

Beyond the substation

Applying IEC 61850 to control street lights and microgrids

Who we are?



Ing. Sander Jansen

Data architect

- (Data) architecture
- IEC CIM/ IEC 61850
- Open source



MSc. Jonas van den Bogaard

IT architect

- IoT
- Software architecture
- Open standards



Where we are?

allliander

Holding

7150 employees

1,6 EURO billion turnover

Liander

DSO

90k km electricity network

42k km gas network



**SMART SOCIETY
SERVICES**

Alliander Startup

Development Open Smart
Grid Platform, Smart Meter
Head-End, Flexible Public
Lighting System, Distribution
automation system

ZOWN

Alliander Startup

Development Microgrid
Platform

**Open Smart
Grid Platform**

Open source project

256,879 lines of code

30+ people involved



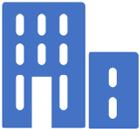
● Elektriciteit and gas
● Gas



allliander

Our 61850 Journey

Some highlights



00's: First substations:

Some substations build with IEC 61850



2014+: Lab demo's:

IEC 61850 battery storage
IEC 61850 base PQ
IEC 61850 based microgrids



2016: New generation substation automation

Substation automation with IEC 61850 by default



2016: Microgrids in production

Microgrids in production



2012: Open Smart Grid Platform was born



2013: More focus on open standards

Company wide attention to use open standards in smart grid projects



2016: Tender Public lightning

Tender won by Vendor that supports 8000+ devices with IEC 61850 interfaces.

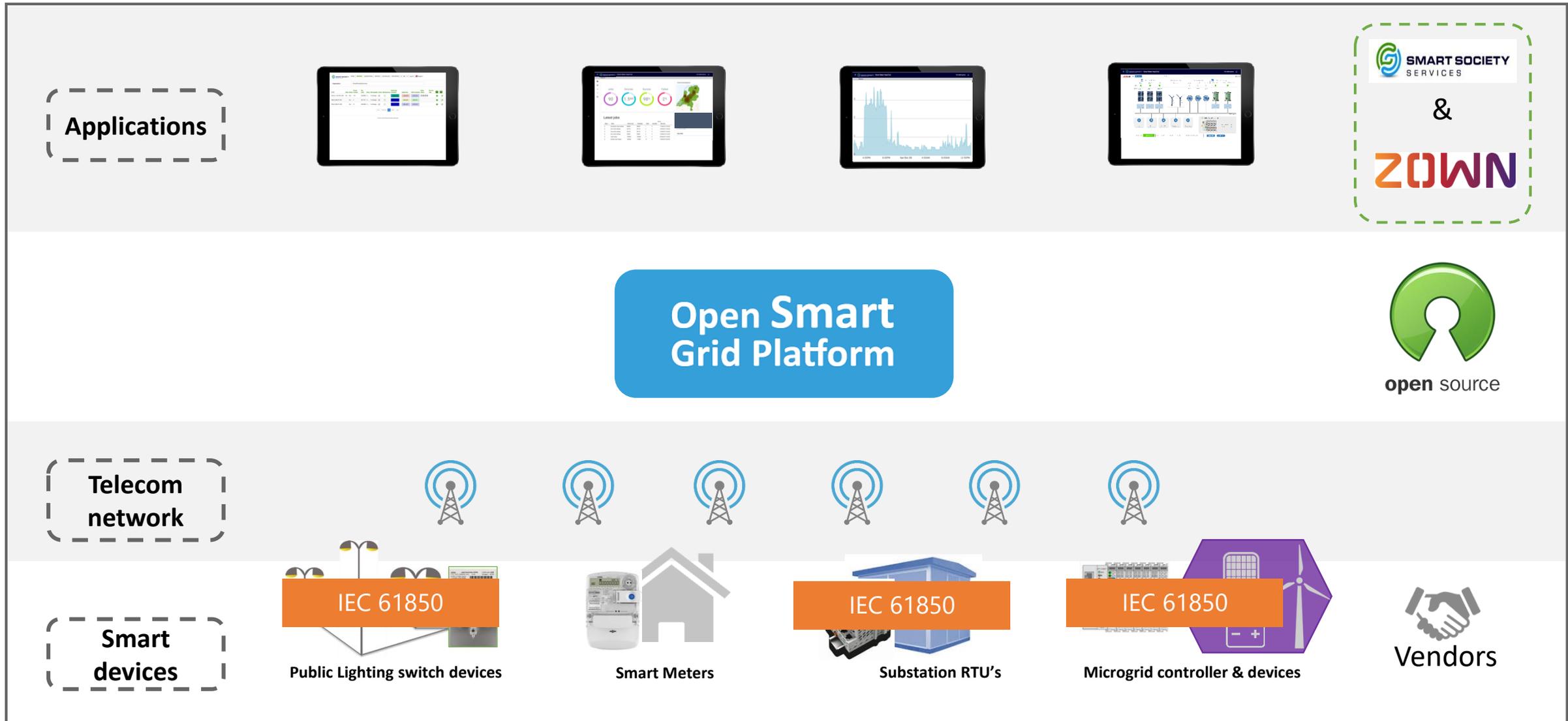


2017: Test IEC 61850 for DA

POC with IEC 61850 for DA



General architecture



Street lights and Microgrids



What are our IEC 61850 divers?



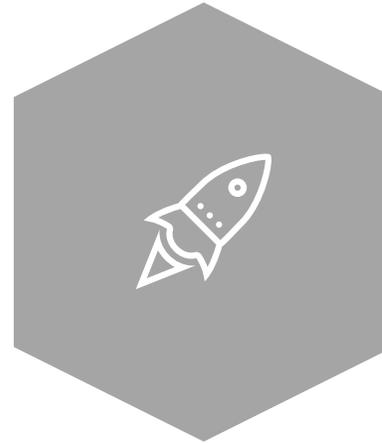
INTEROPERABILITY

IEC 61850 is inter-operable with many devices from different vendors



SEMANTICS INCLUDED

In comparison to other utility standards IEC 61850 has context



FUTURE PROOF

IEC 61850 is more and more used in the utility sector



EXPERIENCE

Our people have experience with IEC 61850

What are our challenges?

01

No best practices for microgrids
and street lights



02

IEC61850 MMS is not optimized
for wireless communication



03

No security built in IEC 61850



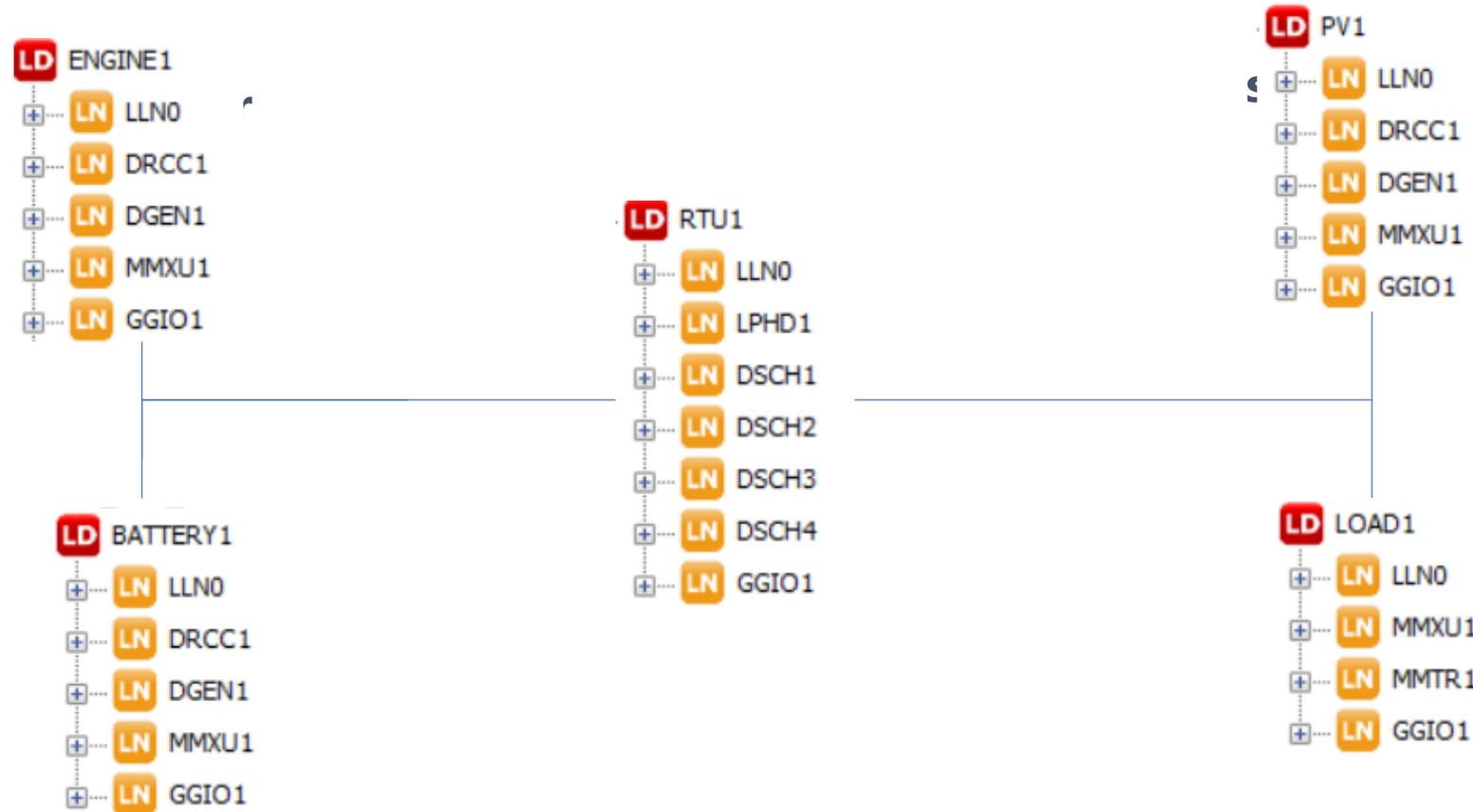
04

No full organization support
for IEC 61850



No best practices for microgrids and street lights

Challenge 1



IEC 61850 MMS is not optimized for wireless communication

Challenge 2



Higher communication costs



More difficult to keep connection open 24/7



Lower throughput



IP based IEC 61850 MMS over CDMA or GPRS



No security built in IEC 61850

Challenge 3

No Authentication

Unique identifier per device

Encrypted communication to and from devices

Role based authorizations on functions per device

Every action to and from devices is logged

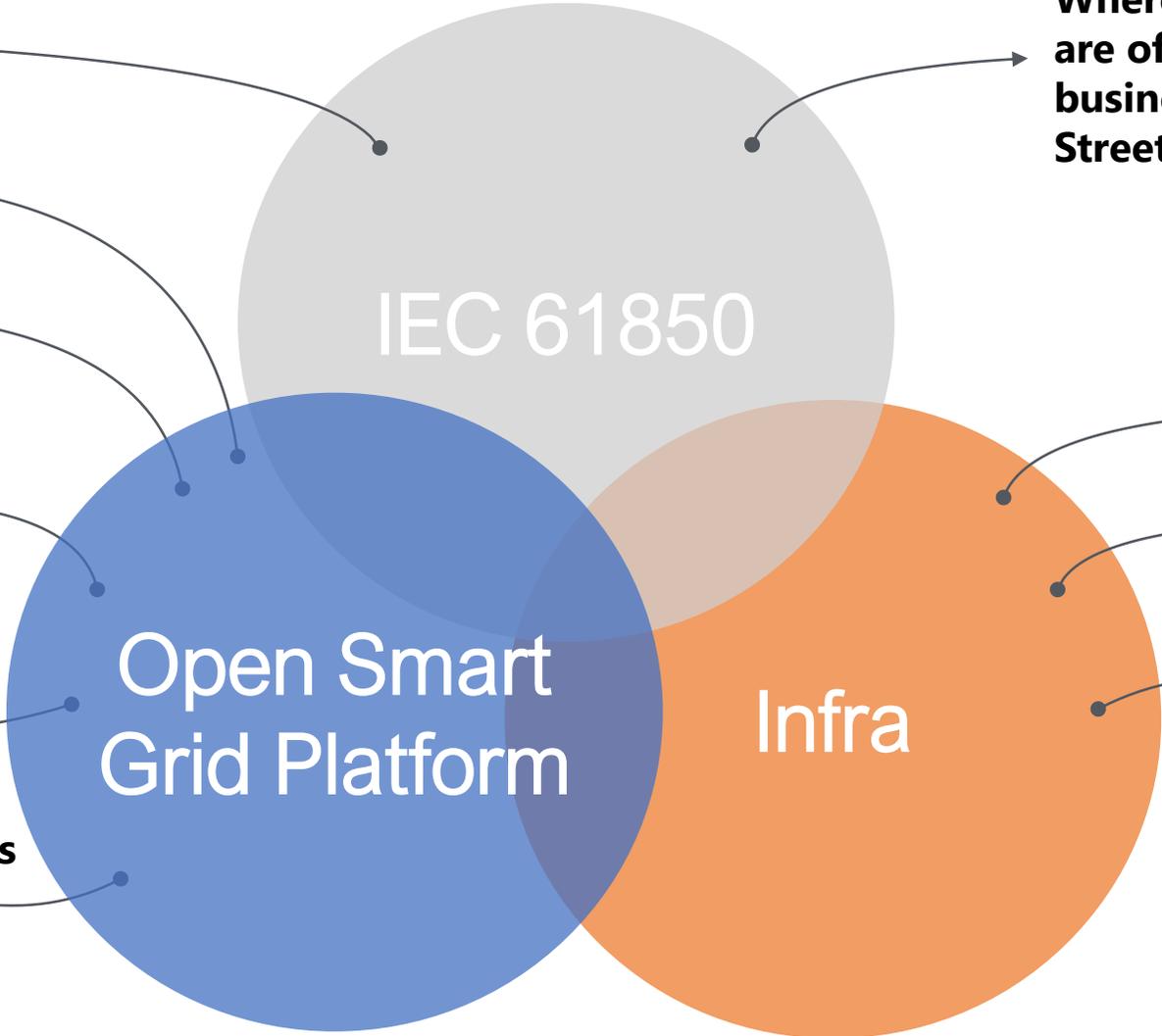
Messages from unknown devices are denied

Where substation networks are often segregated from business networks, Microgrid and Street light networks are not.

Private APN

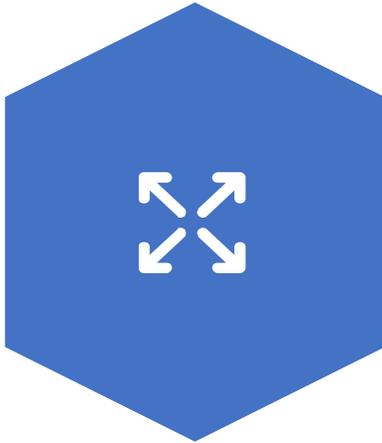
A fixed IP per device

Every connection is monitored



IEC 61850 future at Alliander

Idea's for follow up plans



More applications

More use of IEC 61850



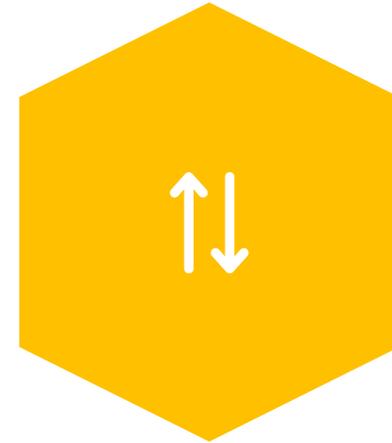
IEC 61850 webservices

Experiments with IEC 61850 webservices would be likely



IEC 61850 in DA

IEC 61850 will be applied in the distribution automation space



IEC 61850-CIM gateway

Ways of sharing IEC 61850 information with other IT systems with the IEC CIM

Recap





Questions?

Q & A

Questions and answers

Where can I find more information about Alliander, Smart Society Services and ZOWN?

<http://www.alliander.com/en>

<https://smartsocietyservices.com/>

<http://www.zown.eu/en/>

Where can I find the code and documentation?

<https://github.com/osgp>

<http://documentation.opensmartgridplatform.org/>

What parts are open source?

The Open Smart Grid Platform is fully open source. Most existing applications are not open source available. There is one open source demo application available.

How can I reach out to the speakers?

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