



THE YEAR THAT
OIL & GAS
BOUGHT INTO
CELL

10 MOBILITY/IOT
PREDICTIONS
FOR 2016



In 2015, there were an estimated 2.6 billion smartphone subscriptions worldwide. It is estimated that by 2020 this number will potentially swell to 6.1 billion. According to Cisco, the total number of connected devices expected to be in place by 2020 will number 50 billion. That is six pieces of connected hardware for every human being on Planet Earth. McKinsey estimate that the industry will be worth \$11 trillion by 2025.

Twenty years ago it would have been pure science fiction to imagine that such a large percentage of the developed world could access the internet from a pocket-size computer. Today, the mobile revolution and the much evangelised “Internet of Things” (IoT) has taken citizens and businesses to the next stage of real-time device/machine connectivity, data access and decision processing.

In a commercial context, IoT can be understood in the following ways:

- The ability to connect dissimilar devices in order to hasten communication, operation and functions.
- The expansion of machine-to-machine (M2M) technology to incorporate all physical/virtual objects in our environment.
- The interconnection of uniquely identifiable embedded computing-like devices within the existing internet infrastructure.
- The ability to access data and interpret it to positively impact business workflow.

Utilising the cloud and parsing information through big data engines, coupled with the capacity to visualise and analyse data while accessing business process rules engines to automate decisions on workflow, can be a driving force for a lean and cost-effective operations.

Big data, analytics and IoT are here to stay and are gaining further pervasiveness as more devices are connected and the methods to capture and usefully employ data expand. In the following analysis, we look at 10 of the trends that we expect to emerge in the mobility and IoT story in 2016, and the kind of effects that they will have on an oil and gas industry that is in the throes of a once-in-a-generation price depression.

ENTERPRISE MOBILITY ADOPTION WILL INCREASE, BUT THE PRINCIPAL FOCUS WILL MOVE TO AUTOMATION AND IoT

Increasingly, IoT and mobility are pulled together into the same landscape and are becoming synonymous in a manner as to be indistinguishable from each other.

In any oil price downturn cycle, industry looks towards technology to replace the exodus of manpower that is concomitant with sub optimal barrel prices.

Quite simply, in the current technological continuum, mobile devices and sensors represent the perfect tools to automate upstream, midstream and downstream operations for wide-scale cost-savings.





MOBILE DEVICE MANAGEMENT (MDM) ADOPTION WILL ACHIEVE CLOSE TO 80% PENETRATION AS THE COST OF ENTRY CONTINUES TO PLUMMET

As many companies have seen their break-even prices abrogated by the swift decline in oil prices, cost-saving and efficiencies have become the order of the day for the industry. Organisations will be transferring their emphasis from mobilising the softer back-of-house disciplines such as human resources, accounting and sales and concentrating more on the boots-on-the-ground functions focusing on operational efficiencies.

Field maintenance, manufacturing and process operations, inspections, tagging, logging, access to ordering, scheduling/dispatch systems, pipeline and storage operations will be enhanced by real-time data collection will come to the fore, as well as using IoT platforms and mobile devices as the tools to remain compliant.

As evidenced by further pressures and consolidation of mobile device management (MDM) companies they are coming to the point where a “race to the bottom” has been initiated. As the total addressable market for MDM closes in on 80% per cent of major organisations, several leading software companies, such as Microsoft have packaged MDM options into their productivity suites. The competitive nature of business and the bundling of MDM with other solutions will effectively drive the solution to the point of gratis.

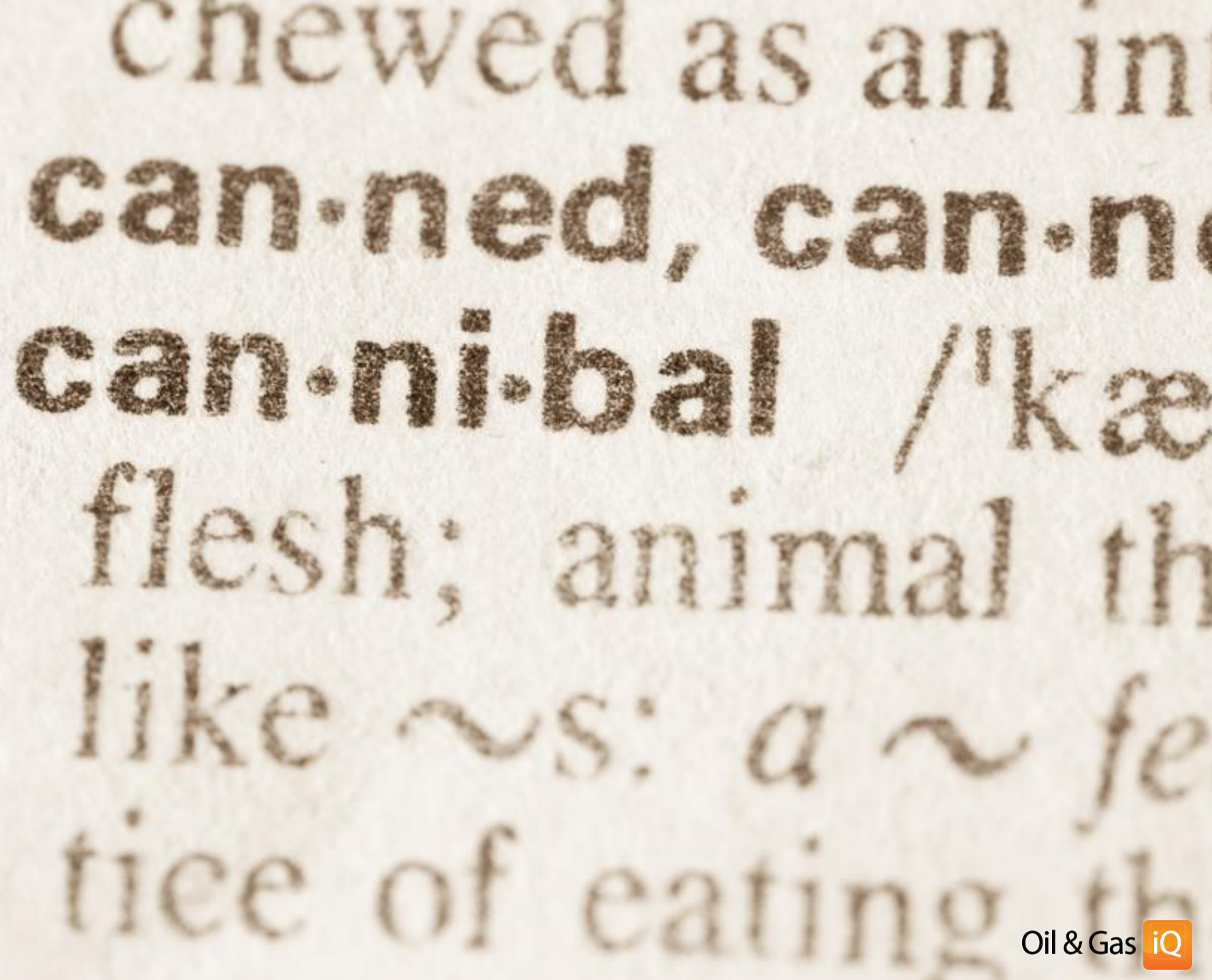
As consolidation of MDM solutions fold into other management platforms, or into other solutions with incumbent in built-in systems, these solutions will be an attractive option for oil and gas companies wishing to consolidate tasks in the current enterprise device/systems management environment.

CONSOLIDATION, CANNIBALISATION, DIVIDE AND CONQUER IN THE MOBILITY LANDSCAPE

The inclusion of enterprise mobility management (EMM) applications within mobile device management and general infrastructure management suites will drive the cost of adoption into insignificance, enabling companies that embed MDM/EMM into their core offerings to dominate the marketplace.

The effect of MDM/EMM consolidation is empowering large software and tech companies to absorb, consume or drive the smaller, agile players to the wall, thus strengthening their own brand position.

With all of the recent consolidation of MDM players, as evidenced by the purchase of Good and AirWatch, it seems that by the end of 2016, the mobile device management landscape may be ruled by as few companies as there are supermajors....




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MOBILE SECURITY CAPABILITIES, LIKE ENCRYPTION, VPN, CONTAINERS, CERTIFICATE AUTHORITY, HYPERVISORS, DUAL PERSONA WILL BE LOOKED AT IN NEW LIGHT

As adoption of these capabilities increase, concerns about data and cyber security will also come to the fore. We will see companies reassessing their systems and methodologies regarding the safeguarding and padlocking of business-critical information that underpins corporate livelihood.

New solutions are continually entering the marketplace from the likes of Checkpoint and Cisco and are branching into enhanced security systems such as virtual private networks (VPNs), containers and security protocols. Oracle, who recently bought a container company (Bitzer Mobile), and certificate authorities like DigiCert, are delving deeply into the mobile landscape.

Dual persona - the provisioning of two separate and independent end user environments (personal and business) on a single mobile device – will continue to gain traction in 2016, with software launching from providers like Intel, Good/Blackberry, Samsung and Cellrox.

The debut of the Android for Work initiative in 2015 will also prove to be a game-changer in enterprise mobility. Solutions like Citrix, VMware and Good/Blackberry are gaining traction with their hypervisor solutions, structures that allow multiple operating systems to share a single hardware host.

The ongoing mobile security narrative with regard to mobile device encryption has been heightened by Apple's recent court battle against the encryption-busting of ISIS-affiliated mass-shooter Syed Farook's iPhone to aid an FBI investigation. As security tightens, governments across the globe will demand "keys to the back door" for these systems. Unfortunately, as anybody that has been burgled knows, back door keys are as useful to malefactors as they are to home-owners. That door swings both ways.

THE COST OF RUGGED DEVICES WILL FALL SIGNIFICANTLY AS NEW PLAYERS ENTER THE MARKET

The prices of ruggedised mobile devices have dropped dramatically in the last few years and this trend will continue unabated as more manufactures rush into the market.

For example, Japanese multinational electronics manufacturer, Kyocera Communications, Inc., are currently providing rugged devices subsidised by carriers in the United States and fulfil Class I, Division 2 prerequisites for electrical equipment in hazardous areas, for \$100.

The days of purchasing a \$4,000 device from the likes of traditional rugged device providers such as Panasonic, Honeywell, Toshiba and Motorola may be seeing their final days, as Chinese mobile device manufacturers such as Huawei, ZTE and Hisense plunge into the rugged device pool and begin to make waves.





OIL AND GAS COMPANIES WILL SPEND RECORD AMOUNTS ON TECHNOLOGY TO DRIVE EFFICIENCY, INCLUDING SCADA TO IOT RETROFITS

Many organisations, especially those in the downstream areas of refining and manufacturing are not IoT-enabled because of proprietary back-end SCADA control and command systems.

These frameworks may have been extant for decades. As point management solutions to single task-based management and control situations, many have significant blind spots with regard to that ability to deliver analytics and actionable data. In many cases, data is not captured and stored in a manner that allows for deep management, analysis and workflow algorithms that can deliver anything predictive.

With an emphasis on efficiency due to the ever-shrinking margins in the oil and gas field, record amounts of investment into IoT platforms will be expended to harness the value proposition that can be achieved through big data analysis by predictive algorithms.

While part of this investment will focus on the addition of managed processes based on reduced cost of integration and deployment of sensors, communication solutions and IoT platforms, additional investment will be pumped into refitting legacy systems and sensor arrays. In the medium to long-term, this will work out better than sun-setting existing systems and deploying all new IoT-friendly system from scratch.

Although these efforts are already in motion across the oil and gas world, as more self-service, out-of-the-box and plug and play upgrading solutions are available, the industry will accelerate the current pace of deploying retrofit programmes.

IoT COMMUNICATION COMPLEXITIES FOR REMOTE LOCATIONS WILL HAVE ENHANCED SOLUTION SETS POWERED BY THE DEPLOYMENT OF LOW POWER WIDE AREA NETWORK (LPWAN) TECHNOLOGIES SUCH AS LORA, RPMA, WEIGHTLESS-N, ULTRA-NARROW BAND (UNB) TECHNOLOGY

One of the major barriers to large-scale adoption of mobile solutions across the world's oil and gas assets is the problem of locale. Telecommunications companies are either unwilling or unable to commit to the construction of expensive cell towers in remote/rural areas or where there may only be a handful of devices that employ that piece of infrastructure.

Mobile carriers with financial pressures cannot justify the expense of installing cellular towers to service a pocket of low data IoT sensors and devices. Additionally, oil and gas companies are hesitant to add cellular data plans to all sensors in the work area. Historically, the industry has plugged gaps in service by the reliance on expensive satellite technology.

Step in LPWAN, a novel type of wireless telecommunication network designed to allow long-range communications at a low bit rate among connected objects that are largely battery-powered. LPWANs typically have circumferential ranges from their base station of five to ten kilometres and the low-powered nature of their feeder devices tends to a battery life of up to ten years in the field.

In the case of LoRa or Weightless N - deploying in the 900 Mhz spectral frequency - as many as 20,000 sensors can load off of one base station with a large range and an initial deployment outlay of between \$10,000-\$50,000 – a fraction of the cost of traditional communication setups. With RPMA (Ingenu) or UNB (Sigfox), there is no radio deployment, but there is an annual “per sensor” subscription charge that is similarly fractional compared to the cost of cellular connectivity.

LoRa, RPMA, Weightless-N and UNB provide the business sphere with different flavours of this LPWAN technology, and are taking IoT into ever more isolated realms at relatively low entry prices.

In Europe, French company, SIGFOX, has become the leading IoT carrier on the continent, installing radios with no need for governmental approval at a monthly subscription price for a SIGFOX UNB sensor standing at the princely sum of a single dollar per year. INGENU, a US based company deploying in the 2.4 Ghz spectral frequency has just announced a 30-city global network opening first in Texas in the first half of 2016.

These solutions will provide connectivity options for mid-tier companies that were previously unavailable to all but the multinational industry leaders.





OPEN STANDARDS AND LOWER COSTS WILL DRIVE SENSOR AND IOT DEPLOYMENTS AT MID-TIER AND SMALL OPERATORS

In the US alone, 2015 saw the bankruptcy of 42 oil and gas firms worth a total of \$18 billion.

In line with the decreasing costs of mobile device platforms and the availability and range of standards, lower costs will drive sensors and IoT development at small to mid-tier independents worldwide.

A low cost mobility environment could be a saving grace for these smaller companies looking desperately to drive efficiency. Companies now have the ability to fulfil many tasks remotely that, in the past, necessitated costly manpower to adhere to compliance and regulatory reporting criteria.

This will drive better and more timely delivery of services and servicing to these facility.

For small-mid sized enterprises, saving tens of thousands of dollars over a protracted period of time could mean the difference between having facilities that produce at a profit or yield at a loss.

THERE WILL BE A MAJOR IOT HACK AT HYDROCARBONS FACILITY THAT WILL BECOME PUBLIC

In a hazardous industry, an unfortunate reality of every day operations is the susceptibility to major incidents with potentially long-term and damaging consequences.

For years, this was confined to dangers in the field and health and safety breaches that could go catastrophically awry.

The digital era has now exposed all data-heavy companies to the threat of disaster in the cyber realm, none more so than those in the energy sector, which has been historically prone to the scourge of cyber villainy.

Major hacks in the IoT space have already happened but have remained under the radar and out of the public eye. It is our opinion that 2016 may be the year that an oil and gas IoT cyber-attack or breach is splashed all over the front pages.





AUGMENTED REALITY WILL START TO BE ADOPTED TO IMPROVE FIELD SERVICES, SAFETY AND COMPLIANCE

Augmented reality (AR) is the direct or indirect view of a real-world environment whose elements are amplified by computer-generated input ranging from audio-visual to GPS data.

Currently, complex machinery is installed and inspected according to voluminous paper manuals and checklists. Using AR, this can all be preloaded electronically and played out using a range of optical projection systems, hand-held devices, and wearable display systems as the gateway to the human-machine interface.

The use of these novel, and very cost-effective techniques could soon become the norm for organisations where field servicing is an expensive and potentially hazardous part of day-to-day business.

The use case that seems to be extremely compelling for the oil and gas industry is to simplify maintenance and rounds for trouble and compliance reporting. The ability to walk the field with AR enabled glasses or visors will gift the user with experiential enhancements such as mapping, tracking and reading of sensors and components with augmented messaging instructions and geostamping. These capabilities can ensure that effective maintenance and reporting is performed with actionable and scripted instructions delivered real-time to the facility user.

WRITTEN BY
Tim Haïdar

IN CONJUNCTION WITH
Peter DeNagy

DESIGNED BY
Tim Haïdar

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Oil & Gas IQ

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