

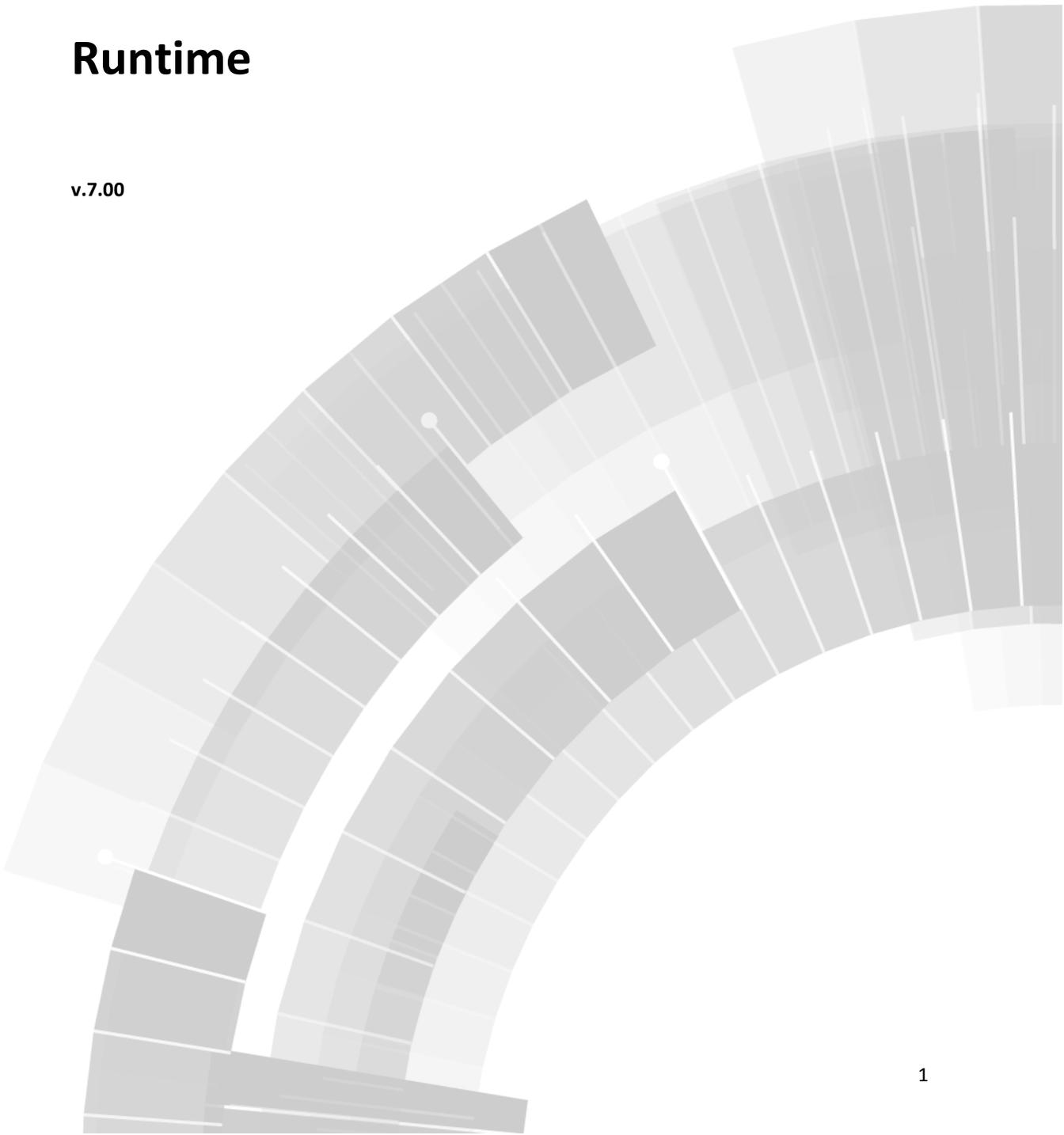


COPADATA
do it your way

zenon manual

Runtime

v.7.00





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1. Welcome to COPA-DATA help

GENERAL HELP

If you miss any information in this help chapter or have any suggestions for additions, please feel free to contact us via e-mail: documentation@copadata.com (<mailto:documentation@copadata.com>).

PROJECT SUPPORT

If you have concrete questions relating to your project, please feel free to contact the support team via e-mail: support@copadata.com (<mailto:support@copadata.com>)

LICENSES AND MODULES

If you realize that you need additional licenses or modules, please feel free to contact the sales team via e-mail: sales@copadata.com (<mailto:sales@copadata.com>)

2. Runtime

Here you will find information on the operation possibilities in the Runtime.

*zenon consists of the engineering environment - the Editor - and the Runtime:
Projects are created in the Editor, operation and monitoring is done in the Runtime.*

 **License information**

The zenon Runtime must be licensed. The license is calculated according to the used TAGs or IOs. For details about licensing see chapter Licensing.

The Runtime is available as zenon Supervisor and as zenon Operator for >Embedded operating systems. The versions differ in their functionalities. For details see Restrictions for zenon Operator.

 **Attention**

Screen resolution: Use the standard operating system settings for the optimum display of Runtime (100%).

3. Starting the Runtime

You can start the Runtime as follows:

- ▶ from the Editor
 - by pressing key `F5`
 - via symbol `start Runtime` in the tool barRuntime files
- ▶ via the Startup Tool
- ▶ via the Windows start menu
- ▶ using Windows Autostart.

DIENST ZENADMINSRV

The `zenAdminSrv` service must be started to start the Runtime. If the service is not available, you will see the "Runtime cannot be started because the 'zenAdminSrv' service cannot be located!" error message.

When starting using Windows Autostart you receive an error message "Waiting for service 'zenAdminSrv' to start". Then zenon tries to start the Runtime up until the service is available or you close the error message by clicking **cancel**. Then the Runtime is not started.

FUNCTION "WINDOW TO FOREGROUND"

The Runtime can be moved behind other running programs with the help of function `Window to the background`. With function `Window to foreground` it is moved to the foreground.  **Info**

At moving the Runtime to the foreground the Runtime window is defined as the topmost window. At this the alarm status line is covered. In order to get the alarm status line back to the foreground, you can:

- ▶ activate the system keys (deactivate project setting `Lock system keys`) and get back the alarm status line via `Alt+Tab` to the foreground
- ▶ activate the Windows task bar and click on window **Status**
- ▶ move the Runtime back to the background
- ▶ restart the Runtime

4. Compatibility Runtime files

The zenon Runtime is backward compatible. The Runtime can always load projects from older version and interpret and display these projects in accordance with their version.

Projects from version 6.20 SP4 on can be started directly without being converted first. Projects with a lower version number must be converted beforehand.

A mixed operation is also possible. This means: With the multi-project administration projects from different versions can be loaded and run at the same time.

ONLINE COMPATIBILITY

The Runtime online compatibility makes interoperability of Runtime systems (also via web clients) in the zenon network possible even if the version of the client Runtime is higher than the version of the server Runtime.

The current Runtime can load projects of the following versions:

- ▶ 6.20 SP4
- ▶ 6.21 SP0
- ▶ 6.21 SP1
- ▶ 6.22 SP0
- ▶ 6.22 SP1
- ▶ 6.50 SP0
- ▶ 6.51 SP0
- ▶ 7.00 SP0

Due to the multi-project administration projects from different versions can be loaded. For example the I-project can have version 7.00, a sub-project version 6.51 and another sub-project version 6.22 SP1. Mixed operation also works in the network. With this different versions can also be started with the zenon web client.

Attention: Server and standby server must have the same version.

COMPATIBILITY BETWEEN THE EDITOR AND RUNTIME:

With the zenon Editor, Runtime files can be created for different versions of Runtime. The Runtime version therefore does not need to correspond to the Editor version. This backwards-compatibility is particularly suited for use of mixed systems. For example: A project that was planned with Editor 6.50 can also be started with Runtime 6.22.

Attention

If, in a project with a later version of the Editor, properties are shown that are not available in the earlier version, these are not available. This can lead to unwanted results in Runtime.

CREATING RUNTIME FILES

To create Runtime files in the editor for earlier versions:

1. Select the project in the project tree
2. Navigate to the `General` section in project properties
3. Open the `Create RT files for` property drop-down list
4. Select the desired version:
 - `Default`: The Runtime files are created for the current version of the editor
 - `6.20 SP4`: The Runtime files are created for version 6.20 Service Pack 4.
 - `6.21 SP0`: The Runtime files are created for version 6.21 Service Pack 0.
 - `6.21 SP1`: The Runtime files are created for version 6.21 Service Pack 1.
 - `6.22 SP0`: The Runtime files are created for version 6.22 Service Pack 0.
 - `6.22 SP1`: The Runtime files are created for version 6.22 Service Pack 1.
 - `6.50 SP0`: The Runtime files are created for version 6.50 Service Pack 0.
 - `6.51 SP0`: The Runtime files are created for version 6.51 Service Pack 0.

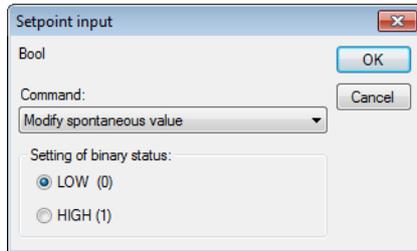
Attention: In order to ensure consistency of Runtime files, all Runtime files must be newly created each time this property is changed. The configurations for all drivers are converted. Settings that do not exist in the respective version are set to the default setting.

5. Operating during Runtime

Depending on the device and the engineering mouse and/or keyboard are available to you as input devices in the Runtime.

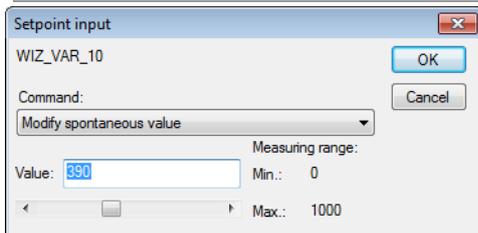
5.1 Mouse

A single click with the left mouse button on a dynamic element opens (depending on the setting of the dynamic element) the standard dialog for setpoint input. Depending on the data type of the variable the following dialogs are opened:



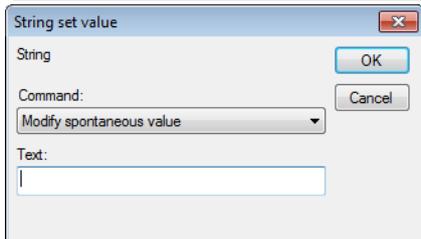
Possible operations are:

Command	Action
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC
Switching and modes. Spontaneous value	Combination of the two commands above
Switch to alternate value	Display substitute value (value from variable definition), if spontaneous value was displayed before
Modify alternate value	Set new substitute value for variable
Switching and modes. Substitute value	Combination of the two commands above
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Presetting of set status	- LOW (0) - HIGH (1)



Possible operations are:

Command	Action
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC.
Switching and modes. Spontaneous value	Combination of the two commands above.
Switch to alternate value	Display substitute value (value from variable definition),if spontaneous value was displayed before.
Modify alternate value	Set new substitute value for variable
Switching and modes. Substitute value	Combination of the two commands above.
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Value	New numerical value (within defined measuring range).



Possible operations are:

Command	Action
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC
Switching and modes. Spontaneous value	Combination of the two commands above
Switch to alternate value	Display substitute value (value from variable definition), if spontaneous value was displayed before
Modify alternate value	Set new substitute value for variable
Switching and modes. Substitute value	Combination of the two commands above
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Text	New text

LASSO

Dynamic elements which are linked with a variable or function can be pre-selected with the lasso in the Runtime and therefore be used for VBA events.

SELECTION PER LASSO

To select elements with the lasso in the Runtime, you must:

- ▶ activate property `Runtime settings/Runtime lasso` in the project settings
- ▶ activate property `Runtime/selectable with lasso` in the property of the dynamic element

In the Runtime several methods for selecting elements are available:

- ▶ Select elements: Left-click on a free area and move lasso over the screen elements while holding the mouse button pressed.

- ▶ **Extend selection:** `Ctrl+mouse click` on an element in order to select/deselect it in addition to the other elements already selected
- ▶ **Add elements:** While spanning the lasso press and hold `Ctrl` in order to add elements to the existing selection
- ▶ **Cancel selection:** Spanning a lasso which does not contain elements.

5.2 Keyboard operation

You can use the keyboard also for the complete navigation and operation in the Runtime. At this the focus is first set to a frame. There you can navigate with the cursor keys and carry out a function with the Enter key. The control is carried out with the following functions (on page 13):

- ▶ Focus: set to frame
- ▶ Focus: Delete from frame
- ▶ Move focus
- ▶ Focus: Activate input to the element with the focus

The order in which the elements are selected is defined via the allocation of index numbers (on page 16) to the elements of a screen. The definition of the navigation order also works with **linked symbols**.

The keyboard operation can also be carried out with freely allocated shortcuts such as `Ctrl+M`. The shortcuts can be assigned to each operation element at the property `Key combination`.

5.2.1 Functions

For engineering the keyboard operation use the following functions:

FOCUS: SET TO FRAME

This function sets the focus to a defined frame when operating the keys in runtime.

To configure the function:

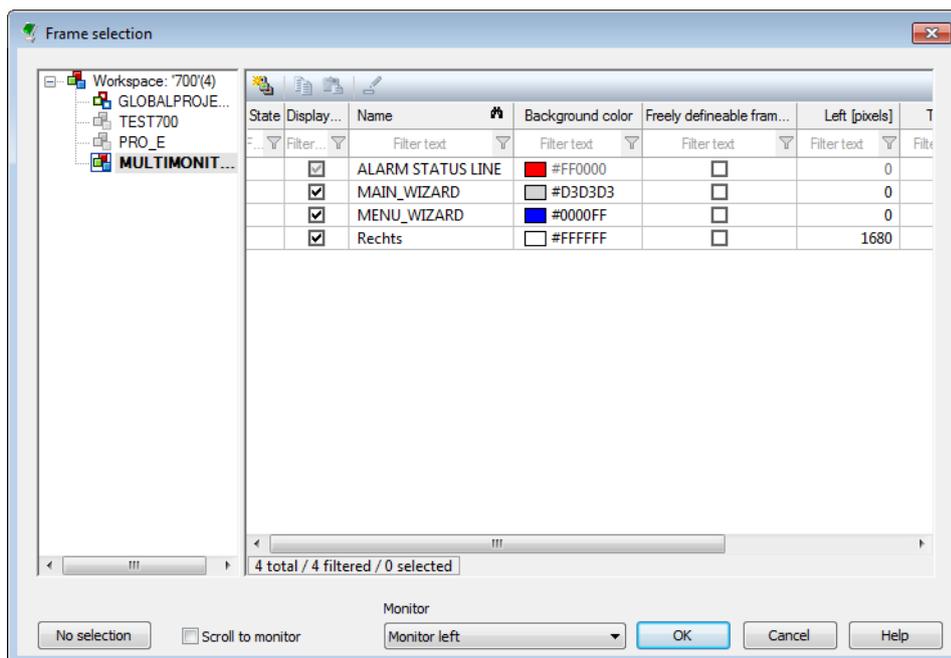
1. Select, in the list of functions, in the Screens node, the `Set focus to frame` function
2. The dialog for selecting a screen is opened
3. select the frame you wish to assign
4. For multi-monitor projects, select the virtual monitor for opening the frame

The frame with a focus is displayed with a frame in runtime. The line width and color of the frame are defined in the `Graphical design/Screens` node in project properties.

FRAME SELECTION DIALOG

In the `Frame` selection dialog, frames can be selected for the execution of functions, from:

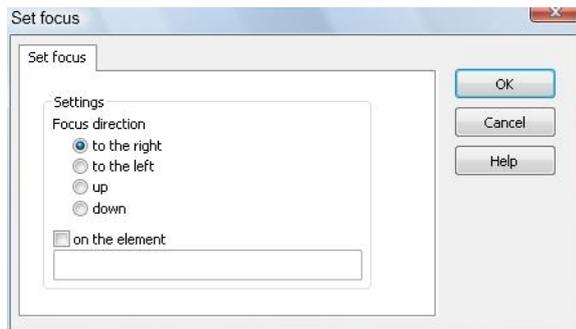
- ▶ Current project
- ▶ Subprojects
- ▶ All projects in the workspace with the `Keep project in memory` option active



Parameters	Description
Project tree window	Displays all projects in the workspace. Frames can be selected from the current project and from all projects with the Keep project in memory option active
Frames window	Selection of frame. If several frames are selected, the first selected frame is used for the execution of the function.
Show this dialog in the Runtime	Switches to this frame selection dialog when this function is executed in Runtime.
No selection	Has no function for this selection.
Scroll to monitor	Active: Scroll bars are shown in Runtime, which make it possible to scroll to the monitor. Only available with multi-monitor systems.
Monitor	Selection of the monitor from the drop-down list. This contains: <ul style="list-style-type: none"> ▶ Current monitor ▶ All virtual monitors defined in the monitor administration Optional: All monitors Only available with multi-monitor systems.
OK	Applies settings and closes dialog.
Cancel	Discards all changes and closes dialog.
Help	Opens online help.

MOVE FOCUS

This function set the focus on a particular element in runtime with keyboard operation and can therefore be used to navigate within a frame.



Property	Action
Direction	Define the direction in which the focus should be moved. The following defined sequence applies in the editor in the context menu or under <i>Edit/change focus sequence</i> . . .
on the element	Definition of the element for the focus. Enter the object name of the element.

ACTIVATE INPUT TO THE ELEMENT WITH THE FOCUS

This function activates the element that is being focused on in the frame selected.

FOCUS: DELETE FROM FRAME

This function takes the focus from the current frame in runtime. To continue operating the keyboard, the focus must be set to a frame again.

5.2.2 Define sort order inside a frame

You define in what sort order the elements in a screen can be selected with the keyboard when engineering the screen:

1. open the screen
2. right-click an empty area
3. select `Shift order for focus` from the context menu

4. select from the drop-down list `Order for left/right` Or `Order for up/down`
5. each element in the screen is displayed with a number in the top left corner
6. click on the element which should be selected first
7. the number of the element changes to 1
8. click on all other elements in the order you want them to be selected
 - Elements which have already been defined change the background color of the number
 - Elements which cannot be selected with the help of the keyboard in the Runtime (property `Focus` is set to the element `inactive`) are displayed with a red number
 - if you click on an element while holding `Ctrl`, the numbering starts with the index number of this element



Info

In the properties of the elements the position is displayed via the properties `Focus position left/right` and `Focus position top/bottom`. These properties are for information only. The index values of the position cannot be changed there.

SYMBOLS

An index can also be assigned to `linked symbols`. During compiling the Runtime files, the symbol is disjointed and its elements are inserted. Thereby the order for selecting the elements which was defined in the symbol is taken into consideration.



Example

There are three elements in a screen: the numerical value `N`, the button `B` and the links symbol `LS`. The linked symbol from the project library receives the three numerical values: `N1`, `N2` and `N3`.

If you define the order in the screen as: `B - LS - Z`,
the order in the Runtime is: `B - N1 - N2 - N3 - N`.

5.2.3 Lock Windows shortcuts

You can lock Windows shortcuts such as `Alt+Tab`, `Alt+Esc` or `Alt+F4` in the Runtime:

In order to lock these shortcuts, deactivate property `Lock system keys` in area `Runtime settings` of the project properties.

Locked are:	Not locked are:
▶ <code>Alt+Esc</code>	▶ <code>Ctrl+Alt+Del</code>
▶ <code>Ctrl+Esc</code>	
▶ <code>Alt+Tab</code>	
▶ <code>Alt+F4</code>	
▶ <code>Key Windows</code>	
all corresponding mouse actions	

To lock all system keys in the Runtime:

- ▶ Activate the `Lock system keys` property
- ▶ start the Runtime via `Keyblock Runtime Start`
- ▶ consider the hints in chapter `protect Runtime files`

6. Runtime profiles

A Runtime profile is a reproducible optical snapshot of the screen in the Runtime including information about:

- ▶ Screen pattern (succession and position)
- ▶ Monitor allocation
- ▶ Filter

Runtime profiles are project- and user-related.

The following screen types support Runtime profiles:

- ▶ Alarm Message List
- ▶ Archive revision
- ▶ Chronological Event List
- ▶ Extended Trend
- ▶ Industrial Maintenance Manager
- ▶ Industrial Performance Analyzer
- ▶ Report Viewer
- ▶ Message Control
- ▶ Variable diagnosis

Every zenon user has an own folder in which he can administrate his profiles. Administrators can see and edit all profiles of all users and copy them to user `System`. From user account `System` all users can load Runtime profiles. It serves as an exchange account for Runtime profiles.

Note: Only administrators an copy to and manage profiles in user account `System`. All other users can only manage their own profiles and load the profiles of user `System`.

PREDEFINED PROFILES

Besides the individual profiles there are two pre-defined Runtime profiles:

- ▶ `DEFAULT`: created by the user and selected as standard profile
- ▶ `LAST`: is automatically saved to the folder of the user when he logs out

Exception: Profile `LAST` is not saved:

- for user `system`
- a temporary login without writting permission

To each zenon user a start profile (on page 24) can be allocated during log in.

Attention

Profiles can only be saved correctly at the Server if all projects are available at the Server:

- ▶ from which screens are called up at the Client
- ▶ which call up screens with a screen switch function

Saving Runtime profiles which do not match these conditions can lead to errors in the Runtime.

6.1 Load and create profile in the Runtime

In order to create a profile in the Runtime you must engineer a respective function (on page 21):

- ▶ Save profile: saves the current profile as it was defined in the function
- ▶ Profile administration (on page 24): opens the administration of the profiles for saving, loading, allocating and administrating profiles

In addition already existing profiles can be activated in the Runtime:

- ▶ Load profile

When loading a profile, the same state as when the profile was saved is restored. The screen structure including all filters as it was when the profile was saved is restored.

Attention: If there are screen switch functions defined at the properties of a screen for functions `Start function` or `End function` - such as (`Screen switch`, `Index screen` or `Screen back`), they are not carried out! All other function types are carried out again.

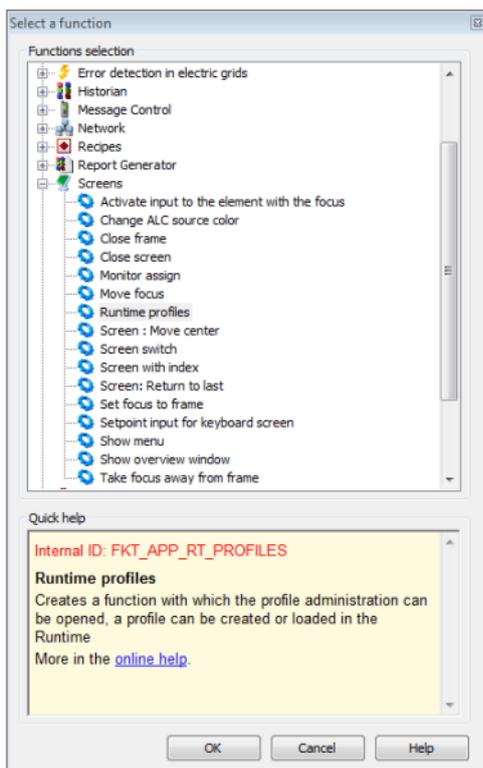
If in those two functions a script is called, the script is carried out completely. Including screen switch functions if there are any. Therefore it can happen that the screen structure after loading the profile does not match the screen structure when saving the profile.

A similar behavior displays variable `Screen active variable`: If a limit which contains a screen switch function is carried out in the variable, the function is carried out and may affect the display in an undesired way.

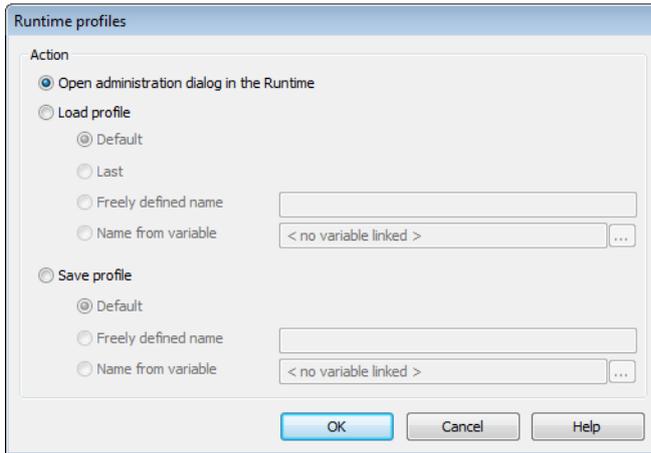
6.1.1 Engineering functions

In order to load, save and administrate profiles in the Runtime, you engineer a function in the Editor and assigned it to a button:

- ▶ select New Function
- ▶ navigate to node **screens**
- ▶ select Runtime profiles



- ▶ the dialog for configuring functions is opened



Property	Action
Open the administration dialog in the Runtime	Opens the dialog for administrating (on page 24), creating, saving and loading profiles in the Runtime.
Load profile	Loads the profile defined in the dialog in the Runtime:
DEFAULT	Loads the profile DEFAULT. It was selected as the standard profile by the user from all existing profiles.
LAST	Loads the profile LAST. It was automatically written to the folder of the user at log out.
Free name	Loads the profile with the name which was defined in the dialog. If the profile does not exist, the current profile is kept.
Name from variable	Loads the profile whose name was generated from the defined variable.
Save profile	Saves the profile which was defined in the dialog.
DEFAULT	Saves the current profile as DEFAULT.
Free name	Saves the profile with the name which was defined in the dialog.
Name from variable	Saves the profile under the name which was created from the variable defined in the dialog.

6.2 Export and import profiles

With the control elements for import and export you can transfer Runtime profiles to other projects and other computers.

To export profiles:

1. create the control elements for import and export in the screen:
Control elements -> Filter profiles -> Import or Export
2. start the Runtime
3. open the screen
4. create the desired profiles
5. save the profiles
6. export the profiles:
these are saved in an XML file and can be imported at the same screen type in another project

To import profiles:

1. save (on page 27) the XML file with the desired profiles at the Runtime computer if it is another computer as the export computer
2. start the Runtime
3. open the screen
4. import the profiles

Info

At the import all existing profiles are deleted. The profile active at the time is not changed.

XML files can only be imported in the screen type in which they were created. If you try to import profiles of other screen types, the import is canceled and an error message is displayed.

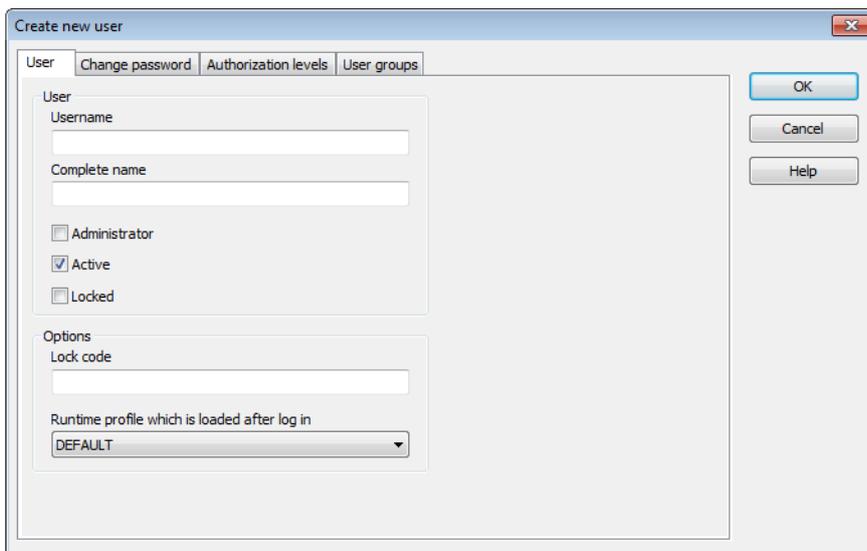
6.3 Allocate and administrate profile

Profiles can be allocated in the Editor and in the Runtime. In the Runtime you can create and save them.

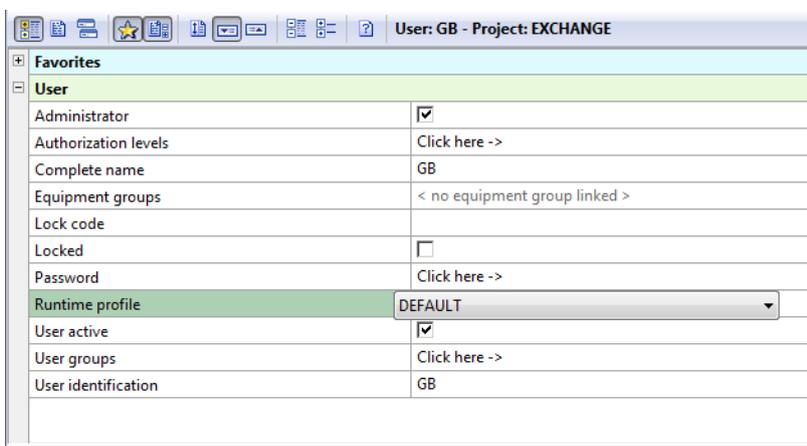
IN THE EDITOR

In the Editor you can allocate Runtime profiles to users:

- ▶ in the dialog for creating a new user with the property `Runtime profile` which is loaded after log in:



- ▶ Via the property `Runtime profile` of a user:



User: GB - Project: EXCHANGE	
Favorites	
User	
Administrator	<input checked="" type="checkbox"/>
Authorization levels	Click here ->
Complete name	GB
Equipment groups	< no equipment group linked >
Lock code	
Locked	<input type="checkbox"/>
Password	Click here ->
Runtime profile	DEFAULT
User active	<input checked="" type="checkbox"/>
User groups	Click here ->
User identification	GB

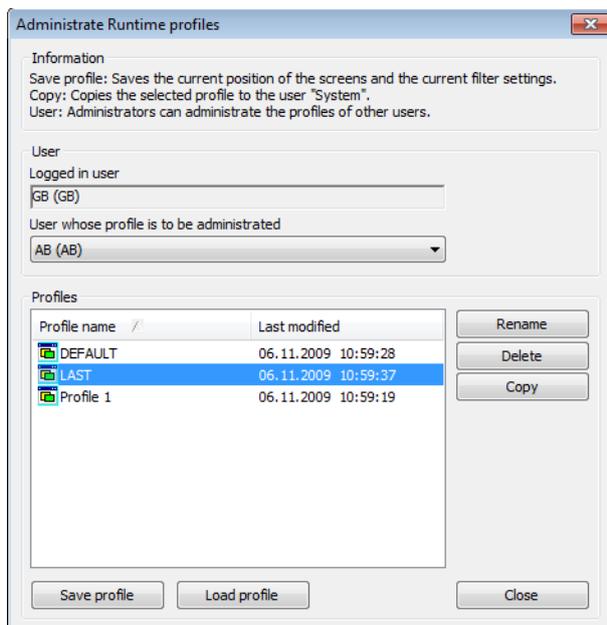
- ▶ In the drop-down list the following settings are available:

- None: No profile is allocated (default setting)
- DEFAULT: Profile DEFAULT is allocated
- LAST: Profile LAST is allocated

IN THE RUNTIME

In the Runtime you can save, load, allocate and administrate profiles with the help of the profile administration. For this you must engineer function (on page 21) Runtime profiles with property Open administration dialog in the Runtime.

Note: Administrators can administrate the profiles of other users.



Property	Action
Logged in user	User who is currently logged in to the system.
User whose profiles are administrated	User whose profiles are displayed and can be administrated.
Profiles	List of the available profile.
Profile name	Name of the profile.
Last modified	Date and time of the last modification.
Rename	Opens the selected profile name in order to rename it.
Delete	Deletes the selected profile after a confirmation message.
Copy	Copies the selected profile to the user <code>System</code> . At this the name can be changed. Hint: Profiles at user <code>System</code> are available for all users which are not logged in.
Save profile	Opens the dialog for assigning a profile name and saving the profile under this name. The following characters are forbidden: Space and the special characters / \ : * ? ! " < > \$
Load profile	Loads the selected profile.
Close	Closes the dialog.

KEYBOARD SHORTCUTS

Key	Action
F5	Updates the profiles' list. At unexpected events in the zenon network such as the loss of server or standby the contents of the list are automatically updated.
Esc	Closes the dialog.
Input	Loads the selected profile.
Ins	Saves the current state of the new profile.
F2	Makes it possible to change the name of the selected profile.
Del	Deletes the selected profile after a confirmation message.

6.4 Storage directories of the profiles

The profile data are stored differently depending on their use in the Runtime:

Type of Runtime	Storage directory
Server or standalone:	Data are stored locally.
Client	Data are stored on the server and are requested and changed interactively.
Standby	Data are stored on the server and are requested and changed interactively and are synchronized locally.

7. Handling of date and time

Date and time in zenon are either local time, UTC time or time periods. The basic principle is that:

- ▶ all times "**from - to**" in filter such as screen switch to AML or CEL are saved in UTC
- ▶ Times in modules such as PFS and EMS are made in local time
- ▶ Time periods are in seconds

Exceptions:

- ▶ the IPA writes historic data in local time as "**datetime**" in the database
- ▶ **Read time from variable** Or **write to variable** does not save times but takes over the local time formatted as string from the control or writes it to the control

UTC

UTC means Coordinated Universal Time. The time unit is second. UTC is the uniform basis for the international time determination and is made available to the public via time senders and other time services. Dependent on the time zone certain time periods must be added or subtracted to or from UTC. This time period can vary one hour because of the day light saving time. Examples:

Country	Local time
Alaska	UTC - 9
Australia, Queensland	UTC +10
Bulgaria	UTC +2
United Kingdom	UTC
Korea	UTC +9
Central Europe (CET)	UTC +1
Central Europe (CET) Day Light Saving Time	UTC +2
Saudi Arabia	UTC +3
USA East coast	UTC - 5
United Arabic Emirates	UTC +4

CONSEQUENCES TO THE CONFIGURATION

Engineered date and time mean different date and time depending on the execution location of the Runtime. For example:

In the Editor you engineer in the PFS for the execution of a function in time zone UTC +1 the local time 14:00 o' clock. After transferring the files to a Runtime in tiem zone UTC +10, the function is carried out at 23:00 o' clock.