1. Define user-defined filters with source object “Type” and value “Instruction”
2. Select program block folder in PNV
3. **Filter result** only indicates statements used

Customer benefits

- Quickly find any versioned statements used
- Statement versions are also displayed



System Functions – Protected libraries – 1/2 (creation)

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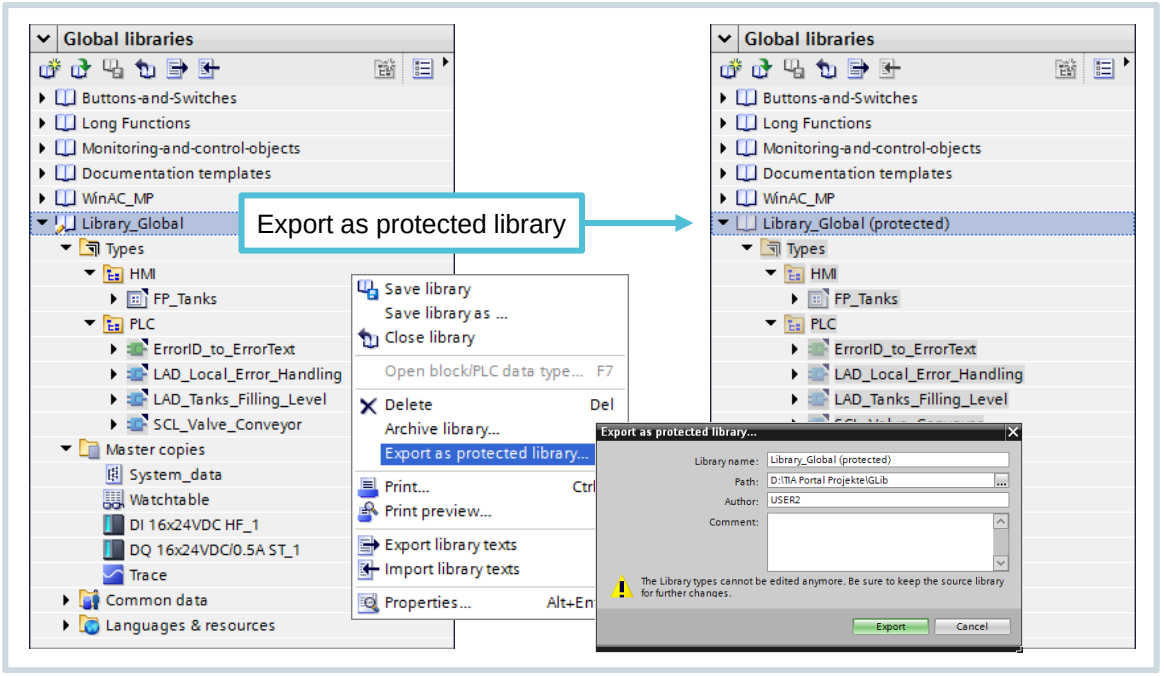
Use of protected libraries

“Write-protected libraries” features

- Global libraries can be exported as write-protected libraries
- Write protection can not be reversed
- No password is needed
- Write protected libraries can not be modified (add or remove objects)



System Functions – Protected libraries – 2/2 (use of protected types)

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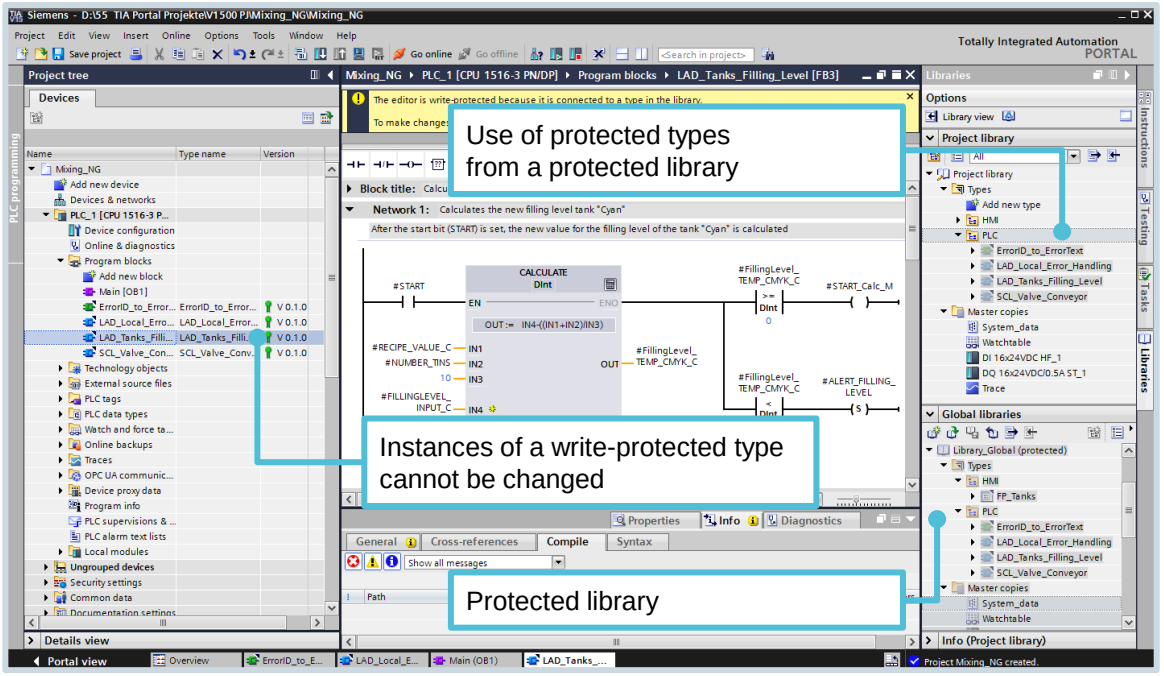
Ingenuity for life

Protected types

“Protected library types” features

- All types in protected libraries are write protected
- Used types and instances keeps write protected and can not be reversed
- Instances of a write-protected type
  - Are displayed read-only in the editor
  - Cannot be edited
  - Cannot be assigned a new version
  - Cannot be terminated from the type
- Available for PLC and HMI types



System Functions – Integrate external applications

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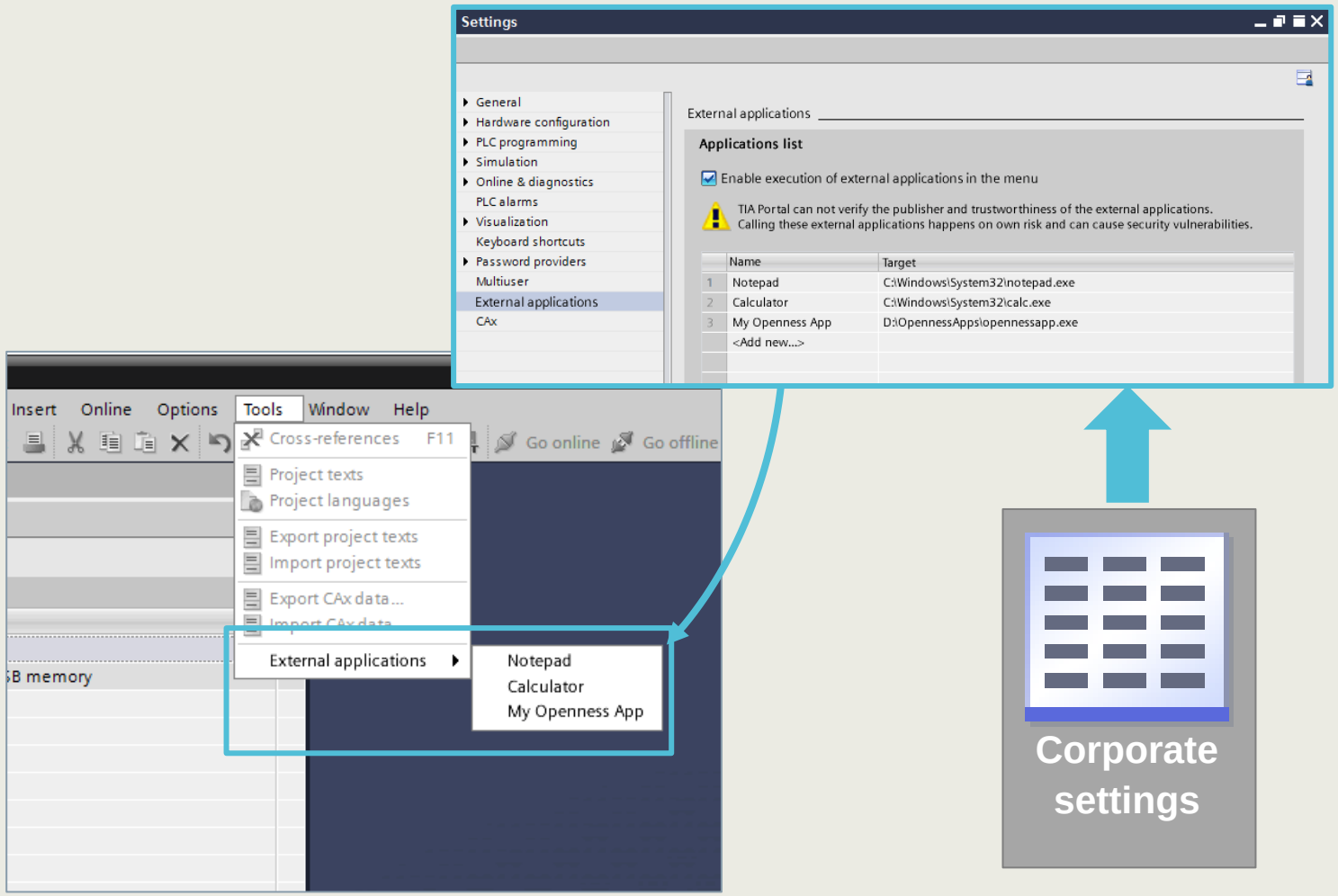

Features

- Menu entry to execute predefined external applications.

Usage

- Is a part of the settings-export/import to allow central predefinition for multiple engineering PCs/Stations.

Allows execution of external applications within the TIA Portal

System Functions – Hardware manuals in the information system

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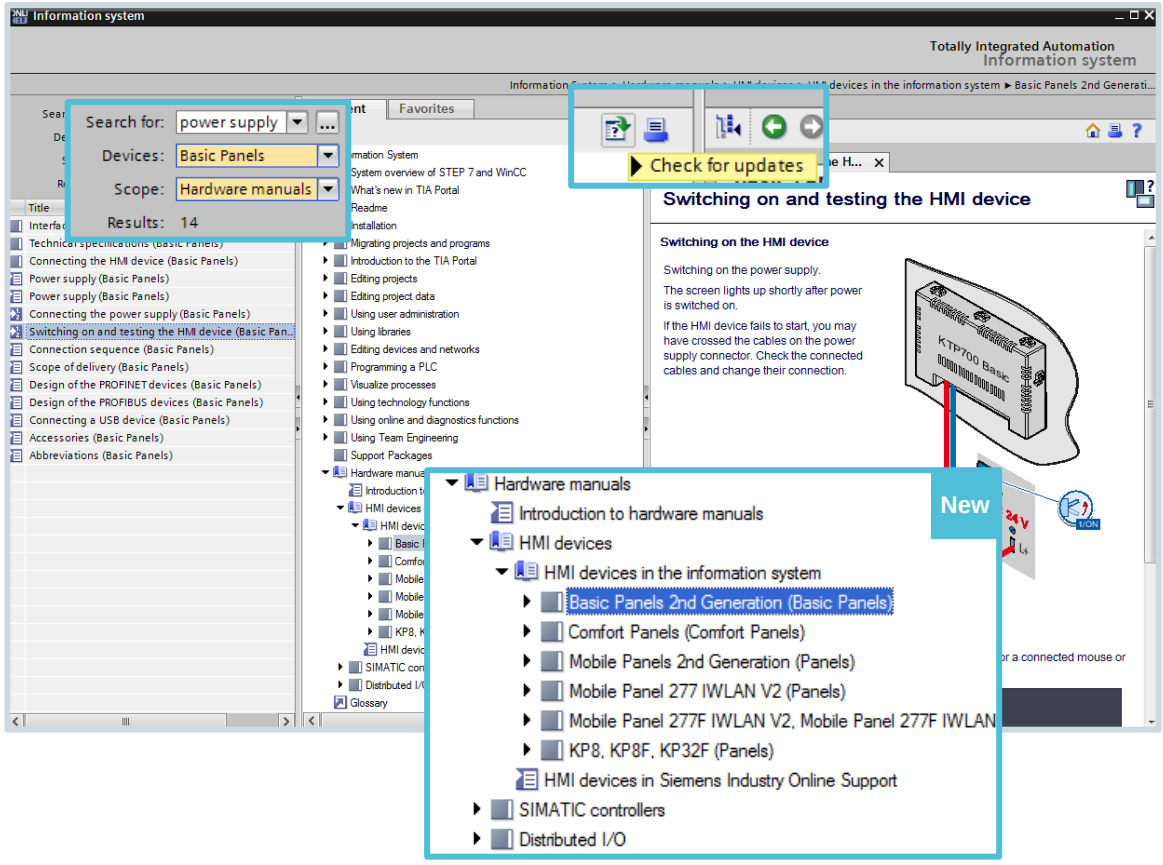
Ingenuity for life

Function

- Hardware manuals integrated in the information system
- Some manuals contained in TIA Portal V15
- Additional manuals available as a support package as needed

Customer benefits

Hardware manuals can be browsed, filtered and used as favorites



System Functions – TIA Administrator

SIEMENS
Ingenuity for life

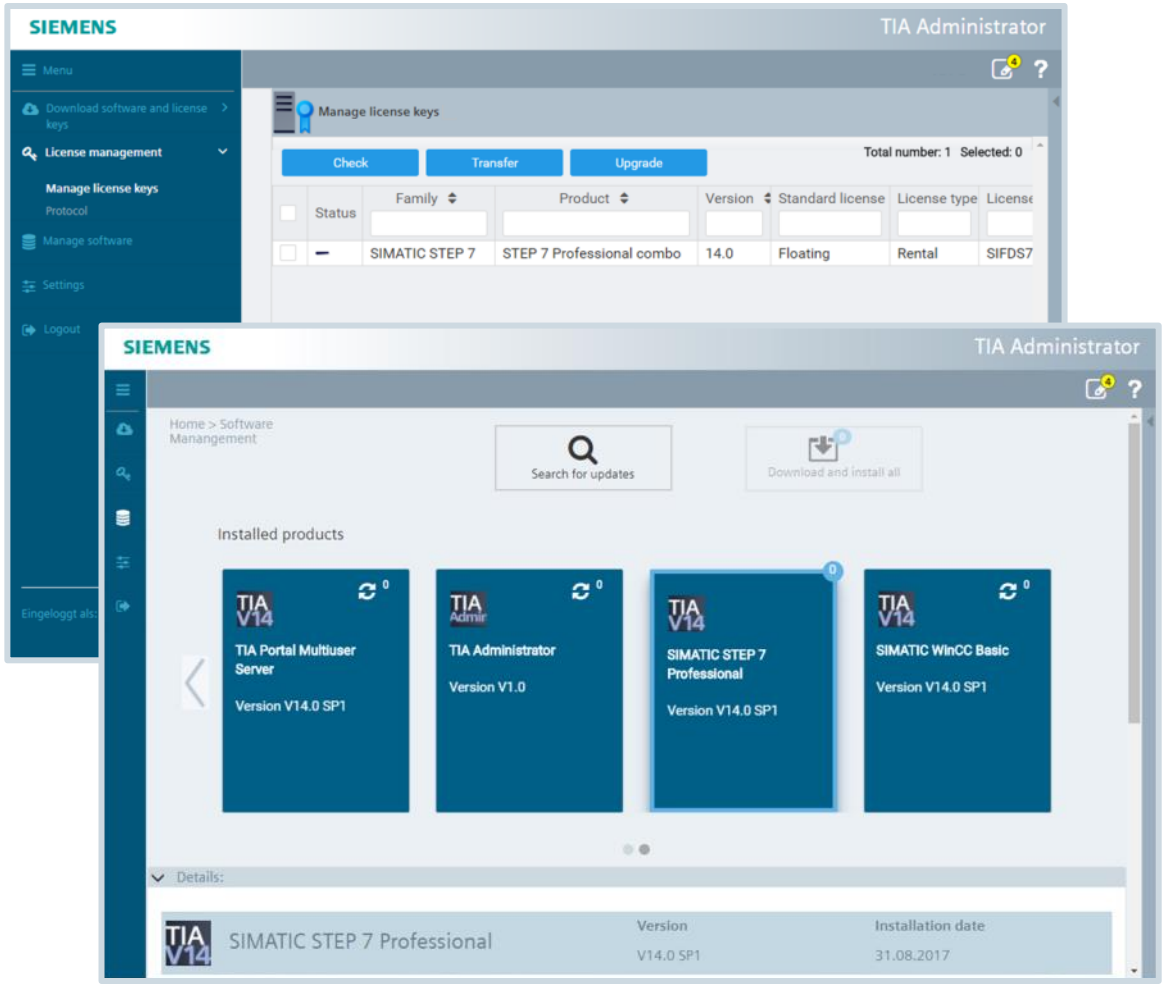
Function

New

- Web-based framework for administration tasks in TIA environment
- Integration of function modules for different applications
- Functions of ALM, Software Updater[1] and Online Software Delivery integrated

Customer benefits

- Joint administration of software and licenses in one tool
- Further functions can be added on according to individual requirements (e.g. user administration with UMC)
- Ease of use via web browser



1 Existing tools will continue to be available in the interim

System Functions – TIA Administrator – Comparison with existing tools

SIEMENS
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License management	Automation License mgr.	TIA admin
Display licenses (local/remote/OSD)	✓	✓
Transfer licenses (local/remote/OSD)	✓	✓
Use/provide licenses remotely	✓	✓
Upgrade licenses	✓	✓
Repair licenses	✓	✗
Offline license transfer	✓	✗
Connection to target systems (HMI, ...)	✓	✗
License folder	✓	✓
Filter/search for licenses	✓	✓
Protocol	✓	✓
Check-out view	✓	✗
MKL reporting to server	✓	✓

Software management	Automation license mgr.	TIA admin
Display installed software	✗	✓
Check/display updates	✓	✓
Download updates	✓	✓
Install updates	✓	✓
Display installed support packages	✗	✓
Look for new support packages	✓	✓
Download support packages	✓	✓
Install support packages	✓	✓
Connection to Siemens update server	✓	✓
Connection to corporate server	✓	✓
Automatic update check	✓	✓
Activate notification of updates	✓	✗

TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

Hardware Configuration

- Support for new hardware components
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- New SIMATIC HMI PRO device family
- New approach for supported devices
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TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

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Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

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Details

TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

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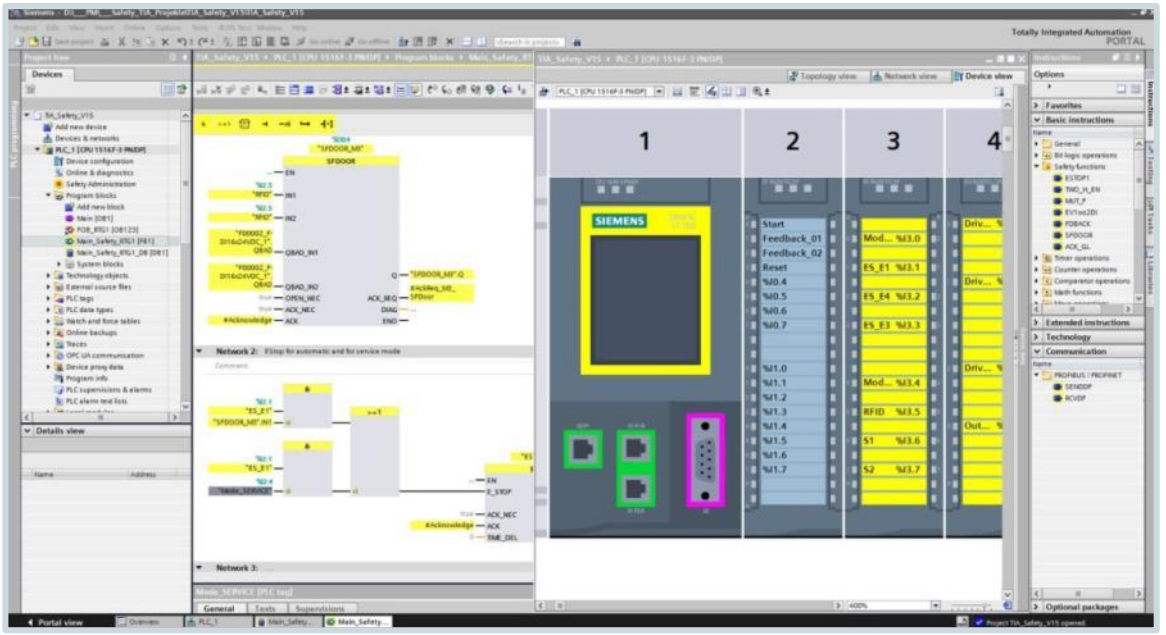
Details

TIA Portal Options – STEP 7 Safety – Overview of new functions

SIEMENS
Ingenuity for life

Function

- Failsafe arrays (read access) for data types INT and DINT
- Separate F-signature for hardware and software
- Overflow handling
- Usability improvements and more new functions
  - Read back of fail-safe F-FB Out parameters
  - Writing of F-FB input parameters as for STEP 7 Standard
  - Start values of instance DBs can be changed
  - Synchronous failsafe OB
  - DINT → INT converter (S7-1200, S7-1500)
  - ABS: Create absolute value (S7-1200, S7-1500)



Customer benefits

Increased efficiency for programming failsafe S7 controllers

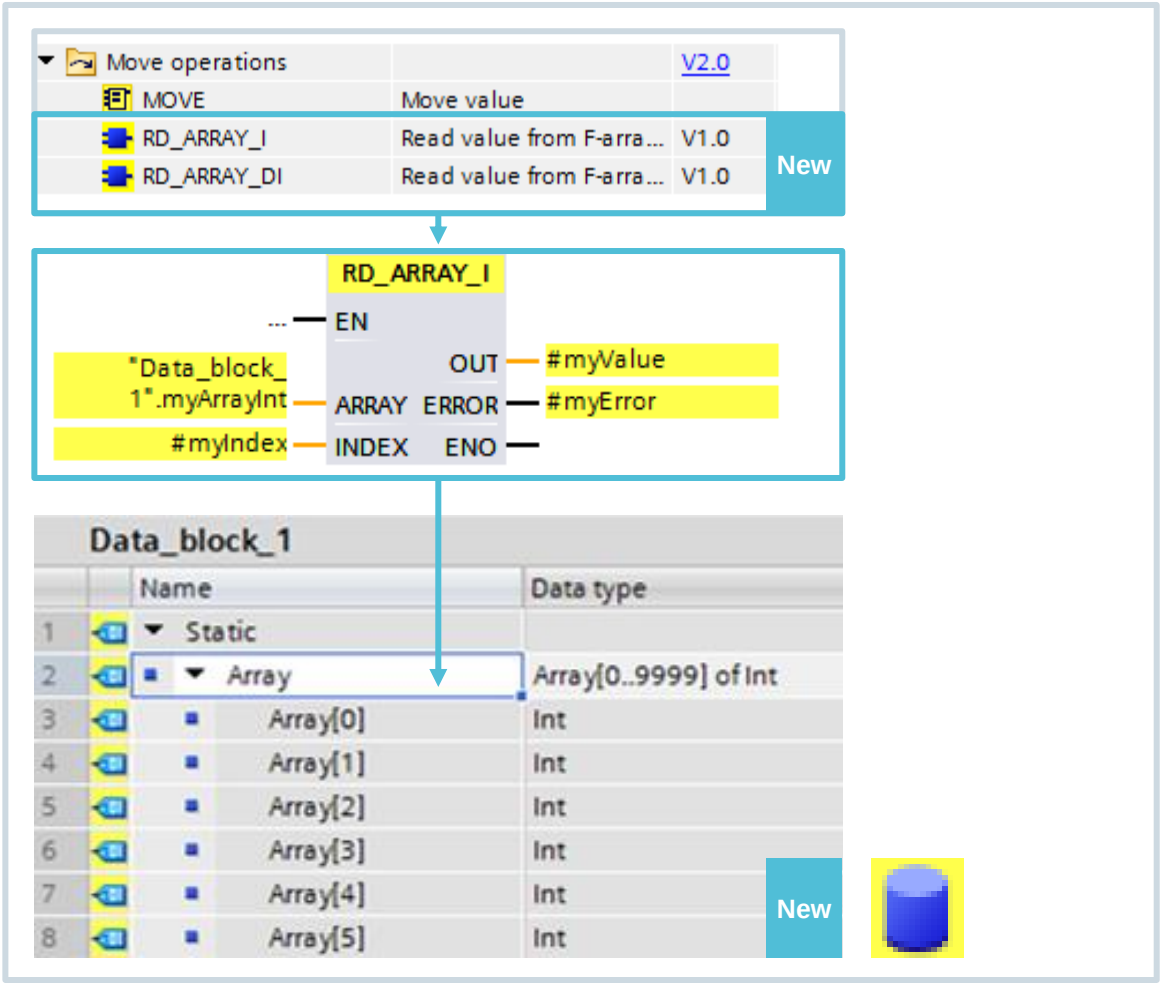
TIA Portal Options – STEP 7 Safety – Read access to failsafe arrays of data type INT/DINT

SIEMENS
Ingenuity for life

S7-1500

Function

- F data blocks support failsafe arrays of **data type INT/DINT**
- Read access to failsafe system blocks **RD_ARRAY_I** and **RD_ARRAY_DI**
- Up to **10,001** (0 … 10,000) **elements per array** are supported



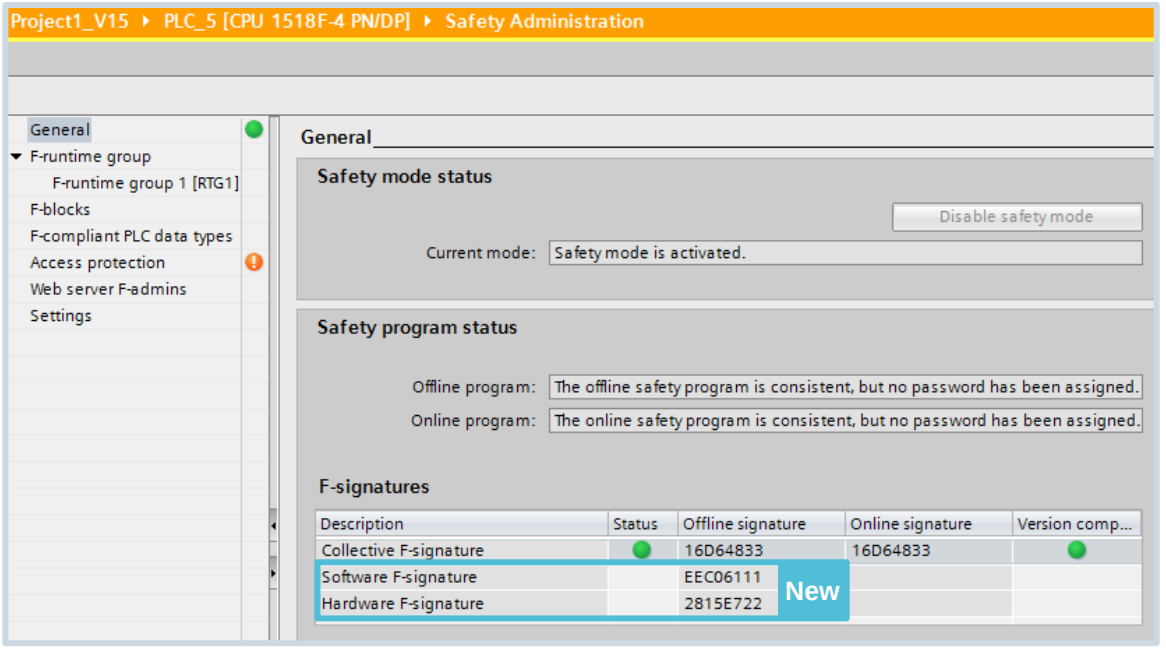
TIA Portal Options – STEP 7 Safety – Separate F-signature for hardware and software

SIEMENS
Ingenuity for life

S7-1200 ✓ S7-1500 ✓

Function

- Differentiability between **hardware** and **software-**related changes
- **Documentation** in safety print-out



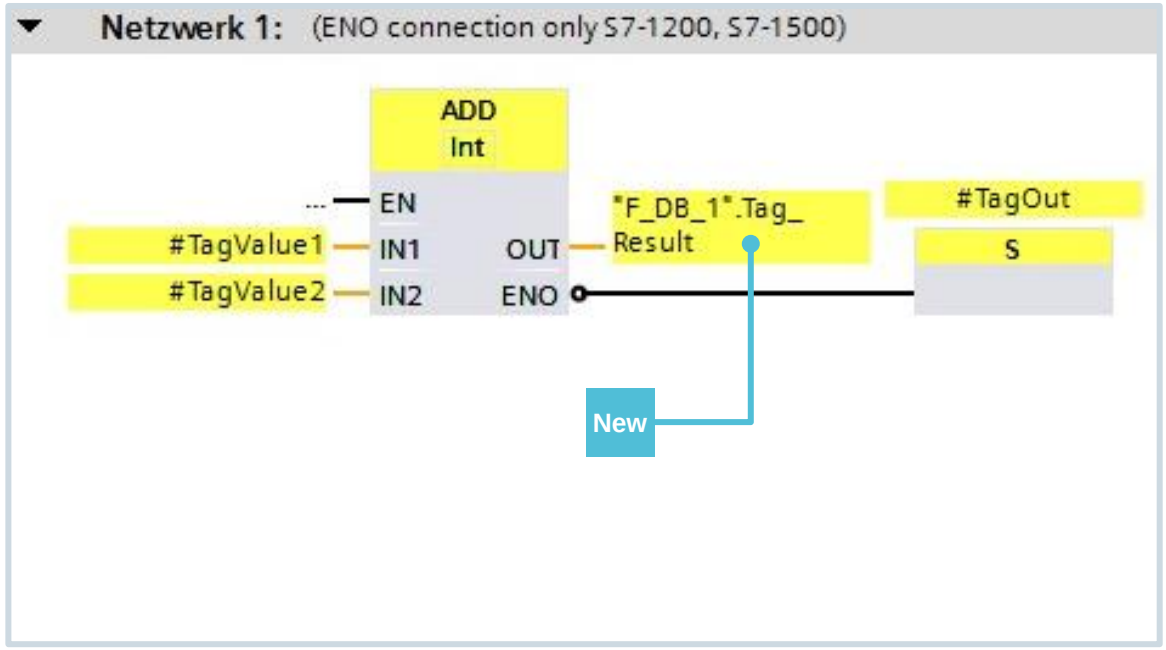
TIA Portal Options – STEP 7 Safety – Overflow Handling

SIEMENS
Ingenuity for life

S7-1200 ✓ S7-1500 ✓

Function

- As with standard operations, failsafe uses the **ENO output** (enable output) **to signal overflows** (according to IEC61131)
- The following **statements** are supported for the data types INT/DINT: **ADD, SUB, MUL, DIV, NEG, ABS, Converter DINT → INT**
- Overflow processing is **activated** by **interconnecting the ENO output**



TIA Portal Options – STEP 7 Safety – Usability improvements and new functions

SIEMENS
Ingenuity for life

S7-1200 ✓ S7-1500 ✓

Usability improvements and other new safety functions

- **Read back of Out parameters with F-FBs** enables a simplified program structure and enhanced clarity
- **Writing of F-FB input parameters** as for STEP 7 Standard/Distributed Safety
- **Start values of instance DBs** can be changed
- **Synchronous F-OB** for connection of synchronous PROFIsafe-Devices (S7-1500)
- **DINT → INT converter** (S7-1200, S7-1500)
- New **"ABS" statement – Absolute value** for INT and DINT (S7-1200, S7-1500)

TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

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Details

TIA Portal Options – Multiuser Engineering – Overview of new functions

SIEMENS
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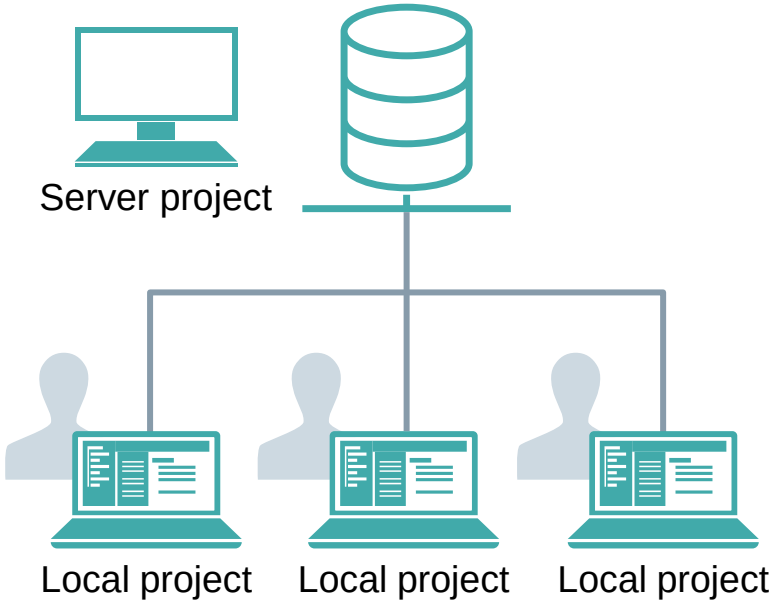
Function

- Automatic marking of multiuser objects
- Offline working possible with multiuser engineering
- Enhanced check-in and comment functions
- Project server with extended revision history and recovery functions

Customer benefits

- Multiuser engineering also possible without active server connection
- Improved usability for quick overview of changed objects and conflict recognition
- Traceability of project progression on the multiuser server (What was changed by whom?)
- Project milestones can be commented and saved
- Project history can be exported for evaluation



TIA Portal Options – Multiuser Server – Improved check-in functions

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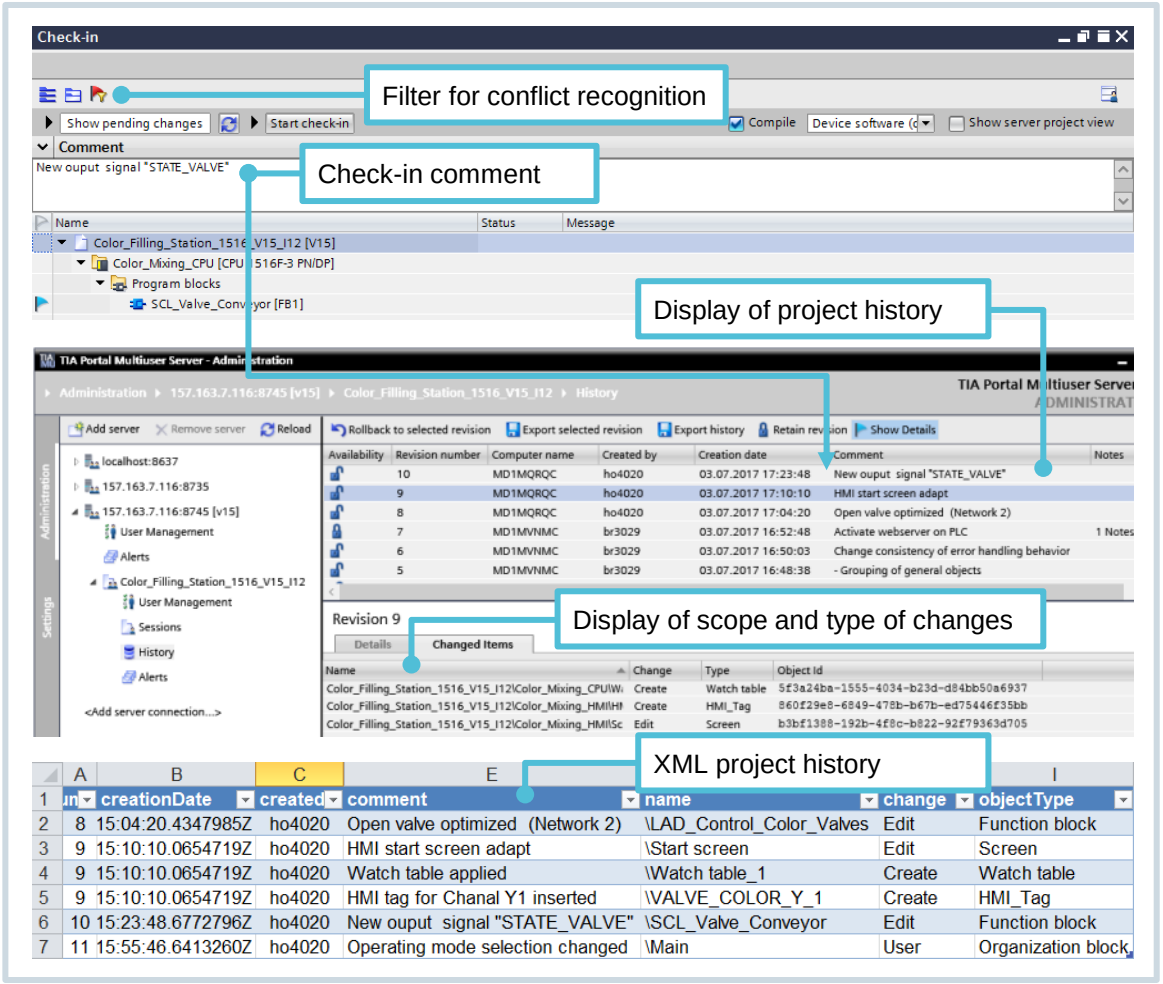
Check-in

- Extended comment option on check-in
- New filter for fast conflict recognition
- Modified objects are saved at check-in
- Export of project history to XML for further evaluations



TIA Portal Options – Multiuser Server – Extended project management

SIEMENS
Ingenuity for life

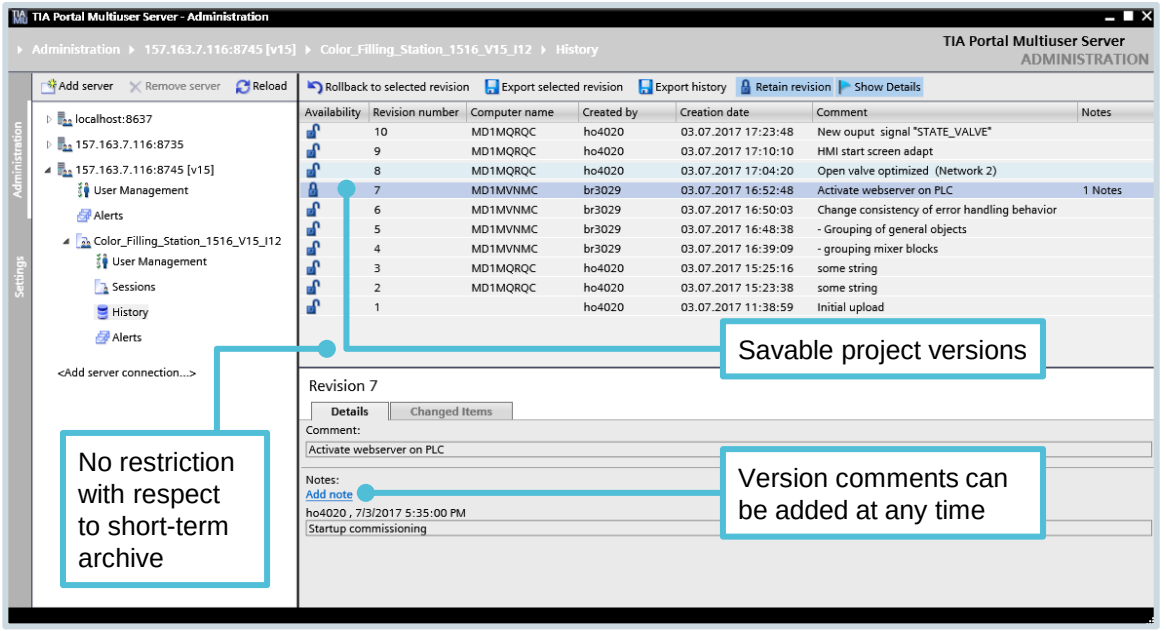
Project management

- No restriction with respect to savable project versions in the short-term archive
- Project versions can be archived and are therefore excluded from the short-term archive

  → Project milestones can be marked in this way (startup, machine handover, functional enhancements, ...)
- Rollback to saved versions possible (since V14)

Server management

- Multiuser Server V15 also supports TIA Portal projects from V14
- Side-by-side installations of Multiuser Server V14 and V15 are possible
- External multiuser tools are now available in all TIA Portal languages



TIA Portal – Highlights of TIA Portal V15

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Ingenuity for life

Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, companion specs

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink: Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

Details

TIA Portal Options – OPC UA – Overview of new functions

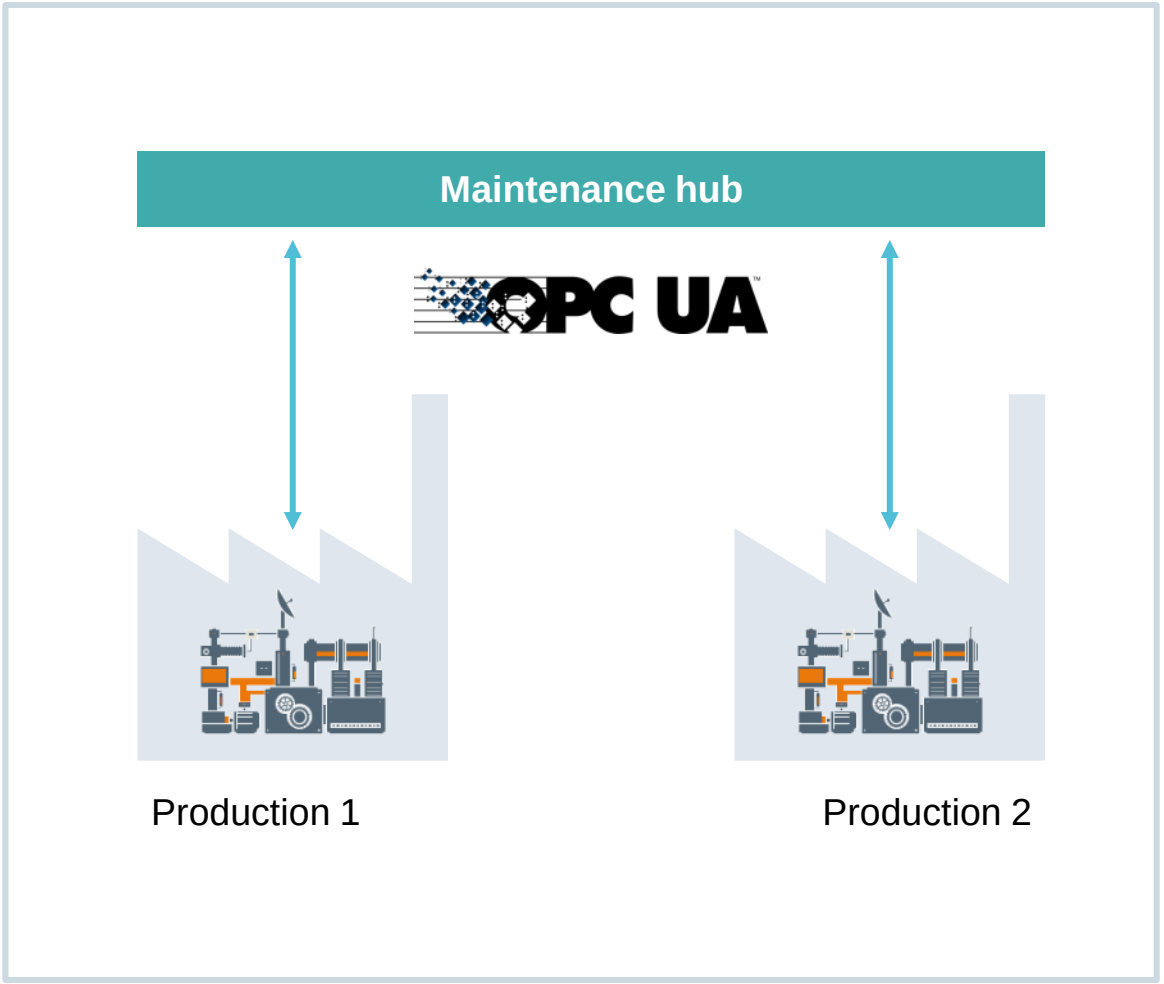
SIEMENS
Ingenuity for life

Function

- OPC UA Server
  - Method call
- Support for companion specifications

Customer benefits

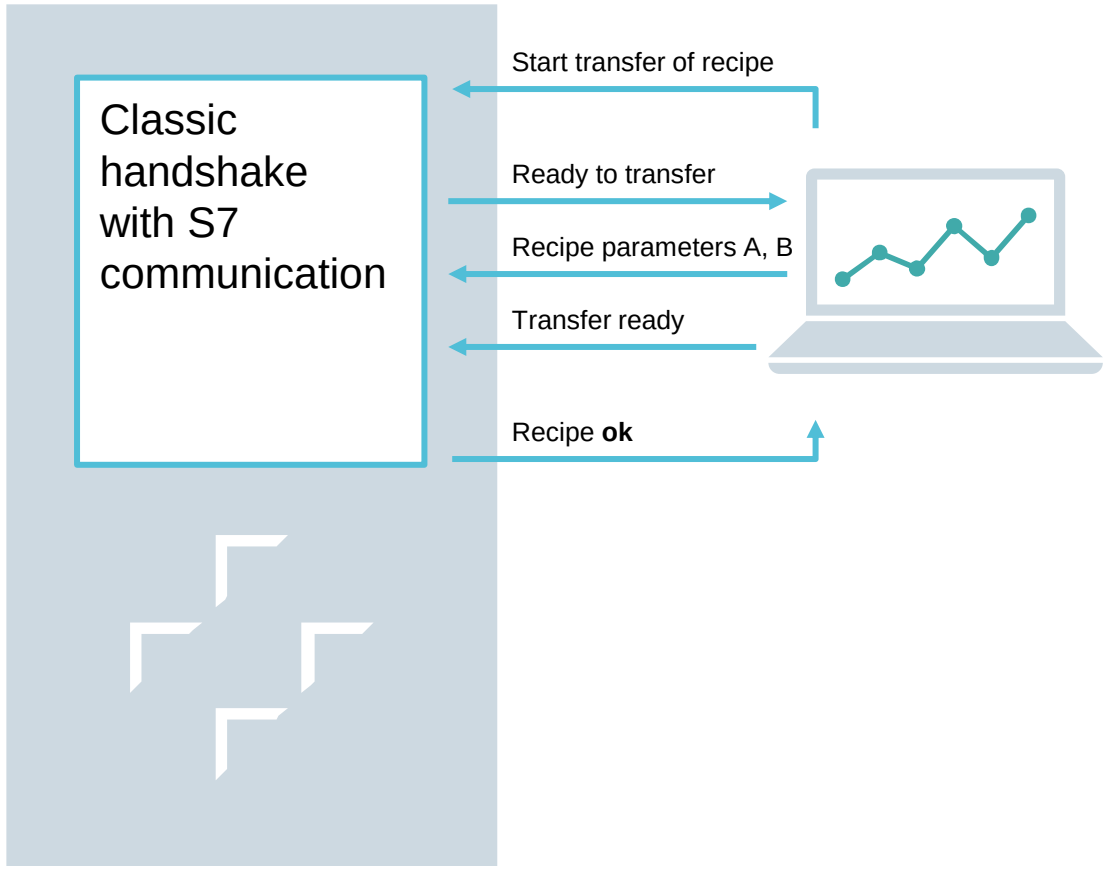
- Simple and safe exchange of data between client and server
- Apart from the up-to-date data and symbolic names, additional attributes can also be exchanged
- Remote Procedure Calls (RPC → call for a remote procedure) are enabled efficiently based on methods
  - Eliminates the need for manually created handshaking
  - Ensures data consistency
- Companion specifications allow plug&play with standardized interfaces



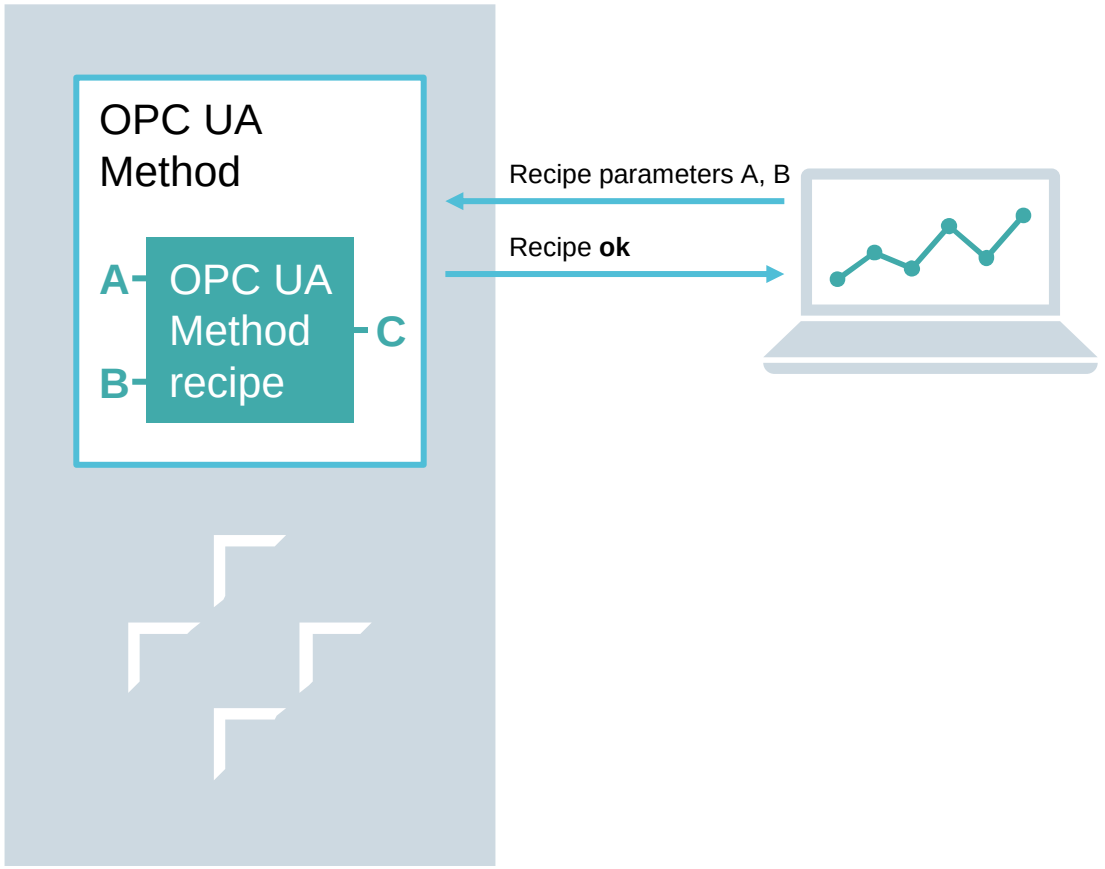
TIA Portal Options – OPC UA – Server method call 1/2

SIEMENS
Ingenuity for life

Classic handshake



OPC UA method call as efficient replacement



TIA Portal Options – OPC UA – Server method call 2/2

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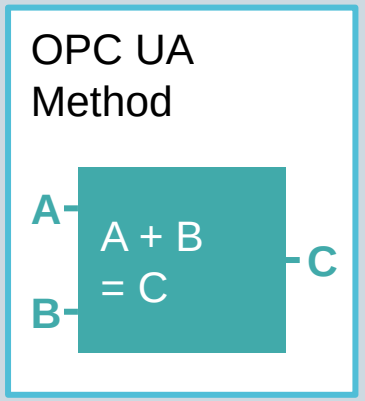
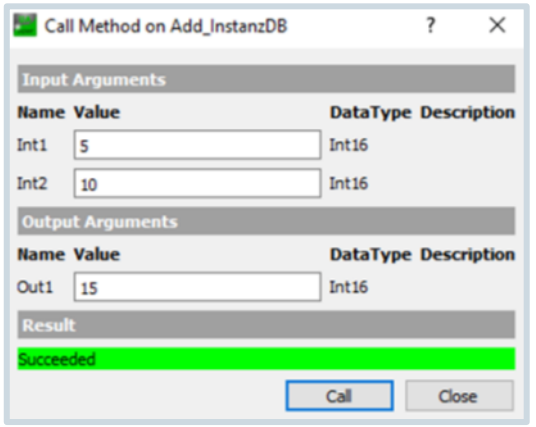
Ingenuity for life



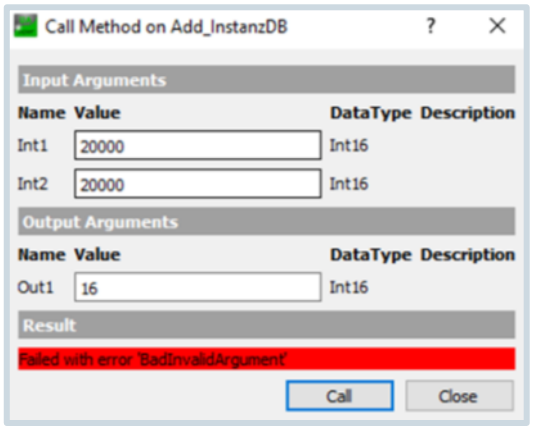
CallRequest(a=5, b=10)

CallResponse(c=15, Good)



CallRequest(a=20000, b=20000)

CallResponse(BadInvalidArgument)



TIA Portal Options – OPC UA – Companion-Spezifikationen

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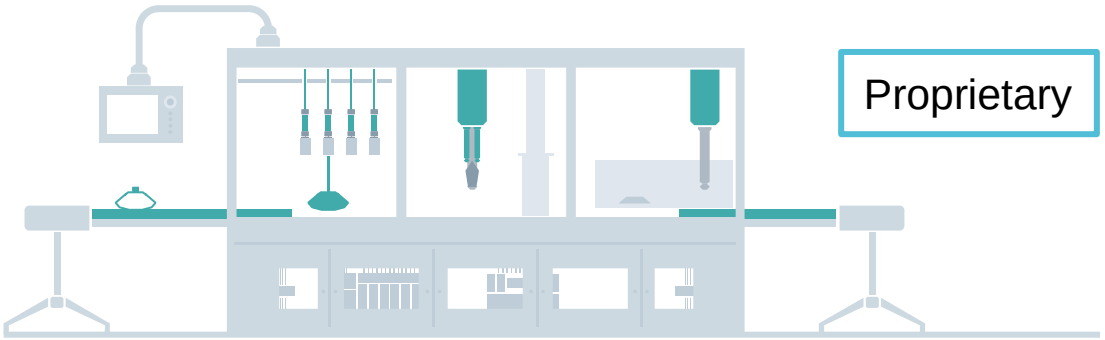
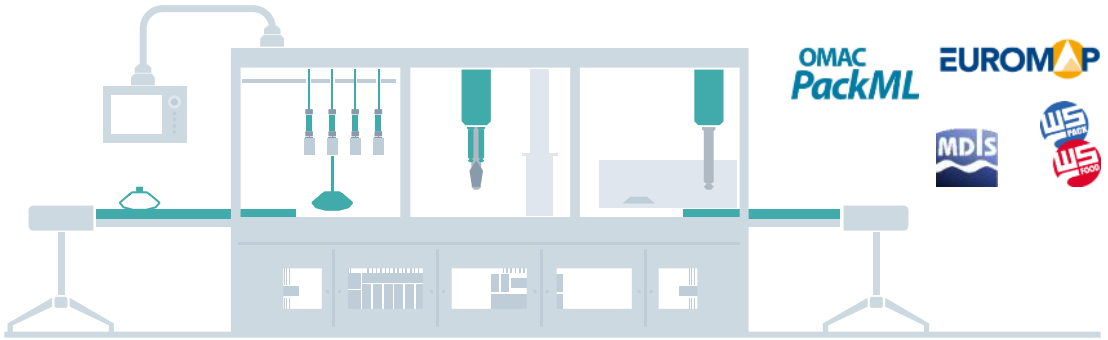
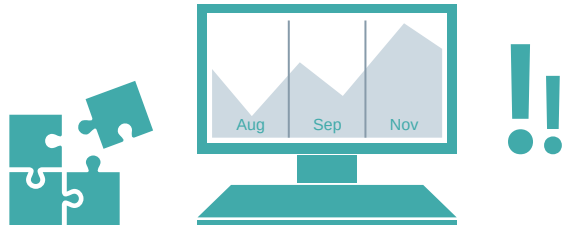
Ingenuity for life

Costly integration of the most varied proprietary standards



Plug&play connectivity with standardized machine type interfaces





TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

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Details

TIA Portal Options – ProDiag – Overview of new functions

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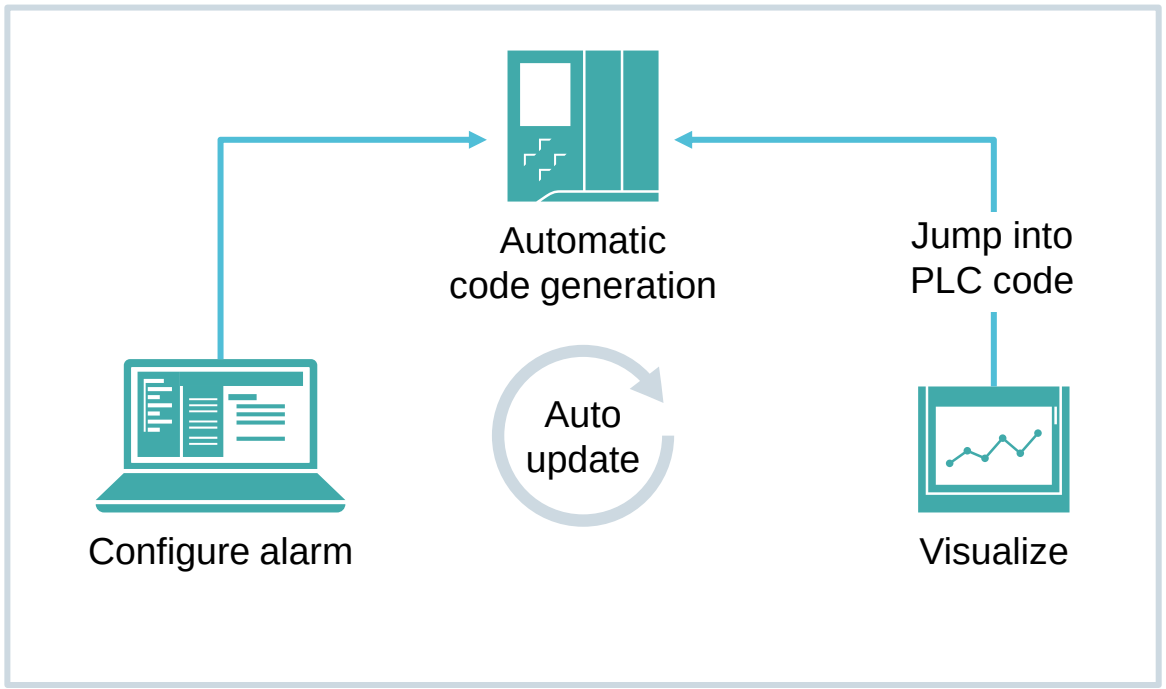
Ingenuity for life

Function

- **Criteria analysis** for ProDiag supervisions and S7-Graph
- Result of the criteria analysis within the alarm text
- Display of Predecessor/successor step within the HMI **S7-Graph Overview Control**
- **1000 supervisions** per supervision block (250 in V14)
- **Identical timestamp** for all identified events in a cycle
- Rapid activation of supervisions in PLC tag table, DB
- Numerous other useful functional enhancements (see detailed slides)

Customer benefits

Even simpler engineering of supervisions and improved diagnosis during operation with **SIMATIC ProDiag**



TIA Portal Options – ProDiag – Result of criteria analysis in alarms

SIEMENS
Ingenuity for life

Function

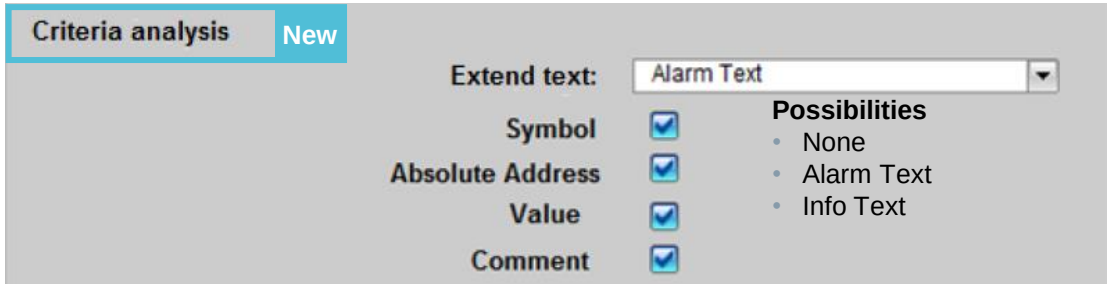
- The result of the “initial value” is included in the alarm for S7-Graph and S7-ProDiag supervisions on the HMI
- The scope of information can be parameterized (symbol, symbol comment, address, value)

Customer benefits

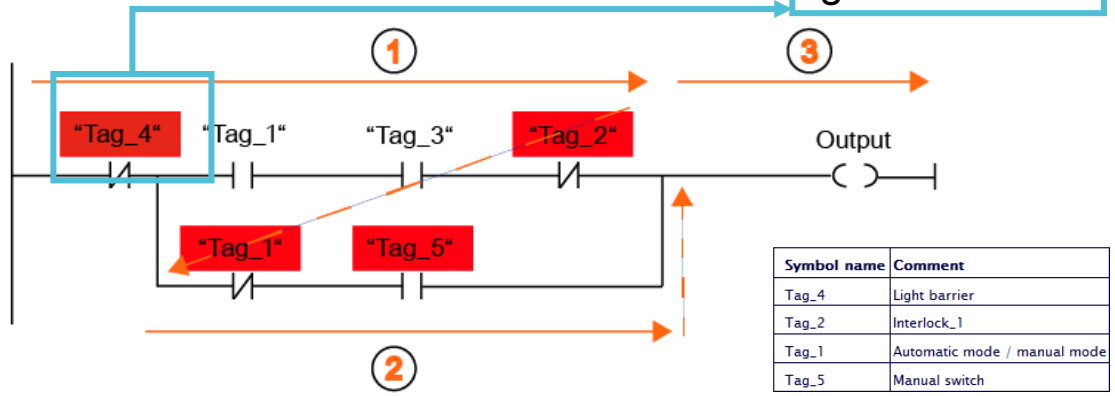
Customer receives initial value in the S7-GRAPH/ProDiag alarm based on a fixed rule, whereby the operand is considered first at the start of the network

Elaborate alarm statistics for machine diagnostics

New HMI Runtime settings



Postfix in alarm text → … Initial value: … _ight barrier

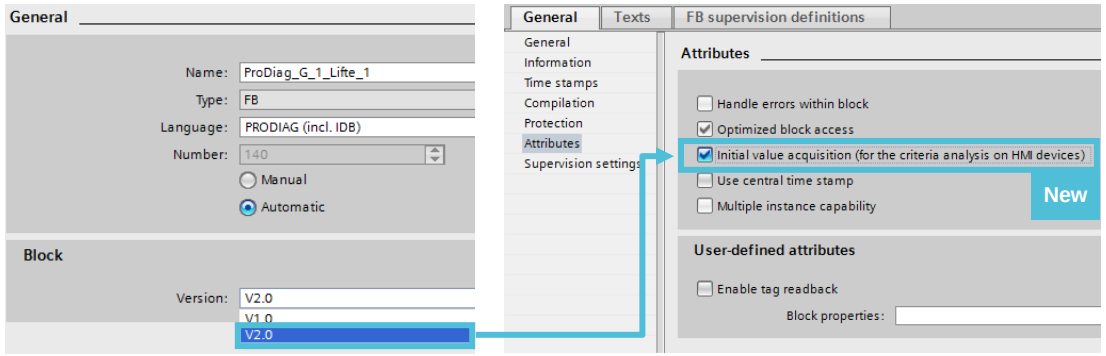


TIA Portal Options – ProDiag – Criteria analysis for HMI PLC Code Viewer

SIEMENS
Ingenuity for life

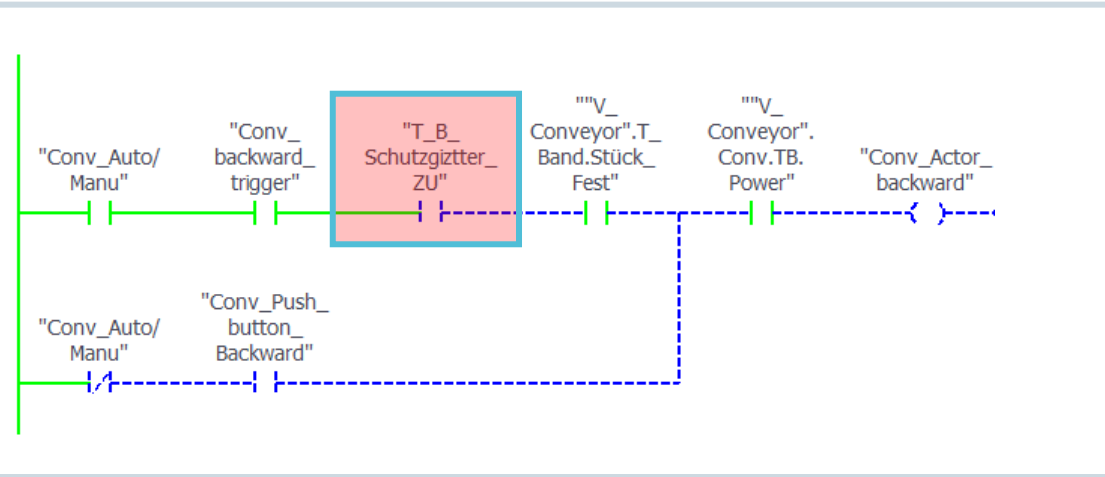
Function

- The initial value identified in a cycle are marked in the PLC Code Viewer for ProDiag supervisions
- This function is available for S7-GRAPH since V14 SP1



Customer benefits

Recurring errors can be localized more easily since the causative error sources are marked



Fast visual recognition of causative error sources

TIA Portal Options – ProDiag – Identical timestamp for all events identified within a CPU cycle

SIEMENS
Ingenuity for life

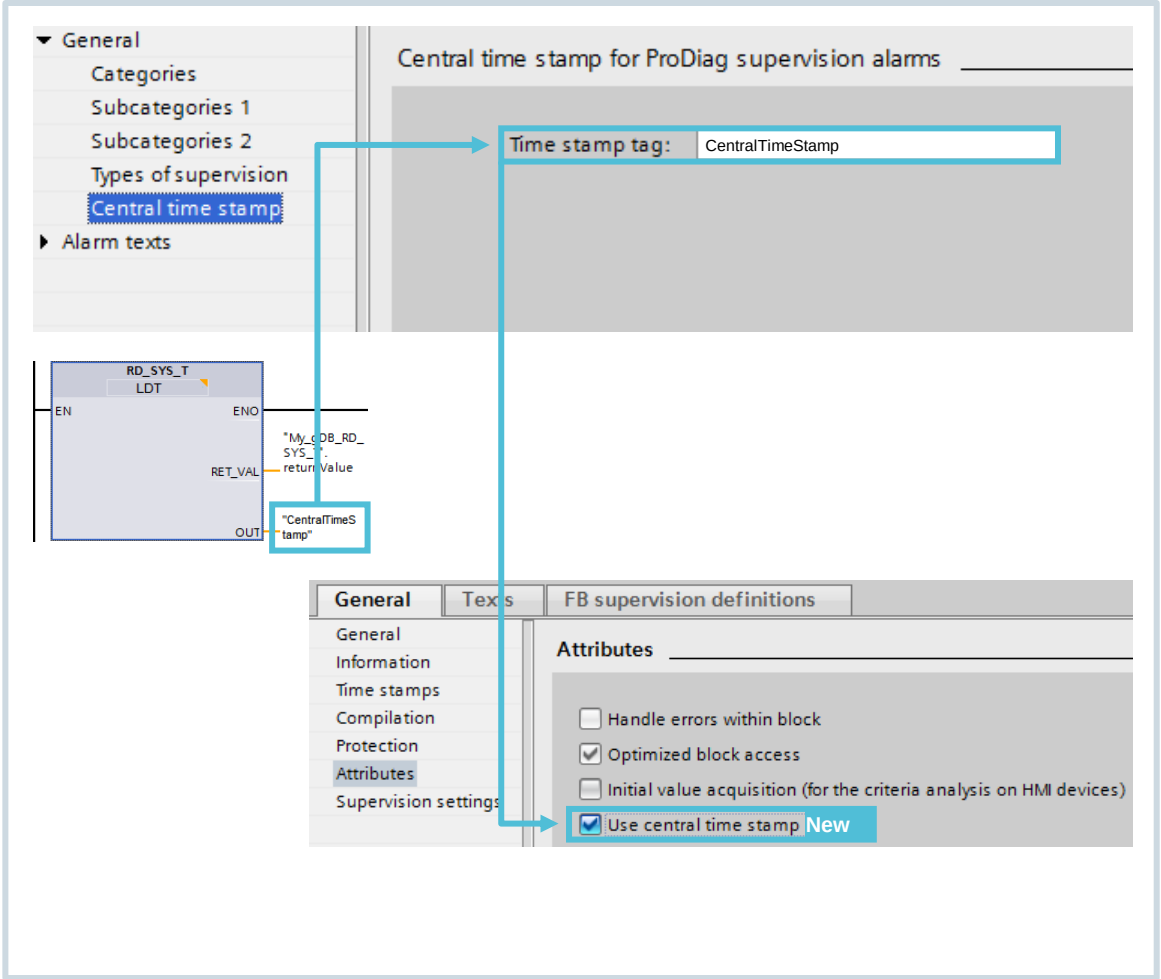
Function

- A tag can be defined in the global supervision settings for recording a time-stamp (at the start of a CPU cycle)
- This is used if necessary by all ProDiag supervision function blocks (property of ProDiag FBs)

Customer benefits

The user can fully trace back which events were identified within a CPU cycle

→ Helpful for resolving the cause of error in comprehensive fault analysis



Timestamping of alarms to the precise second!

TIA Portal Options – ProDiag – Enhancement of HMI S7-GRAPH Overview Control

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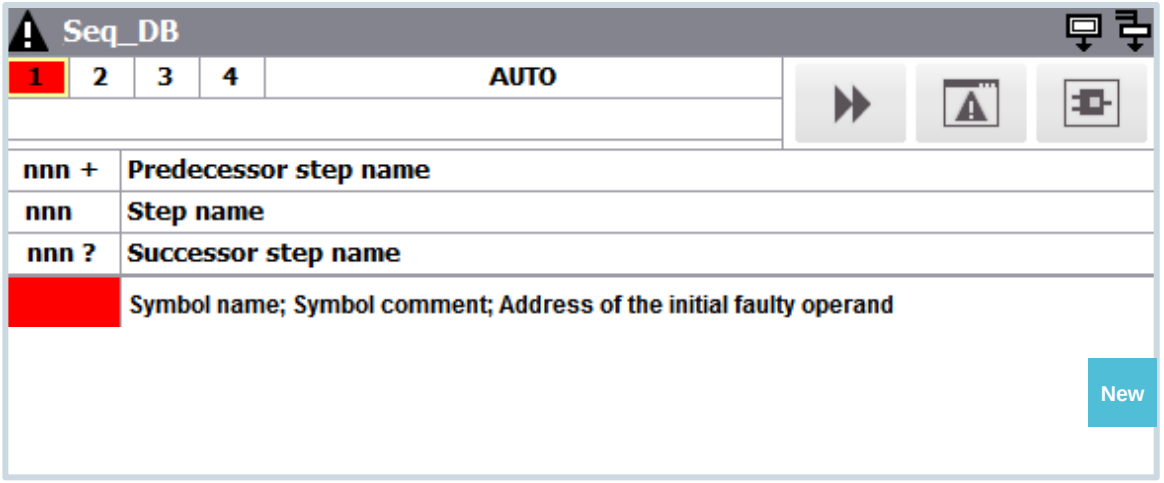
Ingenuity for life

Function

Display of additional information for quickly resolving errors in a faulty step sequence

- Predecessor/successor step
- Several parallel steps are connected upstream (+)
- Several parallel steps are connected downstream (?)
- Display of interlock ■/Supervision error ■
- Output of initial value



Customer benefits

- The operator or maintenance engineer receives all necessary information at a glance
- Access to the PLC Code Viewer is only necessary to obtain additional criteria for the step enabling condition of a sequence (more in-depth fault analysis)

Rapid diagnosis!

Time saving, rapid fault localization without additional operation measures

TIA Portal Options – ProDiag – 1,000 supervisions per ProDiag supervision function block

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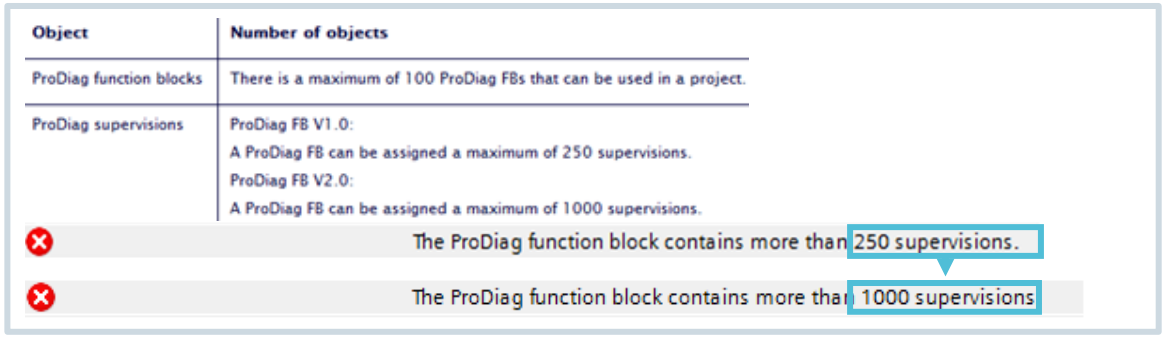
Ingenuity for life

Function

Compared with the predecessor version (V 1.0), 1,000 supervisions can now be grouped (V2.0) within a ProDiag supervision function block instead of 250



Customer benefits

- The customer can organize the grouping of supervisions ever easier in terms of technological aspects
- In case of smaller systems without a technological hierarchy, all supervisions can be groped in a single ProDiag supervision function block so that no separate assignment is necessary

Simple!

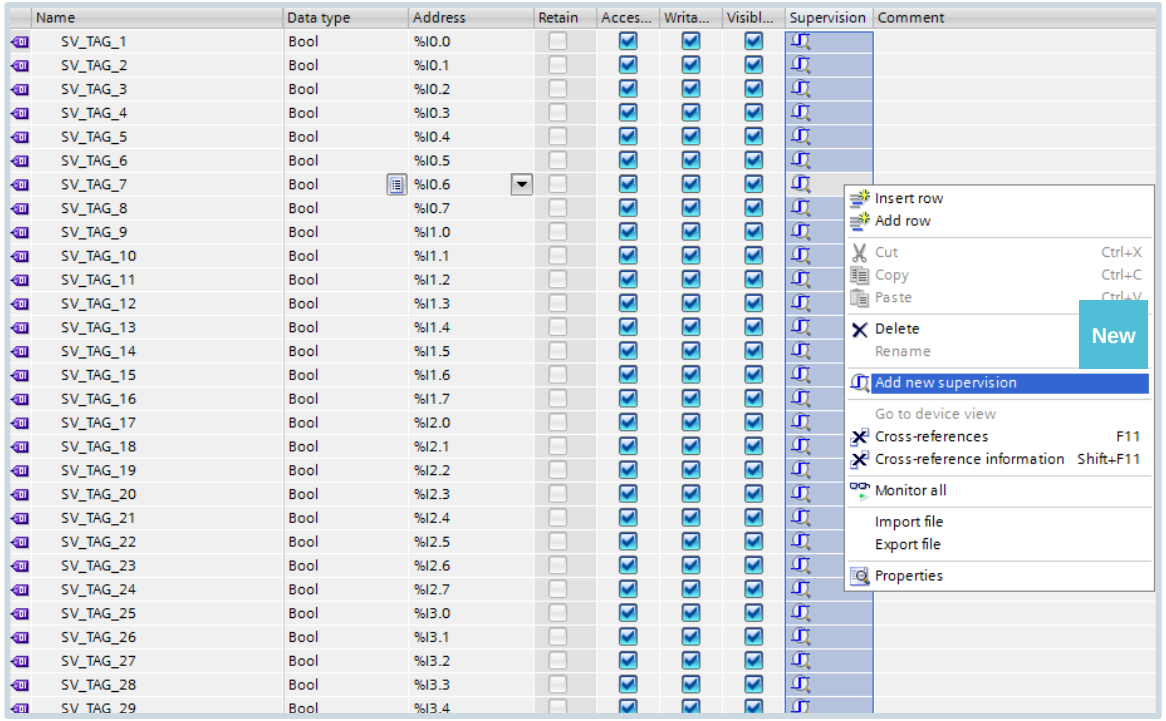
Even simpler ProDiag handling for OEMs

TIA Portal Options – ProDiag – Multiple selection for defining supervisions

SIEMENS
Ingenuity for life

Function

- A large number of supervisions can be created in a single operation in the PLC Tag Table and in the Global DB also in the FB interface
- Only Boolean tags are taken into account within the selection. In other words, non-boolean tags do not have to be specifically excluded in the multiple selection



Customer benefits

Rapid definition of multiple supervisions

Increased engineering efficiency!

Time saving, avoidance of errors

TIA Portal Options – ProDiag – Collection of useful functional enhancements – HMI Display

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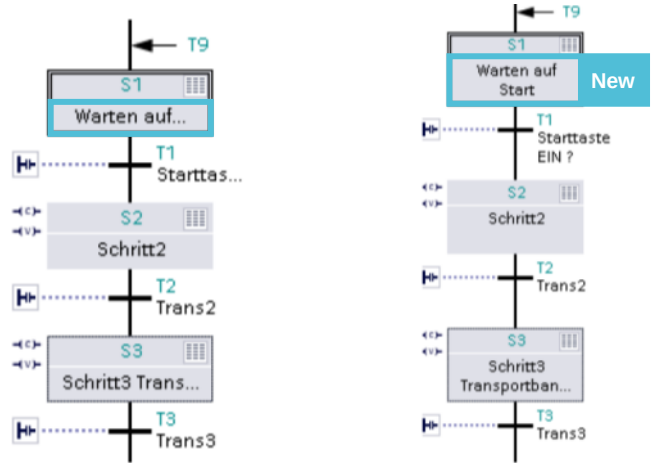
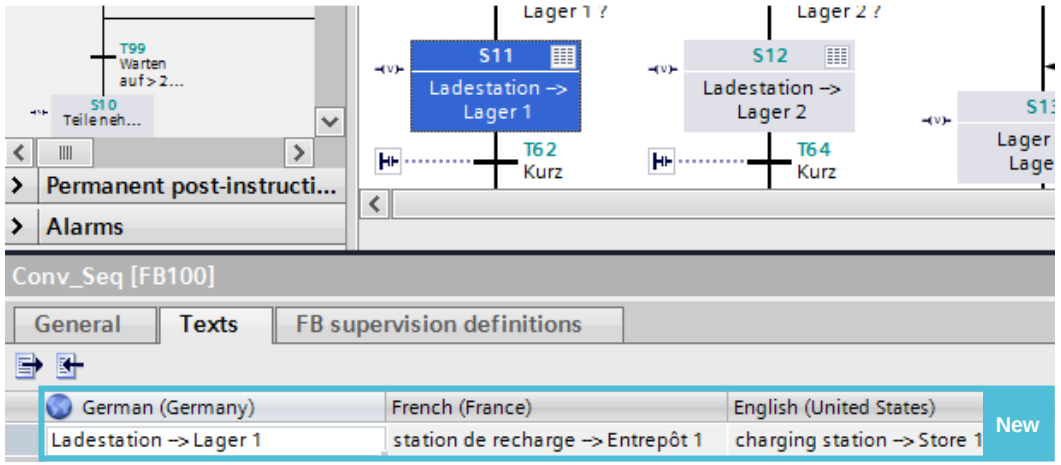
HMI PLC Code Viewer

Two-row presentation of step names and transition names as in the TIA Portal (optional)



S7-GRAPH: Multilingual names

- Multilingual configuration of step/transition names
- Output of multilingual names in the messages, PLC Code Viewer and S7-Graph Overview Control



TIA Portal Options – ProDiag – Collection of useful functional enhancements – HMI Controls

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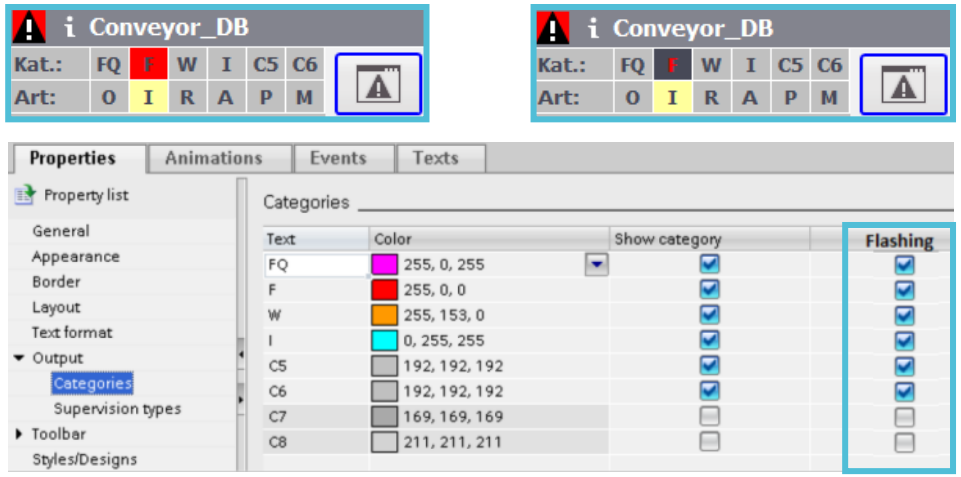
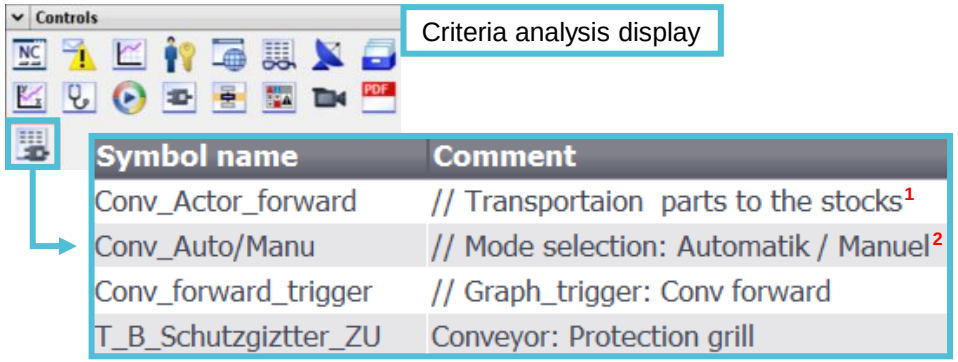
Flashing indicator for Overview Controls

Errors can be registered more easily by the operator (attention factor)



Criteria analysis display

Display of all faulty operands for an S7-ProDiag-/ S7-GRAPH alarm (only the first faulty operand is listed in the message itself) identified in a cycle



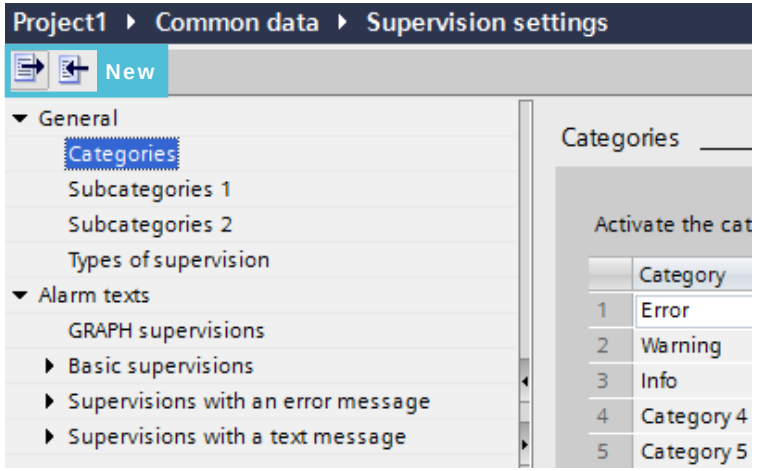
1 First faulty operand → Content of message text
2 Other faulty conditions detected in the same CPU cycle

TIA Portal Options – ProDiag – Collection of useful functional enhancements – Export/import

SIEMENS
Ingenuity for life

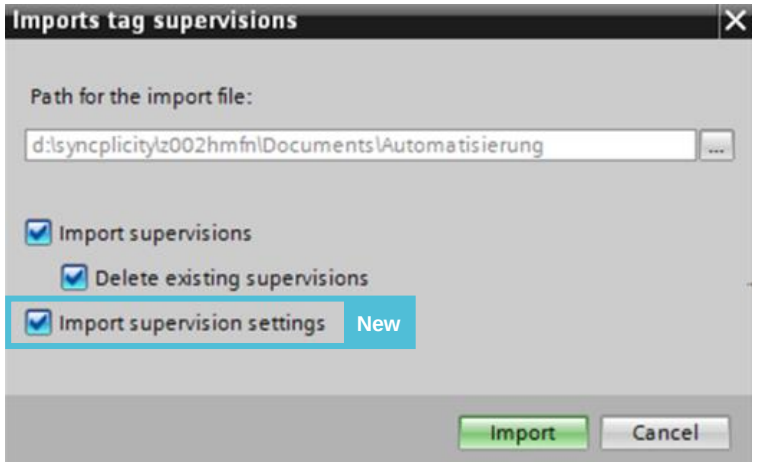
Export/import of global settings

Project settings can be synchronized easily by exporting/importing global settings



Export/import of ProDiag-FB settings

In addition to importing supervisions, the block-specific settings can also be imported (export is executed automatically)

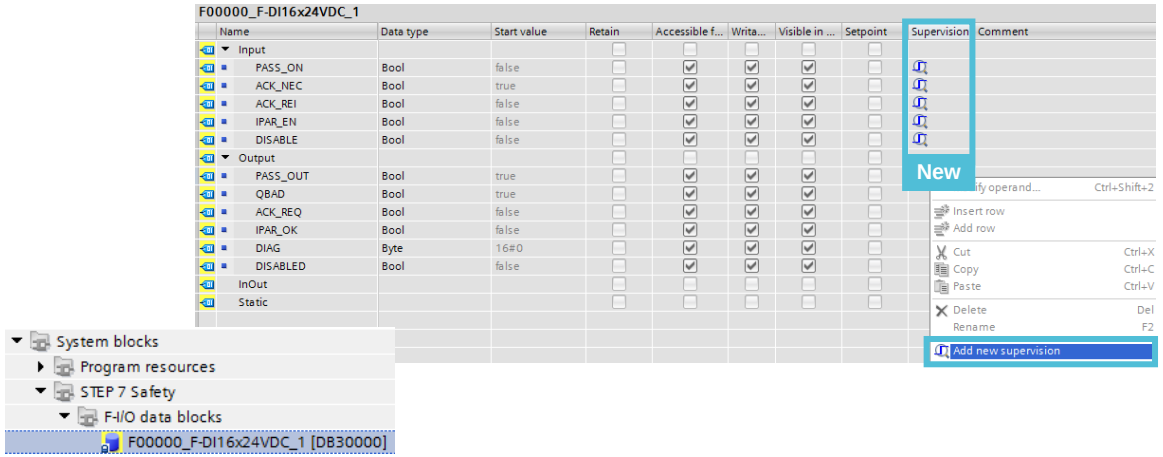


TIA Portal Options – ProDiag – Collection of useful functional enhancements – Failsafe

SIEMENS
Ingenuity for life

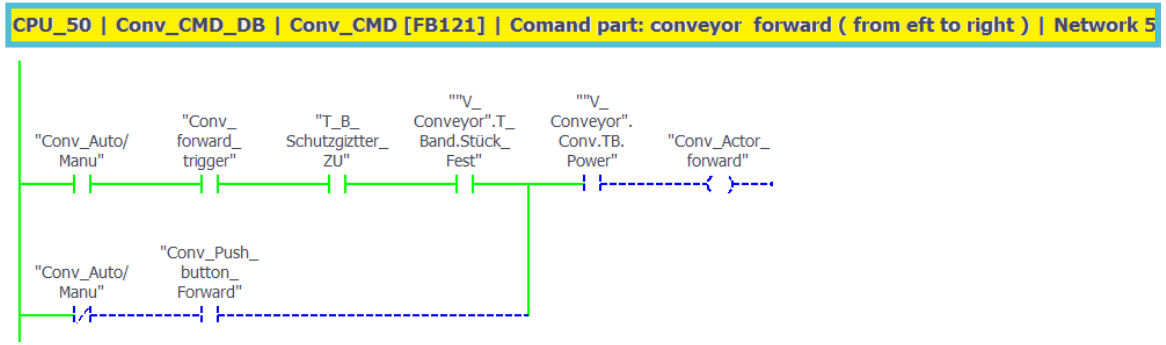
Supervision of failsafe F-IO-FBs integrated in the system

→ Efficient engineering for supervision of F-signals



HMI PLC Code Viewer: Representation of F-blocks

- F-blocks can be displayed in the PLC Code Viewer. The blocks are presented in the same way as for standard blocks
- The user can establish instantly from the yellow-colored header whether s/he is analyzing an F-block

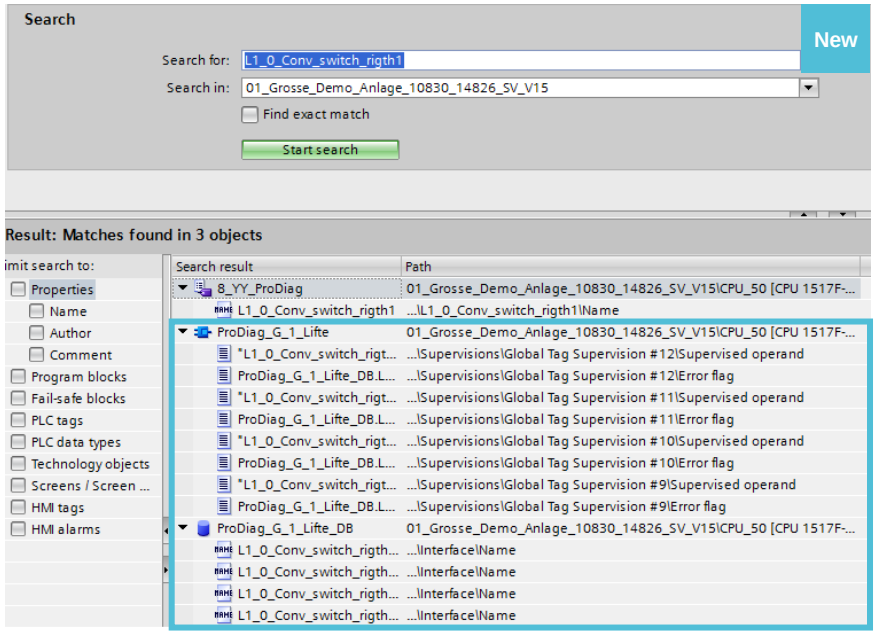


TIA Portal Options – ProDiag – Collection of useful functional enhancements – Engineering

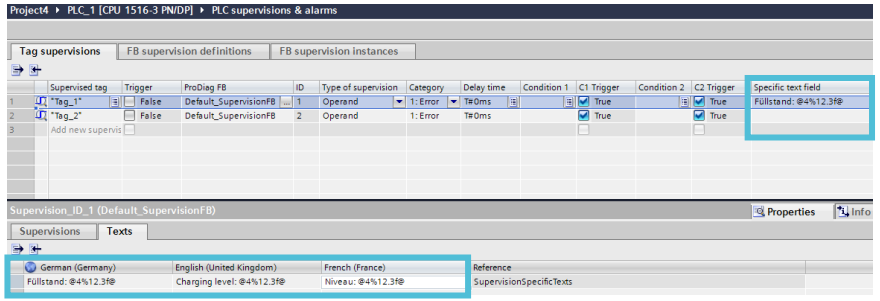
SIEMENS
Ingenuity for life

ProDiag: Global Search

→ ProDiag is now also taken into account in the Global Search



Multilingual, specific text field



TIA Portal Options – ProDiag – Collection of functional enhancements – Engineering

SIEMENS
Ingenuity for life

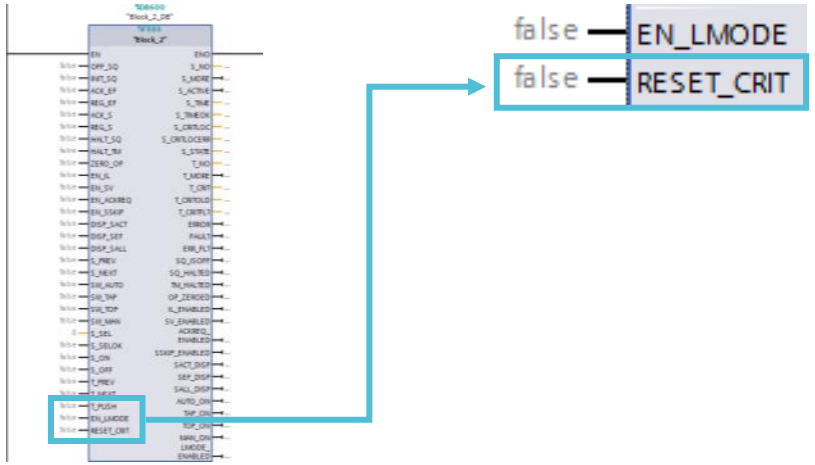
Identification of supervisions

→ If there is more than one supervision for a Boolean tag, this will be identified accordingly

→ The customer can determine instantly if s/he has inadvertently defined more than one supervision per tag

S7-GRAPH: Resetting of first faulty operand via the new “RESET_CRIT” input parameter in the Graph Maximum Interface Set

→ The customer has the option to manually delete the last initial values recorded. No more old values are therefore displayed in the HMI PLC Code Viewer!

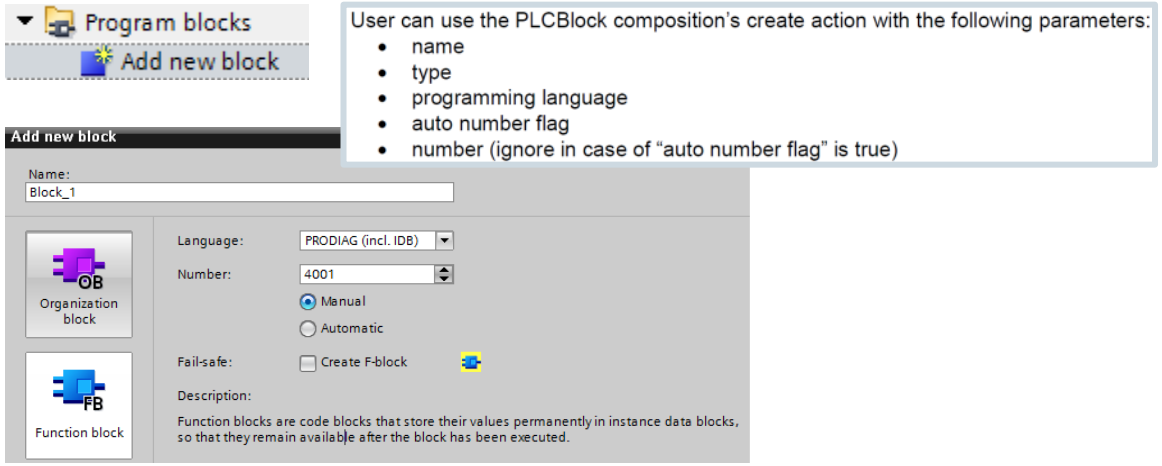


TIA Portal Options – ProDiag – Collection of functional enhancements – Openness

SIEMENS
Ingenuity for life

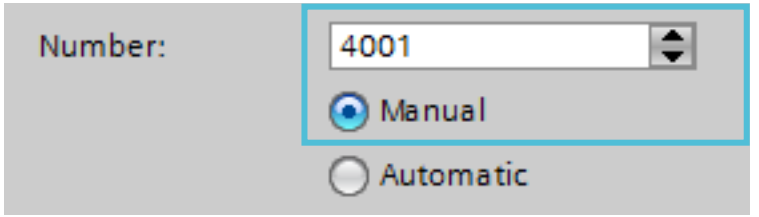
Creation of a ProDiag-FB via Openness

→ The customer can use the Openness interface to add or create ProDiag blocks



Manual assignment of block numbers for ProDiag blocks via Openness

→ The customer can therefore determine number ranges for his/her ProDiag blocks via the Openness interface

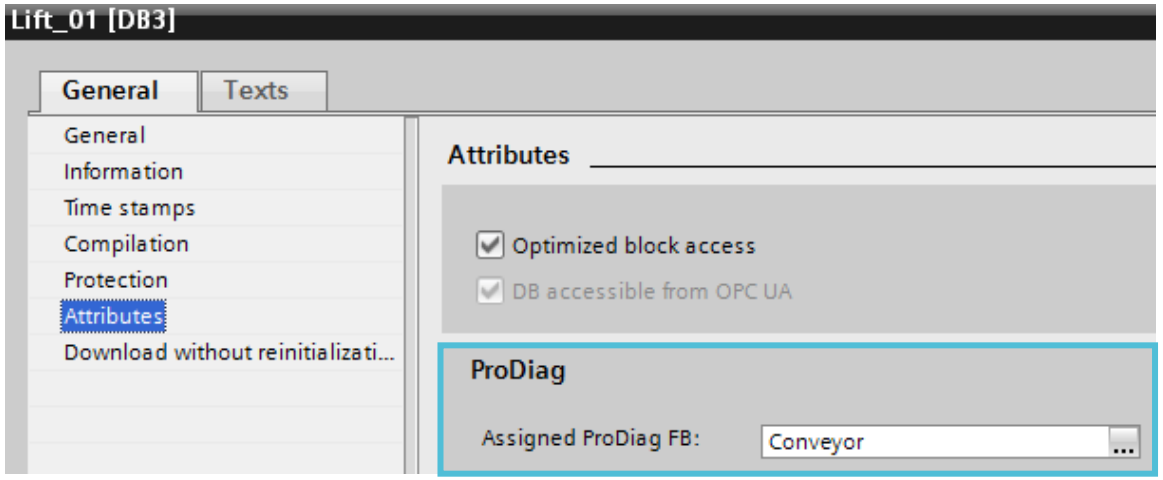


TIA Portal Options – ProDiag – Collection of functional enhancements – Openness

SIEMENS
Ingenuity for life

Assignment of user blocks to a ProDiag supervision block

- The assignment of supervisions of a user FB to ProDiag supervision blocks was possible up to now directly in the TIA Portal or externally via export/import from Excel files (*.xlsx)
- From Version 15, it is now possible to also execute this assignment via the Openness interface




```
PlcBlockGroup blockFolder = YourUtilities.GetFolder();
PlcSoftware instanceDB = blockFolder.Blocks.Find("Lift_01");
PlcSoftware plcProdiag = blockFolder.Blocks.Find("Conveyor");
instanceDB.SetAttribute("AssignedProDiagFB", plcProdiag.name);
```

TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

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TIA Portal Options – PLCSIM Advanced V2.0 – Overview of new functions

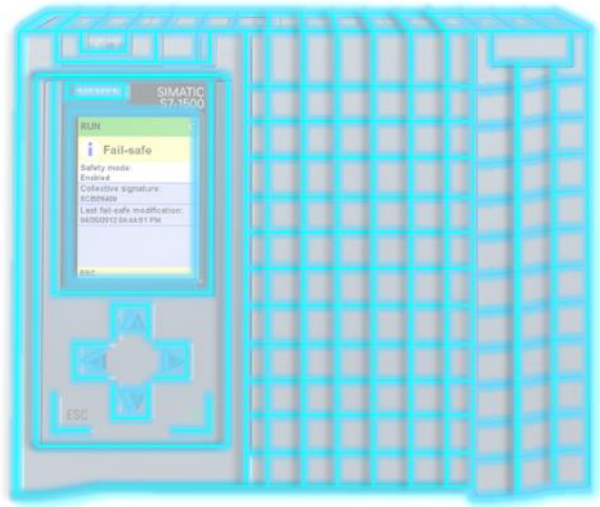
SIEMENS
Ingenuity for life

Function

- **Synchronization of** PLCSIM Advanced with co-simulation tools on **part process images of** cyclical OBs (e.g. watchdog OBs)
- Support for **acyclical services** (RDREC/WRREC) and alarms (e.g. process alarms)
- Process alarms configured in the TIA Portal can be **output** via the **API**
- **Simple backup and recovery** of software and hardware configuration of PLCSIM Advanced instances
- **Parallel installation** of PLCSIM and PLCSIM Advanced on one PC
- Other useful functional enhancements (see detailed slides)

Customer benefits

Development of additional customer use cases in a virtual environment



Digital Twin of S7-1500

TIA Portal Options – PLCSIM Advanced V2.0 – Synchronization of part process images

SIEMENS
Ingenuity for life

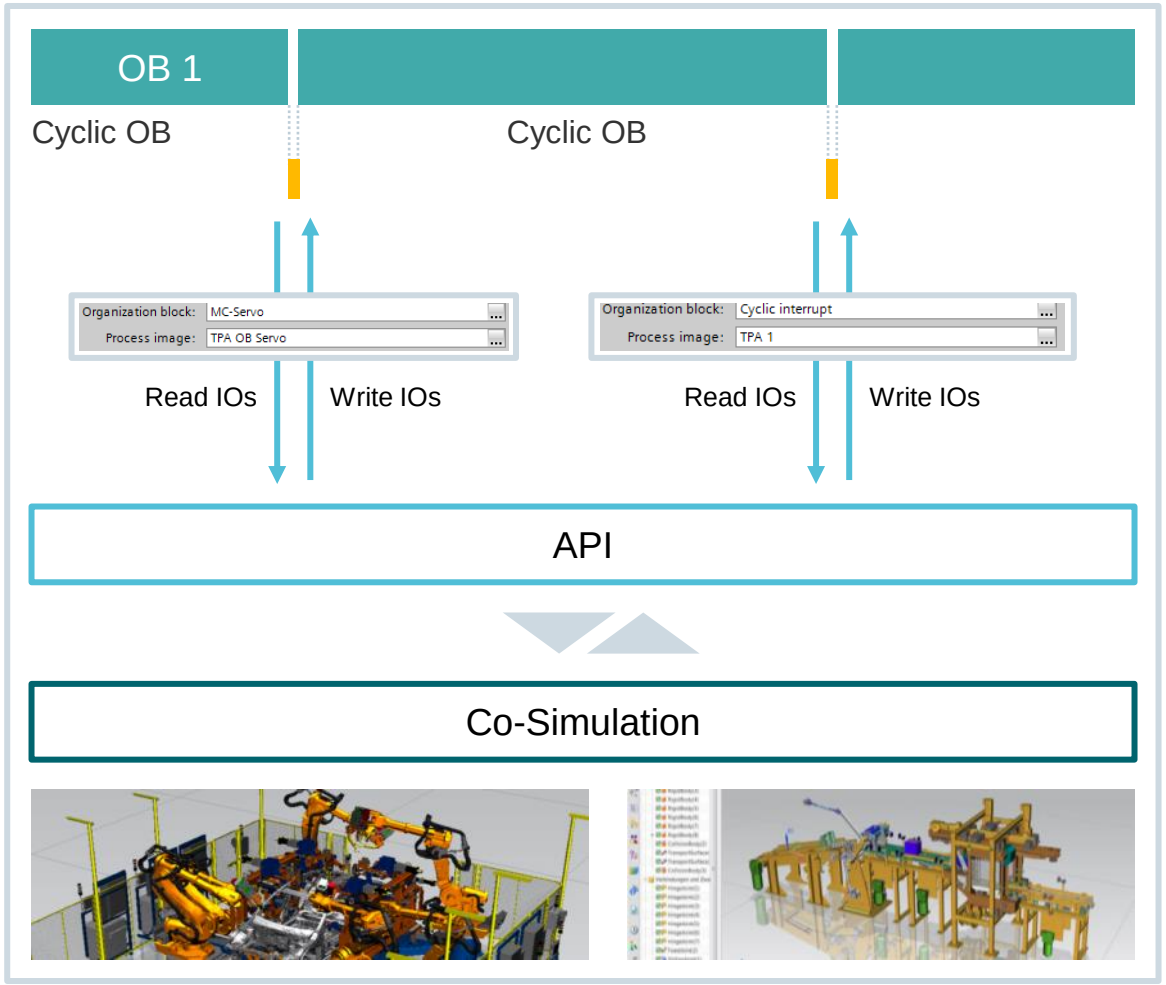
Synchronization of part process images

Via the PLCSIM Advanced API with co-simulation tools when invoking cyclical OBs

- By assigning a part process image to a cyclical OB (e.g. watchdog OB or MC-servo OB)
- In the user program with SFC26 (UPDAT_PI) and SFC27 (UPDAT_PO) or SFC14 (DPRD_DAT) and SFC15 (DPWR_DAT) or SFC126 (SYNC_PI) and SFC127 (SYNC_PO)

Customer benefits

Verification of user program including access to a consistent image of **current** process signals when invoking cyclical OBs



TIA Portal Options – PLCSIM Advanced V2.0 – Support for acyclical services

SIEMENS
Ingenuity for life

Trigger alarms and events with API call

- Process alarms (OB40)
- Status alarms (OB55)
- Update alarms (OB56)
- Profile alarms (OB57)
- Diagnostic alarms (OB82)
- Pull/plug alarms (OB83)

Customer benefits

Comprehensive test options for spontaneously occurring malfunctions in a machine/system

```
enum EProcessEventType
{
    Undefined       = 0,
    RisingEdge      = 1,
    FallingEdge     = 2,
    Limit1Underrun  = 3
    Limit1Overrun   = 4,
    Limit2Underrun  = 5,
    Limit2Overrun   = 6
}
```

```
public struct SPlcSimDiagItems
{
    public UInt16         ChannelNumber;
    public UInt16         ErrorType;
    public UInt16         ExtendedErrorType;
    public EDiagSeverity  Severity;
    public EDiagProperty  Direction
}
```

Exchange acyclical data

Write and read support for data record via SFB52 (RDREC) SFB53 (WRREC)

Customer benefits

Option to transfer acyclical data between a co-simulation and the PLCSIM Advanced API (e.g. RFID data)

TIA Portal Options – PLCSIM Advanced V2.0 – Back up software and hardware configuration

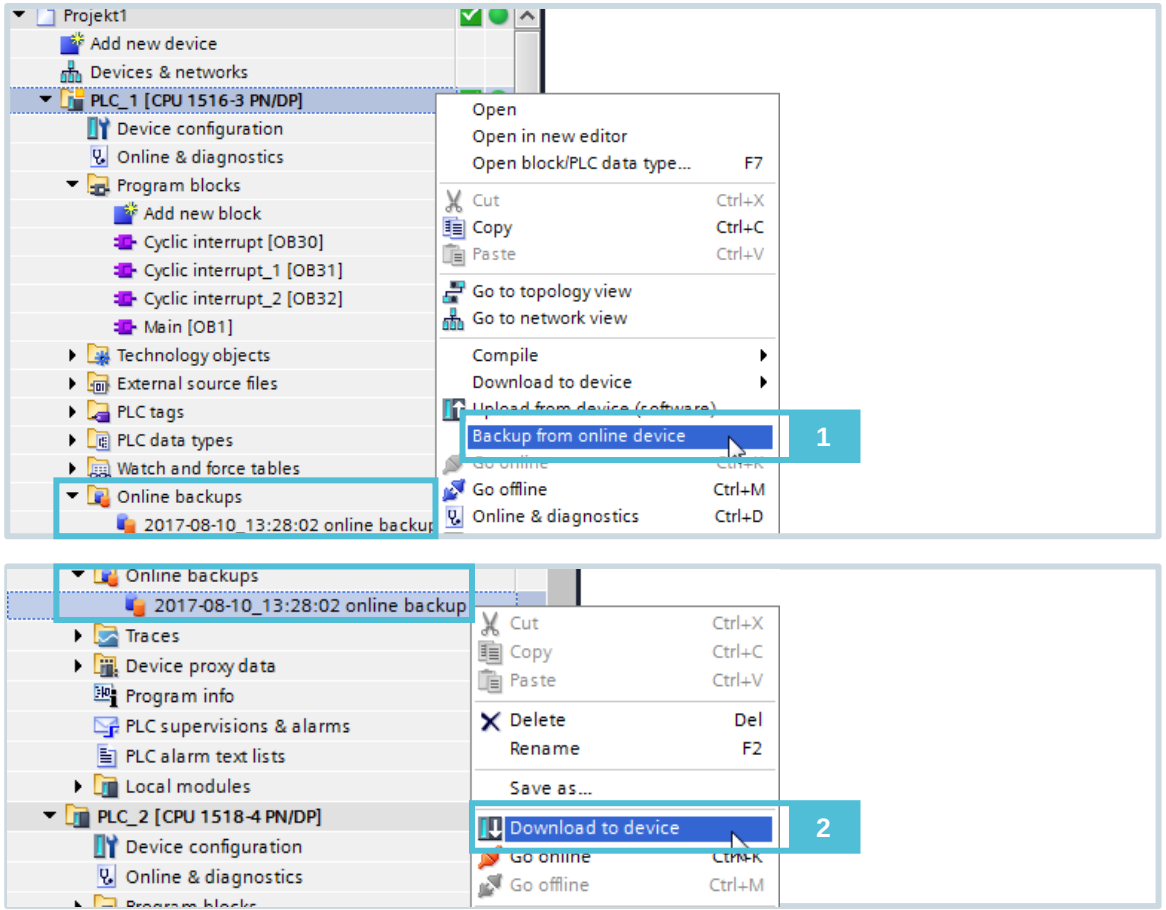
SIEMENS
Ingenuity for life

Backup from online device

- Consistent backup of software and hardware configuration of a CPU created in PLCSIM Advanced from the TIA Portal
- Subsequent loading of backed up software and hardware configuration in a CPU created in PLCSIM Advanced

Customer benefits

Simulations can be interrupted by the backup and continued after the backup is loaded since the backup includes residual up-to-date values



TIA Portal Options – PLCSIM Advanced V2.0 – Direct CPU operation

SIEMENS
Ingenuity for life

Setting CPUs to Run/Stop status

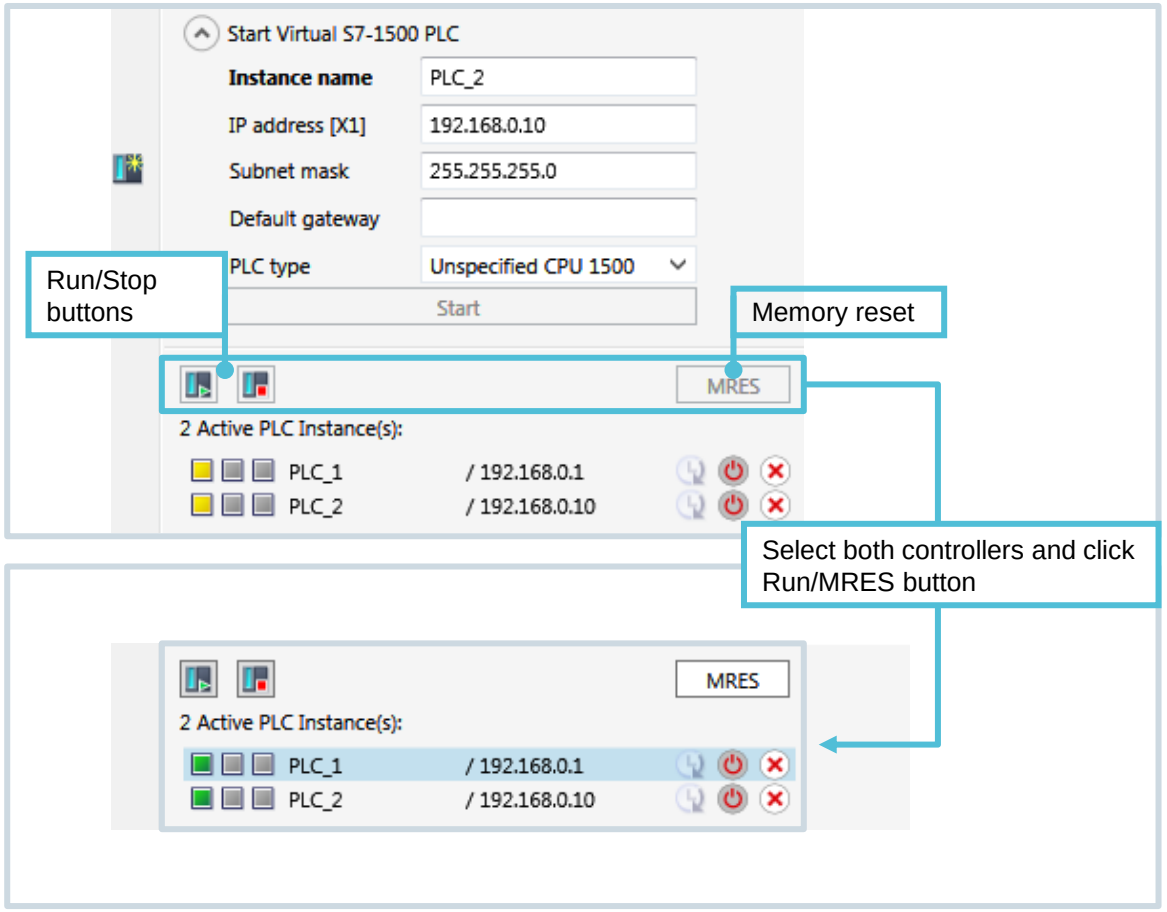
Set one or more CPUs directly to Run or Stop status in PLCSIM Advanced

Perform memory reset

Perform a memory reset in PLCSIM Advanced directly on one or more CPUs

Customer benefits

- Fast, intuitive modification of CPU status without having to switch to the TIA Portal to do this
- Simple option to perform a memory reset directly in PLCSIM Advanced so as to set the controller to a familiar initial state



TIA Portal Options – PLCSIM Advanced V2.0 – Input aids

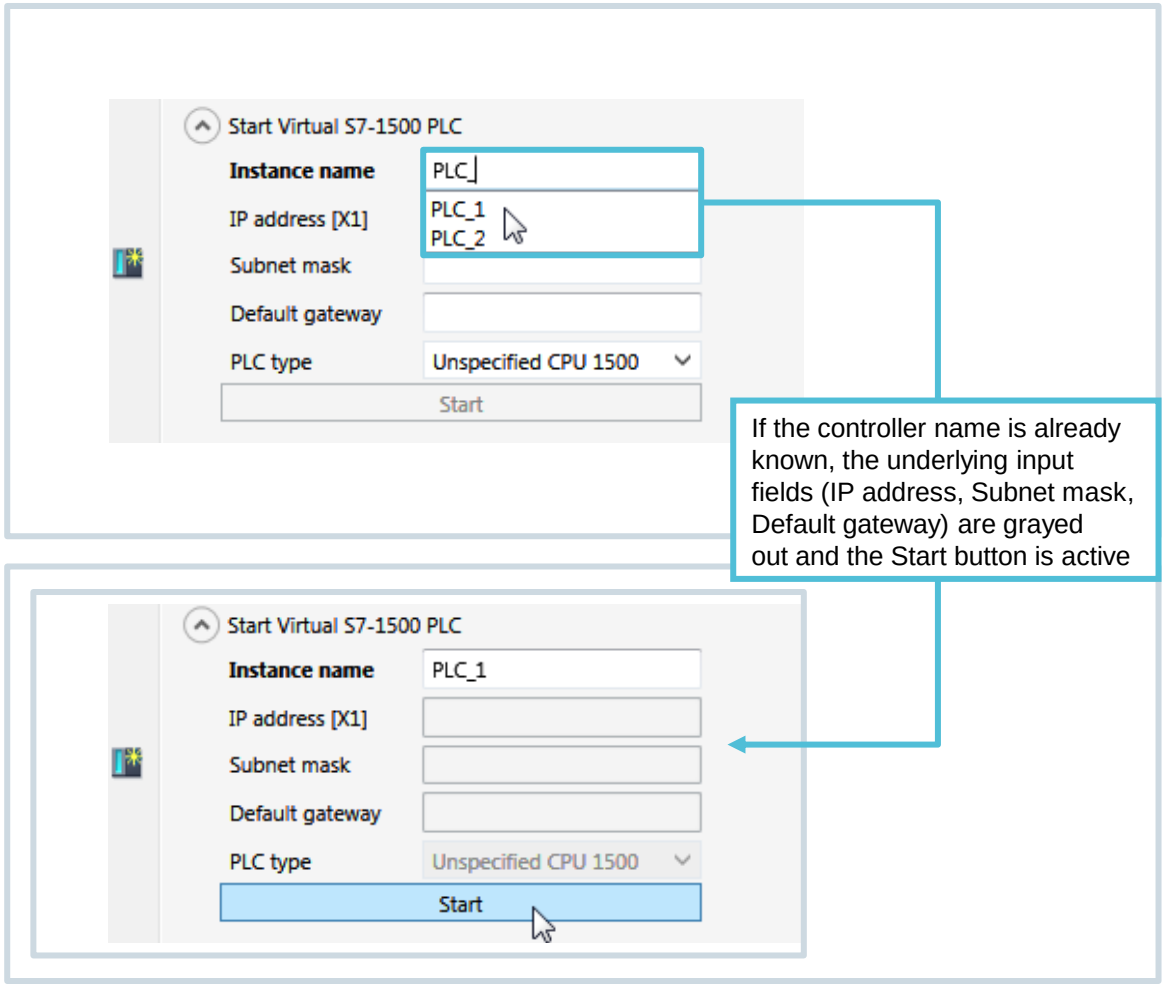
SIEMENS
Ingenuity for life

Identification of previously created controllers

If a controller was already created in the past, a drop-down menu appears when the name is entered, which offers all previously known controllers for selection (based on available virtual SIMATIC memory cards)

Customer benefits

Once created, controllers can be located again easily and started without having to fill out the full mask

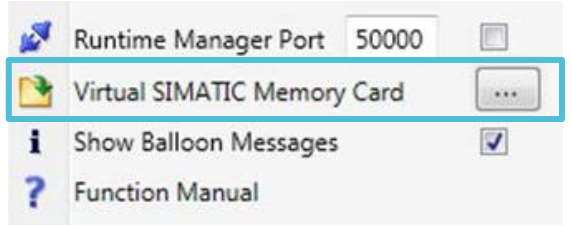


TIA Portal Options – PLCSIM Advanced V2.0 – Collection of useful functional enhancements

SIEMENS
Ingenuity for life

Virtual SIMATIC memory card – storage path

As soon as a controller is created in PLCSIM Advanced, a virtual SIMATIC memory card is also created.
The storage path of this memory card can be chosen freely



Cross-computer access to the SIMATIC memory card

Cross-computer access to the virtual SIMATIC memory card is enabled via API functions

.Net (C#)	

Syntax	`void ArchiveStorage(`
	`  string in_FullFileName`
	`);`

Parameter	• `string in_FullFileName:` the full file path to the .zip file. The path is based on the directories of the computer the API is being called.

.Net (C#)	

Syntax	`void RetrieveStorage (`
	`  string in_FullFileName`
	`);`

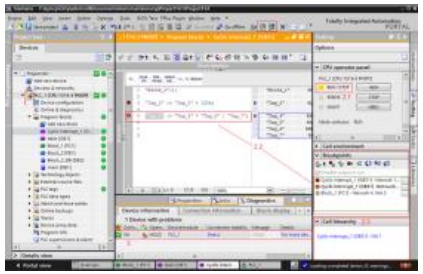
Parameter	• `string in_FullFileName:` the full file path to the .zip file. The path is based on the directories of the computer the API is being called.

TIA Portal Options – PLCSIM Advanced V2.0 – Collection of useful functional enhancements

SIEMENS
Ingenuity for life

Firmware

Firmware versions FW2.5, FW2.0 and FW1.8 are supported

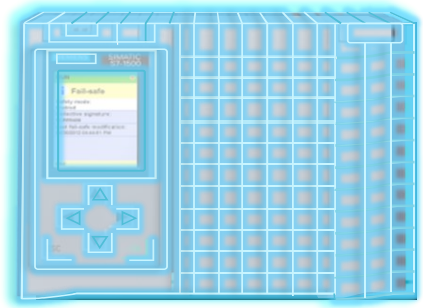


FW 1.8
FW 2.0

Download

FW 2.1
FW 2.5

New



PLCSIM Advanced V2.0

Decoupling from Windows Scheduler

The decoupling from Windows Scheduler provides for higher performance and improvements in

- Deterministic behavior and
- Simulation of motion tasks

TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink:
Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

Details

TIA Portal Options – Target 1500S for Simulink V2.0 – Overview of new functions

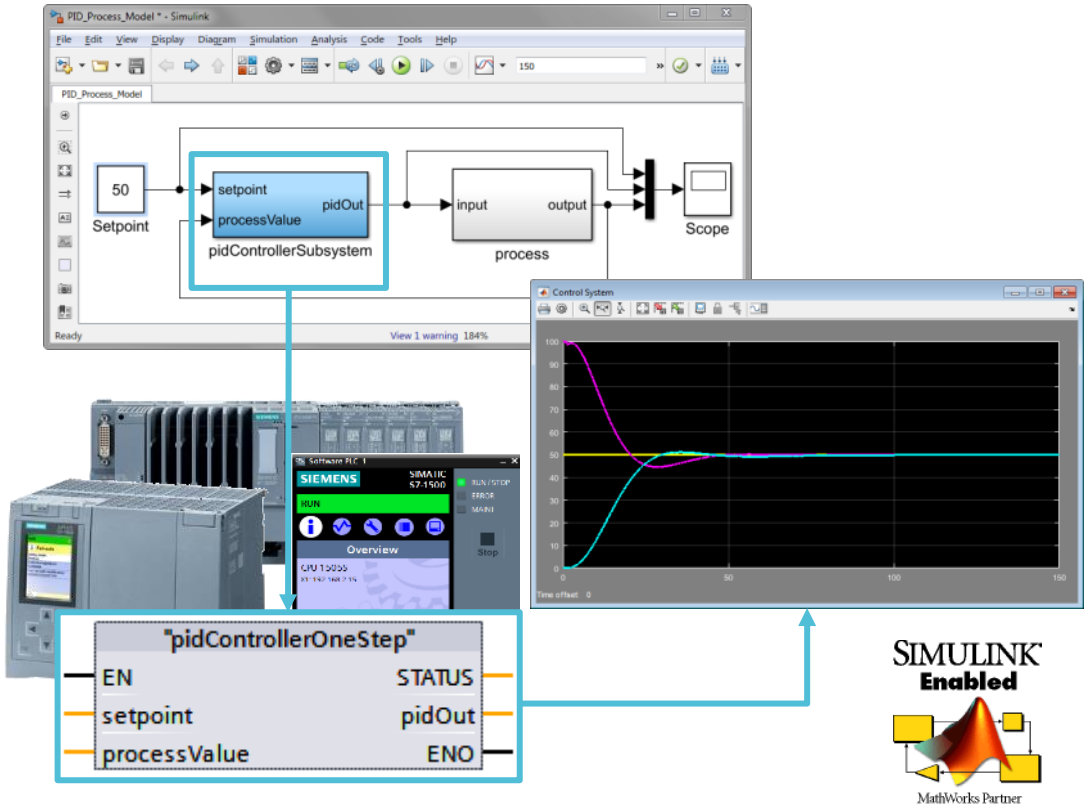
SIEMENS
Ingenuity for life

Function

- Automatic import of program blocks to STEP 7 via Openness interface
- Simple access to all model signals from the S7 program
- Execution of model and external mode possible in different OBs
- Other useful functional enhancements (see detailed slides)

Customer benefits

- Acceleration of workflow by automating manual steps
- Easier verification of the model
- Improved debugging with Simulink



TIA Portal Options – Target 1500S for Simulink V2.0 – Import via Openness interface

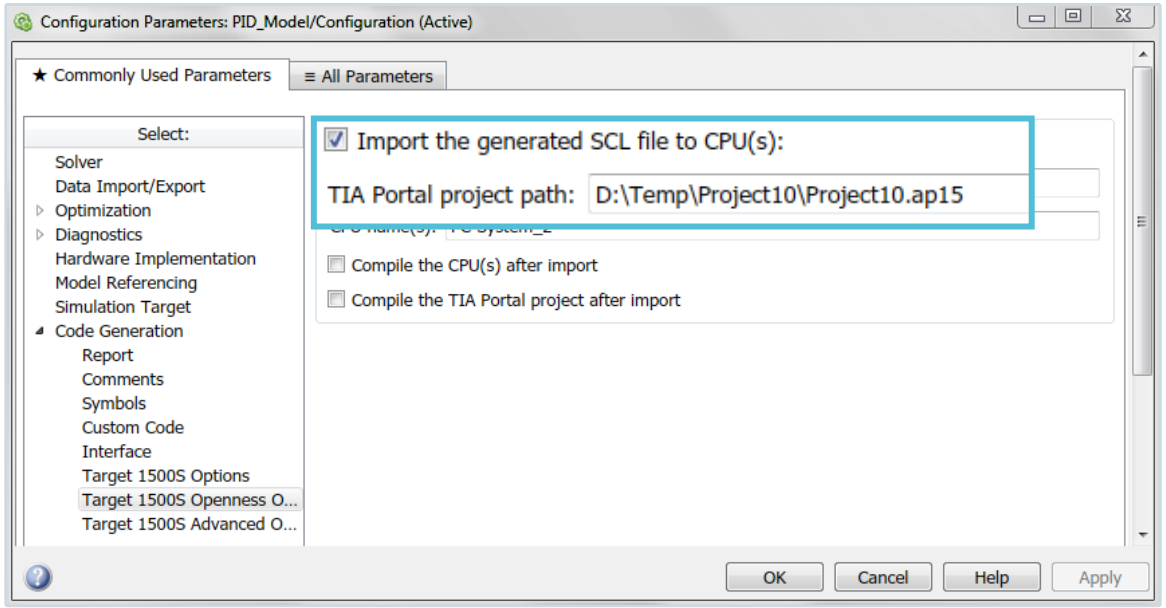
SIEMENS
Ingenuity for life

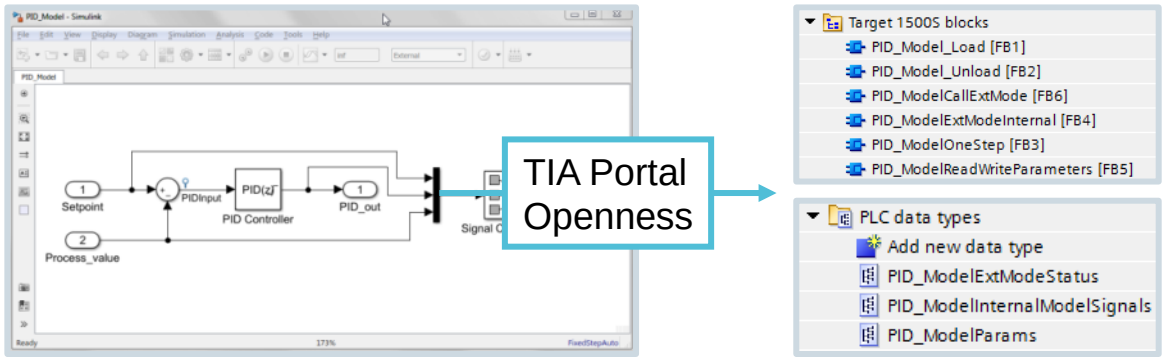
Function

- Automatic import of program blocks to STEP 7 via Openness interface
- Definition of the project and CPU in the model options
- Model in Simulink and project in TIA Portal can be opened at the same time
- Optional compile following import

Customer benefits

Acceleration of workflow
by automating manual steps





TIA Portal Options – Target 1500S for Simulink V2.0 – Access to internal signals

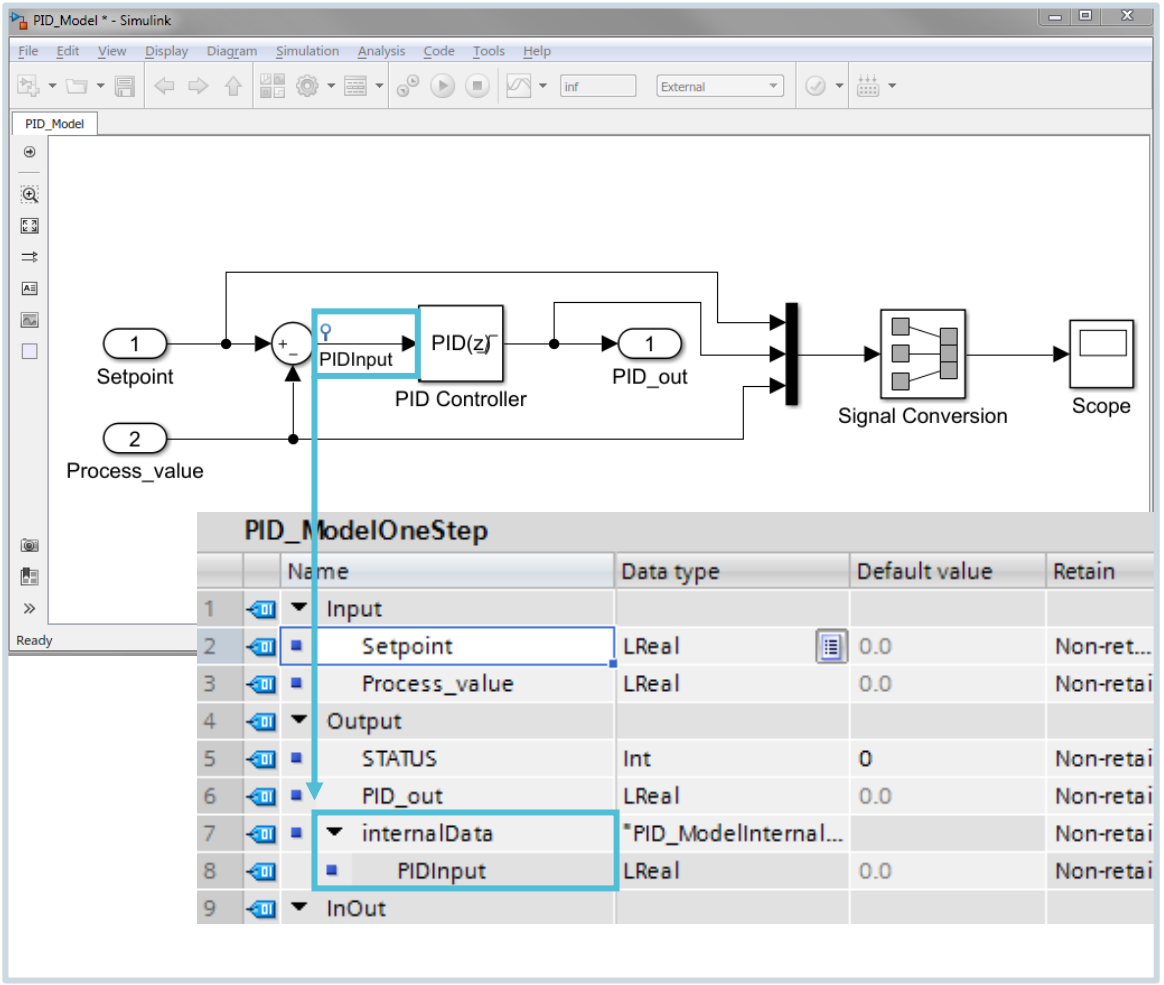
SIEMENS
Ingenuity for life

Function

- Simple access to all model signals from the S7 program
- Scalable for
  - All signals with names
  - All signals with names without test points
  - Test points only

Customer benefits

Verification of user program including access to a consistent image of current process signals when invoking cyclical OBs



TIA Portal Options – Target 1500S for Simulink V2.0 – External Mode

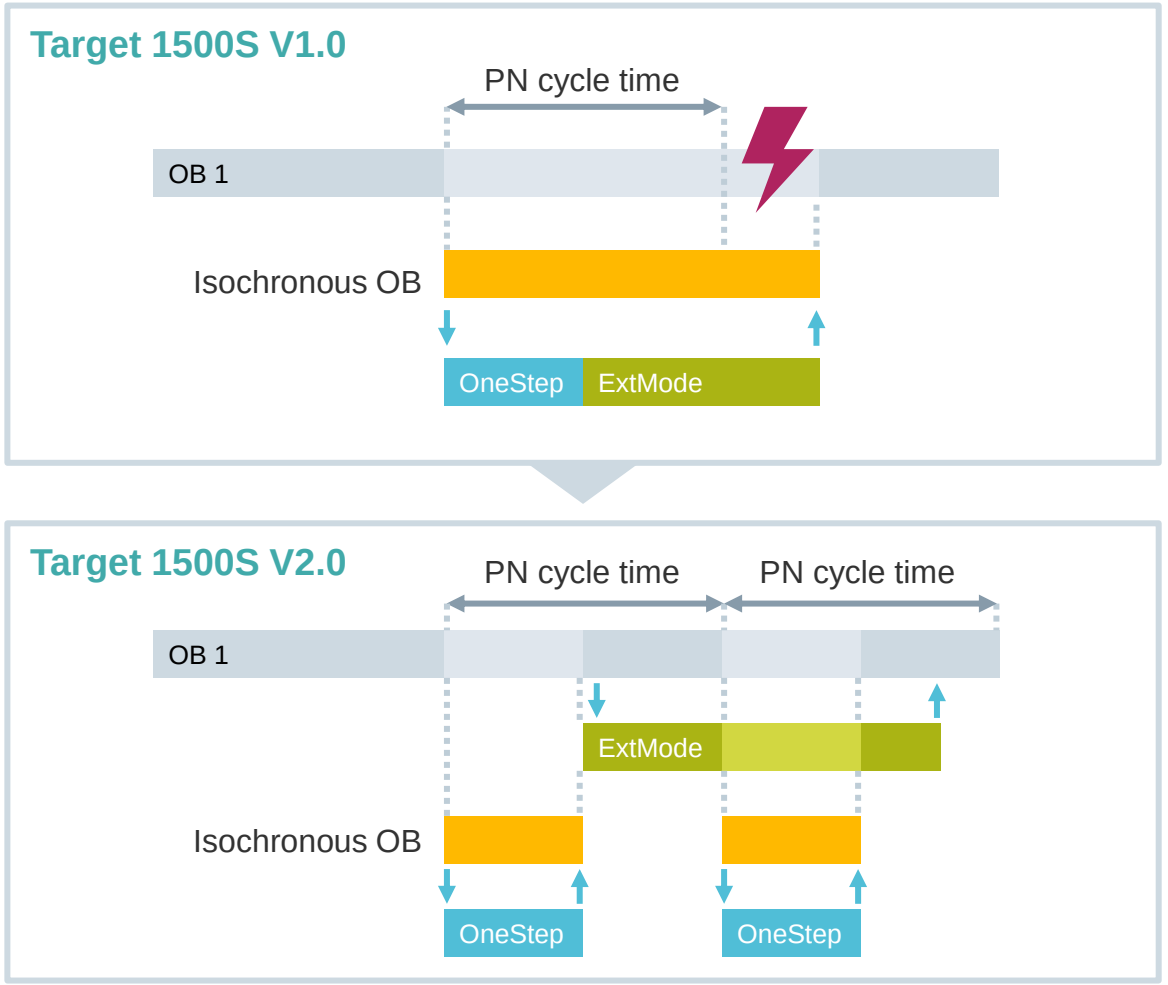
SIEMENS
Ingenuity for life

Function

- Execution of model and external mode possible in different OBs
- Assurance of consistent data exchange between the call levels (thread safety)

Customer benefits

- Reduced impact on cycle time with external mode
- Invocation of model in synchronous OB, handling of external mode in low-priority, cyclical OB
- Use of Target 1500S with external mode also for extremely time-critical applications



TIA Portal Options – Target 1500S for Simulink V2.0 – Overview of functional enhancements

SIEMENS
Ingenuity for life

Licensing

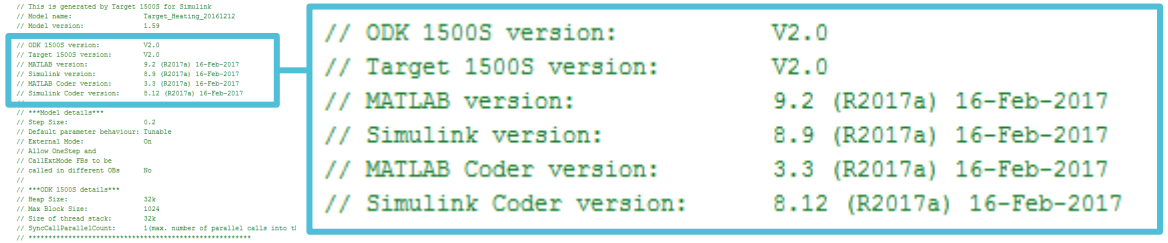
- Floating license for simple application with several users
- Trial license (21 days) for testing
- Upgrade available for 1.0 users

Status	Family	Product	Version	Number of license ...	License
→	SIMATIC STEP 7	Target 1500S	2.0	1	SITTS7

```
Warning: Building model with Target 1500S trial mode:
21 day(s) left
```

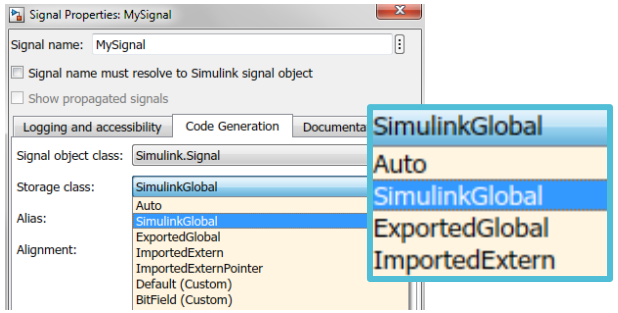
Model information in the generated blocks

- Versions of MATLAB products used
- Information on model and ODK settings



Support for additional Simulink storage classes

- SimulinkGlobal
- ExportedGlobal
- ImportedExternal

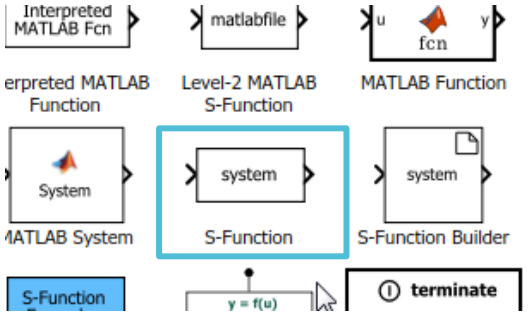


TIA Portal Options – Target 1500S for Simulink V2.0 – Overview of functional enhancements

SIEMENS
Ingenuity for life

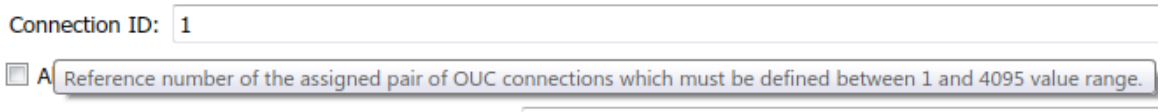
Extended support for S-functions

- Non-inlined S-functions
- Inlined S-functions
- Auto generated S-functions for legacy or custom code



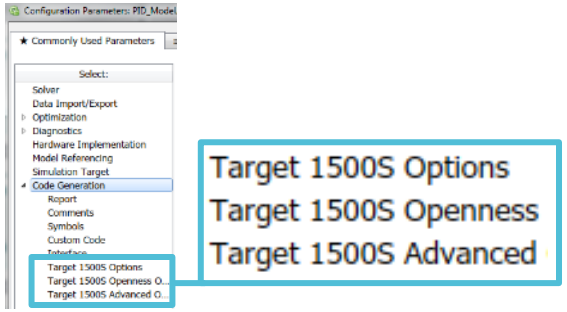
Definable communication ID (open user communication) for external mode

Improved integration with existing OUC connections



New arrangement of target options in Simulink

- Splitting into three areas
- Better clarity and retrieval



TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
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- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

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SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

Details

TIA Portal Options – Visualization Architect – Functional improvements

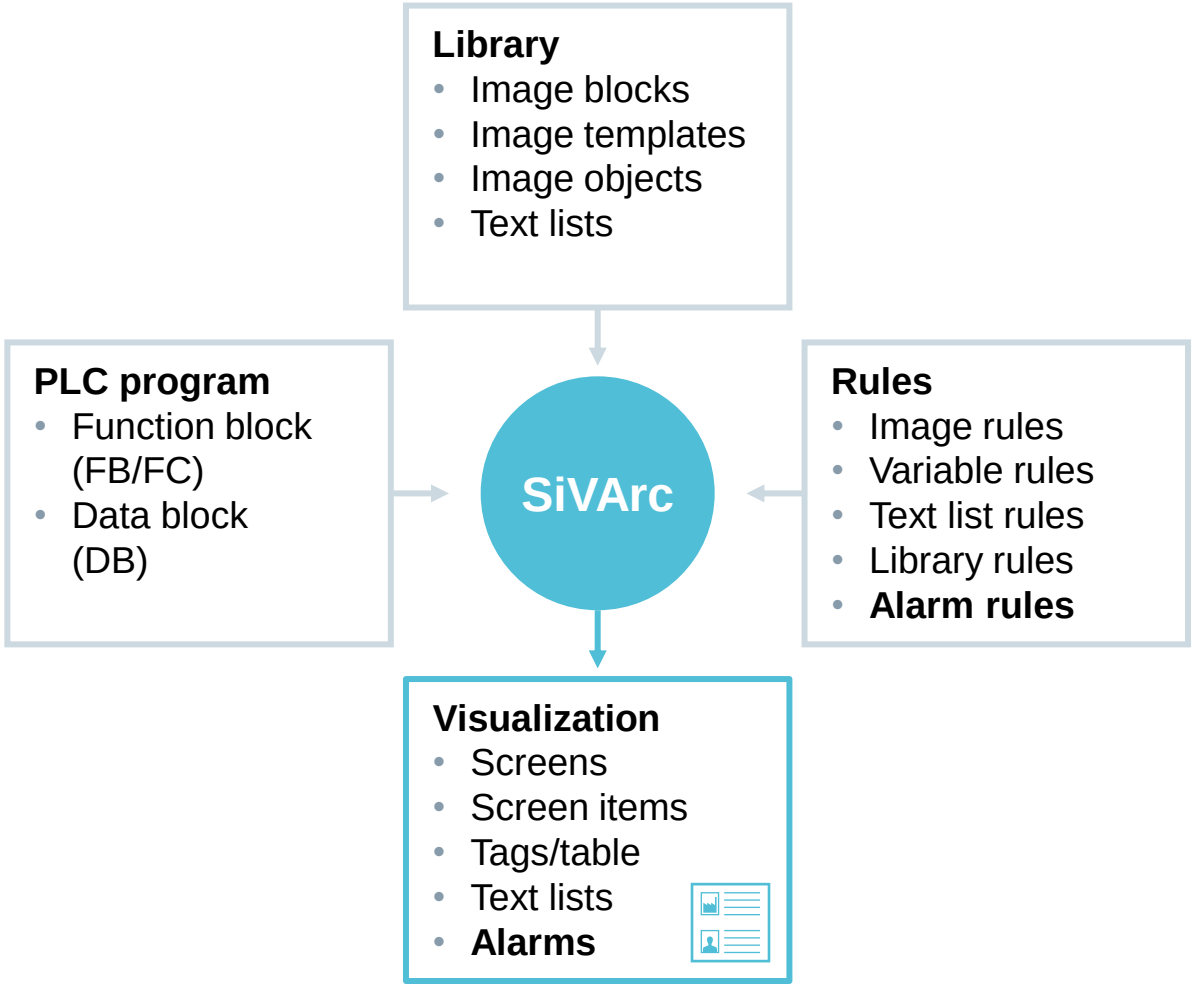
SIEMENS
Ingenuity for life

SiVArc

Automatic generation of HMI tags, screens, screen items and text lists,
based on the existing PLC program

New in V15

- Generation of **alarms** with an alarm rules editor: Bit and analog alarms, classes and groups
- New image object: **TrendControls** F(t)
- **Template screens** for Panels and RT Advanced: Copying from the library and assignment to images



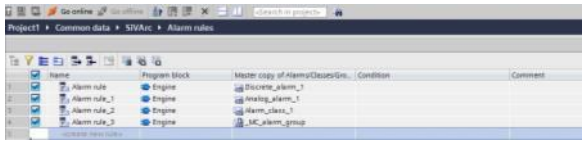
TIA Portal Options – Visualization Architect – Functional improvements

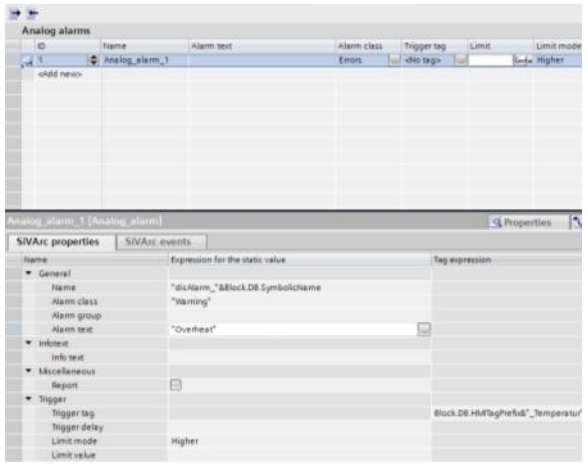
SIEMENS
Ingenuity for life

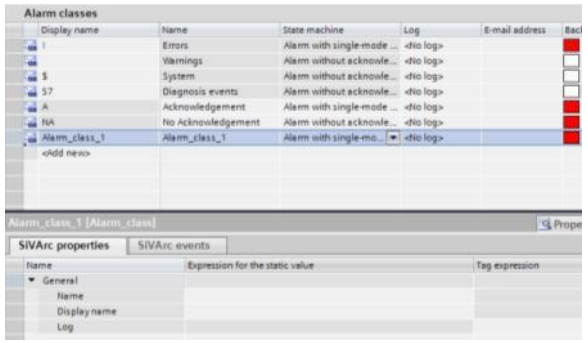
New in V15

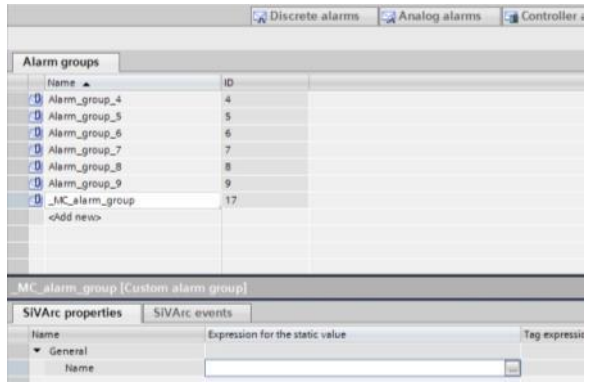
Creation of **alarms** with the alarms rule editor

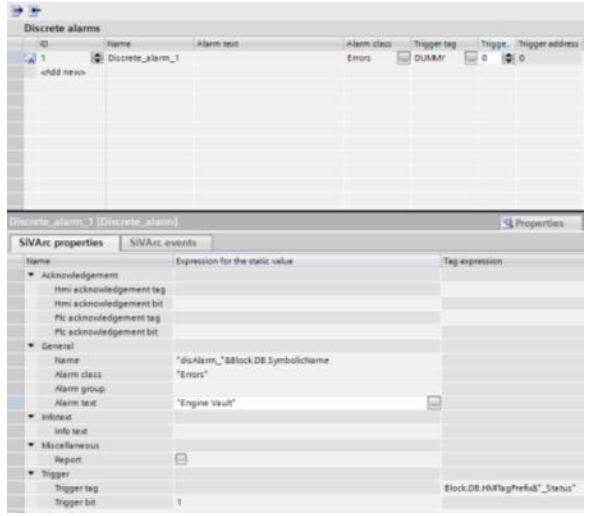
- Bit messages
- Analog messages
- Message classes
- Message groups











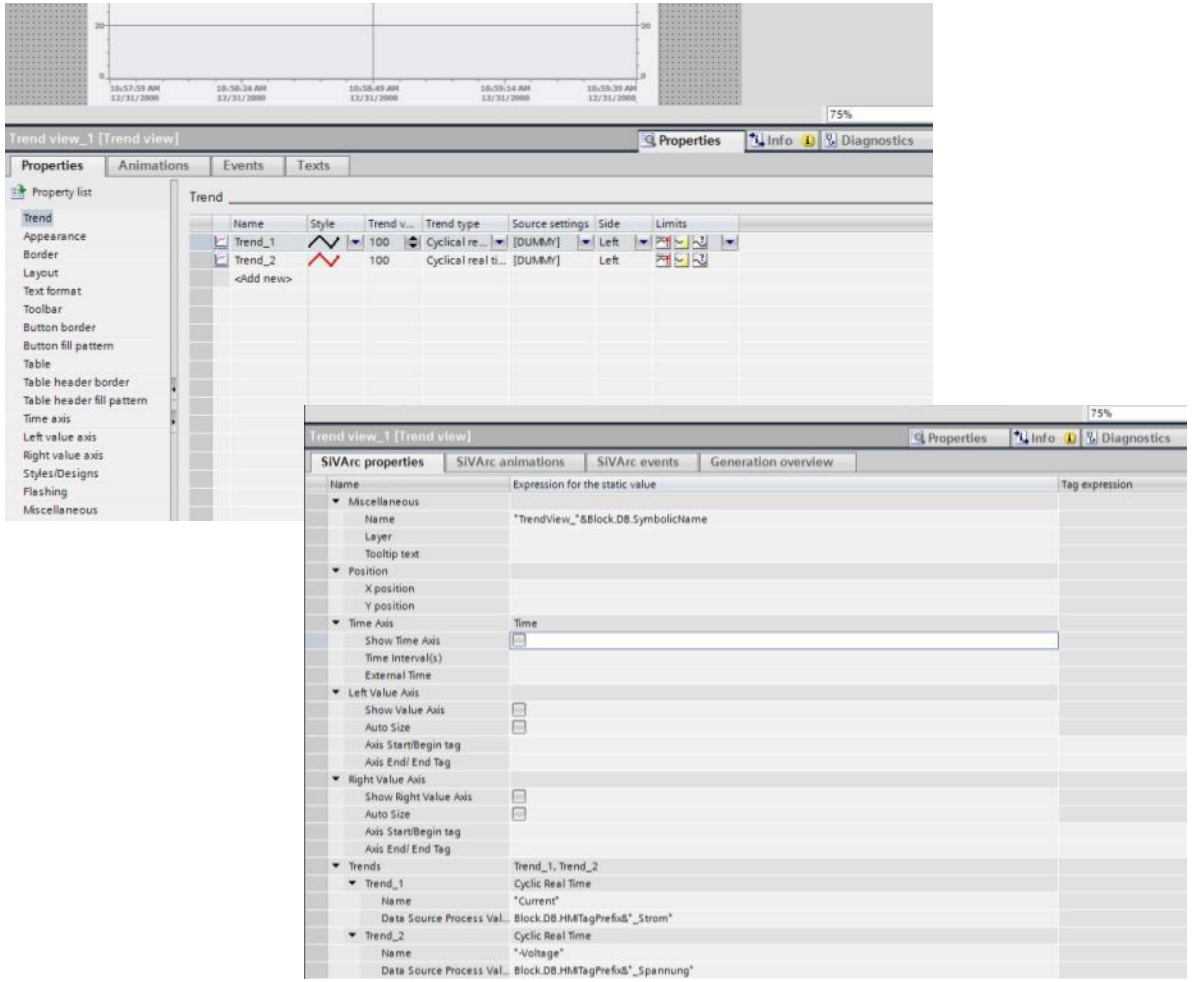
TIA Portal Options – Visualization Architect – Functional improvements

SIEMENS
Ingenuity for life

New in V15

New image object: **TrendControls F(t)**

1. Configuration of trend in the normal properties page
2. Subsequent configuration of trend in the SiVArc properties

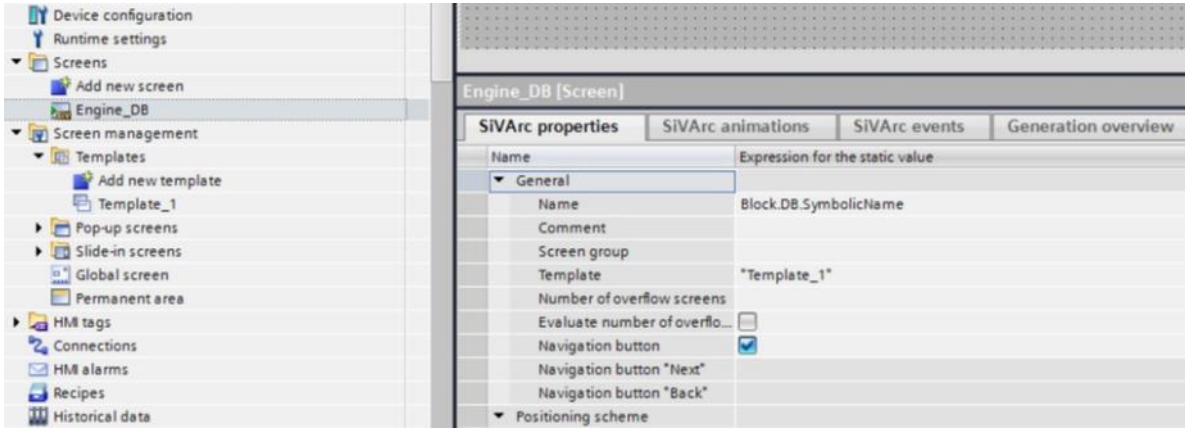


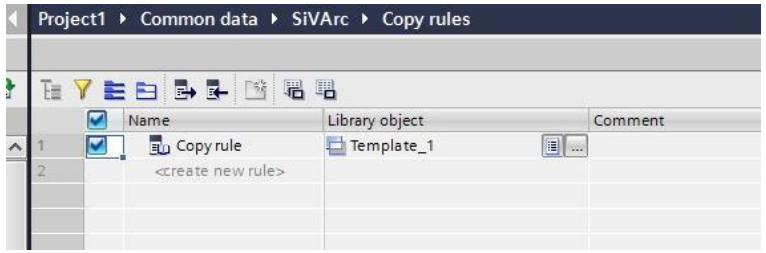
TIA Portal Options – Visualization Architect – Functional improvements

SIEMENS
Ingenuity for life

New in V15

Image templates for the Panels and RT Advanced: copying from the library and assignment to the images





TIA Portal – Highlights of TIA Portal V15

SIEMENS
Ingenuity for life

Hardware Configuration

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SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines — New

TIA User Management Component: Project-spanning maintenance of users/user groups — New

Details

TIA Portal Options – SIMATIC Energy Suite – Overview of functional enhancements

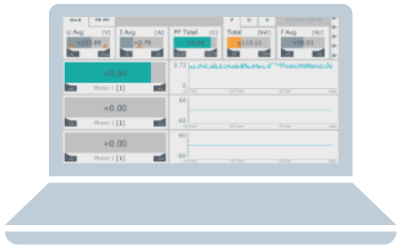
SIEMENS
Ingenuity for life

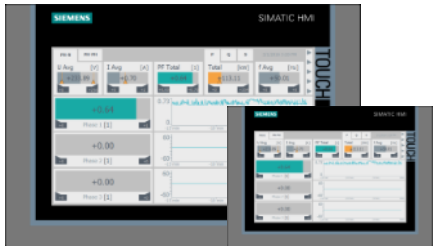
Energy Suite

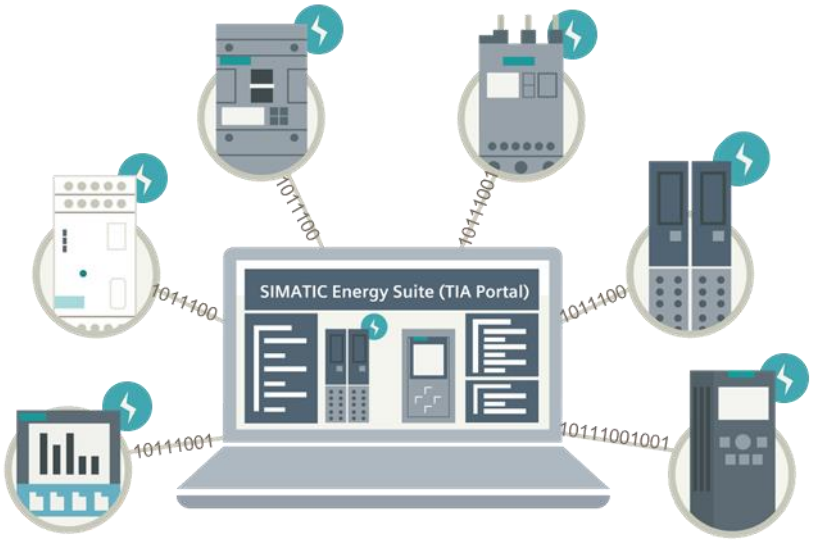
- **Recording of energy data** by PLC
- **Energy monitoring** on HMI and SCADA
- **Simple configuration** directly in the TIA Portal
- **Generated automatically** rather than programmed

New in V15

- **Energy data not counted as WinCC PowerTags** in WinCC RT Professional
- **S7 Energy Efficiency-Monitor for machines:** New S7 instruction for calculating and assessing the energy efficiency of machines







TIA Portal Options – SIMATIC Energy Suite – New – No counting of PowerTags

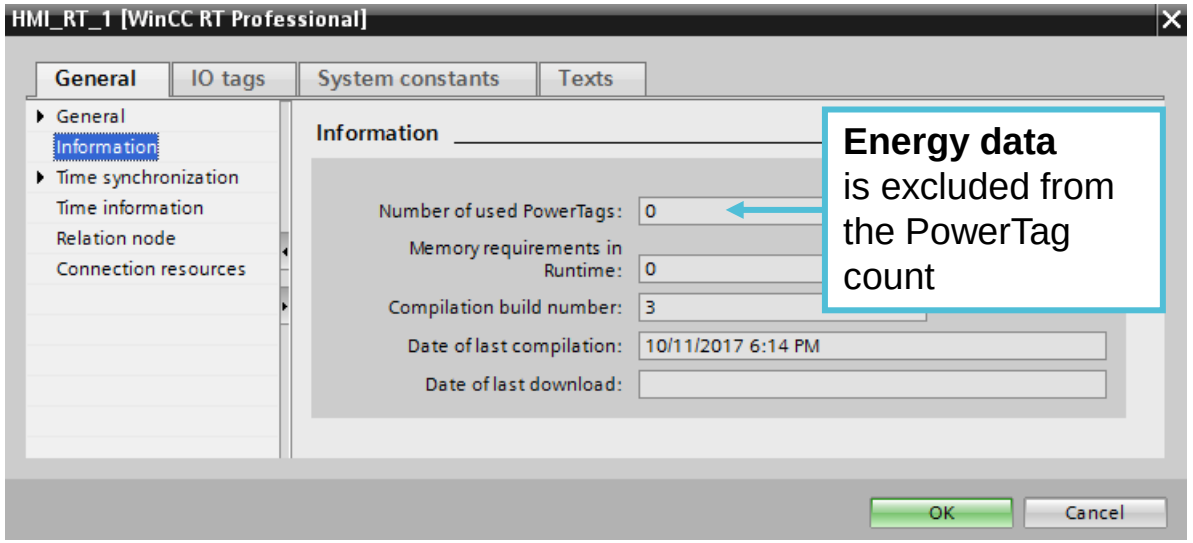
SIEMENS
Ingenuity for life

Function

Visualization of energy data in energy objects[1] requires **no additional PowerTags** in WinCC RT Professional

Customer benefits

- **Cost reduction**
  Number of PowerTags is not increased by energy data
- **Simplified order process**
  - Number of PowerTags required does not have to be calculated in advance
  - New measuring points do not lead to an exceeding of the PowerTag license



Comparison

	V14	From V15
Number of PowerTags per energy object	Up to **180**	**0**

1 Each energy object contains instance data blocks whose data is excluded from the license count

TIA Portal Options – SIMATIC Energy Suite – New – S7 EE-Monitor for machines

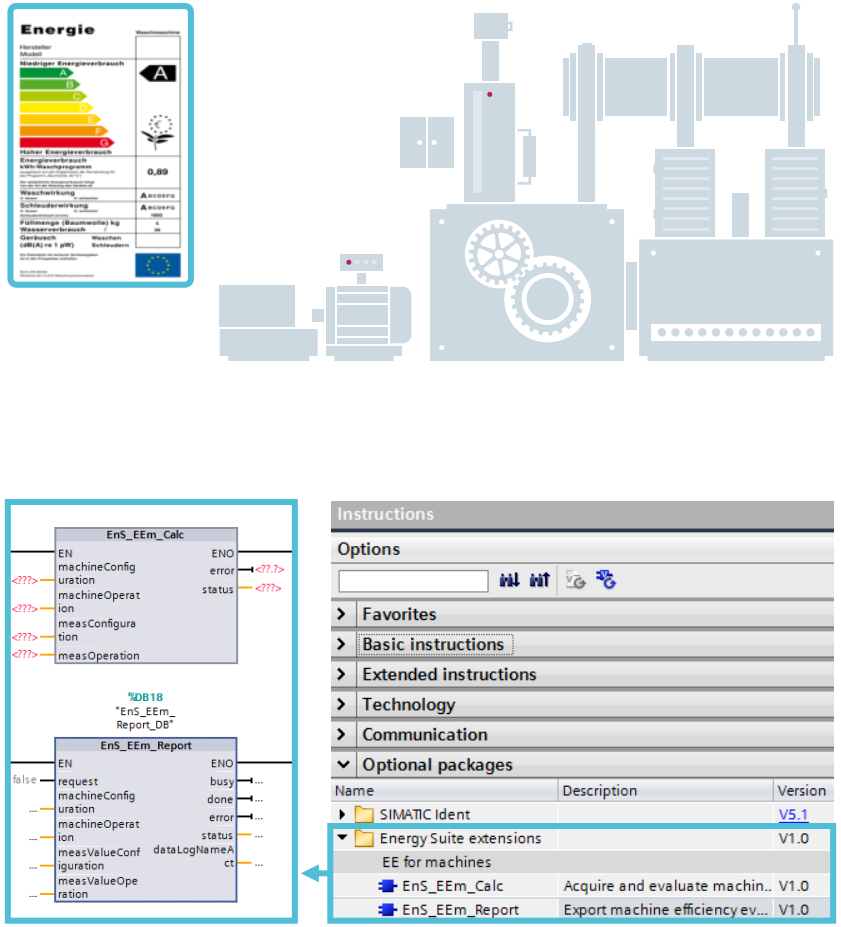
SIEMENS
Ingenuity for life

Function

- **S7 statement** for product-related and standardized[1] **calculation of energy consumption in machines**
- For **integration in machine control (**S7-1200/1500) and **on-site visualization of efficiency status**
- **Automatic long-term measurements** (e.g. batch, shift)
- Creates an **efficiency log** (.csv) for detailed evaluation and documentation

Customer benefits

- **Production-related energy transparency**
  Efficiency status of machine at a glance always
- **Simple integration in existing S7 program**
  As S7 instruction, integral part of STEP 7 (TIA Portal)
- **Cross-vendor**
  According to Measurement Instruction VDMA 34179



1 According to Measurement Instruction VDMA 34179 (German Engineering Federation for plant and machine builders)

TIA Portal – Highlights of TIA Portal V15

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Hardware Configuration

- Support for new hardware components
  - CPU 1518(F)-4 PN/DP MFP
  - CPU 1516T(F)
- Automatic hardware detection of PROFINET IO devices

Startdrive – Innovations

- Support for SINAMICS G130, G150, S150, MV and extensions for S120
- Access of drive parameters via Openness
- Startdrive Advanced: Safety acceptance test for G120

STEP 7 – Innovations

- Breakpoints for CPU S7-1500
- Motion control – kinematics for handling tasks
- Language innovations: References
- Extended functions in PLC tag tables
- Local project text handling
- Mathematical functions for trace

System Functions

- Local administration of users/user groups
- Integration of HW documentation in the Help Viewer
- Extended access to TIA Portal Openness (SCL in XML, PLC download)

WinCC – Innovations

- New SIMATIC HMI PRO device family
- New approach for supported devices
- Scalable vector graphic (SVG support)
- WinCC RT Professional → Communication
- RFID support for panels

TIA Portal Options

STEP 7 Safety: F-arrays (read access), overflow detection

Multiuser: Automatic marking, offline working

OPC UA: Methods call, compenion Spec's

ProDiag: Criteria, quantity structures, handling

PLCSIM Advanced: Alarms, events, part process images

Target 1500S for Simulink: Various extensions

SiVArc: Alarms, trend controls, template screens

Energy Suite: No PowerTags, S7 EE-Monitor for machines

New

TIA User Management Component: Project-spanning maintenance of users/user groups

New

Details

User Management and Access Control UMAC – What is it aiming for?

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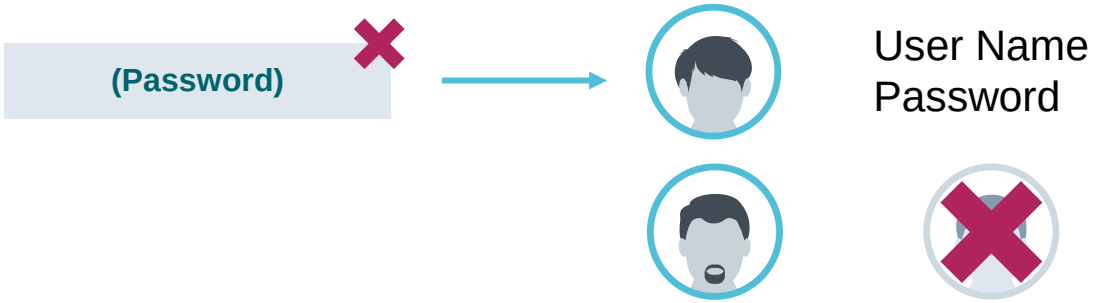
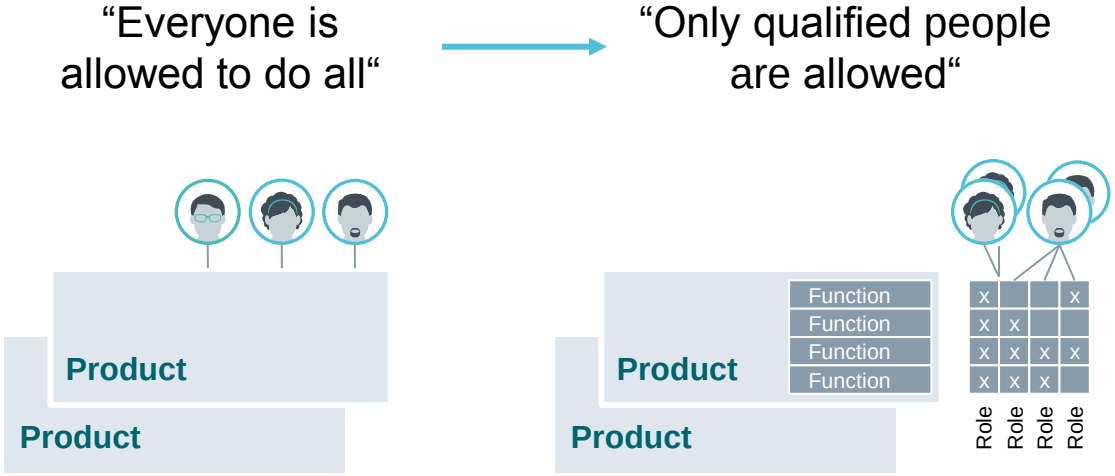
Security: Protection of industrial machines/plants

- Personalized Access
  instead of Password Access
- Unauthorized Access is prevented



Efficiency: Centralized management

- Of Users in a project or even for multiple projects
- Of Roles summarizing Function Rights of products
- Assignment of Users/Groups to Role/s
- Substitutes product-local solutions



User Management and Access Control UMAC and Option UMC – Cooperation

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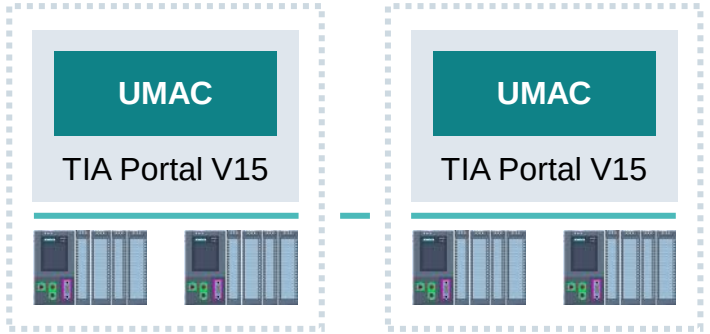
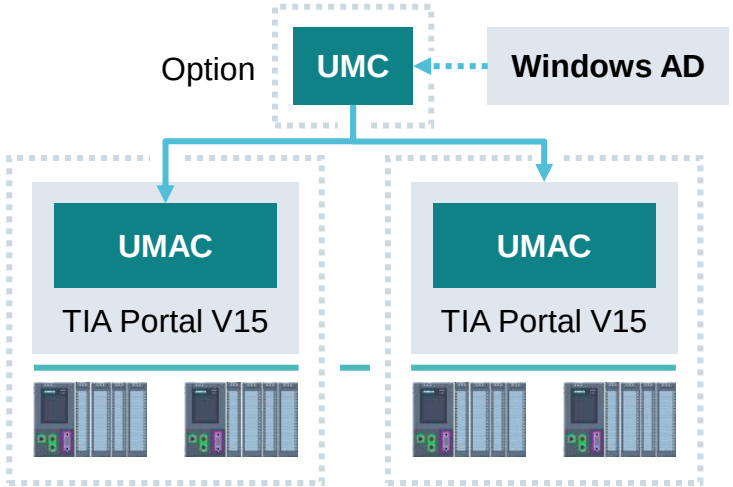
UMAC: User Management and Access Control

- Built-in functionality in TIA Portal
- Allows personalized access to TIA Portal projects
- Define project users, roles and assign them



UMC: User Management Component

- Extends UMAC by optional use
- Manages users/groups outside TIA Portal projects
- Import of needed UMC users/groups into TIA Portal projects
- Assigning project roles to them
- Authenticates UMC users' logins afterwards



User Management and Access Control UMAC – Classification

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User Management and Access Control

- Is an additional TIA Portal V15 Security Feature
- Is inherent part of each TIA Portal V15 installation
- Can be used in projects
- Provides personalized access to TIA Projects/Products
- Is an evolutionary extension of the Global Security Setting philosophy, brought in firstly in V12 for network components
- Is a next step in a mid-term development run bringing up more and more access rights from products

Thank you for your attention!

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