
	Installation and User guide DotView – Demonstration CD	
		Datum: 10.3.2010

Manual

Installation and User guide

DotView – Demonstration CD

You don't need to read this document if you just want to see DotView's basic functionality. Just install DEMO version by running setup.exe and enjoy.

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1 General

This installation and user guide covers all aspects of installation and usage of the product. It also describes internal functionality where better understanding is necessary. It is highly recommended to start from Demo installation of the product and when the basic functionality is clear to adapt it to individual needs.

2 Description of product

The DotView is a HMI (Human Machine Interface) system – to create an interface between a user and a process. Typically it can be used to visualize data from industrial process and to send commands to the process from operator.

Features overview:

- Graphical web based end-user interface for OPC servers
- Client-Server Architecture
- Web client or thick client for real-time visualization
- Communication based on Microsoft .net platform
- WYSIWYG designer for screens

The main target is to offer an easy-to-configure and easy-to-use tool that is powerful enough but without complicated features that make other HMI systems too extensive (and expensive as well).

The DotView is running on Windows 2000 / XP platform, it uses MS Internet Explorer 6 or 7 as user interface or dedicated thick client application.

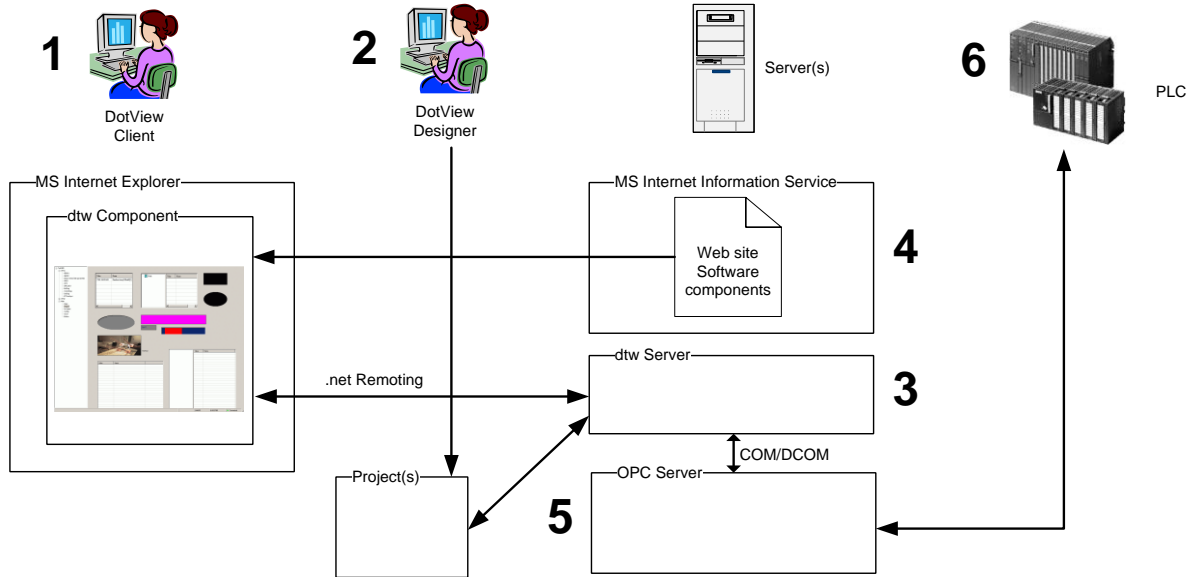
In browser version the whole installation is done on server side only, the clients don't need to install any software to run the visualization – all components are automatically downloaded from the server when needed.

The system is especially powerful as a commissioning tool as changes can be made very easy and are immediately visible.

DotView uses well standardized OPC interface to access the process data – if you use different hardware you need only to get the corresponding OPC server (supplied by most hardware manufacturers) and you can start.

The software on DotView Demo CD can be installed in different ways, depending on environment and your needs. You can choose one system to be a server only (install dotview server and web server there along with 3rd party OPC server), another system can be an engineering station (install dotview designer only), another one can be a client only (in case of web client you don't need to install any additional software, just set the security and go; in case of thick client install the client software). Or you can install all components on one system, which is the fastest way how to get running solution with all the features.

Situation is shown in the following picture:





The variability of using DotView Demo is shown in following table:

Variant	Description	1		2	3	4	5		6	7
		Clients		DotView Designer	Servers					
		MSIE	Thick		dtw	IIS	OPC	OPC demo	PLC	
A	The most complex variant (default) - both types of clients, demo project	yes		yes	yes	yes	possible	yes		possible
B	Both types of client, no demo	yes		yes	yes	yes	necessary	---		yes
C	Thick clients only, demo project	---	available	yes	yes	---	possible	yes		possible
D	Thick clients only	---	available	yes	yes	---	necessary	---		yes

3 Installation guide

3.1 Setup.exe

Installation program will check your environment and then it will install all what is useful in your situation. Having not installed Microsoft Internet Server you are not able to run web visualization by using MS Internet Explorer. In such a case you can try out the thick clients only.

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3.2 Installation

3.2.1 Requirements

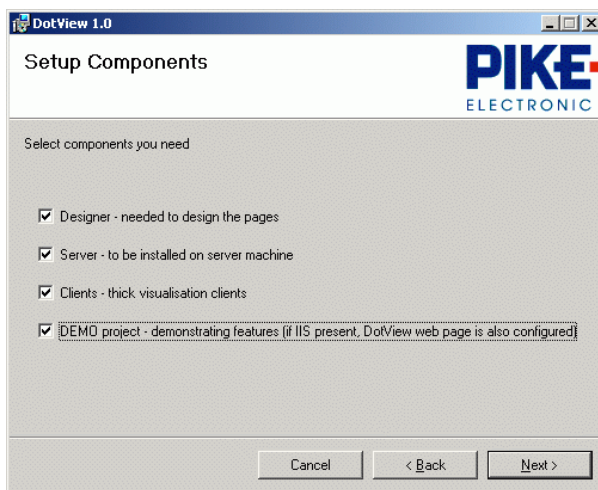
You need a PC running MS Windows 2000 or WinXP as a server computer. **Two additional Microsoft components** have to be installed (if not yet installed):

- .net Framework 2.0. It is available free from Microsoft or you can find a copy on the DotView distribution CD. Start dotnetfx.exe and follow the instructions.
- IIS. This component is optional; if not present, the web visualization is not possible; only thick clients work. Go to Settings - Control Panel – Add Or Remove Programs. Click Add/Remove Windows Components. In the dialog window, check the box “Internet Information Services (IIS)” and continue with “Next”. You can be prompted to insert Windows installation CD if necessary.

3.2.2 Software components

Start DotView installation program. There are several options you can select:



- DotView data server with dtwOpcConnect object (it is registered automatically)
- DtwDesigner – tool to design dotview pages
- DtwClients (one versions with and other without menu)
- DemoProject – simple project demonstrating DotView features (recommended)



3.2.2.1 Server Installation

The core of server installation is dtwServer. This is the point where all clients connect and exchange the process data. The server needs an access to OPC server (done through dtwOpcConnect COM object – it is installed and registered as well).

Server typically contains also the project data – project file, page files, binaries. All that stuff is located in project directory. In case of web visualization this directory should be also accessible as web directory. To accomplish that 2 things are necessary: install Microsoft IIS component (see requirements above) and to configure web access to the directory (see Creating own project, step 1). If you decide to install a Demo project the web access is configured for Demo project as part of installation program, so it is immediately ready.

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To demonstrate communication functionality the Demo project is configured for tags available in Softing OPC toolbox Demo server. It is recommended to install that package (ServerG.exe) on server computer after DotView installation (this free software is also included on distribution CD) to make Demo project fully functional.

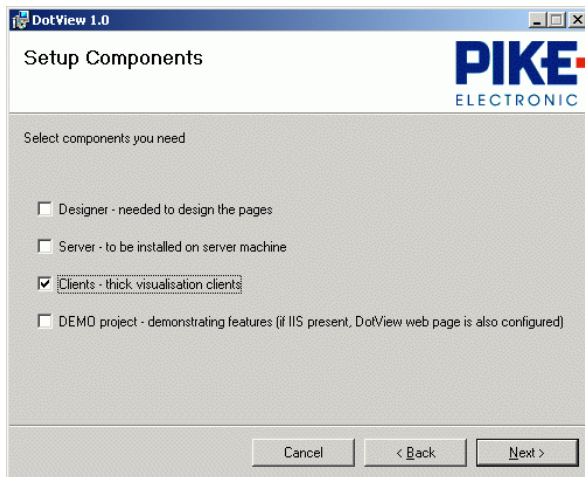
3.2.2.2 Engineering Station Installation

All project changes are made in dtwDesigner – select Designer in installation program. Designer needs only .net framework as precondition. Because it uses only file access to the project (if the project is located on remote computer use windows file sharing mechanism) no special setting is necessary (security, firewall).

It is recommended to install a client (web or thick) on engineering station as well to be able to check page runtime functionality immediately after project changes.

3.2.2.3 Thick Client Installation

Start DotView installation program on client PC. Select Clients only in dialog and finish the installation.



3.2.2.4 Thin client – web visualization client

You don't need to run setup.exe or install some special software on your system to run such client. Just check the .net Framework 2.0 is present and make security adjustment as described in chapter 4.4 – Client security setting.

3.3 Creating own project

It is recommended to get familiar with the Demo project before you try to setup a new one.

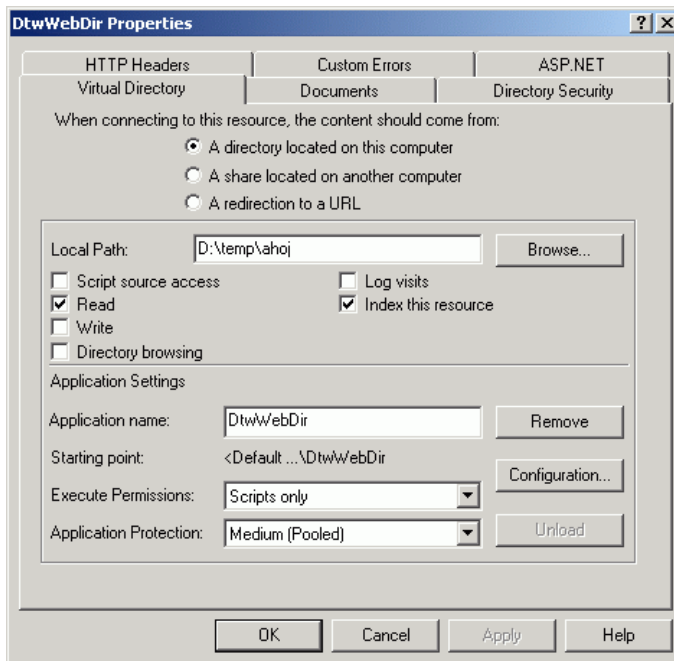
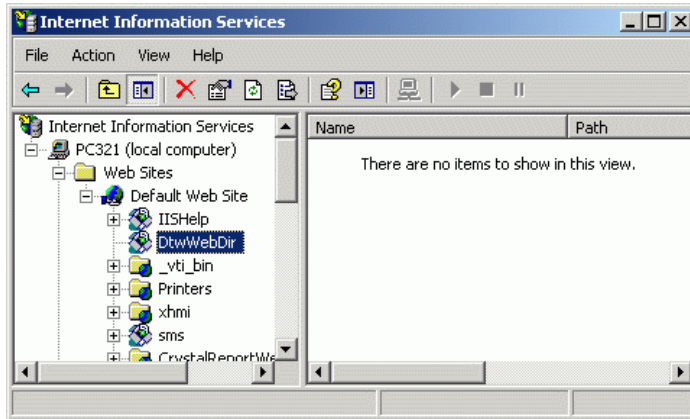
Step 1

Preparation of project directory = creation of web directory.

Go to Setting – Control Panel – Administrative Tools – Internet Information Services. In the tree go down to local computer – Web Sites – Default Web Site. Select in the menu Action – New – Virtual directory. Enter the alias (a name used by remote computers to access this folder – can be different from existing folder name). As next step you select the local directory that has to be shared (if not



existing yet, create a new one). Click Next, leave the permissions as they are, click Next again. The directory is now created and shared on web.



Step 2

Copy binary files to web directory from installation media (or the bin directory of DotView):

dtwComponents.DLL
dtwRemote.DLL
Interop.dtwOpcConnect.DLL

Step 3

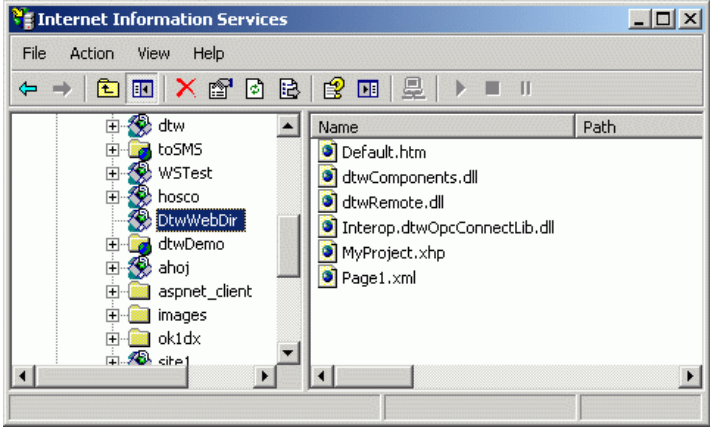
Create a project

Start dtwDesigner. Select menu File – New – Project, select project directory, enter name of the project (to be used as file name, extension XHP). Select default screen size in pixels – select project root, modify property ScreenSize

Step 4

Create using designer (or copy your own) startup file. Its default name is Default.htm. Edit path to project file (*.XHP) as it is visible in the network. Adjust initial screen size to avoid initial component resizing. Startup file can be also automatically generated by Designer.

When you finish your work you should see your web directory similar to this one:

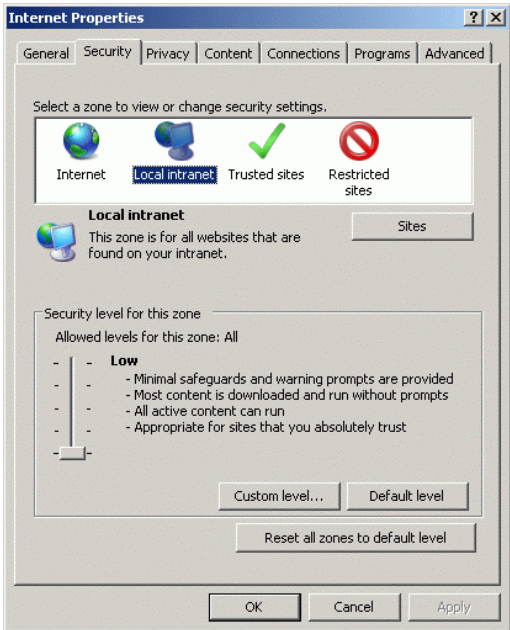




3.4 Client Security settings

To download executable binaries across the network from server to client is a potential security risk. The Internet Explorer and .net framework on client (the same apply to server if you want to run visualization on it) need higher trust for the server (local intranet level). If more strict security is needed it is possible to create security exception for one machine only.

3.4.1 Internet security setting

Go to Settings – Control Panel – Internet Options. A dialog Internet Properties is displayed. Select tag “Security”. Choose zone “Intranet”. Move the track bar down to change security level to “Low”.



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3.4.2 .net security setting

There is no user interface available to manage security setting for .net Framework 2.0. The caspol command line utility program supplied with the framework has to be used to do the job. A script like this can be used to make the changes (additionally displays original and changed setting as well):

```
cd /D %SYSTEMROOT%\Microsoft.net\Framework\v2.0.50727
caspol -lg
caspol -m -cg 1.2 "FullTrust"
caspol -lg
```

The script can be found as security.cmd on the DotView installation CD. Just click on it and done...

3.5 Installation verification

The connection to the server can be verified at this point.

Open MS Internet Explorer.
Type URL of the startup html file – example

<http://pc321/dtw/default.htm>

http – protocol name (always the same)
pc321 – server name (will be different; name of the server as defined in Settings – Control Panel – System – Computer name – “Full computer name”)
dtw – virtual web directory alias

After few seconds a page with DotView container should be displayed indicating the system working properly.

Possible problems:

- server cannot be found: check server connection (cabling, IP addresses, server name). To verify this try ping the server from the client.
- web directory cannot be found: check virtual directory existence and setting
- initial page is read, message “.NET component control failed to load! -- Please check browser security settings.” is displayed: download of binary files failed or container object was not created – check the security setting on client
- container is displayed, error dialog box is shown – follow the error message. Some binary files can be missing on the server, project file can be corrupted or wrong project file name is entered in default.htm etc.

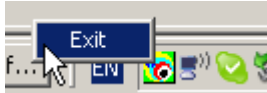
Tip: add the startup page into favorite pages of the browser.



4 User guide

4.1 DotView server

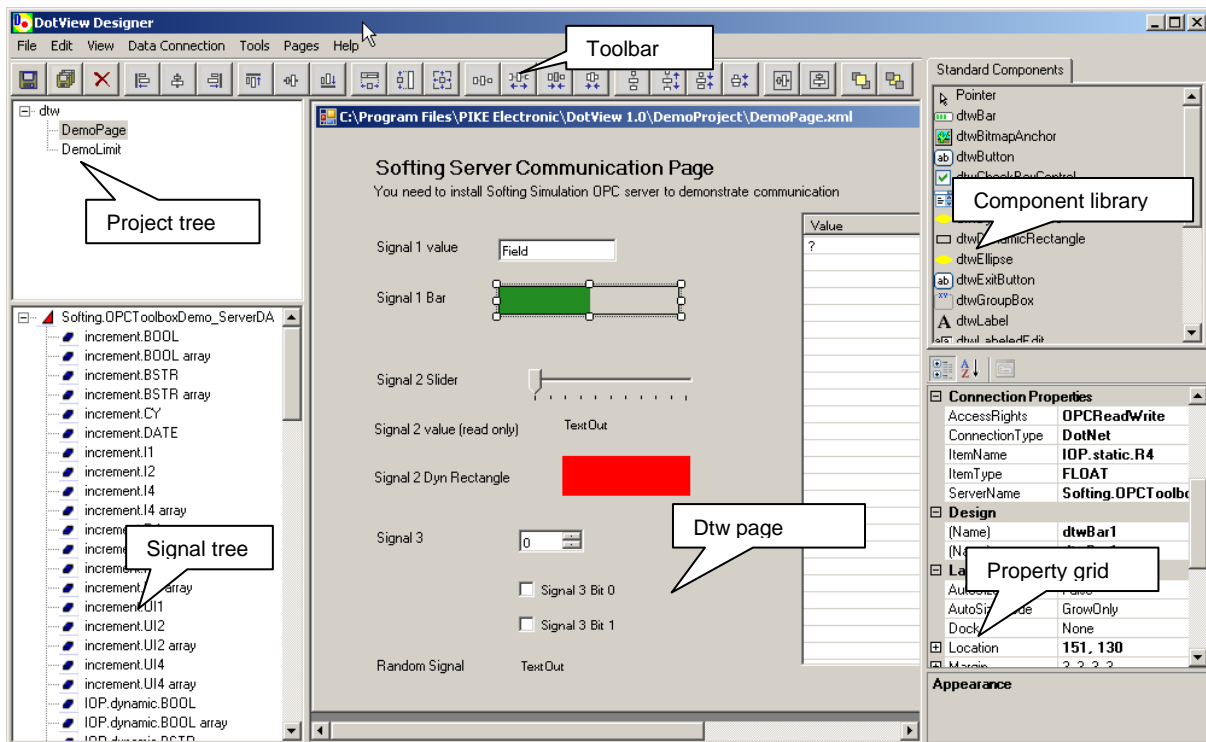
Start DotView server from program menu, eventually start dtwServer.EXE from application directory. An icon appears on the tray bar indicating the server is running. To stop it right click on the icon and select Exit from popup menu.



The server must be working to allow process data to be transferred to visualization and also to browse OPC items in DotView designer.

Note: Firewall programs can report communication activity of DotView server – it is necessary to unblock it to allow the operation.

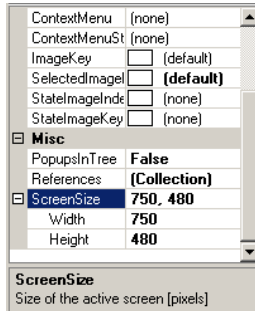
4.2 DotView designer



Designer is a .net managed application used to manage project file and individual page files. It can be started on any computer in the network; if the project is located on remote system use standard network access (file sharing) – no special setup needed.

4.2.1 Project management

New project can be created using menu command File – New – Project. The action creates a new XHP file in specified directory that contains basic project settings (see Project structure description). It is recommended to set ScreenSize property of the project as a first step.



Designer keeps track of last 3 recently used projects.

Project tree is displayed in upper left frame of the designer.

The root node of the tree represents also the project itself (when selected the property grid displays project properties).

The tree can be managed using popup menu: select the tree node and click right mouse button.

4.2.2 Page management

One page is represented by one XML file. The page is usually assigned to project tree node (standard way is one to one relation between node and page) – can be opened when the tree node is double clicked.

Node's property FileName is a reference / link to page file (path is always relative to project root).

When a new tree node is created the page is created as well (user is prompted for page file name and location).

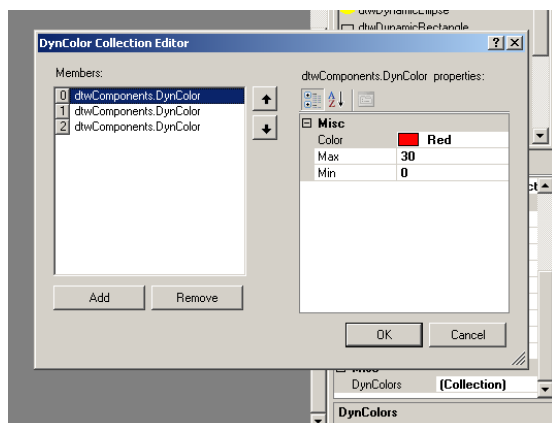
Page (the XML file) contains all properties of page controls – graphical elements used to display or enter the process values (text field, bar, button, ...)

4.2.3 Page editing

The page is edited in DotView designer. The XML file contains properties of the page, list of all page components and their properties. The order of components in the file determines tab order of the page.

Basic operation:

- opening a page: select node in project tree linked to requested page and double click on it. Another way is to use File menu File – Open – Page.
- insert component: select the component in library (Standard components or Custom components) and click on it. Move cursor on page and click again. The component is placed at cursor position.
- set properties: select component (if not yet selected) by mouse click. A rectangle surrounding it is shown, the property grid displays current properties. Make changes as necessary: select the property, modify text strings (label text, file name, ...), select from list of options (like background colour) or modify collection of objects (for complex properties like set of pictures).
- connect signal: see bellow
- save the changes

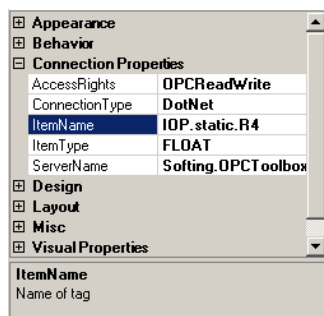


For description of set of standard control elements and their functionality see Designer online help (press F1 or open Help from menu).

4.2.4 Signal management

DotView Designer allows browsing OPC items on the server. Go to menu : Data connection – Open OPC server. You can enter IP address of computer where the DotView Server is running (if server is running locally, default 127.0.0.1 can be used). The list of available OPC servers is shown. Select the server you need and click Finish. Signal tree (left side of Designer) is loaded. The item tree is flat (not structured), each node represents one signal.

The easiest way how to connect a signal is to drag it from signal tree and drop it on required component. It automatically fills in all necessary component properties (Access Rights, Item name, OPC server name, Data type). Of course you can modify that properties manually, but drag and drop is easiest, error free and appropriate for most situations.





Along standard simple datatypes (FLOAT, INT, BOOL,..) there is support of arrays for specialized components (ListView, ListTreeView).

4.2.5 Startup html page generation

This menu function (Tools – Generate startup htm) can be used to create html startup document in case the web visualization is used. Web browser needs an html file that can be displayed. This function generates that file in most simple way – it contains only the visualization object. If you need some additional things to be displayed you can customize this file later manually.

So this function is useful when you quickly need the html document for new project (started from scrap). It asks for project URL address (name of web directory as seen from the network, in form of //server/directory).

The file Default.htm is placed in project root directory.

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4.2.6 Custom components

Custom components are components placed in other independent DLL file written in C# (how to create them is described in another manual). The custom components are typically written by end user when specialized control is needed. They can use the same communication mechanism as standard components. Information about attached custom DLL to the project is part of project file (project property Reference).

To attach custom component DLL to the project use menu (Tools – Add Custom Components). Custom components should be placed in web directory, too.

4.3 Project structure

The project consists of one XHP project file and more XML page files. The directory containing project file is root directory of the project, the page file can be placed in the same directory or subdirectories (but not outside).

The subdirectories can be used to organize the files, but they are not directly related to project hierarchy.

Project hierarchy has a root page – one page assigned to root of the project. That page is displayed when the root is selected.

Developer creates further pages by creating next nodes in the tree. The nodes can have sub-nodes (pages) etc. Tree depth is not limited.

The node in the tree has a describing text (property Text) and linked page file (property FileName). It is possible that more nodes share one page file. The page file can be placed in root directory or any subdirectory, it is not necessary to follow project hierarchy (but it is recommended to simplify project management).

It is possible to create a new page file (node and page file are created together) or add existing page file to the project tree.

When the node in tree is deleted, the page file is not removed from the disk and can be later reassigned.

The project can contain references to optional custom components (property References of the project).

4.3.1 Access control

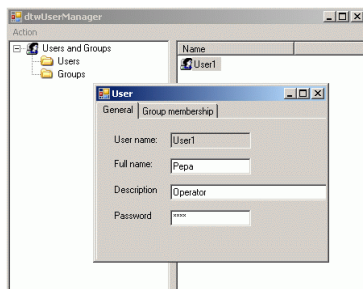
In real plant you sometimes need to restrict control to some critical parts to one person or group of people. Dotview offers access control on page level that means you can allow access to the page only for given users or user groups.

User is always identified by user name and password.



Group can contain one or more users.

Design phase, user management:

You need to create users and (if needed) groups. Open designer, select menu item Tools – User Manager. A dialog is displayed, showing defined users and groups. Here you can create a new user and also empty group. To assign user to the group double click the user, select tab Group membership and select the group from list of available groups.

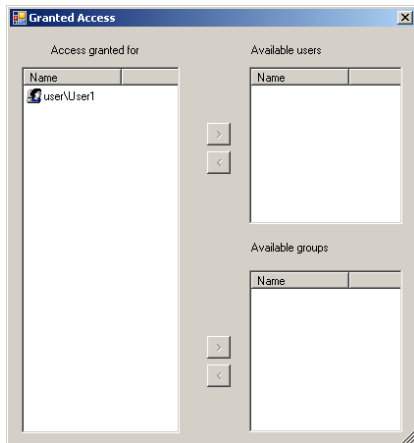


Design phase, page access rights:

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Select the page that has to be under access control. In property grid select GrantedAccess property. A specialized dialog is displayed showing available users and groups. Move them to “access granted for” list.

Note: when the Access granted list is empty, everybody can access the page (access control off, default state). If there is at least one user or group only that user or group members can access that page.



Runtime phase:

At any time user can right click the visualization dialog to open popup menu and select Login from there. A login dialog is displayed asking for user name and password. When login succeeds the user name is used for subsequent pages when access rights are evaluated. If the page is under access control and the current user is not allowed to view the page, the requested page is not displayed and user is informed about insufficient privileges.





4.3.2 Popup dialogs

Dotview offers popup dialogs. This feature is to be used to set a group of values that has to be activated simultaneously. When popup dialog is activated a small window is opened where you can set the values (you can display the values as well, but displayed values are not updated, the displayed value indicates process value at the moment the popup is opened). When you finish editing of all values you can use one of 3 standard popup dialog buttons: Apply – to send the values to process and keep the popup active, OK – to end the values to process and close the popup or Cancel – don't send the modified values to process and close the dialog.

To create a popup page create new page in project tree (same as normal page) and set the property of project tree node “Popup dialog” to true (default value is false).

To create an action that opens popup dialog place dtwButton component into standard page. Go to project tree and drag-drop the popup dialog page on the button component. Note that the properties of button are updated accordingly (ButtonType = PopupDialog, PressedValue = name of popup page file).

Note: the Popup dialog project tree nodes are not displayed in project tree as default. To show them change project property “PopupsInTree” to true.

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5 How it works (Dotview inside)

5.1 Overview

There is an automation system on one side and an operator on the other side. Automation system can run on different hardware and different operation system – it is almost always specific. The OPC server is the connecting element that allows different platforms to exhibit a unified interface to other parts of the system. The OPC interface (specified as COM interface by OPC Foundation based on Microsoft standards) is the key.

OPC server usually runs on MS Windows system. It talks to target system (PLC, hardware specific) on one side and offers standardized OPC interface on the other side. Other applications running on the same computer can access the OPC interface and exchange the data with target system through it.

One such application is DotView server – a program that collects the data from one or more OPC servers and distributes them to DotView clients on the network.

The client side is represented by a computer running MS Internet Explorer application. When the browser connects to the server it opens a web page there (the server runs MS IIS – Internet Information Services as well), it automatically downloads a software component that is necessary to connect to DotView server and immediately starts the visualization.

DotView offers also another way, called thick client. A dedicated Windows application must be installed on each client that has access to both project files and DotView server – the web access through IIS is no more used – it is faster and easier to configure, but installation is necessary.

Both clients variants can be combined as needed.

In fact to run the HMI you just need the following:

- automation hardware (PLC)
- OPC server compatible with the hardware
- MS Windows 2000 or XP with .Net Framework 2.0 to be installed on the server
- IIS (part of MS Windows) running on the server
- DotView package to be installed on the server
- A project / web page on the server (more details later)
- DotView server running on the server machine
- MS Windows 2000 or XP to be installed on client, accomplished by Internet Explorer 6 or 7 and MS .net Framework 2.0

The only software you need is Microsoft Windows, OPC server and DotView package.

For design phase a dedicated tool is used – dtwDesigner. It is a .net MS Windows application that is used to manage the visualization project (project tree / hierarchy) and individual pages (create pages, insert components to page, and change component properties). The changes in page made by designer are immediately available, it is necessary just to switch the page in browser. To connect to process tag an OPC browsing feature is available. See later for details.

5.2 More in detail

The **OPC server** typically communicates with one specific hardware platform only. It is a COM object that has to be registered – an entry in Windows registry is necessary to be created to allow other programs to access the server. The registration is usually done automatically during OPC server installation.

The **DotView server** is a managed application that uses another COM object dtwOpcConnect to connect to OPC server (it is used to cross the border between COM world and managed .net world, together with its wrapper object). The dtwOpcConnect has to be registered as well – it is done during DotView installation or it can be repeated later by command “regsvr32 dtwOpcConnect.DLL”

DotView server is a console application (it creates a console window while running). The communication mechanism between clients and server is **.net remoting**, Microsoft technology used for data exchange across the network.



The user project resides in **project directory** – a directory accessible from IIS server as web page (visible from the network). In case of thick client access only the directory can be just shared directory (using Windows file sharing), it is not necessary to configure it for IIS.

It contains several files:

- startup html page. It is a page containing simple script that creates an instance of the dotview component object. The page can be created manually or better the sample page can be adjusted to current requirements.
- binaries. The DLL files necessary for system to run. The most important is the dtwComponents.DLL comprehending the container object and screen components, and the dtwRemote.DLL used for .net remoting
- project file *.XHP. It is a XML file containing the structure of the project (project tree). It must be referenced in startup html page. The content of the file is managed completely by dtwDesigner.
- page files *.XML. The individual DotView pages, containing information what is to be displayed, what data item is connected, component properties etc. One XML file corresponds to one screen. The page files are managed completely by dtwDesigner.

When the client opens the startup html file in browser, the script creates an instance of visualization object that performs all the functionality needed.

As the first step it processes a XHP project file and fills the project tree. When the user selects a page in the tree, it loads the page, creates the page controls with required properties and activates communication for process tags with dtwServer.

