

The application of semantic models in ISO 15926 *Introduction to the theme*

Integrated Operations in the High North – Joint Industry Project



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High North: opportunities



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- **90 billion barrels** of undiscovered, technically recoverable oil estimated (USGS, 2008)
- About **22%** of the expected undiscovered resources in the world

⇒ **High activity levels**

High North: challenges



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- **Remote locations:**
logistics and operations
 - **Environmental sensitive:**
zero footprint, weather, ...
 - **Technically challenging:**
ice, subsea, communication
 - **High economical stakes:**
High OPEX / High CAPEX
- ⇒ **New field development and operational concepts required**

High North: typical operational concept



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- Heavily instrumented facilities
- Lean local organization
- Extensive remote support organization

⇒ Robust and secure digital infrastructure required

⇒ Novel collaborative work processes required

IO Generation 2: Extended support models

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Continuous use of multi-asset support centres in combination with expert centres

Main advantage:

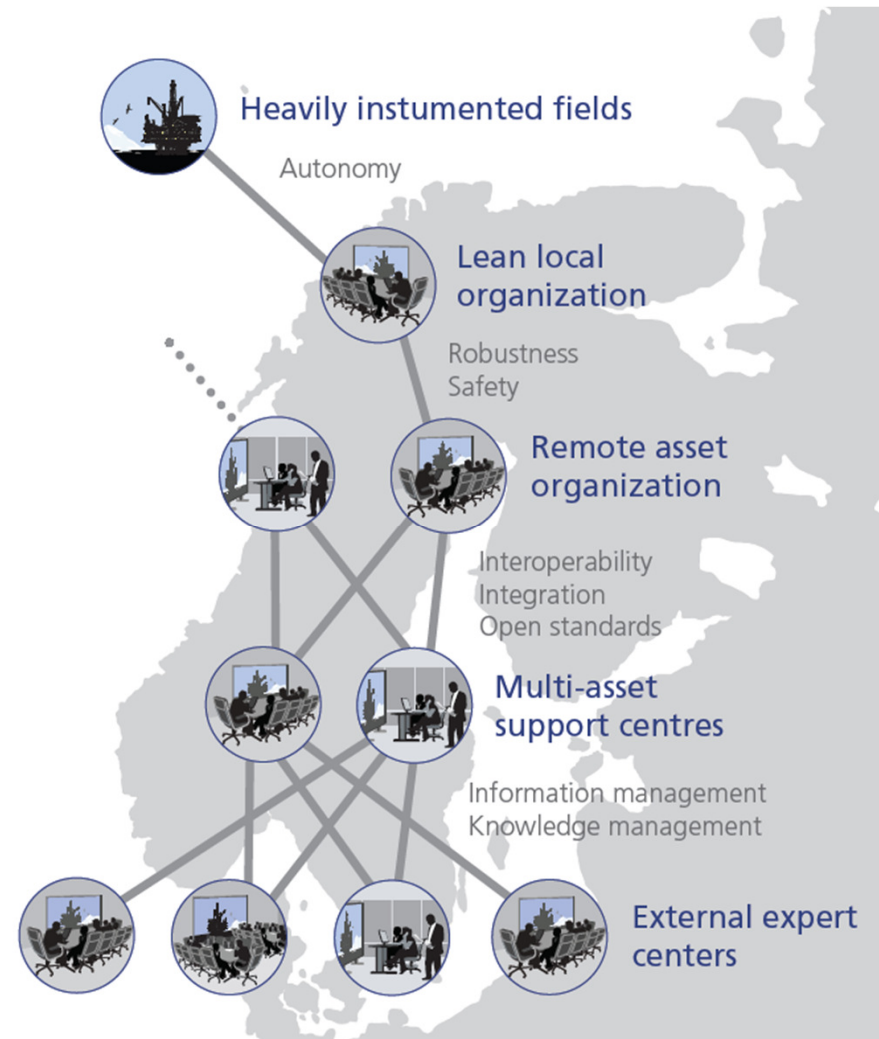
- Better leverage of expertise

Challenge:

- Situational awareness
 - Local situation/set up
 - What is going on?

Prerequisite:

- Reliable digital platform



Main Objective for IO in the High North

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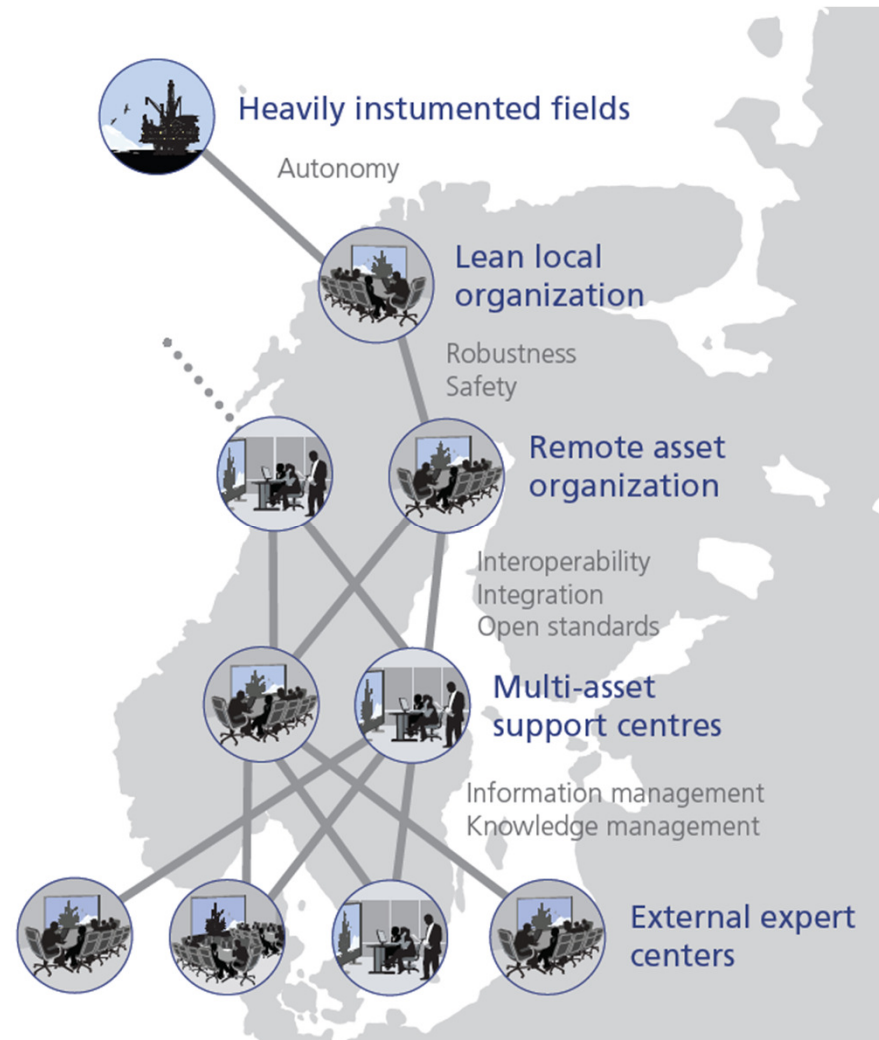


Main objective: Demonstrate a reliable digital platform for Integrated Operation Generation 2 (IO G2)

Requirements: Come from use cases within

- Drilling & Completion
- Production & Reservoir management
- Operation & Maintenance

Key element: Handling of real-time data across applications, disciplines, locations and organizations using ISO 15926



Participants and funding

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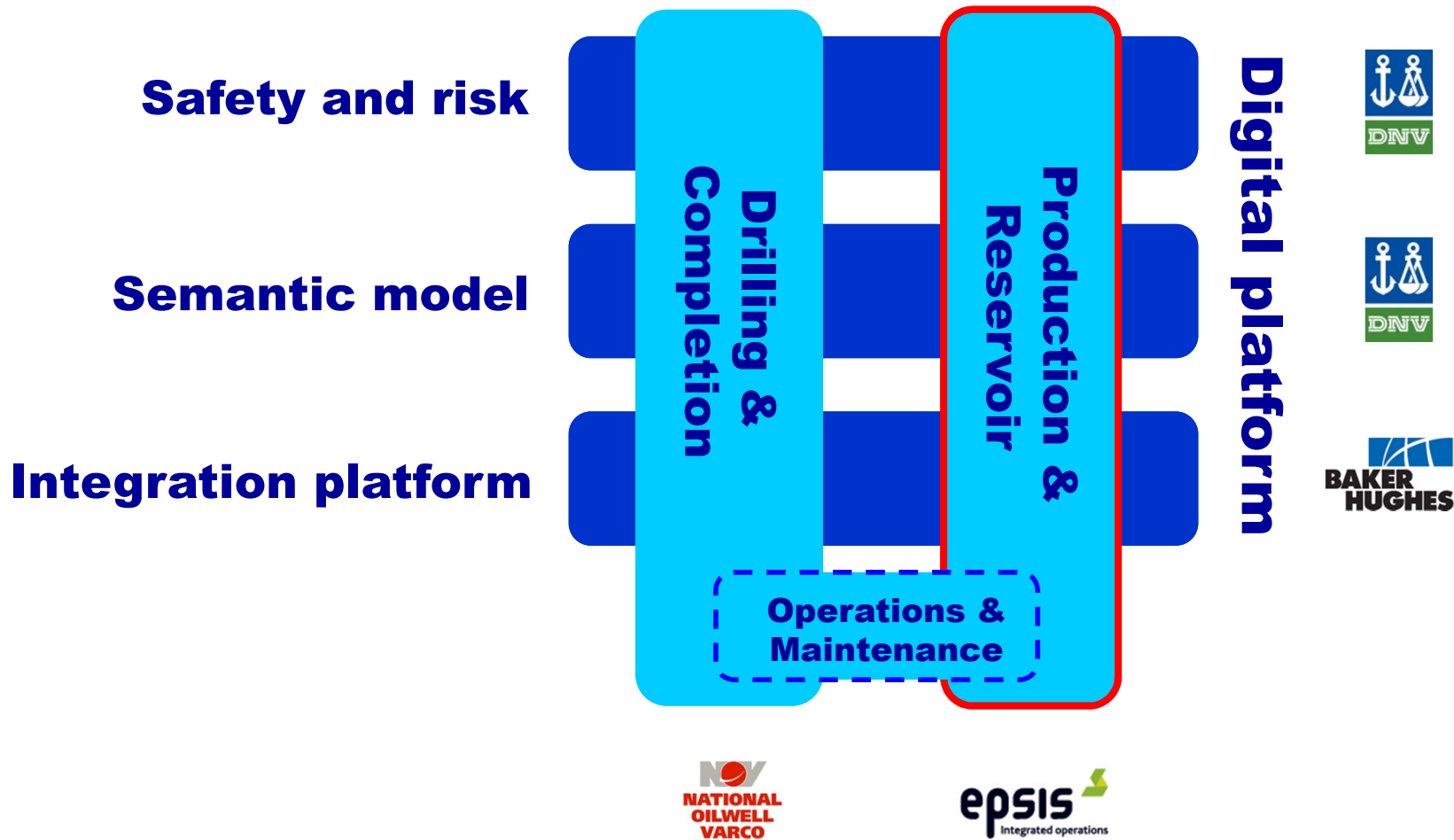
- Funding: 90 M NOK / 15 M USD
- Start-up: 2008-05-01
- Duration: 4 years
- Budget includes 17 MNOK from the Research Council of Norway grants GOICT & AutoConRig.

Project set up and activity leads

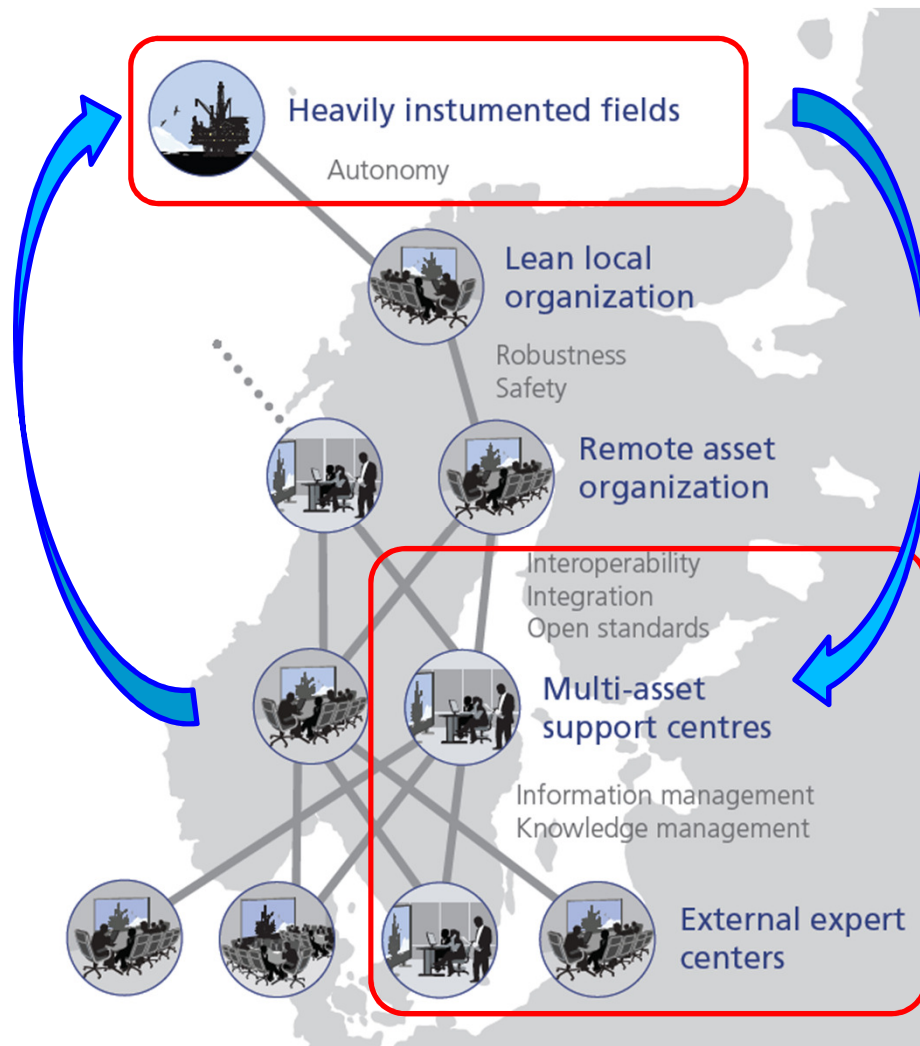
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Business processes



Production use cases



Production Support Center

- Multi-asset Support Center at Statoil in Stavanger
- 3rd line, multi-asset
- Ambition: proactive monitoring and managing production critical sub-systems in collaboration with external expert centers

Challenges:

- Information overload
- Interoperability / Integration
- Data standardization
- Domain knowledge abstraction

Production use cases

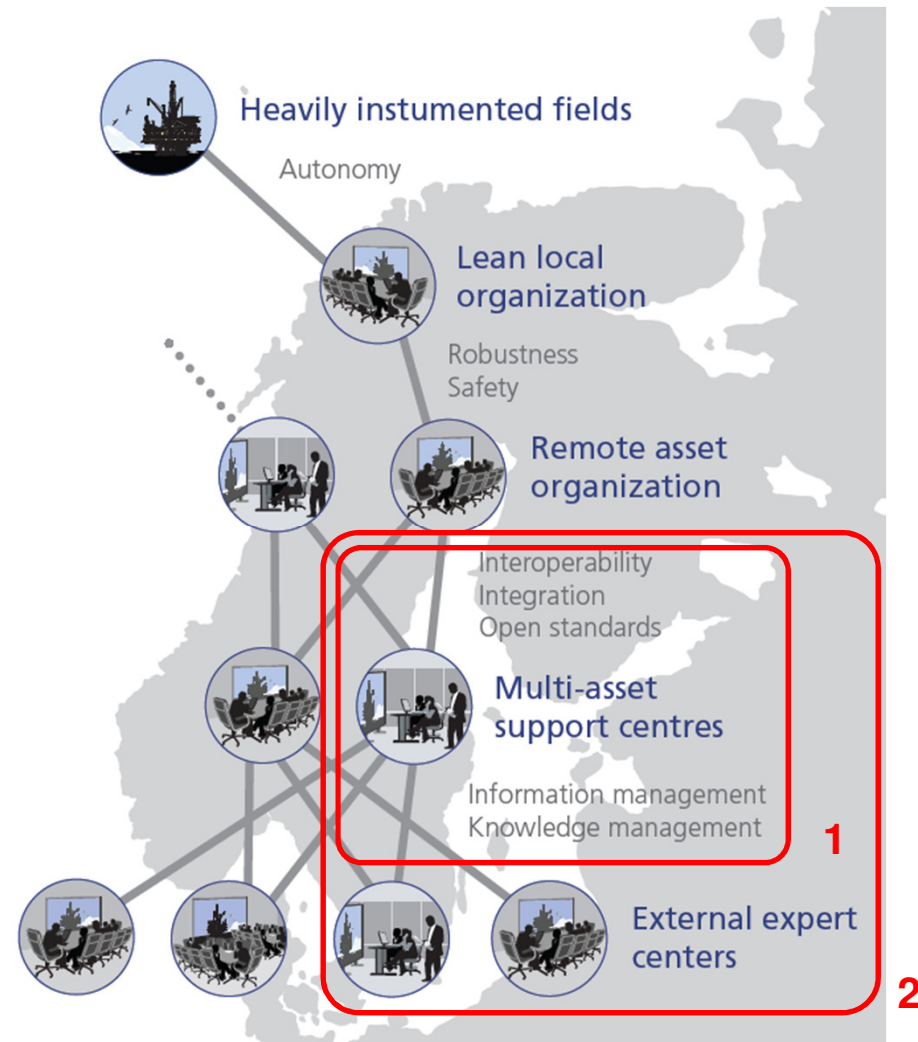


- **Two use cases:**

1. Sand detection: semi-automatic validation of sand measurements (fast loop)
2. Erosion Monitoring: monitoring of erosion through interoperability with external expert centers (slow loop)

- **Common activities:**

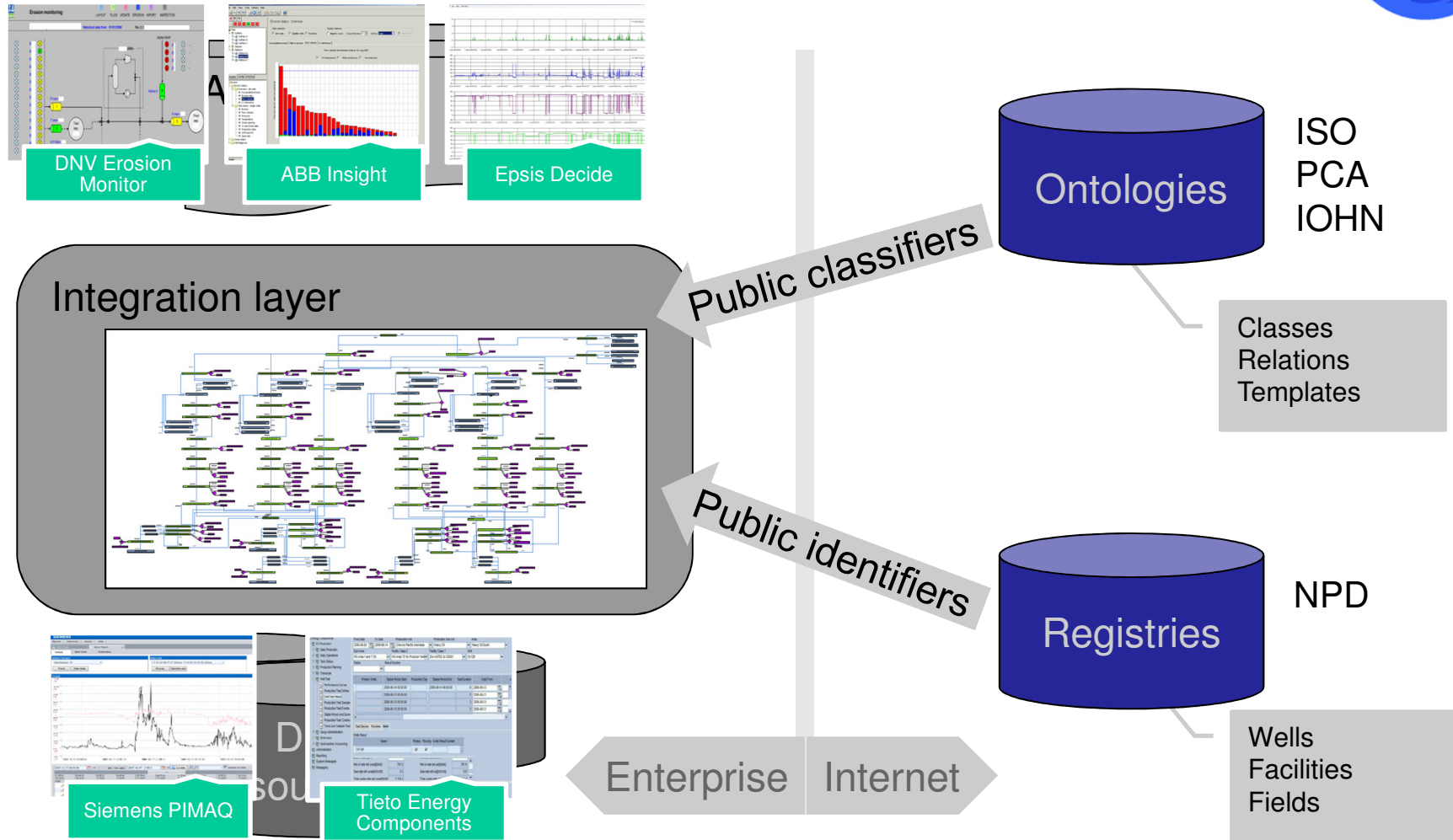
- Data standardization and abstraction of domain knowledge in sand management using a semantic model
- Autonomous decision making using a knowledge model based on an ontology



Use of a semantic model



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SOIL: Secure Oil Information Link

Agenda for this session

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- 8:30 – 9:00: *Intro on IOHN*, Frédéric Verhelst (DNV/Epsis)
- 9:00 – 9:30: *Reservoir and Production use case* by Bård Henning Tvedt (Epsis)
- 9:30 – 10:00: *Semantic model - An ISO 15926 Use Case* by Johan Wilhelm Klüwer (DNV)
- 10:00 – 10:30: Break
- 10:30 – 11:00: *Validity checking of the Semantic model* - Martin Giese (Univ. of Oslo)
- 11:00 – 11:30: Discussions