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

AI in ambito Ingegneristico ed Operativo
Nuovi Strumenti per migliorare la progettazione e l'efficienza nella gestione di un impianto industriale

16/07/2025 | h. 16:00

AI in ambito Ingegneristico ed Operativo

Nuovi strumenti per migliorare la progettazione e l'efficienza nella gestione di un impianto industriale

16/07/2025

a cura di:
Dr Moresh Wankhede
Senior AI Product Manager
AVEVA

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

16/07/2025

Agenda

AI in Engineering and Operations:

Redefining how we design, build, operate and optimize industrial assets

- Maximizing value across industrial asset lifecycle
  - Design, Build, Operate and Optimize
  - Industrial AI Vision & Strategy
- AI-driven engineering and operational excellence
  - Proven results in every step of the industrial lifecycle
- Agentic AI and the future
  - Where are we headed?
- Q&A

Maximizing value across industrial asset lifecycle

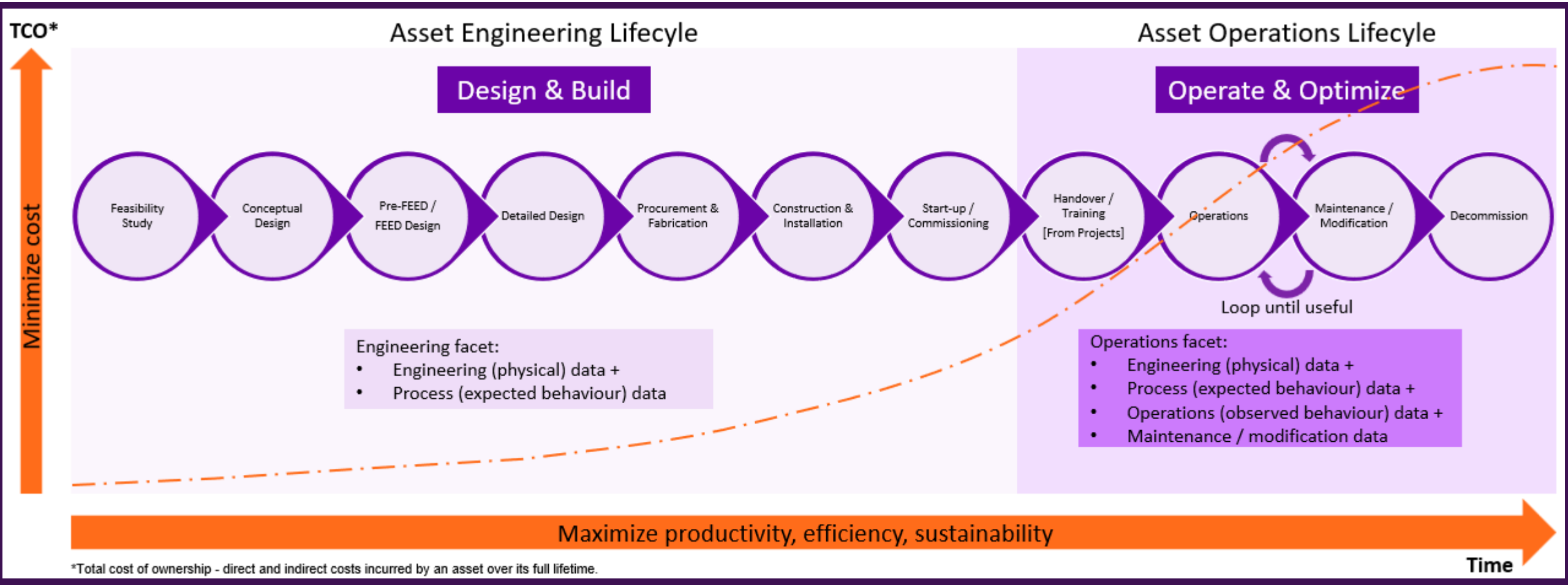
Redefining how we design, build, operate and optimize industrial assets

Design | Build | Operate | Optimize

Infusing and integrating AI to drive industrial asset lifecycle

Maximizing value across industrial asset lifecycle

Industrial AI – Not just technology



AVEVA’s Industrial AI Vision

Industrial AI – Transforming lifecycle challenges into value-driven opportunities

Sustainable Future

- Reduced fuel consumption
- Improved carbon capture
- Lower GHG emissions
- Smaller carbon footprint

Autonomous Plant

- Industry 5.0
- AI and humans working together
- AI no longer just a “tool”
- Humans can do more with AI alongside

Digital Intellect

- AI-driven industrial software
- AI-driven industrial knowledge
- Fast on-boarding
- Objective-driven

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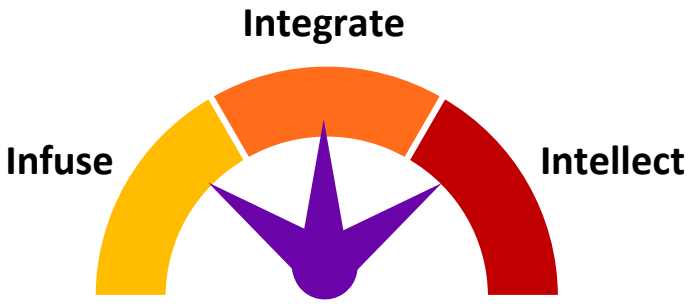
AVEVA's Industrial AI Strategy

Integrated and infused for the intellect



Infuse	Artificial Intelligence →	AVEVA Products
Integrate	Multiple types of AI & Advanced Analytics →	Advanced Solutions
Intellect	AI-driven Knowledge Graph →	Knowledge Linking

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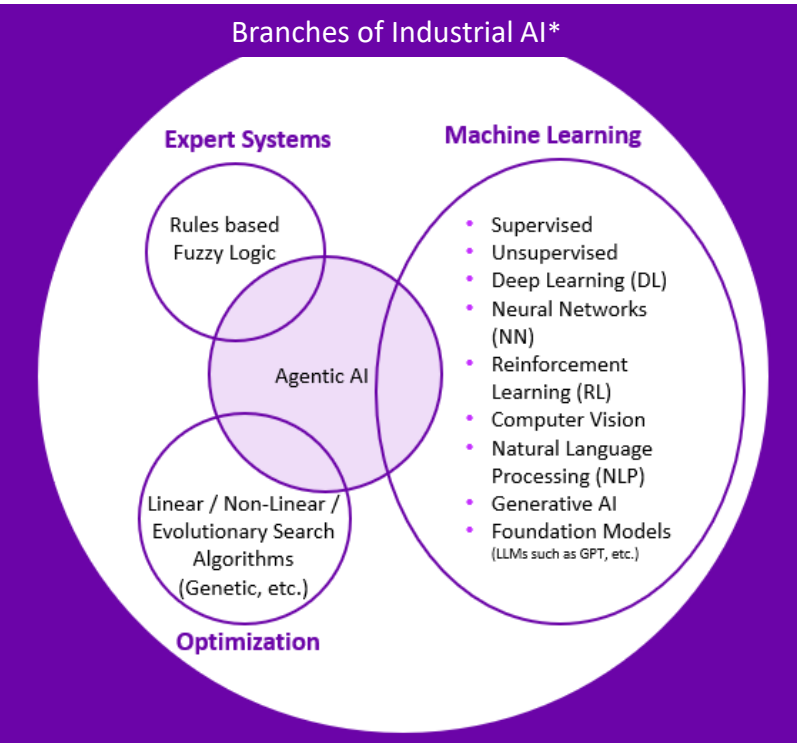
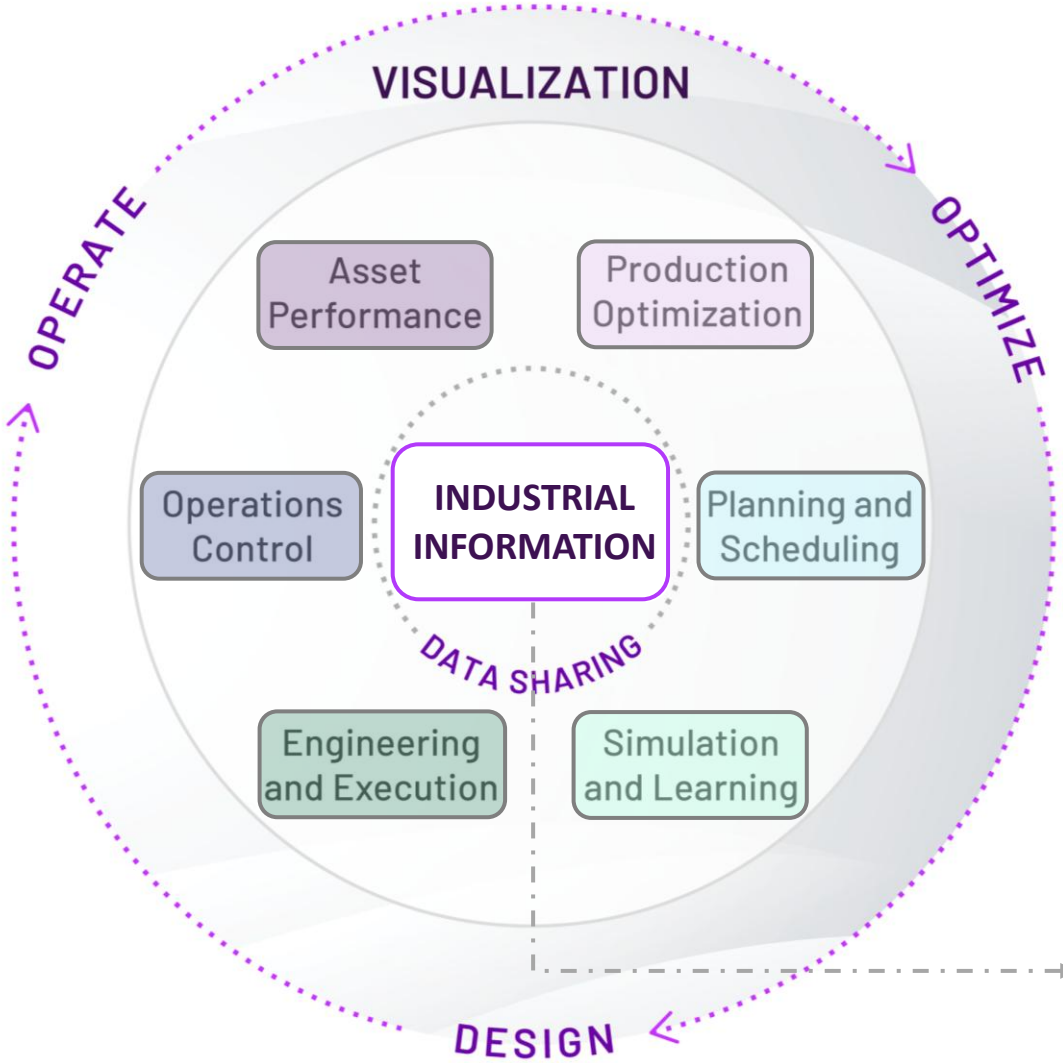
AVEVA's Industrial AI Portfolio

20+ commercially released AI solutions (more in development)



*Although there are other types of AI, these are most applicable to the industrial world



- Automated Analytics
- Guided Analytics
- Predictive Analytics/Maintenance
- Asset Prescriptive Analytics

- Advanced Process Control (APC)
- System Platform SCADA – integrated machine learning
- Vision AI Assistant

- Process Optimization
- Predictive Quality/Throughput (batch)
- Remaining Useful Life Estimation (RULE)
- Predictive Asset Optimization (risk-based)

- Schedule AI Assistant
- Realtime Crude Assistant

- Whitespace Optimizer
- Suggestive Design (Utilizing ML.NET m.)
- Rules Manager
- Generative Design (Preview)
- Intelligent Point Cloud

- Grey-box Modeling (carbon capture, etc.)
- AI-infused Dynamic Simulation

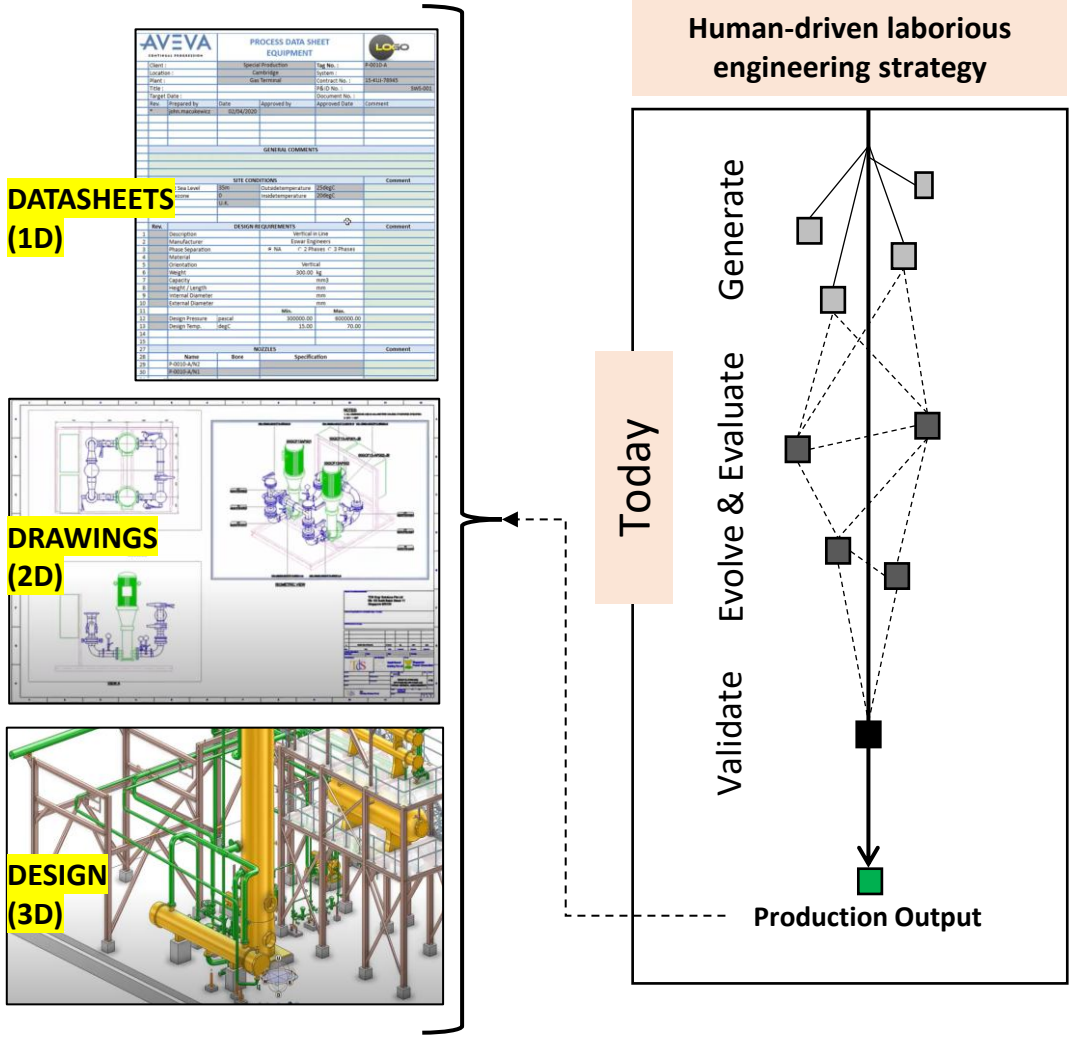
- Industrial AI Assistant (GenAI on CONNECT)

Design & Build

Realizing AI-driven Engineering Excellence

AI-driven Engineering Excellence

Today's typical problem to solve



Productivity Transformation in Engineering & Design:
Need to directly address the EPC industry's core challenge—**productivity**, but also

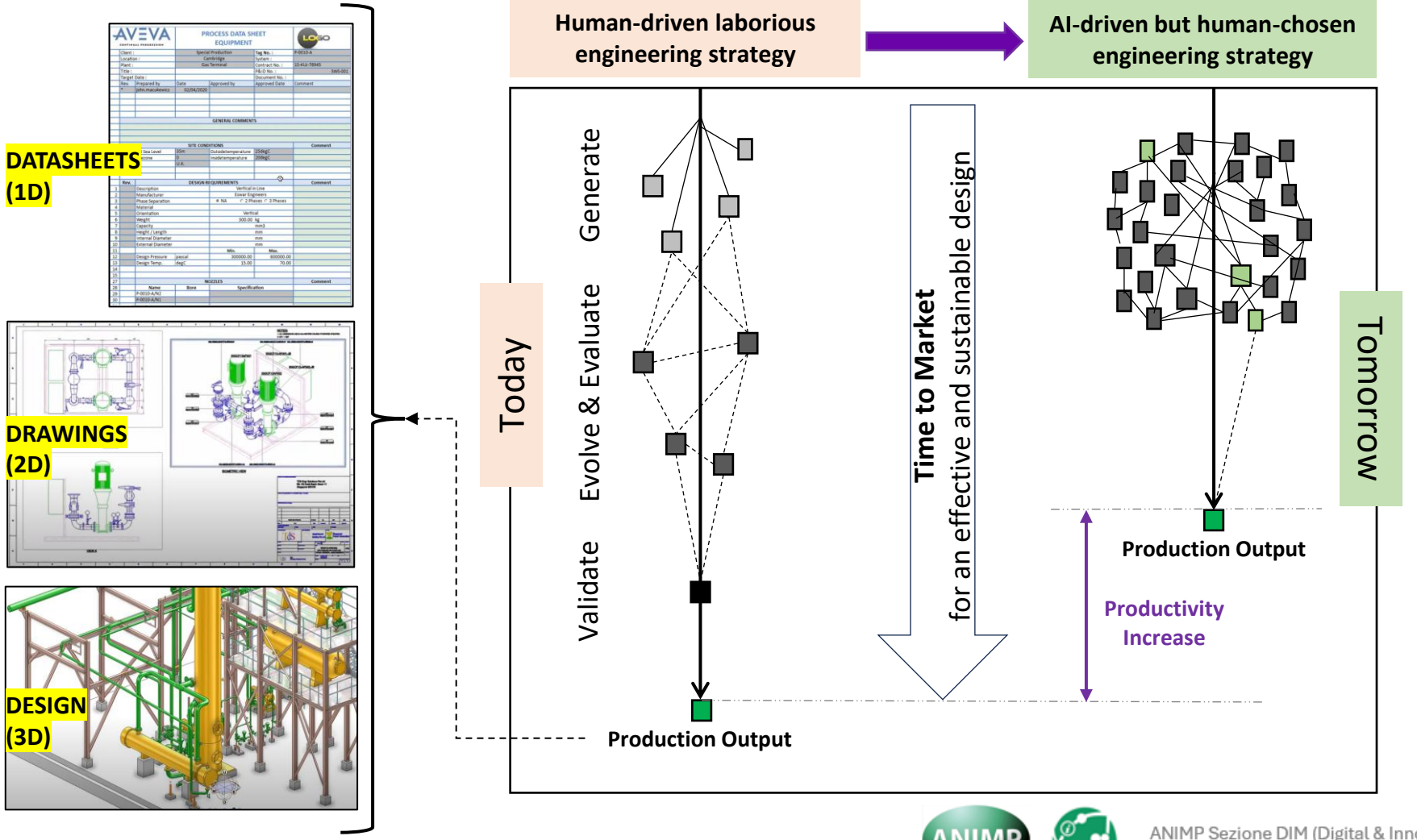
- minimize technical risks
- reduce design cycle times
- maximize design quality

Rapid Early-Stage Optioneering for Sustainability:
Move sustainability and engineering / design decisions to the earliest stages by enabling

- quick generation and comparison of options
- enhancing environmental and operational outcomes

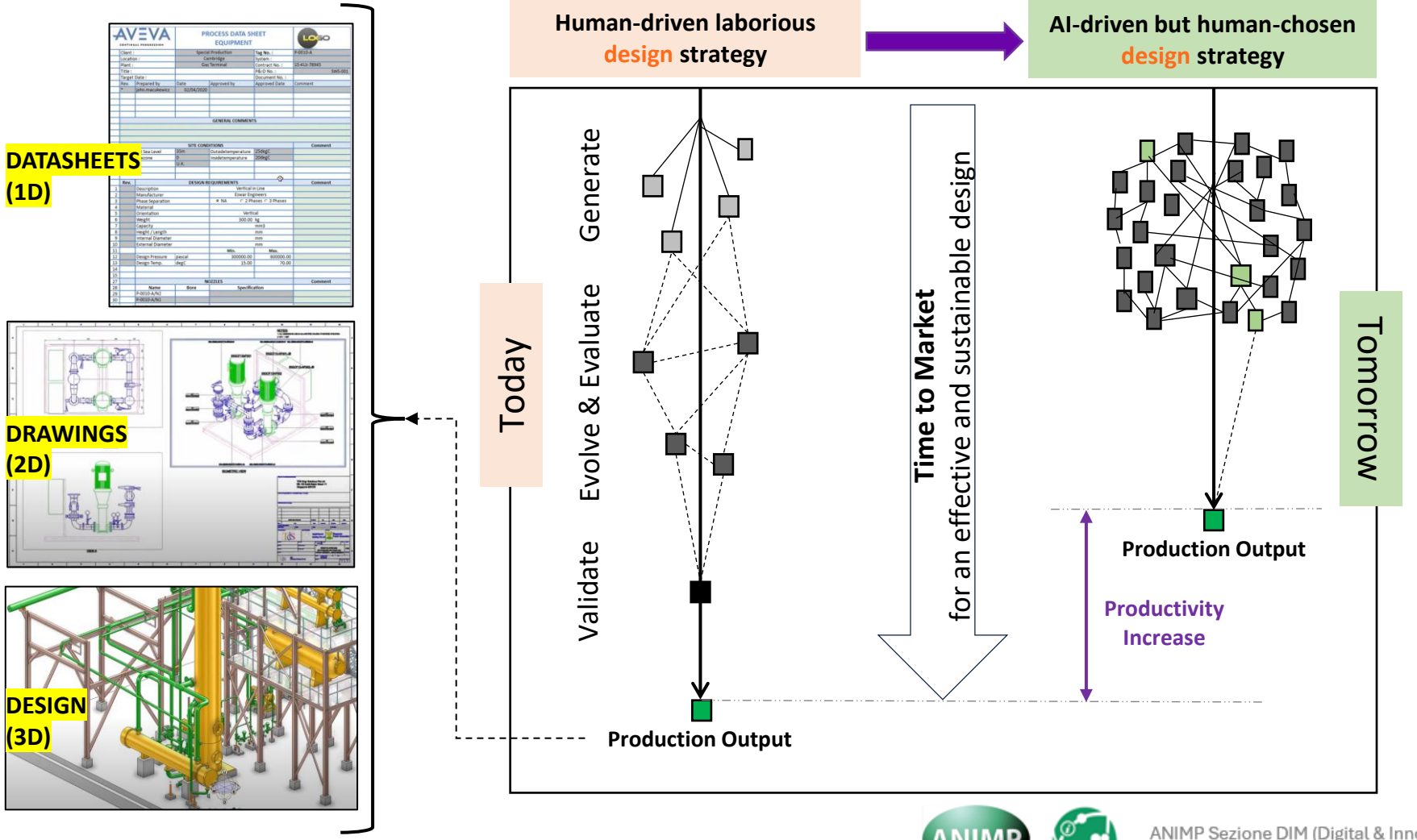
AI-driven Engineering Excellence

The future of engineering and design



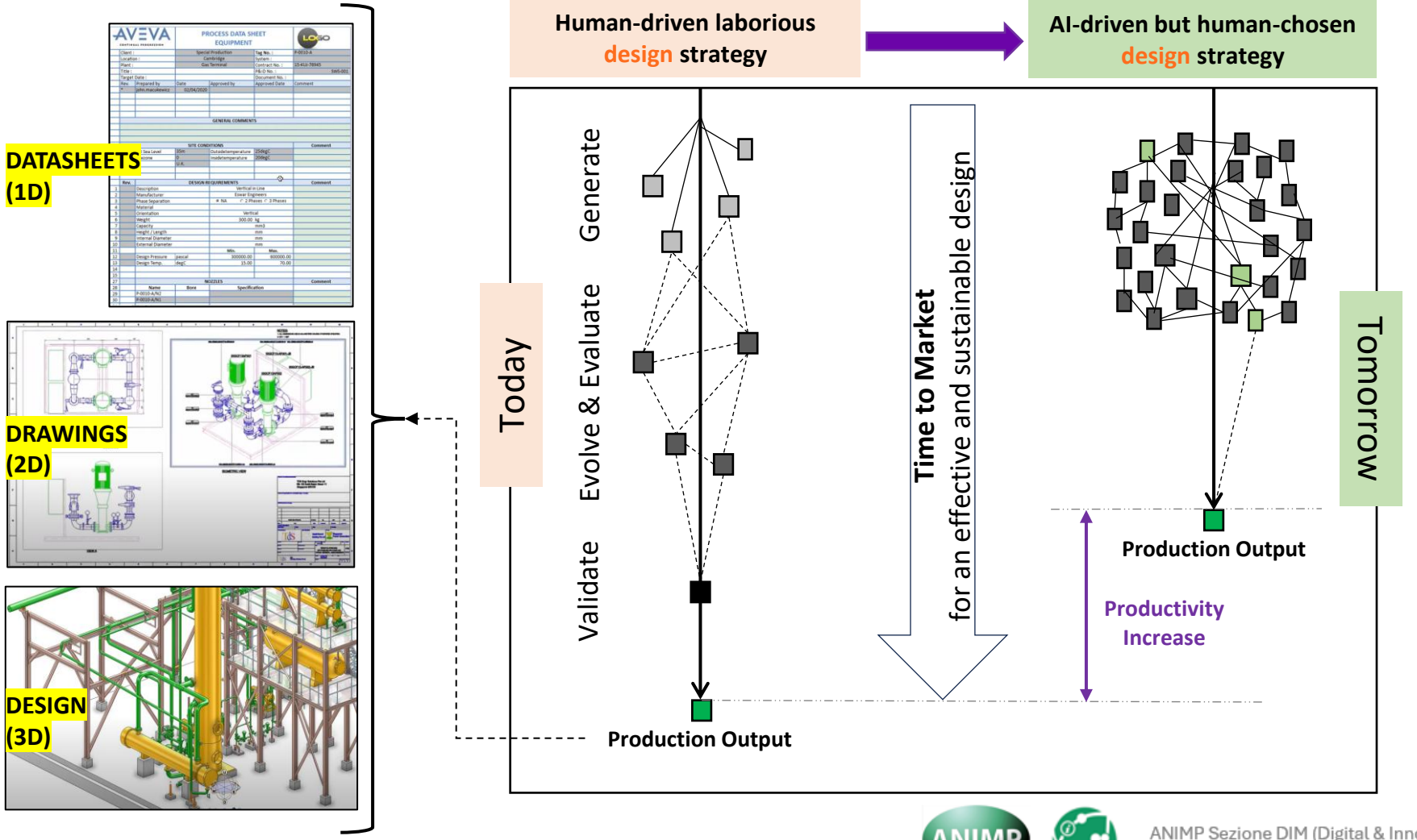
AI-driven Engineering Excellence

The generative future of engineering and design



AI-driven Engineering Excellence

The predictive future of engineering and design

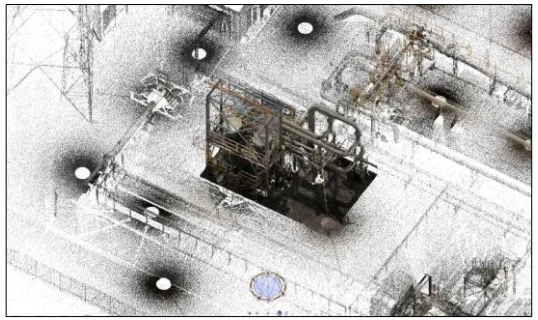


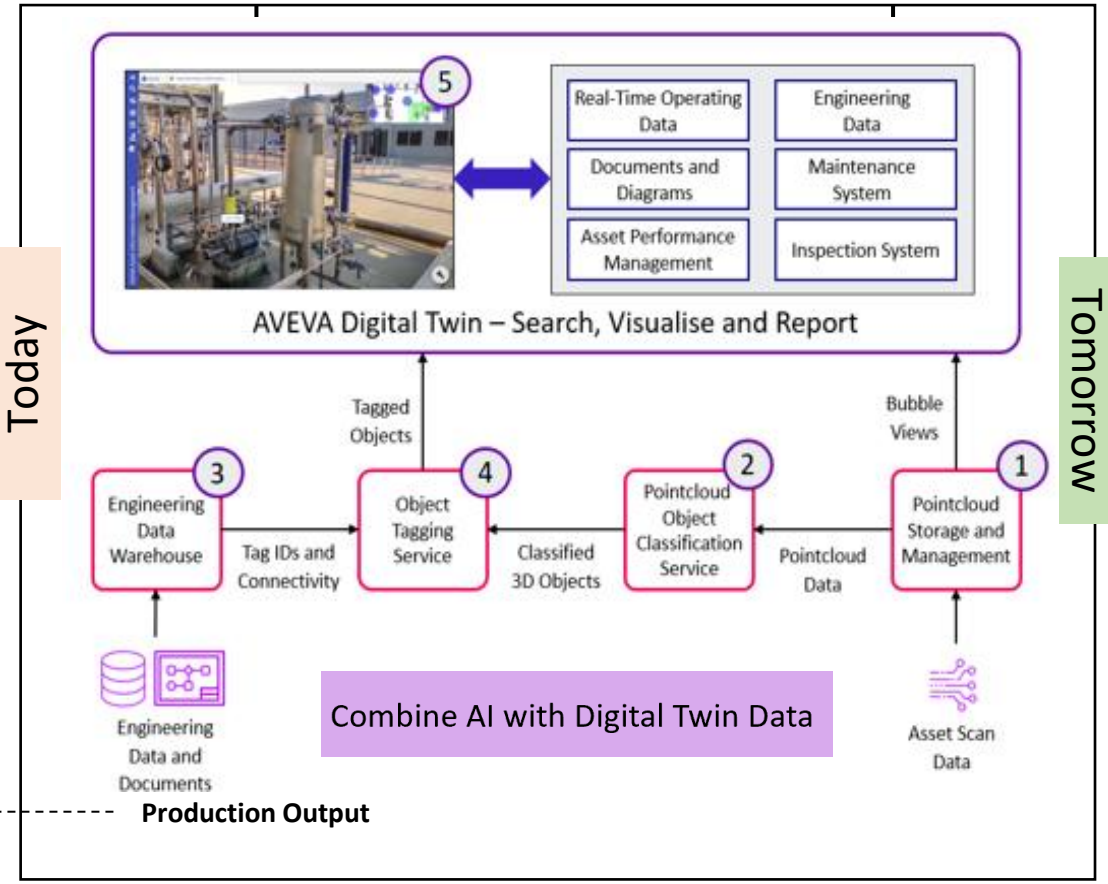
AI-driven Engineering Excellence

The **predictive** future of engineering and design

Human-driven laborious classification strategy → **AI-driven but human-chosen classification strategy**

Unclassified Point Cloud Data

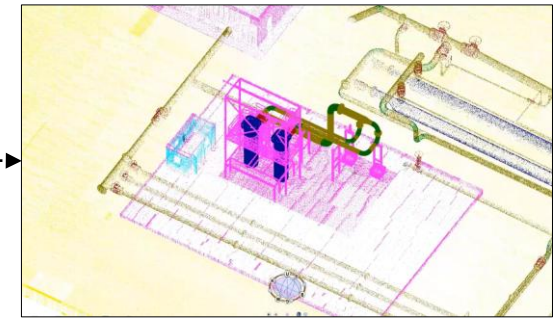




Tomorrow

Trained AI "Brain"

Classified and Segmented Point Cloud Data



- Easily trawl through point cloud data and quickly understand industrial class of objects
- Automatic segmentation to find the boundary of individual classified regions to create distinct objects
- Assisted tagging to recognise relationships & connectivity between objects and combine AI with Digital Twin Data

Operate & Optimize

Realizing AI-driven Operational Excellence

AI-driven Operational Excellence

Today's typical problem to solve

Human-driven
O&M System
'Knowledge based'

Progressive transformation

Human Supervised
O&M System
'AI + Simulation based'

Production Manager

Unit Operator

Process Engineer

Reliability Engineer

Data silos & lack of actionable insights

Inefficient operation/process optimization

Knowledge loss from retiring experts

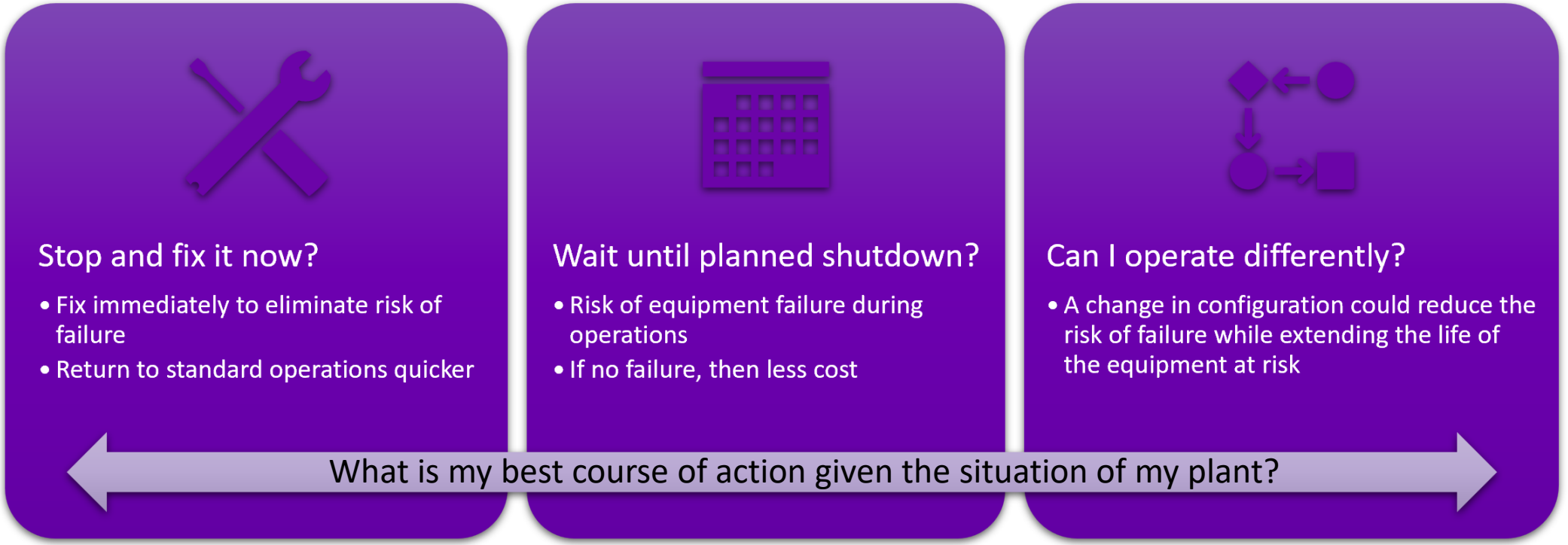
Alarm/alerts overload and slower decision-making

Unplanned downtime/equipment failures

Need for autonomous operations

AI-driven Operational Excellence

Today's typical problem to solve



Data silos & lack of actionable insights

Inefficient operation/process optimization

Knowledge loss from retiring experts

Alarm/alerts overload and slower decision-making

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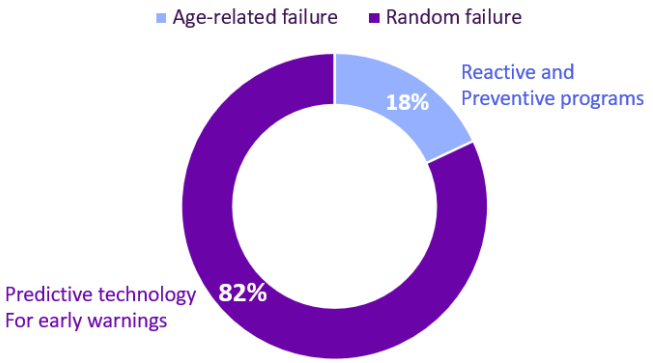
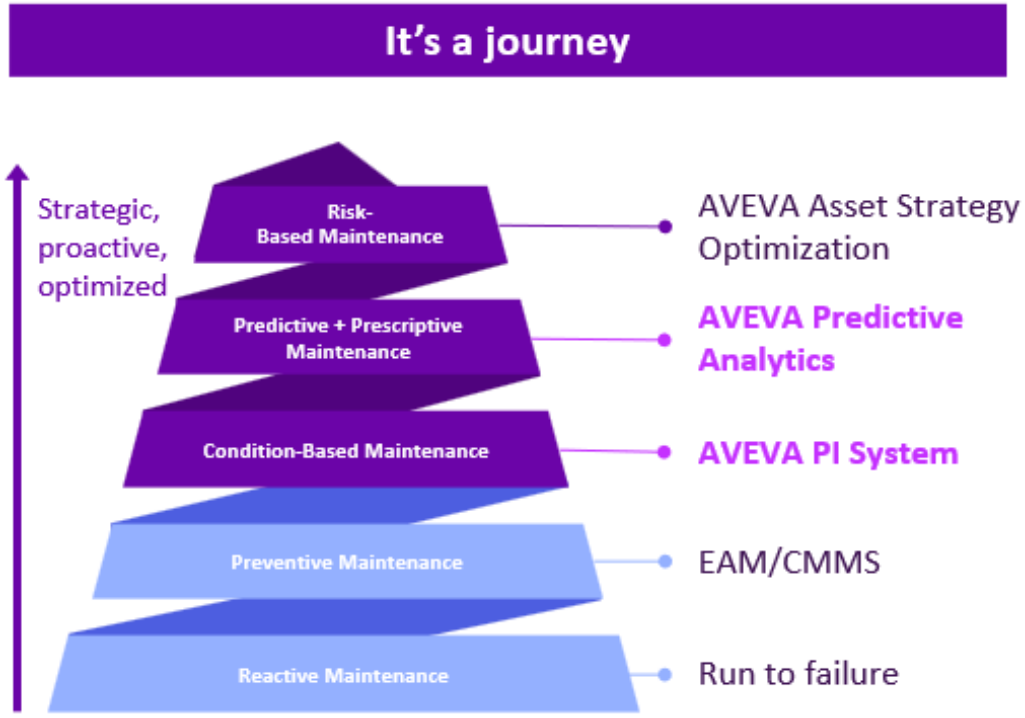
AI-driven Operational Excellence

The **predictive** future of operational optimization

Machine Learning

Using **predictive analytics** to analyze historical data, identify hidden patterns, correlations, and anomalies that may go unnoticed by traditional analysis





AI-driven Operational Excellence

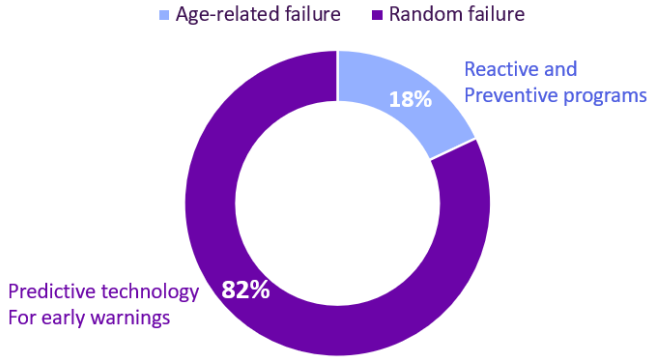
The **predictive** future of operational optimization

Machine Learning

Using **predictive analytics** to analyze historical data, identify hidden patterns, correlations, and anomalies that may go unnoticed by traditional analysis

Improve asset reliability and performance

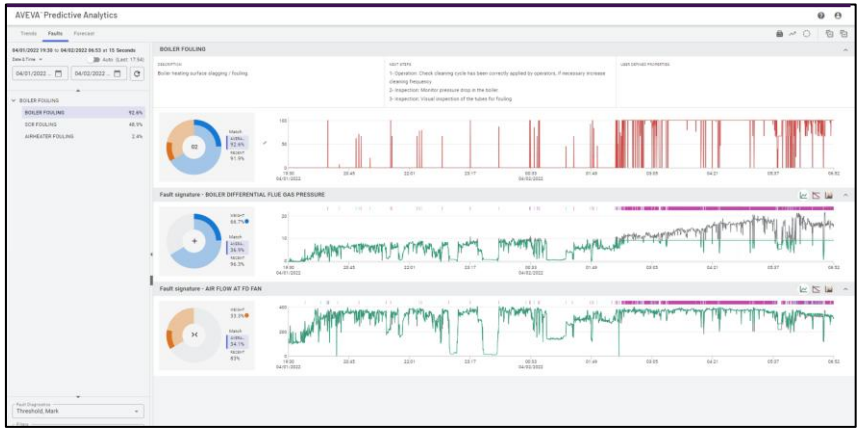
- optimize maintenance planning
- reduce maintenance costs



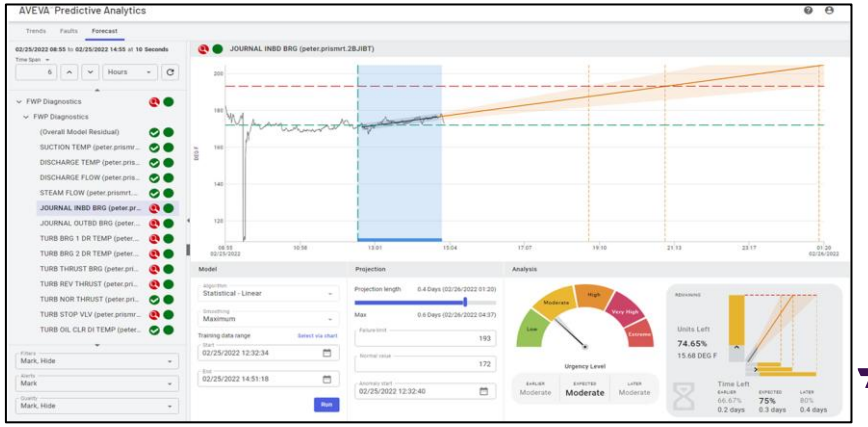
Prevent equipment & process failures

- early warning detection and diagnosis of equipment problems
- detection of industrial process issues

Which sensors are contributing to the anomaly?



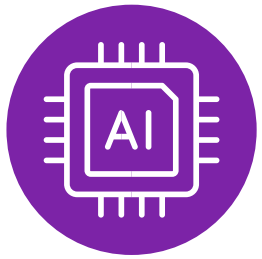
What are the potential faults and related inspections?



What is the urgency level before breakpoint?

AI-driven Operational Excellence

The **predictive** future of operational optimization



Machine Learning

Using **predictive analytics** to analyze historical data, identify hidden patterns, correlations, and anomalies that may go unnoticed by traditional analysis

Simulation

Using **first-principles simulation** models to accurately predicts equipment and process behaviour capturing intricate details of physical processes, detect potential problems, and simulate various scenarios

Real-time Optimization

Using **AI algorithms** in real-time, analyze vast amounts of data from multiple sources to generate precise operating information and empower operators to make informed decisions quickly enabling continuous improvement

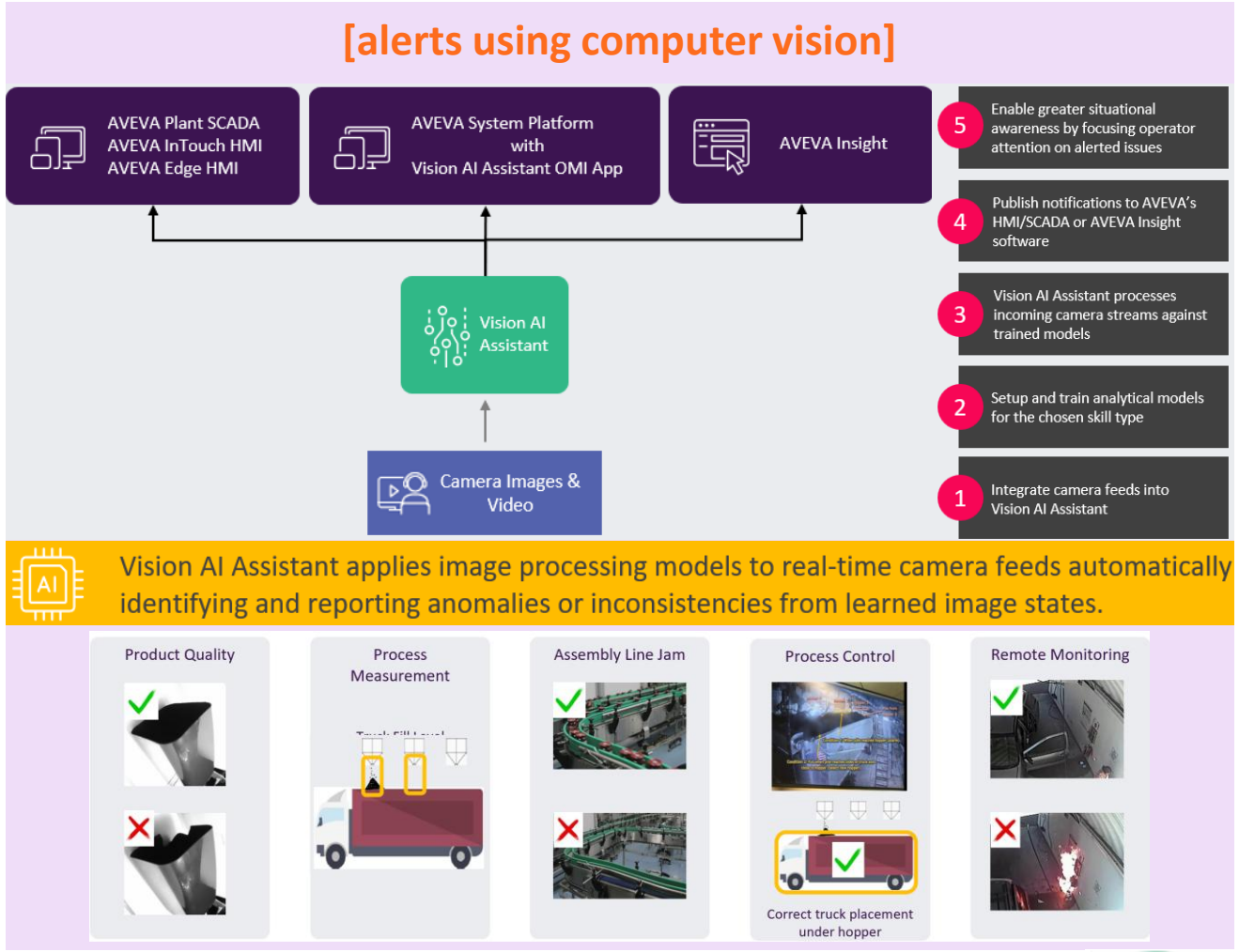
Visualization

Using clear **visualization of data and insights** make complex data visually appealing and easy to understand to quickly grasp the health and performance status of their assets.

Maximized Availability and Profitability ⟷ **Improved Performance and Sustainability** ⟷ **Minimized Operational Risk** ⟷ **Optimized O&M Strategy**

AI-driven Operational Excellence

The generative future of operational optimization



Quickly and easily alert operations staff on deviations from normal/expected

- use existing camera feed
  - train and deploy machine learning models on 'good' images/videos
- monitor real-time image stream
- easy-to-use web interface

Prevent equipment failures before they happen

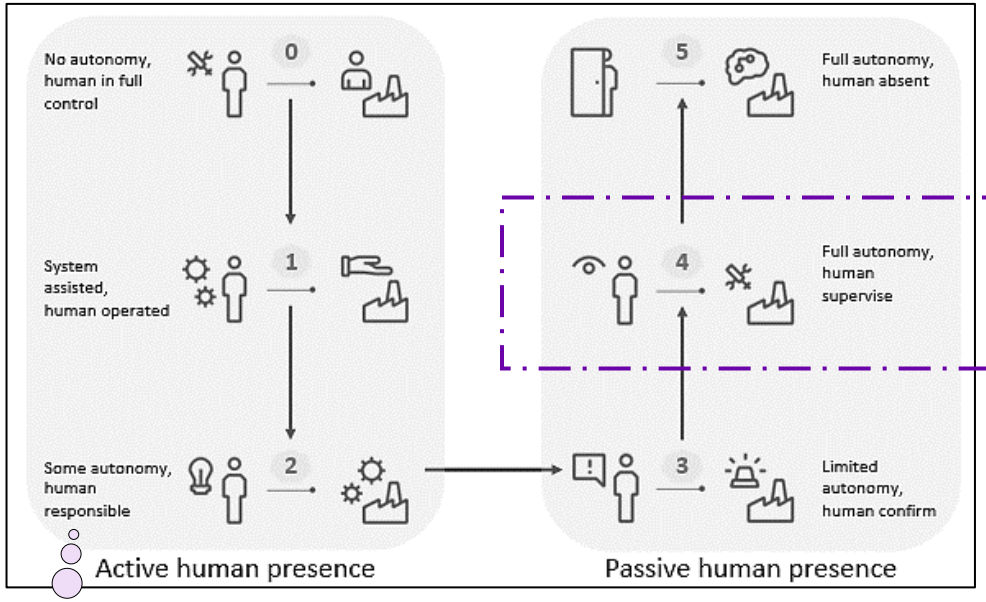
- focus attention on alerted issues in real-time
- investigate/resolve visual anomalies as detected

AI-driven Operational Excellence

The generative future of operational optimization

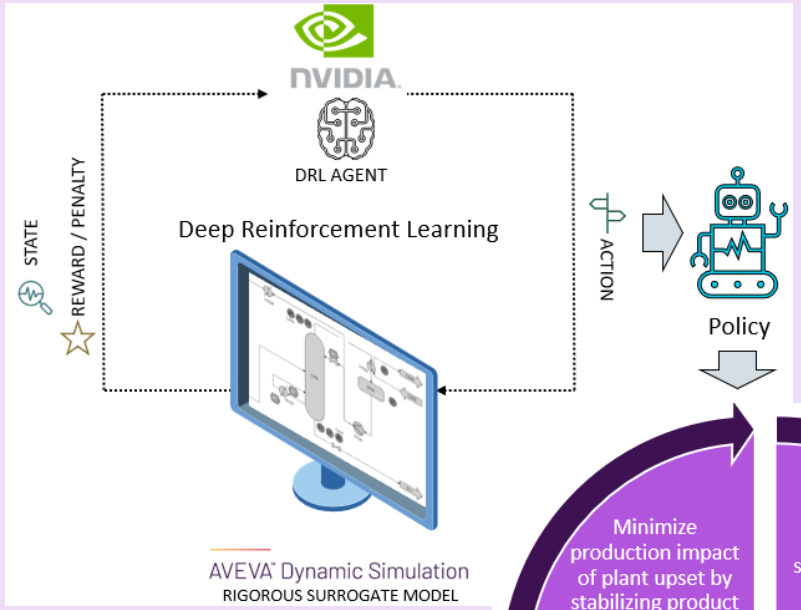
[move towards autonomous plant operations & optimization]

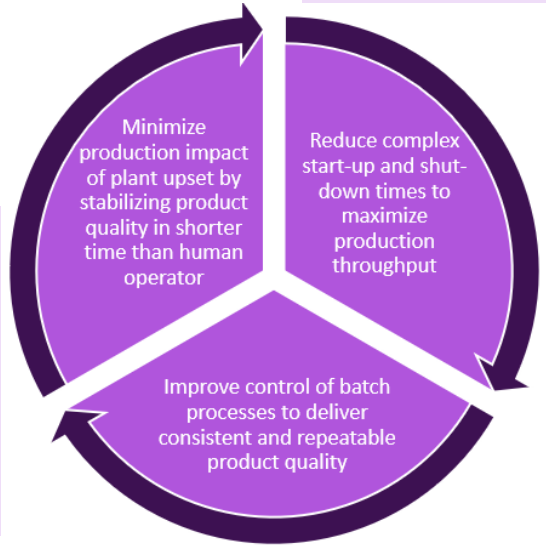
Levels of autonomy



Most industrial plants today are operating at **Level 2**

[policies for transient controls]





Proven results in every step of the industrial lifecycle

Up to **50%**
unplanned downtime reduction

100%
first pass yield

20%
improvement in plant maintenance intervals

Fully automated
quality control

10%
Less material use

5%
Reduction in power consumption for process design

4,6%
Energy reduction

Schedule generation process reduced from **hours to minutes**

100%
clash-free design out-of-the-box

2x Faster
design and optimization

20x
increase in user productivity in plant design

AVEVA

Proven results in every step of the industrial lifecycle

AP CONSULTORIA E PROJETOS

Accelerated pipe support design with AVEVA Unified Engineering

- **>90% time reduction**
- **56% hardware cost reduction**

ISU CHEMICAL

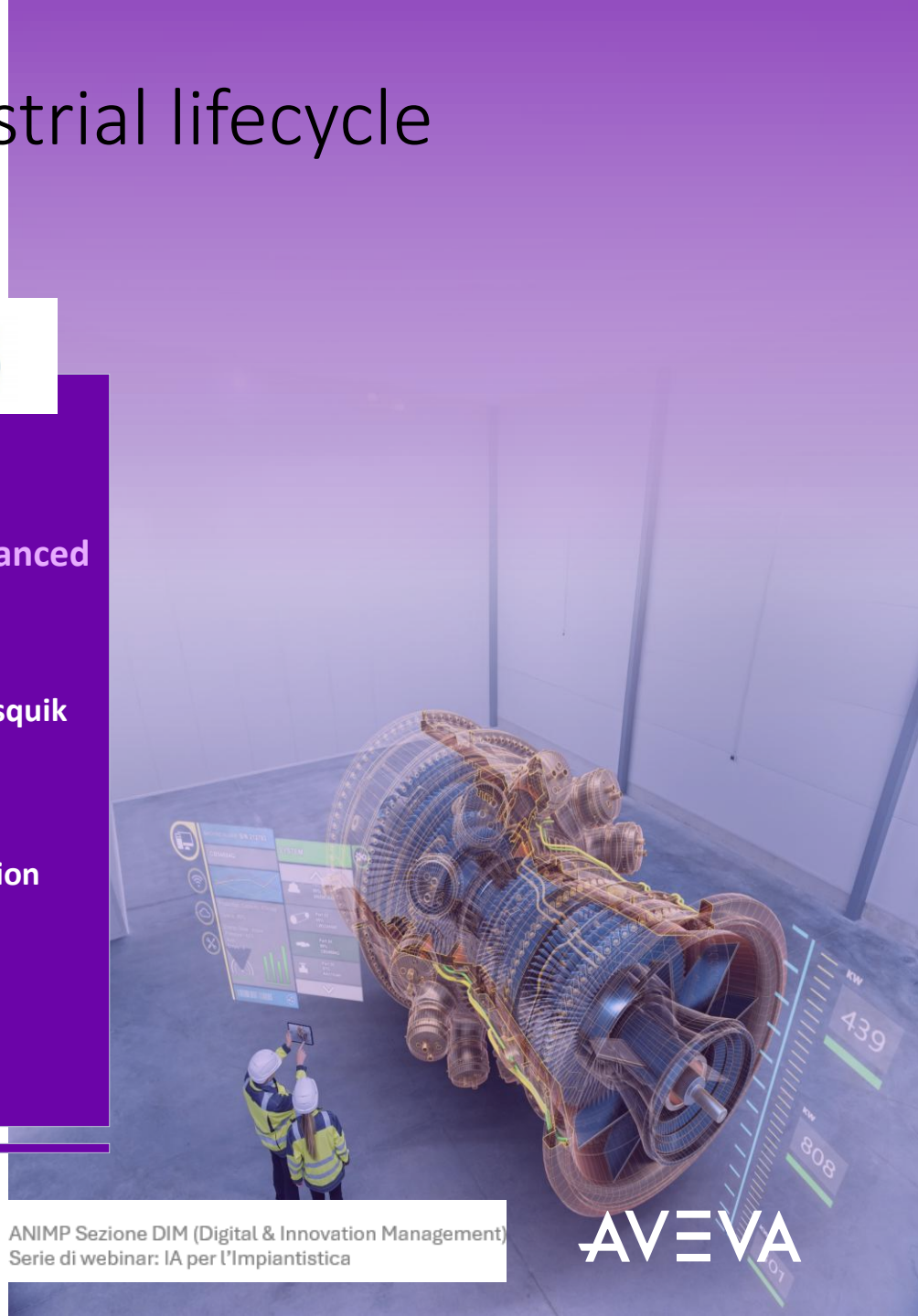
Improved reactor performance with AVEVA Process Simulation

- **99,7% yield can be predicted on different recipes and operation environments**

Nestlé

Improved product consistency with CONNECT and Advanced Analytics

- **10% savings on Nesquik powder**
- **Improved product consistency and consumer satisfaction**



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AVEVA

Proven results in every step of the industrial lifecycle

Optimized safety, uptime and emissions with AVEVA Dynamic Simulation

- Nearly 60% steam reduction
- 5% reduced power consumption

Smarter maintenance, less downtime with AVEVA Predictive Asset Optimization

- Up to 50% reduction in unplanned downtime
- Maintenance intervals extended by 20%

Maximum asset reliability with AVEVA Predictive Analytics and AVEVA PI System

- Over 1,700 anomalies detected early
- $37M+ in cost savings

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WHERE ARE WE HEADED?

Agentic AI and the future

Bringing it all together on CONNECT

Industrial AI Assistant on CONNECT

…partnered with Microsoft | Patent-pending

A generative AI tool

- Smart data analysis with AI knowledge linking
- Automatic relationships across structured and unstructured data
- No data hierarchy or model needed
- Fast on-boarding

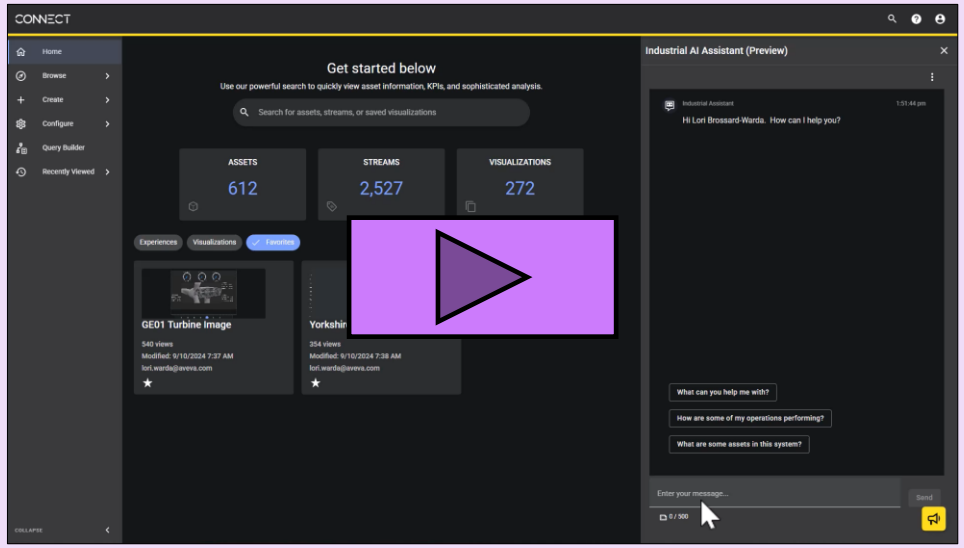
Objective-Driven

- Ask complicated questions (“why is my compressor operating worse now than it did last week?”)
- Breaks down the question into sub-queries behind the scenes, using focused guardrails
- Consolidates the response back to the user
- Transparent & traceable through Citations
- Model is never trained using customer’s data

Industrial AI Assistant on CONNECT

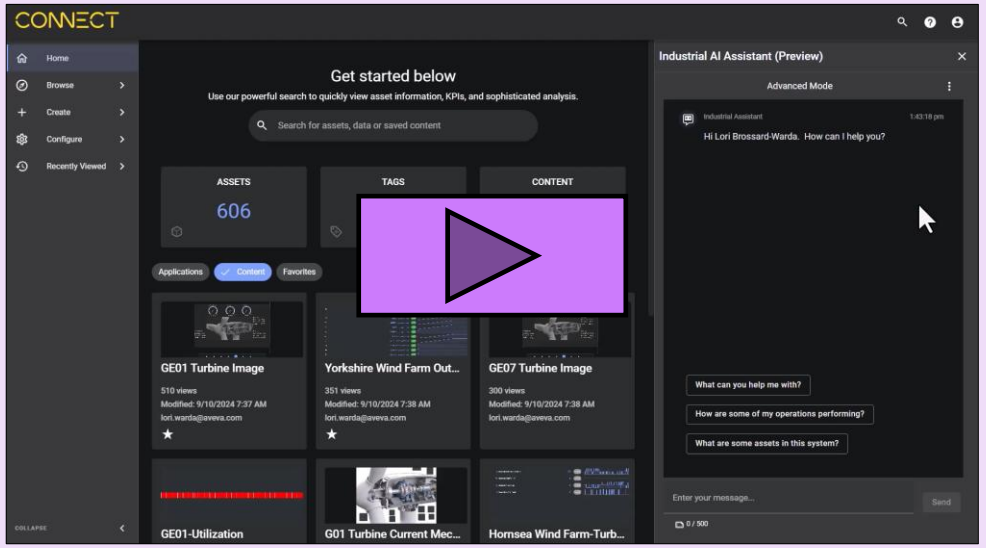
Generative AI for finding / summarizing information and generate insights faster

[document querying and summarizing]



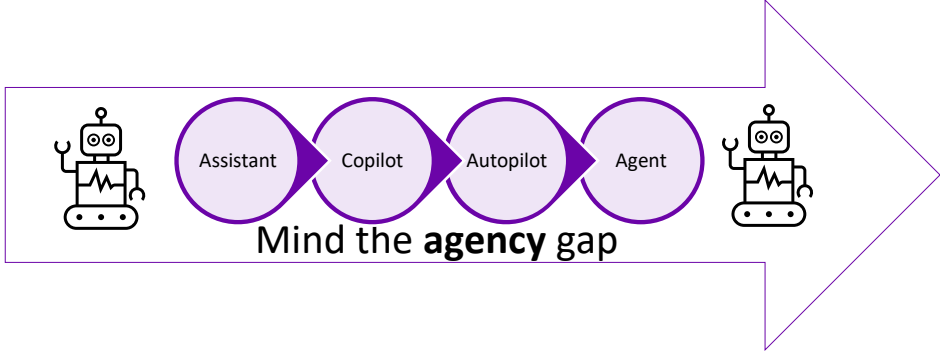
- Find content with all indexed documents and receive well structured summary
- Find content within a specific document and get a summary

[generative dashboards]



- Save time and clicks by using natural language to create visualizations
- Explicit initially: “Create a visualization with a line chart that shows the temperature data from GE01”
- Implicit requests: “Create a visualization highlighting the operating conditions at GE01”

Industrial AI Assistant on CONNECT



Generative AI + Agentic AI

Today

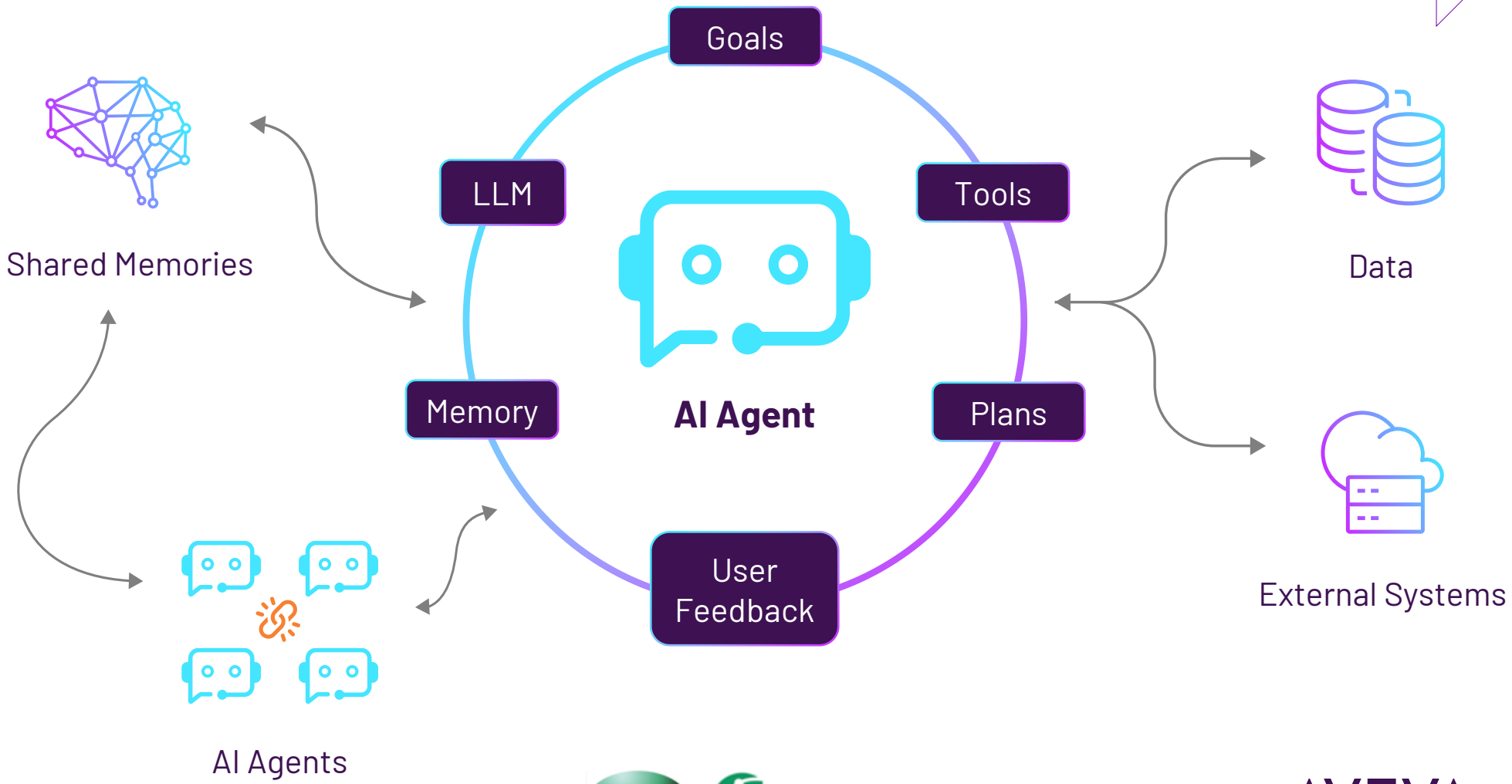
Data & Information Level
"Ask a complicated question"

Next

Functional Software Level
"tell it what you want it to do"

What's after next?

Unified User Experience
"Agentic AI"



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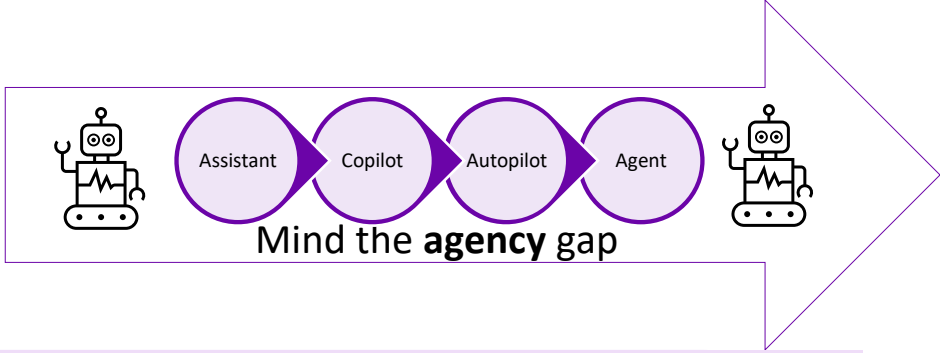
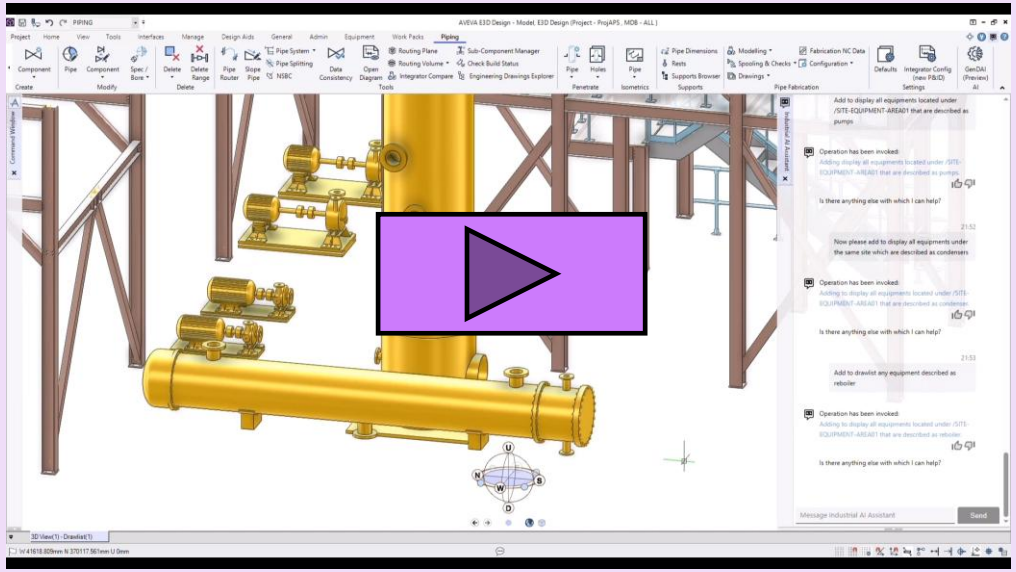
Industrial AI Assistant on CONNECT



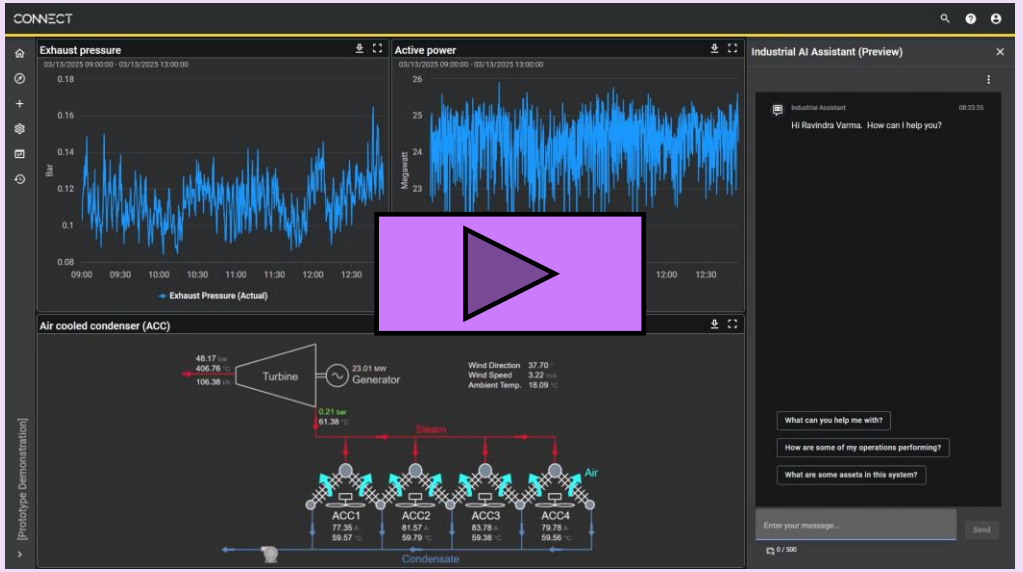
The **Agentic AI**-driven future of engineering and operation

[for engineering design]



- Get step-by-step product usage guidance and capability briefing
- Query data contextually and reason comparatively
- Execute descriptive, parametric and adaptive tasks on-demand
- Executing complex goal-oriented tasks for e.g. searching and deploying predictive models

[for operations monitoring]



- Autonomous model building and deployment for monitoring asset in real-time
- Detect anomalies and generate timely alarms.
- Automatic updated visualizations based on incoming data and model insights
- Informed decision-making through actionable recommendations

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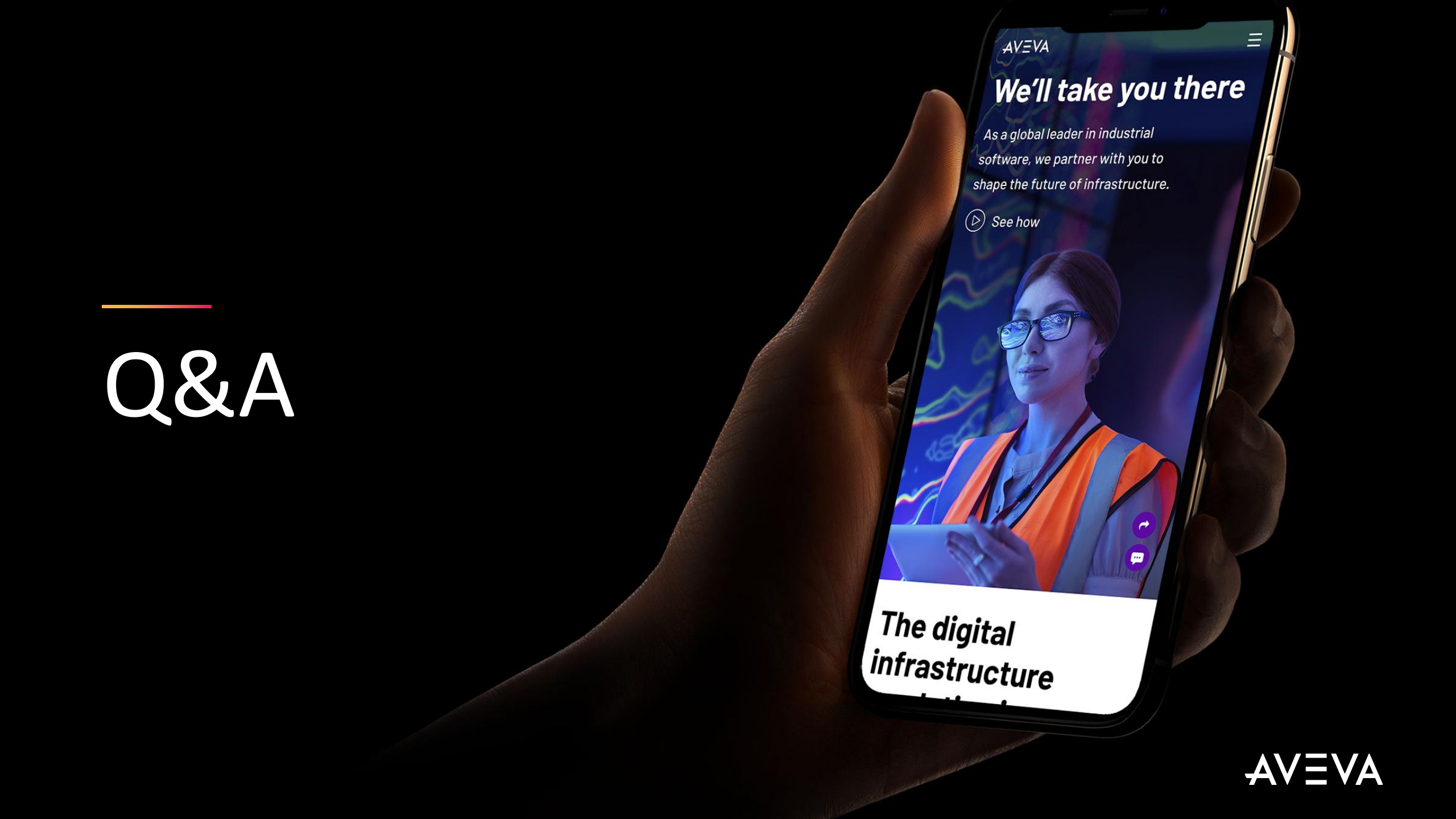
Summary

AI in Engineering and Operations:

Redefining how we design, build, operate and optimize industrial assets

- **Start Now with What's Available**: Generative, predictive, and agentic AI are already delivering tangible value in plant design, operations and maintenance decision-making —waiting means falling behind
- **Develop AI-Ready Practices**: Modernize data management, modeling workflows, and decision-making processes to integrate seamlessly with current and future AI systems
- **Pilot, Learn, Scale**: Launch targeted AI pilots in areas like engineering design, asset information search/summarization, predictive maintenance or operational control to build confidence, skill, and internal momentum
- **Prepare for R(apid)evolution**: The pace of industrial AI innovation is accelerating— establish cross-functional AI task forces and upskill to stay ahead

Q&A


AVEVA
We'll take you there
As a global leader in industrial software, we partner with you to shape the future of infrastructure.
See how
The digital infrastructure

AVEVA

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ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com

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AI in ambito Ingegneristico ed Operativo

Nuovi strumenti per migliorare la progettazione e l'efficienza nella gestione di un impianto industriale

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