

Read Me First

# IEC 61850

Communication networks and systems for power utility automation

Hints for the use of the DLL-Tree-Demonstration Package

by Dipl.-Ing. Karlheinz Schwarz, NettedAutomation GmbH  
Im Eichbaeumle 108  
76139 Karlsruhe

[karlheinz.schwarz@nettedautomation.com](mailto:karlheinz.schwarz@nettedautomation.com)

**DRAFT 03**

# License Agreements

- The core stack/API software of the demonstrations is provided by [SystemCorp](#):

SystemCORP Embedded Technology Pty Ltd

Address 15/50 William St

Beckenham WA 6107 / Australia

info@systemcorp.com.au

[www.systemcorp.com.au](http://www.systemcorp.com.au)

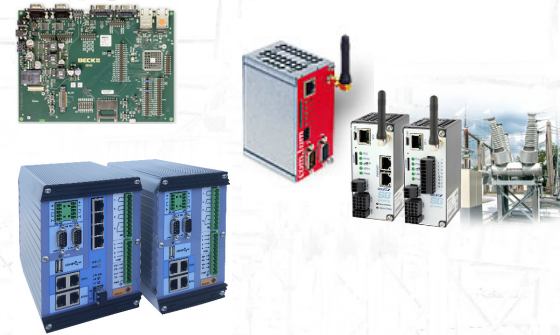
- By using the DLL demonstration packages you accept the attached license agreements:  
<<SW License Agreement.pdf>>  
<<[End-User-Software-License-Agreement-Embedded-Products.pdf](#)>>
- Please note the attached <<Readme.txt>>



# Objective of the DLL-Tree-Demonstration Package

The **main purpose** is to provide a **free of charge simple and easy to use IEC 61850 Client/Subscriber Tool** (running on Windows PCs) that can be used **to communicate with a Server/Publisher** implemented on the platforms:

- [Beck IPC DK151 Development Kit for SC145 \(DK61\)](#)
- [Beck IPC com.tom / IXXAT SG-gateways \(WEB-PLC\)](#)
- [SystemCorp Smart Grid Controllers](#)
- **Windows PC**
- ...



The demonstration uses a **single generic SCL model** (and a derived JSON file [JavaScript Object Notation]) that can (beyond the main purpose) be used on the above platforms to automatically configure (tree structured graphical applications) for Clients, Server/Publisher, and Client/Subscriber roles as shown on the next slides.

The specification of additional models (.icd and .json) could be provided for a fee. Contact NettedAutomation if you are looking for other models, please.

## Useful Links

The DLL-Tree-Demo package can be downloaded from:

<http://www.nettedautomation.com/solutions/demo/dll>

Information about the underlying stack/API software (plus a demo) can be found here:

<https://www.systemcorp.com.au/products/smart-grid-software/iec-61850/>

Usefull information about IEC 61850 can be accessed through the IEC 61850 blog:

<http://blog.iec61850.com/>

Seminars and training for protection, control, SCADA, ... ask the experts:

<http://www.nettedautomation.com/seminars/uca/sem.html>

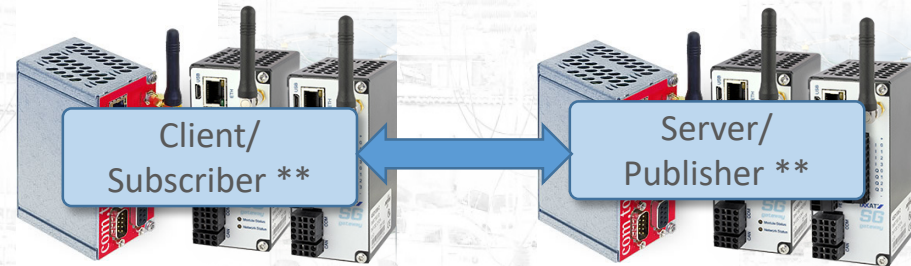
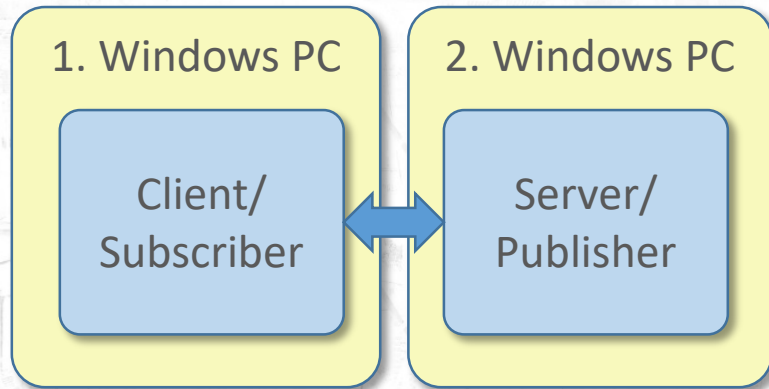
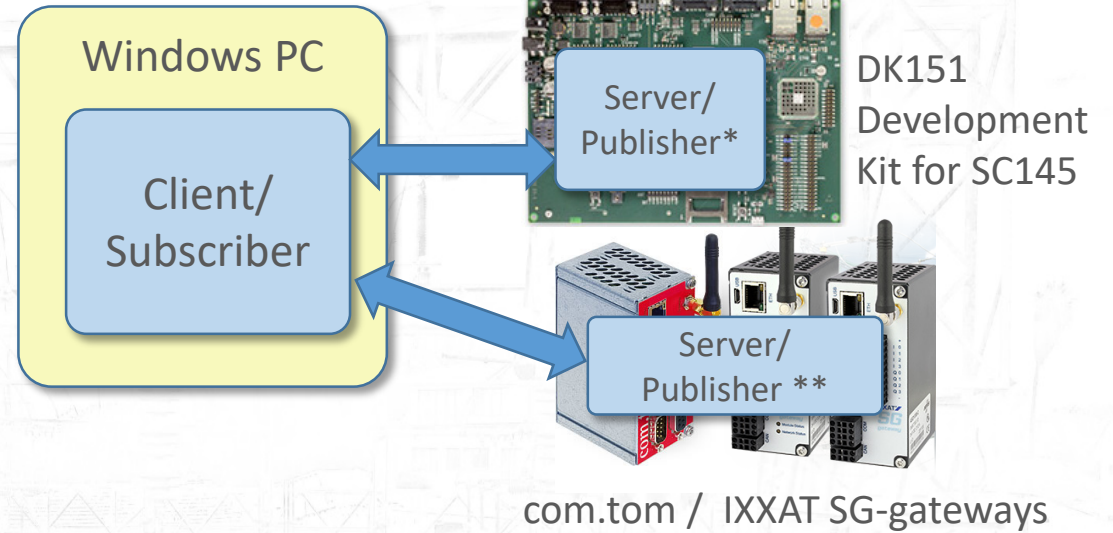
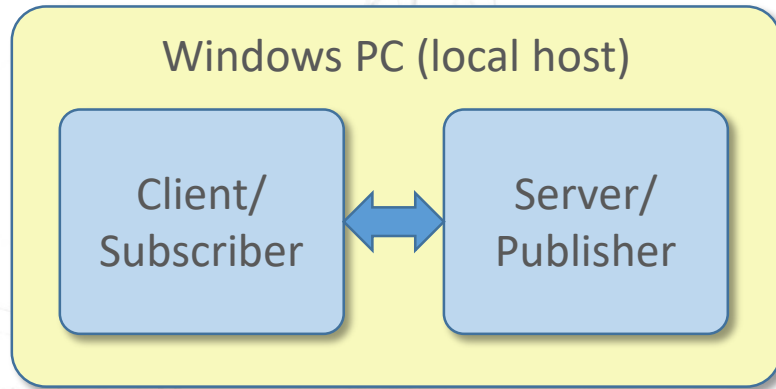
VHPready demo package:

<http://www.nettedautomation.com/iec61850li/dll/index.html>

4,200+ Experts  
from 900+ Companies  
from 90+ Countries  
trained in 240+ courses  
(2017-04)



# Application use-cases of the new IEC 61850 DLL-Tree-Demo



- \* Using the same SCL Files for the configuration of the IED and C++-Application
- \*\* Using the same SCL Files for the configuration of the IEDs and WEB-PLC Appl.

<https://www.com-tom.de/>  
<https://www.beck-ipc.com/en/produkte/dk151/>  
<https://www.ixxat.com/products/energy/sg-gateways/ixxat-sg-gateway-overview>

# Folder with files for DLL-Tree-Demo

- Run Client for Server on 2<sup>nd</sup> PC
- Run Client for Server on local host
- Run Server on local host or 2<sup>nd</sup> PC
- Stack/API provided by SystemCorp \*

config.json

IEC61850GUI.exe

IEC61850GUI.exe.config

IEC61850GUI.pdb

IEC61850GUIClient.bat

IEC61850GUIClientLocal.bat

IEC61850GUIServer.bat

Library.dll

Library.pdb

Newtonsoft.Json.dll

PIS10V2.dll

PowerGenerationC.icd

PowerGenerationCLocal.icd

PowerGenerationS.icd

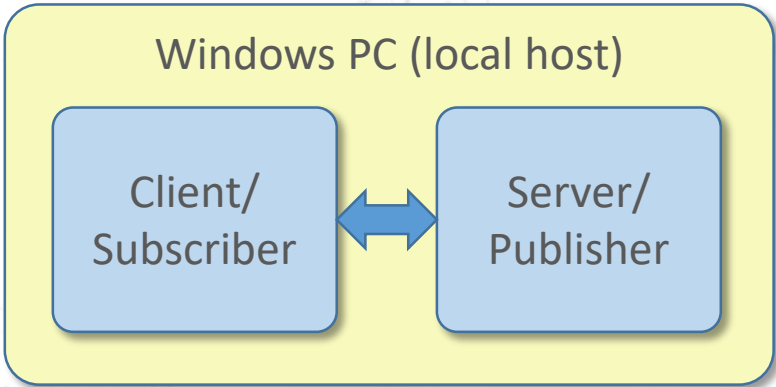
- JSON: configuration of Model for Stack/API generated by WEB-PLC \*\*
- Application for Client, Server, Publisher, and Client/Subscriber
- Client Model for Server on 2<sup>nd</sup> PC
- Client Model for Server on local host
- Server Model for Server on local host

\* <https://www.systemcorp.com.au/products/smart-grid-software/iec-61850/>

\*\* The JSON document is generated by the WEB-PLC for the given SCL model used in the three .icd files. If you need further sample models (.cid and derived .json) please contact NettedAutomation.

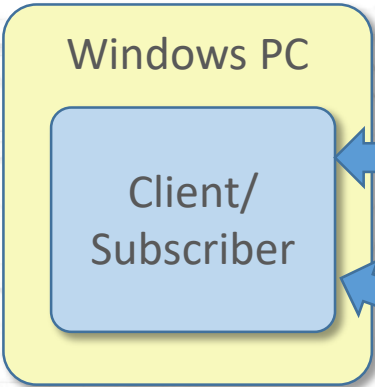


# Application use-cases of the new IEC 61850 DLL-Tree-Demo

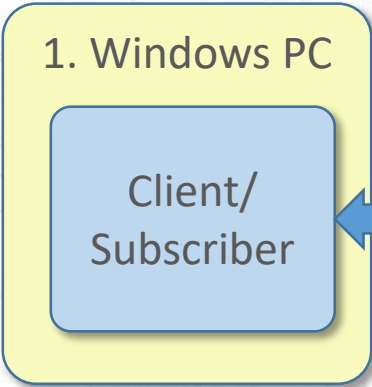
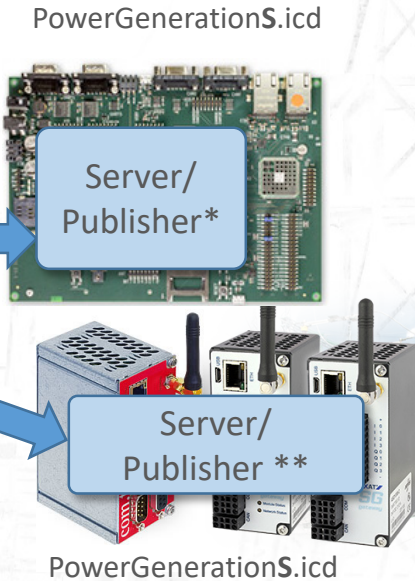


IEC61850GUI**ClientLocal**.bat  
PowerGeneration**C**Local.icd

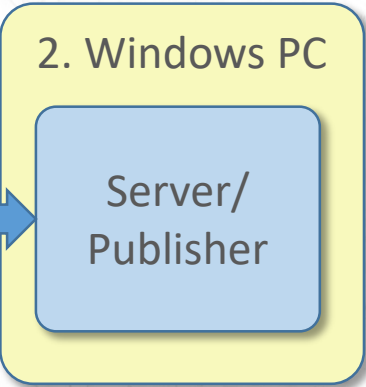
IEC61850GUI**Server**.bat  
PowerGeneration**S**.icd



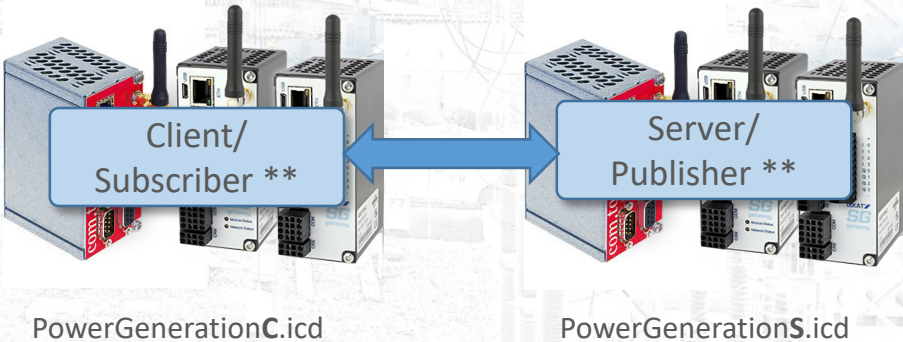
IEC61850GUI**Client**.bat  
PowerGeneration**C**.icd



IEC61850GUI**Client**.bat  
PowerGeneration**C**.icd



IEC61850GUI**Server**.bat  
PowerGeneration**S**.icd

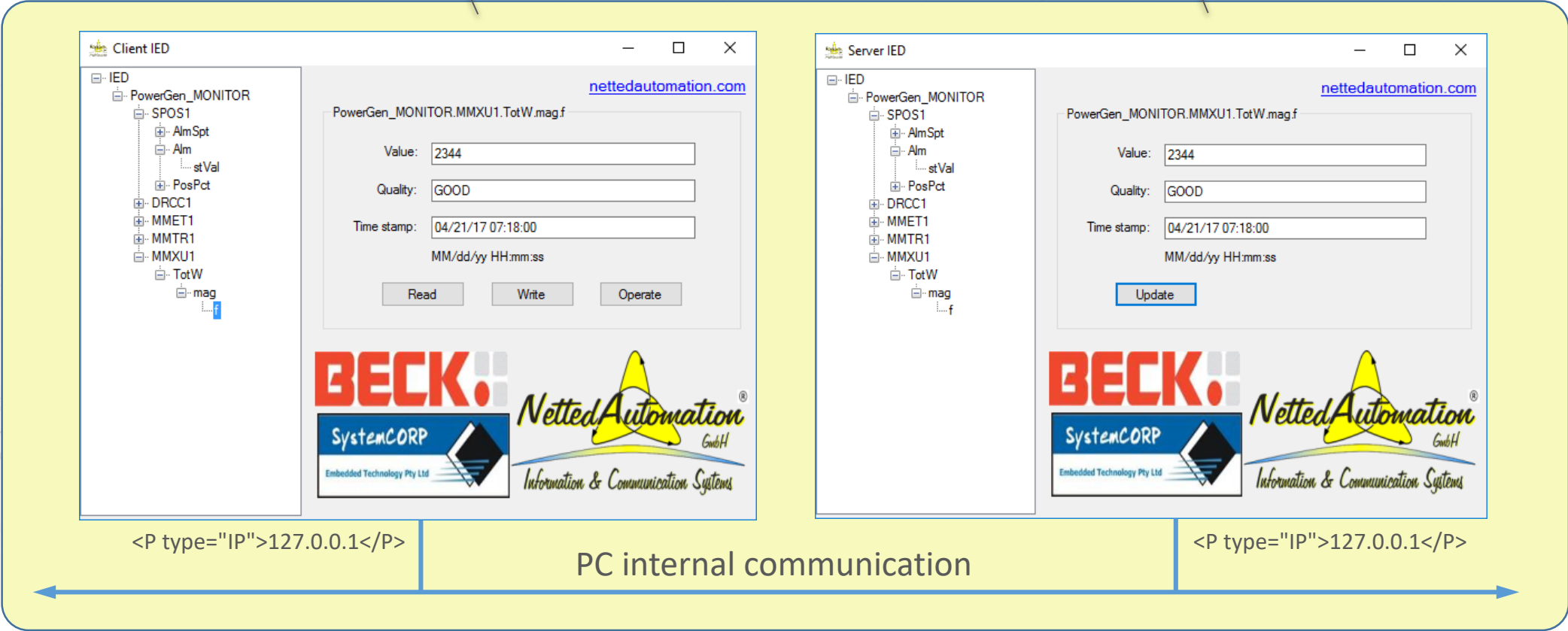


All Models are the same – the IP addresses and MAC addresses are specific for each IED!

# Topology of Demo (on one Windows machine) – local host

2. Run Client for Server on local host

1. Run Server on local host





# Topology of Demo (on two Windows machines)

2. Run Client for Server on 2<sup>nd</sup> PC

1. Run Server on 2<sup>nd</sup> PC

Client IED

IED

PowerGen\_MONITOR

SPOS1

AlmSpt

Alm

stVal

PosPct

DRCC1

MMET1

MMTR1

MMXU1

TotW

mag

f

PowerGen\_MONITOR.MMXU1.TotW.mag.f

Value: 2344

Quality: GOOD

Time stamp: 04/21/17 07:18:00

MM/dd/yy HH:mm:ss

Read

Write

Operate

BECK

SystemCORP

Embedded Technology Pty Ltd

NettedAutomation

GmbH

Information & Communication Systems

<P type="IP">192.168.178.100</P>

Server IED

IED

PowerGen\_MONITOR

SPOS1

AlmSpt

Alm

stVal

PosPct

DRCC1

MMET1

MMTR1

MMXU1

TotW

mag

f

PowerGen\_MONITOR.MMXU1.TotW.mag.f

Value: 2344

Quality: GOOD

Time stamp: 04/21/17 07:18:00

MM/dd/yy HH:mm:ss

Update

BECK

SystemCORP

Embedded Technology Pty Ltd

NettedAutomation

GmbH

Information & Communication Systems

<P type="IP">192.168.178.151</P>

MMS, TCP/IP, GOOSE, Ethernet/Ethertype, ...visible with Wireshark

IEC 61850  
DLL-Tree-Demo, V03

© Karlheinz Schwarz, NettedAutomation GmbH, 2017-04-24

Page 9

## Services used

The services used are:

1. Services are driven by the .icd file.
2. Client connects automatically to the Server.
3. Client enables automatically the Report Control Block (if it is not reserved, Client checks if reserved or not).
4. Events are sent by the configured GOOSE message.
5. Measurements are sent by the RCB every 10 seconds.
6. Read and Write could be used for corresponding attributes.
7. Operate could be used for controlling the LN DRCC (manually change stVal to allow another Operate).
8. Quality may be changed manually (not recommended)
9. Time stamp may be set manually to another time.
10. When Client and Server run on two machines, you can trace the traffic with Wireshark.
11. DataSets with members from the existing models (LD/LN.DO.DA ...), Report Control Blocks, and GOOSE Control Blocks may be added, modified or removed. They do not have an impact on the JSON file.  
**Note that any change in an icd file has to be made in ALL icd files!!**
12. GOOSE messages may be “manipulated” by managed Ethernet Switches. Some may remove the VLAN-Header for example or may duplicate the GOOSE messages (one with and one without VLAN Header).

# Prerequisites

In some cases your Windows computer may not like the demo exe file. Then try the following:

1. Modify the IP Address and MAC Address for the server/publisher and client/subscriber to match with the PCs. For the usecase “local host” you just need to modify the MAC Addresses in **both** .icd files; use the MAC Address of the Ethernet Adapter where the Server/Publisher is running.
2. Switch of the Windows Firewall or open port 102 (where the MMS Server is running).
3. Start the program as Admin ... if you are allowed to do so.
4. Check if the .Net-Framework is installed (one of the latest versions, e.g., 4.6.2).
5. WinPcap needs to be installed (will be installed with Wireshark).
6. Maybe you need “Visual C++ Redistributable Packages install run-time components that are required to run C++ applications built using Visual Studio 2015”:  
<https://www.microsoft.com/en-us/download/details.aspx?id=48145>
7. In some cases you have to deactivate the WLAN adapter.
8. In a few cases you have to connect an Ethernet cable to another PC or an Ethernet Switch. Check if the LED at the Ethernet port is flashing.
9. Very seldom it helps just to reboot your computer.
10. In some cases Windows restricts the Read and Write services in the usecase “local host”.



# Excerpt of icd file of Sever Model

PowerGenerationS.icd

Server/Publisher

```
40 <IED type="Monitoring-Device" name="PowerGen" manufacturer="NettedAutomation GmbH" configVersion="1.0">
41 <Services>
58 <AccessPoint name="SubstationRing1">
59 <Server timeout="30">
60 <Authentication />
61 <LDevice desc="Demo of models and services on DK151" inst="MONITOR">
62 <LN0 inst="" lnClass="LLN0" lnType="LLN0_0">
63 <DataSet name="Status" desc="Status information for GOOSE">
64 <FCDA lnClass="SPOS" lnInst="1" doName="Alm" fc="ST" ldInst="MONITOR" />
65 <FCDA lnClass="DRCC" lnInst="1" doName="DERStr" fc="ST" ldInst="MONITOR" />
66 </DataSet>
67 <DataSet name="Measurements" desc="Measurements for reporting">
68 <FCDA lnClass="SPOS" lnInst="1" doName="PosPct" fc="MX" ldInst="MONITOR" />
69 <FCDA lnClass="MMET" lnInst="1" doName="DffInsol" fc="MX" ldInst="MONITOR" />
70 <FCDA lnClass="MMTR" lnInst="1" doName="TotWh" fc="ST" ldInst="MONITOR" />
71 <FCDA lnClass="MMCU" lnInst="1" doName="TotW" fc="MX" ldInst="MONITOR" />
72 </DataSet>
73 <ReportControl name="Status_Report" rptID="Status_Values" intgPd="0" dataSet="Status" confRev="1" buffered="false">
74 <TrgOps dchg="true" qchg="false" dupd="false" period="false" />
75 <OptFields seqNum="true" timeStamp="true" reasonCode="true" dataSet="true" />
76 <RptEnabled max="2">
77 <ClientLN iedName="MyClient" lnClass="IHMI" prefix="" lnInst="1" ldInst="none" />
78 </RptEnabled>
79 </ReportControl>
80 <ReportControl name="Measurement_Report" rptID="Measured_and_counted_Values" intgPd="5000" dataSet="Measurements" confRev="1" buffered="false">
81 <TrgOps dchg="false" qchg="false" dupd="false" period="true" />
82 <OptFields seqNum="true" timeStamp="true" reasonCode="true" dataSet="true" />
83 <RptEnabled max="2">
84 <ClientLN iedName="MyClient" lnClass="IHMI" prefix="" lnInst="1" ldInst="none" />
85 </RptEnabled>
86 </ReportControl>
87 <DOI name="NamPlt">
88 <DAI name="vendor" valKind="Set">
89 <Val>Beck IPC / NettedAutomation GmbH</Val>
90 </DAI>
91 <DAI name="swRev" valKind="Set">
92 <Val>2.07.18</Val>
```

# Excerpt of icd file of Client Model

PowerGenerationC.icd

```
10 </Header>
11 <Communication>
12   <SubNetwork type="8-MMS" name="SubNetworkName">
13     <ConnectedAP IEDName="MyClient" apName="SubstationRing1"> IED: Client/Subscriber
14       <Address>
15         <P type="IP">192.168.178.100</P>
16         <P type="MAC-Address">34-E6-D7-16-C7-A8</P>
17         <P type="IP-SUBNET">255.255.255.0</P>
18         <P type="IP-GATEWAY">192.168.178.1</P>
19         <P type="OSI-TSEL">00000001</P>
20         <P type="OSI-PSEL">01</P>
21         <P type="OSI-SSEL">01</P>
22       </Address>
23     </ConnectedAP>
24     <ConnectedAP IEDName="PowerGen_" apName="SubstationRing1"> IED: Shadow Server/Publisher
25       <Address>
26         <P type="OSI-AP-Title">1,1,9999,1</P>
27         <P type="OSI-AE-Qualifier">12</P>
28         <P type="OSI-PSEL">00000001</P>
29         <P type="OSI-SSEL">0001</P>
30         <P type="OSI-TSEL">0001</P>
31         <P type="IP">192.168.178.151</P>
32         <!-- Enter the korrekt IP address of the DK151 acting as 61850 server here; 0.0.0.0 means DK151 will use the configured IP of the device -->
33         <P type="IP-SUBNET">255.255.255.0</P>
34         <P type="IP-GATEWAY">192.168.178.1</P>
35         <!-- <P type="MAC-Address">D0-67-E5-4A-91-E6</P> -->
36         <P type="MAC-Address">00-30-56-50-01-4D</P>
37         <!-- Enter the MAC address of the DK151 acting as 61850 server here; needed for GOOSE -->
38       </Address>
39       <GSE cbName="Status_CB_GOOSE" IdInst="MONITOR">
40         <Address>
41           <P type="MAC-Address">01-0C-CD-01-00-36</P>
42           <P type="VLAN-PRIORITY">4</P>
43           <P type="VLAN-ID">000</P>
44           <P type="APPID">0000</P>
45         </Address>
46         <MinTime unit="s" multiplier="m">200</MinTime>
47         <MaxTime unit="s" multiplier="m">10000</MaxTime>
48       </GSE>
49     </ConnectedAP>
50   </SubNetwork>
51 </Communication>
52 <IED name="MyClient"> IED: Client/Subscriber
53   <AccessPoint name="SubstationRing1">
54     <LN lnClass="IHMI" inst="1" lnType="IHMIa"/>
55   </AccessPoint>
56 </IED>
57 <IED type="Monitoring-Device" name="PowerGen_" manufacturer="NettedAutomation GmbH" configVersion="1.0"> IED: Shadow Server/Publisher
58 </DataTypes>
```

# IEC 61850 Gerätemodell für Beck IPC DK151

Karlheinz Schwarz, NettedAutomation GmbH

2017-04-10

Die folgenden Modelle enthalten nur instanzierte Logische Knoten, Daten Objekte und Daten Attribute. Referenzierte Typen werden nicht expandiert. Es werden die dekorierten Signale (mit Private-Elementen) dargestellt.

Die Modelle werden durch eine XSL-Transformation eines CID-Files erzeugt. (Die Endung des CID-Files muss in .xml geändert werden. Die Attribute des SCL-Elements müssen entfernt werden; <SCL attr ...> in Kommentare setzen und <SCL> einfügen.

Transformation durch:

Server\_Report-Meas-Status\_Operate\_publish-GOOSE\_Decorated\_2017-04-10\_14-30\_Final(3).xsl

IED = PowerGen\_

LD	MONITOR	
LN	LLN0	LLN0_0
	Mod.stVal	on
	NamPlt.configRev	0.1
	NamPlt.d	Demonstration of IEC61850 using multiple Models and services with DK151.
	NamPlt.IdNs	IEC61850-7-4:2007B
	NamPlt.swRev	2.07.18
	NamPlt.vendor	Beck IPC / NettedAutomation GmbH
DataSet	Status	
	- MONITOR/SPOS1.ST.Alm.	
	- MONITOR/DRCC1.ST.DERStr.	
DataSet	Measurements	
	- MONITOR/SPOS1.MX.PosPct.	
	- MONITOR/MMET1.MX.DffInsol.	
	- MONITOR/MMTR1.ST.TotWh.	
	- MONITOR/MMXU1.MX.TotW.	
Report Control	RCB-Name = Status_Report	Beschr = , Zyklus = 0 ms, ReportID = Status_Values
	Datensatz = Status	DataChange = true, zyklisch = false, QualityChange = false, DataUpdate = false
Report Control	RCB-Name = Measurement_Report	Beschr = , Zyklus = 5000 ms, ReportID = Measured_and_counted_Values
	Datensatz = Measurements	DataChange = false, zyklisch = true, QualityChange = false, DataUpdate = false
GOOSE Control	GCBName = Status_CB_GOOSE	
	DataSet = Status	
	applID = Status	
LN	LPHD1	
	PhyHealth.stVal	0
	PhyNam.location	All over
	PhyNam.model	SC145
	PhyNam.serNum	76D4
	PhyNam.vendor	Beck IPC DK151
	Proxy.stVal	0
LN	SPOS1	
	Alm.q	
	Alm.stVal	
	Alm.t	
	AlmSpt.setMag.f	28
		Position measurement, by proximity sensor



	PosPct.d PosPct.q PosPct.t PosPct.mag.f PosPct.units.multiplier PosPct.units.SIUnit	on DK151    0 2
LN	MMET1	
	DfflInsol.d DfflInsol.q DfflInsol.t DfflInsol.mag.f DfflInsol.units.multiplier DfflInsol.units.SIUnit	Diffuse insolation by light sensor on DK151    0 55
LN	MMTR1	
	TotWh.actVal TotWh.d TotWh.q TotWh.t TotWh.units.multiplier TotWh.units.SIUnit	 Counter of energy   3 72
LN	MMXU1	
	TotW.d TotW.q TotW.t TotW.mag.f TotW.units.multiplier TotW.units.SIUnit	Current power generated    3 38
LN	DRCC1	
	DERStr.ctlModel DERStr.stVal Mod.stVal Oper.ctlVal	direct-with-normal-security   on

+++++

## LICENSE AND WARRANTY FOR SOFTWARE

THIS LICENSE AND WARRANTY IS A LEGAL AGREEMENT BETWEEN YOU ("LICENSEE", EITHER AS AN INDIVIDUAL OR ENTITY) AND SystemCORP Embedded Technology Pty Ltd (SET) ("LICENSOR"). BY USING THE SOFTWARE SHIPPED WITH THIS LICENSE AND WARRANTY, LICENSEE ACCEPTS AND AGREES TO THE TERMS HEREOF.

### 1. DEFINITION OF SOFTWARE

1.1 As Used herein, "Software" means the SET product that is shipped with this License and Warranty, and "Software" means either the stand-alone software or the software embedded on another product.

### 2. GENERAL

2.1 Under the terms of this license and warranty, the software is licensed (and not sold) to licensee. The licensee accepts the terms and the condition and warranty contained in this end user license agreement with the purchase of the Software.

2.2 Any term of this Agreement may be waived in writing by SET only. No waiver of any condition or breach shall be deemed to be a further or continuing waiver of such condition of breach. Delay or failure to exercise any right or remedy shall not be deemed the waiver of that right or remedy.

Any provision of this Agreement, which shall be determined by a court of competent jurisdiction to be invalid or unenforceable, shall be severed from this Agreement without invalidating the remaining provisions thereof. This Agreement represents the entire agreement between the parties with respect to the Software and supersedes any prior agreement. No agent or employee of Licensor is authorized to make any representation binding on Licensor unless the representation is in writing and signed by an authorized officer.

### 3. LICENSE GRANT

3.1 Licensor hereby grants to licensee, and licensee hereby accepts from Licensor, a non-exclusive, non-transferable license to install, execute, and use the Software either (i) with the product on which it is embedded or (ii) if the Software is the product, on the single computer for which Licensor has provided licensee a security key. All rights in the Software shall remain the property of Licensor or its licensors, if any. Licensee shall not make any modifications to the Software without Licensor's prior written consent. Licensee shall not reproduce the Software except to the extent strictly necessary for proper use of the product; provided, however, that licensee may make an archive copy of the Software if the Software is the product. It is not permitted to sub-license or assign any license without the prior written consent of Licensor. The source code for software is not included unless specifically listed as an item in Licensor's specification. On occasion, third party licensed software is provided, it will be identified as such and licensee will be required to complete any sublicense specified by the software licensor and provided by the Licensor. Licensee shall keep the Software and any operating manuals or user documentation associated therewith in confidence. Licensee may not cause, permit or suffer the Software to be reverse engineered, disassembled or decompiled, rented, or offered for sale or other means of transfer or disposition, nor shall licensee develop software that performs the functions of the Software. As long as licensee complies with all terms of this License and Warranty, the license granted hereunder shall be perpetual. The license shall, however, in all events automatically terminate upon the permanent discontinuance of the use of the

Software by licensee. The use of the Software by any purchaser or other transferee from licensee will be conditioned upon the grant of a new license in respect thereof by Licensor.

#### 4. LICENSOR'S RIGHTS

4.1 Licensee acknowledges and agrees that the Software is a proprietary product of Licensor protected under Australian and International copyright law. Licensee further acknowledged and agrees that all right, title, and interest in and to the Software, including associated intellectual property rights, are and shall remain with Licensor. This License and Warranty does not convey to licensee an interest in or to the Software, but only a limited right of use revocable in accordance with the terms of this License and Warranty.

#### 5. LIMITED WARRANTY

5.1 For a period of 12 months from date of delivery, Licensor warrants and that the Software will substantially conform to the applicable Licensor specifications, provided that any other software not licensed from Licensor used in combination with the Software properly exchange data with it. This warranty is in lieu of all other warranties whether express, implied or statutory, including implied warranties of merchantability or fitness for a particular purpose.

#### 6. LIMITATION OF LIABILITY

6.1 In no event will licensor be liable for any incidental or consequential damages (including, without limitation, loss of use or lost business, revenue, or goodwill) arising in connection with this agreement, the software and/or the use thereof, under any theory of tort, contract, strict liability or negligence, even if licensor has been advised, knew or should have known of the possibility of such damages. In no event shall any damages which may be assessed upon licensor for any reason exceed the paid purchase price of the specific license. Any action against licensor must be commenced within one (1) year after the cause of action arises.

#### 7. NO ASSIGNMENT

7.1 This Agreement shall not be assigned in whole or in part by either party without the prior consent of the other, that shall not be reasonably withheld, and any attempt by either party to so assign this Agreement shall be invalid. However, either party may assign this entire Agreement to a parent, subsidiary or affiliated company of that party without the consent of the other party.

#### 8. GOVERNING LAW

8.1 This Agreement shall be governed by Australian law. Australian courts will have exclusive jurisdiction over any conflicts that flow from these general terms and conditions.



## Open Source and Third Party Software Disclosure

### expat - XML Parser Toolkit

Copyright (c) 1998, 1999, 2000 Thai Open Source Software Center Ltd. Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE

## SYSTEMCORP EMBEDDED TECHNOLOGY SOFTWARE LICENSE AGREEMENT

These license terms are an agreement between SystemCORP Embedded Technology Pty Ltd and you and/or your company. Please read them. They apply to SystemCORP Embedded Technology software applications including the media on which you received it, if any. The terms also apply to any SystemCORP Embedded Technology

- ☐ updates,
- ☐ supplements,
- ☐ Internet-based services, and
- ☐ support services

for this software, unless other terms accompany those items. If so, those terms apply.

**By using the software, you accept these terms. If you do not accept them, do not use the software.**

**As described below, installation or use of the software also operates as your consent to the transmission of certain standard computer information during validation, automatic download and installation of certain updates, and for Internet-based services.**

---

**If you comply with these license terms, you have the rights below for each license you acquire.**

### 1. INSTALLATION AND USE RIGHTS.

- a. **Use.** You may install and use copies of the software on PC or Laptop Computers where you have paid the license fees and received the key for that particular computer's "Hardware Fingerprint".
- b. **Separation of Components.** The components of the software are licensed as a single unit. You may not separate the components and install them on different devices.
- c. **Included SystemCORP Embedded Technology Programs.** The software may contain other SystemCORP Embedded Technology programs. The license terms with those programs apply to your use of them.

### 2. VALIDATION.

- a. The software may cause the operating system software to conduct validation checks of your operating system software from time to time, depending upon your specific operating system.
- b. Validation verifies that your computer's operating system has been activated and is properly licensed. Validation also permits you to use certain features of the software or to obtain additional benefits.
- c. If a validation check is performed, the software will send information about the software and your operating system software to SystemCORP Embedded Technology. This information may include the versions of the software and operating system software, and/or other hardware/software specific machine configuration. This is referred to as the "Hardware Fingerprint" SystemCORP Embedded Technology does not use the information to identify or contact you. **By using the software, you consent to the transmission of this information.**
- d. If, after a validation check, your Hardware Fingerprint is found not to be properly licensed, the software you are installing may be disabled, or the functionality of the application software may be affected, depending upon your specific Hardware Fingerprint..

- e. You may only obtain updates or upgrades for application software from SystemCORP Embedded Technology or authorized sources. For more information see <http://www.systemcorp.com.au>.

**3. INTERNET-BASED SERVICES.** SystemCORP Embedded Technology provides Internet-based services with the software. Except as otherwise noted in materials accompanying a service, it may change or cancel them at any time.

- a. **Consent for Internet-Based Services.** Some software features connect to SystemCORP Embedded Technology or service provider computer systems over the Internet. You will not receive a separate notice when they connect. **By using these features, you consent to the transmission of information.** SystemCORP Embedded Technology does not use any information other than to identify the specific computer running the licensed software (i.e. this information is used to create the software 'key').

Computer Information. The following features use Internet protocols, which send to the appropriate systems computer information, such as your Internet protocol address, the type of operating system, browser and name and version of the software you are using, and the language code of the device where you installed the software. SystemCORP Embedded Technology uses this information to make the Internet-based services available to you.

- ☐ SystemCORP Embedded Technology Updates. By installing the software on your PC or Laptop computer, you also agree to receive updates from SystemCORP Embedded Technology.
- ☐ Error Reports. This software may automatically send error reports to SystemCORP Embedded Technology that describes which software components had errors.
- ☐ Automatic Updates. This software may have an Automatic Update feature. SystemCORP Embedded Technology may change or cancel it at any time.

**4. SCOPE OF LICENSE.** The software is licensed, not sold. This agreement only gives you some rights to use the software. SystemCORP Embedded Technology reserves all other rights. Unless applicable law gives you more rights despite this limitation, you may use the software only as expressly permitted in this agreement. In doing so, you must comply with any technical limitations in the software that only allow you to use it in certain ways. You may not

- ☐ disclose the results of any benchmark tests of the software to any third party without SystemCORP Embedded Technology's prior written approval;
- ☐ work around any technical limitations in the software;
- ☐ reverse engineer, decompile or disassemble the software or software key;
- ☐ make more copies of the software than specified in this agreement or allowed by applicable law, despite this limitation;
- ☐ publish the software for others to copy;
- ☐ rent, lease or lend the software; or
- ☐ use the software for commercial software hosting services.

**5. BACKUP COPY.** You may make backup copies of the software. You may use it only to reinstall the software. These backups must only be used by you.

**6. DOCUMENTATION.** Any person that has valid access to your computer or internal network may copy and use the documentation for your internal, reference purposes only.

**7. EXPORT RESTRICTIONS.** The software is subject to Australian export laws and regulations. You must comply with all domestic and international export laws and regulations that apply to



the software.

8. **SUPPORT SERVICES.** Because this software is “as is,” we may not provide support services for it.
9. **ENTIRE AGREEMENT.** This agreement (including the warranty below), any addendum or amendment included with the software, and the terms for supplements, updates, Internet-based services and support services that you use, are the entire agreement for the software and support services.
10. **APPLICABLE LAW.**
  - a. **Australian.** If you acquired the software in Australia, Australian interpretation of this agreement and applies to claims for breach of it, regardless of conflict of laws principles. The laws of the Australian state or territory where you live govern all other claims, including claims under state consumer protection laws, unfair competition laws, and in tort.
  - b. **Outside of Australia.** If you acquired the software in any other country, the laws of that country apply.
11. **LEGAL EFFECT.** This agreement describes certain legal rights. You may have other rights under the laws of your state or country. You may also have rights with respect to the party from whom you acquired the software. This agreement does not change your rights under the laws of your state or country if the laws of your state or country do not permit it to do so.
12. **DISCLAIMER OF WARRANTY.** The software is licensed “as-is.” You bear the risk of using it. SystemCORP Embedded Technology gives no express warranties, guarantees or conditions. You may have additional consumer rights under your local laws which this agreement cannot change. To the extent permitted under your local laws, SystemCORP Embedded Technology excludes the implied warranties of merchantability, fitness for a particular purpose and non-infringement.

In addition, programs, scripts, and/or code examples demonstrating the usage and/or applications of software may be included and are intended as examples. SystemCORP Embedded Systems Pty Ltd cannot be held responsible for the correct functioning or coding of these examples. If you wish to use these programs, scripts, code, or parts of it in your specific application, you must validate the code yourself and you are responsible for the functioning of the code. SystemCORP Embedded Technology Pty Ltd cannot be held liable for any adverse or unintended behaviour of any code written by any third party or under contract by SystemCORP Embedded Technology Pty Ltd.

2017-04-24

Version 1.0

The wait for a FREE IEC 61850/61400-25 Evaluation/Starter Kit is over - here it is for immediate use.

Congratulation!

SystemCorp (Perth, Australia) and NettedAutomation offer an IEC 61850/61400-25 DLL (Dynamic Link Library) and four Application examples using the DLL (runs under Windows):

- C/C++ Server Application (simple Console)
- C/C++ Client Application (simple Console)
- .Net/C# Server Application (nice graphical interface)
- .Net/C# Client Application (nice graphical interface)

The packages contain executable software and the source code of the C and .Net/C# Applications (projects).

You can use these applications and modify them according to your needs.

NOTE 1: The Clients and the server run on ONE machine (localhost). If you want to run the server on one machine and the clients on another you have to configure both (client and server)! This is done by modifying the ICD files that are in the same folders where the client/server executables are located. Read the Documentation for details!

NOTE 2: To see information communicated by GOOSE messages at the client you have to install WinPcap driver (latest version is 4.1.3 or so / <http://www.winpcap.org>). And you have to have your Ethernet adapter active and running - any other adapter like WiFi MUST be off and disabled!!

NOTE 3: To trace the messages exchanged between Client/Server (Publisher/Subscriber) you have to run them on different machines. Then you can trace the traffic, e.g. with Wireshark.

Run first the simple console applications ... follow the instructions.

Before you start the server and client (launchapp.bat) it is recommended to read first the <<Getting\_Started\_DLL\_IEC61850.pdf>> in the Documentation folder; this folder is generated through installation and is contained in the package.

For the console applications you have to change the IP and MAC Addresses first!!

For Client and Server running on one machine (local host) you have to set the IP Address in both icd files to 127.0.0.1 and you have to set the MAC Address to the MAC Adress of your Ethernet adapter. This may cause problems when you use virtual machines.

NOTE 4: The server must run before the client is started.

NOTE 5: You may also use the IEDScout (Omicron, free demo version) and browse the server. This is quite convenient - but the Browser cannot be used to connect to a client application!

NOTE 6: This Evaluation/Starter Kit requires basic understanding of IEC 61850 Information Models, Information Exchange Services, and Configuration Language!!

NOTE 7: The server uses the same Information Model as the BECK IPC Development Kit DK151. The DK151 is a platform to run IEC 61850/61400-25 in real-time - for real-time applications! The PIS10 runs also on the DK61 (Beck Chip) or the IXXAT SG10, SG20 and SG40 with Profinet. All use the same simple Stack API.

We offer all services for the integration of the PIS10 stack (DLL, ...) into your application

-----  
We offer implementation support provided by our experienced application programmer: Andreas Pfefferle, Karlsruhe, Germany.  
Andreas is familiar with Substation Automation, RTUs, IEC 60870-5-10x, protocol integration, ... SystemCorp PIS10-Stack API and many other domains.

Please contact us, in case you need comprehensive education and/or help for the integration and application development.

I am confident, that our experience and service would help to get started in short time! You would get first-hand, very comprehensive, vendor neutral and up-to-date knowledge, experience, and guidance; learn how to reach interoperability of devices;

You would get best advice and help - for the best price.

Please note also the copyright statements and other crucial information.

Best Regards,

Karlheinz Schwarz  
NettedAutomation GmbH  
Im Eichbaeumle 108  
76139 Karlsruhe  
Germany

Phone +49-721-684844  
Fax +49-721-679387  
mailto:karlheinz.schwarz@nettedautomation.com  
URL [www.nettedautomation.com](http://www.nettedautomation.com)

Visit the IEC 61850 / IEC 61400-25 blog:  
<http://blog.iec61850.com>

(C) 2010-2017 NettedAutomation GmbH