zenon guida

SAP interface

v.7.00

COPADATA
do it your way

Contenuto

1. Benvenuti nell'help COPA-DATA

GUIDA GENERALE

Nel caso in cui non abbiate trovato delle informazioni che cercavate o se avete dei consigli relativi al completamento di questo capitolo dell'help, mandate una Mail a documentation@copadata.com (mailto:documentation@copadata.com).

SUPPORTO ALLA PROGETTAZIONE

Se avete delle domande concernenti progetti concreti, potete rivolgervi per E-Mail al support@copadata.com (mailto:support@copadata.com).

LICENZE E MODULI

Nel caso in cui doveste constatare che avete bisogno di altri moduli o licenze, rivolgetevi ai nostri dipendenti all'indirizzo sales@copadata.com (mailto:sales@copadata.com).

2. SAP interface

In order to connect the ERP level to the process level, zenon uses a bidirectional interface to interact with SAP applications. This gives SAP users direct access to the process level.

The control system can be configured to send messages about any type of events to the SAP application. Companies can establish a direct link between the process level and the ERP level via a closed loop, getting a complete overview over all processes – from order management and recipes to production and shipment. This allows them, for example, to monitor warehousing in real-time, as the control system in

the SCADA level provides exact data about real resource consumption. With this, companies get important basic data for just-in-time production but also for long-term planning.

zenon provides an integrated communication module, which makes it possible to transfer process data directly to SAP ERP. In an SAP environment, this data is used, amongst other things, for the following tasks:

- ▶ Transmission of the status of process orders

- ▶ Information about consumption and production of materials

- ▶ Information about the status of resources

- ▶ Transmission of selected process events

Process messages in SAP can be used for tasks such as creating electronic batch and operation logs or updating a process order or the stock of materials.

Informazioni sulla licenza

Must be licensed for Editor and Runtime (standalone, server, standby).

PROJECT MANAGER CONTEXT MENU

Menu item	Action
`Save`	Saves changes in the SAP ERP configuration.
`Export XML all ...`	Exports all entries as an XML file.
`Import XML`	Imports entries from an XML file.
`Editor profile`	Opens the drop-down list that includes pre-defined editor profiles.
`Help`	Opens online help.

💡 **Informazioni**

Measurement documents: (auf Seite 23)

The control system allows to measure the values of process variables according to time schedules and then transfer them to the SAP system as measurement documents. These measurement documents can be used in the SAP system for planning and creating maintenance tasks or for statistical purposes.

💡 **Informazioni**

Maintenance message: (auf Seite 22)

In addition to the measured values from the alarm messages in the control system, it is also possible to create maintenance messages in the SAP system. These reports can then trigger other actions in the SAP system, depending on the workflows defined there. For example, a maintenance message may automatically trigger the creation of a maintenance task for the affected piece of equipment.

💡 **Informazioni**

Function calls: (auf Seite 25)

SAP function blocks can be called up from zenon and executed in Runtime. The zenon SAP function contains a list of objects that display the parameters and tables of the SAP function block.

3. Basics and requirements

In order to use the direct integration into the SAP world, the computer running the control system must also have the SAP GUI installed. The program libraries included in the SAP GUI are absolutely required for communication with an SAP system.

No further configurations on the SAP side are required. Installing the SAP GUI is sufficient for enabling data exchange. The rest of the parameters can be entered right in the development environment.

💡 **Informazioni**

Integration with SAP ERP was tested and approved with SAP interface version "7100.2.92.5705".

Using the RFC interface, actions in the SAP system are executed by calling up function blocks. Function blocks are supplied with the SAP system. User-defined function blocks can also be programmed via the ABAP Workbench. ABAP is a programming language developed by SAP, which is used for all function blocks in the SAP system. The integration in the control system is currently limited to the standard function blocks delivered by SAP. However, we created a flexible interface in the control system that lays the basics for integrating customer-specific function blocks. Extensions to the interface can be made after clearance by the product marketing and by way of standard extension cycles of the product.

The complete descriptions of function blocks with their parameters, internal tables and structures used can be read from the SAP system via RFC API functions or by means of different function blocks.

Integration is performed according to the following procedure:
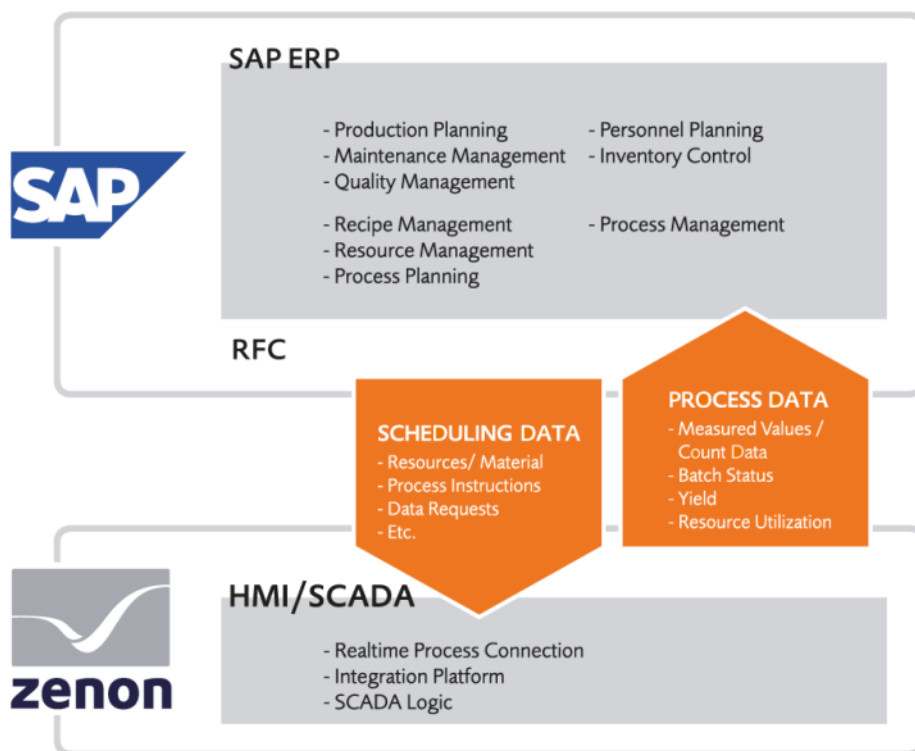
REQUIREMENTS IN ZENON

> 💡 **Informazioni**
>
> *There must be a license for the* `SAP Interface` *module.*

REQUIREMENTS IN THE SAP ERP SYSTEM

> 💡 **Informazioni**
>
> The maintenance module (category logistics) is required as the communication partner in the SAP ERP system.

3.1   Maintenance messages:

The planning system must at all times be informed about malfunctions, downtimes, etc. Productivity indicators can only be calculated correctly when the according uptimes and downtimes are known. The SAP system uses maintenance message**es** for this.

Every maintenance message defined in zenon for a process variable can be configured as a malfunction report. Relevant messages are usually documented in SAP. "Relevant" means that the messages require maintenance services in order to be resolved.

Maintenance messages are created from zenon alarms. When there is an alarm for one of the variables linked to the element, a maintenance message will be created in the maintenance module of the SAP system. If there is a `Cleared event` for an alarm, the maintenance message will be acquired via the document number, and the time stamp of the `Cleared` event will be recorded.

For each type of message from SAP, you own group of message types can be created in zenon. The most significant property of a message in the SAP system is the "notification type". It defines how the message will be processed in the workflow of the SAP system. There are predefined notification types in the SAP system. If you do not specify one of the predefined notification types when trying to create a maintenance message, the SAP system will not create a maintenance message but will return an error message instead.

> 💡 **Informazioni**
>
> *You may also choose to define a maintenance plant and a reporter for every maintenance message. If you do not specify a plant or a reporter, the SAP system will insert default values.*

Every maintenance message refers to an installation part that is predefined in the SAP system. Such an installation part can be a "functional location" or "equipment". Every functional location can in turn contain functional locations and/or equipments.

Every functional location and every item of equipment have a unique identification that must be specified when creating a malfunction report. The identification for functional locations or equipments is taken from the `resources label` of the linked variables. Via the property "`Functional location/Equipment`", you can configure whether the resources label shall be interpreted as the identification of a functional location or an equipment.

You can now link variables to the maintenance messages you just defined. If there is an alarm for one of the linked variables, a maintenance message will be created in the SAP system using the defined parameters and the value and the limit text of the variable.

The maintenance messages receive a unique document number in the SAP system, which will be stored as a comment in the alarm entry of the zenon variable. This allows you to map the alarm event to the document number of the maintenance message in the SAP system.

> ⚠️ **Attenzione**
>
> If an alarm has a dynamic limit text, the comment field of the entry is not available; instead, an entry to the Chronological Event List will be created, which allows to map the alarm to the document number.

3.1.1 Technical background

Maintenance messages in the SAP system are created by executing the function blocks ALM_PM_MAINTNOT_CREATE and ALM_PM_MAINTNOT_SAVE. If the alarm is cleared, the "Cleared time" will be entered into the maintenance message created before by executing the function blocks ALM_PM_MAINTNOT_MODIFY_DATA and ALM_PM_MAINTNOT_SAVE.

These function blocks are created in the SAP system during the standard installation of the maintenance module and are then available for external applications.

> ⚠️ **Attenzione**
>
> *Due to individual adaptations of the SAP system to specific customer requirements, these function blocks may no longer be available! In this case, the SAP system will return the error message FU_NOT_FOUND.*

If the event `Alarm cleared` occurs in zenon for one of the linked variables, the maintenance message belonging to the alarm will be searched via the document number and the time of clearance of the malfunction will be inserted. This happens by executing the ALM_PM_MAINTNOT_MODIFY_DATA function block. The document number of the maintenance message is handed over to the function block with the NUMBER parameter. The values of the fields that need to be changed are specified in the parameter NOTIFHEADER ; the fields that need to be changed are specified with flags in the parameter NOTIF .

The modified maintenance message will then be stored in the SAP database by executing the function blocks ALM_ and BAPI_TRANSACTION_COMMIT.

3.2 Measurement documents

In SAP applications, measured values describe a certain status of a production system at a certain time in the process flow. Any variable existing in zenon can be defined as a measurement document. This allows handing over protocol-independent data from the real time process to the superordinate management level.

In many cases, it is better to aggregate process data already on the process level and then pass it on in a condensed format to the SAP system for analysis. For example, zenon delivers average values and other statistical values calculated from value series to the SAP system. This avoids overloading the management system with raw data.

Measured values and counter readings are recorded cyclically and stored as measured documents for a measuring point in the SAP system. The properties of the measuring point in the SAP system determine whether it is a measured value or a counter. The current variable value is used as the value of the measurement document.

Several measuring points can be defined for every technical location or every piece of equipment in the SAP system. During the definition of the measuring points, you can configure whether the measuring point shall continue a measured value or a counter reading. Counter readings must have monotonously rising values, i.e. every new value you enter must be equal to or higher than the previous value.

Measured values and counter readings of measuring points are passed on to the SAP system by means of what are known as "measurement documents".

In the control system, measured values are recorded according to `schedules`. For every schedule, you can define the weekdays and the times at which measured values shall be recorded. A schedule can be executed either daily or only on specific weekdays. Furthermore, you can define a starting time and an ending time as well as an interval for every schedule. Between the starting time and the ending time, the measured values of the linked variables in the specified interval will be recorded.

You can link a number of values with every schedule. Every time the schedule is executed, the current values of the variables will be read out and a measurement document for every variable value will be created in the SAP system. Every measuring point has a unique number that must be put down in the measurement document. The `resource label` of the linked variables is used to determine the number of the measuring point.

> 💡 **Informazioni**
>
> *The control system variables and the SAP measuring points are mapped via the ID of the measuring point in the SAP system. This unique consecutive number must be entered in the* `resource label` *of the variables in the control system.*

3.2.1   Technical background

Measurement documents for measuring points and counters are created in the SAP system with the function block "MEASUREM_*" . The measurement document is allocated to a measuring point or counter. Whether it is a measuring point or a counter, will be defined during the creation of the measuring point. The measuring point/counter is identified via a unique number in the SAP system.

The measuring document contains the measuring date (date, time), a measured value and its unit, a reporter (creator of the document) and a short text. If the measuring date is not specified, the date of the creation of the document will be used. In case the unit of the measured value is left out, the unit specified at the measuring point/counter will be used.

Setting the COMMIT_WORK parameter causes the document to be written to the SAP database immediately. Measurement documents are created in the SAP system by executing the function block MEASUREM_DOCUM_RFC_SINGLE_001.

> 💡 **Informazioni**
>
> *The MEASUREM_DOCUM_RFC_SINGLE_001 function block is created during the standard installation of the maintenance module in the SAP system.*

> ⚠ **Attention**
>
> *Due to individual adaptations of the SAP system to specific customer requirements, these function blocks may no longer be available! In this case, the SAP system will return the error message* `FU_NOT_FOUND`.

3.3 Function calls

Desired functions in the SAP system can be called up from zenon with very little programming work in VBA and with very little configuration work. To do this, an image of the interface of the function block to be called up is displayed in the editor with the required parameters, tables and structures and linked to zenon variables. The actual function call is made by executing a zenon function (auf Seite 33), which is given this image as a parameter.

FUNCTION BLOCKS

Actions in the SAP system and the transfer of data to the SAP system is carried out by calling up the function blocks. Function blocks are supplied with the SAP system; however user-defined function blocks can also be created via the ABAP Workbench.

PARAMETERS

Data is transferred to and from function blocks via the import and export parameters. Input data is "imported" from the point of view of the function blocks in the SAP system; result data is "exported". The documentation of the function blocks in the SAP system is based on this point of view.

In addition to import and export parameters, there are also changing parameters, which serve for both the transfer of data and the return of results.

INTERNAL TABLES

Data in table form or lists can be transferred in what are known as internal or temporary tables and can be transferred by function blocks.

DATA TYPES, STRUCTURES

In addition to the other simple data types (numerical, text, date, time, etc.), data can also be transferred in structures. Data in tables is usually transferred as structures, but parameters can also take on structured data.

SUPPORT FROM THE SAP SYSTEM

The complete interface descriptions of function blocks including their parameters, internal tables and structures used can be read from the SAP system.

The zenon SAP interface makes use of this possibility in that it offers an assistant (auf Seite 26) to select function blocks and to read in the interface description.

The configured objects are also compared with the interface description of the function block in the SAP system called up when an SAP function is called up.

4. Engineering in the Editor

Measuring points/maintenance messages and function calls can only be configured in the development environment if there is a licensed SAP interface. If this is licensed there are Settings for the SAP connection in the project tree of the `SAP interface` node. Details about the configuration of the parameters are described in the following chapters.
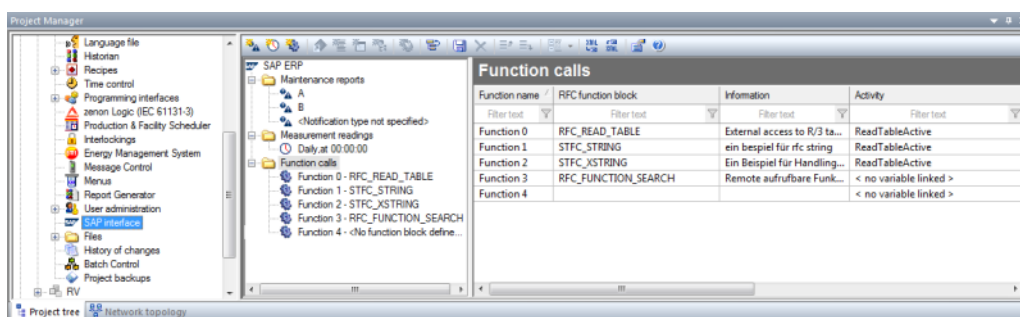
CONTEXT MENU PROJECT MANAGER NODE SAP ERP

Menu item	Action
Save	Saves changes in the SAP ERP configuration.
Export XML all ...	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Editor profile	Opens the drop-down list that includes pre-defined editor profiles.
Help	Opens online help.

4.1   Toolbar and context menus

Symbol	Action
New message type	Inserts a new empty message into the list.
New time plan	Inserts a new empty time plan into the list.
New SAP function	Opens the assistant to select a new SAP function block (auf Seite 26).
Add variable	Opens the dialog for selecting variables.
New parameter	Creates new parameters for the highlighted function.
New table	Creates new table for the highlighted function.
New structure field	Creates a new structure field for highlighted parameters or highlighted table.
Create standard function	Creates a zenon "Execute SAP function" (auf Seite 33) for the highlighted SAP function.
Jump back to starting element	Quando si è passati tramite la funzione **Elementi collegati** nella lista, il simbolo riporta all´elemento di partenza. Nel menu contestuale esistente solamente, se aperto come elemento collegato.
Save	Saves changes in the SAP ERP configuration.
Delete	Deletes the selected entry after a confirmation message.
Move upwards	Moves highlighted element in the detail view up by a position.
Move downwards	Moves highlighted element in the detail view down by a position.
Expand all	Expands all closed structures. Clicking on the arrow next to the symbol opens the drop-down list to select from: ▸ Expand all ▸ Reduce all ▸ Expand selection ▸ Reduce selection
Export XML all ...	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Properties	Opens the property window.

Help	Opens online help.

4.1.1 Context menu node SAP ERP

Menu item	Action
Save	Saves changes in the SAP ERP configuration.
Export XML all ...	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Help	Opens online help.

4.1.2 Maintenance messages context menu

Menu item	Action
New message type	Inserts a new empty message into the list.
Export all XML maintenance messages	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Help	Opens online help.

4.1.3   Maintenance message context menu

Menu item	Action
Add variable	Opens the dialog for selecting variables.
Linked elements	Shows elements linked to the maintenance message in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.
Export selected XML	Exports selected entries as an XML file.
Properties	Opens the properties window.
Help	Opens online help.

4.1.4   Measurement documents nodes context menu

Menu item	Action
New time plan	Inserts a new empty time plan into the list.
Export all XML measurement documents	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Help	Opens online help.

4.1.5   Time plan context menu

Menu item	Action
Add variable	Opens the dialog for selecting variables.
Linked elements	Shows elements linked to the time plan in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.
Export selected XML	Exports selected entries as an XML file.
Properties	Opens the properties window.
Help	Opens online help.

4.1.6   Maintenance message and measurement document variable list context menu

Menu item	Action
Add variable	Opens the dialog for selecting variables.
Linked elements	Shows elements linked to the variable in a drop-down list and makes it possible to jump to these elements.
Remove selected variable	Deletes selected variables from the list.
Help	Opens online help.

4.1.7   Function calls context menu

Function call nodes context menu

Menu item	Action
New SAP function	Opens the assistant to select an SAP function block.
Export all SAP functions	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Help	Opens online help.

FUNCTION CALL TABLE CONTEXT MENU

Parameters	Description
New SAP function	Create new SAP function
Create standard function	Creates a new zenon function to call up the selected SAP function.
Linked elements	Shows elements linked to the SAP function in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.
Export selected XML	Exports selected entries as an XML file.
Import XML	Imports entries from an XML file.
Read in RFC function component from the SAP system	Reads in the interface description of the function block from the SAP system. If no SAP name is given, the assistant to select the function block is displayed.
Display RFC function block documentation	Reads in the documentation of the function block from the SAP system and displays it as an HTML file using the web browser.
Help	Opens online help.

4.1.8   Individual SAP function context menu

SAP FUNCTION CONTEXT MENU

Parameters	Description
New parameter	Create new parameter with the SAP function.
New table	Create new table with the SAP function.
Create standard function	Creates a new zenon function to call up the selected SAP function.
Linked elements	Shows elements linked to the SAP function in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.
Export selected XML	Exports selected entries as an XML file.
Properties	Opens the properties window.
Read in RFC function component from the SAP system	Reads in the interface description of the function block from the SAP system. If no SAP name is given, the assistant to select the function block is displayed.
Display RFC function block documentation	Reads in the documentation of the function block from the SAP system and displays it as an HTML file using the web browser.
Help	Opens online help.

CONTEXT MENU OF THE PARAMETER LISTS OF AN SAP FUNCTION

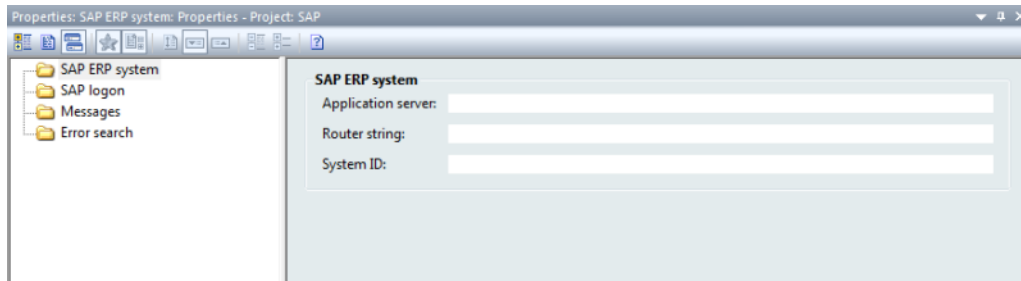| Parameters	Description
New parameter	Create new parameter with the SAP function.
New table	Create new table with the SAP function.
New structure field	Create new structure field for parameter or table.
Linked elements	Shows elements linked to the SAP function in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.

Expand/reduce nodes	Display or hide structure fields of parameters and tables.
▸ **Expand all**	Display structure fields of all parameters and tables.
▸ **Reduce all**	Hide structure fields of all parameters and tables.
▸ **Expand selection**	Display structure fields of all selected parameters and tables.
▸ **Reduce selection**	Hide structure fields of all selected parameters and tables.
Help	Opens online help.

CONTEXT MENU PARAMETER LIST OF AN SAP FUNCTION WITH STRUCTURE FIELD SELECTED

Parameters	Description
New structure field	Create new structure field for parameter or table.
Linked elements	Shows elements linked to the SAP function in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes selected structure fields.
Move upwards	Push selected structure field up by one position.
Move downwards	Push selected structure field down by one position.
Help	Opens online help.

4.2 Connection parameters to an SAP system

In order to establish a connection to an SAP system, some basic parameters must be specified. These are configured in the SAP ERP properties in the project manager detail window.


Parameters	Description
SAP ERP System	Contains settings for the connected SAP ERP system.
SAP logon	Contains settings for the registration on the SAP system.
Messages	Contains information for messages.
Error search	Contains properties for troubleshooting.

You can find details on the individual properties in the properties help for the respective property.

4.3 Maintenance messages:

The planning system must at all times be informed about malfunctions, downtimes, etc. The SAP system uses maintenance messages for this. Every maintenance message defined in zenon for a process variable can be configured as a malfunction report.
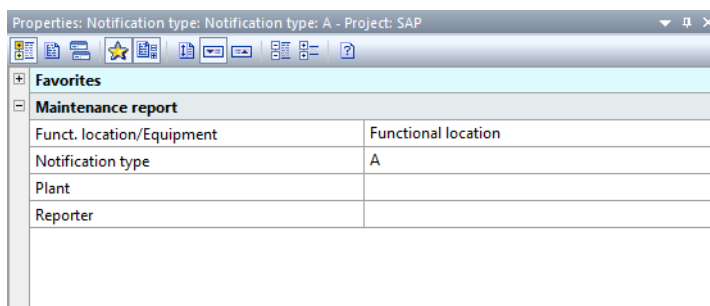
> 💡 **Informazioni**
>
> *If there is an alarm for one of the linked variables, a maintenance message will be created in the SAP system using the defined notification type and the limit text of the alarm. The number of the installation part (functional location or equipment) will be acquired from the resources label of the variable.*

MAINTENANCE MESSAGE CONTEXT MENU (GROUP)

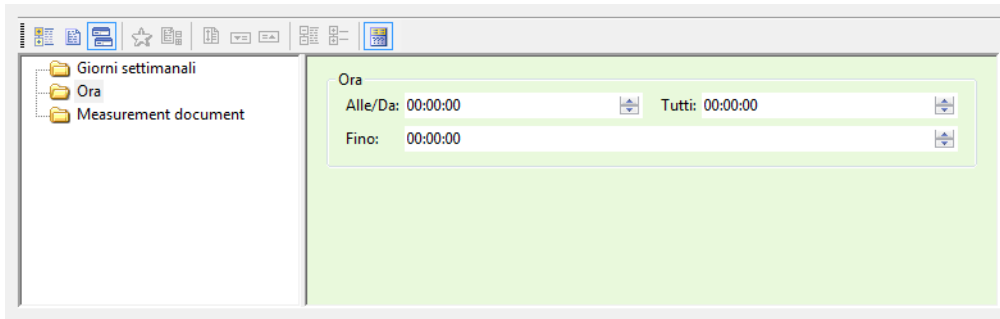| Menu item	Action
`New message type`	Inserts a new empty message into the list.
`Export all XML maintenance messages`	Exports all entries as an XML file.
`Import XML`	Imports entries from an XML file.
`Help`	Opens online help.

MAINTENANCE MESSAGE CONTEXT MENU

Menu item	Action
`Add variable`	Opens the dialog for selecting variables.
`Linked elements`	Shows elements linked to the maintenance message in a drop-down list and makes it possible to jump to these elements.
`Delete`	Deletes the selected entry after a confirmation message.
`Export selected XML`	Exports selected entries as an XML file.
Properties	Opens the properties window.
`Help`	Opens online help.

4.4 Measurement documents

In SAP applications, measured values describe a certain status of a production system at a certain time in the process flow. Any variable existing in zenon can be defined as a measurement document. This allows handing over protocol-independent data from the real time process to the superordinate

management level. Measurement documents are passed on to an SAP system based on a fixed time schedule.

Informazioni

At the times defined in the schedule, the current values of the linked variables are read out. Then, a measurement document in the SAP system is created for every variable value.

MEASUREMENT DOCUMENTS CONTEXT MENU (GROUP)

Menu item	Action
New time plan	Inserts a new empty time plan into the list.
Export all XML measurement documents	Exports all entries as an XML file.
Import XML	Imports entries from an XML file.
Help	Opens online help.

MEASUREMENT DOCUMENTS CONTEXT MENU

Menu item	Action
Add variable	Opens the dialog for selecting variables.
Linked elements	Shows elements linked to the time plan in a drop-down list and makes it possible to jump to these elements.
Delete	Deletes the selected entry after a confirmation message.
Export selected XML	Exports selected entries as an XML file.
Properties	Opens the properties window.
Help	Opens online help.

4.5   Function calls

Actions in the SAP system and the transfer of data to the SAP system are carried out by calling up (auf Seite 27) the function blocks. Function blocks are supplied with the SAP system. However, user-defined function blocks can also be programmed via the ABAP Workbench.

Desired functions in the SAP system can be called up directly from zenon. To do this, an image of the interface of the function block to be called up is displayed in the editor with the required parameters, tables and structures (auf Seite 31) and linked to zenon variables. The actual function call is made by executing a zenon function (auf Seite 33), which is given this image as a parameter.

Note: The SAP RFC interface only permits one function call at a time. To avoid overlapping function calls, the activity can be monitored (auf Seite 29) using a variable.
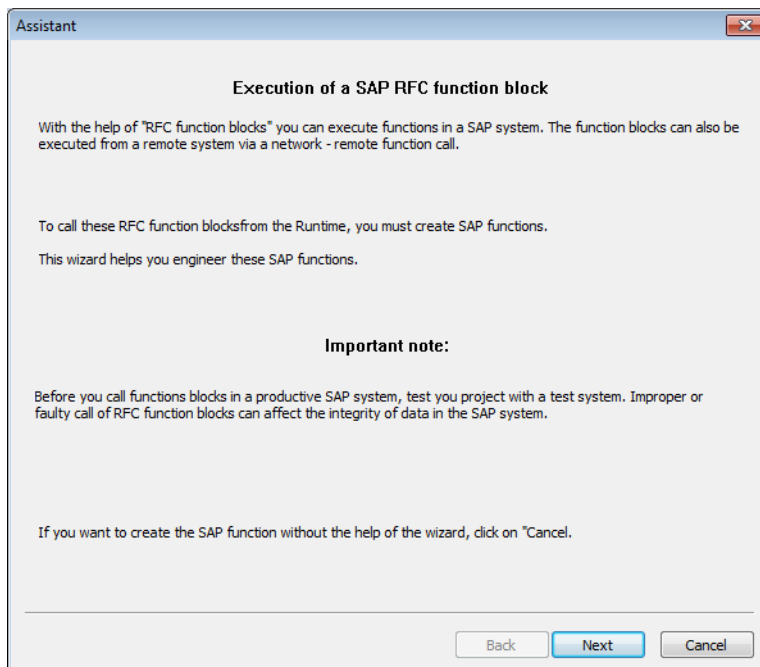
4.5.1   Select function block with assistant

To select a function block from SAP:

1.   In the SAP interface detail view, select the Function calls node
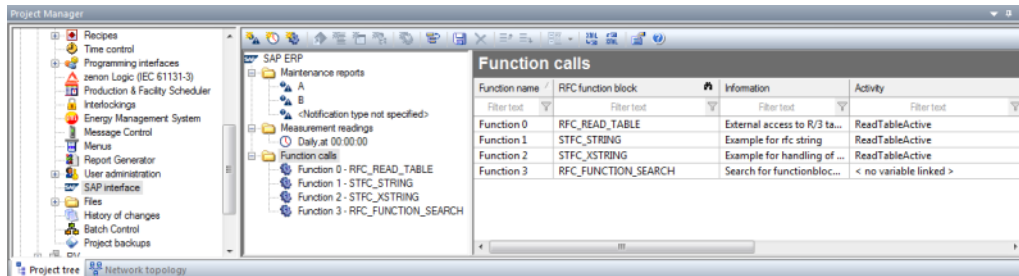
2.   select New SAP function... in the context menu or in the tool bar

3.   The assistant for the selection of the SAP function block is opened (to do this, the setting `Use assistants` must be open in the project options)

Attention: Test your project in a test system before you call up SAP function blocks in a productive system. Errors when calling up can impair the integrity of the data in the SAP system.

4. Select the desired function block.
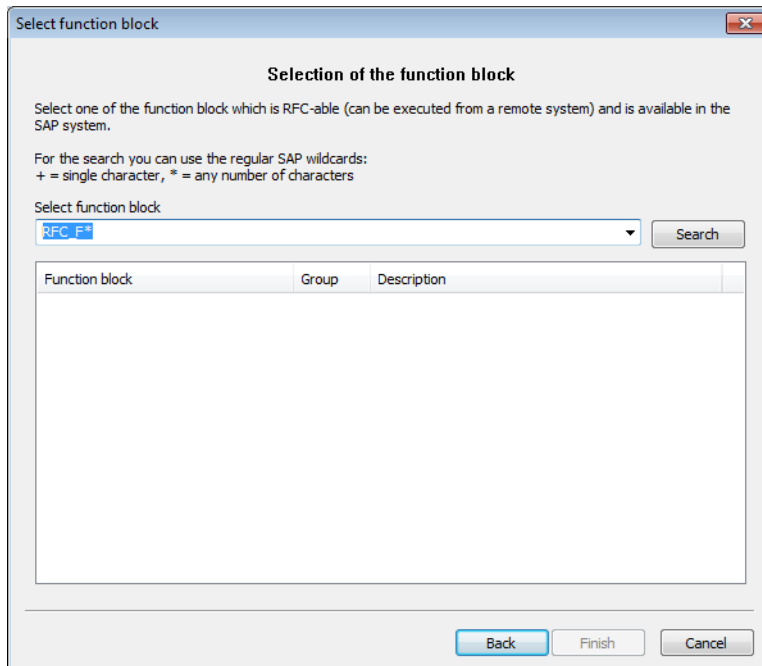
Parameters	Description
Select function block	Combobox for selection of SAP function blocks. The search term can be entered freely or selected from a drop-down list.
List of function blocks	List of function blocks found that correspond to the search term.
Back	Switches back to the assistant start screen.
Finish	Saves function block with all attendant SAP elements in a zenon SAP function.
Cancel	Creates an empty SAP function in zenon

4.5.2   SAP functions

An SAP function displays a function block from the SAP system in zenon. It contains a list of objects that display the parameters and tables of the SAP function block. With an SAP function, variables can be linked that provide information on the call status and result of the last call.

CREATE SAP FUNCTION

SAP functions are created via the `New SAP function` menu item in the context menu of the `Function calls` node or the list of SAP functions.

If the `use assistants` property was activated in the project options, the assistant (auf Seite 26) starts for the selection of an SAP function block. The assistant reads in the interface description of the selected function block from the SAP and creates all objects in the editor.

The SAP functions can also be edited by hand:

▶ To compare the SAP function with the interface description in the SAP system in the process, select the `Read in RFC function block from SAP system` command. If no function block name has been given, the assistant (auf Seite 26) is opened to select function blocks. Settings that have already been defined, in particular linked variables, are not changed in the process.

▶ When creating an SAP function, the `Nome funzione` property receives an automatically-created name for the SAP function; this can be changed at will.

▶ The `RFC function block` property contains the name of the function block in the SAP system. The given name must correspond to the name in the SAP system, otherwise the `FU_NOT_FOUND` Exception occurs when the SAP function is called up.

Error messages

Variables give information on the result of the last call of the SAP function. To do this, the variables are linked with the respective properties:

▶ `Codice di errore`: contains a numerical code that corresponds to the result of the last call.

▶ `Testo di errore`: a short description of the last error code that occurred.

▶ `Descrizione di errore`: extensive description of the last error that is generated by the SAP RFC interface.

ERROR CODES OF THE RFC INTERFACE

Error code	Error text	Meaning
-1	No connection to the SAP system	SAP system cannot be reached (network error, registration etc.).
0	OK	No error occurred.
1	Error occurred	Unknown error, details in the error description property.
2	Exception raised	Exception occurred in the function block (invalid parameter etc.).
3	System exception raised, connection closed	Exception occurred in the system.
4	Call received	Other function call still active.

Hint:

- ▶ The language of the error text depends on the system language of Runtime

- ▶ Not all codes occur when the function blocks are called up.

Activity monitoring

A (numerical) variable linked with the Attività property can assume three different values depending on the status of the SAP function:

- ▶ 0: The SAP function is inactive and is not currently being executed.

- ▶ 1: The SAP function is queued in the call queue (the SAP RFC interface only permits one function call at a time).

- ▶ 2: The function call is being sent to the SAP system; awaiting a response from the SAP system. After this the variable value goes back to 0 (inactive).

This variable can be used for an interlocking to avoid overlapping function calls, for instance.

RFC function block documentation

The documentation for an SAP function block can be called up via the **Display documentation of the RFC function block** in the context menu.

The documentation

- ▶ must be present in the SAP system for this

- ▶ is read in in the language of the registered SAP user

- ▶ Is displayed in the web browser in HTML format.

Documentation that has already been read in is stored in the "Temp" folder of the current Windows user and called up from there next time it is displayed.

INDIVIDUAL DESIGN OF THE DISPLAY

To design the display of the documentation individually:

1. Create a stylesheet with the name `sapdoc.css`

2. Store the stylesheet in the "Temp" folder of the user

EXAMPLE FOR A STYLESHEET

```
BODY,H1,H2,H3,H4,H5,H6,P,TD,TH,UL,DL,DIV {font-family: Geneva, Arial, Helvetica, sans-
serif;}
BODY,TD {font-size: 90%;}
H1 {font-size: 120%; color: 1c1e41;}
H2 {font-size: 110%; color: 1c1e41;}
H3 {font-size: 100%; color: 1c1e41;}
H4 {font-size: 90%; font-style: italic; color: 1c1e41;}
H5 {font-size: 90%; font-style: normal; font-weight: lighter; color: 1c1e41;}
TH {font-size: 90%; font-weight: bold; text-align: left; color: 1c1e41;}
```

4.5.3   RFC function block documentation

The documentation for an SAP function block can be called up via the `Display documentation of the RFC function block` in the context menu.

The documentation

- ▶ must be present in the SAP system for this

▸ is read in in the language of the registered SAP user

▸ Is displayed in the web browser in HTML format.

Documentation that has already been read in is stored in the "Temp" folder of the current Windows user and called up from there next time it is displayed.

INDIVIDUAL DESIGN OF THE DISPLAY

To design the display of the documentation individually:

1. Create a stylesheet with the name `sapdoc.css`

2. Store the stylesheet in the "Temp" folder of the user

EXAMPLE FOR A STYLESHEET

```
BODY,H1,H2,H3,H4,H5,H6,P,TD,TH,UL,DL,DIV {font-family: Geneva, Arial, Helvetica, sans-serif;}
BODY,TD {font-size: 90%;}
H1 {font-size: 120%; color: 1c1e41;}
H2 {font-size: 110%; color: 1c1e41;}
H3 {font-size: 100%; color: 1c1e41;}
H4 {font-size: 90%; font-style: italic; color: 1c1e41;}
H5 {font-size: 90%; font-style: normal; font-weight: lighter; color: 1c1e41;}
TH {font-size: 90%; font-weight: bold; text-align: left; color: 1c1e41;}
```

4.5.4   Parameters, tables and structure fields

When calling up an SAP function (auf Seite 27), data is transferred via parameters and tables. The values of the parameters, tables and their structure fields are taken from the linked variables (incoming parameters) or allocated to the linked variables after the call (return parameters).

CREATE PARAMETERS, TABLES AND STRUCTURE FIELDS

Parameters, tables and structure fields are created via the context menu in the parameter list of an SAP function.

▶ <u>Naming</u>

- When being created via the context menu, the objects receive automatically-created names (`Nome nel sistema SAP` property). These must be changed in such a way that they correspond to the related objects in the SAP system.

- When creating an SAP function with the help of the assistant (auf Seite 26), the names are automatically issued according to the interface description in the SAP system.

▶ <u>Parameters and tables</u>

- When the SAP function is called up, only those parameters and tables are used that are also actually in the interface description of the function block in the SAP system.

- If non-optional parameters or tables are not configured or not linked to variables, they are populated with initial values when the SAP function is called up. This generally leads to an Exception and thus to an error message when a function is called up.

▶ <u>Informative properties</u>

- Some properties of parameters, tables and structure fields (type, optional and info) are only for information. These are populated with the information from the interface description in the SAP system by the assistant when an SAP function is created, but can be changed at any time.

- They are not evaluated when the SAP function is called up. Instead, the actual inputs of the interface description in the SAP system are used.

4.5.5 Link variables

The `Variabile` property is used to link variables of an SAP function with parameters, tables and structure fields (auf Seite 31).

To link variables:

▶ Use either the `Variabile` property in the properties window: Click on the `...` button to open the dialog for selecting variables
or

▶ Drag & drop the desired variable onto an object in the parameter list with the mouse

If structure variables are linked to structured parameters and tables, the variables of the structure fields are also populated with the structure element of the variable if possible.

Attention: This currently only works when linking via drag & drop.

CALLING UP AN SAP FUNCTION

When calling up an SAP function (auf Seite 33), the values of the variables are read, which are linked with parameters and tables for the transfer of data to the function block and are allocated to the parameters and tables.

And vice versa, the parameters and table values that are returned from a function call are allocated to the linked variables.

ROW NUMBER FOR TABLES

Objects for tables can be linked via a variable with the `Conteggio righe` property.

Accepting values:

▸ Before a function call: The value of `Conteggio righe` determines how many rows of the linked (array) variable are transferred to the table.

▸ After the function call: The value provides the number of rows in the table returned from the function call.

4.5.6   Call up SAP functions

SAP functions are called up via a new zenon function type, execute SAP function. The function has the (internal) ID of the SAP function to be executed as a parameter.

To call up an SAP function of zenon in Runtime:

1. Create a new zenon function via *Functions -> Context menu -> New functions*

2. Select **Execute SAP function** in the **Application** node

3. the dialog for configuring functions is opened

4. select the desired SAP function
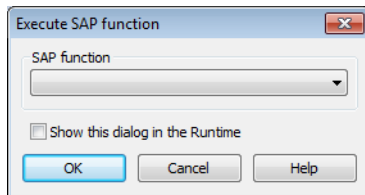
Parameters	Description
SAP function	Drop-down list to select an SAP function. This must already be created in the project.
Show this dialog in the Runtime	Opens this dialog in Runtime before executing the function.
OK	Creates function with selected parameters.
Cancel	Creates function without parameter.
Help	Opens online help.

Hint: In the editor, the Create standard menu item in the context menu can be used to automatically create a function for a selected SAP function, which executes the selected SAP function in Runtime.