

merbon

SCADA

Implementation guide

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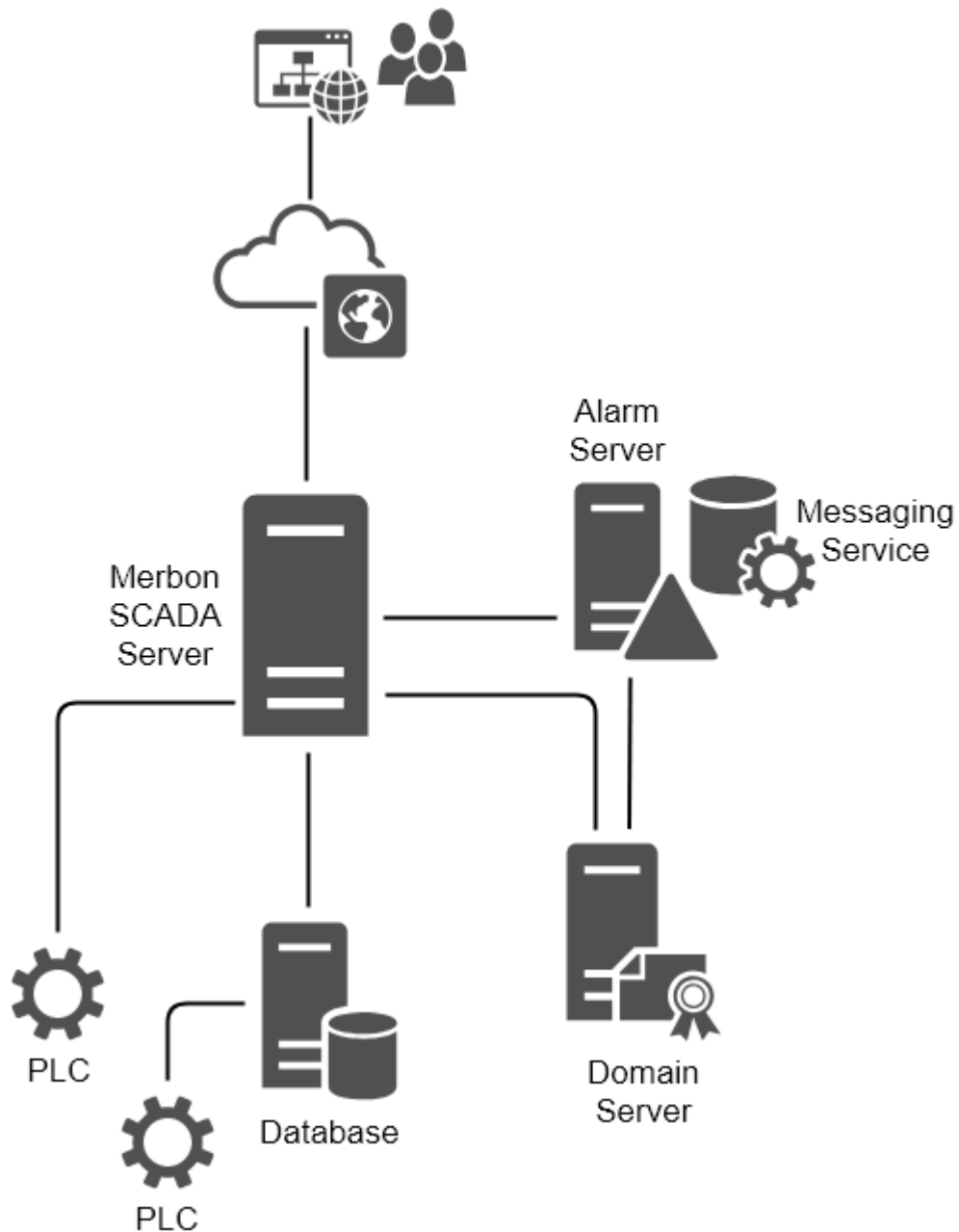
1 Introduction

1.1 Merbon SCADA

Merbon SCADA is a server application used for process visualisation. The package is designed for creating monitor networks of various technologies through telemetric networks and different types of local communication. The system takes advantage of the most modern software tools and communication standards but incorporates a great deal of verified “technically standard” solutions as well. The modularity of the system enables gradual construction of the dispatching sites from the simplest visualisation of metering data to distributed integrated systems. Particular emphasis is placed on high reliability, fast application engineering and easy settings even for less experienced users.

1.2 Project engineering

This manual is intended to describe the process of implementation and configuration of RcWare Vision project in a Merbon SCADA Server environment. In the first part it shows how to set up automatic project launching and periodic trend data saving in a Merbon DB from a PLC or from Merbon SCADA Server. The second part deals with Merbon Alarm Server setup, alarm export, and setup of alarm e-mails and SMS. The last part describes user policies. The final chapter, „Basic problem diagnostics“, helps the user in case of troubles with implementation.



Merbon SCADA Server topology

Merbon SCADA Server manages communication with the PLCs. It establishes and checks the communication with PLCs and displays the current values on its web pages. The trend values may be optionally saved in a database: the data may be written directly by the PLCs, or by the Merbon SCADA Server.

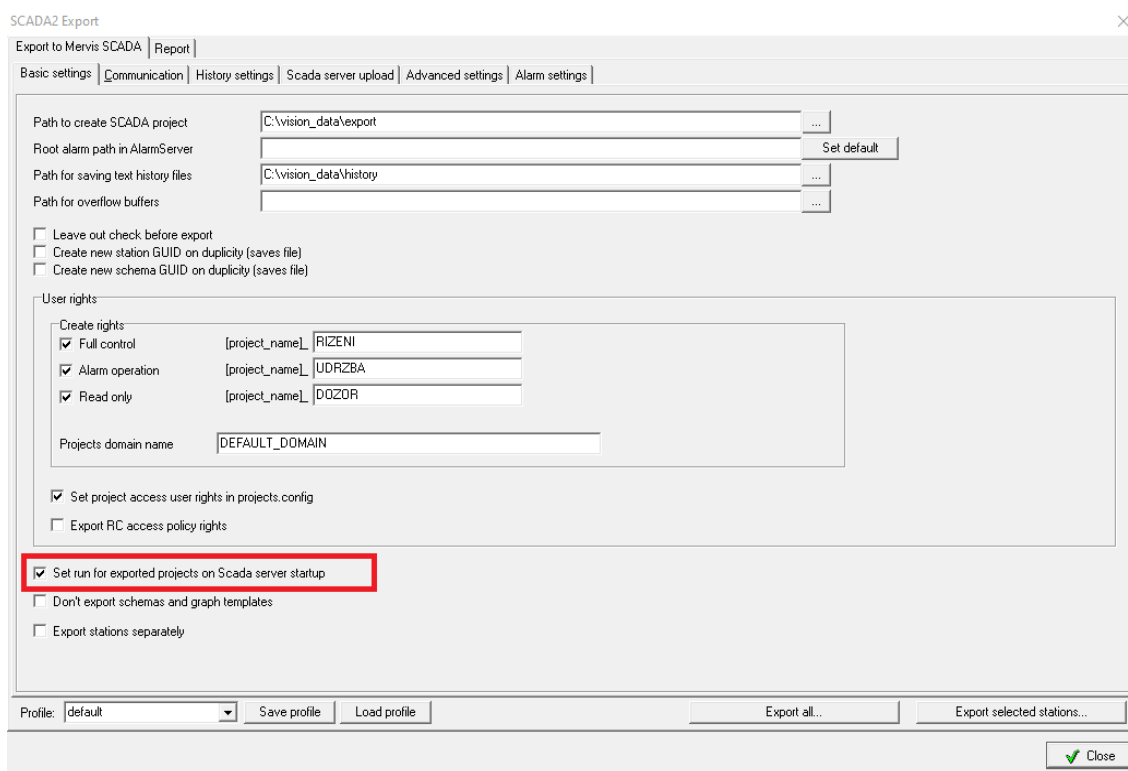
The Domain Server is used for definition of users and user groups. The Alarm Server then controls alarm processing, alarm history saving, and sending of alarm messages.

2 RcWare Vision – The Editor

As a compatibility with RcWare Vision projects is required, projects may be exported to Merbon SCADA directly from RcWare Vision. What must be preserved are all principles of datapoint engineering, mapping to the PLC project data, plant graphics engineering, and communication channel definition (see the engineering notes at <https://domat-int.com/en/downloads/technical-documentation> , *RcWare Vision Function Overview*). This document supposes that the project is fully functional and communicative in the RcWare Vision environment.

There are also parameters which are specific for the RcWare Vision installation rather than for the project. Those parameters which are transferred to the Merbon SCADA Server XML definition files are described below.

2.1 Automatic start of exported projects



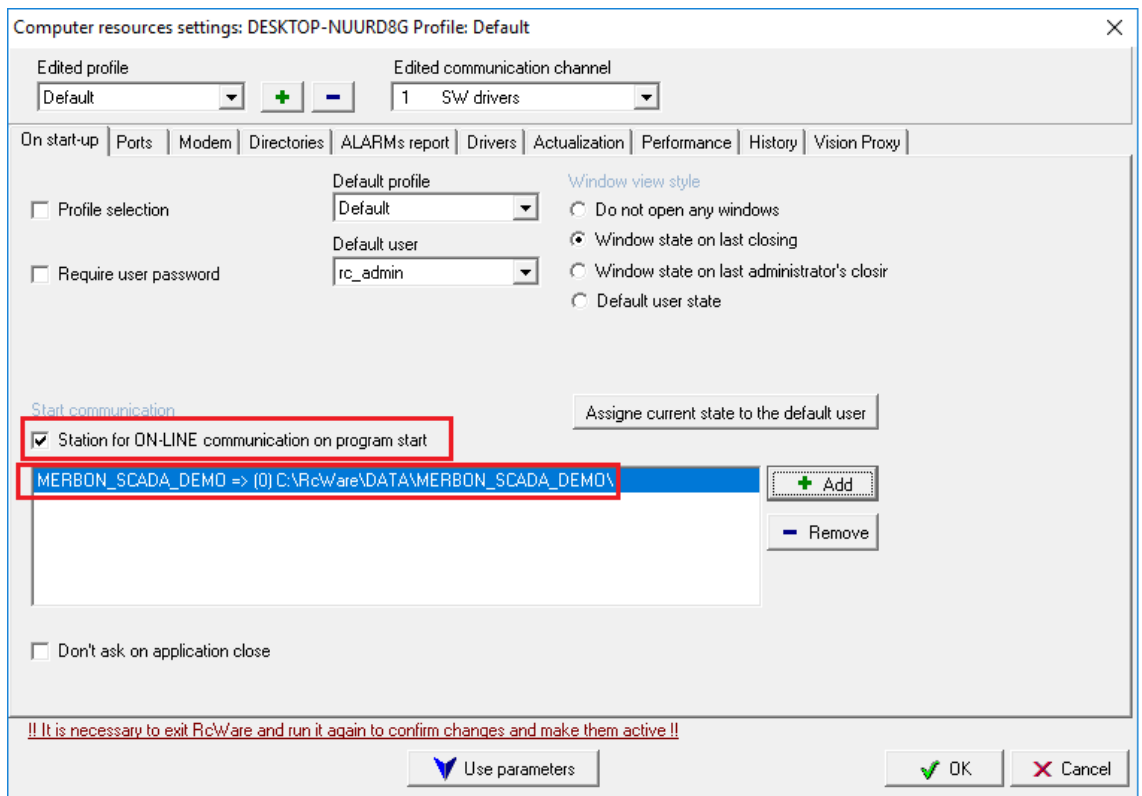
Project start on SCADA server start

Automatic launching of selected projects at start of Merbon SCADA can be configured in the SCADA export dialogue *Settings -> Export to Scada2*. In the *Advanced settings* tab there is an option *Set run for exported projects on Scada server startup*. If this function is enabled, all exported projects in the *behaviors.config* configuration file

will be set to start automatically with the Merbon SCADA Server service start. This option is better than the Automatic project start at startup (see [2.1.1](#)).

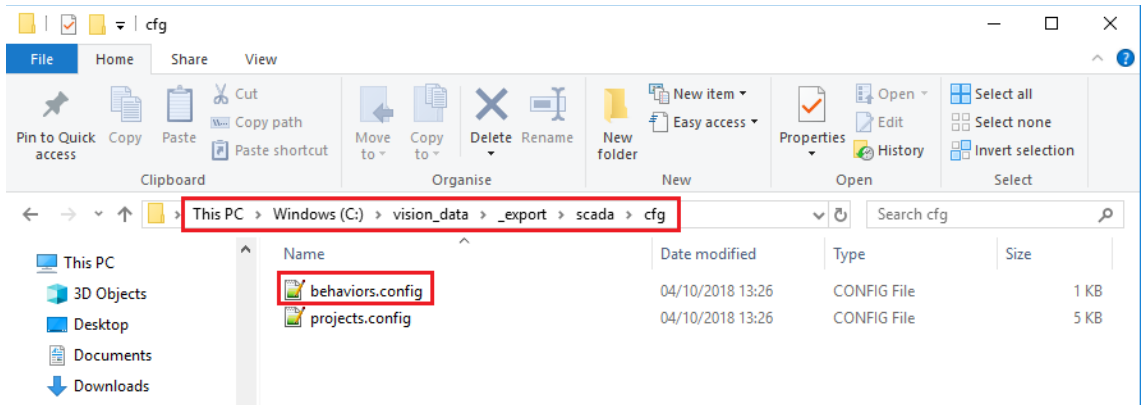
2.1.1 Automatic project start on startup

Another way how to make a project to start automatically is the RcWare Vision automatic project start. When the project definition is exported, the *Settings – PC Resources – On Startup* configuration is included, namely *Stations for online communication on program start*. There is a list of all projects which are launched after the Merbon SCADA server service starts. Click the *Use parameters* button to save settings and apply changes after the RcWare Vision restarts. The disadvantage of this method is that after RcWare Vision is started even as an editor only, all projects which are selected start to attempt to communicate with PLCs, write data into the database, etc. This may be an unwanted behaviour in some situations. It is recommended to use the option which is described in 2.1. It works for Merbon SCADA only, the projects are not started in RcWare Vision.



PC Resources settings

Check the exported configuration in the *scada\cfg\behaviours.config* file.

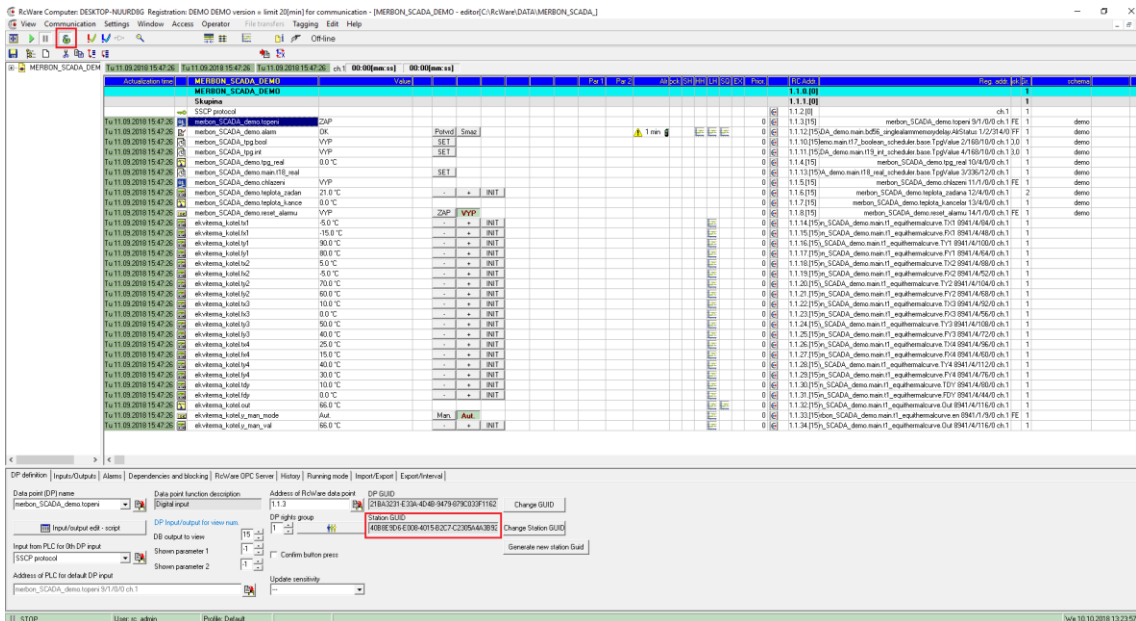


Exported behaviors.config file

A sample from the XML file, according to the configuration above, where the project with its GUID appears at the highlighted line:

```
<?xml version="1.0" encoding="utf-8"?>
<projectBehaviors xmlns:r="http://dev.rcware.eu/serialization/references" kernelId="30303030-3030-3030-3030-303030303030"
xmlns="http://dev.rcware.eu/scada/project-behaviors">
  <behaviors>
    <behavior projId="e2ae9515-d28d-4114-8cd7-78ccdeabbafb">
      <startupRun runCommand="LocalStart" />
    </behavior>
  </behaviors>
</projectBehaviors>
```

The project GUID can be found in the data point editor when unlocked:

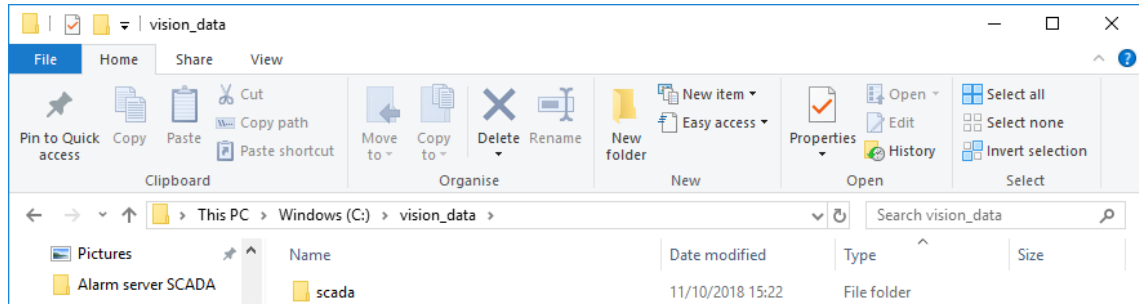


Project GUID

3 Export of SCADA project and upload to Merbon SCADA

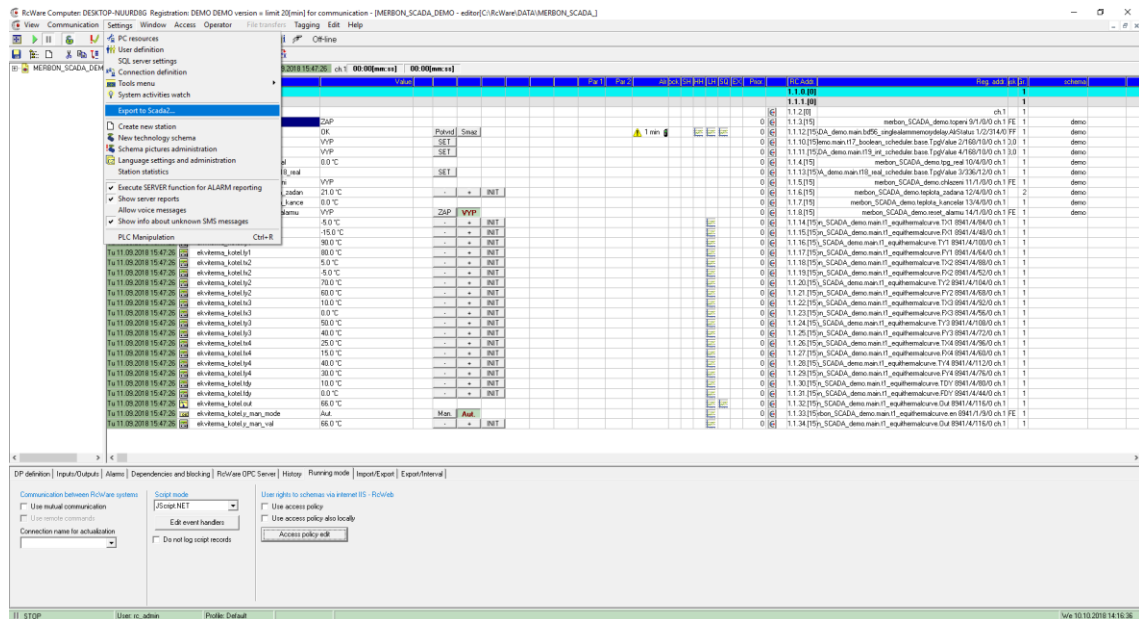
If a previous version of a project had been uploaded to the SCADA server, it is recommended to back it up. Default is „C:\vision_data\scada\projects“.

In the „vision_data“ folder there are already uploaded projects.



The vision_data folder

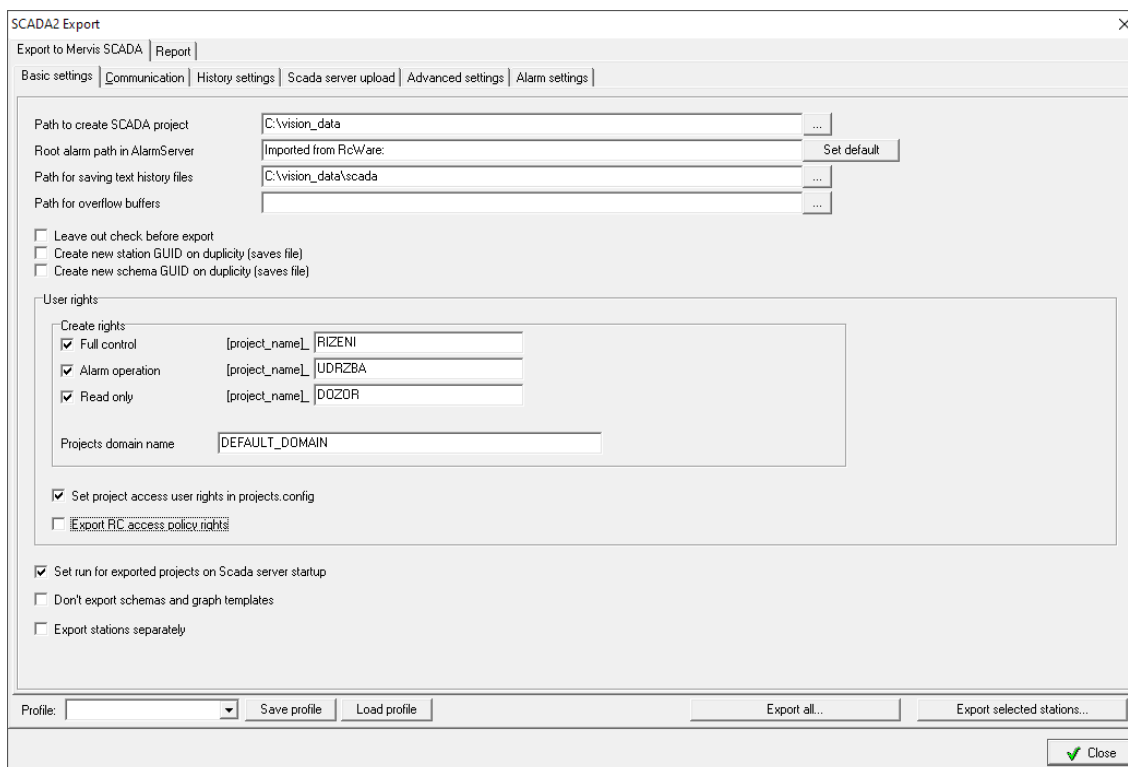
Next, open Settings -> Export to Scada2 in RcWare Vision.



Export to Scada2

3.1 Export dialogue and settings

The Export to Merbon SCADA dialogue is displayed:



Dialogue for Merbon SCADA export

If a project is exported after all necessary parameters have been set up, the dialogue setting is saved for all following exports. The setting also can be saved in profiles – use the „Save profile“ button in the lower part of the dialogue. A profile can be read and activated using the „Load profile“ button.

Dialogue – Basic settings:

- **Path to create SCADA project** – folder where files with Merbon SCADA projects will be exported (folders *cfg* and *projects*)
- **Root alarm path in AlarmServer** – root folder for tree structure of alarm server in a particular project
- **Path for saving text history files** – in case database is not used for history storage. This path is saved in the config file at every project -> projects\<(project GUID)\(project GUID).FILEHISTORYCONFIG
- **Leave out check before export** – check of incompatible settings. If you are sure that it is not necessary, it can be left out. Checking of large project takes more time. If there is incompatibility and the project is not checked, the conversion process returns errors and terminates.

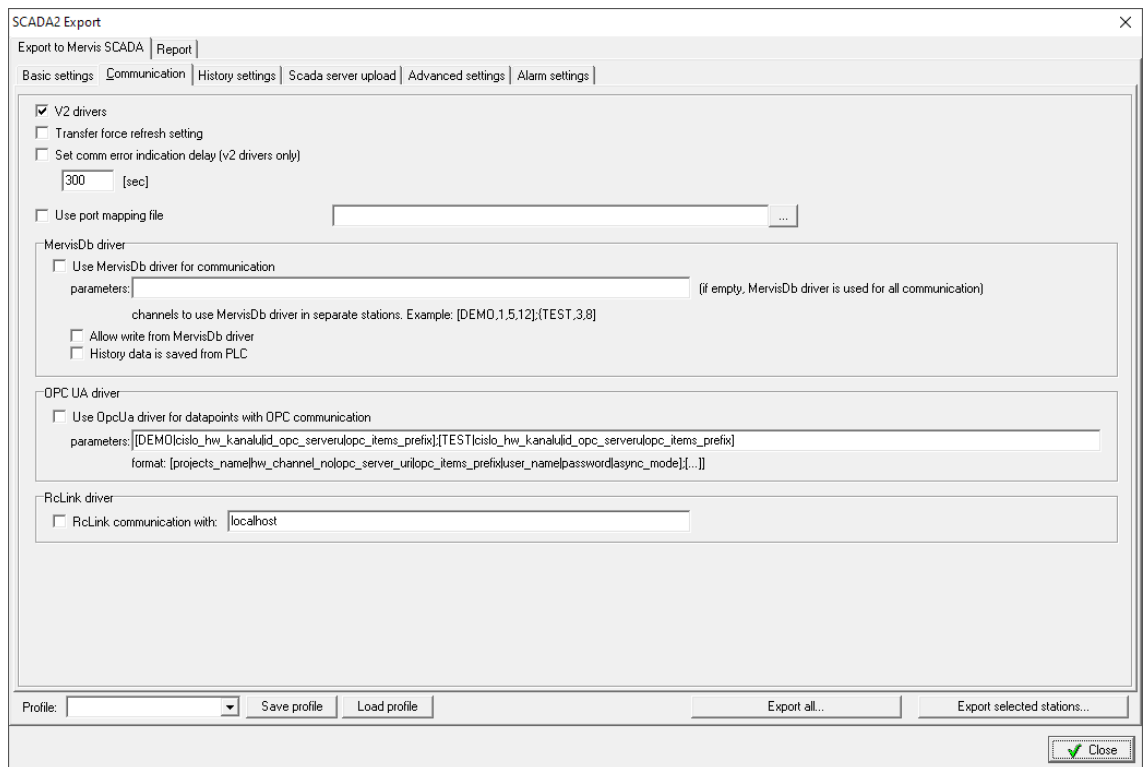
Note: Leaving out check before export can also be useful for more exact specification of an error in the Merbon SCADA server log when attempting to start the service.

- **Create new Station GUID on duplicity (saves file)** – on duplicity, the GUID in the RcWare Vision project is changed as well.
- **Create new schema GUID on duplicity (saves file)** – on duplicity, the schema GUID in the RcWare Vision project is changed as well.
- **Create rights:**
 - Full control [project_name_RIZENI]
 - Alarm operation [project_name_UDRZBA]
 - Read only [project_name_DOZOR]

User groups are created (see 8.2) and exported as far as to the project (*cfg\projects.config*) and schema (*projects\project GUID\schemas\schemas.config*) level and data points.

- **Project domain name** – Domain name at the Domain server. Must be kept as is - „DEFAULT_DOMAIN“.
- **Set projects access user rights in projects.config** – this options allows creation of user groups Full control, Alarm operation and Read only in exported projects.
- **Export access policy rights** - Export of rights to schemas and graph templates (predefined view in RcWare Vision).*projects\project GUID\schemas\schemas.config*
- **Set run for exported projects on SCADA server startup** – always let active. After SCADA server (re)start, projects will start communication to PLCs, which is required in 99 % of installations.
- **Do not export schemas and graph templates** – only the datapoint table will be exported. This is useful if only the datapoint table shall be updated and there are big schemas (plant graphics, floor plans) in the project, which would slow down the export.
- **Export stations separately** – at sites with large number of projects (100+) the projects can not be exported all at once. (RcWare Vision would consume too much resources and Windows would shut it down.) Check this to export projects one after another and save Windows resources.
Note that if there are projects exported which contain schemas with references to other projects, this option must be NOT checked for successfull export. (= All projects must be exported together.)
- **Export all...** - all projects contained in the DATA folder in the RcWare Vision installation will be exported
- **Export selected stations** – only projects selected by user will be exported.

Dialogue – Communication:

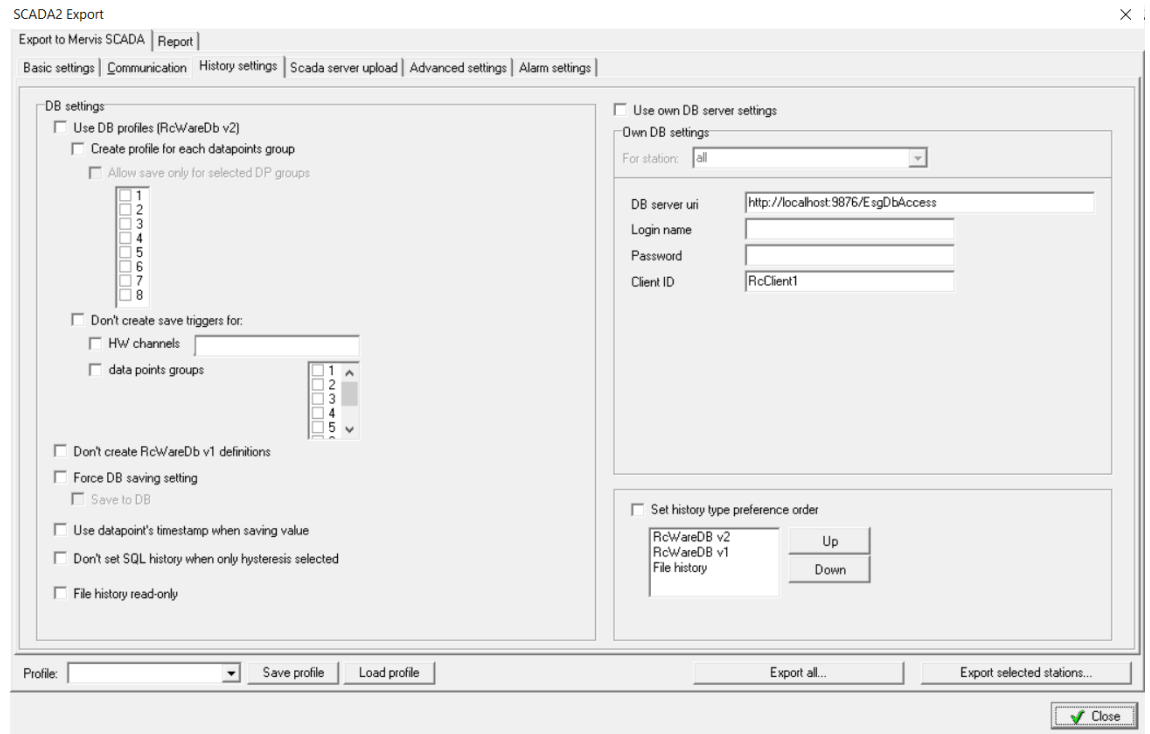


Communication settings

- **V2 drivers** - SCADA used different versions of communication drivers (SSCP, SoftPLC link ...) in the past. Now, V2 drivers are used as a standard. For new projects, this option should be checked.
 - **Transfer force refresh setting** - For SoftPLC Link: If the driver should take the PC time rather than PLC time for datapoint refresh, this is defined in the communication definition data point in RcWare Vision (Force refresh). Check this to take over this setting from the RcWare Vision data file.
 - **Set comm error indication delay (V2 drivers only)** – time delay to indicate communication failure at a data point (caused e.g. by a bad communication line)
 - **Use port mapping file**
 - **Use Mervis DB driver for all communication** – if the data source for the complete project is a database (the communication with PLCs will not be established at all). SCADA only communicates with the database rather than with PLCs.
 - Allow writing from Mervis DB driver
 - History data is saved from PLC: PC actively pushes data to the database
 - **Use OpcUa driver for datapoints with OPC communication** – this setting is used for internal testing purposes only.
- Merbon SCADA does not support OPC communication in the current version.**

- **RcLink communication with:** SCADA communicates to a running instance of RcWare Vision rather than direct to PLCs. Here, enter the IP address of the server where RcWare Vision is running.

Dialogue – History settings

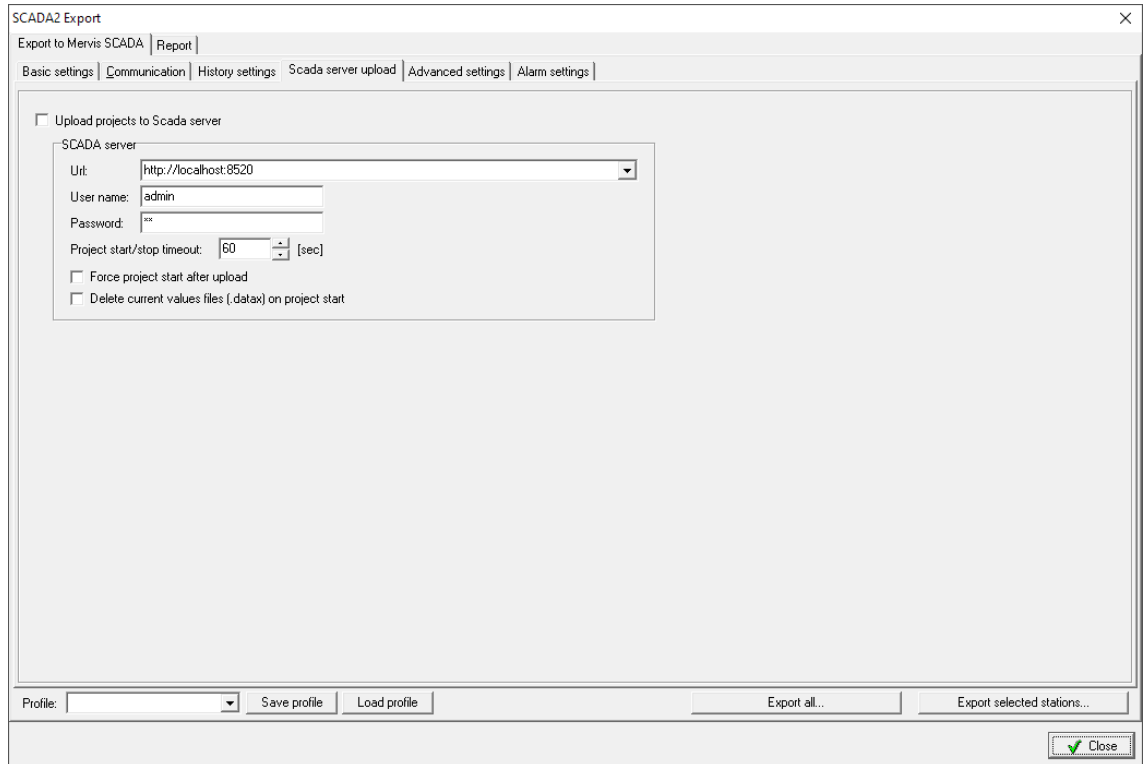


History settings dialogue

- **Use DB profiles** - use more databases from a single project. Now not definable in RcWare Vision.
- **Force DB saving setting** – check to overwrite the *Save data to selected server* in the *SQL Server setting* dialogue. At the selected points, data will be saved to database.
- **Use datapoint timestamp for saving** – normally, the SCADA server timestamp is used when saving data to database. If this setting is enabled, the datapoint timestamp is used instead.
- **Do not set SQL history when only hysteresis selected** - if there is hysteresis history set in the data file, these data points are saved in database automatically (even if the SQL history tag is not set). To prevent this, check this feature, and only the SQL history tagged data points will be saved to database.
- **File history read-only** - History files can be read, yet not written. Old RcWare Vision history files can be used and copied to the respective Merbon SCADA folder to display trends recorded in RcWare Vision.
- **Use own DB server settings** – overrides the DB server settings as in RcWare Vision. Use this when the database settings should not be configured in RcWare.

- **Set history type preference order** - check to apply the set priority of history types.

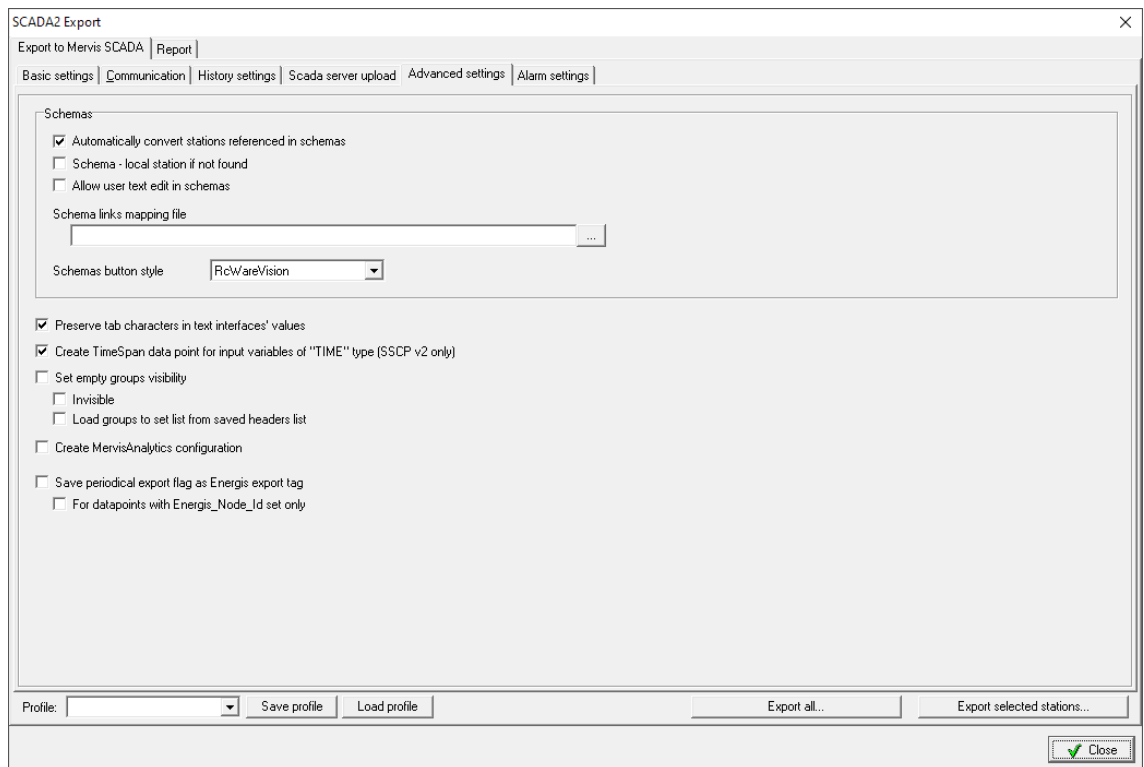
Upload to SCADA server dialogue



Scada server upload dialogue

- **Upload project to SCADA server** – Fill in URL and credentials to Scada server, and upload projects to this server after conversion. The projects must exist on the SCADA server already (= be defined in projects.config), otherwise the upload fails (see chapter 4).
 - **Force project start after upload** – after project upload the project is launched (LocalRun) regardless of its previous state. If unchecked, the project is set to its previous state.
 - **Delete current values files (.datax) on project start** – the .datax file is deleted when restarting. Not necessary to use at version 1.6.6 and later. This option may be useful at older SCADA versions, where the .datax file may contain out-of-date values, and the changes initiated by user would not be reflected in the datapoint table or schemas after the project is overwritten.
!!!Note!!! If there are user-edited texts in the schemas, the .datax file must NOT be deleted. Otherwise all changes in values made by users during the SCADA project operation would be lost.

Dialogue description – Extended settings (only those settings which now affect the exported project properties are described here)

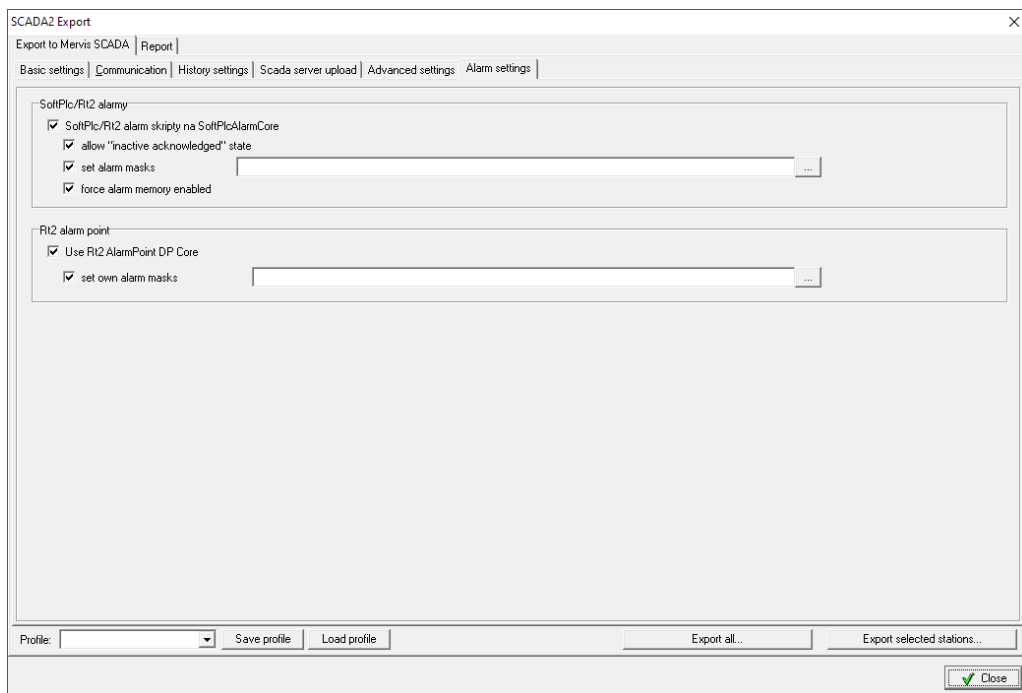


Advanced settings

- **Automatically convert stations referenced in schemas** – this setting is to be let active. If there are references to data points outside of the exported projects in the schemas, connections will be created by exporting .data files from the referenced projects.
- **Schema – local station if not found:** this setting needs not to be enabled at this moment. If a schema contains references to other projects which are not available, the export process tries to find the datapoint in the currently exported project.
- **Enable user text editing in schema** – must be enabled if schemas contain texts to be edited by users when the SCADA service is running (**note** that the .datax files must NOT be deleted when copying the exported SCADA projects to SCADA server).
- **Schema links mapping file**
- **Schemas button style** – style of the default look of buttons in the schemas. There are two options:
 - RcWare Vision – standard look with a 3D effect
 - Mervis – button is displayed as a square which takes over the colours set up in the schema, which indicates if the button is pressed or not.

- **Preserve tab character in text interfaces values** - Fix for a particular case where Tab characters were replaced by space characters unintentionally.
- **Create TimeSpan data point for input variables of TIME type (SSCP v2 only)** – If a TIME value is on a data point input, it will create a TimeSpan data point type rather than take over the RcWare Vision data type
- **Set visibility of empty groups:**
 - **Invisible** – the groups are not displayed in the datapoint table
 - **Load groups to set list from saved header list** – the saved header list to display is loaded.

Dialogue description – Alarm settings



Alarm settings

- **SoftPLC alarm scripts to SoftPLC AlarmCore** - check to use alarm scripts with SoftPLC RT or Merbon RT alarms.
- **Allow „inactive acknowledge“ state** check this option so this state (responding Merbon IDE alarm behaviour) will be included in SCADA export.
- **Set alarm masks** – select a file which contains alarms’ state text values. RcWare Vision includes two files with CZ/EN text values responding Merbon IDE alarm settings in folder on path RcWare\Utilities\ScadaConverter\Resources by default. The texts can be customized and translated.
- **Force alarm memory enabled:** „Active alarms“ bookmark will include all alarms. This is important setting for correct alarms state icons behaviour as well.

3.2 Export

Export may be executed for selected stations only („Export selected stations...“) or for all available projects in the DATA folder („Export all...“). The export process reports the progress in a text window.

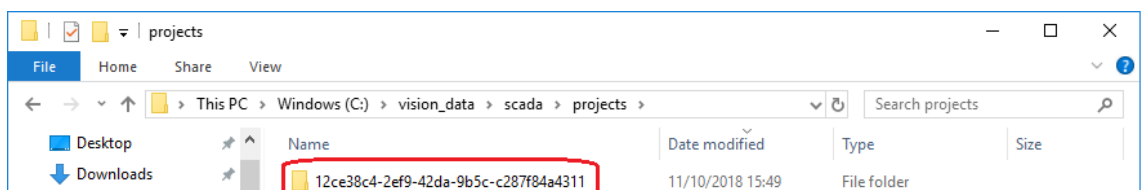
```

C:\RcWare\Utilities\ScadaConverter\ESG.Vision.Proxy.DataConverter.ConsoleTestHost.exe
Scada project converter v. 0.9.18.620
Converting files from C:\Apps\RCWare_Vision\RCWare\Export_vision_data\rc_temp\ to C:\Apps\RCWare_Vision\RCWare\Export_vision_data\
- using v2 drivers
- using SoftPlc Alarm DP Core
- read-only file history
- trying to preserve tabs in string interfaces
- importing as TimeSpan if source variable is SSCP Time
- using "RCWareVision" schema button style
- using schema links mapping file: "(null)"
- base path for overflow buffers: C:\Apps\RCWare_Vision\RCWare\Export_vision_data\scada
Converting project: STANICE
[STANICE]: importing data points...
- reading schema: Rozcesti
- reading schema: Vymenik
[STANICE]: Converting schema: Rozcesti
[STANICE]: Converting schema: Vymenik
Conversion took 2,4243883 sec
Data exported...
Press a key...
    
```

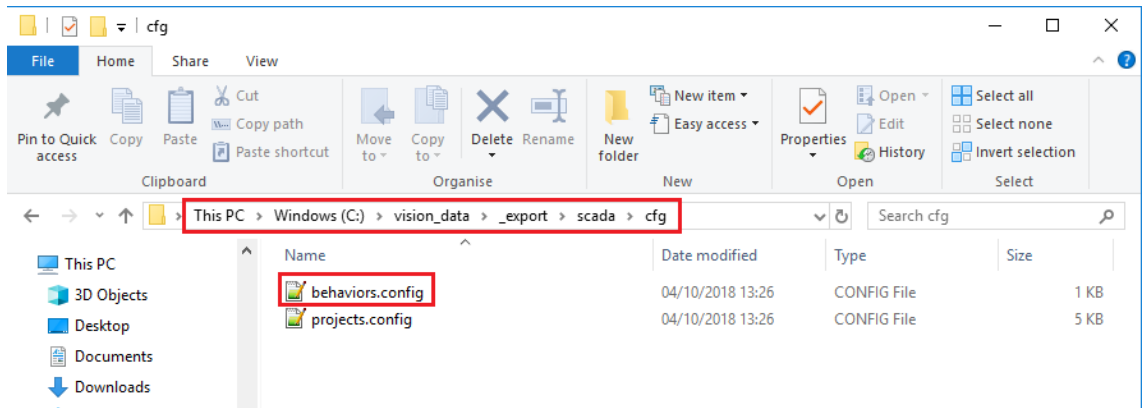
Exported SCADA projekt

If the export has been executed successfully, the dialogue returns message „Data exported“. Press Enter to complete the export process.

In the exported folder, the project is in two folders: „projects“ and „cfg“. If there have been other projects exported into the same folder before, they can be identified by their unique GUIDs (see 2.1.1) or folder creation date.

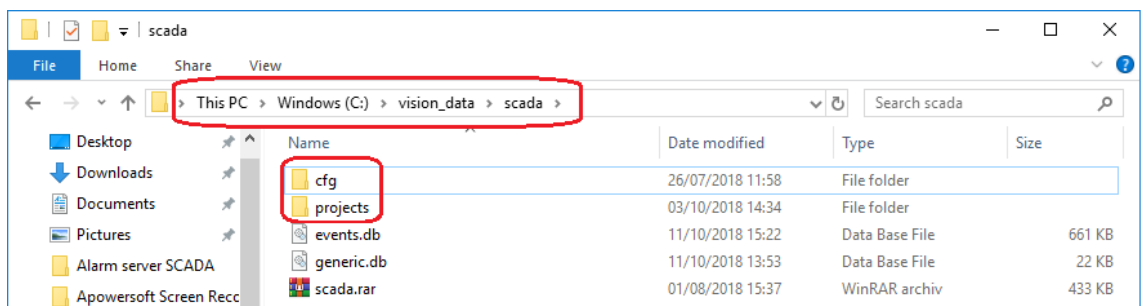


Exported SCADA project





Exported config files

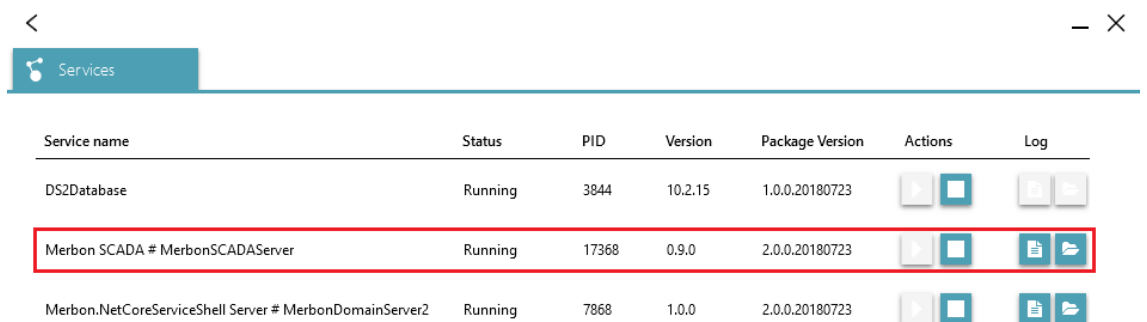
The exported SCADA project folder has to be copied to „C:\vision_data\scada\projects“, and the exported config files to „C:\vision_data\scada\cfg“, as on the screenshot below.



cfg and projects folders in vision_data

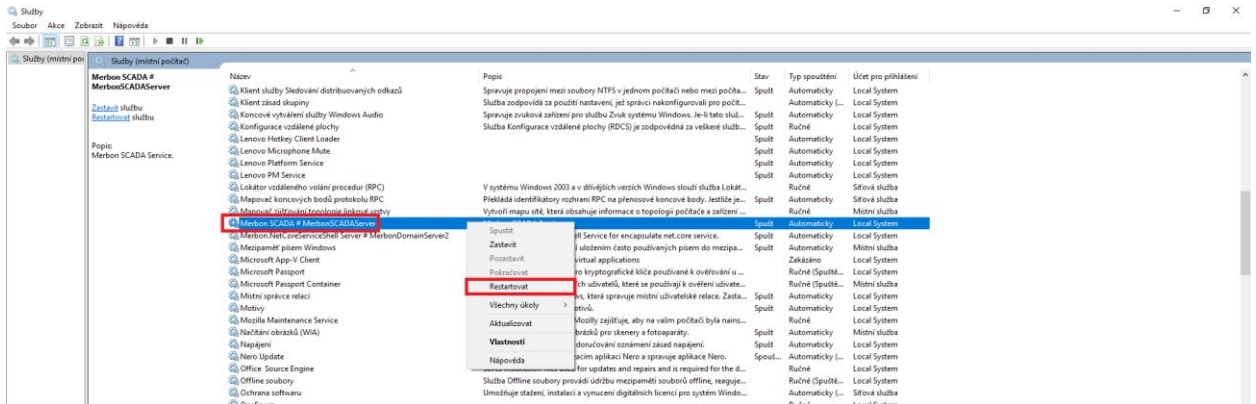
Then restart the Merbon SCADA service „Merbon SCADA # MerbonSCADAServer“.

The service can be restarted from the Merbon SCADA installer in the Services panel by clicking the Stop button  and then the Start button  at the Merbon SCADA # MerbonSCADAServer service.



Merbon SCADA # MerbonSCADAServer service in the installer

Another way to restart the service is to open the PC application *Services* and locate the *Merbon SCADA # MerbonSCADAServer* service. Right click the service and select *Restart*.



Merbon SCADA # MerbonSCADAServer service in the Services application

4 Project update at Merbon SCADA server

4.1 Local update

When updating projects locally, the process is similar to the first export and project upload to Merbon SCADA Server. Several issues must be considered which may affect the successful upload.

First, consider the changes which should be performed at the SCADA server. For standard updates in the data point table or schemas in already running projects, direct upload can be used (Upload projects to SCADA server). The URL will be <http://localhost:8520> with User name and Password of a user who has privileges to edit the uploaded projects (such as the ScadaAdmins group).

In this case, only the datapoint table and schemas are exported into already running projects. No configuration is exported. This means that all configuration files related to the project must be in the respective folders, having been exported before. **Note:** The server is also restarted automatically, and the .datax files may be deleted. Check this option only if projects running on Merbon SCADA older than V1.6.6 are uploaded. In V1.6.6 and more recent this option leads to loss of user defined texts!

If the direct upload function has not to be used, the project can be exported in a standard way and then the newly exported folders copied manually to *C:\vision_data\scada/projects*. The folder names carry the project GUIDs. However, it has to be considered that these folders also contain the RcWare-related configuration of projects. Thus, if a project is exported on another PC, the configuration files must be removed from the export folder before copying (.alrsvrconfig, .filehistoryconfig, .hwconfig, .rcwardbconfig).

If there are changes in configuration required, or new projects are to be added to SCADA Server, please use standard export with the „Upload projects to SCADA Server“ option **not checked**. After export, select which files have to be copied to the *vision_data\scada* folder where the SCADA server reads projects from (the path is *C:\vision_data\scada* by default).

If the number of projects to run on the SCADA server is to be changed (project(s) added or removed), all projects which have to be run after startup have to be included in the export. This information is written into files in the *cfg* folder during

the export. If only new projects would be exported, the information for already running projects would be missing in these files. If a project shall be added or removed from the SCADA server, the whole set of projects has to be exported together, and it must replace the original contents of the *cfg* folder.

If there are no projects to be removed or added, but there are changes in project configuration which have to be included in the export, please execute the standard export, and then copy the *projects* folder into the existing project folder in the C:\vision_data\scada path. A typical example of this change is employing of the alarm server, Merbon Database, or changes in saving of file history.

4.2 Remote upload

To update a project at a remote Merbon SCADA server, the project must already be present in the C:\vision_data\scada folder.

Open the SCADA2 Export dialogue in RcWare Vision in *Settings -> Export to Scada2*. Check the *Upload projects to SCADA server* box. In the *Url* field, enter the URL where the project should be exported to. If the port number at the Merbon SCADA server was not reconfigured, keep the TCP port 8520 as on the image below. The SCADA Server URL may look e.g. like this *http://192.168.2.211:8520*. Enter *User name* and *Password* as defined at the Domain Server. This user must be member of a group which has *Edit* rights allowed in the projects.config file (e.g. default group *ScadaAdmins*).

```
<?xml version="1.0" encoding="utf-8"?>
<projects xmlns:r="http://dev.rcware.eu/serialization/references" xmlns:n1="http://dev.rcware.eu/loc" xmlns:n2="http://dev.rcware.eu/groups" xmlns:n3="http://dev.rcware.eu/permissions" dataVersion="" xmlns="http://dev.rcware.eu/scada/projects">

  <projects> <!-- Defined projects -->
    <project id="e2ae9515-d28d-4114-8cd7-78ccdeabbafb" name="KLAster_BROUMOV" tz="Europe/Prague" r:def="1"> <!-- -Project "KLAster_BROUMOV with assigned number "1" within this XML document -->
      <loc>
        <n1:gps lat="0" lon="0" />
      </loc>
    </project>
  </projects>

  <projectGroups> <!--Defined projects groups -->
```

```

<group n2:name="C:_Apps_RCWare_Vision_RcWare_DATA">

  <n2:tags>

    <n2:tag r:type="52f765d9-6fac-4914-b4bc-5b9d47e70b72">

      <n2:assignments>
        <n2:permissionAssignment>
          <n3:owner type="Group" name="ScadaAdmins"
/> <!--Project group named "ScadaAdmins" -->
          <n3:items>
            <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition
of viewing rights -->
            <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of right to edit projects -->
            <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition
for deleting rights -->

            <n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition of rights to the
data point table -->
            <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition
of rights to graphs -->
          </n3:items>
        </n2:permissionAssignment>
      </n2:assignments>
    </n2:tag>

    <n2:tag r:type="52f765d9-6fac-4914-b4bc-5b9d47e70b72">

      <n2:assignments>
        <n2:permissionAssignment>
          <n3:owner type="Group" name="AllUsers" />
<!--Rights for the user group named: "AllUsers" -->
          <n3:items>

            <n3:i name="View" allow="true" r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition of viewing rights -->

            <n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition of rights -->
          </n3:items>
        </n2:permissionAssignment>
      </n2:assignments>
    </n2:tag>
  </n2:tags>
</group>

```

```

        <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition
of rights to graphs -->
        </n3:items>
    </n2:permissionAssignment>
</n2:assignments>
</n2:tag>
</n2:tags>

<n2:elements>
    <n2:projectItem>
        <project r:ref="1" /> <!-- Users in groups
ScadaAdmins and AllUsers have access rights to project No. "1" -
->

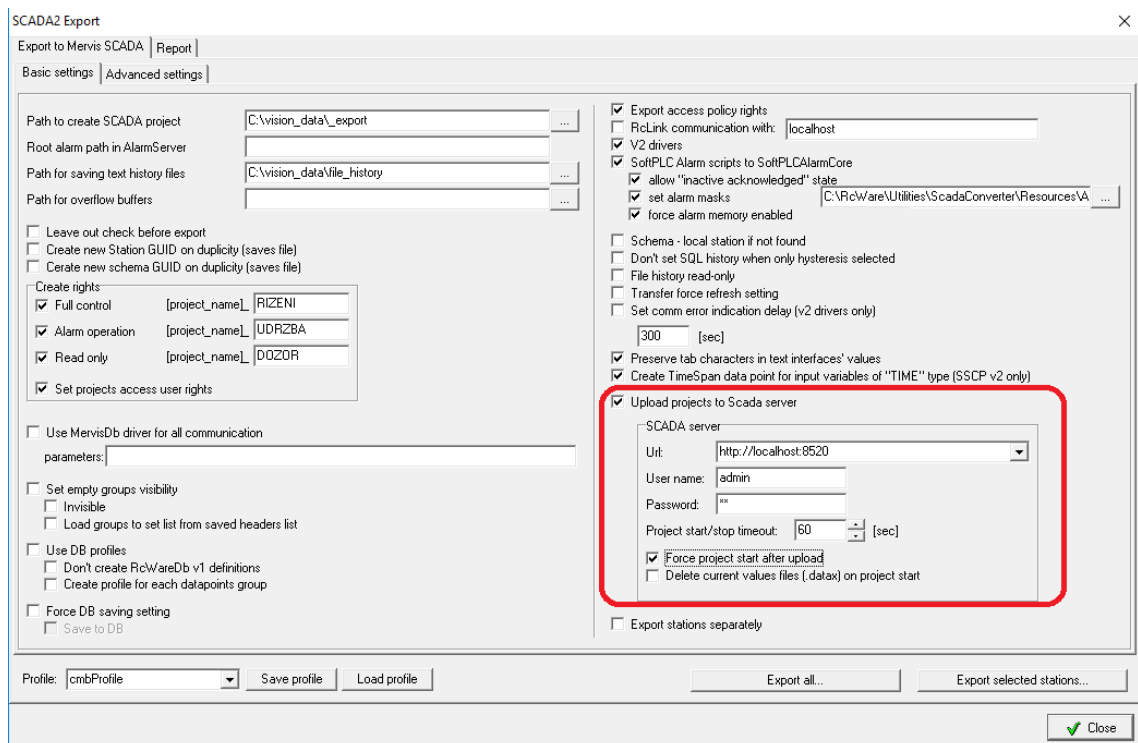
    </n2:projectItem>
</n2:elements>

</group>

</projectGroups>
</projects

```

If the project shall be run automatically after upload to SCADA Server, check the „Force project start after upload“ option.



Project export to SCADA Server

After the export to SCADA Server has been finished successfully, information about uploaded project „Projects uploaded.“ and started project „Starting projects...“ will be displayed.

```

C:\RcWare\Utilities\ScadaConverter\ESG.Vision.Proxy.DataConverter.ConsoleTestHost.exe
- TEST123 : Stopped
Projects stopped.
Getting list of projects charts and schemas:
- "TEST123"
Removing charts from "TEST123"
Removing schemas from "TEST123"
- keeping schema "46ddcfbd-99eb-49b6-b1a9-a79adfd8c4d3"
- keeping schema "61915887-5eb7-444a-99cf-706ee534bb14"
- keeping schema "d286bdad-2623-4e27-9f11-696689e3d80e"
- keeping schema "f33c51e4-0950-4fd4-a3ce-af423290b0a5"
Uploading projects...
Sending project data for "TEST123"...
Sending project charts for "TEST123"...
Sending project schemas for "TEST123"...
- "schema3"
- "schema2"
- "schema3"
- "schema4"
- elapsed: 0 sec
- "TEST123": Stopped
Projects uploaded.
Starting projects...
- "d7a61d57-a0ff-49f2-a66d-5e12d96735c1"
- elapsed: 0 sec
- TEST123 : LocalRun, Starting
Projects started.
Conversion took 6,693289 sec
Data exported...
Press a key...

```

Project upload to SCADA Server

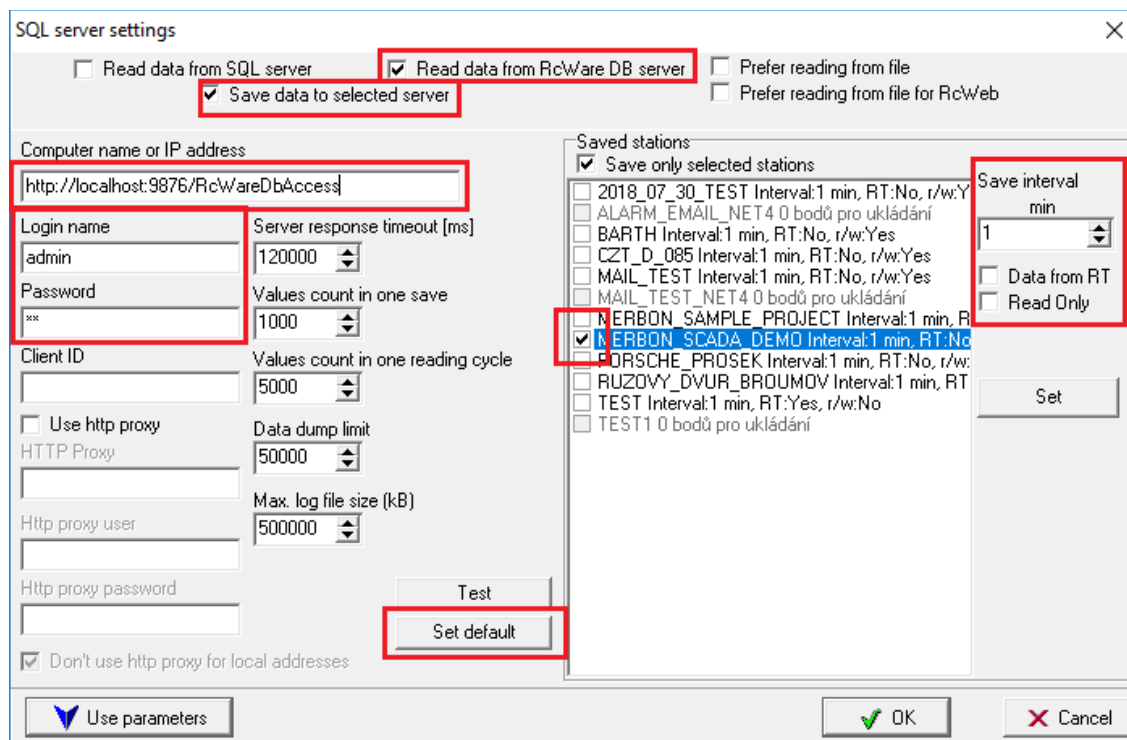
5 History

History data may be saved either as text files in the project folder (file history), or in an external database (Merbon DB). Depending on the preferred way, follow one of the configuration below.

5.1 Merbon DB

If there is a Merbon DB installed in the Merbon SCADA site, please check if the database service is available at port 11112 by opening the <http://localhost:11112/admin> URL. The default user / password for database is admin / rw. After logging in, create a new user for saving data from the PLC or SCADA (of course the existing admin user can be used, too; depending on your security requirements). The credentials are then to be entered in the *SQL Server setting* dialogue in RcWare, or in the *Merbon DB Parameters* configuration item in the PLC configuration in Merbon IDE.

Then, the RcWare Vision has to be configured. Set the Merbon database URL in the *Settings – SQL Server Settings* dialogue, see also the Merbon DB installation notes.



SQL Server settings

Writing to database from Merbon SCADA

The essential settings are marked red in the image above. This configuration allows Merbon SCADA Server to write to the database. Check the *Read data from RcWare DB server* option. Check also the *Save data to selected server* (which is the Merbon DB server) option if the Merbon SCADA server shall read data from PLCs and save them to the database. The projects concerned must be selected (only those projects are enabled which have at least one data point set as *History-> Long term – SQL database* or *Save on value change*) as well as the required data saving interval. **Every particular project must be selected and saved by the Set button separately.** Saving intervals on the individual datapoints are not taken into account. All history data points have a common saving interval set in the dialogue mentioned above.

Writing to database from PLC

Setting *Data from RT* and *Read-only* is used when the PLC itself writes data to the database directly, i.e. not using RcWare Vision. If PLCs write directly to the database at all projects, the *Save data to selected server* option may be

unchecked. **Every particular project must be selected and saved by the Set button separately. The setting applies for this particular project.**

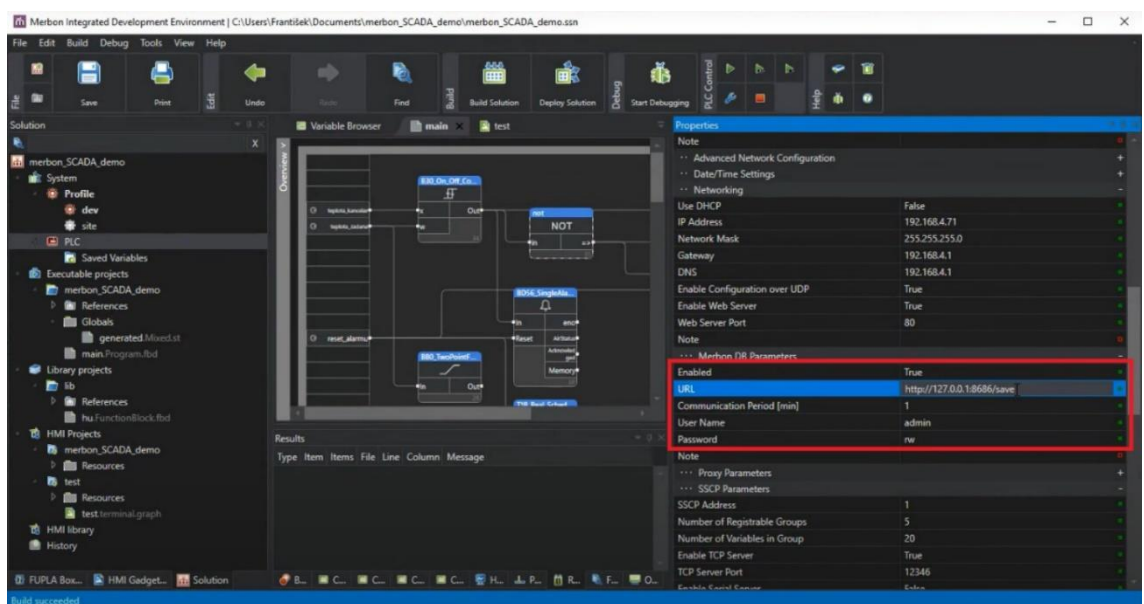
Computer name or IP address refers to the Merbon DB endpoint (= where the Merbon DB is installed). The username and password must be entered as well (default is admin/rw). If there are no special requirements regarding data saving and optimisation, click the *Set default* button and all parameters are automatically set to default values.

Click *Use parameters* to save the whole setting.

To write data to a database directly from a PLC, a Database Adapter has to be installed.

At <http://localhost:11112/admin/#/login> (login: admin, heslo: rw) create a user for saving data from the PLCs.

In IDE, PLC properties – Merbon DB Parameters set up the database adapter URL, TCP port, and credentials of the user which was created in the previous step. See also Merbon IDE Help (Database).

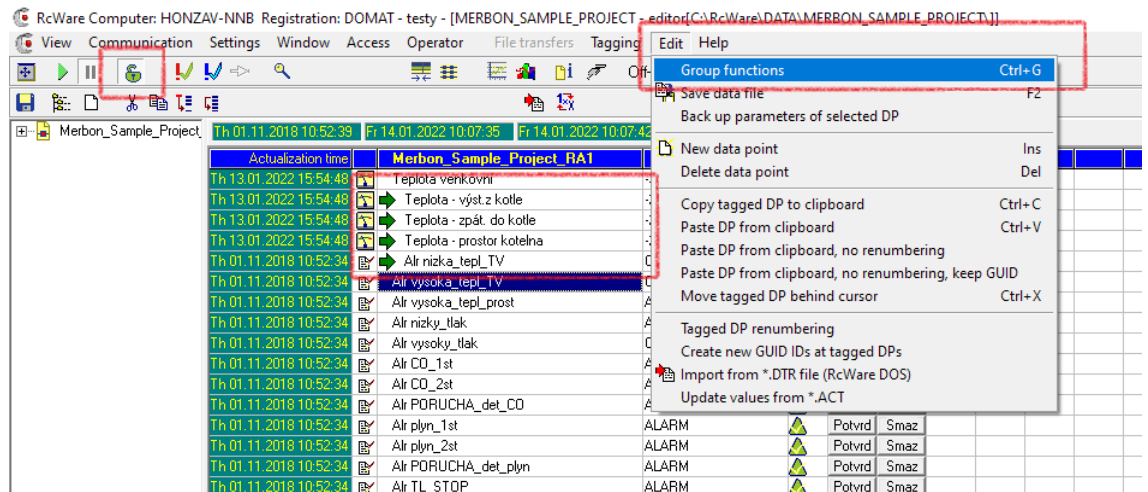


Setup of saving data from a PLC to a database

Then the variable saving must be set in IDE – see Merbon IDE help (press F1) – Process station... - Saving data in a database.

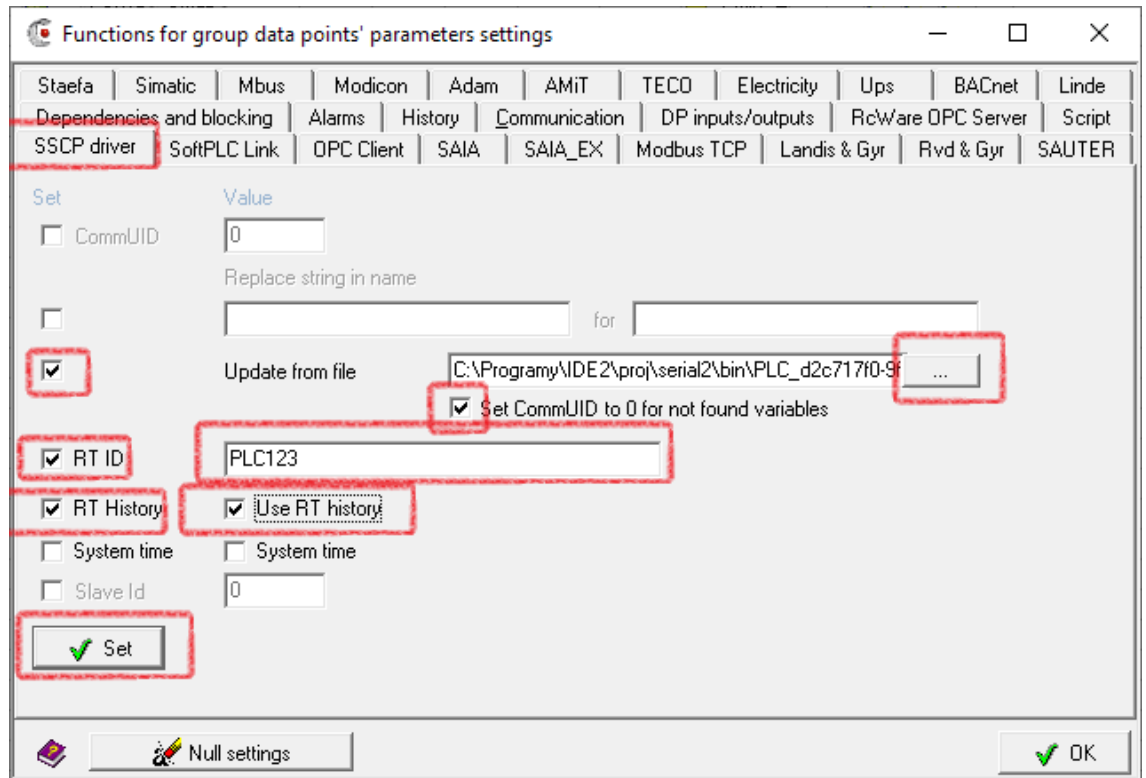
In the IDE, the variables to be written to history must be set. After this, the Solution must be compiled in order to update the .vlist file (the file which describes mapping of variables in IDE).

In RcWare, unlock the data file (padlock icon) and select the datapoints to be written to history. In the **Edit** menu select **Group functions**.



Group editing of data points

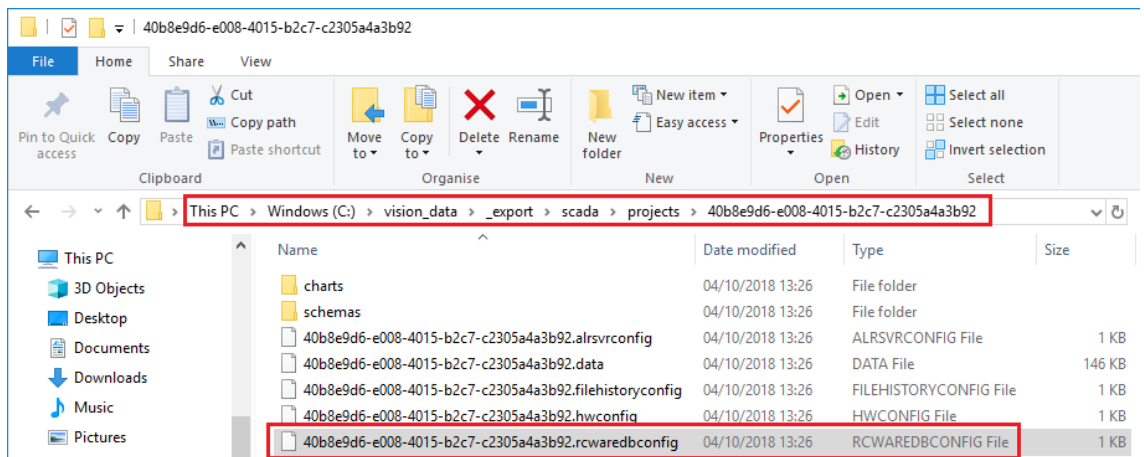
In the Group editing, select the **SSCP Driver** tab. Check the **Update from file** option, and optionally **Set CommUID to 0 for not found variables** if there are some variables to be identified which do not exist in the IDE anymore. Then click the „...“ button and select the .vlist file (its name must **not** contain „utf8“) from the Merbon IDE project folder. Finally, check the **RtID** checkbox, and fill in the history runtime identification string which must match with that defined in the IDE (in PLC properties). Check **Rt History** and **Use RT History**.



Setup of reading history from a database for RcWare data points

The last step is clicking the **Set** button.

After the definition is exported, the configuration can be checked in the file `projects\[project GUID]\[project GUID].rcwardbconfig`:



Exported rcwardbconfig definition in a file explorer

```
<?xml version="1.0" encoding="utf-8"?>
<projectRcWareDbConfig xmlns:r="http://dev.rcware.eu/seri
alization/references" projId="e2ae9515-d28d-4114-8cd7-
78ccdeabbafb" xmlns:n1="http://dev.rcware.eu/server/description"
xmlns="http://dev.rcware.eu/scada/rc-ware-db-config">
```

```

<url>http://localhost:9876/RcWareDbAccess</url>
<userName>admin</userName>
<password n1:encoding="ClearText" n1:text="rw" />
<maxSaveCount>500</maxSaveCount>
<maxQueueLen>819</maxQueueLen>
<overflowBuffersEnabled>true</overflowBuffersEnabled>
<overflowBuffersPath>C:\Apps\RCWare_Vision\RcWare\Export_vision_
data\scada\rcwaredb_overflow_buffers</overflowBuffersPath>
<overflowBuffersMaxSize>50000</overflowBuffersMaxSize>
<commTimeout>PT30S</commTimeout>
<readOnly>>false</readOnly>

<asyncGetDataUnsupported>false</asyncGetDataUnsupported>
</projectRcWareDbConfig>

```

If the user wants to use MerbonDB to display the data, it is necessary to edit the config.js file, which is located in „C:\Apps\Merbon\Web Client\Merbon Scada Web“. If Merbon SCADA reads data from a database, the line „ESGVisionConfig.DefaultHistoryProviderId = "7fa3f8d7-d73d-4d6f-9e30-e424690a22b4" ;“ is commented. It looks then like this: „ // ESGVisionConfig.DefaultHistoryProviderId = "7fa3f8d7-d73d-4d6f-9e30-e424690a22b4" ;“. If it is not commented out, it is necessary to comment out the line, so it is necessary to add two slashes at the beginning of the line and then save the file. If a line is uncommented (there are no two slashes at the beginning of the line), the file history will be used to display the data.

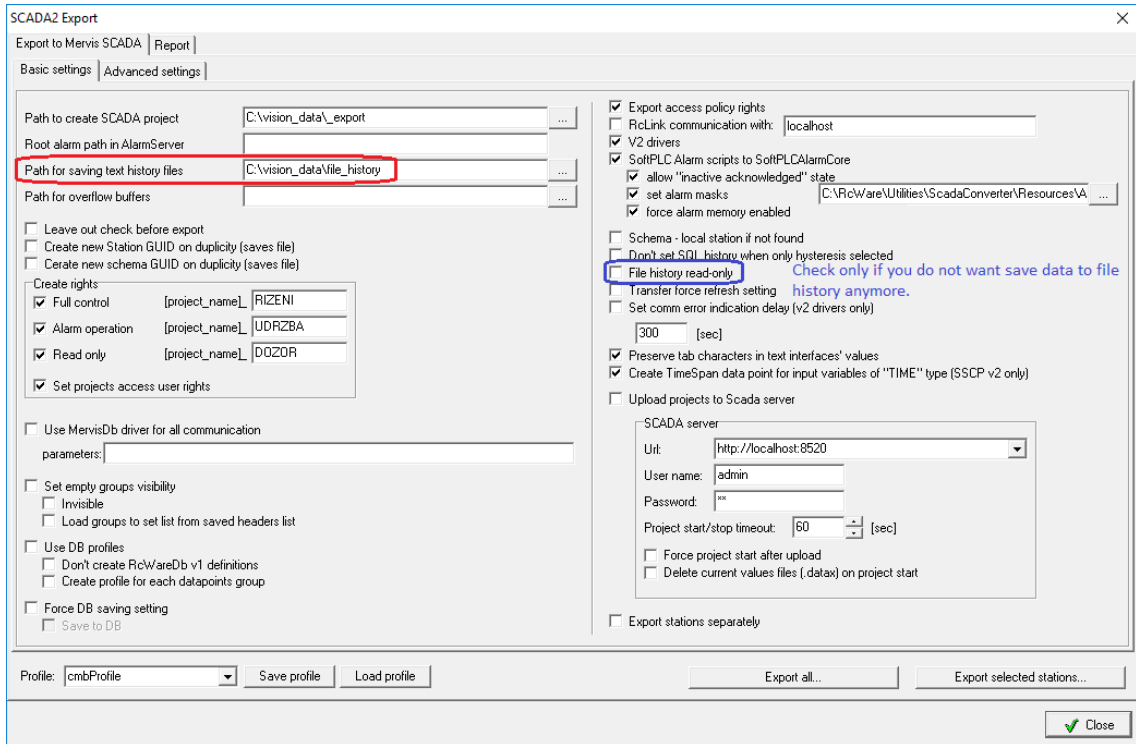
5.2 File history

If the Merbon DB is not available at the Merbon SCADA installation, history is saved in files (similarly to RcWare Vision). All history data points shall have the *History -> Long term – monthly files* attribute and required sampling period set.

File history is the main, default way of history data storage. It is powerful enough for projects sized about 5000...10000 data points and sampling period of 5 minutes and longer. For larger projects and / or more frequent sampling, where reading from files would lag the system, a powerful database is used. All data are saved to history files too by default. (Data may be copied from files to database at any time using a special utility called Data Pump.) If there is a requirement (e.g. to save disk space) not to save history to

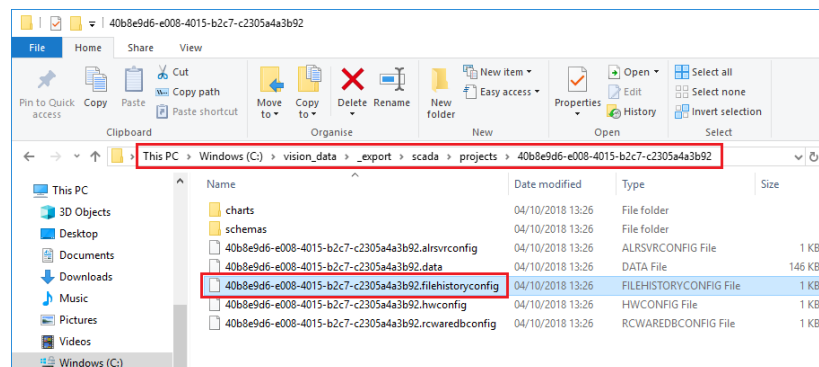
the history files anymore (so it would only be saved to the database), select *File history for reading only* in the export dialogue.

File history for reading only -> this option is set in the *Export for Merbon SCADA* dialogue. Consider if it is required to save data both to files and to the database.



Setup of file history as read-only

After export, the settings can be checked in the file named *projects\[project GUID]\[project GUID.filehistoryconfig]*, which contains the path where history shall be saved. (It is defined in the Merbon SCADA export dialogue.)

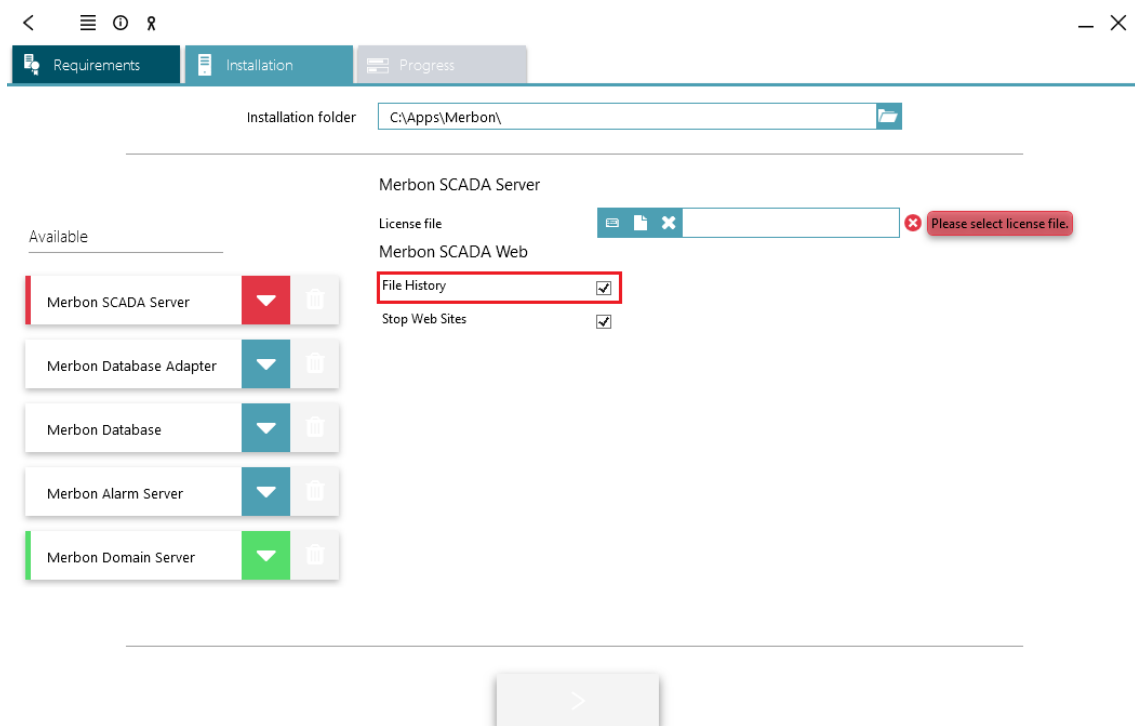


Exported filehistoryconfig file in File explorer

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<projectFileHistoryConfig xmlns:r=http://dev.rcware.eu/serialization/references projId="e2ae9515-d28d-4114-8cd7-78ccdeabbafb"
xmlns="http://dev.rcware.eu/scada/file-history-config">b
  <path>c:\vision_data\scada\file_history\e2ae9515-d28d-4114-8cd7-78ccdeabbafb\</path>
  <forceUseLocalTime>true</forceUseLocalTime>
  <maxQueueLen>0</maxQueueLen>
  <overflowBuffersEnabled>true</overflowBuffersEnabled>
  <overflowBuffersPath>C:\Apps\RCWare_Vision\RcWare\Export_vision_data\scada\filehistory_overflow_buffers</overflowBuffersPath>
  <overflowBuffersMaxSize>50000</overflowBuffersMaxSize>
  <saveInterval>PT10M</saveInterval>
  <singleFilePeriod>Month</singleFilePeriod>
  <readOnly>>false</readOnly>
</projectFileHistoryConfig>
```

Check *File History* at the installation time to enable reading history data from files for Merbon SCADA.



Reading history data from files

If this has not been done and the history files should be used, change this parameter in the config.js file, which is located in „C:\Apps\Merbon\Web Client\Merbon Scada Web“. If Merbon SCADA reads data from a database, the line „ESGVisionConfig.DefaultHistoryProviderId = "7fa3f8d7-d73d-4d6f-9e30-e424690a22b4";“ is commented. It looks then like this: „ // ESGVisionConfig.DefaultHistoryProviderId = "7fa3f8d7-d73d-4d6f-9e30-

e424690a22b4" ; ". To enable history reading from files this line must be uncommented, i.e. the characters // at the beginning of the line must be deleted and the file must be saved.

6 Alarm Server setup

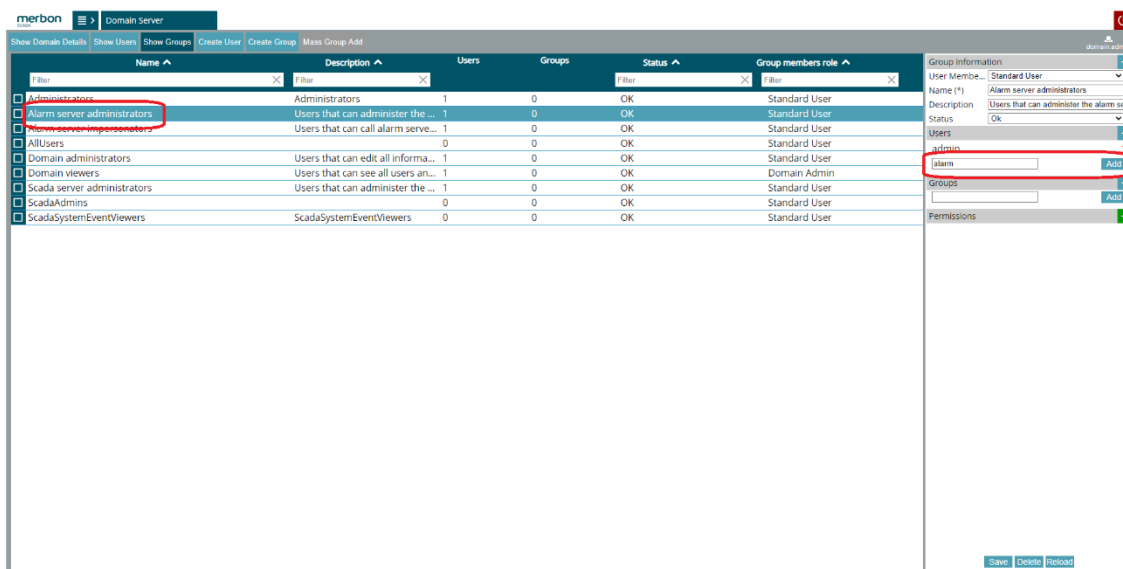
One of the Merbon SCADA components is the Alarm Server. It manages alarm events, stores them, and sends messages and notifications to users.

After installation of Alarm Server, it must be configured as follows:

6.1 Domain server

First, set up the rights for Alarm Server management. Open the Alarm Server web page at <http://localhost:9696> and log in as domain admin (default user is *domain.admin* and password as entered at the domain server configuration). In the „*Show groups*“ tab, the groups with rights for alarm history operation were created automatically after Alarm Server installation. Create a new user (e.g. named „alarm“) and add him to the „Alarm server administrators“ group according to the screenshot below, by selecting from the list, and clicking „Add“ and „Save“.

After installation, there is a user named *admin* already defined in the user list. Check that *Domain.admin* and *admin* have the Alarm server administrator rights, and set them if this is not the case.

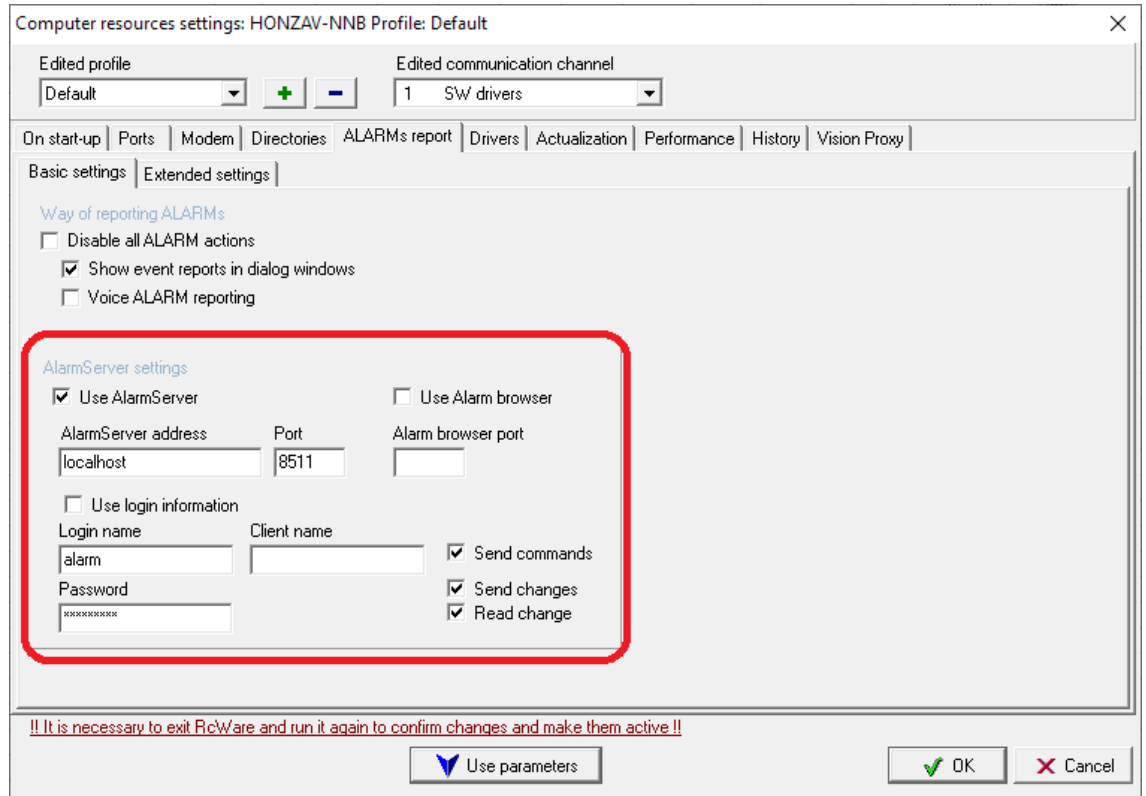


User setup in Domain Server

6.2 Preparation in RcWare Vision

The next step for implementation of Alarm Server in Merbon SCADA is the export of alarm data points from a RcWare Vision project.

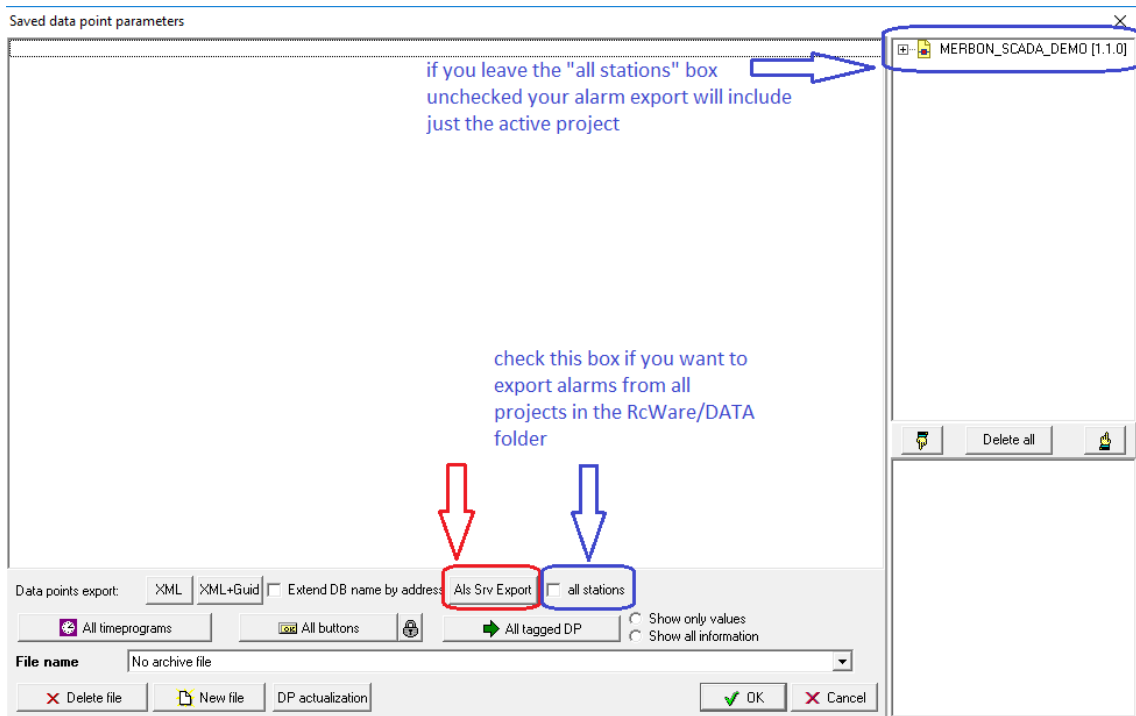
Open the dialogue for alarm server configuration for all projects exported from the current RcWare installation. Go to *Settings, PC Resources*, and select *ALARMS* report. Allow to use Alarm Server and enter the following settings:



Alarm server configuration at the RcWare station

The login name and password must be those of a user who is a member of the *Alarm server administrators* group („alarm“ in the example above).

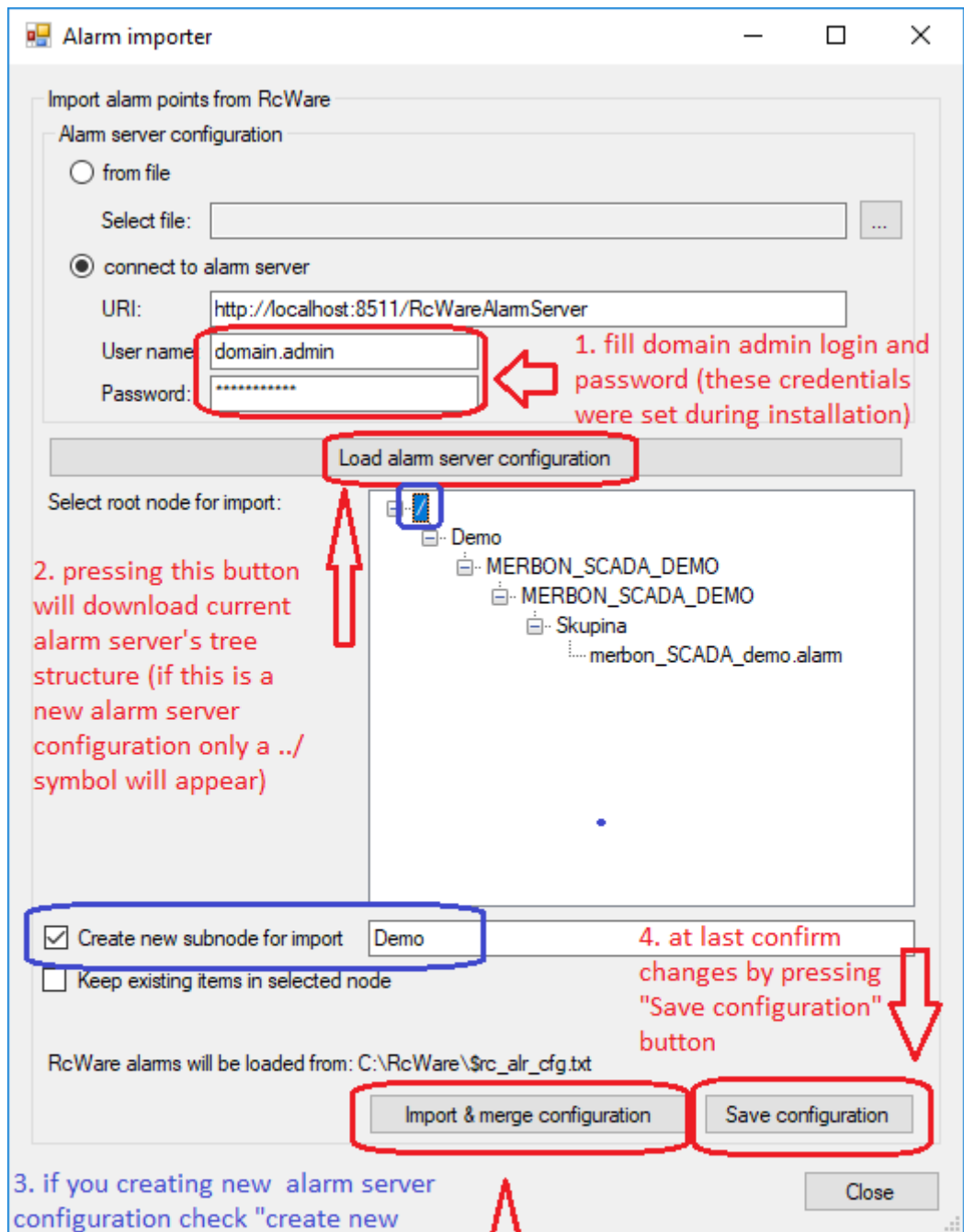
Then open the project for which the Alarm Server is configured in RcWare Vision and enable editing (Ctrl+O). In the „Edit“ tab at the upper panel select *Back up parameters of selected datapoints*. A dialogue appears:



Export of alarms to Alarm Server

Select if alarms shall be exported from this project only or from all projects in the *RcWare/DATA* folder by unchecking / checking the *all stations* box. If this checkbox is blank, the export will only contain alarms from the project which name is in the upper right part of the panel. Click the „Alr svr export“ to continue to the next export step.

The next window appears:

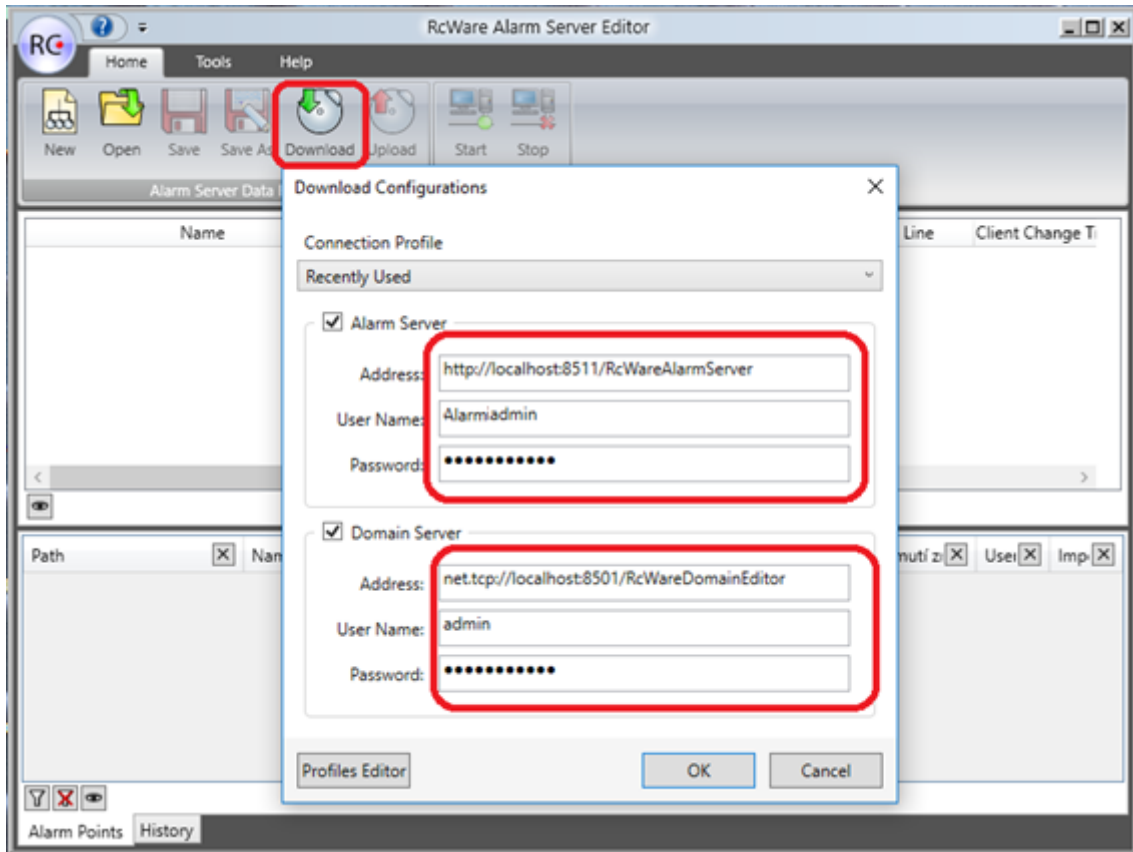


Alarm Importer

Follow the instructions in the screenshot. If the configuration was saved successfully, go to next step.

6.3 Alarm Server Editor

Locate the folder where Merbon Alarm Server is installed and open the „Editor“ folder (e.g. C:\Apps\Merbon\Merbon Alarm Server\Editor). Run the „ESG.AlarmServer.Editor“ program here.



Reading data from the Alarm Server

Fill in the data according to the screenshot here. Copy the addresses as they are listed below.

Alarm server editor:

http://localhost:8511/RcWareAlarmServer

User name: User who was defined as Alarm administrator

Password: This user's password

Domain server:

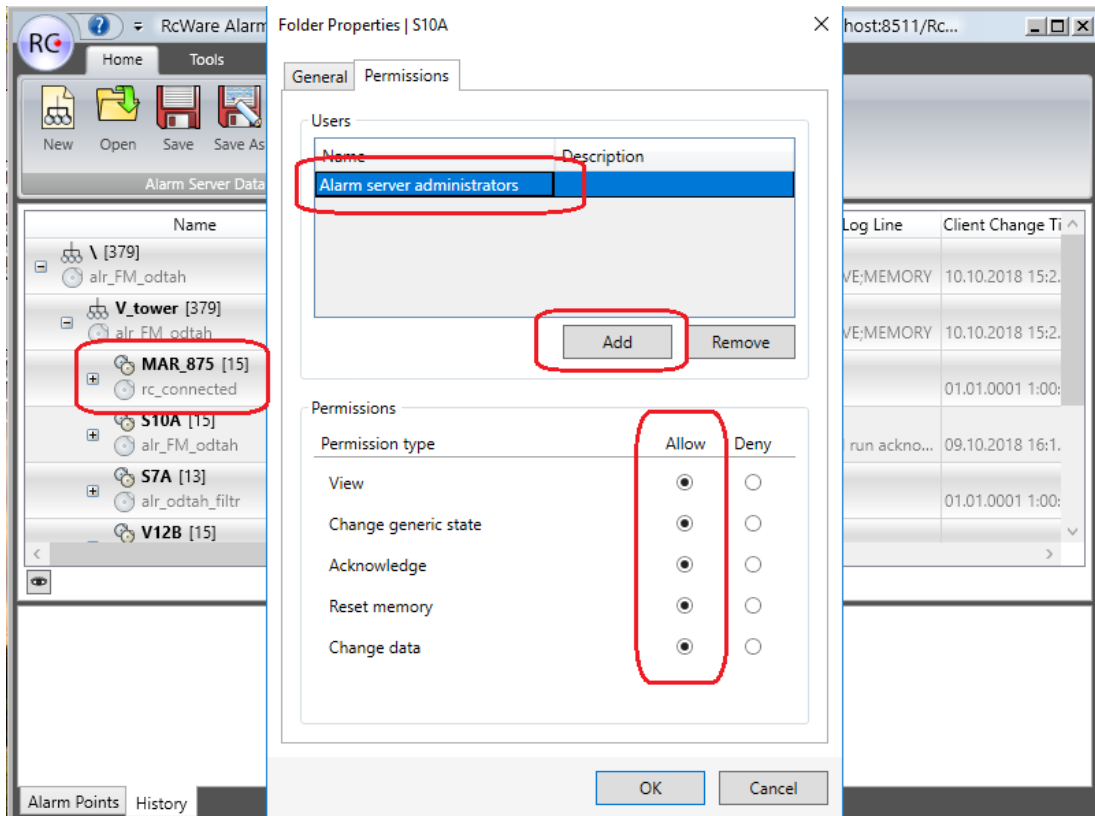
net.tcp://localhost:8501/RcWareDomainEditor

User name: literally "admin"

Password: Password of Domain administrator (as entered during the installation of Domain Server).

Instead of *localhost*, there may be the IP address of the PC where the related services are running.

Click „OK“ to download the Alarm Server configuration and display it in the panel. Then right click the tree item with the project name and select „Properties“. In the „Rights“ tab add a group „Alarm server administrators“, enable all rights for it, and save changes by clicking „OK“. **The domain.admin user must be member of the Alarm server administrators group.**



Setup of user rights

Finally, upload all changes to the Alarm Server by clicking „Upload“, and restart the services Alarm server, Domain server, and SCADA server. Run the Alarm Server by clicking the „START“ button.

6.4 Alarm Server Config

The final step is exporting of project including the new configuration of the ALarm Server, and upload of the projects to the SCADA server. This is useful if the export follows on another PC that the Alarm Server is installed, and we do not want to change the global setup of RcWare Vision for all exported projects.

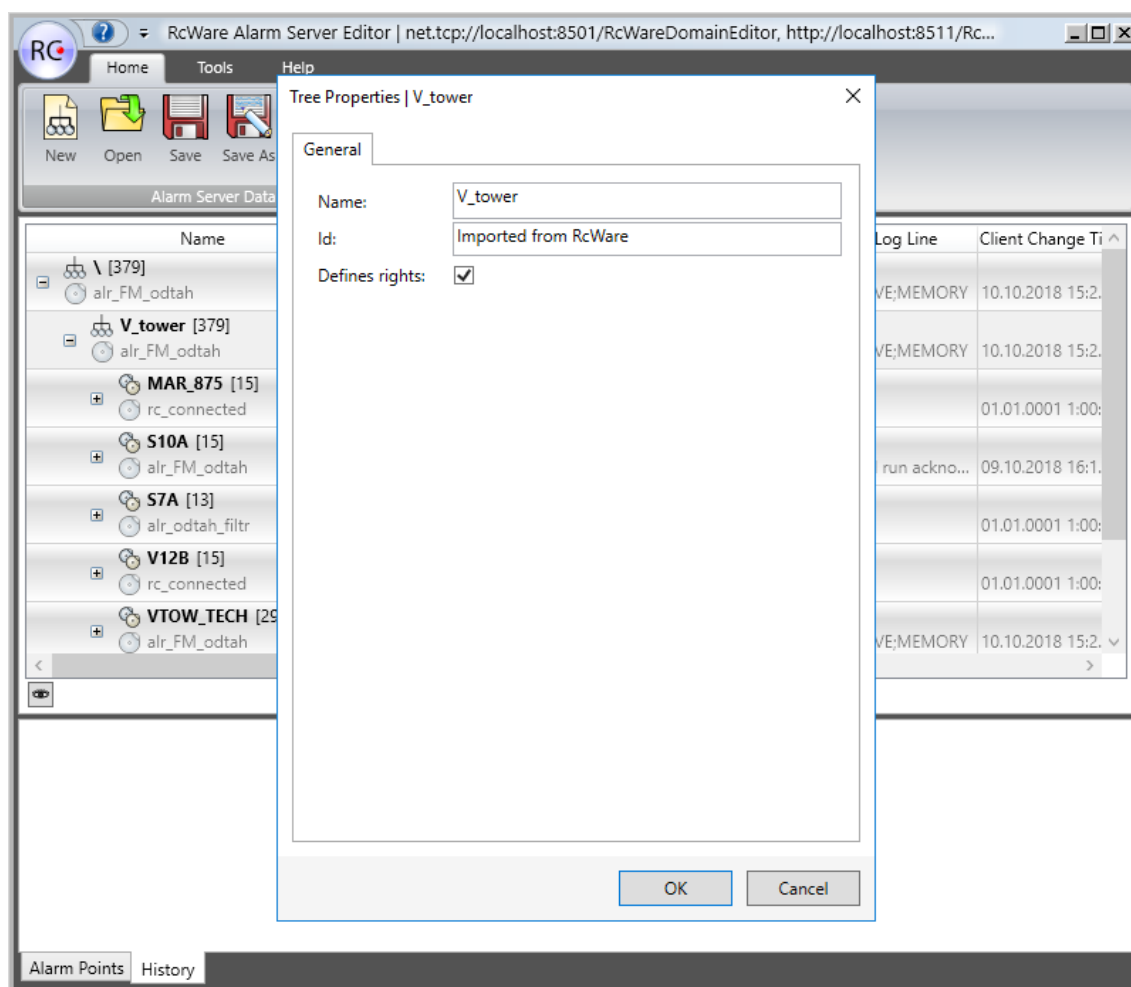
In the vision_data folder locate the project folder (e.g. C:\vision_data\scada\projects\“projID“).

Locate the *.alrsvrconfig file there and open it for editing in a text editor (e.g. Notepad ++).

```
<?xml version="1.0" encoding="utf-8"?>
<projectAlrSvrConfig xmlns:r="http://dev.rcware.eu/serialization/references" projId="40b8e9d6-e008"
<url>http://localhost:8511/RcWareAlarmServer</url>
<n1:cred n="alarm" p="Password_123" pe="0" />
<maxQueueLen>2000</maxQueueLen>
<overflowBuffersEnabled>true</overflowBuffersEnabled>
<overflowBuffersPath>C:\vision_data\export\scada\alarm_overflow_buffers</overflowBuffersPath>
<overflowBuffersMaxSize>100000</overflowBuffersMaxSize>
<commTimeout>PT30S</commTimeout>
<alarmServerTreeRootPath>Imported from RcWare:/MERBON_SCADA_DEMO</alarmServerTreeRootPath>
</projectAlrSvrConfig>
```

Alarm Server Config

Edit the file according to the image above. Set <url> as „...localhost...“ and add the port number „8511“. In the „<n1:cred“ line fill in the n="" user name as above, and in p="" its password. The last step is to enter the project name and „Imported from RcWare:“ – see above. Save changes and restart the Merbon SCADA server.



Editing the config file

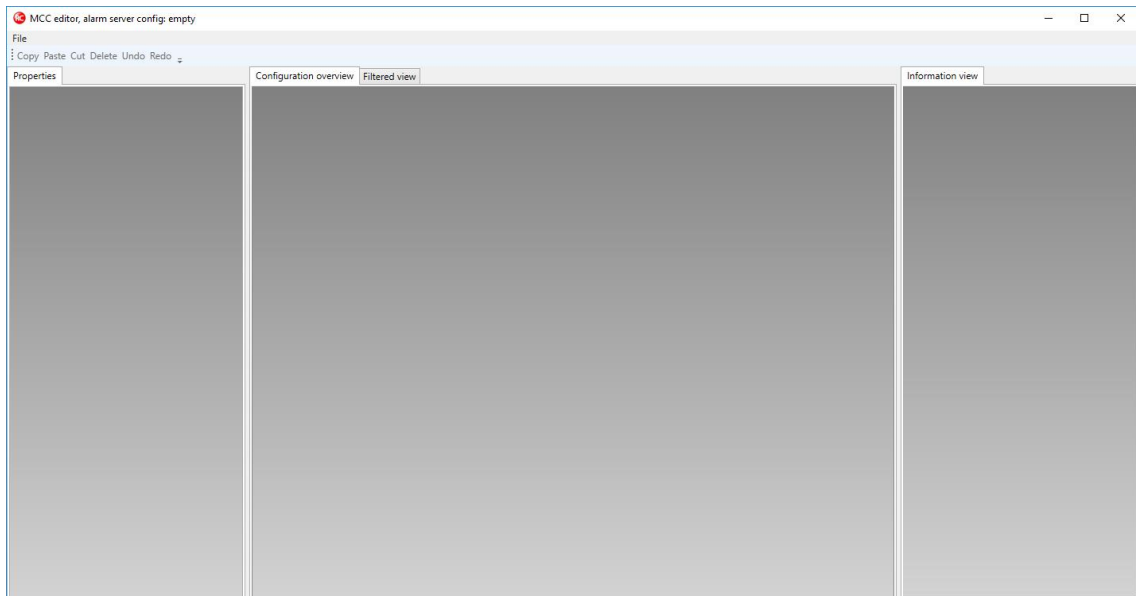
7 Messaging setup

To send alarm messages, the messaging system must be configured.

It is a service which manages sending of e-mails and SMS messages and which contains definition of rules for sending of those messages.

7.1 Settings

Use the editor in folder C:\Apps\Merbon\Merbon Messaging\Editor. The executable file is „ESG.AlarmServer.Messaging.Editor.exe“. Run this program, and the following window appears:



The Messaging Editor window

To add a new rule, an empty definition must be created first. Select File → New configuration → New configuration (in file). The configuration can be uploaded to the server using File → Save as → Save configuration to server.

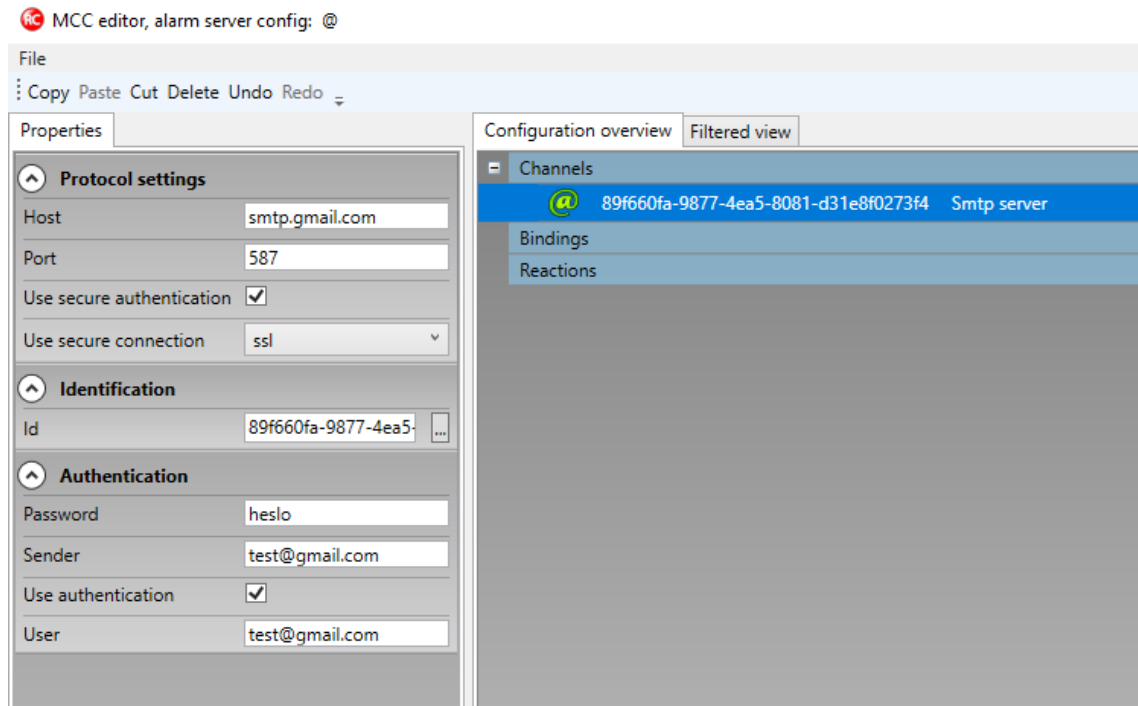
When saving configuration to server, a dialogue window appears where user name should be already filled in. The client selection dialogue follows, where the „**messaging_client**“ should also be predefined. Confirm both dialogues and wait until the operation is completed.

Note: If the client name field is blank, the „**messaging_client**“ name must be entered. This client is defined in the configuration file, and the messaging server is not able to work without it.

7.2 Sending e-mails

To set up sending e-mails, a SMTP channel must be created. Fill the SMTP server address in the „Host“ field, TCP port to connect to, and encryption type. The most common option is port 587 and SSL.

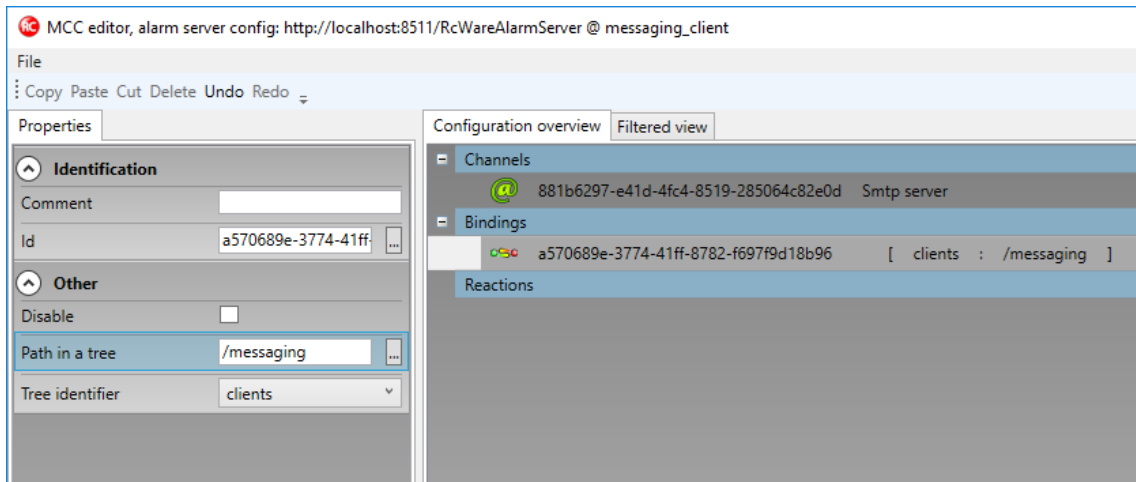
Then enter the e-mail account password, sender address, and e-mail account user to sign in to the SMTP server. The ID may be a custom text or may be filled automatically by clicking the „...“ button.



SMTP server connection setup

The next step is setting of the alarm server binding. Right click to add a binding.

A binding has its identifier (Id) and it must be selected what particular alarm or alarm group shall be initiating the action. If this configuration had been already uploaded to the server as described above, it should be possible to select a group of alarms in the tree. Select a particular alarm from the alarms in the tree in the Tree path item.



Setup of an Alarm Server binding

The next step is definition of the alarm reaction.

Right click the „Reaction“ and create a „Sequential reaction“.

At a sequential reaction, the messaging activity (e-mail or SMS) shall be defined.

It is possible to define how many times the reaction has to be repeated, if there is any other condition, and optional sending of a single message for a whole alarm group (rather than individual message for every alarm). See the image below for correct basic alarm setup.

The screenshot shows a configuration window with three sections:

- Filters:**
 - Ap state filter
 - ok bit: Don't care
 - Acknowledge bit: Not set
 - active bit: Set
 - memory bit: Don't care
 - Filter by Ap blocked flag:
 - Filter by Sms:
- Other:**
 - Delay between repetitions: 00 : 00 : 0
 - Enabling condition: <condition>
 - Repeat count: 1
 - Restart on trigger's change:
 - Trim by AP:
- Identification:**
 - Id: 9773dcb6-1547-47e...

Setup of a sequential reaction

One of the last steps is setting of the e-mail properties. Select the channel through which the e-mail has to be sent, and the recipient address. The recipient may be either direct (a single address), or users and groups defined at the Domain Server can be used. Select „User or group e-mail“ to select groups or users to send the e-mail to. Their e-mail addresses are defined in the user data at the Domain Server. To use this functionality, the messaging configuration must be uploaded to the server (File → Save as → save configuration to server) and then downloaded together with user settings from the server – File → Open existing configuration → Download configuration (server).

The next step is selection between default and customized templates.

Configuration download from the Domain Server

The last step is adding a reference to a previously defined Alarm Server binding. Right click to add a reference and select which sequential reaction the alarm shall respond.

7.2.1 Possible problems sending e-mails

When sending alarms over Google SMTP server, the Google account should be set so as to accept connections from less secure applications -

<https://myaccount.google.com/lesssecureapps>.

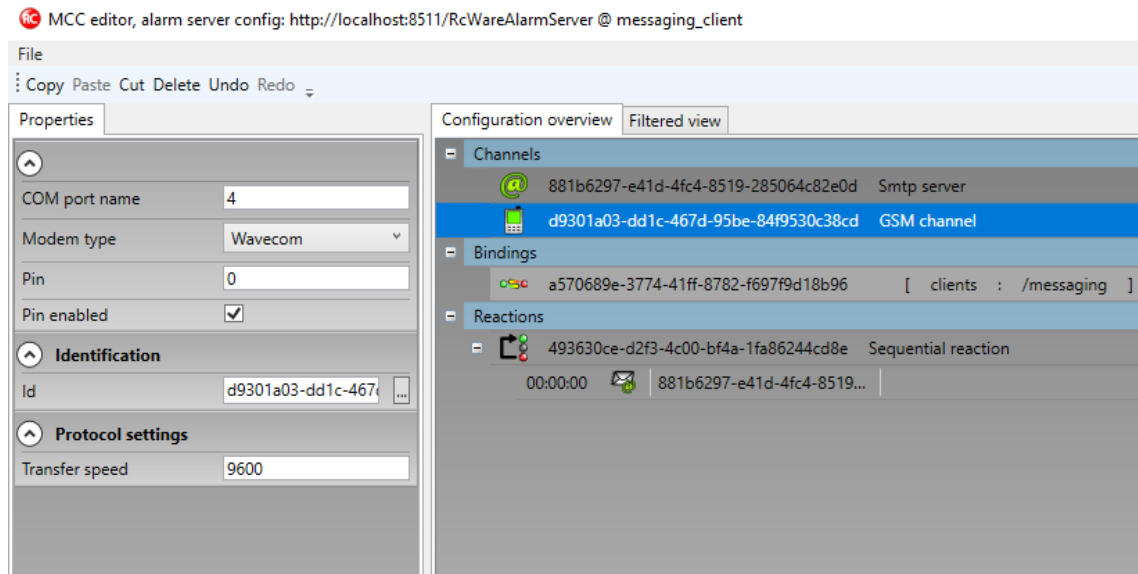
Before attempting to send an e-mail, try logging in to your gmail account over a web browser. Google requires two factor authentication for some services; validity of your login attempt will be verified and added to Google exception list.

7.3 Sending SMS

To send SMS, a communication channel has to be defined in a similar way to that above, of a GSM type. Select the COM port number to which the GSM modem is

connected. If the SIM is protected by PIN, enter the PIN and check the PIN Enabled option. Then select the installed modem type from the list.

Again, enter a unique ID together with modem baudrate.

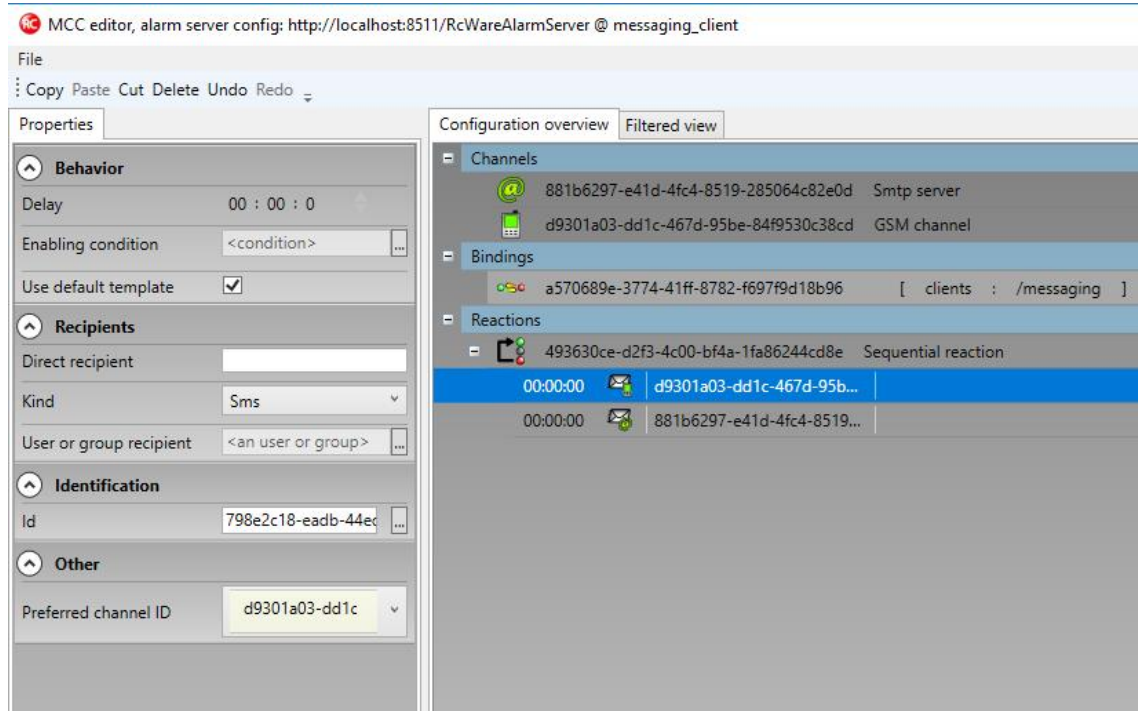


GSM channel setting

In the next steps, use the existing binding to Alarm Server and Sequential reaction. Just add another activity, which is sending an SMS.

SMS is sent over the defined channel, the recipient must be added manually or selected from the users/groups list of the Domain Server.

Remember to select the template type, too.



Sending SMS - setup

The final step in Messaging editor is uploading the configuration to server - File à Save as à Save configuration to server.

To send SMS messages correctly, check and configure also the alarm settings in RcWare Vision:

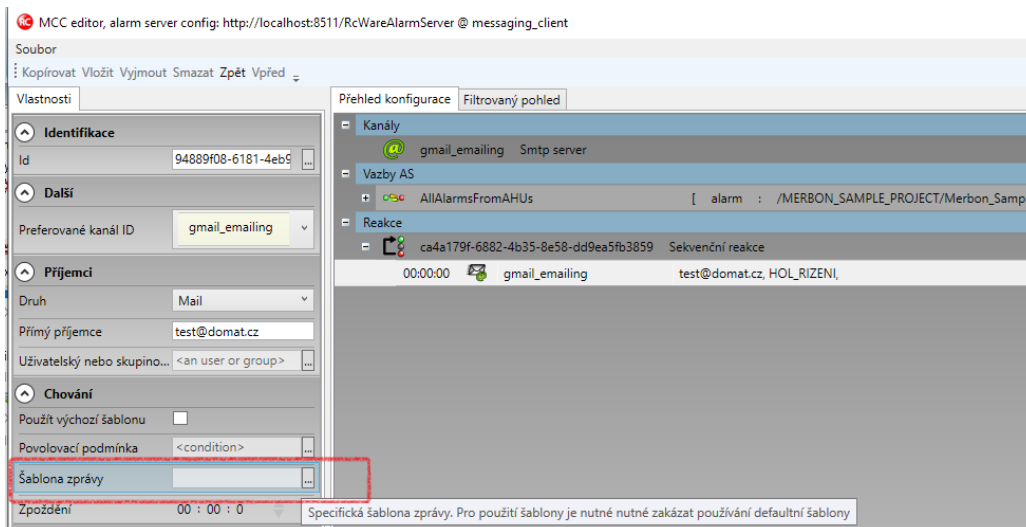
Open the RcWare Vision project and unlock the data file. Focus an alarm script point and go to the Alarms tab below. Check the Allow Alarms and SMS message checkboxes. This enables sending SMS based on this alarm. The settings is also visible in the Alr column on the right: the yellow alarm and phone icons appear.

The screenshot displays the RcWare Vision interface for configuring alarms. The top section shows a table of alarm points with columns for 'Actualization time', 'Value', and 'Alr'. A yellow alarm icon and a phone icon are visible in the 'Alr' column for the 'merbon_SCADA_demo.alarm' point. The bottom section shows the 'Alarms' configuration tab with checkboxes for 'Allow ALARMS (failures)' and 'SMS message', and a dropdown for 'Sensitivity of ALARM issue' set to '1 min'.

Alarm SMS configuration in RcWare data file

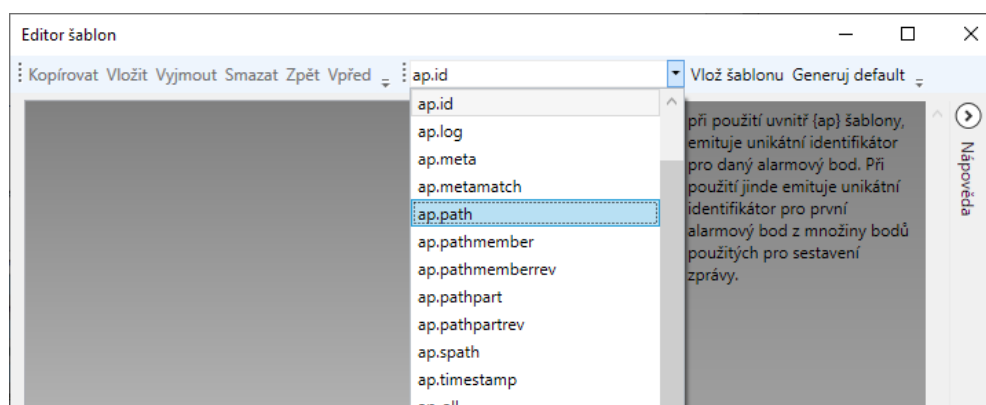
If there are more alarms to be configured, *Group functions* can be used (tag all related alarm datapoints, and press Ctrl-G).

7.4 Merbon SCADA messaging – editing of user templates



A user template allows to set up a customized alarm e-mail format in case the default template is not suitable, and users need to obtain different set of data, or to receive the alarm message in a specific format suitable for machine reading.

In the Template editor, internal system variable names are used, which are replaced by texts at the alarm processing time. Freely definable texts may be placed between the variables. There are rules to define logical expressions, conditions, etc., see below. A system variable is inserted by choosing from the drop-down box and clicking the *Insert template* button.



List of variables:

ap

Syntax: {ap# <body>}

Text specified in <body> for every alarm point from the set of points, used to compile the message. In the template body, templates of type (ap.*) may be used, which then generate information for every alarm point.

ap.ackid

Syntax: {ap.ackid#}

When used within an (ap) template it generates an integer number for every alarm point. The number can be used to acknowledge the alarm. If used outside an (ap) template, it generates a number for the first alarm point in the message.

ap.genericstate

Syntax: {ap.genericstate#}

When used within an (ap) template it generates a generic status for the given alarm point. If used outside an (ap) template, it generates status for the first alarm point in the message.

Example:

Active, Memory

ap.id

Syntax: {ap.id#}

When used within an (ap) template it generates a unique ID for a given alarm point. If used outside an (ap) template, it generates a unique ID for the first alarm point in the message.

ap.log

Syntax: {ap.log#}

When used within an (ap) template it generates a log for a given alarm point. If used outside an (ap) template, it generates a log for the first alarm point in the message.

ap.meta

Syntax: (ap.meta @ <parameter> #)

Generates a text, representing metadata value for the key specified in <parameter> for one alarm point.

ap.metamatch

Syntax: (ap.metamatch @ <parameter> = <value> # <body>)

The template generates a text in <body>, if the metadata value of the given alarm point for the key specified in the <parameter> argument equals the value of the <value> parameter. This function may be used to group and filter alarm points in the message body.

ap.path

Syntax: {ap.path#}

When used within an (ap) template it generates the complete path of the alarm point in the alarm tree. If used outside an (ap) template it generates the complete path of the first alarm point from the set of alarm points used for the compilation of the message.

Example:

```
/MERBON_DEMO/ALARM_SSCP/Skupina/Test.main.alr1.
```

ap.pathmember

Syntax: {ap.pathmember@4#} - {ap.pathmember@3#}...

Generates part of the path in the tree.

ap.pathmemberrev

to be completed – path member reversed

ap.pathpart

to be completed

ap.pathpartrev

to be completed

ap.spath

Syntax: {ap.spath#}

When used within an (ap) template it generates the short path of the alarm data point. If used outside an (ap) template it generates the short path of the first data point of the set of data points used to compile the message.

Example:

```
Test.main.alr1.alrstatus
```

ap.timestamp

Syntax: {ap.timestamp#}

When used within an (ap) template it generates the time stamp of the alarm data point. If used outside an (ap) template it generates the time stamp of the first alarm data point of the set of data points used to compile the message.

Example:

```
28.01.2022 12:36:04
```

ap-all

to be completed

ap-all-metamatch

to be completed

ap-new

Generates only new alarms.

Example:

```
{source.ackid#} ....
```

```
{ap@new#{ap.timestamp#} {ap.pathmember@4#} - {ap.spath#} -  
{ap.log#} }
```

ap-old

to be completed – generates only old alarms

clip

Cuts the inner text to size specified by the parameter.

Syntax: {clip@ clip-size # /*inner-content*/ }

comm

to be completed

curlybrace.close

Syntax: {curlybrace.close#}

to be completed – used for JSON

curlybrace.open

Syntax: {curlybrace.open#}

to be completed – used for JSON

filter.count

Syntax: {filter.count#}

Generates the number of alarm points of the activation filter.

limit

Syntax: {limit@ count # /*inner-content, per-ap templates*/ }

to be completed

meta

Syntax: {meta@ CommonPrefix | PathRest | SkippedCount#}

to be completed

source.ackid

Syntax: {source.ackid#}

Generates an unsigned integer number which can be used for acknowledging of the binding.

source.count

Syntax: {source.count#}

Generates total number of alarm points in the binding.

source.path

Syntax: {source.path#}

Generates the complete source path of the binding.

Example:

Template:

```
name {ap.spath#}      status {ap.genericstate#}      path
{ap.path#}      time {ap.timestamp#}
```

Result:

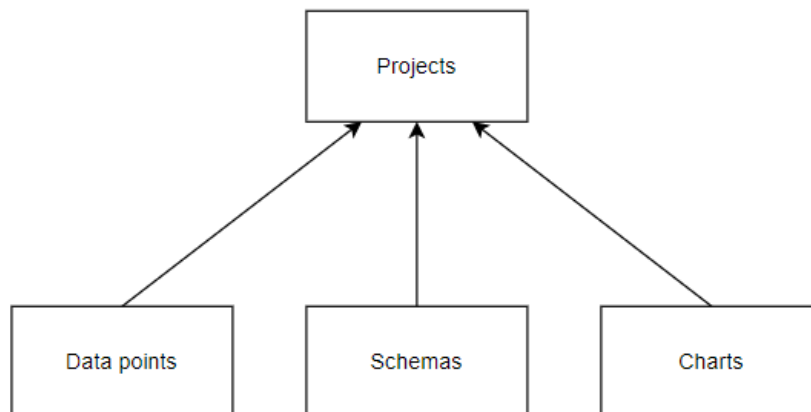
```
name      Test.main.alr1.alrstatus      status      Active,
Memory                                         path
/MERBON_DEMO/ALARM_SSCP/Skupina/Test.main.alr1.alrstatus
time      28.01.2022 12:36:04
```

8 User policy – schemas, editing

Merbon User policy allows setup of user rights at several levels.

There are user rights to:

- Projects
- Schemas (plant graphics)
- Data point groups (as configured and seen in RcWare Vision)



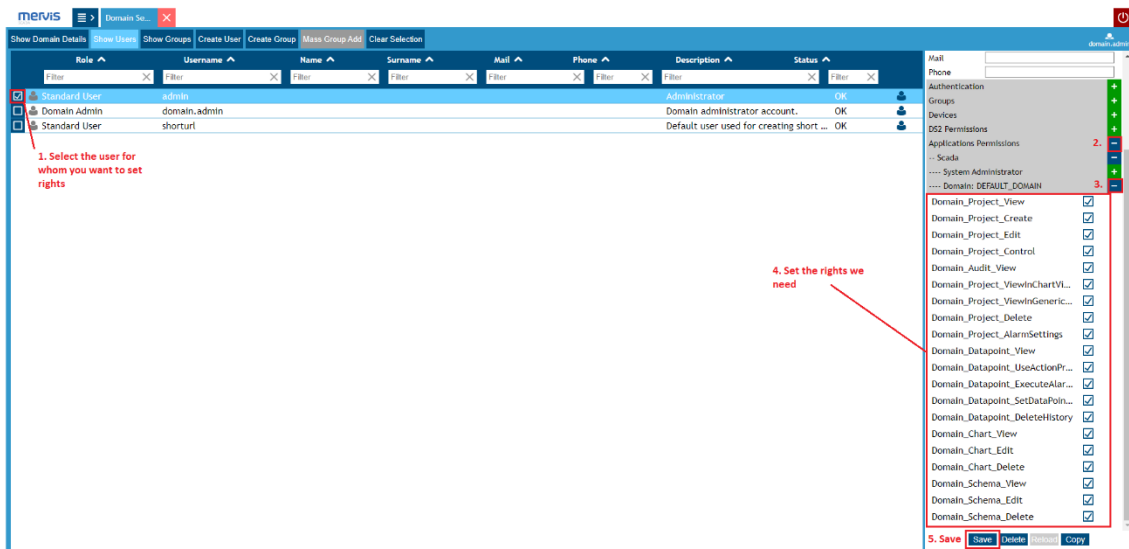
Moreover, it is possible to set read / write rights and rights to access the data point table, schemas, and graphs (trends).

User rights for a particular user are a combination of settings from multiple files. The files with user rights are listed in the following part.

8.1 Settings rights for a specific user

If you do not have to differentiate the rights to certain projects and the changes always apply to the global user policy settings, you can use the rights settings directly in the domain server for specific users.

You need to log in to the domain server at **http: // localhost: 9696 /** and follow the instructions in the picture.



The following setting options apply to the use of user groups.

8.2 Situation 1 – Users have access to all projects

If all users should have access to all projects and only their read / write rights are different, the **ScadaAdmins** and **AllUsers** predefined groups can be used. These two groups are created automatically for all projects, and users assigned to them are allowed to access all projects. Their user rights are defined as follows:

ScadaAdmins:

- Projects – all
- Schemas – all
- Data point groups – all
- Read / write -> data points in a particular project – **read and write**

- Data point table / schemas / graphs view – all options

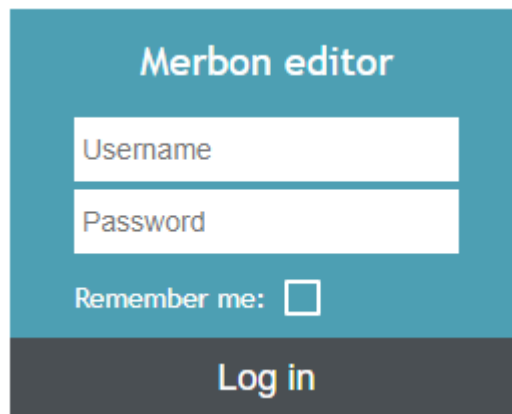
AllUsers:

- Projects – all
- Schemas – all
- Data point groups – all
- Read / write -> data points in a particular project – **read only**
- Data point table / schemas / graphs view – all options

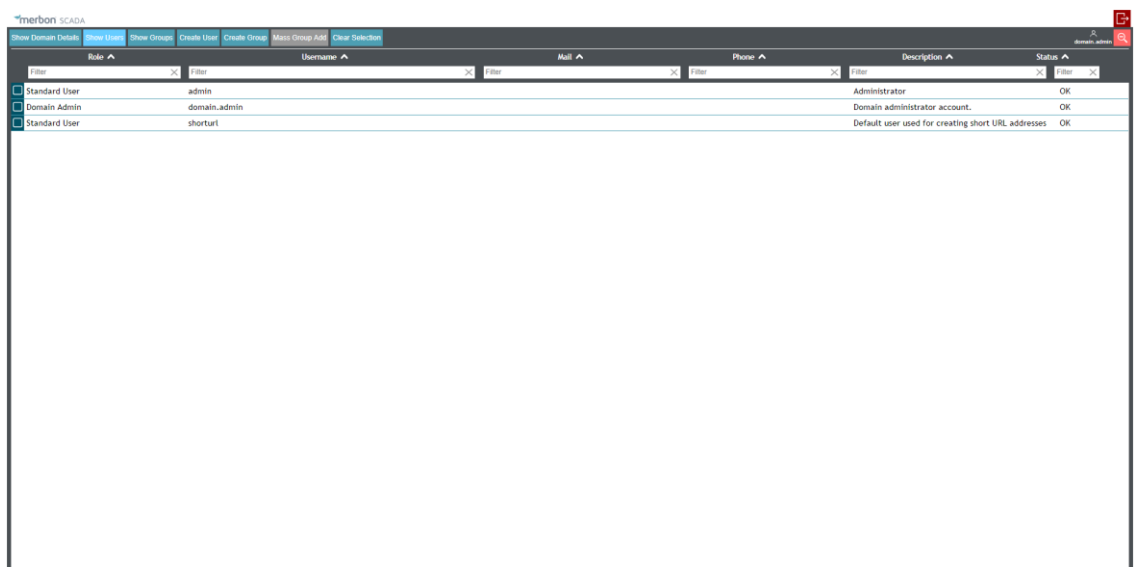
It is enough to specify which users will have the read-only rights and which users will have the read / write rights, define them at the domain server, and assign them to the above named groups.

Users and groups are defined at the domain server which can be accessed from a web browser at <http://localhost:9696>.

Enter the credentials which have been entered at the Merbon SCADA installation procedure, and connect to the Domain server.





Domain server login



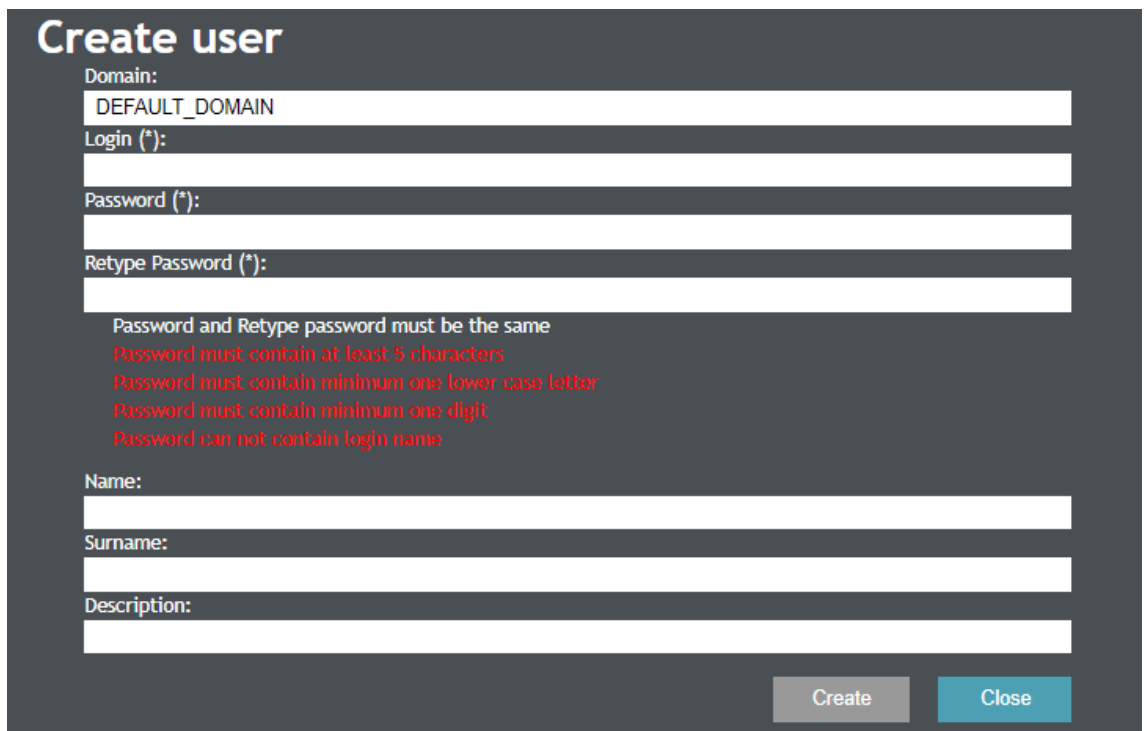
Domain server main page

The exported projects have two groups predefined: *ScadaAdmins* and *AllUsers*.

A new user group can be added by clicking the  button.

Then define new users by clicking the  button and attach them to groups.

A new user must have his user name defined (*Login*), and password (*Password*). The password must have at least 5 characters, containing at least one small character and one numeral and must not contain login. Items *Name*, *Surname* and *Description* are optional and are used to specify the user in more detail if required.



Create user

Domain:

Login (*):

Password (*):

Retype Password (*):

Password and Retype password must be the same
 Password must contain at least 5 characters
 Password must contain minimum one lower case letter
 Password must contain minimum one digit
 Password can not contain login name

Name:

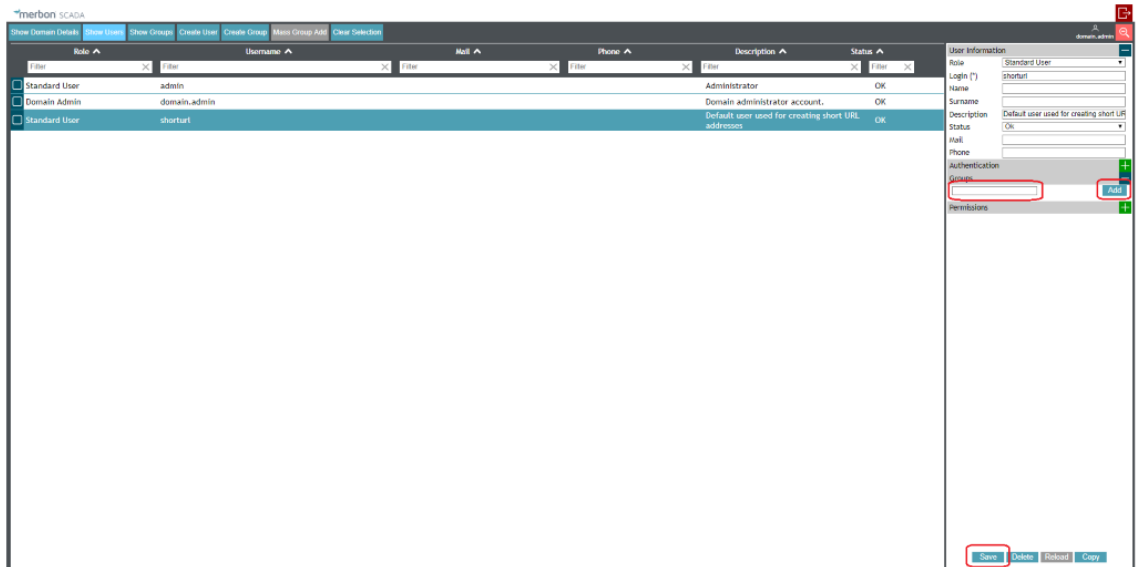
Surname:

Description:

Definition of a new user in the Domain Server

After a new user is defined, it must be assigned to a group to acquire his access rights. This can be done by two ways:

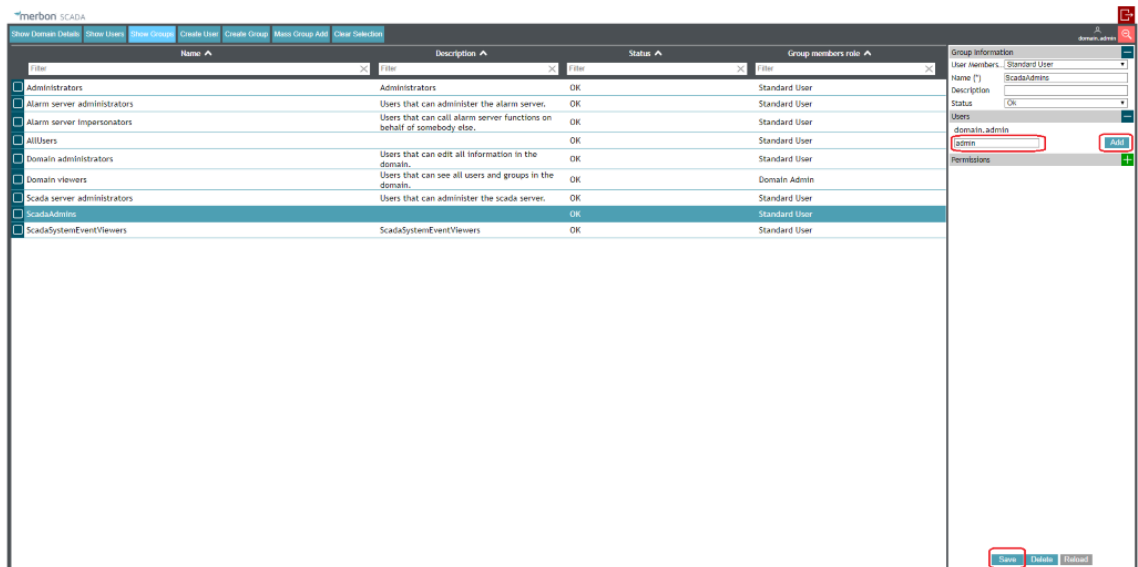
- Add a user to group using the tool panel which is in the *Show users* tab. Go to *Groups* and click *Name* to select a group. The group will be added by clicking *Add*. All changes must be confirmed by the *Save* button.



Adding a user in a group in User editor

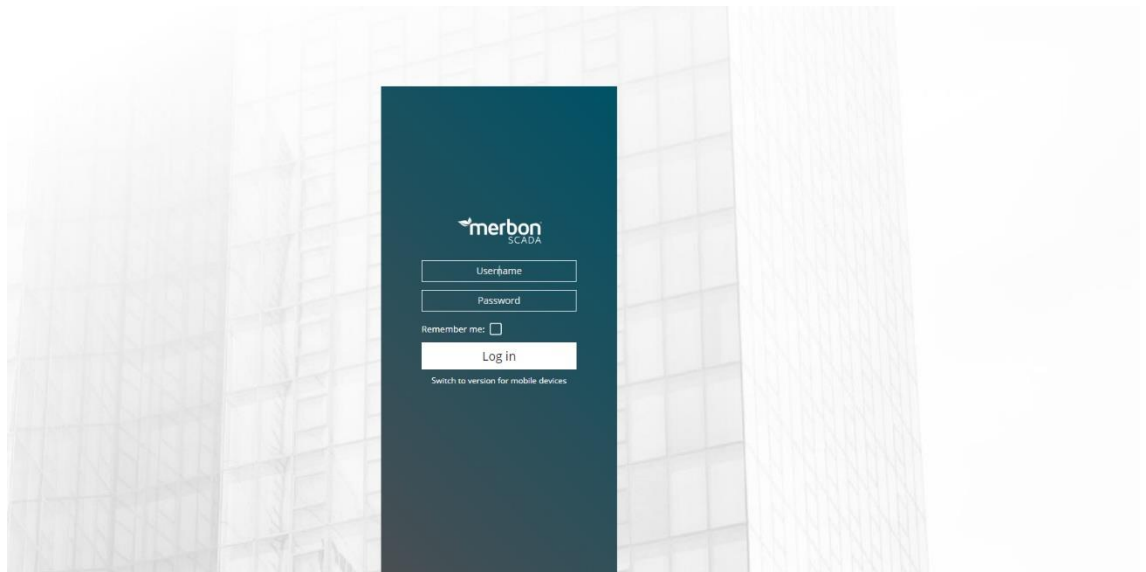
or

- go to *Show groups*, and click the group the user shall be added to. In the tool panel in *Users* click the *Name* field to select a user. Click *Add* to add the user to group. Confirm all changes by clicking *Save*.



Adding a user in a group in Group editor

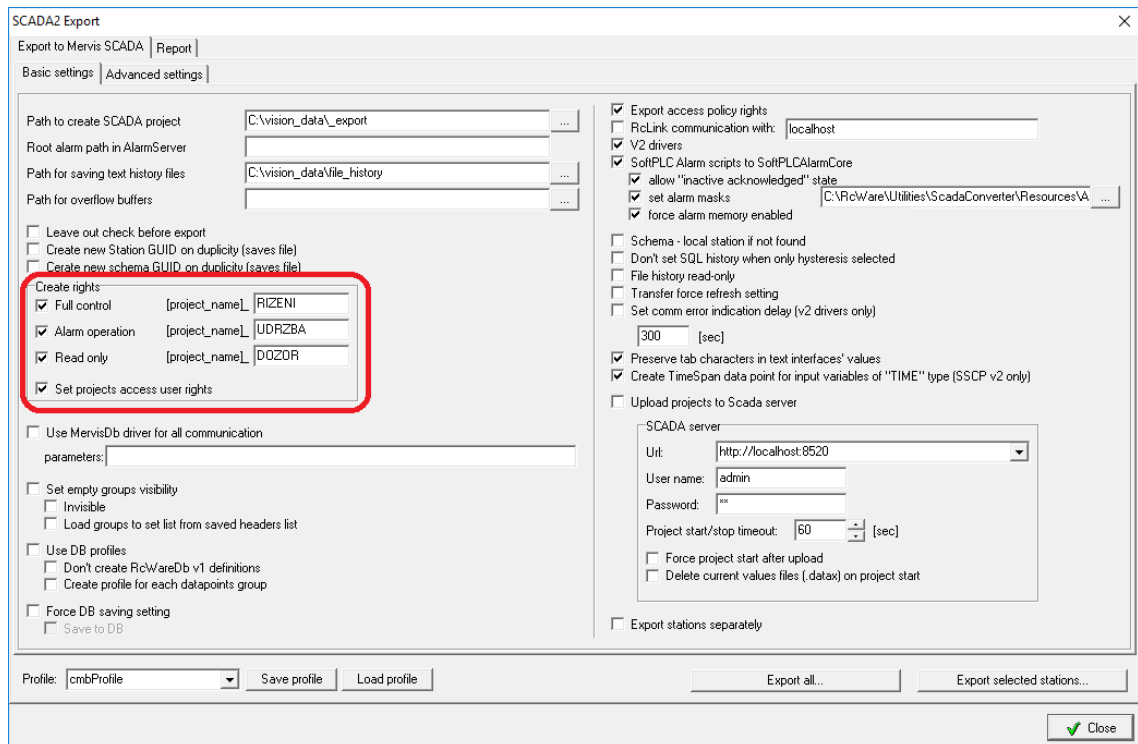
Then log in to the Merbon SCADA server to check that the rights were applied correctly.



Login to the Merbon SCADA server

8.3 Situation 2 – Users have rights to particular projects

If it is required to assign different user rights to different projects, user groups „Full Control“ (RIZENI), „Alarm Operation“ (UDRZBA) and „Read Only“ (DOZOR) can be used. These groups are created only if set in the RcWare Vision export dialogue.



Rights for three custom groups

Each exported project then contains these three user groups. They are specific for each particular project.

Groups with the same names then must be created at the Domain server, and then it is possible to create users and assign them into the groups. If a user is assigned to group „ProjektXY_RIZENI“ only, his rights are limited to „ProjektXY“ only. He will have no rights to other projects.

The user rights are then defined as follows:

Full Control (RIZENI) – full control, read and write

Alarm Operation (UDRZBA) – only read and alarm acknowledge

Read Only (DOZOR) – read only

8.4 Situation 3 – Limited access to data point table / graphs / schemas

If a user or group shall have no access to schemas, graphs, or data point table, the definition files must be edited manually. The access rights are specified in the „*cfg/projects.config*“ file, which is in the export folder.

8.4.1 Project access modification

The file contains project definition, followed by definition of user groups and their rights.

Access rights to the items can be defined globally for all projects, or for each project separately.

The rights are defined in this section:

```
<n3:items>
    <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of view rights -->
    <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of edit rights -->
    <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of delete rights -->

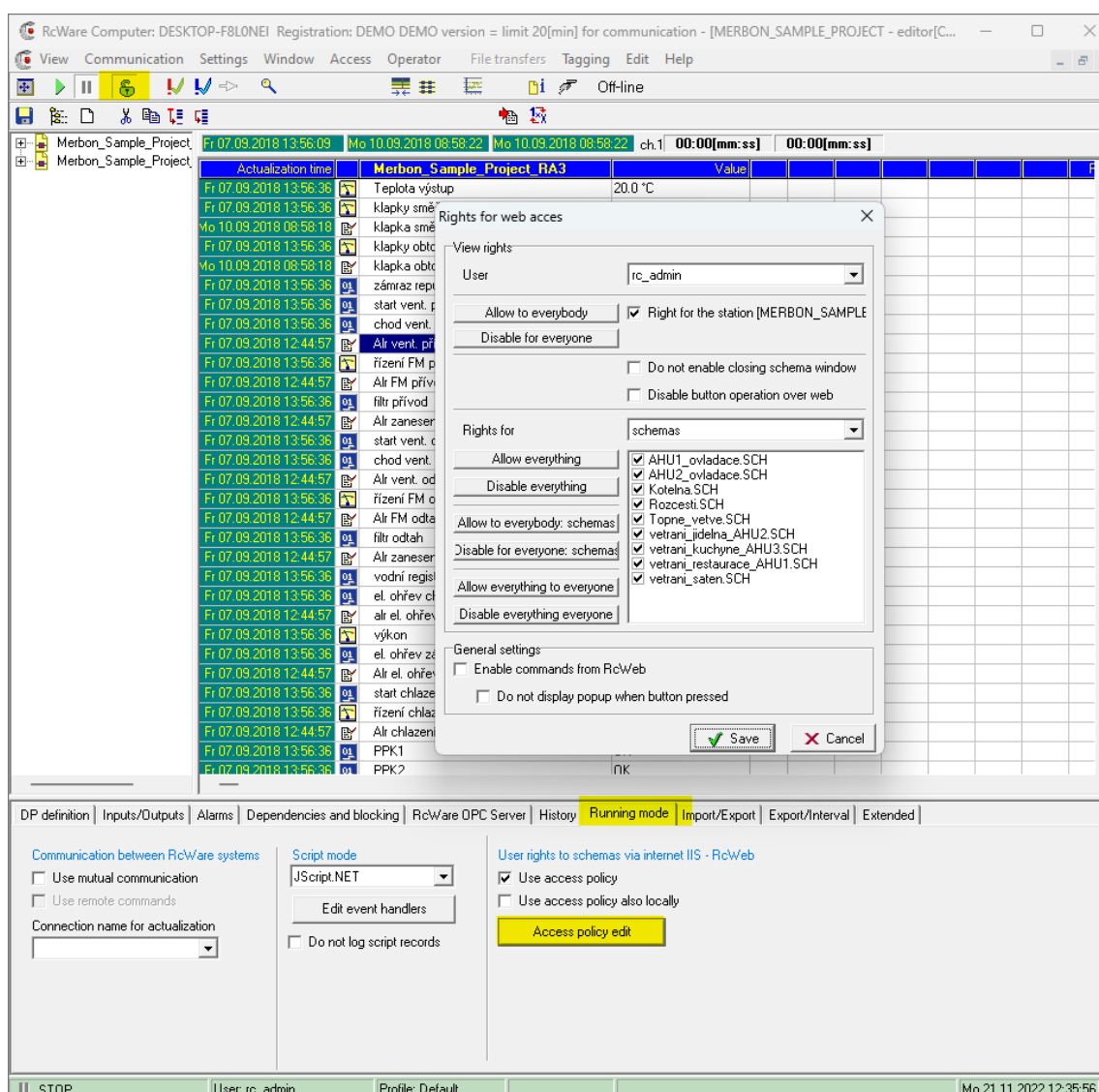
<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition of data table
access -->
```

```
<n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--Definition
of graph view -->
</n3:items>
```

Changing the „allow“ parameter to *false* or complete deletion of the record disables the user or group from access to the data point table, schema or graph.

8.4.2 Schemas access modification

To modify access to groups, we use RcWare. Specifically “Database editor > Unlock DP file > Running mode > Access policy edit”. New windows will show up where you can edit access policy in.



Unfortunately, using RcWare you can modify only access for users, not groups. So if you want to modify access for whole user group, you need to change definition of users to groups. To do this, it's necessary to edit “scada/projects/[project_id]/schemas/schemas.config” file. For basic modifications,

only thing you need to do, is use function “find and replace” in text editor of your choice. You search for type="User" and replace it with type="Group". Eventually, you can change the group name the same way.

You can modify user/group rights to schemas independently of the RcWare in the “schemas.config” file. Due to the demandingness of this action, we do not recommend this process.

You have following options to modify access rights:

- Set access to all schemas in project
 - In xml its located in „schemaConfig > schemaGroups > group> n1:tags“
 - Only right that will affect working of Merbon SCADA in context of “schemas.config” file is the right “View”

```

<schemaConfig xmlns:r="http://dev.rcware.eu/serialization/references"
xmlns:n1="http://dev.rcware.eu/groups" xmlns:n2="http://dev.rcware.eu/permissions"
xmlns="http://dev.rcware.eu/scada/schemas">
  <schemas> ... </schemas>
  <schemaGroups>
    <group n1:name="schema_group">
      <n1:tags>
        <n1:tag r:type="52f765d9-6fac-4914-b4bc-5b9d47e70b72">
          <n1:assignments>
            <n1:permissionAssignment>
              <n2:owner type="Group" name="ScadaAdmins" r:def="101" />
              <n2:items>
                <n2:i name="View" allow="true" r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="1" />
              />
                <n2:i name="Edit" allow="true" r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="2" />
              />
                <n2:i name="Delete" allow="true" r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="3" />
              />
            </n2:items>
          </n1:permissionAssignment>
        </n1:tag>
      </n1:tags>
    </group>
  </schemaGroups>
</schemaConfig>

```

- Set access to schemas
 - There are 2 options to modify access to schemas
 - 1. Allow access to all schemas and forbid access to selected ones
 - 2. Not allow (CAUTION!, not forbid, project would not load) access to all schemas and allow access to some of them.
 - You modify this in „schemaConfig > schemaGroups > group > n1:elements“ part.
 - Every “schemaltem” tag defines access to single schema with link to schema in tag “schema” defined in the begining of file in tag “schemas”
 - Also, it is possible to edit permissions to access schemas in RcWare, which, as mentioned, doesn’t work with user groups. If you do it that way, you will need to change definitions of Users to Groups as described in the begining of 8.4.2 below the picture.

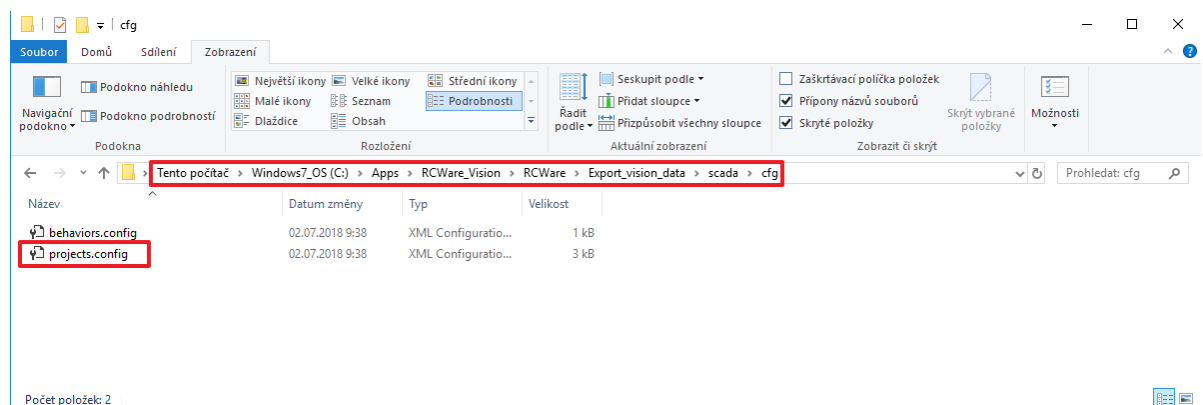
8.4.3 Modify access to data points

- You can alter data point access in [project_id].data file
- This file could be very large, so it is necessary to know, that rights definition is located in “rc rights tree”
- If we forbid access to data points by modifying the “View” right, data points are now shown
- If we forbid rights “UseActionProperties”, user in altered group will not be able to use active elements, - switches, etc.

8.5 Example

To set up the user access, following steps have to be completed:

The user rights to projects for groups and users are defined in the exported definition file `scada\cfg\projects.config`.

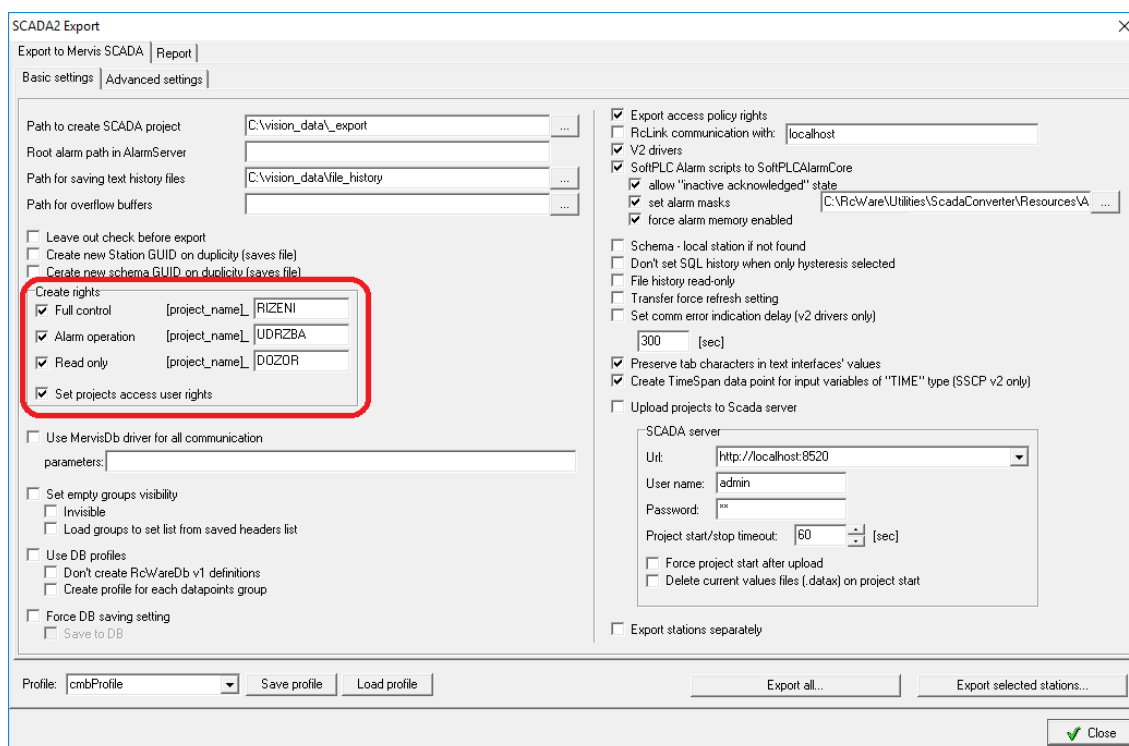


Exported definition file projects.config in File explorer

The example shows a single project with GUID `e2ae9515-d28d-4114-8cd7-78ccdeabba` named `KLASTER_BROUMOV`. The project is assigned number 1 in the definition file. There are user groups `ScadaAdmins` and `AllUsers` created by default, with defined rights (see above). If a more complex user policy is required, this file has to be edited manually and kept as backup for case of future exports so that it is not overwritten. This file does not take over any settings of the RcWare Vision user policy.

To avoid having to enter all users on a manual basis and all schemas in a project have the same user rights, automatic export of every project can be used. Check the *Create rights – Full control* option (read and write rights), Alarm operation (alarm acknowledgement and read-only), or Read only (no writing access). There is a group created for every project, containing user rights to read all schemas and selected rights to data points. These rights are created in the file

scada\cfg\projects.config and it is only necessary to create the user groups in the Domain server. The rights are also automatically added to the project-specific files (projID/projID.data a projID/schemas/schemas.config)



Rights for the groups Rizeni, Udrzba and Dozor

```
<?xml version="1.0" encoding="utf-8"?>
<projects xmlns:r="http://dev.rcware.eu/serialization/references" xmlns:n1="http://dev.rcware.eu/loc" xmlns:n2="http://dev.rcware.eu/groups" xmlns:n3="http://dev.rcware.eu/permissions" dataVersion="" xmlns="http://dev.rcware.eu/scada/projects">
  <projects> <!--Defined Projects -->
    <project id="e2ae9515-d28d-4114-8cd7-78ccdeabbafb" name="KLASTER_BROUMOV" tz="Europe/Prague" r:def="1"> <!-- Project "KLASTER_BROUMOV with assigned number "1" within this XML document -->
      <loc>
        <n1:gps lat="0" lon="0" />
      </loc>
    </project>
  </projects>
  <projectGroups> <!--Defined groups of projects-->
    <group n2:name="C:_Apps_RCWare_Vision_RcWare_DATA">
      <!--Project group named "C:_Apps_RCWare_Vision_RcWare_DATA" -->
      <n2:tags>
```

```

<n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
  <n2:assignments>
    <n2:permissionAssignment>
      <n3:owner type="Group" name="ScadaAdmins"
/> <!--Rights for the user group "ScadaAdmins" -->
      <n3:items>
        <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights -->
        <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to edit the project -->
        <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
for deleting rights -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
the data point table -->
        <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to graphs -->
      </n3:items>
    </n2:permissionAssignment>
  </n2:assignments>
  <n2:assignments>
    <n2:permissionAssignment>
      <n3:owner type="Group"
name="KLAŠTER_BROUMOV_RIZENI" /> <!-- Rights for the user group
"KLAŠTER_BROUMOV_RIZENI" -->
      <n3:items>
        <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights -->
        <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to edit the project -->
        <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
for deleting rights -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
the data point table -->

```

```

        <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to graphs -->
        </n3:items>
    </n2:permissionAssignment>
</n2:assignments>
</n2:tag>

<n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
    <n2:assignments>
        <n2:permissionAssignment>
            <n3:owner type="Group" name="AllUsers" />
<!-- Rights for the group "AllUsers" -->
            <n3:items>

<n3:i name="View" allow="true" r:type="59422c36-cc07-4b73-8be0-
d8ad4e520596" /> <!-- Definition of viewing rights -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
the data point table -->
            <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to graphs -->
            </n3:items>
        </n2:permissionAssignment>
    </n2:assignments>

    <n2:assignments>
        <n2:permissionAssignment>
            <n3:owner type="Group" name="
KLASTER_BROUMOV_UDRZBA" /> <!-- Rights for the user group
"KLASTER_BROUMOV_UDRZBA" -->
            <n3:items>

<n3:i name="View" allow="true" r:type="59422c36-cc07-4b73-8be0-
d8ad4e520596" /> <!-- Definition of viewing rights -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition to rights to
the data point table -->
            <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
to graphs -->
            </n3:items>
        </n2:permissionAssignment>
    </n2:assignments>

```

```

        </n2:assignments>
        <n2:assignments>
            <n2:permissionAssignment>
                <n3:owner type="Group" name="
KLASTER_BROUMOV_DOZOR" /> <!-- Rights for the user group
                "KLASTER_BROUMOV_DOZOR" -->
                <n3:items>

<n3:i name="View" allow="true" r:type="59422c36-cc07-4b73-8be0-
d8ad4e520596" /> <!-- Definition of viewing rights -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
the data point table -->
                <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to graphs -->
                </n3:items>
            </n2:permissionAssignment>
        </n2:assignments>
    </n2:tag>
</n2:tags>
    <!--List of projects in the group -->
<n2:elements>
    <n2:projectItem>
        <project r:ref="1" /> <!-- Users in groups
ScadaAdmins, KLASTER_BROUMOV_RIZENI, AllUsers,
KLASTER_BROUMOV_UDRZBA and KLASTER_BROUMOV_DOZOR have access
rights to project No. "1" -->
    </n2:projectItem>
</n2:elements>
</group>
</projectGroups>
</projects>

```


8.6 Editing of rights to individual projects – new groups and users

The file can be extended by more projects and user groups / users with defined rights by copying and editing. The section

```
<projects>
```

```
</projects>
```

defines projects with their GUIDs, name and identifier within this XML. Then, users and user groups are defined, and access rights to the projects are assigned to them.

```
<n2:elements>
  <n2:projectItem>
    <project r:ref="1" />
  </n2:projectItem>
</n2:elements>
```

The definition above with some more users (**Majitel1, Majitel2, Majitel3, Provozovatel, Domat_service1, Domat_service2**) and two more projects **HOTEL_BROUMOV** a **KLASTER_BROUMOV** may look e.g. like this:

```

    <?xml version="1.0" encoding="utf-8"?>
    <projects
xmlns:r="http://dev.rcware.eu/serialization/references"
xmlns:n1="http://dev.rcware.eu/loc"
xmlns:n2="http://dev.rcware.eu/groups" xmlns:n3="http://dev.rcwa
re.eu/permissions" xmlns="http://dev.rcware.eu/scada/projects">

    <projects> <!-- Defined projects -->
        <project id="e2ae9515-d28d-4114-8cd7-
78ccdeabbafeb" name="KLAster_BROUMOV" tz="Europe/Prague"
r:def="1"> <!-- Project "KLAster_BROUMOV with assigned number
"1" within this XML document -->
            <loc>
                <n1:gps lat="0" lon="0" r:def="1" />
            </loc>
            <project id="c0e865f3-3cd7-42c8-b542-
42026de14888" name="HOTEL_BROUMOV" tz="Europe/Prague" r:def="2">
<!-- Project "HOTEL_BROUMOV with assigned number "2" within
this XML document -->
                <loc>
                    <n1:gps r:ref="1" />
                </loc>
            </project>
            <project id="40106293-e5b4-61cf-ac24-
b4250d24bfb0" name="OBCHOD_BROUMOV" tz="Europe/Prague"
r:def="3"> <!-- Project "OBCHOD_BROUMOV with assigned number "3"
within this XML document -->
                <loc>
                    <n1:gps r:ref="1" />
                </loc>
            </project>
        </projects>

        <projectGroups> <!-- Defined groups of projects -->
            <group n2:name=" Majitel1 "> <!-- Project group with
name "Majitel1" -->
                <n2:tags>
                    <n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                        <n2:assignments>
                            <n2:permissionAssignment>
                                <n3:owner type="User" name=" Majitel1 "/>
<!-- Rights for user "Majitel1" -->
                                    <n3:items>
                                        <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--
Definition of viewing rights to schemas -->

```

```

                <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to graphs -->
            </n3:items>
        </n2:permissionAssignment>
    </n2:assignments>
</n2:tag>
</n2:tags>
<n2:elements>
    <n2:projectItem>
        <project r:ref="1" /> <!-- User Majitel1 in
group Majitel1 has right to project No. "1" -->
    </n2:projectItem>
</n2:elements>
</group>

    <group n2:name=" Majitel2 "> <!-- Project group named
"Majitel2" -->
        <n2:tags>
            <n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                <n2:assignments>
                    <n2:permissionAssignment>
                        <n3:owner type="User" name=" Majitel2 " />
<!-- Rights for user "Majitel2" -->
                    <n3:items>
                        <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to schemas -->
                            <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to graphs -->
                                </n3:items>
                            </n2:permissionAssignment>
                        </n2:assignments>
                    </n2:tag>
                </n2:tags>
            <n2:elements>
                <n2:projectItem>
                    <project r:ref="2" /> <!-- User Majitel2 in
group Majitel2 has right to project No. "2" -->
                </n2:projectItem>
            </n2:elements>
        </group>

    <group n2:name=" Majitel3 "> <!-- Project group named
"Majitel3" -->

```

```

    <n2:tags>
      <n2:tag r:type="52f765d9-6fac-4914-b4bc-5b9d47e70b72">
        <n2:assignments>
          <n2:permissionAssignment>
            <n3:owner type="User" name=" Majitel3 " />
<!-- Rights for user "Majitel3" -->
            <n3:items>
              <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to schemas -->
              <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to graphs -->
            </n3:items>
          </n2:permissionAssignment>
        </n2:assignments>
      </n2:tag>
    </n2:tags>
    <n2:elements>
      <n2:projectItem>
        <project r:ref="3" /> <!-- User Majitel3 in
group Majitel3 has right to project No. "3" -->
      </n2:projectItem>
    </n2:elements>
  </group>

  <group n2:name=" Provozovatel "> <!-- Project group
named "Provozovatel" -->
    <n2:tags>
      <n2:tag r:type="52f765d9-6fac-4914-b4bc-5b9d47e70b72">
        <n2:assignments>
          <n2:permissionAssignment>
            <n3:owner type="User" name=" Provozovatel1
" /> <!-- Rights for user "Provozovatel" -->
            <n3:items>
              <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--
Definition of viewing rights to schemas -->
              <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!--
Definition of viewing rights to graphs -->
              <n3:i name="ViewInGenericTextView"
allow="true" r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" />
<!-- Definition of viewing rights to data points -->
            </n3:items>
          </n2:permissionAssignment>
        </n2:assignments>
      </n2:tag>
    </n2:tags>
  </group>

```

```

        </n2:permissionAssignment>
    </n2:assignments>
</n2:tag>
</n2:tags>
<n2:elements>
    <n2:projectItem>
        <project r:ref="1" /> <!-- User Provozovatel1
in group Provozovatel has right to project No. "1" -->
    </n2:projectItem>
    <n2:projectItem>
        <project r:ref="2" /> <!-- User Provozovatel1
in group Provozovatel has right to project No. "2" -->
    </n2:projectItem>
    <n2:projectItem>
        <project r:ref="3" /> <!-- User Provozovatel1
in group Provozovatel has right to project No. "3" -->
    </n2:projectItem>
</n2:elements>
</group>

<group n2:name="ScadaAdmins"> <!-- Project group
named "ScadaAdmins" -->
    <n2:tags>
        <n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
            <n2:assignments>
                <n2:permissionAssignment>
                    <n3:owner type="User" name="Domat_servicel"
/> <!-- Rights for user "Domat_servicel" -->
                    <n3:items>
                        <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights to schemas -->
                        <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to project editing -->
                        <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to delete in projects -->
                        <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to view graphs -->
                        <n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
data point table -->
                    </n3:items>
                </n2:permissionAssignment>
            </n2:assignments>
        </n2:tag>
    </n2:tags>
</group>

```

```

        </n2:permissionAssignment>
    </n2:assignments>
</n2:tag>
<n2:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
    <n2:assignments>
        <n2:permissionAssignment>
            <n3:owner type="User" name="Domat_service2"
/> <!-- Rights for user "Domat_service2 -->
            <n3:items>
                <n3:i name="View" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of viewing rights -->
                <n3:i name="Edit" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to project editing -->
                <n3:i name="Delete" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to delete in projects -->
                <n3:i name="ViewInChartView" allow="true"
r:type="59422c36-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition
of rights to view graphs -->

<n3:i name="ViewInGenericTextView" allow="true" r:type="59422c36
-cc07-4b73-8be0-d8ad4e520596" /> <!-- Definition of rights to
data point table -->
            </n3:items>
        </n2:permissionAssignment>
    </n2:assignments>
</n2:tag>

</n2:tags>
<n2:elements>
    <n2:projectItem>
        <project r:ref="1" /> <!-- Users
Domat_service1 and Domat_service2 in the ScadaAdmins group have
rights for project No. "1" -->
    </n2:projectItem>
    <n2:projectItem>
        <project r:ref="2" /> <!-- Users
Domat_service1 and Domat_service2 in the ScadaAdmins group have
rights for project No. "2" -->
    </n2:projectItem>
    <n2:projectItem>
        <project r:ref="3" /> <!-- Users
Domat_service1 and Domat_service2 in the ScadaAdmins group have
rights for project No. "3" -->

```

```

        </n2:projectItem>
    </n2:elements>
</group>

</projectGroups>

</projects>

```

The XML file above defines groups / users and their project access rights:

Tab. 1 – Definition of groups and users

Group	User / Project	KLASTER_BROUMOV	HOTEL_BROUMOV	OBCHOD_BROUMOV
Majitel1	Majitel1	yes	no	no
Majitel2	Majitel2	no	yes	no
Majitel3	Majitel3	no	no	yes
Provozovatel1	Provozovatel1	yes	yes	yes
ScadaAdmins	Domat_service1	yes	yes	yes
	Domat_service2	yes	yes	yes

If a group or user is defined with the same name in the Domain server, they are paired according to their names, and the rights to selected projects are granted. These users, however, must also be defined in the files at the projects. The most convenient way is to define them in RcWare Vision before the project is exported to Merbon SCADA. If they are not defined in RcWare Vision prior to export, they must be defined later in files *projID/projID.data* and *projID/schemas/schemas.config*.

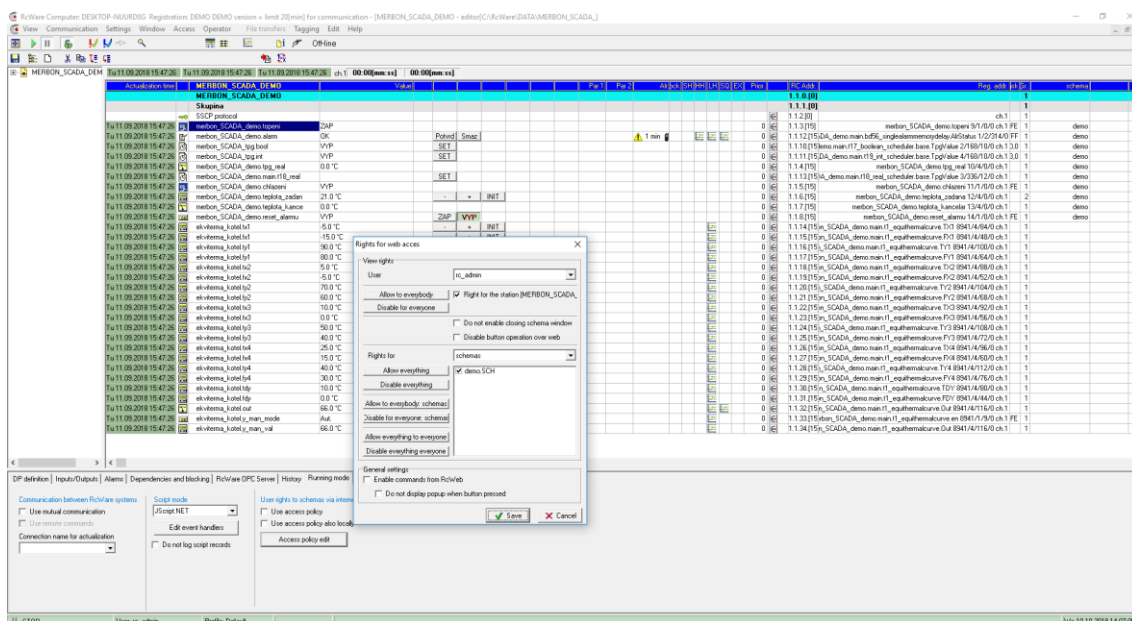
8.6.1 User definition in RcWare Vision

New users are defined in the **Settings -> User definition -> Users** menu.

Eventual editing of user rights for schemas or data point table is described below.

8.6.2 Definition of rights to schemas

Definition of rights to schemas can be set in the user rights setting to RcWare Vision schemas, in the RcWare Vision menu **Running mode -> Access policy edit**.



Definition of access rights to individual schemas

It is necessary to maintain the defined user names in the Domain server and in the definition file `scada\cfg\projects.config`. When exporting the project to Merbon SCADA please check the option *Export access policy rights*.

Access rights to schemas are exported to file `scada\projects\[GUID projektu]\schemas\schemas.config`:

```
<?xml version="1.0" encoding="utf-8"?>
<schemaConfig xmlns:r="http://dev.rcware.eu/serialization/
references"
xmlns:n1="http://dev.rcware.eu/groups" xmlns:n2="http://dev.rcware
.eu/permissions" xmlns="http://dev.rcware.eu/scada/schemas">
  <schemas>
    <schema id="bb409cfe-c537-4473-ab46-e1fbf7e00105"
name="lnp.rozv" r:def="7" /> <!-- Schema named lnp.rozv has ID: 7
-->
    <schema id="fd8a8c66-2cb6-4afb-8ce3-aabda430c03e"
name="lnp" r:def="5" /> <!-- Schema named lnp has ID: 5 -->
    <schema id="822a82ae-3d2c-41d4-8834-9ce5cbc4a9f9"
name="2np.rozv" r:def="10" /> <!-- Schema named 2np.rozv has ID:
10 -->
    <schema id="7cde8abc-cbd3-4c80-bd0b-0ae6bbd0b2c3"
name="2np" r:def="6" /> <!-- Schema named 2np has ID: 6 -->
    <schema id="dc3bc25f-8ba9-43ff-b06b-96cb11773670"
name="3np.rozv" r:def="11" /> <!-- Schema named 3np.rozv has ID:
11 -->
    <schema id="8c0cbbca-491c-45a3-b7ed-d104c0f46fa4"
name="3np" r:def="12" /> <!-- Schema named 3np has ID: 12 -->
```



```

        <schema id="ele94b64-cf81-42c6-aeda-2cccf4d76f35"
name="4np.rozv" r:def="9" /> <!-- Schema named 4np.rozv has ID: 9
-->
        <schema id="819d9c1d-3fcf-4d8b-8168-e3ddb6e9a42"
name="mezanin" r:def="14" /> <!-- Schema named mezanin has ID: 14
-->
        <schema id="665c87dc-8912-4a8e-a661-a759c91e5e14"
name="Rozcesti" r:def="13" /> <!-- Schema named Rozcesti has ID:
13 -->
    </schemas>
    <schemaGroups>

    <group n1:name="schema_group">
        <n1:tags>
            <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                <n1:assignments>
                    <n1:permissionAssignment>
                        <n2:owner type="Group" name="ScadaAdmins" />
<!-- Skupina s názvem "ScadaAdmins" -->
                        <n2:items>
                            <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="1" /> <!--
Definition of rights to view schemas -->
                            <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="2" /> <!--
Definition of rights to edit projects -->
                            <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="3" /> <!--
Definition of rights to delete in projects -->
                        </n2:items>
                    </n1:permissionAssignment>

                    <n1:permissionAssignment>

                        <n2:owner type="Group" name="KLAŠTER_BROUMOV_RIZENI" /> <!-- Group
named "KLAŠTER_BROUMOV_RIZENI" -->
                        <n2:items>
                            <n2:i r:ref="1" r:type="317d8eee-73f8-
43e0-a612-ae45fd2385d8" /> <!-- Definition of rights to view
schemas -->
                            <n2:i r:ref="2" r:type="317d8eee-73f8-
43e0-a612-ae45fd2385d8" /> <!-- Definition of rights to edit
projects -->
                            <n2:i r:ref="3" r:type="317d8eee-73f8-
43e0-a612-ae45fd2385d8" /> <!-- Definition of rights to delete in
projects -->
                        </n2:items>
                    </n1:permissionAssignment>
                </n1:tag>
            </n1:tags>
        </group>
    </schemaGroups>

```

```

        </n2:items>
    </n1:permissionAssignment>
</n1:assignments>
</n1:tag>

<n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
    <n1:assignments>
        <n1:permissionAssignment>
            <n2:owner type="Group" name="AllUsers" />
<!-- Group named "AllUsers" -->
            <n2:items>
                <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" r:def="4" /> <!--
Definition of rights to view schemas -->
            </n2:items>
        </n1:permissionAssignment>

        <n1:permissionAssignment>

<n2:owner type="Group" name="KLAŠTER_BROUMOV_UDRZBA" /> <!-- Group
named "KLAŠTER_BROUMOV_UDRZBA" -->
            <n2:items>
                <n2:i r:ref="4" r:type="317d8eee-73f8-
43e0-a612-ae45fd2385d8" /> <!-- Definition of rights to view
schemas -->
            </n2:items>
        </n1:permissionAssignment>

        <n1:permissionAssignment>

<n2:owner type="Group" name="KLAŠTER_BROUMOV_DOZOR" /> <!-- Group
named "KLAŠTER_BROUMOV_DOZOR" -->
            <n2:items>
                <n2:i r:ref="4" r:type="317d8eee-73f8-
43e0-a612-ae45fd2385d8" /> <!-- Definition of rights to view
schemas -->
            </n2:items>
        </n1:permissionAssignment>
    </n1:assignments>
</n1:tag>

</n1:tags>

<n1:elements>
    <n1:schemaItem>

```

```

        <schema r:ref="5" /> <!-- Schema ID: 5 named lnp
can be viewed by all users -->
    </n1:schemaItem>
    <n1:schemaItem>
        <schema r:ref="6" /> <!-- User rc_admin has
special rights to schema ID: 6 named 2np -->
        <n1:tags>
            <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                <n1:assignments>
                    <n1:permissionAssignment>
                        <n2:owner type="User" name="rc_admin"
r:def="8" /> <!-- User rc_admin has ID: 8 -->
                        <n2:items>
                            <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                            <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                            <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
                        </n2:items>
                    </n1:permissionAssignment>
                </n1:assignments>
            </n1:tag>
        </n1:tags>
    </n1:schemaItem>

    <n1:schemaItem>
        <schema r:ref="7" /> <!-- Schema ID: 7 named
lnp.rozv is available for viewing for all users -->
        <n1:tags>
            <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                <n1:assignments>
                    <n1:permissionAssignment>
                        <n2:owner r:ref="8" /> <!-- ID refers to
user named rc_admin. The user rc_admin will have special rights
for schema ID: 7 named lnp.rozv -->
                        <n2:items>
                            <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->

```

```

                <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
            </n2:items>
        </n1:permissionAssignment>
    </n1:assignments>
</n1:tag>
</n1:tags>
</n1:schemaItem>

<n1:schemaItem>
    <schema r:ref="9" /> <!-- Schema ID: 9 named
4np.rozv is available for viewing for all users -->
</n1:schemaItem>
<n1:schemaItem>
    <schema r:ref="10" /> <!-- User rc_admin The
user rc_admin will have special rights for schema ID: 10 named
2np.rozv -->

    <n1:tags>
        <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
            <n1:assignments>
                <n1:permissionAssignment>
                    <n2:owner r:ref="8" /> <!-- ID refers to
user rc_admin -->
                    <n2:items>
                        <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                        <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                        <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
                    </n2:items>
                </n1:permissionAssignment>
            </n1:assignments>
        </n1:tag>
    </n1:tags>
</n1:schemaItem>

<n1:schemaItem>

```

```

        <schema r:ref="11" /> <!-- Schema ID: 11 named
3np.rozv is available for viewing for all users -->
        <n1:tags>
            <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
                <n1:assignments>
                    <n1:permissionAssignment>
                        <n2:owner r:ref="8" /> <!-- ID refers to
user rc_admin -->
                            <n2:items>
                                <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                                    <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                                            <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
                                                        </n2:items>
                                                                </n1:permissionAssignment>
                                                                    </n1:assignments>
                                                                        </n1:tag>
                                                                            </n1:tags>
                                                                                </n1:schemaItem>

<n1:schemaItem>
    <schema r:ref="12" /> <!-- Schema ID: 12 named
3np is available for viewing for all users -->
    <n1:tags>
        <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
            <n1:assignments>
                <n1:permissionAssignment>
                    <n2:owner r:ref="8" /> <!-- ID refers to
user rc_admin. The user rc_admin will have special rights for
schema ID: 12 named 3np -->
                        <n2:items>
                            <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                                    <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                                            <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
                                                        </n2:items>
                                                                </n1:permissionAssignment>
                                                                    </n1:assignments>
                                                                        </n1:tag>
                                                                            </n1:tags>
                                                                                </n1:schemaItem>

```

```

        </n2:items>
    </n1:permissionAssignment>
</n1:assignments>
</n1:tag>
</n1:tags>
</n1:schemaItem>

<n1:schemaItem>
    <schema r:ref="13" /> <!-- Schema ID: 13 named
Rozcesti is available for viewing for all users. -->
    <n1:tags>
        <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
            <n1:assignments>
                <n1:permissionAssignment>
                    <n2:owner r:ref="8" /> <!-- ID refers to
user rc_admin. The user rc_admin will have special rights for
schema ID: 13 named Rozcesti -->
                    <n2:items>
                        <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                        <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                        <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
                    </n2:items>
                </n1:permissionAssignment>
            </n1:assignments>
        </n1:tag>
    </n1:tags>
</n1:schemaItem>

<n1:schemaItem>
    <schema r:ref="14" /> <!-- Schema ID: 14 named
mezanin is available for viewing for all users. -->
    <n1:tags>
        <n1:tag r:type="52f765d9-6fac-4914-b4bc-
5b9d47e70b72">
            <n1:assignments>
                <n1:permissionAssignment>
                    <n2:owner r:ref="8" /> <!-- ID refers to
user rc_admin. The user rc_admin will have special rights for
schema ID: 14 named mezanin -->
                    <n2:items>

```

```

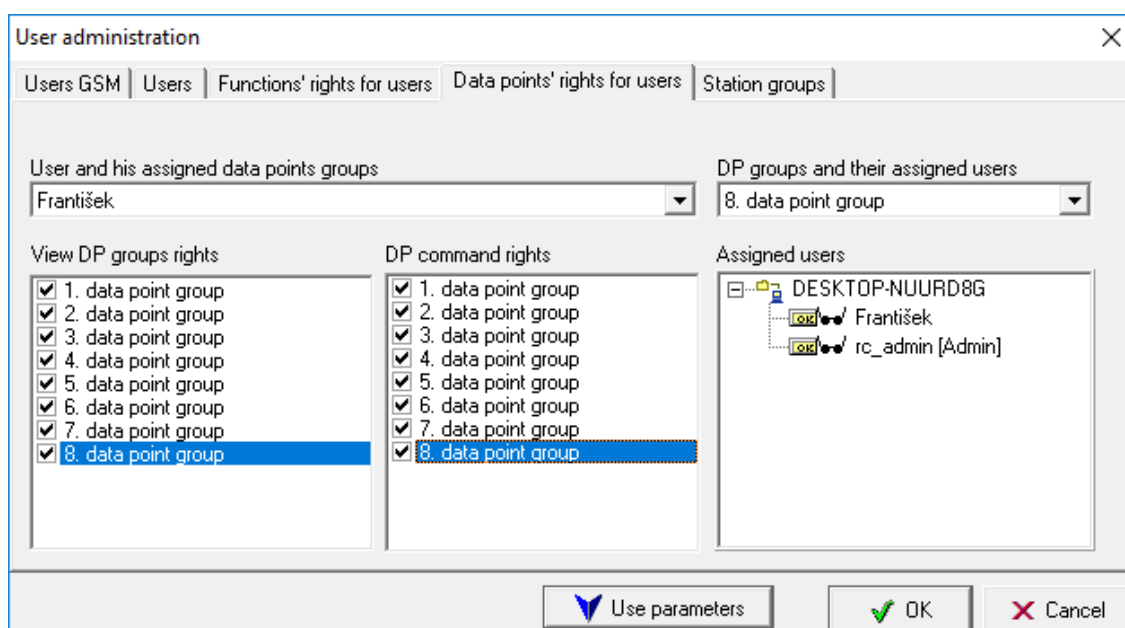
                <n2:i name="View" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to view schemas -->
                <n2:i name="Edit" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to edit projects -->
                <n2:i name="Delete" allow="true"
r:type="317d8eee-73f8-43e0-a612-ae45fd2385d8" /> <!-- Definition
of rights to delete in projects -->
            </n2:items>
        </n1:permissionAssignment>
    </n1:assignments>
</n1:tag>
</n1:tags>
</n1:schemaItem>

</n1:elements>
</group>
</schemaGroups>
</schemaConfig>

```

8.6.3 Definition of rights to individual data points, read / write rights

Definition of rights to individual data points can be set in RcWareVision in *Settings -> User definition -> User rights to data points*. This is also where the read/write rights to the data point groups are defined.



Definition of rights to individual data points

The user names defined in Domain server and in the definition file *scada\cfg\projects.config* must be maintained. When exporting the project to Merbon SCADA please check the option *Export access policy rights*.

Rights to individual data points can be found in the *scada\projects\project GUID\project GUID.data* file.

9 Extended SCADA functions

9.1 Project map

A map with projects is part of every installation. In the default setting, it is turned off. To activate the map, edit the *config.js* file in the *Merbon SCADA Web* folder.

The existing setting is

```
ESGVisionConfig.AppMainIconsVisibility.MapProjectsView = false;
```

which has to be changed to

```
ESGVisionConfig.AppMainIconsVisibility.MapProjectsView = true;
```

Save the file. The SCADA server needs not to be restarted. Just refresh the web page in the browser by Ctrl-F5. In the right part of the page header there should be the map icon



In the basic setting, projects do not have coordinates to specify the position in the map. If the projects should appear at particular positions, the coordinates must be entered.

The coordinates are to be set in the *projects.config* file (located at *vision_data\scada\cfg*). Every project has a separate declaration in this file. Part of this declaration is also the *<loc>* parameter. This is where the longitude and latitude has to be specified:

```
<project id="40b8e9d6-e008-4015-b2c7-c2305a4a3b92" name="MERBON_SCADA_DEMO"  
<loc>  
  <nl:gps lat="0" lon="0" />  
</loc>  
</project>
```

Setting of lat/lon for a project in the „projects.config“ file

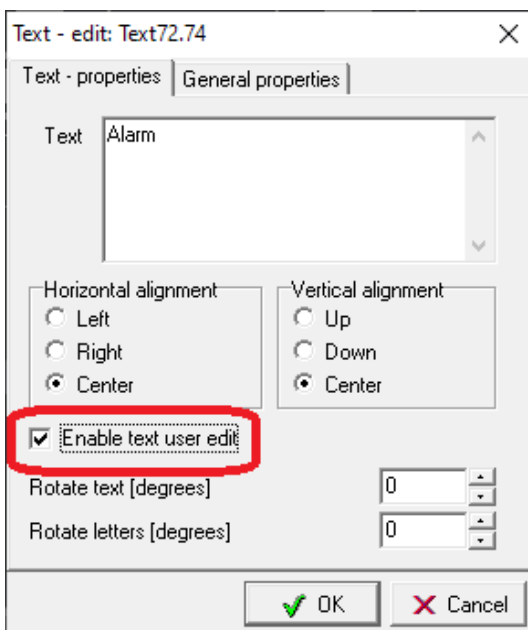
To apply all changes, the SCADA server must be restarted.

Note: When uploading projects, please make sure that the *projects.config* file is not overwritten. RcWare does not include the location settings, and this information would be lost.

9.2 User text editing

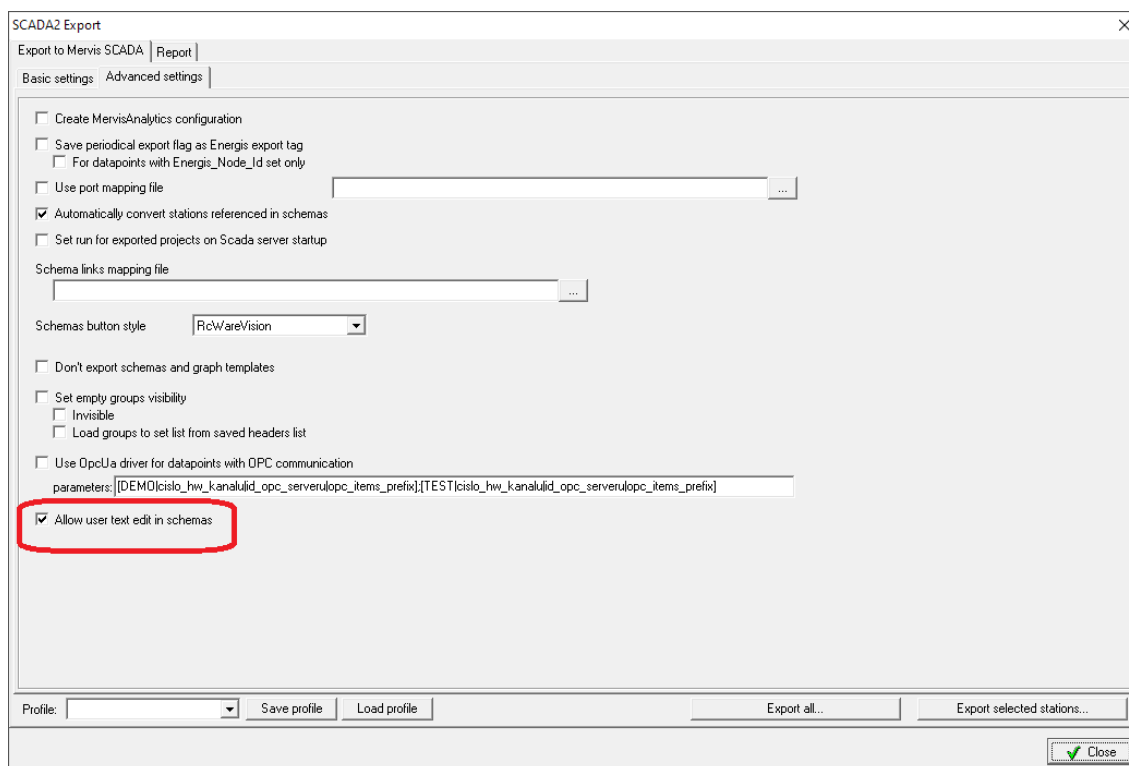
This function allows creating user-editable objects in the Merbon SCADA schemas. The objects can be edited in the web browser where SCADA is viewed. Some minor changes have to be made:

First, specify which *Text* type objects have to be user-editable. Allow editing in the object editing dialogue.



Enable editing at a Text type object in RcWare Vision

Then, allow editing for the project in the export dialogue in the Extended settings tab:



Enable user text editing in the RcWare Vision export dialogue

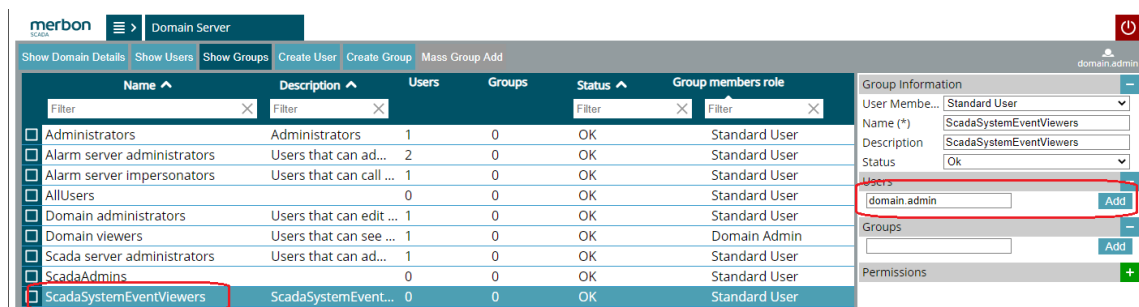
Export projects and restart the SCADA server to make changes active.

Important: User text changes are stored in the **.datax** file, which is located in the project folder. This file **must not be deleted** when a new version of the project is copied to the server.

9.3 Events – overview of all user interventions

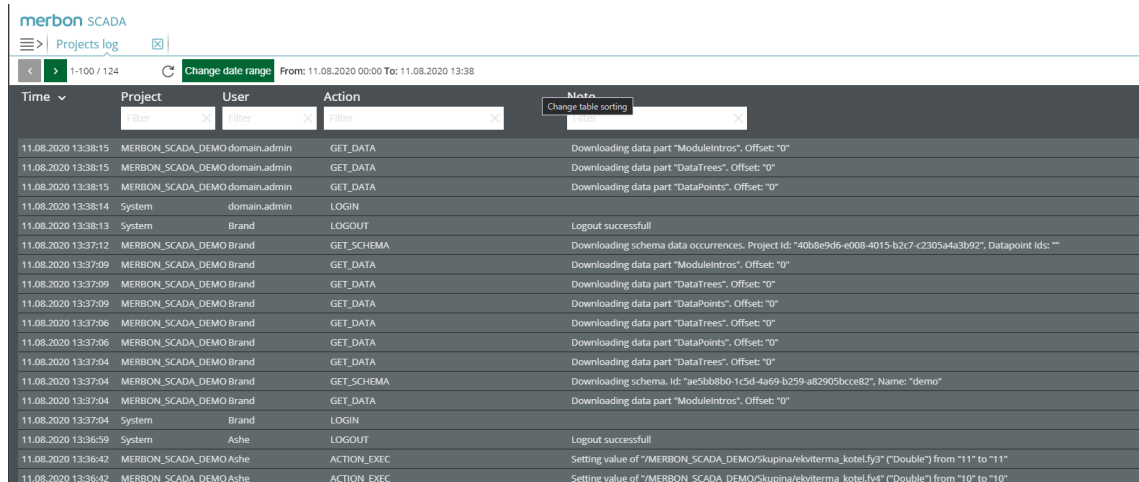
Every Merbon SCADA user can display the *Projects log* tab. This is where the history of interventions in Merbon SCADA is recorded, like login, change of value, display of schema, etc. These events can be filtered according to time span, project, user name, event type, or note, which contains a closer description of the event (e.g. the new setpoint).

Merbon SCADA also allows an administrator view on the Events tab. This view shows all interventions of all users concerning the Merbon SCADA installation. Users can get this authorisation if they are members of the *ScadaSystemEventViewers* user group.



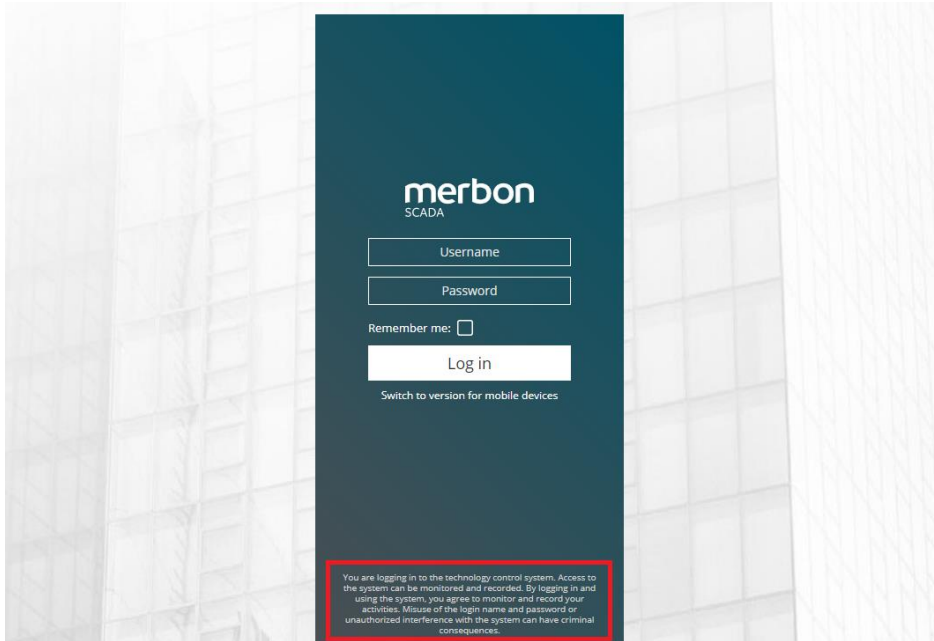
Assignment to the ScadaSystemEventViewers group

As soon as the user is assigned to the group, the *Projects log* tab shows events by all users in the system.



Administrator view on the Events tab

9.4 Security text settings



Login page

The security text on the login page can be set in the configuration file on the way:

C:\Apps\Merbon\Web Client\Merbon Scada Web\config.js on line 19 in the parameter **ESGVisionConfig.LoginConfirmationText**.

```
C:\Apps\Merbon\Web Client\Merbon Scada Web\config.js - Notepad++
Soubor Úpravy Najít Zobrazit Formát Syntaxe Nastavení Nástroje Makro Spustit Pluginy Okno ?
config.js
1 "use strict";
2 angular.module('RcWareVisionAppConfig').
3 run(['ESGVisionConfig', '$log', function (ESGVisionConfig, $log) {
4   ESGVisionConfig.ApiPrefix = "../api";
5   ESGVisionConfig.SetAppButtonLineWidth = false;
6   ESGVisionConfig.schemaTopLineHeight = 114;
7   ESGVisionConfig.schemaBorderHeight = 0;
8   ESGVisionConfig.graphTopLineHeight = 114;
9   ESGVisionConfig.mapTopLineHeight = 114;
10  ESGVisionConfig.AppMainIconsVisibility.ReportBug = false;
11  ESGVisionConfig.AppReportBugUrl = "https://www.domat.cz";
12  ESGVisionConfig.ShowAcknowledgedAlarmsCount = true;
13  ESGVisionConfig.AppMainIconsVisibility.MapProjectsView = false;
14  ESGVisionConfig.ProjectNameSliceEnable = true;
15  ESGVisionConfig.MapHideProjectsWithoutGPS = true;
16  ESGVisionConfig.DataPointsBulkActions = true;
17  ESGVisionConfig.AppVersion = "1.8.1";
18  ESGVisionConfig.AppTitle = "Merbon SCADA";
19  ESGVisionConfig.LoginConfirmationText = "You are logging in to the technology control system. Access to the system can be
   monitored and recorded. By logging in and using the system, you agree to monitor and record your activities. Misuse of the
   login name and password or unauthorized interference with the system can have criminal consequences.";
20  ESGVisionConfig.DefaultHistoryProviderId = "1a318d7-a73d-4a61-9e30-e246b0a22d4";
21  ESGVisionConfig.graphOverrideOptionsFce = function (options) {
22    options.colors = ["#F7931E", "#3BF0F0", "#85F3FF", "#D71920", "#FC2E21", "#FF7357", "#0071BC", "#D4145A", "#00A99D"];
23    if (options.selection != null) { options.selection.color = "#939c9f"; }
24    if (options.xaxis.font != null) { options.xaxis.font.color = "#939c9f"; options.xaxis.font.family = "Open Sans"; options.
   xaxis.font.size = 12; options.xaxis.color = "#939c9f"; }
25    if (options.yaxis.font != null) { options.yaxis.font.color = "#939c9f"; options.yaxis.font.family = "Open Sans"; options.
   yaxis.font.size = 12; options.yaxis.color = "#939c9f"; }
26    if (options.xaxis.color != null) { options.xaxis.color = "#60696c"; }
27    if (options.yaxis.color != null) { options.yaxis.color = "#60696c"; }
28    if (options.crosshair != null) { options.crosshair.color = "#939c9f"; options.crosshair.lineWidth = "1"; }
29    if (options.grid != null) { options.grid.backgroundColor = "#a4f553"; options.grid.borderColor = "#e6e6e6"; }
30    if (options.grid.markingsMidnightColor != null) { options.grid.markingsMidnightColor = "FFFFFF"; }
31    if (options.grid.markingsWeekendColor != null) { options.grid.markingsWeekendColor = "#424649"; }
JavaScript file length: 2.601 lines: 36 Ln: 19 Col: 346 Pos: 1191 Windows (CR LF) UTF-8 INS
```

File config.js

You need to save the modified **config.js** file, restart the **MerbonSCADA_MerbonSCADAServer** service and press **Ctrl + F5** in the browser on the login page.

9.5 Modbus TCP protocol driver

Apart from the SoftPLC (SoftPLC Link protocol) and Merbon (SSCP protocol), since Merbon SCADA version 1.8.1 it is possible also to use directly Modbus TCP. Modbus TCP is used here for 3rd party integration, such as of AHU units or PLC systems which support Modbus TCP server protocol (e.g. Wago). Note, however, that Modbus does not support more complex data structures, such as time schedulers, and these functionalities must be engineered using another means. Moreover, Modbus TCP has no protection against unauthorised reading nor writing, so it should be deployed exclusively in closed technological networks.

Modbus client supports **functions F01, F02, F03, F04, F05, F06, and F16**.

In RcWare Vision, proceed with the communication setup:

- for each Modbus TCP connection, a separate physical channel (port) of type „SW drivers, general device“ must be defined
- in the communication definition data point

enter the **IP address** or URL of the Modbus server, **default port** number is 502

- **Maximum response timeout** should be about 300 ms, depending on network topology and Modbus server response time

- **Pause between response telegrams:** on protocol routing to Modbus RTU it must be long enough for the router to be able to process the requests over the serial line, which has lower data throughput than the IP network.
- **Maximum number of the register types:** Number of registers which will be read together by multiple functions (F01, F02, F03, F04) to optimize the communication. These values depend on the properties of Modbus TCP server, check with the server manufacturer. Maximum value for bit-oriented functions (coil) is 1968, for registers it is 122. If a value of 1 is entered, the requests are sent individually, without grouping.
- **Continuous blocks only:** if active and the group of registers is non-continuous,, the telegram is splitted so that there is no request for a „non-existing“ register which is not defined in any of the data points – these requests may return errors.
- In the datapoint definitions there are settings as follows:

- **Station number:** Modbus link address; if there is no Modbus router behind the IP address, usually 1 is entered
- **Channel:** RcWare communication channel of type „SW drivers, general device“
- **Symbolic address:** not used, do not care
- **Read / Write machine telegram address:** register number, starts with 1 in the Modbus table
- **Answer length:** number of registers ot be read in a request
- **Type of value:** value format (data type) in the Modbus table; consult with the Modbus server supplier

- **Type of READ:** function used for reading
- **Type of WRITE:** function used for writing (analogue / digital outputs in RcWare)
- **Order bytes:** word order (endianness)
- **Swap bytes:** byte order

The interpretation of these parameters is different for 32 bit and 16 bit numbers.

Example:

For 32 bit data types, both Hi-Lo/Lo-Hi and Swap bytes are relevant:

data on bus = byte order in the telegram: AA BB CC DD

Resulting value:

Hi-Lo = AA BB CC DD

Lo-Hi = CC DD AA BB

Resulting value when Swap bytes active:

Hi-Lo = BB AA DD CC

Lo-Hi = DD CC BB AA

For the Int16 data type, Hi-Lo means bytes swap and the Swap bytes parameter is not used:

data on bus = byte order in the telegram: AA BB

Resulting value as integer:

Hi-Lo = AA BB

Lo-Hi = BB AA

For other 16 bit data types (UINT16) the default order in RcWare Vision is Hi-Lo and can not be changed. However, in **Merbon SCADA the Hi-Lo option swaps the bytes** as described at the Int16 data type. Since version 10.8.2022 there is also the option **Numeric types read fix (same behavior as SCADA)** in the communication data point setup. Its activation makes RcWare to behave in the same way as Merbon SCADA, i.e. the Hi-Lo selector influences the byte order.

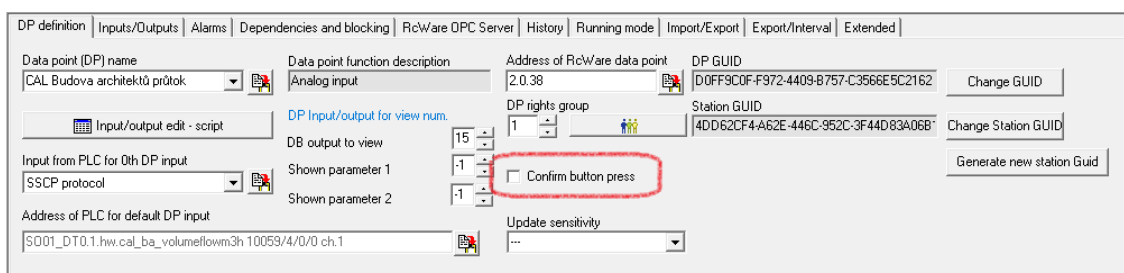
At new projects this option should be active, both RcWare and Merbon SCADA then behave in the same way. At old RcWare projects, activating this option may lead to wrong interpretation of some datapoints in case the Hi-Lo selector is other than the data format (the problem would not appear in older RcWare versions).

9.6 Button press confirmation

At some projects it is required that user confirms a control action (setting of new value or state) using a special dialogue. It is a protection against unintended value change when operating the web page. The protection is set up by the user himself in the *User settings / Show confirmation dialog for actions*. The item has three options:

- **Always** – the confirmation is active for all control elements
- **With flag** – the confirmation is active only for elements which were set as *Confirm button press* in the RcWare editor
- **Never** – the confirmation is not active.

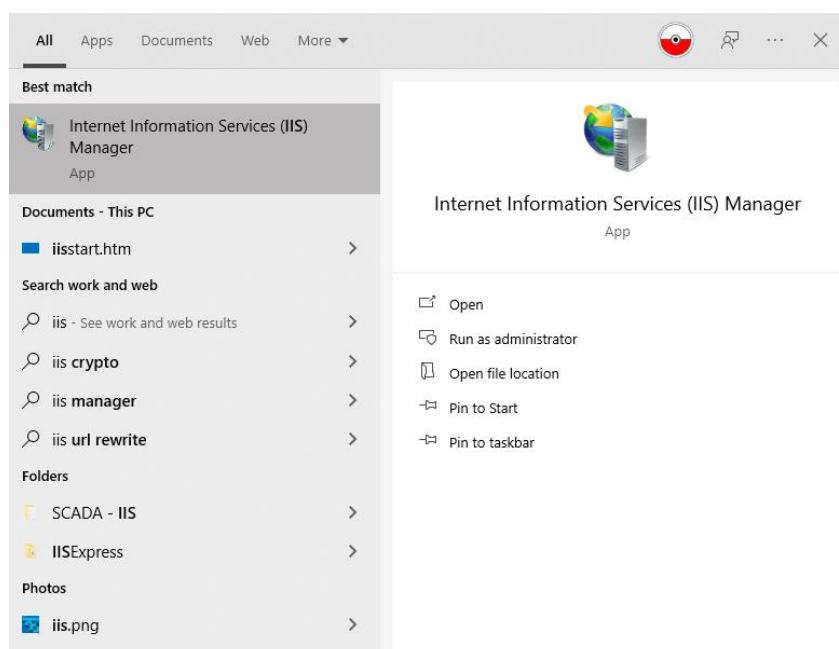
The *Confirm button press* attribute is set in RcWare Vision for every data point individually in the data point definition:



10 Basic problem diagnostics

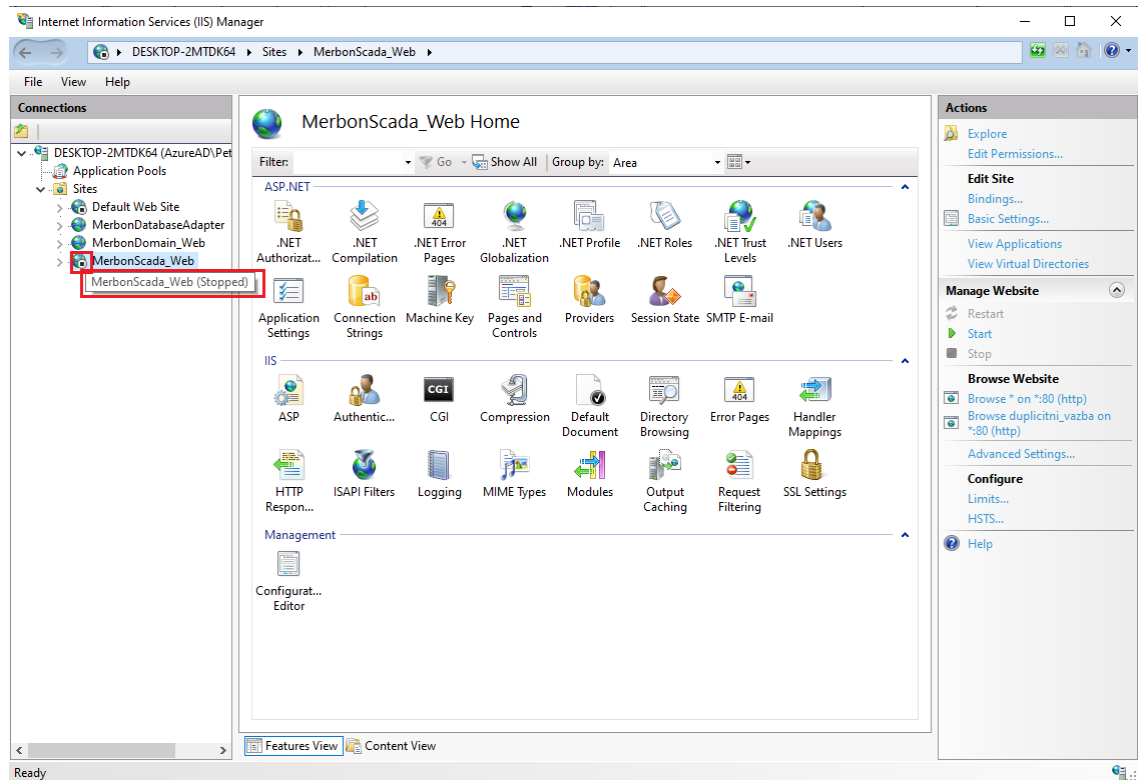
- **Service – running/stopped** (list of all Domain Server/SCADA Server services)
 - **Reasons why the SCADA Server service does not start:**
 - Licence problem – listed in the SCADA server log together with the particular problem description (bad HW imprint, licence timeout, maximum datapoint number exceeded)
 - XML error (list in a log where the service is installed or in the command line if launched from a command line)
 - Check the service settings so that it starts automatically after crashing
 - Duplicate project GUID (in case not all projects have been exported or checked)
 - **Service is running, login not possible** – the login attribute is displayed, but login is not possible

- SCADA server is not responding: big size or number of projects; large projects take more time to start (very big projects take minutes)
- Wrong username or password: definitely check if the name and password are correct. If you are 100 % sure, try Ctrl-F5 at the login page. If the page contents disappears, maybe the SCADA web server is not running (check in the IIS).
- **Duplicate binding of TCP port :80 on the SCADA Server web in IIS:**
 - After Windows upgrade, it may happen tat a duplicate binding to port 80 is created in the SCADA server web in IIS. The duplicate binding must be removed for the SCADA server to work correctly:
 - Start **the IIS Manager**. A shortcut can also be found here:
C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Administrative Tools



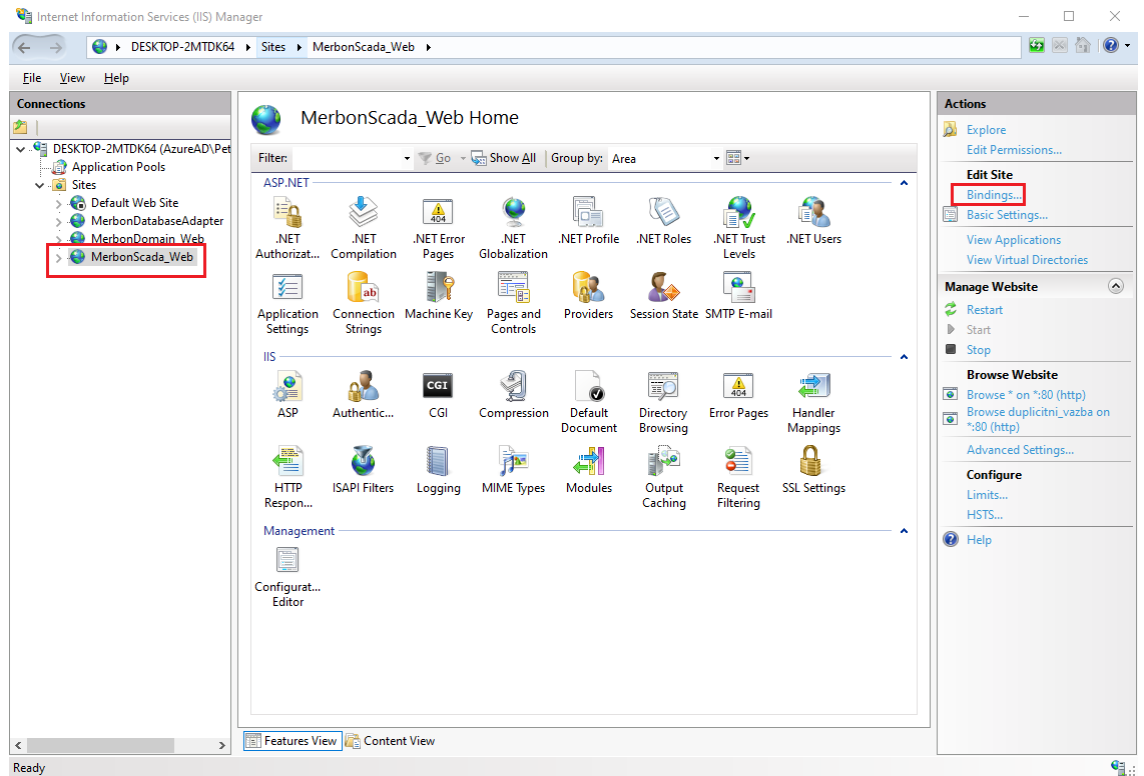
Searching the IIS

- If there is a black square at the web icon, the web is stopped.

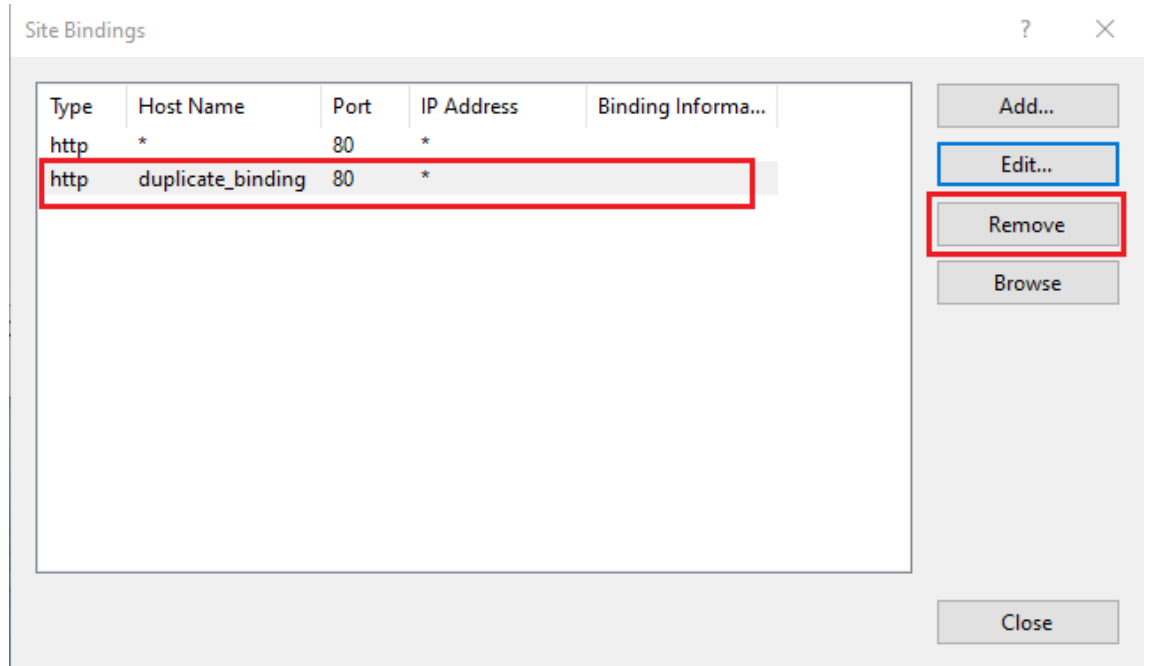


The IIS dialogue

In the *Connections* section, select the MerbonScada_Web, and in the right part select *Bindings*.

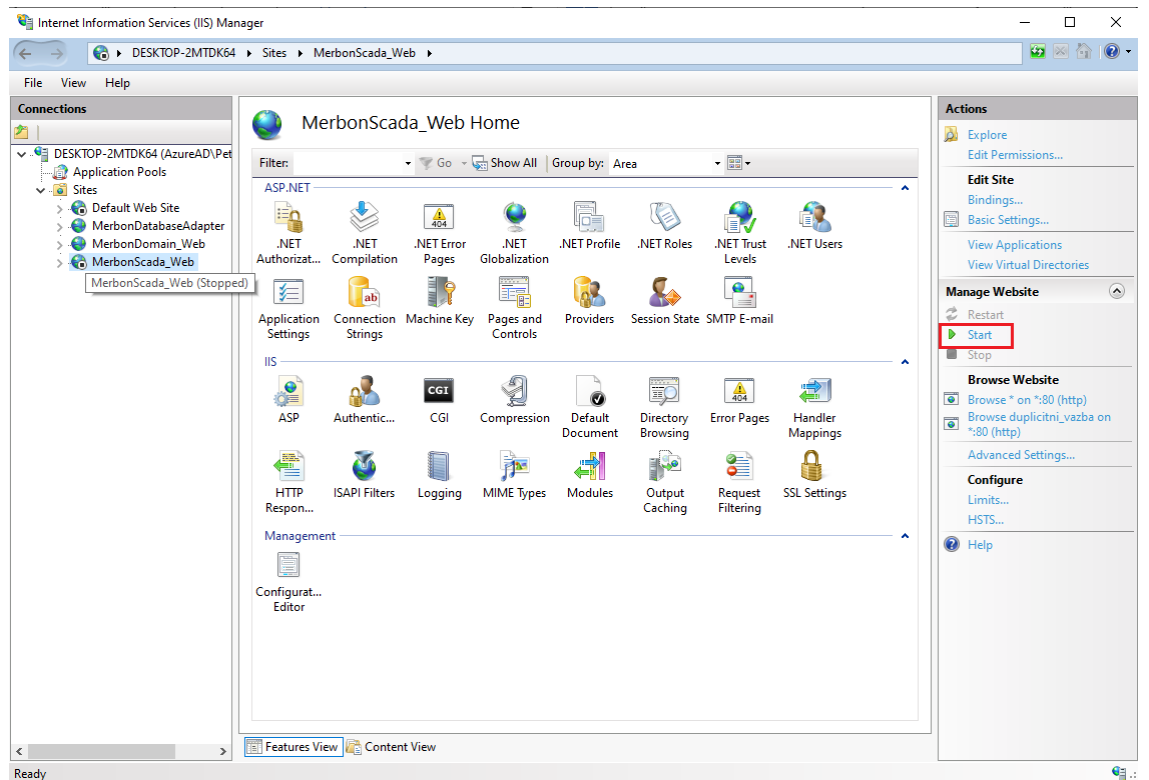


- Now select the duplicate binding and click *Remove*.



The bindings management dialogue

- The last step is to start the web – *Start*.



Starting the web service

- **Domain Server not started – user can not log in**
- **A project is not communicating:**
 - Always check if all projects are running in Merbon SCADA after upload: Project statistics (find the projects which need further examination)

- Check the cfg->behaviors file, if the project with the particular GUID is in the list of projects to start automatically
- Check of connection – channel +
- Check in the project statistics the total number of data points, and compare them with licenced datapoints (in RcWare Ctrl-T / Ctrl-U or in the Stations statistics) and learn for how many datapoints the Merbon SCADA licence is installed. The last project which exceeds the datapoint limit is not started. The „number of licensed data points exceeded“ message is displayed in log / command line.
- **Some schemas are not visible:**
 - Possible duplicate schemas GUIDs - schemas not exported (the project was not checked or warning was ignored). To be checked in the project export folder - have all schemas been exported?
 - User policy set incorrectly (if „Export user policy“ checked at export) Check in RcWare Vision for every project concerned.
- **A group of data points is not communicating in Merbon SCADA, while everything is OK in RcWare Vision:**
 - The reason may be that Merbon SCADA communicates using groups. If any data point has a configuration error, the whole group containing this data point has a communication error. Please check if all data points are really communicating in RcWare Vision even if the group reading is off (setup in the communication data point – the key icon). Only data points which are set up incorrectly should display as in comm failure.
 - Mostly, special data point types show problems, such as TPG, scripts, PLC time setup, etc. A data point may contain a script which is not supported in Merbon SCADA, a TPG may contain invalid exceptions, or the data type may overflow if its value is too high.
- **When exporting alarms from RcWare there is a dialogue „Error during retrieving configuration“:**
 - Check if the alarm export form really contains the correct user name and password. Next, check in Domain server if the user is assigned to the *Alarm server administrators* group (see the Implementation manual).
 - If the problem persists, stop the *Merbon Alarm server* service and open the folder C:\Apps\Merbon\Alarm Server Warehouse. Open folders *cfg* and *history* and delete all files they contain. Next, start the *Merbon Alarm server* service, restart RcWare Vision and try if the alarm export is working properly.
 - If the above steps do not help and the export still does not work, reinstall the Merbon Alarm server. Use Merbon SCADA installer to uninstall the Merbon Alarm server service. Then open C:\Apps\Merbon\ and delete all folders which were created by the Alarm server installer:
 - Merbon Alarm Server,
 - Merbon Messaging,
 - Alarm Server Bridge,

- Alarm Server Bridge Logs,
- Alarm Server Warehouse.
- Then reinstall the service and proceed again with the export.

The most frequent errors that can be found in the SCADA server log (C:\Apps\Merbon\Merbon SCADA Server Logs):

- **HW fingerprint in the licence does not fit the hardware where SCADA runs** – SCADA server service impossible to start

[Critical] - No valid license found

[Critical] - License module checks: ESG.SCADA.Server.Host ->

System.UnauthorizedAccessException: Incorrect HW Win32_NetworkAdapterConfiguration-MACAddress ...

This happens then the hardware information read from the machine does not match the information contained in the activated licence file. The reasons may be as follows:

- 1) The .licact file used when installing the software was activated with a hardware fingerprint created on another machine than the SCADA server is running.
- 2) One or more parameters in the system had changed, or a piece of hardware was replaced (processor, network card, motherboard, etc.)
- 3) SCADA is operated in a virtual OS whose configuration had changed – see above. A MAC address may change when Windows are upgraded, it is recommended to configure a fixed MAC address in the virtual system.

Solution: If you encounter this type of error, please contact Domat technical support. Your licence will be reactivated.

- **Maximum data point number exceeded** – some of the projects are stopped

[Critical] - Data point count limit exceeded.

[Critical] - Cannot load data of project 'MERBON_SCADA_DEMO'. Error:

System.UnauthorizedAccessException: Data point count limit exceeded. ...

This error appears mostly when the SCADA server was expanded by one or more new projects, or added extra datapoints to one or more of projects. This resulted in exceeding the maximum number of licensed data points in the system. Check the number of employed datapoints in RcWare or in the project overview in the Merbon SCADA menu (*Statistics*).

Solution: Remove some unnecessary data points from your projects. Remove unnecessary projects. If another system expansion is necessary, contact Domat sales and buy extra datapoints for your licence.

- **Errors in projects.config**

[Error] - DIAG (SCADA start error) SCADA-service - StartFailed (Error: Loading Projects failed.

| Hodnota GGGroup není platnou hodnotou pro parametr PermissionOwnerType.

| Požadovaná hodnota GGGroup nebyla nalezena)

[Critical] - Merbon SCADA server cannot be started: System.AggregateException: Došlo k jedné nebo více chybám. ---> System.Exception: Loading Projects failed. --->

System.FormatException: Hodnota GGGroup není platnou hodnotou pro parametr

PermissionOwnerType. ---> System.ArgumentException: Požadovaná hodnota GGGroup nebyla nalezena. ...

[Error] - DIAG (SCADA after init) SCADA-service - StartFailed (Message: Initialization of Scada server has failed) (Duration: 00:00:09.0870046)

[Error] - DIAG (SCADA start error) SCADA-service - StartFailed (Error: Loading Projects failed. | Znak < (šestnáctková hodnota 0x3C) nelze použít jako první znak názvu.: řádek 18, pozice 18)

[Critical] - Merbon SCADA server cannot be started: System.AggregateException: Došlo k jedné nebo více chybám. ---> System.Exception: Loading Projects failed. --->

System.Xml.XmlException: Znak < (šestnáctková hodnota 0x3C) nelze použít jako první znak názvu.: řádek 18, pozice 18 v System.Xml.XmlTextReaderImpl.Throw(Exception e) ...

Syntax error in the projects.config file. Most probably caused by manual editing of the file.

Solution: Loading Projects failed – search the mentioned value in the file (here GGGroup) and correct it to a valid value. Initialization of Scada server has failed – the line and position of the error is specified, go to the projects.config file and fix the error. Mostly it is a syntax error.

- **Error in behaviors.config**

[Error] - DIAG (SCADA after init) SCADA-service - StartFailed (Message: Initialization of Scada server has failed) (Duration: 00:00:09.5008805)

[Error] - DIAG (SCADA start error) SCADA-service - StartFailed (Error: Loading Behaviors failed. | Znak < (šestnáctková hodnota 0x3C) nelze použít jako první znak názvu.: řádek 4, pozice 6)

[Critical] - Merbon SCADA server cannot be started: System.AggregateException: Došlo k jedné nebo více chybám. ---> System.Exception: Loading Behaviors failed. --->

System.Xml.XmlException: Znak < (šestnáctková hodnota 0x3C) nelze použít jako první znak názvu.: řádek 4, pozice 6 v System.Xml.XmlTextReaderImpl.Throw(Exception e) ...

Syntax error in the *projects.config* file. Mostly caused when editing the file manually.

Solution: The error type and position is specified here. Go to the file and fix the syntax error..

- **Error in the project – setting of a particular data point or more data points (wrong channel, misassigned .vlist, etc.)**

[Error] - Data of MERBON_SCADA_DEMO cannot be loaded: ArgumentException: Unknown Serialization type id 28bbfc1d-9f90-4339-9f9a-8b3ebd3488cd ...

The problem originated when editing the project in RcWare.

Solution: Search for the datapoint GUID in the log („28bbfc1d-9f90-4339-9f9a-8b3ebd3488cd“ in the example above) in the .data file in the exported project (open in notepad++ or similar editor). This shows the datapoint concerned. Then search this point in RcWare, check and fix possible problems.

If the error in the datapoint is not apparent, contact Domat technical support please.

11 Unsupported scripts in RcWare Vision

Full compatibility of scripts can not be maintained due to different architecture against RcWare Vision. Scripts must be considered individually for each project.

RcWare Vision evaluates scripts in the application GUI. The Merbon SCADA components are running on a server. This means that any interactivity, 3rd parties code integration, etc. are not supported.

RcWare Vision is tolerant to script errors. Components do have more strict supervision, and if a script error appears, the result is undefinable.

Script functions which are not supported in Merbon SCADA:

GetValueFromDialog()
GetParticularData() and other database read functions
GetLoggedInUserName()
TimeProgFunc()
SetParameter()
SendSMS()
RunRCInternalFunction()
GetConnectionStatus()
SetUserButtonPressed()
InterfaceAlarmEnabled()

Time functions in scripts now work in the UTC time zone (rather than following the local time). This is because they are processed on the server, and the time zone of the client platform is thus unknown.