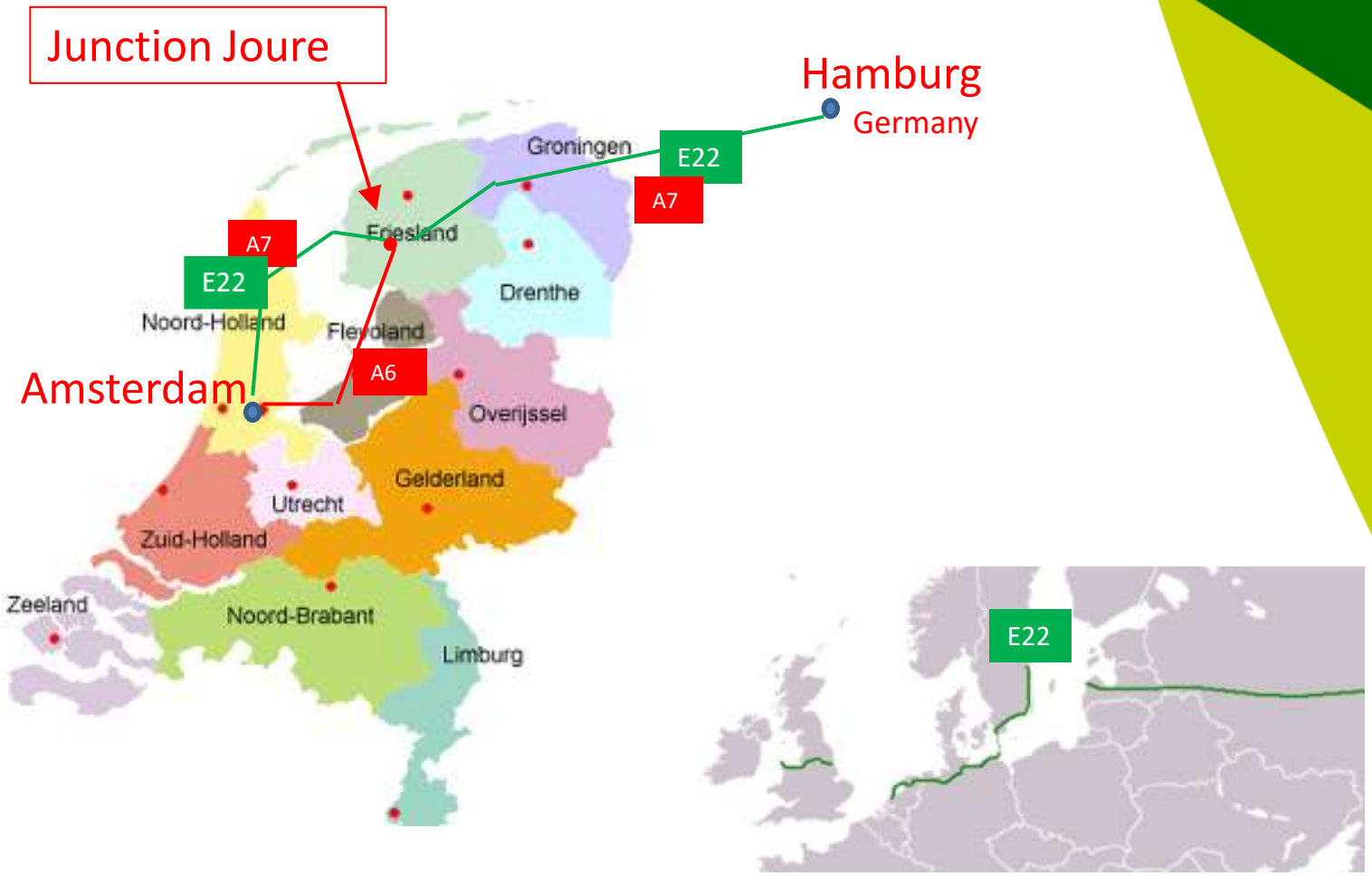
Application of BIM and GIS for Dutch Infrastructure assets.

together with a contractor

Daan Alsem
projectmanager Royal HaskoningDHV

GeoBIM Amsterdam november 24th, 2016

The project: Rebuilding of the junction Joure, NL



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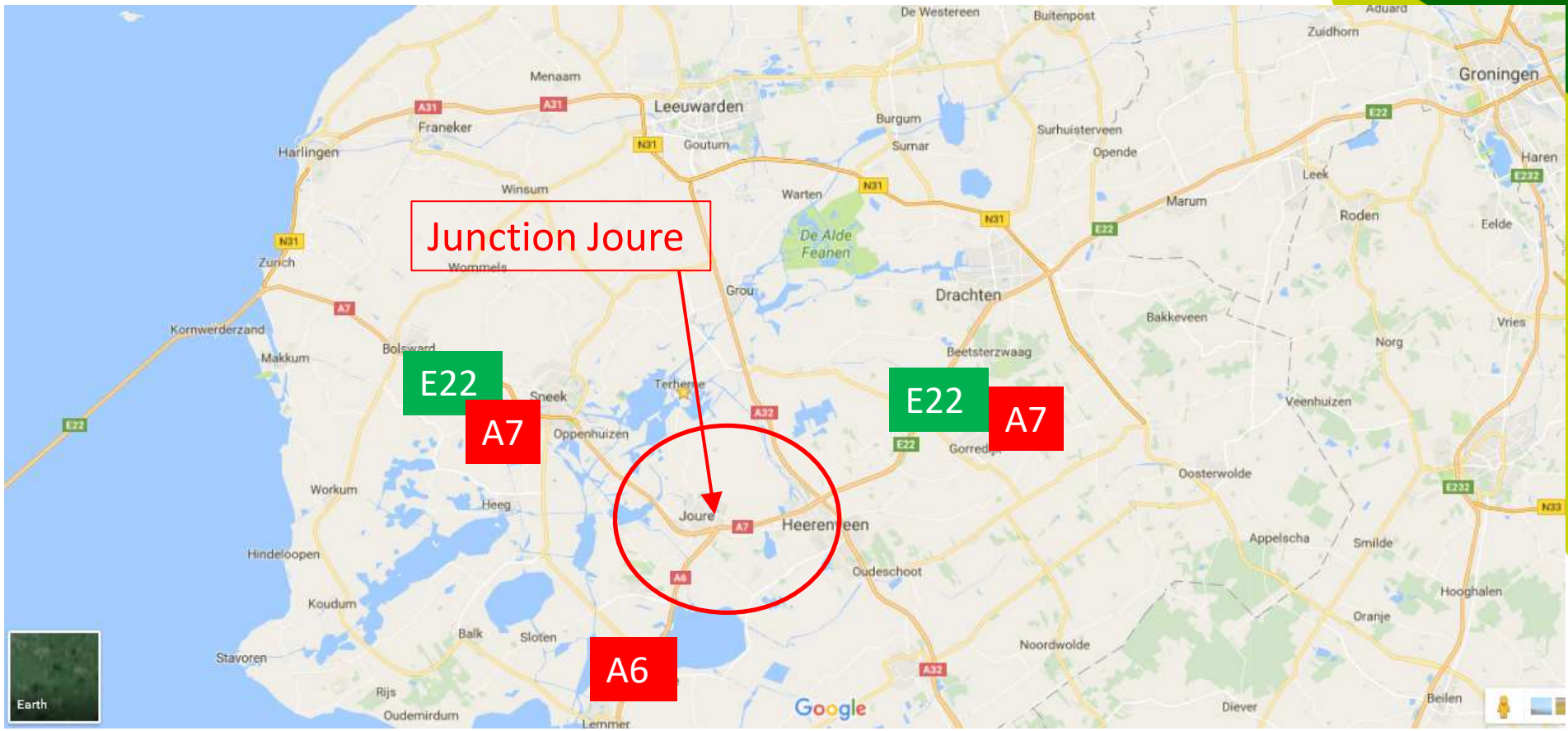
Junction Joure: E22/A7 & A6



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From roundabout……

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.. to the new junction Joure 2018

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Former roundabout

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Client

- Client:
  - Province Fryslân
  - in coöperation with the municipality Joure (De Fryske Marren) and
  - Rijkswaterstaat (National Road Authority)

provinsje fryslân
provincie fryslân

De Fryske Marren

Rijkswaterstaat

- Contractor Design & Construct:
  - Gebr. VAN DER LEE Hagestein (head office), Lelystad en Dordrecht

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Open BIM: Life-cycle asset information using BIM

- Object Type Library (OTL)
- Exchange open standard (COINS)
- Information Delivery Manual requirements (IDM)
- Configuration Management DataBase (CMDB)
- GIS integration Database SE

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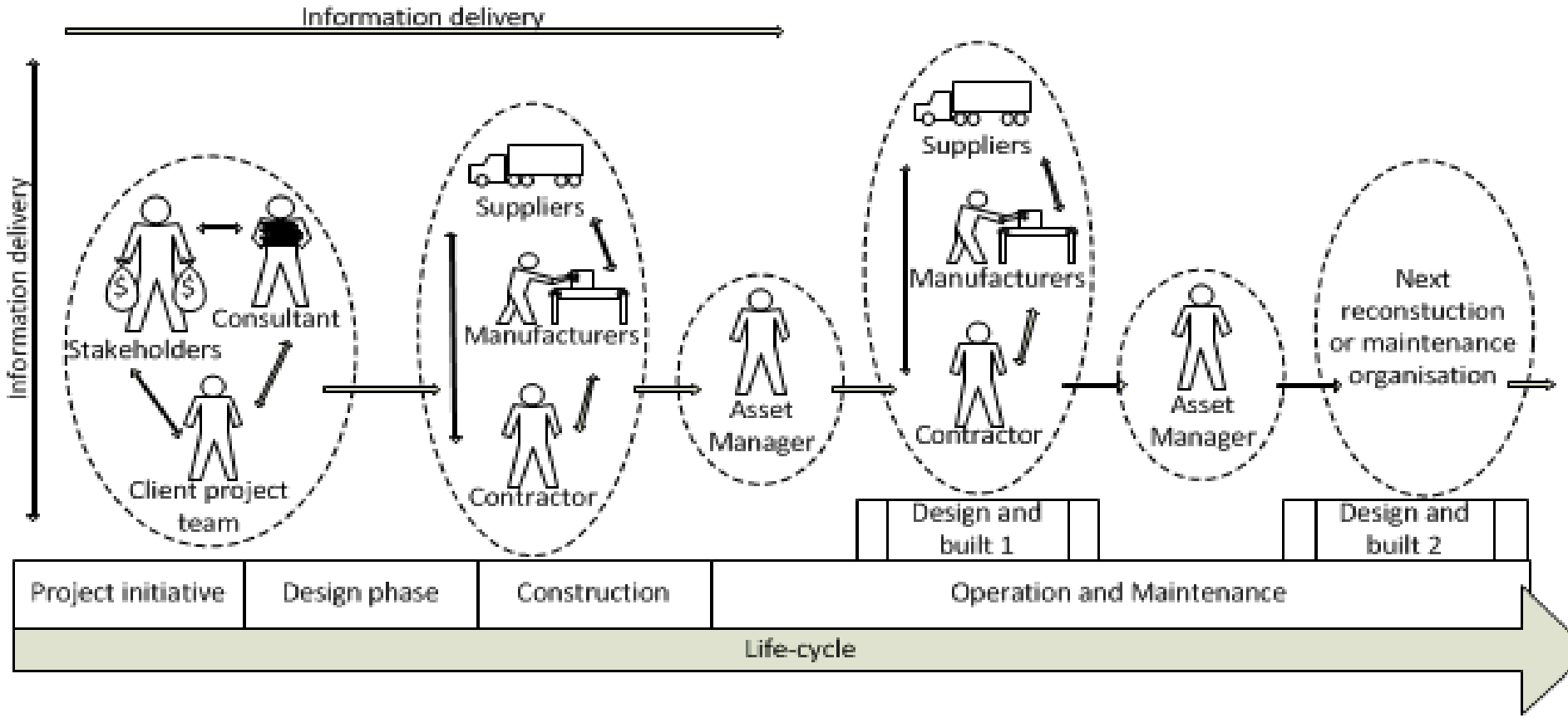
Fragmented information exchange during life-cycle



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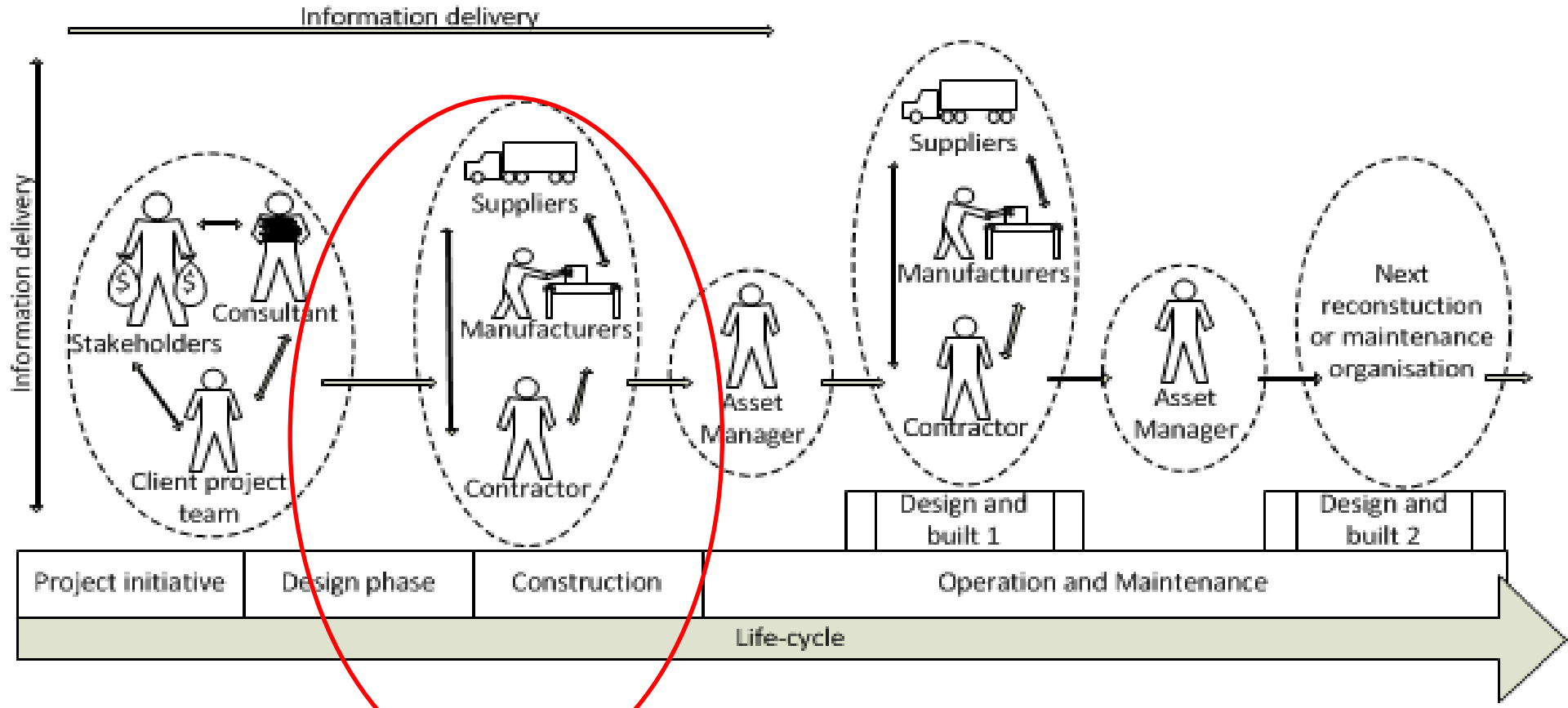
Information exchange D&C-phase



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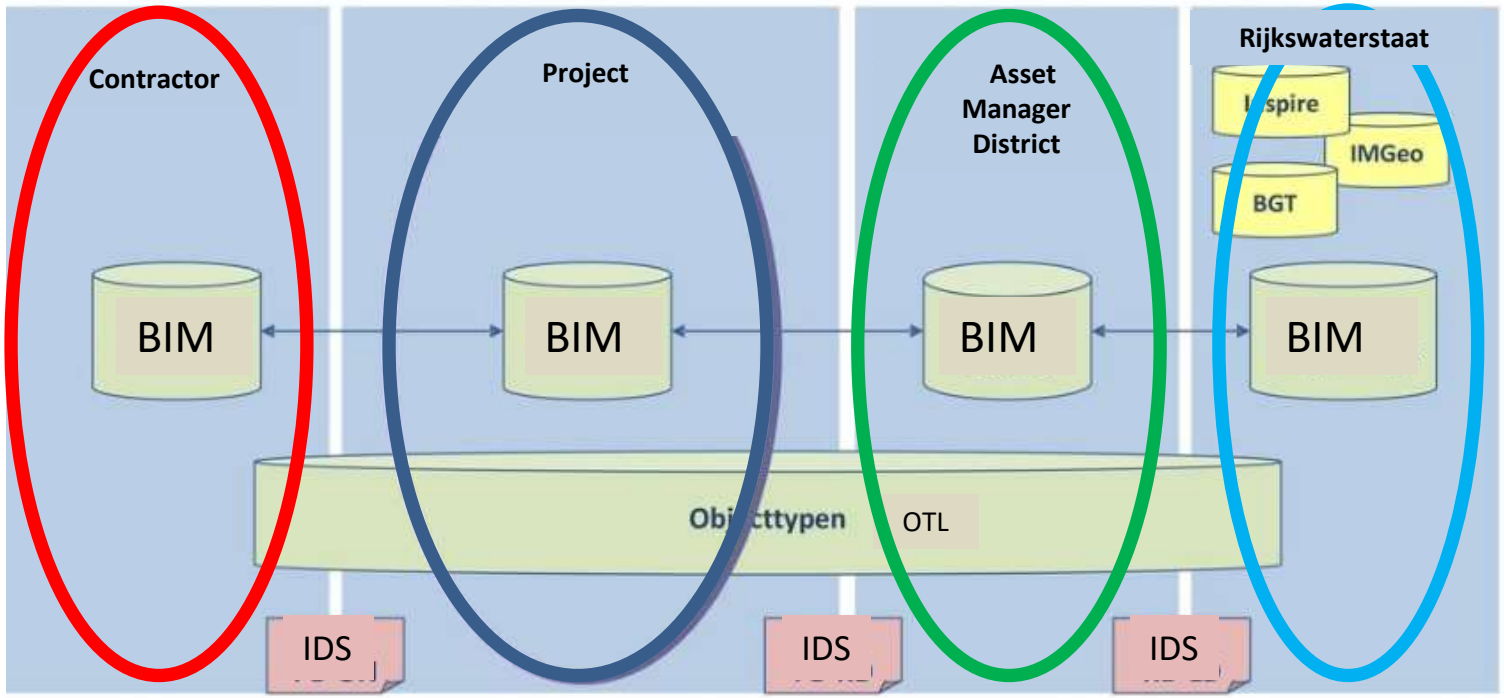
Open-BIM exchange



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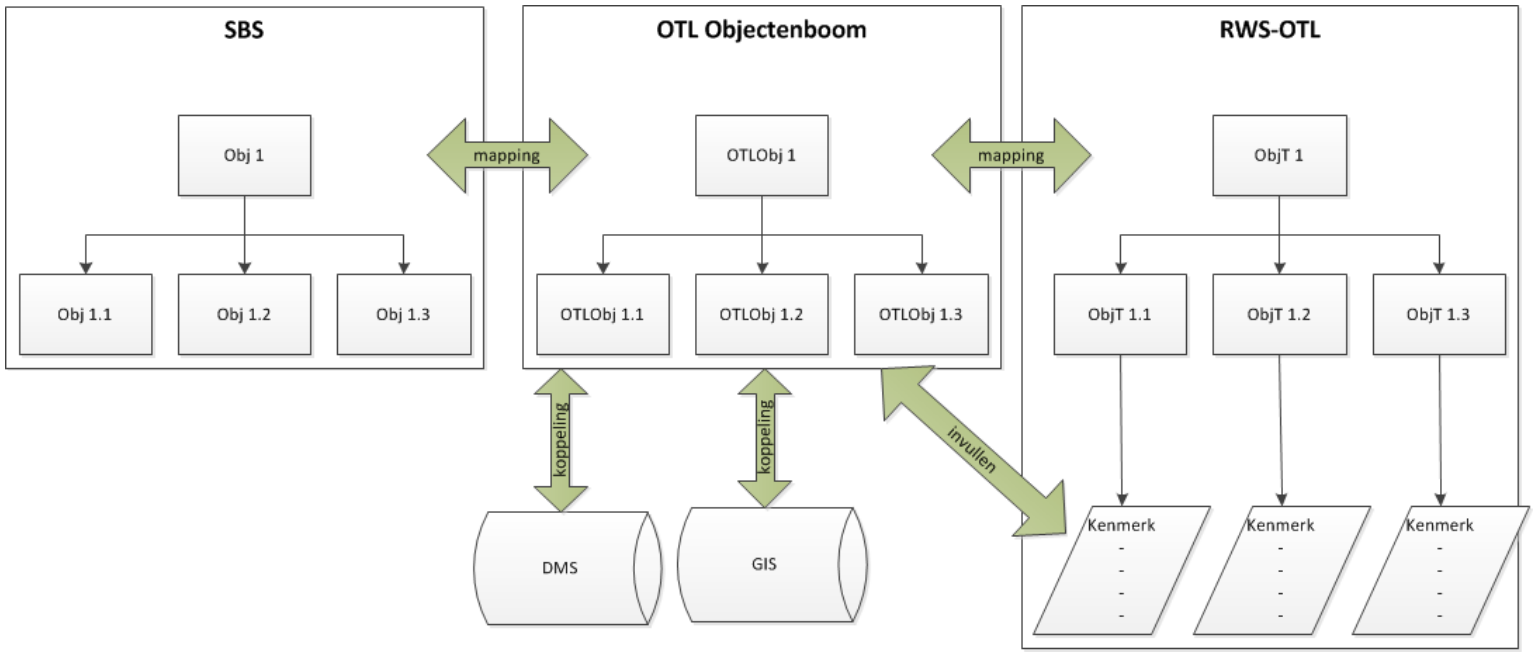
Linked data

SBS system breakdown ⟷ OTL object Types ⟷ RWS-OTL (CB-NL)



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OTL – Object Type Library principles

- Describes the types of physical (bridge, road) and also spatial objects (junction)
- Apply to the entire lifecycle
- Include construction, groundwork, road and hydraulic engineering and spatial (geo-)environment.

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OTL

- Linked to the CB-NL Concept Library Rijkswaterstaat
- Object type data (and not the Object data)
- Data-structure NEN 2767-4:
  - Asset objects
  - Elements
  - Building parts
  - Materials
  - Defects/damage

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Object Type “Fly-over”

https://otl.rws.nl/publicatieomgeving/#/otl/rws-otl/library/otl-lib/version/1.7.1/object/OB00476/info

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Help | Home | Objecttype bibliotheek | OTL Library - 1.7.1 | fly-over

View: Alles

Taxonomie

filter

ObjectType Configuratietype

Viaduct

Fly-over (weg)

FLY-OVER (WEG)

Informatie | Eigenschappen | Relaties | Mappings | Boomdiagram | Graafdiagram

otl-1.6 | 3 jaar geleden gewijzigd | ObjectType

— **Model:** OTL Conceptueel model
— **Views:** otl-nen-beheerobject, otl-nen-element

Definitie

Viaduct dat de realisatie vormt van een ongelijkvloerse kruising tussen drie of meer netwerklinks.

Meta informatie

Example

Name in EN Fly-over (road)

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Exchange open standard COINS

- open exchange standard for all life cycle phases, for all parties and all disciplines.
- Abbreviation: *Constructive Objects and the INtegration of processes and Systems*
- COINS builds on:
  - Geometry standards (IFC, DWG)
  - GIS standards (GML, CityGML)
  - Process standards (IDM part 2)
- COINS supports:
  - Systems Engineering SE
  - Object type libraries OTL
  - Combination of different data structures

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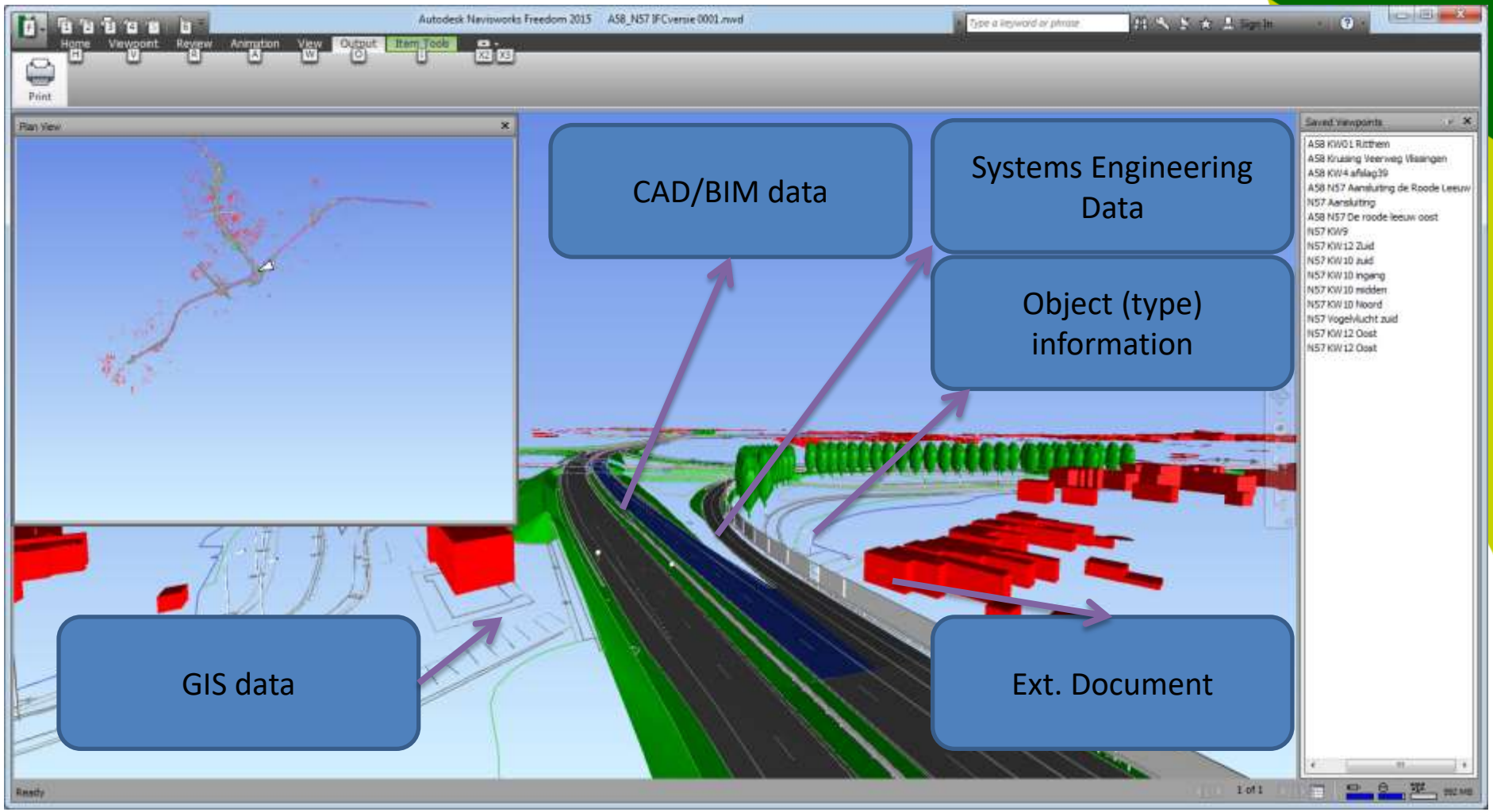
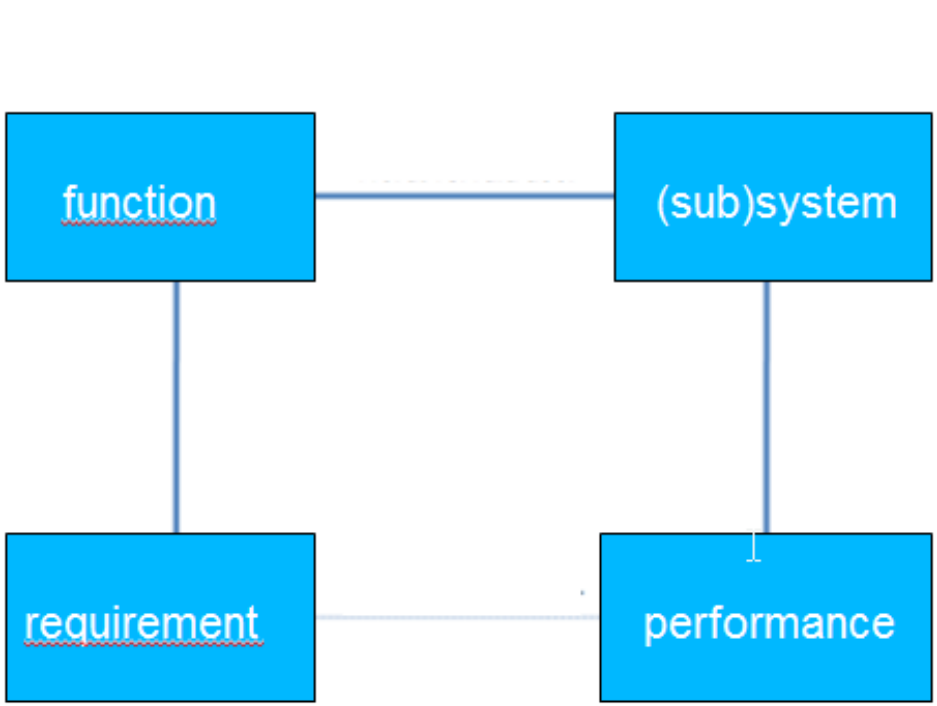
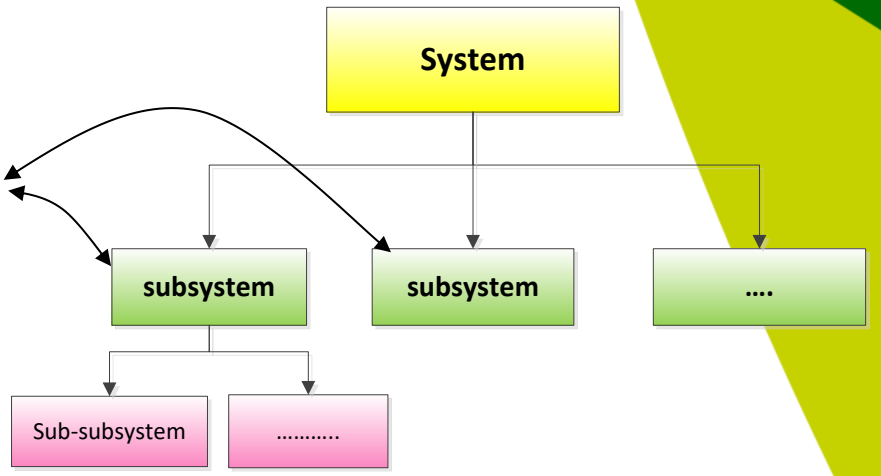
COINS data exchange



Systems Engineering information





System Breakdown Structure SBS

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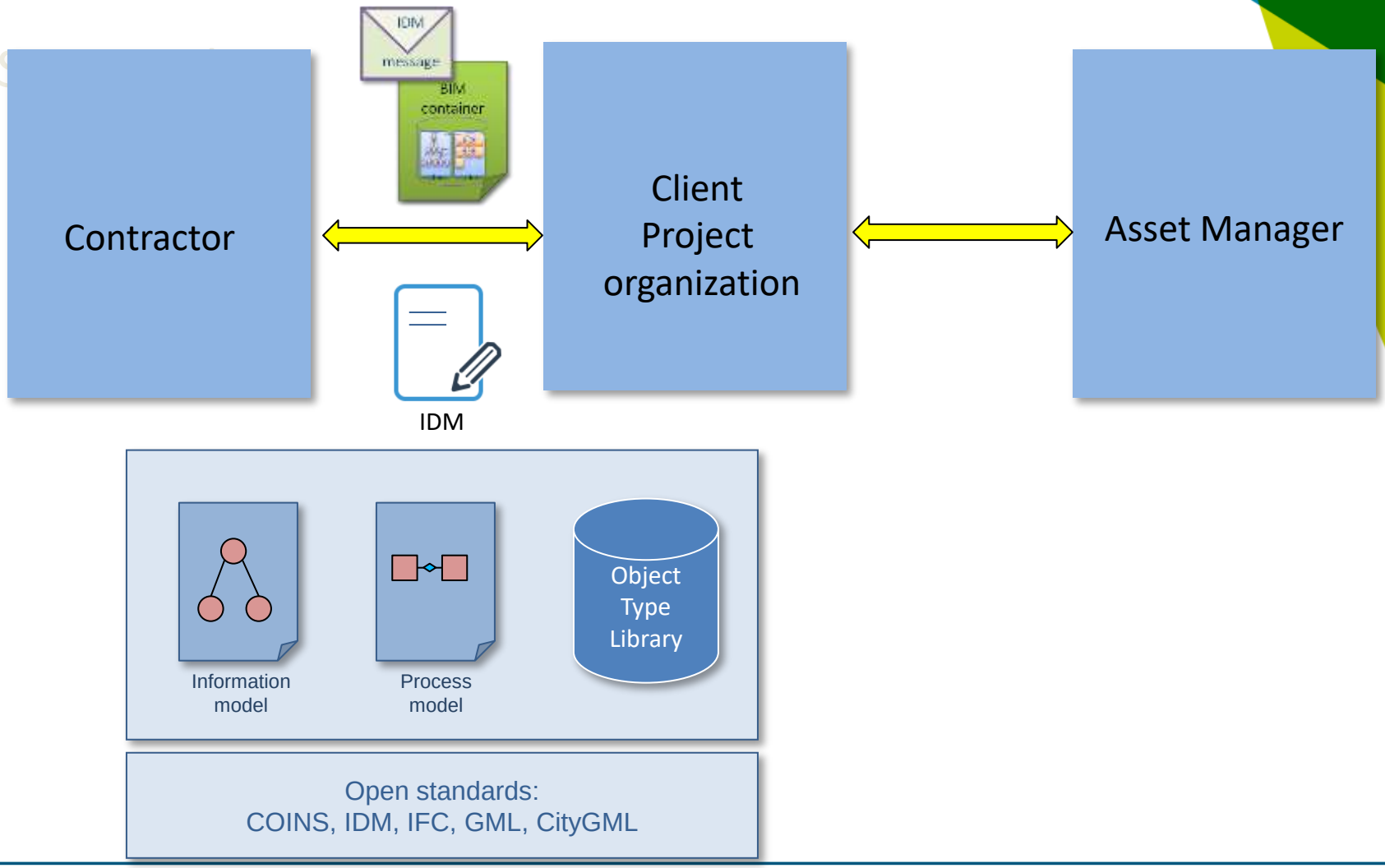
Data exchange IDM Information Delivery Manual



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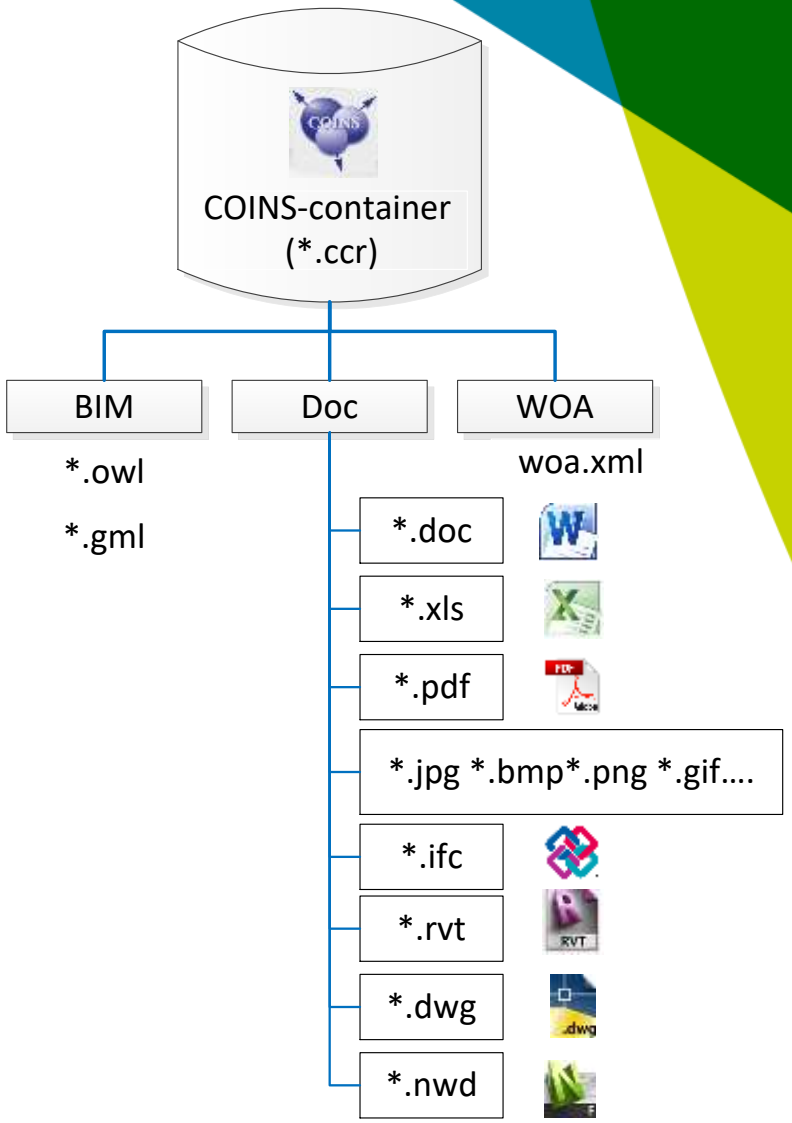
COINS container

COINS-container (= zip file)

- BIM directory
  - OWL based information
- Window of Authorisation directory
  - not used so far in Joure
- Documents directory
  - File-based geometry (drawings), certificates, documents, reports



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Configuration Management DataBase

relatics

Configuration Management Database

- OTL-OBJ-0491 - R - Wegvak Hollandiastraat
  - OTL-OBJ-1919 - F - Onderdoorgang 198 Hollandiastraat
    - OTL-OBJ-1920 - F - Voegovergang 1
    - OTL-OBJ-1923 - F - Steunpunt 1
    - OTL-OBJ-1924 - F - Hoofddraagconstructie
    - OTL-OBJ-1929 - F - Geleideconstructie 1
    - OTL-OBJ-1941 - F - Vleugelwand 1
    - OTL-OBJ-2282 - F - Pompinstallatie
    - OTL-OBJ-6128 - F - Steunpunt 2
    - OTL-OBJ-6145 - F - Geleideconstructie 2
    - OTL-OBJ-6151 - F - Voegovergang 2
    - OTL-OBJ-6153 - F - Vleugelwand 2
    - OTL-OBJ-6292 - F - Folieconstructie 323
    - OTL-OBJ-6293 - F - Overgangsconstructie 1 (Folieconstructie 323)
    - OTL-OBJ-6294 - F - Overgangsconstructie 2 (Folieconstructie 323)
    - OTL-OBJ-6297 - F - Pompkelder

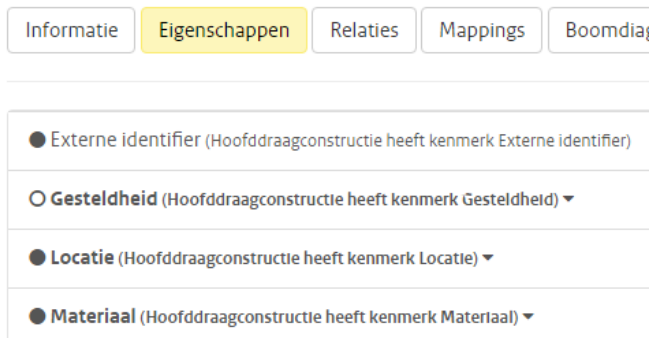
Documents

SharePoint

Geometry

ArcGIS ESRI

OTL specifications



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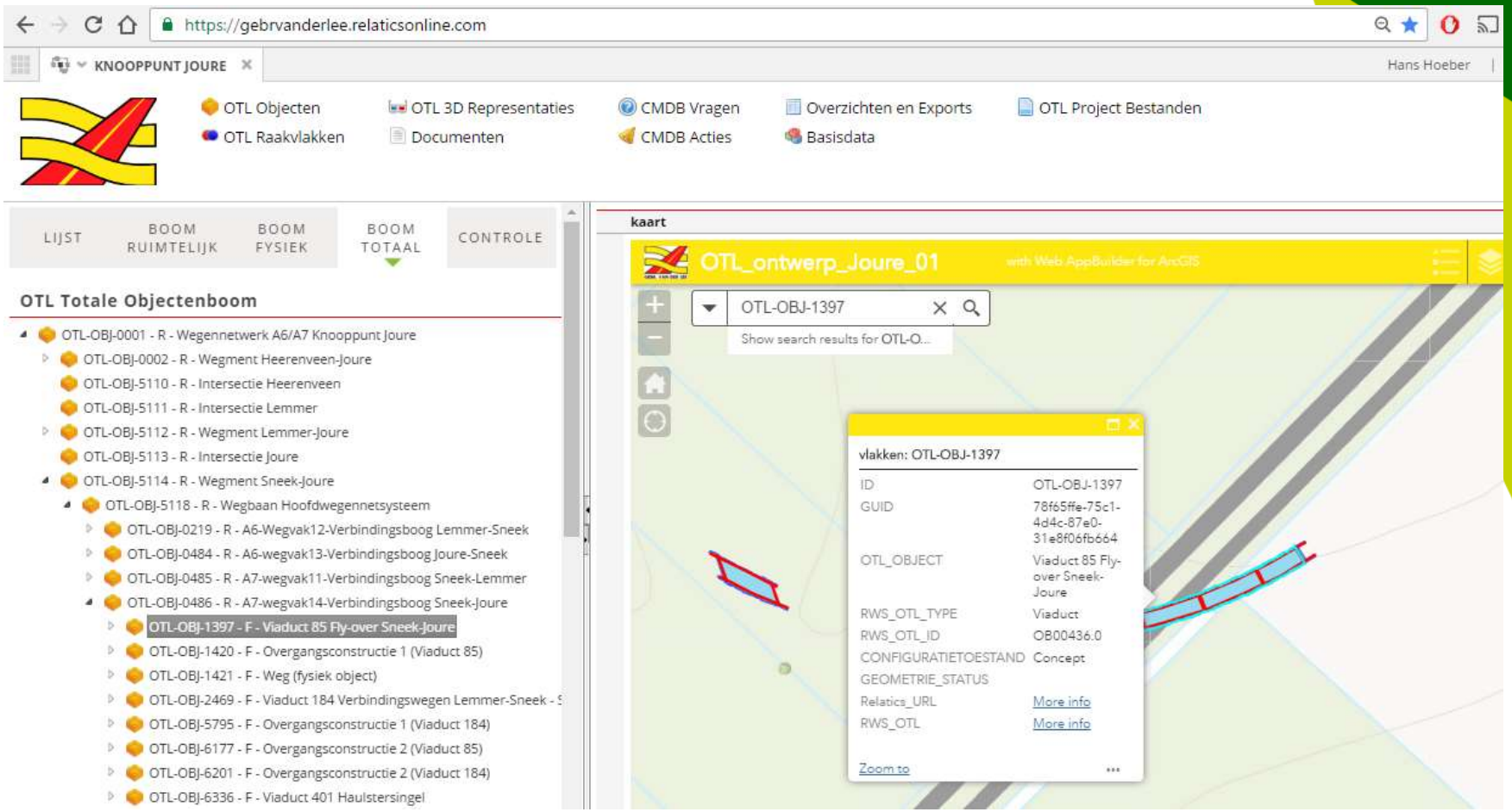
GIS/CMDB integration



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BIM Joure today:

- Finalize BIM model (3000 objects)….
- First delivery COINS container…

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Evaluation of approach

1. Currently only as a contractual duty, not beneficial in the project construction phase
2. BIM protocol should have been used from the project start
3. The OTL and COINS use of the client is not yet mature
4. Tooling developed for the project, no standard tooling available yet
5. It is possible to exchange the information at each delivery
6. while using your own BIM

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Developments:

- TC/TF 442 “BIM” CEN

- CEDR research programme: “Asset Information using BIM” since september 2016 by the consortium INTERLINK

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CEDR & INTERLINK

CEDR
Conférence Européenne des Directeurs des Routes
Conference of European Directors of Roads

INTERLINK

- Research study to the development of an European Road OTL and open exchange standard (2016-2018)

- On three pillars:
  - Technical Specs
  - Standardisation body
  - Acceptance in practice

- Based on:
  - Reliable data
  - Proper datastructure

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Consortium INTERLINK:

- Research institute TNO (The Netherlands)

- Engineering and asset management consultants
  - Roughan & O'Donovan Consulting Engineers ROD (Ireland)
  - Royal HaskoningDHV (The Netherlands)

- ICT consultants and software companies
  - AEC3 (Germany)
  - Vianova Systems (Norway)
  - interactive instruments (Germany)
  - Semmtech (The Netherlands)
  - planen-bauen 4.0 (Germany) national BIM implementation body

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… junction Joure work in progress…..

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