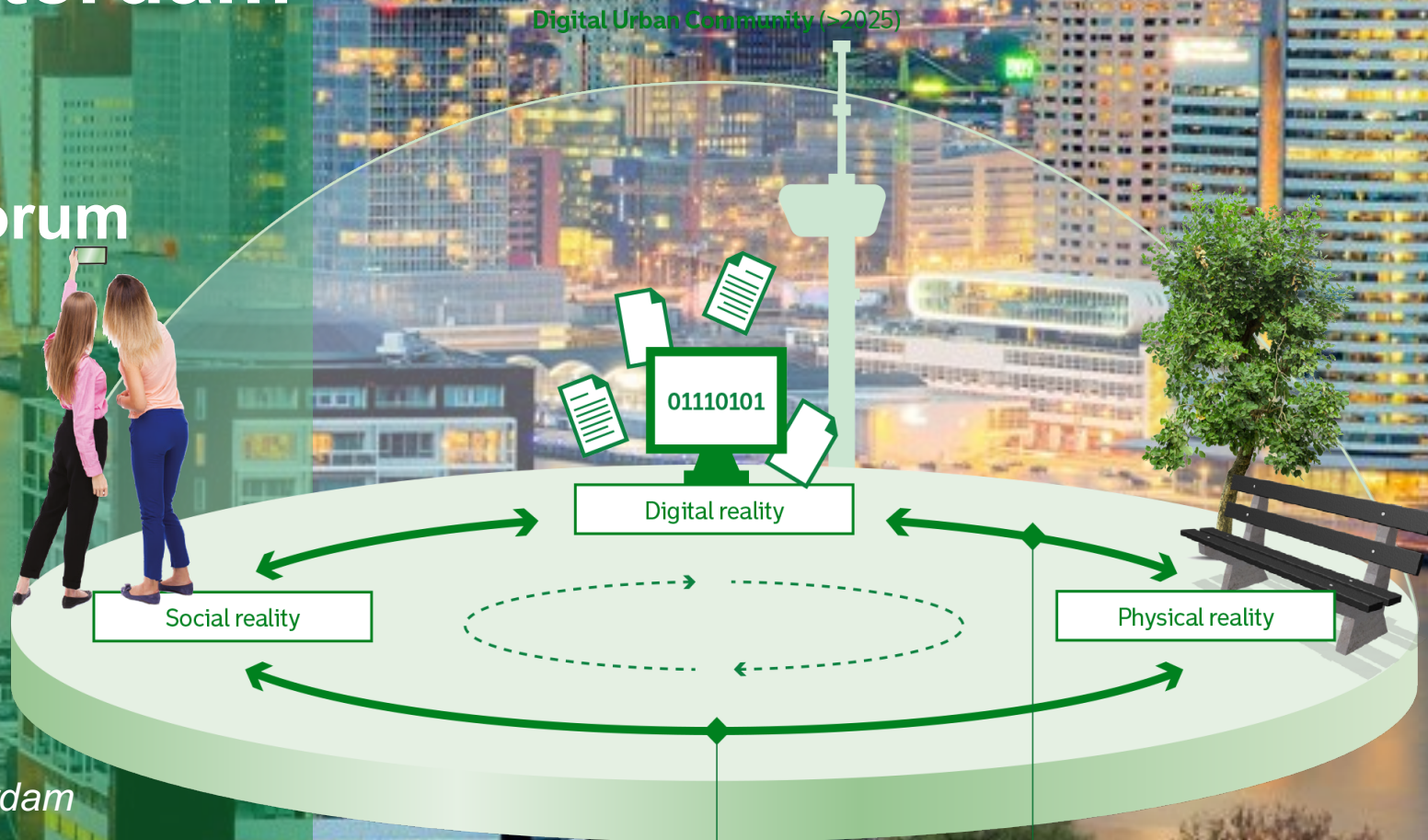


# Digital City Rotterdam

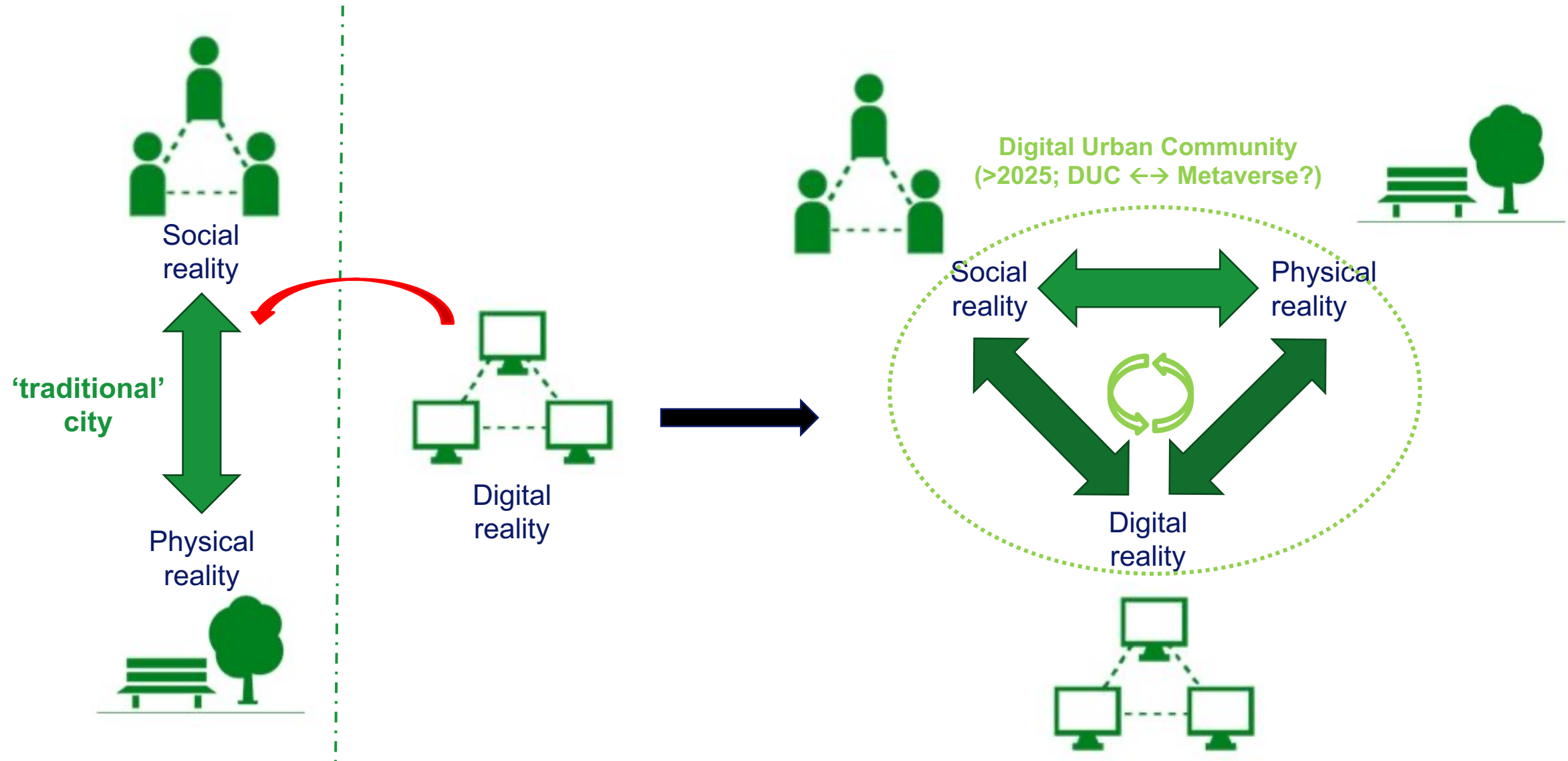
GeoBIM  
Geo Spatial World Forum

May 4<sup>th</sup>, 2023

Roland van der Heijden  
Program manager Digital City Rotterdam

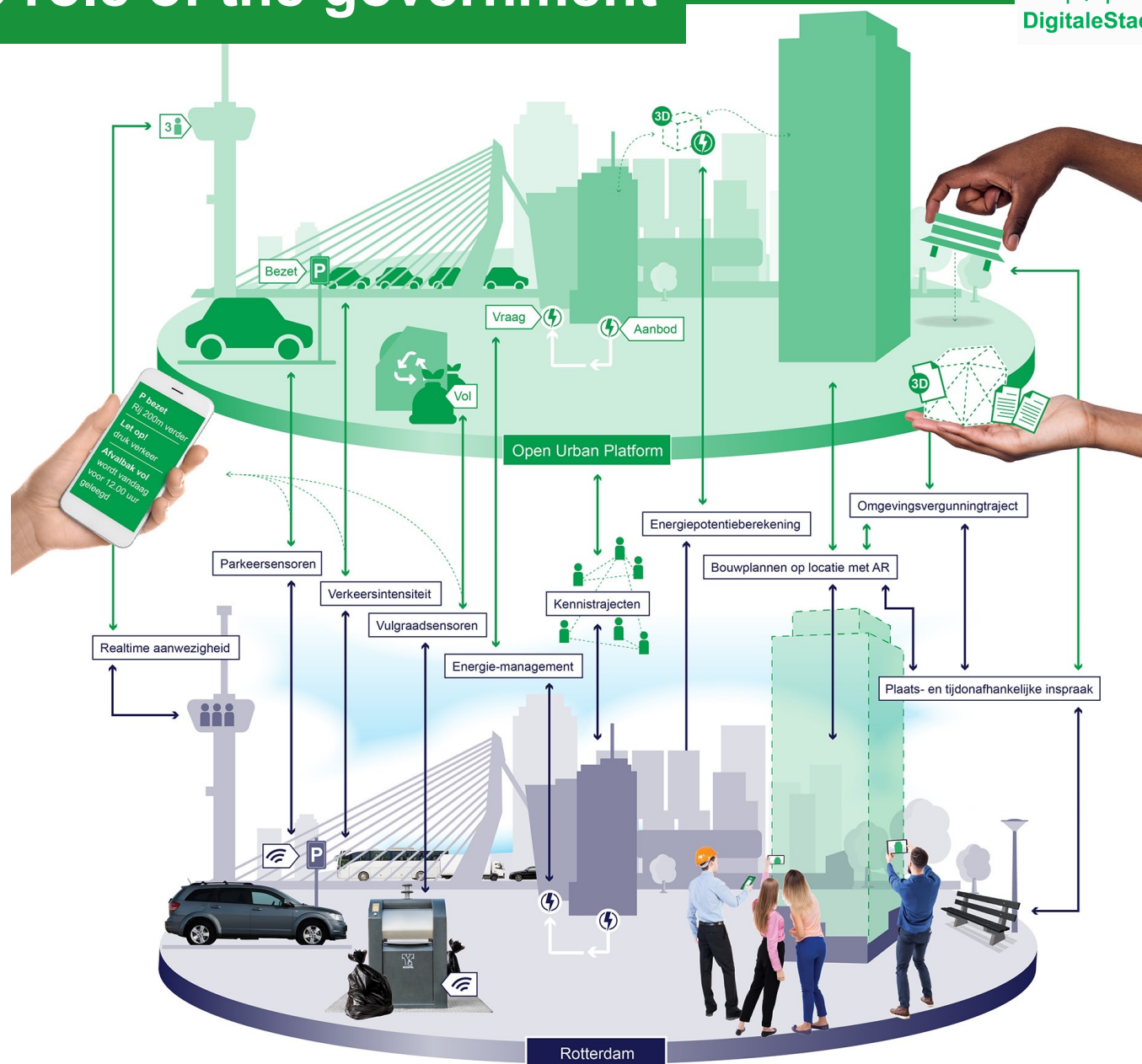
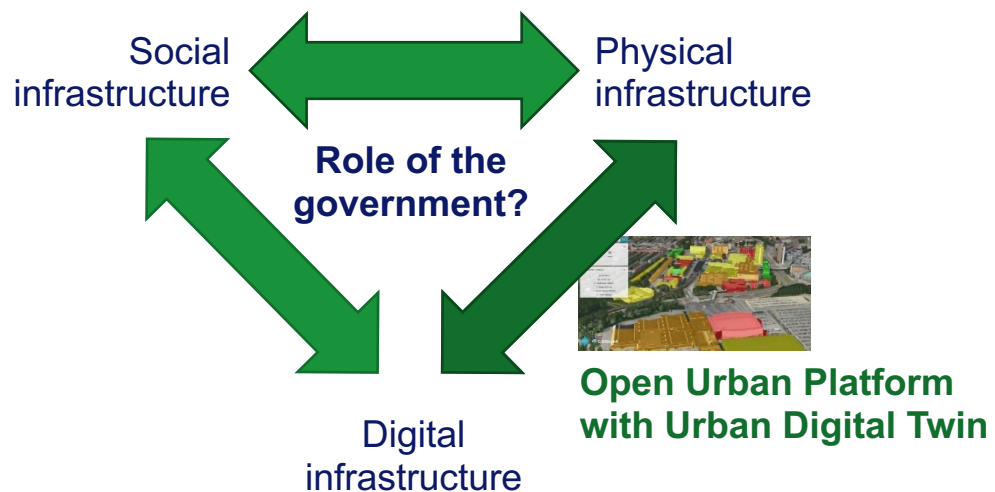


# City in transition – a new reality





# Open Urban Platform and the role of the government



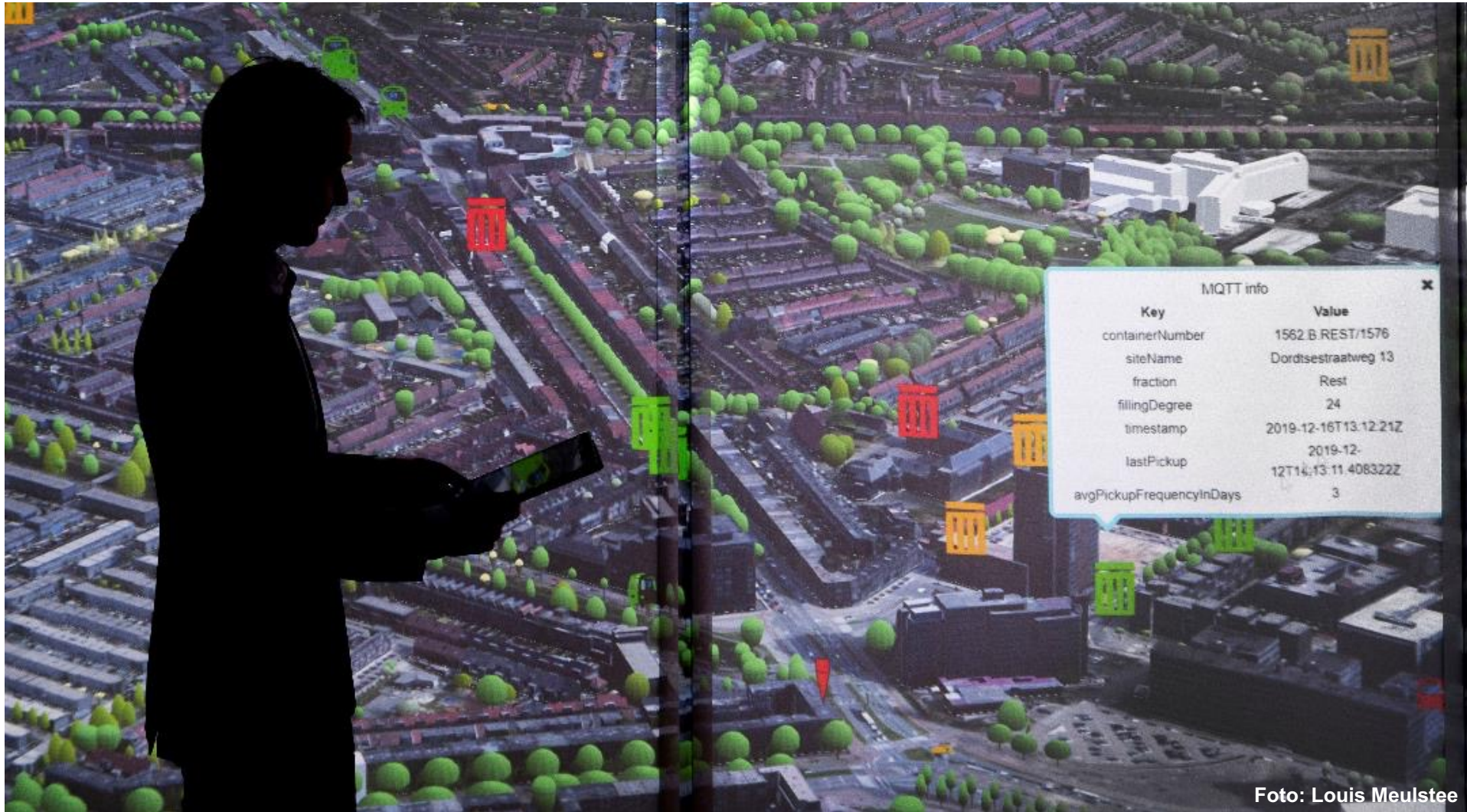


# The Digital Twin: a 'smart' 3D model of the city ...





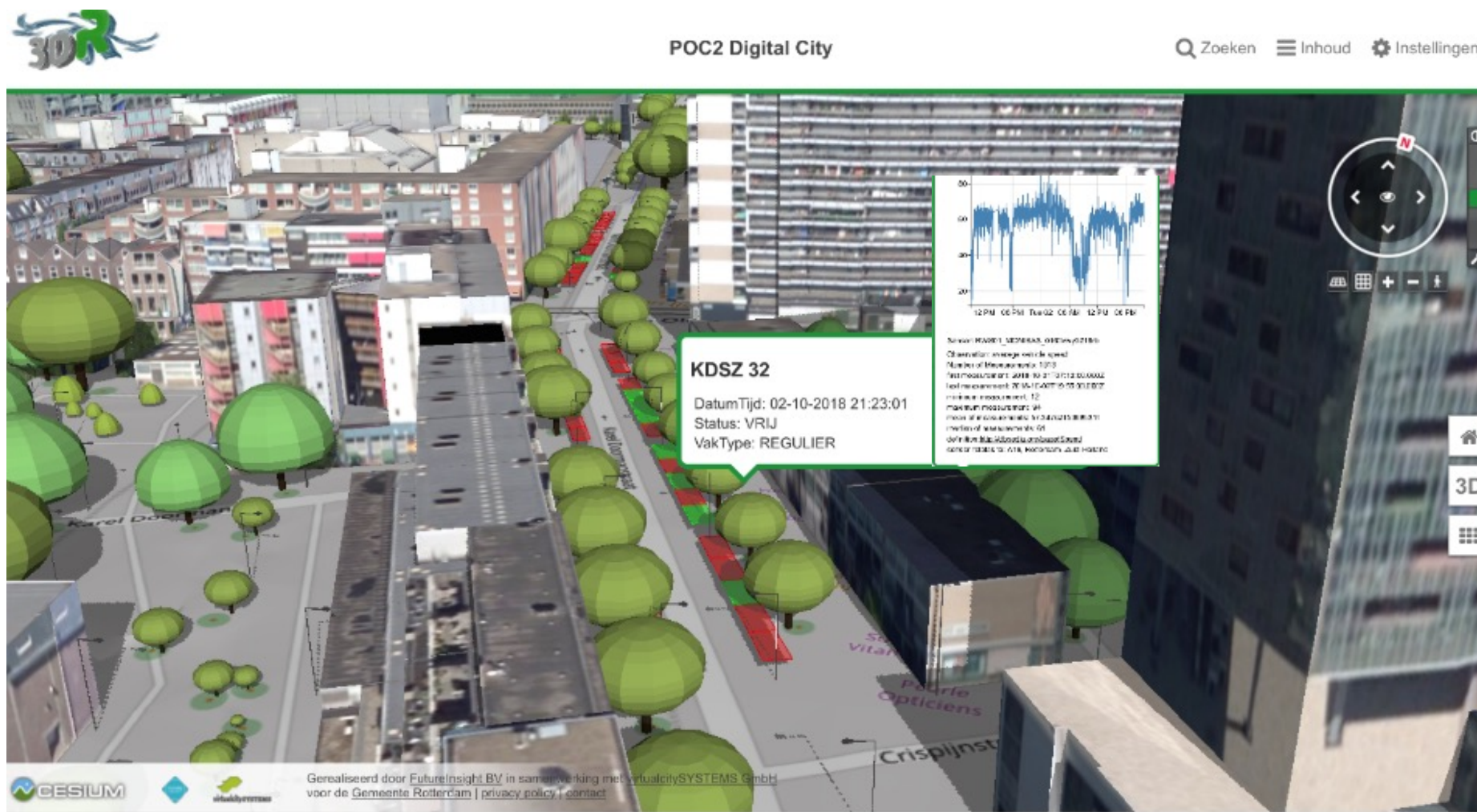
... combined with realtime data ...





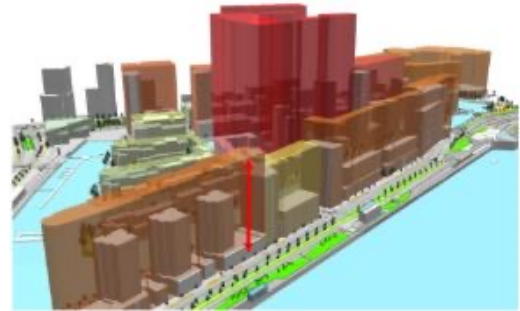
# ... forms an Urban Digital Twin of the city...

Urban (Local) Digital Twin = a common and shareable view on the current physical reality of a city, described by actual (realtime) data



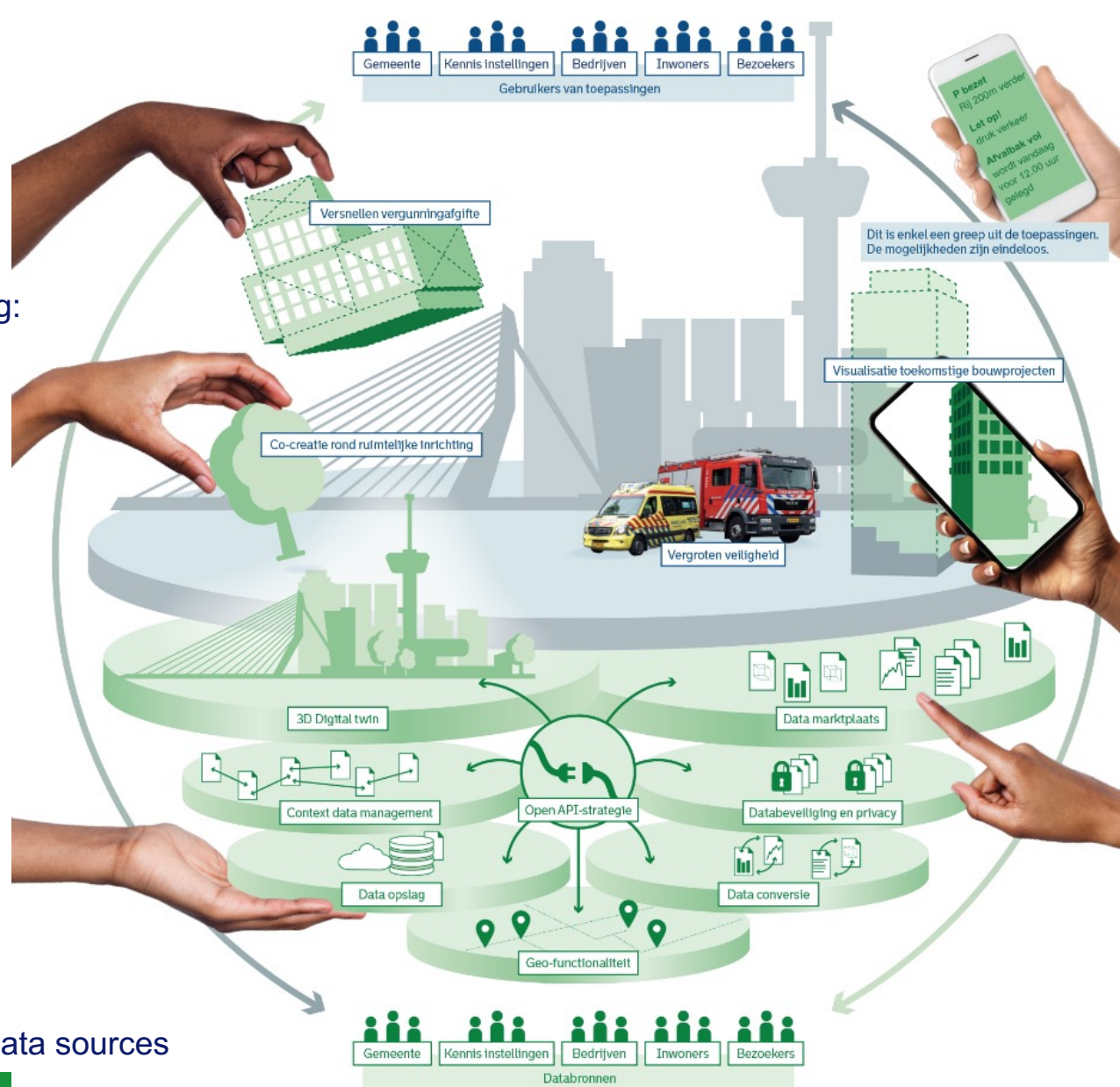


# ...and is therefore a basis for new smart applications & services



## Smart spatial planning:

- Building permit check service
- Co-creation in the digital city



SAFE Rotterdam 3D



Noise reduction harbour area



Regional cooperation 'Borderless data landscape'

Digital Twin Sustainability & Generic, scalable and maintainable data sources



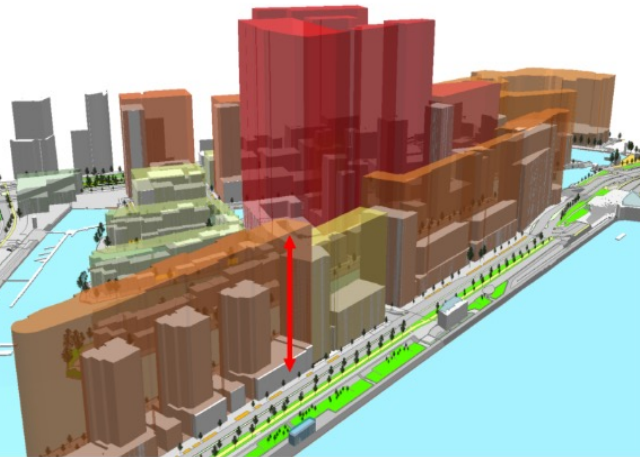


Thank you for your attention!

**Digital  
City  
Rotterdam**







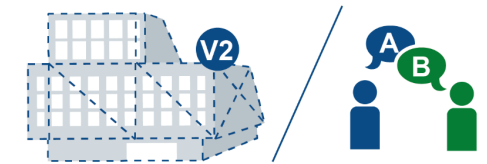
## Meerwaarde 3D in het vergunningentraject



**1.** Projectontwikkelaar plaatst 3D BIM in de door de gemeente digitaal beschikbaar gestelde 3D omgeving



**2.** Detectie van conflicten tussen BIM, ondergrond en regelgeving



**3.** Aanpassingen en/of overleg

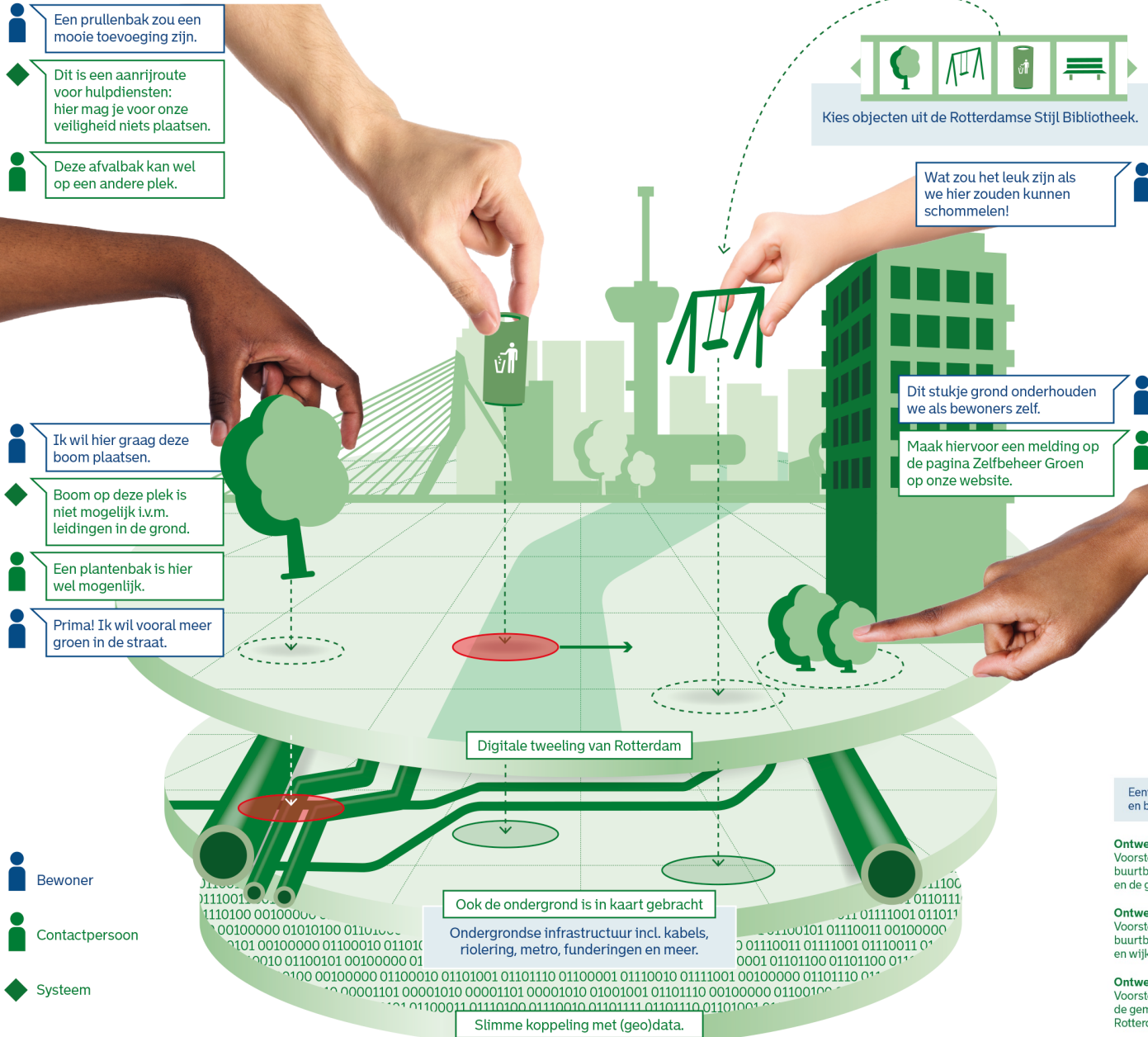


**4.** Passend ontwerp





# Time and place independent participation: Co creation in the digital city



**AR Geomagine**

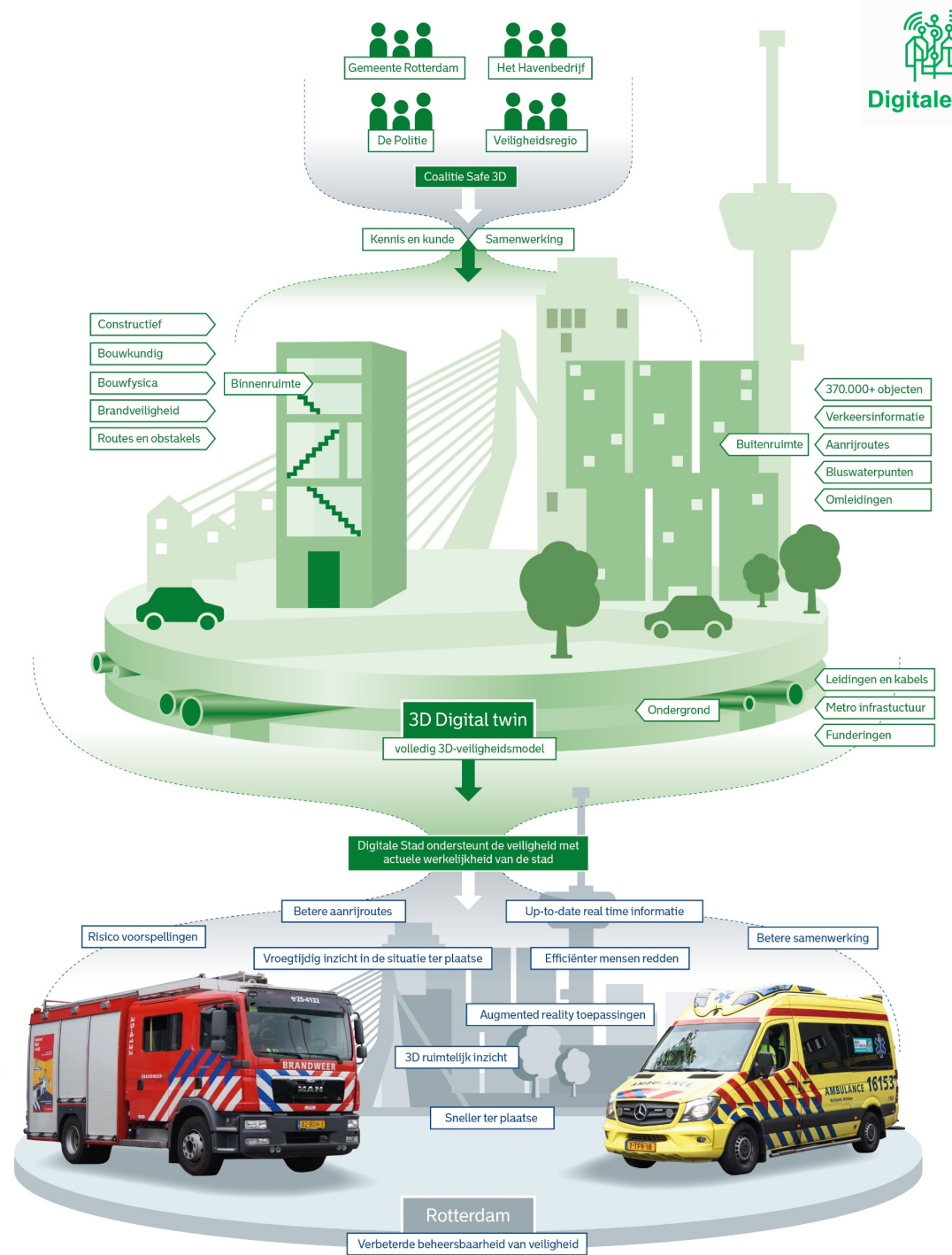
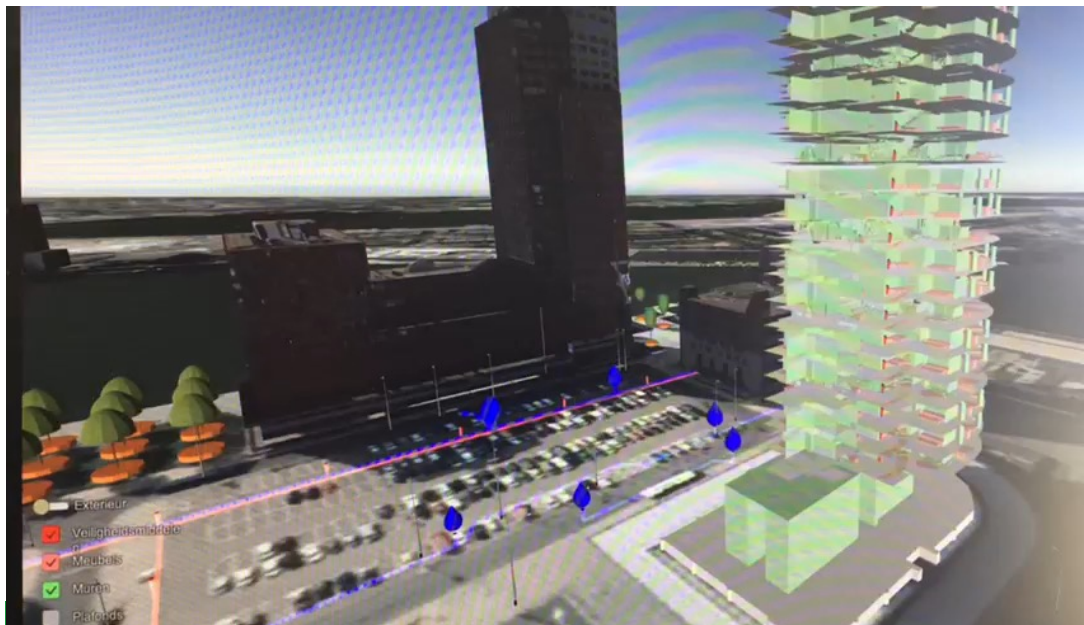
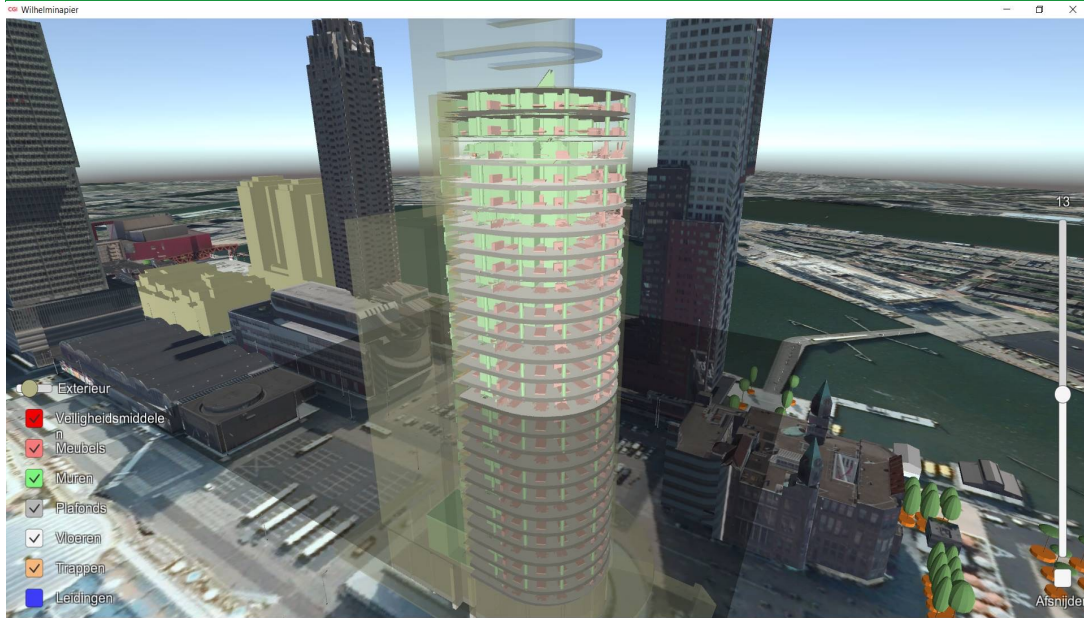
**Explore →**



Eenvoudig verschillende ontwerpen delen en beoordelen	Direct inzicht in kosten en budget	Voordelen van co-creatie en participatie in een digitale werkelijkheid	In een minimaal aantal stappen snel van idee naar uitvoering	
<b>Ontwerp 1</b> Voorstel van buurtbewoners en de gemeente.	1640 12	Meerdere deel en preview mogelijkheden. QR VR AR Bewoners kunnen online brainstormen over de inrichting van hun omgeving. Gemeente en bewoners kunnen makkelijk ruimtelijke ideeën uitwisselen en kennis delen.	<b>1. Digitaal concept plan</b> Plannen zijn sneller te beoordelen door zowel de bewoners als de gemeente. <b>2. Toetsing en accordering</b> Snel duidelijkheid over subsidievoorwaarden en benodigde vergunningen. <b>3. Uitvoering</b> Sneller bij uitvoering door gebruik van één systeem door alle betrokkenen.	
<b>Ontwerp 2</b> Voorstel van buurtbewoners en wijkteam.	1360 3			<b>€ 15k</b>
<b>Ontwerp 3</b> Voorstel van de gemeente Rotterdam.	140 79			<b>€ 20k</b>
			<b>€ 10k</b>	



# SAFE Rotterdam 3D





# Visualisation new buildingplans with augmented reality



Bekijk de nieuwbouw op de bouwlocatie alsof het er al staat



1. Scan de QR-code en download de app.

2. Bekijk de nieuwbouw alsof het er al staat.

Bekijk de nieuwbouw in miniatuur op elke andere locatie.



Thuis op de koffietafel

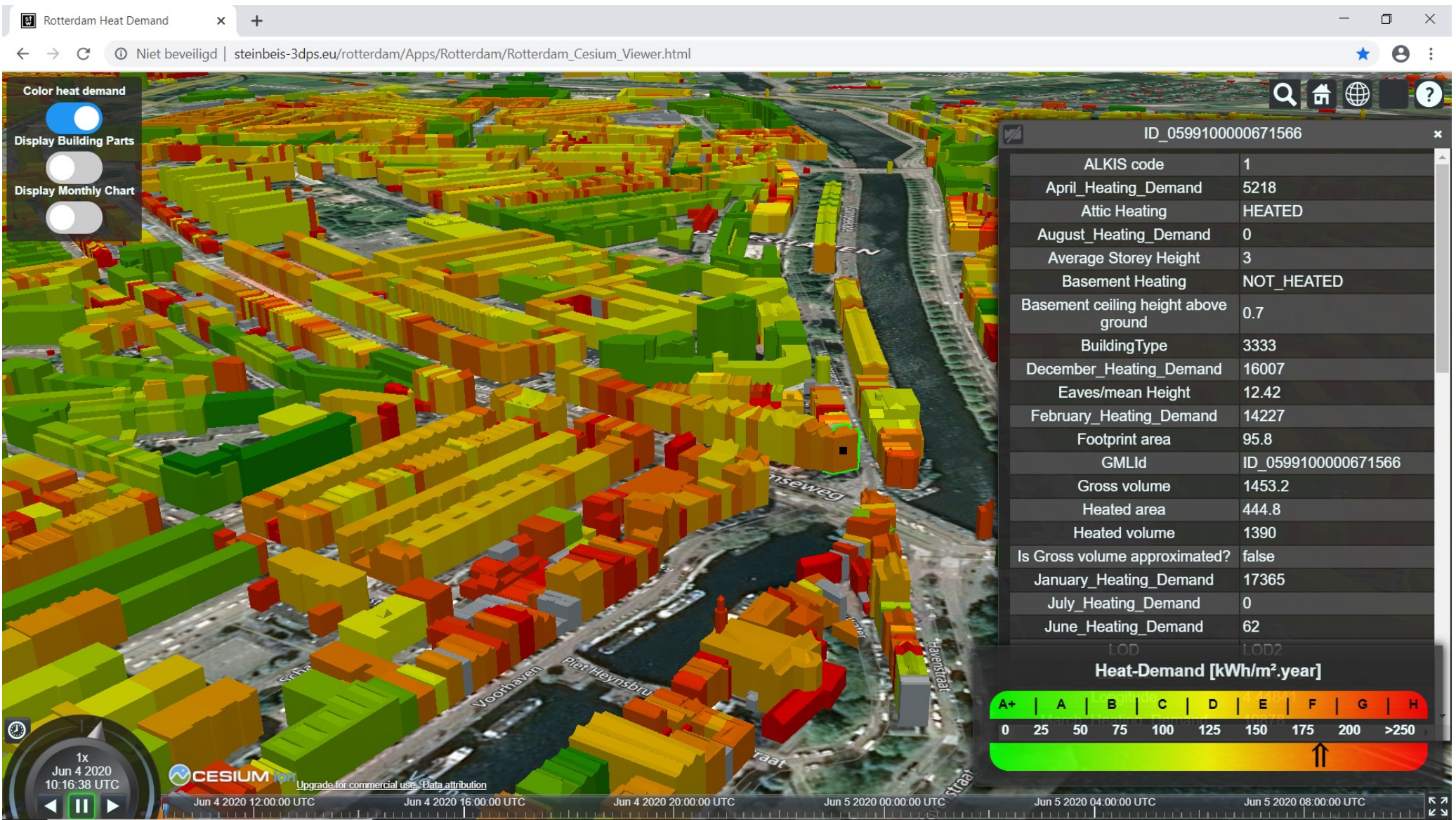


Maar wij kunnen het ook gebruiken voor realistische weergave van wat er gebouwd gaat





# Generic, scalable and maintainable datasources



Rotterdam Heat Demand

Niet beveiligd | steinbeis-3dps.eu/rotterdam/Apps/Rotterdam/Rotterdam\_Cesium\_Viewer.html

Color heat demand

Display Building Parts

Display Monthly Chart

ID_0599100000671566	
ALKIS code	1
April_Heating_Demand	5218
Attic Heating	HEATED
August_Heating_Demand	0
Average Storey Height	3
Basement Heating	NOT_HEATED
Basement ceiling height above ground	0.7
BuildingType	3333
December_Heating_Demand	16007
Eaves/mean Height	12.42
February_Heating_Demand	14227
Footprint area	95.8
GMLid	ID_0599100000671566
Gross volume	1453.2
Heated area	444.8
Heated volume	1390
Is Gross volume approximated?	false
January_Heating_Demand	17365
July_Heating_Demand	0
June_Heating_Demand	62

Heat-Demand [kWh/m<sup>2</sup>.year]

A+ | A | B | C | D | E | F | G | H

0 | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | >250

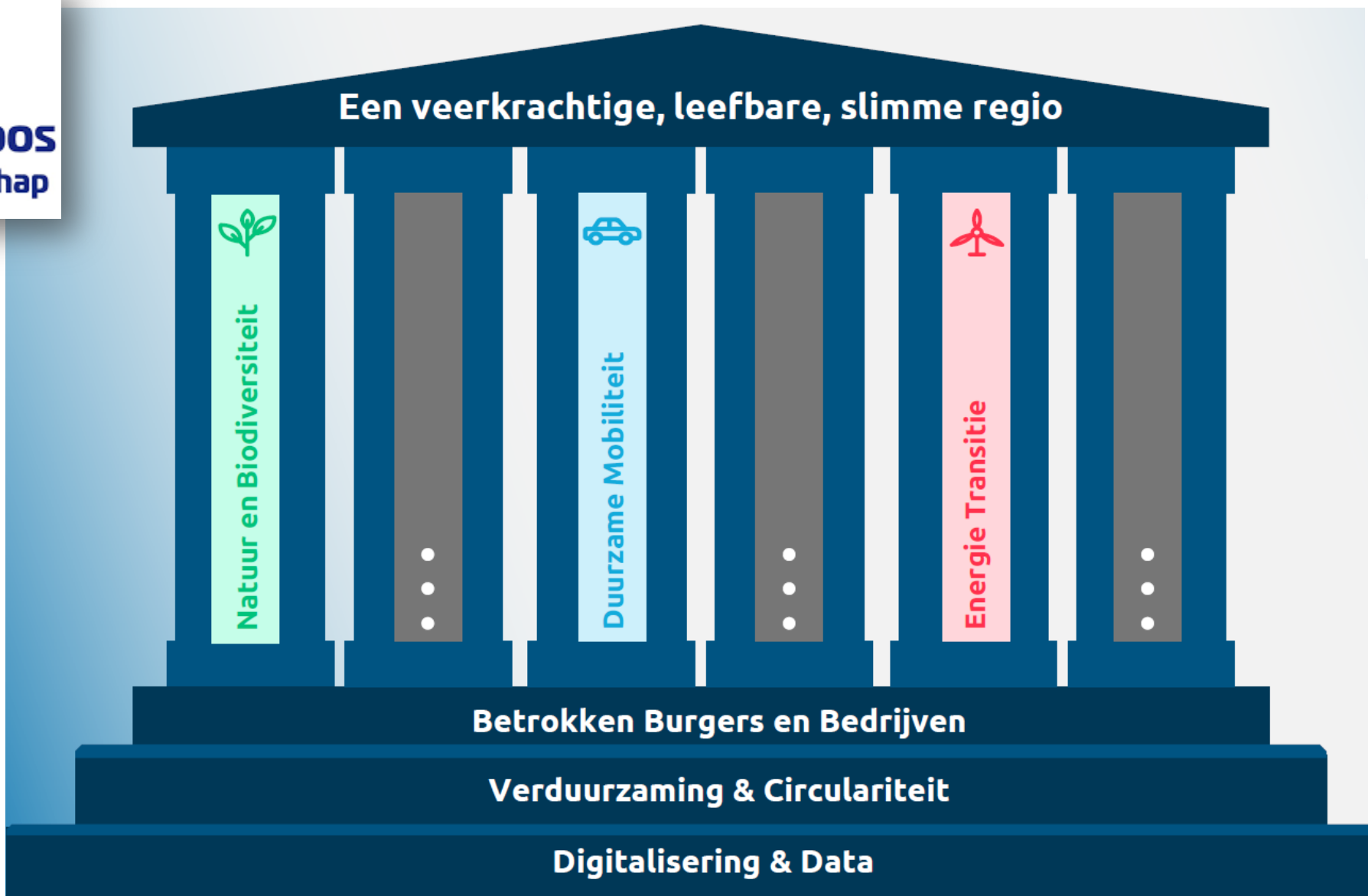
1x Jun 4 2020 10:16:38 UTC

CESIUM Upgrade for commercial use | Data attribution

Jun 4 2020 12:00:00 UTC Jun 4 2020 16:00:00 UTC Jun 4 2020 20:00:00 UTC Jun 5 2020 00:00:00 UTC Jun 5 2020 04:00:00 UTC Jun 5 2020 08:00:00 UTC



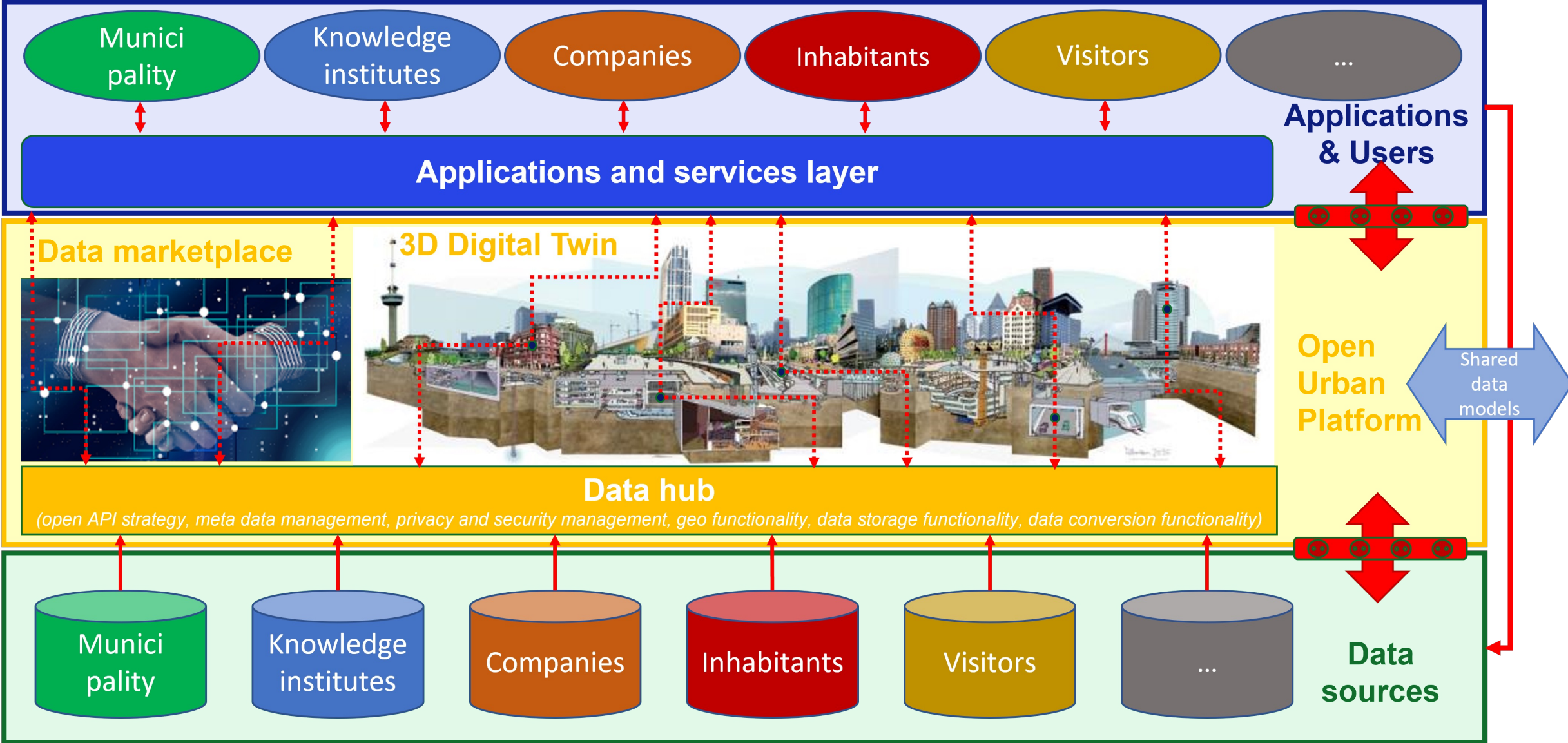
# Regional cooperation 'Borderless data landscape'





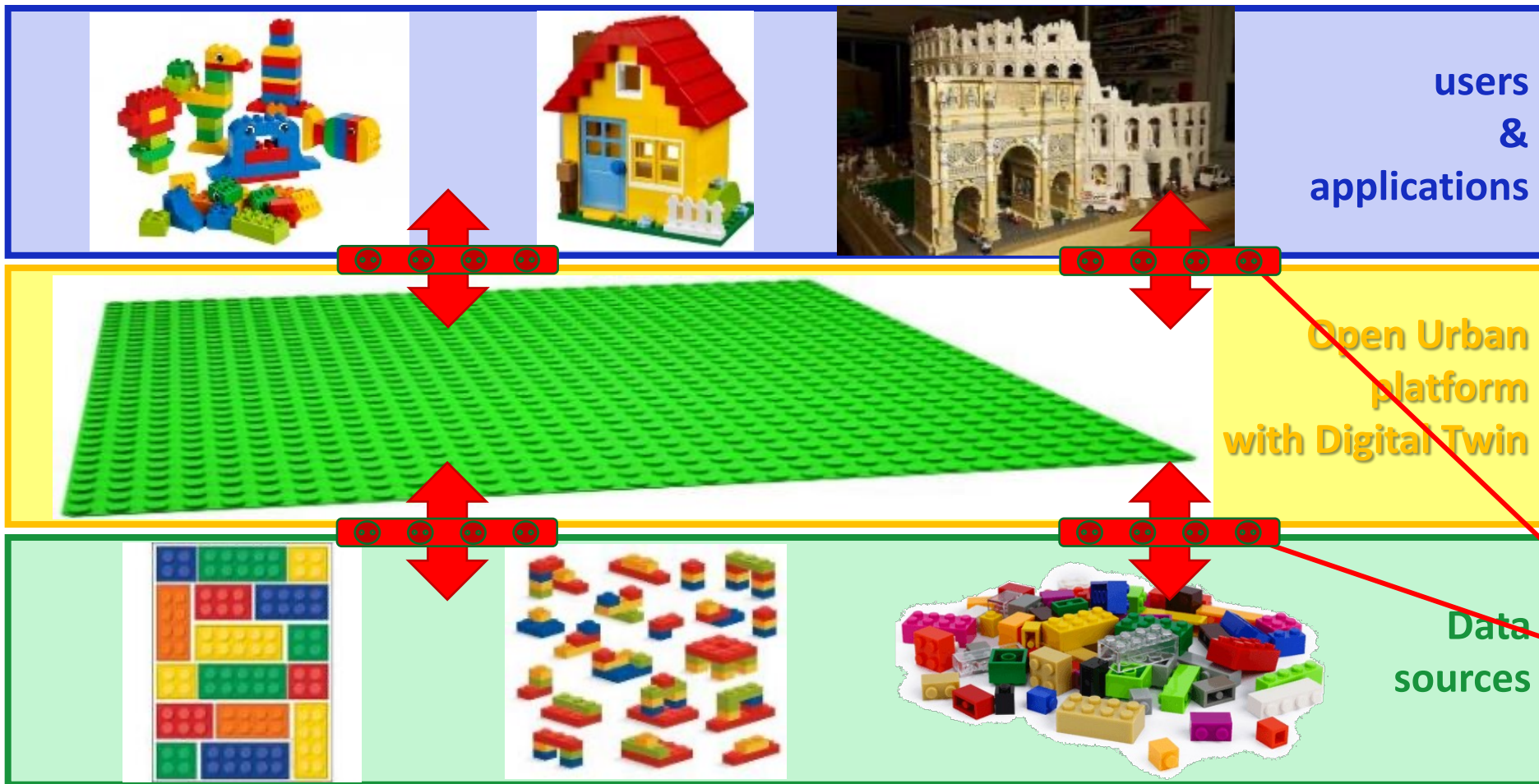
# Digital infrastructure: Open Urban Platform with Digital Twin

Urban digital ecosystem Rotterdam

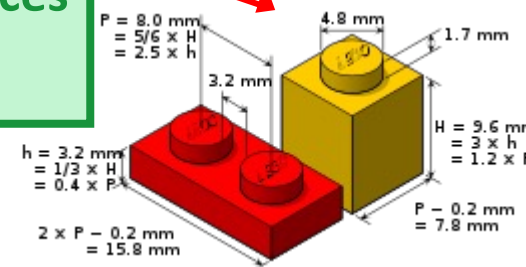




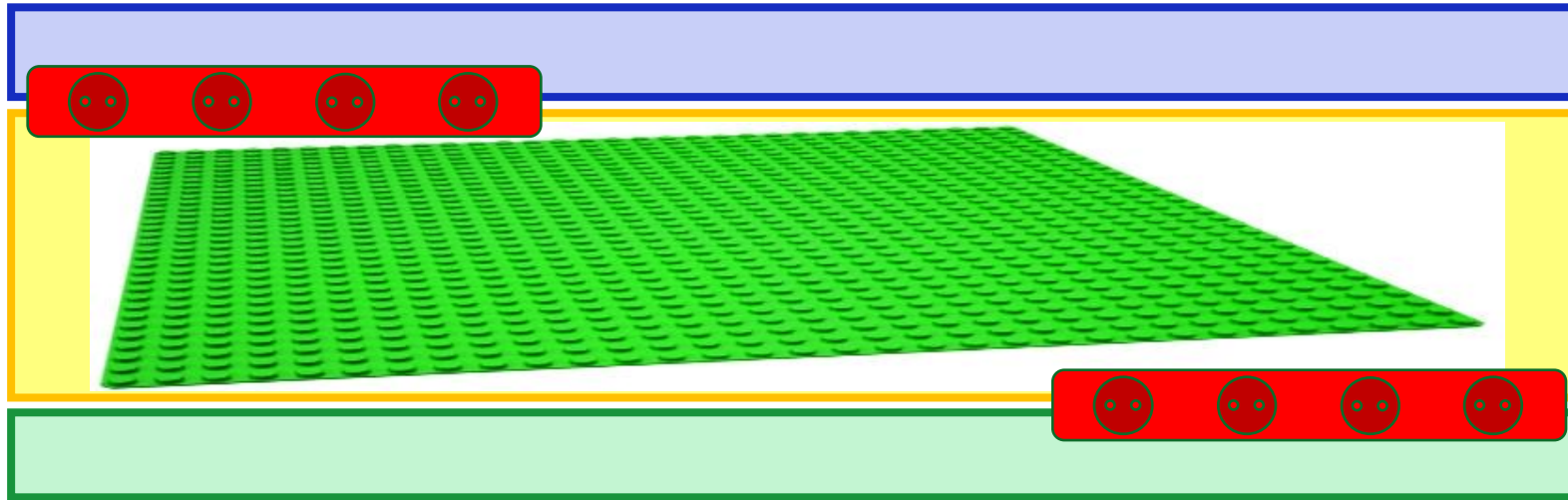
# Open Urban Platform – design principles



**Pivotal Points of Interoperability (PPI's)**







## Minimal Interoperability Mechanisms (MIM's):

1. PPI's/open data standards/shared data models
2. Context information management
3. Privacy and security (IAM)
4. (Access to) Data storage
5. Geo functionality
6. Data conversion
7. Open API strategy (& API management)
8. Data market place
9. 3D Digital Twin
10. (Governance structure & model)



More information:

[www.espresso-project.eu](http://www.espresso-project.eu)

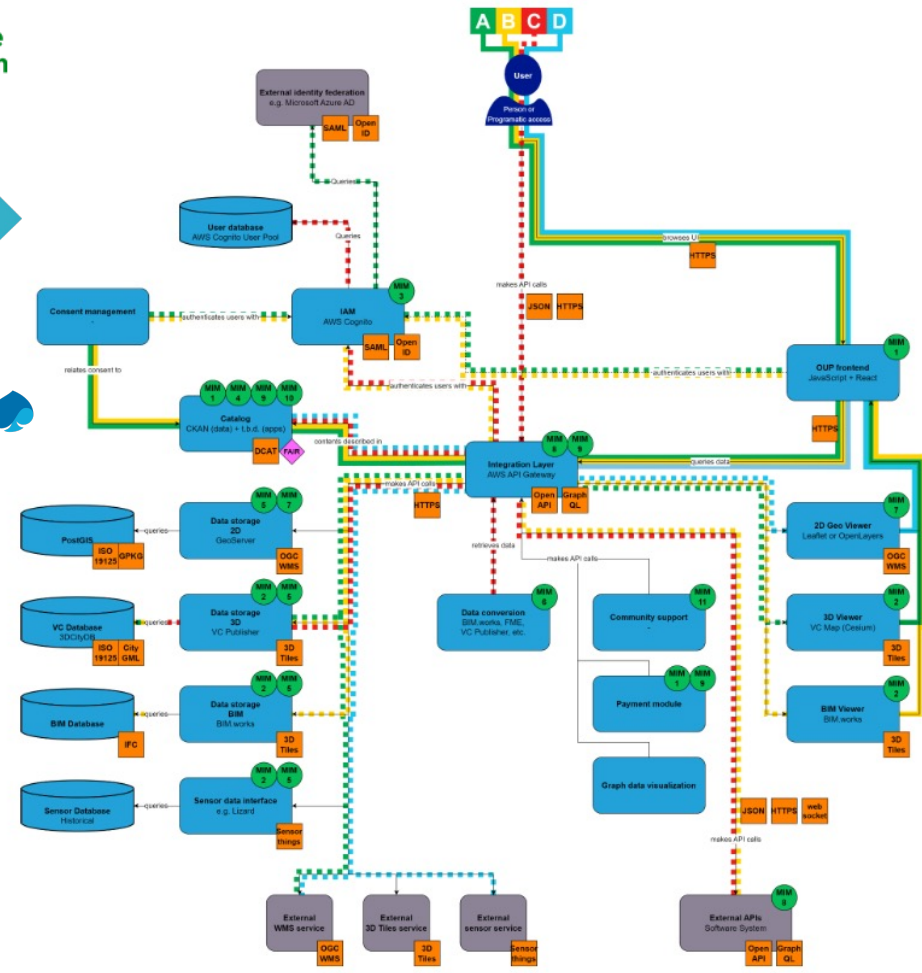
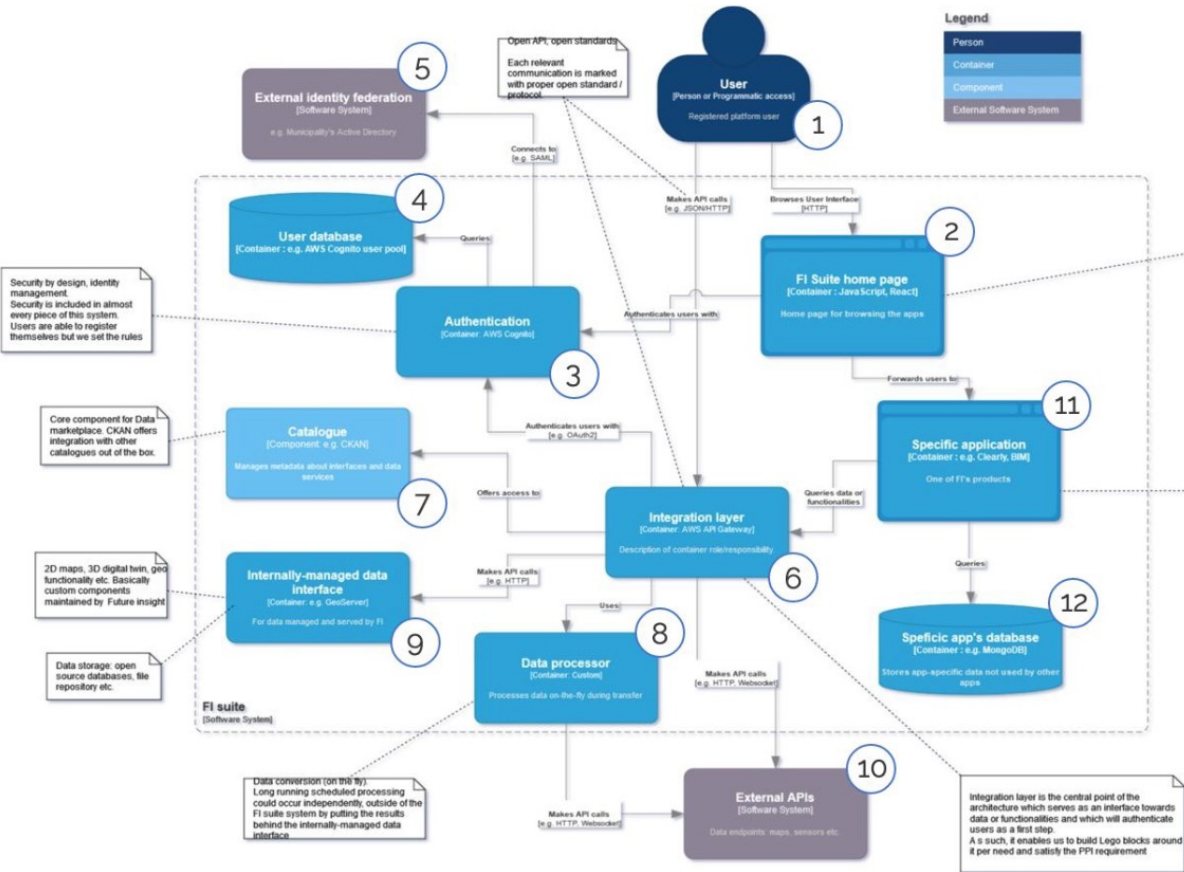
[www.oascities.org](http://www.oascities.org)

[www.ruggedised.eu](http://www.ruggedised.eu)





# OUP: architectural design & 'metro lanes' of user profiles



## Development OUP with DT:

- PoC & prototype developed
- Procurement MVP finished; development started
- Soft launch: may 2023
- End 2023: realisation concept-version MVP
- End 2024: MVP fully operational

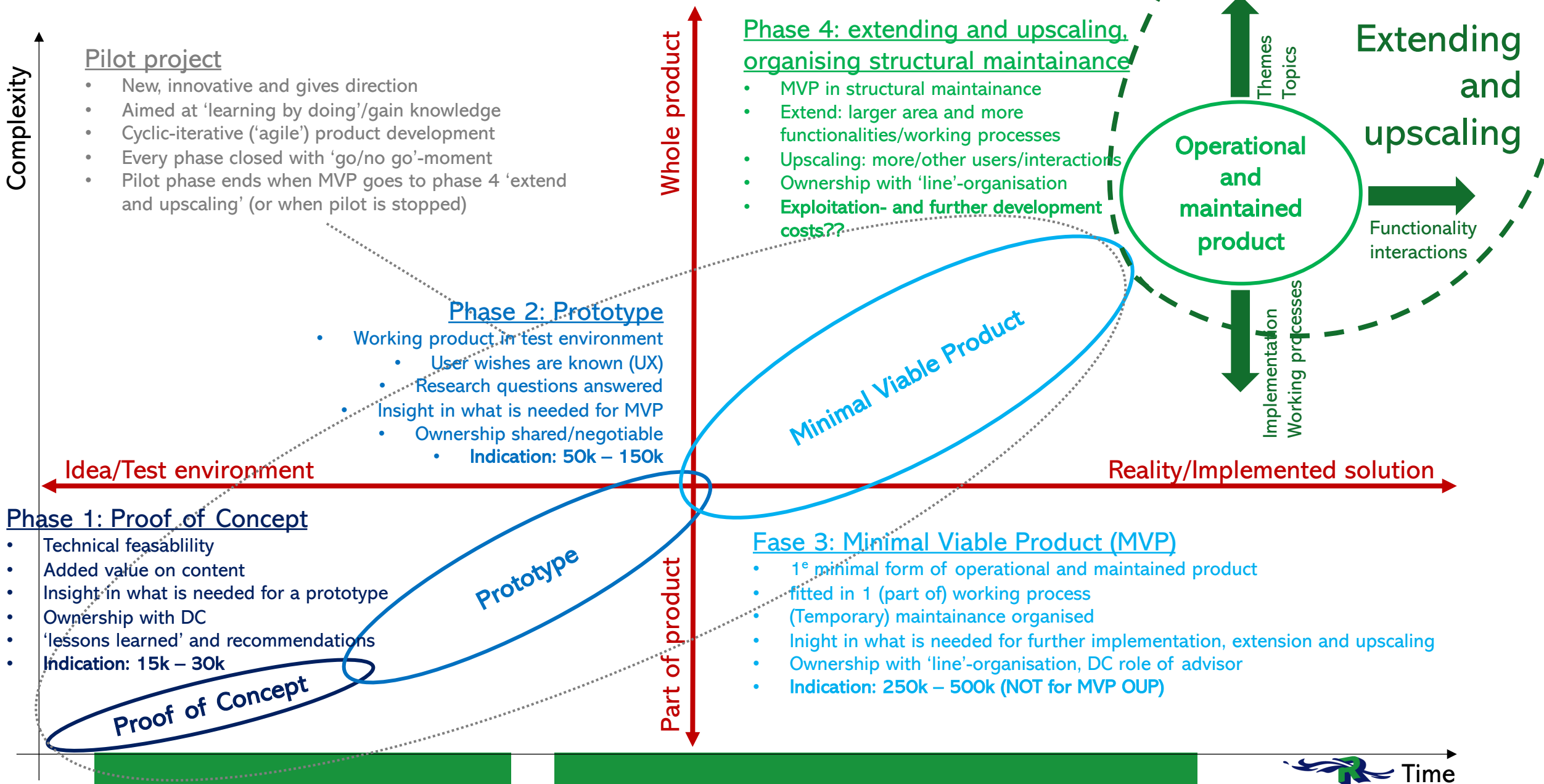
## Innovative:

- Architectural principles (open –data- standards key, software follows → PPI's & MIM's)
- Governance Board / Market Master (guarding **responsible** commercial exploitation)





# Innovative product development within Digital City program



# Advantages using the Urban Digital Twin concept

1. Gives 'meaning' to the OUP
2. Gives visualisation of current and historic state
3. Offers common and shareble image as startingpoint for cooperation
4. Basis for numerous applications and services (i.e. scenario planning, AI)
5. Enhances the ecosystem way of thinking
6. Stimulates the use of generic, scalable and maintainable datasources
7. Consistent user experience
8. Offers new possibilities for citizens participation and empowerment
9. Stimulates economic innovation





# Important lessons learned

1. Development digital infrastructure (with DT) is a long term and iterative process
2. Think outside-in as well as inside-out
3. Think top-down as well as bottom-up
4. Demand-driven as well as supply-driven
5. Seek for 'the energy', organize 'coalition of the willing' over silos and sectors
6. Importance of generic, scalable and maintainable data sources (FAIR-principles)
7. Data-driven means data must be able to flow: data interoperability is key, software follows data
8. Create images/pictures/video's/infographics etc.
9. Innovation is 25% technique/content and 75% organisational and cultural change
10. Embrace uncertainty!





# City of Rotterdam – some facts & figures

- Inhabitants: 656,000 (2022)
- Percentage youth (0-22 years): 26% (2020)
- Labourforce: 392,000 (2020)
- 2<sup>nd</sup> city of the Netherlands
- Largest port in Europe (10<sup>th</sup> worldwide)
- Main economic sectors:
  - Distribution & storage
  - Healthcare & wellbeing
  - Chemicals & refining
  - Retail
  - Business services
- 56% of citizens feel connected to own neighbourhood (2020)
- 51,500 reported crimes a year (2021)
- Feijenoord largest football club of Rotterdam





## Videos and demos

- [Digital City Rotterdam website](#)
- [Interview ENG](#)
- [Demofilm prototype OUP met DT \(Ruggedised\)](#)
- [PoC Co creation in the digital city – tijd- en plaatsonafhankelijke participatie \(demo\)](#)
- [PoC SAFE 3D Rotterdam \(vergroten veiligheid in de stad door betere info voor hulpdiensten - demo van proof of concept\)](#)
- [Rotterdam 3D city model \(basis for Digital Twin\)](#)
- [Energy potential data \(example generic, scalable and maintainable datasources\)](#)

## Background information

- [Erasmus Universiteit – Rotterdam School of Management – Urban Data Platforms](#)
- [NEN – Praktijkrichtlijnen Open Urban Platforms](#)
- [EU-project ESPRESSO](#)
- [EU-project RUGGEDISED](#)
- [Open & Agile Smart Cities \(OASC\)](#)