



**Long-Range Low-Power Connectivity –
A Key Technological Enabler for Energy and Power Industries**

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Oil and gas applications have specific requirements for Industrial IoT deployments

Connectivity

- Equipment and assets in remote, hard-to-access locations
- Large benefits of connectivity for efficiency and safety

Security

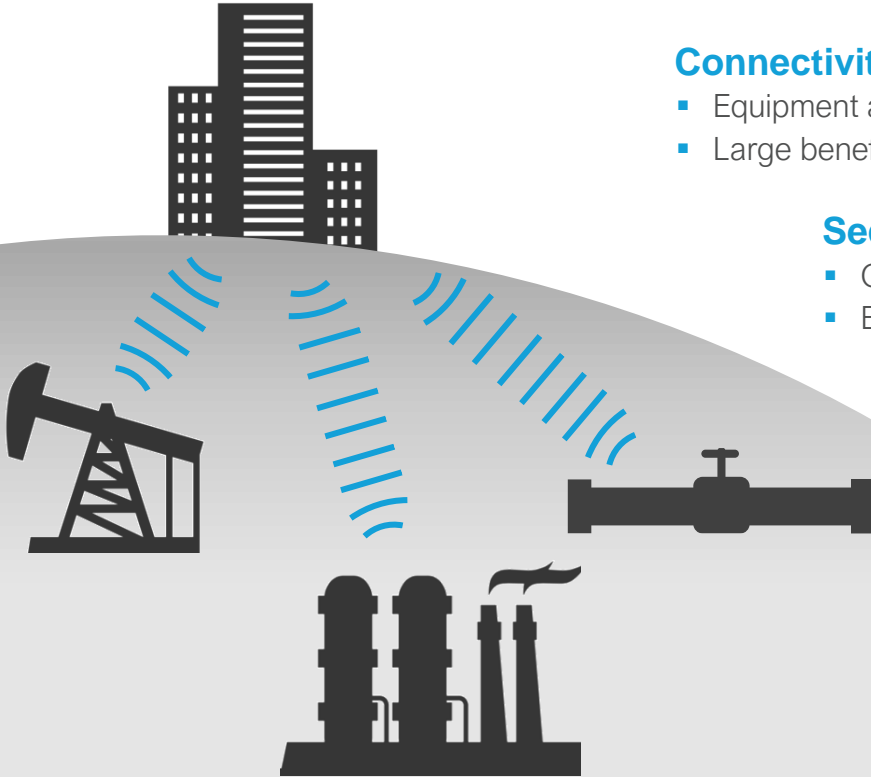
- Operational risks demand the highest levels of security
- End-to-end security on each deployment

User interface

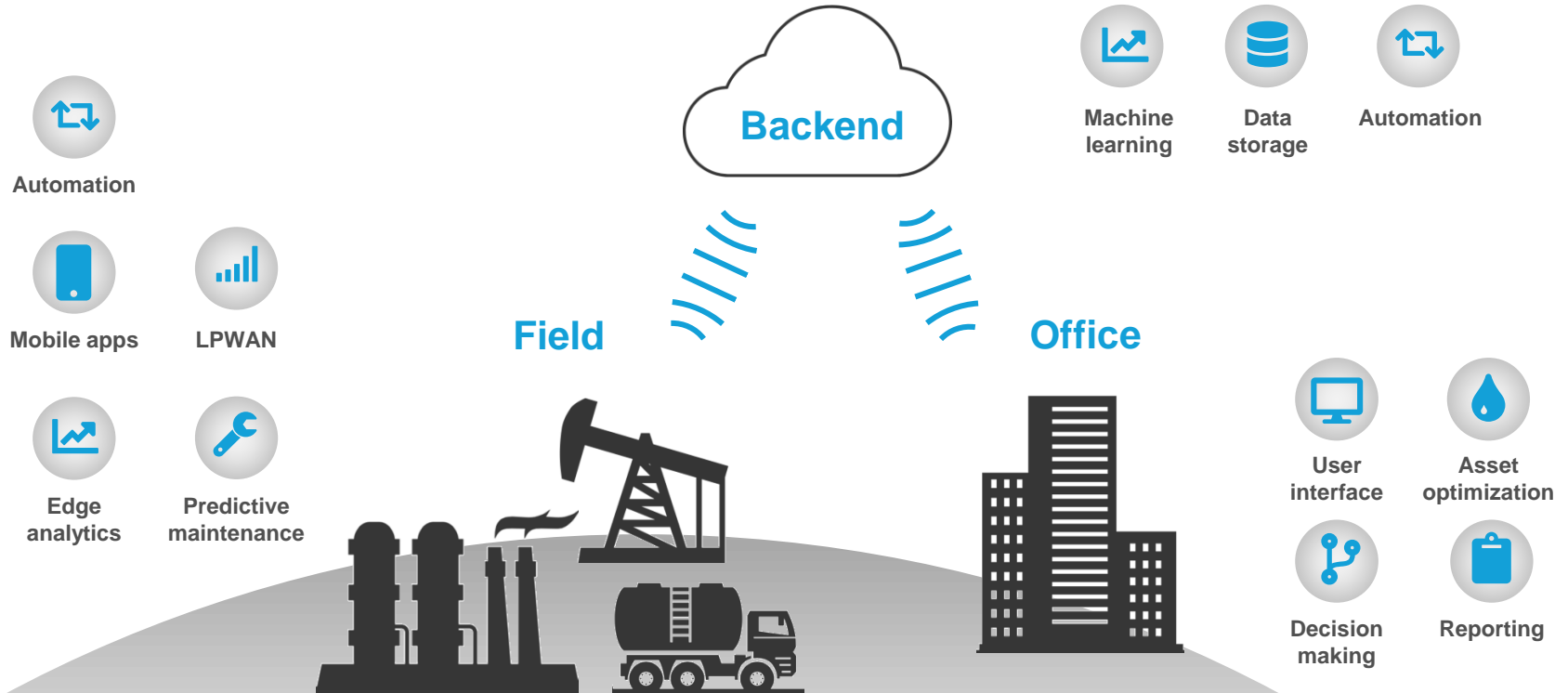
- Right information to the right people at the right time
- Trend visualization and real-time corrective actions

Analytics and automation

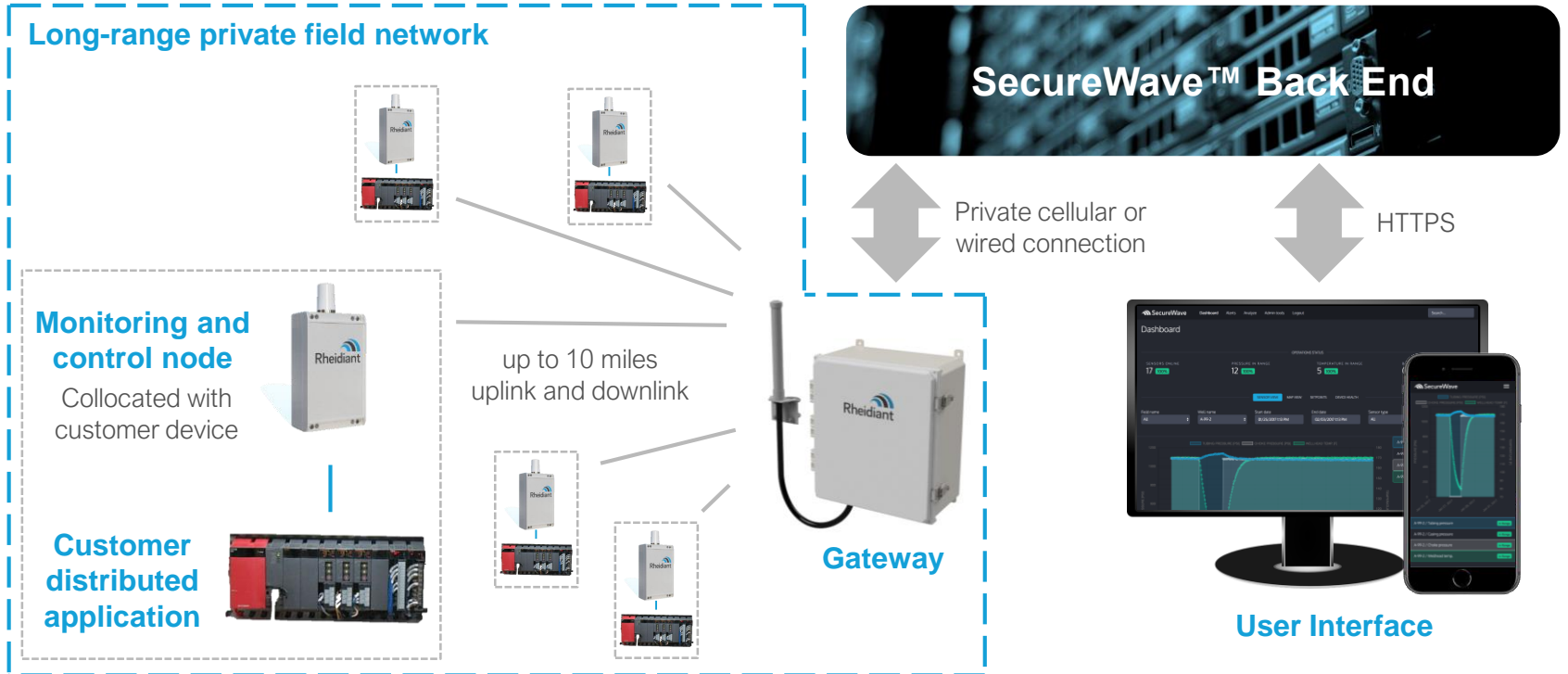
- Anomaly and failure detection
- Consume data at the source



IIoT for oil and gas applications – a real-world example



LPWAN for distributed IIoT applications



LPWAN for oil and gas IIoT



Analytics

Consume data at device
to optimally use
bandwidth



Security

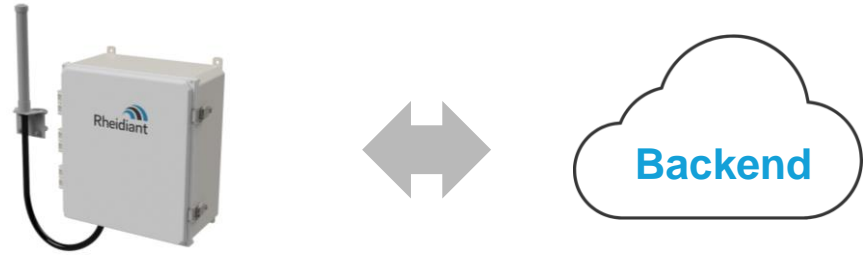
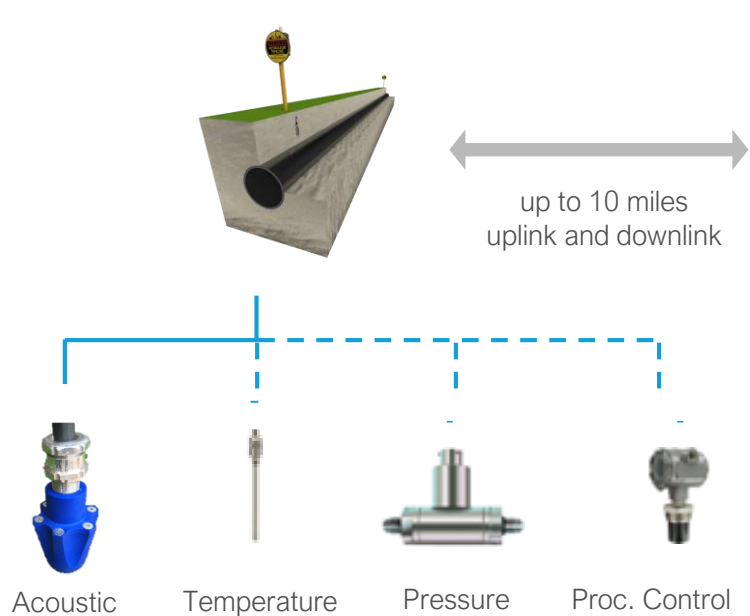
Secure network at the new
surfaces – field gateways
and devices



Maintainability

Scalable solutions to
manage remote
hardware

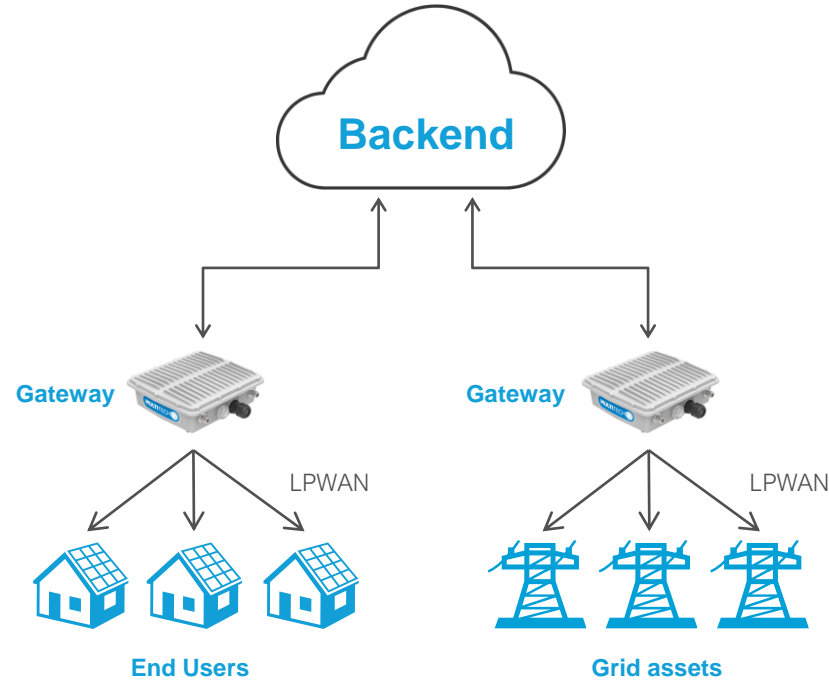
LPWAN use case – Pipeline leak detection



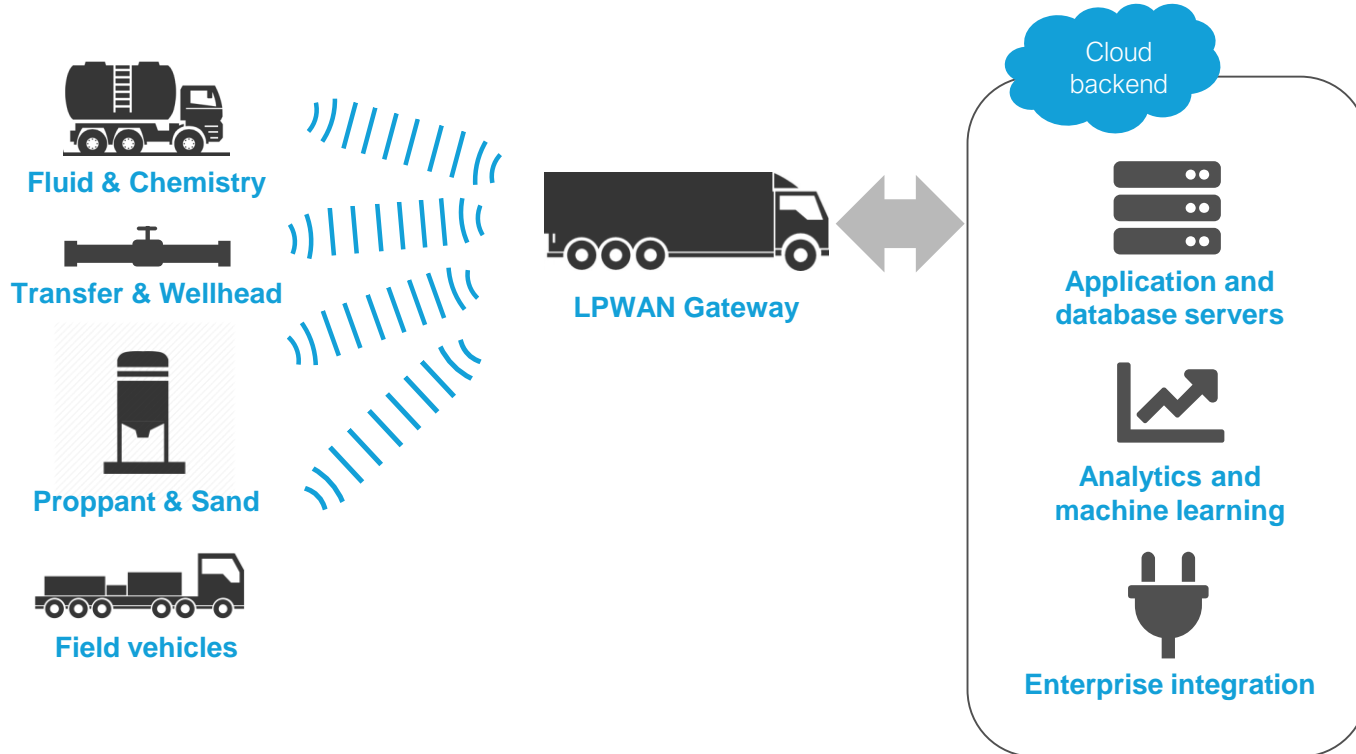
Gateway

- LPWAN connectivity enables deploying low-power devices in remote areas
- Distributed analytics at the device level and backend to detect leaks in noisy environments

LPWAN use case – Power generation and distribution



LPWAN use case – Pressure pumping





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