User Manual

IndigoSCADA

Powerful SCADA with Modbus, OPC, IEC 60870-5-104/103/101, DNP 3.0 and MQTT support

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Note for the reader

This manual refers to IndigoSCADA software version revision 483

Contents

Copyright	2
Note for the reader	2
Introduction	5
Features	5
Known problems and limitations	5
Hardware requirements	6
Software requirements	7
Virtual Environment	7
Installation	8
Installation of IndigoSCADA over existing IndigoSCADA Installation	8
Installation of IndigoSCADA from setup files	8
Uninstall of IndigoSCADA	9
Firewall exceptions	9
IndigoSCADA project management	10
Starting IndigoSCADA	10
Quick tutorial with IndigoSCADA	12
Setting PeakHMI simulator	12
Reading and writing Modbus parameters	17
Animate graphics objects with process data	24
Dinamic bitmaps	32
Historical data analysis	34
Alarms and Alarms group	34
Menu of IndigoSCADA	38
File menu	38
Reports menu	
Make Poviow Print	38 20
Alarms Report	
Events Report	
Audit	
Report Configure	38
Pen Trace	
Configure menu	
Configure SystemThis dialog sets up system wide parameters	40
Configure Users	40
Configure Units	
Configure Scheduled Events	43
Configure Alarm Groups	46
System control menu	47
Restart Monitor	
Kealtime database Management Historical database Management	47
mistoriour uutubase management	

Help menu	51
Main toolbar of IndigoSCADA	52
Report make	52
Report configure	52
Report review	52
Report print	
Report alarm.	
Edit batches	
Acknowledge all alarms	
Help.	
Clock	
Configuration	53
Ini files configuration	53
Advanced topics	53
IndigoSCADA Modbus protocol configuration	53
Advanced topics	56
IndigoSCADA OPC DA protocol configuration	56
Advanced topics	70
Configuration of IndigoSCADA as IoT gateway	70
Support	71

Introduction

IndigoSCADA is a powerful **SCADA** useful for small scale projects where MODBUS, DNP3, OPC DA 2.05, OPC UA 1.03, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104, MQTT 3.1.1/Sparkplug B, IEC 61850 has to be used.

Features

IndigoSCADA has grown many important features during years:

- Use of data to generate daily/weekly/monthly management reports
- Historical and real time graphical presentation of data
- Real-time event and alarm notification
- Integrated real time and historical databases
- SQL editor allows for on-line maintenance of real-time and historical databases
- Multiple users with different access rights
- Built in IEC 60870-5-101 data types
- Small footprint SCADA system
- Support of multiple dedicated lines on the back end
- OPC DA 2.05, DNP 3.0, Modbus, MQTT 3.1.1/Sparkplug B,
- IEC 60870-5-101/103/104, IEC 61850
- Softlogic programming with C scripts
- Easy Backups
- Support of multiple HMI windows
- HMI designer

Known problems and limitations

None at the moment

Hardware requirements

To work with IndigoSCADA, you need a PC or a laptop with the following minimum specifications:

Operating system	Minimum requirements		
	Processor	RAM	Graphics
MS Windows Professional XP	800 MHZ	512 GB	XGA 1024 x 768 16-bit color depth
MS Windows Server 2003	2.4 GHZ	1 GB	XGA 1024 x 768 16-bit color depth
MS Windows Vista	1 GHZ	1GB	XGA 1024 x 768 16-bit color depth
MS Windows Seven	1 GHZ	1GB	XGA 1024 x 768 16-bit color depth
MS Windows 10 - 64 bit	1 GHZ	4GB	XGA 1024 x 768 16-bit color depth
MS Windows 11 - 64 bit	1 GHZ	4GB	XGA 1024 x 768 16-bit color depth

You also need

- Keyboard and mouse
- RS232 serial interface

Software requirements

 $\label{eq:integral} \textbf{IndigoSCADA} is a 32-bit (Win32) application whose functionality has been designed especially for the following operating systems:$

- Microsoft Windows 2000 Professional 32-bit
- Microsoft Windows XP Professional 32-bit with Service Pack 3
- Microsoft Windows Vista Home Premium 32-bit with Service Pack 2
- Microsoft Windows Vista Business 32-bit with Service Pack 2
- Microsoft Windows Vista Ultimate 32-bit with Service Pack 2
- Microsoft Windows Server 2003 Standard Edition 32-bit with Service Pack 2 used as a workstation computer
- Microsoft Windows 7 Ultimate/Enterprise 32-bit
- Microsoft Windows 7 Professional 32-bit
- Microsoft Windows 10 64-bit
- Microsoft Windows 11 64-bit
- VMWare support for virtual machines (for more details, see the next chapter)

IndigoSCADA has not been tested for the following operating systems:

- Microsoft Windows XP Professional 32-bit without Service Pack or with Service Pack 1 or Service Pack 2
- Microsoft Windows Vista Home Basic 32-bit
- Microsoft Windows Vista variants 32-bit without Service Pack or with Service Pack 1 $\,$
- Microsoft Windows Server 2008 32-bit as a workstation computer
- Microsoft Windows 7 Ultimate/Enterprise and Professional 32-bit with Service Pack 1 $\,$
- If you use these operating systems with **IndigoSCADA**, use it is at your own risk.

Virtual Environment

IndigoSCADA can be used with these popular virtualization software:

- VMware Workstation
- WMware Player
- VirtualBox

Installation

Installation of IndigoSCADA over existing IndigoSCADA Installation

It is not recommended to install **IndigoSCADA** over an existing installation because some previous installed files may conflict with newer files.

 $\label{eq:please} Please\ uninstall\ an\ existing\ installation\ of\ IndigoSCADA\ before\ installing\ a\ new\ software\ version.$

Installation of IndigoSCADA from setup files

Please note the following restrictions and recommendations:

• Before starting the installation or update, please close all applications (such as

Microsoft Word) that may interfere with the installation

To start the installation of IndigoSCADA, double-click the setup.exe file that you downloaded from the Sourceforge site. Usually its name will be in the form of **indigo-scada-binaries-XX-XX-YY-YY-revZZZ**.

The **IndigoSCADA** setup program guides you through the installation. Follow the onscreen instructions of the setup program:

Then Accept the license pressing the **I Agree** button and choose as destination folder **C:** (the default installation directory)

🗑 indigo-scada-binaries-07-08-2014-10-52-rev256 Setup	_ 🗆 🗙
License Agreement Please review the license terms before installing indigo-scada-binaries-07-08-2014-10-52-rev256.	
Press Page Down to see the rest of the agreement.	
The Software and documentation are Copyright 2002 to 2014 Enscada Limited and i licensees. All rights reserved.	ts 🔺
This license agreement ("Agreement") is a legal agreement between you, ("Licensee") and Enscada Limited ("Licensor"), for use of Licensor's distribution of IndigoSCADA ("Software"). By downloading the Software electronically, installing, copying, or otherwise using the Software, Licensee agrees to be bound by the terms and conditions of this Agreement. if Licensee does not agree to the terms and conditions of this agreement then do not download the Software, install or use the Software, and immediately destroy the Software.	T
If you accept the terms of the agreement, click I Agree to continue. You must accep agreement to install indigo-scada-binaries-07-08-2014-10-52-rev256.	t the
Nullsoft Install System v2.46 I Agree	Cancel

🌍 indigo-scada-binaries-07-08-2014-10-52-rev2	56 Setup
Installation Complete Setup was completed successfully.	
Completed	
Show <u>d</u> etails	
Nullsoft Install System v2,46	Rack Cascal
Nullsoft Install System v2,46<	Back Cancel

After few seconds the installer will copy the required files and **IndigoSCADA** will be ready to be used.

Uninstall of IndigoSCADA

To remove **IndigoSCADA** from your PC, simply delete the destination folder **C:\scada** used during the installation process.

Firewall exceptions

Create the following exceptions on the firewall: dspserver, rtsqlserver, sqlserver, rtps_mngr

IndigoSCADA project management

After the program is installed, all the project files are located in the folder **C:\scada\project** Project files have the following file extensions: .dbs .fdb .ui .db .ini

These file contains empty databases, except **modbus_database1.db** which contains a predefined modbus configuration with 24 points.

You may zip the C:\scada\project folder to do backup and restore of a project.

The empty databases of the IndigoSCADA distribution are contained in the **empty_project.zip** backup file.

Every time you want to create a new project, you need to create an empty directory, then unzip the files contained in **empty_project.zip** file into the empty directory. Set the path of the new directory in file **C:\scada\bin\project.ini**, restart manager.exe, and continue with the configuration of the empty project. Otherwise you can press the button **Set project folder** and select a folder where there is a project.

Starting IndigoSCADA

After the program is installed, it is possible to configure the empty project and start it to runtime.



Open the subdirectory C:\scada\bin and double-click on manager.exe.

The main applet **Manager** shows up. This applet can be used to conveniently start and stop **IndigoSCADA** without worrying of opening or closing all the sub-processes it opens during the operation.

🖬 manager 📃	×
Control board	7
Start Indigo SCADA	
Stop Indigo SCADA	
Set project folder	
Project folder:	
C: \scaoa \project	

At the beginning there is only one **Administrator User** which can be used to access the program. After the first login, it will be possible to add new users and configure user permissions in detail.

Use **Developer** as Name and **qwerty** as password.

Login		
Name	Developer	
Password	*****	
Ok]	Cancel

Insert a new password to change the default one or press then ${\bf Cancel}$ button to skip this phase.

Quick tutorial with IndigoSCADA

In this tutorial we will use a **Modbus Simulator** called **PeakHMI**, which can be freely downloaded from **http://www.hmisys.com** and use it to subscribe a few data which will be used to animate some graphics object in one of the main tabs.

Setting PeakHMI simulator

Start **MODBUS TCP slave** and next, set up the communication preferences by click on File->Settings menu

PeakHMI MB TCP Slave
<u>File Windows H</u> elp
Clients Connected: 1
Receiving 752
Settings
Port Number: 502 Delay Time: 200 Our Slave ID: 1
Float Byte Order BE 3,4,1,2

and setting **502** as Port and Our Slave ID = 1.

Then let's create a virtual device defined by **IndigoSCADA** as a **Unit**. Select **Configure Units** from the menu **Configure**, press the button **New** and add a new Unit. Name it **MDB** (=MODBUS) for example and enable it by setting the relative checkbox.

: Configuration	
Name	MDB
Comment	(* Test Modbus Unit *)
Туре	modbus_driver
	☑ Unit Enabled Configure
Apply	New Delete Help Exit

Choose **modbus_driver** as Type and press the **Configure** button to set some specific options. Select **TCP** as Context, **127.0.0.1** as IP address, **502** as Port, **24** is the number of total sampling points (N items) belonging to this unit and **1000** ms as Poll interval.

😴 Modbus_driver Config	uration	<u>? ×</u>
MODBUS Context	C RTU	
Name	MDB	
Slave IP address	127.0.0.1	
TCP port	502	
Serial device		
Baud	0	
Data bits	0	
Stop bit	0	
Parity	_	
N Items Poll interval (ms)	24 *	
Ok	Help Cancel	

If you want to use a serial slave simulator: start ${\bf MODBUS}\ {\bf RTU}\ {\bf serial}\ {\bf slave}\ {\bf simulator:}$



and next, set up the communication preferences by click on File->Settings menu and configure the slave parameters 9600, 8, N, 1, Our Slave ID 1:

ttings				
Delay Time: Our Slave ID:	200 (0 - 1000	00 milliseconds)		OK Cancel
Float Byte Order	BE 3,4,1,2	▼ s at start		
COM Port: 4	•	Data Bits:	8	
Baud Rate: 96	00 🔻	Stop Bits:	1	
Parity: No	ne 🔻	RTS:	Disable 💌	

In IndigoSCADA select **RTU** as Context, **COM3** as Serial device, **9600** as Baud, **8** as Data bits, **1** as stop bit, **N** as parity (N= None, E= Even, O= Odd parity), **24** is the number of total sampling points (N items) belonging to this unit and **1000** ms as Poll interval.

Modbus_driver Configur	ration	<u>?</u> ×
MODBUS Context	© RTU	
Name	MDB2	
Slave IP address		
TCP port		
Serial device	СОМЗ	
Baud	9600 🚔	
Data bits	8	
Stop bit	1 🗳	
Parity	N	
N Items	24 *	
Poll interval (ms)	1000 👤	
Ok	Help	

Press **Apply** button and wait it return active, than press **Exit** button.

Uni	t Configuratior	ı
	Name	MDB
	Comment	(* Test Modbus Unit *)
	Туре	modbus_driver
		Configure
	Apply	New Delete Help Exit

Choose **Restart Monitor** from the **System Control** menu. Confirm the Restart operation by pressing the **Yes** button.



In the **Modbus** console you will see that the client is requesting data and



that new **Status tab** is now populated with 24 green rectangles, each one showing the value of one specific **Modbus** data from **MDBPoint01** to **MDBPoint24**.

📑 Indigo	5CADA Cliei	nt													_ 8 ×
<u>File</u> <u>R</u> ep	orts <u>C</u> onf	igure System	Control H	lelp	5 d (
		N N U		1 61:4		1	(1	1	1	1	1	1		
<u>A</u> larms	Status	<u>M</u> essages	hmi0.ui	hmi1.ui	hmi2.ui	hmi3.ui	hmi4.ui	hmi5.ui	hmi6.ui	hmi7.ui	hmi8.ui	hmi9.ui			
	MDBPoint	01	M	DBPoint02		м) BPoint03		Ν	1DBPoint04		MDBF	Point01	Point	Numt
	0.00 sp			0.00 sp			0.00 sp			0.00 sp		Commen	t		
												Failure Ti	me	2013-10-0	3 21:37
		05					200-:-+07					Last Ack	nowledged	2013-10-0	6 19:51
	0.00 sp	05	IVIL	0.00 sp		IVII	0.00 sp		N	0.00 sp		Last Alar	m	2013-10-0	4 16:02
												Last Upd	ate	2013-10-0	6 21:44
												No. Alarr	ns	0	
	MDBPoint 0.00 sp	09	M	DBPoint10 0.00 sp		MI	DBPoint11 0.00 sp		N	1DBPoint12 0.00 sp		•			<u>▶</u>
	0.00 0p			0.00 0p			0.00 op			0.00 0p		Name	sp	Minim	ium Ma
												VALUE	0.00	0	0
	MDBPoint	13	M	DBPoint14		MI	DBPoint15		N	1DBPoint16					
	0.00 Sp			0.00 Sp			0.00 Sp			0.00 Sp					
	MDBPoint	17	M	DBPoint18		MI	DBPoint19		N	1DBPoint20					
	0.00 sp			0.00 sp			0.00 sp			0.00 sp		•			Þ
												Name	Lower Ala	rm Lower	Warning
	MDBPoint	21	M	DBPoint22		M	DBPoint23		N	1DBPoint24		VALUE	(***)	(***)	
	0.00 sp			0.00 sp			0.00 sp			0.00 sp					
	MDBPoint	25	M	DBPoint26		М	DBPoint27		N	1DBPoint28					
	0.00 sp			0.00 sp			0.00 sp			0.00 sp					
Monitori	o Dunnin -	Antivo ranci	no: (dofolt)	Lloor D	avalanar										<u> </u>

Reading and writing Modbus parameters

In **IndigoSCADA Status tab**, green is associated with OK status, light blue with not acknowledged alarm states and red with acknowledged alarm states.

If we interrupt the Modbus communication in **PeakHMI**, then all the rectangles will become blue because data values are now invalid.

😴 IndigoSCADA Client			
File Reports Configure System Control Help			
	148		
Alarms Status Messages hmi0 ui hmi	1. ui [hmi2.ui [hmi3.ui] hmi4.ui [hmi5.ui] h	_ mi6ui hmi7ui hmi8ui hmi9ui	
MDBPoint01	MDBPoint02	MDBPoint03	MDBPoint04
0.00 sp	0.00 sp	0.00 sp	0.00 sp
MDBPoint05	MDBPoint06	MDBPoint07	MDBPoint08
0.00 sp	0.00 sp	0.00 sp	0.00 sp
MDBPoint09	MDBPoint10	MDBPoint11	MDBPoint12
0.00 sp	0.00 sp	0.00 sp	0.00 sp

We used 24 items of data in the Unit options **MDB** because **IndigoSCADA** comes already with a predefined set of 24 Modbus points, (named **MDBPoint01**, **MDBPoint02**, etc.) for quickly test it with **PeakHMI**.

Select **Configure Protocol** from the **Configure** menu and then open the file **C:\scada\project\modbus_database1.db.** Select the **Browse Data** tab and look to the predefined definitions of the 24 points.

IndigoSCADA Protocol Configurator - C:/scada/project/modbus_database1.db															
	2 🔲 🖻	╴ ݤ▕▆ᢪ▆ᢪ▆ᢪ╻	* 🗗 🖭 🐶												
	~ .														
Databa	ase Structure	Browse Data Ex	ecute SQL												
Table	Table: modbus_table New Record Delete Record staxe_id modbus_function_read modbus_function_write_modbus_address modbus_tupe_ioa_control_center_deadband														
	slave_id	modbus_function_read	modbus_function_write	modbus_address	modbus_type	ioa_control_center	deadband 📥								
1 1 1 5 0VT_BOOL 1 2 1 1 5 1VT_BOOL 2															
2 1 1 5 1 VT_BOOL 2															
2 1 3 1 5 1 VT_BOOL 2 3 1 1 5 2 VT_BOOL 3															
4	3 1 1 5 2 VT_BOOL 3 4 1 1 5 3 VT_BOOL 4														
5	4 1 1 5 3 VT_BOOL 4 5 1 1 5 4 VT_BOOL 5														
6	1	1	5	5	VT_BOOL	6									
7	1	1	5	6	VT_BOOL	7									
8	1	1	5	7	VT_BOOL	8									
9	1	3	16	10	VT_14	9									
10	1	3	16	0	VT_R4	10									
11	1	3	16	65	VT_I2	11									
12	1	2	0	33	VT_BOOL	12									
13	2	1	5	0	VT_BOOL	13									
14	2	1	5	1	VT_BOOL	14									
15	2	1	5	2	VT_BOOL	15									
	<	1 - 24 of 24 >				Go to: 0									

The first five columns refers to typical Modbus parameters. For every point, it is defined the Slave_id, Read function, the Write Function, Address and so on.

The other column is specific for the IEC 870-5-104 protocol because every signal is treated internally by **IndigoSCADA** as an IEC 870-5-104 protocol data.

The first record, ioa_control_center 1 is a Boolean data with modbus_address 0,

modbus function 1 is used so this point is a modbus coil output.

The column modbus_address is an offset relative to the first address of the function used.

Record 1 has modbus_address 0, coils function 1 is used, so add the first coils address (000001) and you get actual modbus address 000001;

Record 11, has modbus_address 65, holding registers function 3 is used, so add the first holding registers address (400001) and you get actual modbus address 400066;

Record 12, has modbus_address 33, discrete inputs function 2 is used, so add the first discrete inputs address (100001) and you get actual modbus address 100034;

Activate alarming for MDBPoint01 with the following procedure:

MDBPont01 is a single point (M_SP_TB_1)

Sample Point C	onfiguration							
Name	Comment			MDBPoint01				
MDBPoint01	Point Number 01		-					
MDBPoint02	Point Number 02			Comment	Point Numb	or 01		
MDBPoint03	Point Number 03			Comment		erui		
MDBPoint04	Point Number 04							
MDBPoint05	Point Number 05			Unit	MDB			-
MDBPoint06	Point Number 06							_
MDBPoint07	Point Number 07			Type	M SP TB 1	1		•
MDBPoint08	Point Number 08			1,900	10	•		
MDBPoint09	Point Number 09							
MDBPoint10	Point Number 10			Input Index	01	-		Limits
MDBPoint11	Point Number 11						-	
MDBPoint12	Point Number 12			Units	spi	-		Actions
MDBPoint13	Point Number 13			- Child	lah		L	, tottono
MDBPoint14	Point Number 14							
MDBPoint15	Point Number 15			Enabled		Fileable	Ala	arm Threshold
MDBPoint16	Point Number 16							
MDBPoint17	Point Number 17			🗖 Use Log Gr	aph Scales	Retriggerab	le Alarms	0 🚽
MDBPoint18	Point Number 18							
MDBPoint19	Point Number 19							
MDBPoint20	Point Number 20						IOA	
MDBPoint21	Point Number 21							1
MDBPoint22	Point Number 22						1	
MDBPoint23	Point Number 23							
MDBPoint24	Point Number 24		-					
Apply	New	 Delete		Renam	ie	н	elp	Exit

press "Limits..." button and set the value of the single point (0 or 1) to associate with the alarm state. In the next picture the value of 1 gives an alarm state.

Digita	al Alarm Con	figuration R	eceipe[(d	lefault)]			
	Name	VALUE					·
	Alarm		1		F	Enabled	
	Apply			Help		Exit	

Restart monitor:



Return to the **Status tab**, right-click on the first green rectangle and choose **Send Command**.



Write 1 in the **Value** text box and press **OK** button. The rectangle will become light blue and in the right part of the window a new Alarm will be notified.

📲 Indigo	5CADA Cliei	nt												_ 8 ×
<u>F</u> ile <u>R</u> ep	oorts <u>C</u> onf	igure Syst	em C <u>o</u> ntrol	<u>H</u> elp										
1 🖬 📴	1 🚺 🔤	📐 📐 🛛	U 🗹 J	2 9:2	5									
<u>A</u> larms	<u>S</u> tatus	Messages	s hmi0.ui	hmi1.ui	hmi2.ui	hmi3.ui	hmi4.ui	hmi5.ui	hmi6.ui	hmi7.ui	hmi8.ui	hmi9.ui		
N	//DBPoint0	1	MDB	Point02		MDBPoi	nt03		MDBPoint	04	MDB	Point01	Point Num	iber 01 📤
	1.00 sp		0.0)0 sp		0.00 s	sp		0.00 sp				Ack. Needed	
											Commen	it ïme	2013-10-03 21:3	7-23 133
N	ADBPoint0	5	MDB	Point06		MDBPoi	nt07		MDBPoint	08	Last Ack	nowledged	2013-10-07 09:2	2:36.228
	0.00 0p			,		0.000	·P		0.00 0p		Last Ala	rm	2013-10-07 09:2	2:49.098
Ν	/DBPoint0	q	MDB	Point10		MDBPoi	int11		MDBPoint	12	Last Upd	late	2013-10-07 09:2	2:49.098
	0.00 sp		0.0)0 sp		0.00 s	sp		0.00 sp	12	No. Alar	ms	13	-
											Name	sp	Minimum	Maximum
Ν	//DBPoint1	3	MDB	Point14		MDBPoi	nt15		MDBPoint	16	VALUE	1.00	0	1
	0.00 sp		0.0)0 sp		0.00 s	sp		0.00 sp					
N	/IDBPoint1	7	MDB	Point18		MDBPoi	nt19		MDBPoint	20				
	0.00 sp		0.0)0 sp		0.00 s	sp		0.00 sp					•
											Name	Lower Ala	rm Lower Warn	ng Upper Wa
N	ADBPoint2	1	MDB	Point22		MDBPoi	nt23		MDBPoint	24	VALUE	(***)	(***)	(***)
	0.00 3p		0.1	ло зр		0.00 8	,h		0.00 3p					
	4DBRoint2	5	MDB	Point26		MDBPai	nt27			28				
K	0.00 sp		0.0)0 sp		0.00	sp		0.00 sp	20				
														Þ
Monitor is	s Runnina	- Active rec	eipe: (defau	t) User: D	eveloper									

Return back to ${\bf PeakHMI}$ and you will see that the data value of coils with offset zero (mapped with ${\bf MDBPoint01}$) is now 1.

👰 Data Monitor																		I	- 🗆 🗙
Coils	Hold	ding	Reg	ister	s	I	nput	s		Inp	ut Re	egist	ers						
#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Signed	Unsigned	
000001	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
000017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
000033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
000049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
000065	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
000081	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
000097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

The same operation can be executed with ${\bf MDBPoint11}$, which is an integer type. Send a command of 1000 for example,

Modbus_dri	iver Comn	nand					
Name		MDBPoint11]
Value		1000]		
	Dk		Н	elp		Cancel	

and then return to the $\ensuremath{\textbf{PeakHMI}}$ and select the $\ensuremath{\textbf{Holding Registers.}}$

👰 Data Monitor											I	_ [[IX
Coils	Holding Registers	Inputs	Input Registers										
#	Signed	Unsigned	Float	16	15	14	13	12	11	10	9	8	7
400050	0	0	0000000	0	0	0	0	0	0	0	0	0	c—
400051	0	0	0	0	0	0	0	0	0	0	0	0	C
400052	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400053	0	0	0	0	0	0	0	0	0	0	0	0	C
400054	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400055	0	0	0	0	0	0	0	0	0	0	0	0	C
400056	0	0	00000000	0	0	0	0	0	0	0	0	0	C
400057	0	0	0	0	0	0	0	0	0	0	0	0	C
400058	0	0	00000000	0	0	0	0	0	0	0	0	0	C
400059	0	0	0	0	0	0	0	0	0	0	0	0	C
400060	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400061	0	0	0	0	0	0	0	0	0	0	0	0	C
400062	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400063	0	0	0	0	0	0	0	0	0	0	0	0	C
400064	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400065	0	0	1,40129846432482E-42	0	0	0	0	0	0	0	0	0	C
400066	1000	1000	E8030000	0	0	0	1	0	1	1	1	1	1
400067	0	0	0	0	0	0	0	0	0	0	0	0	C
400068	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400069	0	0	0	0	0	0	0	0	0	0	0	0	C
400070	0	0	0000000	0	0	0	0	0	0	0	0	0	C
400071	0	0	0	0	0	0	0	0	0	0	0	0	C
400072	0	0	0000000	0	0	0	0	0	0	0	0	0	С
400073	0	0	0	0	0	0	0	0	0	0	0	0	C 🗸
•	1												•

The value of the 400066^{th} register will be **1000**.

In ${\bf PeakHMI}$ select ${\bf Inputs}$ and change the value 100034 to get a change in the value of ${\bf MDBPoint12}$

👰 Data Monitor																			
Coils	Hold	ding	Regi	ister	s]	inpul	ts		Inp	ut Re	egist	ers						
#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Signed	Unsigned	
100001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100033	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	
100049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100065	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100081	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100209	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100257	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100273	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100289	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100321	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100337	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100385	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Animate graphics objects with process data

Binding a graphic object with a process data is very easy. Let's begin with a Boolean type (True/False) to animate three object: a rectangular led, a counter and circular led.

Open the **HMI Designer** by choosing **Configure HMI** from the **Configure** menu, select the **OpenFile/Project Tab** and open one of the .ui files present in **C:\scada\project** (hmi1.ui for example)

📑 Open							×
00	鷆 🝷 Syst	em (C:) 🔻 scada	• ▼ project ▼	-	Cerca		
0 Organ	izza 🔻 📑 V	/isualizza 🔻	📑 Nuova carte	ella			0
Collegame	Nome 🔺 👻	Data acquisizion	e 🛨 Tag	- Dimensione	- Classifica	zione 👻	
📄 D 强 R							
📃 D	hmi0.ui	hmi1.ui	hmi2.ui	hmi3.ui	hmi4.ui	hmi5.ui	hmi6.ui
Image: Constraint of the second se	hmi7.ui	hmi8.ui	hmi9.ui				
	<u>N</u> om	e file: hmi1.ui				esigner Files (*.u Apri 🚽	ii •.pro) ▼ Annulla

or create a new dialog:

📲 Qt De	signer - New/Open				? ×
<u>N</u> ew Fi	ile/Project Open File	Project Recently Op	bened		
	C++ Project		پت Wizard	Widget	
	t show this dialog in the	future			
<u>H</u> e	elp			OK Can	

Press OK button and save Form1 with .ui file extension in C:\scada\project

📲 IndigoSCADA HMI desig	jner			
File Edit Project Search	Tools Layout Preview Window Help			
No Proje	d> ▼] [2] [2] [2] [2] [2] [2] [2]		5 🗖 🖌	Þ 🗄 🗞 🕅 🕅
Common Widgets	Form1		<u>– – – – ję</u>	
Buttons			lic	No Project>
Containers			· · · · · · · · · · · · · · · · · · ·	Form1: unnamed1.ui
Views	😴 Save Form 'Form1' As		× Q	
Database	C:\scada\project	Cerca		
Input		,		10
		<u></u>	<u>-</u>	
	Salva come: Qt User-Interface Files (*.ui)	iç	Objects Members
				Name Class
Plot		Salva	Annulla	Form 1 QDialog
AnalogClock	· · · · · · · · · · · · · · · · · · ·		i i i i i i i i i i i i i i i i i i i	10
mc ² PushButton			· · · · · · · · · · · · · · · · · · ·	<u>, 1</u>
Scale			i i i i i i i i i i i i i i i i i i i	
SinglePointLed			::::::: <mark>!</mark>	<u>n</u>
PTank			i i i i i i i i i i i i i i i i i i i	
			:::::::"	3
Themo			::::: ic	10
PMeter				
C Knob			::::: <mark> 0</mark>	/(<u> </u>
1.3 Counter				Properties Signal Handlers
A Davible Paintland			io	

Then, "draw" these three objects from the **SCADA Widgets** toolbar onto the map:

- PLCDNumber
- SinglePointLed
- PsinglePointLed



Rename these objects with format UnitNamePointXX_oldname (es. **pLCDNumber5** becomes **MDBPoint01_pLCDNumber5** and so on) using the Property Palette. Do this for all three objects.

F	Properties	Signal Handlers		
F	roperty		Value	▲
	name		MDBPoint01_pLCDNumber5	
	enabled		True	
	geometr	у	[30, 110, 81, 31]	
0	sizePolicy	l	Minimum/Minimum/0/0 🛛 🔊	
0	i minimumS	ize	[0,0]	

Name	Class
🏷 textLabel1	QLabel
🏷 pixmapLabel2	QLabel
	QLabel
OMDBPoint01_pSinglePoint	PSinglePointLed
OMDBPoint01_singlePointLe	SinglePointLed
🔠 MDBPoint01_pLCDNumb	PLCDNumber

😴 Indig	goSCAD/	A Client				
File R	(eports	Configu	ure Syste	m Control	Help	
	🤨 🕑	1	5 🚺 🚺		? !!!:	
Alarm	s Sta	itus 🚺	Messages	hmi0.u	i hmi1.ui	hmi
					-	
				\bigcirc		

Save the map and exit **IndigoSCADA Client** by choosing **Exit** from the **File** menu, After few seconds, the client will be opened again and in the **hmi1.ui** tab those three new objects will be inside.

Now open the **PeakHMI** Data monitor window, select the Windows->Register data menu and change values of the coils

📲 Inc	ligoSl	eada ci	ient						
File	Repo	orts Co	onfigure	Syst	em Co	ontrol	Help		
	!		2 📐				?		E
Alarr	ns	Status	3 Me	ssage	s h	mi0.ui	hn	ni1.ui	h
				-	6				
		i				Ľ			

The graphic object will begin to flash because Point is in alarm state. Press the **Acknowledge All Alarms** button to stop the animation.



At the moment there is no contextual menu associated with these object: pressing the right button on it won't do nothing. So, now we will enable it. Open again the map **hmi1.ui** with the **HMI Designer**, right-click on the pSinglePointLEd and choose **Connections**

· · · · · · · · · · · · · · · · · · ·			
: : • · · · · · · · · · · · · · · · · · ·) 🗶	Cut	Ctrl+X
***	(D	Сору	Ctrl+C
	: B	Paste	Ctrl+V
· · · · · · · · · · · · · · · · · · ·	· · ·	Delete	Del
····· SimDig07 ·····	:: 🖻	Adjust Size	Ctrl+J
	: 000	Lay Out Horizontally	Ctrl+H
		Lay Out Vertically	Ctrl+L
		Lay Out in a Grid	Ctrl+G
	(+)	Lay Out Horizontally (in	Splitter)
	T	Lay Out Vertically (in Sp	itter)
10.00	5	Break Layout	Ctrl+B
5.00	1	Connections	
		Source	Ctrl+E

Add a new row as shown in the picture below.

-	View	and Edit Connections			
(Connec	tions:			
		Sender	Signal	Receiver	Slot
	√1	SimAdc05_pThermometer1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	✓2	SimAdc01_pTank1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	✔3	SimAdc02_wtThermo1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	✓4	SimDig03_pDoublePointLed1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	✓5	SimDig04_pSinglePointLed1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	6</th <th>SimDig07_pSwitch1</th> <th>RightClicked(QString&,QString&)</th> <th>Form1</th> <th>RightClicked(QString&,QString&)</th>	SimDig07_pSwitch1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	7</th <th>SimAdc02_pLCDNumber8</th> <th>RightClicked(QString&,QString&)</th> <th>Form1</th> <th>RightClicked(QString&,QString&)</th>	SimAdc02_pLCDNumber8	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	√8	SimDig04_pLCDNumber5	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
	√ 9	SimDig03_pLCDNumber4	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)
d	~/ 1(SimDig07_pl_CDNumber3	BightClicked(QString&QString&)	Form1	BightClicked(QString&QString&)
	√11	MDBPoint01_pSinglePointLed2	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)

Save the map, close the **IndigoSCADA Client**, and now it should be possible to interact with the object. Right-click on the object and send a command with a value of zero.



📲 Inc	digoS(ADA	Clien	it						
File	Repo	orts	Confi	gure	Sys	stem	Contr	ol H	elp	
	!	Þ	*	>				?		:30
Alarr	ms	Sta	tus	Me	ssag	es	hmiO	.ui	hmi1	I.ui
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							_			
[<u> </u>				\bigcirc			
							-			

Using the same procedure, it is possible to animate graphic objects connecting them with analogue process data.

Open the **HMI Designer**, and rename the three objects **Pthermometer**, **Ptank** and **QwtThermo** using the formula UnitNamePointXX_oldname.



Objects	Members			
Name			Class	•
	SimAdc02	pLCDNum	PLCDNumber	
	MDBPoint11	wtThermo1	QwtThermo	
- <mark>V</mark> te:	ktLabel1	_	QLabel	
🚫 pix	(mapLabel2		QLabel	
🚫 pix	(mapLabel1		QLabel	
— 🛅 мі	DBPoint01_pl	LCDNumb	PLCDNumber	
-OMD	BPoint01_pS	inglePoint	PSinglePointLed	
- OMD	BPoint01_sin	glePointLe	SinglePointLed	
- 🖌 🚽 MD	BPoint11_pT	ank1	PTank	
L 👫 MD	BPoint11_pT	hermomet	PThermometer	•

Set type of MDBPoint11 to M_ME_TE_1, accordingly to **modbus_database1.db** column iec_type_read.

The PLCDNumber object require the setting of **numDigits**, 6 digits to display correctly **MDBPoint11** which is a 16 bits signed integer (VT_I2).



Dinamic bitmaps

Use the **Breaker** widget to animate single point bitmaps. The bitmaps are selected in Properties Onpixmap and Offpixmap.

Onpixmap is shown in HMI when the value of the point is 1.

Offpixmap is shown in HMI when the value of the point is 0.



Use **DoubleBreaker** widget to animate double points bitmaps. The bitmaps are selected in Properties Onpixmap, Offpixmap, Invalid11pixmap and Invalid00pixmap. Onpixmap is shown in HMI when the value of the point is 2.

Offpixmap is shown in HMI when the value of the point is 1.

Invalid11pixmap is shown in HMI when the value of the point is 3.

Invalid00pixmap is shown in HMI when the value of the point is 0.



Historical data analysis



IndigoSCADA Client allows to inspect data in order to analyze the data and observe the trend of the process data. Go to the **Status** tab and right-click inside one the rectangles representing process data (e.g **MDBPoint11**) and choose **Inspect last two hours** for example.

The ongoing trend of **MDBPoint11** will be shown in a new window.



Alarms and Alarms group

As seen above, **IndigoSCADA Client** uses color to show the process data status. Sometimes, hovewer, it would be necessary to monitor many points at once and have one calculated point which is the OR combination of all these point. This point could summarize those point for example. This functionality is carried out by **IndigoSCADA client** using the **Alarm Group functionality**.

Suppose you need a calculated point called A (=Plant Alarm) which must true on whenever MDBPoint01 or MDBPoint02 are true.

Choose **Configure Alarms group** from the **Configure** menu and create a new point pressing the **New** button.

📲 New Item		×
Name	A	
Ok	Help Cancel	

Now we will have a new group Alarm named $\boldsymbol{A}_{\boldsymbol{\cdot}}$

Add MDF	3Point01	and	MDBPoint02	to	the	list	for	the	alarm	А.
---------	----------	-----	-------------------	----	-----	------	-----	-----	-------	----

Name A			-
Comment (***)			
Sample Points		Points In Group	
MDBPoint03 MDBPoint04 MDBPoint05 MDBPoint06 MDBPoint07 MDBPoint08 MDBPoint09 MDBPoint10 MDBPoint11 MDBPoint12	Add >>	MDBPoint02	
Angly I Now			= wit

Apply these settings and close the window.

Change values in **PeakHMI** and look at the **Alarms tab.** In this example **MDBPoint01** has got value 1(light blue=alarm) and so the Plant Alarm **A** has become an alarm too.

😴 Indigos	5CADA Clier	ıt										
File Rep	orts Confi	igure System	Control H	lelp								
1 🖬 🗾	D 🖸	💌 💟 🛄	🗾 🛛	19:	H							
Alarms	Status	Messages	hmi0.ui	hmi1.ui	hmi2.	ui hmi3.ui	hmi4.ui	hmi5.ui	hmi6.ui	hmi7.ui	hmi8.ui	hmi9.ι
Name	Comment	Update		A	L	pdate		MDB	Point01	Point	Numbe	er 01
A (.***)	2013-06-03 1	3:02:00.73	MDBPoi	nt01 20	13-06-03 13:	02:00.734			Ack. Ne	eded	
				MDBPoi	nt02 20	13-06-03 13:	01:23.671	Commer	nt			
								Failure T	ïme	2013-05-	27 14:46:1	3.123
								Last Acl	nowledged	2013-06-	03 13:01:4	2.648
								Last Ala	rm	2013-06-	03 13:02:0	0.684
								Last Up	late	2013-06-	03 13:02:0	0.684
								No. Alar	ms	206		
								No. Mea	sures	460		
1								Intel Soles	at a set of the set of			

Right-click the **MDBPoint01** and choose **Acknowledge Alarm.**



 ${\bf MDPoint01}$ changes his state in ${\bf Acknowledged}$ ${\bf Alarm}$ and ${\rm Plant}$ ${\rm Alarm}$ ${\bf A}$ changes this state too.

😴 Indiga	SCADA Clien	ıt										
File Re	ports Confi	gure System	Control H	elp								
🖬 🖪	2 🚺 🖭	N N	2	8	2							
Alarms	Status	Messages	hmi0.ui	hmi1.ui	hmi2.ui	hmi3.ui	hmi4.ui	hmi5.ui	hmi6.ui	hmi7.ui	hmi8.ui	hmi9.u
Name	Comment	Update		А	Upd	late		MDB	Point01	Point	Numbe	er 01
A	(***)	2013-06-03 1	3:02:00.73	MDBPoir	nt01 2013	8-06-03 13:0	2:00.734	Commer	nt			
				MDBPoir	nt02 2013	8-06-03 13:0	1:23.671	Failure T	ïme	2013-05-	27 14:46:10	3.123
								Last Ack	nowledged	2013-06-	03 13:11:0	5.544
								Last Ala	rm	2013-06-	03 13:02:00	0.684
								Last Upo	late	2013-06-	03 13:02:0	0.684
								No. Alar	ms	206		
								No. Mea	sures	460		
								No. War	nings	0		
										0.1		

You can create as many alarm groups as you want.

Menu of IndigoSCADA

File menu

Reports menu

Make

Review Print

Alarms Report

Events Report

Audit

Report Configure

The reports generated by the system are fairly simple.

Comment/Title (***) Time Frame Templa From Last Hour ▼ 00:00:00 2013-05-02 Front To Now 00:00:00 2013-05-02 Front Table To Now 00:00:00 2013-05-02 Front Table Table Filter All Results ▼ Back MDBPoint01 ▲ Add >> Add >> MDBPoint03 < Remove Femove MDBPoint05 MDBPoint06 MDBPoint07	
Time Frame Templa From Last Hour 00:00:00 2013-05-02 Front Table To Now 00:00:00 2013-05-02 Front Table Grapt Back MDBPoint01 All Results All Results All Results Add >> Add Add >> Add >> Add >> Add >> Add >> Add	
From Last Hour 00:00:00 2013-05-02 Front To Now 00:00:00 2013-05-02 Grapt Table Filter All Results MDBPoint01 Add >> MDBPoint02 MDBPoint03 << Remove	Э
To Now O0:00:00 2013-05-02 Table Graph Back Table Filter All Results MDBPoint01 MDBPoint02 MDBPoint03 MDBPoint04 MDBPoint05 MDBPoint06 MDBPoint07	(***)
To Now 00:00:00 2013-05-02 Grapt Table Filter All Results MDBPoint01 MDBPoint02 MDBPoint03 MDBPoint05 MDBPoint06 MDBPoint07 MDBPoint07	(***)
Table Filter All Results Back MDBPoint01 MDBPoint02 MDBPoint03 MDBPoint04 MDBPoint05 MDBPoint06 MDBPoint07	'Stat: (***)
MDBPoint01 MDBPoint02 MDBPoint03 MDBPoint04 MDBPoint05 MDBPoint06 MDBPoint07	(***)
MDBPoint08	

The Name field selects the report to be examined or modified.

The **Comment/Title** field is the title or description of the report.

The **From** and **To** fields define the time frame of the report. There are three parts to the **From** and **To** parts of the time frame, the type, a date and a time of day.

The type field can be for the From field:

- Last Hour
- Last Four Hours
- Last Twelve Hours
- Last Day (last 24 hours)

- Last Week (last 7 days)
- Date-Time (an explicit date and time, right click on the date field to get a calendar)
- Today (the date is current day and time of day is the given time)
- Yesterday (the date is previous day and time of day is the given time)

The type field for the **To** fields:

- Now. The current date and time.
- Date-Time (an explicit date and time, right click on the date field to get a calendar)
- Today (the date is current day and time of day is the given time)
- Yesterday (the date is previous day and time of day is the given time)

The **Add** button copies from the available sample points list (left) to the reports sample points list (right).

The **Remove** button copies selected sample points from the reports sample points to the available sample points.

The buttons at the bottom have the following function:

Apply. Any changes are made permanent for the currently selected report point. *Unless Apply is pressed any changes are discarded*.

New. This creates a new report. The New Report dialog is displayed and the existing report listed. The new name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected report is deleted after a confirmation.

Make. The selected report is generated and displayed.

Help. This displays this help page.

Exit. The dialog is closed.

Batch Editor

Pen Trace

Pen Trace is used to draw process data trend and make analysis.

Configure menu

System Configuration		
System Name	IndigoSCADA	
Comment	IndigoSCADA tr(Client)	
Default Language	English	
Audit Level	Log Without Comment	
	T Auto Log Out Time (minutes)	
	Reset Statistics At Midnight	
Ok	Help Cancel	

Configure SystemThis dialog sets up system wide parameters.

The System Name is the name of the system. This is used in the application title bar.

The **Comment** is a long (free text) description of the installation.

Default Language sets the language to use when starting up. Users can select a different language to use after logging in.

Audit Level sets the type of change auditing that is performed. The setting may be **None** (for no auditing), **Log Without Comment** (changes are logged silently) and **Log With Comment** (requires the user to enter a reason for the change).

Auto Log Out Time. When checked a user is logged out automatically after the selected number of minutes.

Press the **Ok** button to accept and set the changes, then exit.

Press the **Cancel** button to discard any changes and exit.

Configure Users

This dialog allows users to be added, removed and configured.

User Configuration	
Name	Developer -
Password	(***)
Comment	Enscada developer
Language	English
	Age Passwords After 99 🚔 days
	 All Priviledges Can Acknowledge Alarms Reports Design Priviledge Can Make and Print Reports Can Exit Application Factory Administrator
Apply	New Delete Help Exit

The **Name** field selects which user is being examined or edited.

The **Comment** field is a free text description of the user.

The **Language** field selects the language to use for this user after login.

The group of checkboxes select which privileges the user has. These control what options are displayed to the user:

All Privileges. The user is a system administrator with all options and no restrictions. Note that although the application will not prevent access or modification of the system's configuration the privileges granted by the database system (when starting the application) may not permit any changes to the databases.

Reports Design Privileged. The user can design reports.

Can Acknowledge Alarms. The user can acknowledge alarms.

Can Make and Print Reports. The user can generate, view and print reports.

The buttons have the following function:

Apply. Any changes are made permanent for the currently selected user. **Unless Apply is pressed any changes are discarded**.

New. This creates a new user. The New User dialog is displayed and the existing users listed. The new user name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected user is deleted after confirmation.

Help. This displays this help page.

Exit. The dialog is closed.

Configure Units

A Unit is a piece of measuring equipment.

Each unit has one type of communication protocol associated with it.

This dialog provides the configuration common to all units. The configuration specific to a unit type is selected by pressing the Configure button on this dialog.

Uni	t Configura	tion
	Name	MDB
	Comment	(***)
	Туре	modbus_driver
		Configure
	Apply	New Delete Help Exit

The Name field selects which unit is being examined and modified.

The **Comment** field is a free text description of the unit.

The **Type** field shows what sort of unit it is. The type determines the driver protocol used to interface to the equipment and to provide the configuration services.

If **Unit Enabled** is checked then the unit is by default enabled. Otherwise it is not enabled, by default. This can be overridden when a recipe is loaded.

The **Configure** button opens the specific configuration dialog for the selected unit of the selected type.

The buttons at the bottom have the following function:

Apply. Any changes are made permanent for the currently selected unit. **Unless Apply is pressed any changes are discarded**.

New. This creates a new unit. The New Unit dialog is displayed and the existing units listed. The new unit name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected unit is deleted after confirmation. All associated sample points are deleted if requested. The results associated with these sample points is not deleted.

Help. This displays this help page.

Exit. The dialog is closed.

Configure Sample Points

This dialog configures sample points. Each sample point represents an input into the system that measures one or more physical values. Each of these physical values is named with a **tag name**.

The list on the left hand side shows the configured sample points and their comments.

The **Comment** field allows a free text description of the sample point to be entered.

The **Unit** field selects the unit associated with the sample point. All sample points must be connected to a unit.

The **Type** field selects the type of input. This in turn (with the Unit field) selects the specific configuration for the sample point.

The **Input Index** field selects the actual input of a given type into the given unit that maps on to this sample point. The choices are determined by the Type and Unit fields.

The **Units** field sets the physical units for the sample point.

Pressing the Limits button opens the alarm threshold configuration dialog.

Pressing the **Actions** dialog opens the event action dialog. This allows certain commands to be performed when a sample point is measured and/or a sample point goes into alarm. This is an advanced user's function and although providing a considerable degree of flexibility it can cause serious damage if it is incorrectly used.

Sample Point C	onfiguration							
Name	Comment			1	MDBPoint01			
MDBPoint01	Point Number 01							
MDBPoint02	Point Number 02				Comment	Point Numbe	or 01	
MDBPoint03	Point Number 03					J. one reambe		
MDBPoint04	Point Number 04							
MDBPoint05	Point Number 05				Unit	MDB		-
MDBPoint06	Point Number 06							
MDBPoint07	Point Number 07				Type	M SP TB 1		•
MDBPoint08	Point Number 08					1		
MDBPoint09	Point Number 09							
MDBPoint10	Point Number 10				Input Index	01	•	Limits
MDBPoint11	Point Number 11							
MDBPoint12	Point Number 12				Units	spi	*	Actions
MDBPoint13	Point Number 13					Job.		
MDBPoint14	Point Number 14							
MDBPoint15	Point Number 15				Enabled		Fileable	Alarm Threshold
MDBPoint16	Point Number 16							
MDBPoint17	Point Number 17				🔲 🗆 Use Log Gr	aph Scales	Retriggerable Alarn	ns 0 🗾
MDBPoint18	Point Number 18				,			
MDBPoint19	Point Number 19							
MDBPoint20	Point Number 20		_	_			IC	A
MDBPoint21	Point Number 21							
MDBPoint22	Point Number 22						1	
MDBPoint23	Point Number 23							
MDBPoint24	Point Number 24			·				
Apply	New	l	Delete		Renam	e	Help	Exit

The **Enabled** checkbox indicates if the sample point is enabled by default. This can be overridden by loading a recipe.

The **Fileable** checkbox indicates if the data from the sample point is to be filed. Normally this should be checked, however there is the possibility that some data does not need filing (e.g. free disk space).

The **Use Log Graph Scales** check box indicates if the graphs for this sample point should use logarithmic scales. This is normally set for particle counts type measurements.

The **Retriggerable Alarms** checkbox indicates if a new alarm is registered for each measurement in alarm. If not checked then an alarm is only generated when the sample point enters alarm.

The **Alarm Threshold** field sets the number of consecutive alarms to be detected before the alarm is logged. While waiting for the alarm threshold to be breached the sample point is in a warning state.

The panel below the checkboxes is for the specific configuration fields. These are specific to a particular unit/type combination and allow for additional configuration (for example conversion factors).

The buttons at the bottom have the following function:

Apply. Any changes are made permanent for the currently selected sample point. *Unless Apply is pressed any changes are discarded*.

New. This creates a new sample point. The New Sample Point dialog is displayed and the existing sample points listed. The new name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected sample point is deleted after a confirmation.

Help. This displays this help page.

Exit. The dialog is closed.

Name			F		
Comment	(***)				
Frequency	Every Monday	00:00:00			
Trigger Point	(***)	•	(***)	> •	
Report	(***)	•	Print Report	Edit Report	
Receipe	(***)	•		Edit Receipe	
Action					

Configure Scheduled Events

The Name field selects which event is being examined or edited.

The **Comment** field is a free text description of the event.

The **Frequency** fields set how often the event is run and the time of day or period between events.

The **Trigger Point** parameters allow an event only to run when the given sample point-tag value meets a given criterion.

The **Report Field** selects which report to generate (or (***) selects no report).

If the **Print Report** checkbox is checked then the report is printed after generation.

Clicking the **Edit Report** button opens the report design dialog.

The **Recipe** selects the recipe to load when the event is run (or (***) selects no recipe).

Clicking the **Edit Recipe** button opens the recipe design dialog.

The **Action** field may be set to an action to be performed. If the action starts with a ! then the command is assumed to be a shell command, otherwise it is an SQL command performed on the current values database. This is an advanced user command, being very powerful it can cause considerable damage to a system. For this reason the application must never run with root privileges.

The buttons at the bottom have the following function:

Apply. Any changes are made permanent for the currently selected event. **Unless Apply is pressed any changes are discarded**.

New. This creates a new event. The New Event dialog is displayed and the existing events listed. The new name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected event is deleted after confirmation.

Help. This displays this help page.

Exit. The dialog is closed.

Configure Alarm Groups

Alarm groups allow the alarm state of a collection of sample points to be collected together and handled as a single entity. The state of a group is the highest alarm state of any of the alarm group's members. Alarms can be acknowledged as a group

Name	
Comment (***)	
Sample Points	Points In Group
MDBPoint01	
MDBPoint02	Add >>
MDBPoint03	
MDBPoint04	
MDBPoint05	<< Remove
MDBPoint06	
MDBPoint07	
MDBPoint08	
MDBPoint09	
MDBPoint10	
MDBPoint11	
MDBPoint12	
MDBPoint13	
MDBPoint14	
MDBPoint15	
·	

The Name field selects the alarm group to be examined or modified.

The **Comment** field has a free text description of the alarm group.

The **Sample Points** list is the list of sample points not in the alarm group.

The **Points In Group** list has the list of sample points in the group.

Clicking the **Add** button copies the selected sample points from the **Sample Points** list to the **Points In Group** list.

Clicking the **Remove** button removes the selected sample points in the **Points In Group** list to the **Sample Points** list.

The buttons at the bottom have the following function:

Apply. Any changes are made permanent for the currently selected alarm group. *Unless Apply is pressed any changes are discarded*.

New. This creates a new alarm group. The New Group dialog is displayed and the existing alarm groups listed. The new name must consist only of letters and numbers. The name must be unique (ignoring case).

Delete. The selected alarm group is deleted after a confirmation.

Help. This displays this help page.

Exit. The dialog is closed.

System control menu

Restart Monitor

This menu entry is used to restart monitor and make **IndigoSCADA client** aware of new Units(= protocol devices) added using the **Configure Units** functionality



present in the **Configure** menu.

Press **Yes** button to confirm the restarting.

Realtime database Management

Realtime database management is a sub-program used to inspect all realtime data of **IndigoSCADA.** Using a SQL language it is possible to query data and administrate the internal database.

🚅 Real time database management											_ 🗆 ×
File Options Help											
н () и											
Online real time databases /		NAME	COMMENT	UNIT	QTYPE	UNITS	ENABLED	FILEABLE	IPINDEX	LOGMODE	ALARMTHRESHOLD
P confiadb	1	MDBPoint01	Point Number 01	MDB	M SP TA 1	sp		1	01	(0
- ACTIONS	2	MDBPoint02	Point Number 02	MDB	M SP TA 1	sp		1	02	(0 0
	3	MDBPoint03	Point Number 03	MDB	M SP TA 1	sp		1	03	0	0
- PBATCH	4	MDBPoint04	Point Number 04	MDB	M_SP_TA_1	sp		1	04	(0
	5	MDBPoint05	Point Number 05	MDB	M_SP_TA_1	sp		1	05	0) 0
	6	MDBPoint06	Point Number 06	MDB	M_SP_TA_1	sp		1	06	(0 0
	7	MDBPoint07	Point Number 07	MDB	M_SP_TA_1	sp		l é	07	(0 0
REPORTS	8	MDBPoint08	Point Number 08	MDB	M_SP_TA_1	sp		1 '	08	0	0 0
SAMPLE	9	MDBPoint09	Point Number 09	MDB	M_SP_TA_1	sp		1 '	09	(0 0
SCHEDULE	10	MDBPoint10	Point Number 10	MDB	M_SP_TA_1	sp		1 '	10	(0 0
- SERIAL	11	MDBPoint11	Point Number 11	MDB	M_SP_TA_1	sp	,	-	11	(0 0
-BAGS	12	MDBPoint12	Point Number 12	MDB	M_SP_TA_1	sp	′	l í	12	(0 0
-BUNITS											
L. BUSERS											
Currentdb											
-BALM GRP											
-BALM GRP STATE											
-PCVAL DB											
- PROPS											
Presultedb											
- Braudill											
EVENIS											
- MDBPoint01											
-BMDBPoint02											
- MDBPoint03	1										
-mMDBPoint04											
- MDBPoint05											
-BMDBPoint06											
	11										<u>·</u>
Query: [select * from PROPS limit	t 150;] Number of	records fetched: 2	0 Res	ult ok						
Query: [select * from TAGS limit 1	150.1	Number of re	ecords fetched: 12	Result	ok						
Query: [select * from SERIAL limi	t 150	1 Number of	records fetched: 12	13 Res	ultok						
Query: [select * from SAMPLE lin	nit 15	0:1 Number c	f records fetched	12 Re	sult ok						
addry. [control work of white 22 mil		o,j nomotro		12 110	out on						
<u> </u>											
Monitor is Running Active receip	pe: (d	lefault) User	: Developer								

Execution of a SQL command.

Right clicking with the mouse on the configdb database icon, the popup window shows up:

🚅 Real time database management												
File Options Help												
∐н • ► н												
Online real time	databas ANAME	1										
📑 configdb	ant Int	01 \										
- ACTIONS	nt(02 \										
	🚽 🚽 Backup Database 🔤 nt	03 \										
BATCH	m Purge Database nt	04 \										
PROPS	Cancel	05 \										
- RECEIPE		06 \										

Insert a **SELECT** query similar as shown below

Enter SQL Command for configdb	? ×
Command for configdb	
select * from TAGS where IOA = 11;	
ОК	Cancel

The result shows how is recorded the **MDBPoint11** sample point in the real time configuration database (configdb) **TAGS** table:



📻 Real time database management							
File	Options Help						
K	🔇 View Date/Time						
Onli	Ø Maximum records						
er ci	Set credentials						
∎• ct ∰• re	sultsdb						

Select the **Options Set credentials** menu, it opens the following dialog where you can set the user and password for accessing the real time database:

Set credentials	<u>?</u> ×
User	
Password	
Ok Cancel	

Nata	The Backup SQL function works in this revision. The restore function is
Note	done with the SubSQL program.

Historical database Management

a Historical database management						
<u>File</u> Options <u>H</u> elp						
₩ 4 ► ₩						
Online historical databases 🙏		TIMEDATE	STATE	VALUE	<u> </u>	
Presultsdb	1	1366895500461	1	2570		
🐨 ALARMS	2	1366895502473	1	2570		
📅 AUDIT	3	1366895503503	1	5140		
EVENTS	4	1366895504517	1	5140		
MDBPoint01	5	1366895506545	1	7710		
📅 MDBPoint02	6	1366895508573	1	10280		
MDBPoint03	7	1366895511615	1	12850		
📅 MDBPoint04	8	1366895513643	1	15420		
IP MDBPoint05	9	1366895516685	1	17990		
📅 MDBPoint06	10	1366895518713	1	20560		
IP MDBPoint07	11	1366895521755	1	23130		
📅 MDBPoint08	12	1366895524781	1	25700		
📑 MDBPoint09	13	1366895526825	1	28270		
🐨 MDBPoint 10	14	1366895529867	1	30840		
■* MDBPoint11	15	1366895531895	1	-32126		
	16	1366895533907	1	-29556		
	17	1366895536965	1	-26986		
	18	1366896964895	1	-24416		
	19	1366896967922	1	-21846		
	20	1366896969965	1	-19276		
	21	1366896972992	1	-16706		
	22	1366896975067	1	-14136		
	23	1366896978077	1	-11566		
۱	24	1366896980137	1	-8996	-	
Quant: [aslast * from MDBPaint11	limit 1	E0:1 Number of r	rocordo fo	tobod: 150	Popult ek	
Query. [select non wibb-oint h	innine i	50, Number on	ecorus ie	icheu. 150	Result on	
,						

Historical database management is used to analyze all the process data samples from the beginning. It gives a low level access to all internal tables of **IndigoSCADA**

The **MDBPoint11** table is selected on the left pane.

📑 Hi	storio	al database managemer	ıt	
File	Opt	ions Help		
H	٢	View Date/Time		
Onl	Ø	Maximum records		
e r	A	Set credentials		
I .				
I .				

Select the **Options View Date/Time** menu

Select again the **MDBPoint11** table on the left pane. **TIMEDATE** column now shows a readable date and time.

Historical database management	t			_[],
Online historical databases 🛆	TIMEDATE	STATE	VALUE	
💕 resultsdb	127 2013-04-25 15:40:50.531	1	-1290	
- ALARMS	128 2013-04-25 15:40:52.575	1	1280	
📑 AUDIT	129 2013-04-25 15:40:55.617	1	3850	
EVENTS	130 2013-04-25 15:40:57.645	1	6420	
IP MDBPoint01	131 2013-04-25 15:41:00.687	1	8990	
IIII MDBPoint02	132 2013-04-25 15:41:02.715	1	11560	
IP MDBPoint03	133 2013-04-25 15:41:05.757	1	14130	
MDBPoint04	134 2013-04-25 15:41:07.785	1	16700	
- MDBPoint05	135 2013-04-25 15:41:10.827	1	19270	
III MDBPoint06	136 2013-04-25 15:41:13.869	1	21840	
IIIP MDBPoint07	137 2013-04-25 15:41:15.881	1	24410	
MDBPoint08	138 2013-04-25 15:41:17.925	1	26980	
IIIP MDBPoint09	139 2013-04-25 15:41:20.951	1	29550	
🐨 MDBPoint 10	140 2013-04-25 15:41:22.995	1	32120	
MDBPoint11	141 2013-04-25 15:41:26.037	1	-30846	
MDBPoint12	142 2013-04-25 15:41:28.065	1	-28276	
	143 2013-04-25 15:41:31.107	1	-25706	
	144 2013-04-25 15:41:33.135	1	-23136	
	145 2013-04-25 15:41:36.177	1	-20566	
	146 2013-04-25 15:41:38.205	1	-17996	
	147 2013-04-25 15:41:41.247	1	-15426	
	148 2013-04-25 15:41:44.273	1	-12856	
	149 2013-04-25 15:41:46.317	1	-10286	
	150 2013-04-25 15:41:49.343	1	-7716	
Query: [select * from MDBPoint11 Query: [select * from MDBPoint11	limit 150;] Number of records f limit 150;] Number of records f	etched: 15 etched: 15	0 Result o	ik k

The **Options Set credentials** menu allows for the setting of user and password of historical database.

Help menu

Show the online help guide.

Main toolbar of IndigoSCADA

The main toolbar of IndigoSCADA is made up by 10 objects:

📷 💵 🖻 💁 💌 🛄 🗹 🔞	8:58	
-----------------	------	--

Report make

Report configure

Report review

Report print

Report alarm

Report events

Edit batches

Acknowledge all alarms

Help

Clock

Configuration

Ini files configuration

Edit C:\scada\project\scada.ini in order to configure the default browser.

The browser is used to show help windows and reports produced by the user.

[internet_browser]

path=C:\Program Files\Internet Explorer\IEXPLORE.EXE

In order to enable the recording of protocol communication to log files in $C:\columnwideC:\col$

[drivers] log_to_file=1

Advanced topics

IndigoSCADA Modbus protocol configuration

IndigoSCADA is using VT_types (used in OPC) to describe the modbus type:

VT_BOOL is a bit

VT_I4 is a 32 bits signed integer

VT_UI4 is a 32 bits unsigned integer

VT_R4 is a 32 bits floating point

VT_R4SWAP is a 32 bits floating point with swap of words

VT_I2 is a 16 bits signed integer

VT_UI2 is a 16 bits unsigned integer

Modbus function codes:

The following modbus functions are used to read:

_FC_READ_COILS 0x01 for IndigoSCADA this is type VT_BOOL

_FC_READ_DISCRETE_INPUTS 0x02 for IndigoSCADA this is type VT_BOOL

_FC_READ_HOLDING_REGISTERS 0x03 for IndigoSCADA this can be type VT_I4, VT_R4, VT_I2, VT_UI4, VT_UI2

_FC_READ_INPUT_REGISTERS 0x04 for IndigoSCADA this can be type VT_I4, VT_R4, VT_I2, VT_UI4, VT_UI2

The following modbus functions are used to write:

_FC_WRITE_SINGLE_COIL 0x05 for Indigo this is type VT_BOOL

_FC_WRITE_MULTIPLE_REGISTERS 0x10 for Indigo this can be type VT_I4, VT_R4, VT_I2

Columns of Data Table in **IndigoSCADA Protocol Configurator** for Modbus protocol are used this way:

MODBUS part:

slave_id = ID of the device in daisy-chain modbus function read = MODBUS function used to read ITEM

≘ Inc	🖹 IndigoSCADA Protocol Configurator - C:/scada/project/modbus_database1.db								
<u>F</u> ile E	ile Edit View Help								
Dat	tabase Str.	ucture	e Browse Data E	cecute SQL					
Та	ible: mod	bus_t	table 💌 🔍				New Record	Delete Record	
Γ	slav	e_id	modbus_function_read	modbus_function_write	modbus_address	modbus_type	ioa_control_center	deadband 📥	
1		1	1	5	0	VT_BOOL	1		
2	2	1	1	5	1	VT_BOOL	2		
3	1	1	1	5	2	VT_BOOL	3		
4	F I	1	1	5	3	VT_BOOL	4		
5	i - 1	1	1	5	4	VT_BOOL	5		
6	; ;	1	1	5	5	VT_BOOL	6		
7	7	1	1	5	6	VT_BOOL	7		
8	1	1	1	5	7	VT_BOOL	8		
9)	1	3	16	10	VT_14	9		
1	0	1	3	16	0	VT_R4	10		
1	1	1	3	16	65	VT_I2	11		
1	2	1	2	0	33	VT_BOOL	12		
1	3	2	1	5	0	VT_BOOL	13		
1	4	2	1	5	1	VT_BOOL	14		
1	5	2	1	5	2	VT_BOOL	15	_	
•								Þ	
	<		1 - 24 of 24 >				Go to:		

 $modbus_function_write = MODBUS$ function used to write the ITEM $modbus_address = MODBUS$ address of the ITEM, is an offset relative to the first address of the function used.

Record one has modbus_address 0, coils function 1 is used, so add the first coils address (000001) and you get actual modbus address 000001; Record 11, has modbus_address 65, holding registers function 3 is used, so add the first holding registers address (400001) and you get actual modbus address 400066;

Record 12, has modbus_address 33, discrete inputs function 2 is used, so add the first discrete inputs address (100001) and you get actual modbus address 100034;

modbus_type = WINDOWS (or OPC) type, used to describe the ITEM type

IEC104 part:

ioa_control_center = progressive number identifying the ITEM

🚅 Real time database manag	📕 Real time database management									<u>- 🗆 ×</u>							
<u>File</u> Options <u>H</u> elp	Eile Options Help																
∥ н ∢ ▶ भ																	
Online real time databases			TAG	UPPE	UPPE	LOW	LOWE	UAEN	UWEN	LWE	LAEI	RECEIPE	ENABLED	IOA	PARAMS	UNIT	<u> </u>
💕 configdb	1	MDBPoint01	VALUE	0	0	0	0	0	0	0	0	(default)	1	1		MDB	
- ACTIONS	2	MDBPoint02	VALUE	0	0	0	0	0	0	0	0	(default)	1	2		MDB	
	3	MDBPoint03	VALUE	0	0	0	0	0	0	0	0	(default)	1	3		MDB	
BATCH	4	MDBPoint04	VALUE	0	0	0	0	0	0	0	0	(default)	1	4		MDB	
- PROPS	5	MDBPoint05	VALUE	0	0	0	0	0	0	0	0	(default)	1	5		MDB	
RECEIPE	6	MDBPoint06	VALUE	0	0	0	0	0	0	0	0	(default)	1	6		MDB	
- REPORTS	7	MDBPoint07	VALUE	0	0	0	0	0	0	0	0	(default)	1	7		MDB	
- SAMPLE	8	MDBPoint08	VALUE	0	0	0	0	0	0	0	0	(default)	1	8		MDB	
- SCHEDULE	9	MDBPoint09	VALUE	0	0	0	0	0	0	0	0	(default)	1	9		MDB	
- SERIAL	10	MDBPoint10	VALUE	0	0	0	0	0	0	0	0	(default)	1	10		MDB	
TAGS	11	MDBPoint11	VALUE	0	0	0	0	0	0	0	0	(default)	1	11		MDB	
UNITS	12	MDBPoint12	VALUE	0	0	0	0	0	0	0	0	(default)	1	12		MDB	
USERS	13	MDBPoint13	VALUE	0	0	0	0	0	0	0	0	(default)	1	13		MDB	
Currentdb	14	MDBPoint14	VALUE	0	0	0	0	0	0	0	0	(default)	1	14		MDB	
"resultsdb	15	MDBPoint15	VALUE	0	0	0	0	0	0	0	0	(default)	1	15		MDB	
	16	MDBPoint16	VALUE	0	0	0	0	0	0	0	0	(default)	1	16		MDB	
	17	MDBPoint17	VALUE	0	0	0	0	0	0	0	0	(default)	1	1/		MDB	
	18	MDBPoint18	VALUE	0	0	0	0	0	0	0	0	(default)	1	18		MDB	
	19	MDBPoint 19	VALUE	0	0	0	0	0	0	0	0	(default)	1	19		MDB	
	20	MDBPoint20	VALUE	0	0	0	0	0	0	0	0	(default)	1	20		MDB	
	21	MDBPoint21	VALUE	0	0	0	0	0	0	0	0	(default)	1	21		MDB	
	22	MDBD=i=t22	VALUE	0	0	0	0	0	0	0	0	(default)	1	22		MDB	
	23	MDBPoint24	VALUE	0	0	0	0	0	0	0	0	(default)	1	23		MDD	
	24	WDBP0IIIL24	VALUE	U	U	U	U	U	U	U	U	(deladit)	1	24		NDD	•
Query: [select * from TAGS I	imit 1	50;] Number of	of records	fetched	: 28 Re	esult ol	k										
		1															
																	1

The relation between modbus_table and TAGS table of configdb database is done by ioa_control_center column on modbus_table and IOA column on TAGS table, so for example MDBPoint11 has IOA 11and through modbus_table has modbus type VT_I2, modbus_address 65, modbus_function_read 3.

If you need another modbus unit (line 2), create for example a unit with name MDB2 and make a copy of file C:\scada\project\modbus_database1.db and rename the copy as C:\scada\project\modbus_database2.db Configure the unit and restart the monitor.

MODBUS TCP address 127.0.0.1 PORT 502 SERVER_ID 1 LINE 2 polling time 1000	
modbus_read_registers: get bit 15 from word: value = 1	
get bit 14 from word: value = 1	
get bit 13 from word: value = 1	
get bit 12 from word: value = 1	
get bit 11 from word: value = 1	
get bit 10 from word: value = 1	
get bit 9 from word: value = 1	
get bit 8 from word: value = 1	
get bit ? from word: value = 1	
get bit 6 from word: value = 1	
get bit 5 from word: value = 1	
get bit 4 from word: value = 1	
get bit 3 from word: value = 1	
get bit 2 from word: value = 1	
get bit 1 from word: value = 1	
get bit 0 from word: value = 1	
[15]1E2][00][00][00][00][01][01][00][00][00][01]	
Waiting for a confirmation	
<12> <e2><00><00><00><01><01><01><01><01><01><01</e2>	
modbus_read_bits: value = 0	
[15][60][00][00][00][00][01][01][00][01][00][01]	
Walting for a confirmation	
<12><16×00><00×00><04×01×01×01×00>	
modbus_read_bits: value = 0	

Advanced topics

IndigoSCADA OPC DA protocol configuration

Step 1:

Browsing of available OPC DA itemID's in the server

Open a command shell windows and run the command, that will create the file configuration_file.sql in C:\scada\project:

opc_client_da.exe -a server_IP_address -p OPCServerProgID -e configuration_file.sql -q {CLSID}

Example:

opc_client_da.exe -a 10.15.20.30 -p Enscada.OPC.Srv -e configuration_file.sql -q {78BB6572-B8BA-47F9-83B3-4EC99DF9B1A3}

Step 2:

Creation of protocol configuration database

Go to C:\scada\bin and run protocol_configurator.exe

 $\label{eq:linear} Import the C:\configuration_file.sql, selecting the C:\configuration_file.sql with the menu: File->Import->Database from SQL file \\$

At the question: Do you want to create a new database file to hold the imported data?

Answer: Yes

The database name should be your OPCServerProgID with extension .db

Save it in C:\scada\project

If you do not use OPCServerProgID.db name, the Step 3 will fail.

Example: Enscada.OPC.Srv.db

Wait for few seconds the Import Completed confirmation Window

Step 3:

Creation of the new SCADA points

1 - Select the menu: Configure \Configure Units

😴 [Non-Commercial] - IndigoSCADA Client									
<u>File</u> Reports	Configure System Control H	elp							
🖬 👿 🗈	🗐 <u>C</u> onfigure System	1							
HMI Alarm	🗟 Configure Users								
	Configure Units								
Sim	Sim 🖧 Configure Sample Points								
102	Scheduled Even	nts							
	Configure Alarm Groups								
Sim	Adc05 Si	SimAdc06							
98	.45 V S	04.23 V							
SimC 60.7	Counts01 Sim 1 N/cuft 957	Counts02 23 N/cuft							

2 - Press button New

Uni	Unit Configuration							
	Name Sim 💌							
	Comment Analogici e contatori							
	Туре	Simulator						
		☑ Unit Enabled Configure						
	Apply	New Delete Help Exit						

 ${\bf 3}$ - Fill in the edit field Name: OPC

📲 [Non-Com	[Non-Commercial] - New Item						
Name	OPC						
Ok	Help Cancel						

4 - Select Type opc_client_da_driver, flag Unit Enabled and press Configure button

[No	[Non-Commercial] - Unit Configuration							
	Name	OPC -						
	Comment	(***)						
	Туре	opc_client_da_driver						
		I Unit Enabled Configure						
	Apply	New Delete Help Exit						

5 - Fill in the OPC Server ProgID, OPC Server IP address, OPC Server Class ID, number of Items and Update Interval in milliseconds. If IP address is left empty, local OPC DA server is used.

If OPC Server Class ID is left empty, it is necessary to configure opcenum.exe on the OPC server host.

[Non-Commercial] - Opc_client_da Configuration						
Name	OPC					
OPC Server ProgID	Enscada.OPC.Srv					
OPC Server IP address	10.15.20.30					
OPC Server Class ID	{78BB6572-B8BA-47f9-83B3-4EC99DF9B1					
N Items	20					
Update Interval (ms)	1000					
Ok	<u>H</u> elp Cancel					

 $\mathbf{6}$ - Press button Apply and wait that the Apply button returns active and then press Exit

[No	n-Commercial]	- Unit Configuration
	Name	OPC -
	Comment	(***)
	Туре	opc_client_da_driver
		I Unit Enabled Configure
	Apply	New Delete Help Exit

7 - Restart monitor.exe

😴 [Non-Commercial] - IndigoSCADA Client							
<u>File</u> <u>Reports</u> <u>C</u> onfigure	System Control Help						
📑 🛂 赵 💁 関	🖶 <u>R</u> estart Monitor						
HMI <u>A</u> larms <u>S</u> tatus	Real time database management						
	J Historical database management						
SimAdc01	SimAdc02	SimAdc					
101.68 V	94.31 V	118.05					
SimAdc05 90-30 V	SimAdc06	SimAdo 93.97 \					

Step 4:

Configure each sample point

8 - Select the menu: Configure Configure Sample Points

📲 [No	😴 [Non-Commercial] - IndigoSCADA Client								
<u>F</u> ile	<u>R</u> eports	<u>C</u> on	figure	Syste	m C <u>o</u> ntrol	<u>H</u> elp			
	🕎 🖹	9	<u>C</u> onfi	gure Sy	ystem		:24		
HMI	Alarm	ٰ	<u>C</u> onfi	gure Us	sers				
	1		<u>C</u> onfi	gure Ur	nits				
	Sim	G	<u>C</u> onfi	gure Sa	ample Poin	its			
86			Configure Scheduled Events						
			<u>C</u> onfi	gure Al	arm Group	s			
	Sim	Adc)5			SimAdc06	5		
102.27 V				82.05 V					

9 - Set Comment, Type, Units and the limits of each new point. Press button Apply

Sample Point Configuration							
Name	Comment		<u> </u>	OPCPoint09			
OPCPoint01	Point Number 01						
OPCPoint02	Point Number 02			Comment	Point Number	ar 09	
OPCPoint03	Point Number 03					51 05	
OPCPoint04	Point Number 04						
OPCPoint05	Point Number 05			Unit	OPC		•
OPCPoint06	Point Number 06				·		
OPCPoint07	Point Number 07			Type	M ME TE 1		-
OPCPoint08	Point Number 08			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1		
OPCPoint09	Point Number 09						
OPCPoint10	Point Number 10			Input Index	09	•	Limits
OPCPoint11	Point Number 11						
OPCPoint12	Point Number 12			Units	V	*	Actions
OPCPoint13	Point Number 13				1.		
OPCPoint14	Point Number 14						
OPCPoint15	Point Number 15			Enabled		Fileable	Alarm Threshold
OPCPoint16	Point Number 16						
OPCPoint17	Point Number 17			Use Log Gr	aph Scales	Retriggerable Ala	arms 0 🔽
OPCPoint18	Point Number 18			·			
OPCPoint19	Point Number 19			Item ID			
OPCPoint20	Point Number 20			J			
OPCPoint21	Point Number 21						
OPCPoint22	Point Number 22			OPC Type			Writeble
OPCPoint23	Point Number 23						
OPCPoint24	Point Number 24		-				
Apply	New	<i>I</i>	Delete	Renam	ie	Help	Exit

- Set type $M_SP_TB_1$ for digital OPC point (i.e VT_BOOL OPC type or any scada point that evaluate to 0 and 1)

- Set type $M_ME_TF_1$ for analog OPC point

Step 5:

HMI configuration with HMI designer

- 10 Run the process C:\scada\bin\hmi_designer.exe
- 11 Open the XML designer file C:\scada\project\hmi0.ui
- 11.1 Or create from scratch your HMI (dialog) and save it as hmi0.ui in C:\scada\project
- $12\ \mbox{-}\ Use the following widget classes$

v	/idget	Class		
SINGLE	POINT	LED	PSinglePointLed	
DOUBLE	POINT	LED	PDoublePointLed	
SINGLE	POINT	LED	SinglePointLed	
DOUBLE	POINT	LED	DoublePointLed	
SWITCH			PSwitch	
THERMON	IETER		QwtThermo	
LCD NUN	1BER		PLCDNumber	
COMMANI	D BUTTO	ON	QPushButton	
TANK			PTank	
THERMON	IETER		PThermometer	
EDIT FI	IELD		QLineEdit	
BREAKEF	२		Breaker	
DOUBLEE	BREAKEI	DoubleBreaker		
PLOT			QwtPlot	
METER			Pmeter	

13 - Widget names must contain the underscore $_$ as separator between sample point SCADA name and widget ID

For example the widget with SCADA name <code>OPCPoint09</code> and <code>widget ID 10</code> has full name: <code>OPCPoint09_10</code>

Please see next image 1



14 - To enable the inspect popup window, please follow the procedure:

You have to connect the signals RightClicked(QString&,QString&) of the widgets with the slot RightClicked(QString&,QString&) of the HMI dialog (here Form1)



😴 [Non-Commercial] - View and Edit Connections							
<u>C</u> on	Connections:						
	Sender	Signal	Receiver	Slot	New		
- A	SimDig04_pLCDNumber5	<no signal=""></no>	Form1	<no slot=""></no>	Delete		
					Delete		
					<u>E</u> dit Slots		
					ок		
					<u>C</u> ancel		

😴 [Non-Commercial] - View and Edit Connections								
<u>C</u> o	Connections:							
Γ	Sender		Signal	Receiver	Slot		New	
	SimDig04	_pLCDNumber5	<no signal=""></no>	Form1	<no slot=""></no>			
			<no signal=""></no>				Delete	
			RightClicked(QString&,QString&)				Edit Slots	
			overflow()					
							<u>о</u> к	
							Cancel	
1								

R	😴 [Non-Commercial] - View and Edit Connections							
9	Connec	ctions:						
		Sender	Signal	Receiver	Slot	New		
	٩	SimDig04_pLCDNumber5	RightClicked(QString&,QString&)	Form1	(No Slot)	Delete		
						Delete		
					(<u>E</u> dit Slots		
					Press "Edit Slo	ts"		
						<u>C</u> ancel		

4	[Non-Commercia	l] - Edit Functions					?×
	Function	Return Type	Specifier	Access	Туре	In Use	
	Only display slots				New	Function	Delete Function
		Press "	New Function	n button"			
	Function Properties					stum tuno: Luo	id
					<u> </u>	stann type. Tvo	
	Specifier: virtual	Access:	public 🗾]	[ype: slot	Y		
	<u>H</u> elp					<u>о</u> к	Cancel

📲 [Non-Commercia	l] - Edit Functions					? ×
Function	Return Type	Specifier	Access	Туре	In Use	
📚 newSlot()	void	virtual	public	slot	No	
1						
Only display slots	•			<u>N</u> ew	Function	Delete Function
-Function Properties	Rename "newS	lot() to "Righ	tClicked(QS	String&,QS	String&)	
Function: newSlot	0				etum type: vo	id
				-		
Specifier: virtual	✓ <u>A</u> ccess:	public 💌]	Type: slot	•		
Help					<u>о</u> к	Cancel

🕎 [Non-Commercial] - Edit Functions							
Function	Return Type	Specifier	Access	Туре	In Use		
😂 RightClicked(QString&,QString&)	void	virtual	public	slot	No		
✓ Only display slots				New Function	n <u>D</u> elete Fur	nction	
-Function Properties							
Eunction: RightClicked(QString&,	QString&)			_ <u>R</u> eturn type	e: void	_	
Specifier: virtual <u>A</u> cce	ss: public 💌	<u>T</u> ype: slot	-				
Help				ок	Can	cel	

📑 [No	📲 [Non-Commercial] - View and Edit Connections								
Conn	Connections:								
	Sender	Signal	Receiver	Slot	New				
A	SimDig04_pLCDNumber5	RightClicked(QString&,QString&)	Form1	<no slot=""></no>					
				<no slot=""></no>					
				RightClicked(QString&,QString&)					
				accept()					
				adjustSize()					
				exect					
				reject()					
					ОК				
					<u>C</u> ancel				
,									

R	🚏 [Non-Commercial] - View and Edit Connections								
9	Connections:								
		Sender	Signal	Receiver	Slot	New			
	~	SimDig04_pLCDNumber5	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)	Delete			
						Edit Slots			
						<u>о</u> к			
						<u>C</u> ancel			

nnections:						
Sender	Signal	Receiver	Slot	Nev		
SimAdc05_pThermometer1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimAdc01_pTank1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)	<u>D</u> ele		
SimAdc03_pLCDNumber2	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)	Edit Slo		
SimAdc04_pLCDNumber1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimAdc02_wtThermo1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig03_pDoublePointLed1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig04_pSinglePointLed1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig07_pSwitch1	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimAdc02_pLCDNumber8	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig04_pLCDNumber5	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig03_pLCDNumber4	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig01_pLCDNumber6	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig02_pLCDNumber7	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimDig07_pLCDNumber3	RightClicked(QString&,QString&)	Form1	RightClicked(QString&,QString&)			
SimAdc01_wtPushButton1	pressed()	Form1	sendCommand()			
				OK		
				<u></u>		



Advanced topics

Configuration of IndigoSCADA as IoT gateway

IndigoSCADA supports MQTT/Sparkplug B as payload encoding.

Open file C:\scada\project\manager.ini. Add the following section to activate MQTT client publisher for sending messages to broker broker.hivemq.com:

[Process6] Process = mqtt_client_publisher.exe -a broker.hivemq.com -p MIA_Command/# -l 1 -t 1883 PauseStart= 1000 PauseEnd= 1000 UserInterface = Yes Restart = Yes

 $Open file broker.hivemq.com_publisher.db with protocol_configurator.exe and configure each ioa_control_center for every mqtt_topic.$

ioa_control_center has to match with the one of input protocol, eg. modbus

8	IndigoSCADA Protocol Configurator - C:/scada/project/broker.hivemq.com_publisher.db								
Eile Edit View Help									
]									
	Database Structure Browse Data Execute SQL								
Table: mqtt_client_table New Record Delete Record									
mqtt_topic mqtt_command_topic ioa_control_center iec_type re					readable wr				
	1	MIA_Temp/Temp_ude	MIA_Command/Temp_ude	1	M_ME_TF_1	1			
	2	MIA_Temp/Temp_udestue	MIA_Command/Temp_udestue	2	M_ME_TF_1	1			
	3	MIA_Temp/Temp_sove	MIA_Command/Temp_sove	3	M_ME_TF_1	1			
	4	MIA_Temp/Temp_stue	MIA_Command/Temp_stue	4	M_ME_TF_1	1			
	5	MIA_Temp/Temp_koekken	MIA_Command/Temp_koekken	5	M_ME_TF_1	1			
	6	MIA_Temp/Maaler	MIA_Command/Maaler	6	M_ME_TF_1	1			
	7	MIA_Temp/Effekt	MIA_Command/Effekt	7	M_ME_TF_1	1			
	8	MIA_Temp/b	MIA_Command/b	8	M_ME_TF_1	1			
	9	MIA_Temp/c	MIA_Command/c	9	M_ME_TF_1	1			
	10	MIA_Temp/d	MIA_Command/d	10	M_ME_TF_1	1			
	11	MIA_Temp/e	MIA_Command/e	11	M_ME_TF_1	1			
	12	MIA_Temp/f	MIA_Command/f	12	M_ME_TF_1	1			
	13	MIA_Temp/g	MIA_Command/g	13	M_ME_TF_1	1			
	14	MIA_Temp/h	MIA_Command/h	14	M_ME_TF_1	1			
	15	MIA_Temp/i	MIA_Command/i	15	M_ME_TF_1	1 👻			
						▶			
	< 1 - 24 of 24 > Go to: 0								

Support

For questions about **IndigoSCADA**, please email your request to the following e-mail or use the forum at Sourceforge site.

E-MAIL: info at enscada.com SITE: https://sourceforge.net/projects/indigoscada/ SITE: https://www.enscada.com/a7khg9/indigoscada.html FORUM: https://sourceforge.net/p/indigoscada/discussion/users/