BROCHURE

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 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 whereas 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 for advanced notice of potential asset failures before they occur.

AVEVA Predictive Analytics enables your personnel to proactively assess equipment and schedule maintenance activities at the most economically advantageous time. It helps to streamline asset performance, increase reliability, and reduce unscheduled downtime to improve the operational efficiency and profitability of your business.

AVEVA Predictive Analytics enables operations and maintenance personnel to be more proactive in their work. Instead of tripping the unit or immediately reducing load on the power plant, maintenance teams can assess problematic situations for more optimized outcomes. Operators might shift loads to reduce asset strain or schedule necessary maintenance during a planned outage. These software solutions allow you to optimize maintenance scheduling to minimize the impact on operations.

AVEVA Predictive Analytics is an off-the-shelf solution. It requires no programming or data science knowledge. Other key benefits of AVEVA Predictive Analytics include:

- Unparalleled breadth and depth of analyses with a proven approach
- Fault diagnostics and prescriptive actions, which provide guidance and reduce uncertainty and errors
- The ability to operationalize AI at scale by leveraging templates and deploying models in minutes instead of weeks or months

Achieve asset excellence

Improving 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 maximizing value from existing investments. AVEVA Predictive Analytics supports predictive maintenance (PdM) programs with early warning and diagnosis of equipment issues ahead of asset failures and existing operational alarms.

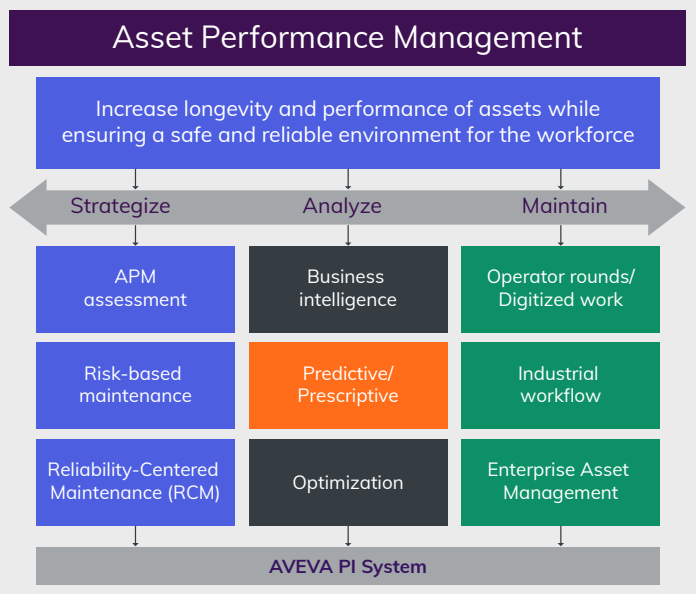
The power of AVEVA Predictive Analytics lies in its ability to automatically transform raw data into easy-to-understand, actionable insights, which can help you improve the availability, reliability, and performance of your operations.

And, because it's equipment agnostic, users can configure the software to monitor assets regardless of equipment type, vendor, or asset age without the need for OEM-specific asset information.

Sensor data from your equipment, such as turbines, pumps, 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 AI and machine learning to automatically identify abnormal asset behavior weeks and months before a failure may occur without having to write a single line of software code. The result is advanced early warning notification so that assets can be proactively inspected and equipment failures, which otherwise might not have been identified, can be avoided.

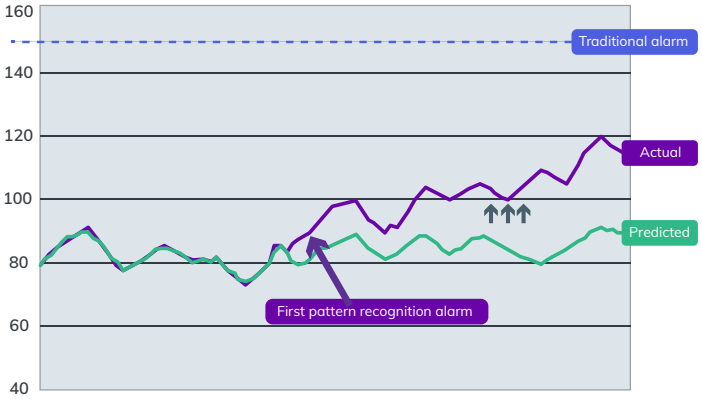
Asset Performance Management functional view



AVEVA Predictive Analytics overview

With native integration to your existing AVEVA PI System, AVEVA Predictive Analytics allows users to quickly use AVEVA PI System data to develop a predictive and prescriptive maintenance practice in their organization – without the need for data scientists and software development.

The success of any predictive analytics solution depends not only on the algorithmic approach but also on its ability to be operationalized within your business at scale. This no-code, purpose-built solution enables companies to deploy and sustain a predictive monitoring program across the enterprise.



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

Sensor data is input into the software's advanced modeling process and compared to real-time operating data to alert users of subtle deviations from expected equipment behavior. Once an issue has been identified, the software can assist in root cause analysis and fault diagnostics, providing prescriptive actions to remedy the problem as quickly as possible.

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

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

Another increasingly important benefit of AVEVA Predictive Analytics is the capability for knowledge capture and transfer in the workforce. The built-in case library ensures that asset and process problems are captured and documented. With AVEVA Predictive Analytics, maintenance decisions and processes are repeatable even when organizations are faced with workforce turnover.

The AVEVA Predictive Analytics advantage

1. Reduce unscheduled downtime
2. Prevent equipment failures
3. Reduce maintenance costs
4. Increase asset utilization
5. Extend equipment life
6. Identify underperforming assets
7. Improve safety
8. Optimize maintenance planning and execution

Reduce OPEX by 10%-20%

Software features

AVEVA Predictive Analytics offers native integration to your existing AVEVA PI System. The solution is highly scalable and can be used to monitor a single asset, a specific plant, or thousands of remote assets across many sites. Users can easily integrate results from the AVEVA Predictive Analytics models with other business systems using open and industry-standard integration approaches.

Native AVEVA PI System integration

There is no extension of AVEVA PI System that is more natural than AVEVA Predictive Analytics. AVEVA Predictive Analytics provides native integration to AVEVA PI System. By enabling users to generate faster insights and make better decisions, AVEVA Predictive Analytics helps organizations get even more value from the AVEVA PI System.

AVEVA Predictive Analytics connects seamlessly to 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 AVEVA PI System data to identify potential asset failures before they can occur. AVEVA Predictive Analytics also integrates with other components of the AVEVA PI System. This includes integration with the asset framework (AF) of AVEVA PI Server for asset analytics and asset relative displays as well as event frames and AVEVA PI System notifications.

Prescriptive actions

AVEVA Predictive Analytics provides users with prescriptive advice and recommends actions to remediate problems. Prescriptive actions empower your workforce to execute predefined guidance when addressing asset maintenance and performance issues, which improves decision-making. It also ensures that your teams investigate, manage, and resolve issues consistently.

Asset remaining useful life

AVEVA Predictive Analytics provides the ability to forecast sensor data towards potential breakpoints. The application provides a remaining useful life estimation (RULE) and provides actionable insight into operations and maintenance risk. Operations and maintenance teams can use this information to determine whether it is possible to operate the asset until the next planned maintenance outage or if an urgent shutdown is required. This enables plant personnel to be more effective in scheduling maintenance and assessing risk to maximize safety and profitability.

Intuitive model building

With AVEVA Predictive Analytics, 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 existing assets. Model templates provide fast deployment and simplified maintenance of predictive models for common assets at a site or across the enterprise. Playback enables users to fully validate and optimize predictive models before they are operationally deployed.

Alerts and notifications

Alerts are configured to provide early warning indication when an asset's current operation deviates from its learned asset signature. The alerts provide clear indication of the assets that require further investigation and remediation. Alerts also enable users to quickly link to diagnostic, prescriptive, and prognostic information about the asset. Users can configure notifications to proactively notify responsible stakeholders of alert conditions. AVEVA Predictive Analytics flags and identifies sensor malfunctions and can exclude them from model calculations to avoid clouding insights.

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

Fault diagnostics

The fault diagnostics of AVEVA Predictive Analytics provide clear indication of how well the current condition of an asset matches common failure modes that have been defined for the asset. This enables timely, consistent analysis of alert conditions so that users can quickly diagnose and remedy problems. This reduces the likelihood that an abnormal operating condition will be attributed to the wrong cause.

Additionally, the software offers sensor diagnostics. Nearly 25% of detected issues can be related to sensor malfunctions which often are not repaired in a timely manner degrading the accuracy of predictive model results. Unreliable data can cloud analysis as well as decision-making. Configurable sensor analysis rules in AVEVA Predictive Analytics identify unreliable data and exclude it from the model calculations. Users can also explicitly select sensors to be excluded for maintenance and manage sensor alerts over the duration of the corrective process.

Transient module

The transient module of AVEVA Predictive Analytics enables online monitoring of abnormal conditions during transient events, such as turbine startups and shutdowns. AVEVA Predictive Analytics is also able to automatically identify 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 that provides the ability to develop simple and complex calculations to create soft sensor inputs to the models. Results of these calculations are then used in AVEVA Predictive Analytics models to allow for greater system flexibility and accuracy.

Case management

AVEVA Predictive Analytics provides an integrated case management solution to actively manage and track predictive machine alerts from inception to resolution for the entire lifecycle of the asset. Users can assign cases to specific team members. Users can also compare previous cases involving similar assets to aid in root-cause analysis and remediation. The case management solution enables knowledge transfer through the structured capture of problem analysis and resolution. This ensures that the knowledge gained by your most experienced teams is available to the entire workforce, accelerating the transfer of knowledge.

Operational scale

The ability to operationalize and scale AI and machine learning projects 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 accelerate your time to value and 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
- Asset comparison and reporting
- Remaining useful life estimation
- Integrated alert workflow

Cybersecurity

The security of your data is our top priority. As an established leader with more than 50 years of experience delivering industrial software solutions, we recognize that your data demands a stringent cybersecurity posture 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

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

AVEVA™ Asset Strategy Library

By combining AVEVA PI System data and predefined asset templates, users can deploy an asset performance management strategy up to 90% faster. 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 and over 22,000 man-hours of 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, and various data formats to create a 360-degree digital twin of the physical asset.

AVEVA™ Unified Operations Center

AVEVA Unified Operations Center empowers teams with a centralized view to help make informed decisions fast. Unified Operations Center enables faster time to value with out-of-the-box industry solution templates, reports, dashboards, and operational KPIs that seamlessly unify functional teams, departments, and sites under one platform.

AVEVA™ Mobile Operator

AVEVA Mobile Operator equips field workers with the information they need to make tough decisions on the spot using rugged handheld devices or commercially available off-the-shelf mobile devices. AVEVA Mobile Operator gives your teams access to valuable information, such as operations and maintenance procedures, equipment diagrams, and operating history. This ensures that work is executed in a way that is consistent with best practices and followed across the entire business.

AVEVA™ Insight

AVEVA Insight makes asset performance, OEE reporting, big data, and analytics easy. A cloud-based solution that provides information in the right context to enable anyone to easily manage your operations and assets from anywhere, at any time.

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

AVEVA Asset Strategy Optimization generates optimized maintenance and spare parts strategies by first looking at the company's business strategy and objectives, then prioritizing actions down to an individual asset level to develop a risk-based asset performance and maintenance strategy.

AVEVA™ APM Assessment

AVEVA APM Assessment gives you a clearer understanding of the status of your business and helps you see where improvement opportunities will provide the quickest financial return.

AVEVA APM Assessment provides you with a comprehensive action plan to execute against, which bridges people, processes, and systems.

AVEVA™ Operational Safety Management

Plan and perform safe, compliant work on complex engineering assets. AVEVA Operational Safety Management enables asset operators to eliminate, minimize, or mitigate operational risk while optimizing asset performance. AVEVA Operational Safety Management 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