# PIM – Pavement Information Modelling

## A lifecycle process and performance information system for Dutch contractors

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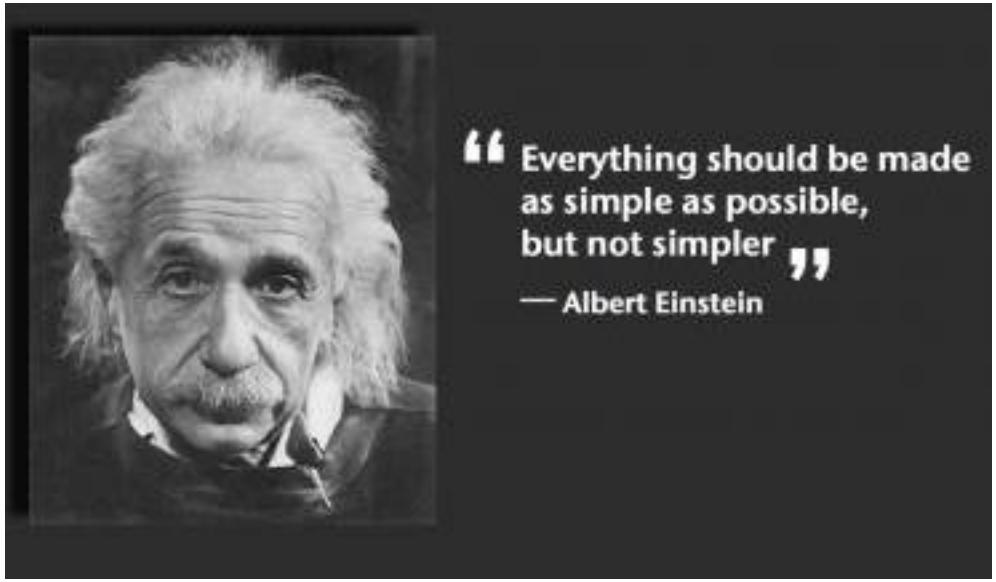
Dr.ir.ing. Frank Bijleveld (Strukton Civiel / Ooms Producten)

# Content of this presentation

- Context why we need PIM?
- What is PIM and its scope?
- Some examples of the web-based PIM-tool
- How does it professionalise the industry?
- Future and further digitisation of the road construction industry



# Reasons for PIM

Trends in the (Dutch) road construction industry:

- Contractors beside construction, also responsible for design and maintenance of projects (Asset Management)
- CE-marking in the industry
- Systems Engineering (SE) and performance contracting → evidence and traceability (data/information) increasingly important
- Development of BIM in the road construction industry
- Plethora of sensors and technologies available → big data
- Outdated systems available (AIS + Roadlab), empirically / old contracts

Necessity: register, manage, exchange data from road construction (product and process) systematically stored in one system (supply chain)

PIM developed by 8 Dutch road contractors

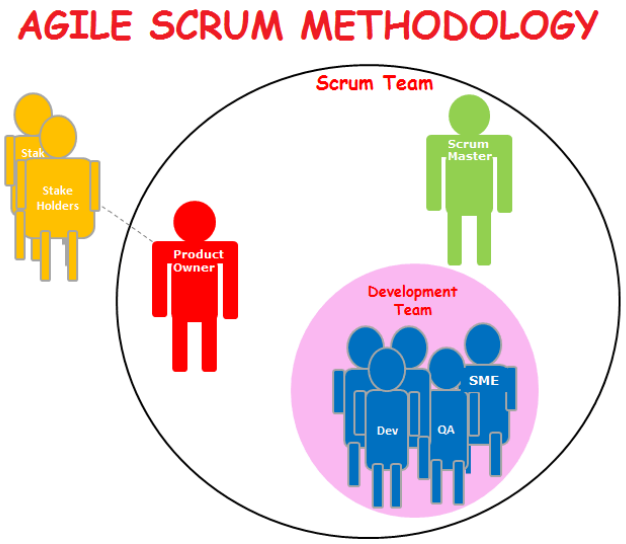
# Goals of PIM

- Contracts, requirements, specifications, characteristics in one system
- Central registration, control, and management of materials, production information, on-site construction information
- Objective management information (KPI's) – over projects
- Evidence – requirements towards agencies
- Measureable performance information
- Proper archive for discussion about guarantee/warranty
- Efficient long-term monitoring of realised road work (risk management + product development)
- Efficient information exchange
- Decrease the administrative pressure

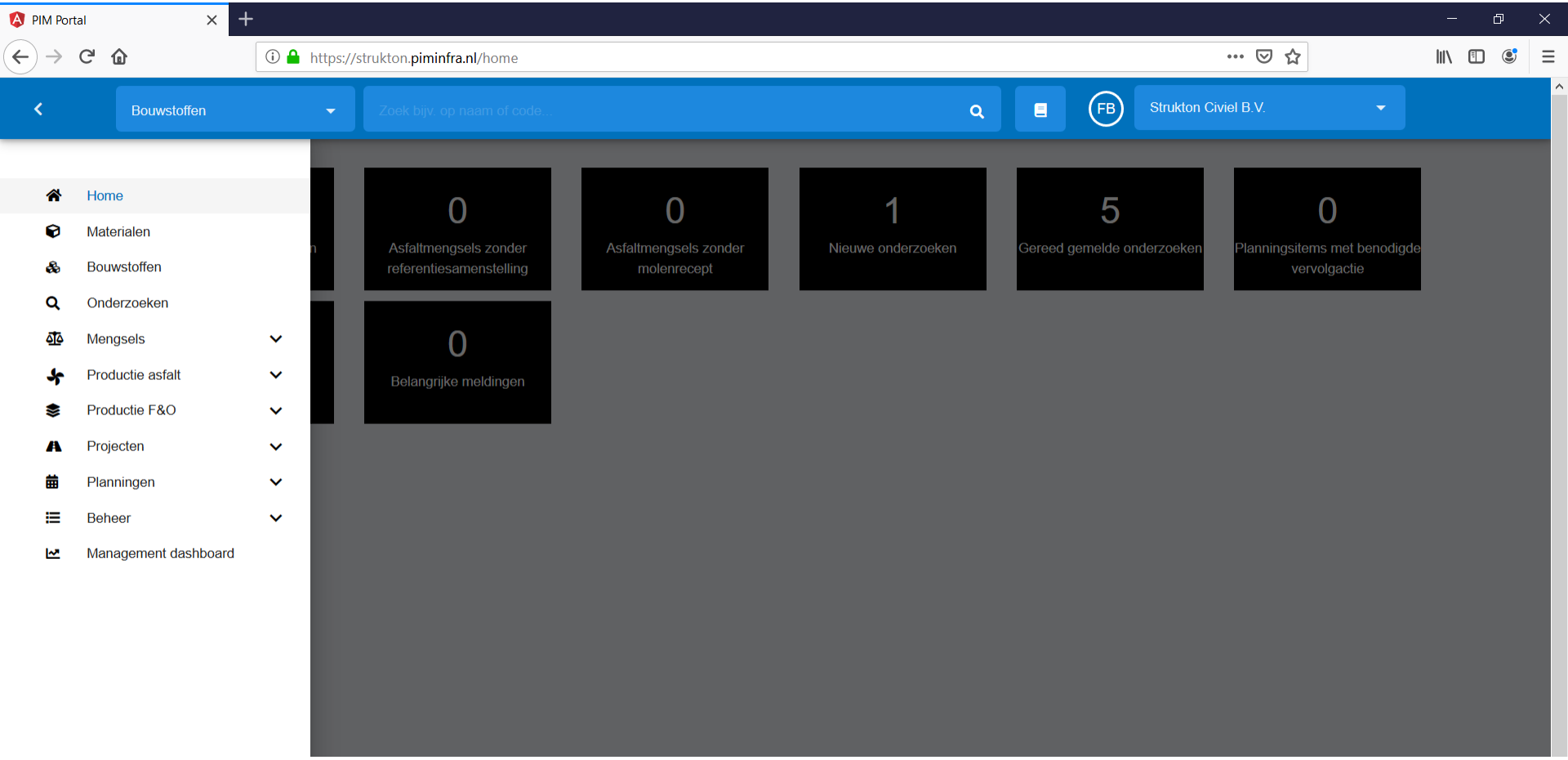
# The developement process

- Started in April 2016 – until December 2018 (2019 implementation)
- Used a SCRUM-agile development strategy
- App. 35 sprints of 3 weeks
- Own product owner, key-users contractors wrote User Stories
- Key-users + testers 3 days a week physically at the software-company

- Costs and hours: ~ 50.000 hrs (€4M)
  - –Out-of-pocket app. 2,5 million Euro (initial €2,0 + €0,5 RFC's)
  - –App. 25.000 hrs from the 8 contractors



# PIM – web-based information system



# For which materials can PIM be used for?

- Building materials asphalt
  - aggregate
  - sand
  - filler
  - bitumen
  - additives / rejuvenators
  - etc.
- Subsurface materials
  - Sand
  - Granular materials (+ mixtures)
- Foundation materials
  - Unbound materials
  - Bound materials (cement and bitumen based, e.g. CTB)
- Asphalt mixtures characteristics and performance





# Which processes can PIM be used for?

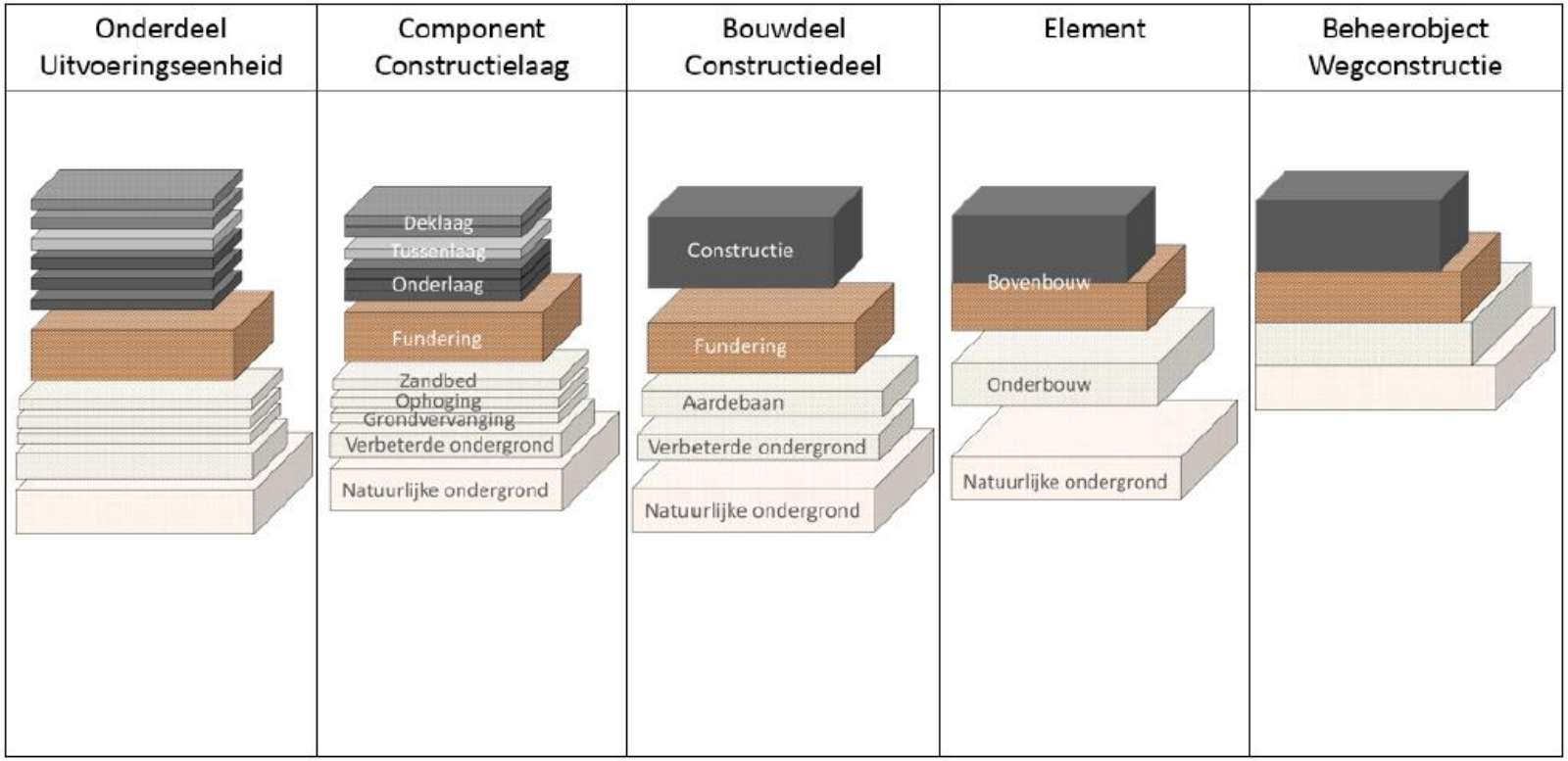
- Material testing (potential characteristics, production control, in-situ control)

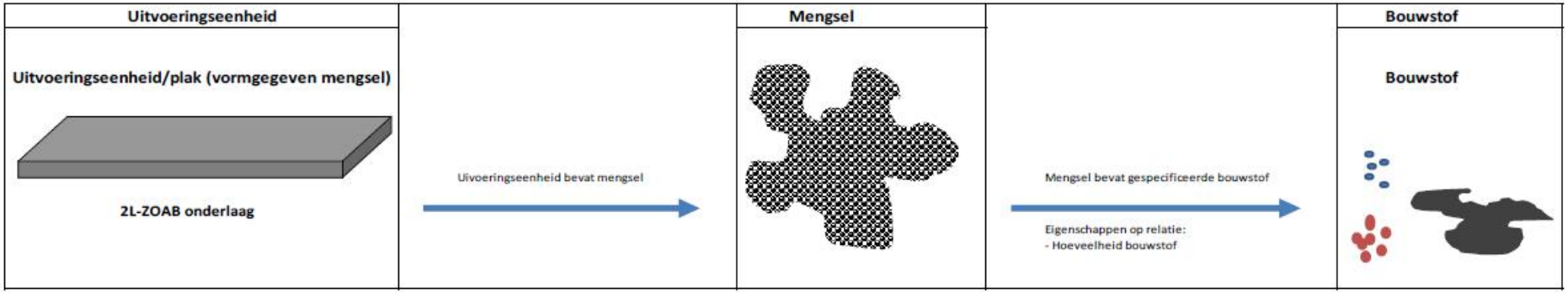



- Production, transportation (and weighing), on-site construction

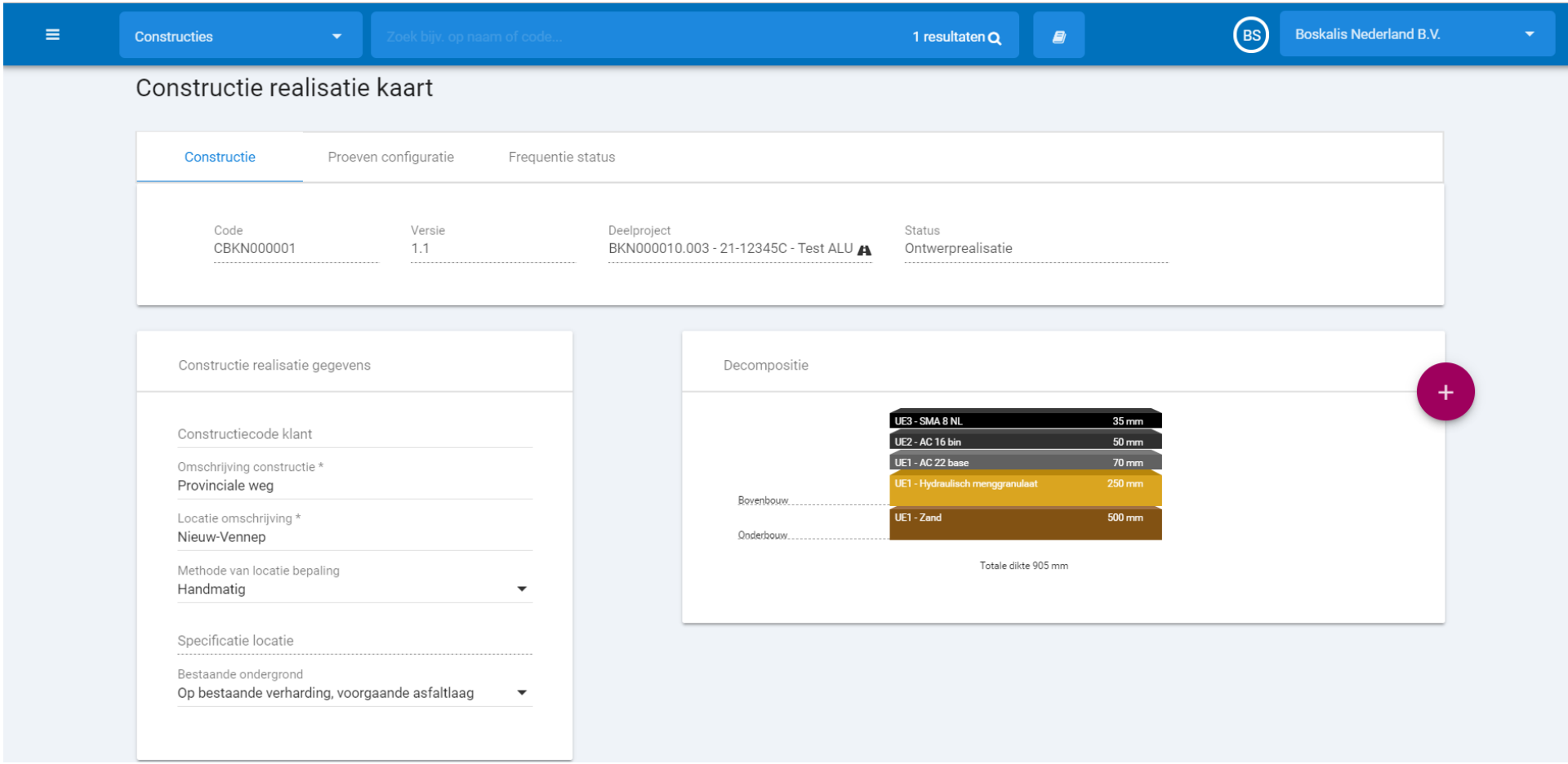


# Terminology BIM – physical decomposition

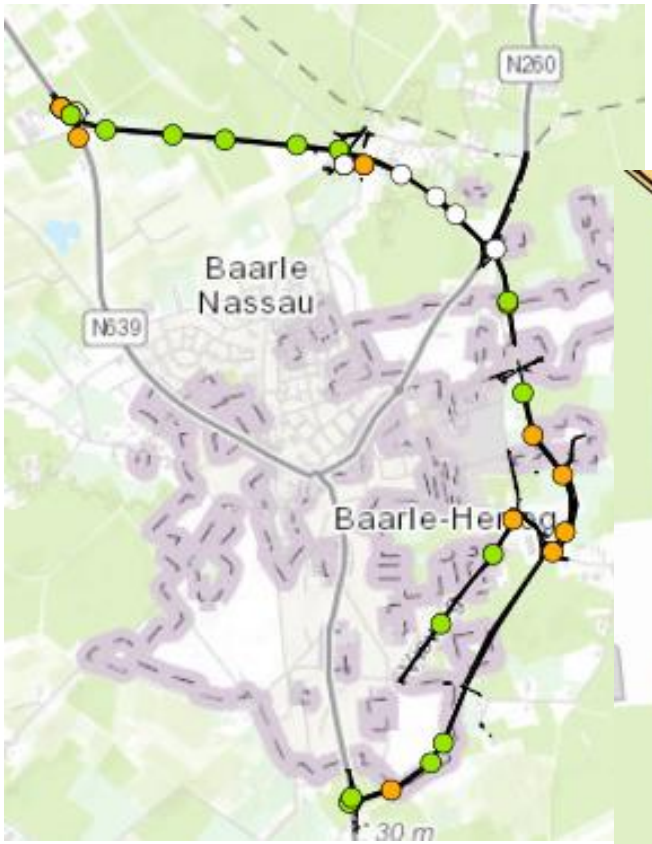


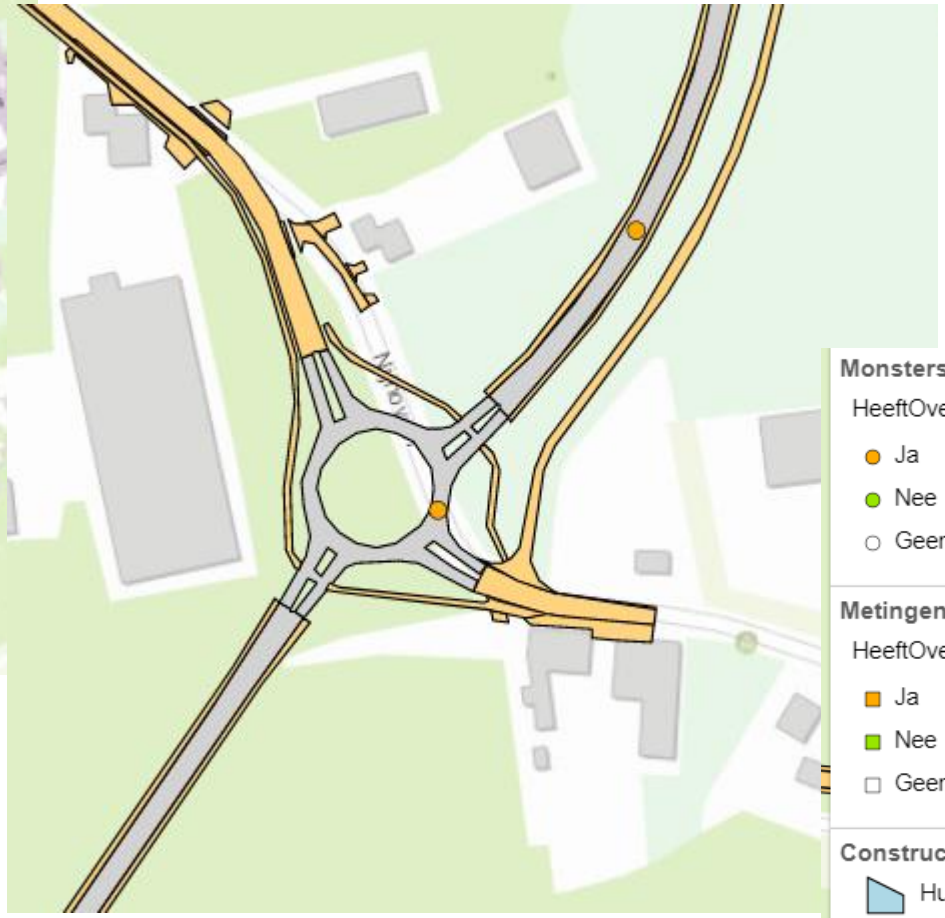



# PIM – physical decomposition of a construction



# Terminology BIM – spatial decomposition (GPS)



**Monsters**

HeeftOvertredingJaNee

- Ja
- Nee
- Geen resultaten

**Metingen**

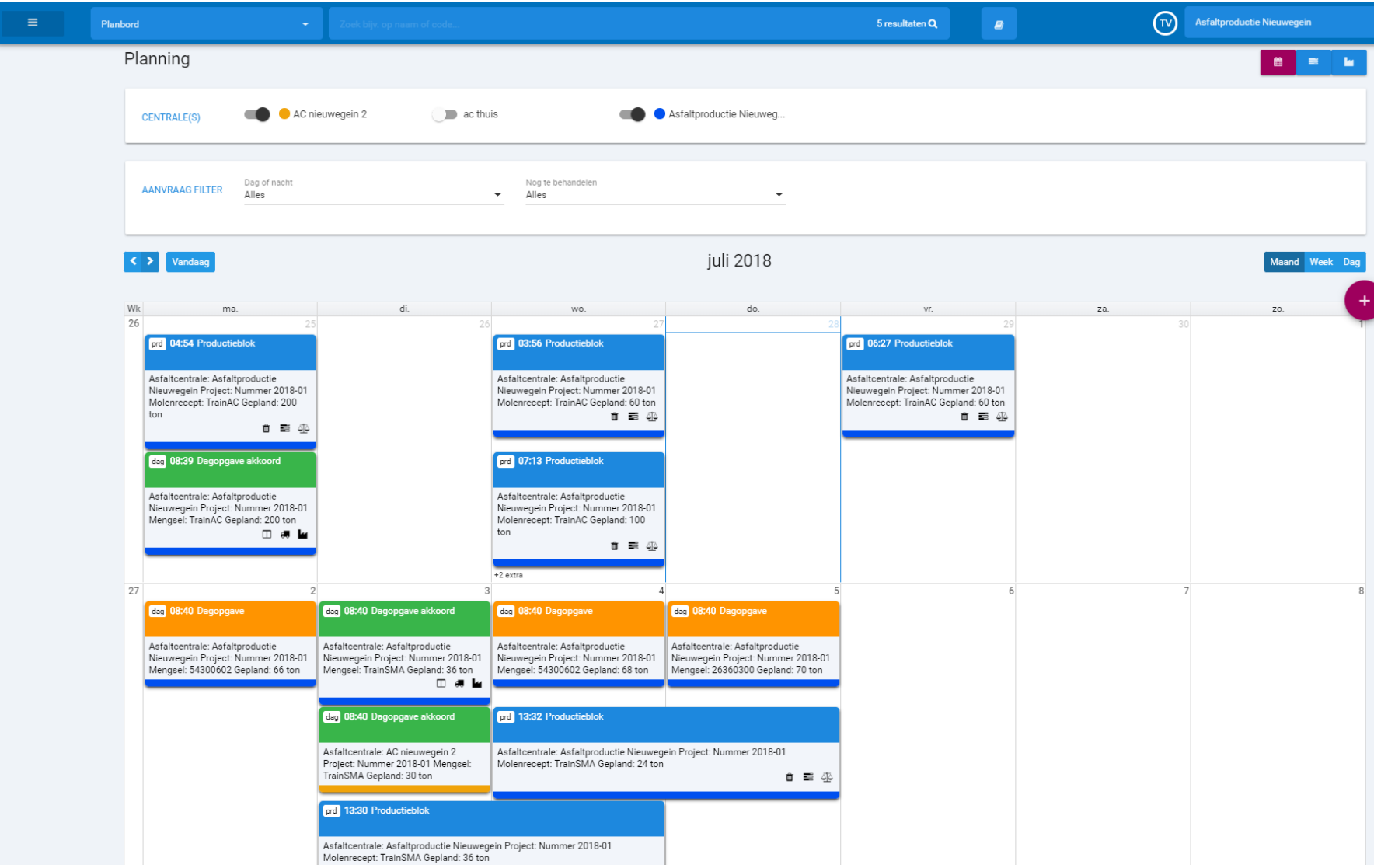
HeeftOvertredingJaNee

- Ja
- Nee
- Geen resultaten

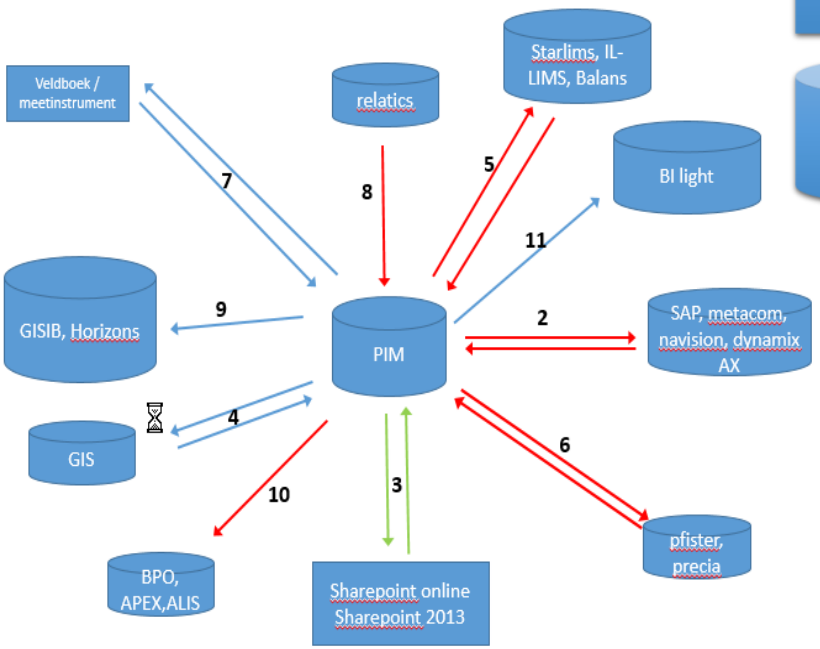
**Constructie realisatiekaarten**

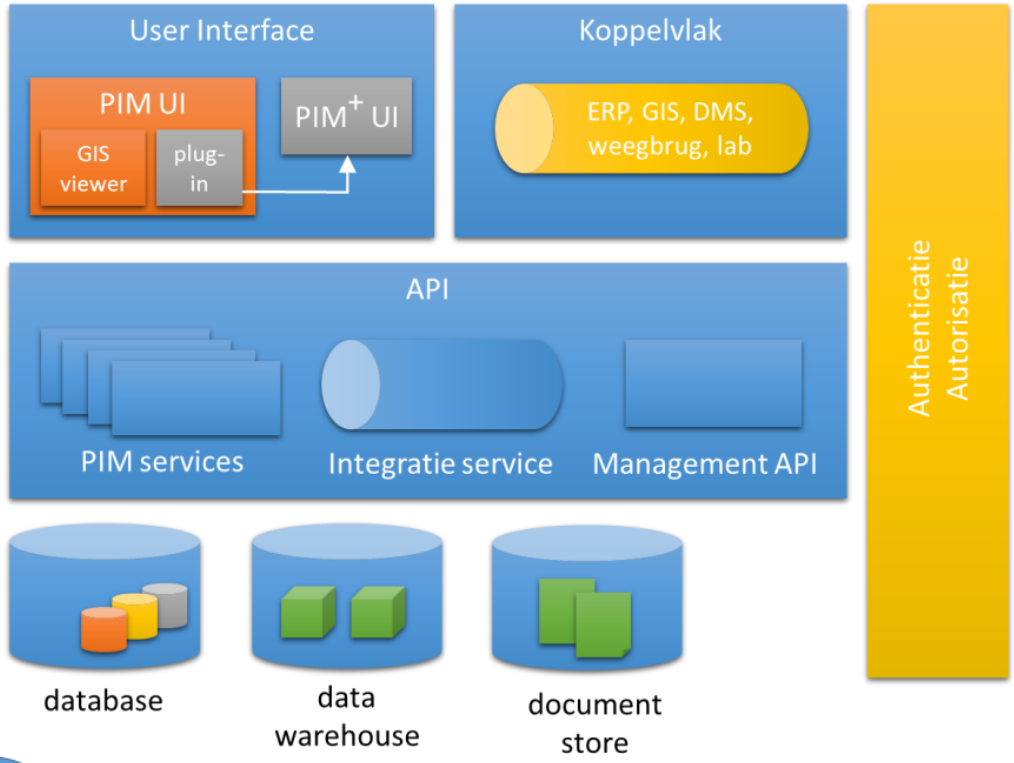
- Huidig
- Niet gekoppeld
- Gekoppeld

# Production scheduling



# IT-architecture PIM and company - example



# What does PIM bring us?

**Regulation, requirements:**
- Evidence and traceable quality control
- CE, FPC, RAW-national

**Direct savings**
- Less time to make delivery files and reports
- Less time for data collection and analyses
- Less failure costs: Right people have the correct data

**Indirect savings**
- More insight in:
  - Production quality
  - On-site construction quality
  - Better project and product choices
- More uniform process

# Conclusion

PIM leads to:

- Professionalisation of the industry regarding information management
- A more efficient process + information exchange with agencies
- Standardisation towards a BIM-standard (PIM-OTL) for roads

Future steps:

- Further implementation and data-collection
- Data lake → combine with i.e. traffic intensities, maintenance, etc.

# PIM as the birth certificate of the road

Each realised road has a PIM birth certificate:

- ✓ What materials are where?
- ✓ How was it produced?
- ✓ How was it constructed?

# Questions and contact details

Frank Bijleveld

frank.bijleveld@strukton.com

+31 6 51618194