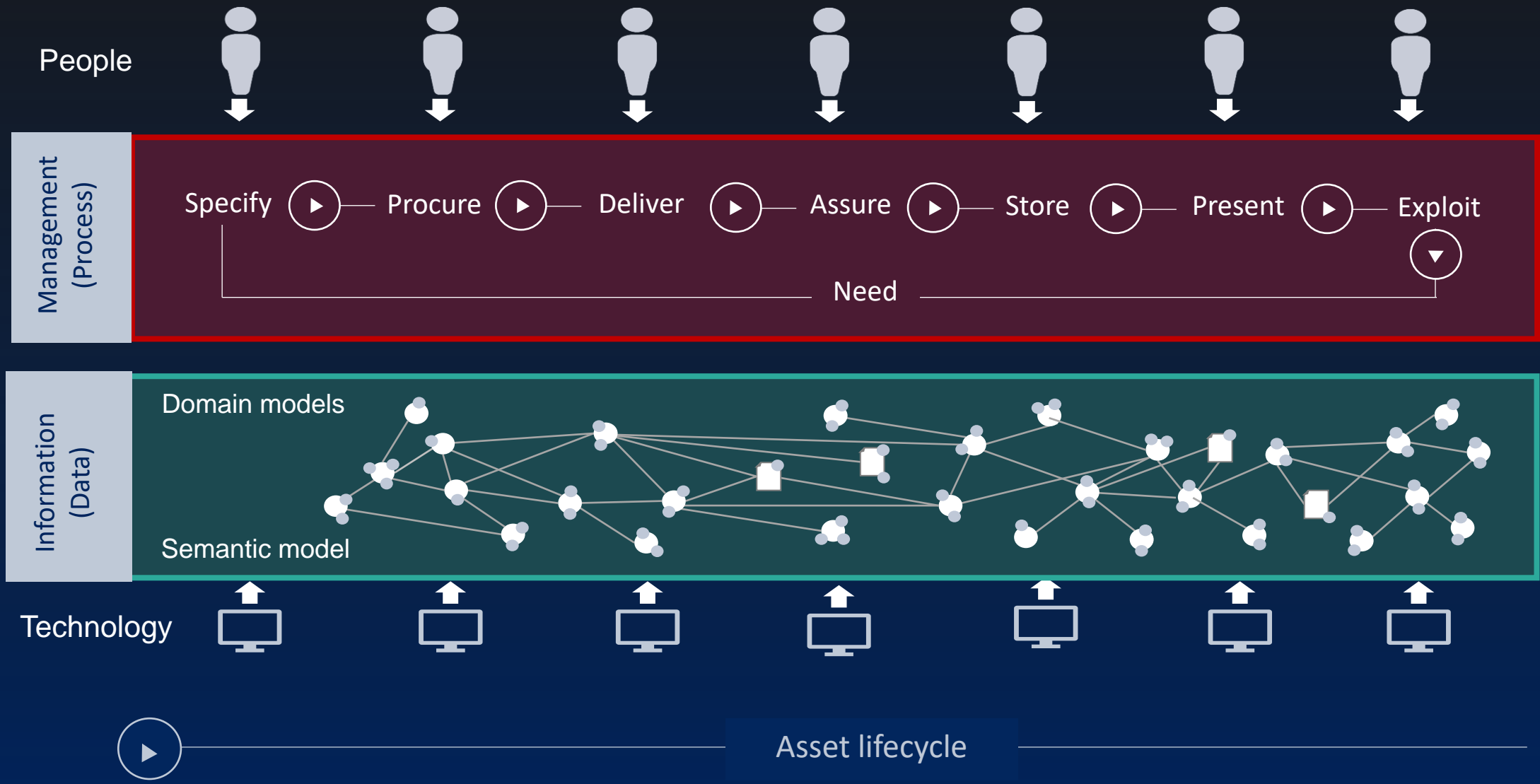


buildingSMART UK & Ireland

Joining up the dots of information management

buildingSMART International – General Assembly of Implementers



Management (Process)	ISO 19650		
Information (Data)	ISO 12006-3	ISO 16739	ISO 23386
	ISO 12006-2	ISO 7817	ISO 23387
	ISO 4157 / ISO 22014	ISO 12911	ISO 21597

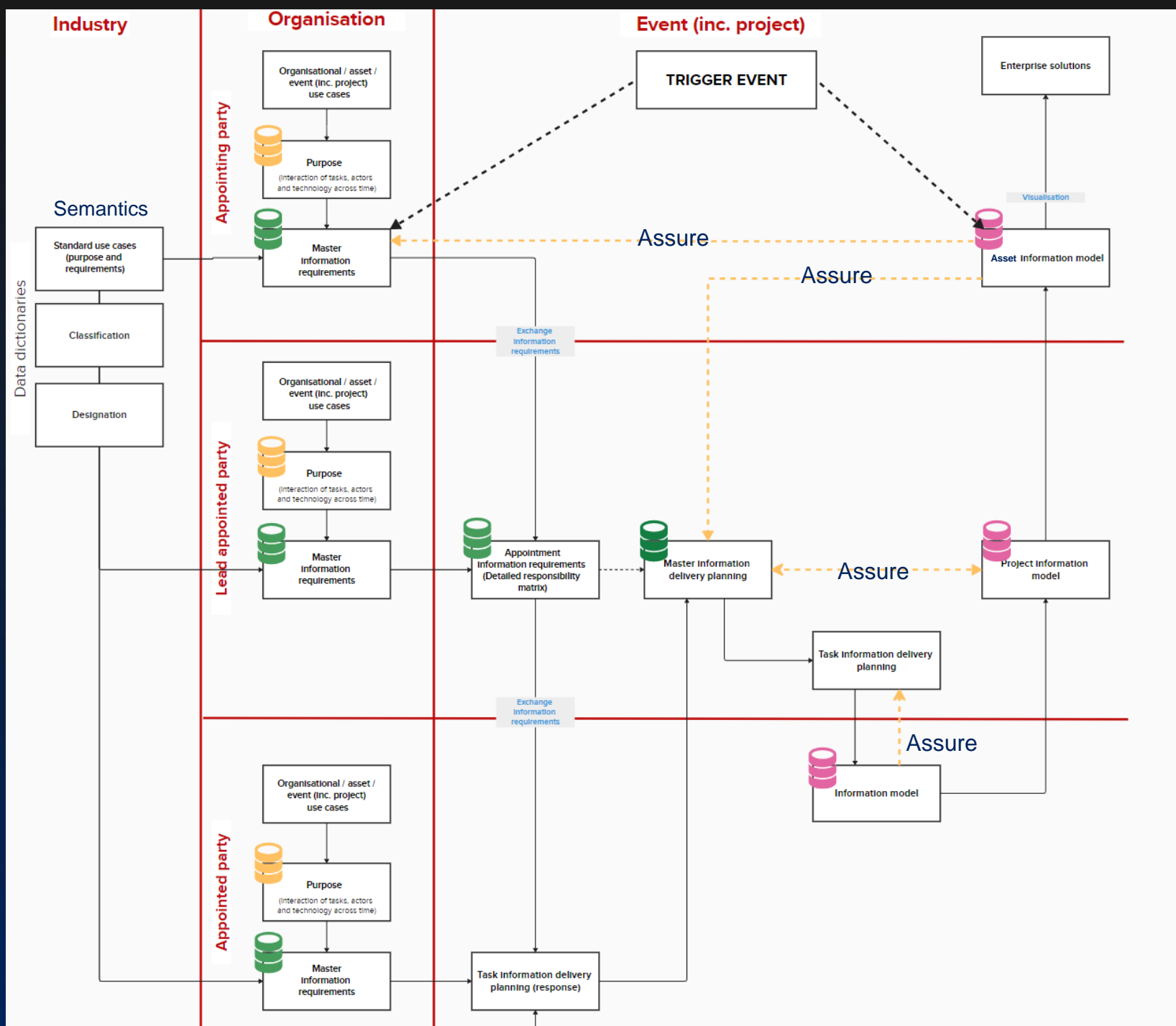
+IDS, bsDD, BCF...and many others (GIS...Brick etc...)

These are complex standards and need joining up (grounding in ISO 19650)
to give us any chance of doing this in real life

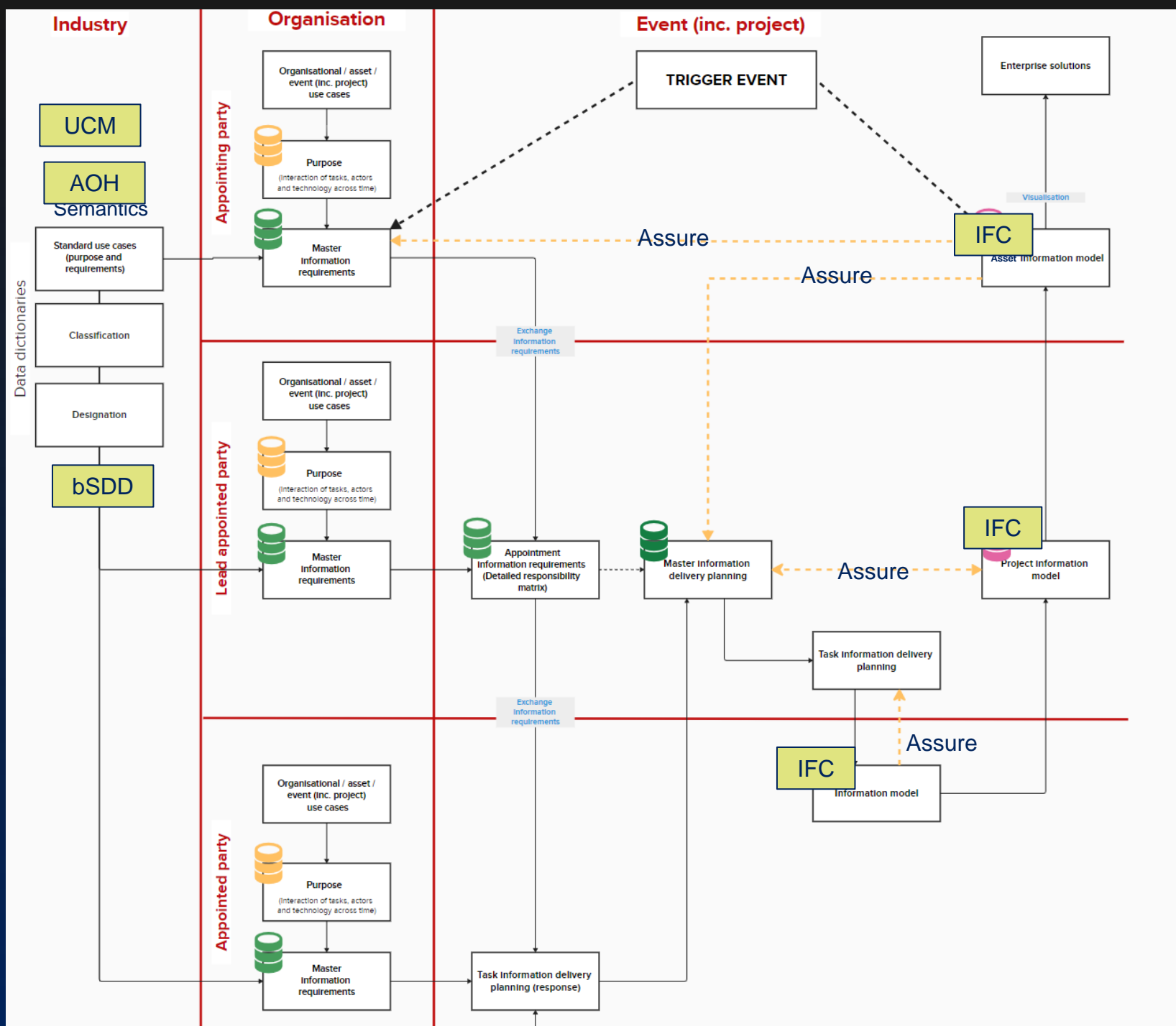
The management and information layers must be joined up for information management to work...

...for people to use technology and gain value in the context of how we work in the real world

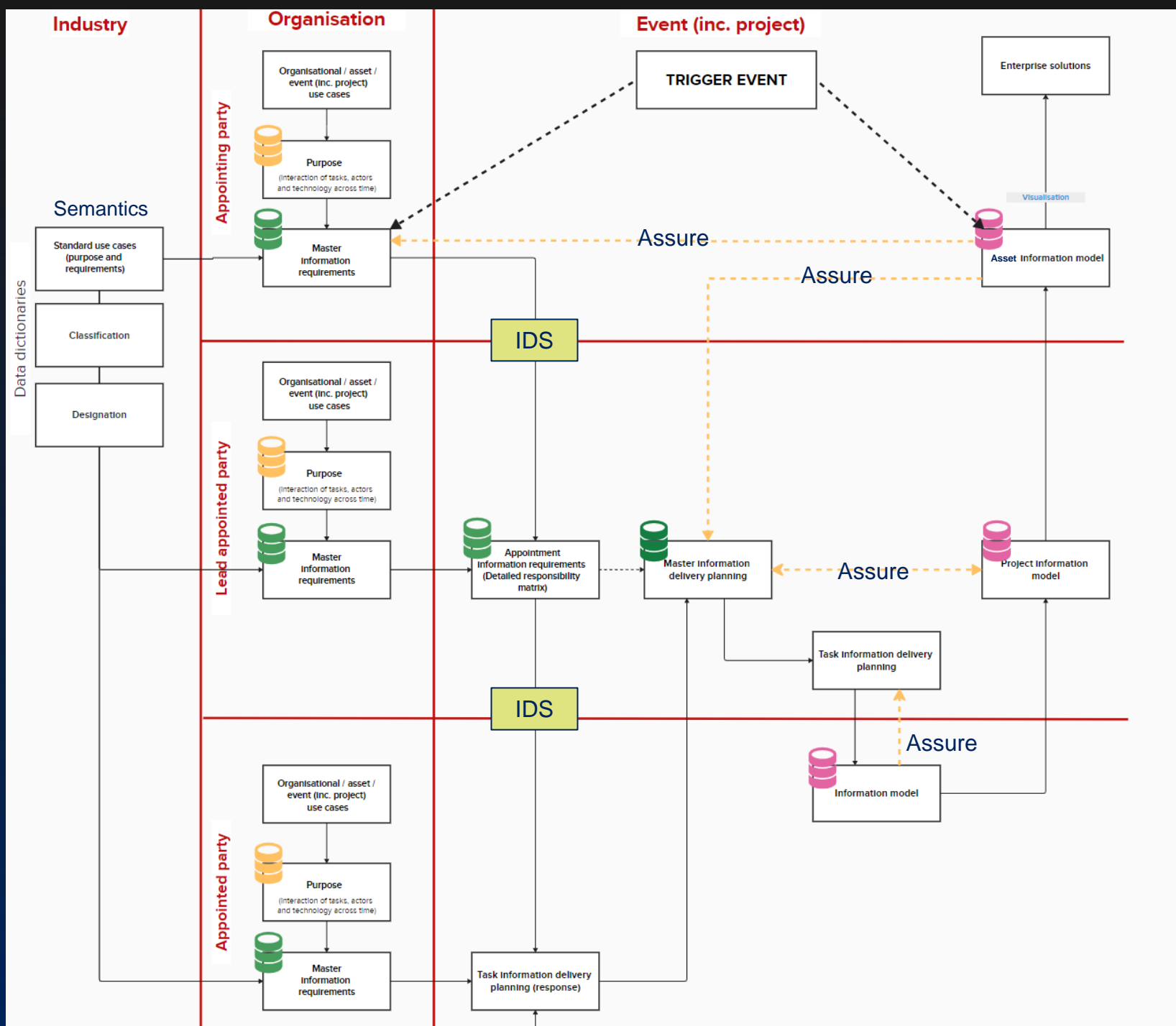
The start of an overall joined-up approach (simplified)



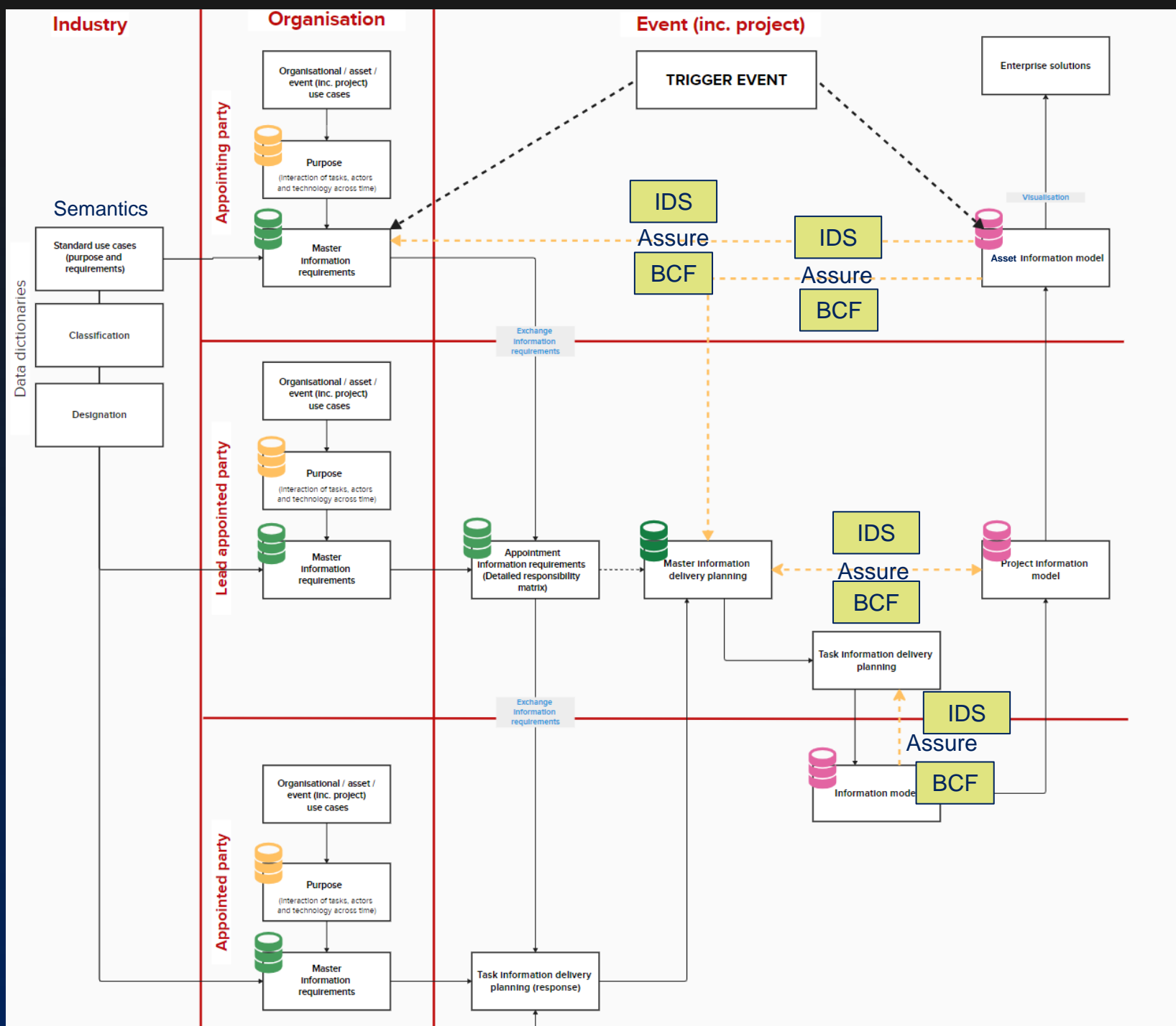
buildingSMART overlay 1



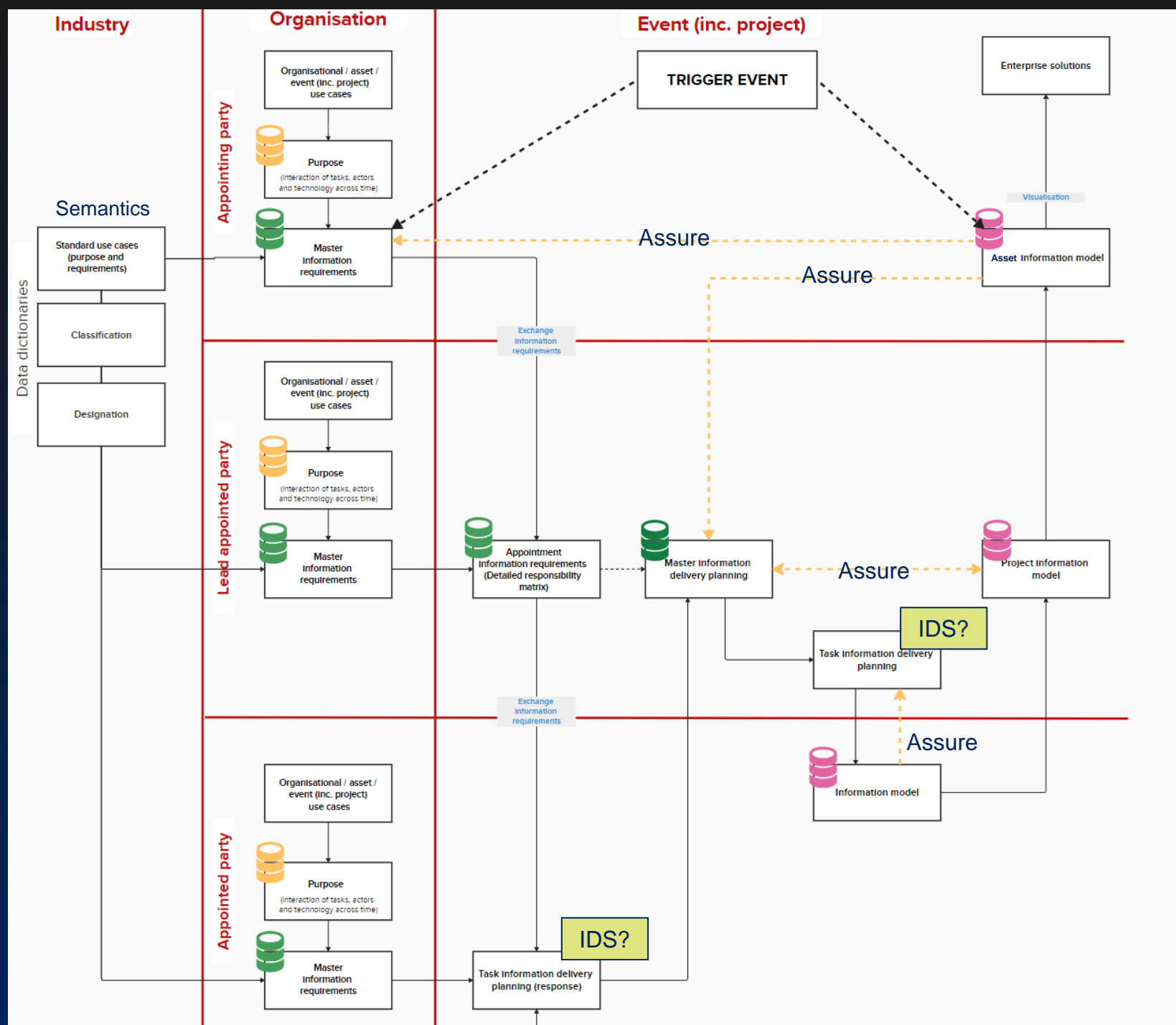
buildingSMART overlay 2



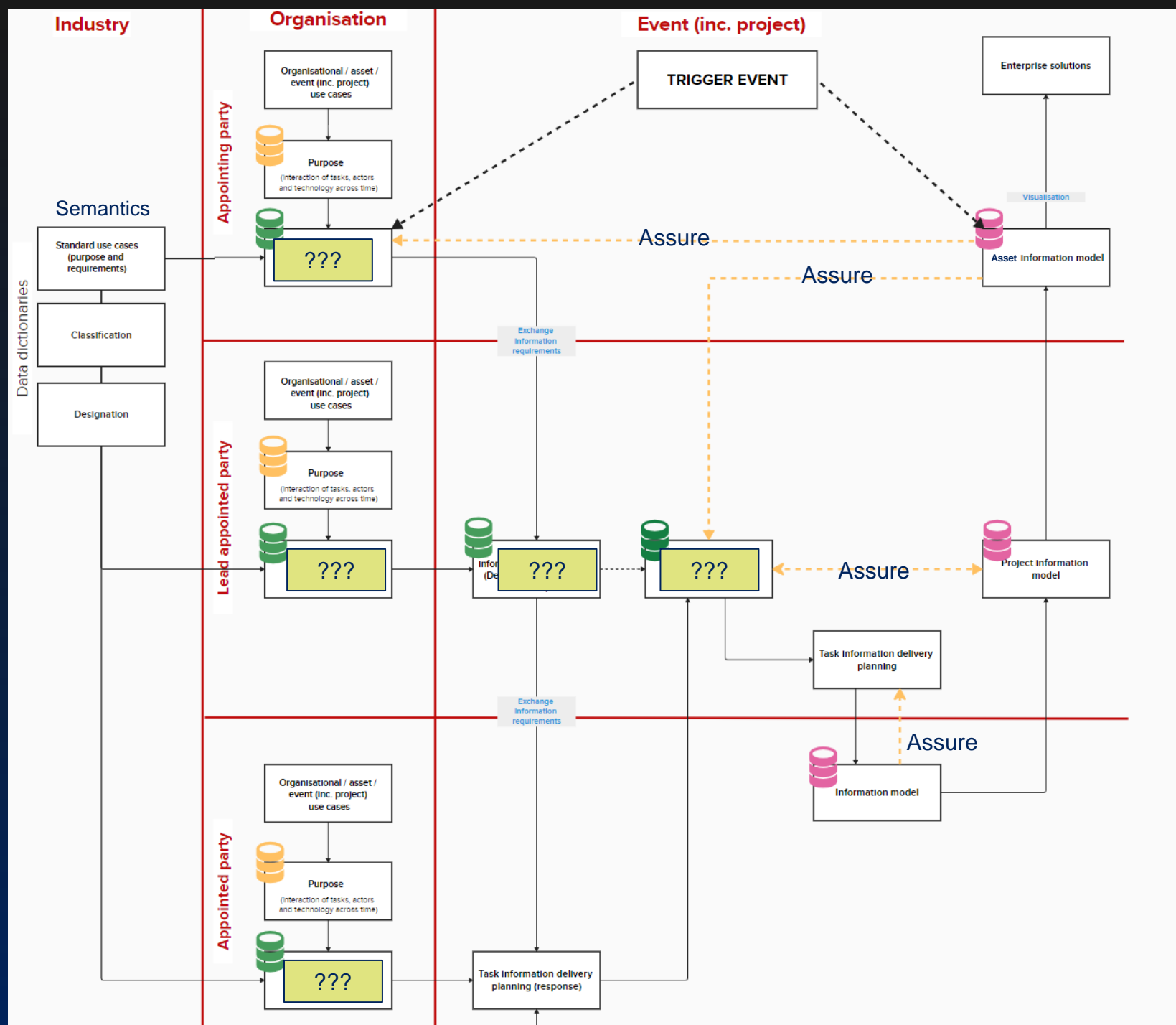
buildingSMART overlay 3



buildingSMART overlay potential



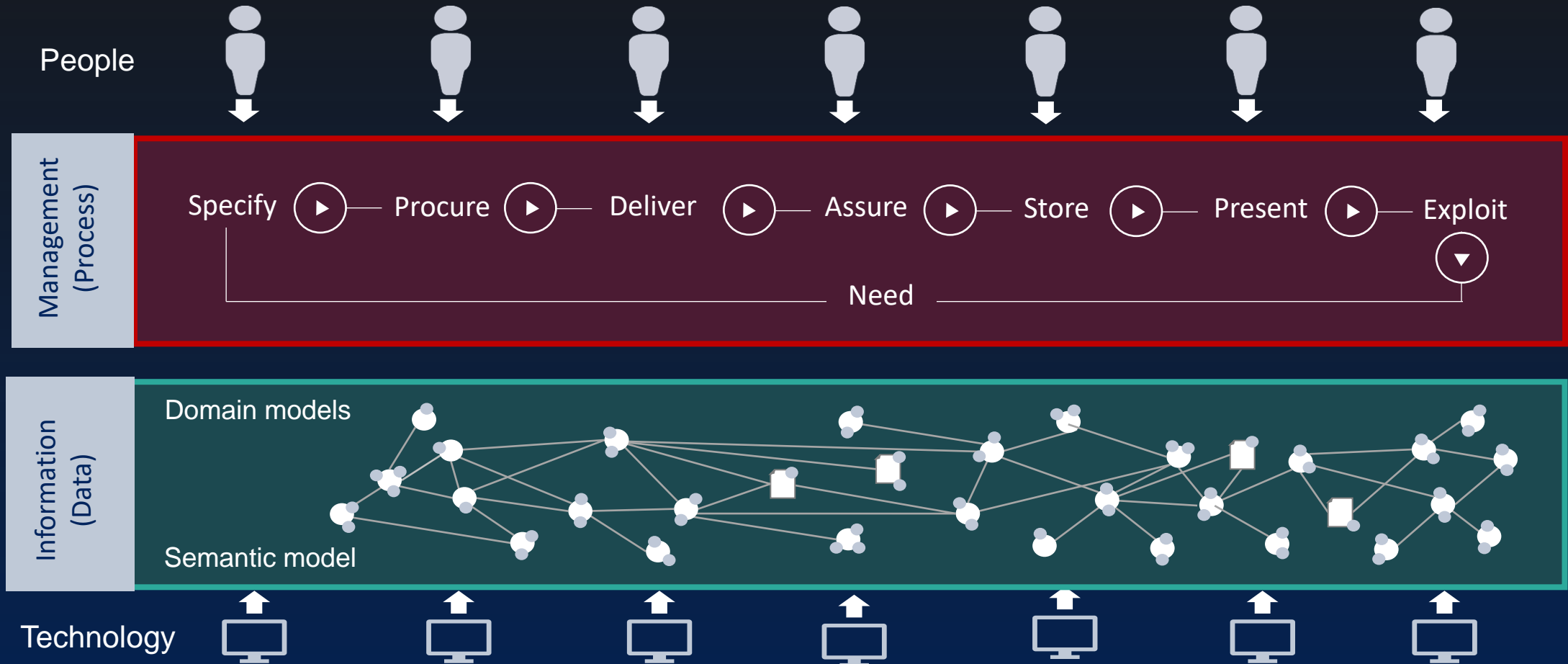
The need for a object based requirements schema



Therefore in any decisions made about the future
of buildingSMART standards
we have to bring in the principles of
information science and management

(not just the science and functionality of
technology)

**IFC becomes the default object based
schema to develop neutral information
models within CDE databases**



Information management is all about the planning, creation, updating and maintenance of connected information across the life of an asset

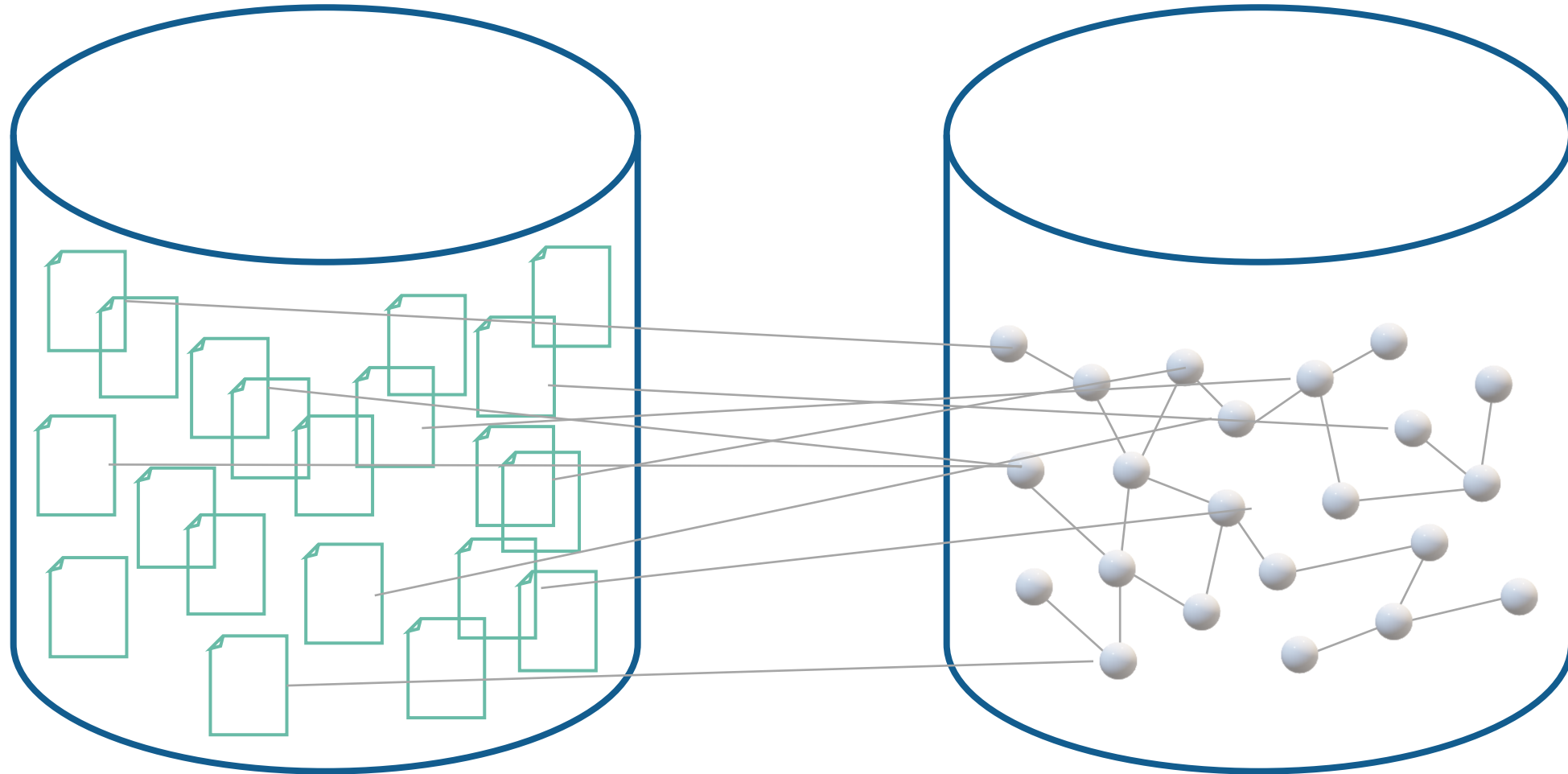
IFC provides the base structure of an
information (data) model

...within a CDE

... therefore within **databases**

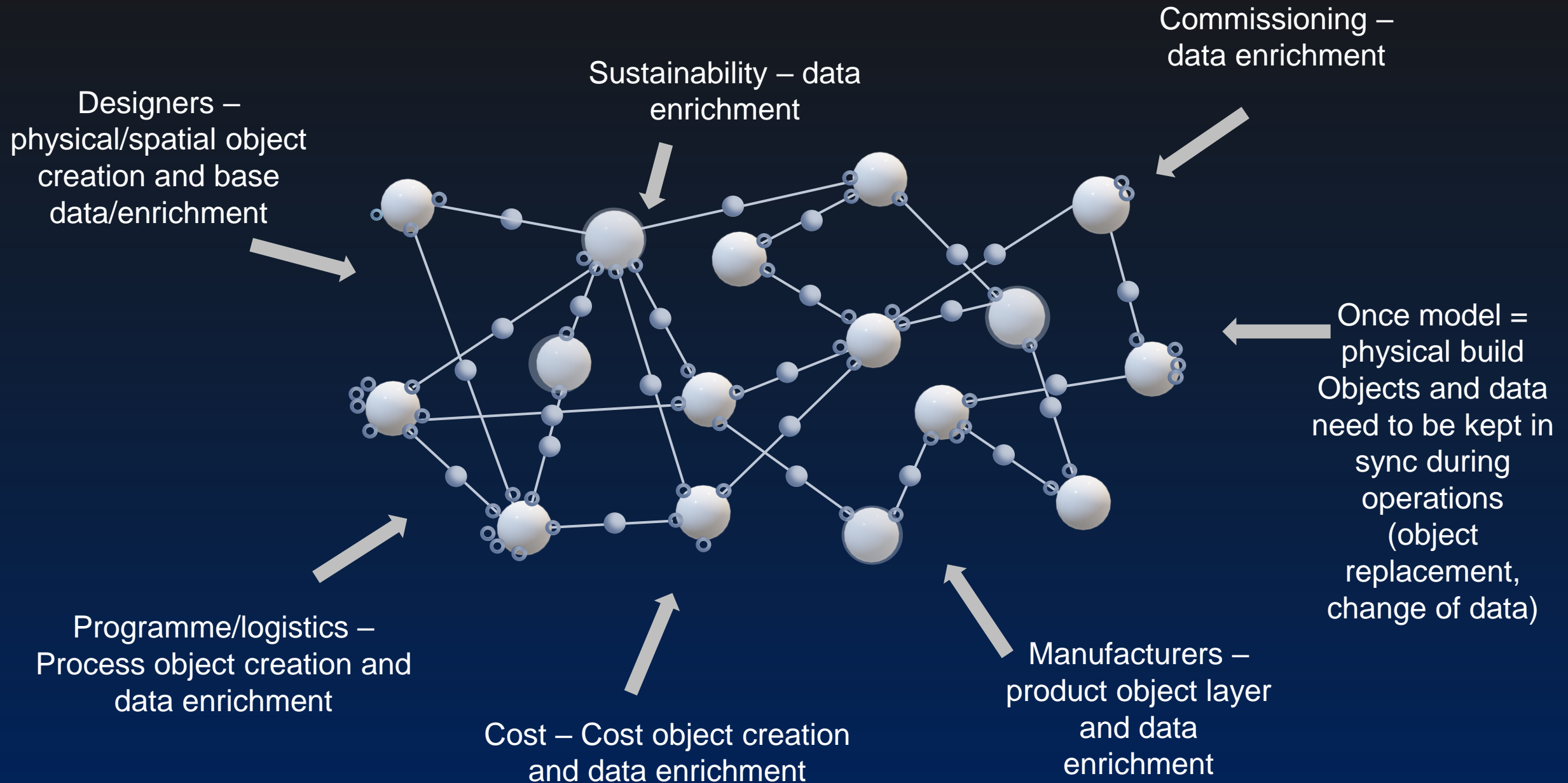
The 'Common Data Environment'

Release the data from monolithic files
(where it is often duplicates, contradictory and not connected)

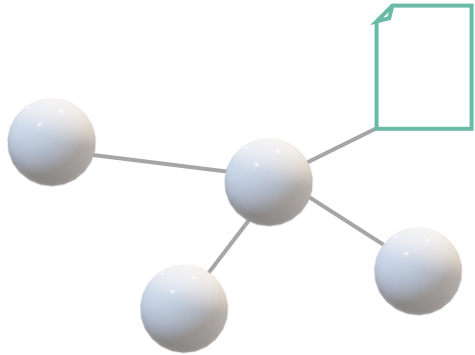


#FreeTheData

An Information Model in a 'proper' CDE



Owner - Let's Build...An Information Model

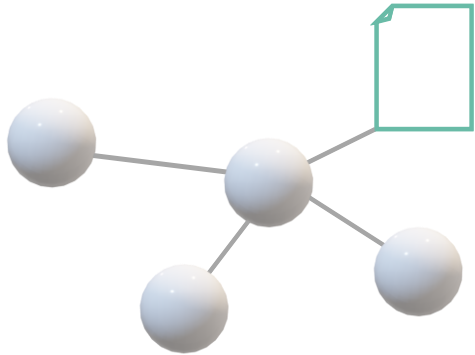


*A few pieces of data like
site/facility name and location
for a very small model.*

Owner (Asset information model)

Supplier (Project information model)

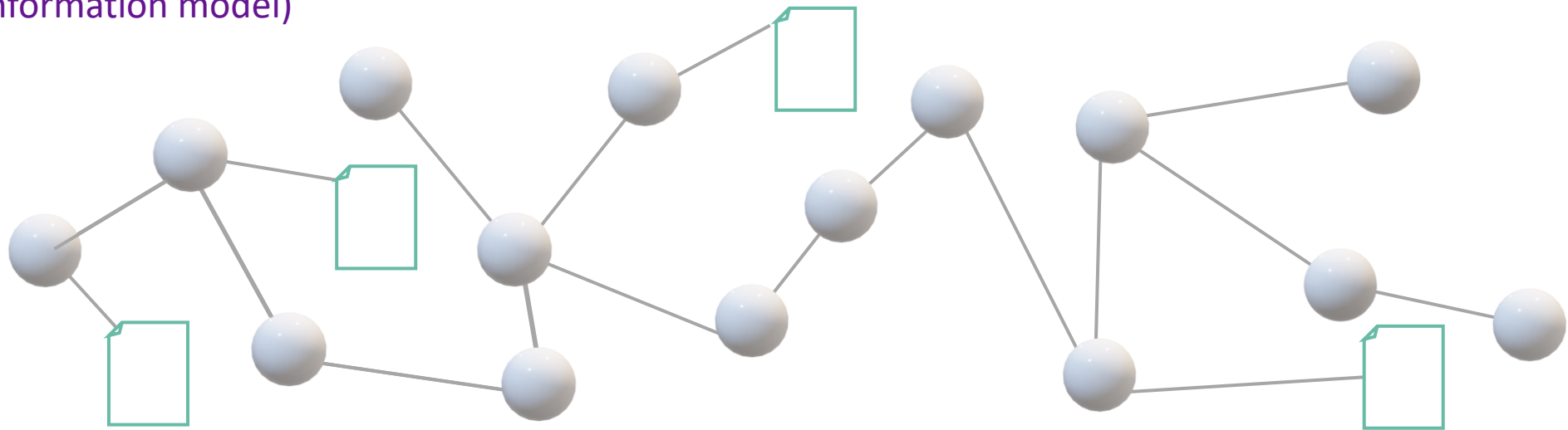
Design – The “Foundations” of The Information Model



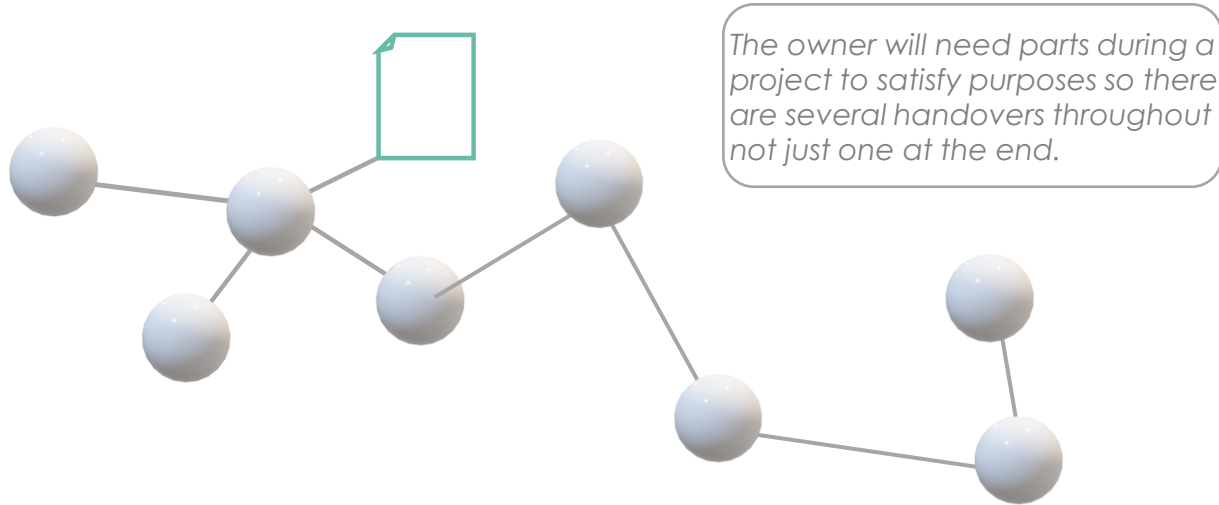
The small model (together with information requirements) is passed to the designers where they create the base object structure using their authoring tools to design and analysis tools to refine. The model of information starts to take shape.

Owner (Asset information model)

Supplier (Project information model)

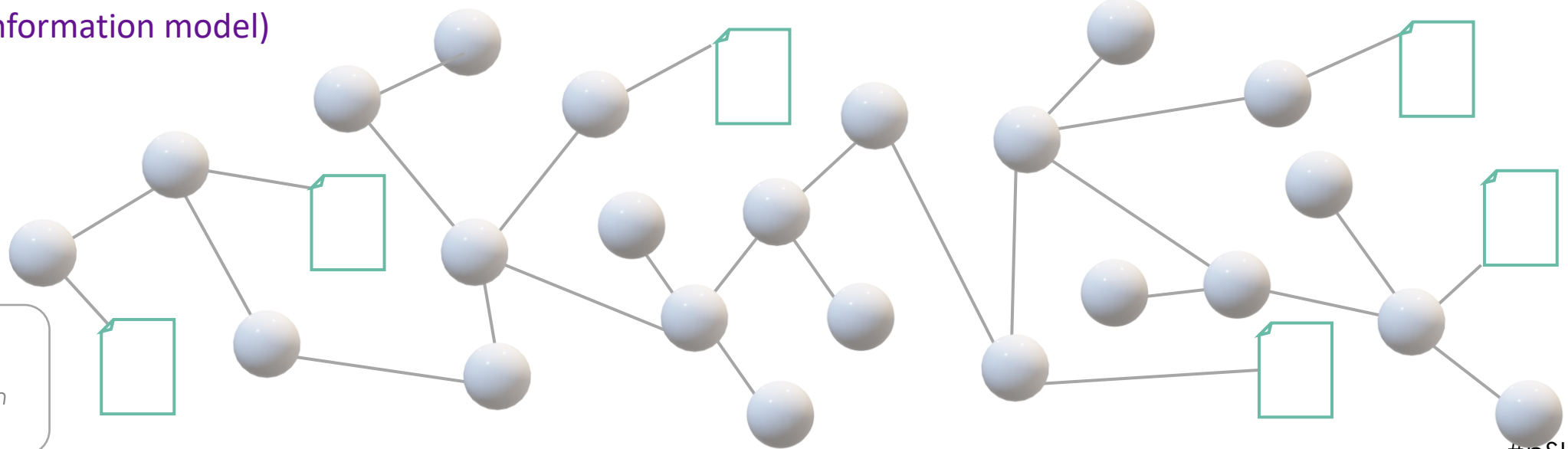


Construct – Enrichment And Feedback

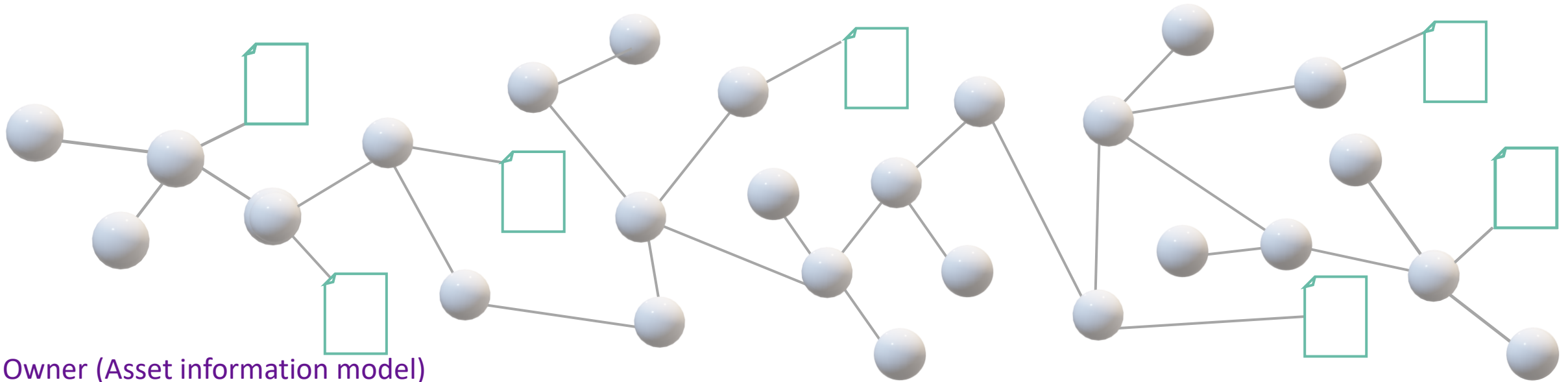


Owner (Asset information model)

Supplier (Project information model)



In Use - Maintaining The Information Model

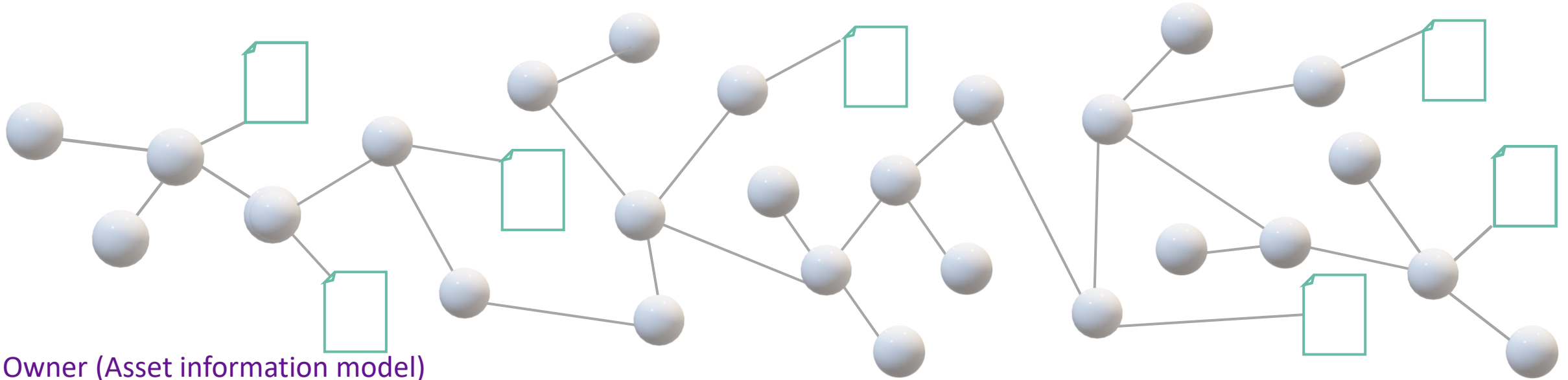


Owner (Asset information model)

Supplier ('Event' information model)

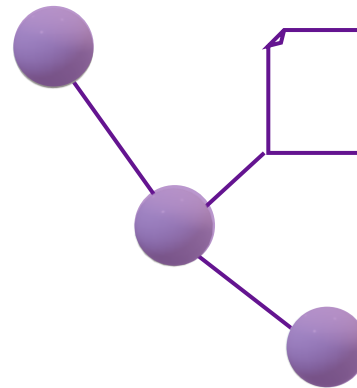
The owner will need parts during a project to satisfy purposes so there are several handovers throughout not just one at the end.

In Use - Maintaining The Information Model



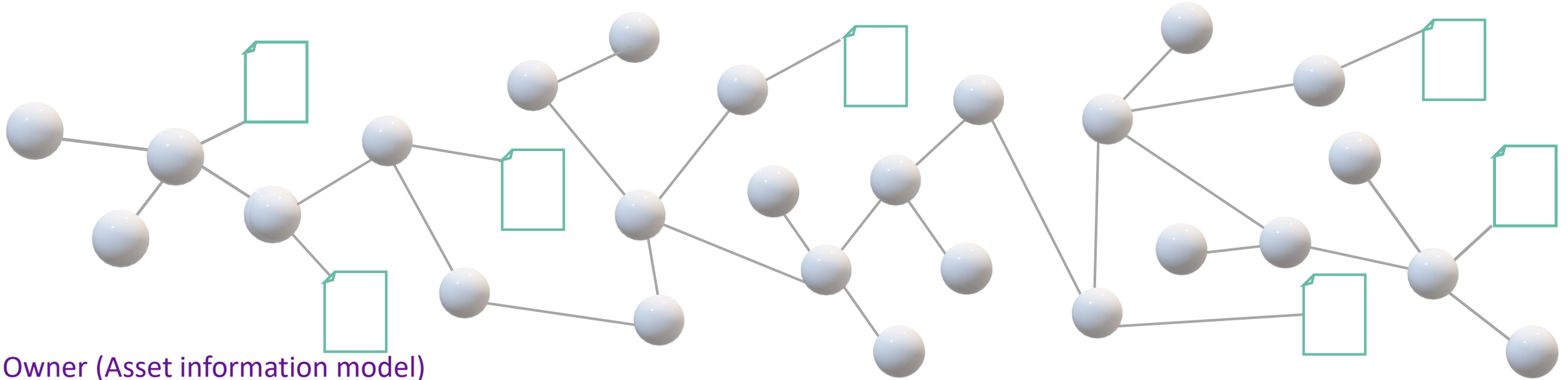
Owner (Asset information model)

Supplier ('Event' information model)



Pump breaks down. Maintenance engineer replaces the pump, so in the virtual world they update the information which has changed, the manufacturer, model number and warranty. This is done by filling in a form and it updates the relevant parts of the asset information model.

In Use - Maintaining The Information Model



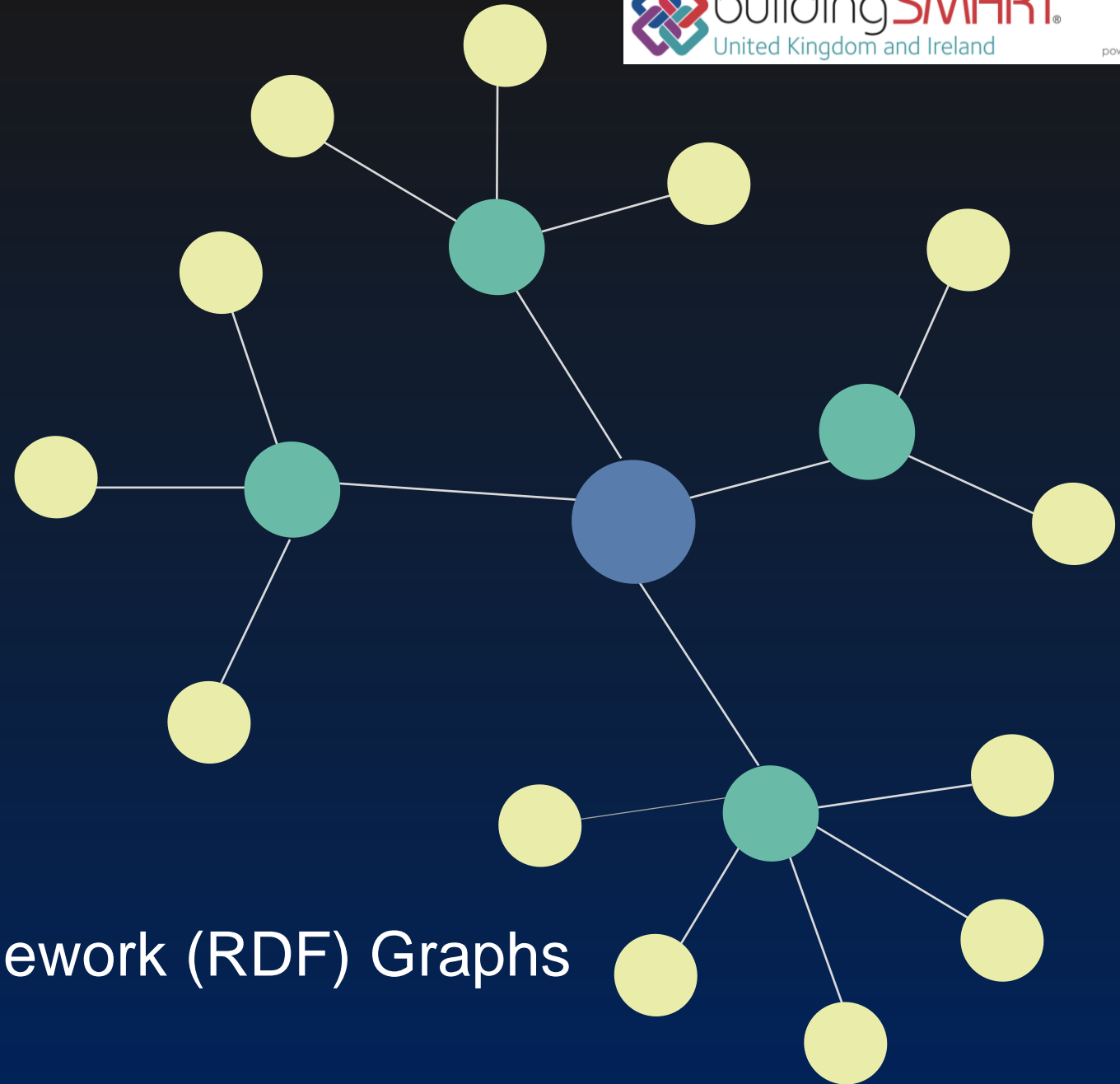
Owner (Asset information model)

Supplier ('Event' information model)

*At the end of life, if objects were to be used in other facilities, that object and its data could potentially transfer into **another** asset information model, contributing to a circular economy approach.*

IFC used in the context of knowledge graphs

Graph databases



Labelled Property Graphs

Resource Description Framework (RDF) Graphs

**Graph structures + Domain Knowledge
= Knowledge Graph**

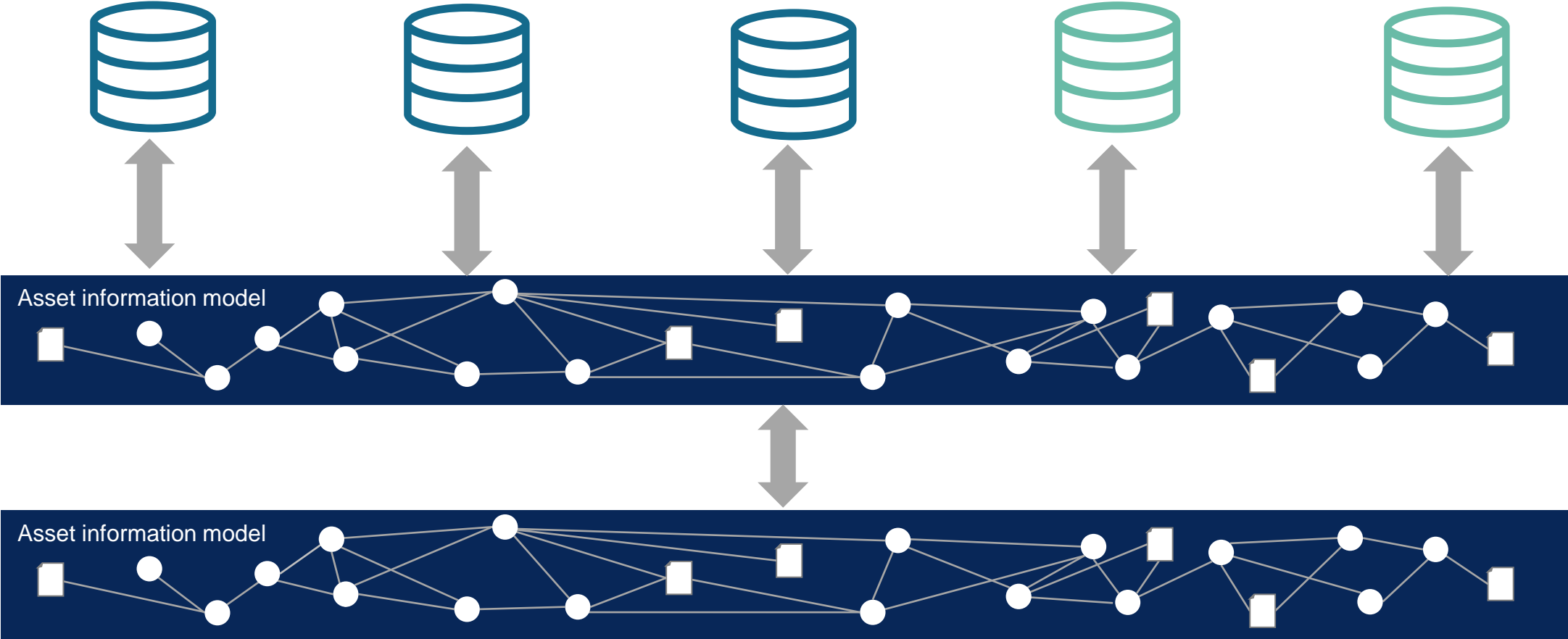
= Magic[★]

*Requires a more robust
semantic ontology.
This is where the bSDD
has potential*

The data arrangement of built facilities naturally lends itself to
knowledge graphs

Knowledge graph asset information models

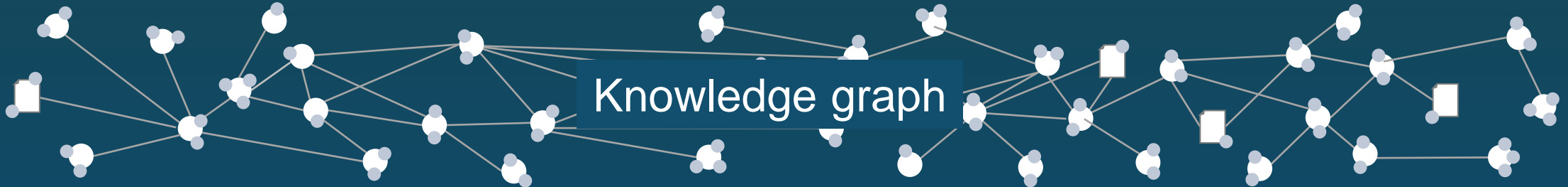
Each built facility can be represented as a knowledge graph



Large language model + Retrieval augmented generation



Knowledge graph

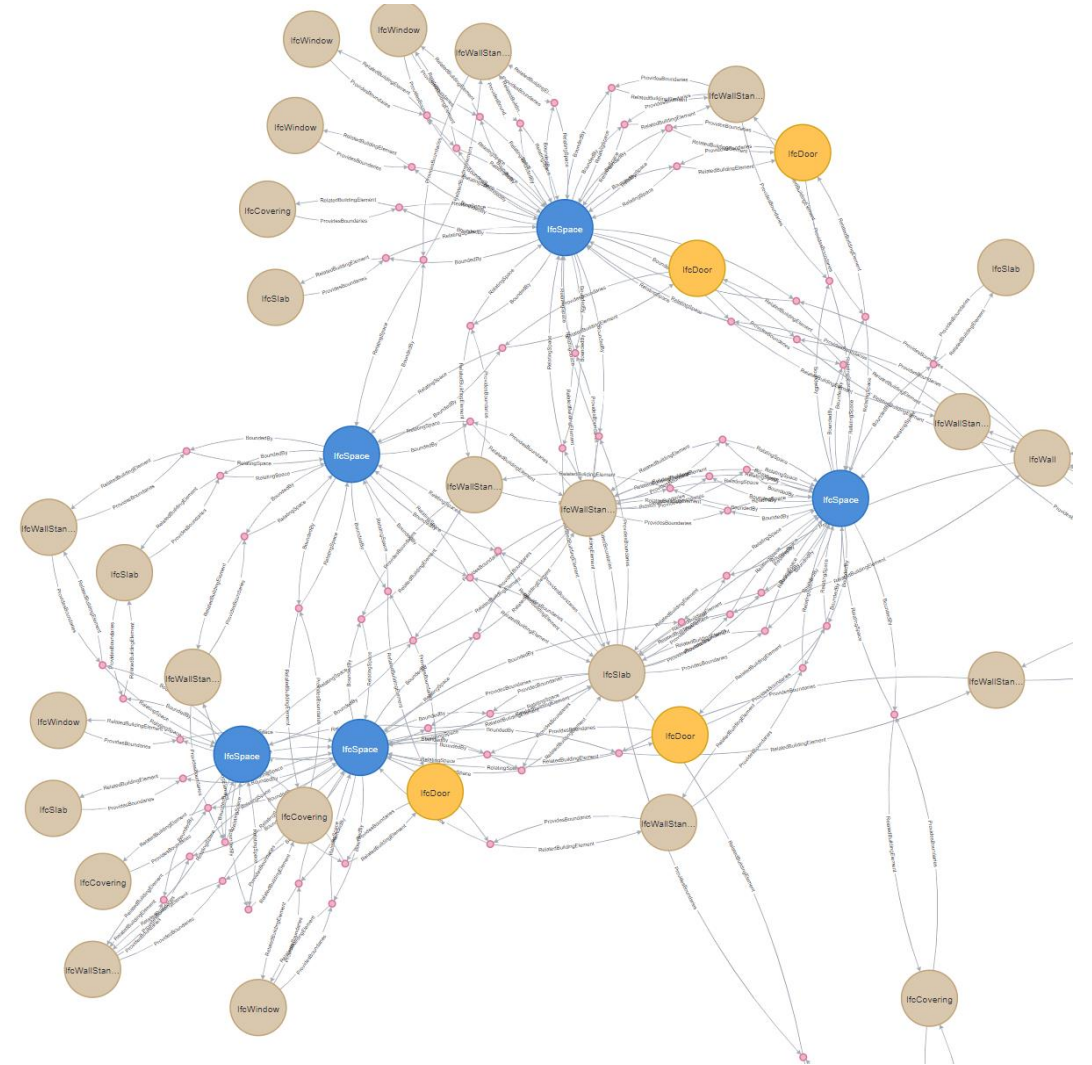


Pockets of research out there

Cypher4BIM: Releasing the Power of Graph for Building Knowledge Discovery

Junxiang Zhu ^{1,4,*}, Nicholas Nisbet ², Mengtian Yin ¹, Ran Wei ³, Ioannis Brilakis ¹

+ others!



Generated by Junxiang Zhu, Department of Engineering, University of Cambridge, UK

- The implementation within information management needs to be considered just as much as technology. Making something easily implementable within technology can shift complexity into the information management process.
- The technology has to fit into the wider context of information management and its principle role is to be the interface between the complexity of the science and people. It allows people to extract value from data.
The complexity needs to be taken away from users.
- Binary serialization needs serious discussion and debate!
- Can we have a list of the planned deprecated parts of the IFC 5 schema?
- It's great to be influenced by developments in the virtual world but we are building real things in the context of a multitude of variables, risk and contractual arrangements that need to be maintained.
All of which are delivered by **people** (with varying levels of digital capability) which need to keep people safe.
Whatever the solution it needs to address this.