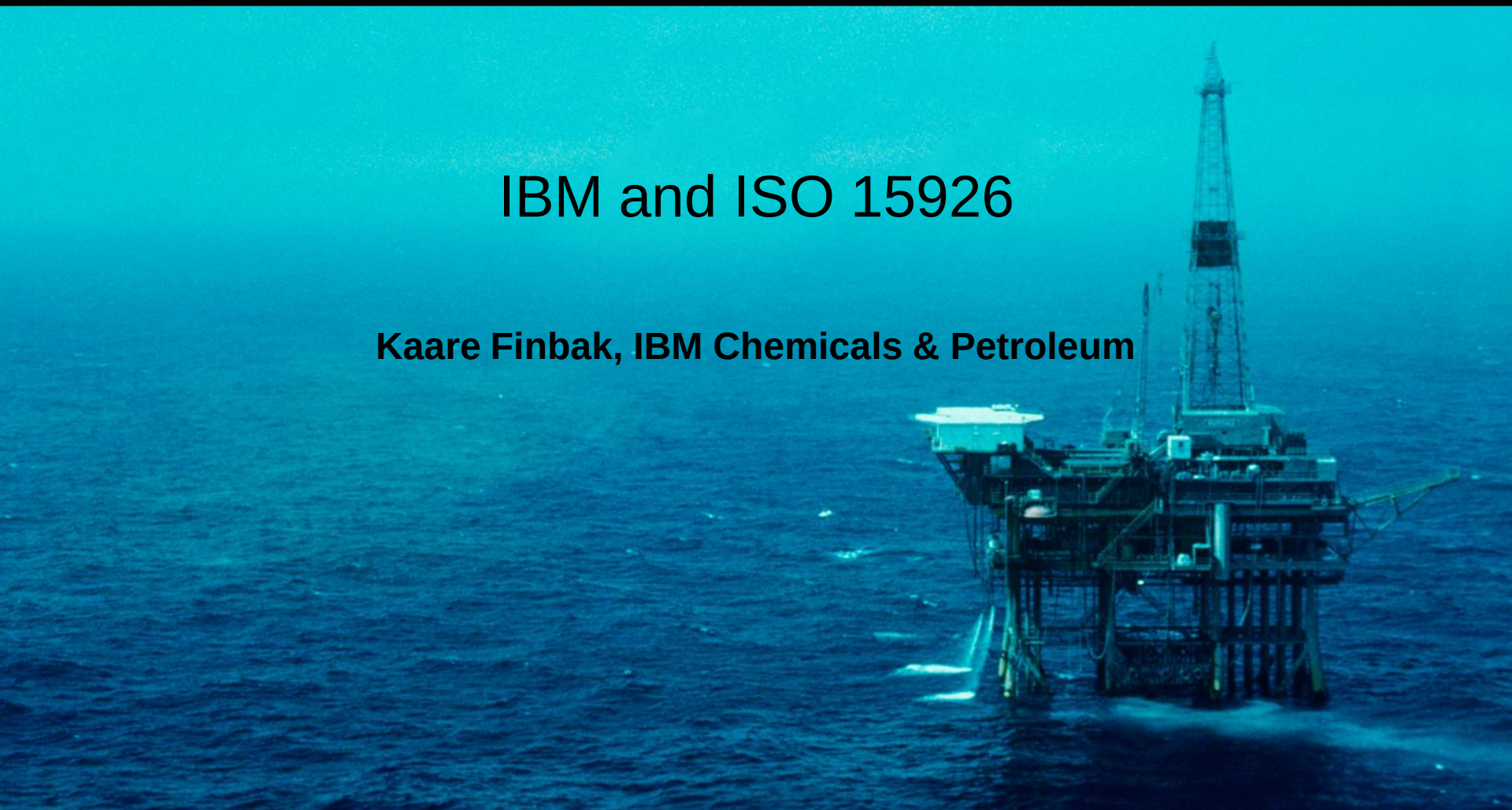
STOP TALKING. **START DOING.**

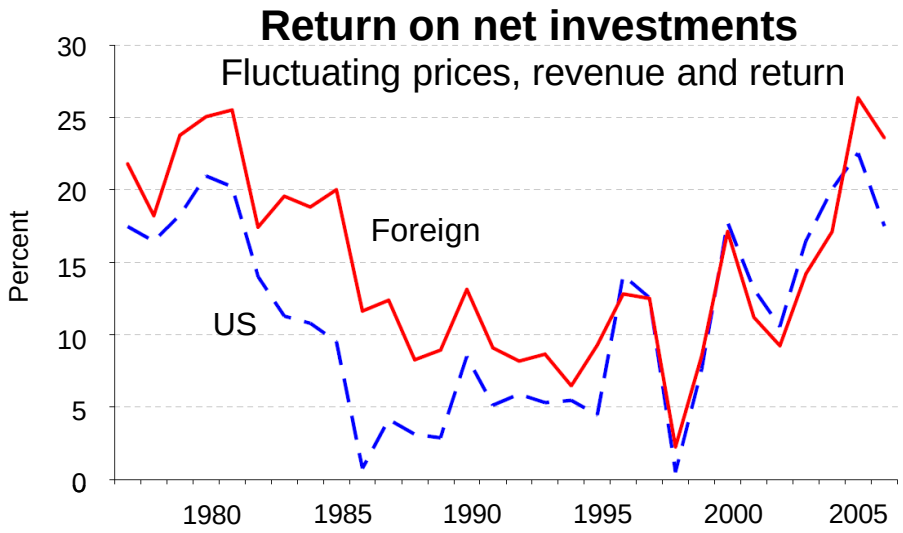
Practical Innovation. True Integration. Connected Operations.

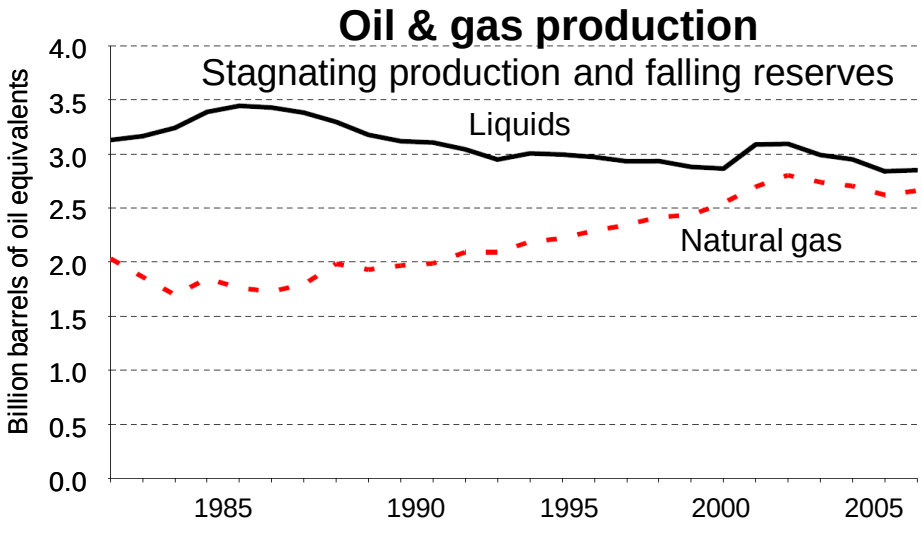


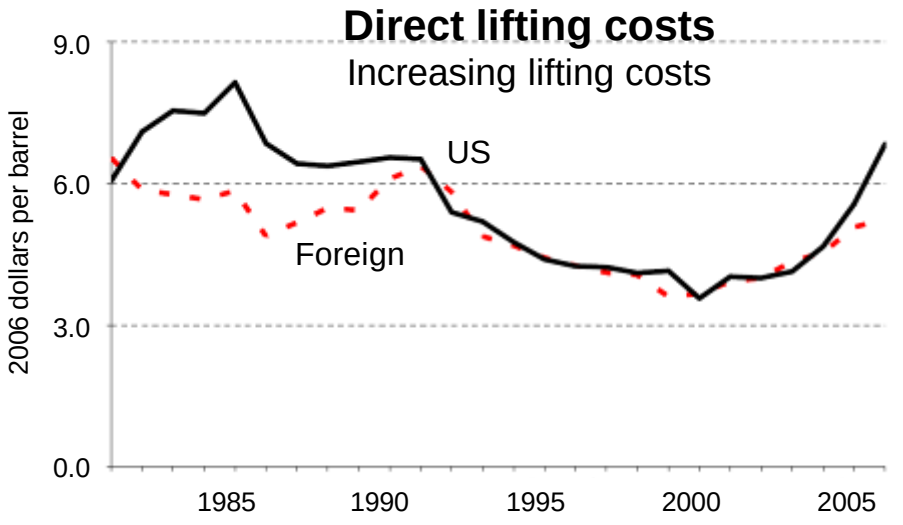
IBM and ISO 15926

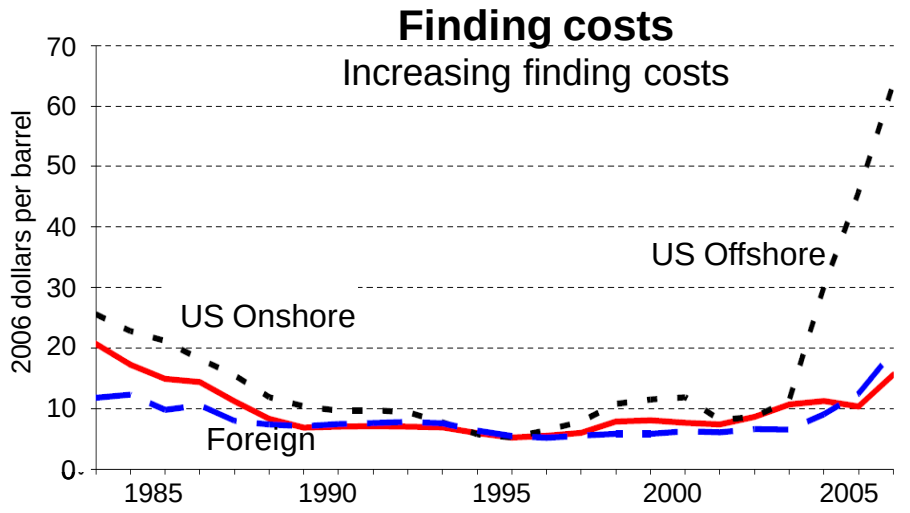
Kaare Finbak, IBM Chemicals & Petroleum

The oil & gas industry faces several challenges









Source: US DOE, 2007, Financial Analysis of the 16 largest US oil and gas companies

Better utilization of information available is part of the answer

1 terabyte

200 DVDs' worth of data generated by on oil field daily. Oil and gas engineers can spend up to 60% of their time mining this data

90,000

Man-hours required to execute turnaround effort every two years on an offshore platform.

33%

Amount of oil, on average, that is recovered from an existing reservoir.

85%
reduction in seismic mapping

New technologies and algorithms exist that significantly reduce the time to map and analyze oil and gas reservoirs, thereby speeding time to recovery

10%
improved asset utilization

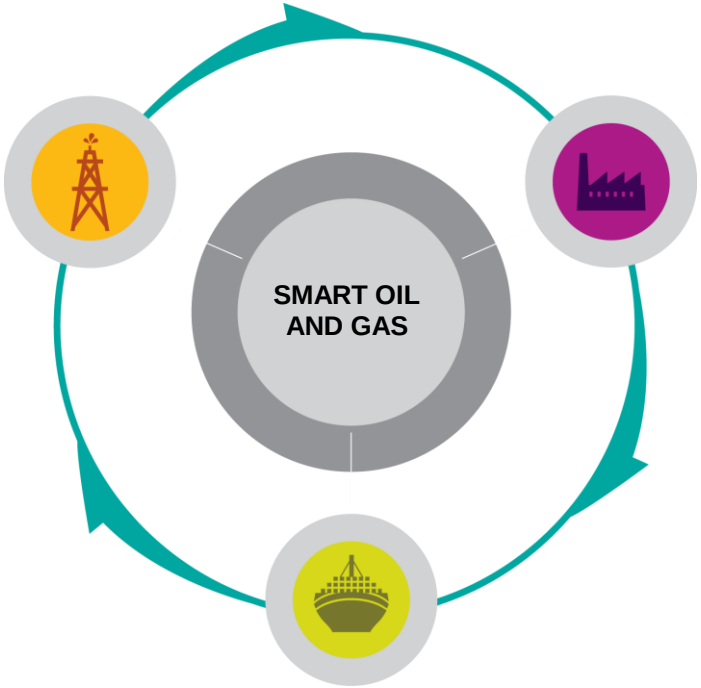
Adopting best-in-class asset management strategies can reduce asset downtime by 10%.

1.5%
increase in oil recovery

A 1.5% increase in recovery from existing wells, on average, would yield enough oil for half a year's global consumption.

Oil and gas companies therefore are working to make better use of data in order to…

IMPROVE EXPLORATION AND PRODUCTION
Capture and process data to identify previously inaccessible reserves, improve well performance, and optimize production



IMPROVE ASSET MANAGEMENT
Boost availability, flexibility and reliability of producing facilities

OPTIMIZE OPERATIONS GLOBALLY
Increase visibility, improve utilization of available expertise, standardize, and realize economies of scale

The timing is good, as the world is increasingly becoming ...

INSTRUMENTED

- Today, there are 1 billion transistors for each person on the planet
- By 2010, 30 billion RFID tags will be deployed

- **Condition monitoring systems can improve asset utilization for example, by identifying signs of wear before breakdowns occur**

INTERCONNECTED

- Almost one third of the world's population will be on the web by 2011
- There are an estimated 4 billion mobile phone subscribers worldwide

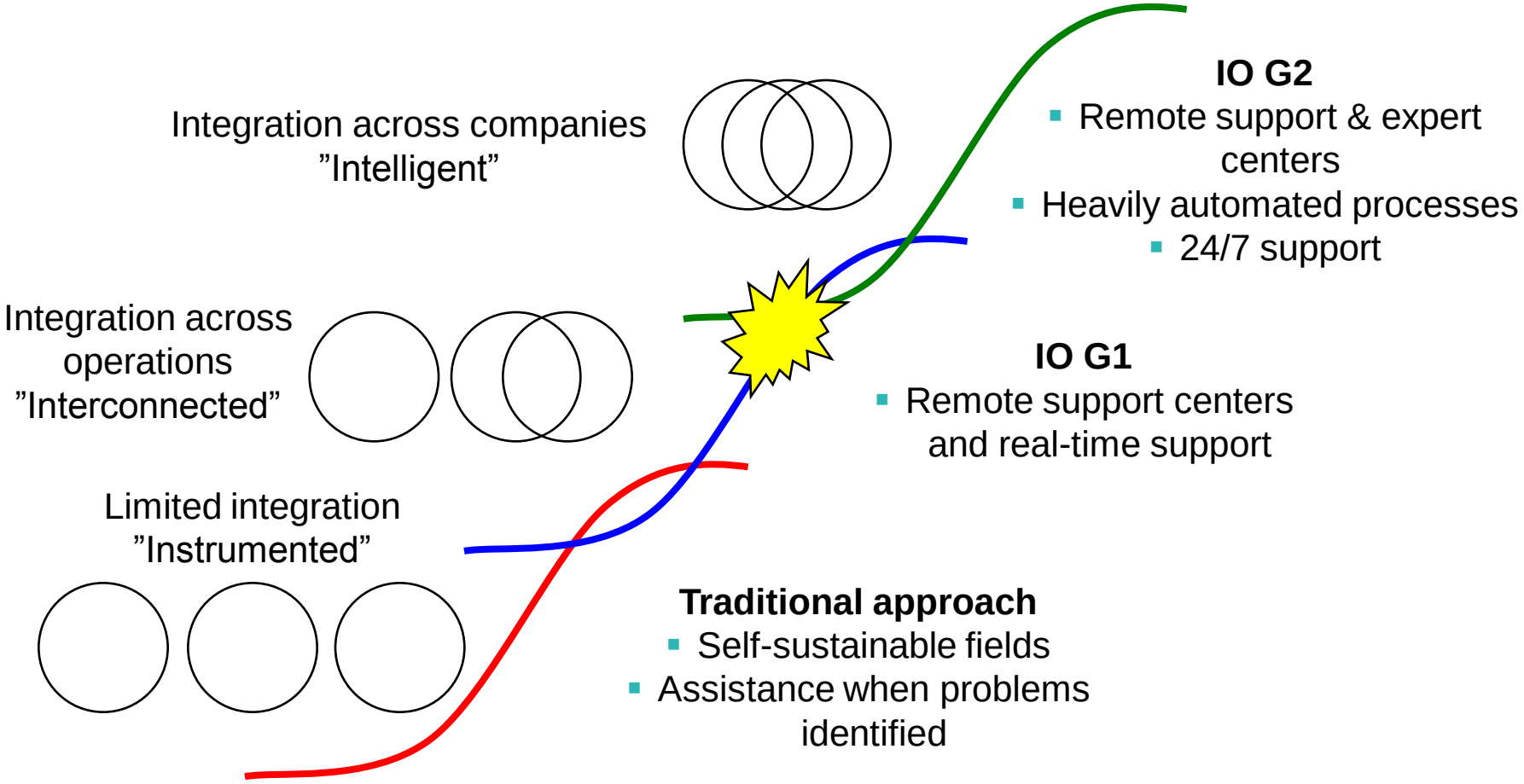
- **Connecting offshore and onshore support centers for real-time collaboration across the globe speeds decision-making and increases productivity**

INTELLIGENT

- Every day, 15 petabytes of new information are being generated
- A company with 1,000 employees spends $5.3 million a year to find information on its servers

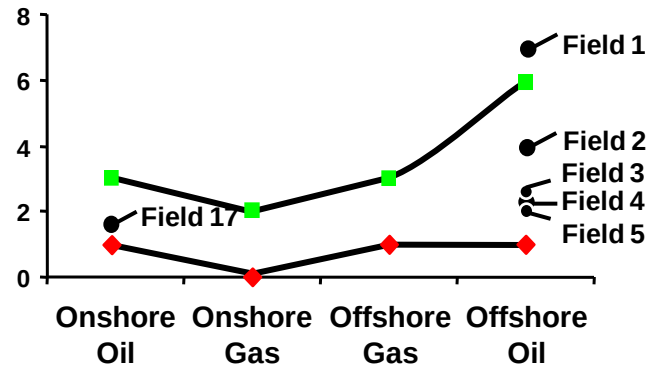
- **New intelligence transforms the way oil and gas companies operate: increases oil recovery, lowers costs and accelerates production**

The emerging operational concept is called Integrated Operations (IO)

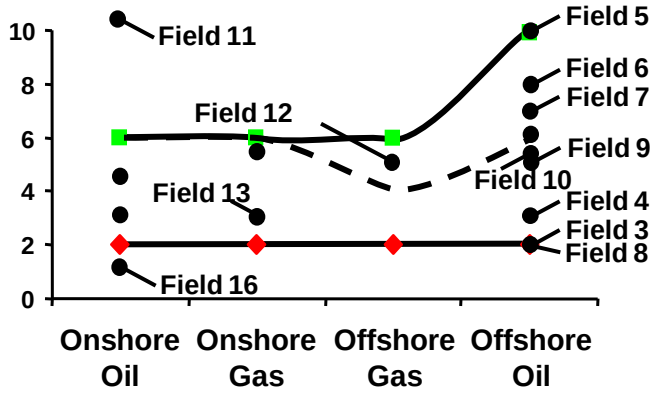


The effects of IO on the industry's performance have been significant already

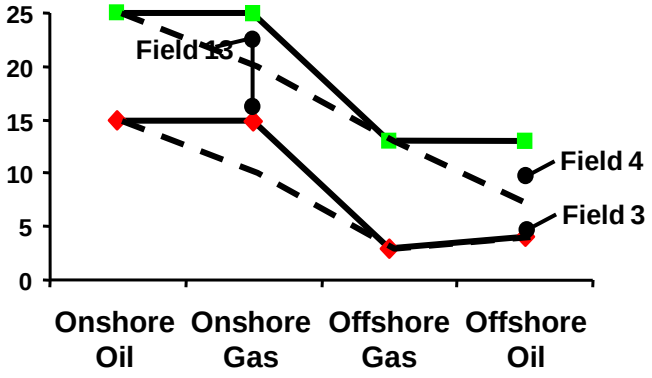
Increased Reservoir Recovery (% OOIP)



Increased Production Rates (%)



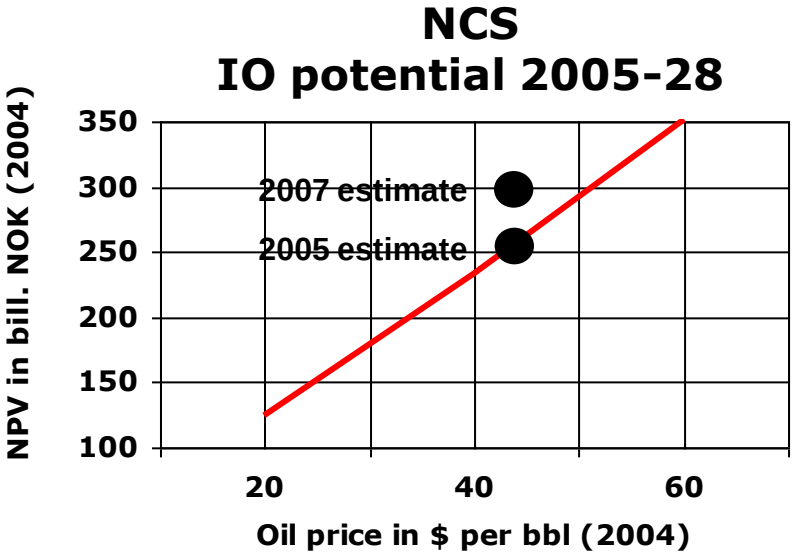
Lower Operating Costs (%)

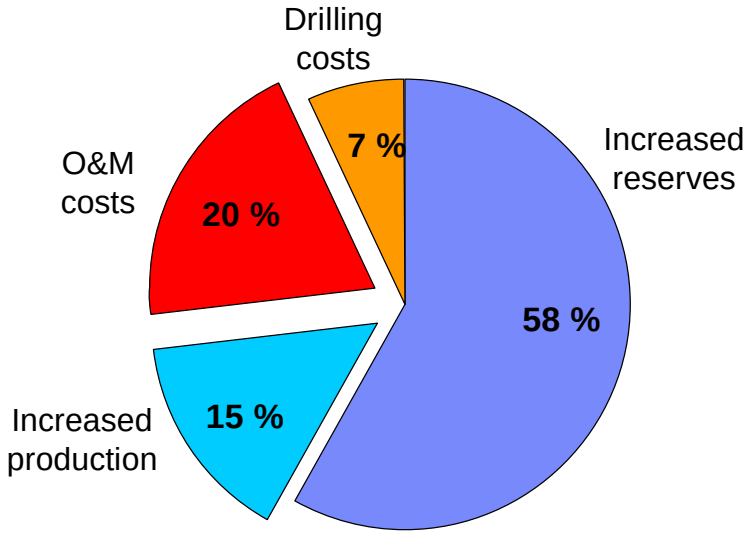


Source: CERA, 2007

But there is much more to gain, as illustrated by this example from Norway

- The economical potential of IO on the Norwegian Continental Shelf (NCS) is estimated to 50 bill. USD
- 80-90% of the potential has yet not been realized





Source: OLF, 2007

For the full potential to be realized, IO G2 has to be implemented

Excellence in IO requires:

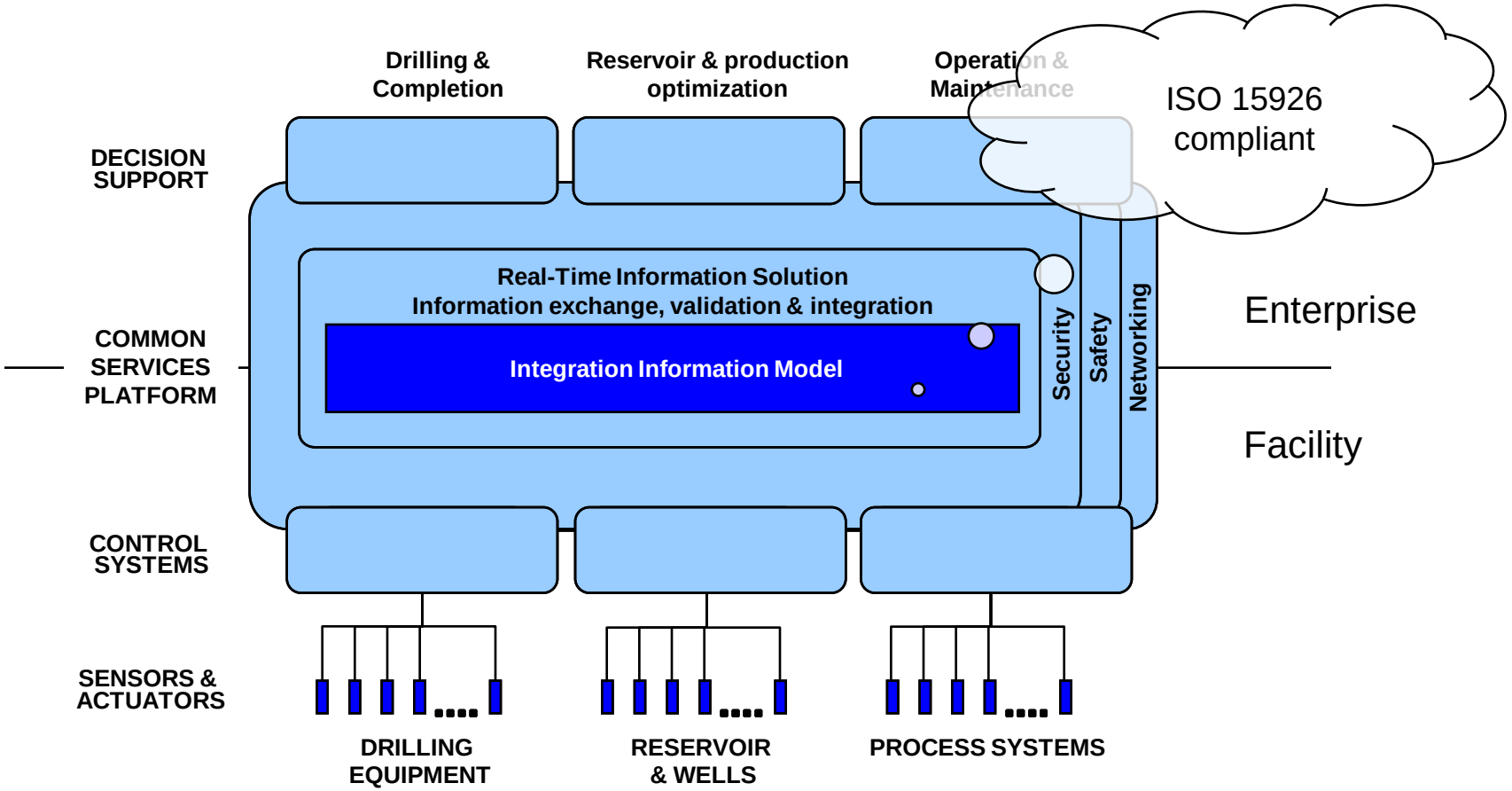
- Detailed knowledge about the state & condition of operations and facilities
- Consolidation of processes as well as IT solutions
- Vertical in addition to horizontal integration of IT solutions

IO.anytime@anywhere

- Enterprise-wide processes

- Many different systems: Well management, DCS, asset management, IMS, ...
- Heavily instrumented facilities

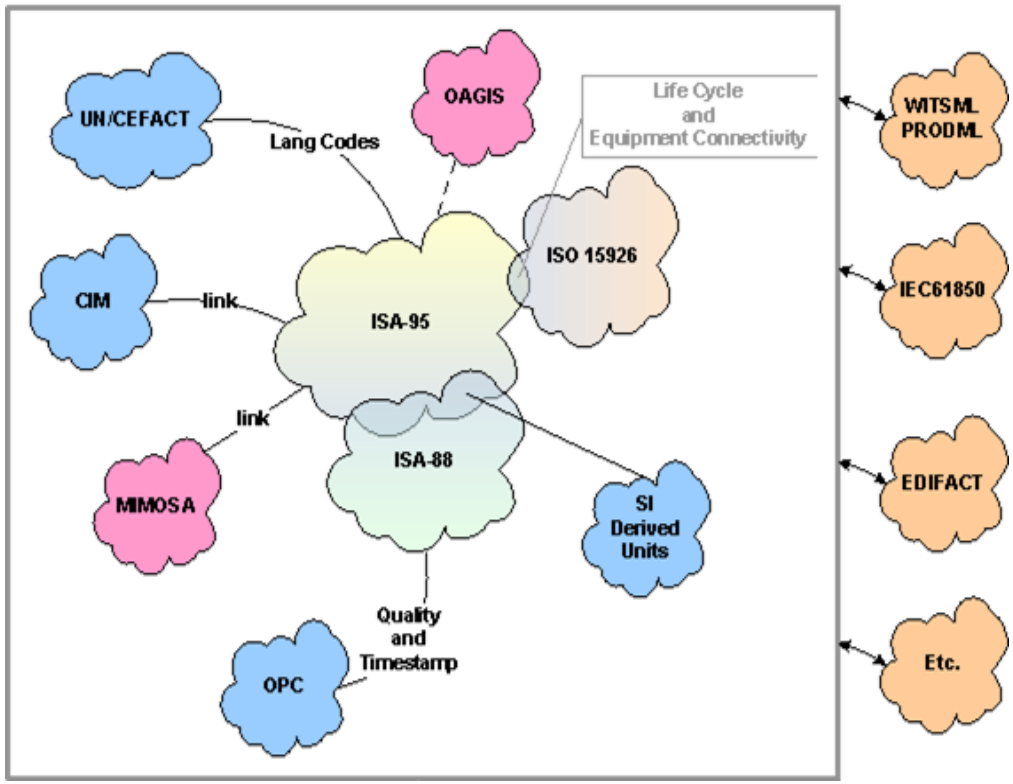
So has standardized (canonical) information models that span disciplines and domains



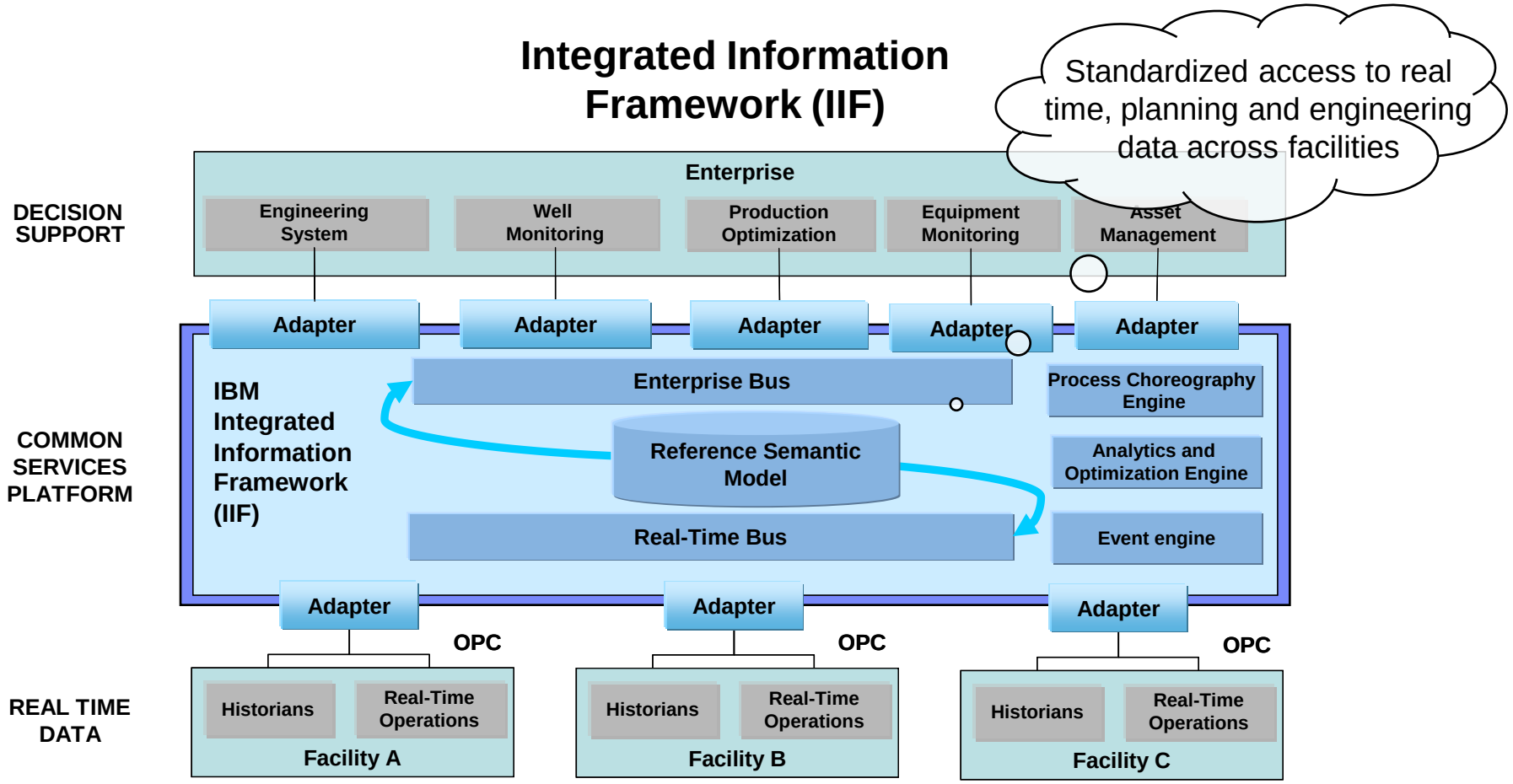
Architecture based on Reference Architecture for The Norwegian Oil Industry, Integrated Operations Generation 2

IBM participated in development of a first version of such an information model

Reference Semantic Model (RSM)



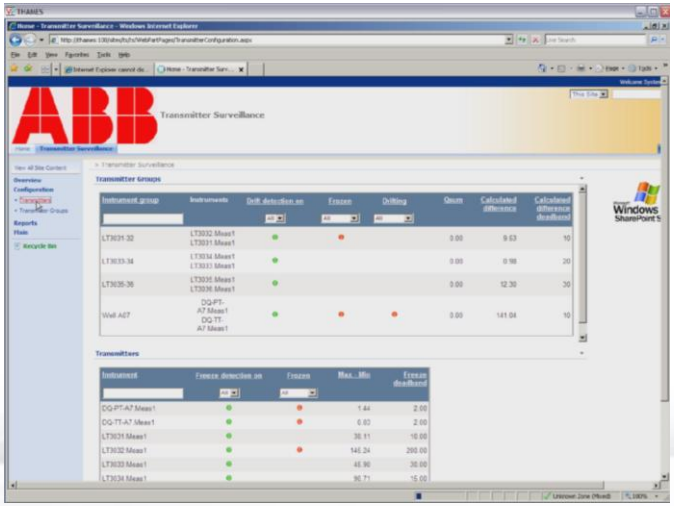
IBM also has developed a real time integration solution that is based on this model



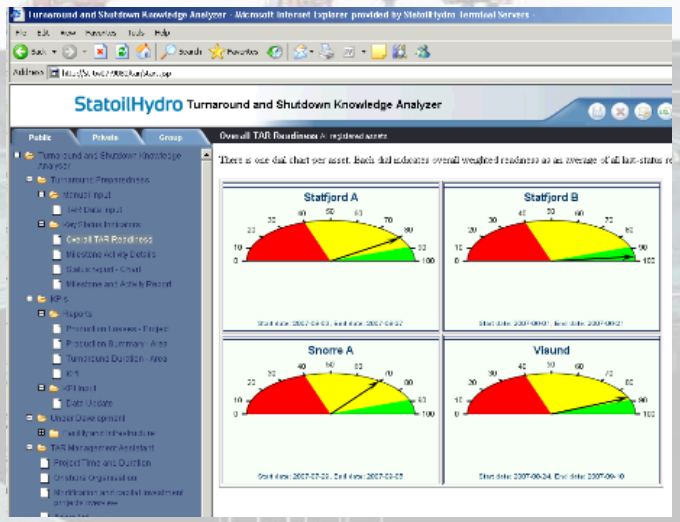
The IIF and the RSM jointly facilitate required interoperability and consolidation

Morning meeting

Equipment monitoring



Turnaround optimization



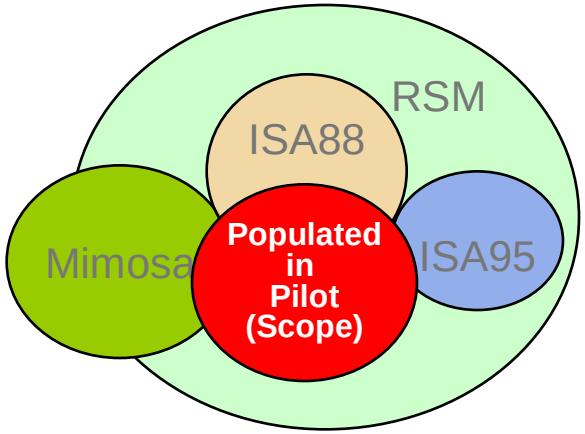
IBM will continue its focus on IO and ISO 15926

- Participate actively in extending ISO 15926
  - Extend ISO 15926 into the real-time domain through inclusion of the RSM in ISO 15926
- Demonstrate that ISO 15926 extensions provide the interoperability and scalability required for IO G2 to be implemented
  - In projects such as the IOHN project
  - With partners
- Continue to develop ISO 15926 compliant products
  - Adapt the Integrated Information Framework (IIF) product to future releases of ISO 15926
  - Co-operate with partners

Extend ISO 15926 into the real-time domains

IOHN assignment:
Represent RSM in ISO 15926

Scoping statement phase 1:
Parts of RSM piloted at StatoilHydro



Status:

- Classes and relations added to PCA RDL
- RSM model version 2.0 proposed
- Ready for review and standardization through PCA

Participants first phase

StatoilHydro
- Requirements

POSC Caesar Association (PCA)
- Custodian of ISO 15926 RDL

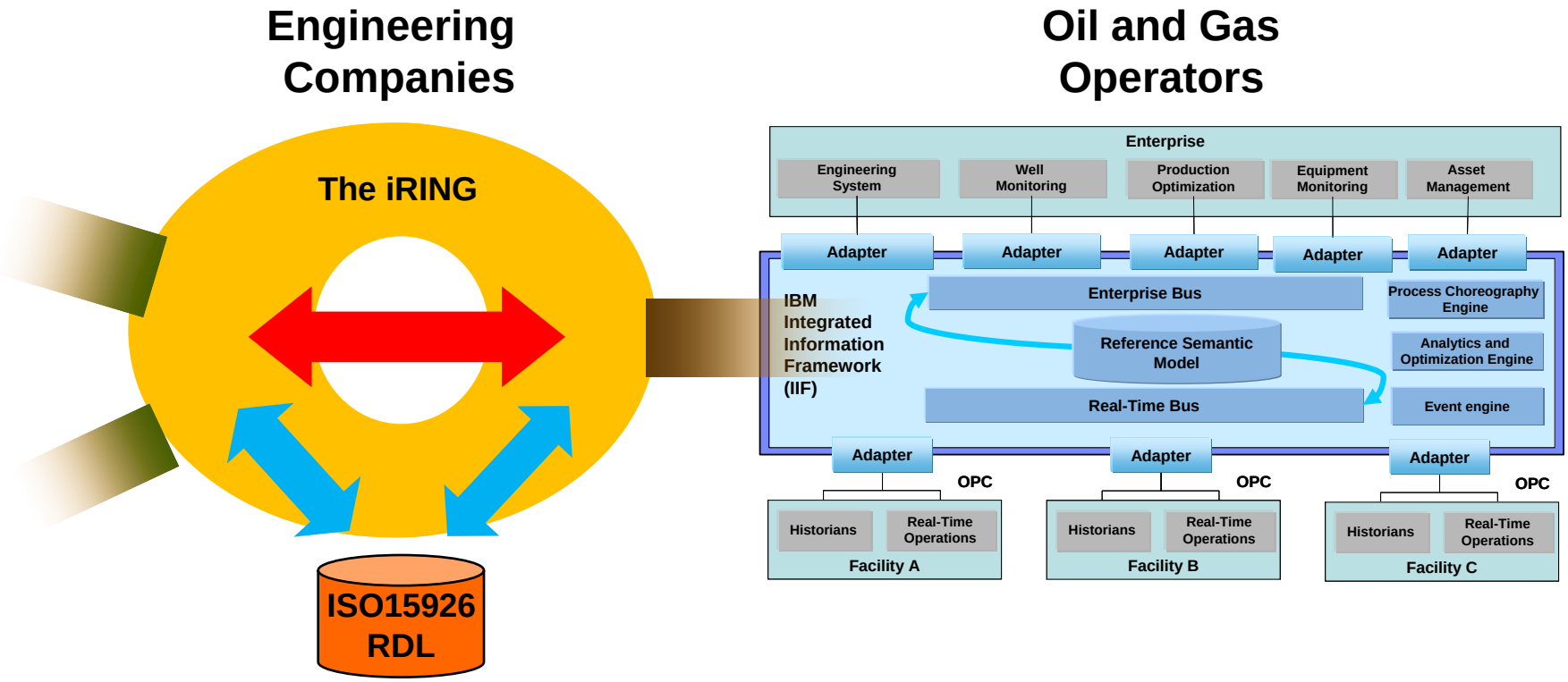
IBM
- RSM provider
- UML modeling expertise
- Application integration know-how
- Business scenario insight

DNV
- Vendor independent advisor
- Semantic technology expertise
- ISO 15926 modeling expertise
- Project management

Epsis
- Semantic technology expertise

Mimosa
- Domain standards expertise

Demonstrate that extended ISO15926 provides required interoperability



Engineering Company – Operator integration

- Needs shared terminology in Reference Data Libraries (RDL)
- **ISO 15926: the semantics of iRING**

Oil and Gas Enterprise – Facility Integration

- Needs a standardized information model
- **ISO 15926 extension Reference Semantic Model (RSM): the basis for IO G2**