DT Rotterdam

Gemeente Rotterdam

The Digitale Transformatie of the Digitale Twin (DT)²

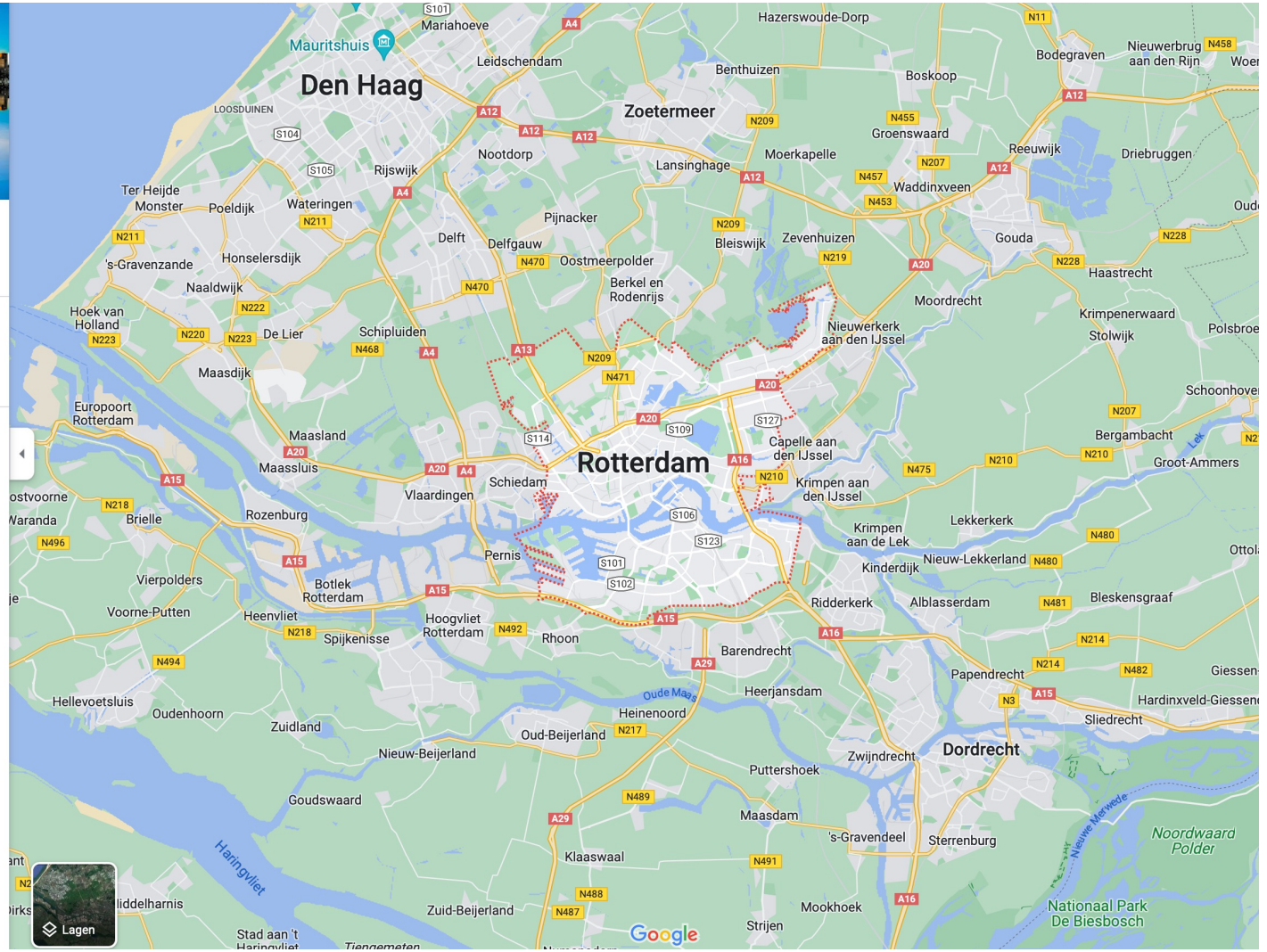
Speaker: Bart De Lathouwer
Program Architect

b.delathouwer@rotterdam.nl
b.delathouwer@geonovum.nl

Rotterdam

DigitaleStad

Rotterdam
Nederland
Zonnig · 28 °C
20:11



Source: google maps

Bron: Bart De Lathouwer

What is a Digital Twin*

DigitaleStad

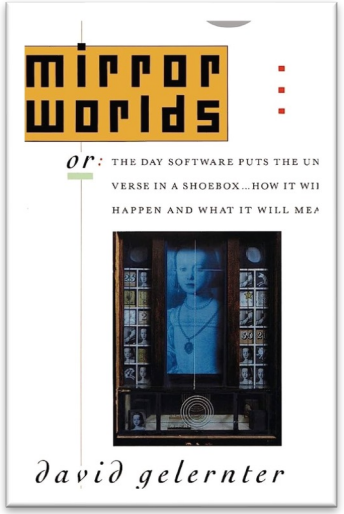
A digital twin is **a digital representation of an** intended or actual **real-world physical product**, system, or process (a physical twin) that serves as the effectively **indistinguishable digital counterpart** of it for practical purposes, such as **simulation, integration, testing, monitoring, and maintenance**.

Source: wikipedia

What is a Digital Twin*

DigitaleStad

A digital twin is **a digital representation of an** intended or actual **real-world physical product**, system, or process (a physical twin) that serves as the effectively **indistinguishable digital counterpart** of it for practical purposes, such as **simulation, integration, testing, monitoring, and maintenance**.



Source: wikipedia

…publicly introduced in 2002 by Michael Grieves, at a Society of Manufacturing Engineers conference in Troy, Michigan.

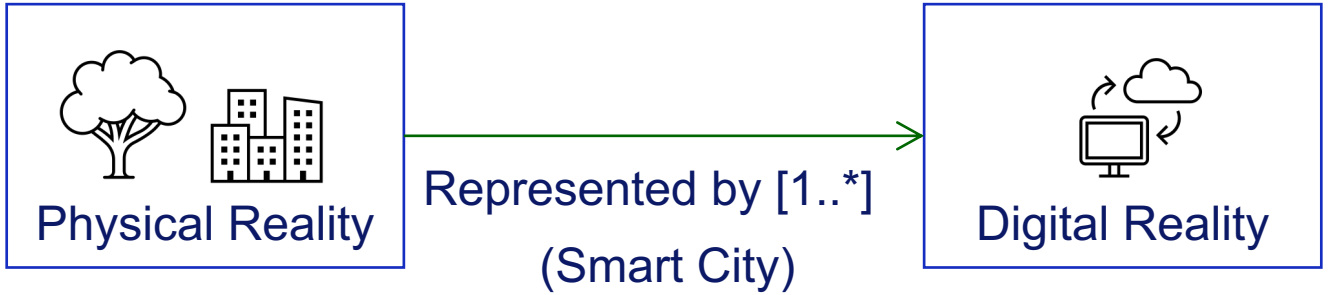
Aka “virtual twin”

What is a Digital Twin*

A digital twin is **a digital representation of an** intended or actual **real-world physical product**, system, or process (a physical twin) that serves as the effectively **indistinguishable digital counterpart** of it for practical purposes, such as **simulation, integration, testing, monitoring, and maintenance**.

What is a Digital Twin*

A digital twin is **a digital representation of an** intended or actual **real-world physical product**, system, or process (a physical twin) that serves as the effectively **indistinguishable digital counterpart** of it for practical purposes, such as **simulation, integration, testing, monitoring, and maintenance**.



What is a Digital Twin

DigitaleStad

Quid a Digital Twin in an Urban context?

Physical Reality

Digital Reality

What is a Digital Twin

DigitaleStad

Quid a Digital Twin in an Urban context?

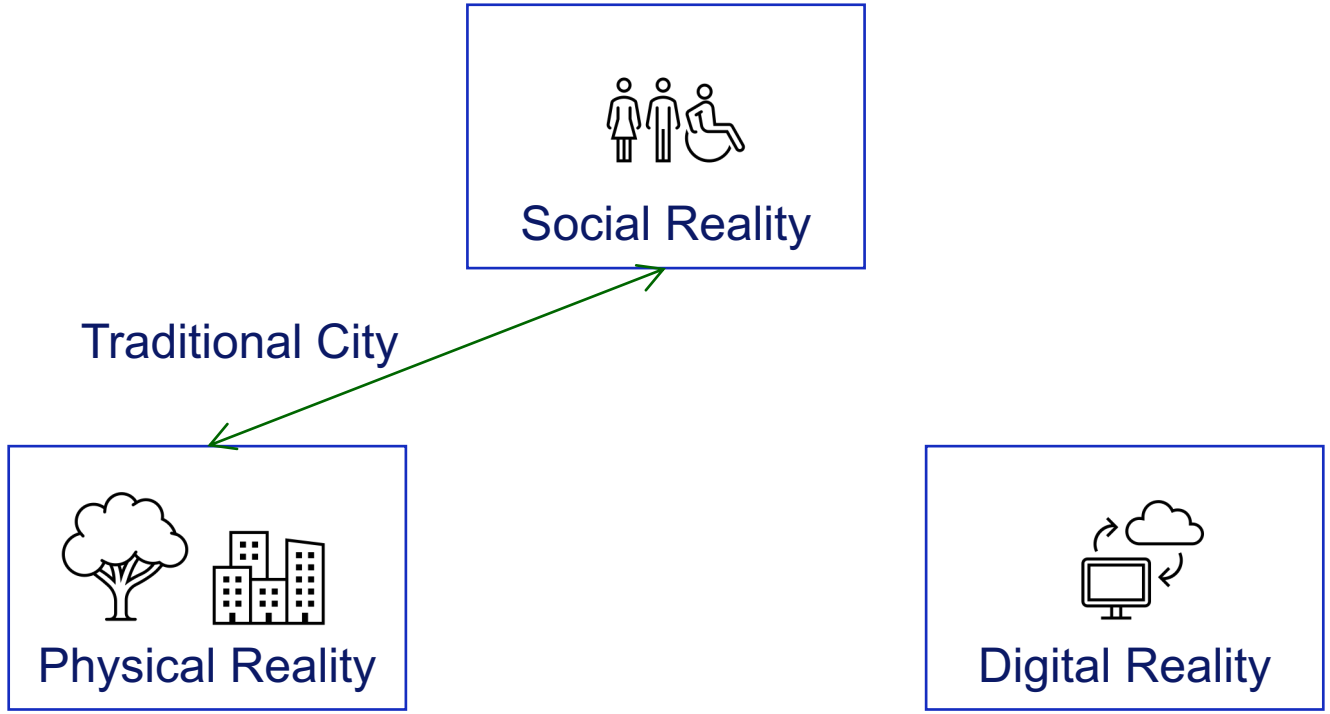
Social Reality

Physical Reality

Digital Reality

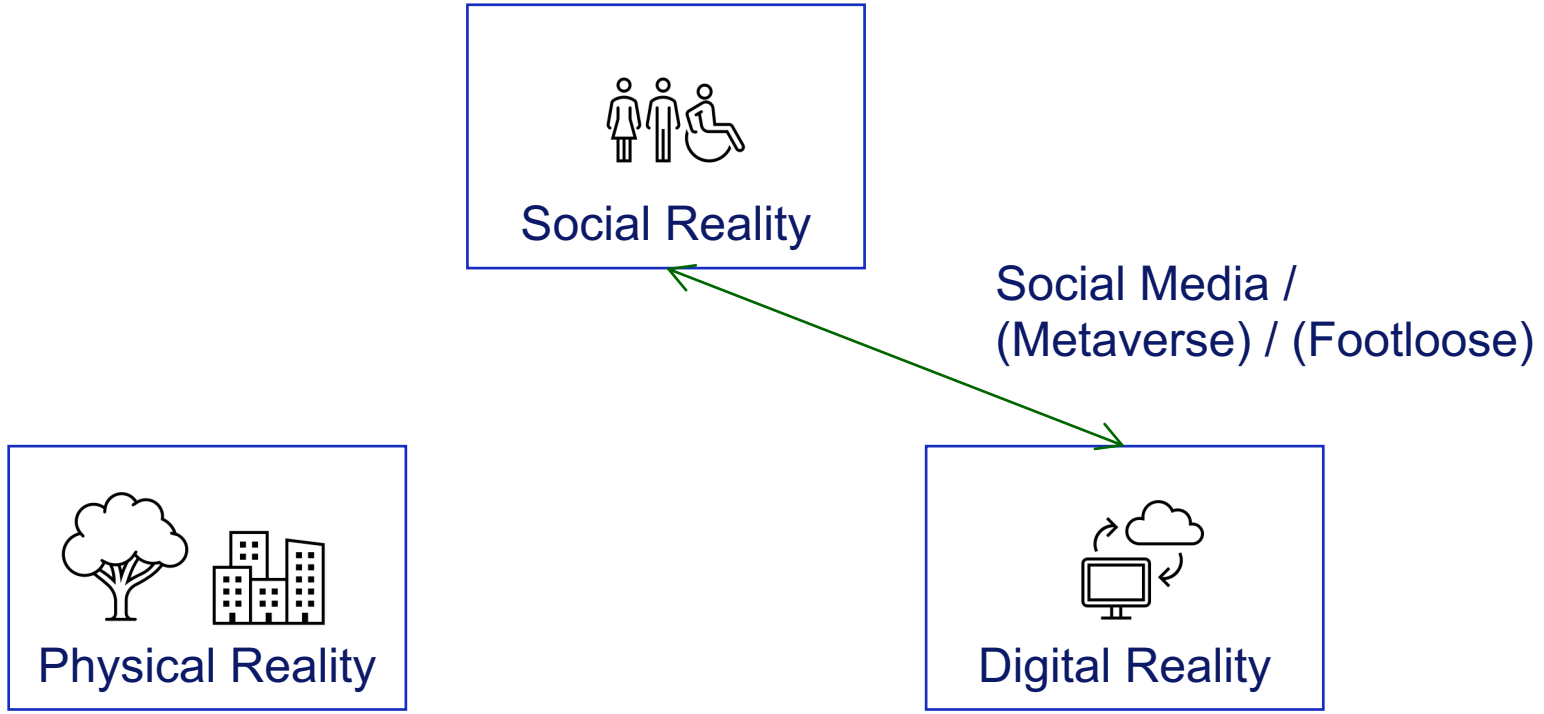
What is a Digital Twin

Quid a Digital Twin in an Urban context?



What is a Digital Twin

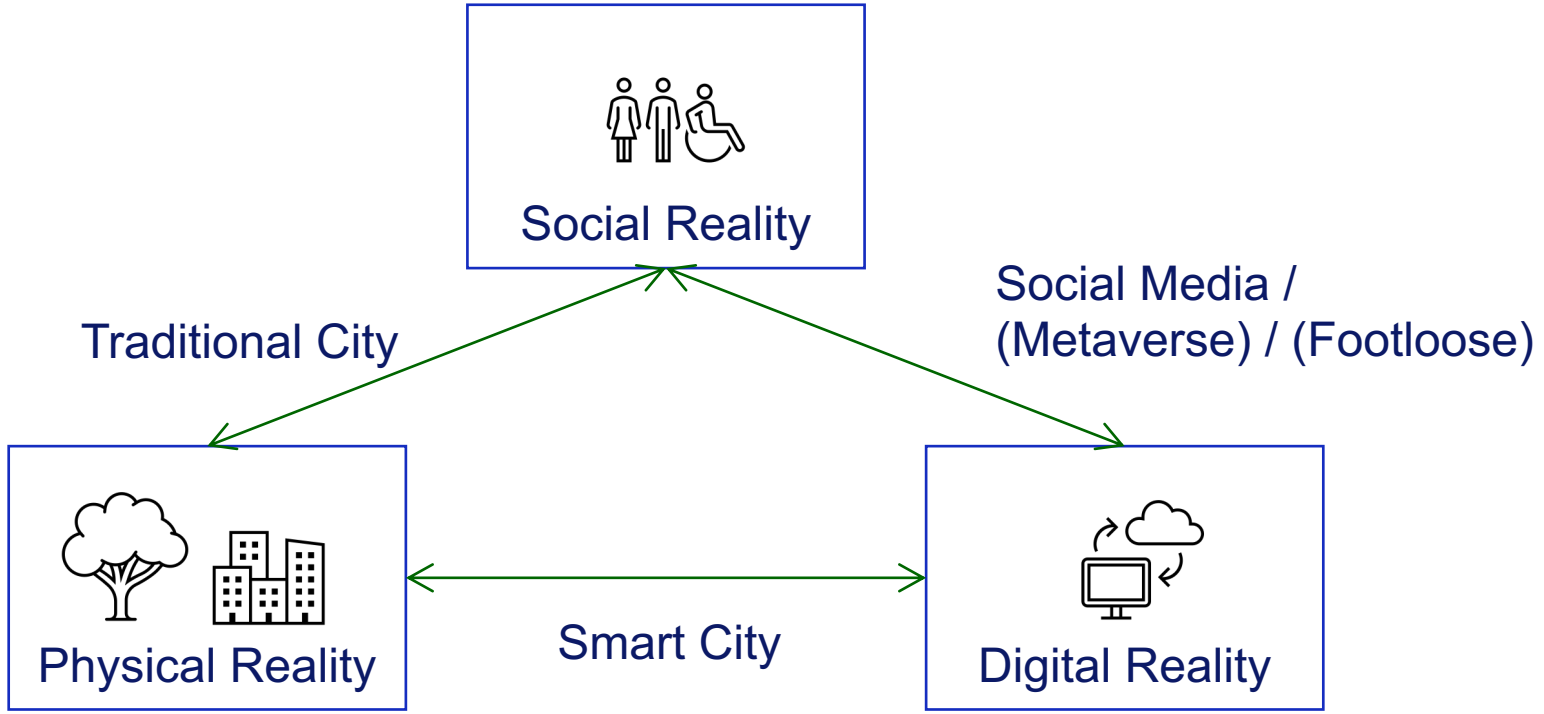
Quid a Digital Twin in an Urban context?



What is a Digital Twin

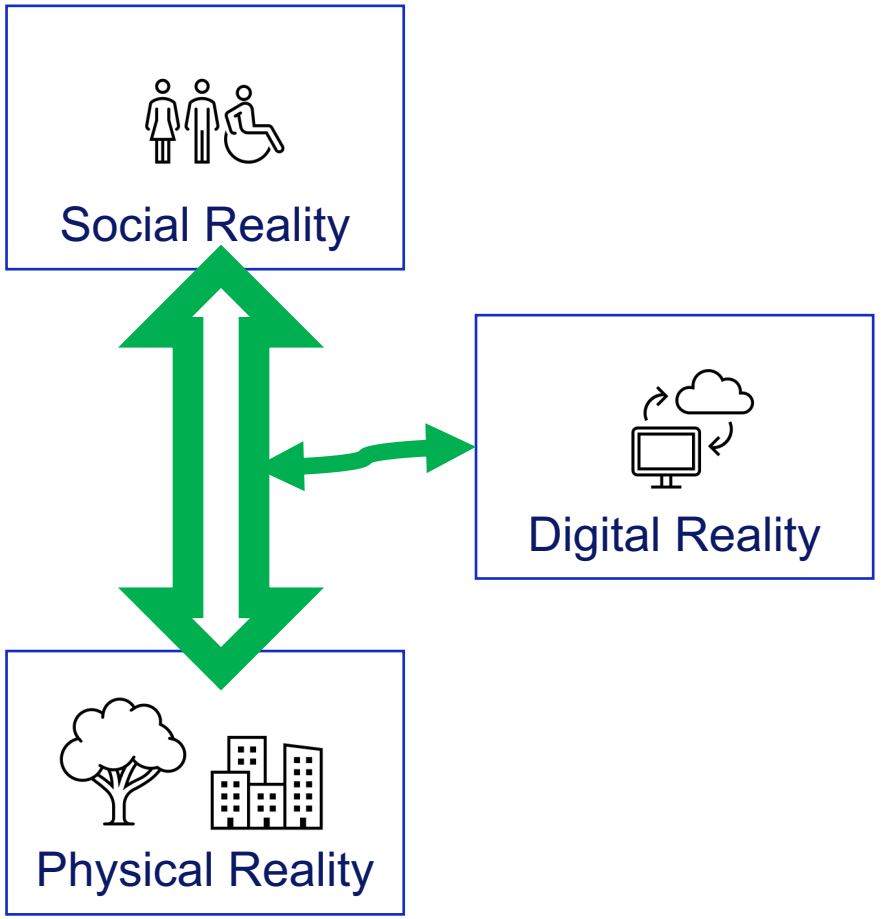
DigitaleStad

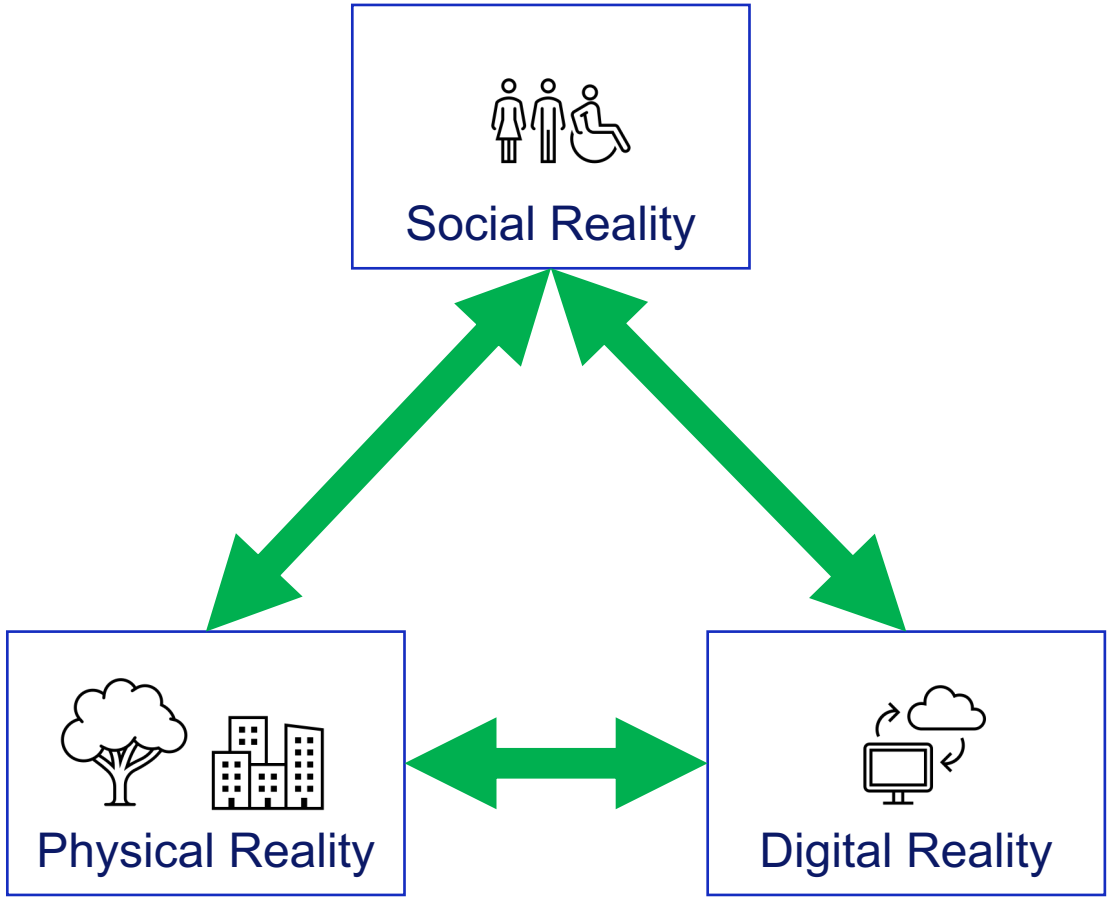
The Urban Digital Twin is a Triple!



Digitale Twin. vs Digitale Urban Community

DigitaleStad





The Digital Transformation of the Digital Twin

DigitaleStad

Why is it difficult?

- Digital is seen an aid / instrument, not as the ‘Digital reality’
- Eldermen don’t get elected for their ‘digital agenda’

At the same time

- Digital expectations from citizens
- Digital offering from the market <-> Public values

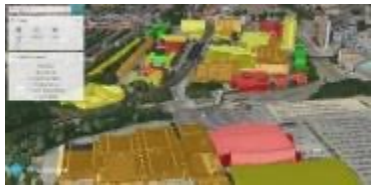
Ownership and Governance of the Open Urban Platform

DigitaleStad

Private platforms

Public platforms

Open Urban Platform



?

Role of NMCA?

Research topics for an Urban Digital Community / Twin:

DigitaleStad

- DT as a Data Integration exercise
  - Early vs Late Binding (eg Data Mesh, ETL, Dynamic Product) (TJS)
- DT Visualization for machines
- Web 3.0, Decentralized Web & Personal Data Vaults
- UI for slow and fast movers (STAPI)
- Design for “Contestability”
  - Quality, Lineage (of combined data), reproducibility, …
- What is the OUP experiece, by public values
- (Machine readable legislation)
- (AI)

Gemeente Rotterdam

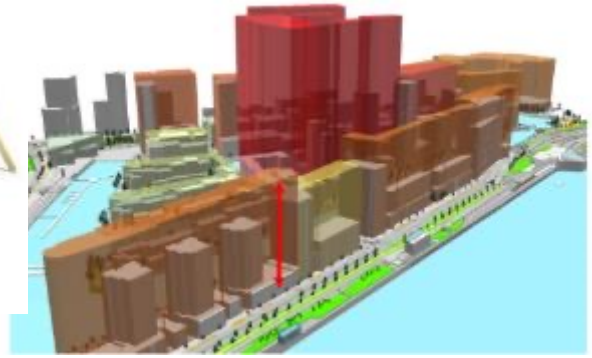
Thank you

b.delathouwer@rotterdam.nl

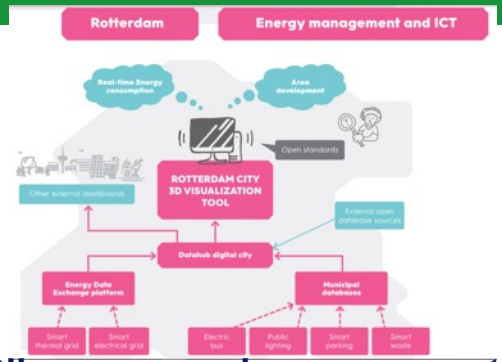
b.delathouwer@geonovum.nl

DigitaleStad

Innovatieve toepassingen met de 3D Digital Twin als basis



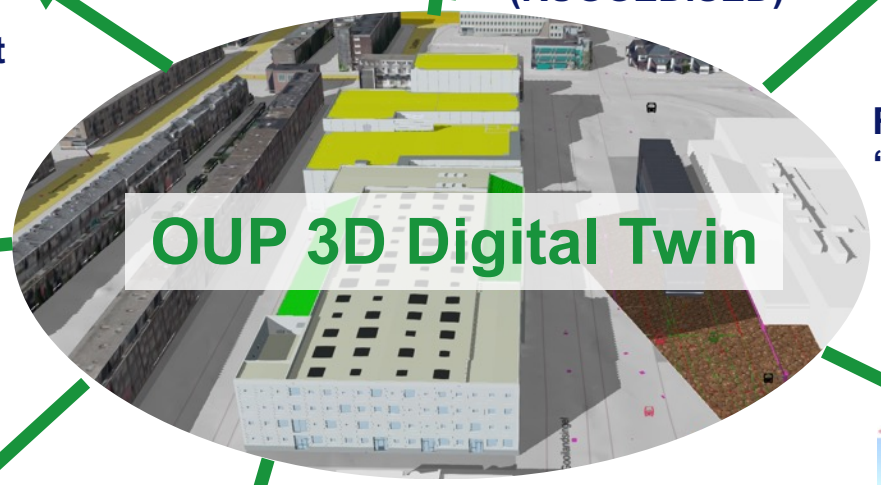
Omgevingswet:
- **Co-creatie in de digitale stad**
- **Automatiseren Omgevingsvergunningtraject**



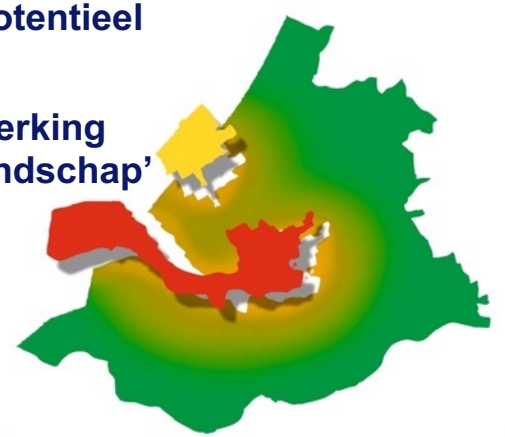
Slimmer energiemanagement (RUGGEDISED)

Generieke en schaalbare databronnen:
- **Energiebesparingspotentieel**
- **Zonnepotentieel**

- **Digital Twin Duurzaam**
- **Digital Twin Onderwater**



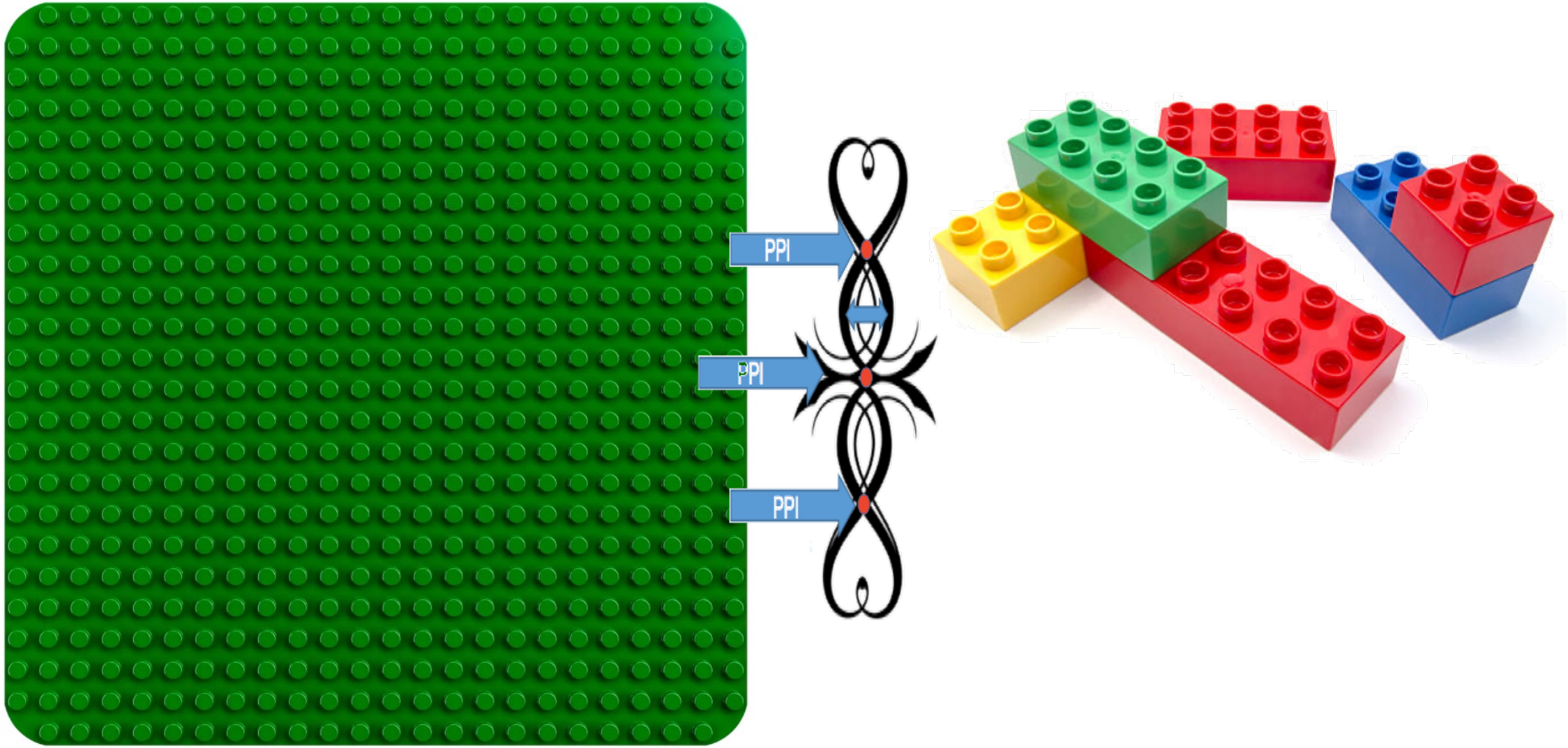
Regionale samenwerking 'Grenzeloos datalandschap'



- **Doorontwikkeling 3D stadsmodel**
- **Het nieuwe winkelen (vertraagd)**

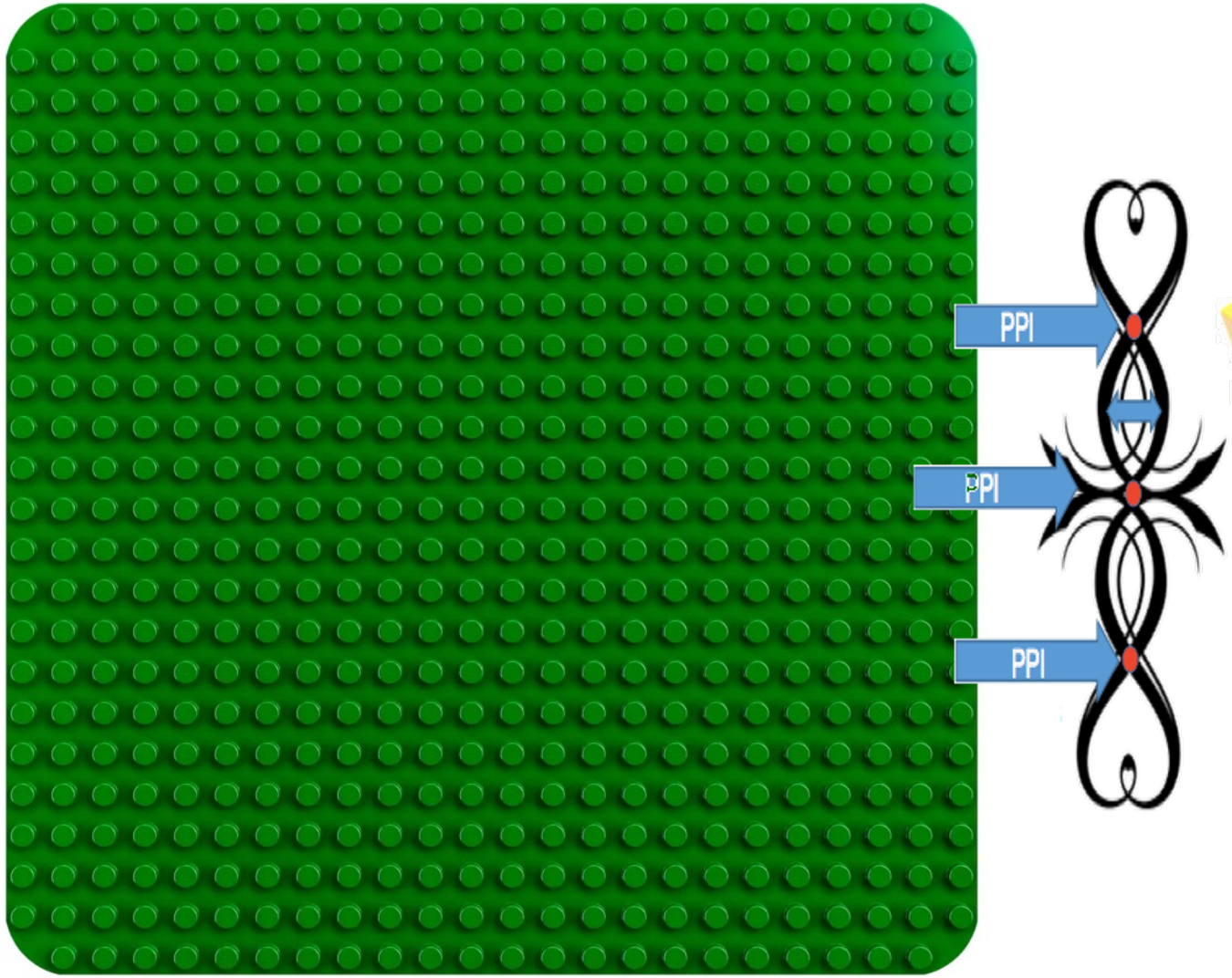
Visualiseren nieuwbouwplannen m.b.v. AR

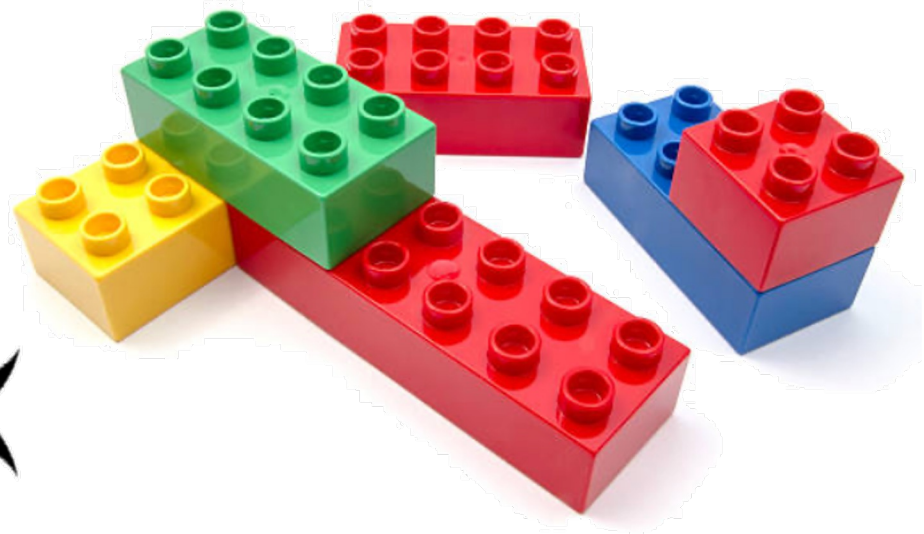
Design principles: MIM & PPI



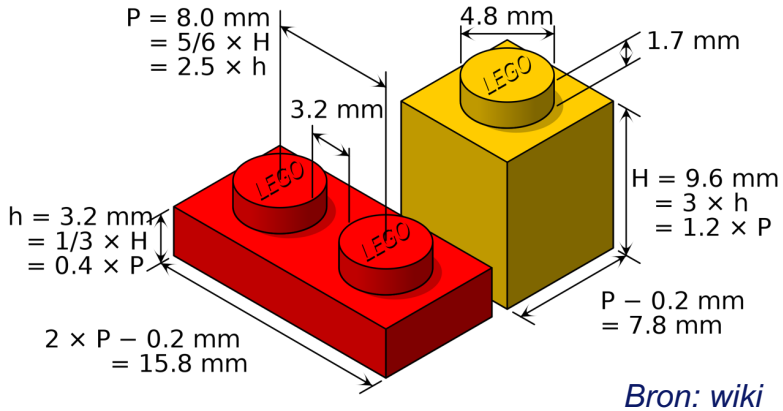
Bron: wiki

Design principles: MIM & PPI



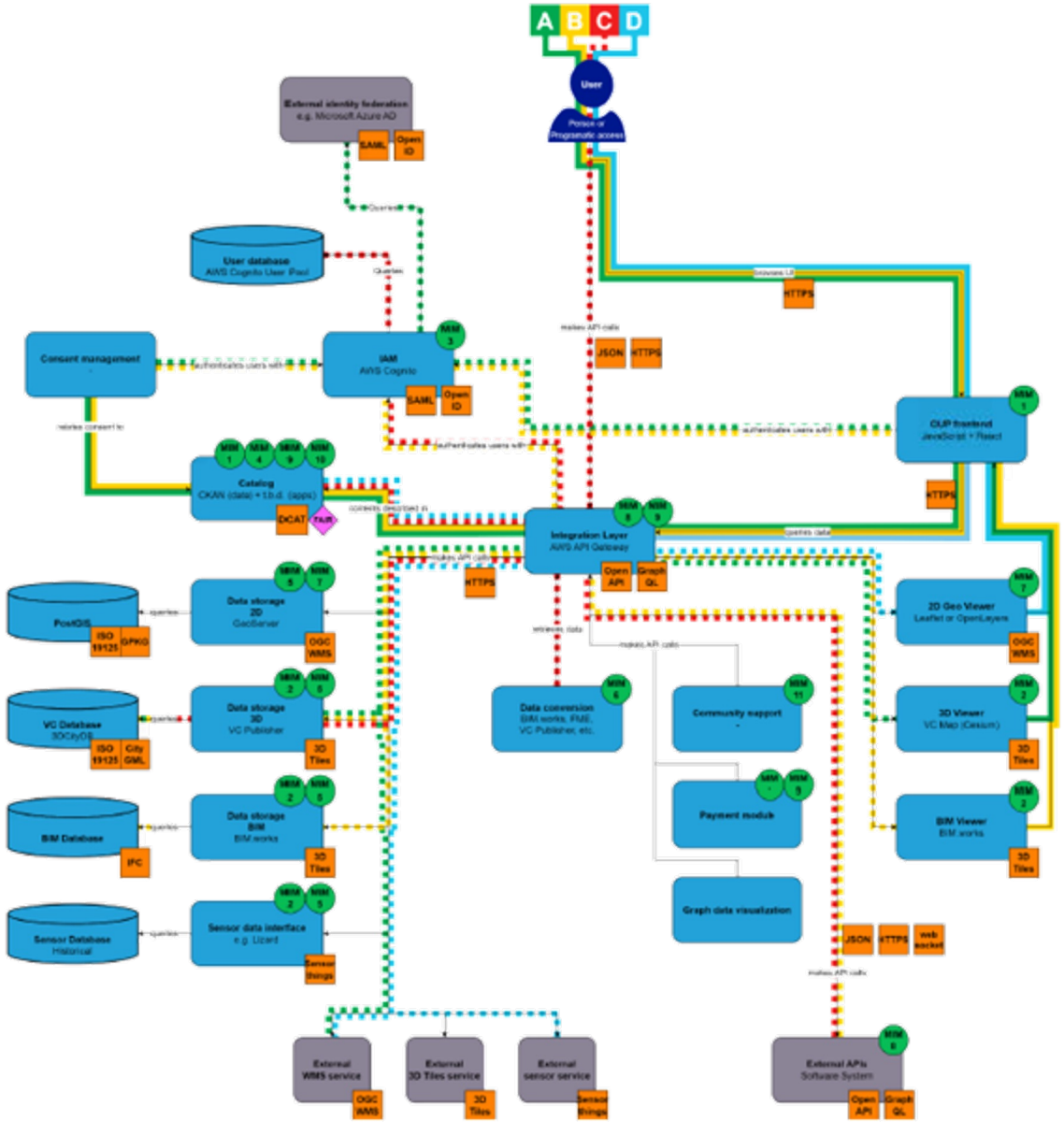


Lego API:



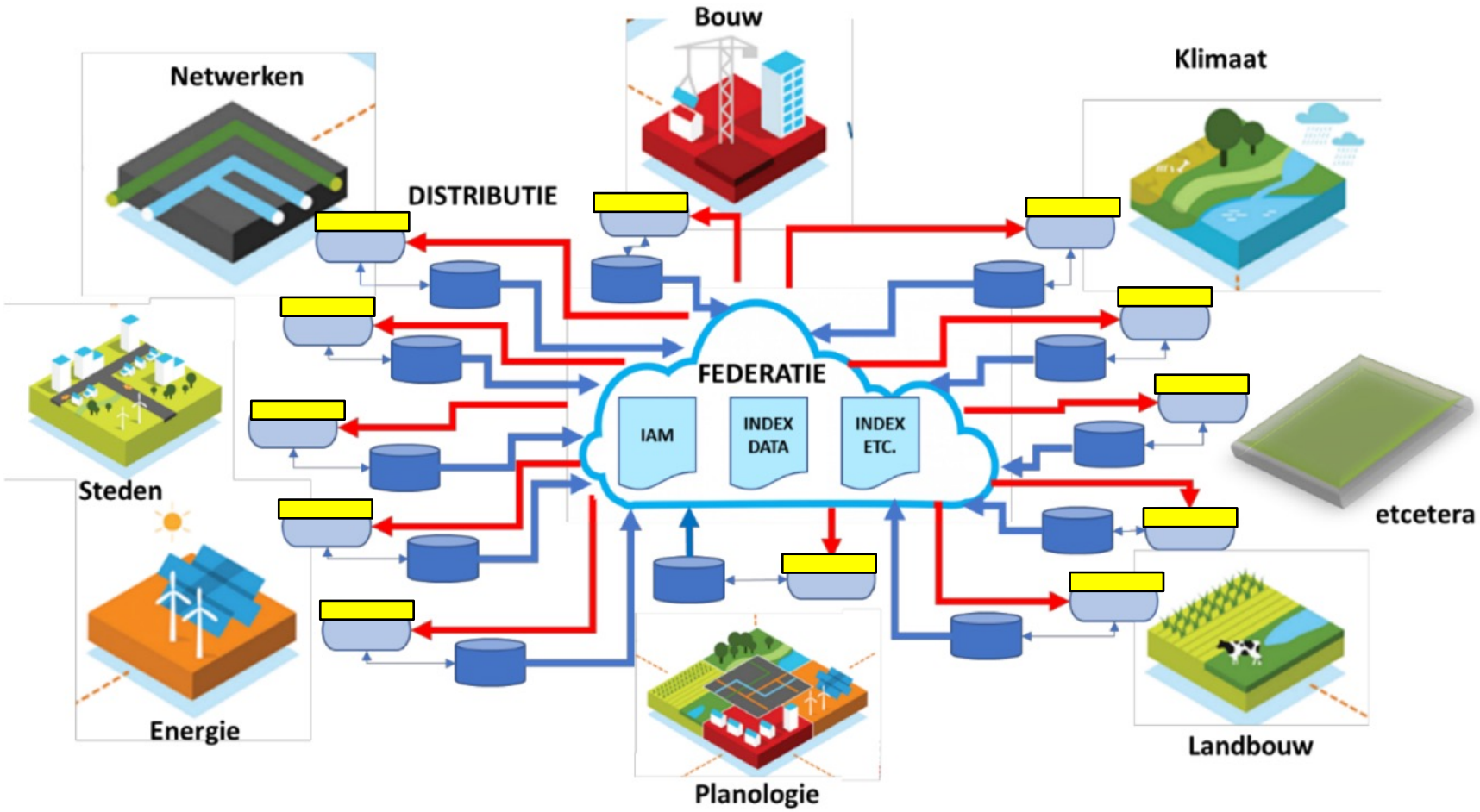
Bron: wiki

Architectuur middels Metrobanen (simplified)



Bron: FutureInsight

national Digital Twin for the fysical environment (nDTFL)



Figuur 1 stelselarchitectuur voor Digital Twinning

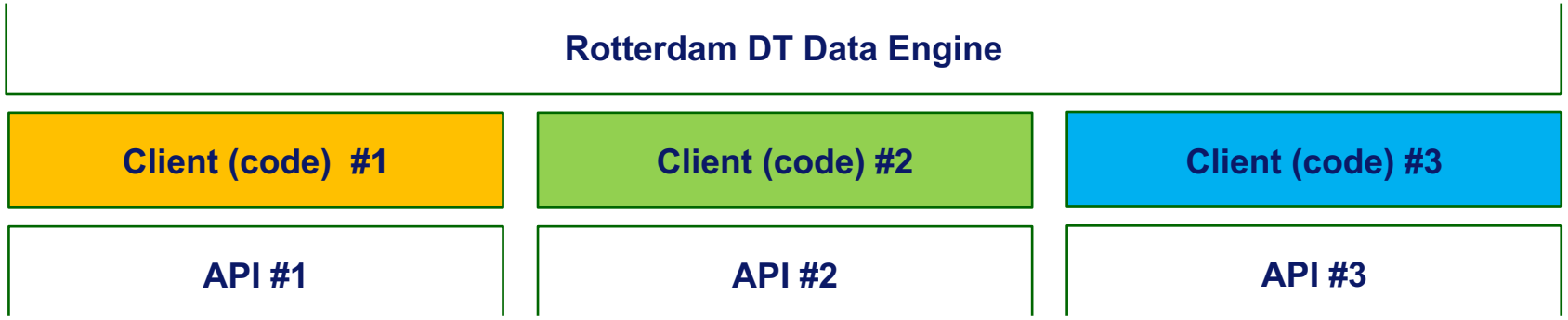
https://www.geonovum.nl/uploads/documents/20220211%20Referentiearchitectuur%20Stelsel%20DTFL%20versie%200.9.pdf

API patronen

- API's kunnen op verschillende manieren worden gemaakt, waarbij elke manier perfect scoort voor tegen de ADR's (maar ook hoe queries worden doorgegeven).

```
GET https://example.org/v1/oai?verb=ListRecords
GET https://example.org/v1/Records
GET https://example.org/v1/GetRecords
```

Aanroepende software heeft dan steeds "client" code nodig – voor elk van de API die toegang geven tot data.

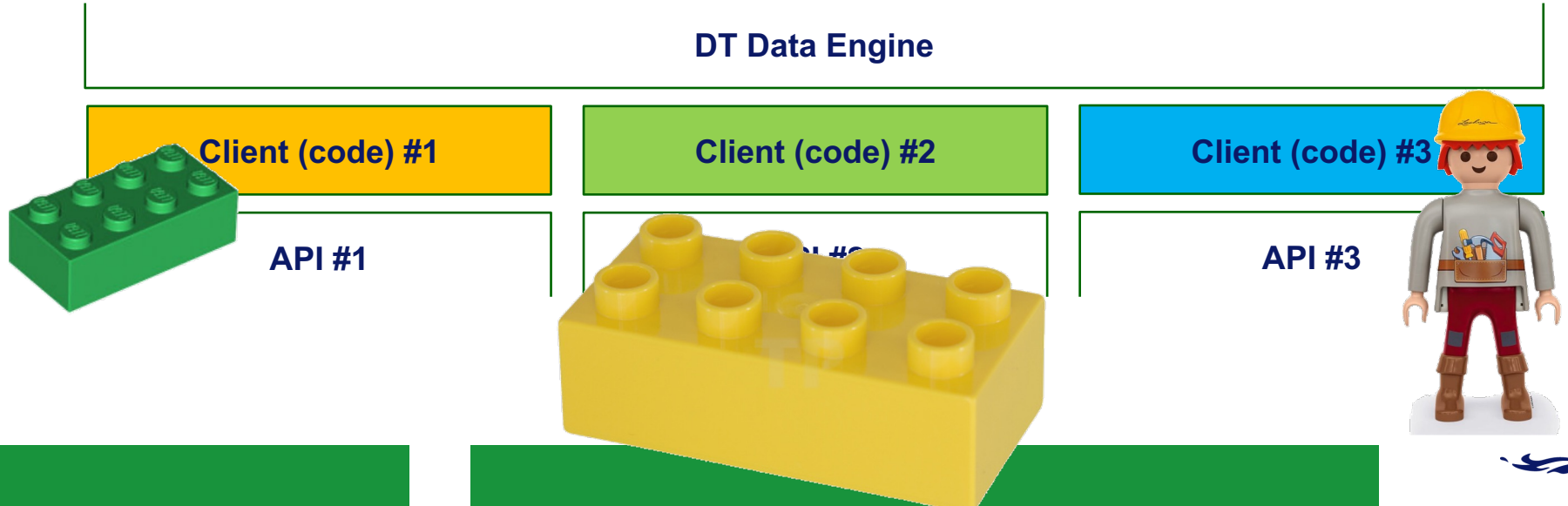


API patronen

- API's kunnen op verschillende manieren worden gemaakt, waarbij elke manier perfect scoort voor tegen de ADR's (maar ook hoe queries worden doorgegeven).

```
GET https://example.org/v1/oai?verb=ListRecords
GET https://example.org/v1/Records
GET https://example.org/v1/GetRecords
```

Aanroepende software heeft dan steeds "glue" code nodig – voor elk van de API die toegang geven tot data.



Bron: wiki

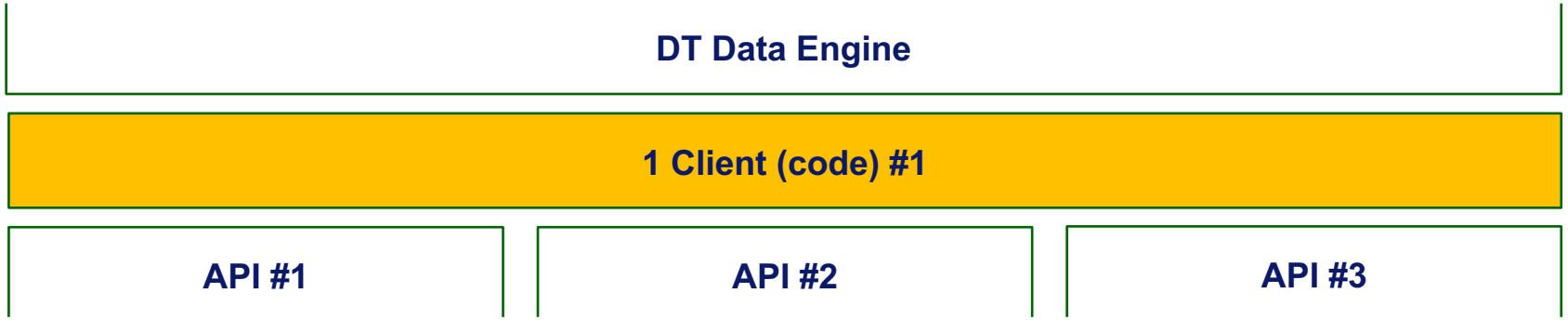
API patronen

- OGC API patronen

```
GET https://example.org/v1/collections/{collection}/items/{item}
```

(Zie ook VNG zaakgericht werken, pagination, filters, …)

Slecht 1x keer (of alvast veel minder) ‘client’ code nodig



“Full use” van HTTP (verbs, content negociation, range, …)

Conclusie

DigitaleStad

- Digitale Tweelingen zijn een 3D data integratie oefening, gebaseerd op welgekende Open Standaarden (ForumStd)
- API's spelen een belangrijke rol, voor zowel mens als machine interactie
  - ADR 100% score
- Gebruik welgekende *patronen* om "client" code te verminderen
  - Snellere en beter integratie