Statoil

Data modelling challenges in industrial domains

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Backdrop

- GODI = Global Operation Data Integration
- The GODI solution originated in the TAIL research programme
- The MapIT project was launched in 2009 to commercialise the GODI solution
- After an extensive RFP process, Statoil chose the Information Integration Core (IIC) solution from IBM
- We are currently executing a pilot project where we implement the GODI solution at four assets

Why GODI?

The GODI vision:

Provide enterprise-wide access to plant and equipment related data, through standardised information models combining data from different sources, to end-user applications

What are we aiming for?

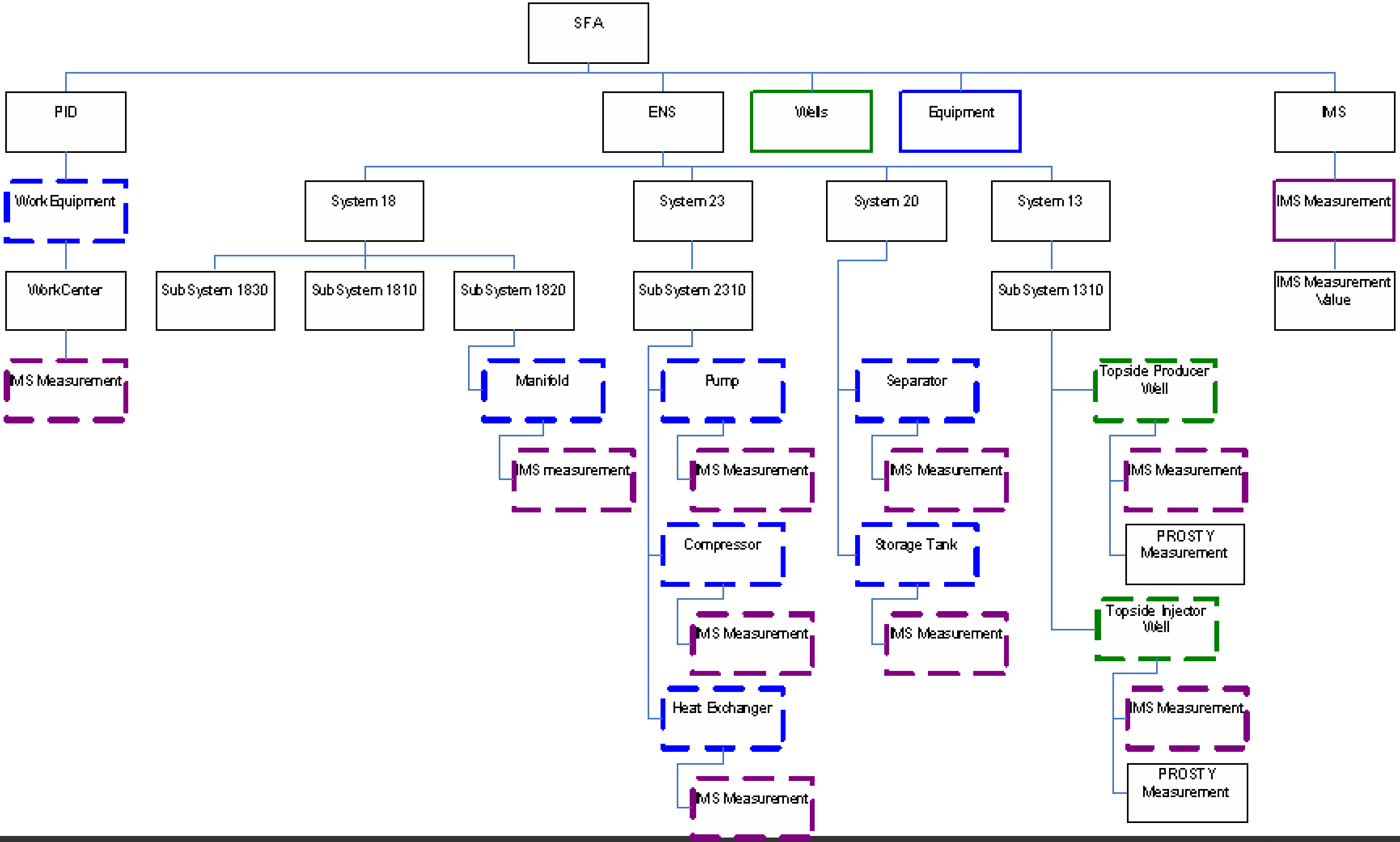
- Introduce an integration layer for plant related data
    - Providing data through a model that sets data in context
        - In our case this means to connect a number of data sources through an equipment-centric model
            - In this context, “equipment” is anything from a single valve to a complete well

- We are not “just” trying to model pieces of equipment and how they relate to plants and to each other
    - The main purpose of the integration layer and its model is to facilitate easy data capture for applications, without requiring detailed data source knowledge

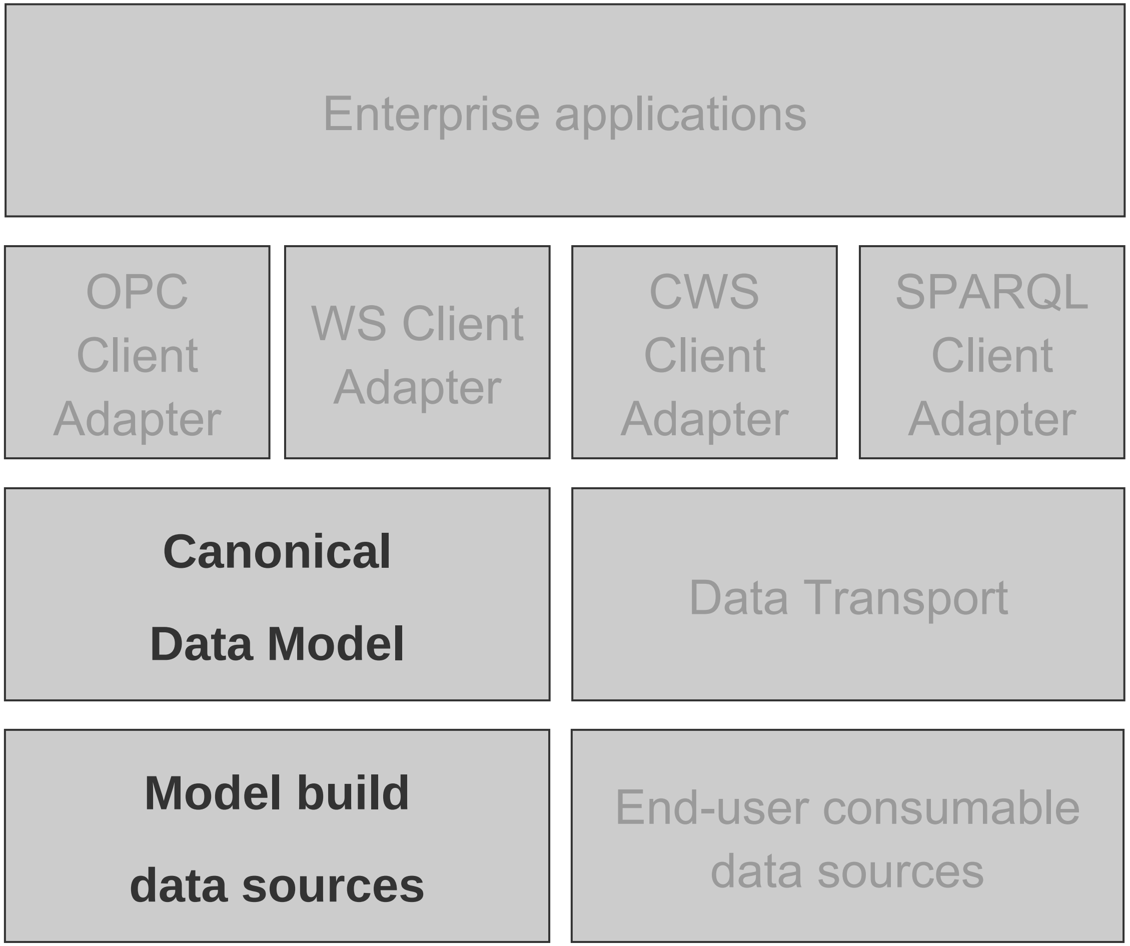
The MapIT method

- Learn to crawl before attempting to fly
  - Only model what you know will add value to a work process
    - Ensure that the model is able to grow into new requirements
  - Aim for a well-defined scope
    - For the pilot phase we are closely connected to a single end-user visualisation project
      - However, we try to make sure that we don’t do anything that prohibits a more extensive usage
  - Find a balance between the need to avoid scope creeping and the need to uncover problem areas (a.k.a. “challenges”)

Example from the current model



The GODI stack - simplified



Enterprise applications

OPC Client Adapter

WS Client Adapter

CWS Client Adapter

SPARQL Client Adapter

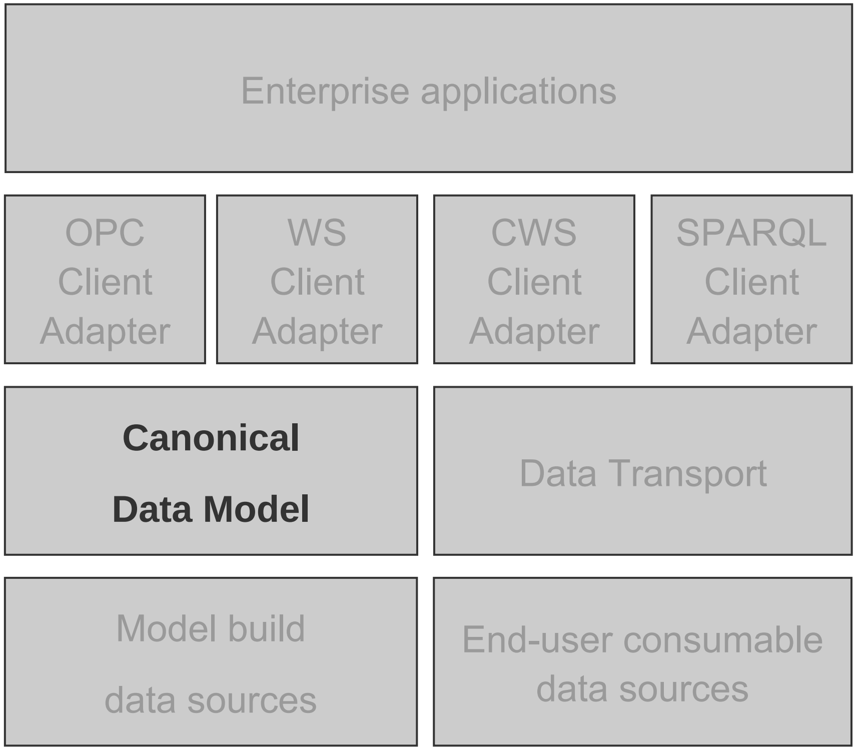
Canonical Data Model

Data Transport

Model build data sources

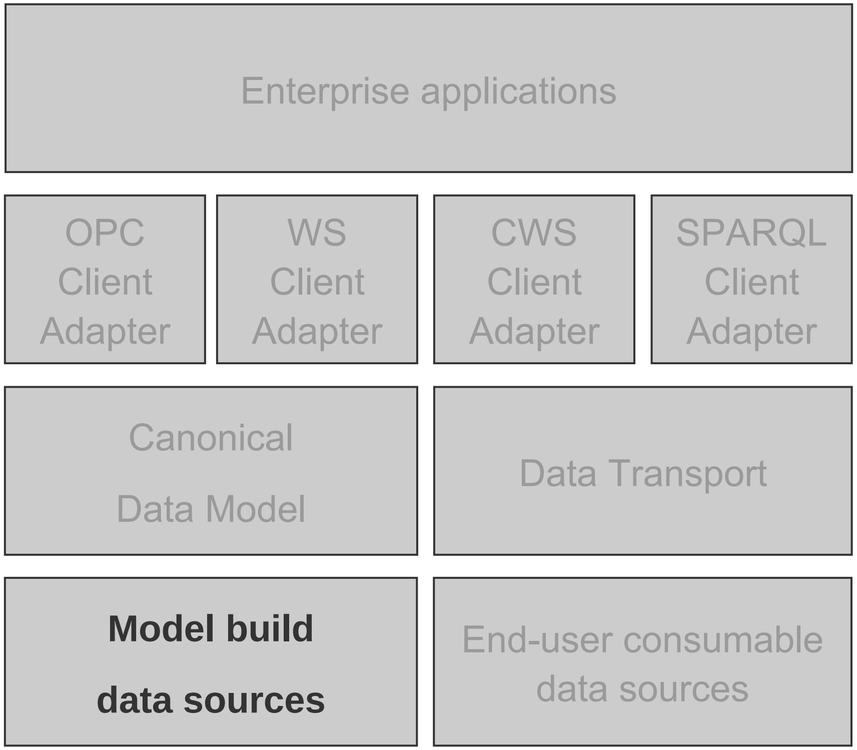
End-user consumable data sources

Model design challenges



- Enterprise applications need to be **detailed** with regards to data requirements
  - “We want all data about everything” is not detailed enough
- No single **standard** covers our requirements
- How can a client **discover** which interface to use?
- How do we **name** things?
- How do we **combine** several physical assets into a single logical asset?
  - E.g. multiple ID’s in SAP
- How do we **organise** the data?

Model instantiation challenges



- How can we **automatically** extract equipment of various kinds and connect them to data series without
  - **Enough information** in our technical information systems?
  - Usable and agreed-upon **naming standards**?
  - Enterprise-wide **standards compliance**?
  - **Coherence** between data sources with regards to definitions and identifiers?

Lesson learned

Get it right!

Lesson #1 – Model the right things

- Don’t bite off more than you can chew, and don’t attempt to model everything at once
  - Decide on the use-cases for which you require data
  - Determine the essential pieces of equipment for the problem at hand
    - Decide what they are and what they should be called
  - Determine the necessary data series/attributes for each piece of equipment
    - Decide what they are and what they should be called
- Model this, and nothing else, but keep in mind that you will have to expand the model later so don’t do anything that will restrict expansion

Lesson #2 – Use the right standards

- Use the right **combination** of industry modelling standards and custom classes
  - Neither ISO 15926, ISA95, MIMOSA nor any of the other available standards are able to provide all of the required functionality
    - Currently we are using only one ISO15926 class and a few ISA95 classes, the rest are custom classes
- The custom classes are used to model equipment and their related data
  - To keep the number of classes down, we decided on weak typing for both equipment and measurements
  - We need to include data source identifiers within the model

Lesson #3 – Keep the right focus

- As with other integration projects this is, and should always be, a business driven project and not technology driven
- Everything, from the data sources through the model to the client endpoints, should be included only when it adds value to do so
- An integration layer is not always the correct answer to a given problem

Lesson #4 – Right scope

- The integration layer, and especially the model, will never be “completed”
  - There is no point in attempting to model everything from the start
  - Do only what is needed for a given task, and do that well!
- Baseline scope for version one needs to be relatively narrow
  - Narrow enough to ensure success for the first production-ready version
  - Broad enough to investigate the most important possible problem areas
- While keeping a narrow scope, keep the bigger picture in mind
  - Ensure, as far as possible, that you don’t do anything that restricts expansion into new usage areas

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Questions?

Thank you

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