SIEMENS

SIMATIC

TIA Portal Updates Readme

Readme

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Validity

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Validity

This update is valid for the following products:

- STEP 7 Basic V20
- STEP 7 Professional V20
- WinCC Basic V20
- WinCC Comfort V20
- WinCC Advanced V20
- WinCC Professional V20
- WinCC Unified Comfort V20
- WinCC Unified PC V20
- TIA Portal Openness V20

Note

If you modify your system after installing the update with the product DVD, you will have to perform the update again.

Improvements in STEP 7

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2.1 Improvements in Update 3

This update contains the following improvements and changes:

Working with the TIA Portal

Stability when working with the TIA Portal has been improved, partly based on the feedback from returned crash reports.

Named value data types

Named value data types can also be used in know-how protected Safety programs in libraries.

Exporting LAD blocks to SIMATIC SD format (S7-1200, S7-1500)

The export function offers the following innovations:

- Export without default values:
  LAD blocks are exported without default values, which expands the range of possible applications.
- Block attributes:
  Attributes are now inserted in front of the program code in text format.
- Multilingual comments:
  Multilingual comments are now generated in YAML format instead of in XML.
- Version Control Interface:
  Versioning of the exported blocks via the Version Control Interface (VCI) is supported. You can now also select and version individual objects.
- Technology objects:
  Blocks that reference technology objects can now also be exported.

Specific object selection for Version Control Interface (VCI)

An additional column with check boxes has been added in the project area. This means that you can select for each object whether it is used in the Version Control Interface.

The following table shows the possible states that the check boxes can take:

Status	Description
	The object and any lower-level objects can be used for Version Control Interface operations.
	Different settings were made for the lower-level objects during object selection.

Status	Description
☐	The object and any lower-level objects cannot be used for Version Control Interface operations.
☐	The object and any lower-level objects cannot be used for Version Control Interface operations and the check box is read-only. This status is used for type instances and know-how protected blocks, for example.

Workspace-specific setting of export formats for Version Control Interface (VCI)

As of V20 Update 3, you have the option to set the export formats individually for specific workspaces. The "Configure workspace" dialog has been expanded for this purpose.

To individually set the export formats for a workspace, follow these steps:

1. Click "Configure workspace" in the workspace area toolbar.
   The "Configure workspace" dialog opens.
2. Select the "Export format" group in the area navigation.
3. Change the export format for the desired object types.

The export formats can also still be set via "Options > Settings > Version Control Interface > Export". These basic settings are used if you do not individually adapt the settings of a workspace.

Workspace-specific automatic assignment of the workspace paths for Version Control Interface (VCI)

As of V20 Update 3, you can set the automatic assignment of the workspace paths individually for specific workspaces. The "Configure workspace" dialog has been expanded accordingly.

To individually set automatic assignment for a workspace, follow these steps:

1. Click "Configure workspace" in the workspace area toolbar.
   The "Configure workspace" dialog opens.
2. Select the "General" group in the area navigation.
3. Change the assignment for this workspace.

The automatic assignment can also still be set via "Options > Settings > Version Control Interface". This basic setting is used if you do not individually adapt the setting for a workspace.

Expanding or collapsing all objects for Version Control Interface (VCI)

You will find the new command "Expand/collapse all" in the context menu of the project area. With this command, you can expand or collapse the lower-level objects of the selected object with a click.

Using engineering objects as member tags in the Add-In

If an Add-In is to be generated as member tag despite the use of engineering objects, it is possible to use the "-- skipEngMemberCheck" or "-s" parameter when calling the "Siemens.Engineering.AddIn.Publisher.exe" program. The check for the existence of such a member tag is skipped. However, the author of the Add-In then agrees to bear responsibility for the consequences mentioned above.

Export files of libraries

The export of libraries offers the following innovations:

- The export files are now available in the formats *.libinfo and *.libint to improve readability.
- The files are optimized to facilitate merging.
- To reduce the file sizes, properties are only exported if they deviate from the default settings.

Exporting and importing LAD, UDT and DB documents in the SIMATIC SD format via Version Control Interface (VCI)

LAD, UDT and DB documents can be exported and imported in the SIMATIC SD format via the VCI interface. This function provides the following advantages:

- Well-defined, easily understandable and mergeable document format in which code changes can be tracked, managed and edited in a team.
- User-generated data is not lost during export and import.
- The format can be merged easily and is better compatible with Git.

2.2 Improvements in Update 1

This update contains the following improvements and changes:

Working with the TIA Portal

Stability when working with the TIA Portal has been improved, partly based on the feedback from returned crash reports.

New S7-1200 G2 CPUs

Update 1 supports the following new CPUs:

- S7-1200 G2 CPU 1216
- S7-1200 G2 CPU 1217

The CPUs are available in selected regions.

Inter Project Engineering (IPE)

As of V20, it is no longer possible to import controller data from STEP 7 Classic projects with IPE into TIA Portal projects.

Structural changes when editing and enabling library types

When structural changes are made to library types and you undo them manually (not by an undo command), dependent types are set to the "Processing" state during the enable.

If you continue without editing the dependent types, the following error message is output when you compile the dependent blocks: "This interface contains changes that are not compatible with the block/type used. Please edit this block."

TIA Openness explorer

The STEP 7 V20 Readme describes the following restriction in the TIA Openness Explorer:

Navigation in the directory tree of a library is restricted if you use named value data types in the library.

This restriction has been fixed and the readme entry no longer applies.

Improvements in WinCC Unified 3

3.1 Important notes

This page contains important information about product properties.

Device versions with V20 Update 3

The new device version 20.0.0.2 has been introduced for Unified PC and Unified Panels in order to be able to use the new functions which were introduced with V20 Update 3. Please note the following:

- If you open a project on a computer on which TIA Portal V20 is installed without an update, you cannot edit the devices contained there with device version 20.0.0.2.
- If you switch from a device version 20.0.0.2 to a previous device version, you can no longer use new functions.
- The functions introduced with V20 Update 3 are also supported in higher device versions.

Device versions for Unified PC

- Install Update 3 for WinCC Unified Runtime on the target device before loading a device with device version 20.0.0.2.
- If you load a device with the configured device version 20.0.0.0 into Runtime with a higher device version, warnings are displayed pointing out the different versions. To avoid incompatibilities, the configured device version should correspond to the actual Runtime version.

Images for Unified Panel

- Images can be downloaded from the Industry Online Support.
- Images are enabled independent of WinCC (TIA Portal).
- Use ProSave to import an image version that does not correspond to the configured device version onto a Panel.
- If a new image only contains improvements for the Runtime of the device, this version is not shown in the Engineering System. In this case, use the latest device version displayed in the Engineering System.
- If the image 20.0.0.0 is installed on the device, install image download version V20.0 Upd.2 or higher before you load a device with the configured device version 20.0.0.2. When loading this device, enable the "Keep aspect ratio" setting in the "Load preview" dialog so that the new image version is transferred to the Panel. Alternatively, use ProSave.
- If you load a device with the configured device version 20.0.0.0, it is not absolutely necessary to update the image on the Panel. If you load a device with the configured device version 20.0.0.0 onto a Panel with a higher device version, warnings are displayed pointing out the different versions. You can ignore them.

Panel: Read and write access to linked S7-300 String tags

String tags of an S7-300 controller can have a maximum of 210 characters. Read and write access to linked HMI tags with String data type is therefore also limited to 210 characters.

Restoring log segments in Runtime

If you restore an archive segment via Runtime Management or the system functions, observe the following notes:

- If you monitor the restored data in a control and display the online data at the same time, a data gap may occur as soon as the oldest segment of online data is automatically deleted in accordance with the configuration. This automatically deleted segment is not included in the restored logging data or in the current online data and is therefore missing from the timeline.
- If you delete an archive segment from the backup, you can still restore the remaining data. In this case, after recovery, an alarm appears that the log segments have only been partially restored.

Archives: Database for simulation

The configuration of the storage location is ignored during the simulation. Instead, a new relative folder is used, which is created in the path configured in "WinCC Unified Configuration".

File size of archived projects

The file for an archived project can be unexpectedly large if the "Optimize the size of high-resolution raster graphics" option is activated in the Runtime settings for one of the configured HMI devices under "General > Screen".

Activate the "Discard restorable data" option when archiving the project.

The archive size is considerably smaller. Corresponding data is not lost and can be restored.

Transfer log to another PC

If you are using MSSQL, follow these steps:

1. Use the "TIA Updater Corporate Configuration Tool" to configure the new PC.
2. Make sure that the configuration of the new PC corresponds to the configuration of the replaced PC.
   Make sure that the following settings are identical:
   - Names of the Runtime project
   - Runtime settings
   - Paths to the databases and to the MSSQL server instance.
3. Stop Runtime.
4. Create backups of the databases with the MSSQL Management Studio.

5. Copy the backups to the new PC.
6. Use the MSSQL Management Studio to restore each of the databases individually. Make sure that the path to the databases is identical to the path that has been configured on the replaced PC.

Redundancy

Restriction for plant objects

Plant objects are not yet supported for redundancy. Using plant objects in a redundant project has the result that Runtime cannot be started completely (partly running).

Restrictions for web client switchover

After a web client switchover, the screen settings of the control, e.g. alarm filters, are reset, even if they were saved before the web client switchover.

Audit

The "Force" settings of the Audit Trail are not supported in WinCC Unified.

The "HmiCheckLogIntegrity" tool for checking changes in the Audit Trail is not supported in WinCC Unified.

Updating the search index in a project

The search index in a project is automatically recreated when the project is upgraded from one major version to the next version, e.g. from V19.02 to V20.

If a project is opened after an update, the search index is not updated.

Example: A project created in V20 is opened in V20 Update 3.

You manually recreate the search index under "Settings > General > Search in project" with the "Recreate search index" button.

Parameter set control

Configuration limit parameter set type elements

Unified PC and Unified Comfort Panel support a maximum of 4000 parameter set type elements.

Filter parameter sets

If you use the filter function to filter parameter sets in Runtime, please note the following information:

Note

Only elements that contain the search term at the beginning of the element name are found.

Example: The "Concentrate" element is found using the "Con" search term; the "onc" search term returns no results.

Create edit tag

1. To create the same structure for the edit tag as for the parameter set tag, duplicate a corresponding **HMI** user data type in the library.
2. Change the connection to "Internal connection" in the newly created copy.
3. Create an instance of the data type in the tag table of the HMI device.
4. In the properties of the tag, select "Session local" under "Scope".
5. Use this tag in a parameter set as an edit tag.

You cannot copy a **PLC** user data type in the library. You will need to create this separately and manually.

Configure parameter sets: Transferring and deleting parameter sets automatically

A local session HMI tag must be selected as the edit tag.

Disabled system folders (Linux)

The following system folders are disabled for the export and import of parameter sets and are no longer available for selection:

- /home/industrial
- /home/industrial/.local/share/Trash/files
- /net/mount (if mounted)
- /media/simatic/X51 (if mounted)
- /media/simatic/X61 (if mounted)
- /media/simatic/X62 (if mounted)
- /media/simatic/X63 (if mounted)
- /media/simatic/X64 (if mounted)

System behavior: Importing exported parameter sets again

If you export parameter sets and delete a parameter set in the exported file, this parameter set is still available after the edited file is imported.

By exporting and reimporting parameter sets, you can add new parameter sets or modify existing parameter sets. You cannot delete parameter sets in this way.

Alarm control

To configure the alarm control output, the following setting options can be defined under "Miscellaneous > Alarm statistics - Settings":

- Start time
- Time range - start
- Time range - base
- Time range - factor

The maximum number of alarms is not supported in "Alarm statistics - Settings".

Notation for the data type: LTime

LTime has granularity of 100 ns.
Operators recommended for comparisons with LTime: <=, <, =>, >
Do not use: ==, <>

System functions

"EjectStorageMedium()" system function

The "EjectStorageMedium()" system function is available on Unified Comfort Panels and on Unified Basic Panels.

The description of the "Storage device" parameter of the "EjectStorageMedium" system function is as follows:

Parameter	Description
Storage device	Specifies the external storage medium to be ejected: • SD-X51 • USB-X61 • USB-X62

"StartProgram" system function

The "Display mode" parameter of the "StartProgram" system function determines how the program window is displayed on the HMI device. This function has no effect on Linux systems.

This parameter is reserved for future use.

"ExportUserAdministration" system function

- The system function "ExportUserAdministration" internally adds the .udz extension to the specified file name.
  The user administration file can be imported in `udz` or `json` format.
  When importing in `json` format, you need to explicitly specify the file extension.
  When importing in `udz` format, you can specify the file extension. However, this is not necessary.
- After the file is exported, renaming or removing the file extension by the user will result in an invalid file. The file can no longer be imported.

The Control Panel can export both `udz` and `json` format. The system function only supports `udz` format.

Runtime scripting

"ParameterSetType.GetName" and "ParameterSet.GetName" methods

- If the language ID of the default language is specified, the name is returned.
- The display name is returned for other language IDs. If no display name is configured, the name is returned.

"hmiReadDirect" method

The "`hmiReadDirect`" method cannot be used in Runtime scripts. Using the method causes Runtime to be aborted.

The "`hmiReadDirect`" method is part of the "`HMIRuntime.Tags.Enums.hmiReadType`" enumeration. The enumeration can be used.

"ParameterSet.ReadAndSave()" method

The correct syntax of the "ParameterSet.ReadAndSave()" method is:

```
ParameterSet.ReadAndSave(OverWrite, OutputStatus)
.then(function() {
    ...
})
.catch(function(errorCode) {
    ...
})
```

"UserManagement.GetRolesFromUser()" and "UserManagement.HasUserRole()" methods

The UserManagement.GetRolesFromUser() and UserManagement.HasUserRole() methods do not provide a meaningful return value when used in a scheduled task, as no user is assigned to a task.

Do not use the method in scheduled tasks.

"Authorization" property

Reading the ”Authorization” property is currently not supported.

"ReadElectronicRecord()" system function

When using the system function "ReadElectronicRecord()", transfer the parameters "`dateFrom`" and "`dateTo`" into the Date Time String Format without time zone offset (UTC time): "YYYY-MM-DD HH:mm:ss.ttt"

"SysFct.ExecuteToolbarButton()" system function

For the "`systemDiagnosisControlID`" parameter, the control IDs "`Previous (2)`" (previous) and "`Next (3)`" (next) are only supported up to V17 inclusive.

In the current version of WinCC Unified, this information is obsolete because the buttons are no longer supported.

Unified JavaScript property "LoggedAlarmStateResult.HostName"

The data type of the "HostName" property is "String".

Faceplate types: Use and visibility of layers

The documentation of the faceplate types has been improved. Observe the following when using layers in faceplate types:

Note

Use and visibility of layers

As in screens, you can use layers in faceplate types to edit the screen objects in a differentiated way.

Note that the visibility of levels in the Engineering System and Runtime is controlled separately. The display in Engineering System has no influence on the display in Runtime. To show or hide a layer in Runtime, adapt the "Runtime visible" property in the Inspector window of the faceplate type under "Properties > Properties > Miscellaneous > Layers".

UaExpert: Free OPC UA client for testing purposes

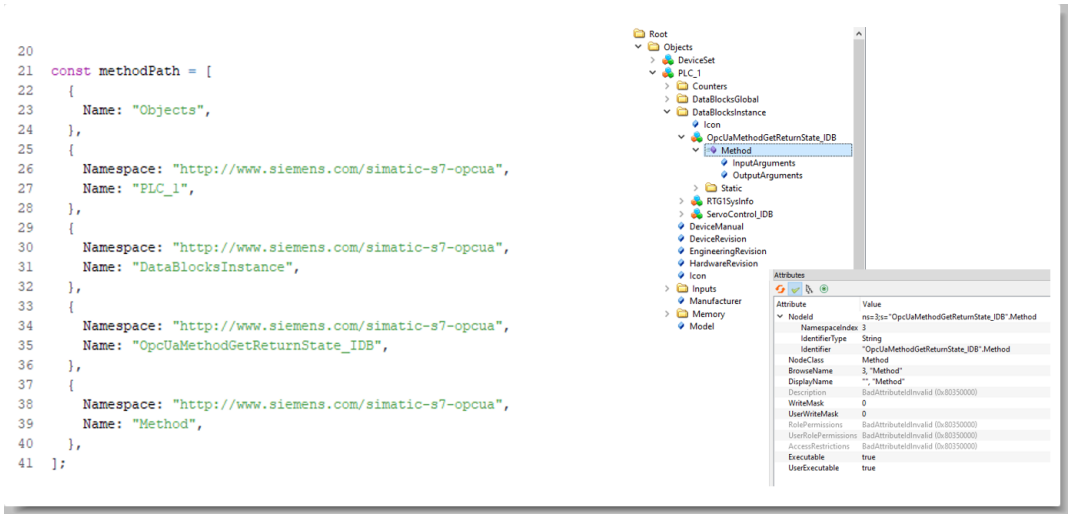
The OPC UA client "UaExpert" communicates directly with the OPC UA server.

"UaExpert" supports the OPC UA functionalities Browse and Read/Write.

Connect UaExpert to an OPC UA server. In the "Address Space" of the OPC UA server, you can see the OPC UA nodes that you have configured in the configuration of the OPC UA server interface. In the "Data Access View" area, you can monitor and edit data.

"UaExpert" is a tool provided by a third-party vendor.

Use UaExpert to determine the correct path to a method.



Runtime settings: Replacement character set

The replacement character set is provided by the system. The character set is used if a configured character set is not available on the system. The default replacement character set is "Siemens Sans". This font may not be able to display certain language-specific characters. When compiling a project, you will receive a warning if the replacement character set is used.

To show texts with different character sets, enable the "Activate language-compatible font families" option in the Runtime settings under "Language & font". When the option is enabled, you can select a language-compatible replacement character set for the Runtime languages. Font families that are suitable for displaying the respective Runtime language are offered.

Alternatively, deactivate the "Use same font for all languages" option under "Settings > Visualization > Screens > General". Assign a separate character set to each screen object in the properties of the object.

Runtime settings: Automatic updating of alarms

If the "Automatic update" is deactivated for a connection in the Runtime settings of an HMI device under "Alarms", the alarm system is not initiated for this connection so that no PLC alarms are received.

If the "Automatic update" option is deactivated, no alarms are received from an S7-1200/1500 PLC. In this case, a configured alarm control does not show any alarms.

For the PLC S7-1200 there is no support for "Central alarm management" in the PLC. Therefore the user can disable this option while communication between an HMI device and the PLC is taking place.

Runtime settings: Ignore the time stamp change

Under "Tags > Tag notification behavior", you can activate the "Ignore time stamp change" setting. Please note the following information:

Note

Tag logging

The "Ignore time stamp change" setting has no effect on the logging of the tag value.

Reading Quality Code and time stamps

The quality code and time stamp of a PLC tag can only be read with the help of a script using an internal script tag.

Example:

Realization of the LiveBit functionality for checking the connection status to the PLC

```
HMIRuntime.Tags.SysFct.ResetBitInTag("LiveBit",0);
// This code is suitable
let live = Tags("LiveBit");
live.Read();
HMIRuntime.Trace("LiveBit changed" + "Q-Code:" + live.QualityCode +
"Timestamp:" + live.TimeStamp);
// This code is not suitable
Tags("LiveBit").Read()
HMIRuntime.Trace("LiveBit changes" + "Q-Code:" +
Tags("LiveBit").QualityCode  + "Timestamp:" +
Tags("LiveBit").TimeStamp);
```

Alternatively, use the properties of the "TriggerDataSet" parameter introduced in version 19.2 in tag-triggered scripts.
Using this parameter, it is possible to access the respective properties of the "TriggerTag" directly via "`triggerDataSet("TriggerTag").QualityCode`" or "`triggerDataSet("TriggerTag").TimeStamp`".

Tags: Arrays

The direct access to a complete array is not permitted without block access. For arrays that are not read or written in blocks, access must always be via the individual array elements, even when using scripting methods.

Direct access to the HMI tag that contains the array can cause Unified Runtime to crash.

Tags: Arrays as block

The following data types are not permitted for read or write access to an array as a block via an external HMI tag in the PLC:

- DateTime
- LTime
- WString

Tags: String is not displayed

Affects Unified Basic Panels, Unified Comfort Panels and Unified PCs if they should display a tag of the type String from an S7-300/400 PLC under Unified Runtime.

Long strings from an S7-300/400 PLC cannot be displayed by Unified Runtime.

Divide long strings into multiple tags so that they can be taken from the PLC.

Trigger tags

If you dynamize a property of a screen object using a script triggered by a trigger tag, note the following:

- Writing the tag value within a script of a property dynamization that has this tag as a trigger tag could result in endless loops and thus impaired performance.
- The use of a method to write the tag value of the trigger tag in the same code line in which the tag object is defined results in a corresponding warning on compilation.
  Example:
  ```
  let tag1 = Tag("Tag1").Write(1234);
  ```

If a scheduled task has a tag as trigger condition, note the following:

- Writing the tag value by means of a system function within a scheduled task that has this tag as a trigger tag can result in endless loops and thus impaired performance.

Controls: DataGridControl

The "DataGridControl" screen object is not implemented in Unified Engineering and has therefore been removed from the WinCC Unified Javascript object model and the associated documentation.

Connection without Secure Communication

Note

Deactivating this option increases the security risk.

A connection between Runtime and a PLC without certificate is only possible if the PLC does not support the use of certificates, e.g. PLCs with older firmware or other series.

It is essential to configure a certificate in the PLC for secure communication.

Connection: Change with system function "ChangeConnection"

An HMI device has been connected to a PLC using the "ChangeConnection" system function.

Note

The HMI device does not initially trust the PLC certificate after calling the system function. To establish a secure connection, you must trust the certificate manually.

The following scenarios can occur in combination with the system function:

- Source PLC (configured self-signed TLS certificate) ⇒ "ChangeConnection" system function ⇒ Target PLC (configured self-signed certificate)
  You can manually trust the certificate for Unified Comfort Panels and Unified PCs.
  - Unified PC: SIMATIC Runtime Manager > Settings > Certificates
  - Unified Panel: Control Panel > Security > Certificates
- Source PLC (CA-signed certificate) ⇒ "ChangeConnection" system function ⇒ Target PLC (CA-signed certificate from the same CA as the source)
  The new connection to the target PLC is established automatically without any further action. The TLS certificate is not shown in the certificate management and it is not necessary to trust it manually.
- Source PLC (CA-signed certificate) ⇒ "ChangeConnection" system function ⇒ Target PLC (CA-signed certificate from a CA other than the source)
  The new connection to the target PLC cannot be established. The TLS certificate is not shown in the certificate management and cannot be classified as trusted. The manual import of the CA of the target PLC also has no influence.

Download to device - Internal error due to unsupported path specification

If an unsupported path is specified as the storage location for logs, this can lead to an internal error when loading the project.

Relative path specifications are not supported.

Example

"`.../test`" is not a valid storage path. Runtime attempts to create such a folder with a relative path under "system root", where this is not permitted.

Solution

Enter an absolute path including the storage medium as the storage location.

Runtime does not start after multiple changes to the device version

Under the following conditions, it is possible that a Unified device is compiled and loaded but Runtime cannot be started:

- You use structured PLC tags in the configuration of a Unified device.
- You have upgraded the device to device version 20.0.0.2.
- You have compiled the device and saved the project.
- You change the device version to a lower version, e.g. 20.0.0.0.
  If you have no access to the project before the upgrade, delete the folder with the Runtime IDs of this device in <project folder>\AdditionalFiles\RtIdFiles\. If multiple folders are located in <project folder>\AdditionalFiles\RtIdFiles\, compile the device again and delete the folder with the most recent time stamp in <project folder>\AdditionalFiles\RtIdFiles\.

IPI proxy with extended PLC user data type

If you have expanded a PLC software unit with a PLC user data type and then export the PLC proxy and update the existing PLC proxy in another project, you must fully compile first the PLC and then the HMI device after the import.

Language after starting Runtime

After starting Runtime, the language for which the lowest number has been configured in the Runtime settings is always set.

When using central user management, Runtime is displayed in the language you have selected in the "User login" dialog during login. If this language is not available for the current project or if the language setting has not been set in the central user management, the language for which the lowest number has been configured in the Runtime settings will be set.

Data loss when changing PLC user data types

Changes to the elements of a PLC user data type (e.g. name or data type) can cause the configuration of the elements of the user data type (e.g. projected logging tags) to be lost on the HMI device. In this case, even a reconfiguration (for example re-creating a logging tag with the same name) does not lead to a connection to the existing values in Runtime.

To avoid data loss in Runtime, it is recommended to make a copy of the engineering project and a backup of the Runtime project before making any changes to the elements of PLC user data types.

Rendering error with OGV videos in the media player

Videos in OGV format are not rendered in the media player.

Convert videos with OGV format to MP4 and use the videos in MP4 format.

3.2 Engineering and runtime

3.2.1 Improvements in Update 3

3.2.1.1 Improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Upper/lower case of the user name

When checking the user name, upper/lower case is no longer checked in the following cases:

- During DSSO login to Runtime (DSSO = Desktop Single Sign-On)
- When entering an electronic signature for Audit

Runtime settings: Language-compatible font families

You can use project languages that cannot be displayed with the standard "Siemens Sans" character set.

To centrally configure font families that are compatible with the Runtime languages used, enable the "Activate language-compatible font families" option in the Runtime settings of the HMI device under "Language & Font > Font family settings".

If this option is activated, select one of the font families installed on the device for each Runtime language in the "Replacement character set" column.

True type font families are supported.

Upgrade scenarios for custom styles

If you have a custom style that is based on a V18 template and you upgrade your TIA Portal project to V20 Update 3, the following applies:

- If the MTP device uses device version V18, the use of the existing V18 custom style is not supported. The use of the V18 custom style can lead to a compilation error.
- If the MTP device is upgraded to V20 Update 3, generate a new custom style based on V20 Update 3. Use this new custom style.

Changing styles when a screen is open

Display errors in an open screen that occurred when changing a style in the Runtime settings have been fixed. If you instantiate a faceplate type with a specific style in a screen and then select a different style in the Runtime settings, all screen objects are displayed correctly.

Formula with "Range" evaluation type

If floating point numbers are used in the formula in the "Range" evaluation type, the result is displayed correctly in Runtime.

Position of faceplates in pop-up

The position of pop-ups has been improved.

When you open a faceplate via the "OpenFacePlateInPopUp" method, the pop-up opens at the correct position, depending on the "IndependentWindow" parameter.

Snippets for the dynamization of faceplate types

The "Subscribe to property changes of a faceplate popup window" snippet for the dynamization of faceplate types has been improved. The created code now works without errors.

Dynamic SVGs in faceplates

Color dynamizations for dynamic SVGs in faceplates have been improved. Dynamization now works correctly even when flashing is enabled.

Interface properties of faceplates

An array must not be assigned to an interface property of type WString. An attempt to assign an array is now recognized and rejected by Runtime.

Visibility of nested faceplates

The visibility of nested faceplates has been improved. If the outer faceplates are visible, the inner faceplates are also visible. If the outer faceplate is invisible, so are the inner faceplates.

"ReadAndSaveParameterSet" system function

Successful execution of the "ReadAndSaveParameterSet" system function no longer generates an error message in TraceViewer.

Runtime scripting - "ReadMaxAge" method

If you call ReadMaxAge for a tag, the current tag value from the PLC is now also always returned in faceplates.

Runtime scripting - "GetSelectedAlarmAttributes" method

Problems with the "GetSelectedArmatAttributes" method have been fixed. The properties of the alarms are returned correctly.

"LeaveFullScreen" and "EnterFullScreen" script functions for kiosk mode

Calling the `HMIRuntime.UI.Kiosk.LeaveFullScreen()` script function in Runtime terminates kiosk mode without simultaneously ending the Runtime display.
The `HMIRuntime.UI.Kiosk.EnterFullScreen()` script function allows the kiosk mode to be started from Runtime.

LeaveFullScreen()

Ends kiosk mode and switches to window mode. As a result:

- Access to the functions of the operating system is possible.
- Runtime is still displayed in a client.
  The client has the following buttons:
  - Minimize: Minimizes the client window.
  - Maximize: Maximizes the client window.

Note

Call Alt+F4

If Alt+F4 has been configured to exit kiosk mode and users press Alt+F4 while the mouse pointer is in the client, the client is closed.

If users press Alt+F4 while the mouse pointer is outside the client, Microsoft Windows is locked.

EnterFullScreen()

If the conditions for starting kiosk mode are met, kiosk mode starts. If the client is in window mode, the client switches to kiosk mode.

Expressions

Performance when loading screen objects with a property dynamized via an expression has been improved. If the expression is not linked to a tag, the screen object is now loaded faster.

Line breaks in Runtime and simulation

The display of line breaks for Unified Panel and Unified PC has been standardized. Line breaks are now displayed the same in simulated projects and in projects with the "RUN" status.

Double line breaks in a text box

In Runtime, duplicate line breaks are displayed correctly in a text box.

Texts from library objects

After a screen change, the text from library objects is displayed correctly.

Text boxes

- The text alignment in text boxes has been improved. The texts are now displayed correctly in the Unified Screen Editor (Next Gen.) and in Runtime.
- Changes to the border width of a text box no longer affect the position of the text in the text box.

"Allow operator control" for grouped screen objects

The behavior of grouped screen objects has been improved. The value of the "Allow operator control" property is now correctly read and applied in Runtime for all objects in a group. This also applies after a change of value during Runtime.

Gauge

The display of the "Gauge" element has been improved.

IO fields

- Line breaks in IO fields
  In the IO field, defined line breaks, e.g. between date and time, are displayed correctly and consistently in Unified PC and Unified Comfort Panel
- Values of the output format {P,DD hh:mm:ss} are correctly displayed in the IO field if a tag of the "Real" data type is connected.
- Scrolling in symbolic IO fields has been improved on touch devices.
- When a custom style is used, IO fields are now correctly displayed in Runtime if the customer creates a new custom style based on a V20 Update 3 template.

Symbolic IO fields with graphics lists

If a symbolic IO field uses a graphics list and users open the corresponding drop-down list in Runtime, the graphics stored in the graphics list are displayed correctly.

Configure parameter sets: Adapting field labels

You can adapt the labels of the "Parameter set type", "Parameter set" and "Number" fields individually and in multiple languages.

To do this, configure under "Properties > General" a static value or a dynamization for the following properties:

- "Number - label": Specifies the label of the "Number" field.
- "Parameter set - label": Specifies the label of the "Parameter set" field.
- "Parameter set type - label": Specifies the label of the "Parameter set type" field.

If you have enabled multiple Runtime languages, adapt the label for additional languages under "Texts".

Editing exported parameter sets

The options for editing parameter sets have been improved. You can open and edit the exported .tsv files in a spreadsheet. When opening, select the tab stop as separator. Make sure that consecutive separators are handled as one separator and no changes are made to the character coding.

Importing parameter sets in Runtime

The import of parameter sets in Runtime has been improved. If you export parameter sets to a TSV file, change a value and re-import the changed file, the import is now also successful if the last value has the data type string and is empty.

Parameter sets: Tracing

After successful execution of the "LoadAndWriteParameterSet" system function, the alarm "Failed to write to PLC" no longer appears in the Trace viewer.

Alarms

- The texts for system alarms relating to redundancy have been improved.
- Scrolling in the alarm control has been improved.
- The display of alarms in the alarm control has been improved. Long or broken alarm texts are displayed correctly and without delay.

Trend control

- The interface for displaying and setting the time has been corrected in the trend control, in the "Time selection" dialog. After a language change in Runtime, the time is displayed correctly and can be configured.
- The trend update can now also be started or stopped by changing the "Switch state" property of the "Start/Stop" button.

Time stamp in value table

The display of time stamps in the control value table has been corrected. Time stamps are never displayed with line breaks.

Trend control: Array as block

A trend control now represents external HMI tags with array as block as a trend with the values via the index. To configure such a trend, follow these steps:

1. Select the type "HMI_Variable" for "Properties > General > Trend areas > Trends > [0] Trend > Data source Y > Source".
2. Select an external HMI tag that accesses a PLC array tag with an array as a block.
3. Select "Index" as the setting of the time axis under "Properties > General > Time axes bottom > Time axis [0]".
4. Select the number of index values to be displayed for "Properties > General > Time axes bottom > Measuring points".

The last read data record of the array as a block from the external HMI tag is displayed in the configured trend control in Runtime.

For correct display of the block data of the array in Runtime, you must observe the following:

- There are two prerequisites for reading in a new data record of the array as a block in Runtime:
  - The trend control is in "Online" mode.
  - A script for manually reading the data record of the external HMI tag with an array as a block is implemented.
    A script can be linked to an event and realized as follows:
    `Tags(<block array tag>).Read(Tags.Enums.hmiReadType.hmiReadDirect)`
- To ensure the consistency of the block data of large arrays to be displayed in the trend control, implement a manual handshake procedure on the HMI and PLC side.

System diagnostics

- The display of tooltips for tiles in various screen styles has been improved.
- If a system diagnostic alarm had a line break, the word "undefined" was displayed.
  This problem has been fixed. Multi-line system diagnostics alarms are now correctly displayed with line breaks.
- The system diagnostics control now shows the complete text of an error description.
- After selecting a device tile in the matrix view, the correct error description is now displayed in the hardware detail view.

PLC code view

- The display of the tooltips within the PLC code view when using Remote Desktop has been improved.
- The slicing of variable values for comparison operations now works correctly.

Reports

Adjustment of the time stamp format in the "Reports" control

In the Engineering System, users have now the option to configure the time stamp format with which the date and time are displayed in the "Reports" control in Runtime. To that end, in the Engineering System, configure the "Time stamp format" property in the properties of the control under "Miscellaneous > Interface > General".

You have the following options:

- Select one of the preconfigured entries under "Date and time" or "Date and time (automatic, language dependent)".
- Enter the desired format manually in the field.
- Add a dynamization and apply the value, for example, from a tag.
  This will make it possible for you to change the time stamp format during Runtime.

Result:

- After the compile and load, all the specifications for date and time are displayed in Runtime in the "Reports" control in the format that you have selected.
  Excluded from this are:
  - Report names that contain the date and time
  - Specifications for the definition of series triggers on the "Task parameters > Triggers" tab in the "Trigger type" area
- If the property is empty or contains an incorrect value, the current Runtime language is evaluated and the standard format of the corresponding region is used.

Note

The configuration of the "Time stamp format" property does not affect the time stamps output in the generated report.

Tracing

The trace messages for faceplate instances have been improved. If the tag linked in the faceplate type in the tag interface is not available in Runtime, the trace message now supplies the name of the faceplate instance.

Panel: Displayed language

If a project language that does not support Runtime has been configured for a Panel in engineering, Runtime displays English instead.

Comfort Panel: Display local files via browser address bar

The display of local files of the UCP via the browser address bar has been improved.

Files stored under "media\SIMATIC_MC" on the UCP can now be viewed in Runtime in a browser, for example in the Control browser.

Example:
To display the file `file:////media/SIMATIC_MC/SDS.pdf`, enter the following URL in the Control browser: `https://localhost/webfile/SDS.pdf`

Comfort Panel: "ExecuteFunctionButton" in alarm controls

The "ExecuteToolbarButton" system function is correctly executed in the alarm control of the Unified Comfort Panel.

Comfort Panel: Trend control

The time range of trend view displays the date and time correctly.

3.2.1.2 Load user files

Introduction

You have the possibility to load your own files with useful additional information onto a Unified PC, e.g. system manuals, video tutorials or plant and project documentation files.

Files loaded onto the PC can be displayed as follows:

- In a web browser
- In a Runtime client: On an HMI screen in the "Browser" control

To update or delete user files, change the configuration of the user files in the engineering and load the project onto the device.

For changes to user files that have already been loaded, edit the configuration of the user files in the engineering and load the files again.

In Runtime, administrators can delete the folder with the user files.

Restrictions

- The HMI device is a Unified PC.
- The user files are only loaded onto the HMI device when fully loaded.
- The file formats that can be displayed depend on the browser and browser version selected to display them.
- To be able to open user files in Runtime, the following applies to the files and folders in the "UserFiles" folder:
  - The file names and folder names cannot contain a "+" character.
  - All other special characters in file names and folder names must be URL encoded in the address string.

Requirements

- Runtime version configured for the Unified PC and installed Runtime version: V20 Update 3

Workflow

1. Enable access to user files on the Unified PC.
2. In the Engineering System, configure which user files are loaded onto the device.
3. Load the files to Runtime.
4. Open the user files in Runtime.

Activating access to user files

1. Open the WinCC Unified Configuration tool on the Unified PC.
2. Switch to the "Download of projects" step.
3. Enable the "Activate access to user files" option.
4. Switch to the "Apply settings" step and click "Apply".
   The settings are applied.
5. Click "Complete".

Configuring user files in the engineering

In the engineering, you configure in the "HMI files" editor which user files are loaded to Runtime on loading.

You can create folders to improve structuring. Then you save the files in the folders.

NOTICE
Protection from malware Malware can be installed by opening a file, e.g. a PDF file with embedded links. Only upload files from secure locations into the editor. If necessary, scan files with an antivirus program first.

Requirements

- In the engineering, a project is opened with a Unified PC.

Procedure

1. In the project tree, open the "HMI files" editor under "Common data".
2. To add one or more new files, follow these steps:
   - Click "Add new" in the work area of the editor.
     A Windows Explorer opens.
   - In the Explorer, select the desired file(s) and click "Open".

   The files appear in the work area numbered and in alphabetical order.
   On the engineering PC, the files are saved in the file system under "<TIAProjectname>\UserFiles\HMI_globalFiles".

   Note

   If you change the contents of the "HMI_globalFiles" folder directly in the file system, the "HMI files" editor reflects these changes.

3. To store the files in a folder structure, follow these steps:
   - To add a folder, select an empty line in the work area and choose the "Create new folder" command in the context menu.
     In the "Create new folder" dialog, assign the folder name and confirm your entries.
     The folder appears in the work area.
   - To add a subfolder to a folder, select the line with the respective folder and choose the "Create new folder" command in the context menu.
     In the "Create new folder" dialog, assign the folder name and confirm your entries.
     The subfolder appears in the work area under the selected folder.
4. To add files to a folder, follow these steps:
   - Select the folder in the work area.
   - Select "Insert object" from the context menu.
     A Windows Explorer opens.
   - In the Explorer, select the desired file(s) and click "Open".

   The files are added to the folder.
5. To update an added file, follow these steps:
   - Click "Add new" in the work area of the editor or select the "Insert object" command in the context menu of a folder.
     A Windows Explorer opens.
   - In the Explorer, select a file with the same name as the file to be updated.
   - Confirm the prompt.

   The file is overwritten.
6. To delete one or more files, follow these steps:
   - Select the line(s) of the file(s) in the work area
   - Select "Delete" from the context menu.

Result

The files and folders stored in the editor are shown in the "Load preview" dialog and can be loaded onto the Unified PC.

Loading user files to Runtime

Requirements

- At least one file has been added in the "HMI files" editor.

Procedure

To transfer the user files configured in engineering into Runtime, follow these steps:

1. Select the Unified PC in the project tree in engineering.
2. Select "Download to device > Software (all)" in the context menu.
   The "Load preview" dialog is shown after a successful compilation check.
   The "Load" button is inactive.
3. Click the "HMI Runtime" entry.
   The number and total size of the files configured in the "HMI files" editor and a list of the configured files is shown under the entry.
4. Enable the option "Download all user files, including changed or newly added files from the list below".
   The "Load" button becomes active.

NOTICE
Protection from malware Malware can be installed by opening a file, e.g. a PDF file with embedded links. Only enable the option if you trust the files. If necessary, scan the files in the "<TIAProjectname>\UserFiles\HMI_globalFiles" folder with an antivirus program first.

5. Check the remaining default settings and change the settings as necessary.
6. Click "Load".

Result

If access to user files is enabled for Runtime, the contents of the "<TIAProjectname>\UserFiles\HMI_globalFiles" folder are mirrored in the "<Runtime project folder>\UserFiles" folder.

If a file from the "<Runtime project folder>\UserFiles" folder is being used in Runtime, this file is not overwritten. A warning informs you about it.

Opening user files in Runtime

Requirements

- A loaded project has the "RUNNING" status.
- The web browser or Runtime client has access to the web server.
- For opening in a Runtime client:
  The "Browser" control was configured for the displayed HMI screen.

Opening a file directly in the web browser

1. Enter the following URL in the address bar of a web browser:
   "`https://<IP address or FQDN of the Unified PC>/UserFiles/<file name or file path>`"

   Note

   Use the same computer addressing as for Unified Runtime.

2. Authenticate yourself with your UMC user name and password.

Opening a file in the Runtime client in the "Browser" control

1. Enter the following URL in the address field of the "Browser" control:
   "`https://<IP address or FQDN of the Unified PC>/UserFiles/<file name or file path>`"

   Note

   Use the same computer addressing as for Unified Runtime.

Result

The document is opened directly in the web browser or in the "Browser" control.

Deleting user files in Runtime

1. Start SIMATIC Runtime Manager as administrator.
2. Click "Settings".
3. Click on the "Telemetry - User files" tab.
   Under "User file settings", you will see the current storage location and the file size.
4. To delete the folder with the user files, follow these steps:
   - Click "Delete folder".
   - Confirm the prompt.
     The project is stopped and the folder and files are deleted.
   - Close the settings.
5. Start Runtime again.

3.2.1.3 Reading an array as block with handshake procedure

Introduction

To ensure consistency when reading large data records from arrays as block, implement a manual handshake procedure on the HMI side and PLC side.

The following is an example implementation for read access to an array as a block using a manual handshake procedure, for example to represent rapid changes in the value of a PLC tag in a trend control in an HMI screen:

Read access with handshake procedure

Requirements:

- The "TrendBufferTransfer_ReadRequest" tag is used in the HMI screen as a trigger for the request to read the array as block.
  - For a single request to read: The "TrendBufferTransfer_ReadRequest" tag must be set in script to dynamize a property from the HMI side and reset after the read access from the HMI side is completed.
  - If there is a permanent request to read in a screen: The tag must be set from the HMI side for the "Loaded" event and reset from the HMI side for the "Cleared" event.
- The "TrendBufferTransfer_DataAvailable" tag must be set by the PLC side when the array is ready for data transfer as block and reset by the HMI side as soon as the read access is completed.
- "TrendBufferTransfer_ReadRequest" and "TrendBufferTransfer_DataAvailable" are tags of the type "Int" or "Bool".

Script examples

There are two ways to implement the manual handshake procedure:

- The following script is triggered when a property is dynamized by a change in the value of the trigger tag "TrendBufferTransfer_DataAvailable".
  - In the event that the trigger tag is not set again within at least 200 ms after it has been reset.
  - The reason for this is a minimal query time of the trigger tag "TrendBufferTransfer_DataAvailable".
- The following script is triggered when a property is dynamized by a "Cycle" trigger with a desired cycle time.

Example script for HMI: Handshake procedure for reading an array as a block

Script to dynamize a property (cycle or trigger tag)

```
// Handshake tag to signal from PLC to HMI that block array data is available
let tagRequest_ReadBlock_Available = Tags("HMIData_TrendBufferTransfer_DataAvailable");
if (tagRequest_ReadBlock_Available.Read());
{
  let blockData =
Tags("HMIData_BlockTrendBufferTransfer").Read(HMIRuntime.Tags.Enums.hmiReadType.hmiReadDir
ect);
  // Do something useful with the block array data
  // New data can be transferred into the block array within the PLC as long as requested
  tagRequest_ReadBlock_Available.Write(false);
}
```

Script in screen with trend control for "Loaded" event

```
// Handshake tag to signal from HMI to PLC that the block array data is requested and will
be prepared
  let tagRequest_ReadBlock = Tags("HMIData_TrendBufferTransfer_ReadRequest");
  tagRequest_ReadBlock.Write(true);
```

Script in screen with trend control for "Cleared" event

```
// Block array data in PLC is not needed to be prepared anymore
  let tagRequest_ReadBlock = Tags("HMIData_TrendBufferTransfer_ReadRequest");
  tagRequest_ReadBlock.Write(false);
```

Example script for PLC: Handshake procedure for reading an array as a block

```
// Example for filling two arrays with sine/cosine data
IF "HMIData".simSinCos = TRUE THEN
        // Statement section IF
   FOR #i := 0 TO 179 DO
        "HMIData".TrendBuffer1[#i] := (SIN(INT_TO_REAL(#i) * 2 * "PI" / 180.0))*100;
        "HMIData".TrendBuffer2[#i] := (COS(INT_TO_REAL(#i) * 2 * "PI" / 180.0))*100;
    END_FOR;
END_IF;

// Signal the HMI that the trend can read the block array data
IF ("HMIData".finishedMoveBuffer) THEN
    "HMIData".TrendBufferTransfer_DataAvailable := TRUE;
    "HMIData".finishedMoveBuffer := FALSE;
END_IF;

// Prepare the block array data once if requested by the HMI
IF ( "HMIData".TrendBufferTransfer_ReadRequest AND NOT
"HMIData".TrendBufferTransfer_DataAvailable) THEN
    // Alternately write sine / cosine data into the block array
    IF ("HMIData".currentReadBuffer = 1) THEN
        FOR #i := 0 TO 179 DO
            "HMIData".TrendBufferTransfer[#i] := "HMIData".TrendBuffer1[#i];
        END_FOR;
        "HMIData".finishedMoveBuffer := TRUE;
        "HMIData".currentReadBuffer := 2;
    ELSIF("HMIData".currentReadBuffer = 2) THEN
        FOR #i := 0 TO 179 DO
            "HMIData".TrendBufferTransfer[#i] := "HMIData".TrendBuffer2[#i];
        END_FOR;
        "HMIData".finishedMoveBuffer := TRUE;
        "HMIData".currentReadBuffer := 1;
    END_IF;
END_IF;
```

3.2.1.4 Set system time

A correctly set and synchronized system time is essential.

- Establish communication with other devices
  The system time is used as the basis for establishing communication between devices and various services. An incorrect system time can cause communication partners to reject connections.
  Some communication protocols also rely on certificate-based security or encryption. If the system time is incorrect (especially if it is set in the future), certificates may be considered expired, leading to connection errors.
- Precise logging of data and events
  Logging and audit trails use a device's system time to time stamp events. An incorrect system time results in data and events being recorded with incorrect time stamps. This will also trigger unexpected alarms.
- Reliability of the overall system
  A correct system time is not only important for Runtime operations but also for operations at operating system level, such as creating and modifying files, which rely on the accurate system time to set time stamps.

When should the system time be set?

- During commissioning of a device
  - Set the system time before commissioning the device.
  - Do not set the system time manually.
    Instead, configure a connection to the NTP server.
- After prolonged storage of the device
  The system time setting for an HMI device or a PLC may be lost if the device is turned off for more than 6 weeks.

Rules for setting the system time

- Never set the system time in a running system, i.e. during production.
  - Sudden jumps in the system time can lead to unpredictable malfunctions.
  - A problem may remain hidden for an extended period, e.g. regular script tasks that are no longer executed.
  - Note: Note that not only the product's own code but also scripts and third-party libraries may rely on the system time to determine, for example, when the "next execution cycle" of a program should run. If the time suddenly jumps back by 8 hours, the next execution cycle will be triggered in 8 hours, not in 100 ms.
- A backward setting of the system time requires re-commissioning (cold restart).
  - Resetting the system time, even when runtime is not active, requires a restart of the project.
- Note the difference between setting the system time and changing the time zone.
  - The system time is based on UTC and is independent of the selected time zone.
  - The software uses UTC time and is therefore not affected by changes in the time zone configuration.
  - If the hardware is moved to a different time zone, change the time zone, not the system time.
  - A change in the time zone has no impact on the UTC system time and therefore does not pose a risk to Runtime.

Time synchronization with NTP

- Configure devices as NTP clients
  - Both HMI panels and PCs can be configured as NTP clients. NTP clients require an NTP server that is synchronized with the NTP server's clock via a radio signal (DCF77), GPS, or the internet.
- Configure an S7 PLC as an NTP server.
  - As an alternative to an internet connection, you can configure an S7 PLC to function as an NTP server.

Avoidable alarms

These alarms can be avoided through consistent time synchronization.

ID	Alarm text	Effect/cause	Solution
537526277 536871427	Computer1 (@2%s@): A time stamp has been corrected.	The alarm is triggered when a value change or a state change from the external source (including via scripting) is timestamped with a value that is not acceptable for the HMI. The following cases are possible: • Too new, default is more than 3 seconds in the future, based on the system time of the HMI system. • Too old, configurable: Values that are so old that they no longer make sense, e.g. an alarm from 1970. • Older than or equal to the last known time stamp of a value/alarm If any of these three conditions are violated, a time correction occurs. The message is information. The system behavior does not change.	Eliminate the cause of the necessary time correction. Ensure that all devices in the system use the same time stamp through time synchronization. You can find information on synchronization under "Basics of communication".

3.2.2 Improvements in Update 1

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

3.3 Unified Engineering

3.3.1 Improvements in Update 3

3.3.1.1 General improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Colors and color palettes

The local and global search for colors, color palettes and their references has been improved.

- The local search now lists results from the screen editor, faceplate editor, color palette editor and script editor.
- The global search now lists results from the screen editor, faceplate editor, color palette editor and script editor.

Redundancy

Process and system diagnostics is supported for redundancy.

Routed S7 connections

The following scenarios are possible for configuring routed S7 connections between a Unified Basic Panel/Unified Comfort Panel/Unified PC and a PLC.

The source device is always a Unified device with a PROFINET (Ethernet) interface. At least one "Router" is always installed in between.

Scenario	Devices
S7-PLC as a router (PROFINET) ⇔ S7+ PLC as end device (PROFIBUS/PROFINET)	Router: S7-300/400 PLC End device: S7-1500 PLC (PB)
	Router: S7-300/400 PLC End device: S7-1500 PLC (PN)
	Router: S7-300/400 PLC End device: S7-1200 PLC (PN)
S7+ PLC as a router (PROFINET) ⇔ S7+ PLC as end device (PROFIBUS/PROFINET)	Router: S7-1500 PLC End device: S7-1500 PLC (PB)
	Router: S7-1500 PLC End device: S7-1500 PLC (PN)
	Router: S7-1500 PLC End device: S7-1200 PLC (PN)
S7+ PLC as a router (PROFIBUS/PROFINET) ⇔ S7+ PLC as an additional router (PROFIBUS/PROFINET) ⇔ S7+ PLC as end device (PROFINET)	Router: S7-1500 PLC Router: S7-1500 PLC End device: S7-1200 PLC (PN)
IE/PB link (PROFIBUS) ⇔ S7 PLC/S7+ PLC as end device (PROFIBUS)	Router:IE/PB link End device: • S7-300/400 PLC (PB) • S7-1500 PLC (PB)

S7-300/S7-400 PLCs with only one PROFIBUS interface are thus reached via S7 routing from a Unified device with a PROFINET (Ethernet) interface.

Note:

- Information on whether a device supports routing can be found in the respective Equipment Manual. Under the "Asynchronous communication connections - S7 routing" keywords, you will find information on the support of Ethernet, PROFIBUS DB and communications modules.
- Other possible scenarios have not been tested.
- A virtual PLC can only be used as an end device in a routed connection, as it only has one connection.
- Version-dependent restrictions apply to the S7-1500 Software Controller.

Remote access via Web client and Smart Server

After replacing an HMI device or migrating a project, remote access via Web client or Smart Server may no longer be possible. The cause of the problem has been eliminated.

Unified JavaScript properties "ScreenWindow.SupportedNavigation" and "TopLevelScreenWindow.SupportedNavigation"

Together with the listed system functions and methods, the properties enable the creation of navigation between screens in Runtime.

- ClearScreenHistory
- SysFct.ClearScreenHistory()
- ChangeScreenNext
- SysFct.ChangeScreenNext()
- ChangeScreenNextAsync
- SysFct.ChangeScreenNextAsync()
- ChangeScreenPrevious
- SysFct.ChangeScreenPrevious()
- ChangeScreenPreviousAsync
- SysFct.ChangeScreenPreviousAsync()

3.3.1.2 Unified Screen Editor (Next Gen.)

Introduction

The Unified Screen Editor (Next Gen.) in the TIA Portal is a new editor in addition to the existing "Screens" editor. You can design screens more efficiently with the Unified Screen Editor (Next Gen.).

The next sections contain a description of the new functions and the improvements to existing functions.

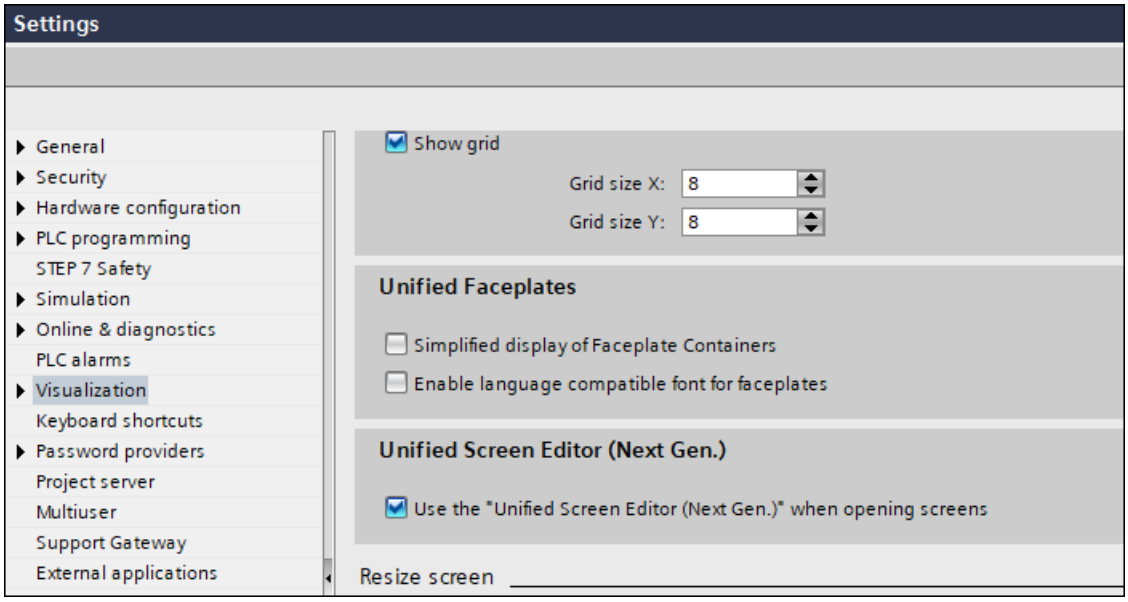
Select editor

In the Unified Screen Editor (Next Gen.), you visualize all screen objects like in the existing "Screens" editor.

Change editor

If you want to change from the existing "Screens" editor to the Unified Screens Editor (Next Gen.), follow these steps:

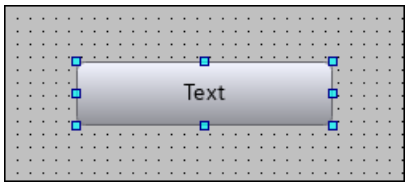
1. Enable the "Unified Screen Editor (Next Gen.)" option under "Options > Settings > Visualization > Screens".
   All open screens in the project are closed when you change the editor.
2. Open the screens again.



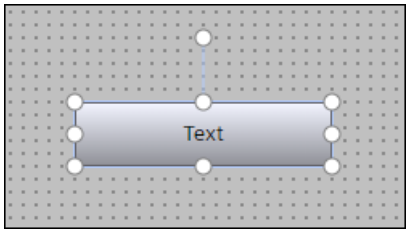
Identify editor

To distinguish between the editors, the grab handles for the objects have a different shape and size.

- In the existing "Screens" editor, the grab handles are blue rectangles.



- In the Unified Screen Editor (Next Gen.), the grab handles are shown as small white circles. The white circle above the object is the rotation handle for rotating the object.



New functions

Zooming and panning a screen

Zooming a screen in the editor

You can use the combination of the mouse or touchpad and keyboard to work efficiently with the screens.

By combining the mouse or touchpad and the keyboard, you can zoom in on a screen in the screen editor. The size of the objects in the screen is adapted proportionally to the zoom factor.

You can zoom and pan a screen at the same time.

Requirement

- Place the mouse cursor in the screen outside of an object.
- Press the space bar on the keyboard. The mouse cursor turns into a "Hand" symbol .

Zooming a screen with the mouse

To zoom a screen with the mouse, follow these steps:

1. Hold down the space bar.
2. Move the mouse wheel up or down.

The screen is zoomed into or out of in the screen editor.

Zooming a screen with the touchpad

To zoom a screen by combining the keyboard and touchpad, follow these steps:

1. Hold down the space bar.
2. Pull two fingers apart or together from the center of the touchpad.

The screen is zoomed into or out of in the screen editor.

Note

To make the touchpad work efficiently, adjust the touchpad sensitivity:

1. Open the "Settings" on your computer. Navigate to "Devices > Touchpad".
2. Under "Touchpad sensitivity", select the option "Highest sensitivity".

Zooming and panning a screen at the same time

To zoom and pan a screen at the same time, follow these steps:

1. Place the mouse cursor in the screen.
2. Hold down the space bar.
3. Hold down the left mouse button.
4. Move the mouse wheel up or down.
   Alternatively, pull two fingers apart or together from the center of the touchpad.

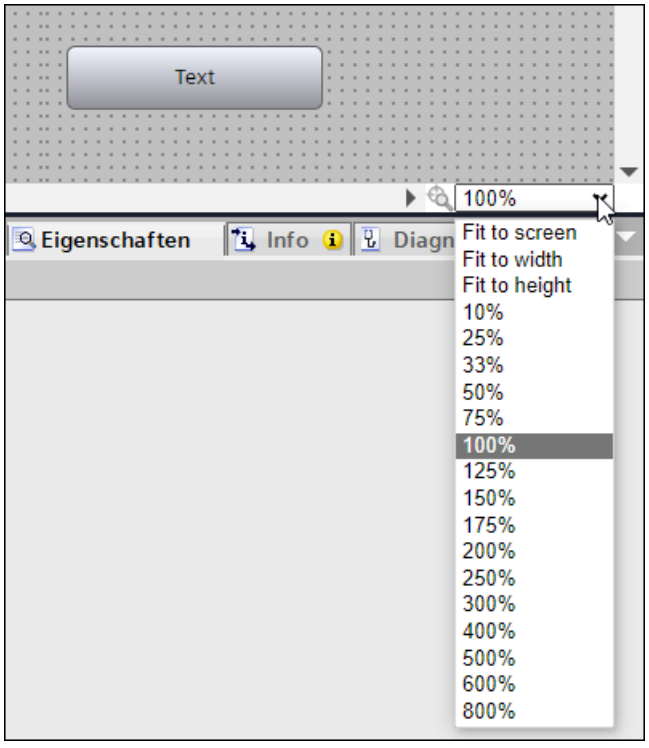
The screen is zoomed and panned at the same time.

Zooming a screen via drop-down list

You can zoom a screen in the screen editor using the drop-down list in the lower-right corner of the screen editor.

To work efficiently with zooming, the following options are shown in the drop-down list:

- Fit to screen
- Fit to width
- Fit to height



Panning a screen in the editor

You can use the combination of the mouse or touchpad and keyboard to work efficiently with the screens.

By combining the mouse or touchpad and the keyboard, you can pan a screen in the screen editor.

You can zoom and pan a screen at the same time.

Requirement

- Place the mouse cursor in the screen outside of an object.
- Press the space bar on the keyboard. The mouse cursor turns into a "Hand" symbol .

Panning a screen with the mouse

To pan a screen with the mouse, follow these steps:

1. Hold down the space bar and the left mouse button.
2. Move the mouse in the direction you want to pan the screen.

The screen is panned in the screen editor.

Panning a screen with the touchpad

To pan a screen by combining the keyboard and touchpad, follow these steps:

1. Hold down the space bar.
2. Move two fingers on the touchpad in the direction you want to pan the screen.

The screen is panned in the screen editor.

Note

To make the touchpad work efficiently, adjust the touchpad sensitivity:

1. Open the "Settings" on your computer. Navigate to "Devices > Touchpad".
2. Under "Touchpad sensitivity", select the option "Highest sensitivity".

Zooming and panning a screen at the same time

To zoom and pan a screen at the same time, follow these steps:

1. Place the mouse cursor in the screen
2. Hold down the space bar.
3. Hold down the left mouse button.
4. Move the mouse wheel up or down.
   Alternatively, pull two fingers apart or together from the center of the touchpad.

The screen is zoomed and panned at the same time.

See also

Keyboard shortcuts for screens (Page 59)

Zooming and moving an object

Zooming an object in the screen

You can use the combination of the mouse or touchpad and keyboard to work efficiently with the objects.

By combining the mouse or touchpad and the keyboard, you can zoom into an object on the screen.

Zooming an object using the mouse

To zoom an object with the mouse, follow these steps:

1. Place the mouse cursor in the object.
2. Press the space bar on the keyboard. The mouse cursor turns into a "Hand" symbol  .

3. Hold down the space bar.
4. Move the mouse wheel up or down.

The object is zoomed.

Zooming an object using the touchpad

To zoom a screen by combining the keyboard and touchpad, follow these steps:

1. Place the mouse cursor in the object.
2. Hold down the space bar.
3. Pull two fingers apart or together from the center of the touchpad.

The object is zoomed.

Note

To make the touchpad work efficiently, adjust the touchpad sensitivity:

1. Open the "Settings" on your computer. Navigate to "Devices > Touchpad".
2. Under "Touchpad sensitivity", select the option "Highest sensitivity".

Moving an object in the screen

You can use the combination of the mouse or touchpad and keyboard to work efficiently with the objects.

By combining the mouse or touchpad and the keyboard, you can move an object in the screen.

By combining the left mouse button and the space bar, you can alternately move the object and pan the entire screen with the object. In this way, you can place an object in a screen area that is currently not visible in the editor.

Moving an object using the mouse

To move an object with the mouse, follow these steps:

1. Place the mouse cursor in the object.
2. Hold down the left mouse button.
3. Move the mouse in the direction you want to move the object.

If you want to move the object in the screen further, for example to the top left corner of the screen, continue as follows:

1. Press the space bar.
2. Move the mouse in the direction you want to pan the screen with the object.
   The screen with the object is panned.
3. Release the space bar.
4. Move the mouse in the direction you want to move the object.

The object is moved in the screen.

Moving an object using the touchpad

To move an object by combining the keyboard and touchpad, follow these steps:

1. Place the mouse cursor in the object.
2. Hold down the left key on the touchpad.
3. Move one finger on the touchpad in the direction you want to move the object.

If you want to move the object in the screen further, for example to the top left corner of the screen, continue as follows:

1. Press the space bar.
2. Move one finger on the touchpad in the direction you want to pan the screen with the object. The screen with the object is panned.
3. Release the space bar.
4. Move your finger on the touchpad in the direction you want to move the object.

The object is moved in the screen.

Note

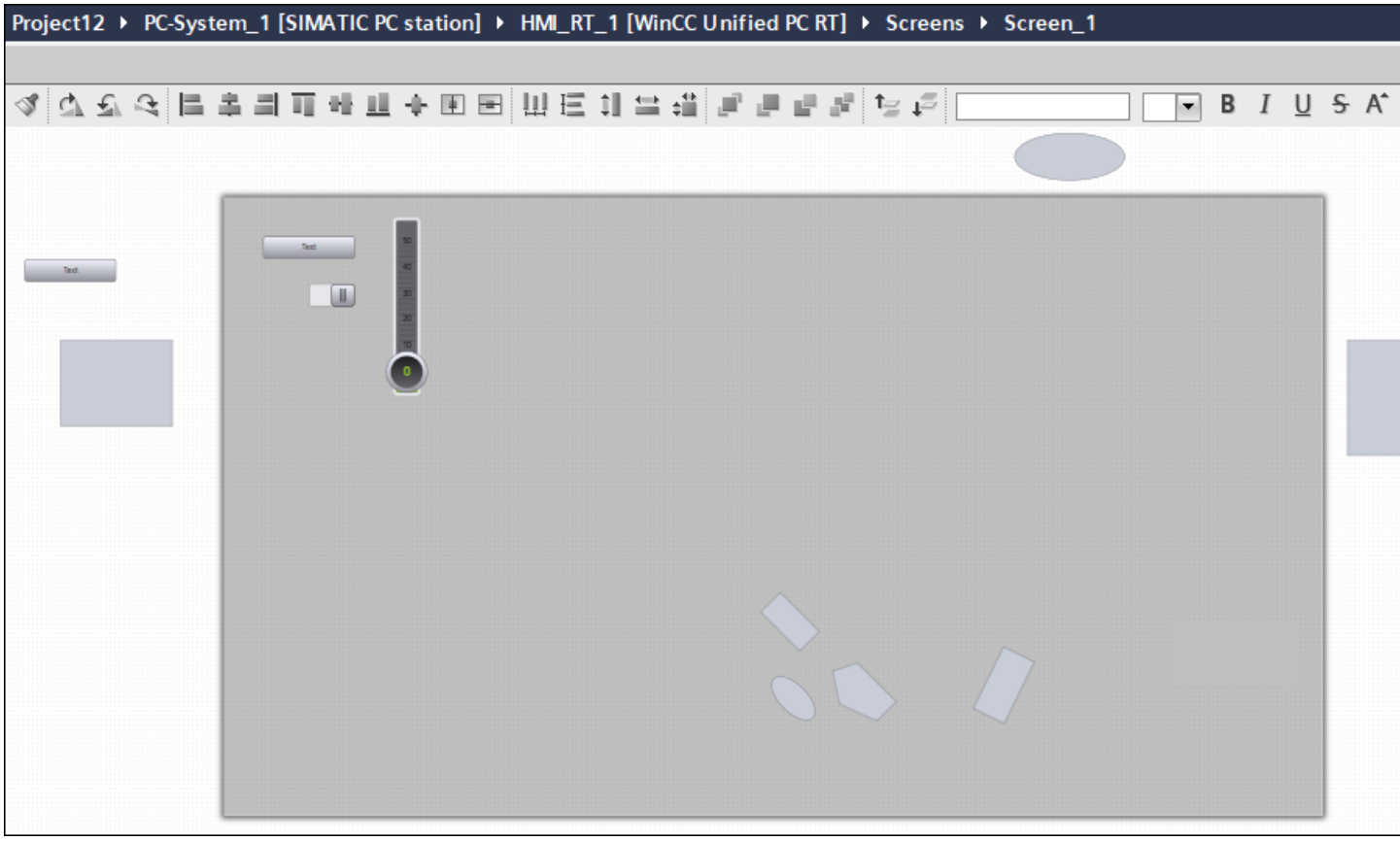
To make the touchpad work efficiently, adjust the touchpad sensitivity:

1. Open the "Settings" on your computer. Navigate to "Devices > Touchpad".
2. Under "Touchpad sensitivity", select the option "Highest sensitivity".

Moving an object into the invisible screen area

You can place the objects outside of the screen area visible in Runtime. In this area, you can configure the objects and move them back into the screen area visible in Runtime.

The objects outside of the screen area visible in Runtime are stored in this area for the next use.



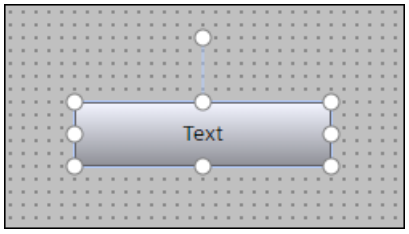
Rotating objects or groups

Rotating an object

You can rotate an object in the editor without configuring the rotation angle in the Inspector window. The white circle above the object is used as a grab handle for rotating the object - the rotation handle.

You can rotate all objects with the "Rotation - angle" property:

- Basic objects
- Elements
- Objects in the multiple selection
- Object groups
- Faceplates



When you rotate the object, the rotation is snapped at every 90° angle.

With the <Alt> button pressed, you can select an exact rotation angle.

If the "Rotation - angle" property is not supported for an object or an object in the multiple selection or group, the symbol is shown instead of the rotation handle.

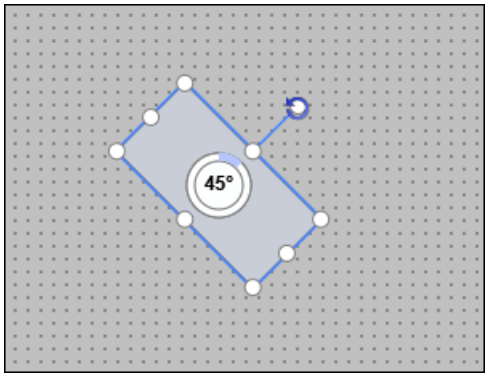
Rotate object

To rotate the object, follow these steps:

1. Click the rotation handle with the mouse.
   The mouse cursor turns into a "Rotation" symbol .
2. Move the rotation handle to the right or to the left.

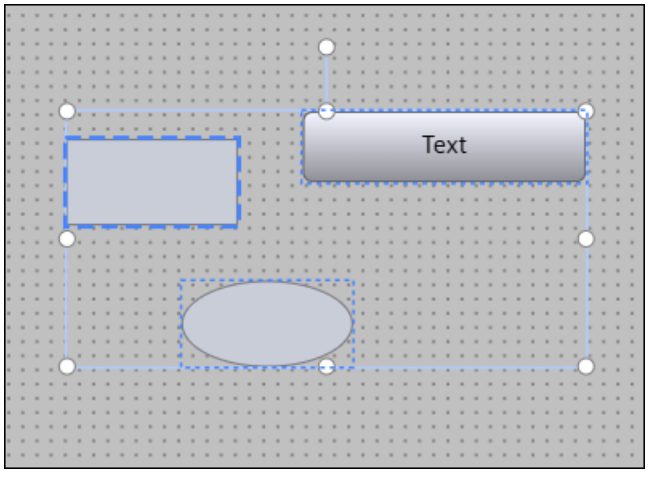
The object is rotated.

In the center of the object, the rotation angle is displayed continuously in degrees.



Rotating objects in the multiple selection

You can rotate the objects in the multiple selection without grouping the objects or configuring the rotation angle in the Inspector window. The rotation handle is used as a grab handle for rotating the objects in the multiple selection.



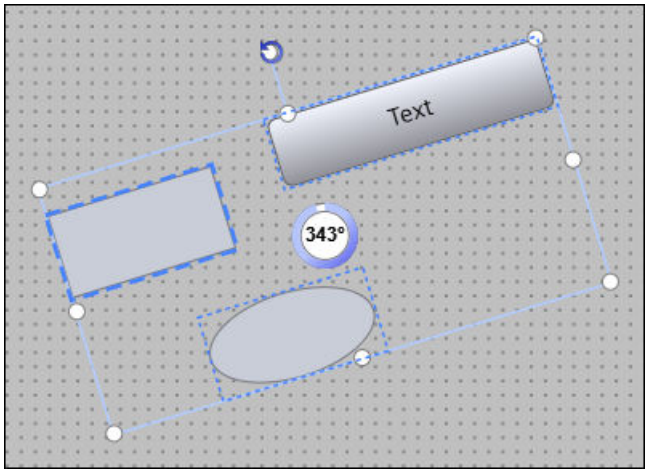
Rotating objects in the multiple selection

To rotate the object, follow these steps:

1. Select the objects using multiple selection.
2. Click the white grab handle outside the bounding box.
   The mouse cursor turns into a "Rotation" symbol .
3. Move the grab handle to the right or to the left.

All objects in the multiple selection are rotated.

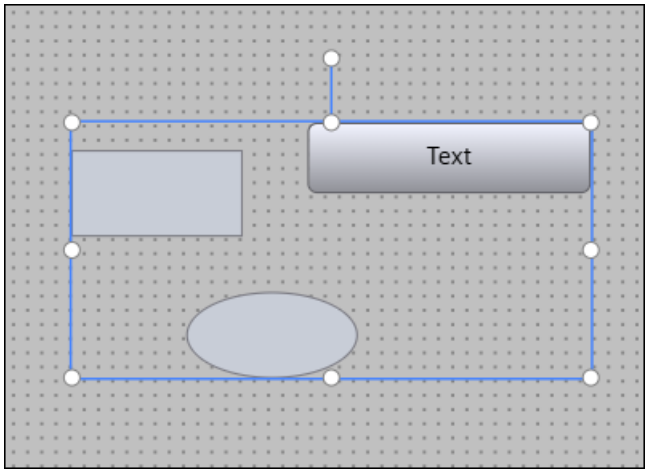
In the center of the multiple selection, the rotation angle is displayed continuously in degrees.



Rotating a group

You can rotate a group of objects in the editor without configuring the rotation angle in the Inspector window. The rotation handle is used as a grab handle for rotating the object.

If you resolve the group, all objects remain rotated.



When you rotate the group, the rotation is snapped at every 90° angle.

With the <Alt> button pressed, you can select an exact rotation angle.

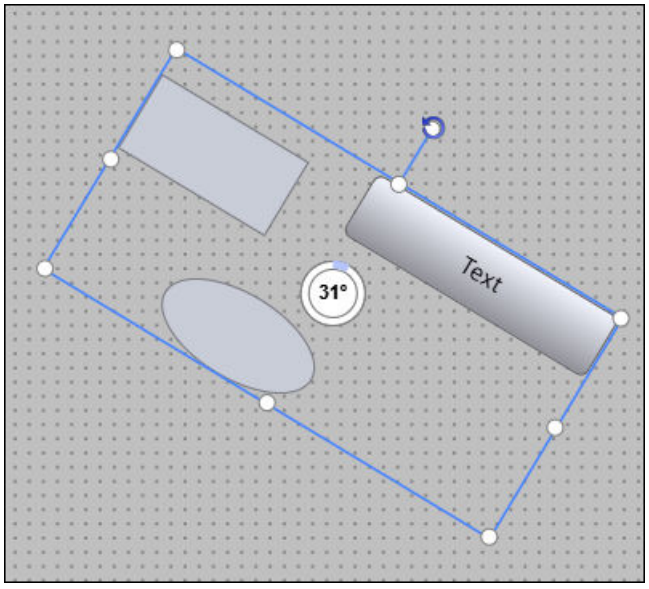
Rotating a group

To rotate the group, follow these steps:

1. Click the rotation handle with the mouse.
   The mouse cursor turns into a "Rotation" symbol .
2. Move the rotation handle to the right or to the left.

The group is rotated.

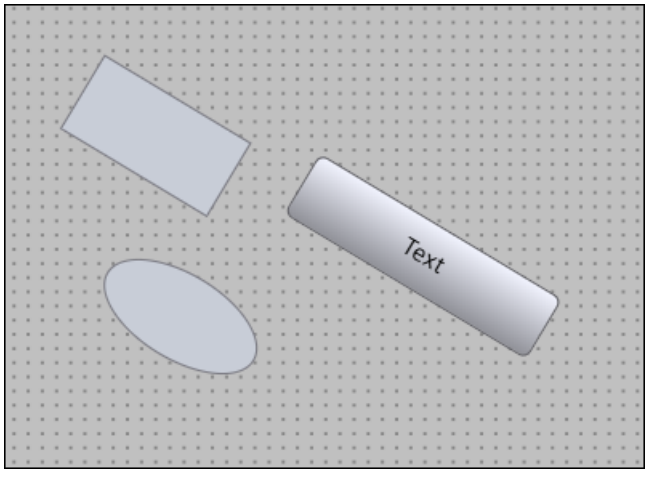
In the center of the group, the rotation angle is displayed continuously in degrees.



Ungroup

To ungroup a group, choose the command "Group > Ungroup" from the shortcut menu of the group. The group is ungrouped.

The objects remain rotated.



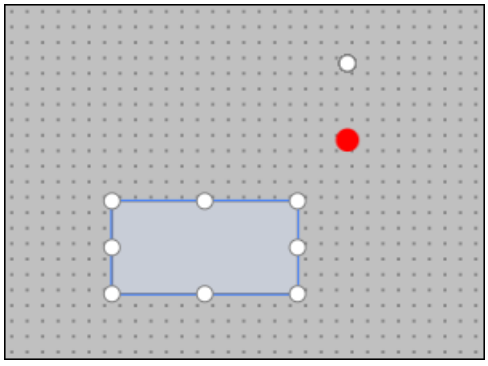
Add or remove an object from the rotated group

When you add or remove an object to or from the rotated group, the original rotation of the object is retained.

Rotating an object or group via an external rotation point

You can rotate an object or object group in the editor using an external rotation point. This allows you to rotate the objects or groups from elsewhere in the screen.

The external rotation point is displayed in the screen as a red dot with the rotation handle.



When you rotate the object, the rotation is stopped at every 45° angle.

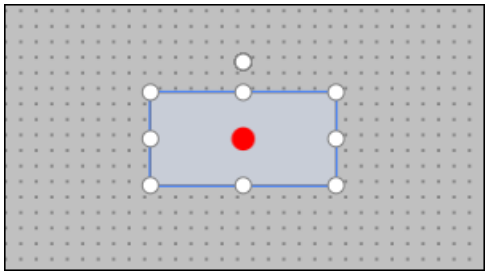
With the <Alt> button pressed, you can select an exact rotation angle.

Displaying the rotation point

To display the rotation point, follow these steps:

1. Press the <Alt> key.
2. Select the object or object group.

The rotation point is displayed in the object.

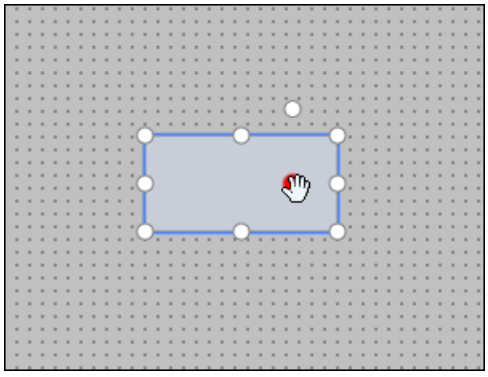


Moving the rotation point in the screen

To move the rotation point, follow these steps:

1. Click the red dot in the object or group.
   The mouse cursor turns into a "Hand" symbol .
2. Move the red dot to the desired location in the screen.

The rotation point is moved in the screen or displayed outside the object.

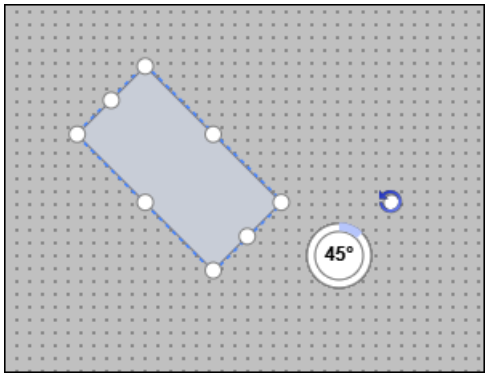


Rotating an object or group via an external rotation point

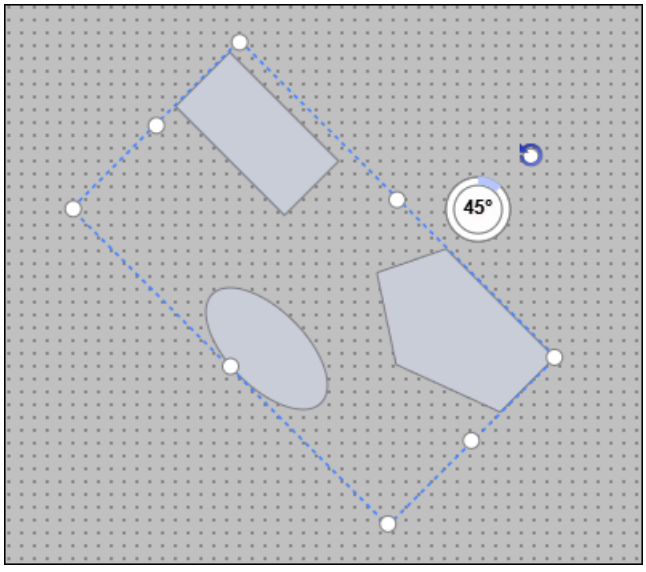
To rotate the object or group via the external rotation point, follow these steps:

1. Click the white grab handle with the mouse.
   The mouse cursor turns into a "Rotation" symbol .
2. Move the grab handle to the right or to the left.

The object is rotated. The red dot shows the rotation angle in degrees.



The group is rotated.



After ungrouping, the objects remain rotated in the screen.

Entering text directly into the object

For the objects with the "Text" property, you can enter the value or the text directly, e.g. at:

- Gauge
- Check box
- Radio button
- Alarm control
- Trend control
- Function trend control

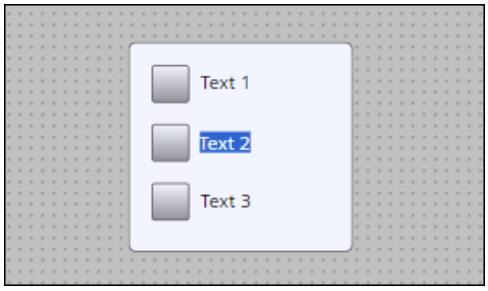
By pressing the Tab key, you can jump to the next input field in the object and edit the text.

Entering text directly into the object

To enter a text directly into an object, follow these steps:

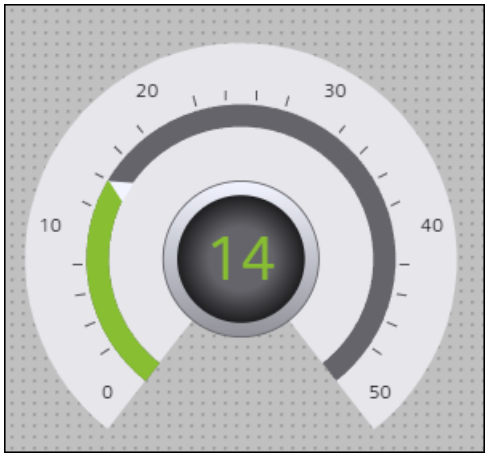
1. Select the object in which you want to enter a text.
2. Double-click in the input field or press the F2 key.
3. Enter the text.
4. To jump to the next text in the object, press the tab key.

The next input field is displayed in edit mode. You can edit the text.



Gauge - entering values directly

For the gauge, you can enter the values directly in the object.



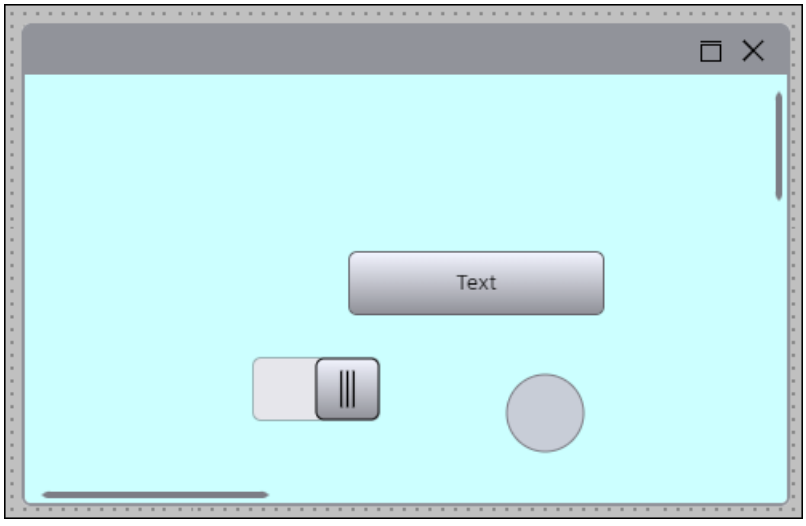
See also

Keyboard shortcuts for objects with the "Text" property (Page 60)

Displaying a screen in the screen window

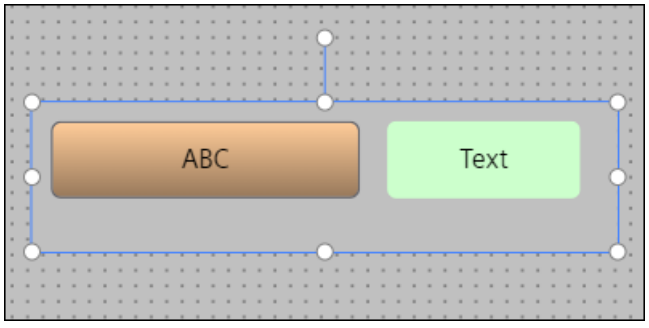
The embedded screen is displayed directly in the screen window in the Engineering System.

All changes that you configured in the embedded screen are shown to you immediately in the screen window.



Faceplate preview

The faceplates are displayed in the Engineering System with the configured static values. You can see the static content without starting the simulation.



Improvements in Unified Screen Editor (Next Gen.)

Using keyboard shortcuts

Using keyboard shortcuts

You can use various keyboard shortcuts to efficiently configure screens and screen objects.

The following sections contain the keyboard shortcuts for different object types or screens:

- Screens
- All objects in the "Toolbox" task card
- Line objects: Line, polygon, polyline
- Objects with the "Text" property

Keyboard shortcuts for screens

The table below shows the actions and the corresponding keyboard shortcuts for configuring the screens.

Keyboard shortcuts for screens

Select the screen and use the following keyboard shortcuts:

Action	Keyboard shortcut	Use
Move	<Space bar + Drag with the left mouse button>	Screens
Zoom	<Ctrl + Scroll with the mouse wheel> <Space bar + Scroll with the mouse wheel>	

See also

Panning a screen in the editor (Page 45)

Keyboard shortcuts for all objects

The following table shows the actions and the corresponding keyboard shortcuts for configuring the objects in the "Toolbox" task card.

Keyboard shortcuts for all objects

Select the object and use the following keyboard shortcuts:

Action	Keyboard shortcut	Use
Deactivate snap lines	<Alt>	With non-visible snap lines, rotate the objects and align them with the line or the grid.
Resize centrally	<Alt + Drag grab handles>	

Using keyboard shortcuts for line objects

The following table lists the actions and the corresponding keyboard shortcuts for configuring the "line", "polygon", and "polyline".

Switching to editing mode

To edit the line objects, switch from display mode to editing mode:

- Double-click on the line object in the screen.
- Select the line object and use the F2 key.

Using keyboard shortcuts for line objects

Select the object and use the following keyboard shortcuts:

Action	Keyboard shortcut	Use
Editing line objects	Double-click F2 key	Line, polygon, polyline
In editing mode, add a point between two points	<Ctrl + Click>	With respect to the line, you can change: • The position of the line in the screen in display mode. • The position of the start and end points in editing mode.
In editing mode, add a point to the beginning or end of the object	<Alt + Click>	
Delete a point in editing mode	<Delete> <Ctrl + Double-click>	
Exit editing mode	<Enter> Click outside the object	
Exit editing mode and discard all unsaved changes.	<Esc>	

See also

Configuring line objects (Page 61)

Keyboard shortcuts for objects with the "Text" property

The following table lists the actions and the corresponding keyboard shortcuts for configuring objects that contain the "Text" property.

Keyboard shortcuts for objects with the "Text" property

Select the object and use the following keyboard shortcuts:

Action	Keyboard shortcut	Use
Enter text directly	Double-click on the text in the object F2 key	
Go to the next text	<Tab>	Move to previous/next text: • In check box, radio button, slider, gauge, controls. • In the objects that you have selected by multiple selection.
Go to the previous text	<Shift + Tab>	
Exit editing mode	<Enter> Click outside the object	
Exit editing mode and do not save the last entry	<Esc>	

See also

Entering text directly into the object (Page 56)

Configuring line objects

You can configure the following line objects in editing mode:

- Line
- Polygon
- Polyline

Without activating editing mode, you can:

- Resize an object
- Move an object
- Rotate an object
- Delete an object

Activating editing mode

To edit the line objects, switch from display mode to editing mode:

- Double-click on the line object in the screen.
- Select the line object and use the F2 key.

Using editing mode

In editing mode, you can configure the line objects using the following keyboard shortcuts:

- Add a point between two points: <Ctrl + Click>
- Add a point to the beginning or end of the object: <Alt + Click>
- Delete point:
  - <Delete>
  - <Ctrl + Double-click>
- Exit editing mode:
  - <Enter>
  - Click outside the object
- Exit editing mode and discard all unsaved changes: <Esc>

You can find the overview of keyboard shortcuts in the section Using keyboard shortcuts for line objects (Page 59).

See also

Using keyboard shortcuts for line objects (Page 59)

Drawing vertical or horizontal lines

You can configure the horizontal or vertical lines in the screen using the <Shift> key without configuring the X and Y position of the start and end point of the line.

The same procedure also applies to the polygon and polyline.

Configuring horizontal or vertical lines

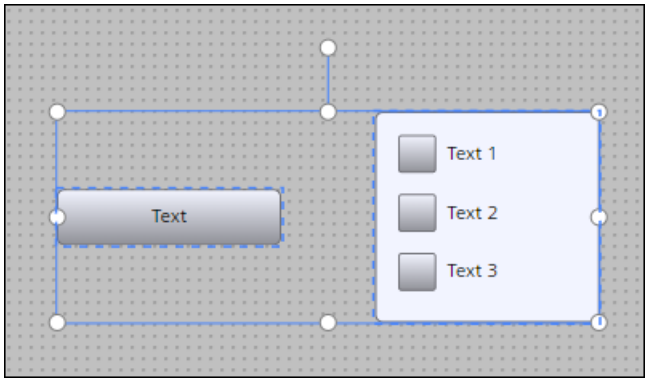
Proceed as follows to configure a horizontal or vertical line:

1. Drag and drop a line to the screen.
2. Activate editing mode by double-clicking on the line.
3. Press the <Shift> key.
4. Drag the start or end point to the horizontal, vertical or oblique 45° angle position.

Showing objects in the multiple selection

If you select the objects using the multiple selection, the selection border is displayed.

The selection box remains visible even when you release the mouse button. You can position, reduce, enlarge, or rotate the objects in the multiple selection using the handles.



If you position the mouse cursor outside of the multiple selection, the selection box is hidden.

Extended multiple selection

In addition to the objects that you selected with multiple selection, you can select more objects with the <Shift> key.

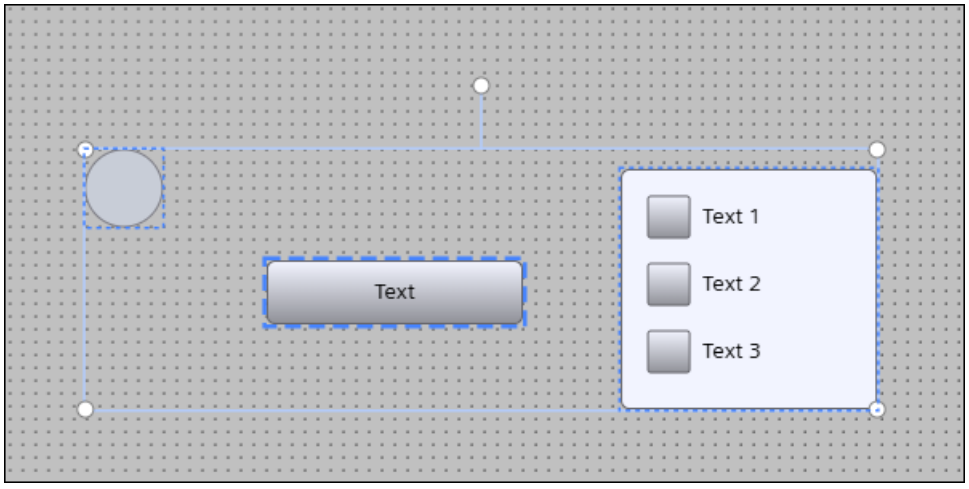
Using extended multiple selection

You have selected multiple objects in the screen using multiple selection.

If you want to add more objects to the selected objects, follow these steps:

1. Press the <Shift> key.
2. Drag the bounding box around the objects that you want to add.

All objects are selected.



The bounding box remains visible even when you release the mouse button.

You can position, reduce, enlarge, or rotate the objects in the multiple selection using the grab handles.

If you position the mouse cursor outside of the multiple selection, the bounding box is hidden.

Editing a group

You can manage a group of objects in the Engineering System and in Runtime just like you manage an individual object.

The next paragraphs cover improvements in working with groups.

Changing the size of the group

When you change the size of the group, the change is displayed in real time.

Ungrouping a rotated group

When you ungroup a rotated group, the objects remain rotated and do not return to their non-rotated position.

Rotated group in editing mode

In editing mode, a rotated group is shown as rotated and does not return to its non-rotated position.

Adding or removing objects to or from the rotated group

After adding an object to or removing an object from the rotated group, the rotated objects stay in their original position.

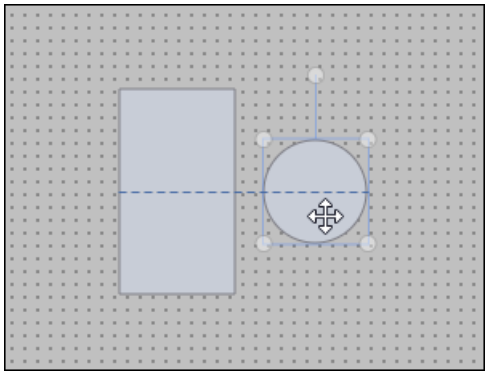
Aligning objects to the center

You can use the snap lines to align an object in the screen horizontally or vertically in relation to the center of the other object. To align, use the snap line that runs through the center of the objects.

Aligning objects in relation to the center

To align an object horizontally or vertically with respect to the center of the other object, follow these steps:

1. Select an object.
2. Drag the object until the blue snap line appears in the center of the two objects.



3. Release the left mouse button.

The objects are aligned to their center.

3.3.1.3 Screens and screen objects

Screens and screen objects - Improvements (Unified ES)

This update contains the following improvements and changes:

Screen objects in layers

If the "Hide layer" option and then "Show layer" is selected in a screen with objects, the objects in the layer are displayed correctly.

Fit to size screen windows

After a device change and automatic adjustment of the screens, the content in image windows is adjusted correctly.

Display of the "Reports" control in the screen editor

If a user interface language which does not have localization for the "Reports" control is active in the engineering, the control is now shown in English in the screen editor.

Determining whether screen objects are contained in a group

The "`LayoutContainer`" property is made available for screen objects with the WinCC Unified JavaScript object model in scripts. The property indicates whether a screen object is part of a group of screen objects.

Return

- If the screen object is part of a group, the property returns the LayoutContainer screen object.
- If the screen object is not part of a group, the property returns "Null".

Example

```
let container = Screen.Items("Rectangle_1").LayoutContainer;
if (container)
{
  HMIRuntime.Trace("Layout container of Rectangle_1:
"+container.Name);
}else
{
  HMIRuntime.Trace("Rectangle_1 is not in a layout container");
}
```

Determining the bounding box of screen objects

The new method "`GetBoundingBoxInScreenCoordinates()`" of the WinCC Unified JavaScript object model in scripts returns an "HMIBox" object for the underlying screen object containing the properties "Left", "Top", "Width" and "Height".

This method is used to determine when a screen object disappears from the visible area if the screen is scrolled when zoomed.

Example

```
let box =
Screen.Items("Rectangle_1").GetBoundingBoxInScreenCoordinates();
if (box)
{
  HMIRuntime.Trace("Bounding box: ("+ box.Left +","+ box.Top +","+
box.Width +","+ box.Height +")");
}
```

Alarm line

Use

The alarm line is a write-protected object that displays up to three of the most recent or important active alarms based on configurable criteria. This ensures quick identification of critical alarms, reduces configuration time and increases system efficiency.

The "Alarm line" object is supported as of Version V20 Update 3 and is not compatible with the earlier versions.

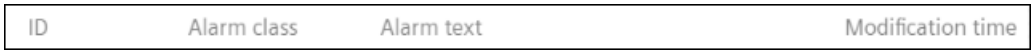
Configuring the alarm line

Requirements

- A screen is open.
- The "Toolbox" task card is open.

Procedure

Drag and drop the "Alarm line" object from the "Toolbox" task card into the screen. The "Alarm line" object is displayed on the screen as a single row with a header text.



Layout

By default, the following columns are displayed in the alarm line:

- ID
- Alarm class
- Alarm text
- Modification time

Properties of the "Alarm line" object

The "Alarm line" object allows the display of up to three alarms, with the "Number of rows" property set to 1 by default and configurable to a maximum of 3 rows.

The standard row height is fixed at 28. The row height depends on the height of the object.

The alarms can be filtered based on the filter criteria configured by the user.

The "Alarm line" object is compatible with screen windows. Compatibility with faceplates is not supported in this version.

The alarm text wrapping is enabled by default, and the multiline text feature is not supported.

Note

The "Alarm line" object is used exclusively for alarm display; alarm selection is not supported.

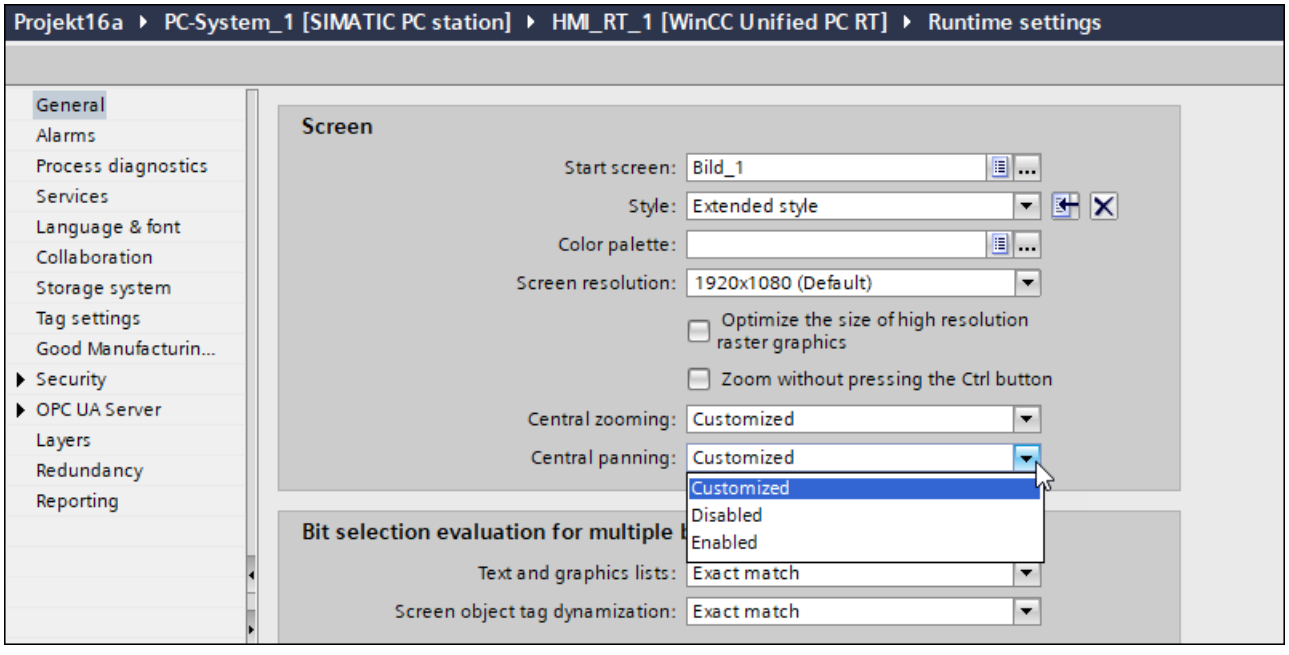
The "Alarm line" object does not support row and column headers, toolbars or vertical and horizontal scroll bars.

Centrally defining zooming and panning

In the Runtime settings, you can define the central setting for zooming and panning for the following objects in a Unified device:

- Main screen window
- Screen window
- Popup window
- Faceplate container

Defining zooming and panning



"Central zooming" is the central setting for zooming for the objects in a Unified device.

- If "Custom" is selected, local setting of the "Zoom - allow" object property is supported in Unified Runtime.
- If "Enabled" or "Disabled" is selected, zooming is centrally enabled or disabled in Unified Runtime.

"Central panning" is the central setting for panning for the objects in a Unified device.

- If "Custom" is selected, local setting of the "Pan - allow" object property is supported in Unified Runtime.
- If "Enabled" or "Disabled" is selected, panning is centrally enabled or disabled in Unified Runtime.

Localized default texts for screen objects

For screen objects with the default texts, e.g. column headers in the alarm control, the text appears in the installed user interface language that you set as project language when creating the project.

If you select a different language as project language, a secondary, so-called fallback language is used to display the default text.

The localized default texts are only displayed for the objects you created with TIA Portal V20 Update 3. This function is not available for objects created with an earlier version of the TIA Portal.

Overview of the fallback languages

The following table shows the fallback languages for the listed project languages:

Project language	Fallback language
Catalan (Catalonia)	Spanish (Spain)
Basque (Basque country)	Spanish (Spain)
Galician (Galicia)	Spanish (Spain)
Ukrainian (Ukraine)	Russian (Russia)
Belarusian (Belarus)	Russian (Russia)
Georgian (Georgia)	Russian (Russia)
Kazakh (Kazakhstan)	Russian (Russia)
Uzbek (Cyrillic, Uzbekistan)	Russian (Russia)
Azerbaijani (Cyrillic, Azerbaijan)	Russian (Russia)
Swahili (Kenya)	English (United States)
Chinese (Taiwan)	Chinese (simplified)
Chinese (Hong Kong S.A.R.)	Chinese (simplified)
Chinese (Macau S.A.R.)	Chinese (simplified)
Other languages	English (United States)

Display of default texts

The default texts are displayed:

- On the screen:
  In the objects in the screen, the default texts are shown in the language you selected in the "Tasks" task card under "Languages & resources > Editing language".
  If you change the editing language, the default texts are shown in the changed language.
- In the Inspector window:
  Under "Properties > Texts", all default texts of the object are shown in the languages you selected in the project tree under "Languages & resources > Project languages".

If you add another language under "Project languages", this language is first shown in the default texts of a newly added object.

The default text in existing objects is shown in English.

Searching for an object property in the screen

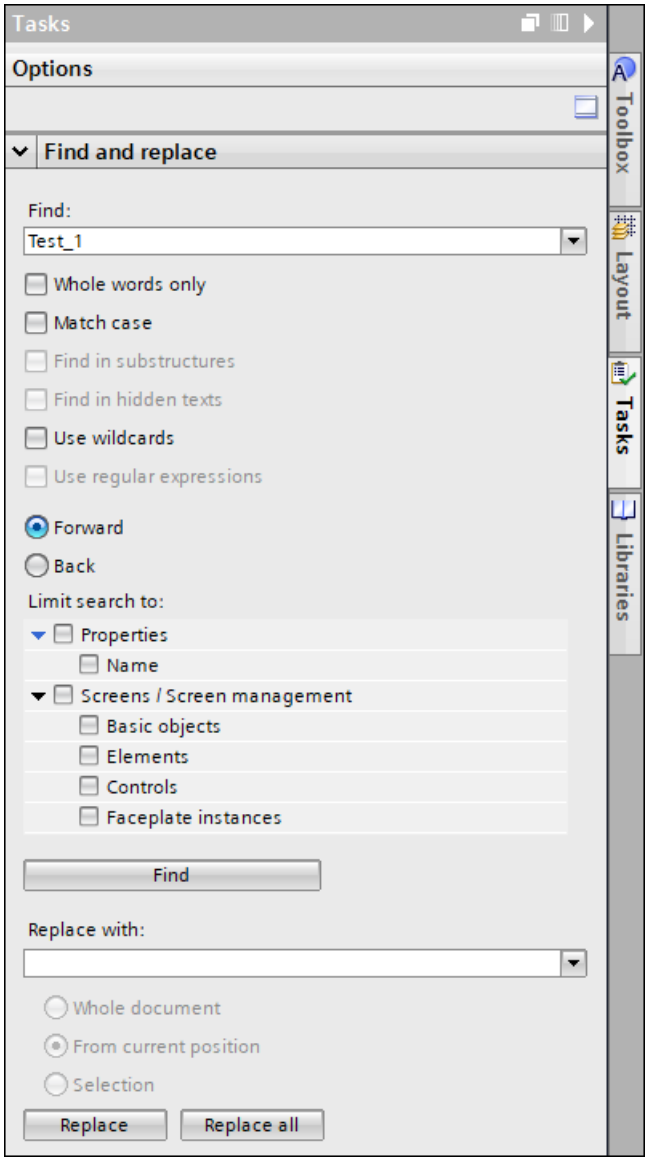
You can search for a static object property without leaving the current screen in the editor.

In the "Find and replace" pane in the "Tasks" task card, you can search for a string in the object properties. After the search:

- The corresponding objects are marked in the screen.
- The hits in the Inspector window are shown under Properties.

You can limit the search to the "Name" property and to selected object types if you enable one or more options under "Limit search to".

The limit is disabled by default.



Limit search

To limit the search to a string, enable the desired option under "Limit search to".

You can search for a string:

- In the "Name" property, when you enable the "Property > Name" option.
- In all properties in the selected object types, when you enable the "Screens / Screen management" option and one or more object types.
- In the "Name" property and in the selected object types, when you enable the "Property > Name" option and one or more object types at the same time.

If you do not enable any option, the string is searched for in all static properties in the screen.

Examples

The following two examples show the search for:

- String in the "Name" property.
- String in the property for the object types.

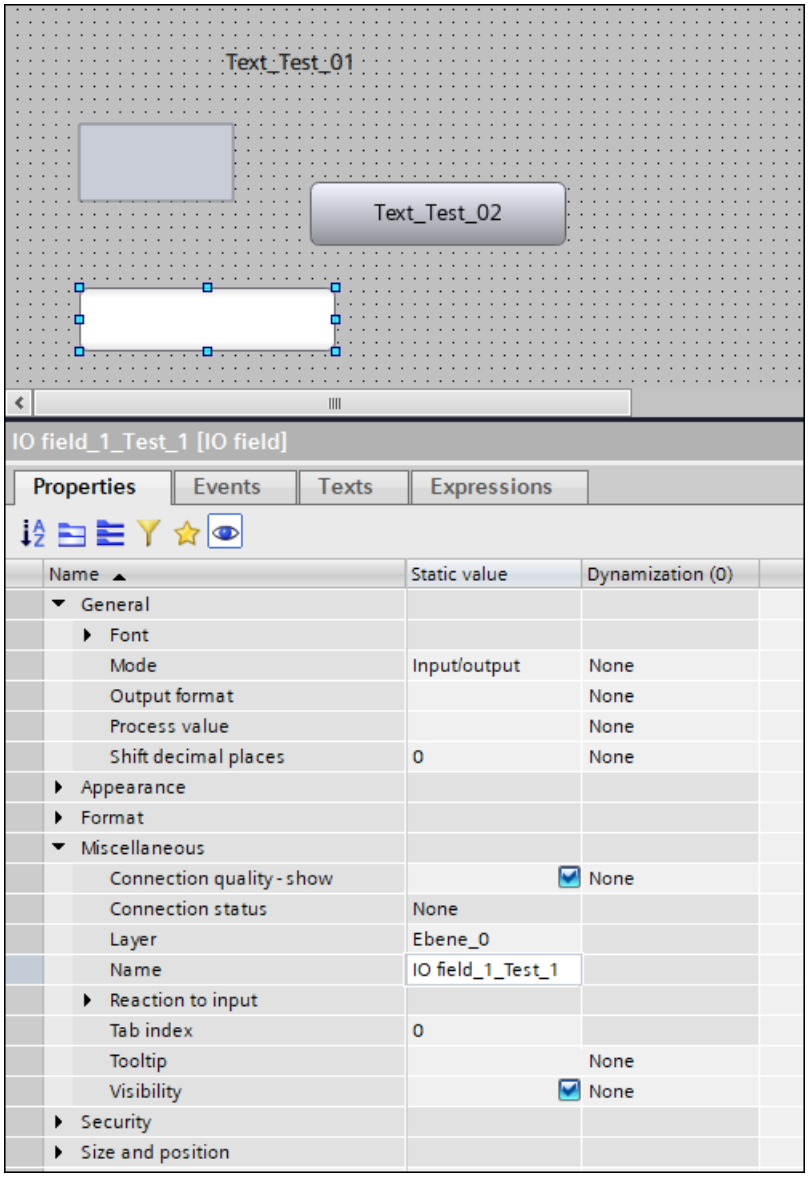
Example: Searching for the string in the "Name" property

You can search for a string in the "Name" property under all objects in the screen.

To search for the string in the "Name" property, follow these steps:

1. Open the "Find and replace" pane in the "Tasks" task card.
2. Enter the string to be searched for in the "Find" drop-down list, e.g. "Test_1".
3. Under "Limit search to", select the "Property > Name" option.
4. Click "Find".
   - The first object with the string that was searched for in the "Name" property is marked in the screen.
   - The name with the string that was searched for is marked in the "Static value" column in the Inspector window.
5. Click "Find" again to display the next hit.
   The next hit is marked.

Repeat this step until you reach the last hit.



Example: Searching for a string in the property for the object type

To search for the string in all properties for the selected object type, follow these steps:

1. Enter the string to be searched for in the "Find" drop-down list, e.g. "Test_1".
2. Enable the "Elements" and "Controls" options, for example, under "Limit search to" under "Screens / Screen management".

3. Click "Find".
   - The first object with the string that was searched for is marked in the screen.
   - The first property with the string that was searched for is marked in the "Static value" column in the Inspector window.
4. Click "Find" again to display the next hit.
   The next hit is marked.

Repeat this step until you reach the last hit in this example in all elements and controls in the screen.

Overview of Screen resources

On an HMI device, you can view an overview of all screen objects that you configured in the screens. The screens and the number of all objects contained is shown in a write-protected table.

Opening the "Overview of Screen resources" table

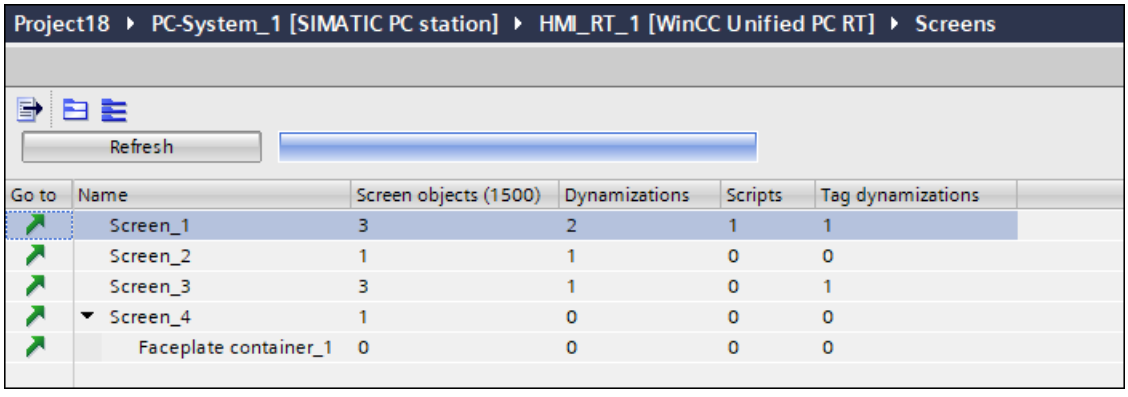
You open the "Overview of Screen resources" table:

- Via the context menu of the "Screens" folder in the project tree.
- Via the "Go to" button in the Resource Monitor of the HMI device.

"Overview of Screen resources" table - Contents

In the "Overview of Screen resources" table, you will find the following columns:

- Go to with the button
- Name
- Screen objects
- Dynamizations
- Scripts
- Tag dynamizations



Functions in the "Overview of Screen resources" table

You go directly to the selected screen with the "Go to" button. You can continue configuring the objects in the screen.

The faceplate container is shown hierarchically. You can expand or collapse the display.

In each column except "Go to", you can sort the entries alphabetically in ascending or descending order.

The number of screen objects in a screen is shown in the "Screen objects" column. The system limit for the number of all screen objects is given in brackets in the column header.

With the button:

- "Export" , you can export the overview as a .csv file.
- "Show all layers" , you can display all layers.
- "Hide all sublevels" , you can hide all sublevels.
- "Update", you can update the table if necessary. The progress of the refresh operation is shown in the progress bar.

I/O field: "Shift decimal places" property

The "Shift decimal places" property for the "I/O field" object enables automatic conversion of the integer tags with a power of 10.

The entered value is multiplied according to the number of decimal places and written to the tag. The value is also written into the controller for an external tag.

Conversely, the value from the tag or controller is divided accordingly if the value is shown in the I/O field.

Shifting the decimal places

To shift the decimal place, follow these steps:

1. Dynamize the process value with the tag based on an integer data type, such as SInt, DInt, LInt, Word, DWord, LWord.
2. In the "Shift decimal places" property, enter a value in the "Static value" column, for example, the value 2.
3. Set {F2} as output format.
4. The process value is adjusted in Runtime:
   - If the tag has the value 123, for example, the value 1.23 is shown in the I/O field.
   - If you have entered the value 23.4 in the I/O field, for example, 2340 is written to the tag.

You can dynamize the "Shift decimal places" property using a tag, script or expression.

If the "Shift decimal places" property is enabled, the value of the tag is adapted for the display or the entered value is adapted before it is written into the tag.

Important information

- Ensure that the output format matches the shifted value:
  Select an output format of the "Floating-point numbers" category which matches the value of the "Shift decimal places" property.
  Example:
  With two decimal places, you set {F2} for the output format.
  If you do not set an output format, the value will always be displayed with 2 decimal places, regardless of the value you have configured for the "Shift decimal places" property.
- If you have configured the "Shift decimal places" property and the value is not 0, a warning is displayed under the following conditions:
  - The process value is dynamized with a tag that is not based on an integer data type.
  - The process value is dynamized with an expression or a script.
  - The process value is not dynamized.
  - The assigned tag is processed in a formula.
  - Indirect addressing is activated.

  The warning is displayed:
  - For the "Shift decimal places" property in the "Static value" column.
  - When loading the project.

3.3.1.4 Faceplates

Interface tags

This update contains the following improvements and changes:

Interface tags of "LReal" data type

You can link interface tags of the "LReal" data type on the faceplate container with a tag of any simple data type. This means that you do not have to pay attention to a special data type.

Note

The "WString", "WChar", "ULInt", "LInt", "LWord", "LTime", "DateTime", "Date", "LTime_Of_Day" data types are not supported for linking to an interface tag of the "LReal" data type.

Faceplates: Dynamization via interface properties

Object properties can be dynamized with the "Properties interface" option through interface properties via formulas or assignment of evaluation types.

The following property types and interface tag types are supported:

		Interface properties of the faceplate					
		Bool	**LInt**	**ULInt**	**LReal**	**Multilingual Text**	**WString**
Properties of a screen object	**Enum**	x	x	x	x	-	x
	Variant	x	x	x	x	-	x
	Text	x	x	x	x	x	x
	String*	x	x	x	x	-	x

* Formula or evaluation type is not supported for the "Alarm filter" property.

In contrast to the use of scripts, direct dynamization leads to improved performance. Knowledge of scripts is not required.

Dynamization of object properties

1. Select the "Property interface" dynamization type for a property.
   In the Inspector window, the "Properties" of the dynamization are displayed on the right-hand side.
2. Under "Settings", select one of the available interface properties.
   Only properties with a suitable data type are displayed.
3. **Formula**
   To apply a formula, activate the corresponding option in the "Formulas" area.
   The result of the formula must be a numerical value.
4. **Evaluation type**
   If the source property and the target property are of different data types, use the table.
   - Select an evaluation type.
   - In the table, assign the corresponding values to the selected conditions.
     The value of the tag or the result of the formula is assigned to the values.

Note

If you select "None" under "Type", ensure that the source data type and the target data type are the same.

Dynamization of interface properties via the formula

You can dynamize interface properties using formulas with multiple tags and/or interface properties. In a formula, the interface properties are linked by operators. The result of the formula determines the dynamization.

Predefined functions are available in the "Bit by bit" selection list for tags linked bit by bit.

Conversion functions are available to convert values into different reference systems.

The following data types of properties are supported for dynamization via a formula and/or evaluation type:

- Bool
- Color
- LInt (64-bit integer)
- ULInt (unsigned 64-bit integer)
- LReal (floating-point number)
- Multilingual text
- WString (configuration string)

Conditions and restrictions for the evaluation type

You can define the evaluation type of the interface property. The result of the activated formula is the basic value for the evaluation type.

- None
- Area
- Multiple bits
- Single bit

The following conditions and restrictions apply to the evaluation type:

- If the formula is deactivated:
  - The data type of the evaluation type corresponds to the data type of the interface property.
  - Values up to 64 bits are supported for the "single bit" and "multiple bits" evaluation types.
  - Negative values are not allowed.
  - Values up to 32 bits and a maximum of 15 decimal places are supported for the "Area" evaluation type.
- If the formula is activated:
  - The data type of the evaluation type is "LReal".
  - Values up to 32 bits are supported for the "single bit" and "multiple bits" evaluation types.
  - Values up to 32 bits and a maximum of 15 decimal places are supported for the "Area" evaluation type.
- If formula is activated and the data type of the interface property is "color", you can only use the evaluation types in connection with formula.

Validation

Data types and values in the assignment table are validated. Invalid information means that the faceplate type cannot be enabled.

Errors can occur when validating projects migrated from previous versions. If necessary, you have to adjust values or data types.

When compiling a project, invalid values or data types also lead to an error.

Improved flexibility with use of user data types

Support of changes to constants in arrays of user data types

User data types that contain arrays defined by constants can be connected to the property interface.

With Unified devices as of device version 20.0.0.2, the user receives warnings instead of errors if the user data type is an array and the number of elements is smaller than the array of the faceplate interface. The faceplate type does not need to be adapted.

In this case, Runtime sends a quality code that shows an access error to the elements, e.g. I/O fields, in the faceplate.

Dynamic access via script (access to interface tag is only established during Runtime) also generates a quality code that indicates an access error. A trace entry is generated.

For devices with a device version up to 20.0.0.2, an error is indicated during compiling as before.

If the constant actually used is larger than the value found in the faceplate type, no error is indicated during compiling as before.

3.3.1.5 Libraries

Use type in type

Faceplate types: Using types in types

If other types, such as faceplate types, text lists or SVGs are referenced in a faceplate type, and the referenced types are changed, the referenced type is only versioned and placed in edit mode when necessary.

In the case of compatible changes on the referenced type, the referencing type is updated. No new version is created. The number of versions and the amount of configuration effort are minimized.

Non-compatible changes lead to versioning of the referencing type.

Import of text lists

Incrementing the version number

When importing a text list, the option of "Import library texts and increment version" is now available in the context menu of the types.

This option is offered for the project library and for global libraries.

The version number is only incremented for the text lists that contain new or changed texts.

Imported texts change the version of the library objects from which the export was performed and not the default type. The export is version-specific.

Manual updating is therefore not required.

Scripting: Referencing the default version

Simplified access to default version in scripting

The default version of a type in a library can be directly referenced via scripts without the version of the type being specified.

With these methods, you can access the default version of a type in a library directly:

- `HMIRuntime.Resources.FaceplateTypes("MyFacePlate").DefaultName;`
- `HMIRuntime.Resources.GraphicTypes("MyGraphicType").DefaultName;`
- `HMIRuntime.Resources.TextListTypes("MyTextList").DefaultName;`

The methods are available for these library types:

- Faceplate
- Graphic
- Text list

This eliminates the need to adapt a script after a new type version is created.

User Tags > Set 'AlwaysDownload'

New option: Always download

For the following library types, you have the option to always use the current version as a default when compiling and loading.

- Faceplates
- Graphics
- Text lists

Via the context menu of a type, you specify in the library under "User Tags > Set 'AlwaysDownload'" that the current version of this type is always loaded when loading. Alternatively, the version used in the project is always loaded if the option is not set.

For selected library types, make sure that the default version is always loaded and is available in Runtime, regardless of whether the default version is used directly in the device or not.

The option is available for types in the project library and in global libraries.

The option can be enabled for multiple types at the same time.

If the option is enabled, this is displayed in the library in the "User Tags" column. The display can be filtered by this option.

When a new type is created, the marking is not set.

Restrictions

This option is not available for HMI devices with a device version lower than 20.0.0.2.

This option is not available for View of Things devices.

3.3.1.6 System functions

System functions for local user management

Note

Support as of V20 Update 3

The system functions for user management are described in the V20 help, but are only supported with V20 Update 3.

Export and import of local user management

The following cases are supported:

- Exchange of users and passwords between different devices to have the same basis on different devices.
- Securing/restoring users and passwords on locked devices to restore the release state.

If all users are locked out, no backup or import can be performed. A user with the "Manage users and roles" permission must be logged in.

There are two new system functions available for this purpose:

- `HMIRuntime.UI.UserManagement.SysFct.ImportUserAdministration(Storagepath, [optional] Password)`
- `HMIRuntime.UI.UserManagement.SysFct.ExportUserAdministration(Storagepath, [optional] Password)`

Parameter:

- `Storagepath (string)`
  Full path and file name for export and import
- `Password`
  Optional, can be provided via a screen object or a tag
  The system function removes the password from the tag or the screen object.
  If a password is used during export, this password must be specified during import. If no password is used during the export, no password is required during the import either.

  Note

  Indirect addressing

  If you pass the parameter via indirect addressing of a tag, the tag must be of the "String" data type. Otherwise, the system function will not be able to delete the value after execution.

Restriction

Since the password is deleted after the system function is executed, it is not possible to execute the system function twice within a function list.

Notes

The data exchange can be made between different devices:

- Between Unified Panels
- Between Unified PCs
- Between Unified Panels and Unified PCs

The Control Panel already offers the option to import/export user data.

The `ImportUserAdministration` system function offers the option of importing exported user data using the Control Panel. Exported user data can be imported via the Control Panel via the `ExportUserAdministration` system function.

The import/export is only possible for local user management.

The system functions can only be executed by users with the "User Administration" right.

System functions for screen navigation

Navigation between screen windows in Runtime

The following cases are supported:

- Navigation between screens using Next and Previous buttons.
- Creation of a history with up to 24 entries.

Four new system functions are available for navigation between screen windows:

- `HMIRuntime.UI.SysFct.ChangeScreenNext([optional] string screenWindowPath)`
- `HMIRuntime.UI.SysFct.ChangeScreenPrevious([optional] string screenWindowPath)`
- `HMIRuntime.UI.SysFct.ChangeScreenNextAsync([optional] string screenWindowPath)`
- `HMIRuntime.UI.SysFct.ChangeScreenPreviousAsync([optional] string screenWindowPath)`

Parameter:

- `screenWindowPath (string)`
  Path of the screen window to be changed. If the parameter is empty, the screen window changes from the main screen.

New system function to delete the history:

- `HMIRuntime.UI.SysFct.ClearScreenHistory([optional] string screenWindowPath)`

Parameter:

- `screenWindowPath (string)`
  Object path of the screen window to be deleted from the history, e.g. "~/Screen_window_1". If the parameter is empty, the history of the main screen window is deleted.

This history is deleted in the following cases:

- "`ClearScreenHistory`" system function is executed
- User is switched
- Window is closed or user logs out
- Main screen is switched

In addition, there are two new properties for creating the navigation:

- `ScreenWindow.SupportedNavigation`
- `TopLevelScreenWindow.SupportedNavigation`

These properties indicate which navigation is possible in the screen history. Example: The Previous button is disabled in the first screen window.

SupportedNavigation property

Description

The property is used to dynamize the navigation buttons and describes the direction in which navigation takes place (similar to the navigation buttons of a browser). It is a write-protected property that is only set by the system. It returns a value between 0-3 and has the type Enumeration HmiSupportedNavigation.

Type

Enumeration HmiSupportedNavigation

Possible values:

- `HmiSupportedNavigation.None` (0): Navigation is not possible. Neither forward nor backward navigation can take place.
- `HmiSupportedNavigation.Backward` (1): Only backward navigation can take place.
- `HmiSupportedNavigation.Foreward` (2): Only forward navigation can take place.
- `HmiSupportedNavigation.Backward | HmiSupportedNavigation.Foreward` (3): Both forward and backward navigation can take place.

Access

Read-only

Syntax

`ScreenWindow.SupportedNavigation` or
`TopLevelScreenWindow.SupportedNavigation`

Example script

This example script serves to dynamize the "Previous" and "Next" buttons for script-supported navigation.

Step 1: Disable the previously created buttons with the names "Previous" and "Next" as follows:

```
export function Screen_1_OnLoaded(item) {
            Screen.Items("Previous").Enabled = false;
            Screen.Items("Next").Enabled = false;
}
```

Step 2: Dynamize the "SupportedNavigation" property to change the "value" as follows:

```
export function
Screen_window_1_SupportedNavigation_OnPropertyChanged(item, value) {
            let supportedNavigation =  item.SupportedNavigation;
            HMIRuntime.Trace("Supported Navigation = " +
supportedNavigation);
            if(supportedNavigation ==
UI.Enums.HmiSupportedNavigation.None)
            {
              Screen.Items('Next').Enabled = false;
              Screen.Items('Previous').Enabled = false;
            }
            else
if(supportedNavigation == (UI.Enums.HmiSupportedNavigation.Backward
| UI.Enums.HmiSupportedNavigation.Foreward))
            {
              Screen.Items('Next').Enabled = true;
              Screen.Items('Previous').Enabled = true;
            }
            else if(supportedNavigation ==
UI.Enums.HmiSupportedNavigation.Backward)
            {
              Screen.Items('Next').Enabled = false;
              Screen.Items('Previous').Enabled = true;
            }
            else if(supportedNavigation ==
UI.Enums.HmiSupportedNavigation.Foreward)
            {
              Screen.Items('Next').Enabled = true;
```

```
                Screen.Items('Previous').Enabled = false;
            }
        }
```

System functions for backing up and restoring logs

Backup and restore of logs

New system functions are available to back up log segments and restore backed up segments using scripts.

- async HMIRuntime.Audit.SysFct.**RestoreAuditLog** (Log[optional], StorageMedium[optional], Filepath[optional], DateFrom [optional], TimeRange[optional], ProcessingStatusTag [optional])
- async HMIRuntime.TagLogging.SysFct.**RestoreTagLog** (Log[optional], StorageMedium[optional], Filepath[optional], DateFrom [optional], TimeRange[optional], ProcessingStatusTag [optional])
- async HMIRuntime.AlarmLogging.SysFct.**RestoreAlarmLog** (Log[optional], StorageMedium[optional], Filepath[optional], DateFrom [optional], TimeRange[optional], ProcessingStatusTag [optional])
- async HMIRuntime.Audit.SysFct.**UnrestoreAuditLog** (ProcessingStatusTag [optional])
- async HMIRuntime.TagLogging.SysFct.**UnrestoreTagLog** (ProcessingStatusTag [optional])
- async HMIRuntime.AlarmLogging.SysFct.**UnrestoreAlarmLog** (ProcessingStatusTag [optional])

These system functions are available on Unified Comfort Panels and Unified PCs.

If a backup or restore process is already active, the system functions cannot be performed.

Errors during execution can be read with the "`GetDetailedErrorDescription`" system function.

Parameters

- `log`
  Log name
  If not specified, all logs of the respective type are included in the restore.
- `StorageMedium/FilePath`
  Path of the restored segments
  If not specified, the backup path as configured in TIA Portal is considered for the restore.
- `DateFrom`
  Start or end date (if the time range is negative)
  If not specified, the entire time range is considered.

- `TimeRange`
  Time span in seconds; can be negative, e.g. NOW - 10 days
- `ProcessingStatusTag`
  Returns the execution status as an integer:
  - 2: Function is currently being executed.
  - 4: Function has been executed successfully.
  - 12: Execution of the function failed.

Note

Parameter DateFrom / TimeRange

Both parameters are optional. Thus, the following combinations can arise during configuration:

- Both parameters are not set: The entire time range is taken into consideration.
- Both parameters are set:
  - `DateFrom` = now: `Time Range` is negative, e.g. now - 10 days.
  - `DateFrom` = [date in the past]>: `TimeRange` is positive: e.g. 01.01.2021 + 10 days
- Only `DateFrom` is set: The time range `DateFrom`. to today is taken into consideration
- Only `TimeRange` is set: Invalid configuration. Errors in Runtime.

Note

Parameter DateFrom

Time is interpreted as UTC (Coordinated Universal Time).

Application example

You configure a button with which log segments that have already been swapped out can be loaded using a script and visualized in a control.

System functions for PLC code view

"OpenPLCCodeViewByFCCall" system function

The documentation has been improved.

For the LAD and FBD PLC languages, the function displays the pre-interconnection of a network input of a standard block. The UDT instance is taken into account in the PLC code view.

Note

To display an S7-GRAPH block, use the "OpenGRAPHViewerByBlock" system function.

Use in the function list

OpenPLCCodeViewFromFCCall (String search, PLC name, Containing block, Called block, PIN, User data type instance, Object path to PLC code display)

The "OpenPLCCodeViewFromFCCall" system function has the following parameters:

Parameter	Description
PIN string search	During the search for the PIN name, a substring is searched for, i.e. the PIN name begins with the string passed in the PIN. If this bit is not set, the full PIN name is compared with the PIN.
PLC name	Name of the PLC.
Containing block	Name of the block to be opened and displayed.
Called block	Name of the local or global instance that is called in the code block belonging to the "Containing block" parameter. • For local instances, the hash character # must also be called here, for example "#feeder1". • For global instances, the global name must be specified without the hash character (#), e.g. "feeder3". The use of the name of a function (FC) is not allowed. If "Called block" is called several times within the "Containing block" or its function block (FB), the entry point is always the first call of "Called block".
PIN	Name of the Input PIN of "Called block". The parameter is used to indicate the network that is connected to the Input PIN in the PLC code view.
User data type instance	Limiting the display of multiple called FCs. The display is limited based on the UDT instance connected to any Input Pin or InOut Pin.
Object path to PLC code view	Path of the screen object "PLC code view".

Using scripts

For more information about the "OpenPlcCodeViewByFCCall" system function in JavaScript functions, see the WinCC Unified object model.

3.3.1.7 Using event parameters in the function list

Assignment of event parameters

The parameters of an event can now be redirected directly to parameters of script functions in global modules.

To do this, a global function can be selected for an event in the function list and the new "Event parameters" value assigned to its parameters. In this way, a call of the global script function with the assigned event parameters is created in the script automatically in the background. Previously, the event parameters could only be used by programming directly in

the script.
The parameters of events of the following objects can be assigned:

- Screens and screen objects
- Faceplates (also in connection with interface events of faceplate types)
- Tasks

Restriction

The underlying script of the event parameter assignment is generally downward compatible with TIA Portal V20 and older. However, if you edit the assignment in an older version, the parameters of the script function are converted into strings and the assignment is lost.

3.3.2 Improvements in Update 1

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

3.4 Unified PC

3.4.1 Important notes

This page contains important information about product properties.

Previously installed versions of WinCC Unified

If you have V16 installed and want to upgrade to V20 with the latest update, it is recommended that V16 be uninstalled first.

Alarm control

The "Information" alarm class has the "Active" state machine, which defines an alarm without state. The alarm is therefore triggered immediately and deleted. When the value is evaluated, all bits are evaluated. This means the alarm is triggered for bit [0] and bit [2], although only bit [2] is changed - the entire value is evaluated.

System diagnostics control

The system diagnostics view does not support Soft PLC and 1500 R/H PLC.

My WinCC Unified

- The following applies for logging on to My WinCC Unified:

Logon via ...	Website of the Runtime web server is addressed via ...	
	Device names	**IP address**
Web client	Enter "https://<FQDN or device name>" of the web server in the address line of the browser.	Enter "https://<IP address of the HMI device>" of the web server in the address line of the browser.
Windows tray of a device with SIMATIC WinCC Unified Station Configurator installation	In the Windows system tray, select "SIMATIC WinCC Unified Station Configurator" > "Configure server". Enter the FQDN or device name of the web server under "Server".	In the Windows system tray, select "SIMATIC WinCC Unified Station Configurator" > "Configure server". Enter the IP address of the web server under "Server".

- To configure a client configuration for the local device in My WinCC Unified, enter the IP address of the local device under "Client settings > IP address".
  Do not enter 127.0.0.1 as the IP address.

Disabling Windows shortcuts for kiosk mode

On a device in kiosk mode

If you prevent access to the operating system via shortcuts, the Windows taskbar will no longer be displayed on the kiosk device in the following case. It is no longer possible to operate the device.

Initial situation:

- The device is configured in My WinCC Unified in such a way that the option "Disable shortcut keys for operating system access for operating system access" is deactivated in the kiosk settings.
- The configuration has been saved in My WinCC Unified.
- Kiosk mode has been started on the kiosk device.

Trigger incorrect response:

1. On the kiosk device, press the Windows key+D.
   Kiosk mode is minimized.
2. Open My WinCC Unified on the device.
3. In My WinCC Unified, update the kiosk settings for the kiosk device:
   – Select the option "Disable shortcuts for operating system access".
   – Save your change.

Solution:

You have the following options to block access to the operating system via shortcuts when the device is already in kiosk mode:

Option 1:

1. Terminate kiosk mode.
2. Open My WinCC Unified on the kiosk device.

3. In the kiosk device settings, activate the option "Disable shortcuts for operating system access".
4. Save the change.
5. Restart kiosk mode.

Option 2:

1. Open My WinCC Unified on a device other than the kiosk device.
2. In the kiosk device settings, activate the option "Disable shortcuts for operating system access".
3. Save the change in My WinCC Unified.

Archive databases and backwards compatibility

The method documented under "Using WinCC version compatibility" for replacing a Unified PC with installed Runtime only supports databases that use the "SQLITE" database type.

Trend control

Adding an IO field to a trend area using drag-and-drop

To add a trend in runtime by dragging and dropping an IO field, the following applies as of V19 Update 3:

- The following requirements must be met:
  - A trend control is configured on the HMI screen.
  - An IO field whose data type is not Date or Time is configured on the HMI screen.
  - The IO field does not have the focus.
  - For touch devices: No "Click left mouse button" event is configured on the IO field.
- Procedure on a device with a touch screen:
  - Press the IO field for at least 1 second without moving your finger.
  - Then drag your finger to the trend area.
- Procedure on a device without a touch screen:
  - Left-click on the upper or lower border of the IO field and keep the button pressed.
  - Do not move the mouse for at least 1 second.
  - Keep the left mouse button pressed and drag the IO field onto the trend area.

Adding a trend in runtime is not supported for function trend controls.

3.4.2 Improvements in Update 3

3.4.2.1 General improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Licensing of WinCC Unified options

SIMATIC licenses are downward compatible. With a newer License Key from WinCC Unified options, older versions can also be operated.

Storage location of temporary files

The folder for storing temporary or cached files has been changed from "C:\Users\Public\Documents" to "C:\Users\Public\Siemens". As a result of this change, access to the folder works even if the Microsoft Windows security option "Monitored folder access" is enabled.

3.4.2.2 My WinCC Unified

Stronger PIN for exiting Runtime in kiosk mode

You have the option of increasing the security of the PIN for exiting Runtime in kiosk mode.

When configuring the kiosk mode, you can now activate the use of a 12- to 16-digit PIN. The PIN must contain numbers, special characters as well as upper and lower case letters.

Download the Station Configurator

If you select “Download” in the navigation bar in My WinCC Unified and download Station Configurator, the package with the installation files no longer starts with “_”.

Configuration of RFID login

Users can log into Runtime on local clients via RFID card and a card reader.

As of this update, you have the option of configuring the use of RFID cards in My WinCC Unified. There is no need to install additional software products.

Supported card readers

RFID reader 10x0R (USB), 11x0R (TCPIP)

Supported functionality

- Maintain the RFID card list:
  - Register cards
  - Deregister cards
  - Edit the display names of the cards
- Manage RFID settings of users added in My WinCC Unified:
  - Assign cards
  - Configure login via PIN
  - Assign default PIN
- Users can view RFID cards assigned to them in My WinCC Unified.
- Users can change the PIN of the RFID cards assigned to them in My WinCC Unified.

Enable RFID

RFID must be activated for Runtime in order to configure login via RFID cards or to log into Runtime via RFID cards.

To activate RFID, you have the following options:

- When installing Unified PC Runtime, in the "User management" step
- After installing Unified PC in "WinCC Unified Configuration" in the "User management" step
- For projects with central user management: In the SIMATIC Runtime Manager settings on the "User management" tab

Maintaining the RFID card list

Introduction

In the RFID card list, you can register cards, deregister cards and edit the display name of the cards.

To register multiple RFID cards, proceed as described here.

To register a new RFID card for an individual user, there is the alternative option of registering a card inserted in the reader during the card assignment to a user. Proceed as described under "Manage user RFID settings".

Requirements

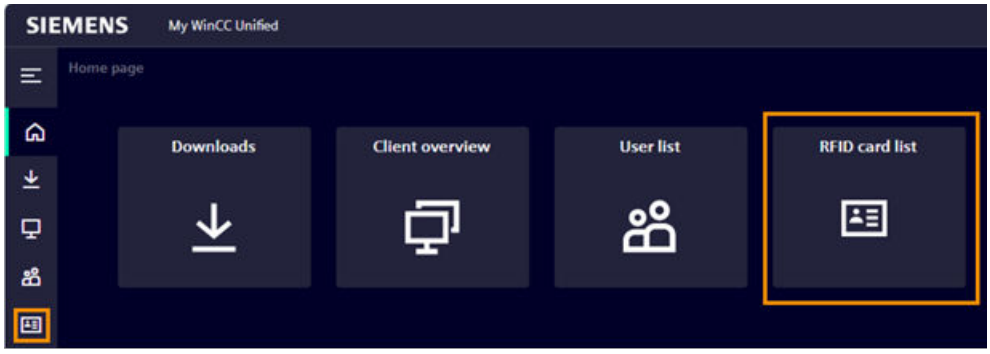
- RFID is activated for Runtime.
- You are logged into My WinCC Unified with a user who has the "User management" function rights.
- The card reader is connected to the HMI device.
- You have access to the reader and the RFID cards.

Restriction

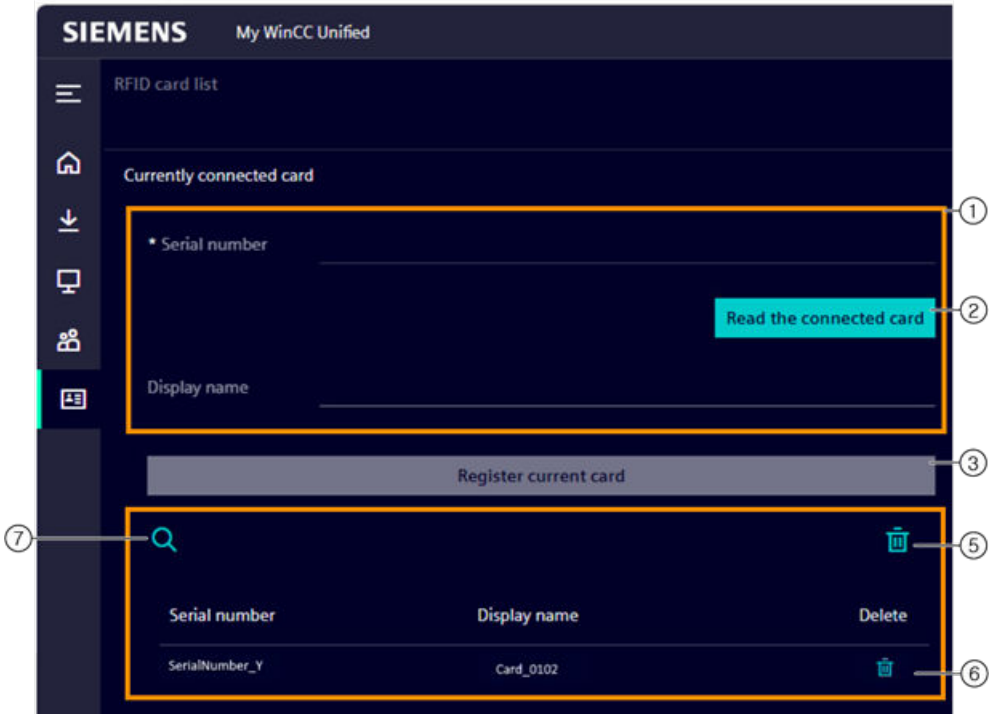
The display name of RFID cards is limited to 128 characters.

Procedure

1. Click on "RFID card list" in the start view of My WinCC Unified or in the navigation bar:



The RFID card list opens in the work area:



① Data of the last card read
② Button for reading the card inserted in the reader
③ Button for registering the last card read
④ List of cards registered for Runtime login
⑤ Button for deregistering all cards registered for Runtime login
⑥ Button for deregistering a single card
⑦ Button for browsing the list

2. To register an RFID card, proceed as follows:
   – Insert the card into the reader.

- Click "Read connected card".
  The card data is read in and displayed
- (Optional): Enter the display name of the card in the "Display name" field.
- Click "Register current card".

The card is added to the list of registered cards.

3. To edit the display name of a registered card, proceed as follows:
   - Click on a display name in the list of registered cards.
     The field switches to the editing mode.
   - Enter the display name.
4. To deregister a card, click the button in the "Delete" column in the list of registered cards.
5. Save your entries.

Result

The cards from the list are registered for the login to Runtime.

Assign the cards to the users by configuring the RFID settings of the user.

Configure RFID settings of the users

Administrators configure the following for the users added in My WinCC Unified using the "RFID" configuration:

- Which RFID cards are assigned to the user
- Whether Runtime login with one of the assigned cards requires the entry of a PIN
- The standard PIN

Requirements

- RFID is activated for Runtime.
- You are logged into My WinCC Unified with a user who has the following function rights:
  - "User management"
  - "My WinCC Unified - Read and write access to all user settings"
- The user to whom you want to assign an RFID card has been added in My WinCC Unified.
- An alias has been stored for the user in the user management.
- At least one RFID card is registered in My WinCC Unified that is not yet assigned to a user.
  Or, if all cards are already registered:
  - The card reader is connected to the HMI device.
  - You have access to the card reader and an RFID card that has not yet been registered, and the card is inserted in the card reader.

Procedure:

1. Click on "User list" in the navigation bar: 
2. Click on a user in the navigator under "Users".
   The interface for the user configurations is loaded into the work area.

3. If the "RFID" configuration has already been added for the user, click "RFID".
   If the configuration has not yet been added, click "+" and select "RFID".
   The RFID configuration interface is loaded.
   Under "Card" you will see a list of the cards assigned to the user.
4. To assign a new card to the user, proceed as follows:
   – Click "+".
     A new entry is added to the list.
     If all registered cards are already assigned and a card is inserted in the card reader, this card is read in.
   – Open the drop-down list of the new entry.
     You are offered all cards registered in My WinCC Unified that are not yet assigned to a user or the card in the reader if it is not assigned to any user.
   – Select the desired card in the drop-down list.

   The card is added to the list and selected.
5. To link the login with a card to a PIN, proceed as follows:
   – Activate the "PIN required" option in the list for the card.
   – Enter a standard PIN with 8 digits in the "PIN" and "Repeat PIN" fields.
6. Click "Save": 

Result:

- The card is assigned to the user.
- If you have selected the card inserted in the reader, the card is simultaneously registered in the RFID card list and assigned to the user.
  The display name is empty. Switch to the RFID card list to set the display name.

Additional options:

- Delete registered cards:
  – All cards: Use the buttons above the list with the registered cards and save.
  – Single card: Use the buttons in the list with the registered cards and save.
- Filter displayed cards:
  Use the search field above the list with the registered cards.

View your own cards

Requirements

- RFID is active for the project running in Runtime.
- You are logged into My WinCC Unified with a user who has one of the following function rights:
  – "My WinCC Unified – Read access to user and device settings"
  – "My WinCC Unified – Read/write access to the user's own settings"

Procedure

In the "User list" under "Users", click on your user and then "RFID".

Change your own PIN

Requirements

- RFID is active for the project running in Runtime.
- You are logged into My WinCC Unified with a user who has the following function right: "My WinCC Unified – Read/write access to the user's own settings"

Procedure

1. In the "User list" under "Users", click on your user and then "RFID".
2. In the "Card" list, click on a card for which the "PIN" option is activated.
3. Enter a new PIN in the "PIN" and "Repeat PIN" fields.
4. Click "Save": 

3.4.3 Improvements in Update 1

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Redundant systems

PLC alarms are received on both redundant partners.

3.4.4 Improvements in Service Release 1

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Unified Runtime

After a complete download in RUN, the redundancy switchover is again possible.

If a screen is adapted to the window size and has a solid background, clicking on the background no longer triggers events of elements that are positioned behind the screen.

3.5 Unified Comfort Panel

3.5.1 Connecting Unified Comfort Panel with SQL database

Introduction

You can access MS SQL databases and SQLite databases via JavaScript functions from the Unified Comfort Panel. Note that the resource utilization is directly proportional to the number of the requests to the database and the size of the data to be read or written. This means that frequent access to databases can also affect the performance in Runtime.

The following database options are available for Unified Comfort Panels:

- Microsoft SQL with the driver:

ODBC driver name	Description
{ODBC Driver 18 for SQL Server}	Microsoft ODBC driver for SQL Server version 18.3 Included in this version are: • Azure SQL Database • Azure Synapse Analytics • Azure SQL Managed Instance • SQL Server 2022 • SQL Server 2019 • SQL Server 2017 • SQL Server 2016 • SQL Server 2014

- SQLite with the driver:

ODBC driver name	Description
{SQLite3}	SQLite3 ODBC driver

To create a connection to the database with the "CreateConnection" method, a "connectionString" parameter of type "String" is transferred. The "connectionString" parameter has the form:

MS SQL	`let connectionstring = "DRIVER={ODBC Driver 18 for SQL Server};DATABASE=UCP; UID=userid; PWD=password; trusted_connection=no; SERVER=ipaddress,port_number;TrustServerCertificate=yes";`
	Example:
	`let connectionstring = "DRIVER={ODBC Driver 18 for SQL Server};DATABASE=UCP; UID=TestUser; PWD=test; trusted_connection=no; SERVER=192.168.0.115,1433;TrustServerCertificate=yes";`

SQLite	`let connectionstring = "Driver={SQLite3};Database=PathToDatabase;trusted_connection=yes; ";`
	Example:
	`let connectionstring = "Driver={SQLite3};Database=/media/simatic/X51/MyUCP.db;trusted_connection=yes;";`

Example

The example shows how you can use a button to establish a connection between a Unified Comfort Panel and an SQL server. You create a table there and then close the connection to the server.

1. Configure a button.
2. Specify "Click right mouse button" as event.
3. Convert the event into a script.
4. Insert the sample code into the script.

Result

By clicking the button you establish a connection with an MS SQL database. You create a table and close the connection again.

Sample code

```
//JEx: "CreateConnection"
//SOM_OM_"HMIDatabaseConnection"

(async function() {
try{
HMIRuntime.Trace("Open MS SQL DB");
let connectionstring = "DRIVER={ODBC Driver 18 for SQL Server};
DATABASE=UCP; UID=TestUser; PWD=test; trusted_connection=no;
SERVER=192.168.0.115,1433;";
let conn = await HMIRuntime.Database.CreateConnection(connectionstring);
let query = "Create Table TableMotorData (Name varchar(50), ID char, Temp
float);";
let results = await conn.Execute(query);
conn.Close();
HMIRuntime.Trace("Close MS SQL DB");
}
catch(e)
{
let res = e.Results;
for(let statement in res)
{
let errors = res[statement].Errors;
for (let i in errors)
{
let detailed = errors[i];
HMIRuntime.Trace("Errors state : " + detailed.State);
HMIRuntime.Trace("Errors Message : " + detailed.Message);
}
}
}
})();
```

3.6 Audit

3.6.1 General improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Adjustment of the time stamp format in the "Audit Viewer" control

In the Engineering System, users have now the option to configure the time stamp format with which the date and time are displayed in the "Audit Viewer" control in Runtime.

To that end, in the engineering, configure the "Time stamp format" property in the properties of the control under "Miscellaneous > Interface > General".

You have the following options:

- Select one of the preconfigured entries under "Date and time" or "Date and time (automatic, language dependent)".
- Enter the desired format manually in the field.
- Add a dynamization and apply the value, for example, from a tag.

Result

After the compile and load, all the specifications for date and time are displayed in Runtime in the "Audit Viewer" control in the format that you have selected.

If the property is empty or contains an incorrect value, the current Runtime language is evaluated and the standard format of the corresponding region is used.

Display of checked Audit data records

Checked audit data records are correctly displayed in the Audit Trail as either valid or manipulated.

3.6.2 Audit Trail parameters

Based on an Audit Trail report, it is possible to determine which operator carried out operator actions at which time. The configuration engineer uses the WinCC Unified Excel add-in to configure a report template with parameters of the Audit Trail. The parameters are relevant for quality assurance in the manufacturing process. You can print out the report either as an Excel file, a PDF file or send it via email.

General information on configuring report templates in the Excel add-in is available in Creating report templates for production protocols.

General functions on the configuration of report jobs in runtime are available in Working with production protocols in runtime.

Audit Trail parameters

The following table contains an overview of the potential values of the individual report columns:

Parameter	Description
Time stamp	Contains the time stamp at which the event occurred.
Object name	Contains the name of the object that triggered the change.
User	Contains the name of the logged-on user. When no user is logged on, the field remains empty.
Operator Station	Contains either the name of the PC or PLC, or the IP address of the web client.
Old value	Contains the tag value before the change.
New value	Contains the tag value after the change.

Parameter	Description
Cause	Contains the user comment for user actions or the result of the operation for system responses.
Event ID	Contains the internal identifier of the event.
Tracking ID	Contains the internal identifier to link the user action to the system response.
Provider type of the audit	Refers to the internal system component in which the change was made.
	2 - Task scheduler "Scheduler" is entered as provider type in the event of changes in the configured cyclic tasks.
	6 - User interface "UI" is entered as provider type in the event of changes made via the user interface.
	8 - User management On changes to the user management: e.g.: "User management" is entered as provider type on login or logout.
	11 - System diagnostics In the event of changes made by the system in connection with the system response, e.g. "WriteTag", "System diagnostics" is entered as provider type.
Audit provider	Contains the name of the provider, for example, Scheduler, User Interface, Event Manager.
Type of operation	Specifies whether the changed object was created, modified or deleted. 1 - New value 2 - Updated value 3 - Deleted value
Object reference	Contains an identifier of the triggering object. This parameter is reserved for internal purposes.
Integrity	Contains an identifier for proof that data was manipulated later.
Signature	Contains the information on the provided electronic signature (user, role, contract).

Note

Type of operation

Due to the harmonization of the type of operation and to avoid changes to already logged data in the Audit Trail, the description of the type of operation of the previously logged data records differs from the new description.

3.7 Redundancy

3.7.1 Redundancy switchover of the web clients with local user management

Redundancy switchover of the web clients is now also possible with local user management.

When a download is performed during which the user data is overwritten, the operator needs to log in again on the first web client redundancy switchover, in contrast to central user management.

Note

When using local user management, it must be ensured that the same users are configured on Unified PC 1 and 2. During a full download in Run to a computer, the modified users are not synchronized with the second computer.

3.8 Unified Station Configurator

3.8.1 Important information (Unified Station Configurator)

This page contains important information about product properties.

Disabling Windows shortcuts for kiosk mode

On a device in kiosk mode

If you prevent access to the operating system via shortcuts, the Windows taskbar will no longer be displayed on the kiosk device in the following case. It is no longer possible to operate the device.

Initial situation:

- The device is configured in My WinCC Unified in such a way that the option "Disable shortcut keys for operating system access for operating system access" is deactivated in the kiosk settings.
- The configuration has been saved in My WinCC Unified.
- Kiosk mode has been started on the kiosk device.

Trigger incorrect response:

1. On the kiosk device, press the Windows key+D.
   Kiosk mode is minimized.
2. Open My WinCC Unified on the device.
3. In My WinCC Unified, update the kiosk settings for the kiosk device:
   - Select the option "Disable shortcuts for operating system access".
   - Save your change.

Solution:

You have the following options to block access to the operating system via shortcuts when the device is already in kiosk mode:

Option 1:

1. Terminate kiosk mode.
2. Open My WinCC Unified on the kiosk device.
3. In the kiosk device settings, activate the option "Disable shortcuts for operating system access".
4. Save the change.
5. Restart kiosk mode.

Option 2:

1. Open My WinCC Unified on a device other than the kiosk device.
2. In the kiosk device settings, activate the option "Disable shortcuts for operating system access".
3. Save the change in My WinCC Unified.

3.8.2 General improvements in Update 3

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Desktop link to start the kiosk mode

Starting the kiosk mode has been simplified. After installing SIMATIC WinCC Unified Station Configurator, the "Launch Kiosk Mode" link is now available on the desktop:

If the requirements for starting kiosk mode are met, double-clicking on the link starts Runtime in kiosk mode.

Alternatively, you can still start the kiosk mode via the "SIMATIC WinCC Unified Station Configurator" Windows tray.

Stronger PIN for exiting Runtime in kiosk mode

If a strong PIN was configured in the kiosk settings in My WinCC Unified, the PIN for exiting Runtime must now contain 12 to 16 characters, including numbers, special characters as well as upper and lower case letters.

Script function for starting/exiting kiosk mode

Calling the `HMIRuntime.UI.Kiosk.LeaveFullScreen()` script function in Runtime terminates kiosk mode without simultaneously ending the Runtime display.
The `HMIRuntime.UI.Kiosk.EnterFullScreen()` script function allows the kiosk mode to be started from Runtime.

LeaveFullScreen()

Ends kiosk mode and switches to window mode. As a result:

- Access to the functions of the operating system is possible.
- Runtime is still displayed in a client.
  The client has the following buttons:
  - Minimize: Minimizes the client window.
  - Maximize: Maximizes the client window.

Note

Call Alt+F4

If Alt+F4 has been configured to exit kiosk mode and users press Alt+F4 while the mouse pointer is in the client, the client is closed.

If users press Alt+F4 while the mouse pointer is outside the client, Windows is locked.

EnterFullScreen()

If the conditions for starting kiosk mode are met, kiosk mode starts. If the client is in window mode, it switches to kiosk mode.

Access to the operating system in kiosk mode

If the "Disable shortcut keys for operating system access" option has been activated in the kiosk settings of the kiosk device in My WinCC Unified, the Windows Ctrl+Alt+Del screen can no longer be opened in kiosk mode.

Note

Blocking access via screen keyboard

Users can access operating system functions via the Settings page on device with screen keyboard.

To prevent this, enable the setting "Prohibit access to control panel and PC settings" in the Windows group policies. You can find more information on the procedure in the Station Configurator help with the keyword "Blocking access to the operating system for kiosk mode".

Incognito mode

Kiosk mode now starts in Incognito mode. As a result, inputs in I/O fields are no longer suggested with autofill. Cookies and the web cache are deleted at the end of the session.

In earlier versions of Station Configurator, the browser settings had to be adjusted manually on the kiosk device and applied by restarting the browser. (Microsoft Edge: Select "Settings > Privacy, search, and services > Delete browsing data > Choose what to clear every time you close the browser": Enable options "Autofill form data (includes forms and cards)" and "Cookies and other site data")

File selection in custom web controls

If you open an Explorer for file selection from a Custom Web Control, the paths configured in My WinCC Unified are now applied correctly for access to the file system.

Error message after restarting a device in kiosk mode

After restarting a device that is in kiosk mode, the following error message no longer appears: "Device incompatible. The start of the client is supported for device version V19.0.0.0 and higher. The current device version is V0.0.0.0"

Fewer trace alarms

Trace alarms have been improved for kiosk devices. The number of warnings for IP6 addresses has been reduced.

3.9 Corporate Designer

3.9.1 Improvements in Update 3

Corporate Designer

After a change in the "Documents\WinCC Unified Corporate Designer\LocalWorkspace" folder, all new projects are displayed correctly in the Corporate Designer.

Siemens Style Library

The IO field, which is based on the "style.sslrt.iofield.simple" rendering template, is shown grayed out when user rights are insufficient.

3.9.2 Password for secure transfer of the style

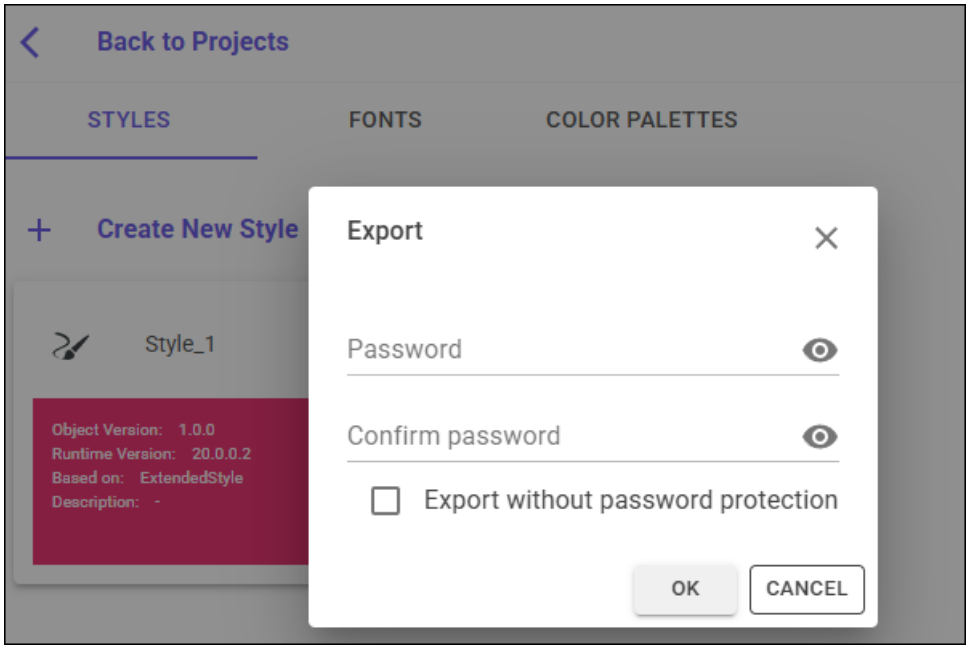
To ensure that your custom style is protected from manipulation during export and import, you can define a password in the Corporate Designer.

The use of this password is optional.

Defining a password for the export

To define a password for the export in the Corporate Designer, follow these steps:

1. Click the three dots in the style card.
2. Click "Export".
   The "Export" dialog opens.



3. Enter a password.
   The password must be at least 8 characters long.
4. Confirm the password.
   You can also export the style without password protection.
5. Select the style file.
   - The file with password protection has the format ".cdx20".
   - The file without password protection has the format ".cd20".
6. Select a local storage location for the style file.

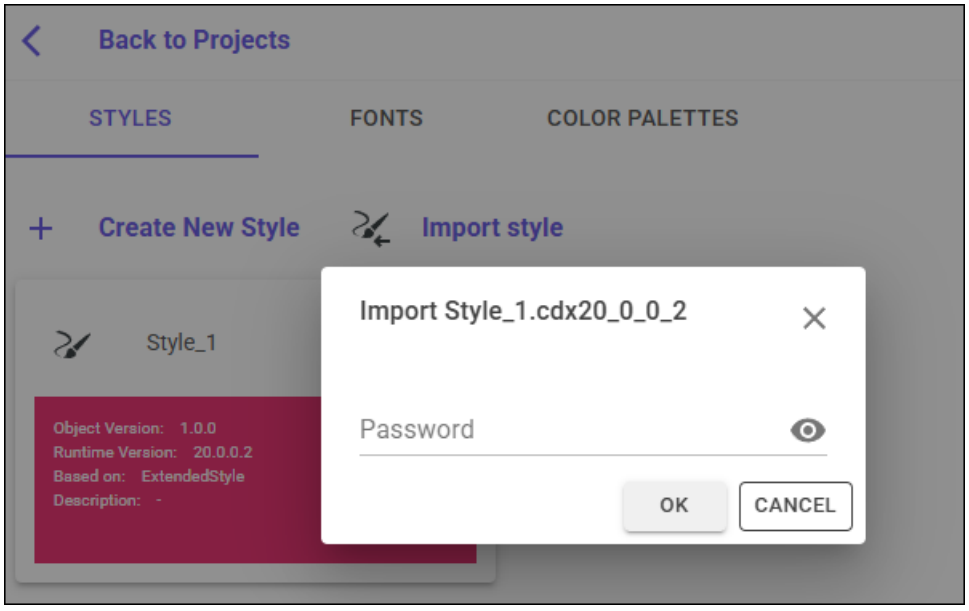
The style file with password protection is exported from the Corporate Designer.

Importing a style file with password protection into the Corporate Designer

To import a style file with password protection into the Corporate Designer, follow these steps:

1. Click the "Import style" icon.
   Your storage location opens.
2. Select a .cdx file that corresponds to the device version in the TIA Portal project.

3. Click "Open".
   The "Export" dialog opens.
4. Enter the password.



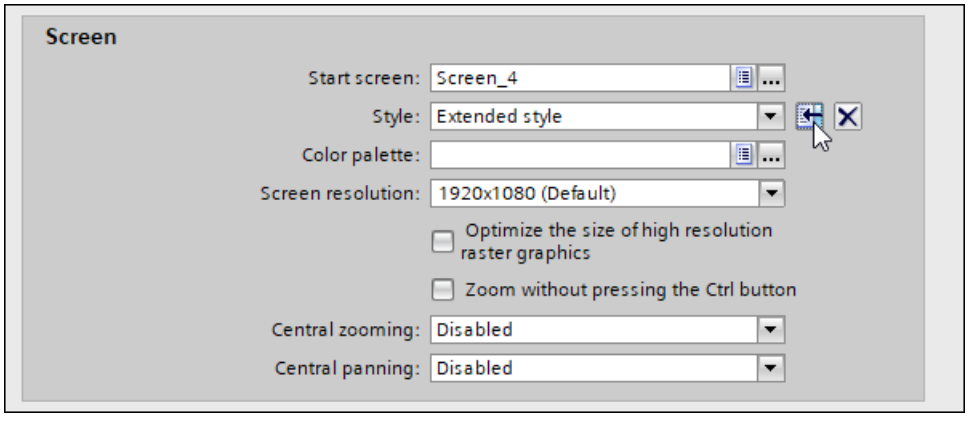
The style file with password protection is imported into the Corporate Designer.

If you select an invalid file or enter an incorrect password, an error message is displayed.

Importing a style file with password protection into the TIA Portal

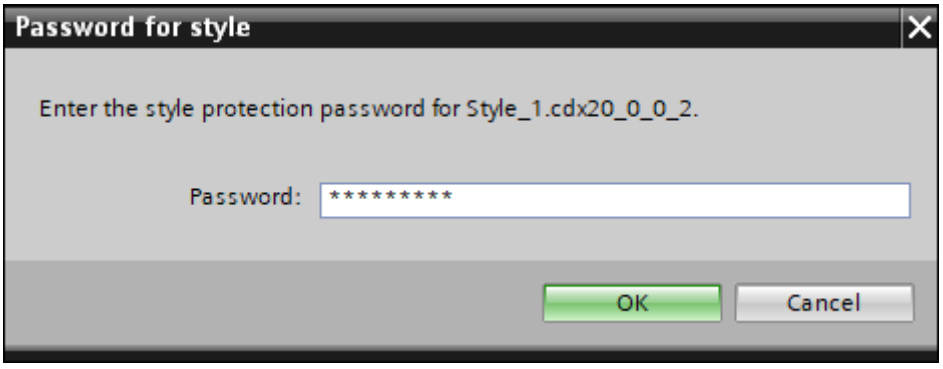
To import the style file with password protection into the TIA Portal, follow these steps:

1. Under "Runtime settings > General > Screen > Style", click the import icon.



   The local storage location opens.
2. Select the style file.

3. Click "Open".
   The "Password for style" dialog opens.



4. Enter the password. Confirm the selection with "OK".

The style is integrated into the TIA Portal project and is available in the "Style" selection list for compatible devices.

3.10 WinCC Unified Data Hub

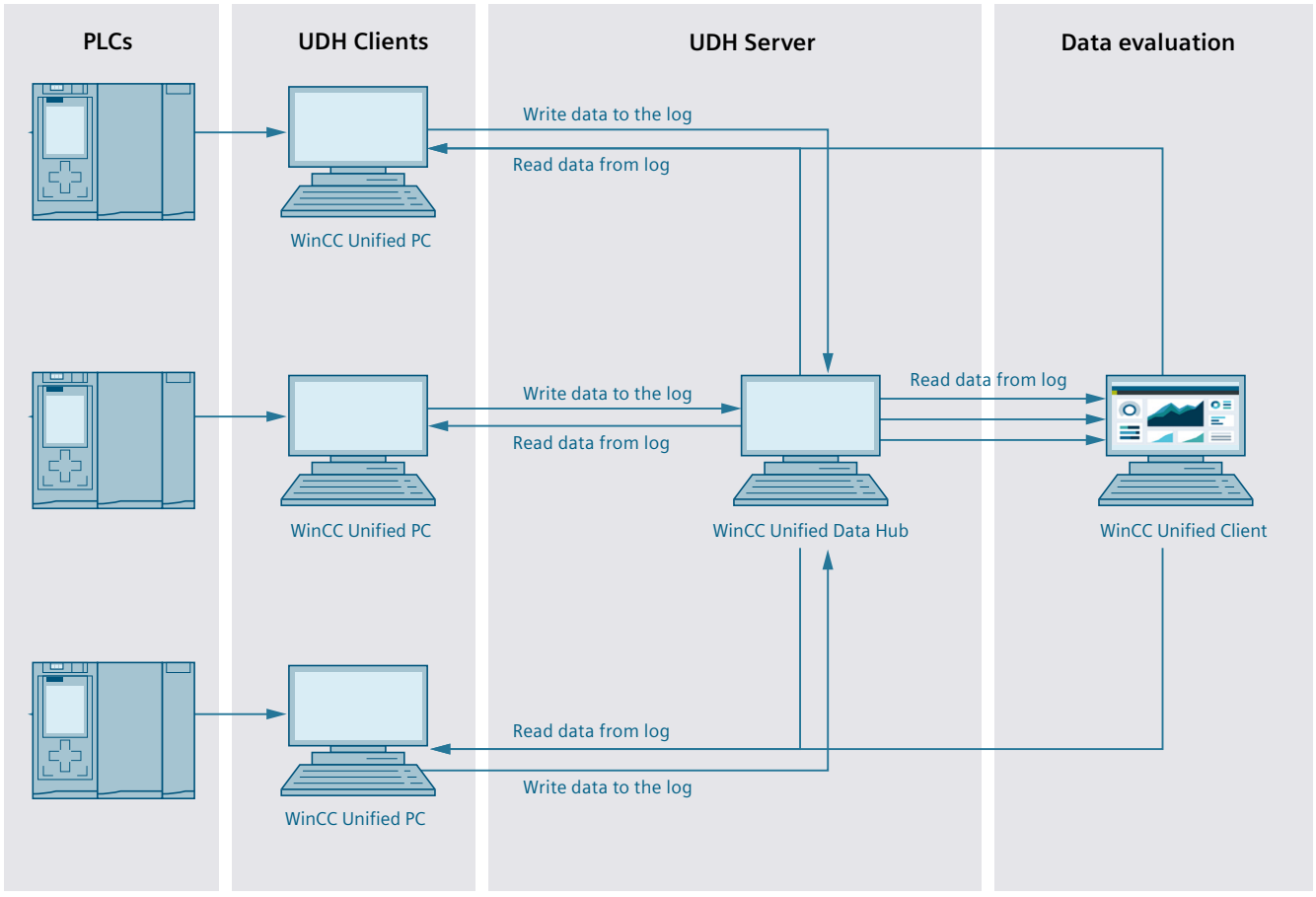
3.10.1 Introduction to Unified Data Hub

Introduction

SIMATIC WinCC Unified Data Hub is an add-on for WinCC Unified PC.

With WinCC Unified Data Hub you store and process Runtime data in a server-client system. In the process, data from Unified Data Hub Clients is stored in real time on the Unified Data Hub Server for long-term archiving. As a result, all data can be retrieved centrally from one device and can thus be evaluated more easily together.

In this documentation, the term "UDH" (Unified Data Hub) is also used to refer to "WinCC Unified Data Hub".



Benefits

With WinCC Unified Data Hub you store and process Runtime and logging data on a client-server system.

This system offers numerous advantages:

- You store data additionally in a central archive, leaving the local archives untouched.
- You save logging tags, alarms and Audit Trails.
- You retrieve data stored on the central archive on your local HMI device.
- You retrieve data from the central archive even if the Unified Data Hub client is not running.
- A buffer ensures that no data is lost even if the connection to the UDH server is lost.

Functional scope

You create and configure the following functions with WinCC Unified Data Hub:

- You define which device is to function as the central archive.
- You define which devices should write data to the central archive.
- You specify which data is to be stored in the central archive (Unified Data Hub Server).

3.10.2 Installing the WinCC Unified Data Hub

3.10.2.1 Software and hardware requirements

Introduction

With WinCC Unified Data Hub, you store and process Runtime data in a server-client system. You require a license on the configuration device to use this Add-on. Different products are required on the devices used as UDH server and UDH client.

Operating system

WinCC Unified Data Hub supports the same operating systems as WinCC Unified Runtime PC.

You can find more information in the system manual "WinCC Unified Runtime" under "SIMATIC Unified PC Installation".

User rights

You have administrator rights on the device.

Software requirements

Before you install WinCC Unified Data Hub in the Engineering System and Runtime, you need the following products:

On the UDH server

- WinCC Unified Runtime PC V20 Update 2
- Microsoft SQL Server

On the UDH clients

- WinCC Unified Runtime PC V20
- Optional: Microsoft SQL Server, if Microsoft SQL is to be used

On the device for the configuration

- TIA Portal V20 or higher with STEP 7 Professional and WinCC Unified

Hardware requirements

The following points show the recommended hardware requirements.

SSD is recommended for both servers and clients.

UDH server

- Computer: SIMATIC IPC
- Processor: Intel® Core™ i7 / XEON
  at least Intel® Core™ i7 12th generation
- RAM: 128 GB
- 4 separate physical hard disks with the following allocations:
  - Hard disk 1 SSD 500 GB: Operating system and transaction log
  - Hard disk 2 SSD 1TB: Data log
  - Hard disk 3 SSD 1TB: Central alarm log and Audit Trail
  - Hard disk 4 HDD 1TB: Backup

UDH client

- Processor: Intel® Core™ i7 12th generation at least
- Free hard disk space as fallback database for connection losses or UDH server failures. The following hard disk space is kept free by default:
  - Tag Logging: 80 GB
  - Alarm Logging: 80 GB
  - Audit Trail: 10 GB

Bandwidth

- Network bandwidth with 1000 Mbps network speed

Recommendations

- The local log database and the central log database should not be stored in the same location.
- Do not store the project on the hard disk on which central Tag Logging is configured.
- It is not recommended to run a large UDH client on the UDH server computer. If required, a small logging application can be run on the UDH server computer, specifically on hard disk 3. The maximum load for the small logging client is defined as 12 value and 2 alarm changes per second.
- The UDH server must be able to trigger alarms that should not be deactivated.
- Clients and UDH servers should have the same locale settings.

3.10.2.2 Licenses

Use Automation License Manager to manage the licenses.

You can find more information in this online help at "Installation > Licensing > Licensing WinCC Unified options > Unified Data Hub".

Required licenses

You need the following licenses to configure and use WinCC Unified Data Hub:

On the UDH server

- WinCC Unified Runtime (RT)
  min.: Unified PC (150) RT
- WinCC Unified Data Hub Server

Note

UDH licenses for UDH servers are version-dependent.

On the UDH clients

- WinCC Unified Runtime (RT)
- WinCC Unified Data Hub Client
  - Unlimited for tags that are logged on the UDH server
  - Unlimited for tags and alarms of a UDH client
- Logging tags
- Data Hub Audit Trail
  For projects that use Audit Trail
- WinCC Unified Database Storage (when using MSSQL)

You are reminded of missing licenses by a pop-up window.

Note

UDH licenses for UDH clients are version-independent.

On the device for the configuration

- WinCC Unified Engineering System (ES)
- WinCC Unified Data Hub (ES)

Note

Collaboration

Licenses for Collaboration are only required if you want to use the full range of Collaboration functions that go beyond UDH. Without a Collaboration license, the logging data on the UDH server cannot be accessed from UDH clients.

3.10.2.3 Certificates

Creating certificates

Introduction

The relevant certificates must be provided in advance. All certificates are issued by a common Certification Authority (CA) to simplify the trust relationship between the communication partners.

The root certificate of the CA is classified as trustworthy on each device for each application. When accessing WinCC Unified Runtime via websites, the root certificate must be configured as trustworthy once in the web browser.

You need a "Runtime Collaboration certificate" for each collaboration device in addition to the root certificate.

You create and manage the certificates with the WinCC Unified Certificate Manager.

Creating a root certificate

1. Select a WinCC Unified PC device in your network that is to serve as the certification authority. The root certificate and the associated key are only available on this device. The configuration of additional application certificates for other devices is only possible on this device.
2. Open WinCC Unified Certificate Manager on this device.
3. Create a new root certificate. Double-click the "Create new certification authority" button.
4. Enter the properties of the root certificate in the "New certification authority" dialog. The fields are freely editable.
   Mandatory fields:
   - "Certification authority"
   - "Password" for the private key

   If necessary, select a different key length and runtime for the certificate.
5. Click "Create".

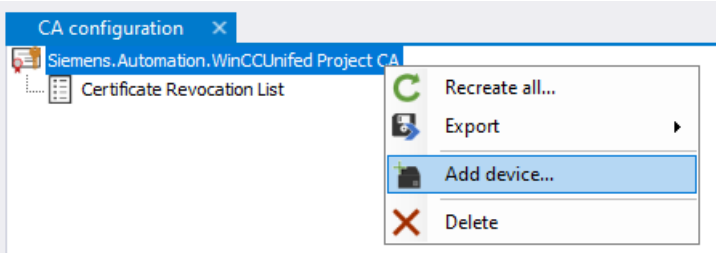
The root certificate and its key are stored on the device and used to generate the device certificates.

Note

If the "WinCC Certificate Manager" is restarted on this device, the root certificate and the device certificates generated with it are loaded automatically.

Adding devices

1. Right-click the root certificate and select "Add device ...".



2. Enter the name and/or IP address of the device in the "New device" dialog box.
   The specification of the IP address is sufficient for Unified Comfort Panel.
   For devices with dynamic IP addresses, enter only the host name.

   Note

   Permitted names

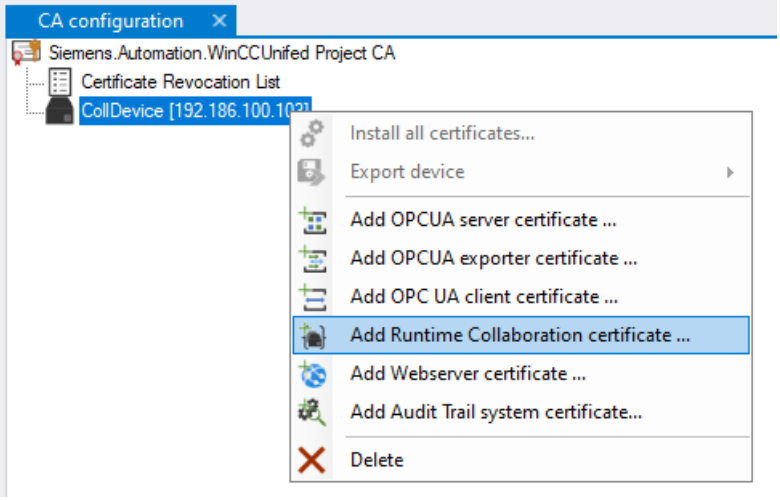
   Either the host name or the "Fully qualified domain name" can be used as the name. The name is inserted in the certificates created for the device and used for validation. To avoid validation errors when accessing the web pages, the "Fully qualified domain name" must be used within a domain.

   Using the name "localhost" is not permitted and is automatically replaced with the name of the local device by the Certificate Manager.

3. Repeat steps 1 and 2 until all devices have been added.

Adding a "Runtime Collaboration certificate"

1. Right-click on a device and select "Add Runtime Collaboration certificate ..."



2. Enter the properties of the certificate in the dialog.
   If necessary, select a different key length and runtime for the certificate.

3. Create a "Runtime Collaboration certificate" for each collaboration device.
4. If necessary, create additional certificates, e.g. web server certificates.
   You can find additional information in the "WinCC Unified Certificate Manager" operating manual.

Result

- You have created the root certificate.
- You have added all devices.
- You have added a "Runtime Collaboration Certificate" for all devices.
- You have created additional certificates as required.

Distributing and installing certificates

Introduction

To distribute the configured certificates to the corresponding devices, the certificates must be exported to a secure storage file. This file must be transferred manually to the respective device and imported there.

Trust communication partners

For successful communication, the device must trust the root certificates of its communication partners and vice versa.

Trust relationship between devices

Devices whose certificate configuration comes from the same certificate authority automatically trust each other after the certificate configuration is installed.

Trust relationship with external communication partners

To establish the trust relationship with an external communication partner, follow these steps:

1. On the certificate authority device:
   Export the root certificate and CRL file to an external data storage medium.
2. On the external communication partners:
   - Connect the external communication partner to the external data storage medium.
   - Copy the files and trust them. To do this, proceed as described in the user help of the device.
   - Import the root certificate of the external communication partner and its CRL file to the external data storage medium.

3. Connect the external data storage medium to the collaboration device.
4. Import the root certificate and the CRL file of the external communication partner into the device and trust it:
   – Unified PC: Use SIMATIC Runtime Manager.

During the next connection attempt, the communication partners mutually accept their application certificates.

Exporting the certificate configuration

After you have completed the certificate configuration of the devices, export the certificate configuration.

Note

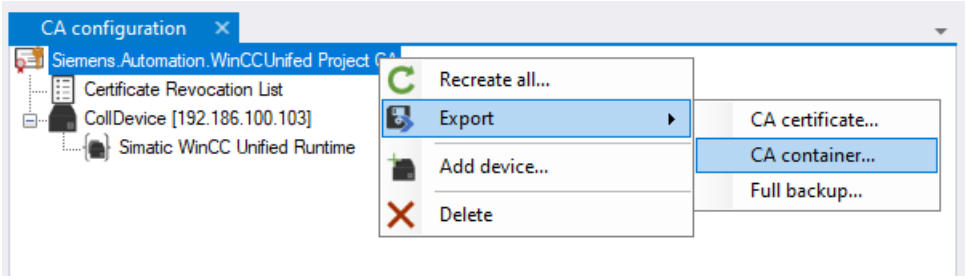
Distribution of root certificate and CRL file

Root certificate and CRL file are part of the certificate configuration of a device. They are exported or imported with the certificate configuration, installed and classified as trusted.

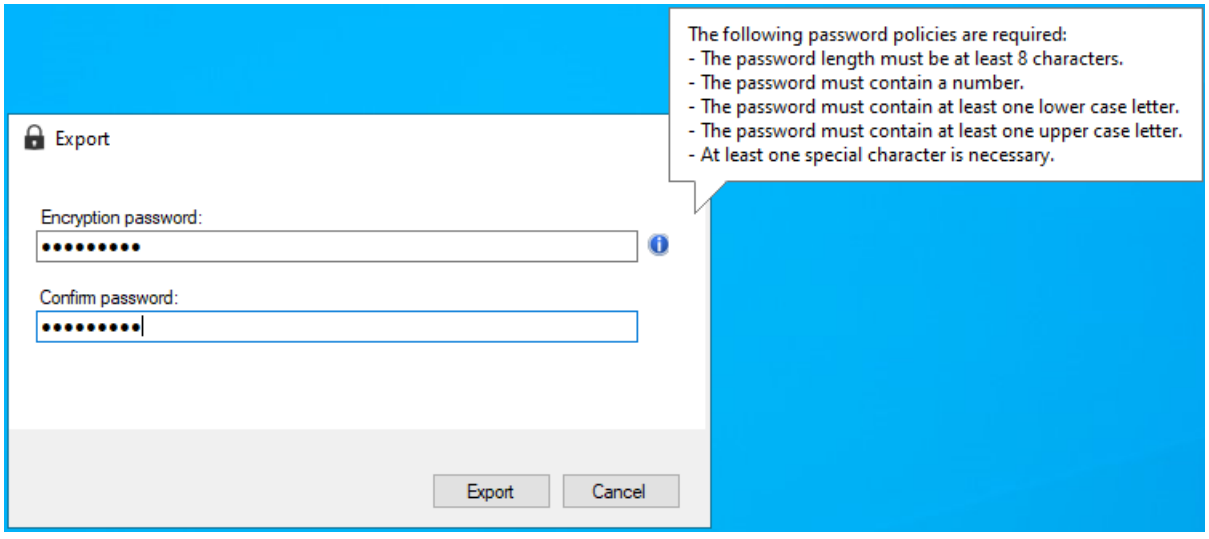
On Unified PCs, you can also export the root certificate and the CRL file via the SIMATIC Runtime Manager.

Exporting all certificates for Unified PC

1. Right-click the root certificate and select "Export..." > "CA container" in the menu.



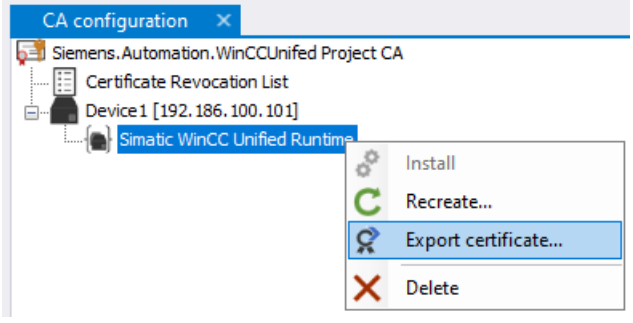
2. Assign a password in the "Export" dialog.



3. Click on "Export" and select the storage location and file name.
   The data is stored encrypted with the specified password.

Exporting the certificate for a device

1. Right-click on the certificate and select "Export certificate" in the menu.



2. Select the format for the exported certificate.
3. Select the storage location.

Making certificates available on Unified devices

To make the certificates of a Unified HMI device available on the Unified PC, follow these steps:

1. Transfer the CA container or the certificates to the Unified PC.
2. Open the Certificate Manager.
3. Open the certificate configuration.

To install an individual certificate of the device:

1. Under the local machine node, right-click the certificate.
2. Select "Install".

Result

You have distributed and installed the required certificates on all collaboration devices.

The Runtime Collaboration certificate only becomes effective after a restart of the WinCC Unified Runtime.

3.10.2.4 Starting installation

Procedure

1. Download the download package for SIMATIC WinCC Unified Data Hub from the Siemens Internet portal to the device and unzip it.
2. Copy the setup files to the UDH server.
3. Double-click the `SIMATIC_WinCC_Unified_Data_Hub_Vxx_xx.exe` file.
4. Follow the installation instructions.
5. Restart the PC.

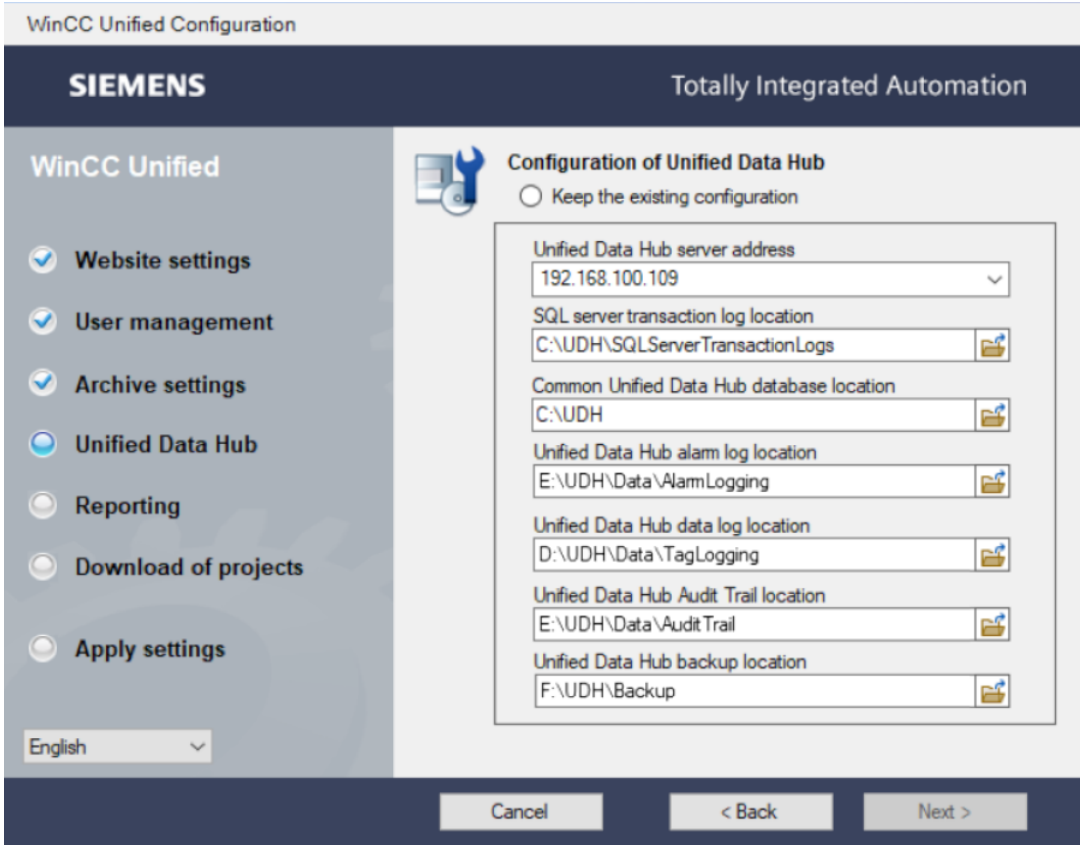
Configuring the UDH server

WinCC Unified Configuration is started automatically during the UDH setup. The UDH server configuration is performed beforehand during the UDH setup.

After the automatic configuration, only the server address and backup storage location can be changed.

To view and modify the configuration, follow these steps:

1. Open WinCC Unified Configuration.
2. If required, modify the configuration of the UDH server:



- Unified Data Hub server address
  TCP/IP address of the UDH server computer
- SQL server transaction log location
  Path of the database transaction log, which should be configured on a dedicated physical hard disk.
- Common Unified Data Hub database location
  Path of the UDH database, can be configured on any non-dedicated hard disk.
- Unified Data Hub alarm log location
  Path of the alarm log; alarm and audit logs should be configured on the same dedicated physical hard disk. SSD is recommended.
- Unified Data Hub data log location
  The storage location of the data log should be configured on a separate physical hard disk. SSD is recommended.
- Unified Data Hub Audit Trail location
  Path of the Audit Trail storage, alarm and audit logs should be configured on the same dedicated hard disk. SSD is recommended.

– Unified Data Hub backup location
  The storage location should be configured on a separate physical hard disk.
  The size should be four times the hard disk capacity of the alarm/audit and data log.

The configuration routine runs even if you do not make any changes. The successful configuration of UDH is displayed in the last step.

If you have made changes, it is recommended that you log out and log back in.

Note

The start times of the central segments for the various logs (alarms, tags, audit traces) should be different, as new segments are created on this basis. This prevents all segments from changing at the same time.

3.10.2.5 Adapting the IP address of the UDH server

The Unified Configuration Tool does not recognize a change to the IP address of the UDH server. In this case, you need to run WinCC Unified Configuration again.

Preferably use fixed IP addresses.

Procedure

1. Configure the desired IP address on the computer to be used as the UDH server.
2. Change the IP address of the UDH server in the TIA Portal project under "Runtime settings > Collaboration".
3. Use the command "Software > Rebuild all" to compile the project that is trying to establish a connection to UDH and the UDH project.
4. Save the project and perform a full download to all affected devices.

   Note

   Do not yet start the UDH project via "Full download".

5. Start the Unified Configuration Tool on the UDH server.
6. Go to the Unified Data Hub section.
7. Click "Next" and run the "Unified Configuration Tool" until it is completed.
   "DONE" is expected as the configuration result.
   The UDH Configuration tool reports contain a warning that the PC must be restarted due to a change of IP address.
8. Start the project now.

3.10.3 Configuring WinCC Unified Data Hub

3.10.3.1 Requirements

Introduction

You archive Runtime data with Unified Data Hub. You require a license to configure this option in the TIA Portal and then use it in Runtime. You can find information about the licenses in the Software and hardware requirements (Page 109) section.

Browser

WinCC Unified Data Hub supports the same browsers as WinCC Unified Runtime PC.

For more information, refer to section "Internet browsers WinCC Unified PC" in the "SIMATIC Unified PC readme".

User knowledge

You have the following knowledge:

- General knowledge about TIA Portal

Requirements in TIA Portal

Your TIA Portal project must meet the following requirements:

- The project is open.
- Multiple PLCs and HMI devices (Unified PC) are created on the "Devices" tab.
- The logs to be backed up have been created.

3.10.3.2 Configure the device as a Unified Data Hub server

Introduction

The UDH server is used as the receiver of the data of the individual clients and stores them in the central archive on the server.

To store data, you need to set and configure a device as a UDH server.

Requirements

- A Unified PC with device version V20 or higher is configured.
- Microsoft SQL is activated.

Procedure

To configure an HMI device as a Unified Data Hub Server, proceed as follows:

1. In the project tree, click on the HMI device of the PC system that is to be used as the UDH server.
2. Double-click on "Runtime settings" in the project tree.
   The editor for "Runtime settings" opens.
3. Click "Services".
4. Enable "Operate as Unified Data Hub" under "Central archiving system".
5. Click "Storage systems".
6. Under "Database type", select the "Microsoft SQL" type.

   Note

   In order not to impair performance, do not configure any client functionality on the server.

7. Click "Collaboration".
8. Select "Enable collaboration" under "General settings".
9. Assign a system ID for the HMI device under "Identification".
10. Specify the Collaboration name.
11. Enter the IP address or the hostname of the device.
12. Click "Good Manufacturing Practice".
13. Disable "Configuration conforms to GMP".

Note
Performance

For optimized performance, do not install a UDH client on the UDH server PC.

Result

You have configured a Unified PC as a UDH server.

All logging tags, alarms and Audit Trails of a UDH client created in Runtime are automatically stored on the UDH server.

3.10.3.3 Configuring the device as a Unified Data Hub client

Introduction

The UDH clients receive data from the PLCs. This data is archived locally and additionally sent to the UDH server for long-term logging.

To store data on the UDH server, you need to set and configure one or more devices as UDH client(s).

Requirements

- A Unified PC with device version V20 or higher is configured.

Procedure

1. Open the Runtime settings of the device that is to be used as the UDH client.
2. Switch to the "Services" area.
3. Disable the option "Operate as Unified Data Hub".
4. Switch to the "Collaboration" area.
5. Select "Enable collaboration" under "General settings".
6. Under "Identification", create the system ID, collaboration name and IP address or hostname of the UDH client.
7. Under "Connect actively to", select the device that you have configured as a UDH server.
8. Switch to the "Storage system" area.
9. Select "Microsoft SQL" or "SQLite" as the database type.
   Using SQLite allows tags to be logged in the central archive.
10. Under "Central archiving with Unified Data Hub (UDH)", select the data you want to store.
11. Enter the system ID of the UDH server in each case.
12. Click "Good Manufacturing Practice".
13. Enable "Configuration conforms to GMP".
14. Repeat steps 1 to 13 for additional PC systems to be used as clients.

Result

You have configured a Unified PC as a UDH client.

You define the data logs to be backed up separately; see "Defining logs to be transferred (Page 122)".

3.10.3.4 Defining logs to be transferred

Introduction

You can archive the following types of logs:

- Data log
- Alarm log
- Audit log

Segmented logs are used for archiving on the UDH server to optimally store the data.

Each log consists of a configurable number of segments. The segments are filled one after the other.

Requirements

- A Unified PC is configured as a UDH client.

Procedure

To activate logging on the UDH server for an individual log, follow these steps:

1. In the project tree, open the "Logs" editor of the UDH client.
2. Select the log that is to be backed up on the UDH server.
3. In the Inspector window, select "Properties > Central".
4. Select the "Activate central logging" check box in the "General" section.
5. Specify the time period and the maximum log size.
6. Repeat steps 1-5 for additional logs and clients.

Result

You have specified which logs are logged on the UDH server.

Note on configuring the segments

When new data logs are created, segmenting on the UDH server is configured automatically. The default values should not be changed.

Automatic configuration takes place in accordance with the following recommendations:

- The recommended time period of an individual segment amounts to ≥ 1 week. The time period is set automatically to 1 week.
- The start time of a new segment should lie outside the main production time. The start time of a segment is set automatically to 23:00.
- The start time of a new segment should not intersect within the client. The start time is shifted automatically by one minute for each data log that is added.

3.10.3.5 Connection diagnostics

Introduction

To run diagnostics for the data flow, use the "Diagnostics Viewer UI".

Diagnostics Viewer UI is started with `RTILdiagnosticsViewer.exe`. The tool can be started on any system and displays the available diagnostics data on this system. To see additional diagnostics data from other systems, enable Trace forwarding and receipt.

Activating diagnostics

1. Start "`RTILtraceTool -mode forwarder -tcp`" on the system on which the additional diagnostics data is located.
2. Start "`RTILtraceTool -mode receiver -tcp -host <hostnames>`" on the system on which Diagnostics Viewer UI is running.
   `<hostnames>` stand for the IP addresses (or network-resolvable names) of the target computers. All computers must be part of the same network or have suitable routing between them. Multiple IP addresses are separated by commas.
   You can find more information by calling `RTILtraceTool -help` or `RTILtraceTool -mode receiver`.

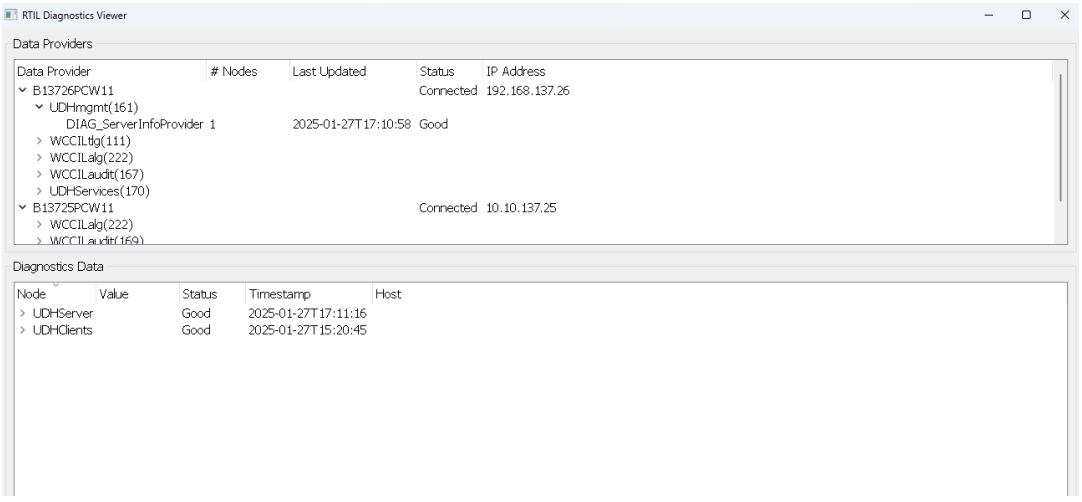
Note

Ensure that the server port is activated in the firewall for the computer on which `traceforwarder` is started.

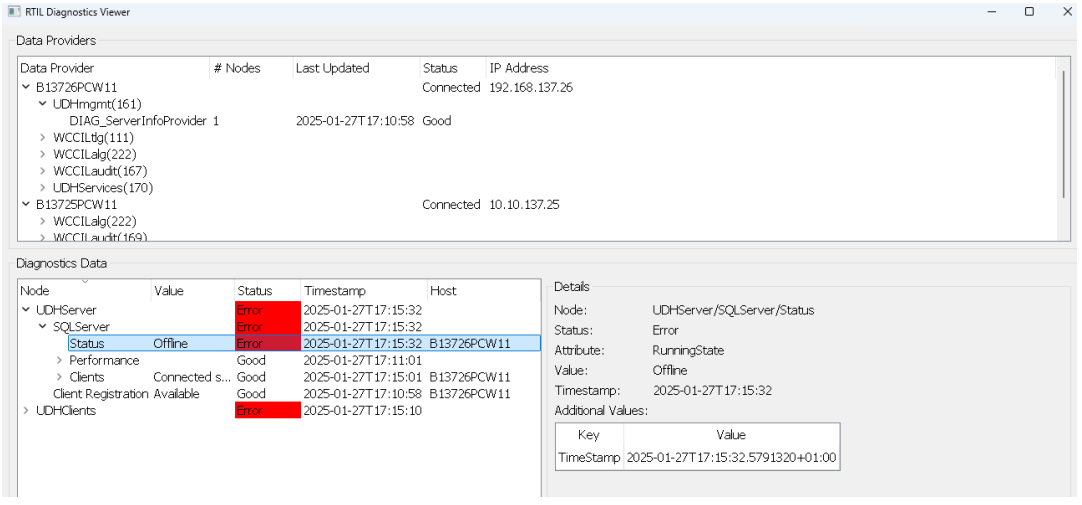
Diagnostics Viewer

Diagnostics Viewer shows the list of data providers, i.e. the systems of the sender, in the upper half. The first node shows the device name, the connection status and the IP address of the device.

1. Click on the device name to display the list of managers that send diagnostics data to the Diagnostics Viewer. The number of nodes, the overall status and the time stamp of the last update are displayed for each manager.



The lower half shows the diagnostics data. Each line represents a node in the tree view. In the structure view, the first node is "UDHServer".



2. Click on a node in the tree view to display the status.
   Each node has a value and a status. The status can be "Good" (green), "Error" (red) or "Partially Good" or "Degraded" (yellow). Additional attributes of a node are displayed on the right side. There are two types of diagnostics data: server-side and client-side. Server-side diagnostics data shows the attributes of the UDH server, client-side data applies to the respective client.

Standard and extended diagnostics data

Each node can be displayed as "Basic" or "Advanced". By default, only the "Basic" diagnostic nodes with the essential attributes of the machine are displayed.

1. To display extended diagnostics data nodes, edit the "`TraceProfile.xml`" file.
2. Enable the "`ProfileAdvanced`" Trace flag for the corresponding manager under the "Diagnostics" subsystem.

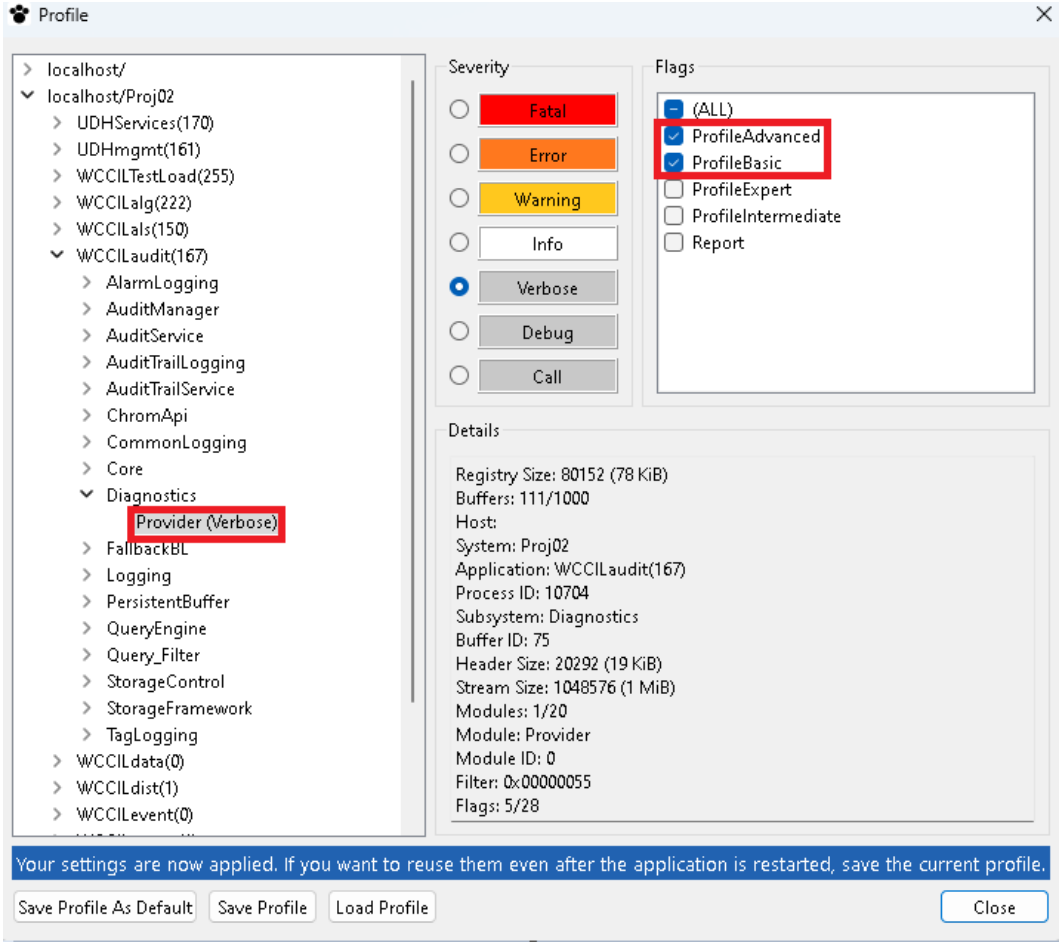
```
<SubSystem Name="Diagnostics">
  <Module Name="Provider" Severity="Verbose">
    <Flag Name="ProfileAdvanced" Activated="true"/>
    <Flag Name="ProfileBasic" Activated="true"/>
    <Flag Name="ProfileExpert" Activated="false"/>
    <Flag Name="ProfileIntermediate" Activated="false"/>
    <Flag Name="Report" Activated="false"/>
  </Module>
</SubSystem>
```

3. Start the "RTILtraceTool" with "`RTILtraceTool -mode profile -file TraceProfile.xml`".

Trace flags cannot be activated in the Diagnostics Viewer UI.

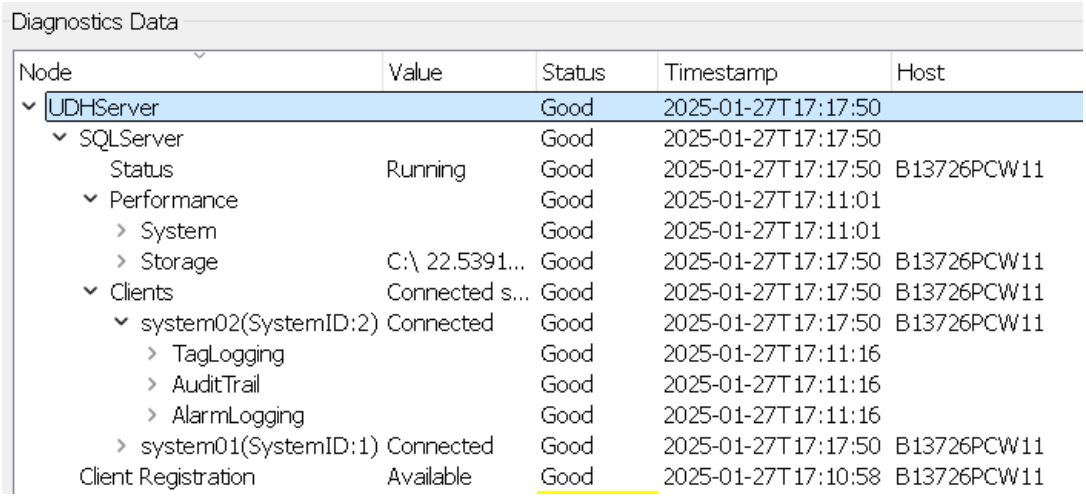
Another way to activate these Trace flags is to use Trace Viewer (`RTILtraceViewer.exe`).

1. Click the icon "Open trace profile dialog" .
2. Under "Diagnostics > Provider", enable the Trace flags.



Server-side diagnostics data

Diagnostics data for the server is displayed under "UDH server".



UDHServer/SQLServer/Status

- Running:
  `SQL Server Services` runs on the same computer on which `UDHmgmt.exe` runs.
- Offline:
  `SQL Server Services` must be started/restarted. While the SQL Server is offline, no data is written to the UDH database, only local logging and buffering (fallback logging) takes place. After restarting the SQL Server, data synchronization from the fallback database to the UDH database begins.

UDHServer/SQLServer/Clients

Returns the list of active clients. This number indicates how many connections are active and sending logging data to the UDH server.

Additional attribute: Registered clients. Displays the total number of registered clients that were connected to the UDH server, even if they are not currently connected. It is possible that there are three registered clients, but only one of them is active, two clients are displayed as "inactive", even if they have been removed from the system. Permanent removal of a UDH client is not supported.

UDHServer/SQLServer/Clients/<SystemName>

`<SystemName>`: Consists of the configured "Collaboration Name" in the TIA Portal, followed by "SystemID", e.g. `MySystem(SystemID:1)`. These values are set in the TIA Portal under "Runtime settings > Collaboration".

Each system can have several managers with open connections to the UDH server.

Examples:

- Tag Logging: WCCILtlg
- Alarm Logging: WCCILalg
- Audit Trail: WCCILaudit

Status:

- Connected
  All managers are connected.
- Partial connected
  Only some of the managers are connected.
- Not connected
  None of the managers are connected.

UDHServer/SQLServer/Clients/<SystemName>/<Manager>/Connection

- Connected
  The manager (e.g. TagLogging) is connected to the UDH server. This means that logging can take place both in the local database and in the UDH database.
  Additional attributes
  - IP address of the system on which the manager is running
  - Operating time (how long the connection is online)
  - Last connection time
- Not connected
  The manager is not connected to the UDH server. This may mean that the <Manager> must be started or restarted on the system <System name>. If a manager is not connected to the UDH server, the "IP address" in the additional attributes is set to zero and the operating time is 0 seconds.

UDHServer/SQLServer/Clients/<SystemName>/<Manager>/Registration

During the registration process, the client establishes a connection to the UDH server for the first time and authenticates itself. The logging process to the server can only be started after successful registration.

- Connect
  The <Manager> is started and registers on the UDH server.
- Successful
  The registration was successful and the logging/synchronization in the UDH database was started.
- Failed
  The registration was not successful. New files cannot be created in the UDH database. This can be caused by an SQL Server error, e.g. if there is already an inconsistent database with the same name.
  The manager and/or the SQL Server must be restarted.

UDHServer/SQLServer/Clients/<SystemName>/<Manager>/Storage

- Size
  Size of the UDH database of the current manager in MB.

UDHServer/Performance/Storage

- Drive
  Returns the most used hard disk and information about how much of it is currently in use.

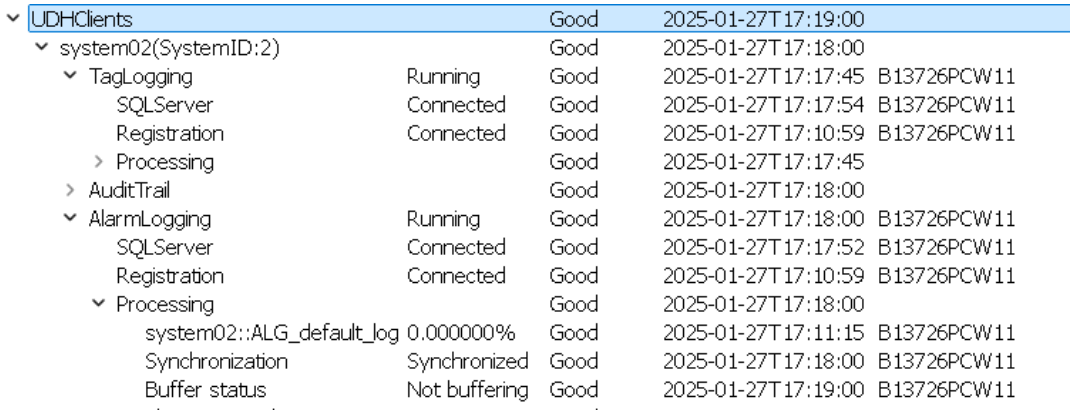
UDHServer/Performance/Storage/<CurrentDisk>

Returns the total capacity of the current data storage medium and how much of it is currently in use.

UDHServer/Performance/System/SQL Server Memory

Returns information about the memory of the SQL Server services.

Client-side diagnostics data



UDHServer/Client registration

- Available
  The UDH server can process incoming connection requests from clients.
- Not available
  The UDH server (`UDHmgmt.exe`) must be restarted. As long as this is not available, no new clients can connect to the UDH server. However, managers with existing connections can continue to write data to the UDH database as this is done via ODBC connections and they are therefore not affected.

UDHClients/<SystemName>/<Manager>: (e.g. UDHClients/System1/TagLogging)

- Running
  The <Manager> runs on <SystemName>.
- Stopped
  The <Manager> is stopped at <System name> and no local or UDH-related logging takes place with this manager.

UDHClients/<SystemName>/<Manager>/SQLServer

- Connected
  The manager is connected to the SQL Server, the health state of the manager is good (e.g. `Healthstate_Good`, `HealthState_Synchronizing`).
  Logging can take place.
- Connected with error
  The health state of the manager is not good, but it also not interrupted (e.g. `HealthState_StorageSpaceExceeded`).
  This indicates that there is a connection to the SQL Server, but there are errors. For example, not enough space on the hard disk.
- Offline
  The manager has no connection to the SQL Server, the HealthState is disconnected (`HealthState_Disconnected`).
  No logging takes place. SQL Server and/or manager must be started/restarted.

UDHClients/<SystemName>/<Manager>/Registration

- Like "UDHServer/SQLServer/Clients/<SystemName>/<Manager>/Registration" but shown by the client page.

UDHClients/<SystemName>/<Manager>/Processing/<LogName>

- Fill level of the WriteQueue in %.
  If the WriteQueue becomes too full (> 75%), it is displayed in yellow. The SQL Server is too slow or the load is too high and the manager's WriteQueue cannot be reduced.
- Additional attribute:
  Bulk mode: Disabled by default, automatically switched on at high load.

UDHClients/<SystemName>/<Manager>/Buffer status

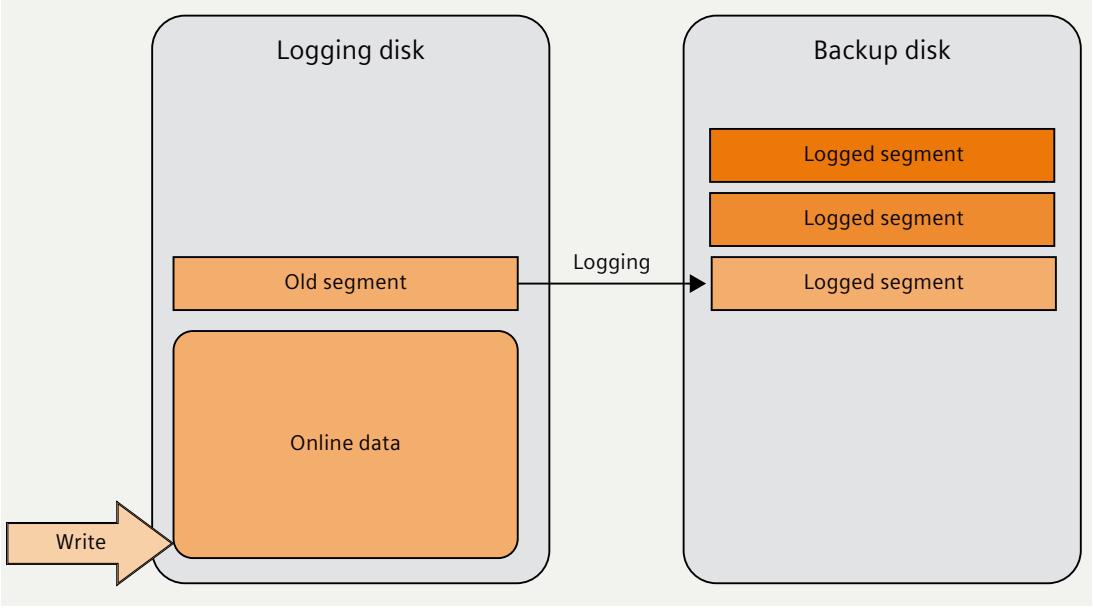
- Buffering
  The manager cannot write to the UDH database. It writes to the fallback database instead.
- Not-buffering
  The manager can write to the UDH database.
- Additional attribute
  BufferSize, the size of the fallback database in MB.
  The "Buffering" status indicates connection problems with the UDH server. As soon as the connection is re-established, the fallback and UDH databases are synchronized so that the fallback database is not overfilled and no data is lost.

UDHClients/<SystemName>/<Manager>/Synchronization

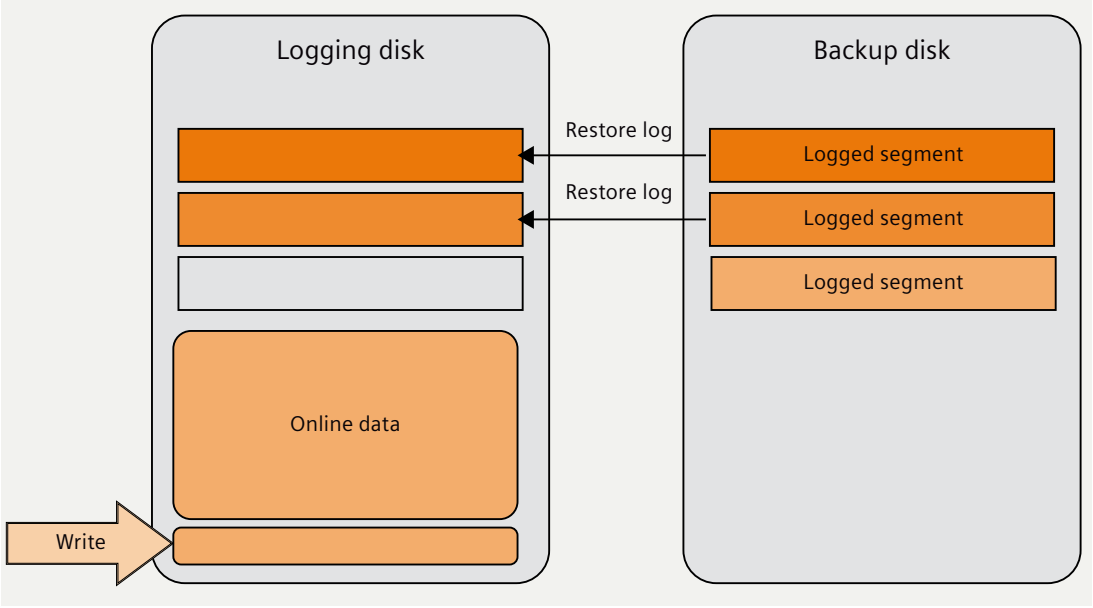
- Synchronized
  The connection to the UDH server is established from the local client, and the same data that is in the local database can be found in the UDH database.
- Synchronizing
  The connection was interrupted but restored. As soon as synchronization is complete, this value automatically changes to "Synchronized". If this is not the case, an error has occurred during synchronization, which is displayed as additional error messages from the manager.
- Out of sync
  The connection to the UDH server is interrupted. There is no logging in the UDH database. The manager writes to the fallback database.

3.10.4 Central logging and restoring

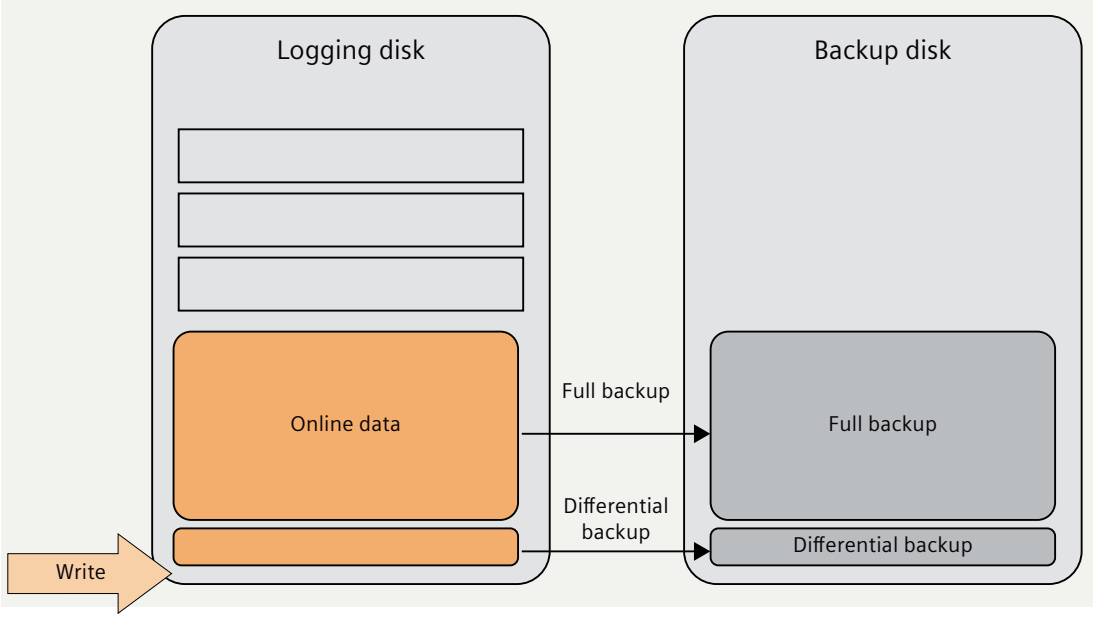
Data is continuously written to a storage medium ("logging disk"). This online data can be read. After a configurable time span, data is swapped out to a segment. This swapped-out archive segment can no longer be read directly and is swapped out to a further storage medium ("backup disk").



Archive segments that have been swapped out can be restored "read only" on the "logging disk". The restoration can be undone (unrestore).



In addition, the online data that has not yet been segmented on the "backup disk" is backed up completely and periodic differential backups are created.



If the "logging disk" is corrupt, the data from the backup can be restored to a new "logging disk".

In this way, data loss is reduced to an unavoidable minimum.

See also

Restore backup (Page 143)

Restore intervals (Page 145)

3.10.4.1 Working with GraphQL

Introduction to GraphQL

GraphQL API is an easy-to-use, quick-to-integrate Web API with few dependencies and little code. Use GraphQL queries in UDH for specific operations to read and write data in the database.

GraphQL API is provided by the GraphQL Server Manager "UDHServices.exe".

GraphQL Server Manager is available via IIS at "https://localhost/udhlogadmin".

Requirements

- Public Internet connection

What is GraphQL?

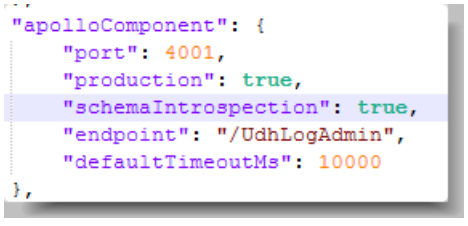
GraphQL is an API concept that defines the following basic properties:

- Transport layer for operations and responses is HTTP and web sockets
- Operations and responses use a JSON-like format
- Operations and responses are described in a standard schema.
- Operations define which response they expect.

Using GraphQL

They use the GraphQL API of any web, mobile, desktop, console and service applications if they have network access via HTTP and web sockets.

1. Log into Apollo Studio:
   Apollo Studio (https://studio.apollographql.com/sandbox/explorer)
   Default for the UDH Services endpoint address: http://localhost:4001/UdhLogAdmin
   The endpoint can be configured in `LogAdminConfig.json` if required
   (Default storage location: `WCCIL_CC\config\UDH\LogAdministrator\ Folder`)



Additional documentation

You can find documentation for GraphQL on the Internet:

- SiePortal: SIMATIC HMI WinCC Unified GraphQL (https://support.industry.siemens.com/cs/ww/en/view/109826709)
- GraphQL documentation (https://graphql.org/learn/)
- GraphQL at GitHub (https://docs.github.com/de/graphql/guides/introduction-to-graphql)

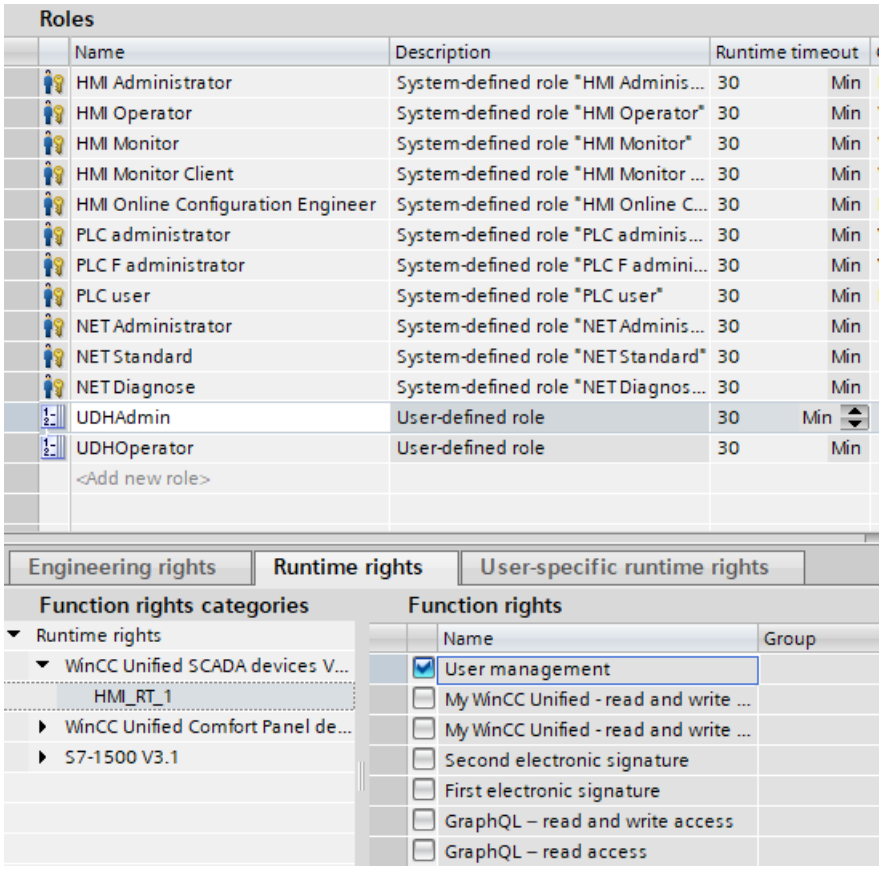
Creating UDH user roles

To access the GraphQL functions for UDH, you must manually create two user roles.

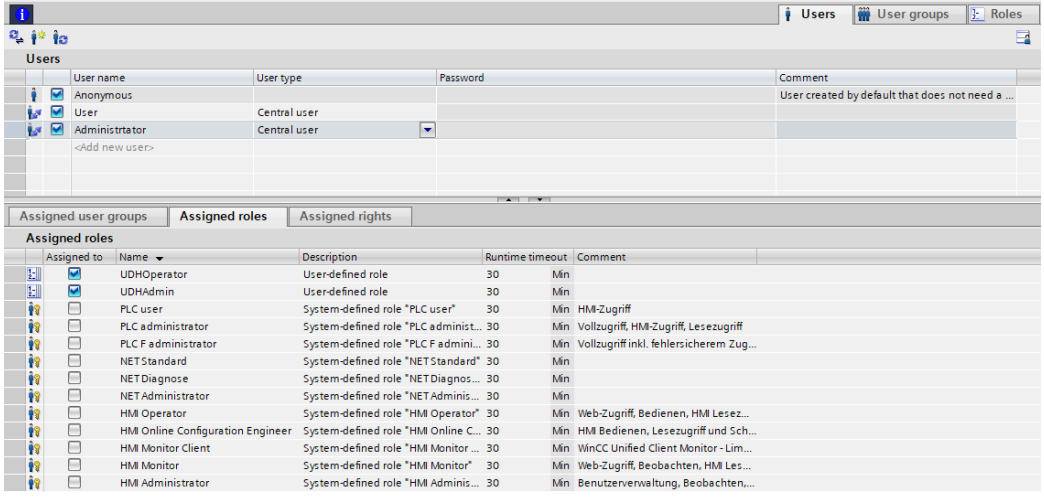
Procedure

1. In the project tree of the TIA project, select "Security settings > Users and roles".
2. Select the "Roles" tab.
3. Add two new roles:
   - UDHAdmin
   - UDHOperator
4. Select the Runtime of the UDH device under "Runtime rights, Categories of function rights".

5. Assign the "User management" function right to each of the two newly created roles.



6. Assign the newly created roles to the appropriate users under "Users".



7. Load the project completely into the UDH device.
   The newly created roles are displayed in the user management of the UDH server.
   To work with GraphQL, users can log in to Apollo Studio with the newly created authorizations.

See also

Working with GraphQL (Page 134)

Authorizations in GraphQL

Query Mutation	UDHAdmin	UDHOperator	Each authenticated user	Unauthenticated users
Authentication				
session	✓	✓	✓	-
nonce	✓	✓	✓	✓
identityProviderUrl	✓	✓	✓	✓
login*	✓	✓	✓	✓
loginSWAC*	✓	✓	✓	✓
extendSession	✓	✓	✓	-
logout	✓	✓	✓	-
Core				
QueryDatabases	✓	✓	-	-
Read				
QueryAlarms	✓	✓	-	-
QueryAuditRecords	✓	✓	-	-
QueryTags	✓	✓	-	-
Database operations				
QueryArchivedIntervals	✓	-	-	-
QueryRestoredIntervals	✓	-	-	-
QueryBackupInfo	✓	-	-	-
RestoreInterval	✓	-	-	-
UnrestoreInterval	✓	-	-	-
UnrestoreAllIntervals	✓	-	-	-
RestoreDatabase	✓	-	-	-

* Remove the authorization header before logging in, because if the token has expired, the login request will be rejected before a login attempt can be made.

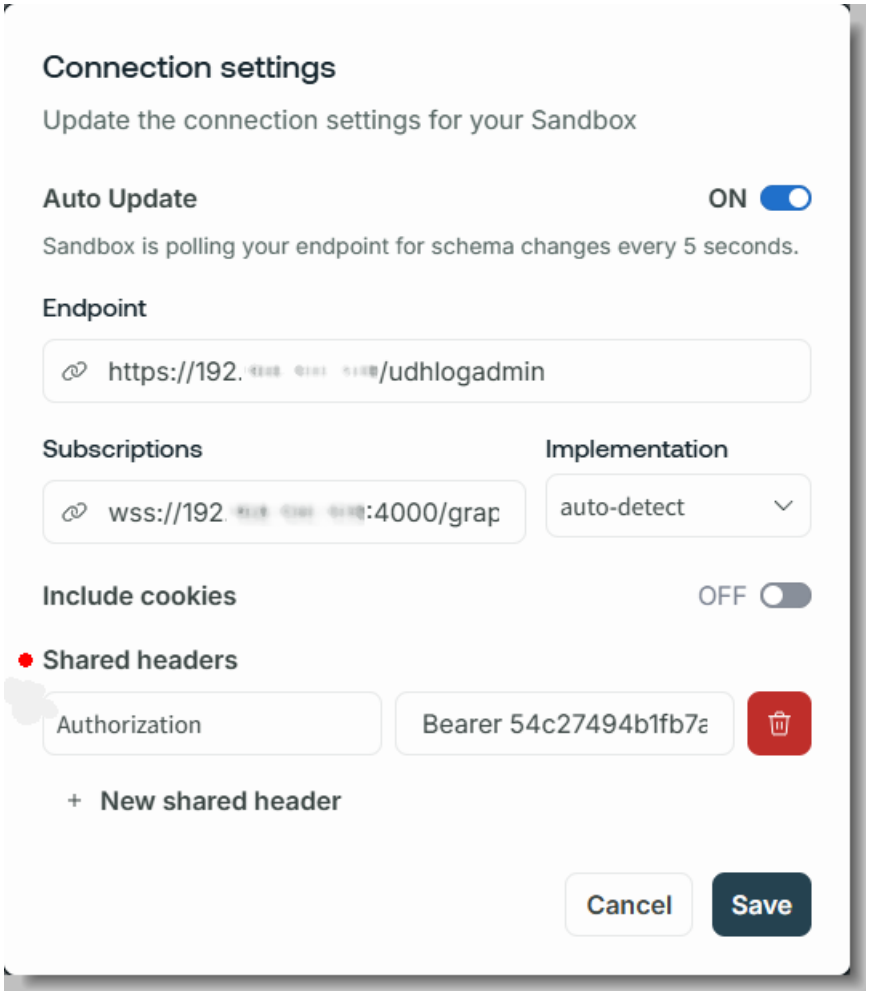
Setting up the GraphQL client

To access the GraphQL server, set up a GraphQL client on any computer.

Procedure

1. Open Apollo Studio in your browser:
   https://studio.apollographql.com/ (https://studio.apollographql.com)
2. Log in.
3. To open the configuration panel of the GraphQL client, click on the gear wheel icon.

4. Configure how the GraphQL client accesses your GraphQL server.



5. Enter the token "Bearer <received token>" under "Shared headers".
   The token can be found in the response to the login operation performed earlier.


Response
200
27.0ms
{
"data": {
"login": {
"error": {
"description": "Success",
"code": "0"
},
"expires": "2025-03-27T14:18:07.710Z",
"token": "54c27494b1fb7a38fa0fc17213366d40",
"user": {
"name": "Operator",
"groups": [
{
"name": "HMI Administrator",
"id": "102"
},
{
"name": "HMI Operator",
"id": "106"
},
{
"name": "UDHAdmin",
"id": "107"
},
{
"name": "HMI Monitor",
"id": "103"
},
{
"name": "HMI Online Configuration Engineer",
"id": "105"
}
],
"language": "und",
"id": "109",
"fullName": "Operator",
"autoLogoffSec": 1800
}
}
}
}

After successful setup, a green symbol is displayed in the top left corner.

The GraphQL server provides your GraphQL client with the queries required to work with UDH.

The documentation for the GraphQL API is available.

Executing GraphQL operations

In Apollo Studio, you can enter GraphQL operations in the Operations panel. Operations can be entered manually or created semi-automatically using the plus symbols in the documentation view.

You define the parameters of the operation directly in the operation or in the Tags panel at the bottom.

In the Header area, you define additional HTTP header values, e.g. the mandatory authorization token for access to tags and active alarms.

Once the operation, parameters and header have been set up, click on the blue button to run the operation.

The response from the GraphQL server is displayed in the Response panel.

Logging in

To access Runtime data, you need to log in to the GraphQL server.

Use the "`Login-GraphQL`" mutation for this.

Note

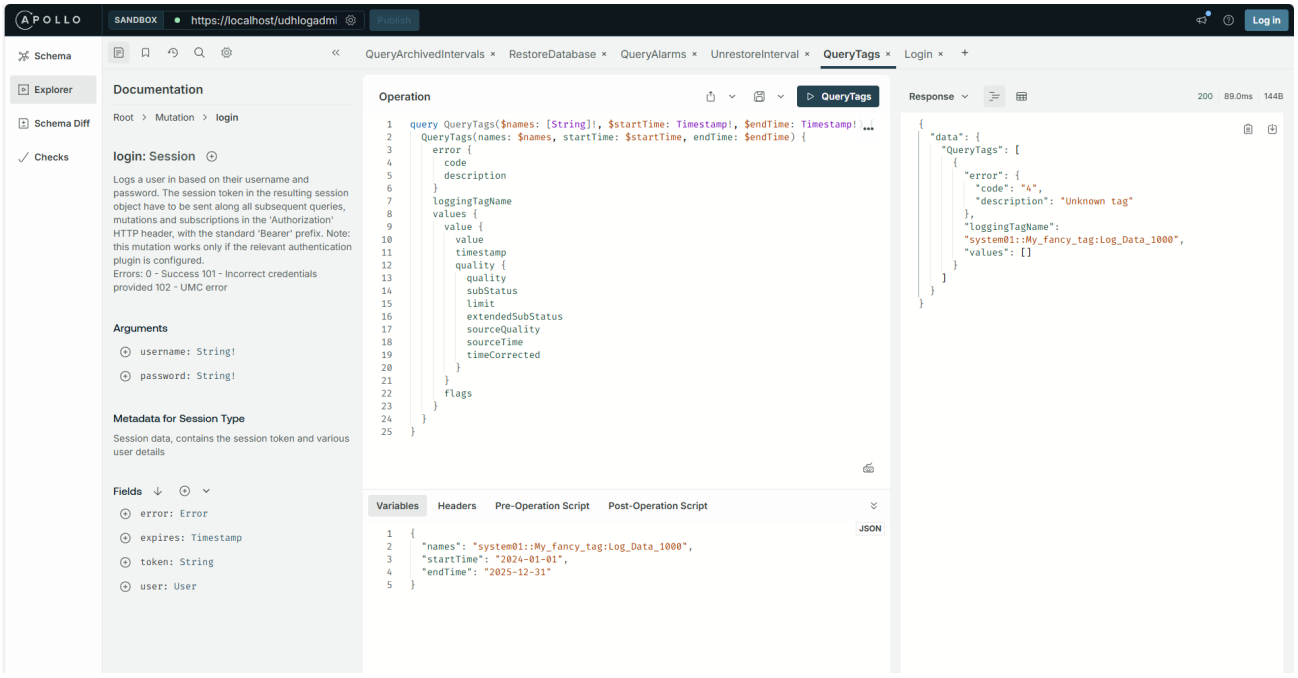
You must use your own UMC-based username/password combination that you use to log in to your installed product.

The generated token must be specified as the authorization header for all subsequent GraphQL operations. After a certain period of inactivity, your token may expire. In this case, a new registration is required.

GraphQL operations

Query

Query operations read data that corresponds to a specific filter, e.g. the value of a tag or active alarms. The query operations send a one-off HTTPS request to the GraphQL server.



Note

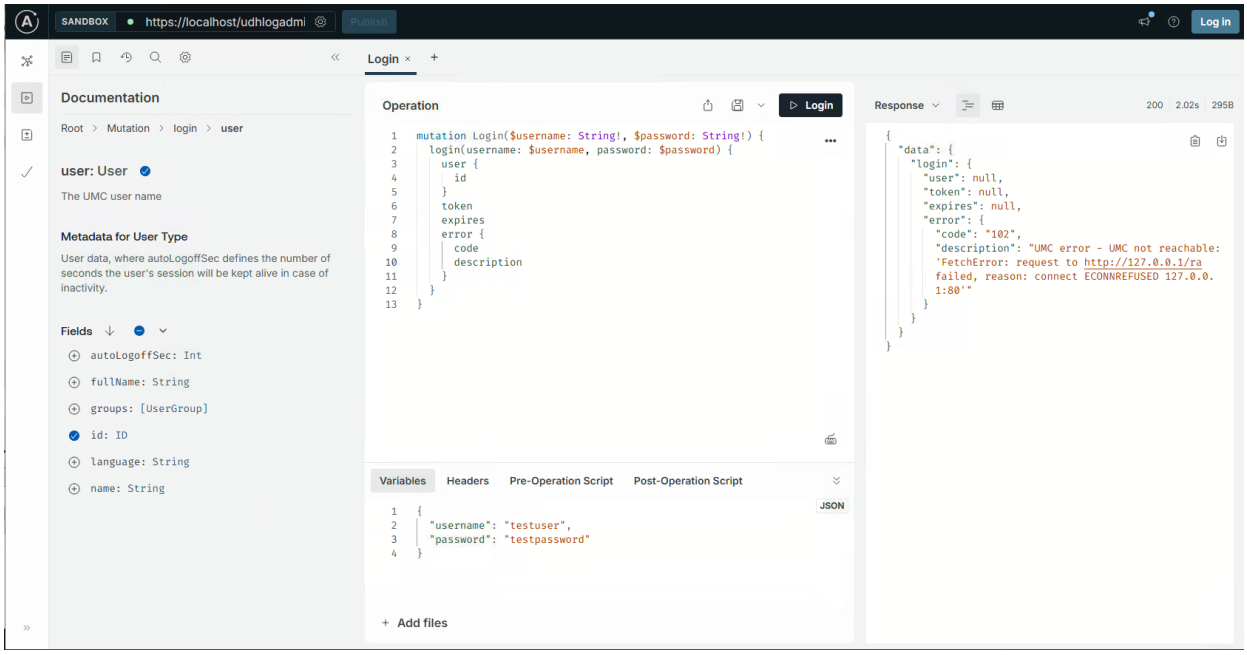
Ensure that you have configured the HTTP header authorization correctly and that you are using a tag name that is available in your product.

Mutation

Mutation operations write data, e.g. changing the value and quality code of a tag. The mutation operations send a one-off HTTPS request to the GraphQL server.

Query

You can read data for the specific logging services with different queries. Each query has its own parameters. A query send a one-off HTTPS request to the GraphQL server.



Note

Ensure that you have configured the HTTP header authorization correctly and that you are using a tag name that is available in your product.

If you query the tag again after performing this mutation, you will find that the value has changed.

Automatic backup and archiving of segments

Segments are logged and backups are created automatically. If the system cannot find a complete backup, a complete backup is created. If a backup is available, differential backups are created periodically.

Settings

The backup is saved in the same folder as the archive. The frequency of differential or full backups is defined in a configuration file. Use the default settings.

Enabling or disabling automatic backup is also managed via the configuration.

The time interval for differential backups should be configured to be shorter than the time interval for full backups. Both time spans can be configured separately via the logging applications.

Default values:

- Differential backup: 1 hour
- Full backup: 1 day

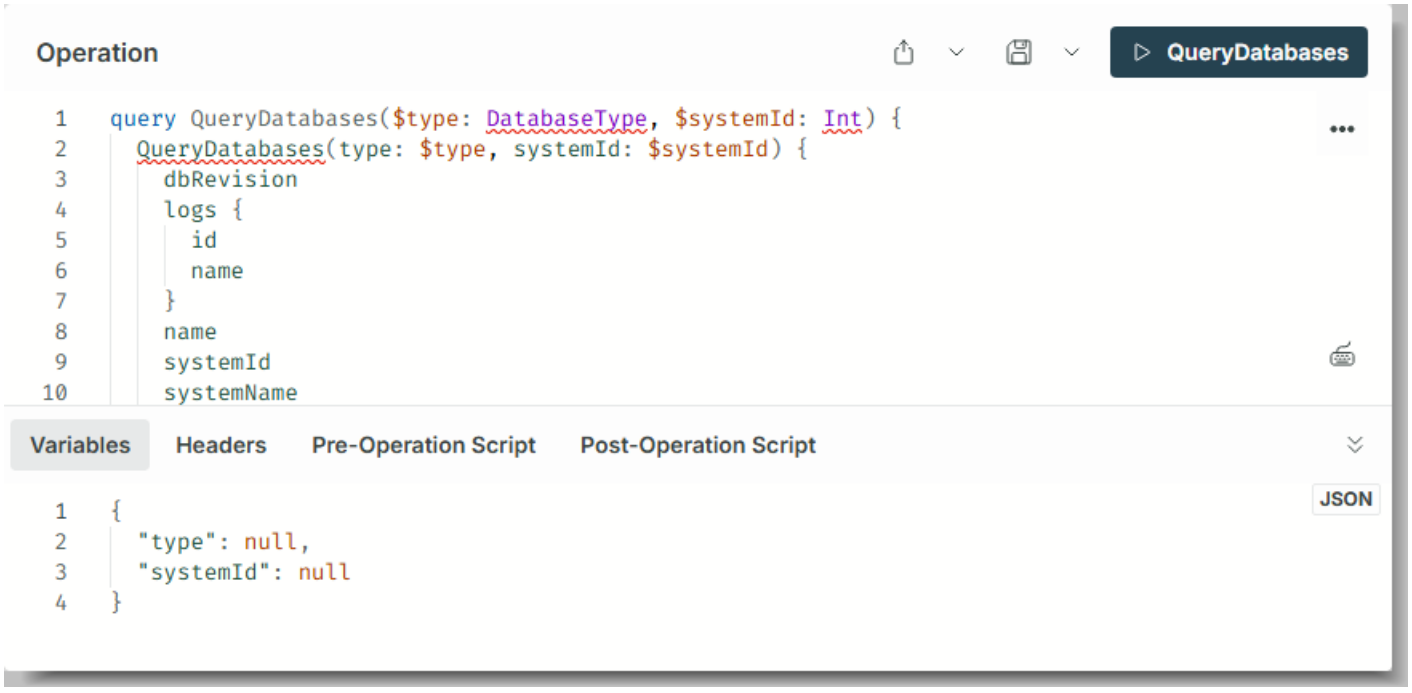
Restore backup

Requirement

- Public Internet connection

Procedure

1. Log into Apollo Studio:
   Apollo Studio (https://studio.apollographql.com/)
   See also "Setting up the GraphQL client (Page 137)".
   Available queries are displayed on the left side.
2. Perform the query `QueryDatabases`.



   – `type` is an optional parameter that specifies the type of database to be queried. If it is not specified, all databases are returned.
   – `systemId` is an optional parameter that specifies the system ID of the database to be queried. If it is not specified, all databases are returned.

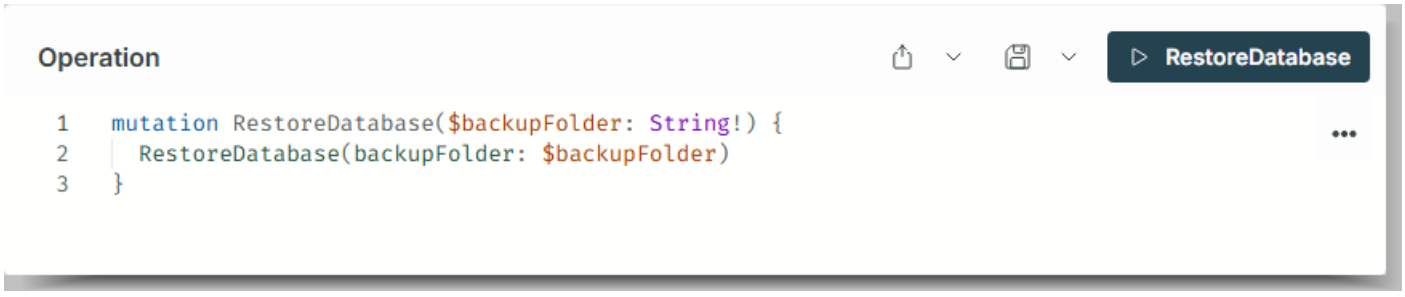
   The response provides the system name, which is required for the next steps.

3. Perform the query `QueryBackupInfo`.

   - To list the available backups, click on the + sign next to `QueryBackupInfo` in the left pane.
     The operation is displayed in the middle area.
   - Select the files you want to retrieve in the left area.
   - Fill in the "Tags" arean below.
     `type` and `systemName` are mandatory parameters for the execution of `QueryBackupInfo`.
   - Click "Query".
     The result is shown on the right.

   The response contains `systemName` and `type` which are required for the next step.

4. Perform the query `QueryBackupInfo`.
   The response contains the `backupFolder` which is required for the next step.
5. Perform the mutation `RestoreDatabase`.



   You use this function to restore a database.
   The entry is the `backupFolder` in which the backups are saved

   - Fill in the "Variables" section.
   - Click "RestoreDatabase" to complete the database.
     The system searches for the available backup files and selects them automatically.
     The response contains the time stamp of the restoration process or an error message if an error has occurred.

Restore intervals

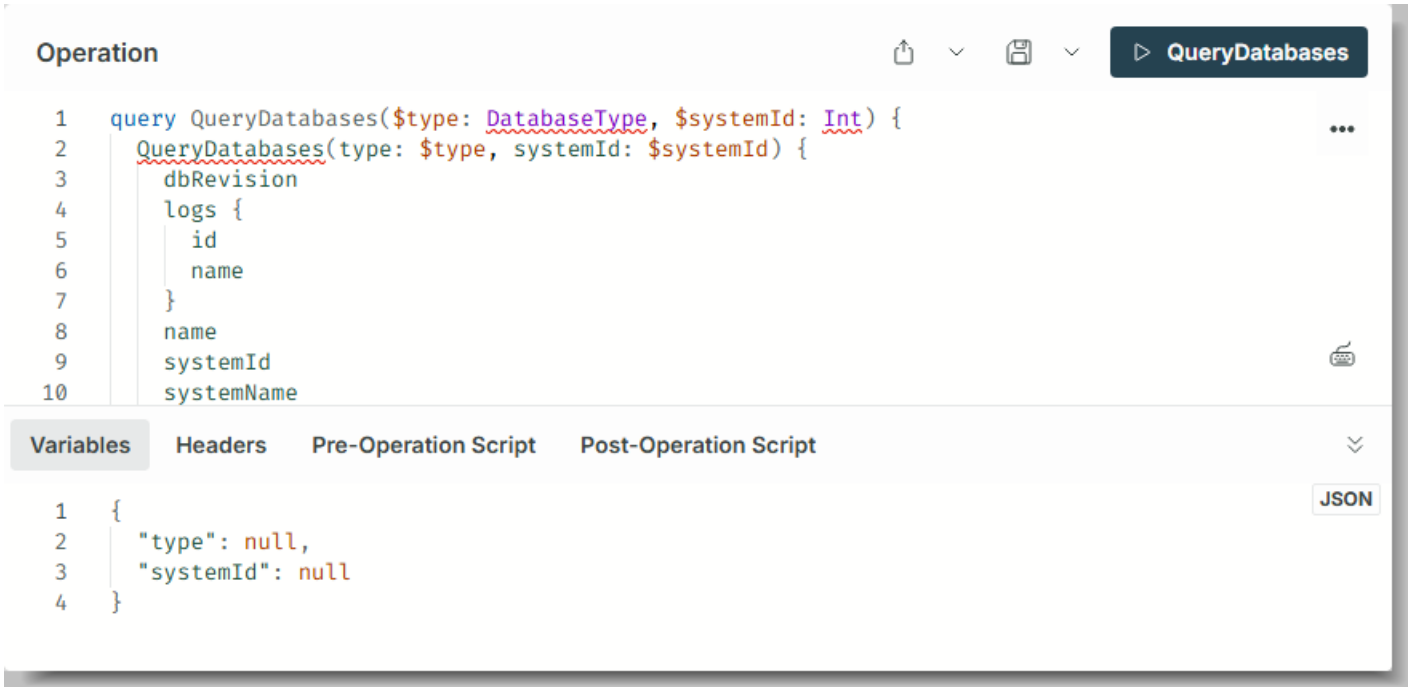
An interval corresponds to a segment that is characterized by the start time and end time of the data acquisition. Segments are periodically swapped out.

You restore intervals in order to be able to read the data they contain.

You undo the restore to free up disk space and prevent unnecessary read access to the data.

Restore interval

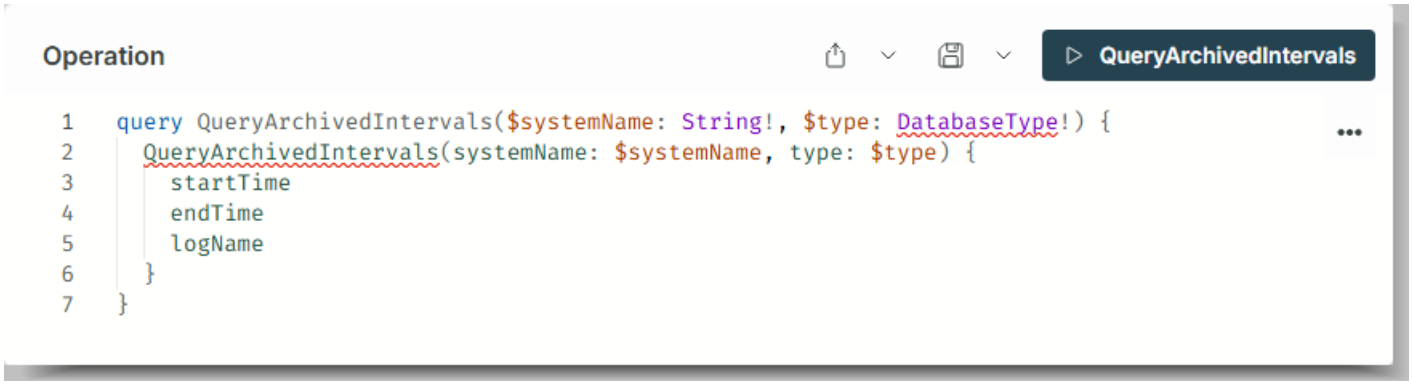
1. Log into Apollo Studio.
2. Perform the query `QueryDatabases`.



   - `type` is an optional parameter that specifies the type of database to be queried. If it is not specified, all databases are returned.
   - `systemId` is an optional parameter that specifies the system ID of the database to be queried. If it is not specified, all databases are returned.

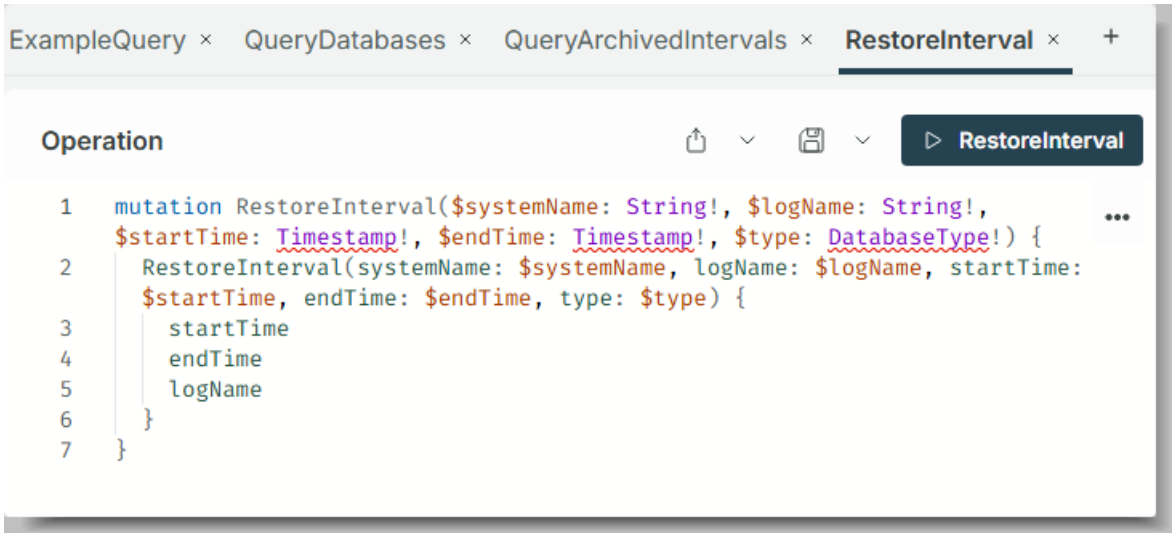
   The response provides the `systemName`, which is required for the next steps.

3. Perform the query `QueryArchivedIntervals`.



The response provides the archive intervals that can be restored in the next step.

4. Perform the mutation `RestoreInterval`.



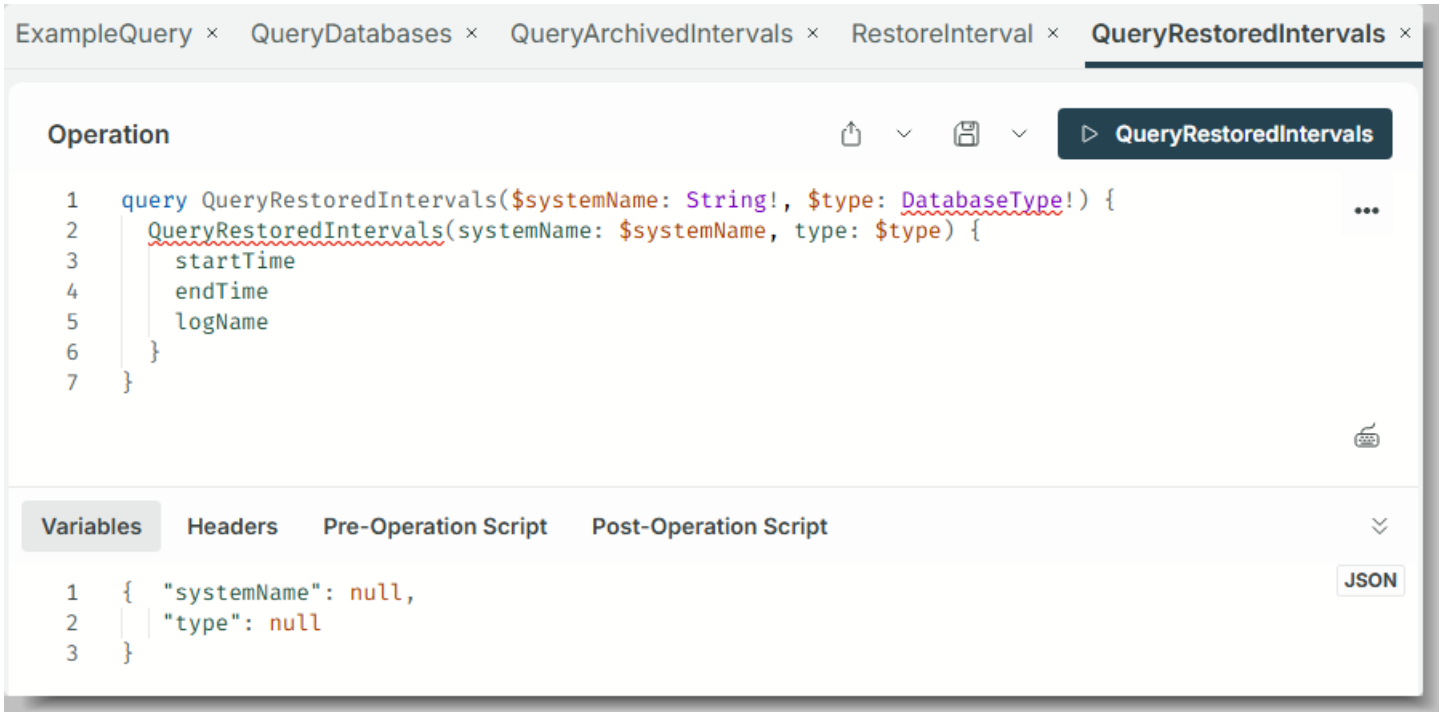
Restored intervals are available again.

5. Log out of Apollo Studio.

Undoing the restoration of an interval

1. Log into Apollo Studio.
2. Perform the query `QueryDatabases`.
   The response provides the `systemName`, which is required for the next steps.

3. Perform the query `QueryRestoredIntervals`.



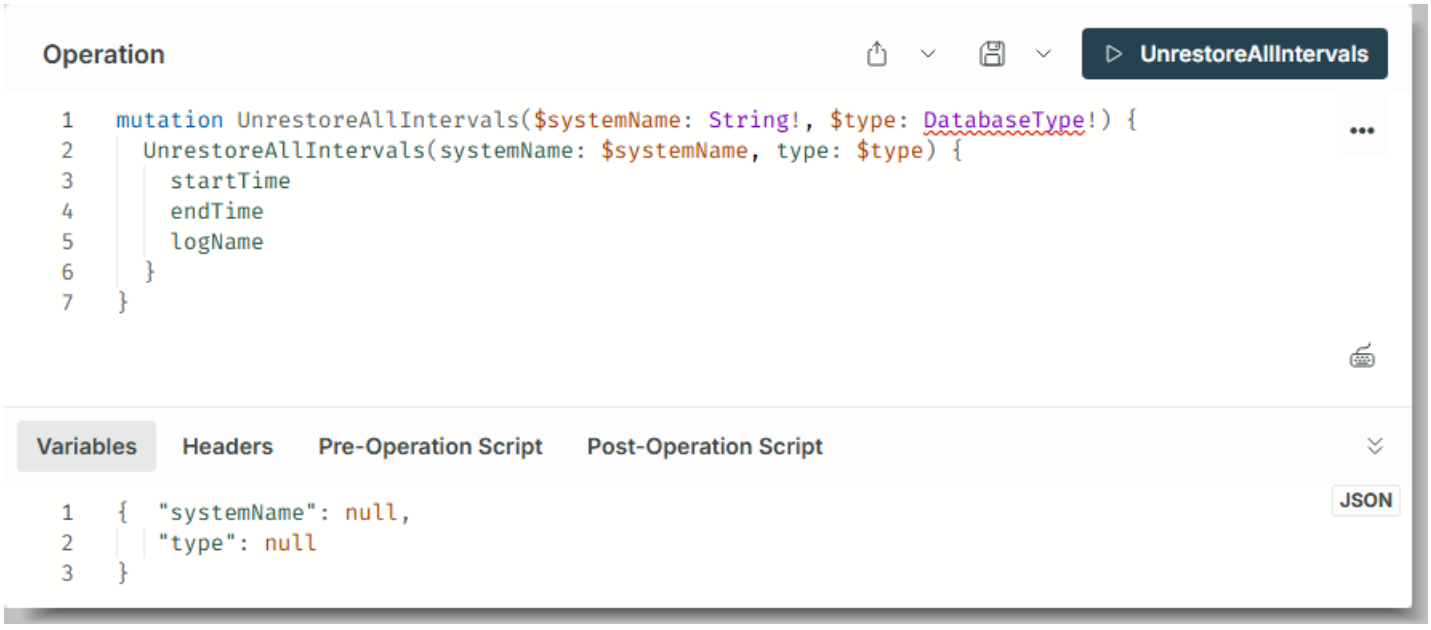
The response provides the intervals whose restoration can be undone.

4. Perform the mutation `UnrestoreInterval`.
   The restoration of the selected interval is undone.
5. Log out of Apollo Studio.

Undoing the restoration of all intervals

1. Log into Apollo Studio.
2. Perform the query `QueryDatabases`.
   The response provides the `systemName`, which is required for the next steps.

3. Perform the mutation `UnrestoreAllIntervals`.



The restoration of all intervals is undone.

4. Log out of Apollo Studio.

See also

Setting up the GraphQL client (Page 137)

Improvements in WinCC Basic, Advanced, Professional

4

4.1 Important notes

This page contains important information about product properties.

Migration

The migration of a WinCC flexible project with Simotion components is only possible if SIMOTION is installed.

Visual Studio 2010 Redistributables

The EoL versions of Visual Studio 2010 Redistributables have been removed in V20.

It is thus no longer possible to download a project to HMI SIMATIC Basic Panels V11 or V12 or to simulate the HMI SIMATIC Basic Panels V11 to V15.

If HMI SIMATIC Basic Panels of the named versions are still needed, you must install the missing Visual Studio Redistributables manually. Please note that an EoL version can have security vulnerabilities. You are solely responsible if you install such as version.

4.2 Improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Style and design for lines

When creating a line or a circle in the project library, the style/design options are displayed correctly.

4.3 Readme Runtime Advanced

4.3.1 Validity

Validity

This update is valid for the following products:

- WinCC Runtime Advanced V20

Note

It is possible that the .NET Framework installed with WinCC Runtime Advanced V20 is no longer up to date and could have security vulnerabilities. Since it cannot be brought up-to-date with an update, you yourself have to ensure that the latest version of the .NET Framework is always installed. You can find instructions on how you can determine the installed version and how to update the .NET Framework in the .NET Framework documentation.

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines, and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions only form one element of such a concept.

It is the responsibility of the customers to prevent unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the Internet if and to the extent such a connection is necessary and only when appropriate protective measures (e.g. firewalls and/or network segmentation) are in place.

For more information on protective industrial cybersecurity measures for implementation, visit:

https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are outdated or no longer supported may increase the customer's exposure to cyber threats.

To stay informed about product updates at all times, subscribe to the Siemens Industrial Cybersecurity RSS Feed under:

https://new.siemens.com/global/en/products/services/cert.html

4.3.2 Important information

This page contains important information about product properties.

4.3.3 Improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

4.3.4 Improvements in Update 1

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

4.4 Readme Runtime Professional

4.4.1 Validity

Validity

This update is valid for the following products:

- WinCC Runtime Professional V20

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines, and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions only form one element of such a concept.

It is the responsibility of the customers to prevent unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be

connected to an enterprise network or the Internet if and to the extent such a connection is necessary and only when appropriate protective measures (e.g. firewalls and/or network segmentation) are in place.

For more information on protective industrial cybersecurity measures for implementation, visit:

https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html

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4.4.2 Important information

This page contains important information about product properties.

Installing WinCC Professional without WinCC Professional Runtime

If only WinCC Professional V20 Engineering is installed on a PC and error messages are displayed in the download dialog after installing an update, install at least the simulation from the DVD with WinCC Professional Runtime. It is recommended that you then install the latest WinCC Runtime Professional update.

Power tags that can be configured in the engineering system and the compatibility of licenses and devices

Available License	**Devices that can be used**						
	Unified devices			Additional devices			
	WinCC Unified PC	Comfort Panels	Basic Panels	Professional	Advanced	Comfort Panels	Basic Panels
WinCC Unified Basic ES	No	No	Yes	No	No	No	Yes
WinCC Unified Comfort ES	No	Yes	Yes	No	No	Yes	Yes
WinCC Unified PC 10k ES	Yes (10k*)	Yes	Yes	No	Yes	Yes	Yes
WinCC Unified PC 100k ES	Yes (100k*)	Yes	Yes	Yes	Yes	Yes	Yes
WinCC Unified PC max ES	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WinCC Basic	No	No	Yes	No	No	No	Yes
WinCC Comfort	No	Yes	Yes	No	No	Yes	Yes

Available License	Devices that can be used						
WinCC Advanced	Yes (10k*)	Yes	Yes	No	Yes	Yes	Yes
WinCC Professional 512	Yes (10k*)	Yes	Yes	Yes (512*)	Yes	Yes	Yes
WinCC Professional 4096	Yes (10k*)	Yes	Yes	Yes (4096*)	Yes	Yes	Yes
WinCC Professional max **	Yes (100k*)	Yes	Yes	Yes	Yes	Yes	Yes

* Maximum number of possible PowerTags

** The Information refers to the engineering system. A max license means that there is no limit to the number of power tags in the configuration. However, this does not mean that they are available in unlimited form in Runtime. The licensed number of RT licenses, which is either 250k or 500k applies there.

Example:

The following devices can be configured with the WinCC Professional 4096 license:

- WinCC Unified PC up to 10k PowerTags
- WinCC Unified Comfort
- WinCC Unified Basic
- WinCC Professional up to 4096 PowerTags
- WinCC Basic/Comfort/Advanced

Runtime scripting

If the "SmartTags" object is used within faceplates, the object can only access the tags of the faceplate. The object has no access to device tags.

System function

The "LookUpText" system function is executed synchronously.

No OPC UA server for client project

If a client project is executed in Runtime Professional, the OPC UA server is not executed as it does not have its own project.

The OPC UA server only runs if a client system has its own project.

Support for HSTS (HTTP Strict Transport Security)

WebNavigator

HSTS is supported for the WebNavigator website as web client for displaying runtime on local computers and on standalone client computers.

1. Add the HTTP and HTTPS websites to the trusted sites in the Internet options on the client computer.
2. Make sure that the HTTPS connection is established before attempting to use HSTS.

HSTS only supports the standard ports.

WebUX

HSTS is not supported.

Web client

HSTS is not supported for runtime on a Web client.

DataMonitor: Hardware and software requirements

To install and use the DataMonitor option, please note the hardware and software requirements.

Recommended values for an optimal configuration:

DataMonitor server

		Recommended
DataMonitor server on WinCC server for more than 10 clients	CPU	Intel® Core™ i5E, 5 GHz
	Work memory	8 GB
DataMonitor server on WinCC server with WinCC project in runtime	CPU	Intel® Core™ i5E, 5 GHz
	Work memory	8 GB
DataNavigator server on the WinCC server	CPU	Intel® Core™ i5E, 5 GHz
	Work memory	8 GB
DataMonitor server on WinCC single-user system or WinCC client with own project	CPU	Intel® Core™ i3-6100U, 3.5 GHz
	Work memory	8 GB

DataMonitor client

	Minimum	Recommended
CPU	Dual core CPU, 2.5 GHz	Dual core CPU, 3 GHz
Work memory	3 GB	4 GB

Software requirements

- Access to the intranet/Internet or a TCP/IP connection to the web server.
- Microsoft Internet Information Service (IIS) is installed and configured during the WinCC installation

- DataNavigator server on the WinCC server:
  WinCC basic system or WinCC file server
  If you want to publish information on the intranet, you need a network-compatible computer, a LAN connection and a name resolution system that resolves computer names into IP addresses.
  If you want to publish information on the Internet, you need an Internet connection and an IP address from your Internet service provider (ISP), a network card that is suitable for connecting to the Internet and a DNS registration for your IP address.
- DataMonitor server on WinCC single-user system or WinCC client with own project:
  WinCC basic system or WinCC file server, Microsoft Office
- DataMonitor client:
  Microsoft Office

4.4.3 Improvements in Update 3

This update contains the following improvements and changes:

Stability and performance

The stability and performance have been improved based on the feedback received and other factors.

Microsoft Message Queuing services

WinCC Runtime Professional requires Microsoft Message Queuing services.

These services are installed and configured during the installation of WinCC Runtime Professional.

Screen keyboard

The behavior of the screen keyboard has been improved, especially when changing the layout.

4.4.4 Removing an SQL instance

Contents

With the installation of WinCC V20, a new Microsoft SQL Server 2022 instance is installed.

If you already had a version of WinCC Runtime Professional installed, the SQL server is updated automatically.

Note

By removing WinCC Runtime Professional or WinCC Professional you do not remove the instance of the SQL server.

Uninstalling an SQL instance

If you want to uninstall an instance of the Microsoft SQL Server, follow these steps:

1. Open the Control Panel.
2. Click "Remove program".
3. From the list of installed programs, select the version of Microsoft SQL Server to remove and click "Remove/change".
4. Click "Remove" in the dialog.
5. In the "Select instance" dialog, select the instance "WINCC" and click "Next".
6. In the "Select functions" dialog, click "Select all" and then "Next".
7. In the "Function rules" dialog, click "Next".
8. In the "Ready to uninstall" dialog, click "Remove".
9. After removal is complete, click "Close" in the "Completed" dialog.