

This IDC Technology Spotlight examines the strategic approach to asset performance that utilizes advanced technologies such as IoT, edge computing, 5G, AR/VR, AI, and machine learning to enable connected assets, connected customers, and connected experiences.

Connected Assets, Connected Customers, Connected Experiences: A Strategic Approach to Asset Performance Management

November 2019

Written by: John Villali, Research Director, IDC Energy Insights

Introduction

Asset performance management (APM) systems in the utilities and natural resources sectors provide a platform for asset data management, analysis, visualization, and informed decision making. A main goal of these systems is to ensure the best availability of assets related to market demand by providing effective optimization of and maximum output from an organization's assets.

Although the concept of an APM platform has existed for years, most APM platforms were homegrown solutions developed to serve the needs of a specific business or a specific asset type. While capital-intensive industries such as energy and utilities and natural resources continue to make substantial investments in the assets they use in their operations, it is only recently that their focus has shifted toward using asset-generated data with an APM platform to manage those assets by connecting the assets, field technicians, and customers to create better business outcomes and excellent customer experiences.

The recent interest in APM shown by the energy and utilities sectors has been driven by the need to gather and analyze historical and real-time data from an asset or a fleet of assets to limit downtime while arming field technicians with critical operational data and analysis that will help drive smarter business decisions. Using the Internet of Things (IoT) and connected devices to connect assets, field workers, and customers will not only increase an asset's return on investment (ROI) but also create a safe and efficient work environment for field technicians while improving customer satisfaction in the long run. Strategic APM offers a way to achieve these business objectives.

AT A GLANCE

WHAT'S IMPORTANT

Strategic APM uses vast amounts of data to create insightful analytics to enable better business decisions that can improve asset and employee productivity, safety, and reliability as well as provide excellent customer experiences.

Strategic APM uses vast amounts of data to create insightful analytics to enable better decision making that can improve asset and field technician productivity, safety, and reliability; improve customer engagement; and drive operational excellence throughout an organization. Data collected via sensors embedded in equipment can provide a plethora of data to be analyzed at the edge or remotely via a cloud platform. This operational data, combined with sophisticated analytics, artificial intelligence (AI), and machine learning (ML), can provide actionable intelligence to operate and maintain assets in the most efficient way possible. Strategic APM offerings can span preventive, predictive, and prescriptive maintenance to minimize downtime and increase the overall value and life of an asset. The continuous analysis of operational data can enable an understanding of an asset's past, current, and future performance to help drive informed and effective business decisions. The utilization of cloud by collecting and storing data from connected assets in a centralized data repository gives business units across an organization a unified view of information and analysis. Enterprise access to this data can be leveraged in multiple ways to improve the operational efficiencies of an asset or a fleet of assets and increase a field technician's productivity while improving customer engagement and ensuring customer satisfaction.

APM and connected assets in the electric utility space are becoming a higher priority due to the continued growth of distributed resources. Wind, solar, energy storage, and electric vehicles are making the balance of supply and demand in the power industry more complex. Connected assets, both existing fossil fuel and all the new clean distributed generation, can benefit from advanced APM, which will fully optimize these assets. Distributed energy is at times unpredictable, and fossil fuel units are at times uneconomical to dispatch. Having insight into market conditions by connecting assets in order to make timely strategic decisions on how to best operate your assets is becoming a necessity to compete in the changing dynamics and competitive landscape within regional power markets.

Additionally, connected assets have capital-intensive industries preparing for or considering upgrading their communication networks. For example, utilities have historically built in-house communications systems, and as technology changes at a rapid pace, utilities are beginning to evaluate upgrades in their communication networks. Advancements in communications now have utilities at least aware of the future possibilities of using 5G communication technology, which has already started to be commercially available in many major cities.

Benefits of a Strategic Approach to APM

A strategic approach to APM can lead to heightened levels of productivity, reliability, and operational efficiency in a company's assets that positively impact employee and customer experiences and a utility's bottom line. Some major benefits of strategic APM are as follows:

- » Preventing unexpected outages by using analytics to perform predictive and preventive maintenance to fully diagnose and detect the root cause behind equipment failure
- » Shifting resources from time-based to condition-based maintenance to reduce spending in ways that do not adversely affect the reliability and productivity metrics of assets
- » Providing greater visibility across an organization into the performance of all its assets, leading to faster and better-informed decisions from both an asset strategy management perspective and a capital planning perspective

- » Tracking an asset's degradation from the beginning of equipment failure to the resolution of and restoration of its operations, with full operator actions documented in a production case management system
- » Enabling increased availability and reliability of all assets, leading to longer periods of uninterrupted production with limited downtime
- » Improving field technician productivity and safety by accessing critical operational, market, and customer data
- » Creating excellent customer experiences by engaging in a digital and timely manner with information on items such as new products and services, billing, outage restoration estimates, and safety information in emergency situations such as natural disasters or power outages
- » Detecting and modeling additional electric vehicles (EVs) in order to balance supply and demand on the transmission and distribution (T&D) systems, in addition to keeping in front of the need for capital investment in the power grid
- » Using AI and ML in efforts to clearly comprehend historical asset failures and gain insights to provide prescriptive maintenance to avoid such failures in the future
- » Performing cognitive inspections such as robot or drone monitoring on assets such as underwater hydro-generation assets or transmission line inspections

Additionally, some companies may want to consider a digital thread APM approach across their asset fleet. A holistic view of the health and orchestrated performance of an entire fleet of assets will yield a greater long-term return on investment than the typical break/fix approach many companies use on individual assets.

Ultimately, strategic APM improves the reliability and availability of an organization's assets while reducing maintenance costs, maximizing both operational and financial results to help achieve higher levels of customer satisfaction and operational excellence.

Specific examples of utilities and natural resources sectors using strategic APM include the following:

- » Electric utilities can perform outage predictive maintenance to avoid equipment failure and limit downtime.
- » Gas utilities can monitor gas pipelines to detect gas leaks in real time, improving safety and reliability.
- » Water utilities can automate ways to detect water quality issues in a timely manner.
- » Owners and operators of renewable resources (i.e., solar and wind) can model and predict optimal dispatch times.
- » Mining companies can perform autonomous operations in instances where human involvement may be unsafe.

The bottom line is that strategic APM can produce real-world results such as the following:

- » Asset availability improves by 20%.
- » Spare inventory turns improve by 30%.
- » Maintenance labor costs decline by 15% to 20%.

- » Mechanical efficiencies increase by 8% to 10%.
- » Field technician productivity gains increase by 15% to 25%.
- » Customer satisfaction ratings increase by 10% to 20%.

Considering Tech Mahindra

Tech Mahindra is taking a strategic approach to APM that connects to assets, connects to customers, and improves employee and customer experiences. Tech Mahindra is helping asset owners and operators in electric, gas, and water utilities as well as mining and engineering, procurement, and construction (EPC) companies navigate digital transformation initiatives aimed at the following goals:

- » Improving customer, employee, and ecosystem experiences
- » Improving business processes that enhance operational efficiencies and business profitability
- » Creating road maps of evolving utility and natural resources business models in order to provide new products and services that can tap into new revenue streams

Tech Mahindra's asset performance management approach addresses the following key elements of strategic APM:

- » **Prediction of potential equipment failures:** A unified view of machine and equipment health with analytics that predicts potential failures before they negatively impact asset operations
- » **Diagnosis of root cause:** Accurate diagnosis of potential failures and root causes providing the ability to drill into operational data to perform real-time analysis
- » **Optimization to meet market's demands:** Create advanced analytics and machine learning algorithms to balance supply and demand and improve reliability, availability, and performance in a cost-effective way to maximize the value of the asset and maintain uptime to meet peak market demands
- » **Combining work and asset management:** Digitally connecting assets and field technicians by providing critical operational data to workers in the field to ensure efficient and safe equipment maintenance and timely outage restoration

As Tech Mahindra connects assets, employees, and customers, these connections create improved digital experiences. Tech Mahindra's strategic approach to APM focuses on key technologies that can be beneficial in today's changing market conditions. For example, the use of 5G will enable enhanced mobile broadband capacity in the field, providing field technicians with augmented reality/virtual reality (AR/VR) capabilities and real-time remote monitoring of assets, as well as enable efficient and timely asset data tracking and predictive maintenance analysis.

Tech Mahindra's core platforms and offerings specific to strategic asset performance management include the following:

- » **Asset Management Consulting:** This offering provides guidance and direction to capital intensive–focused companies in search of improving their approach to APM. Asset management consulting can help an organization develop a road map, strategy, and maturity timeline expected when taking on strategic APM initiatives.
- » **Digital Enterprise Asset Management:** This comprehensive work and asset management (WAM) platform has five core areas of functionality: Intelligent Asset Management, Field-Force Management, Plant/Grid Operations, Resource Management, and Asset and Work Analytics Management.
- » **Automatic Metering Infrastructure (AMI) and Automatic Meter Reading (AMR) Implementations:** AMI and AMR implementations focus on six key areas: Smart Meters (electricity, water, and gas), Mesh-Based Wireless Networks, Transmission Networks, Meter Data Management, Utility Data Center (i.e., Load, SCADA), and a Customer Service platform.
- » **Network Services:** Tech Mahindra provides utilities with consulting and advisory services on enhancing telecom capabilities, moving to private networks using 4G and 5G technology to improve mobile broadband, and creating low-latency remote communications in the field.
- » **Microgrid as a Service:** An analytical platform provides intelligent automation and next-generation capabilities that optimize decentralized generation that can utilize blockchain technology to facilitate peer-to-peer trading at the distribution level.
- » **Operational Technology (OT) Security Services:** These services provide continuous threat detection with complete IT/OT visibility, along with security assurance testing, while ensuring OT security is up to date with regulatory compliance.
- » **AssetRise:** This intelligent asset platform has connected assets and pre-enabled use cases that can integrate with enterprise resource planning (ERP) systems. AssetRise can provide real-time asset conditioning monitoring and diagnostics along with mobile workforce management tools providing access to critical operational data and analytics. AssetRise includes technologies and capabilities such as AR/VR for remote service, IT/OT integration, and workforce planning and scheduling.
- » **Renewable Insights:** This platform uses AI and ML algorithms to provide predictive maintenance and workforce planning strategies specifically for solar and wind assets. The platform also offers an operations and management command center with remote monitoring capabilities and analytic tools to fully optimize renewable assets.
- » **IEVCS Plug-in:** This offering is geared toward electric vehicle smart charging and smart grids, which can help utilities integrate renewables such as rooftop solar and battery storage, manage electric demand and supply, and enable peer-to-peer electricity trading at the distribution level using blockchain technology.

Tech Mahindra's offerings can provide the necessary element of IT and OT integration to connect assets, field workers, and customers while providing a positive and efficient digital experience. In addition to IT/OT integration, Tech Mahindra can supply the necessary operational technology security from both an IT (i.e., data) standpoint and an OT (i.e., mechanical equipment and devices) standpoint to provide capital-intensive companies with cybersecurity and physical security.

Challenges

Today, the utilities and natural resources sectors are facing challenges that heighten the need for a strategic approach around APM. Forced outages and equipment failures that create unplanned downtime can amount to sizable financial impacts in the form of missed revenue opportunities, the costly inability to meet market obligations, and poor customer relations if operations are compromised. Labor costs for unplanned maintenance and longer than expected downtime waiting on spare parts can also impact a company's bottom line. In addition to downtime, changes in regulatory compliance are becoming an important issue, particularly in the energy sector. For example, compliance around power plant emissions reductions, as well as ancillary services and power grid system reliability, is being closely evaluated for expected improvements.

Implementing strategic APM is not always easy, and it is particularly challenging in capital-intensive markets such as the utilities and natural resources sectors. IDC research shows that only 50% of assets within capital-intensive industries are connected. The reality is that many organizations maintain their assets on a "break/fix" basis. A change to condition-based maintenance, as opposed to time-based maintenance, is needed to limit unplanned downtime and drive down maintenance costs. Although concentrating first on connecting high-value critical assets makes sense, organizations need to consider a digital-thread approach to asset management, which will connect and maintain a company's entire fleet of assets in a comprehensive manner.

Conclusion

In a time where many industrial assets are aging while many new efficient renewable assets are coming online, a strategic approach to APM can provide a sizable competitive advantage. In the utilities and natural resources sectors, strategically deploying APM in regulated markets with rate-based recovery mechanisms is equally important, as participants in these markets need to invest in models that focus on asset resiliency, reliability, and quality of service to their customers.

When considering implementation of a digital APM strategy, capital-intensive organizations should prioritize high-value assets that have operational risk. Moving away from traditional time-based maintenance to a condition-based maintenance approach will create sizable savings while improving the financial and physical performance of an organization's assets as well as customer satisfaction.

As capital-intensive markets connect more assets, the IoT also grows — in essence, the growth of advanced analytics applied to big data — and traditional IT and OT intertwine, creating new business opportunities, operational efficiencies, and better customer engagement.

When companies are connecting assets, having a cloud strategy in place is essential to a successful APM implementation. Integrating separated IT systems will enable all asset data to be collected, structured, and analyzed in a single repository accessible across an enterprise, giving access to analytics and insights to all invested stakeholders within an organization.

As capital-intensive markets connect more assets, the IoT also grows — in essence, the growth of advanced analytics applied to big data — and traditional IT and OT intertwine, creating new business opportunities, operational efficiencies, and better customer engagement.

The IoT, along with advanced communication technology such as 5G, can significantly advance the traditional approach to APM. The collection and analytics of data applied to critical operations at high speeds using low latency and software-defined networks can provide a holistic and centralized controlled system that can lead to overall greater efficiencies.

Ultimately, strategic APM can provide asset owners and operators with the benefits of longer periods of continuous operation without unplanned outages, greater productivity, and a path to a more sophisticated asset strategy that will produce the best operational and financial results for an organization while ensuring customer satisfaction.

IDC believes the asset performance management aspect within the utilities and natural resources sectors will continue to be important and grow, and to the extent that Tech Mahindra can address the challenges described in this paper, the company has a significant opportunity for success.

About the Analyst



John Villali, Research Director, IDC Energy Insights

John Villali is a Research Director for IDC Energy Insights, primarily responsible for thought leadership in the area of utility digital transformation.

IDC Custom Solutions

IDC Corporate USA

5 Speen Street
Framingham, MA 01701, USA
T 508.872.8200
F 508.935.4015
Twitter @IDC
idc-insights-community.com
www.idc.com

This publication was produced by IDC Custom Solutions. The opinion, analysis, and research results presented herein are drawn from more detailed research and analysis independently conducted and published by IDC, unless specific vendor sponsorship is noted. IDC Custom Solutions makes IDC content available in a wide range of formats for distribution by various companies. A license to distribute IDC content does not imply endorsement of or opinion about the licensee.

External Publication of IDC Information and Data — Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request. IDC reserves the right to deny approval of external usage for any reason.

Copyright 2019 IDC. Reproduction without written permission is completely forbidden.