

# BIG DATA and Analytics in Upstream Oil and Gas Industry

## From Idea to Realization

On 10<sup>th</sup> of February, the representatives of various companies from oil and gas and IT industry met together at the event dedicated to Big Data solutions and analytics and claimed to be the first of its kind in Norway. The one day conference and exhibition was held at Radisson Blu Scandinavia Hotel in Oslo and attracted around 100 people from operating companies, oil service providers, IT vendors, management consultancies and academia.

Among them there were Statoil, Schlumberger, SAS Institute, Teradata, IBM, Microsoft, Oracle, McKinsey & Co, Bain & Co, SINTEF, NTNU and others.

It can be said that Norway is a right place for such kind of an event in order to tap into Big Data within oil and gas industry taking into account not only data-heavy seismic services activity in the country, but also its vast offshore operational activity and status of being a leader in subsea technology applications. The latter implies remote and integrated operations during drilling and production and lots of subsea instrumentation and sensors. Regarding the global status of data usage, it should be emphasized that today the need to collect more data for competitive and informed decision-making is driving the industry to thoroughly address Big Data within E&P and Drilling. The desire to better understand subsurface has driven oil and gas companies to collect different types of even more data at higher frequencies. Thanks to real-time data collection, the amount of data being gathered from seismic activity, drilling process, logging activity, production activities, subsea equipment, downhole sensors, etc. has dramatically increased over the past years. At the same time, data analytics becomes the key to the success of the

business in today's competitive environment. Hence, the industry deals with huge quantities and varieties of data on one hand, and ever-bigger expectations for analytics on the other.

The event therefore provided a unique opportunity for the industry experts to address the challenges, status and emerging technologies in Big Data within E&P and Drilling domain. Well-known professionals from such companies and institutions as SAS Institute, IBM, Teradata, Microsoft, Oracle, Bain & Co, NTNU and University of Oslo presented their vision and best practices about the main issue, i.e. how to exploit data as a strategic asset in a better way. They were all well welcomed by the audience, and the common interest in the topic seemed to have sparked communication and establishing business contacts.

To summarize, the conference received a lot of positive feedback from the participants. It was discovered that such kind of the event if made annual would be highly appreciated by the industry professionals who expressed their opinion after the event that they were lacking it. The organizing team in turn will take into consideration all inputs with respect to possible improvements in order to hopefully make this conference even a bigger success next year.



**Egor Bokin**  
SPE Oslo board member/  
Subsea Production Engineer/  
Digital Field Support, FMC Technology

## Big Value from Big Data : How Oil and Gas can learn from other industries

by Duncan Irving, Practice Lead, Oil and Gas, EMEA & APAC, Teradata



**Dr Duncan Irving**  
Principal Consultant,  
Oil & Gas, EMEA &  
APAC

The downward trend in oil prices has marked the longest decline since the US travel and leisure organization, the AAA, started tracking retail gasoline prices 15 years ago.

But for oil and gas companies, that recent stabilisation is hardly any comfort. The current price still represents a nearly six-year low and, considering the geopolitical landscape driving the price of oil – ever-downward at the moment – it's clear that gasoline prices simply aren't going to bump back up substantially anytime in the foreseeable future.

So, what does big data and analytics have to do with the price of gasoline? For the oil and gas industry, a whole lot. Simply put, to weather this storm of deflated prices and uncertainty, the oil and gas industry must undergo a fundamental shift in how it collects, shares and analyzes data. I've dubbed this new approach the "Connected Well" and truly believe it is a fundamental framework that oil and gas companies – which account for hundreds of billions of dollars in transactions and employ hundreds of thousands of people globally – will adopt to deal with today's uncertainty.

### The Secret is in Shared, (Big) Data-Driven Insights

What is the "Connected Well?" At its core, it's built on the same conceptual framework as the Quantified Self and the Connected Car paradigms – a conceptual framework by which an industry can understand the value of bringing stakeholders together around a particular ecosystem.

Already, the manufacturing, aerospace and automotive industries have employed such a framework to bounce back from industry upheaval. Just like oil and gas, these industries invested heavily in sensor technology over the last decade. But, the idea of using this kind of data to make better business decisions isn't (or at least

shouldn't be) new. The key is that, when things got tough, these industries took the important next step of integrating and analyzing that high-volume data (like data from sensors) in conjunction with financial, logistics, equipment condition and usage data across their organization and across their industries.

Consider what could happen in the oil and gas industry if we brought this concept to operations, reservoir, production and maintenance domains, integrating them under a 'Connected Well' approach. For example, decision-makers in the oil and gas industry must know full lifecycle costs of any given well, from exploration to abandonment, in order to have a true picture of what is most cost effective in terms of avoiding non-productive time, scheduling maintenance against overall productivity based on recorded equipment usage, and when to buy, sell, develop or defer. This is always the case, but the stakes are even higher now, considering the state of the industry and price of oil.

This "true picture" requires more than integrating data spread out across various business units – it requires accessing and integrating data that's across an ecosystem of contractors, partners and stakeholders. In this example, decision-makers must look at costs in the context of all wells and equipment on the same – and similar – fields. (Note: analytics will tell you what "similar" means here.) Then, they must integrate this with all available equipment information from drilling contractors, plant providers and engineering inspection and service companies to develop an understanding of what works and what doesn't. This is how the aerospace industry transformed through the 1990s and 2000s, whereby aircraft operators and owners, and the engine manufacturers shared data in the new service-level rather than product-driven business model.

### Realizing the Vision of the "Connected Well"

How do we make the "Connected Well" a reality? Well, like most mega-trends, it takes more than one. The movement can't happen without the right technology and, more importantly, the leaders willing to forge new lines of communication and new pan-organizational and intra-industry relationships. With regard to technology, companies need a platform that can grow with the increasing data demands, and enable analytics that is fast, easy, accurate and ready to put into production. Lots of oil companies have already worked to integrate their own data into one data warehouse, but that's not the same as bringing together outside data and making sure it can actually be analyzed.

Data warehousing has long been the scale-out solution for integrating large amounts of data to quantify well-defined relationships for immediate business use. However, the disruptive explosion of massive amounts of time series data from sensors and loggers means that a refining process must be applied before newly generated data can be placed in the context of a wider knowledge pool. The emergent and vibrant Hadoop ecosystem has all of the components to ingest and process such data at the scale and pace necessary and pass it to the operational data warehouse for contextualization and decision support. Crucially this ecosystem is already realizing its potential in other science-driven and engineering-driven workflows such as the biopharmaceutical, aerospace, and petrochemical industries where data describing complex systems and operations is captured and integrated into operational business processes.

As has been seen in these other industries, the biggest challenge is often leadership and organizational culture. This type of industry-wide integration requires lots of different groups talking to each



other. You need to actually put people in the same room and bring disparate teams together – until you can do that efficiently, you aren't doing it right. So why isn't this happening in Oil and Gas? The gaps in understanding between what technology companies have to offer and what the oil industry requires for this digital transition need closing. It doesn't suffice for tech companies to namecheck Big Data and Cloud and hope that it will do the trick – there are a lot of gotchas in this industry: from the high science; to the fact that the data often outlives the applications and even the people who work on an oilfield.

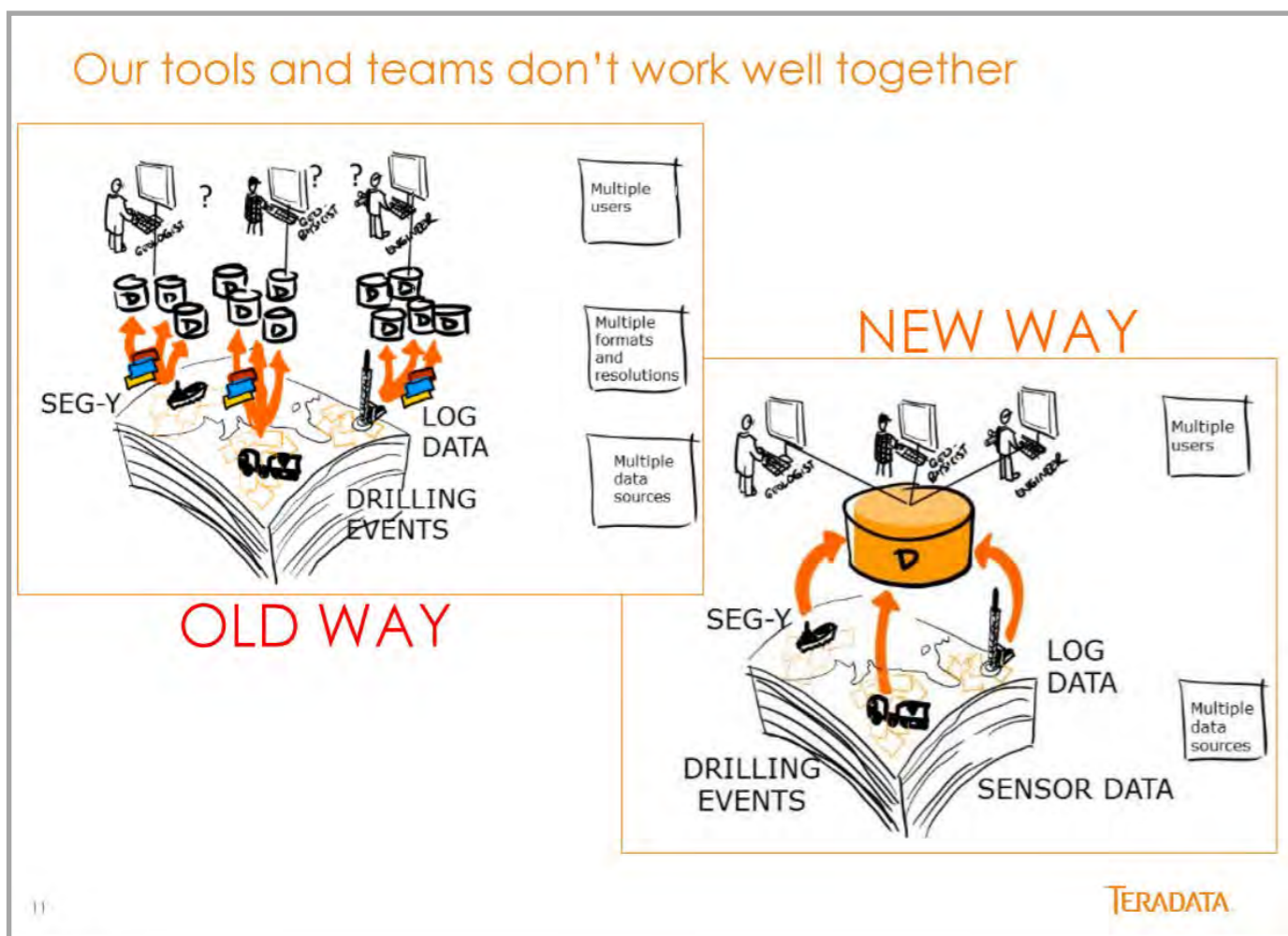
Domain expertise is a fundamental prerequisite but there also needs to be an investment in a data-driven and analytical mindset on the part of the oil companies and the service companies to understand how this new connected world will function. Any organization that can bridge this gap will be highly valued – from the analytically-minded scientific consultancies, to analytics and data science teams working as centers of excellence in the service companies and operating companies. The transition will be more about people and processes than technology, and it will require much closer cooperation

between the operating companies, the service companies and the technology companies to make it work. The bottom line is that there is a storm raging in the oil and gas industry – thanks to myriad factors – that's not going to go away for foreseeable future. On a philosophical level, that means companies need to really focus on what they can control in order to survive. On a practical level, a large part of that means putting the right technology and communication processes in place to make more out of the big data that's out there, beyond the four walls of the business units, and ultimately

beyond the business. Just like the manufacturing, aerospace and automotive industries, oil and gas will learn and evolve in the face of adversity. And, ultimately, I have no doubt that it will become a model for other sectors to follow. In a data-rich world, this quantified and connected evolution is an inevitable one that will spread like wildfire across industries.

# Are Hidden IT Costs Affecting Your Bottom Line?

Do you pay for software licenses and IT resources that your company doesn't use?



Dr. Duncan Irving presented "Big Value from Big Data" at the Conference "Big Data Solutions & Analytics in Upstream Oil and Gas Industry" in Oslo, on February 10th. All the presentation from the Conference are posted on the web site at <http://oslo.spe.org/bigdata>

Open iT creates software for IT resource monitoring, reporting and optimization. Companies around the globe use Open iT to reduce the cost and complexity of managing corporate IT assets.

