



## Private networks in oil & gas: Use cases and deployments

The oil and gas industry faces challenges with the hazardous and remote nature of the operating environment. Other forms of connectivity often fall short for site connectivity needs, resulting in issues with critical operations. This article explores the role of private networks in the oil and gas industry, looking at key use cases and example deployments.

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## What challenges are the oil & gas industry facing?

The oil and gas industry often operates in vast and remote operational landscapes so maintaining consistent and low-latency connectivity can be challenging. For instance, an offshore rig located miles away from the mainland can't afford connectivity lapses when critical decisions need to be made. Likewise, a pipeline stretching hundreds of miles requires ongoing monitoring to detect issues like leaks or blockages. Connectivity solutions therefore need to account for a number of physical considerations including:

- Varying installation heights depending on the structure
- Need for power efficiency
- Space constraints (e.g. on an oil rig)

Equipment used in the oil and gas industry also operates under extreme weather conditions (winds, salt water exposure, high temperatures). As a result, they need to be ruggedised and require regular checks to prevent unexpected downtime. However, conducting physical site inspections across such large areas is often problematic – it tends to be labour-intensive, time-consuming and potentially put employees in areas of risk where the asset or 'thing' in need of inspecting is hard to access.

Avoiding downtime is absolutely vital in the oil and gas industry; any interruptions to operations can have significant cost implications. [The Society of Petroleum Engineers](#) predicts that **a brief 3.65 days of downtime can cost companies more than \$5 million.**

Even more problematic is the hazardous nature of the oil and gas industry. There is a strong emphasis on safety for workers as well as the need for stringent site security. Companies need to ensure they are providing a safe operating environment for their workforce and are complying to industry regulation and company operational standards when it comes to health and safety.

## How can private networks help in the oil & gas industry?

Private networks stand out as a useful solution to address the challenges faced by oil and gas sites by providing dedicated, reliable, and secure connectivity. Facilitating consistent connectivity across sprawling and remote sites, these networks enable the deployment of various innovative use cases like autonomous robots, drones, and advanced predictive maintenance systems.

By bridging the connectivity gap in distant operational sites, private networks pave the way for enhanced operational, maintenance, and safety protocols within the oil and gas industry.

Beyond providing a secure and reliable communications network, the key use cases in oil & gas that private networks can support include:

- Advanced predictive maintenance
- Video ingest and analytics for:
  - Worker safety and monitoring
  - Incident detection
  - Security and surveillance
- Drone navigation for site inspection
- Push-to-X (talk, video, message)
- Various IoT use cases, including for environmental (condition) sensing

For instance, private networks enables advanced predictive maintenance through providing reliable connectivity to ensure equipment is being monitored continuously to pre-empt failures. Autonomous robots and drones, used for data collection and site inspection, rely on uninterrupted data flow. They can be better enabled to roam vast areas, sending back vital information in real time, ensuring timely decisions are made whether it's about machinery health or potential site issues.

Precision in monitoring is another domain where private networks can deliver value. Real-time data from extraction points and processing units ensures production quality remains consistent, minimizing wastage and ensuring efficiency. This real-time communication also enables the remote operation of equipment, allowing for machinery to be controlled from central hubs, and reducing the need for human intervention in potentially hazardous zones.

Safety and security applications are also enhanced. Surveillance footage, whether for site security or worker safety monitoring, is transmitted and analysed in real time. This means potential threats, whether they're security breaches or safety hazards, are detected and acted upon immediately.

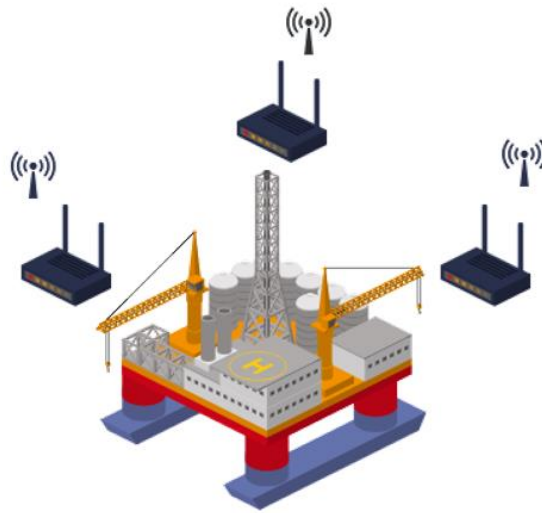
Many use cases also benefit from the use of edge computing, which we explore in more detail in our article here: [Edge Computing in Oil and Gas: Driving Efficiency in Digital Transformation](#)

## Example private network deployments in oil & gas industry

### **Centrica & Vodafone: Advanced predictive maintenance**

Centrica has partnered with Vodafone to implement a 5G mobile private network at its [Easington gas plant](#) in Yorkshire. This private network, characterized by its high-speed, low latency, and stability, will create a fully connected digital ecosystem. It enables real-time monitoring of both indoor and outdoor areas, enhancing maintenance and ensuring safety by promptly alerting workers to issues like gas emissions or potential equipment failures.

Vodafone Business, using Ericsson equipment, will oversee the network's construction. This move by Centrica follows a similar decision by Ford to use a Vodafone 5G MPN at an electric car plant in Essex. Centrica's Easington facility holds significant national relevance, processing and storing gas brought in from offshore pipelines, which eventually serves millions in the UK. The key application here is advanced predictive maintenance, facilitated through the private 5G infrastructure, with Ericsson as the network vendor in this crucial oil & gas vertical.



### **Tampnet and Ericsson: IIoT for autonomous operations and predictive maintenance**

**Tampnet** is working with Ericsson to deploy a private LTE network across 50 offshore oil and gas rigs, all located in the Gulf of Mexico, on behalf of customers. The three unique challenges that had to be addressed in the deployment were: (1) the challenging nature of the physical environment with requirements for the structural geometry, installation heights and signal transmission range, and (2) the specialised safety mounting skills to install the equipment in this environment at the highest point and (3) the harsh environmental conditions.

The primary use cases across these deployments focused on predictive maintenance (monitoring corrosion and vibrations), environmental condition monitoring to measure greenhouse gas emissions and general environmental indicators and improving worker communications for better safety and awareness.

### **Phillips 66 (Belle Chasse refinery), Accenture & AT&T: Reliable and secure site connectivity**

Accenture and AT&T have partnered to develop a private network for Phillips 66, aiming to enhance mobile connectivity at its **Belle Chasse refinery in Louisiana**. This collaboration came after Phillips 66 identified performance gaps with its current public cellular network. The Belle Chasse Refinery has both private 4G and 5G running on its site. The private network, specifically designed to cater to Phillips 66's digital needs, has served as a testbed to evaluate its ability to support the company's digital transformation efforts.

Phillips 66 has suggested that such networks are vital for their operations, with applications ranging from safety inspection forms to capacity tracking. The results from the proof of concept have been positive, showing notable speed improvements and signal strength enhancements at the refinery.

Accenture emphasized the network's capacity to enhance connectivity selectively and provide comprehensive insights across the refineries and their supply chains. The primary use case so far has been site connectivity.

### **Shell & Aqura Technologies**

**Aqura Technologies (Telstra)** secured a \$1.3 million contract from Shell to commission and validate a new Private LTE network for its Australian operations. The deal also included a 3-year managed services agreement with an option to extend for an additional two years. The project is a crucial step in improving operational efficiency.

Aqura's portfolio spans a range of services, from Industrial Wireless (including Private 4G/5G LTE Networks) to IoT applications and Aqura's Unified Communications. In this case, Aqura has deployed a Private 4G LTE network, specifically catered to the oil and gas industry.

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