



NETx Voyager 5.0



System Documentation

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1. Product description

NETx Voyager 5.0

The visualization software NETx Voyager 5.0 is used to control and visualize smart homes and buildings. Being part of the technical building management, the NETx Voyager 5.0 acts as a client of an OPC server (OPC version). Alternatively, the NETx Voyager 5.0 can directly communicate with a KNX installation (Direct(KNX) version). The building automation system is represented through a comfortable graphical user interface which provides a multitude of different management functions dedicated to the use within the building management.

The field of application ranges from small residential buildings and homes up to large hotel and office buildings, hospitals, commercial buildings, and airports. A complex and widespread installation can be controlled and maintained from a central point in a reliable and comfortable way.

Usability and scalability are of utmost importance for NETx Voyager 5.0. Thanks to the used concepts based on Drag & Drop and the powerful engine, professional visualizations for large-scale projects can be created in a fast and easy way. The user is able to freely choose the level of detail and the appearance at the display – NETx Voyager 5.0 provides a multitude of possibilities. Background images, figures, and any web based content (e.g. web cams) can be included. The integrated mechanisms of NETx Voyager 5.0 provide a broad range of possible applications like the integration of multimedia devices and hotel management systems.

Traditional visualization concepts have been enhanced with new functionality. It is possible to include web based services and animated figures. Additional modules like the integrated scene manager, the embedded calendar, the flexible processor, or the alarm management module offer new opportunities for professional visualizations.

1.1. Main criteria

- **Reliability** – The NETx Voyager can be combined with a NETx Main/Backup server solution (e.g. NETx BMS Server, NETx KNX OPC Server). If the main server fails, the visualization is able to switch to the backup server immediately without being noticed by the end user.
- **Versatile** – Datapoints can be integrated within the visualization independently from the underlying automation system. Using this approach, datapoints originating from different technologies (e.g. KNX, BACnet, Modbus, ...) can be represented and controlled within a single visualization.
- **Look & Feel** – Individual layouts can be defined by using a master page and customized components. By reusing the own design, it is possible to create an individual Look & Feel.
- **Drag & Drop** – Using Drag & Drop, the datapoints can be linked to the controls very simply. This approach provides the possibility to create and modify professional visualizations with just a few clicks and in a short amount of time.
- **Multi-language support** – The language of the editor as well as of the visualization itself can be customized. Therefore, it is possible to provide country-specific solutions.
- **Unique editor** – The editor that is used to create NETx Voyager projects is identical to the one that is used to design other NETx visualizations. The use of this unique tool minimizes the effort for training and learning.
- **Button editor** – The NETx Voyager includes an integrated button editor. Using this button editor, buttons with a user-specific layout (icons, text, appearance, ...) can be created. To reuse them, these button layouts can be stored as templates.
- **Advanced Controls** – In addition to standard graphical elements like buttons, sliders, and images, enhanced and professional Controls are available (e.g. Graph, Multi-Internet, RGB Control ...).
- **Library** – User-defined control elements can be grouped and stored as components of a library. This approach provides the opportunity to reuse components in other visualization projects.
- **Scene manager** – With the help of the integrated scene manager, scenes can be configured and maintained directly within the visualization. Saving and replaying of defined scenes can not only be done by the visualization designer but also by the visualization user.
- **Metering Chart** – The metering chart provides the possibility to integrate smart meters. Using the metering chart, it is possible to visualize the current and historical consumption values of smart meters in an easy and user-friendly way.
- **Historical data chart** – In combination with the NETx BMS Server, the past data values of any datapoint within the building automation system can be shown. This historical data can be visualized using different chart types (lines, bars, areas, ...) or using a table view. Printing and exporting to PDF or Excel is also possible.
- **Alarm management** – The integrated alarm module provides the opportunity to define and maintain user-specific alarms. The end user is able to confirm, acknowledge, or suppress an alarm. All changes of alarm states are logged accordingly.
- **Client Calendar** – The embedded client calendar module enables the definition and management of client-based timer events which are only available within the corresponding visualization. Using a Look & Feel that is similar to Microsoft Outlook, the visualization designer as well as the end visualization user are able to maintain these events – even at runtime.
- **Server Calendar** – In combination with the NETx BMS Server, server based calendar events can be used. These server based calendar events are independent of the visualization since they are defined and running within the NETx BMS Server. Using a Look & Feel that is similar to Microsoft Outlook, server based calendar events can be visualized and modified within the visualization – even by the end user at runtime.
- **Eventor, Processor** – Using the built-in eventor and/or processor, control functionality that is not available within the field and automation level can directly be added within the visualization.

1.2. System overview

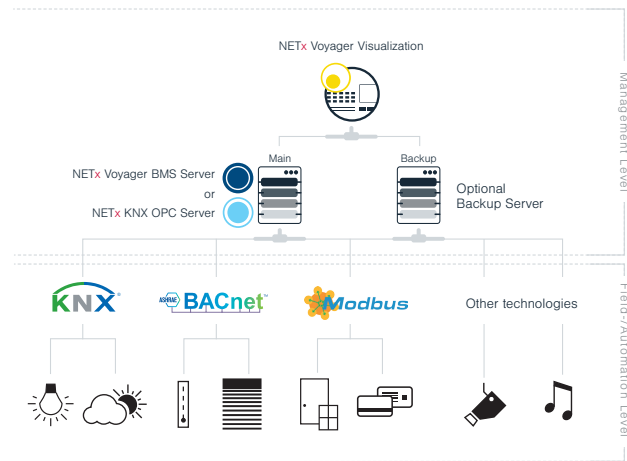


Figure 1.1.: NETx Voyager within a building automation system

The NETx Voyager is part of the technical building management. The information that is collected by the OPC server is represented in a user-friendly way. The user gets a global view of the whole building automation system and its datapoints.

Due to the use of the standardized OPC Data Access 2.0 interface, the NETx Voyager is able to connect to any OPC server that supports this specific interface. Thus the user is independent of vendors and can freely choose the field of application.

In addition to the OPC version of NETx Voyager, a so called Direct(KNX) version is available. The Direct(KNX) version provides the possibility to directly communicate with a KNX system without using an OPC server in between. Compared to the unrestricted OPC version, the Direct(KNX) version is limited to KNX systems with a single interface. Therefore, it is only recommended for small KNX projects. For large-scale projects where different technologies are used, the OPC version has to be preferred.

As it is common for all NETx solutions, the NETx Voyager provides a lot of benefits when comparing it to other products. NETx Voyager guarantees a high data throughput and is able to handle a large amount of datapoints while still providing a reliable communication to the underlying building automation system. Thanks to the high reliability and scalability, NETx Voyager can be used even within the largest building automation projects of the world.

1.2.1. Visualization structure

The NETx Voyager is designed for the use in building automation systems of any type and any size – from smart homes up to large enterprise buildings. To be able to fulfill the requirements of large-scale visualization projects, a flexible, modular, and clear visualization structure is of utmost importance.

To provide this scalability, the NETx Voyager is based on the concepts of visualization pages, controls, and layers. A visualization page is simply a side that is shown to the visualization user. While the visualization user only sees one visualization page at a time, a NETx Voyager project (also referred to as a NETx Voyager workspace) can contain multiple different visualization pages (depending on the used license 1,000 pages and more are possible). Depending on the design of the visualization, the user can navigate through different visualization pages using dedicated control elements. Using this approach, a (hierarchical) structure can be defined. A typical example would be a start page that is linked to a building page that shows an overview of all floors. This building page is in turn linked to different floor pages where each floor page shows a floor plan. These floor pages can in turn be used to navigate to room pages that show a more detailed view of each room.

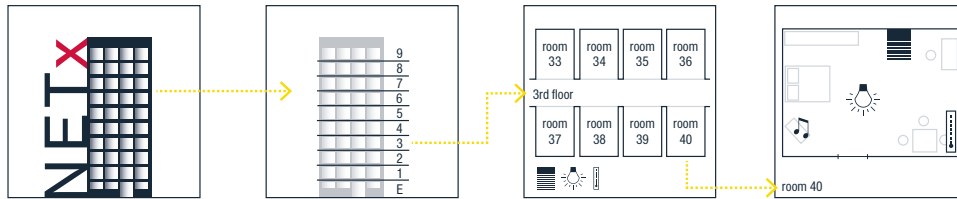


Figure 1.2.: Visualization Example

Each visualization page contains different Controls that are placed by the visualization designer. Controls are used for visualization and/or control purposes. Typical examples of simple controls are images, labels, and buttons. Images are used to display pictures. Labels can be used to show static text information or the current value of a datapoint. Buttons can be used to show the current value of a datapoint and to change it. In addition to these simple control elements, more advanced ones are available, too. Consider, for example, the Historical Data Chart that can be used to visualize past values of datapoints.

Another key feature of the NETx Voyager is the concept of layers. This concept is similar to the layer concept of well-known CAD software applications. Control elements can be assigned to a layer independently from the page where they are used. This assignment to layers helps the visualization designer to organize the visualization. Using special controls, layers can be shown or hidden as well as activated or deactivated even at runtime. In combination with the integrated user management, the layer management is an efficient mechanism to define views for different visualization users.

In addition to these standard concepts, the NETx Voyager provides so called modules. Modules help to implement advanced visualization and control functionality. In NETx Voyager 5.0, the following modules are supported:

- Scene Manager
- Alarm Module
- Client Calendar
- Server Calendar
- Eventor
- Processor

1.2.2. Visualization modes

The NETx Voyager can be used in three different modes: Editor Mode, Visualization Mode, and Full Screen Visualization Mode. These three different modes can be started by clicking the corresponding icon at the Desktop or by selecting the corresponding entry within the start menu of the operating system.



Figure 1.3.: Different modes of NETx Voyager

Using the editor, the visualization designer is able to create new visualization projects as well as modifying existing ones. Within this mode, different visualization pages can be created, control elements can be placed on these pages, the different modules can be configured, and the control elements can be linked to datapoints within the

building automation system. Within the OPC version, the connection to the OPC server can be configured, too. Within the Direct(KNX) version, the ETS project can be imported and the connection to the KNX network can be configured.

After having finished the design process of the visualization project, the NETx Voyager can be started in Visualization Mode. In this mode, the visualization is online. This means that the values of the datapoints of the building automation systems are visualized by the different control elements of the visualization. Furthermore, inputs from the visualization user (e.g. pressing a button or clicking on a slider) are processed and the configured actions (e.g. changing a datapoint value) are initiated. In other words, the Visualization Mode is the mode that is seen by the visualization user i.e. the end customer.

As shown in figure 1.3(b), some graphical user interface elements (e.g. the menu bar, the window border, the item property window, the system messages, ...) are still shown. To hide these elements, the Visualization Fullscreen Mode can be used. Like the Visualization Mode, the visualization is online – however, the graphical user interface elements mentioned before are hidden from the visualization user.

1.2.3. Versions

The NETx Voyager is available in two different versions: Direct(KNX) and OPC. These two versions differ in their used drivers. While the Direct(KNX) version is based on the Falcon driver that is provided by the KNX Association, the OPC variant uses an OPC client driver that has been implemented by NETxAutomation Software GmbH.

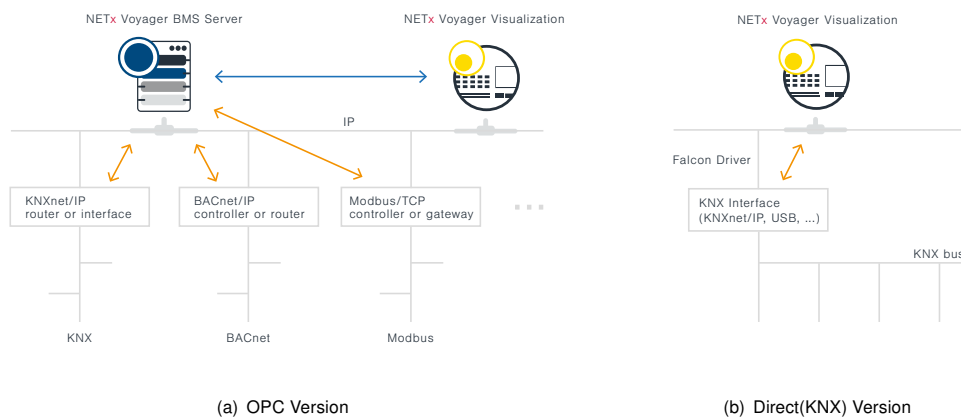


Figure 1.4.: Versions of NETx Voyager

Features OPC version:

- Simultaneous use of different technologies (KNX, BACnet, Modbus, and more)
- Direct access to data via OPC server
- Multiple visualization clients
- For visualization projects with any OPC servers
- Main/Backup solution possible
- In combination with NETx BMS Server: access to historical data and use of NETx MaRS Chart possible

Features Direct(KNX) version:

- Only for KNX projects
- Direct connection to KNX network without needing an OPC server
- Supports all official KNX protocols
- Simple import of configuration from ETS
- For one KNX interface only (e.g. USB or IP Router)

1.2.4. Main/backup solution

Reliability is one of the most important requirements within the building automation domain. Therefore, the NETx Voyager can be combined with a NETx Main/Backup server solution. The visualization is able to communicate with the main and backup server at the same time. If the network connection to the main server is interrupted, the connection to the backup server becomes active. By communicating with the backup server, the NETx Voyager is still able to retrieve the data from the building automation system. Switching between main and backup server is done automatically – without the need of manual interaction of the end user.

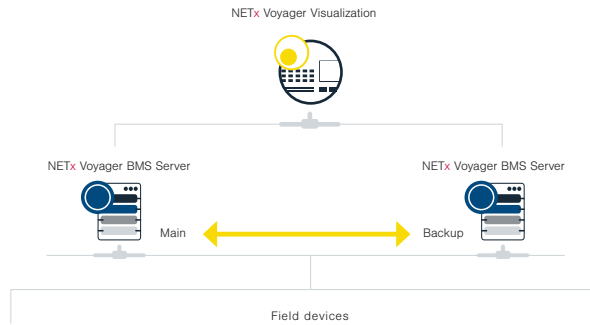


Figure 1.5.: Main/Backup solution

A main/backup solution not only increases the reliability of the system but also eases the maintainability. If the configuration of a building automation system has to be changed during runtime, the main server can simply be turned off in order to adapt the configuration. In the meantime, the backup server can remain online and the end user can still use the visualization. Again, the switching between main and backup is done automatically without any user intervention.

1.3. Disambiguation

1.3.1. Project/workspace

A NETx Voyager project is a collection of visualization pages, Controls (connected to Server Items), and layers to display and manage a building automation system in a user-friendly way. The sum of configuration files and directories containing a project are referred to as workspace.

1.3.2. Page

Pages in a workspace display dedicated areas of the building automation system in different levels of detail (e.g. a single room or a whole floor). While the visualization user sees one visualization page at the same time, the user is able to switch between them.

1.3.3. Layer

In the NETx Voyager, Controls can be assigned to a layer independently from the page where they are used. This assignment to layers helps the visualization designer to organize the visualization. Using special Controls, layers can be shown or hidden as well as activated or deactivated even at runtime.

1.3.4. Control

A Control is a single object (e.g. a button to display or control a light switch) that can be placed on a page. Controls are used for visualization and/or control purposes. To show or control datapoint values, Controls are connected to one or more Server Items.

1.3.5. Group

Controls can be grouped together. These groups can be named, graphically fixed, or can even represent a pop up control.

1.3.6. Server Item

Server Items represent datapoints (e.g. KNX group addresses, BACnet objects, Modbus registers) of the building automation system. They can be assigned to Controls. The Server Item ID is unique within the server and therefore it is used as a reference when the Server Item is assigned to a Control.

1.3.7. Visualization user

A visualization user is a person (usually the end customer) that uses the visualization when it is online.

1.3.8. Visualization designer

A visualization designer is a person (e.g. a system integrator) who creates, modifies, or configures a visualization project.

2. Getting started

2.1. Installation

Insert the disk into the optical drive.

Either the installation software will start at autorun or the user will need to execute it manually.

The setup will guide the user through the installation. During this process it is possible to make a few specifications such as a different installation path other than the default one.

Inside the directory – either specified by the user or the default one – a sub folder “Workspaces” will be created. The latter one will not be deleted when deinstalling the software. It has a special role in saving workspaces and also contains the default workspace, from which all new workspaces will derive.

! Note that under Microsoft Windows™ server systems the installation of Microsoft .NET Framework 3.5™ might need to be done manually by installing the according server feature.

!Attention: All anti virus software and anti malware has to be deactivated. The user installing the software has to have appropriate rights to do so. Make sure the necessary exceptions are set in your security software so that NETx Voyager is working properly.

2.2. First steps

First start the NETx Voyager Editor 5.0. This can be accomplished by either clicking the icon on the desktop or one can run the program out of the start menu. When the software is run the first time and there is no valid hard-lock (Universal Serial Bus (USB) stick) connected to the system, a window will be prompted to either license the software with a soft-lock or to continue the evaluation period of 30 days. For now it is fully sufficient to continue with the evaluation. If there is more detailed information needed about licensing the software, please refer to section A.3.

Again assuming the software is run the first time it will ask, which demo workspace should be opened. Once a workspace is chosen and the software was closed with a still open workspace, it will reopen the last workspace used on a new start.

Now that a workspace is opened, the software will ask to log in. For all demo projects user name “admin” and password “aaa” will work. Now the user can start working on the opened project. For creating a new one please refer to the next section.

2.2.1. Create a new workspace

To create a new workspace it is possible to either select the menu “Workspace” and then “New workspace. . .” or to use the shortcut [Ctrl] + [N].

The first screen of a wizard will appear and a few global settings about the new project can be made. The name shall not include any special characters since it will be used as the name of the directory where all information of the project will be stored in.

The two most important settings besides the name are the project type and the default page size. For the first project it is enough to keep default settings. For any more detailed information about these settings please refer to section 10.1.

The next screen of the wizard will ask about the administrative user for the project. Name, password, and password confirmation are mandatory. Optionally an email address can be entered. Below the text fields there is a check box to declare this user as the default one for the visualization. When the application starts in visualization mode, the default user will be logged in automatically and the login dialog will be suppressed.

2.2.2. Connect to a server

This chapter is directly related to creating a new workspace since the third screen of the wizard will ask for the details of the connection to the server. In case there is the need for designing parts of the new project without being connected to a server it is possible to skip this step and setting the connection information later.

Assuming the server to connect to is situated on the same machine the quickest way to create a working connection is to click "Search" right after the list appears.

After listing the available servers it is possible to select the one to connect to. If the server to connect to is one developed by NETxAutomation Software GmbH it is possible to connect via VNET protocol. Check the according check box and set the communication port to the default 4530 or the one the server was adjusted to.

If at a later time it is needed to connect to a different server it is possible to call this dialog by clicking the traffic light symbol in the toolbar.

The connection parameters are saved inside the workspace. Multiple connections to different servers at a time are not supported.

2.2.3. Adding a new page

This dialog can be reached via menu item "Page" selecting "New page...".

The first text box contains a default name of the page. It can be useful to change this one into something more descriptive (e.g. "First Floor" or "Temperature Regulation").

By hitting the OK button a new page is successfully created.

2.2.4. Placing a Control

To place a Control onto a page it is simply dragged out of the object catalog and dropped onto the page.

After placing the control onto the page a Server Item can be assigned to it by the same simple method. Every Server Item can be dragged out of the Item Tree and dropped directly onto a Control.

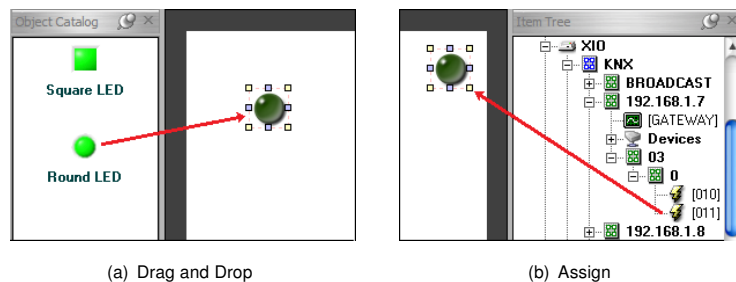


Figure 2.1.: Assigning a 2-state KNX actuator to the switch control

By clicking the green arrow in the toolbar(Run) the application will switch to the visualization mode. Given the fact that the connection to the server is properly established it will be possible to turn the switch on and off already.

3. Modes of the NETx Voyager

The NETx Voyager can be run in three modes:

- Visualization only full screen with start parameter “VOF” for the Voyager
- Visualization only with start parameter “VO” for the application
- Editor mode with no parameter at application startup

3.1. Visualization only full screen

This mode allows the user only to directly interact with the graphical user interface of the NETx Voyager 5.0. When it would run on a touch device with no keyboard, then even minimizing the software would be impossible. This mode has found its use mostly in visualization projects where the user should have the highest comfort with very little technical knowledge.

An example would be an inbuilt touch panel in a hotel room making the climate and light control available for the user without the expense of too much technical information.

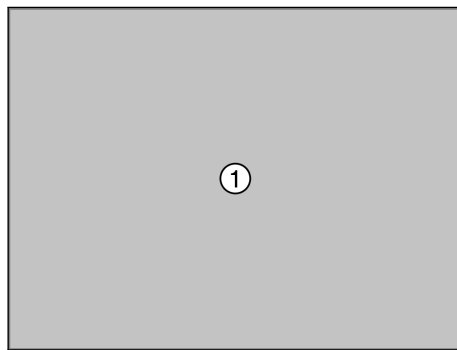


Figure 3.1.: Visualization only fullscreen

1. **Page** – The area to display the pages. When the dimensions of the page fit the screen resolution, there will be no frame visible. At a higher size, scrollbars will be displayed.

3.2. Visualization only

The visualization mode allows the user a more detailed interaction with the project. For example, he could choose the page to be displayed from the toolbar. The software can be minimized and closed even on a touchpad.

This mode is mostly applied to an administrative use. Maintenance staff have a deeper insight into a Server Item by displaying its properties. The Eventor or Calendars can be accessed easily from the visualization page, without the need of placing a specific button onto the page to achieve this. The user can open other workspaces and even reconfigure the connection to the server, if needed.

1. **Title Bar** – Application name, workspace, and current page are displayed.
2. **Toolbar** – The drop down to select pages can be found here. Eventor, scene management, and other features are available as well.
3. **Page** – Here the currently selected page will be displayed.
4. **Item Properties** – When a Control - with a Server Item attached - is right clicked the option “Show information” can be chosen. The underlying Server Item - including its ID and properties - will be displayed in this docking window.
5. **System Messages** – Log information will be displayed in this window.
6. **Alarm List** – Like the name already states, alarms and their history are listed here. It is also possible to track alarms if they are still up or already gone.

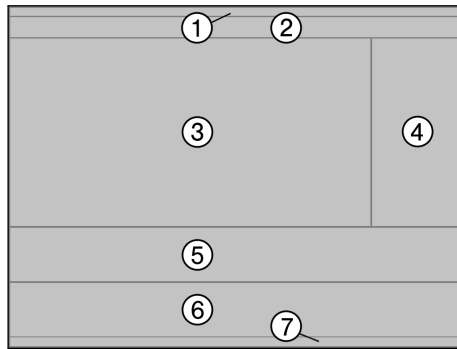


Figure 3.2.: Visualization only

7. **Status Bar** – statuses of the application can be viewed here like the currently logged on user.

3.3. Editor mode

The editor mode is used to create and maintain the visualization projects respective workspace. A user with appropriate rights is able to change the visualization. Adding or removing pages here, placing buttons which link to other pages, positioning background pictures, and many more things to create an individual project can be done in this mode.

During the change to visualization mode, which can be done by hitting the green Run icon, all changes are checked for their correctness instantly.

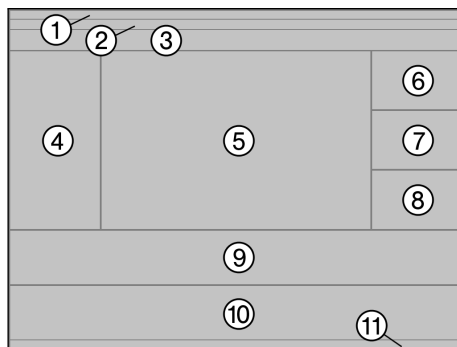


Figure 3.3.: Editor mode

1. **Title Bar** – Application name, workspace, and current page are displayed.
2. **Menu bar** – Besides the common menus like “Edit” most of the management functionality such as “Page” or “User” can be found here.
3. **Toolbar** – A dropdown to select the page to display can be found there. The Eventor, scene management and other features are available as well.
4. **Object Catalog** – All controls which can be used in a visualization project can be found here.
5. **Page** – The actual selected page will be displayed here.
6. **Item Tree** – The Item Tree contains all Server Items the server provides to this client.
7. **Search Datapoints** – A search pattern can be put in to reduce the amount of the displayed items to a size which can be handled easier.
8. **Item Properties** – When a control which has an Server Item assigned to is right-clicked, the option “Show information” can be chosen. Then the attached Server Item - including its ID and properties - will be displayed in this docking window.

9. **System Messages** – Log information will be displayed in this window.
10. **Alarm List** – Like the name already states, alarms and their history are listed here. It is also possible to track alarms if they are still up or already gone.
11. **Status Bar** – The status of the application can be viewed here (e.g. the currently logged on user).

The editor mode of the NETx Voyager is the most substantial one. Therefore most of this documentation will deal with it.

4. Editor commands

The most important features of the editor are:

- Drag and Drop – Controls as well as Server Items are easily placed or assigned by simply dragging them from the dockable windows onto your working surface
- Right click / context menu – Most of the functions concerning a Control, group, or page can be called by a right click onto the object wished to be manipulated
- Menus / toolbar – Here one can find administrative tools or objects, which do not have an immediate presence on the page itself.

4.1. Selecting Controls

Controls on a page can be selected by just clicking on it.

By holding the [Ctrl] key and clicking other Controls multiple elements can be selected. Clicking a control of the selected collection again while pressing [Ctrl] is deselecting it.

Another possibility to select multiple Controls is to click with the left mouse button into the background and while holding it pressed moving the mouse. This will open a frame, with which Controls can be fetched. It is not necessary to have the frame surround the controls entirely; as long as they are touched by it, they will be selected.

4.2. Edit Controls

In order to get to the properties of a Control you can either double click it or right click the selection and use the context menu entries.

4.3. Moving Controls

To move a Control, click it and, with the mouse button still held down, change its position. Release the mouse button, when the desired position is reached.

An alternative way to use is, to hold the [Alt] key pressed and use the arrow keys to move the controls. This is especially useful, when it is wanted to position a Control very precisely, because of the small steps the Controls move each time an arrow key is hit.

4.4. Cut, copy, delete, paste Controls

It is possible to accomplish cutting, copying, deleting, or pasting Controls in three different ways:

1. Select the control or several of them, then go to the menu "Edit" and pick the action to be applied onto the selection from there.
2. Use the context menu and choose here, whether you wish to delete the selection or use a different action on it.
3. The third possibility is to use the shortcuts on the keyboard.
 - [Del] – Erases the selection from the page
 - [Ctrl] + [C] – Copies the selection to the clipboard
 - [Ctrl] + [X] – Cuts the selection off the page and copies it to the clipboard
 - [Ctrl] + [V] – Pastes the content of the clipboard onto the page

4.5. Aligning Controls

You can align multiple controls. To accomplish this, first select the controls. Now right click the item, the others shall align to. The context menu will open and offer you six different possibilities:

- Left
- Center
- Right
- Top
- Middle
- Bottom

For example, the option “Align” + “Left” will line up your controls in a vertical line with their left borders all sitting underneath each other.

4.6. Unifying the size of Controls

To make the size of the Controls equal, it is needed to select them first, and then right click the Control, to which size it is desired all of the items to change. The context menu will open and three options are available:

- Width
- Height
- Width and height

For example, “Make same size” + “Width” will resize all Controls as horizontally wide as the Control which was right clicked.

4.7. Equalizing spaces between Controls

First select the Controls to manipulate. Right click the one at the edge of the line (e.g. the very left one or the one on the bottom). The context menu will open and two options are provided:

- Equal horizontal
- Equal vertical

4.8. Grouping of Controls

In order to group Controls it is necessary to select more than one. Then open the context menu and choose “Grouping” and “Group”. The selected Controls will be put into a group, which can be named in the appearing dialog. These check boxes are found also:

- “Graphically fixed” means that the group’s appearance will remain like it was at the moment it was created. Changing size or position of the single Controls by accident will be prevented. It is still possible to move the group around.
- “Toggle switch” is an option for buttons only. It allows only one button of the group to be turned on. When one button is turned on, which is in off-state, it will automatically turn off any other button, which might have been in an on-state.
- “Popup window” creates a group, which is invisible at startup, but can be turned visible by clicking a single button (cf. section 5.2.4.6). Popup groups can be used, for example, to display detail information of the actual page.

4.9. Changing the drawing order

Sometimes it is necessary, when controls overlap each other, to change their order. Therefore, just select the Control, group, or multiple objects and call the context menu with a right click. Now choose “Order” and it will be possible to select from two options:

- Move to top
- Move to background

4.10. Moving Controls to layers

Controls can be moved to different layers in two ways. First one can edit them and on the “Position / Layer” tab select the layer they should be situated on. Second, one can also select the layer one wants to move the controls to first, then select the controls, and finalize it by choosing “Move to current layer” from the context menu.

4.11. Adding Controls to the library

Already placed Controls can be selected and used to create a library component using the context menu command “Add to library”. When no library was created yet, the user will be asked to type in a library’s name. The dialog to create a component appears:

There are two mandatory properties in this dialog: the name of the component and the destination library.

The option “keep Item” also allows the user to save the assigned Server Items inside the new component. When it is dragged onto a new page from the library now, the Server Items are already assigned to it.

A component can be created out of multiple controls. An example can be component used to control a dimming actuator. It may consist of buttons to increase and decrease the brightness as well as a label that visualizes the current brightness value. This component can be reused in any project without the need of placing, sizing, and adapting every single control again.

5. Controls

5.1. Overview

All Controls the NETx Voyager Editor 5.0 provides, can be found in the Object Catalog. The Controls are grouped in the following categories:

- General
- Functional
- Buttons
- Sliders
- Meters
- Charts
- Libraries

This chapter describes the Controls of the listed categories. Special attention will be paid to the parameter pages of the Controls.

5.1.1. Identical tabs

Some of the pages are identical. In particular the tab “Position / Layer” reoccurs in all Controls in the same way.

5.1.1.1. Tab Position / Layer

The center of origin is at the upper left corner of each page.

Tab:	Position / Layer
Top	The vertical position of the Control in pixel
Left	The horizontal position of the Control in pixel
Width	The horizontal dimension of the Control in pixel
Height	The vertical dimension of the Control in pixel
Layer	The layer the Control is placed on, for setting user rights

5.2. General

5.2.1. Label

Labels are used to display the value of a Server Item or to simply show static text. It can be used also for the input of numeric or string values.

The tab “Appearance” is the same for all four modes of the label. It is structured as follows:

Tab:	Appearance
Text	The text the label will display. It will only remain the way it is when the label is set as indicator. All other modes will alter this field.
Formatted text	A preview of the formatted text. This field cannot be edited. It is a result of the combination of the text and text format.
Text format	A string to format the Control's value (cf. table A.1).
Font	The font the label's content will be displayed in.
Alignment	Position of the text inside the defined area of the label (left, center, right).
Background color	The background color of the label.
Text color	The font color of the label.
False value color	The background color when the value is outside a defined limit.

On the “Object” tab of the Control the following functions can be selected:

5.2.1.1. Static text

A text will be displayed at a predefined place which will not change in its appearance.

Tab:	Object
Function	The mode of the Label can be selected here.

5.2.1.2. Indicator

The label shows the value of the assigned Server Item. In this mode it is read only. The Item on the server cannot be changed by the label.

Tab:	Object
Function	The mode of the Label can be selected here.
Item ID	The Server Item assigned to the label.
Scale factor	The factor, the Server Item's value is multiplied with.
Limit value	Min. value and max. value, to set borders for the false value color.
Send value on click	On click the current value is sent back to the Server Item.

5.2.1.3. Date / time

Here the Control displays the actual date and time depending on the given text format.

Tab:	Object
Function	The mode of the Label can be selected here.

5.2.1.4. Control

The label controls the values of its Server Items. It can send these values back to the server actively.

Tab:	Object
Function	The mode of the label can be selected here.
Item ID	The Server Item assigned to the Label.
Scale factor	The factor, the Server Item's value is multiplied with.
Limit value	Min. value and max. Value, to set borders for the false value color.

5.2.2. Text

The Text Control is capable of holding larger pieces of text. The tab "Appearance" is the same for all modes of the control. It is structured as follows:

Tab:	Appearance
Font	Determines which font is used for the text.
Back color	The background color of the Text.
Text color	The font color of the Text.

5.2.2.1. Static text

This mode can be used to display any static text. The user is able to edit the text. Words will be wrapped at the borders of the control.

Tab:	Object
Function	The mode of the text can be selected here.

5.2.2.2. Indicator

This mode shows the value of a Server Item. The value is read only.

Tab:	Object
Function	The mode of the text can be selected here.
Item ID	The Server Item assigned to the text.

5.2.3. Image

The Image Control can display different formats of pictures. It can be used as a background image or you can stack several pictures with transparency. The picture can be stretched, flipped, or scaled.

Tab:	Object
Empty	

Tab:	Appearance
Picture	Defines the picture that shall be shown.
Rotation	The angle which the picture will be turned clockwise.
Flip	If either vertically or horizontally is checked, the picture will be flipped accordingly.
Scale	If set, the picture can be proportioned under perpetuation of the ratio between width and height
Stretch	If set, the picture can be scaled without keeping the ratio between width and height
Opacity	It contains the percentage of how through shining a picture will be displayed. 100% is solid and 5% makes the picture almost invisible.
Use transparency	When set, one color of the control is made transparent.
Transparent color	This color is the one set to invisible, when the check box above is set. A color can be picked with the pipette tool.

5.2.4. Picture Button

This control is one of the most powerful ones of the visualization software. Not only that it can switch or toggle binary values of boolean Server Items, moreover it can be used to navigate through the NETx Voyager, call external applications, send NET commands, or simply close the program.

Parts of tab "Object" and the whole tab "Appearance" are the same for all button modes. The following properties all functions of the button have in common:

Tab:	Object
Function	The mode of the button can be selected here.
Code Lock	The drop down list offers three choices: <ul style="list-style-type: none">● None – no code will be asked for● Numeric code – when the Control is clicked, the user will be asked to enter a number. The code is the one entered in the text field.● Confirmation – a message box will appear in which the user can enter a confirmation text like "Do you really want to quit?". Is the question declined with "No", the button command will not be executed.

Tab:	Appearance
Template name	A button template can be selected or written to the text box. The buttons below give the visualization designer the possibility to create, edit, or load a template. The option "Files. . ." opens a new dialog to select three different picture files instead of a template; one picture for each, off-, on-, and uncertain-state.

Tab:	Appearance
Rotation	The angle which the button will be turned clockwise.
Flip	If either vertically or horizontally is checked, the button will be flipped accordingly. The caption is not affected by this.
Auto size	When it is set, the size of the "Off" state image is used as the button's size otherwise the button can be resized.
Stretch	If this property is set, the pictures of the button are stretched to the size of the button.
Hor. alignment	The horizontal alignment of image can be set here. It is only active when neither "Stretch" nor "Auto size" is set.
Vert. alignment	The vertical alignment of image can be set here. It is only active when neither "Stretch" nor "Auto size" is set.
Use background color	If set, a background color for the button can be selected. This is especially useful if neither "Stretch" nor "Auto size" is active or the Control is rotated at an odd angle. A frame with the selected color will fill the space up to the full size of the Control.
Background color	This color is used to fill the background of the control.
Opacity	It contains the percentage of how through shining the Control will be displayed. 100% is solid and 5% makes the control almost invisible. Only the images of the Control are inflicted by the opacity, background color and caption will remain solid.
Use transparency	When set, one color of the control is made transparent.
Transparent color	This color is the one set to invisible, when the check box above is set. A color can be picked with the pipette tool.
Caption	Contains the text written onto the Control. It is also possible to define a caption in the button editor when creating or editing a template. This one will be merged with the pictures and therefore can be stretched, rotated, and inflicted by transparency. The caption outside the button editor is not influenced by the above mentioned.
Caption color	The font color of the caption can be selected here.
Hor. alignment	The horizontal alignment of caption can be set here. A positive value (measured in pixel) of X will put an offset to the right onto the caption, a negative one will shift it to the left.
Vert. alignment	The vertical alignment of caption can be set here. A positive value (measured in pixel) of Y will put an offset upwards onto the caption, a negative one will shift it down.

5.2.4.1. Standard button

The Picture Button in the Standard-Button-Mode can be used to change Server Items or display their values.

Tab:	Object
Operation mode	<p>There are several different operation modes for the standard button:</p> <ul style="list-style-type: none"> ● Indicator – The button only displays the value of the Server Item, the control is read only. ● Switch – The button will lock in place in either down or up state. Once any of the two positions has been reached the according value will be sent to the Server Item. ● Toggle – The ON value will be sent when the toggle button is pressed. Once it is released the OFF value will be sent. ● Toggle on/off – sends alternating on- or off-signals when it is pressed. ● Toggle down – sends the value when the button is pressed ● Toggle up – sends the value when the button is released ● +Value – increases a value by a defined amount. The maximum value - when set - will not be exceeded. ● -Value – decreases a value by a defined amount. The minimum value - when set - will not be exceeded. ● Send actual value – just sends the current value back to the server.
Values	For the modes “Switch”, “Toggle”, and “Toggle on/off” the values for the on- and off-state can be set here. For “Toggle up” and “Toggle down” a single value can be set, which will be sent to the server either on pushing or releasing the button.
Step	By this value the Server Item value will be increased or decreased. If a max value or min value is needed, the check box needs to be activated and the limit needs to be entered into the text box.
Confirmation	The time interval that is used to determine whether sent value was received by at least one Server Item. After this timeout, the button switches to the state “Undefined”.
Items	It is possible to assign up to ten items to the button. Depending on the operation mode they can be set to either “receive” or “send” for either getting the value from the server for putting it to the control or sending it to the Server Item for setting it's value. Once a row is selected, the buttons below the table allow the visualization designer to either select a Server Item of the Item Tree or erase a formerly selected off of the table.

5.2.4.2. Start application

With this function the button can start any application on the machine.

Tab:	Object
Target	The executable file which shall be run. The buttons below the field allow the visualization designer to either select an application with the opening dialog or erase a formerly selected path.
Parameters	The parameters the application shall be started with need to be typed into this text field.
Description	The text typed in here will be displayed as a tooltip in visualization mode.
Embed	If set, the newly opened application window will be opened within the main window of the NETx Voyager. When the NETx Voyager will be closed the embedded application will too.

5.2.4.3. Execute menu command

Tab:	Object
Short cut	The short cut for the button needs to be placed here for it to execute any program functionality of the NETx Voyager.

The format of the short cut needs to be done in the following syntax:

All special keys must be set in curly brackets except for [Alt], [Ctrl], and [Shift]. Regular keys like any letter or digit are just plainly set (e.g. a for the letter "a"). Keys can be combined in writing them next to each other without any spaces in between.

Table 5.17.: Special keys and characters

Key	Encoding
Backspace	{BACKSPACE}, {BS}, {BKSP}
Break	{BREAK}
Caps lock	{CAPSLOCK}
Delete	{DELETE}, {DEL}
Arrow down	{DOWN}
Arrow up	{UP}
Arrow left	{LEFT}
Arrow right	{RIGHT}
End	{END}
Enter, Return	{ENTER}
Escape	{ESC}
Help	{HELP}
Home	{HOME}
Insert	{INSERT}, {INS}
Num lock	{NUMLOCK}
Page up	{PGUP}
Page down	{PGDN}
Scroll lock	{SCROLLLOCK}
TAB	{TAB}
F1, F2, ... F12	{F1}, {F2}, ... {F12}
Shift	+
Control	^
Alt	%

Table 5.18.: Function keys in the NETx Voyager 5.0

Function key	Effect
F1	Documentation
F2	Login
F3	Workspace parameters
F4	Connection properties
F5	Eventor
F6	Calendar
F7	Alarms
F8	Trending
F9	System Messages
Continued on next page ...	

Table 5.18.: Function keys in the NETx Voyager 5.0

Function key	Effect
F10	Alarm list
F11	System parameters
F12	Scenes

Table 5.19.: Possible Examples

Short	Keys	Effect
^e	[Ctrl] + [E]	Export Alarm List
%{F4}	[Alt] + [F4]	Quits the application

5.2.4.4. Go to page

This function allows the user to navigate from one page to another. There are special targets implemented like navigating to the home page or simply back and forth.

Tab:	Object
Linked page	<p>The visualization designer can select either a page of the project to navigate to or one of the following special options:</p> <ul style="list-style-type: none"> • <Navigate back> – is calling the previously viewed page. If there is no page in the history of the program, the visualization will remain at the current page. • <Navigate forward> – gets the user to a page from which he previously must have navigated back. • <Go to home page> – will bring the user to the page which was declared “Home page”. For information about how to do this see chapter 10.4.

5.2.4.5. Change layer visibility

This function turns layers and their controls visible or invisible.

Tab:	Object
Layer	This layer will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the button to turn the layer visibility on or off.

5.2.4.6. Change popup window visibility

Like layers, popups can be hidden or shown.

Tab:	Object
Popup window	This popup will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the button to turn the popup visibility on or off.

5.2.4.7. Send NET command

Sends NET commands to other computers.

Tab:	Object
Send NET command Arguments	It is possible to select, create, edit and delete NET commands here. The arguments will be attached to the NET command.

5.2.4.8. Close Voyager

This function closes the application.

5.2.5. Link Area

The Control Link Area can support the user with its functionality to either link to another page, change a layer visibility, or change a popup visibility. A picture can be set into the control to change its appearance.

Tab:	Appearance
Picture	Determines which picture should be displayed.
Stretch	If this property is set, the picture of the Link Area is stretched to the size of the Link Area.
Border	If set, a solid black border will frame the Link Area.

5.2.5.1. Go to page

This function allows the user to navigate from one page to another. There are special targets implemented like navigating to the home page or simply back and forth.

Tab:	Object
Linked page	The visualization designer can select either a page of the project to navigate to or one of the following special options: <ul style="list-style-type: none"> • <Navigate back> – is calling the previously viewed page. If none is in the history of the program, the visualization will remain at the current page. • <Navigate forward> – gets the user to a page from which he previously must have navigated back. • <Go to home page> – will bring the user to the page which was declared “home page”. For information about how to do this see chapter 10.4.

5.2.5.2. Change layer visibility

This function turns layers and their controls visible or invisible.

Tab:	Object
Layer	This layer will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the area to turn the layer visibility on or off.

5.2.5.3. Change popup window visibility

Like layers, popups can be hidden or shown.

Tab:	Object
Popup window	This popup will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the area to turn the popup visibility on or off.

5.2.6. Multi Picture

This Control is used as an indicator. Depending on the conditions assigned to an image and the actual value of the Item attached to the Multi Picture different results in the visualization are achieved. A possible example could be a picture of a fireplace with the fire turned on or off depending on the state of the heating system. Another possibility is the use of different background images depending on the time of day.

Tab:	Object
Item ID	The item assigned to this control

Tab:	Appearance
Stretch	If this property is set, the pictures of the control are stretched to the size of it.
Hor. alignment	The images will be aligned according to this. It is only active when "Stretch" is not set.
Vert. alignment	The images will be aligned according to this. It is only active when "Stretch" is not set.
Use background color	If set, a background color for the control can be selected. This is especially useful if "Stretch" is not active or the Control is rotated at an odd angle. A frame with the selected color will fill the space up to the full size of the control.
Background color	This color is used to fill the background of the control.
Use transparency	When set, one color of the control is made transparent.
Transparent color	This color is the one set to invisible, when the check box above is set. A color can be picked with the pipette tool.

Tab:	Pictures / Conditions
Index	This drop down list selects the picture that shall be configured. In the following fields, the symbol "#" is a placeholder for the current selected picture.
Picture #	This field contains the file name of the picture which shall be displayed.
Picture not in use	The picture is kept in the workspace but will not be displayed at all. This option is to quickly take an image off the Multi Picture without losing the given information.
Picture when quality is not GOOD	The picture will be shown, when the quality of the Server Item is not "GOOD", when no valid value is available, or when no server item is assigned to the control.
Use condition (quality is GOOD)	The following condition is applied to the item and the picture will be shown when they are fulfilled.
Condition #	The "#" is the number of the actual picture. Here the conditions can be edited under which the the picture shall be show.
Value =	The value of the assigned Server Item equals the one which is placed in the textbox.
Value >	The value of the assigned Server Item is greater than this set value.
Value <	The value of the assigned Server Item is less than this set value.
Value > & Value <	The value of the assigned Item is between those two set values.
Conditions not met	The picture will be displayed when none of the other pictures' conditions are met.

5.2.7. Graph

It is possible to display up to three different Items and their development over time in this Control.

!This Control only shows the value changes of Server Items, when the NETx Voyager is in visualization mode – when the application is closed, data changes are not recorded. To permanently store data changes of Server Items, it is recommended to use the Metering or Historical Data Chart (cf. section 5.7).

Tab:	Object
Item ID 1-3	This contains the Items which can be watched in the graph. The check box "Receive" is to determine whether the Item indeed is taken into consideration or not.

Tab:	Object
Scale factor 1-3	The content of this field is used to stretch or shrink the values of the Server Items. For example consumption values of smart meters can be converted from Wh to kWh. The scale factor is a float value with a decimal point as separator.

Tab:	Appearance
Caption	Contains the head line written onto the Control.
Caption color	The font color of the caption can be selected here.
Plot line color	One color for each Item is selected here to have the graph lines printed differently.
Plot line width	The width of the graph lines in pixel.
3D frame visible	Determines if the frame around the graph should be displayed in 3D.
Background color	The color of the Graph's background.
Plot area color	If set, the plot area will be filled with the color selected.
Fill color graphs	If set, the areas below the graph lines will be filled with the selected color.

Tab:	X-axis and Y-axis
Visible	If set, the labeling is turned on (caption, scale).
Caption	This text is plotted as a caption for the axis
Caption color	Select the color for your axis title here
Axis label color	The color for the labeling (numbers, dates)
Axis color	The color of the scale of the axis (marks of the axis)
Axis mode (X)	Set the time scale for the axis here
Axis auto scale (Y)	If set, the axis will scale its labeling automatically
Axis format string	The format string for the labeling. For the correct syntax see table A.1.
Axis maximum value	The maximum value displayed on the axis
Axis minimum value	The minimum value displayed on the axis

5.2.8. Multi Text

Depending on the value of the assigned Item this Control can display up to ten different texts under different conditions.

Tab:	Object
Item ID	The Server Item assigned to this control

Tab:	Texts / Conditions
Index	This drop down list selects the text that shall be configured. In the following fields, the symbol “#” is a placeholder for the currently selected text index.
Text#	In this text field, the text for this index can be defined. In addition the font can be selected using the “Font” Button. The following options are available for the selected text:
Text not used	Keeps the actual text in the Control without losing the content
Text when quality is not GOOD	This text will be shown, when the quality of the Server Item is not “GOOD”, when no valid value is available, or when no server item is assigned to the control.
Use condition (quality is GOOD)	This option will make the text appear, when the condition set further down in the dialog is met.
Condition#	Here you can edit the conditions to show the text.
Value =	The value equals the one of the assigned Item.
Value >	The value of the assigned Item is greater than this set value.
Value <	The value of the assigned Item is less than this set value.
Value > & value <	The value of the assigned Item is between those two set values.
Conditions not met	The text will be displayed when none of the other text's conditions are met.

5.2.9. Multi Internet

This Control shows different URLs depending on the conditions set for each of them.

Tab:	Object
Item ID	The Item assigned to this control
Tab:	Appearance
Show scrollbars	If set, scrollbars will appear in the window when the size of the displayed page exceeds that of the control
Tab:	URLs / conditions
Index	This drop down list selects the URL that shall be configured. In the following fields, the symbol “#” is a placeholder for the currently selected URL.
URL#	In this text field, the URL for this index can be defined. The following options are available for the selected URL:
URL not used	Keeps the actual URL in the Control without losing the content
URL when quality is not GOOD	This URL will be shown, when the quality of the Server Item is not “GOOD”, when no valid value is available, or when no server item is assigned to the control.
Use condition	This option will make the URL appear, when the condition set further down in the dialog is met.
Condition#	Here you can edit the conditions to show the URL.
Value =	The value equals the one of the assigned Item.
Value >	The value of the assigned Item is greater than this set value.
Value <	The value of the assigned Item is less than this set value.
Value > & Value <	The value of the assigned Item is between those two set values.
Conditions not met	The URL will be displayed when none of the other URL's conditions are met.

5.2.10. Drop Down List

With the Drop Down List you can select from a list of named items and set the value of the assigned item. The user will see a selection of names and does not need to worry about any numbers.

Tab:	Object
Items	Here the list of items that shall be assigned to the drop down list must be defined.
Use list content item	This option activates the opportunity to change the list content via a Server Item. If activated, the Item ID of the Server Item must be specified in the text field below.
Tab:	Appearance
Text	The text the drop down list will display if no entry matches.
Formatted text	A preview of the formatted text.
Text format	A character row to format the Control's value (cf. table A.1)
Font	The font the label's content will be displayed in.
Alignment	Position of the text inside the drop down list (left, center, right)
Back color	The background color of the label.
Text color	The font color of the label
Outside limit color	The background color when the value is outside a defined limit
Tab:	List Content
List items	Add, edit, or remove your list entries here. For each list entry, a value as well as its appearance (font, size, color) can be defined.

Tab:	List Content
List item definition	The formatted definition string for the list content will be displayed here after you clicked "Apply".

The control can also be administrated by assigning a Server Item to it. This one contains a string variable. The string has to be formatted in a special way, so that the NETx Voyager 5.0 can read and interpret it.

The syntax of the definition string is as follows:

- `|#|` – Separator between each of the entries.
- `;` – Separator between the properties of the entry.
- `@` – Separator between name and value of a property

Supported properties are:

- `Text` – The displayed name in the drop down list (mandatory)
- `Value` – The respective value of the entry (mandatory)
- `TxtColor` – A 24 Bit Integer containing the color of the text (optional)
- `BGColor` – A 24 Bit Integer containing the background color of the text (optional)

Examples:

```
Text@full;Value@100;TxtColor@15744;BGColor@10535167|#|Text@undefined;Value@;TxtColor@0;BGColor@16777215|#|
Text@half full;Value@64;TxtColor@32768;BGColor@13434828|#|Text@overflow;Value@128;TxtColor@8388608;BGColor@16764108
```

! Note that a linebreak must not be in this string. The above two lines are to be read as a single one.

A shorter definition for a single entry could be:

```
Text@empty;Value@0
```

Text color and background color are left empty and will be filled with default values, when the NETx Voyager interprets the entry.

! Separators cannot be used in names or values of list items.

5.2.11. Polygon

Similar to the Link Area, a Polygon can be used to link to another page, to change the visibility of a layer, or show a popup group. Compared to a normal Link Area, the shape of the Control is not limited to a rectangle. Using multiple points, any arbitrary polygon can be used as border for the area.

5.2.11.1. Using the polygon

Create a new polygon by placing the control from the object catalog onto the page. After having created a new polygon, it has four points. The points of the polygon can be moved using the mouse. In addition, new points can be added and available points can be removed from the polygon. To add a new point, right-click on the line where the point shall be added and select the context menu item "Add point". To remove a point, right-click on the point that shall be deleted and select "Delete point" from the context menu.

Furthermore, a so called "free drawing mode" is available. To activate the "free drawing mode", right-click on the polygon and select the context menu item "New polygon". Afterwards, the available points will be deleted and the "free drawing mode" starts. Now the user can draw the polygon by clicking on the position where a point shall be added. After adding a new point the polygon will be extended to the new point. After having created all points of the polygon, the polygon has to be closed. This can be done by selecting "Close polygon" from the context menu.

5.2.11.2. Appearance

To change the appearance of the polygon, double-click the polygon Control and change to the "Appearance" Tab.

Tab:	Appearance
Border	If set, a solid black one pixel broad border will frame the Polygon.

Tab:	Appearance
Border Width	Here, the width of the border can be specified.
Border Color	Here, the color of the border can be specified.

5.2.11.3. Go To Page

This function allows the user to navigate from one page to another. There are special targets implemented like navigating to the home page or simply back and forth.

Tab:	Object
Linked page	<p>The visualization designer can select either the page of the project to navigate to or one of the following special options:</p> <ul style="list-style-type: none"> • <Navigate back> – is calling the previously viewed page. If none is in the history of the program, the visualization will remain at the current page. • <Navigate forward> – gets the user to a page from which he previously must have navigated back. • <Go to home page> – will bring the user to the page which was declared “home page”. For information about how to do this see chapter 10.4.

5.2.11.4. Change layer visibility

This function turns layers and their controls visible or invisible.

Tab:	Object
Layer	This layer will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the area to turn the layer visibility on or off.

5.2.11.5. Change Popup Window Visibility

Like layers, popups can be hidden or shown.

Tab:	Object
Popup window	This popup will be the one whose visibility will be turned on or off.
Mode	The drop down list contains the options for the area to turn the popup visibility on or off.

5.3. Functional

5.3.1. Clock

This Control can be used as a clock that shows the current time. It is possible to customize its appearance according to the users' needs.

Tab:	Object
Empty	

Tab:	Appearance
Clock face picture	A possible new background image can be placed here.
Hour hand picture	An image for a customized hour hand can be placed here.
Minute hand picture	An image for a customized minute hand can be placed here.
Second hand picture	An image for a customized second hand can be placed here.

5.3.2. Alarm Clock

The Alarm Clock will play the wave sound selected, when it is turned on. The time is set on a 24 hour display.

Tab:	Object
Empty	

Tab:	Appearance
Button Up picture	An image for the increment button can be placed here
Button Up pressed picture	An image for the increment button in its pressed state can be placed here
Button Down picture	An image for the decrement button can be placed here
Button Down pressed picture	An image for the decrement button in its pressed state can be placed here
Alarm sound wave file	The file played when the alarm goes off can be placed here
Alarm enabled text	The text displayed when the alarm is turned on.
Alarm disabled text	The text displayed when the alarm is turned off.
Font	The font for the Alarm Clock can be selected here

5.3.3. Calendar Link

This Control will open a dialog with a defined calendar inside. The user will be able to schedule new events, change old ones, or delete them. Only one calendar can be assigned to the Control at a time. To create assignable calendars please refer to section 9.4.1.

Tab:	Object
Link to calendar	Please select the calendar to assign to the Control here.

Tab:	Appearance
Picture	It is possible to place a different image for the Control here.
Scale	If set, the Control can be proportioned under perpetuation of the ratio between width and height.
Stretch	If set, the Control can be scaled without keeping the ratio between width and height
Use transparency	When set, a color of the Control is made transparent.
Transparent color	This color is the one set to invisible, when the check box above is set. One can pick a color with the pipette tool.

5.3.4. Scene Configuration

The Control "Scene Configuration" allows the user to record and replay partial or full states of the system. The scene has to be defined in advance and then assigned to the control. In visualization mode the user can add items to and remove items from the scene when the control was clicked. A second click saves the scene and exits the edit mode.

Tab:	Object
Scene	Please select the scene to assign to the control here.

Tab:	Object
Code lock	<p>The drop down list offers three choices:</p> <ul style="list-style-type: none"> • None – no code will be asked for • Numeric code – when the control is clicked, the user will be asked to enter a number. The code is the one entered in the text field. • Confirmation – a message box will appear in which the user can enter a confirmation text like “Do you really want to change the editing mode for this scene?”.

Tab:	Appearance
Template name	A button template can be selected or written to the text box. The buttons below give the visualization designer the possibility to create, edit, or load a template. The option “Files...” opens a new dialog to select three different picture files instead of a template; one picture for each, off-, on-, and uncertain-state.
Rotation	The angle which the button will be turned clockwise.
Flip	If either vertically or horizontally is checked, the button will be flipped accordingly. The caption is not affected by this.
Auto size	When it is set, the size of the “Off” state image is used as the button’s size otherwise the button can be resized.
Stretch	If this property is set, the pictures of the button are stretched to the size of the button.
Hor. alignment	The horizontal alignment of image can be set here. It is only active when neither “Stretch” nor “Auto size” is set.
Vert. alignment	The vertical alignment of image can be set here. It is only active when neither “Stretch” nor “Auto size” is set.
Use background color	If set, a background color for the button can be selected. This is especially useful if neither “Stretch” nor “Auto size” is active or the Control is rotated at an odd angle. A frame with the selected color will fill the space up to the full size of the Control.
Background color	This color is used to fill the background of the control.
Opacity	It contains the percentage of how through shining the Control will be displayed. 100% is solid and 5% makes the control almost invisible. Only the images of the Control are inflicted by the opacity, background color and caption will remain solid.
Use transparency	When set, one color of the control is made transparent.
Transparent color	This color is the one set to invisible, when the check box above is set. A color can be picked with the pipette tool.
Caption	Contains the text written onto the Control. It is also possible to define a caption in the button editor when creating or editing a template. This one will be merged with the pictures and therefore can be stretched, rotated, and inflicted by transparency. The caption outside the button editor is not influenced by the above mentioned.
Caption color	The font color of the caption can be selected here.
Hor. alignment	The horizontal alignment of caption can be set here. A positive value (measured in pixel) of X will put an offset to the right onto the caption, a negative one will shift it to the left.
Vert. alignment	The vertical alignment of caption can be set here. A positive value (measured in pixel) of Y will put an offset upwards onto the caption, a negative one will shift it down.

5.3.5. RGB Control

This Control was designed foremost to set up light actors in a specific color and intensity. For example the lighting in a restaurant during daytime could be done in a slight blue tone where it might add to a lighter atmosphere, where in the evening one might want to choose a warmer color.

Tab:	Object
Function	The drop down list contains two modes. It is possible to connect to a 24 bit single Item or to three different 8 bit Items.

Tab:	Object
Control Item	Depending on the selected function, the following options are available: <ul style="list-style-type: none"> • Single 24 bit item – Select the single Item here. • Three 8 bit items – There is one field for each of the three colors “Red”, “Green”, and “Blue”. The user may connect each to a 8 bit Server Item.
Status Item	Depending on the selected function, the following options are available: <ul style="list-style-type: none"> • Single 24 bit item – When “Status On” is checked, it is possible to select an item for status feedback right below the check box. • Three 8 bit items – when “Status On” is checked, it is possible to select an Item for each of the three color status reports right below the check box.

Tab:	Appearance
Text	Contains the text written on the button to send the colorvalue(s).
Font	Determines which font is used in the text of the send button.

5.3.6. RGB Image

This Control is used to make RGB actuator states visible in a layered way. The base is the color of the RGB actuator(s) which is covered with an Opacity Mask. Any colored pixel of the mask determines a dot which will be colored in the resulting image. Invisible areas work, as if they are completely colorless and through shining. As a third layer you can place an image with alpha channel or an image with invisible parts (PNG or GIF). This could be a photo of the restaurants guest room mentioned in RGB Control. When the lighter part of the image (e.g. the walls illuminated with indirect spots) would be through shining, one can get a preview of the room and its colored hue.

Tab:	Tab Object
Function	The drop down list contains two modes. It is possible to connect to a 24bit single Item or to three different 8bit Items.
Status Item	Depending on the selected function, the following options are available: <ul style="list-style-type: none"> • Single 24 bit item – When “Status On” is checked, it is possible to select an item for status feedback right below the check box. • Three 8 bit items – when “Status On” is checked, it is possible to select an Item for each of the three color status reports right below the check box.

Tab:	Appearance
Picture	The overlaying image covering the masked color areas.
Opacity mask	The mask determines which part of the RGB Image will be colored and which will show the background. Other underlying Controls will be shown as well and might contribute to the final resulting image. When no opacity mask is set at all the whole area will be colored.
Rotation	The angle which the button will be turned clockwise.
Flip	If either vertically or horizontally is checked, the button will be flipped accordingly. The caption is not affected by this.
Scale	If set, the Control can be proportioned under perpetuation of the ratio between width and height
Stretch	if this property is set, the pictures of the control are stretched to the size of the control regardless of its proportion.
Opacity	It contains the percentage of how through shining the Control will be displayed. 100% is solid and 5% makes the control almost invisible. Only the images of the Control are inflicted by the opacity, background color and caption will remain solid.
Use transparency	When set, one color of the control is made transparent.

Tab:	Appearance
Transparent color	This color is the one set to invisible, when the check box above is set. A color can be picked with the pipette tool.

5.3.7. Server Calendar

The Control “Server Calendar” allows the user to add, modify, and delete events of server based calendars. In contrast to client calendars, server calendars do not demand that the NETx Voyager is running because the event processing is directly done within the NETx BMS Server. The end user needs to start the client software only to create or administrate the events on the server. Once this is done the client connection can be shut down and the scheduled events on the server still will be executed. For more information about the server calendar see section 9.3.

Tab:	Object
Name	The button next to the text box allows the user to select a server calendar group or remotely create a new one inside the server.
Description	Displays the description of the server calendar. It may remain empty when no description was given.
Actions	This drop down list contains all actions defined for this calendar. The selected one may be edited or deleted.
Description	Displays the description of the actually selected action. It may remain empty when no description was entered. <ul style="list-style-type: none"> • Add – will open the editing dialog for a new action. • Edit – will open the editing dialog for the actually selected action. • Delete – will delete the actually selected action off of the list.

Tab:	Appearance
Title	Defines the title of the Server Calendar.
Font	The button on the right will open the font selection dialog. The selected font will be applied to the title of the calendar. The color chosen in the dialog will be taken as title color.
Title color	This determines the actual color of the calendar title.
Background color	This determines the background color of the calendar head.

5.3.7.1. Dialogs in editor mode

Calendars are saved in the server like any other items – in a tree. Starting at the root node the user can structure them in any hierarchy. Only branches (calendars) shall be chosen as associated calendar to the visualization control.

Dialog:	Select calendar group
Context – Add calendar group	Opens the dialog to add a new server calendar group.
Context – Delete calendar group	Deletes the selected server calendar group.

Dialog:	Calendar group parameters
Name	Contains the name of the calendar group.
Description	Contains the description of the server calendar.

Dialog:	Action parameters
Name	Contains the name of the action saved in the calendar group. It is recommended to use well chosen names for actions since the user in visualization mode has no other information but this and the description to know what the action will do. Once the action was added with their new name this parameter will not be allowed to change again. The name of an action has to be unique inside a server calendar.
Description	Contains the description of the action saved in the server calendar. It is recommended to use well chosen descriptions for actions since the user in visualization mode has no other information but this and the name to know what the action will do.
Start command	The visualization designer may want to create the command for the begin of the calendar event in here. "Edit" will open a dialog to put this command together.
Stop command	This command will be run at the end of an event. If - for an example - an event is defined from 10:00 AM to 6:00 PM of the same day this command will be run at exactly 6:00 PM.

Dialog:	Command parameters
Name	Contains the name of the command. This parameter is not editable. It shows which of the action's commands the user is editing.
Items	Shows a table consisting of all Server Items taking part in this command. Entries can be added, edited and deleted. It is possible to place different items for both start and stop of the event's action. So it is possible - for an example - that an actuator A is turned on at the start command of an action where at the stop command a minimum temperature on actuator B is set to 19°C. A pair of Server Item and value is referred to as Command Step.

Dialog:	Command step parameters
Item	It is possible to either add an item by typing the Item ID into the text field or selecting from the appearing dialog when clicking the button next to it.
Value	Enter the value here which shall be written to the Server Item when the command is executed.

5.3.7.2. Dialogs in visualization mode

Like already described in the beginning of this section during runtime (in the visualization mode) the actual events are defined and saved at the server. Once there they will be executed. The creation of an event consists of two steps; the adjustment of the timer and the selection of an action to that timer. The four buttons in the top left corner of the calendar allow the user to switch between the different views. The button in the right hand side opens a small date-time-picker to navigate back and forth.

Dialog:	Event parameters
Name	Contains the name of the event displayed on the calendar surface.
Description	Contains the description of the server calendar event.
Color	The color is used to display the event on the calendar surface.
Active	This check box activates or deactivates the event.
Start time	This determines when the event first is started. No dates smaller than the 1st of January 1900 shall be entered. The "On start" command will be executed at this time.
Stop time	That time determines when the event shall end. The "On end" command will be executed at this time. The minimum time span between start time and stop time is 30 seconds where the maximum duration is 365 days. The stop time always needs to be after the start time.
Action	The user shall select an action for the event in here. In the drop down list all actions are listed which the visualization designer defined for this server calendar.

Dialog:	Event parameters
Recurrence	<p data-bbox="512 304 1289 327">It is possible to repeat an event. The available options are the following ones:</p> <ul data-bbox="549 353 1353 831" style="list-style-type: none"> <li data-bbox="549 353 951 376">● None – the event will not be repeated <li data-bbox="549 409 1353 495">● Daily – depending on the period set to 1, 2, or more; the event will be repeated everyday, every other day, or in larger steps. The second option is to repeat the event on workdays only. <li data-bbox="549 521 1353 667">● Weekly – depending on the period set to 1, 2, or more; the event will be repeated every week, every other week, or in larger steps. The day pattern (check boxes) determines on what days during an active week the event will be repeated. (e.g. the period is set to “2” and Monday and Thursday are activated, then the event will run on all Mondays and Thursdays every other week) <li data-bbox="549 694 1353 748">● Monthly – depending on the period set to 1, 2, or more; the event will be repeated every month, every other month, or in larger steps. <li data-bbox="549 775 1353 831">● Yearly – depending on the period set to 1, 2, or more; the event will be repeated every year, every other year, or in larger steps. <p data-bbox="512 857 1353 972">All options can explicitly include or exclude holidays. Including holidays means, that the event is not only executed on the days defined by the recurrence but also on all holidays in between. Excluding holidays will result in preventing the execution of the event on holidays even if they were defined as event-days by the schedule.</p>
Period	<p data-bbox="512 981 1353 1093">The start is defined by the start time and simply will be taken over. It is not editable directly. For Stop there may be chosen either “none”, “after”, or “at”. “none” defines an infinite recurrence for the event. “after” makes it possible to define a certain amount of recurrences where “at” sets a final date for recurrences.</p>

5.4. Buttons

This section contains an assortment of buttons with different appearances. The general functionality of the buttons is the same. Therefore the tab “Object” and tab “Appearance” of each button style are identical to each other.

The following button styles are available:

- V. Toggle
- H. Toggle
- Square LED
- Round LED
- Push Button
- V. Rocker
- H. Rocker
- V. Slide Switch
- H. Slide Switch
- Toggle OFF/ON
- Command Ok

Tab:	Object
Operation mode	<p>There are several different operation modes for Buttons:</p> <ul style="list-style-type: none"> • Indicator – Button only displays the value of the Item, the Control is read only • Switch – The button will remain in the down or up state • Toggle – As long as it is pressed, the true state is sent
Values	One can set ON- and OFF-value here.
Confirmation	The time interval that is used to determine whether the sent value was received by at least one Server Item. After this timeout, the button switches to the “Undefined” state.
Code lock	<p>The drop down list offers three choices:</p> <ul style="list-style-type: none"> • None – no code will be asked for • Numeric code – when the Control is clicked, the user will be asked to enter a number. The code is the one entered in the text field. • Confirmation – a message box will appear in which the user can enter a confirmation text like “Do you really want to quit?”. Is the question declined with “No”, the button command will not be executed.
Items	It is possible to assign up to ten items to the button. Depending on the operation mode they can be set to either “receive” or “send” for either getting the value from the server for putting it to the Control or sending it to the Server Item for setting it’s value. Once a row is selected, the buttons below the table allow the visualization designer to either select a Server Item of the Item Tree or erase a formerly selected off of the table.

Tab:	Object
Style	It is possible to switch between the above mentioned styles back and forth.
Title	The caption above the actual button.
ON text	The text in the center of the button when it is in the “ON” state.
OFF text	The text in the center of the button when it is in the “OFF” state.
Back color	This color will fill the background of the button solidly in a rectangle.
Title color	The color of the caption on top of the button.
ON color	The base color of the button in its “ON” state.
OFF color	The base color of the button in its “OFF” state.
Undefined state color	The base color of the button in its “Undefined” state.
ON text color	The color of the text in the center of the button in its “ON” state.
OFF text color	The color of the text in the center of the button in its “OFF” state.

5.5. Sliders

This section contains an assortment of sliders with different appearances. The general functionality of the sliders is the same. Therefore the “Object”, tab “Appearance”, and tab “Axis” of each slider style are identical to each other.

The following slider styles are available:

- V. Fill Slide
- V. Pointer Slide
- V. Progress Bar
- V. Graduated Bar
- H. Fill Slide

- H. Progress Bar
- H. Graduated Bar
- Tank
- Thermometer
- H. Pointer Slide

Tab:	Object
Operation mode	<p>There are two different operation modes for the Slider:</p> <ul style="list-style-type: none"> • Indicator – The slider only displays the value of the Item, the control is read only • Control – The slider will display the value of a Server Item as much as it can send its value to several Server Items.
Scale factor	This is the multiplier the Server Item value will be scaled with before being displayed.
Use as KNX dimmer	The slider is split in half and reacts like a seesaw. On the right hand side it dims down where on the left hand side it dims upwards. The further away from the center it is clicked, the stronger it reacts. The data type the control is based on in this state is a 4 bit value (EIS2).
Confirmation	The time interval that is used to determine whether the sent value was received by at least one Server Item. After this timeout, the button switches to the “Undefined”state.
Items	It is possible to assign up to ten items to the button. Depending on the operation mode they can be set to either “receive” or “send” for either getting the value from the server for putting it to the control or sending it to the Server Item for setting it’s value. Once a row is selected, the buttons below the table allow the visualization designer to either select a Server Item of the Item Tree or erase a formerly selected off of the table.

Tab:	Appearance
Style	It is possible to switch between the above mentioned styles back and forth.
Title	The caption above the actual slider.
Back color	This color will fill the background of the slider solidly in a rectangle.
Title color	The color of the caption on top of the slider.
Pointer color	The base color of the pointer in a slider. This color only is used when the slider style implements a pointer.
Fill color	The color of the filled part of the slider.
Interior color	The color of the empty part of the slider scale.
Undefined state color	The color of the filled part of the slider in its “Undefined” state.

Tab:	Axis
Visible	Determines whether the axis scale and title should be shown or not.
Title	If set this title will be shown along the scale of the slider.
Title color	Changes the color of the axis title.
Format string	The format string for the values of the axis scale.
Label color	The color of the displayed numbers along the axis scale.
Color	Sets the color for the hair lines along the axis scale.
Maximum value	Determines the maximum value of the axis scale.
Minimum value	Sets the minimum value possible to be displayed and set with the slider.

5.6. Instruments

The section contains an assortment of knobs and different instruments to display or regulate values of a wider range. The general functionality of the instruments is the same. Therefore the tab “Object”, tab “Appearance”, and tab “Axis” of each instrument style are identical to each other.

The following instrument styles are available:

- 3D Knob
- 3D Dial
- 3D Top Meter
- 3D Right Meter
- 3D Bottom Meter
- 3D Left Meter
- Knob
- Dial
- Top Meter
- Right Meter
- Bottom Meter
- Left Meter

Tab:	Object
Operation Mode	<p>There are two different operation modes:</p> <ul style="list-style-type: none"> • Indicator – The instrument only displays the value of the Item, the control is read only • Control – The instrument will display the value of a Server Item and can send its value to several Server Items.
Scale factor	This is the multiplier the Server Item value will be scaled with before being displayed.
Use as KNX dimmer	The slider is split in half and reacts like a seesaw. On the right hand side it dims down where on the left hand side it dims upwards. The further away from the center it is clicked, the stronger it reacts. The data type the control is based on in this state is a 4 bit value (EIS2).
Confirmation	The time interval that is used to determine whether the sent value was received by at least one Server Item. After this timeout, the button switches to the “Undefined”state.
Items	It is possible to assign up to ten items to the button. Depending on the operation mode they can be set to either “receive” or “send” for either getting the value from the server for putting it to the control or sending it to the Server Item for setting it’s value. Once a row is selected, the buttons below the table allow the visualization designer to either select a Server Item of the Item Tree or erase a formerly selected off of the table.

Tab:	Appearance
Style	It is possible to switch between the above mentioned styles back and forth.
Title	The caption above the actual control.
Back color	This color will fill the background of the control solidly in a rectangle.
Title color	The color of the caption on top of the instrument.
Fore color	The color of the disk of the knob or dial and that of the 3D instruments. It has no impact on flat instruments.

Tab:	Appearance
Pointer color	The base color of the pointer in a Control.
Fill color	The color of the filled part of the instrument.
Undefined state color	The color of the filled part of the instrument in its "Undefined" state.

Tab:	Axis
Visible	Determines whether the axis scale and title should be shown or not.
Title	If set this title will be shown along the scale of the slider.
Title color	Changes the color of the axis title.
Format string	The format string for the values of the axis scale.
Label color	The color of the displayed numbers along the axis scale.
Color	Sets the color for the hair lines along the axis scale.
Maximum value	Determines the maximum value of the axis scale.
Minimum value	Sets the minimum value possible to be displayed and set with the slider.

5.7. Charts

5.7.1. Metering Chart

The Metering Chart displays metering data of the metering module of the NETx BMS Server. The data can be viewed in a table as well. The possibility of printing this data is given as well. One is able to browse through different time segments to view any point of interest. Metering data is calculated data off of historical datapoints. It can represent trends of different meters or show the actual counter values.

Tab:	Graphs
Index	The index of the graph that shall be edited has to be selected from this drop down list.
Name	The text box contains the name of the currently chosen graph. This name can freely be chosen.
Resource	This drop down list contains all resources created on the currently connected server. Depending on which resource is selected the selection of the next field is altered.
Meter	This drop down list contains all meters which count the previously selected resource. The graph of the currently selected meter will be displayed in the chart at runtime.
Interpolation	To limit the amount of values that shall be display in one graph view, an interpolation can be selected. The following different interpolation modes can be chosen: "None", "Average", "Minimum", "Maximum", and "Minimum/Maximum". "Average" computes the average of the values within one interpolation interval. "Minimum" takes the smallest value and "Maximum" the largest value. "Minimum/Maximum" is a special mode where the minimum and maximum values is visualized together using a bar. The following text field contains the maximum amount of values that shall be displayed.
Scale factor	The values of the datapoint are multiplied with this factor to exaggerate or flatten their amplitude.
Graph type	It is possible to select a certain type of graph from this field.
Line color	This field defines the color of the graph.
Show values at	This defines whether the values are displayed on the left or the right y-axis of the chart.

Tab:	Appearance
Theme	It is possible to a choose predefined appearance using themes. Using a customized theme is also possible.
Title	This defines the caption of the whole chart.

Tab:	Appearance
Title color	Set the color of the title in either selecting it from the color selector or use the pipette to select a color from anywhere on the display.
Back color	This color will solidly fill the back of the whole chart.
Border visible	Check this box to turn the border's visibility on.
Diagram fill color 1	The first color to fill the background of the actual diagram with.
Diagram fill color 2	The second color to fill the background of the actual diagram with.
Legend visible	Set to true for displaying the legend.
Alignment	Change the alignment of the legend here. It is possible to display it either inside or outside the graph on all four sides centered or border anchored.

Tab:	X-Axis
Axis visible	Determines whether the x-axis shall be displayed or not.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	The color here defines how the axis/ruler is displayed.
Show axis at	Shall the axis be displayed at the bottom or on top of the chart?

Tab:	Left Y-axis
Axis visible	Determines whether this axis shall be displayed or not.
Axis title	This field contains the text which will be displayed at the axis.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	This color defines how the axis/ruler is displayed.

Tab:	Right Y-axis
Axis visible	Determines whether this axis shall be displayed or not.
Axis title	This field contains the text which will be displayed at the axis.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	This color defines how the axis/ruler is displayed.

5.7.2. Historical Data Chart

The Historical Data Chart displays any historical data of any historical datapoints inside the NETx BMS Server. This data can be viewed in a table. The opportunity of printing the data is possible. One is able to browse through different time segments to view any point of interest. The data of the Historical Data Chart is displayed unaltered (except for scaling) and thus shows only the values of the monitored items in their history.

Tab:	Object
Index	The index of the graph the visualization designer wishes to edit shall be selected from this drop down box.
Name	The text box contains the name of the currently chosen graph. This name can freely be chosen.
Item ID	This field defines which historical item the graph shall display.

Tab:	Object
Interpolation	To limit the amount of values that shall be display in one graph view, an interpolation can be selected. The following different interpolation modes can be chosen: "None", "Average", "Minimum", "Maximum", and "Minimum/Maximum". "Average" computes the average of the values within one interpolation interval. "Minimum" takes the smallest value and "Maximum" the largest value. "Minimum/Maximum" is a special mode where the minimum and maximum values is visualized together using a bar. The following text field contains the maximum amount of values that shall be displayed.
Scale factor	The values of the datapoint are multiplied with this factor to exaggerate or flatten their amplitude.
Graph type	It is possible to select a certain type of graph from this field.
Line color	This field defines the color of the graph.
Show values at	This defines whether the values are displayed on the left or the right y-axis of the chart.

Tab:	Appearance
Theme	It is possible to choose a predefined appearance using themes. Using a customized theme is also possible.
Title	This defines the caption of the whole chart.
Title color	Set the color of the title by either selecting it from the color selector or use the pipette to select a color from anywhere on the display.
Back color	This color will solidly fill the back of the whole chart.
Border visible	Check this box to turn the border's visibility on.
Diagram fill color 1	The first color to fill the background of the actual diagram with.
Diagram fill color 2	The second color to fill the background of the actual diagram with.
Legend visible	Set to true for displaying the legend.
Alignment	Change the alignment of the legend here. It is possible to display it either inside or outside the graph on all 4 sides centered or border anchored.

Tab:	X-Axis
Axis visible	Determines whether the x-axis shall be displayed or not.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	This color defines how the axis/ruler is displayed.
Show axis at	Shall the axis be displayed at the bottom or on top of the chart?

Tab:	Left Y-Axis
Axis visible	Determines whether this axis shall be displayed or not.
Axis title	This field contains the text which will be displayed at the axis.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	The color here defines how the axis/ruler is displayed.

Tab:	Right Y-axis
Axis visible	Determines whether this axis shall be displayed or not.
Axis title	This field contains the text which will be displayed at the axis.
Axis title color	Change this color to display the axis title differently.
Axis label color	This color defines how the axis values and units are displayed.
Axis color	This color defines how the axis/ruler is displayed.

5.8. Libraries

In the “Libraries” section components are stored consisting of Controls or groups of Controls. These components can be created by the user for the purpose of multiple use in reoccurring situations or even different projects. Especially the visualization designer will profit from the predefined appearance and behavior of the Controls which are stored in library components.

The tree view in the “Libraries” section consists of single libraries. The libraries themselves again consist of components. With this structure it is possible to group related components.

6. Menu

In the following section the commands of the menu bar will be explained.

6.1. Workspace

- **New ...** – A copy of the “Default” workspace is made with all its content and settings. The new name of the workspace will also be the name of the workspace directory. Therefore special characters like “/” or “:” are prohibited in the name.
- **Open ...** – Opens a dialog where a workspace can be selected. The upcoming mask will contain all existing workspaces. The previous workspace will be closed. Only one workspace at a time can remain opened.
- **Save** – Saves the current workspace.
- **Save as ...** – Opens a dialog where the current workspace can be saved under a different name.
- **Export ...** – This menu command will open a file dialog. A name can be defined under which the export will be stored. Visualization Export Workspace (VEW) files contain the compressed content of the exported workspace including all files and settings.
- **Import ...** – The upcoming dialog allows the user to reimport an exported workspace. After selecting the VEW file to import it is necessary to define the new workspace name. The imported workspace will be opened immediately.
- **Export to BMS client file ...** – Exports the current workspace as NETx BMS Client Project. The workspace is exported as a “vxf” file. This “vxf” file can be imported into the NETx BMS Server Studio.
- **Export Items to CSV...** – This command exports all used Server Items into a Comma Separated Value (CSV) file. The purpose is to be able to quickly adapt a visualization project to different Server Items. The exported file consists of two columns. The first contains the Server Items to replace. Those MUST NOT be changed. The second column contains the new IDs the old ones will be replaced with.
- **Import Items From CSV...** – This reimports the changed Server Items and overrides the old definitions.
- **Close** – Closes the workspace.
- **Delete...** – Deletes the selected workspace with all of its content and directories irreversibly.
- **Configuration...** – This calls the configuration dialog to change the settings of the workspace. For more detailed information about individual settings please refer to section 10.2.
- **System configuration...** – This calls the configuration dialog to change the settings of the software. For more detailed information about individual settings please refer to section 10.3.
- **Exit** – Ends the application.

6.2. Edit

- **Undo (Ctrl + Z)** – Undoes the last operation.
- **Redo (Ctrl + Y)** – Redoes the last undone operation.
- **Cut (Ctrl + X)** – Cuts the selected Controls and adds them to the clipboard.
- **Copy (Ctrl + C)** – Copies the selected Controls and adds them to the clipboard.
- **Paste (Ctrl + V)** – Pastes the Controls in the clipboard to the current page.
- **Delete (Del)** – Deletes the selected Controls.
- **Select all (Ctrl + A)** – Selects all elements of the current page.
- **Order**
 - **Move to top** – Moves the selected Controls to the foreground.
 - **Move to background** – Moves the selected Controls to the background.
- **Replace (Ctrl + H)** – Can be used for searching and replacing Item IDs.

6.3. Page

- **New...** – This creates a new empty page and opens the page configuration dialog (cf. section 10.4).
- **Delete** – Deletes the opened page.
- **Copy** – Copies the opened page to a new one.
- **Configuration...** – This opens the page configuration dialog (cf. section 10.4).

6.4. Library

- **New** – Creates a new library in the object catalog.
- **Import** – Imports a new library in the object catalog from a file.
- **Export** – Exports a library in the object catalog to a file.
- **Delete** – Deletes a library in the object catalog.
- **Add component** – Adds the selected Control or Control group to a library. Name of the component, library to add to, and whether the Server Items shall be kept or not, needs to be defined in the upcoming dialog.
- **Delete component** – Deletes the selected component from the library.

6.5. Layer

- **Configuration...** – Opens the layer configuration dialog (cf. section 10.5).

6.6. User

- **Login** – Used to login another user, with the current user being logged out.
- **User list...** – Opens the user management dialog (cf. section 9.1.1).

6.7. Modules

- **Alarms**
 - **Export log to XLS (Ctrl + E)** – Opens a file dialog to export the alarm log into an Excel file.

6.8. System

- **Run / Stop** – Changes from editor mode to visualization mode or vice versa.
- **Reconnect server** – Interrupts the connection to the server and creates it a new or retries to establish a new connection to the server.
- **Select server** – Opens the connection parameters dialog described in section 10.6.

6.9. View

- **Object Catalog** – Turns the “Object Catalog” sub window on or off.
- **Item Tree** – Turns the “Item Tree” sub window on or off.
- **Search data points** – Turns the “Search data points” sub window on or off.
- **Item Properties** – Turns the “Item Properties” sub window on or off.
- **System messages** – Turns the “System Messages” sub window on or off.
- **Alarm list** – Turns the “Alarm List” sub window on or off.
- **Trending** – Turns the “Trending” sub window on or off.
- **Toolbars**
 - **Standard** – Turns the “Standard” toolbar on or off.
- **Status bar** – Turns the status bar on or off.
- **Restore panel position** – Reestablishes the default positions and sizes of the panels.
- **GUI theme** – It is possible to select from thirteen main themes (1-10) and (2007, 2008, 2010).

6.10. Help

- **Registration** – This will start the license manager. In case a hardlock was purchased along with the NETx Voyager opening it is not necessary. For any further details on registration please refer to the according section A.3.

- **About** – The dialog coming up when this menu point is selected contains software name, version, license type, license key and other information.
- **Documentation** – This menu point can either be selected directly or called by pressing the [F1] button. It calls this document.

7. Toolbar

- **Open** – Opens a workspace.
- **Save** – Saves the full workspace.
- **Home** – Jump to the homepage.
- **Page drop down** – The page to be displayed can be selected with it.
- **Layer drop down** – The current layer can be selected here. Controls placed by Drag & Drop are put to this Layer.
- **Server** – The icon shows the status of the Server connection. A click on it will open the connection properties dialog.
- **Start / Stop** – This icon switches to run mode or back to editing mode.
- **Eventor** – Opens the Eventor module (cf. section 9.2).
- **Calendar** – Opens the calendar module (cf. section 9.4).
- **MultiCal** – Opens the Multi Calendar module (cf. section 9.4).
- **Scenes** – Opens the scene module (cf. section 9.5).
- **Alarms** – Opens the alarm module (cf. section 9.6).
- **Processor** – Opens the processor module (cf. section 9.7).
- **Undo** – Undoes the last operation.
- **Redo** – Redoes the last undone operation.
- **Cut** – Cuts the selected Controls and adds them to the clipboard.
- **Copy** – Copies the selected Controls and adds them to the clipboard.
- **Paste** – Pastes the controls in the clipboard to the current page.
- **Delete** – Deletes the selected Controls.

8. Window

8.1. Menu bar

This area was already described in section 6. For its exact location when the application windows are in their default position refer to number 2 in figure 3.3.

8.2. Tool bar

This area was already described in section 6. For its exact location when the application windows are in their default position refer to number 3 in figure 3.3.

8.3. Object Catalog

The Object Catalog consists of several areas containing different controls for different purposes (cf. number 4 in figure 3.3). This window can be closed with the small cross in the upper right corner or activated and deactivated by the according point in the menu bar (View → Object Catalog). The pin in the upper right corner fixates the window in its position or allows it to collapse. The double arrow button in the lower right corner allows to enlarge or collapse the button list on top of it step by step.

- General – This panel contains controls for basic functionality like the picture button for switching boolean actors on or off or the label to display numeric values or even strings.
- Functional – In this area advanced controls can be found to solve advanced tasks. It is possible to control RGB actuators or display their values as well as it is possible to configure and play scenes etc.
- Buttons – Predefined buttons for different occasions can be found in this area.
- Sliders – In order to control and display numeric values several different sliders were integrated.
- Meters – Different types of meters can be used to scale, control or display values in diverse ranges.
- Charts – Chart Controls can be used to analyze or visualize historical data or consumption values of smart meters.
- Libraries – The visualization designer can customize and group Controls and add them to libraries. It is possible to place them from there into new projects or onto several places in one and the same project. Therewith the development process can be accelerated a lot.

8.4. Item Tree

The Item Tree contains the Server Items of the connected server in a tree view (cf. number 6 in figure 3.3). Activating a Server Item shows, if the window is open, this item's properties in "Item properties".

8.5. Search datapoints

The "Search datapoints" window consists of two areas. The Control elements on the top of it and the visualization area below it. The drop down list in the upper left corner allows the user to choose in which property of the server Item should be searched (Item ID or Description). The text box right next to it is to contain a search expression to search for (the syntax of the Microsoft Like-Operator is used). The button with the magnifying glass on it starts the item search. Displayed Server Items can be dragged onto Controls the same way like those from the Item Tree. Highlighting one of the search results with a mouse click will display this item's properties in the "Item properties" window. For locating the "Search datapoints" window refer to number 7 in figure 3.3. This window can be closed with the small cross in the upper right corner or activated and deactivated by the according point in the menu bar (View → Search datapoints). The pin in the upper right corner fixates the window in its position or allows it to collapse.

8.6. Item properties

It is possible to view the Server Item's properties in this window. Not all items do have the same ones. It is also possible to determine whether the item can only be read or is writable. For locating this window refer to number 8 in figure 3.3. This window can be closed with the small cross in the upper right corner or activated and deactivated by the according point in the menu bar (View → Item properties). The pin in the upper right corner fixates the window in its position or allows it to collapse.

8.7. System messages

This window contains all relevant messages concerning the running application. For locating the "System messages" window refer to number 9 in figure 3.3. This window can be closed with the small cross in the upper right corner or activated and deactivated by the according point in the menu bar (View → System messages). The pin in the upper right corner fixates the window in its position or allows it to collapse.

8.8. Alarm list

The alarm list consists of two tabs containing one table each. The tables consist of the following columns:

- Alarm group – The alarm group the alarm was defined in.
- Priority – The priority of the alarm.
- Alarm time – Determines when the alarm occurred or when it was gone.
- Name – The short name of the alarm.
- Alarm text – The description of the alarm.
- Direction – Did the alarm occur or is it gone already?
- Value – TRUE if the alarm is still active or FALSE if the alarm has gone.
- State – Determines whether the alarm is new, acknowledged, suppressed, vanished, or quit.
- Last status change at – When was a change made to the alarm.
- Comment – When changing the alarm state it is possible to write a comment there.
- User – The user who changed the state of the alarm.

It is possible to drag and drop column headers up onto the grouping area of the alarm table to group it. Multiple grouping is possible. A double click on a line allows a user to change the state of an alarm (cf. Dialog 9.6). For locating the Alarm List window refer to number 10 in figure 3.3. This window can be closed with the small cross in the upper right corner or activated and deactivated by the according point in the menu bar (View → Alarm List). The pin in the upper right corner fixates the window in its position or allows it to collapse.

9. Modules

9.1. User

Depending on the application, different users shall be able to control a visualization. Based on the access rights of the user, dedicated actions shall be allowed while others shall be denied. A typical example would be a hotel where the hotel staff is allowed to perform a more broad range of actions than a typical hotel guest.

To satisfy these requirements, the NETx Voyager provides a comprehensive user management. In addition to an administrative user, users with limited access rights can be created. For example, it is possible to specify parts of the visualization as invisible while other parts can be defined as “read only”. In addition, the access rights to dedicated modules (e.g. the calendar module) can also be constrained.

The user management allows the visualization designer to restrict different rights in one and the same project independently for each user. A user declared administrator cannot be restricted. He has always full access rights to all modules and layers. Only administrators can edit the visualization project. Therefore only administrators can set user rights.

The management of the user rights is layer oriented. Each Control can be assigned to one of 1000 layers. For each layer the user gets an access right assigned to. In addition, it is possible to define individual access rights for each module of the NETx Voyager.

The following access rights are available for each layer and module:

- Invisible – The module or the Controls on this layer can neither be viewed nor used.
- Visible only – The module or the Controls on this layer can be viewed but not touched.
- Full control – The module or the Controls on this layer can be viewed and touched.

! Only administrators have access to the user module.

9.1.1. User management

To open the user management dialog, select the menu item “User list” within the menu “User”. The dialog contains a table which lists all currently defined users and their properties. Each line in the table corresponds to one user.

The following menu elements are available in the tool bar of the dialog:

- New – Adds a new user and opens the user parameters dialog.
- Copy – Creates a new user with exactly the same parameters like the original one.
- Delete – Removes the selected user.
- Edit – Opens the user parameters dialog to edit the dialog which is selected.
- Import – Imports users from a Microsoft Excel file.
- Export – Exports users to a Microsoft Excel file.

9.1.2. New user

Within the user management dialog, click the “New” button. A new dialog opens where the user parameters can be specified:

Dialog:	User Properties
User name	Here the name of the user must be specified. The name of the user is also used as login name for the visualization.
Password/Confirm password	Within these two fields, the password of user that is used for authentication has to be set. If an existing user is edited, the button “Set/Change password” is shown instead of these two fields. If this button is clicked, a new dialog opens that can be used to change or reset the user’s password.
Email	This is the email a user can get signified on when an alarm occurs.
Use as default user for visualization	Only one user can be set as default. If a user is set as default user it will be used to automatically log on onto the visualization when the software is run in any of the two visualization modes.

Dialog:	User Properties
User type	The two types of users are “Administrator” or “User”. Only administrators can set user rights, create new users, delete users, edit a workspace/project or even log on into a workspace in editor mode.
Rights	There are two kinds of rights displayed and editable: <ul style="list-style-type: none"> • Layer rights – Here it is possible to adjust the different rights for each layer and user. Restricted rights for administrators are ignored. The export button is to create an Excel file which can be used to adjust the layer rights there in a more comfortable way. With “Import” the changed rights can be imported again. • Module rights – This is the section where the administrator can allow or restrict the access to the modules (i.e. Scenes or Alarms).

9.1.3. Edit user

Select the menu item “User list” within the menu “User”. Double-click on the user that shall be edited. The following dialog is identical with the “New user” dialog (cf. section 9.1.2).

9.2. Eventor

The Eventor provides a user-friendly solution to change datapoints based on specific conditions (time or value based conditions).

The Eventor can be used in online mode during runtime. This means that new events – time or value based – can be created while the software is in visualization mode. These just created events can be set active immediately upon saving.

9.2.1. Create new event

For accomplishing the creation of a new event it is necessary to open the Eventor first. This can be done by either clicking the symbol in the tool bar or pressing the key [F5]. A new window will pop open and offer the user the possibility to create, edit, or delete events.

The items in the tool bar of the upcoming window from left to right:

- Back – Navigate up (within a node in the event tree).
- Forward – Navigate down (within a node in the event tree).
- Add task group – Will add a branch in the tree to contain value- or time based tasks. Task groups are elements to structure the tasks inside the Eventor. They have no actual influence onto any tasks.
- Add value task – Will add a value based task to the actual task group.
- Add time task – Will add a time based task to the actual task group.
- Copy - Copies a task to the clipboard. Does not work for task groups.
- Paste – Pastes a copied task from clipboard into the current task group. Does not work for task groups.
- Delete – Deletes the current task or task group.

9.2.2. Value based event

This kind of events will react to a value of a Server Item and set one or more other items accordingly. It is possible to make a simple comparison or use the hysteresis comparison. The values set to the Server Items in the output list can be applied with a delay. One can also set a time frame for the task.

Comparison

There are two ways to compare the value of the input Server Item; a single comparison to a value or a hysteresis comparison. In the first case the input value will be compared with a fix value. Operands like “<”, “>”, “=”, or similar

ones can be chosen from a drop down list. Should this condition be evaluated to true at runtime the set “True Value” will be applied to all output items in the list. Optionally a “False Value” can be declared for the case of the condition to check wrongly.

Hysteresis

The hysteresis comparison offers an “Upper limit” and a “Lower limit”. If the “Upper limit” is exceeded the “Upper value” will be set. Should the “Lower limit” be exceeded the “Lower value” will be set. Thus the value of the input item is allowed to alter between lower and upper boarder without any value changes.

Delay

Writing to the output items can be delayed. The delay is to be set in seconds.

Recurrence

It defines the schedule for the time frame to recur. It is possible to select between different models of recurrence. Holidays can be explicitly included or excluded.

Input

The input Server Item is the one to be used for the comparison. “Select” will open the item tree where the Server Item can be selected from. The “Description” will hold the content of the Server Item description. “Item ID” will hold path and ID of the Server Item. Both cannot be altered.

Output

Up to ten output items can be defined for one event. To all these items the True/Upper Value will be written.

Current event connection

It is possible to connect a Control to an event. Either in editor moder or in visualization mode right click onto a Control to pull up the context menu. Select “Event Connection” and further “New Connection” to create a new connection to an event. Set a name and select a connected event. Once it has been saved and the application is in visualization mode, the event will write its value also to the Control. The Control will broadcast its value to all send items.

9.2.3. Time based event

This kind of events will be fired when a time has been reached in a defined schedule. The values set to the Server Items in the output list can be applied with a delay.

Time frame

At the start time the event will be fired and the first value will be written to the output items. Optionally a stop time can be defined at which the second value will be written to the output items.

Recurrence

It defines the schedule for the time frame to recur. It is possible to select between different models of recurrence. Holidays can be explicitly included or excluded.

Output

Up to ten output items can be defined for one event. To all these items the Start/Stop Value will be written.

Current event connection

It is possible to connect a Control to an event. Either in editor moder or in visualization mode right click onto a Control to pull up the context menu. Select “Event Connection” and further “New Connection” to create a new connection to an event. Set a name and select a connected event. Once it has been saved and the application is in visualization mode, the event will write its value also to the Control. The Control will broadcast its value to all send items.

9.3. Server Calendar

The Server Calendar allows the user to schedule server based events. These events consist of the timer and an action. The timer contains the information about “when” the event needs to work. An action defines what work has to be done. It consists of commands. The start command is executed at the beginning of an event while the stop

command will be called at the end. The whole event may be set recurring so that it will start and stop over and over at either a daily, weekly, monthly, or even yearly basis. The definition of the actions is done by the visualization designer during the design process of the project. The events with their timers are created by the end user when the project is actually running.

A big advantage of the Server Calendar is that no client connection is necessary to execute any event defined on it. The end user needs to start the client software only to create or administrate the events on the server. Once this is done the client connection can be shut down and the scheduled events on the server still will be executed.

Another positive thing is that multiple clients can manipulate one and the same Server Calendar. Information sent to the server will be distributed immediately to all other connected clients. That way all changes made to the calendar instantly show up at the clients and can be considered for further changes.

To add, modify, and delete events of server based calendars, the dedicated "Server Calendar" control has to be used. More information about this control can be found in section 5.3.7.

9.4. Client Calendar

With the help of the included calendar module, time based events can be defined. To specify these events, a graphical user interface similar to Microsoft Outlook is available. Calendar events can be defined as one time event or as a recurring one.

Calendar entries can be created and modified either by the visualization designer or by the visualization user themselves during runtime. As for all other modules, any datapoint (regardless the underlying technology) can be used for calendar events.

This client calendar will run only as long as the NETx Voyager is running. If any calendar logic is needed when the client software is turned off it is recommended to use the server calendar (cf. section 9.3).

9.4.1. New calendar

Click the MultiCal symbol in the tool bar. A new window will occur. Click "New Calendar" to open a dialog to enter name and description of the new calendar. After confirming with "OK" an entry with the newly given name will appear in the calendar list. A double click will open the calendar to create calendar events.

9.4.2. Calendar events

Navigate through the calendar to the time an event should be created. Mark the time in which the event shall happen. Right click the marked area and select "New Event" of the context menu. The following dialog will appear:

Dialog:	Event parameters
Name	contains the name of the event. This parameter will be shown in the calendar view.
Description	The content of this field describes the event closer. It will also be displayed in the calendar view.
Label	This determines which color the event will be displayed in on the calendar.
Active	Check the box to activate the event. Inactive events will not be fired.
Start time	This determines when the event will be started the first time.
Stop time	This determines when the event will be stopped the first time. It also defines the duration of one occurrence of the event if it is defined as recurring.
Recurrence	This button opens the recurrence dialog to set a schedule for the currently edited event.
Value at	Values for the start and the stop of an event occurrence are defined here.
Comment	Room for notes to the event.

Dialog:	Event recurrence parameters
Time	The start and stop time are defined here.

Dialog:	Event recurrence parameters
Recurrence pattern	<p>It is possible to select from different patterns to let an event reoccur.</p> <ul style="list-style-type: none"> • Daily – depending on the period set to 1, 2, or more; the event will be repeated everyday, every other day, or in larger steps. The second option is to repeat the event on workdays only. • Weekly – depending on the period set to 1, 2, or more; the event will be repeated every week, every other week, or in larger steps. The day pattern (check boxes) determines on what days during an active week the event will be repeated. (e.g. the period is set to 2 and Monday and Thursday are activated, then the event will run on all Mondays and Thursdays every other week) • Monthly – depending on the period set to 1, 2, or more; the event will be repeated every month, every other month, or in larger steps. It is also possible to run the event every second Friday every 3 Months. • Yearly – depending on the period set to 1, 2, or more; the event will be repeated every year, every other year, or in larger steps. The schedule can also be set to every year every 4th Thursday in November (Thanksgiving) or similar dates. <p>All options can explicitly include or exclude holidays. Including holidays means, that the event is not only executed on the days defined by the recurrence but also on all holidays in between. Excluding holidays will result in preventing the execution of the event on holidays even if they were defined as event-days by the schedule.</p>
Period of recurrence	<p>This section describes how often or how long the recurrence is supposed to work. Start defines the first date the event will be run at. It can be set to a date in the past.</p> <ul style="list-style-type: none"> • Infinite – Recurrence will not end. • End after – Recurrence will end after a defined number of times. • End by – Recurrence will end by this defined date.

9.5. Scenes

Using the integrated scene manager, the visualization designer is able to create user defined scenes. To achieve this, the datapoints that shall be part of the scene have to be assigned to it. In addition, the visualization designer is able to specify a datapoint for storing the scene and another datapoint for replaying it. Again, any datapoint can be used. In addition to virtual datapoints that only exist within the server, physical datapoints from different technologies (e.g. datapoints from KNX and datapoints from Building Automation and Control Networking Protocol (BACnet)) can be used at the same time within a single scene.

Storing the current datapoint values and replaying them again (i.e. reestablishing the stored values) can directly be initiated by the visualization user. For this purpose, real datapoints from the field (e.g. a simple switch) as well as virtual datapoints that are only available within the visualization can be used.

9.5.1. Scene module dialog

Click the Scenes symbol in the tool bar. A new dialog will occur. It contains a table which lists all currently defined scenes and their properties. Each line in the table corresponds to one scene.

The following menu elements are available in the tool bar of the dialog:

- New scene – Adds a new scene and opens the scene parameters dialog.
- Copy scene – Creates a new scene with exactly the same parameters like the original one.
- Delete scene – Erases the selected scene.
- Edit scene – Opens the scene parameters dialog to edit the scene which is selected.

- Save scene – Saves the current values of the Server Items into the scene.
- Play scene – Restores the saved values of the Server Items of the scene.

9.5.2. New scene

Within the scene module dialog, click the “New” button. New dialog opens where the scene parameters can be specified:

Dialog:	Scene parameters
Name	The name of the scene shall be set in this field.
Description	The description of the scene can be written into this text box.
Save on	The Server Item in here will be compared to a static operand. If the comparison proof true the scene will be saved. Select the operator in the drop down box and put in a value the Server Items value shall be compared with. “Single Shot” means that the scene is only saved if the result of comparison changes from FALSE to TRUE (i.e. a raising edge is detected). If “Single Shot” is deactivated, the scene is saved if the Server Item changes and the comparison evaluates to TRUE. “Select” opens the item tree to select the Server Item from. “Remove” clears the item.
Play on	The Server Item in here will be compared to a static operand. If the comparison proof true the scene will be played. Select the operator in the drop down box and put in a value the Server Items value shall be compared with. “Single Shot” means that the scene is only replayed if the result of comparison changes from FALSE to TRUE (i.e. a raising edge is detected). If “Single Shot” is deactivated, the scene is replayed if the Server Item changes and the comparison evaluates to TRUE. “Select” opens the Item Tree to select the Server Item from. “Remove” clears the item.
Scene Items	This table contains all the Server Items which participate in the scene. By clicking the “Add” button, the new Server Item has to be selected from the Item Tree. Afterwards, the scene item parameters dialog opens where the user can optionally specify a value for the scene. The button “Remove” will delete the selected item. Finally, the button “Edit” will open the scene item parameters dialog where the scene value can be changed.

Dialog:	Scene item parameters
Datapoint	Here the name and the Item ID of the selected Server Item is shown.
Value	The visualization designer has the possibility to set a pre-defined value of the Server Items within the scene. These values are overwritten, if the values are stored during runtime using the datapoint to save the scene.

9.5.3. Edit scene

Click the Scenes symbol in the tool bar to show the scene manager dialog. Double-click on the scene that shall be edited. The following dialog is identical to the dialog that is used to create a new scene (cf. section 9.5.2).

9.6. Alarms

Defining alarms and monitoring alarm states is an essential requirement within the building management domain. Therefore, the NETx Voyager provides a comprehensive alarm mechanism that can be used by the visualization designer to define any number of alarms. If the corresponding alarm condition is met, the end user is notified. This can directly be done within the visualization by a popup window or by switching to a user defined alarm page or sound. In addition, a notification via e-mail or SMS is also possible.

By means of the provided alarm list, an end user is able to monitor the alarm states. Alarms can be confirmed, acknowledged, or suppressed by the end user. All alarm state changes are logged in a dedicated alarm log file for

further use.

All current active alarms as well as all past alarms and their state changes are displayed in the alarm list of the NETx Voyager (cf. section 8.8). An alarm has a direction: "Came" or "Gone". "Came" means that the alarm appeared. Its conditions are still present (e.g. a door contact is open or a pump is running and the fluid meter is not counting). "Gone" means that the alarm is gone since the conditions are no more present (i.e. the door contact has closed or the earlier mentioned pump was turned off).

In addition, each alarm has an alarm state which can change during the alarm handling process. In NETx Voyager, the following alarm states are possible:

- New – The alarm conditions are met and the alarm appeared.
- Suppressed – The alarm has been suppressed by the user. As long as the suppression is active, new alarms of this type will be suppressed.
- Acknowledged – The alarm was acknowledged by the user.
- Vanished – The alarm vanished since the alarm conditions are no longer met.

Within the alarm list, the user is able to handle alarm and to changes their states. Changing a state can be done by double-clicking the alarm within the active alarm list. By doing this, the following dialog appears:

Dialog:	Alarm handling
Status	In here the user can select the action to be applied to the alarm.
Comment	The user may comment the action to be taken on the alarm in here.

The state transitions that are possible as well as the individual actions that can be done by the user depend on the actual state of the alarm. The following state transitions are possible:

Current state: New		
Action:		New state:
New Alarm	If the input items of the alarm conditions change and the alarm conditions are still met, a new alarm arises and the alarm notification is triggered.	New
Acknowledge	The user acknowledges the alarm and optionally adds a comment.	Acknowledged
Suppress	The user suppresses all further alarms and optionally adds a comment.	Suppressed
Alarm vanished	The input items of the alarm conditions change and the alarm conditions are not meta.	Vanished

Current state: Acknowledged		
Action:		New state:
New alarm	If the input items of the alarm conditions change and the alarm conditions are still met, a new alarm arises and the alarm notification is triggered.	New
Suppress	The user suppresses all further alarms and optionally adds a comment.	Suppressed
Alarm vanished	The input items of the alarm conditions change and the alarm conditions are not meta.	Vanished

Current state: Vanished		
Action:		New state:
New Alarm	If the input items of the alarm conditions change and the alarm conditions are still met, a new alarm arises and the alarm notification is triggered.	New
Quit	The user quits the alarm and optionally adds a comment.	Quit

Current state: Vanished		
Action:		New state:
Suppress	The user suppresses all further alarms and optionally adds a comment.	Suppressed

Current state: Quit		
Action:		New state:
New alarm	If the input items of the alarm conditions change and the alarm conditions are still met, a new alarm arises and the alarm notification is triggered.	New

Current state: Suppressed		
Action:		New state:
Release suppression	The user releases the suppression and optionally adds a comment.	New
*	If an alarm is suppressed, all further actions are ignored.	Suppressed

9.6.1. Alarm module dialog

Click the Alarms symbol in the tool bar. A new dialog will occur. It contains a table which lists all currently defined users and their properties. Each line in the table corresponds to one user.

The following menu elements are available in the tool bar of the dialog:

- New – Adds a new alarm and opens the alarm parameters dialog.
- Copy – Creates a new alarm with exactly the same parameters like the original one.
- Delete – Erases the selected alarm.
- Edit – Opens the alarm parameters dialog to edit the scene which is selected.
- Import – Imports alarms from a Microsoft Excel file.
- Export – Exports alarms to a Microsoft Excel file.

9.6.2. New alarm

Within the alarm module dialog, click the “New” button. New dialog opens where the alarm parameters can be specified:

Dialog:	Alarm parameters
Group name	The drop down list contains all actual alarm groups. New ones can be added by simply typing into this field. Alarm groups which are not in use will be deleted.
Priority	The field holds a user defined numeric value for sorting the alarms in the alarm list according to the users needs.
Name	This field contains the alarm’s name. It will be displayed in the alarm list.
Description	The content of this field describes the alarm closer. It will also be displayed in the alarm list.
Condition	Under which conditions the alarm arises or vanishes is defined here. All conditions are AND-related. This means that all conditions must proof true to have the alarm appear. “Add” puts a new line into the the conditions table. “Delete” removes the currently marked line.
Value	This determines whether the conditions result of the alarm or the value of the given Server Item will be shown in the alarm list. Thus it is possible to display an additional value which might be relevant to the alarm. A possible example would be; an alarm arose because of a faulting cooling device and the additional information is the actual temperature of the cooled area. So now the technician knows how severe the situation is.

Dialog:	Alarm parameters
Unit	This field contains the unit displayed together with the value set in the previous field.
Messaging	<p>Different adjustments can be made here to inform technical personnel when an alarm arises.</p> <ul style="list-style-type: none"> ● Printer – If active the application prints the alarm - properties separated by semicolon - onto the printer which was set up in the workspace parameters (cf. section (10.2)). Depending on the printer either a single line is printed or a whole page. ● Email – “To” contains semicolon divided addresses of those which shall be notified of the alarm. Messages can be sent out “On Appearing” and on “On Vanishing” of the alarm. The outgoing e mail server has to be set up in the workspace parameters (cf. section (10.2)). With “Add” a dialog will appear to add addresses of users to the “To” box. ● SMS – The alarm will be sent to an email-to-sms-provider. “To” shall contain the email address the alarm notification is to be sent to. “Subject” contains the subject of the email. Usually this is the place where user name and password are placed for the email-to-sms-provider. ● “Printer, SMS, E Mail On Reconnecting” – if activated, an alarm notification is sent when the alarm condition is met and the connection to the server is reestablished or the NETx Voyager is started. ● Popup – If active the application rises a popup window when the alarm arises. ● Sound – If active the application plays a sound when the alarm arises. The sound played is the exclamation (alarm) sound of the operating system. ● Switch To Page – If active the application will switch to the defined page.

9.6.3. Edit alarm

Click the Alarm symbol in the tool bar to show the alarm module dialog. Double-click on the alarm that shall be edited. The following dialog is identical to the dialog that is used to create a new alarm (cf. section 9.6.2).

9.7. Processor

If the existing control functionality provided by the field and automation level is not sufficient, the missing functions can be realized at the management level using the NETx Voyager. To achieve this, the so called Processor is available.

If the available mechanisms of the Eventor are not sufficient, the Processor can be used to provide the missing functionality. Using the Processor, predefined or user-specific VBA scripts can be integrated.

The Processor can be used in online mode during runtime. This means, that all scripts and changes can be done while the program is in visualization mode.

Virtual devices are the main parts of the processor. They unite inputs, outputs, script, and the occasion on which the virtual device shall be called. Scripts contain the logic of the processor. In them the inputs are compared, calculations done, outputs set, or any other logic executed.

9.7.1. Processor module dialog

Click the Processor symbol in the tool bar. A new window will occur. The processor dialog consists of two main parts/tabs – a list containing the virtual devices and one containing the scripts. According to which tab is active symbols in the tool bar are enabled or disabled. Starting from the left the following commands are available:

- New device – Opens the parameter dialog for creating a new virtual device (cf. section 9.7.2).
- Edit device – Opens the parameter dialog for editing an existing virtual device (cf. section 9.7.2).
- Copy device – Opens the parameter dialog for editing a copy of the currently marked virtual device and save it under a different name (cf. section 9.7.2).
- Delete device – Erases the currently marked virtual device.
- New script – Opens the dialog to create a new script and edit its logic.
- Edit script – Opens the script dialog to edit an existing script.
- Delete script – Erases the currently highlighted script.

It is possible to activate or deactivate virtual devices in simply checking or unchecking the “Active” box in the list.

9.7.2. Virtual device configuration

Dialog:	Virtual device parameters
Name	Contains the name of the virtual device. This parameter will be shown in the virtual device list.
Description	The content of this field describes the virtual device closer. It will also be displayed in the virtual device list.
Script	This determines which script the virtual device will use and execute onto its inputs and outputs.
Script description	The content of this field describes the used script closer.
Run condition	The condition under which the virtual device will operate. <ul style="list-style-type: none"> • On input value changed – The virtual devices script will be executed at any value change on one of its inputs. • On timer elapsed – The virtual devices script will be executed every specified time period (value given in seconds). • On input and timer event – The virtual devices script will be executed in both cases; either an input value changed or the timer elapsed. • On start event – The virtual devices script will be executed at application start. • On stop event – The virtual devices script will be executed at application stop. • On page event – The virtual devices script will be executed at any page switch while running the application. • On user event – The virtual devices script will be executed at any user change while running the application.
Inputs	This list contains all input items for this virtual device. It can be left empty, it can contain any Server Item, it can be a virtual item, or a static value. Not all input items must be mandatory. Some may be defined optional and therefore may be left empty.
Outputs	The output list contains either Server Items, virtual items, or nothing. Static values are not allowed here (and wont make much sense either). All outputs can be either mandatory or optional depending on the script definition.
Dialog:	Script editor
Name	The name of a script needs to be unique. It is recommended to keep is short but still meaningful.
Description	This field contains further information about the script. Explain the use of the script in here.
Input count	This determines how many inputs are possible to be used for this script.

Dialog:	Script editor
Mandatory	The count in this drop down list defines how many of the previously defined inputs are mandatory.
Output Count	This determines how many outputs are possible to be used for this script.
Mandatory	The count in this drop down list defines how many of the previously defined outputs are mandatory.

9.7.3. Virtual items

Virtual items of the NETx Voyager exist in the processor only. They are not to be confused with with any virtual items inside a server software. Virtual items have the purpose to transfer data from one virtual device to another one without the need to send any data to the server. A virtual item can be set as an output of one virtual device and then be used as an input of another virtual device, thus a cascade of chained virtual devices following each other in the process of execution can be created. The value of a virtual item cannot be viewed directly since it only exists as a bridge between two virtual devices.

9.7.4. Predefined scripts

= (Equal)

The inputs are compared with each other. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison
- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

> (Greater than)

The inputs are compared with each other whether the first operand is greater than the second one. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison
- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

< (Less than)

The inputs are compared with each other whether the first operand is less than the second one. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison
- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

>= (Greater than or equal)

The inputs are compared with each other whether the first operand is greater than the second one or equal to it. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison

- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

<= (Less than or equal)

The inputs are compared with each other whether the first operand is less than the second one or equal to it. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison
- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

<> (Unequal)

The inputs are compared with each other whether the first operand is less than the second one or equal to it. Should the comparison proof true the output is set to true as well, otherwise it is set to false.

Inputs:

- Variant – Input1, the first operand in the comparison
- Variant – Input2, the second operand in the comparison

Outputs:

- Boolean – Contains the result of the comparison

+ (Add)

The inputs are added to each other and the sum set as the result. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first summand of the summation
- Variant – Input2, the second summand of the summation
- ...
- Variant – Input16, the 16th summand of the summation

Outputs:

- Variant – Contains the result of the summation

- (Subtract)

The inputs are subtracted from each other and the difference set as the result.

Inputs:

- Variant – Input1, the minuend of the subtraction
- Variant – Input2, the subtrahend of the subtraction

Outputs:

- Variant – Contains the result of the subtraction

/ (Divide)

The inputs are divided through each other and the quotient set as the result.

Inputs:

- Variant – Input1, the dividend of the division
- Variant – Input2, the divisor of the division

Outputs:

- Variant – Contains the result of the division

*** (Multiply)**

The inputs are multiplied with each other and the product set as the result. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first factor of the multiplication
- Variant – Input2, the second factor of the multiplication
- ...
- Variant – Input16, the 16th factor of the multiplication

Outputs:

- Variant – Contains the result of the multiplication

% (Modulo)

The inputs are divided through each other and the integer remainder set as the result.

Inputs:

- Variant – Input1, the dividend of the division
- Variant – Input2, the divisor of the division

Outputs:

- Variant – Contains the remainder of the division

AND (Conjunction)

The inputs are conjuncted with each other and the result set as the output. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first operand of the conjunction
- Variant – Input2, the second operand of the conjunction
- ...
- Variant – Input16, the 16th operand of the conjunction

Outputs:

- Variant – Contains the result of the conjunction

OR (Disjunction)

The inputs are ORed with each other and the result set as the output. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first operand of the disjunction
- Variant – Input2, the second operand of the disjunction
- ...
- Variant – Input16, the 16th operand of the disjunction

Outputs:

- Variant – Contains the result of the disjunction

XOR (Exclusive disjunction)

The inputs are exclusively ORed with each other and the result set as the output.

Inputs:

- Variant – Input1, the first operand of the exclusive disjunction
- Variant – Input2, the second operand of the exclusive disjunction

Outputs:

- Variant – Contains the result of the exclusive disjunction

NOT (Negation)

The input is negated and the result set as the output.

Inputs:

- Variant – Input1, the operand of the negation

Outputs:

- Variant – Contains the result of the negation

MIN (Minimum)

The inputs are compared with each other and the arithmetic minimum set as the output. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first operand of the comparison
- Variant – Input2, the second operand of the comparison
- ...
- Variant – Input16, the 16th operand of the comparison

Outputs:

- Variant – Contains the result of the minimum comparison

MAX (Maximum)

The inputs are compared with each other and the arithmetic maximum set as the output. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first operand of the comparison
- Variant – Input2, the second operand of the comparison
- ...
- Variant – Input16, the 16th operand of the comparison

Outputs:

- Variant – Contains the result of the maximum comparison

AVG (Average)

The inputs are used to create the arithmetic average which afterwards is set as the output. This script can handle up to 16 inputs.

Inputs:

- Variant – Input1, the first operand of the calculation
- Variant – Input2, the second operand of the calculation
- ...
- Variant – Input16, the 16th operand of the calculation

Outputs:

- Variant – Contains the arithmetic average of the inputs

IF a=b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the "ELSE" branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison
- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the "THEN" value which will be set as output given the fact that the condition proves to be true

- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

IF a<b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the “ELSE” branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison
- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the “THEN” value which will be set as output given the fact that the condition proves to be true
Variant – Eingang3, Wert wird als Ausgang gesetzt falls die Bedingung erfüllt ist (“THEN” Wert)
- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

IF a>b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the “ELSE” branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison
- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the “THEN” value which will be set as output given the fact that the condition proves to be true
- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

IF a<=b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the “ELSE” branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison
- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the “THEN” value which will be set as output given the fact that the condition proves to be true
- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

IF a>=b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the “ELSE” branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison

- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the “THEN” value which will be set as output given the fact that the condition proves to be true
- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

IF a<>b THEN [ELSE]

The first two inputs are compared with each other. Should the condition prove to be true the content of input 3 is set as output. Otherwise the value of input 4 is used. If input 4 is not set or its value be null the “ELSE” branch of the decision is ignored.

Inputs:

- Variant – Input1, the first operand (a) of the comparison
- Variant – Input2, the second operand (b) of the comparison
- Variant – Input3, the “THEN” value which will be set as output given the fact that the condition proves to be true
- Variant – Input4, the “ELSE” value which will be set as output when the condition’s result is false

Outputs:

- Variant – Contains the value of input 3 or input 4 depending on the validity of the condition

9.8. Trending

The aim of the trending module is to monitor and analyze past and future values of datapoints within a certain time period. The main difference between historical values of datapoints that are visualized in the historical data chart and trending of datapoints within the trending graph is the time interval for storing data changes. While data changes of historical datapoints are permanently stored (as long as the NETx BMS Server is running), trending of datapoints can be activated and deactivated within the NETx Voyager during running – restarting the NETx BMS Server is not necessary. Furthermore, enabling and disabling of a trend can be done in the visualization mode of the NETx Voyager by the end user directly – changing the configuration of the NETx BMS Server is not required.

Datapoints that have trending activated can be grouped together. A trending group can be visualized in a trending graph window that shows the trends of the datapoints that belong to the group. In NETx Voyager it is possible to show up to 20 different trending graphs at the same time. This provides the opportunity to compare trending groups and their included trends with each other. Within a trending group, the end user has the opportunity to configure trends – even during runtime. It is possible to change the time interval of the trending and the appearance (e.g. graph type, graph color, interpolation mode). Furthermore, trends can be completely removed from a trending group.

! The trending module needs functionality that is only provided by the NETx BMS Server. Therefore, trending is only possible if the NETx Voyager is connected to a NETx BMS Server.

9.8.1. Enable trending

Activating trending can only be done in visualization mode using the control that is linked to the datapoint(s) that shall be trended. To enable trending, right-click on the control that is linked to the datapoint that shall be trended and select the menu entry “Add Items” within the menu “Trending”. A dialog appears that contains a table that shows all items which are linked to the control:

Dialog:	Select Trending Items
Item ID	This field shows the Item ID of the datapoint within the NETx BMS Server.
Name	Here, the name of the trend that will be shown in the trending graph can be specified. If available the description of the item is proposed as default name.
Selected	This option is used to decide whether this item shall be added to the trending group or not.

Dialog:	Select Trending Items
Start date	The date when the NETx BMS Server shall start storing data changes.
End date	The date when the NETx BMS Server shall stop storing data changes.
Group	Here, the trending group to which the trend shall be added has to be specified. The user is able to select an existing group. In addition, the user may add a new group by simply typing in the new group name into the text field.

If the button "OK" is selected, all selected Items are added to the specified trending group. "Abort" closes the dialog without adding Items to any trending group.

9.8.2. Show/edit trends

A trending group and its trends can be visualized by selecting it within the "Trending" window. The "Trending" window can be shown by choosing the entry "Trending" within the "View" menu or by simply pressing "F8". Within the "Trending" window, a tree is presented that lists all trending groups as well as all associated trends.

To show a trending group within a new trending graph window, either the group or one trend of the group has to be double-clicked. As an alternative, the "Show" button at the right hand side of the row that lists the trend can also be pressed.

Up to 20 different trending graph windows can be opened. On the right hand side of the "Trending" window, a list of all open trending graph windows are shown. This list can be used to move a trending graph to the foreground. The appearance of a trending graph is similar to the Historical Data Chart. The only difference is the "Link" button within the tool bar of the graph. If activated, the time scale is changed together with all other trending graphs where the "Link" option is also activated. This means that if the time scale is changed within one trending graph, the time scale of all other trending graphs are updated, too.

The "Trending" window can also be used to remove or change trends and trending groups. Removing a trending is done by selecting the "Delete" button of the trend. In addition, it is also possible to delete the whole trending group including all associated trends. By selecting the "Settings" button of a trending group, the name of the group can be changed. If the "Settings" button of a trend is pressed, the configuration parameters of the trend can be altered by using the following dialog:

Dialog:	Trending Item Setting
Name	The text box contains the name of the currently chosen trend. This name can freely be chosen.
Item ID	This field defines the item which shall be trended.
Start date	The date when the NETx BMS Server shall start storing data changes.
End date	The date when the NETx BMS Server shall stop storing data changes.
Interpolation	To limit the amount of values that shall be display in one graph view, an interpolation can be selected. The following different interpolation modes can be chosen: "None", "Average", "Minimum", "Maximum", and "Minimum/Maximum". "Average" computes the average of the values within one interpolation interval. "Minimum" takes the smallest value and "Maximum" the largest value. "Minimum/Maximum" is a special mode where the minimum and maximum values is visualized together using a bar. The following text field contains the maximum amount of values that shall be displayed.
Scale factor	The values of the datapoint are multiplied with this factor to exaggerate or flatten their amplitude.
Graph type	The visualization designer can select a certain type of graph from this field. Columns or a Step Line occasionally might be the better choice to display certain values than a Line.
Line color	This field defines the color of the graph.

10. Dialogs

10.1. New workspace

This dialog appears when the user wants to create a new workspace. Some basic information has to be put in. Once the "OK" button is clicked the workspace will be created.

Dialog:	New Workspace
New workspace name	The name of the new workspace is to be filled in here. This name will also be used to create a new folder in the "Workspaces" directory of the program directory. Therefore no special characters like ":", "/", or similar are allowed.
Project type	This defines the type of the project. It has a great impact onto the functionality and the possible platform to display the project. Two project types are possible: <ul style="list-style-type: none">• Voyager – Full functionality available. Recommended for main control.• BMS client – web enabled and can be run on any NETx BMS Client.
Page size	The size of the standard page is defined here. All newly created pages will have this size at start. The size of each page can be altered afterwards at any time. This standard size can be defined by selecting a defined size off of the drop down list or by adjusting a user defined format manually.

10.2. Workspace configuration

Tab:	General
Workspace name	Displays the name of the workspace. It cannot be changed.
Server name	This text box determines the name of the server application/service.
Computer	If left empty "localhost" will be used. Otherwise this text box specifies to which IP address or computer the NETx Voyager should connect. With the "Select ..." button the Connection Properties dialog (cf. section 10.6) will be opened and the values inherited once it is closed again.
Background picture	The picture specifies the background behind the canvas where the controls are placed on. If the text box is empty or filled with "Default" no picture will be displayed.
Background color	The background behind the canvas where the controls are placed on will be colored in the selected color specified here. The pipette tool behind the color can be used to select a color from anywhere on the screen. A click onto the color field calls a color palette to select from directly.
Project type	This defines the type of the project. It has a great impact onto the functionality and the possible platform to display the project. Two project types are possible: <ul style="list-style-type: none">• Voyager – Full functionality available. Recommended for main control.• BMS Client – Web-enabled and can be run on any NETx BMS Client.
Page size	The size of the standard page is defined with width and height. All newly created pages will have this size at start. The size of each page can be altered afterwards at any time. This standard size can be defined by selecting a defined size off of the drop down list or by adjusting a user defined format manually.

Tab:	Messaging
Printer	A printer to use for the alarm printing can be chosen from the drop down list. If a printer is lead by an asterisk it is set as the default printer of the operating system.
Email setup	Here the outgoing e mail server for sending alarm notifications has to be configured.
To	The address the test e mail should be sent to.

Tab:	Messaging
From	The general address used when mails are sent out by the NETx Voyager.
SMTP server	The SMTP Server to communicate with to send a mail from the NETx Voyager.
Port number	The port on the SMTP server to communicate with to send a mail from the NETx Voyager.
Use authentication	If activated, user authentication will be used to connect to the SMTP server.
Log session	The NETx Voyager will log the SMTP session (recommended for maintenance use only).
Username	The user name used to log on onto the SMTP server.
Password	The password used to log on onto the SMTP server.
Test email	By clicking this button an email will be sent out to the address put in the "To" box.
SMS email setup	Here the e mail server of the email-to-sms service provider for sending alarm notifications has to be configured.
To	The address of the SMS Per Email provider the message should be sent to.
From	The general address used when mails are sent out by the NETx Voyager.
Subject	SMS via email usually requires an authentication. This one is usually sent in the subject of the email.
SMTP server	The SMTP server to communicate with to send a SMS per email from the NETx Voyager.
Port number	The port on the SMTP server to communicate with to send a mail from the NETx Voyager.
Use authentication	The NETx Voyager will use user name and a password to log onto the SMTP server.
User name	The user name used to log on onto the SMTP server.
Password	The password used to log on onto the SMTP server.
Test SMS	By clicking this button an email will be sent out to the SMS per email provider.

Tab:	System
Import holiday file	<p>A holiday file can be imported into the system to define what days of the year are considered as holiday. "Overwrite" will replace the former data while "Add" appends the new data to the new one.</p> <p>The format of the holiday file (nxaHoliday.dat) is the date of the holiday followed by a semicolon and the name of the holiday.</p>
Calendar	By clicking the "Update" button holiday-dependent calendar events will be updated.
Tool tips	<p>In deactivating "Show tool tips" they are disabled through the entire visualization.</p> <p>"Built in" or "Customized" tool tips can be used. In order to customize the tool tip a format string needs to be put into the text box below.</p> <p>Example for a customized tool:</p> <p>"Item value: 15" can be achieved in putting the leading text in quotation marks followed by the concatenator "+" followed by the keyword "Value".</p> <pre>"Item value: "+Value</pre>
Visualization mode	<ul style="list-style-type: none"> • Group element borders – Enables displaying the frames around all Controls of a group when the mouse arrow is hovering over one group element and the application is in visualization mode. • Auto close popup windows – If active popup windows will be automatically closed when clicking into an area which is not part of the popup window and the application is in visualization mode.
Border	<ul style="list-style-type: none"> • Show item quality – Displays a red border around the controls that have Server Items with an invalid (e.g. BAD, UNCERTAIN, ...) item quality.

Tab:	Multimedia connection
Enable connection	This determines whether the connection will be active or not..
Destination address	The address of the multimedia station the NETx Voyager will connect to.
Destination port	The port of the multimedia station the NETx Voyager will connect to.
Local port	The port of the local machine the NETx Voyager will listen on to get incoming commands.
Protocol	Currently, only the User Datagram Protocol (UDP) is available for communicating with multimedia devices.
Start command	The Edit button opens a dialog to create or edit the command which will be sent to the multimedia device to connect to it.
End command	The Edit button here opens the dialog to alter the closing command for the multimedia connection.

Tab:	License
Controls	Shows the number of actual and maximum possible placed controls in this workspace.
Pages	Shows the number of actual and maximum possible pages in this workspace.
Alarms	Shows the number of actual and maximum possible alarms put into this workspace.
Calendar	Shows the number of actual and maximum possible entries put into any calendar.
Eventor	Shows the number of actual and maximum possible events put into this workspace.
Scenes	Shows the number of actual and maximum possible scenes put into this workspace.
Virtual devices	Shows the number of actual and maximum possible virtual devices put into the processor.

10.3. System configuration

System specific parameters can be changed within this dialog. These parameters do not have just workspace wide impact but affect the whole NETx Voyager.

Dialog:	System Parameters
Auto reconnect	If it is enabled a lost connection to the server will be automatically reestablished if possible. No manual action is necessary.
Language	This shows the possible languages available. After selecting a different language, the NETx Voyager has to be restarted to apply the change.
Auto scale controls	After placing a Control and putting a Server Item onto it by Drag & Drop the scaling of the axis or value will be adjusted according to the properties of the Server Item. If the maximum value is 100 or 360 the scale factor will be set to 1 and the maximum value of the control will be set accordingly. Should the maximum be 255 the value will be scaled by 1/2.55 and the Control's maximum be set to 100. In case the minimum value of the Server Item is -128 and its maximum 127 the scale factor 1/2.54 is applied and the boarders are set to -50 to 50.

10.4. Page configuration

Page specific parameters can be changed in this dialog.

Dialog:	Page parameters
Name	This name will be displayed in the title bar of the application in editor or visualization mode (not full screen). It also is the name under which the page appears in the drop down list in the tool bar.
Homepage	This determines whether this page is declared to be the homepage or not. One page must be homepage at any time. When the waiting time has elapsed without any user interaction the program will switch to the homepage.

Dialog:	Page parameters
Standby page	Standby page is the page the NETx Voyager will switch to when the virtual standby time has elapsed. Is a waiting time set for the homepage this one will elapse first whereupon the timer for the standby page will run. If 2 minutes are set for the homepage timer and 3 minutes are set for the standby page then the standby page will be reached 5 minutes after the last user interaction. Only one page can be standby page. Homepage and standby page cannot be one and the same. The check box Log off user determines whether the user will be logged off when switching to the standby page or not.
Is master page	If enabled this page functions as a template for all pages deriving from it.
Use master page	Pages where the this option is set derive directly from the master page. Several properties are directly taken over. In addition to the page background and color, controls shown on the master page are displayed and will function exactly like defined on there.
Page color	By clicking onto the pipette the user is able to select a color from anywhere on the screen and use it as color for the page canvas. A click onto the blank area left of it a color of a palette can be chosen.
Page size	The standard drop down list allows the user to select a page size from predefined sizes. Width and height determine the size of the page while switching landscape and portrait also exchanges width and height with each other. The page size applied in the workspace configuration dialog (cf. section 10.2) is applied as the default page size to any new page.

10.5. Layer configuration

Layers are the administrative tools to make controls visible and enabled to the actual logged on user. There are 1000 layers available in the NETx Voyager which each can be adjusted to be visible or not. Controls placed onto a layer a user has no right to access will not be shown on the page.

The dialog to change the layer configuration contains a table which lists all layers and their properties. Furthermore, it is possible to define user rights for individual layers. Each line corresponds to one layer.

Dialog:	Layer parameters
Name	The name and with it the appearance of the layer how it is displayed in the drop down list of the layer parameters dialog and the tool bar. It is very much recommended to use speaking names for the layers.
Enabled in editor	The Controls can be marked, moved and edited on this layer in editor mode of the NETx Voyager. If this option is disabled but the visibility turned on the controls can be seen but not touched by accident. This can make things a lot easier while editing.
Visible in editor	The Controls can be seen in the editor mode of the NETx Voyager.
Enabled in visualization	The Controls can be touched and executed on this layer in visualization mode of the NETx Voyager (except for those user which do not have the necessary rights to execute this layer's content). If this option is disabled, the control cannot be executed. However, the actual state of the assigned items are visualized by the controls.
Visible in visualization	The Controls can be seen in visualization mode of the NETx Voyager (except for those user which do not have the necessary rights to view this layer's content).

10.6. Connection configuration

The NETx Voyager can connect to any server which implements the OPC DA 2.0 Server interface and in addition to this any Server who supports the VNET interface developed by NETxAutomation Software GmbH. It is also possible to connect to a second server in case the first one is not available. This feature allows not just a higher flexibility but a real main-backup-solution up to the management level of any Building Management System (BMS).

Dialog:	Connection parameters
Server name	This field needs to contain the service name of the OPC or VNET server to connect to. It is possible to either type it in or can be inserted automatically by the search feature described below. For using the NETx BMS Server the name "NETx.VOYAGER.SERVER.2.0" has to be used – for the NETx KNX OPC Server name "NETxKNX.OPC.Server.3.5" has to be typed in.
Computer	The IP address or DNS name of the server should be put in this text box. It can be left empty when the server to connect to is on one and the same machine.
Search server	This feature helps the user to search and locate an OPC service to connect to. There is a choice between two search options; Local and Remote. On Local the search is done on the current machine where Remote allows to search on distant computers. When the option Remote is chosen, the user shall enter the IP Address or the DNS name of the distant computer. Once this is done the Search button will display a table of possible OPC services to connect to. Selecting one of them will transfer the service name to the Service text box.
VNET	Using this option, the communication to a NETx BMS Server or to NETx KNX OPC Server is done via VNET instead of using OPC. The VNET port must also be entered. For the NETx BMS Server the default port is 4530 – for the NETx KNX OPC Server the default port is 4531. In combination with a NETx BMS Server or NETx KNX OPC Server, using VNET is recommended since some features (e.g. graphs, server calendar, ...) are only available via VNET.
Backup server	These options are used to configure a backup server. If it is activated, the following text box must contain the IP address or the DNS name of the backup system. All other parameters (e.g. VNET port, server name) are those used for the main server.
Backup extension	This option determines what extension will be added to the client name when connecting to the backup server. In compatibility mode ".BACKUP" will be added. When compatibility mode is turned off the content of the text box will be added. An empty box will cause that nothing is added. This feature is used foremost by the NETx BMS Server or the NETx KNX OPC Server. If the backup extension is sent the clients will be disconnected when the backup server switches back into standby mode. Therewith the clients are forced to connect anew and will connect with the main server first.

A. Appendix

A.1. Tables

Table A.1.: String Format

Key	Encoding
{General Number}	Displays the number as entered, with no rounding and no commas.
{Currency}	Displays the number with a currency symbol in front of the comma (if appropriate), and two digits to the right of the decimal point. Negative numbers are displayed according to the local settings (with leading minus or set in parentheses).
{Fixed}	Displays the number with at least one digit to the left of the decimal separator and two digits to the right.
{Standard}	Displays the number with at least one digit to the left of the decimal separator and two digits to the right and commas (if appropriate).
{Percent}	Multiplies the value by 100 and displays the result with two digits to the right of the decimal point and a percent sign at the end.
{Scientific}	Uses standard scientific notation.
{Yes/No}	Any nonzero numeric value is Yes. Zero is No.
{True/False}	Any nonzero numeric value is True. Zero is False.
{On/Off}	Any nonzero numeric value is On. Zero is Off.
{General Date}	Shows date and time if expression contains both. If expression is only a date or a time, the missing information is not displayed.
{Long Date}	Uses the Long Date format specified in the Regional Settings dialog box of the Microsoft Windows Control Panel.
{Medium Date}	Uses the "dd-mmm-yy" format to display a date according to the local settings.
{Short Date}	Uses the Short Date format specified in the Regional Settings dialog box of the Windows Control Panel.
{Long Time}	Shows the hour, minute, second, and "AM" or "PM" using the "hh:mm:ss" format.
{Medium Time}	Shows the hour, minute, and "AM" or "PM" using the "h:mm AM/PM" format.
{Short Time}	Shows the hour and minute using the "hh:mm" format".
{0}	Mandatory digit placeholder – Display a digit or a zero. If the expression has a digit in the position where the 0 appears in the format string, display it; otherwise, display a zero in that position. If the number has fewer digits than there are zeros (on either side of the decimal) in the format expression, display leading or trailing zeros. If the number has more digits to the right of the decimal separator than there are zeros to the right of the decimal separator in the format expression, round the number to as many decimal places as there are zeros. If the number has more digits to the left of the decimal separator than there are zeros to the left of the decimal separator in the format expression, display the extra digits without modification.
{#}	Optional digit placeholder – Display a digit or nothing. If the expression has a digit in the position where the # appears in the format string, display it; otherwise, display nothing in that position. This symbol works like the 0 digit placeholder, except that leading and trailing zeros are not displayed if the number has the same or fewer digits than there are # characters on either side of the decimal separator in the format expression.
{.}	In some locales, a comma is used as the decimal separator. The decimal placeholder determines how many digits are displayed to the left and right of the decimal separator. If the format expression contains only number signs to the left of this symbol, numbers smaller than 1 begin with a decimal separator. If always a leading zero has to be displayed with fractional numbers, use 0 as the first digit placeholder to the left of the decimal separator instead. The actual character used as a decimal placeholder in the formatted output depends on the number format recognized by the system.
{%}	The expression is multiplied by 100. The percent character (%) is inserted in the position where it appears in the format string.
{,}	In some locales, a period is used as a thousand separator. The thousand separator separates thousands from hundreds within a number that has four or more places to the left of the decimal separator. Standard use of the thousand separator is specified if the format contains a thousand separator surrounded by digit placeholders (0 or #). Two adjacent thousand separators or a thousand separator immediately to the left of the decimal separator (whether or not a decimal is specified) means "scale the number by dividing it by 1000, rounding as needed." Large numbers can be scaled using this technique. For example, this format string can be used "##0," to represent 100 million as 100. Numbers smaller than one million are displayed as 0. Two adjacent thousand separators in any position other than immediately to the left of the decimal separator are treated simply as specifying the use of a thousand separator. The actual character used as the thousand separator in the formatted output depends on the Number Format recognized by the system.
{-}, {+}, {\$}, {(), {}}, {{space}}	Displays the character as is, in the position specified by the format string. To display a character other than one of those listed, precede it with a backslash (\).
{E-}, {E+}, {e-}, {e+}	If the format expression contains at least one digit placeholder (0 or #) to the right of E-, E+, e-, or e+, the number is displayed in scientific format and E or e is inserted between the number and its exponent. The number of digit placeholders to the right determines the number of digits in the exponent. Use E- or e- to place a minus sign next to negative exponents. Use E+ or e+ to place a minus sign next to negative exponents and a plus sign next to positive exponents.
{:}	Time separator. In some locales, other characters may be used to represent the time separator. The time separator separates hours, minutes, and seconds when time values are formatted. The actual character used as the time separator in formatted output is determined by the system settings.
{/}	Date separator. In some locales, other characters may be used to represent the date separator. The date separator separates the day, month, and year when date values are formatted. The actual character used as the date separator in formatted output is determined by the system settings.
{C}	Display the date as dddd and display the time as tttt, in that order. Display only date information if there is no fractional part to the date serial number; display only time information if there is no integer portion.

Continued on next page ...

Table A.1.: String Format

Key	Encoding
{d}	Display the day as a number without a leading zero (1 - 31).
{dd}	Display the day as a number with a leading zero (01 - 31).
{ddd}	Display the day as an abbreviation (Sun - Sat).
{dddd}	Display the day as a full name (Sunday - Saturday).
{dddddd}	Display the date as a complete date (including day, month, and year), formatted according to the system's short date format setting. The default short date format is m/d/yy.
{dddddd}	Display the date as a complete date (including day, month, and year) formatted according to the long date setting recognized by the system. The default long date format is mmmm dd, yyyy.
{w}	Display the day of the week as a number (1 for Sunday through 7 for Saturday).
{ww}	Display the week of the year as a number (1 - 53).
{m}	Display the month as a number without a leading zero (1 - 12). If "m" immediately follows "h" or "hh", the minute rather than the month is displayed.
{mm}	Display the month as a number with a leading zero (01 - 12). If "mm" immediately follows "h" or "hh", the minute rather than the month is displayed.
{mmm}	Display the month as an abbreviation (Jan - Dec).
{mmmm}	Display the month as a full month name (January - December).
{q}	Display the quarter of the year as a number (1 - 4).
{y}	Display the day of the year as a number (1 - 366).
{yy}	Display the year as a 2-digit number (00 - 99).
{yyyy}	Display the year as a 4-digit number (100 - 9999).
{h}	Displays hours in 24hour format numeric without leading zeros (0 - 23). When any Ante/Post Meridian formatting is involved it is switched to 12hour format.
{hh}	Displays hours in 24hour format numeric with leading zeros (00 - 23). When any Ante/Post Meridian formatting is involved it is switched to 12hour format.
{n}	Display the minute as a number without leading zeros (0 - 59).
{nn}	Display the minute as a number with leading zeros (00 - 59).
{s}	Display the second as a number without leading zeros (0 - 59).
{ss}	Display the second as a number with leading zeros (00 - 59).
{tttt}	Display a time as a complete time (including hour, minute, and second), formatted using the time separator defined by the time format recognized by the system. A leading zero is displayed if the leading zero option is selected and the time is before 10:00 A.M. or P.M. The default time format is h:mm:ss.
{AM/PM}	Use the 12-hour clock and display an uppercase AM with any hour before noon; display an uppercase PM with any hour between noon and 11:59 P.M.
{am/pm}	Use the 12-hour clock and display a lowercase AM with any hour before noon; display a lowercase PM with any hour between noon and 11:59 P.M.
{A/P}	Use the 12-hour clock and display an uppercase A with any hour before noon; display an uppercase P with any hour between noon and 11:59 P.M.
{a/p}	Use the 12-hour clock and display a lowercase A with any hour before noon; display a lowercase P with any hour between noon and 11:59 P.M.
{AMPM}	Use the 12-hour clock and display the AM string literal as defined by the system with any hour before noon; display the PM string literal as defined by the system with any hour between noon and 11:59 P.M. AMPM can be either uppercase or lowercase, but the case of the string displayed matches the string as defined by the system settings. The default format is AM/PM.

A.2. Acronyms

BACnet Building Automation and Control Networking Protocol

BMS Building Management System

CSV Comma Separated Value

UDP User Datagram Protocol

USB Universal Serial Bus

VEW Visualization Export Workspace

A.3. Licensing

Two different possibilities are available:

- Hard lock – Hardware based (USB Dongle) security system
- Soft lock – Software based security system

A.3.1. Hard lock

One of the solutions is hard lock. Just insert the USB-Dongle into any USB port in your system and let the hardware driver get installed. The software will automatically recognize and read your license from the USB dongle. It might be necessary to restart the software to make it recognize the license.

! The USB dongle has to be connected at all times from start of the application on. If it is disconnected the correct work of the software will stop after two warnings (which is approximately after 15 minutes).

A.3.2. Soft lock

In this case the software license is assigned to a local code that depends on a checksum of the local hard- and software.

! The local code of the soft lock license can be changed by any major change of hardware (e.g. network adapter) or software (e.g. operating system). After such change it might be necessary to license the software again.

A.3.2.1. Software Licensing

The licensing is processed during start-up of the program. You can either continue in demo mode or press “Enter license tool . . .” to view all necessary information to get a License Code.

Should you decide to continue in demo mode the licensing process can be initiated by starting the “License Manager” from the “Help” menu.

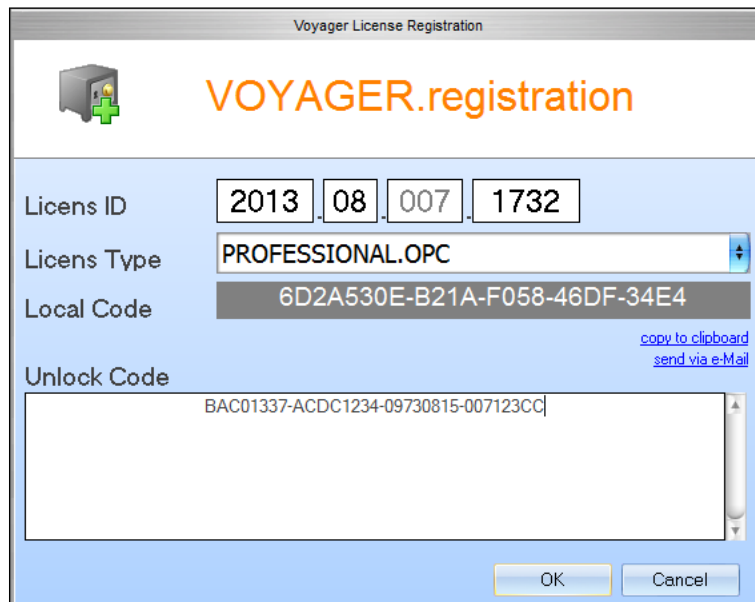


Figure A.1.: Licensing Software

The License Manager will show up with several fields:

- License ID – This block consists of 4 fields. Please fill in the License ID from your invoice.
- License Type – According to your invoice select the type here. Page count and count of displayed elements will depend on it.
- Local Code – This code is calculated from the license type and the existing hard- and software. It is generated automatically.

Once the above listed fields are all filled out with the correct information send an email directly to NETxAutomation Software GmbH by clicking the according link. If there is no access to the Internet, choose the link “copy to clipboard”. Open a text file in which the clipboard content needs to be inserted (usually via [Ctrl]+[V] or “Edit” and “Paste”). Now send it from any other computer by mail to register@netxautomation.com.

The following entries shall be in your clipboard or in your Email:

- License ID
- License Type
- License Code
- Local Code
- Date

Transmit this data to NETxAutomation Software GmbH to receive your “Unlock Code”. Once you got the unlock information insert the code into the bottom field and click “OK”. Make sure you copy the “Unlock Code” without any blanks, tabs or other white spaces. If you receive an error message after the process, check the given data and try the registration again.

! The user executing the licensing software must be local administrator. The program needs to be started as administrator.

A.3.2.2. Software Unlicensing

When it is planned to move the NETx Voyager 5.0 from one system to another or the system will change (hardware upgrade), it is useful to unlicense the software. The unlicensing process can be initiated by starting the “Registration...” from the “Help” menu of the NETx Voyager Editor.

Press the “Transfer/Remove License” button to gain the removal code. Send this code to NETxAutomation Software GmbH to receive the new “Unlock Code” to license the software on the new or upgraded system.

A.3.3. License Count

The NETx Voyager is purchasable in four different main licenses; Home, Basic, Professional, and Enterprise. Each of them features different amounts of Elements, Pages, Elements per page, Eventor Elements, Calendar Elements, Alarm Elements, Scene Elements, and Virtual Devices.

The following table lists the amounts of included features according to the license:

Table A.2.: Licensed features

Feature	Home	Basic	Professional	Enterprise
Elements	400	2500	10000	∞
Pages	20	100	200	∞
Elements per page	400	500	1000	1000
Eventor Elements	50	500	∞	∞
Calendar Elements	50	500	∞	∞
Alarm Elements	50	500	∞	∞
Scene Elements	10	500	∞	∞
Virtual Devices	0	500	∞	∞

A.3.3.1. Feature Explanation

Elements

The amount of Controls (e.g. buttons, images, etc.) possible to use in the application.

Pages

The maximum count of pages the visualization designer may use inside a visualization project.

Elements per page

The maximum number of Controls the visualization designer may use on a single page.

Eventor Elements

The maximum count of events inside the Eventor module.

Calendar Elements

The maximum count of events inside the Calendar module.

Alarm Elements

The maximum count of alarm definitions the visualization designer may implement into one and the same NETx Voyager Project.

Scene Elements

The maximum count of scenes allowed within a NETx Voyager Project.

Virtual Devices

The maximum count of virtual devices possible to use in the Processor module. If it is 0 (zero) the Processor module is not available in this license type.

A.4. Support and Contact

Please send all your support questions to:

support@NETxAutomation.com

If you have general questions regarding the product and service please send your email to:

info@NETxAutomation.com

A.5. System Requirements

A.5.1. Hardware

- Processor: Intel or AMD 1.6GHz (Multicore recommended)
- System Memory: 2048MB
- Harddisk Space: 4GB (8GB recommended)
- Network Adapter: 100 MBit/s
- Screen Resolution: 1280 x 1024 Pixel (for Editor)

A.5.2. Supported Operating Systems

A.5.2.1. OPC/UD Version

- Microsoft Windows XP Professional 32bit Servicepack 3
- Microsoft Windows 7 32bit Servicepack 1
- Microsoft Windows 7 64bit Servicepack 1
- Microsoft Windows 8 64bit
- Microsoft Windows Server 2008 32bit Servicepack 2
- Microsoft Windows Server 2008 64bit Servicepack 2
- Microsoft Windows Server 2008 Release 2 64bit Servicepack 1
- Microsoft Windows Server 2012 64bit

A.5.2.2. Direct(KNX) Version

- Microsoft Windows XP Professional 32bit Servicepack 3
- Microsoft Windows 7 32bit Servicepack 1
- Microsoft Windows 7 64bit Servicepack 1
- Microsoft Windows Server 2008 32bit Servicepack 2
- Microsoft Windows Server 2008 64bit Servicepack 2
- Microsoft Windows Server 2008 Release 2 64bit Servicepack 1

A.5.3. Other

- .NET Framework: 3.5 or higher