

TIA Portal V16 – Highlights

November 2019



TIA Portal - Highlights of TIA Portal V16

WinCC Unified

- New HMI (Engineering and Runtime)
- Scalability from Panel to SCADA
- New HMI Comfort Panel
- Modern UI, Openness, new options



Startdrive – Innovations

- SINAMICS S120 Blocksize (CU310-2, PM240-2)
- DQ hubs support
- SIMATIC Drive Controller S120 Integrated
- S120 know-how protection
- DCC Openness support



TIA Portal options

- STEP 7 Safety**
F-SCALE – DINT, Openness Extensions
- Multiuser**
Exclusive Engineering with the TIA project server, asynchronous Multiuser Commissioning
- OPC UA**
S7-1200: OPC UA Data Access Server; S7-1500: No restart on delta download, improved diagnostics; new features, SiOME tool
- PLCSIM Advanced**
CPU 1518 MFP support
- Target 1500S for Simulink**
Simplified workflow, improved TIA Portal integration
- Test Suite**
Styleguide checker, application test
- SiVArc**
Support of Energy Suite, generation based on HWCN, merging of properties
- Energy Suite**
Load management, automatic screen generation – with SiVArc (integrated & license-free)

WinCC – Innovations

- HMI Panels: Multilingual keyboards, HMI Option Plus V3
- WinCC Advanced: ProDiag system function "ShowBlockInTIAPortal"
- WinCC Prof: Archiving string tags, Integ. tag sim., ProDiag extensions



Hardware configuration

- CPU 1513pro (F)-2 PN
- IP forwarding
- Cross-device trace
- Direct data exchange on the basis of Profinet IRT
- JSON RPC2.0 as new "Web data interface"
- S7-1200 FW4.4



STEP 7 – Innovations

- Software Units (Openness, access to PLC tag tables)
- Block comparison between project & library
- Multilingual SCL comments
- Project Trace (cross-device traces)



System functions

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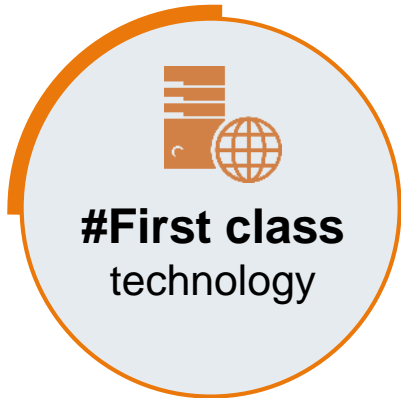
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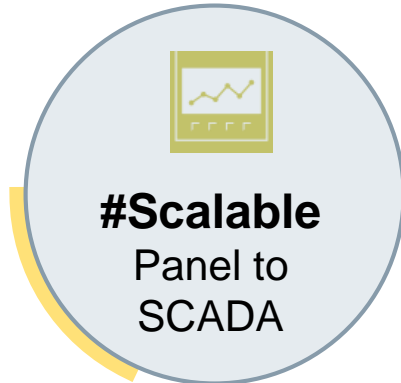


SIMATIC WinCC Unified

Overview of new functions



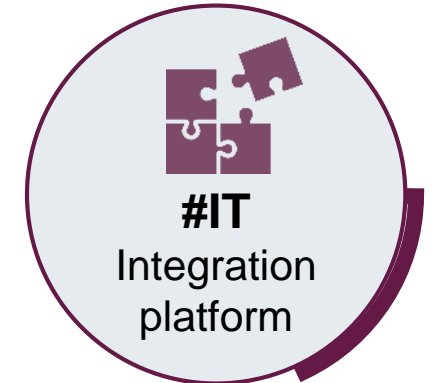
- Native Web technology
 - HTML5, SVG
 - Java script
- Device-independent
- Object-oriented – HMI



- Unified Comfort Panel
- WinCC Unified RT/ES
- One engineering platform and RT for all HMI products
- Runtime Collaboration



- OnPremise
- HMI @ Cloud
- MindApps
- SIMATIC Edge



- Basis for digitalization
- Plant Intelligence
 - Integration platform for everything north of the PLC
- Openness

Additional information in a separate set of technical slides for WinCC Unified

SIMATIC WinCC Unified

WinCC Unified PC properties

TIA configuration

Creation of Unified HMI projects in the familiar TIA Portal environment. Automated creation of WinCC Unified projects by the new HMI ES Openness functionality.



Seamless scalability

Simple extension of machine-level HMI (Comfort Panel or PC) to a distributed SCADA (PC) within the TIA Portal without loss of configuration information.



Seamless expandability

Simple increase of configuration limits or extension of functionality by adding additional options.



Native HTML5 support

The modern user interface is based on HTML5/SVG/JavaScript technology. Customer-specific extensions of the HMI are possible via dynamic SVG files and custom Web controls.



Remote access

Access to the HMI from any operating device possible. All that is needed is an HTML5-capable Web browser on a PC or mobile device.



Ready for the future – from today!

Make use of the benefits of WinCC Unified. Modern user interface, openness and scalability.



Integrative platform

Read and write access to the process values during runtime via the HMI RT Openness functionality.



Plant hierarchy

The new object-oriented HMI configuration enables structured working in the TIA Portal in order to minimize the workload and prevent inconsistencies.



Additional information in a separate set of technical slides for WinCC Unified

SIMATIC WinCC Unified HMI Unified Comfort Panel properties



High user friendliness in a brilliant manner

Capacitive multitouch technology in combination with bold colors and excellent readability.



Size doesn't matter

Same functionality for all display sizes from 7" to 22".



Do you need more? Use the apps!

Use Siemens Industrial Edge to extend the standard functionality.



Security Integrated

From access control through encoded communication to security patches – Everything is integrated.



Everything under control – with only one tool

Full commissioning with the TIA Portal. No IT management required.



Ready for the future – from today!

Make use of the benefits of WinCC Unified. Modern user interface, openness and scalability.



The power to achieve more

Implementation of larger applications through significantly higher system limits.



Comfort Panel DNA is retained

Functions such as automatic system backup remain, of course.



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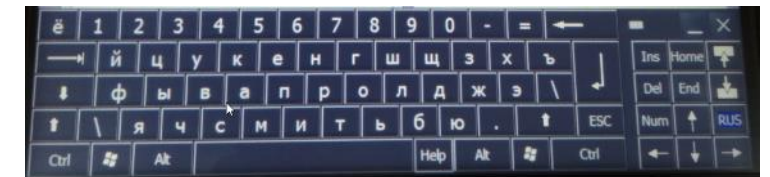
WinCC – Innovations HMI Panels V16



New functions for Comfort/Mobile Panels

Multilingual Comfort Panel Keyboards

- Choice between full-screen or small keyboards with 7" and 9"
- Other keyboard languages included, e.g. German, Cyrillic
- Hidden entry on connection via Sm@rtServer for devices with a full-screen keyboard



Hiding the navigation toolbar and frame of HTML-Browser Control

- The HTML-Browser Control can be configured, that the content of HTML-Browser Control is shown as full screen without navigation toolbar.

Deactivation of focus color in alarm view

- The Alarm view can be configured that the configured alarm colors of the currently selected alarm are not overlaid by the focus color

Update of PDF control and PDF printer

- Use of current PDF versions

Printing barcodes

- The legibility of barcodes on a printout can be improved via ProSave Add-On



Toolbar and Frame displayed



Toolbar and Frame hidden

Nr.	Zeit	Datum	Status	Text	Gruppe quittieren
110091	10:00:51	16.10.2019	K	Wechsel in die Betriebsart Online	0
70018	10:00:51	16.10.2019	K	Benutzerverwaltung importieren 0 erfolgreich beendet.	0
70022	10:00:51	16.10.2019	K	Benutzerverwaltung importieren 0 gestoppt.	0

WinCC – Innovations

WinCC Advanced V16

New functions for WinCC RT Advanced

Hiding the navigation toolbar and frame of HTML-Browser Control

- The HTML-Browser Control can be configured, that the content of HTML-Browser Control is shown as full screen without navigation toolbar

Deactivation of focus color in alarm view

- The Alarm view can be configured that the configured alarm colors of the currently selected alarm are not overlaid by the focus color

ProDiag system function "ShowBlockInTIAPortal"

- The "TIA Portal project path" parameter can be supplied with a dynamic value from a tag



Toolbar and Frame displayed



Toolbar and Frame hidden

Nr.	Zeit	Datum	Status	Text	Gruppe quittieren
110001	10:00:51	16.10.2019	K	Wechsel in die Betriebsart 'Online'	0
70018	10:00:51	16.10.2019	K	Benutzerverwaltung importieren	0
70022	10:00:51	16.10.2019	K	Benutzerverwaltung importieren	0

WinCC Professional V16

Logging string tags

The screenshot shows the 'Variablenarchive' window with one entry: PWA_1, located in the 'Datenbank' with 100 data records. Below it, the 'Archivvariablen' window lists three variables: PWA_1 (PWA_Int), PWA_2 (PWA_Bool), and PWA_3 (PWA_String). The 'PWA_String' variable is selected. A tree view on the left shows the path: PC-System_1 [SIMATIC...] > HMI_RT_1 [WinCC RT Pr...] > HMI-Variablen > Standard-Variablen. A table of variables is visible in the background.

Name	Datentyp	Adresse	Kom...
@SCRIPT_COUNT_TAGS	UDInt		
@ServerName	WString[10]		
@ServerVersion	WString[10]		
@TLGRT_AVERAGE_TAGS...	LReal		
@TLGRT_SIZEOF_NLL_IN...	LReal		
@TLGRT_SIZEOF_NOTIFY...	LReal		
@TLGRT_TAGS_PER_SEC...	LReal		
PWA_Bool	Bool		
PWA_Int	Int		
PWA_String	String		

This screenshot is identical to the one on the left, but with a red box highlighting the 'PWA_String' entry in the variable table. A red arrow points from this box to a teal callout box at the bottom right that says 'New in V16'.

Name	Datentyp	Adresse	Kom...
@SCRIPT_COUNT_REQUE...	UDInt		
@SCRIPT_COUNT_TAGS	UDInt		
@TLGRT_AVERAGE_TAGS...	LReal		
@TLGRT_SIZEOF_NLL_IN...	LReal		
@TLGRT_SIZEOF_NOTIFY...	LReal		
@TLGRT_TAGS_PER_SEC...	LReal		
PWA_Bool	Bool		
PWA_Int	Int		
PWA_String	String		

New in V16

WinCC Professional V16

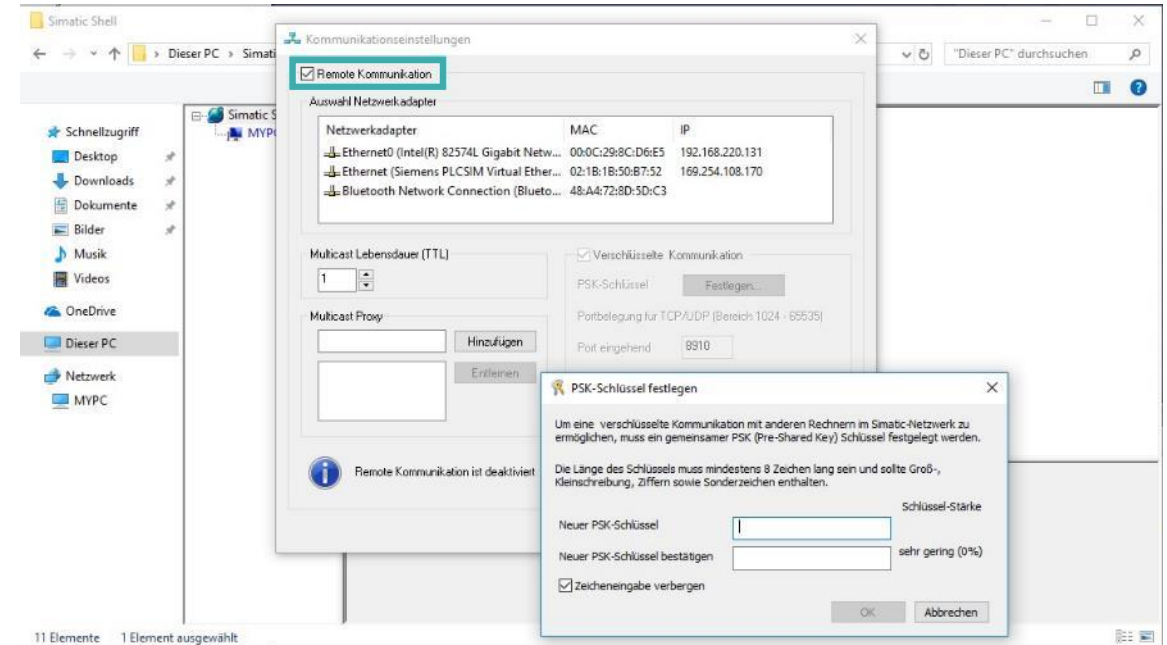
Remote communication

Function

The remote connection can be activated and deactivated and assigned a password via the SIMATIC Shell.

Advantage

Due to "Security by default", security is increased within device communication for the customer. The user must make an conscious decision in favor of the encryption and activation of remote communication.

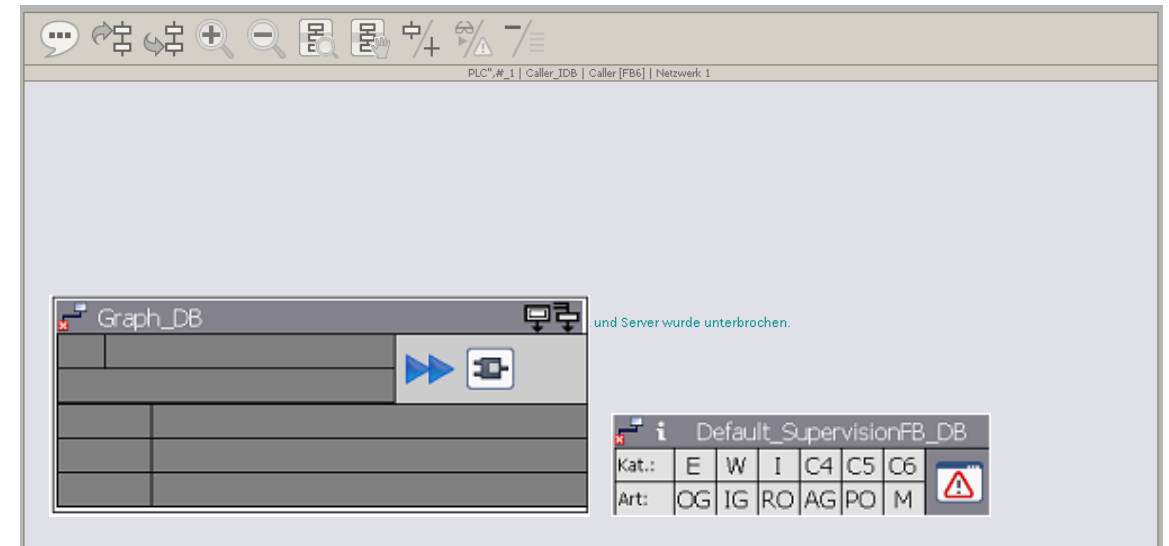
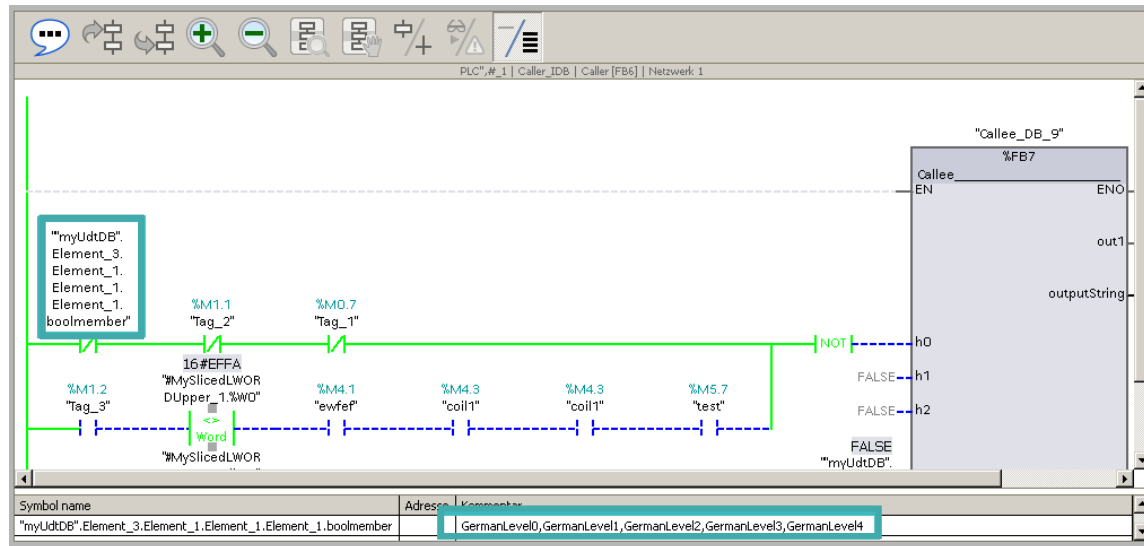


Activation and deactivation of remote communication via the SIMATIC Shell is possible.

WinCC Professional V16

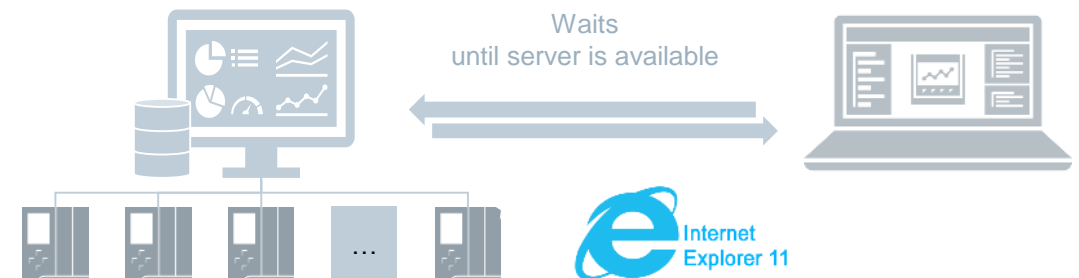
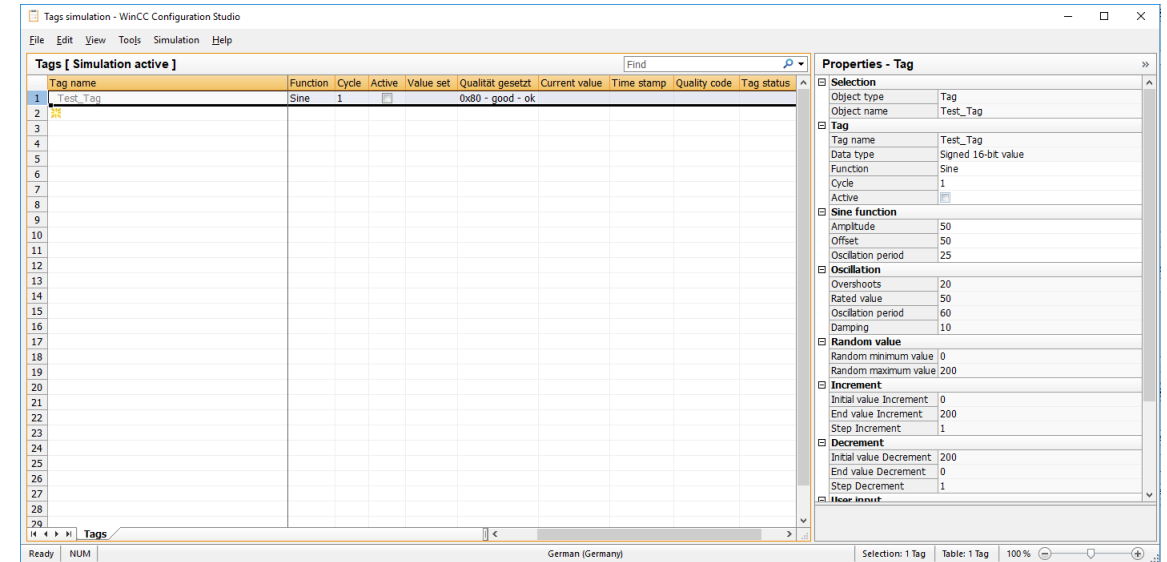
ProDiag control

- Hierarchical comments of the symbols are displayed in the PLC Code Viewer
- With Slice access of the PLC, the values are displayed in the PLC Code Viewer
- Interruptions of the connection between the server and client are displayed in the controls PLC Code Viewer, Graph Overview and ProDiag Overview



WinCC Professional V16 Additional extensions

- The client waits in autostart until the server is available
- Integration of a new tag simulator
- The connection status of the PLC can be displayed via a system tag
- WinCC Professional Web Browser Control is compatible with IE 11



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STEP 7 - Innovations

Improve basic workflows for Software Units

Function

S7-1500 ✓

S7-1200 ✗

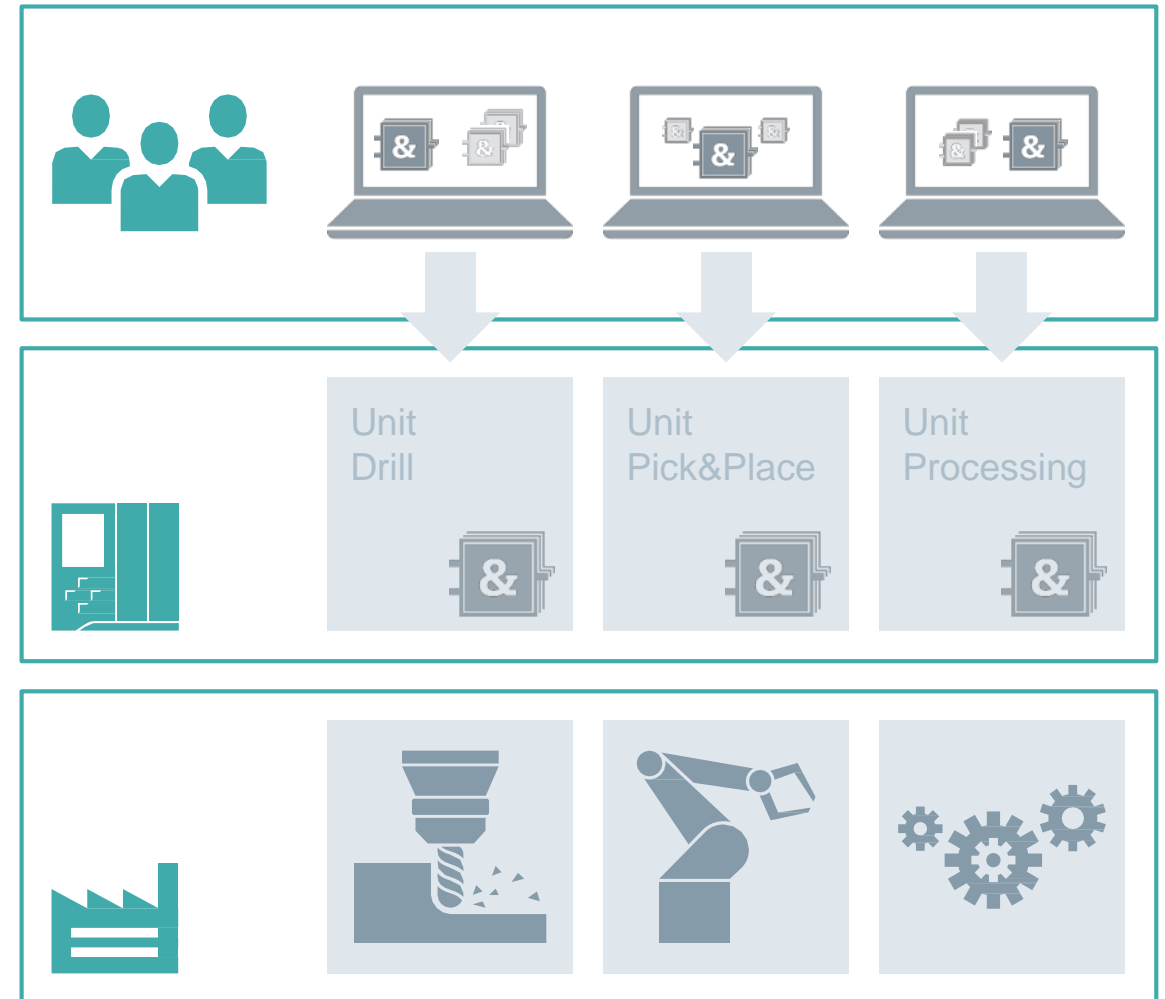
S7-300/400/WinAC ✗

- Free splitting of the program into software units
- Separate loading of the software units into the PLC
- Defined interfaces between the software units
- Purely optimized programming and data storage
- **Full Openness support for Software Units**
- **Import/Export of SCL source files to Software Units**
- **Access PLC tags of another Unit from within a Unit**

New in V16

Benefits

- Complete project generation based on Openness and SCL source files with external tools
- Common usage of PLC tags and constants from different units

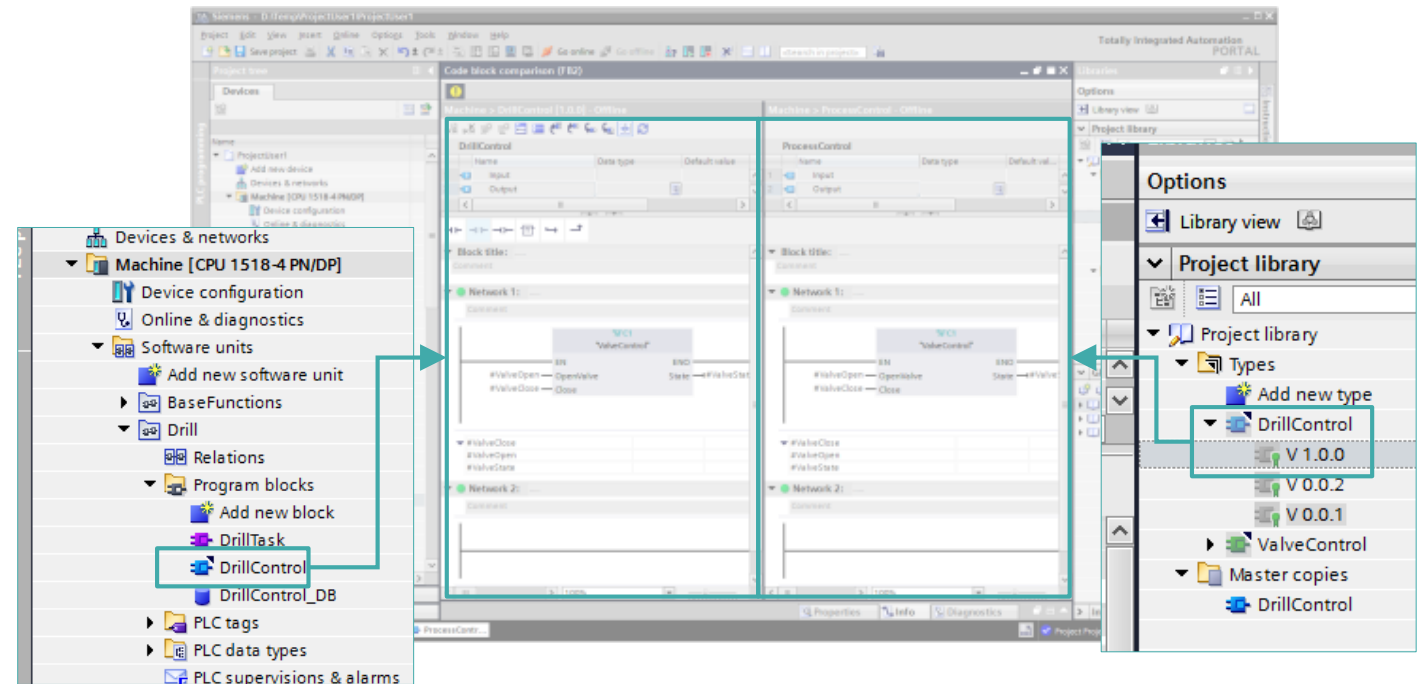


STEP 7 - Innovations

Detailed block compare for project ↔ library

Function

- Detailed block compare for blocks from a project and
 - Mastercopies (project or global library)
 - Single versions of Types (from project or global library)
 - Via Quick Compare or High-Level Compare Editor
- Detailed block compare between library blocks (e.g. V1.0 vs V2.0)



Benefit

- Easier handling of blocks in libraries
- Better usability for tracking changes between type versions

STEP 7 - Innovations

Multilingual comments in SCL programs

Function

S7-1500 ✓

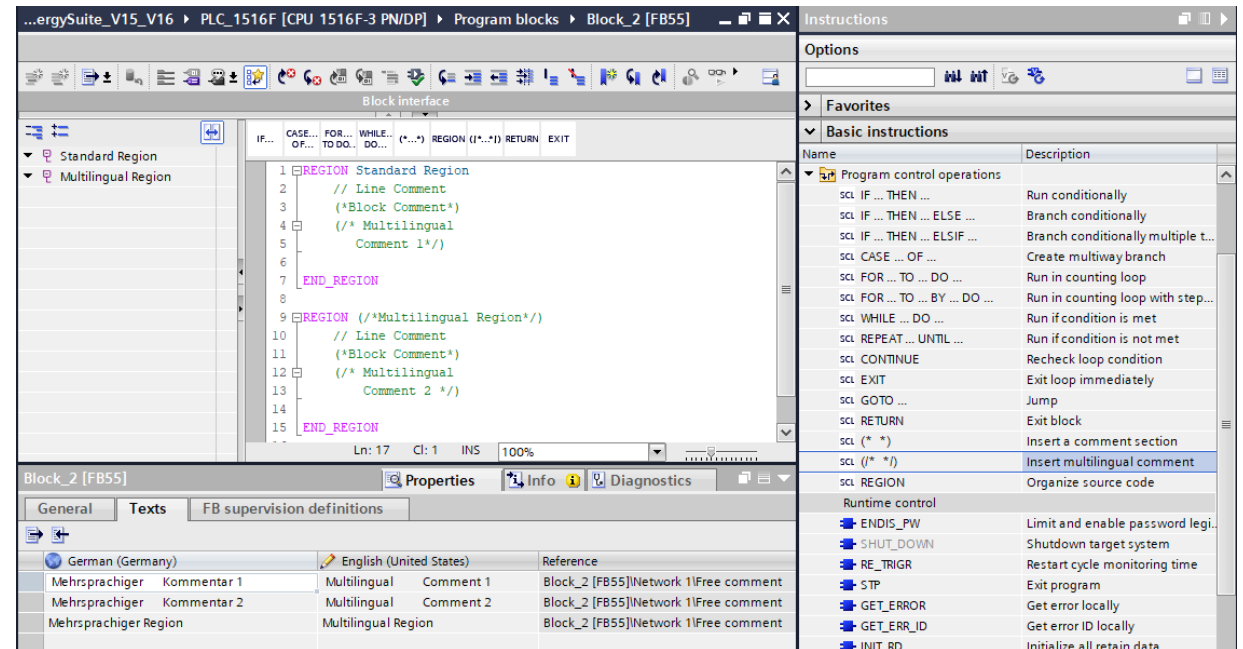
S7-1200 ✓

S7-300/400/WinAC ✓

The syntax (`/* ... */`) enables the entry of multilingual comments and regions in SCL blocks.

Advantage of the function

The code implementation can be commented in different languages. This enables the use and maintenance of complex algorithms at distributed production sites worldwide.



STEP 7 - Innovations

Collection of useful functional extensions

SCL Case statement

In addition to an integer, the value of the expression can now also be a bit sequence. This means, for example, that data type conversion is not required to transfer the value to the status word.

```

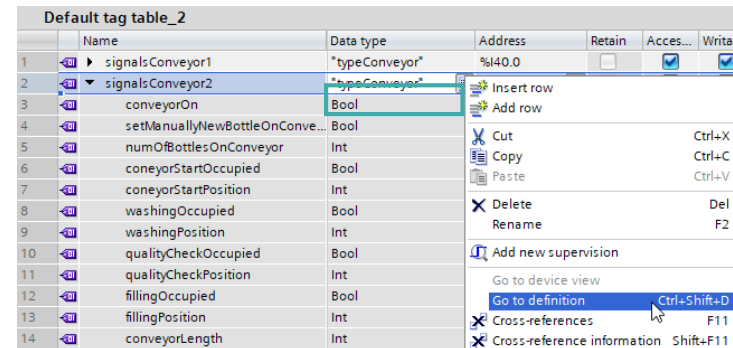
#InstIsendC(REQ := #sendReq,
             DONE => #tempDone,
             BUSY => #bempBusy,
             ERROR => #tempError,
             STATUS => #tempStatusWord,
             CONNECT := "PLC_1_Send_DB",
             DATA := "ComData".send);

CASE #tempStatusWord OF
  // Connection is currently being established (REQ irrelevant)
  16#7002 :
  ;
  // Communication connection is being terminated
  16#7003 :
  ;
  //IP address of the remote endpoint of the connection is invalid
  16#80C5:
  ;
  // Connection terminated by the communication partner.
  16#80A7:
  ;
  ELSE // Statement section ELSE
  ;
END_CASE;

```

Navigation "Go to definition"

"Go to definition" is now also offered in the tag table (for tags of the data type UDT), as well as in watch and force tables.



Parameter instance as DB_Any

When a function block is called, the parameter instance can now also be passed on via a tag of the data type DB_ANY.

Name	Data type
Static	
instanceDB	Array[1..NUM_OF_INSTANCES] of DB_ANY
instanceDB[1]	DB_ANY
instanceDB[2]	DB_ANY
instanceDB[3]	DB_ANY
instanceDB[4]	DB_ANY
instanceDB[5]	DB_ANY

```

1
2 FOR #tempIndex := 1 TO "NUM_OF_INSTANCES" DO
3
4 IF "DBAnyStorage".instanceDB[#tempIndex] <> 0 THEN
5
6 CASE TypeOfDB("DBAnyStorage".instanceDB[#tempIndex]) OF
7
8 "MyBlock1":
9 "CallMyBlock1"(CurrentInstance := "DBAnyStorage".instanceDB[#tempIndex]);
10
11 "MyBlock2":
12 "CallMyBlock2"(CurrentInstance := "DBAnyStorage".instanceDB[#tempIndex]);
13
14 END_CASE;
15 ELSE
16 EXIT;
17 END_IF;
18 END_FOR;
19

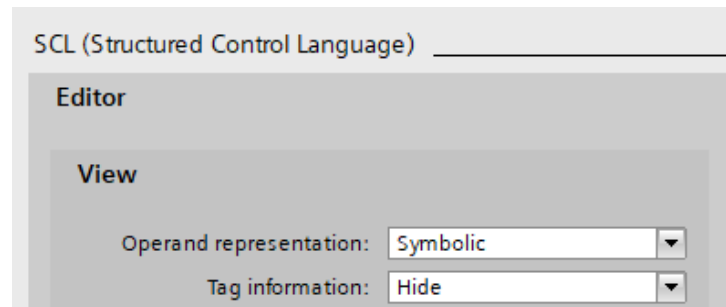
```

STEP 7 – Innovations

Collection of useful functional extensions

Display of the operand representation and tag information for SCL blocks

The display of the operand representation and tag information in SCL can now be adapted independently of the other programming languages via the global settings.



FOR loops in SCL – support of all available integer data types

In addition to signed integer tags, the integer tags of the data type USINT, UINT, UDINT and ULINT can now also be used in FOR loops.

Improved instructions

- The new statement "File Delete" is used to delete existing files on the memory card for S7-1500 CPUs
- The existing statement "TMAIL_C" has been extended for S7-1500 CPUs/S7-1200 CPUs. You can now send data logs, recipes and user files located on the SIMATIC memory card as an e-mail attachment, e.g. via an integrated interface of your CPU
- The existing statement "TMAIL_C" for S7-1200 CPUs has been extended and now allows email encryption, for example
- Improved performance of the statements "Serialize: Serialize", "Deserialize: Deserialize" and "CMP" (comparator) for S7-1500

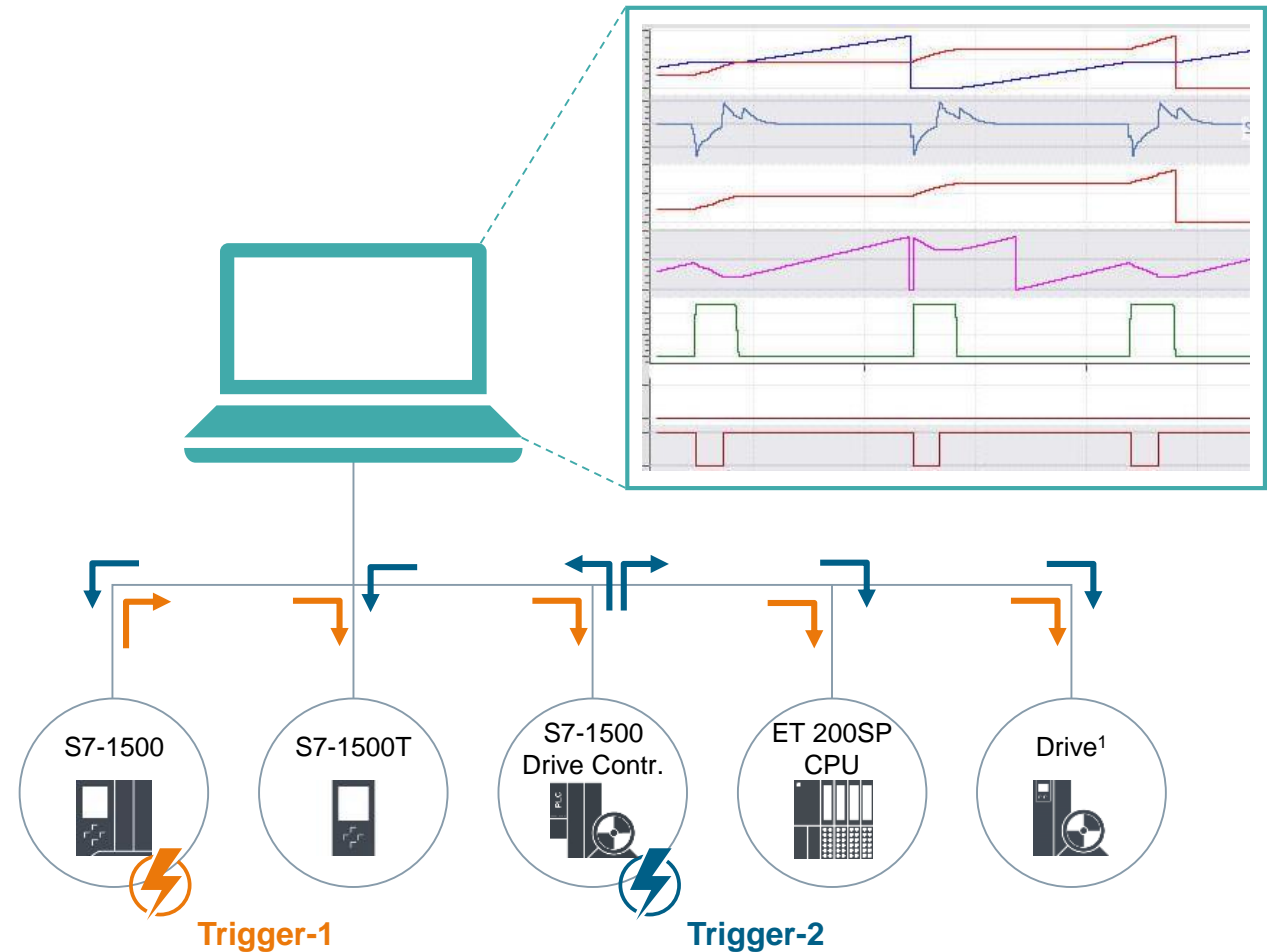
STEP 7 - Innovations Project Trace

Function

- Coordination of traces in several devices
 - Supports multiple CPUs
 - Supports a wide range of device types
- Display in a common diagram
- Alternative trigger sources possible

Benefits

- Cross-device troubleshooting
 - Extensive trigger options
 - Simple combination of related traces



¹⁾ Not in TIA Portal V16

New functions in S7-PLCSIM V16

Cycle control

Function

In order to improve the applicability of PLCSIM while testing the PLC programs, the functionality has been extended to include “Cycle control”.

In the options below the operator panels the following modes can be set via the new section "Scan Control".

Pause allows the cycle to stop

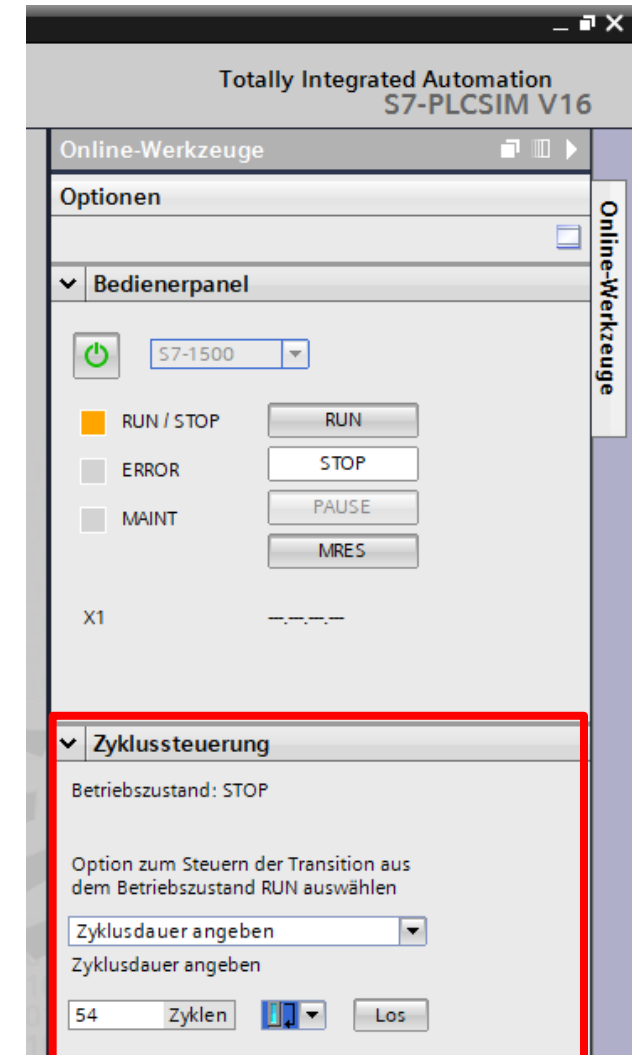
- For analyzing process values at a selectable time

Specify simulation duration (image)

- Observing the program behavior in slow motion. At least one cycle is always running through
- The following can be set: number of cycles or running time in ms./ sec./ min.

Pause after execution of the startup OB

- To analyze and verify the OB startup behavior, the program is stopped after its execution



New functions in S7-PLCSIM V16

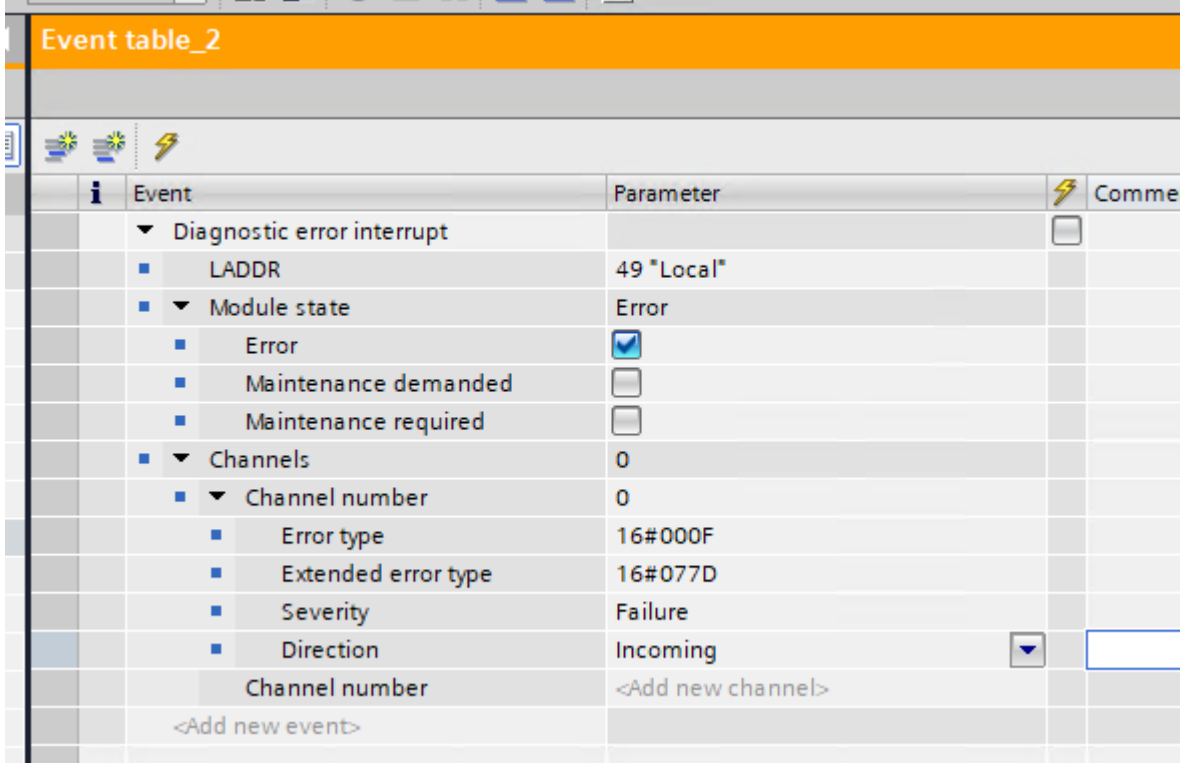
Event Simulation

Function

In S7-PLCSIM an event table is now available. With its help events of the following OBs can be simulated.

- Hardware alarm (OB 4x)
- Diagnostic error alarm (OB 82)
- Pulling or plugging the module (OB 83)
- Rack or station failure (OB 86)

You can create new event tables or access existing ones via the project tree in the project view.



The screenshot shows the 'Event table_2' configuration window. It features a tree view on the left and a table on the right. The table has columns for 'Event', 'Parameter', and 'Comme'. The 'Event' column is expanded to show a hierarchy: 'Diagnostic error interrupt' (with a checkbox), 'LADDR' (with value '49 "Local"'), 'Module state' (with a checkbox), 'Error' (with a checked checkbox), 'Maintenance demanded' (with a checkbox), 'Maintenance required' (with a checkbox), 'Channels' (with value '0'), 'Channel number' (with value '0'), 'Error type' (with value '16#000F'), 'Extended error type' (with value '16#077D'), 'Severity' (with value 'Failure'), 'Direction' (with value 'Incoming' and a dropdown arrow), and 'Channel number' (with value '<Add new channel>'). At the bottom, there is a button '<Add new event>'. The 'Comme' column is partially visible with a lightning bolt icon.

Event	Parameter	Comme
Diagnostic error interrupt		<input type="checkbox"/>
LADDR	49 "Local"	
Module state	Error	
Error	<input checked="" type="checkbox"/>	
Maintenance demanded	<input type="checkbox"/>	
Maintenance required	<input type="checkbox"/>	
Channels	0	
Channel number	0	
Error type	16#000F	
Extended error type	16#077D	
Severity	Failure	
Direction	Incoming	<input type="button" value="v"/>
Channel number	<Add new channel>	
<Add new event>		

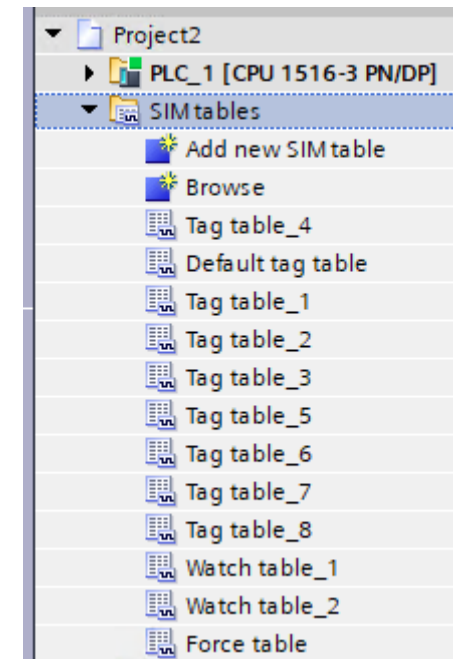
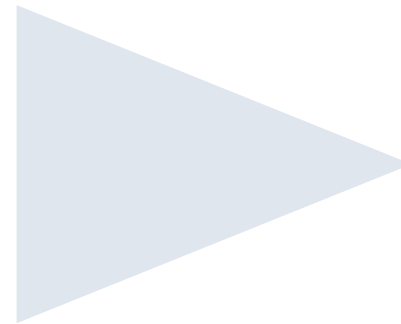
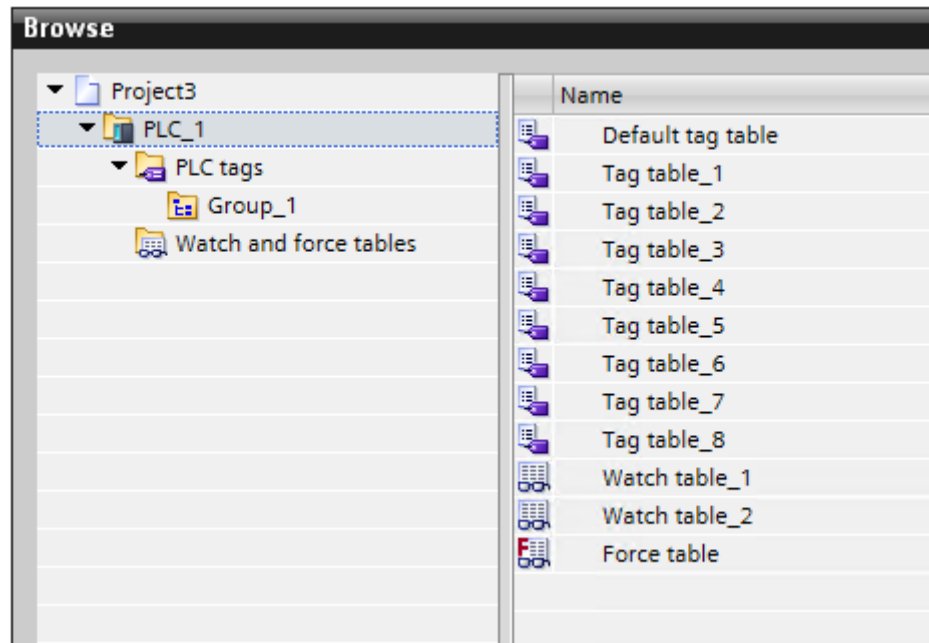
New functions in S7-PLCSIM V16

Automatic creation of simulation tables

Function

The transfer of filled tables from the TIA Portal has been improved.

It is now possible to import labels / observation control tables from the TIA project into the PLCSIM project using TIA Openness.



TIA Portal - Highlights of TIA Portal V16

WinCC Unified

- New HMI (Engineering and Runtime)
- Scalability from Panel to SCADA
- New HMI Comfort Panel
- Modern UI, Openness, new options



Startdrive – Innovations

- SINAMICS S120 Blocksize (CU310-2, PM240-2)
- DQ hubs support
- SIMATIC Drive Controller S120 Integrated
- S120 know-how protection
- DCC Openness support



TIA Portal options

- STEP 7 Safety**
F-SCALE – DINT, Openness Extensions
- Multiuser**
Exclusive Engineering with the TIA project server, asynchronous Multiuser Commissioning
- OPC UA**
S7-1200: OPC UA Data Access Server; S7-1500: No restart on delta download, improved diagnostics; new features, SiOME tool
- PLCSIM Advanced**
CPU 1518 MFP support
- Target 1500S for Simulink**
Simplified workflow, improved TIA Portal integration
- Test Suite**
Styleguide checker, application test
- SiVArc**
Support of Energy Suite, generation based on HWCN, merging of properties
- Energy Suite**
Load management, automatic screen generation – with SiVArc (integrated & license-free)

WinCC – Innovations

- HMI Panels: Multilingual keyboards, HMI Option Plus V3
- WinCC Advanced: ProDiag system function "ShowBlockInTIAPortal"
- WinCC Prof: Archiving string tags, Integ. tag sim., ProDiag extensions



Hardware configuration

- CPU 1513pro (F)-2 PN
- IP forwarding
- Cross-device trace
- Direct data exchange on the basis of Profinet IRT
- JSON RPC2.0 as new "Web data interface"
- S7-1200 FW4.4



STEP 7 – Innovations

- Software Units (Openness, access to PLC tag tables)
- Block comparison between project & library
- Multilingual SCL comments
- Project Trace (cross-device traces)



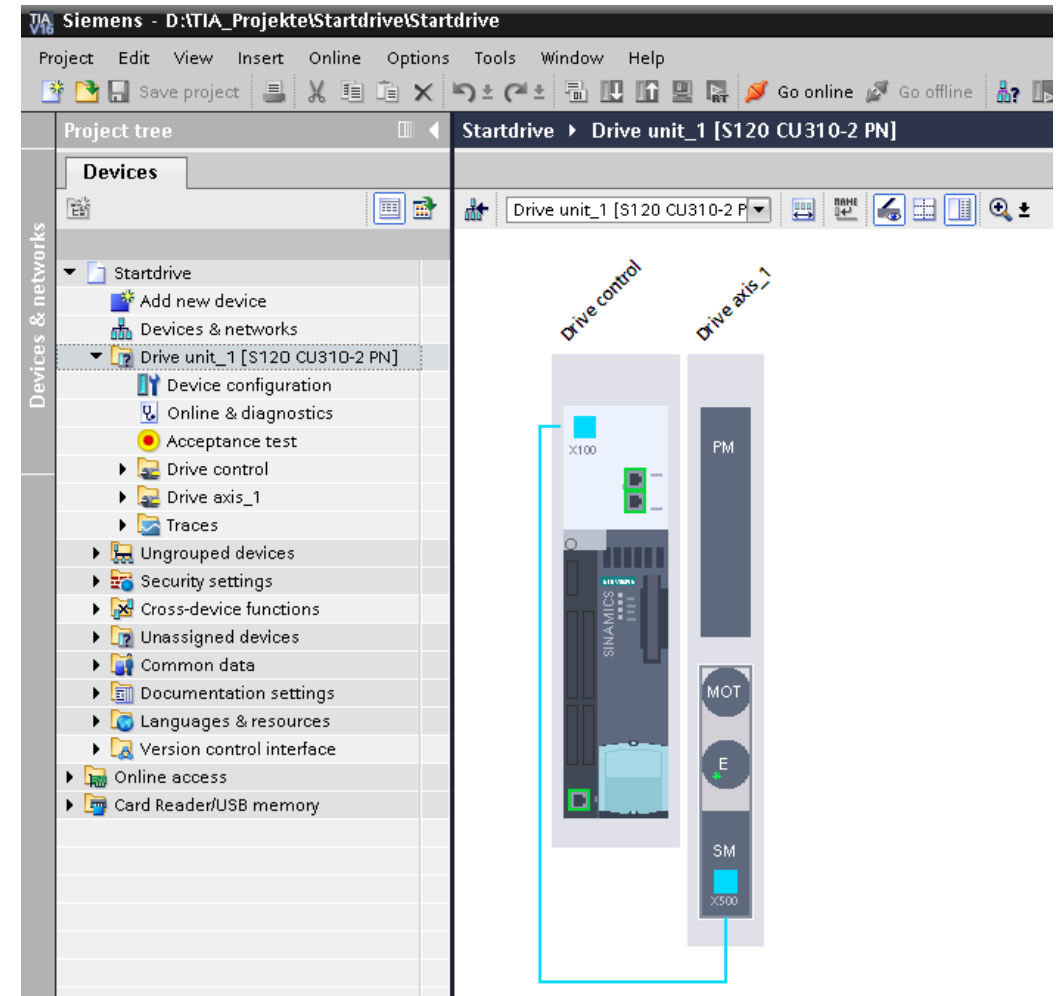
System functions

- TIA Portal Support Gateway
- TIA Portal logs and reference projects
- TIA Portal Version Control Interface
- TIA Portal add-ins
- Openness: Read/write online PLC fingerprints/HW parameters for S7-1500 and ET200SP



Startdrive - Innovations Hardware

- Support of **CU310-2 PN with PM240-2**
- Support of **CU Adapters CUA31/32**
- Support of SINAMICS **Integrated** for **SIMATIC Drive Controller**
- Support of **DQ-Hubs DMC20/DME20**



Startdrive - Innovations Functionality

Startdrive

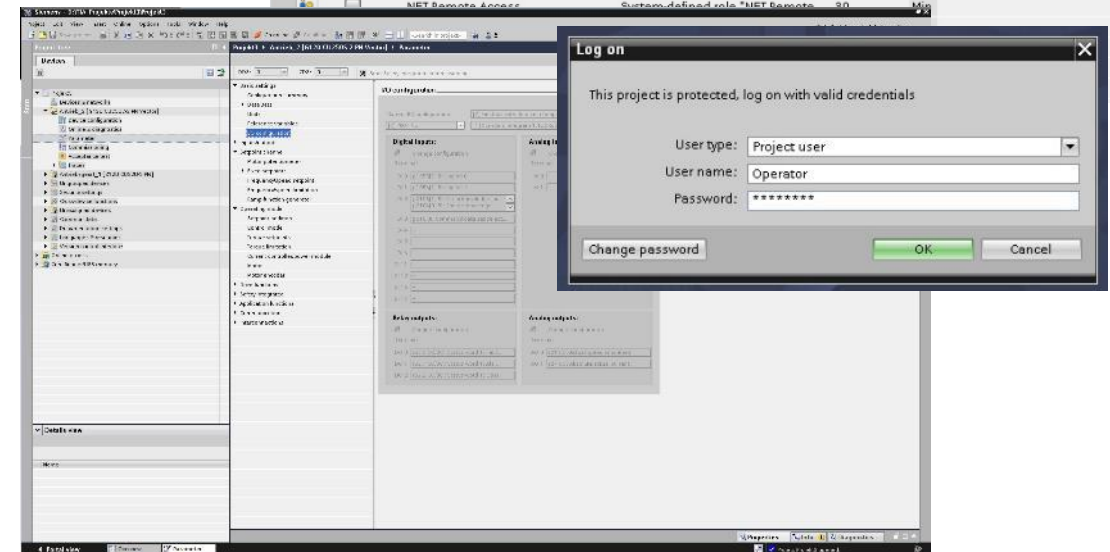
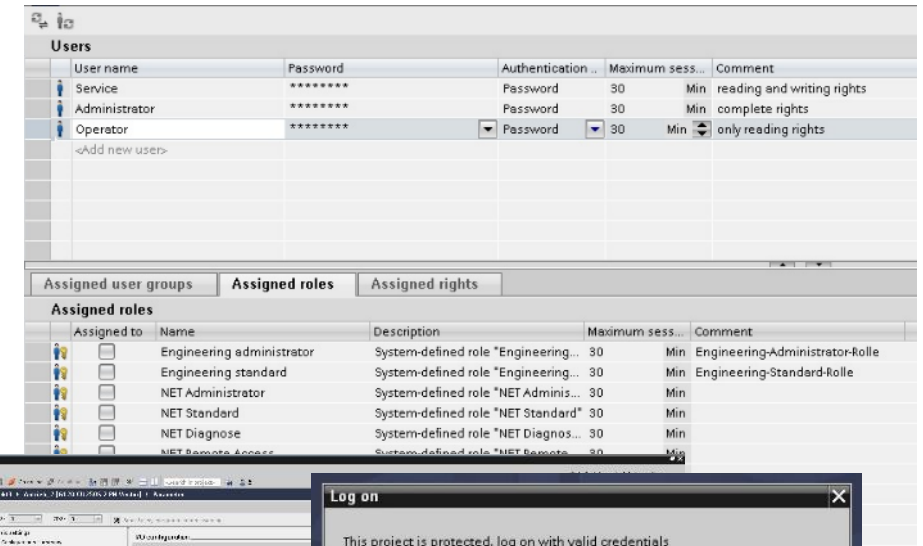
- Support of SINAMICS **Know-How and Write protection** (SINAMICS S)
- Support of Telegram 39x for TO Measuring Input
- Extended **UMAC** Support (User Management and Access Control)
- Support of selected SINAMICS TEC functions (Technology Extension) e.g. VIBX

SINAMICS DCC

- Openness for DCC
- Support of DCC for CU310-2
- New parameter group for DCC parameters

TIA Add-Ins

- App “Edit parameters in several drives” now available as integrated Add-In
- Several new Add-Ins for SINAMICS drive based applications now available



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- TIA Portal logs and reference projects
- TIA Portal Version Control Interface
- TIA Portal add-ins
- Openness: Read/write online PLC fingerprints/HW parameters for S7-1500 and ET200SP



Hardware configuration

ET 200pro CPUs based on S7-1500 – Key data

Key data for ET 200pro CPU based on S7-1500

- Memory concept, configuration limits and features of a SIMATIC S7-1500 1513(F)-1 PN CPU
- 2 CPU variants: Standard CPU 1513pro-2 PN and Fail-safe CPU 1513pro F-2 PN
- 2 independent PROFINET IO interfaces
- Use of current ET 200pro IO modules
- Technology integration: Standard Motion Control/PID/Trace
- Degree of protection IP65/67
- Dimensions as for CPU 1516pro-2 PN/IM154-8 PN/DP CPU
- Configuration/programming with STEP 7 V16 or higher

Differences from the S7-1500 CPU 1513(F)-1 PN

- No display
- **Second** PROFINET IO interface



Hardware configuration

ET 200pro CPUs based on S7-1500 – CPU 1513pro (F)-2 PN

Highlights CPU 1513pro (F)-2 PN

- Working memory
 - Program: 300 KB (450 KB F-CPU); data: 1.5 MB
- Performance
 - Bit command execution time: 40 ns bit/48 ns Word/64 ns fixed point/256 ns sliding point
- PN interface X1
 - PROFINET IO (**RT/IRT**) with 3 ports (2 ports M12 & 1 port RJ45)
 - **IO controllers** for 128 devices
 - **iDevice**
 - Media redundancy
- PN interface X2
 - PROFINET IO (**RT**) with 1 port (M12)
 - **IO controllers** for 32 devices
 - **iDevice**
- PROFINET shared iDevice for 4 controllers (via X1 & X2)



Hardware configuration

Improvement of the mechanical ruggedness

S7-1500 CPUs with new mechanical design

- The integration of the display into the CPU results in a new mechanical design
 - Installation dimensions remain identical
 - Slight variation regarding connection placement of the connectors
(PN connector 90° rotated, DP connector)
- RUN/STOP switch is replaced with RUN/STOP buttons
 - No more "cancelling" of the RUN/STOP switch
 - "STOP ACTIVE" indicates that the CPU was switched to STOP via the STOP button
 - Memory reset/Reset operation: Same as before
- Display can now be read – even when the cover is open
- Mechanical manipulation protection is retained

Spare part functionality

The CPUs are fully "spare part compatible" with previous versions

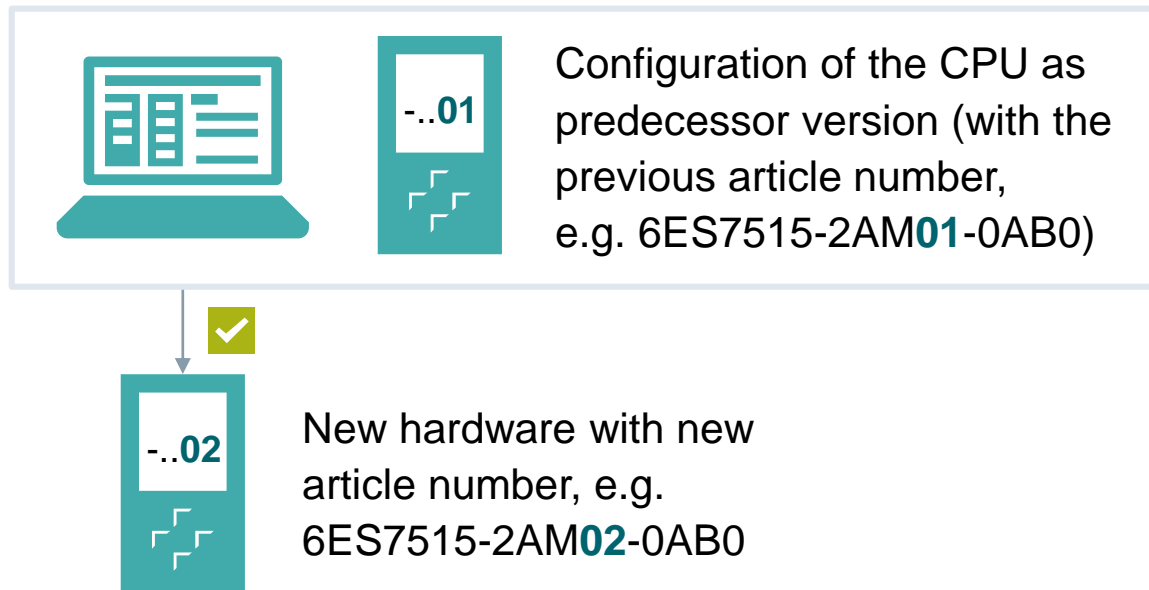
CPU 1515(F) and CPU 1516(F)



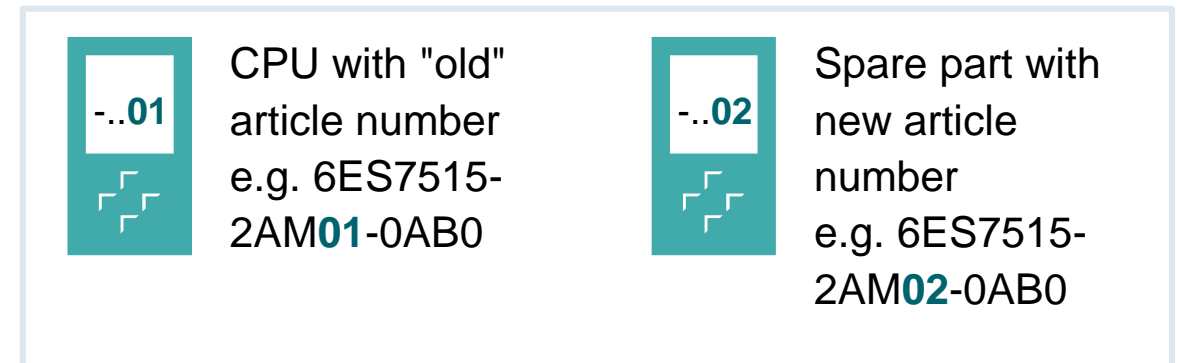
Hardware configuration

Spare part compatibility – CPU 1515-2 PN / CPU 1516-3 PN/DP

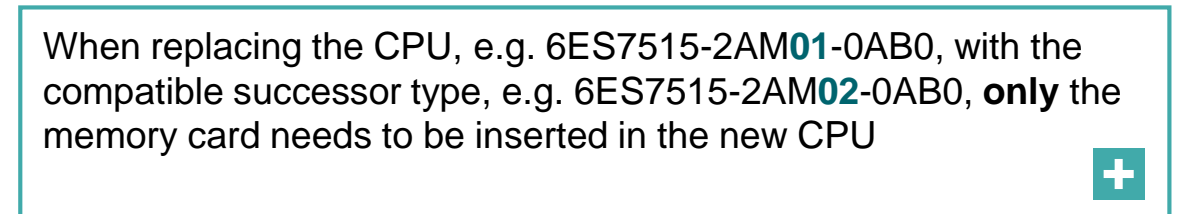
TIA PORTAL Configuring with older TIA Portal software versions (<TIA Portal V16)



Replacement part scenario

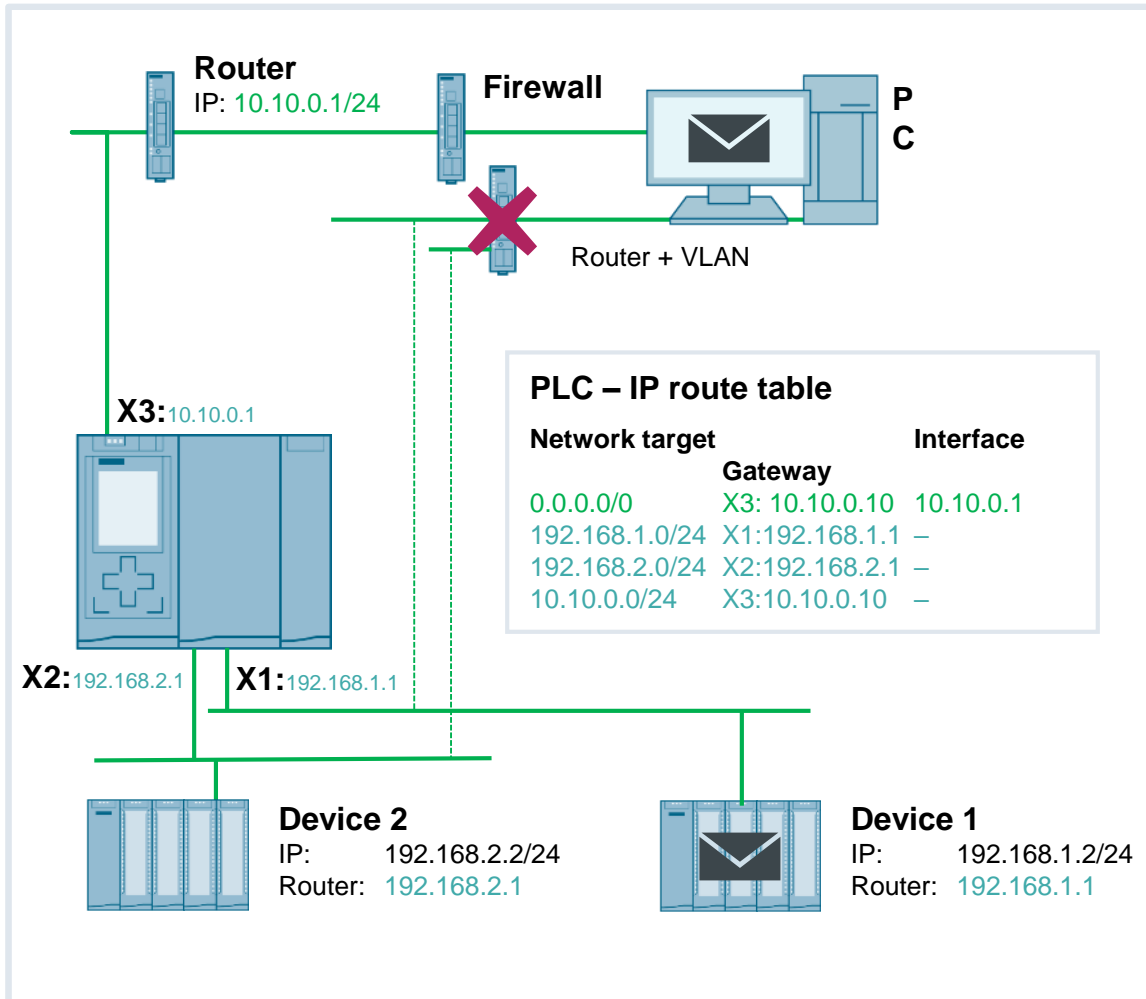


Full spare part functionality



Hardware configuration

S7-1500 based CPUs - IP-Forwarding



IP forwarding in PLC

- New** PLC can forward received IP frames to directly reachable IP subnets. IP route table is automatically generated by the IP configuration of the PLC interfaces
- Optional default IP route if external IP routers are used
- New** Additional external router is not needed **X**

Area of application

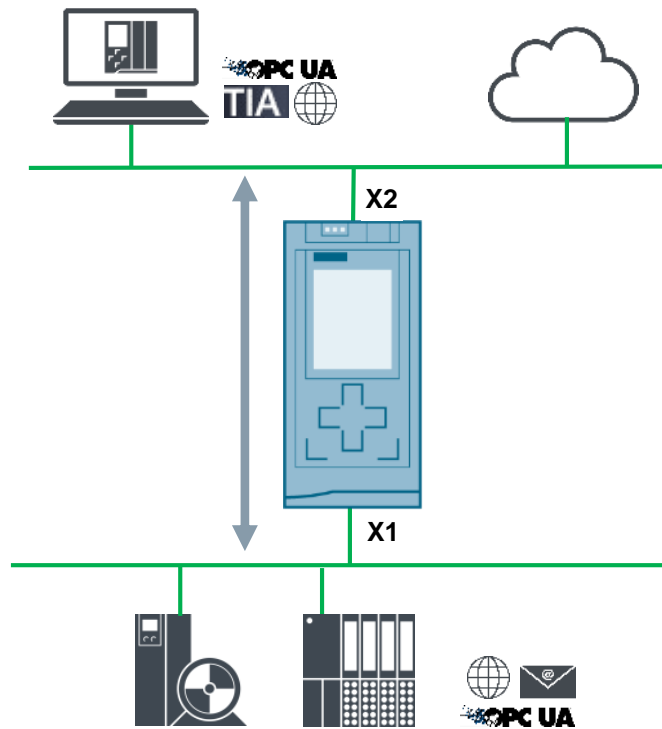
- Simplified integration of devices for remote access, e.g. for diagnostics for remote maintenance or firmware update
- Simple access from control to field level for configuration and parameter assignment of devices, e.g. via PDM or Web browser ...

Restriction

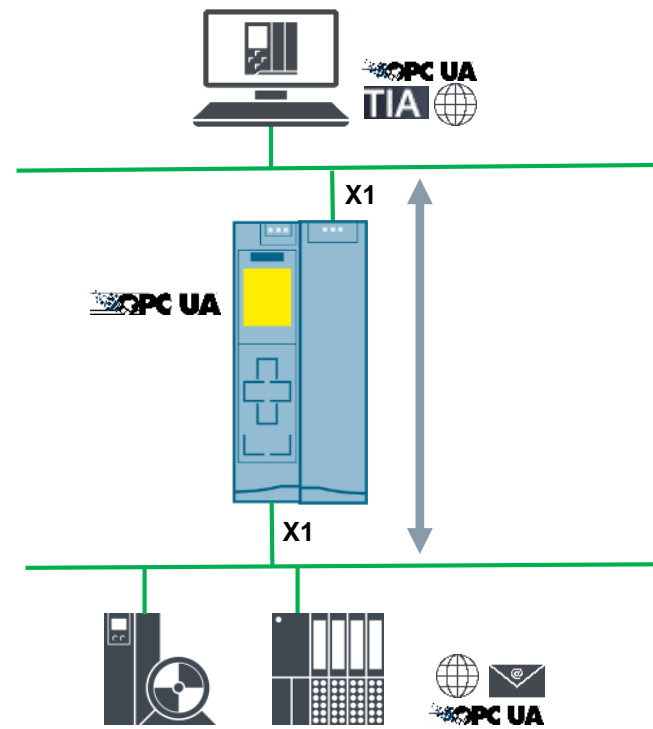
Additional IP routes cannot be entered in the route table of the PLC

Hardwarekonfiguration S7-1500 based CPUs V2.8 - IP-Forwarding - Applications

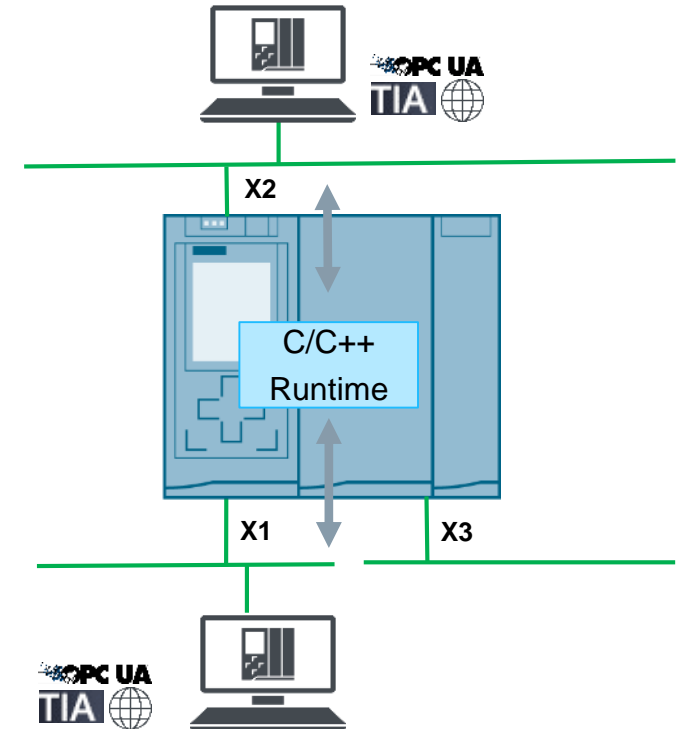
Parameterization and diagnosis of subordinate devices



CP1543-1 V2.2 – Accessibility of OPC UA server of PLC and subordinate devices



PLC1518 MFP V2.8 - Accessibility of the C/C++ runtime via interfaces X1/X2



Hardware configuration

C2C communication on the basis of Profinet IRT

Function

- For direct data exchange, an S7-1500 CPU provides one or more partners with cyclic user data from the peripheral area (I/O).
- The direct data exchange is based on PROFINET IRT and clock synchronicity.

Advantages of the function

- Fast, clock-synchronous exchange of I/O data to one or more S7-1500 CPUs
- I-Device functionality remains freely available for other applications
- Support of MRPD for existing MRP project configuration

The screenshot displays the SIMATIC Manager interface for configuring Profinet IRT communication between two PLCs. The top part shows a network diagram with two PLCs, PLC_1 and PLC_2, connected via a green line representing the Profinet IRT connection. Below the diagram, the 'I/O communication' tab is active, showing a table of communication partners.

Partner 1	Partner 2	Interface partner 2	Mode	Optional IO-Device
1	PLC_2			
2	PROFINET-Schnittstelle_1			
3	X1	PLC_1	PROFINET-Schnittstelle_1	Direct data exchange
4		Drop or select the device ...		

Below the table, the 'Direct data exchange [DDX]' properties window is open, showing the 'Transfer areas' section. The filter is set to 'Inputs' and 'Outputs'. The table below shows the configured transfer areas.

Transfer area	Type	Address PLC_2	Partner	Partner address	Length
1	DX	Q 256	PLC_1	I 256	1 Byte
2		<Add new>			

Hardware configuration

SIMATIC S7-1500 based CPUs – Web server innovations 1st

STEP

Function

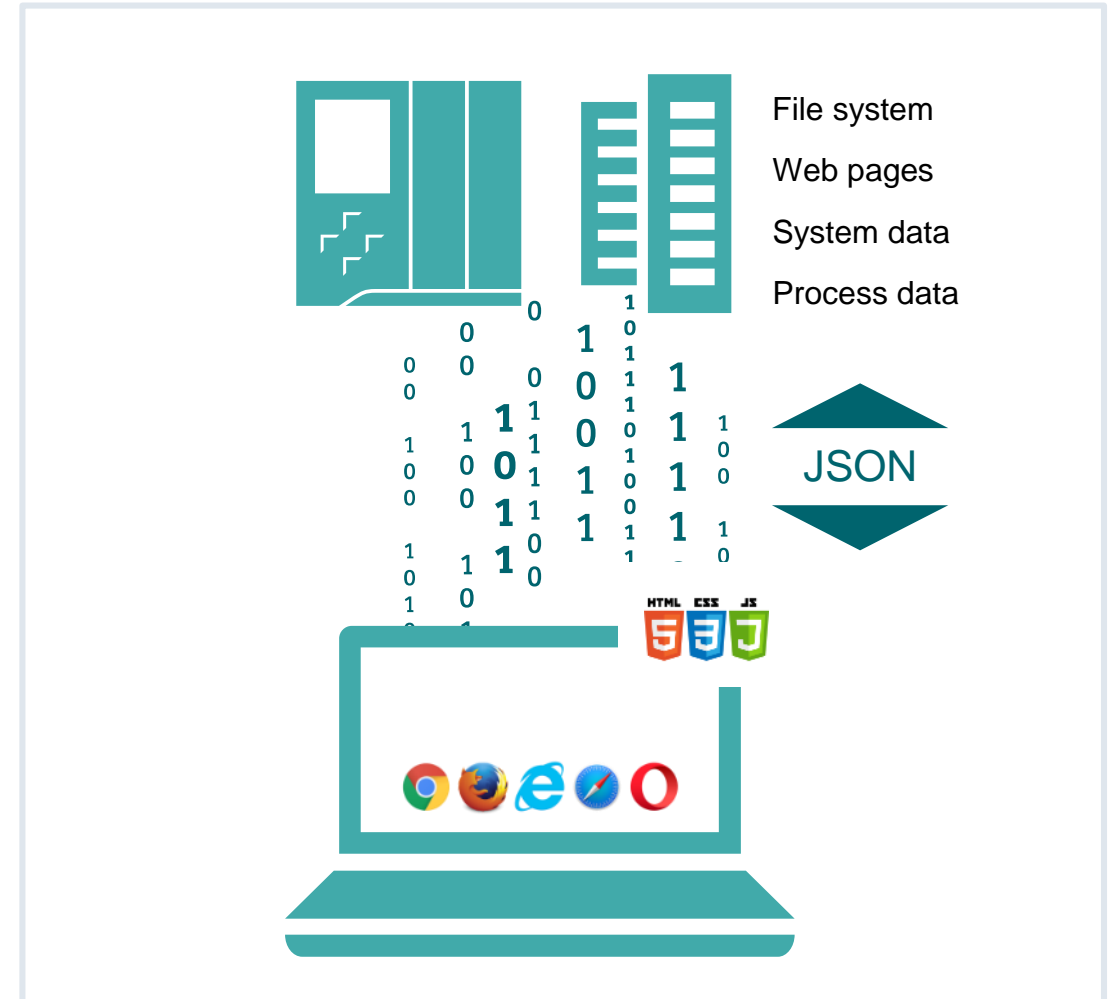
- Web server with JSON RPC2.0 as new "Web data interface" for access to Web server data such as
 - Process values (tag values)
 - Status and CPU diagnostics data (partly)
- CPU Web server response in JSON format

Advantages of the function

- Future basis for "state of the art" creation of user-defined Web pages
- JSON as Web-capable data format for simple linking to Web data consumers, e.g. MES systems, SCADA systems
- JSON as a stable data format for accessing Web server data, i.e. no adjustment of Web client code (e.g. Java Script code) needed after firmware update
- Spare part compatibility as the new Web data interface can be used in addition to the current options

SIEMENS

Ingenuity for life



Hardware configuration

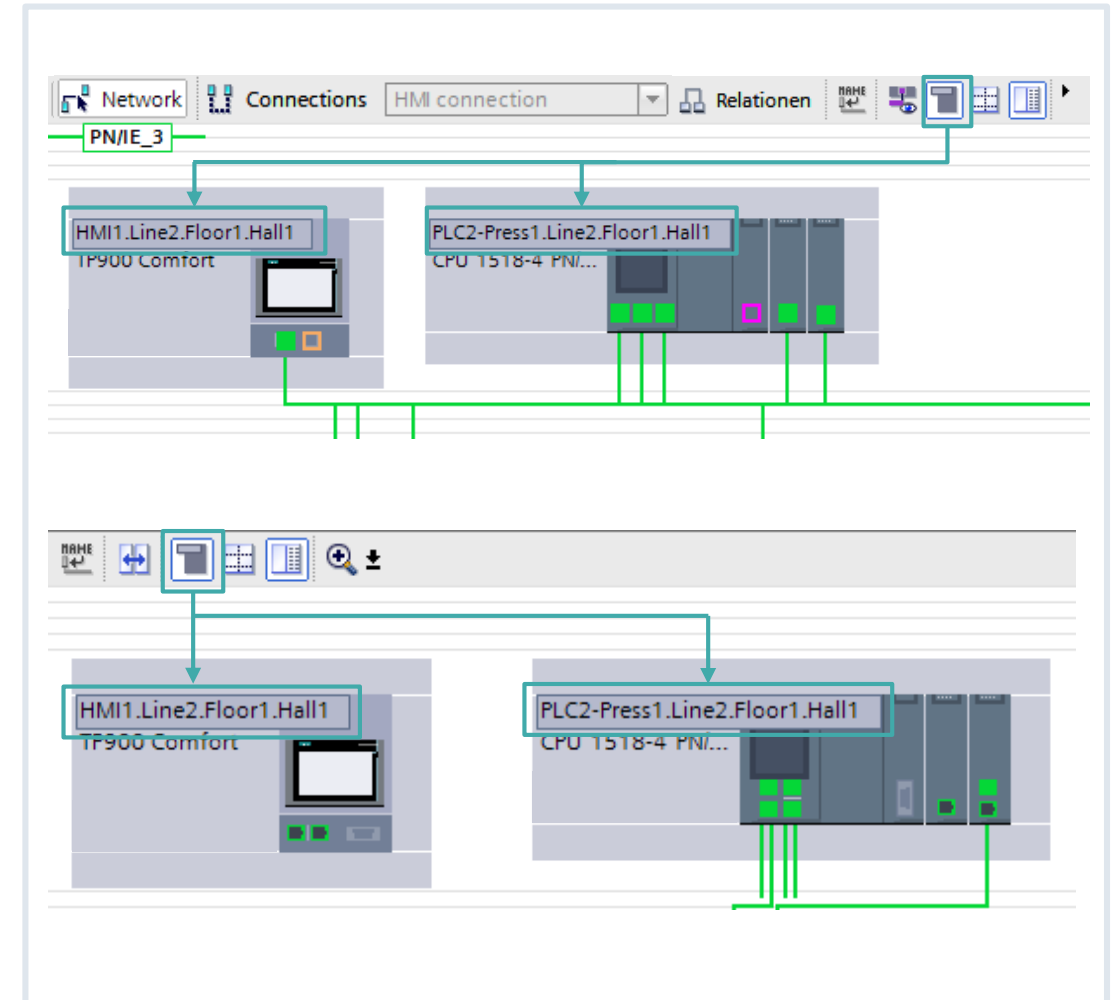
Improvement of display of the device name in network and topology view

Function

- Device name can be displayed in network view and topology view.

Advantage

- The clarity and orientation of projects with long device names is facilitated.



Hardware configuration

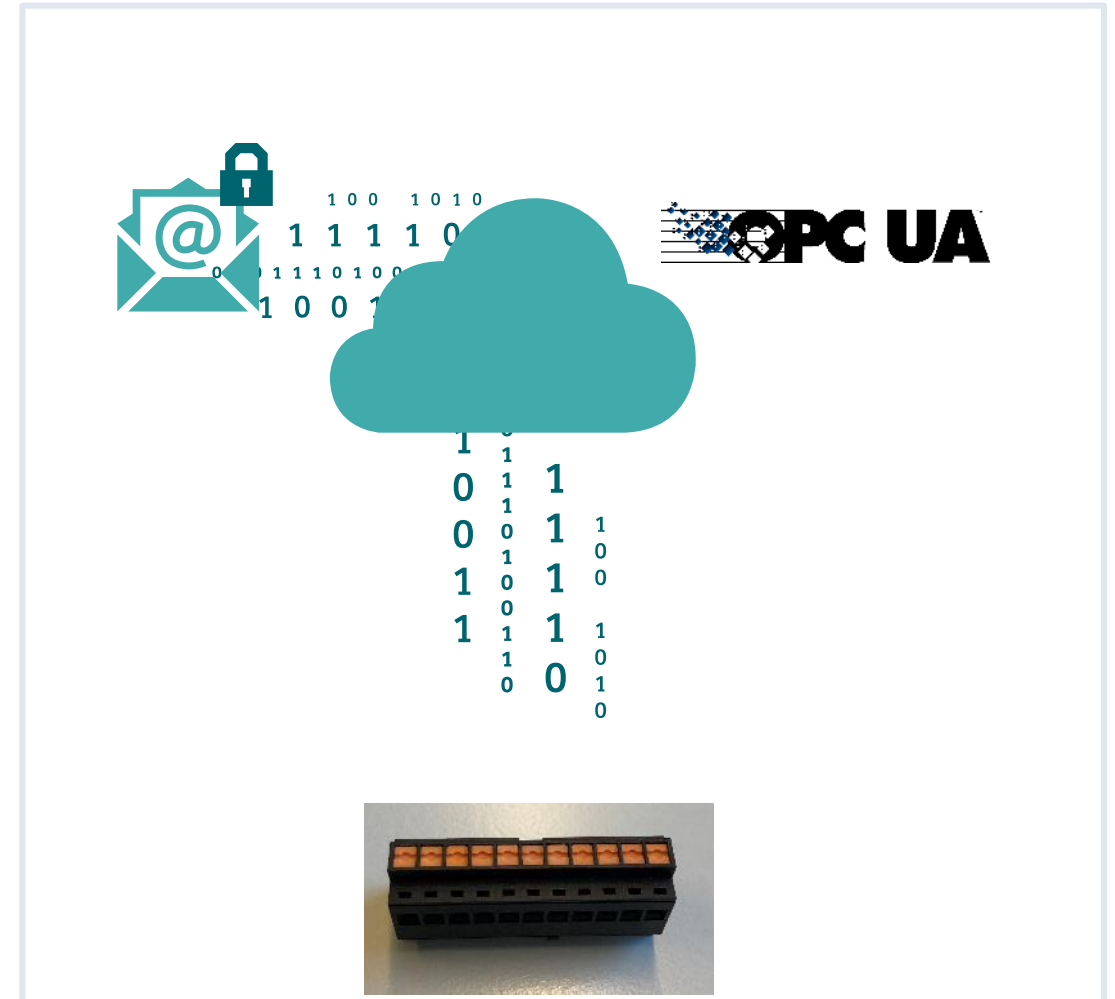
S7-1200 highlights

Key data firmware V4.4

- Secure e-mail with attachment
- OPC UA
 - Server
 - Companion Specification
- Support DNS (OUC)
- Web server harmonization
 - Firmware update distributed I/O
 - Download/Clear of data logs
- MindSphere connection based on Secure OUC + MQTT (SIOS example)
- Configuration/programming with STEP 7 V16

Hardware

- 2 additional DO modules (16 channels) – sinking
- Push-in terminals as accessories



Hardware configuration

S7-1200 V4.4 – E-mail encryption with TMAIL_C – optionally with attachment

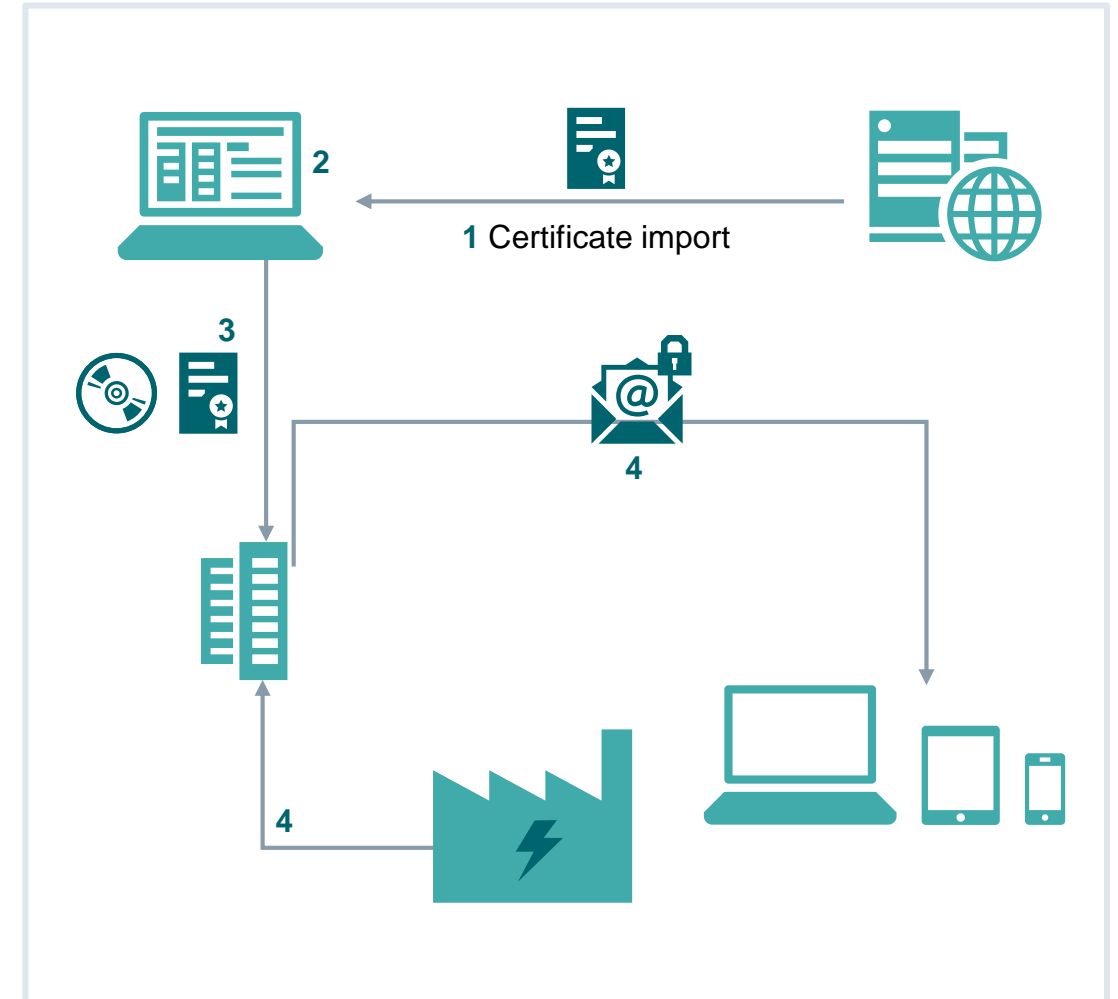
Encrypted e-mail communication with TMAIL_C via internal CPU interfaces

Requirements

- TIA Portal V16, CPU FW V4.4 and TMAIL_C block version **V6.0**

Procedure

1. Import of certificate from the e-mail provider to the TIA Portal
2. Programming with TMAIL_C and reference to imported certificate (assignment of certificate to the CPU)
3. Program download with TMAIL_C and referenced certificate for encrypted communication
4. Sending of an encrypted e-mail with fault/diagnostics information to service staff/center; display on PC, tablet or smart watch
5. Optional: Sending of data log, recipes or user files



Hardware configuration

S7-1200 V4.4 – OPC UA server – Functional scope



S7-1200 exceptions in the 1st version

- Registered read/write
- No structured data types and arrays
- No methods
- No alarms and conditions

Hardware configuration

S7-1200 V4.4 – DNS name resolution for OUC

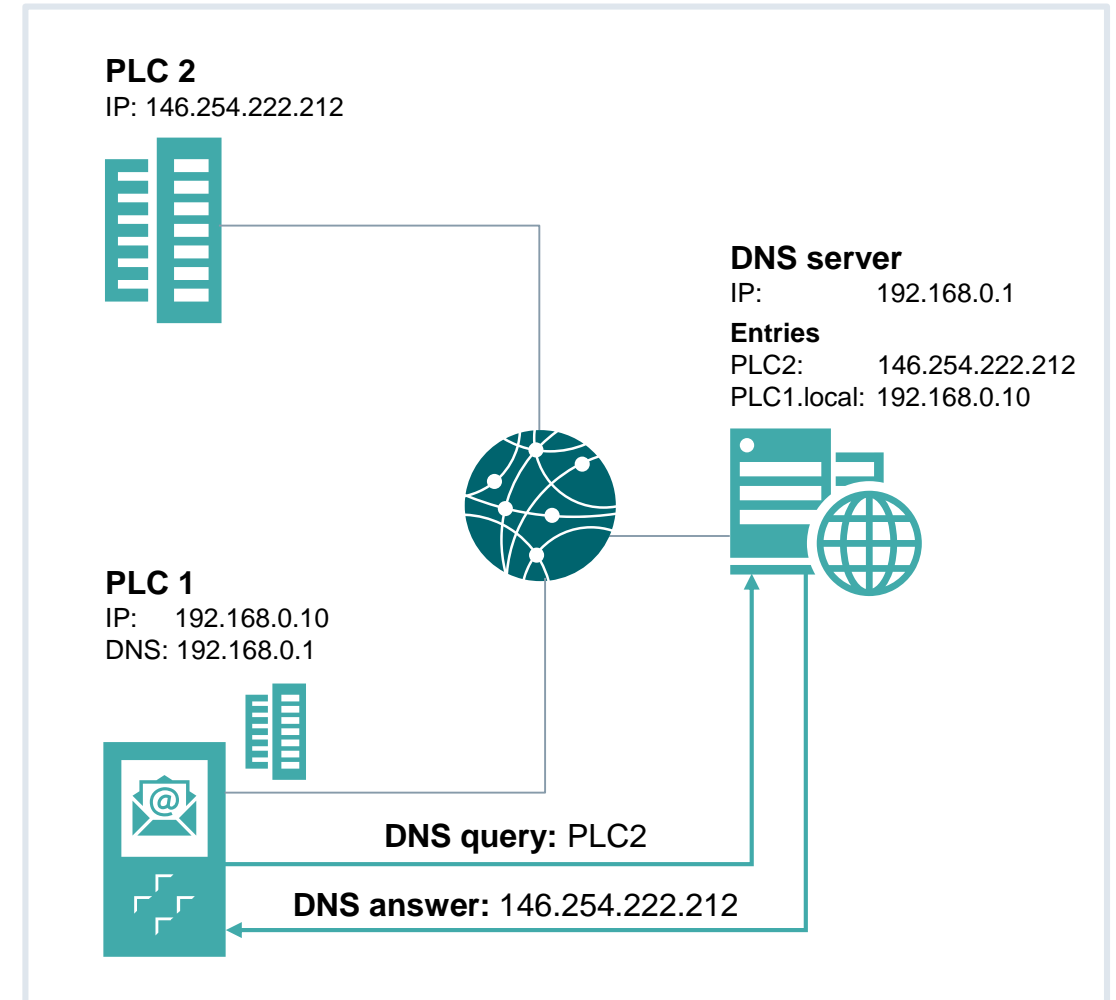
Open user communication with DNS name resolution

- CPUs query IP addresses from one another on the DNS server
- DNS server configuration in the CPU properties

Benefits

- Clear configuration thanks to name-based addressing
- No IP addresses needed for configuration of Open User Communication

OUC independent of IP address



Hardware configuration

S7-1200 – DC signal modules with 16 digital outputs sinking

Sourcing/PNP

SM 1222 DC DQ16xDC
6ES7222-1BH32-0XB0

**SM 1223 DC/DC DI 16xDC/
DQ 16xDC**
6ES7223-1BL32-0XB0

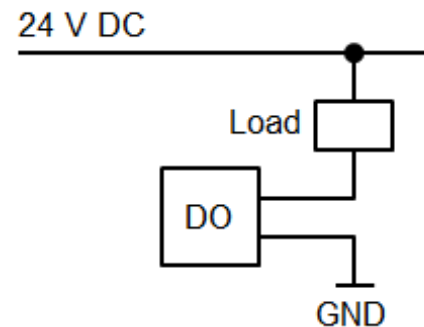
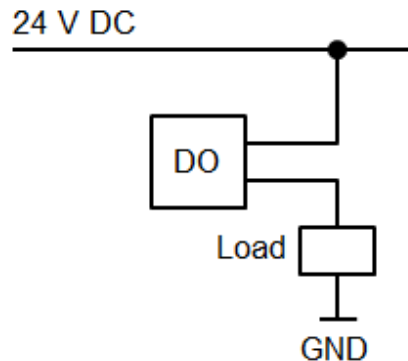
Sinking/NPN

SM 1222 DC DQ16xDC SINK
6ES7222-1BH32-1XB0

**SM 1223 DC/DC DI 16xDC/
DQ 16xDC SINK**
6ES7223-1BL32-1XB0

New

2 additional 16-channel DC output modules sinking



TIA Portal - Highlights of TIA Portal V16

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- Scalability from Panel to SCADA
- New HMI Comfort Panel
- Modern UI, Openness, new options



Startdrive – Innovations

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- S120 know-how protection
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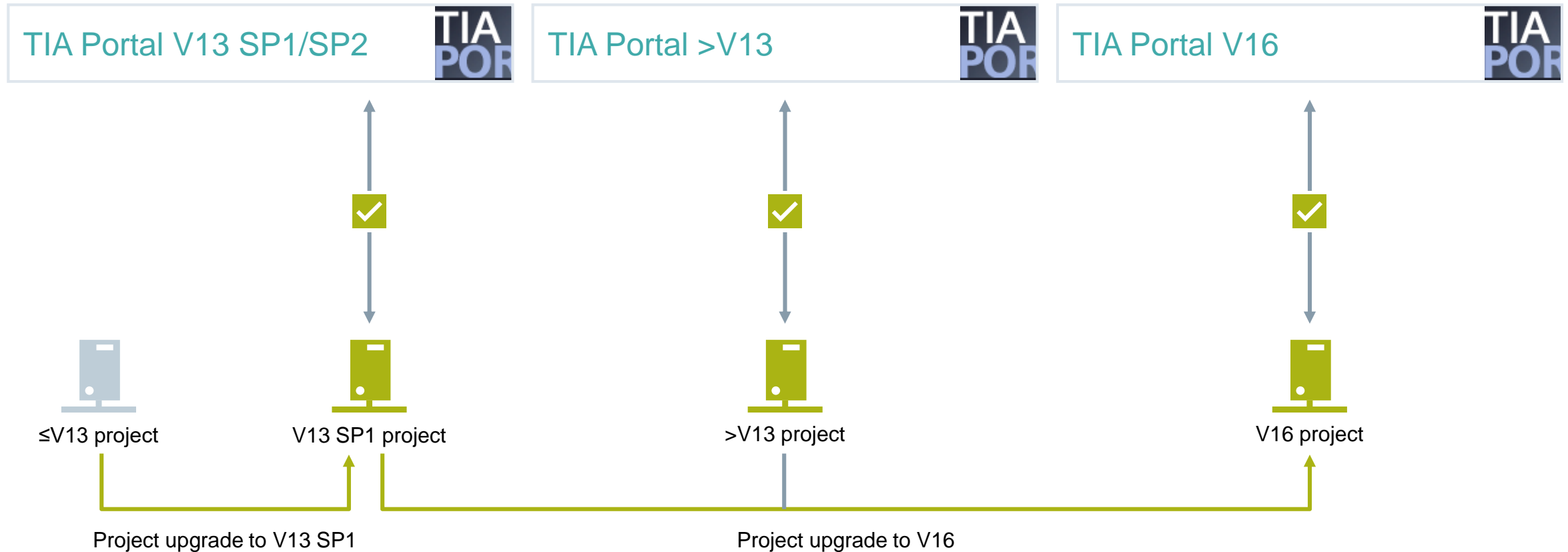
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- TIA Portal logs and reference projects
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- TIA Portal add-ins
- Openness: Read/write online PLC fingerprints/HW parameters for S7-1500 and ET200SP



System functions

Project upgrade



Side-by-side installation of V13 SP1/SP2 up to V16 allows access to all project versions. The V16 license can be used for all available versions from V11.

System functions

Spare parts compatibility S7-1500 and ET 200 CPUs – FW 2.8 with older TIA Portal versions

TIA Portal V12/V13/V14/V15/V15.1



TIA Portal V16



V12
project
with FW 1.0/1.1



Firmware V2.8

V13/V13 SP1
project with FW
1.5/1.6/1.7/1.8



Firmware V2.8

V14/V14 SP1
project with
FW 2.0/2.1



Firmware V2.8

V15/V15.1
project with
FW 2.5/FW 2.6



Firmware V2.8

V16 project
with FW 2.8



Firmware V2.8

Full spare part functionality: Online support: ID 109744163



New functions can be used with TIA Portal V16 and firmware V2.8

System functions

New features for the SIMATIC S7-1500 system and ET 200SP CPUs – Enhanced environmental conditions

Possible applications

- Cable railways
- Wind farms
- Automobile (e.g. Mexico)
- Surface mining (e.g. South America)

Benefits

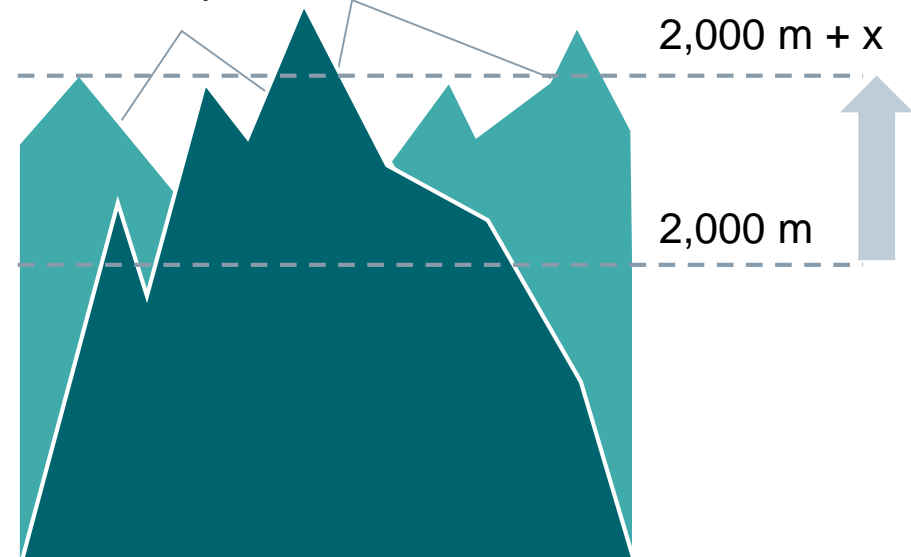
Extended range of applications

Additional benefits of SIPLUS versions

- Portfolio largely released for 5,000 m
- Higher operational temperature at higher altitudes

Extended installation altitude

- Adjustment in stages
- Permissible installation altitude depends on the module
- Information about the possible installation altitude can be found in the technical specifications or in the system manual



System functions

New features for the SIMATIC S7-1500 system and ET 200SP CPUs – Enhanced environmental conditions

Use at 2,000 m above sea level

- The maximum "Height in operation in relation to sea level" depends on the module and is described in the technical specifications of the respective module
- For heights >2,000 m, the following boundary conditions apply
 - Derating factor of the maximum specified ambient temperature in relation to the installation altitude

Installation altitude (in meters)	Derating factor for ambient temperature ¹
-1,000 – 2,000	1.0
2,000 – 3,000	0.9
3,000 – 4,000	0.8
4,000 – 5,000	0.7

¹ Basic value for the application of the derating factor is the maximum permissible ambient temperature in °C for 2,000 m. The derating factors compensate for the reduced cooling effect of air at higher altitudes due to the reduced density.

System functions

New product features for SIMATIC S7-1500 and ET 200 CPUs – Enhanced environmental conditions

Examples of possible applications

- Outdoor plants
- AGV (deep-freeze) cold storage facilities
- Tunnel construction
- Cranes
- Shipbuilding
- ...

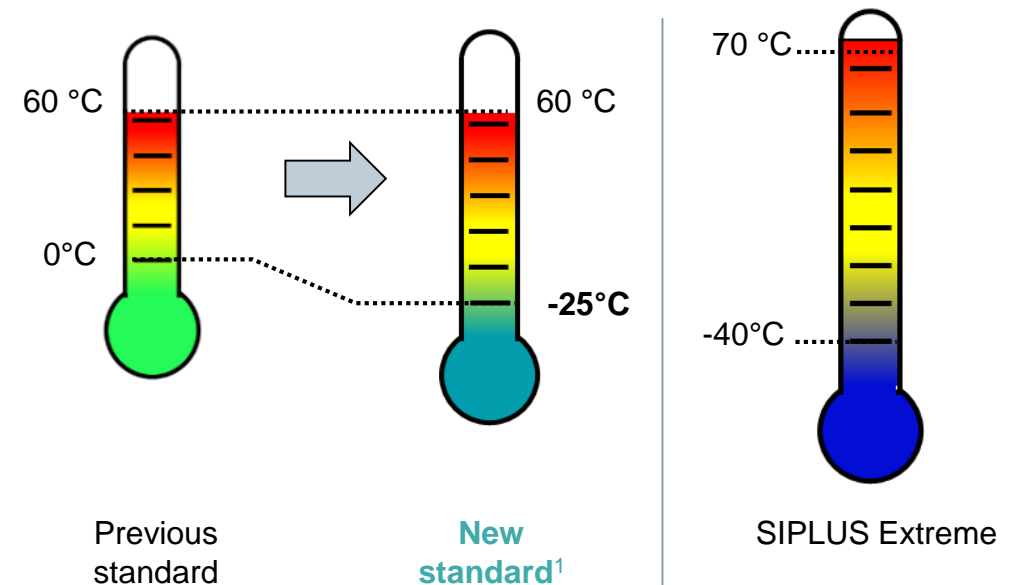
Additional benefits of SIPLUS versions

- -40° C to +70° C
- Condensation, 100% rel. humidity and icing allowed
- Higher resistance to harmful gases and salt mist
- Railway standards

1) Please observe the information in the manual with regard to condensation

Planning

- Adjustment in stages
- -25°C for CPUs
- I/O modules down to -30°C in some cases



System functions

New product features for SIMATIC S7-1500 and ET 200 CPUs – Enhanced environmental conditions

Extended ambient conditions with operation from -25°C

The ambient temperature for operation depends on the module and is described in the technical specifications of the respective module or can be read on the enclosure of the CPU.

Overview of the minimum operating temperature for the respective CPU types

CPU type	Operating temperature ¹
ET 200(F) CPUs based on S7-1500	-25°C to +60°C
CPU 1511(F)/1513(F) with integrated display	-25°C to +60°C
CPU 1511C/1512C with integrated display	-25°C to +60°C
CPU 1515(F)/1516(F) with integrated display	-25°C to +60°C
CPU 1517(F)/1518(F)/1518(F) MFP	0°C to +60°C
SIMATIC S7-1500 T CPUs	0°C to +60°C
SIMATIC S7-1500 R/H CPUs	0°C to +60°C

1) Please observe the information in the manual with regard to condensation

System functions

TIA Portal Language Packs

Extension of the user interface languages

New

The following user interface languages are additionally available centrally in the TIA Portal as of version 16 (STEP 7, WinCC)

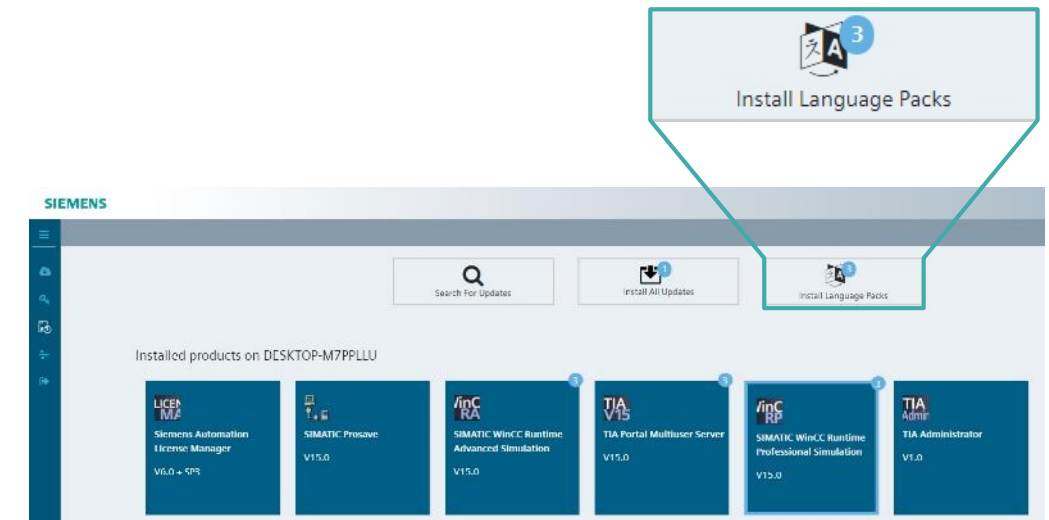
- Japanese¹
- Korean¹
- Russian¹

Supply

The languages DE, EN, ES, FR, IT, CH are still made available directly for the installation.

¹ Without online help

Provision of the language packs in the same way as updates or support packages



System functions

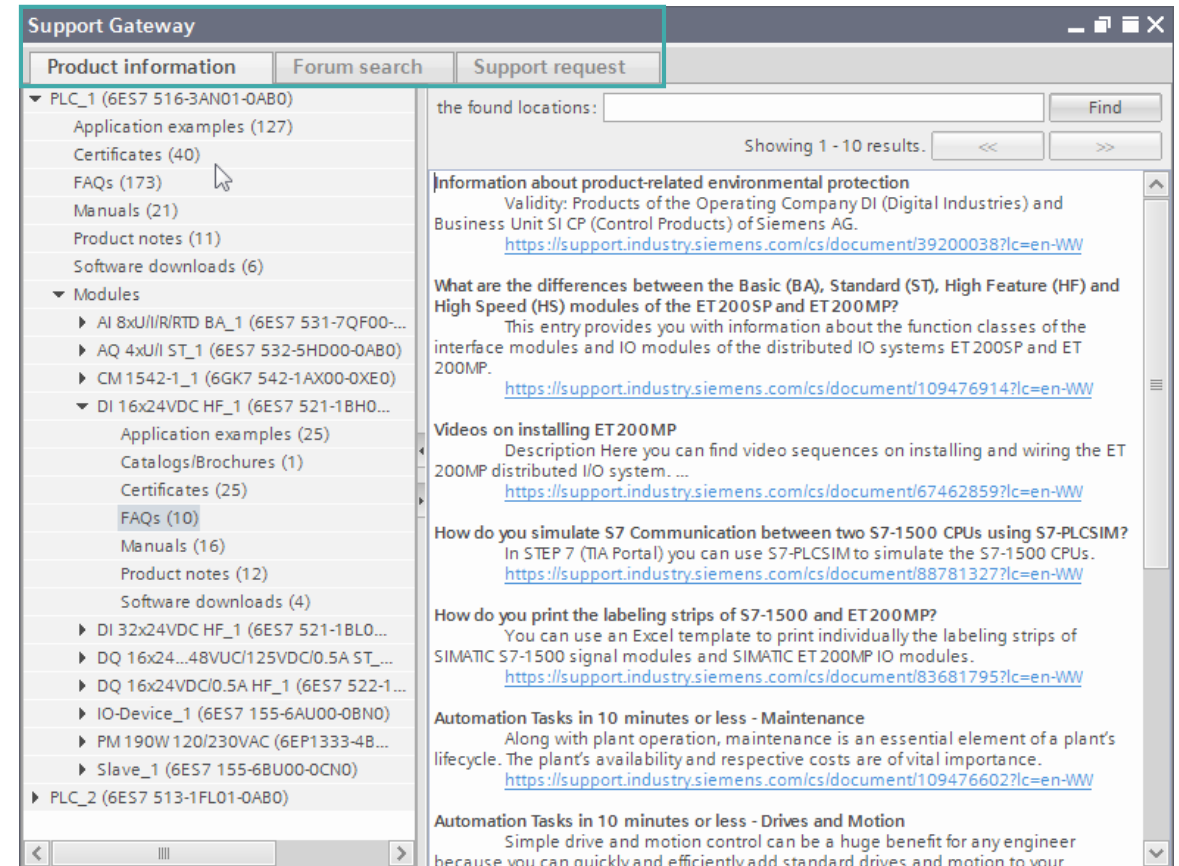
TIA Portal Support Gateway

Overview

- The TIA Portal Support Gateway is the integrated connection of the Siemens Industry Online Support pages to the TIA Portal
- The Support Gateway includes the following functions:
 - Forum search
 - Product search
 - Generation of support request file

Benefits

- Seamless integration of SIOS added value functions into the TIA Portal
- Know-how management without change of media
- Simple and fast forum search
- Pre-filtered product search based on the components contained in the TIA Portal
- Generation of a support request file with the most important computer and TIA Portal data



System functions

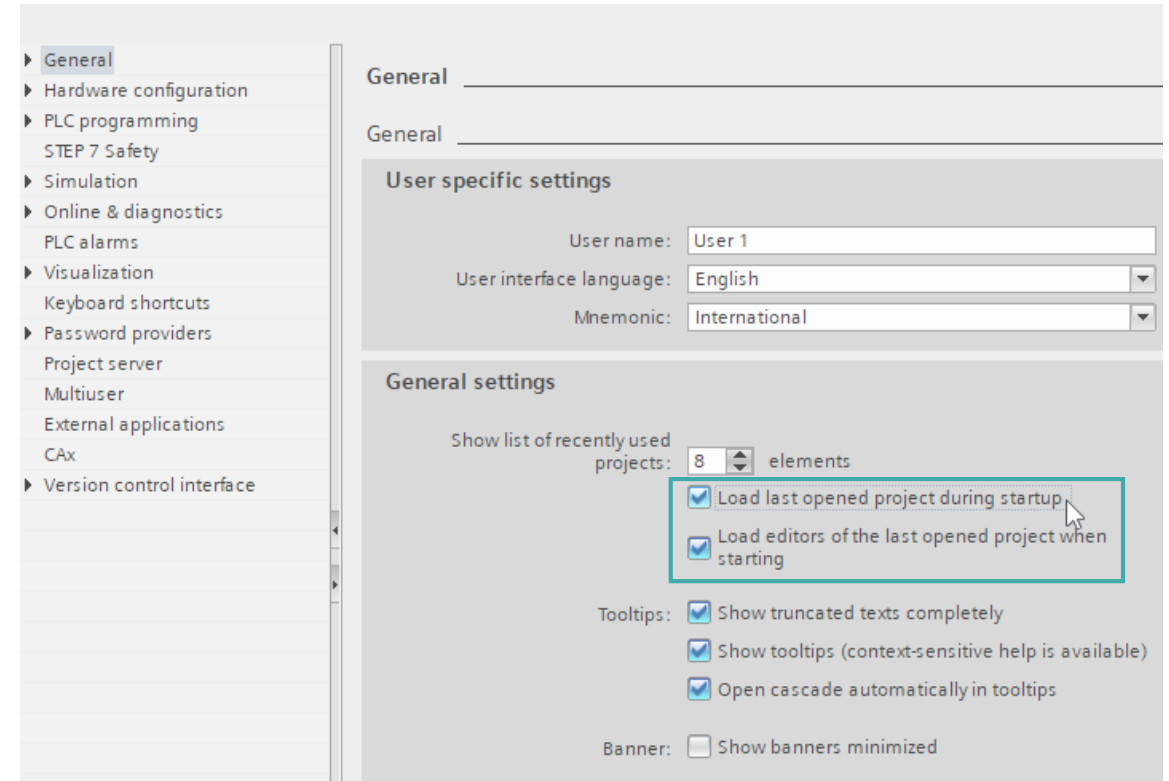
Autostart function for projects and editors

Function

- The last used TIA Portal project are restored on start-up of the TIA Portal
- Optionally, the last used editors and their content can also be restored

Advantage

- The editing of a TIA Portal project can be continued in the same development environment after a restart of the TIA Portal. The last opened TIA Portal project is automatically opened again and the editors that were open when the TIA Portal project was closed are restored with the last edited objects



System functions

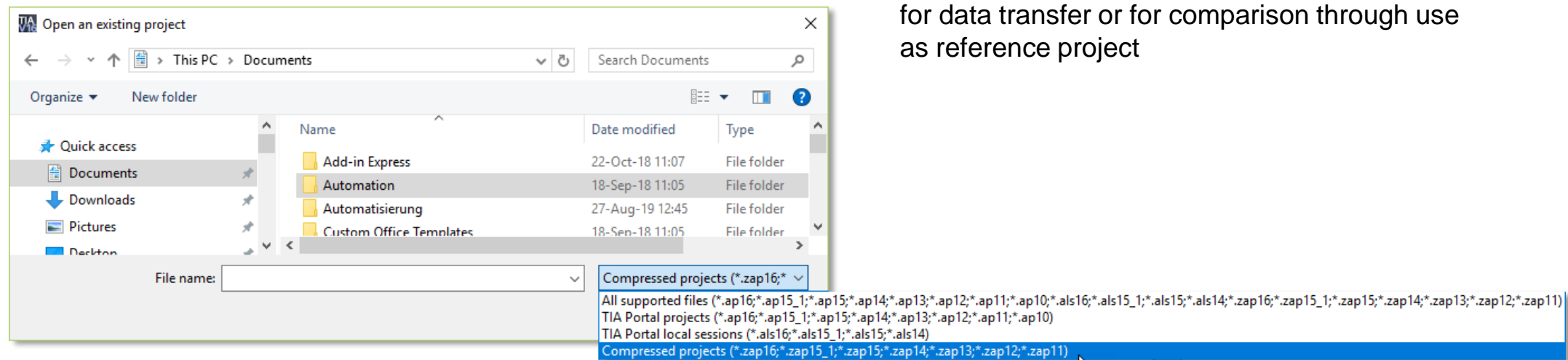
TIA Portal archives and reference projects

Function

- TIA Portal archives can now be retrieved via the "Open project" dialog. Note: The menu item "Retrieve" has been removed
- Using TIA Portal archives as a reference project
- Locally saved multiuser and exclusive sessions can be used as reference project

Advantage

- All project use functions can be accessed via a dialog (open and retrieve)
- Simple use of TIA Portal project archivess as reference project with a mouse click
 - Archivess to be displayed are opened temporarily and displayed as a reference project
 - Once the reference project function is complete, the temporary data is deleted
- Extended functions for Multiuser and Exclusive Sessions for data transfer or for comparison through use as reference project



System functions

VCI – Interface for external version management

Functionality

Ex-/Import of program objects

- Blocks
- User data types
- Tagtables

Compare

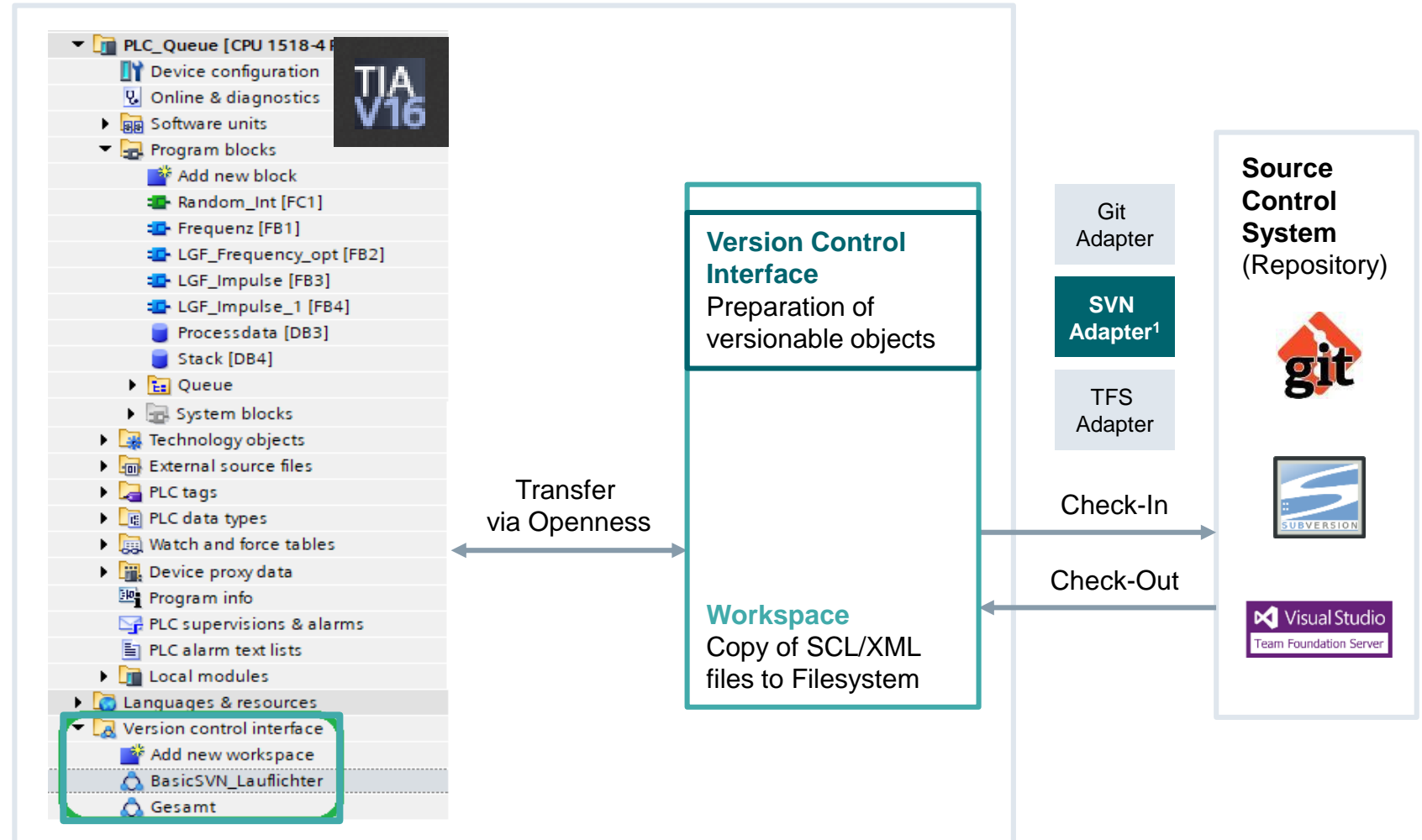
- Objectstatus (equal/unequal)
- Detailed Block compare

Interfaces for

- External compare tool
- Userscripts

Openness Interface

- API with VCI operations
- Without User-Interface



1 Samplescripts available

System functions

TIA Portal Add-Ins

Overview

- Add-Ins offer a convenient way to enrich TIA functionality using the Openness API
- Add-Ins are written as .NET programs
- Add-Ins can be easily shared within a company and even distributed to third-party vendors

Installation

- Add-Ins can be easily installed by copying the .add-in file into the “Add-Ins/” folder in the TIA Portal installation directory
- Add-Ins can be activated or deactivated in the Add-Ins task card (by default Add-Ins are deactivated)
- Additional information about the Add-In like the author, description or the required permissions are also shown in the Add-Ins task card

The screenshot displays the 'Add-ins' task card in the TIA Portal. The card is divided into several sections:

- Options:** A section for configuring the add-in's behavior.
- Add-ins:** A table listing installed add-ins. The 'Source Control.addin' entry is highlighted with a red box and has a green checkmark in the 'Status' column.
- Details:** A section providing metadata for the selected add-in, including:
 - Name: Source Control.addin
 - Path: D:\DS\TIA\Source Control.addin
 - Author: AddIn Team
 - Modified on: 9/12/2019 2:03:04 PM
 - Product: Siemens Source Control
 - Version: 1.0.1.0
 - Status: (Active)
- Description:** A text area containing the description: "This TIA Add-in is used to provide source control support for TIA project data."

On the right side of the task card, there are three vertical tabs: 'Tasks', 'Libraries', and 'Add-ins'. The 'Add-ins' tab is currently selected and highlighted with a red box.

System functions

TIA Portal Add-Ins

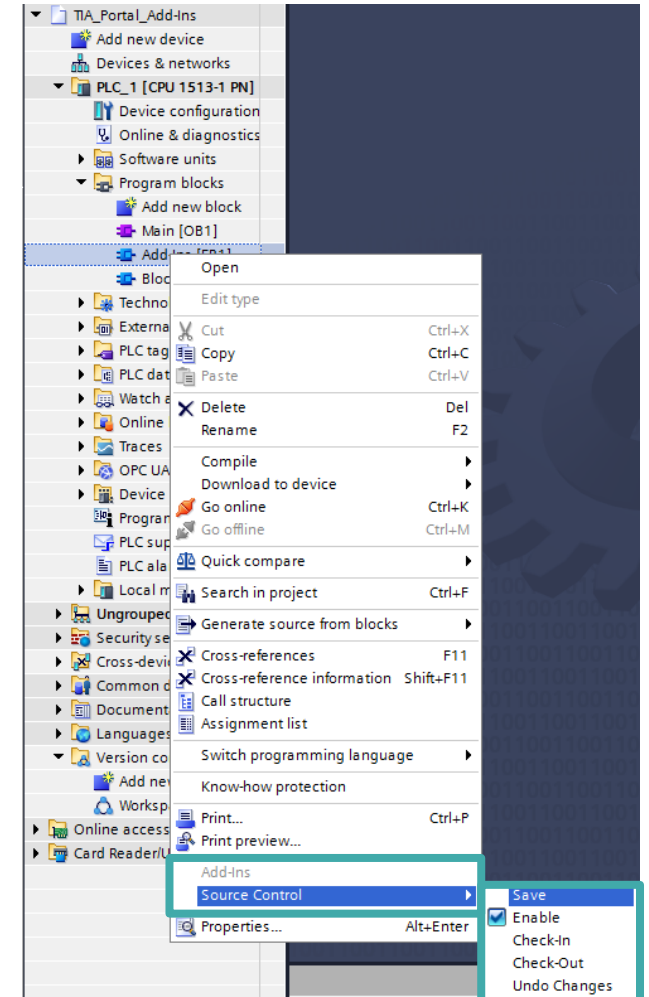
Benefits

- Add-Ins integrate as a part of the TIA Portal environment
- Add-Ins can be run without having any knowledge of high-level programming languages
- Add-Ins are context sensitive. This means they only appear for the selected objects within a TIA Portal project
- Add-Ins can also execute Windows system functions, file or network operations and interact with other application

Utilization

Add-Ins can be used inside the following areas of the TIA Portal

- Project tree
- Library view
- Version Control Interface
- Devices and network view



System functions

TIA Portal Openness – PLC online checksums

PLC online checksums

Reading out of checksums of a PLC S7-1500 and S7-1200.

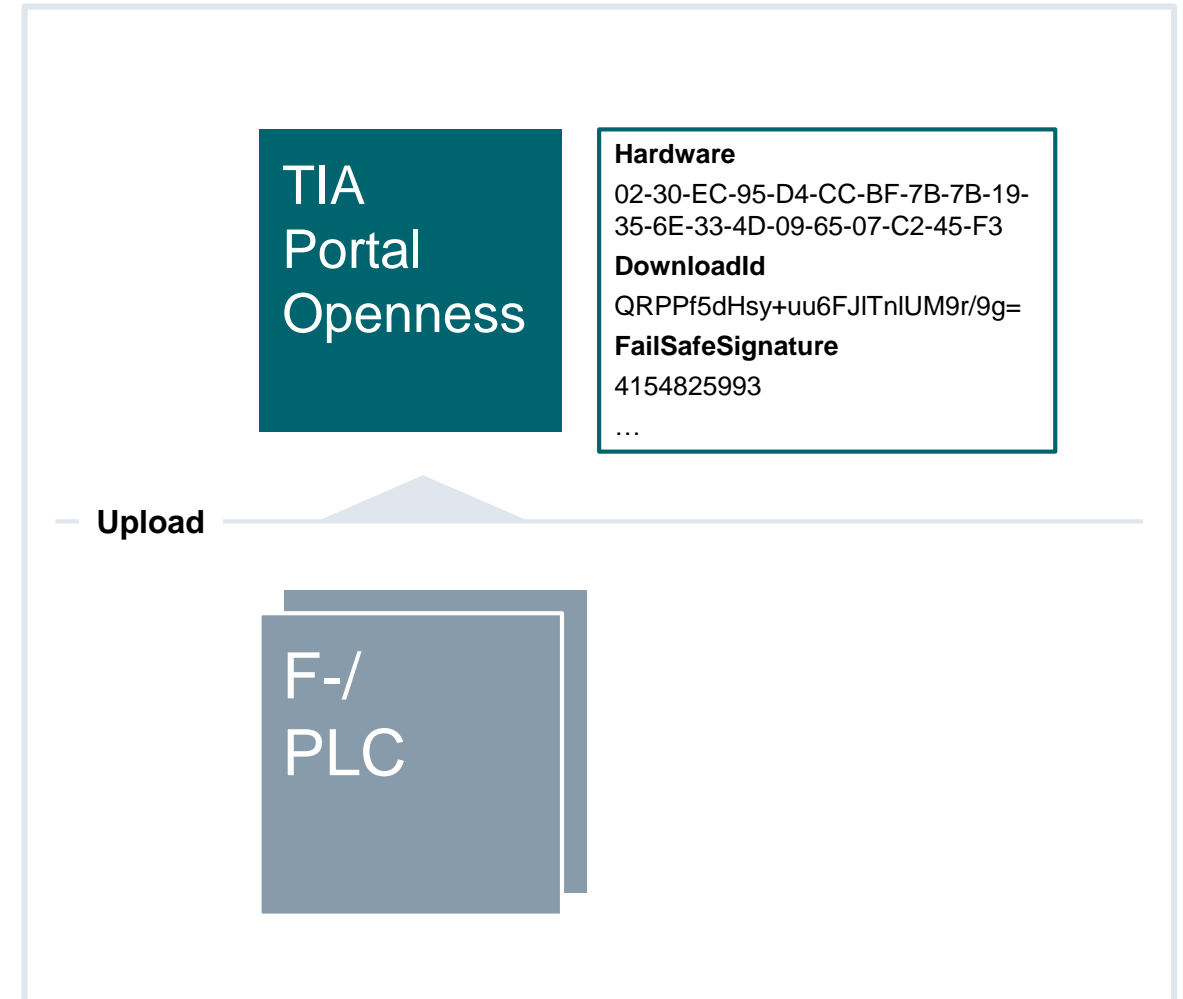
Checksums can be read out for the following data:

Hardware, connection, routing, certificates, text lists, download, fail-safe program, change counter

Advantages of the function

The online checksums can be used to determine whether the data of the online PLC has changed by comparing it with previous checksums.

This enables changes to the PLC to be detected quickly or e.g. to guess whether a station upload is necessary.



System functions

TIA Portal Openness – Hardware configuration of modules and components

Extension of the support of the configuration of modules and components

Configuration of the S7-1500 PLCs and ET200SP modules such as

- OPC UA server configuration and user management
- Certificate management
- Web server configuration and user management
- Watch tables for Web server and display

Advantages of the function

In addition to the automated placement of devices/modules in a networked configuration, automated configuration of the S7-1500 PLCs and ET 200SP modules is now also possible.

This enables, for example, the consistent and full generation of the hardware configuration of a plant project.

Openness API

Read and write complex module parameters

Name	Access level	Password
Everybody	Minimum	
Operator	Restricted	*****
Maintainer	Administrative	*****
Service	Restricted	*****
<Add new user>		

System functions

TIA Portal Openness – Compatibility

Openness libraries of all previous versions as of TIA Portal V14 SP1 are available

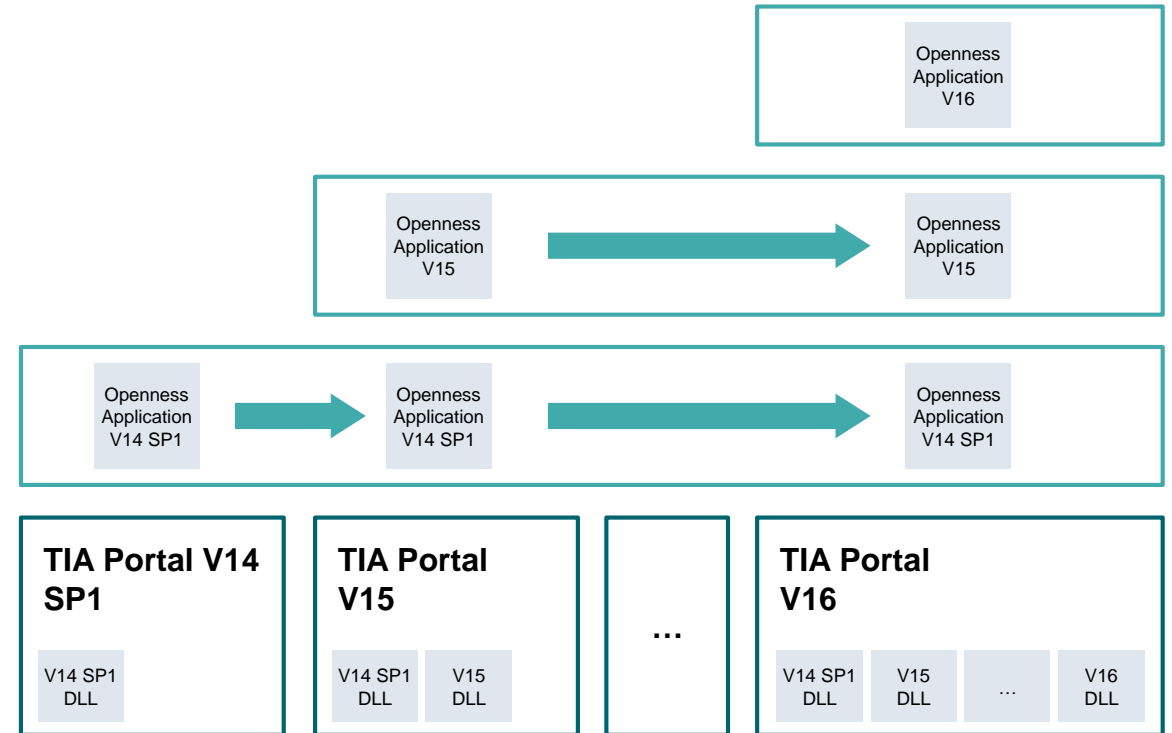
The Openness DLLs from V14 SP1, V15 and V15.1 are also available in the TIA Portal V16 in addition to the new V16 DLL.

Advantages of the function

Openness applications created on the basis of an older TIA Portal version such as V15 can be used directly with the TIA Portal V16 environment.

The new Openness functions are only available in the new DLL and can be

- expanded by exchanging the earlier Openness DLL for the V16 DLL and
- used after a re-compile



System functions

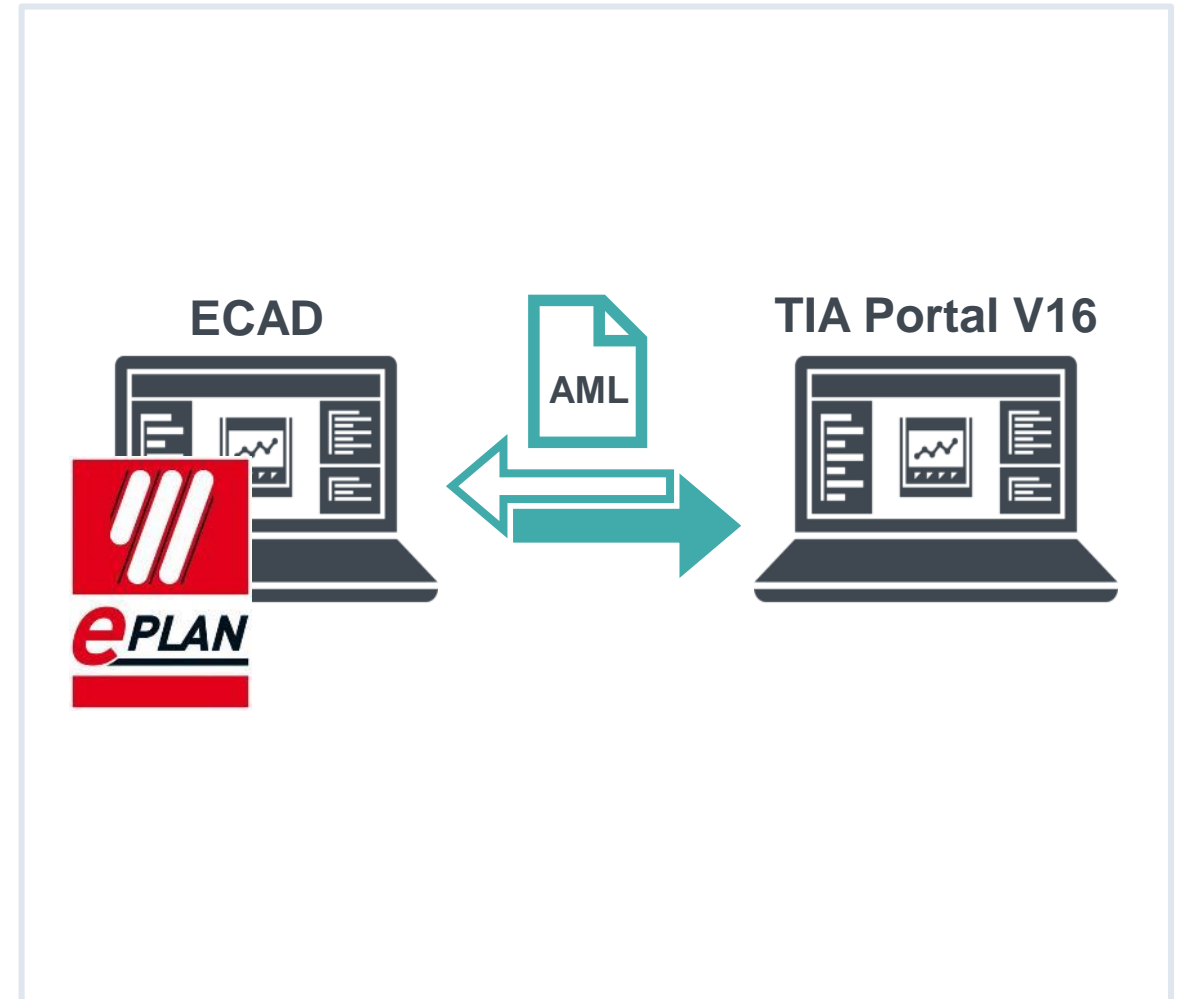
Cx export/import

Extension of the Cx export and import

- Support of the AR APC V1.1
- Use of objects from TIA Portal libraries
- Support of BaseUnits for ET200SP modules (except Safety modules)

Advantages of the function

- Due to the extension, the relevant data is retained in round-trip scenarios and saves manual post-configuration
- The use of references to library objects (master copies) enables the integration of pre-configured hardware components



TIA Portal - Highlights of TIA Portal V16

WinCC Unified

- New HMI (Engineering and Runtime)
- Scalability from Panel to SCADA
- New HMI Comfort Panel
- Modern UI, Openness, new options



Startdrive – Innovations

- SINAMICS S120 Blocksize (CU310-2, PM240-2)
- DQ hubs support
- SIMATIC Drive Controller S120 Integrated
- S120 know-how protection
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TIA Portal options

- STEP 7 Safety**
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S7-1200: OPC UA Data Access Server; S7-1500: No restart on delta download, improved diagnostics; new features, SiOME tool
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CPU 1518 MFP support
- Target 1500S for Simulink**
Simplified workflow, improved TIA Portal integration
- Test Suite**
Styleguide checker, application test
- SiVArc**
Support of Energy Suite, generation based on HWCN, merging of properties
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Load management, automatic screen generation – with SiVArc (integrated & license-free)

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- HMI Panels: Multilingual keyboards, HMI Option Plus V3
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Hardware configuration

- CPU 1513pro (F)-2 PN
- IP forwarding
- Cross-device trace
- Direct data exchange on the basis of Profinet IRT
- JSON RPC2.0 as new "Web data interface"
- S7-1200 FW4.4



STEP 7 – Innovations

- Software Units (Openness, access to PLC tag tables)
- Block comparison between project & library
- Multilingual SCL comments
- Project Trace (cross-device traces)



System functions

- TIA Portal Support Gateway
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TIA Portal options


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Exclusive Engineering with the TIA project server, asynchronous Multuser Commissioning



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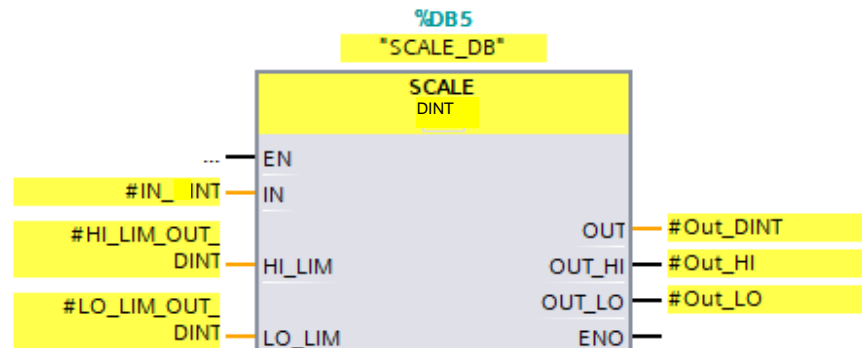


SIMATIC STEP 7 Safety V16

F-SCALE – DINT

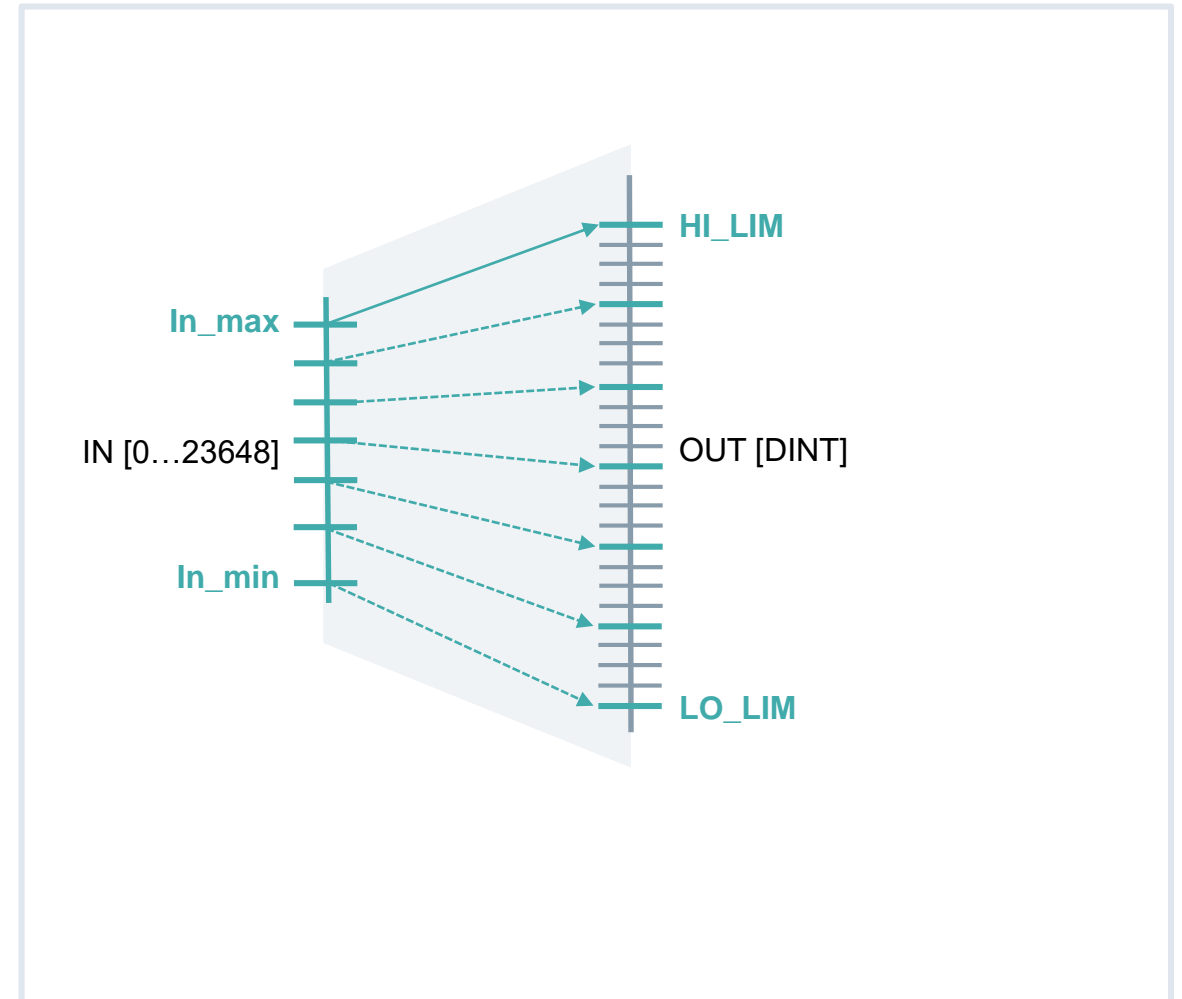
Function

Fail-safe scaling for encoder values from 0 ... 27648 to an output value range in the DINT range.



Benefits

- Large value range for acquisition large distances, bulk data etc.
- Prevention of complex, compile- and runtime-intensive solutions



SIMATIC STEP 7 Safety V16

Openness extensions

Version Control Interface (VCI) - Support

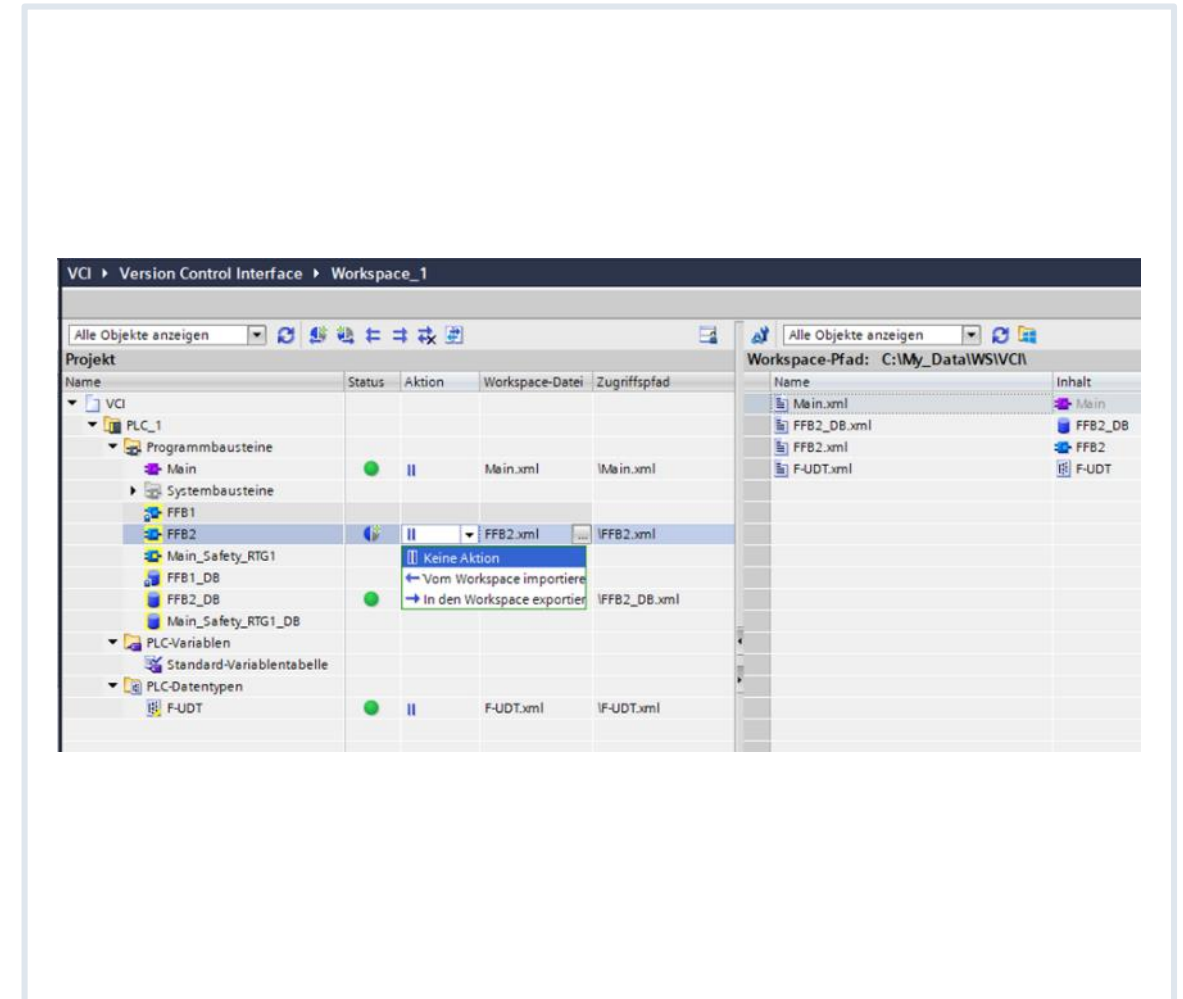
also for fail-safe blocks! Enables the connection of external versioning tools. A graphical user interface also offers simple operation and integrated block comparison via UI or via 3rd party tools.

Reading out of PLC Online fingerprint

For fast detection of differences between online CPU program and offline TIA Portal projects.

Openness with set F-password

The use of Openness will in future be supported by authentication with the Safety Engineering password.



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Multiuser TIA Portal project server – Overview

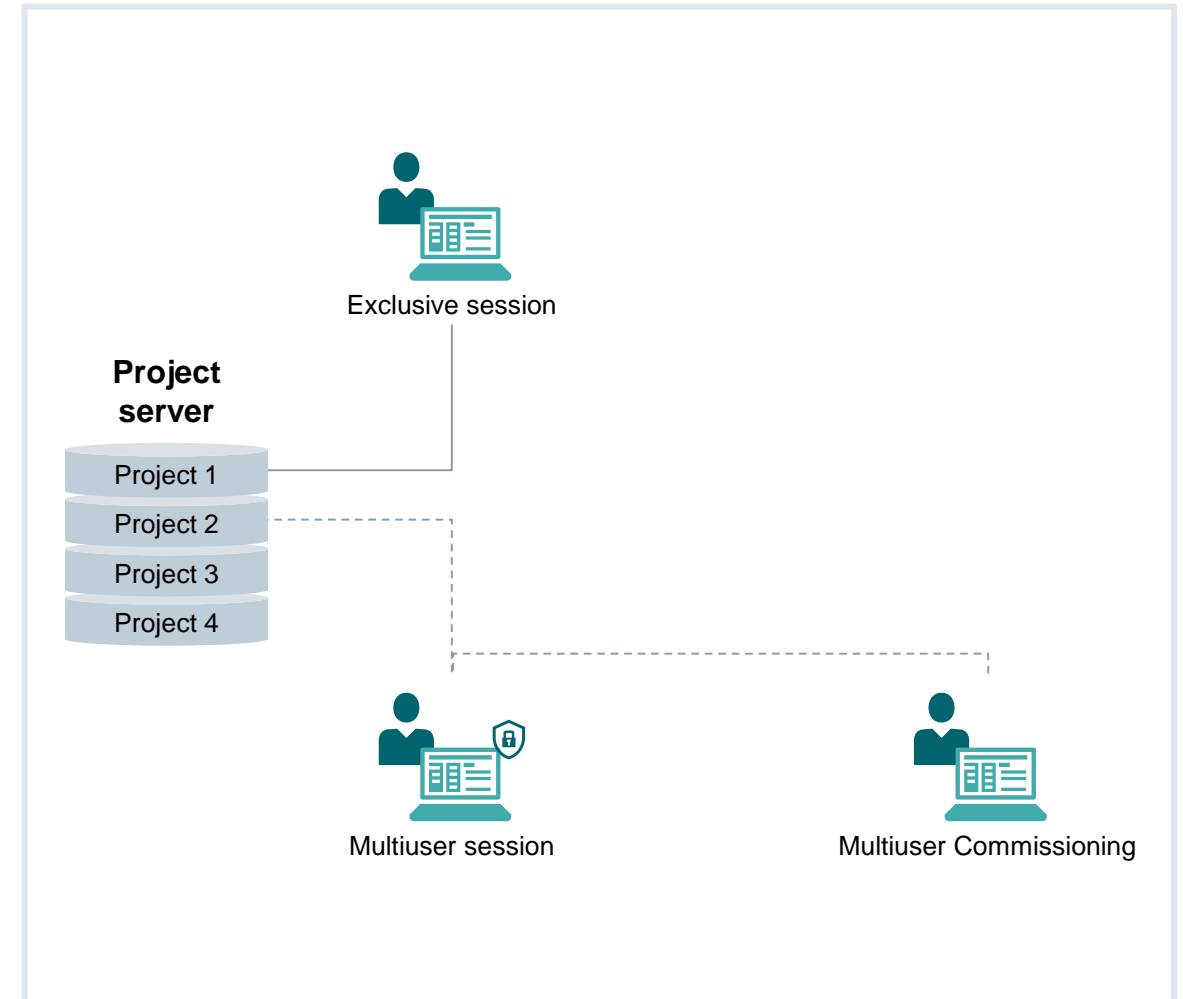
TIA Portal project server

- The project server enables convenient editing of TIA Portal projects with Multiuser Engineering, Multiuser Commissioning and Exclusive Engineering
- In addition to the dedicated project server, a local project server with restricted functionality is also available

Advantages of using the project server

- Central storage of projects in the network
- Secure communication over https
- Central user and access management, e.g. via Windows Domain
- Use of project revisions for
 - Interim backups
 - Project milestone archiving
 - Rollback
- Change log for the synchronized objects
- Automated execution of tasks with scripts

No license needed for the
project server



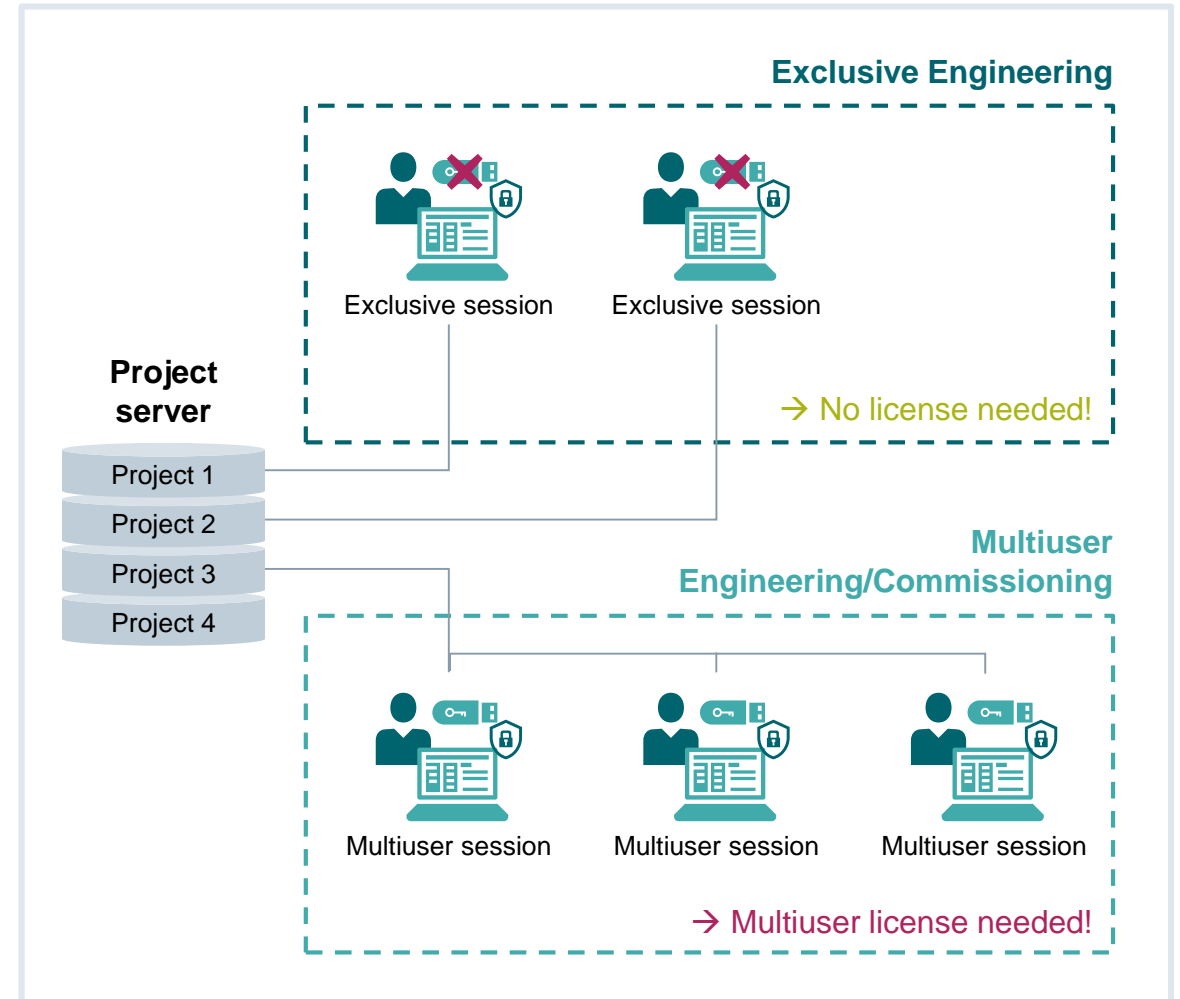
Multiuser Exclusive Engineering – Overview

Use of the TIA Portal project server also for Exclusive Engineering of projects

- Projects are stored centrally on the project server for Exclusive Engineering and for Multiuser Engineering
- Optimized workflows for editing projects in Exclusive Engineering
- No functional restrictions in Exclusive Engineering

Advantages of using the project server

- Use of project revisions for interim backups and for archiving project milestones
- Change log for the edited objects
- Central user and access management
- Automated reporting and archiving



No license needed for Exclusive Engineering

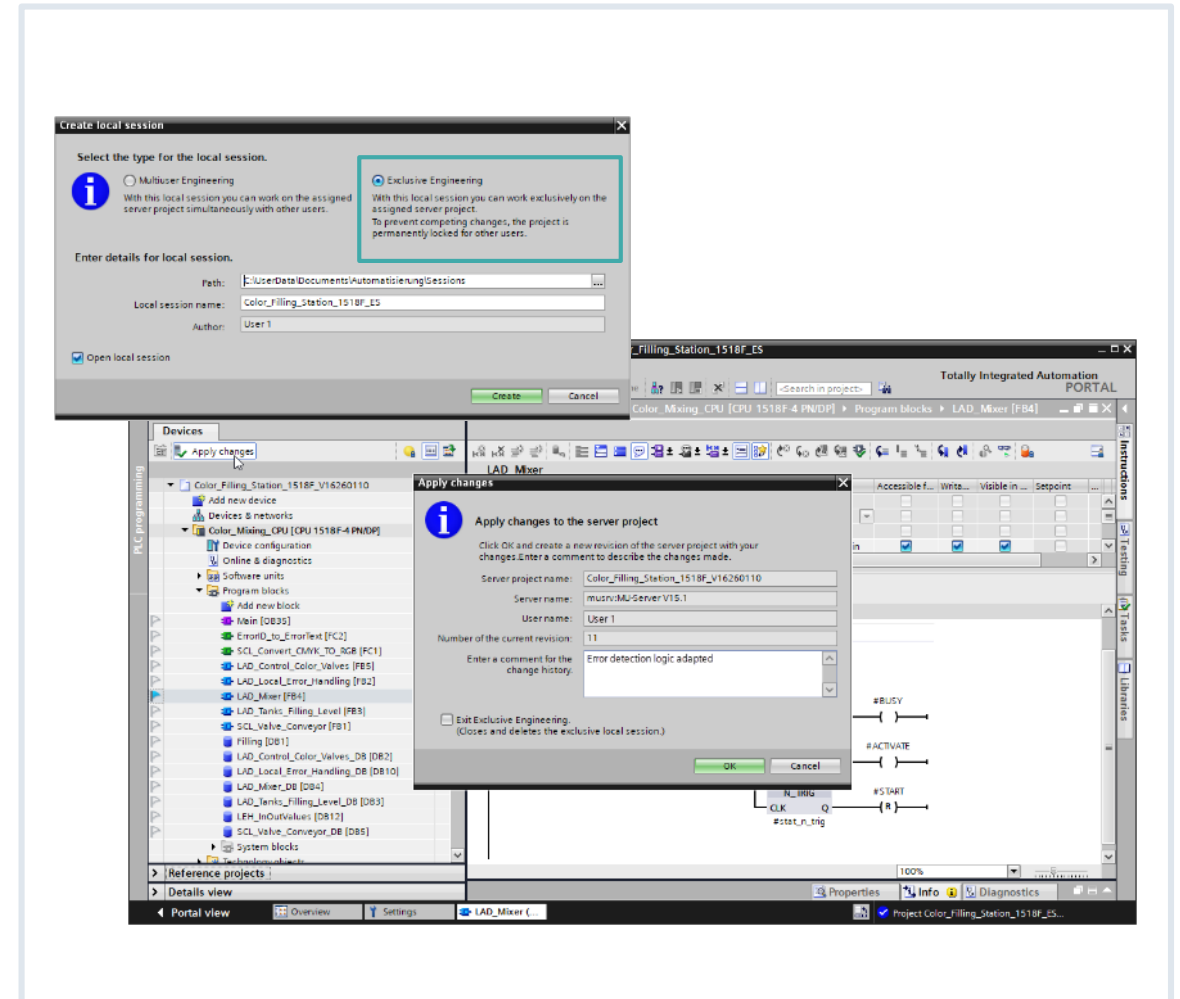
Multiuser Exclusive Engineering – Configuration

Requirements

- Projects are centrally accessible on the project server
- User and access management is set up for the server

Engineering workflow

- When opening the project, users can decide whether they want to work with Multiuser Engineering or Exclusive Engineering ...
- All changes in Exclusive Engineering can be transferred with change comments to the project server
- Every transfer generates a new project revision with change log
- Modified project data is always accessible from the project server and can be applied with a refresh



Multiuser Multiuser Commissioning – Overview

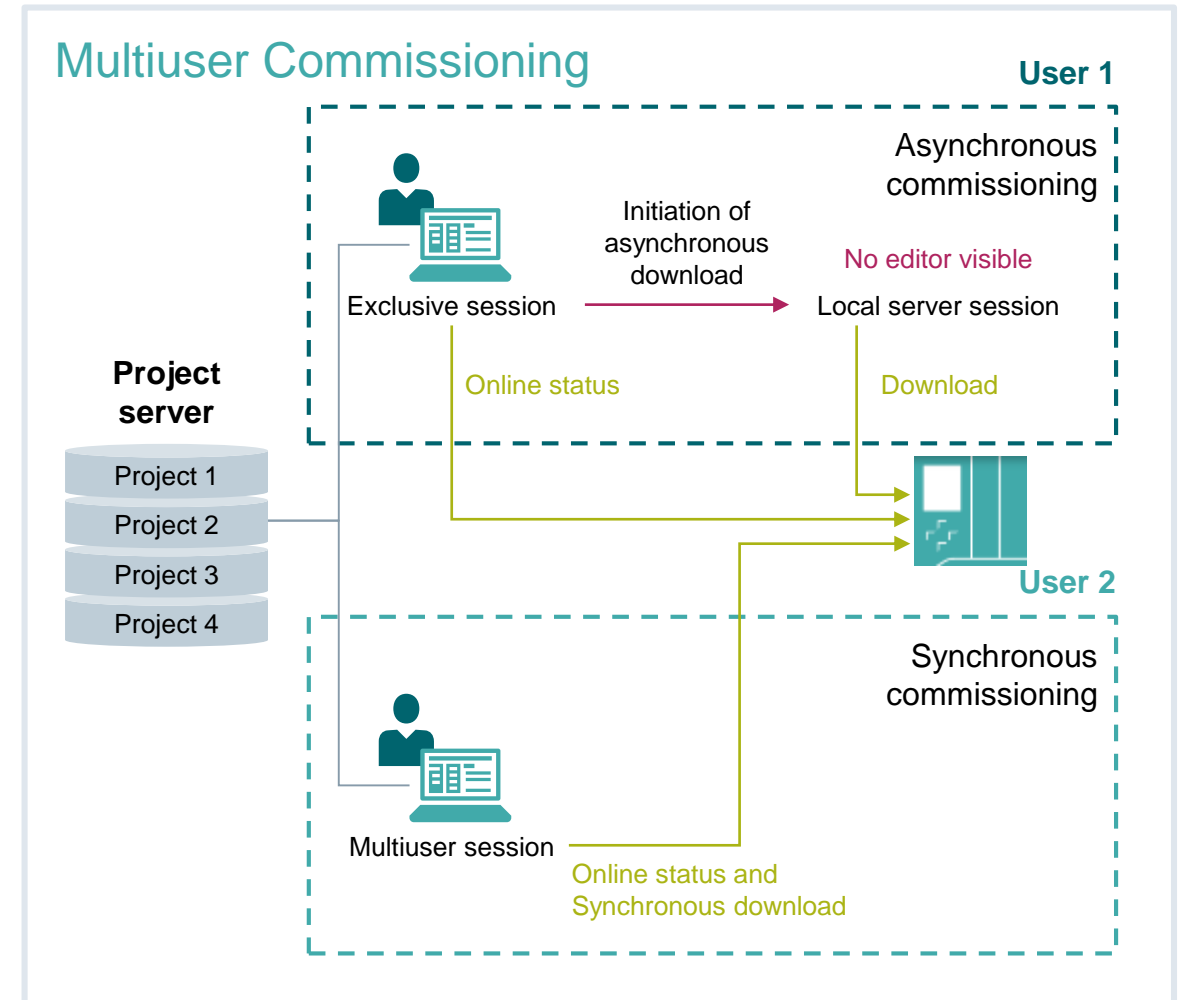
In V16, an extended Multiuser Commissioning Mode is available for commissioning

Synchronous commissioning mode (since V15.1)

- Downloading is performed synchronously with configuration
- No further activities are possible during the download
- Maximum synchronism of the data between local session, server project and PLC

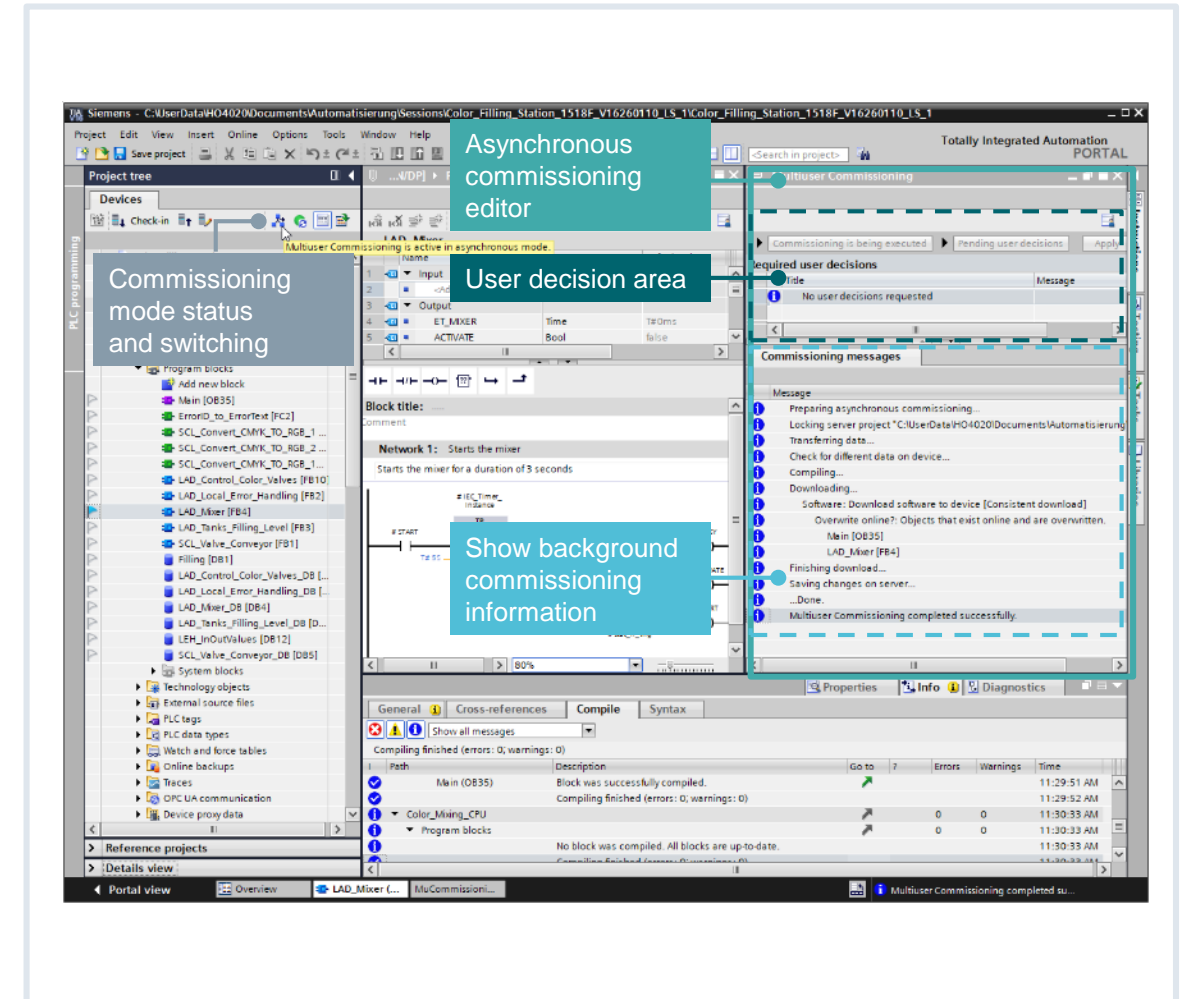
Asynchronous commissioning mode (new with V16)

- In asynchronous commissioning, the data is downloaded to the device by a second TIA Portal instance in the background
- This significantly reduces load times
- The TIA Portal instance running in the foreground can be operated again immediately
- Feedback to the user if actions or decisions on downloading to the device are necessary



Multiuser Asynchronous commissioning – Benefits

- Fast download of the modified objects to the PLC
- Local Multiuser Session is immediately ready for editing after transfer of the download
- Download requirements and necessary user decisions are displayed in the new asynchronous Commissioning Editor
- No automated refresh after the download
- Direct switching between synchronous and asynchronous commissioning is possible at any time in the TIA Portal, depending on the commissioning situation



Restrictions in V16

Program modifications which require a safety password and PLC with set protection level password must be downloaded in synchronous commissioning mode.

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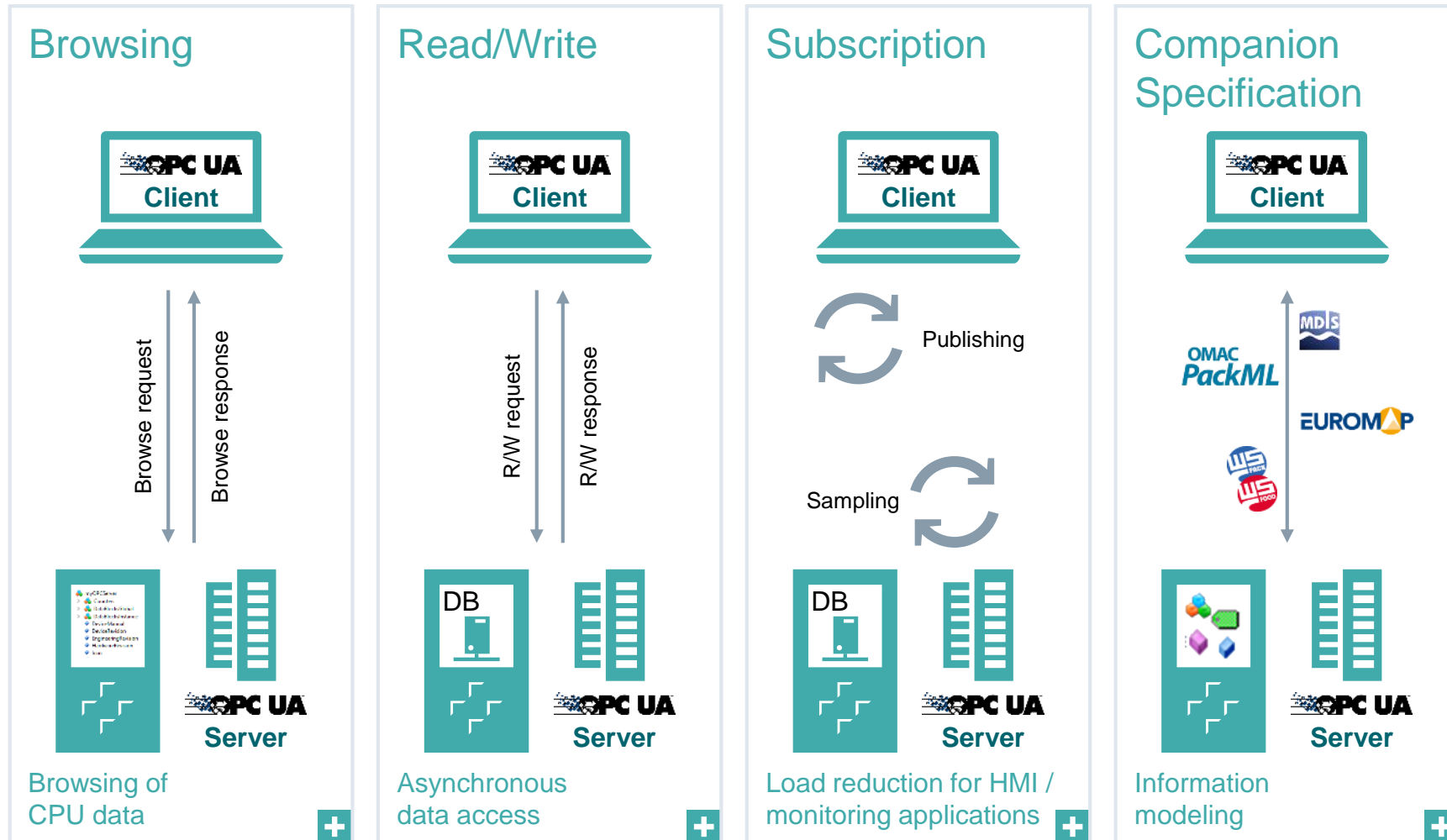


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OPC UA S7-1200 V4.4 - Functional scope



S7-1200 exceptions in the 1st version

- No registered read/write
- No structured data types and arrays
- No methods
- No alarms and conditions



OPC UA

S7-1500 – Server restart only for OPC UA-relevant changes

- When objects are loaded in RUN mode of the CPU, the OPC UA server only stops if the loaded objects are OPC UA-relevant
- When objects are loaded in STOP mode of the CPU, the OPC UA server always stops and then starts again

Before OPC UA-relevant objects are downloaded to the CPU and stop the OPC UA server, STEP 7 displays a warning in the preview dialog relating to the download.

You can then decide whether a server restart is acceptable for the current process or whether you want to cancel the download. These warnings are only displayed with a running OPC UA server. If the OPC UA server is not activated, modified OPC UA data does not have an impact on the download process.

	▼ OPC UA Server	The OPC UA server will be restarted due to data changes	Restart OPC UA server
		OPC UA relevant data were changed in the offline project and this leads to a restart of the OPC UA server.	

Examples

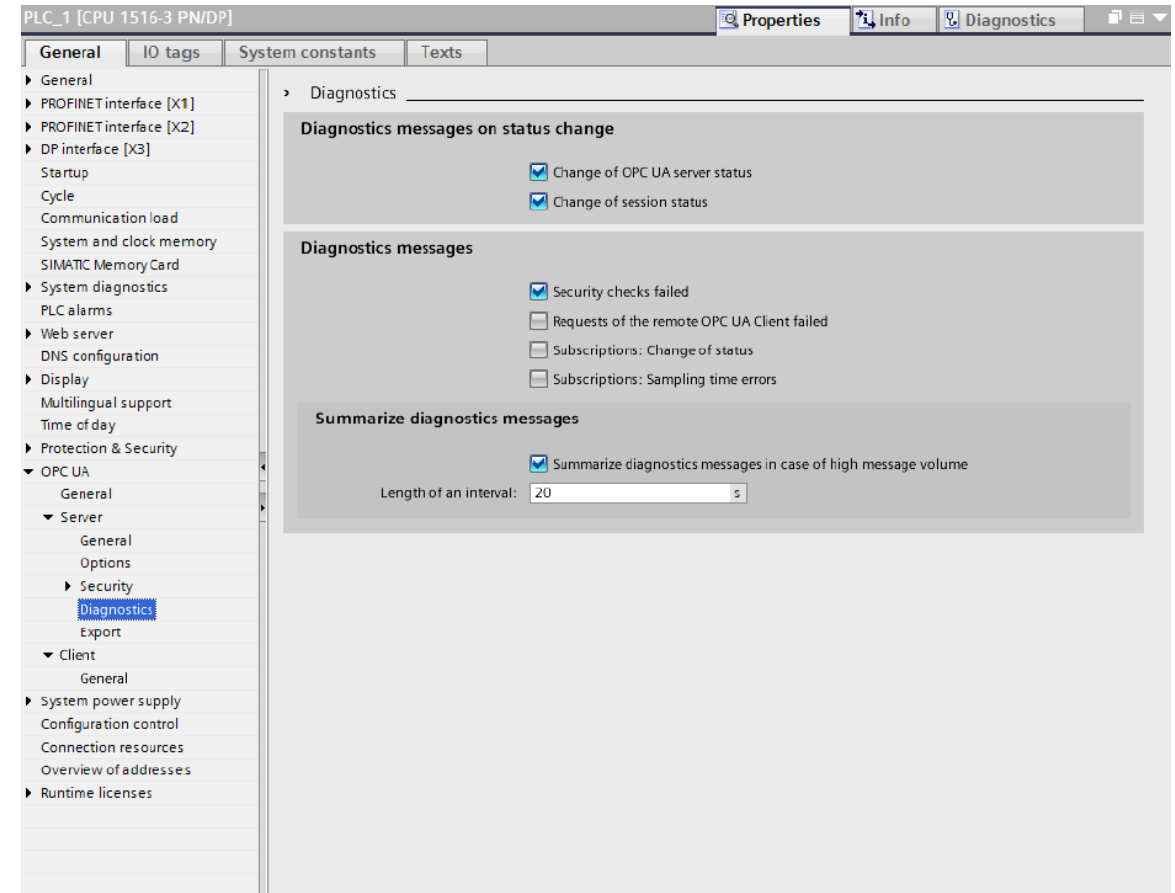
- You only want to add an additional code block to the program. Neither data blocks nor inputs, outputs, bit memory, times or counters are affected
-> Reaction during download: A running OPC UA server is not interrupted
- You want to download a new data block and you have marked the data block as not OPC UA-relevant
-> Reaction during download: A running OPC UA server is not interrupted
- You want to overwrite a data block where you have changed the OPC UA properties in some way, e.g. you have changed the property "Accessible from HMI/OPC UA" for a DB element
-> Reaction during download: A warning is displayed stating that the server will be restarted



OPC UA S7-1500 – Diagnostics in the TIA Portal | Focus – OPC UA server

Additional diagnostic buffer entries for the OPC UA server

- Messages can be configured in the hardware config
- In the event of a surge of OPC UA messages, they can be combined and only appear once in the diagnostic buffer



OPC UA S7-1500 – Diagnostics in the TIA Portal | Focus – OPC UA server

Online diagnostics view in the TIA Portal – General

The screenshot displays the Siemens TIA Portal interface for configuring an OPC UA server. The left sidebar shows the 'Project tree' with 'PLC_1 [CPU 1516-3 PN/DP]' selected. The main area is divided into 'Online access' and 'Diagnostics' sections. The 'Diagnostics' section is expanded to show 'OPC UA' > 'Server' > 'General'. The 'Server addresses' table lists three endpoints:

Endpoint URL	Device	Slot
opc.tcp://192.168.0.1:4840	PLC_1 [CPU 1516-3 PN/DP]	1 X1
opc.tcp://192.168.1.1:4840	PLC_1 [CPU 1516-3 PN/DP]	1 X2
opc.tcp://192.168.3.1:4840	CP 1543-1_1 [CP 1543-1]	5 X1

The 'Security policies' section shows a table with the following entries:

Application name / Security policy	User authentication
SIMATIC.S7-1500.OPC-UA:Application:PLC_1	User name and password
No security	
Basic256 - Sign	
Basic256 - Sign & Encrypt	
Basic256Sha256 - Sign	
Basic256Sha256 - Sign & Encrypt	

The 'Status' section shows the server is running with the following details:

- Display PLC Time stamps in PG/PC local time:
- Current time stamp: Tuesday, September 25, 2018 11:04
- Start time stamp: Monday, September 24, 2018 07:01
- Server status: Running
- Seconds till shutdown: 1000
- Shutdown reason: User action

OPC UA S7-1500 – Diagnostics in the TIA Portal | Focus – OPC UA server

Online diagnostics view in the TIA Portal – Sessions

The screenshot shows the Siemens TIA Portal interface with the 'Online Diagnostics' view selected. The left sidebar shows the project tree for 'PLC_1 [CPU 1516-3 PN/DP]'. The main area displays the 'Sessions' view, which includes a 'Statistic' section and a 'Session/subscription diagnostics' table.

Statistic

Session count:	3	of	15
Monitored items count:	300	of	1000
Total request count:	11257	Request error count:	0
Rejected count:	0	Session timeout count:	0

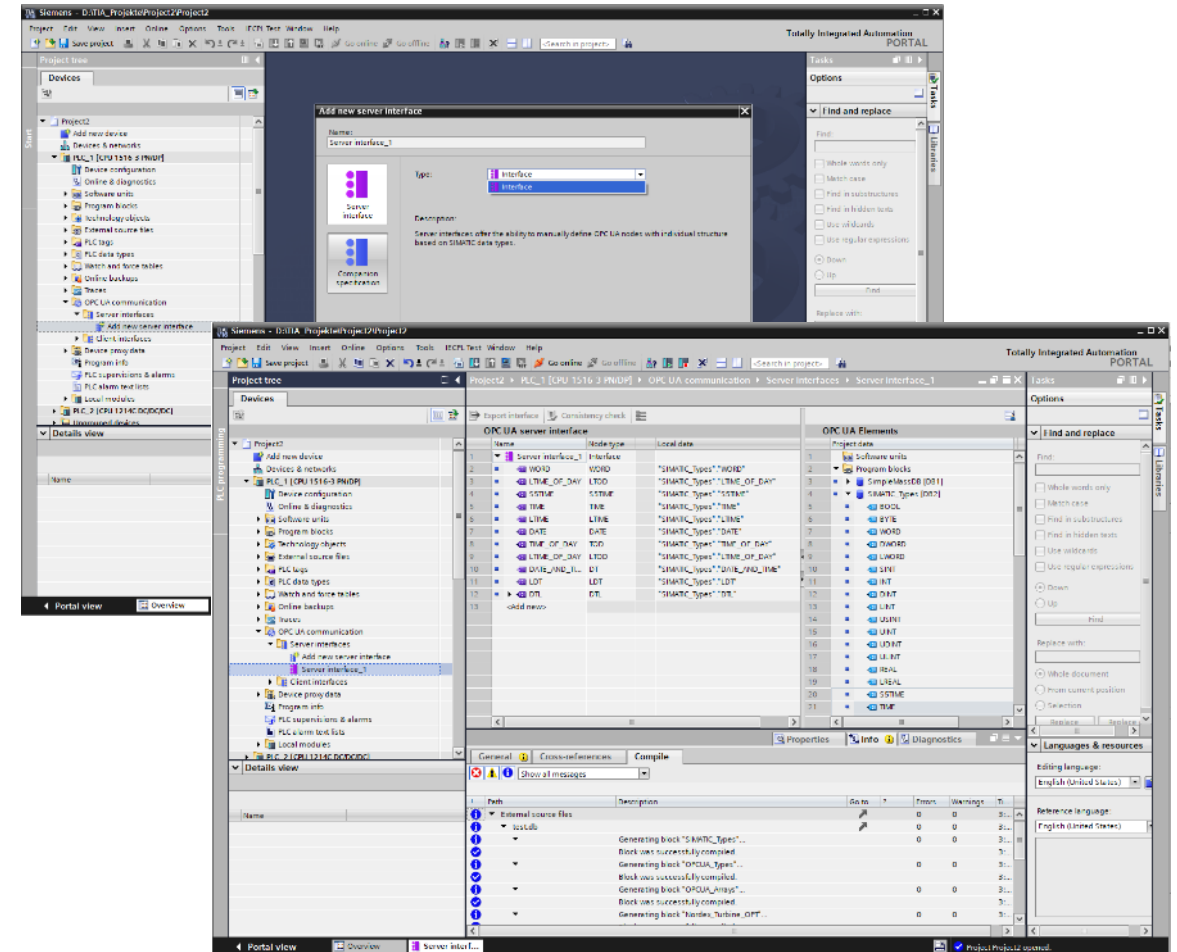
Session/subscription diagnostics

ID	Name	Endpoint URL	Subscriptions	Monitored Items	Timeout
1231399004	urn:md1sbahc:UnifiedAutomation:UaExpert	opc.tcp://192.168.0.10:4840	2 of 20	100	10000...
2964789174	Subscription_2964789174		1	67	5 of 10...
2964789175	Subscription_2964789175		1	33	2 of 10...
1231399005	urn:MD1SBHHC:Siemens:TIA-Portal@adbebe8:Client...	opc.tcp://192.168.0.11:4840	2 of 20	100	10000...
2964789176	Subscription_2964789176		1	67	5 of 10...
2964789177	Subscription_2964789177		1	33	2 of 10...
1231399006	urn:md1sbahc:Siemens:OPC Scout	opc.tcp://192.168.0.12:4840	2 of 20	100	10000...
2964789178	Subscription_2964789178		1	67	5 of 10...
2964789179	Subscription_2964789179		1	33	2 of 10...

OPC UA S7-1500 – Server Interface Modeling in the TIA Portal

Server interfaces or Companion Specs can now also be modeled in the TIA Portal

Using the TIA Portal, a server interface can be created or a Companion Specification can be used in simplified form and with restricted functionality.

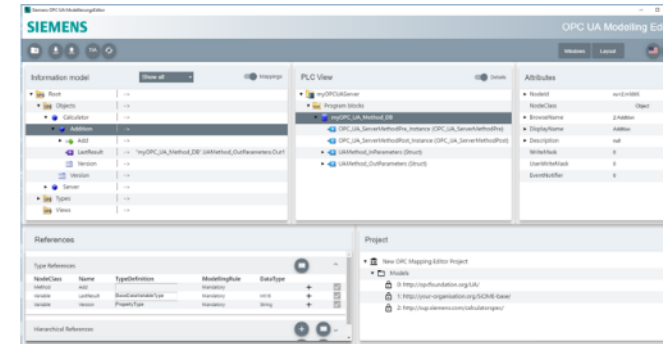
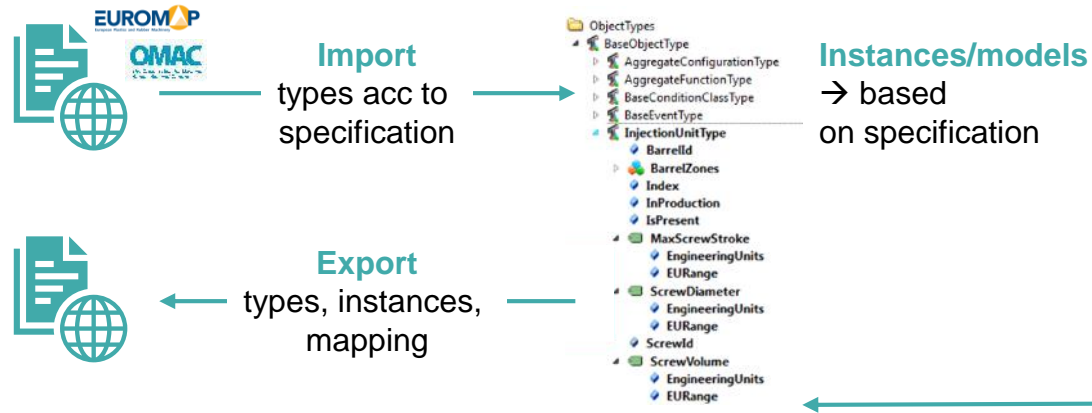


The aim is to offer TIA Portal users without any special OPC UA know-how the possibility to create OPC UA information models.

SiOME is also the established tool with full functionality for the OPC UA user for creating OPC UA server interfaces and modeling or changing Companion Specifications.

OPC UA SiOME – Siemens OPC UA Modelling Editor

Companion specifications – SiOME



<https://support.industry.siemens.com/cs/us/en/view/109755133>



Mapping

V1.96: New functions (Oktober 2019 release)

- Creation of data blocks based on OPC UA information models and vice versa
- Checking OPC UA information models and Companion Specifications for OPC UA conformity
- Online diagnostics for reading out OPC UA diagnostics information of the CPU
- Connection to the TIA Portal via OPENNESS
→ e.g. transfer of OPC UA XML files to the TIA project

- Free download via Siemens homepage
- Long-term tool support
- Advantages with regard to stability and features in comparison with other OPC UA modeling tools



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Hardware configuration

- CPU 1513pro (F)-2 PN
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S7-PLCSIM Advanced V3.0

Extended CPU support CPU 1518 MFP



Function

PLCSIM Advanced V3.0 now also supports the simulation of applications that were created with the ODK development package without the need for changes to be made to the STEP 7 program and the hardware configuration in the TIA Portal project.

Supported CPUs

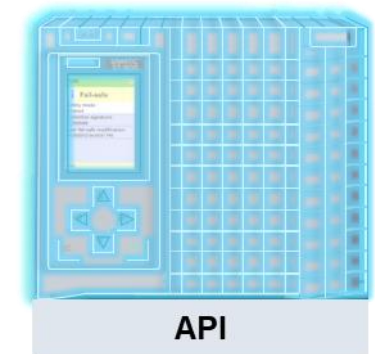
PLCSIM Advanced V3.0 now supports the following controllers and their ODK functionality:

- CPU 1518(F)-4 PN/DP MFP
- CPU 1518(F)-4 PN/DP ODK

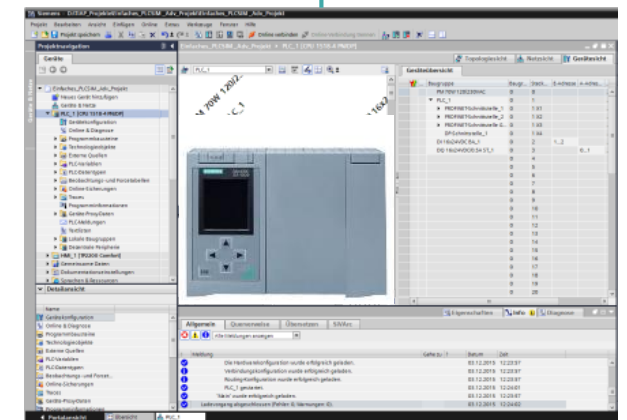
Supported function libraries for the real-time environment

- CPU function library: Original Shared Object, SO files for the hardware CPUs (the SO files for ODK are not know-how protected)
- PLCSIM Advanced Function library (Windows Sync)
 - A 32-bit Windows DLL for ODK Runtime
 - A 64-bit Windows DLL for ODK Runtime

Function libraries must not be downloaded mixed.



API



S7-PLCSIM Advanced V3.0

New functions and compatibility

Function

To improve the applicability of PLCSIM Advanced in instances distributed in the network, the API functionality has been extended.

1 New function: RunAutodiscover()

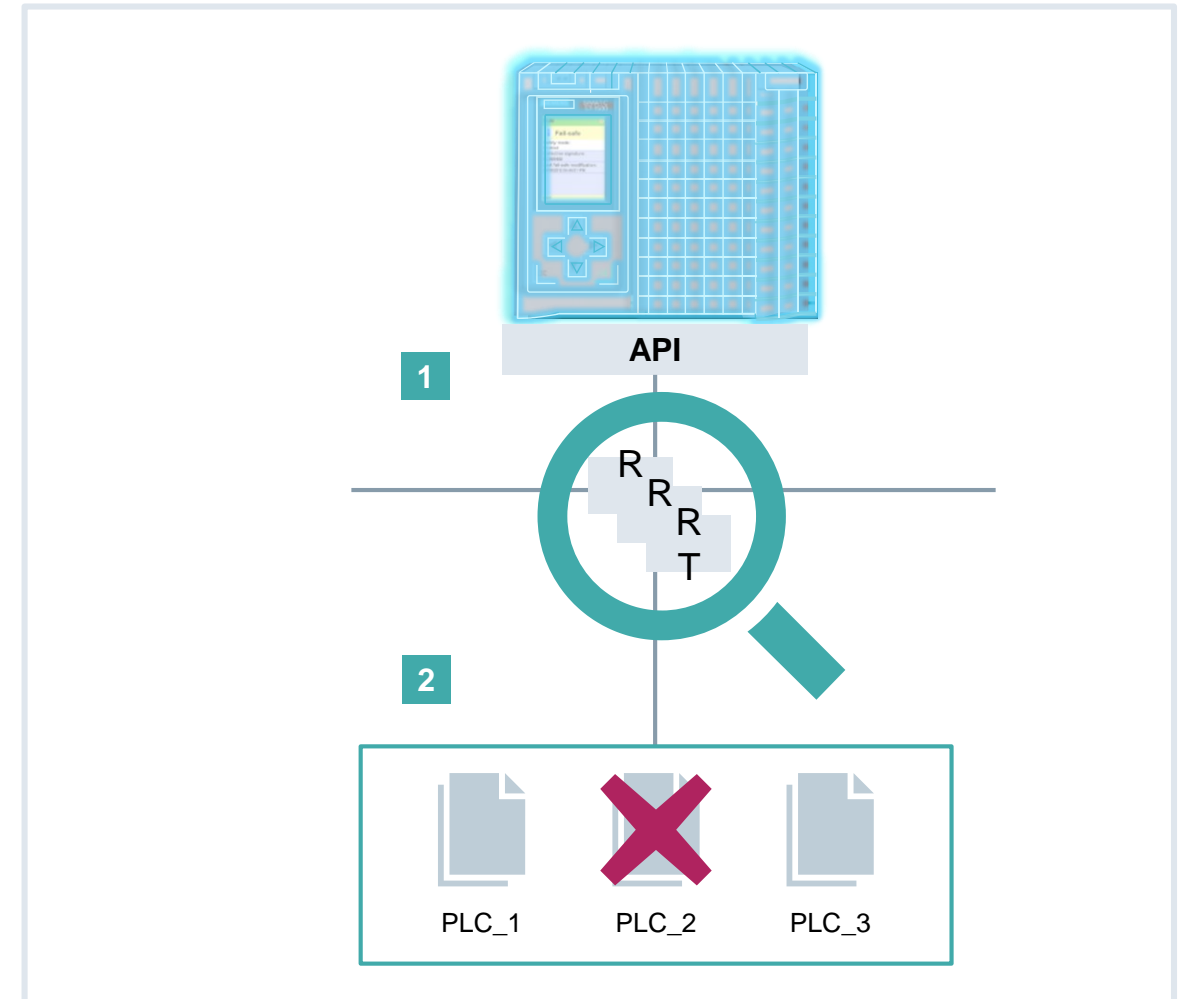
The API was extended with the option to browse for distributed runtimes in the network, which further improves the applicability in complex test scenarios.

2 New function: CleanupStoragePath()

The API now also supports the deletion of virtual memory cards (local and remote) in order to free up memory space in automated test scenarios, for example.

Compatibility

- Compatible with TIA Portal projects from versions V14 to V16
- Support of the CPU firmware versions V1.8 – V2.8



TIA Portal - Highlights of TIA Portal V16

WinCC Unified

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- Scalability from Panel to SCADA
- New HMI Comfort Panel
- Modern UI, Openness, new options



Startdrive – Innovations

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TIA Portal options

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Target 1500S™ for Simulink® V4.0

Simplified workflow and improved TIA Portal integration

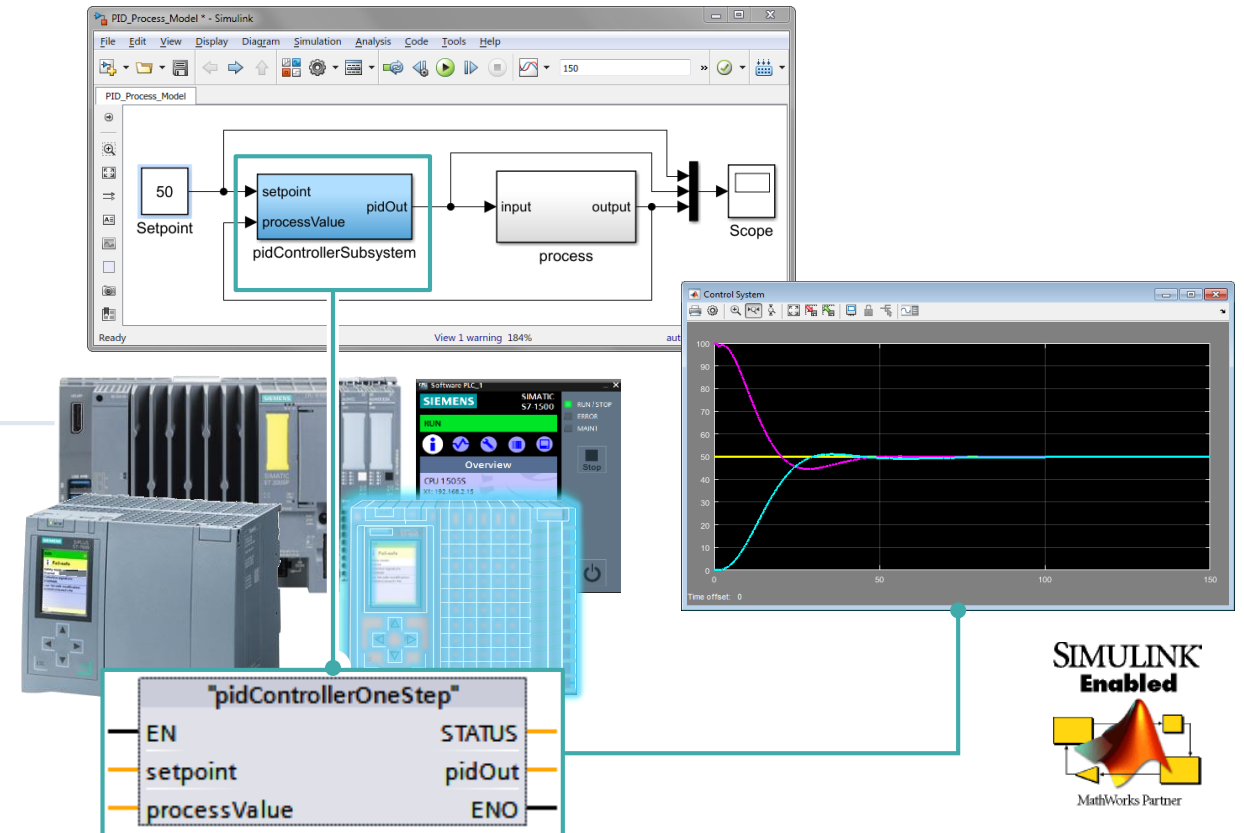
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Function

- Automatic configuration of the external mode based on CPU HW config from TIA Portal project
- Automatic generation of the cycle OB based on model settings
- Visualization of state flow models in the CPU Web server
- Simulation with PLCSIM Advanced V3.0

Benefits

- Considerably simplified integration of Simulink models in the PLC user program
- Reduction of error sources during integration into the user program
- Software in the loop simulation with PLCSIM Advanced V3.0



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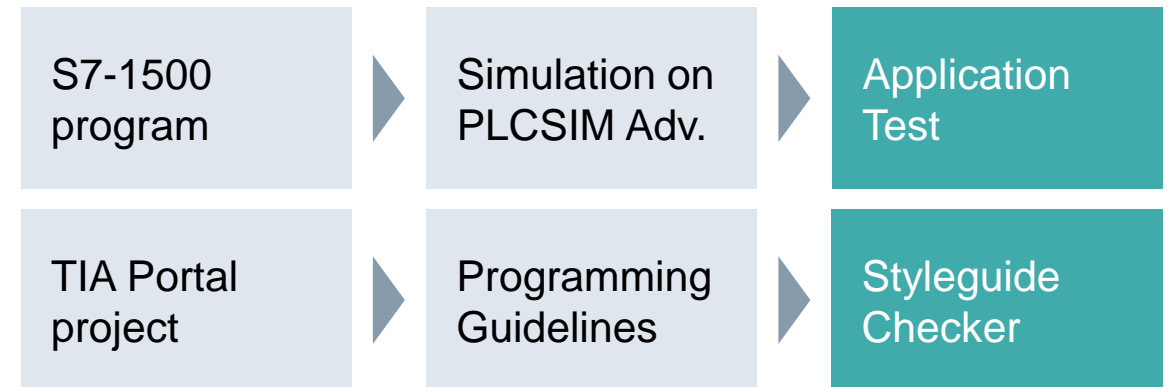
TIA Portal Test Suite Overview

The Test Suite is a new licensed TIA Portal option package and offers the following options

- Defining programming rules and checking projects for observance of these rules
 - Writing test cases for S7 applications and performing tests with the support of PLCSIM Advanced
- These solutions guarantee consistently high programming quality

TIA Portal Test Suite V16 Advanced

03/2020

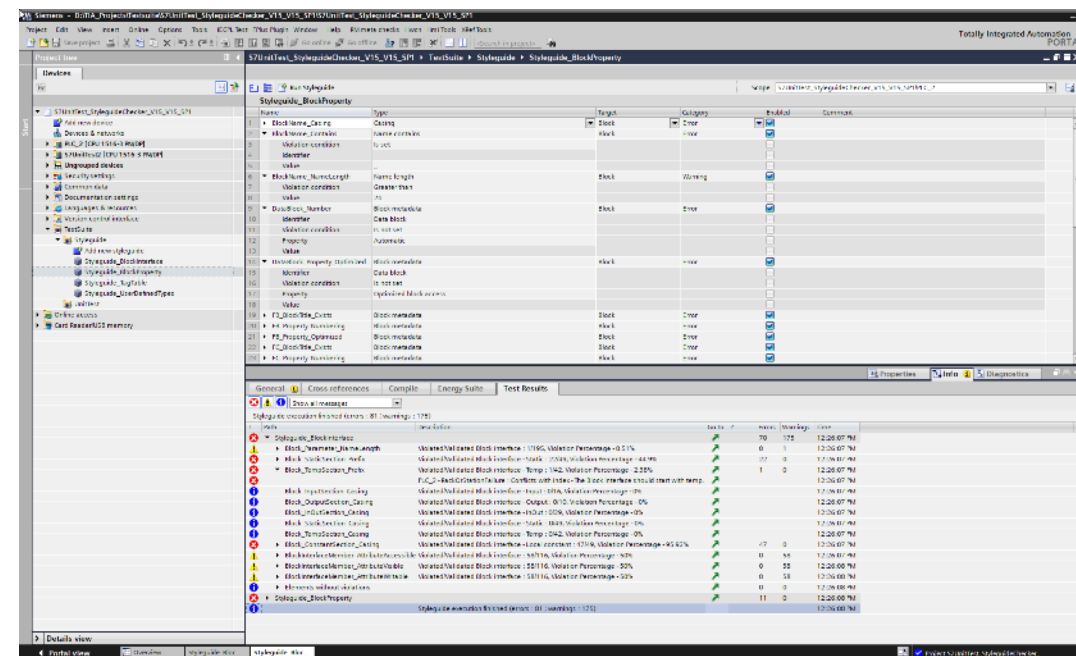


TIA Portal Test Suite Styleguide checker



Function

- With the help of the following rules, programming guidelines can be created for PLC tags, blocks, block interfaces and UDTs
 - Name Length
 - Name Contains
 - Prefix
 - Casing
 - Block/tag properties (check as to whether a block comment exists, for example)
- Within a TIA project, the check for observance of the rules can be started by the user
- The results of this check are output in the TIA Portal. Using the GoTo function, the location with the rule violation is opened



Benefits

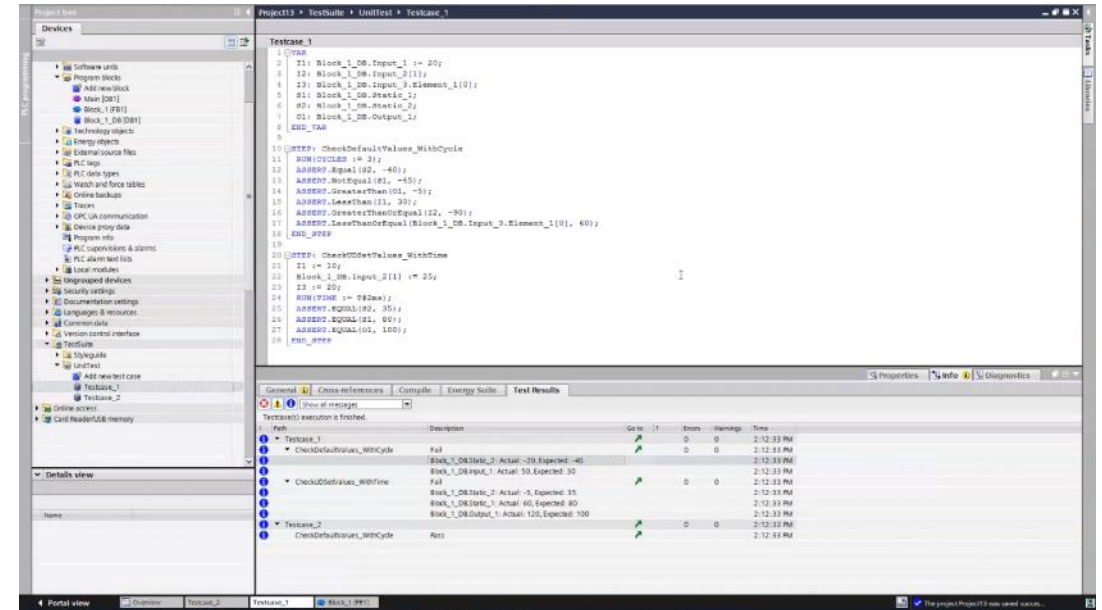
- Simple definition of programming guidelines in the TIA Portal
- Quick tracing and fixing of violations against the programming guidelines
- Consistent program code is ensured

TIA Portal Test Suite

Application test with S7-1500

Function

- Textual editor for creating test cases of an S7 application
- In each test case, local aliases can be optionally defined for PLC tags and multiple test steps for checking the application can be created. A single test step consists of
 - Value assignment for one/multiple global PLC tags (DB/PLC tags)
 - RUN statement: Number of CPU cycles/runtime
 - Asset: After the time has elapsed, the current value of a tag is compared with a defined value
- The following steps are automatically performed by the user after the test has been started
 - Creation of a PLCSIM Adv. instance
 - Download of the CPU selected in the project to the PLCSIM Adv.
 - Test execution and subsequent deletion of the PLCSIM instance
 - Output of test results in the TIA Portal



Benefits

- Support of a test-driven development for S7 programs
- Only tested code is deployed on a real machine
- Continuous regression tests guarantee permanently reliable code quality

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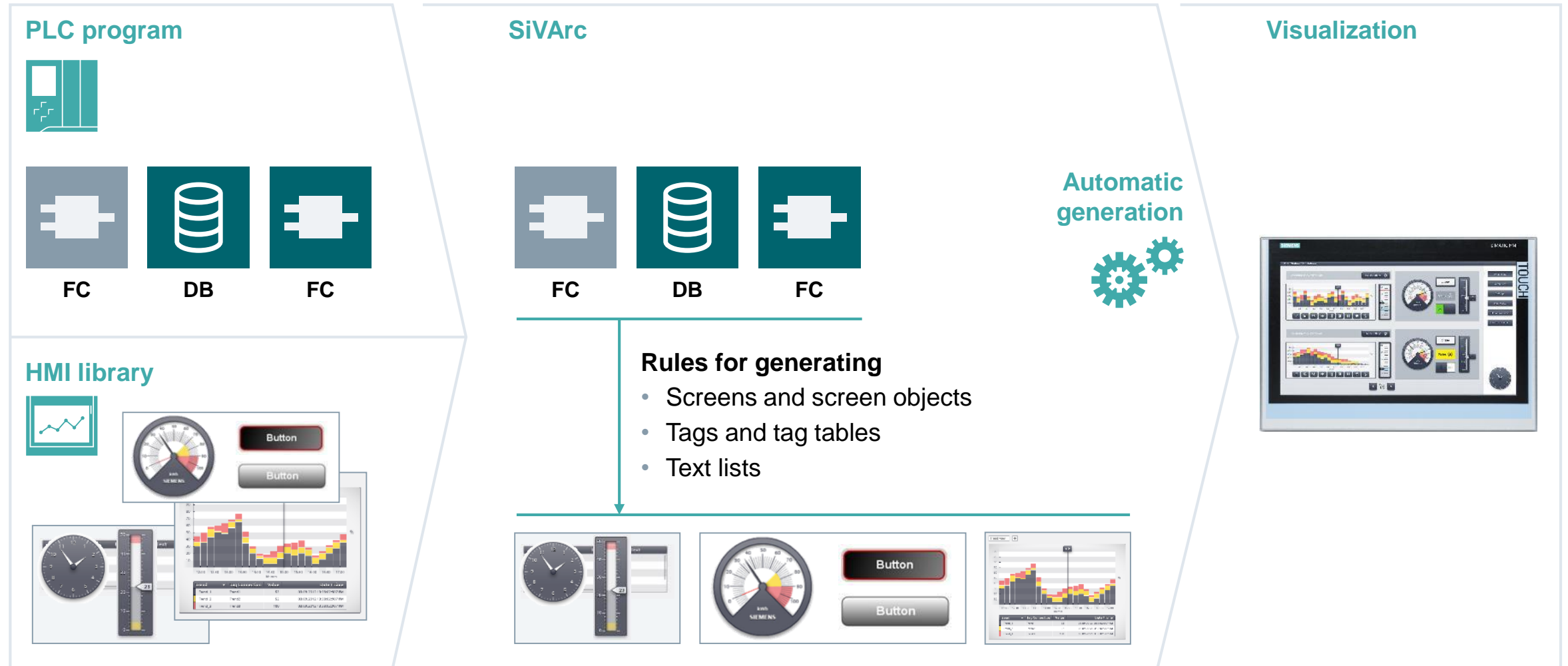
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SIMATIC Visualization Architect (SiVArc)

Simple, fast and flexible creation of HMI projects in the TIA Portal



SIMATIC Visualization Architect (SiVArc) V16

Overview of new functions

- Screen events can be used by SiVArc
- Generation of HMI screens based on the PROFINET devices that are configured in the hardware configuration
- Creation and modification of rules via Openness
- Generation of the HMI screens for energy data of the Energy Suite
- Template screens and pop-up screens can be used in the Generation Matrix
- SiVArc is now able to retain the manual changes to previously selected properties of a faceplate for subsequent generations

SiVArc – SIMATIC Visualization Architect HMI-Projekte im TIA Portal

einfach

schnell

flexibel

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SIMATIC Energy Suite V16

Overview of new functions



Intelligent load management

- **Avoidance of expensive peak loads** and optimization of the energy supply through priority-based switch-on/-off of consumers & producers
- **PLC-based load management** – offers considerably higher flexibility and availability as a pure PC-based solution
- **Intuitive and simplified engineering of the actors** (consumers and producers) with automatic generation of the S7 program
- Screens included in scope of delivery (for WinCC Professional)

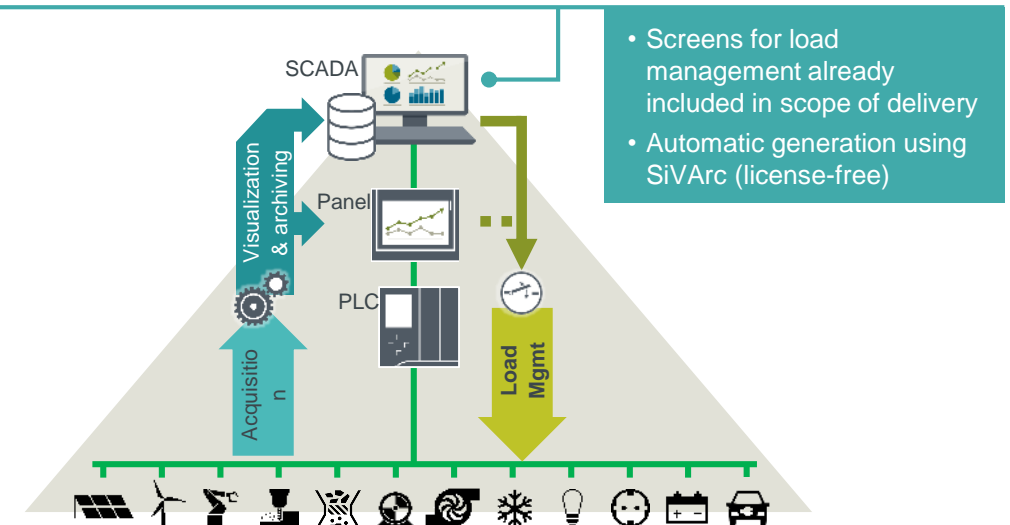
Generation of screens with SiVArc

- **Significant reduction of engineering workload thanks to** automatic screen generation for all energy objects (energy measurement and load management)
- For generation of the Energy Suite screen **no SiVArc license is required¹**

Performance and usability enhancements

- **Reduced PLC cycle times** thanks to optimized PLC code (up to 40% quicker program execution compared with previous version)
- Improved engineering due to minor usability optimizations

¹ Installation of SiVArc V16 on the Engineering PC required



Thank you for your attention.

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[siemens.com/tia-portal](https://www.siemens.com/tia-portal)