The Next Chapter in Production Operations

SiS Global Forum 2019
Technical Track
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16:15 – 16:45

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Agenda

- Vintage IO
- The Cognitive Enterprise
- Transform Operations
- Dealing with Data – Data Foundation
- Production Operations & Our Alliance
- The Hybrid Cloud Journey
- Close and Q & A
Vintage IO
Going back to 2005...

Automatic detection of events
• Well, process, critical equipment

Automatic evaluation of the effect of events on KPIs
• Production targets, costs or HSE
• From corporate to equipment level

Automatic generation of advices on how to manage events

Automatic processing of events

Automatic follow-up of events, e.g. actions required to handle events

300 bill. NOK on the NCS
Source: OLF (NOG) 2005, 2008
2015 → Similarities across industries

**Oil & Gas**

“Integrated Operations”  
Cross Functional – Collaborative – Operations  
See “One asset” – independent of “my location”

**Health**

*Integrated Operations*  
Cross Functional – Collaborative  
See “One Patient”

*Illustrative IO Room* (Source – IO Center Trondheim)

*Medical expertise St. Olav’s Hospital Trondheim*

*Doctor on duty Stavanger*

*Medic and patient Ekofisk*
Industry Examples – SIS Forum 2017

BERNARD LOONEY
Chief executive, Upstream

However, digital technology now offers us new ways to address those challenges and prosper in a very different business environment.

In BP, we have used digital technology for decades, but the focus now is on harnessing it for profound and transformational change, across the business.

We have a vision. And that vision is to be the leading digital Upstream company, comprised of globally connected networks of physical equipment, people and digital processes.

Digital technology is redefining possibilities in the Oil & Gas industry

**Artificial Intelligence and Analytics**
- Supports staff to make decisions
- Identifies business-critical operational improvements

**Blockchain**
- Improves identity management and distribution
- Enables transformational business model innovations

**Quantum computing**
- Equips physical assets with digital data
- Optimizes existing operational processes

**Internet of Things**
- Equips physical assets with digital data
- Optimizes existing operational processes

**Cloud**
- Allows data to be stored and accessed, and applications run, from everywhere
- Delivers cost-effective innovation quickly

**Cyber security**
- Enhances productivity by working autonomously or in conjunction with staff
- Increases worker safety

**APIs and Microservices**
- Enables ecosystem partners to collectively innovate

**Mobile**
- Improves identity management and distribution
- Enables transformational business model innovations

**Automation and Advanced Robotics**
- Enhances productivity by working autonomously or in conjunction with staff
- Increases worker safety

**Disruptive forces**

Digital technology is redefining possibilities in the Oil & Gas industry.
The Cognitive Enterprise
The market is entering a new chapter in cloud and digital

CHAPTER 1
Consumer-driven innovation
Digital/AI experimentation
“User applications” driving cloud (20% of workloads)
Public cloud

• Companies "experimenting"
• "Adding" vs. "transforming"

CHAPTER 2
Enterprise-driven innovation
Digital/AI embedded in the business and at scale
“Mission critical” workloads driving cloud (80% of workloads)
Hybrid cloud
Public + Private + Traditional
Open and multi-cloud

• Companies moving to production
• Transforming mission critical
• End-to-end integration advantaged
Resulting in a re-invented Transform Operations imperative

**Transform Operations** is the strategy and framework for the transformation into a more predictable, controllable and optimized production stream through:

- Integration of critical processes into a cross-functional, cross-discipline way of thinking
- Capture of operational data and leveraging technology to make better use of data and predictive analytics
- Knowledge sharing, streamlined workflows, and implementation of standard industry practices
- Focus on predictable business outcomes, operational efficiency, and sustainable performance

**People**
- Skills Development
- Virtual teams using internal / external experts
- Multidiscipline knowledge
- Attract and retain talent

**Technology**
- Proactive monitoring and remote diagnostics
- Sensors and Automation
- Enabling infrastructure and data management
- Collaboration environment

**Work Processes**
- Collaborative and multidiscipline based
- Consistent application of standards and processes
- Real-time decision making
- Leverage internal / external and vendor expertise
- Remote / integrated decision making

**Organizational**
- Organizational structure to support decision outcomes
- Communities of Practice (CoP) and Centres of Excellence (CoE)
- Emphasis on HSE Management
- Integrate diverse initiatives across the organisation
The approach to this challenge has 3 major dimensions

- Cognitive and Analytics
- Process Orchestration
- Dealing with Data - Data Foundation

Source: Morburre/Wikimedia Commons
Capable of extracting information from the most complex data sources.
Explosion of data generated by large-scale simulation leading to a paradigm shift: from simulation-centric to **data-centric discovery**

Data analytics and machine learning used to turn reams of simulation data into **actionable** information that can be used for better interpretation and steering

Applying machine learning for making existing simulation codes more **intelligent**, more productive, and more robust

Increasing interest in **large-scale** analytics and machine learning on high-end platforms

Emerging hybrid workflows that embody the **entire** inference cycle of discovery

Co-deployment of **heterogenous** software stacks

Diagram adapted from BDEC report

[https://www.exascale.org/bdec/report](https://www.exascale.org/bdec/report)
Building “Technical Workflows”

Example - Petroleum System Knowledge Graph

**Legend**
- PO Agent – Production Optimization
- KES - Knowledge Exploration System
- DL - Deep Learning
Building “Technical Workflows”

From 2015, SIS and IBM has provided clients Integrated Operations transformation services that unifies the decision environment by providing support critical for productivity and efficiency gains in today’s oilfield operations.

Together, we enable Operational Excellence by infusing AI into production optimization workflows with cloud-based enterprise business processes to enable multidisciplinary solution teams to implement customized business offerings spanning asset to enterprise levels.
Operational Excellence requires expertise across all capability areas

- Production Optimization
- Reservoir Management
- Maintenance
- Supply Chain
- Flow Assurance
- Well Integrity
- Activity Planning
- People Productivity

Integrated workflows
IO 2.0+ : Deliver AI infused E&P workflow automation on hybrid multi-cloud

Shared Vision + Leadership for Change + Smart Governance + Deep Engagement

- Insight Phase
- Design Phase
- IO Garage Implementation
- Improvement through Learning

**Envision Session - Executives**

**Design Thinking - Owners**

**IO Garage**
- "Optimization"
- "Frictionless"

**New AI Enabled IO Process**

**Training** | **Organizational Change**

**DevOps Cycle**
- Make
- Observe
- Reflect

**Continuous Improvement Cycle**

**Cognitive Business Modeler**

**Integrated Workflow**
- Domain Technical
- Enterprise

**Digital Reinvention Model**
- Cloud
- Internet of Things
- Blockchain
- Security

**New Focus**
- New Expertise
- New Ways to Work

**DevOps Cycle**
Link to Hybrid Multi-Cloud for security, scalability and as-a-service
Storm clouds ahead

• “By 2021, 99% of chemicals and petroleum organizations plan to adopt multicloud architectures,

• but only 44% have a multicloud management strategy and

• just 47% have procedures and tools to operate a multicloud environment.”
Successful enterprises accelerate their journey to cloud...

**TODAY**

- **Unique workload and data needs**
  Compliance, security, location require choice

- **Multiple clouds and vendors**
  Hard to connect across clouds and the data center

- **Technology generation gap**
  Need to broker cloud-native and traditional

**TOMORROW**

- **Build once, deploy anywhere**
  For optimized data and workload placement

- **Open, secure, and integrated**
  Visibility, governance, and secure data access

- **Culture and skill transformation**
  Best practices, proven methods, and tools
THANK YOU

Production Operations – Chapter 2 – Cognitive Enterprise
PO@Anywhere!

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