

Downhole Monitoring Tools in Artificial Lift

IIoT and DMT new phase

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Why Downhole Monitoring Tools

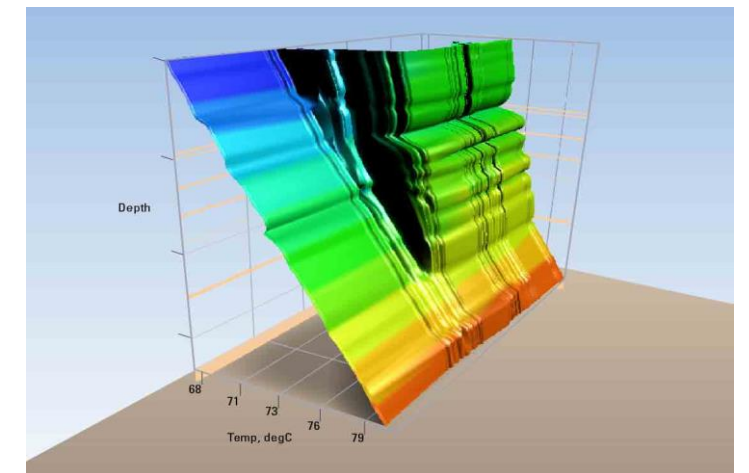
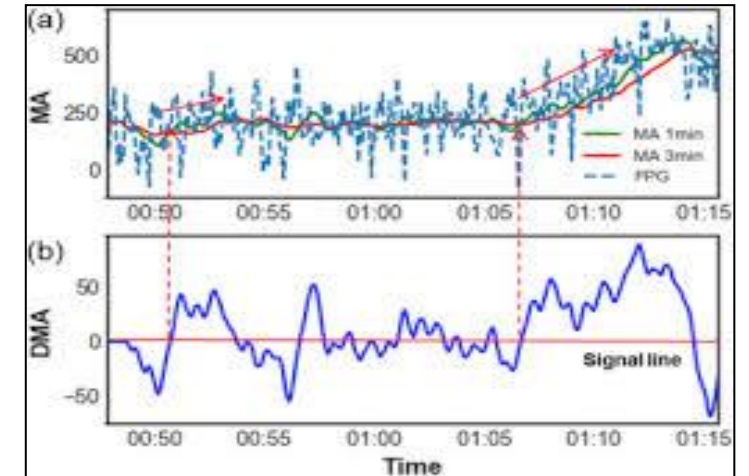
- Equipment Protection
 - Alarm & Trip setting
- Troubleshooting and Diagnose
 - Downhole view
 - Clear judge on what we do not see
- Wellbore understanding
 - Improve ALS Tech
 - More reliable
 - Optimize Production

Collecting Data



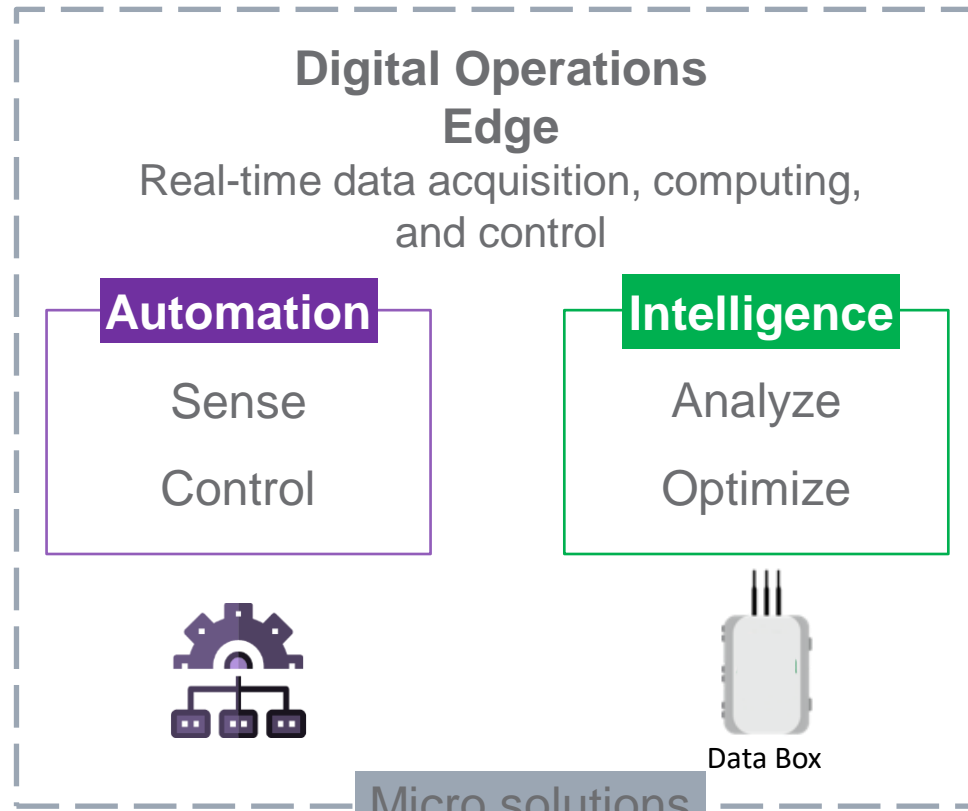
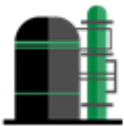
Downhole gauges Overview

- **Memory Gauges**
 - Quartz gauges
 - Lithium Battery gauges
 - Mainly used by Completion and Testing
- **Real-Time Gauges** (electrical cables and data Acquisition)
 - Phoenix XT
 - Select
 - CTS (Cable to Surface)
 - Mainly used by Artificial Lift
- **Fiber Optic and Thermal gauges**
 - Using Temperature Profile

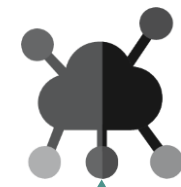
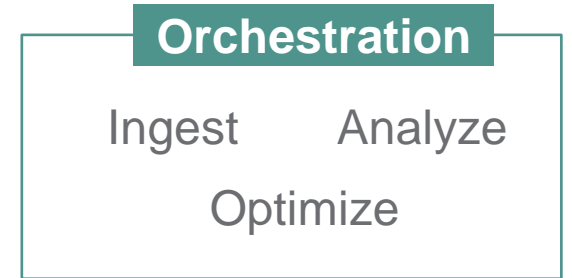


Data Revolution DMT vs IIoT

Assets



Digital Enterprise Cloud
E&P intelligence in collaborative environment



Closed loop

- Well-Centric or facilities
- Quick application focus on production operation challenges
- Automated Control and adjustment

Data Revolution DMT vs IIoT

CHALLENGE

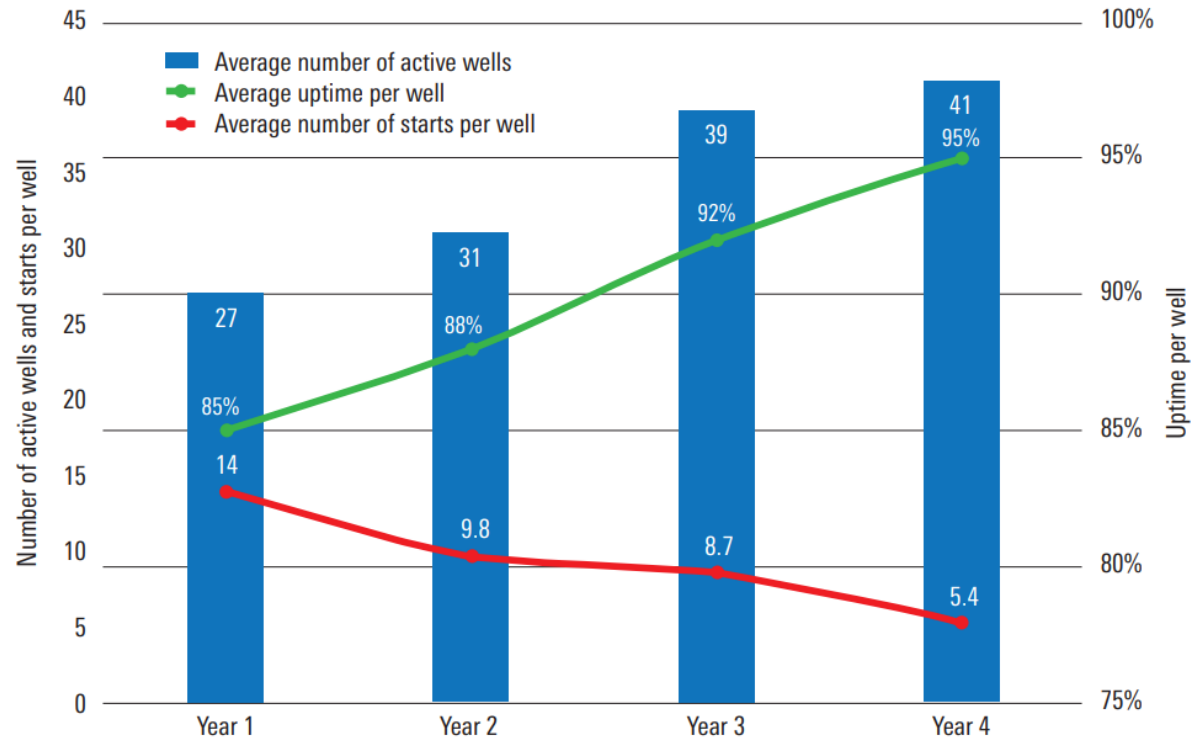
Maximize ESP uptime and minimize deferred production in gassy wells with significant solids production in an offshore field.

SOLUTION

Monitor and enhance ESP performance in real time via Lift IQ* production life cycle management service.

RESULTS

- Increased ESP uptime from 85% to 95%.
- Reduced average number of ESP starts per well per year from 14 to 5.4.
- Decreased average number of ESP incidents reported per well per year by over 50%.



Lift IQ service increased ESP uptime to 95% while reducing the number of starts per well per year from 14 to 5.4, thereby improving system survivability.

Schlumberger

Artificial Lift