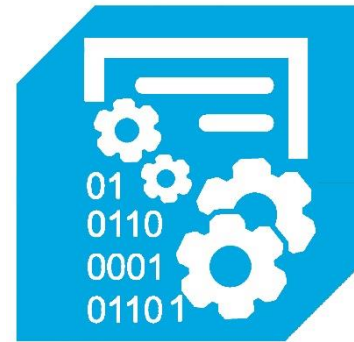
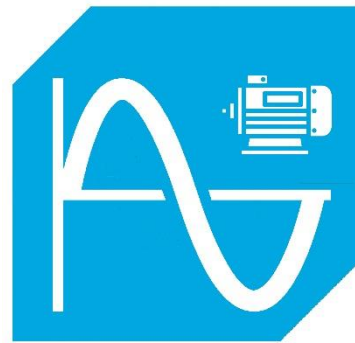


iQunet.®

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 Anomaly Detection – ALARM

iQunet®
last updated 15:00:40

MONITORED DEVICES

- S128H_NDE_vib 07:3b:6d:3e
- S228H_NDE_vib 0c:51:01:8d
- S104H_L_loopas_vib 17:f7:5c:77
- S102H_M1_cur 23:70:d3:5e
- S202H_M1_cur 27:08:00:a6
- S202H_DE_boven_vib 31:31:20:8e**
- S202H_DE_onder_vib 33:08:4f:db
- S102H_M2_cur 49:78:bd:68
- S102H_NDE_boven_vib 57:3c:53:ba
- S128H DE vib 5c:a3:3c:ef

ANOMALY MONITOR

Level
Alarm

VIBRATION ANOMALY (TFL3_8192_1600_16_Z)

Legend: HI 95%, median, LO 5%, raw

VIBRATION LAB

Stats | mm/s | 20mm/s | XYZ | 1Hz | 1x

VEL | FREQ

MODEL SUMMARY

Device MAC: 31:31:20:8e

Model: TFL3_8192_1600_16_Z
 Type: Autoencoder
 Version: sha256 - 4b5532b4be
 License: perpetual

Model info: [details...](#)
 Train date: April 18th, 2024 at 6:15 PM
 Trained on: 1111 samples (62 days)
 Test set: 348 samples
 Median loss: 0.1

Status: Idle
 Service: Id = 000000000000
 Inference Rate: 10 [runs/sec]

Loss	ISO-8601 DATE
2.571	2024-06-17T12:08:52.768000+00:00
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

HISTORIAN

Past | Later

04	11	18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	01	08	
05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	02	09	
06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	
07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	
01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12
02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	06	13
03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	07	14

Mar-2024 | Apr-2024 | May-2024 | Jun-2024 | Jul

TIME SERIES

Mon Jun 17 2024 04:57:00

Mon Jun 17 2024 05:20:36

Mon Jun 17 2024 05:43:34

Mon Jun 17 2024 06:09:29

Mon Jun 17 2024 06:51:47

Mon Jun 17 2024 07:20:03

Mon Jun 17 2024 09:21:12

Mon Jun 17 2024 09:47:36

Mon Jun 17 2024 10:14:06

Mon Jun 17 2024 11:33:12

Mon Jun 17 2024 12:03:42

Mon Jun 17 2024 12:32:06

WATERFALL

Fr1 Mar 15 2024 15:07:07

Fr1 Mar 29 2024 03:12:59

Fr1 Apr 12 2024 08:01:41

Fr1 Apr 26 2024 15:20:30

Fr1 May 10 2024 07:20:50

Fr1 May 24 2024 05:03:43

Fr1 May 31 2024 07:40:28

Fr1 Jun 07 2024 09:07:53

Fr1 Jun 14 2024 22:03:20

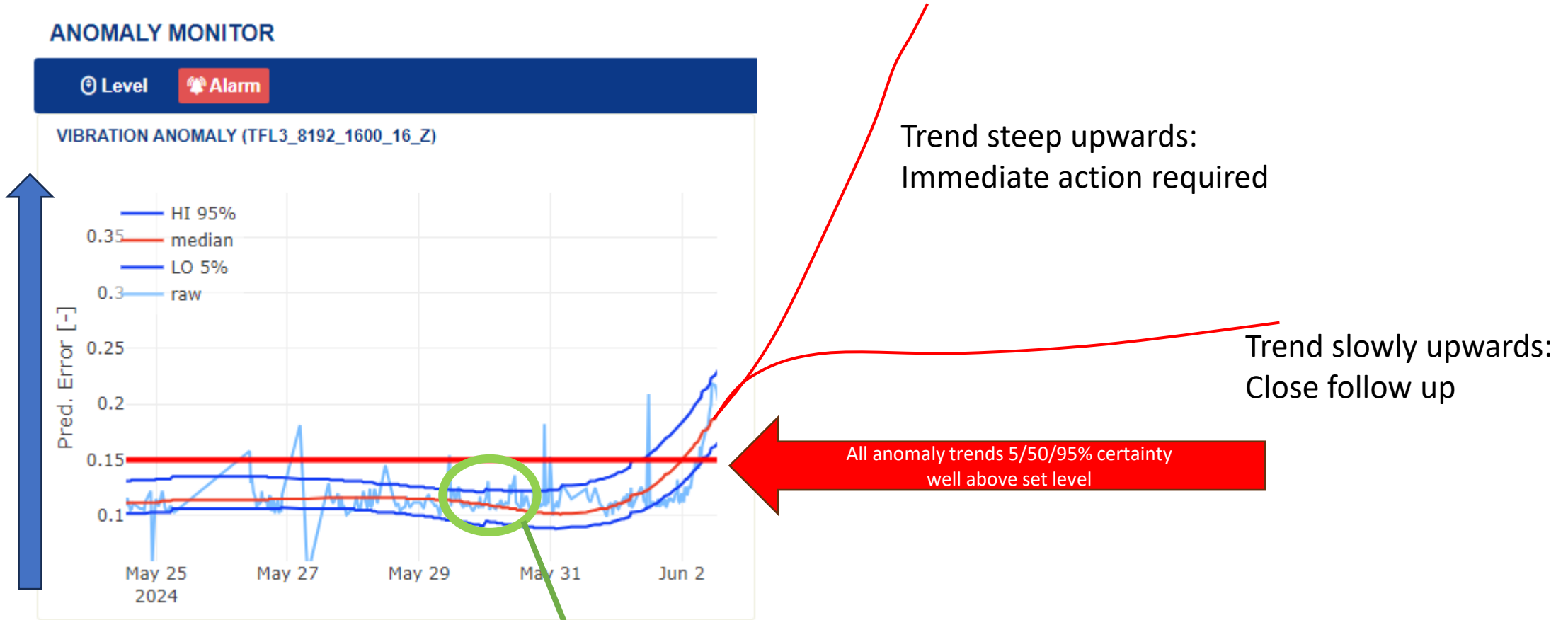
Sun Jun 16 2024 11:07:23

Mon Jun 17 2024 14:08:52

© 2024 iQunet bv EU868 Version 1.11.14 - build 13-5-2024 - sha1 d4541cef

AI Anomaly Detection – ALARM

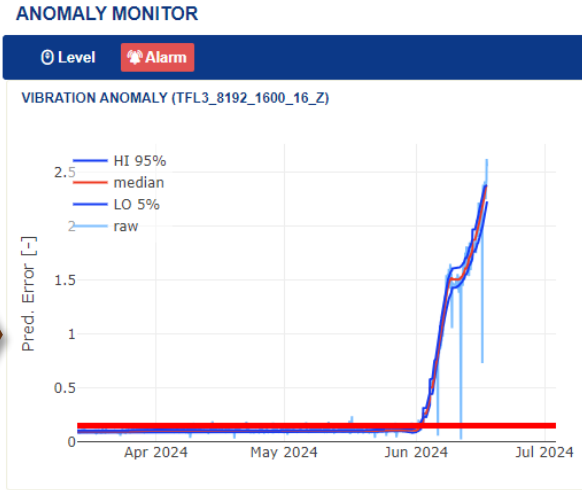
Anomaly score : difference between expected (or normal) behavior and what is actually observed



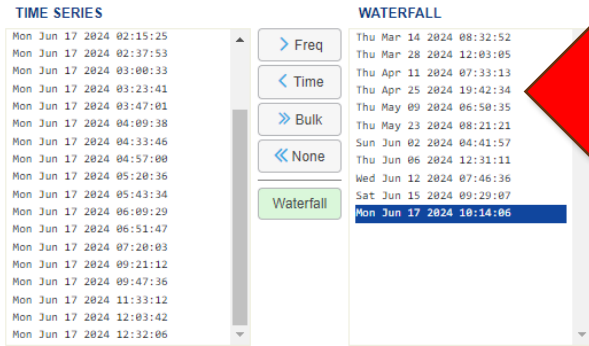
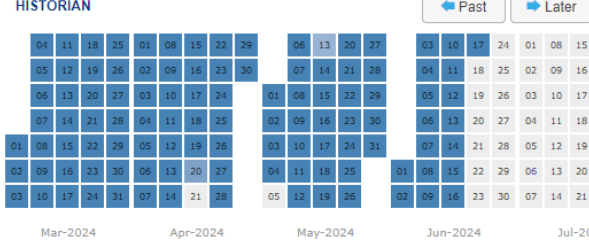
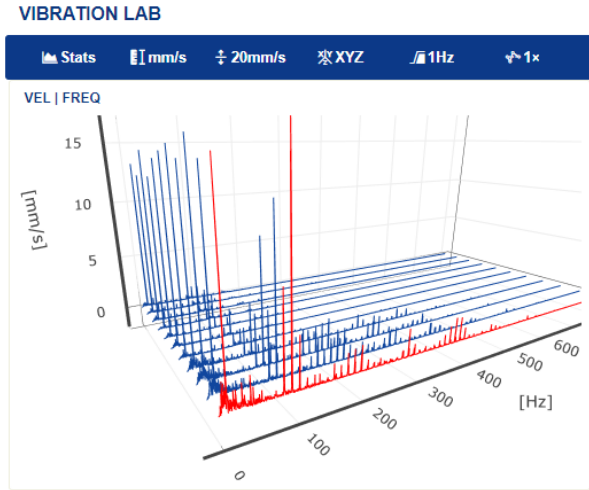
Each (raw) graph data point = "AI-score" of 1 complete time series (or one vibration measurement in this case)

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
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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



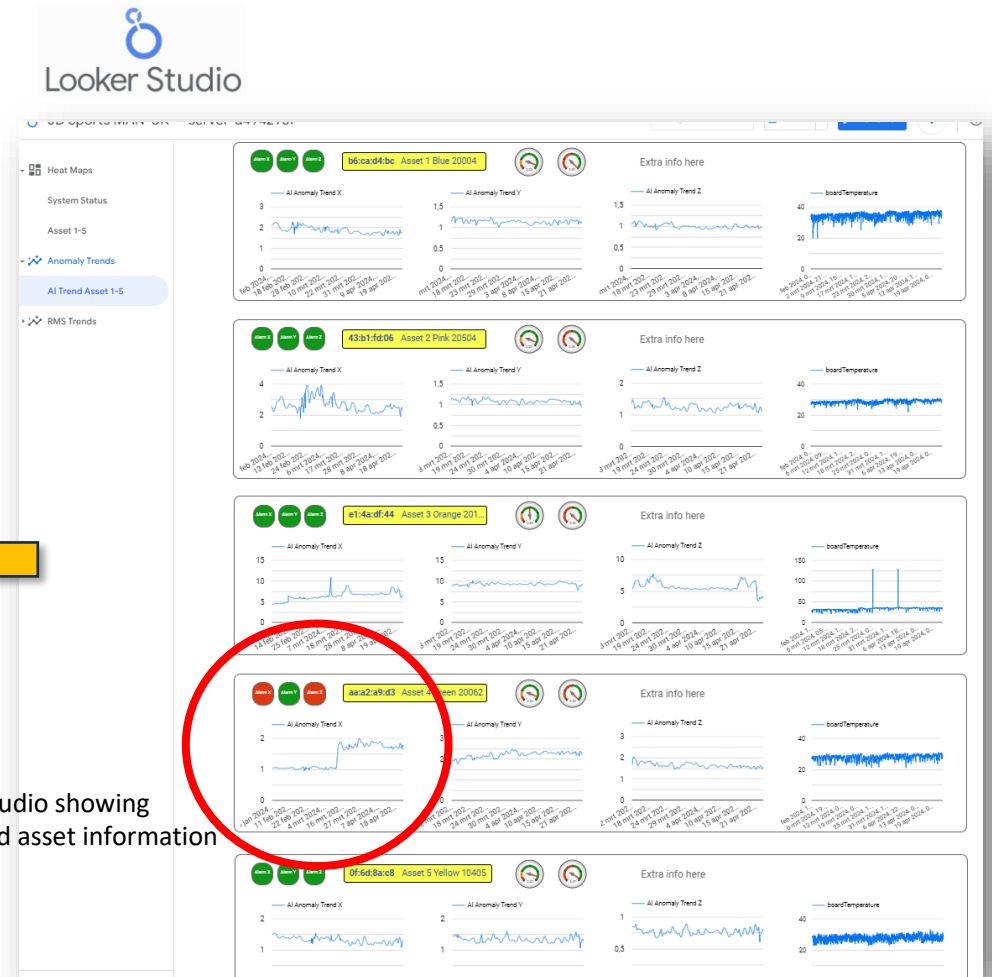
Waterfall from last month visualized with a few clicks

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

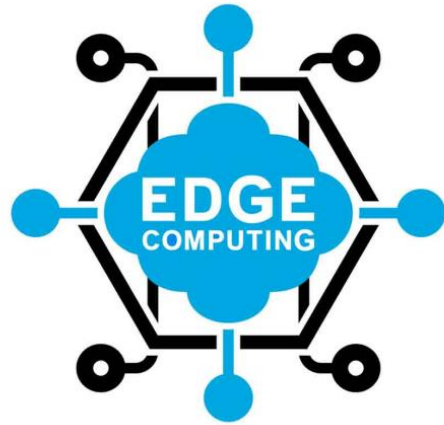


Looker Studio showing integrated asset information



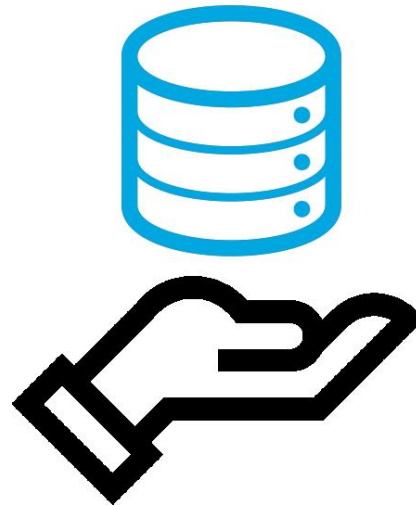
Key Benefits

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



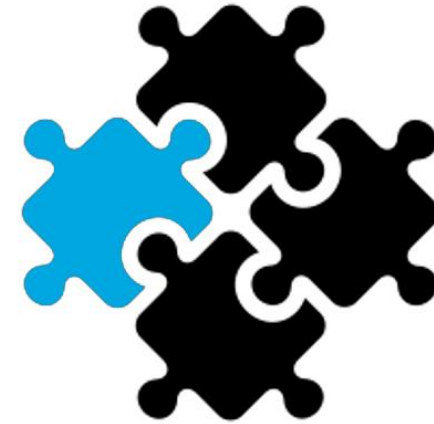
**Wireless &
Edge Computing**

**Unique Remote
Real Time Processing,
embedded AI**



**Data Ownership &
Local Data Storage**

**No Vendor Lock-in
Mainly CAPEX**



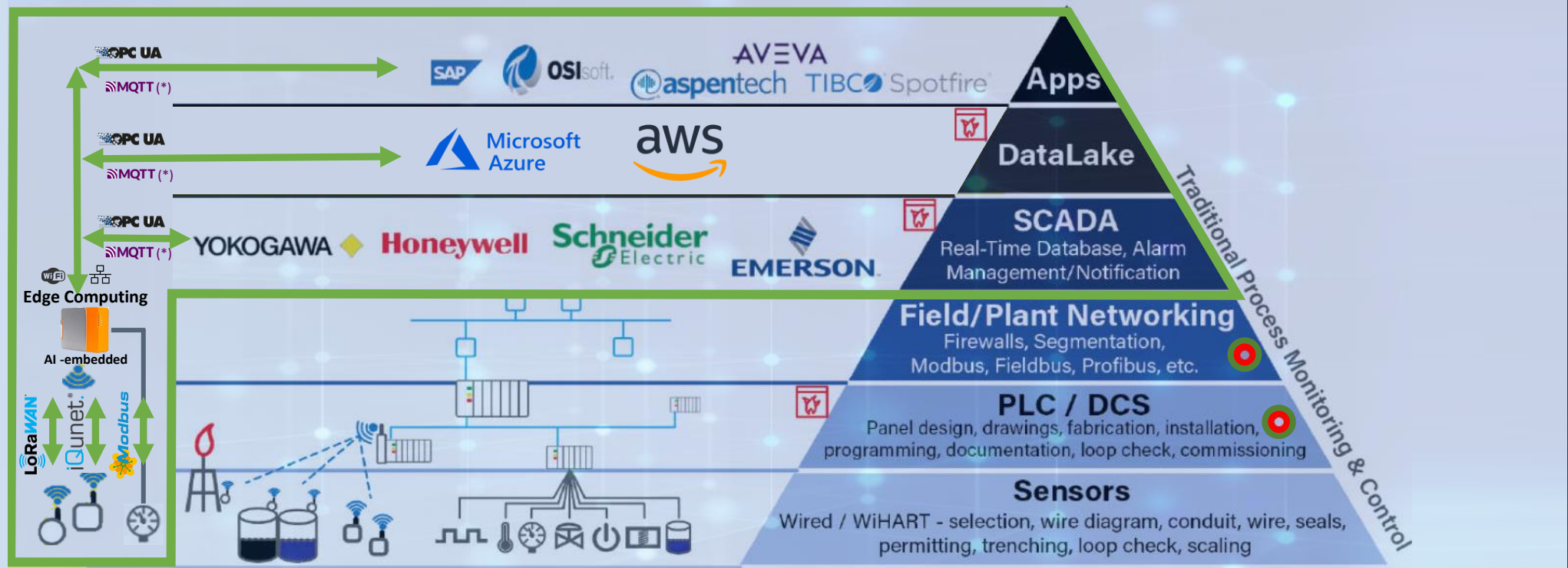
End-to-End solutions

**High Interoperability
High ROI**



iQunet “Green Route”

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

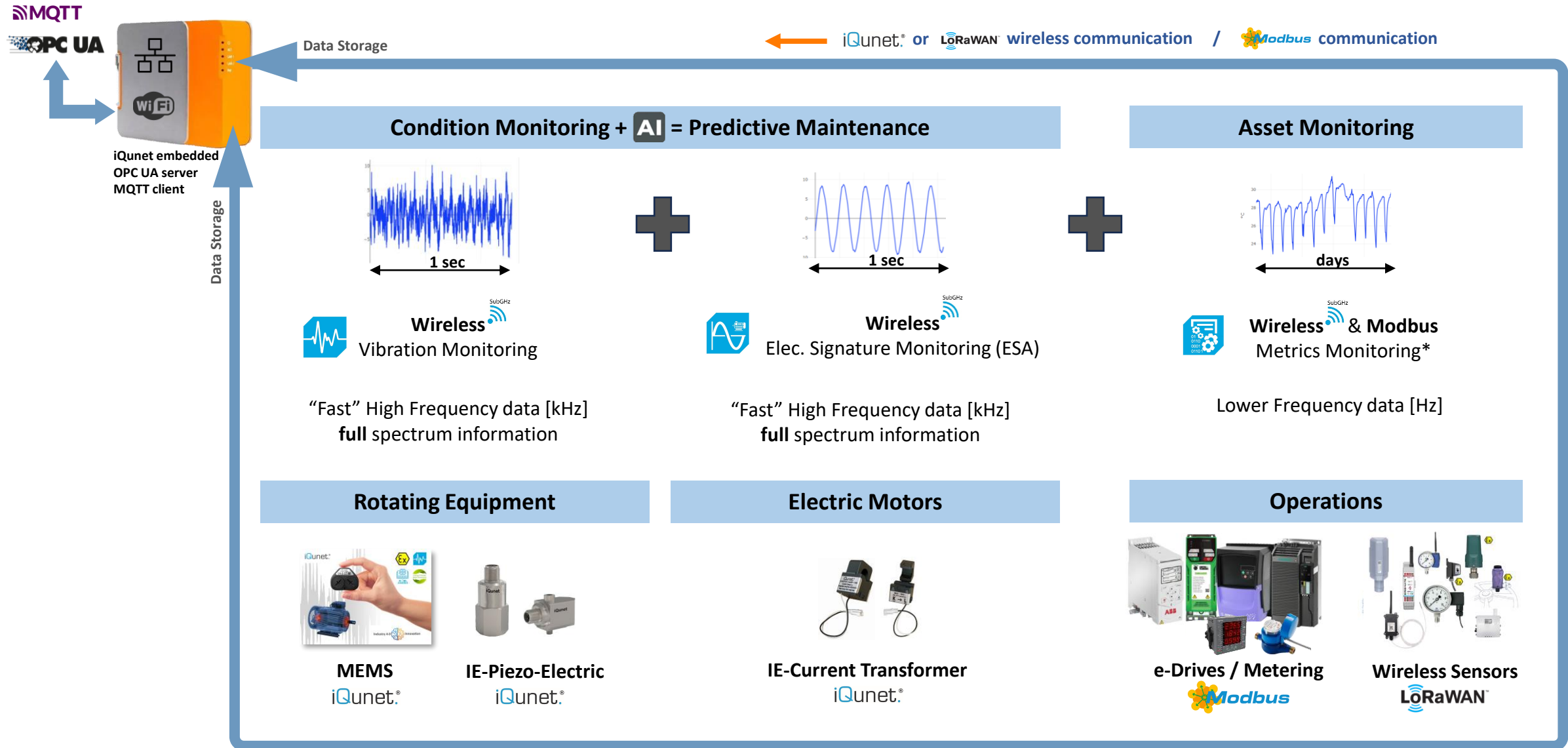


Industry Control System Topology

To be eliminated through LPWAN and iQunet WPAN “Green Route” = straight interoperability

MQTT (*) Intermediate software might be required

iQunet.® Use Cases



← iQunet.® or LoRaWAN wireless communication / Modbus communication

*with LoRaWAN enabled Sensor Base Station

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