OILFIELD OPERATIONS – WELLHEAD ANALYTICS

SPE-GCS Digital Transformation Study Group

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Agenda

OMV Pilot

- Market Conditions
- Pilot Description
- Results

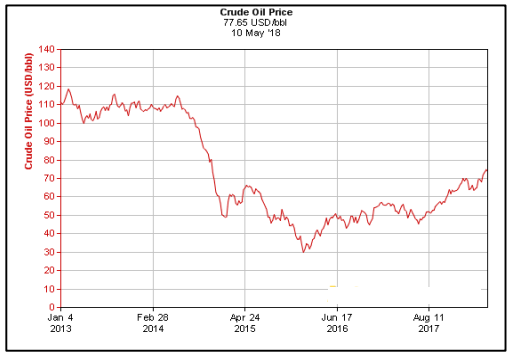
The next generation automation @ the edge

- The Open Automation Forum
- UWC – Universal Well controller

Oil & Gas Market Conditions

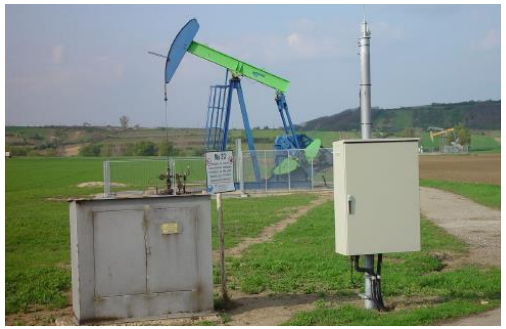
Market Conditions

- Oil & Gas Price dropped by 50% since 2014
- Production Decline in mature Assets
- Cost pressure demands efficiency increase and business transformation



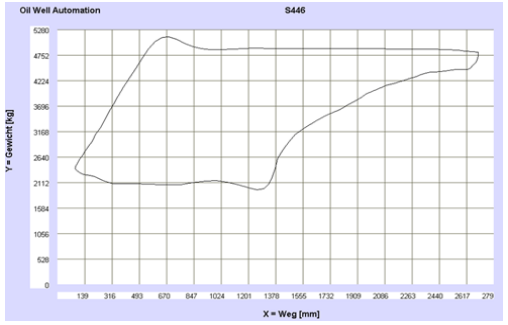
OMV Situation (Austria)

- 1.000 wells spread over 2.400 km²
- 47% of „good“ wells online (Alarms & I/O)
- 53% „stripper wells“ without communication
- Well monitoring through regular on site visits



Challenge

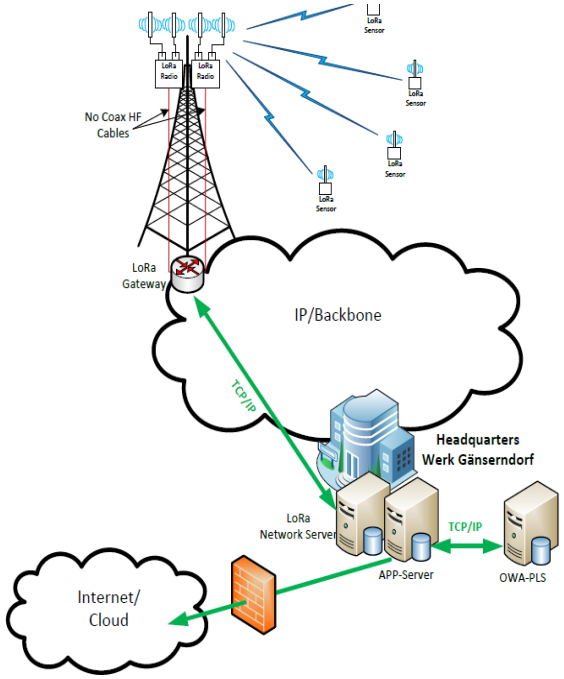
- Connect the unconnected @ low cost
- Allow Production Optimization through innovation



Oil Well Pilot

before

- No data transmission
- Well monitoring through operator
- Production optimization based on well tests and manual checks



after

- Data communication
- Online Well monitoring
- Reduction of deferred Production through alarms
- Production Optimization through online Dynacard (from Power metering)

Future Field Operations – Beam Pump

Integrated, Smart & Scalable

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Ingenuity for life

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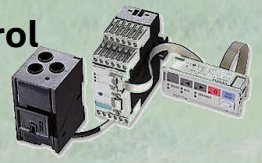
OMV

1 Smart Motor Control
covering all safety/automation functionality and power measurement



2 IoT gateway / Edge Analytics

- Industrial Intel®-based gateway
- Soft sensing
- Alarming

3 Connectivity

- WLan, 3G/4G, LoRa,WIMAX
- Intel®-processor ruggedized tablet
- Industrial Cloud

4 Power supply:
Complete equipment for power supply

Future Field Operations

Doing things differently: scalable, more efficient

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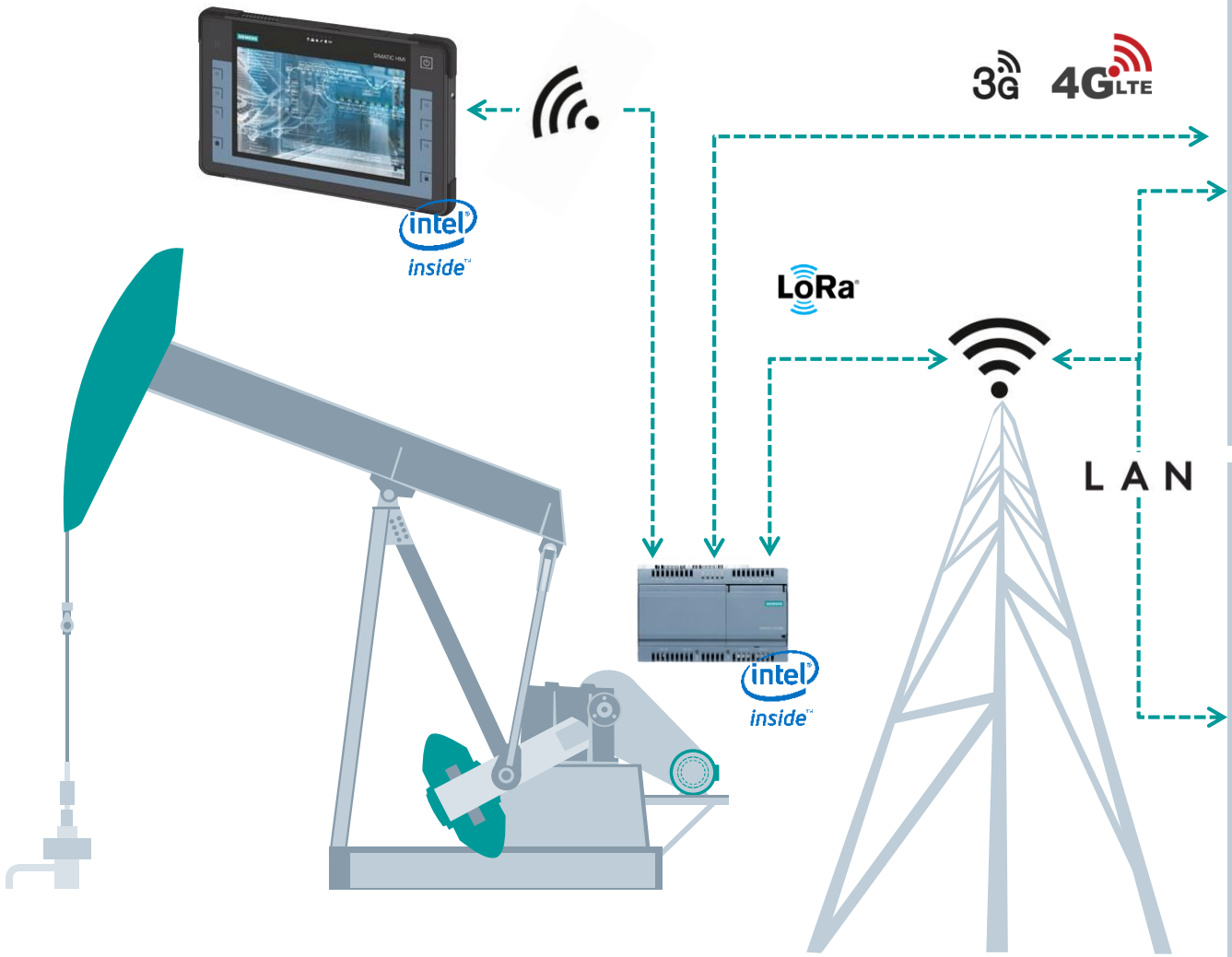
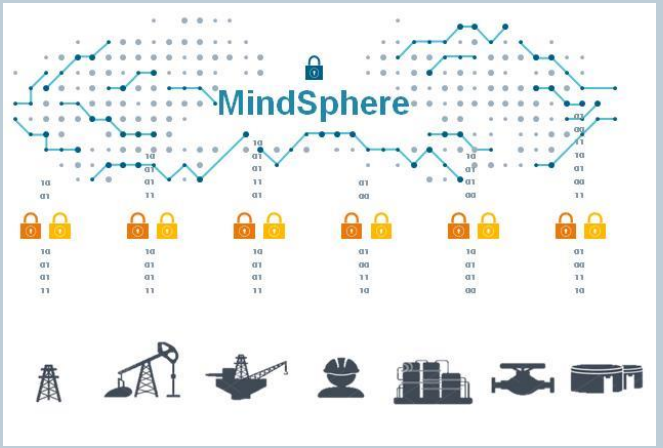
OMV



IoT Platform + Domain Solutions



- Reservoir Monitoring
- Optimization of production
- Neighborhood Analysis/ Drilling Optimization
- Optimization of energy consumption
- Future Service concepts
- Video Surveillance
- Learning Systems

Control room / SCADA

- Monitoring
- Alarms
- Software upgrades
- Central shutdown

Future Field Operations – Beam Pump

Safety, Flexibility, Minimizing Hardware

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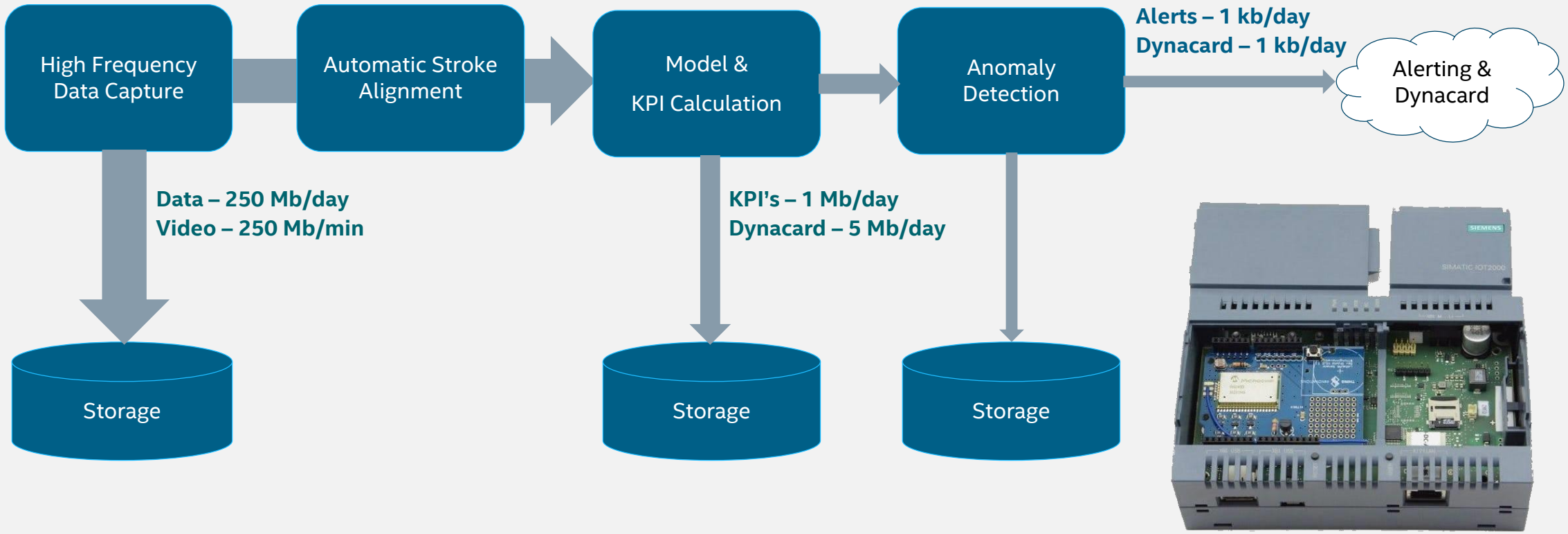
1. Switch disconnectors
2. Fuse disconnector (s) Motor
3. Fuse disconnector Service Power

4. Power contactor
5. SIMOCODE current measuring module
6. Current transmitter

7. Power supply unit control voltage
8. SIMOCODE Motor Management, Control and Protection
9. Ripple control receiver
10. IPC227E Gateway/Lora/WLAN
11. Intrinsic save barriers
12. Option: Power socket service tablet

13. Option: Weighing electronics
14. Option: 3G/4G router

Edge Analytics Enables Local Independent Operations and Minimizes Load on Backhaul



Edge Analytics Enables Efficient Operations and Situational Awareness for Field Operations

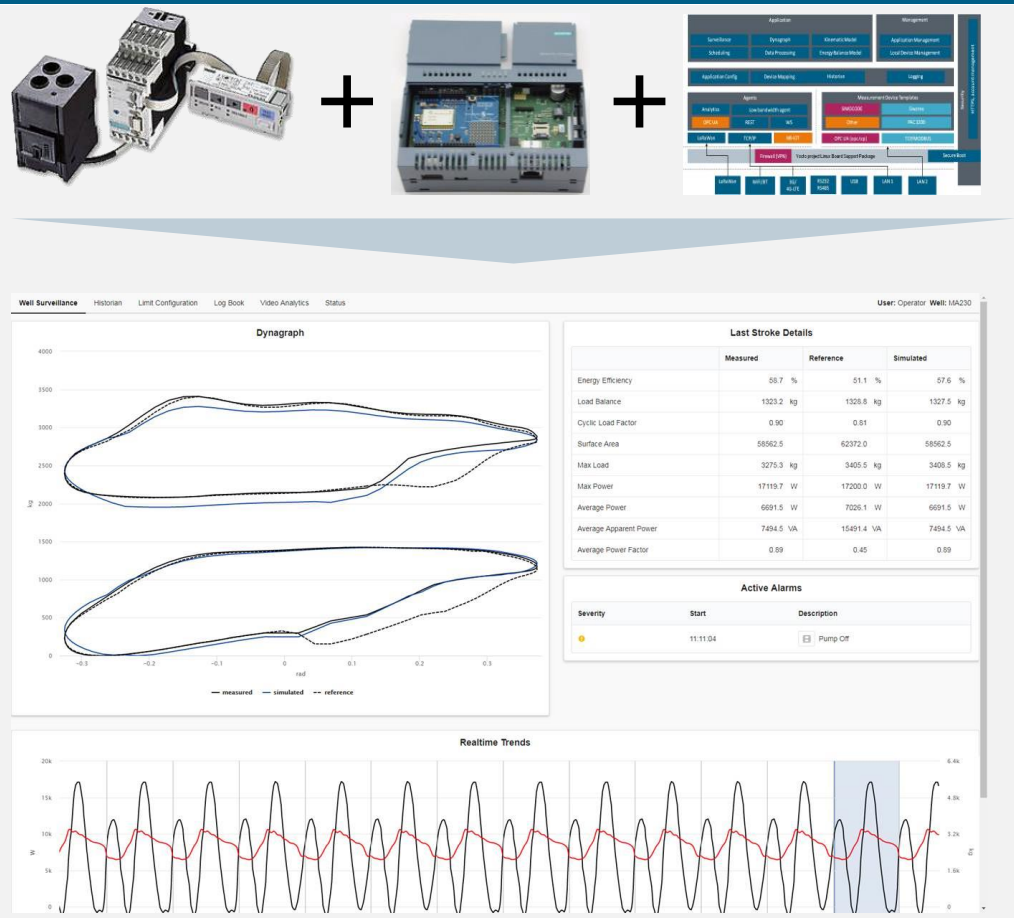
Functionality of Edge Device

- **Advanced Analytics**
  - Real-time Pump Energy model
  - Soft sensing of surface and pump Dynacard
  - Video enabled inclinometer
  - Near Real-time Calculation of key well performance indicators
  - Exception based surveillance with video integration

- **Fully Interactive Web portal**
  - Near Real-time Surveillance Dashboard & History screen
  - Operator Logbook

- **Closed loop control**
  - Remote Start Stop
  - Pump off controller

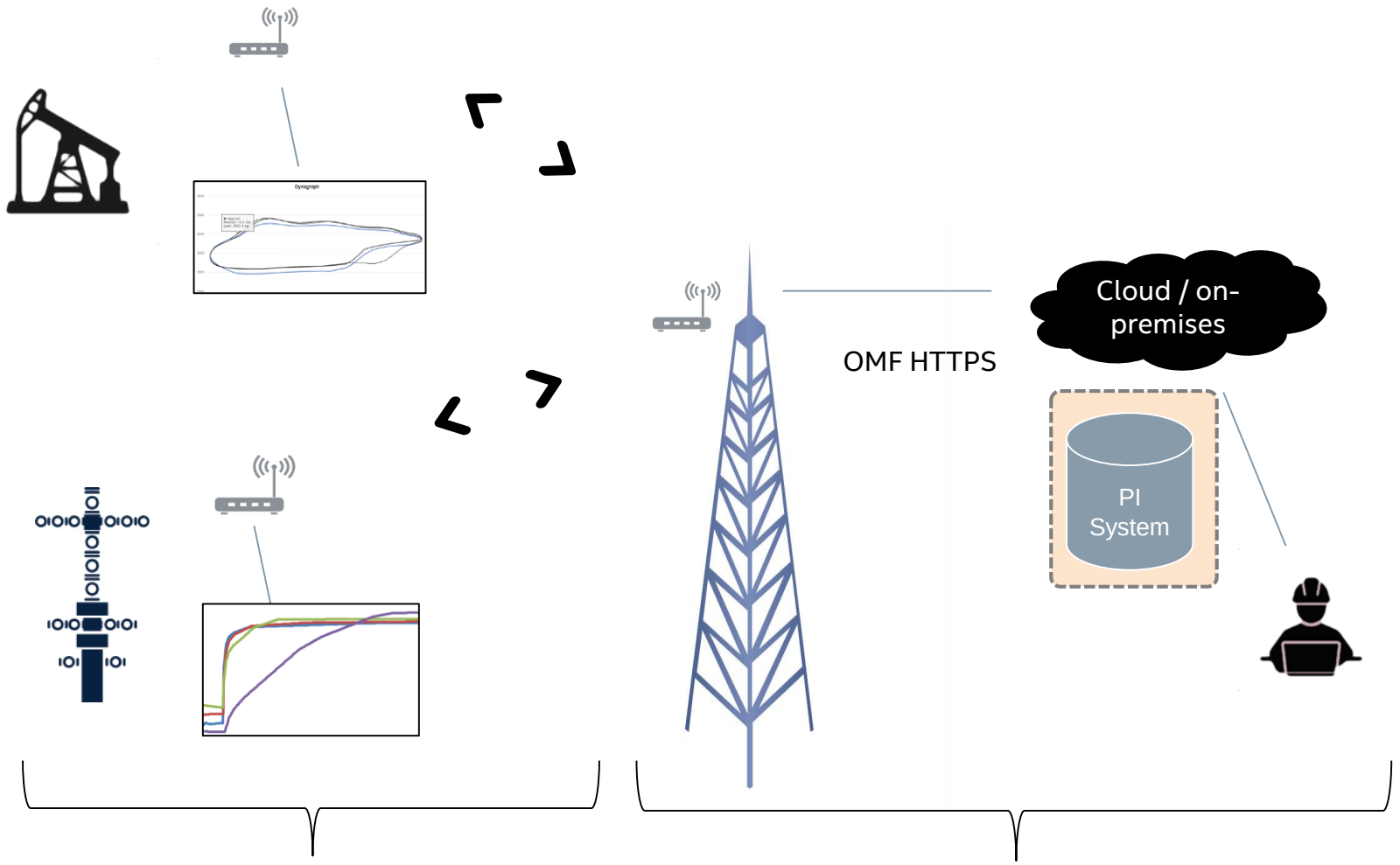
- **Cloud Integration**
  - Transfer of KPI's/alarms to Siemens MindSphere
  - Secure Cloud Connectivity (LoRa,3G,4G,LTE,Wimax)



Well Performance & Surveillance IoT solution concept

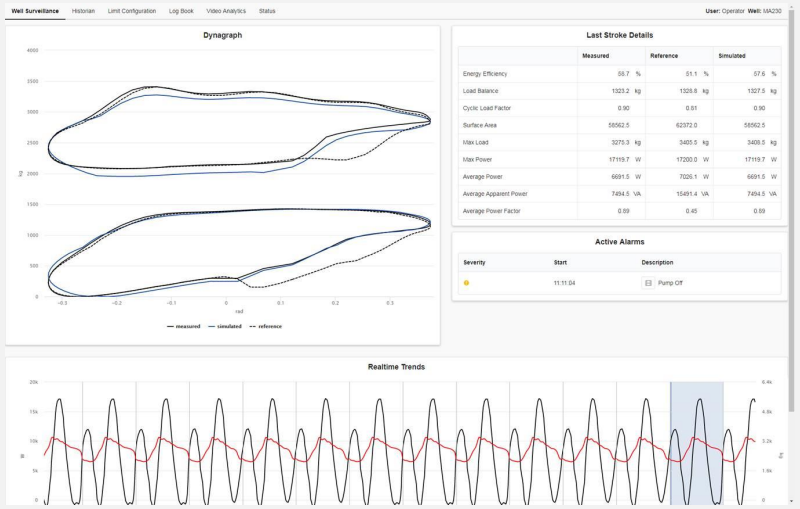
Benefits:

- Alternative solution for field automation
- Strong vertical integration at low cost without SCADA / OPC
- Bring advanced logic to the well
- Low cost for installing instrumentation
- Data become available in the traditional PI Historian
- Smart Mobile worker use case



Proven End-to-end Beam Pump Monitoring/Automation Solution at Lower TCO (Total Cost of Ownership)

Proven values



- ✓ Production optimization
- ✓ Early production losses identification
- ✓ Minimized well interventions/workovers
- ✓ Maintenance optimization
- ✓ Relief field personnel

WHAT IS NEXT FOR AUTOMATION?

The Open Process Automation™ Forum

The Open Process Automation™ Forum is focused on developing a standards-based, open, secure, interoperable process control architecture.

The Forum is a consensus-based group of end users, suppliers, system integrators, standards organizations, and academia. It addresses both technical and business issues for process automation.

A standards-based, open, secure, and interoperable process control architecture that:

- Enables access to leading edge capability
- Allows integration of best-in-class components
- Preserves asset owners' application software; Significantly lowers cost of future replacement
- Employs an adaptive intrinsic security model
- Promotes innovation and value creation
- Applies across multiple process industries
- Is commercially available
- Is an inclusive collaboration between users and suppliers to provide the framework for an open systems architecture innovation and value creation

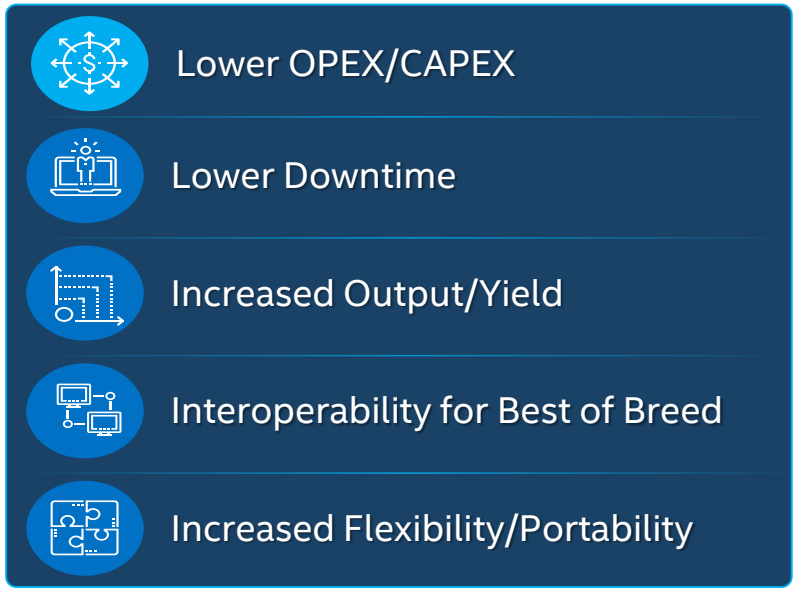
http://www.opengroup.org/open-process-automation

THE OPEN GROUP
OPEN PROCESS AUTOMATION™ FORUM

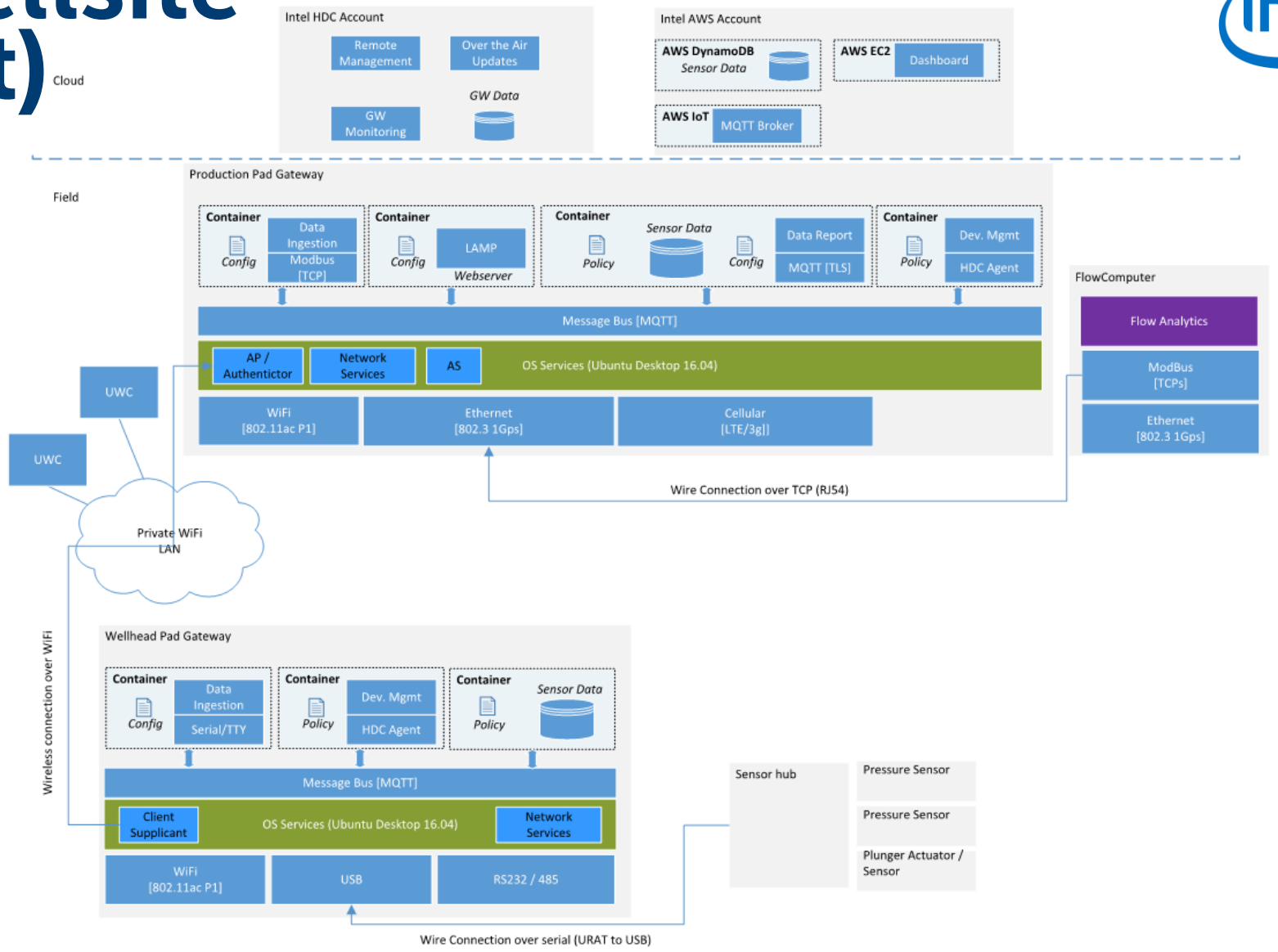
Universal Wellhead Controller (UWC)

Goal

- Develop an UWC (Universal Wellhead Control) that can securely and economically monitor and control onshore/offshore production wells and surface production facilities using off-the-shelf HW and open architecture SW from multiple vendors that can integrate into a single UWC.
- Solution must specifically address cost of life cycle management, inter-operability, obsolescence and control through all phases of the wellhead production cycle (from free flowing high production to secondary recovery and low production).
- Wellhead data must be securely accessible across entire organization.



Example Wellsite (Plunger Lift)



Thinking of Developing an Edge Platform?

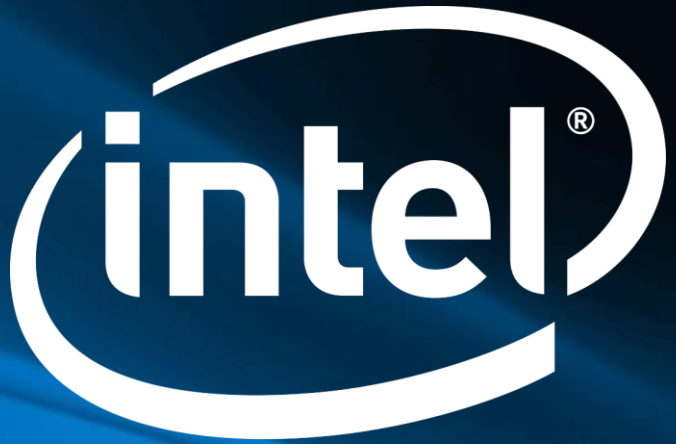
See the following Open Source Initiatives

AKRAINO EDGE STACK

www.akraino.org

ACRN

www.projectacrn.org



experience
what's inside™