ROLTA

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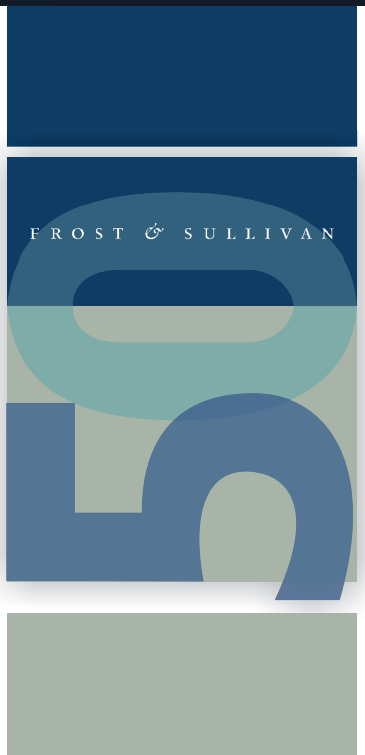
FROST & SULLIVAN

IT Solutions for the Oil and Gas Industry:

ICT Innovations to Build a Smarter Oil and Gas Sector



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Global Oil and Gas Industry Snapshot

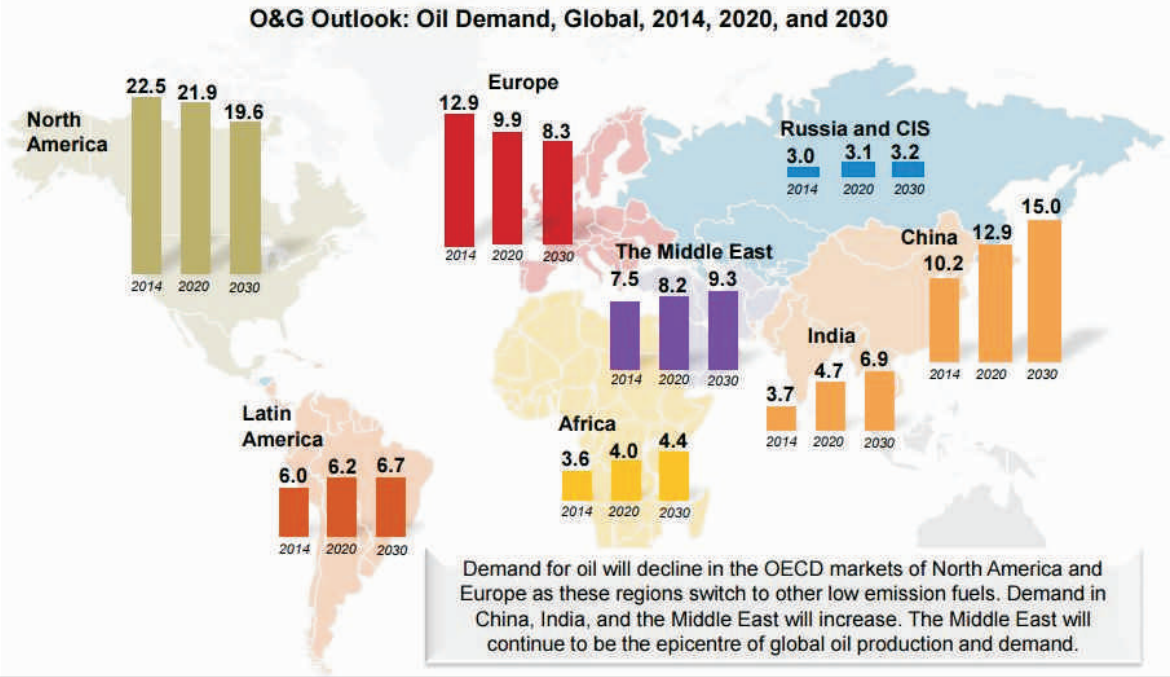
Population growth and rising urbanisation in developing markets have created a huge demand for Oil & Gas (O&G). The global energy demand is forecast to increase 1.4 times by 2030. The rise of the Asian giants particularly China and India has shifted the economic power to the Eastern hemisphere. Large industrial and domestic demand in this region is creating business opportunities.

Global energy consumption is forecasted to grow by 39.2% in the next two decades while non O&G energy sources will see a rise of 50% from the 2010 levels. Therefore, O&G will continue to remain the major source of energy.

O&G contribution to the global consumption will be 55% in 2030. Oil consumption will be 18% higher in 2030 and gas consumption will rise by 52% over 2010 levels. Investments in unconventional gas and increased exploration of natural and shale resources have created a growth market for gas. While the global incremental supply of gas will be dominated by North America, the demand will largely come from the Asian region.

With the industry tackling ever deeper and more complex reservoirs, the challenge of extracting commercial amounts of O&G is growing all the time. Technology has become a key mainstay of the O&G industry; major innovations are being developed in advanced seismic imaging technologies to enhance understanding of reservoir structures and to more accurately target reservoirs with commercial potential. Advanced technological breakthroughs in expansion of deep water resources and shale gas require both skill and capital investments.

Figure 1 : **Geopolitical situations and economic policies will also play a key role in defining the global fuel dominance in 2030**



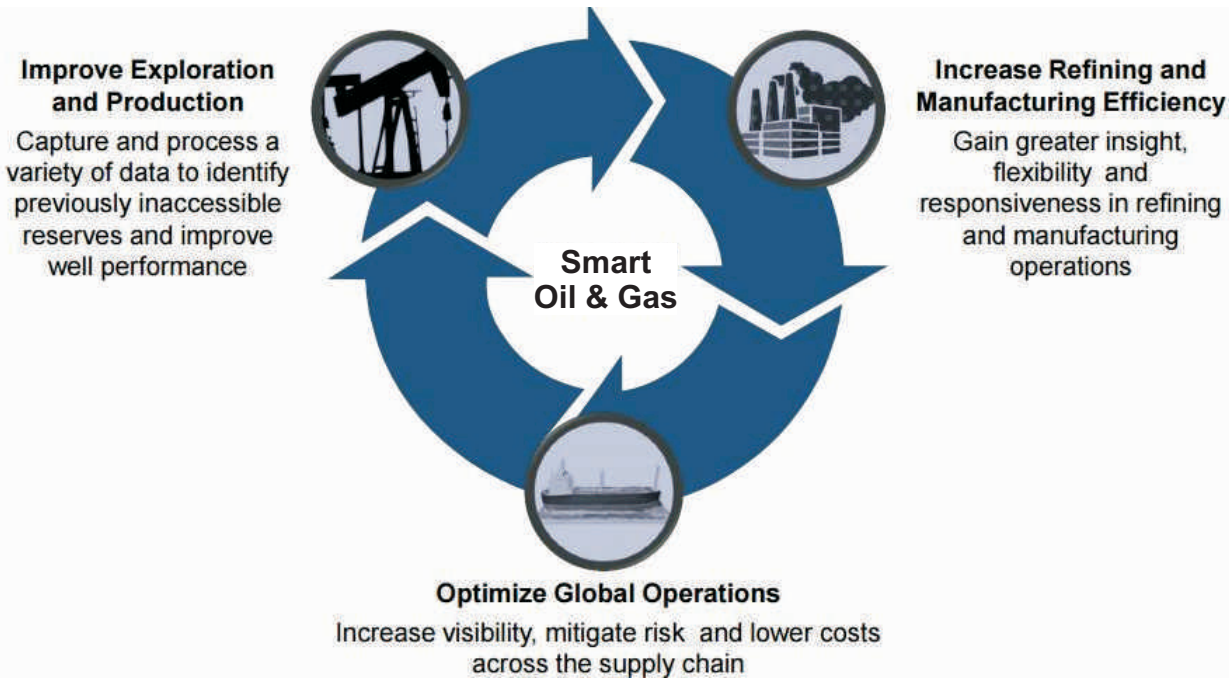
Business Challenges in the Oil and Gas Industry

The O&G industry, despite its massive revenues is plagued with challenges, ranging from oil becoming harder to find, more expensive to produce and ever increasing regulations to deal with. With the need to explore deeper and have higher safety standards, O&G companies globally are finding the need for better, more reliable information that can support timely decisions. In a nutshell, below are the key focal points for O&G companies:

- It has been estimated that petroleum engineers can spend as much as 60% of their productive time mining data to better manage well performance
- In downstream operations, O&G companies face thin margins and are under constant pressure to manage costs. Short-term volatility in both the supply of raw material (e.g. crude and feedstock) and the demand for products requires great insight, flexibility and responsiveness in refining and manufacturing operations to remain competitive and profitable
- Real-time visibility into operations can help control costs and optimize the performance of assets, facilities and employees, allowing nimble reaction to issues such as market dynamics, weather and logistics
- The supply chain is one area in which companies are increasing visibility and flexibility through sensor-based technologies across operations. Advanced supply-chain analytics capabilities, improved, integrated decision support is helping to optimize global activities

Information Technology (IT) therefore has become a go-to tool to support O&G companies optimise their operations, track their assets and take quick decisions. IT majors are working with many large multinational O&G companies and national O&G companies to empower them with transformational tools that can support them across the value chain.

Figure 2 : **Key focus areas for O&G majors globally**

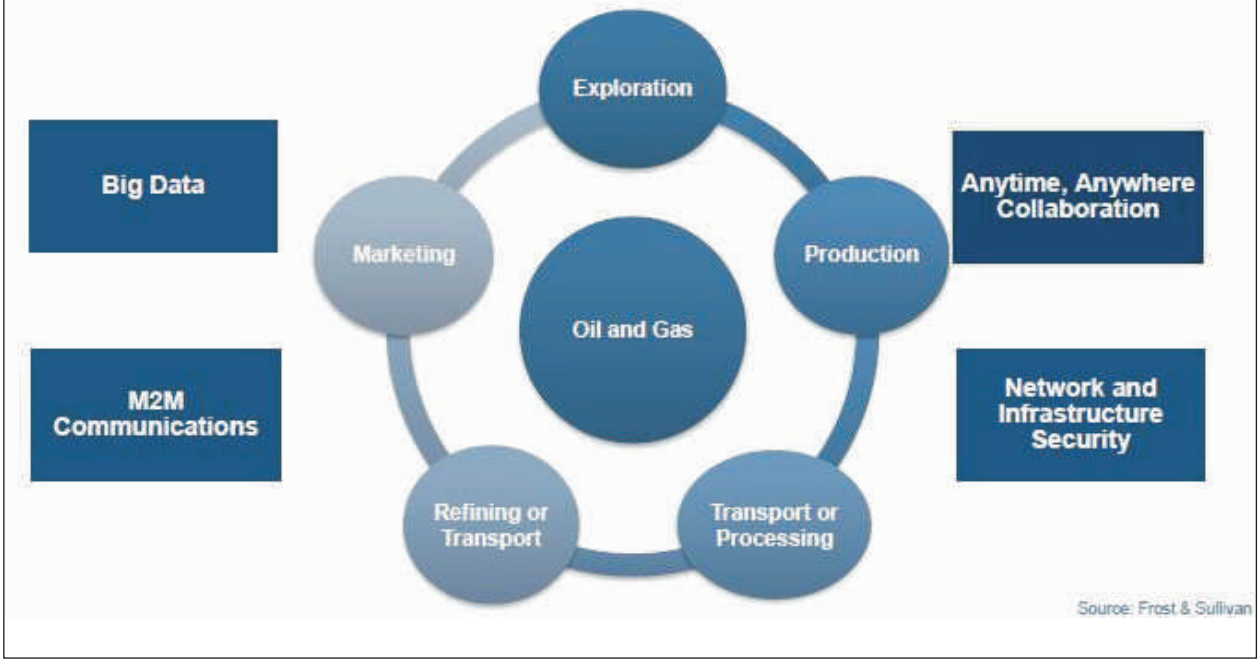


Overview of ICT in the Oil and Gas Sector

IT aids and facilitates the ongoing transformation of the O&G sector. Upstream O&G companies can intensely leverage IT in order to facilitate, enable and support most of the core functions including exploration and production.

The industry is now ready to enter the next stage of IT adoption and use: the digital oil field. Digital oil fields are used by O&G companies in the upstream sector to increase efficiency and improve collaboration, like real-time production surveillance, 4D visualization and remote communication technologies. Even if the actual adoption of these technologies is still in the early stages, the digital oil field can be considered as a credible answer to some of the industry's biggest concerns: security, collaboration and cost reduction. From the spectrum of enterprise solutions and services - the increasing uptake of communications technologies such as cloud services, mobility, and customised applications has helped organisations facilitate remote access to systems and distant capabilities in upstream and downstream operations. Furthermore, technologies such as Big Data are allowing O&G organisations to use predictive analytics to gain a comprehensive understanding of the structured and the unstructured data collected to help them make smarter, more informed decisions.

Figure 3 : **The technology elements of the Oil &Gas industry**



Technology Led Transformation – Big Data and Analytics in Oil and Gas Industry

The O&G industry is experiencing rapid market, competitive and regulatory change. Faced with the unending search for natural resources and the fluctuating global demand marked by price volatility, firms need every bit of insight they can produce. The need to address health, safety and environmental risks adds even more urgency. Yet sorting through exponentially growing volumes of data inputs for actionable business intelligence becomes increasingly challenging.

In the O&G industry, Big Data can garnered from traditional sources, such as equipment monitoring and maintenance records. Data from these sources is often captured and used as needed. But until recently it was not always retained for long-term use. Big Data can also be extracted from relatively new or previously untapped sources, such as seismic input, weather patterns and social media. Combining these disparate sources of data can lead to interesting insights that empower decision-makers.

With the proper infrastructure and tools, O&G companies can gain measurable value from all of these data sources. As the amount of data, the number of sources and the frequency of data updates increases, so too does the value of Big Data. Only about 4% of companies across industries have the talent and skills they need to draw tangible business value from analytics. Although some O&G companies have invested in building their capabilities, many struggle to get their arms around this powerful new opportunity.

Figure 4 : **The impact analysis of various technologies on Oil & Gas companies globally**

Product	Large O&G Company			Medium O&G Company			Small O&G Company		
	America	EMEA	Asia	America	EMEA	Asia	America	EMEA	Asia
Data Management									
Seismic Attribute Analysis									
Drilling and Completion Optimization									
Production Management (Forecasting and Optimization)									
Exploratory and Predictive Data Analysis									
Real-Time Analytics Drives Decision Support for Oil Well Drilling									

Very High Impact High Impact Medium Impact Low/No Impact

Source: Frost & Sullivan

Potential applications of Big Data in O&G include the following:

- Equipment maintenance: using data collected from pumps and wells to adjust repair schedules and prevent or anticipate failure
- Production optimization using powerful modeling capabilities to anticipate costs and production volumes
- Price optimization: using scalable computing technologies to determine optimum commodity pricing
- Safety and compliance: using weather or workforce scheduling data to avoid creating dangerous conditions for workers and mitigating environmental risks
- Asset analytics solutions: predicting equipment failures and studying the impact of the these failures
- Real time predictive analytics: organizing the unstructured data on a platform to create real-time models to show the process flow, efficiency and other metrics

The Way Forward

Frost & Sullivan identifies below some key areas that will drive IT in the O&G industry going forward. O&G companies going forward will:

- Focus on cyber risk management to protect their critical assets and information
- Use predictive analytics as key tools to differentiate themselves in the market
- Drive the necessity for Big Data for improved access and visibility
- Leverage maximum potential from real-time systems and adopt evolving technologies with integration of IT systems
- Adopt automated drilling software as the next step in technology advancement that is expected to provide process improvement

The need of the hour is :

- A pre-built, rapidly deployable solution that is rich in Big Data Analytics
- A solution that provides built-in contextual collaboration and role-based actionable insights, thereby providing right information to the right people at the right time
- A solution providing cross-function visibility across OT-IT, spatial and engineering systems which results in business outcome along with business transformation
- Predictive analytics consumerized for self-service BI
- Managing and deriving meaningful insights and decision optimization from huge volumes of data

Rolta OneView™ Enterprise Suite is one such comprehensive industry rich analytics solution which is Big Data ready. It brings unique value through pre-built role based actionable insights and correlated operational & business analytics, leveraging its patented OT-IT Fusion technologies. This helps drive organizational strategy across the value chain, through informed decisions resulting in desired business transformation.

Solutions such as Rolta OneView™ will play a critical role in addressing the challenges faced by asset intensive industries by leveraging the power of predictive and prescriptive analytics to strive operational excellence.

Rolta OneView™ has 200+ pre-built business value scenarios powered by 3000+ pre-built KPIs which are rapidly deployable and customizable, thereby resulting in faster ROI and lowest TCO.

ANNEXURE

Rolta OneView™ Enterprise Suite – The Smart Solution for a Smart Oil & Gas Sector

Rolta OneView™ Enterprise Suite is a comprehensive industry rich solution which is Big Data and Cloud ready. It brings unique value through role based actionable insights and correlated operational and business intelligence. This helps drive organizational strategy across the value chain, through informed decisions resulting in desired business transformation. Rolta OneView™ breaks down the fundamental barriers to achieving operational and business excellence, such as silos across operational networks, business networks, safety & sustainability networks and enterprise social networks. It provides a 360-degree view of the enterprise and touches the nerve center of all critical functions, quickly adapting to existing systems, instilling best practices and accelerating process improvement. The enterprise solution provides role based KPIs and actionable insights to empower every role to achieve its individual and organizational objectives while ensuring that there is a 'single version of truth' across all those levels. Rolta OneView™ simplifies the information complexity in the enterprise by providing loosely coupled, yet comprehensive integration across the operation and business systems with "Integrate-Analyze-Deliver" approach built by leveraging best of breed platforms.

Rolta OneView™ rich knowledge model provides enterprise wide multi-site as well as cross function visibility across areas such as Operations, Assets, Maintenance and Reliability, Supply Chain, Health Safety and Environment, Projects and Business for effective decision making.

Rolta OneView™ leverages over 200 value scenarios with 3000+ pre-built KPIs across verticals that can be monitored on a continuous basis, built on industry-specific data models to provide cross-functional insights at operational, tactical and strategic levels.

Figure 5 : **Rolta OneView™ Solution Architecture At A Glance**

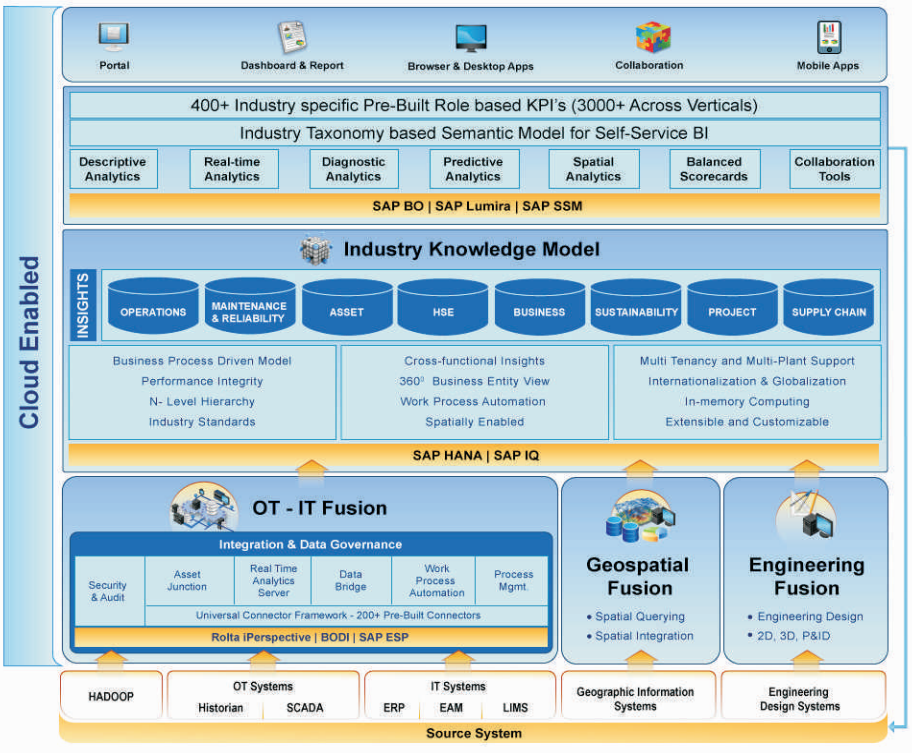
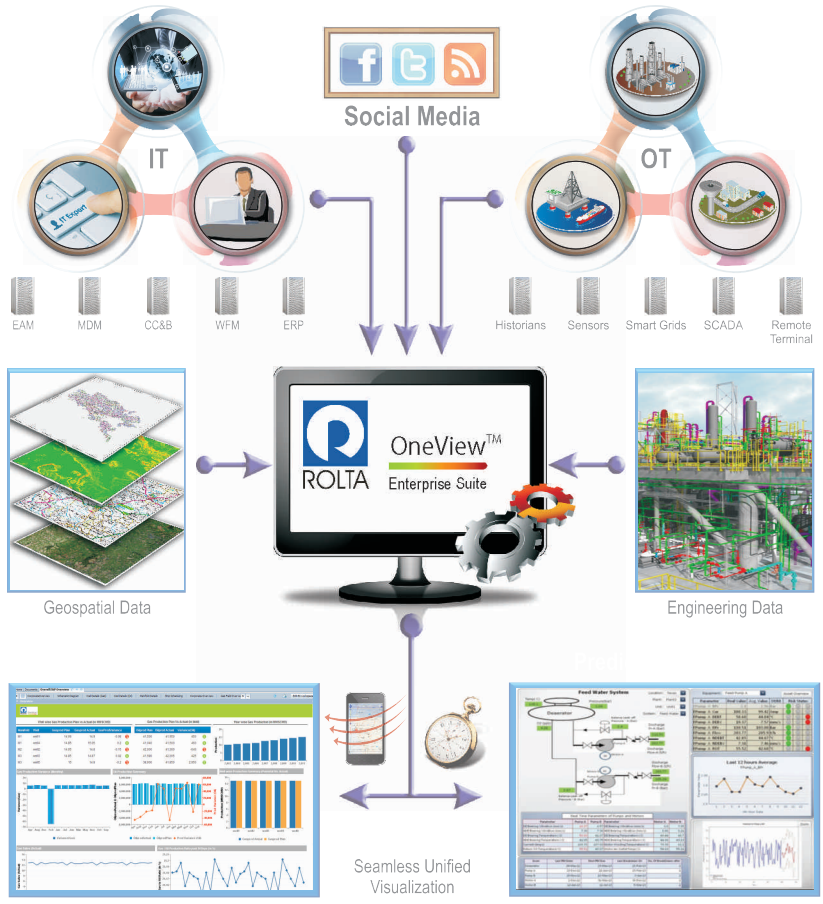


Figure 6 : **Rolta OneView™ - Unique Fusion of Big Data, IT, OT, Geospatial & Engineering Data for Deeper Analytics**



Pre-Built Industry Value Scenarios for Oil and Gas Upstream –Examples

OPERATIONAL EXCELLENCE

In increasingly globally competitive markets, upstream companies are looking towards Operational Excellence (OpX) as the key to drive long-term success. OpX programs tend to require cross-functional visibility by drawing information from multiple functions like Operations, Assets, Maintenance & Reliability, Health Safety & Environment, Projects, Supply Chain, Finance, Human Capital, etc. The key benefits value by Rolta OneView™ include:

- Improved field and well performance tracking to sustain entrepreneurial spirit amongst departments and business functions with clear understanding of productivity targets by all stakeholders
- Reliable prediction of well production and capacity utilization of assets
- Measuring operational and maintenance metrics accurately and monitoring assets through appropriate operational levers, driven by data
- Aligning equipment non-availability at a micro level to top line impact at a macro level
- Integrated view of production operations for people to collaborate, discuss and examine data together

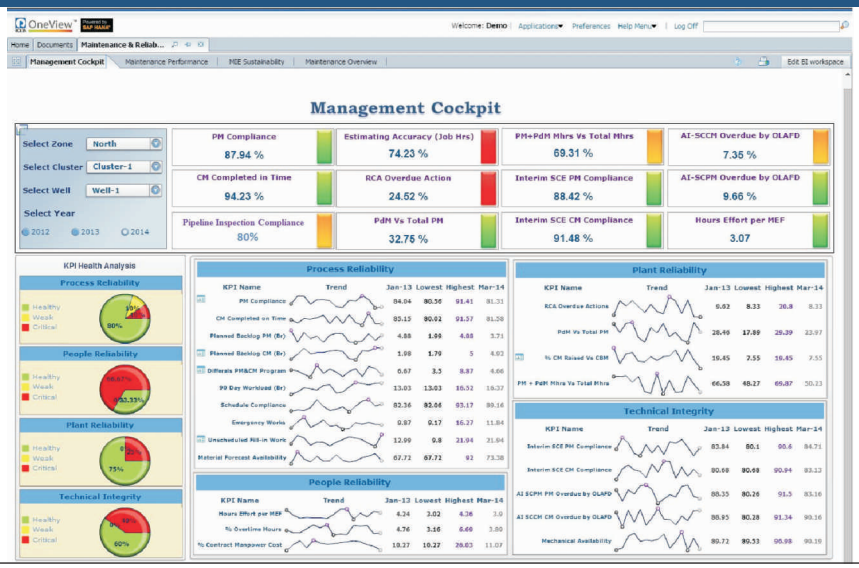
Figure 7 : **Enterprise dashboard to monitor and analyse business performance**

ASSET INTEGRITY

Asset Integrity Management (AIM) is a crucial function in asset intensive industries, with significant impact on production, costs and profitability. Rolta OneView™ helps upstream companies gain greater contextual visibility into their asset integrity programs, providing benefits like:

- Improved well and pipeline integrity surveillance and well downtime analysis
- Adequate visibility into subsea, onshore and offshore asset performance and operational & maintenance costs
- Aligning asset performance to corporate objectives with clarity of ownership
- Maintenance efforts to be accountable, coordinated, condition-based and proactive
- Leveraging systems perspective to know relationships of multiple business functions between reservoir, wells, networks and facilities
- Monitoring wrench time for crews with scientific tool time analysis and productivity metrics

Figure 8 : **Enterprise level view for asset integrity**



PREDICTIVE ANALYTICS

While descriptive and diagnostic maintenance analytics help drill into past performance, it is critical for companies to leverage past learnings, analyze real-time data and proactively identify potential hazards and execute preventive maintenance activities to avoid costly failures. Predictive maintenance benefits supported by Rolta OneView™ include:

- Monitoring real-time performance of hundreds of critical assets with thousands of variables
- Reduction in unscheduled failures and interruptions that affect topline, people and process safety
- Proactively identifying incipient events before they grow in proportion and impact performance
- Leveraging enterprise data landscape for developing insights and generating alarms as needed
- Balancing corrective and preventive maintenance tasks to reduce backlogs

Rolta OneView™ brings built-in predictive analytics capabilities allowing users to forecast performance of different equipment and processes to enable early identification of possible deviations and bad actors. Timely actions can thereby minimize the impact and result in significant cost savings. The solution provides the capability to use the best model suited for a scenario and achieve realistic results for appropriate actions. Rolta OneView™ has several out-of-the-box predictive analytics models covering a range of areas such as assets, operations, maintenance, supply chain and projects.

Figure 9 : **Tag analysis for predicting the failure of gas turbines**

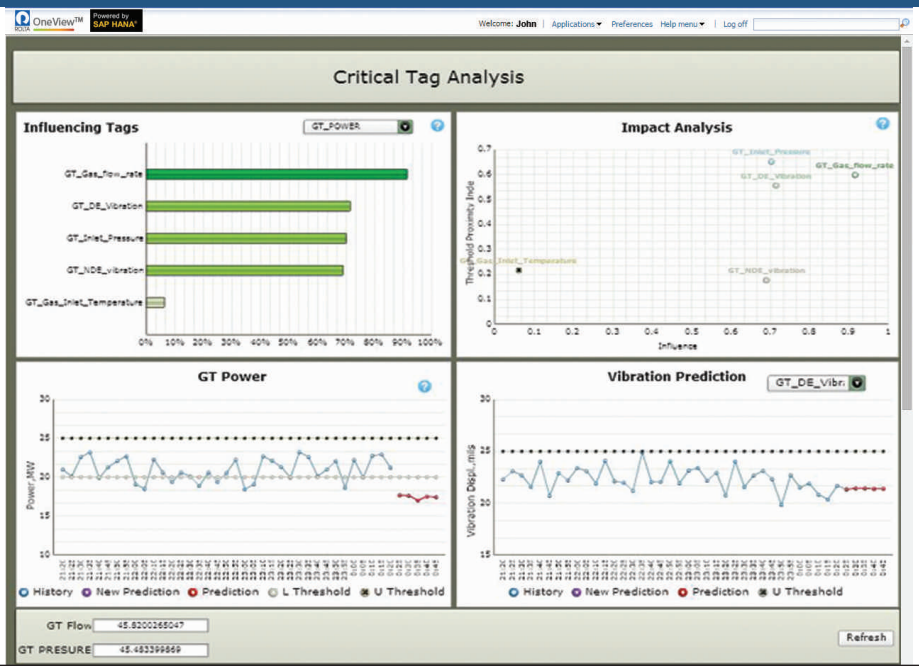
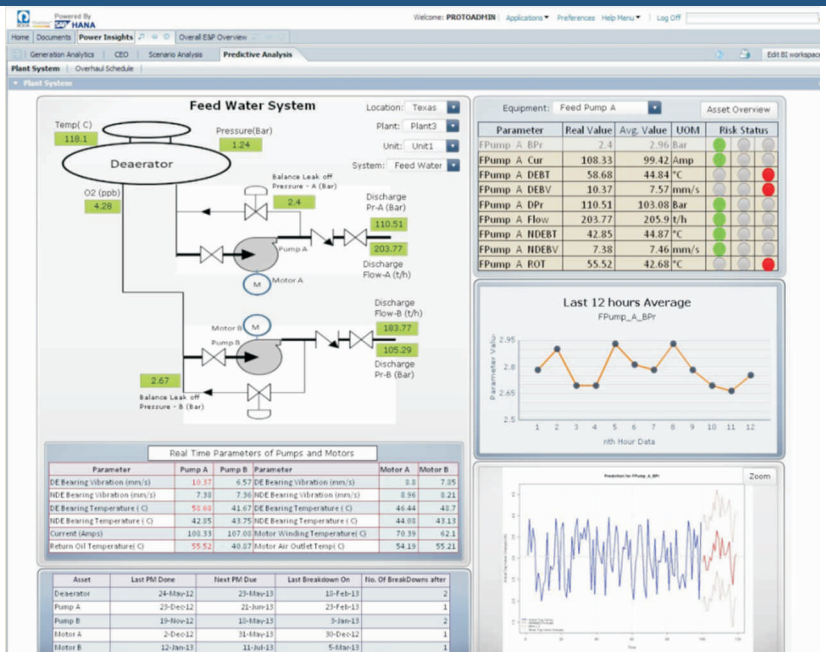


Figure 10 : **Predictive analytics for feed water system**



MANAGING SAFETY AND RISK

Appropriate and timely risk management is critical to ensure continued business sustainability. Risk value scenarios supported by Rolta OneView™ are:

- Unified view of risk management encompassing multiple processes and systems
- Rigor in understanding integrity barriers and discipline in adhering to pre-set targets
- Identifying, monitoring and managing bad actors on a continuous basis

Figure 11 : **Technical integrity risk monitoring with various safety barriers for a selected plant**

COST CONTAINMENT

Reducing cost is key to improving business profitability. The key benefits of this value scenario include:

- Critical repair vs. replace decisions for assets based on lifecycle costs
- Monitoring planned vs. actual expenditure on near real-time basis
- Seamless alignment between finance and operations metrics for work prioritization and optimization
- Transparency and awareness on specific production costs

Asset/plant level cost analytics integrated with 3D engineering drawings enables selection of assets to provide cumulative ownership cost along with breakdown, thereby providing insights into the cost drivers for the selected plant.

Figure 12 : **Asset/plant level cost analytics integrated with 3D engineering drawings**

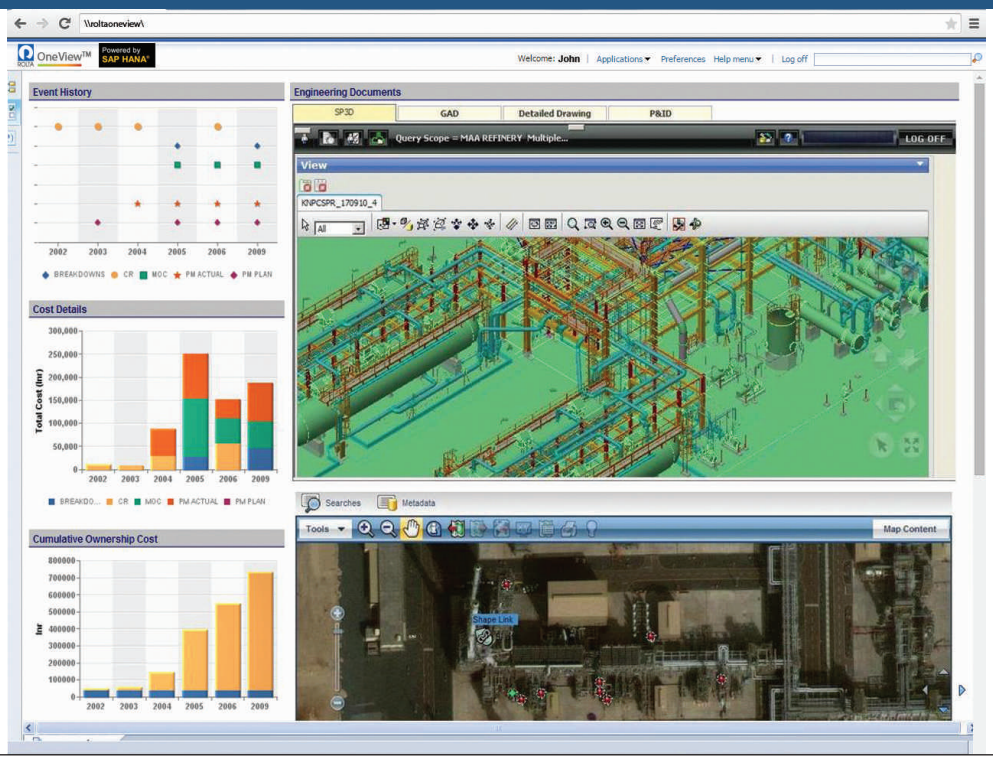


Figure 13 : **Historic analysis of energy consumption at asset level with alerts**

ENERGY EFFICIENCY

In upstream scenarios, it is critical to optimize energy efficiency. Rolta OneView™ features energy efficiency scenarios that provide key benefits like

- Understanding energy generation and consumption actors and their efficiencies
- Leveraging margin pricing, wherever appropriate for augmenting power generation
- Monitoring critical factors that contribute to energy inefficiencies and excess consumption

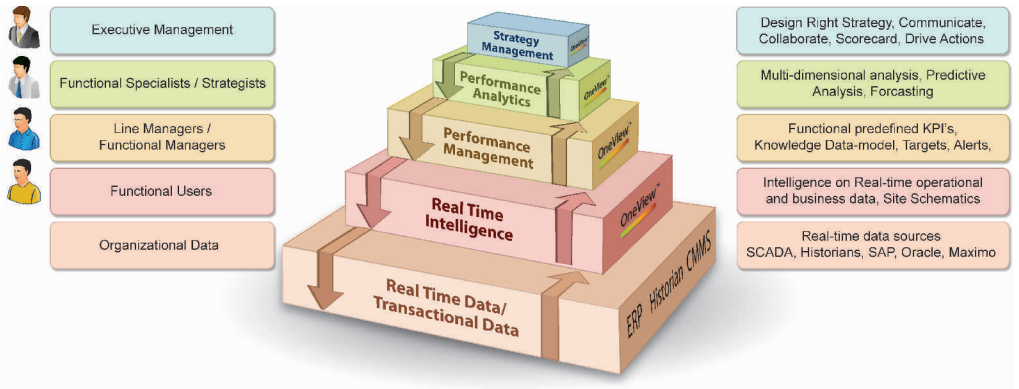
ENTERPRISE SCORECARD FOR BUSINESS PERFORMANCE

From the overall business perspective, it is important to ensure synergy between various functional areas and drive the organization excellence strategy.

Rolta OneView™ can help:

- Provide an enterprise level view for various corporate level KPI's covering areas like HR, Finance, Sales and Marketing
- Set targets for various supporting functions of the enterprise and track the performance against the target

Figure 14 : **Rolta OneView™ - Role Based Actionable Insights**



ROLTA ONEVIEW™ - UNIQUE VALUE PROPOSITION

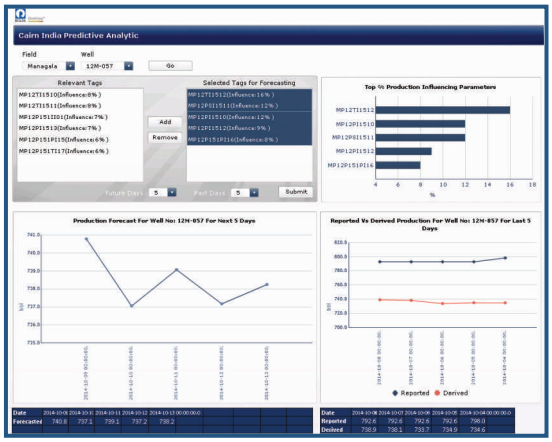
Pre-built, rapidly deployable industry rich Big Data Analytics solution, rapidly deployable in 12- 18 weeks, brings faster ROI and lower TCO

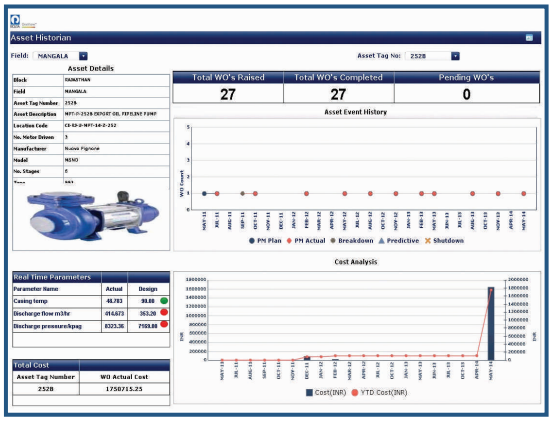
ROLTA ONEVIEW™ KEY BUSINESS VALUE & TECHNOLOGY DIFFERENTIATORS

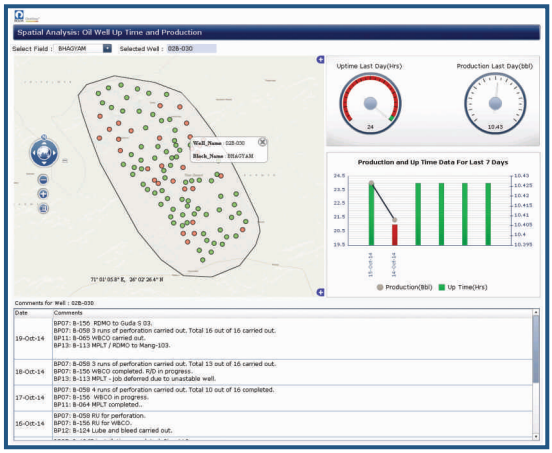
- Pre- built, rapidly deployable industry rich Big Data Analytics solution
- Deeper and broader coverage across all the key business functions for each industry vertical
- Role based dashboards providing actionable insights - single source of truth
- Seamless integration and tracking of enterprise balanced scorecard and strategy maps to operational and role based KPIs
- Modular solution with unified performance integrity model
- Pre-built business process driven knowledge model providing cross functional visibility across OT / IT / Spatial / Engineering systems
- 3000+ Pre-built KPIs across verticals [400+ for each industry]
- Rich diagnostic analytics with intuitive and granular drill downs
- 200+ Pre-built business value scenarios - rapidly deployable & customizable
- Pre-built predictive analytics scenarios across areas
- Pre-built work processes for event based alerts and capturing remediation
- Self-service BI - business user friendly to customize and extend KPIs
- Industry taxonomy based semantic model to provide self-service BI
- Built-in contextual collaboration enabling right decisions quickly
- Adoption of industry standards ISA 95, PPDM, CIM, OPC, MIMOSA
- Cloud ready enterprise intelligence solution with multi-site / multi-tenant support
- Pre-built industry rich knowledge for high performance analytics and cohesive view
- Real time & predictive analytics with knowledge driven recommendations
- Built-in comprehensive OT-IT Fusion platform
- Engineered for in-memory computing. Exploits the power of SAP HANA
- Logical data warehouse support for Big Data
- Out of the box support for Hadoop & “R”
- 200+ Pre-built real-time and ETL based connectors
- Universal Connector Framework to develop and plug in new connectors quickly
- Built-in rich spatial analytics
- User-friendly configuration for easy mapping and monitoring of assets and systems
- Easy configuration of integrity limits and automated alerts
- Built–in collaboration & recommendations
- Work process automation
- Multi-channel presentation with mobile friendly user interface, globalization and localization

CASE STUDY

Exploration and Production Analytics







Business Challenges

When one of the largest and fastest growing independent oil and gas exploration and production companies engaged Rolta for a Rolta OneView™ implementation, their prime focus was improved capacity utilization of their assets, reduction of risks by improving compliance to maintenance practices, improved energy utilization and compliance to dispatch commitments. Their challenge was that 20% of wells reported downtime on a daily basis, an equivalent of 60,000 barrels of production loss and even a 1% improvement would result in US $17.5 M of revenue.

The Solution

Rolta OneView™ Enterprise Suite for Upstream Oil and Gas with its ready-built cross-functional analysis across multiple functions was able to provide the much needed multi-site visibility to take corrective actions and was ideally suited to solve these challenges. During a short discovery workshop followed by a pilot implementation, Rolta OneView™'s real-time, predictive and locational analytics capability could successfully predict the likely downtime of a production well. This evidence was sufficient to trigger their decision to implement the full solution.

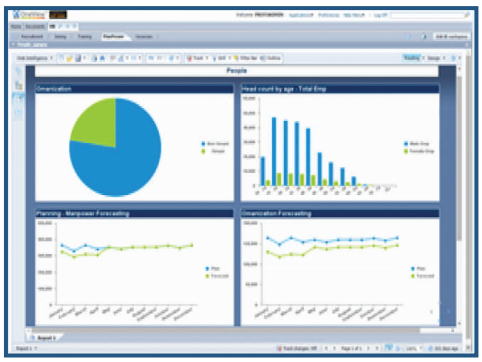
The Benefits

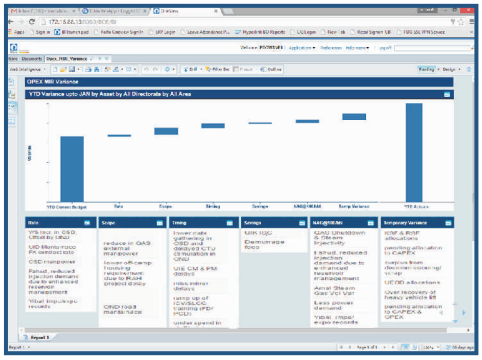
Although the full deployment of Rolta OneView™ is currently under way, the customer is already seeing several benefits:

- Fast ROI – The predictive analytics capability of Rolta OneView™ is resulting in early planning and decision making and is already resulting in significant savings
- Improved cross- function visibility between planning, operations and maintenance
- Locational analytics is greatly simplifying optimization of maintenance field crew and equipment
- Pre-packaged industry rich business scenarios has resulted in minimal involvement of functional team during deployment
- Expecting to Go-Live within months compared to their internal estimation of two+ years for an in-house bespoke development by their IT team and incumbent IT services provider

CASE STUDY

Accelerating the BI & Analytics Maturity Journey for Operational Excellence & Composite Risk Management





Business Challenges

One of the largest oil & gas conglomerates in the Middle East recognized the critical need for transforming the information ecosystem augmenting collaboration and transparency in their pursuit of excellence.
The organization wanted to define a phased roadmap to accelerate their BI and Analytics maturity journey

The Solution

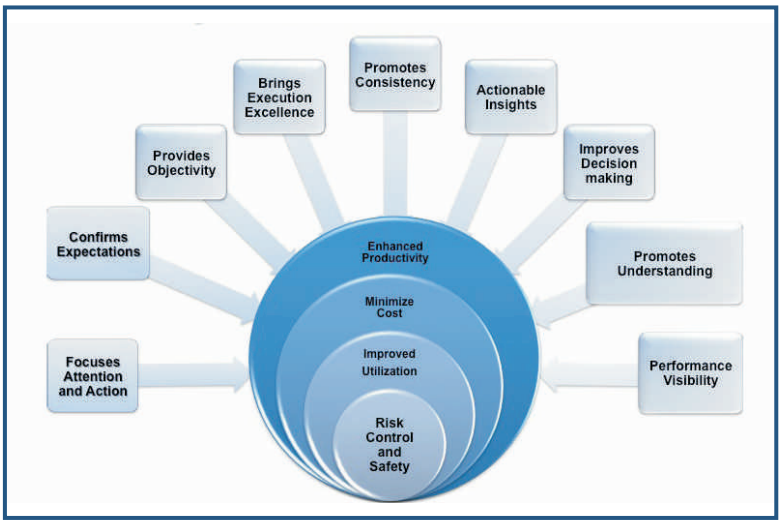
Rolta successfully delivered the complete BI phased roadmap for operation excellence to move from ad-hoc to pervasive intelligence. Rolta performed a detailed design thinking workshop with various stakeholders of the customer and delivered a detailed roadmap to execute in 3 waves with specific business outcomes in each wave. The solution protects the customers existing investments in SAP while moving towards the OT/IT integration with Rolta OneView™ Enterprise Suite Powered by SAP HANA.

The Benefits

- Improved productivity
- Cross domain communication, transparency and visibility
- Self-service BI and reports
- Improved logistic planning
- Reducing business risk
- Scheduled compliance for safety of critical equipment
- Improved HCM planning and competency tracking of service providers

SUMMARY

Rolta OneView™ with its out-of-the-box industry-specific analytics clearly enables organizations to embark on their business transformation journey confidently, to achieve positive business outcomes. As a packaged solution, Rolta OneView™ can be rapidly deployed in 12-18 weeks and easily customized, resulting in a higher and faster ROI.



ABOUT ROLTA

Rolta is a leading provider of innovative IT solutions for many vertical segments, including Utilities, Oil & Gas, Manufacturing, Federal and State Governments, Defense, Homeland Security, Financial Services, Retail, and Healthcare. By uniquely combining its expertise in the IT, Engineering and Geospatial domains Rolta develops exceptional solutions for these segments. The Company leverages its industry-specific know-how, rich repository of field-proven intellectual property that spans photogrammetry, image processing, geospatial applications, Business Intelligence, Big Data analytics and Cloud computing for providing sophisticated enterprise-level integrated solutions. Rolta OneView™ Enterprise Suite is one such innovative Big Data Analytics solution for asset-intensive industries with field-proven benefits. It brings unique value through its IT-OT integration and Predictive Analytics capabilities using Rolta's patented technology. Rolta is a multinational organization headquartered in India with revenues exceeding US$ 600M and over 3500 people operating from 40 locations worldwide and has successfully executed projects in over 45 countries.

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