

IBM Predictive Maintenance and Optimization

Optimize maintenance schedules and resources by predicting failure of critical equipment

IoT for better management of critical equipment

An increasingly connected world facilitated by the Internet of Things (IoT) is transforming products, services and business models. The volume of data generated by the IoT provides a new means to understand and monitor the performance of critical equipment. Sophisticated analytics and machine learning can now be applied to volumes of operational data to give organizations a more detailed and accurate understanding of equipment performance. They can then use this information to optimize maintenance practices and resources for improved equipment reliability and availability.

IBM® Predictive Maintenance and Optimization (PMO) enables asset-intensive organizations to apply machine learning and analytics to improve maintenance strategies while minimizing the cost of maintenance management. The solution offers two methods for creating predictive models—customized and standard—based upon the category of equipment criticality determined by the organization.

A focus on reliability

Building on the strengths and capabilities of previous predictive analytic solutions for maintenance, PMO focuses on the needs of the reliability engineer to identify and manage equipment reliability risks that could adversely affect plant or business operations. It applies machine learning, using principles of math, science and engineering, to help make industrial manufacturing, production processes, and products more efficient and dependable.

With PMO a reliability engineer can build a statistically significant, multivariate metric of remaining equipment life based on operational data and other factors to improve maintenance strategy. In some instances analysis may indicate current equipment maintenance schedules and practices are ideal and no changes need be made.

For others, analysis will prescribe that maintenance occur sooner than originally planned to avoid equipment failure or postponed to avoid unnecessary maintenance. In the event that there is insufficient operational data to assess current maintenance practices Predictive Maintenance and Optimization will request additional data.

Deliver value from your data using advanced analytics

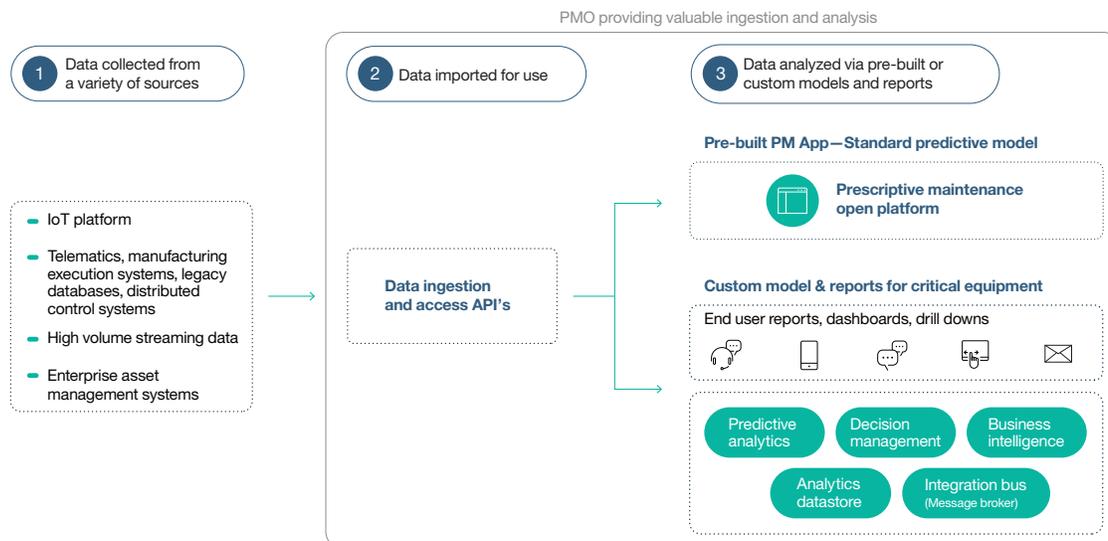


Figure 1

Customized models and reports for the most critical equipment

Equipment which an organization classifies as the most critical—that is, those having unique functionality, where unplanned downtime has major impact on production and repair costs are significant—warrants extra rigor in optimizing maintenance schedules. For such equipment customized predictive models are best. These models typically involve custom data preparation and the expertise of a data scientist to perform additional exploration to develop accurate failure predictions for this type of equipment.

PMO supports building and deploying customized models for an organization's most critical equipment by using a full suite of IBM middleware including IBM SPSS® for analytic tools, IBM Cognos® for reporting capabilities, IBM DB2® for relational database storage and IBM Information Integration Bus for messaging and data orchestration (See figure 1).

Pre-built standard predictive models

Organizations that have critical equipment of similar type or class—such as generators, motors, pumps, robots—where unplanned downtime impacts production and cumulative maintenance costs are significant can use the pre-built app provided with the development tools in PMO. Use of these standard predictive models enables reliability, manufacturing, production, and maintenance personnel to:

- Quickly assess performance of critical equipment to help plan and prioritize maintenance schedules
- Determine which equipment is being over-, under- or well-maintained and use prescriptive analysis to optimize maintenance practices
- Identify operational factors that positively and negatively affect equipment performance and use this information to guide maintenance strategy and procedures
- Determine which factors are most influential in affecting equipment performance
- Examine the detailed performance aspects of equipment, including attributes, risk factors, maintenance logs, and predicted time to failure, and use this insight to prescribe equipment-specific or equipment-class maintenance strategies.

Using the standard model can make it easier to monitor and analyze more types of equipment and their current maintenance schedules in comparison to using custom-built models that are specific to certain equipment.

Quickly assess maintenance needs and equipment performance

The pre-built application provided with PMO, enables reliability engineers to quickly and easily obtain high-level, as well as detailed understanding of equipment performance, maintenance practices, and factors that influence performance. The user experience supports analysis and reporting on all equipment, classes of equipment, or filters for properties common to a set of equipment. Flexibility in reporting facilitates quick and accurate analysis and understanding of current equipment maintenance practices and helps prioritize maintenance for equipment needing attention.

IoT, big data, and integration

Accurate analysis of equipment performance and maintenance practices is a factor of the quality and variety of operational data acquired. Inability to access relevant data undermines analytic accuracy and lessens the prescriptive value of any recommendations that could be made. PMO is designed to meet the challenges presented by the need for IoT connectivity, the massive volumes of data generated by connected equipment, and the variety of relevant data sources required to realize quantifiable benefits that could be achieved through predictive analytics.

An ideal time to realize the benefits of predictive maintenance

Increasingly instrumented equipment, improved connectivity, and sophisticated machine learning and process management capabilities now enable organizations to have greater control of critical equipment. Through machine learning, analytic models, and reporting capabilities that are tailored to the needs of reliability personnel PMO can help organizations optimize maintenance schedules and resources to improve equipment reliability and availability.

Learn more

PMO is one of the IBM IoT for Manufacturing offerings designed to help drive cost savings and operational efficiency across the factory value chain. To learn more about PMO, its complementary solutions—IBM Prescriptive Quality, IBM Visual Inspection for Quality, IBM Prescriptive Warranty, and IBM Plant Performance Analytics, contact your IBM representative or IBM Business Partner, or visit ibm.com/us-en/marketplace/ibm-predictive-maintenance-optimization