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## Data-Driven Production Optimization Conference

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## Rosetta Resources uses data visualization to optimize production

Mar 20, 2015

Digital solutions are increasingly helping oil companies to optimize production. Large operators such as Chevron, ConocoPhillips and Marathon are leading the way, but smaller independent oil companies like Rosetta Resources are also making the most out of new technologies.

Programs that focus on the science of taking large amounts of data and displaying them on the screen are becoming increasingly useful, both for exploratory analysis and for answering specific questions.

"The industry seems to be responding to the lower priced commodity market by relying more heavily on data, tools, and analysis in both their forecasting and decision making processes," said Jeff Baker, Manager, IT Applications at **Rosetta Resources**, a leading producer in the Eagle Ford shale in South Texas.

"For example, utilizing modeling software to examine reservoirs for the most effective entry point, running multiple simulations to predict the impact on production that running 10 frac jobs versus 15 might have, or even evaluating spacing of wells to potentially reduce drilling activity without impacting production output. None of these activities are new, but it would make sense to make every effort to maximize the value of any capital expenditure, especially under the current climate," he added.



Credit: tumpikuja

### Different applications

According to Jim Crompton, Managing Director at **Reflections Data Consulting**, visualization is an essential part of any useful analytical

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- ▶ **Flow Assurance & Operability Conference**  
May 26, 2015 to May 27, 2015  
DoubleTree By Hilton Houston Greenway Plaza, USA
- ▶ **Subsea Processing Conference**  
May 26, 2015 to May 27, 2015  
Houston, Texas
- ▶ **Structural Integrity Management Conference, Gulf of Mexico**  
Jun 2, 2015 to Jun 3, 2015  
Houston, Texas
- ▶ **Data-Driven Production Optimization Conference**  
Jun 16, 2015 to Jun 17, 2015  
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### Reports

- ▶ **North Sea Decommissioning Strategy Report 2015**  
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- ▶ **6th Edition: Offshore Decommissioning Report 2015 - Gulf of Mexico**

"It has gone far beyond just historical graphs, time versus production. There is a large variety of visualization techniques and quite a large variety of tools that goes with those techniques. There isn't one tool because there isn't one problem. There are a lot of tools because there are a lot of problems," Crompton added.

New visualization technologies are adopted by **Marathon** to obtain precise readings of seismic data collected from resource basins. Their Visionarium, situated in Houston, hosts an immersive and interactive environment where up to 50 people can look at data on a 27' x 8' curved screen.

**ConocoPhillips** is using comprehensive data visualization and multiple projection capabilities in its Emergency Operation Center (EOC), situated in the company's Houston campus.

Data visualization tools have also been used for years in reservoir modelling. "The reservoir piece has been there for a long time. I think that the tools are getting a bit more sophisticated and the data is getting better," said Baker (**Rosetta Resources**).

"These tools are making it easier for end users to represent data in a way that is meaningful to them. As more information becomes available and the tools get smarter, the business is empowered to make better decisions with more confidence in less time," Baker continued.

#### Production optimization

One of the most common data visualization is **TIBCO Spotfire**, developed by a consortium at the University of Maryland. **Chevron**, which was part of the consortium, is using the software to obtain a better assessment of drilling operations for production optimization, but also to test applications before their full development.

Effective data visualization strategies can indeed lead to significant production improvements, according to a Senior Engineer at a leading independent oil company.

"It's hard to believe until you start to realize the difference between bad visualization versus good visualization," the engineer added.

"With good visualization, when you glance at it, you are immediately able to see what is out of place, for example if the production of an asset went down," he said.

"We are not working directly with the physical world, we are working with data. So, you should be really good at data visualization. The better you get there, the more efficient you are going to be," the engineer added. "Just getting better at data visualization alone, is a game changer."

#### Identifying anomalies

Spotting an exception on a dashboard can help to understand whether the problem is related - for example - to speed, gas or engine temperature.

"I generated data visualization tools in a way that allows me to see everything very rapidly. Thanks to these tools, you can understand very well how the fields are working - even better than the people on the field," the engineer said.

The senior engineer mentioned that spotting one anomaly in an offshore field recently resulted in a gain of 1000 b/d. "That paid for all the costs, including my salary - and translated into millions of dollars over the next months".

"This is just one specific example of the things we saw using these new tools," he added. "We know it's possible - now we are trying to scale it.

**forecasts and predictions**

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Oil companies are often using visualization tools on the reporting side – like **TIBCO Spotfire** – to validate forecasts and predictions.

“These tools are useful in gathering facts and evaluating multiple scenarios in order to make the most informed decisions that you can – before you invest any capital into any project,” said Baker.

“Data visualization tools provide a quick analysis, such as side by side comparisons. They are very easy, quick and intuitive,” he added.

**Rosetta Resources** is also developing initiatives around front end data issues such as governance, quality, and integration with the intent of enhancing the capabilities on the reporting and visualization sides.

**Asking the right questions**

Data visualization tools are useful when the results are based on sound data analytics premises. Hence, a priority for the industry consists in asking the right questions when using the analytical tools, in order not to be overwhelmed by huge data flows.

According to Andrea Cortis, Data Scientist at **Ayasdi**, an advanced analytics company that provides machine learning software, new techniques such as Topological Data Analysis (TDA) can provide innovative ways to discover variables that were previously hidden.

Since anomaly detection can provide the real insight to understand the root causes of underperforming wells, it is essential to extract the most relevant parameters.

By using TDA, for instance, one company found that the reason for a patch of underperforming wells was related to their particular choice of fracking fluid viscosity and proppant in that area. A separate company that was confirming the existence of a well known sweet spot, discovered the existence of a previously unknown second sweet spot.

“Overall, data-driven approaches are changing the way we think about the entire drilling and production cycle,” he added. “You stop thinking in terms of monolithic models from first principles, and let the data speak for itself.”

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