User Manual of DG-A Series Gateway Products

Shanghai Digigrid Information Technology Co., Ltd.

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1. Product Introduction

1.1. Overview

• DG-A2/A4

DG-A2/A4 is a compact embedded type intelligent communication gateway designed for meeting the IEC61850 consistent communication standard and applying to system integration. It can be deployed in any automation systems as distributed intelligent communication node to collect various data through its RS485/RS232 serial ports and Ethernet ports. By importing any predefined IEC61850 SCL template file -.icd/.cid file via special configuration tool, and mapping object data to internally collected data, DG-A2/A4 can communicate with the master station as IEC61850 IED proxy device (node), so as to simplify the communication process of automation system.





Figure 1.1 Schematic diagram of DG-A4

• DG-A8

DG-A8 intelligent communication gateway is a centralized data acquisition unit device designed for meeting the IEC61850 consistent communication standard, which adopts the 1U, 19" standard rack mounting structure; it can be deployed in power automation systems as intelligent communication node to collect various data through a number of RS485/RS232 serial ports and Ethernet ports; By importing any predefined IEC 61850 template file -.icd/.cid file via special configuration tool, and mapping object data to internally collected data information, DG-A8 is an ideal device that serves as the data acquisition and conversion core of automation system of intelligent station.





Figure 1.2 Schematic diagram of DG-A8

1.2. Packing information and open-box inspection

Packing information

See the packing list for details.

• Open-box inspection

Before unpacking, place the box on a stable surface and pay attention to the orientation of packing box with right side up, so as to prevent DG-A series gateway products from scattering out after the box is opened.

After unpacking, count the quantity of DG-A gateway (including main device, device accessories, user manual, and optical disk, etc.) according to the packing list, and inspect the appearance of DG-A gateway.

1.3. Features

DG-A series gateway products adopt low-power embedded TI Stara AM3352 CPU module. AM3352 adopts ARM Cortex A8 processor, with the dominant frequency of 800MHz and the processing capacity of 795MIPS, integrates NEONTM processor for multimedia and signal processing, and contains 32K instruction/32K data L1 Cache and 256K L2 Cache. The design architecture guarantees the high efficiency of parallel execution and processing performance of the system. Different from x86 CPU module, the architecture based on ARM features high performance and low power consumption, which is particularly applicable to high-end industrial sector with severe environment. DG-A series gatewayis provided with power source with output short-circuit/overvoltage/undervoltage protection functions to adapt to complex operation conditions in industrial environment.



Items	A2	A4
Console port	RS232, RJ45	RS232, RJ45
Serial ports	2 x RS232/RS485(Isolated)	4 x RS232/RS485(Isolated)
Ethernet	1 x 10/100M RJ45	2 x 10/100M RJ45
GPRS Module	1 x 3G Optional	1 x 3G Optional
Build-in storage	512M Nand Flash	512M Nand Flash
Extra storage	N/A	8G/64G Micro SD
Hardware Watchdog	Configurable	Configurable
Time synchronization	NTP	NTP
Power supply	12~24V DC or optional	12~24V DC or optional
Power supply	85~265V AC/100~375V DC	85~265V AC/100~375V DC
Power consumption	<5W	<5W
Weight	0.5kg	0.5kg
Dimensions(W*H*D)	48mmx138mmx86mm	54mmx139mmx118mm
Mounting	DIN rail	DIN rail
Operating Temperature	-40°℃~+85° ℃	-40℃~+85℃

1.4. Specifications and parameters

Item	A8	A16
Console port	RS232, RJ45	RS232, RJ45
Serial ports	8xRS232/RS485(Isolated)	8xRS232/RS485(Isolated)+8xRS485
Ethernet	4 x 10/100M RJ45	4 x 10/100M RJ45
Field Bus	2 x CAN Bus Ports	1 x CAN Bus port
Build-in storage	512M Nand Flash	512M Nand Flash
Extra storage	8G/64G Micro SD	8G/64G Micro SD
Hardware Watchdog	Configurable	Configurable
Time synchronization	NTP	NTP and IRIG-B DC
Power supply	85~265V AC/100~375V DC	85~265V AC/100~375V DC
Power consumption	< 8W	< 8W
Weight	3 kg	3 kg
Dimensions(W*H*D)	483mm x 45mm x 200mm	483mm x 45mm x 200mm
Mounting	1U, 19"rack-mount	1U, 19"rack-mount
Operating Temperature	-40°C~+85°C	-40 ℃~+85℃

2. Installation and Wiring

2.1. Overview

This chapter mainly describes how to install and connect the product effectively. Din rail mounting is preferred to DG-A2/A4; rack mounting is preferred to DG-A8/A16.



2.2. Installation of DG-A2/A4

DG-A2/A4 device can be directly installed on DIN rail to the wall or inside a cabinet. After installation, communication ports and power interfaces shall be protected against such dangerous events as splashing of liquid or wetting; in case of such events, turn off the power or directly unplug the power cord as soon as possible, and place the device at a well-ventilated place for natural drying; if it still cannot start, please seek technical support from our company.

After the device is installed, it shall be ensured that the shell grounding terminal of DG-A2/A4 device is well earthed.

2.3. Wiring of DG-A2/A4

2.3.1. Power connection

Make sure the correct input power, please connect the power source to the device in strict accordance with the following steps:

- > Connect the power line and earth wire to the power socket of DG-A2/A4 device;
- > Check status of PSW indicator lamp for DG-A2/A4 working power supply;
- In case of any abnormality, please turn off the power or directly unplug the power cord as soon as possible, and then seek for technical support from our company.

 \bigstar Note: It's recommended to complete the power connection and debugging of

DG-A2/A4 device before connection with network and serial devices.

2.3.2. Network connection

DG-A2 device provides one independent 10/100Base-T Ethernet interface in its standard configuration, and the default factory configuration is as follows:

Ethernet port	IP address	Subnet mask
ЕТНО	192.168.0.111	255.255.255.0

DG-A device provides two independent 10/100Base-T Ethernet interfaces in its standard configuration, and the default factory configuration is as follows:

Ethernet port	IP address	Subnet mask
ETHO	192.168.0.111	255.255.255.0
ETH1	192.168.1.111	255.255.255.0

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2.3.3. Serial connection

Terminals of RS485/RS232 serial communication ports from DG-A2/A4 are defined as follows.

PIN	Pin	Device Type
1	RS485-1A,RS232-1RX(jumper selection)	DG-A2/A4
2	RS485-1B,RS232-1TX(jumper selection)	DG-A2/A4
3	Signal GND	DG-A2/A4
4	RS485-2A,RS232-2RX(jumper selection)	DG-A2/A4
5	RS485-2B,RS232-2TX(jumper selection)	DG-A2/A4
6	Signal GND	DG-A2/A4
7	RS485-3A,RS232-3RX(jumper selection)	DG-A4
8	RS485-3B,RS232-3TX(jumper selection)	DG-A4
9	Signal GND	DG-A4
10	RS485-4A,RS232-4RX(jumper selection)	DG-A4
11	RS485-4B,RS232-4TX(jumper selection)	DG-A4
12	Signal GND	DG-A4

2.4. Installation of DG-A8/A16

DG-A8/A16 device can be directly installed on a standard 19" rack. Fix the device to the vertical mounting rails at both sides of the rack with four screws, and ensure good earthing between the shell ground terminal of device and the earth wire of rack, as shown below.

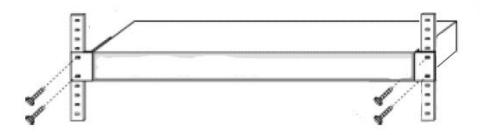


Figure 2.1 Schematic diagram of rack mounting of DG-A8 device

2.5. Wiring of DG-A8/A16

2.5.1. Power connection

The standard input voltage of DG-A8/A16 device is 85~264V AC, and please connect the power



source of the device in strict accordance with the following steps:

- > Connect the power line and earth wire to the power socket of the device;
- > Check status of PSW indicator lamp for DG-A8 working power supply;
- ➢ In case of any abnormality, please turn off the power or directly unplug the power cord as soon as possible, and then seek for technical support from our company.

PIN	Pin
1	N(Neutral line of power source)
2	L(Live line of power source)
3	E(Earth wire of power source casing)

.

 \bigstar Note: It's recommended to complete the power connection and debugging of DG-8

device before connection with network and serial devices.

2.5.2. Network connection

DG-A8/A16 device provides four independent 10/100Base-T Ethernet interfaces in its standard configuration, and the default factory configuration is as follows:

Ethernet port	IP address	Subnet mask
ЕТНО	192.168.0.111	255.255.255.0
ETH1	192.168.1.111	255.255.255.0
ETH2	192.168.2.111	255.255.255.0
ЕТНЗ	192.168.3.111	255.255.255.0

2.5.3. Serial connection

DG-A8/A16 supports 8/16 channels of RS485/RS232 serial port communication, and the terminals of its communication ports are defined as follows:

A8 Slot PIN	Description	Port Name
1	RS485-1A,RS232-1RX (jumper selection)	
2	RS485-1B,RS232-1TX (jumper selection)	COM 1
3	Signal GND	
4	RS485-2A,RS232-2RX (jumper selection)	
5	RS485-2B,RS232-2TX (jumper selection)	COM 2
6	Signal GND	



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7	RS485-3A,RS232-3RX (jumper selection)	
8	RS485-3B,RS232-3TX (jumper selection)	COM 3
9	Signal GND	
10	RS485-4A,RS232-4RX (jumper selection)	
11	RS485-4B,RS232-4TX (jumper selection)	COM 4
12	Signal GND	
1	RS485-5A,RS232-5RX (jumper selection)	
2	RS485-5B,RS232-5TX (jumper selection)	COM 5
3	Signal GND	
4	RS485-6A,RS232-6RX (jumper selection)	
5	RS485-6B,RS232-6TX (jumper selection)	COM 6
6	Signal GND	
7	RS485-7A,RS232-7RX (jumper selection)	
8	RS485-7B,RS232-7TX (jumper selection)	COM 7
9	Signal GND	
10	RS485-8A,RS232-8RX (jumper selection)	
11	RS485-8B,RS232-8TX (jumper selection)	COM 8
12	Signal GND	

A16 Slot#1 PIN	Description	Port Name
1	RS485-1A	COM 1
2	RS485-1B	
3	RS485-2A	COM2
4	RS485-2B	COM 2
5	RS485-3A	COM 2
6	RS485-3B	COM 3
7	RS485-4A	COM 4
8	RS485-4B	COM 4
9	RS485-5A	COM 5



	User Manual	
10	RS485-5B	
11	RS485-6A	
12	RS485-6B	COM 6
13	RS485-7A	00)17
14	RS485-7B	COM 7
15	RS485-8A	
16	RS485-8B	COM 8(Multiplex)
17	RS485-9A	
18	RS485-9B	COM 9(Multiplex)
19	RS485-10A	
20	RS485-10B	COM 10(Multiplex)
21	RS485-11A	COM 11(Multiplay)
22	RS485-11B	COM 11(Multiplex)
23	RS485-12A	COM 12(Markin1ar)
24	RS485-12B	COM 12(Multiplex)
25	RS485-13A	COM 12(Multiplay)
26	RS485-13B	COM 13(Multiplex)
27	RS485-14A	COM 14(Malkinlay)
28	RS485-14B	COM 14(Multiplex)
29	RS485-15A	COM 15(Markin1ar)
30	RS485-15B	COM 15(Multiplex)
31	RS485-16A	
32	RS485-16B	COM 16(Multiplex)

A16 Slot#2 PIN	Description	Port Name
1	RS232 RX	
2	RS232 TX	COM 9(Multiplex)
3	Signal GND	
4	RS232 RX	COM 10(Multiplex)



	User Manual	
5	RS232 TX	
6	Signal GND	
7	RS232 RX	
8	RS232 TX	COM 11(Multiplex)
9	Signal GND	
10	RS232 RX	
11	RS232 TX	COM 12(Multiplex)
12	Signal GND	
1	RS232 RX	
2	RS232 TX	COM 13(Multiplex)
3	Signal GND	
4	RS232 RX	
5	RS232 TX	COM 14(Multiplex)
6	Signal GND	
7	RS232 RX	
8	RS232 TX	COM 15(Multiplex)
9	Signal GND	
10	RS232 RX	
11	RS232 TX	COM 16(Multiplex)
12	Signal GND	

Pin definition of CAN bus:

1	CAN1H
2	CAN1L
3	CAN2H
4	CAN2L

3. Product Application

3.1. Conversion of communication protocol



DG-A series gateway is applicable to the integration of various automation systems to complete data acquisition and conversion of communication protocol. The device performs data communication with such devices as relay protection, fault recorder, watt hour meter, and DC panel via any serial interface or Ethernet port, and then performs data communication with a third-party system via corresponding network or serial port in accordance with the communication standard designated by the system after internal processing. The device can be widely applied in various automation systems, distributed data acquisition and protocol conversion, and the topographic graph of its typical application is as shown in Figure 3.1:

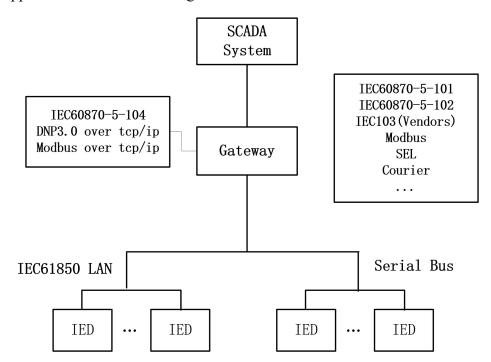


Figure 3.1 Application of DG-A series gateway in conversion of communication protocol

3.2. Integrated automation of power station

• Data acquisition and storage

Any communication port of DG-A series communication gateway can be flexibly configured with corresponding data acquisition protocol, to collect all kinds of communication data from protective devices, measuring and control devices, instruments, fault recorders, and intelligent sensors, and forward the collected real-time data synchronously online while storing such data into local real-time database, thus largely simplifying the communication topology structure of automation system.

• Control and operation functions



DG-A series communication gateway also supports the forwarding of control commands of main station end in different communication links to realize control operation to different devices at field. It can also support such functions as batch control, sequence control, and condition control through logic programming.

• Accurate real-time online monitoring function

By relying on the high-precision time service function provided by clock server, DG-A series gateway can conduct time synchronization in many ways such as NTP/SNTP protocol to guarantee time accuracy in the device and realize transmission of local events and data with time mark, which offers help for subsequent data analysis and fault handling, as shown in Figure 3.2 below.

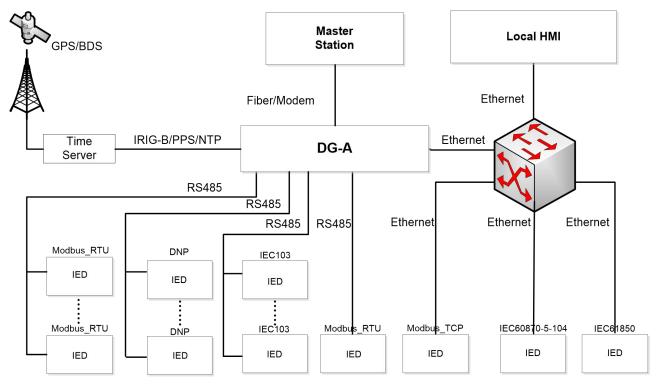


Figure 3.2 Application of DG-A series gateway in integrated automation system of power station

3.3. Virtual port connection

DG-A series gateway also supports the configuration of any serial port virtual connection (terminal server) link layer service, so that it can convert serial data into TCP/IP network data, and realize two-way transparent transmission of serial data and TCP/IP network data, which makes serial devices can directly perform data communication with network applications based on TCP/IP, and facilitates telecommunication of a large number of legacy serial devices.



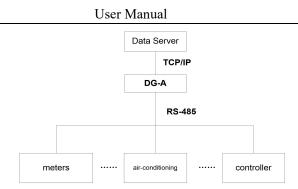


Figure 3.3 Block diagram of application of DG-A series gateway in virtual port connection

3.4. IEC 61850 client/server services

DG-A series gateway supports data acquisition and forwarding based on IEC 61850 Standard. It can be configured as an abstract virtual IEC 61850 communication proxy device (VMD) by importing any SCL (.icd/.cid) template file, to provide IEC 61850 data server services for traditional IED devices, and can also serve as IEC 61850 client to collect IEC 61850 IED data and convert the data into traditional protocol-based data according to the requirements of third parties; this feature provides flexible, convenient, economical and efficient solutions for traditional devices to realize IEC 61850 communication and for IEC 61850 IED to exchange data with traditional data collectors; the typical application is as shown in Figure 3.4 below:

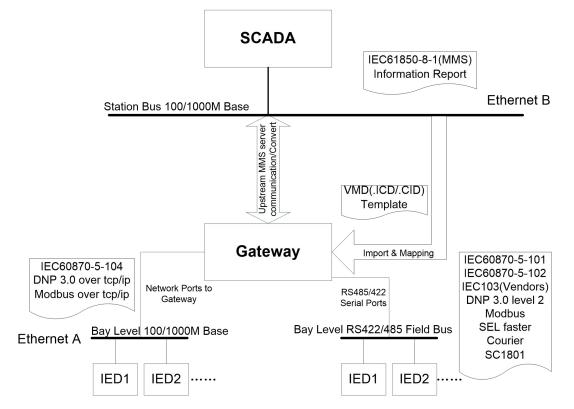


Figure 3.4 Schematic diagram of application of DG-A series gateway in IEC 61850 server



3.5. Soft PLC application

DG-A series gateway is provided with C-type scripting language that is easily understood to meet the requirements of various engineering applications such as online computation, logical judgment, and arithmetical operation. The soft PLC function is widely applied in such aspects as information point synthesis and computation, data volume accumulation, batch processing control, closed-loop control, timed execution, and conditional block, in which the detecting and scanning frequency of logical operation can reach millisecond level.

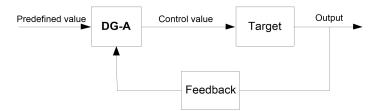


Figure 3.5 Block diagram of application of DG-A series gateway in advanced applications

4. ICE Toolset Software

4.1. Overview

EDPS ICE –anintegrated configuration environment tool allows the user to realize simple configuration in DG gateway products. The user can realize one-key installation by accessing the accompanying optical disk via friendly UI. **EDPS ICE** now supports such installation platforms as Win2000/WinXp/Win7/Win8/Win10. **EDPS ICE** installation disk includes executable files, configuration files, language package and firmware package. The firmware package is an operating file provided by the system for target devices, which can be transferred to any target device that meets conditions through the tool of **EDPS IEC**.

4.2. ICE Toolset installation

The installation is realized by the following steps:

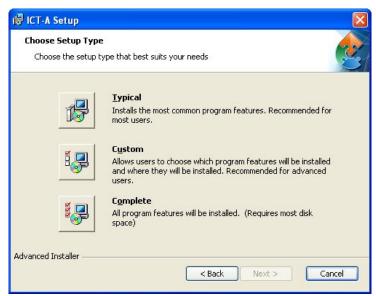
- Insert the installation disk into the computer's CD driver, find the installation file ICE A Toolset.msi or ICE A Toolset.exe in the corresponding directory, and execute the file to install ICE Toolset program.
- 2. After the software tests the current operating system, the system automatically pops up the dialog box of welcome and wizard page.





Note: The system automatically selects currently required software components to complete installation.

3. Click Next (N) to continue installation.



During installation, the user can select one of the three installation types "Typical", "User-defined" and "Overall" as needed. When selecting "Typical", the default installation path is C:\Program Files\, and the software also provides user-defined installation directory; click "Next" after confirmation.

4. Click "Install" to install the software, or click "Cancel".



🛃 ICT-A Setup	×
Ready to Install	
The Setup Wizard is ready to begin the ICT-A installation	2
Click "Install" to begin the installation. If you want to review or ch installation settings, click "Back". Click "Cancel" to exit the wizard.	
Advanced Installer	
Sack In	istall Cancel

5. Enter into the installation process display page.

ICT-A Setup	
Installing ICT-A	
Please wait while the Se	etup Wizard installs ICT-A. This may take several minutes.
Status:	
vanced Installer	

6. After the installation is completed, the system displays the completion page, and prompt the user whether to start the application immediately. Click "Complete" after confirmation.





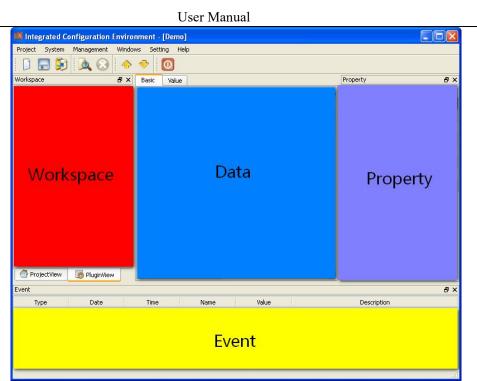
Note: After the software is installed successfully, the user can uninstall the software or repair the previous installation by running the setup program again.

4.3. Interface layout

The user must be familiar with the overall layout of the software before use. Multiple application configurations and operation management functions can be realized through every layout structure.

EDPS ICE adopts the typical dock-mode window structure. The so-called dock window is a type of window docked in an area of the main window, and the dock area of window includes four areas: east, south, west and north. A dock window has such independent features as dock, float, show, hide and close. The use of dock window can bring three-dimensional visual impact to the user, and can independently control the operations within its own working scope.





Menu bar	Provide basic menu operation functions
	of windows
Tool bar	Provide basic tool bar operation functions
	of windows
Project area	Manage project data information
Data area	Basic area for displaying data
Attribute area	Basic area for displaying attributes
Event area	Basic area for displaying events

5. Protocol Configuration

5.1. MODBUS protocol configurationModbus acquisition configuration

5.1.1.1. Driver information

Overview Describe detailed configuration information of acquisition driver

Create Create Modbus acquisition driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the acquisition service plugin;



Workspace	×
E System	
E Client	
2	Click
🔢 Server	
🔝 Task	
IEC61850 Clien	t
IEC61850 Server	
IEC61850	
🐴 ProjectView	👩 PluginView

4. Right click in the blank space, and select the menu option "New acquisition service" to pop up the "Create driver dialog";

	New Client
ß	Paste

5. Select the driver to be created in the driver page;

	Driver Name	Version	Description	12
1	DNP3	2.8.0	Define DNP client.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 client.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 client.	
4	Modbus	2.8.0	Define Modbus client.	

6. Configure basic attributes of the target driver in the attribute page;



Properties Drivers		
ID	Property	
Name		
Description		
Yersion	2.8.0	
Data Update	Value Change	
Driver Cache	64	
Latency Time(ms)	100	
Binding Driver	modbusclient	
Channel update period(s)	30	
Port switch threshold	-1	
IED off-line threshold	3	Y

7. Click "OK" to complete creation;

Note: Driver information

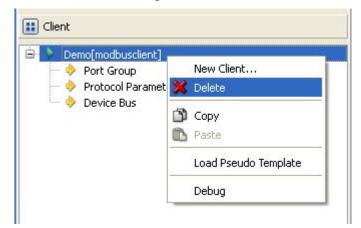
No.	Name	Description
1	Name	Define the display name of driver.
2	Description	Define the description information of driver.
3	Version	Define the version information of driver.
4	Data update	Define the data updating mode.
		Value change - The system updates the database and notifies
		other driver protocols only when a value changes;
		Time change - The system updates the database and notifies
		other driver protocols no matter whether a value or time
		changes;
		Time update - The system updates the database no matter
		whether a value or time changes, and notifies other driver
		protocols only when a value changes;
5	Driver cache	Define the cache size of driver.
6	Latency time(ms)	Define the delay time of updating real-time database.
		The system shall write raw data into the real-time database
		after a delay of the time defined.
7	Binding driver	Define the name of driver module, which is unique and
		cannot be modified.
8	Channel update	Define the cycle of updating IED communication times.
	period (s)	
9	Port switch	Define the switching conditions among multiple ports; when
	threshold	the number of consecutive communication failures of the
		primary port reaches the threshold, it's switched to another



		port1 indicates port switching is deactivated.	
10	IED off-line	Define the offline threshold of IED device; when the number	
	threshold	of consecutive communication failures reaches the threshold,	
		the device is switched to offline state.	

Delete Delete Modbus acquisition driver

8. Right click and select the menu option "Delete";



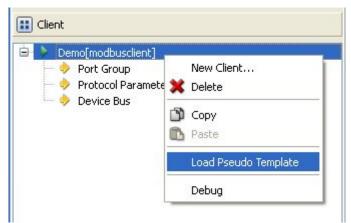
9. It prompts whether to delete;

💷 Tips	
?	Do you want to delete Demo[modbusclient]?

10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:



E	Basic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

5.1.1.2. Port group information

Overview Describe communication channel configuration information

Create Create communication channel

1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Serial Po	rt	N 1
ID	Property	1
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	1

2. Select serial port or network port according to actual situation;

Notes: Attributes of serial channel

No.	Name	Description
1	Serial port name	Set the name of serial port;
2	Port mode	Set the work mode of serial port;
3	Baud rate	Set the Baud rate of serial port;
4	Data bit	Set the data bits of serial port;
5	Parity check	Set the check bit of serial port;
6	Stop bit	Set the stop bit of serial port;
7	Data flow control	Set the data flow control mode of serial port;

Attributes of network channel

No.	Name	Description
1	Port mode	Set the work mode of network port;
2	Service IP	Set the IP address at TCP server/UDP destination address;
3	Port number	Set the work port number of network port;
4	Broadcast address	Set the broadcast address of network port;

Delete Delete communication channel



3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.1.1.3. Protocol parameter

Overview Define communication protocol parameter of protocol

- Attribute View protocol parameter attributes of *EDPS ICE*
 - 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
 - 2. Activate the acquisition service plugin;
 - 3. Select the protocol parameter node in the management area;

Workspace	×	
🔢 System		
Elient		
Demo[modbusclient] Demo[modbusclient] Port Group G CH.1[COM1] Protocol Parameter Device Bus		
E Server		
🔝 Task		
IEC61850 Client		
IEC61850 Server		
IEC61850		
ojectView 🛛 🌆 PluginView 🖣		

4. View protocol parameter attributes

Property	×
ID	Property
Frame Type	RTU
Reference 1	0
Reference 2	1
App. Layer Timeout(ms)	2000
Retry Times	0
Enable Echo	Disable
Idle Interval(ms)	10
Byte Order for CRC	21

Note: Protocol parameter information

No.	Name	Description
1	Frame type	Define the format of communication data frame
2	Reference 1	Define the first reference parameter of TCP frame type
3	Reference 2	Define the second reference parameter of TCP frame type



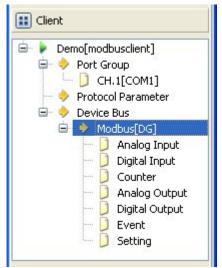
			User Manual
	4	App.layer timeout	Define the timeout interval of waiting for response of
		(ms)	application layer, in ms
Ī	5	Retry times	Define the times for which the application layer resends
			request for data when failing to receive valid data within the
			time allowed
	6	Enabled echo	Define whether to judge whether Echo data bits receive valid
			data.
	7	Idle interval (ms)	Define the idle time interval of communication, in ms
Ī	8	Byte order for	Define the arrangement order of CRC check code
		CRC	

5.1.1.4. Device parameter

OverviewDefine device parameter of protocol

AttributeView device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the acquisition service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;



Property	1
ID	Property
Name	Modbus
Vendor	DG
Address	1
Model	Standard
Period for Class 1 Data(ms)	500
Period for Class 2 Data(ms)	1000
Period for Class 3 Data(ms)	10000
Time Sync Period(s)	-1
Events(ms)	0
Byte Order for 2 Bytes	21
Byte Order for 3 Bytes	321
Byte Order for 4 Bytes	4321
Byte Order for Float	4321
The Maximum Coils for Polling	2000
The Maximum Registers for Polling	125
The Maximum Coils for Writing	800
The Maximum Registers for Writing	100
Data Bytes in a Register	2
Event Mode	Auto
Setting Mode	
Fault Records(ms)	0
Fault Description	
Dist. Mode	
Dist. Channels	
Dist. Sample Rates	
Channel Mode	XXY

Note: Device attribute information

No.	Name	Description
1	Name	Set name information
2	Vendor	Set device manufacturer information
3	Address	Define the address information of device
4	Model	Define the model information of device
		• Standard
		• AREVA Px2x
		• AREVA Px3x
		• AREVA Px4x
		• WIT Mx
5	Period for class 1 data (ms)	Define the cycle of querying Class 1 data, in ms



	User Manual			
6	Period for class 2 data (ms)	Define the cycle of querying Class 2 data, in ms		
7	Period for class 3 data (ms)	Define the cycle of querying Class 3 data, in ms		
8	Time sync period (s)	Define the cycle of performing time		
		synchronization to device, in s		
9	Events (ms)	Define the cycle of performing time reading to		
		device, in ms		
		Min: 0ms		
		Max: 3600000ms		
10	Byte order for 2 bytes	Define the arrangement order of 2 bytes in the		
		device		
11	Byte order for 3 bytes	Define the arrangement order of 3 bytes in the		
		device		
12	Byte order for 4bytes	Define the arrangement order of 4 bytes in the		
		device		
13	Byte order for float	Define the arrangement order of floating-point		
		number bytes		
14	The maximum coils for	Define the maximum number of query coils		
	polling			
15	The maximum registers for	Define the maximum number of query registers		
	polling			
16	The maximum coils for	Define the maximum number of writing coils		
	writing			
17	The maximum registers for	Define the maximum number of writing		
	writing	registers		
18	Data bytes in a register	Define the number of bytes occupied by each		
		register		
19	Event mode	Define the mode of acknowledging event,		
		which is only valid for 2-series device of		
		AREVA		
20	Setting mode	Define the mode of processing setting		
21	Fault records (ms)	Define the cycle of performing fault query to		
		device, in ms		
22	Fault description	Define the fault description of device and carry		
		out IEEE standardization		
23	Dist. mode	Define the mode of processing disturbance data		
24	Dist.channels	Define the channel information of disturbance		
		data in the device		
25	Dist.sample rates	Define the sampling rate information of		
		disturbancedata in the device		
26	Channel mode	Define the mode of reading channel, which is		
		only valid for 2-series device of AREVA		
++wibut	X <i>T</i> [*] 41 1 4	area of EDDS ICE		

Virtual point attribute

View the data area of *EDPS ICE*



Basic Value					UT 45	0011
Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1 IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2 ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3 TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4 FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.
2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.
3	Total communication times	Display the total number of communication times at present.
4	Failed communication times	Display the number of failures during current communication process.Failure means that data are not sent successfully or the received data are incorrect, etc.

5.1.1.5. IO parameter

Overview The user can view IO parameters of each kind of information point on

the IO information page in the data area of *EDPS ICE*.For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.1.1.5.1. Analog input

Function code	 Define the function code of reading information point. 3-Holding Register 4-Input Register 	
Register address	Define the address information of register of information point.	
Starting position	Define the start byte position of the current information point in	
	the register.	
Priority	Define the processing priority of information point.	
	Class 1 data	
	Class 2 data	
	Class 3 data	
Data length	Define the data length of information point in the register.	

	\frown
DIG	lgrid

DIGIgrid	User Manual
Value type	 Define the value type in the register. Discrete type Integer Unsigned integer Floating-point number
5.1.1.5.2. State input	
Function code	 Define the function code of reading information point. 1-Coil Status 2-Input Status 3-Holding Register 4-Input Register 7-Exception Status
Register address Starting position	Define the address information of register of information point. Define the start byte position of the current information point in the register.
Priority	 Define the processing priority of information point. Class 1 data Class 2 data Class 3 data
5.1.1.5.3. Cumulant	input
Function code Register address	 Define the function code of reading information point. 3-Holding Register 4-Input Register Define the address information of register of information point. Define the start byte position of the current information point in
Starting position Priority	 Define the start byte position of the current information point in the register. Define the processing priority of information point. Class 1 data Class 2 data
Data length Value type	 Class 3 data Define the data length of information point in the register. Define the value type in the register. Discrete type Integer Unsigned integer Floating-point number
5.1.1.5.4. Analog out	put
Function code	Define the function code of reading information point. Define the function code of reading information point.

- 3-Holding Register •
- 4-Input Register •



DIGIgrid	User Manual		
Register address	Define the address information of register of information point.		
Starting position	Define the start byte position of the current information point in		
	the register.		
Priority	Define the processing priority of information point.		
	Class 1 data		
	Class 2 data		
	Class 3 data		
Data length	Define the data length of information point in the register.		
Value type	Define the value type in the register.		
	• Discrete type		
	• Integer		
	Unsigned integer		
	Floating-point number		
Writing function	Define the function code of writing information point.		
code	• 6-Preset Register		
	16-Preset Multiple Registers		
5.1.1.5.5. State output	t		
Function code	Define the function code of reading information point.		
	• 5—Force Coil		
	• 15—Force Multiple Coils		
	• 6—Preset Register		
	• 10—Preset Multiple Register		
Register address	Define the address information of register of information point.		
Starting position	Define the start byte position of the current information point in		
	the register.		
Pulse number	Define the number of pulses. It's valid when the control mode is		
	pulse mode.		
High-level time	Define the duration of rising edge at pulse output mode		
Low-level time	Define the duration of falling edge at pulse output mode		
Open command	Define the substituted value for executing open command.		
value			
	Define the substituted value for executing close command.		
value			

5.1.1.5.6. Event

Event code	Define the serial number of event code.It's used to retrieve
	event information.

5.1.1.5.7. Setting

Function code	Define the function code of reading information point.
	• 3-Holding Register
	• 4—Input Register
Register address	Define the address of register.



agria	User Manual
Starting position	Define the start byte position of the information point in the
	register.
Data length	Define the data length of information point.
Value type	Define the data length of information point.
	• Discrete type
	• Integer
	• Unsigned integer
	• Floating-point type
Writing function	Define the function code of writing information point.
code	• 6- Force Register

5.1.2. Modbus forwarding configuration

5.1.2.1. Driver information

Overview Describe detailed configuration information of forwarding driver

Create Create Modbus forwarding driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the forwarding service plugin;

Workspace	×	
🔝 System		
🔝 Client		
E Server		
	Click	
🔝 Task		
IEC61850 Clier	ıt	
IEC61850 Server		
1EC61850		
🐴 ProjectView	PluginView	

4. Right click in the blank space, and select the menu option "New forwarding service" to pop up the "Create driver dialog";



5. Select the driver to be created in the driver page;



	Driver Name	Version	Description	10
1	DNP3	2.8.0	Define DNP server.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 server.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 server.	
4	Modbus	2.8.0	Define Modbus server.	

6. Configure basic attributes of the target driver in the attribute page;

ID	Property	<u>^</u>
Name Description		-
Version	2.8.0	
Binding Driver	modbusserver	
Channel update period(s)	30	

7. Click "OK" to complete creation;

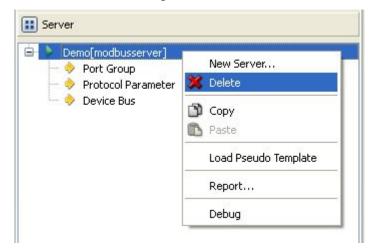
Note: Driver information

No.	Name	Description	
1	Name	Define the display name of driver.	
2	Description	Define the description information of driver.	
3	Version	Define the version information of driver.	
		Define the name of binding module, which is unique and	
4	Binding driver	cannot be modified.	



5	Channel update period(s)	Define the cycle of updating IED communication times.	
---	-----------------------------	---	--

- Delete Delete Modbus forwarding driver
 - 8. Right click and select the menu option "Delete";



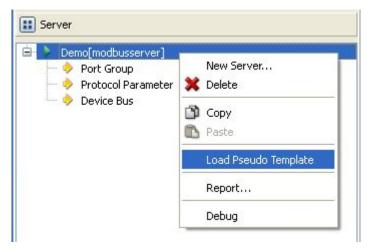
9. It prompts whether to delete;

🚺 Tips		
2	Do you want to d	delete Demo[modbusserver]?
	Yes	No

10. Click "Yes" to complete deletion;

Virtual point template

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:



Basic Value							
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

5.1.2.2. Port group information

- **Overview** Describe communication channel information
- **Create** Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Serial Po	rt	~
ID	Property	1
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	
		V

2. Select serial port or network port according to actual situation; Notes: Attributes of serial channel

	No. Name		Description		
	1	Serial port name	Set the name of serial port;		
	2 Port mode		Set the work mode of serial port;		
3 Baud rate Se		Baud rate	Set the Baud rate of serial port;		
	4	Data bit	Set the data bits of serial port;		
	5	Parity check	Set the check bit of serial port;		
	6	Stop bit	Set the stop bit of serial port;		
	7 Data flow control Set the data flow control mode of serial port;		Set the data flow control mode of serial port;		
Attributes of network channel					

No.	Name	Description				



1 Port mode Set the work mode of network port;		Set the work mode of network port;
2	Service IP	Set the IP address at TCP server/UDP destination address;
3	Port number	Set the work port number of network port;
4	Broadcast address	Set the broadcast address of network port;

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.1.2.3. Protocol parameter

Overview Define communication protocol parameter of protocol

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select the protocol parameter node in the management area;

Workspace	×	
🔃 System		
E Client		
👥 Server		
Demo[modbusserver] Port Group Group Group Group Ort.1[COM1] Protocol Parameter Solution Operice Bus		
🔝 Task		
IEC61850 Client		
IEC61850 Server		
IEC61850		
rojectView 🛛 🦽 PluginView		

4. View protocol parameter attributes

Property	×
ID	Property
Frame Type	RTU
Byte Order for 2 Bytes	21
Byte Order for 3 Bytes	321
Byte Order for 4 Bytes	4321
Byte Order for Float	4321
Data Bytes in a Register	2
Idle Interval(ms)	10
Byte Order for CRC	21

Note: Protocol parameter information



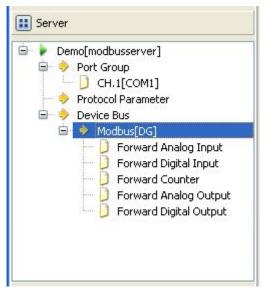
No.	Name	Description
1	Frame type	Define the format of communication data frame
2	Byte order for 2 bytes	Define the arrangement order of 2 bytes in the device
3	Byte order for 3 bytes	Define the arrangement order of 3 bytes in the device
4	Byte order for 4 bytes	Define the arrangement order of 4 bytes in the device
5	Byte order for float	Define the arrangement order of floating-point number
		bytes
6	Data bytes in a register	Define the number of bytes occupied by each register
7	Idle interval (ms)	Define the idle time interval of communication, in ms
8	Byte order for CRC	Define the arrangement order of CRC check code

5.1.2.4. Device parameter

Overview Define device parameter of protocol

Attribute View device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;

Property	×
ID	Property
Name	Modbus
Vendor	DG
Address	1

Note: Device attribute information

No. Name Description



User Manual				
	1	Name	Define the name of device	
	2	Vendor	Define the manufacturer of device.	
	3	Address	Define the address information of device.	
		×		

Virtual point attribute

View the data area of ICE

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.
2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.
3	Total communication times	Display the total number of communication times at present.
4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.

5.1.2.5. IO parameter

Overview The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.1.2.5.1. Analog input

Function code	Define the function code of reading information point.
	• 3-Holding Register
	• 4—Input Register
Register address	Define the address of register.
Starting position Define the start byte position of the current information	
	the register.
Data length	Define the length of data.

	\frown
DIGI	grid

Dicigina	User Manual
Value type	Define the value type of data.
	• Discrete type
	• Integer
	Unsigned integer
	Floating-point number
Offset	Define the offset of numerical value of information point.
Divisor	Define the division factor required in case of data change at the
	information point.
5.1.2.5.2. State input	
Function code	Define the function code of reading information point.
	• 1-Coil Status
	• 2—Input Status
	• 3-Holding Register
	• 4—Input Register
Register address	Define the address information of register of information point.
Starting position	Define the start byte position of the current information point in
	the register.
5.1.2.5.3. Cumulant inj	put

Function code	Define the function code of reading information point.	
	• 3—Holding Register	
	• 4—Input Register	
Register address	Define the address information of register of information point.	
Starting position	Define the start byte position of the current information point in	
	the register.	
Data length	Define the data length of information point in the register.	
Value type	Define the value type in the register.	
	• Discrete type	
	• Integer	
	Unsigned integer	
	Floating-point number	
Offset	Define the offset of numerical value of information point.	
Divisor	Define the division factor required in case of data change at the	
	information point.	

5.1.2.5.4. Analog output

Function code	Define the function code of reading information point.			
	• 3—Holding Register			
	• 4—Input Register			
Register address	Define the address information of register of information point.			
Starting position	Define the start byte position of the current information point in			
	the register.			
Data length	Define the data length of information point in the register.			



leigi id	User Manual
Value type	Define the value type in the register.
	• Discrete type
	• Integer
	• Unsigned integer
	Floating-point number
Offset	Define the offset of numerical value of information point.
Divisor	Define the division factor required in case of data change at the
	information point.

5.1.2.5.5. State output

Function code Define the function code of reading information point			
	• 5—Force Coil		
	• 15—Force Multiple Coils		
Register address	Define the address information of register of information point.		

5.2. IEC60870-5-101 protocol configuration

This chapter mainly describes how *EDPS ICE* configures IEC60870-5-101 acquisition and forwarding driver modules. The configuration manual mainly describes driver information, protocol parameter information, device parameter information, and IO parameter information of various information points. IEC60870-5-101 acquisition and forwarding modules of EDPS completely match the standard protocol text, and *EDPS ICE* provides a concise and fast way to help the user to conduct configuration.

5.2.1. IEC101 acquisition configuration

5.2.1.1.Driver information

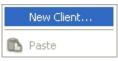
Overview Describe detailed information of acquisition driver

- Create Create IEC101 acquisition driver
 - 1. Open a project file;
 - 2. Select the plugin management page in the management area of *EDPS ICE*;
 - 3. Activate the acquisition service plugin;



Workspace	×
E System	
E Client	
2	Click
🔢 Server	
🔝 Task	
IEC61850 Clien	t
IEC61850 Servi	er
1EC61850	
🐴 ProjectView	👩 PluginView

4. Right click in the blank space, and select the menu option "New acquisition service" to pop up the "Create driver dialog";



5. Select the driver to be created in the driver page;

	Driver Name	Version	Description	1
1	DNP3	2.8.0	Define DNP client.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 client.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 client.	
4	Modbus	2.8.0	Define Modbus client.	
				8

6. Configure basic attributes of the target driver in the attribute page;



Properties Drivers		
ID	Property	
Name		
Description		
Yersion	2.8.0	
Data Update	Value Change	
Driver Cache	64	
Latency Time(ms)	100	
Binding Driver	iec101client	
Channel update period(s)	30	
Port switch threshold	-1	
IED off-line threshold	3	×

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description		
1	Name	Define the display name of driver.		
2	Description	Define the description information of driver.		
3	Version	Define the version information of driver.		
4	Data update	Define the data updating mode.		
		Value change - The system updates the database and		
		notifies other driver protocols only when a value changes;		
		Time change - The system updates the database and		
	notifies other driver protocols no matter whether			
		time changes;		
		Time update - The system updates the database no matter		
		whether a value or time changes, and notifies other driver		
		protocols only when a value changes;		
5	Driver cache	Define the cache size of driver.		
6	Latency time (ms)	Define the delay time of updating real-time database.		
		The system shall write raw data into the real-time database		
		after a delay of the time defined.		
7	Binding driver	Define the name of driver module, which is unique and		
		cannot be modified.		
8	Channel update	Define the cycle of updating IED communication times.		
	period (s)			
9	Port switch	Define the switching conditions among multiple ports;		
	threshold	when the number of consecutive communication failures		
		of the primary port reaches the threshold, it's switched to		



		another port1 indicates port switching is deactivated.
10	IED off-line	Define the offline threshold of IED device; when the
	threshold	number of consecutive communication failures reaches the
		threshold, the device is switched to offline state.

- Delete Delete IEC101 acquisition driver
 - 8. Right click and select the menu option "Delete";

🕨 🕨 Demo[iec101client]	
🔶 Port Group	New Client
Protocol Parameter	💥 Delete
🥌 🤣 Device Bus	🕥 Сору
	Paste
	Load Pseudo Template
	Debug

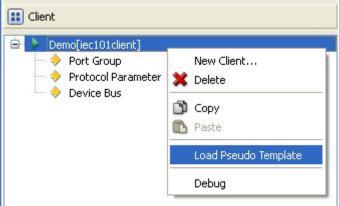
9. It prompts whether to delete;

🚺 Tips	
Do you want	to delete Demo[iec101client]?
Yes	No

10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority



1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

5.2.1.2. Port group information

Overview Describe communication channel information

- Create Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";

roperties Type Serial Po	rt	~
ID	Property	
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	2

2. Select serial port or network port according to actual situation; Notes: Attributes of serial channel

No.	Name	Description		
1	Serial port name	Set the name of serial port;		
2	Port mode	Set the work mode of serial port;		
3	Baud rate	Set the Baud rate of serial port;		
4	Data bit	Set the data bits of serial port;		
5	Parity check	Set the check bit of serial port;		
6	Stop bit	Set the stop bit of serial port;		
7	Data flow control	Set the data flow control mode of serial port;		

Attributes of network channel

No.	Name	Description	
1	Port mode	Set the work mode of network port;	
2	Service IP	Set the IP address at TCP server/UDP destination address;	
3	Port number	Set the work port number of network port;	
4	Broadcast address	Set the broadcast address of network port;	

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.2.1.3. Protocol parameter



Overview Define communication protocol parameter of protocol

- Attribute View protocol parameter attributes of *EDPS ICE*
 - 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
 - 2. Activate the acquisition service plugin;
 - 3. Select the protocol parameter node in the management area;

Workspace		×	
System			
🔡 Client			
Demo[iec101client] Port Group CH.1[COM1] Protocol Parameter Device Bus			
E Server			
📰 Task			
IEC61850 Client			
IEC61850 Server			
IEC61850			
rojectView 🛛 📕 PluginView 💽 🕨			

4. View protocol parameter attributes

Property	X
ID	Property
App. Layer Timeout(ms)	2000
Address Length(byte)	1
Retry Times	0
Idle Interval(ms)	10
Enable E5	Disable

Note: Protocol parameter information

No.	Name	Description		
1	App. layer timeout (ms)	Define the timeout interval of waiting for response of application layer; when the system doesn't receive the response of application layer within the time interval, the system decided no response from the device.		
2	Address lengthDefine the length of link address; the attribute is ma(byte)used to enhance the compatibility of driver.			
3	Retry times	Define the times for which the data need to be resent afte data fail to be sent.		
4	Idle interval (ms)	Define the idle waiting time interval between two complet		



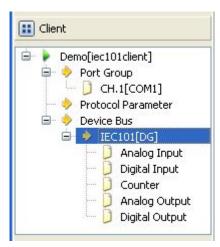
		communication processes in the system.A complete communication process means from sending request for data to receiving all valid data.
5	Enable E5	Define whether to process E5 when IEC60870-5-101
5	Endole E5	processes data.

5.2.1.4. Device parameter

Overview Define device parameter of protocol

Attribute View device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the acquisition service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;



Property			
ID	Property		
Name	IEC101		
Yendor	DG		
Address	1		
Length of Common Address	2		
Length of COT	2		
Length of Info Object Address	3		
Integrity Interval(ms)	10000		
Request Interval(ms)	1000		
Counter Polling Mode	Disable		
Counter Period(s)	0		
Counter Reset	No		
Time Sync Period(s)	60		
Group Info			
Counter Group Info			
Negative Format	Complementary		

Note: Device attribute information

No.	Name	Description
1	Name	Define the name of device
2	Vendor	Define the manufacturer of device.
3	Address	Define the physical address of device.
4	Length of common	Define the number of bytes occupied by public address
	address	in IEC101 communication byte stream.
5	Length of COT	Define the number of bytes occupied by transmission
		reason in IEC101 communication byte stream.
6	Length of info object	Define the number of bytes occupied by information
	address	object address in IEC101 communication byte stream.
7	Integrity interval (ms)	Define the cycle of performing general interrogation to
		device, in ms
8	Request interval (ms)	Define the time interval of querying Class 2 data at
		nonequilibrium mode, in ms
9	Counter polling mode	Define the mode at which the device processes
		cumulant. It's divided into mode A/B/C/D. See 101
		protocol text for details.
10	Counter period (s)	Define the cycle of sending cumulant calling command.
		It's only valid at mode B/C/D.0 means cyclic call is
		deactivated.
11	Counter reset	Define whether to reset cumulant when calling
		cumulant.



User Manual					
12	Time sync period (s)	Define the cycle of sending time synchronization			
		command1 means it's invalid.0 means the system			
		sends time synchronization command when starting up.			
13	Group info	Define the detailed group information when calling			
		group.			
14	Counter group info	Define the detailed group information when calling			
		cumulant group.			
15	Negative format	Define the decoding method when the analog value is			
		negative.			

Virtual point attribute

View the data area of *EDPS ICE*

B	asic	Value						
1	Point	Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDST	A	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPO	ORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTAL	COM.	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILC	ом	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description	
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.	
2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.	
3	Total communication times	Display the total number of communication times at present.	
4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.	

5.2.1.5.IO parameter

Overview

The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.



5.2.1.5.1. Analog input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.2.1.5.2. State input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.2.1.5.3. Cumulant input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.2.1.5.4. Analog output

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	
Output	Define the ASDU type of information point. See IEC60870-5-101
type	protocol text for details.
	• C_SE_NA_1 (scale value)
	• C_SC_NB_1 (normalized value)

• C_SC_NC_1 (short floating-point number)

5.2.1.5.5. State output

Public address	Define the public address in communication process.
Point number	Define the information object address of information point.
Output	Define the mode of executing command. See IEC60870-5-101 protocol
coding	text for details.
	• Undefined
	• Short pulse
	• Long pulse
	Continuous output
Output	Define ASDU type of command. See IEC60870-5-101 protocol text for
type	details.
	Single-point command



- Two-point command
- Step position command

5.2.2. IEC101 forwarding configuration

5.2.2.1. Driver information

Overview Describe detailed information of forwarding driver

Create Create IEC101 forwarding driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of EDPS ICE;
- 3. Activate the forwarding service plugin;

Workspace	×
🔝 System	
🔝 Client	
E Server	
C	Click
🔝 Task	
IEC61850 Clier	nt
IEC61850 Serv	/er
1EC61850	
ProjectView	🧑 PluginView

4. Right click in the blank space, and select the menu option "New forwarding service" to pop up the "Create driver dialog";

	New Server
ß	Paste

5. Select the driver to be created in the driver page;



-				100
	Driver Name	Version	Description	12
1	DNP3	2.8.0	Define DNP server.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 server.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 server.	
4	Modbus	2.8.0	Define Modbus server.	
				2

6. Configure basic attributes of the target driver in the attribute page;

ID	Property	1
Name Description		
Version	2.8.0	-
Binding Driver	iec101server	
Channel update period(s)	30	
		0

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description
1	Name	Define the display name of driver.
2	Description	Define the description information of driver.
3	Version	Define the version information of driver.
	D' 1' 1'	Define the name of binding module, which is unique
4	Binding driver	and cannot be modified.



(s) times.	5	Channel update period	Define the cycle of updating IED communication	
	5	(s)	times.	

- **Delete** Delete IEC101 forwarding driver
 - 8. Right click and select the menu option "Delete";

Demo[iec101server]	
Port Group	New Server
- 🔶 Protocol Parameter	💢 Delete
	🕥 Сору
	🚯 Paste
	Load Pseudo Template
	Report
	Debug

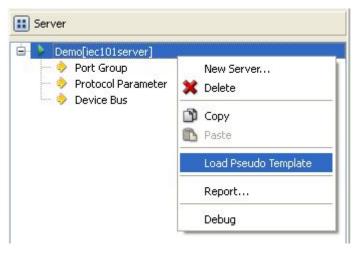
9. It prompts whether to delete;

💷 Tips	
?	Do you want to delete Demo[iec101server]?
	Yes No

10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:



E	Basic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1		Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description	
1	Running	Observe the running state information of the driver.	
	status		
2	Authority	Observe the authorization state of the driver.	

5.2.2.2.Port group information

Overview Describe communication channel information

- **Create** Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Serial Po	rt	~
ID	Property	
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	V

2. Select serial port or network port according to actual situation; Notes: Attributes of serial channel

No.	Name	Description	
1 Serial port name Set the name of serial port;		Set the name of serial port;	
2	Port mode	Set the work mode of serial port;	
3	Baud rate	Set the Baud rate of serial port;	
4	Data bit	ta bit Set the data bits of serial port;	
5	Parity check	Set the check bit of serial port;	
6	Stop bit	Set the stop bit of serial port;	
7	Data flow control	Set the data flow control mode of serial port;	

Attributes of network channel

No. Name Des		Name	Description
1 Port mode Set the work mode of network port;		Set the work mode of network port;	
	2	Service IP	Set the IP address at TCP server/UDP destination address;



3	Port number	Set the work port number of network port;	
4	Broadcast address	Set the broadcast address of network port;	

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.2.3. Protocol parameter

Overview Define communication protocol parameter of protocol

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select the protocol parameter node in the management area;

Workspace	×
🔢 System	
🔝 Client	
🔝 Server	
•	no[iec101server] Port Group CH.1[COM1] Protocol Parameter Device Bus
🔝 Task	
IEC6185	i0 Client
IEC6185	i0 Server
1EC6185	0
rojectView	🌆 PluginView 🚺 🕨

4. View protocol parameter attributes

Property	X
ID	Property
Address Length(byte)	1
SBO TimeOut(s)	30
Idle Interval(ms)	10
Protocol Version	2002

Note: Protocol parameter information

No. Name Description		Description
1	1 Address length (byte) Define the length of link address, in byte	
2	2 SBO timeout (s) Define the timeout interval of remote control	
	command, in s	
3	Idle interval (ms)	Define the idle time interval of communication, in ms



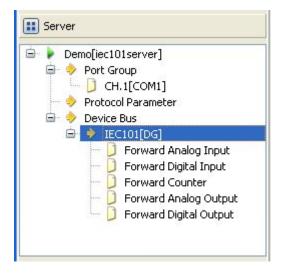
4	Protocol version	Define the working version number of communication
		protocol

5.2.2.4. Device parameter

Overview Define device parameter of protocol

Attribute View device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;



Property	E
ID	Property
Name	IEC101
Vendor	DG
Address	1
Length of Common Address	2
Length of COT	2
Length of Info Object Address	3
Counter Polling Mode	Disable
Counter Reset	No
Counter Time Tag	Disable
Cyclic Transmission	Disable
Negative Format	Complementary
Group Info	
Counter Group Info	
Back Scan Period(s)	0
Float Order	1234

Note: Device attribute information

No.	Name	Description
1	Name	Define the name of device
2	Vendor	Define the manufacturer of device.
3	Address	Define the physical address of device.
4	Length of common	Define the number of bytes occupied by public address in
	address	IEC101 communication byte stream.
5	Length of COT	Define the number of bytes occupied by transmission reason
		in IEC101 communication byte stream.
6	Length of info object	Define the number of bytes occupied by information object
	address	address in IEC101 communication byte stream.
7	Counter polling mode	Define the mode at which the device processes cumulant. It's
		divided into mode A/B/C/D. See 101 protocol text for details.
8	Counter reset	Define whether it's allowed to reset cumulant
9	Counter time tag	Define whether to add time mark information to cumulant
10	Cyclic transmission	Define whether it's allowed to send data cyclically according
		to group definition information
11	Negative format	Define the decoding method when the value is negative.
12	Group info	Define the detailed group information when calling group.
13	Counter group	Define the detailed group information when calling cumulant
	info	group.
14	Back scan period (s)	Define the cycle of sending background scanning data frame.



6

User Manual 0 means no data are sent. 15 Float order Define the coding sequence of floating-point number

Virtual point attribute

View the data area of EDPS ICE

B	asic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.
2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.
3	Total communication times	Display the total number of communication times at present.
4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.

5.2.2.5.IO parameter

The user can view IO parameters of each kind of information point on Overview the IO information page in the data area of EDPS ICE. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.2.2.5.1. Analog input

Public	Define the public address in communication process.
address	
Point number	Define the point number of information point.
ASDU type	Define the application function type of information point.
	• M_ME_NA_1 (normalized value)



leight	User Manual
	• M_ME_NB_1 (scale value)
	• M_ME_NC_1 (short floating-point number)
	• M_ME_ND_1 (normalized value with quality)
	• M_ST_NA_1 (step position information)
Working	Define the working mode of information point.
mode	• Cyclic
	• Burst
Time mark	Define whether an information point is provided with time mark in
	transmission frame.
Offset	Define the offset for computing raw data at the information point.
Divisor	Define the division factor for computing raw data at the information
	point.
Dead zone	Define the dead zone value of producing event value; it's satisfied when
value	the absolute value of the difference between the previous transmission
	value and the current value is greater than the dead zone value.

5.2.2.5.2. State input

Public address	Define the public address in communication process.
Point number	Define the point number of information point.
ASDU type	Define the ASDU transmission type of information point.
	• M_SP_NA_1 (single-point)
	• M_DP_NA_1 (two-point)
Working	Define the working mode of information point.
mode	• Cyclic
	• Burst
Automatic	Define whether the system transmit change data as SOE according to
SOE	settings after it receives shift information.
	• Invalid
	• Open enabled
	• Close enabled
	• Change enabled
SOE	Define whether the system directly uses SOE data of device after it
	receives valid SOE data.
COS	Define whether the system sends change information after it receives
	shift information.

5.2.2.5.3. Cumulant input

Public	Define the public address in communication process.
address	
Point	Define the point number of information point.
number	
Min. value	Define the minimum value of raw data.
Max. value	Define the maximum value of raw data.



signa	User Manual
Offset	Define the offset for computing raw data at the information point.
Divisor	Define the division factor for computing raw data at the information point.

5.2.2.5.4. Analog output

Public I	Define the public address in communication process.
address	
Point number	Define the point number of information point.
ASDU type	Define the application function type of information point.
Output type	Normalized value
	• Scale value
	Short floating-point number
Offset	Define the offset for computing raw data at the information point.
Divisor	Define the division factor for computing raw data at the information
	point.

5.2.2.5.5. State output

Public	Define the public address in communication process.
address	
Point	Define the point number of information point.
number	
Control	Define the mode of executing control operation command at the
mode	information point.
	• Direct execution

• Remote control selection

5.3. IEC60870-5-104 protocol configuration

Appendix D mainly describes how *EDPS ICE* configures IEC60870-5-104 acquisition and forwarding driver modules. The configuration manual mainly describes driver information, protocol parameter information, device parameter information, and IO parameter information of various information points. IEC60870-5-104 acquisition and forwarding modules of EDPS completely match the standard protocol text, and *EDPS ICE* provides a concise and fast way to help the user to conduct configuration.

5.3.1. IEC104 acquisition configuration

5.3.1.1.Driver information

Overview Describe detailed information of acquisition driver

Create Create IEC104 acquisition driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the acquisition service plugin;



Workspace	×
E System	
E Client	
2	Click
🔢 Server	
🔝 Task	
IEC61850 Clien	t
IEC61850 Servi	er
1EC61850	
🐴 ProjectView	👩 PluginView

4. Right click in the blank space, and select the menu option "New acquisition service" to pop up the "Create driver dialog";

	New Client
ß	Paste

5. Select the driver to be created in the driver page;

	Driver Name	Version	Description	11
1	DNP3	2.8.0	Define DNP client.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 client.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 client.	
4	Modbus	2.8.0	Define Modbus client.	
				8

6. Configure basic attributes of the target driver in the attribute page;



Properties Drivers		
ID	Property	
Name		
Description		
Yersion	2.8.0	
Data Update	Value Change	
Driver Cache	64	
Latency Time(ms)	100	
Binding Driver	iec104client	
Channel update period(s)	30	
Port switch threshold	-1	
IED off-line threshold	3	Y

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description
1	Name	Define the display name of driver.
2	Description	Define the description information of driver.
3	Version	Define the version information of driver.
4	Data update	Define the data updating mode.
		Value change - The system updates the database and
		notifies other driver protocols only when a value changes;
		Time change - The system updates the database and
		notifies other driver protocols no matter whether a value or
		time changes;
		Time update – The system updates the database no matter
		whether a value or time changes, and notifies other driver
		protocols only when a value changes;
5	Driver cache	Define the cache size of driver.
6	Latency time (ms)	Define the delay time of updating real-time database.
		The system shall write raw data into the real-time database
		after a delay of the time defined.
7	Binding driver	Define the name of driver module, which is unique and
		cannot be modified.
8	Channel update	Define the cycle of updating IED communication times.
	period (s)	
9	Port switch	Define the switching conditions among multiple ports;
	threshold	when the number of consecutive communication failures
		of the primary port reaches the threshold, it's switched to



		another port1 indicates port switching is deactivated.
10	IED off-line	Define the offline threshold of IED device; when the
	threshold	number of consecutive communication failures reaches the
		threshold, the device is switched to offline state.

Delete Delete IEC101 acquisition driver

8. Right click and select the menu option "Delete";

🖃 🕨 Demo[iec104client]	
🚽 🤣 Port Group	New Client
Protocol Parameter Device Bus	💥 Delete
	🕥 Сору
	🚯 Paste
	Load Pseudo Template
	Debug

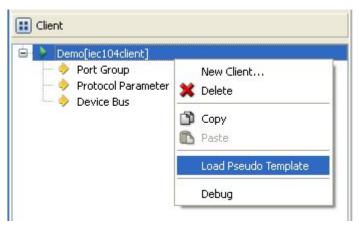
9. It prompts whether to delete;

🚺 Tips		
2	Do you want to o	delete Demo[iec104client]?
	Yes	No

10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:

Ba	sic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
	ORVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
20	ORVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority



No.	Name	Description
1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

5.3.1.2. Port group information

Overview Describe communication channel information

- **Create** Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Serial Po	rt	~
ID	Property	12
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	

2. Select network port;

Type Network	Port	~
ID	Property	
Port Mode	Disable	
Server IP	0.0.0.0	
Port Number	20000	
Broadcast Address	255.255.255.255	

Note: Attributes of network channel

No.	Name	Description
1	Port mode	Set the work mode of network port;
2	Service IP	Set the IP address at TCP server/UDP destination address;
3	Port number	Set the work port number of network port;



Broadcast address Set the broadcast address of network port;

 4
 Broadcast address

 Delete
 Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.3.1.3. Protocol parameter

- **Overview** Define communication protocol parameter of protocol
- Attribute View protocol parameter attributes of *EDPS ICE*
 - 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
 - 2. Activate the acquisition service plugin;
 - 3. Select the protocol parameter node in the management area;

Workspace	×			
🔝 System				
🔝 Client				
Demo[iec104client] Port Group Ort.1[192.168.0.111:2404] Protocol Parameter Opublic Bus				
E Server				
🔝 Task				
IEC61850 Client				
IEC61850 Server				
IEC61850				
💮 ProjectView 🛛 🧕 PluginView				

4. View protocol parameter attributes

Property	×
ID	Property
App. Layer Timeout(ms)	4000
Idle Interval(ms)	10

Note: Protocol parameter information

No.	Name	Description
1	App.layer timeout (ms)	Define the timeout interval of waiting for response of application layer; when the system doesn't receive the response of application layer within the time interval, the system decided no response from the device.
2	Idle interval (ms)	Define the idle waiting time interval between two complete communication processes in the system. A complete



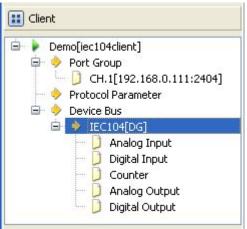
communication process means from sending request for data to receiving all valid data.

5.3.1.4. Device parameter

Overview Define device parameter of protocol

Attribute View device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the acquisition service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;



Property	
ID	Property
Name	IEC104
Vendor	DG
Length of Common Address	2
Length of COT	2
Length of Info Object Address	3
ĸ	12
W	8
Integrity Interval(ms)	10000
Counter Polling Mode	Disable
Counter Period(s)	0
Counter Reset	No
Time Sync Period(s)	60
Group Info	
Counter Group Info	
Negative Format	Complementary
Sequence Check	Yes

Note: Device attribute information

No.	Name	Description
1	Name	Define the name of device
2	Vendor	Define the manufacturer of device.
3	Length of common address	Define the number of bytes occupied by public address in communication byte stream.
4	Length of COT	Define the number of bytes occupied by transmission reason in communication byte stream.
5	Length of info object address	Define the number of bytes occupied by information object address in communication byte stream.
6	К	Define the maximum number of frames unconfirmed in buffer.
7	W	Define the maximum number of frames that can be received in buffer before the device confirms. It's better not to exceed 2/3 of K value.
8	Integrity interval (ms)	Define the cycle of performing general interrogation to device.
9	Counter polling mode	Define the mode of querying cumulant. It's divided into mode A/B/C/D. See 104 protocol text for details.
10	Counter period (s)	Define the cycle of sending cumulant calling or freezing command. It's only valid at mode B/C/D. 0 means cyclic call is deactivated.



		User Manual
11	Counter t reset	Define whether to reset cumulant when calling
		cumulant.
12	Time sync period (s)	Define the cycle of performing time synchronization to
		device1 means it's invalid. 0 means the system sends
		time synchronization command when starting up.
13	Group info	Define the detailed group information when calling
		group.
14	Counter group info	Define the detailed group information when calling
		cumulant group.
15	Negative format	Define the decoding method when the analog value is
		negative.
16	Sequence check	Define whether to check whether the frame number of
		received frame matches with that of transmit frame.

Virtual point attribute

View the data area of EDPS ICE

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description	
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.	
2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.	
3	Total communication times	Display the total number of communication times at present.	
4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.	

5.3.1.5.IO parameter

Overview The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively



reduce the error rate of configuration data in the user's input process.

5.3.1.5.1. Analog input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.3.1.5.2. State input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.3.1.5.3. Cumulant input

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	

5.3.1.5.4. Analog output

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	
Output	Define the ASDU type of information point. See IEC60870-5-101
type	protocol text for details.
	• C_SE_NA_1 (scale value)
	• C SC NB 1 (normalized value)

- C_SC_NB_1 (normalized value)
- C_SC_NC_1 (short floating-point number)

5.3.1.5.5. State output

Public	Define the public address in communication process.
address	
Point	Define the information object address of information point.
number	
Output	Define the mode of executing command. See IEC60870-5-101 protocol
coding	text for details.
	• Undefined

- Short pulse
- Long pulse
- Continuous output
- Output Define ASDU type of command. See IEC60870-5-101 protocol text for



type

- Single-point command
- Two-point command
- Step position command

5.3.2. IEC104 forwarding configuration

details.

•

5.3.2.1. Driver information

Overview Describe detailed information of forwarding driver

- Create Create IEC104 forwarding driver
 - 1. Open a project file;
 - 2. Select the plugin management page in the management area of *EDPS ICE*;
 - 3. Activate the forwarding service plugin;

Workspace	×	
🔝 System		
🔢 Client		
E Server		
Click		
🔝 Task		
IEC61850 Client		
IEC61850 Server		
1EC61850		
ProjectView	S PluginView	

4. Right click in the blank space, and select the menu option "New forwarding service" to pop up the "Create driver dialog";



5. Select the driver to be created in the driver page;



	Driver Name	Version	Description	
1	DNP3	2.8.0	Define DNP server.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 server.	-
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 server.	
4	Modbus	2.8.0	Define Modbus server.	

6. Configure basic attributes of the target driver in the attribute page;

ID	Property	1
Name Description		
Version	2.8.0	
Binding Driver	iec104server	Į.
Channel update period(s)	30	

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description
1	Name	Define the display name of driver.
2	Description	Define how to describe the driver.
3	Version	Define the version information of driver.
	Binding driver	Define the name of binding module, which is unique
4		and cannot be modified.



5	Channel update period	Define the cycle of updating IED communication	
5	(s)	times.	

- **Delete** Delete IEC104 forwarding driver
 - 8. Right click and select the menu option "Delete";

Demo[iec104server]	
Port Group Protocol Parameter Protocol Parameter Protocol Parameter	New Server
	💥 Delete
	🕥 Сору
	🚯 Paste
	Load Pseudo Template
	Report
	Debug

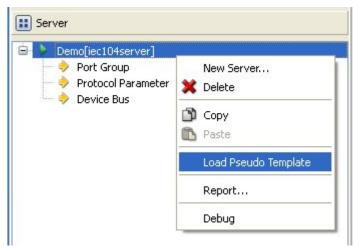
9. It prompts whether to delete;

1 Tips	
?	Do you want to delete Demo[iec104server]?
	Yes No

10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:



В	asic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description	
1 Running Observe the running state information of the driver.		Observe the running state information of the driver.	
	status		
2	Authority	Observe the authorization state of the driver.	

5.3.2.2. Port group information

Overview Describe communication channel information

Create Create communication channel

1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Network P	Port	~
ID	Property	16
Port Mode	TCP Server	
Server IP	192.168.0.111	
Port Number	2404	
Broadcast Address	255.255.255.255	~

2. Select network port;

Note: Attributes of network channel

No.	Name	Description		
1	Port mode	Set the work mode of network port;		
2	Service IP	Set the IP address at TCP server/UDP destination address;		
3	Port number	Set the work port number of network port;		
4	Broadcast address	Set the broadcast address of network port;		

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.3.2.3. Protocol parameter

Overview Define communication protocol parameter of protocol

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select the protocol parameter node in the management area;



Workspace	×	
🔢 System		
Elient		
E Server		
 Demo[iec104server] Port Group CH.1[192.168.0.111:2404] Protocol Parameter 		
🧼 🔶 Device Bus		
🔝 Task		
IEC61850 Client		
IEC61850 Server		
IEC61850		
🔄 ProjectView 🛛 🧕 PluginView		

4. View protocol parameter attributes

Property	×
ID	Property
SBO TimeOut(s)	30
Idle Interval(ms)	10
Event Mode	Single
Event Buffer	32

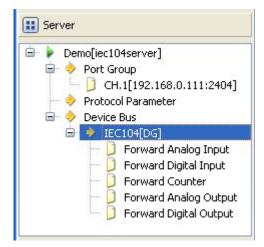
Note: Protocol parameter information

No.	Name	Description
1	SBO timeout (s)	Define the timeout interval of remote control selection
		command, in s
2	Idle interval (ms)	Define the idle time interval of communication, in ms
3	Event mode Define the event handling mechanism; single	
	single connection and multichannel for all connections.	
4 Event buffer Define the size of e		Define the size of event buffer.

5.3.2.4. Device parameter

- **Overview** Define device parameter of protocol
- Attribute View device parameter attributes
 - 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
 - 2. Activate the forwarding service plugin;
 - 3. Select any child node under the node of device bus in the management area with mouse;





4. View the attribute area of *EDPS ICE*;

Property	×
ID	Property
Name	IEC104
Vendor	DG
Length of Common Address	2
Length of COT	2
Length of Info Object Address	3
к	12
w	8
Counter Polling Mode	Disable
Counter Reset	No
Counter Time Tag	Disable
Cyclic Transmission	Disable
Spontaneous Transmission	Enable
Negative Format	Complementary
Sequence Check	Yes
Group Info	
Counter Group Info	
Back Scan Period(s)	0
Time Zone	0

Note: Device attribute information

No.	Name	Description
1	Name	Define the name of device
2	Vendor	Define the manufacturer of device.
3	Length of common	Define the number of bytes occupied by public address
	address	in communication byte stream.



		User Manual
4	Length of COT	Define the number of bytes occupied by transmission
		reason in communication byte stream.
5	Length of info object	Define the number of bytes occupied by information
	address	object address in communication byte stream.
6	К	Define the maximum number of frames unconfirmed in
		buffer.
7	W	Define the maximum number of frames that can be
		received in buffer before the device confirms. It's better
		not to exceed 2/3 of K value.
8	Counter polling	Define the mode of querying cumulant. It's divided into
	mode	mode A/B/C/D. See 104 protocol text for details.
9	Counter reset	Define whether to reset cumulant when calling
		cumulant.
10	Counter time tag	Define whether it's allowed to transmit cumulant with
		time mark.
11	Cyclic transmission	Define whether it's allowed to send data information
		cyclically according to group definition information.
12	Spontaneous	Define whether burst transmission of data information is
	transmission	allowed.
13	Negative format	Define the decoding method when the analog value is
		negative.
14	Sequence check	Define whether to check whether the frame number of
		received frame matches with that of transmit frame.
15	Group info	Define the range of information object addresses to
		which data are transmitted by group.
16	Counter group info	Define the range of information object addresses to
		which cumulant data are transmitted by group.
17	Back scan period (s)	Define the scanning cycle of sending background
		scanning data.
18	Time zone	Define the time zone information of time.

Virtual point attribute View the data area of *EDPS ICE*

E	Basic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	
5	TotalCli	Current Total Client	16 Bits Unsigned Short	0	Local	By Value	

No.	Name	Description	
1	IED status	Describe the communication state of the current device.	
		The user can view whether the device is online by the	
		value of the information point.	



User Manual							
2	Current active port Display which communication port is used by the current						
	number	channel for communication. For a link with multiple ports,					
		the user can easily find the running port by the value of the					
		information point.					
3	Total	Display the total number of communication times at					
	communication	present.					
	times						
4	Failed	Display the number of failures during current					
	communication	communication process. Failure means that data are not					
	times	sent successfully or the received data are incorrect, etc.					
5	Current total client	client Count the number of current clients.					

5.3.2.5.IO parameter

Overview The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.3.2.5.1. Analog input

Public address	Define the public address in communication process.				
Point numbe	er Define the point number of information point.				
ASDU type	Define the application function type of information point.				
	• M_ME_NA_1 (normalized value)				
	• M_ME_NB_1 (scale value)				
	• M_ME_NC_1 (short floating-point number)				
	• M ME ND 1 (normalized value with quality)				
	• M ST NA 1 (step position information)				
Working	Define the working mode of information point.				
mode	• Cyclic				
	• Burst				
Time mark	Define whether an information point is provided with time mark in				
	transmission frame.				
Offset	Define the offset for computing raw data at the information point.				
Divisor	Define the division factor for computing raw data at the information				
	point.				
Dead zone	Define the dead zone value of producing event value; it's satisfied when				
value	the absolute value of the difference between the previous transmission				



value and the current value is greater than the dead zone value.

5.3.2.5.2. State input

Public address	Define the public address in communication process.
Point number	Define the point number of information point.
ASDU type	Define the ASDU transmission type of information point.
<i>.</i> .	• M SP NA 1 (single-point)
	• M_DP_NA_1 (two-point)
Working	Define the working mode of information point.
mode	• Cyclic
	• Burst
Automatic	Define whether the system transmit change data as SOE according to
SOE	settings after it receives shift information.
	• Invalid
	• Open enabled
	• Close enabled
	• Change enabled
SOE	Define whether the system directly uses SOE data of device after it
	receives valid SOE data.
COS	Define whether the system sends change information after it receives shift information.

5.3.2.5.3. Cumulant input

Public	Define the public address in communication process.
address	
Point	Define the point number of information point.
number	
Min. value	Define the minimum value of raw data.
Max. value	Define the maximum value of raw data.
Offset	Define the offset for computing raw data at the information point.
Divisor	Define the division factor for computing raw data at the information
	point.

5.3.2.5.4. Analog output

Public	lic Define the public address in communication process.			
address				
Point numbe	r Define the point number of information point.			
ASDU type	Define the application function type of information point.			
	Normalized value			
	• Scale value			
	• Short floating-point number			
Offset	Define the offset for computing raw data at the information point.			



point.

5.3.2.5.5. State output

Public	Define the public address in communication process.
address Point	Define the point number of information point.
number	
Control	Define the mode of executing control operation command at the
mode	information point.
	Direct execution

- Direct execution
- Remote control selection

5.4. DNP3.0 protocol configuration

This chapter mainly describes how *EDPS ICE* configures DNP3.0 acquisition and forwarding driver modules. The configuration manual mainly describes driver information, protocol parameter information, device parameter information, and IO parameter information of various information points. DNP3.0 acquisition and forwarding modules of EDPS completely match the standard protocol text, and *EDPS ICE* provides a concise and fast way to help the user to conduct configuration.

5.4.1. DNP3.0 acquisition configuration

5.4.1.1.Driver information

Overview Describe detailed information of acquisition driver

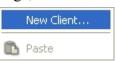
Create Create DNP protocol acquisition driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the acquisition service plugin;

10								
Workspace	×							
🔢 System								
Elient								
Click								
🔝 Server								
🔝 Task								
IEC61850 Client								
IEC61850 Server								
IEC61850	IEC61850							
🐴 ProjectView	BluginView							



4. Right click in the blank space, and select the menu option "New acquisition service" to pop up the "Create driver dialog";



5. Select the driver to be created in the driver page;

	Driver Name	Version	Description	12
1	DNP3	2.8.0	Define DNP client.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 client.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 client.	
4	Modbus	2.8.0	Define Modbus client.	
				2

6. Configure basic attributes of the target driver in the attribute page;

Properties Drivers			
ID	Property		
Name			
Description			
Version	2.8.0		
Data Update	Value Change		
Driver Cache	64		
Latency Time(ms)	100		
Binding Driver	dnpclient		
Channel update period(s)	30		
Port switch threshold	-1		
IED off-line threshold	3		

7. Click "OK" to complete creation; Note: Driver information



No.	Name	Description			
1	Name	Define the display name of driver.			
2	Description	Define the description information of driver.			
3	Version	Define the version information of driver.			
4	Data update	Define the data updating mode.			
		Value change - The system updates the database and			
		notifies other driver protocols only when a value changes;			
		Time change – The system updates the database and			
		notifies other driver protocols no matter whether a value or			
		time changes;			
		Time update – The system updates the database no matter			
		whether a value or time changes, and notifies other driver			
		protocols only when a value changes;			
5	Driver cache	Define the cache size of driver.			
6	Latency time (ms)	Define the delay time of updating real-time database.			
		The system shall write raw data into the real-time database			
		after a delay of the time defined.			
7	Binding Driver	Define the name of driver module, which is unique and			
		cannot be modified.			
8	Channel update	Define the cycle of updating IED communication times.			
	period (s)				
9	Port switch	Define the switching conditions among multiple ports;			
	threshold	when the number of consecutive communication failures			
		of the primary port reaches the threshold, it's switched to			
		another port1 indicates port switching is deactivated.			
10	IED off-line	Define the offline threshold of IED device; when the			
	threshold	number of consecutive communication failures reaches the			
		threshold, the device is switched to offline state.			

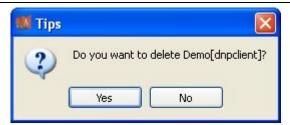
Delete Delete DNP acquisition driver

8. Right click and select the menu option "Delete";

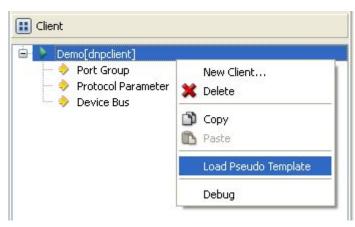
😑 🕨 Demo[dnpclient]				
🧼 🤣 Port Group	New Client			
Protocol Parameter Device Bus	💥 Delete			
	🕥 Сору			
	🚯 Paste			
	Load Pseudo Template			
	Debug			

9. It prompts whether to delete;





- 10. Click "Yes" to complete deletion;
- Virtual point template Load virtual point of driver from the system template library
 - 11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:

Basic Value							
Point Name		Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running	Observe the running state information of the driver.
status		
2	Authority	Observe the authorization state of the driver.

5.4.1.2. Port group information

Overview Describe communication channel information

- Create Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";



Type Serial Po	rc	~
ID	Property	
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	

2. Select serial port or network port according to actual situation;

Notes: Attributes of serial channel

No.	Name	Description	
1	Sserial port name	Set the name of serial port;	
2	2 Port mode Set the work mode of serial port;		
3 Baud rate Set the Ba		Set the Baud rate of serial port;	
4	Data bit	Set the data bits of serial port;	
5	5 Parity check Set the check bit of serial port;		
6	Stop bit	Set the stop bit of serial port;	
7	Data flow control	Set the data flow control mode of serial port;	

Attributes of network channel

No.	Name	Description		
1	Port mode	Set the work mode of network port;		
2	Service IP	Set the IP address at TCP server/UDP destination address;		
3	Port number	Set the work port number of network port;		
4	Broadcast address	Set the broadcast address of network port;		

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.4.1.3. Protocol parameter

Overview Define communication protocol parameter of protocol

Attribute View protocol parameter attributes of *EDPS ICE*

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the acquisition service plugin;
- 3. Select the protocol parameter node in the management area;



Workspace		×	
🔢 System			
🔝 Client			
È- ▶ De È- ∲	mo[dnpclient] Port Group D CH.1[COM1] Protocol Parameter		
 Protocol Parameter Device Bus 			
📰 Server			
🔃 Task			
IEC61850 Client			
IEC618	IEC61850 Server		
IEC618	1EC61850		
rojectView	rojectView 🛛 😹 PluginView 🕢 🕨		

4. View protocol parameter attributes

Property	
ID	Property
App. Layer Response Timeout(ms)	4000
App. Layer Confirm Timeout(ms)	2000
App. Layer Retries	0
Link Layer Timeout(ms)	2000
Link Layer Retries	0
Master Address	1
Enable Echo	Disable
Idle Interval(ms)	10

Note: Protocol parameter information

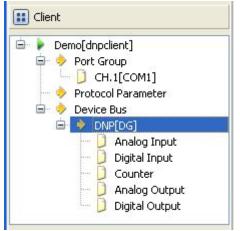
No.	Name	Description
1	App.layer	Define the timeout interval of waiting for response of
	response timeout	application layer; when the system doesn't receive the
	(ms)	response of application layer within the time interval, the
		system decided no response from the device.
2	App.layer confirm	Define the timeout interval of acknowledgement frame;
	timeout (ms)	when the system doesn't receive the acknowledgement
		frame of application layer within the time interval, the
		system decided that the communication fails.
3	App.layer retries	Define the times for which the data need to be resent after
		the application layer fails to process data.
4	Link layer	Define the timeout interval for link layer to process data;
	timeout (ms)	when the system doesn't receive correct data of link layer



	User Manual				
		within the time interval, the system decided that the			
		communication fails.			
5	Link layer retries	Define the times for which the link data need to be resent			
		after link data fails to be processed.			
6	Master address	Define the source station address of data communication.			
7	Echo enabled	Define whether to process Echo frame that may occur during			
		information communication. When it's defined not to			
		process Echo, Echo data frame received will be regarded as			
		communication error frame.			
8	Idle interval (ms)	Define the idle waiting time interval between two complete			
		communication processes in the system. A complete			
		communication process means from sending request for data			
		to receiving all valid data.			

5.4.1.4. Device parameter

- **Overview** Define device parameter of protocol
- Attribute View device parameter attributes
 - 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
 - 2. Activate the acquisition service plugin;
 - 3. Select any child node under the node of device bus in the management area with mouse;



4. View the attribute area of *EDPS ICE*;



Property	×
ID	Property
Name	DNP
Vendor	DG
Address	1
Time Sync Mode	Auto Time Sync
Polling Table	
Auto Integrity Poll	Enable
Time Format	Local
Initialize	Enable

Note: Device attribute information

No.	Name	Description		
1	Name	Define the name of device		
2	Vendor	Define the manufacturer of device.		
3	Address	Define the physical address of device.		
4	Time sync mode	 Define the processing mode. Invalid mode Process time synchronization according to time change state (temporarily no processing) Process time synchronization according to IIN state Automatic time synchronization 		
5	Polling table	Define the query table of DNP processing.		
6	Auto integrity poll	Set whether to perform general interrogation.		
7	Time format	 Define how to convert time at time operation. UTC mode Local mode 		
8	Initialize	Define whether to perform initialization of handshake link.		

Virtual point attribute

View the data area of *EDPS ICE*

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No. Name		Description
1	IED status	Describe the communication state of the current device. The user
1	IED status	can view whether the device is online or offline by the value of the



1	9	User Manual			
			information point.		
	2	Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.		
	3	Total communication times	Display the total number of communication times at present.		
	4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.		

5.4.1.5.IO parameter

Overview The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.4.1.5.1. Analog input

Point number Define the point number of information point.

5.4.1.5.2. State input

Point number Define the point number of information point.

5.4.1.5.3. Cumulant input

Object	Define the object number of cumulant processing.
number	• 20 - binary cumulant
	• 21 - frozen cumulant
Point	Define the point number of cumulant input.
number	

5.4.1.5.4. Analog output

Point	Define the point number of analog output.
number	
Data	Define the data length of analog output.
length	• 16-bit integer
	• 32-bit integer



5.4.1.5.5. State output

5.4.2. DNP3.0 forwarding configuration

5.4.2.1. Driver information

Overview Describe detailed information of forwarding driver

- **Create** Create DNP forwarding driver
 - 1. Open a project file;
 - 2. Select the plugin management page in the management area of *EDPS ICE*;
 - 3. Activate the forwarding service plugin;



4. Right click in the blank space, and select the menu option "New forwarding service" to pop up the "Create driver dialog";



New Server			
ß	Paste		

5. Select the driver to be created in the driver page;

	Driver Name	Version	Description	10
1	DNP3	2.8.0	Define DNP server.	
2	IEC 60870-5-101	2.8.0	Define IEC 60870-5-101 server.	
3	IEC 60870-5-104	2.8.0	Define IEC 60870-5-104 server.	
4	Modbus	2.8.0	Define Modbus server.	
				0

6. Configure basic attributes of the target driver in the attribute page;

ID	Property	1
Name		
Description Version	2.8.0	
Binding Driver	dnpserver	
Channel update period(s)	30	
		~

7. Click "OK" to complete creation;

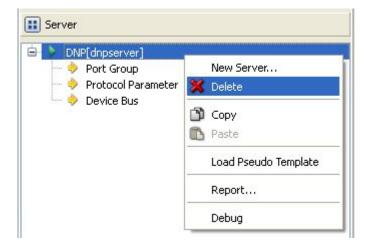
Note: Driver information

No.	Name	Description				
1	Name	Define the display name of driver.				
2	Description	Define how to describe the driver.				



User Manual					
	3	Version	Define the version information of driver.		
	4	Binding driver	Define the name of binding module, which is unique and cannot be modified.		
	5	Channel update period(s)	Define the cycle of updating IED communication times.		

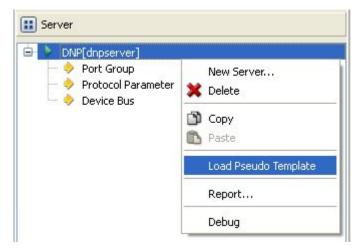
- **Delete** Delete DNP forwarding driver
 - 8. Right click and select the menu option "Delete";



9. It prompts whether to delete;

💔 Tips	
?	Do you want to delete DNP[dnpserver]?
	Yes No

- 10. Click "Yes" to complete deletion;
- Virtual point template Load virtual point of driver from the system template library
 - 11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



Note:



В	asic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1 Running		Observe the running state information of the driver.
	status	
2	Authority Observe the authorization state of the driver.	

5.4.2.2. Port group information

Overview Describe communication channel information

- **Create** Create communication channel
 - 1. Right click a port group and select "New port" to pop up the "Create port dialog";

Type Serial Po	rt	~
ID	Property	10
Serial Port Name	COM1	
Port Mode	R5232	
BaudRate	9600	
DataBit	8	
Parity Check	None	
StopBit	1	
Data Flow Control	None	V

2. Select serial port or network port according to actual situation; Notes: Attributes of serial channel

No.	Name	Description
1	Serial port name	Set the name of serial port;
2	Port mode	Set the work mode of serial port;
3	Baud rate	Set the Baud rate of serial port;
4	Data bit	Set the data bits of serial port;
5	Parity check	Set the check bit of serial port;
6	Stop bit	Set the stop bit of serial port;
7	Data flow control	Set the data flow control mode of serial port;

Attributes of network channel

No.	Name	Description
1	Port mode	Set the work mode of network port;



2	Service IP	Set the IP address at TCP server/UDP destination address;
3	Port number	Set the work port number of network port;
4	Broadcast address	Set the broadcast address of network port;

Delete Delete communication channel

3. Right click a channel number and click "Delete", and select "Yes" to complete deletion.

5.4.2.3. Protocol parameter

Overview Define communication protocol parameter of protocol

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select the protocol parameter node in the management area;

Workspace	×
🔢 System	
🔝 Client	
🔢 Server	
DNP[dnpserver] DNP[dnpserver] Port Group CH.1[COM1] Protocol Parameter Device Bus	
🔢 Task	
IEC61850 Client	
IEC61850 Server	
IEC61850	
rojectView 🛛 🧑 PluginView 💽	

4. View protocol parameter attributes

Property	X	
ID	Property	
App. Layer Confirm Timeout(ms)	2000	
App. Layer Retries	0	
Link Layer Timeout(ms)	2000	
Link Layer Retries	0	
Master Address	1	
SBO TimeOut(s)	30	
Idle Interval(ms)	10	
Event Mode	Single	
Event Buffer	32	

Note: Protocol parameter information



No.	Name	Description			
1	App.layer confirm timeout (ms)	Define the timeout interval of acknowledgement frame; when the system doesn't receive the acknowledgement frame of application layer within the time interval, the system decided that the communication fails.			
2	App.layer retries	Define the times for which the data need to be resent after the application layer fails to process data.			
3	Link layer timeout (ms)	Define the timeout interval for link layer to process data; when the system doesn't receive correct data of link layer within the time interval, the system decided that the communication fails.			
4	Link layer retries	Define the times for which the link data need to be resent after link data fails to be processed.			
5	Master address	Define the source station address of data communication.			
6	SBO timeout (s)	Define the timeout interval of executing remote control selection command.			
7	Idle interval (ms)	Define the idle waiting time interval between two complete communication processes in the system. A complete communication process means from sending request for data to receiving all valid data.			
8	Event mode	Define the event handling mechanism; single channel or multichannel.			
9	Event buffer	Define the size of event buffer.			

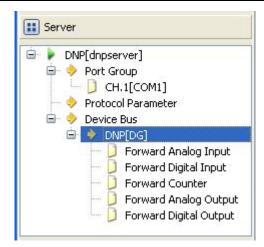
5.4.2.4. Device parameter

Overview Define device parameter of protocol

Attribute View device parameter attributes

- 1. Open a project, and select the plugin management page in the management area of *EDPS ICE*;
- 2. Activate the forwarding service plugin;
- 3. Select any child node under the node of device bus in the management area with mouse;





4. View the attribute area of *EDPS ICE*;

Property	×
ID	Property
Name	DNP
Vendor	DG
Address	1
Unsolicited Class 1	Disable
Unsolicited Class 2	Disable
Unsolicited Class 3	Disable
App. Layer Confirm Mode	Confirm
Link Layer Confirm Mode	Confirm
Time Format	Local
Initialize	Enable

Note: Device attribute information

No.	Name	Description		
1	Name	Define the name of device		
2	Vendor	Define the manufacturer of device.		
3	Address	Define the physical address of device.		
4	Unsolicited Class 1	Set whether to actively report Class 1 data.		
5	Unsolicited Class 2	Set whether to actively report Class 2 data.		
6	Unsolicited Class 3	Set whether to actively report Class 3 data.		
7	App. Layer confirm	Set the acknowledge mode of communication of		
	mode	application layer; acknowledge by default.		
8	Link layer confirm mode	Set the acknowledge mode of communication of link		
		layer; acknowledge by default.		
9	Time format	Define the clock format of device		
10	Initialize	Define whether to perform initialization of handshake		



link.

Virtual point attribute

View the data area	of EDPS ICE
--------------------	--------------------

B	Basic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description
1	IED status	Describe the communication state of the current device. The user can view whether the device is online or offline by the value of the information point.
2	2 Current active port number	Display which communication port is used by the current channel for communication. For a link with multiple ports, the user can easily find the running port by the value of the information point.
3	Total communication times	Display the total number of communication times at present.
4	Failed communication times	Display the number of failures during current communication process. Failure means that data are not sent successfully or the received data are incorrect, etc.

5.4.2.5.IO parameter

Overview

The user can view IO parameters of each kind of information point on the IO information page in the data area of *EDPS ICE*. For IO parameters of each kind of data, accurate marginal check and data verification have been provided in the system according to setup parameters, which can effectively reduce the error rate of configuration data in the user's input process.

5.4.2.5.1. Analog input

Point numberDefine the index number of information point.CategoryDefine the processing level of current information point.• InvalidClass 1 date

- Class 1 data
- Class 2 data
- Class 3 data



Sigrid	User Manual
Data length	Define the size of data.
	• 16-bit integer
	• 32-bit integer
	• 32-bit floating point
	• 64-bit double precision
Time mark	Define whether to perform time mark processing to data.
Offset	Define the offset of numerical value of information point.
Divisor	Define the division factor required in case of data change at the
	information point.
Dead zone	Define the dead zone value of producing event value; it's satisfied
value	when the absolute value of the difference between the previous
	transmission value and the current value is greater than the dead
	zone value.

5.4.2.5.2. State input

Point number	Define the index number of information point.
Category	Define the processing level of current information point.
	• Invalid
	Class 1 data
	Class 2 data
	Class 3 data
Automatic	Define whether the system transmits change data as SOE according
SOE	to settings after it receives shift information.
	• Invalid
	• Open enabled
	• Close enabled
	Change enabled
SOE	Define whether the system directly forwards SOE after it receives
	valid SOE data.
Data length	Define the data length of information point.
	• 1-bit state
	• 2-bit state

5.4.2.5.3. Cumulant input

Point	Define the index number of information point.
number	
Category	Define the processing level of current information point.

- Invalid
- Class 1 data
- Class 2 data
- Class 3 data

Data type Define the data type of information point.

- Binary cumulant
- Frozen cumulant



3.14	User Manual
Data	Define the size of data.
length	• 16-bit integer
	• 32-bit integer
Min. value	Define the minimum value for data conversion at the information point.
Max. value	Define the minimum value for data conversion at the information point.
Offset	Define the offset of numerical value of information point.
Divisor	Define the division factor required in case of data change at the
	information point.
Dead zone	Define the dead zone value of producing event value; it's satisfied when
value	the absolute value of the difference between the previous transmission
	value and the current value is greater than the dead zone value.

5.4.2.5.4. Analog output

Point	Define the index number of information point.
number	
Data	Define the processing level of current information point.
length	• 16-bit integer
	• 32-bit integer
Offset	Define the offset of numerical value of information point.
Divisor	Define the division factor required in case of data change at the
	information point.

5.4.2.5.5. State output

Point	Define the index number of information point.
number	

6. Frequently Asked Questions

6.1. Hardware Failures and Troubleshooting

6.1.1. The PSW indicator for power supply on the panel doesn't light after the device is

powered on

• The voltage of power supply is lower than the normal starting voltage.

Before the power supply is started, use a multimeter to measure the voltage between the two ends PWR+ and PWR- of power source. If failing to reach the starting voltage, the input power needs to be inspected.

At normal operation, the voltage range of power source is as shown below.

Device type	Standard voltage	Working range
DG-A2/A4	12VDC	12~24VDC
DG-A2/A4A8/A16	220VAC/110V DC	85~265VAC/100~375V DC

• Fuse blown



Open the cover of device to see whether the fuse has blown after the power is disconnected. If yes, replace it with a new fuse. If not, check for short-circuit between PWR+ and PWR-.

• Power switch failure Use a multimeter to check the input end and output end of power switch after the power is disconnected.

6.1.2. The working power supply is normal but the mainboard doesn't work

- The CPU board is not closely connected with the mainboard Re-plug the CPU board to make bus connection close.
- Problem in working power supply of mainboard Use a multimeter to measure the voltage at the mainboard to see if it's 3.3VDC.

6.1.3. Network and device communication interruption

- Problem in network cable Check whether network cable is connected correctly.
- Wrong network connection method If the network port of notebook computer is not self-adaptive, use cross network cable to connect with the device or use two straight-through cables to connect with the device via Switch or HUB.
- Network not in the same segment Check whether the local network address of PC is in the same network segment as the device.
- Interference of wireless network
 Check whether the wireless network is in the same segment as the local network address; if yes, close wireless network or move it to another segment.

6.1.4. Serial communication is abnormal

- Communication cable doesn't meet requirements The field communication environment is very harsh, so standard category 5+ cable must be used to basically meet technical requirements; the use of ordinary communication table may cause unstable communication and bit error, etc.
- Communication distance is too long and there are too many devices

Every communication method has strict requirements for the length of communication cable; the communication distance for RS485 is 1200m covering 32 devices in ideal conditions, but the actual situation on site is complicated and unlikely reaches the ideal requirements, so the extreme communication distance may be 400~500m covering about 10 devices.

• Terminal resistance is not provided

When adopting RS485 communication, there is more than one device in the communication link, and capacitance interference and echo signal are produced during communication, so it's necessary to add 120Ω terminal resistance at the receiving end of the last device in the communication link to eliminate interference.

- Electrical level is unmatched The RS-485 communication port of outdated devices of some manufacturers adopts TTL level mode but not differential level mode, so an adapter is needed.
- The voltage at communication port is too low
 Protective devices of some manufacturers need 5V or 12V power source to supply power for



communication port during communication, so a power source needs to be provided.

- The serial communication mode in software is not configured correctly The serial communication mode in configuration software is configured according to actual situation, and serial channels should be configured according to actual link.
- Attribute configuration of serial port doesn't match with devices Serial communication attributes adopted by different manufacturers/protocols are different, so the attributes of serial port should be configured according to actual situation of IED devices.

6.2. Software problems and solutions

6.2.1. How to telnet to and access the device

- Input "cmd" in "Running" to pop up the "Command prompt"
- Input "telnet 192.168.0.111" (Server IP)
- Input username and password as shown in Figure 6.1 to login the device

Note: The first password is "ENG", the second password is "digigrid", and both of them are invisible.

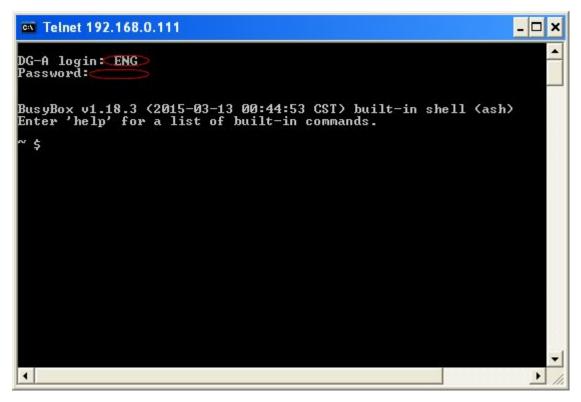


Figure 6.1 Telnet interface

6.2.2. View whether the main program is running

- Telnet to the device
- Input "ps"; as shown in Figure 6.2, it indicates the main program edpsmainarm473 is running



Telnet 192.1	68.0.111	×
\$ps ID USER	TIME	COMMAND
1 root	0:05	
2 root		[kthreadd]
3 root	0:00	[ksoftirqd/0]
4 root		[kworker/0:0]
5 root		[kworker/u:0]
6 root	A :00	[khelper]
7 root	0:00	[netns]
8 root	A:00	[kworker/u:1]
172 root	0:00	[sync_supers]
174 root	0:00	[bdi-default]
176 root		[kblockd]
191 root		[khubd]
227 root		[cfg80211]
315 root	0:00	[musb-hdrc.0]
320 root		[musb-hdrc.1]
322 root	0:00	[rpciod]
334 root	0:00	[kswapd0]
335 root	0:00	[fsnotify_mark]
336 root	0:00	[nfsiod]
337 root	0:00	[crypto]
351 root	0:00	[ocf_0]
352 root	0:00	[ocf_ret_0]
355 root	0:00	EOMAP UARTØJ
357 root	0:00	[OMAP UART1]
359 root		[OMAP_UART2]
361 root	0:00	[OMAP UART4]
397 root	0:00	[mtdblock0]
402 root		[mtdblock1]
407 root	0:00	[mtdblock2]
412 root	0:00	[mtdblock3]
417 root	0:00	[mtdblock4]
422 root	0:00	[mtdblock5]
427 root	0:00	[mtdblock6]
432 root	0:00	[mtdblock7]
440 root	0:00	[ubi_bgt0d]
677 root	0:00	[irq/275-FUGUI]
681 root		[ubifs_bgt0_0]
708 root		[kworker/0:2]
722 root	0:00	/usr/local/bin/sshd
725 root	0:00	/usr/sbin/inetd
734 root 737 root	0-00	/sbin/syslogd -0 /home/ENG/log/messages [loop0]
737 root 738 root	0-00	[kjournald]
738 root 739 root	0.00	./edpsmainarm473
739 root 740 root	0 - 05 0 - 00	/sbin/getty 115200 tty00
740 root 756 root	0-00	[flush-7:0]
756 root 757 root		[flush-ubifs_0_0]
925 root		telnetd
926 ENG	0:00	
1082 ENG	0:00	
\$	0.00	10
		· · · · · · · · · · · · · · · · · · ·

Figure 6.2 Main program running interface

6.2.3. View currently running projects

- Telnet to the device
- Input "cat project/edpsrun.xml" and press "Enter" to view running projects as shown in Figure 6.3

Note: active= "1" means the project is running currently



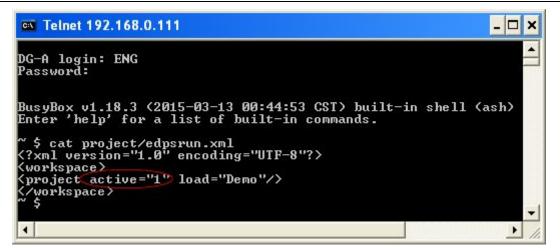


Figure 6.3 Currently running project interface

6.2.4. How to view and update driver files

Here introduce two methods of viewing drivers

View drivers via the ICE tool (integrated with configuration environment)

• Open the ICE configuration tool, click "Management" ->"Firmware" ->"View" on the menu bar, and input the corresponding server (i.e. the IP address of network port), for which both the username and password are "root", as shown in Figure 6.4.

Firmware Management Detail Information		?
System Files Library Files	Driver Files	
Active Nam	e Module Version Description	
	Uploading	
	Server: 192.168.0.111	
	Password: ••••	
🚇 View 🛛 🧭 Open	Download 🚺	Exit

Figure 6.4 Query firmware

• Click "OK" to see the information of drivers/firmwares downloaded in the device, as



shown in Figure 6.5.

Date: 16/11/2015					
8.8					
Device: 192.168.0.111					
	No	Name	Module	Version	
	1	EDPS Main Program	edpsmainarm473	2.8.36.101	
	2	EDPS Main Library	libarm473edpslib.so	2.8.36.101	
	_	EDPS Kernel library	libarm473edpskernel.so	2.8.36.101	
	4	EDPS Diagnose Service	arm473edpsdns.so	2.8.36.101	
	5	EDPS Deamond Service	arm473edpsdmn.so	2.8.36.101	
	6	DNP Client Driver	arm473dnpclient.so	2.8.36.101	
	7	IEC101 Client Driver	arm473iec101client.so	2.8.36.101	
	8	IEC104 Client Driver	arm473iec104client.so	2.8.36.101	
	9	Modbus Client Driver	arm473modbusclient.so	2.8.36.101	
	10	DNP Server Driver	arm473dnpserver.so	2.8.36.101	
	11	IEC101 Server Driver	arm473iec101server.so	2.8.36.101	
	12	IEC104 Server Driver	arm473iec104server.so	2.8.36.101	
	13	Modbus Server Driver	arm473modbusserver.so	2.8.36.101	
	14	EDPS Calculation Task	arm473edpscal.so	2.8.36.101	
	15	EDPS Script Task	arm473escript.so	2.8.36.101	
1		Ale di			

Figure 6.5 Firmware information

Here introduces the method of updating drivers

Update driver file by using FTP command in the DOS window, and take the driver updating file runtime.edps.upgrade.img in the local directory C: \patch as example. See Figure 6.6 for reference.

- Open the start menu of Windows, select "Run" command, input "cmd" in the dialog box, and click "OK" to switch to the DOS window, where command prompt appears.
- Input the command ftp 192.168.0.111 (for example, the gateway IP is 192.168.0.111) Input the user name and password and wait for verification (user name: ENG, password: digigrid).
- Upload the file and input the command:

ftp>put c:\patch\runtime.edps.upgrade.img /firmware/runtime.edps.upgrade.img Restart the device when it prompts the transmission is completed.



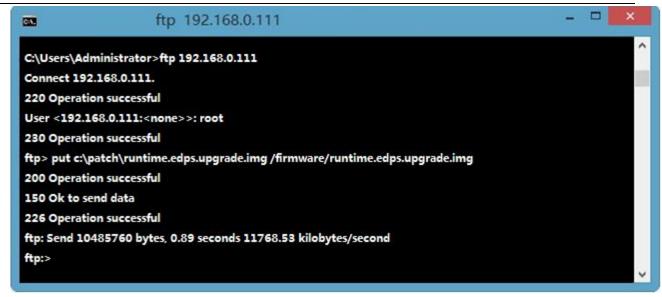


Figure 6.6 Driver updating

6.2.5. How to modify system time

Use the command in the figure to modify system time

Note: The format of date is: MMDDHHMMYYYY (M-month, D-day, H-hour, M-minute, Y-year); the system time of device adopts UTC time as reference.

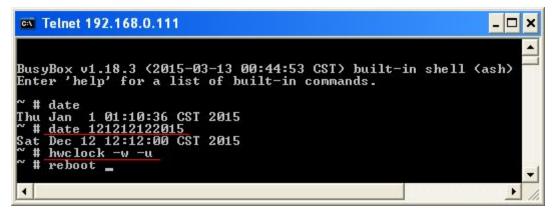


Figure 6.7 Modify system time

6.2.6. How to modify the IP address of device

The default address of device is eth0: 192.168.0.111, eth1: 192.168.1.111.

Modify the address in the project configuration via the ICE configuration tool

- Open the ICE configuration tool, open "System information", and select "Property";
- Select the option "Network configuration" in the right attribute area, and double-click it to open the table editor;



- Click "New" and modify the IP address of corresponding network port, as shown in Figure 6.8
- Click "Ok" and save the project and download it to the device, and then reboot the device with power off;

······	operties		1
eth0 192.168.0.111 255.255.255.0	DEVICE	IP Addr	Net Mask
	eth0	192.168.0.111	255.255.255.0

Figure 6.8 Network configuration

6.3. Manufacturer support

Thank you for your attention to Digigrid products and services, and please contact us if you have any

questions or opinions:

Shanghai Digigrid Information Technology Co., Ltd.

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Tel.: +86-21-6162-9238

Fax: +86-21-6162-9213

Website: http://www.digigrid.com.cn



Appendix A IEC 61850 Configuration

Appendix A mainly describes how *EDPS ICE* configures IEC 61850 acquisition and proxy (forwarding) modules, and for the independence of IEC 61850 modules, *EDPS ICE* will complete the customization and management of IEC 61850 acquisition or proxy data through independent customized plugin, i.e. IEC 61850 acquisition or proxy plugin.Meanwhile, the configuration manual will detail driver information, communication parameters, device parameters, and IO parameter information of various information points. Please refer to IEC 61850 specification documents for IEC 61850 related terms referred to in the configuration manual.

EDPS ICE integrates configuration software by means of plugin. IEC 61850 plugins are **EDPS ICE** configuration plugins which meet **EDPS ICE** plugin interface and specially serve IEC 61850 proxy.Plugins are managed through the plugin manager of **EDPS ICE**. **EDPS ICE** plugin has three view interfaces: management area, data area, and attribute area.

M Integrated Configuration Env		
	ndows Setting Help	
🗋 🗖 🛐 🔯 🖓	s 🕹 🕹	
Workspace 🗗 🗙	🚟 Analog Input 🛛 🚟 Digital Input 🖉 Counter 🖉 Analog Output 🖣	Property 🗗 🗙
System	Basic IO Value	ID Property
🔝 Client	Device Name Point Name LDRef	
	1 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn1\$mag\$f MEAS	LDInst MEAS
Server	2 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn2\$mag\$f MEAS	Description (RLD)
III Task	3 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn3\$mag\$f MEAS	
	4 TEMPLATEMEAS YEAGGIO1\$MX\$AnIn4\$mag\$f MEAS	
IEC61850 Client	5 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn5\$mag\$f MEAS	
IEC61850 Server	6 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn6\$mag\$f MEAS	
🐵 🧱 IEC61850[iec61850server]	7 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn7\$mag\$f MEAS	
General Parameters	8 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn8\$mag\$f MEAS	
GOOSE Subscribers	9 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn9\$mag\$f MEAS	
Physical Devices	10 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn10\$mag\$f MEAS	
⊕ [] [] LD0	11 TEMPLATEMEAS YCAGGIO1\$MX\$AnIn11\$mag\$f MEAS	
	Data	Property
IEC61850	×	

A.1. IEC 61850 acquisition

A.1.1.Driver management

Create Create IEC 61850 acquisition driver 1. Open a project file;



- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 acquisition plugin;

Workspace	×		
🔝 System			
E Client			
🔝 Server			
🔝 Task			
IEC61850 Client			
Ì	Click		
IEC61850 Server			
IEC61850			
ProjectView	💮 ProjectView 🛛 👩 PluginView		

4. Right click in the blank space, and select the menu option "New 61850" to pop up the "Create driver dialog";

New 61850

5. Select the driver to be created in the driver page;

EDPS IEC61850 Client Application 2.8.0 Define IEC61850 client ap	Define IEC61850 client application	50 Client Application 2.8.0 Define IEC61850 client application.

6. Configure basic attributes of the target driver in the attribute page;



Properties Drivers		
ID	Property	
Name		
Description		
Yersion	2.8.0	
Data Update	Value Change	
Driver Cache	64	
Latency Time(ms)	100	
Binding Driver	iec61850client	
Channel update period(s)	30	
IED off-line threshold	3	2

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description	
1	Name	Define the display name of driver.	
2	Description	Define the description information of driver.	
3	Version	Define the version information of driver.	
4	Data update	Define the data updating mode.	
		Value change - The system updates the database and notifies	
		other driver protocols only when a value changes;	
		Time change - The system updates the database and notifies	
		other driver protocols no matter whether a value or time	
		changes;	
		Time update - The system updates the database no matter	
		whether a value or time changes, and notifies other driver	
		protocols only when a value changes;	
5	Driver cache	Define the cache size of driver.	
6	Latency time (ms)	Define the delay time of updating real-time database.	
		The system shall write raw data into the real-time database	
		after a delay of the time defined.	
7	Binding driver	Define the name of driver module, which is unique and	
		cannot be modified.	
8	Channel update	Define the cycle of updating IED communication times.	
	period (s)		
9	IED off-line	Define the offline threshold of IED device; when the	
	threshold	number of consecutive communication failures reaches the	
		threshold, the device is switched to offline state.	

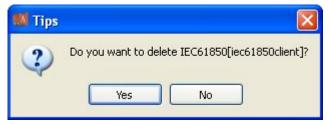
Delete Delete IEC 61850 acquisition driver



8. Right click the driver bar and select the menu option "Delete";



9. Select the menu option "Delete"; It prompts whether to delete;



- 10. Click "Yes" to complete deletion;
- **Virtual point template** Load virtual point of driver from the system template library
 - 11. Right click the driver bar, and select the menu option "Load virtual point template";

IEC61850[iec61850client]	
- 🌆 General Parameters	New 61850
Physical Devices	💢 Delete
	Import SCD
	Export SCD

12. Select the menu option "Load virtual point template" to complete loading of virtual point of driver.

Note:

	Basic	Value						
		nt Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
	1 IEC61	850STA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
4	2 IEC61	850AUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

A.1.2. General parameters



Overview View and configure general parameter information of IEC 61850 driver

View and configure View and configure communication parameter attributes

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 acquisition plugin;
- 4. Select the general parameter node in the management area;

Workspace	
🔝 System	
🔝 Client	
🔝 Server	
🔝 Task	
IEC61850 Clier	ıt
IEC61850[iec61850client] Iec61850[iec61850[iec61850[iec61850] Iec61850[iec61850[iec61850] Iec61850[iec61850[iec61850[iec61850] Iec61850[iec61850[iec61850[iec61850[iec61850] Iec61850[iec61850[iec61850[iec61850[iec61850[iec61850[iec61850] Iec61850[iec618500]	
IEC61850 Serv	er
IEC61850	
🔄 ProjectView	- PluginView

5. View the information in the attribute area;

ID	Property
MMS Maximum Message Size	32000
MMS Maximum Calling	4
MMS Maximum Called	0
Dynamic Object Capacity	500
CLNP/ES-IS	
TP4(ISO 8073)	
TCP/IP(RFC1006)	
Network Address	
GOOSE Subscriber/Publisher	Disable
GOOSE Mode	Finally

Note: Information in the attribute area (including configuration operation)

No.	Name	Description	Remarks	
1	MMS Maximum	Define the maximum PDU length	Configure it with the default parameter	
	message size	information.		
2	MMS Maximum	Define the maximum number of	Configure it according to actual	
	calling	connections of MMS service	situation, or by referring to the figure	



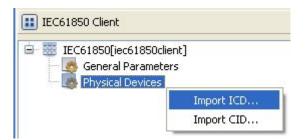
			above
3	MMS Maximum	Define the maximum number of passive	Configure it according to actual
	called	connections of MMS service	situation, or by referring to the figure
			above
4	Dynamic object	Define the maximum number of	Configure it according to actual
	capacity	dynamic objects	situation, or by referring to the figure
			above
5	CLNP/ES-IS	Define the configuration of network	Create a new line and configure it with
		layer of OSI protocol stack	default parameter in the table editor
6	TP4(ISO 8073)	Define the configuration of	Configure in the same way as item 5
		transmission layer of OSI protocol	
		stack	
7	TCP/IP(RFC1006)	Define the configuration of TCP/IP	Configure in the same way as item 5
		protocol stack.	
8	Network address	Define the configuration of local	Configure in the same way as item 5
		network address.	
9	GOOSE	Define whether to activate the GOOSE	Configure it according to actua
	subscription/publishe	information subscription.	l situation
	r		
10	GOOSE mode	Define the parsing mode of GOOSE	Configure it according to actual
		information.	situation

A.1.3. Physical device management

Import ICD file Ci

e Create IEC 61850 acquisition device by importing IEC 61850 ICD file

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 acquisition plugin;
- 4. Right click the node of physical device, and select "Import ICD";



5. Open the selected file in the pop-up dialog box "Select file";



Select files					? 🛛
Look in:	🗀 ICD Files		· 0	1 🖻 🖽 -	
My Recent Documents	TEMPLATE.icc				
My Documents					
My Computer					
	File name:	TEMPLATE			Open
My Network	Files of type:	ICD Files(*.icd)		· (Cancel

6. The system pops up the dialog box "ICD configuration";

ICD Configuration	
Options	
IED Name	
TEMPLATE	
TEMPLATE	
	OK Cancel

7. Edit the instance name of IED device and click "OK" to complete the creation of IEC 61850 device;



Workspace	X
🔢 System	
🔝 Client	
🔢 Server	
🔝 Task	
IEC61850 Clien	t
	al Parameters al Devices TEMPLATE LD0 MEAS CTRL
IEC61850 Serv	er
IEC61850	
🐴 ProjectView	🌆 PluginView

Import CID fileCreate IEC 61850 acquisition device by importing IEC 61850 CID file8.Right click the node of physical device, and select "Import CID";

🔢 IEC61850 Client	
EC61850[iec61850cl	-
	Import ICD
	Import CID

9. Open the selected file in the pop-up dialog box "Select file";



Select files					? 🛛
Look in:	🗀 CID Files		· O (• 🖭 🔁 🕽	
My Recent Documents Desktop	TEMPLATE.cid				
My Documents					
My Computer					
	File name:	TEMPLATE		<u> </u>	Open
My Network	Files of type:	CID Files(*.cid)		·	Cancel

10. Click "OK" to complete creation of IEC 61850 device;

Workspace	×
🔝 System	
🔝 Client	
🔝 Server	
🔝 Task	
IEC61850 Clien	t
□ ○ IEC61850[□ ○ Genera □ ○ Physic □ □ ① □ □ ① □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	al Parameters
IEC61850 Serv	er
1EC61850	
🔿 ProjectView	🌆 PluginView

Delete device Completely delete the imported IEC 61850 device

11. Right click the first-level child node under the node of physical device;



IEC61850[iec61850clier General Parameter Office Physical Devices Office TempLate	s
🖶 🛄 🌔 LDO	🔊 Create
I MEAS	Remove
	💢 Delete
	Load Pseudo Template
	Operations +

12. Select the menu option "Delete";

1 Tips	
?	Do you want to delete TEMPLATE with associated PD?

- 13. Click "Yes" to complete the deletion of IEC 61850 physical device;
- **Create device** Establish mapping relation between IEC 61850 physical device and EDPS
 - 14. Right click the first-level child node under the node of physical device;

IEC61850[iec61850clier General Parameters General Devices General Devices General Devices General Devices	- C2
😟 🔲 🌔 LDO	💊 Create
	2 Remove
	💢 Delete
	Load Pseudo Template
	Operations 🕨

15. Select the menu option "Add" to complete the mapping between IEC 61850 physical device and EDPS;

1 Tips		
?	Add who	le data of TEMPLATE?
	Yes	No

16. Click "Yes" to establish mapping relation between all information points in IEC 61850 device and EDPS;

Note: Selectively add practical application information points according



to actual situation.

Remove device Remove mapping relation between IEC 61850 physical device and EDPS 17. Right click the first-level child node under the node of physical device;

IEC61850[iec61850clier General Parameters Applied Physical Devices	
	Create
	Delete Load Pseudo Template Operations

18. Select the menu option "Remove";

PLATE[1] from database
No

19. Click "Yes" to remove mapping relation between IEC 61850 physical device and EDPS

Device parameters Configure physical device parameters of IEC 61850 driver

- 20. Click the first-level child node under the node of physical device;
- 21. View virtual points in the data area of *EDPS ICE*;

В	lasic V	/alue						
	Point I	Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA		IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	MMSTOT	ALCOM	MMS total communication times	32 Bits Unsigned Long	0	Local	By Value	
3	MMSFAIL	.COM	MMS invalid communication times	32 Bits Unsigned Long	0	Local	By Value	
4	REPORT	NUM	RCB total received times	32 Bits Unsigned Long	0	Local	By Value	
5	GOOSEN	UM	GOOSE total received times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description	
1	IED state	Describe the communication state of the current device.	
2	MMS total	Count the number of MMS communication times	
	communication times		
3	MMS invalid	Count the number of MMS communication failures	
	communication times	during communication process.	
4	RCB total received	Count the number of times of receiving event report.	
	times		
5	GOOSE total received	Count the number of times of receiving GOOSE	
	times	information.	



22. View the attribute area of *EDPS ICE*;

Property	×
ID	Property
Name	TEMPLATE
Vendor	SAC
Description	TEMPLATE
Туре	PSR660U
Version	1.0
AR Name	TEMPLATE
AP Title	1 3 9999 23
AE Qualifier	23
PSEL	00 00 00 01
SSEL	00 01
TSEL	00 01
Net Type	TCP(REF1006)
NSAP/IP	127.0.0.1
Idle Time(ms)	1000
Rep. Timeout(s)	60
RCB Configuration	in .
GCB Configuration	
UTC Time Zone	0

No.	Name	Description	Remarks
1	Name	Define the name of device	Edit it when importing ICD/CID
			files according to actual
			configuration
2	Vendor	Define the manufacturer of device.	Defined by ICD/CID file
			configuration
3	Description	Define the description information of device.	The same as item 2 above
4	Туре	Define the type of device.	The same as item 2 above
5	Version	Define the version information of device.	The same as item 2 above
6	AR Name	Define the reference name of MMS application.	The same as item 1 above
7	AP title	Define the object identity named by network	By default as shown in the
		authorization organization to express prelude.	figure above
8	AE qualifier	Define an optional integer to express the qualifier of	The same as item 7 above
		application.	
9	PSEL		Defined by ICD/CID file; keep
		Define the access point of presentation layer of OSI	the default value as shown in the
		protocol stack, which is 4-byte by default.	figure above
10	SSEL	Define the access point of session layer of OSI protocol	The same as item 9 above
		stack, which is 2-byte by default.	



TSEL	Define the access point of transmission layer of OSI	The same as item 9 above
	protocol stack, which is 2-byte by default.	
Net type	Define whether the network address belongs to TP4 or	Select according to actual
	TCP.	situation; keep the default value
NSAP/IP	Define network address.	Configure the IP address of
	• TP4 is expressed by 20 hexadecimal character	actual device
	strings	
	• TCP is expressed by network alias or IP address	
Idle time (ms)		Configure it according to actual
	Define the idle time interval of MMS query, in ms.	situation
Rep. timeout (s)	Define the timeout interval of MMS's request for data, in	Configure it according to actual
	s	situation
RCB configuration	Define the configuration information of Report Control	Configure it according to actual
	Block.	situation
GCB configuration	Define the configuration information of GSE Control	Configure it according to actual
	Block.	situation
UTC time zone		Configure it according to actual
	Define the UTC time zone correction value of device	situation
	Net type NSAP/IP Idle time (ms) Rep. timeout (s) RCB configuration GCB configuration	protocol stack, which is 2-byte by default.Net typeDefine whether the network address belongs to TP4 or TCP.NSAP/IPDefine network address.• TP4 is expressed by 20 hexadecimal character strings • TCP is expressed by network alias or IP addressIdle time (ms)Define the idle time interval of MMS query, in ms.Rep. timeout (s)Define the timeout interval of MMS's request for data, in sRCB configurationDefine the configuration information of Report Control Block.UTC time zoneItem configuration information of GSE Control

Remote control/settingSend remote control/setting command to device via *EDPS ICE*23. Right click the first-level child node under the node of physical device;

E IEC61850[iec61850clie General Parameter Physical Devices Fhysical Devices I IEMPLATE I IDO I IDO I IDO I IDO I IDO I CTRL	s	
	Operations 🔸	Remote Control
		Remote Set

24. Select the menu option "Remote control" to pop up the dialog box "Remote control";



ints		Notes	
Tag Name	Reference Name	Ref Name	R5192.DEV1.DO0
YK3GGIO1\$CO\$SPCSO1	RS192.DEV1.DO0	Tag Name	YK3GGIO1\$CO\$SPCSO1
		Comment	
		Status	
		Commands	
		Туре	SELECT 💌 Send
		Value	

- 25. Select executing information point, control type and control value in turn;
- 26. Click the button "Send" to complete the operation of writing command and waiting for the executing result.

A.1.4. Information point management

Create Create information point to realize data mapping between IEC 61850 and EDPS

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 acquisition plugin;
- 4. Right click the data management node under the instance name of physical device;



5. Select the menu option "Add" to complete the creation of information point;

Delete

Delete information point to remove data mapping between IEC 61850 and EDPS

6. Right click the data management node under the instance name of physical device;



IEC61850 Client	
EC61850[iec61850clier General Parameters Physical Devices E M C TEMPLATE E D C LDO E MEAS E C TRL	(D)

- 7. Select the option "Remove" to complete the deletion of information point;View attributes View the attributes of internal object of IEC 61850
 - 8. Select any child node under the instance name of physical device, and view the

attributes of corresponding object in the attribute window.

A.1.5. Data management

Batch modify Modify the data in the data area in batch

View the parameters of information point through different types of data in the data area of *EDPS ICE*; device name and point name in basic information as well as IO information parameters are not editable, which are determined by IEC 61850 device.

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 acquisition plugin;
- 4. Select the basic information page of different types of data in the data area;
- 5. Right click an object and select the menu option "Batch modify" to pop up the dialog box "Modify";

📷 Batch Modif	γ
Reset	Ctrl+Del
🖄 Copy	Ctrl+C
🖺 Paste	Ctrl+V

6. Modify the data and confirm it to complete batch modifying;

Reset Replace current value with initial value of table data attribute

7. Right click an object and select the menu option "Reset" to complete modification;

Copy and paste Copy and paste data

- It's allowed to copy and paste data across plugins, links, devices and types. It's allowed to copy and paste data between EXCEL and *EDPS ICE*.
- It's allowed to perform copy operation to all data areas.
- It's allowed to perform paste operation to editable areas.
- 8. Right click an object and select "Copy/paste" to complete operation (Paste operation cannot be performed in non-editable areas).

Note: IO information parameters



User Manual										
000	📅 Analog Input	🧱 Digital Input	🚟 Counter	🚟 An	alog Output		Digital C	Dutput		
E	Basic IO V	alue	hi dh							
Device Name		Point	Point Name		LNRef	FC	DORef	DARef	BType	CDC
1 TEMPLATEMEAS		5 YCAGGIO1\$MX	\$AnIn1\$mag\$f	MEAS	YCAGGIO1	MX	AnIn1	mag.f	FLOAT32	MΥ
2 TEMPLATEMEAS		S YCAGGIO1\$MX	YCAGGIO1\$MX\$AnIn2\$mag\$f		YCAGGIO1	MX	AnIn2	mag.f	FLOAT32	MV
3	TEMPLATEMEA	S YCAGGIO1\$MX	\$AnIn3\$mag\$f	MEAS	YCAGGIO1	MX	AnIn3	mag.f	FLOAT32	MV
4	TEMPLATEMEA	S YCAGGIO1\$MX	\$AnIn4\$mag\$f	MEAS	YCAGGIO1	MX	AnIn4	mag.f	FLOAT32	MV
5	TEMPLATEMEA	S YCAGGIO1\$MX	\$AnIn5\$mag\$f	MEAS	YCAGGIO1	MX	AnIn5	mag.f	FLOAT32	MV

No.	Name	Description						
1	Device name	Specify the instance name of logical device that the						
		information point belongs to.						
2	Point name	Specify the complete reference name of the information point						
		in MMS index.						
3	LDRef	Specify the reference name of logical device that the						
		information point belongs to.						
4	LNRef	Specify the reference name of logical node that the						
		information point belongs to.						
5	FC	Specify the functional constraint of information point.						
6	DORef	Specify the reference name of data object of information						
		point.						
7	DARef	Specify the reference name of data attribute of information						
		point.						
8	ВТуре	Specify the basic data type of information point.						
9	CDC	Specify the common data class that the information point						
		belongs to.						

A.2. IEC 61850 proxy

A.2.1. Driver management

Create Create IEC 61850 proxy driver

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 proxy plugin;



Workspace	X						
🔝 System							
👥 Client							
🔢 Server							
🔝 Task							
IEC61850 Clier	ıt						
IEC61850 Serv	er						
Č	Click						
1EC61850							
💮 ProjectView	🧑 PluginView						

4. Right click in the blank space, and select the menu option "New 61850" to pop up the "Create driver dialog";

New 61850

5. Select the driver to be created in the driver page;

Creat	e New Dialog			?
Propert	ies Drivers			
	Driver Name	Version	Description	
1 EDP	S IEC61850 Server Application	2.8.0	Define IEC61850 server application.	
				5
-				
			OK Can	icel

6. Configure basic attributes of the target driver in the attribute page;



Properties Drivers			
ID	Property		
Name			
Description			
Version	2.8.0		
Driver Cache	64		
Latency Time(ms)	100		
Binding Driver	iec61850server		
Channel update period(s)	30 3		
IED off-line threshold			
IED Test State		×	

7. Click "OK" to complete creation;

Note: Driver information

No.	Name	Description			
1	Name	User-defined name.			
2	Description	Set name description information.			
3	Version	Set the version information of module.			
4	Driver cache	Set the buffer size of driver. 64KB by default and 128KB at			
		most			
5	Latency time(ms)	Define the delay time of updating real-time data, in ms.			
6	Binding driver	It's unique and cannot be modified.			
7	Channel update	Set the cycle of updating the channel communication state			
	period(s)	information, in s.			
8	IED off-line	Set the statistical threshold of device state; the device is			
	threshold	switched to offline state when the number of consecutive			
		errors in the channel exceeds the threshold.			
9	IED test state	It's usually associated with internal maintenance state point			
		of the device to be collected, and the maintenance state may			
		influence the behavior of forwarding end.			

Delete IEC 61850 proxy driver

8. Right click the driver bar and select the menu option "Delete";





9. Select the menu option "Delete"; It prompts whether to delete;

💷 Tips	
?	Do you want to delete IEC61850[iec61850server]?

- 10. Click "Yes" to complete deletion;
- Virtual point template Load virtual point of driver from the system template library
 - 11. Right click the driver bar, and select the menu option "Load virtual point template";

IEC61850[iec61850server]	-
General Parameters	New 61850 X Delete
	Import SCD Export SCD
	Load Pseudo Template

12. Select the menu option "Load virtual point template" to complete loading of virtual point of driver.

Note:

	Point Name	Desc	ription	V	alue Type	Initial Value	Owner	Show Mode	Parameter
1	IEC61850STA	Running	status	16 Bits l	Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	IEC61850AUTH	Authorit	y	Bool		0	Local	By Name	0:Demo,1:Authority
3	ConnectedOK	Connect	ed OK	32 Bits S	5igned Long	0	Local	By Value	
4	ConnectedErr	Connected Error		32 Bits S	5igned Long	0	Local	By Value	
5	Indicated	Request Status		atus 32 Bits Signed Long		0	Local	By Value	
6	RespOk			OK 32 Bits Signe		0	Local	l By Value	
7	RespErr Response Error 32			Err Response Erro	32 Bits 9	Bits Signed Long	0	Local	By Value
8	InfoRpt	RCB Sta	itus	32 Bits 9	5igned Long	0	Local	By Value	
		No.	Na	me]	Descript	ion	
		1	Runni	nσ	Observe the r	unning state ir	formatic	on of the drive	r



	status	
2	Authority	Observe the authorization state of the driver.
3	Connected	Count the number of successful connections
	OK	
4	Connected	Count the number of fault connections.
	error	
5	Request	Count the number of requests for service.
	status	
6	Response	Count the number of correct responses of service.
	ОК	
7	Response	Count the number of error response of service.
	error	
8	RCB status	Count the number of information reports of BRCB/URCB.

A.2.2. General parameters

Overview View and configure general parameter information of IEC 61850 proxy driver **View and configure** View and configure communication parameter attributes

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 proxy plugin;
- 4. Select the general parameter node in the management area;

Workspace	
🔝 System	
🔝 Client	
🔢 Server	
🔢 Task	
IEC61850 Clier	ıt
IEC61850 Serv	er
Gener	iec61850server] al Parameters E Subscribers al Devices
IEC61850	
ProjectView	🧑 PluginView

5. View the information in the attribute area;



Property	×
ID	Property
MMS Maximum Message Size	32000
MMS Maximum Calling	4
MMS Maximum Called	0
Dynamic Object Capacity	500
CLNP/ES-IS	
TP4(ISO 8073)	
TCP/IP(RFC1006)	
Network Address	
GOOSE Subscriber/Publisher	Disable
GOOSE Mode	Finally
File Service	-
Journals scan periods(ms)	1000
Max journals entries	1000
RCB Scan Time(ms)	500
RCB Buffer(K Bytes)	100
RCB Index	No
Active IED	
Access Point	

Note: Information in the attribute area

No.	Name	Description
1	MMS Maximum	Set the allowable maximum length of PDU in MMS
	message size	
2	MMS Maximum calling	Set the maximum number of connections allowed by client, which must be configured 0 here
3	MMS Maximum called	Set the maximum number of passive connections allowed by server; configure it according to
		actual situation, or by referring to the figure above
4	Dynamic object capacity	Configure it according to actual situation, or by referring to the figure above
5	CLNP/ES-IS	Set the configuration of OSI network layer; create a new line and configure it with default
		parameter in the table editor
6	TP4(ISO 8073)	Set the configuration of OSI transmission layer; configure it in the same way as item 5 above
7	TCP/IP(RFC1006)	Set the configuration of TCP/IP protocol stack at RFC1006 mode; configure it in the same way
		as item 5 above
8	Network address	Set one network address at least; configure it in the same way as item 5 above
9	GOOSE	Set whether to activate the GOOSE subscription/release function; configure it according to
	subscription/publisher	actual situation
10	GOOSE Mode	Set the mode of parsing GOOSE information: last receiving, real-time parsing; configure it
		according to actual situation
11	File service	Set the root path of file service; configure it according to actual situation
12	Journals scan time (ms)	Log scanning time, in ms; configure it according to actual situation
13	Max journals entries	Set the maximum number of logs saved; configure it according to actual situation



14	RCB scan time (ms)	Report scanning time, in ms; configure it according to actual situation
15	RCB buffer (K Bytes)	The default size of buffer for report with buffer, in K Bytes
16	RCB index	Automatically add RCB index suffix
17	Active IED	Set the name of device to be activated, which is usually the attribute "iedName" under the node
		"ConnectedAP" in the .ICD/CID instance file
18	Access point	Set the name of service access point, which is usually the attribute "apName" under the node
		"ConnectedAP" in the .ICD/CID instance file

A.2.3. Physical device management

Import ICD file Create IEC 61850 proxy device by importing IEC 61850 ICD file

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 proxy plugin;
- 4. Right click the node of physical device, and select "Import ICD";

	🍓 Physical Devices Import ICD	EC61850[iec618]	ameters scribers
--	----------------------------------	------------------	---------------------

5. Open the selected file in the pop-up dialog box "Select file";

Select files						? 🛛
Look in:	CD Files		~	00	🕑 🛄 •	
My Recent Documents Desktop	TEMPLATE.icd					
My Documents						
My Computer						
	File name:	TEMPLATE			*	Open
My Network	Files of type:	ICD Files(*.icd)			~	Cancel



6. The system pops up the dialog box "ICD configuration";

🗱 ICD Configuration	
Options IED Name	
TEMPLATE	
	OK Cancel

7. Edit the instance name of IED device and click "OK" to complete the creation of IEC 61850 device;

Workspace	×
🔝 System	
🔝 Client	
🔢 Server	
🔢 Task	
IEC61850 Client	:
IEC61850 Serve	er
👘 🌆 Genera	ec61850server] Parameters Subscribers Devices TEMPLATE LD0 MEAS CTRL
1EC61850	
💮 ProjectView	🧔 PluginView

Import CID fileCreate IEC 61850 proxy device by importing IEC 61850 CID file8.Right click the node of physical device, and select "Import CID";



IEC61850 Server	
IEC61850[iec61850si General Paramete GOOSE Subscribe Physical Devices	ers
	Import ICD
	Import CID

9. Open the selected file in the pop-up dialog box "Select file";

Select files							? 🔀
Look in:	🗀 CID Files		~	G	1 10	.	
My Recent Documents	TEMPLATE.cid						
My Documents							
My Computer							
	File name:	TEMPLATE			*		Open
My Network	Files of type:	CID Files(*.cid)			*		Cancel

10. Click "OK" to complete creation of IEC 61850 device;



Workspace	X			
E System				
🔝 Client				
🔢 Server				
🔝 Task				
IEC61850 Clien	t			
IEC61850 Serv	er			
IEC61850[iec61850server] General Parameters GOOSE Subscribers Physical Devices TEMPLATE H C D D C C C C C C C C C C C C C C C C				
1EC61850				
💮 ProjectView	🧑 PluginView			

Activate device Complete activation of IEC 61850 physical device

11. Right click a physical device, and select the menu option "Activate" to complete the activation of physical device and access service point; view the activated device in the general parameter attribute area after activation;

IEC61850 Server		
EC61850[iec618 General Para GOOSE Subs COSE Subs	ameters cribers	-
	LDO MEAS CTRL	💊 Create 🥢 Remove
		Active
		💥 Delete

Delete device Completely delete the imported IEC 61850 device

12. Right click the first-level child node under the node of physical device;



🖹 🧱 IEC61850[iec6	51850ser	ver]
🗁 💆 General P	arameter	s
GOOSE SU	ubscribers	5
🖻 🧑 Physical D		
ė 📃 🚭 🗰	EMPLATE	
😐 🔲 🚺	LDO	🕤 Create
	MEAS	🖉 Remove
		🕨 Active

13. Select the menu option "Delete";

1 Tips	
2	Do you want to delete TEMPLATE with associated PD?
	Yes No

14. Click "Yes" to complete the deletion of IEC 61850 physical device;

Device parameters View physical device parameters of IEC 61850 driver 15. View the attribute area of *EDPS ICE*.

Property	X		
ID	Property		
Name	TEMPLATE		
Vendor	SAC		
Туре	PSR660U		
Version	1.0		
Description	TEMPLATE		
SCL File			

No.	Name	Description
1	Name	Set name information
2	Vendor	Set device manufacturer information
3	Туре	Set type information
4	Version	Set version information
6	Description	Set description information
5	SCL File	Specify the SCL file associated with physical device

A.2.4. Information point management

Create Establish mapping relation between EDPS and IEC 61850 client

1. Open a project file;



- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 proxy plugin;
- 4. Right click the data management node under the instance name of physical device;

IEC61850 Server	
IEC61850[iec61850ser General Parameter GOOSE Subscribers GOSE Subscribers Physical Devices GOSE Subscribers	s
00.1 <u>1</u> 🖬 🖶	💊 Create
🕀 🛄 🔽 MEAS	2 Remove
	Active
	💢 Delete

5. Select the menu option "Add" to complete the mapping between EDPS and IEC 61850 client;

👹 Tips	
?	Add whole data of TEMPLATE?
	Yes No

6. Click "Yes" to establish mapping relation between all information points in IEC 61850 device and EDPS;

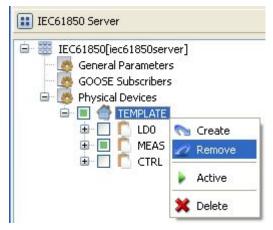
Note: Selectively add practical application information points according

to actual situation.

Delete

Remove the mapping relation between EDPS and IEC 61850 client

7. Right click the data management node under the instance name of physical device;



8. Click "Yes" to remove mapping relation between EDPS and IEC 61850 client;Mapping Create mapping between data point of traditional protocol and IEC 61850 data object



9. Select any child node under the instance name of physical device, and view the mapping table in the data area of *EDPS ICE*;

000	🗄 Analog Input	🧱 Digital Input	🚟 Counter	Analog Output		🔠 Digital Output	Setting
В	Basic IO Val	ue					
	Device Name	Point Na	ame	RTDB Point			
1	TEMPLATEMEAS	YCAGGIO1\$MX\$A	nIn1\$mag\$f				
2	TEMPLATEMEAS	YCAGGIO1\$MX\$A	nIn2\$mag\$f				
3	TEMPLATEMEAS	YCAGGIO1\$MX\$A	nIn3\$mag\$f				
4	TEMPLATEMEAS	YCAGGIO1\$MX\$A	nIn4\$mag\$f				
5	TEMPLATEMEAS	YCAGGIO1\$MX\$A	nIn5\$mag\$f				

- 10. Click the edit box "Associated point" of data object;
- 11. Select the corresponding traditional data point in the popup information point editor;

🗱 Point Editor						
Project	Source	e				
🕀 🕨 System	No	Reference	Bay Name	Device Name	Point Name	Description
Client	0	RS193.DEV1.CP0			AIO	
	1	RS193.DEV1.CP1			AI1	
🖨 🔶 Cal	2	R5193.DEV1.CP2			AI2	
🖵 🕽 Cal	3	RS193.DEV1.CP3			AI3	
	4	R5193.DEV1.CP4			AI4	
		nation				
	No	Reference	Bay Name	Device Name	Point Name	Description
	0	RS193.DEV1.CP0			AIO	
					6	
					ок	Cancel

12. Click "Ok" to complete the mapping between traditional data point and IEC 61850 data object;

View attributes View the attributes of internal object of IEC 61850

13. Select any child node under the instance name of physical device, and view the attributes of corresponding object in the attribute window.

A.2.5. Data management

Batch modify Modify the data in the data area in batch

View the parameters of information point through different types of data in the data area of *EDPS ICE*; device name and point name in basic information as well as IO information



parameters are not editable, which are determined by IEC 61850 device.

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate IEC 61850 proxy plugin;
- 4. Select the basic information page of different types of data in the data area;
- 5. Right click an object and select the menu option "Batch modify" to pop up the dialog box "Modify";

📑 Batch Modif	у
Reset	Ctrl+Del
🖺 Сору	Ctrl+C
🖺 Paste	Ctrl+V

- 6. Modify the data and confirm it to complete batch modifying;
- **Reset** Replace current value with initial value of table data attribute
 - 7. Right click an object and select the menu option "Reset" to complete modification;
- Copy and paste Copy and paste data

It's allowed to copy and paste data across plugins, links, devices and types. It's allowed to copy and paste data between EXCEL and *EDPS ICE*. It's allowed to perform copy operation to all data areas. It's allowed to perform paste operation to editable areas.

- It's allowed to perform paste operation to editable areas.
- 8. Right click an object and select "Copy/paste" to complete operation (Paste operation cannot be performed in non-editable areas).

🚟 Analog Input		Analog Input 🛛 🗱 Digital Input 🛛 🚟 Counter		🔠 Ana	alog Output	🔠 Digital Output			🚟 Setting			
B	Basic	IO	Valu	Je								
	De	evice Na	ame	Point	Name	LDRef	LNRef	FC	DORef	DARef	ВТуре	CDC
1	TEM	PLATEN	1EAS	YCAGGI01\$MX	\$AnIn1\$mag\$f	MEAS	YCAGGIO1	MX	AnIn1	mag.f	FLOAT32	MV
2	TEM	PLATEN	1EAS	YCAGGIO1\$MX	\$AnIn2\$mag\$f	MEAS	YCAGGIO1	MX	AnIn2	mag.f	FLOAT32	MV
3	TEM	PLATEN	1EAS	YCAGGI01\$MX	\$AnIn3\$mag\$f	MEAS	YCAGGIO1	MX	AnIn3	mag.f	FLOAT32	MV
4	TEM	PLATEN	1EAS	YCAGGI01\$MX	\$AnIn4\$mag\$f	MEAS	YCAGGIO1	MX	AnIn4	mag.f	FLOAT32	MV
5	TEM	PLATEN	1EAS	YCAGGI01\$MX	\$AnIn5\$mag\$f	MEAS	YCAGGIO1	MX	AnIn5	mag.f	FLOAT32	MV

No.	Name	Description							
1	Device name	Specify the instance name of logical device that the							
		information point belongs to.							
2	Point name	Specify the complete reference name of the information point							
		in MMS index.							
3	LDRef	Specify the reference name of logical device that the							
		information point belongs to.							
4	LNRef	Specify the reference name of logical node that the							
		information point belongs to.							
5	FC	Specify the functional constraint of information point.							

Note: IO information parameters



User Manual							
6	DORef	Specify the reference name of data object of information					
		point.					
7	DARef	Specify the reference name of data attribute of information					
		point.					
8	ВТуре	Specify the basic data type of information point.					
9	CDC	Specify the common data class that the information point					
		belongs to.					

A.2.6. GOOSE subscription

Configure the information of IEC 61850 GOOSE module.

Note: About the configuration of GOOSE subscription module, it's needed to import an ICD/CID file with GOOSE control block, add object points included in GOOSE block, and activate the control block; other operations are the same as those described in A.2.3 and A.2.4, and need not to be repeated here.

Appendix B DNS Service Configuration

Appendix C mainly describes the configuration of DNS service module by EDPS ICE. DNS service is correctly loaded and used through configuration. The configuration manual mainly describes attribute information and virtual point information. EDPS ICE provides a concise and fast way to help the user to conduct configuration.

Operation View service information

- Open a project file; 1.
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the system information plugin;



Workspace	×			
E System				
Property Service [DNS Service] [DMN Service]				
🔢 Client				
E Server				
🔝 Task				
IEC61850 Client				
IEC61850 Server				
IEC61850				
💮 ProjectView	S PluginView			

4. Right click to select the node "DNS service". The node name can be modified by the user.

Attributes View the attribute area of *EDPS ICE*

ID	Property			
Name	DNS Service			
Version	2.8.0			
Binding Driver	edpsdns			
Description	System diagnose service.			
Service Port	20085			
Authority Users				
Response Timeout(s)	10			
Heart Beat Max Interval(s)	120			

No.	Name	Description	
1	Name	Define the name of service.	
2	Version	Define the version information of service.	
3	Binding driver	Define the name of binding module, which is unique and	
		cannot be modified.	
4	Description	Define the description information of service.	
5	Service port	Define the parameters of communication port of the	
		service.	
6	Authority users	Define the authorized user.	
7	Response timeout	Define the maximum timeout interval of waiting for	
	(s)	response after a DNS command is sent.	



DiGigria				ser Manual				
	8 Heart beat max		x D	Define the maximum interval for the client to send				
	interval (s)		he	heartbeat.				
Virtual point View the data area o		area of <i>E</i>	DPS ICE					
Basic Value								
Point Name	Description Value Type		је Туре	Initial Value	Owner	Show Mode	Para	meter
1 SRVSTA F	Running status 16 Bits Unsigne		signed Short	0	Local	By Name	0:Exit,1:Running,2	Paused,3:StandBy
	• •	N I			. .]
	No. Name			Description				
	1 Running Observ		Observe the	e running state	informati	on of the serv	ice.	
		status						

Appendix C Script Calculation Application Configuration

Appendix E mainly describes how EDPS ICE configures logic script advanced application module. The configuration manual mainly describes application information, parameter information, configuration information, and calculation information. The logic script advanced application module of EDPS adopts standard C Language Specification for logic programming, and EDPS ICE provides a concise and fast way to help the user to conduct configuration.

Application Information

Overview Describe basic application information of driver and parameter of script calculation Create script calculation driver Create

- 1. Open a project file;
- 2. Select the plugin management page in the management area of *EDPS ICE*;
- 3. Activate the advanced application plugin;

Workspace	×				
E System					
🔝 Client					
📰 Server					
🔝 Task					
Click					
IEC61850 Client					
IEC61850 Server					
1EC61850					
ProjectView	ProjectView 🛛 🛃 PluginView				



4. Right click in the blank space, and select the menu option "New task" to pop up the "Create driver dialog";



5. Select the driver to be created in the driver page;

Сг	reate New Dialo	g		?
Pro	operties Driver:	5		
	Driver Name	Version	Description	1
1	EDPS CALCULATE	2.8.0	Define common calculator application.	
				×
_			OK Can	cel

6. Configure basic attributes of the target driver in the attribute page;

IC)	Property	1
Name			
Descriptio	n		
Version		2.8.0	
Data Upda	te	Value Change	
Driver Cac	he	64	
Latency Ti	me(ms)	100	
Binding Dr	iver	edpscal	-
			V

7. Click "OK" to complete creation;

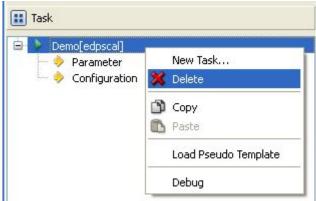
Note: Driver information



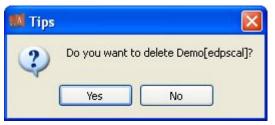
		User Manual				
No.	Name	Description				
1	Name	Define the display name of driver.				
2	Description	Define how to describe the driver.				
3	Version	Define the version information of driver.				
4	Data update	Set the way of updating data to database.				
		Value change - The system updates the database and notifies				
		other driver protocols only when a value changes;				
		Time change - The system updates the database and notifies				
		other driver protocols no matter whether a value or time				
		changes;				
		Time update - The system updates the database but doesn't				
		notify other driver protocols if the value doesn't change but tir				
		changes;				
5	Driver cache	Define the size of buffer.				
6	Latency time	Define the delay time of updating real-time database.				
	(ms)	The system shall write raw data into the real-time database after				
		a delay of the time defined.				
7	Binding driver	Define the name of binding program, which is unique and				
		cannot be modified.				

Delete Delete script calculation driver

8. Right click and select the menu option "Delete";



9. It prompts whether to delete;



10. Click "Yes" to complete deletion;

Virtual point template Load virtual point of driver from the system template library

11. Right click the driver bar, and select the menu option "Load virtual point template" to complete loading of virtual point of driver.



😑 🕨 Demo[edpscal]	-
	New Task X Delete
	Depy
	Load Pseudo Template
	Debug

Note:

E	Basic Value						
	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	TSKSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	TSKAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running	Observe the running state information of the driver.
	status	
2	Authority	Observe the authorization state of the driver.

Parameter information Define the parameters of advanced application.

View parameter attributes

Property	×
ID	Property
Task Mode	Max Performance

Note: Operating parameter information

	No.	Name	Description	
	1	Task mode	Define the operating mode of application, which is maximum	
			performance by default.	
			• Normal	
			Maximum performance	

Configuration information Define the application information of configuration

Right click the configuration and click "New" to pop up the "Create configuration dialog", and click "Ok" to complete creation.



Property	E
ID	Property
Name	Cal
Description	DG
Trigger Mode	Periodic
Trigger Period(ms)	1000
Trigger Condition	
Trigger Timer	12:00

Note:

No.	Name	Description
1	Name	Define the name of script application.
2	Description	Describe the current script application.
3	Trigger mode	Define the mode of triggering script calculation task.
		Cyclic trigger
		Condition trigger
		• Timing trigger
4	Trigger period	Define the time interval of cyclic trigger, in ms.
	(ms)	
5	Trigger condition	Define the operating parameters of condition trigger.
6	Trigger time	Define the 24-hour-system time of timing trigger, accurate
		to minute, in the format of HH:MM.

Calculation information

Right click the calculation and click "New information point", and click "Ok" to complete the creation of calculation point. Select and modify the value type as needed after creation; double-click the expression/script and edit it, and adopt standard C Language Specification for logic programming.