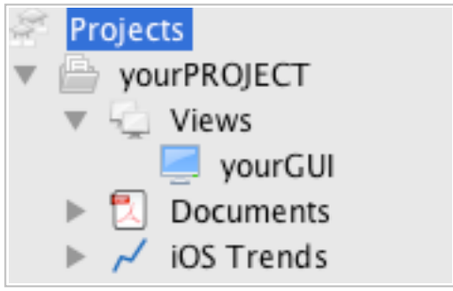
mySCADA

Tutorial:
Getting Started with myPROJECT Designer

by mySCADA Technologies, Jan. 2014



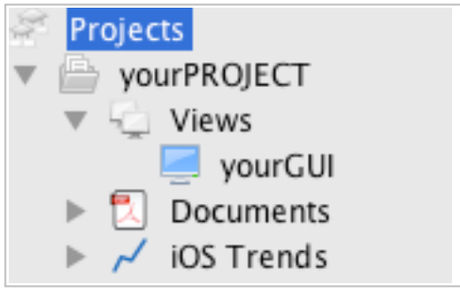
Introduction to myPROJECT Designer

All-in-one Development Platform

myPROJECT Designer is a powerful software tool to develop and setup mySCADA projects for all devices capable of running mySCADA - mobile phones, tablets, desktop PCs or servers. A project is the collections of graphic visualizations - views, trends, alarms, data logs, and scripts.

The aim of this tutorial is to give you a quick guide of the main myPROJECT Designer functions. At the end of this tutorial you learn the most essential techniques for developing your projects. For further information please download the myPROJECT Designer User's Manual from our website www.myscada.org.

mySCADA > Mobile > Compact > Panel > Desktop > Server Series



Workplace

Getting to know your workplace

Main Toolbar

GUI Designer

Properties

Project window

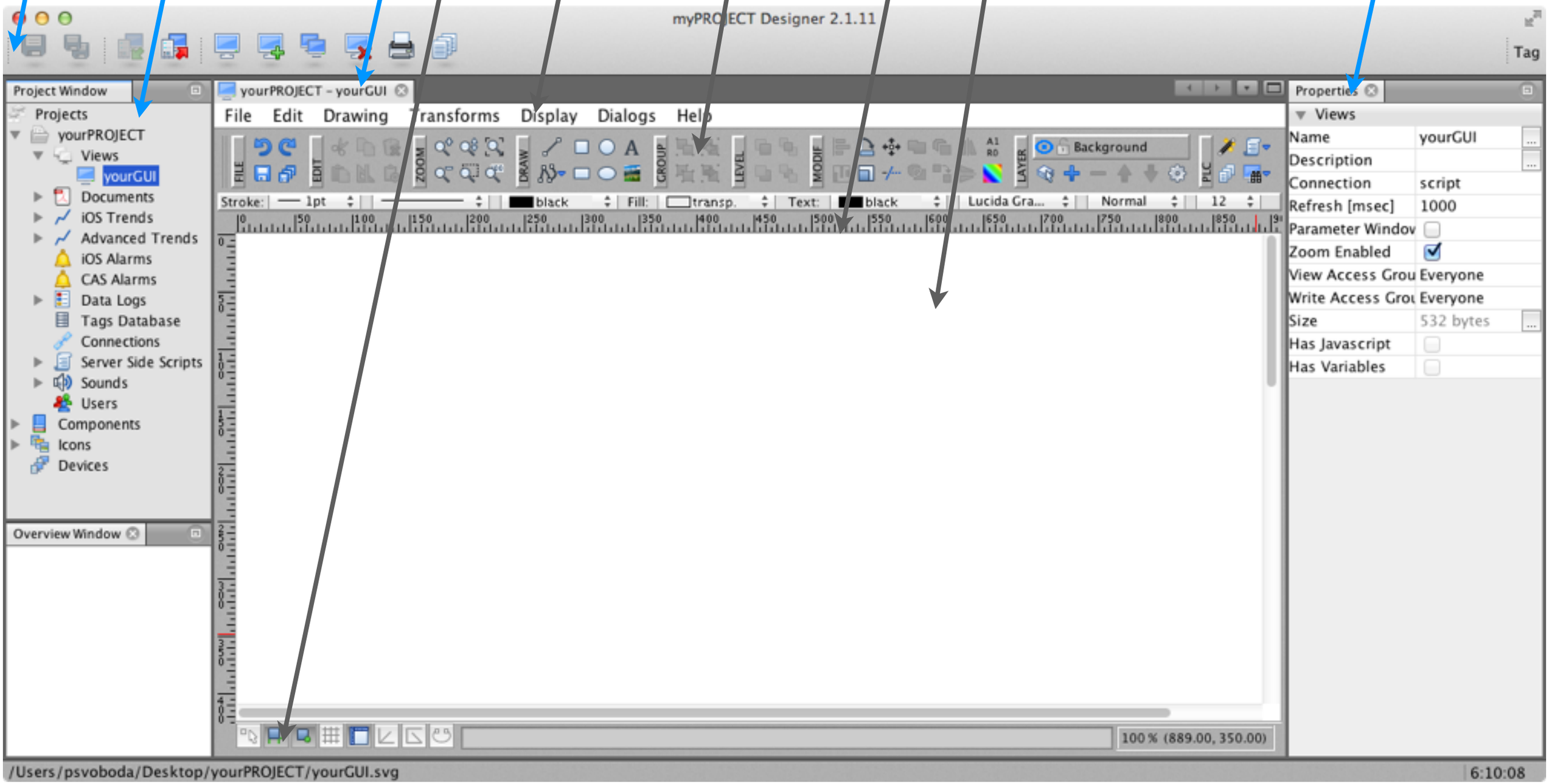
Options

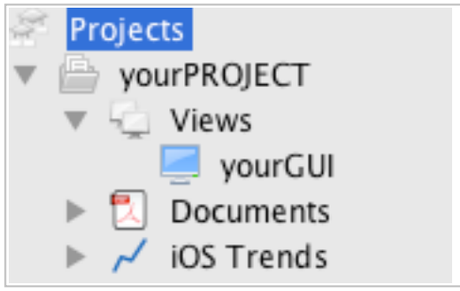
GUI Menu

GUI Toolbar

Rulers

Canvas



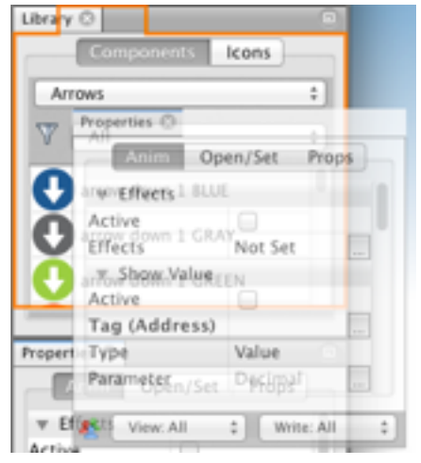


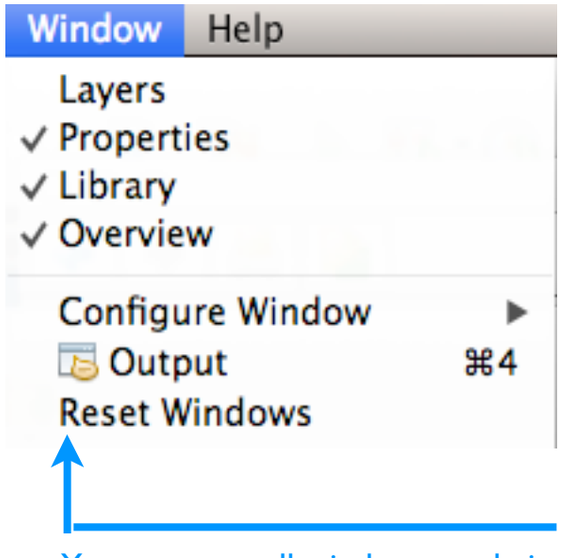
Managing Workplace - Windows

Getting to know your workplace

Each window in the PD appears as a tab in the pane in which it resides. The PD's windowing system enables you to arrange the windows anywhere in your workplace by dragging and dropping. The designer remembers the position of both manually and automatically closed windows the next time they are opened. If you drag a window away from the workplace, it will be undocked. You can dock it back by pressing Alt-Shift-D

To move a window:
1. Click the window header and drag it to the desired position. A red preview box indicates where the window will reside once you drop it.
2. Drop the window.



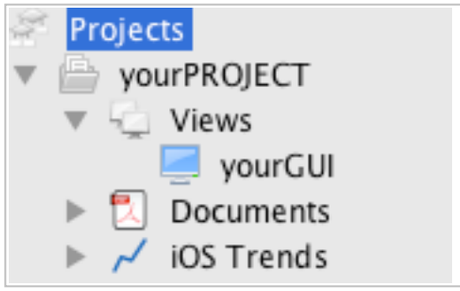


You can reset all windows to their default location by selecting "Reset Windows"

Automatically Appearing Windows:
Some windows only appear when you are performing a task to which they are related. For example, the Library window only appears when you are designing a view in the graphical editor. You can control which windows will automatically appear in the Main Menu -> Windows

Shortcuts

Shift-Escape	Maximize current window
Ctrl-Shift-W	Closes all open documents in the Source Editor.
Alt-Shift-D	Pins a detached window to the IDE.



Creating a New Project

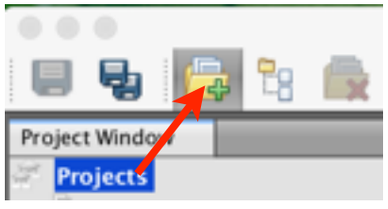
Getting to know your workplace

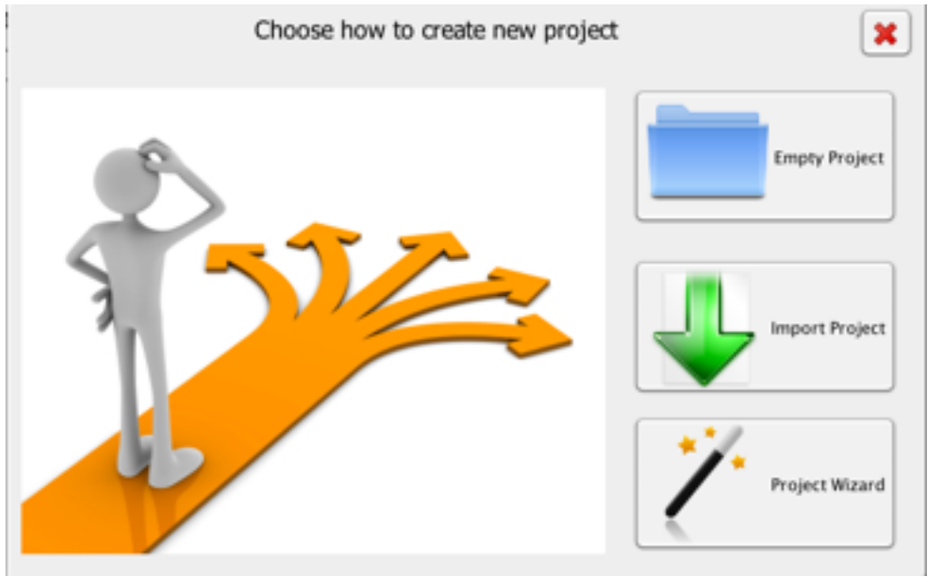
To start working with myPROJECT Designer, you must first create a new project.

- use the "**New Project**" command from the Projects on the main menu to create an empty new project, or

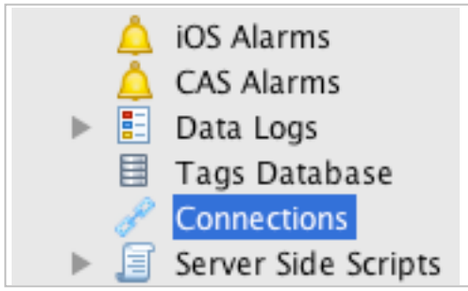
- click the **New Project icon** on the main toolbar to create an empty new project, or

- click the **New Project** on the main toolbar. and select **New Project Wizard.** If you select this option, the wizard guides you through several simple steps to create a functional base of your new project. The wizard creates for you a new PLC connection, set up a simple screen with animations, preconfigure alarms and data logging.





1. Select *Projects* in the Project window.
2. Click the New Project icon on the main toolbar.
3. Select Empty Project or Project Wizard.



Creating PLC Connections

Connecting to your technology

The mySCADA system has built-in all necessary communication drivers for access to PLCs. It is therefore very easy to add and communicate with a new PLC - you do not need to configure the parameters for communication with drivers.

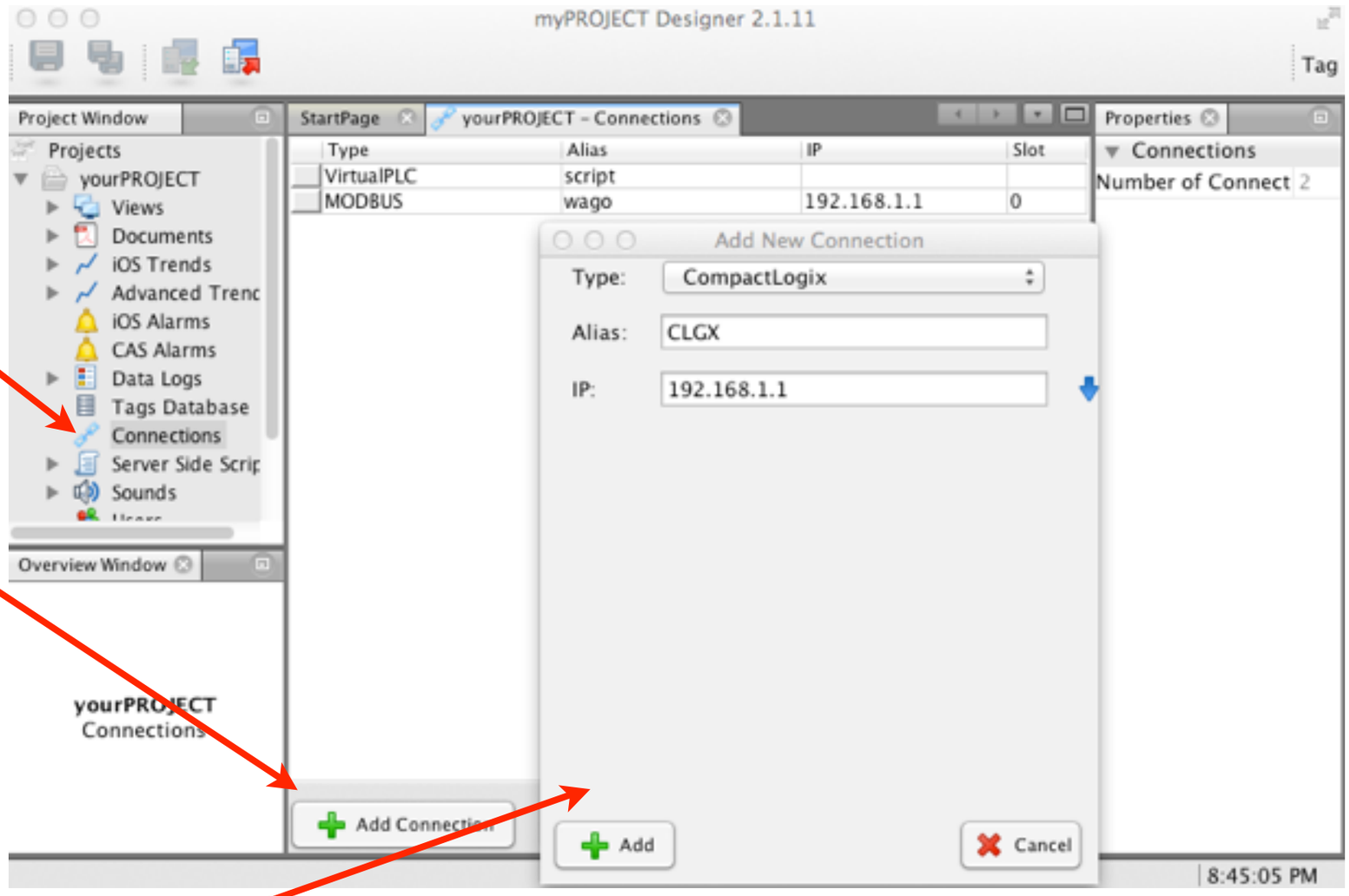
1. Select "Connections" from the Project window tree structure

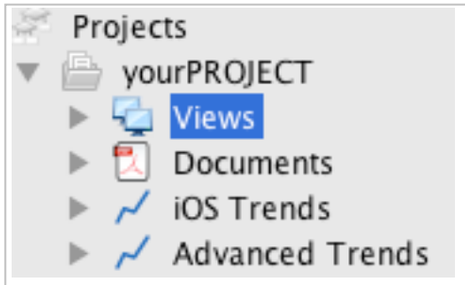
2. Click on the "Add Connection" button

3. Select your PLC type and fill in the

   Alias: arbitrary name of your choice. Under this name you will reference this PLC in whole Project

   IP Address: the IP address of your PLC



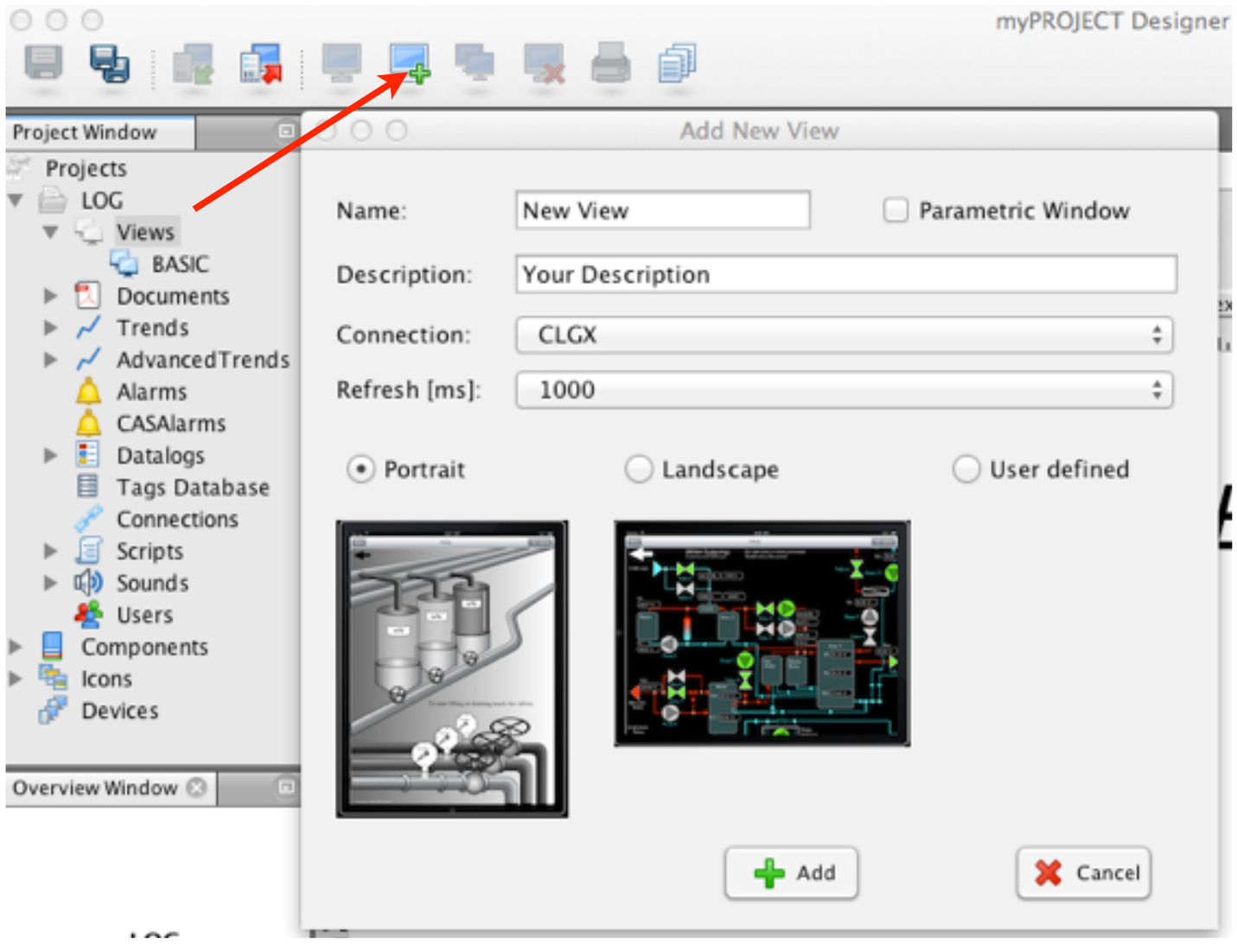


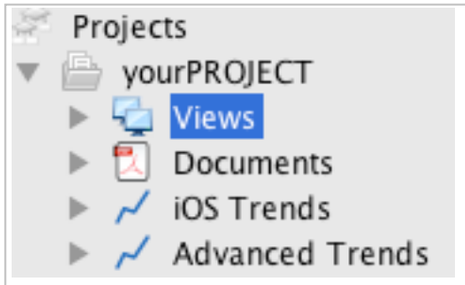
Creating Graphics - Views

Creating Graphics

You can create rich graphic visualizations by designing the views in the integrated graphical editor.

1. First select "*Views*" from the Project Window tree structure.
2. Click on the *Add View* icon on the main toolbar.
3. In the configuration window enter the *Name* of your view and *Description*. You can select the dimensions of your views to suit your needs.
3. Select *Default Connection* to your PLC. to simplify entering of tags.
4. Click on the *Add* button. A new view will be created in the project and you are ready to design your visualization.



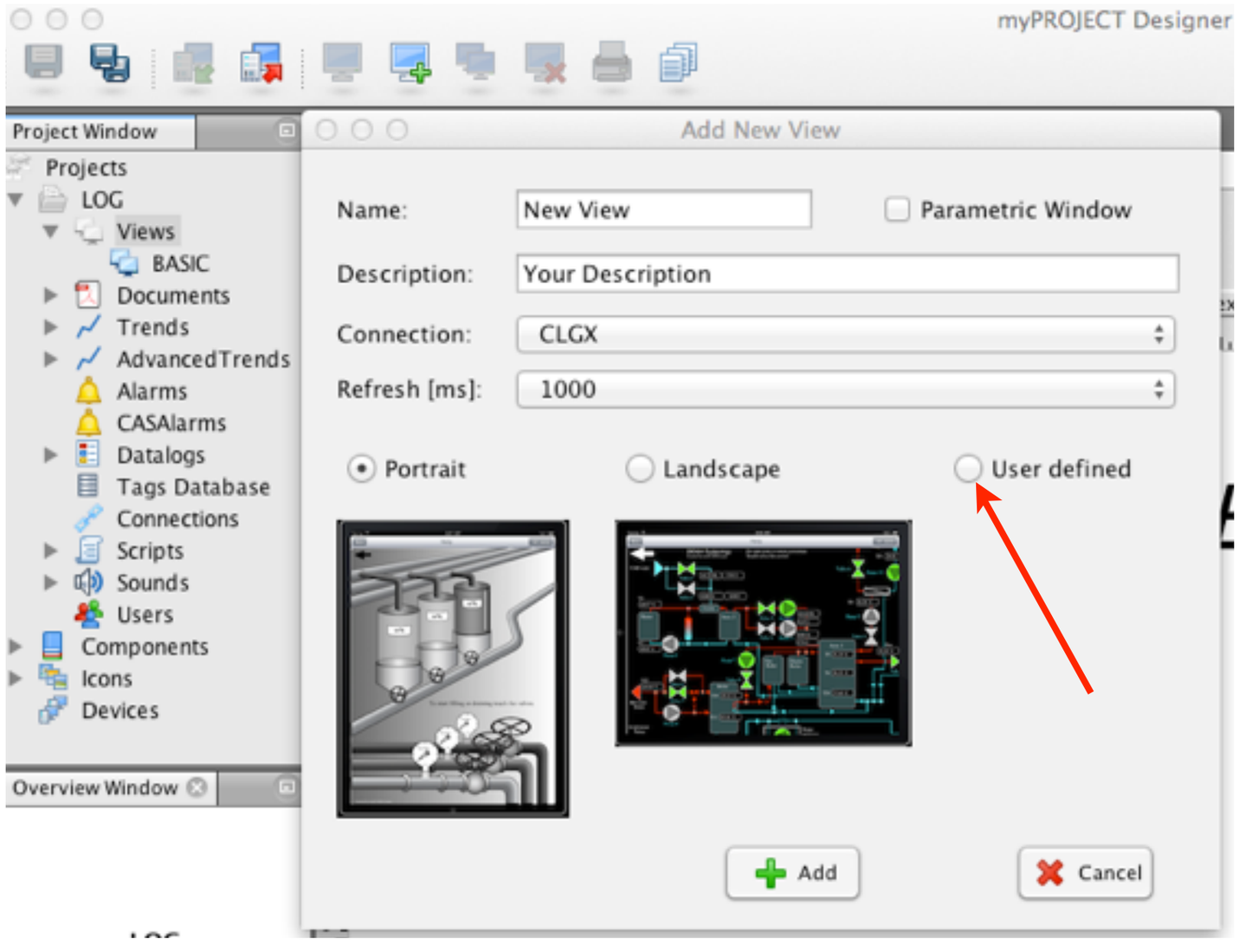


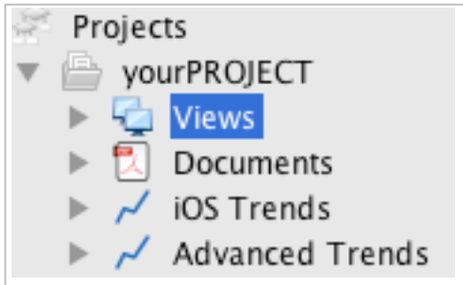
Creating Graphics - Views

Creating Graphics

Choosing the resolution and aspect ratio of your drawings.

mySCADA is based on vector graphics so you do not have to take care of final resolution of your device. However you should design your views with respect to aspect ratio of you devices. You can change default resolution and aspect ratio by clicking on “User defined” in Add New View dialog.





Layouts & Views

Creating Graphics

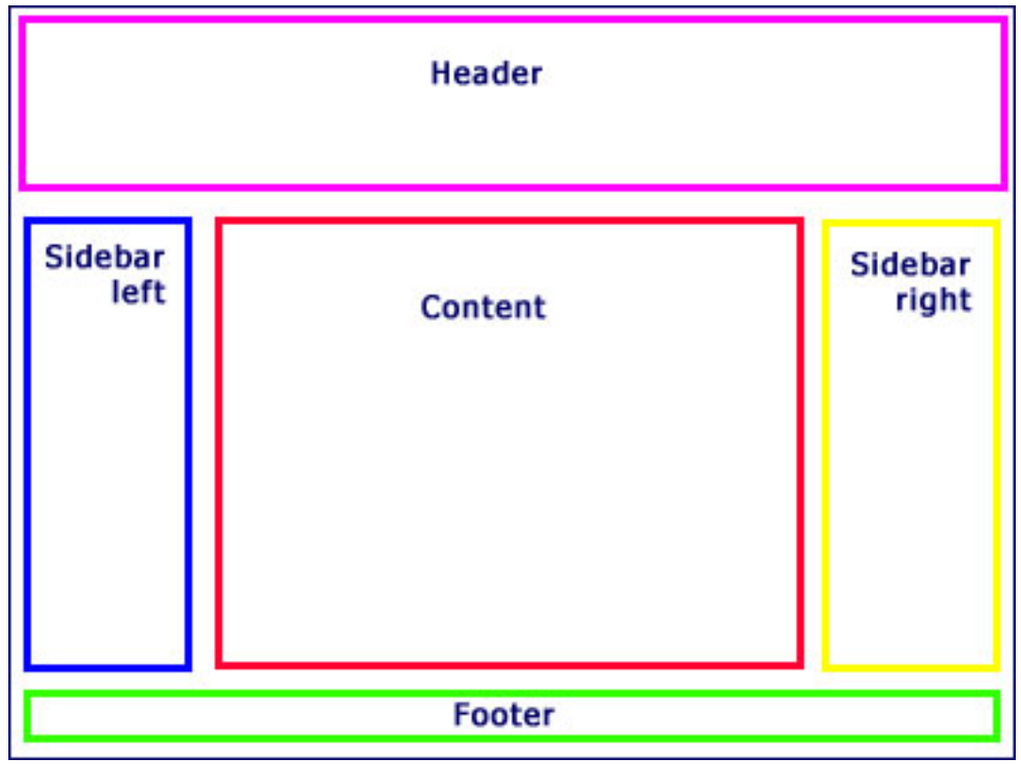
Page Layout defines the arrangement and style of content on a page. You can create multiple user defined layouts in mySCADA Designer. Each view you create can use different layout.

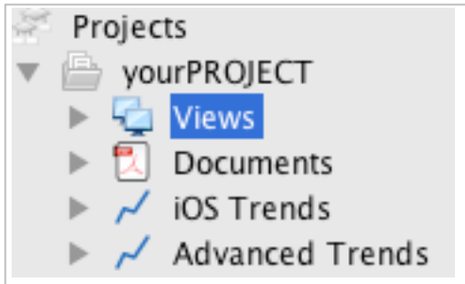
Header - the section of the page at the top which can display for example the logo, name, logged user and often the main menu.

Main Content - the section of the page where your views will be displayed. This section sits prominently in the middle of the page.

Sidebar Left/Right - the columns on either side of the main content section. The sidebar can display secondary menus, pictures, etc. or can be used for control buttons or gauges.

Footer - a bar spanning across the bottom of the page..



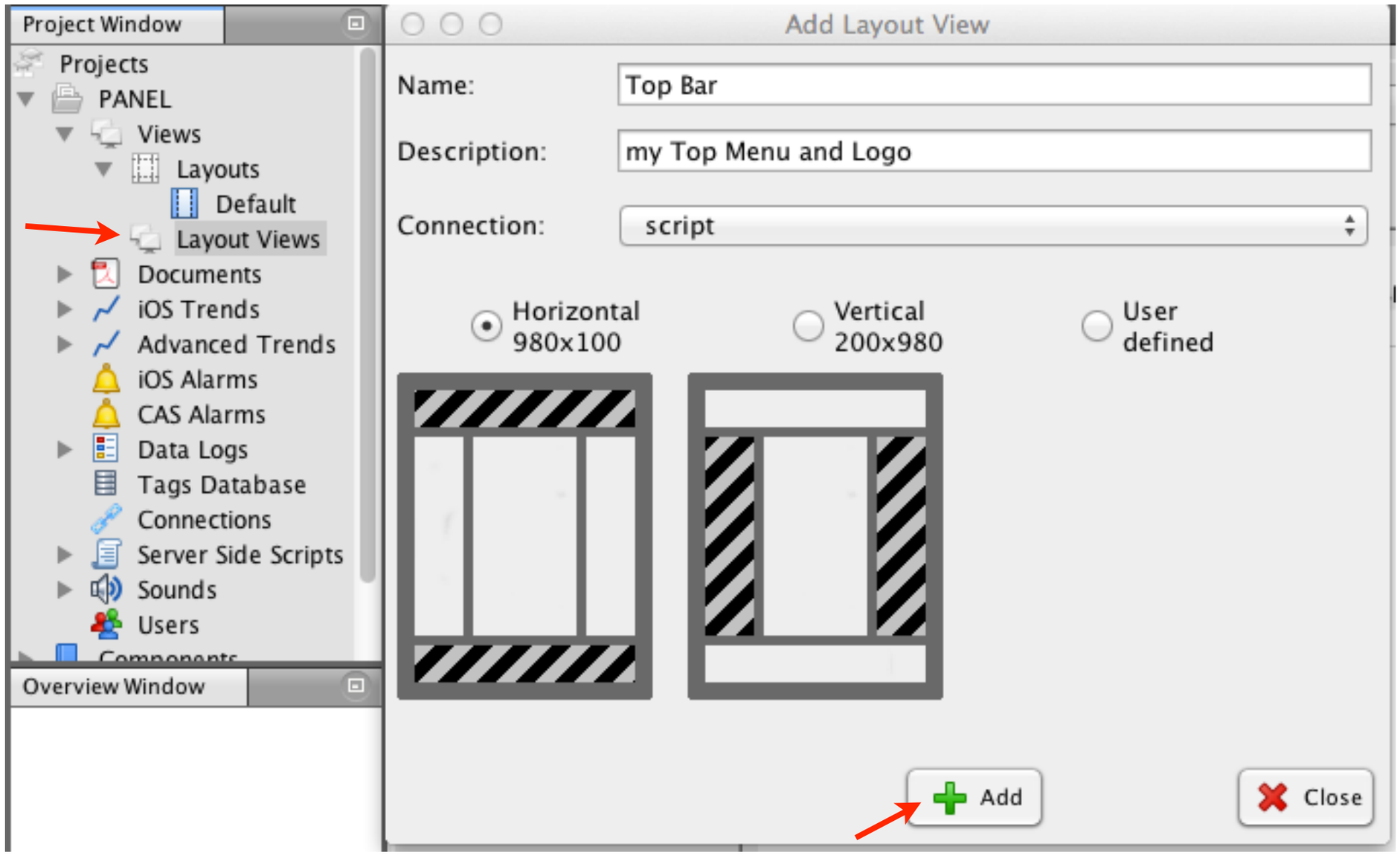


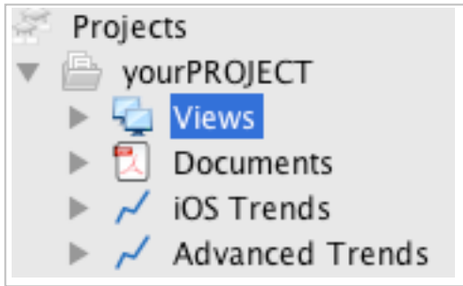
Layouts & Views

Creating Graphics

To use layouts you must first create layout views. Layout view is behaving exactly as regular view, therefore you can use any functionality such as animations, effects and scripts.

- select Views -> Layout Views
- click on Add Layout View
- Fill in the name and click Add button



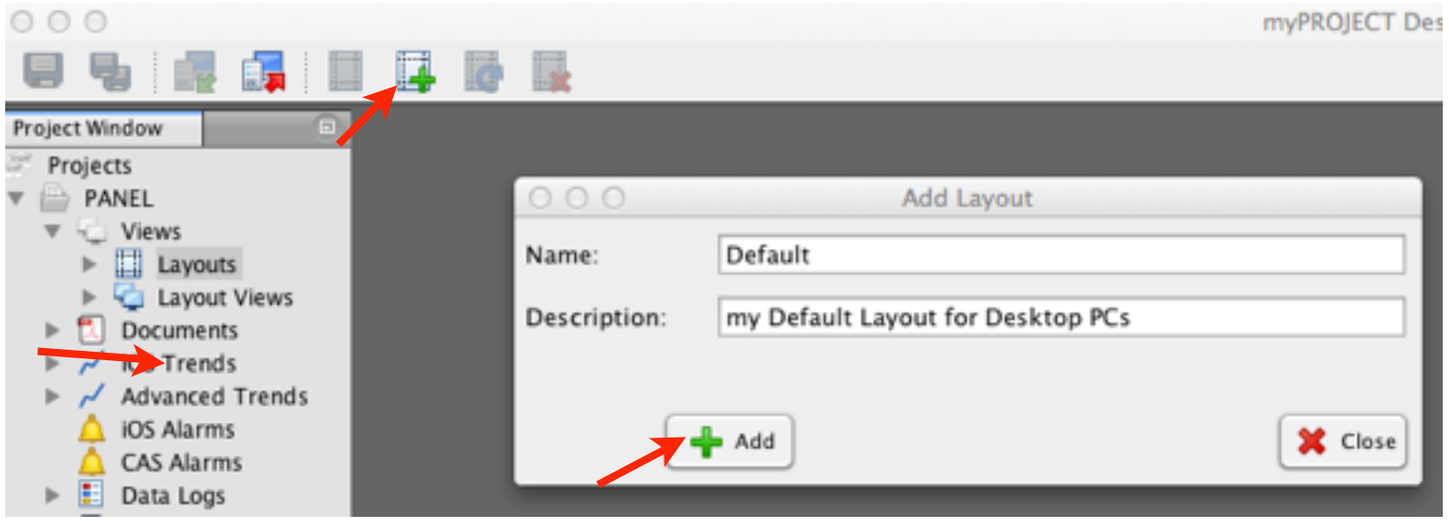


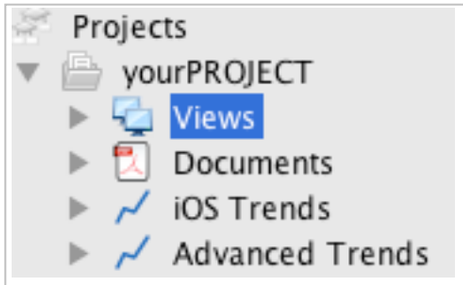
Layouts & Views

Creating Graphics

Creating new layout:

- select Views -> layout
- click on Add Layout
- Fill in the name and click Add button





Creating Graphics - Layouts & Views

Creating Graphics

Specifying details of the Layout

Project Window
Projects
PANEL
Views
Layouts
Default
Layout Views
Documents
iOS Trends
Advanced Trends
iOS Alarms
CAS Alarms
Data Logs
Tags Database
Connections
Server Side Scripts
Sounds
Users
Components

Overview Window
PANEL
Views
Layouts
Default

Default – Layouts

Top
View: none
Spacing: 0 Enabled Scaled Sliding

Top part - custom header

Left
View: none
Spacing: 0
Enabled
Scaled
Sliding

Left Side

Overlay
View | Spacing | Enabled | Scaled | Sliding
none | 0

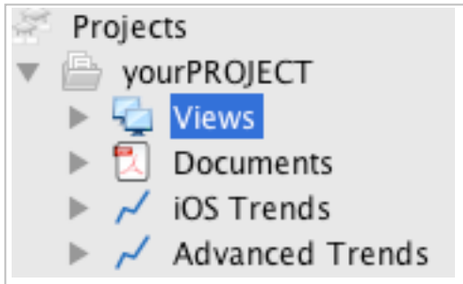
Here you can specify multiple views which will be displayed on top of view using this layout

Right
View: none
Spacing: 0
Enabled
Scaled
Sliding

Right Side

Bottom
View: none
Spacing: 0 Enabled Scaled Sliding

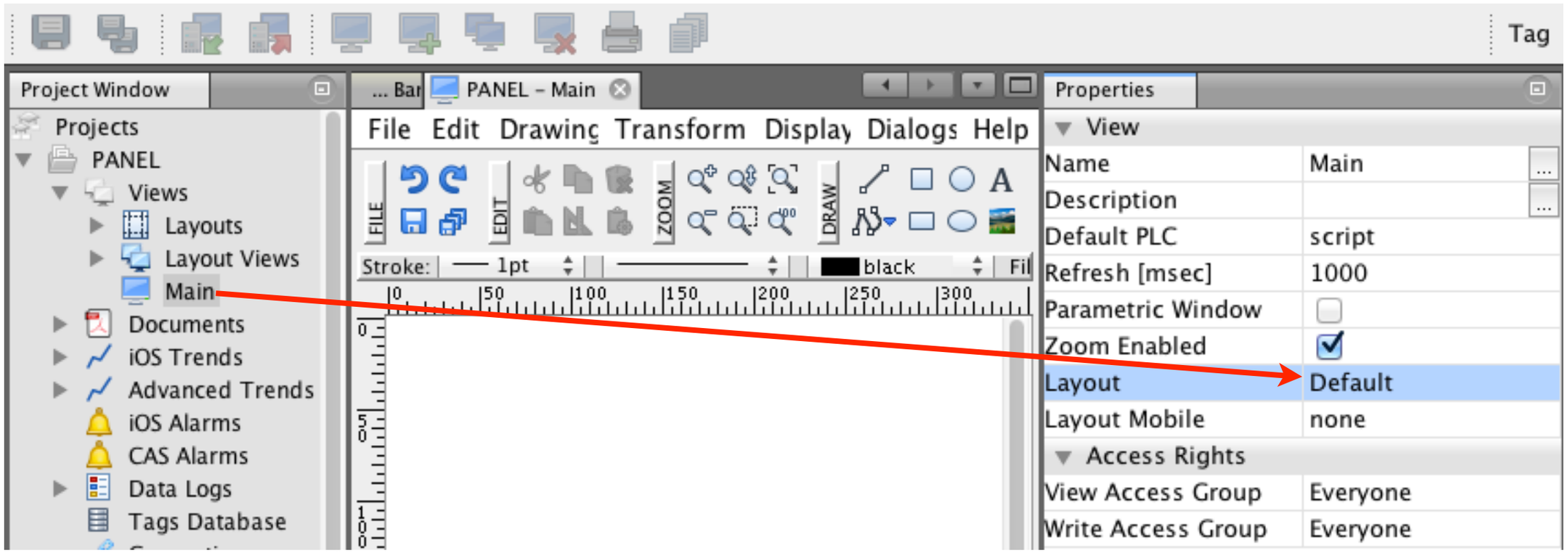
Bottom part - custom footer



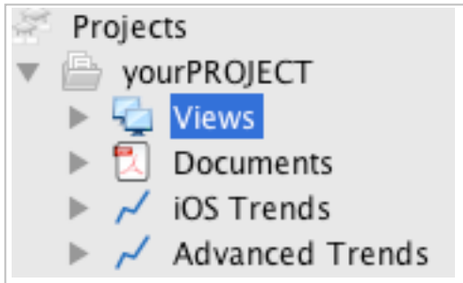
Creating Graphics - Layouts & Views

Creating Graphics

Using configured layout in views.



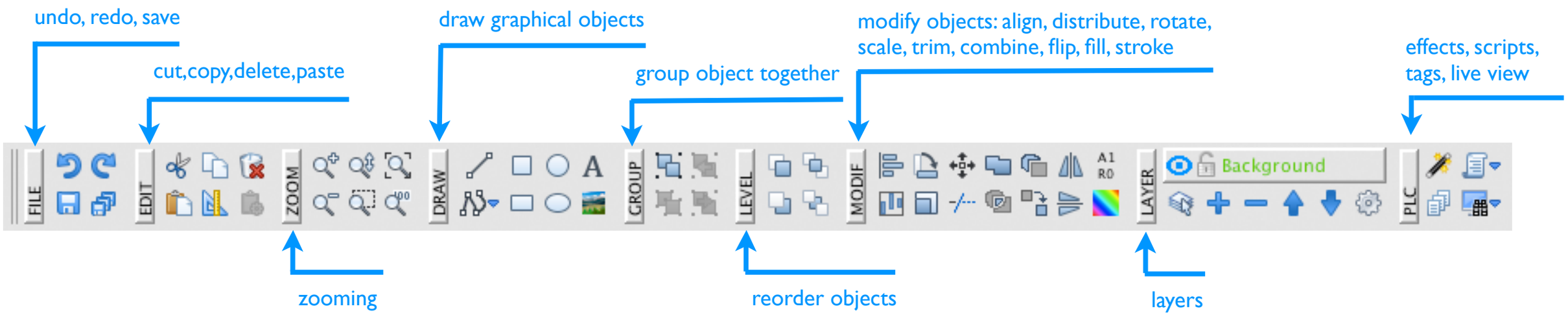
- select view you would like to apply layout to
- in *Properties* select *Layout* from drop down combo box



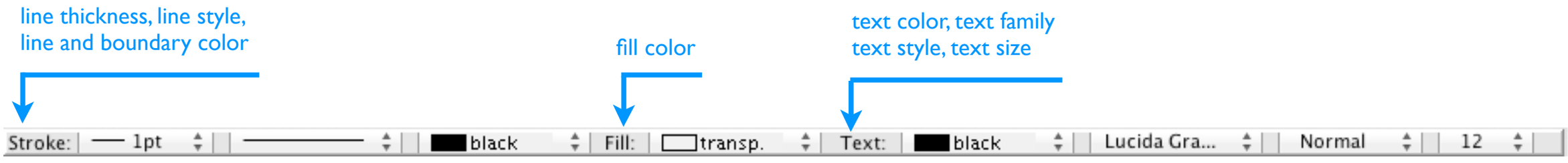
GUI Toolbar

Creating Graphics

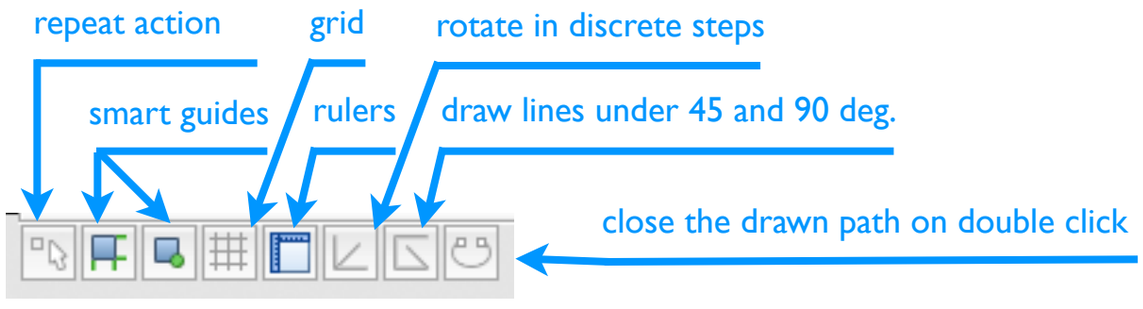
In the upper part of your view window you see the secondary GUI Toolbar where you find all the necessary functions for designing and animating views.



Properties Bar is located under the GUI toolbar. If no object is selected, you specify the default properties of the object to be created. If you select an object, you see its current properties and can modify them.



Options Bar is located in the lower left part of your window.

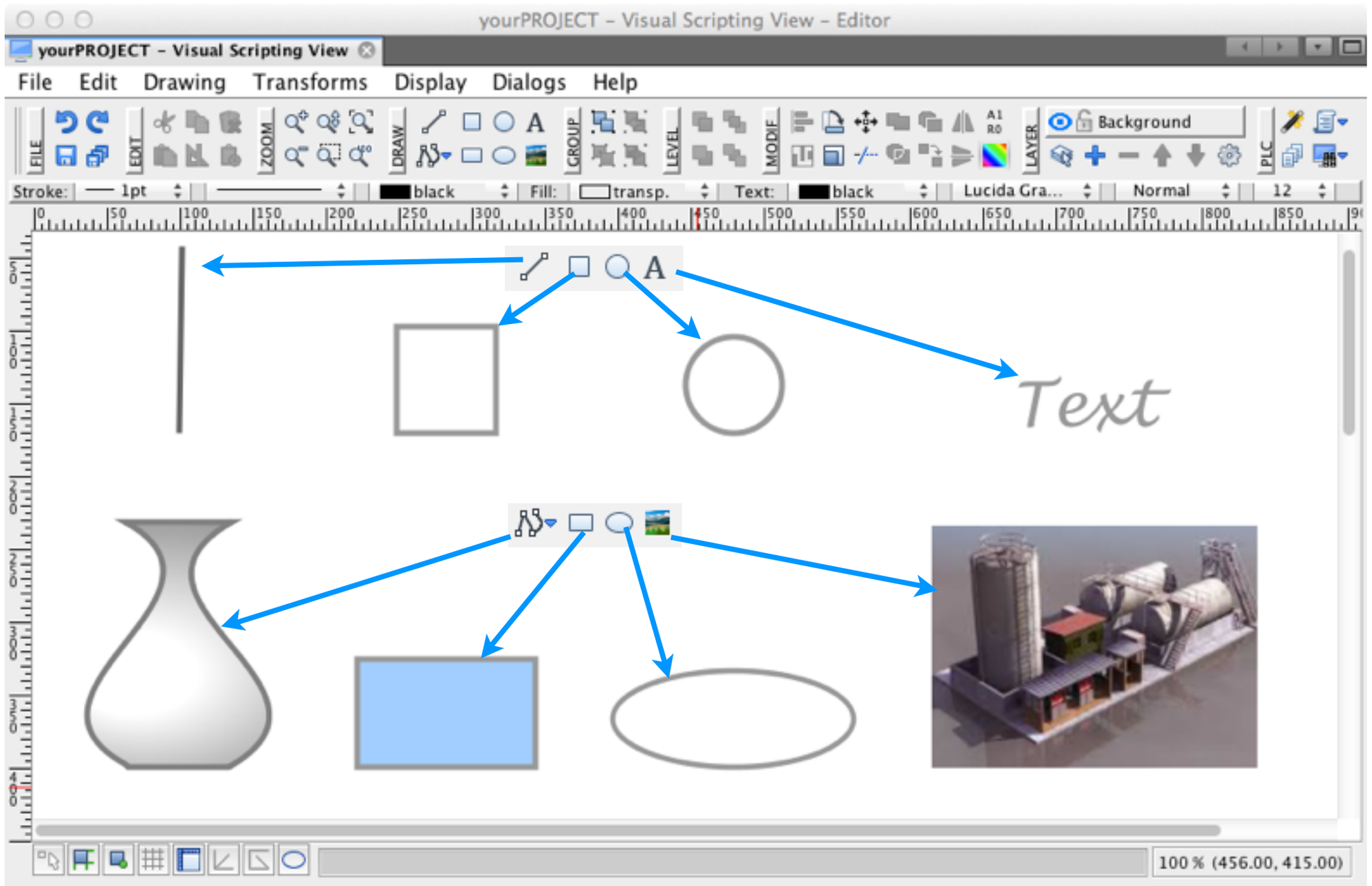


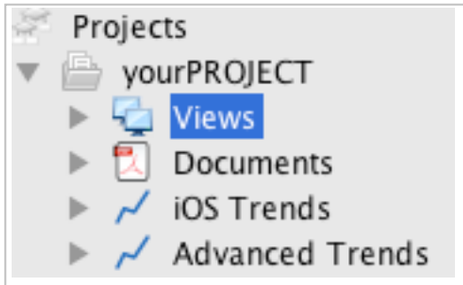
Projects
yourPROJECT
Views
Documents
iOS Trends
Advanced Trends

Drawing Primitives

Creating Graphics

In the DRAW section on the GUI Toolbar, you can choose a shape to draw: line, poly-line, square, rectangle, circle, ellipse, text or arbitrary image from file.



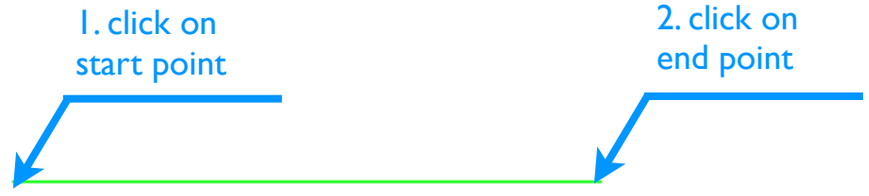


Drawing Poly-lines

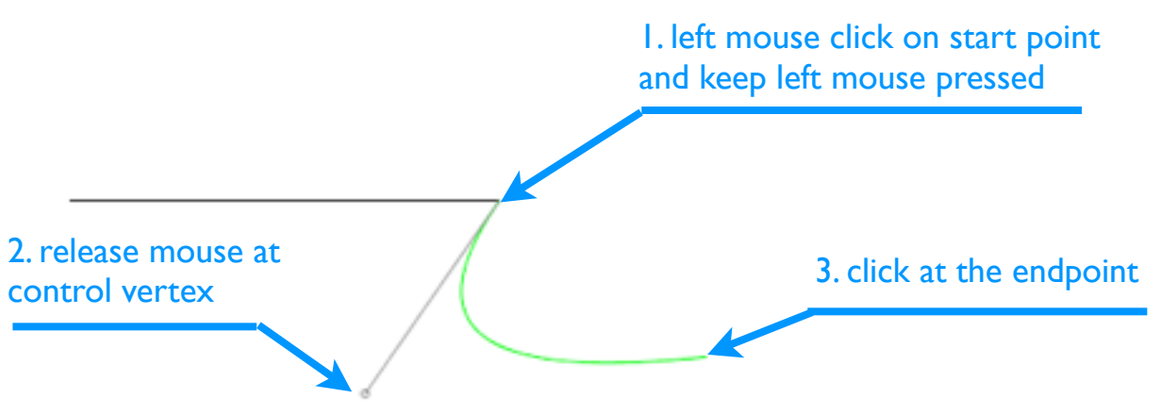
Creating Graphics

Using a poly-line, you can create independent and continuous lines, arcs, splines or any of their combinations.

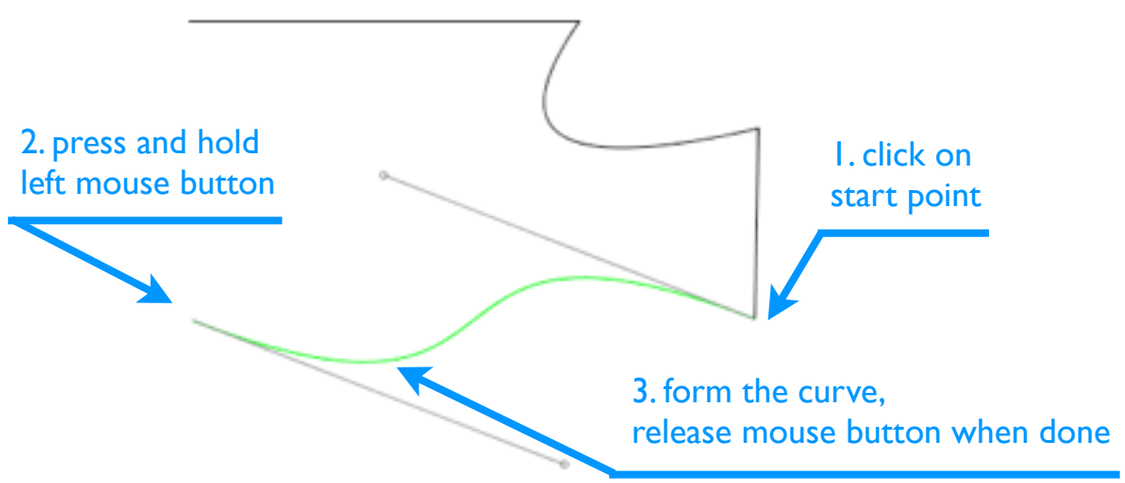
Create line: single click at the start and then at the end point of the line.

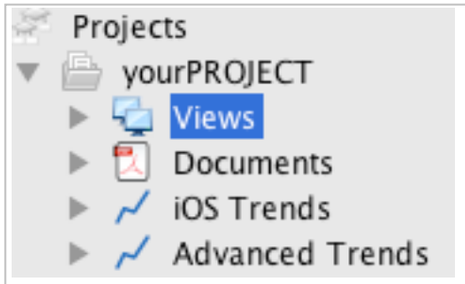


Create arc: keep left mouse button pressed since the starting point, release it at the control vertex point and finally click at the end point.



Create spline: start spline by a regular mouse click, move a mouse to an endpoint, press and hold a left mouse button while forming the curve. Release mouse to finish the spline creation.

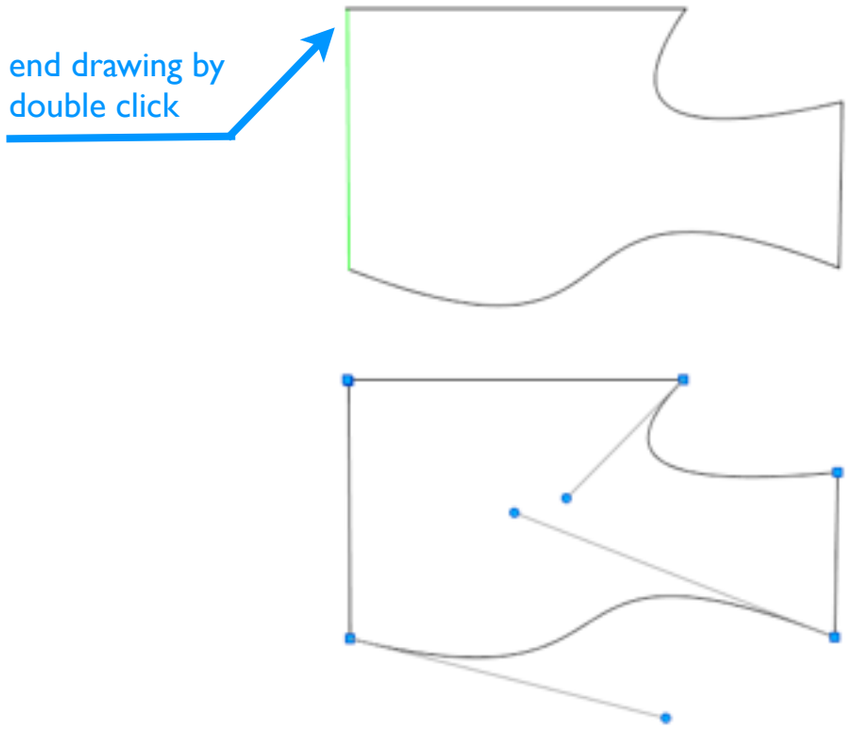




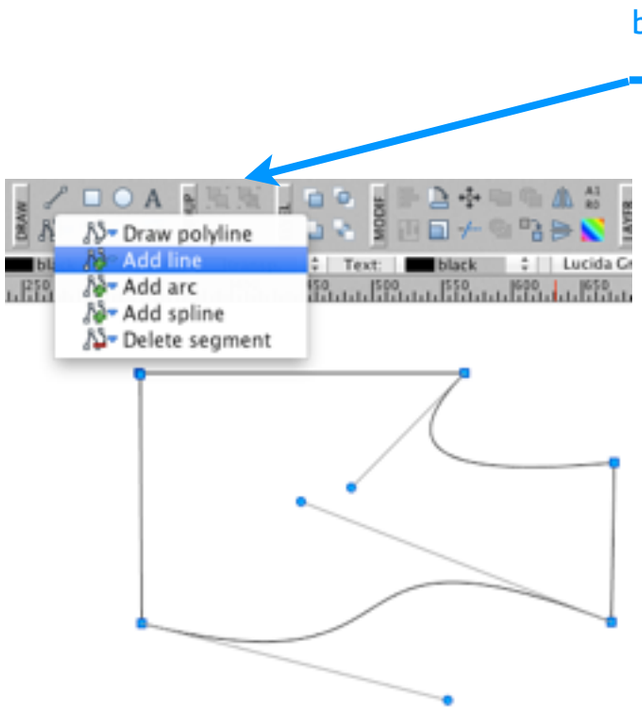
Drawing Poly-lines

Creating Graphics

End the poly-line drawing by double mouse click or by pressing the ESC key.



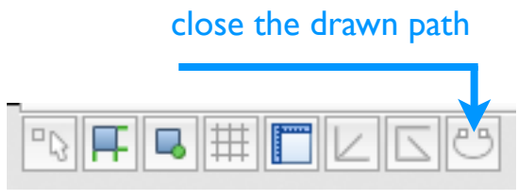
When is the final object drawn, you can see all your end points, control and vertex points. You can modify them by mouse dragging.

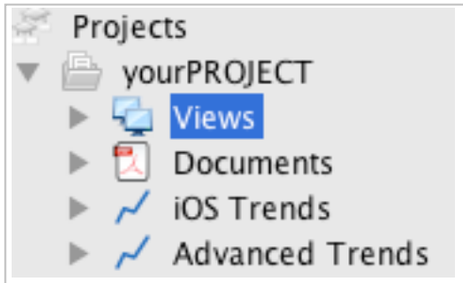


Adding a segment:
choose the segment you would like to add from the options menu. Click on the control point on the poly-line where you want to add the segment.

Delete a segment:
choose "Delete segment" from the options menu. Click at the end control point of the segment you would like to remove.

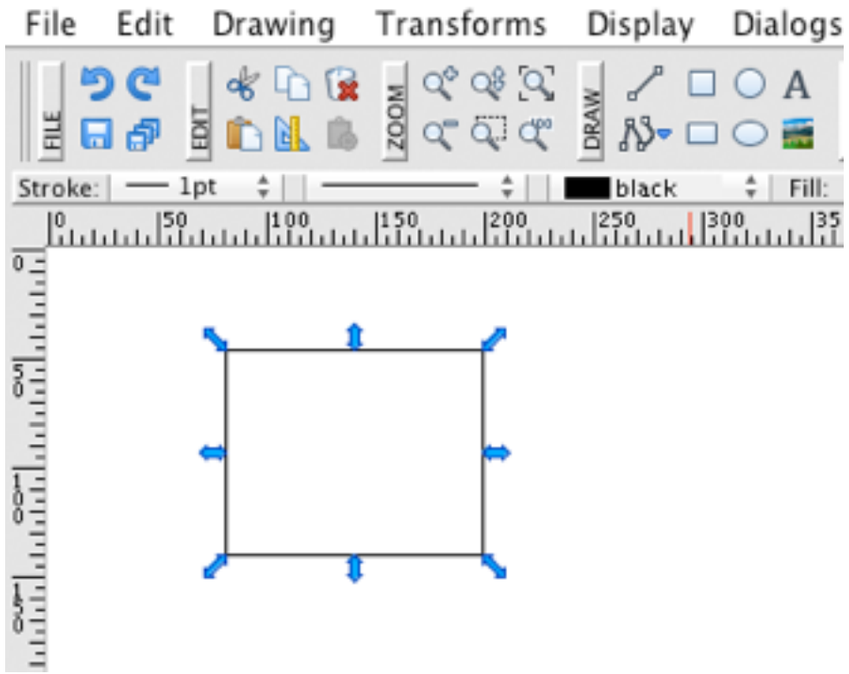
Close the path option on the Options Bar: if this option is active, all your drawn poly-lines are automatically closed.



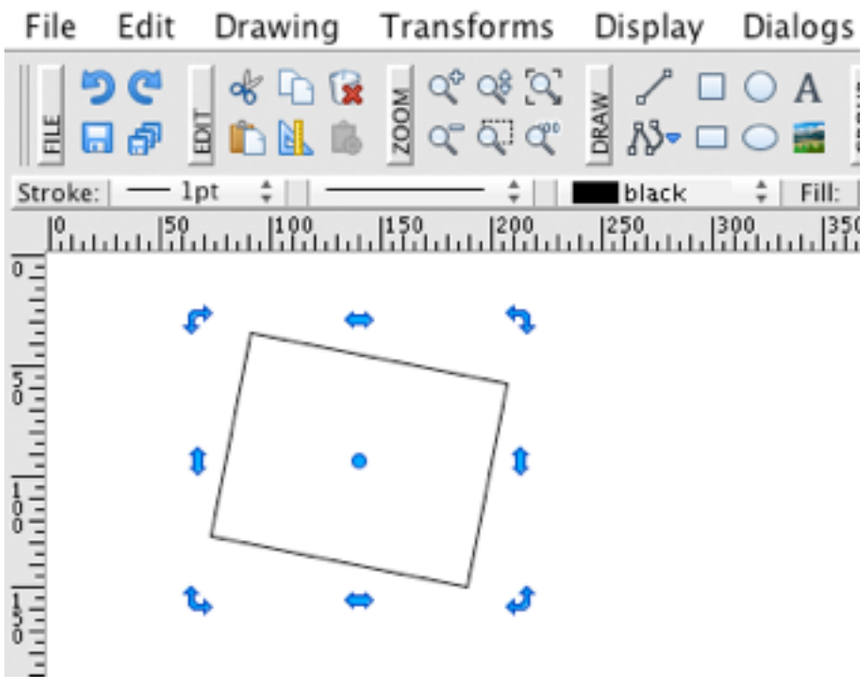


Selecting, Changing Size and Rotating

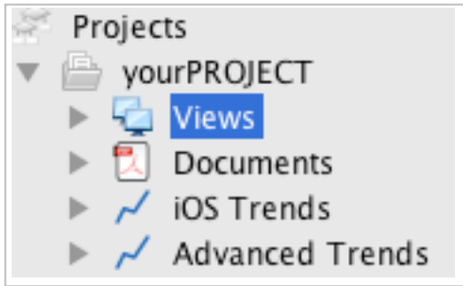
Creating Graphics



- you select an object by a single mouse click
- the selection is indicated by blue arrows around the selected object.
- by dragging the arrows you can change the size of the selected object



- a second click on the selected object activates the rotation option
- the rotation option is indicated by rotational arrows around the boundary of the selected object
- drag the arrows to rotate the object around the blue rotation centre point
- you are free to move the rotation centre point to customize the rotation to your preferences

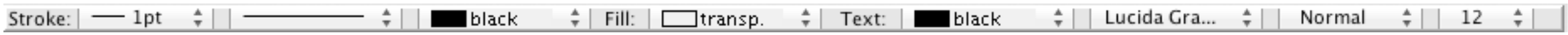


Using Properties Bar

Creating Graphics

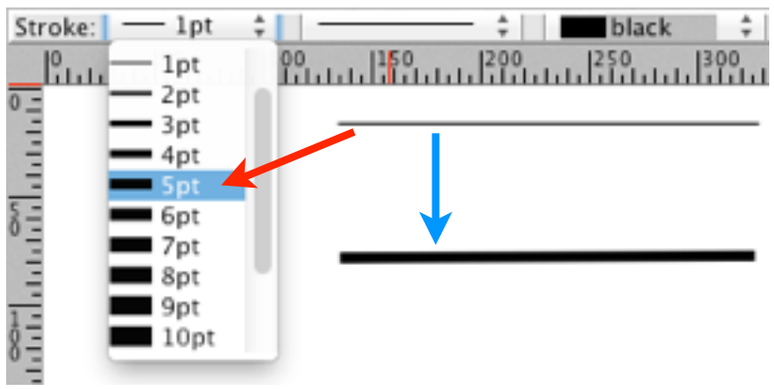
Properties bar allows you to view or change the properties of selected objects or set default drawing properties such as fill and stroke color, line type and thickness, font type, family and size.

If no object is selected, the properties bar shows properties for newly created objects. In following example, all new objects you draw will have transp. fill and black solid line stroke:

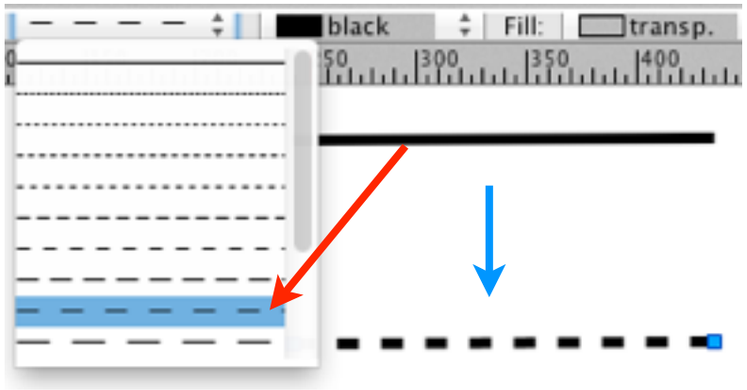


If you select a specific object, the properties bar shows its current properties and you can easily modify them. Properties bar works even for multiple selected objects - you can easily change the properties of multiple objects at once.

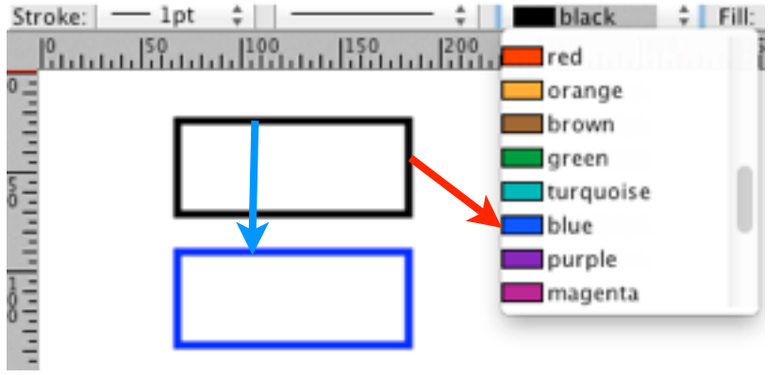
Stroke width:



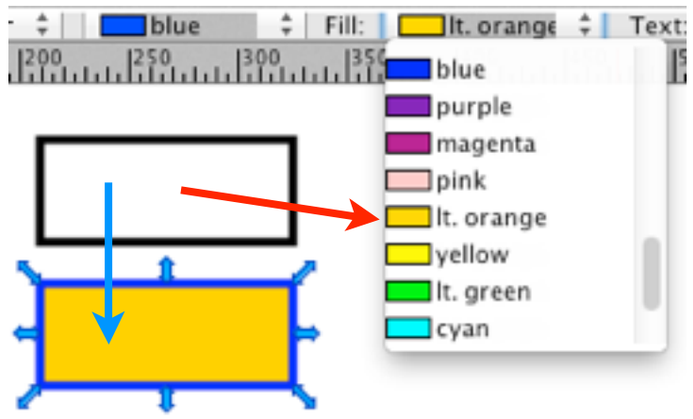
Line style:

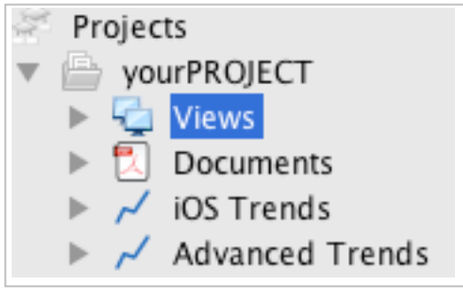


Stroke color:



Fill color:

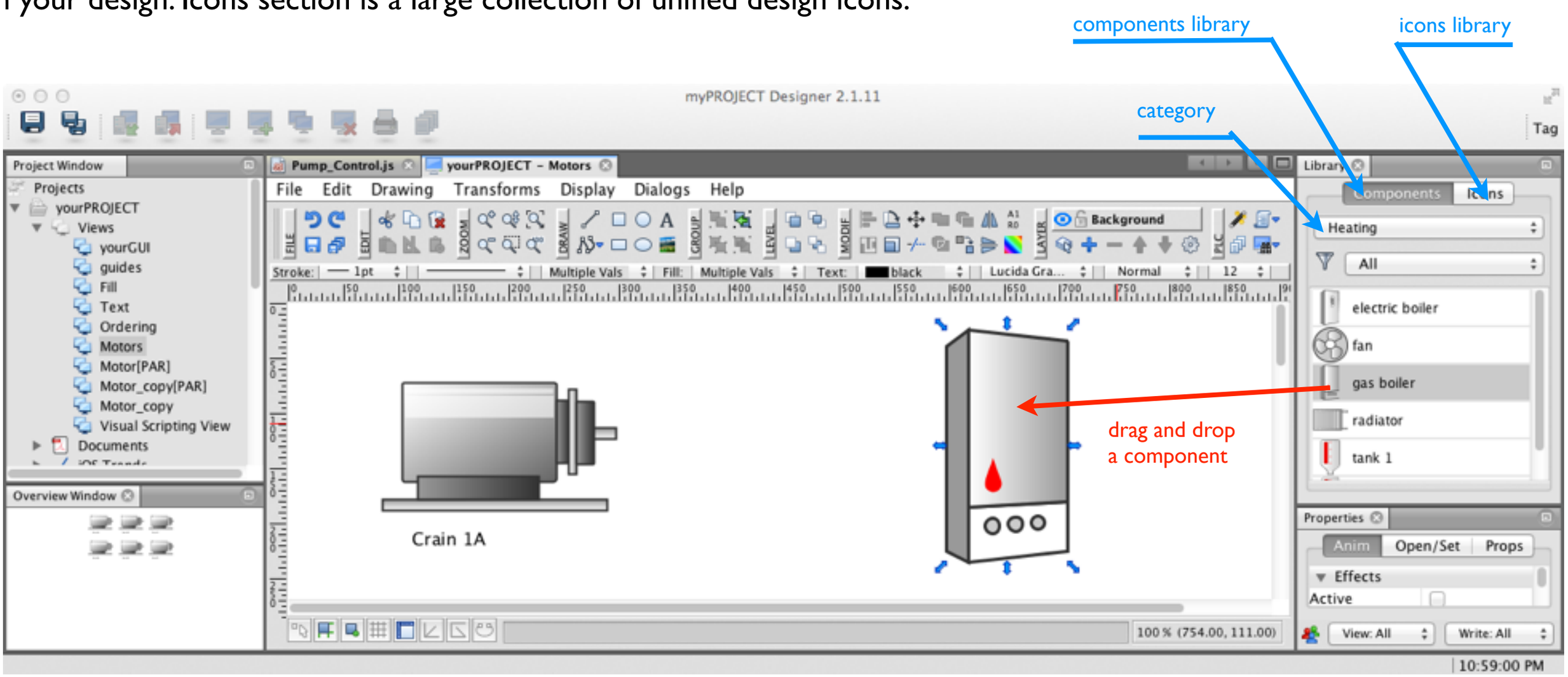




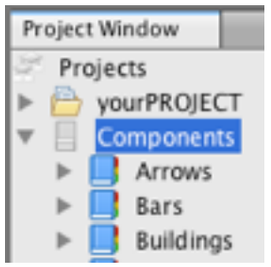
Components Library

Extending Your Graphics

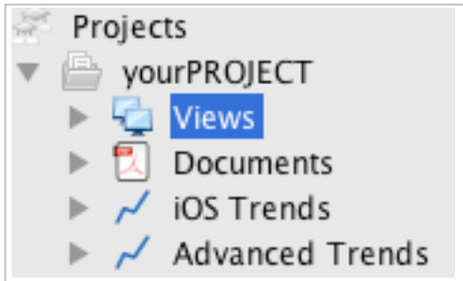
Components library is a collection of pre-built graphic symbols that you can simply integrate into your view. It consist of two main sections: components and icons. Components section is a vector source high quality artwork you can freely use in your design. Icons section is a large collection of unified design icons.



Each component or icon can be inserted on your screen using the Drag&Drop technique and resized as desired by dragging its corner. It can also by configured in their properties just like any other graphic symbol using the Properties window.



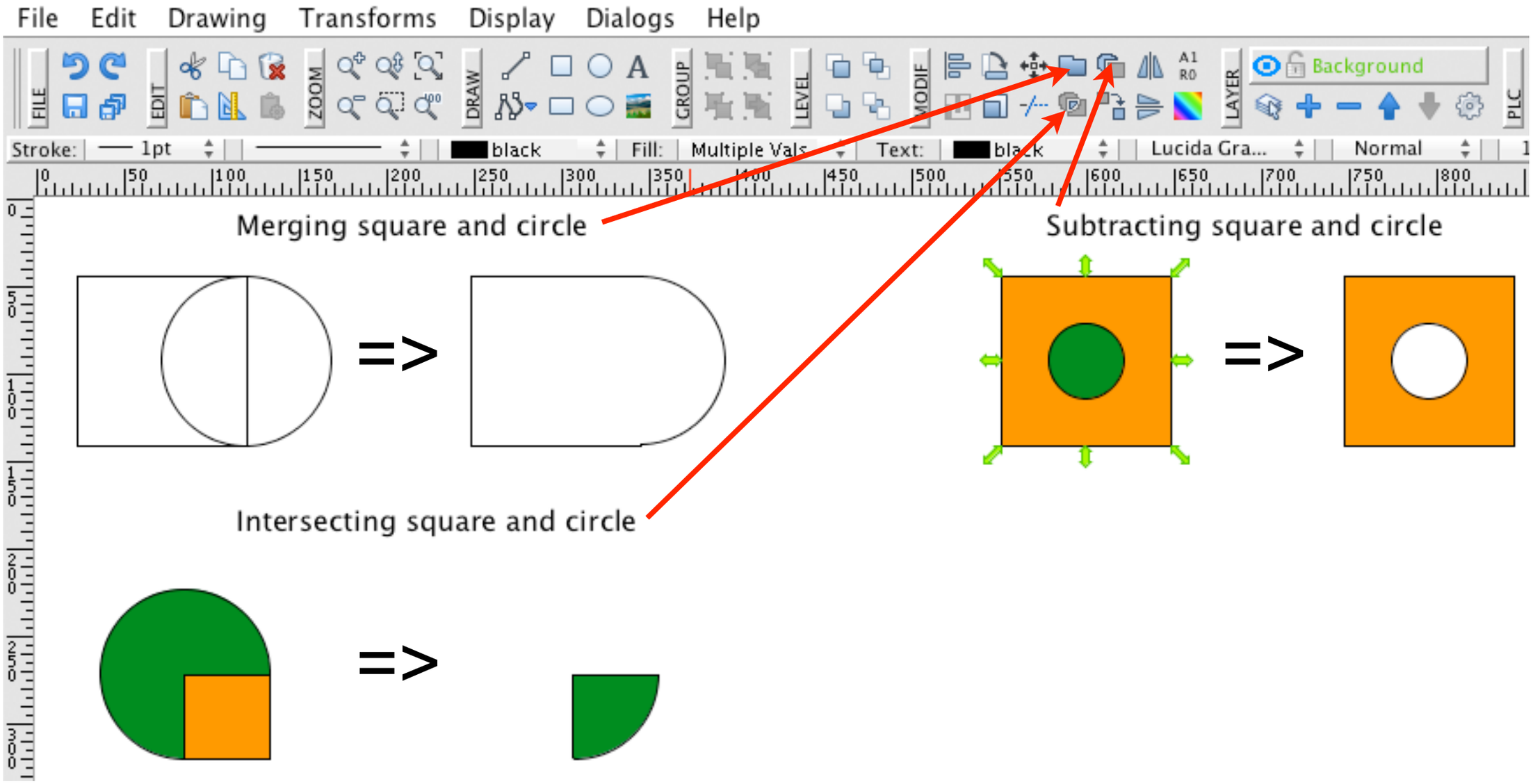
Tip: You can edit and than save the existing components or create and save new ones in Components section in the Project Window

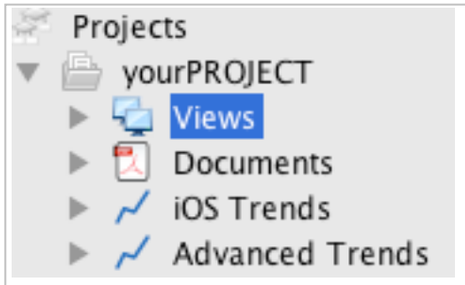


Combining Objects

Creating Graphics

You can compose your final graphics from multiple simple objects aligned above each other. However, you can merge or subtract your graphical objects to create one complex object of arbitrary shape and color.



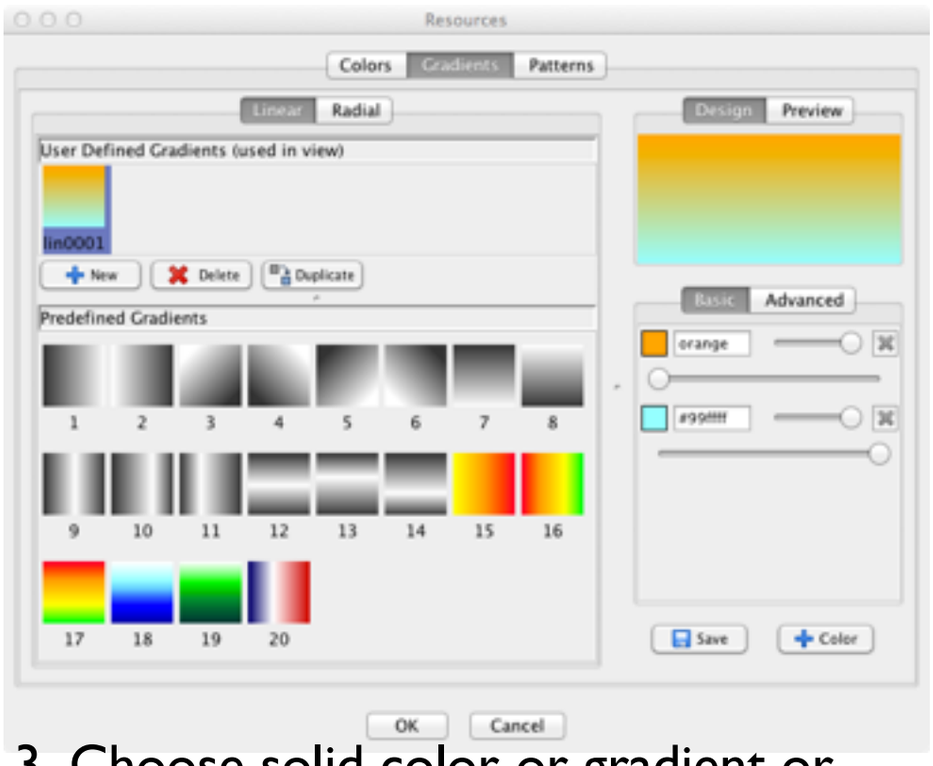


Fill and Stroke

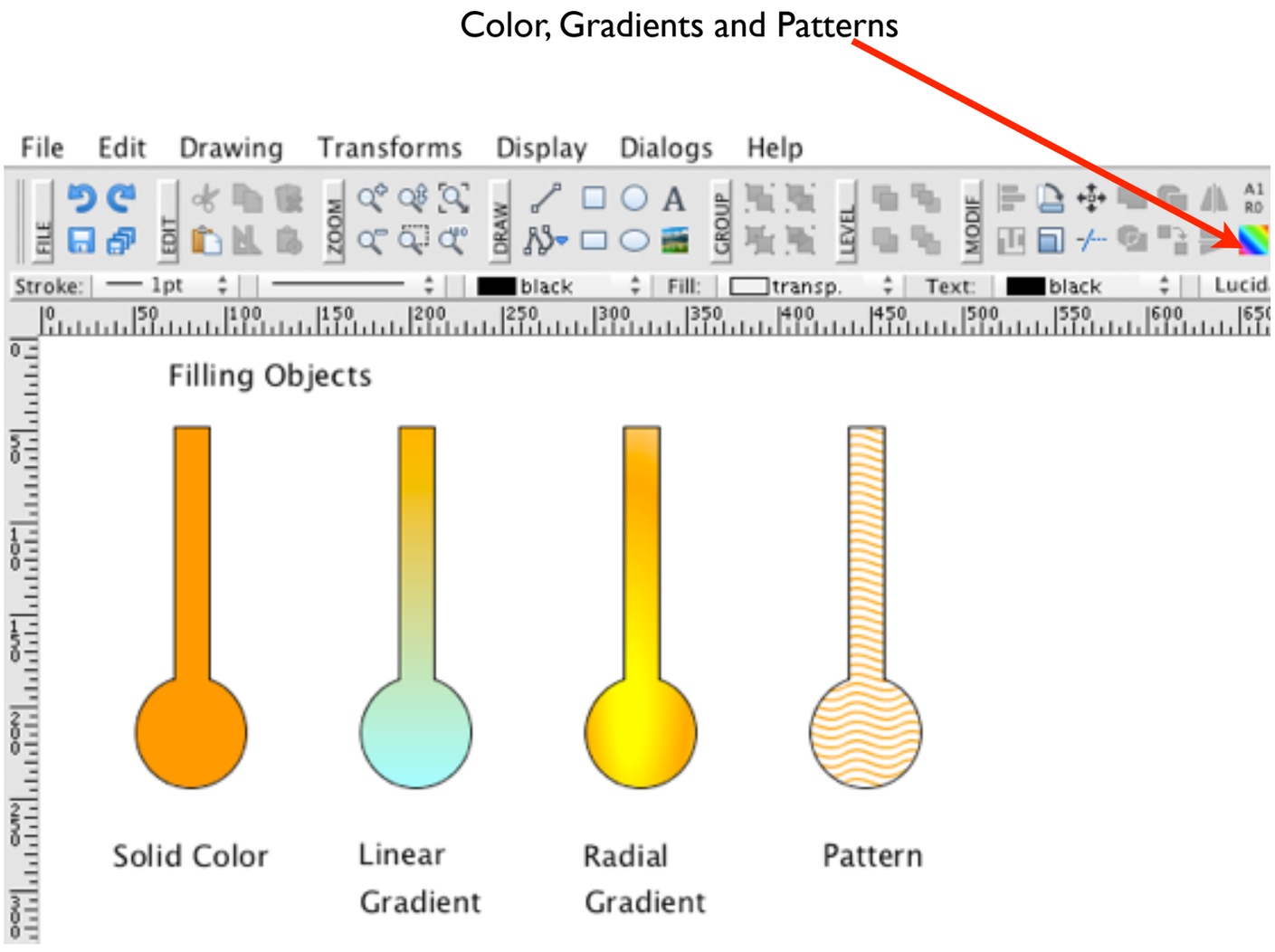
Creating Graphics

You can fill or stroke any graphical object either by a solid color, or by linear gradient, radial gradient, or even by a complex pattern.

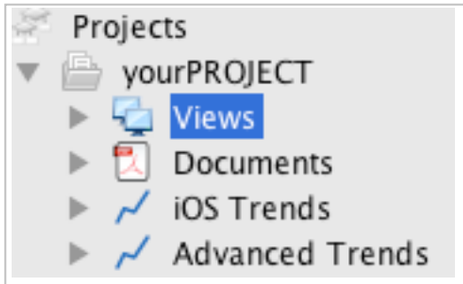
1. Select the object whose color you want to change.
2. Click on the Color, Gradients and Patterns button.



3. Choose solid color, or gradient or pattern.
4. Confirm the change by the OK button.



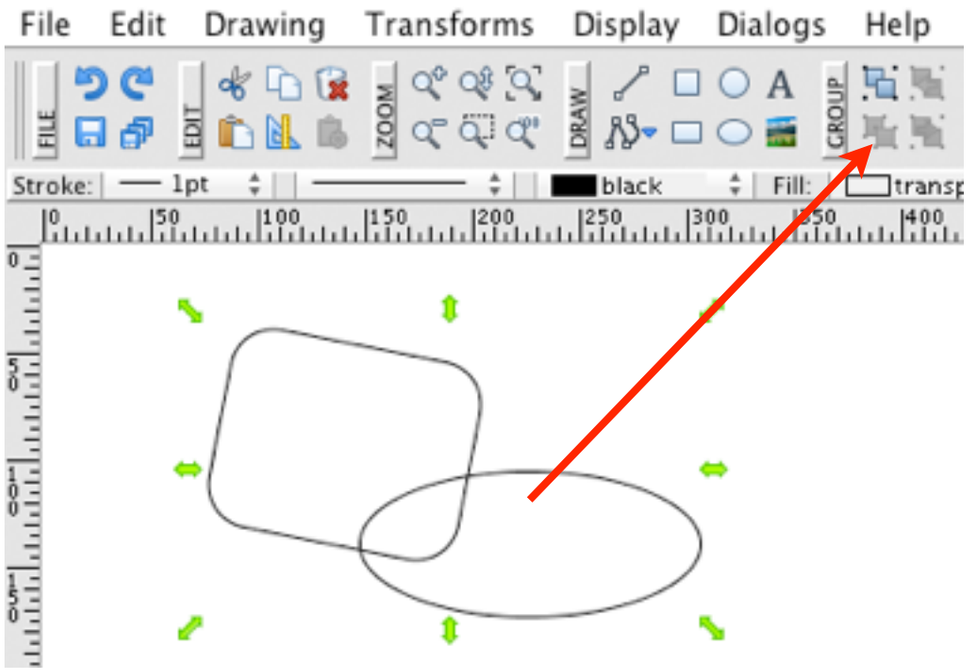
Gradients and patterns can be freely modified according to your exact requirements.



Grouping

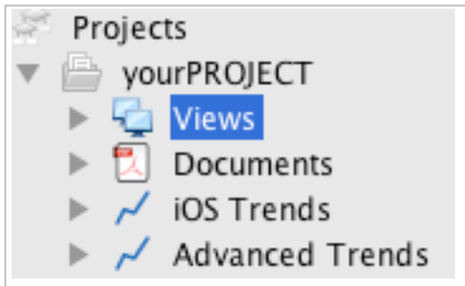
Creating Graphics

You can compose your graphics from multiple elements. Moving or copying these graphics could be difficult. To simplify these operations, you can group multiple objects together so that you can treat them as a single unit.



	group selected objects together
	un-group selected object
	enter group: change objects inside a group without un-grouping
	exit group: end enter group mode

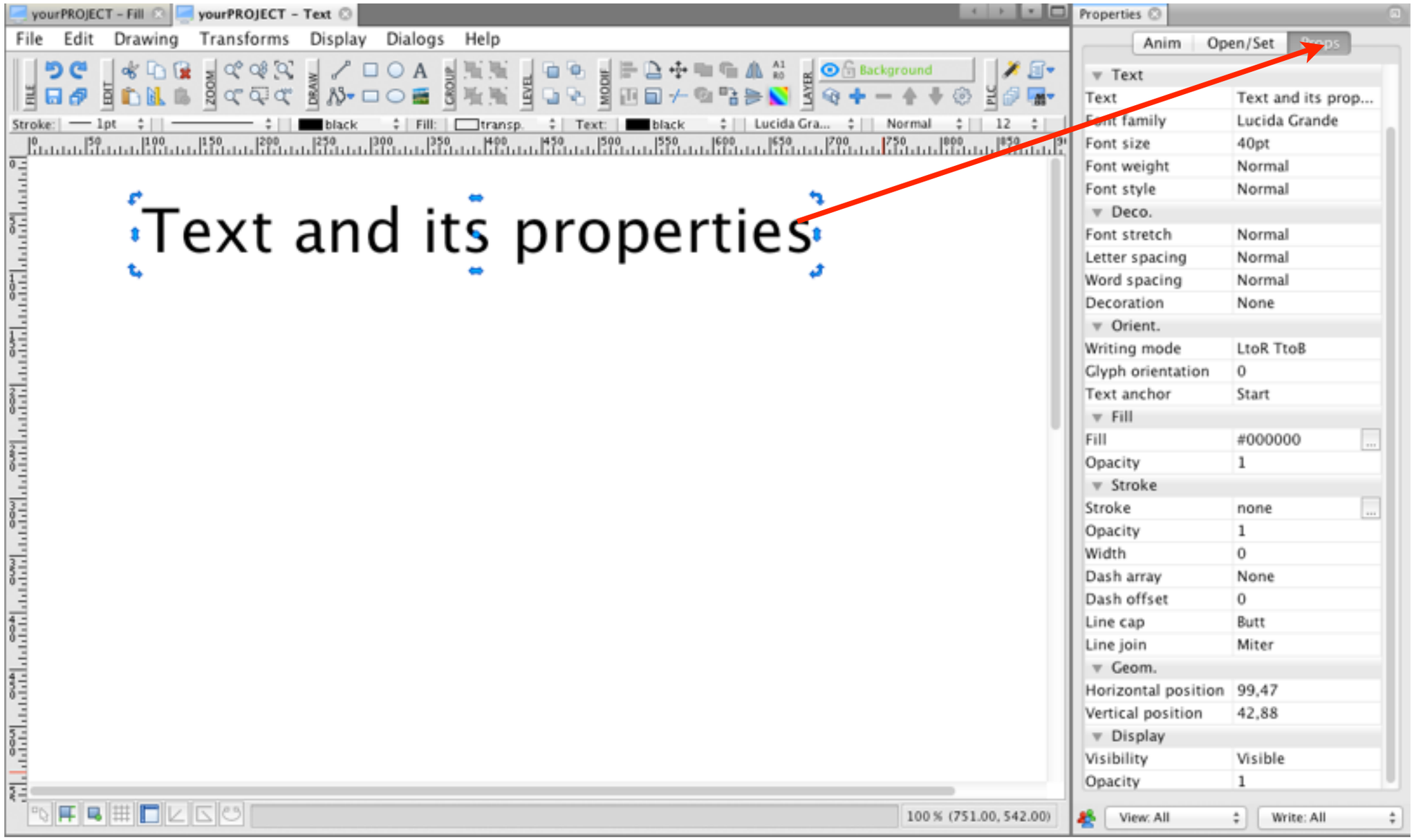
- If you group together more items from the same layer they create a group and act as one objects. The group is indicated by **blue** color.
- il you group together more items from multiple layers they create a multilayer group. All objects in the multilayer group will maintain their respective position in the layer. Multilayer group is indicated by **green** color.

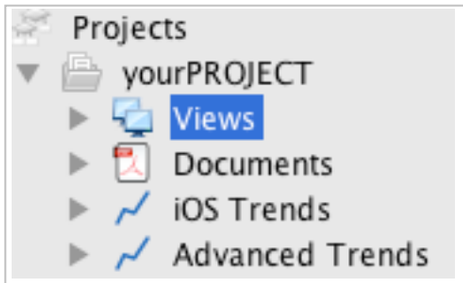


Modifying Objects' Graphical Properties

Creating Graphics

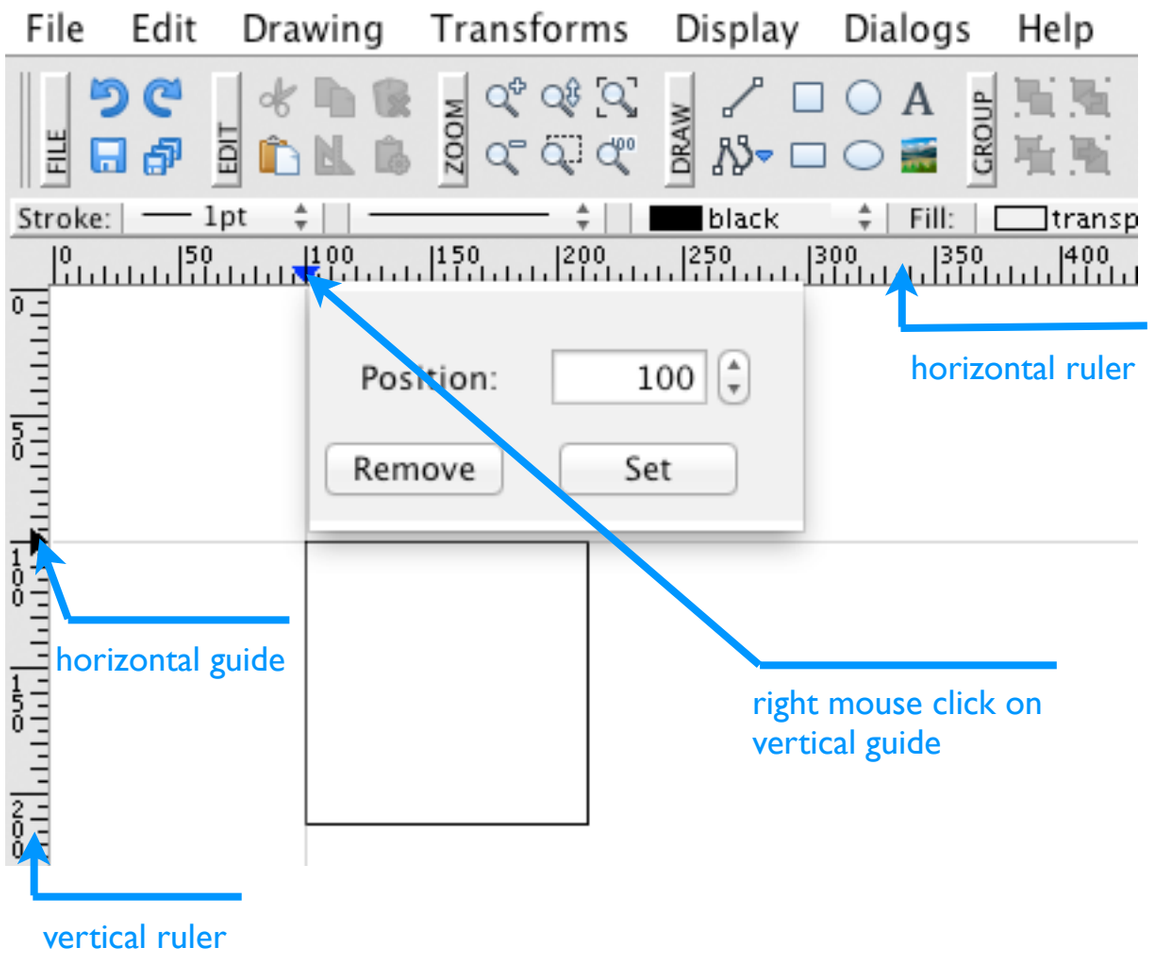
If you select an object, you can change its visual properties in the Properties window on the right side of your view. You can set up any parameter to change the visual appearance of your object. If you multi-select different types of graphical objects, you will see the set of parameters common for all selected objects.





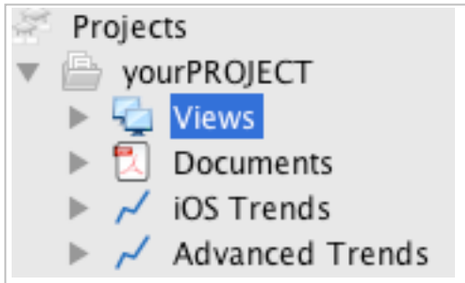
Rulers and Guides

Creating Graphics



Use of rulers:
Rulers help you accurately place and measure objects on the canvas. The point where 0 appears on both horizontal and vertical ruler is called the ruler origin.

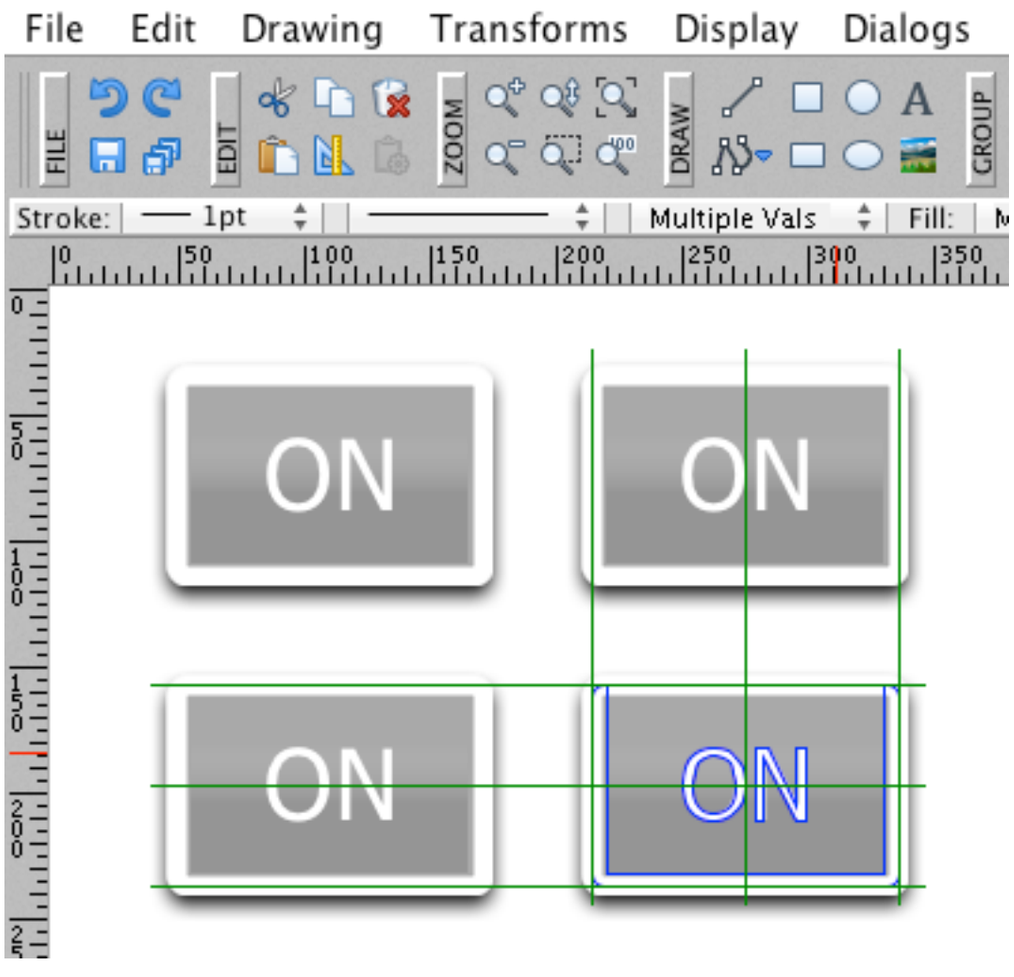
Use of guides:
Guides help you to align text and graphic objects. You can create ruler guides (straight vertical or horizontal lines) to align objects. Like the grid, guides do not print. To create a new guide, click on the ruler at the position where you want to have new guide. You can freely move the created guide by the mouse. If you right click on the guide, you will be presented with the menu where you can set the exact location of the guide or delete it.



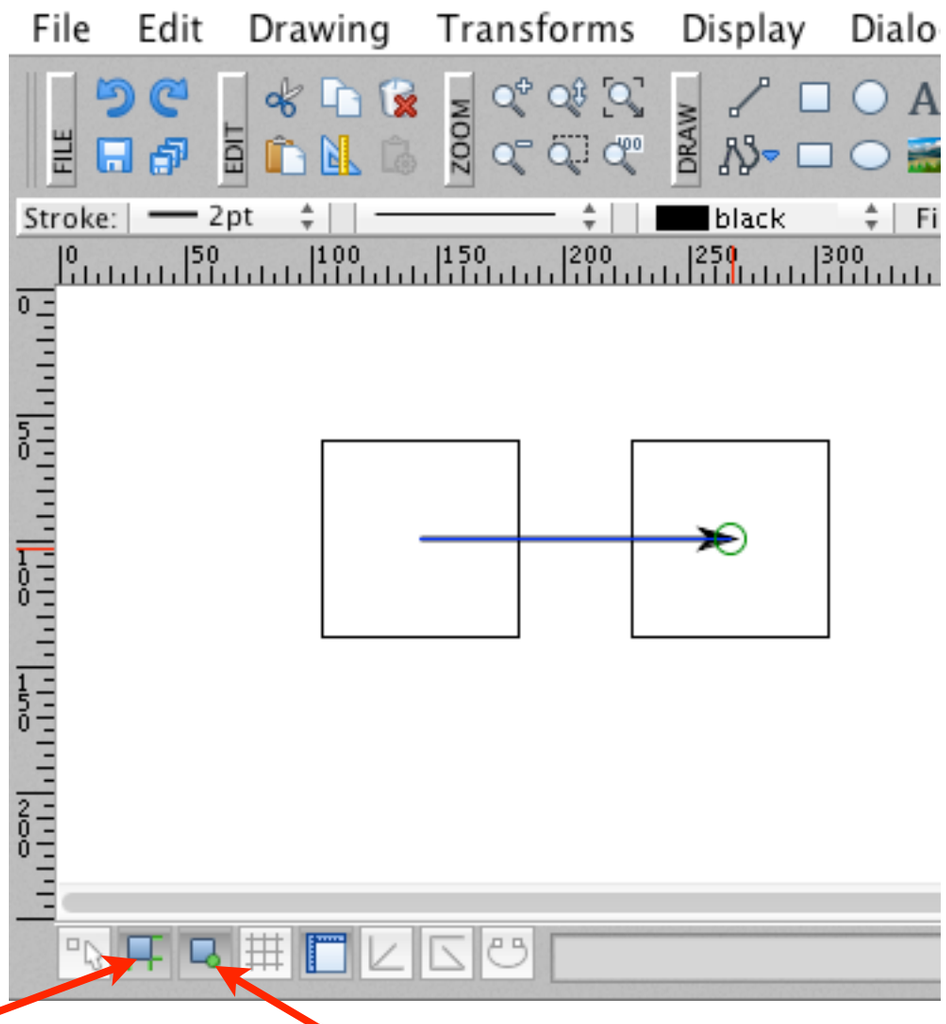
Smart Guides and Snap-to-Point

Creating Graphics

Smart Guides are temporary snap−to guides that appear when you create or manipulate objects. They help you align, edit, and transform objects relative to other objects by snap-aligning and displaying visual guides.

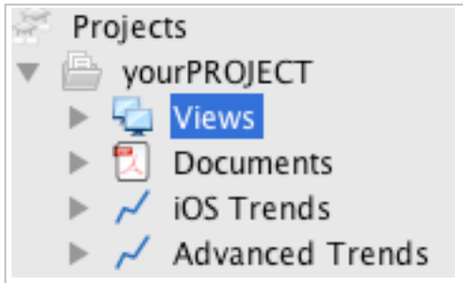


Snap-to-point are temporary snap−to circular points that appear when you create or manipulate objects. They help you to snap your object to other objects.



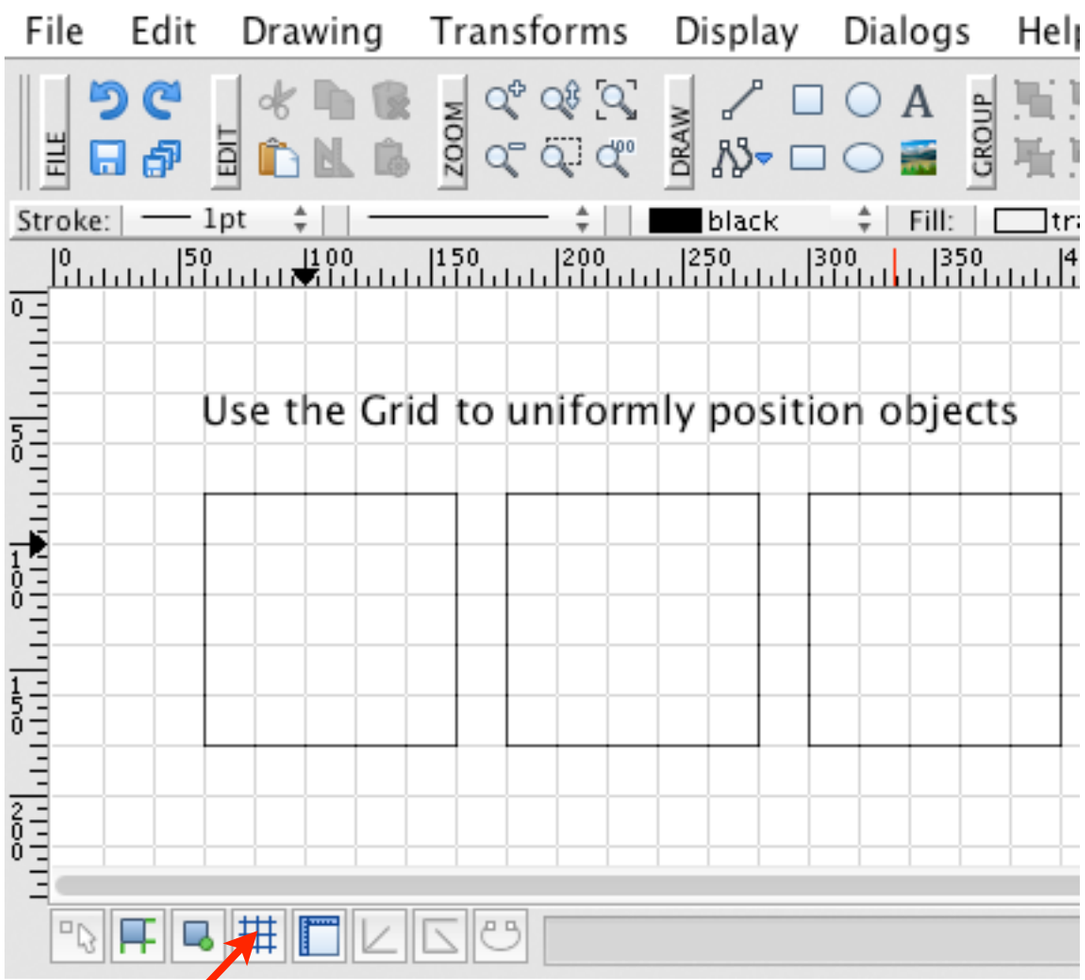
Enable Smart Guides

Enable Snap to Points



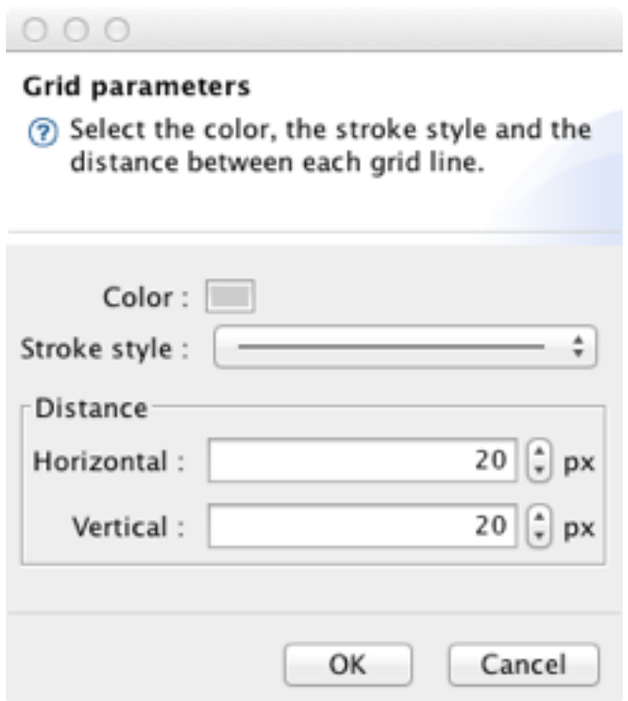
Grid

Creating Graphics

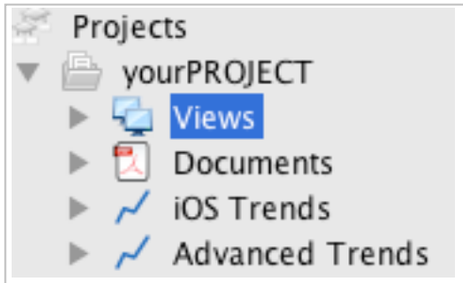


Enable Grid

Use of grid:
the grid appears behind your graphics on the canvas, and it does not print. If you move your objects when the grid is enabled, they will be automatically aligned.



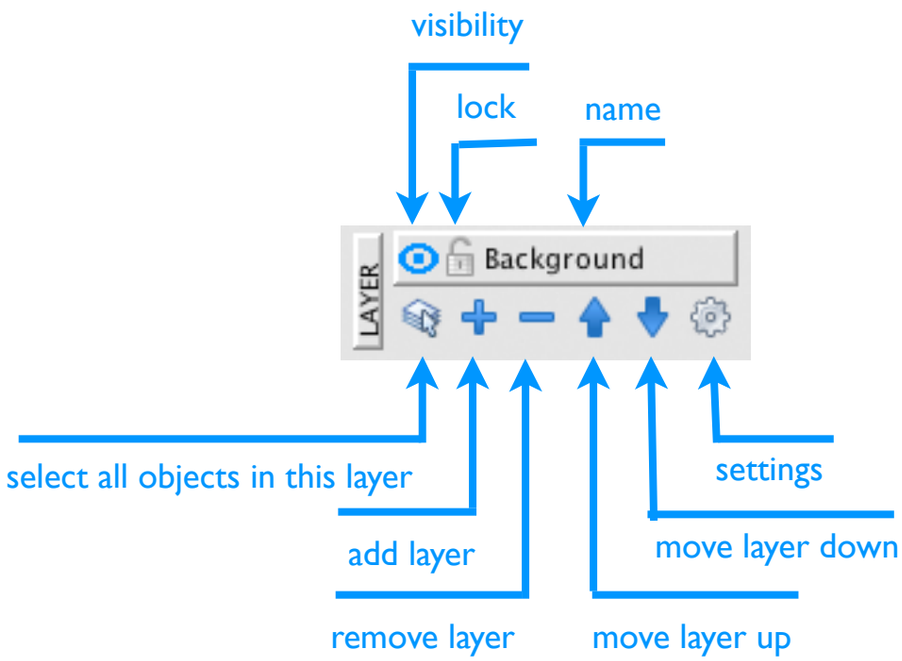
You can change the parameters of the grid by invoking the grid parameters dialog box from the GUI Menu -> Display -> Grid settings.



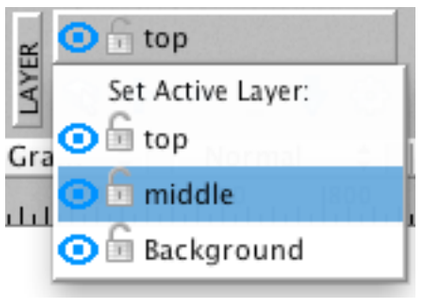
Layers

Creating Graphics

When creating complex visualizations, it's often challenging to keep track of all the items on your canvas. Small items get hidden under larger items, and selecting objects becomes difficult. Layers provide a way to manage all the items that make up your artwork. Think of layers as transparent planes stacked on each other that contain graphical objects. If you reshuffle the layers, you change the position (visibility) order of the items on your canvas. You can move items between layers or group multiple items spread in several layers. If you copy objects, the new object is copied to the same layer as the original one.

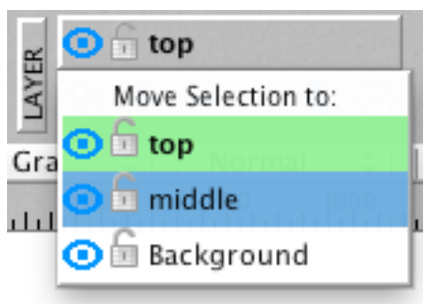


If no object is selected - the active layer is displayed.

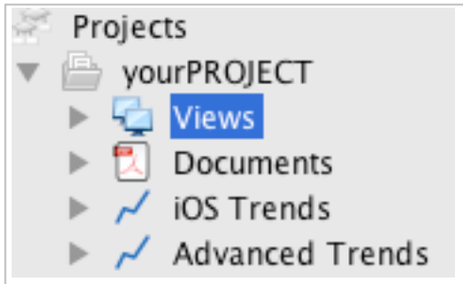


- *Clicking on the layer name will present you with a list of all layers to set the active layer.*

If an object is selected - the layer in which lays the object is displayed and highlighted in green color on the list of layers.



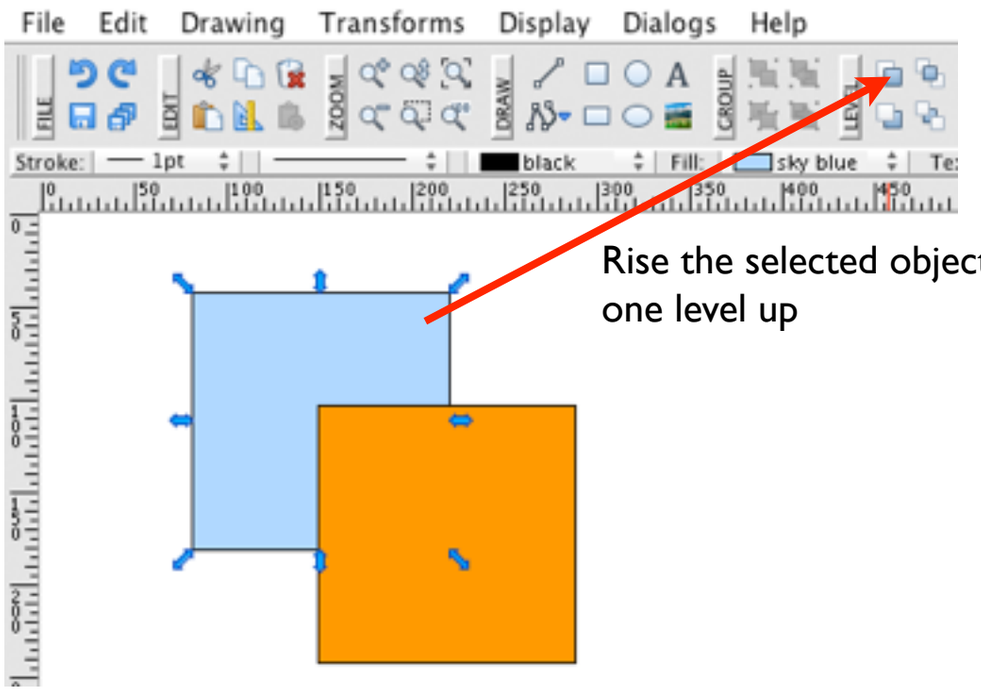
- *Clicking on the active layer name will present you with a list of all layers and you can move the selected object into a different layer.*



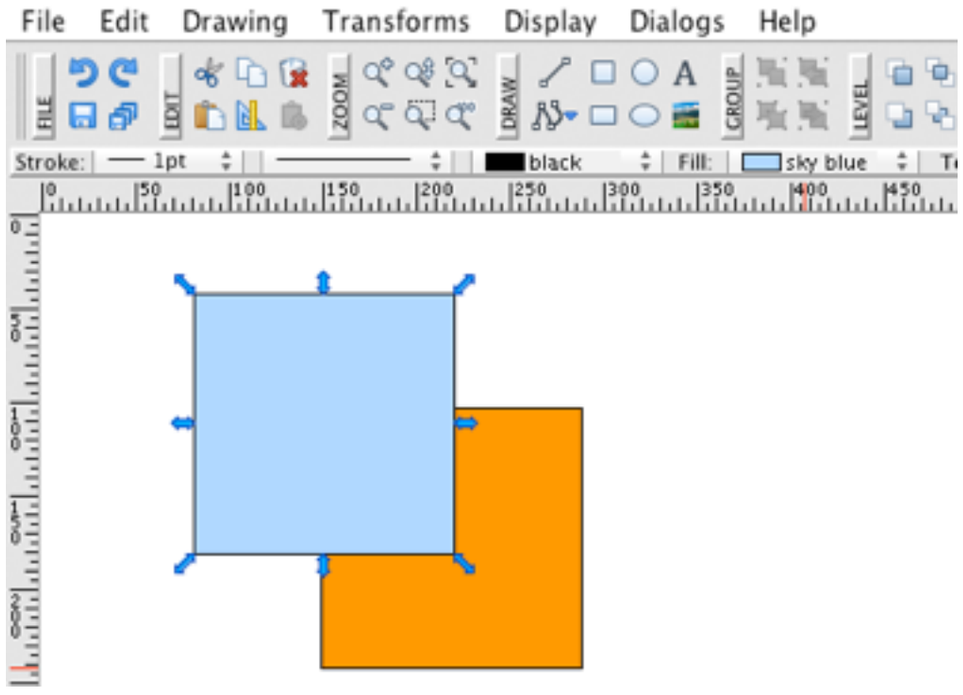
Ordering Objects

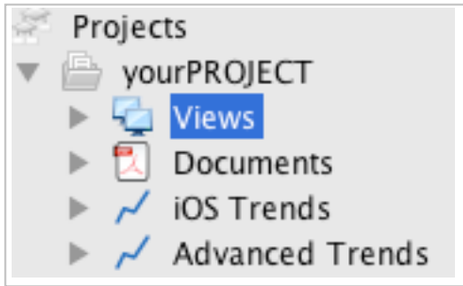
Creating Graphics

Within a layer, objects are leveled hierarchically. When two objects overlap, the one located higher within a layer will overlap the one located lower. You can change the level of the selected object by rising it one level up or down, rising it to the top or lowering it to the background.



=>





Linking with a controller (PLC)

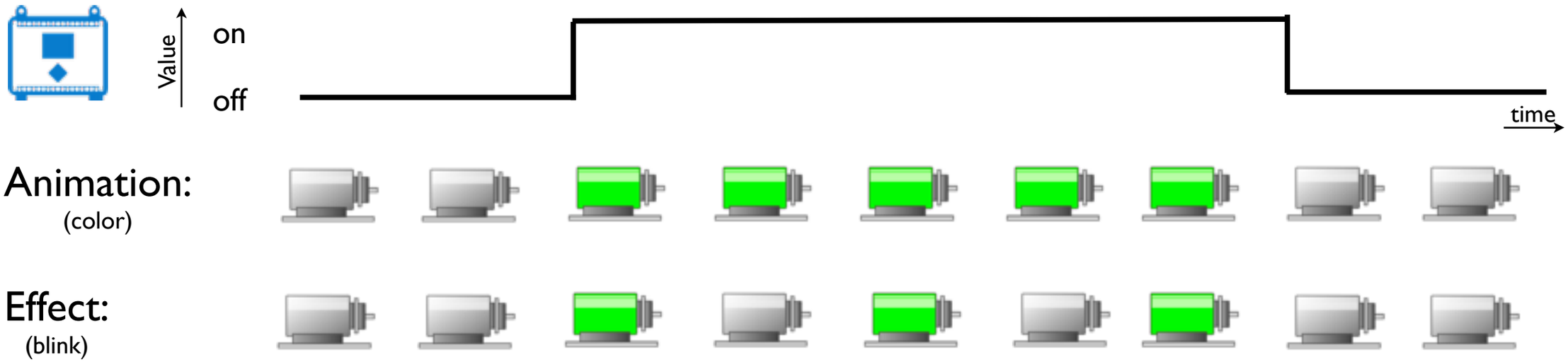
Creating Graphics

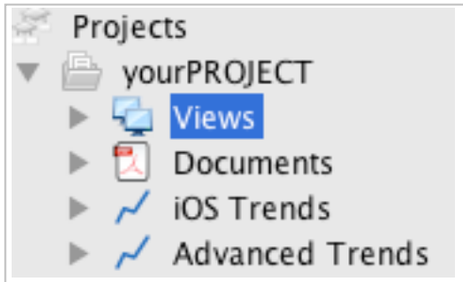
There are two options to link your visualization with a PLC:

Animations: with animations you match the visual appearance of your graphical object with the **real value** read from the PLC. The visual change is reflected immediately. You can for example show the value of PLC tag/ variable in a text object, you can change the fill color of a graphical object based on the PLC value and so on.

Effects: with effects you mainly **add dynamics** to your graphical objects. Effect can be activated either by evaluating tag/variable from the PLC or by the user action such as a mouse click. An effect is dynamic change of visual appearance of an object in a specified time sequence.

The following example describes the use of effects:
imagine you would like to display a rotating wheel on your visualization when the tag/variable read from the PLC is equal to 1. Set the rotation effect on your wheel by specifying revolution time and infinite repeat. This way your wheel will rotate as long as your tag read from PLC is equal to 1.

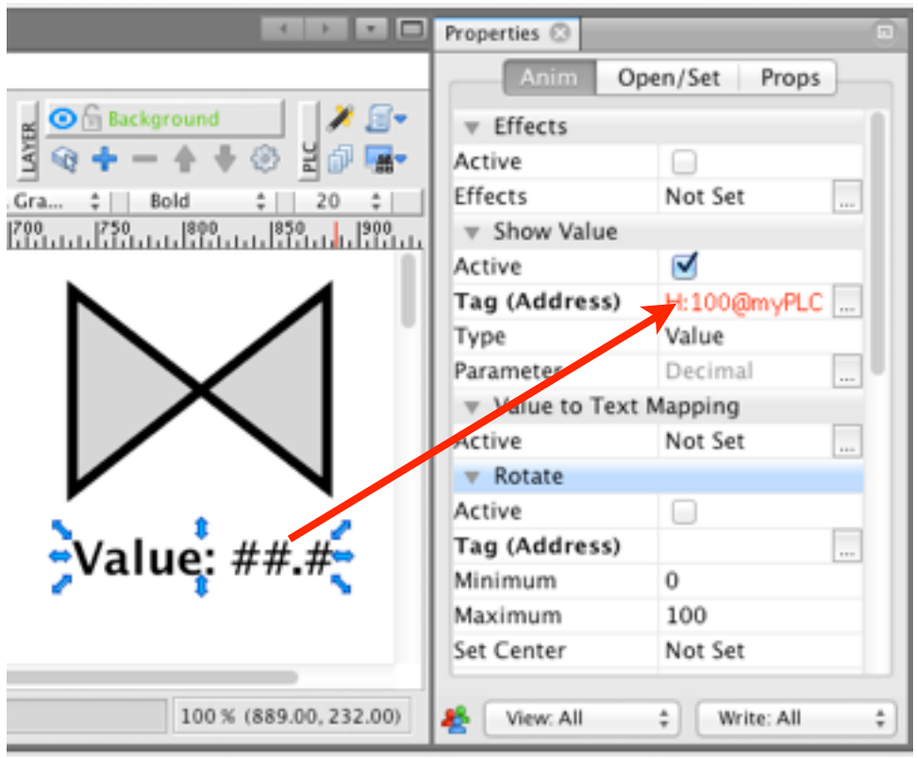




Linking with PLCs - Animations

Creating Graphics

Animations: represent the exact state of an object as in the PLC. Changes are reflected immediately.



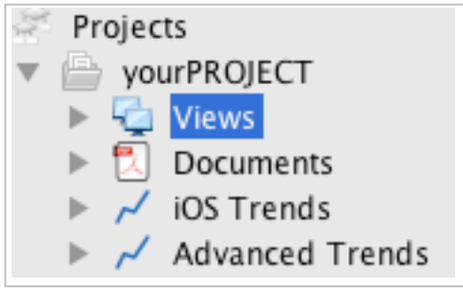
Showing a numerical value from PLC in a text object:

1. create a text object
2. select the *Anim* tag in the Properties window
3. fill in the *Tag (Address)* field

You can specify the formatting of your numerical value by using the # in your text. For example ##.# means use two leading numbers and one decimal place. Your # will be automatically replaced by a real number read from the PLC.

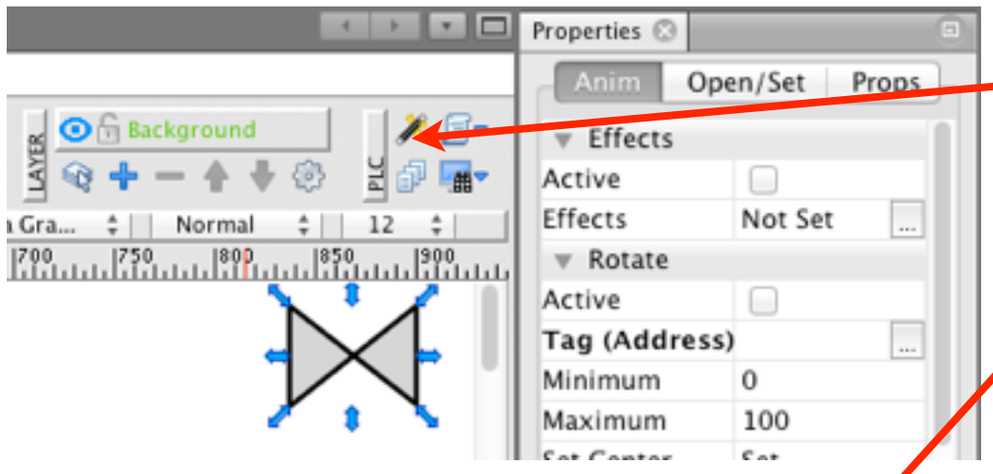
Animation types:

- Show Value - show the real value from the PLC in text objects.
- Value to Text Conversion - converse numerical values from the PLC to texts and use them in text objects.
- Rotate - rotate object (if you put minimum > maximum, the object will rotate counter-clock wise).
- Visibility - control visibility by the value from the PLC.
- Color - change background color based on the value from the PLC. You can also chain multiple conditions.
- Size - change size of an object. Useful for bar animations. You can specify to change width, height, or both.
- Move - move your object along specified curve.
- Sound - play sound.



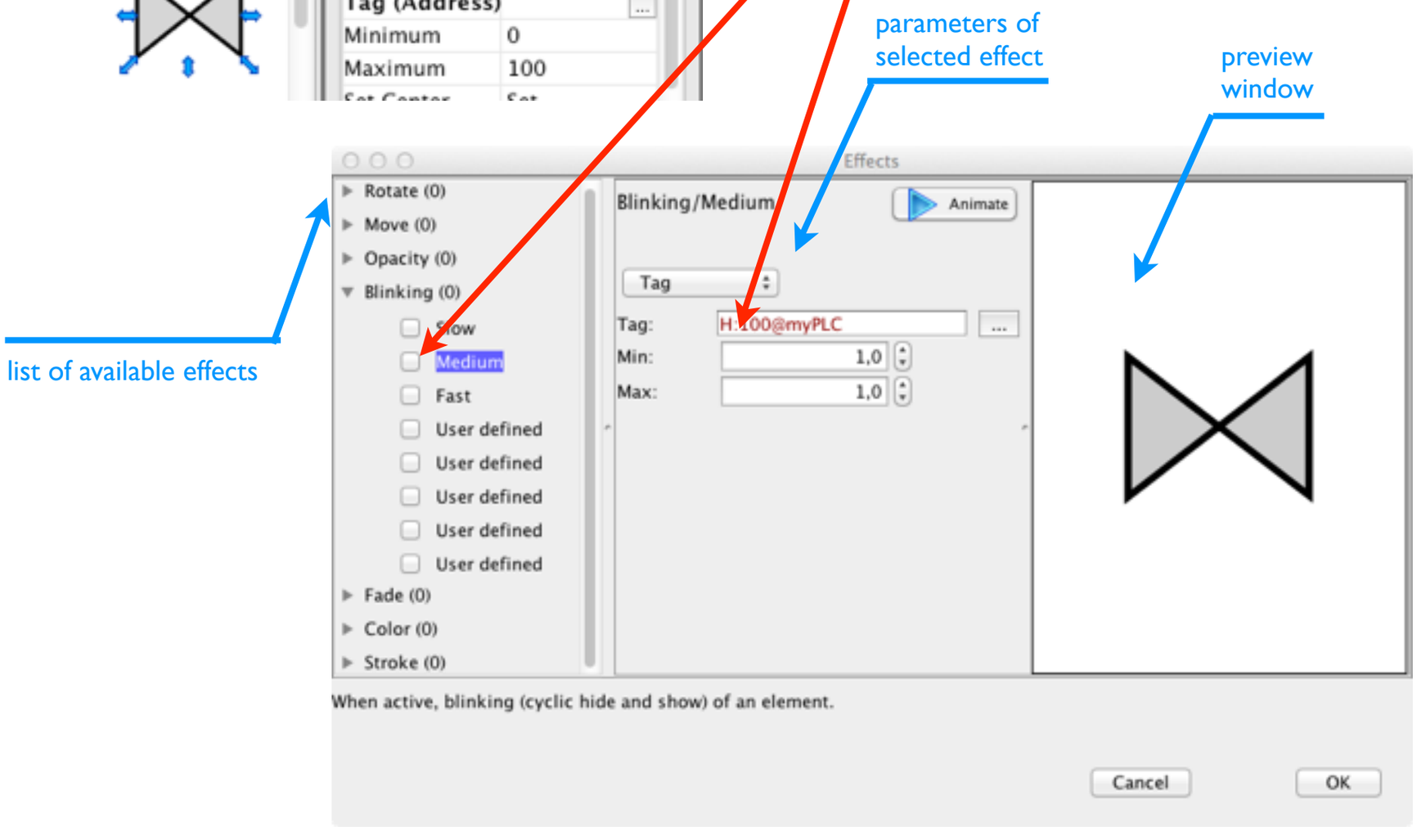
Linking with PLCs - Effects

Effects brings dynamics to your screen.

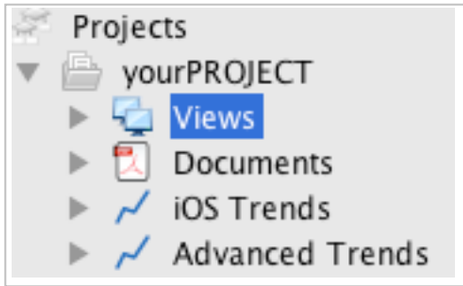


To activate blinking of an object based on the PLC value:

1. select the object you would like to apply the blinking to
2. click on the effects icon on the GUI toolbar - a new dialog will open
3. select Blinking effect and check the speed
4. fill in the *Tag (Address)* field



You can have multiple effects defined on a single object



Entering Tags

Creating Graphics - Linking with PLCs

To link your visualization with a PLC, you must enter the name of the tag or address you would like to read/ write data from. The syntax of the tag depends on the type of PLC you want to access.

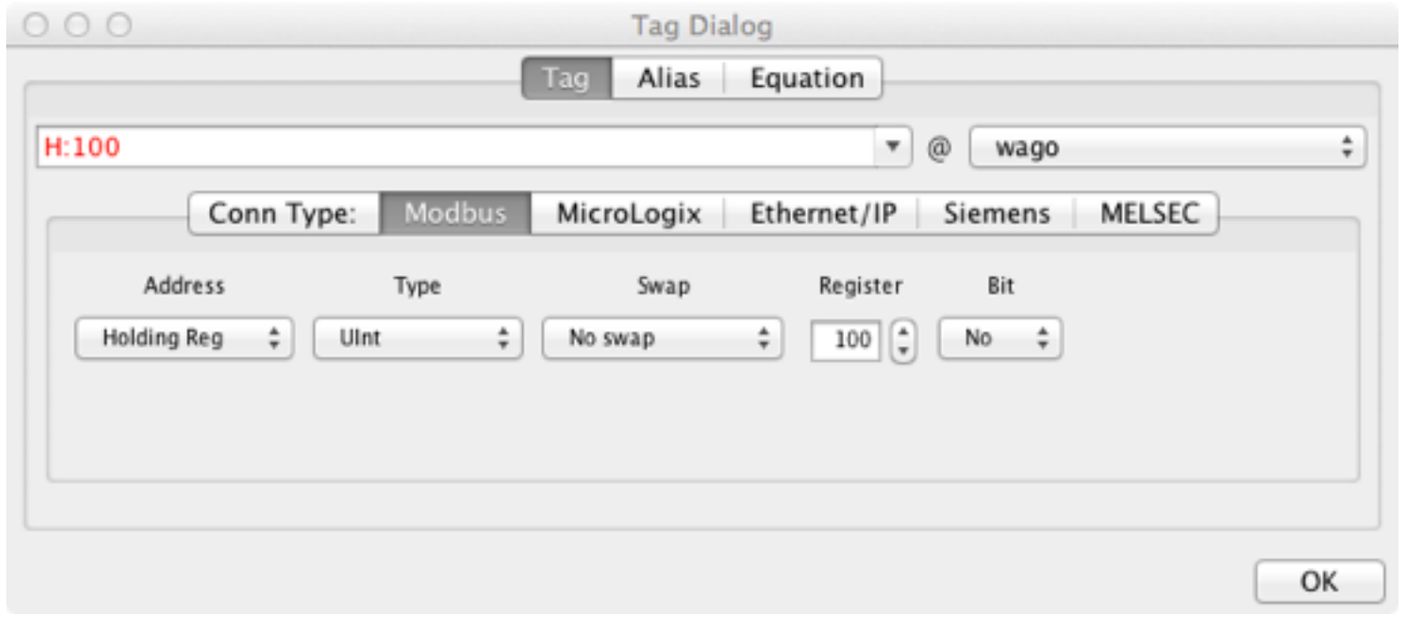
tag / address

Tag syntax: tag@connection_alias

Alias syntax: *alias

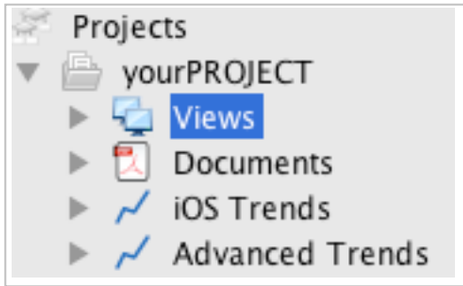
alias of your PLC (if you do not specify, default will be used)

You do not have to enter your full tag syntaxes directly all the time. Instead you can use a symbolic simplified link to your tag called Alias. You can define aliases in the tag database, or you can create them if desired.



You can type the tag directly in the tag edit field or you can invoke the tag editor by clicking on the ... button on the right side of the tag edit field. A new dialog is shown.

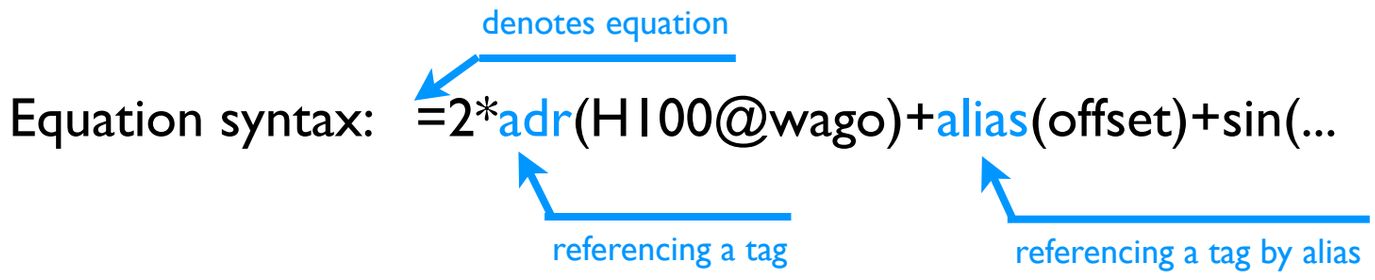
The Tag dialog will guide you to entering your tag and will check the correct syntax.



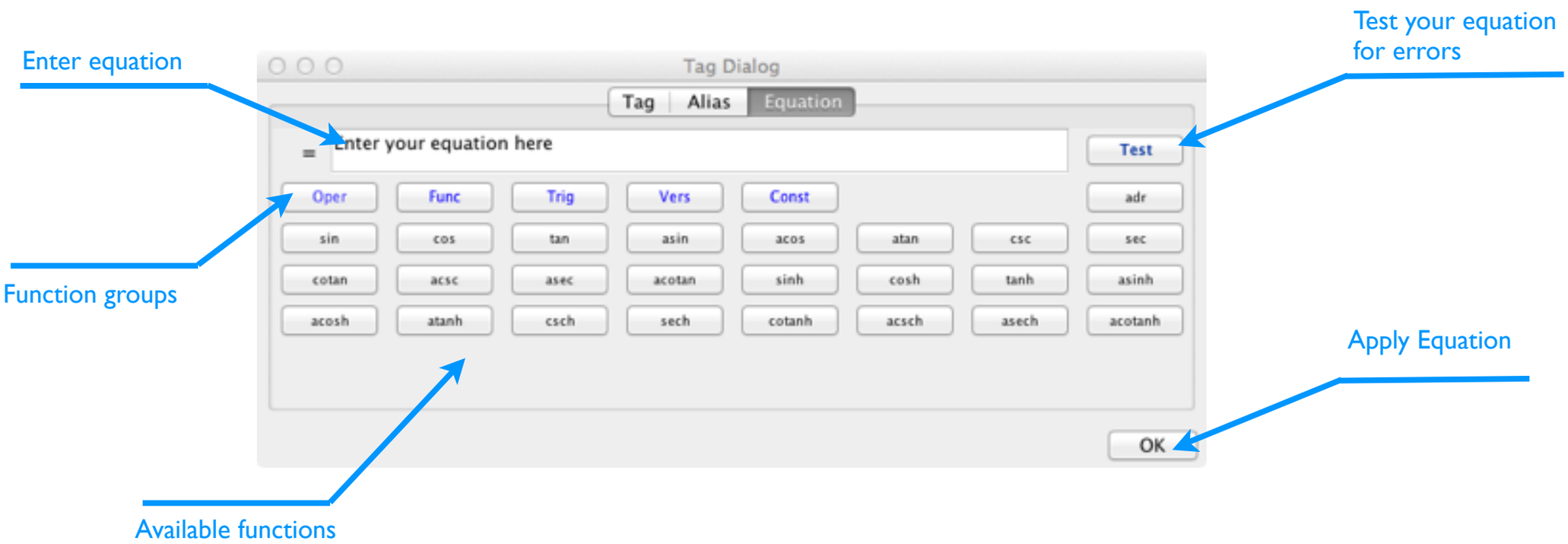
Entering Equations

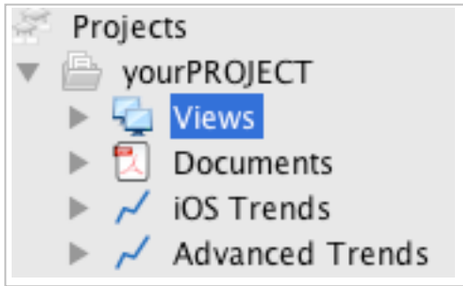
Creating Graphics - Linking with PLCs

You use equations to scale the value read from the PLC or solve a more complex problem involving multiple tags.



In the equations you can use operators + - * / and common mathematical functions such as sin, cos, exp, ... Also you can do binary comparison and much more. To get the complete list of options invoke the Tag dialog and select Equation.

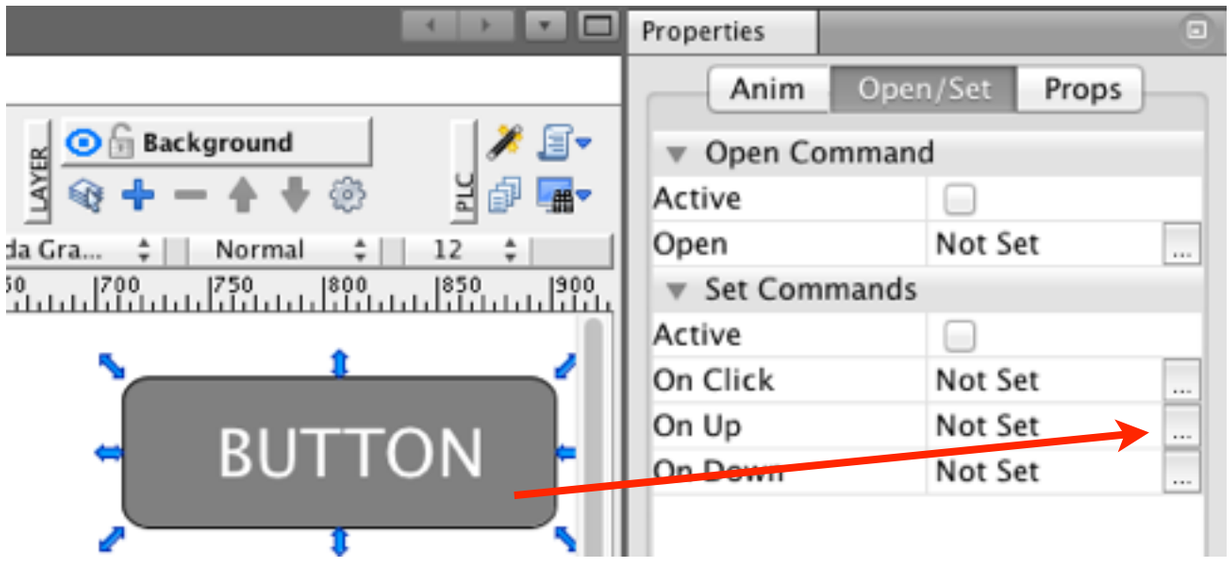




Write Commands

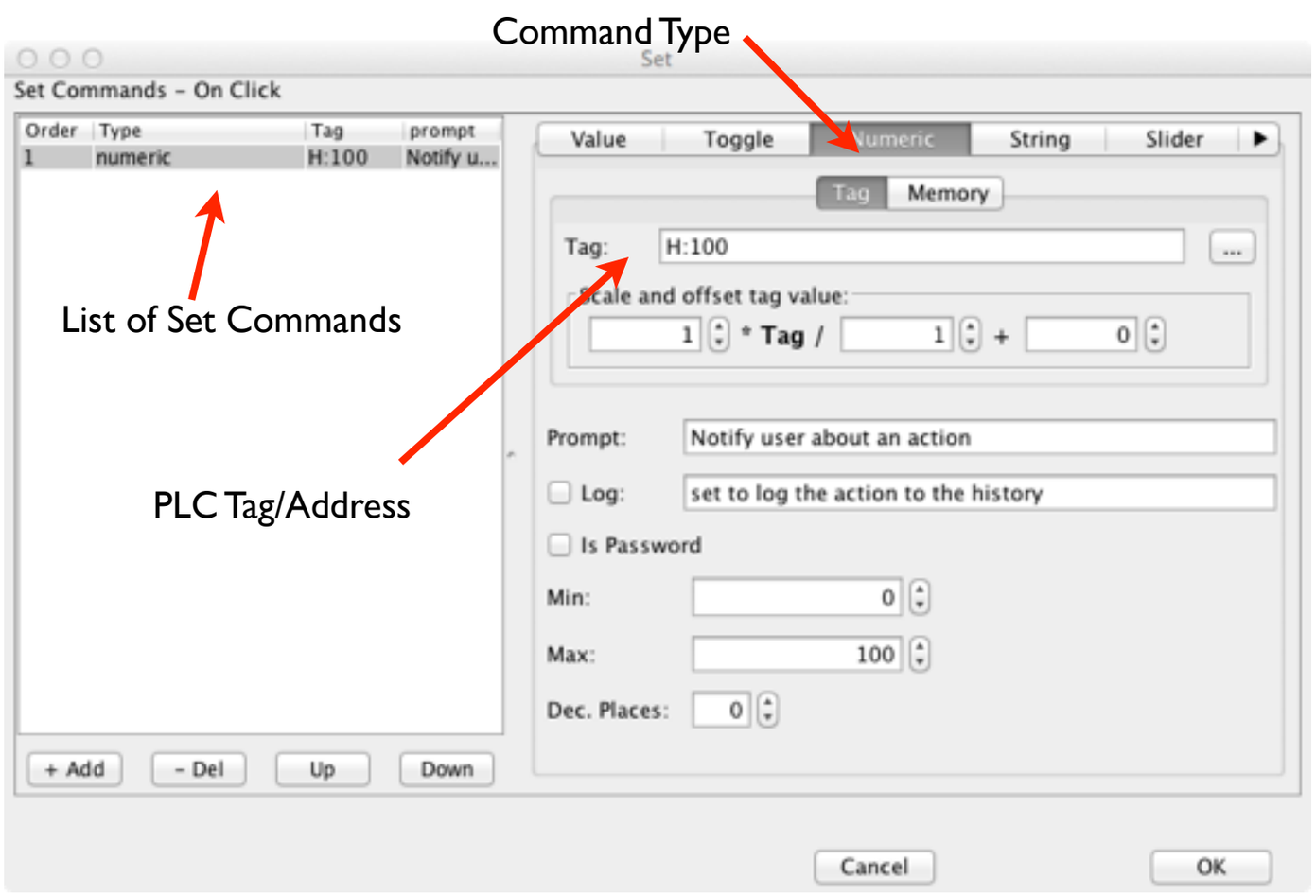
Creating Graphics

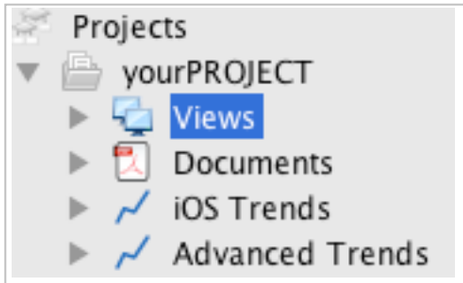
Sending commands to PLC is easy. You can assign commands to any graphical object in the screen's user interface to send data to PLC by a mouse click or touch.



1. Select the object you would like to assign the command executed by mouse click or touch to.
2. Go to Properties window and select the Open/Set tab.
3. In Set Command choose the desired action - on click, on up or on down:
   - On Click - responds to a single mouse click.
   - On Down - active while pressed the mouse or touching the screen.
   - On Up - active when releasing the pressed mouse or the touch.
4. Set dialog appears with multiple options.
5. You can chain multiple set commands

If you specify the Prompt, the user will be provided with a dialog window with the text specified in this field when writing to the PLC.





Open Command

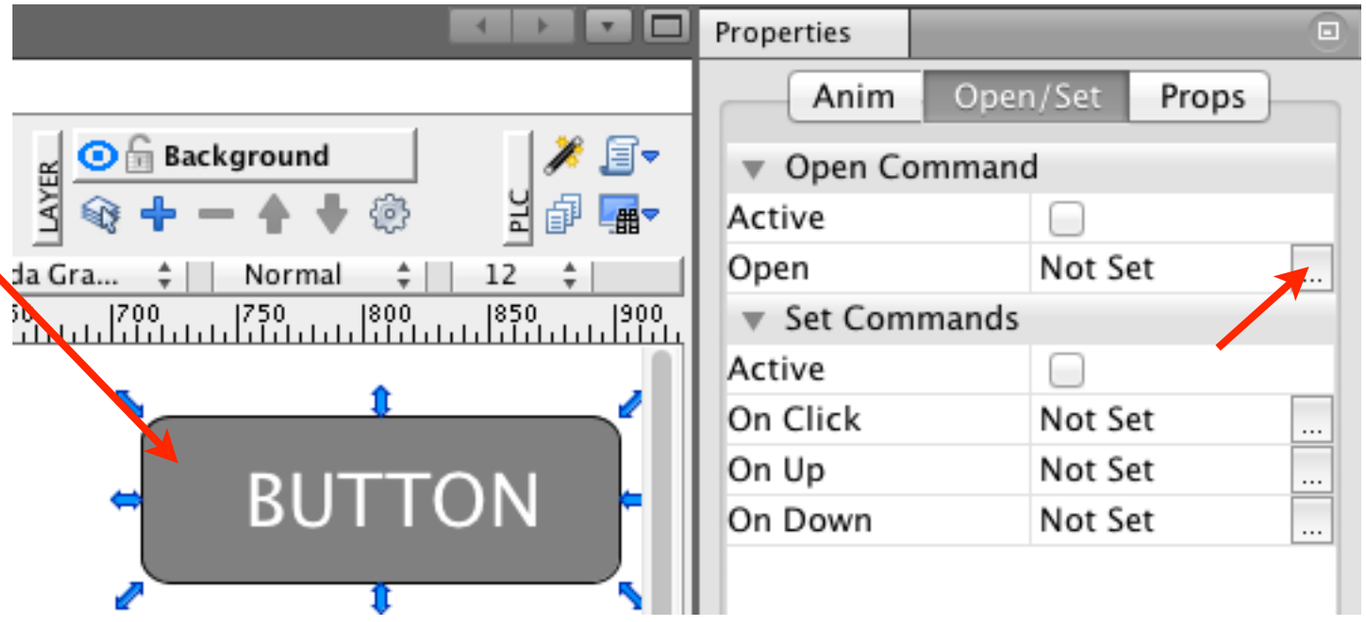
Creating Graphics

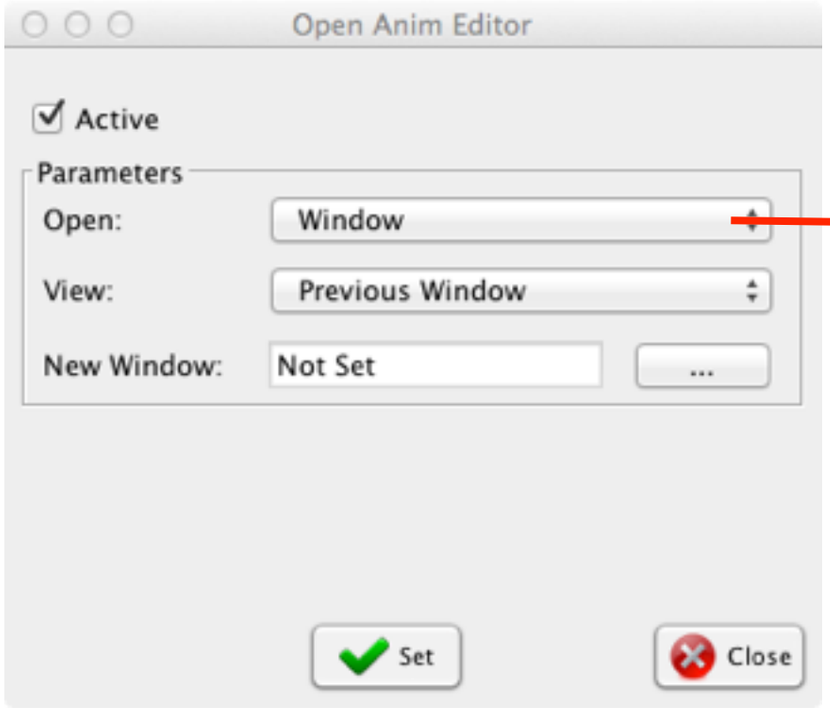
You can use an object on your screen to open another view, trend (chart) or PDF document by a mouse click or touch .To set up this option use the Open Command.

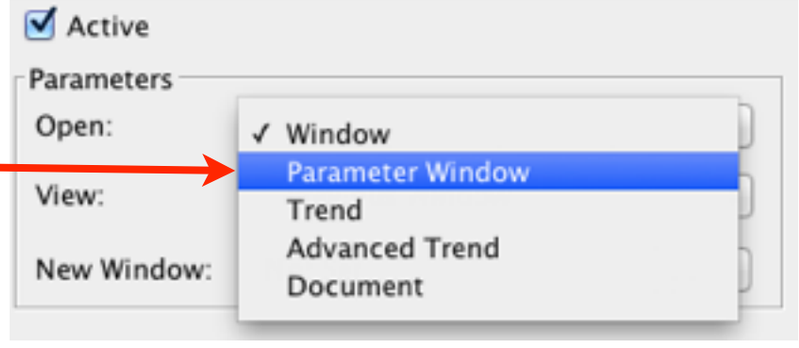
1.Select the object you would like to assign the Open Command by mouse click or touch to.

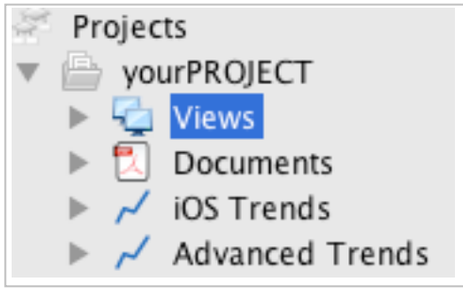
2.Go to the Properties window and select the Open/Set tab.

3.In Open Command choose the desired action: open view, parametric view, trend or document





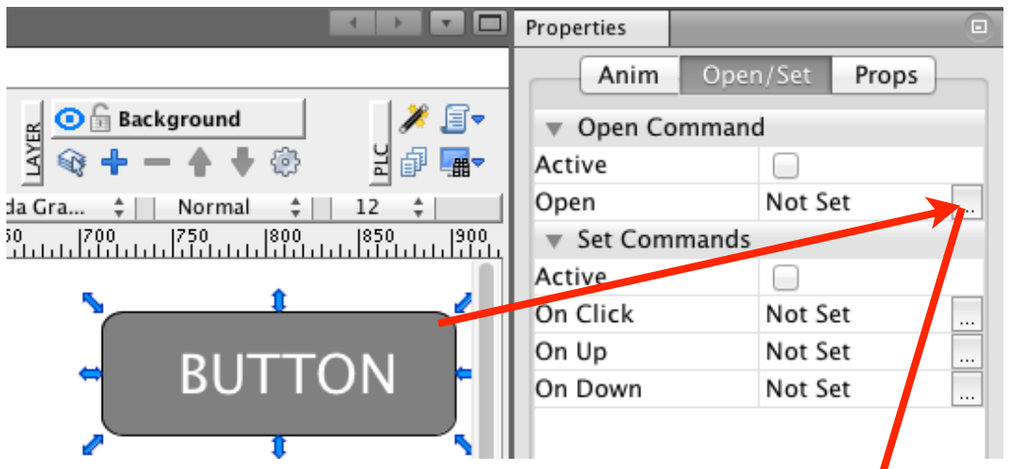


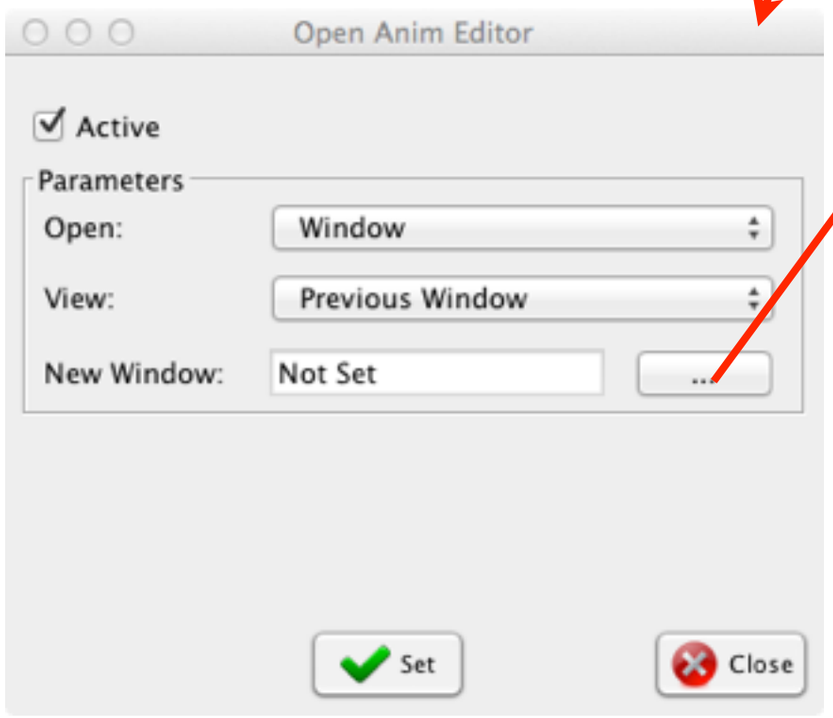


Open in New Window (Faceplate)

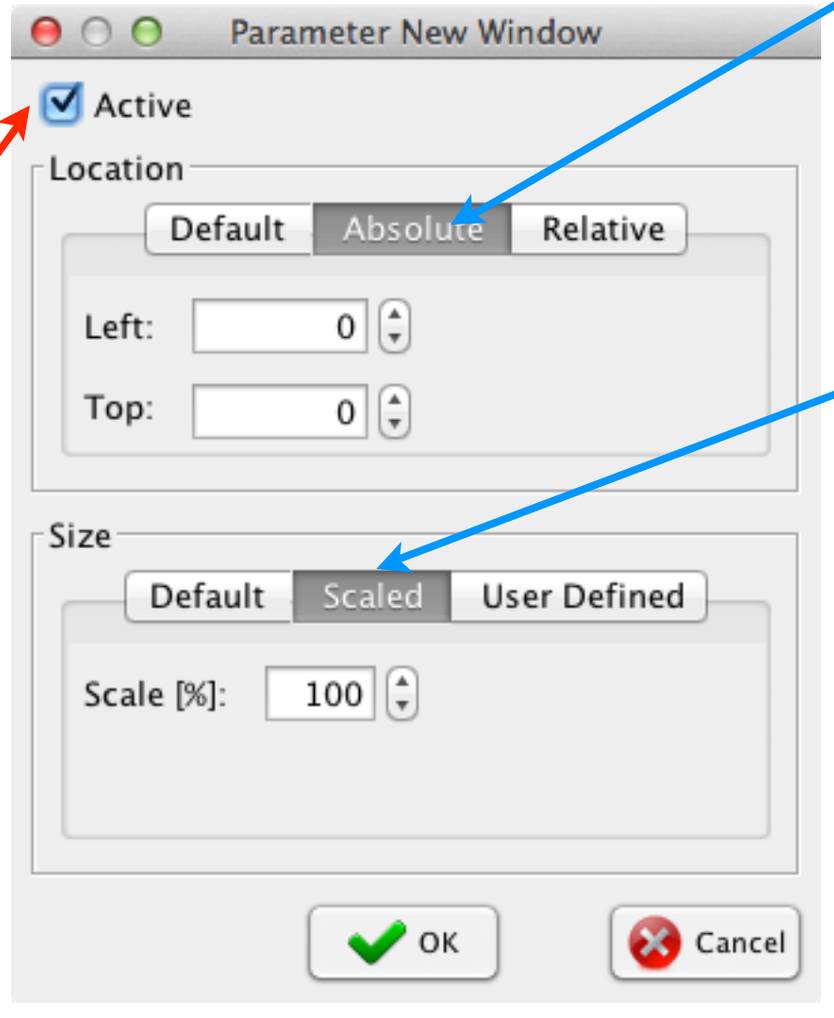
Creating Graphics

You can use an object on your screen to open another view, trend (chart) or PDF document by a mouse click or touch .To set up this option use the Open Command.





- To open a new window, click on a "..." button next to New Window:
- New Dialog is shown, where you can specify additional parameters for newly open window

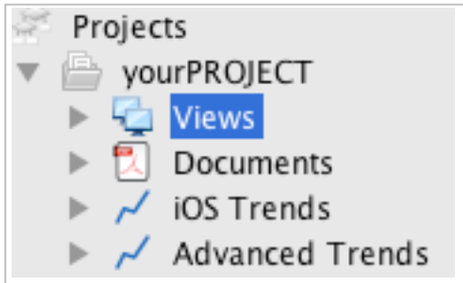


location of newly open window

- default: show window at the center
- absolute: set absolute coordinates of top left corner
- relative: set relative offset to current mouse position

size of newly open window

- default: original size of window
- scaled: scale window to set percentage
- user defined: specify new dimensions of opened window

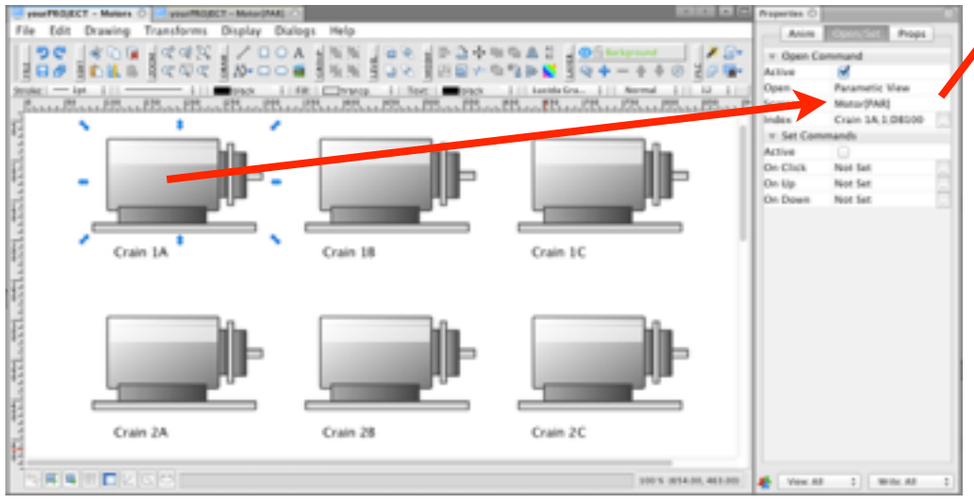


Parametric Views

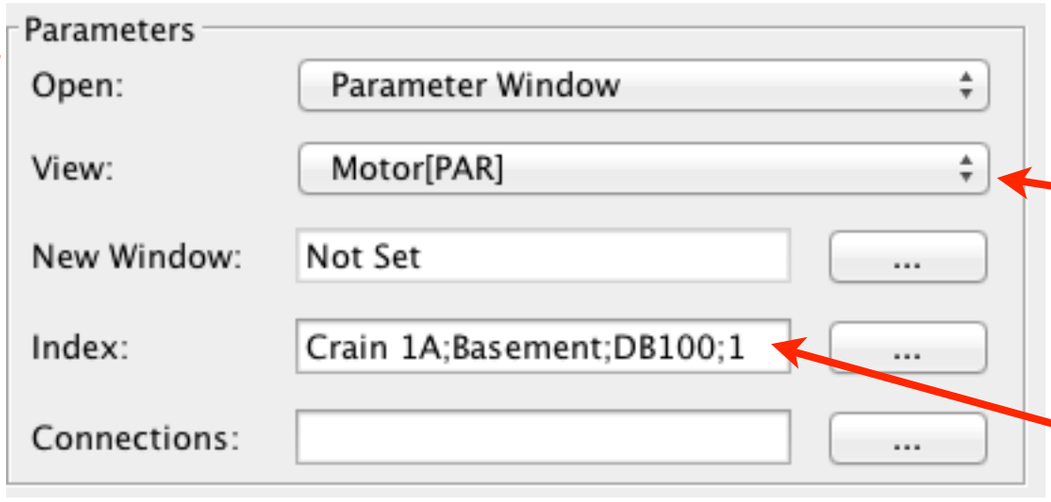
Creating Graphics

Instead of designing similar visualizations of multiple field technology that only differ in its operational parameters not the appearance, you can design only one master view. You may set and use the opening parameters to link the view to a specific piece of technology.

Example: Imagine you visualize a plant with 200 similar motors. Instead of designing 200 identical screens with different links to PLC, you only create one view. The visualization user can select a specific motor by entering the desired parameters when opening the requested view.



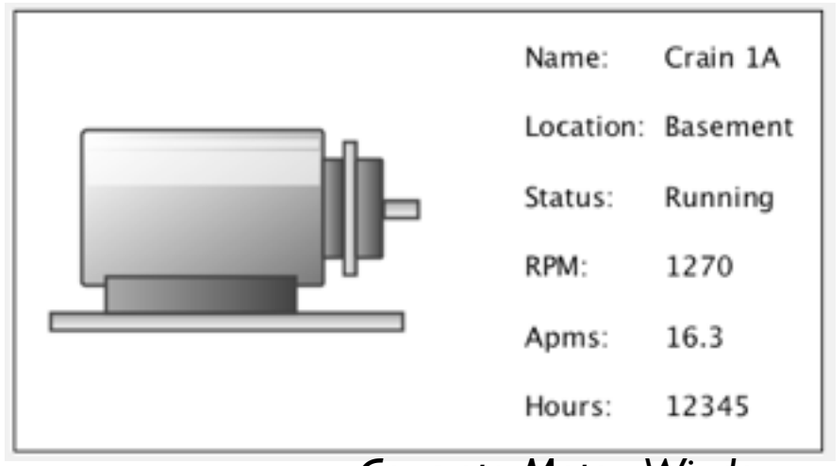
Overview Window created by the user - every motor has different opening parameters



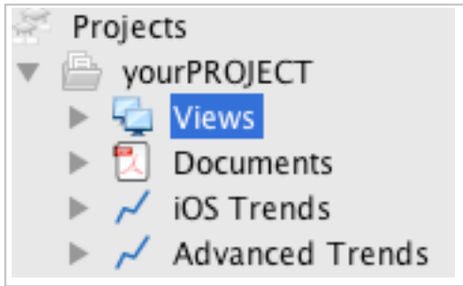
View Name

Opening parameters

Parametric Views are denoted by [PAR] after its name. You can specify parametric views when designing a new view.

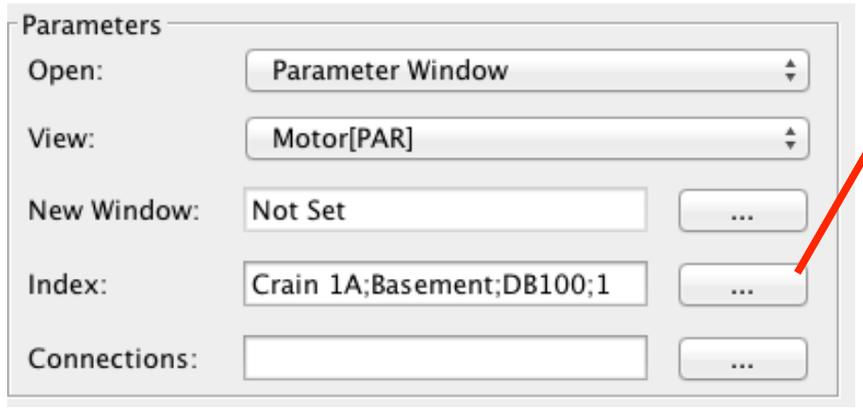


Concrete Motor Window

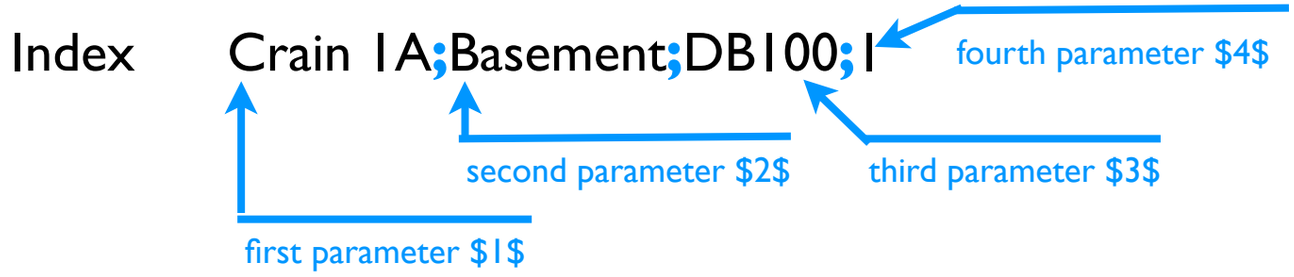


Parametric Views - Opening Parameters

Creating Graphics



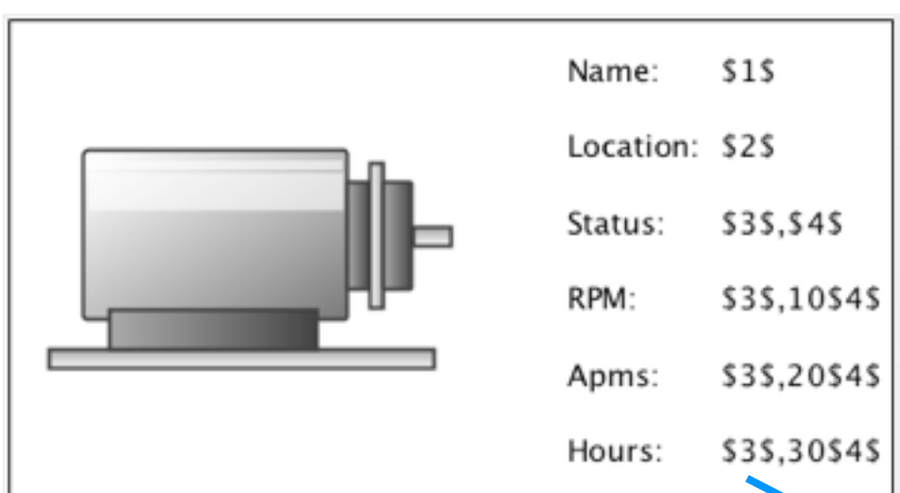
Specifying opening parameters: you can set the opening parameters in the *Index* field. Parameter can be any number or string. Parameters are separated by a semicolon ;



You can access parameter value by $Number$ notation, where number is the position of a parameter. The first parameter in this example will be accessed as 1. You can set parameter values when specifying tags.

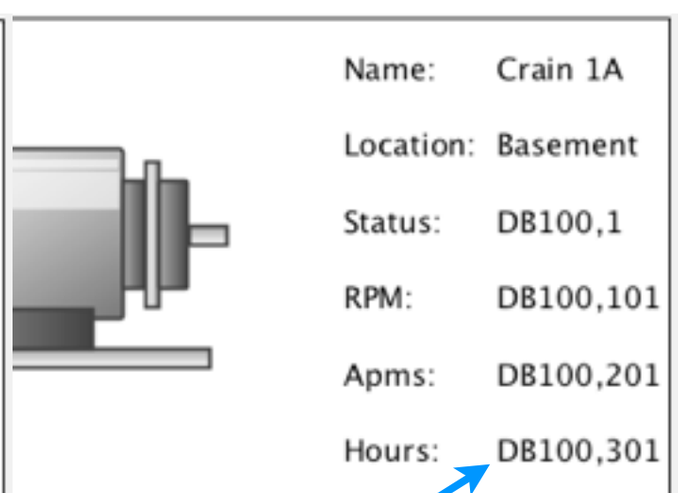
DESIGN →

Specify tags when designing the view with parameter values denoted by $index$. Use multiple parameters if necessary.



BEFORE VIEW OPENS →

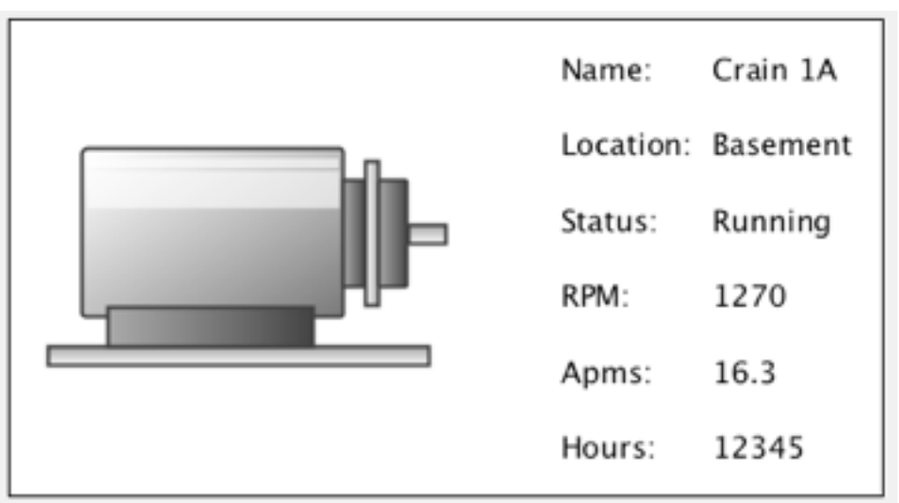
When opening the view, your tags will be automatically converted with parameter values

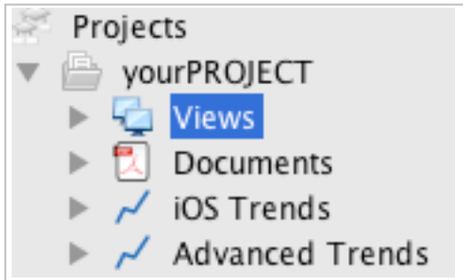


Crain 1A;Basement;DB100;1

LIVE DATA

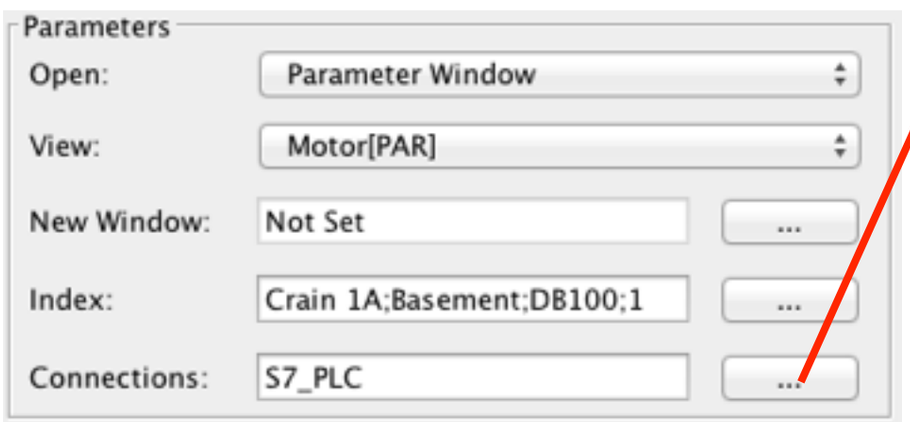
Online view will read correct real data from the PLC for a specific motor.





Parametric Views-Change Connections

Creating Graphics



Specify connection for opened view: you can specify to what PLC will your view link in Connections section:

1 means replace for S7_PLC connection

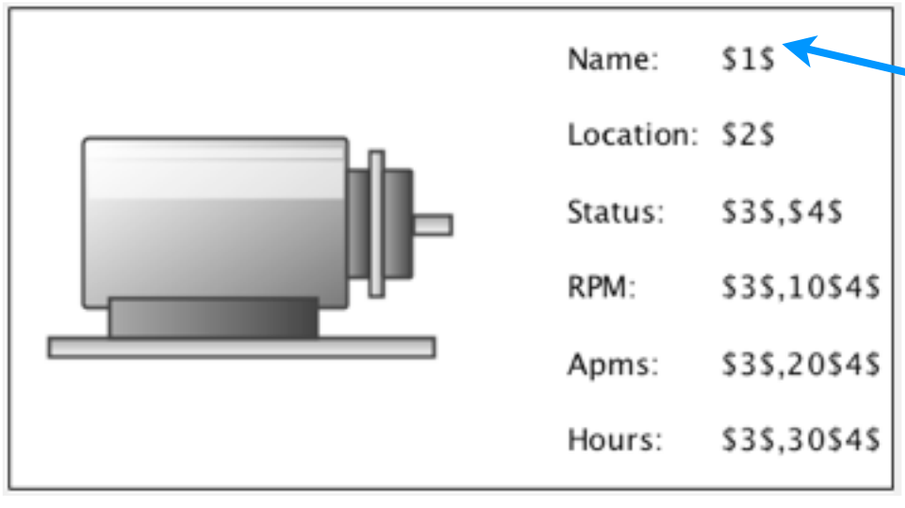
Tag Entering: DB3@1

3 means take 3rd parameter from Index.

Again as with Index parameter, you can define multiple replacements for your connections. To set more than one connection replacement use ";" to separate them.

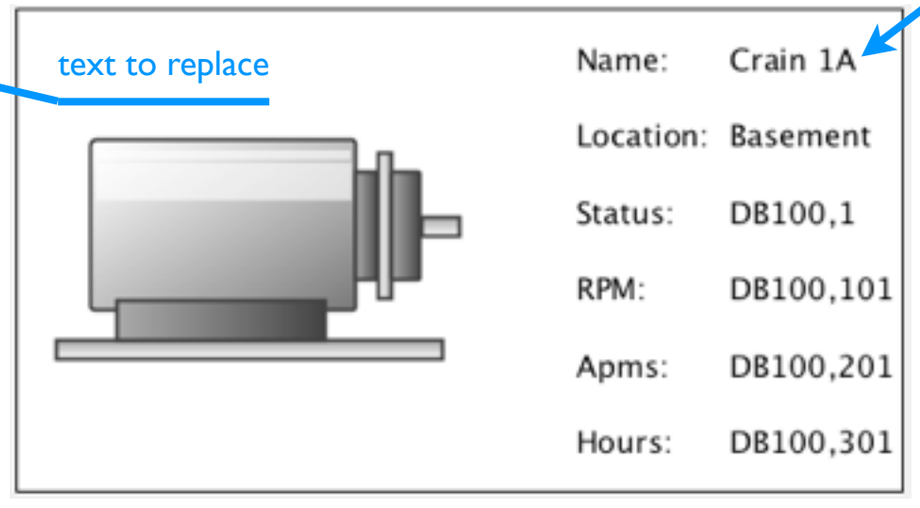
Use $number$ in texts

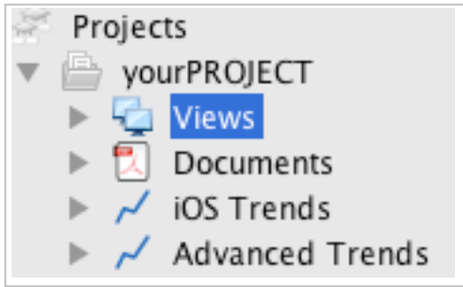
You can also use your Index parameter to include any parameter in the text elements:



text to replace

replace 1 with "Crain 1A"





Visual Scripting

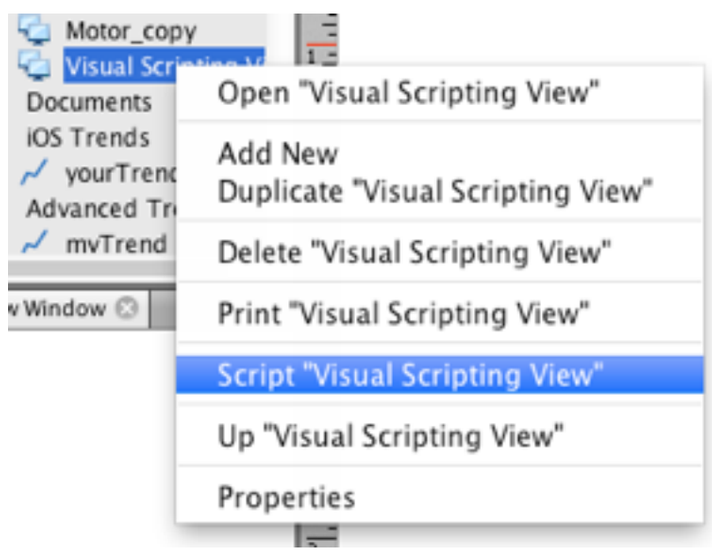
Creating Graphics

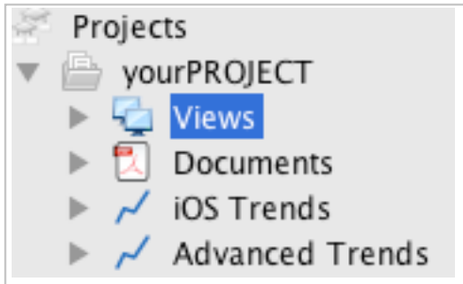
mySCADA provides many tools to perform the most common data acquisition, display, animations and effects without coding. For maximum flexibility mySCADA also includes complete scripting language based on Java Script. Java Script in mySCADA allows you to interact programmatically with most of mySCADA functions with a high level scripting language.

Easy to learn
Scripting can be used for all sorts of tasks. They can be as simple as setting a few output values to a preset state to complex animation scenarios. The possibilities are endless. Scripting is designed to be easy to use, extending the functions of mySCADA. You do not need to be an experienced programmer to use scripting. Using java script as a scripting language means you don't have to worry about memory allocations, leaks, and complex programming issues. Usage is very simple and straightforward.

Using visual scripting in your view:
For each view you can create its own script. Script is evaluated every time the active screen is refreshed. Refresh logic can be seen in the left side diagram.

Entering the script window:
In the Project Window locate the view you would like to script. Right click will present you with a menu, where you can select Script.

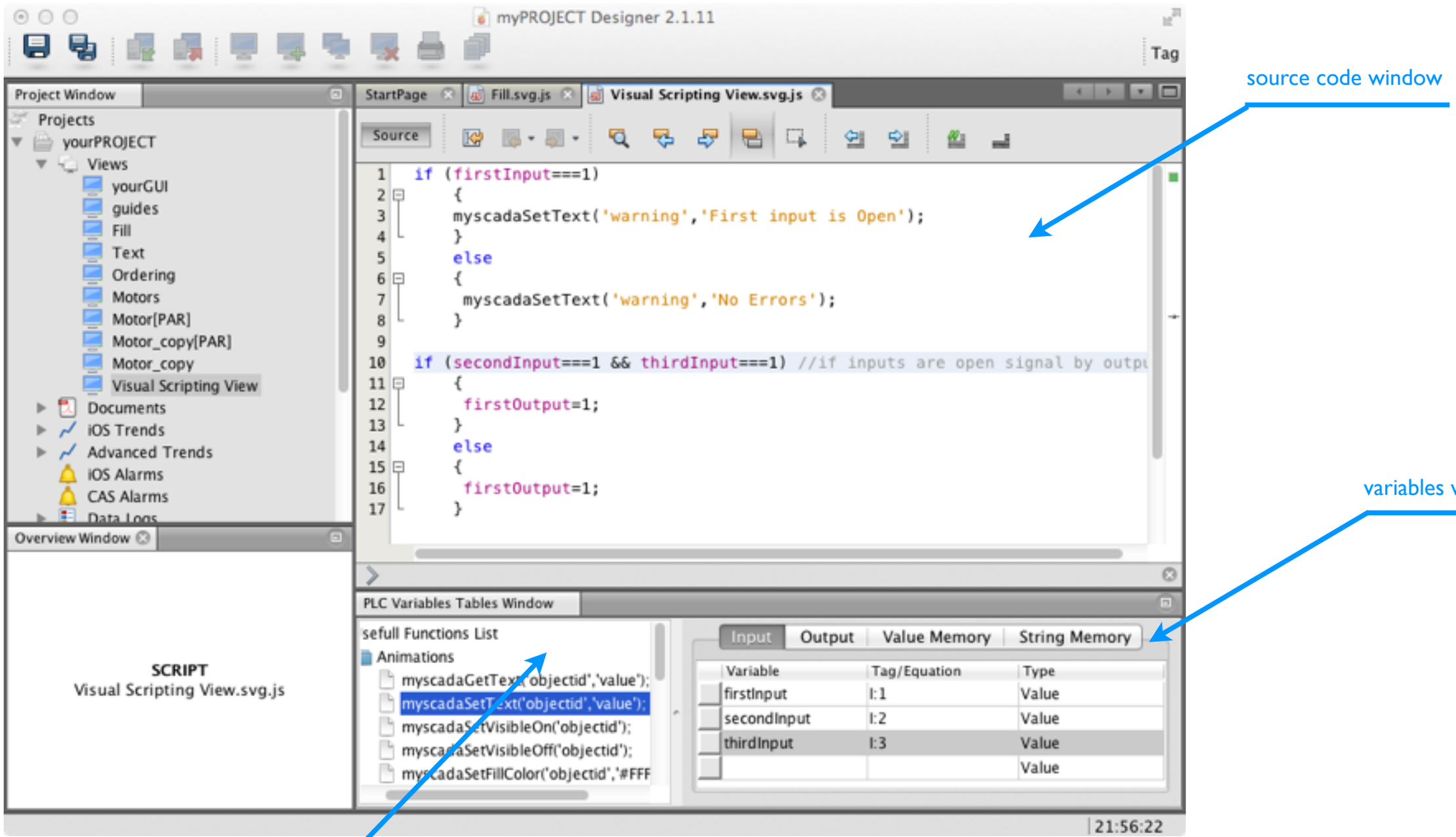


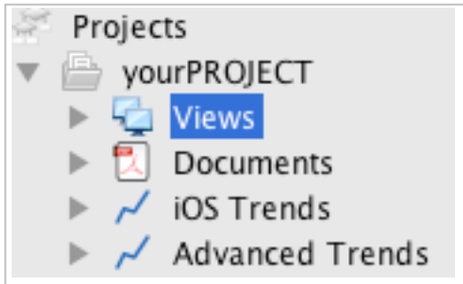


Visual Scripting - Edit Window

Creating Graphics

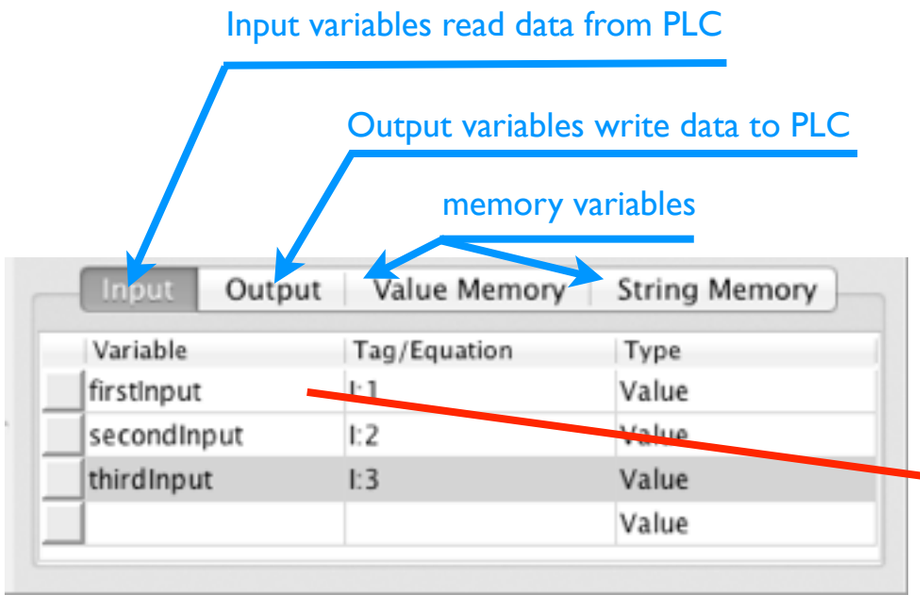
For each view, you can have one Visual Script. When you edit the script, a source code editing window is shown:





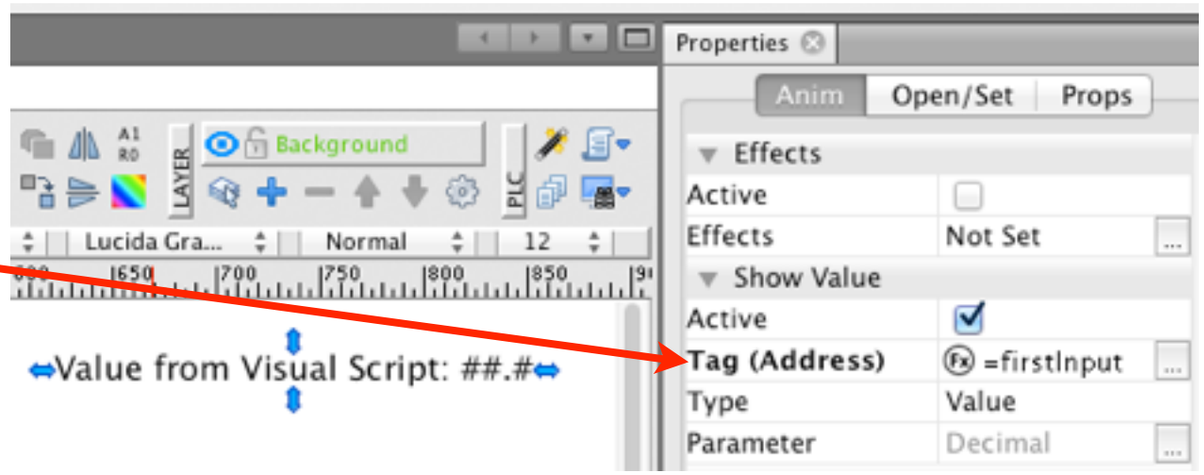
Visual Scripting - Using Variables

Creating Graphics

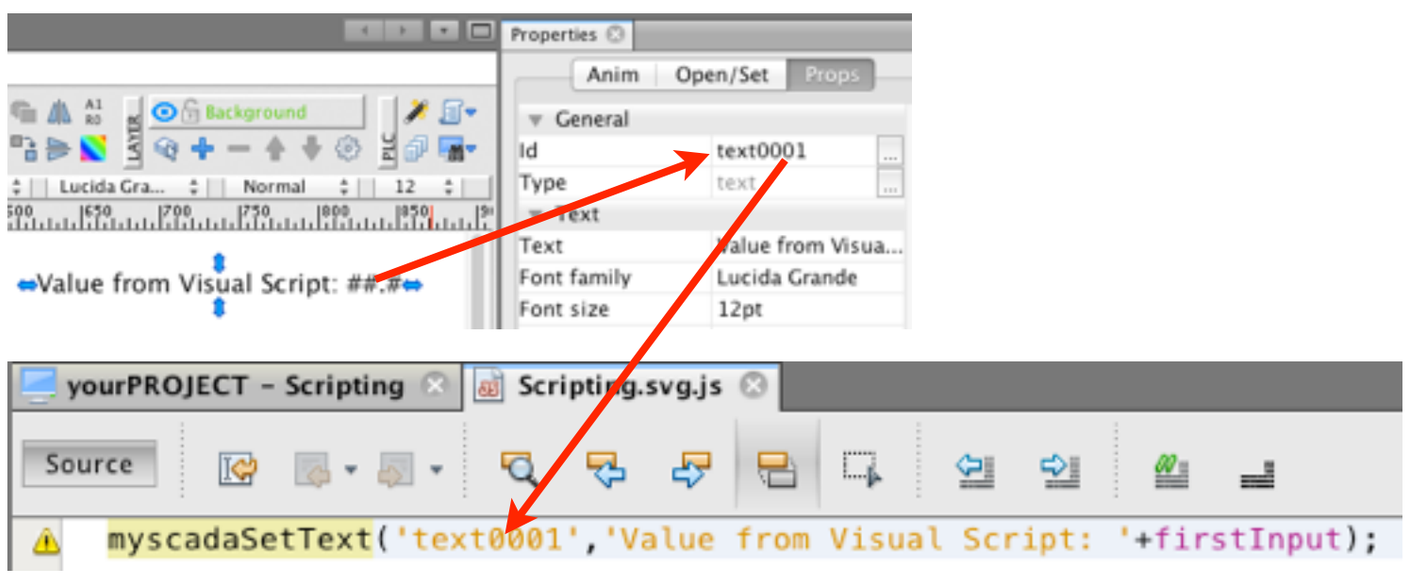


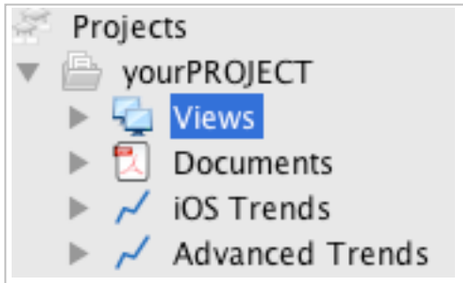
You can define 4 types of variables: Input, Output, Value Memory and String Memory. You can use this variables to read data from PLC, use them for computations, put them into any equation in your view and use them to write data to PLC.

Using variables in animations: you can use script declared variables in animations. To tie the variable with the animation use the equation editor as with regular PLC tags.



Trigger Animations Directly in Visual Script: you can control animations and effects directly in Visual Script. All necessary functions are listed in *Useful Functions List* window.

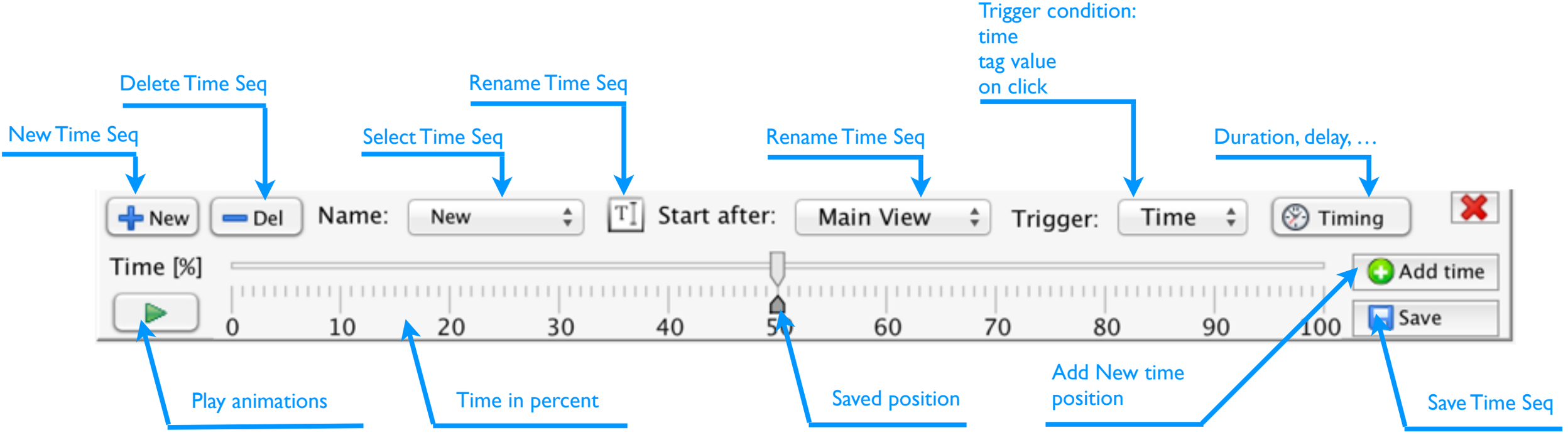


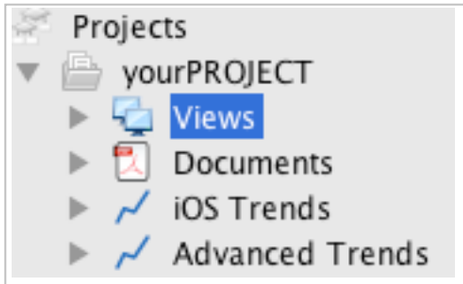


Time Sequence

Adding time based dynamics simple way

Time Sequence is a simple to use, yet extremely powerful functionality to add time based animations to your views. Time Sequence editor is implemented directly in GUI designer. It lets you graphically change properties of your drawn objects in specified time intervals. The mySCADA system automatically computes transitions among defined time intervals.

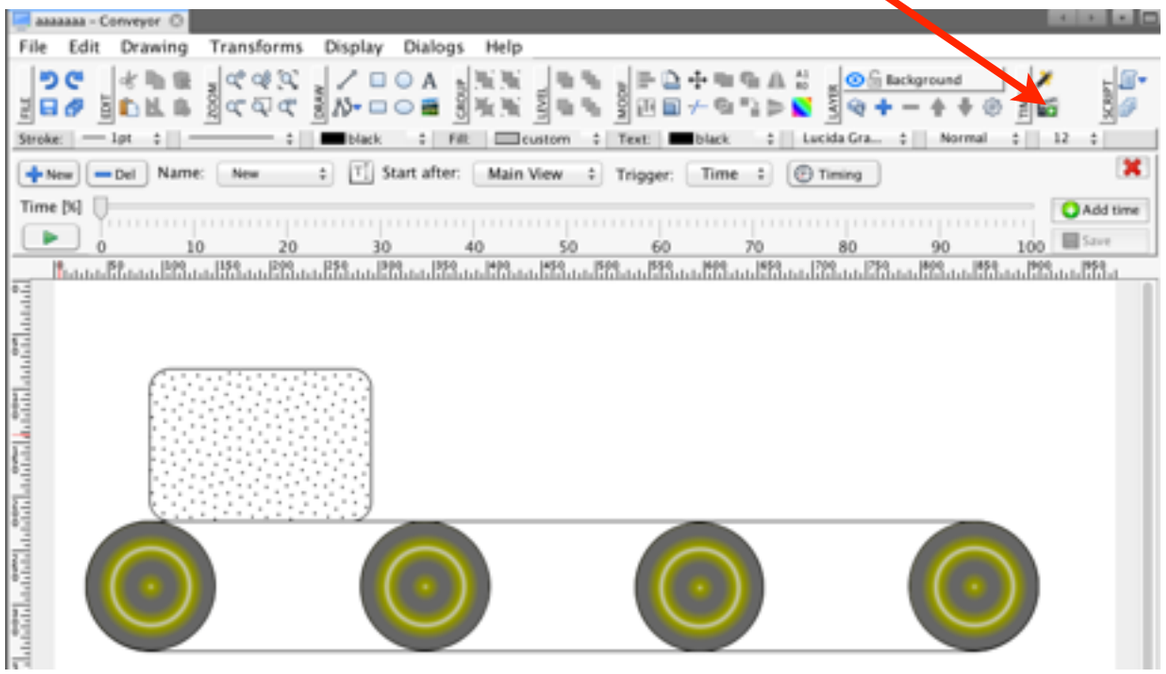




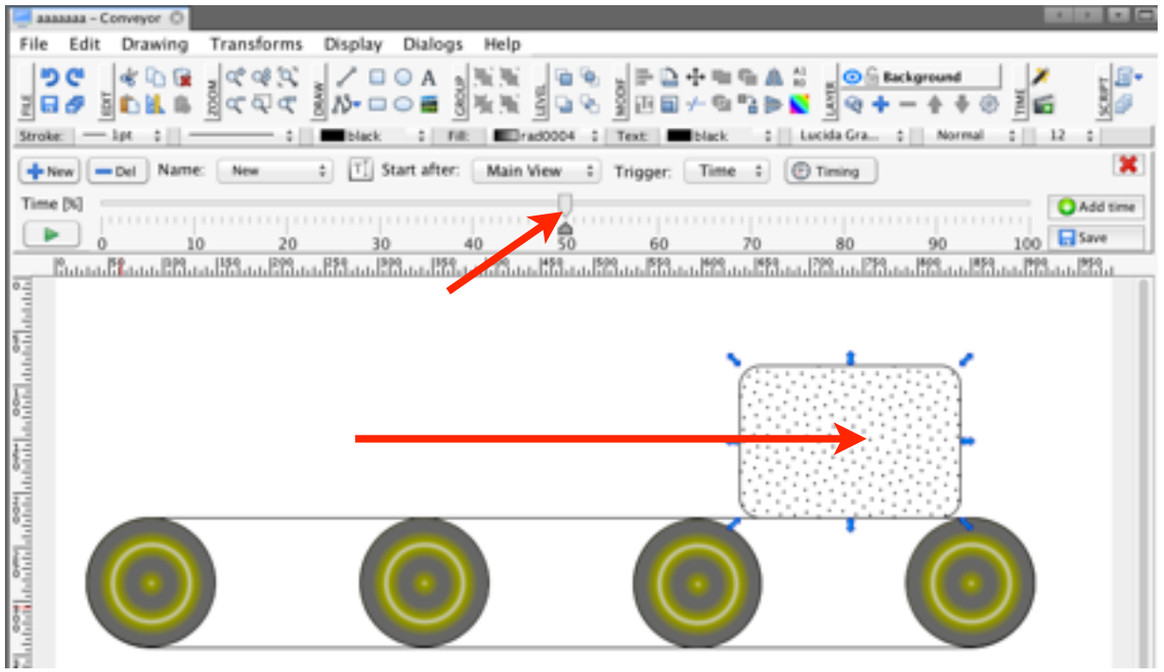
Time Sequence

Adding time based dynamics simple way

Step 1: Open Time Sequence Editor



Step 2: Move a Time Slider than modify objects



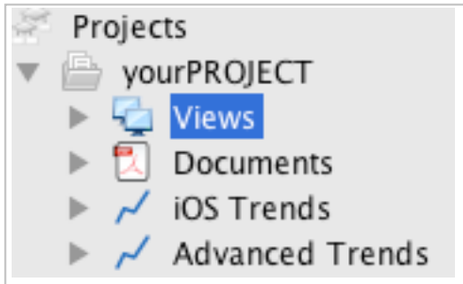
Step 3: Add more time positions and save

Allowed:

- position - move
- size change
- color change
- visibility

Prohibited:

- new element creation (please use visibility)
- rotation

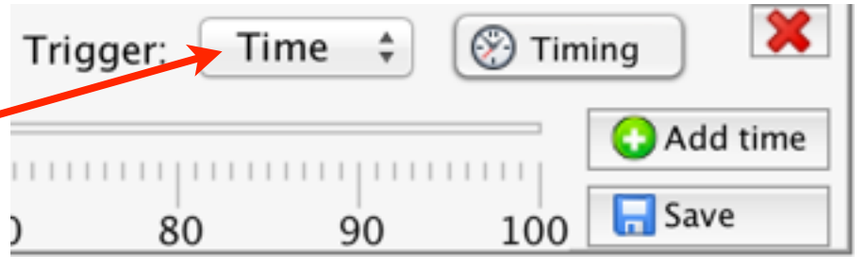


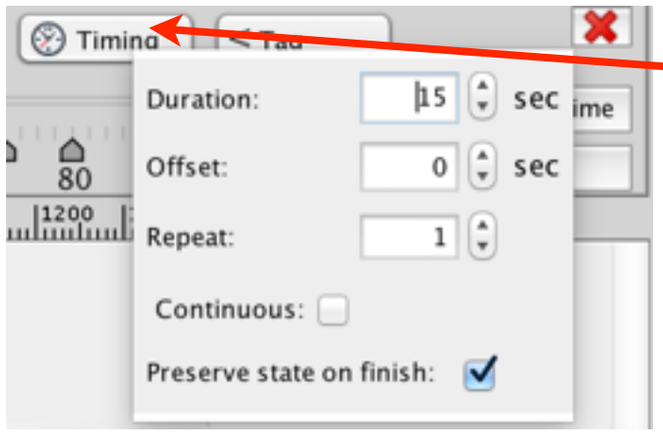
Time Sequence

Adding time based dynamics simple way

Time Sequence can be triggered by:

- TIME: from view shown
- TAG: read from PLC or virtual
- CLICK: on any graphical object





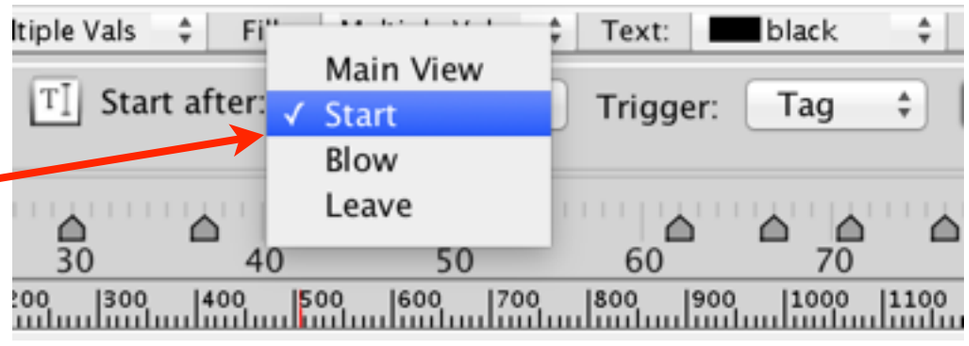
Modify timing:

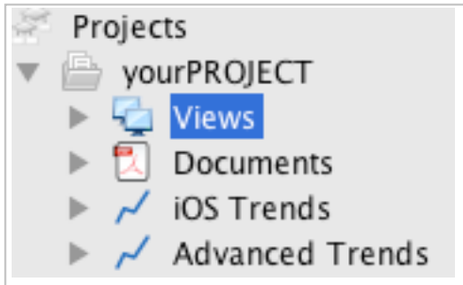
- Overall duration of sequence
- Time offset of sequence start
- number of repeats
  (or choose continuous)

TIP: Preserve state on finish will leave your objects in the state they were at the end of animation.

Nesting Sequences:

- create multiple sequences
- set start after for each sequence

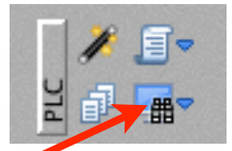


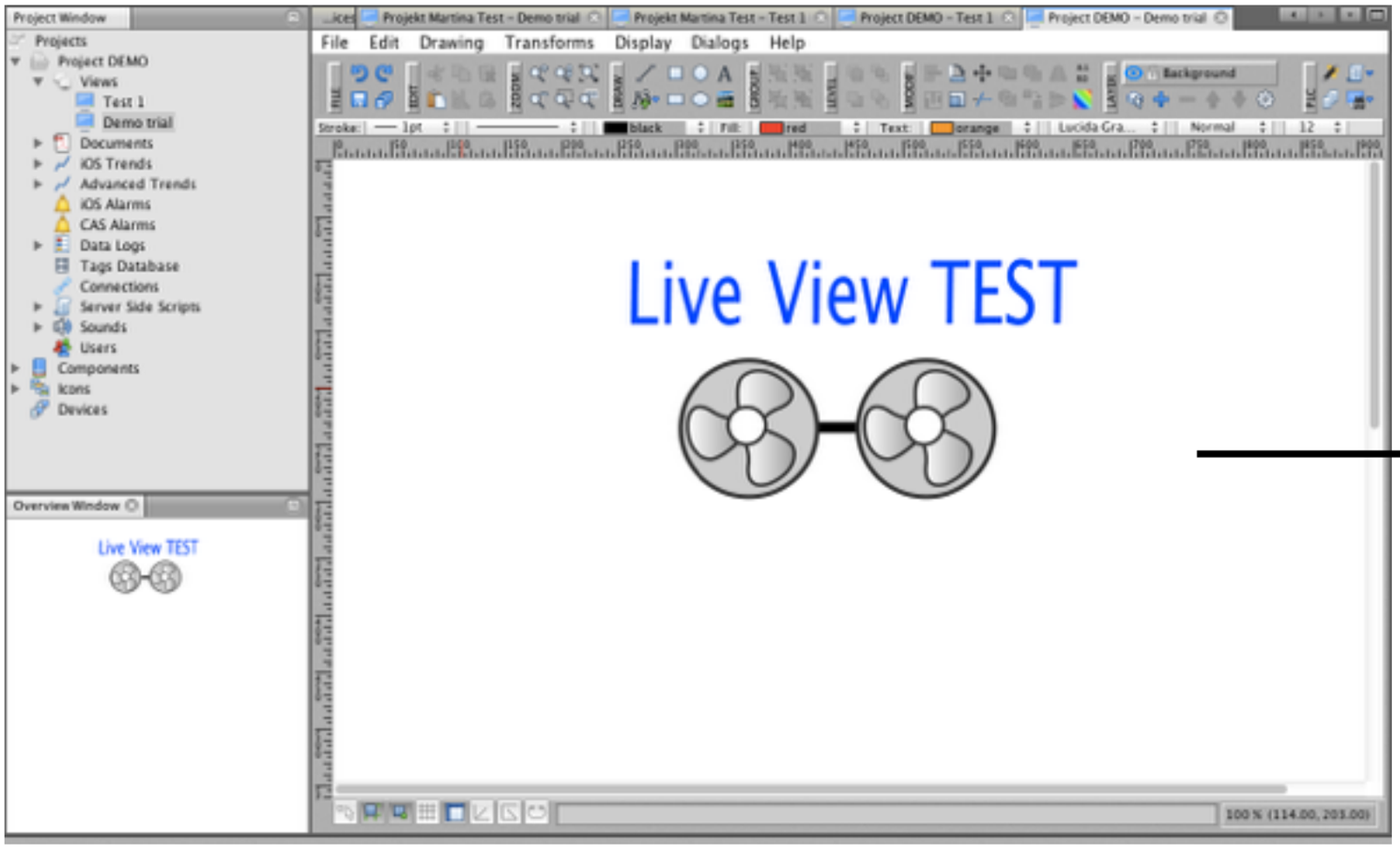


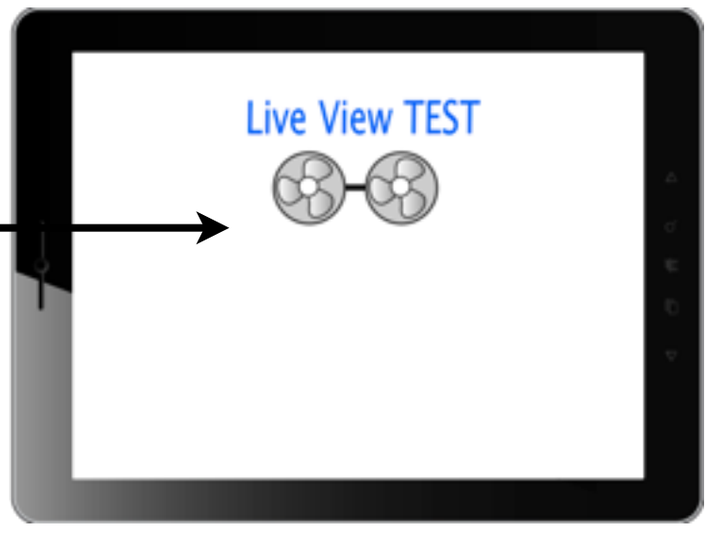
Live View - Testing Your View

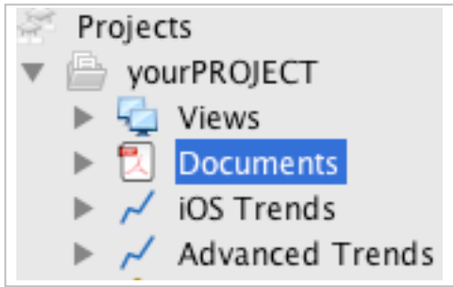
Creating Graphics

Live View is an immediate preview function to see what the visualization will look like on the screen of your mobile device. To be able to execute the Live preview function keep the mySCADA Mobile Application running your mobile device.







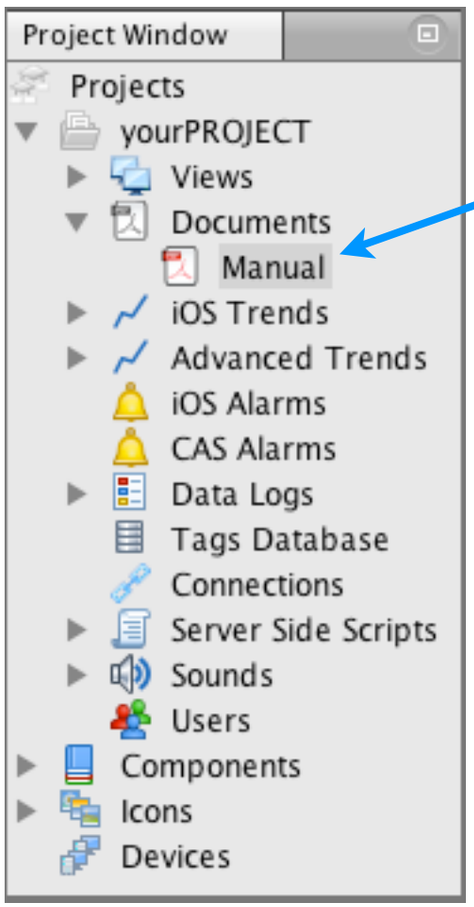


Documents

Link HMI Elements with Your Documents

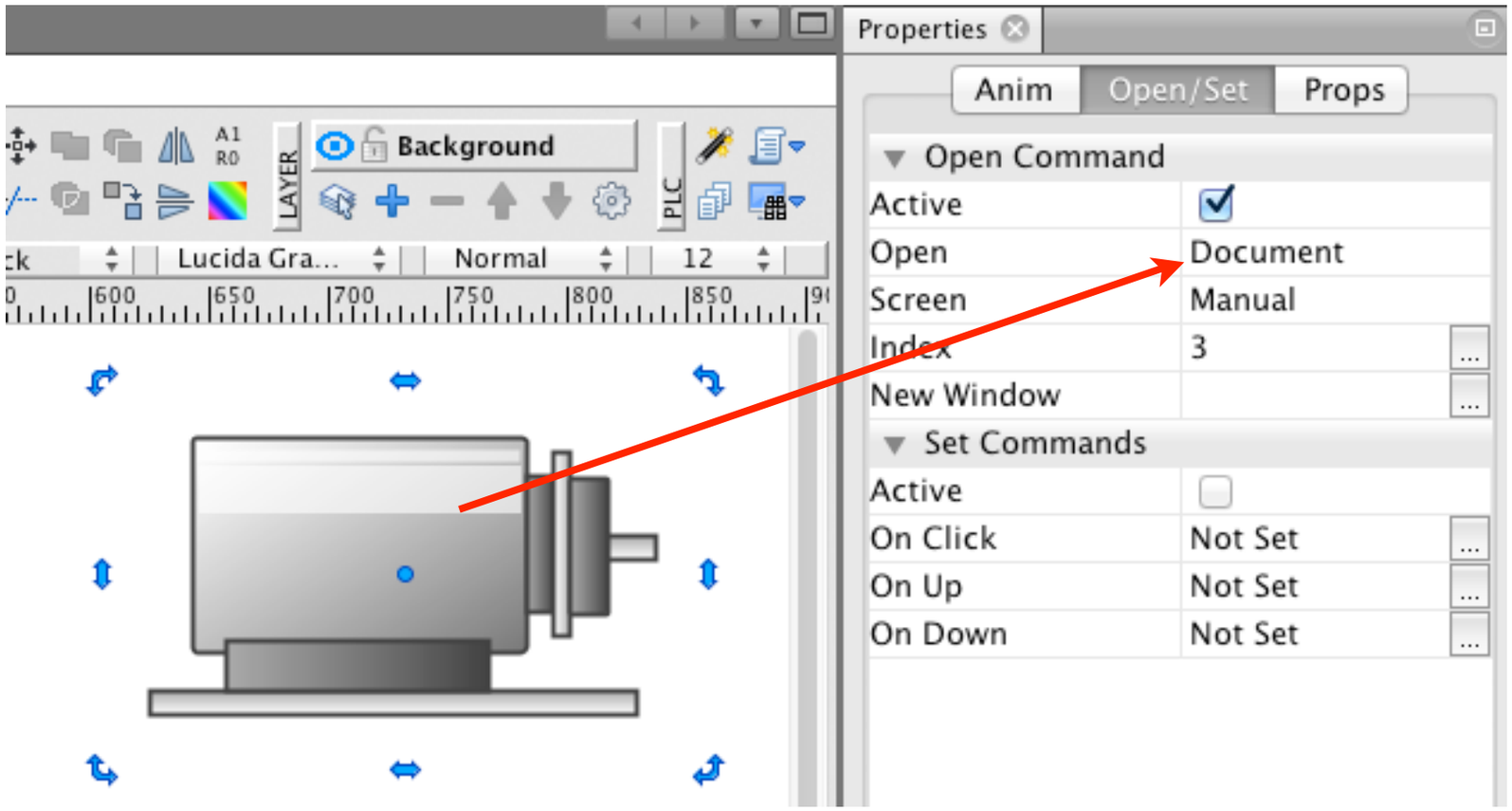
If you have your documentation in electronic form, you can interconnect any graphical object on the HMI screen with a PDF document imported in your mySCADA Project.

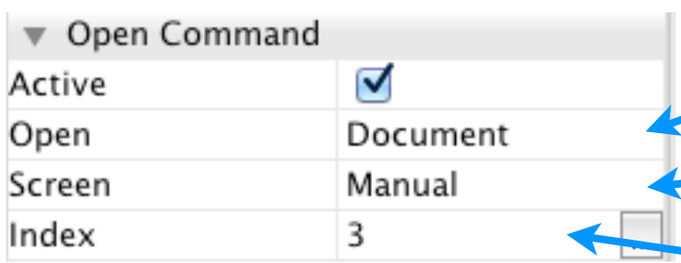
First import the PDF Document in the Documents folder in the Project Window. Right-click the Documents -> Import and select the PDF Document you want to import.



import PDF document

In the Properties window select the Open/Set tab, fill in the "Open", and select the desired PDF document.

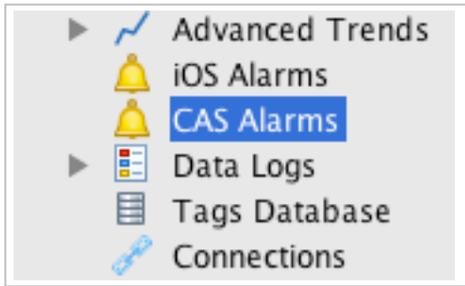




select Document

select your imported document

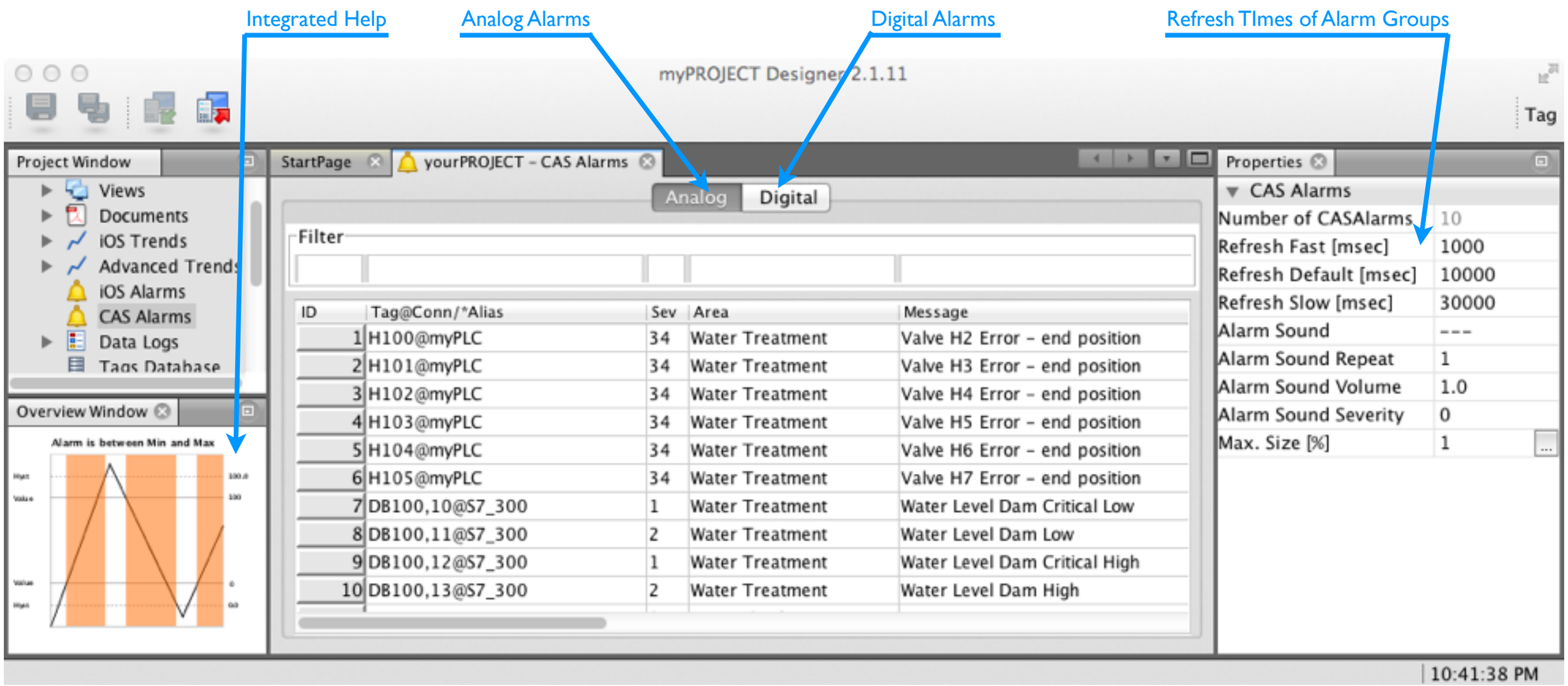
enter a page number to open a document at



CAS Alarms

Complex Alarm System

Alarming is essential part of mySCADA system. The myPROJECT Designer lets you, in a simple way, set up alarming even for complex situations.
Alarm definitions are split into two tables, one for analog and second for digital alarms. For analog alarms, you can specify complex evaluation criteria such as dependent conditions on multiple tags, complex equations, use dead band area. You can group alarms by area either geographical or virtual and you can have multiple alarms defined on one technological object. Alarms can be filtered by severity value, alarm text, area and by objects.

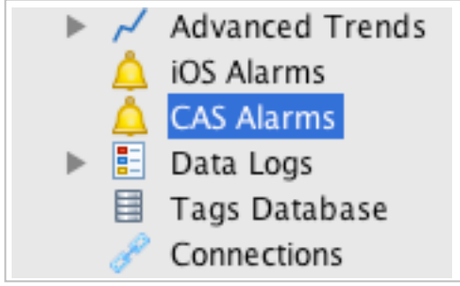


CAS Alarms

Complex Alarm System

Table below explains all possible options for each defined alarm.

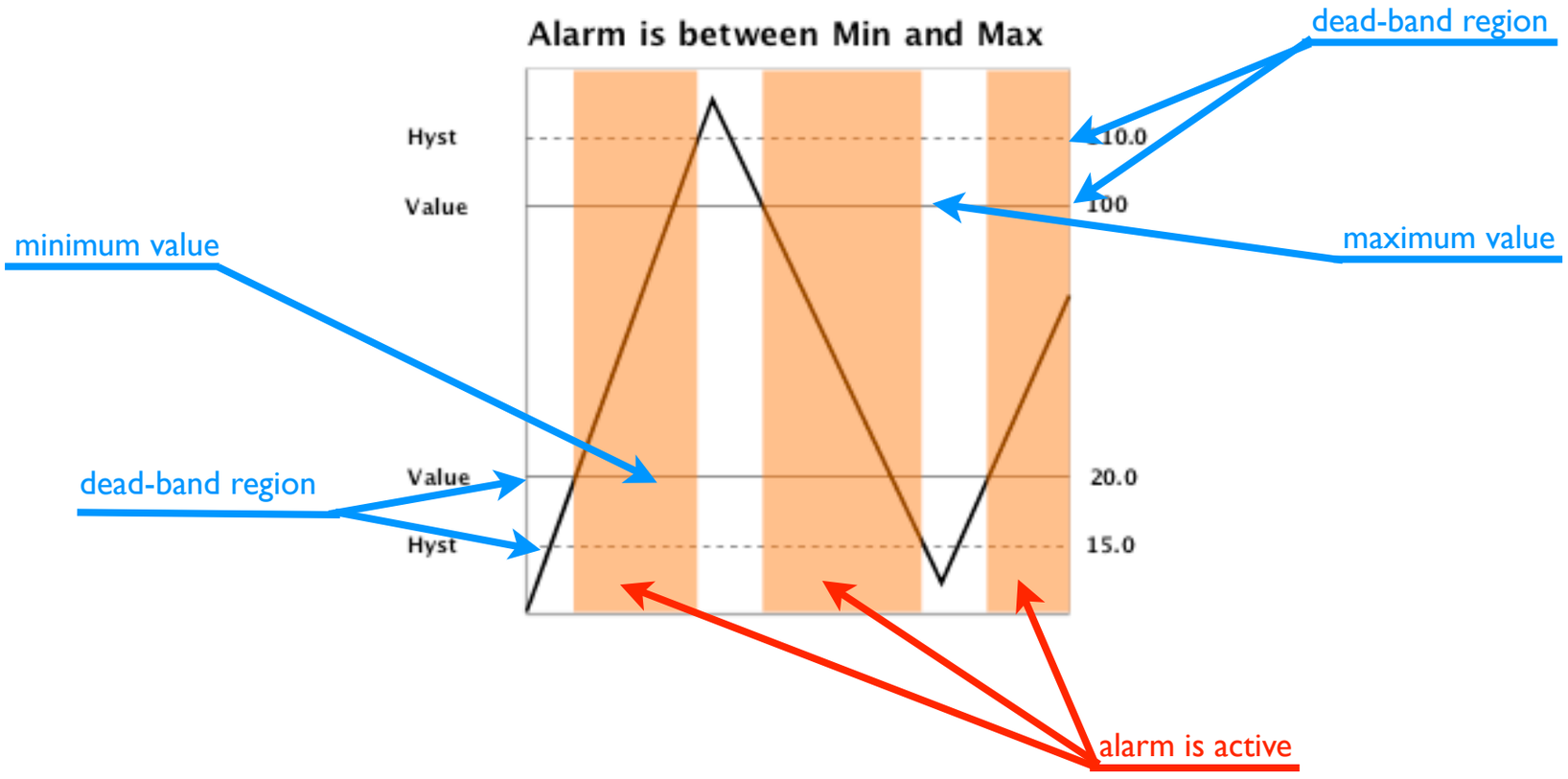
ID	Automatically generated unique ID. You will need this ID when accessing alarms from server side scripts.
Tag@Conn / *alias	Tag (Address) or Equation specifying data read from PLCs.
Severity	Severity is an unsigned integer value specifying the importance of a given alarm. The lower the number, the higher the priority.
Area	You can split your alarms by geographical or virtual area that they belong to. An Area is a string value you can use to filter the alarms.
Message	The message of your alarm.
Device	The name or description of the device this alarm belongs to. One device can have multiple alarms defined.
Inv	Check to invert alarm (when digital alarm is inverted it is active at the value 0, for analog alarm activation area is reversed).
Hide	Enable to hide the alarm from the user. This is useful when you use alarm as condition in triggered data-log. Hidden alarm is not shown in alarm window and is not logged into database.
Delay	Specify delay in milliseconds as long the condition must be active before alarm can activate. This is time hysteresis function.
Refresh	Specify the refresh rate of your alarm. You can set 3 predefined groups: default, fast, slow. You can change the refresh values for each group in the properties window.
email	Check to send email on each alarm activation or deactivation.
SMS Act	Check to send SMS on each alarm activation.
SMS Deact	Check to send SMS on each alarm deactivation.
G0 - G9	Check appropriate user group to receive alarms by email and SMS.



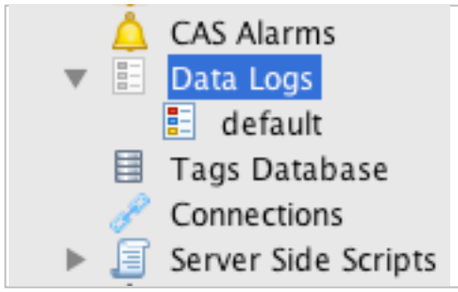
CAS Alarms - Analog Values

Complex Alarm System

Analog alarms are tied to analog values usually read from the PLC. Aside of common parameters which are the same for digital and analog alarms, you should specify minimum and maximum values for your tag or equation. You can also specify the dead-band region for any value to eliminate false alarms.



Dead-band region helps to eliminate nuisance alarms caused by a tag's value wandering above and below the alarm limit. A Tag will enter an alarm condition only when the tag's value exceeds the alarm limit. However, the point will NOT go OUT of alarm until the point's value exceeds the dead-band.



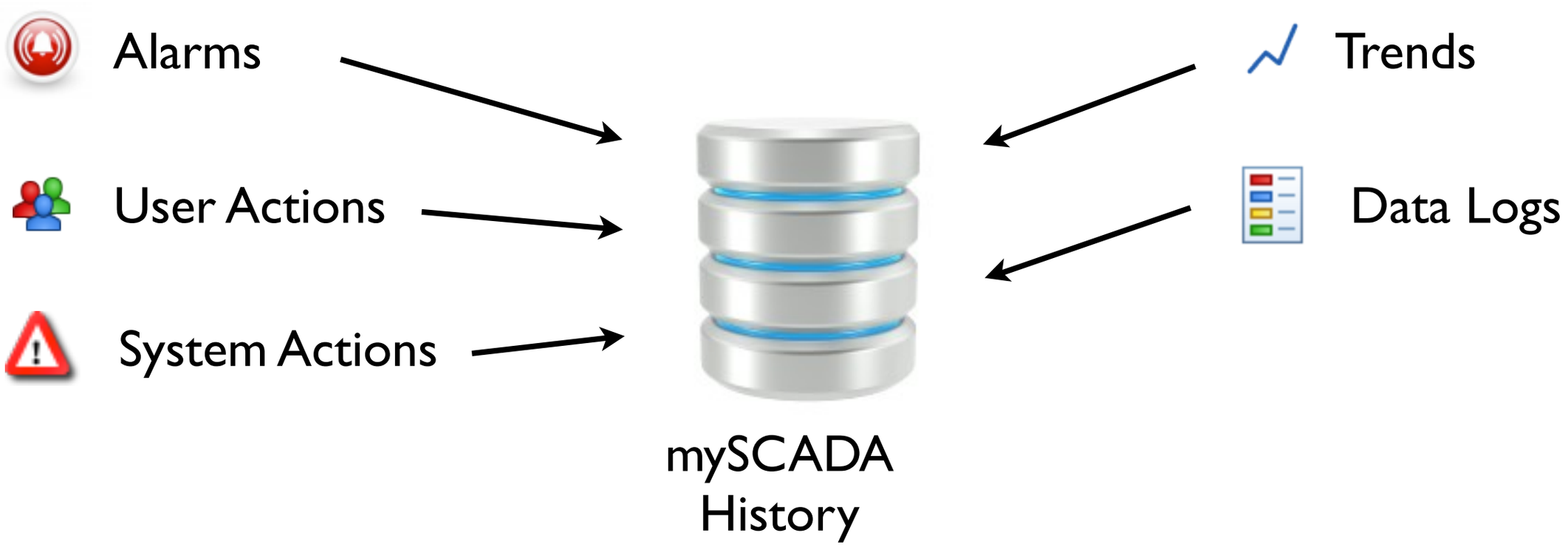
Historical Data

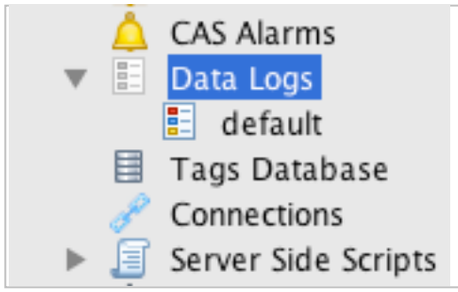
Historical Data

• You can log and access complete history of alarms, all users actions, and any technological data you wish to log. The historical data are grouped into logical sections called the Data Logs.

• Data Log has many options you can set up to fine tune your logging options. You can simply optimize your data logs for speed and storage.

• Data logs can be periodic or event driven. Using pre and post event buffers, you can save collection of data before the specified event has happened.

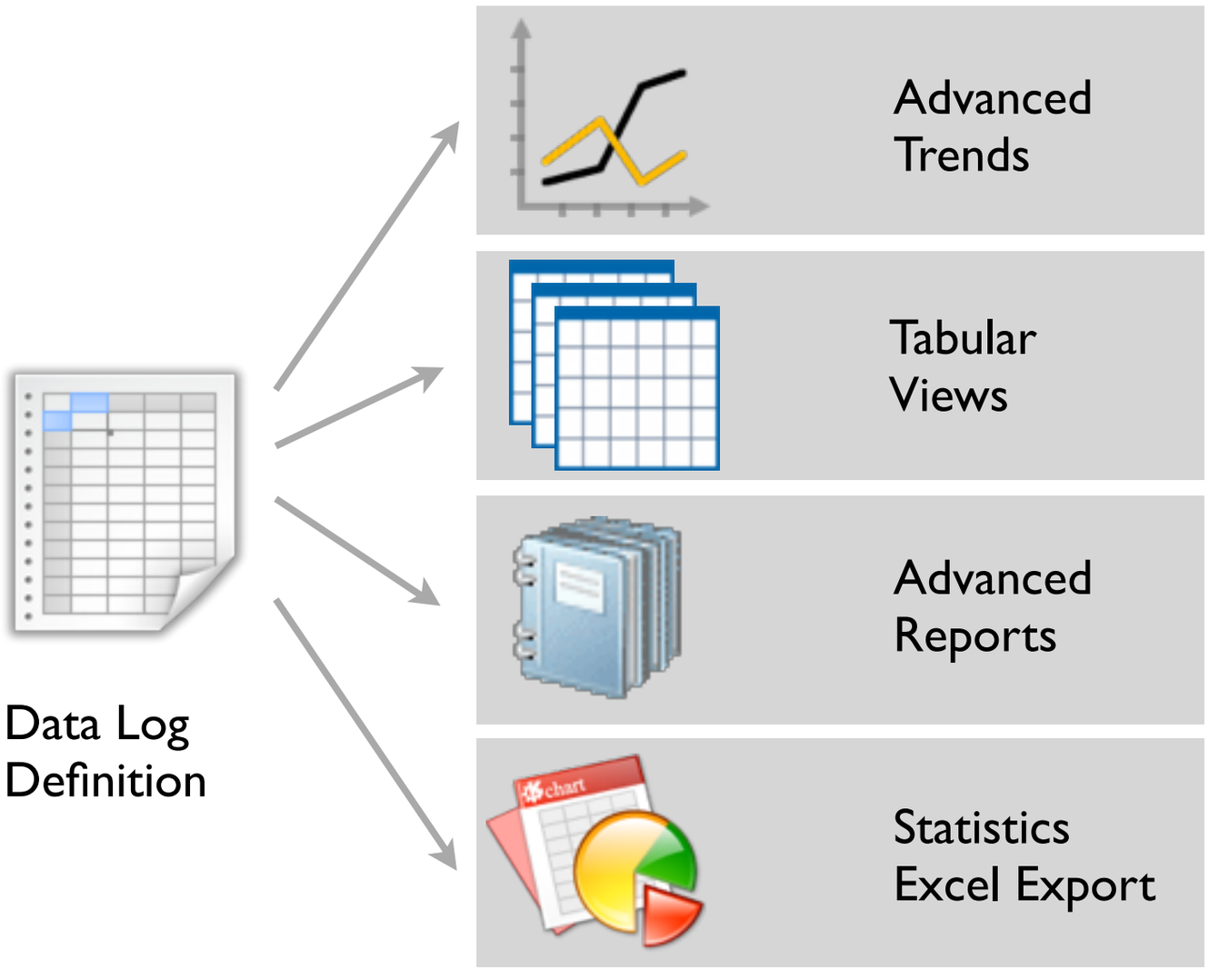


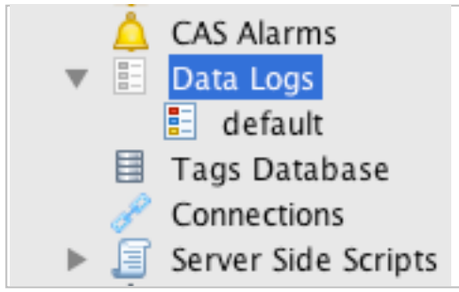


Data Logs

Historical Data

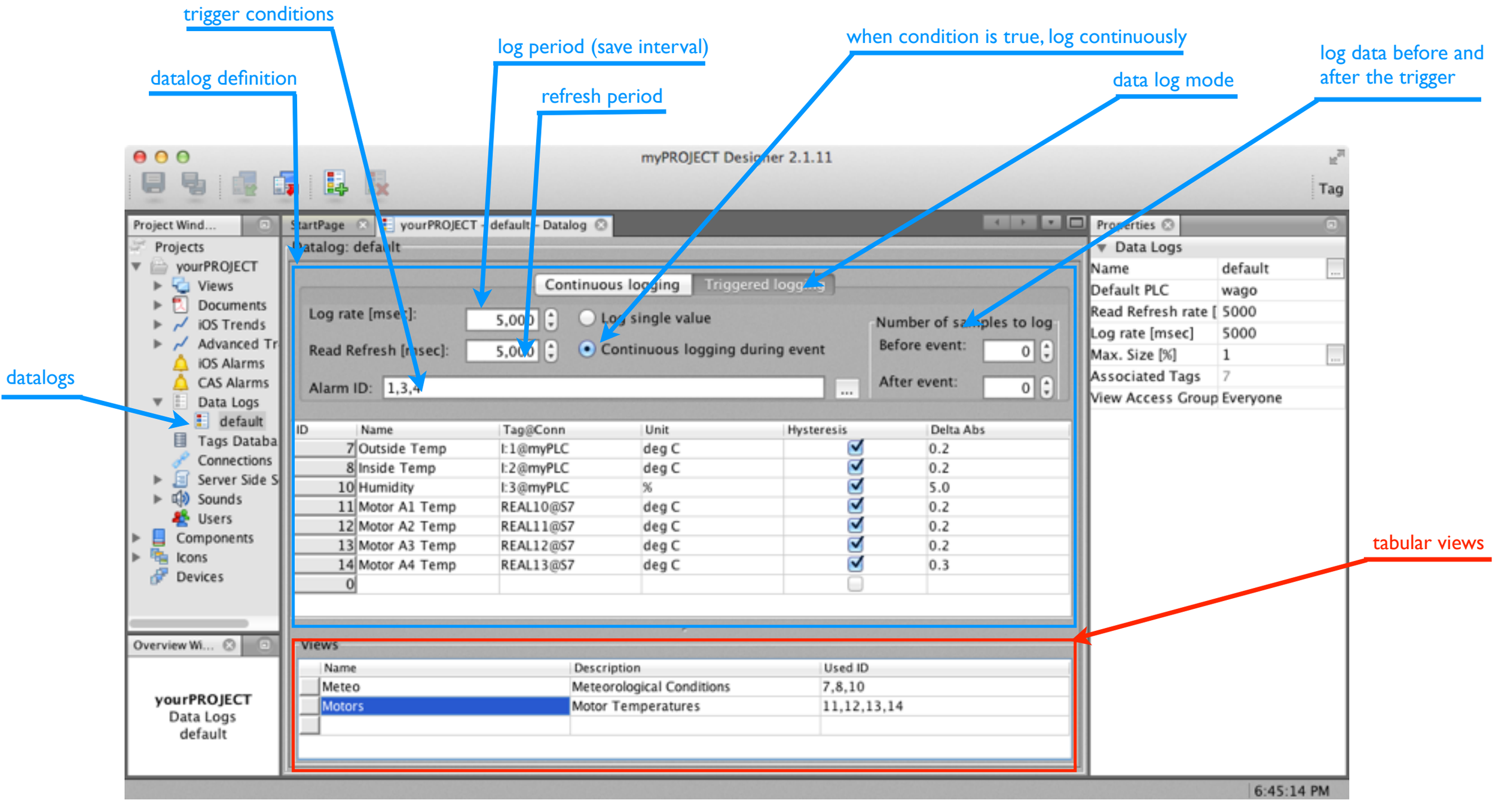
You can log eventually any data or information available in mySCADA. For user convenience and easy access the data are grouped into so called "Data Logs". You can think of data log as a collection of similar data. It can be for example a set of temperatures read each second from a PLC, a motor start up voltage and current logged each 100 milliseconds, run hours of machinery, operators' actions, or computed production statistics. You can also log any user defined variables from Server Side Scripts via the virtual PLC.

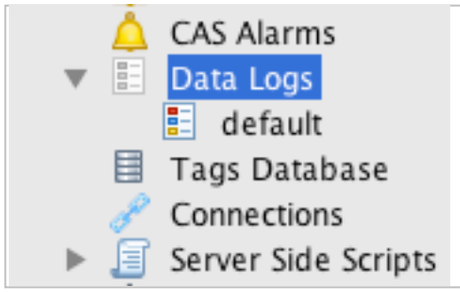




Data Logs

Historical Data





Data Logs

Historical Data

Data logs: are data sets grouped together. Each data log has a set of parameters such as log period, pre and post event buffers and so on. Every data log is defined by the data you wish to read and log. Data is the collection of data points. Data points can be variables read from PLCs, user defined variables and computed statistics from Server Side Scripts.

Data point: can be either a numerical value or an array of values. Numerical value can be of any numerical type such as boolean, integer, float, double, signed of unsigned. Numerical value is always automatically converted and logged as double value. This way you don't have to care about data type and its conversions. An array can represent a set of numerical values, buffer, string or date. Representation of array is user-defined by its type, however, you can change its type any time later - without data loss. You can freely combine numerical values and arrays in a single data log. Therefore, you can have values, strings and dates logged together.

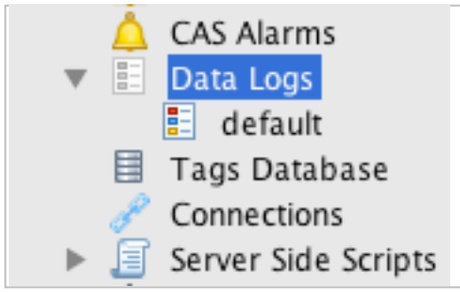
Data Log Types

Continuous data logs

Log data periodically without interruption. This type of data log is useful mainly for persistent processes.

Triggered data logs

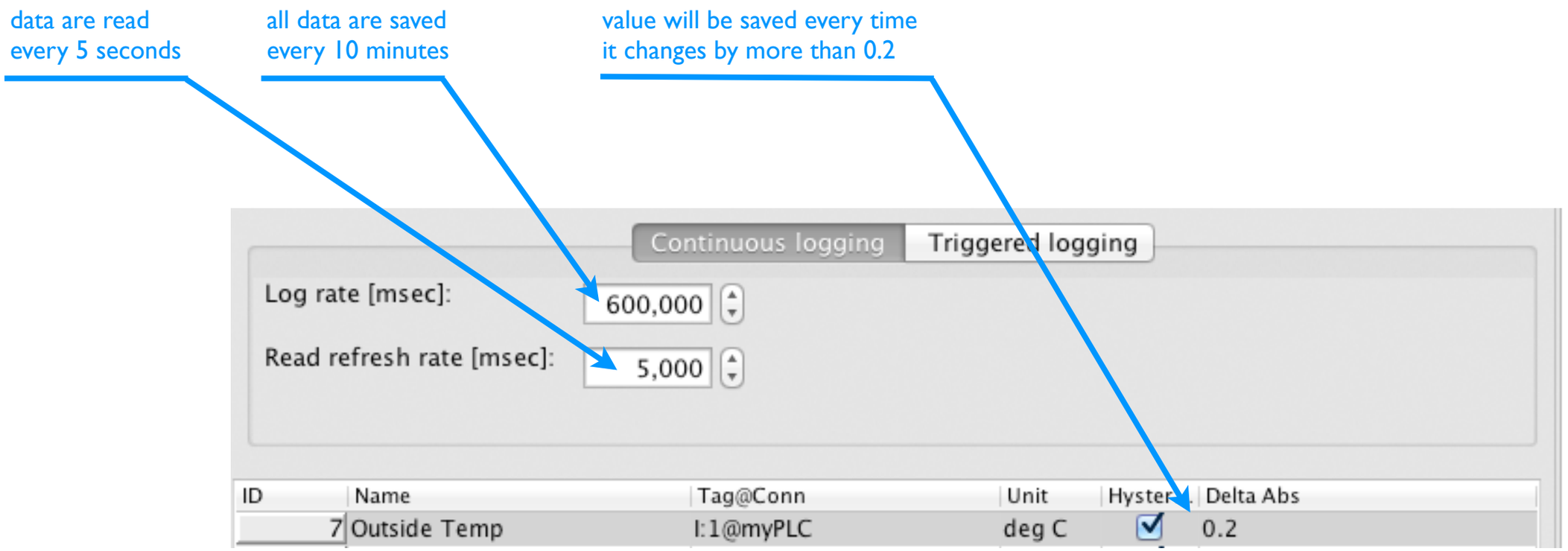
Log data which depend on some event - condition. The condition is specified by alarm ID. This type of data log is useful for repetitive or random processes where you can specify the start condition.

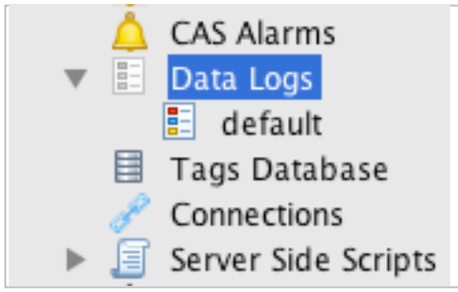


Data Logs - Continuous

Historical Data

The purpose of the continuous data log is to log data periodically without interruption. This type of data log is useful mainly for persistent processes.
With continuous data log you define the **read refresh rate** in milliseconds. With this period, all data defined in data log are read from PLCs and logged into database. For any data point you can define **hysteresis** for data logging. When hysteresis is enabled for a given data point, data point is read each read cycle defined by the read period, however it is logged only if its value changed by more than defined hysteresis value. This can be especially useful when logging analog data which does not change very often. When you set the hysteresis of some data points in the data log, you can specify the **log rate** - this is the period in which all data points in the data log will be logged regardless of whether they have changed of not. By enabling hysteresis, you can dramatically decrease the number of historical data logged while maintaining precision and time continuity of the data.





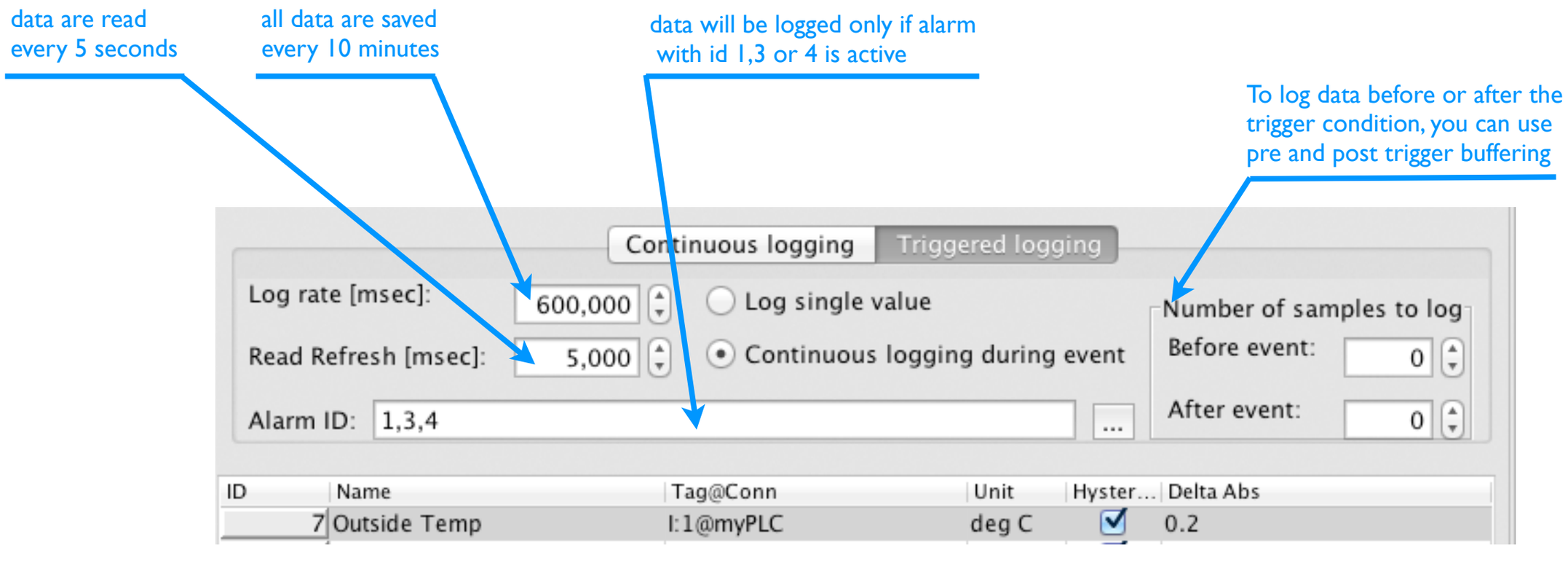
Data Logs - Triggered

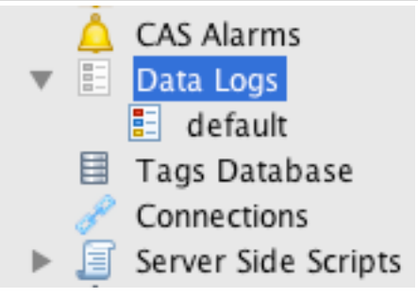
Historical Data

The purpose of the triggered (event driven) data log is to log data depending on some event - condition. This is useful for repetitive or random processes where you can specify the start condition. You can, for example, log production data only at the time when the production line is running, or log data at the system failure and use the logged data for diagnostic purposes. With event driven data log you specify the start of the event by a condition. If the trigger condition is met, the system is recording the data.

Pre trigger buffering: *you specify the number of time samples to log before the trigger condition is met. The system automatically keeps the number of defined time samples in memory. If the event occurs, the system will flush all the buffered data into a database and continue logging.*

Post trigger buffering: *the system will continue to log your data even after the trigger condition has stopped. You should specify the number of time samples to log after the trigger condition has ended. Time sample duration is equal to the read period.*





Data Logs - Tabular Views

Historical Data

Each data log can have defined multiple tabular views. You can define tabular views in the same window as you define the data log. Tabular views enable to display all captured data from your data log in the form of a table.

Datalog: default

Continuous logging | Triggered logging

Log rate [msec]: 600,000

Read refresh rate [msec]: 5,000

ID	Name	Tag@Conn	Unit	Hysteresis	Delta Abs
7	Outside Temp	I:1@myPLC	deg C	☑	0.2
8	Inside Temp	I:2@myPLC	deg C	☑	0.2
10	Humidity	I:3@myPLC	%	☑	5.0
11	Motor A1 Temp	REAL10@S7	deg C	☑	0.2
12	Motor A2 Temp	REAL11@S7	deg C	☑	0.2
13	Motor A3 Temp	REAL12@S7	deg C	☑	0.2
14	Motor A4 Temp	REAL13@S7	deg C	☑	0.3
0				☐	

Views

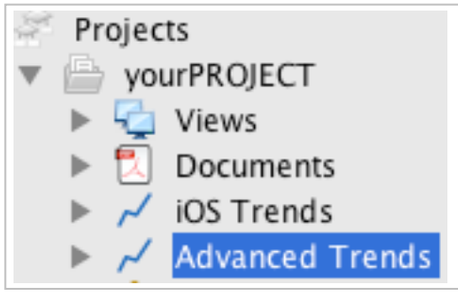
Name	Description	Used ID
Meteo	Meteorological Conditions	7,8,10
Motors	Motor Temperatures	11,12,13,14

tabular views

IDs of your data points you would like to include in the tabular View

In this example, we have one data log where we log temperatures and humidity. You can see we log data from two different PLCs (myPLC and S7).

We have defined two tabular views: Meteo and Motors. mySCADA will automatically generate two tables for the user based on your tabular views definitions. This way the user can browse and save the historical data or export them into Excel for further evaluation.



Advanced Trends

Historical Trends

You can easily present your historical data in the form of a historical trend.

advanced trend definitions

data log to read data from

data point - tag

legend

pen color

myPROJECT Designer 2.1.11

Tag

Project Window

Projects
yourPROJECT
Views
Documents
iOS Trends
Advanced Trends
myTrend
iOS Alarms
CAS Alarms
Data Logs
default
Tags Database

Overview Window

yourPROJECT
Advanced Trends
myTrend

yourPROJECT – myTrend – Advanced Trends

Datalog	Tag	Description	Unit	Color
default	I:1@myPLC	Inside Temp	deg C	
default	I:2@myPLC	Outside Temp	deg C	

Add Tag | Delete Tag | Edit Tag | Shift Up | Shift Down

Properties

Advanced Trends

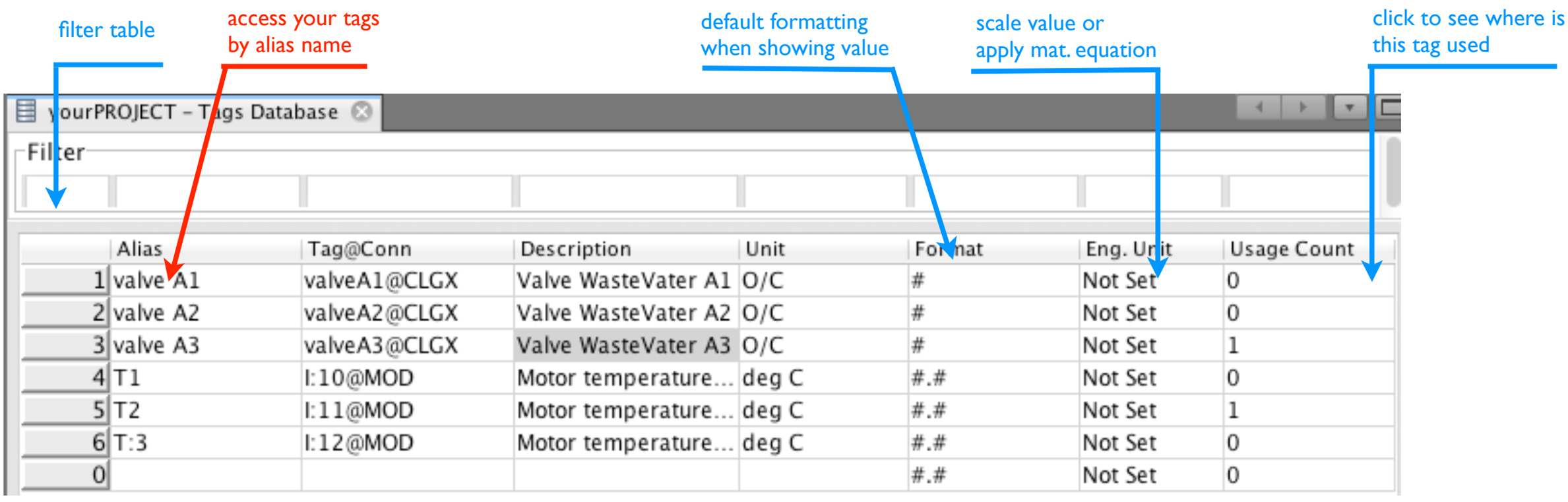
Name	myTrend
Description	
Refresh [msec]	1000
No. of Records	100
Smoothed	
View Access Grou	Everyone
No. of Tags	2

6:54:03 AM

Tags Database

Manage your tags easily

The tags database is very useful for managing all your tags and connections. mySCADA flexible design does not require you to the use tag database, however it can be a powerful tool if you do so. You can start your project by creating or importing a tag database and than designing your project afterwards. Or you can let mySCADA Designer to interactively create tag database for your purposes as you enter the new tags.



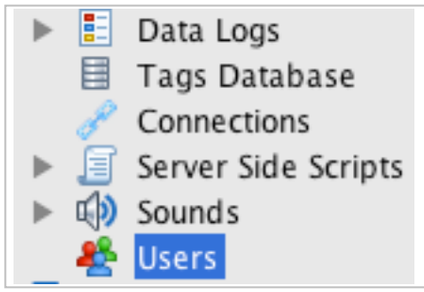
	Alias	Tag@Conn	Description	Unit	Format	Eng. Unit	Usage Count
1	valve A1	valveA1@CLGX	Valve WasteVater A1	O/C	#	Not Set	0
2	valve A2	valveA2@CLGX	Valve WasteVater A2	O/C	#	Not Set	0
3	valve A3	valveA3@CLGX	Valve WasteVater A3	O/C	#	Not Set	1
4	T1	I:10@MOD	Motor temperature...	deg C	#.#	Not Set	0
5	T2	I:11@MOD	Motor temperature...	deg C	#.#	Not Set	1
6	T:3	I:12@MOD	Motor temperature...	deg C	#.#	Not Set	0
0					#.#	Not Set	0

Tag syntax:

Tag: tag@connection_alias

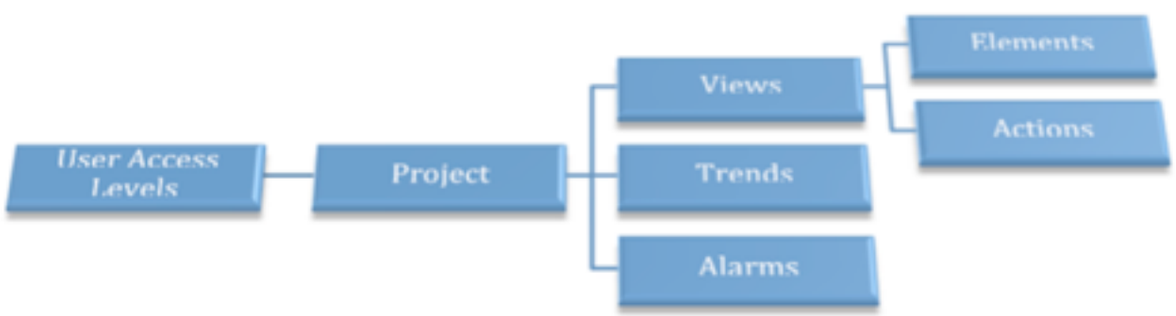
Alias: *alias

Equation: =2*adr(H100@wago)+alias(offset)+sin(...



User Access

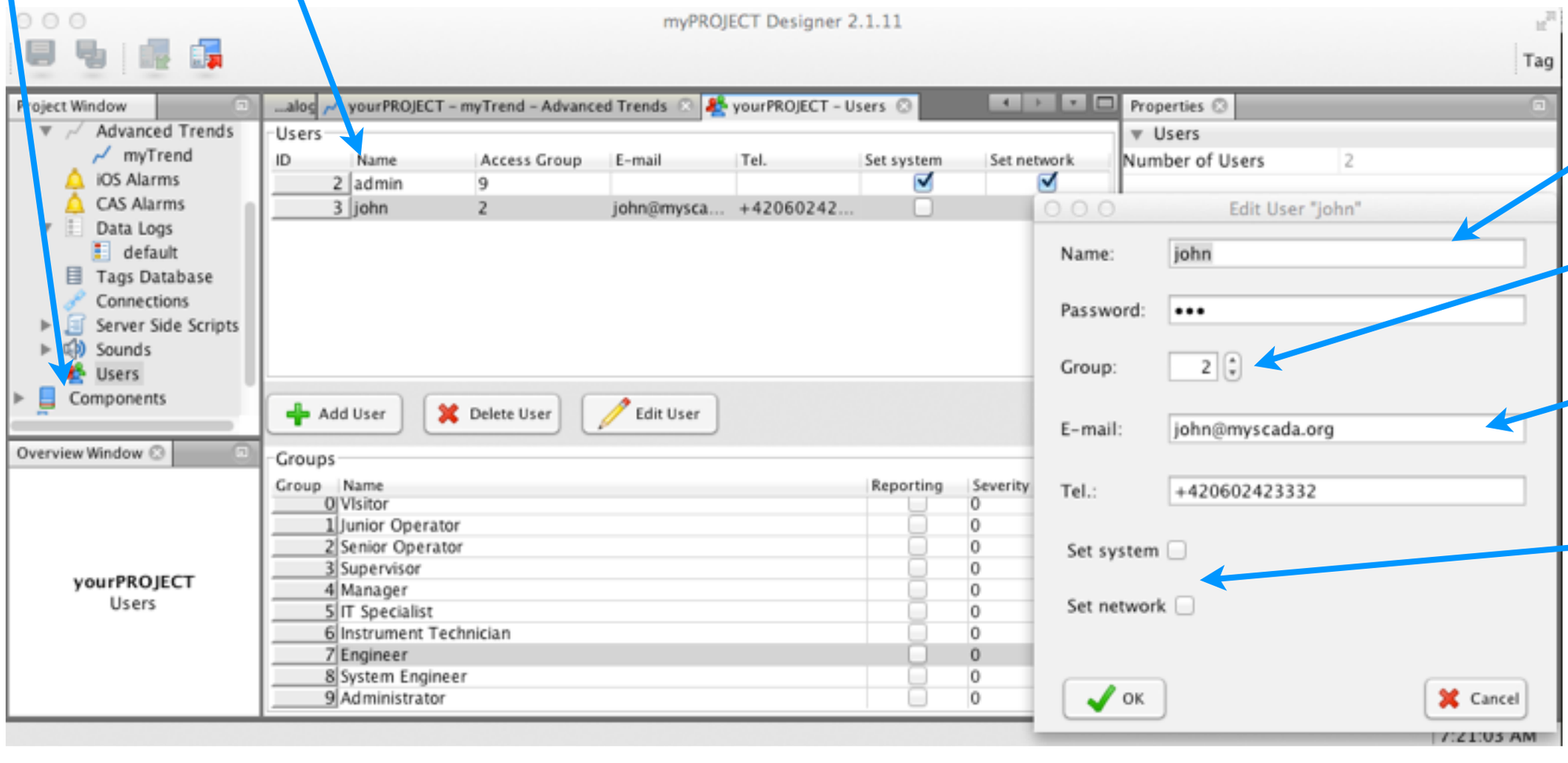
Protect Your System



User Access protection is integrated on all levels of access to guarantee high level of transparency and traceability of all user actions. You can define up to 10 user groups to grant access rights for different users of your system. The number of users of the system is not limited.

users

users list

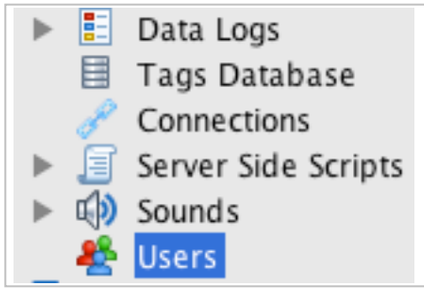


adding new user

access level

email and telephone for alarms and reporting

let the user configure system parameters and network

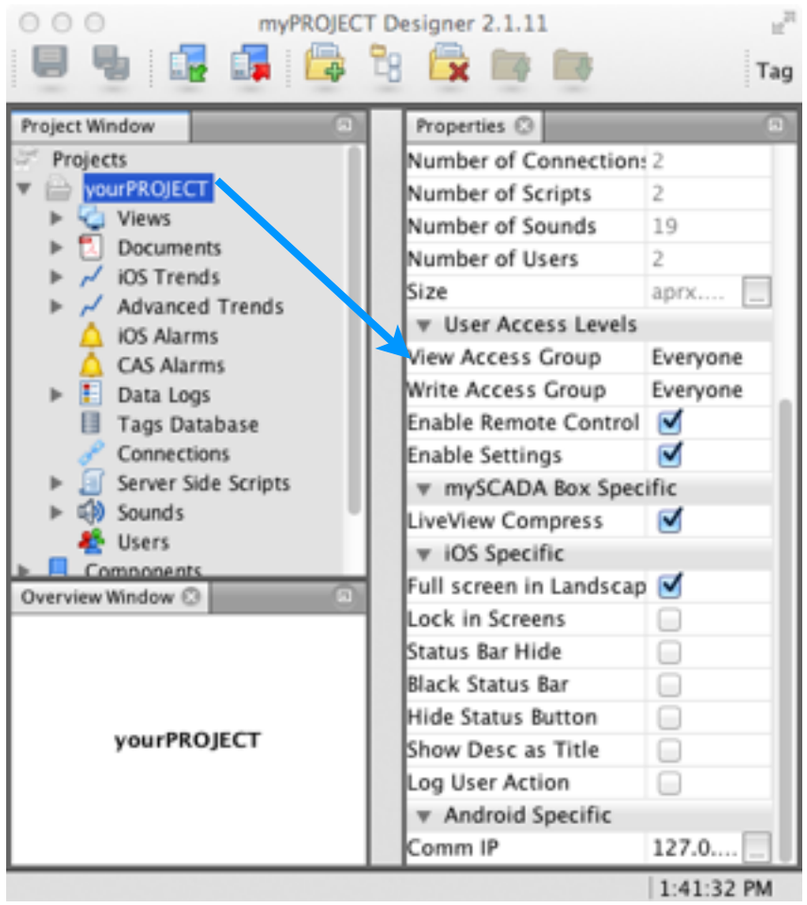


User Access - Limiting Access

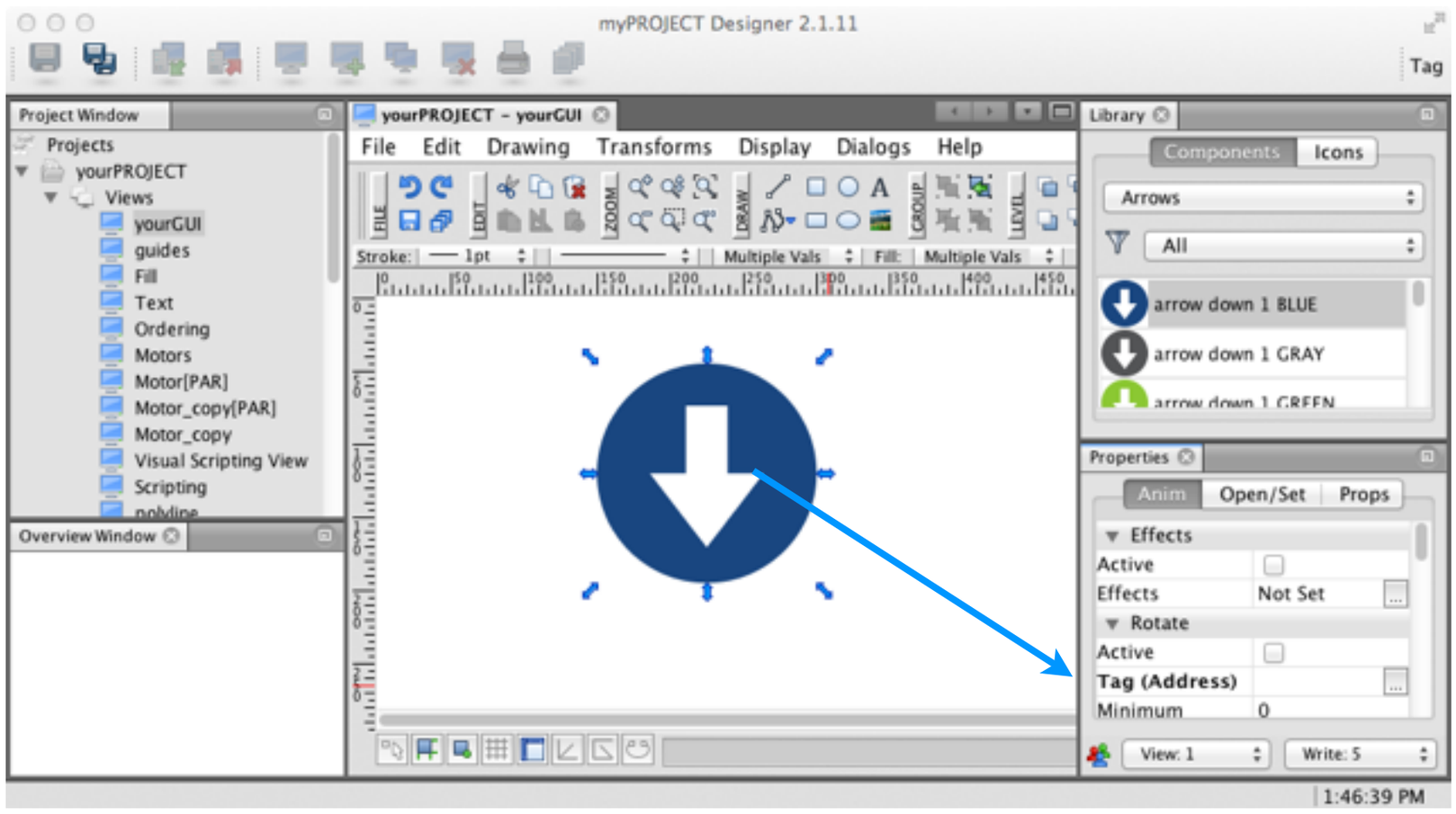
Protect Your System

You can limit user access for viewing and for writing almost for any part of your project. Namely you can limit user access for:

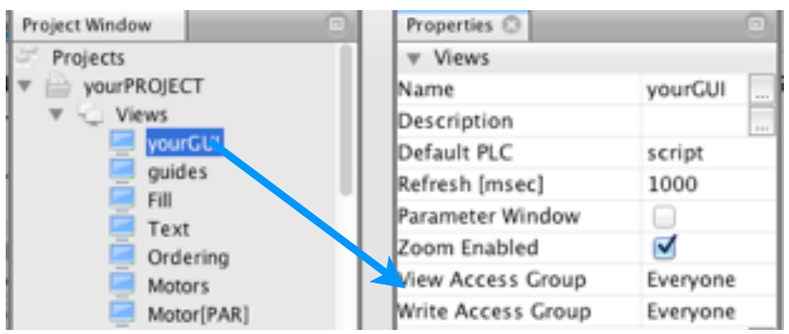
The whole project:



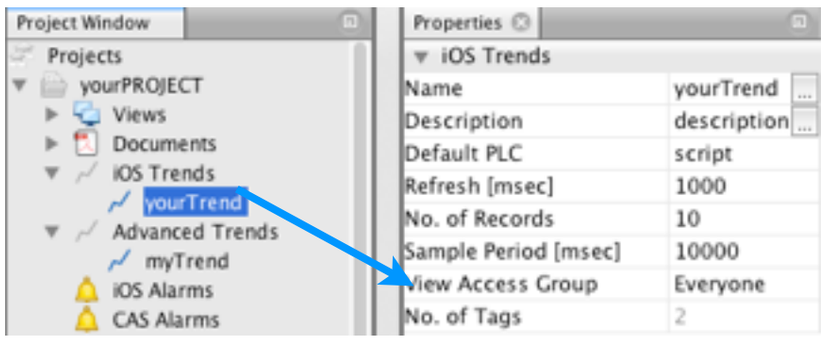
Any graphical object:

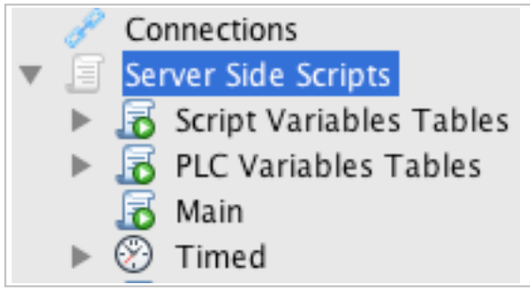


Window:



Trend:





Server Side Scripts

Powerful scripting tool

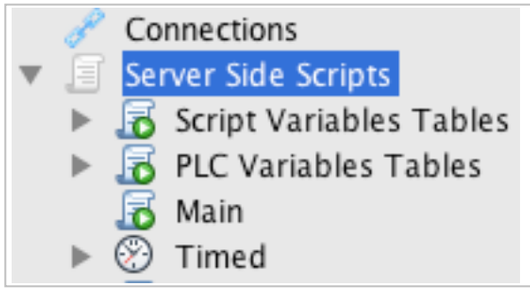
Server side scripting is an easy to use, yet extremely powerful option to extend the functionality of your mySCADA system. Server side scripting is using JavaScript as a primary language for writing scripts. JavaScript is one of the most simple, versatile and effective scripting languages that is relatively easy to learn. You can find a lot of resources and prepared libraries for JavaScript on the web. This is the main reason why JavaScript was chosen as server side script on mySCADA platform.

The execution of the javascript is based on the V8 engine from Google. Javascript alone is a powerful tool to use. To maximize script potential and create complex programming environment, JavaScript is extended with Node.Js framework.

Node.js is a server-side software system designed for writing scalable applications,. Programs are written on the server side in JavaScript, using event-driven, asynchronous I/O to minimize overheads and maximize scalability.

What you can achieve with Server Side Scripts:

- *process and analyze data from PLCs*
- *compute statistical data*
- *create reports*
- *serve content over web server*
- *implement complex data handling*
- *communicate with devices over Ethernet or serial line*
- *implement your own protocol for specialty devices*
- ...



Server Side Scripts - Node.js

Powerful scripting tool

Node.js is asynchronous and non-blocking, making it simple to write complex communication library. It is also very extensible, you can find and freely use a module almost for any task you require.

Traditional way:

```
data = file.read("/foo/bar");
  // wait...
  doSomething(data);
```

non-blocking, event driven way:

```
file.read("/foo/bar", function(data) {
  // called after data is read
  doSomething(data);
});
otherThing(); // execute immediately;
```

Simple example: creating an HTTP server listening on port 8000

load http module

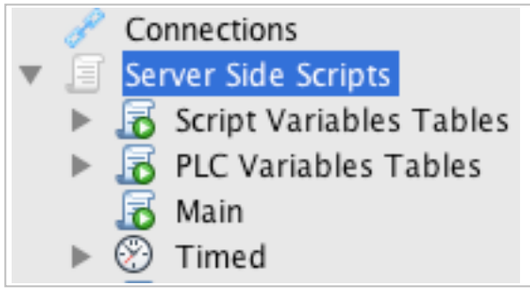
create callback

each time user connects this function is executed

bind the server to the port 8000

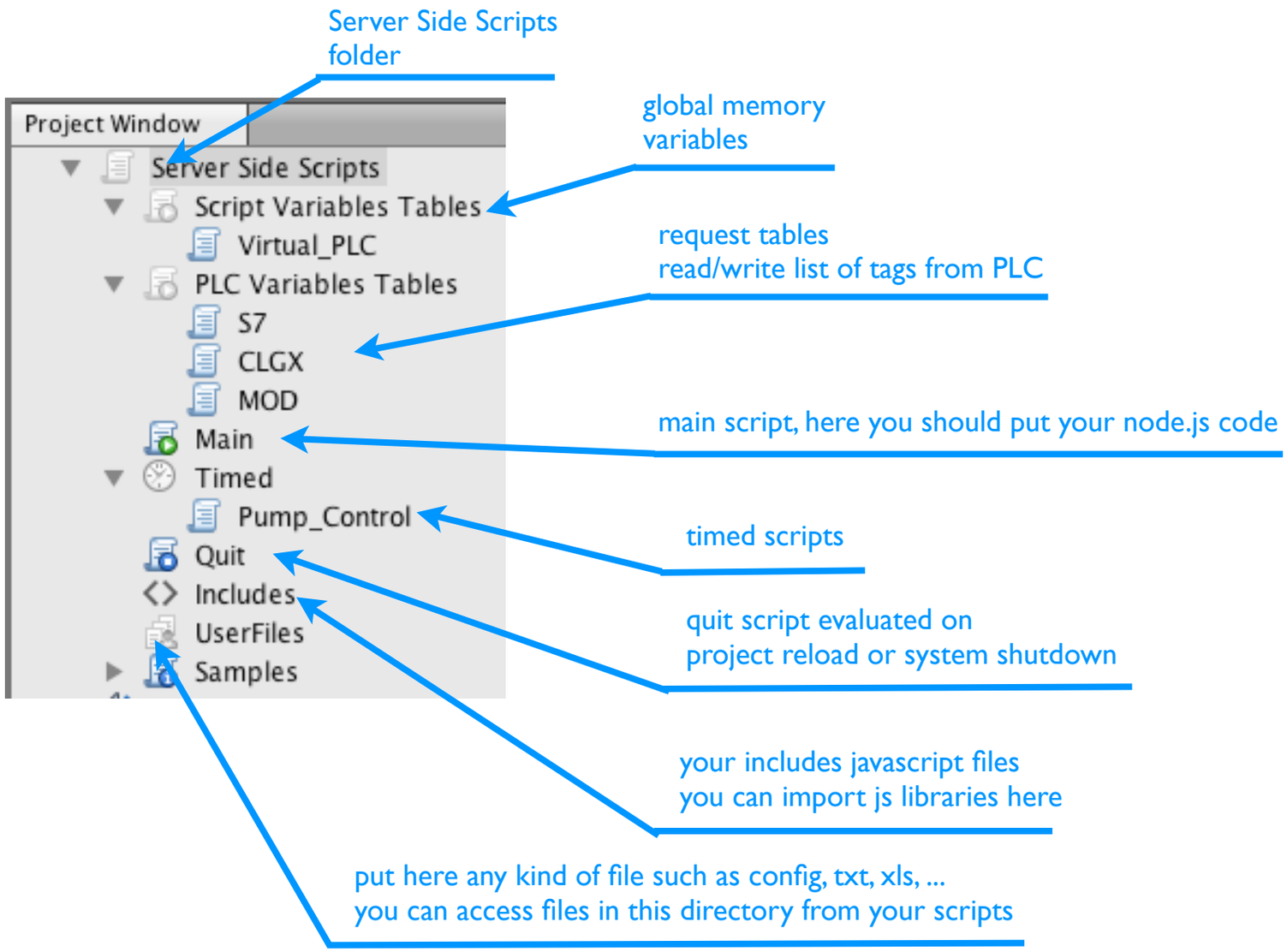
log to console

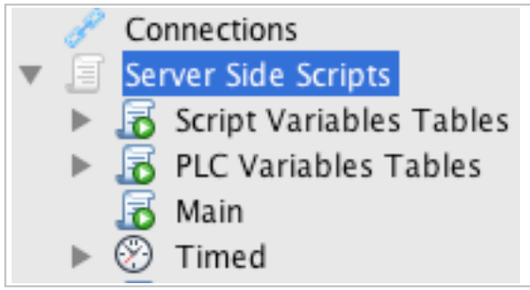
```
var http = require('http');

http.createServer(
  function (request, response) {
    response.writeHead(200, {'Content-Type': 'text/plain'});
    response.end('Hello World\n');
  }
).listen(8000);

console.log('Server running at http://localhost:8000/');
```



Server Side Scripts - Integrated Source Code Editor

mySCADA Project Designer includes an integrated source code editor with syntax highlight and integrated help for simple editing of your server side scripts.





Server Side Scripts

Simple Example

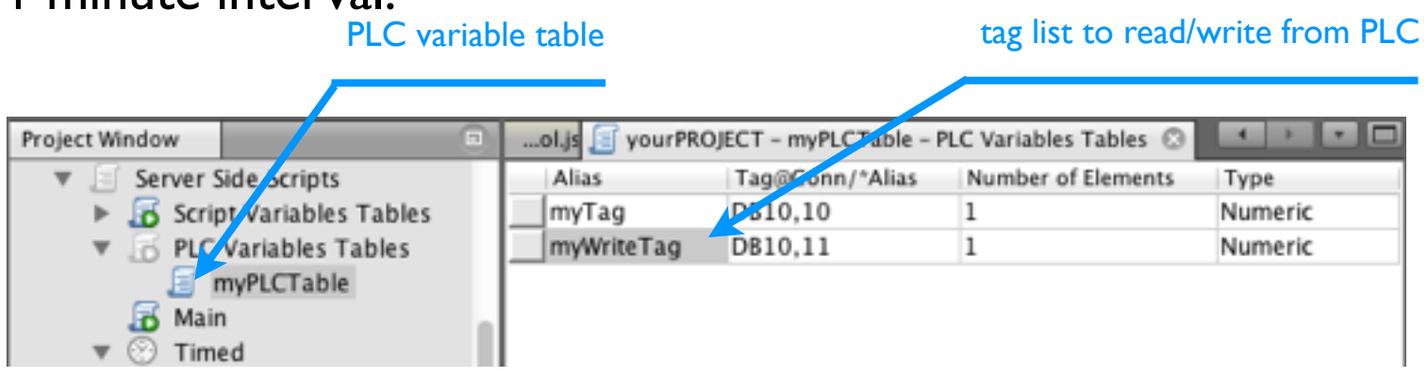
In this example, the task is to read and write data to PLC with 1 minute interval:

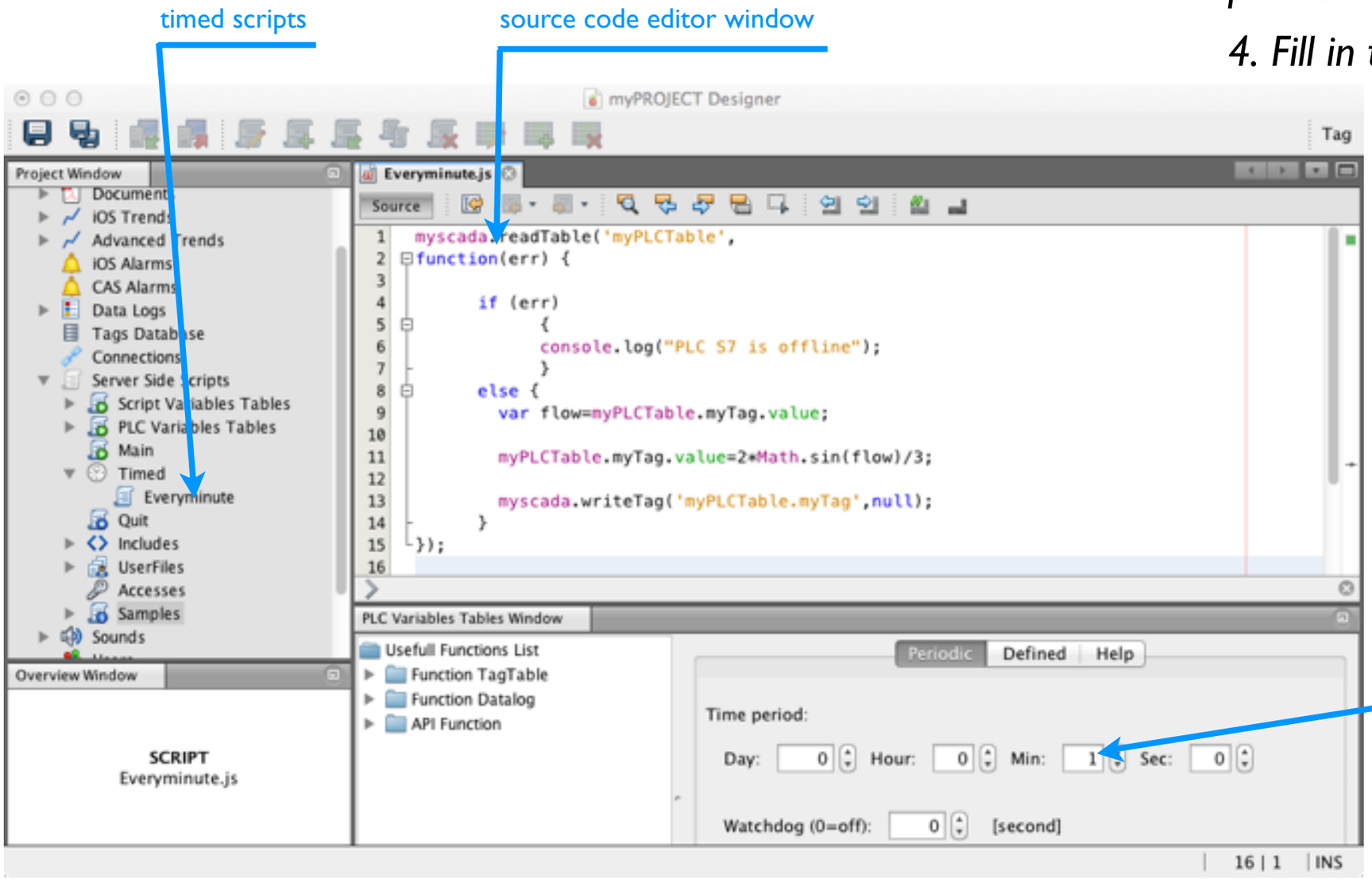
1. Create PLC variable table and give it a name.

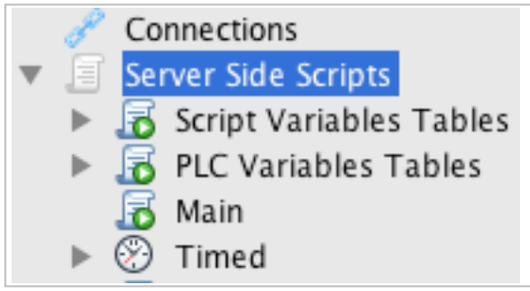
2. Fill in the tags you want to read from the PLC. Alias is a variable name under which you access your defined tag in the scripts.

3. Create a timed script and set refresh period to 1 minute.

4. Fill in the code into the code window.







Server Side Scripts

Simple Example

Function readTable will read tags from PLC. The first parameter is a table name where tags are defined, the second parameter is a callback function.

Callback function: when readTable is finished, this function is executed.

```
1   myscada.readTable('myPLCTable',
2  function(err) {
3
4         if (err)
5               {
6               console.log("PLC S7 is offline");
7               }
8         else {
9           var flow=myPLCTable.myTag.value;
10
11          myPLCTable.myTag.value=2*Math.sin(flow)/3;
12
13          myscada.writeTag('myPLCTable.myTag',null);
14        }
15 });
16
```

variable err defines if read data from PLC ended with error

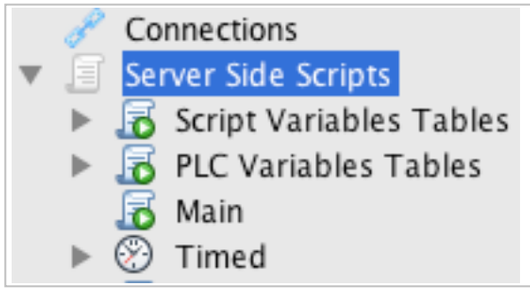
on error log message into console

save value from tag into new variable called flow

compute new value for write variable

write a variable into PLC

Important functions:
readTable('table_name',callback);
writeTable('table_name',callback);
writeTag('table_name.tag_name',callback);
readActiveAlarms('max_severity',callback);
readAlarmStatus('severity',callback);

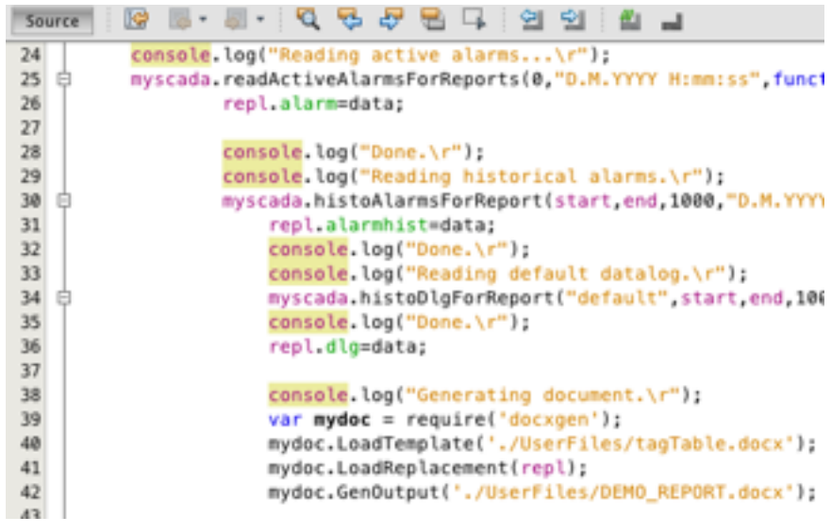


Server Side Scripts - Reports

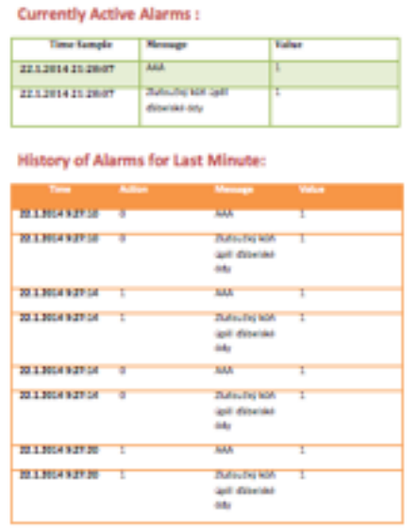
Creating Reports

Report templates are created in Microsoft Word (and compatible programs) with simple syntax. During report processing, all defined variables inside Word document are replaced with data provided from the script.

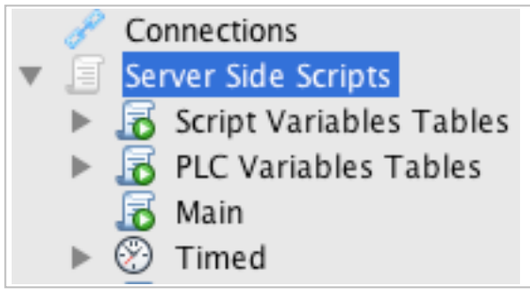
MS Word Template



Server Side Script



Generated Report



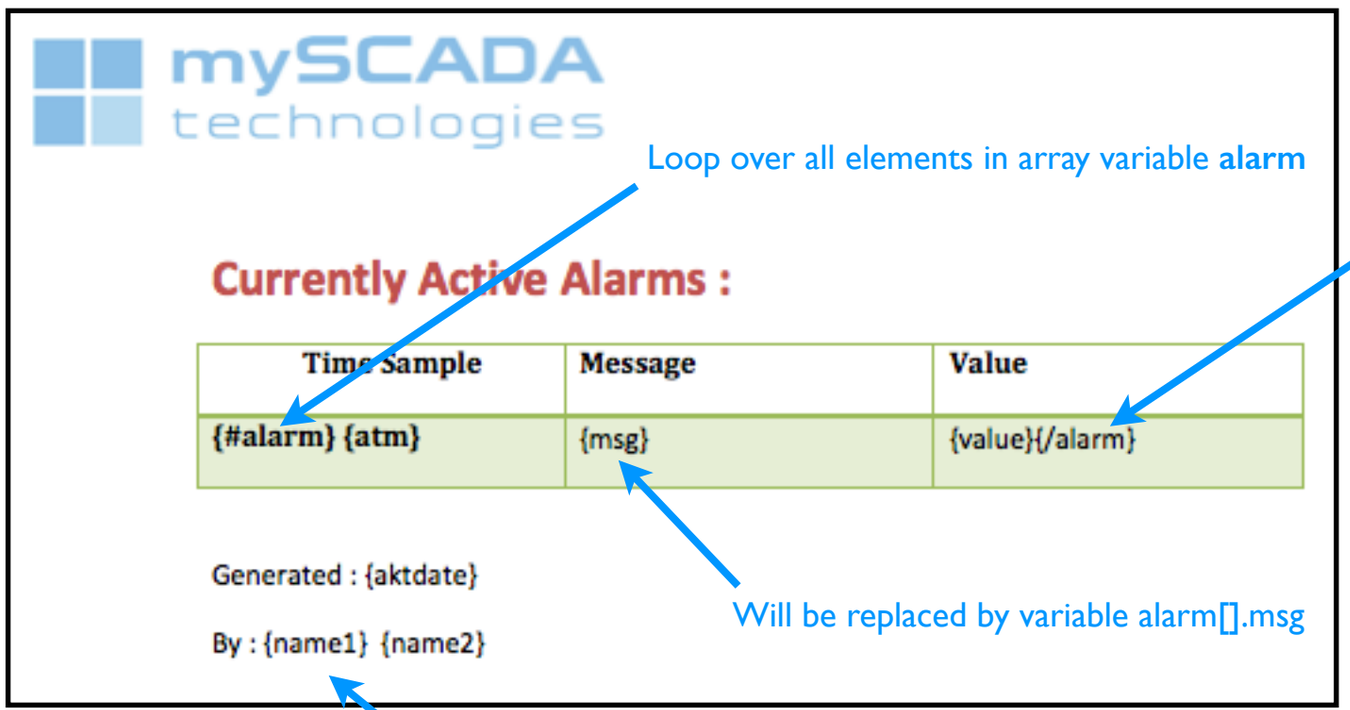
Server Side Scripts - Reports

Creating Reports

1. Prepare Report in MS Word.

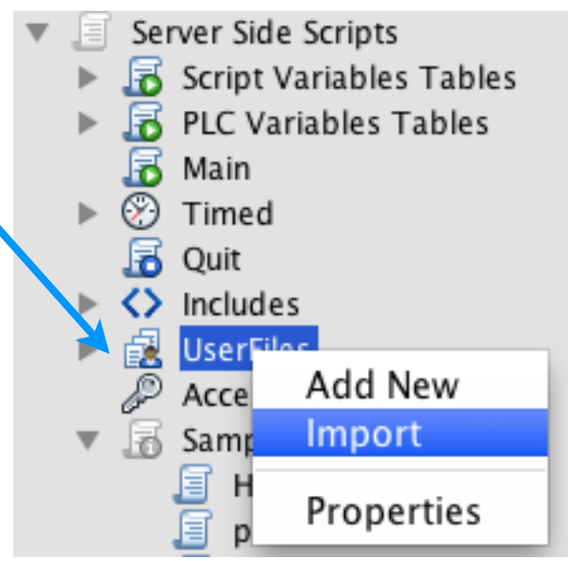
a) To replace single variable place it in single bracket: {variable}

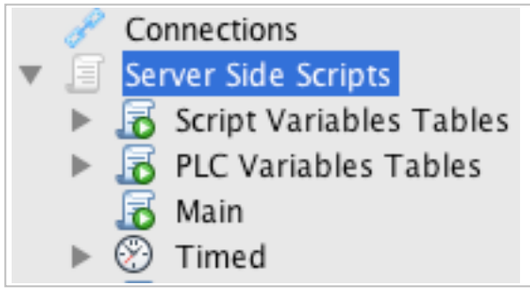
b) To create a loop you can use loopopening {#} and loopclosing {/} brackets



Word Template Example

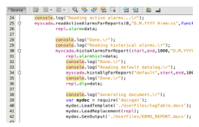
c) Import document into UserFiles in Server Side Scripts





Server Side Scripts - Reports

Creating Reports



2. Create a script to fill the MS Word Report with data

a) create replacement variable

b) fill it with data

c) require “docxgen”

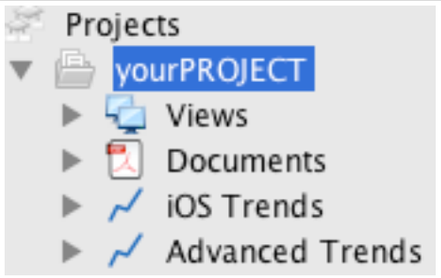
d) open MS Word template file

e) generate report

f) save it to file

script example which reads active alarms from the system and fills table in word template

```
// A) Create Replacement variable repl and fill it with
// some data such as Name and Surname
repl = {
            "name1" : "Petr",
            "name2" : "Svoboda"
            };

 //Read active alarms from the system
 myscada.readActiveAlarmsForReports(0,"D.M.YYYY H:mm:ss",
function(status,data) {
    //add data into replacement variable under the name alarm
    //use same variable name as in script
    repl.alarm=data;

    //create the document engine by require docxgen
    var mydoc = require('docxgen');
    //load your template saved in UserFiles
    mydoc.LoadTemplate('./UserFiles/Template.docx');
    //perform the replacements with our repl variable
    mydoc.LoadReplacement(repl);
    //save newly created report into file
    mydoc.GenOutput('./UserFiles/DEMO_REPORT.docx');

    myscr.A.value=0;
    myscada.writeTable("myscr",function(err){});
});
```

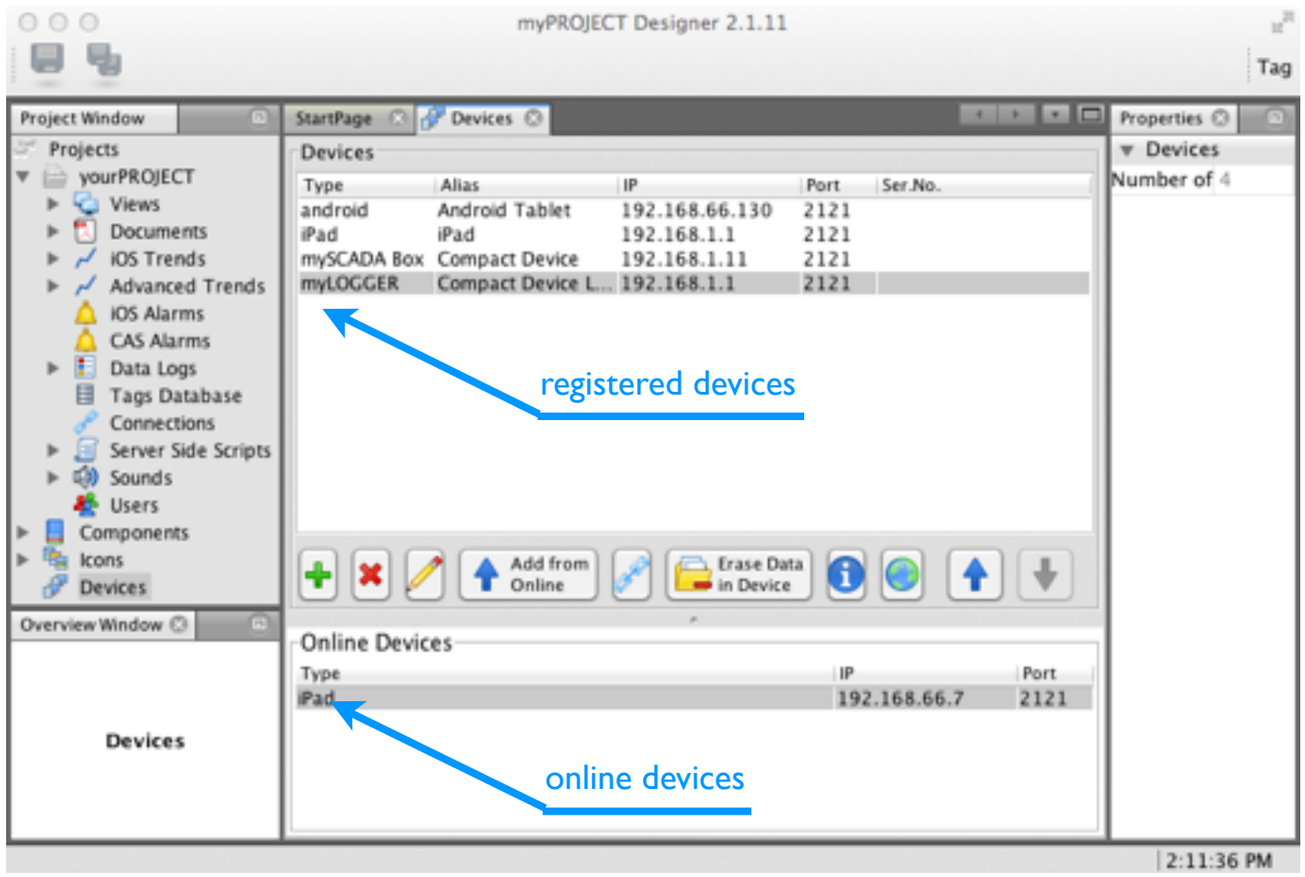


Downloading to Device

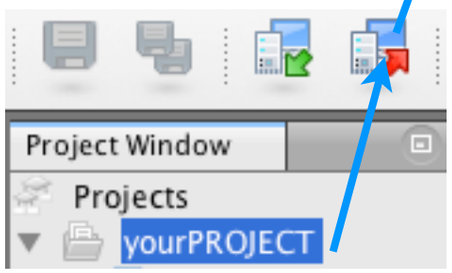
Managing Devices

When your project is prepared, you can download it to your device. The project designed in myPROJECT Designer can be downloaded to multiple types of devices: Mobile, Compact, Operators' panels, desktop and server mySCADA.

1.register your device in Devices in the Project Window



2.click on your project in the Project Window and click on Download to Devices icon on the Main Toolbar



3. check the devices you want to download the project to

4. confirm the Download to Devices button

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