

# The Convergence of Operations, Maintenance and Safety

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*Global Industry Leader for Oil & Gas*

*IBM Watson IoT*

# Agenda

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- Regulations, Economics, Operations, Maintenance and Safety
- Capturing Requirements and Great Ideas
- Convergence Scenarios
- Maximo Oil and Gas – Today and Tomorrow
- A few recent client success stories
- Summary

# Regulations, Economics, Operations, Maintenance and Safety

# Oil and Gas Industry Drivers

Oil and Gas companies must:

- Provide safe and reliable operations
- Operate cost effectively in a new era of lower prices
- Sustain and extend production capability

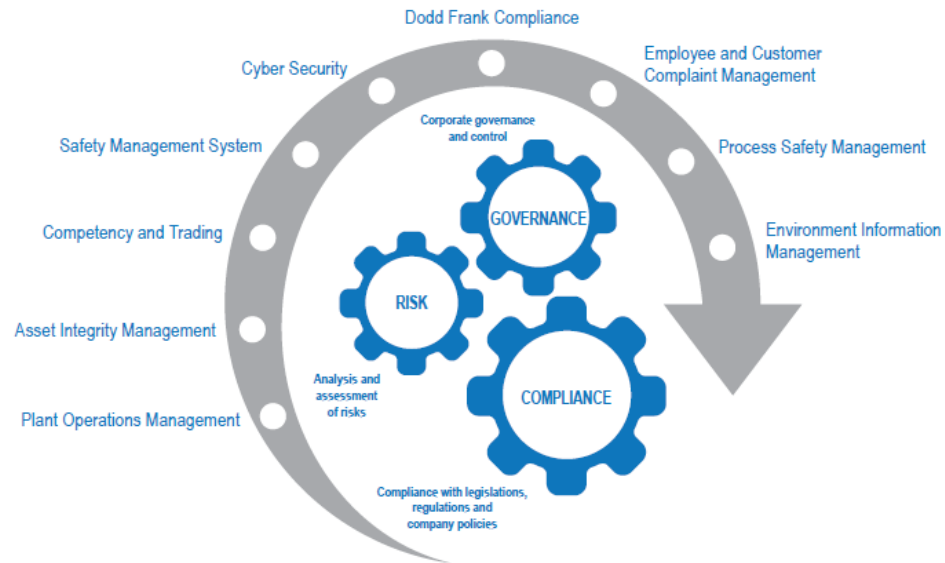
Oil and Gas companies are under increased pressure to:

- meet growing environmental legislation
- replace an aging workforce
- manage a diverse set of operational risks





# Regulatory Compliance is Increasingly Complex





Institutionalize Safety or  
Face The Consequences



# \$39bn+

IoT spending by Oil and Gas  
Companies by 2023<sub>1</sub>

# \$56bn+

HSE spending by Oil and Gas  
Companies by 2030<sub>2</sub>

\*IoT – Internet of Things

\*HSE – Health, Safety and Environmental

1 Research and Markets  
2 Lux Research

# How can Maintenance Software Institutionalize Safety?

IBM Maximo for Oil and Gas fully supports and integrates health, safety and environmental work processes with operations, maintenance planning and execution.



# Capturing Requirements and Great Ideas

# Enhancement Requests

developerWorks

LearnDevelopConnect

developerWorks > RFE Community >

IBM RFE Community

Overview

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Help

Welcome Request for Enhancement (RFE) Community users! Here you have an opportunity to collaborate directly with the IBM product development teams and other product users.

**Note:** The Watson Commerce and Watson Customer engagement product requests will no longer be submitted through the RFE Community. Instead, requests for those products should be submitted through the [Watson Supply Chain Ideas](#) site.

**Filter the page content by brand and product**

Internet of Things

Maximo Asset Management (MAM)

Hot

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New

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**Your ideas matter!**

As of today:

992 new

4776 planned

17488 delivered

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28848 users

228152 votes

188333 comments

**Spotlight**

IBM Watson IoT / © 2019 IBM Corporation

<https://www.ibm.com/developerworks/rfe/>

# Advisory Councils

Maximo Advisory Council (MAC)

Maximo Oil and Gas / HSE Advisory Council

Abbie detailing their successes with Selenium and #IBM Maximo during #Maximo Advisory Council



IBM Watson IoT / © 2019 IBM Corporation



# Development Partners



# User Groups, Conferences and Site Visits



GOMaximo April 1-3, 2019  
Royal Sonesta, Houston



August 6-8, 2019  
ORLANDO, FL

maximo eSolutions IBM Watson IoT  
...we make a difference

Maximo Middle East User Group Conference 2019  
*SUPERCHARGING MAXIMO WITH AI AND ANALYTICS*

April 24-26, 2019 | Orlando

## IBM IoT Exchange 2019

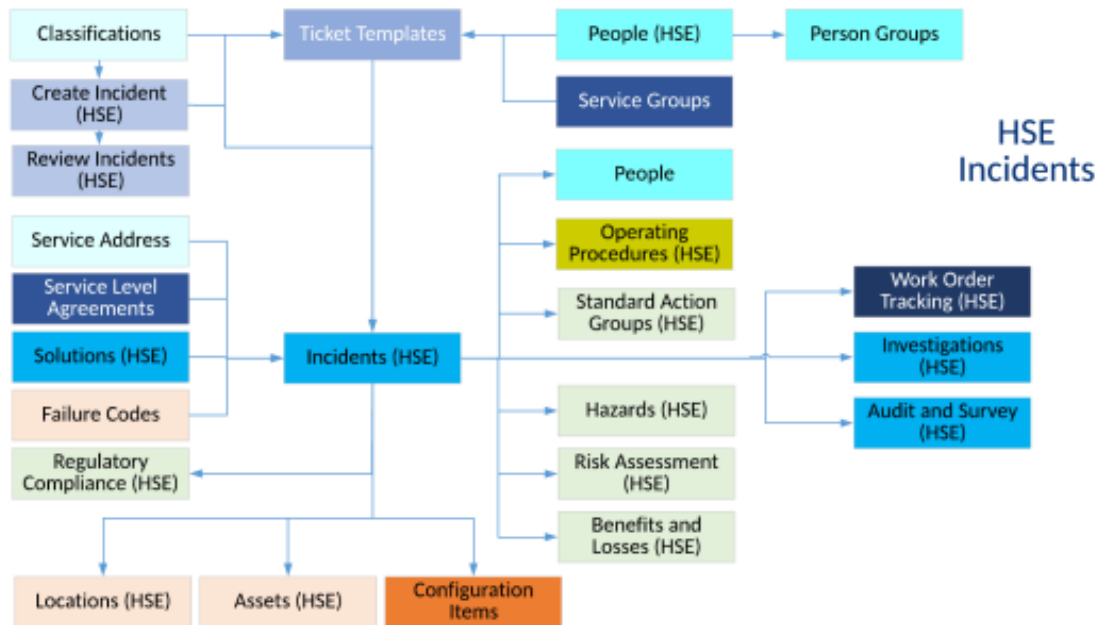
Unlock new value from data with AI



# Convergence Scenarios

# Incidents

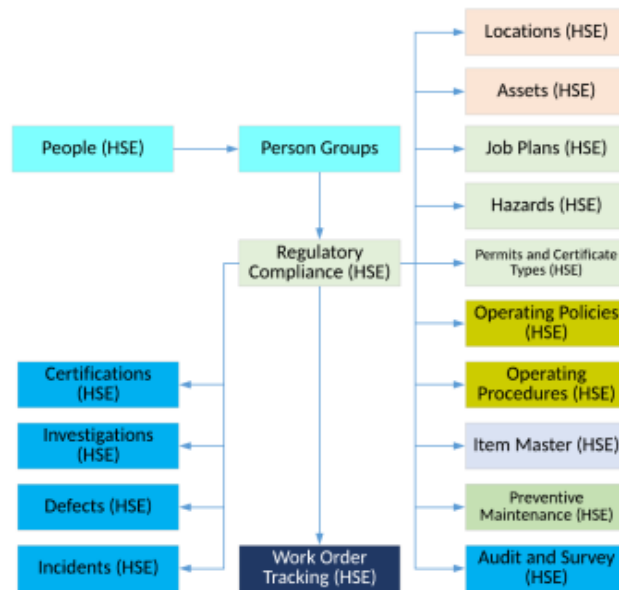
The use cases for Incident Management reporting include, injury and illness, environmental or security incidents, a near miss, a spillage, a safety observation or a failure in a safety process.



- An Incident is a class of Ticket, the application would be used for events with a HSE impact. Some Incident records will later be marked as being a Defect.
- An Incident can be an injury/illness, a safety, environmental or security incident, a near miss, a spillage, a safety observation or a failure in a safety process.
- A Ticket Template can be applied to the Incident. It can have a classification, owner or owner group, a Service Group and a set of activities which are copied to the Incident. The applied classification creates a Specification, a set of attributes specific to the class of incident.
- Self-service applications are provided for any user to Create Incident or Review Incidents that they previously created.
- The incident can be related to one or more Locations, Assets or Configuration Items (CI). A regulatory clause may be associated with the incident.
- One or more people who were witnesses to the incident or impacted by it can be recorded. Follow-up actions can be associated with each person and an applicable Operating Procedure referenced.
- The Hazard or Risk Assessment associated with the Incident and its impact can be recorded. The impact record is created in the Benefits and Losses application.
- A Solution can be used to indicate how the incident was resolved. In addition a failure report can be recorded if it is known prior to the investigation.

# Regulatory Compliance

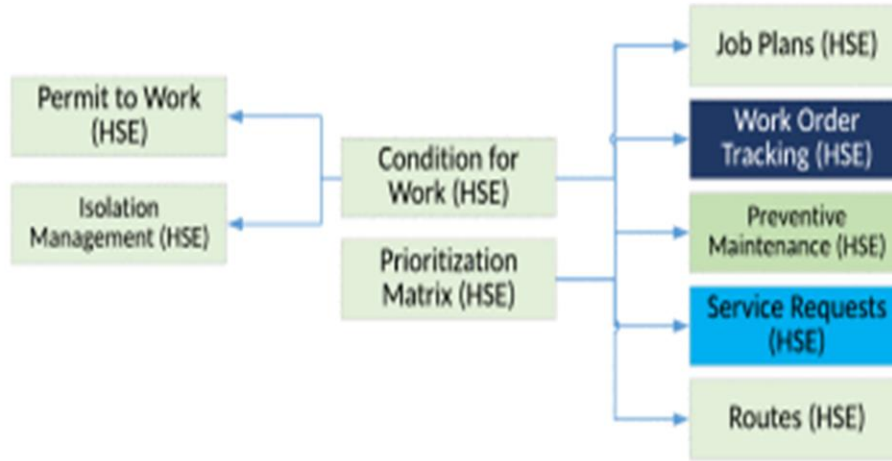
- In highly regulated industries, regulations typically specify how often a piece of equipment needs to be inspected.
- Thru the combination of core Maximo Work Management functionality, (Job Plans, PMs & PM Generation) and the ability to maintain and reference applicable regulations a company can generate and assign the WOs to perform the regulatory compliance activities, track the associated cost, identify follow-up actions to maintain compliance and finally be able to report the details of compliance activities on demand.



HSE  
Regulatory  
Compliance

- External and internal regulations, certifying authorities and performance standards are all entered using the Regulatory Compliance application.
- A regulation can be assigned an owning group (Person Group) or owner.
- A regulation can be used or referenced in many HSE applications.
- A regulation can have a validity period and must be set to Active status to be used elsewhere.

# Condition for Work

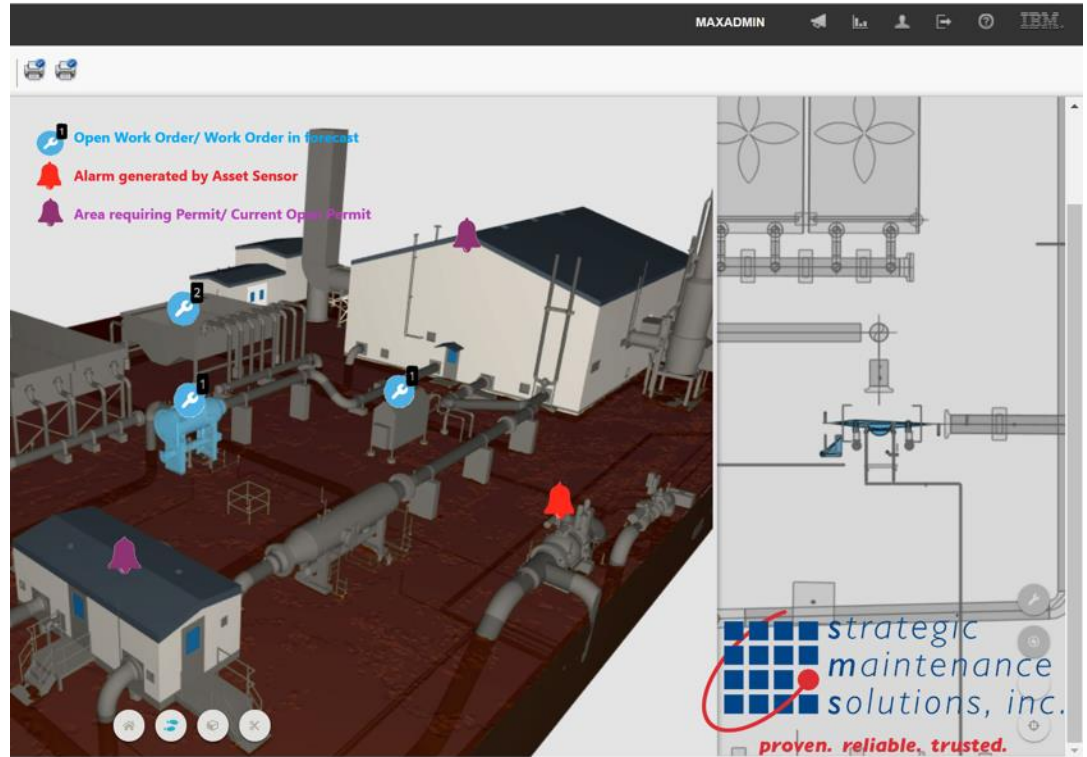


## HSE Condition for Work, Prioritization Matrix

- The Condition for Work and the Reason for Work (Prioritization Matrix) are normally used together.
- The Condition for Work helps plan or schedule Work Orders that require the same plant condition or to find work quickly if there is an unplanned shutdown.
- The Reason for Work is used with the Asset and Location Priority to form a Prioritization Matrix. An Organization setting determines whether Location or Asset priority is used as the default.
- The Condition for Work and the Reason for Work are specific to a Function, e.g. Maintenance, Inspection, Projects, Production.
- Both the Condition for Work and the Reason for Work fields will be found in Job Plans, Preventive Maintenance, Routes, Service Requests and Work Order Tracking. The Priority Matrix is used to adjust the target start and finish dates on the work order.
- The Condition for Work will be found on both Permit to Work and Isolation Management, multiple records can be added but there is no Reason for Work field.

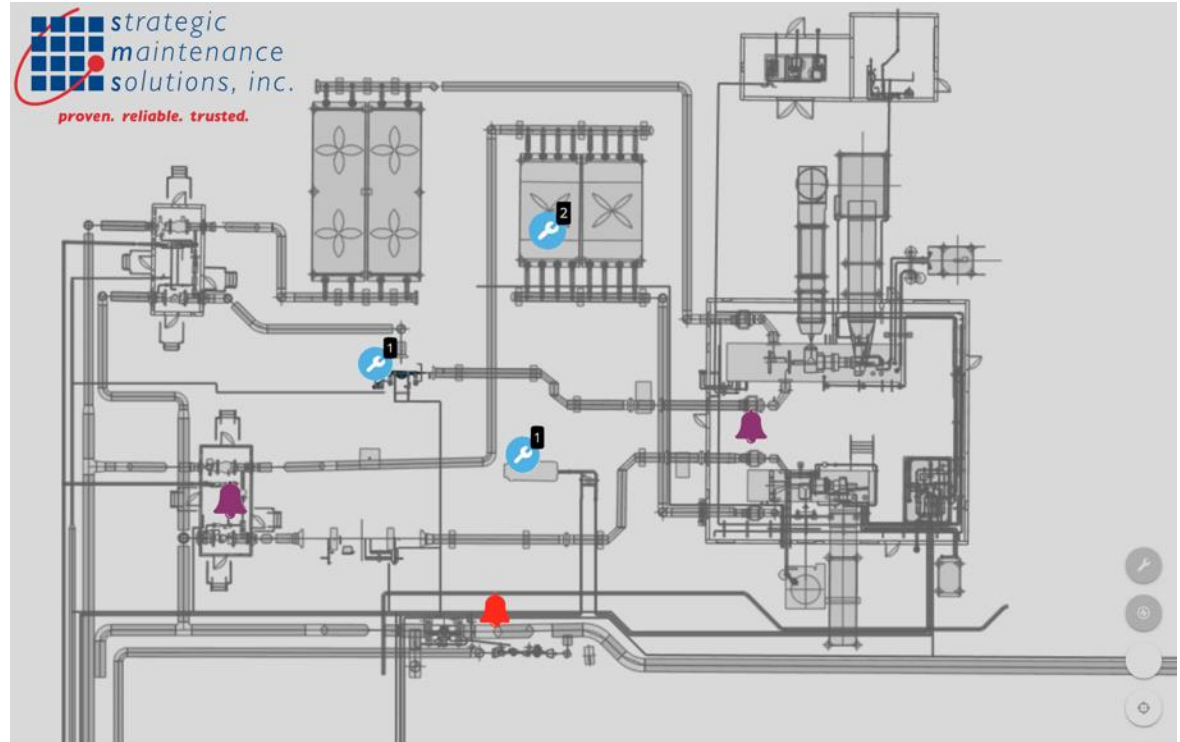
# Permitting and Work Execution

## 3D



# Permitting and Work Execution

## 2D



# Maximo Oil and Gas – Today and Tomorrow

# IBM Maximo Oil and Gas

- Supports oil and gas best practices to enhance the productivity and efficiency of critical assets.
- Helps improve safety and reliability while controlling costs.
- Supports standardization, convergence and collaboration to boost operational intelligence and achieve operational excellence
- Enables the capture, distribution and institutionalization of organizational knowledge
- Monitors and manages objects in the physical world electronically.
- Provides a consolidated and trusted platform for managing the smallest tools and parts to highly complex and digitized business-critical assets.



# Maximo Oil and Gas and HSE Features



## Operations

Policies, Procedures,  
Operator's Logs,  
Operational Actions, Shift  
Handover, Bypass  
Management, Production  
Loss Reporting,  
Benefits/Losses



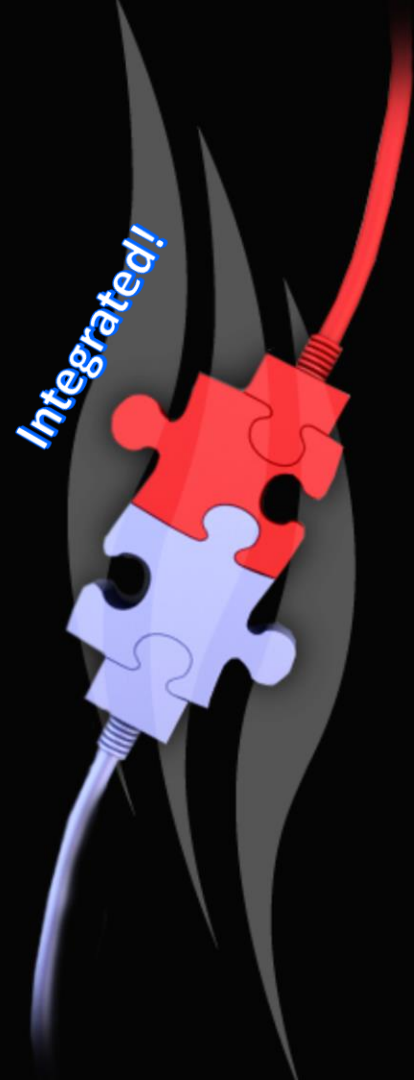
## Maintenance

Isolation Management,  
Risk, Permit to Work,  
Hazards, Failure  
Reporting, Defects,  
Commissioning and  
Startups, Competency  
and Certifications



## Safety (HSE\*)

Incidents, Investigations,  
Corrective Actions,  
Improvements, MOC,  
Solutions, Regulatory  
Compliance, Audits,  
Knowledge Management



# IBM is a Leader in The Gartner Magic Quadrant for Enterprise Asset Management Software, Oct 2018

- Delivering improved user experience and role-based work centers
- Adding AI and advanced analytics to the portfolio to optimize maintenance and repair (APM)
- Expanding delivery options with a new Maximo SaaS version
- Incorporating blockchain to increase visibility and transparency across Maximo ecosystems
- Adapting to new workforce models with improved mobility capabilities
- Industry solutions powered by AI
- Integrations with AI-powered production solutions

Download the Report here: <https://ibm.co/GartnerMQEAM>

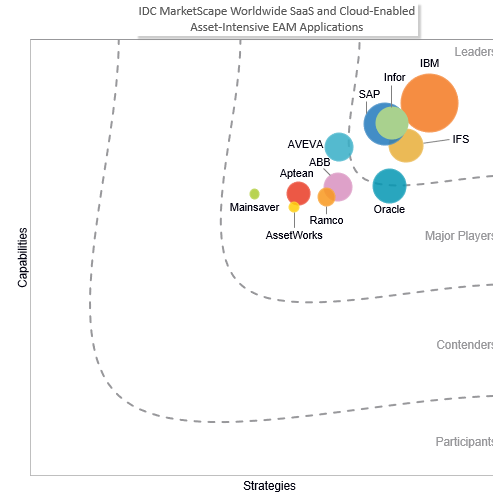


Source: Gartner Magic Quadrant for Enterprise Asset Management Software, October 2018 by Kristian Steenstrup, Nicole Foust, Nigel Montgomery. October 9<sup>th</sup>, 2018.

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# IBM is a Leader in the IDC MarketScape: Worldwide SaaS and Cloud-Enabled Asset-Intensive EAM Applications 2019 Vendor Assessment

- IBM Maximo has been at the forefront of EAM software for nearly three decades.
- IBM has developed a large and fervent client base that it can tap into for product development.
- IBM has collected a large ecosystem of EAM business partners that have deep industry/domain expertise.
- One of IBM Maximo's most important benefits is that it is a part of an \$80 billion company, which gives IBM Maximo product management access to innovative technologies from within IBM for cloud, cognitive, analytics, and mobile.



Source: IDC MarketScape: Worldwide SaaS and Cloud-Enabled Asset-Intensive EAM Applications 2019 Vendor Assessment, March 28, 2019 by Kevin Permenter, Mickey North Rizza, Frank Della Rosa. IDC MarketScape vendor analysis model is designed to provide an overview of the competitive fitness of ICT suppliers in a given market. The research methodology utilizes a rigorous scoring methodology based on both qualitative and quantitative criteria that results in a single graphical illustration of each vendor's position within a given market. The Capabilities score measures vendor product, go-to-market and business execution in the short-term. The Strategy score measures alignment of vendor strategies with customer requirements in a 3-5-year timeframe. Vendor market share is represented by the size of the icons.

# A few recent client success stories

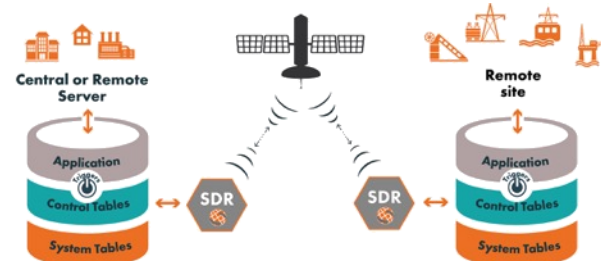
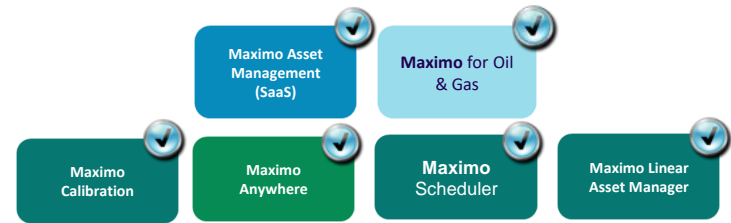
**Diamond Offshore** is a leader in offshore drilling, operating with a total fleet of 17 drilling rigs. In 2017 they selected Maximo SaaS Flex 7.6 Oil and Gas solution to replace their legacy EAM system that will operate on all rigs and their headquarters in Houston. There are currently 26 global Diamond locations that host Maximo with over 1500 active users.

#### Standard Requirements

- Asset Managements
- Work Management
- Inventory Management
- Purchase Requisitions

#### Unique Requirements

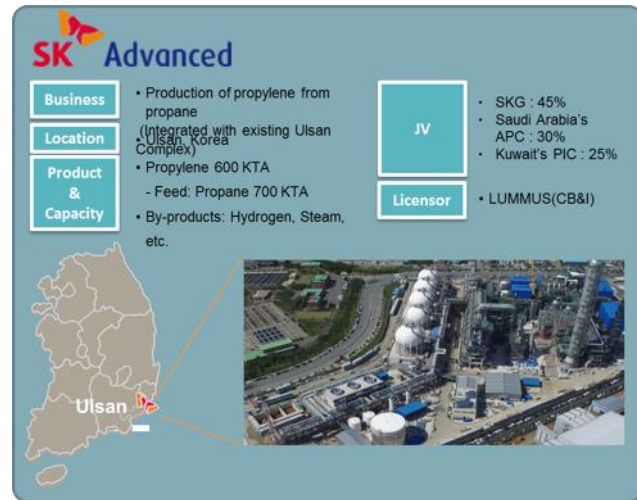
- Cargo Manifest
- Riser Manifest
- Certifications
- Safety Cases
- Global Rig Replication
- ISO 14224
- Location Hierarchy
- Item Master



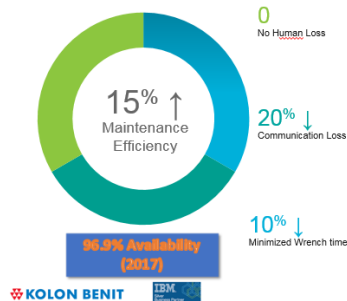
**SK Advanced** manufactures propylene at a new plant they built in Ulsan, Korea. Commencing in 2015, they compared SAP PM to Maximo and chose to implement Maximo for Oil and Gas with just three personnel supporting the project. They chose Maximo because of its support for global standards ISO 14224 and ISO 55001, Maximo's user-friendly interface, its ease to integrate with other systems (ERP, EDMS) and its ability to support expansion to other plants (scalability).

SK Advanced presented their results at MaximoWorld conference in 2018. They reported that in 2017, they achieved:

- a 15% improvement in maintenance efficiency,
- a 20% improvement in process time loss,
- 96.9% availability,
- a 10% improvement in wrench time and
- **no human loss.**



## What we Got - Benefit from Maximo



### No Human Loss Accident

- After Start Up, No human loss Accident
- No external audit fail
- Number of PTW : 6,345(2017)
- Number of MoC : 124(2017)

### Communication Loss Minimize

- Review & Approval time loss for MoC
- Review & Approval time loss for PTW
- Process time loss between Operation and Maintenance
- Shift change loss with Operation log & Daily report

### Minimize Wrench Time

- Minimized searching time for history of MoC
- Minimized waiting time for approval PTW
- Minimized relative document search
- Make maintenance standard for sister and child company

**Cheniere Energy, Inc.** is an international energy company headquartered in Houston, Texas, and is the leading producer of liquefied natural gas in the United States. Cheniere chose Maximo Oil and Gas in Fall of 2014 and deployed the software to production environments in early 2015.

Cheniere has pursued continuous improvements in its maintenance and HSE processes leveraging Maximo functionality. They have implemented [MOC](#) and are now working on implementing [Incident Management](#) and [Regulatory Compliance](#).

Cheniere is represented on the board of directors for GOMaximo, the Houston-based Maximo user group for the oil and gas industry.



**CHENIERE**



**ONEOK** is a leading midstream service provider and owner of one of the nation's premier natural gas liquids (NGL) systems, connecting NGL supply in the Mid-Continent, Permian and Rocky Mountain regions with key market centers and an extensive network of natural gas gathering, processing, storage and transportation assets.

ONEOK has been a Maximo customer for several years and is constantly implementing improvements to its maintenance and HSE operations with Maximo for Oil and Gas. [They also started with MOC.](#)

ONEOK has a representative sitting on the board of directors for GOMaximo, the Houston-based Maximo user group for the oil and gas industry.

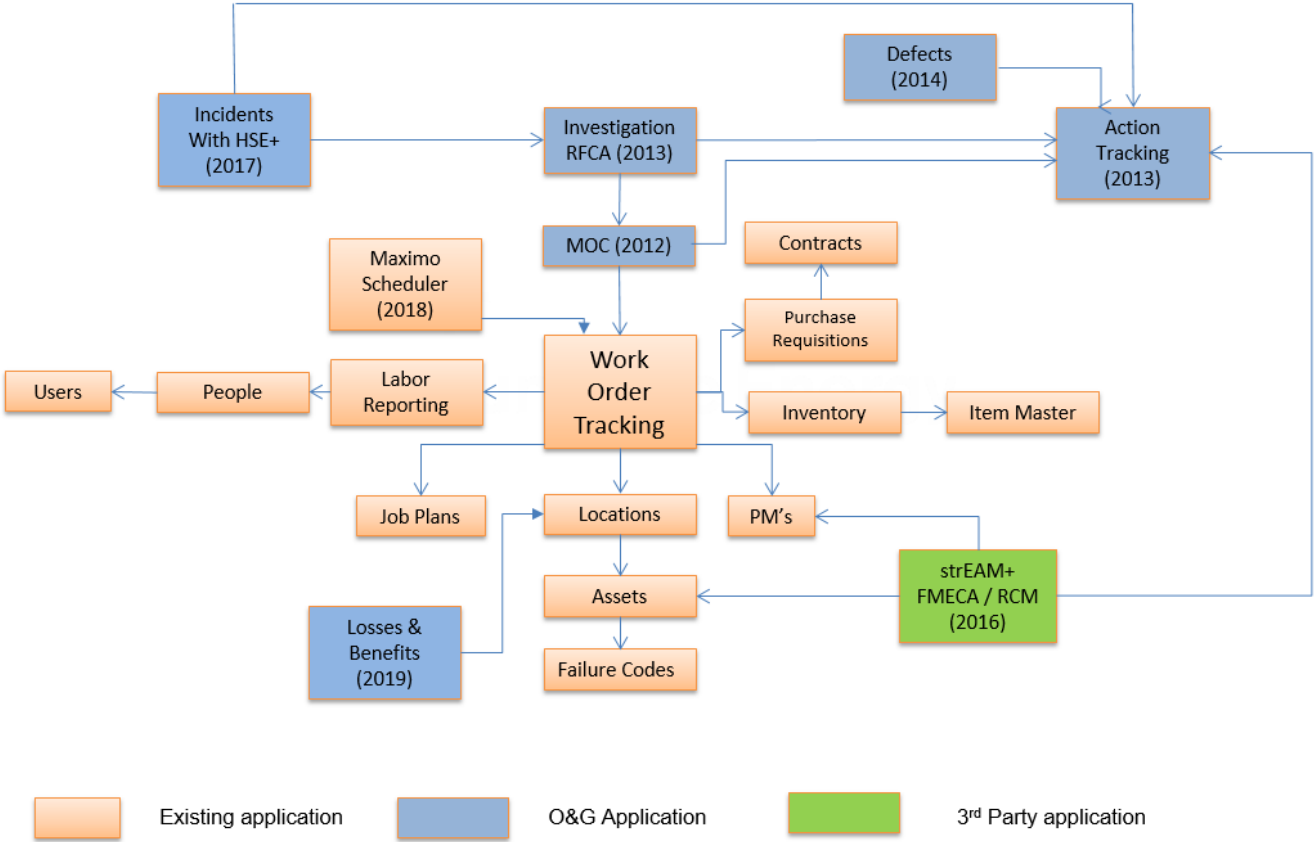


## Successes

- Completed project ahead of schedule
- Completed project under budget
- Completed project without requiring additional resources
- User buy-in
- Met all business requirements
- Maintained business segment processes
- Did not disrupt day to day operations
- Managed to hit all of ONEOK's Key Drivers

# Suncoke

This is what they've implemented to date.  
Next on the agenda is Operator's Logs.



## Suncoke – Usability Example

From: "FLUDER, JOE H." <JHFLUDER@suncoke.com>  
To: "'russell.bee@uk.ibm.com'" <russell.bee@uk.ibm.com>  
Cc: David Turner/Bedford/IBM@IBMUS  
Date: 11/14/2014 23:50  
Subject: INVESTIGATION in action

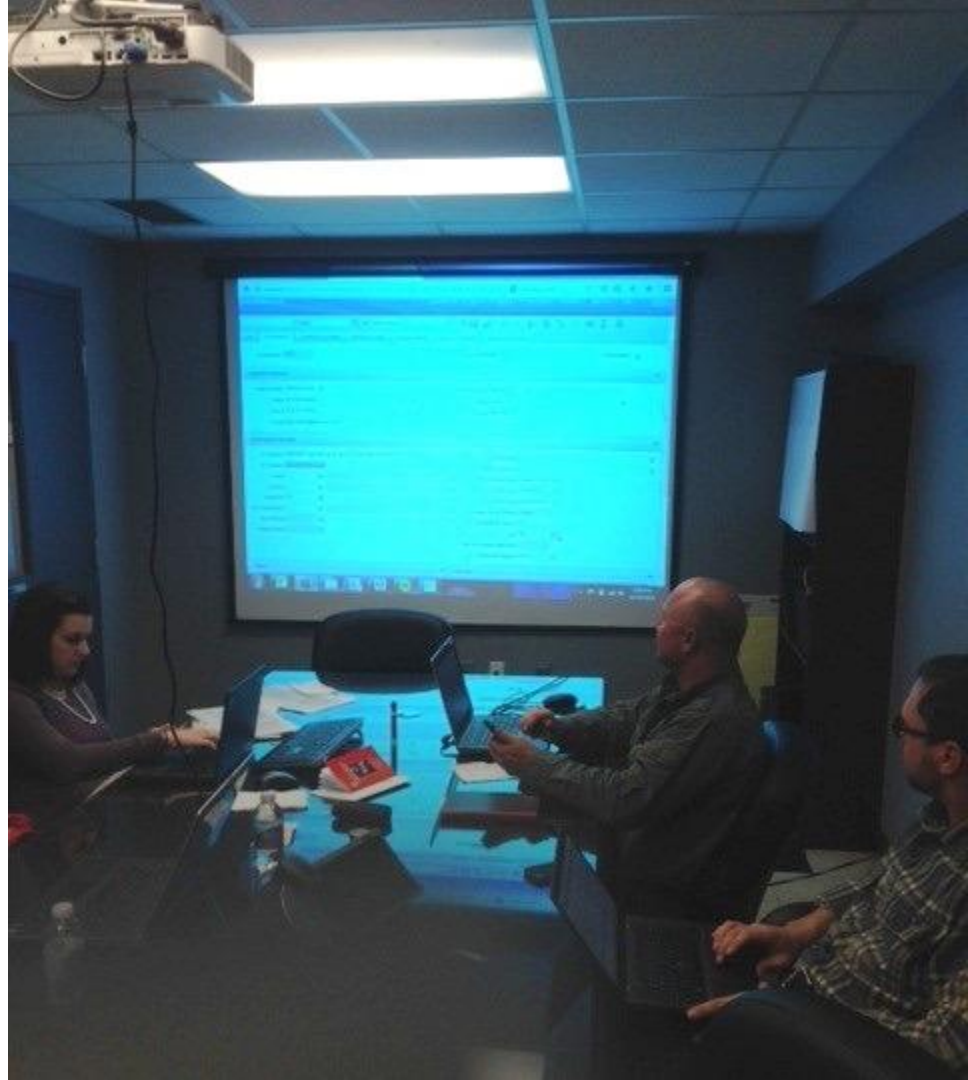
Russell, I was visiting one of our plants today and happened across this group of people doing an RCFA\* directly in the INVESTIGATION app. Your brainchild in action.



Joe Fluder  
*Director of Corporate Maintenance  
and Reliability*  
Suncoke Energy

Joe Fluder is the president of GOMaximo.

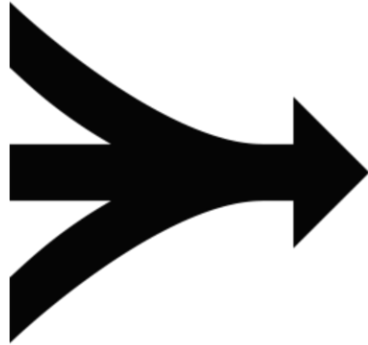
\*RCFA = Root Cause Failure Analysis



# Summary

Plan – Do – Study – Act > TOGETHER

Operations  
Maintenance  
Safety



# Maximo Strengths

Maximo is designed to augment and integrate with financial, human capital, document management, data historians and operational technology systems to provide enhanced usability, flexibility, functional depth and faster time to value for asset-intensive organizations.

## Usability

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Usability is critical to ensure the intended gains in worker efficiency are realized.

## Depth of functionality

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Depth of functionality enables the organization to continuously improve.

## Flexibility

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Flexibility (through configuration vice customization) enables the organization to rapidly adopt new techniques and react to regulatory change.

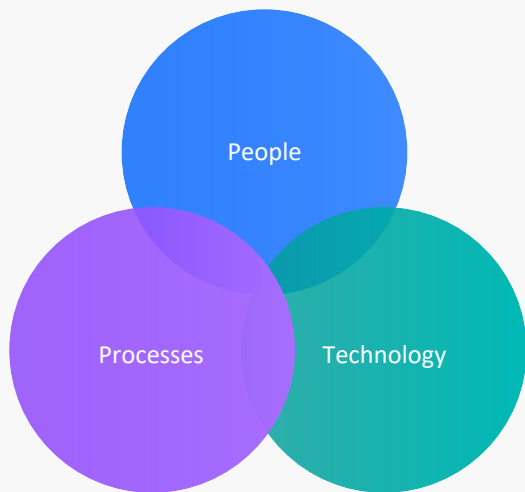
## Maximo

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Maximo can be rapidly deployed and upgraded following agile methodologies, thereby providing shorter time to value.

# Summary

- It's still about people, process and technology
- Technology is merely the enabler.
- But, you can simplify the technology implementation with a product that supports the integration of operations, maintenance and safety “out-of-the box.”



***MAINTENANCE  
AND SAFETY***



# Connect with us to take the next step

- Learn more about the award-winning performance of IBM Maximo at:  
[ibm.com/products/maximo](https://ibm.com/products/maximo)
- Connect with an IBM expert to start a discussion

# Thank you



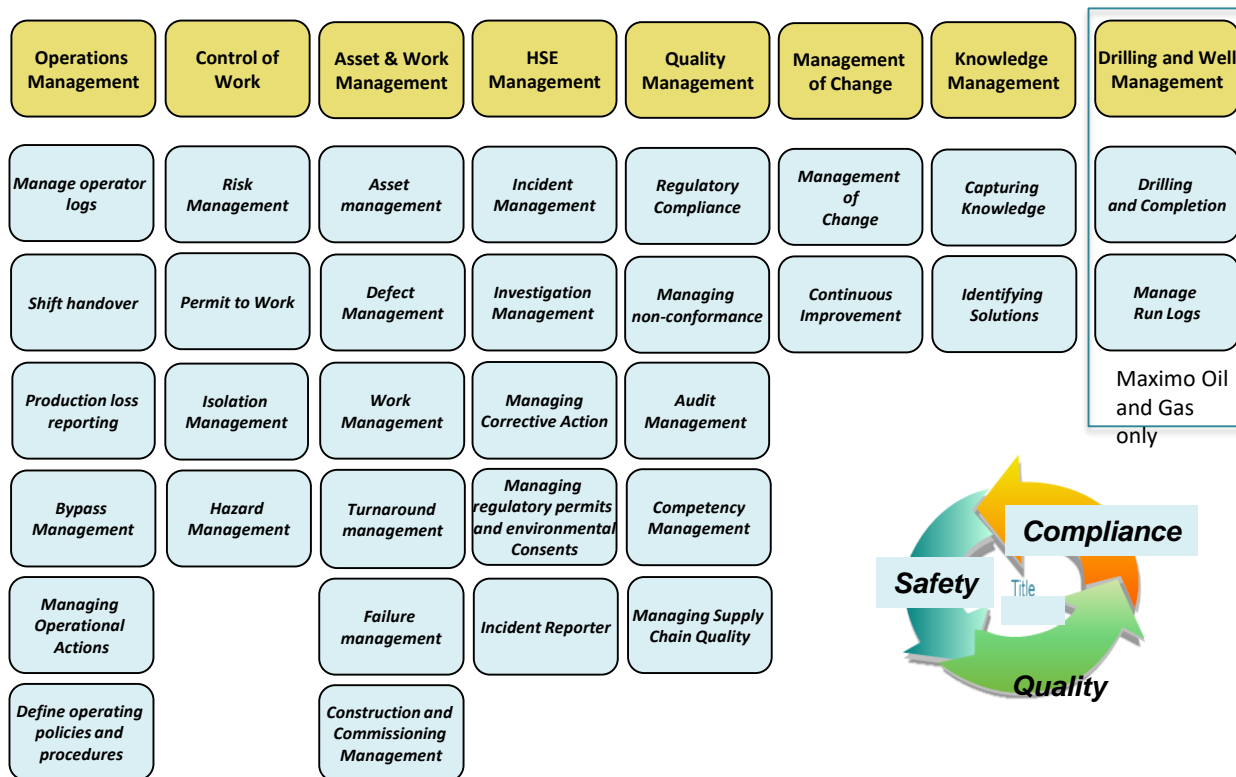


# Backup






# Maximo Oil and Gas/HSE Business Processes

## Major Business Processes



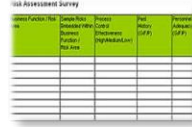
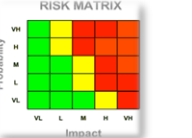

### Detailed Business Processes








# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>Incidents</b> 	<p>Addresses the continuous need for customers to improve operational performance by creating, reviewing, and analyzing incidents. Includes Self Service Create and Review Incident capability. A mobile Incident Reporter application is also available.</p> <p><b>Value Drivers:</b> Financial - Reduce IT application cost, Process - Improve cross team collaboration. Visibility of safety.</p>
<b>Investigations</b> 	<p>Supports identifying the root cause of problems arising from incidents that may be safety, environmental, or production related. Manages unresolved incidents and defects. Designed to support both HSE and reliability related investigations. Supports RCFA, FMECA 5 Whys and human factor analysis.</p> <p><b>Value Drivers:</b> Financial - Reduce IT application cost, Process - Improve cross team collaboration</p>
<b>Management of Change</b> 	<p>Allows customers to support change management in a more robust way with multiple levels of reviews/approvals, authorization of change, pre and post start actions. <b>Value Drivers:</b> Financial - Reduce IT application cost, Process - Improve cross team collaboration</p>
<b>Defects, Non-Conformance</b> 	<p>Provides non-conformance management capabilities designed to automate, manage, and streamline for identifying, evaluating, reviewing, and handling on non-conforming engineering specifications, materials, components, parts and processes.</p> <p><b>Value Drivers:</b> Financial - Reduce lost production, reduce operating costs, Process - Operate safely</p>
<b>Regulatory Compliance</b> 	<p>Identifies regulatory permit requirements within your organization and associates actions to these regulations to ensure compliance.</p> <p><b>Value Drivers:</b> Financial – significantly reduce the costs associated with compliance. Process - Improve compliance, operate safely.</p>





# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>Operating Procedures</b> 	Capabilities for documented, step-by-step operating procedures. <b>Value Drivers:</b> Process - Improve compliance with standard operating procedures.
<b>Operating Policy</b> 	Governance application for structuring operating policy. Designed to identify operating and maintenance strategies. Relates these strategies to locations and assets and cross references the PMs and Job Plans used to implement strategy. <b>Value Drivers:</b> Financial - Reduce application lifecycle cost. Process - Improve compliance
<b>Risk Assessment</b> 	Iterative document that links all associated Health, Safety and Environment activities and organizational data. Allows users to analyze the risks associated with work, identifying hazards and defining the impact ranking. Used to support job safety analysis (JSA). <b>Value Drivers:</b> Financial - Reduce IT application cost. Process - Operate safely
<b>Risk Matrix</b> 	An application that models consequence vs likelihood of events supporting risk management processes. Configurable to match customer matrix structure and terminology. <b>Value Drivers:</b> Process – Operate Safely.
<b>Improvements</b> 	Manages continuous improvement programs like Six Sigma or similar methodologies. <b>Value Drivers:</b> Financial - Reduce IT application cost, Process - Improve cross team collaboration


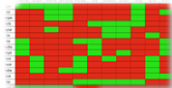


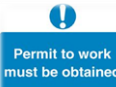

# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>People (Competency Extensions)</b> 	Improves competency assurance through capabilities for adding, modifying, and updating competencies of the workforce. <b>Value Drivers:</b> Process – Improve resource utilization.
<b>Operators Log</b> 	Electronic log used by shift operators for recording and qualifying events which occur during an individuals shift watch. Includes a loss reporting function. <b>Value Drivers:</b> Financial - Reduce IT application cost, Process - Improve cross team collaboration.
<b>People (Certification) Tracking</b> 	Provides the capability to build a wide range of certificates in Maximo and link these certificates to multiple Maximo objects. Covers multiple types of certificates eg Construction, Material, Equipment, Personal, Environmental, Drilling, Regulatory <b>Value Drivers:</b> Process – Operate safely and improve resource allocation.
<b>Action Tracking</b> 	Allows customers to track statutory implications to ensure certain types of work and actions are completed by the agreed dates. Can be used to manage campaigns of actions or safety bulletins. <b>Value Drivers:</b> Process – Improve compliance.
<b>Benefits &amp; Losses</b> 	Captures benefits/losses associated with improvements or costs associated with incidents, failures, survey/audit findings. Directly relate maintenance activities to production losses <b>Value Drivers:</b> Financial - Reduce production losses, reduce operating costs. Process Operate safely.







# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>Failure Reporting</b> 	Reporting mechanism for capturing metrics to support consistent Failure Reporting and Corrective Action process (FRACAS). <b>Value Drivers:</b> Reliability – improve reliability analytics capabilities.
<b>Solutions</b> 	Searchable learning repository associated with lessons learned, or with proven solutions having a safety, operational, maintenance or engineering context. <b>Value Drivers:</b> People - Improve organizational learning and process efficiency.
<b>Defects</b> 	Integrated approach to manage or eliminate defects. Can also be used to manage quality related non conformances. Defects can be captured using a mobile device as an option. <b>Value Drivers:</b> Process – Operate safely and decrease maintenance costs.
<b>Bypass Management</b> 	Use to manage bypass operations, also known as inhibits, or overrides, for safety related systems such as Emergency Shutdown, Fire and Gas Systems, Alarm Panels and soft alarms on DCS systems. It can also be used to manage bypasses of mechanical systems such as sprinklers. A further use case is management of security system bypasses. <b>Value Drivers:</b> Process – Improve process safety.

# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>Certifications</b> 	A certification record contains the details that are used to verify that standards for assets or locations are met. They can also be used to make sure that personnel are qualified for specialized tasks. <b>Value Drivers:</b> Financial - Reduce application life-cycle cost. Process - Operate safely.
<b>Location Profile</b> 	Location profiles contain information on production data. You can use location profiles to reduce the production losses that can result from planned or unplanned maintenance shutdowns. <b>Value Drivers:</b> Financial – Reduce production losses.
<b>Preparation Activities</b> 	An application to manage the preparation activities that are associated with different phases of scheduled work packages. Preparation activities are tasks that are usually carried out either before assets are put into operation or in preparation for a plant turnaround. <b>Value Drivers:</b> Financial – Reduce production losses, Reduce operating costs.
<b>Lock Out/ Tag Out Plan</b> 	Lock out and tag out operations specify a plan of isolation for assets or locations to ensure the safety of the plant. The plans describe how to remove work assets from service and place them back into service. <b>Value Drivers:</b> Process - Operate safely.
<b>Permit to Work</b> 	A permit to work provides for the effective management of hazards in the work place. The permit to work is frequently used with one or more work orders. You can also generate a permit to work based on an existing work order or task. <b>Value Drivers:</b> Process - Operate safely.
<b>Audit and Survey</b> 	Audits are used to evaluate compliance with industry-related regulations or with internal regulations. You can use either audits or surveys to evaluate locations and assets for regulatory compliance. <b>Value Drivers:</b> Process – Improve compliance.

# Features & Benefits of Maximo Oil and Gas

Capability	Benefit
<b>Operational Actions</b> 	<p>Consolidates standard actions across multiple different applications. Supports the sign-off of completion of actions in a single place. Allows standard actions to be added to a Start Center.</p> <p><b>Value Drivers:</b> Process – Improve resource utilization</p>
<b>Log Book</b> 	<p>Provides a way to bring together individual operator logs into a Log Book. Supports the shift handover process.</p> <p><b>Value Drivers:</b> Process – Improve resource utilization</p>
<b>Isolation Management</b> 	<p>Supports the scenario where customers want to manage isolation separately from a permit. Fully integrated with permit to work if required.</p> <p><b>Value Drivers:</b> Process – Improve compliance.</p>
<b>Incident Reporter</b> 	<p>A Maximo Anywhere based mobile application to report an incident, hazard or safety observation. Supports disconnected operation. Also provides the ability to view your reported incidents from the mobile device.</p> <p><b>Value Drivers:</b> Process – Improve compliance.</p>
<b>Certifications (Environmental Consents)</b> 	<p>Extension of Certification application to support the management of environmental consents and regulatory permits.</p> <p><b>Value Drivers:</b> Process – Improve compliance.</p>
<b>Assets &amp; Locations (FMECA Criticality)</b> 	<p>Extensions to Assets and Locations to provide failure mode analysis and criticality analysis.</p> <p><b>Value Drivers:</b> Reliability – improve reliability analytics capabilities.</p>

# Maximo benefits all functional departments

- **Executives** have visibility and control across the organization through common systems enabling better business decisions.
- **Purchasing managers** can see costs and orders enterprise-wide for price comparisons, discounting, standardization and order tracking.
- **Contract Managers** can see asset related contracts; negotiate vendor T&Cs and monitor supplier performance.
- **Financial Managers** can see the entire inventory and analyze return on assets for financial reporting.
- **Compliance Manager** can see asset detail to ensure regulatory compliance and mitigate risk.
- **Operations Managers** can see asset conditions in sufficient detail to improve asset utilization & performance.
- **IT Managers** can see how to streamline inventory and resources across the organization.
- **Reliability Engineers** can see asset health and make better repair replace decisions.
- **Planners and Schedulers** can see availability of their workforce and use graphical tools to make assignments.
- **Maintenance Managers** can see job plans enabled by availability of information to increase asset capacity.
- **Field Technicians** can see work assigned to them and capture critical data about assets in a mobile device.

# Taking action pays back

Using powerful AI, standard data platforms and advanced analytics, **IBM Enterprise Asset Management** minimizes unplanned repair work, increases asset availability, lowers maintenance costs, and reduces the risk of equipment failure and safety incidents, **increasing the average return on asset across Oil and Gas Companies worldwide.**

20%

Reduction in inventory carrying cost

15%

Increase in asset life

40%

Reduction in operational maintenance costs through prediction

50%

Reduction in unplanned downtime

30%

Reduction in MRO inventory costs

60%

Labor cost savings from auto detection of asset conditions