

BROCHURE

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# AVEVA™ Predictive Analytics for AVEVA™ PI System™

What if you combined the real-time and historical information from AVEVA™ PI Server with the artificial intelligence (AI) and machine learning (ML) capabilities of AVEVA Predictive Analytics? How much more profit could you achieve for your business? How many critical asset failures could you prevent and how much would that improve the safety, reliability, and sustainability of your operations?

The combination of AVEVA Predictive Analytics with AVEVA PI System goes beyond condition monitoring. Condition-based maintenance (CBM) deploys user-defined rules to identify abnormal or out-of-range operating conditions. Predictive analytics uses AI and machine learning to learn the unique operating signature of each asset while automatically adapting to changing load, ambient, and operational conditions to give you advanced warning of potential asset failures before they occur.

AVEVA Predictive Analytics assesses equipment proactively, so you can schedule maintenance activities when they'll make the most impact. Streamline asset performance, increase reliability, and reduce unscheduled downtime to improve the operational efficiency and profitability of your business.

Operations, maintenance, and reliability stakeholders can be more proactive as well. Maintenance teams can assess problematic situations to identify better outcomes. Operators might shift loads to reduce asset strain or schedule necessary maintenance during a planned outage. With predictive analytics, you can control maintenance scheduling to minimize the impact on operations.

**Other key benefits:**

- A proven no-code solution that requires no programming or data science knowledge to build
- Deploy, validate, and interpret the results of the predictive models
- Fault diagnostics and prescriptive actions, which provide guidance and reduce uncertainty and errors
- The ability to deploy AI at scale by deploying models in minutes, instead of weeks or months

**Achieve asset excellence**

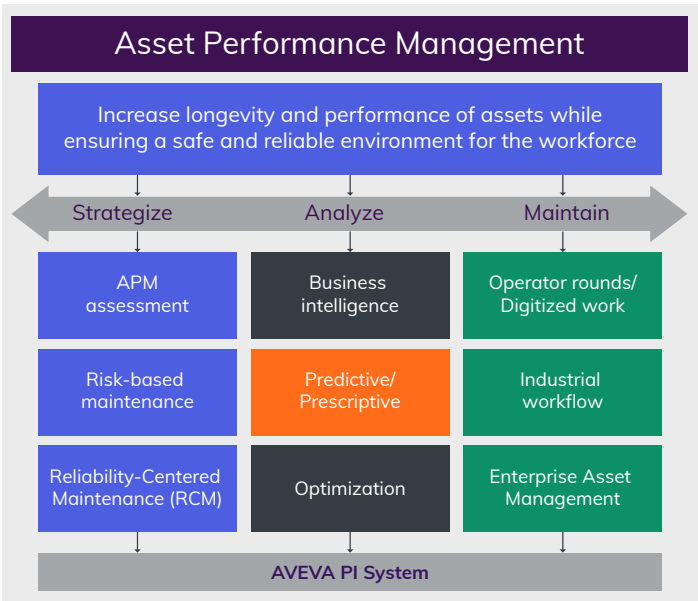
Improving sustainability, reliability, performance, and safety are among the top priorities of industrial plants and other asset-intensive organizations. Businesses today focus their efforts and resources on controlling costs and gaining value from existing investments. AVEVA Predictive Analytics supports predictive maintenance (PdM) programs with early warning notification and diagnosis of equipment issues ahead of asset failures and existing operational alarms. The power of the solution lies in its ability to transform raw data into easy-to-understand, actionable insights.

And, because it's equipment agnostic, users can configure the software to monitor assets regardless of manufacturer, equipment type, model, or the asset's age, with no OEM-specific asset information.

Sensor data from your equipment, such as turbines, pumps, compressors, and motors, has correlated readings like speed, bearing temperature, vibration, and load.

By combining this data stored in AVEVA PI Server with AVEVA Predictive Analytics, you can use built-in artificial intelligence and machine learning to automatically identify abnormal asset behavior weeks or months before failures occur, without having to write a single line of software code. This advanced early warning notification gives you time to proactively inspect assets and identify potential equipment failures before they happen.

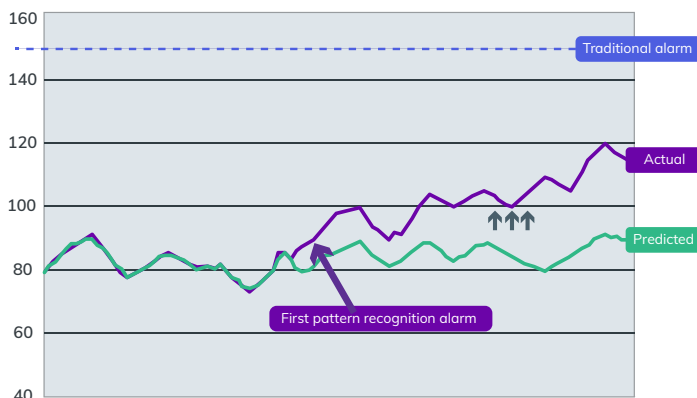
**Asset Performance Management functional view**



# AVEVA Predictive Analytics overview

Native integration with your existing AVEVA PI System allows you to use AVEVA PI System data to develop a predictive and prescriptive maintenance practice in your organization—without requiring data scientists and software development.

The success of any predictive analytics solution depends not only on the algorithmic approach but also on how you scale it across your business. Deploy and sustain a predictive monitoring program across the enterprise with this no-code, purpose-built solution.



AVEVA Predictive Analytics learns an asset's unique operating profile to clearly identify minor changes in its operation before fixed operational alerts are triggered

Input sensor data into the software's advanced modeling process and compare it to real-time operating data to alert users of subtle deviations from expected equipment behavior. Once you identify an issue, the software can assist in root-cause analysis and fault diagnostics, providing prescriptive actions to remedy the problem as quickly as possible.

The application uses AI and machine learning to provide early warning identification and diagnosis of equipment reliability and performance problems. Combining early warning detection and fault diagnostics with prescriptive guidance enables users to optimize maintenance planning and execution for more profitable operations.

With predictive analytics, teams know and understand the actual and expected performance of an asset's operational state. They know where inefficiencies are, how those inefficiencies impact financial performance, and how performance deficiencies will affect current and future operations. This information also helps assess the risk associated with each monitored asset and better prioritize capital and operational expenses.

Another increasingly important capability is knowledge capture and transfer for your workforce. The built-in case library captures and documents asset and process problems. Make maintenance decisions and processes repeatable, even when you face workforce turnover.

# Reduce OPEX by 10%-20%



# Software features

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AVEVA Predictive Analytics offers native integration with your existing AVEVA PI System. The solution is scalable to monitor a single asset, a specific plant, or thousands of remote assets across many sites. Integrate results from the analytics models with other business systems using an open, industry-standard integration approach.

## Native AVEVA PI System integration

There is no extension of AVEVA PI System that is more natural than AVEVA Predictive Analytics. Users generate faster insights and make better decisions that help your organization get even more value from the AVEVA PI System.

Combine predictive analytics with AVEVA PI System data archives to provide AI-driven predictive analytics across one or multiple AVEVA PI Systems. AVEVA Predictive Analytics users can then cleanse AVEVA PI System data, develop predictive models, and analyze the data to identify potential asset failures before they occur. AVEVA Predictive Analytics also integrates with other components of the AVEVA PI System, including the asset framework (AF) for asset analytics, asset relative displays, event frames, and system notifications.

## Intuitive model building

You don't have to be a data scientist or software developer to build, validate, and deploy predictive models. The software uses a no-code, intuitive user interface to develop predictive models for your assets. Model templates provide fast deployment and simplified maintenance of predictive models for common assets at a site or across the enterprise. Fully validate and optimize predictive models with the software's built-in playback capability before you deploy them for production monitoring.

## Alerts and notifications

Configure alerts to provide early warning when an asset's current operation deviates from its learned asset signature. The alerts clearly indicate the assets that require further investigation and remediation. Link alerts to diagnostic, prescriptive, and prognostic information about the asset, or configure notifications to notify responsible stakeholders of alert conditions.

## Fault diagnostics

Predictive diagnostics use customized data and diagnostic tools to provide precise, real-time insights and identify potential issues. AVEVA Predictive Analytics shows clearly how the current situation relates to asset fault conditions and how individual sensors are contributing to these faults. With this timely, consistent alert condition analysis, users can quickly diagnose and remediate problems.

Sensor failure degrades the accuracy of analytics. Unreliable data can cloud analysis and decision-making. The software includes sensor preprocessing to detect sensor problems and improve data quality.

## Time to failure forecast

AVEVA Predictive Analytics's time-to-failure forecast provides an estimated time until a failure is likely to occur to help identify the urgency for repair. The application provides actionable insight into operations and maintenance risks.

Operations and maintenance teams can use this information to determine whether to operate an asset until the next planned maintenance outage or initiate an urgent shutdown.

## Prescriptive actions

Get prescriptive advice and recommended actions to remediate problems. With prescriptive actions, your workforce can execute predefined tasks when addressing asset maintenance and performance issues.

AVEVA Predictive Analytics is used to monitor over 35,000 assets globally.

## Transient module

Monitor abnormal conditions online during transient events, such as turbine startups and shutdowns, with the transient module. The software automatically identifies previous transient events from historical data, which is useful when making comparisons of common transient conditions.

## Calculation engine

The software includes an advanced calculation engine where you can develop simple and complex calculations to create soft sensor inputs for the models. The models use these results for increased fidelity and analysis.

## Case management

The software provides an integrated case management solution. Actively manage and track predictive machine alerts from inception to resolution. Assign cases to specific team members or compare previous cases involving similar assets for root-cause analysis and remediation. Transfer knowledge by capturing the analysis and resolution of asset issues. Share the knowledge gained by your most experienced teams with the entire enterprise to increase workforce productivity.

## Bring your own algorithm

Your data scientists can add their own custom algorithms and include them in the results. Additional features for custom algorithms include:

- Built-in model templates
- Sensor pre-processing
- Data cleansing
- Alerting and alert workflow
- Fault diagnostics
- Prescriptive actions
- Forecasting and case libraries

## Operational scale

The ability to operationalize and scale AI and machine learning can mean the difference between the success and failure of a monitoring and diagnostic center. AVEVA Predictive Analytics has all the built-in and ready-to-deploy features you need to sustain a predictive monitoring program at scale:

- Model templates and validation
- Alert management
- Fault diagnostics
- Fault tree
- Prescriptive analytics
- Known failure modes and remediation steps
- Failed sensor management
- Case library
- Time-to-failure forecasts
- Integrated alert workflow

## Automated model building

Autonomously deploy new predictive models for assets of the same type in a single action. Save valuable resources, reduce errors, and ensure consistency.

You can also send predictive results back to AVEVA PI System to display them in context with all asset-related information to provide a more complete integrated picture of asset health and performance. Incorporate predictive analytics fault diagnostics, prescriptive actions, and case library visualizations directly into AVEVA™ PI Vision™ displays with the same contextual information and visualization experience that users experience in the predictive analytics software.

## Cybersecurity

The security of your data is our top priority. As an established leader with over 50 years of experience delivering industrial software solutions, we recognize your data demands stringent cybersecurity protection and the highest operational standards.

AVEVA Predictive Analytics software integrates with existing enterprise security systems and supports single sign-on authentication with the ability to limit user access rights and editing privileges at a granular level.

## Additional products

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AVEVA offers a comprehensive portfolio of asset performance management software solutions to maximize return on asset investment, including mobile workforce enablement, condition-based maintenance, reliability-centered maintenance software, and more.

### AVEVA™ Asset Strategy Library

Deploy asset performance strategies up to 90% faster with industry-specific asset libraries. The AVEVA Asset Strategy Library contains known failure mode data and preventive maintenance procedures for most common asset types, including:

- 1,000 components
- 1,500 known failure causes with failure conditions
- 2,000 preventive maintenance tasks
- 5,000 prescriptive tasks
- >20 years of data representing over 22,000 hours of operator experience

### AVEVA™ Asset Information Management

AVEVA Asset Information Management turns data from multiple information sources and systems into trusted actionable insights, identifying and cross-referencing all the relationships between equipment, documents, drawings, operations and asset management data to create a comprehensive 360-degree digital twin of the physical asset.

### AVEVA™ Unified Operations Center

AVEVA Unified Operations Center gives teams enterprise-wide visualization to help make informed decisions quickly. Unified Operations includes industry solution templates, reports, dashboards, and operational KPIs that seamlessly unify functional teams, departments, and sites under one platform.

### AVEVA™ Predictive Asset Optimization

AVEVA Predictive Asset Optimization delivers the next generation of predictive maintenance, taking operations and manufacturing to the next level of intelligence and sophistication. By combining artificial intelligence (AI) with physics-based simulation, AVEVA Predictive Asset Optimization can help you achieve in-depth risk analysis and detect asset issues early.

### AVEVA™ Mobile Operator

Extend consistent work processes across the business so work is consistently executed in accordance with best practices. Field workers can digitally capture operator rounds, maintenance rounds, and safety and environmental inspections for automated analysis and reporting.

### AVEVA™ Insight

AVEVA Insight gives you complete visibility of your operations and assets in the cloud so you can make better, faster decisions. Built-in OEE provides visibility into how assets are performing and provides a quantitative way to measure the impact of improvements to the asset strategy.

### AVEVA™ Monitoring and Diagnostic Service Center

Reduce maintenance costs and capital expenditures by leveraging our Monitoring and Diagnostics Services Center for remote monitoring of your industrial assets as a service.

### AVEVA™ Asset Strategy Optimization

Build a risk-based asset strategy to balance the impact and cost of failure as you improve productivity. With AVEVA Asset Strategy Optimization, you get a better understanding of critical assets, failure behaviour, and mitigating actions. Simulate different maintenance strategies to see how they affect the ability to meet core business objectives.



### AVEVA™ APM Assessment

AVEVA APM Assessment gives you a clearer understanding of the status of your business so you can identify which improvement opportunities will provide the quickest financial return.

AVEVA APM Assessment provides a comprehensive action plan that unites people, processes, and systems.

### AVEVA™ Operational Safety Management

AVEVA Operational Safety Management enables asset operators to eliminate, minimize, or mitigate operational risk while optimizing asset performance. It provides risk assessment, digital work permitting management, work activity plotting, lockout/tagout planning and execution, safe job analysis, and lessons-learned reporting to reduce operating risk and maximize workforce safety.

For more information, visit: [aveva.com/predictive-analytics](https://aveva.com/predictive-analytics)

**AVEVA**

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