

With oil prices falling, producers need the efficiency of mobile solutions built on the IoT. >>

Huawei's IoT Vision for the Digital Oilfield

By Stephen McBride, Editor, *ITP.net*

Huawei's digital-oilfield concept rests on the company's overall vision for a four-layer Internet of Things (IoT) platform. This article describes that platform and several of the crucial technologies needed to apply the IoT to meet the needs of oil and gas production, including mobile solutions and security capabilities.

These topics were in the spotlight recently at the *Global Energy Industry Summit 2015* in Almaty, Kazakhstan. Attendees expressed a variety of concerns about efficiency, employee safety, and network security.

Dr. Hasem Nasr, Senior Advisor, Digital Oilfield, Kuwait Oil Company, warned that with the average production cost for oil approaching USD 42 per barrel, "We are almost at the point where the entire industry is losing money."

Nasr asserts that the sensor coverage in today's oil fields is totally inadequate. "How many wells in the world today are there for which we know daily production figures? Less than ten percent. You should be shocked by that number."

His closing comment: "Go digital or perish."

Go Mobile

"It is time now for enterprise mobility," declared Mohammed Al Dhamen, IEEE Saudi Arabia Section Chairman and a twenty-seven year veteran of Saudi Aramco.

He explains that efficiency is not the only reason to set up remote sensing of oilfield equipment parameters. "Right now, if you want to get a reading from one of your wells, you have to send someone to do it manually, and they have to travel in pairs; they cannot travel alone for safety reasons. Enterprise mobility is the need of the hour."

Al Dhamen cited a survey of mobility specialists in which eighty-nine percent of respondents stated that enterprise mobility solutions could revolutionize the oil and gas sector.

Building the IoT

Huawei has implemented a number of digital oilfield solutions in regions as diverse as the Arabic Gulf Cooperation Council (GCC) countries, Norway, and China. These IoT solutions range from unified communications to Bring Your Own Device (BYOD).



Some employ sensors in pipelines and other infrastructure that relays information in real time to decision-makers. These applications are an integration of software and machinery in a convergence of information and oilfield operations technologies.

Huawei's IoT infrastructure is a four-layer construction. The first is the application layer, where Huawei relies on expert partners to develop specialized oilfield management programs. The fourth layer consists of sensors, sourced from multiple vendors, to which Huawei adds the communications module.

Huawei's core expertise is directed to the second and third layers of the IoT infrastructure: the platform and network layers. The platform layer provides the functionality for managing connections, networks, and sensors. The platform layer is the tier within which the Application Programming Interfaces (APIs) give access to the application-layer solutions for integration with the IoT platform.

In the third (network) layer, most functions are similar to any traditional network layer except for the IoT gateways that must work in environments of extreme heat, cold, and vibration.

Huawei also provides the LiteOS real-time open-source operating system, designed specifically for IoT. Over the past four years, Huawei has hired about 20 top global specialists in operating systems design to develop this OS. These specialists reduced a software kernel with more than 10 million lines of source code to just 10 thousand. The result is that Huawei's partners and customers can install LiteOS in small, low-cost sensors and controllers. Further, the response times using LiteOS are extremely short, which is vital when responding to critical oilfield issues.

Assuring Security

While the IoT offers obvious benefits for oilfield management, some enterprises hold back due to security concerns. High-profile attacks, particularly the 2012 muggings of Saudi Aramco and Qatar RasGas personnel,

have given pause, but today's defenses are much improved.

Huawei has invested in network and cyber security for more than ten years, and the company's security portfolio now includes a robust firewall, intrusion prevention, intrusion detection, anti-Distributed Denial of Service (anti-DDoS), anti-Advanced Persistent Threats (anti-APT), and sandboxing functionality.

Huawei is one of the few vendors in the world offering an anti-APT solution. Using Big Data to uncover patterns of aggression by analyzing the whole network, the anti-APT software monitors all four layers of the IoT infrastructure to detect suspect activity.

This infrastructure-wide security view is in contrast to traditional approaches that monitor only a single point, or perhaps several nodes of a network. When a traditional approach detects and repels an attack at one point, the threat is thought to be averted. The use of Big Data analysis now detects whether an attack at a single point is part of a pattern that requires a broader response. For this type of situation and other threats, Huawei's security functions provide the assurance needed to bring the benefits of an IoT platform into full play.

This assurance is timely, since the viability of the global oil and gas sector may well depend on the use of IoT capabilities to realize the widespread implementation of digital oilfields. With a broad portfolio that includes unified communications, LTE networks, enterprise mobility, cloud computing, machine-to-machine functionality, and high-performance computing, Huawei offers solutions for energy production that extend from back-office management to oilfield equipment for the oil and gas industry, worldwide. ▲

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