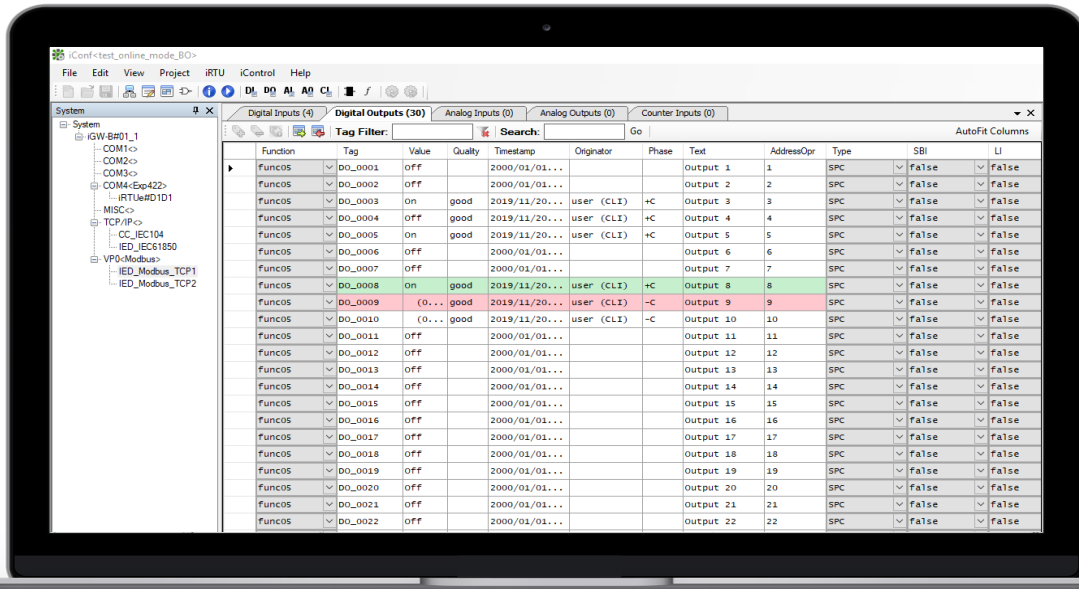




iGW-VM



Powerful substation automation made simple and scalable – with the hardware of your choice!



- > **Porting to Linux & Windows** platforms, from servers to embedded systems
- > **Redundant hot-standby** architecture
- > **Extremely scalable and adaptable** to any particular present and future needs
- > **Simple configuration** with iConf tool
- > **Secured** with IEC62351 cyber security standard
- > **PLC automation** with IEC61131-3
- > **Numerous communication configurations** to freely adjust to substation requirements
- > **Simple integration of I/O modules** from the IRTU family

Our substation automation software has been developed to control and monitor any substation (HV & MV). It supports all architectures based on Windows or Linux servers, as well as embedded controllers, acting as a substation gateway, bay controller, RTU or communication front-end for SCADA systems.

The data collection from meters, protection relays, and other IEDs can be managed using any protocol, including IEC 60870-5, IEC 61850 (MMS/GOOSE), DNP3, DLMS, Modbus or Procome. Further, the iGW-VM can also process and transfer the data to one or multiple control centers or SCADA master stations using upstream protocols such as IEC 104, IEC 101, TASE2.0/ ICCP (IEC 60870-6), IEC 61850-90-2, DNP3, and Modbus RTU/TCP.

Amongst its state-of-the-art features, the iGW-VM is able to provide load shedding functionalities, high accuracy time stamping/processing (<1ms accuracy), as well as straightforward PLC programming/automation according to IEC 61131-3 via the free iConf tool.

HOT-STANDBY REDUNDANCY

In a hot-standby architecture, the active iGW-VM continuously feeds the recorded data to the redundant standby iGW-VM to ensure that the newly active iGW-VM has all the historical information (no data loss) when a switchover occurs. (for example due to a connection or device failure)

Furthermore, if the active iGW-VM detects that an IED is not able to communicate, it tries to access the IED via through its connected hot-standby twin, which (in the case there was a connection problem) can pass the data to the active RTU, acting as a serial server.

COMMUNICATION PROTOCOLS

The iGW-VM was developed to use a high number of protocols and communicate with several control centers at once.

The stack includes newer protocols such as IEC 61850 MMS or GOOSE (A-level certified by DNV-KEMA), but also older standard and proprietary protocols e.g. ModbusRTU/TCP, SpaBus or Procome. Other supported downstream protocols for meters and protection relays are IEC 60870-5-102/103, IEC 62056-21 and DLMS, while upstream **protocols for control centers also include IEC 60870-5-101/104 or DNP3.0 serial/TCP.**

IEC 61850 MMS

The iGW-VM can be used as a simple link between serially connected physical devices and logical IEC 61850 devices, as it can map any signal from many kinds of data models and structures onto IEC 61850 logical nodes, whilst also providing IEEE1588 / PTP time synchronization.

Thanks to its full iGrid protocol stack, it can convert any standard or legacy protocol such as IEC 60870-5-103, SPABus, Modbus, DLMS to IEC61850, allowing it to communicate with hundreds of vendors.

NETWORKING

The iGW-VM is equipped with transparent TCP bridging and configurable IP routing to tunnel any serial protocol (such as Modbus) over a TCP/IP connection and facilitate the data transfer through complex IP networks.

Its VLAN and VPN support allow to improve the network's performance, simplifying its traffic management, design and deployment and also helping to secure communications through particularly hazardous networks.

IEC61131-3 PLC AUTOMATION

Thanks to its internal PLC based on IEC 61131-3, the iGW-VM can provide powerful automation and control functionalities. For example, you can easily reuse programs on different projects, run multiple PLC instances simultaneously or use triggered variables for control commands and set points. It also allows to run hot program updates, stop PLC executions depending on the quality of selected PLC inputs and debug PLCs online, either cycle-by-cycle or step-by-step.

The iGW-VM has a high execution speed – a 2000 ST line program takes less than 3ms.

CYBER SECURITY – IEC 62351

iGrid enforces several layers of security measures to protect its devices from all kinds of threats, guided by the propositions of the IEC 62531 standard.

The iGW-VM is a hardened device featuring Role Based Access Control (RBAC) to avoid intrinsic risks such as security holes and unauthorized actions by authenticated users. In addition to encryptions via TSL/SSL, HTTPS, SSH and standard procedures for VPNs (e.g. OpenVPN), its communication can also be secured with network control methods such as firewalls, IP filters, ACL or TCP port blocks.



iGW Series – Powerful Software Inside Its Favorite Casing

The iGW B, M & S series combine these software capabilities with optimized hardware in order to directly collect data from and control IEDs. Any iGW series comes with (4) software configurable serial ports and (2) Ethernet ports to connect multiple IEDs or iRTUe units and to be adaptable to any modifications in the network architecture, such as a change of communication media. The iGW S Series provides up to (4) Ethernet ports (optional fiber optics) via an ethernet switch with RSTP/HSR/PRP redundancy.

All models feature several LEDs, a high precision RTC, highly accurate timestamping via NTP, a USB port for local maintenance and an SD card slot for additional memory.

More specifications on the back

iConf<PHUOCHUUn gay12-9>

File Edit View Project iRTU iControl Help

System PHUOCHUUN

Id	ClassTag	Out.Tag	On Change Only
SOLAR_FARM_AVAIABILITY	AnalogIn	AI_0043	no
CRP1_Protection_Relay_Fail	DigitalIn	DI_0290	no
CRP2_Protection_Relay_Fail	DigitalIn	DI_0291	no
171_F67_Trip	DigitalIn	DI_0292	no
171_F67_Trip	DigitalIn	DI_0293	no

Formulas

```
if (DI("CRP2BCULD0/SP16GGIO1.Ind.stVal")==1 and
DI("CRP2BCULD0/SP16GGIO1.Ind2.stVal")==1 and
DI("CRP2BCULD0/SP16GGIO1.Ind3.stVal")==1 and
DI("CRP2BCULD0/SP16GGIO1.Ind4.stVal")==1) then
return 1 else return 2 end
```

Properties - COM3

Port

Name COM3

Mode 232

Baudrate 9600

Parity even

FlowControl none

Data Bits 8

Stops Bits 1

Loop redundancy false

iConf – One Configuration Tool for Everything

iGrid products, including devices operating with iGW-VM can all be locally and remotely configured and maintained via USB or Ethernet, using iGrid's free iConf tool or standard software tools such as telnet. Alternatively, configuration data can be up- or downloaded via USB flash drive, SFTP manager or iConf.

We recommend using the iConf tool because it has been specifically developed for electrical applications, saving you lots of time and money throughout the control system set-up and maintenance tasks, whilst also minimizing your project risks.

UCA
International Users Group

IEC61850 compliant

Import SCL files or scan the substation LAN directly

Templates for common IEDs

Create your own device templates to drag & drop

PLC Automation

- Program PLCs according to IEC 61131-3 with graphical languages
- Execute by cycle or event based
- Run multiple PLC instances independently from each other

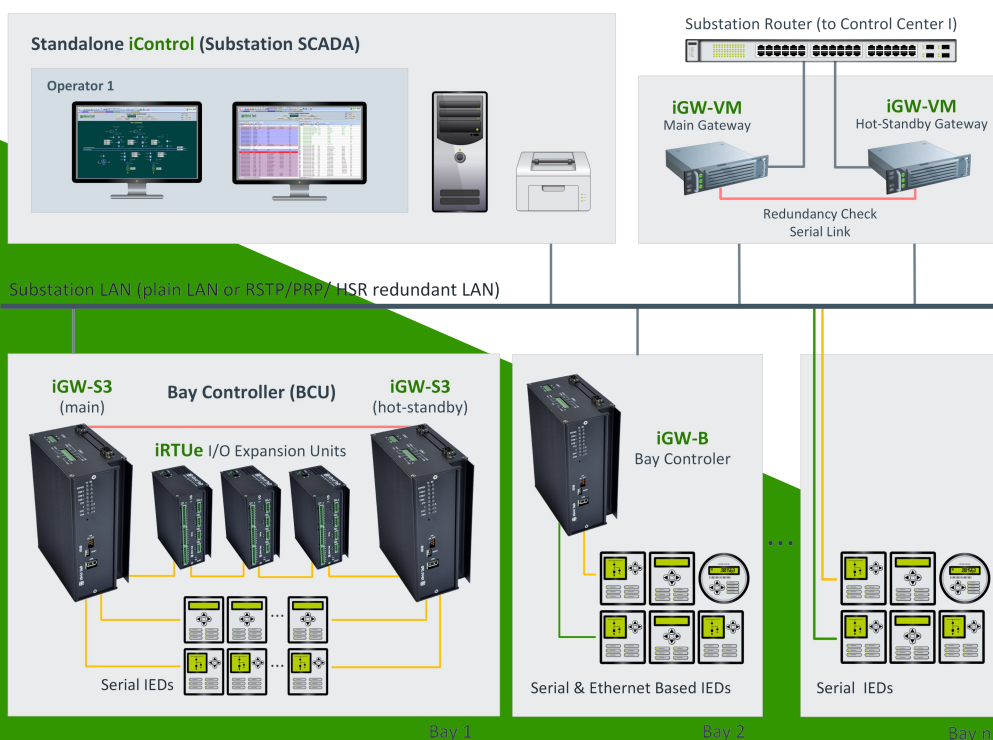
iRTUe – Remote I/O Expansions

The digital and analog inputs and output capabilities of the device the iGW-VM operates on can be freely extended by serially connecting one or multiple iRTUe units.

iRTUe units connect to all kinds of devices, can communicate via **IEC 61850 (GOOSE)** or Modbus RTU/TCP and come in many configurations such as 48 DI, 16 relays, 16 AI, 24 DI + 8 relays, 24 DI + 8 AI or 8 relays + 8 AI.



IGW-VM AS SUBSTATION GATEWAY IN HOT-STANDBY REDUNDANCY





GENERAL

Easy configuration with iConf tool

Command console with full information on packet exchanges, on all available protocols

Local or remote maintenance via USB or Ethernet port

Operating System OS Linux or Windows based servers

Command console with full information on packet exchanges, on all available protocols

Internal web server, allowing real time monitoring of the system and all its internal parameters

Communication Ports Ethernet & serial port management

RTC & TIME SYNCHRONIZATION

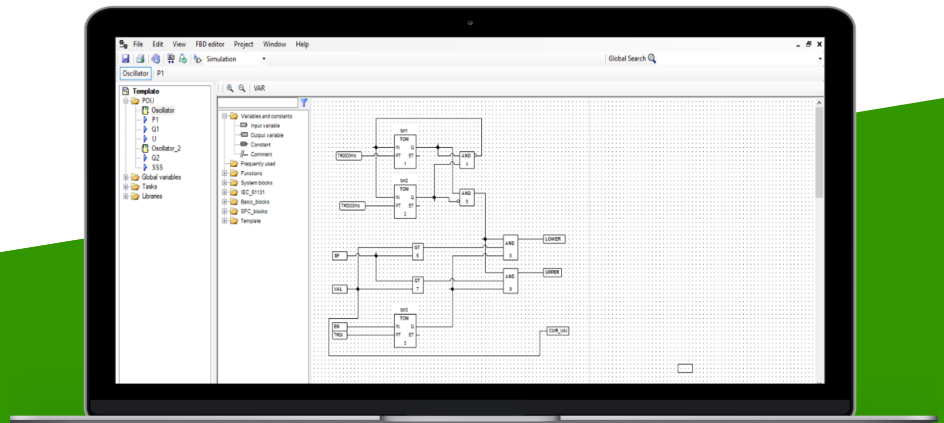
Client IEEE 1588/PTP (depending on hardware support),

Server IEEE 1588/PTP (depending on hardware support), NTP, IEC 60870-5-101, IEC 60870-5-102, IEC 60870-5-103, IEC 60870-5-104 DNP3.0, DLMS, Spabus and Procome

The iGW-VM also provides watchdog and real-time-clock (RTC) functionalities



PLC Programming with iConf
using function block diagrams
(one of 6 standard languages)



PROTOCOL STACK

Master/Slave IEC 60870-5-101	Master/Slave IEC 60870-5-104
Master/Slave Modbus TCP/UDP and JBUS (master)	Master/Slave ModbusRTU
Master/Slave DNP3.0 (serial, UDP, TCP)	Master IEC 60870-5-103
Master IEC 60870-5-102	Master Procome
Master DLMS	Master Spabus
Master IEC 62056-21	SNMP Agent/Manager
IEC 61850 MMS Client/Server	IEC 61850 GOOSE Publisher/Subscriber

IGCOMMS SOFTWARE APPLICATION

LUA language & iConf can be used to create simple and complex logic and mathematical expressions

Security IEC 62351-3 and IEC 62351-5 support, including TLS/SSL, SSH and VPN connections

IEC 61131-3 automation logic and PLC programming, with LD, FBD, ST and SFC editor

Redundancy iGComms includes redundant architectures using hot-standby configuration

COMTRADE file transfer from IEC 61850 & IEC 60870-5-103 IEDs to control center

I/O modules simple integration of iRTUe

Licensing USB license based on number of connections, tags and functionalities

ORDERING INFORMATION

Features	IEDs	Master	Tags	IEC 61131-3	Redundancy
iGW-VM#SubstationServerLite	32	10	6.000	Yes	No
iGW-VM#SubstationServerPlus	150	10	15.000	Yes	Yes
iGW-VM#FrontEndLite	150	10	15.000	Yes	No
iGW-VM#FrontEndMid	500	10	50.000	Yes	Yes
iGW-VM#FrontEndPlus	>500	10	150.000	Yes	Yes

(*) The connection numbers of tags, masters and IEDs can be increased by purchasing extra licenses