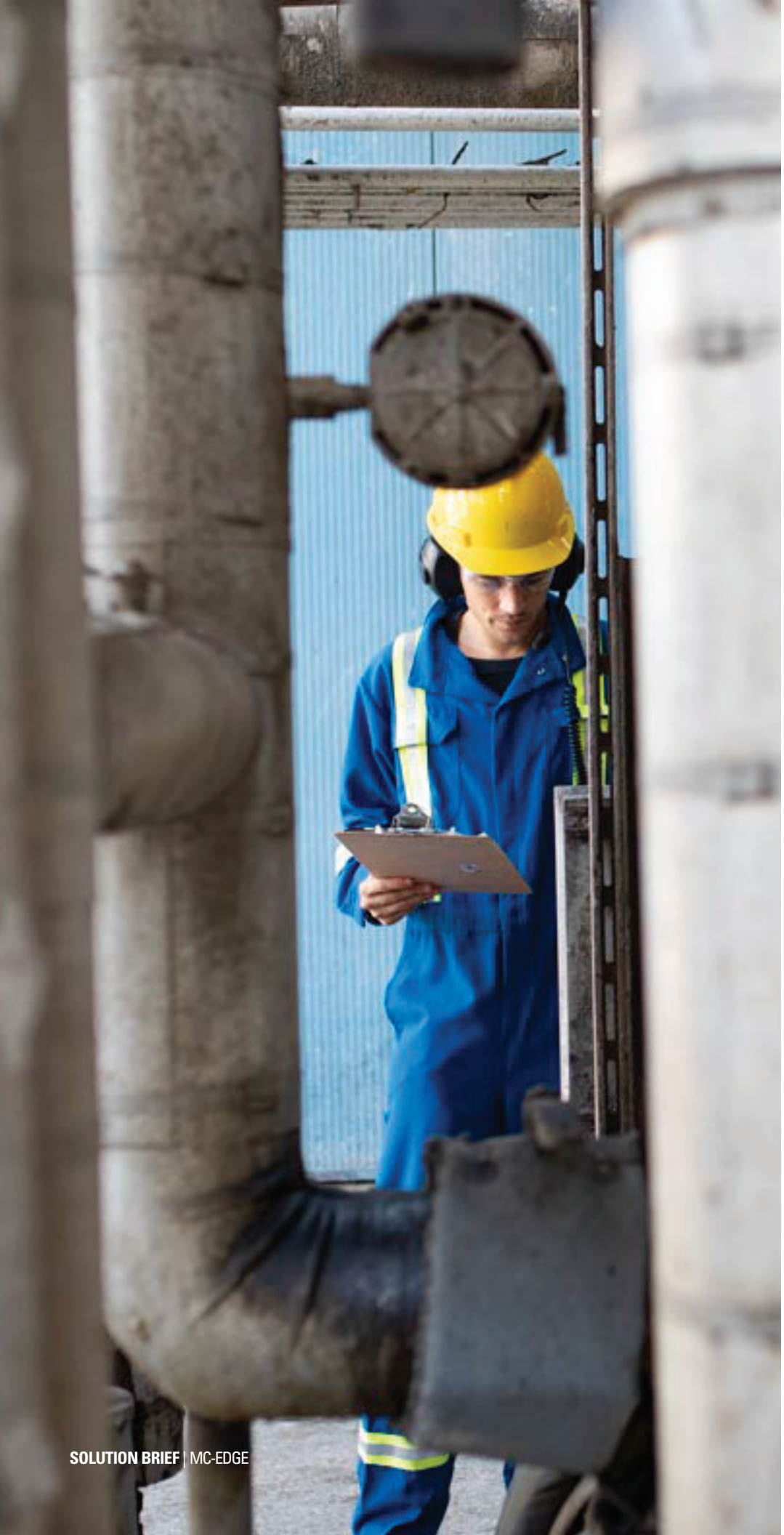
MC-EDGE INTELLIGENT GATEWAY

EXTENDING PROSPECTS FURTHER, CAPTURING PROFITS FASTER

MOTOROLA SOLUTIONS



As energy demands continue to increase globally, the oil and gas industry is expanding.

The surge creates new opportunities — but also creates new challenges, as producers are forced to prospect further afield.

> Responding to increased demand requires tapping reserves in more remote locations, raising logistical difficulties and concerns around environmental sensitivity.
>
> There's greater pressure to innovate, automate and modernize operations in order to reduce costs, optimize productivity and compensate for a shrinking workforce.
>
> Environmental, social and governance factors play an important role in the future of the industry, with market leaders emphasizing transparency and traceability.

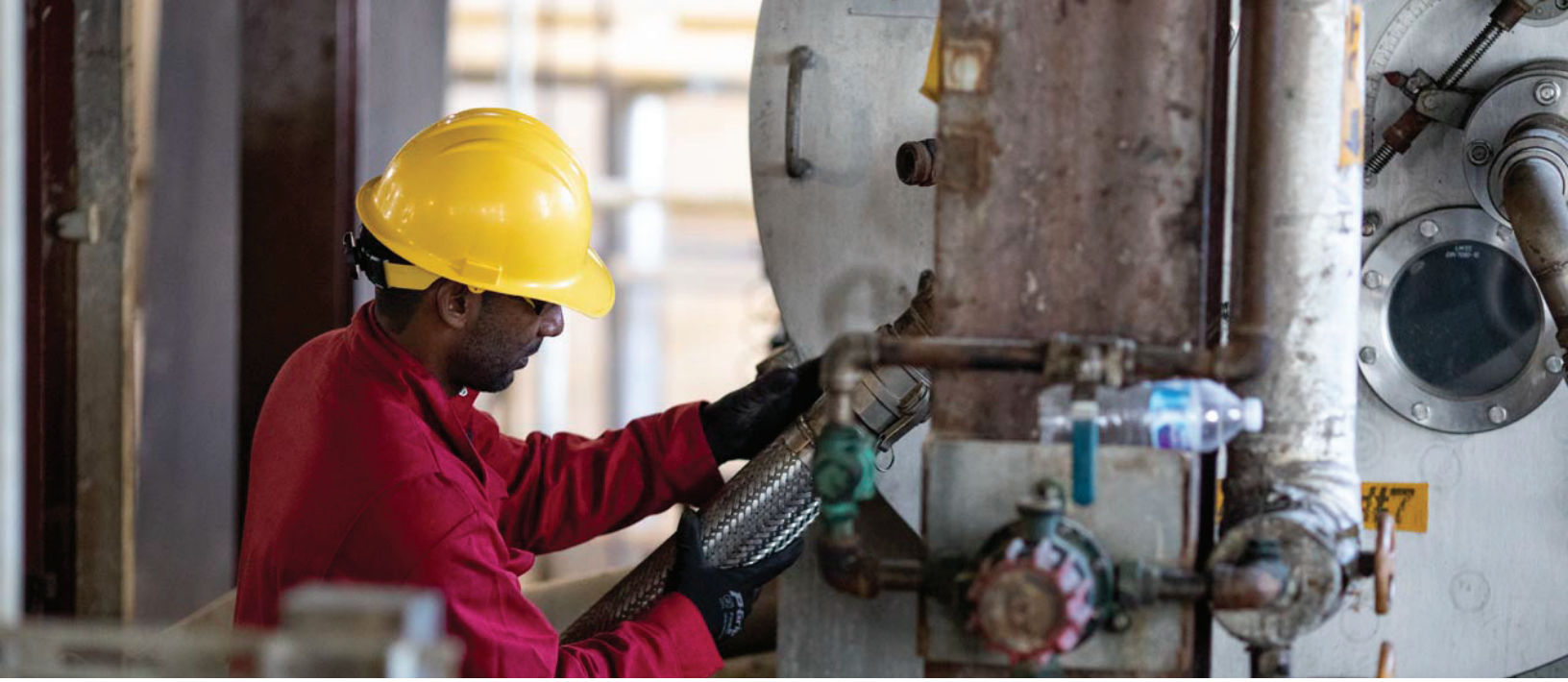
Technology is critical for meeting these challenges. As oil and gas companies operate more remotely and meet more stringent requirements around environmental metrics and reporting, the power of the Internet of Things (IoT) — edge computing and analytics — will be a game changer.

INTERNET OF THINGS

Objects embedded with sensors and software that endow them with processing power and the ability to send and receive information.

EDGE COMPUTING AND ANALYTICS

Processing data at the edge, where it is created with built-in analytics so that information can be analyzed and actioned quickly.



INTRODUCING THE MC-EDGE INTELLIGENT GATEWAY

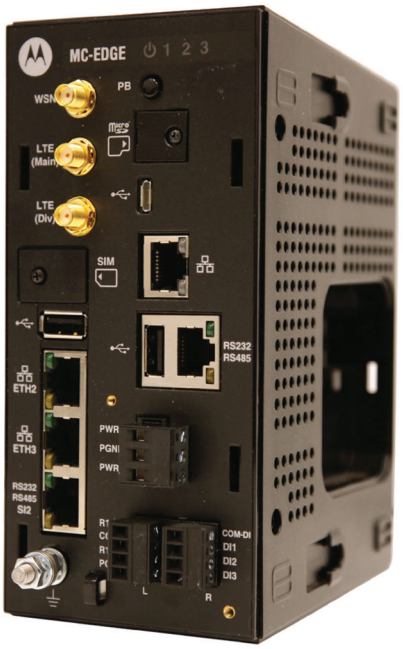
To keep pace with the increased flow of data resulting from operations moving to more distant areas, there needs to be sufficient computing power in order to optimize and automate operations, maximize security and minimize risk. With edge computing and IoT, operators and decision makers can call the shots at any time, in any location — whether they're managing a short-term emergency or mapping out long-term profitability and success.

The MC-Edge™ Intelligent Gateway makes this possible by merging these varied capabilities in a single versatile solution:

MC-Edge is an IoT sensor hub: It can connect hundreds of long-life battery sensors, both wired and wireless. Because it supports LoRaWAN, this connectivity can cover a 10 km radius, reaching into remote areas that have no power or internet connection.

MC-Edge is a gateway: The system collects and forwards data to centralized applications and servers for analysis and reporting. With embedded two-way radio (all-band P25 LMR), Private/Public LTE and Ethernet, it's equipped with multiple backhaul options to send data in any situation.

MC-Edge is an intelligent controller: With best-in-class supervisory control and data acquisition (SCADA) functionality, MC-Edge is capable of taking immediate action to correct issues that would be catastrophic if left unchecked.



HOW MC-EDGE CAPTURES AND PROCESSES DATA

What exactly is LoRaWAN? It's a wide area networking protocol built on the LoRa radio modulation technique.

This network of low-power sensors in the field is ideal for hard-to-reach or dangerous places, and can connect wirelessly, transmitting small data packets to the MC-Edge.

With our solution, the gateway, network and application servers can be implemented on the MC-Edge, allowing the system to implement logic and analyze results, shorten communication lines and maximize security.

By processing, sharing and showing data from end devices in real time, operators onsite and business leaders at corporate headquarters have the context they need to ensure productivity, safety and accountability — and solve the challenges facing the industry today.

UPSTREAM Exploration and production	MIDSTREAM Transportation and storage	DOWNSTREAM Refinement and distribution
• Environmental and sensor monitoring • Wellhead monitoring • Real-time data upload and exchange • Predictive maintenance and alerts with wide area coverage and service continuity	• Secure flow and pressure monitoring • Elevated temperature monitoring • Predictive maintenance and alerts to ensure employee and environmental safety • Early leak detection	• Secure flow, vibration and pressure monitoring • Asset monitoring and management • Remote system management and provisioning • Predictive maintenance with analytics

AN ENGINE THAT DRIVES CONTINUOUS BUSINESS VALUE

BENEFIT 1
PROCESS OPTIMIZATION

Oil and gas facilities are complex, but hold enormous profit potential if the right systems are in place. That's what MC-Edge delivers.

- Seamless communication across systems reduces the risk of downtime, potentially saving hundreds of thousands of dollars each month.
- Distributed interoperability across devices, along with network agnostic functionality, helps keep down time for operations to a minimum.
- The Motorola Data Link Communication (MDLC) protocol links distant sites to allow for easy scaling, so you can retire legacy programming and communications infrastructure.

By extending automation and data capacity to remote sites, manpower needs are reduced — a massive advantage for companies looking to expand their operations, eliminate costs, guarantee safety and compensate for a shrinking labor pool.

BENEFIT 2
SITUATIONAL AWARENESS

For systems operating in remote and sensitive environments, having intelligent, connected IoT devices is the first line of defense when something goes wrong. MC-Edge not only gives you visibility to remote operations, but can also shut down equipment, close valves and take action remotely to prevent or mitigate a disaster if a leak is detected or a pressure measurement is too high.

BENEFIT 3
POWERFUL DATA SECURITY

With its connected sensors and video cameras, MC-Edge helps ensure physical security at remote sites — but also ensures cybersecurity with end-to-end encryption, full authentication, role-based access control and digital signatures. Equipped with intrusion detection, the system constantly scans for malicious activity or violations of security policies. Other security features include:

- A firewall that can permit or deny data transmission based on established criteria.
- Time window commands that combat replay attacks by users with legitimate access.
- Auditing that immediately logs and reports unauthorized access attempts.
- Unused port deactivation that further reduces vulnerability to unauthorized access.

BENEFIT 4
FULL ACCOUNTABILITY

Being able to collect and consolidate data from MC-Edge allows operators to keep tabs on key parameters, including flow rates, line and wellhead pressure and tank levels. This is beneficial short-term for day-to-day practicality, and also for long-term ESG considerations. After all, ESG brings significant business value. The best oil and gas producers prove to stakeholders that they're complying with the highest standards, and are being transparent about their process and progress.

THERE'S NO LIMIT TO WHAT YOU CAN DO

Motorola is a leader in digital technology, and the MC-Edge Intelligent Gateway adds the power of edge computing and analytics to a comprehensive portfolio of communication, security, redundancy, automation and analytics solutions. As energy companies expand their operations, ensuring seamless data transmission to and from end devices is mission-critical — and the next frontier for digital transformation.

Learn more about the MC-Edge Intelligent Gateway and how Motorola Solutions can help you expand your operations safely and securely at motorolasolutions.com/mc-edge.

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