

PIM – Pavement Information Modelling

A lifecycle process and performance information system for Dutch contractors



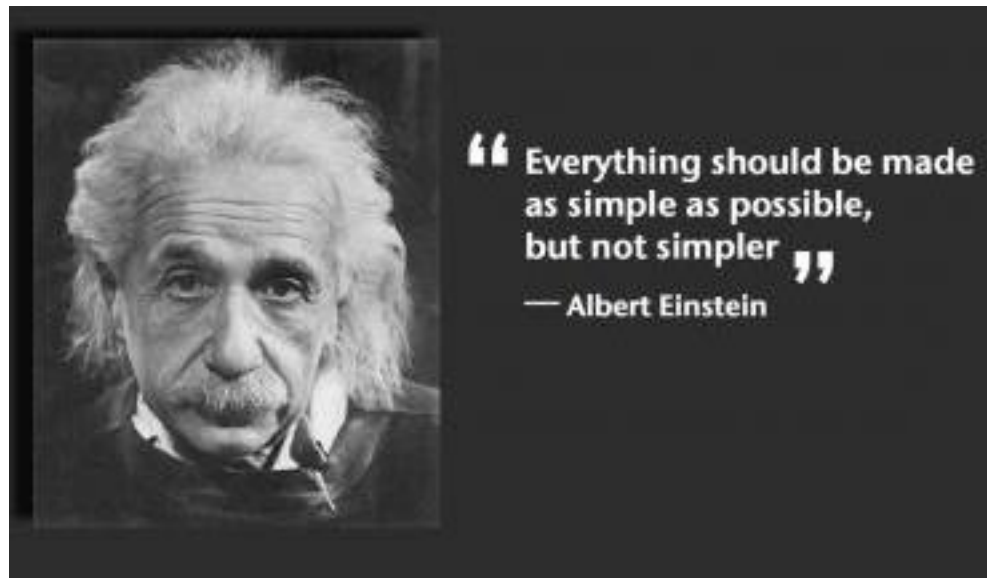
EAPA-symposium Paris, June 6 2019

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- Outdated systems available (AIS + Roadlab), empirically / old contracts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

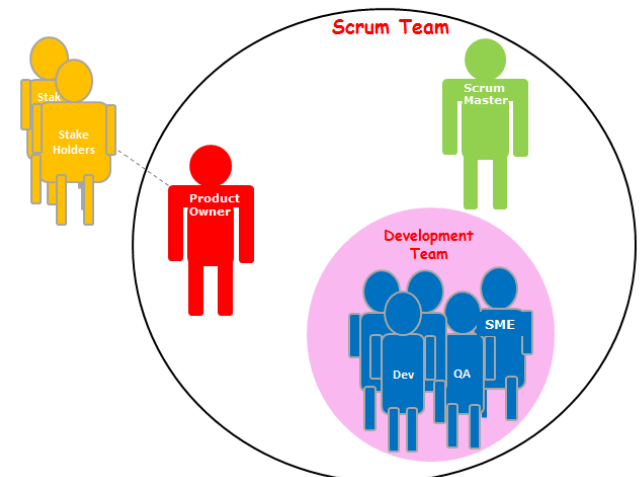


The development process

- 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

AGILE SCRUM METHODOLOGY



PIM – web-based information system

The screenshot displays the PIM Portal web application. The browser's address bar shows the URL <https://strukton.piminfra.nl/home>. The application's header is blue and contains a navigation menu on the left with icons and labels: Home, Materialen, Bouwstoffen, Onderzoeken, Mengsels, Productie asfalt, Productie F&O, Projecten, Planningen, Beheer, and Management dashboard. The main content area is dark gray and features a grid of six cards, each with a large number and a description:

- 0: Asfaltmengsels zonder referentiesamenstelling
- 0: Asfaltmengsels zonder molenrecept
- 1: Nieuwe onderzoeken
- 5: Gereed gemelde onderzoeken
- 0: Planningsitems met benodigde vervolgactie
- 0: Belangrijke meldingen

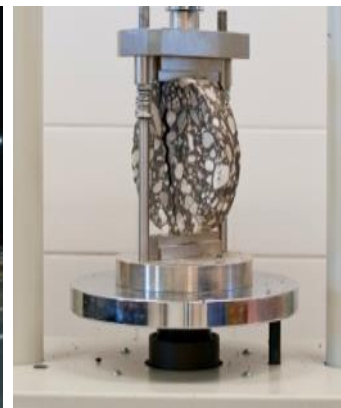
For which materials can PIM be used for?

- 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?

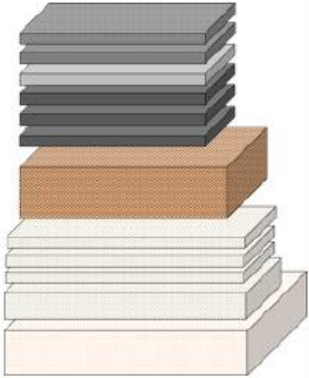

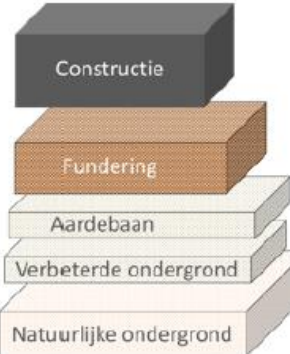
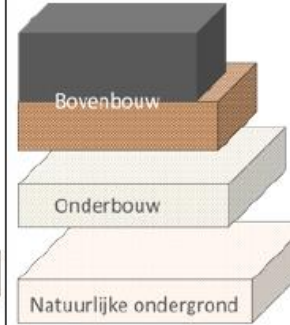
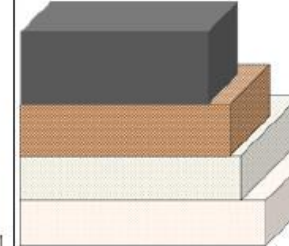
- Material testing (potential characteristics, production control, in-situ control)

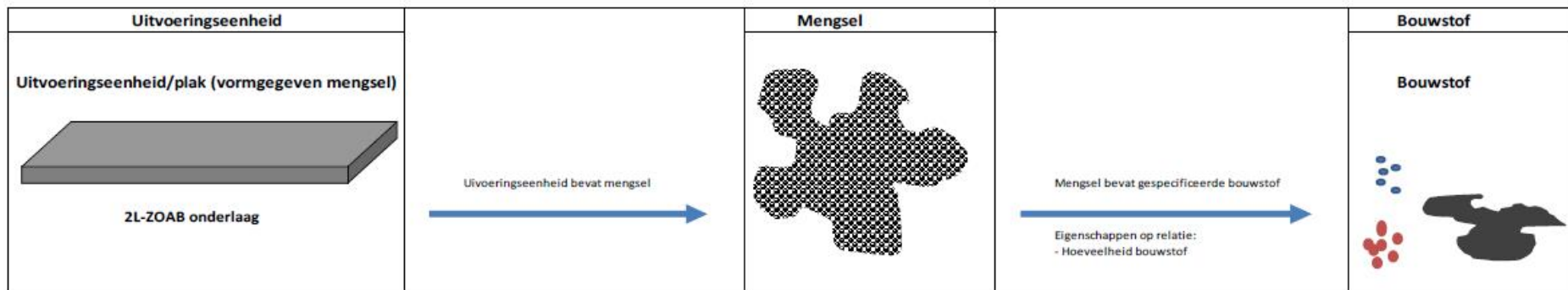


- Production, transportation (and weighing), on-site construction



Terminology BIM – physical decomposition

Onderdeel Uitvoeringseenheid	Component Constructielaag	Bouwdeel Constructiedeel	Element	Beheerobject Wegconstructie
				



PIM – physical decomposition of a construction

Constructies

Zoek bijv. op naam of code...

1 resultaten

BS

Boskalis Nederland B.V.

Constructie realisatie kaart

Constructie

Proeven configuratie

Frequentie status

Code
CBKN000001

Versie
1.1

Deelproject
BKN000010.003 - 21-12345C - Test ALU

Status
Ontwerprealisatie

Constructie realisatie gegevens

Constructiecode klant

Omschrijving constructie *
Provinciale weg

Locatie omschrijving *
Nieuw-Vennep

Methode van locatie bepaling
Handmatig

Specificatie locatie

Bestaande ondergrond
Op bestaande verharding, voorgaande asfaltlaag

Decompositie

Bovenbouw

Onderbouw

UE3 - SMA 8 NL35 mm

UE2 - AC 16 bin50 mm

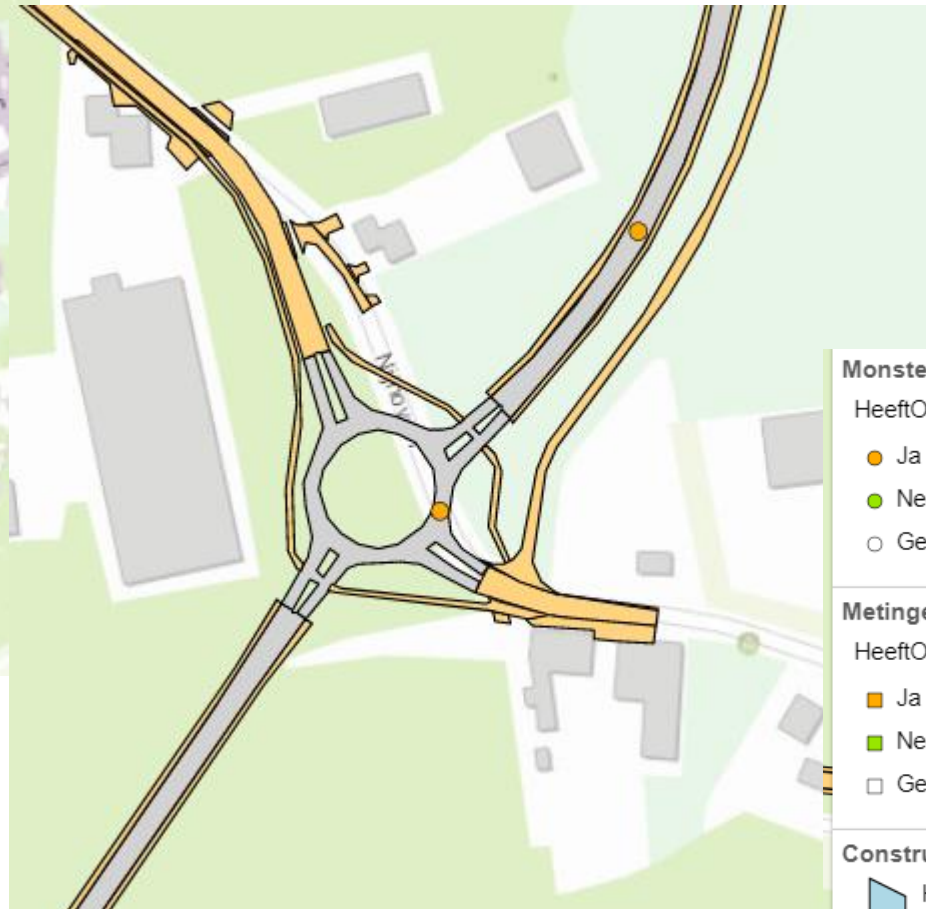
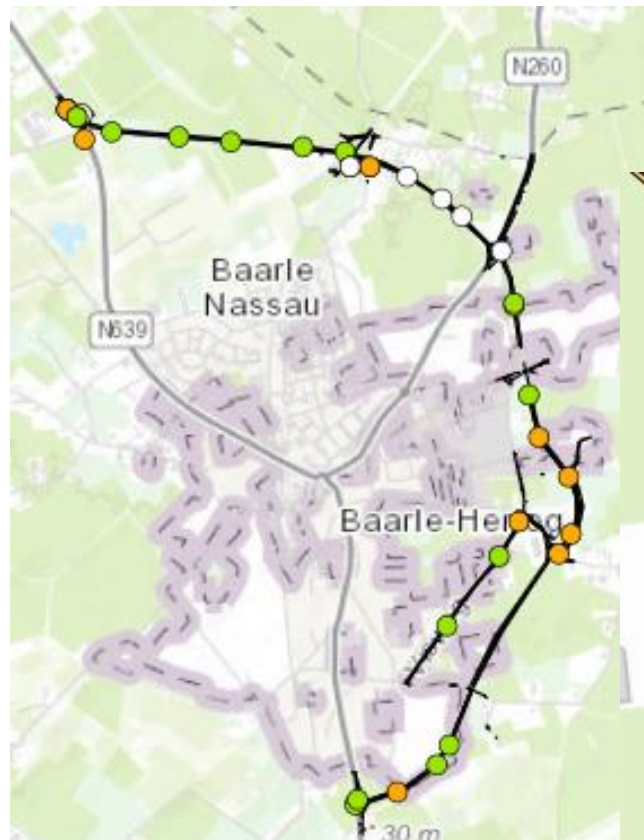
UE1 - AC 22 base70 mm

UE1 - Hydraulisch menggranulaat250 mm

UE1 - Zand500 mm

Totale dikte 905 mm

Terminology BIM – spatial decomposition (GPS)



Monsters

HeeftOvertredingJaNee

- Ja
- Nee
- Geen resultaten

Metingen

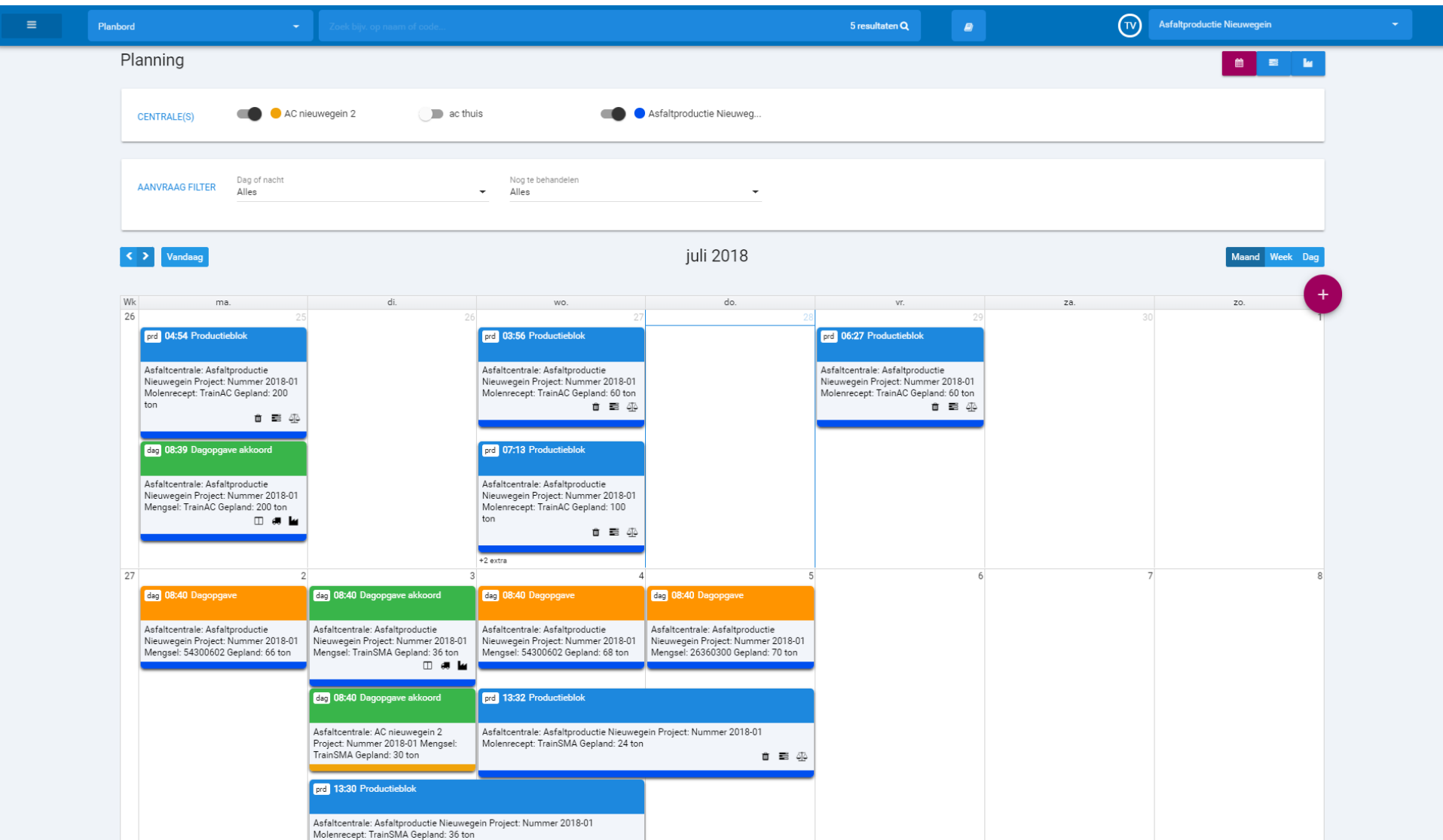
HeeftOvertredingJaNee

- Ja
- Nee
- Geen resultaten

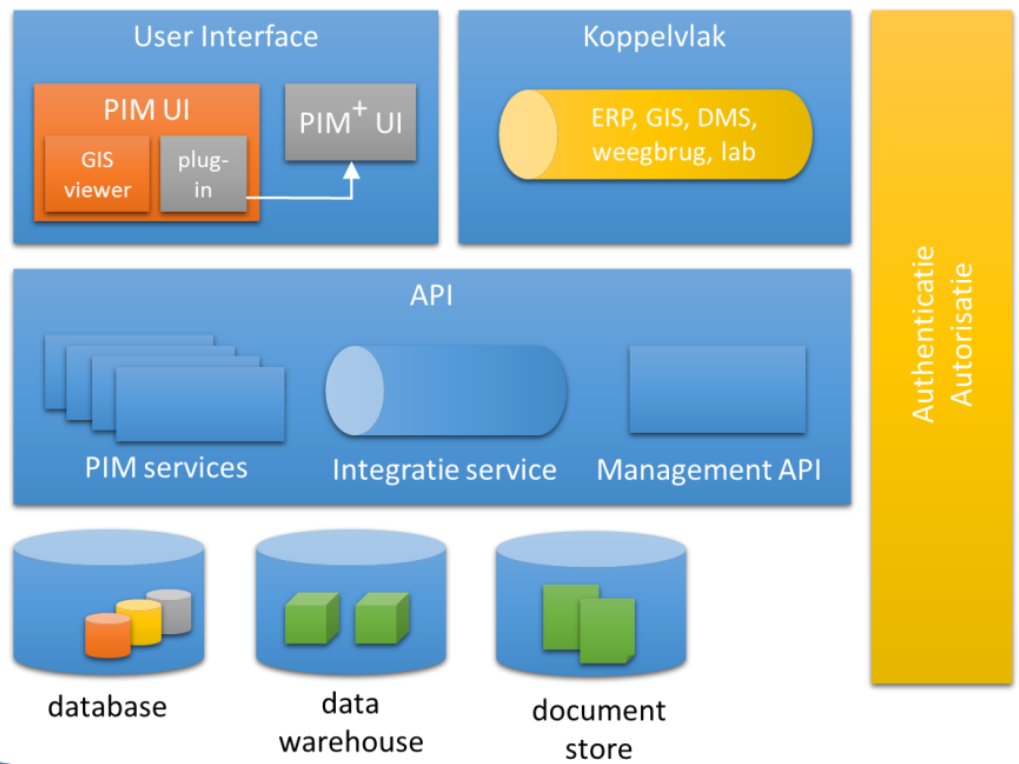
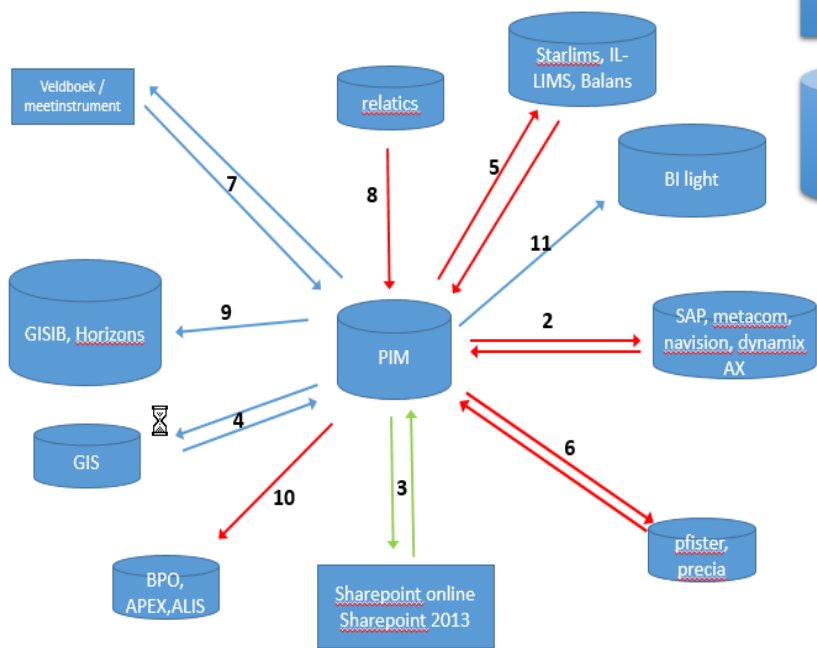
Constructie realisatiekaarten

- ▬ 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

