



**OpreX™** Asset Management and Integrity

## **Smart Asset Performance Management (APM)**

A plant manager's guide to selecting and implementing a cloud-based asset performance management solution

## Smart Asset Performance Management (eBook)

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# Introduction/Foreword



Twenty years ago, our cars didn't have many implementations on their dashboards. So if we wanted to calculate the fuel efficiency in miles per gallon (i.e., (gallons used X 100) ÷ miles traveled = gallons per 100 miles), we had to manually calculate data gathered from our fuel gauge, gas pumps, and physical maps. Fast forward to today. Our cars now have the power to calculate all of this data automatically so we can make better decisions to improve our driving efficiency.

In the past few decades, the way we gather data to make better decisions has changed in all aspects of our lives—from the way we drive to how we run our businesses. The technology industry has been talking about digital transformation since the early 2000s but some industries have been slow to change and continue to operate in the same way they did 20 years ago.

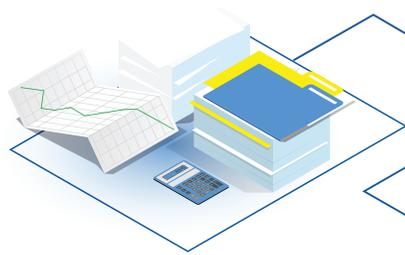
As the needs of today's industrial manufacturers are changing rapidly to adjust to driving forces in the industry, the growing gap between traditional and digital systems and processes becomes clear. According to [Deloitte's latest Manufacturing Industry Outlook](#), the manufacturing industry is focused on finding “ways to make itself disruption-proof,” with 76% of manufacturing executives increasing their investments in digital initiatives to accomplish this.

All manufacturers experience disruptions to production. These can come in many forms, but traditionally manufacturers have focused on machine downtime as the primary culprit, attributed to machine maintenance and repair. As such, asset performance management is one of the highest impact, lowest disruption digital transformation initiatives that any organization can undertake.

[According to McKinsey](#), when industrial manufacturers incorporate APM into their standard workflows, they typically improve productivity by 30 to 50 percent within eight to 12 weeks of deployment while simultaneously increasing on-time deliveries and unlocking additional capacity.

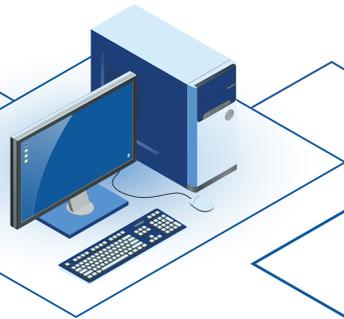
Industries that have the most to gain from advanced asset performance management include chemicals, energy, water plants, utilities, oil and gas production and refineries, food and beverage production, and pulp and paper.

## The Digital Evolution of Asset Performance Management



### Pre-1990

Manual maintenance and paper-based systems and processes



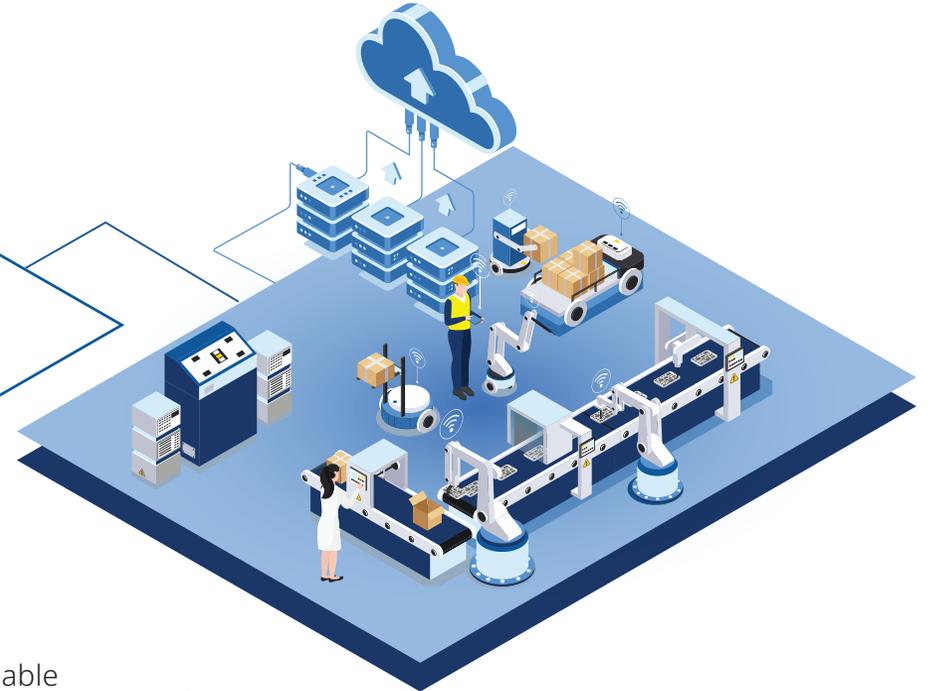
### 1990s

Desktop computers enable early digital APM



### 2000s

Mobile devices and sensors enable IoT, real-time data, and some predictive maintenance



### 2020s

Digital transformation drives a new era: Industry 4.0. APM solutions move to the cloud to collect, refine, and aggregate Operational Technology (OT) data from distributed assets and finally connect OT to IT.

# APM: The Smoothest Path to Smart Manufacturing

We're headed into a new age of opportunity and value creation with industrial digital transformation.

Asset Performance Management, or APM, can be the catalyst your organization needs to bring together physical systems, the Internet of Things, and cloud computing to create a smart and efficient factory, plant, facility, or utility.

At its core, the next generation of APM solutions combine:



## 1. Cloud-based applications

To truly gain value from APM, organizations need to adopt cloud-based applications. Only cloud-based applications have the capability to gather real-time data from IIoT devices and power the insights to deliver true business value.



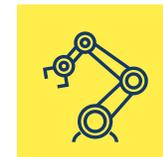
## 2. Smart connected assets

APM leverages the information from smart assets—sensors, instrumentation, controls, and connected devices—to deliver valuable insights to maintenance organizations by leveraging predictive analytics and machine learning.



## 3. Predictive analytics and machine learning

With basic APM, maintenance can evolve from reactive to condition-based. However, this is not enough to match the digital transformation paradigm shift maintenance organizations face. Advanced APM—powered by machine learning—includes predictive and prescriptive analytics to achieve an entirely new level of maintenance value. Machine learning enables an automated search through data to look for patterns, and is the basis to adjust and improve APM processes and actions such as the prescription of maintenance activities to postpone or prevent failure.



## 4. IIoT

The benefits of IIoT in manufacturing are well documented. APM helps organizations handle many connections to assets and communication protocols, and when it makes sense, to send that data to the cloud.

# Benefits of Smart APM

Not all APM solutions are equal so ensure you select a truly advanced solution that will help you future-proof operations. Using cloud technology for asset health is particularly effective as it leads to improved collaboration and decision making, reusable data for further operational improvement, greater cost-effectiveness, increased scalability, and improved accessibility.



**An Asset** is an item, thing, or entity that has potential or actual value to an organization (ISO55000). A valve or a pump is an example of an asset.



## **Asset Management (AM)**

is a coordinated process of balancing risks, costs, and desired asset performance across the asset lifecycle to achieve an organization's objectives.



## **Asset Performance Management (APM)**

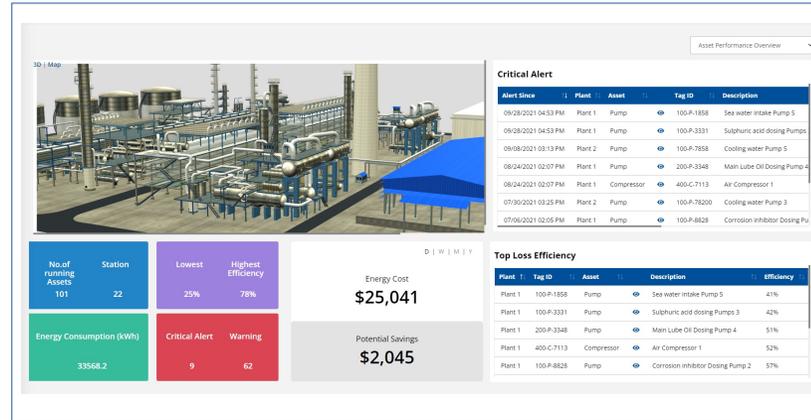
is an advanced, cloud-based system that enables proactive maintenance and prescriptive analytics to drive greater efficiencies and reduce organizational risk.

# Benefits of Smart APM

The following are some of the benefits that many organizations enjoy from employing a Smart APM strategy.

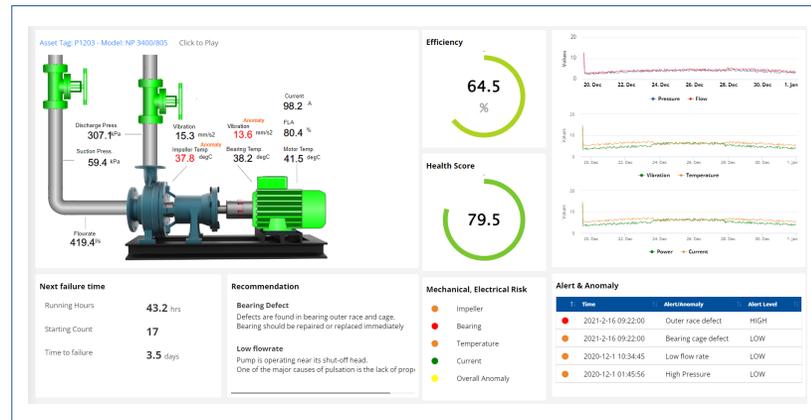
## Combine maintenance and production data for better decision-making

By bringing traditionally siloed maintenance and production data into one view and achieving one single source of truth, plant management can connect workers and managers across multiple departments working directly out of the same system so collaboration becomes easier and helps avoid issues that disrupt production.



## Production Manager's View

A high-level overview that highlights production efficiency ranges, issues, and Return on Assets.



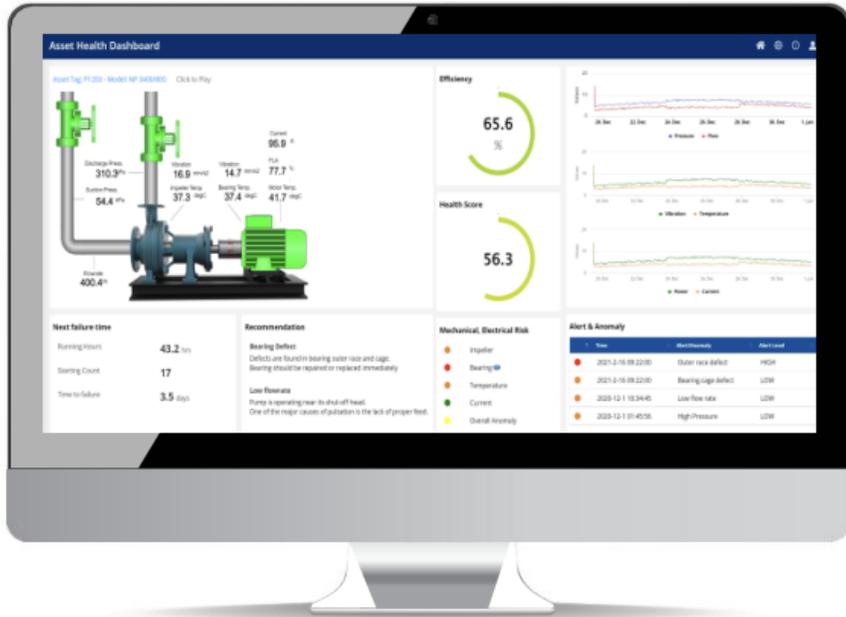
## Maintenance Manager's View

Detailed views on machinery conditions to assure it's working standards, procedures, and operations, while overseeing equipment stock.

# Benefits of Smart APM

## Optimize performance and profit margins

Manage and extend the lifecycle of every asset—from sensors to pumps, chillers, compressors, and turbines—and identify and eliminate inefficiencies for a cost-effective operation.



## APM for Enhanced Pump Performance & Anomaly Detection

APM collects process data from the pump (discharge pressure, suction pressure, flow rate, power, etc) and determines the performance gap between actual and ideal efficiency. It also estimates the potential energy savings to be gained from optimal usage. APM also helps detect abnormal process events using AI. The solution will proactively alert site engineers to operational issues and provide actionable insights on how to address them.

### Business outcomes:

- Increased pump efficiency
- Reduced operational costs
- Increased product quality and reliability
- Maximization of warranty programs

# Benefits of Smart APM

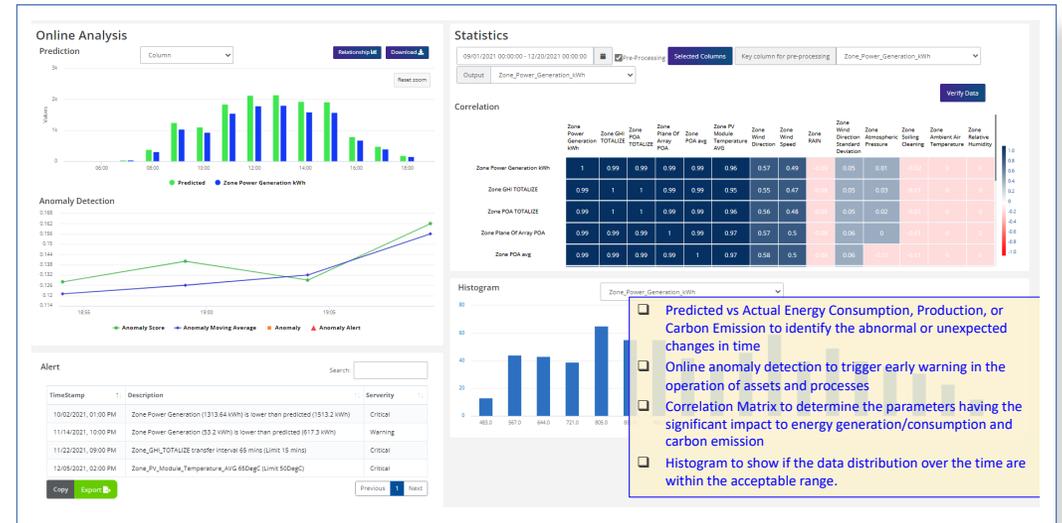
## Gain a 360-degree view of operational assets—from anywhere

Access the data while on the go so you always have access to relevant information pertaining to a stoppage, such as the repair history, bill of materials, spare parts, quality history, and standard procedures. This allows workers to stay onsite solving the problem rather than tracking down information elsewhere.

Examine each asset and situation from every angle, interact with data and explore what-if scenarios using real-time and historical benchmark data.

## Predictive asset management

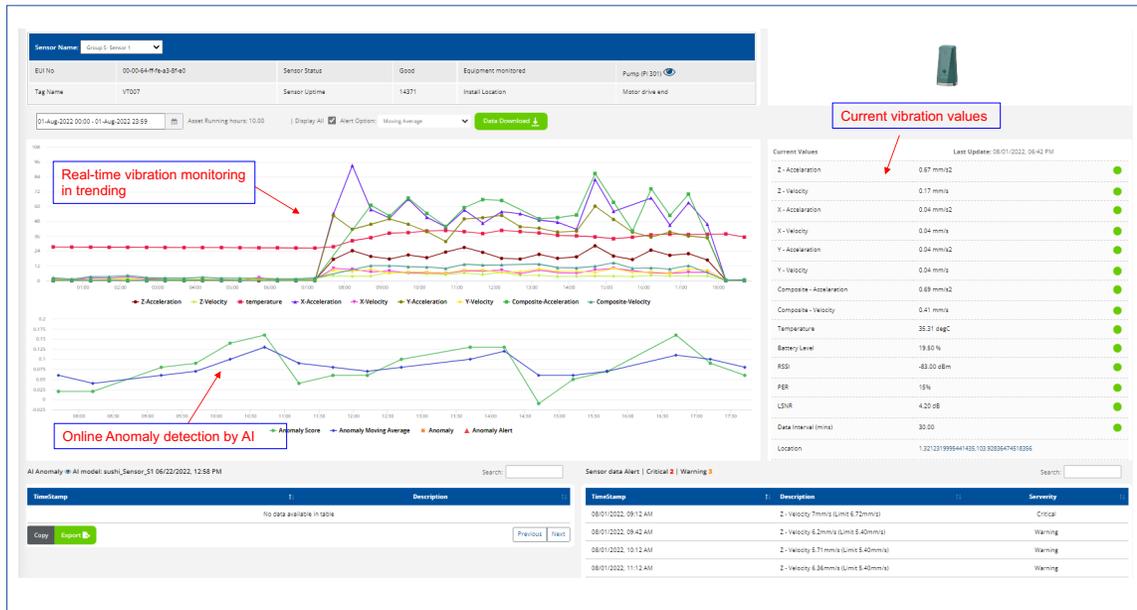
Enable real-time and historical asset data in combination with AI/ML to predict future events so appropriate measures can be taken to avoid operational failures.



# Benefits of Smart APM

## Better safety with proactive asset management

Receive alerts and notifications of potential risks before they occur, take preemptive action, avoid negative outcomes, and improve safety.



## APM for Condition Monitoring

When coupled with smart sensors (e.g., Yokogawa Sushi sensor), APM helps organizations move from schedule-based maintenance to proactive monitoring of asset performance. This helps organizations detect anomalies and alert to any issues that occur between maintenance efforts.

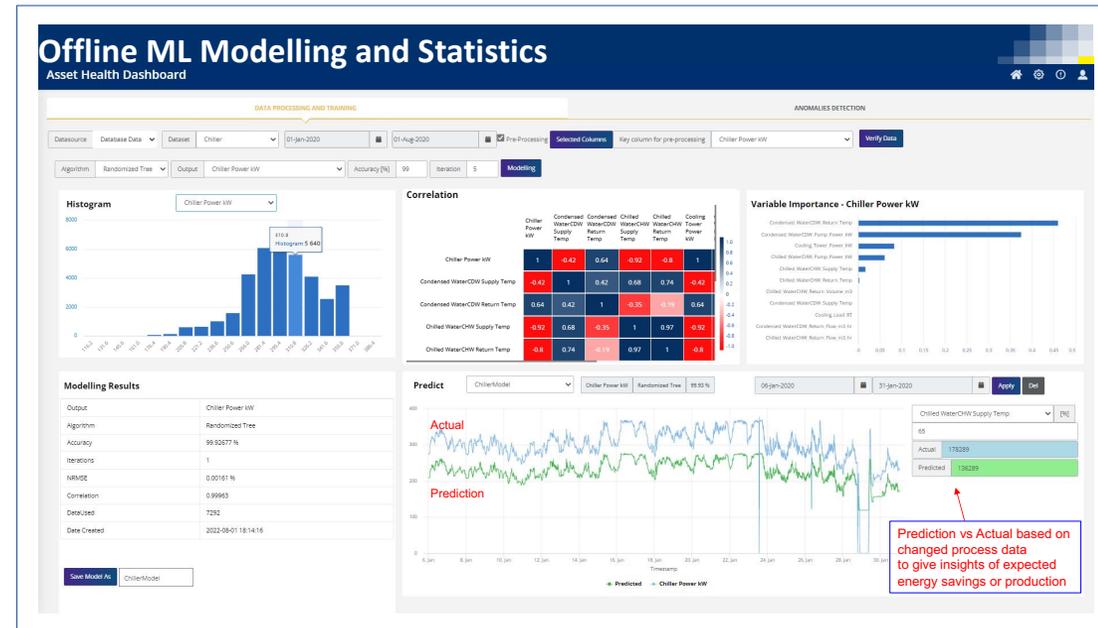
### Business outcomes:

- Reduced operational costs
- Increased product quality and reliability
- Real time data monitoring and anomaly detection through remote monitoring

# Benefits of Smart APM

## Boost transparency and accountability

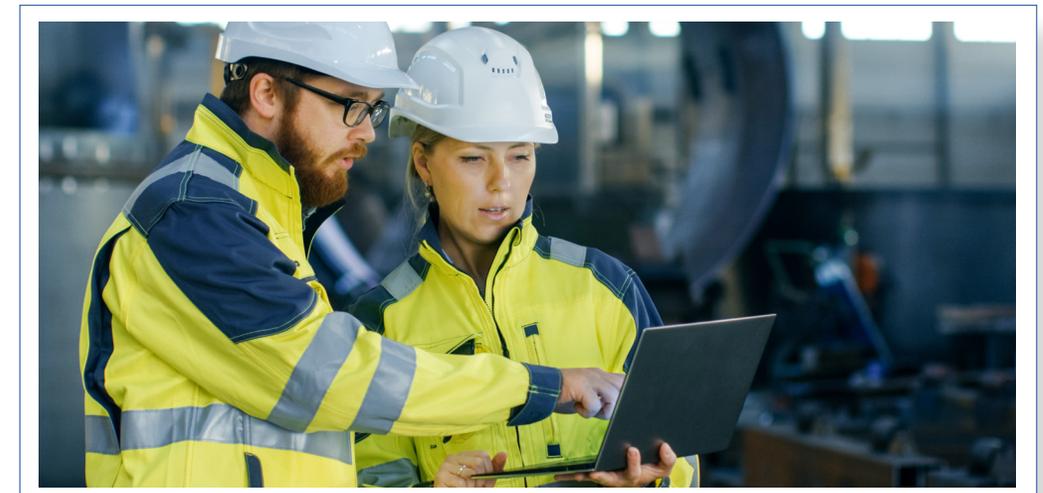
Increase overall transparency in the factory, plant, facility, or utility highlighting where issues are occurring in real time. This creates a sense of accountability for the right people to be in the right places fixing the right problems.



## Increase adoption of digital technology to help drive wider digital transformation

Once a cloud-based APM solution is installed, the benefits become clear right away, which leads to faster adoption and higher use by the workforce. And if the software is easy to use, system experts or “gatekeepers” are no longer necessary.

Data can be democratized across the organization to help with real-time decision-making by the workers themselves, which increases the perceived value and use of the system.

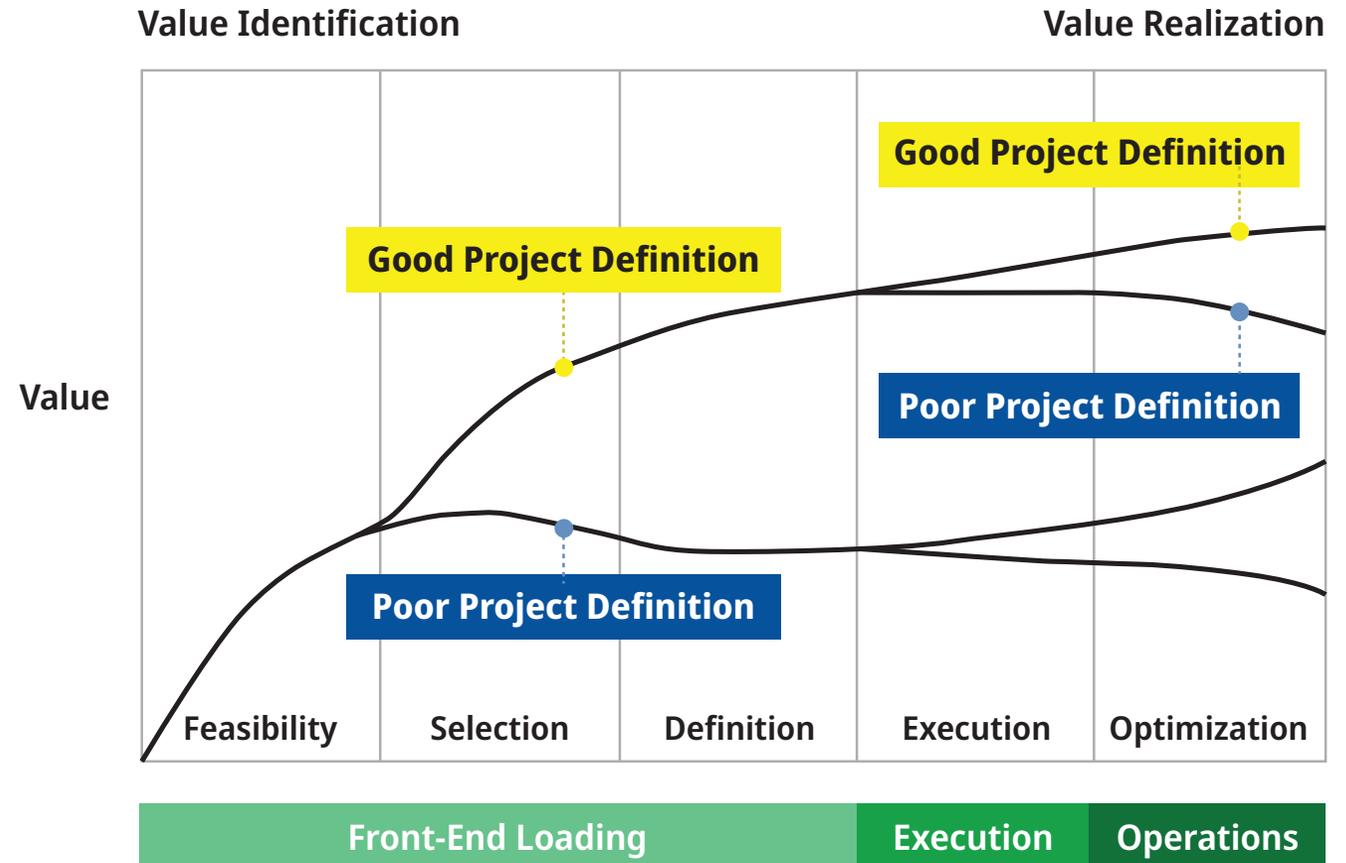


# Implementing a Cloud-Based APM Solution

## Implementing a Cloud-Based APM Solution

### Define the scope of your project

Conduct research on the problems you're aiming to solve with APM and the relevant stakeholders that need to be involved. According to Merrow (Independent Project Analysis), well-defined projects cost less, take less time to execute, and operate better. The cost and project slippage deviation between a good project rollout and a poor one is 29% and 21% respectively.



# Benefits of Smart APM

## Asset strategy and placement

Identify all of the assets from which data will be collected. Some advanced APM solutions like Yokogawa Asset Health Insights have a process that activates existing and new sensors within minutes, including sensors for pressure, flow, temperature, vibration, and other use cases.

## Data collection/process configuration

APM starts with the data. Data in any factory, plant, facility, or utility can be siloed, disparate, and require a lot of manual interaction to derive value from it.

With advanced APM, once collected, data is cleaned and optimized within the advanced APM's cloud-based environment. This ensures data accuracy, quality, and relevance—key characteristics of data integrity.

## 3 Characteristics of Data Integrity



**1. Data Accuracy:** All instruments measuring the data and all calculations made with the data have been validated and calibrated.



**2. Data Quality:** All data is measured at the same time and in real-time so APM comparisons and insights are highly accurate.



**3. Data Relevancy:** All data is examined and insights are delivered in the context of the specific organization and industry.

# Benefits of Smart APM

## Set KPIs

Although managing industrial operations using KPIs is as old as industrialization itself, the effective use of KPIs is still an ongoing struggle for most manufacturers. With APM, it is easier to set, track, and manage KPIs across the business.

Once, it's all set up, business leaders and plant managers can use the real-time information to examine and analyze the operation, proactively acting as needed.

## The 10 Key Performance Indicators



# 10 Questions to Ask Your APM Vendor

Here are several key questions you should consider asking your vendor before doing business with them:

## 1 Is your APM solution cloud-based?

Cloud-based solutions unify data, systems, plants, and assets to provide greater organizational intelligence. By combining deep domain expertise with machine learning, software innovation, and asset connectivity, cloud-based APM delivers real-time, data-driven insights for smarter, safer, and more efficient operations.

### Related questions:

- Do you support cloud-based enterprise integrations?

## 2 Do I have control over my own assets?

The ability to lightly customize your APM solution will add additional business value. Greater customization should also be available through local domain-experienced managed services teams to ensure your solution is fit for purpose now and in the future.

### Related questions:

- Can I manage my own asset? e.g., add, configure, rename, etc.
- Can I download my own data?
- Can I add and configure my own KPIs?
- Is there a management function?
- How fast can I add and configure new devices?

# 10 Questions to Ask Your APM Vendor

## 3 Does your APM support predictive maintenance?

Predictive maintenance is facilitated by real-time connectivity and machine learning capabilities that help you better understand assets to reduce downtime, increase safety, and operate within more efficient parameters.

### Related questions:

- Do you support cloud-based enterprise integrations?

## 4 Is your APM contextual?

Select a vendor that understands your industry and has built a solution to meet the needs of your specific domain.

### Related questions:

- Do you have domain expertise to ensure accurate, industry-specific real-time analytics and insights?
- Does the product provide specific diagnostics for common issues?

## 5 Is your solution intelligent?

Determine if the solution can detect abnormal process event by AI (artificial intelligence) to alert a site engineer to operational issues, efficiency potential, etc.

### Related questions:

- Does your product continuously learn the normal performance of the asset or do I have to set manual thresholds?
- Can it learn different load and response time patterns for different days or times of day?
- Can it learn “normal” deviation patterns?

# 10 Questions to Ask Your APM Vendor

Here are several key questions you should consider asking your vendor before doing business with them:

## 6 Can your solution reduce mean-time-to-repair (MTTR)?

Ascertain if the APM provides detailed asset information down to the datasheet so you can confirm situations, predict events, and act immediately to reduce MTTR.

### Related questions:

- When a problem occurs, is diagnostic data automatically captured?
- How does the product distinguish one-time anomalies from consistent patterns of poor performance?
- What actions does the product take when it detects systemic failures?

## 7 Is your APM solution easy to deploy?

Lengthy implementations can be costly, resource-intensive, and frustrating. Ask your vendor how the APM solution is deployed and whether there are local experts available to help smooth out the implementation. Assess the capabilities you have in-house to implement and maintain a digital APM solution.

### Related questions:

- Can I deploy the APM myself or do you recommend that I have your consultant assist me in the deployment?

# 10 Questions to Ask Your APM Vendor

Here are several key questions you should consider asking your vendor before doing business with them:

## 8 Is your APM solution easy to use?

If a solution is difficult to use, adoption will be low. Over time, teams may look at the APM as a bureaucratic process instead of a useful resource. Ask for a demo or proof-of-concept to assess the use cases and user experience for all relevant roles in your organization.

### Related questions:

- Does your product's user interface require experts to interpret the data when problems happen?
- Does your product have an intuitive design and can I access your product from a web browser or mobile app?

## 9 Is your APM secure?

Assess if the cloud-based APM solution has best-of-breed applications and security to ensure data, users, systems, compliance, and intellectual property are protected.

### Related questions:

- Where does the data reside?
- What cloud applications and security do you use to ensure data, users, systems, and intellectual property are protected?

# 10 Questions to Ask Your APM Vendor

Here are several key questions you should consider asking your vendor before doing business with them:

## 10 What is the total cost of ownership (TCO)?

The TCO of an APM solution is reduced when the solution is delivered via a cloud-based, software-as-a-service (SaaS) subscription model, providing flexibility and access to business insights where it matters—with edge, cloud, and hybrid configurations.

### Related questions:

- What does maintaining an on-premises and/or initial software license cost compared to a subscription-based cloud offering?
- What are the annual labor and consulting costs for APM configuration or Instrumentation?
- What are the costs for ongoing maintenance, software upgrades, cloud hosting, etc.?



# Introducing Asset Health Insights

OpreX Asset Health Insights by Yokogawa is a cloud-based asset monitoring service that collects, refines, and aggregates Operational Technology (OT) data from distributed assets. The service connects any asset with sensors from anywhere helping organizations manage large, asset-intensive operations to increase efficiency and reduce downtime.

Asset Health Insights supports all types of organizations ranging from those that rely on manual workflows to more advanced operations that are building a digital future including adopting industrial internet-of-things (IIoT), smart manufacturing, and a shift from on-premises to the cloud.

Organizations can easily connect siloed systems and asset data with a unified model that shares information in real-time, eliminate costly cycles of attending to equipment that is already performing, and focus on the assets that need attention.

Asset Health Insight users manage their operations in the moment, predicting and responding to events before they happen to increase efficiency and reduce downtime.

## Why OpreX Asset Health Insights?

- **Deep OT insights and expertise:** Built to meet domain-specific requirements and can support IoT and IIoT
- **Easy flexible deployment:** Modular, light, and fit-for-purpose
- **Unified and all-in-one:** Manage any asset on your choice of infrastructure
- **Quick and simple set-up:** Prebuilt integrations and templates
- **A single intuitive dashboard:** Asset Health Insights presents complex data from every asset across the operation.



[Learn more about Asset Health Insights](#)

# Thank you for reading our eBook about Smart Asset Performance Management!

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