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Implementing an Enterprise Data Management strategy in Oil and Gas

And the opportunities this brings for data stewards and architects

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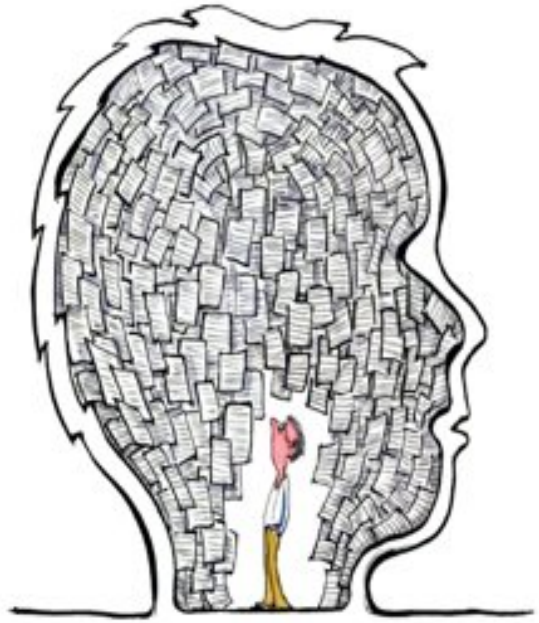
An Enterprise Data Strategy

- The Strategy bit
- The People & Organisation bit
- Talking the same language
- “Special Needs”?
- Data Management as a Profession
  - Opportunities for Data Stewards and Architects



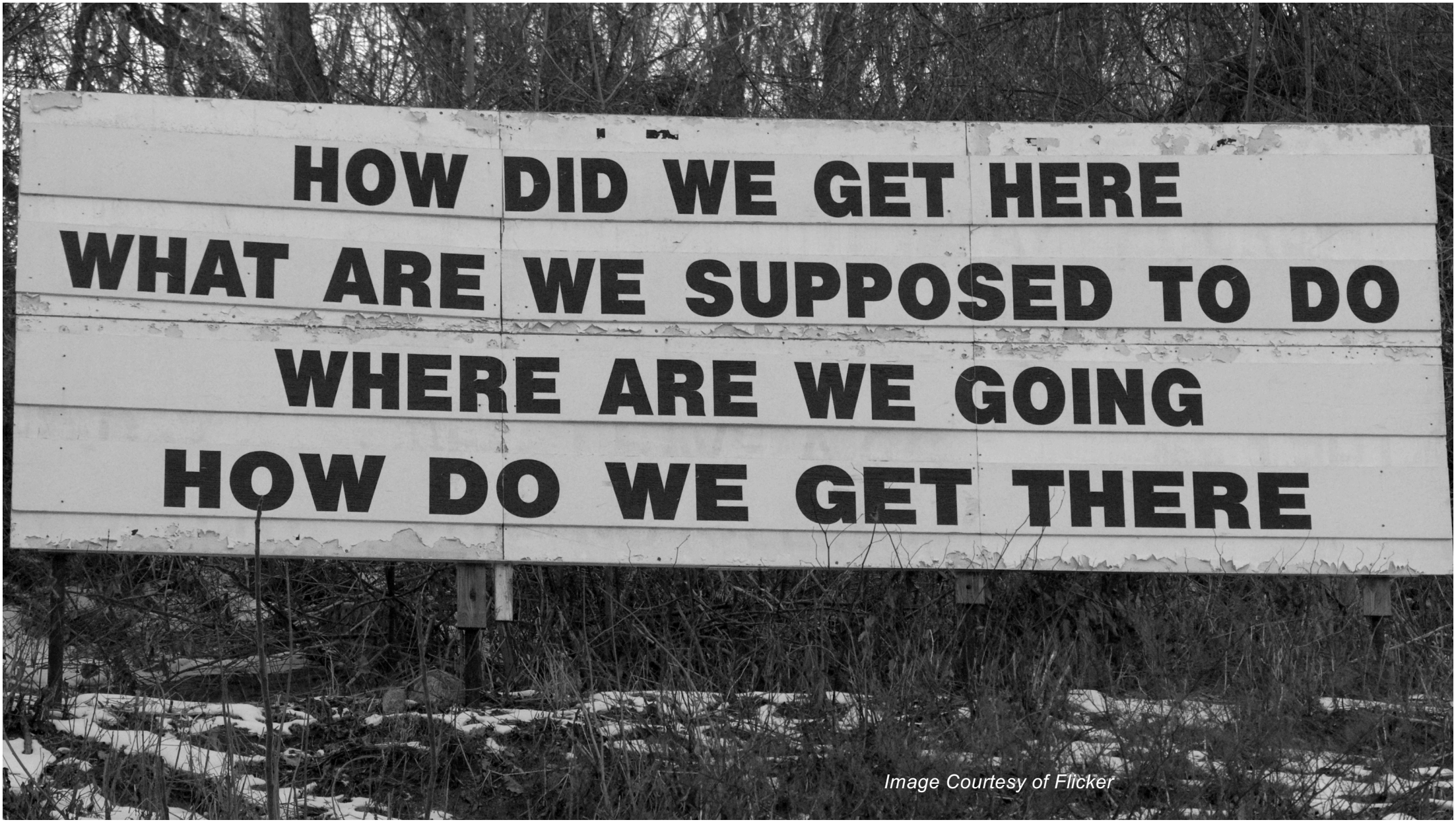
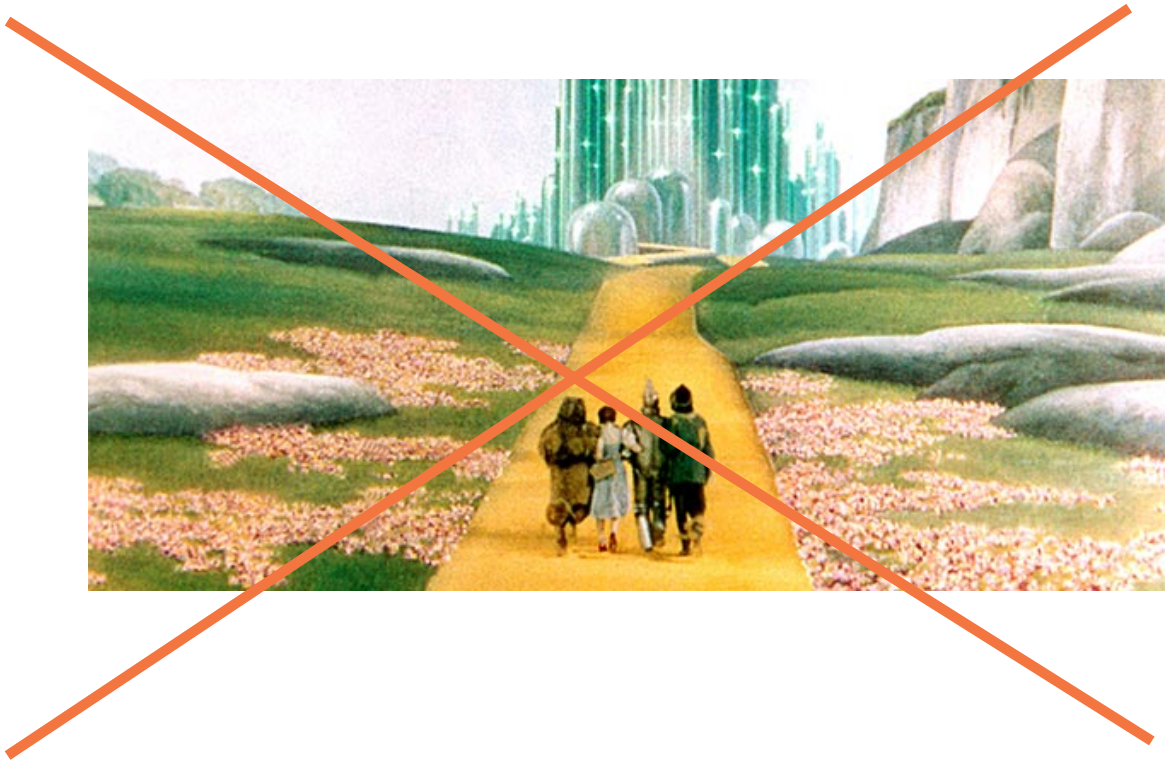


Image Courtesy of Flicker

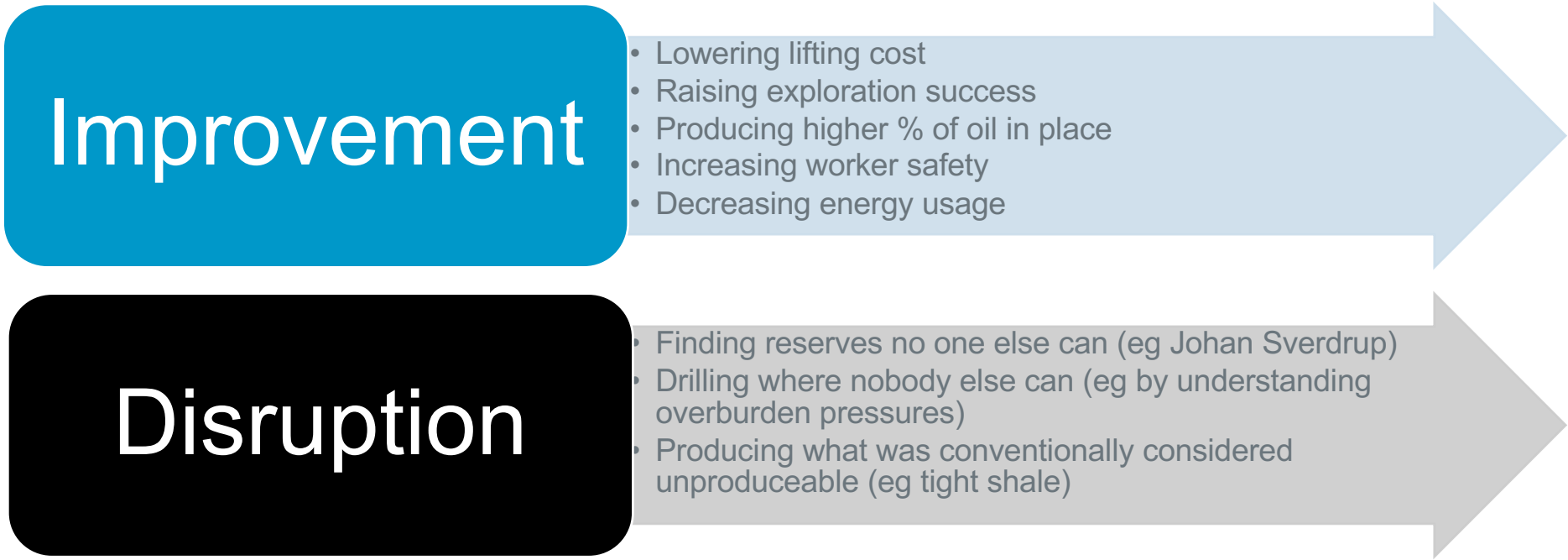
1. The Data Strategy must align with the Business Strategy

Let’s start with where oil companies are NOT going

- We’re not Uber
- We’re not “monetizing data”
- We’re not transforming or disrupting the way our **product** is sold (because we don’t have a product, we sell a commodity)



Digital Transformation – Oil and Gas Edition



It's about getting better at what we do – finding and lifting hydrocarbons – by using all the data and new analytic techniques, and developing new technologies and processes - to change our definition of possible

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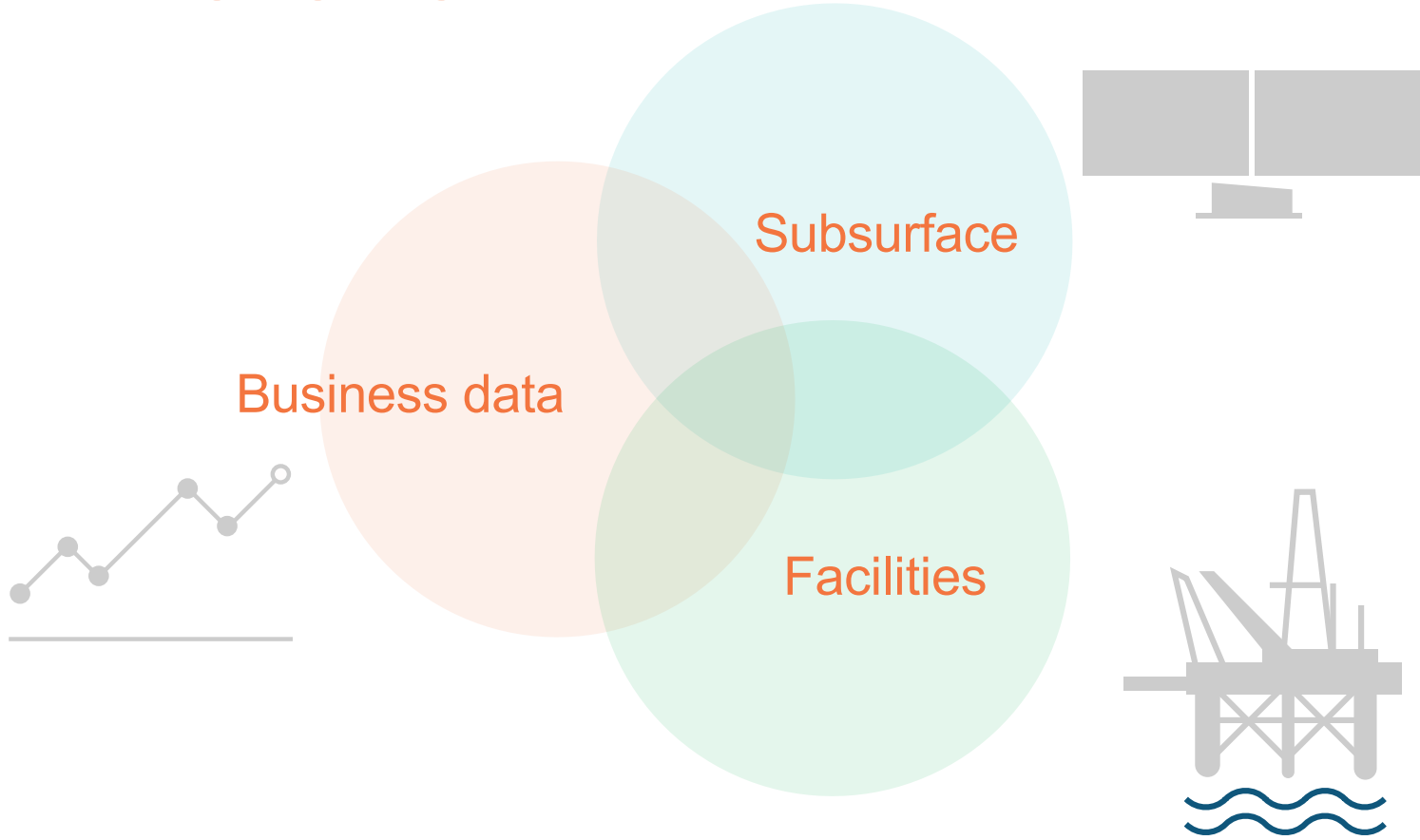
2. Data management needs the right people and organisation

We are bringing together 3 different data and IT worlds



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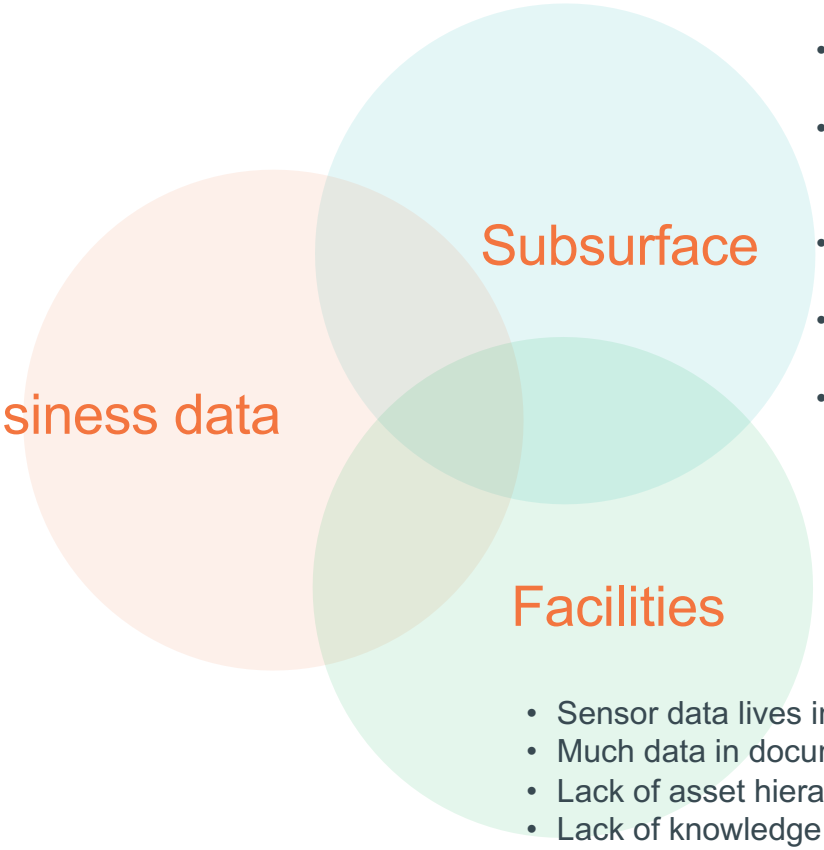
In each world, the data itself is different



- Historical focus on library-style management of technical surveys
- Specialist (scientific, industry history) knowledge required to set rules for management of this data
- Lack of data model for integrating data at the detail level
- Strong need for master and reference data to contextualise survey data
- **Massive** potential from integrating this data in new ways, across traditional processes

- Mainly SAP data
- Normal difficulties with extracting data from SAP
- Data well known to large community within IT
- Data well managed with traditional BI processes – and most value that can be leveraged within this world already is
- Potential – and challenge - is in **linking** this world to the two technical domains

- Sensor data lives in IACS solutions
- Much data in documents and free text fields – not structured
- Lack of asset hierarchy model
- Lack of knowledge of data structure in IACS solutions – historically managed by external vendors
- **Massive** potential with linking this sensor data with business data – condition based maintenance, safety, energy efficiency etc

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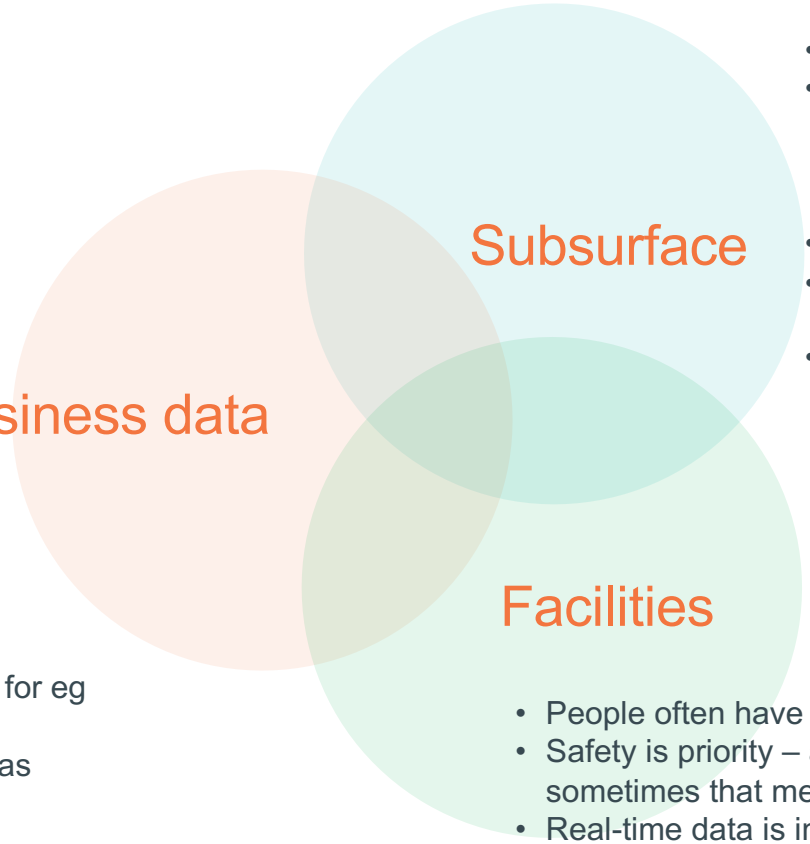
The Culture, Priorities, and even the Language used, is different

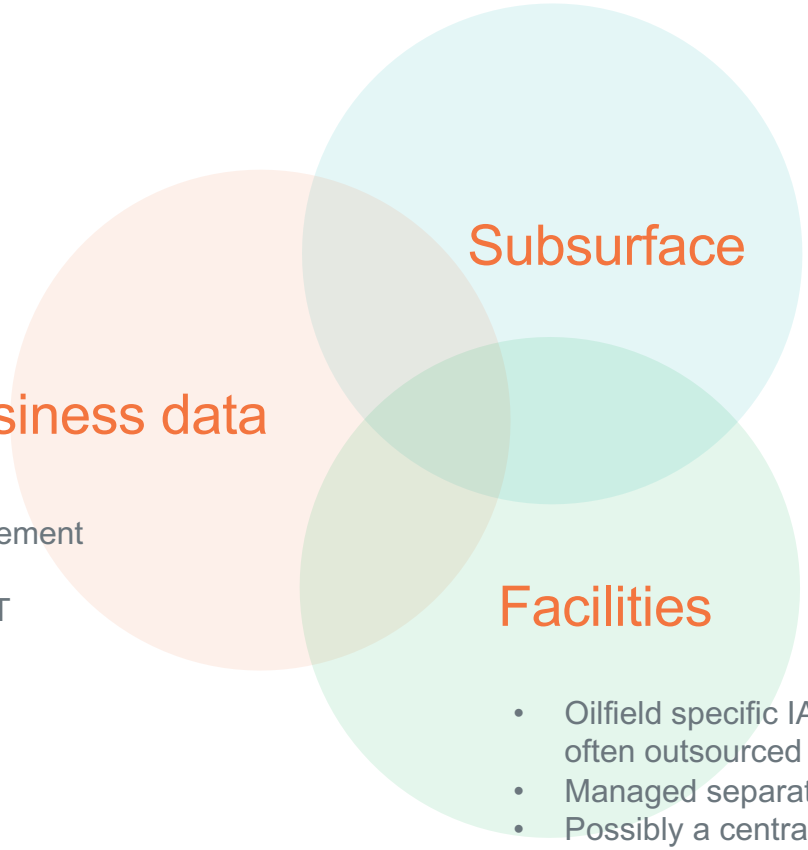


- People often have a geoscience background
- Not losing or breaking the (expensive to acquire) data is priority – and correctness of master data and measurement data (CRS, UoM)
- Data is useful forever - geological time ☺
- “Model” means physics-based model eg reservoir simulation
- “Asset” means an oil field

- People normally have an IT background
- Up to date data is priority
- Office hours thinking
- “Model” means statistical model for eg finance
- “Asset” means something that has financial value

- People often have an engineering background
- Safety is priority – and sometimes that means correctness, sometimes that means timeliness
- Real-time data is important – often true real-time
- “Model” means 2D or 3D CAD drawing of a facility
- “Asset” means a piece of equipment – that often has sensors and actuators associated

And they have been managed separately, in different organisations



- Exploration and production subsurface IT teams
- Technical data management functions
- Historically very tied to subsurface application portfolio – little experience of how to manage the data outside of apps and industry data exchange formats

- Traditional IT and Data Management functions
- Centrally managed in a core IT group
- May have a BI/DW sub-group

- Oilfield specific IACS teams supporting data and technology – often outsourced to vendors
- Managed separately for each installation
- Possibly a central team managing document-based data

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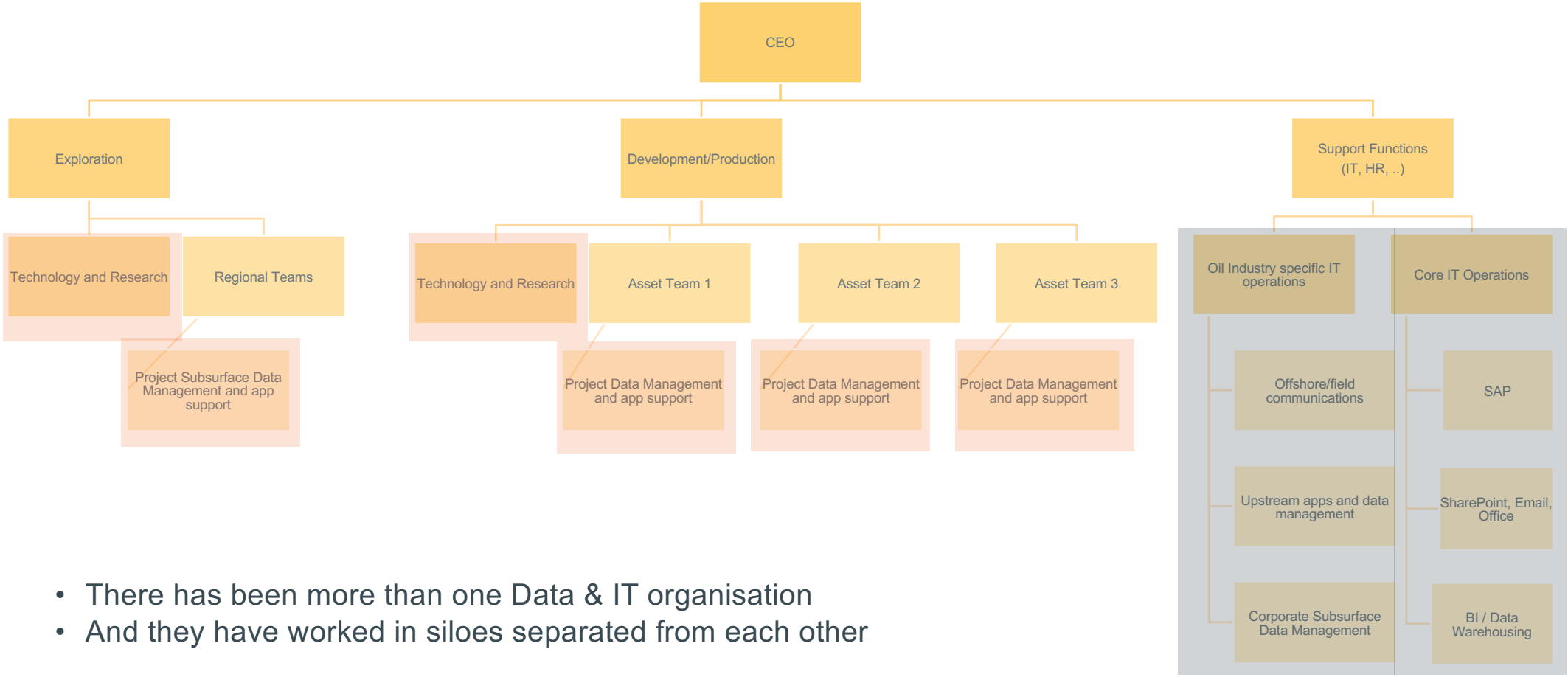
The data management organisation hasn't helped



- There has been more than one Data & IT organisation
- And they have worked in siloes separated from each other

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To support innovation and cross-discipline solutions, we need to align.

Language

Create a new data language so we can communicate effectively

- Data dictionary
- Data models
- Data quality metrics

Attitudes to data

- Sharing data by default (when it is legal and safe)
- One man's "data exhaust" is another man's gold dust – looking for the potential value across the enterprise
- Meeting the differing business needs for timeliness and correctness while managing cost

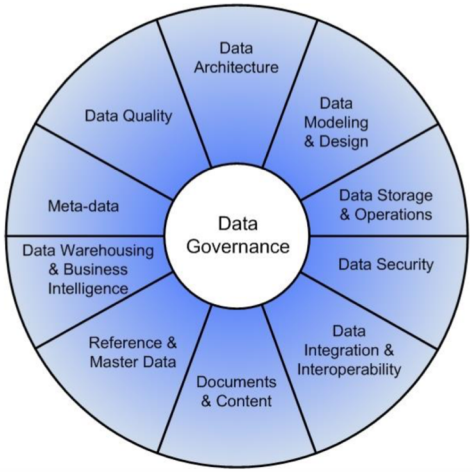
Organisation

- Professional networks for data management
- Data management job roles and careers
- Centralised functions to support integration and cross-discipline data use

New Enterprise Data Management Organisation, Standards and Processes

Modernise the Data Management Organisation

- Common governance across the Enterprise – topside, subsurface and business data
- Anchor it high up – at least as high as IT
- Think of EDM as a business organization, not a data or IT group
- Focus on business outcomes held hostage to data, not data standards
- Design to operate at speed of business, not get in the way
- Focus on all data - app data, master data, analytics, content, algorithms etc.
- Unify at the enterprise level the policies setting for security, privacy, trust, quality, value, retention etc.



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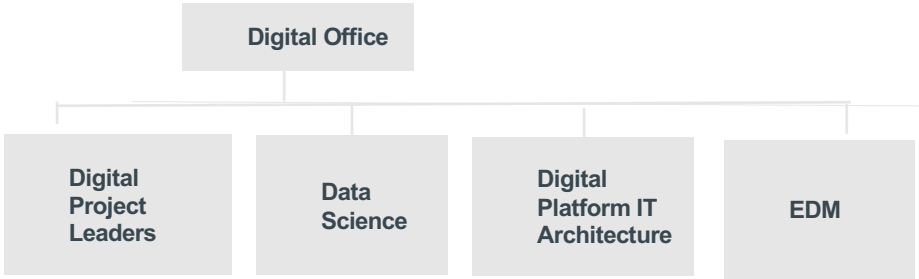
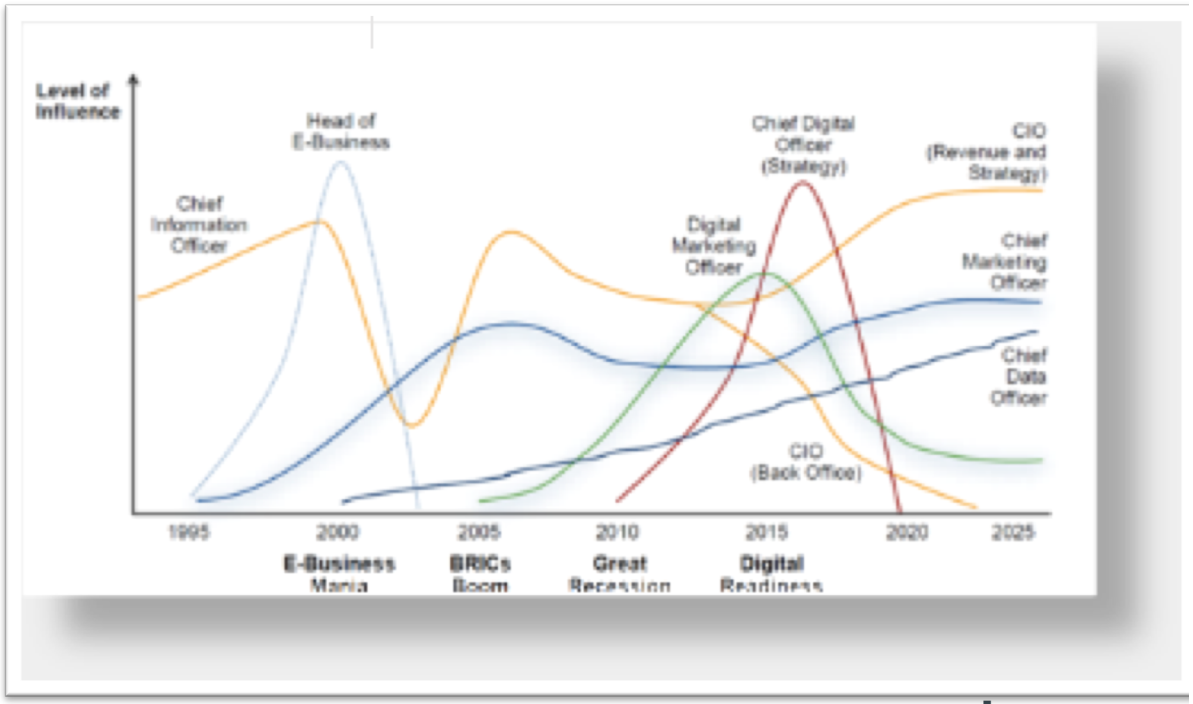
When companies start the Digital Transformation, the new data management is often placed within the Digital Office



Chief Digital Officer is a strategic transition role,
Chief Data Officer is a permanent role



Source: Andrew White, Gartner 2017

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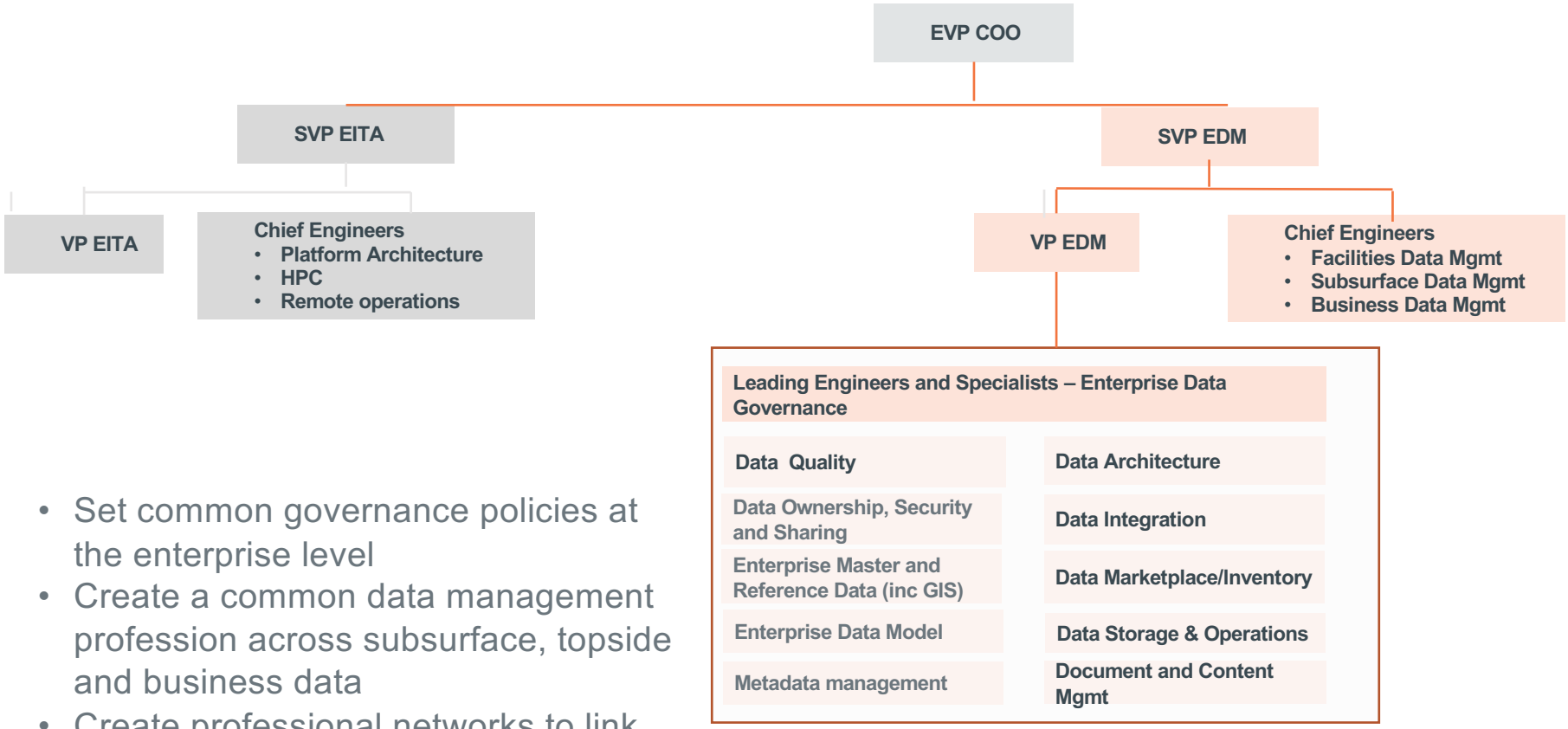
ASAP - Plan the permanent Enterprise Data Management organisation. Possibly use the same structure as Enterprise IT architecture



- Set common governance policies at the enterprise level
- Create a common data management profession across subsurface, topside and business data
- Create professional networks to link data stewards together

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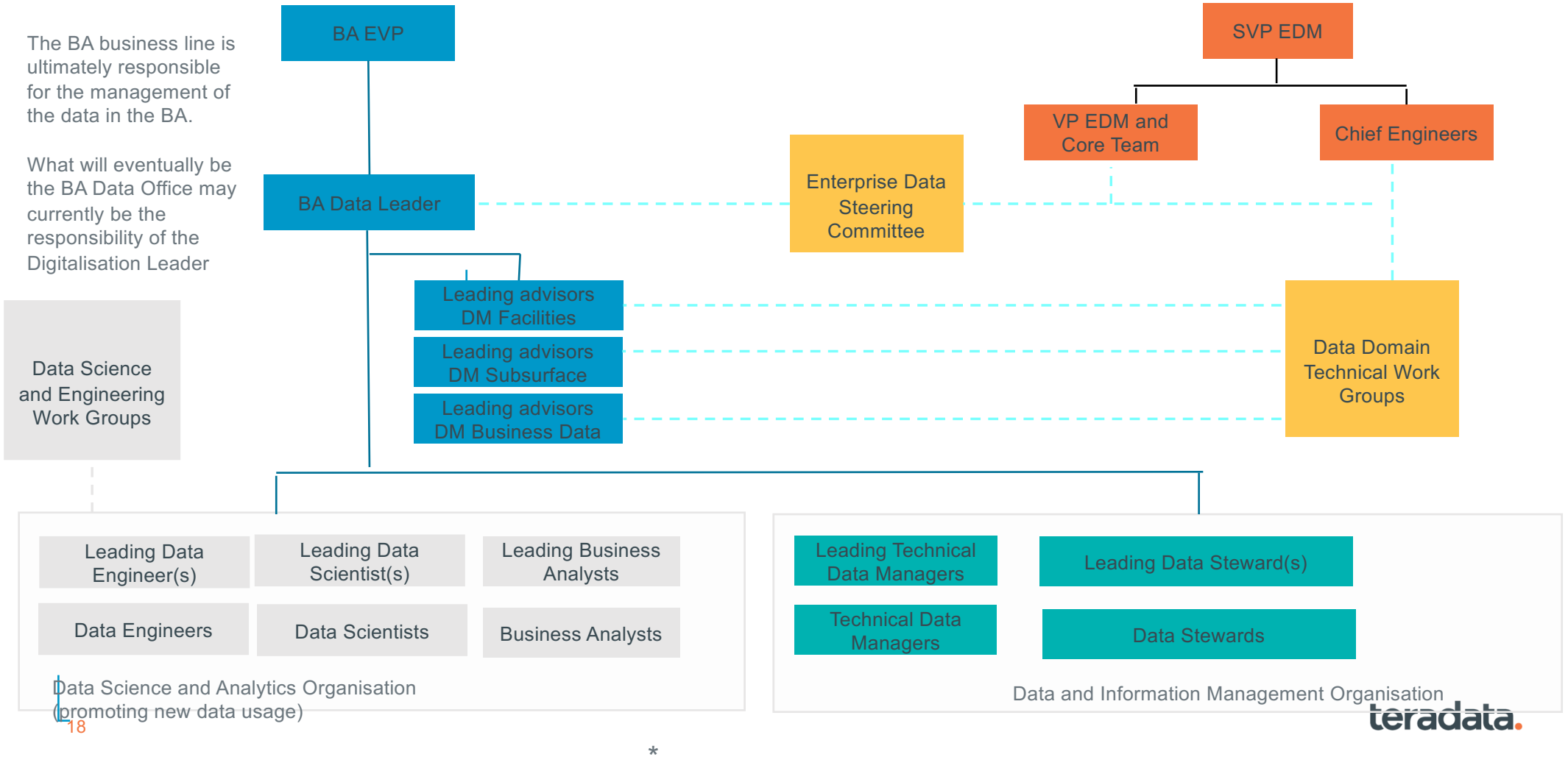
BA data offices should have similar shape but different size, based on size and need

The BA business line is ultimately responsible for the management of the data in the BA.

What will eventually be the BA Data Office may currently be the responsibility of the Digitalisation Leader



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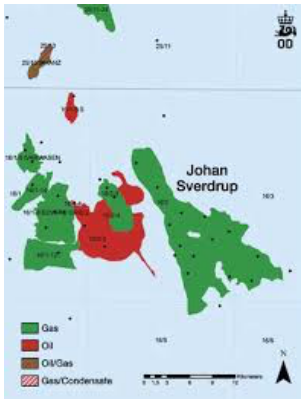
3. We need a common language

We need to learn how to talk to each other again

Talking across the Enterprise – Business, Topside and Subsurface

"Asset"  or  or 

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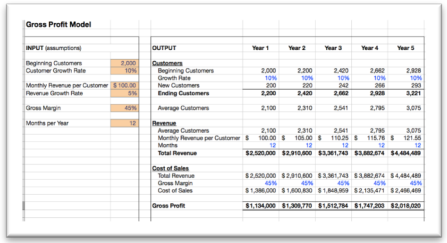
We need to learn how to talk to each other again

Talking with application developers and data scientists

"Model"



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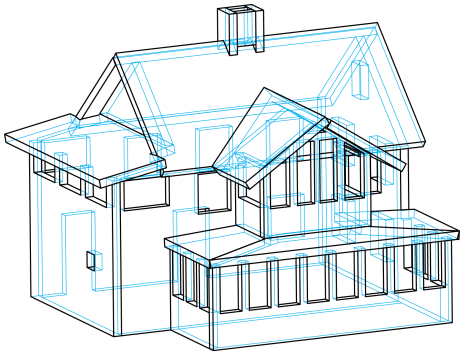

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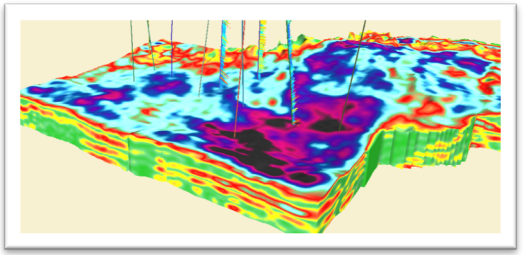

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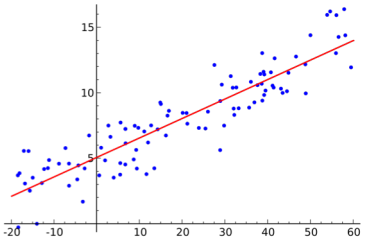
And when we include the data scientists:



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Ways that Enterprise Data Management can help

- Create a common, enterprise level **Business Glossary**
- Create a **conceptual data model** for the key elements of the business
  - And flesh this out with detail when needed by projects
- **Own** the master data and reference data for the organisation
- Create a **Data Catalog** of available data sets
- Set common standards for **Data Quality** – and measure it

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“Special needs”?

Is Oil & Gas Data Management really so different?

We’re a bit behind…

- Moving from an application-centric to a data-centric approach
- Raising data management from individual departments and disciplines to the enterprise level

- Things that are going to take some work
  - Subsurface Data model
    - We have relied on applications to provide this for decades
  - Asset hierarchy for topside and facilities
    - We have relied on CAD drawings – sometimes with hand-written updates – and tribal knowledge for decades

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What's really harder (than retail, finance, telco etc)

- Complexity of the vocabulary and technical terms
  - Data models and business glossary are key to taming this
  - Close links with the "business" users are key to working with this data
- Importance of Measurement Data
  - Coordinate Reference System definitions and transformations
  - Units of Measure definitions and transformations
  - Data quality standards need to include precision, accuracy as well as ensuring that measurement data is always tagged with appropriate Units
  - Derive "standard" data on data ingest? Common strategy to convert and add standardised measurements eg SI units, coordinates in WGS84
- The length of time that data stays relevant
  - And the associated backlog of legacy formats, tapes, scans of reports etc

Data Management as a Profession

Opportunities for Data Stewards and Data Architects

Data Stewardship rather than Data Loader

- The operational arm of information governance
- Manage data from reception through to disposal
- "Power Users" in line of business
  - Organized by data domain, function or department
  - Data science members for analytical governance
- Chief problem solvers, any time of day
- Rewarded, recognized
- Plan for turnover and change (don't outsource)
- Monitor, measure, enforce, improve

https://imgs.xkcd.com/comics/disaster_movie.png

Define A Technical Career Ladder for Data Management

- Data Management is Data Management (ie we don't need to call it Technical Data Management anymore)
  - Domain technical knowledge is a specialisation (eg geomatics)
  - So is specialising on a core capability (eg data quality or metadata management)
- Data Management career should have a technical career path as high as IT
- THIS IS AN OPPORTUNITY!!

Thank you.

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