

OTC Extra: Field Development, Operational Workflows Enable End-to-End Digital Solutions

CONTRIBUTED BY SCHLUMBERGER
PUBLISHED: MONDAY, APRIL 30, 2018 - 8:00AM

As the search for hydrocarbons moves into deeper depths and harsher environments, the oil and gas industry will be inhibited in reaching its full potential for value creation unless the networked connection of people, process, data and equipment takes place throughout the value chain. Digital enablement has become a mandate to improve operational efficiency, increase asset reliability and boost throughput and optimize field recovery.

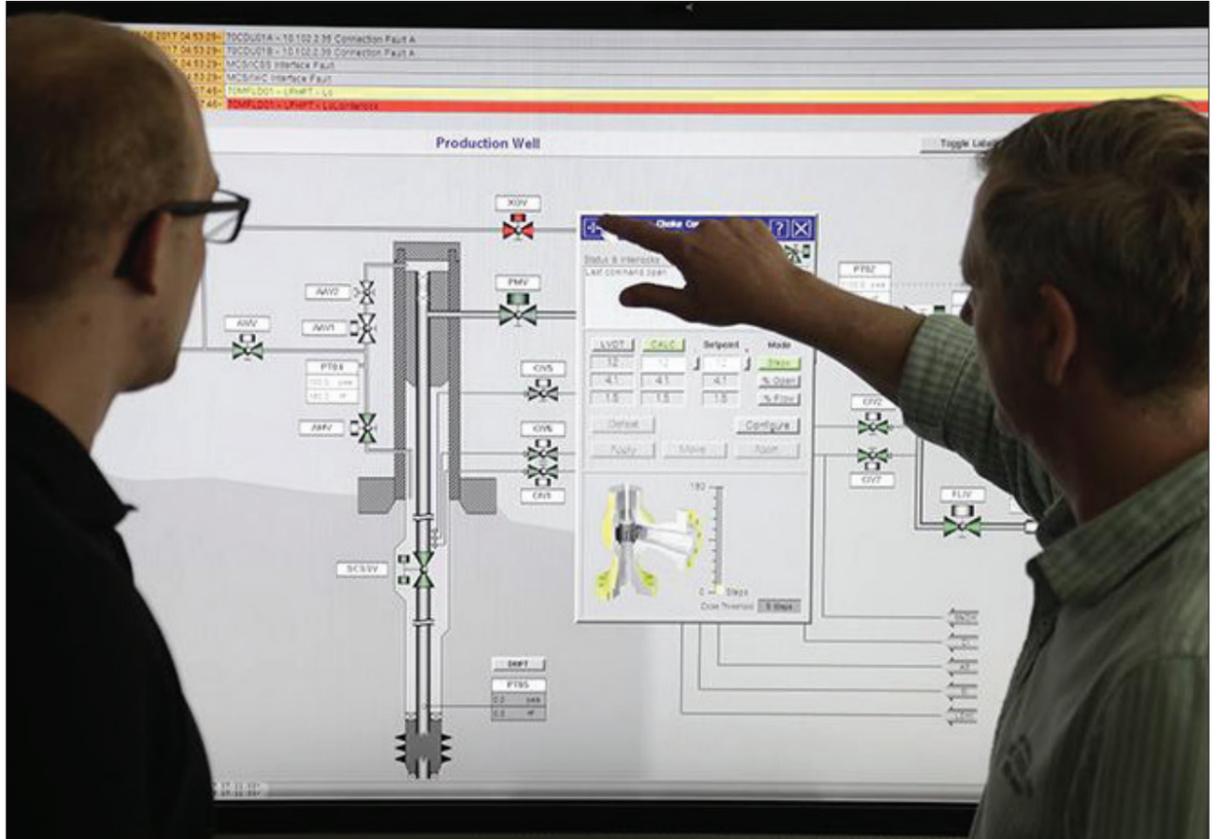
Operators are investing in digital capability and organizational transformation, and demand digital solutions that extend across the value chain for the life of their fields. End-to-end digital solutions are required to address these needs. Understanding operational workflows and building greater connections between technical domains can increase efficiency and minimize risks, while amplifying the application of expertise throughout planning and operational phases. End-to-end solutions require digital functionality in both planning and operations.

Planning begins with the reservoir

An integrated field development workflow begins with the reservoir as the foundation for building a concept, utilizing modeling techniques appropriate to the maturity of the subsurface data, and forecasting potential production from optimal well locations. In-house drilling engineers consider well design, generate topohole locations for field layout and cost and risk estimates. Integrating digital technology into E&P workflows requires extensive domain expertise about the entire system—from hardware and software technologies to the complexity of the data and systems involved.

Schlumberger OneSubsea, provides a contextual subsea field development planning experience by continuously integrating the reservoir, production system, and people in one secure and shared environment. This field development planning solution is modular, scalable, and integrated. It provides rapid system simulation for concept selection to support the operator's decision gates towards final investment decision. Modeling is used to develop the drilling and production schedules, laying the foundation for phased investment. It includes a portfolio of tools, project delivery organization, experience, and domain specialists to develop solutions that consider the full hydrocarbon journey from reservoir to process while maintaining focus on lowest capital cost and maximizing asset value.

The digital environment connects experts from every domain to fast-track optimal field development plans by combining subsurface and production assurance knowledge with established technology and capital-efficient



OneSubsea equipment and production monitoring approach ensures the integrity and lifespan of subsea equipment, helping to reduce operational risk through automated operations while optimizing hydrocarbon recovery. (Image courtesy of Schlumberger)

equipment, including subsea production systems, boosting systems, umbilicals, risers and flowlines. By working in a digital environment, OneSubsea experts from every domain can seamlessly combine subsurface and production assurance knowledge with established technology and capital-efficient equipment to expedite field development plans.

Connecting the digital field plan with the operational plan

The next step is to connect the field development plan with the operational plan. Advanced technology (sensors, controls, equipment, modelling engines, analytics and software) must connect to intelligent, automated and autonomous real-time systems that not only alert the operator, but automatically combine data, models and accumulated operational experience to interpret what is happening, why it is happening, what is likely to happen next and how to control it.

The capability to monitor deviations and capture patterns proves quite helpful during the operations phase. An example of output from a digital platform is the OneSubsea equipment and production monitoring solution that connects subsea equipment, sensors, and actuators

via a master control system, a secure cloud-enabled environment, and intuitive cross-platform web interfaces. It supports high-value client solutions for both equipment and production monitoring and real-time flow assurance.

Advanced analytics and machine learning algorithms monitor instrument metrology and equipment performance based on historical data signatures and performance history. Potential failure modes are probabilistically analyzed, enabling operators to maximize equipment lifetime, schedule maintenance based on predicted future health, and minimize the risk of long-lead items by identifying cause of failure.

A key part of the end-to-end digital solution, this equipment surveillance, and production monitoring, and real-time flow assurance environment integrates unique hardware, software, and advanced analytics in a hosted solution. It ensures subsea equipment lifetime and integrity, reduces uncertainty, and accelerates decision-making through automated and autonomous unmanned operations, and enables production optimization, improved hydrocarbon recovery, and cross-domain collaboration. ■