

pbsSoftLogic V4.4

pbsSoftLogic is an integrated development environment for RTU programming from pbscontrol. pbsSoftLogic has been on the market since 2007 and runs on many different hardware platforms.

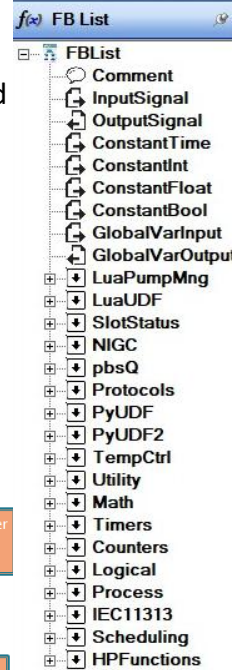
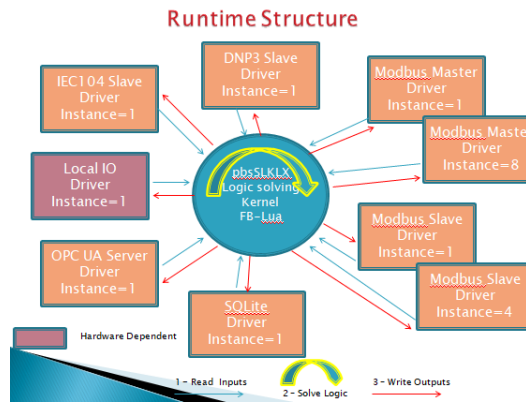
pbsSoftLogic Supports following protocols : ModbusTCP/RTU(M/S),DNP3(M/S),IEC101/104 (M/S),IEC62351 for IEC104 and DNP3 , Beckhoff ADS , Siemens S7 ,MQTT , Redis , OPC Classic , OPC UA (C/S), Vestas Wind Turbine , IEC62056-21 , SQLite with TDS protocol ,EmailPub , Fatek PLC and GSP.

pbsSoftLogic supports Function Block programming based on the IEC1131-3 standard. pbsSoftLogic has more than 400 ready function blocks and user can create new FB by C and Lua Scripting.

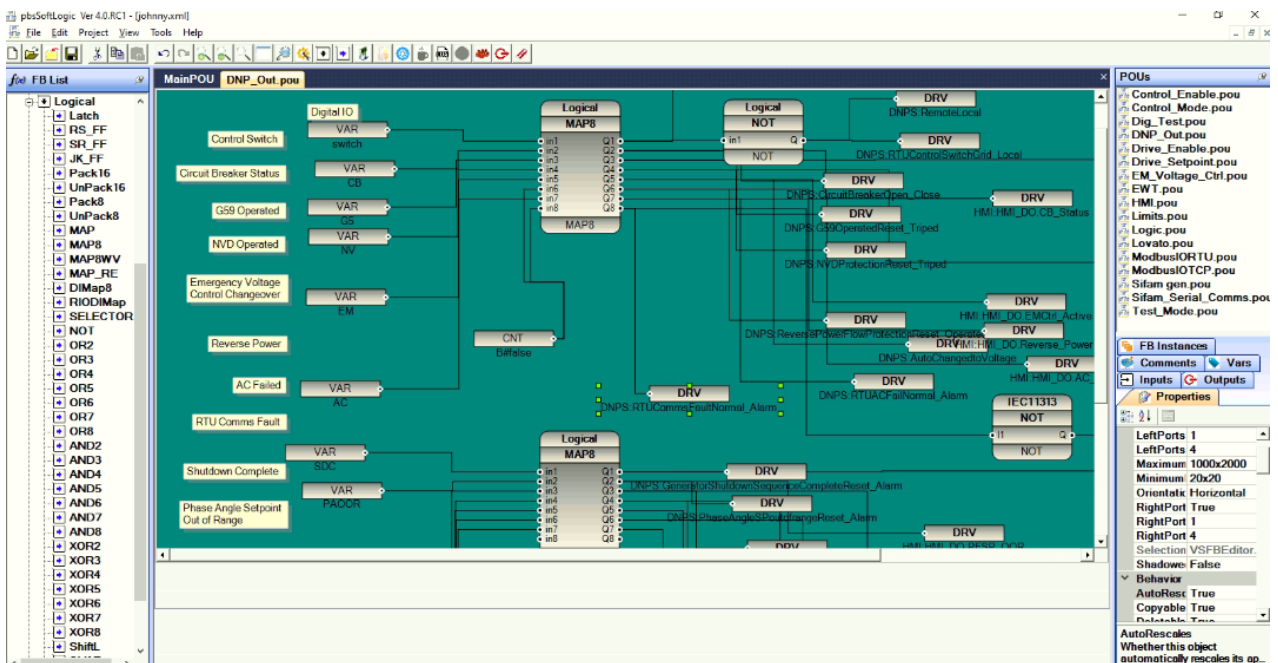
pbsSoftLogic IDE runs on Windows and the runtime kernel is ported to Linux, WinCE and Win32 operating systems. pbsSoftLogic has offline logic emulation on Windows.

Logic Monitoring Facility helps the user to monitor logic at runtime and perform hot and cold updating of logic and change tag value.

pbsSoftLogic IDE is free and only the license applies to the runtime kernel.



User can define many Program Organization Units for a project . There is no limitation for logic size . Multiple instance for each driver is supported .



File

Publish Subscribe MQTT Tags

Broker URL(IP) 127.0.0.1

TCP Port 1883

RTU Topic RTU1Pub

QOS 0

User Name

Password

☒ Publish Change Only

DataModel Nigc

Publish Period 5 Sec



There is a GUI for each communication driver for easy configuration.

DNP3 , IEC101/104 , Modbus ,Fatek PLC , Vestas Wind Turbine , IEC62056-21 and IEC62351 and GSP are developed at pbsControl .

Other protocols like MQTT , OPC UA , TDS are used from open sources

For OPC UA we used Open62541 and for MQTT , Mosquitto stack is used .

Options

General Time Setting LAN Setting Stats License Kernel

Logic Scan Time(ms)

100

RTU

RTU-550E

RTU IP

192

168

1

74

Drivers List

Name	Path	Type	Enable
> IEC 104S	\IEC104S	IEC8705Slave	<input checked="" type="checkbox"/>
uasrv	\uasrv	OPCUaServer	<input checked="" type="checkbox"/>
dnp3	\dnp3	DNP3Slave	<input checked="" type="checkbox"/>
MS	\MS	ModbusSlave	<input checked="" type="checkbox"/>
mqtt	\mqtt	MQTT	<input checked="" type="checkbox"/>
LIO	\LIO	LOCAL_IO	<input checked="" type="checkbox"/>

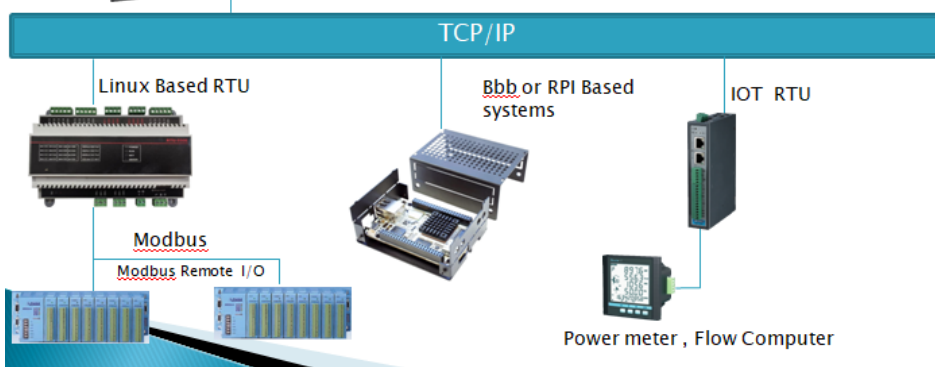
Internal Events passing between Modbus ,DNP3 , IEC101/104 and MQTT is handling automatically by runtime kernel .

Logic Development



pbsSoftLogic Engineering

- Develop control logic by Function Block language ,
- Develop User defined FB by Lua , C, Python
- Simulate on Windows
- Transfer Configuration and logic to controllers
- Monitor Logic at runtime and update logic



MQTTGoldCh.xmlNewChannel1.xml

ParametersnigcTags

☒ Enable

ProtocolMQTT

Broker IP127.0.0.1

Port1883

User Name

Password

ScanTime(ms)1000

CommunicationTimeout(min)15

Data Model

☒ raw☐ xml☐ json☐ meco☐ nigc

Sub Topic

Pub Topic

☐ Use Tag Address

MQTT Support

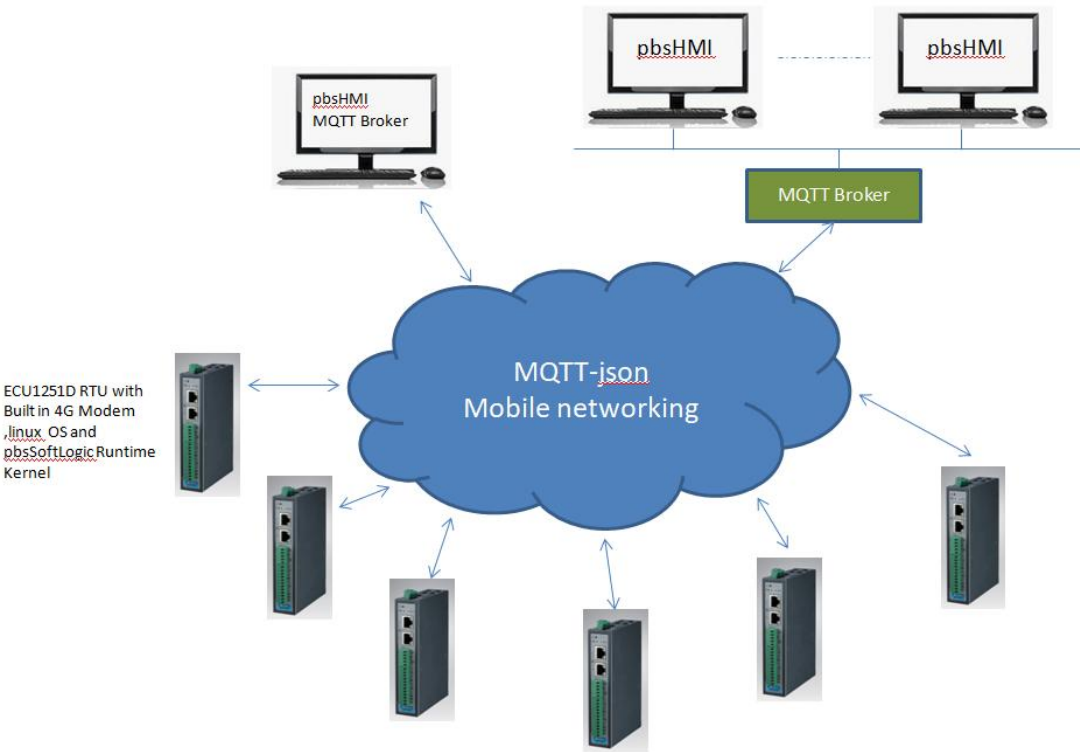
pbsSoftLogic and pbHMI have built Data model export/import facility to quickly define SCADA platform based on MQTT. pbsHMI supports MQTT driver for various data models. You can define tags as raw data, XML, json, or a user-defined data model.

It is possible to import tags from an XML file or from a pbsSoftLogic project. To reduce data consumption, tag address can be used between pbsSoftLogic and psbHMI MQTT drivers instead of tag name.

To secure communications, you can use TLS or frame encryption in the pbsSoftLogic and pbsHMI drivers.

pbsSoftLogic enabled RTUs can publish MQTT frames to up to eight different brokers simultaneously.

Parameters	nigc	Tags	
Block Name	Type	Init Value	Address
SYS_Online	SYS	0	0
MainMeter_L1_Current	AI	0	1
MainMeter_L2_Current	AI	0	2
MainMeter_L3_Current	AI	0	3
MainMeter_Total_Active_Power	AI	0	4
MainMeter_Total_Reactive_Power	AI	0	5
MainMeter_Total_Real_Power	AI	0	6
MainMeter_Total_Power_Factor	AI	0	7
MainMeter_Active_Energy_Pos	AI	0	8
MainMeter_Reactive_Energy_Pos	AI	0	9
InatkeReception_L1_Current	AI	0	10
InatkeReception_L2_Current	AI	0	11
InatkeReception_L3_Current	AI	0	12
InatkeReception_Total_Active_Power	AI	0	13
InatkeReception_Total_Reactive_Power	AI	0	14
InatkeReception_Total_Real_Power	AI	0	15
InatkeReception_Total_Power_Factor	AI	0	16
InatkeReception_Active_Energy_Pos	AI	0	17
InatkeReception_Reactive_Energy_Pos	AI	0	18
Grinder31_L1_Current	AI	0	19



pbsSoftLogic Supports DNP3 and IEC104 slave drivers with IEC62351 and TLS layer .

DNP3 and IEC104 Support

PhysicalLayer IEC101 IEC SA Layer TLS Others Tags

General Configuration

Slave Address(CASDU)	3	Originator Address	0
K (T) Parameter	12	Automatic sending Counters Time (s)	0
W (R)Parameter	12	Physical Layer Scan Time (ms)	100
N Parameter	32767	TimeZone	LocalTime
T0 Timeout (s)	20	Max Frame Len	250
T1 Timeout (s)	20	Command Timeout(Sec)	10
T2 Timeout (s)	10	Short Pulse for DO(Sec)	2
T3 Timeout (s)	60	Long Pulse for DO(Sec)	10
CounterMode	Counter	SBO Timeout(sec)	20
Cyclic DT COT	2	Clock Valid Time(Min)	60
		Test Frame Mode	Disconnet

IEC104 Slave drivers is fully tested with DNV and TMW test tools .for IEC104 protocol , SA Layer (IEC62351) and TLS layer .

PhysicalLayer IEC101 IEC SA Layer TLS Others Tags

IEC IEC/TS 62351

SA Enable	False	Update Key	Static
Update key	1E E6 54 35 A3 BC BC 9F 3E 13 EF 84 02 DA 1F BB 39 2F 74 86 83 0F 81 66 8C 2C 8E 2E 88 E0 2C 47		
Aggressive mode	True	Aggressive Mode Answer	IEC104
HMAC Algorithm	4-HMAC_SHA_256_16octets_networked	Expected Session key interval(min)	1260
KeyWrap Algorithm	2-AES-256	Expected Session key Count	10000
Max Error Sent	5 <input type="checkbox"/> Do not send error messages		
Addressing Information	No Addressing information		
<input type="checkbox"/> IEC62351 Log Events in the RTU			
IEC62351 Log File	/home/iec62351log/		
KCL CLN	8	Challenge data Len <4...64>	
User ID	1	Note: SA System tags and IEC counters share the same address space	
Reply Timeout(sec)	10	SA Sys Tags Base Address	400
<input type="checkbox"/> Do not Include Segmentation Field to MAC Calculation			

Update Key Change

Symmetric Key File Path for changing Update Key

/home/openssl/symmetric_key.bin

Password

User Name Default

The IEC104 and DNP3 Slave drivers support the TLS layer with various parameters to configure TLS operation.

DNP3 and IEC104 Support

PhysicalLayer IEC101 IEC SA Layer TLS Others Tags

☐ TLS is Enabled for IEC104

CA Certificate File

/home/pbsLX/cert/cer1.crt

CA TLS Common Name

RTU Public Key X.509 Certificate File

/home/pbsLX/cert/rtu.crt

RTU Private Key File

/home/pbsLX/cert/rtu.pem

Private Key Pass Phrase

X.509 certificate revocation list File

/home/pbsLX/cert/cer0.crl

Blank = Disable

Master X509 Certificate(s) File

Blank = All Cert Accept

TLS Renegotiation Count

10000

TLS Resumption Timeout(Sec)

21600

TLS Handshake Timeout(sec)

3

TLS Version

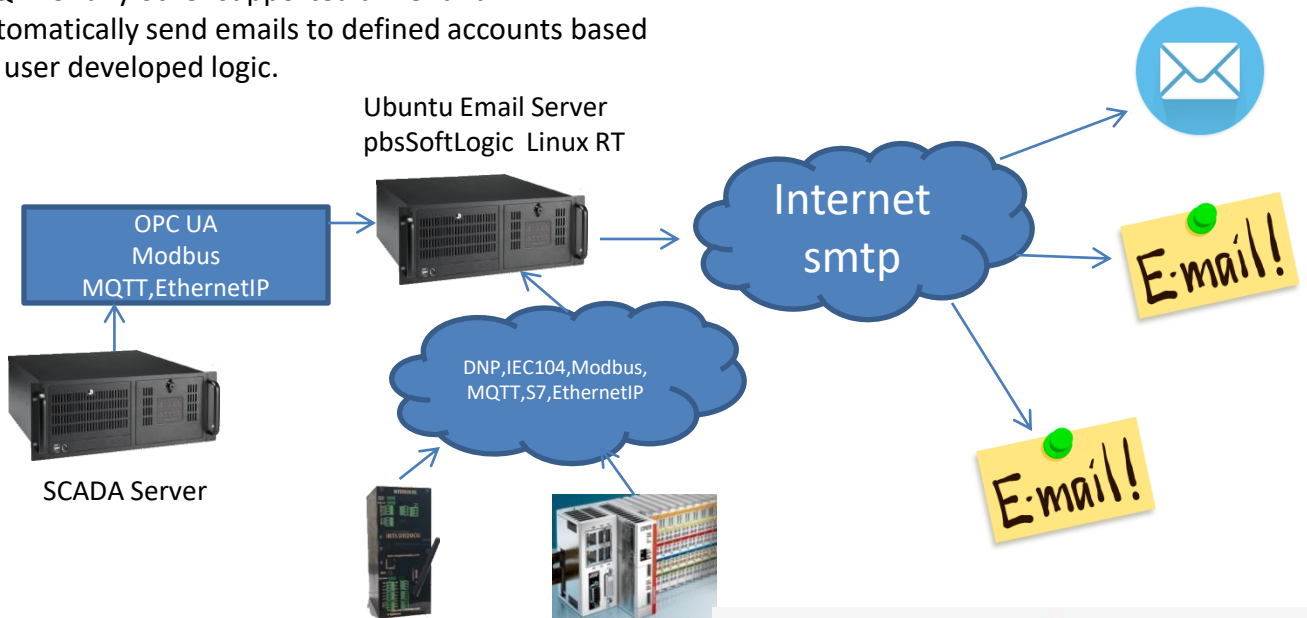
1.3

IEC62351 statistics counters are defined as driver tags and can be used by RTU logic.

PhysicalLayer	IEC101	IEC	SA Layer	TLS	Others	Tags	
Name							Type
							Class
							Init
							Address
							Period
SYS.MasterIsOnline							SYS-System Diagnostic
SYS.GIStatus							SYS-System Diagnostic
SA_UnexpectedMessagesNum							SYS-System Diagnostic
SA_AuthorizationFailuresNum							SYS-System Diagnostic
SA_AuthenticationFailuresNum							SYS-System Diagnostic
SA_ReplyTimeoutsNum							SYS-System Diagnostic
SA_RekeysDueToAuthenticationFailureNum							SYS-System Diagnostic
SA_TotalMessagesSentNum							SYS-System Diagnostic
SA_TotalMessagesReceivedNum							SYS-System Diagnostic
SA_CriticalMessagesSentNum							SYS-System Diagnostic
SA_CriticalMessagesReceivedNum							SYS-System Diagnostic
SA_DiscardedMessagesNum							SYS-System Diagnostic
SA_ErrorMessagesSentNum							SYS-System Diagnostic
SA_ErrorMessagesReceivedNum							SYS-System Diagnostic
SA_SuccessfulAuthenticationsNum							SYS-System Diagnostic
SA_SessionKeyChangesNum							SYS-System Diagnostic
SA_FailedSessionKeyChangesNum							SYS-System Diagnostic
SA_UpdateKeyChangesNum							SYS-System Diagnostic
SA_FailedUpdateKeyChangesNum							SYS-System Diagnostic
SYS.CounterResetedByMaster							SYS-System Diagnostic
SYS.EnableFrameLogging							SYS-System Diagnostic
DI Tag1							DI-Digital Input (IEC Tag Type 1,30)
DI Tag2							DI-Digital Input (IEC Tag Type 1,30)
DI Tag3							DI-Digital Input (IEC Tag Type 1,30)
DI Tag4							DI-Digital Input (IEC Tag Type 1,30)
DI Tag5							DI-Digital Input (IEC Tag Type 1,30)
DI Tag6							DI-Digital Input (IEC Tag Type 1,30)
DI Tag7							DI-Digital Input (IEC Tag Type 1,30)
DI Tag8							DI-Digital Input (IEC Tag Type 1,30)

pbsSoftLogic supports email publishing driver to automatically send emails to defined accounts.

pbsSoftLogic can read data by ModbusTCP, OPC UA, MQTT or any other supported driver and automatically send emails to defined accounts based on user developed logic.



The mail server can be a standard Ubuntu server with the pbsSoftLogic runtime kernel installed. Email server can read data from SCADA server or directly from RTU with various supported protocols such as DNP3, IEC104, OPC UA, Modbus, MQTT, Redis, S7, AB,

pbsSoftLogic Email Publishing GUI

File

Sender Emails

EmailUser:

EmailPassword:


☐ UseSSL

SMTP:

EmailSubject:

Diagnostic Mode:

Instance:



Diagnostic data like Number of sent emails, Number of Failed Emails, Email Server online status, .. are defined in EmailPub Driver.

Drivers List				
	Name	Path	Type	Enable
▶	EmailDrv	\EmailDrv	EmailPub	<input checked="" type="checkbox"/>
	mqtt	\mqtt	MQTT	<input checked="" type="checkbox"/>

You can define many EmailPub Driver for Email Server. At each driver instance you can define 100 email accounts for publishing emails.

Each driver instance has 8 inputs for accepting emails from logic to publish. Email content can be dynamically changed at runtime by user-defined FBs created by Lua Scripting.

