



MARCH 2023

ABB Ability Asset Performance Management (APM)

Customer Overview Presentation

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About this session

- What is APM?
- What are the benefits?
- How can I start?



Dries Van Laerhoven
Digital Solutions Architect

30 minutes + 15 minutes Q&A

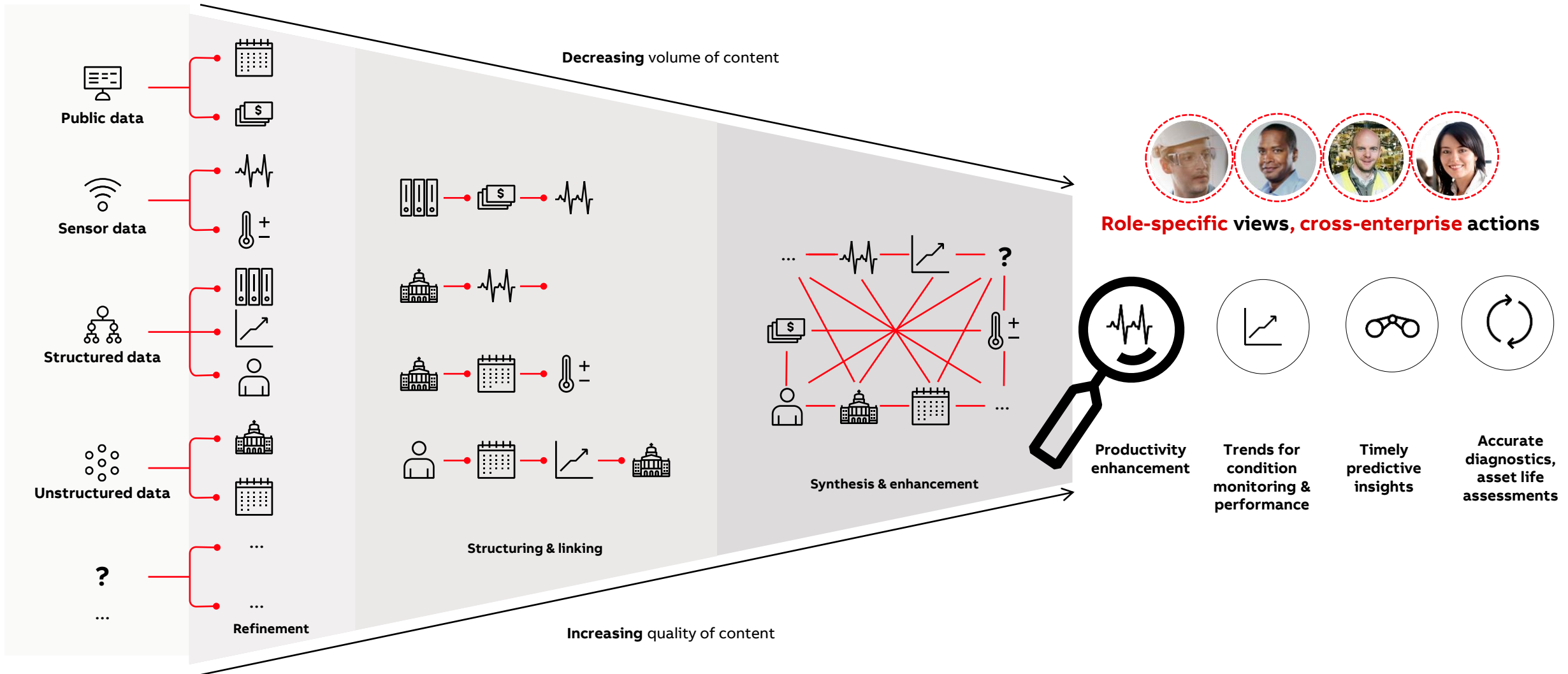
What is Asset Performance Management?

A well-planned, structured and strategic asset management program, with data integration, visualization, predictive and prescriptive analytics tied together.

APM helps industrial enterprises maximize economic returns and meet strategic objectives.



What do we mean with data integration?



What do we need for APM?

A way of working (**a strategy**) and a **set of tools** to optimize equipment reliability & costs



Like LEAN or Six Sigma

Expertise in a known technical domain

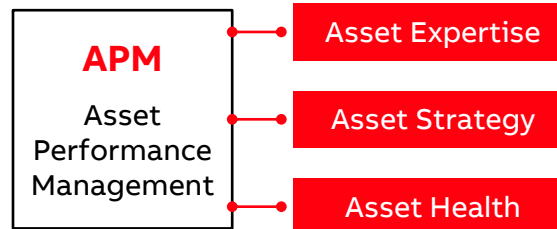
Software and applications to improve the reliability and availability of physical assets (plants, systems of equipment, infrastructure)¹



Like Cybersecurity or Cloud Computing

Services and Software

An analytics platform and app development initiative to combine strategy and expertise in modern and agile tooling.



Like Predictive Analytics – IOT platform – Collaborative Operations Center expertise

1. Source: Gartner

What are the benefits?

A Costly and Common Concern – Asset Performance Pain Points

70%

Of field service decision makers are **not fully aware of when their equipment is due for maintenance, upgrade or replacement**

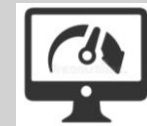
Source: Aberdeen



The typical offshore platform runs at approximately

77%

of its maximum production potential



Unplanned downtime can cost as much as

\$260,000 an hour



Source: Vanson Bourne



Industry-wide, this shortfall represents

US\$200B

in annual revenue

Source: McKinsey

PAEN Asset Performance Management Business Impact

Measured benefits

Cost Savings



\$12M
in production
improvements

Large chemical company

Improved Performance



10%
increased generation
capability

Hydropower producer

Increased Production Uptime



1 year → 3 years
extended turnaround
intervals

Oil & gas provider

Manual Work Reduction

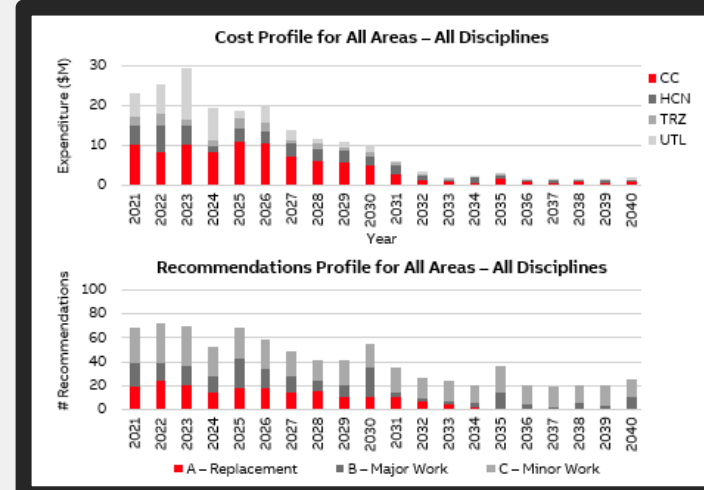


97%
reduction in
offshore work

Offshore operator

Asset life assessment study at 11 chemical sites with 50-year-old assets

- A 6-months study covering mechanical, static, machines & rotating equipment, E,C & I, civil and structural
- Need to identify the primary threats, determine an “order of magnitude” scope for work to bring the facility back to a sustainable state over the 20-year period, the timing and the spend profile
- Addressing asset condition, reliability, obsolescence, maintainability using Remote Insights app



2040

Extended operations

Identified equipment that can be fit for purpose until 2040

1 year
payback

Reduced OPEX, optimized CAPEX

improved understanding of ageing asset condition and strategy planning
<1 year payback

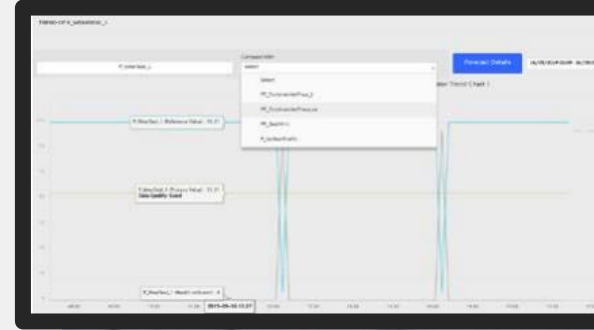
AR

Talent & Safety

Reduced HSE incidents and downtime, developing competence using AR app

Predictive analytics deployed across 26 hydropower sites

- A global re-organization of maintenance processes to improve sustainability and lower costs
- Need to optimize performance, reliability and efficiency of hydro fleet to remain competitive with fossil fuels



Early notifications

Providing warning of critical failures and health diagnostics



Performance

Hydro specific performance efficiency KPIs, increased generation capability 10%



Maintenance costs

Assistance for more informed decisions resulting in fleet maintenance savings up to 2%













How Can I start?

Asset Types – What’s in Your Organization?











Applicable for Condition Monitoring

2500+ ASSET MODELS
ALREADY BUILT










Static

Heat Exchanger	
Boiler	
Pipeline	
Burners	
Column	
Fired heater	
Pressure safety valve	
Pressure vessel	
Reactor	
Storage tank	






Rotary

Centrifugal compressor	
Centrifugal pump	
Rotary pump	
Gear box	
Motor	
Radial blower	
Roller bearings	
Mounted bearings	
Turbine - gas	
Turbine - steam	

Electrical

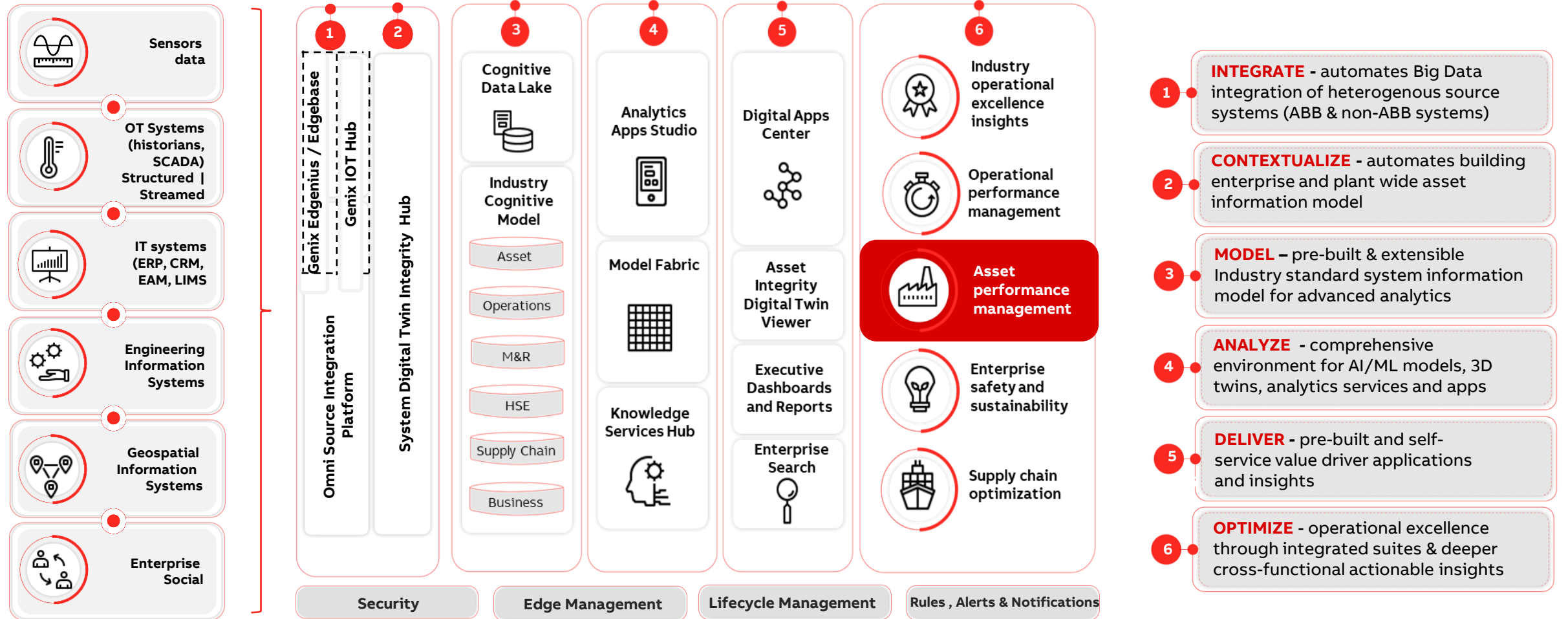
Transformer	
Electric generator	
Battery	
Cable	
Switchgear	
Circuit breaker	
Drive	
Relay	
UPS	

Instrument

Analyzer	
Control system	
Control valve	
On-off valve	
Transmitter (pressure, temp, flow)	

Understand your Assets by Criticality Level, % Instrumented, and Known Bad Actors

Digital Landscape – What is already there?



The how – built on ABB domain knowledge

Data, domain, technology and capabilities coming together for maximum impact

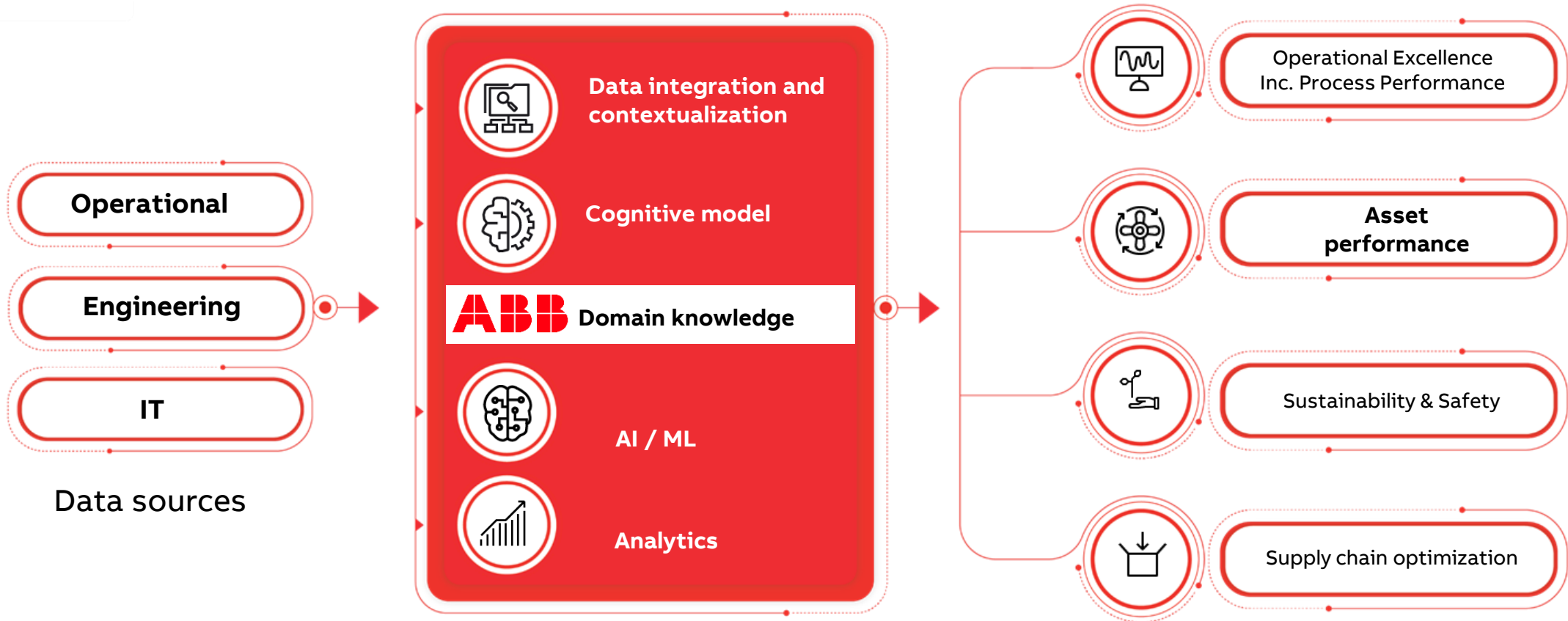


ABB Ability Asset Performance Management Portfolio – Software and Expertise

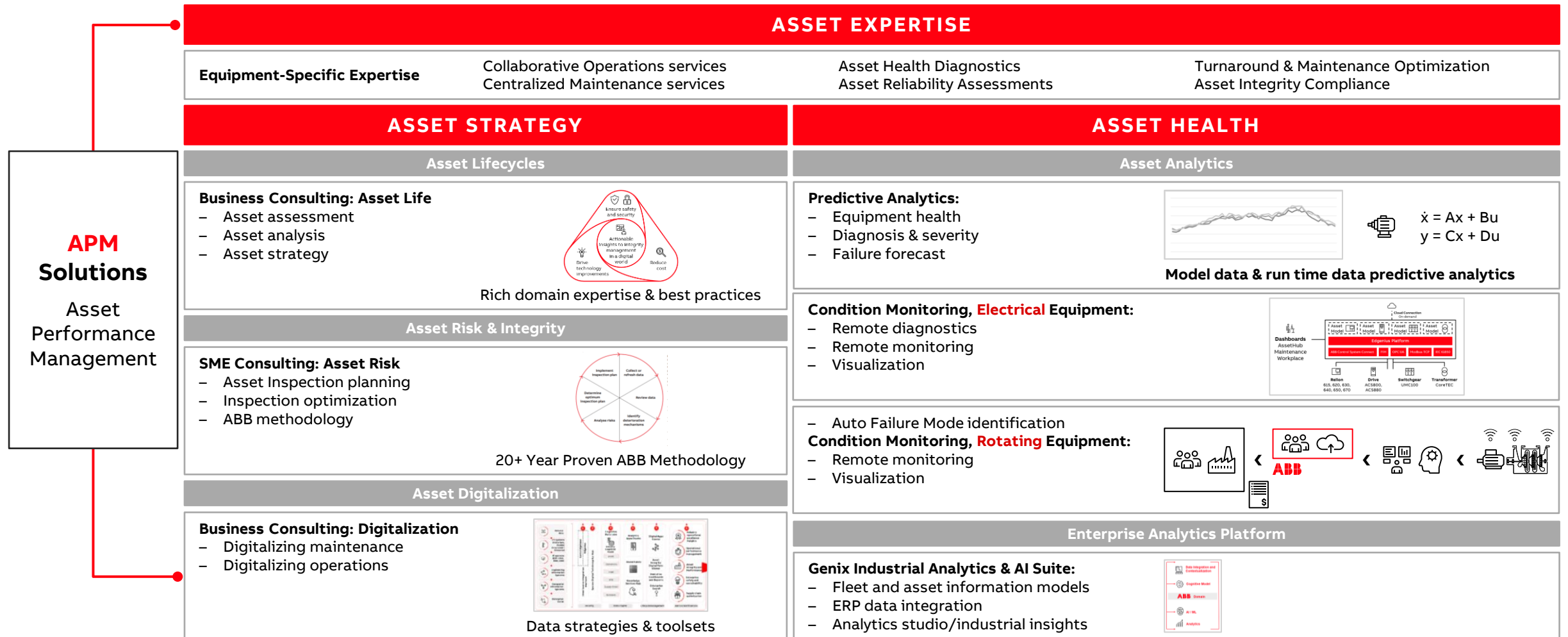
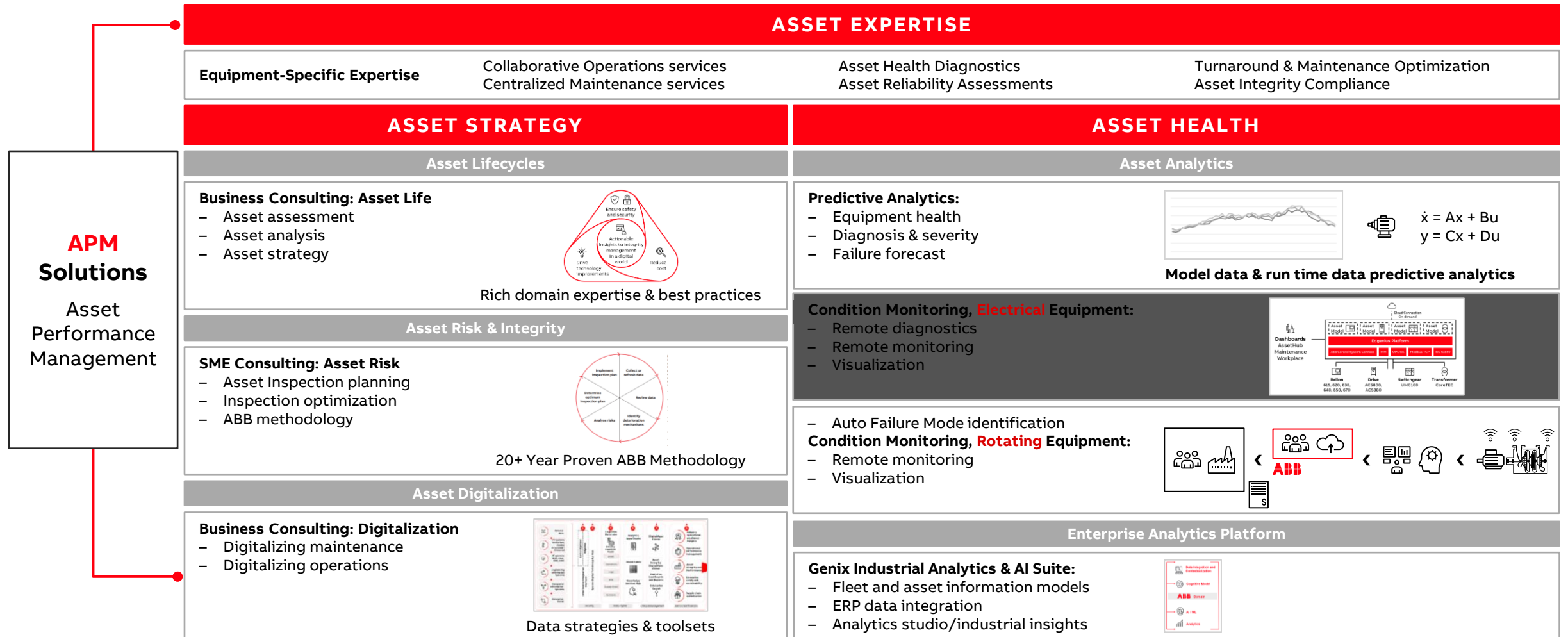


ABB Ability Asset Performance Management Portfolio – Software and Expertise



Digitalizing asset performance management: the ABB Ability™ Genix way

Means both near-term and long-lasting impact on your profitability

Get answers, reveal the invisible

Integrated suite of APM solutions and services, from condition monitoring and predictive maintenance to asset reliability, integrity and strategy.

Combines ABB's deep domain knowledge with automated data collection and contextualization, pre-built optimization models, industrial analytics and AI/ML tools.

Provides asset 360°-degree actionable insights and expertise helping various functions in all industries to achieve maximum uptime, safety and performance (quality, quantity, consistency) in a cost-effective manner.

+ ZOOM IN

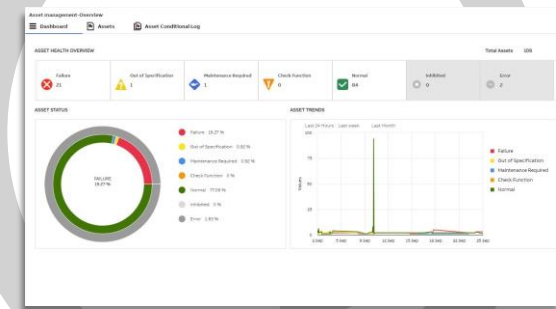


for a close look at details

So what?

Know your risks
Bring visibility across the org
Automatically identify anomalies
Decide where to focus and how to act

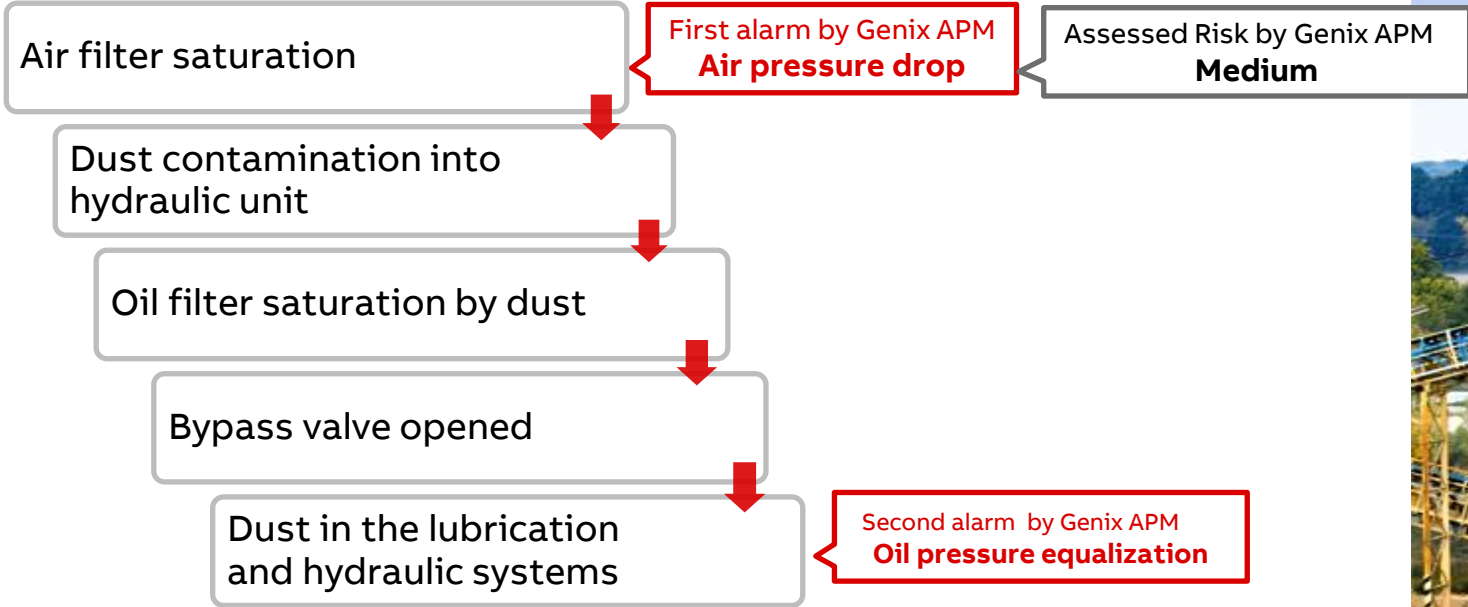
— ZOOM OUT



for the big picture

Genix APM Predict use case

Reduced downtime, increased output, significant cost savings in a cone crusher



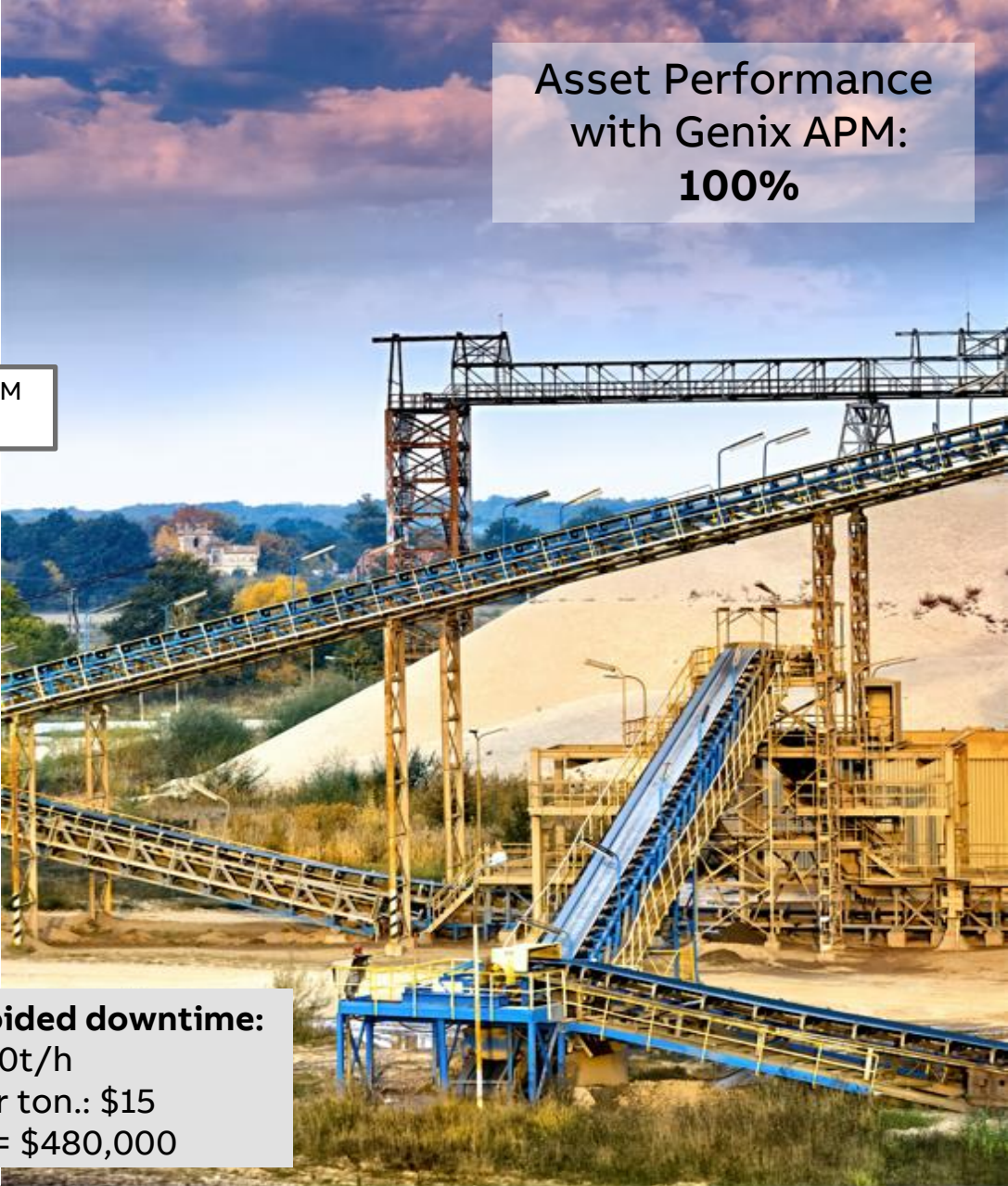
Downtime: 08 hours

Total estimated saving:
\$600,000 in a single event

Repair saving:
At least \$120,000 in parts & man-hours

Production saving - avoided downtime:
Hourly production: 4.000t/h
Contribution margin per ton.: \$15
Savings: $8 \times 4.000 \times 15 = \$480,000$

Asset Performance with Genix APM: **100%**



What is behind the first alarm?

WM	KDI_1	KDI_2	KDI_3	KDI_4	KDI_5		FPV	
Fault_1	0.6	0.2	0.2	0	0	X	1	=
Fault_2	0.333333	0.333333	0.166667	0.166667	0		0	
Fault_3	0	0	0	0.333333	0.666667		1	
Fault_4	0.2	0	0	0	0.8		0	
							1	

DM	DM1	DM2	DM3	DM4	DM5
Fault_1	0.6	0	0.2	0	0
Fault_2	0.333333	0	0.166667	0	0
Fault_3	0	0	0	0	0.666667
Fault_4	0.2	0	0	0	0.8

Real models have a lot more dimensions!

Failure modes for a generator

Asset Template	Failure Mode	Rule Based	AI ML Based
Generator	Rotor Failure	Y	Y
	Stator Failure	Y	Y
	End windings	Y	Y
	bearing and seals	Y	Y
	Enclosures	Y	Y
	Over Temperature	Y	Y
	High Vibration	Y	Y
	Under Voltage	Y	Y
	Over Voltage	Y	Y
	Over Current	Y	Y
	Under Excitation	Y	Y
	Over/under Frequency	Y	Y
	Thermal Overload	Y	
	Unbalanced Load	Y	Y
	Over Flux	Y	
	Stator Earth Fault	Y	
Rotor Earth Fault	Y		

2500+ Asset Models Already Built by our Domain experts

ABB Ability Asset Performance Management Portfolio – Software and Expertise

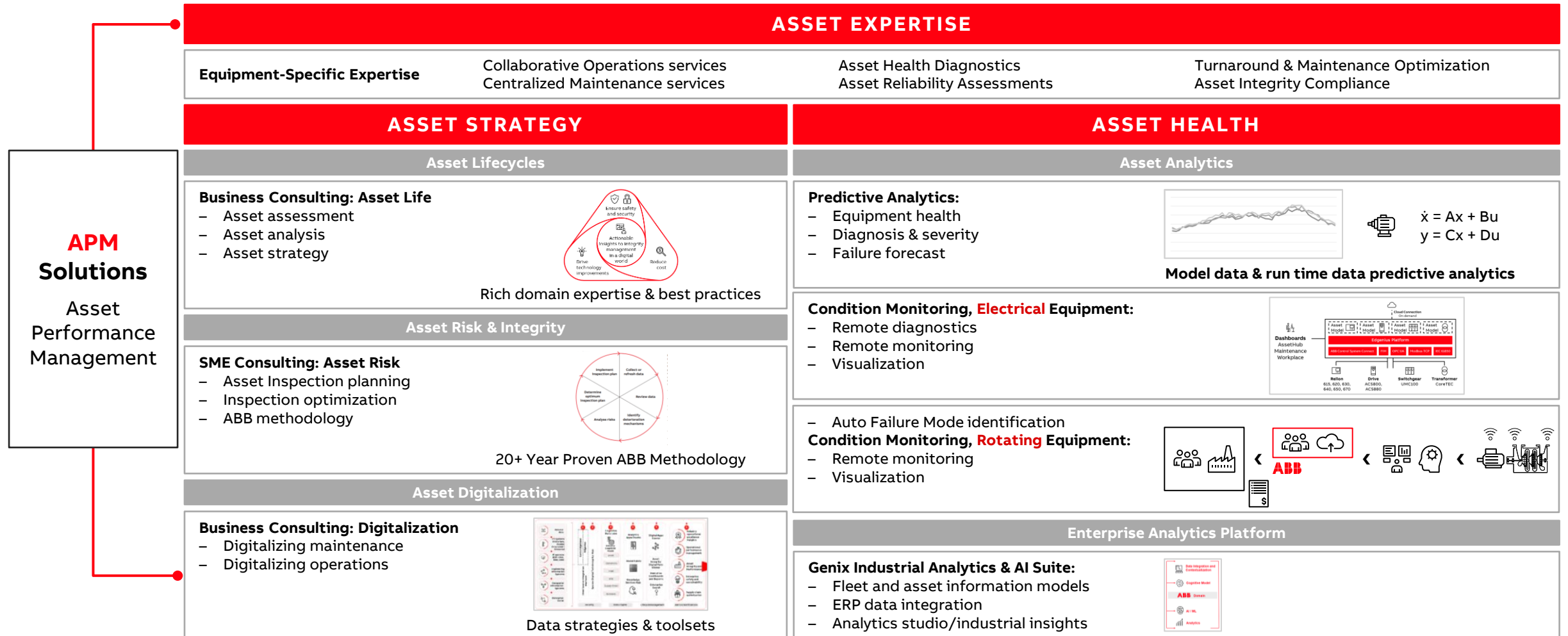


ABB Ability Asset Performance Management Portfolio – Software and Expertise

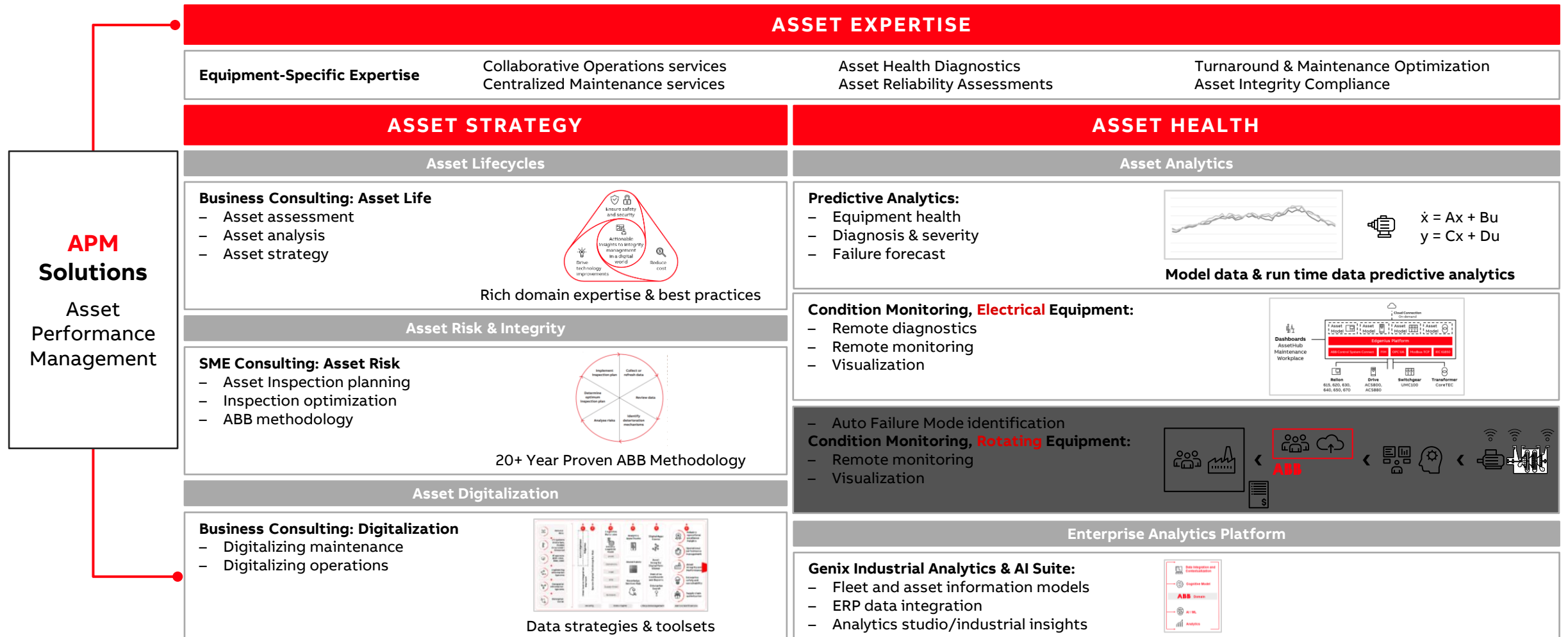
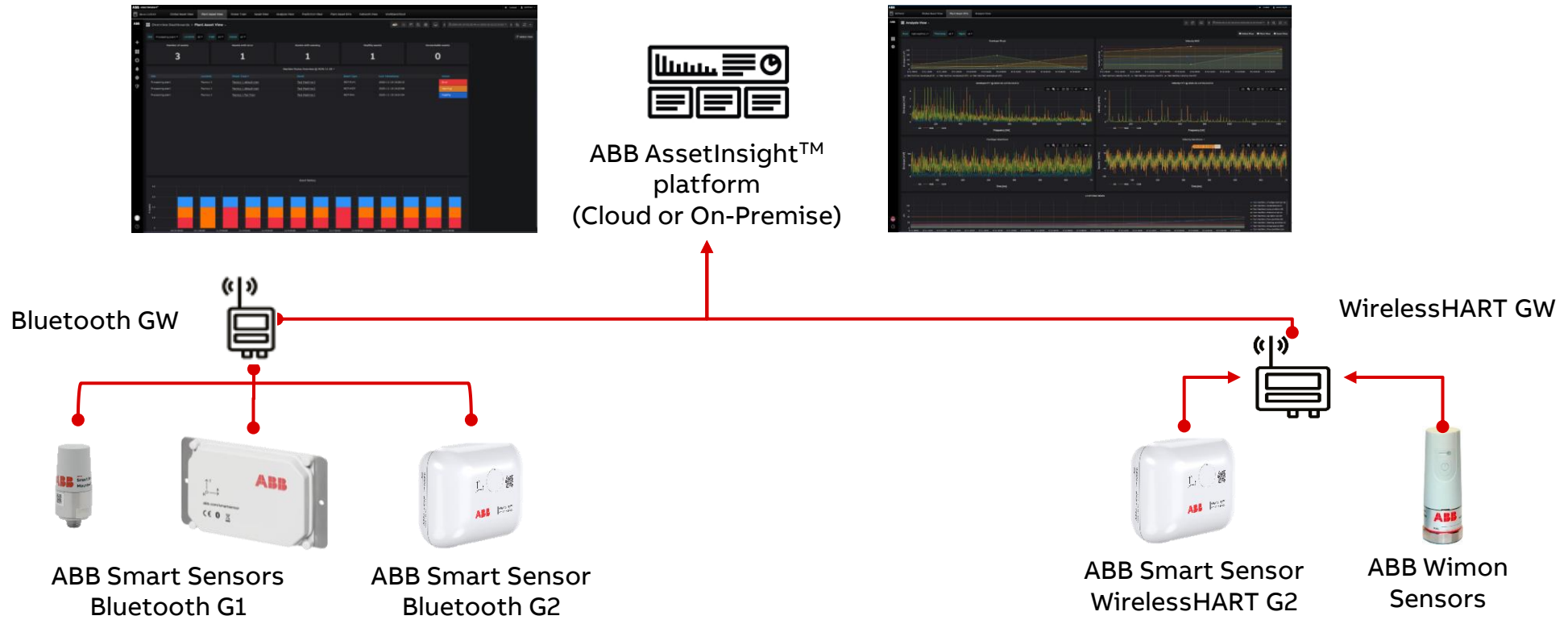




ABB Ability AssetInsight™



Flexible wireless sensors and software for standard size rotating equipment

What do we measure?

SmartSensor G2

Physical measurements

SPECIFICATIONS

Temperature measurement (machine skin temperature)

Measurement range	-40 °C to +85 °C
Resolution	0.1 °C
Accuracy	+/-0.5 °C

Vibration measurement

Acceleration, low frequency (x, y, z direction)

Amplitude range	0.03 - 157 m/s ² (16g)
Frequency bandwidth	0.1 Hz - 1.5 kHz

Acceleration, high frequency (z direction)

Amplitude range	0.1 - 450 m/s ² (50g)
Frequency bandwidth	100 Hz - 20 kHz

Magnetic field measurement

Magnetic field (x, y, z direction)

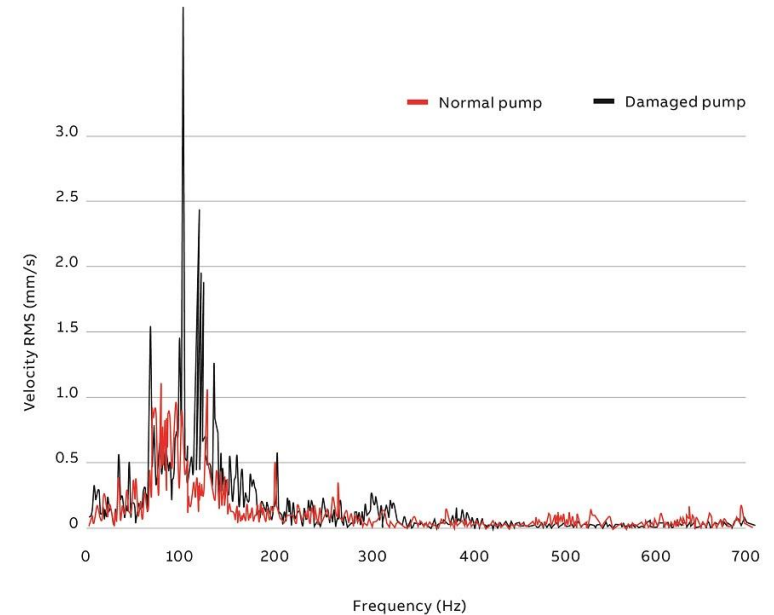
Amplitude range	1 - 1600 μ T
Frequency bandwidth	0.1 - 250 Hz

Ultrasonic sound measurement

Microphone

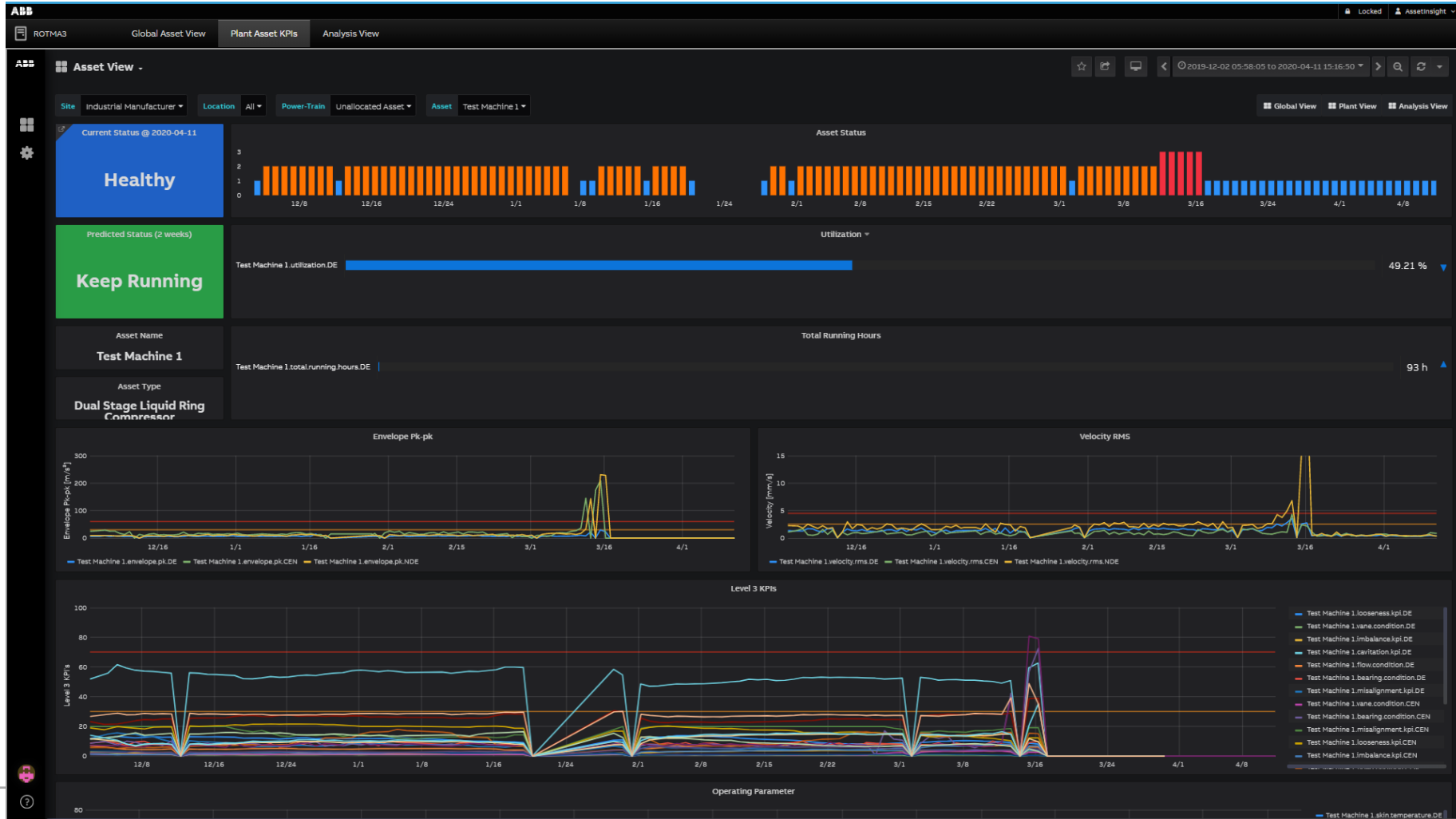
Amplitude range	0.6 mN/m ² - 20 N/m ²
Frequency bandwidth	100 Hz - 80 kHz

FFT



Asset Detail View

Level 1 KPI's , Time series view for envelope peak2peak and velocity RMS and Level 3 KPI's



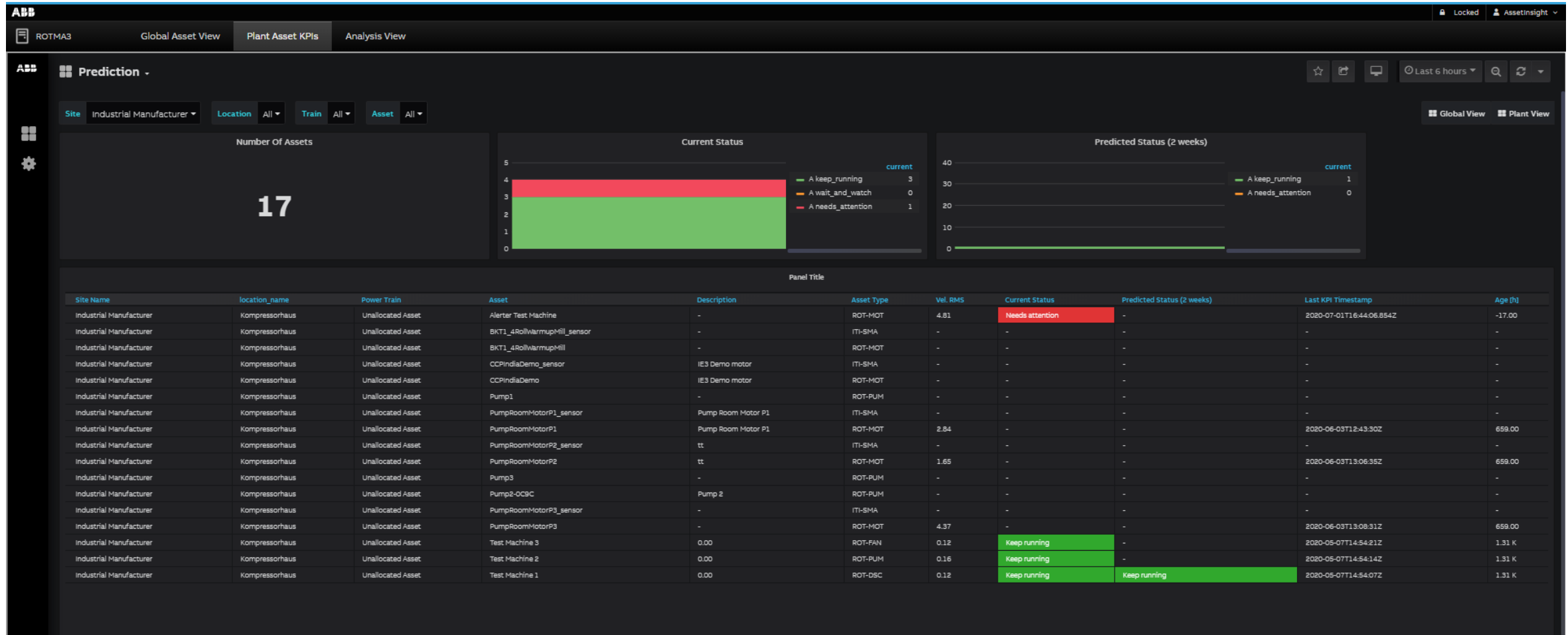
Asset Raw Data - Analyst view

Velocity and envelope FFT data view for ABB Analyst user

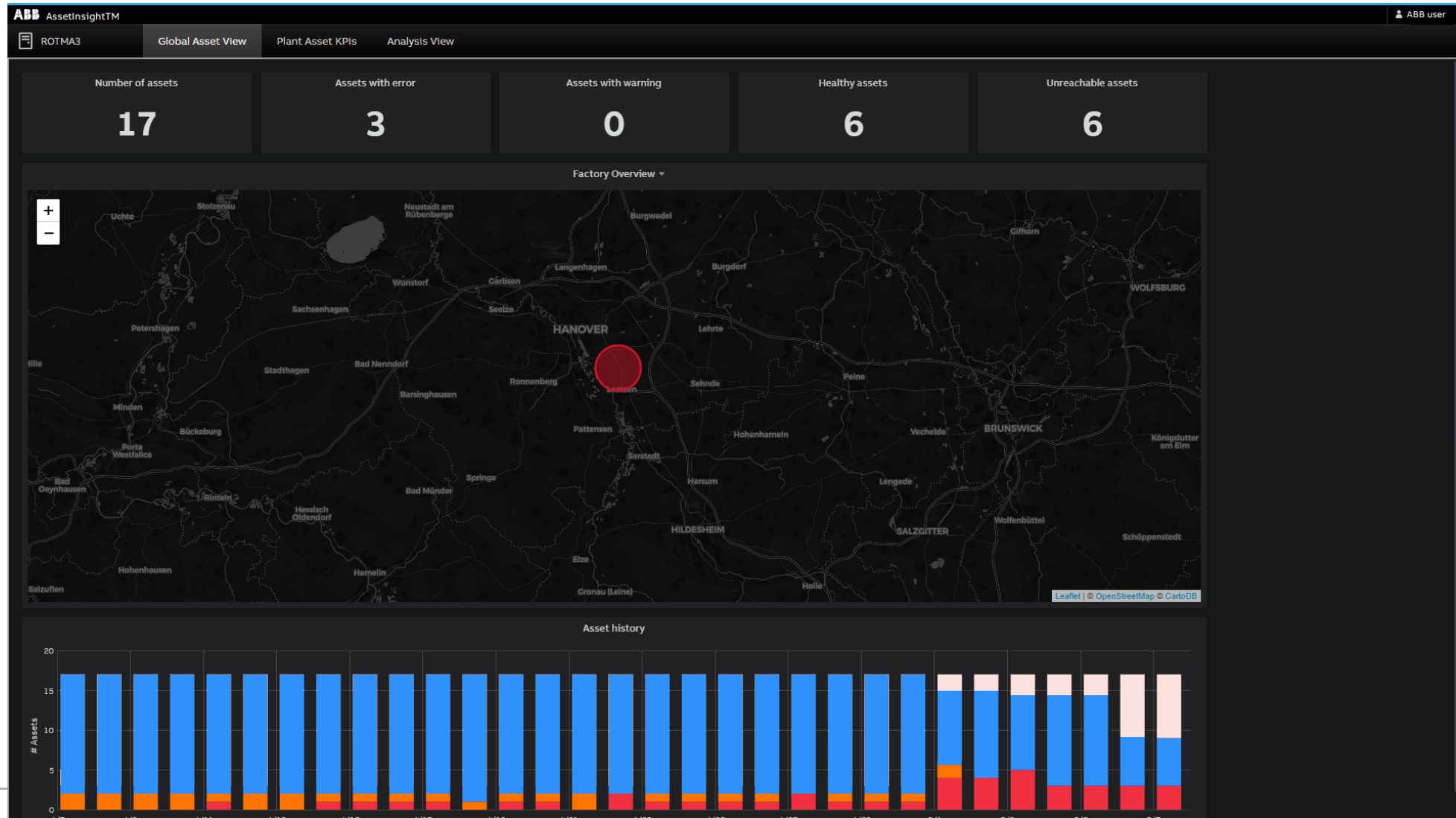


Predicted status view

Fleet overview with predicted status indication

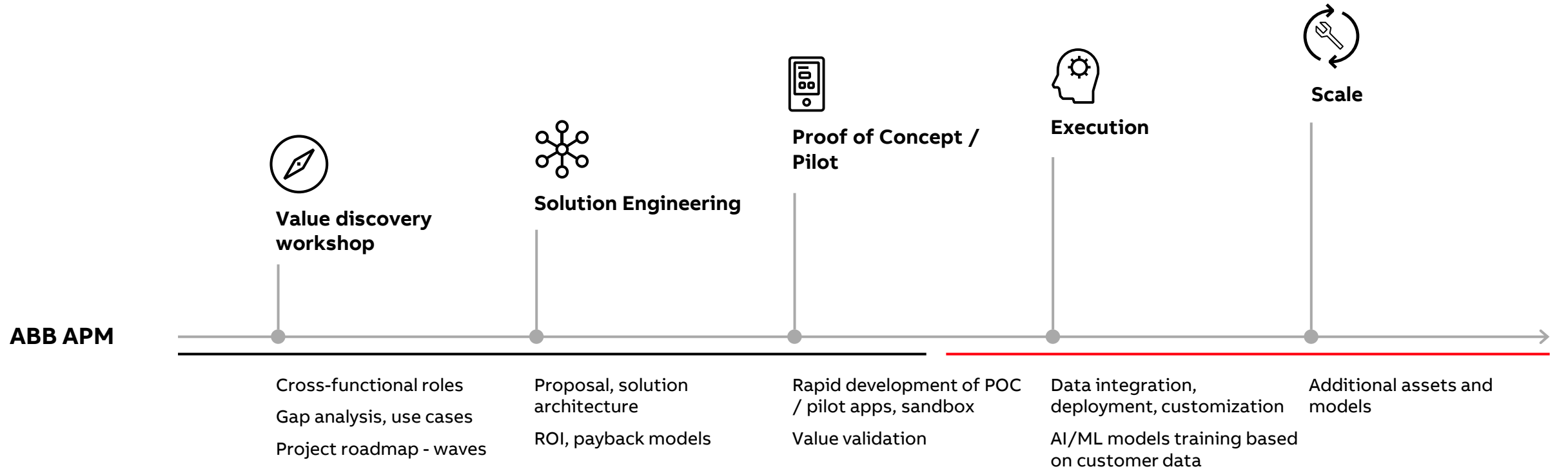


Global Enterprise Asset Fleet Overview – aggregated asset status and history view



How to get started

Next steps with ABB



Next Steps



Today:

Identify “bad actor” assets or priority asset failure concerns

In a few months:

Understand your Maintenance and Digitalization strategies – how do those impact your asset integrity?

Next Month?

Try and Buy kit - AssetInsight

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