# metroscope

Software for Monitoring & Diagnostics

Metroscope is software start-up founded in Paris in 2018
Located in France, Germany and the USA.

As of today, we equip 67 industrial assets around the world.

Metroscope is a subsidiary of

Metroscope provides technology to understand faults and energy losses on industrial equipment.

Explore your data

Detect abnormal behavior

Understand the root cause
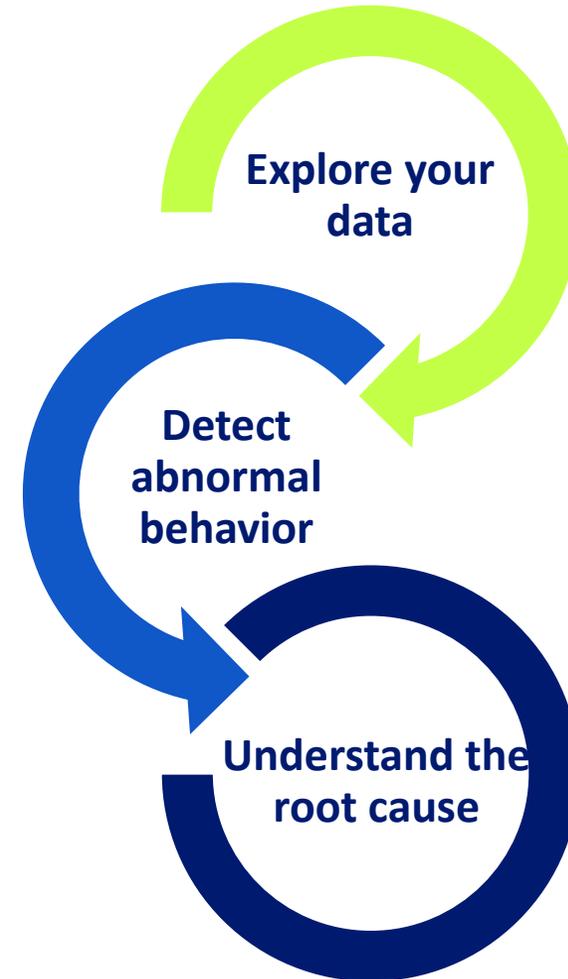
Monitoring and Diagnostics

metroscope

Metroscope value chain

Data Collection	Data Storage	Data Visualisation	Data Analytics	Diagnostics	Decision-making	Maintenance

Metroscope

Plant - sensors → DCS → Historian → [monitor] → [scatter plot] → [lightbulb] → [document] → [tools]
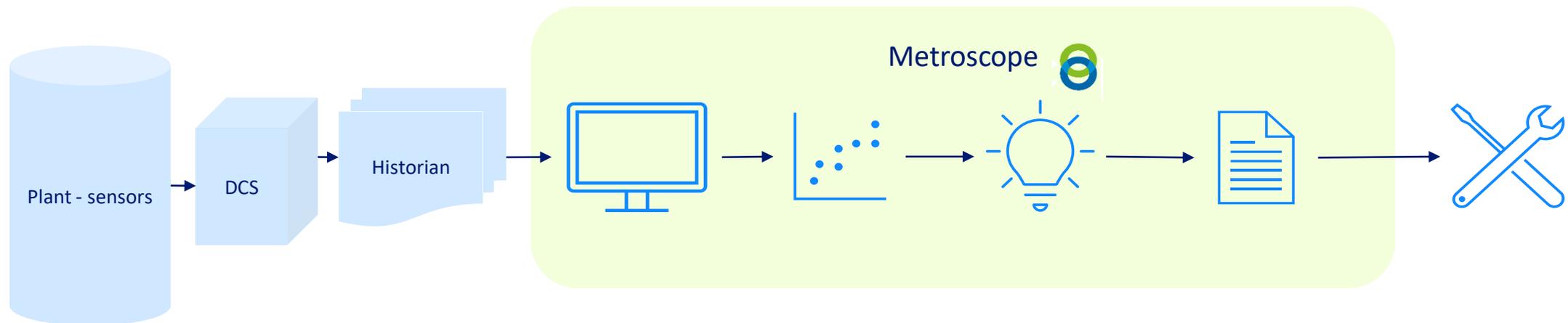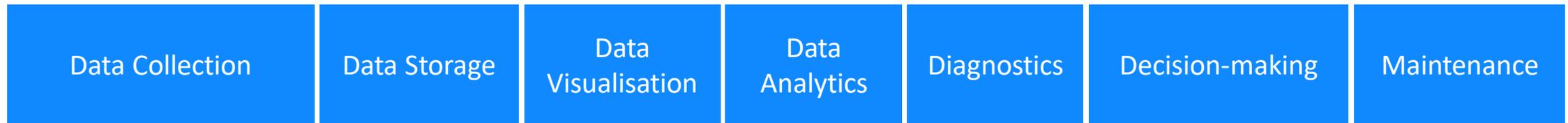
63

Powerplants

4

Cooling systems

5

Countries

300

Users

The Metroscope Software

A product for operators and decision-makers.

- Detect energy losses automatically

- Diagnose faults automatically and live

- Collaborate on performance

- Monitor key parameters

- Monitor deviations
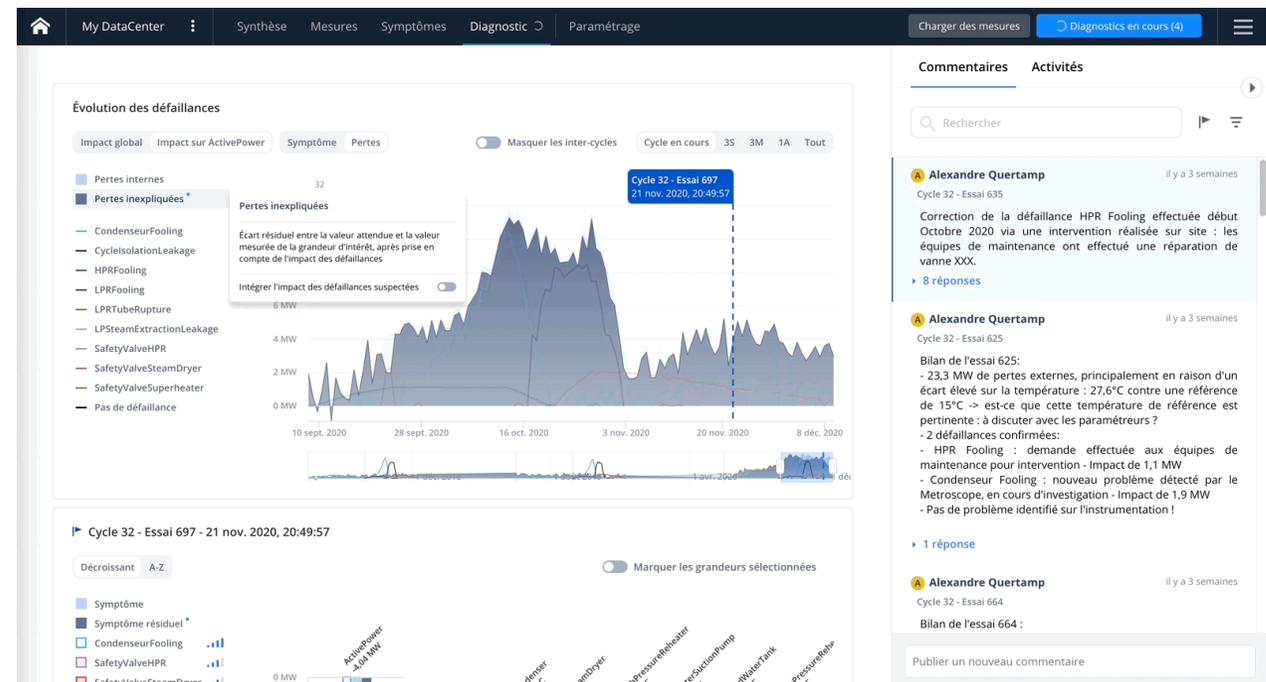
Metroscope technology leverages operating experience to provide real-time, reliable diagnostics.

Sensors

Digital Twin

Expected behavior

Symptoms

Faults

Inferential Engine

Diagnostics
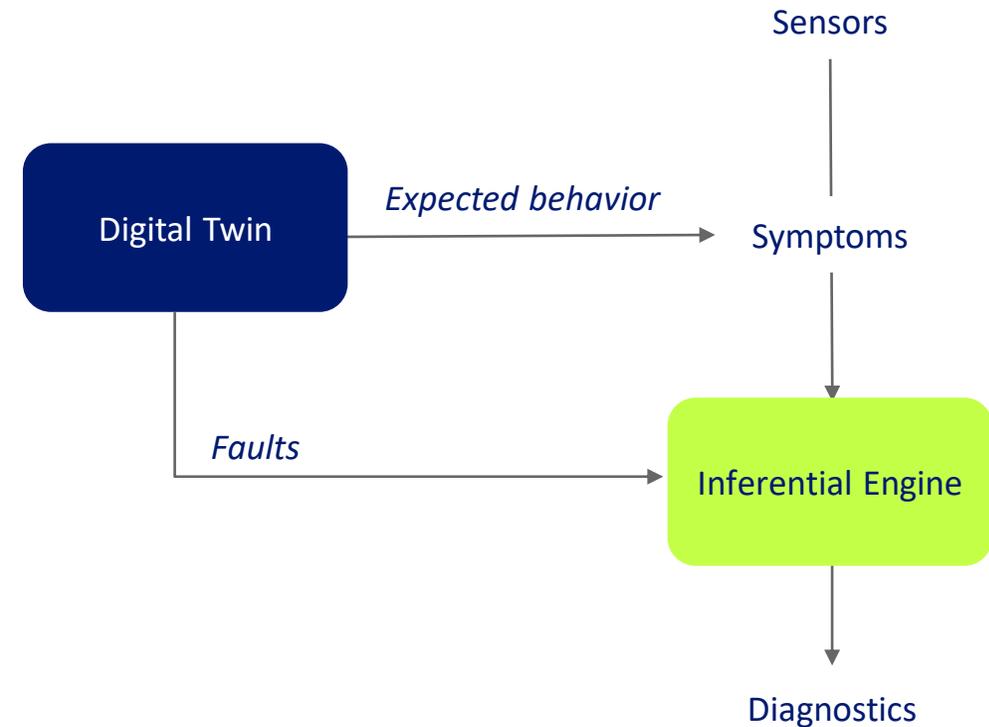
![metroscope]

Metroscope value: Performance

Use case: unknown valve leakage

Without Metroscope

- *19 months* of unknown losses - average of *2 MW*
- Total losses avoidable via MTS *~30 000 MWh*
- Assuming *42€/MWh* in 2018 **~ 1,3M€ savings**

With Metroscope

- Detection of an unknown leakage (AOV Valve controlling a ventilation line on a purge recovery tank collecting condensate from reheater)
- Quick maintenance in 2 weeks
- Fleet capitalization

Energy losses

Valve leakage diagnosis

✔ **Monitor evolution of the fault to intervene as soon as possible**

Metroscope value: Performance

Use case: Condenser fouling

Without Metroscope

- Aware something is wrong with the condenser, but not able to properly identify the fault.

With Metroscope

- 2020: losses -up to 35MW

- Total gain thanks to MTS in 2021: 18 MW*30 days = 12,96 GWh.

- Assuming 100€/MWh **~ 1,3M€ savings**

Energy losses

Condenser fouling diagnosis

✓ New performance engineer without particular expertise able to justify maintenance (high pressure cleaning)

✓ Quickly justify the need of intervention to faster recover losses
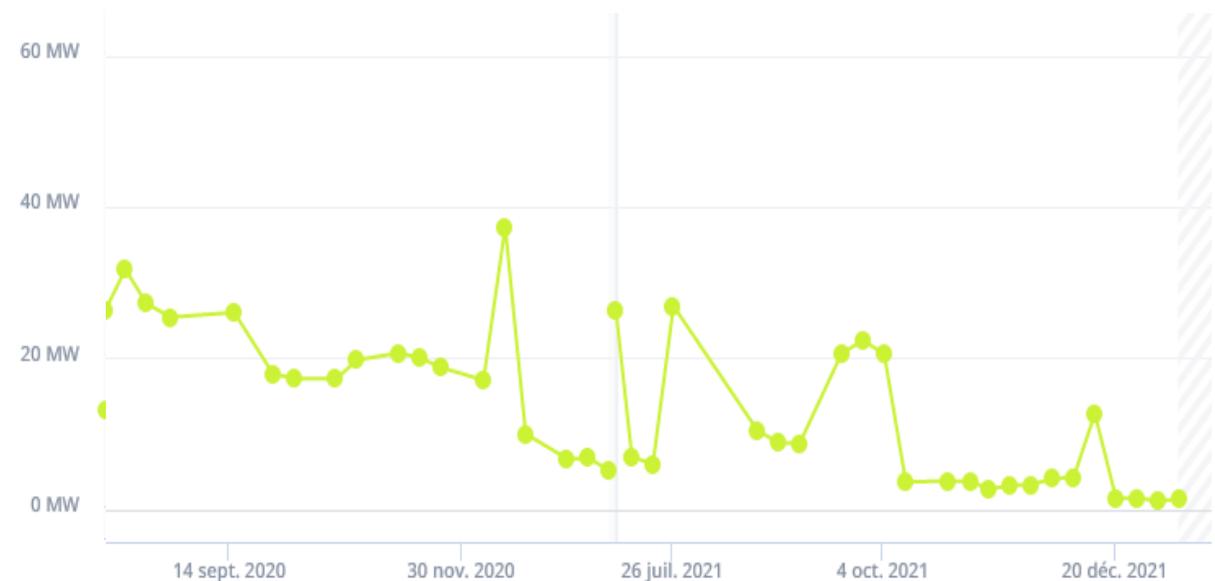
Metroscope value: Maintenance

Use case: tube rupture of a heat exchanger

73K Euros/unit/year [1]

- Early-stage detection - Tube rupture detected at the threshold of 3 kg/s, instead of 9 kg/s

- Low energy losses but costly thread isolation

✓ Optimize maintenance planning and timing, time to better prepare outage

✓ Extend the life of the heat exchanger by limiting the number of tubes plugged (5M Euros of component)

Cycle 35 - Test 15
Dec 19, 2018, 01:00:00 AM

Cycle 35 - Test 15
Dec 19, 2018, 01:00:00 AM

Tube_Rupt_1

Amplitude : 3.46 kg/s

Nov 19, 2018   Dec 31, 2018   Feb 11, 2019   Mar 25, 20
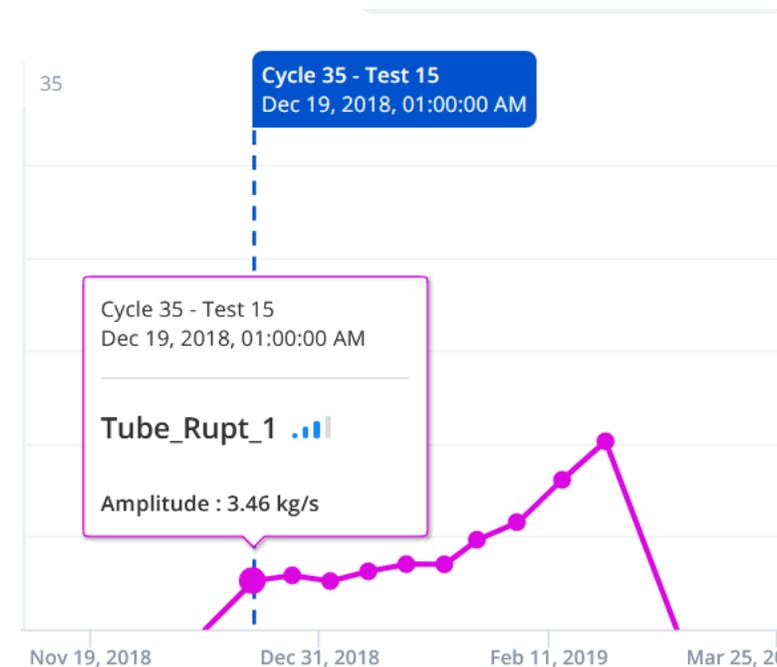
Tube rupture diagnosis

1. *20MW of power decrease due to the isolation of the reheater line * 60 days of power decrease due to the isolation difficulties of the line * 110€ per MWh = 37GWh * 110€ = 4070k€*

Metroscope value: Organization

10K Euros/unit/year [1] only on time savings for engineering time and internal communication

Metroscope as a **common source of knowledge**:

- Accessible and understandable by as many people as possible.

- **80%** users display results outside of their division

- Impact on the workload of employees in positions directly related to performance monitoring, ability to make decisions on O&M.

- **Accelerate** decision making: transversal tools for different silos

Corporate
asset management, fleet supervision

M&D Center
engineering teams supporting the operations

On-site teams
maintenance, operations, peformance, metrology

Behind our Saas: the Cloud

- Clusters / Customer completely isolated from each other

- User permissions defined per Metroscope deployment

- Environment access via authorized IPs only

- Security training and know how to handle sensitive data.

- Authentication and Authorization (2FA)

- All data encrypted in motion and at rest

Architecture
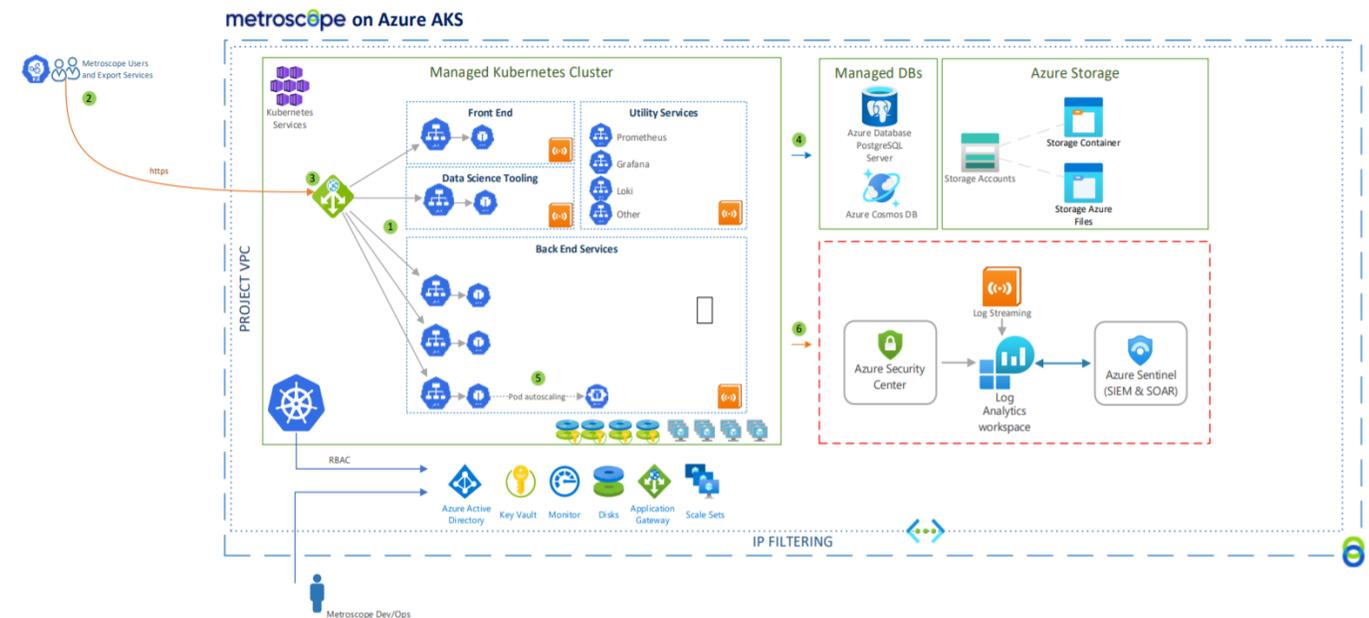
Our offers

Digital twin

- Data engineering
- Nominal Model
- Failure Library
- Fine tuning

SaaS

- Software
- Engineering Services
- R&D
- IT services

Engineering studies

- Overall performance assessment
- Instrumentation review and diagnostics capacity heat map

Thank you for your attention