

Foundations for AI: Digital Twins and Knowledge Modelling



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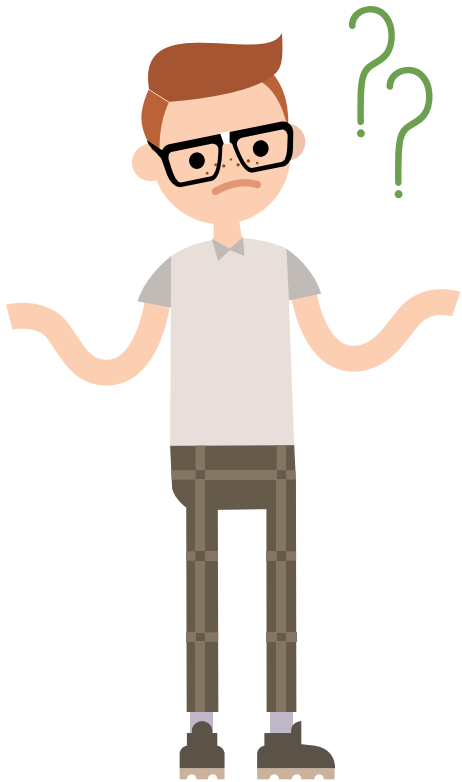
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The twin transition will blend the process, energy and construction disciplines



Digital Twins: a pattern for using IT to make good decisions



Optimal Performance
(Reliable, Safe,
Profitable, Sustainable)

Analysis, reasoning and decision
support
i.e. Artificial Intelligence

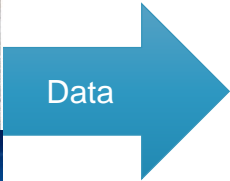
The system's
design and
configuration

Measurements

Simulation
and analysis

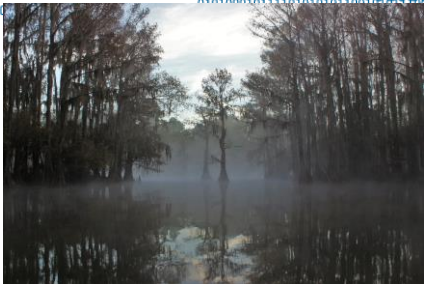
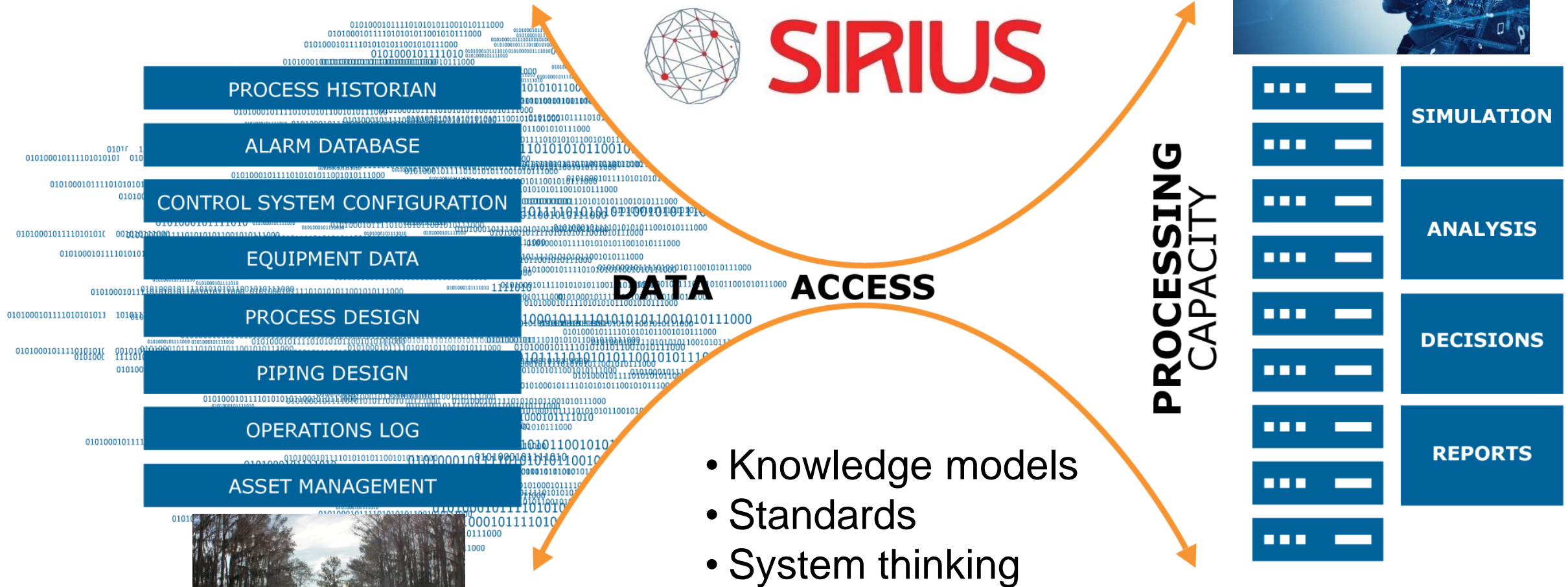
Building digital twins is difficult and expensive

- How can I get an overview?
- How can I get *just* the information I need?
- Why are there so many documents?
- Where is my data?
- What are things called?
- How can I integrate and exchange data?
- How can I avoid typing data into Excel spreadsheets?

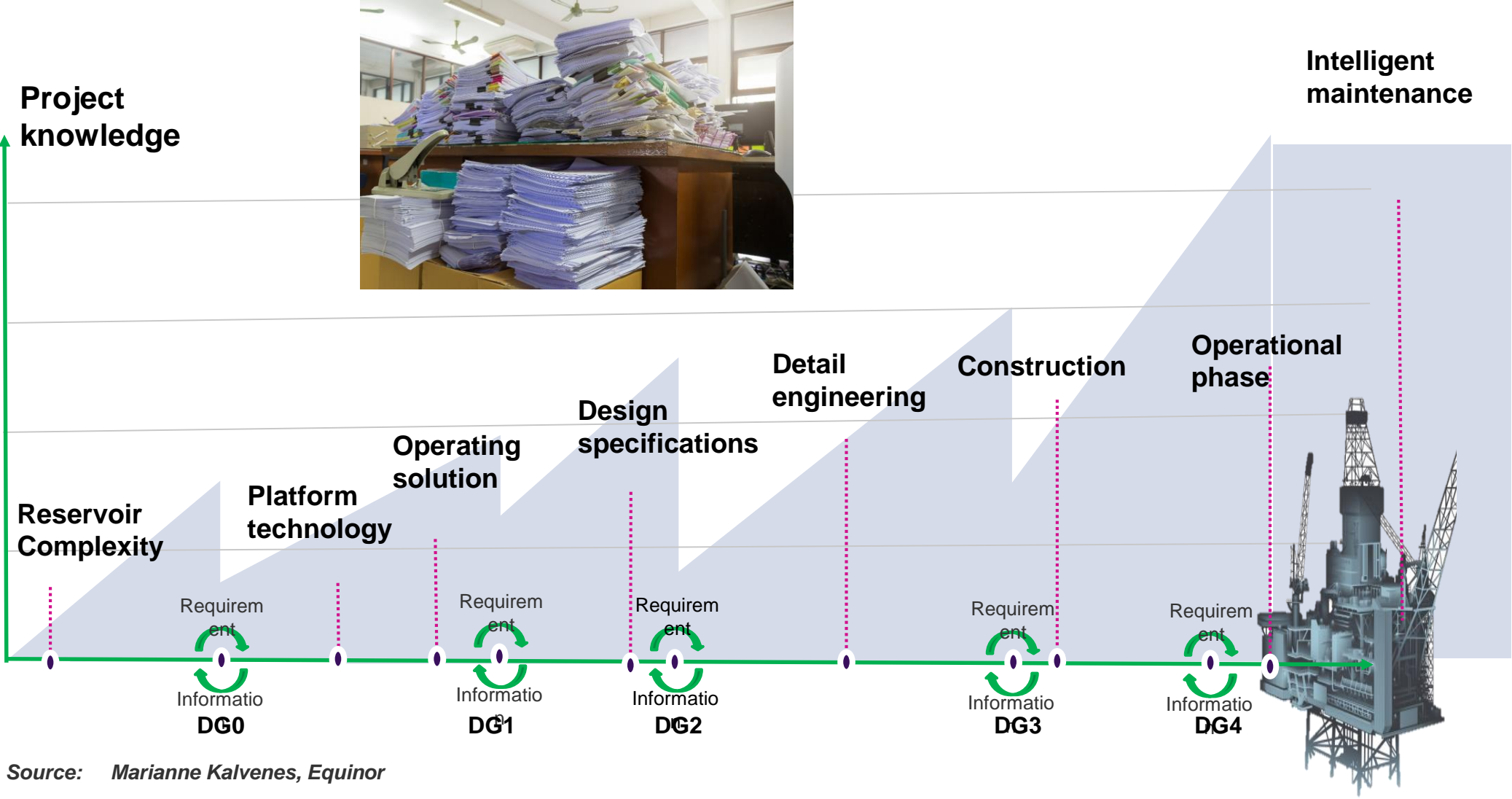


Scalable Data Access is Still a Limiting Step

80% of the work is related to obtaining and checking data

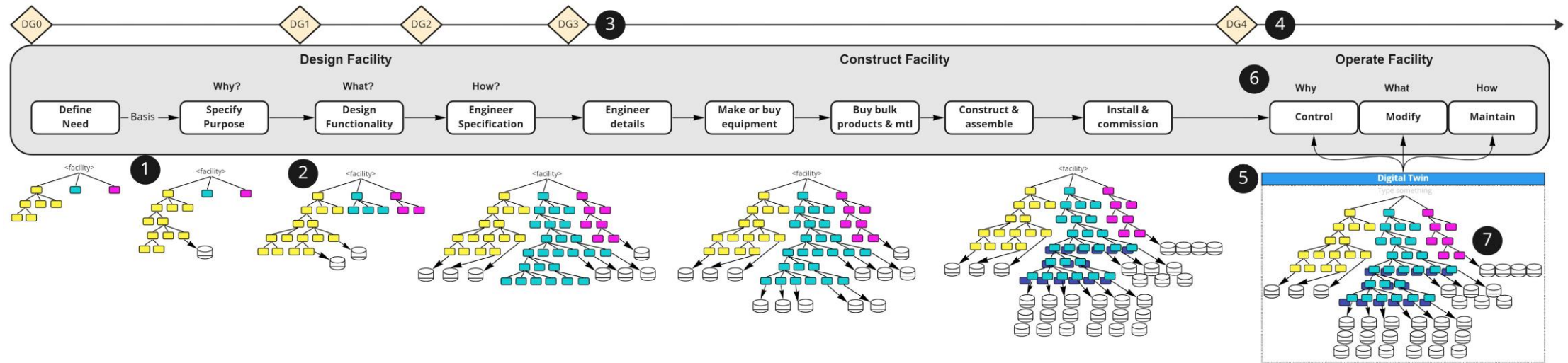


Information loss along the project life cycle



Source: Marianne Kalvenes, Equinor

Data-centric engineering: moving from documents to data



Courtesy Prof. Arild Waaler

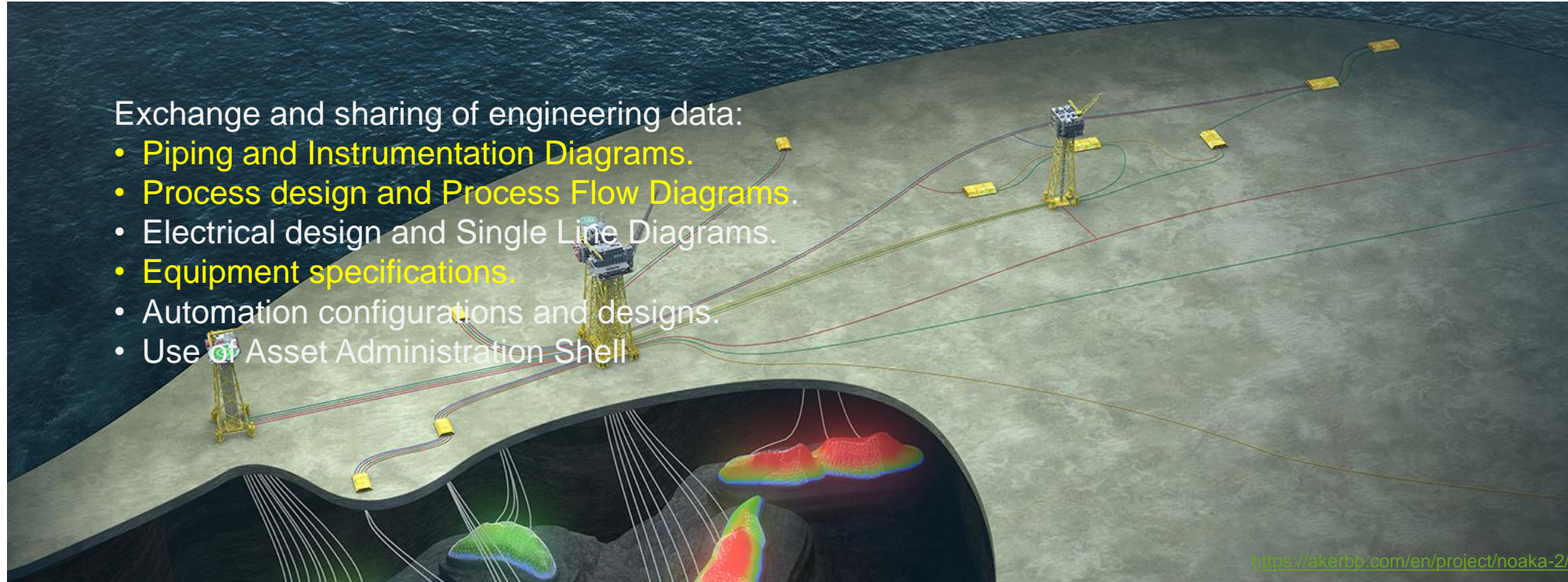
DISC: The Yggdrasil field Development

Two Operating Companies and Two EPC Contractors with a Coordinated, Interlinked Development

Exchange and sharing of engineering data:

- Piping and Instrumentation Diagrams.
- Process design and Process Flow Diagrams.
- Electrical design and Single Line Diagrams.
- Equipment specifications.
- Automation configurations and designs.
- Use of Asset Administration Shell

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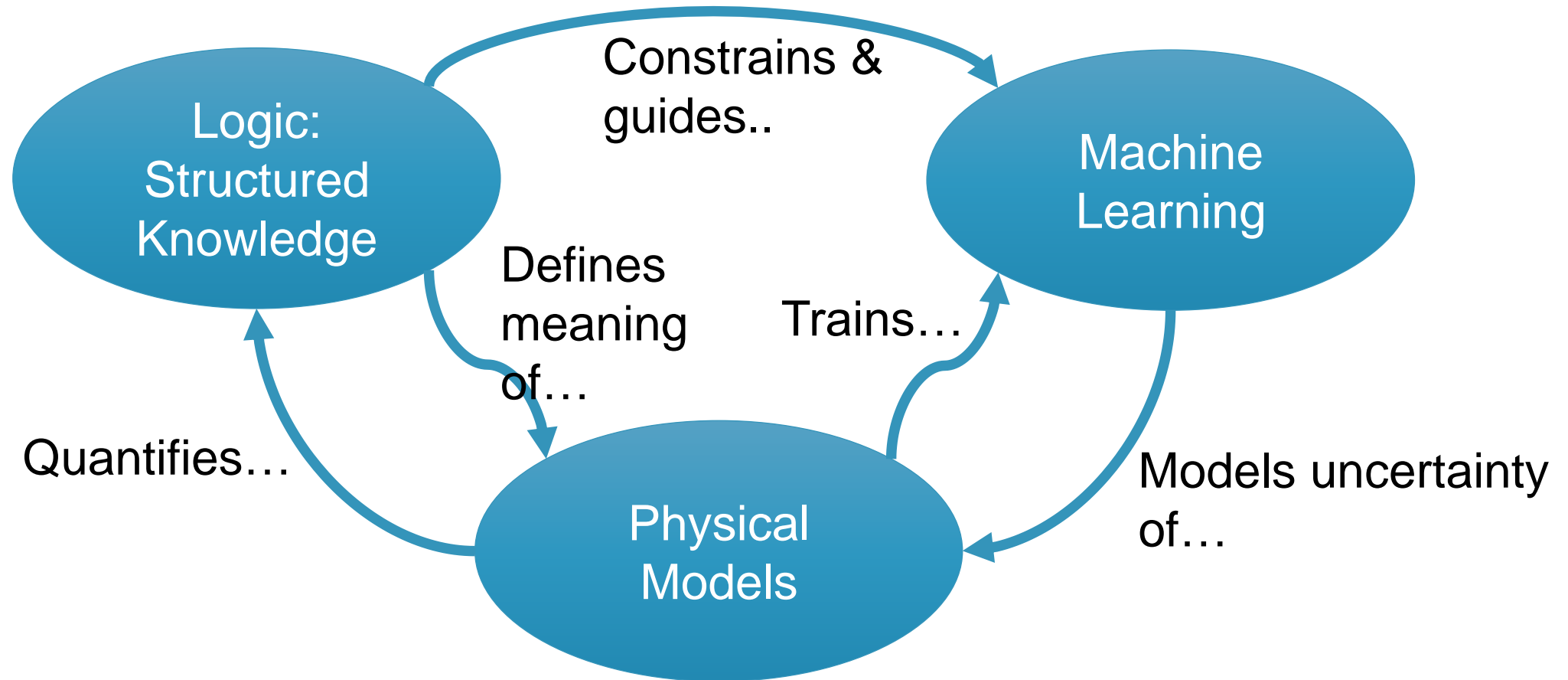
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Move from **document-centric** to **data-centric** engineering.

Use **aspect systems** to model the design information for a topside facility

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We need to build a multi-faceted way of capturing knowledge



Active development and testing in use of standards

A Norwegian investment in the future



ISO/NP 23726-3 IDO
ISO/IEC 81346
IEC61970 CIM
ISO



Capital Facilities Information HandOver Specification

