

# IT Architecture for Integrated Operations

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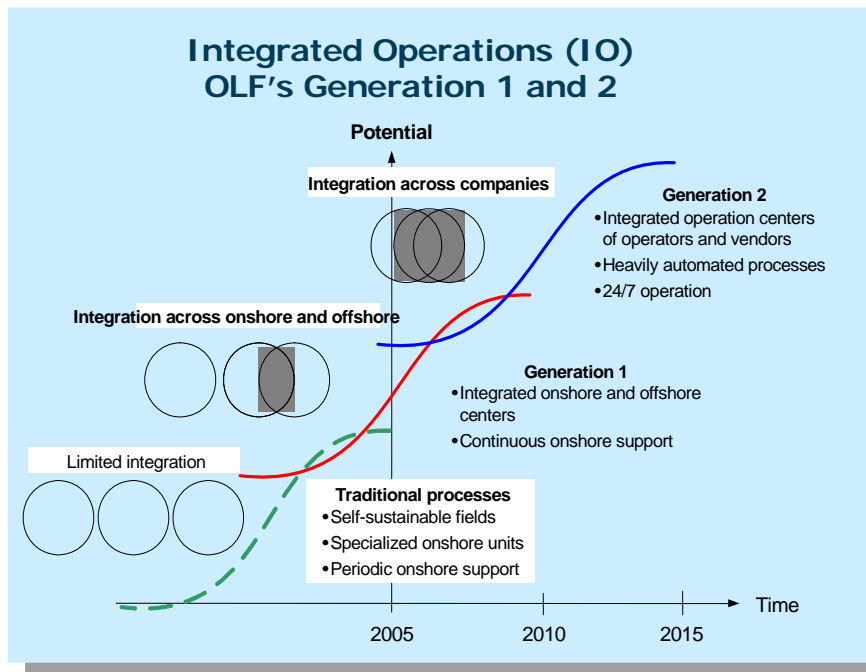
## Acknowledgements

Thanks to Thore Langeland and OLF for initiating this work

Thanks to the sponsors at StatoilHydro Tor Inge Vik, Wenche Havn and Bernt Helge Hansen for their support

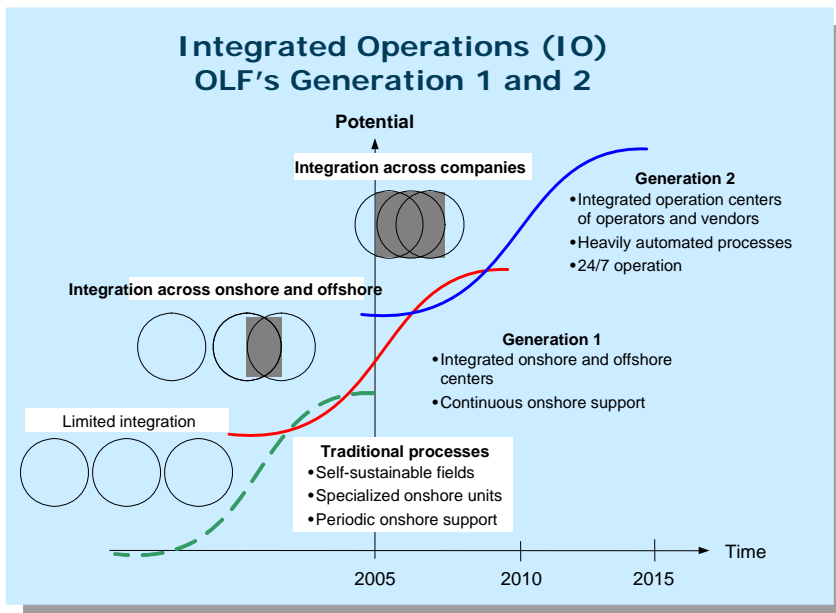
Thanks to the members of the work group: Knut Sebastian Tunglund (StatoilHydro), Frode Myren (IBM), Paul Carr (Capgemini) and Svein G. Johnsen (Sintef)

# According to OLF is Integrated Operations about



- More real-time data onshore and offshore
- Safer, faster and better decisions
- 300 billion NOK

# StatoilHydro has a leading position



## Focus on OLF G1

- Work processes
- Infrastructure

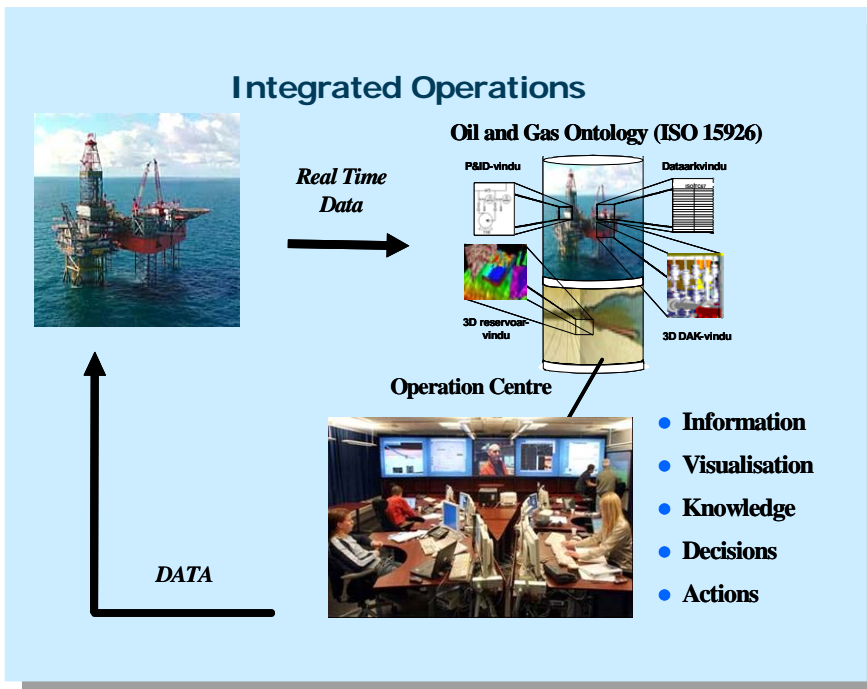
## Identified IT challenges

- Data quality
- Existing IT solutions (software) not designed for the task

G2 will drive for more advanced solutions

- Information Overload
- Automation & Autonomy

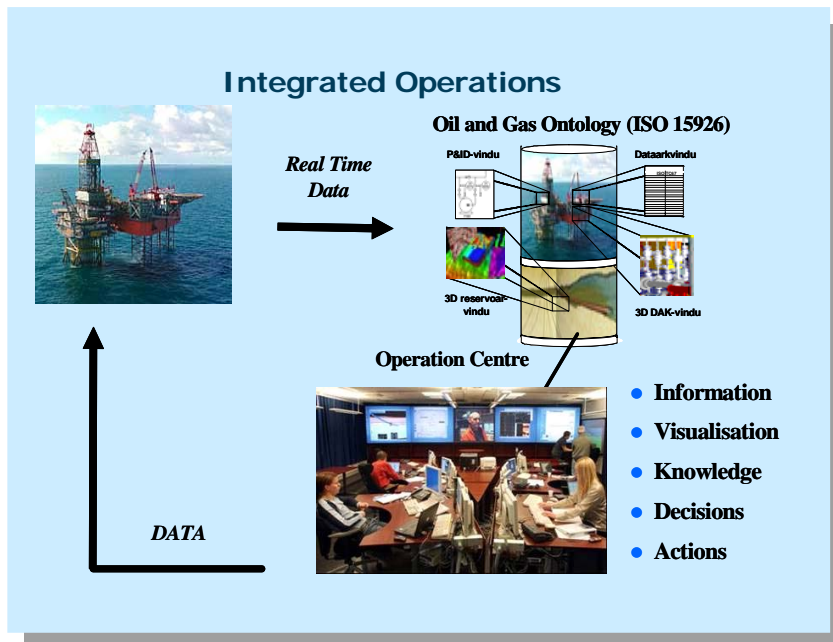
# From an IT perspective Integrated Operations is about



- Large scale networked systems
- Data fusion algorithms
- Machine learning
- Computerized decision making
- Bayesian uncertainties
- Safety critical domains
- Autonomy & automation
- Resource scheduling in highly dynamic environments
- Semantic web technologies

solving non trivial problems on the boundary of the possible

# Business case for a reference architecture



A reference architecture, provides the symbols, the language and solution templates for a particular domain

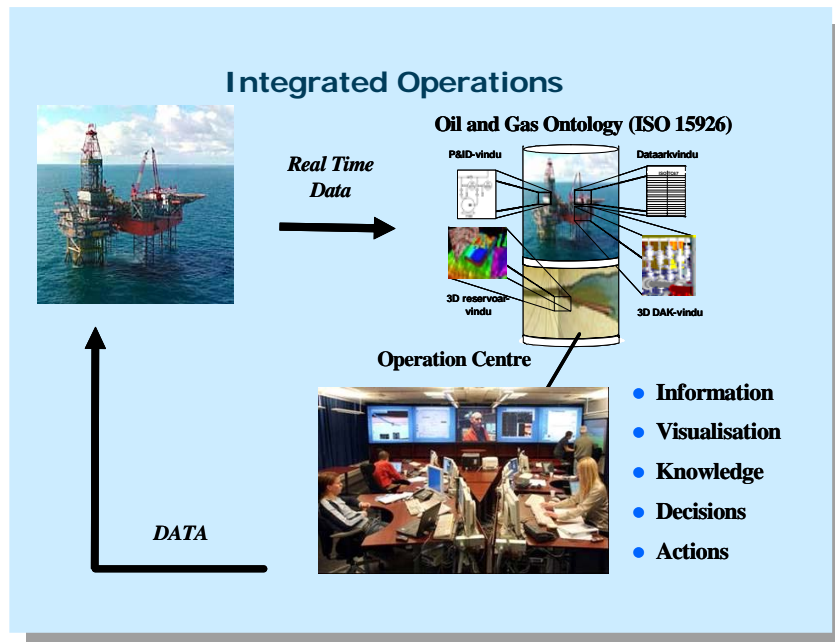
## Socio-technical systems

- Human and technical elements working to achieve common goals
- Holism over reductionism
- Offloading the human element through automation

## Architecture

- Communicates how elements are connected into a working hole
- Vehicle for comparison
- Vehicle for planning
- Vehicle for improvement

# Approach



## Standards based

- IEEE Std. 1471
  - IEEE Recommended practice for architectural descriptions of software intensive systems

## Focus on

- Context
- Stakeholders and stakeholder concerns
- Viewpoints and views
- Symbols and language

Document concerns and solution as a pattern

# Ambition



## Build on the back of earlier projects

- IIP, TAIL IO, SIOR, WITSML/PRODML, LicenseWeb/Diskos, SOIL, RigNet/TampenNet

## Use applicable industry standards

- ISO 15926, PRODML, WITSML, ...

## Address 5-10 stakeholder concerns

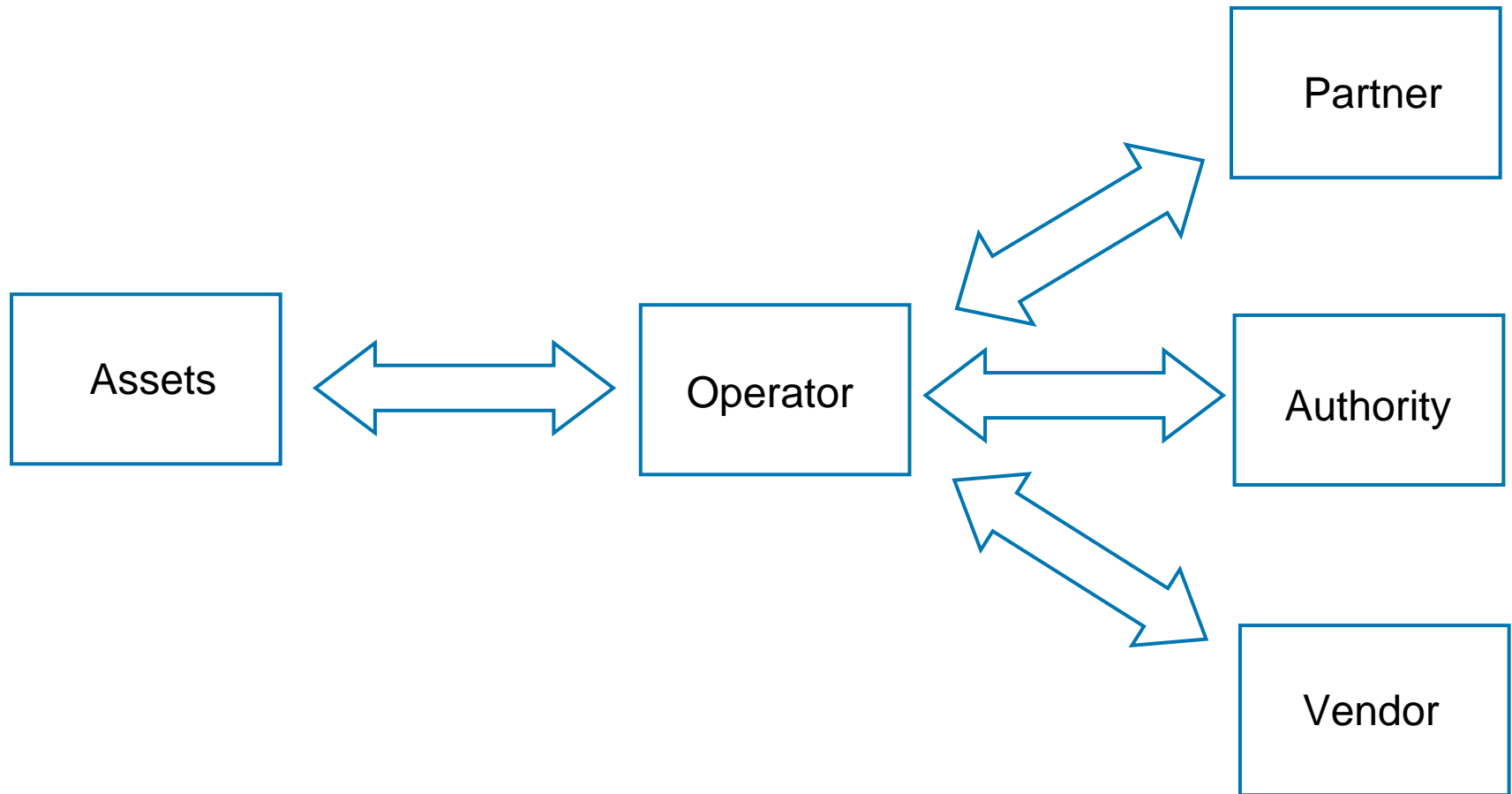
- Document each as a pattern

## Focus on language & communication

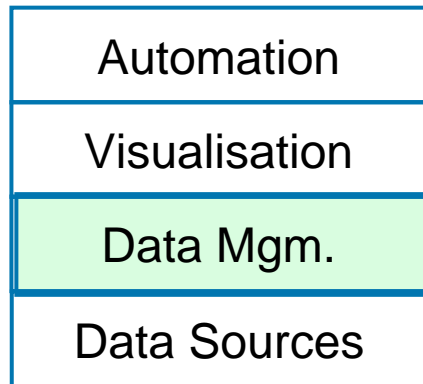
- Avoid the Tower of Babel effect



## Identified areas of concern (Operator perspective)

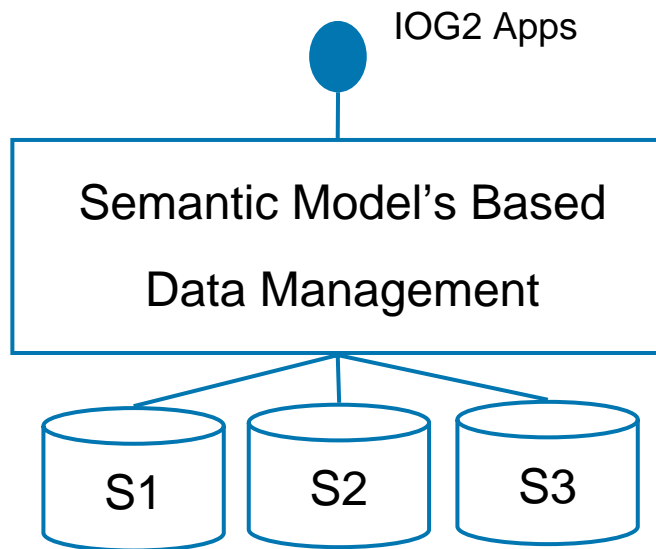


# Pattern for Asset – Operator Collaboration



## Semantic models based data management

- Based on TAIL IO results
- IBM best practice
- Pattern might be applicable for other concerns



## Addresses the concern of:

- Interfacing legacy systems
- Interfacing heterogenous data sources
- Provision of standardized data access

## Status and further work

- Feasibility study accomplished
  - Provided one pattern
  - Methodology in place
- Identify the most important stakeholders and their concerns
  - Capture relevant patterns
  - Identify applicable standards (for the pattern)
- Decide upon organisation of further work
  - Need for more than one NCS operator
  - International applicable

# Questions?