

Reduce asset downtime and improve product quality

Maximize productivity and operational performance



Highlights

- Anticipate asset maintenance and product quality problems.
 - Reduce unscheduled asset downtime.
 - Spend less time solving production machinery and field asset problems.
 - Improve asset productivity and process quality.
 - Monitor how assets are performing in real-time and predict what will happen next.
 - Identify poor quality issues earlier than traditional quality control techniques.
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In today's uncertain economic climate, capital and operational budgets remain tight, while assets' availability and reliability may lag behind baseline performance expectations. Asset downtime and poor quality parts can be disastrous to meeting customer demands, and pose potential risks to human safety. Breakdowns, ill-timed maintenance, and stoppages due to quality issues can be wasteful, destructive and inefficient. Leading companies focus on optimizing their physical assets and operational processes to ensure they are functioning as intended and the return on investment (ROI) is maximized.

IBM® Predictive Maintenance and Quality helps asset-intensive organizations keep manufacturing processes, infrastructure and field equipment running in order to maximize utilization and performance and minimize costly, unscheduled downtime that can disrupt production, service and delivery. In addition to manufacturing machinery, IBM Predictive Maintenance and Quality helps to provide insights into:

- Field-level assets (consumer appliances, vending machines, heavy equipment machinery, all types of networks and connected transportation, such as planes, trucks, buses, tanks, fleets, forklifts, etc.)
- Buildings (property, real estate, universities, stadiums corporate offices, headquarters and field offices)



Organizations using IBM Predictive Maintenance and Quality can:

- **Monitor, maintain and optimize assets for better availability, utilization and performance.** Gain better visibility into assets via real-time monitoring, mobile, decision management and predictive analytics capabilities.
- **Predict asset failure and identify poor quality parts earlier to better optimize operations and supply chain processes.** Extend predictive analytics from the asset to its associated processes, such as quality and maintenance, inventory and resource schedules — and provide insights for both assets and processes.
- **Make critical decisions faster and more accurately by combining institutional knowledge and analytics.** Real-time, interactive dashboards and reports allow you to quickly get different views and drill into information so when something changes; you know immediately and can take the recommended actions.

Don't wait for failures — predict and prevent them

Driven by business analytics, IBM Predictive Maintenance and Quality brings insights to your desk, your iPad, or wherever you are in the field. The software analyzes various types of data, including usage, wear and conditional characteristics from disparate sources, and proactively detects failure patterns. The software sends those insights and optimized recommended decisions directly to decision makers — so you can reduce operational costs, improve asset productivity and increase process efficiency.

The software product uses an open architecture to connect a pre-configured software and content stack to your environment. With out-of-the-box data connectors, data schemas, predictive models, dashboards and reports, it accelerates ROI and reduces the need for additional services engagements.

The solution enables organizations to:

- Identify issues faster.
- Estimate and extend component life.
- Assess the health of an asset.
- Determine predictors to bad quality parts.
- Deploy maintenance and repair resources proactively.
- Reduce post-production warranty returns and recalls.
- Dramatically reduce downstream costs of lost field productivity or poor quality.
- Optimize spare parts inventory
- Improve customer service.



Figure 1: IBM Predictive Maintenance and Quality analyzes data from multiple sources and provides recommended actions, enabling informed decisions.

From data collection to recommended actions

As seen in Figure 1, IBM Predictive Maintenance and Quality begins with the data. Due to its open architecture, the software works with a variety of data sources and types of data: structured or unstructured, real-time or batch, streaming or at-rest. For example, the data may reside in enterprise asset management systems, meters, sensors, and supervisory control and data acquisition (SCADA) systems.

Pre-configured message paths allow for real-time connections to the data. In the event you want to add a new information source, you can quickly create new linkages with no complicated programming. Similarly, the solution has a preconfigured template for adding or modifying existing asset information for safe and uniform master data entry.

Next, selected data is staged and aggregated in a centralized data analytics store for pre-calculation. Key Performance Indicators (KPIs) are made available for real-time, streaming analytics. Within the relational data store, IBM SPSS software (predictive analytics) and IBM Cognos software (business intelligence) run the necessary analytics services—whether descriptive, predictive, prescriptive or all three.

The analytics determine what data points or variables are key predictors for a certain outcome, such as asset failure or poor quality. Those key predictors enable the organization to focus their energy and resources rather than reviewing the entire data set in their root-cause analysis.

Finding ways of acting on the insights is typically one of the biggest challenges for organizations. IBM Predictive Maintenance and Quality enables those predictive insights to become prescriptive actions by aligning and optimizing rules-based decisions to a predictive outcome. While sophisticated analysis occurs within IBM Predictive Maintenance and Quality, users see summarized asset or quality health in an easy-to-navigate, simple set of dashboards and scorecards. Additionally, the decision or insight can be delivered as an email, streamed to a mobile device or even sent back to an enterprise asset management system, such as IBM Maximo® Asset Management, where work orders can be launched based on the predictive insights.

All this happens in real time, so you can monitor what's happening and even predict what will happen next. IBM Predictive Maintenance and Quality enables your organization to resolve issues before they escalate into costly downtime or affect product quality.

Extend asset life

An electricity provider uses predictive maintenance technologies to model the behavior of its turbines, and monitors their performance in real time. When anomalies are detected, it can quickly trigger maintenance resources to fix problems before outages occur or efficiencies are reduced.

As a result, the company was able to reduce costs by up to 20 percent by avoiding the need to restart turbines after an outage—an expensive process. The provider also enhanced predictive capabilities from a 30-minute alert from the manufacturer to now being able to predict failure 30 hours before it happens.

Under the hood of IBM Predictive Maintenance and Quality

Diving deeper into the proven architecture (Figure 2), IBM Predictive Maintenance and Quality includes capabilities for master data management, advanced analytics, business intelligence, workflows and dashboards. IBM Predictive Maintenance and Quality supports three key data functions:

- Data integration and management
- Analytics
- Process integration

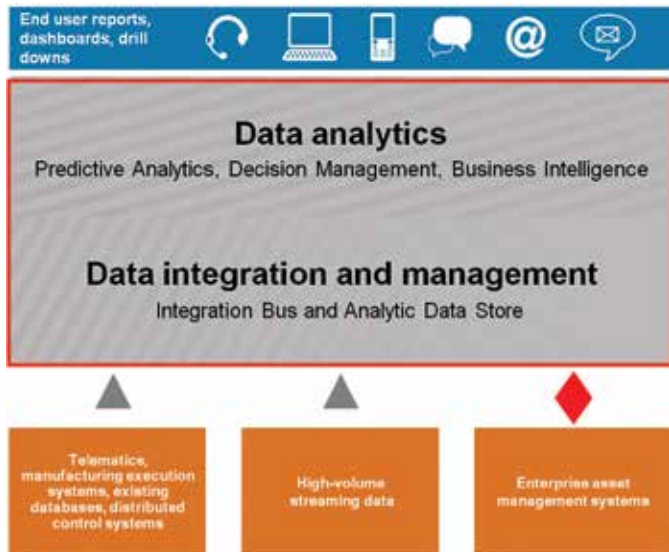


Figure 2: IBM Predictive Maintenance and Quality uses data integration, analytics and process integration.

The data integration and management capabilities enable the real-time connection and processing of production, quality and field asset event data. It easily integrates with big data streaming sources, such as sensors and Programmable Logic Controllers (PLCs). Data integration involves integrating, connecting, transforming, collecting, staging, scoring and orchestrating various data types. Each data point is captured as an event and stored within the data store, which contains the data model that summarizes the relevant measurements, log data, failure data, etc. This model is then used for predictive analytics, data mining and exception reporting.

IBM Predictive Maintenance and Quality uses predictive, prescriptive and descriptive analytics for asset maintenance and production quality. The solution relies on three key business analytics products:

- **IBM SPSS® Modeler** performs the data mining and statistical calculations behind predictive maintenance insight. Through predictive modeling, IBM Predictive Maintenance and Quality can detect anomalies and find outliers; monitor activities and analyze logs to calculate health scores; profile failures to better understand drivers; and predict asset life spans.
- **IBM Analytical Decision Management** captures institutional knowledge in the form of business rules for systematic application into the analytic process. This product also ensures that IBM Predictive Maintenance and Quality can deliver recommended actions at the point of impact when employees or systems need them most.
- **IBM Cognos® Business Intelligence** provides real-time, interactive reports and dashboards that easily adapt to reflect changes in configuration settings applied during implementation. These reports contain high-level summaries with the ability to drill down for root-cause analysis and additional exploration of the data.

Relevant master and meta-data required for predictive maintenance is typically available in other systems or data warehouses. When providing results, insights, or recommended actions, IBM Predictive Maintenance and Quality connects to a wide variety of sources and into existing Enterprise Asset Management (EAM) systems, including IBM Maximo EAM—so your organization can act efficiently in real time.

Predict production quality

A vehicle manufacturer wanted to improve its production quality. IBM's solution used real-time data to monitor production quality and quickly identify and resolve issues.

As a result, the company reduced its defect rate in the production of cylinder heads by 50 percent in 16 weeks, improved production line productivity by 25 percent and increased customer satisfaction.

Gain more value with IBM Predictive Maintenance and Quality

From monitoring your assets to predicting and preventing asset failure, IBM Predictive Maintenance and Quality improves the accuracy and efficiency of your entire operational process. As an integrated solution stack that includes data integration services and business analytics software for asset management, maintenance and quality issues, only IBM Predictive Maintenance and Quality provides:

- **Industry expertise**—Cross-industry expertise from IBM Software Services, IBM Global Business Services and IBM Partners ensures alignment with your needs.
- **Big data and predictive analytics**—Advanced analytics technology, tailored to the needs of the predictive asset maintenance and quality space, including specialized algorithms for wear and lifetime analysis, as well as for early identification of poor quality issues relative to traditional quality control techniques
- **Accelerators**—Predictive models, preconfigured dashboards and visualization templates, and an analytics data store within a service-oriented architecture enable industry customization and easy adaptability in specialized customer environments.
- **Talent**—A resource pool of subject matter experts and industry experts with advanced analytics and predictive maintenance experience.
- **Deployment options**—Software can be deployed in the cloud, as well as on-premises, depending on customer need.

Results from recent IBM studies have found that, on aggregate, companies that use predictive maintenance solutions attain ten times higher ROI, a 20–25 percent reduction in maintenance costs, a 70–75 percent elimination of breakdowns, a 35–45 percent elimination in downtime and a 20–25 percent increase in production than those that use traditional approaches.¹ With IBM Predictive Maintenance and Quality, your company has the ability to spot problems before they happen—and save time and money.

To learn more about predictive maintenance solutions from IBM, visit <https://ibm.biz/BdR6C9>

About IBM Business Analytics

IBM Business Analytics software delivers data-driven insights that help organizations work smarter and outperform their peers. This comprehensive portfolio includes solutions for business intelligence, predictive analytics and decision management, performance management, and risk management.

Business Analytics solutions enable companies to identify and visualize trends and patterns in areas, such as customer analytics, that can have a profound effect on business performance. They can compare scenarios, anticipate potential threats and opportunities, better plan, budget and forecast resources, balance risks against expected returns and work to meet regulatory requirements. By making analytics widely available, organizations can align tactical and strategic decision-making to achieve business goals. For further information please visit ibm.com/business-analytics

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- 1 These results are based on averaging the ROI of IBM customers that have utilized predictive maintenance solutions. They also appear in an infographic that was used in the 2012 U.S. Open. http://www.huffingtonpost.com/2012/09/11/ibm-predictive-maintenance_n_1873701.html?1347826655



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