



Serie di webinar Sezione ANIMP-DIM (Digital & Innovation Management)  
IA per l'Impiantistica

22/01/2025 | h. 16:00

**Manutenzione evoluta nell'era dell'IA  
Digital Reliability Platform:  
manutenzione proattiva  
e incremento dell'affidabilità degli asset**



# Manutenzione evoluta nell'era dell'IA

Digital Reliability Platform: manutenzione proattiva e incremento dell'affidabilità degli asset

---

22/01/2025



a cura di:  
***Ilaria Michelizzi***  
*Southern Europe*  
*Presales Manager*  
**AVEVA**



ANIMP Sezione DIM (Digital & Innovation Management)  
Serie di webinar: IA per l'Impiantistica







---

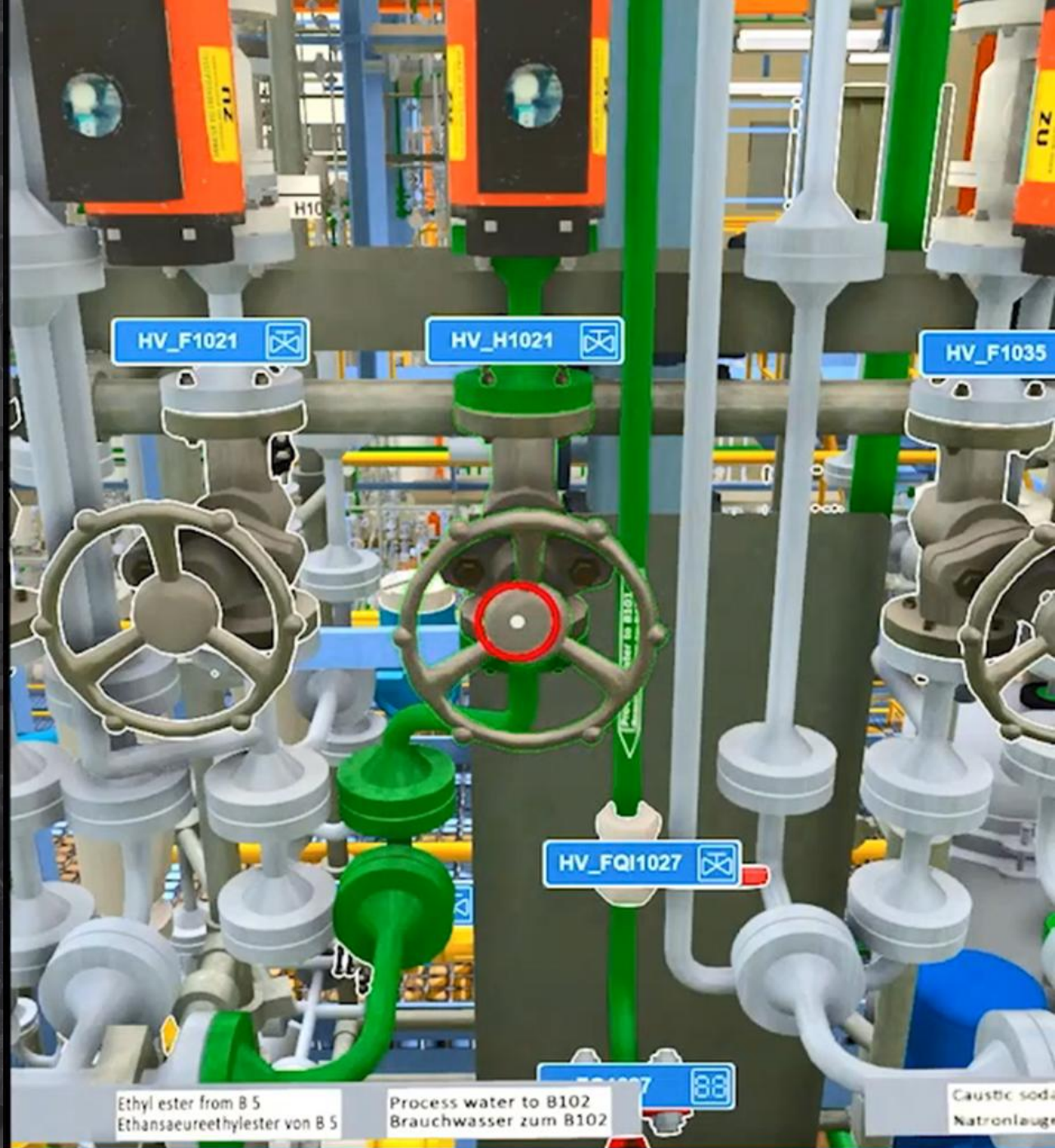
In ways, industry  
hasn't changed

- Laws of physics
- Increasing production
- Minimizing waste

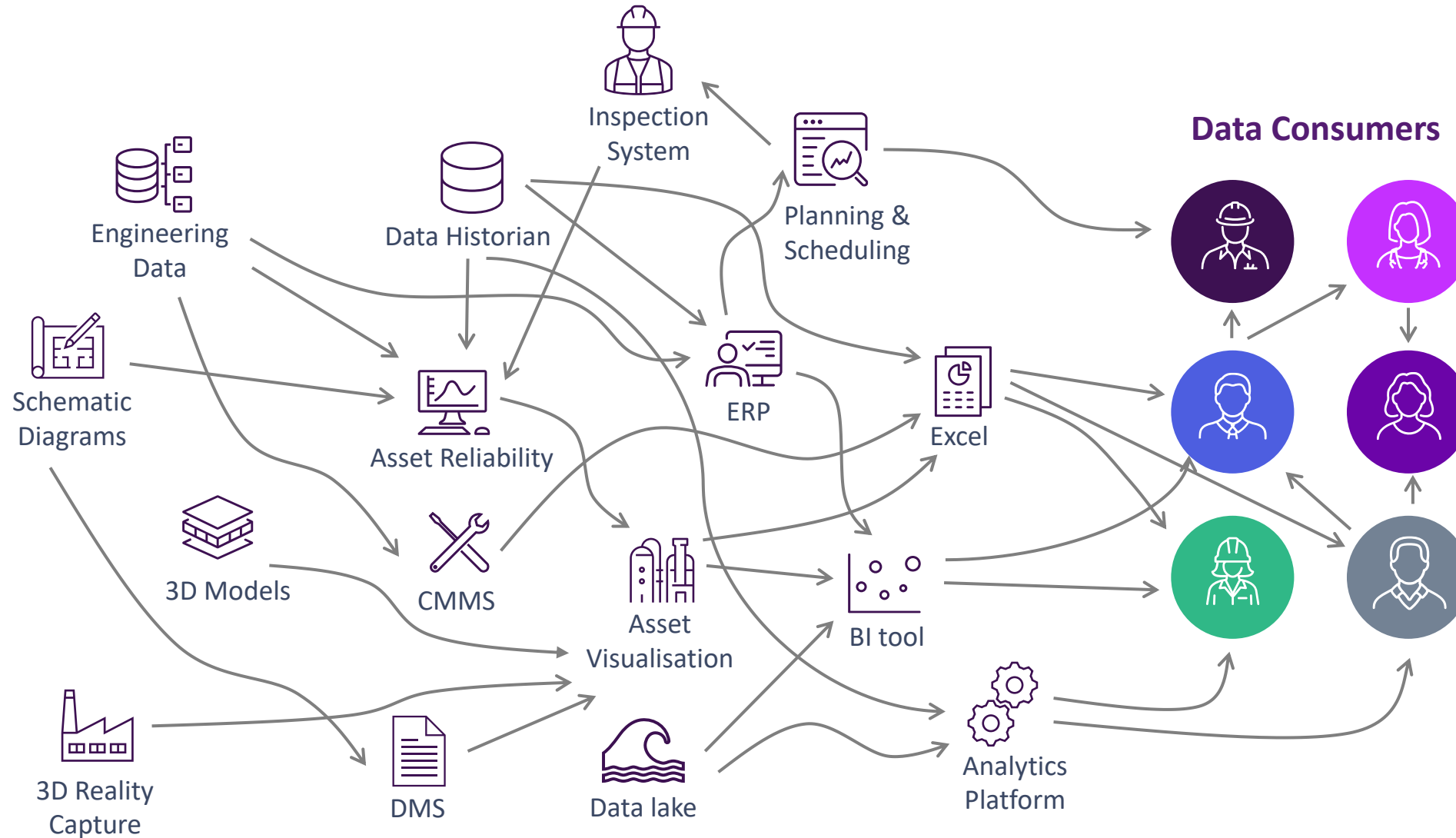


But in many ways,  
it has

- Market forces
- Changing technology
- Expectations of a skilled, mobile workforce



# The data challenge – extract value from the data







Up to  
**73%**  
of all data collected within  
enterprises goes unused



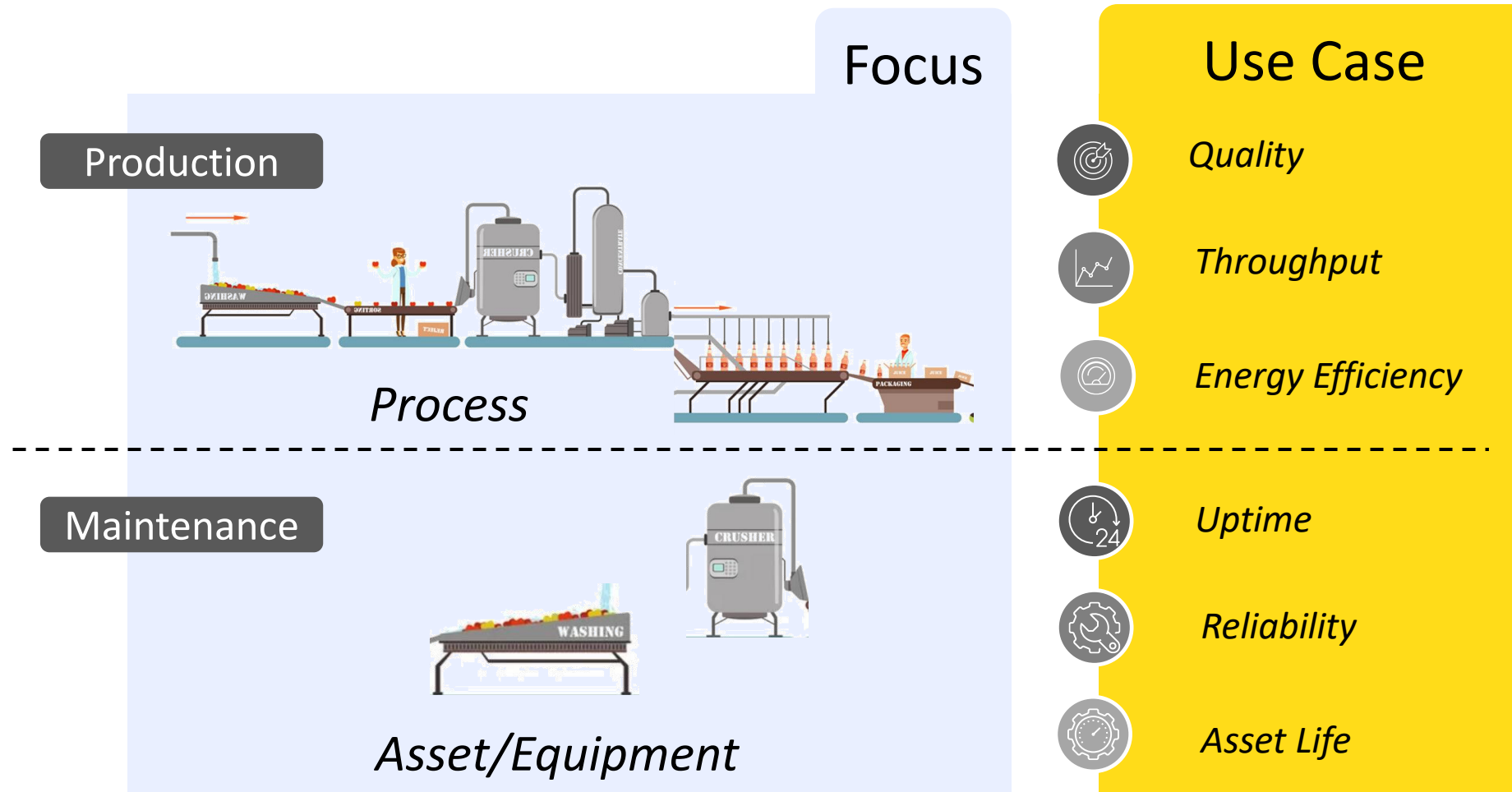
Fewer than

# 10%

% of enterprises are advanced  
in their insights-driven capabilities



# AI drive improvements for Assets & Process





# Industry challenges

Predictive maintenance can enable **10-20% reduction in OPEX**



**Maintenance and  
performance  
optimization**

**70%**

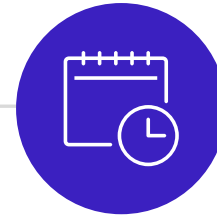
Operators are unaware of  
when to replace, upgrade  
or maintain assets <sup>3</sup>



**Asset  
failures**

**82%**

82% of asset failures are  
random<sup>1</sup>



**Unscheduled  
downtime  
avoidance**

**\$260K**

Average cost of industrial asset  
downtime/hour <sup>2</sup>



**Safety risk  
management**

**Major accident  
hazards**

Failure to address major  
accident hazards leads to  
injury, loss of profits and  
reputational damage

Sources: 1. [Arcweb.com](https://www.arcweb.com), 2. [Aberdeen](https://www.aberdeen.com) 3. [Vanson Bourne](https://www.vansonbourne.com)

# What are our maintenance options?

## Reactive

“Break-Fix”  
Run to failure



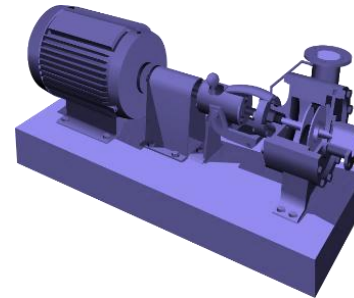
## Preventative

Calendar-based



## Condition Based

Repair based on insight



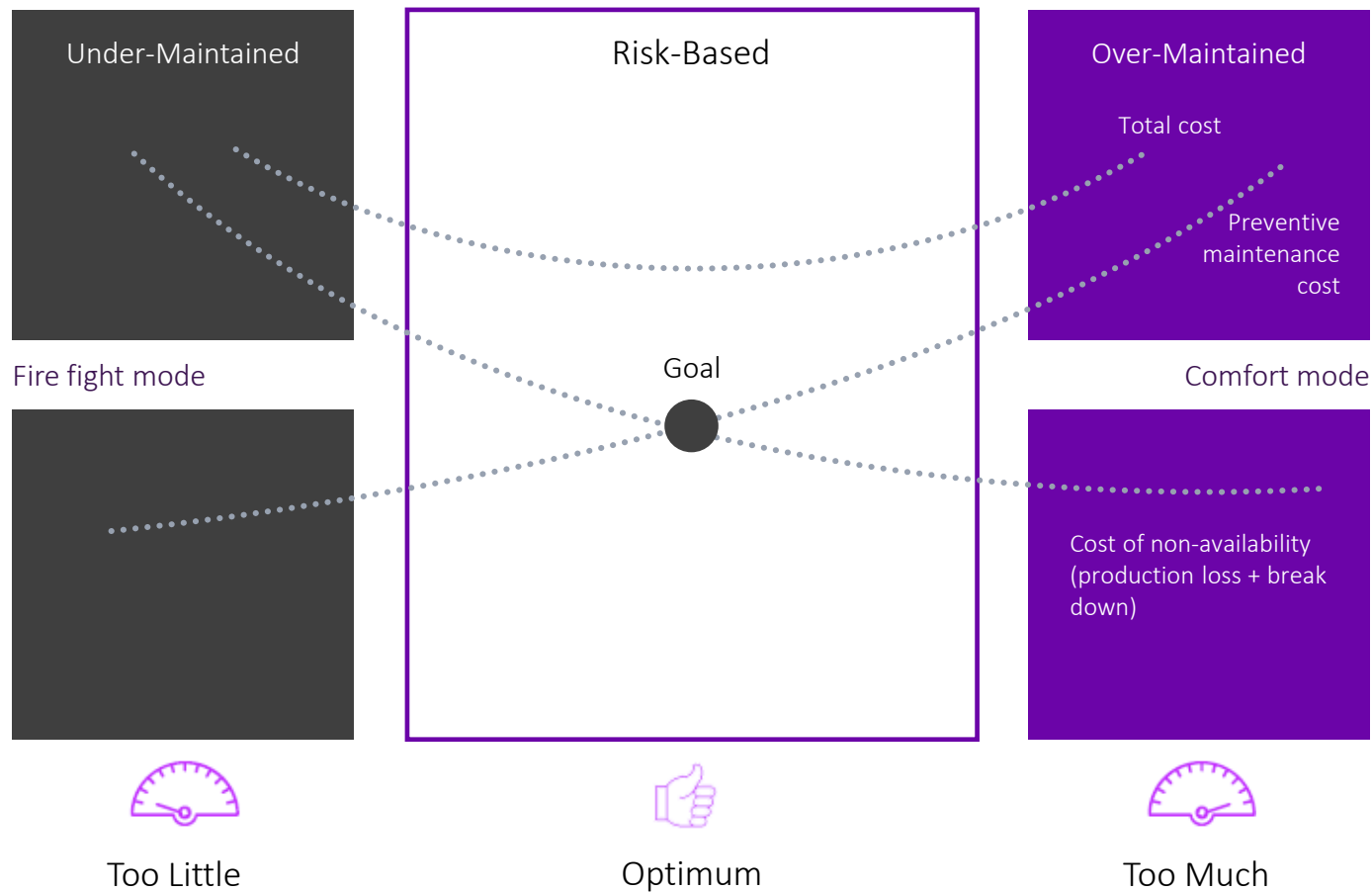
## Predictive

Advanced Pattern  
Recognition





# Is your asset strategy optimized?



Reduce Downtime



Prevent Asset Failures



Reduce Maintenance Costs



Improve Safety



Extend Equipment Life



Optimize Asset Strategy

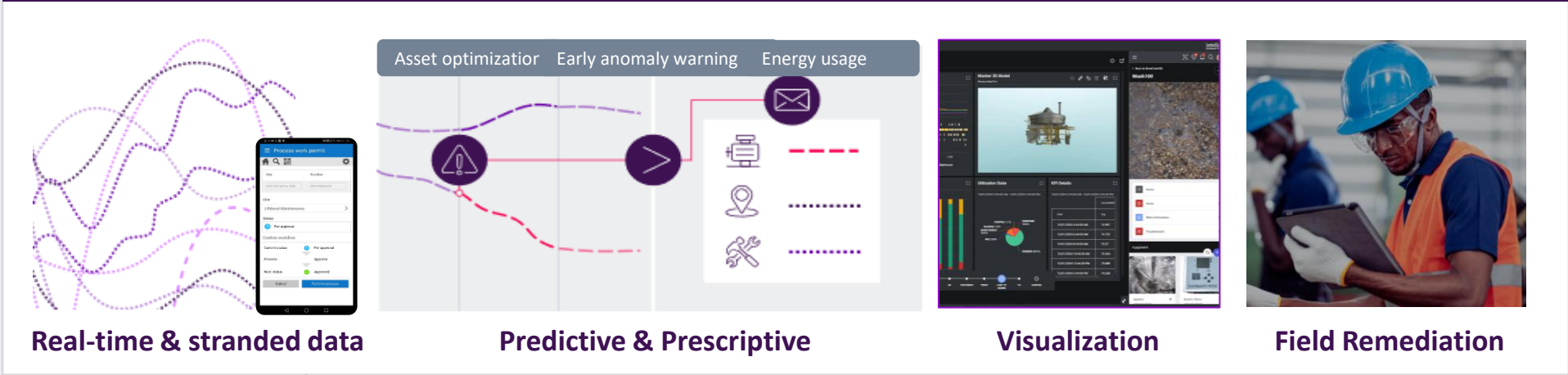
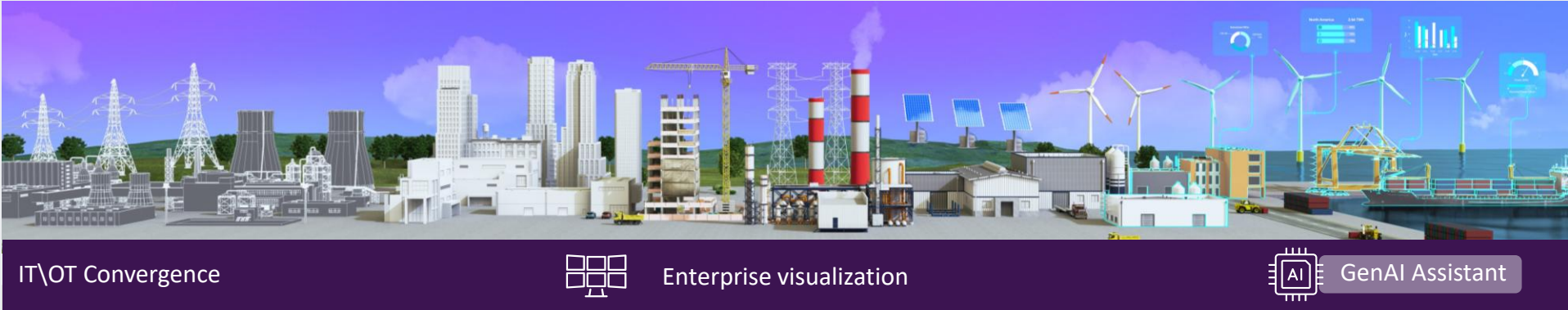
Asset Strategy

Asset Analytics

Maintenance Execution

Define  
**optimized**  
Asset  
Performance  
**Strategy**

Fit for  
purpose,  
**actionable**  
**insights**

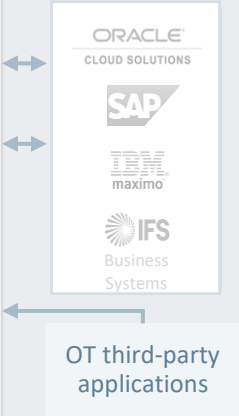


**Access** to massive volumes  
of rich operational data

Apply **CBM**, **OEE** analysis,  
and **machine learning** for **AI**  
**driven insights** and closed  
loop remediation

**Add Engineering**  
**information in context**  
to optimize planning  
and scheduling

**Safe and efficient**  
execution of work







## 4IR - Future is Now

Integrated monitoring center supporting remote operations and decision making

Connectors for 400+ data sources

1D, 2D and 3D visualizations

Connected Information Model

Dashboards w/real-time updates

Asset Performance Management - Predictive Analytics (AI enabled) for up to 10,000 assets

### ENERGY INTENSITY KPI

#### CORPORATE



ENERGY (MMBtu/h)  
71.0K  
2.4 | 4%

PRODUCT (MMBoe)  
13.6K  
226.0 | 2%



#### DOWNSTREAM



ENERGY (MMBtu/h)  
71.0K  
2.4 | 4%

PRODUCT (MMBoe)  
13.6K  
226.0 | 2%

#### UPSTREAM



ENERGY (MMBtu/h)  
71.0K  
2.4 | 4%

PRODUCT (MMBoe)  
13.6K  
226.0 | 2%

### HYDROCARBON DISCHARGE TO MARINE



AVEVA

---

# Data Infrastructure

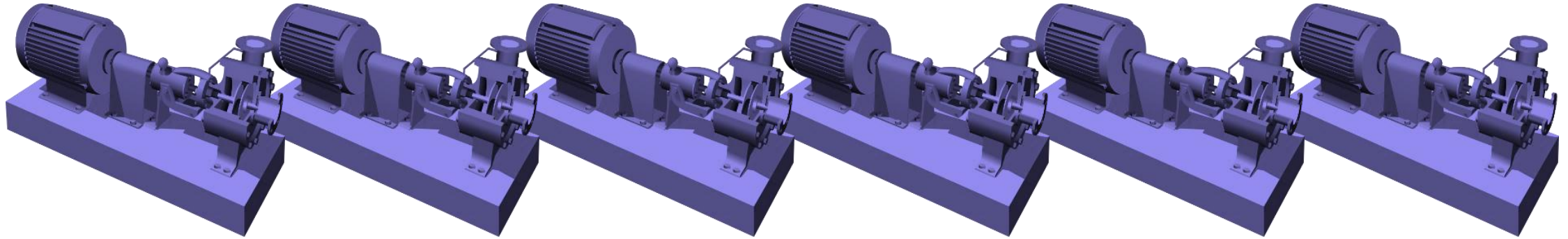
The heart of the system

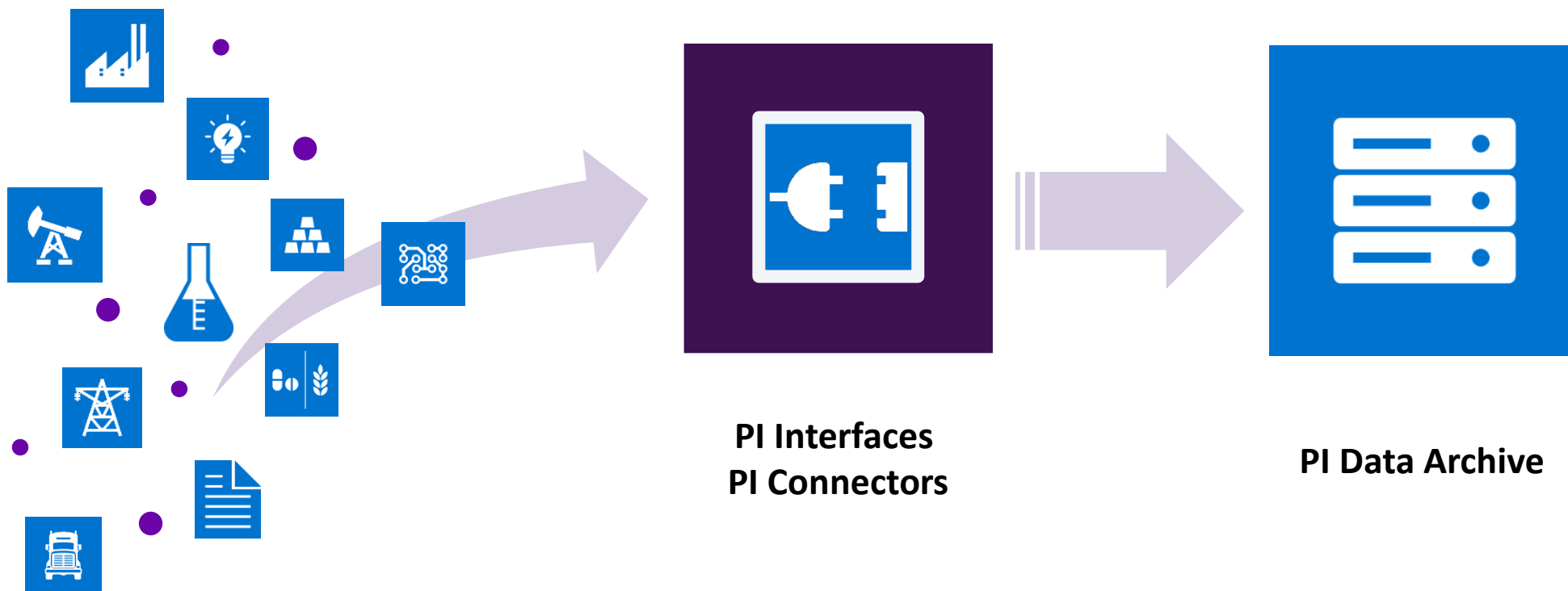
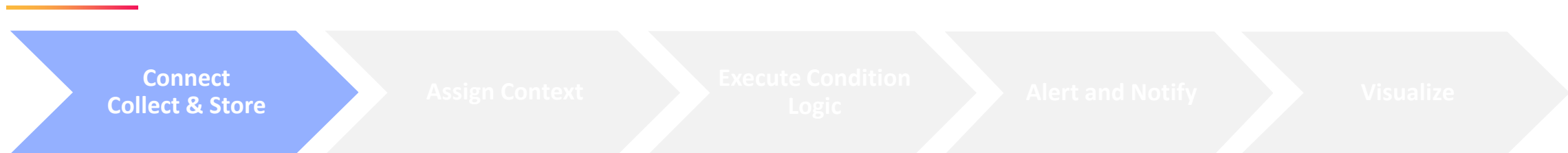


AVEVA



Are all of my pumps healthy today?







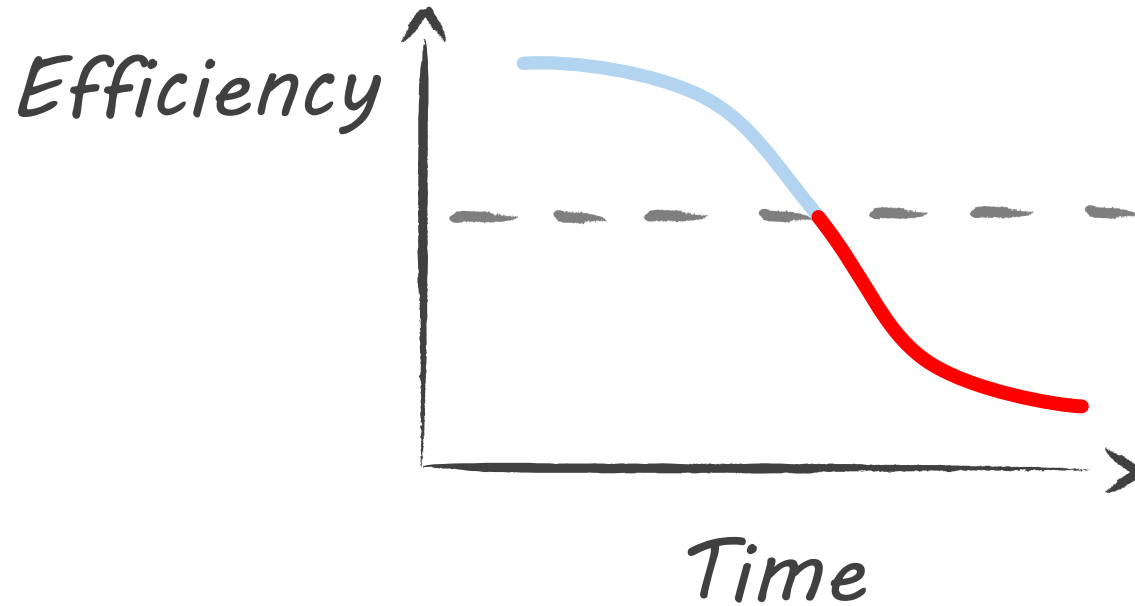
Connect  
Collect & Store

Assign Context

Execute Condition  
Logic

Alert and Notify

Visualize



LAST MAINTENANCE
BY _____
DATE _____

$$\frac{\text{Flowrate} \times \text{Head}}{\text{Horsepower}}$$

Connect  
Collect & Store

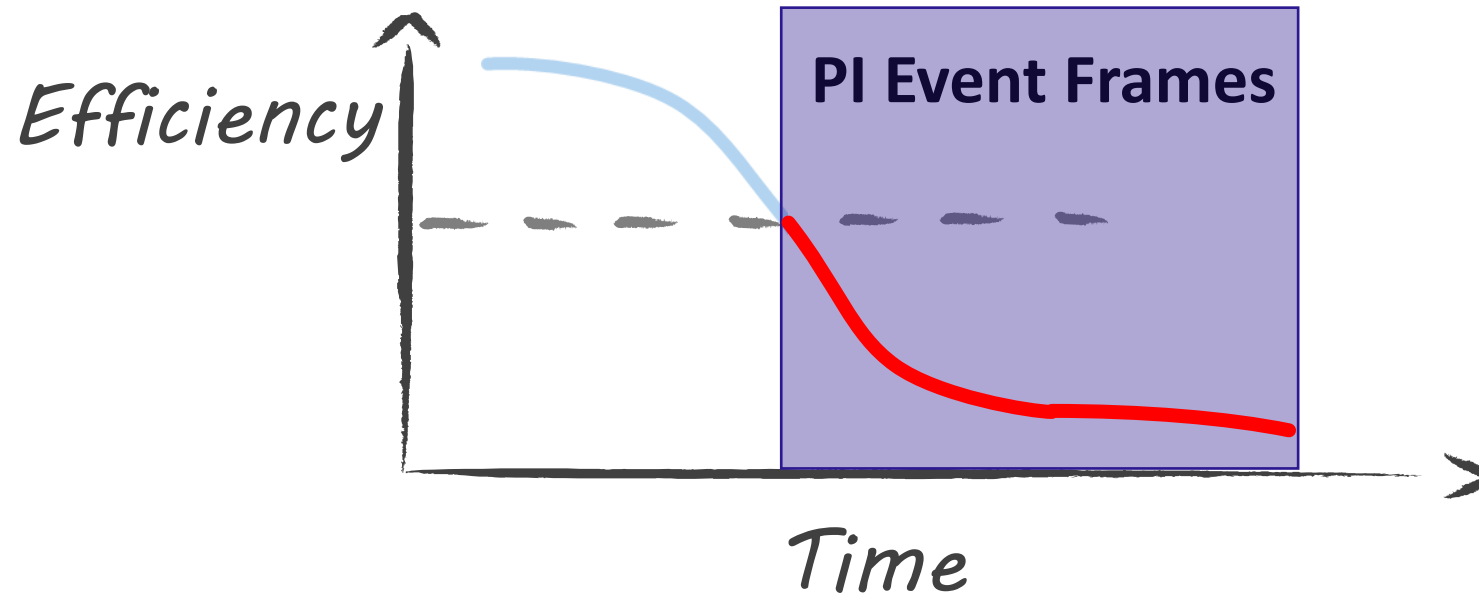
Assign Context

Execute Condition  
Logic

Alert and Notify

Visualize

Pump  
Efficiency < 75%





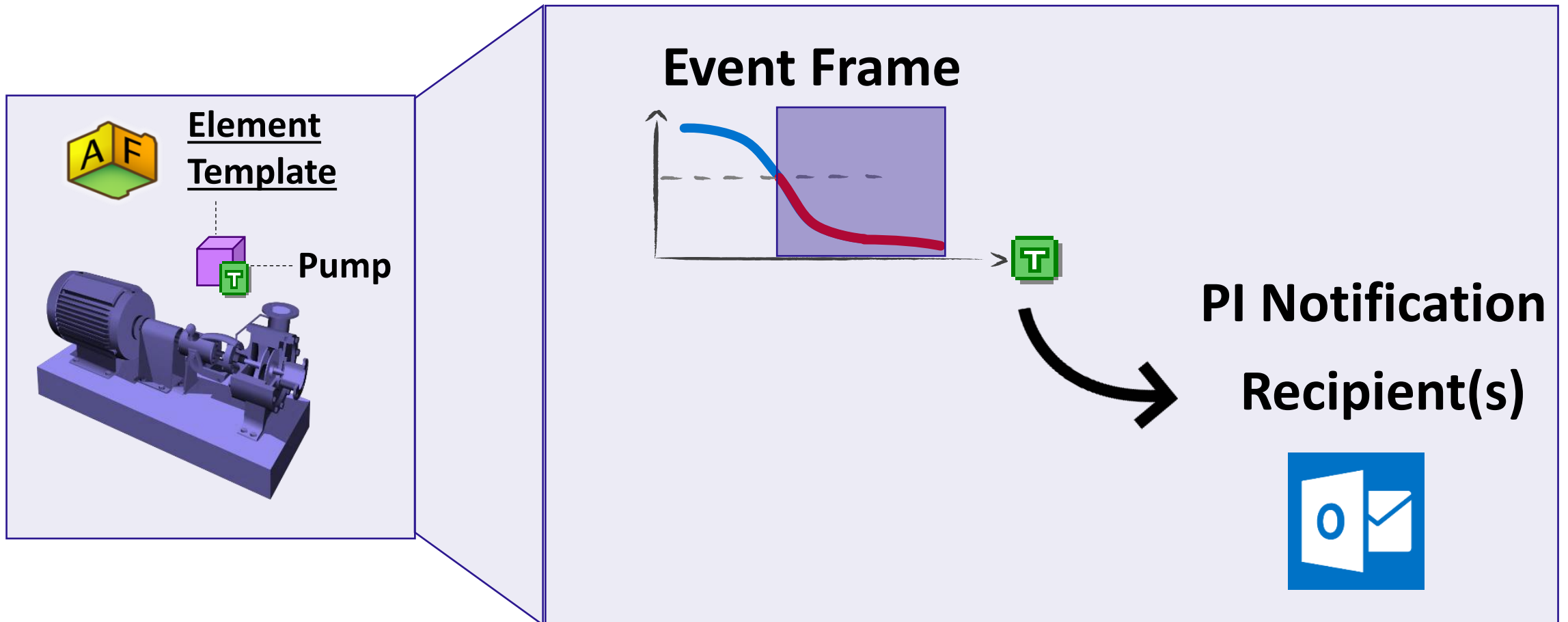
Connect  
Collect & Store

Assign Context

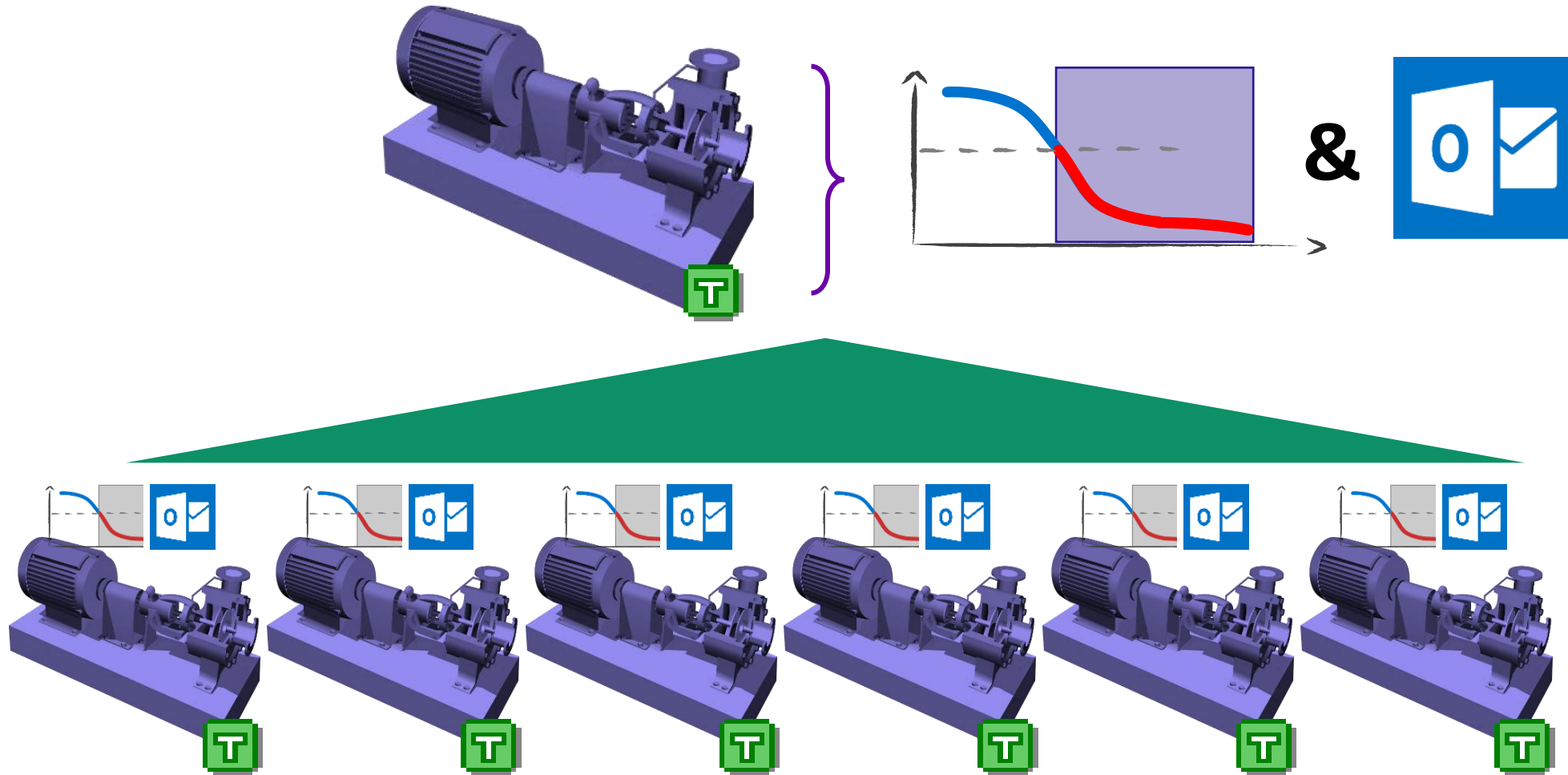
Execute Condition  
Logic

Alert and Notify

Visualize



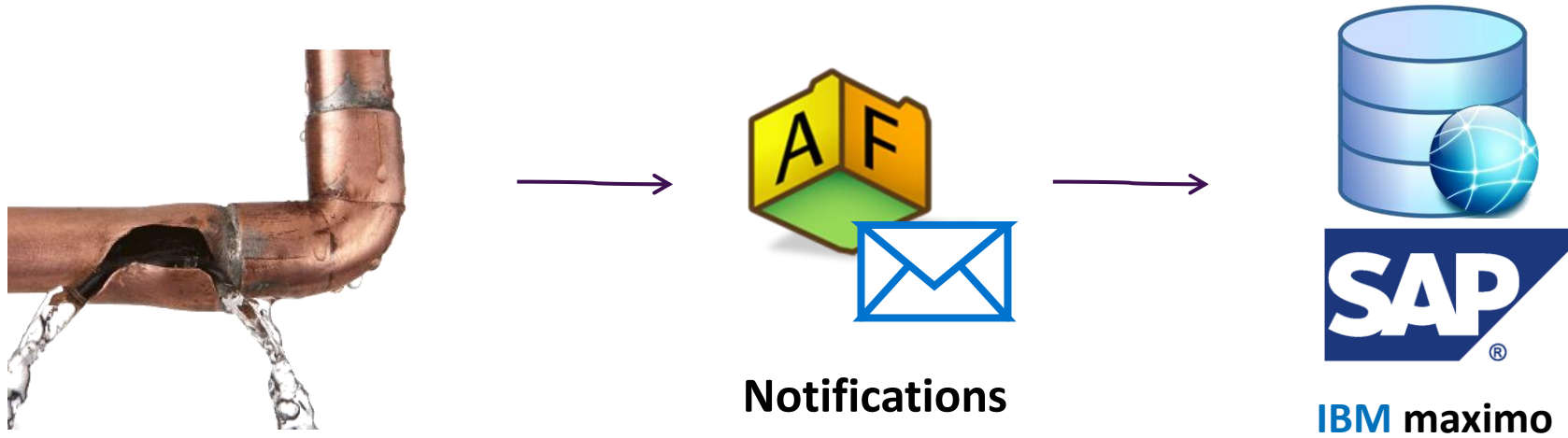
# Reuse Your Template





# Beyond basics: Notifications to a CMMS

Computerized Maintenance Management System



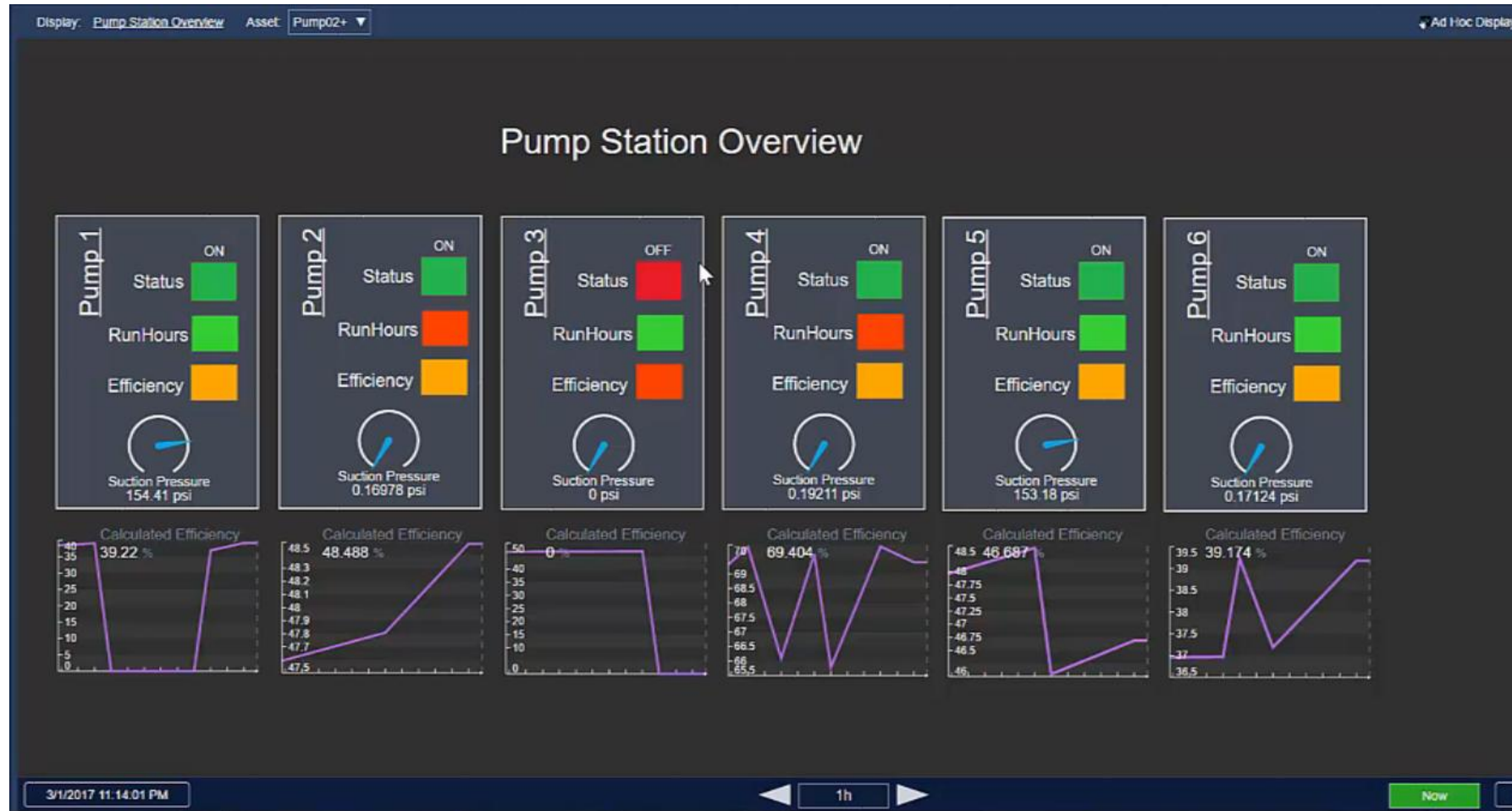
Connect  
Collect & Store

Assign Context

Execute Condition  
Logic

Alert and Notify

Visualize





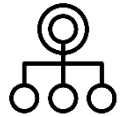
Connect  
Collect & Store

Assign Context

Execute Condition  
Logic

Alert and Notify

Visualize



Speaks to your data sources



No IT Skills Needed

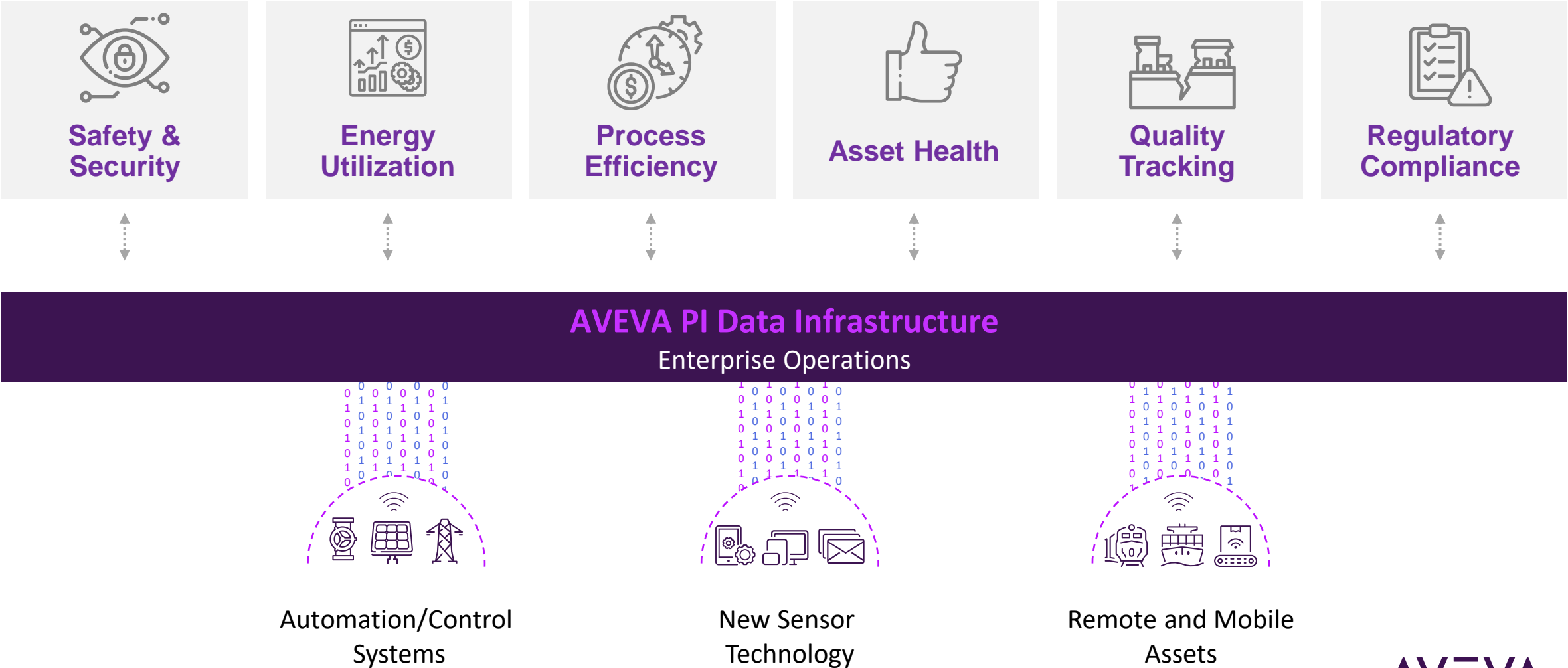


Built for Industry Experts



AVEVA

# A real-time data infrastructure across the Enterprise



---

# Predictive Maintenance

AI for anomaly detection



AVEVA





What were the signs  
this might happen?

How much will it cost  
your organization?

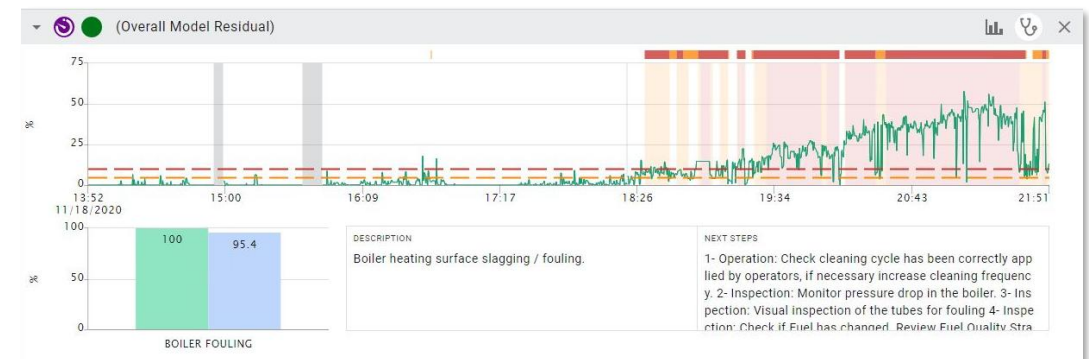
Take action before the  
next failure.





# AVEVA Predictive Analytics

- Anomaly detection for business-critical equipment.
- Advanced pattern recognition with sensors contribution, failure modes and prescriptive actions for reliable troubleshooting.

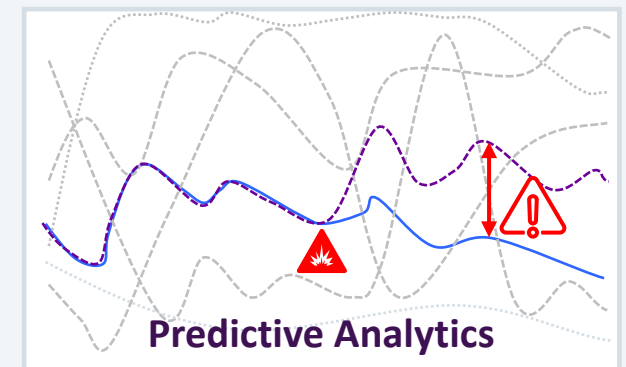
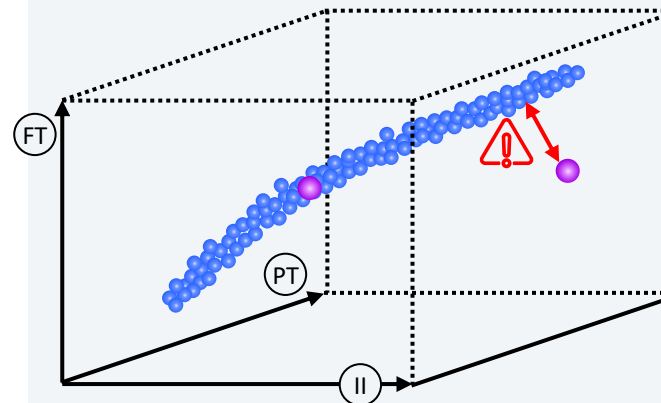
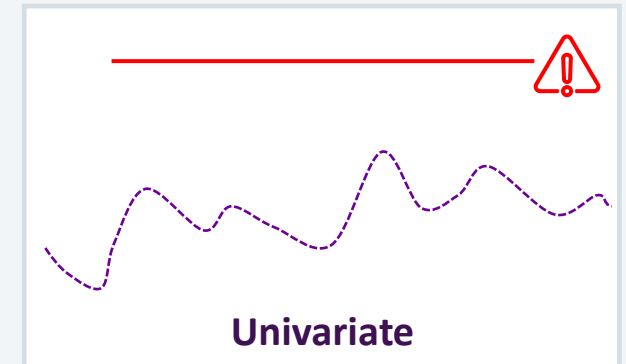
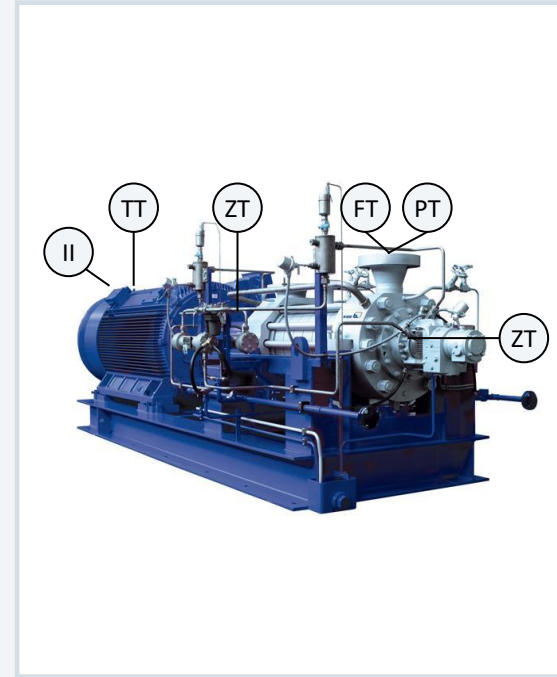


# AI-driven analytics and risk mitigation

## Predictive failure detection for business-critical equipment

- No code AI and machine learning
- Advanced alert and case management for knowledge capture and reporting
- Templates accelerate configuration, deployment and scale-up

**It's the way you operationalize and scale AI for industrial operations**

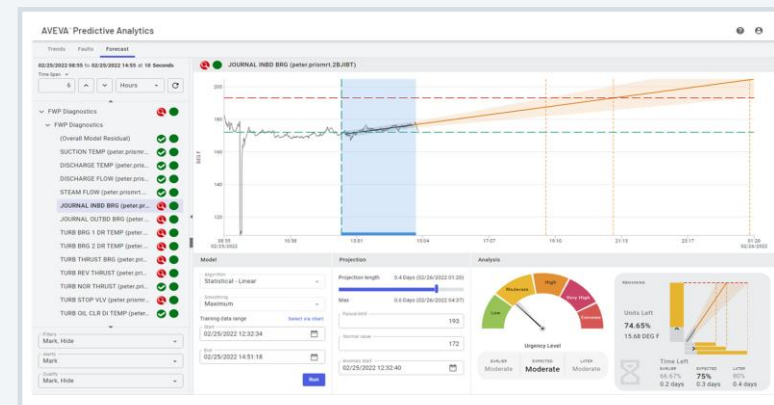
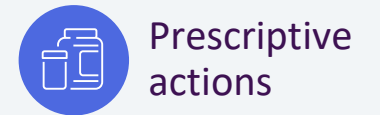
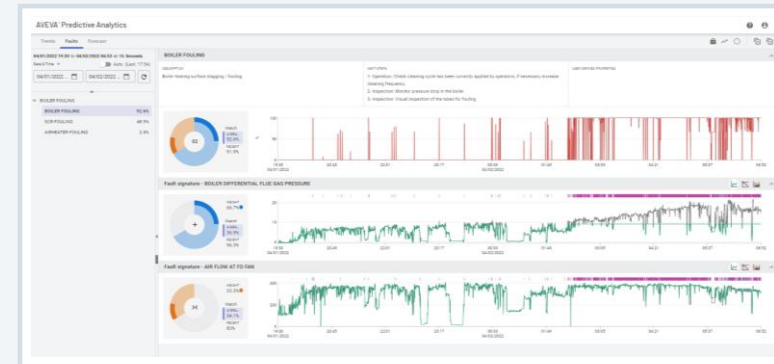


**AVEVA**



# Solution: AI-driven analytics and risk mitigation

- Monitor health in real time – early identification of anomalies via anomaly index and drill-down to contributing signals
- Rank and diagnose faults based on anomaly deviation signature
- Obtain prescriptive guidance for remediation
- Forecast and track burndown of time until failure



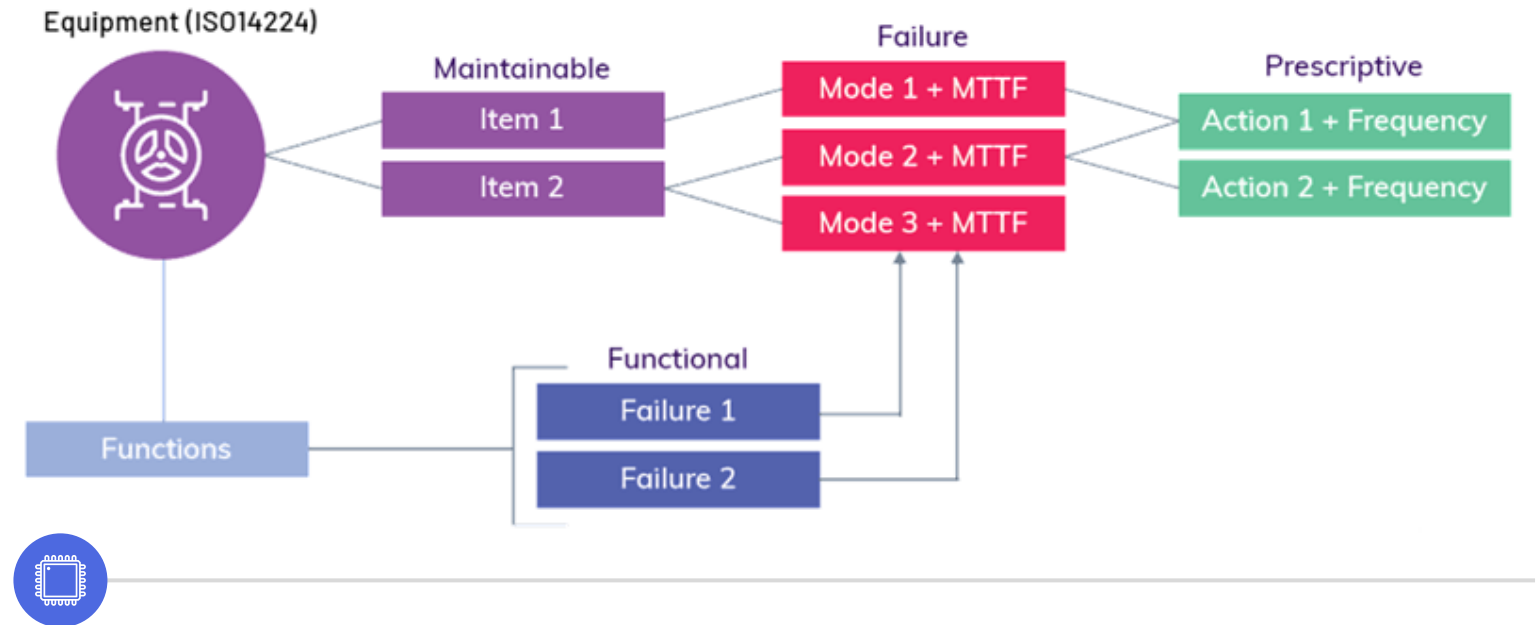
# Fault + Prescriptive Asset Library - Deployment Acceleration

## AVEVA Asset Strategy Library



**By adding data and asset templates to the solution strategy deployment can be done up to 90% faster.**

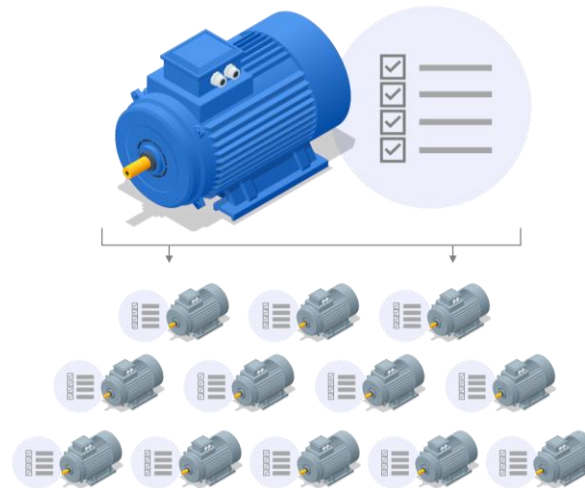
The AVEVA Asset Library contains RCM-based equipment failure data and preventive maintenance for the most commonly found asset types in asset-intensive industries:



- 1,000 components
- 1,500 failure causes with failure conditions
- 2,000 preventative tasks
- 5,000 prescriptive tasks
- 20 years and 22,000 man-hours of experience



Deep integration  
to PI System for  
contextualized  
insights



**Native PI Integration**  
**Bulk Model Building**



---

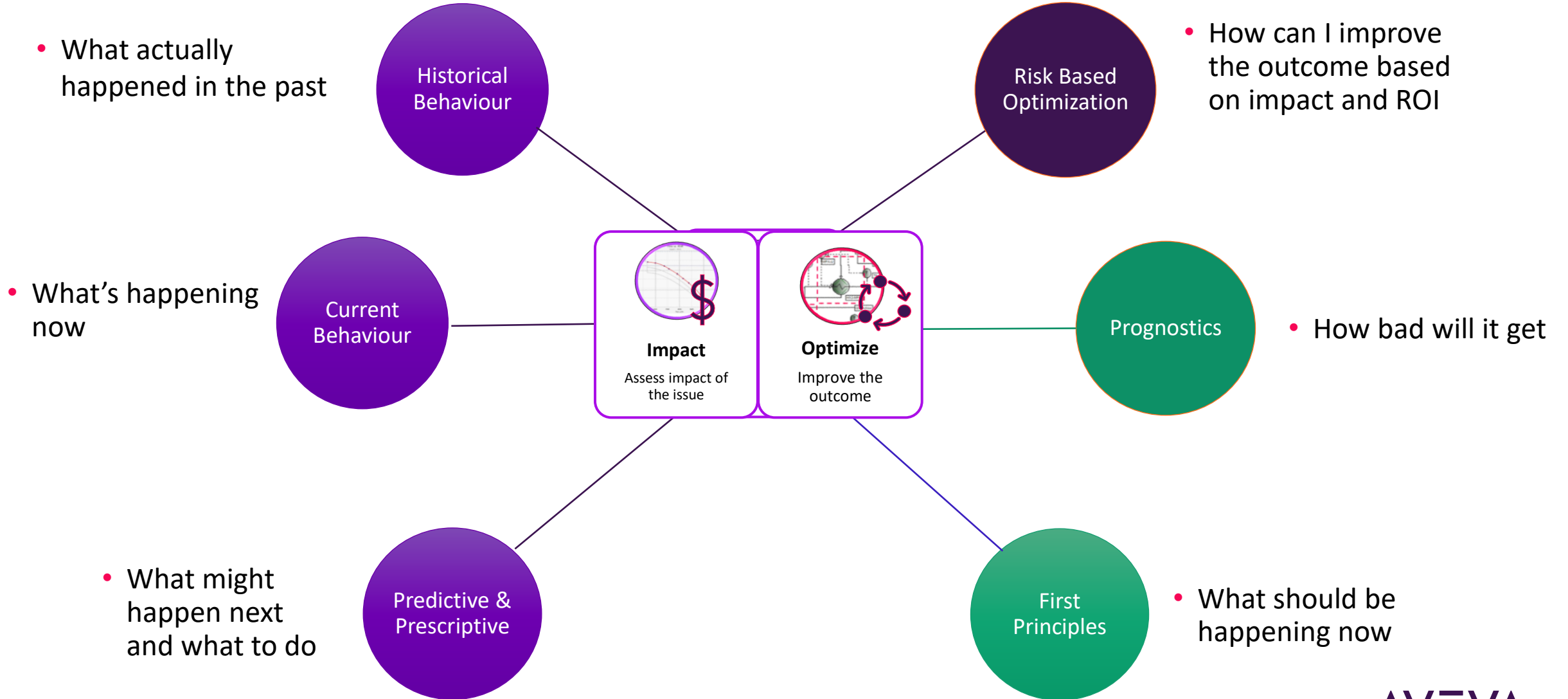
# Predictive Asset Optimization

Combining AI with  
Performance Computation

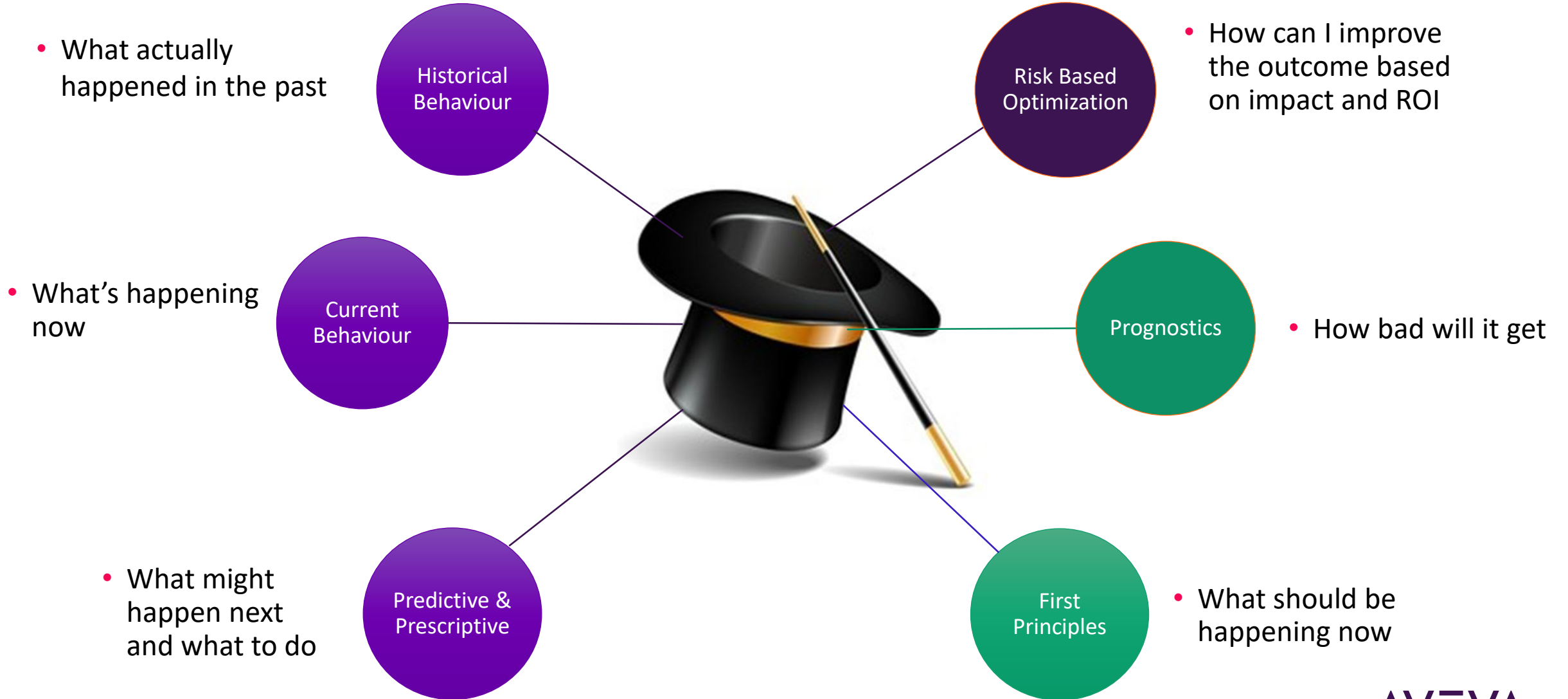


AVEVA

# Which benefits from Hybrid AI modelling?

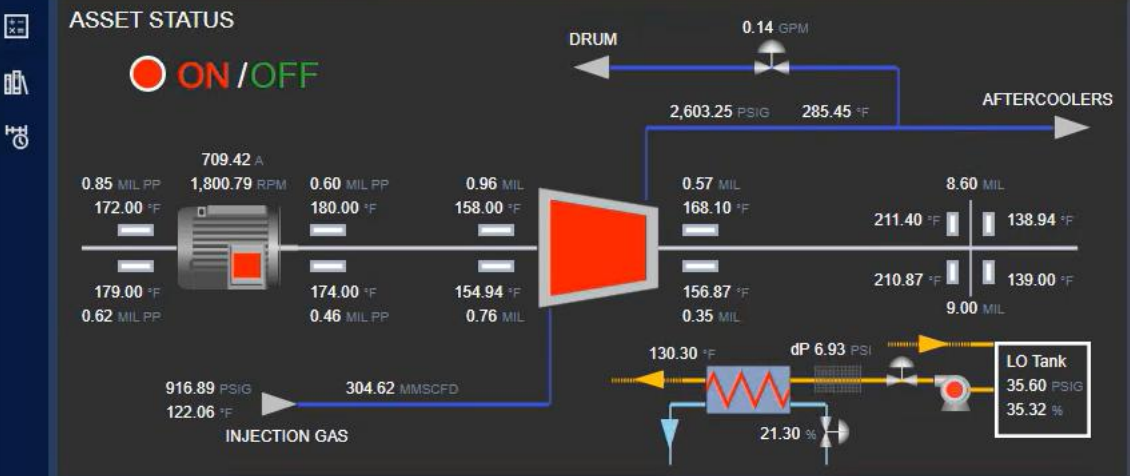


# Which benefits from Hybrid AI modelling?





Motor Driven Centrifugal Compressor



MECHANICAL

Name	Description	Value	Units	Trend	Minimum	Maximum
Motor_Mechanical Brg	Bearing Vibration X Drive End	0.5978	MIL PP		0.4636	0.7145
Motor_Mechanical Brg	Bearing Vibration X Non Drive End	0.8513	MIL PP		0.7203	0.9858
Motor_Mechanical Brg	Bearing Vibration Y Drive End	0.4565	MIL PP		0.3377	0.5856
Motor_Mechanical Brg	Bearing Vibration Y Non Drive End	0.6244	MIL PP		0.5647	0.6937

Name	Description	Value	Units	Trend	Minimum	Maximum
Mech BrgAxialDis1	Axial Position 1	8.5991	MIL		8.4290	8.7701
Mech BrgAxialDis2	Axial Position 2	8.9966	MIL		8.7912	9.0583
Mech BrgDEVibXDis	Bearing Vibration X Drive End	0.5704	MIL		0.4961	0.7399
Mech BrgDEVibYDis	Bearing Vibration Y Drive End	0.3479	MIL		0.2182	0.4348
Mech BrgNDEVibXDis	Bearing Vibration X Non Drive End	0.9555	MIL		0.8746	1.1177
Mech BrgNDEVibYDis	Bearing Vibration Y Non Drive End	0.7586	MIL		0.6085	0.8711

Name	Description	Value	Units	Trend	Minimum	Maximum
Lube_Oil LubeOilHdrPr	Lube Oil Header Pressure	35.5996	PSIG		34.1348	36.5743
Lube_Oil LubeOilTemp	Lube Oil Temperature After Cooler	130.3040	°F		129.9740	130.4572

ASSET HEALTH

MODEL	ANOMALY INDEX (OMR)	ALERT STATE	RUNTIME STATUS	# OF CASES
DRY GAS SEAL	1.68 %	NEW	CLEAR	1
GEARBOX MECHANICAL	2.24 %	CLEAR	CLEAR	2
LUBE OIL	0.37 %	NEW	CLEAR	3
COMPRESSOR MECHANICAL	2.68 %	NEW	CLEAR	4
MOTOR MECHANICAL	0.00 %	NEW	CLEAR	2
MOTOR THERMAL	0.00 %	CLEAR	CLEAR	1
PERFORMANCE	10.01 %	NEW	ALERT	4
PROCESS	0.21 %	NEW	CLEAR	3



---

# A full lifecycle Digital Twin

Connected industrial intelligence empowered by AI  
from Engineering to Operations and Maintenance

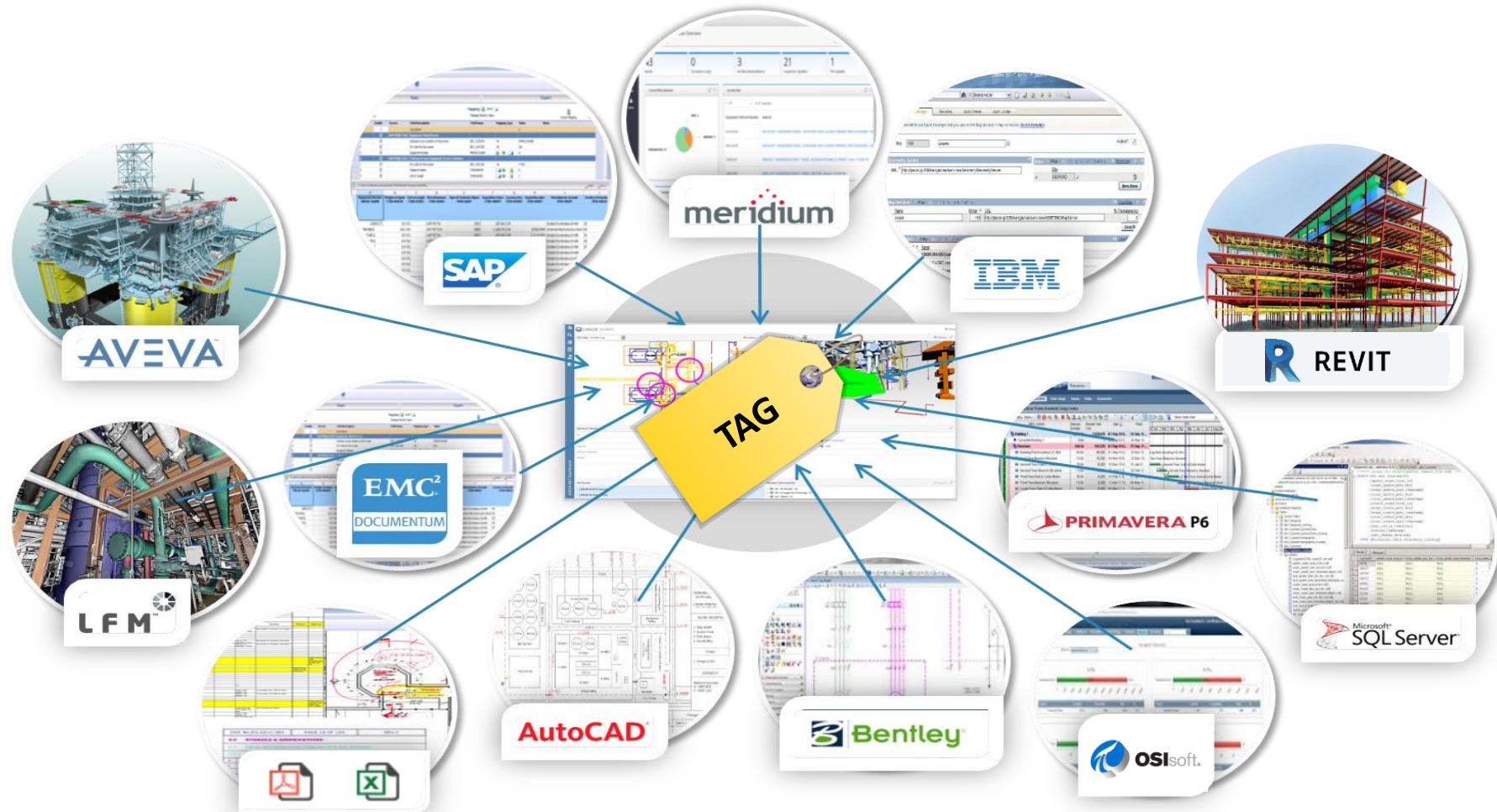


**AVEVA**



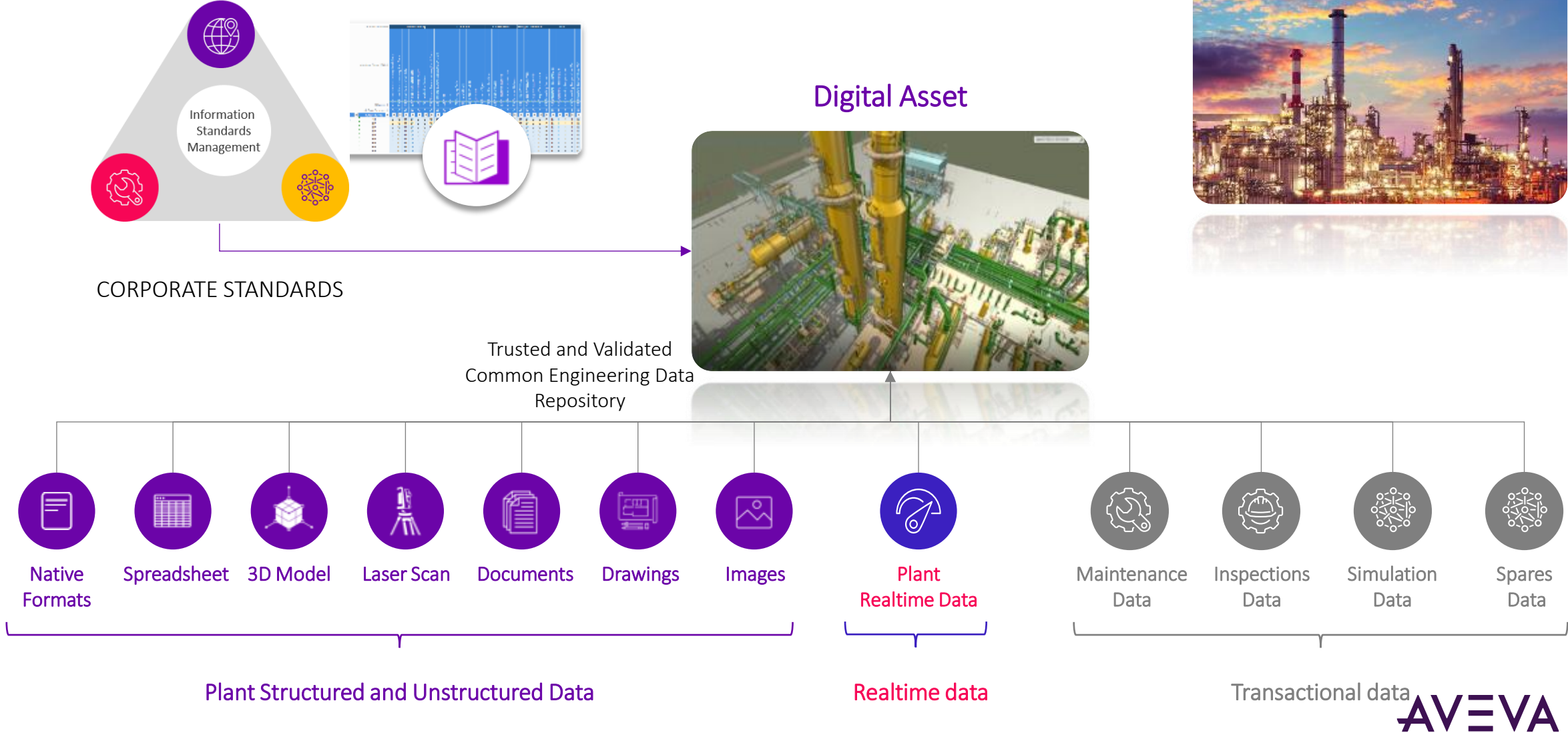
# AVEVA Asset Information Management

Single Unified View of all associated asset information



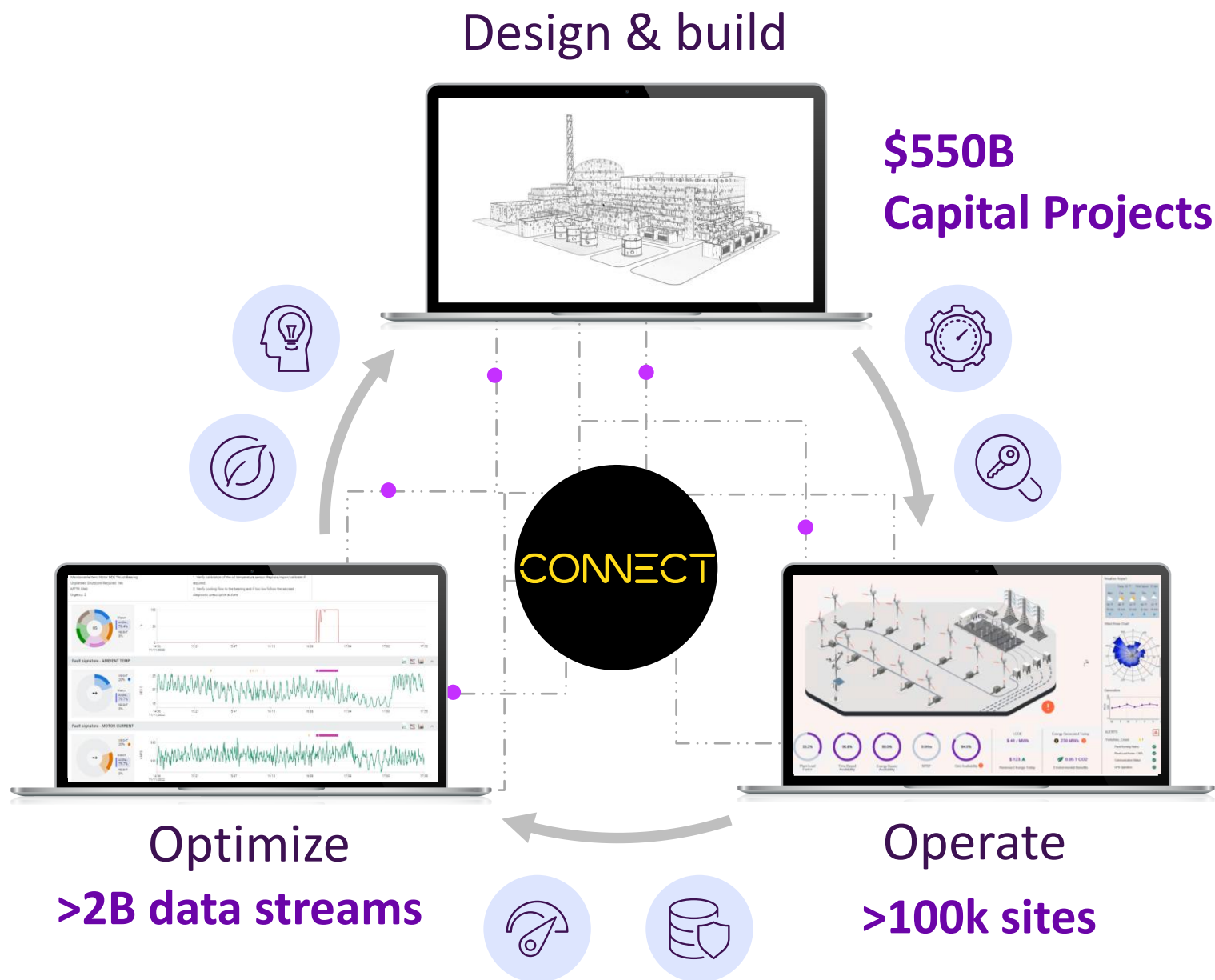


# Fast, easy access to asset information



# CONNECT

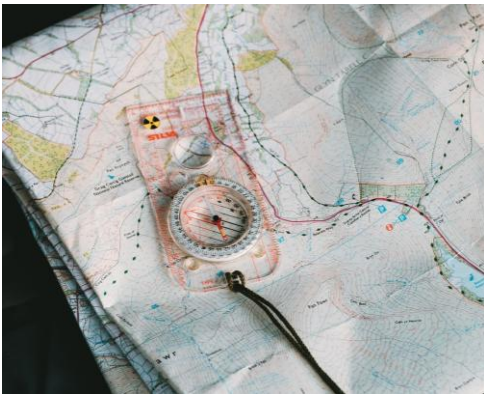
The industrial cloud platform to accelerate digital transformation with real-time data, rich AI, and robust insights



**AVEVA**

# Drive to unify

From



To

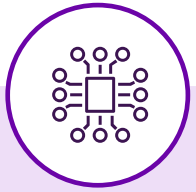




# Unlock cutting-edge data intelligence

To ensure optimal asset operation in the face of commercial pressure and market turbulence

What if...



...you could correlate data from every stage of an asset's lifecycle



...you could deploy advanced analytics and simulation to minimize fault impact



...you could fully access all related asset information in less than 3 minutes

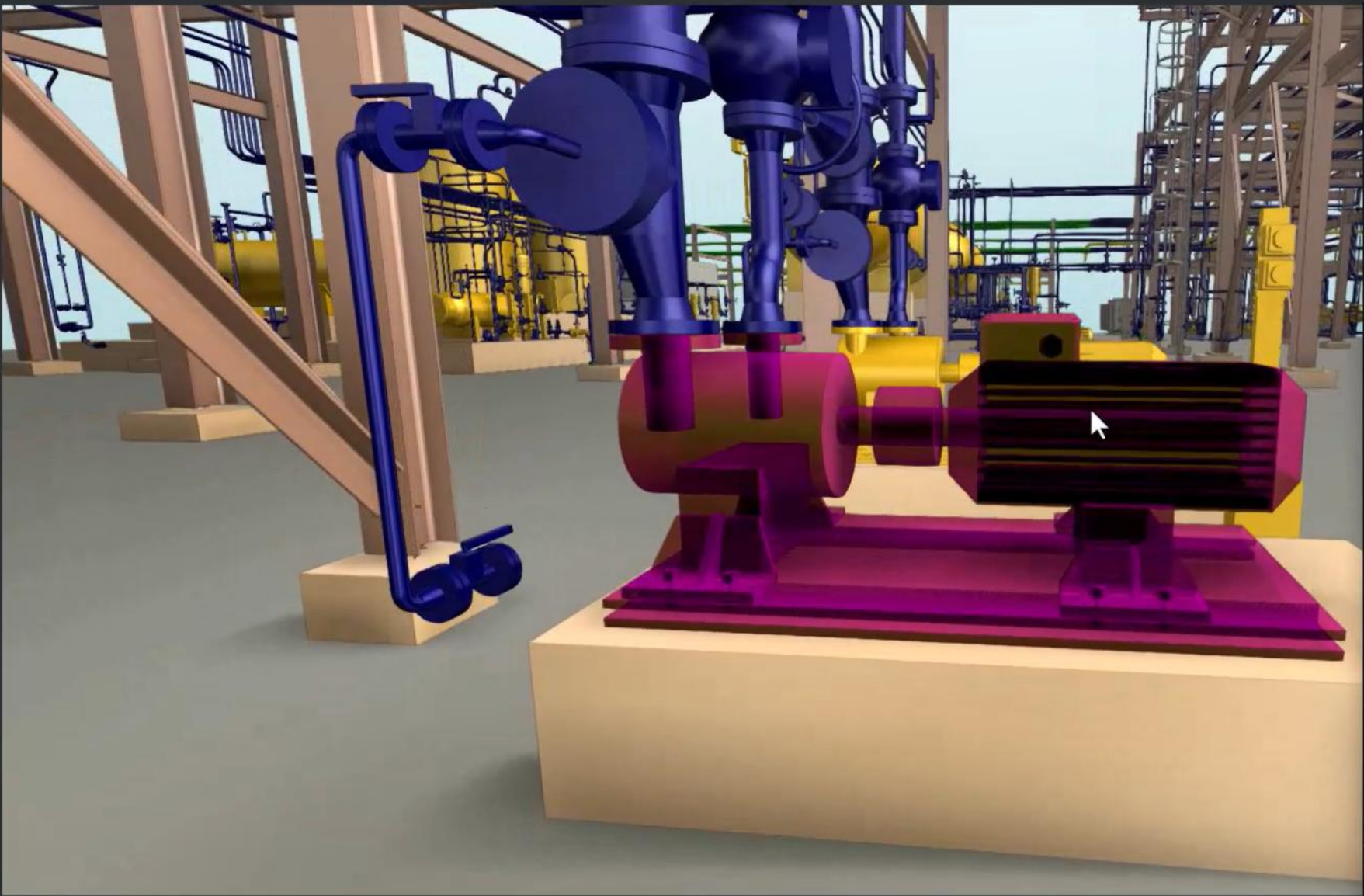


...you could use NLP to ask complex questions, guided with confidence by industrial generative AI

UNIQUE BREADTH & DEPTH OF INSIGHT

FAST, INTUITIVE & ACTIONABLE

3D Models  
IED Model



Industrial AI Assistant

- 4. **Remove the Impeller:** With the casing removed, you can now remove the impeller. Again, refer to the pump maintenance manual for the correct procedure.
- 5. **Inspect the Impeller:** Once the impeller is removed, inspect it for any damage. If any damage is found, it will need to be repaired or replaced.
- 6. **Remove the Bearing:** After the impeller is removed and inspected, the bearing can be removed. The pump maintenance manual will provide the correct procedure for this.
- 7. **Inspect the Bearing:** Finally, inspect the bearing for any damage. If any damage is found, it will need to be repaired or replaced.

Please note, this plan assumes that you have access to the necessary safety and maintenance manuals and are trained to perform these tasks. If you are not trained or certified, you should not attempt to perform these tasks and should instead contact a trained professional.

David Smith 10:38:11 am  
Can you find a 3D model that contains pump J-9002A?

Assistant 10:38:23 am  
Yes, there is a 3D model available that contains pump J-9002A. The model is titled "IED Model". Please refer to this model for a detailed 3D representation of the pump.

Enter your message...



# Customer achievement with AVEVA analytics

Typical deployments enjoy 10x ROI on subscription investment

↑ 12%  
Improvement in line  
performance

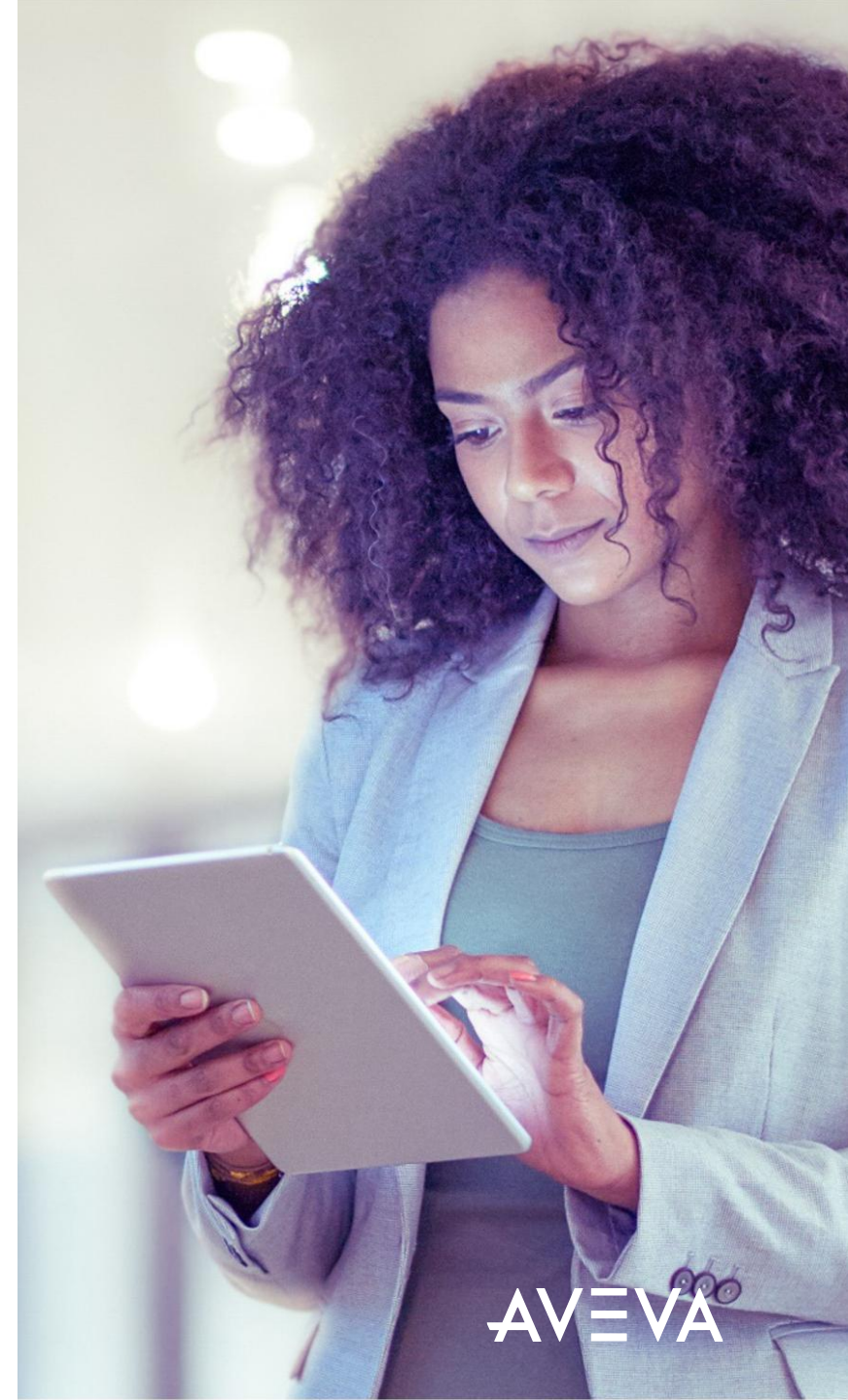
↑ 100%  
First-pass quality

↑ 30%  
Reduction in  
maintenance costs

↓ 4%  
Reduction in  
energy costs

↓ 90%  
Reduction in hardware,  
development, and  
consulting costs

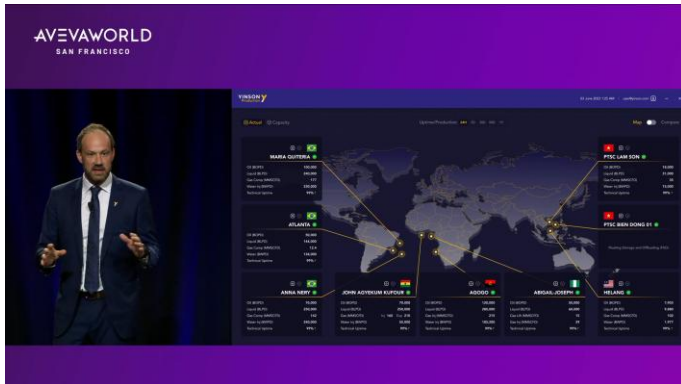
↓ 25%  
Reduction in in  
unplanned downtime



AVEVA



# Is it only my challenge? Absolutely not. It is a journey.



2023 - AVEVA World San Francisco - Oil, gas, and energy

[Yinson: Driving towards the Vision of Sustainable Autonomous FPSO Operations – Project Polaris](#)



Driving enterprise-wide transformation with a digital twin

<https://www.aveva.com/en/perspectives/success-stories/nigeria-lng/>



2022 - AVEVA PI World Amsterdam - Chemicals

[How SCG Chemicals Digital Reliability Platform harnesses AI-infused APM to prevent unplanned downtime](#)

# Conclusions

“Operationalizing artificial intelligence at scale is the difference between success and failure.”

Start small  
and think big



Keep in mind your final  
goal and vision

Preparing your **data** for accelerating  
**successful scale deployment** starts  
with how you handle them.

Start digital transformation with your  
**future** in mind.

CBM to start improving  
your asset strategy



Drive quick time  
to value

for equipment & processes having  
easy to understand patterns through  
**CBM, OEE and KPIs visibility**

Leverage calculations easy to  
configure and deploy at scale to start  
**reducing operational & maintenance  
expenditure**

Advanced analytics  
accelerate reliability  
and sustainability



Artificial  
intelligence

is not just a trend for technology's  
sake, it can help you **solve complex  
problems** that are not easy to identify  
by knowing behaviours.

Keep in mind: **easy to use tools** are  
those your experts will adopt

Digital Twin in context drive  
efficient and agile work



Close the asset  
strategy loop

An optimized asset strategy  
enhanced by **AI** intelligence should  
also be **actionable**.  
Connecting your data in context to  
**proven remediations** will empower  
efficient and agile **connected workers**  
with insightful information