

VELUX EXPERIENCE WITH MQTT AS IIOT INTERFACE

SESAM Presentation

23/6-2020

Skjern/TEAMs



AGENDA

- **Who are we?**
- **Intro to the VELUX PackML interface**
- **Architecture drawing for using MQTT in Manufacturing**
- **The fun part! – Live demo**
- **Conclusion**

WHO ARE WE?

Kasper Korsholm Christiansen

Technology Coordinator – Digitalization & PackML
VELUX since 2007

Martin Skov

Senior software developer
VELUX Since 2003

Lasse Hamer Hedeby

Senior automation programmer
VELUX Since 2013

All employed in the Technology Centre in Skjern



The VELUX product programme ranges from complete skylight systems to roof windows, sun tunnels, blinds and shutters as well as home automation systems.

Sun tunnels



VELUX blinds and shutters



Smart ventilation



VELUX Modular Skylights



Roof windows



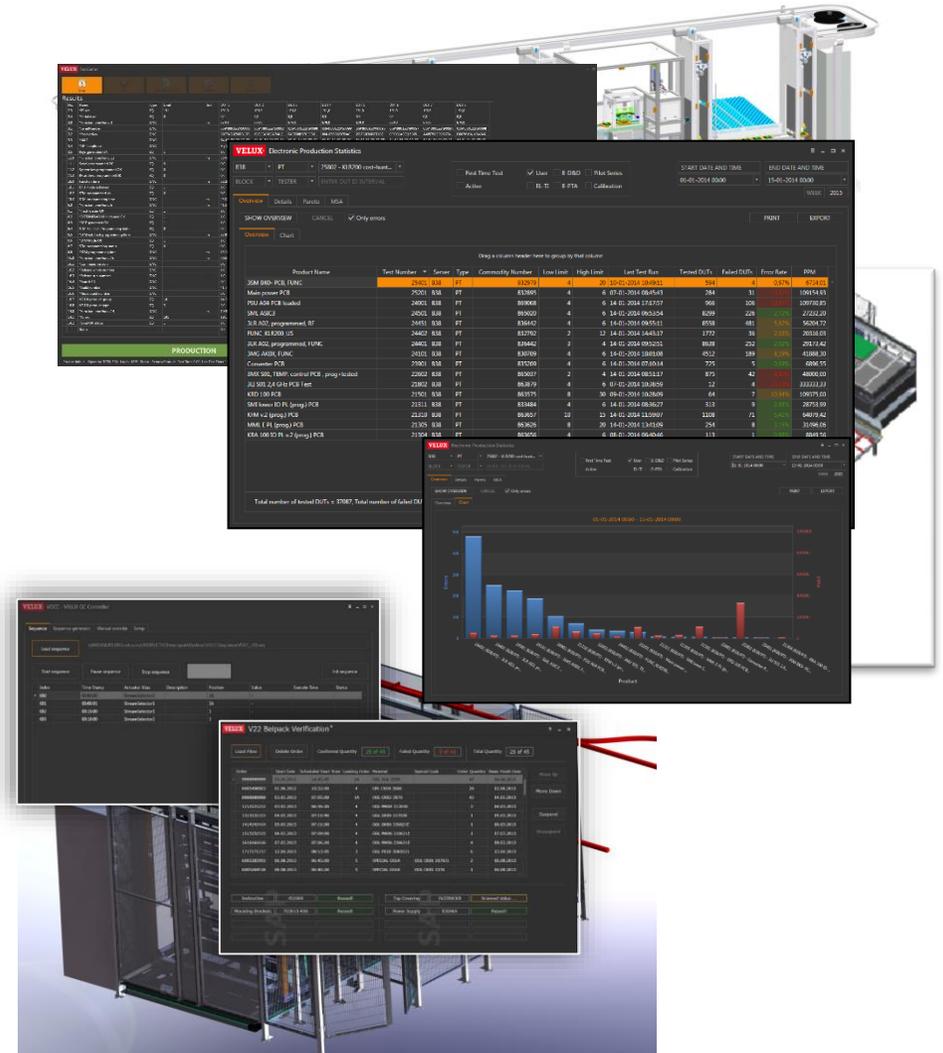
Flat roof windows



THE TECHNOLOGY CENTRE

Role

- Support the business in testing and developing new production technologies
- Support product development by testing and developing production method for new products
- Technologies can both be machines and software



THE VELUX "EXPERIENCE"

Disclaimer

- We don't have 100's of installations using MQTT as an IIoT interface
- **BUT**, we have the first installations running!
- **AND**, we see MQTT as a vital part in our digitalization journey in the future.
- **SO**, in this presentation we will show what we do today, and how we imagine to use MQTT in the future.

VELUX IIOT ARCHITECTURE/STRATEGY – HIGH LEVEL

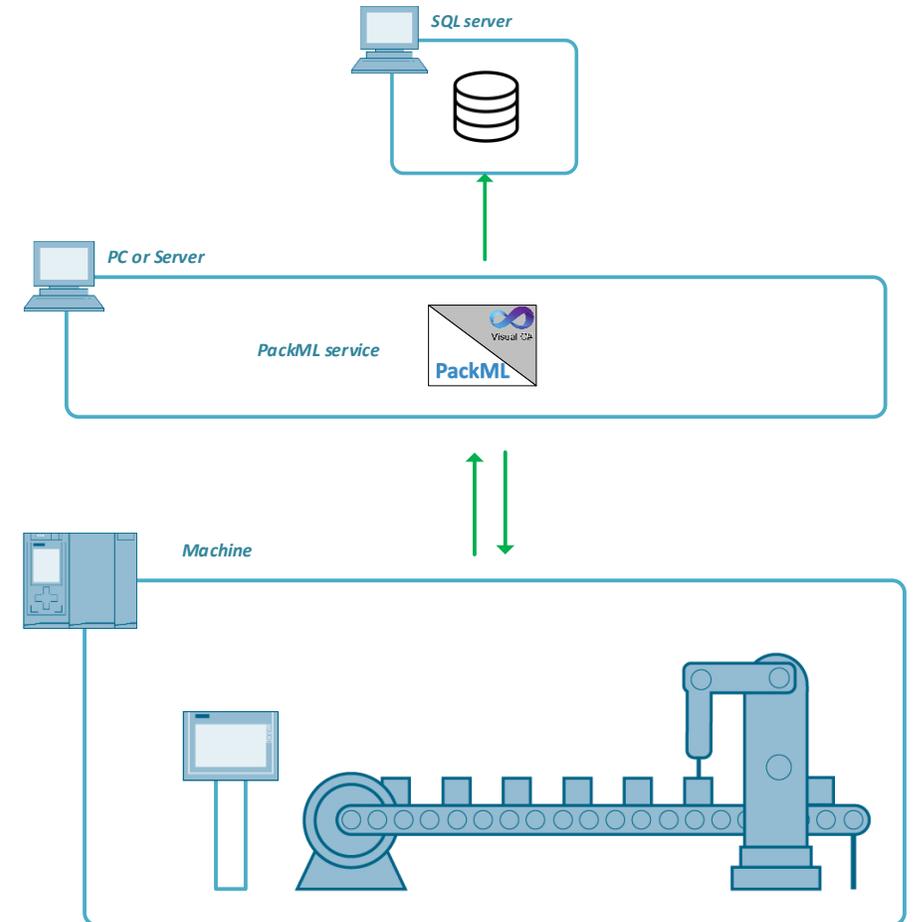
- Structure data at the shop floor, at first encounter
- Focus on standardizing interfaces
- Standardize the IT Architecture, not a specific software solution.
- Cloud

- One of the main components in this is the: **VELUX PACKML Interface**

THE VELUX PACKML CONCEPT

The VELUX PackML Interface

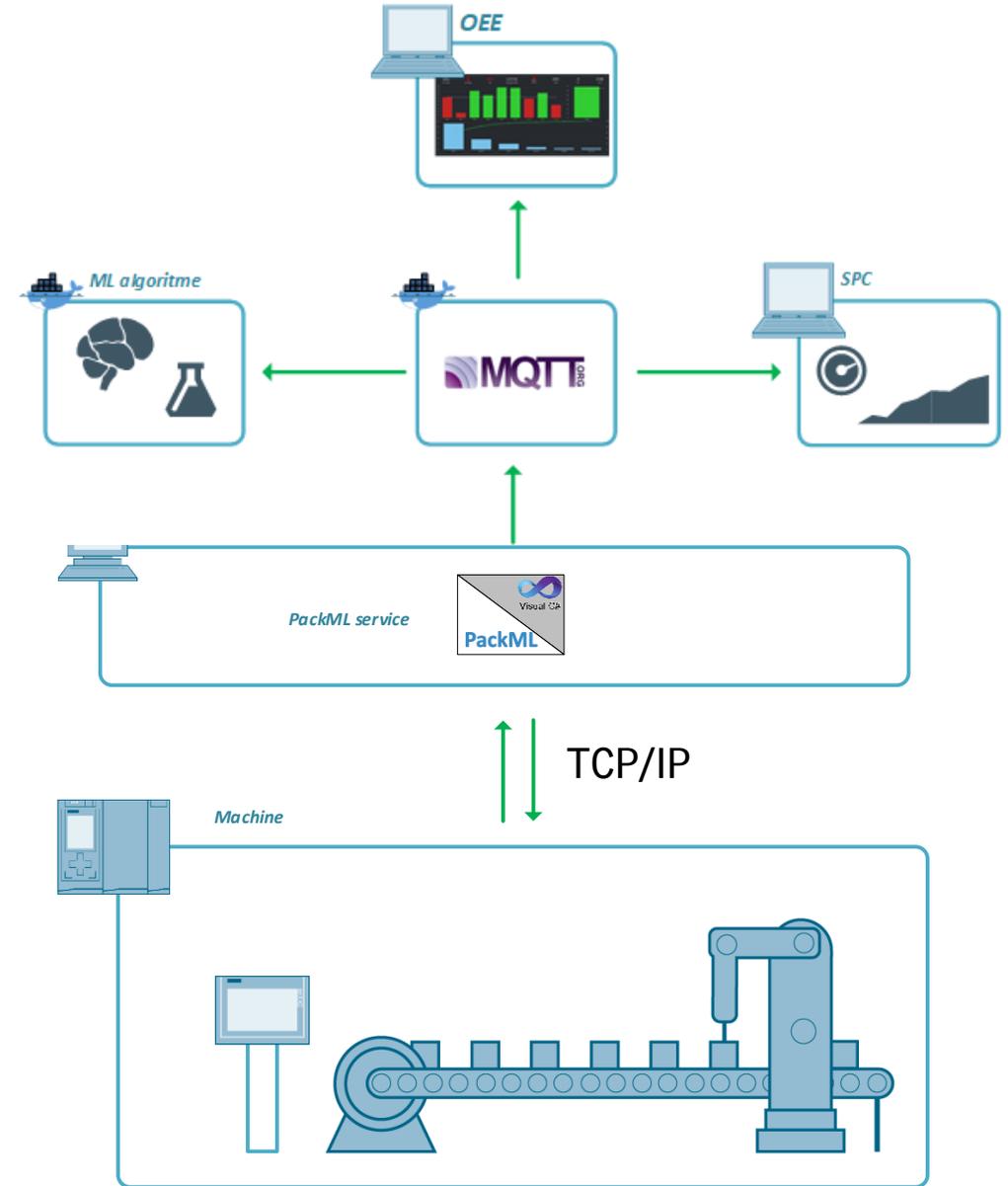
- It is basically a proprietary middleware, handling communication from machines/shop-floor both horizontally and vertically
- We started the development 5-6 years ago
- This interface has been used in approx. 250 installations
- The current version is running in 98 machines,
meaning 98 units will be able to support the architecture shown later without any changes in the PLCs



THE VELUX PACKML CONCEPT

What does it do?

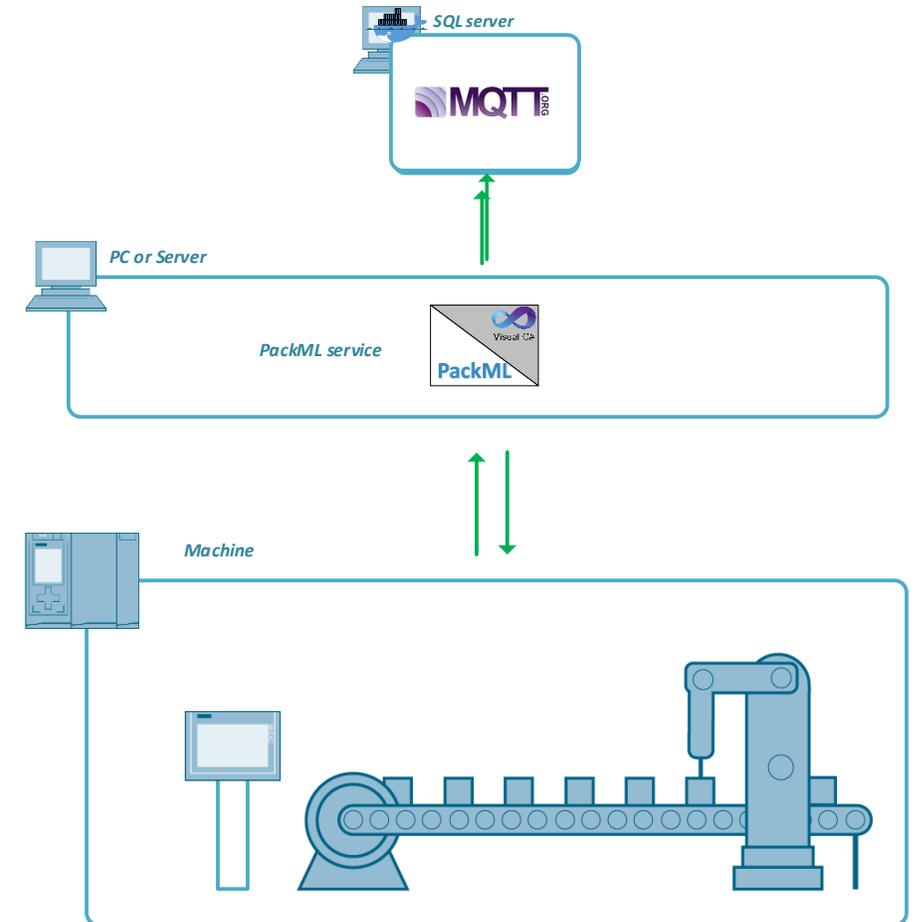
- We use a proprietary protocol using TCP/IP to talk to the PLC
- The communication is event based, where each event is defined as a telegram documented in a JSON file.
- The PackML service act as a data gateway between the machines and other systems
- The PackML service has built-in system integrations like
 - SAP, SMS & E-MAIL, SPC software, OEE software, MQTT
- It is in these integrations MQTT is a perfect match!



THE VELUX PACKML CONCEPT

The data model!

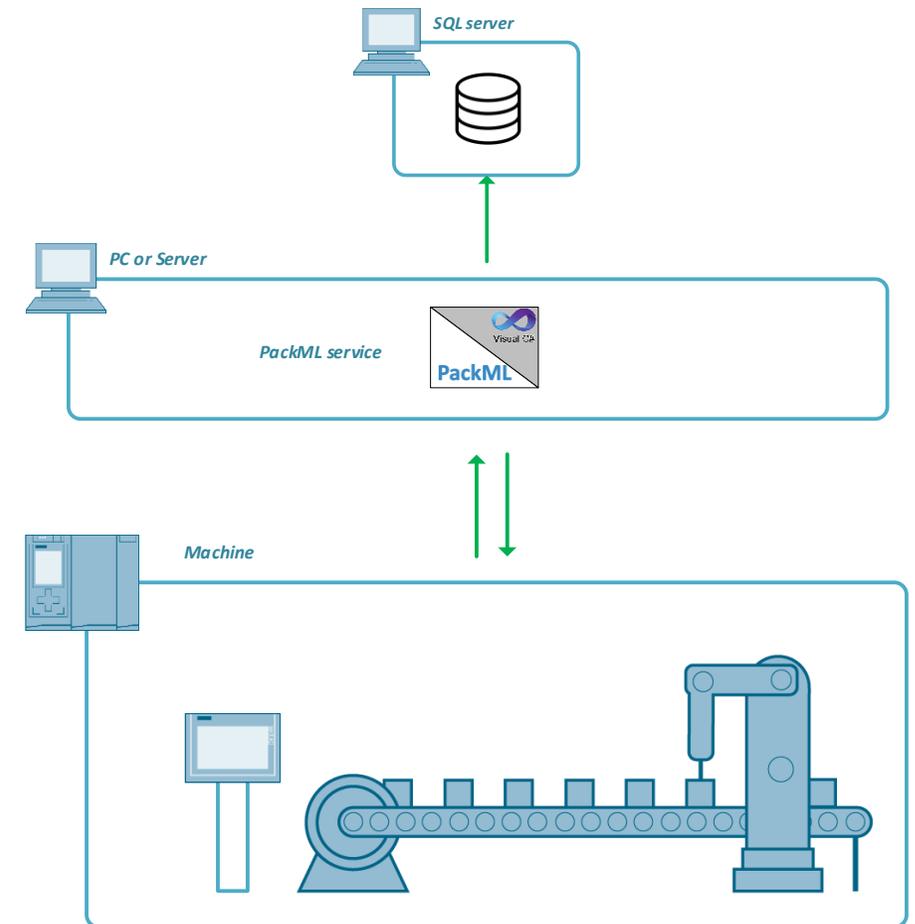
- The Interface PackML does not only provide a way to communicate, but also a uniform way to store data collected from machines
- Meaning that e.g. OEE data is stored in the same structure even though that the source of data is not the same
- You could say, that we have build our own VELUX Companion standard based on TCP/IP and documented in JSON instead of OPC UA.
- It is the same uniform data model, that we until know has used to store data in SQL servers, we know can broadcast as MQTT messages.



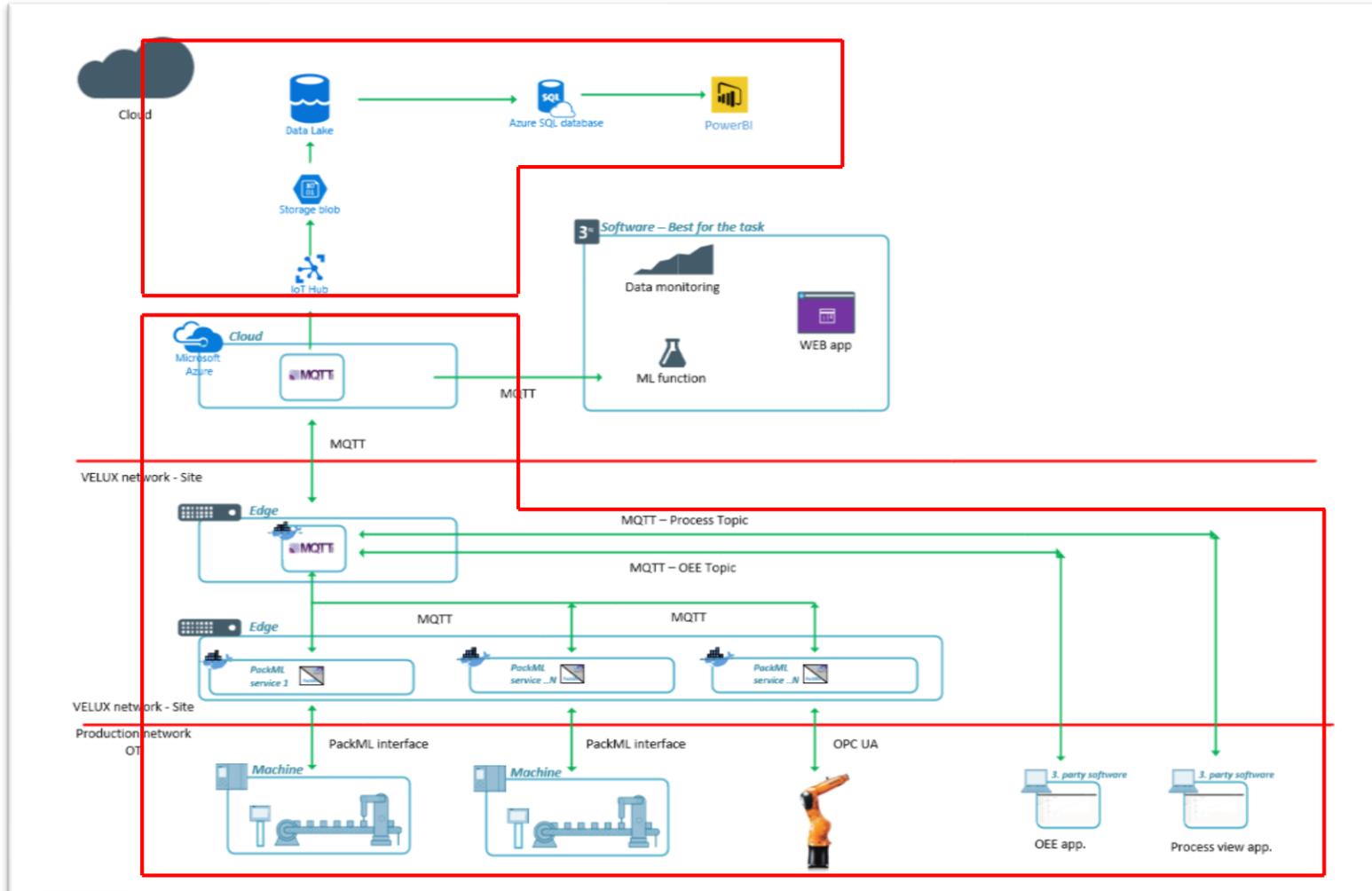
THE VELUX PACKML CONCEPT

Benefits with VELUX PackML Interface

- Our machine suppliers only need to know ONE interface!
- The PackML service is controlled by VELUX, so **WE** are in control of connections and credentials, and data distribution
- We put data into right context at the shop floor, no data transformation
- There is **NO** project logic in the PackML service layer
- Each installation is a self contained eco system.
- Fits well with our IT strategy about moving towards edge/cloud



ALMOST MOST ARCHITECTURE



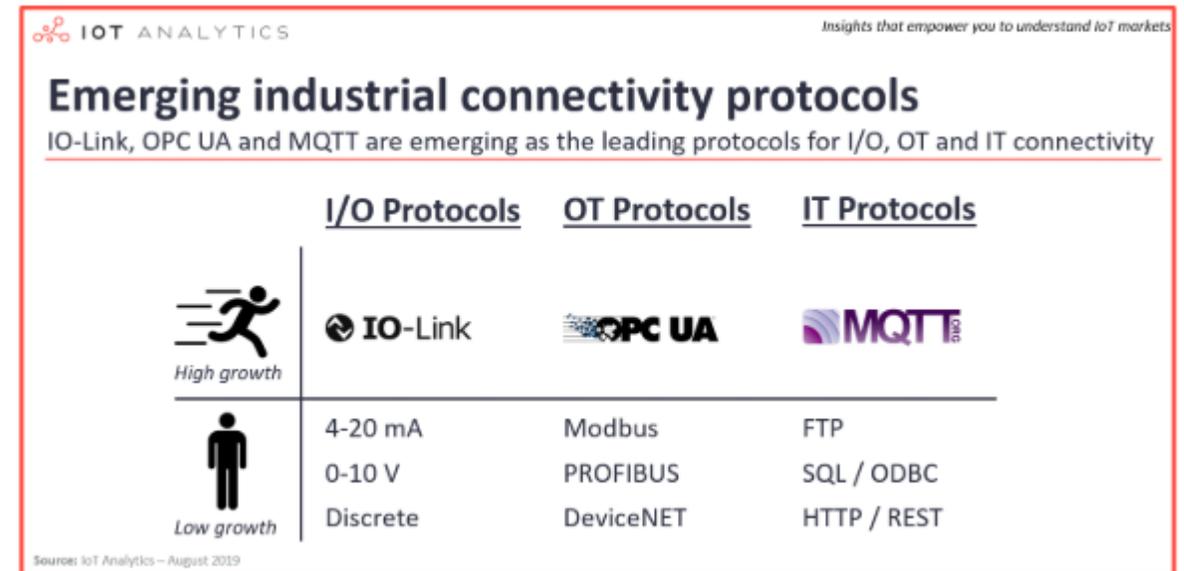
Being build at the moment

Already built and in use, and we will show this during the live demo

LIVE DEMO

MQTT VS. OPC UA

- We don't see OPC UA and MQTT as to battling each other
- We see two different protocols with different purposes.
- We see OPC UA as a OT protocol which has it force in connection equipment at the OT level in a easy way
- And MQTT as an IT protocol which is easy to use when interfacing with IT solutions.



<https://iot-analytics.com/5-industrial-connectivity-trends-driving-the-it-ot-convergence/>

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