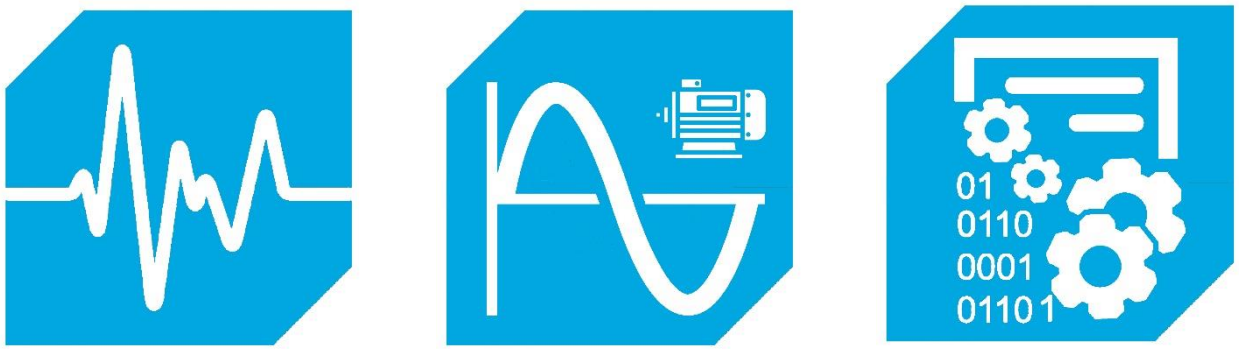
iQunet®

Asset & Condition Monitoring

with iQunet intelligent IoT Edge



iQunet®

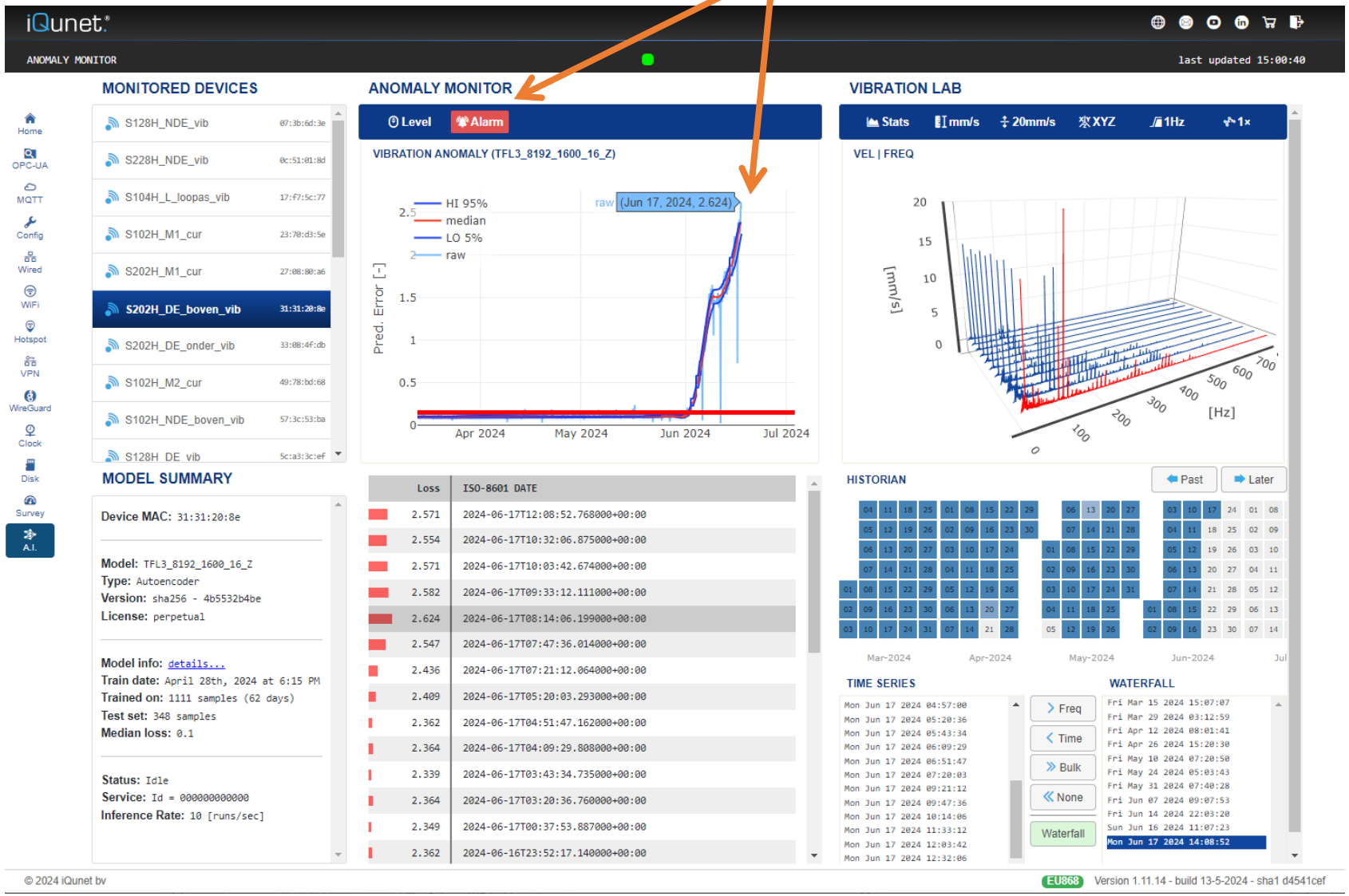
Use case:

- **Waste treatment**: ballistic separators, waste conveyors
- **Monitoring of critical bearings** on drive axes of multiple machines

- **Installed monitoring**
  - 3-AX iQunet wireless vibration sensors
    - Battery powered
    - Magnet base
  - ESA iQunet current clamps on motor phases (elec. cabinet)
    - Clamp over IE current transformers
    - Wireless bridge
  - iQunet server to collect all wireless data from all sensors
  - Installed AI monitoring (on real sensor produced data)
  - Analytic dashboards

AI dashboard - S202H_DE_boven_vib 31:31:20:8e

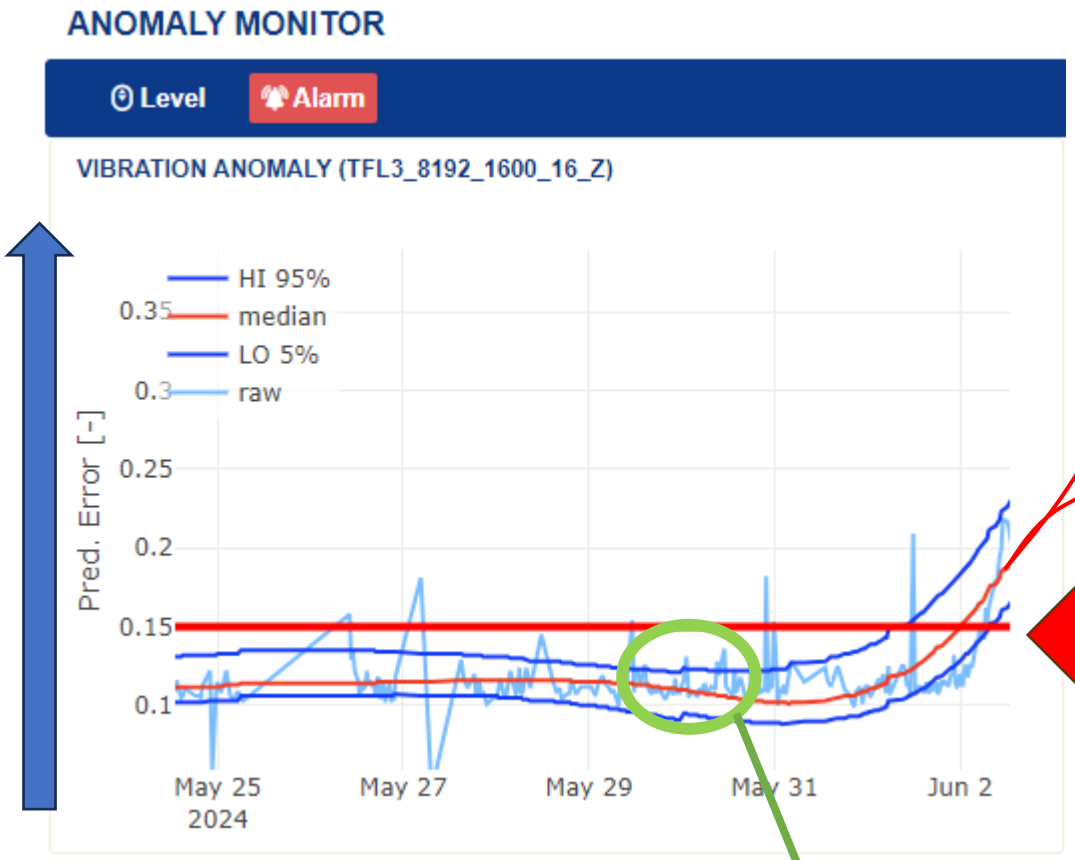
AI Anomaly Detection – ALARM



AI dashboard - S104H_R_aandrijfas_vib d7:3f:25:90

AI Anomaly Detection – ALARM

Anomaly score : difference between expected (or normal) behavior and what is actually observed



Trend steep upwards:
Immediate action required

Trend slowly upwards:
Close follow up

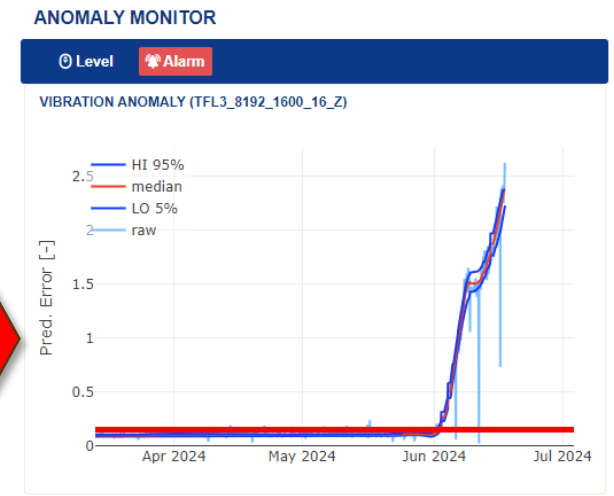
All anomaly trends 5/50/95% certainty
well above set level

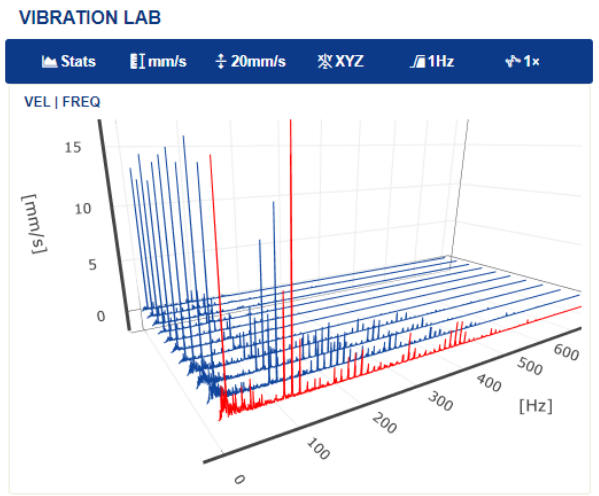
Each (raw) graph data point = "AI-score" of 1 complete time series (or one vibration measurement in this case)

AI dashboard - S104H_R_aandrijfas_vib d7:3f:25:90

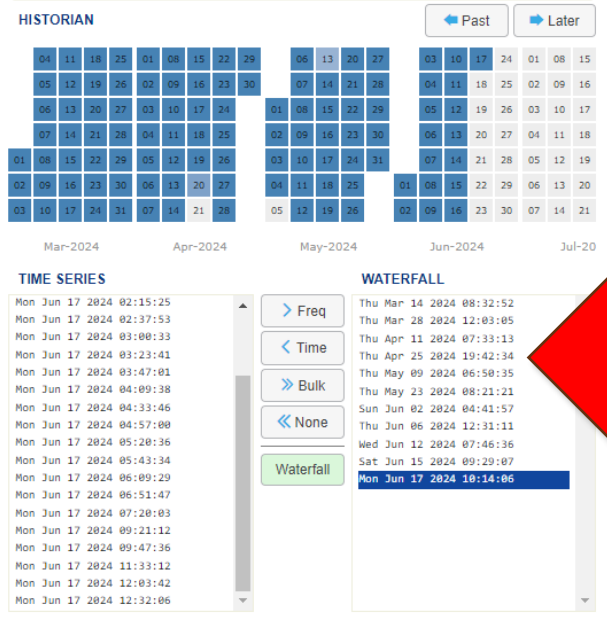
AI Anomaly Detection – ALARM

Steep trend curve showing short remaining useful lifetime.
IMMEDIATE ACTION REQUIRED





Loss	ISO-8601 DATE
2.554	2024-06-17T10:32:06.875000+00:00
2.571	2024-06-17T10:03:42.674000+00:00
2.582	2024-06-17T09:33:12.111000+00:00
2.624	2024-06-17T08:14:06.199000+00:00
2.547	2024-06-17T07:47:36.014000+00:00
2.436	2024-06-17T07:21:12.064000+00:00
2.409	2024-06-17T05:20:03.293000+00:00
2.362	2024-06-17T04:51:47.162000+00:00
2.364	2024-06-17T04:09:29.808000+00:00
2.339	2024-06-17T03:43:34.735000+00:00
2.364	2024-06-17T03:20:36.760000+00:00
2.349	2024-06-17T00:37:53.887000+00:00
2.362	2024-06-16T23:52:17.140000+00:00
2.387	2024-06-16T23:29:25.419000+00:00
2.395	2024-06-16T23:07:16.503000+00:00
2.413	2024-06-16T22:42:44.177000+00:00
2.331	2024-06-16T22:00:53.232000+00:00



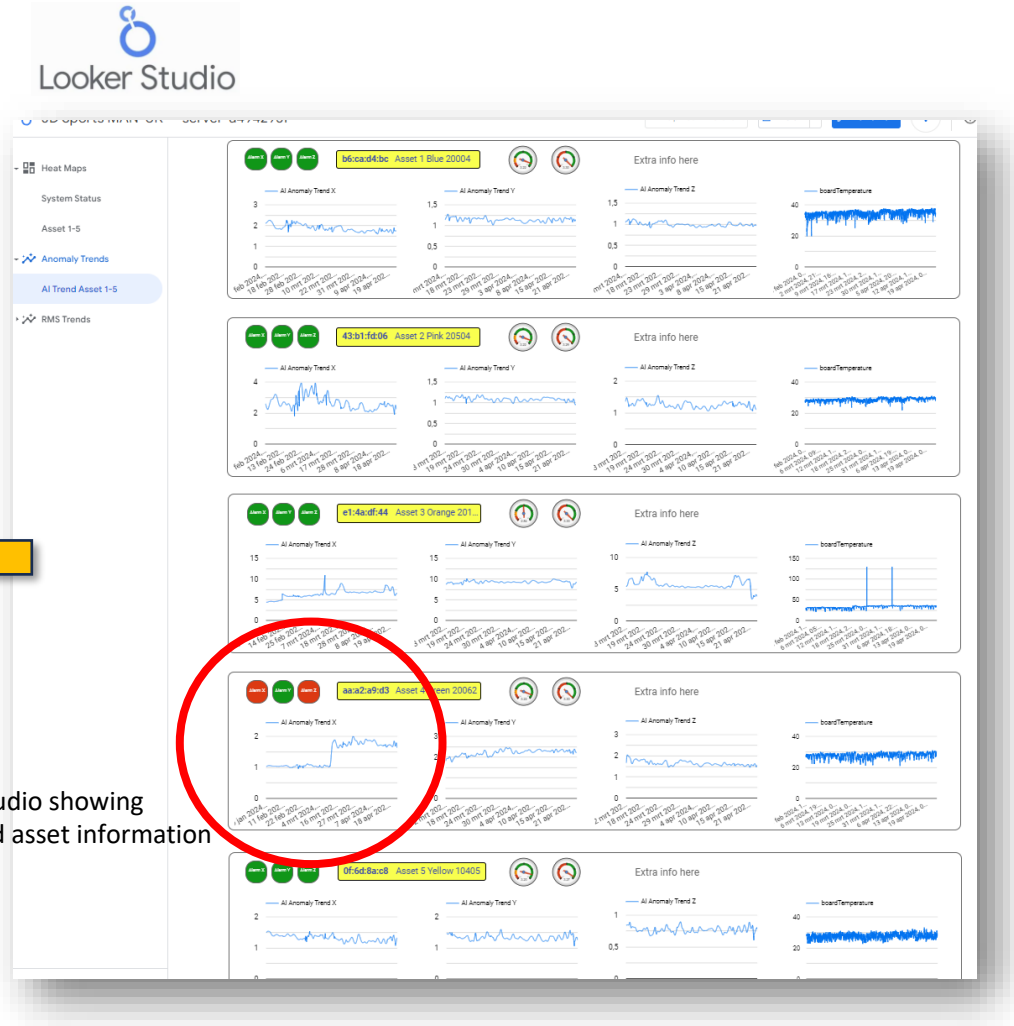
Waterfall from last month visualized with a few clicks

ALL data is

- Free to use and to be exported freely
- Readily available due to Edge computing
- Full sensor control over (extra) captures
- User can focus on assets with sensitive **AI alarms**

ALL data (waveforms, FFT's, RMS, Kurtosis, …, or any sensor metric or motor drive data) can be exported via:

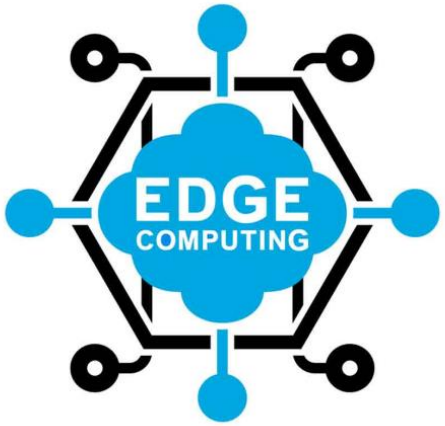
- OPC UA (historian) – including raw sensor data
- MQTT (broker)
- CSV, Excel (own PC)
- Looker Studio (free Google BI platform)
  - Heat maps
  - AI Trends
  - Battery levels
  - Asset pictures
  - …
- or to **ANY** customer platform



Looker Studio showing integrated asset information

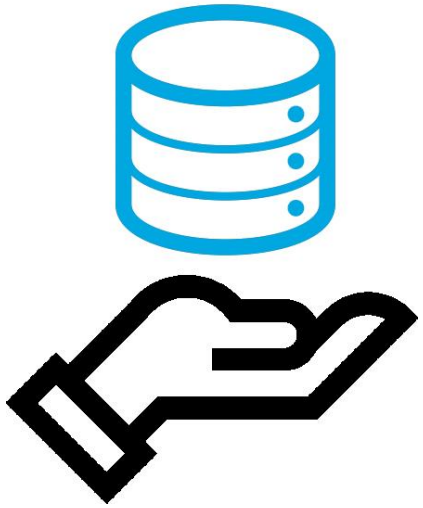
Key Benefits

Edge Computing / Data Ownership / End-to-End solutions



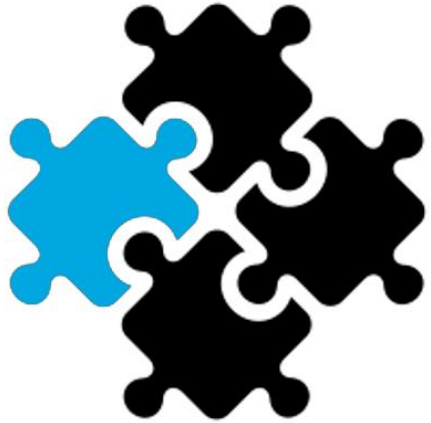
Wireless &
Edge Computing

Unique Remote
Real Time Processing,
embedded AI



Data Ownership &
Local Data Storage

No Vendor Lock-in
Mainly CAPEX

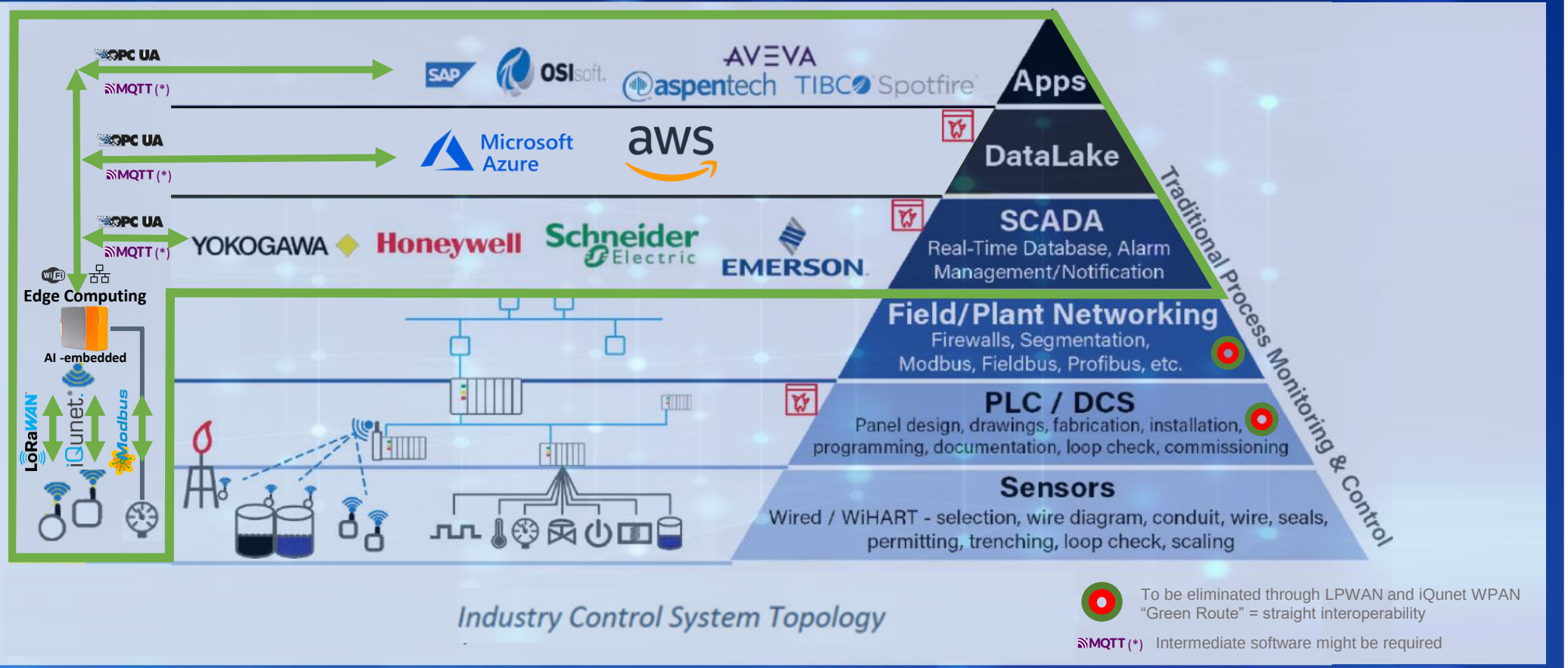


End-to-End solutions

High Interoperability
High ROI

iQunet "Green Route"

iQunet = (Wireless) Sensors + Edge (AI) Computing + sensor management + embedded OPC UA / MQTT



iQunet® Use Cases

MQTT
OPC UA

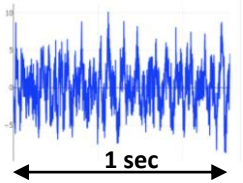
iQunet embedded
OPC UA server
MQTT client

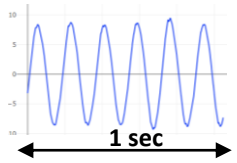
Data Storage

Data Storage

iQunet® or LoRaWAN wireless communication / Modbus communication

Condition Monitoring + AI = Predictive Maintenance





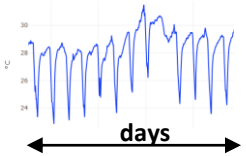
Wireless SubGHz
Vibration Monitoring

“Fast” High Frequency data [kHz]
full spectrum information

Wireless SubGHz
Elec. Signature Monitoring (ESA)

“Fast” High Frequency data [kHz]
full spectrum information

Asset Monitoring



Wireless SubGHz **& Modbus**
Metrics Monitoring*

Lower Frequency data [Hz]

Rotating Equipment

MEMS
iQunet®

IE-Piezo-Electric
iQunet®

Electric Motors

IE-Current Transformer
iQunet®

Operations

e-Drives / Metering
Modbus

Wireless Sensors
LoRaWAN

iQunet® or LoRaWAN wireless communication / Modbus communication

*with LoRaWAN enabled Sensor Base Station

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