E&P ALERT

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Why Performance Management Matters

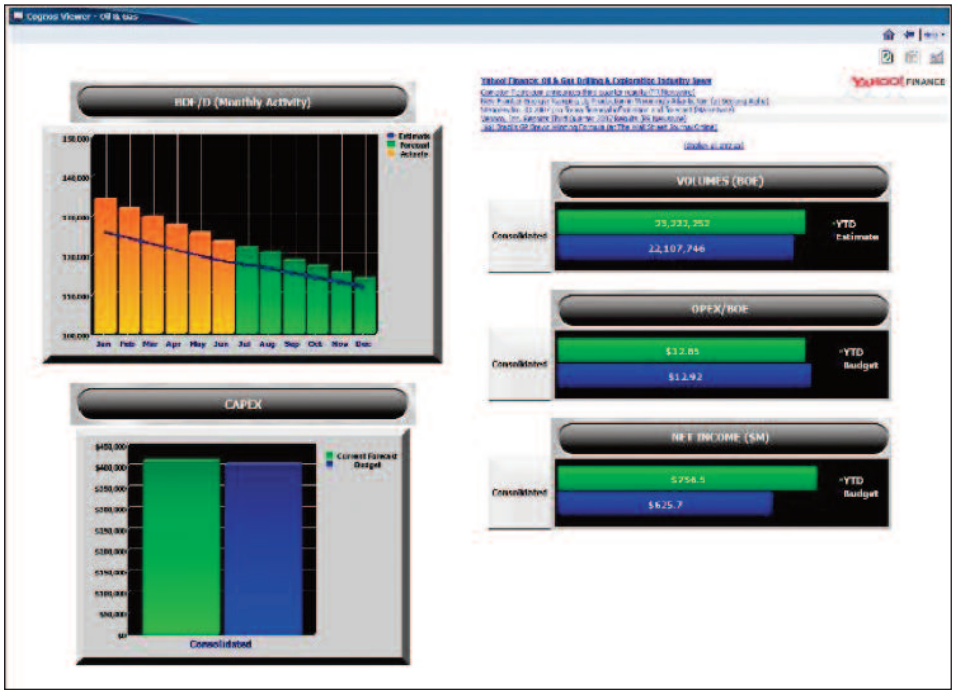
Business intelligence applied in the upstream petroleum industry as the means to decision making based on a single version of the truth.

Upstream oil and gas exploration and production is a skill-based industry made up of highly trained individuals, and its use of advanced technologies and computerization is unmatched. For one, no other industry has mastered high-performance computing, such as in building highly complex earth models, like the upstream. And, to name but a single other example, the industry can put forward numerous instances of high-tech operations centers that ease the rigors of managing offshore oil rigs.

Yet when it comes to business-process automation, upstream operations can seem an outlier, compared with the level of operations automation common to refining, process industries and consumer-product manufacturing. Very early in the computer revolution, the shared characteristics of those industries allowed each to benefit from the quantities of scale following from enterprise, operations and process-control software systems based on common platforms. And of course, these industries have little as complex as earth models to deal with.

Nevertheless, systems in oil and gas today are increasingly open. But the upstream's uniqueness—its global nature, remote operations and capital risk-mitigating strategies—has had far-ranging consequences when it comes to use of information technology.

"We use the term 'asset independence,'" says one senior industry analyst. "It comes up time and time again when we speak of new technology. Because of it, for any given asset, the goal is simply to make that year's production-output objectives. There may not be an obligation to pursue longer-term strategies. Any transformative strategy that is applied has to be quick, among other things."



In production-driven industries, performance-management applications—by integrating onsite process monitoring, operations decision making, and business functions—allow better decision making.

Yet there is pressing demand in the upstream, as in other industries, to move away from point solutions and over-reliance on spreadsheets. This need is exacerbated for the upstream industry by increasing volatility in supply, demand and prices; the need to tap into difficult-to-access reserves; and the need to increase recovery from existing wells.

It's news then, but not entirely surprising, that oil and gas professionals are increasingly drawn to the idea of performance management based on a common business-intelligence platform.

"IBM Cognos is used today by petroleum companies for performance management," says Paul Hoy, industry director, IBM Cognos software, "to control costs, improve customer service, maximize productivity and manage all elements of their upstream operations."

Performance-management applications include business intelligence (BI), which can be said to describe a decision-support system that relies on historical, current and predictive views of business operations

Remote field operations common to the upstream oil and gas industry gain considerable support from the advanced functionality and usability of today's remote devices.

based on data gathered from disparate sources. In production-driven industries, performance-management applications—by integrating onsite process monitoring, operations decision making and business functions—allow better decision making based on a single version of the truth.

IBM Cognos makes it easier for the oil and gas industry to benefit from performance management by providing tools, including the IBM Cognos Oil and Gas Blueprint, a pre-defined, industry-based data model. Such tools ease implementation and furnish industry-specific applications. Companies tend to engage with the system based on the need to solve a specific problem. Then, based on its benefits and flexibility, deploy it in other uses throughout the organization.

IBM acquired Cognos in 2008. According to reports from Forrester Research, Cognos has benefited from the financial and human resources of IBM and, since the companies didn't have many overlapping products, its combined efforts have been focused on functionality improvements rather than reconciliation of competing technologies.

In fact, in the past several years, the company has attained a unified platform and integrated product lines. According to Forrester, starting with release 8, the IBM Cognos BI suite is 100% J2EE-based and provides a common user interface for its products.

Read further to learn some of the uses, methods and benefits of performance management and business intelligence based on a common platform, especially as applied to upstream oil and gas.

Proven performance

"What we've seen," Hoy says, "is that the petroleum industry, like a number of other industries, is in a state of transition, moving from automation of day-to-day transactions to the strategic use of information as a means for driving optimized business operations." The automation of transactions, such as the transfer of goods or materials, came through implementation of ERP

Based On A Blueprint

Performance management empowers traditional planning methodologies to do the job they were meant to do.

The IBM Cognos Upstream Oil and Gas Blueprint provides a performance-management framework—including planning, metrics and reporting—that allows the upstream oil and gas sector to plan production, revenue, expenses and capital expenditures at the well, field or area level. By means of its predefined data model, users can focus on solving business problems, rather than dealing with fundamental process analysis and technical design.

The standardized planning format maximizes ease of planning for both those responsible for submitting their plans and managers assigned to review those plans.

The capabilities of the blueprint allow managers to:

- Access systems of record to obtain both projected and historical volumes, as well as financial data needed as a starting point for the budget or forecast process;
- Identify operating expenses and production variances, trends, anomalies and opportunities, and model the effect of drivers versus various scenarios;
- Structure data and reporting to comply with Sarbanes-Oxley and other regulatory-compliance initiatives;
- Integrate operational and financial planning in real time for immediate insight into resource requirements and future consolidated business results for various scenarios;
- Understand the impact of increased or decreased production volumes on cash flow, distributions and financial statements;
- Incorporate exchange-rate assumptions to roll-up to a consolidated forecast in the company's local currency;
- Conduct "what if" modeling that allows managers to analyze the impact of changes in operating costs, exchange rates, commodity prices and the effects of other scenarios;
- Engage in break-back distribution of production-, revenue- and expense targets across fields and areas;
- Compare incremental increases in production volumes related to capital expenditures;
- Forecast field expenses at gross and net levels;
- Manage royalties and provide insight into the impact of royalty rates on profitability;
- Integrate workflow to manage and consolidate plans with a visual scorecard, so the status of the planning process can be easily determined and actions can be taken to complete the planning process;
- Streamline reconciliation with company-wide strategic financial plans, managing consistency between top-down and bottom-up plans; and
- Summarize calculated metrics and link them to scorecards and reports to measure financial performance at any level of the organizational hierarchy of plans compared with actual or budget values.

The blueprint delivers information in a customized set of reports. Typically, a manager accesses reports, analyses and plans through a role-customized dashboard. Charts provide the capability of drilling through to more detailed analyses and include up-to-date information from source systems. ■

(enterprise-resources planning), financial-control systems and supply-chain management systems.

In addition, there are the upstream commercial and ad hoc home-grown systems for managing drilling and rig operations. These common core applications in oil and gas E&P—typically reserves, production and accounting systems—serve their purposes well.

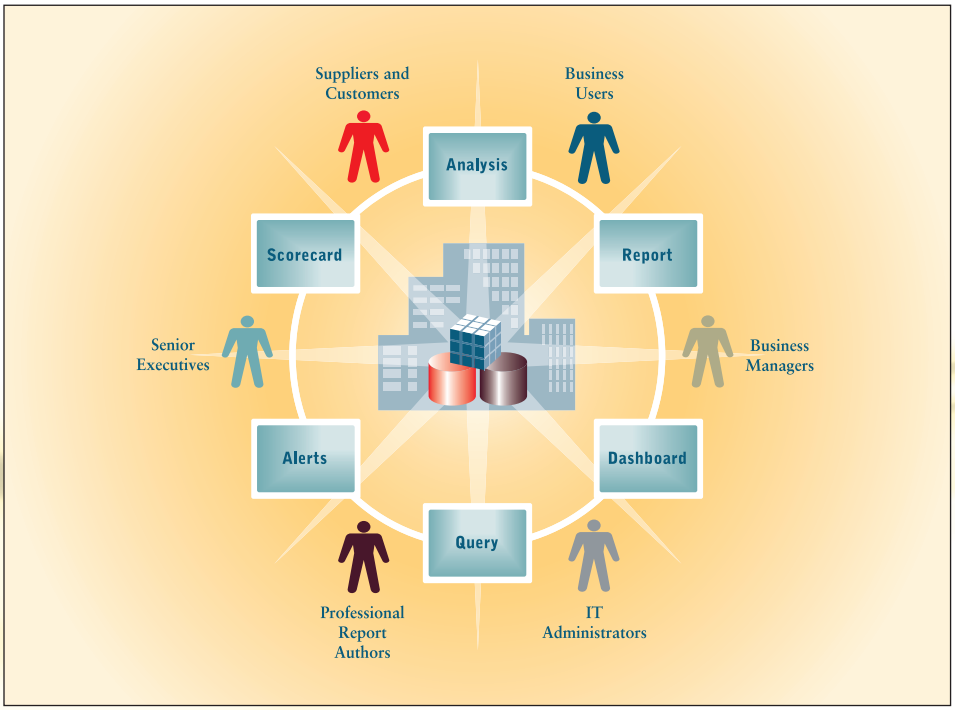
Yet organizations remain challenged to derive information from that data. Systems are often geographically dispersed and do not talk to one another. For example, a well in a reserve system might be classified differently in accounting than it is in production, challenging the presentation of integrated information in context.

Hoy says that, once companies act on the need to derive greater value from the information locked in transactional systems, a natural progression often occurs. "First is the presentation of that data to users so they can make fact-based decisions. Next comes optimizing their operations using that data."

What's needed is to move from a "backward-looking" view, based on transactional data, to a "forward-looking" view that supports the well-informed generation of forecasts and plans. With these capabilities in place, day-to-day management based on defined metrics culminates in a closed-loop system, ensuring status vis-à-vis planned targets is understood over time. Thus, BI-based performance management fits seamlessly within planning processes with which industry professionals have been long familiar.

Key budgeting and forecasting processes for upstream oil and gas professionals include gathering and consolidating volume forecasts, identifying key drivers and applying financial assumptions to build and consolidate a master budget and forecast. The results of these planning processes provide input into an accurate view of pro forma income statements, balance sheets, cash-flow statements and resulting targets for key performance indicators (KPIs). Also important is support in such areas as modeling distributions and dividends, developing hedging and financing strategies, and managing acquisitions and divestitures.

Unfortunately, in the past and still today, many companies perform needed data consolidations using spreadsheets. As marvelous a tool as spreadsheets are, the need for operations, finance and accounting to validate spreadsheet data on an ongoing basis is unwieldy in the extreme and tends to undermine management's confidence in the numbers thereby derived.



Day to day management of upstream operations based on defined metrics culminates in a closed loop system, supporting an informed understanding of planned targets over time.

In contrast, performance management comprehensively addresses the three most common everyday business questions. "The first," Hoy says, "is 'how are we doing?' This is what KPIs are meant to answer. Companies set goals; then, they rely on scorecards and dashboards to track day-to-day performance and adherence to the stated goals."

The next logical business question is "why am I performing as I am?"

"If performance issues are evident, what led to this poor performance?" Hoy says. "What are the underlying causal factors? Conversely, if performance is good, what were the enabling factors? Know that and you might be able to leverage that information across other business processes or units."

The third question is "what should I be doing?" Given prior insight into troubled areas, and awareness of underlying causes, performance management can model or simulate possible scenarios and probable events to help identify the best plan for optimized performance, vis-à-vis customers and internal performance.

Answered questions

Hoy says that, through IBM Cognos' work with upstream organizations—across geographic regions and with companies of all different sizes—it has gained insight into the range of performance-management issues top of mind for petroleum-industry executives. And IBM Cognos has embodied the capabilities needed to address these issues, and answer the three questions—How are we doing? Why? And what should we be doing?—in IBM Cognos 8 Planning and IBM Cognos 8 Business Intelligence.

IBM Cognos 8 Planning provides an alternative to cumbersome budgeting and forecasting processes by means of:

- Automated workflow and aggregation, by collecting volume and financial data from source systems;
- Collaboration among finance, operations and other stakeholders, for reduced budgeting and forecasting workload and improved analysis;
- Modeling of key business drivers, such as commodity prices, against various scenarios; and
- Increased understanding of the implications of changes in production volumes based on cash flow, distributions, income statements and the balance sheet.

Looking at how petroleum companies actually use these kinds of capabilities, says Hoy, "we see they have evolved a superior closed-loop system for managing performance. They use metrics to understand performance, often based on the SCOR (the Supply Chain Operations Reference model developed by the Supply Chain Council) methodology. These metrics guide development of an integrated financial plan, as well as making ongoing changes to the financial plan."

Performance management then enables an improved executive view into the traditional sales and operations-planning process. "Metrics are used to monitor adherence to the resulting goals," Hoy says. "Then on a day-to-day tactical level the financial plan and operations plan are used to drive substantial elements of operations, distribution, production and customer-facing activities."

While transaction systems provide data—whether rig, inventory, logistics or supply-chain data—performance management gives information to users the way they want to consume it—whether in the form of scorecards, dashboards, event notifications or alerts sent to mobile devices.

Thus, on a given day, a production manager might make a weekly check of a high-level dashboard to keep an eye on production from the district down to the well level. The dashboard shows some red lights in the central district. Drilling down on the relevant KPIs to discover why, the manager sees that the district is down by more than 800 barrels a day, a drop of 7.6 percent from the previous week. The question then naturally arises: "Which areas, fields and wells are causing this drop in production?"

The dashboard, by means of the drill-downs and other techniques, makes it clear that the production level of one particular well in Field 4 is down almost 27 percent. This well is contributing heavily to the overall production drop. The manager can also analyze this problem through the lens of financial accounts, budget information, another time period and any other dimension relevant to the business.

Across oil and gas, says Hoy, "we see these type methodologies being evoked based on challenges companies face, including globalization and managing cost effectiveness, as well as risk and compliance. Addressing these and other challenges by means of transactional systems have led to corresponding information-based challenges. These include complexity, multiple versions of the truth and information that is incomplete because the data are not presented in a business context. So it's not surprising that 60 percent of CEOs say they need to do a better job of leveraging information."

As a result of these challenges, the market for business-intelligence solutions is a dynamic one—and growing across industries and global regions. It is one of the few business-software categories to have sustained growth through the current recession. The market also has been the scene of major merger and acquisition activity. This type of activity is indicative of a maturing market, and of one whose time has come.

Moreover, given its proven efficacy, software-application development over time has proliferated to model the most diverse industries and skills-based business processes—even as computing power grows and its unit costs fall. Thus, the oil and gas industry has less reason than ever to consider itself an outlier when it comes to opportunities to streamline and automate its most important processes based on sound business intelligence in pursuit of improved performance management. ■

Asking The Right Question

Improving performance sometimes means venturing into the unknown.

Besides performance-management applications, another important aspect of business intelligence is analytics. Yet, defining exactly what is meant by "analytics" can be a bit tricky because there is a considerable gap between specialists' use of the term and what it connotes in the marketplace.

"In the marketplace, analytics are tools that deliver insights, as opposed to just looking at reports," says one industry insider. "This could mean anything from the ability to configure a visualization to the ability to configure statistical tools that work in conjunction with that visualization."

Analytics is sometimes differentiated from performance management, which is aimed at answering more or less "known" questions, e.g., production by region. Use of something like an OLAP cube takes it a step further, allowing detailed examination of the known question. Analytics bring with it the ability to answer ad hoc questions—the questions you didn't know you needed to ask until you came upon them.

IBM recently announced new business-analytics offerings meant to help clients better manage unstructured and structured data in a unified manner. The volume of unstructured data found on Web sites and social-networking sites, and in digital files, portal and databases, is increasing exponentially. Typically, organizations manage this unstructured information separately from the structured data found in applications and databases. By compiling and analyzing both structured and unstructured information, organizations can garner business insight from unlimited volumes of text found in e-mails, documents, blogs, wikis and websites.

Applied in this way, analytics allow business users to find and gain insight from virtually any type of content—in any format—by extracting, sorting, filtering and categorizing information and making the content relevant to decision makers.

- IBM Cognos Content Analytics allows organizations to discover, refine and deliver new insight by analyzing unstructured enterprise content alongside structured data. Through focused navigation, users can identify trends and patterns and proactively detect anomalies for improved decision making. IBM plans to expand the IBM Cognos Content Analytics family to include new solutions aimed at specific industry and business requirements.
- Using content analytics, the new IBM InfoSphere Content Assessment offering helps organizations rapidly assess unmanaged content to identify high-risk and highly valued content, such as corporate records that need to be secured, retained and managed throughout their lifespan. The software simultaneously detects unnecessary content eligible for decommissioning, creating the opportunity to dramatically reduce production-system burdens and associated storage requirements. ■

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www-01.ibm.com/software/data/cognos/