

AVEVA

Beyond big data:
How Visual APM takes
digitalization into
three dimensions

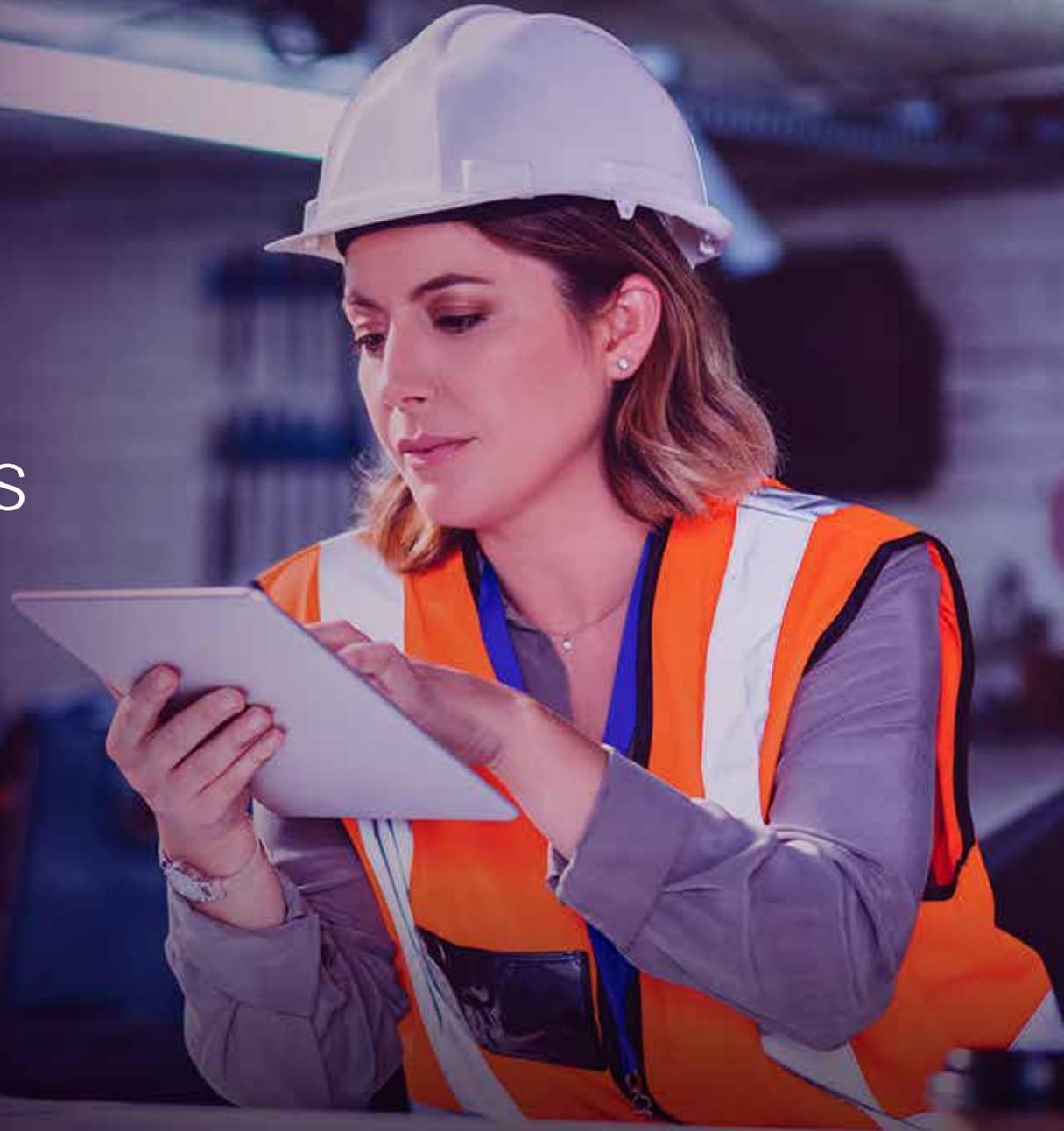


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Introduction

Over the last two decades, industry has pushed assets, people, and related maintenance technology to their limits to reduce costs, improve workforce efficiency and asset utilization, while minimizing business risks.

With the advent of the Industrial Internet of Things (IIoT) and the ever-increasing volume of operation-generated data, companies today monitor every single aspect of their operations. On one hand, this data empowers organizations to improve their businesses and achieve digital transformation. On the other, it creates challenges for managing large volumes of data, avoiding data silos, and transforming data into actionable insights.

By using existing digital twin technology, it's possible to funnel multiple silos and formats of information into a single functional lens, with visualization capabilities that garner real-time insights. At the core of this functional lens is Visual Asset Performance Management – the ability to visualize an asset's digital twin in context throughout its entire life cycle.

In this eBook, we describe what Visual Asset Performance Management is, the technology pieces required to make it happen, and practical industry applications for this approach.



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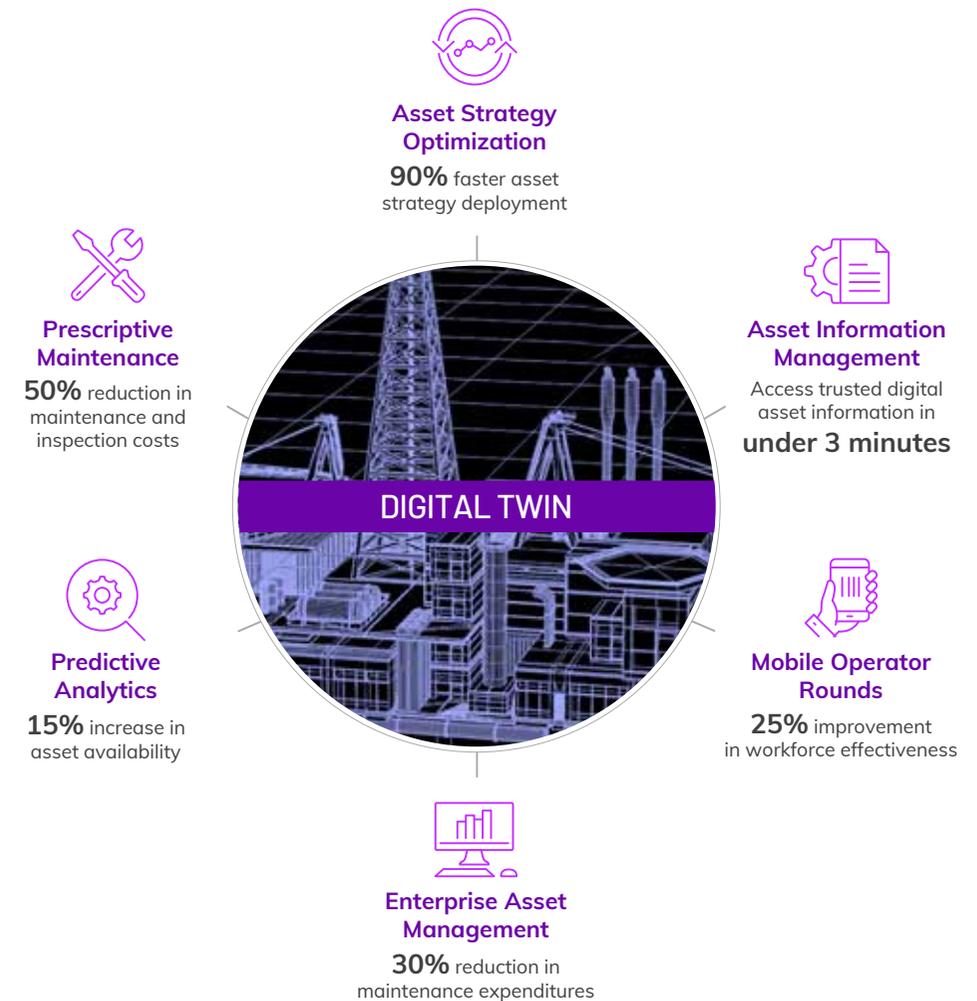


What is Visual Asset Performance Management?

Traditional APM combines IT data (like historical work orders) and OT data (like machine sensor data) with big data analytics to define a course of action that will improve reliability and availability of physical assets and increase return on asset investment.

Visual APM adds an asset information layer (asset models, P&ID information, drawings, laser scans, etc.) to APM and uses navigable 2D and 3D models to visualize “living” digital twins of equipment, machinery, and processes.

The result is 1D, 2D, and 3D navigable visualizations of equipment and plants integrated with real-time data and analytics that teams can assess, for example, to virtually inspect asset health and see how the business is operating in real time.



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Contextualized insights create new opportunities



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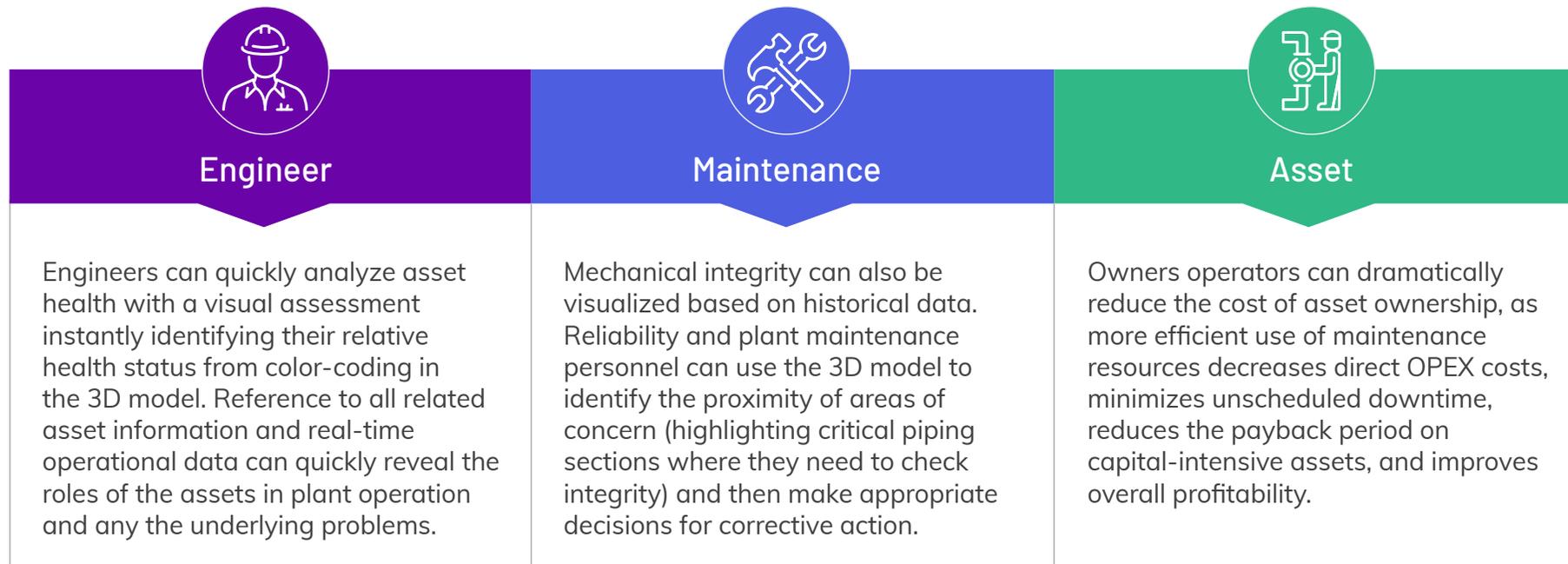
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Contextualized insights create new opportunities

The ability to quickly access asset and plant information and visualize asset performance opens the door to significantly increasing the overall health of a facility.



Building blocks of Visual APM



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Building blocks of Visual APM

Any journey begins with overcoming inertia. In this case, it means establishing a clear understanding of the capabilities or building blocks required to realize Visual APM. Here we lay out the path as to where the focus should be when beginning the journey to Visual APM.



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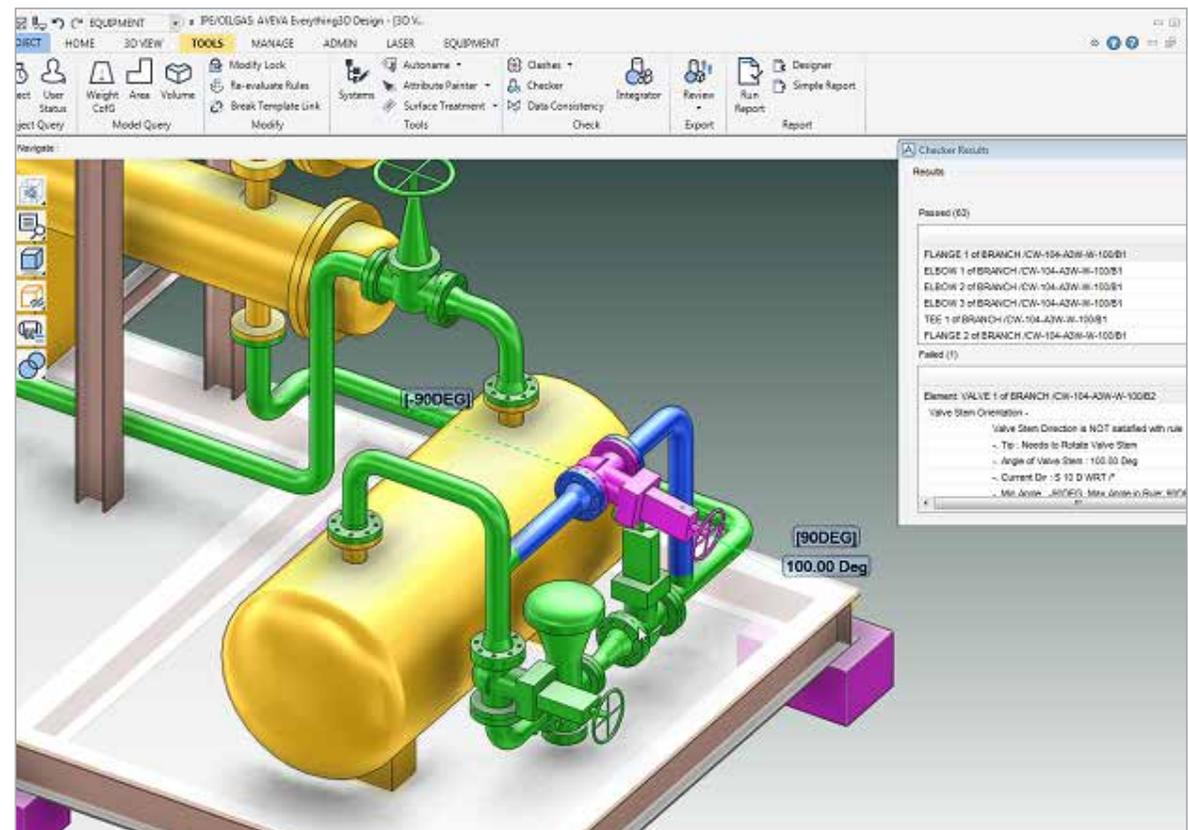
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Digital representation of assets

Visualizing the digital twin can begin in the design, engineering, and procurement phase of a physical asset's life cycle, using the digital representation models of assets that were generated. If these models are not available, advanced laser scanning can be used to manifest detailed digital twins of existing plants and assets quickly.

1D, 2D, and 3D asset models are generated with engineering data populated behind the model to bring the operational characteristics and behavior of the asset to life.



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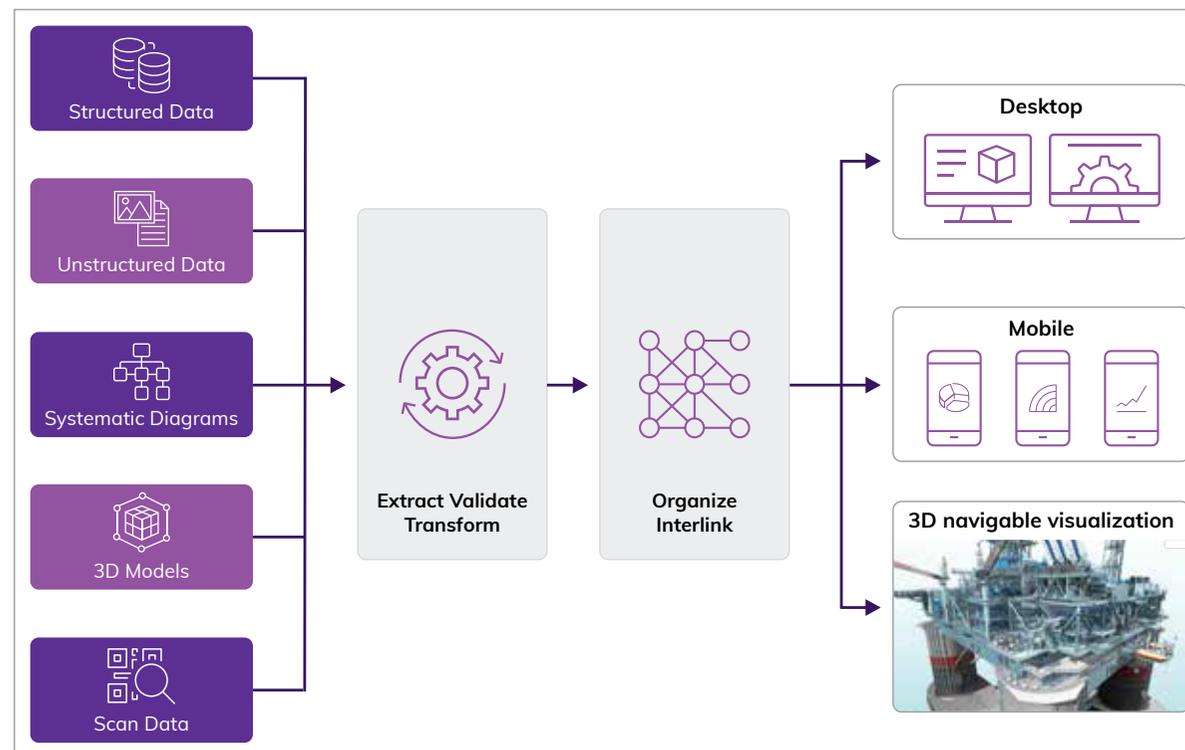
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Asset information management

To address enterprise-wide information access and visualization needs, companies need a centralized repository to bridge disparate information sources and give users control of their project and asset information throughout the entire asset life cycle. This repository should enable users to capture, connect, access, and visualize data from all possible sources, such as documents, drawings, registers, 3D models, and operations databases.



Operational information management – bringing the digital twin to life

As the digital twin's life cycle progresses, users must update it in real time with operational data such as risk-matrices, spare parts inventory, maintenance records, known failure modes, and sensor data. This data describes the contribution of the assets to the enterprise and its physical behavior across operational functions. Feeding the digital twin historical and real-time data requires:

A data platform that collects, stores, displays, analyzes, and reports on operational and asset health information.

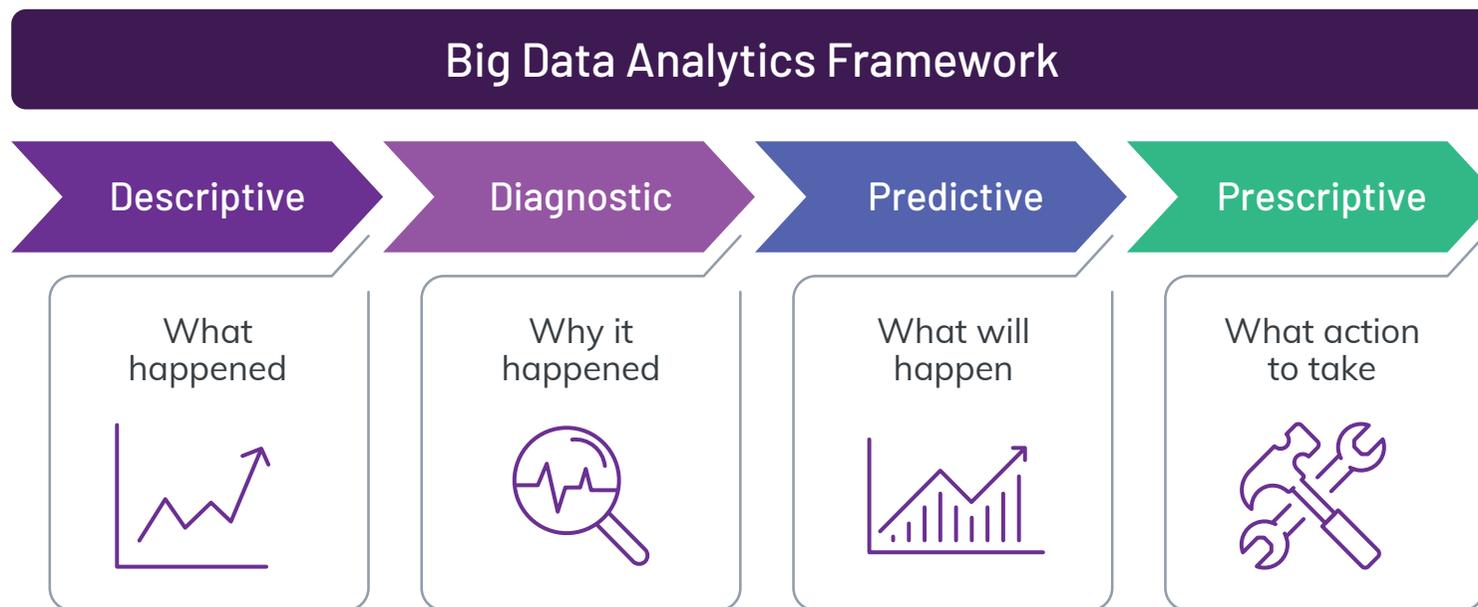
An enterprise asset management solution to provide maintenance, procurement, and inventory management for assets.



Big data analytics – shifting from proactive to prescriptive

As the enterprise begins to understand how the asset has performed in the past, implementing data analytics can provide insight into how fleets of assets are operating in the present and which assets might be trending toward potential failure. It is essential to assess risks associated with asset failure and prescribe the correct maintenance activities to drive the most economically advantageous outcomes for the business.

A Visual APM solution needs to include predictive (minimally) and, ideally, prescriptive analytics to achieve an entirely new level of maintenance value.



Visualize and contextualize information

An essential component of a Visual APM solution is a visualization tool that delivers a 360-degree view of the enterprise asset management tool, data in the asset information repository, and historical data and predictive analytics. By joining all pieces of the puzzle together, this visualization tool connects experts to problems, delivering information and documents within the context of the 3D model.



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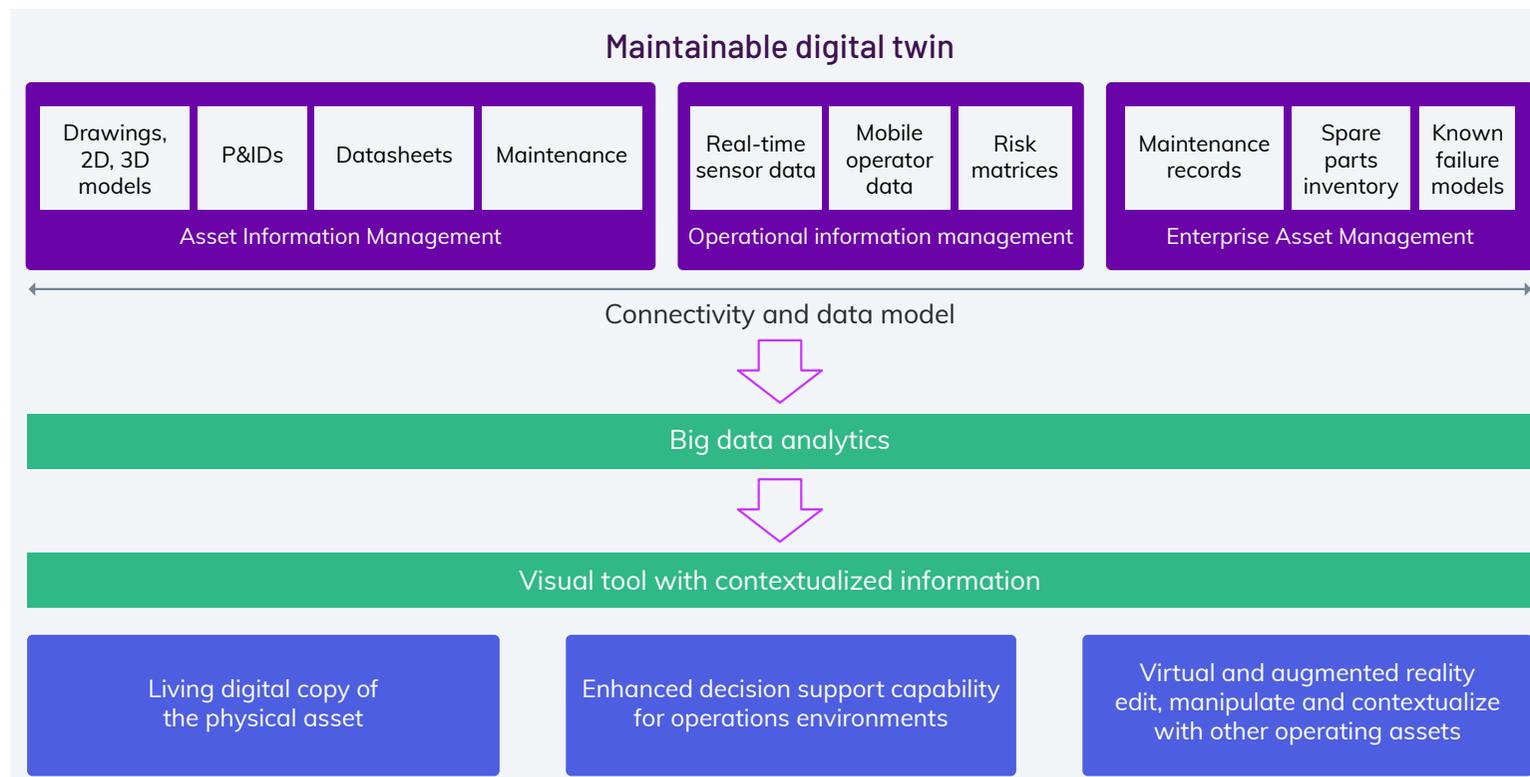
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A maintainable digital twin

The maintainable digital twin is a “killer app” of value to maintenance, sitting at the top of the food chain for APM. It presents a living digital copy of the physical asset, delivering highly efficient and effective decision support capability for operations environments



Application: Risk-based inspection program to address corrosion under insulation (CUI)

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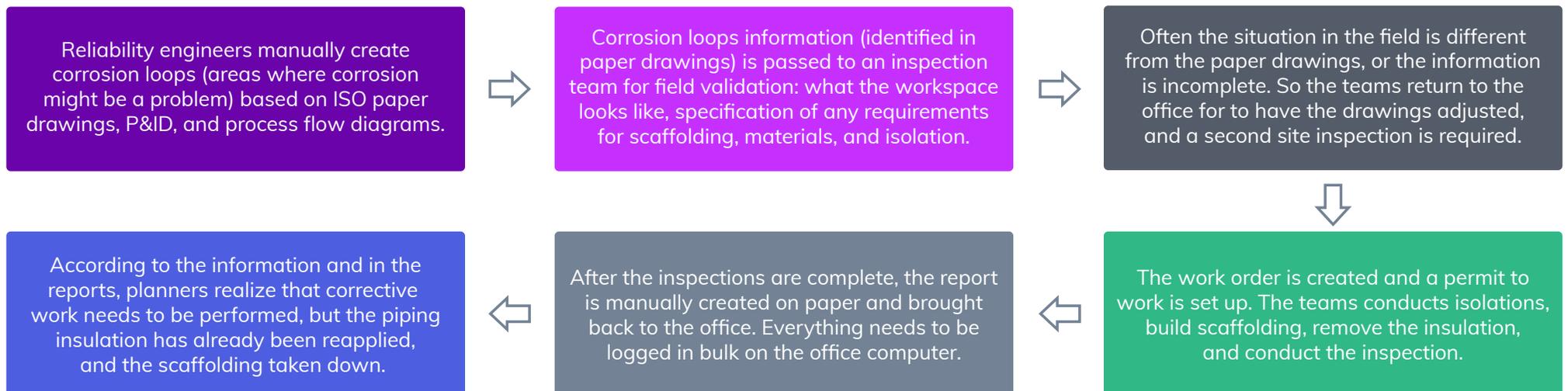


Application: Risk-based inspection program to address corrosion under insulation (CUI) continued

In the simplest terms, corrosion under insulation (CUI) is any type of corrosion that occurs due to moisture present on the external surface of insulated equipment. If CUI goes untreated, it can lead to leaks that may cause accidents, shutdowns of entire facilities, and huge penalties.

At one of our customers, a top 10 Oil & Gas company, CUI became a big issue, representing the single most significant contributor to plant downtime and maintenance costs.

The company had annual risk-based inspection campaigns, everything based on paper, requiring a lot of rework. The way they traditionally operated was:

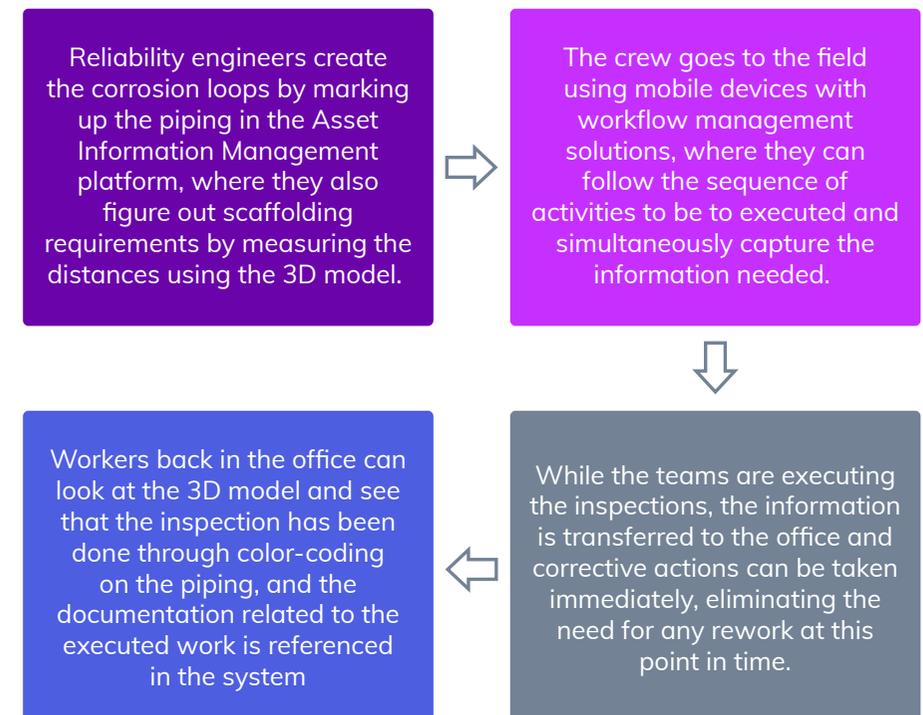


Application: Risk-based inspection program to address corrosion under insulation (CUI) continued

Then, they adopted a Visual APM approach by implementing a set of AVEVA technologies disrupting this process:

- The manual process of going through paper drawings and diagrams to find the information was replaced with an interactive 3D model.
- The immersive user experience replaces the need to verify what the workspace looks like in the field, while at the same time eliminating any adjustment to documents and a second site inspection before creating the work order.
- The digitization of data capture in the field ensures that information is captured in a structured, consistent format, enabling the elaboration of valuable reports.

Now, the digital process for doing CUI inspections looks like this:



Application: Risk-based inspection program to address corrosion under insulation (CUI)

Watch the Visual APM webinar to learn more

In summary, this Oil & Gas company was able to:

- Cut down time to find engineering information from 6 hours to 3 minutes in average
- Realize a multi-million-dollar return on investment over the asset life cycle
- Decrease the number of site visits by 67%
- Cut CUI maintenance costs by 10–20%
- Shorten time spent in the planning process by up to 60% while improving the quality of the planning
- Achieve overall improvement in the effectiveness of CUI campaigns and minimize rework
- Reduce health, safety, and environmental hazards
- Eliminate the need to manually log results into the office computer
- Increase the accuracy of data captures in the field
- Enhance reporting capabilities

Digitalization is not just about a single instance of inspection and maintenance, but also assuring all personnel is working with the same practices and capturing the same information. It's possible to establish best practices, for example, by analyzing which crew is working more efficiently and finding out what is influencing their work.

Some other examples of potential use cases are:

- Planning and execution of planned field crew maintenance
- Optimizing routes for crews (avoiding hazardous zones, limiting radiation exposure, finding the fastest route, etc.)
- Responding rapidly to operator alarms by finding the nearest competent team
- Visualizing an outline of commissioning progress and activities (mechanical completion energization, work planned, work completed, etc.)
- Providing remote support, incorporating AR/VR
- Executing fire safety and lighting compliance inspections
- Planning emergency and evacuation procedures

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At AVEVA, we are focused on helping companies manage risks, improve competitiveness, and reduce costs. Customers face OT- and IT-related challenges in sharing data, and our objective is to enable secure information sharing and improved insights across the enterprise.

Our portfolio spans from building the asset's digital representation and uniting all asset and operational information into a single interface to applying predictive analytics and visualizing insights to support real-time situational awareness across the enterprise.

Throughout the past years, we have partnered with the most prominent players in the industry.



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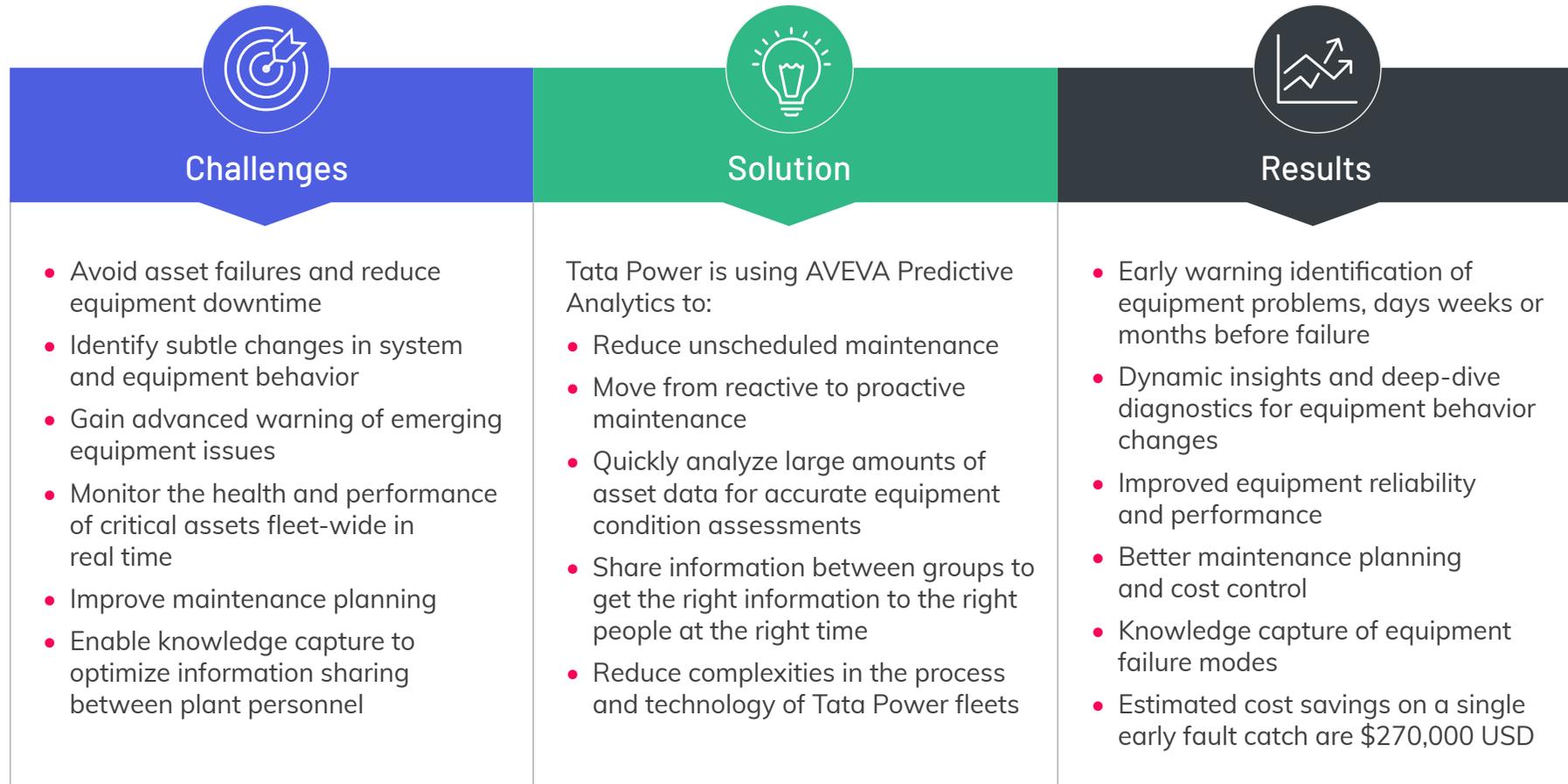
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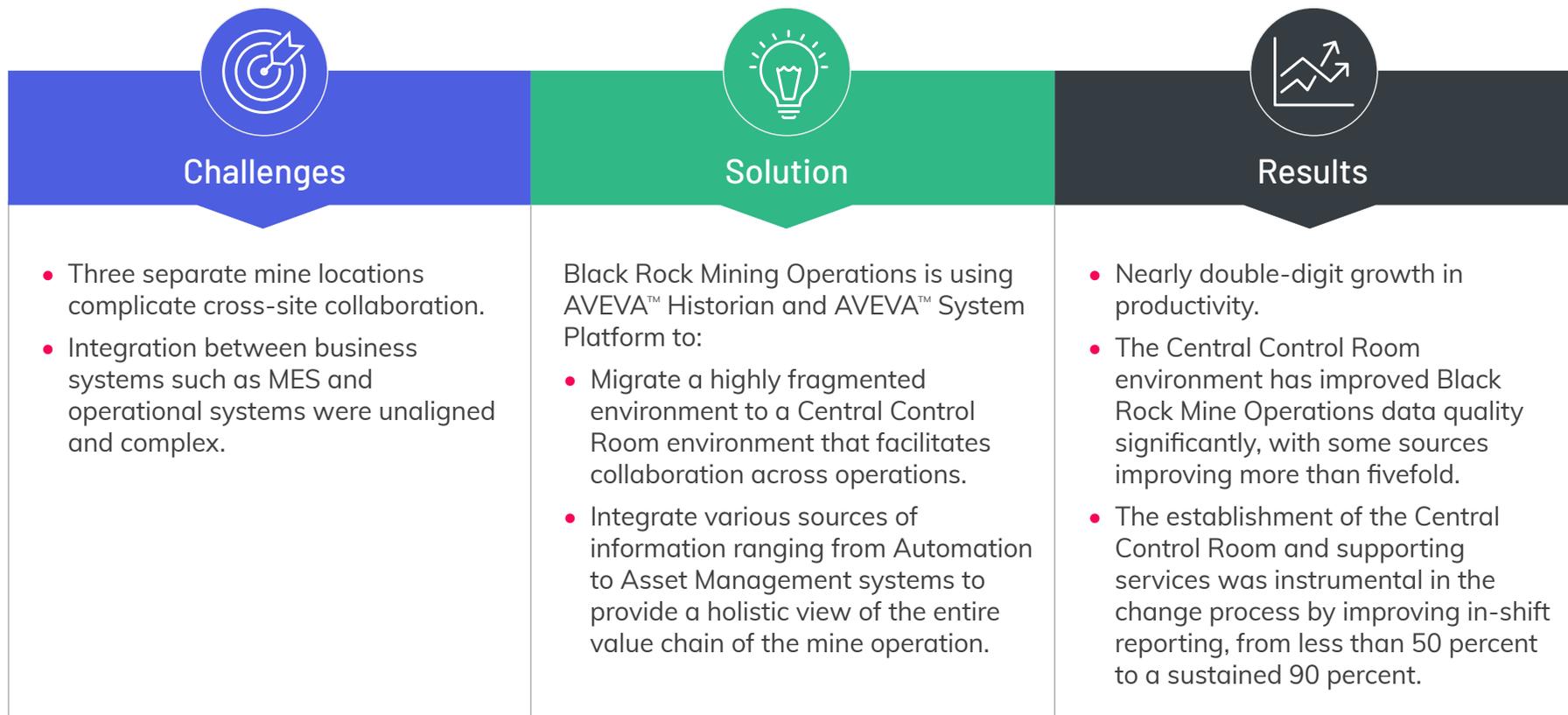
Tata Power Uses AVEVA™ Predictive Analytics to improve equipment reliability and performance

[Read the full case study here](#)



Black Rock Mining creates a Central Control Room with AVEVA technology

[Read the full case study here](#)



Information management delivers clear benefits for Petroleum Development Oman

[Read the full case study here](#)

 Challenges	 Solution	 Results
<ul style="list-style-type: none">• Poor information management: laborious, slow searches for information were holding back operational performance.• Critical information stored in a wide variety of formats among various repositories and systems across the organization.• Hard to keep as-built drawings updated after the completion of modification work on a plant which had obvious safety implications.• Avoid potentially poor decisions that could endanger both the plant and its personnel.	<p>Petroleum Development Oman is using AVEVA NET for:</p> <ul style="list-style-type: none">• Enabling accurate, detailed asset information visualization across the organization.• Providing users with access and navigation across a digital version of their plant.	<ul style="list-style-type: none">• Engineers can quickly search for a tag and find all its related information, such as process drawings, manuals, specifications, or maintenance history.• 5% of total worker's time saved on searching for information = 10,000 worker days. This is the equivalent of finding an extra 50 skilled workers at no extra cost to the business.

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Successful businesses of the future will dominate their markets and industries through a foundation of digital twin technology. These businesses manifest detailed, accurate digital twins of equipment, production lines, and even full-scale plants and the processes within them.

By adopting a Visual APM approach, companies allow users to better understand and interpret the health and risk status of an operating plant in real-time. This approach also breaks down silos and democratizes data access, enabling situational awareness throughout the enterprise from the personnel in the field to decision-makers at headquarters.

As a result, companies that successfully adopt Visual APM will see dramatic decreases in the cost of asset ownership, as more efficient use of maintenance resources reduces direct OPEX costs, while minimized unscheduled downtime reduces the payback period on capital-intensive assets and improves overall enterprise profitability.

Cut through the hype and invest in an industry leading solution

Watch the Visual APM Webinar

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We'll Take You There

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About AVEVA

AVEVA is a global leader in engineering and industrial software driving digital transformation across the entire asset and operational life cycle of capital-intensive industries. The company's engineering, planning and operations, asset performance, and monitoring and control solutions deliver proven results to over 16,000 customers across the globe. Its customers are supported by the largest industrial software ecosystem, including 4,200 partners and 5,700 certified developers. AVEVA is headquartered in Cambridge, UK, with over 4,400 employees at 80 locations in over 40 countries.

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