

# Environmental Intelligence

*-Vejen til Effektiv Digitalisering og Datahåndtering*



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EI-Group



# Agenda

1. Baggrund
2. Målgruppe og Målsætning
3. Knowledge Mapping – et fagligt omdrejningspunkt for digitale løsninger
4. Faglige og Økonomiske fordele ved løsningen
5. “Do Nothing” scenarie



# EI-Group and Environmental Intelligence

“Environmental intelligence is a governance model for managing knowledge assets.”

## **Mission:**

- *“To give back control of knowledge assets”*
- *“To grant knowledge-based companies a fully transparent and traceable insight in their knowledge assets, how knowledge flows, where knowledge is founded and how knowledge is linked.”*
- *“To grant knowledge-based companies the opportunity to use and reuse their knowledge across different (IT) platforms and applications preserving the traceability.”*

# Digitalization Outcome - *Predictions*



## Relative price evolution per delivered Solution/Service unit

Commodities – Price goes down:

1. Data as fuel
2. Technology to engage with data



Differentiators - Price goes up:

1. **Knowledge** about the core solutions
2. **Knowledge** about technology: what data to use, how to use the data and what technology to use



Loose/Win/Earn:

- **Loose** projects by *not* Mastering the Technologies and associated tasks
- **Win** projects by "Mastering" Knowledge and add it as extra value and quality to the basic technology service
- **Earn** money through efficient reuse and upscaling of the solutions

# Environmental Intelligence løsningen er gradvist udviklet under kontinuerlig dialog og samarbejde med mange interessenter



Idea

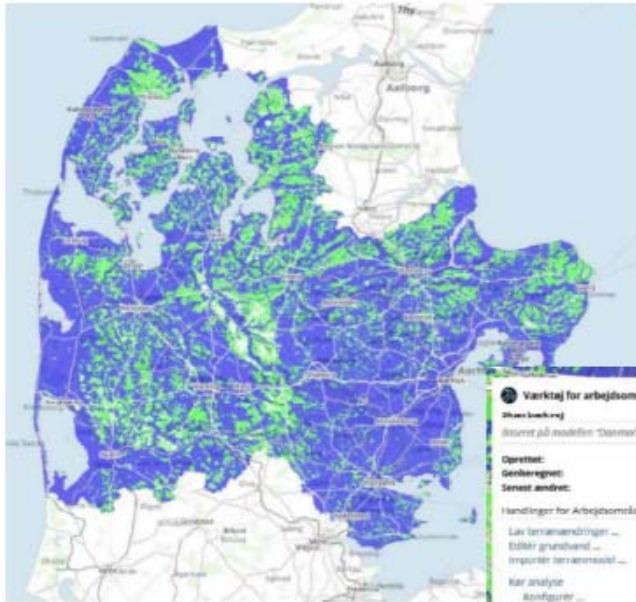
Testing and Verification

Prototype, Implementation and starting commercialization

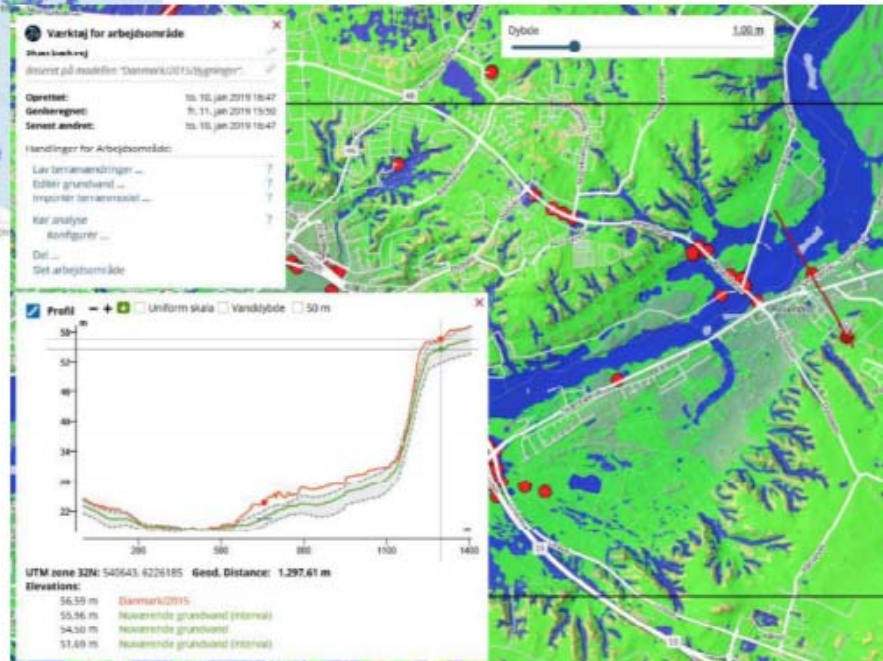




# Nuværende Anvendelses områder



- Anvendes i Ørsted til styring af videns-indput til IT løsninger fra Offshore Ingeniører og Geoteknikere.
- Anvendes i COWI til Hydrologiske, Hydrogeologiske og Geotekniske data
- Brugt til Styring af Datagrundlaget for etableringen af det terrænnære grundvandskort i RegionMidt (2018)



# Målgruppe



## **Ingeniør- og Videns-virksomheder**

- med et kompleks samspil af vidensmedarbejdere, der ønsker at digitalisere deres leverancer.
- ,hvor produktet er fagviden fra vidensmedarbejdere, der i stigende grad skal anvendes på store datamængder, automatiseres og kunne skaleres.
- der forbruger og genererer store mængder data i digitale løsninger.



# Den økonomiske målsætning for brugere af EI-løsningen

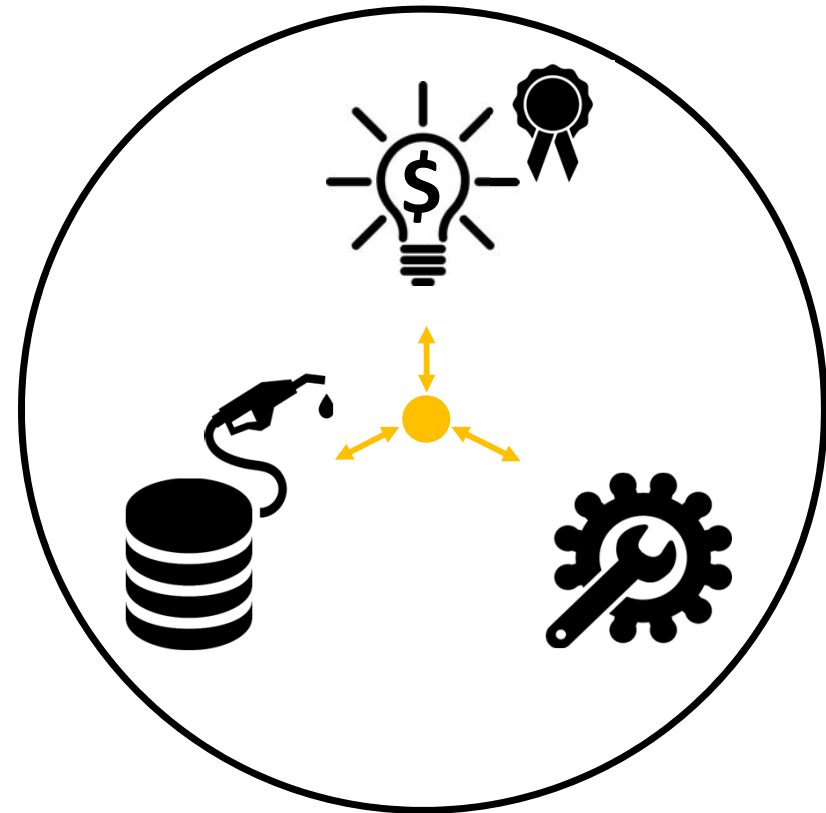
1. Hurtigere opgave løsning / projekt eksekvering
2. Reducere tidsforbruget på en opgave/projekt
3. Reducere udgiften ved dårlig kvalitet
  - a) Fejl i løsningen skal hurtigt kunne spores og rettes
  - b) Løsningen og dets del-elementer skal kunne genbruges
  - c) Løsningen skal kunne skaleres



# Den faglige målsætning for brugere af EI-løsningen



1. Bygge bro mellem fag specialister, Data og IT produkter
2. Ét sted hvor alle løsnings elementer registreres:
  - a) Samlet overblik relevante fagpersoners input
  - b) Samlet overblik over fag-relevant data
  - c) Samlet overblik over fag-relevante IT løsninger
3. Løsningen skal være gennemskuelig, sporbar og dokumenterbar for både fag specialister samt IT udviklere.
4. Data og teknologier skal ikke nødvendigvis samles central.

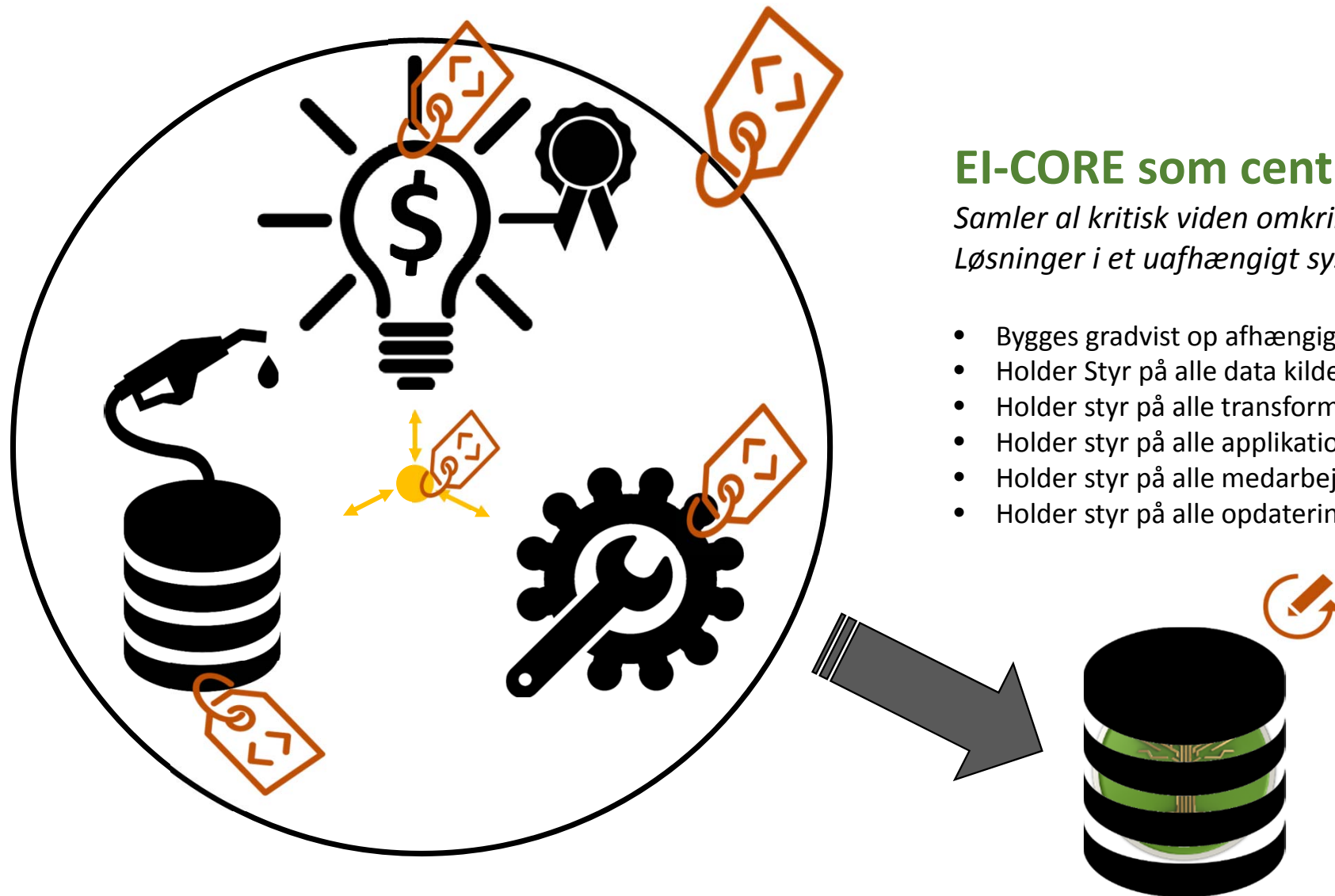




## EI-CORE som central Videns Hub

*Samler al kritisk viden omkring tilblivelsen af Digitale Løsninger i et uafhængigt system tilgængeligt for alle.*

- Bygges gradvist op afhængig af behov for løsninger.
- Holder Styr på alle data kilder.
- Holder styr på alle transformationer og beregninger.
- Holder styr på alle applikationer data anvendes i.
- Holder styr på alle medarbejders input.
- Holder styr på alle opdateringer (versionering).



- Activity Manager
- Domain Groups
- Code Manager
- Settings
- Tenant: ORSTED
- Data Sources
- Models
- Exchange
- Input
- Knowledge Hub**
- Output
- Translations
- Design
- Business
- Projects
- Applications
- Services

**Models** **Attributes**

Save Delete Selected Cancel & Refresh Add Row Grid Find Column Filter Last Modified Change History Knowledge Hub Show Matrix Model Overview Model Diagram

Data Grid Tools Tools

Item: Knowledge Hub

Drag a column header here to group by that column

Select	Display Name	Abbr	Type	Status	Behaviour	Domain	Comment	Description	Wareh
<input type="checkbox"/>	AIS Dataset	AISD	Fact+Dimension	Open	Standard	Burial Depth Design		Catalog of AIS Datasets	T1_
<input type="checkbox"/>	AIS density grids	AISG	Fact	Open	Standard	Burial Depth Design	Typically provide...	Processed AIS data (co...	T1_
<input type="checkbox"/>	AIS points	AISP	Fact	Open	Standard	Burial Depth Design	Provided throug...	Raw AIS data (provide...	T1_
<input type="checkbox"/>	AIS tracks	AISL	Fact	Open	Standard	Burial Depth Design	Typically provide...	Processed AIS data (co...	T1_
<input type="checkbox"/>	Anchor	ANC	Dimension	Open	Standard	Burial Depth Design	Used as input to ...	Catalog of anchor types	T1_
<input type="checkbox"/>	Array Cables	ACB	Fact	Open	Standard	Cable routes			T1_
<input type="checkbox"/>	As Built Design route point Data	ABDR	Fact	Open	Standard	Execution	Example	The Final Design RPL wi...	T1_
<input type="checkbox"/>	As Built Listing	ABL	Fact+Dimension	Open	Standard	Execution			
<input type="checkbox"/>	As Found Listing	AFL	Fact+Dimension	Open	Standard	Execution			
<input type="checkbox"/>	As Laid Listing	ALL	Fact+Dimension	Open	Standard	Execution			
<input type="checkbox"/>	As Planned Listing	APL	Fact+Dimension	Open	Standard	Execution			
<input type="checkbox"/>	As Trenched Listing	ATL	Fact+Dimension	Open	Standard	Execution			
<input type="checkbox"/>	As-build Survey	ABS	Fact+Dimension	Open	Role Playing	Surveys			
<input type="checkbox"/>	As-laid Survey	ALS	Fact+Dimension	Open	Role Playing	Surveys			
<input type="checkbox"/>	As-ploughed Survey	APS	Fact+Dimension	Open	Role Playing	Surveys			
<input type="checkbox"/>	As-trenched Survey	ATS	Fact+Dimension	Open	Role Playing	Surveys			
<input type="checkbox"/>	Bathymetry-MBES	MBES	Fact+Dimension	Open	Standard	Surveys	DELETE!!!???		
<input type="checkbox"/>	Boulders	BOU	Fact	Open	Standard	Execution			
<input type="checkbox"/>	Bulk Density	BDE	Fact	Open	Standard	Geotech			
<input type="checkbox"/>	Bulk density tests	LDEN	Fact+Dimension	Open	Standard	Geotech			

Properties Status AGS Info

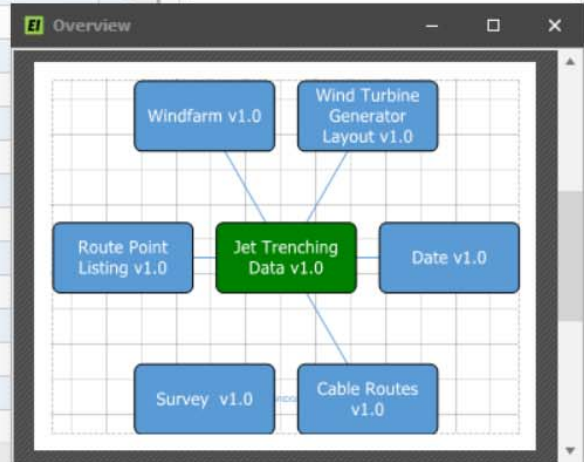
Name: Jet Trenching Data

Comment:

Major Version: 1 Minor Version: 0

New Version

Create New Version





# Den centrale akse bygges op omkring fagligheder og ikke data eller teknologi

1. Fag Domæne Grupper
2. Fag Modeller
3. Faglige Beregninger, Funktioner, O.lign.



## Hydrologi

- Boringsindtag
- Vandstandsmålinger
- Vandprøver



## Geologi

- Boringer
- Jordprøver
- Lithologi



## Geoteknik

- CPT
- Vane Tests
- Lab Tests



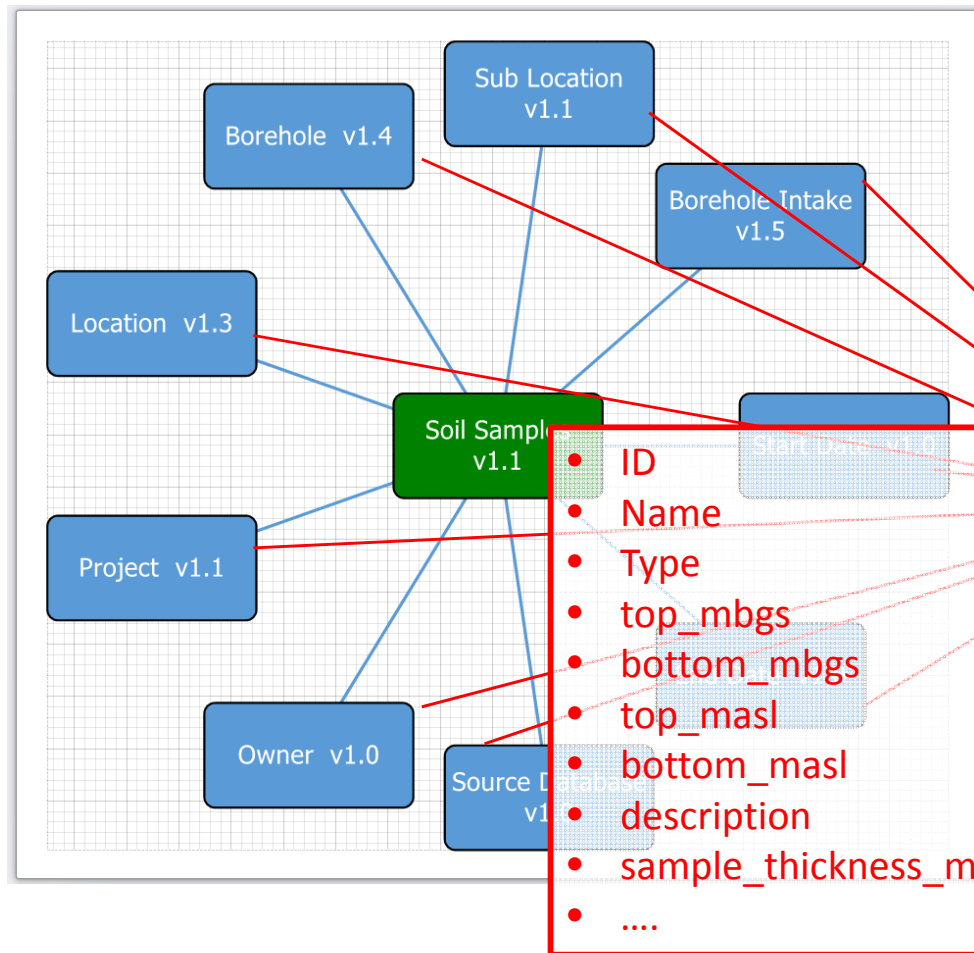
## Geokemi

- Grundvandskemi
- Drikkevandskemi
- Jordforurening

**!!Modeller og Funktioner kortlægges i takt med at denne viden bruges i andre sammenhænge!!**



# Opbygning af Fag Modellen



## Fag Modellens Elementer:

1. Fag relevant Information
  - a) Domæne Gruppe
  - b) Navne
  - c) Beskrivelser
  - d) Ejere
2. Anvendte Beregninger og Funktioner
3. Relationen til andre Fagmodeller



# Overblik efter opbygning af Fagmodeller

1. Værdifuld Fagviden opdelt efter fag-domæner og fagområder
2. Videns input knyttet til en person eller person-gruppe

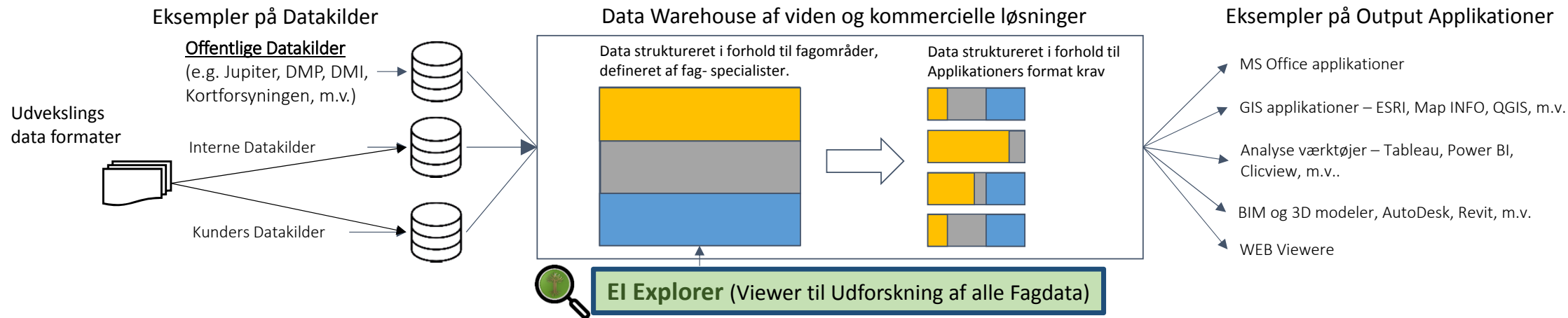


# EI kobler *Data, Teknologi og Viden* sammen

- Én samlet "manual", der beskriver forretningens input i tilblivelsen af en digital løsning
- Omdrejningspunktet er faglighed og specialist input



**EI-CORE** (Dokumentation af Datakilder, Transformationer, Beregninger, Output Applikationer, Videns Ejere, m.v.)



!!!Brugeren **vælger frit platform** til implementering af hele eller dele af data flowet (f.eks. Microsoft, Oracle, Google, IBM, FME, m.v.)!!!

# Benefit and disbenefit outline

Non-financial Benefits:



## **1. Digital organization coherency - Bridging gaps between Technology, People and Data**

1. Domain knowledge and other critical knowledge input is gathered and updated one place and becomes the anchor point for all usage.
2. One platform where both Human, Data and Technological input can be viewed together, yet based on individually managed data and technology platforms.
3. The Business has agreed on one way to present the valuable parts of the information.

## **2. “Knowing what the company knows“**

1. All IT solutions can use this knowledge catalogue for reference and be notified whenever relevant parts are updated.
2. Track IT-Solutions based on Domain Knowledge content.

## **3. High Level QA for Digital Solutions and –Processes**

1. All content contributors are tracked which means the inputs will never be left unsupported because it is easy to get an overview of knowledge contributions grouped by person and hand the responsibility to another when needed.
2. Greatly improved GDPR compliancy.





# Benefit and disbenefit outline

Financial Benefits from consistent Knowledge mapping:

The largest part of creating a digital solution that supports a specialist workflow is capturing of Domain Knowledge to ensure the IT solution serves the purpose of the user. This task is up to 80% of the total work for the entire IT solution.

1. **>50% of the total work saved when solutions are revisited.** A large benefit comes when solutions shall be revisited because you do not need to start over with capturing the business logic and get support from the business as it is uniquely described in EICORE in a form understood and approved by the Domain Specialists.
2. **>50% of the total work is saved when other IT solutions can reused prior structured Domain Knowledge.** When it is possible to reuse Domain Knowledge, the largest task in the development of many IT solutions is already taken care of and focus can be on the technological aspects of the solution from the very beginning.
3. **>80% workload saved for ML and AI projects.** Data are already prepared for Machine Learning and Artificial Intelligence projects where data preparation (Feature Engineering) consume >80% of the work.



# Benefit and disbenefit outline

Disbenefits – New approach

- It is new for Domain Experts to structure their knowledge in a form suitable for a database. However, the approach used by EICORE has proven possible.
- It is new to Domain Experts that a full “Chain of Custody” can be developed where their knowledge is tracked and managed in a way similar to developers manage and version control code.



# 'Do nothing' scenario

## **Domain Knowledge complexity and silo structures increase with each new IT solution**

Each new IT solution is essentially a new Domain Knowledge silo without a plan for maintenance. Today, each time a new IT solution is developed, domain knowledge is embedded randomly without structured ties back to the business from where the knowledge belongs.

## **The risk for Zombie Solutions are overwhelming**

The goal of many IT solutions is to automate Specialists Analysis tasks and provide an output without delaying manual interference. If there is no governance to assure that the business still possesses the Domain Experts qualifications to support the ongoing outputs from the IT solutions, there is a serious risk that once the output is questioned (which it always will at one point), the business realize that the experts originally feeding the solution with their knowledge, have left the company without assuring anyone to take over this area.

## **Business will distance themselves from the IT developments because of lacking interface**

When business feels unsure of what is being developed and how their input is interpreted and embedded into the solution, they will naturally distance themselves from the development process and the final solution (ownership).

# EI-Explorer

*Få hurtigt overblik over alle tilgængelige data i sammenhæng.*

- Viser data struktureret som i EI-CORE efter fagområder.
- Udforsk, Filtrer og Beskær alle data præcis som ønsket.
- Metadata defineret i EI-CORE kan ses i sammenhæng med de fysiske data de omhandler.
- Forbered og se datagrundlag for output applikationer.

