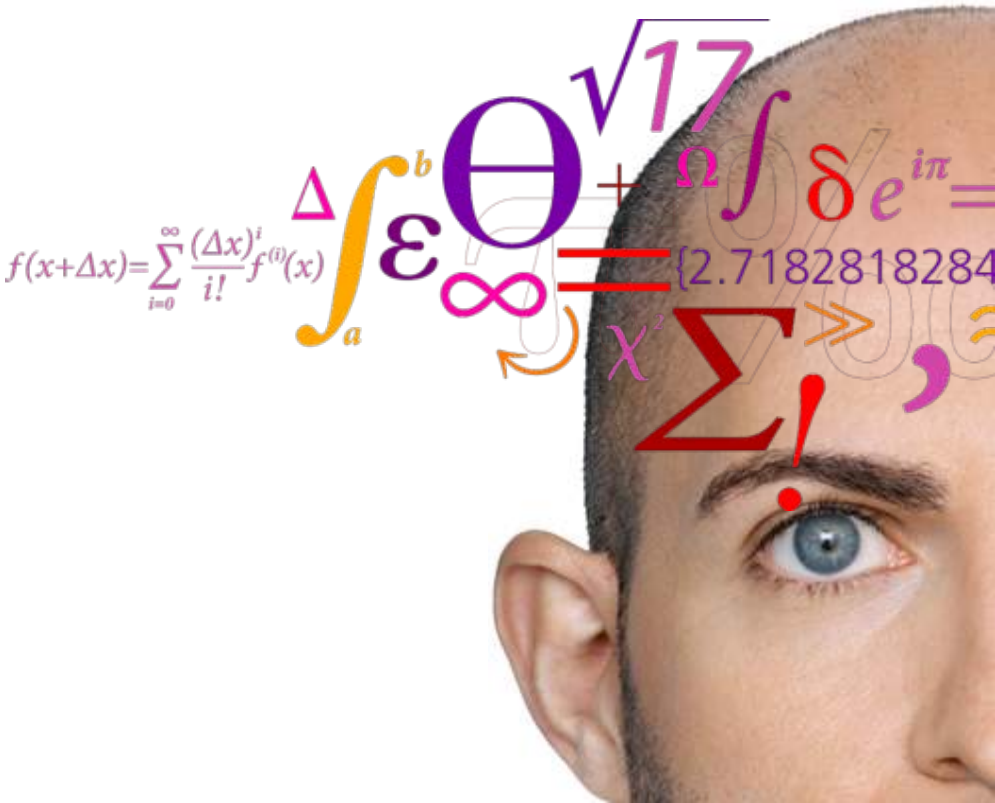
Technical University of Denmark (DTU)

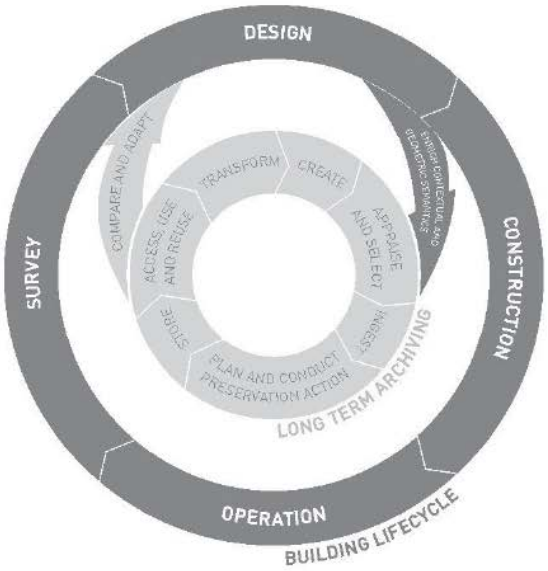
Campus Service

ICT & BIM: Client perspective driven from the operation phase

Markus Lampe, BIMmanager



FM at DTU Campus

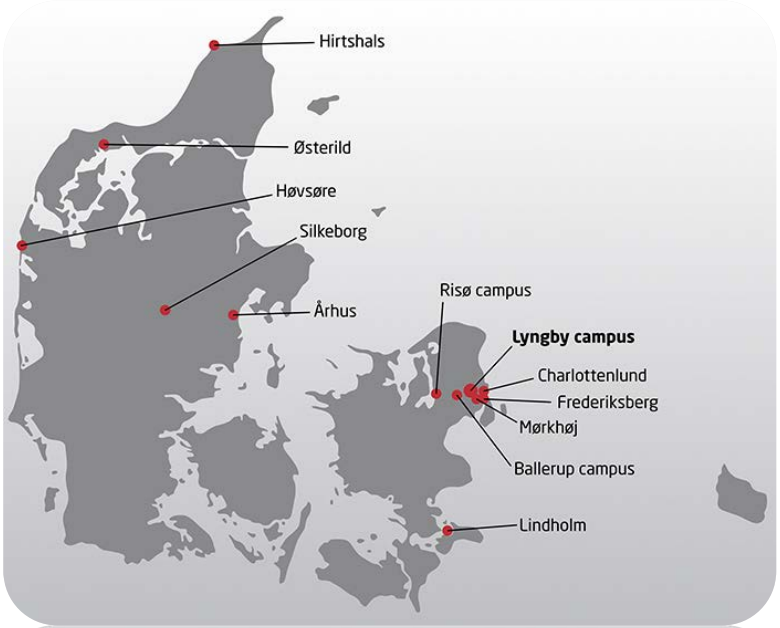


A future lifecycle of building data will need to include and integrate components that stem from operational systems - such as Facility Management Software - as original BIM data.

- **DTU** – general information
- **FM tasks** - Illustrated by the Facility Management Spiral
- **BIM strategy** - BIMkontor in Building Management Systems

  Where do vi come from and where do we want to go?
- **Everyday business** - BIMkontor - information flow, dataset and processes

Technical University of Denmark– (Established 1829, First rector: H.C Ørsted)



Key Figures (2013)

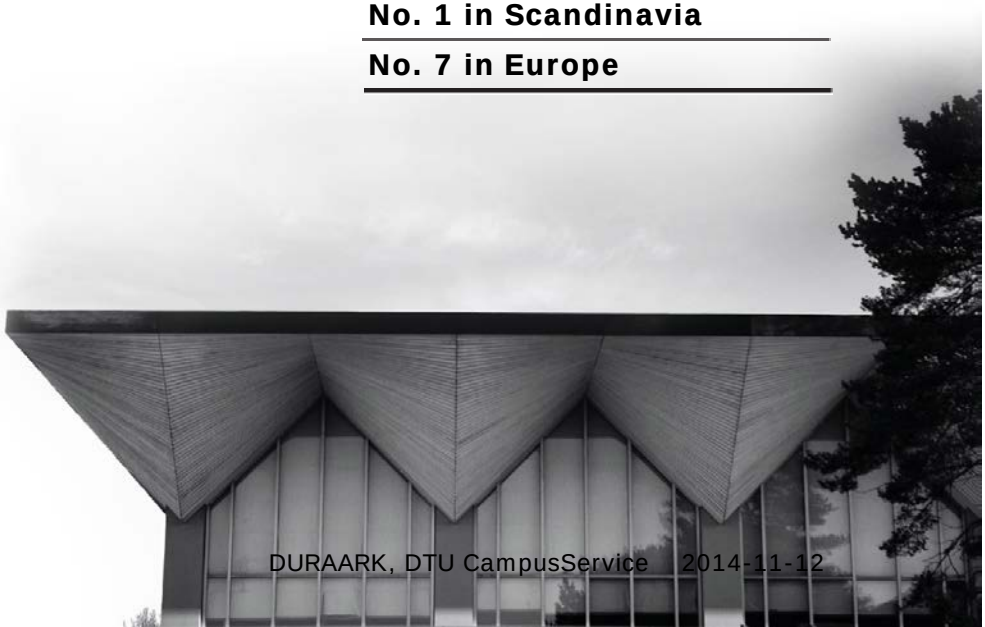
Number of students	ca. 8,500
here of Ph.D. Stud.	1,200
Science staff	1,700
Publications	3,600

Ranking

Leiden *Crown Indicator* 2010:

No. 1 in Scandinavia

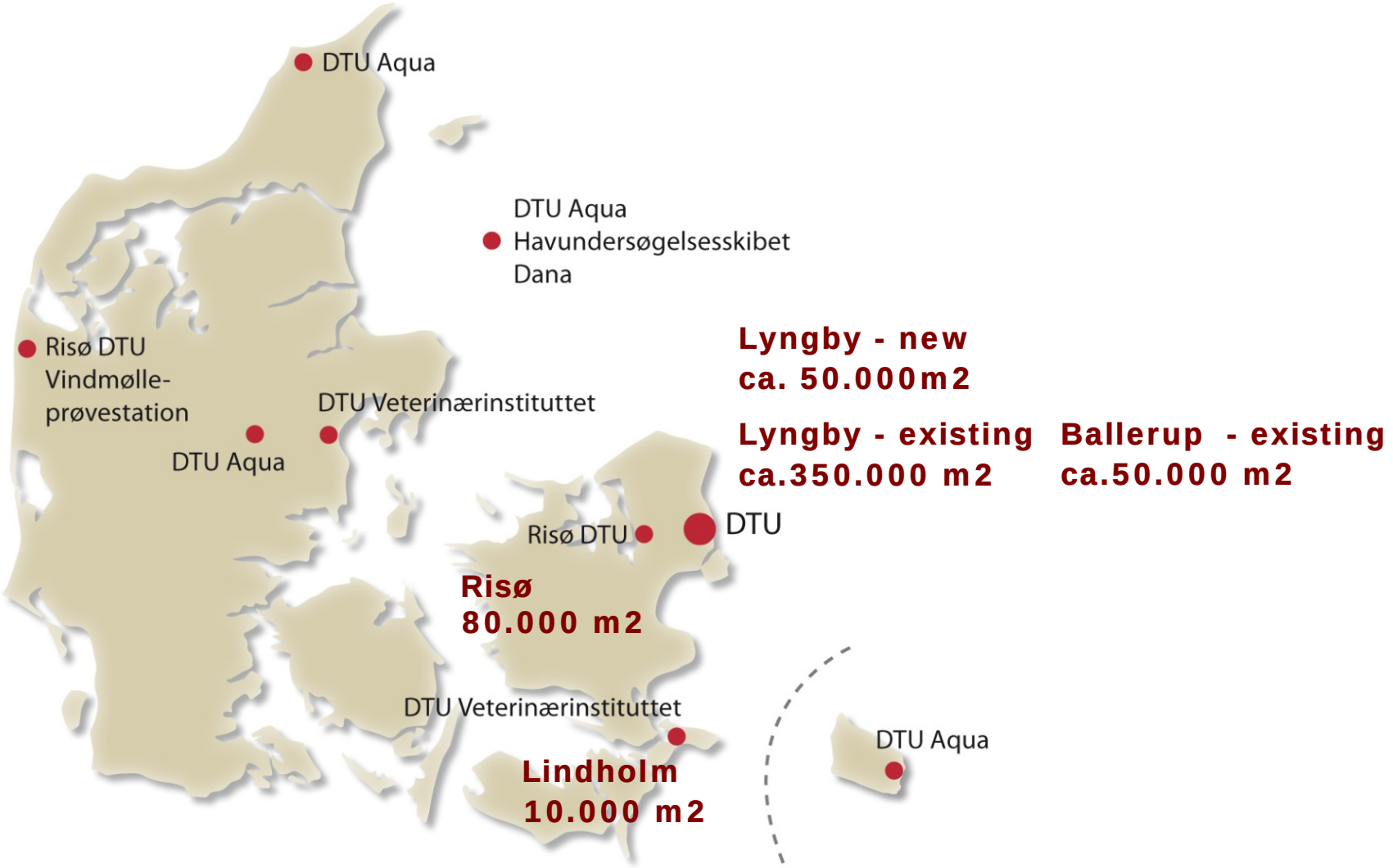
No. 7 in Europe

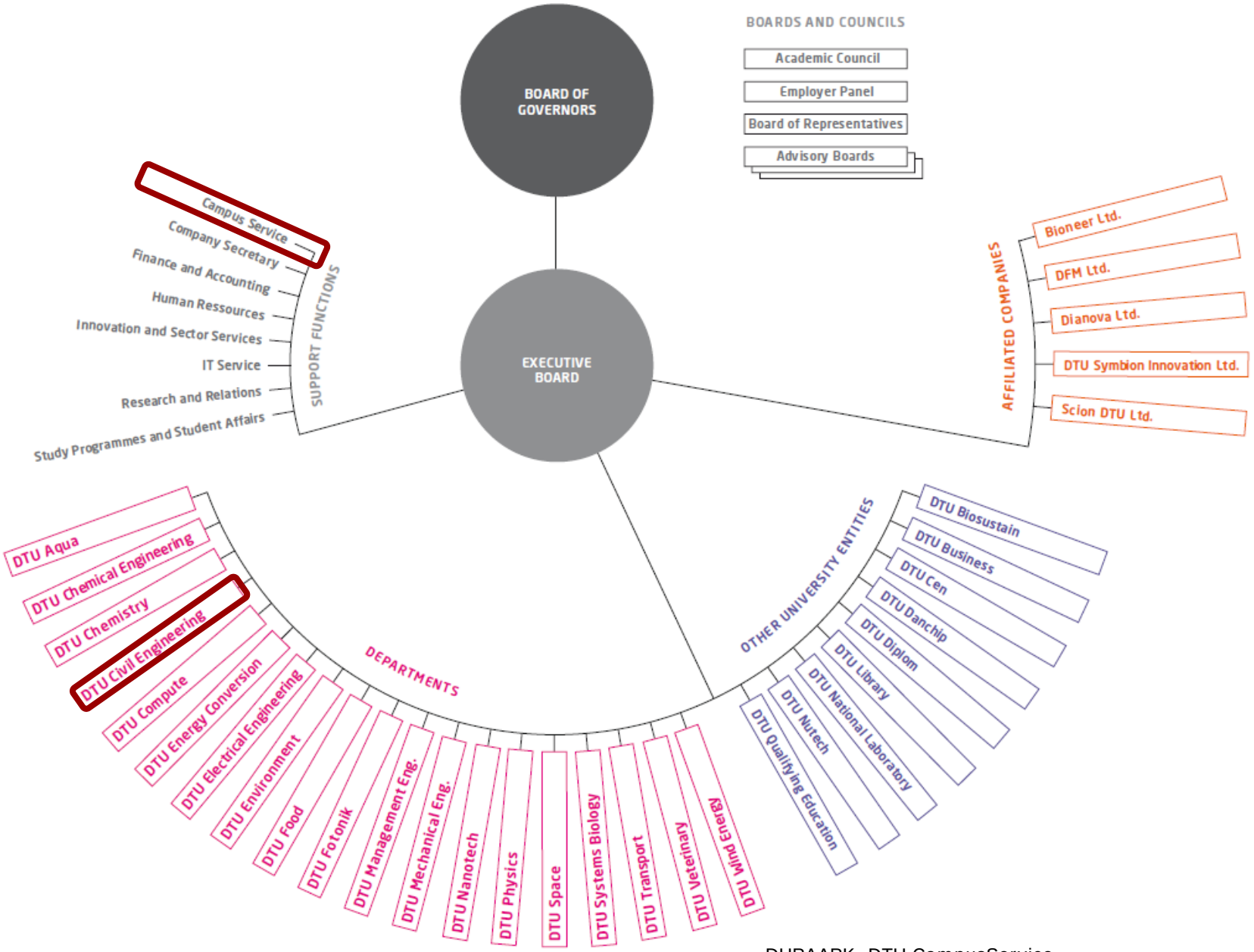


FACTS about DTU

FACTS about DTU

600.000m2 and 9 locations

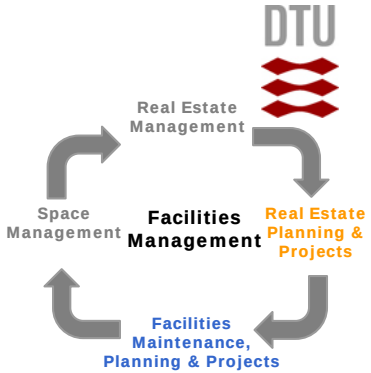



BOARD OF GOVERNORS
BOARDS AND COUNCILS
Academic Council
Employer Panel
Board of Representatives
Advisory Boards
EXECUTIVE BOARD
SUPPORT FUNCTIONS
Campus Service
Company Secretary
Finance and Accounting
Human Ressources
Innovation and Sector Services
IT Service
Research and Relations
Study Programmes and Student Affairs
AFFILIATED COMPANIES
Bioneer Ltd.
DFM Ltd.
Dianova Ltd.
DTU Symbion Innovation Ltd.
Scion DTU Ltd.
DEPARTMENTS
DTU Aqua
DTU Chemical Engineering
DTU Chemistry
DTU Civil Engineering
DTU Compute
DTU Energy Conversion
DTU Electrical Engineering
DTU Environment
DTU Food
DTU Fotonik
DTU Management Eng.
DTU Mechanical Eng.
DTU Nanotech
DTU Physics
DTU Space
DTU Systems Biology
DTU Transport
DTU Veterinary
DTU Wind Energy
OTHER UNIVERSITY ENTITIES
DTU Biosustain
DTU Business
DTU Cen
DTU Danchip
DTU Diplom
DTU Library
DTU National Laboratory
DTU Nutech
DTU Qualifying Education

Facilities Management – Technical University of Denmark

DTU - CAMPUS SERVICES

Jacob Steen Møller



REAL ESTATE PMO

Ole Kristian Bottheim

FACILITIES MAINTENANCE & PROJECTS

Anders B. Møller

REAL ESTATE- & SPACE MANAGEMENT

Uffe G. Thomsen

LYNGBY
FREDERIKSBERG
MØRKHØJ
BALLERUP
RISØ
LINDHOLM

PMO 1 – Claus Møller Rasmussen

PMO 2 – Søren Uslev

PMO 3 – Nils Møller

FM – Planning & Projects – Allan A. Murphy

Parks & Roads – Michael Jepsen

Buildings maintenance – Synne Remvig

Electrical – Allan Egetoft

HVAC – Anders Wang-Holm

CAS Frederiksberg – Finn L. Mosegaard

CAS Mørkhøj – Finn L. Mosegaard

CAS Ballerup – Finn L. Mosegaard

CAS Risø – Poul Erik Søderdahl

CAS Lindholm – Jesper Dose

anagement Systems – Tommy Plesner

BIMkontor

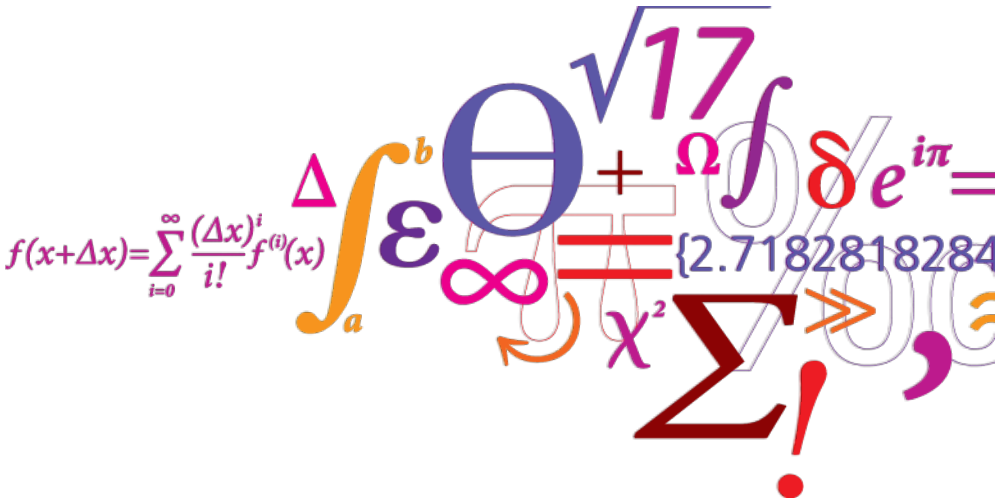
Facility Service Centre – Nils Turpie

Administration – Uffe G. Thomsen

Professional Responsibility

Campus Service - Tasks

Illustrated by the Facility Management Spiral



Facility Management Spiral

Portfolio Management (Property)

Space Management

Decisions
Acquisitions
Rentals
Construction

Planning
Needs Assessment
Prognoses
Scenarios

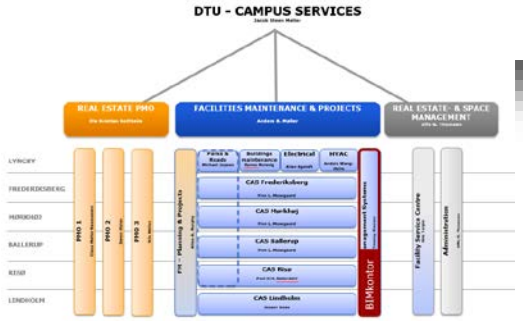
Facilities Management

Construction
New Constructions
Reconstruction
Expansion

Operations
Utilities
Administration
Maintenance
Services

REAL ESTATE PMO

FACILITIES MAINTENANCE & PROJECTS



CAS TASK OVERVIEW

Investment Management

- Goals
  - Own / rent
  - RoI
- Strategies
  - Market
  - Finances
  - Legal matters
  - Technical matters
  - Environment
- Acquisitions and sales
- New constructions / modernization / demolition

Financial / Administrative Management

- Funding
- Budgets
- Financial accounts
- Taxes
- Key figures / benchmarking
- Insurance
- Contracts
  - External / internal
- Rentals, in / out

Area Management

- Space management
- Area utilization
- Lay-out
  - Premises
  - Working areas
- Relocations
- Furniture & fixtures

Operations Management

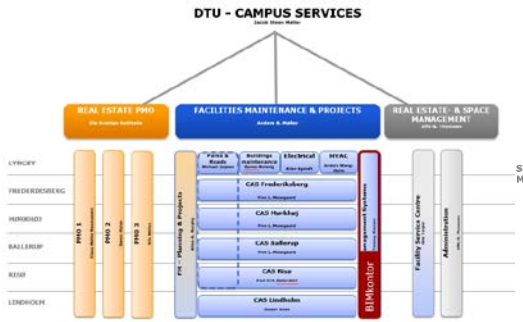
- Maintenance
  - Grounds
  - Building exteriors
  - Building interiors
  - Building installations
  - Furniture & fixtures
- Utilities
  - Heating
  - El installations
  - Water
  - Sewage
  - Renovation
- Upkeep
  - Exterior grounds
  - Exterior buildings
  - Interior
  - Window cleaning
- Joint operations
  - Care, supervision and control
  - Materials, tools, machinery
  - Service – external assistance
  - External con-sultancy services
- Insurance

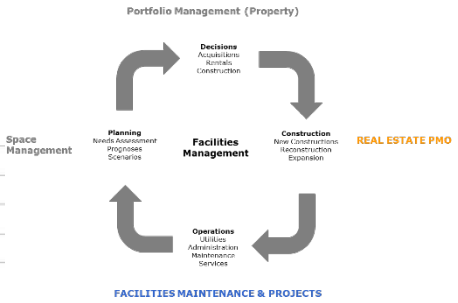
Service Management

- Projects / construction contracts
- EDP
  - Data net
  - Telephone
  - IT tools
  - Internet

DTU Centrally

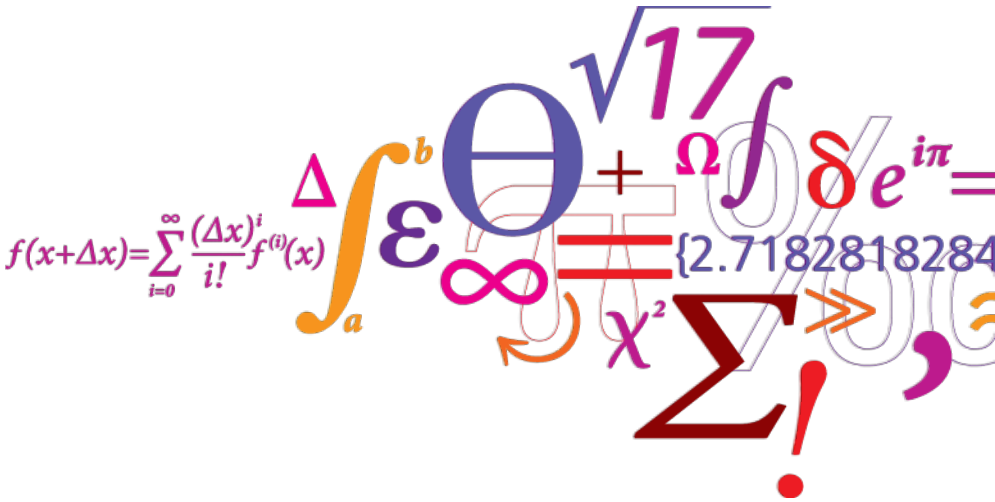
- Security & guards
- Working environment
- Canteen
- Reception
- Internal mail service
- Office management





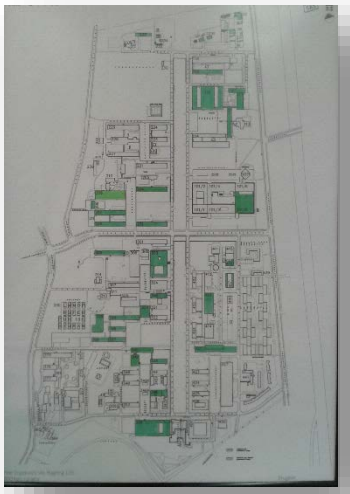
Campus Service – BIM strategy

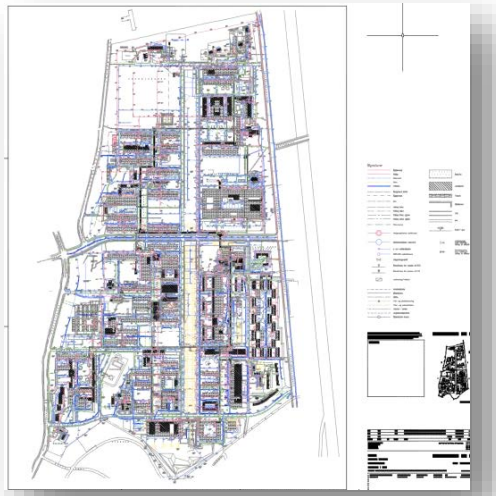
BIMkontor in Building Management Systems

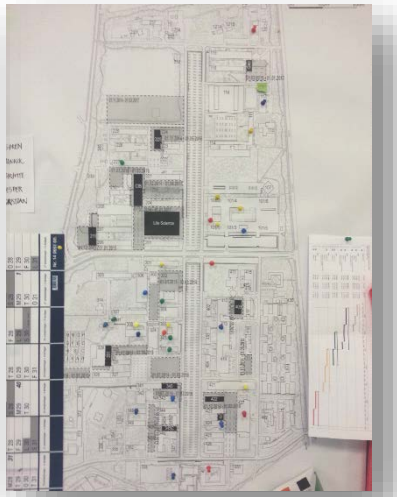


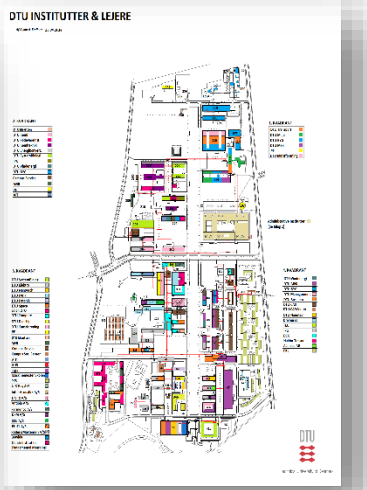
DTU, Lyngby Campus

GIS...









BuildingInformations in the DTU

History, 2011

Dig. registering of sustainability relevan data for each house

Validate User and functions

Space management and updating

Registering of techn. systems [EL, VVS, VE on a room level

Update and register through digital interface

1. Digitalizing

reports, drawings, FM material **digitaliz**

3. BIM

Digital model and building parts register

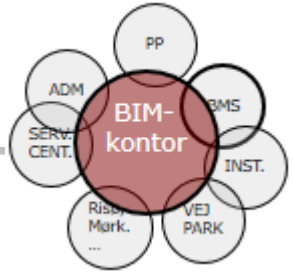
2. IDMer / IKT

DTU defines **IDMer a detailed ICT contra**

Document management

BuildingInformations in the DTU

2013



100%

0%

Dig. registering of sustainability relevan data for each house

Document management

Validate User and functions

Space management and updating

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Update and register through digital interface

1. Digitalizing

reports, drawings, FM material **digitaliz**

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Digital model and building parts register

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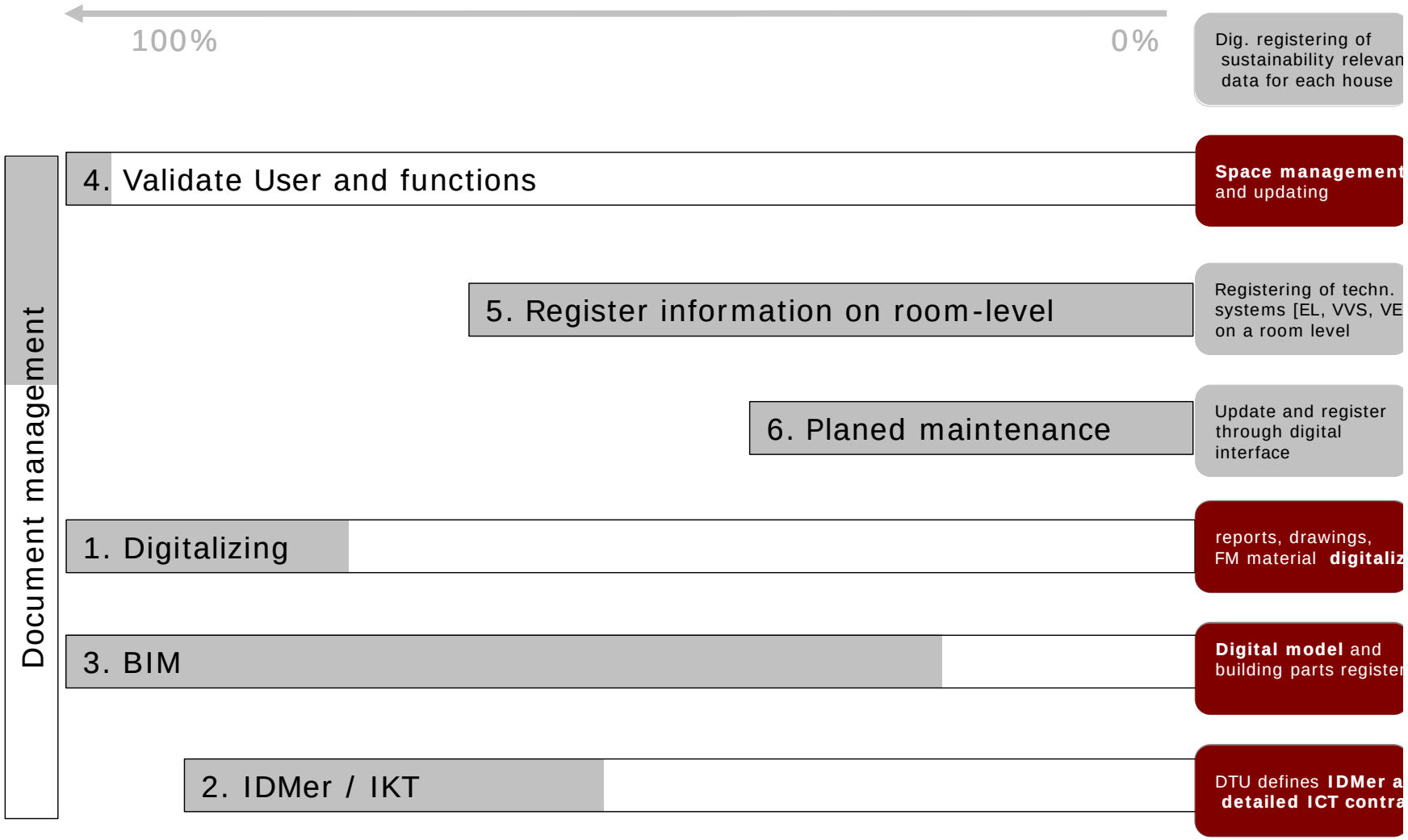
DTU defines **IDMer a detailed ICT contra**

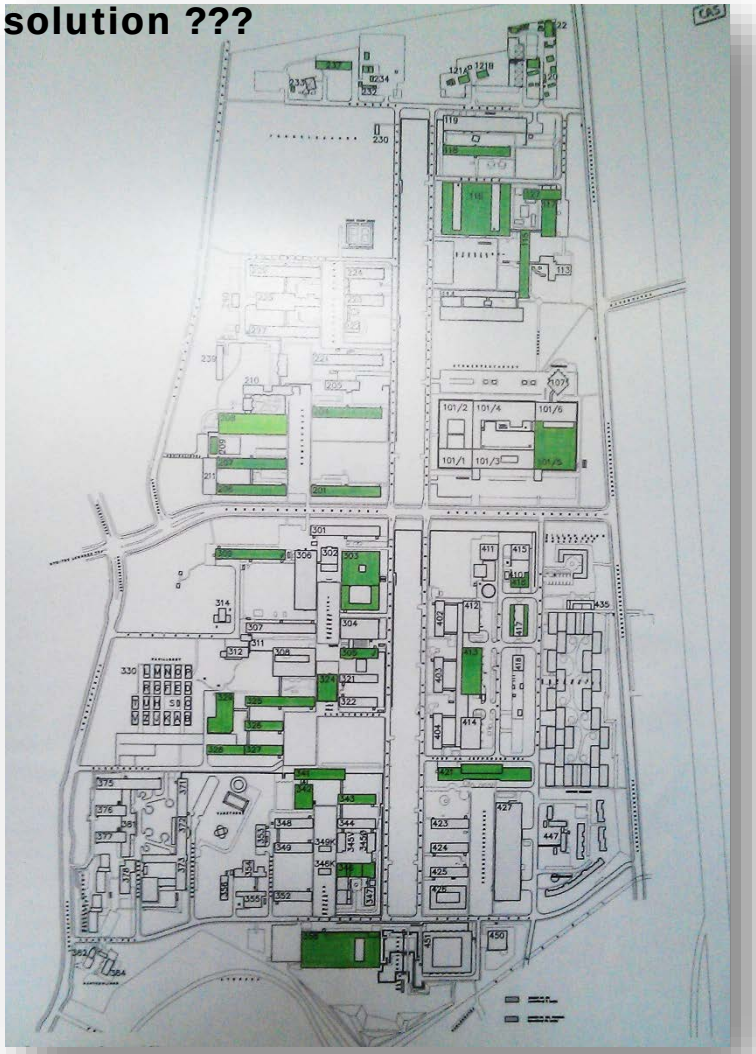
BuildingInformations in the DTU

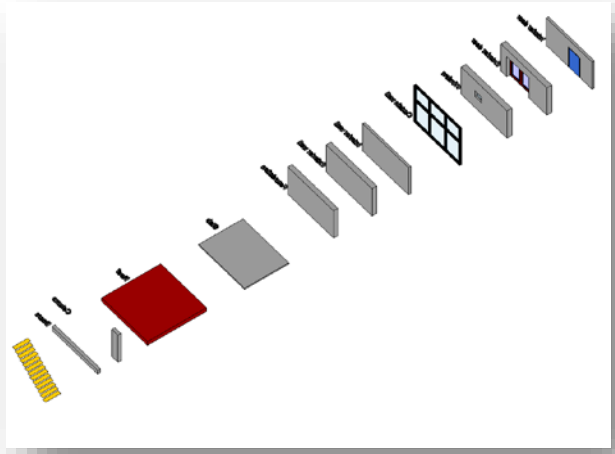
Vision, 2016



Digitalization an prioritization

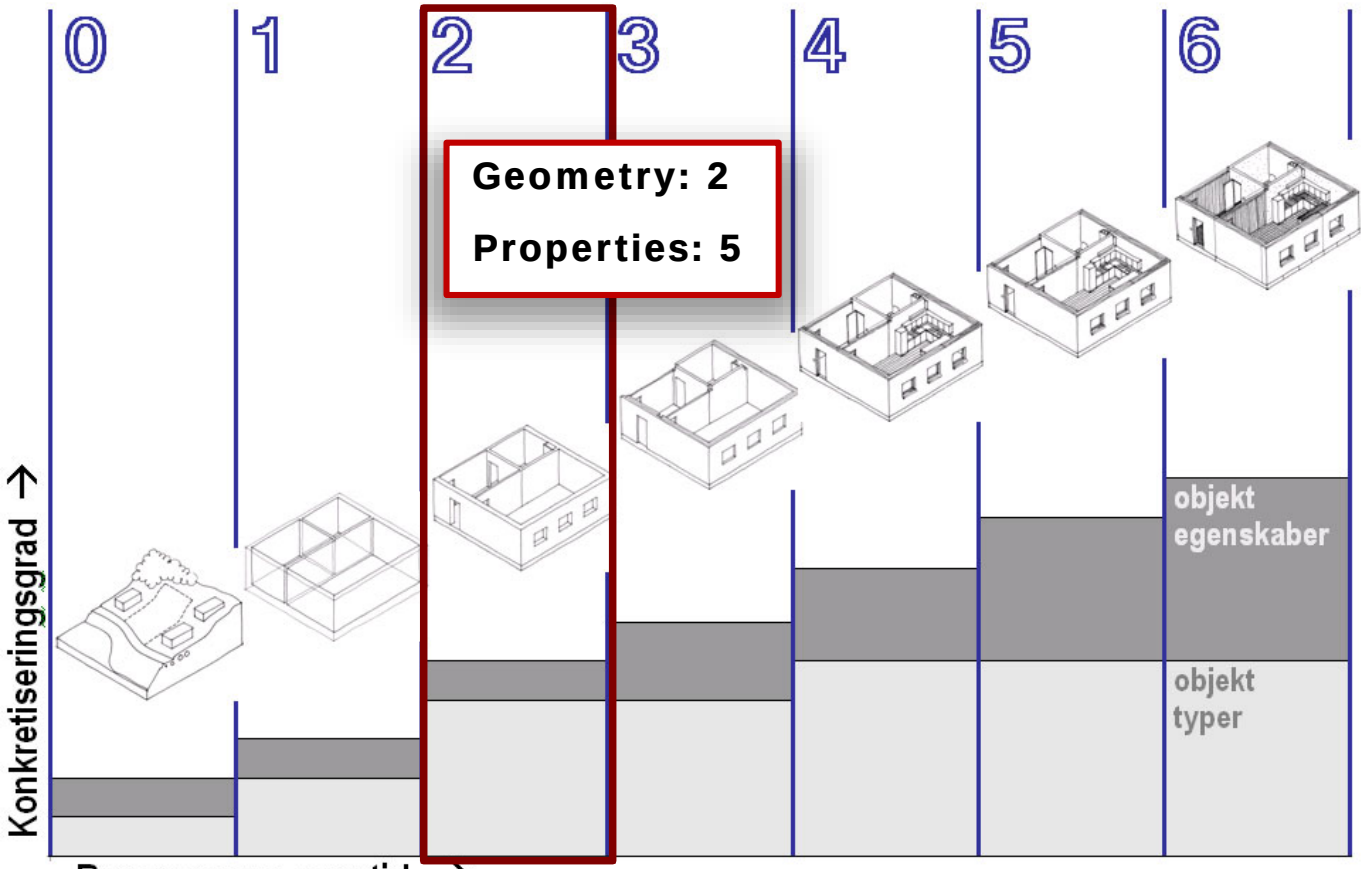
What's first?





DTU strategy – from paper to BIM

FM-BIM: Information levels

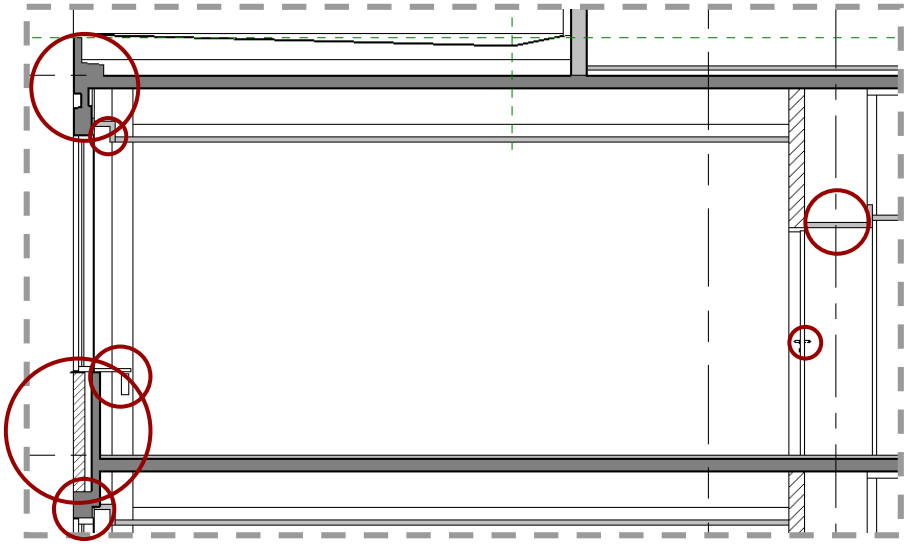


Figur 8: Informationsniveauerne fra 0 til 6 placeret i forhold til et traditionelt faseforløb som eksempel.

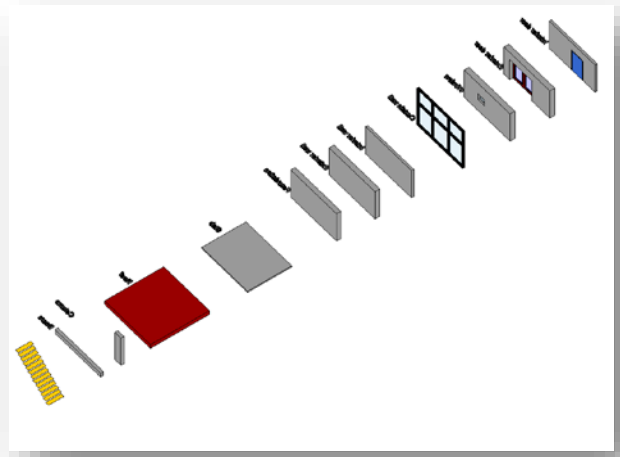
[DDB, informationsniveauer]

DTU strategy – from paper to BIM

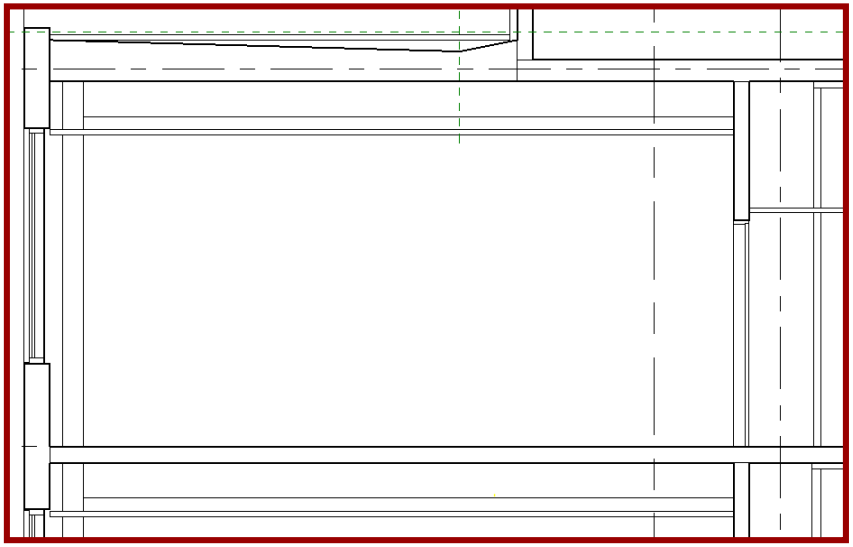
FM-BIM: Information level 2 for building elements



'Over-' detailed



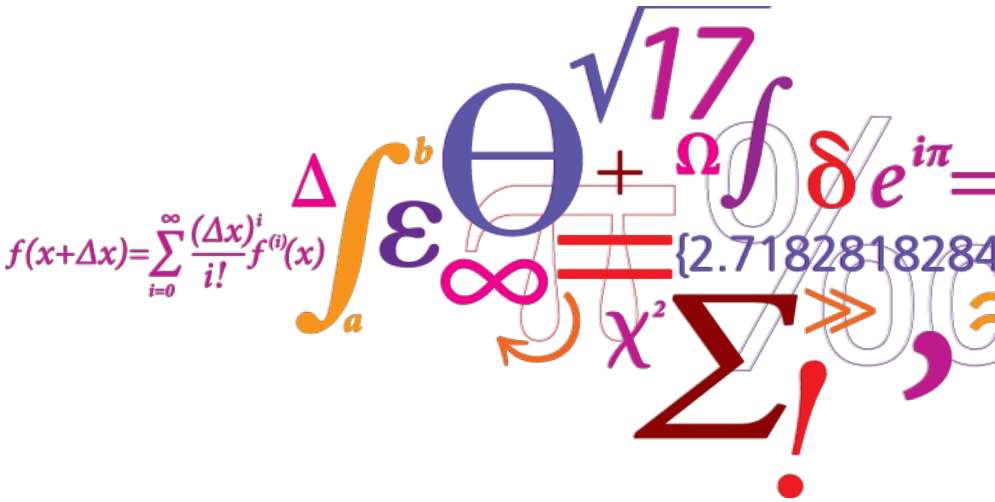
Needed level for FM



Overdetaljeret

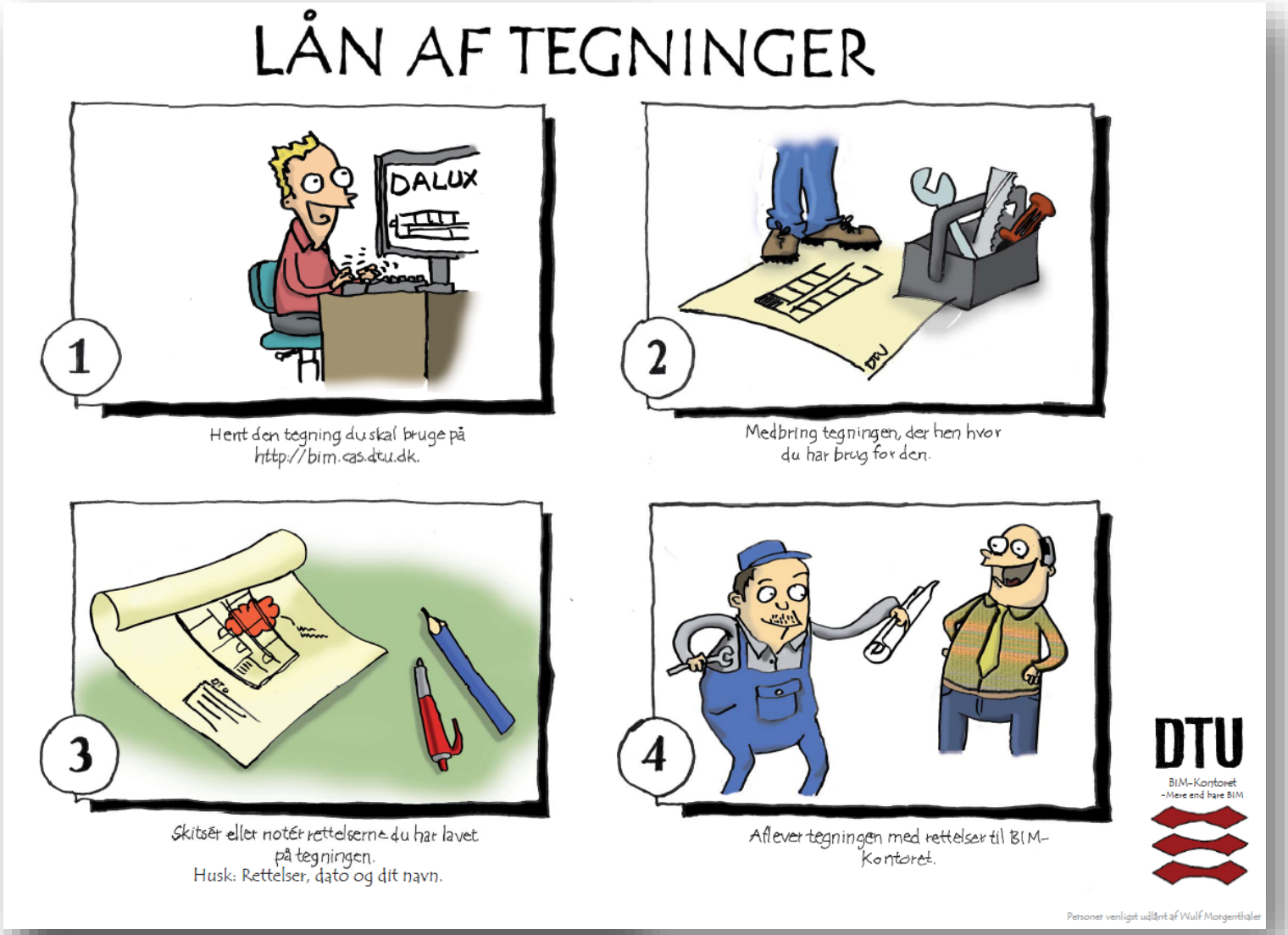
Campus Service – in everyday business

BIMkontor - information flow, dataset and processes



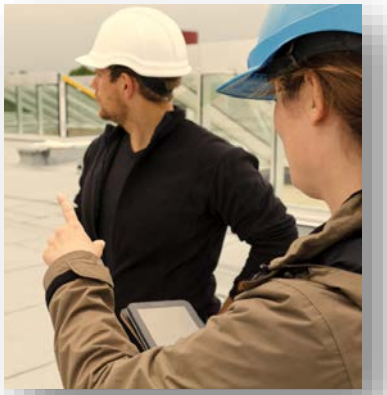
Update of smal changes

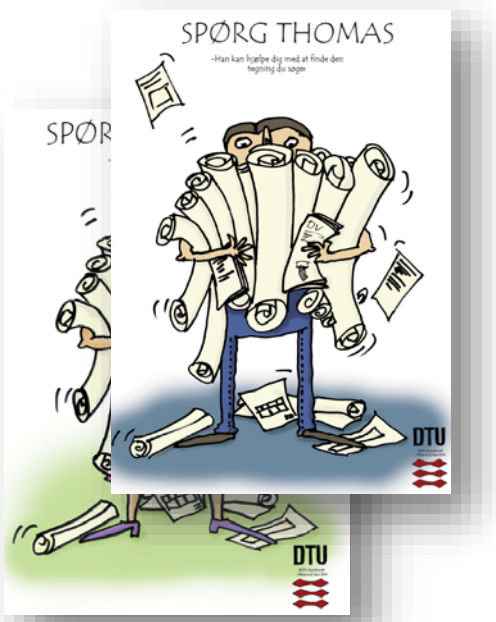
2D & dokuments in real life

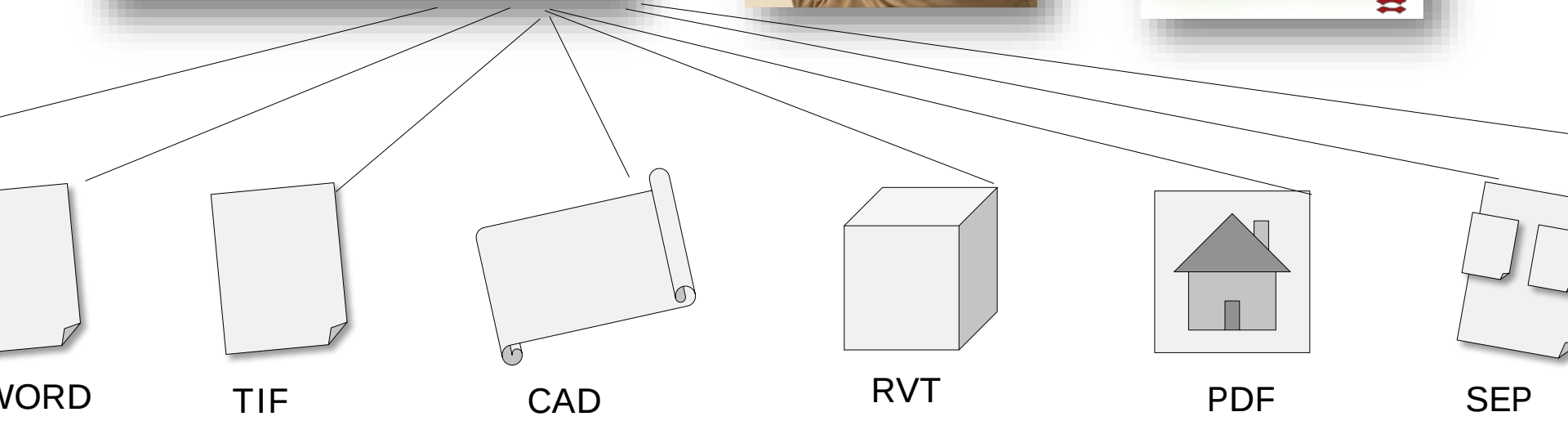


Challenge: Information sources

2D & documents: Different formats for one older building

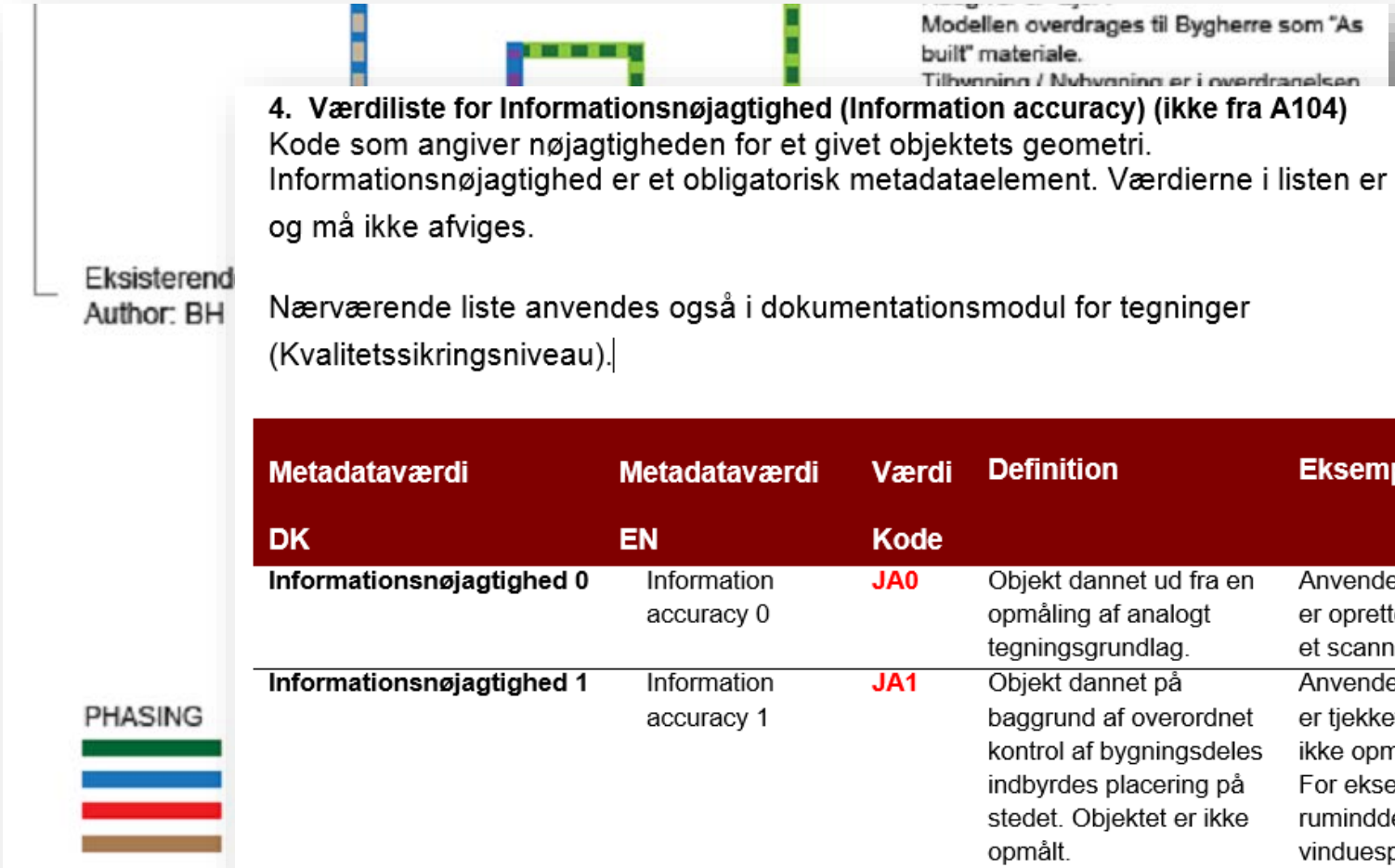






Credibility and accuracy

Illustration for information accuracy and stade



4. Værdiliste for Informationsnøjagtighed (Information accuracy) (ikke fra A104)

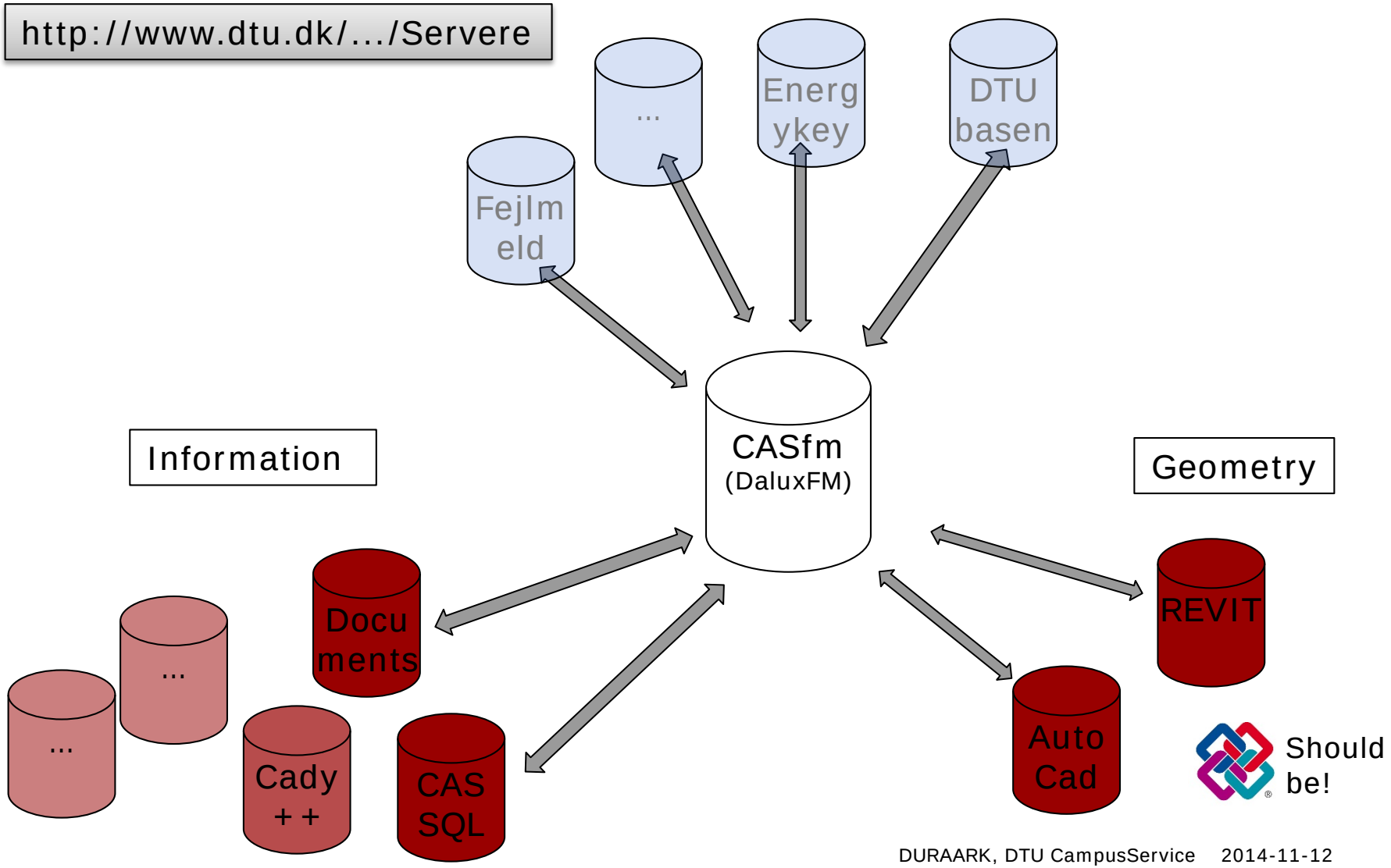
Kode som angiver nøjagtigheden for et givet objektets geometri.
Informationsnøjagtighed er et obligatorisk metadataelement. Værdierne i listen er bundne og må ikke afviges.

Nærværende liste anvendes også i dokumentationsmodul for tegninger (Kvalitetssikringsniveau).

Metadataværdi DK	Metadataværdi EN	Værdi Kode	Definition	Eksempler
Informationsnøjagtighed 0	Information accuracy 0	JA0	Objekt dannet ud fra en opmåling af analogt tegningsgrundlag.	Anvendes hvor objektet er oprettet direkte ud fra et scannet grundlag
Informationsnøjagtighed 1	Information accuracy 1	JA1	Objekt dannet på baggrund af overordnet kontrol af bygningsdeles indbyrdes placering på stedet. Objektet er ikke opmålt.	Anvendes hvor objektet er tjekket visuelt, men ikke opmålt, på pladsen. For eksempel ruminddeling eller vinduesplacering.
Informationsnøjagtighed 2	Information accuracy 2	JA2	Objektet er dannet på baggrund af gældende projekteringsgrundlag.	Anvendes for objekter ændret eller tilføjet i forbindelse med projekteringen.

DTU strategy – from paper to BIM

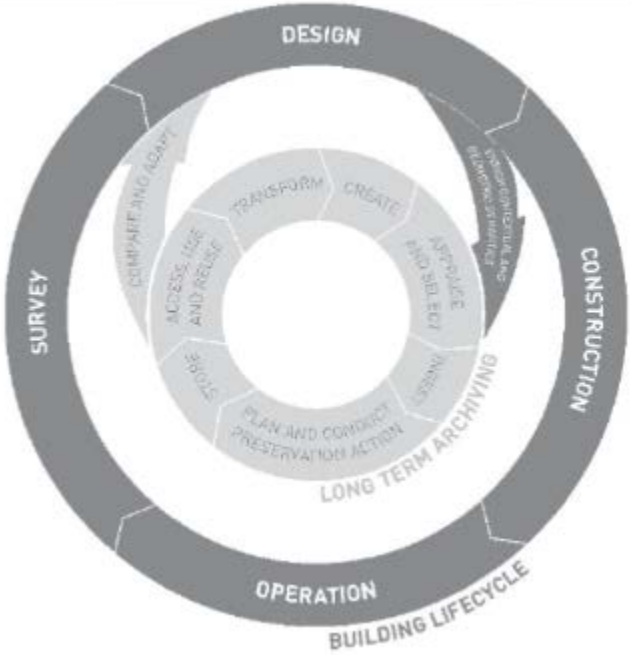
Digital information flow: Structures data and different viewer



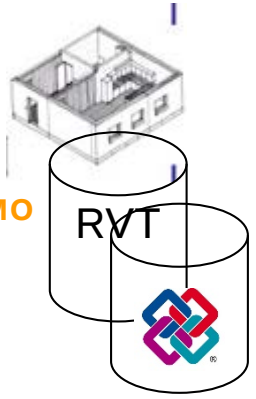
Facility Management Spiral

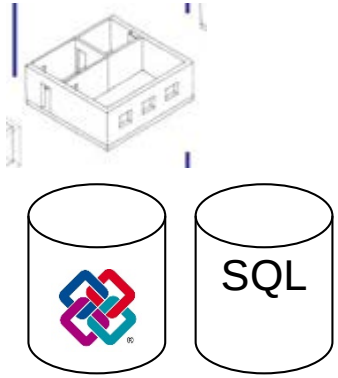
Portfolio Management (Property)

Space Management



REAL ESTATE PMO





FACILITIES MAINTENANCE & PROJECTS

Important questions for longterm FM

What is crating value?

- Who is **interested (to update)** information? Need to know and nice to know.
- How to **link the different formats**, which capture information?
- Is there really a **need for a high level detailed information** for building parts in the everyday FM business?
- How to always update the information about the **credibility and accuracy** of the information?
- How to **motivate clients to use open formats**, like e.g. IF properties?
- Is it important to **find and document the processes** for working with information?