Enabling Data Driven Intelligence in the Hyper-Connected World
73% of executives said the complexity of data is the largest IT challenge (Forrester, 2013 report)

The cost of complexity

- **Complex business processes**: Large organizations can spend between 40% and 80% of their time on non-value-added activities. (BCG, Complexity Report)
- **Complex user experiences**: “Large global organizations have created so much complexity that businesses often struggle to bring good ideas to the marketplace profitably.” (McKinsey, 2014)
- **Complex technology**: 73% percent of executives said the complexity of data is the largest IT challenge. (Forrester, 2013 report)

10.2% or US$237 billion of profits are lost by top 200 global companies due to hidden costs of complexity.

Global Simplicity Index, 2013
## Business complexity in the oil and gas industry

<table>
<thead>
<tr>
<th>Capital and spend effectiveness</th>
<th>Integrated digital oilfield operations</th>
<th>Hydrocarbon supply chain</th>
<th>Operational integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing size of projects and suboptimal transparency for decision making</td>
<td>Disparate data sources prohibit integrated production and maintenance planning</td>
<td>Scattered supply and demand information</td>
<td>Weak situational awareness regarding safety and regulations as status quo drives the organization</td>
</tr>
</tbody>
</table>

- **Overruns in project budget and timelines**
- **Production losses due to poor operational insight**
- **Excess inventory and stock-outs**
- **Increased risk of incidents**

<table>
<thead>
<tr>
<th>Finance</th>
<th>HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separation of legal and management accounting and reporting based on aggregates; no ability to drill down to line-item level</td>
<td>Challenge to develop right talent in a changing environment with aging workforce and rapidly evolving new skill sets</td>
</tr>
<tr>
<td><strong>Long closing times</strong></td>
<td><strong>Low HR productivity</strong></td>
</tr>
</tbody>
</table>
User experience complexity in the oil and gas industry

- **Scattered information**: Information needs to be collected from different systems or transactions.
- **Low user acceptance**: Low-performing simulations and unintuitive user interfaces.
- **High data latency**: Inconsistent and outdated data due to batch processing and duplication.
- **Multiple UI technologies**: Complex user interfaces that vary by system and device; no personalization.

- High error rates
- Long analysis and reporting cycle time
- Lower employee productivity
- Delayed decision making
- Lower employee productivity
IT complexity in the oil and gas industry

- **Data redundancy**: Data duplication across systems, such as from online transaction procession (OLTP) to online analytical processing (OLAP)

- **Extensive data footprint**: Data explosion pushing the limits of current technology

- **Maintenance of data aggregates**: Database inflation due to predefined aggregates with numerous tables

- **Complex system landscape**: High maintenance needs across systems holding redundant data

- **High percentage of data inconsistencies**

- **Huge hardware costs and decreasing scalability**

- **Lower IT productivity**

- **High hardware and systems maintenance costs**
Key levers to drive down complexity for business, users, and IT

**Simplify business processes**
- Real-time business processes with connectivity to the business network and the Internet of Things
- Unified transactional and analytical processing
- Integrated unstructured external data for more insight and better decisions

**Simplify user experiences**
- Intuitive user experiences on all devices
- Users supported by applications tailored to their roles in the enterprise

**Simplify technology**
- More operational efficiency from reduced data footprint
- Elimination of data redundancy, eliminating need for reconciliation and synchronization efforts
- Innovation platform for value-adding custom and solutions
Example Work Flow
Key Building Blocks For Asset Health

Asset Classes
- Substation Transformers
- Substation Breakers
- URD
- Others (TBD)

Outcomes
- Reduced Asset Risk
- Increased Capital Effectiveness
- Improved System Reliability
- Improved Maintenance Strategies
- Increased Regulatory Transparency
- Increased Cust. & Worker Safety
- IT Benefits

Analytics Architecture / HANA Technology Platform

1. Asset Information
2. System integrity
3. Predictive analytics
4. Asset risk and algorithms
5. Future simulation for investment
6. Load profiles
7. Duval triangles
8. Geo-spatial display of analytics
The Convergence of Information and Operational Technology

Enabling digital enterprises to do business innovation
An Infrastructure Connects the Enterprise
Addressing Customer Challenges - Creating Value

Device | Asset | Fog

- Edge Intelligence
- Reliable and Robust communication

Operations

- Operational Analytics
- Pattern Detection
- Predictive Services

Business

- Workflows & Networked Applications
- Simplified Enterprise

Sense & Monitor

Analyze & Predict

Optimize & Act

Application Platform
- Device Integration
- In-Memory Data Platform
IT/OT Integration Examples Creating Value in Oil and Gas

O&G companies are pursuing IT/OT integration to reduce drilling-days per well, extend the life of existing production assets, and improve overall operational awareness.

Business processes supported include:

- Drilling Optimization
- Geospatial Integration
- Asset health management and predictive maintenance
- Leakage Detection and Pipeline Integrity Analytics
- Fuel Management
- Feedstock supply optimization
- Transmission Line-Pack Management
- Regulatory Compliance
Connecting SAP HANA with OSIsoft PI System for real-time enterprise intelligence

Connect with intelligence on the edge

SAP Event Stream Processor

SAP MobiLink

SAP SQL Anywhere / SAP UltraLite

Transform business operations

Smart Data Access

SAP HANA for Internet of Things (On Premise or Cloud)

Logical DW

SAP HANA
SAP IQ
HADOOP

Optimize corporate planning and reporting

Real-time insights and automated decision-making

Reimagine business models

Reimagine product design

Reimagine customer experience

Reimagine business with value-added services

Build real-time supply chains

Enable responsive manufacturing

Tap into the world’s largest business network

Reimagine employee experience

Sense & Monitor

Analyze & Predict

Optimize & Act
Empowering People Across the Enterprise

- Business:
  - Optimize operations
  - Stop cost leakage
  - Accelerate cost and profitability analysis

- Operations:
  - Operational efficiency
  - Asset health
  - Resource utilization

- IT:
  - Lower TCO
  - Better data governance
  - Cybersecurity

- Executives:
  - Enterprise insights
  - Accelerated decisions
  - Improved P&L
Optimize your own value chain

Connected Logistics – Port of Hamburg

Real Time Road Traffic Control Systems

Cloud

Smart Logistics Hub
operated by
SAP HANA Cloud Platform

Freight Forwarders & Truck Drivers

Parking Space Providers

PORT OF HAMBURG

Real Time Integration

Smart Operations Platform

Real Time Road Traffic Control Systems

Port Road Management and Operations Backend Systems
(Knowledge Base + Operations)

Business Network of 950+ Connected Businesses

e.g. maintenance, spare, part, food and beverage, medical, cargo, terminal, marine, container, research and engineering, warehouse and storage related suppliers and service providers

Built-in Telematics Unit Tablets & Smartphones

TRUCK

TRAILER

SAP

Hapag-Lloyd

T • Systems
SAP Predictive Maintenance and Service
Involved parties and their contribution

- Maintenance Engineer
- Service Engineer
- Maintenance Engineer
- Service Technician
- Asset Manufacturer
- 3rd Party Service Provider
- Asset Operator
- Physical Asset Level
- CRM, Customer Service
- Enterprise Asset Management

Remote Service Management
New business models around the device
Installation and repair services
Predictive Maintenance for critical assets
SAP Connected Manufacturing

Performance Management

- Sustainable Operations
  - EH&S
- VP Operations
- Quality Management
  - Quality Department
- SAP HANA Cloud Platform
  - Production Planning
  - Physical Asset Level
  - Materials Management