STORAGE SYSTEM

“DATALOGGER DATABASE”

Database based storage system for data acquisition systems, dataloggers and transmitters

Instruction Manual

Introduction

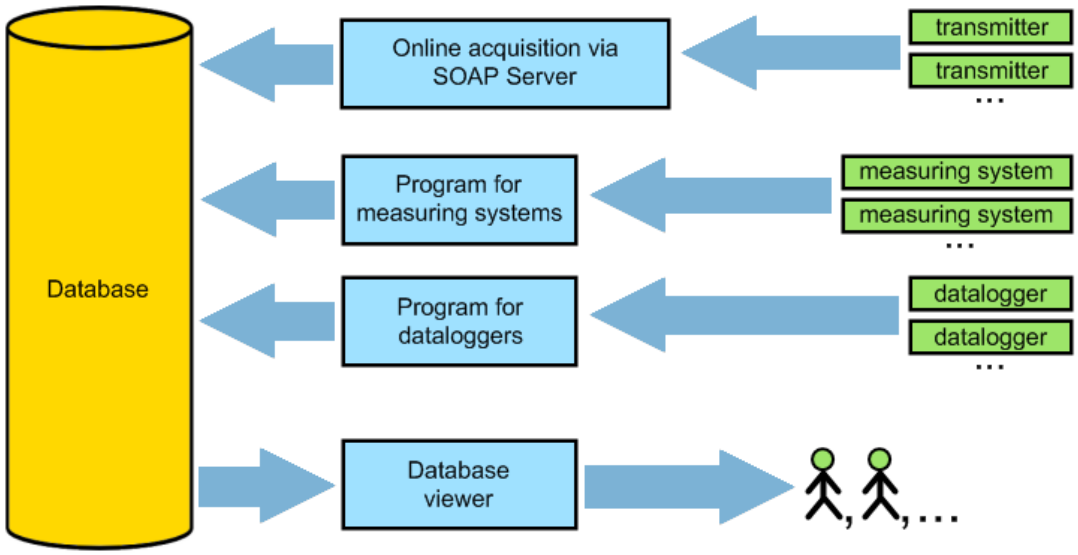
This storage system is database based system for data collection from data acquisition systems, dataloggers and transmitters. It offers:

- loading the database with data downloaded from data acquisition systems or dataloggers
- online data collection from ethernet transmitters into the database
- backing up the database
- viewing data from the database in tabular and chart format
- print and PDF output as tables and charts as well
- output table data to CSV (MS Excel compatible format)
- viewing data from different devices at a time and their comparing on one chart
- viewing online values from ethernet transmitters

Attention:

Primary data source of measured values from data acquisition systems and dataloggers are downloaded files. **Never delete original *.msx , *.mss and *.msb files!**

System brief scheme:



Content

1 Preparation of storage system

The database (the data store, place where all records are being saved) is the base of the storage system. It is necessary to install database server and create the database of storage system on it.

1.1 Installation of MySQL database server

Storage system is able to work with MySQL database server of version 5.0. Supported versions are from 5.0.37 to 5.0.91.

!!! Storage system will not work with MySQL 5.1, 5.5 or 5.6 !!!

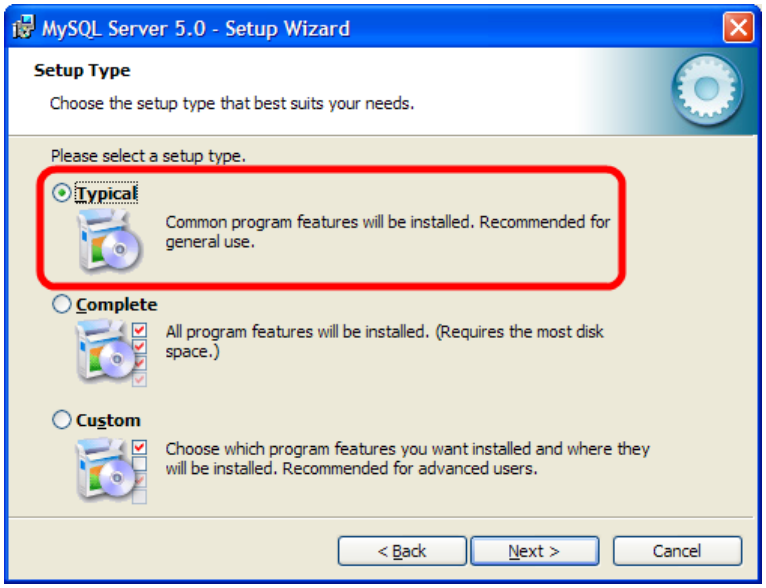
Installation instructions assume that MySQL server will be installed under operation system Windows XP, Vista, 7 or Server 2003/2008 and that there is not installed any instance of MySQL server on the computer yet.

If there is already installed an instance of MySQL 5.0, you can skip this chapter and use that server. You will need to know the password for database administrator account (username: *root)*.

Step by step instructions how to install MySQL server:

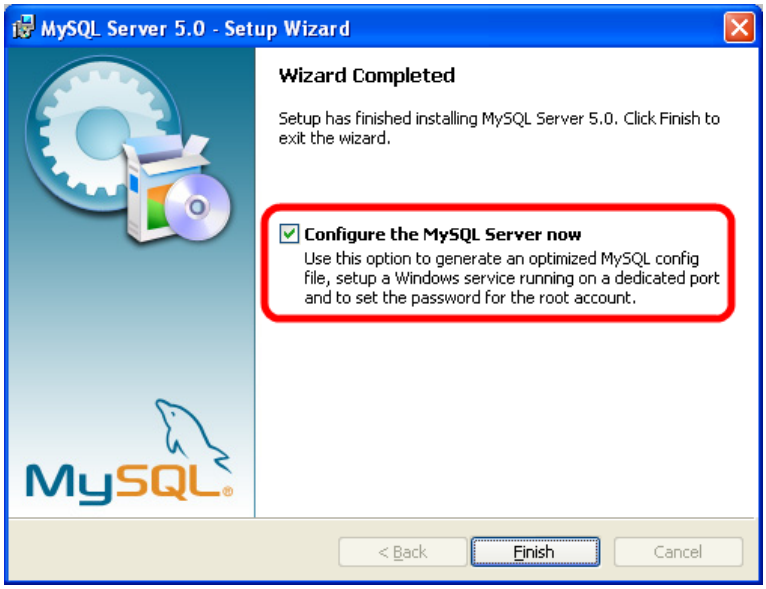
1) Download the installer of MySQL 5.0 Community server from:
   http://downloads.mysql.com/archives/mysql-5.0/mysql-essential-5.0.91-win32.msi
2) Lunch downloaded installer *mysql-essential-5.0.91-win32.msi*.

3) Skip the first welcome page by button *Next* to the page *Setup type*. Choose *Typical* type of installation and continue by the button *Next*.

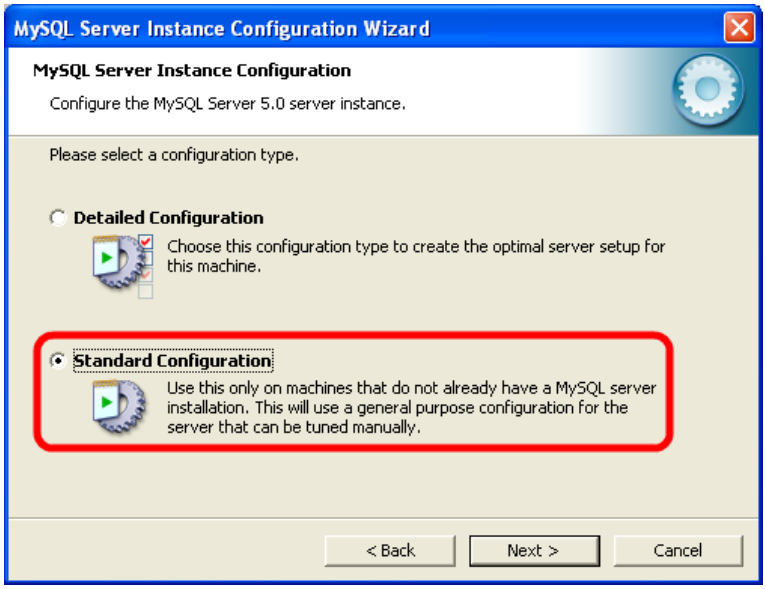


4) Confirm installation by the button *install* on the following page. The installation process will take a time now. Confirm continuation of the installation several times by *Next* button until you get to the page *Wizard completed*.

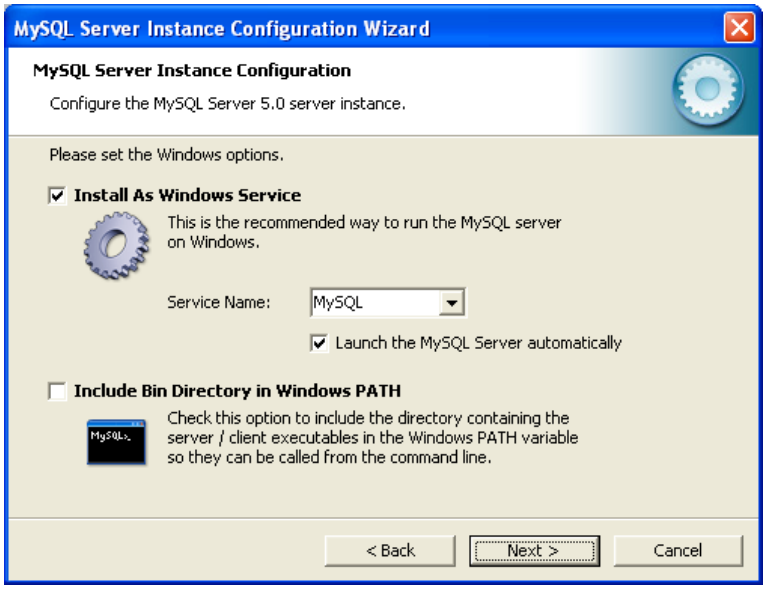
5) Check if the choice *Configure the MySQL Server now* is selected and continue by the button *Finish*.



6) Use button *Next* to skip welcome page of configuration wizard, then choose *Standard Configuration* and continue by the button *Next*.



7) Leave everything without changes on the following page and continue by the button *Next*.



8) Create new password for system administrator account (its username will be *root*) and enter it here. Enable the access from other computers in the network for this account as well. **Make a note of the password because you will need it later!** Then click the button

Next.

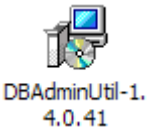
9) Run the configuration process by the button *Execute*. MySQL server installation is finished at the moment but there is still one step left: You have to allow TCP/IP port 3306 on the firewall to be able to connect to the database server from other computers in the network. Allow port *3306 – MySQL standard port* on the firewall. How to do it you can read in chapter 7.1 Allowing TCP port on windows firewall. Also remember, that there can be other firewalls running on your computer and also some anti-virus programs contains firewalls.

2 Using program Database Administration Utility

The program *Database Administration Utility* is the utility for managing the storage system. Primarily, you will use it for creation of the database on the *MySQL database server*. Then you will have to use it for administrating user accounts. Not the least function of *Database Administration Utility* is configuring and controlling the SOAP server which serves as online collector of measured values from transmitters. You can read about all *Database Administration Utility* functions in chapter 2.3 Functions of program Database Administration Utility

2.1 Installation of program Database Administration Utility

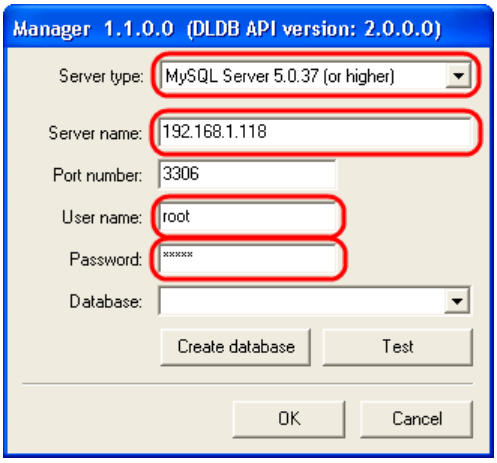
Installation is simple with help of the installer. It is strictly recommended to install the *Database Administration Utility* on the same computer where you have installed *MySQL database server*. Lunch the installer and proceed through the installation.



2.2 Using Database Administration Utility for creation database on database server

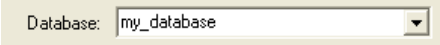
Creating the database on database server is the primary function of the *Database Administration Utility*. Find the program icon and run it.

Login dialog will be displayed at first. Enter database connection parameters (more info in chapter 7.2 Entering database connection parameters), but don't choose the *database* at this moment. Enter ***root*** as the *username* and as the *password* enter the password that you entered during MySQL installation.



At this moment you can use button *Test* to verify if you have entered correct database connection parameters. If parameters are OK, then message *Database name is not entered* will be displayed. Otherwise the program will inform you that it is unable to log in the server.

If parameters are OK, create some database name and enter it into the field *Database*. Use characters *a..z, 0..9* only and instead of character space use character underline „_“. Remember, number can not be the first character (valid examples: *test_01, storage_system,…)*

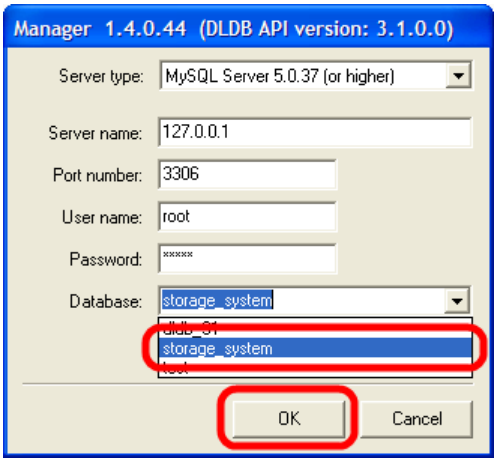


Click on the button *Create database* to execute creation process of the database. After successful creation of the database following message will be displayed:

Creation of the database is finished now.

2.3 Functions of program Database Administration Utility

In the previous chapter, we have used the program *Database Administration Utility* for creating new database only. Now and also at any time later you can reenter database connection parameters, choose already created database from *Database* list and press the *OK* button to get to the database administration. How to enter database connection parameters is explained in chapter 7.2 Entering database connection parameters.



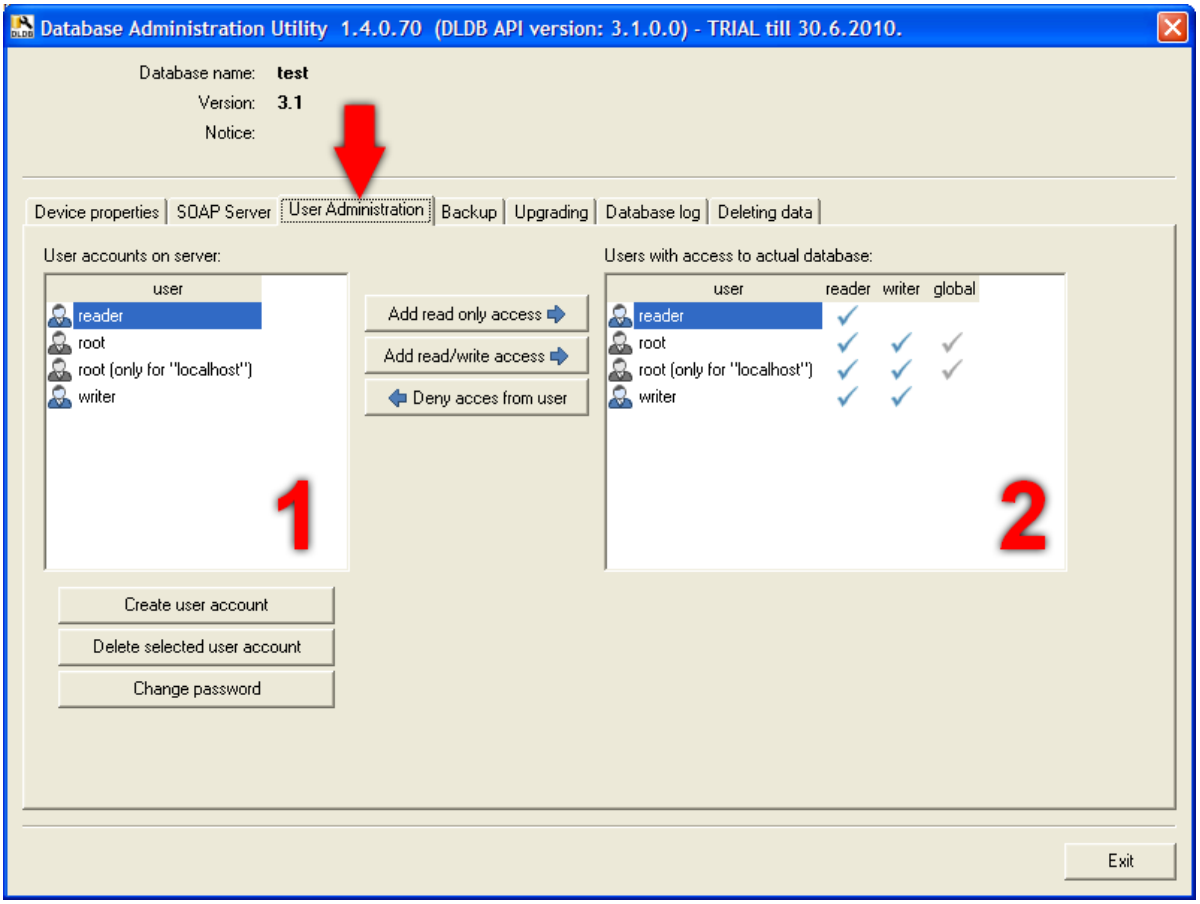
It will allow you to:

- administrate users for database
- configure and control SOAP server
- set device properties i.e. renaming.
- execute the backup and eventually upgrade the database
- view database log
- delete data

There are basic information about database at the top of the manager form: name, version and eventually there can be some message (e.g. that the database should be upgraded to newer version). Tabs with manager functions are under these basic information:

2.3.1 User administration

You'll find this function on *User Administration* tab of the manager. This administration has two lists: *User accounts* (marked with number 1 on the picture below) and *Users with access to actual database* (marked with number 2 on the picture below).



User accounts list displays all user accounts on the database server. Below are buttons for creating new user, deleting existing user and changing the password for existing user. Be careful especially when deleting user or changing password that you have selected known user – program allows deleting and changing password for all users on server (except *root* user).

The list *Users with access to actual database* displays users who can view or insert data into actual database. Next to the *User* column are columns *reader* and *writer*. If the user have in *reader* columns tick and don't have tick in *writer* column then this user has rights for viewing the database only. If the user have tick in both *reader* and *writer* column then he has rights for viewing and also for inserting data to the database.

You can add *read-only* or *read/write* access rights to any existing user in *User accounts* list by buttons between this list: first select user in *User accounts* list and then click the button. You can also deny access rights for user who already have some rights to the database: first select the user in *Users with access to actual database list* and then click on the *Deny access from user* button.

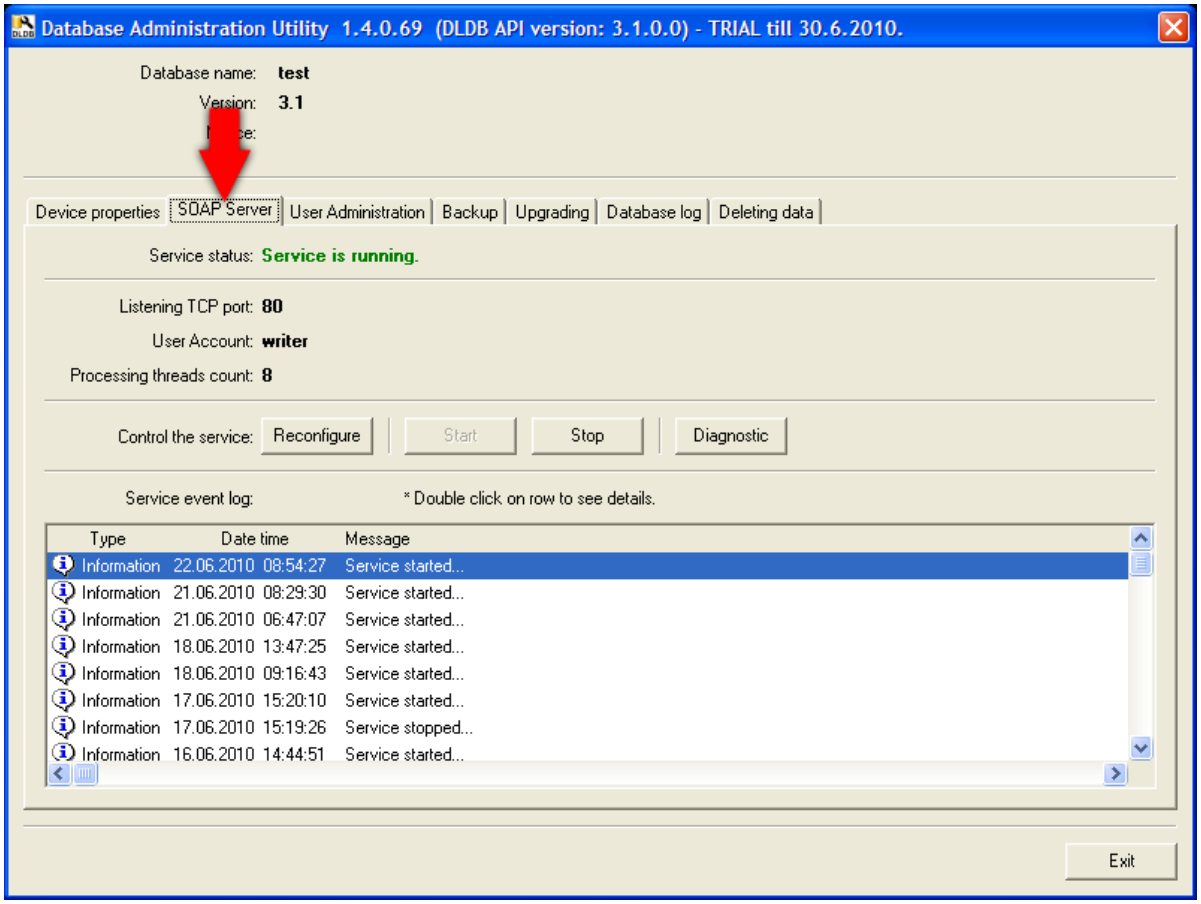
If some user in *Users with access to actual database* list has gray tick in last *global*

column then this user has access rights globally. It means that the user has global rights for all databases on the server (e.g. user *root* will be the one for sure, because *root* user has all rights to all databases, because it is system administrator). If another user than *root* is in the list with global tick, then the only way to deny the access to the database for him, is to completely delete him from the database server by the button *Delete selected user account*. Remember, you must be sure that this user is not used in another project on SQL server!

2.3.2 SOAP Server

This function serves for configuring and controlling the SOAP server. SOAP server acts as online collector of measured data from transmitters, so you will only need to use this when you are using storage system with transmitters

Attention! To be able to configure and control the SOAP Server service you have to run *Database administrator utility* with administrator privileges.



You can check if SOAP server is running or stopped on the top of the page. There are configuration parameters below and then buttons for controlling the SOAP server. At the bottom is the list of events. This list can prompt you to solve problems.

Use the button *Reconfigure* for the server configuration. Configuration wizard will be executed where you will be asked for entering *listening TCP port*, *database account* and and *processing thread count*.

Port 80 is recommended as *listening TCP port*, but you have to be sure, that there is no other application using this port on the computer. Especially HTTP server like Apache or IIS use this port (port 80 is standard for HTTP). Finally remember to allow entered port on firewall!

As *database account* you have to use account with *read/write* privileges (explained in chapter 2.3.1 User administration). Leave the value 8 in *Processing thread count*. Increasing this value leads to increasing the SOAP server performance, but it is the question of tuning SQL server.

Buttons *Start, Stop* allows you to control the SOAP server. When you start the service you should check the SOAP server diagnostic by clicking on the button *Diagnostic*.

2.3.3 Device properties

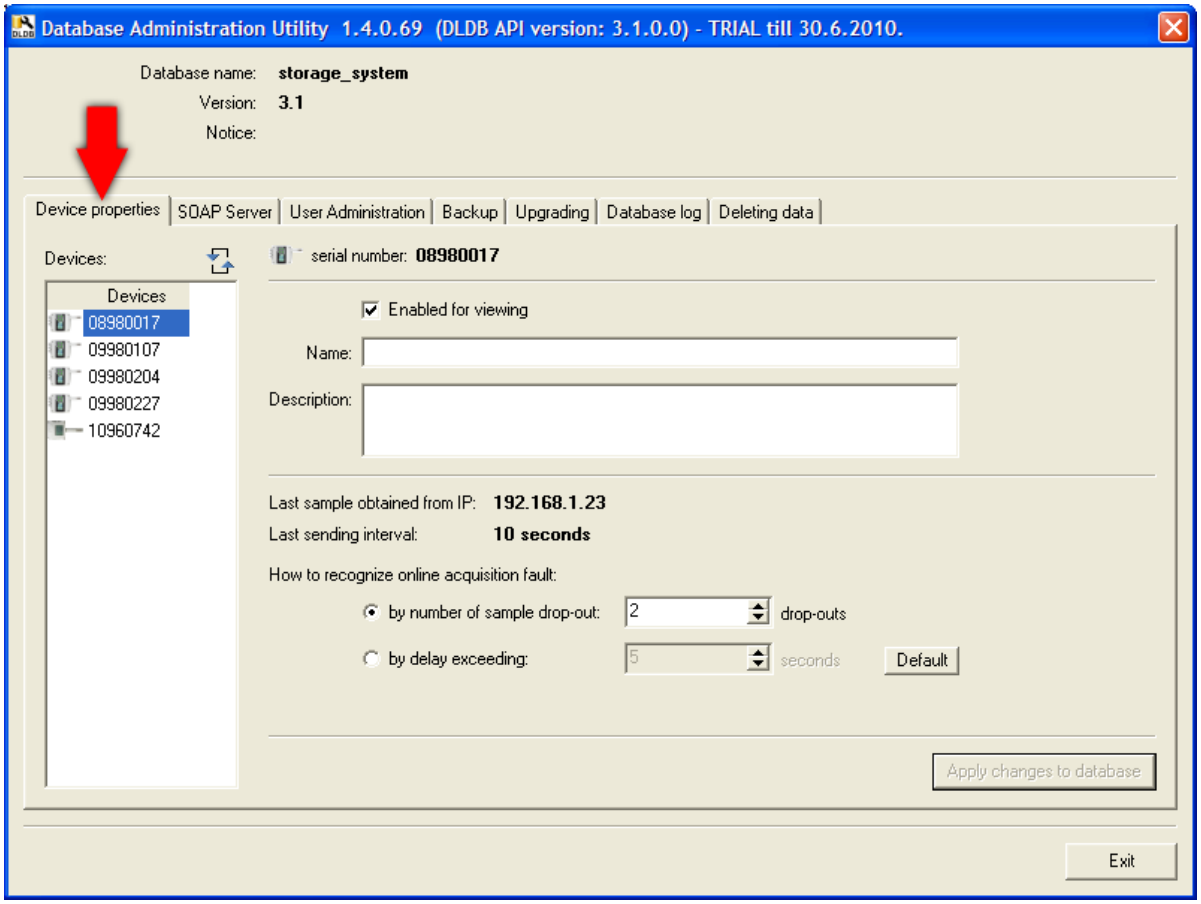
This tool primarily allows you to rename devices. You can give user-friendly name to any device in the database. This name will be displayed everywhere in *Database Viewer* where device serial number was displayed before.

Another function is enabling / disabling devices for viewing. For example, when you cancel monitoring from some device and you don't want to see this device and its values in *Database Viewer*, then switch off *Enabled for viewing* checkbox.

The setting *How to recognize online acquisition fault* applies only to transmitters and online monitoring via SOAP Server. This sample frequency delay is here due to used SOAP protocol, which rely on HTTP and TCP/IP protocol. If you monitor from transmitters via internet then samples from transmitters will probably never come exactly on time.

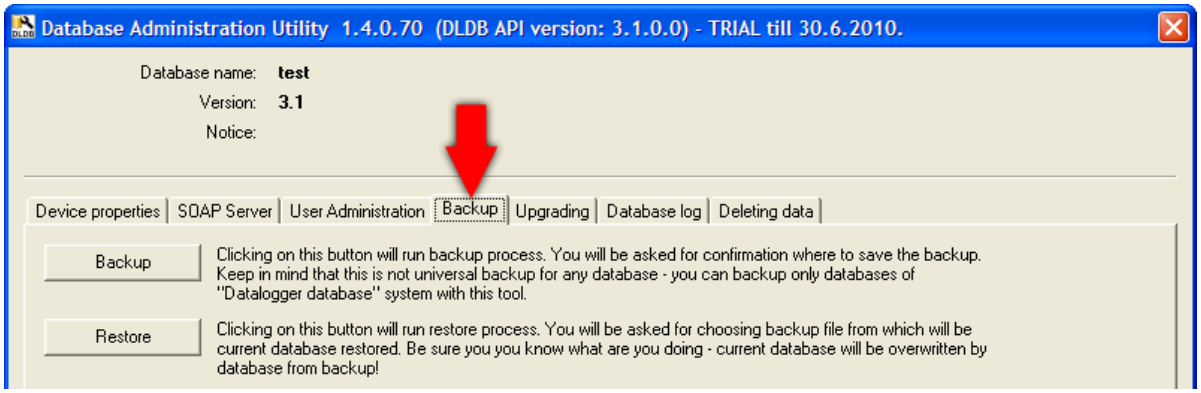
For example when some transmitter has sending interval 10 seconds and this settings is set to *2 drop-outs* by default then samples which came in times: *12:00:00; 12:00:10; 12:00:20* are considered to be correct logging. But when samples came in times: *12:00:00; 12:00:14; 12:00:50* then interrupted logging will be recognized between 2nd and 3rd sample. In most cases default settings is acceptable and don't need to be changed.

You can get useful information about sensor location in the network from *Last sample obtained from IP*.



2.3.4 Backing up and restoring

You'll find this function on *Backup* tab of the manager:



Use the button *Backup* to backup the database. Backing up process can takes a few minutes (it depends on how much data are in the database and on hardware). It is recommend to run the backup when no user is using the database.

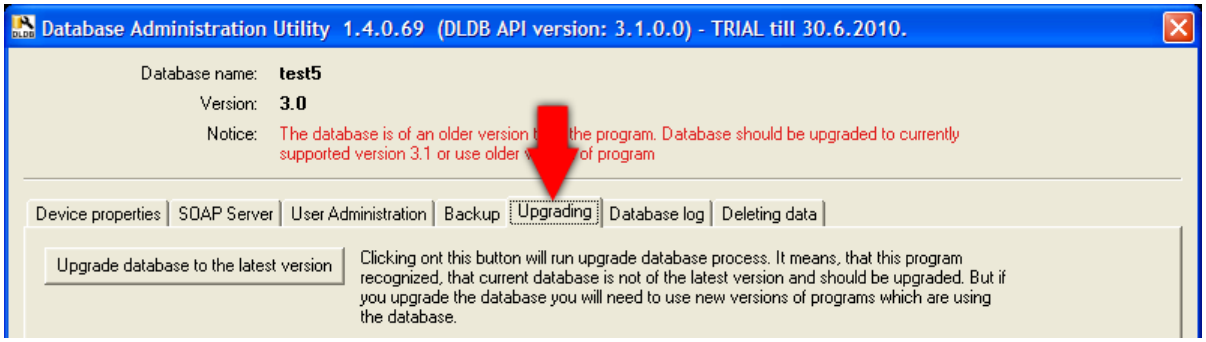
The button *Restore* can be used to restore the database. Keep in mind that this will overwrite existing database completely, so be careful! Also, all users must be disconnected from the database. If you're not sure that there is no user using the database then you, for

example, can run the manager on the machine with database server and disconnect the machine from the network or something similar: disallowing database port on firewall, disabling TCP/IP communication on MySQL server, etc.

The best way how to restore the database is not to overwrite existing, full of data, database but to create new one (described in chapter 2.2 Using Database Administration Utility for creation database on database server) and restore from backup into this data empty database.

2.3.5 Upgrading

You'll find this function on *Upgrading* tab of the manager.



When you get newer version of program manager it is possible that this newer version of program supports newer version of the database. In this case the manager will inform you in the *Notice* label that the database is of an older version and that the database should be upgraded. If this happens then you'll find the button *Upgrade database to the latest version* on *Upgrading* tab enabled.

It is strictly recommended to backup the database before executing upgrade process! More info about backing up is in chapter 2.3.4 Backing up and restoring.

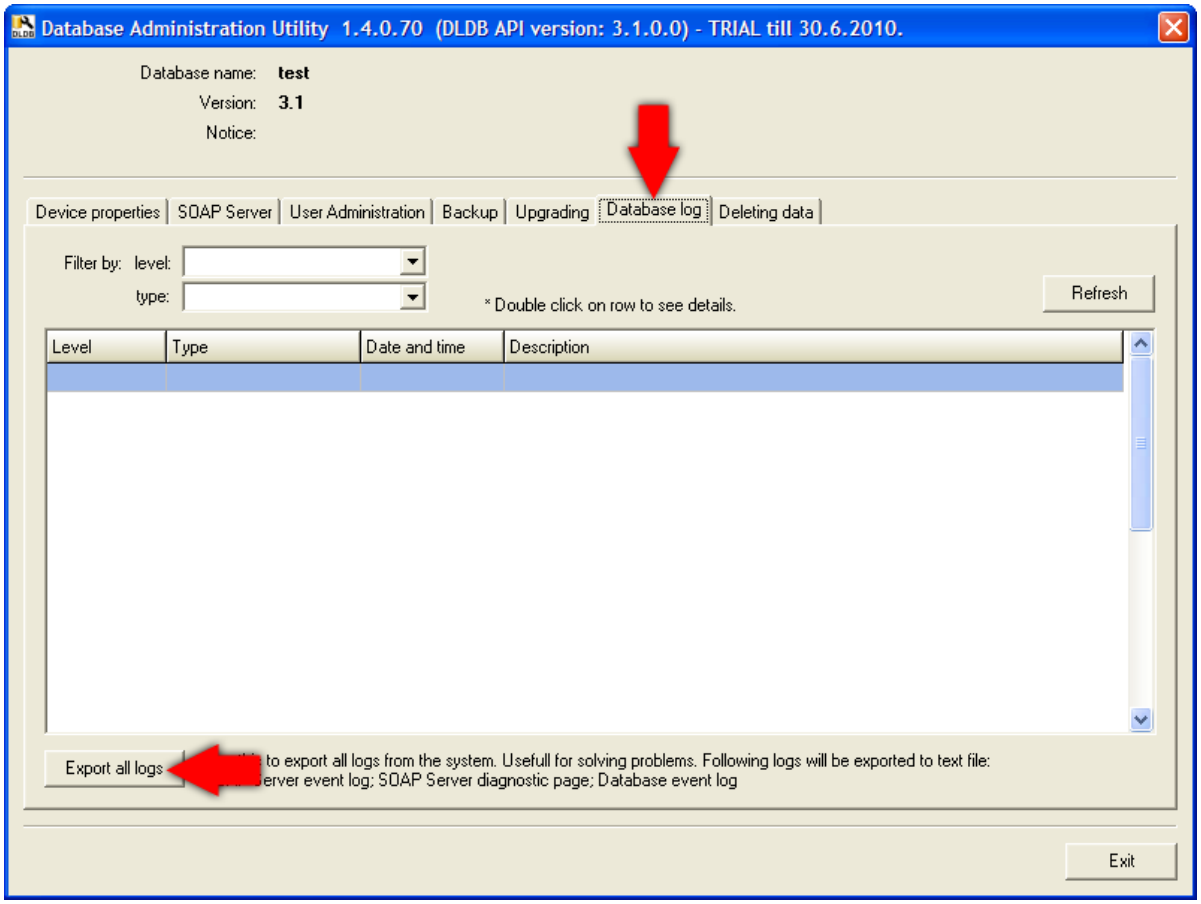
Another think you have to figure out before upgrading is that after the upgrade the database will be of an newer version and other programs which currently uses the database (*Database Viewer*, *Program for Data Acquisition Systems*, *Program for Dataloggers*, *PHP SOAP Service for data acquisition from transmitters*) will not be able to connect to this newer database. Hence you will have to reinstall all programs to their newer version, so get all installers before running upgrade or don't run the upgrade at all.

2.3.6 Database log

It is viewer of the storage system log table. Errors during inserting data into the database are logged here especially. If any problem occurs then information from this table should help us to solve it.

Also, there is the button *Export all log*. If you would be solving some problem with our

support, you probably will be demanded to generate the log by this button and send it to us.



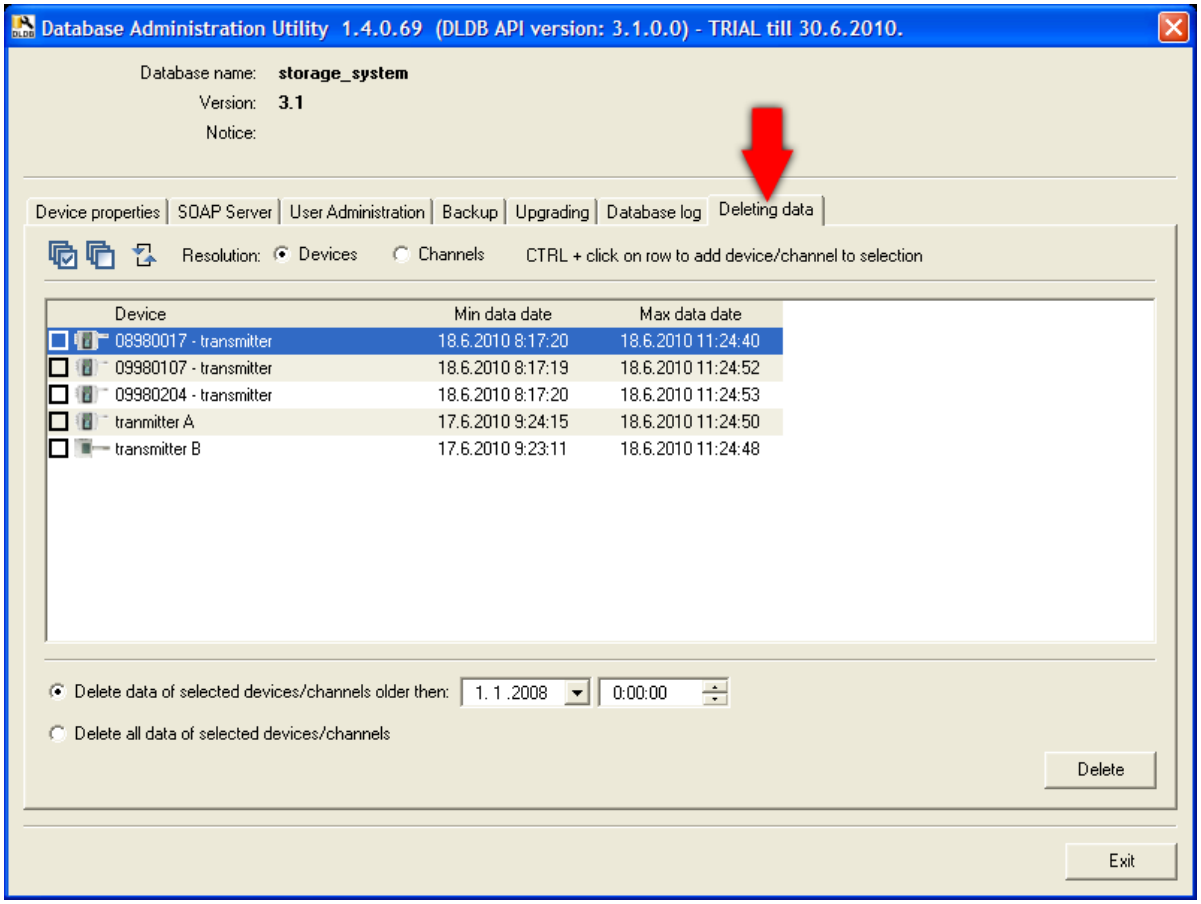
2.3.7 Deleting data

This tool allows you to delete data from the database. Be careful when using this tool, because changes done by it are inreversible!

You can switch between two kinds of resolution:

- *resolution on devices* allows you to delete data from selected devices (i.e. when you choose *delete all*, then whole device will be deleted from the database)
- *resolution on channels* allows you to delete data only from selected channels (i.e. when you choose one channel and *delete all*, then only that channel will be deleted from the database.

To select the row use CTRL + Click on the row. Under the grid there you can choose if you want to delete all data or only values older then entered date-time. Finally use button delete to proceed deletion.


Database Administration Utility 1.4.0.69 (DLDB API version: 3.1.0.0) - TRIAL till 30.6.2010.
Database name: storage_system
Version: 3.1
Notice:
Device properties
SOAP Server
User Administration
Backup
Upgrading
Database log
Deleting data
Resolution: Devices Channels
CTRL + click on row to add device/channel to selection
Device
Min data date
Max data date
08980017 - transmitter 18.6.2010 8:17:20 18.6.2010 11:24:40
09980107 - transmitter 18.6.2010 8:17:19 18.6.2010 11:24:52
09980204 - transmitter 18.6.2010 8:17:20 18.6.2010 11:24:53
tranmitter A 17.6.2010 9:24:15 18.6.2010 11:24:50
transmitter B 17.6.2010 9:23:11 18.6.2010 11:24:48
Delete data of selected devices/channels older then:
1. 1 .2008
0:00:00
Delete all data of selected devices/channels
Delete
Exit

3 Using program Database Viewer

The program *Database Viewer* serves for viewing data from the database. You can view records from the database as tables and charts. You can print and export to PDF as tables and charts. Also, you can export table data to CSV (useful for processing in MS Excel).

Great deal of this storage system is that you can view records of any channel and any device, which are stored in the database, all at once and compare it on one chart.

When using the storage system with transmitters then *Database Viewer* offers online visualization of actual values and alarms.

3.1 Installation of Database Viewer

You can install *Database Viewer* on whatever computer in local network where is the computer with database server or directly on the computer with database server. To install it, run *Database Viewer* installer on the computer where you want it to be installed.

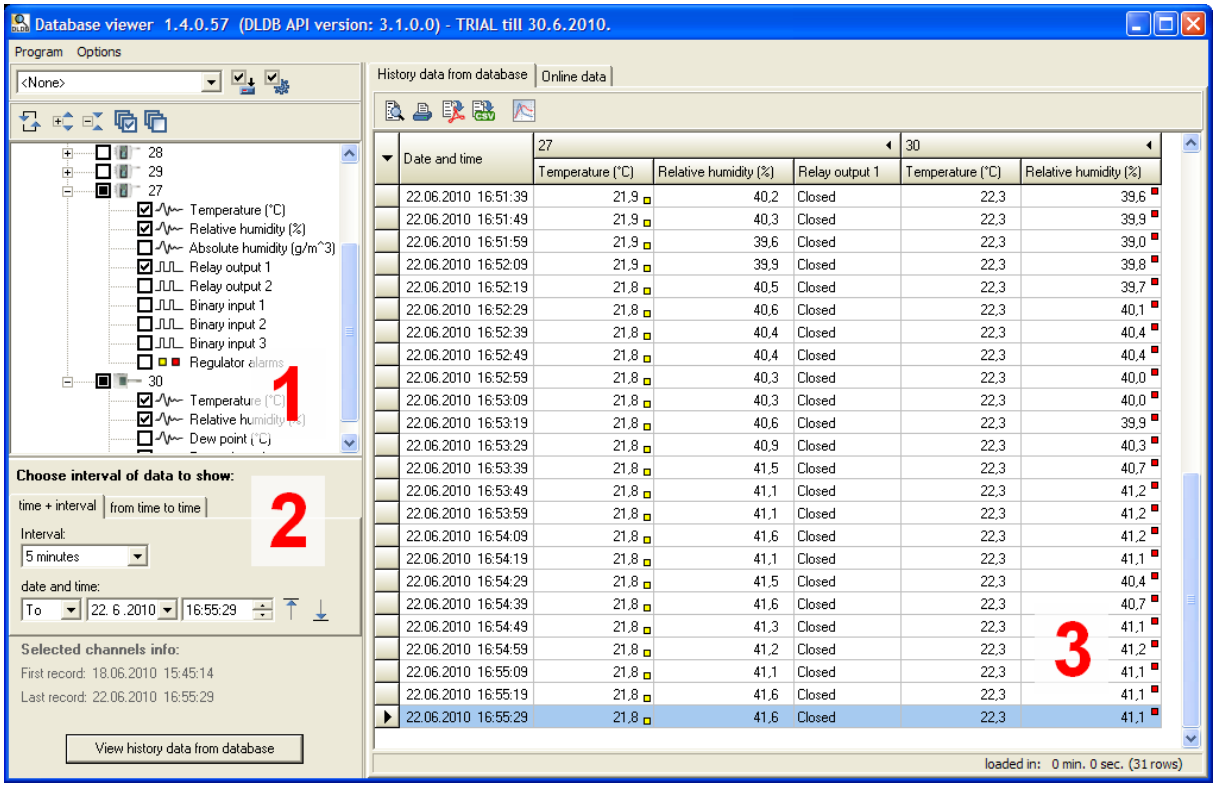
3.2 Database connection parameters settings

You have to set database connection parameters before using *Database Viewer*. This settings are located in program *Menu* → *Program* → *Connection Settings*. How to enter connection parameters is described in chapter 7.2 Entering database connection parameters. You can use the user with *read-only* access to the database.

3.3 Viewing history data from database

This chapter describes how to view history data from database. You have to do four simple steps to obtain requested history data view from the database:

1) Switch to the tab *History data from database*
2) Choose channels whose records you want to view
3) Choose interval – time boundaries, data will be displayed within them
4) Click on the button *View history data from database* – data will be displayed as table



3.3.1 How to choose channels whose data are to be viewed

Tree view, which is marked by number 1 on previous picture, provides it. The tree of devices and their channels, which are in the database, is displayed here after launching the viewer or clicking on the button *Refresh* . Any channel can be added into channels which are to be viewed by enabling the field next to the channel:

- analog channel
- binary channel
- alarm channel

Clicking on field at device level selects / unselects all channels of the device:

- datalogger device
- acquisition system device
- transmitter device – P85xx ethernet thermometers
- transmitter device – Txxxx series (Temperature, Relative Humidity, Pressure)
- transmitter device – Hxxxx series (Temperature, Relative Humidity, Pressure + Relay output and Binary input)

3.3.2 Choosing of interval

This provides area for interval selection, which is marked by number 2 on the picture above. Use this to set time boundaries of data to be viewed. You have two options how to

choose the interval:

- by entering one date-time and selecting length of the interval. In addition, it is possible to choose whether requested interval shall start from or end to the selected date.
- By entering two date-times as *from – to* boundaries

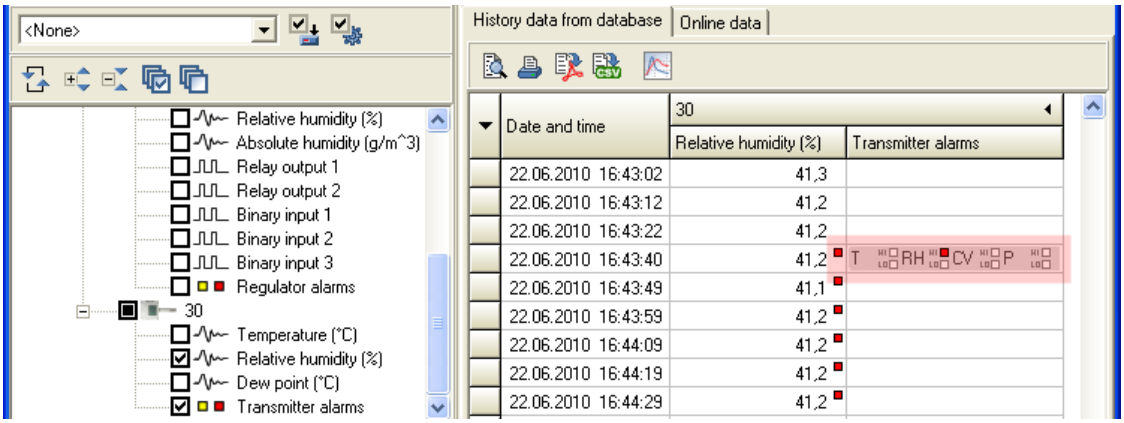
You can use additional buttons to set a date-time to the first or the last sample date-time of data from selected channels in *Tree view*.

Finally, clicking on the button *View history data from database* will launch the process of mining data from the database. This can take a short time or several minutes. It depends on the amount of data which was selected (too many channels, too wide interval). This also depends on hardware equipment. The program executes counting of selected data before execution of mining data from the database. There are preset amount boundaries, when the program warns and stops data mining process. This is useful in case of MySQL server, because MySQL server doesn't support interruption of running SQL statement.

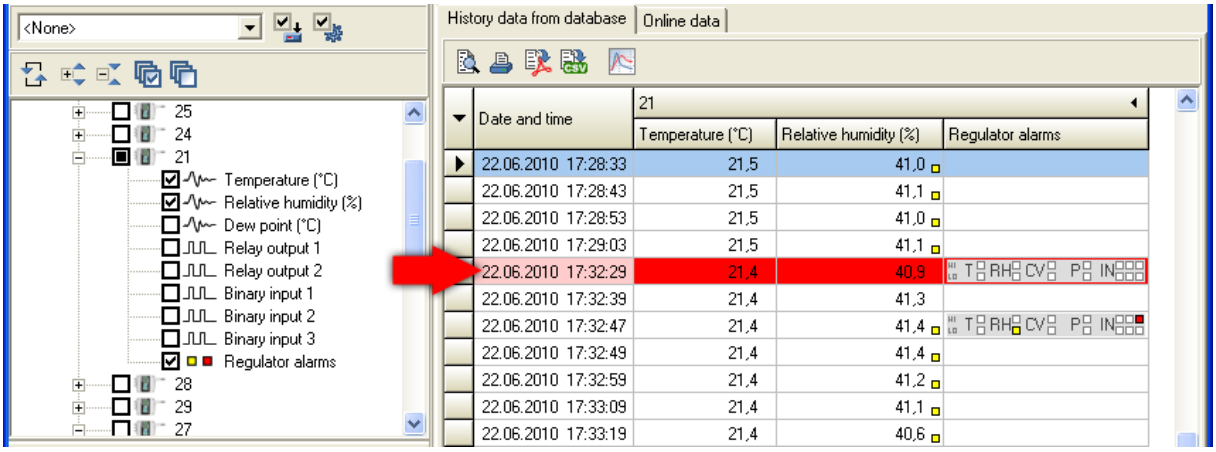
3.3.3 Displayed data

This is labeled by number 3 on the picture above. You can view data in table format here. Data are sorted chronologically from the oldest to the newest samples within selected interval. First column of every view displays date-time of samples. The other columns displays data of selected channels. There can be displayed red/yellow square next to the analog or binary value, which informs that high/low alarm was on.

If alarm channel of any device is displayed then you can see that there aren't its values in every sample. It is because there are displayed only changes of alarms. For example, you can see alarm channel of Hxxxx transmitter on the picture below. There is only one sample in alarm channel when alarm of Temperature channel arose. Alarm channel shows states of all alarms in device at the sample date and time.

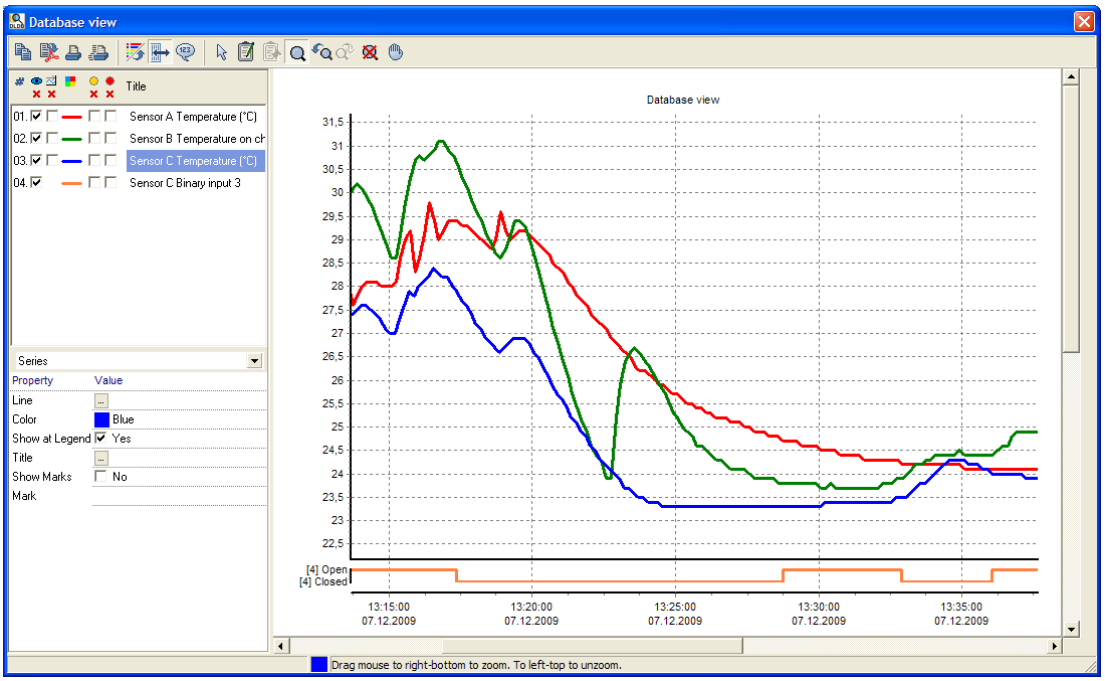


If monitoring is interrupted (i.e. transmitter is disconnected from the network and then connected back again) then whole row of starting sample (first sent sample after transmitter reconnection) is marked by red color. See example on the picture below.



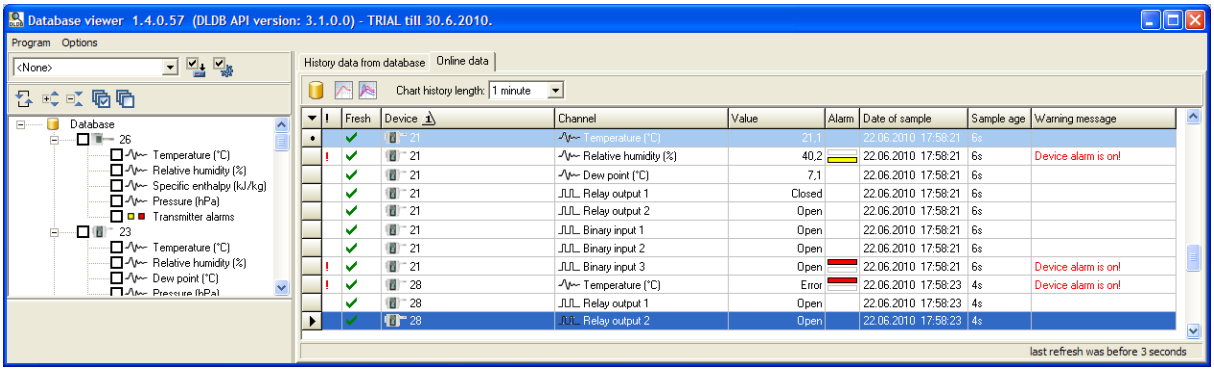
To print with preview, print or export viewed data to the PDF, CSV use these buttons:

To switch from table view to chart view use button  . You will be able to view, and also print, viewed data as graphical visualization in curves:



3.4 Viewing online data

Database Viewer has very useful tool *Online Data Monitor*. It allows you to watch actually measured values and alarms' states from devices witch sends its data online. These devices are P85xx, Txxxx and Hxxxx ethernet transmitters or RS232/RS485 transmitters networked via GSM modem. Lets call them *Online* devices.



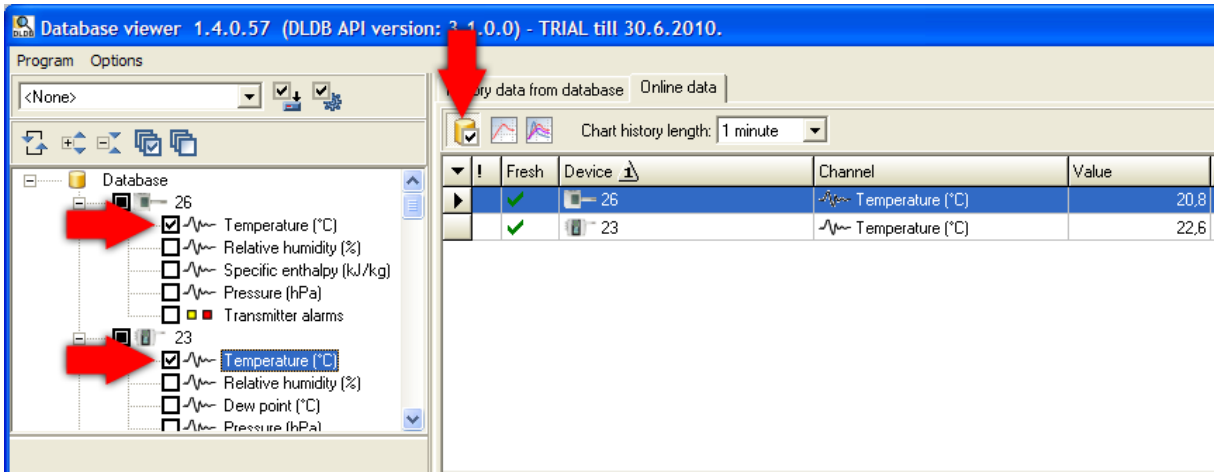
Click on the tab *Online data* to switch to this tool. If any *Online* device ever sent measured data to the storage system, then there will be its last values visible. Every row in the table represents last value from one channel of the device. For example you can see values from channels of sensors named *"21" and "28"* on the picture above.

Note: When program is switched to *Online data*, then area for interval selection is hidden, because it has no use in this mode.

Columns of the *Online data* table have following meanings:

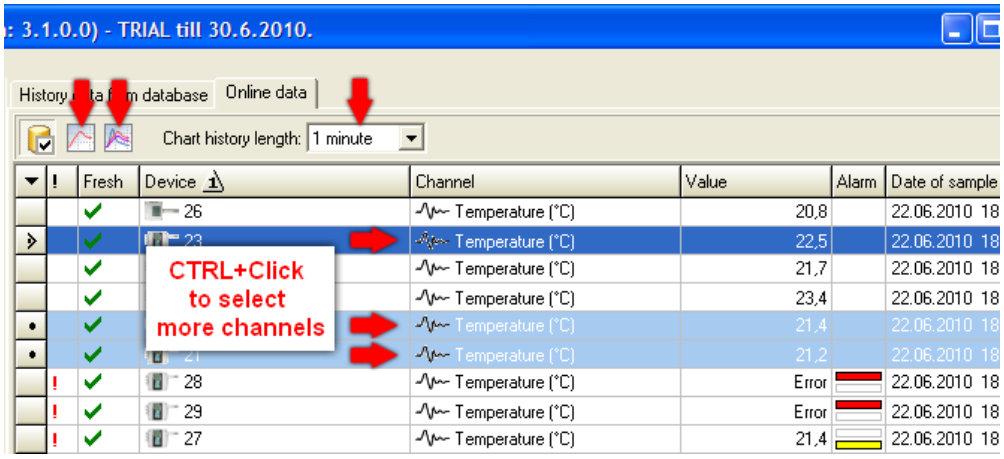
- Columns *" ! "* informs about any warning. Type of the warning is written in column *Warning message*. For example it can be that the data aren't fresh (it means that it's too long from the time when the device lastly send values), or that the channel is in alarm state.
- Column *Fresh* displays green tick if the value is fresh. Otherwise whole row is grayed.
- Columns *Device* and *Channels* display device serial number or renamed name (devices can be renamed, see 2.3.3 Device properties) and channel type.
- Column *Value* displays lastly measured analog value or state of binary channel.
- Column *Alarms* informs about alarm on the channel. If red rectangle higher in the cell is displayed then channel is in high alarm state. If yellow rectangle lower in the cell is displayed then channel is in low alarm state.
- Column *Date of sample* informs about time and date when the sample was measured. Additionally next column *Sample age* shows elapsed time since date of sample to last online table refresh. Note: Online table refreshes every 5 seconds.

If too many rows are in the table then you can use filtering. Select channels which you want to watch from *Tree view* and switch filter button from  to  . For example, there is online table filtered on temperature channels of both devices on the picture bellow.



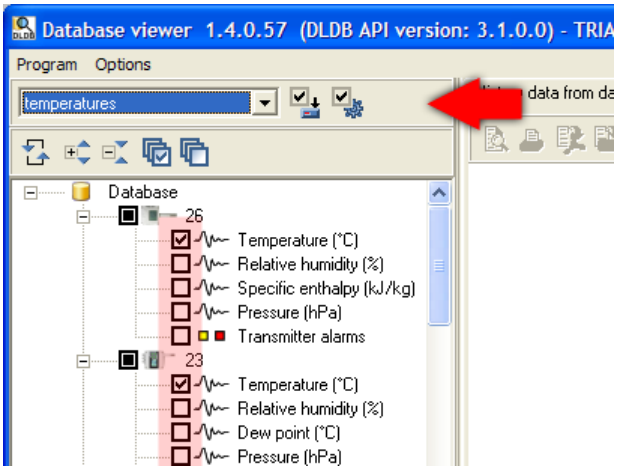
You can also see online chart of selected channels. This chart will be changing online as new values will income to the system. First choose *chart history length*, then click *Online chart* button:

- Use  to see online chart of selected channel / channels (to select more channels use CTRL + Click on the row in grid)
- Use  to see online chart for all channels in the grid.



3.4.1 Presets of selected channels

This tool allows you to save current selection of channels and reuse it later. Click on the button  to save current selection. You will be asked for entering selection name. You're also able to export/import presets to/from file. This can be useful when you want to move presets to another *Database Viewer* on another computer. Use button  to open export/import manager.



3.4.2 Viewer settings

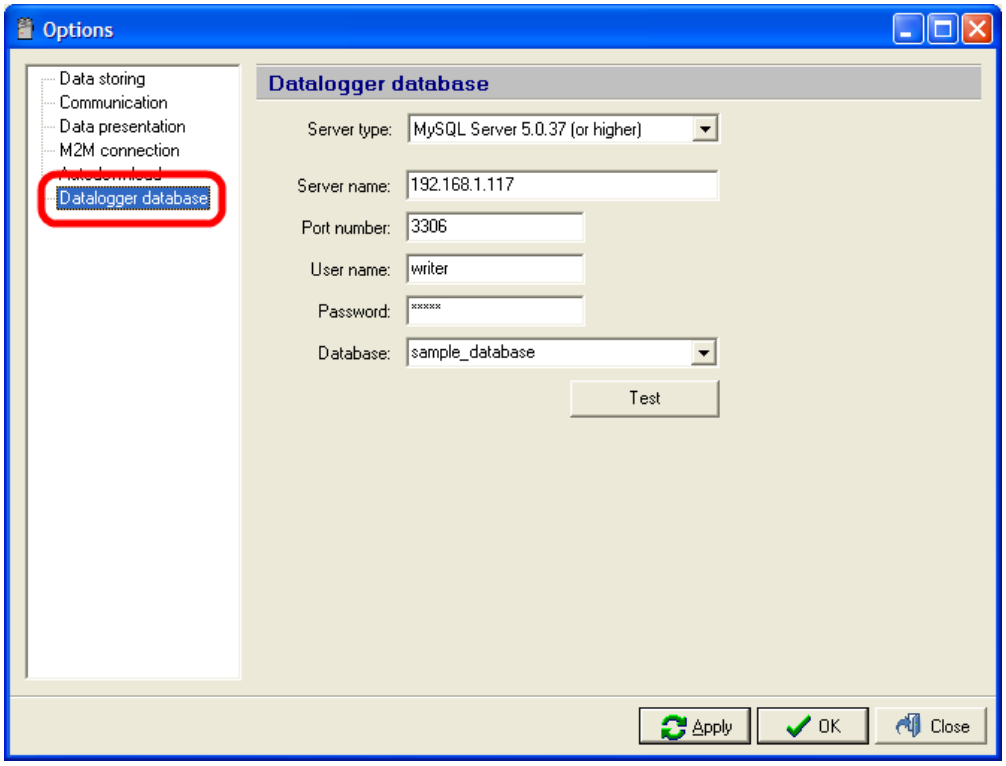
You'll find it in *Menu* → *Options* → *Viewer settings*. Primarily, you can adjust time shift settings here. This setting applies only to data from devices which haven't got time generator (acquisition from these devices is online and the SOAP service assigns the time to each incoming sample). These devices are Txxxx, Hxxxx and P85xx transmitters. The program automatically shifts the time to current locale but you can adjust it to manual shift towards UTC time.

4 Using storage system with dataloggers

The program for dataloggers provides both: data insertion to the database and viewing the data. The first what is needed is to set database connection parameters.

4.1 Database connection parameters settings in program for dataloggers

This settings is located in program options *Menu→File→Options* on page *Datalogger database*. How to enter parameters is explained in chapter 7.2 Entering database connection parameters.

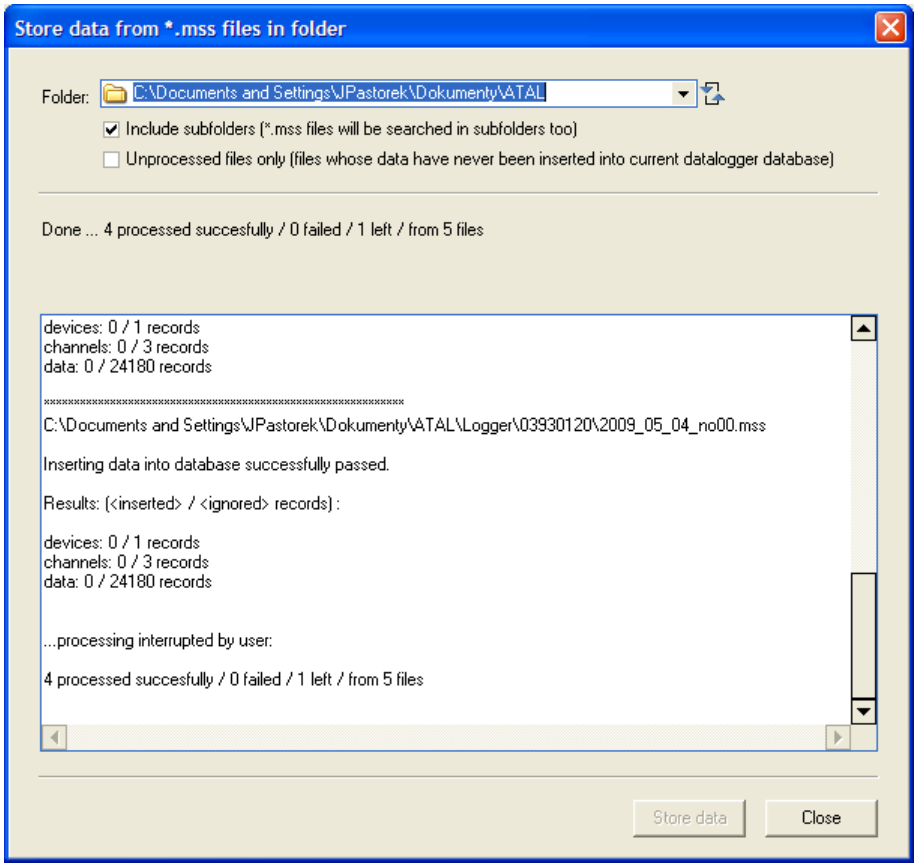


4.2 Storing data from dataloggers into database

You can store currently opened data in the program for dataloggers into the database by clicking on the command in menu: *Menu→File→Add current file to database*. There are

“opened data” in the program when they are downloaded from the device or after opening them from *.mss file.

Second option is mass storing of data into the database from *.mss files in directory. This tool is located in: *Menu→File→Fill database from directory*.



Drop down choosing dialog *Folder* and choose the directory where *.mss files, from which you want to store data into the database, are placed. There is info window under choosing parameters where you can see how many files has program found.

You can also enable the choice *Include subfolders* - then *.mss files will be searched in subdirectories of selected directory too.

If you enable the choice *Unprocessed files only* then only files, which weren't processed yet, will be included into the storing process. When any file is stored into the database then its filename with full path is stored into the database as the source. Therefore the system is able to detect if data from the file were stored into the database or not. It is not needed to enable this choice – system is able to detect duplicate records and forbids insertion of duplicate records into the database. It means that if any record exists in the database (record is identified by device, channel and time) then no new record with the same identification will be inserted.

By clicking on the button *Store data* storing process is executed. Above the info window you can see information about how many files are already processed, how many files processing failed and how many files left. There are detailed information about processing of one file in the info window.

Storing process can be interrupted by clicking on the button *Interrupt*. After clicking on this button processing of current file will be finished and then storing process will stop.

4.3 Viewing data from database in program for dataloggers

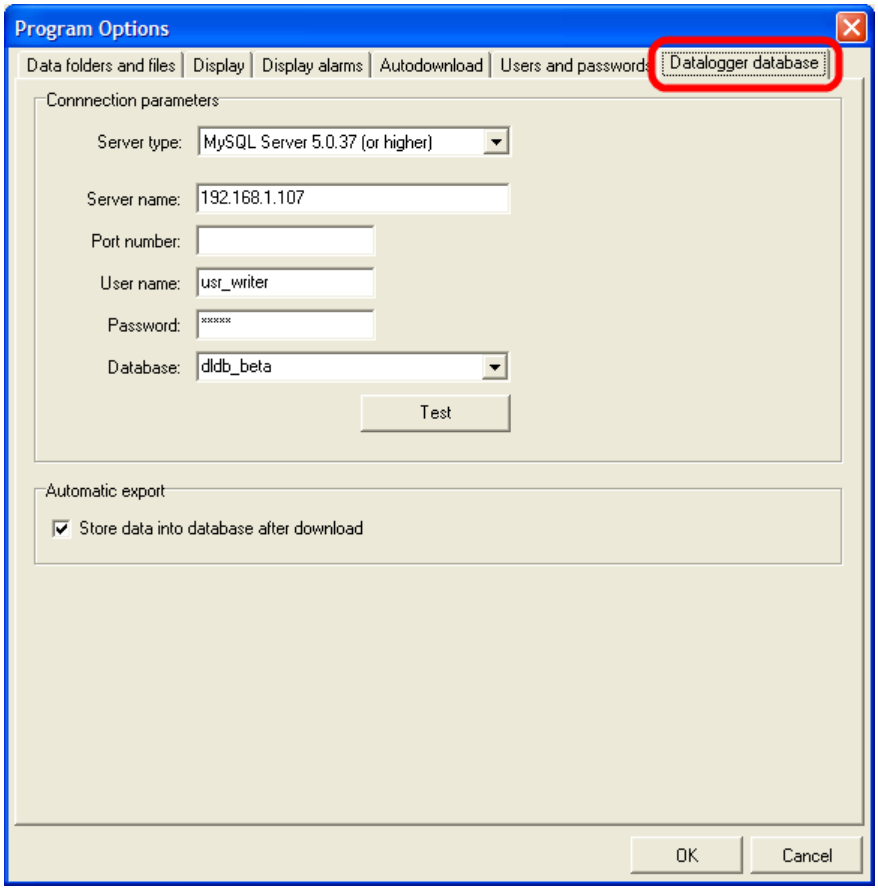
Database Viewer is located in *Menu→Show→Database viewer*. More info how to use the D*atabase Viewer* is explained in chapter 3.3 Viewing history data from database.

5 Using storage system with data acquisition systems

Working with storage system in the program for data acquisition system is similar as in the program for dataloggers. Program also provides both functions: data insertion and data viewing. Also, the first thing to do is to set database connection parameters.

5.1 Database connection parameters settings in program for data acquisition systems

These settings are located in program options *Menu→File→Options* on page *Datalogger database*. How to enter parameters is explained in chapter 7.2 Entering database connection parameters.



There is additional settings *Automatic export* located under the *Connection parameters* settings. If the *Automatic export* is enabled then downloaded data will be stored into the database after downloading them from the device ( ).

5.2 Storing data from data acquisition systems into database

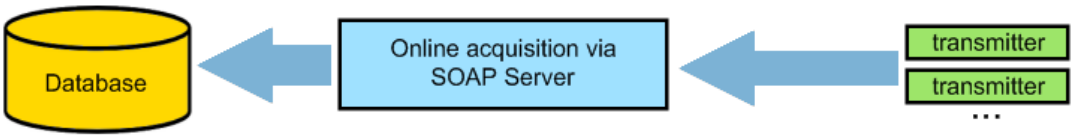
Storing data into the database is absolutely the same as in the program for dataloggers with only one exception: data files of acquisition systems has this format: *.msx. To understand this topic please read chapter 4.2 Storing data from dataloggers into database.

5.3 Viewing data from database in program for acquisition systems

Database Viewer is located in *Menu→Show→Database viewer*. You can also use icon in toolbar. More info how to use the *Database Viewer* is explained in chapter 3.3 Viewing history data from database.

6 Using storage system with transmitters

Storage system also supports transmitters with ethernet output. The advantage is that data acquisition from transmitters is online and automatic. This means that you don't need to download data from the device manually like in case of dataloggers. Ethernet transmitters periodically sends measured values to the database via SOAP protocol. Hence, there have to be SOAP Server running, which captures messages sent from transmitters and stores them to the database.



6.1 Preparing SOAP Server (data entry from transmitters)

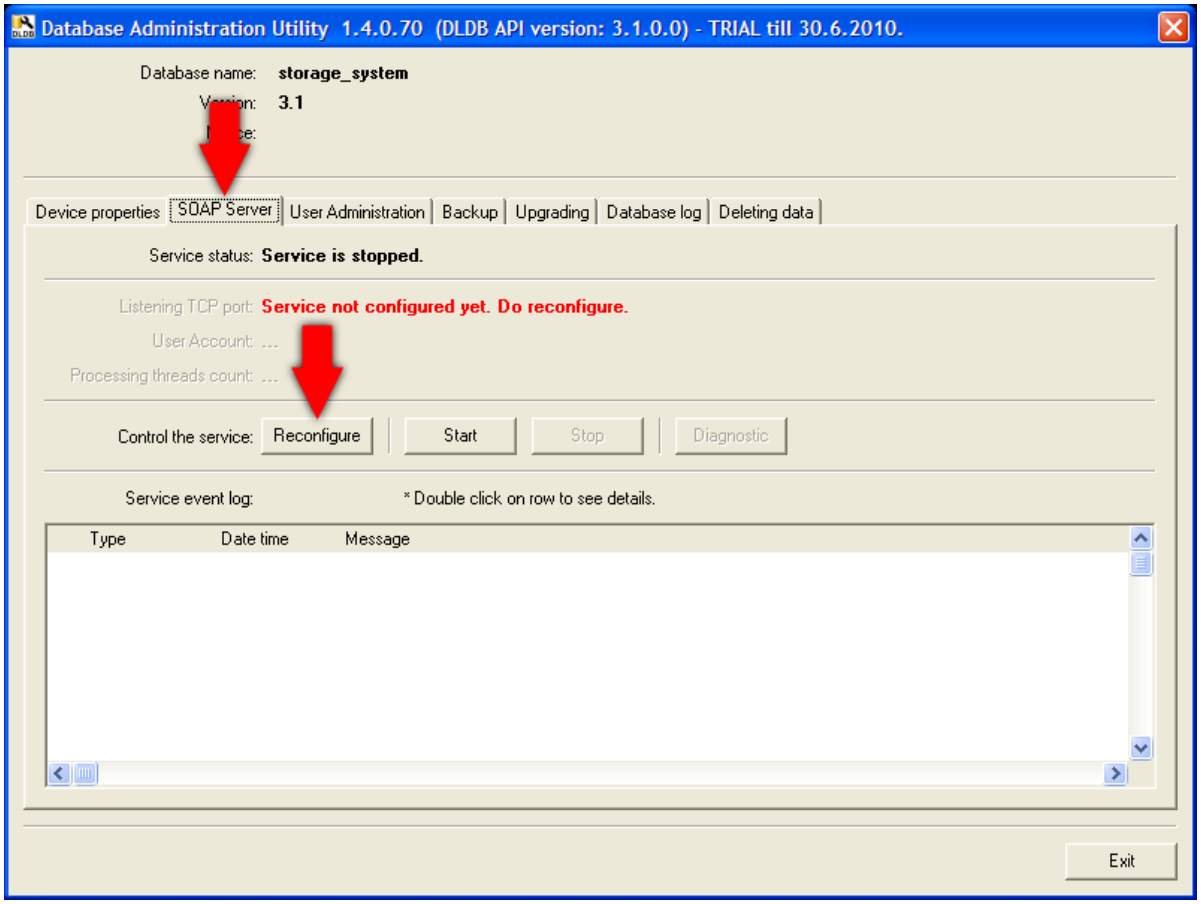
The SOAP server was placed on the computer during installation of the *Database administration utility*. It is only needed to configure and start it.

Attention! To be able to configure and control the SOAP Server service you have to run *Database administrator utility* with administrator privileges.

Step by step instructions how to configure and start SOAP server:

1) Connect to your database with program *Database Administration Utility* and switch to the tab *SOAP Server*.

Press the button *Reconfigure* to run configuration wizard



2) On the first page of the wizard enter *listening TCP port*. **80** is recommended value, but you have to be sure, that there is no other application using this port on the computer. Especially HTTP server like Apache or IIS uses port 80 because 80 is standard for HTTP. If this is the case then another recommended port is 8080. Finally click the *Next* button. Program will check if the port is occupied and if so, program will ask you for reentering the port.

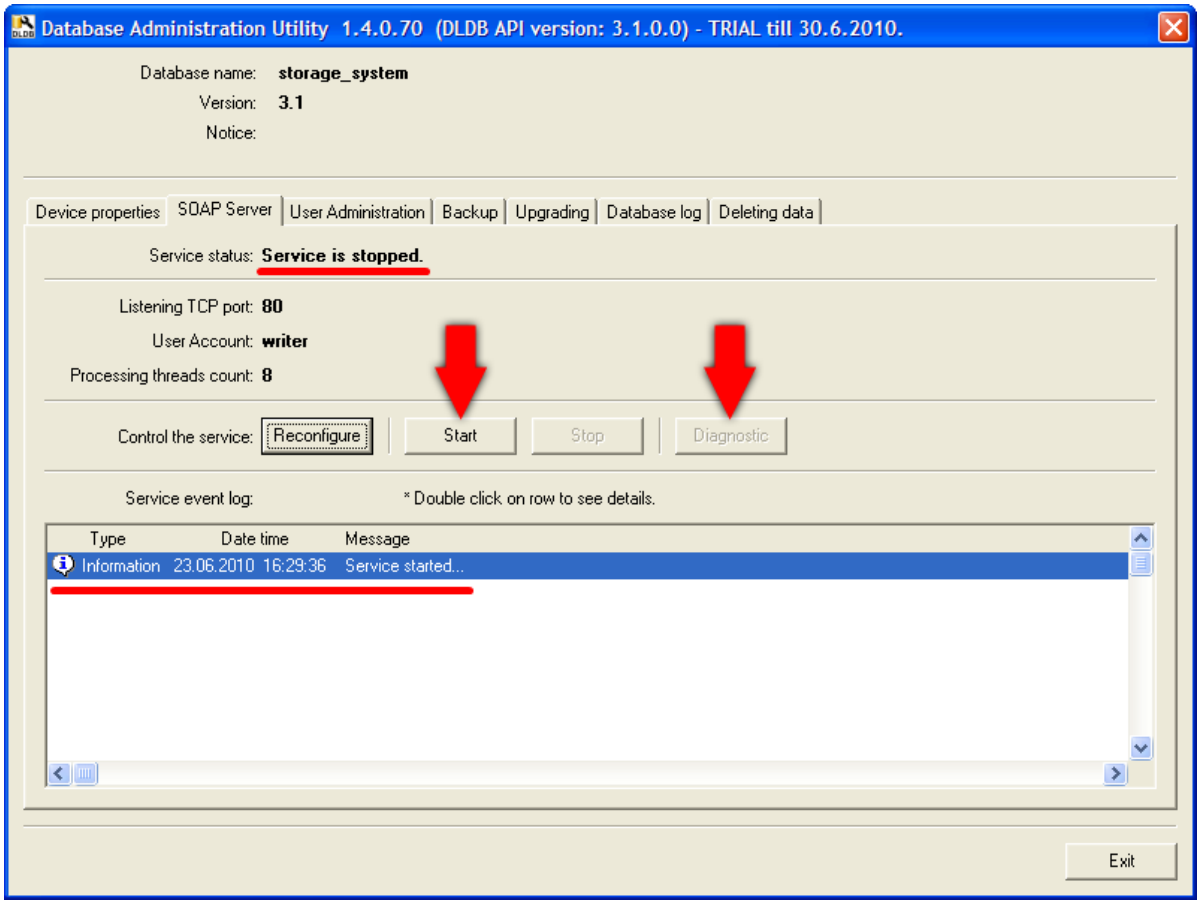
3) On next page you have to enter database user account. This account must have *read/write* access to the database. About database user accounts you can read in chapter 2.3.1 User administration. Finally click the *Next* button.

4) On last page leave the value **8** for *Processing thread count*. Increasing this value leads to increasing the SOAP server performance, but it is the question of tuning SQL server. Finally click the *Finish* button

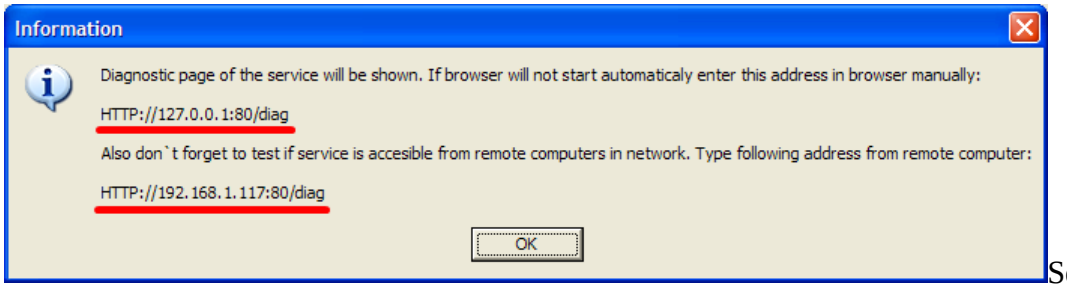
5) Configuration wizard is finished and the SOAP server is configured at this moment. Now, you have to allow listening TCP port on the firewall. Allow port *80 – HTTP standard port* on the firewall (or *8080* if you used this one). How to do it you can read in chapter 7.1 Allowing TCP port on windows firewall. Also remember, that there can be other firewalls running on your computer and also some anti-virus programs contains firewalls.

6) Since you have the port allowed, go back to the *Database administration utility* and press the button *Start* to start the SOAP server.

7) Wait until the Service status is *Service is running*. You can see new message in *Service event log*: *Service: Serice started…*

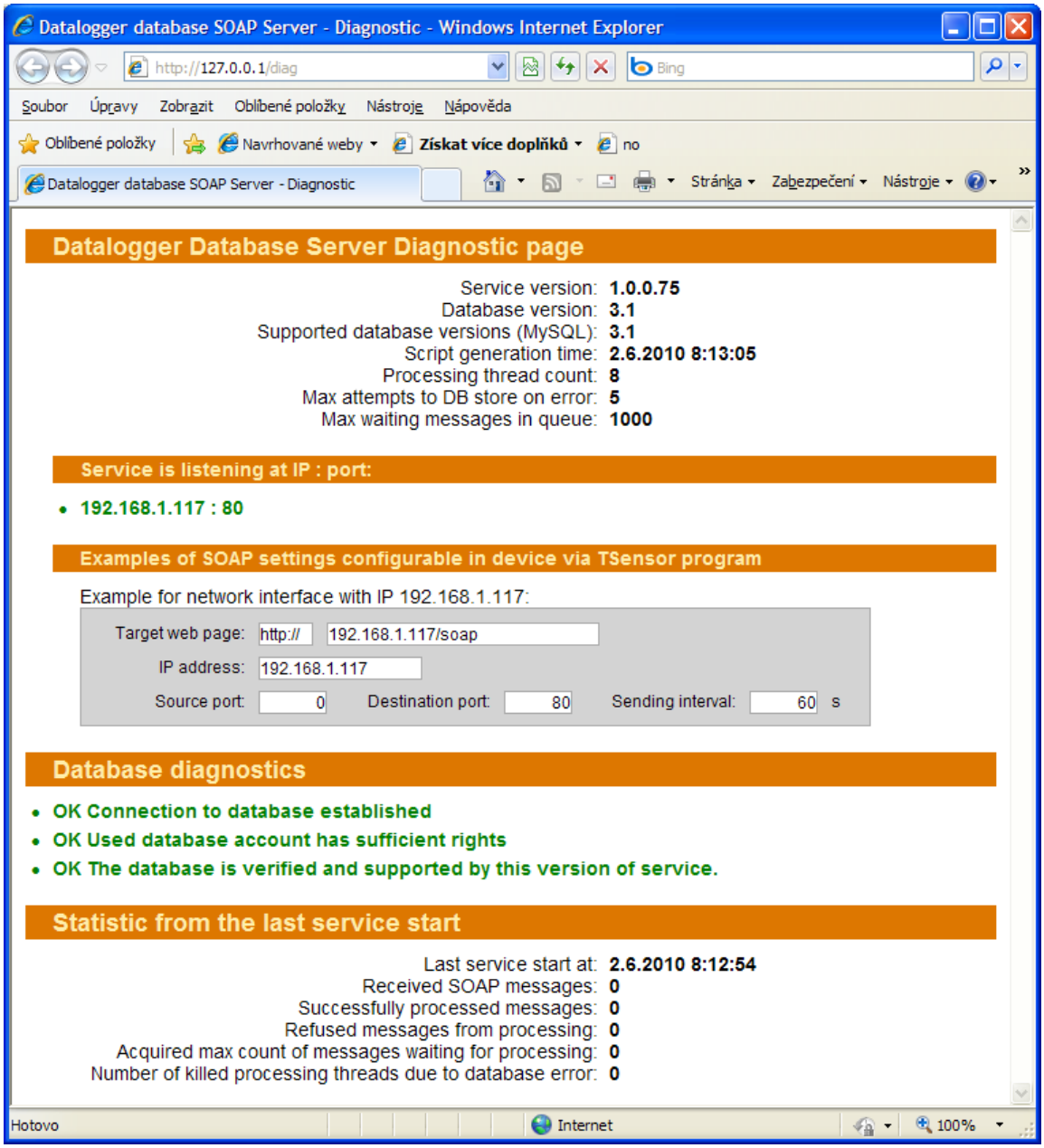


Click the button *Diagnostic* to verify if the SOAP server is well running and well configured. Diagnostic page will be opened in the default web browser. Before it, you will see the dialog with HTTP addresses, which tells you how to get to the diagnostic page if the browser doesn't open automatically.



Seconds

The second HTTP address guides you to open diagnostic page on remote computer. Go to some another computer in the network and open second HTTP address in browser on that computer. This will verify, that SOAP server is accessible and not blocked by firewall.
If the SOAP server is well configured, then there are no warnings highlighted with red color on the diagnostic page and the diagnostic page should look like this one:



If i.e. you have configured the SOAP server with incorrect database user account, then the diagnostic page will inform you about this:

8) If diagnostic page opened on local and also on remote computer doesn't show any warnings, than you have successfully prepared the SOAP server. At this moment, you only have to configure your transmitters to send its measured values to this service. You will do this with the program *Tsensor – configuration program for transmitters and transducers*. There is *Example of SOAP settings* on the diagnostic page:

Examples of SOAP settings configurable in device via TSensor program

Example for network interface with IP 192.168.1.117:

Target web page:	http://	192.168.1.117/soap			
IP address:	192.168.1.117				
Source port:	0	Destination port:	80	Sending interval:	60 s

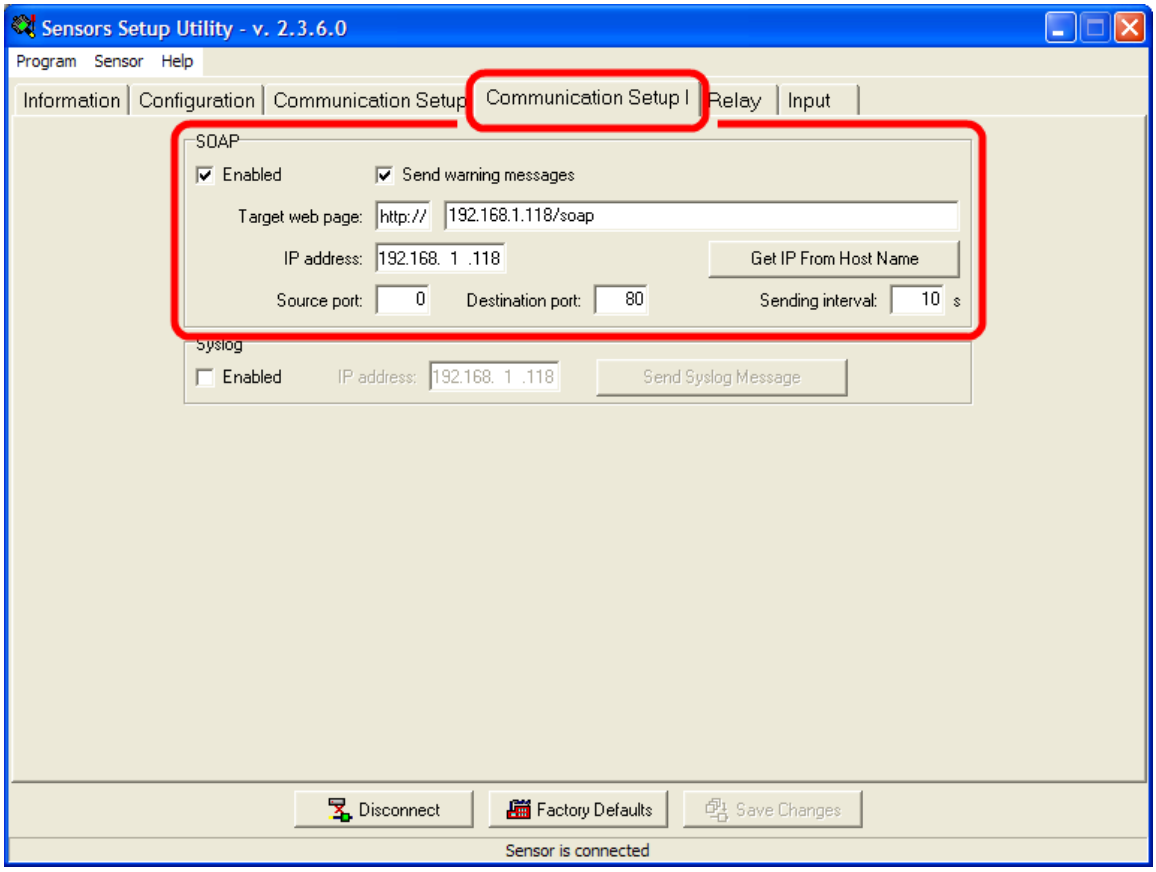
You should enter all parameters as in this example. Only setting of *Sending interval* is up to you, but we alert you, that entering short interval will lead to rapid growing of the database. Please use short intervals (10 s) only when tuning data acquistion. But when you are sure that acquisition works well, reconfigure all devices settings and set *sending interval* minimally on 60 seconds. But recommended are values longer than 300 seconds (5 minutes).

6.2 Transmitter settings

Now, when the SOAP server is ready, the last step to do is to set transmitters to send measured values to the SOAP service. You have to use configuration program for transmitters – *Tsensor*.

TSensor

Establish the connection with the ethernet transmitter and choose the tab *Communication Setup I*. There is SOAP settings of the transmitter:



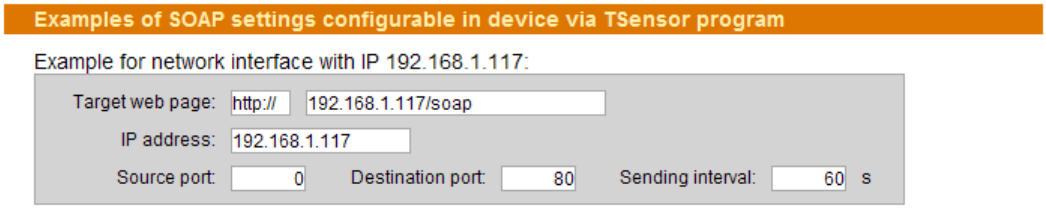
As *Target web page* enter the text composed of SOAP server IP address and string"*/soap*":

`http://<IP address>/soap.php` (do not enter string "http://", its already predefined)

Then click the button *Get IP from host name* – it will automatically fill the field *IP address*. As the source port enter 0 and as the destination port enter *listening TCP port* of the SOAP server (if you went in accordance with this manual then it is *80*).

Finally, choose *sending interval*. You can enter minimally 10 seconds, but we alert you, that entering short interval will lead to rapid growing of the database. Please use short intervals (10 s) only when tuning data acquistion. But when you are sure that acquisition works well, reconfigure all devices settings and set *sending interval* minimally on 60 seconds. But recommended *sending interval* value is longer than 300 seconds (5 minutes).

The good help, how to set SOAP settings, is on the SOAP server diagnostic page. There is *Example of SOAP settings* with real values (IP and port of the SOAP server) displayed:



You should enter all parameters as in this example. Only setting of *Sending interval* is up to you

This is everything you have to set up in the transmitter. Click the button *Save changes*. From this moment the transmitter will start sending SOAP messages to SOAP service. If you entered short interval, e.g. 10 seconds, then it can take up to half of minute until the first value will be sent.

6.3 Viewing data from database

For viewing the database use standalone program *Database Viewer*. All information about this program are in chapter 3 Using program Database Viewer.

7 Appendixes

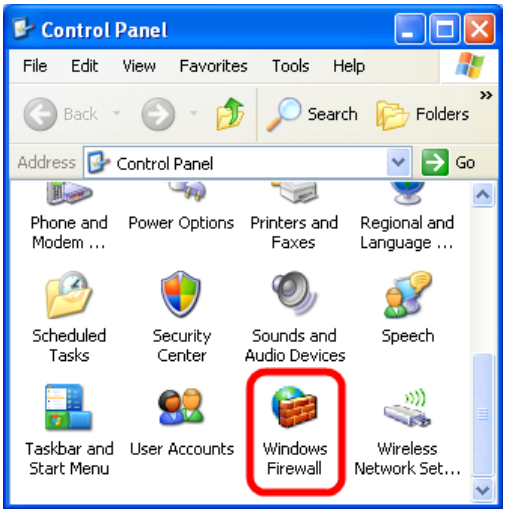
7.1 Allowing TCP port on windows firewall

Following subchapters guides you how to allow TCP port on Windows firewall. First chapter 7.1.1 explains it for Windows XP. Following chapter explains it 7.1.2 for Windows 7 (or Vista).

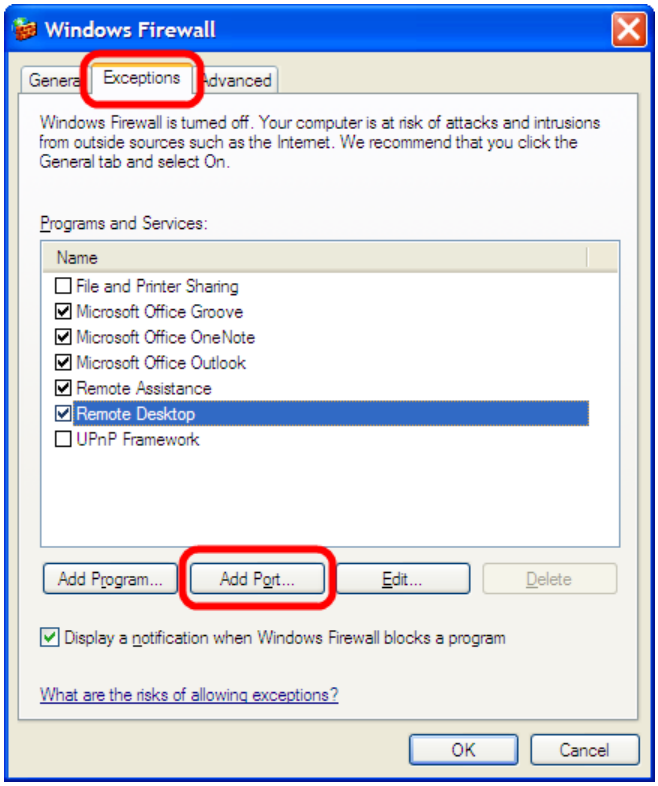
Attention: Not only Windows firewall can be running on the computer. Also, for example some antivirus programs includes own firewalls. If this is the case then allowing port on this firewall or disabling whole firewall is needed too.

7.1.1 Allowing TCP port on Windows XP firewall

1) Run applet Windows firewall in Control panel:



2) Switch to the page *Exceptions* and click on the button *Add port*.

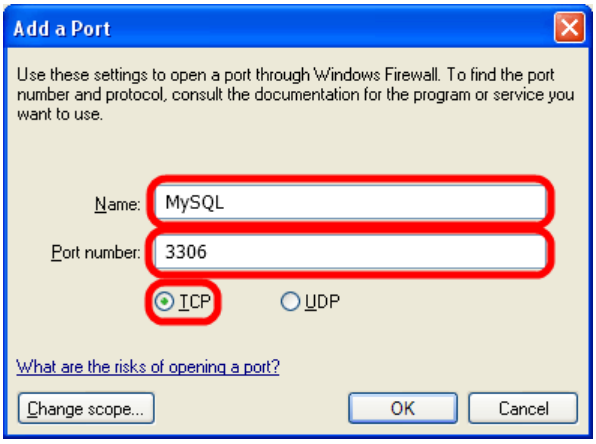


3) Enter exception name (it's up to you what name you think up) into the field *Name*. Then enter the port number which is to be allowed into the field *Port number*. Finally, left the choice *TCP* selected.

Examples of standard port which you may need to allow:

Name: **MySQL** *Port number:* **3306**

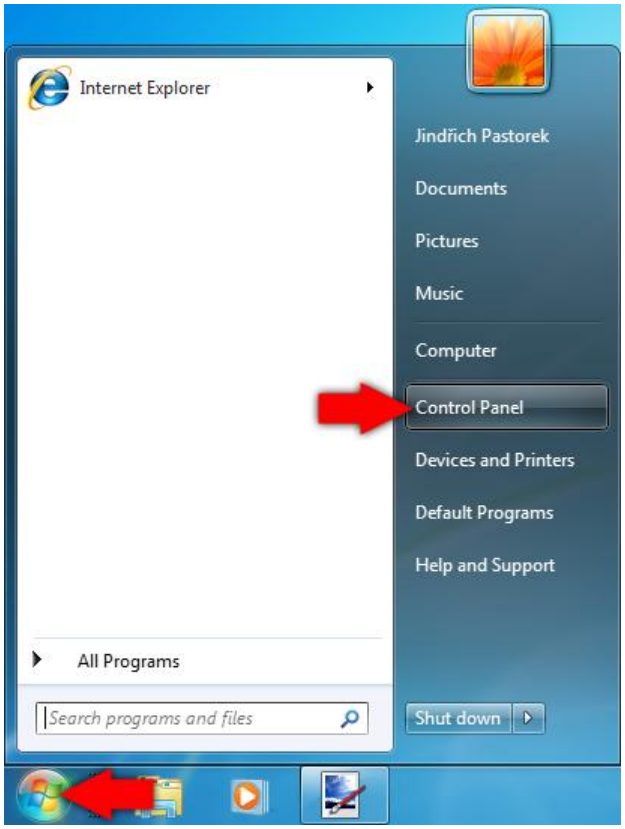
Name: **HTTP** *Port number:* **80**

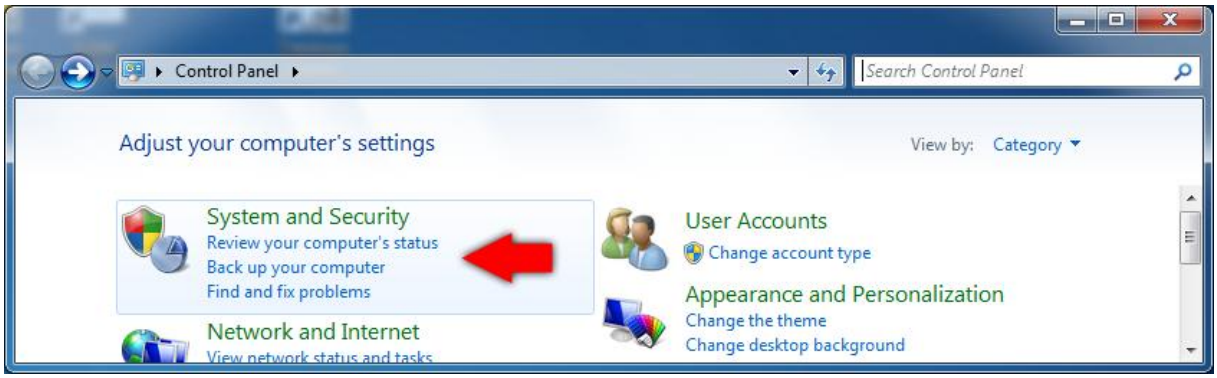


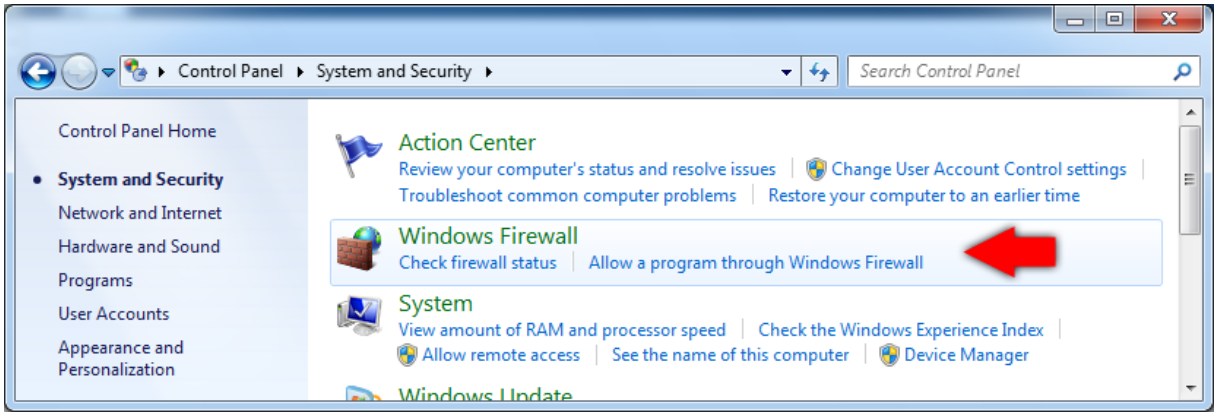
4) Confirm by the button *OK* and exit the applet *Windows firewall* by the button *OK* again.

7.1.2 Allowing TCP port on Windows 7 (or Vista) firewall

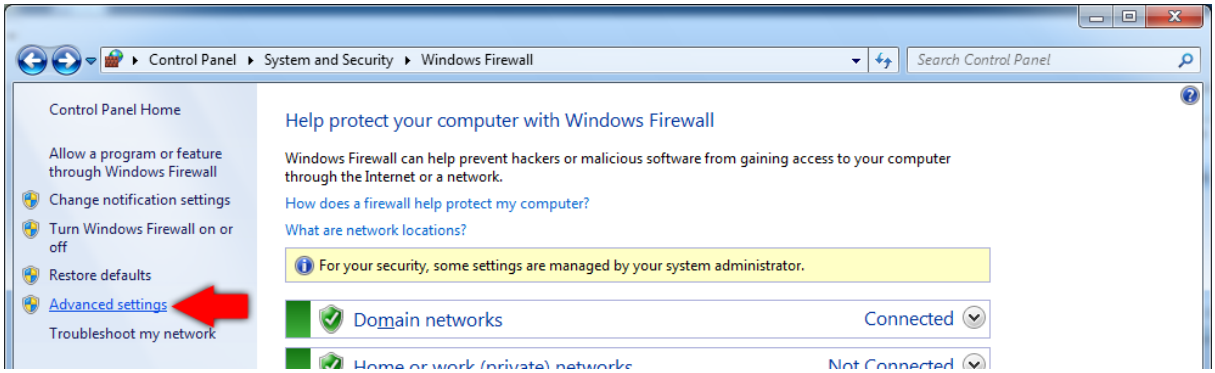
1) Run applet Windows Firewall in Control Panel:



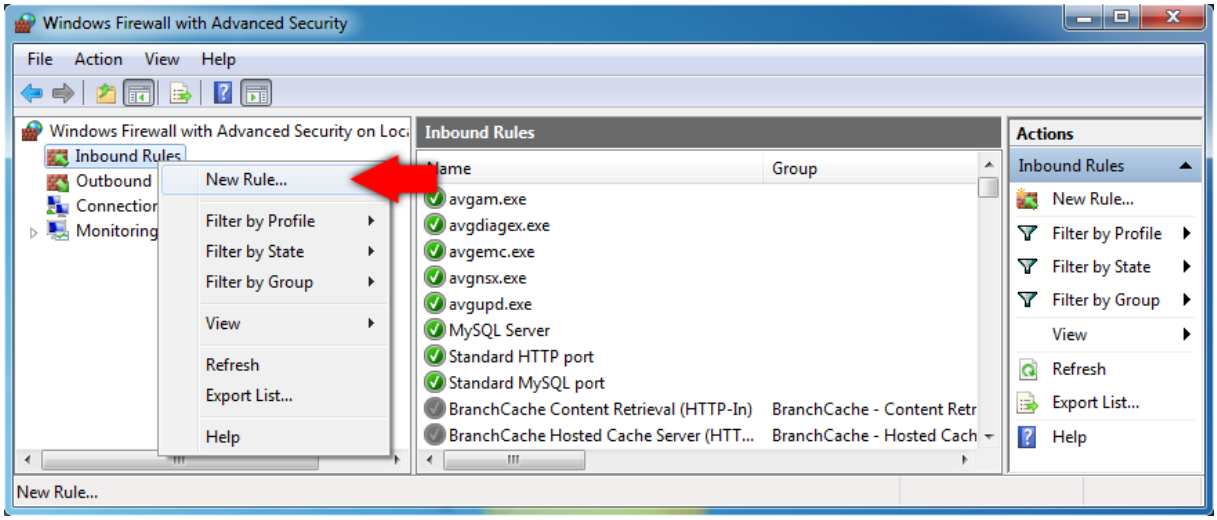




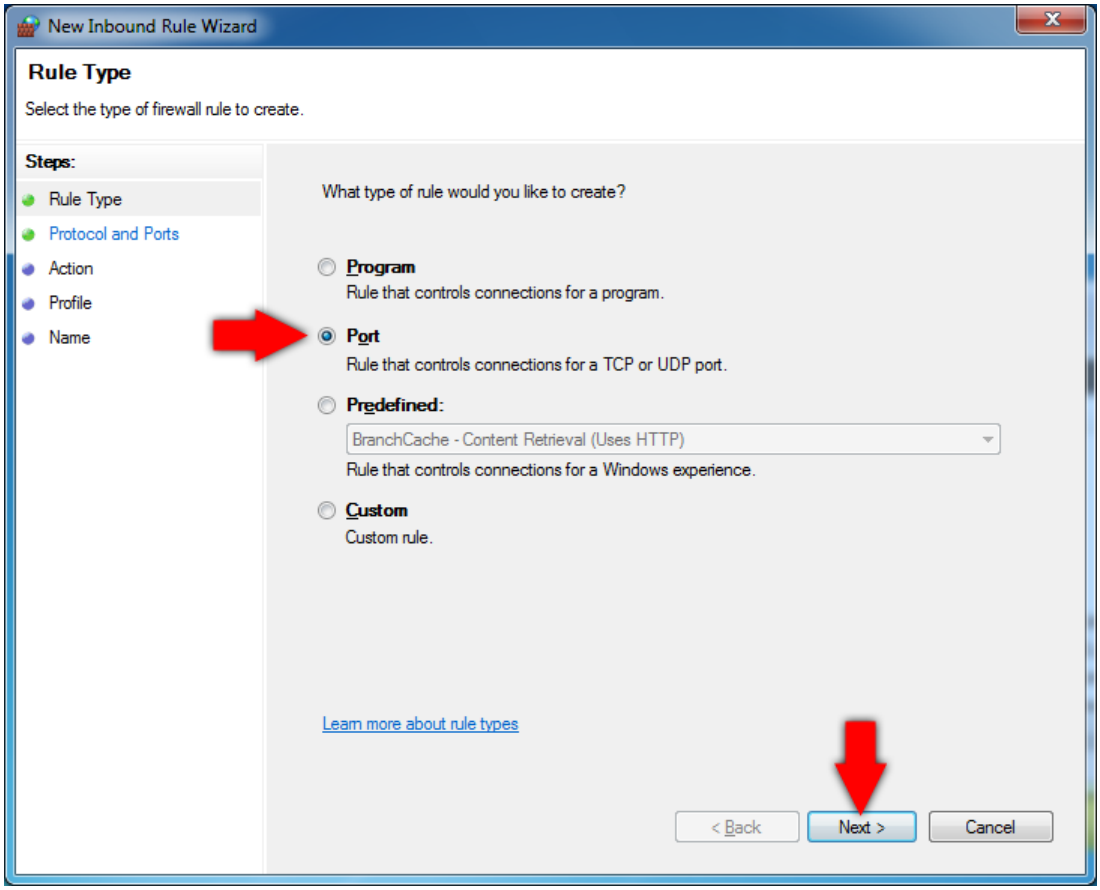
2) Choose advanced settings in Windows Firewall:



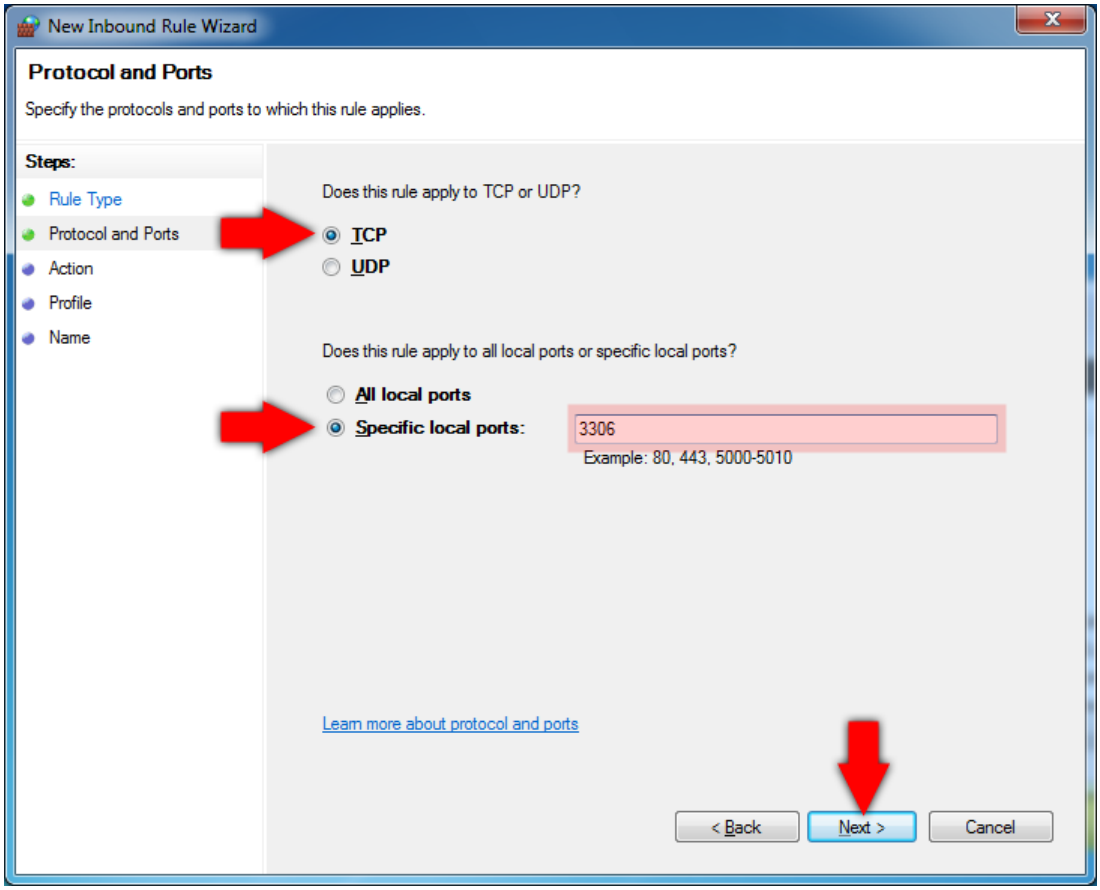
3) Left-click on *Inboud Rules* and choose *New Rule…*



4) Choose *Port* as the type of rule on the first page of *New Inbound Rule Wizard*. Then click the button *Next*.

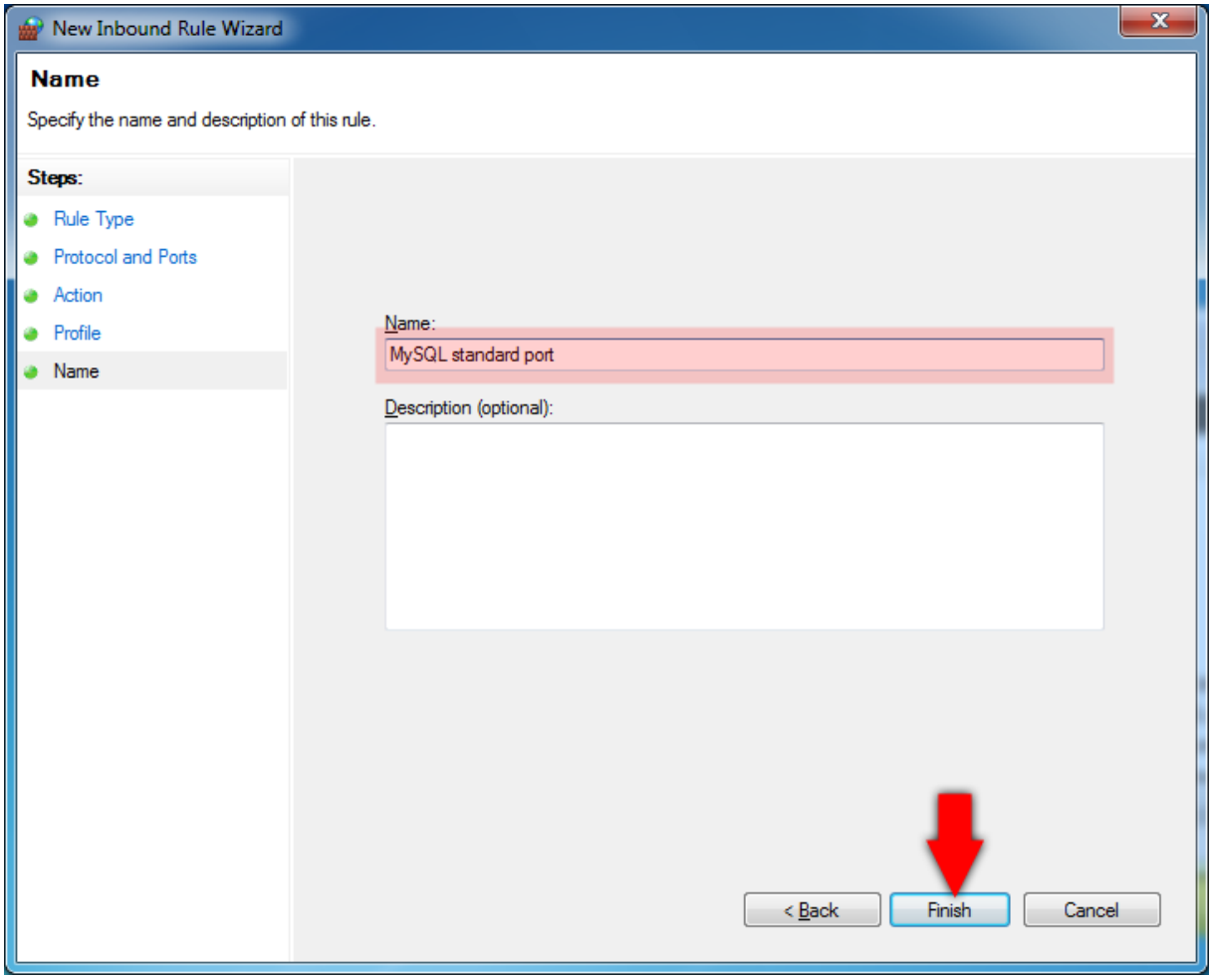


5) Left the choice *TCP* selected. Enter the port number which is to be allowed into the field *Specific local ports*. Examples of standard port which you may need to allow:
Name: **MySQL** *Port number:* **3306**
Name: **HTTP** *Port number:* **80**



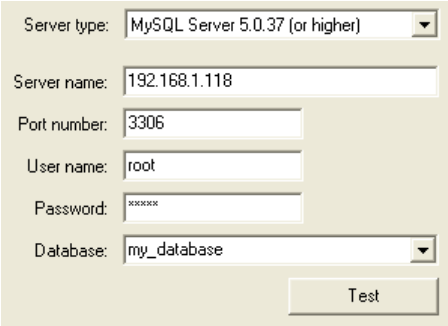
6) Skip following two pages without changes with the button *Next* until you get to the page *Name*. Enter exception name (it's up to you what name you think up) into the field *Name*.

Finally click the button *Finish.*



7.2 Entering database connection parameters

Every program which works with storage system needs to have entered database connection parameters to establish connection with the database server. Programs have the same interface for entering these parameters. How to use it is explained once at this chapter for all programs:



To establish connection with database server these parameters have to be entered:

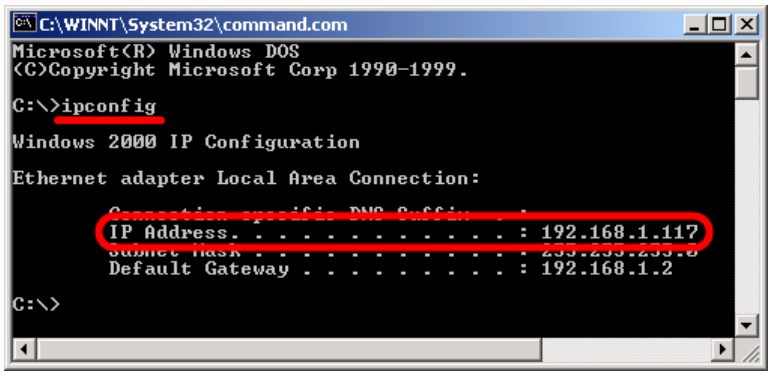
- ***Server type:***

  Choose *MySQL Server* from dropdown list.

- ***Server name:***

  As server name enter IP address of the computer where the MySQL server was installed. If the database server is installed on actual computer you can enter (and is recommended to enter) IP address *127.0.0.1*.

  IP address can be found out by executing command *ipconfig* in the command line:



- ***Port number:***

  MySQL uses TCP port 3306 by default. So left ***3306*** here.

- ***User name:***

  When you are logging in *Database Administration Utility* program, you have to use system administrator account, so enter the text ***root***. *Root* is the username of system administrator account and its password you have entered during MySQL installation.

  When you enter parameters in the other programs, enter the username of *read-only* or *read/write* user account. How to create these accounts is explained in chapter 2.3.1 User administration.

  It is sufficient to use *read-only* user in *Database Viewer* program, but you have to use *read/write* user in the other applications. For example, if you use *read-only* user in program for dataloggers, then data insertion will be disallowed.

- ***Password:***

  Enter the password for the user.

- ***Database:***

  Drop down the list and choose the database. Also, you can type in the database name. Typing in the database will be usefull when creating new database.

Whenever you want, you can use button *test* to verify entered parameters. Program will try to connect, verify rights and check the database. Then it will show test result, for example that:

- parameters are ok and entered database is accessible for reading and writing
- the server is unreachable (probably there is not any MySQL server running on computer identified by *Server name*)
- the program cannot log in with entered user name and password
- the database doesn’t exits
- etc.