

# IBM Maximo Asset Management solutions for the oil and gas industry

*Internet of Things helps oil and gas companies achieve operational excellence  
and improve quality*



## Highlights

- Helps improve safety and reliability while controlling costs
- Offers standardization, convergence, collaboration and industry-standard practices to help achieve operational excellence and boost operational intelligence
- Enables a repository of organizational knowledge
- Provides a consolidated and trusted platform for managing the smallest tools and parts to highly complex and digitized business-critical assets to the largest production and maintenance facilities
- Monitors and manages objects in the physical world electronically

## Embracing the opportunities in oil and gas

As technology reaches every corner of the globe, the world becomes smaller—and smarter. With global organizations and systems that are more instrumented, interconnected, and intelligent than ever, the oil and gas industries now have the potential to achieve new levels of business value and optimize operations.

IBM® is using its technological expertise and decades of leadership to help organizations in the oil and gas industries. From exploration and production to refining and marketing, IBM offers IoT solutions for oil and gas operations. With deep industry and process expertise, IBM helps oil and gas companies to enhance operational sectors, which can improve efficiency and optimize global resources in ways that enable organizations to focus on operational efficiency and resource utilization.

## A wave of change in oil and gas

Oil and gas companies are facing major changes due to an era of lower oil and gas prices. Energy companies are increasing their investments in analytics, mobile, and Internet of Things capabilities. These investments will help them to reduce costs, improve operations, be more secure, and be safer. The companies are connecting their processes, people and their assets (things).

In order to extract oil and gas in today's economic environment, companies need to utilize and understand cutting-edge technologies and to employ highly skilled engineers, which can come at a high price. Maintaining the highest safety standards possible is paramount and companies are constantly improving their behavior, safety and teamwork leadership skills.

Oil and gas companies must also continue to address a range of industry challenges, including:

- Improving asset analysis
- Facilitating compliance efforts
- Planning shutdowns
- Reducing manual intervention
- Responding to complex supply chain demands
- Aligning roles and responsibilities
- Facilitating continuous improvement

Industry-driven asset management solutions from IBM can help oil and gas companies face this sea of challenges.

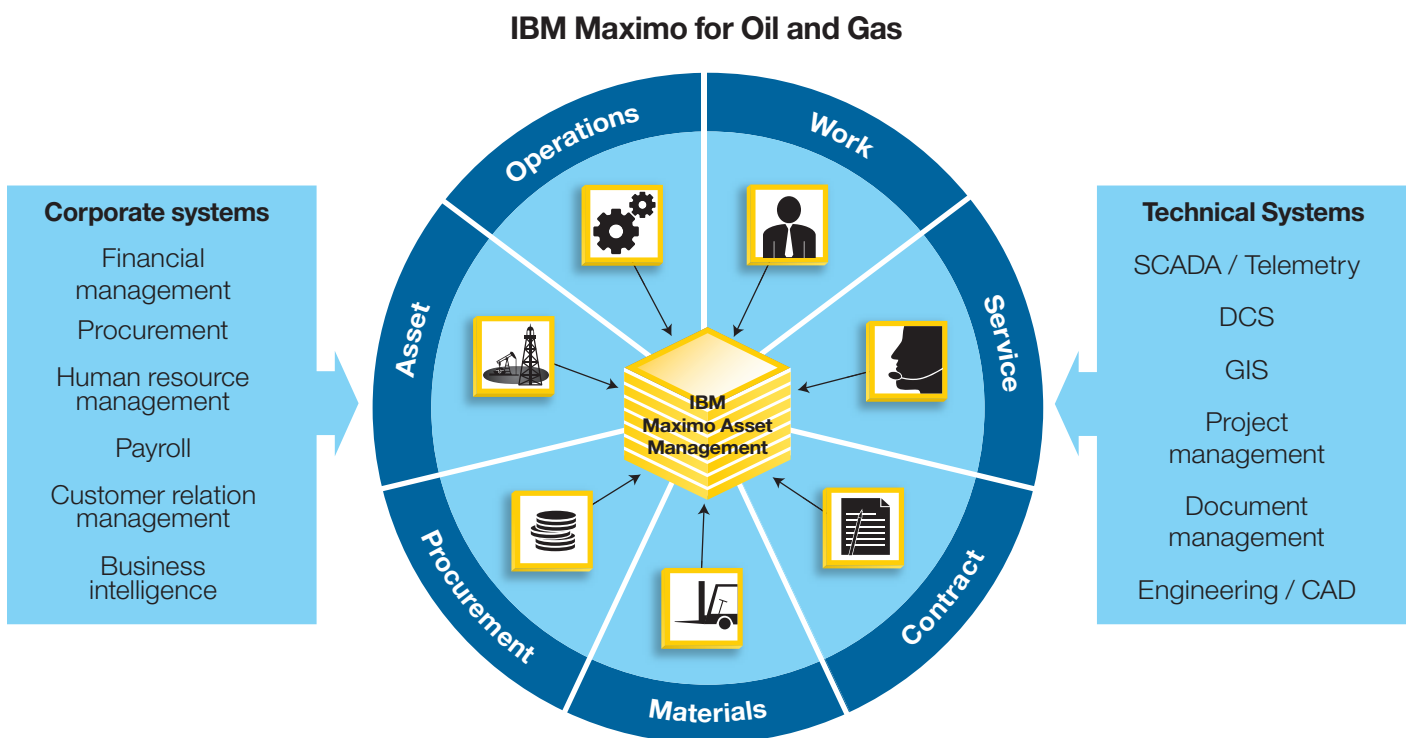
IBM Maximo® for Oil and Gas builds on the strength and reliability of IBM Maximo Asset Management to deliver the critical capabilities that oil and gas companies need. These capabilities range from enabling processes that record and store organizational knowledge to providing a consolidated and trusted platform for managing assets—from the smallest tools and parts to the largest production and maintenance facilities.

Today's oil and gas companies are on a quest for operational excellence to improve safety, reliability and compliance while controlling costs and making better operational decisions. Success depends on a number of factors, which include how well they manage physical assets and human capital, how well they use operational intelligence, and how they make use of available data and information.

IBM Maximo for Oil and Gas can help organizations boost operational intelligence—and realize operational excellence—with standardization, convergence, collaboration and the adoption of industry-standard operational practices.

### An integrated foundation for improved operational intelligence

Built on a service-oriented architecture, Maximo for Oil and Gas Solution consists of seven key functional areas—work, service, contract, materials, procurement, asset, and operations management—bringing together traditionally separate business functions onto one single, integrated platform.



*Figure 1:* Maximo for Oil and Gas brings together traditionally separate business functions onto a single, integrated platform, and then adds a layer of industry-specific functionality to support the unique requirements of the oil and gas industries.

Bringing together traditionally separate business functions onto one single, integrated platform enables Maximo for Oil and Gas to add a layer of industry-specific functionality to support the unique requirements of the oil and gas industries. This integrated platform can reduce the number of applications and redundant data stores, which helps reduce costs while creating a single source of information for use and reference. It enables collaborative, cross-functional business processes that help improve efficiency. And with increased collaboration that spans functional roles and increased confidence in the underlying data, Maximo for Oil and Gas can provide a foundation for improved operational intelligence.

### **Driving operational excellence in the oil and gas industries**

Maximo for Oil and Gas adds a layer of industry-specific functionality to Maximo Asset Management, thereby delivering the following capabilities that are designed to drive operational excellence.

#### **Action tracking**

Actions that result from regulatory audits or internal reviews are tracked, which provides a mechanism for ensuring that the findings and recommendations of internal and external audits are managed and tracked to closure.

#### **Asset management**

Capabilities for managing detailed information about assets are provided. These capabilities include location management, hierarchy modeling from enterprise to sub-assemblies, condition monitoring, metering, hazards and precaution management, costing, and rich work order history.

#### **Audit and survey**

Combined with enhanced failure reporting, audit and survey helps customers include processes that can help them manage compliance and assess cumulative risk.

#### **Benefits and losses**

Maximo for Oil and Gas records and stores benefits associated with improvements and losses associated with shutdowns or near-misses. Capturing benefits for proposed solutions or losses associated with equipment downtime (planned or unplanned) helps provide insight into areas for improving availability and safety.

#### **Calibration**

Calibration processes are automated, which enables traceability and can improve compliance management and work planning. With the explosion in instrumented devices, being able to view calibration work with other work helps drive efficiency and has a positive impact on equipment reliability.

#### **Certifications**

Management of multiple different types of certifications covering materials, people and equipment. Can be used to support processes requiring formal certification such as mechanical completion and commissioning.

#### **Competency management**

Capabilities for adding, modifying and updating workforce competencies help assure competency. In addition, Maximo for Oil and Gas can link competency requirements to permit and certificate requirements and enable the identification and validation of competency requirements on job plans and work orders.

#### **Condition for work**

Maximo for Oil and Gas aggregates similar jobs that span assets, groups of assets, areas and individual locations, which helps support opportunity maintenance. Identifying work that can be merged into planned or unplanned work can improve efficiency as well as equipment reliability.

### **Contract management**

Capabilities are provided for managing many types of contracts for maintenance, repair, and overhaul materials and services. Functional areas supported by Maximo for Oil and Gas include purchase contracts, master contracts, warranty contracts, lease and rental contracts, labor rate contracts, payment schedules and terms and conditions.

### **Control of work**

With the Maximo solution, oil and gas companies can manage permits for work orders and job plans. This includes permit and certificate requirements in work orders and job plans that can improve safety, efficiency, communication and collaboration between operations and maintenance.

### **Defect elimination**

An integrated approach enables the management and elimination of mechanical defects. With this standardized approach, operations and maintenance can record equipment defects in near real time, which can improve communication between different domains and can help service levels remain high.

### **Failure reporting**

Maximo for oil and gas supports the ISO 14224-based standard for failure mode effects analysis and failure reporting and corrective action system processes. Implementing a standardized practice for failure reporting and root cause analysis enables a good reliability program.

### **GIS spatial integration**

Many oil and gas companies use GIS software to provide geospatially enabled applications, and some of these GIS solutions record and store asset information that is valuable for an asset management system. Maximo for Oil and Gas enables spatial visualization and analysis of work and asset objects, along with a bidirectional data exchange of valuable work and asset information between IBM Maximo software and the GIS system.

### **IBM Integrated Information Framework integration**

The IBM Integrated Information Framework integrates open industry standards with real-time systems and engineering data sources such as MIMOSA, ISA88/95, ISO 15926, Open O and M, and others. Real-time oil and gas systems integration can trigger defect reports, incident reports, inspection notification or other work orders in IBM Maximo software. Other systems, including engineering systems, integrated in a bidirectional fashion, can enable cross-domain workflows and process orchestration.

### **Continuous improvements**

Maximo for Oil and Gas includes capabilities help manage continuous improvement programs such as Six Sigma or similar methods. This provides an industry-standard practice for capturing improvements and helps facilitate continuous improvement programs.

### **Improvements**

Manages continuous improvement programs like Six Sigma or similar methodologies. Provides an enterprise standard or better practice for capturing improvements at all levels, across all domains to fundamentally become your continuous improvement program.

### **Incident management**

Work and safety incident management are integrated to address incidents that occur in organizations that work on assets and equipment in challenging and hazardous locations. Asset custodians can view incidents and trends in their areas of responsibility as well as status information on corrective and preventive maintenance work.

### Investigations

Maximo for Oil and Gas supports required incident and defect investigations such as root cause failure analysis or after action review. Regardless of the significance of the incident or defect, an integrated investigation application provides complete traceability into historical incidents, defects, work orders, and other relevant data, which helps to support the investigation.

### Linear asset modeling

Linear modeling capabilities for linear assets such as wells and pipelines are provided to help enable levels of data capture, exchange and analysis that cannot be achieved by hierarchical models. Many data elements associated with linear assets, such as station and offset or mileposts, are not relevant to hierarchical assets. Some of these data elements are dynamic or have regulatory requirements that must be managed in different ways. Adding linear information in free-form text fields in a hierarchical model is no longer effective or efficient. Maximo for Oil and Gas enables the practice of modeling a linear asset based on features and attributes.

### Location and work details

Maximo for Oil and Gas captures characteristics such as physical location, engineering reference numbers, drawing IDs, safety zones, safety criticality and permitting requirements, and provides the ability to report production losses against a work order or location. The Maximo solution workflow can activate all fields in the Maximo database for additional details that can enhance operational intelligence and allow for better operational decision-making.

### Change management

Full management of change processes is integrated with work management and other applications. This provides transparency and visibility that spans operations, maintenance and engineering domains changes that can improve communications and collaboration, which helps reduce risks and drive more efficient operations.

### Materials management

Capabilities for managing maintenance, repair and overhaul inventory support functional areas, such as the item master, storeroom management, inventory management, lot management, kitting, issues and transfers, condition codes, stocked tools, service items, cycle counting, ABC analysis, inventory costing and more.

### Operator's Log

Shift operators are provided with a log to record and qualify events that occur during an individual's shift watch. The application tracks shift staffing, plant operating parameters, log entries, associated qualifying data, and web or document links for an individual plant unit, a staff position or both. The Operator's Log integrates with work management, incident management and other asset management applications, which can help improve collaboration between operations, maintenance and engineering domains.

### Permit to Work

Integrated with work management and operator logs to allow customers to replace Permit to Work systems or eliminate third party systems and at the same time support improved communications between maintenance, operations, and engineering to enhance safety and reliability.

### Permit and certificate types

Permit types and certificates are defined for use on job plans and work orders. Identifying hazardous locations in operating environments and following the appropriate procedures for isolation and safety, including permits and certificates, is a critical part of a safety culture. Having this capability integrated with work management planning and scheduling can increase the effectiveness of work management, as well as improve overall safety compliance.

### **Plant, facility and equipment modeling**

Modeling establishes a common, standard approach for reliability and maintenance data collection, exchange and analysis based on ISO 14224 engineering and asset specifications. Standardization of location, asset and equipment referencing and asset classifications throughout the enterprise provides the foundation for measurement and benchmarking. It also helps promote continuous improvement in an enterprise and across the industry.

### **Procurement**

Capabilities to acquire maintenance, repair and overhaul materials and services are provided to support requests for quotes, purchase requisitions, purchase orders, receiving orders, material inspections, invoicing, desktop requisitions and more.

### **Regulatory compliance**

Maximo for Oil and Gas is designed to help manage efforts to comply with health, safety, and environmental statutes. Regulators provide the licensing requirements to safely operate the industry's infrastructure, along with requirements that apply to asset and equipment in certain locations. Maximo Oil and Gas can help manage compliance, which can significantly reduce the costs associated with compliance.

### **Risk analysis**

Maximo for Oil and Gas helps to standardize how an oil and gas enterprise manages risk for challenging operating locations, assets and equipment, across job plans, work orders and change records. The result is a powerful solution for managing risk and improving safety and reliability.

### **Risk matrixes**

Modeling probability and the consequences of events helps support risk management processes. The standardization of how risk is modeled in an enterprise provides a common approach that can be used by different operating locations, assets, equipment and types of work. This practice can improve how an enterprise manages risk, promotes a safety culture, improves reliability and manages compliance efforts.

### **Solutions**

An operational learning repository collects lessons learned and proven solutions in an operational, maintenance or engineering context to be used by the operations, maintenance, and engineering domains. The learning repository offers a valuable opportunity to share institutional knowledge in an environmental context, along with history, scenario and experience.

### **Work management**

Maximo for Oil and Gas provides capabilities for managing multiple types of work, such as planned downtime, unplanned outages and emergencies. These capabilities include job planning and routes, service requests and service items, safety, labor reporting, qualifications, lock-out or tag-out, labor, materials, tools, planning versus actual costing, preventive maintenance and more.

### **Work prioritization**

Matrix-based prioritization helps optimize the planning and scheduling of maintenance by using operational standard criteria to prioritize critical assets. This practice enables dynamic scheduling and schedule optimization, which can help to improving overall operational efficiency.

## Conclusion: Support for a critical industry

Maximo for Oil and Gas provides vital support for a critical industry that faces complex and evolving issues. Maximo software provides IoT solutions necessary to collect valuable knowledge, improve operational efficiency, and manage and operate mission-critical assets safely and productively. As oil and gas companies strive for operational excellence in a world that's growing smaller and smarter, Maximo for Oil and Gas helps provide a competitive advantage.

## For more information

To learn more about how IBM Maximo for Oil and Gas can facilitate your organization's operational excellence, contact your IBM sales representative or IBM Business Partner, or visit [ibm.com](http://ibm.com)



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