

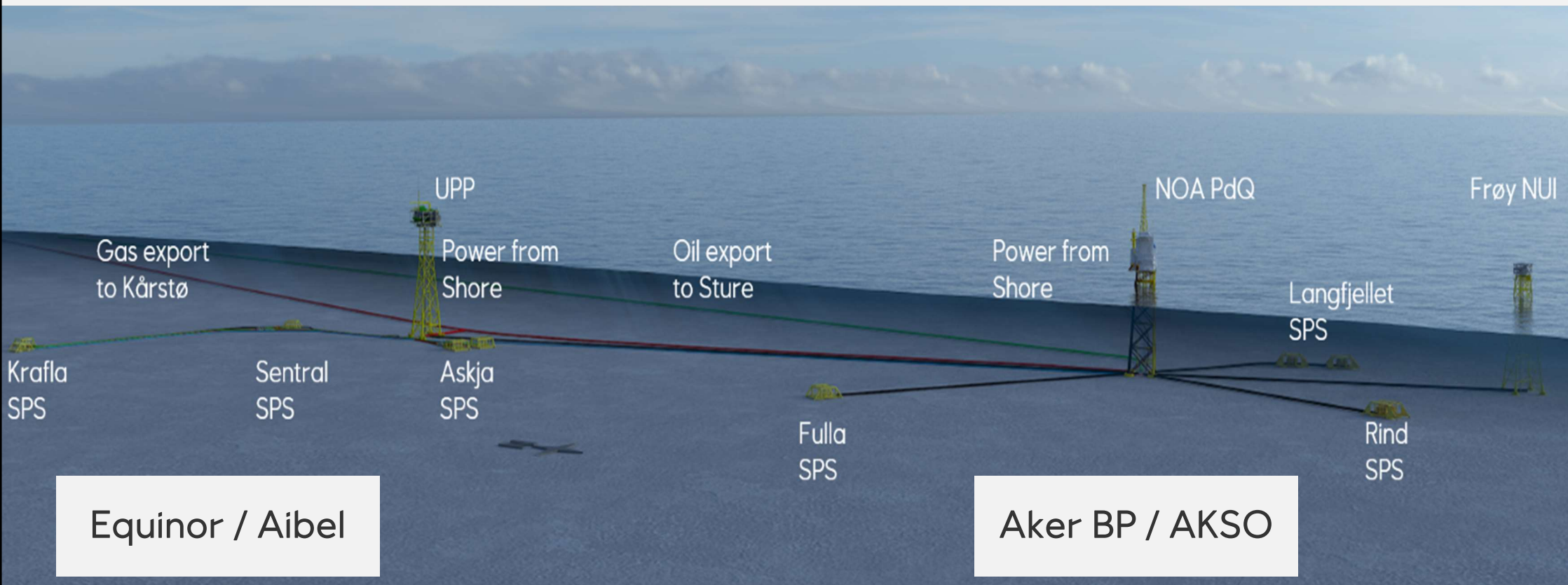


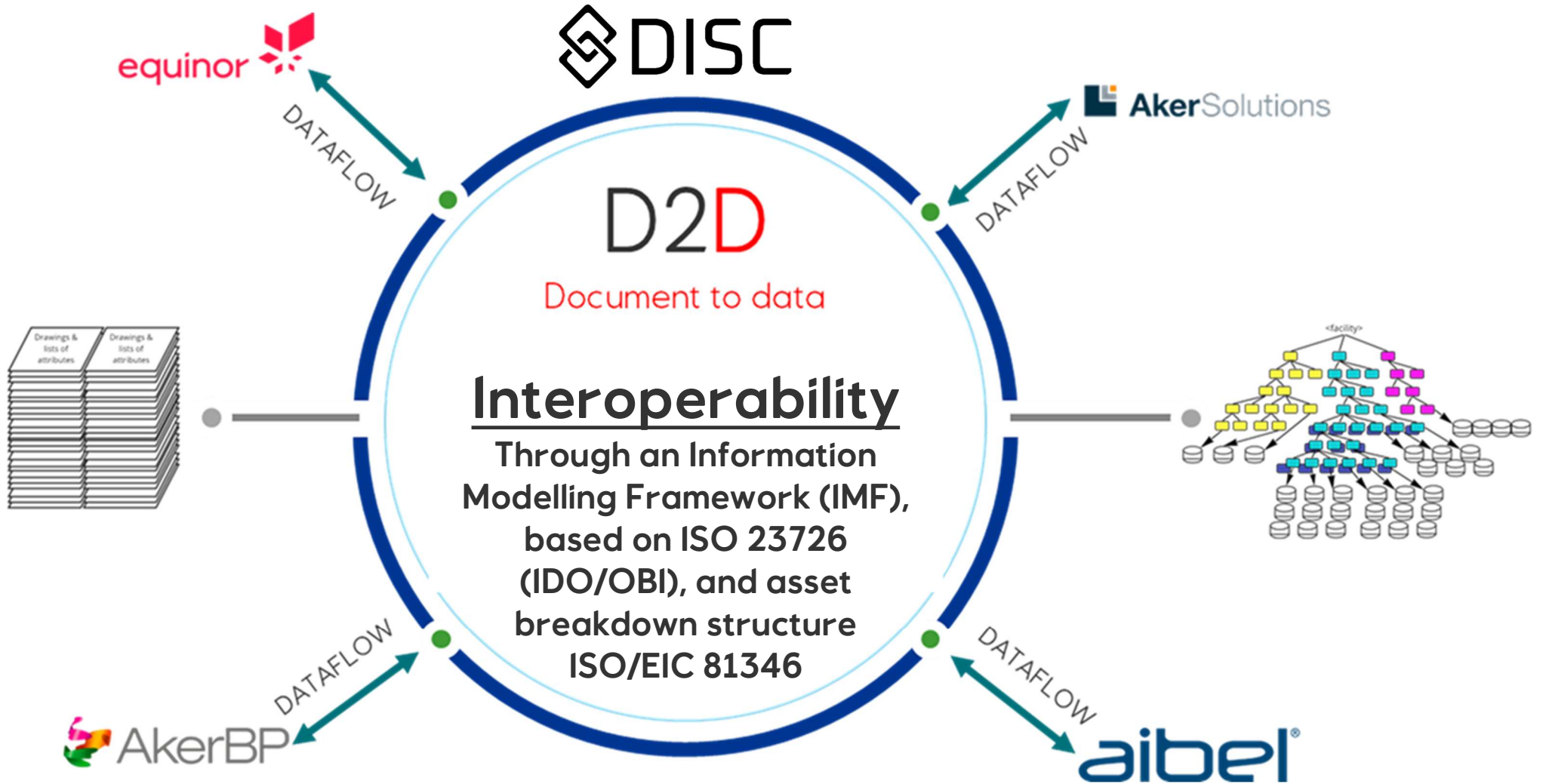
# DISC


Presented by  
HELGE FERDINAND SCHJØTT Aker BP  
Equinor Business Center, Stavanger 23-10-2024

# NOAKA Digital Collaboration 2020

Equinor / Aker BP / Aker Solutions / Aibel





The  DISC objective is to achieve  
a Seamless, Standardized, Secured and Verified Dataflow  
enabled by PCA library services,  
to accelerate Project Execution and streamline  
Operational Processes for greater efficiency

## ORGANISATION

**Work Group**

- Charles Halaas – Aibel
  - Idar Pe Ingebrigtsen – Equinor
  - Jann Slettebakk – Aker Solutions
  - Tonje Sandnes Blix – Aker Solutions
  - Helge Ferdinand Schjøtt – Aker BP
  - Ove Heitmann Hansen – Aker BP
  - Veronica Tverbakk – Aker BP
- 
- Lars Dag Berthinussen – PCA
  - Fredrik Valde Antonisen – Webstep
  - Pål Rylandsholm – DNV

**Steering Committee**

- Ellen Christine Karlsen – Aibel
- Per Kristian Veiberg – Equinor
- Nina Solie – Aker Solutions
- Steinar Mollan – Aker BP



ACTIVITIES

ID	Task Name	Navn på ressurser	Varihet	Start	Slutt	% fullført	Notater	2024	2024
1	1] PROJECT DELIVERIES - Standardised Dataflow		392 dager	fr 01.07.22	se 31.12.23	99%			
2	1.1 Resources - Project resources & SMEs identified and allocated	Magnus O K	20 dager	ma 03.10.22	fr 28.10.22	100%	Activity schedule to be updated with all resources		100%
3	1.2 PoC - Sketch aligned, agreed and approved	Ove H H	110 dager	ti 02.08.22	le 31.12.22	100%	Success criteria 1, 2 and 4		100%
4	1.3 PoC - Test procedure defined and agreed	Magnus O K	8,8 dager	to 01.11.22	ti 11.12.22	100%	Second day aligned and PoC		100%
5	1.4 New use cases - Identified and agreed	Magnus O K	8,8 dager	to 01.11.22	ti 11.12.22	100%	Second day aligned and PoC		100%
6	1.6 Establish activity plan for remaining success criteria	Magnus O K	257 dager	ma 15.02.23	ti 06.02.24	100%	Plan updated success criteria and PoC. Workshop to be held.		100%
7	1.7 Support and onboarding selected and agreed projects	Ove H H	522 dager	ma 02.01.23	ti 31.12.24	100%	Sprint/Use cases and learning, training, involvement of resources and SMEs. Key stakeholders engaged.		100%
8	1.8 PoC Presentation Steering Committee	Helge Ferdinand S	17 dager	on 23.11.22	to 03.12.22	100%	Present plan and status. PoC to be endorsed.		100%
9	1.9 PoC Demo / PoC FAT executed	Helge Ferdinand S	17 dager	on 23.11.22	to 03.12.22	100%	Present plan and status. PoC to be endorsed.		100%
10	1.10 Common Data Model Architecture Acceptance	Helge Ferdinand S	17 dager	on 23.11.22	to 03.12.22	100%	Present plan and status. PoC to be endorsed.		100%
11	1.11 Common IT specification for RDL and IMF - OHH to check with Magnus	Magnus O K	77 dager	fr 15.12.23	se 31.03.24	70%	Plan with Mihaly. IMF manual. System architecture in DISC stakeholders		70%
12	1.12 Automated Data Verification (Digital Requirements)	Jann S	130 dager	on 01.11.23	ti 30.04.24	100%	See activity 2.10.4		100%
13	1.13 Verify delivery according to Task Descriptions	Jann S	130 dager	on 01.11.23	ti 30.04.24	100%	Void. New activity list established, see 2B)		100%
14	1.15 Plan for success criteria 1-11 content and deliveries	Jann S	130 dager	on 01.11.23	ti 30.04.24	100%	Plan and PoC to demonstrate all projects success criteria and include content and deliverables.		100%
15	1.16 Alignment projects & Offshore Norway	Jann S	130 dager	on 01.11.23	ti 30.04.24	100%	Project communicated		100%
16	1.17 Cyber security	Lars	457 dager	on 01.11.23	to 31.07.25	100%	See activity 2.10.1 (to be followed up by PCA)		100%
17	1.18 MoC and ID management	Magnus O K	20 dager	ma 03.10.22	fr 28.10.22	100%	Over the top. ABB Mac case. PoC established and published. See activity 2.10.1		100%
18	1.19 Follow-up PCA GOING live	Magnus O K	20 dager	ma 03.10.22	fr 28.10.22	100%	Over the top. ABB Mac case. PoC established and published. See activity 2.10.1		100%
19	1.20 MVP for viewer of data sheets and DEXPI format - ta inn i en av sprintene	Magnus O K	133 dager	ma 05.06.23	on 06.12.23	100%	To be done after datasheets are finished.		100%
20	1.21 Testdata for Digital LCI Workshop - ta inn i en av sprintene	Charles H Jann S	24 dager	fr 18.08.23	on 20.09.23	100%	DEXPI, datasheet, P&ID etc. Activity included in sprint		100%
21	2A] SPRINT - Based on Use Cases and Success Criteria								
22	2.1 Sprint development - SoW agreed and approved	Ove H H	522 dager	ma 02.01.23	ti 31.12.24	100%	General templates based on NOA use case		100%
23	2.2 Sprint 1 - SLD	Ove H H	44 dager	fr 01.07.22	on 31.08.22	100%	General templates based on NOA use case		100%
24	2.3 Sprint 2 - SLD	Ove H H	76 dager	to 01.09.22	to 30.12.22	100%	Includes Krafla and NOA use cases		100%
25	2.4.1 Sprint 3A - Electro load lists	Ove H H	76 dager	to 01.09.22	to 30.12.22	100%	Includes Krafla and NOA use cases		100%
26	2.4.2 Sprint 3B - Asset information Model	Ove H H	76 dager	to 01.09.22	to 30.12.22	100%	Includes Krafla and NOA use cases		100%
27	2.4.3 Sprint 3C - Symbol Library	Jann S	24 dager	fr 18.08.23	on 20.09.23	100%	DEXPI, datasheet, P&ID etc. Activity included in sprint		100%
28	2.5.1 Sprint 4A - Digital Datasheets	Ove H H	183 dager	on 18.01.23	fr 29.09.23	100%	Input from Aibel use case: Define process data sheet (ex. flow transmitters) with references from PCA RDL		100%
29	2.5.2 Sprint 4B - Digital Datasheet II	Ove H H	183 dager	on 18.01.23	fr 29.09.23	100%	Input from Aibel use case: Define process data sheet (ex. flow transmitters) with references from PCA RDL		100%
30	2.6 Sprint 5 - Compliance verifications	Ove H H	239 dager	ti 02.05.24	fr 29.03.24	100%	Update proposal for reference data and IMF types. To be checked out in FAT. See activity 2.10.1		100%
31	2.7.1 Sprint 6A - Changes of RDL and Production of IMF Types	Ove H H	239 dager	ti 02.05.24	fr 29.03.24	100%	Update proposal for reference data and IMF types. To be checked out in FAT. See activity 2.10.1		100%
32	2.7.2 Sprint 6B - RDF Format and Ontology	Ove H H	174 dager	on 01.11.23	se 30.06.24	100%	Test of the ontology from RDL (PCA) to RDF Graph. Test of PLM-RDL (IDO compliant). See activity 2.10.1		100%
33	2.8 Sprint 7 - Change Management of Data (Manual)	Ove H H	150 dager	fr 01.07.22	on 31.08.22	100%	General templates based on NOA use case		100%
34	2.9.1 Sprint 8A - Maintenance and Integrity Management	Ove H H	109 dager	to 01.08.24	ti 31.12.24	100%	See activity 2.10.8		100%
35	2.9.2 Sprint 8B - Work planning and work order (Wg)	Ove H H	109 dager	to 01.08.24	ti 31.12.24	100%	See activity 2.10.8		100%
36	2B) 2024 Activity list								
37	2.10.1. Continue Maturation, Testing, Knowledge Transfer of Established Library Services (PCA) and Frameworks (IMF and IDO)	Helge Ferdinand S	261 dager	ti 02.01.24	ti 31.12.24	25%	Pri 1. Ongoing. Supported by Per Kristian.		60%
38	2.10.2. Establish PCA Library Service for Machine-Understandable Symbols	Idar Pe Ingebrigtsen	154 dager	ma 01.04.24	to 31.10.24	2%	Pri 1. Ongoing. Supported by Jann and Charles.		2%
39	2.10.3. Concept and Requirements for Identifiers of Machine-Understandable and Model-Based Technical Information (Persistent)	Veronika Tverbak	86 dager	ma 03.06.24	ma 30.09.24	0%	Pri 3. Supported by Ove.		0%
40	2.10.4. Pilot for Reasoning and Automated Capability Checks on Technical Information	Veronika Tverbak	132 dager	fr 01.05.24	le 31.08.24	10%	Pri 1. Ongoing. Supported by Jann and Ove.		10%
41	2.10.5. Concept and Requirements for Management of Change, Versioning, and Revisions of a Digital Asset	Ove H H	135 dager	to 02.05.24	on 06.11.24	5%	Pri 3. Supported by Olaf Grødem.		5%
42	2.10.6. Pilot for using Industry 4.0's Asset Admin Shell (AAS) as a Technology for Exchange of Techn Information between industry	Charles H	100 dager	ma 05.08.24	fr 20.12.24	0%	Pri 3		0%
43	2.10.7. Maturation of DEXPI	Idar Pe Ingebrigtsen	218 dager	ti 02.01.24	to 31.10.24	60%	Pri 1. Ongoing. Supported by Ove and need assistance from Tonia Pedersen (Draga).		60%
44	2.10.8. Pilot for Converting Legacy Documents of Techn Information into Machine-Understandable Information Models According	Ove H H	141 dager	ma 18.03.24	ma 30.09.24	5%	Pri 2. Ongoing. Need support from EQN.		5%
45	2.10.9. Pilot a Multi-Discipline Digital Asset of a TEG System to test Maturation, Management of Change, Versioning, Revisioning a	Ove H H	130 dager	ma 17.06.24	fr 13.12.24	0%	Pri 2		0%
46	2.10.10. Large scale production and standardization of digital equipment data sets (Datasheets)	Ove H H	270 dager	ma 04.09.23	fr 13.09.24	50%	Pri 1. Ongoing. Split between EQN (Olaf Grødem) and ABP.		50%
47	2.10.11. Pilot and concept for integrating technical information describing the facility asset (LCI) and operational information (OT a	Jann S	86 dager	ma 03.06.24	ma 30.09.24	0%	Pri 4		0%
48	2.10.12. Mature IEC 63131 System Control Diagrams	Idar Pe Ingebrigtsen	80 dager	ma 02.09.24	fr 20.12.24	0%	Pri 4. Need support by Aker BP.		0%
49	3] SHOW & TELL 2023 - Shaping the Digital Future		357 dager	ma 21.08.23	ti 31.12.24	100%			100%
50	4] SHOW & TELL 2024 - Shaping the Digital Future		254 dager	ti 02.01.24	fr 20.12.24	0%			0%

Provide Library Services (PCA) and Frameworks (IMF and IDO)

Common Symbol Library

Maturation of DEXPI

Generate IMF Types made available through PCA

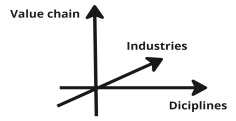
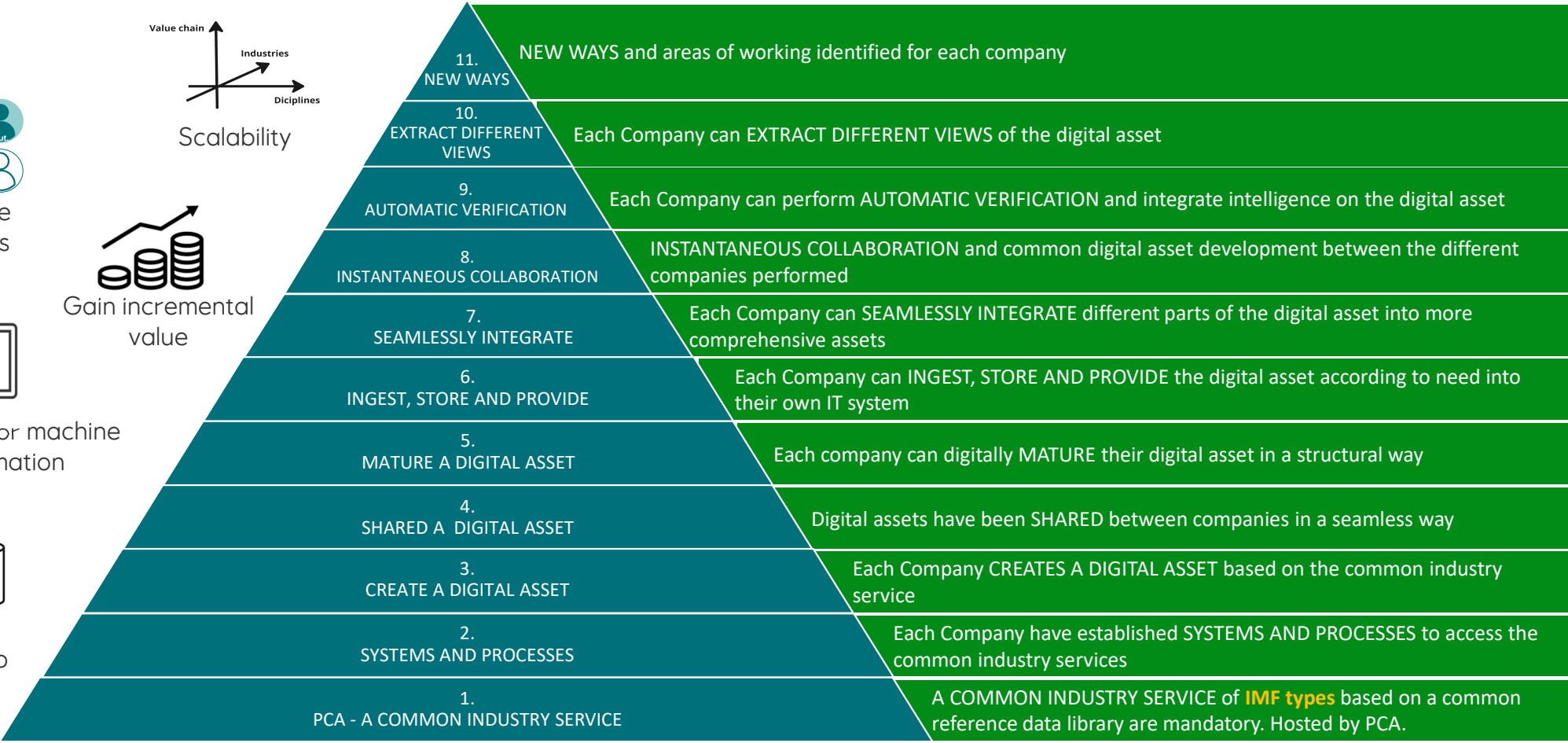
Reasoning and Automated Capability Checks

Management of Change of a Digital Asset

Pilot Using Industry 4.0 (AAS)

Training and onboarding - IMF, DEXPI, OBI-IDO, etc

SUCCESS CRITERIA AND ROADMAP



Scalability



Gain incremental value



SMEs are the users



Precision for machine automation



Utilize and contribute to industry commons

## WHAT IS THE IMF (Information Modelling Framework)

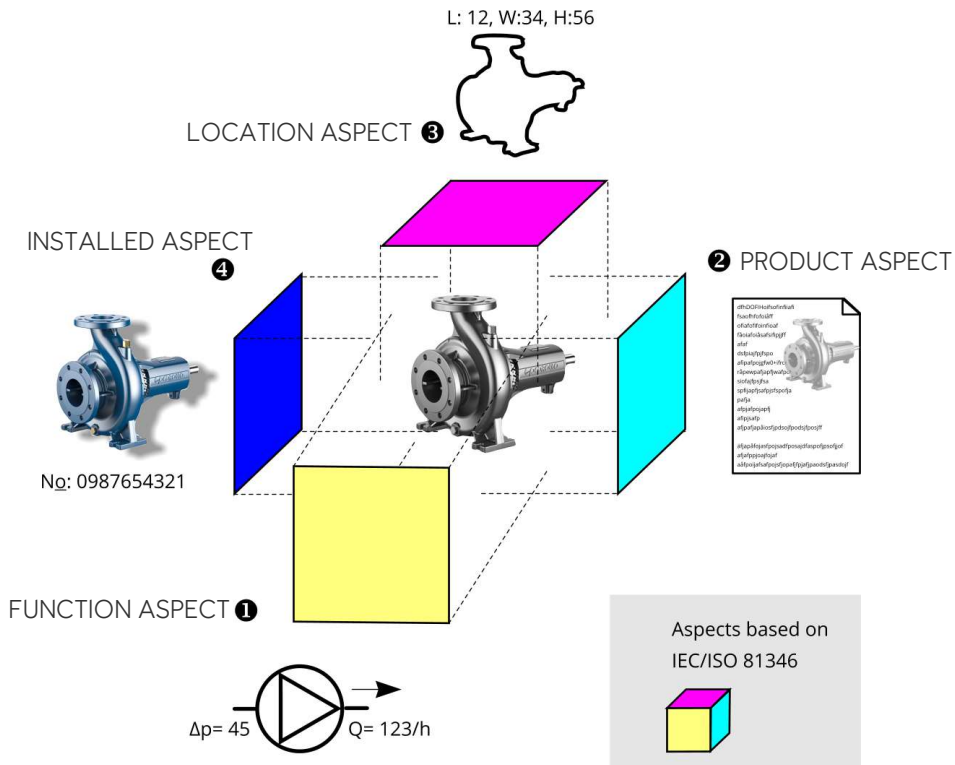
The **IMF** is a method, a framework, and a language that allows creating  
**an engineering friendly description of a Facility Asset,**  
using graphical figures and common industry reference data libraries.

The libraries contains definitions of elements (IMF Types) that are frequently re-used.

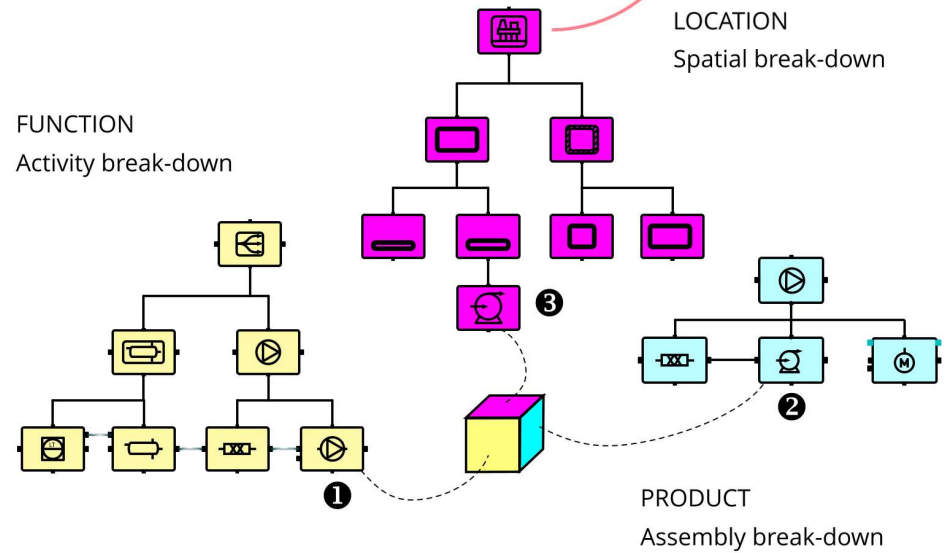
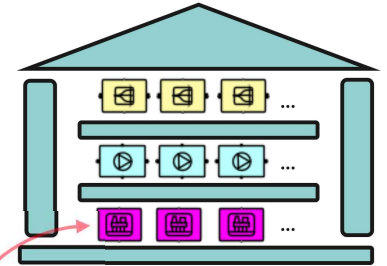
The resulting Information Model of the Facility Asset contains information  
in a format which is **readable to humans as well as to computers.**



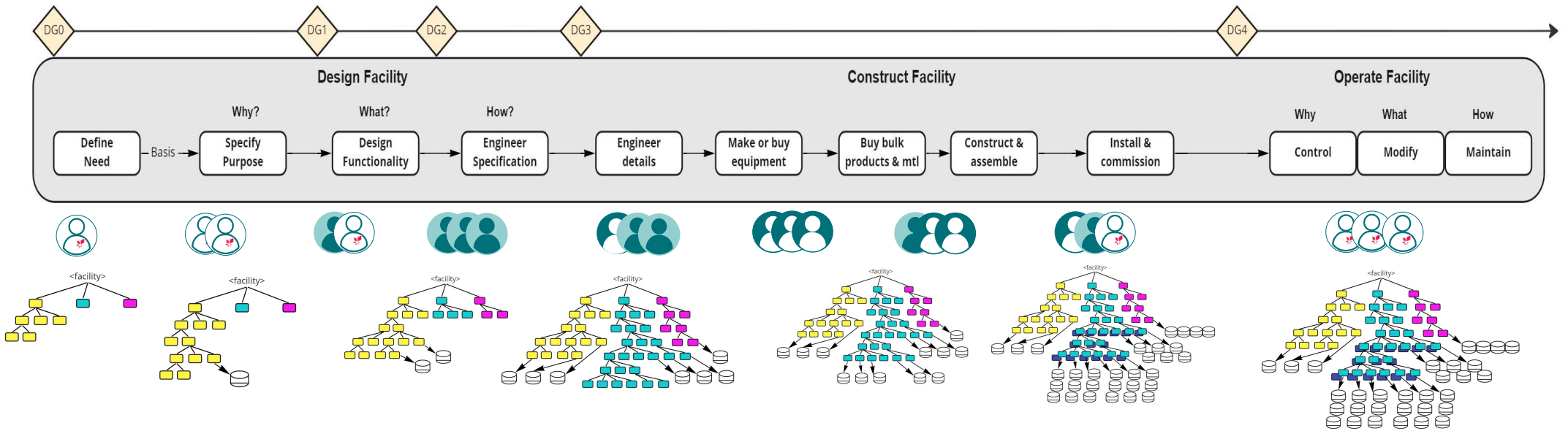
THE IMF



Industry commons



THE IMF



## FROM DATASHEET TO DIGITAL DATASET

NORSOK		Statoil		Project No. C132	
AkerSolutions		Project Name Gna Krog		Site Location North Sea	
		Client Name Statoil		Client Prog. No.	
1	Rev. GENERAL	Rev.		02	Tag No. 13HCV0330
2	06 Service	02 Location code		02	Location code V200
3	Supplier	02 Requirement			
4	06 Manufacturer	03 Purchase order			
5	06 Model	03 P&ID Number			
6	06 Serial No.	03 P-XX-1303-01			
7	02 Procurement package	05 Pipe Line Number			
8	Equipment no.				
9	Equipment Conditions				
10	06 Linesize in				
11	06 Linesize out				
12	15 Line rating in				
13	15 Line rating out				
14	01 Pipe spec. in				
15	01 Pipe spec. out				
16	01 Design Temperature				
17	01 Design Pressure				
18	01 Maximum Operating Temperature				
19	19 Fluid				
20	02 Phase				
21	21 Corrosive components				
22	22 Operating Conditions				
23	09 Case				
24	09 Total flowrate				
25	09 HC gas flowrate				
26	09 HC liquid flowrate				
27	09 Temperature				
28	09 Inlet pressure				
29	09 Pressure drop				
30	09 Liquid specific gravity @15P				
31	09 Liquid viscosity @TSP				
32	09 Liquid vapour pressure @TSP				
33	09 Liquid critical pressure				
34	09 Vapour molecular weight				
35	09 Vapour compressibility factor				
36	09 Vapour specific heat ratio				
37	Special Conditions				
38	Maximum shut-off delta P				
39	Tight shut-off				
40	Opening/Closing time				
41	02 Failure action (power/signal)				
42	NOTE:				
43	DATASHEET HAS BEEN UPDATED TO REFLECT SIZING FOR TRIM WITH C <sub>2</sub> = 30. ORIGINAL DATASHEET IS VOIDED, BUT NOTES FROM ORIGINAL SIZING ARE KEPT.				
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28	09	Inlet pressure	bara	190
16		Design Temperature	°C	Min: -46 Max: 120
17	01	Design Pressure	barg	Min: FV Max: 400

We give properties like inlet pressure, design temperature and design pressure and their units of measure precise interpretations and publish these to the common industry service (PCA) for public use

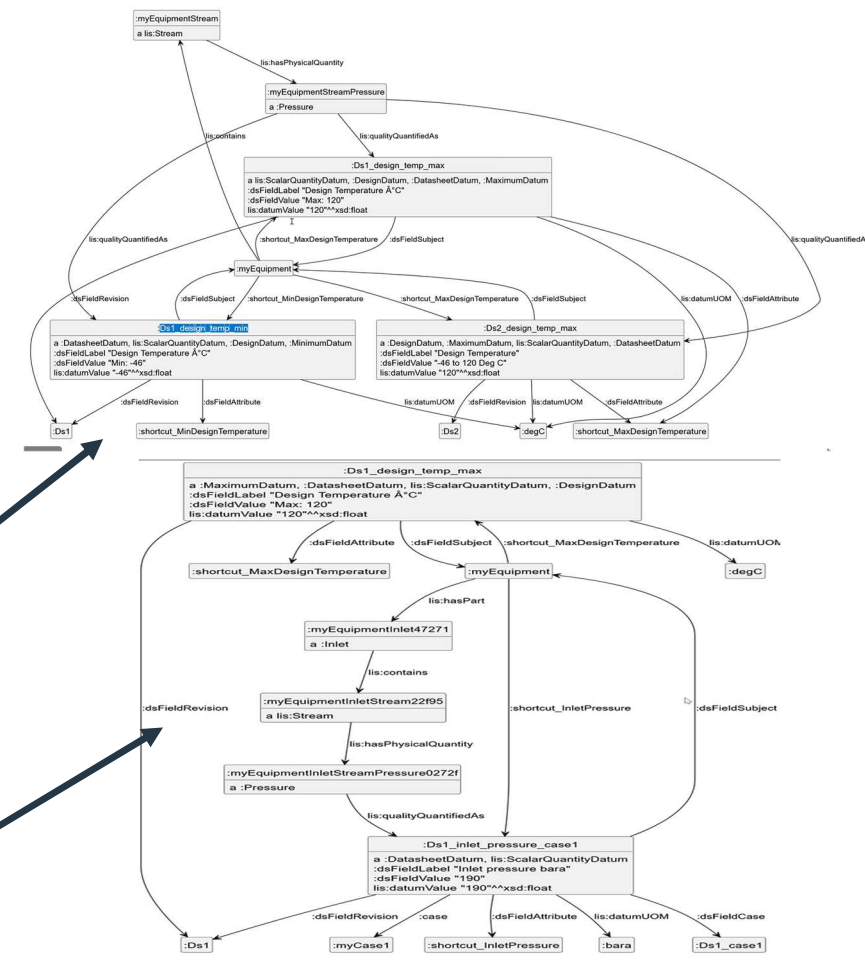
```

dsa:82c7d416-2e24-47f0-8c09-8b2ec5e4b2bb
rdf:type ds:QuantityDatum, ds:DatashetDatum;
rdfs:label "design temperature max datum";
lis:quantifiesQuality dsa:e1e728c0-b872-4c1c-a47f-f13070da2980;
ds:datumValue "120"^^xsd:decimal;
rdl:design temperature max;
ds:dsFieldAttribute "Design Temperature °C";
dsa:C132-KA-P-DS-0008-stream;
ds:dsFieldValue "Max: 120";
ds:dsRevision dsa:C132-KA-P-DS-0008-02_Rev09;
ds:uom rdl:degree Celsius.
    
```

```

dsa:80244475-4367-44a5-9d94-cbe01c3a33d0
rdf:type ds:DatashetDatum, ds:QuantityDatum;
rdfs:label "inlet pressure datum";
lis:quantifiesQuality dsa:abb65dc0-40b6-4a42-a7d9-67d60afd7a59;
ds:datumValue "190"^^xsd:decimal;
rdl:inlet pressure;
ds:dsFieldAttribute "Inlet pressure";
dsa:C132-KA-P-DS-0008-case1;
ds:dsFieldRevision dsa:exRev09;
dsa:13HCV0330;
ds:dsFieldSubject "190";
ds:dsFieldValue dsa:C132-KA-P-DS-0008-02_Rev09;
ds:dsRevision dsa:C132-KA-P-DS-0008-02_Rev09;
ds:uom rdl:bar absolute.
    
```

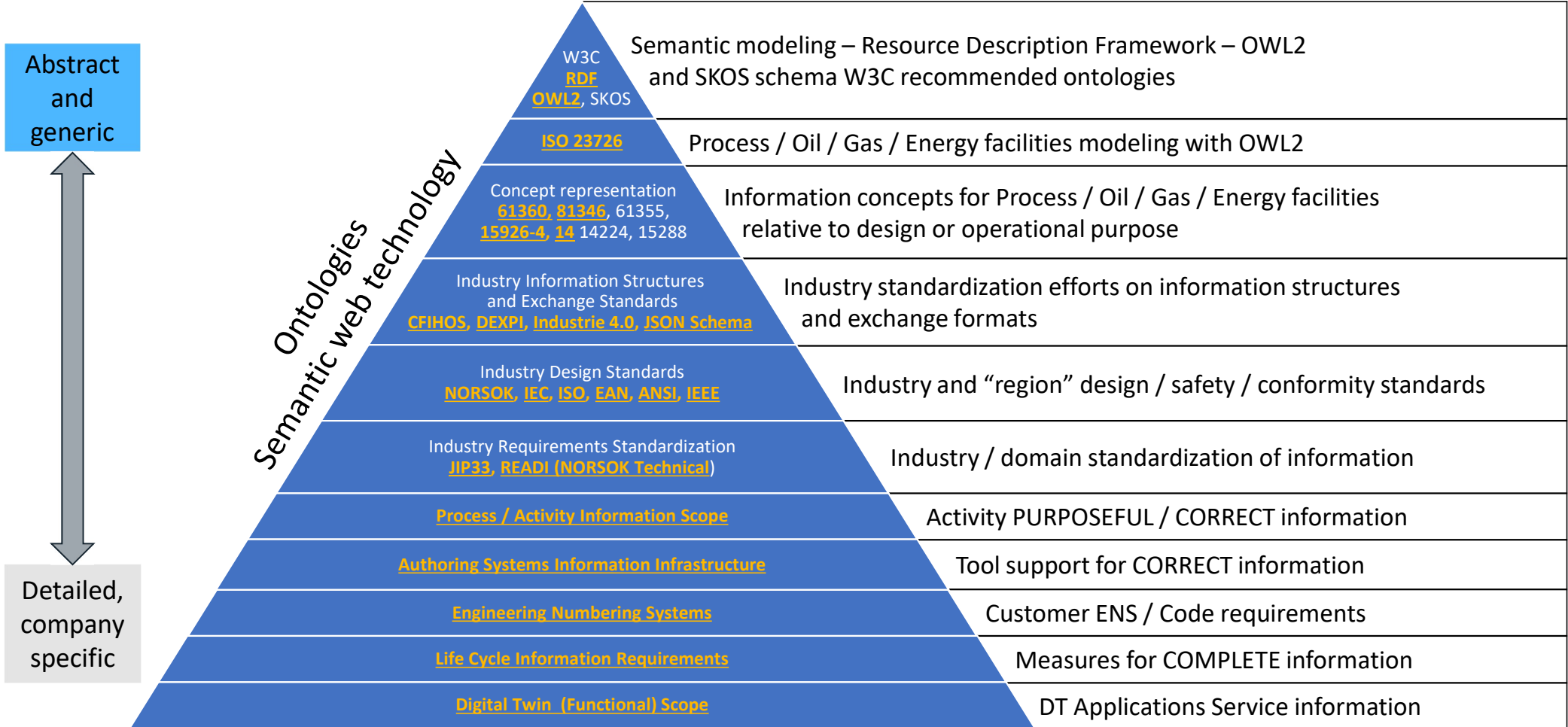
Each line/item in the datasheet becomes a graph



The whole datasheet becomes a graph/model/IDO ontology for the equipment and processes that the datasheet describes

Datasheets (Excel) in pdf, implicit information and underspecified fields

IMF RELEVANT STANDARDS (orange and underlined)



## BUSINESS VALUE EXAMPLE FOR DIGITAL GREENFIELD (Johan Castberg)

- 7 000 000 engineering hours in DG3-DG4 (construction phase)
  - 2 100 000 hours estimated to be manually tasks
  - Human error rate set to 2%, giving 50 000 errors (P&ID, PFD, SLD, SCD, ELL, etc)
  - Time to correct each error set to 10 hours
  - Time needed to correct errors 500 000 hours
- ✓ Approximate cost associated with correcting human errors (updates, alteration and modifications) estimated to **\$100 million**
  - ✓ The DISC collaboration project are aiming to demonstrate that by going from **document to data**, we can reduce human errors by at least 50% = **\$50 million.**



USE CASE PRESENTED AT DISC SHOW & TELL September 4, 2024

# «The Broken Pump»

a WEBSTEP presentation

<https://www.youtube.com/watch?v=5nEIXZlkzy4>

***Opportunities given by structured data  
Munin TEG/MEG pump replacement***

by

Bård Henning Tvedt & Martin Ulvesæter

## USEFUL LINKS

**PCA (POSC Caesar Association) Library Services** <https://www.posccaesar.org/>

**PCA on YouTube** <https://www.youtube.com/@POSCCaesarAssociation/videos>

**DISC Show & Tell September 4<sup>th</sup> 2024** <https://www.youtube.com/watch?v=W4Qyf0IGLt0>

**IOGP Standards** <https://www.iogp.org/bookstore/product-category/standards/>

**EqHub Vendor Documentation** <https://collabor8.no/services/eqhub/>

**TIRC Z-018 Requirement Catalog** <https://tirc.collabor8.no/#/navigator>

**CFIHOS 1.5.1 Data Model** <https://www.jip36-cfihos.org/datamodel/v1.5.1/>

**DEXPI Data Exchange** <https://dexpi.org/>



DISC