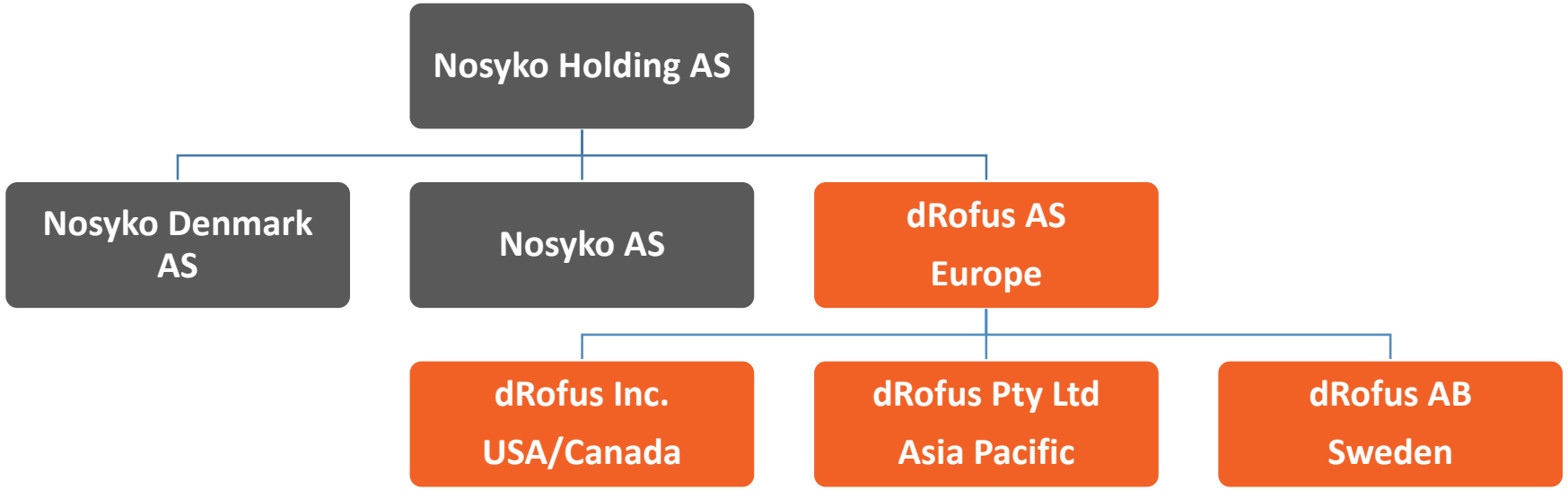
Oslo International Airport (OSL)

Sömlöst informationsflöde från kravställning till förvaltning

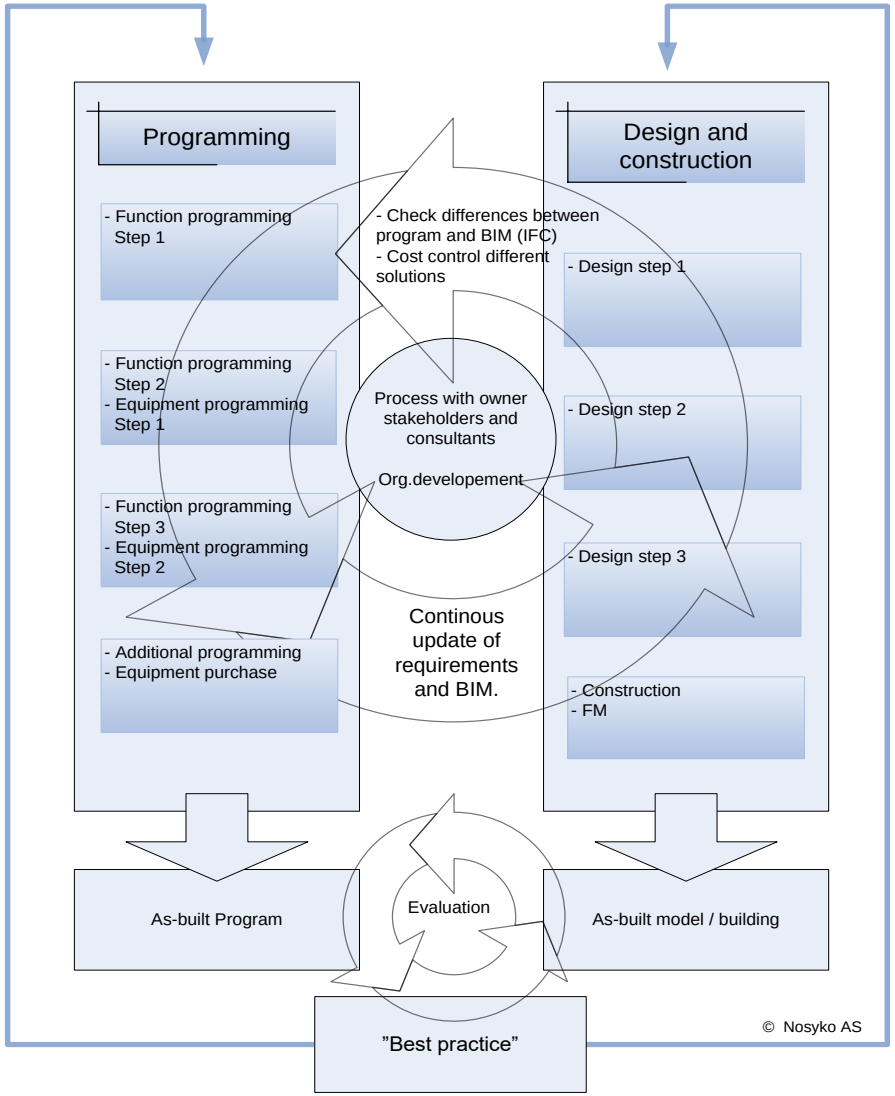
BIM alliance – Stockholm 20. Oct.

dRofus

dRofus


Nosyko Holding AS
Nosyko Denmark AS
Nosyko AS
dRofus AS Europe
dRofus Inc. USA/Canada
dRofus Pty Ltd Asia Pacific
dRofus AB Sweden

Client requirement management



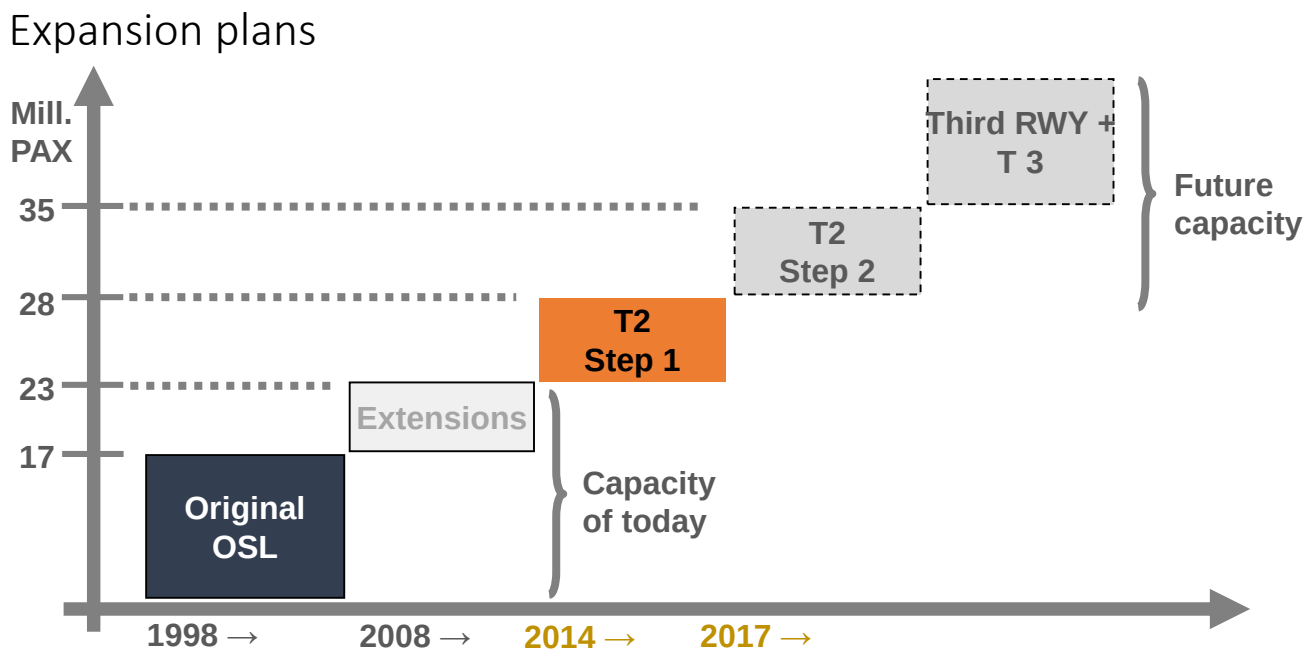
The iterative process of client requirement management

- Standardized Requirements model
- Exchange and present requirements in design tool
- Exchange and compare design to requirements
- Deviations trigger minimum one of the following actions:
  - Update design
  - Update requirements
  - Present delta
- At handover Requirement=Design=As Built
- All data exchange using open BuildingSMART standards

Oslo International Airport (OSL)

- Opened 8th October 1998
  - Capacity 17 mill passengers
  - Designed with mainly Bentley products
    - As-built in dgn format.
    - Still uses BentleyFacilities for FM

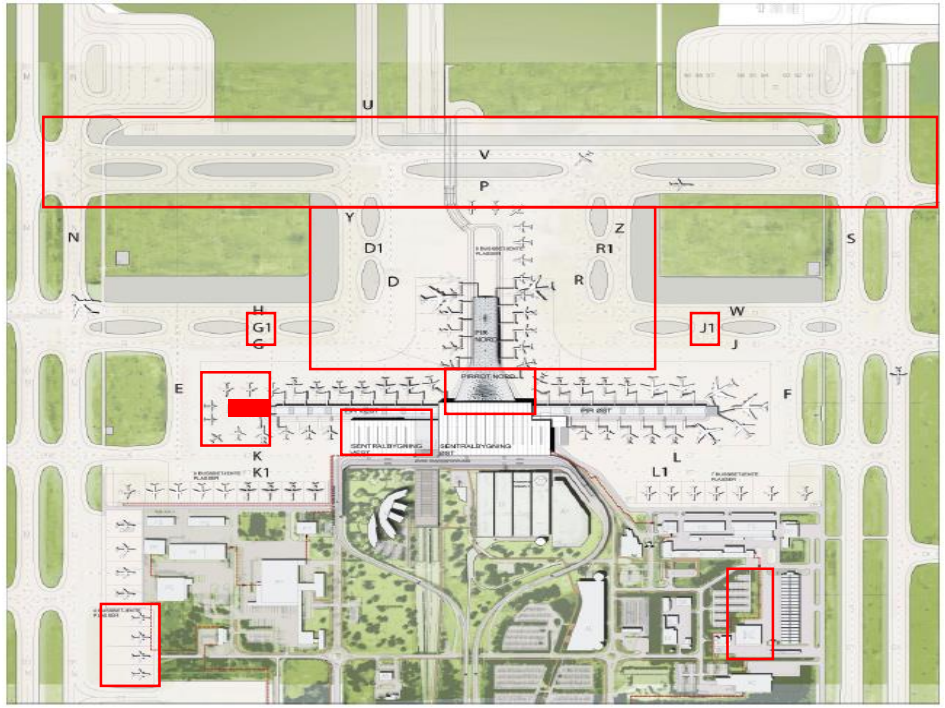
Oslo International Airport (OSL)



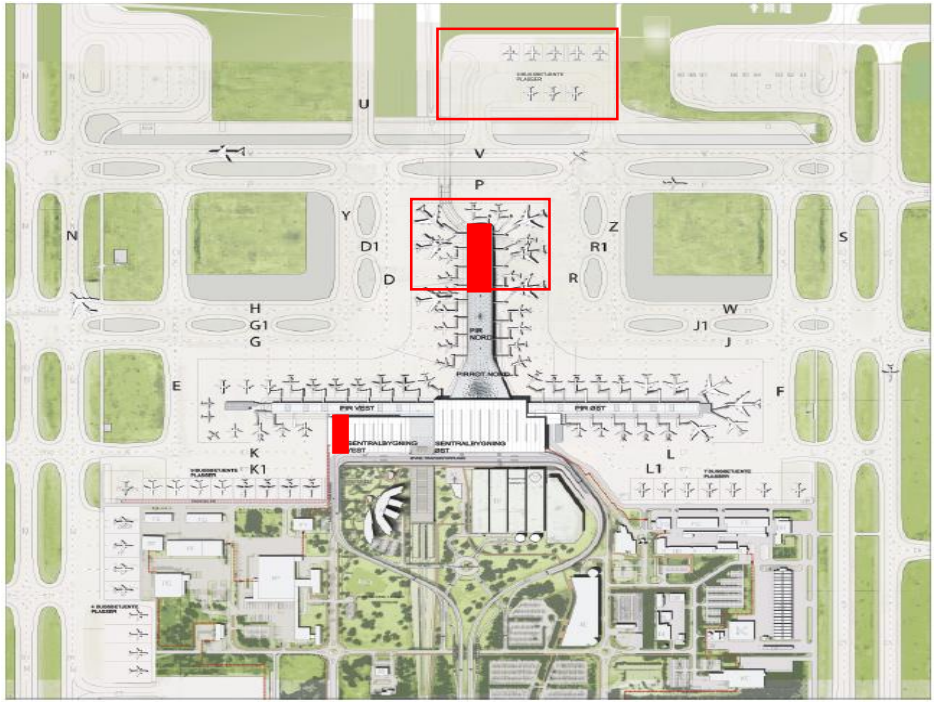
Oslo International Airport (OSL)

Oslo International Airport (OSL)

Phase 1



Phase 2



HARD FACTS – T2 PROJECT

Owner:

Avinor AS

Client:

Oslo Lufthavn AS (OSL)

Project management:

ÅF Advansia AS

New terminalarea:

117 000 m²

Reconstruction:

25 000 m²

New airside area:

660 000 m²

Budget:

NOK 14+ billion

Kapasity:

28 million pax

On project initiation…

- The client realized they where heading against a “digital memory loss” for their as-built data.
  - The tools (and their native formats) where no longer used in on-shore AEC industry
  - They had 3 full time employees updating/converting as-built data.
- All contracts: *“Models produced in the project is owned by the client and is to be handed over in Native and ifc format”*
- Open standards/formats for:
  - Transport in- and between business processes (projects)
  - Archiving and FM
- The market leader at present, Revit, will not be around forever…

BIM authoring tools in design

PM – ProjectInformationManagement, PIM (+AIM):
- dRofus
- 1 db.

AA1 - ARCH- Nordic:
- Revit Architechture
- BIM Files: 14 Native, 145 Ifc

AB1 - STRU - Aas-Jakobsen:
- Tekla Structures
- BIM Files: 1 Native, 96 Ifc

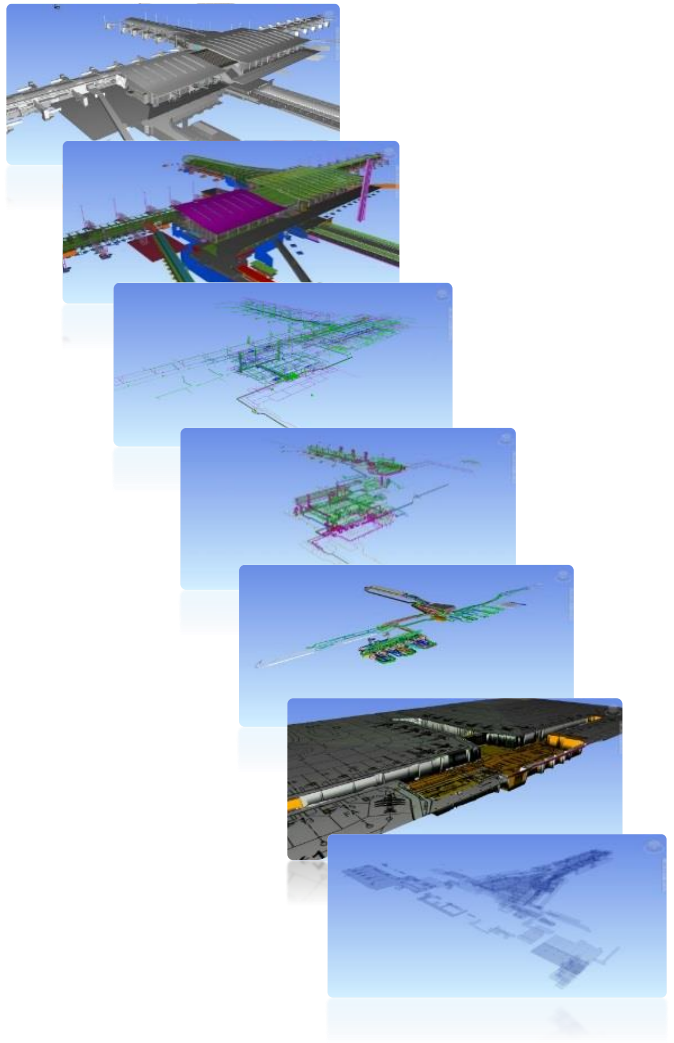
AE1 - EL - Ingeniør Per Rasmussen:
- Revit MEP Magicad
- BIM Files: 9 Native, 19 Ifc

AV1 – MECH/PIPE - Cowi:
- Revit MEP Magicad
- BIM Files: 5 Native, 35 Ifc

AC1 - TECHN CONS - Norconsult (Airside/landside):
- Microstation / Autodesk Civil 3D / Novapoint / Revit

AC2 - LANDSCAPE - Bjørbekk og Lindheim:
- Autodesk Civil 3D / Revit

Contractors – Various use:
- BIM Files: Approx 20 Native files, 48 Ifc



Someone started thinking – getting worried

- Huge dataset coming in – “conservation”?
- Will BIM “die” like drawings do today

- Can it be handed over, and to what?
- ICT solutions…?
- Is the Client-/owner organization ready for it?
- The product we are looking for don’t exist…

- At the same time dRofus was used for room management and product documentation in the T2 project
  - To reserve O&M ID’s in use, all ID codes was imported to dRofus
  - (After a good clean up) dRofus was set as owner of the ID’s in the project
- It worked out well -> R&D project

R&D targets

- Improve FM&**OM** processes
  - Maintain all data one place
  - Better quality/trust in data
  - Distribution and availability
- ROI for «BIM» in the T2 project and all other projects currently using BIM.
  - ICT that can handle it…
  - Prepare the organization…
- Implement an asset database and ModelServer that communicates to each other and the FM processes/tools out there
- BIM for the masses…
  - BIM on site for maintenance operators – navigate from data to graphics and vice versa

Client-/owner organization

- A professional FM&OM organization
  - Well organized and a ton of applications to help (40+ syst.)
- **Unique ID's** - the backbone of communication between applications (and humans).
  - Rooms, systems, components
- They have a ton of routines etc. to make sure that any change in the facility is taken care of and reflected in the as-built documentation (ID's and drawings)
- Still…

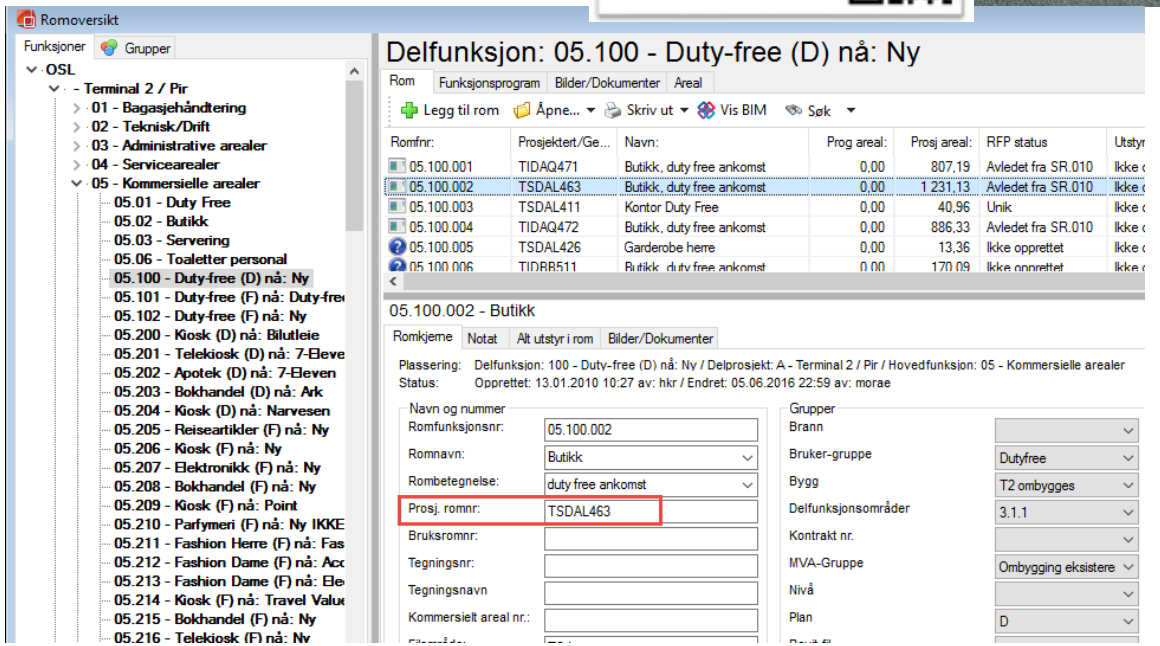
The challenge/pitfalls

- Very «dynamic» facility
- Mission critical ID's **MUST** be tracked due to security, efficiency in maintenance and operations, trust in data etc.
- Maintaining codes and their integrity
- Maintain data one place
- Transaction project to FM and vice versa
- Integrate BIM in FM/M&O or it will "die"…
- The classification created in a time without BIM -> "BIMify"

Unique ID’s – classifications/physical labeling

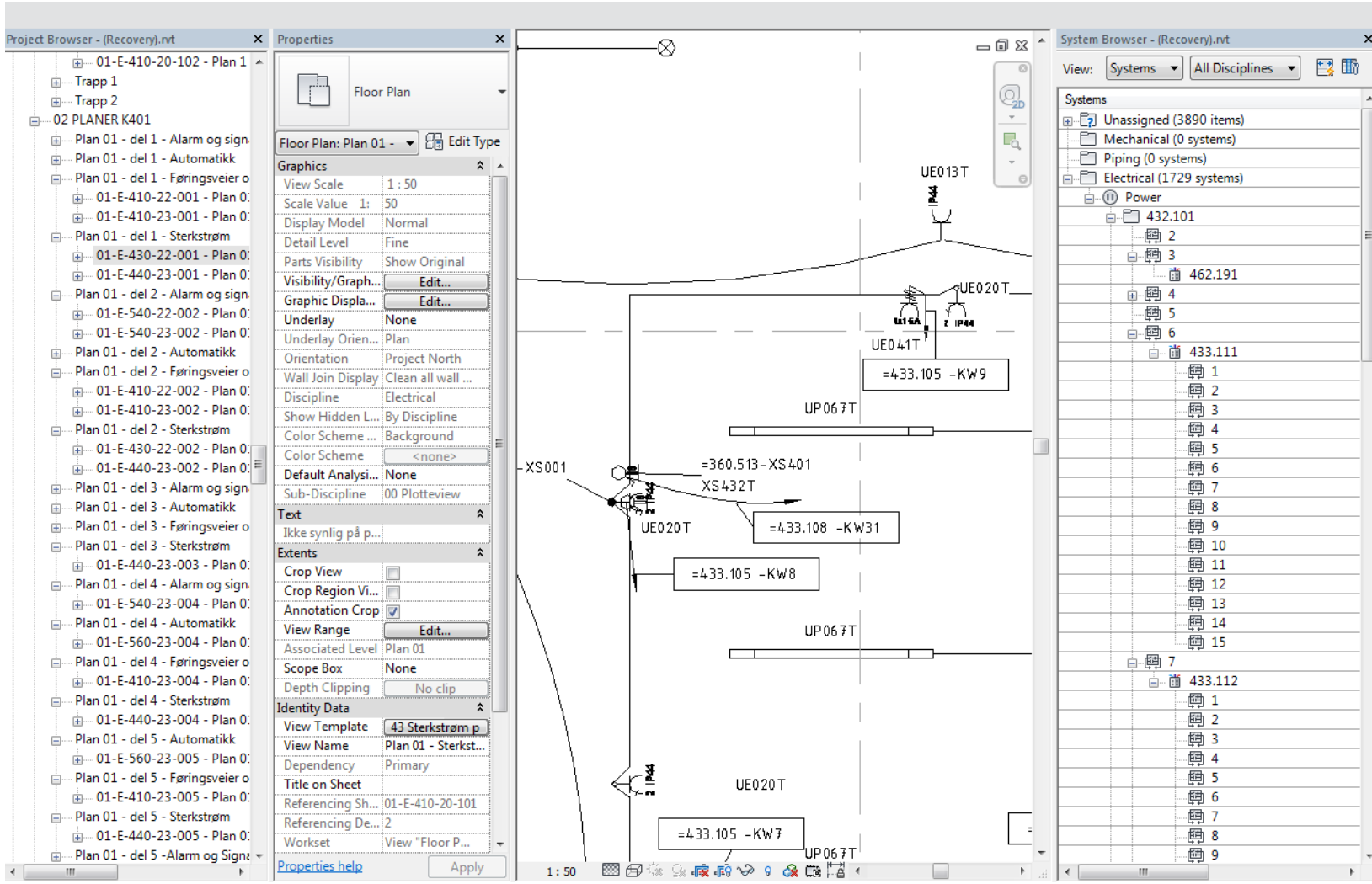
- Location code (+C)
- System classification
  360 = Ventilation
- Type classification
  RT = Temperature sensor
  (RT50 – unique in system)
- +C=360.04-RT50
  Project/facility unique ID

- Room ID – “TSDAL”
  - TS = Location code
  - D = Level
  - AL = Grid
  - 463 -> Makes it unique at location



Unique ID’s – in the clean sheet industry

- Designed in Excel
- Schematics
- Drawings/BIM
- O&M



How ID’s are defined and generated…

- CAD/BIM and project guidelines
- With a lot of human logic built in
- A lot of manually interpretation and punching involved
- Process
  - Punch in what you know (Excel, schematic, BIM)
  - Get some help concatenating parameters
  - Export schedule to Excel
    - Do some fixes
  - Import to dRofus…

36	Brannspjeld	• Nummereres unikt for hvert spjeld • Nummeret skal følge ventilasjonssystemets nummer. • Dlabcc BRANNSPJELD Dla--- 1=Tilluft 2=Avtrekk Dl-b—Antall spjeld i gruppe Dl--cc Løpenummer

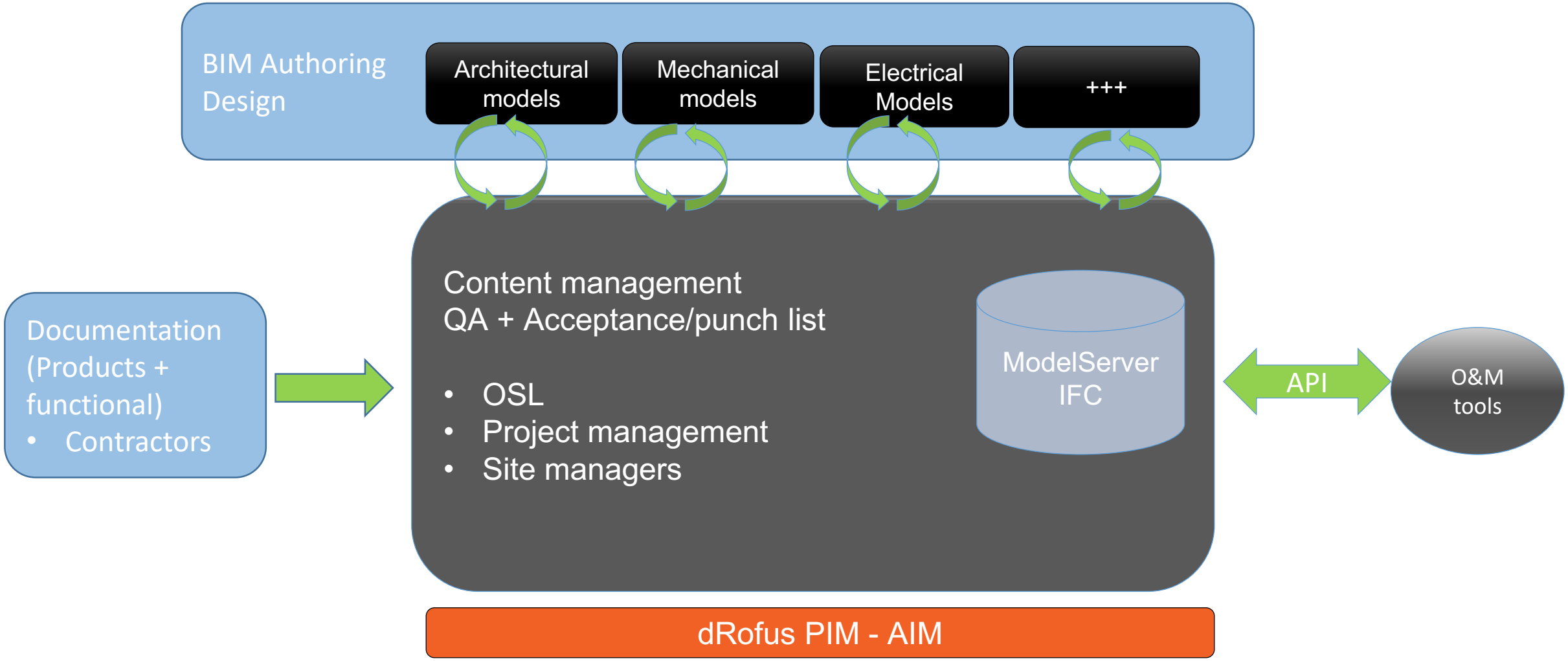
Eksempel: "Signalidentitet for operasjonell status for kjølemaskin":

+DE=393.001-AA0001D01	
+DE	Områdekode (Sentralt driftsområde, energisentral)
=393	Anleggsgruppe 393 (Fjernkjøling)
.001	Anleggsgruppe, løpenummer 001 (Anlegg nr. 1)
-AA	Komponenttypekode AA (Toveisventil)
0001	Løpenummer for komponenter (Toveisventil nr. 1)
D	Kode for punkttype (D=driftsindikering, se tabell 8.2)
01	Løpenummer for signalpunkt

Client, non-graphical data (Priority systems)

- **IFS –** M&O-system (User: OSL)
  Contains Object-Id – synchronized from dRofus (ID's that require maintenance)
- **GIS –** Registration of room. E.g. in the Terminal - roomshape
  - Rooms containing:
    number, name, floor finish, cleaning frequency, etc., Data synchronized with FM system "ISY Eiendom"
- contains **Object-ID – manually entered**, contains **room number – manually entered**
- **Gemeni VA -** GIS-system for infrastructure(Users: OSL)
  - contains Object-ID – From dRofus (Excel)
- **Telemator -** Design, documentation and M&O cables and IT-networks (Users: OSL and consultants)
  - contains **Object-ID – manually entered** (created here)
  - contains **room-ID – manually entered**
- **Starwatch: -** Surveillance doors with alarm (Users: OSL)
  - contains **Object-ID – manually entered**
- **Firewin: -** Fire Surveillance (12 buildings) (Users: OSL)
  - contains no Object ID, **room number – manually entered**
- **Autronica:** - Fire Surveillance (remaining buildings) (Users: OSL)
  - contains **Object ID – manually entered**
  - contains **room number – manually entered**
- **SD/SRO:** - Building Automation systems– (Users: OSL)
  - contains **Object-ID – manually entered**

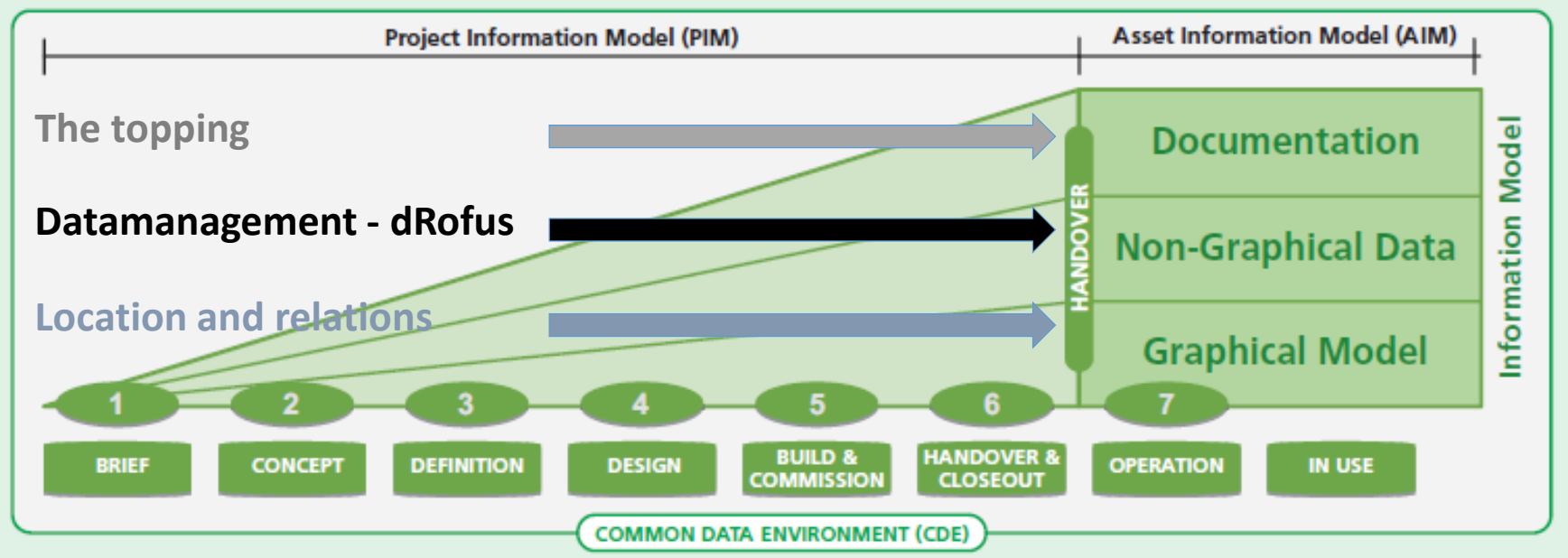
The new set up - simplified



Why this is a good idea

- Database rules ensures ID integrity across all models and all domains
  - Less human logic -> Can simplify project guidelines
- The Design team (primarily engineers) gets help for their process of ID tagging and documenting the designed systems and components
  - Data is captured when it’s created rather then retrospective
  - You can choose when you want to push back the ID’s to BIM/Tags in drawings
- The contractor documents the same place (at the type level)
- The ID’s are maintained one place and can be distributed…
- BIM gives all the data a location

BS 1192



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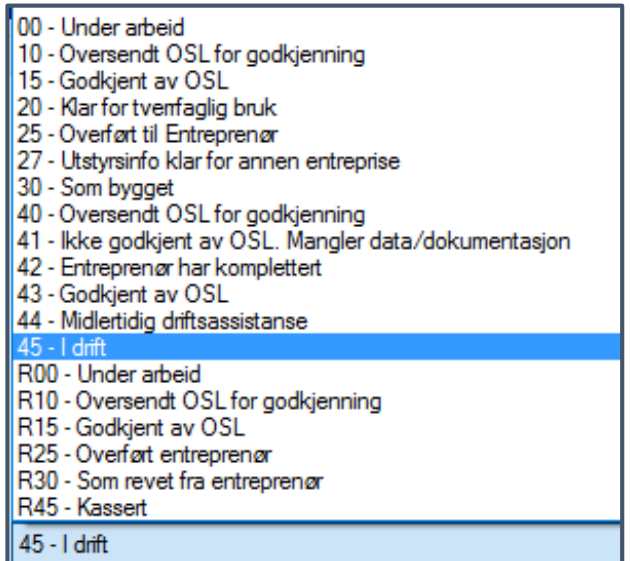
The non-graphical is “Solved”

- dRofus used in T2 project

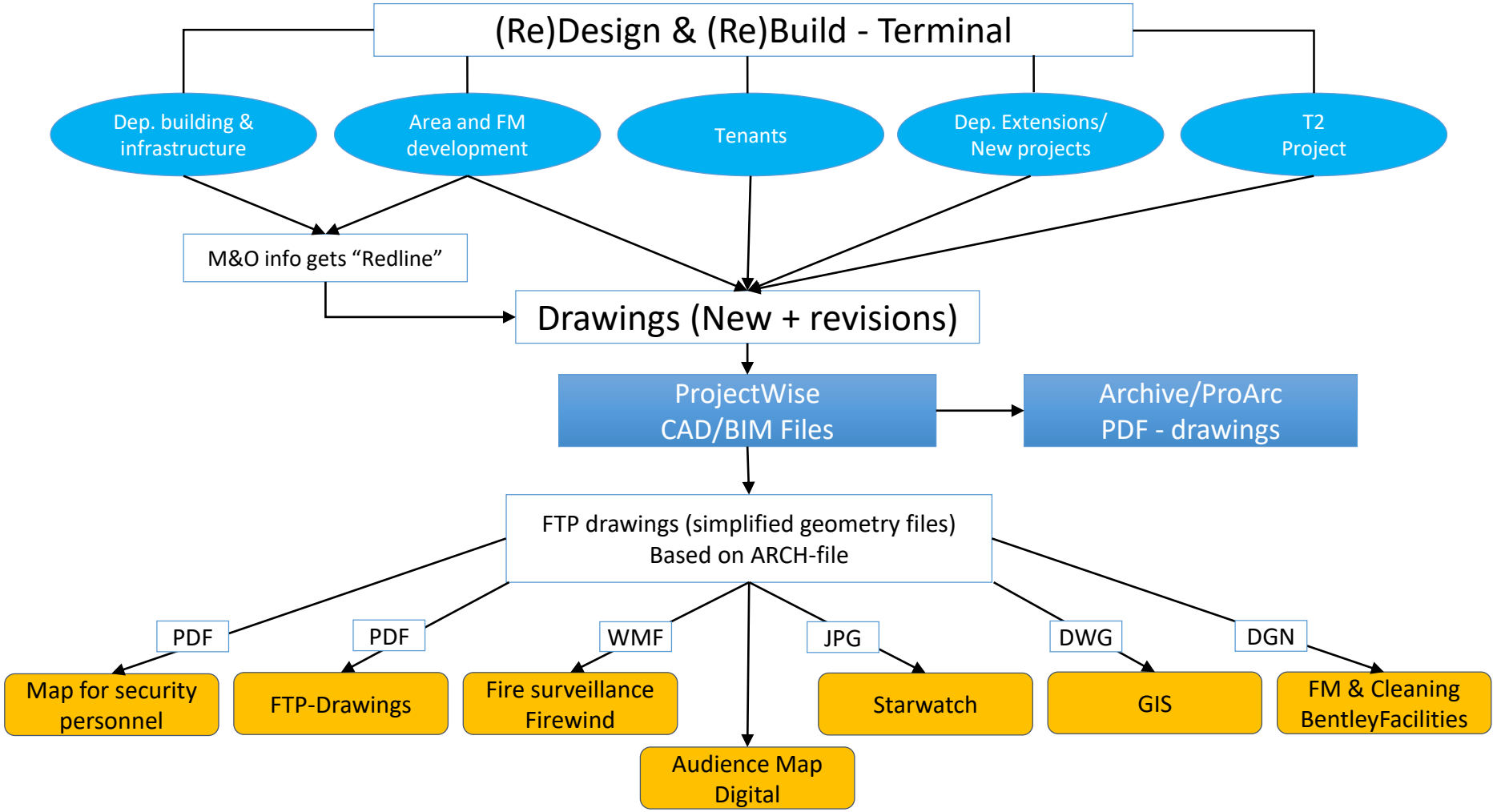
  “Reserve” used ID’s from M&O -> dRofus

- January 2015 – dataflow reversed -> IFS gets correct ID’s from dRofus
  - 270 000 ID’s various “status”.
  - Approx. 70 000 (Status «45 In operations») synchronizes to IFS (M&O) every 15 minute

- ID’s owned/maintained one place
- API for data distribution in place

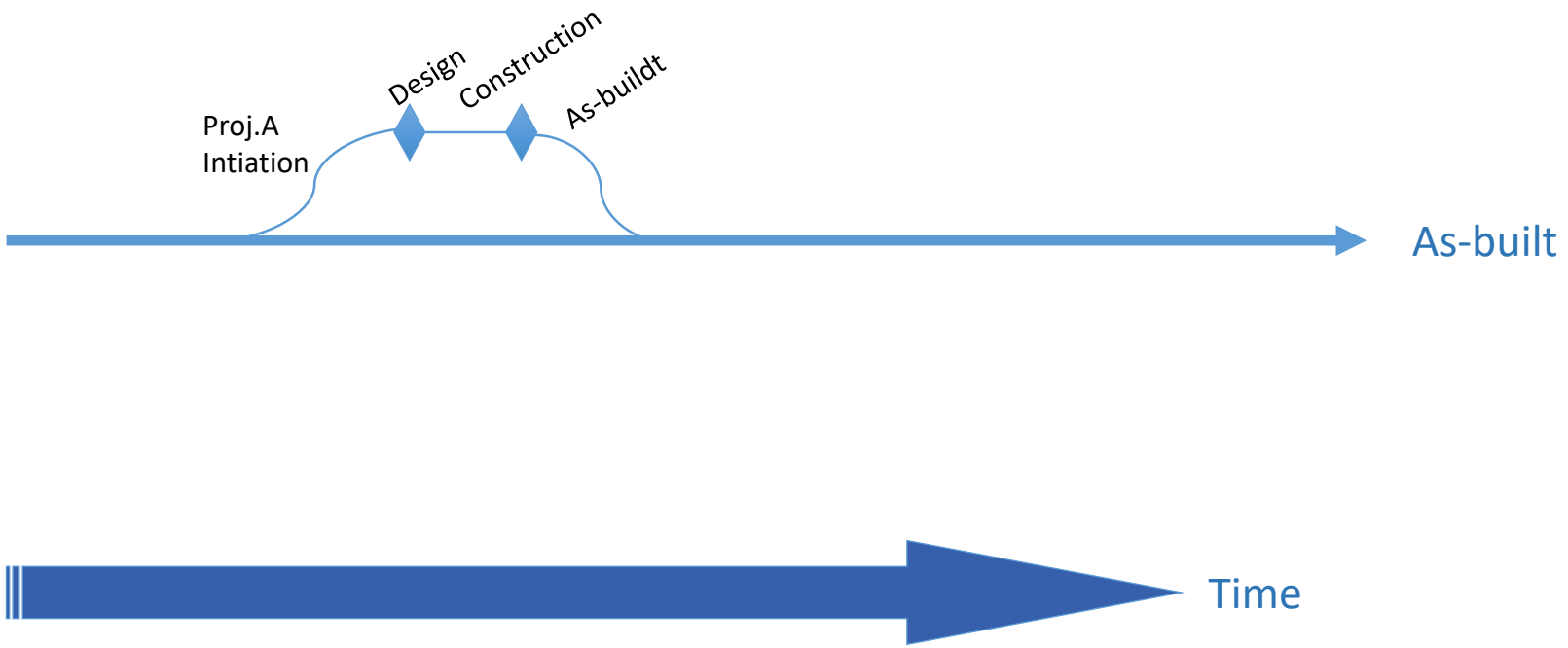


Client organization – Graphical data

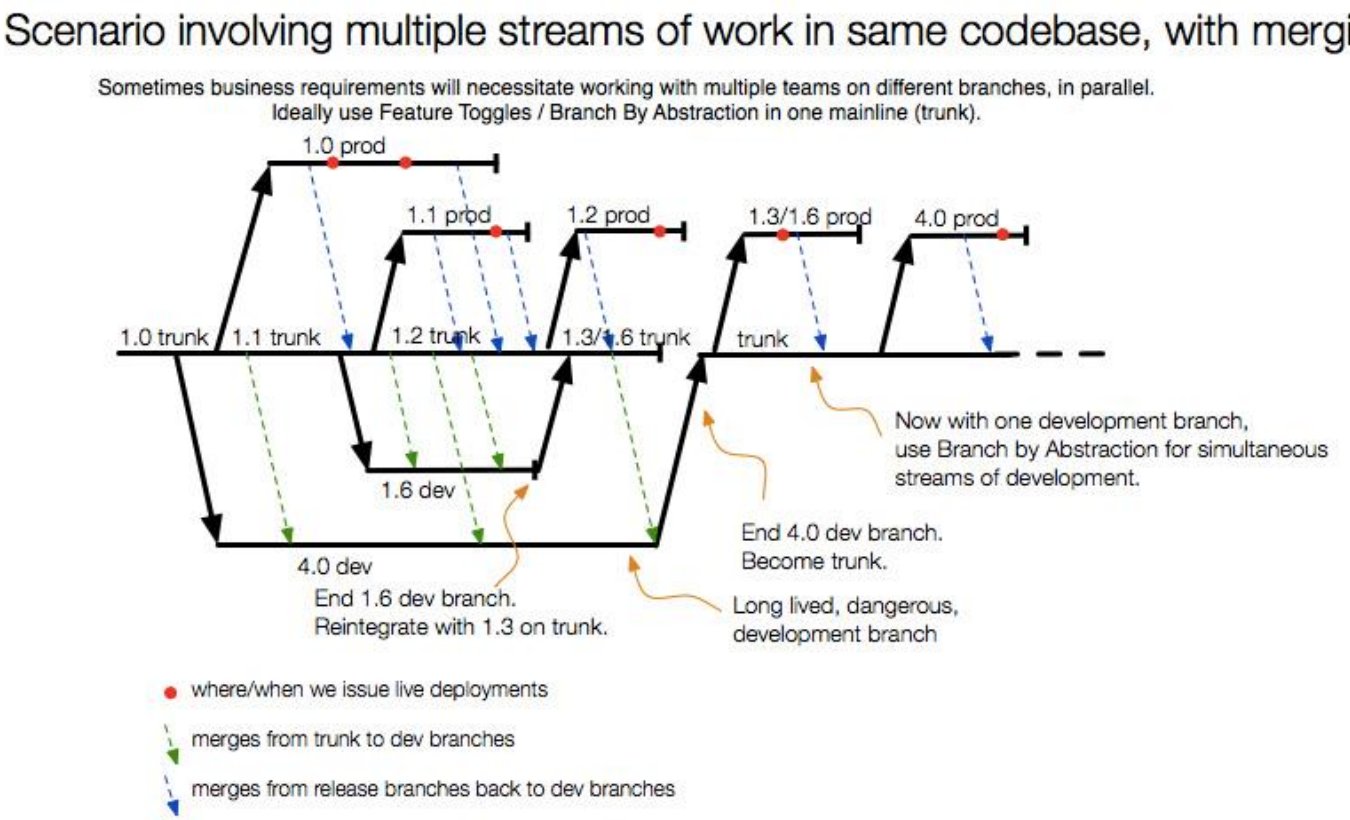


The nature of the (airport) facility

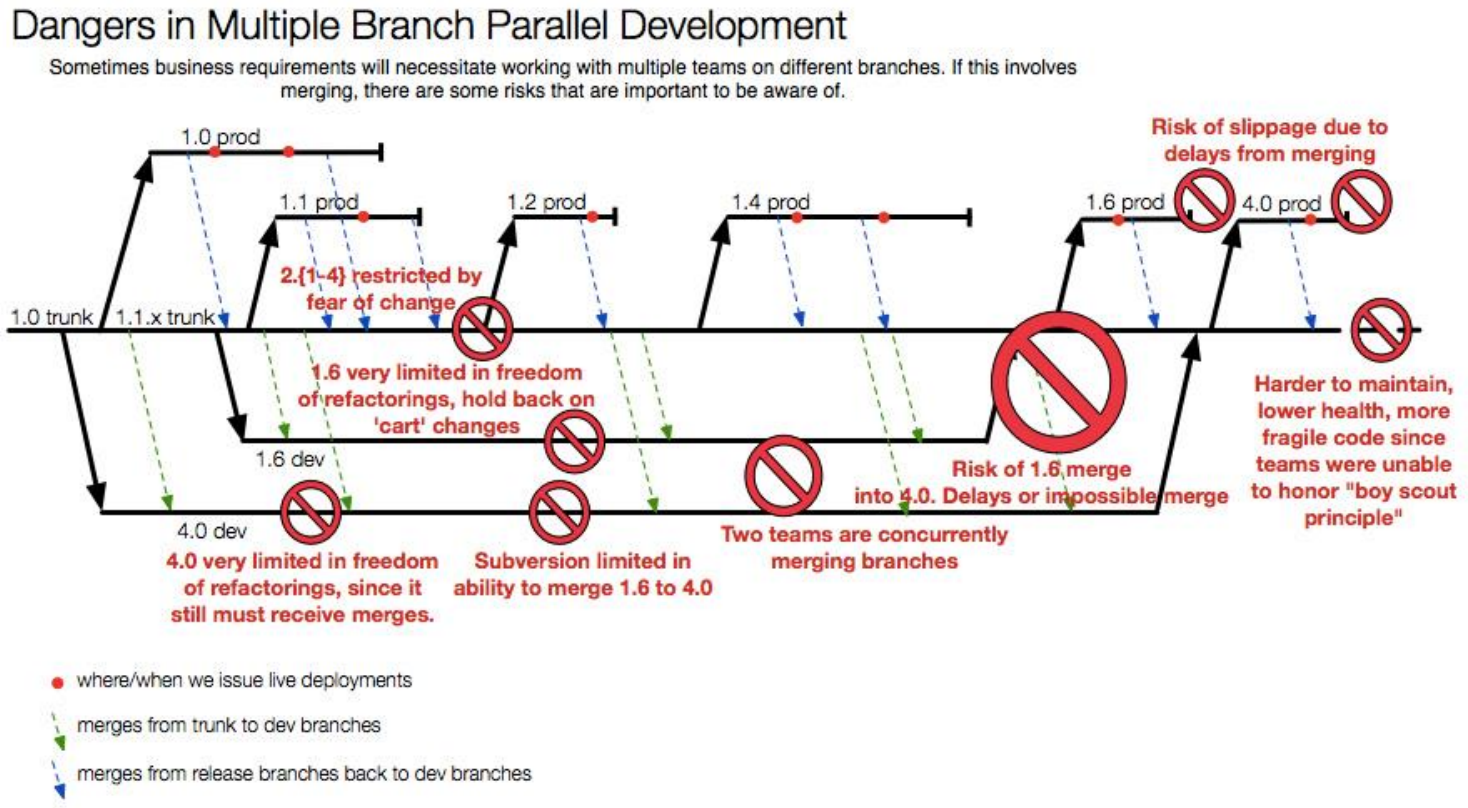
- Branching and merging…



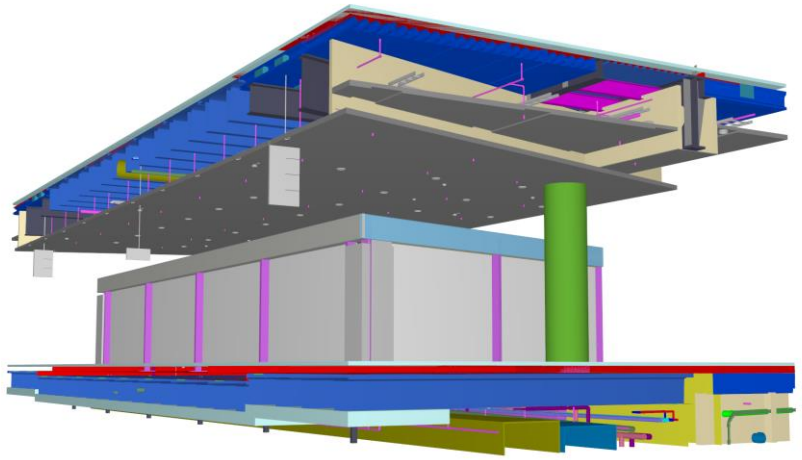
The nature of software development



And challenges…



Why the comparison…



=

```
ISO-10303-21;
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FILE_SCHEMA(('IFC2X3'));
ENDSEC;

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#3= IFCORGANIZATION($,'Tekla Corporation',$,$,$);
#7= IFCPERSONANDORGANIZATION(#1,#3,$);
#8= IFCAPPLICATION(#3,'Next','Tekla Structures','Multi material modeling');
#9= IFCOWNERHISTORY(#7,#8,$,.NOCHANGE.,$,$,$,1316450720);
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#14= IFCDIRECTION((1.,0.,0.));
#18= IFCDIRECTION((0.,1.,0.));
#22= IFCDIRECTION((0.,0.,1.));
#26= IFCAXIS2PLACEMENT3D(#10,#22,#14);
#29= IFCGEOMETRICREPRESENTATIONCONTEXT('Body','Model',3,1.0000000E-5,#26,$);
#32= IFCGEOMETRICREPRESENTATIONCONTEXT('BoundingBox','Model',3,1.0000000E-5,#26,$);
#35= IFCSIUNIT(*,.LENGTHUNIT.,.MILLI.,.METRE.);
#36= IFCSIUNIT(*,.AREAUNIT.,$,.SQUARE_METRE.);
#37= IFCSIUNIT(*,.VOLUMEUNIT.,$,.CUBIC_METRE.);
#38= IFCSIUNIT(*,.MASSUNIT.,.KILO.,.GRAM.);
#39= IFCSIUNIT(*,.TIMEUNIT.,$,.SECOND.);
#40= IFCSIUNIT(*,.PLANEANGLEUNIT.,$,.RADIAN.);
#41= IFCSIUNIT(*,.SOLIDANGLEUNIT.,$,.STERADIAN.);
#42= IFCSIUNIT(*,.THERMODYNAMICTEMPERATUREUNIT.,$,.DEGREE_CELSIUS.);
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```

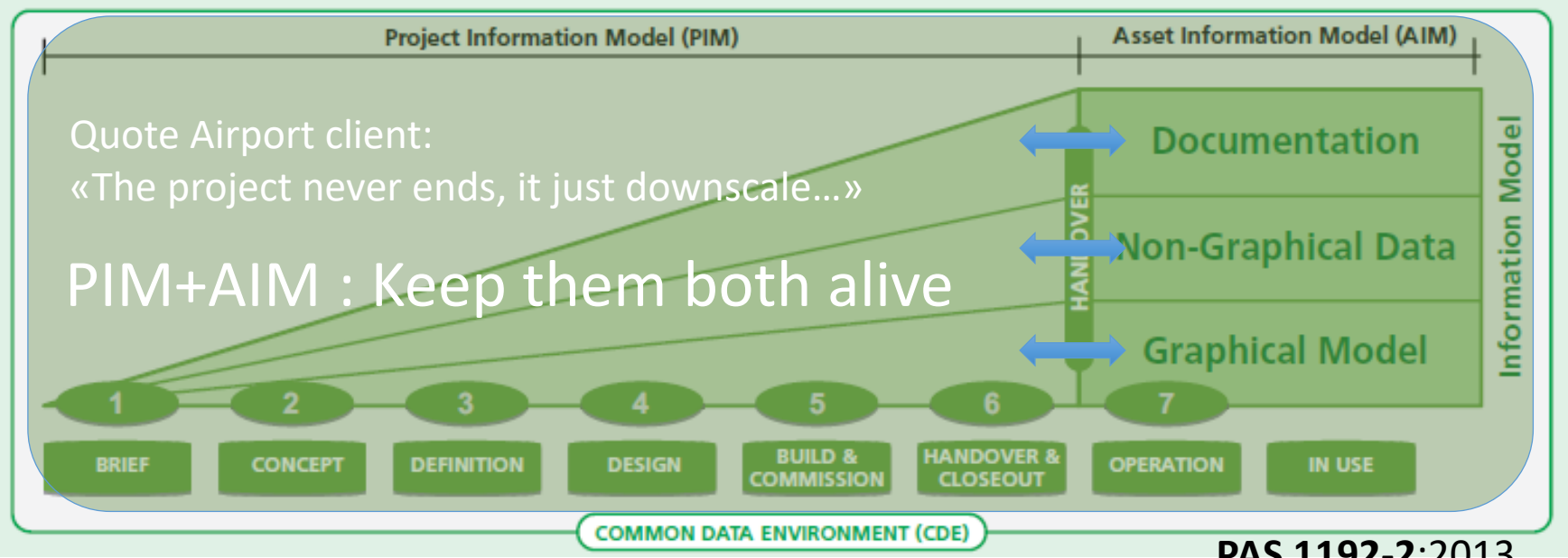
- One BIM “replacing” 1000 drawings

Graphical data - status

- As-built BIM – in place
- BIM for the masses – piloted
- The cut out for design starting point – in place
- They will (for now) keep both Revit models and ifc models alive
  - Due to better export functionality than import…
- Hope to see roundtrip
- Targets:
  - Graphical distribution from one central (merged) model - not in place yet
  - Full ifc based roundtrip – not robust enough
  - Merge of delta – Not robust enough yet

The key to success

- PIM and AIM is connected



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Tack!


Spaces (0)
Type
Flow Terminal
MagiCAD Pset_Device
Pset_ElectricalDeviceCommon
Pset_LightFixtureTypeCommon
T2 Egenskaper
T2_Entreprise
U5B-586
T2_Fase
F30
T2_Status
S1
TT-nummer
-TT6
ID-nummer
+TO=442.001-IB5402
T2_Arbeidspakke
-
Kryperom
Type
Space
Long Name
Kryperom
Name
02.82.141
OSL
Pset_SpaceCommon
ePset_ModelInfo
dRofus room 02.82.141 link
dRofus room id
7471
Programmed area
0
Designed area
336.17
Fra TIDA (6)
dRofus
Kryperom
Fra TIDA
+TI=561.010*-XD001T/0843
+TI=332.001*-AN005T/3001
+TI=443.261:FT-TT001T/6611
Current quantity
0
Quantity
0
Occurrence ID
303749
Item ID
856
Name
Nødlys
Number
T44.001
Classification number
TT001T
To be modelled
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