



# Unlocking existing data from assets to make maintenance more plannable



# OpenIndustry 4.0 Demonstration Project

@ Flow Center of Excellence

## Purpose:

**Asses** if compliance to OI4 publications provides a generic means to onboard devices/sensors and providing Northbound data communication

**Evaluate** what the advantages and disadvantages are of aligning to the OI4 publications

**Show-case** the demonstrator to industry and share lessons learned (industry and education)



*Dordrecht – The Netherlands*

## Partners:





# Field to Cloud

In a real process industry setting



Supported By:

**Innovation  
Quarter**

*Invest & Innovate in  
Greater Rotterdam-  
The Hague*

**SMITZH**

Unlocking data from the field, 4-20mA + HART, HART IP, IO-Link, from pressure transmitters, flow transmitters, control valves, motors, pumps (brown and green field)

Also including hardware from other OI4 members: Endress+Hauser, Balluff, Hilscher, WAGO and non members such as Krohne, Honeywell



# Implementing the Reference Architecture

Multi vendor, multi protocol



ISO/IEC 20922:2016  
 MQTT  
 docker  
 DIN SPEC 27070.

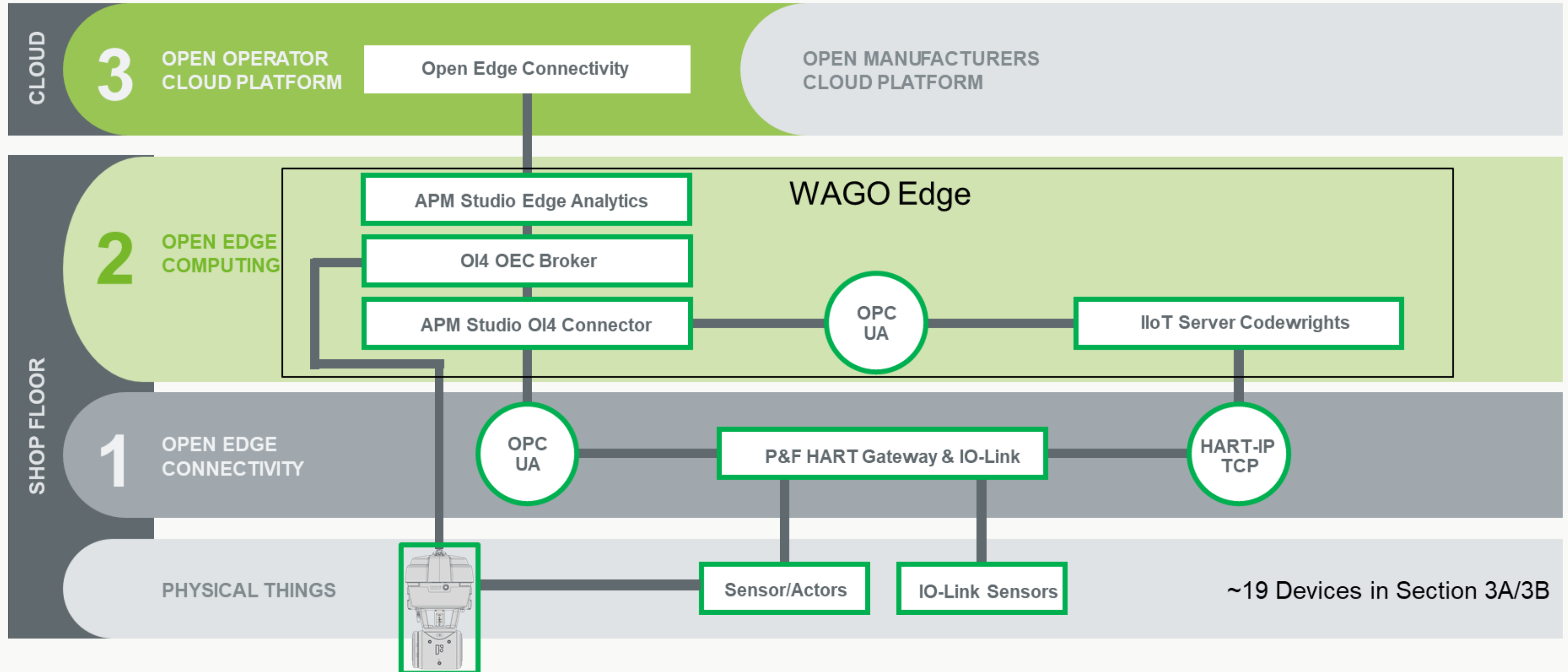
**BALLUFF** **econosto** **SAMSON** **Honeywell** **KROHNE** **Endress+Hauser** **EH**





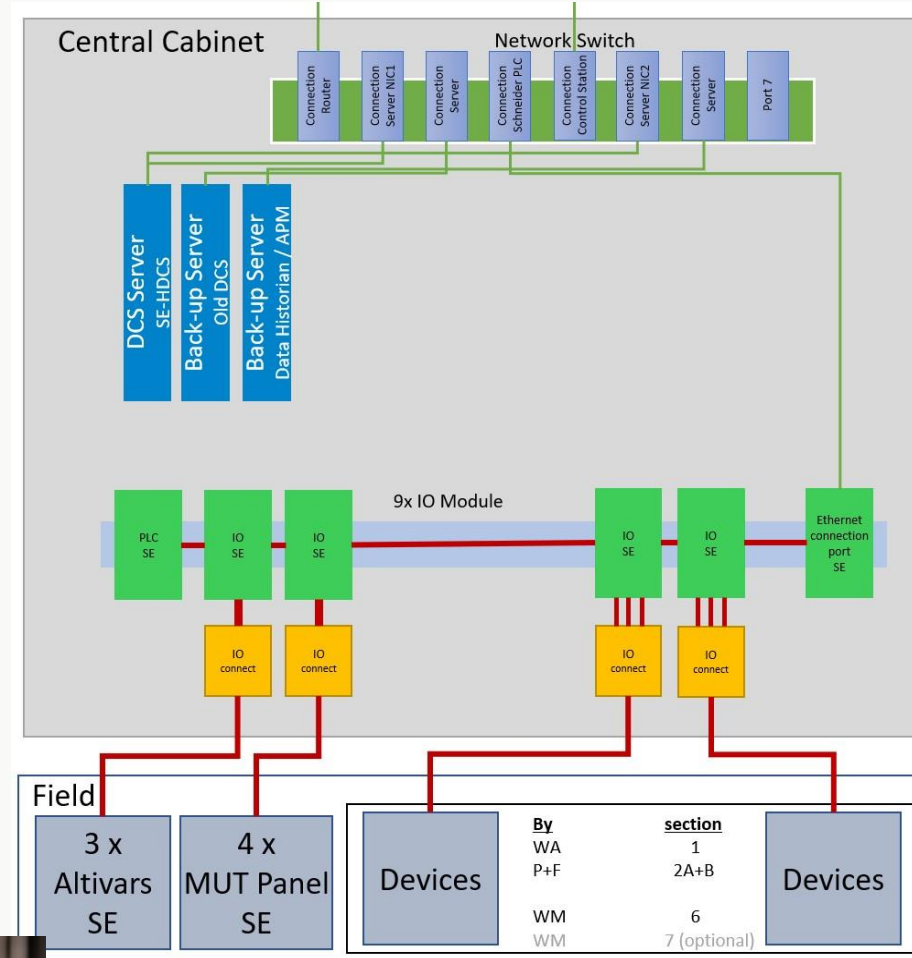
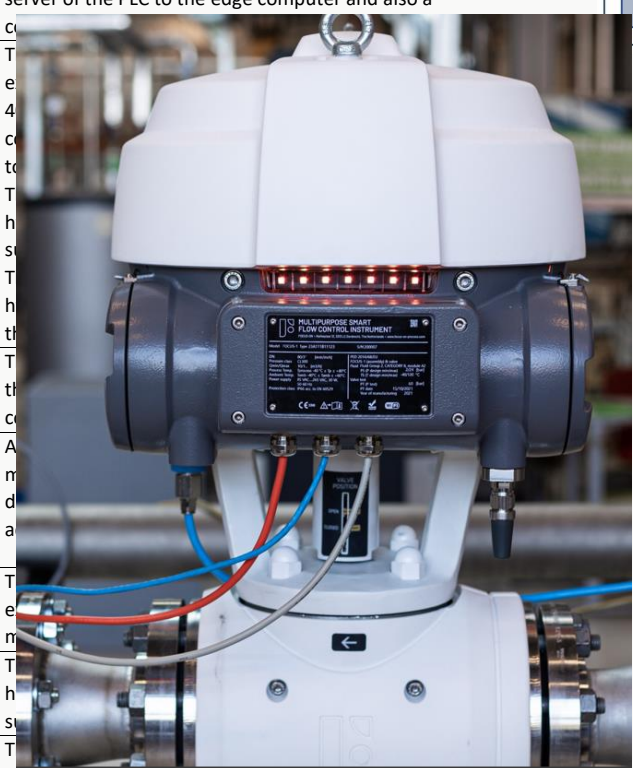
# Experience the Openness !

Live demo



# Live Demo

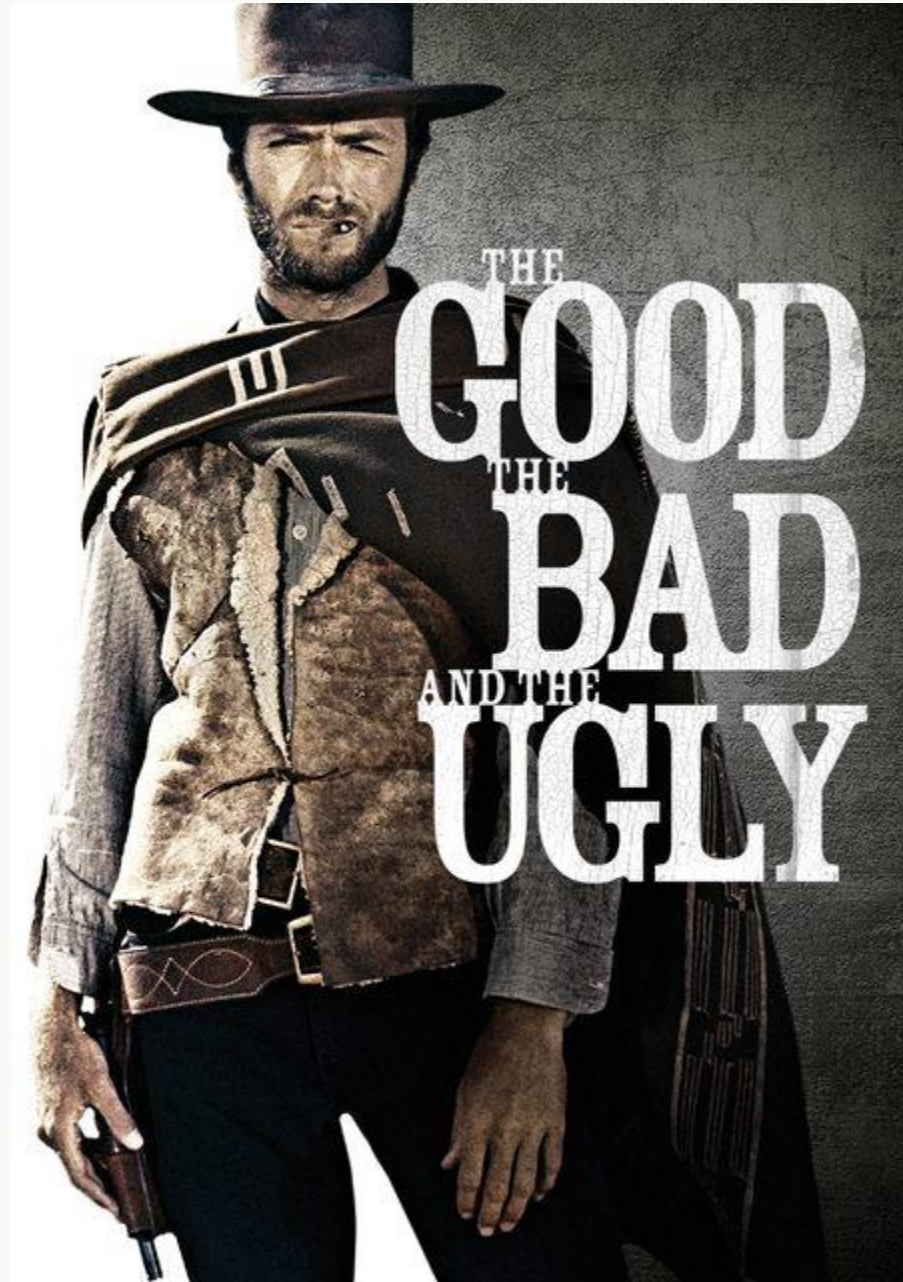
Pepperl+Fuchs	Base Backplane	LB9023BP08110.1	2	This is a base backplane for several different IO cards as well as a gateway and a power supply.
	Power supply	LB9006C	2	This is the power supply that belongs to the backplane.
	Universal Input/Output card	LB7104A	6	This IO card can read several analog or digital input values. It fits on the backplane and enables to read and write HART commands.
	Gateway for PROFINET	LB8122A.1.EL	2	This is the gateway that fits on to the backplane. It enables Profinet communication as well as a separate HART-IP port.
	IO-Link master	ICE2-8IOL-K45S-RJ45	1	This IO-Link master can connect to any IO-Link device, communicating via OPC UA
CodeWrights	IIoT Server	Not Available	1	This specific software acts as a HART-IP client and can publish the data on an OPC UA server. It automatically detects devices and reads all available data from them. This software is still in development and therefore not commercial available.
Wago	Edge Controller	752-8303/8000-002	1	This is the edge controller on which all data streams are combined. It runs a docker instance on it, which has several containers.
	Controller PFC	750-8210	1	This is the controller PLC which is connected to different module cards. On it runs a PLC program which reads the different HART and IO-Link data.
	2 Channel Analog module	750-482	4	This module card is connected to the controller PLC. It can read a total of 2 different HART channels.
	IO-Link-Master module	750-657	2	This module card is connected to the controller PLC. It can read a total of 2 different IO-Link channels.
M&M Software	OPC UA & Cloud connector	Not Available	1	M&M provided software to connect the OPC UA server of the PLC to the edge computer and also a



# Lessons Learned

## The Good, The Bad The Ugly



### The Good:

- OI4 OEC Guidelines work! – No Integration Hassle
- Plug and Play, Achieve Openness and Interoperability in hours
- Realize Condition Monitoring/Predictive Maintenance at Edge and Cloud (SAP & Ultimo)

### The Bad: 😊 None!

### The Ugly: Time delays .. Electronics shortages





# Next Steps ?

It does not stop here!

**AAS:** Implementing the OI4 reference implementation of the Asset Administration Shell (AAS). This is used to describe an asset electronically in a standardized manner. Its purpose is to exchange asset-related data among industrial assets and between assets and production orchestration systems or engineering tools.

**APL:** Implementing the IEEE 802.3cg-2019 (10BASE-T1L) standard using Ethernet over the process industry's last mile – providing connectivity with broadly distributed, two-wire, loop-powered field instruments

**SECURITY:** Investigating attack possibilities/vulnerabilities in converged IT/OT networks using anomaly detection techniques on network data and sensor data

**5G and CLOUD:** Set-up of Hybrid Cloud solution using the Micro Data Center on the roof of the DZHF and integrating with SAP IOT and SAP PAI





● ● ● ● ● ● ●

# Come Visit?!

Experience the OI4 Demonstrator in Dordrecht





# Q&A



Jules Oudmans  
[joudmans@ureason.com](mailto:joudmans@ureason.com)

