

# Exploring the power of cognitive IoT

Generating timely action in oil and gas

**“We teach Watson to think like an engineer. Watson teaches us to think like a thousand engineers from a thousand sources”**

# Exploring the power of cognitive IoT

The Internet of Things (IoT) has helped the oil and gas industry become more efficient, and yet the ability to make sense of the vast volume of available data, at the precise moment it is needed, remains elusive.

New cognitive technology has the capacity to transform the value of data, whether structured or unstructured, bringing significant operational and strategic benefits beyond pattern identification, to deliver powerful real-time recommendations.

Some oil and gas companies are already seeing results from cognitive system projects providing useful clues and approaches for others to follow.



# IoT past and present

The oil and gas industry has been at the forefront of connected devices long before IoT usage emerged in other industries. Measurement, monitoring and control have all been key industry features since the 1950s.

Since devices have become cheaper, with more IP addresses to identify them, the volume of data has increased, leaving huge data lakes untapped.

IoT devices create structured data. This overlooks the considerable merits of unstructured data.

With such vast quantities of data available, the current IoT value system is starting to run 'hot' at the analysis stage.





# IoT + Cognitive = IoT<sup>C</sup>

Cognitive systems are a new technology that applies human-like capabilities of **understanding, reasoning** and **learning** on data, unlocking new value by quickly addressing seemingly unsolvable problems.



“Traditional analytics reveals patterns.  
Cognitive systems create recommendations.”

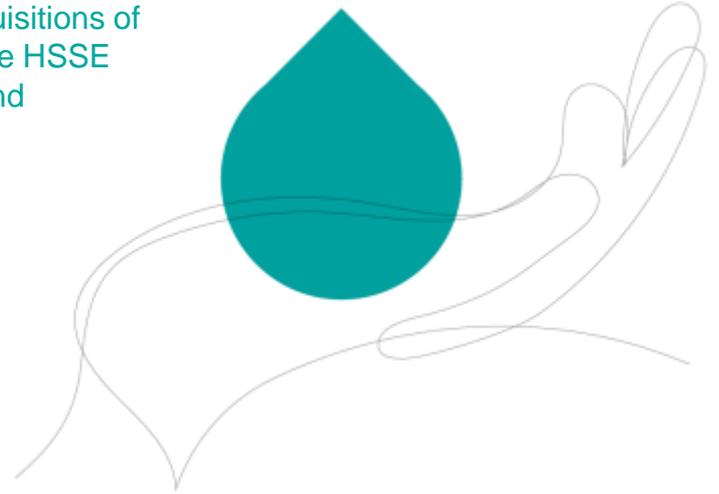
- Ashar Zaheer, IBM Chemicals & Petroleum industries

# IBM - serving the Oil and Gas industry for over 50 years

“In cognitive computing, IBM is helping large oil and gas clients make critical business decisions in several areas such as optimization of oil production and acquisitions of oilfields and prospect valuations and discovering the best ways to improve HSSE response and effectiveness. IDC Energy Insights believes that Watson and Cognitive will make a big difference for IBM in the next couple of years.

IBM has been serving the oil and gas industry for over 50 years, including more than 500 oil and gas companies worldwide, with 100+ of these clients engaged on an annuity cycle. Cognitive computing, predictive modelling, and personalized insights are the key areas the company has introduced to oil and gas clients over the past couple of years.

IBM Watson — both its own set of APIs and its new IoT platform — and Bluemix cloud solutions act as PaaS offerings with 50+ services. IBM is positioned as a Leader in this IDC MarketScape for oil and gas professional services.”



# Woodside Energy



Source: <https://www.youtube.com/watch?v=GFZ2IaTVkY8>

# Use case examples

## Predict incidents



One company saved \$250 million a year in downtime losses by using a cognitive system to combine drill-sensor data and unstructured data to predict stuck drill-bit incidents. Prediction confidence: 34–74% within a 3-hour window



## Enhance maintenance operations

Cognitive systems can recognise a failing asset and demonstrate the 'next best action' to engineers via augmented reality devices. These devices can provide all the information stored on that asset from multiple sources.



## Mitigate weather risks

Companies operating in arctic conditions are successfully using weather patterns, sea-ice flow, aircraft, satellite, radar, drone and historical data to predict the optimum times to drill. An emergency management centre used weather data to safely guide staff around fumes driven by high winds.



## Analyse proactively

Companies using predictive analytics can spot anomalies in the data flow before thresholds are reached. Cognitive computing can take this further by learning new behaviours and trends.

## Recognise similarities



A cognitive system helped to identify commonalities in reservoirs in extraction and production, based on similar examples, helping to make a timely, informed decision, which in turn supported a successful licence-agreement bid.

## Draw on experience



By applying data from a previously resolved incident, new engineers, using a data corpus of experienced engineer information, are able to solve new problems such as deterring birds from oil platforms.



# Of oil and gas executives familiar with cognitive computing ...



... believe that it will have a critical impact on the future of their business

... are likely to invest in cognitive in future

... believe that it will play a disruptive role in the oil and gas industry

## Ask yourself ....

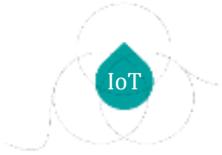
- What other data (including unstructured elements) am I not leveraging? If converted to knowledge, how could I better meet key objectives and requirements?
- What is the associated cost to my organisation of not having the full array of possible options to consider when decisions and actions are being made?
- What benefit could I gain from detecting patterns locked away in unstructured data by combining it with structured elements? How would this accelerate innovation, production or performance?
- What would change if I could equip every employee to be as effective as the leading expert in that position or field?

“The crucible of market forces will drive the adoption of cognitive capability in our industry”

- David Womack, Director of Strategy, IBM Chemicals & Petroleum industries



# Summary



IoT has created considerable operational value for oil and gas companies. The industry has become overloaded with a vast volume of data, drawn from millions of sensors.



With experienced employees leaving the industry, the need to capture and transfer their expertise for the next wave of employees has never been greater.



Cognitive systems have the ability to understand structured and unstructured data to make the kind of timely, complex decisions that add value.



Cognitive systems will help companies realise the full potential of IoT by delivering deeper insights in a more timely way than ever before. The capacity of such systems to understand, reason, learn and make prescriptive recommendations will help the industry 'buy time' – a commodity more valuable than oil itself.



It will be the industry's forward thinkers who will harness the power of Cognitive IoT to shape their companies' future.

# About the research

In this research we set out to understand the opportunities that Internet of Things technologies can offer the oil and gas industry, specifically the additional value of cognitive technologies. We wanted to learn from examples, exploring the challenges and learnings shared by early adopters through three key data sources:

- In-depth interviews with 24 IBM subject-matter experts (SMEs), who regularly consult and advise clients across the oil and gas industry, in the USA, Europe, China and Brazil
- Client interviews and testimonials from a number of oil and gas companies
- A 2015 study completed by the IBM Institute for Business Value in collaboration with The Economist Intelligence Unit entitled 'A New Natural Resource: Your cognitive future in the oil and gas industry'.

To learn more follow us on Twitter [@ibmoilandgas](https://twitter.com/ibmoilandgas) #IBMIoTC

Discover more insights in our [whitepaper](#)

# About the authors

**Richard Cave** is a Principal with IBM Market Development and Insights. He conducts primary research and develops insight into emerging business and technology trends for forward thinkers. Richard can be contacted on [LinkedIn](#) and at [richard\\_cave@uk.ibm.com](mailto:richard_cave@uk.ibm.com).

**Mike Foden** is a Consultant with IBM Market Development and Insights who has 20 years' experience in market analysis across IT, retail and consumer behaviour. He currently specialises in emerging and strategic business and technology topics. Mike can be contacted on [LinkedIn](#) and at [mike\\_foden@uk.ibm.com](mailto:mike_foden@uk.ibm.com).

**Matthew Stent** leads IBM's Market Development & Insights Industry team in Europe and has a long-held passion for championing market intelligence and insights within IBM. His past fields of expertise are broad, covering a variety of industries, geographic regions and technologies. Matthew can be contacted on twitter [@mjstent](#) and at [stent@se.ibm.com](mailto:stent@se.ibm.com).

**Key Contributors:** *Amit Bhandari, Anthony Marshall, Ashar Zaheer, David Haake, David Womack, Phaedra Kortekaas, Madalina Irimia, Flavius Dogioiu*

© Copyright IBM Corporation 2016

Produced in the United Kingdom

IBM, the IBM logo and [ibm.com](http://ibm.com) are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. Other company, product and service names may be trademarks or service marks of others.

References in this publication to IBM products and services do not imply that IBM intends to make them available in all countries in which IBM operates.