Role of Information Technology in finding Oil & Gas

Abstract

The energy industry doesn't just explore for and produce oil and natural gas.The industry also actively explores information technology to increase exploration success and to reduce production costs.

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Introduction

Important role of information system are as follows:

Visualization

Visualization turns mountains of hard-to-understand tabular data into realistic, colorful 3-D models. Users can literally walk through the projected data using special glasses that maintain the 3-D illusion. Geologists and engineers use these immersive environments to collaborate about reservoir characteristics and production strategies. Environmentalists use visualization to study water flow in watersheds and air currents in the atmosphere.

Oil and gas explorers are making significant investments in visualization hardware and software to reduce finding costs by accelerating the prospect identification process.The most recent advance is the reduction of both hardware and software costs that is contributing to the expanding use of the technology.

Key suppliers of visualization hardware are Silicon Graphics and Sun Microsystems.

Computer Power

Every industry is applying the continuing increases in computer capacity and power that are occurring while costs are decreasing. In the energy industry, this improvement is being applied to innovative applications in seismic interpretation and reservoir modeling.

The major suppliers of the computing power are Fujitsu, HP, IBM and Sun.

Reservoir Modeling

Production engineers use reservoir modeling software to better understand the physics , that force the oil and natural gas to the surface, at work in the reservoir.This understanding leads to improved production strategies that leads to more recovered oil and gas that deliver more revenue.

Mr. Dan Dexter, an Account Executive at Computer Modeling Group (CMG), indicates that recent advances in their software have improved modeling of the actual physics of the reservoir to reduce the previous use of approximations. CMG has also advanced its software to address reservoir modeling for coal bed methane, Steam Assisted Gravity Drainage (SAGD) and In-Situ combustion production.

Well Log Analysis

Well logs are used to enhance our understanding of the characteristics of various geological formations that the well bore has penetrated. Well logs measure formation characteristics such as electrical conductivity, radioactivity, porosity, density and speed of sound.

3-D and 4-D Reservoir Characterization

Geologists and geophysicists use 3-D and 4-D reservoir characterization software to more accurately determine where to drill. This enhanced understanding leads to fewer costly dry holes. It can also lead to higher production volumes per well and lower water production per well.

The recent advances include an emphasis on reducing the elapsed time to interpret data by improving workflow support and by simplifying the data manipulation process required between steps in the reservoir characterization work. Geophysicists continue to develop ever more sophisticated mathematical analytical techniques for their work.

The major suppliers of reservoir characterization software are GeoQuest, Landmark and Paradigm.

Geographic Information Systems

The oil and gas industry makes extensive use of Geographic

Information Systems (GIS) to produce map displays that visually represent multiple types of exploration or environmental data integrated to the survey grid. For example, a typical GIS display includes data about land holdings, bodies of water, geological features, reserves, production and pipelines.

According to Mark Dumka, a Geospatial Information Specialist at Talisman Energy Inc., "Linear Reference (LR) geometry is an important advance in GIS technology that enables oil and gas exploration companies to display well, seismic, and pipeline data more accurately. LR is the most efficient method to model exploration events, like formation horizon picks, well Drill Stem Tests (DSTs), seismic lines and pipelines."

Collaboration Tools

Collaboration by professionals across continents is a frequent requirement in the oil and gas industry as head office, field operations and key supplier staffs are rarely located in close proximity.

WebEx Communications is an example of a firm that provides the software and server infrastructure that makes online meetings smooth to setup and conduct. WNS Emergent, a Calgary company, offers its C3 WorkNet application to support collaboration, messaging and the management of supporting documents for remote access and retrieval. Tecskor, another Calgary company, licenses the PEAK Work Coordination System to support collaboration and project management. Microsoft Project 2003 Server enables a geographically dispersed team to manage project task details and supporting documents.

The recent advances include more robust software, easy access to the Internet in remote corners of the globe and improved software functionality available at lower license cost.

Risk Analysis Software

Risk analysis software implements probabilistic methods, including the Monte Carlo technique, for risk assessment. While long used in the financial services industry, its adoption within the oil & gas industry is a new advance. Risk analysis software is valuable because it can assess the cumulative impact of a large set of risks accurately and consistently. That capability is well beyond the ability of single person to juggle in their head.

In the oil & gas industry, risk analysis software is used to rank the relative merits of capital projects that are competing for funding and to improve reserve volume estimates. The software is also used to manage the risk associated with various contracting and trading strategies in oil and natural gas marketing activities.

Supply Chain Optimization

The oil & gas industry spends billions on development projects and on productions operations each year. That spending demands a well-oiled, pun intended, supply chain to contain costs, to ensure accuracy of orders and to maintain delivery and construction schedules.

The advance of the Internet and a standard called XML, that is used to electronically describe the content of documents, have made it possible for oil & gas producers to create tighter links with key suppliers using supply chain software. The software manages the creation and communication of purchase orders, shipment confirmations and invoices among trading partners.

Key suppliers of supply chain software, specifically oriented to the oil & gas industry, are Digital Oilfield and electroBusiness.

Readily Available Exploration and Production Data

The Canadian oil & gas industry benefits from the ready availability of a wealth of seismic, geology and production data. The advance is the rich set of applications that a large number of Canadian software companies have built to analyze this data in a myriad of ways to identify exploration opportunities.

Data management companies like Divestco, GeoLogic, IHS Energy and IPL assemble this data from various sources, integrate it and make it easily accessible to oil and gas professionals.

Neural Networks

Neural networks are a software advance that is being employed to improve reservoir characterization from seismic data to improve drilling locations to achieve higher production from wells. Neural networks are a category of software that is "trained" by presenting it examples of input and the corresponding desired output. For example, the input might be seismic velocities for a defined subsurface volume with the required output being the locations and depths of potential wells.

Organizations including the U.S. Petroleum Technology Transfer Council, the U.S. Department of Energy, Hampson-Russell, Rock Solid Images and Schlumberger are participating in research and have produced related software.

Conclusions

Advances in this diverse set of information technologies all contribute to the success of oil & gas producers

References and Bibliography

1. Bartels Andrew (2006). Trends 2006: Six economic shifts affecting IT. Forrester, March 15.
2. http://www.erlassjahr.de/content/publikationen/dokumente/20051205_esf_analysis.pdf
3. EIA (2006).International Energy Outlook 2006.
4. Shin Eui-Soon (2005) Joint stockpiling and emerging sharing of oil: Update on the situations in the ROK and on arrangements for regional cooperation in Northeast Asia. Presentation at the Asian Energy Security Workshop, Sampson 13-16 May
5. Franssen Herman (2005). The end of cheap oil: Cyclical or structural change in the global oil market? Middle East Economic Survey, 7 February.
6. Geyer Gerda (2003). E-marketplaces in the Energy Sector.Norwegian Trade Council.
7. Hill Fiona (2004).Oil, gas and Russia's revival. Foreign Policy Centre, London, September.
8. IEA (2000). India-a growing international oil and gas player, March, Paris.
9. IEA (2002).World Energy Outlook 2002, Paris.

10. IEA (2003).World Energy Investment Outlook 2003.Insights. Paris.
11. IEA (2005a).World Energy Outlook 2005.
12. IEA (2005b).Energy technologies at the cutting edge.
13. IMF (2006b).Oil prices and global imbalances, Chapter II, World Economic Outlook, April.
14. IndjikianRouben (1983). OPEC in the world capitalist economy, monograph (in Russian), International Relations Publishers, Moscow.