

Rotterdam & Meta Citi | VERSE



How do we explore and shape the new future together?



DigitaleStad

Webinar UN ITU – Roadmap on development Civerse – october 30th 2023

Roland van der Heijden – program manager Digital City of Rotterdam (Netherlands)

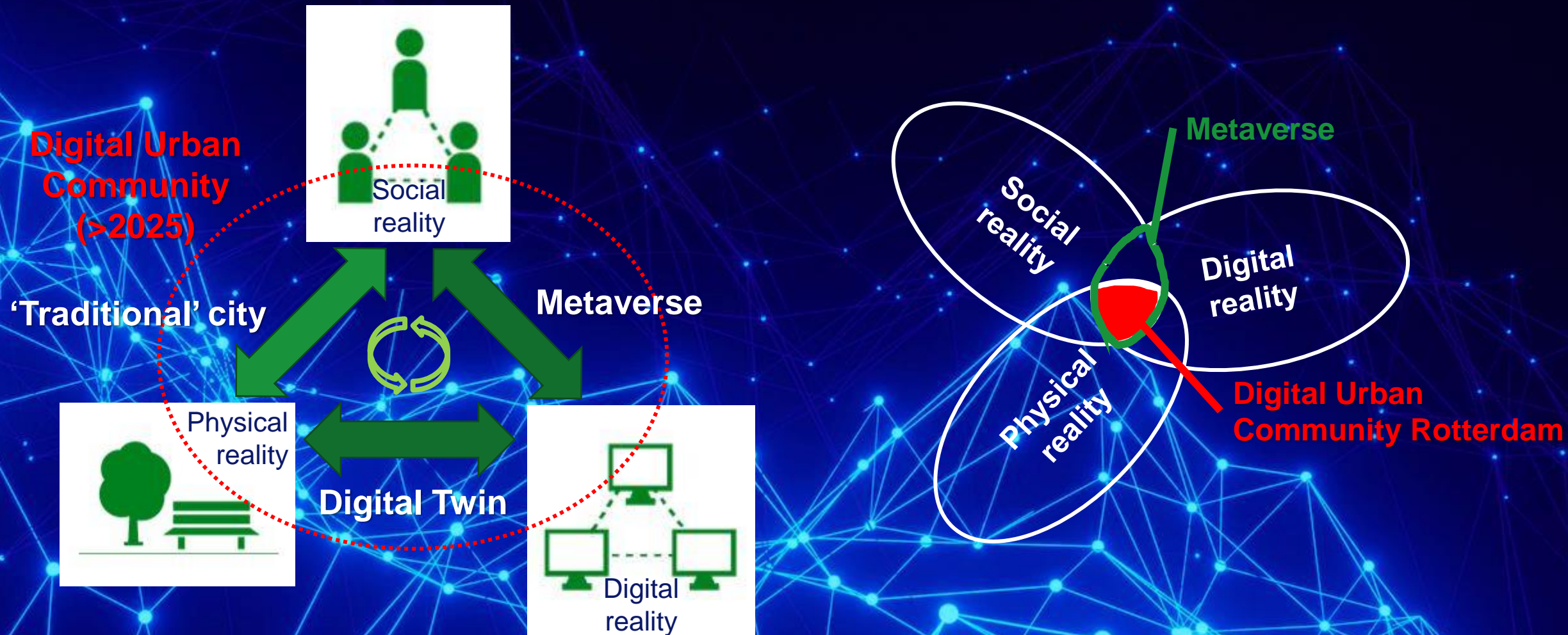


**Gemeente
Rotterdam**

A person stands on a rocky pier extending into a large body of water. The sky is filled with soft, colorful clouds in shades of orange, pink, and blue, suggesting a sunset or sunrise. The water is calm with gentle ripples. The person is silhouetted against the bright horizon.

What's next?

Rotterdam: through a Digital Twin towards Digital Urban Community



Digital Urban Community Rotterdam & Metaverse

Metaverse

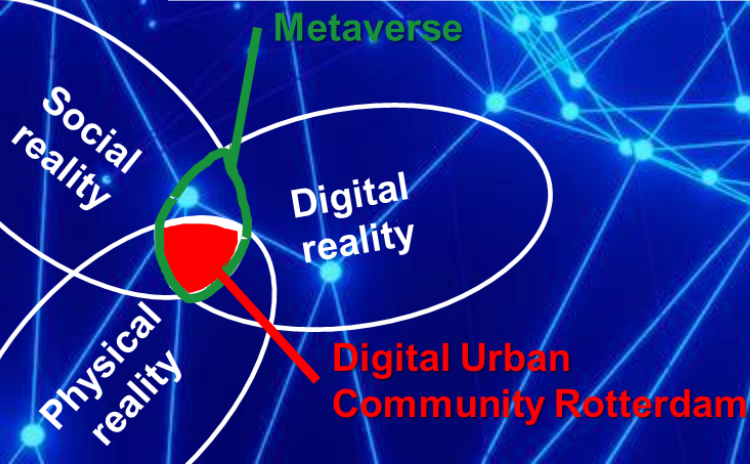
'footloose' (social-digital): fluidly moving between social-digital surroundings

'borderless', bigger than Rotterdam (worldwide)

Digital Urban Community Rotterdam

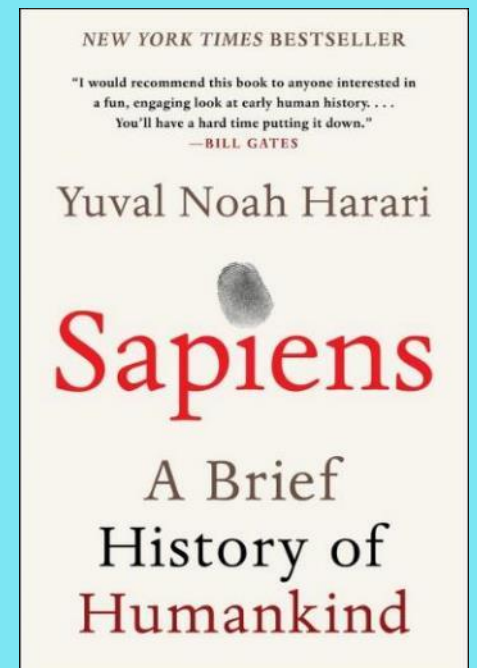
'footloose' (social-digital) and 'physical bounded' (social-physical-digital): fluidly moving between social-physical, social-digital, physical-digital and social-physical-digital

'local' ecosystem, in which social, physical and digital Rotterdam come together



The 'Metaverse-light' already exists!

- A lot of 'bètaverses'
- Behaviour youth
- Covid, war Ukraine, ...
- Companies like [Nike](#) and emergence NFT's (i.e. Digital art, [Dutch Digital Collectibles](#))
- VR-encounter mother with deceased daughter
- Immortality?
- 'Imaginary layer' (Y. Harari 'Sapiens')



What is then the Metaverse?

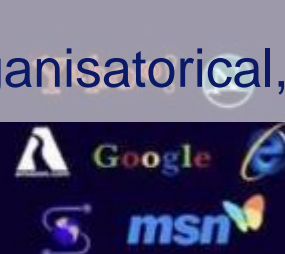
Several developments come together:

- Techniques (AI, blockchain, immersive, quantum, web3.0, ...)
- Data
- Software
- Networks
- (integration of bètaverses)

Keyword: interoperability

(technical, functional, semantic, organisational, juridical, ...)

WEB 3.0 & new marketing world



Web 1.0

"Read Only",
Decentralized



Web 2.0

Participatory,
Centralized



Web 3

No Intermediaries,
Decentralized



What is then the Metaverse?

The background of the slide is a composite image. On the left, a person is shown in profile, wearing a VR headset and holding a controller. The rest of the image is a digital cityscape with neon lights, cars, and buildings. A large, glowing diamond shape is centered at the top. A semi-transparent text box is overlaid in the middle.

- The Metaverse is a digital experience, that is completely intertwined with the social reality of us people.
- In the Metaverse we can move fluidly and 'footloose' from one to another digital surroundings, and in which we can undertake all kinds of interaction with that surroundings (including other people).

Leave it up to 'the market' or do it together?

- 
- A woman wearing VR goggles is shown in a futuristic, digital environment. The VR headset she is wearing has a miniature cityscape on top, with various social media icons like a heart, a speech bubble, a location pin, and a play button. The background is filled with glowing blue and purple lines, suggesting a high-tech or virtual reality setting.
- Public vs private
 - Role government (learning by doing; ethics, safety, transparency, privacy)
 - 'Quadruple'-helix cooperation necessary
 - Shared research agenda

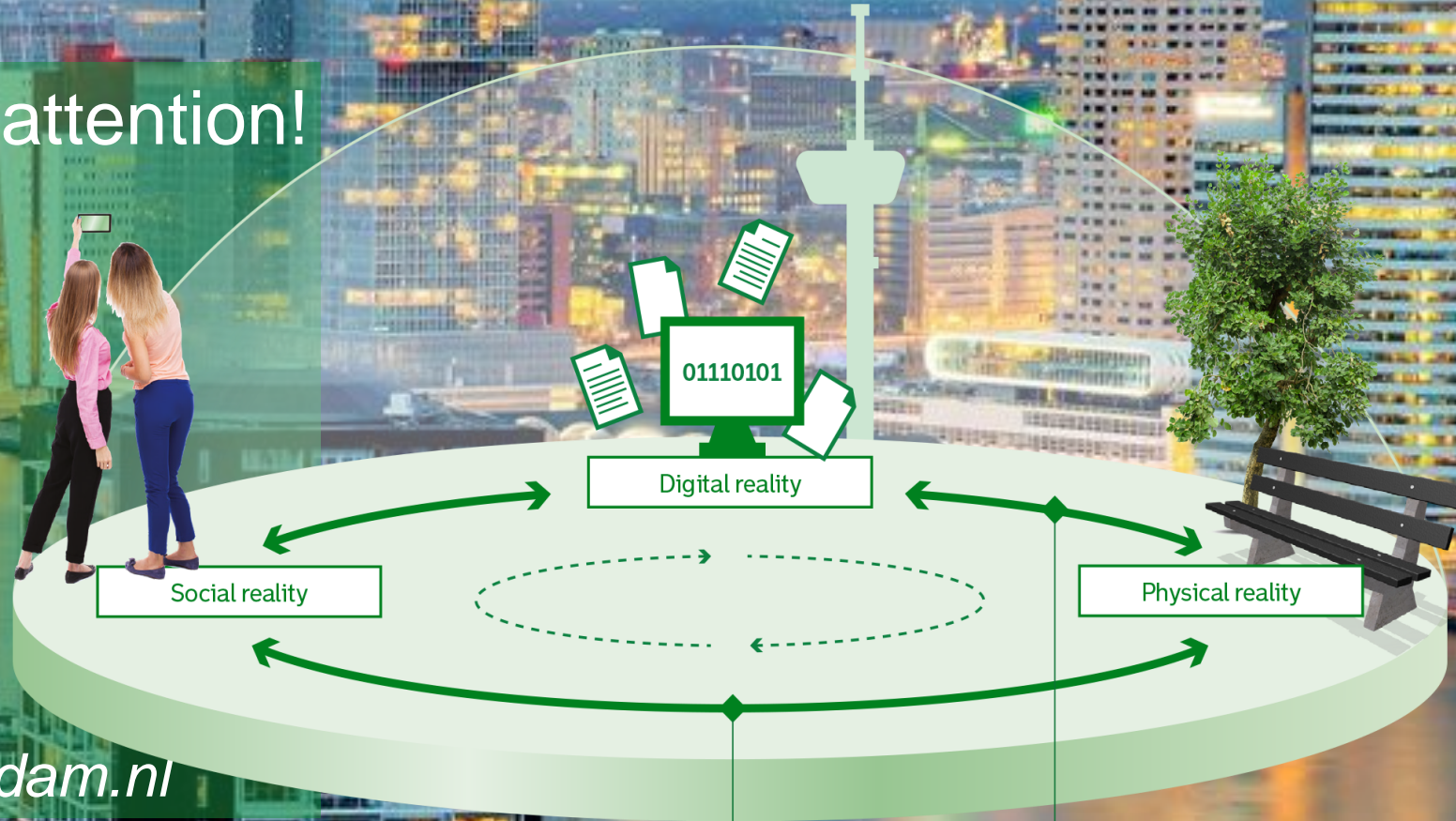
Digital Inclusion

What does the digital transformation (incl Metaverse) with the resiliency of the city and its citizens, companies and institutions?

- 'digital divide'
- Everybody should be able to participate in digital reality
- Focus municipality on those 'who are left behind' but also on frontrunners
- Make frontrunners jointly responsible

Thank you for your attention!

Digital Urban Community (>2025)

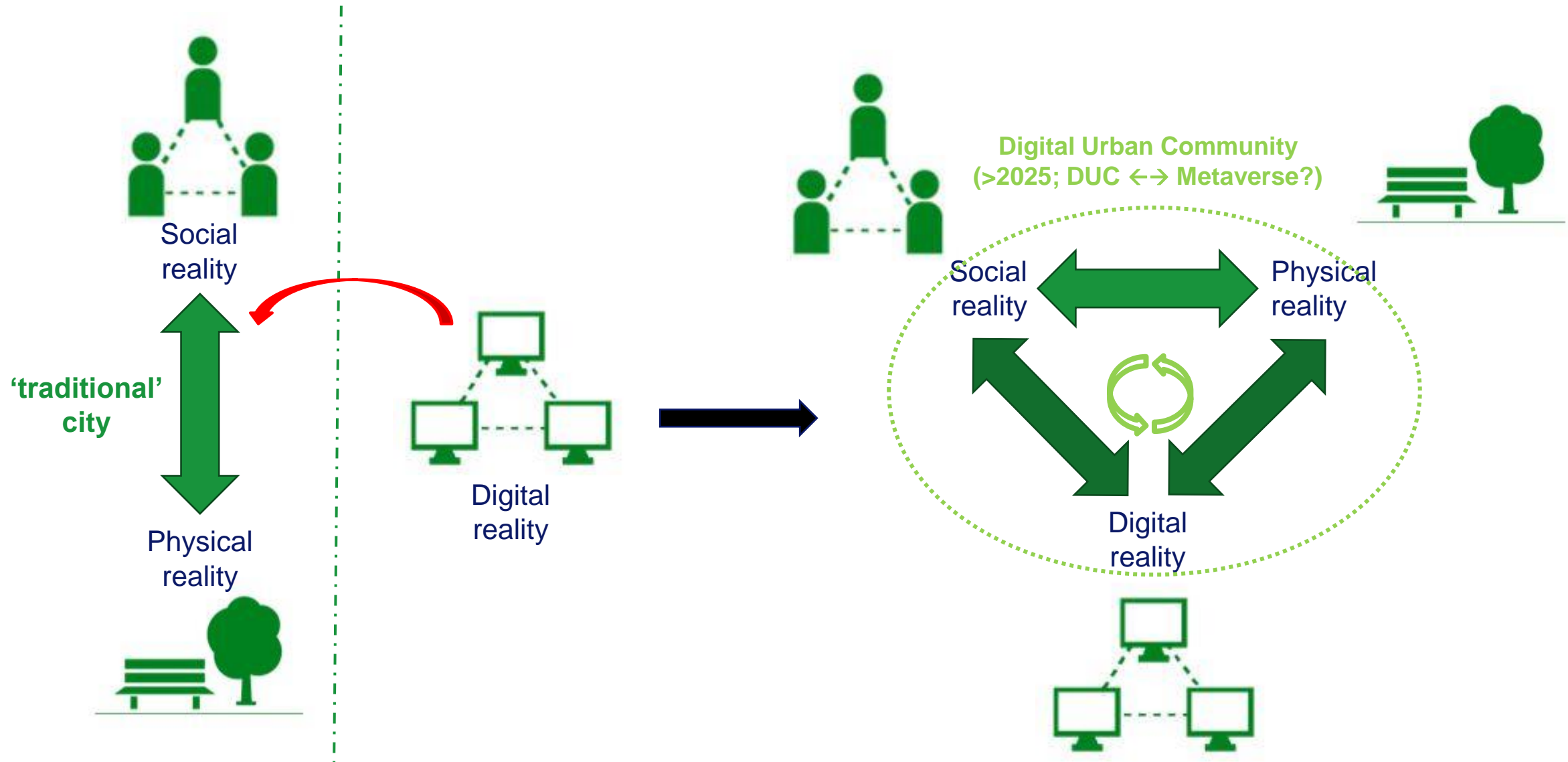


More information:
digitalestadBCO@rotterdam.nl

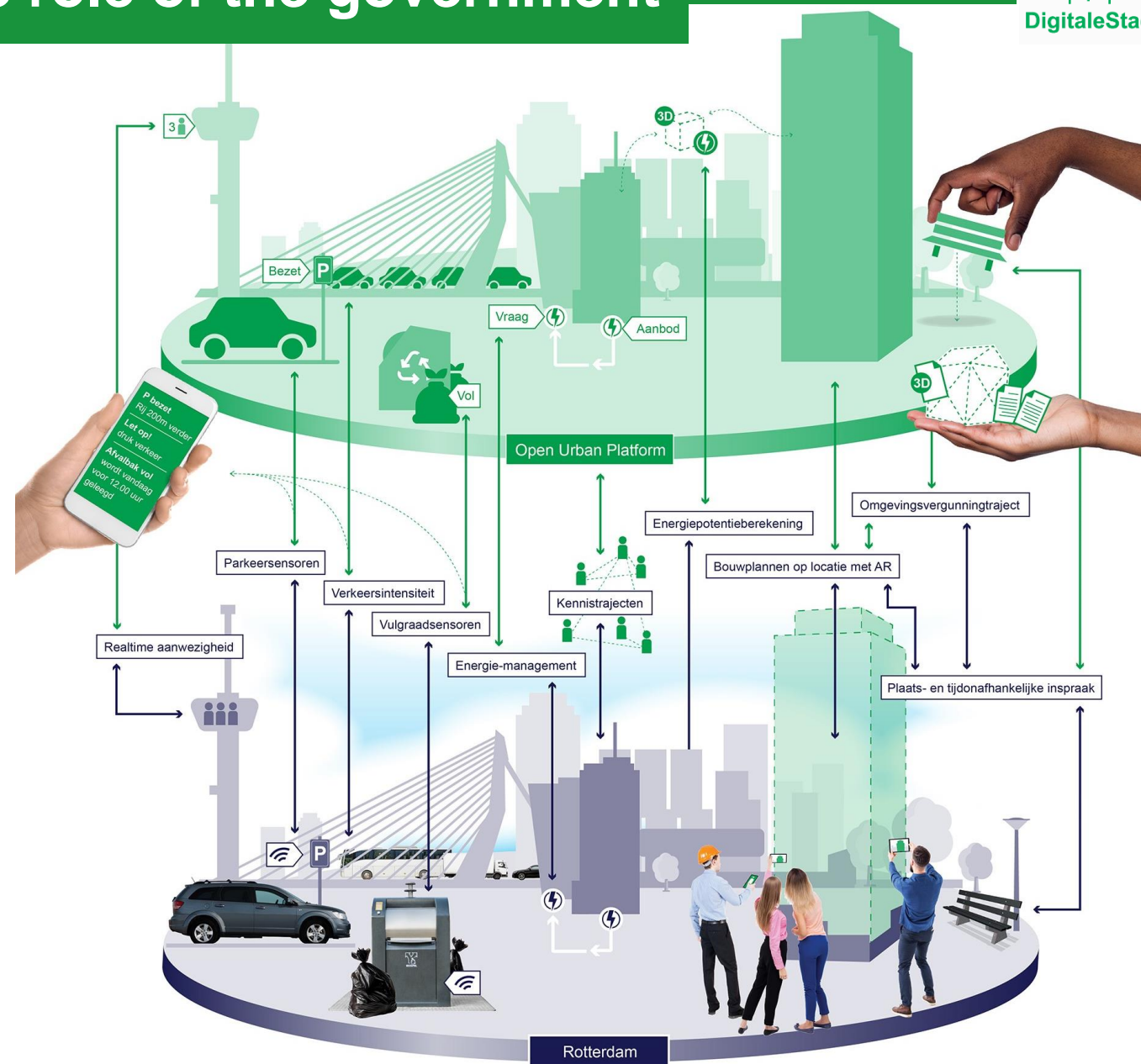
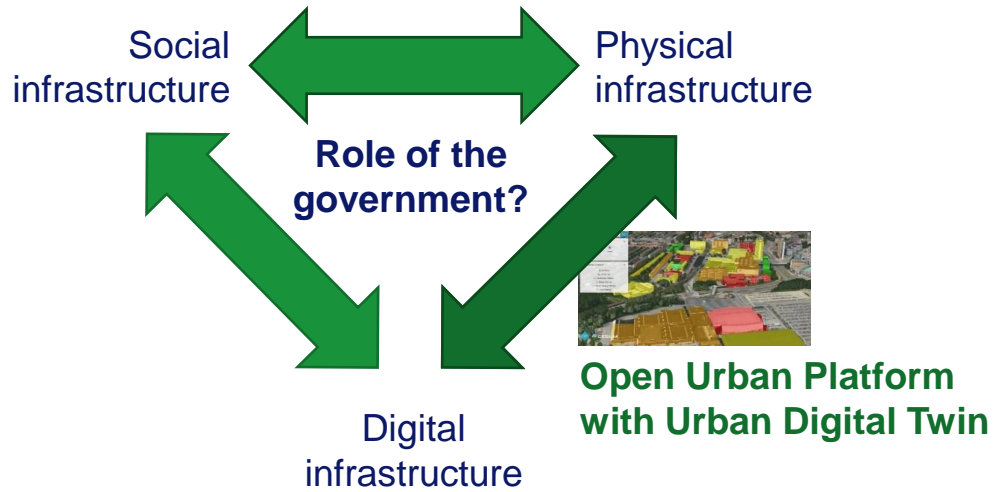
Traditional city

Open Urban Platform
with 3D digital twin

City in transition – a new reality (why a digital city program?)



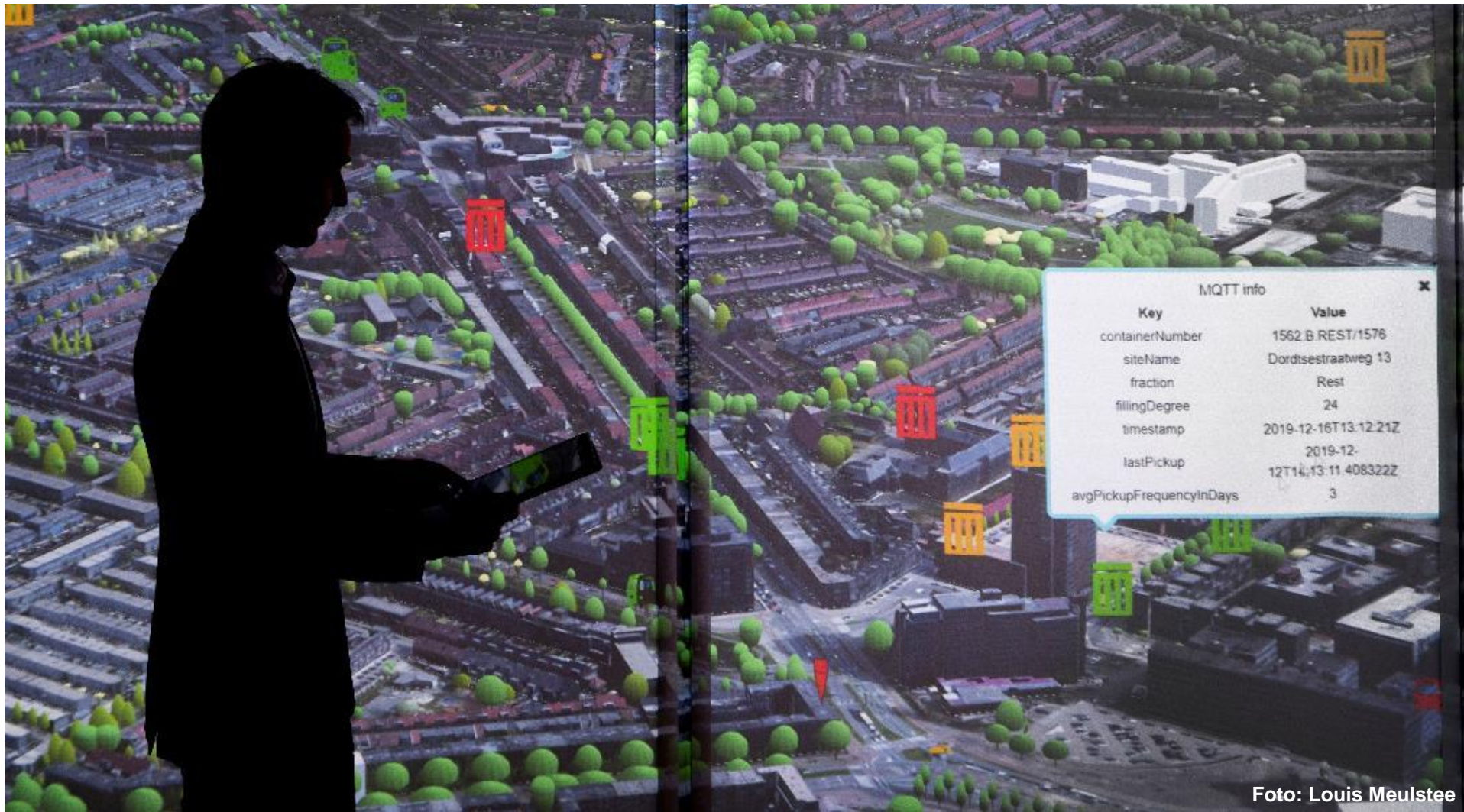
Open Urban Platform and the role of the government



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

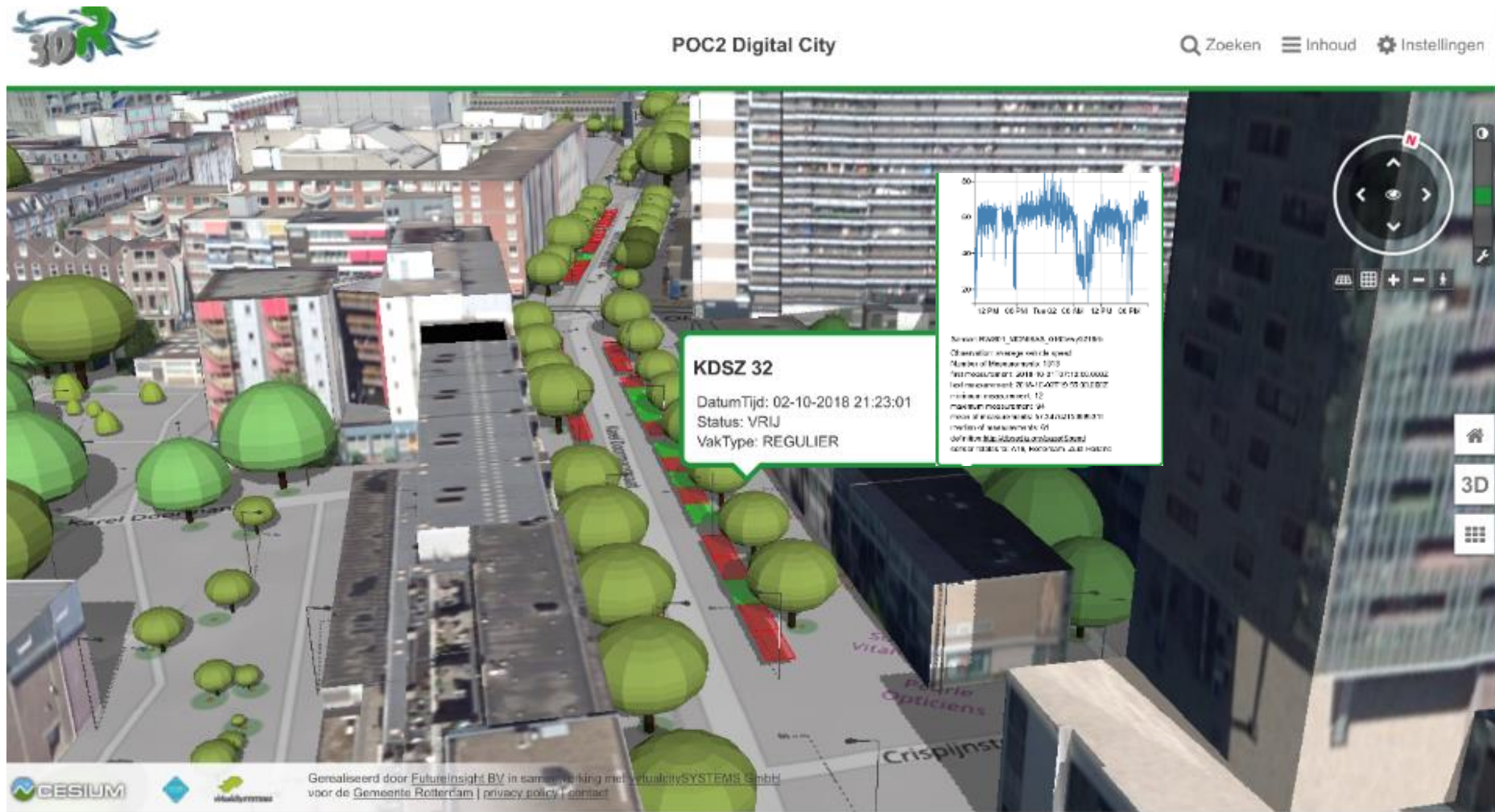


... combined with realtime data ...

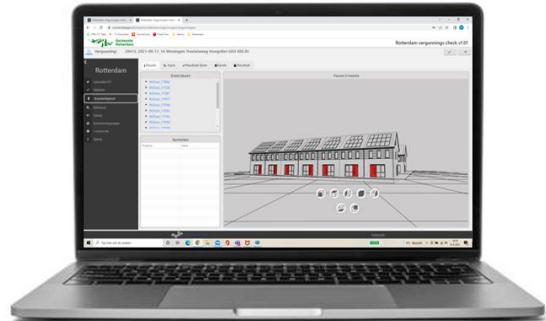


... forms an Urban Digital Twin of the city...

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

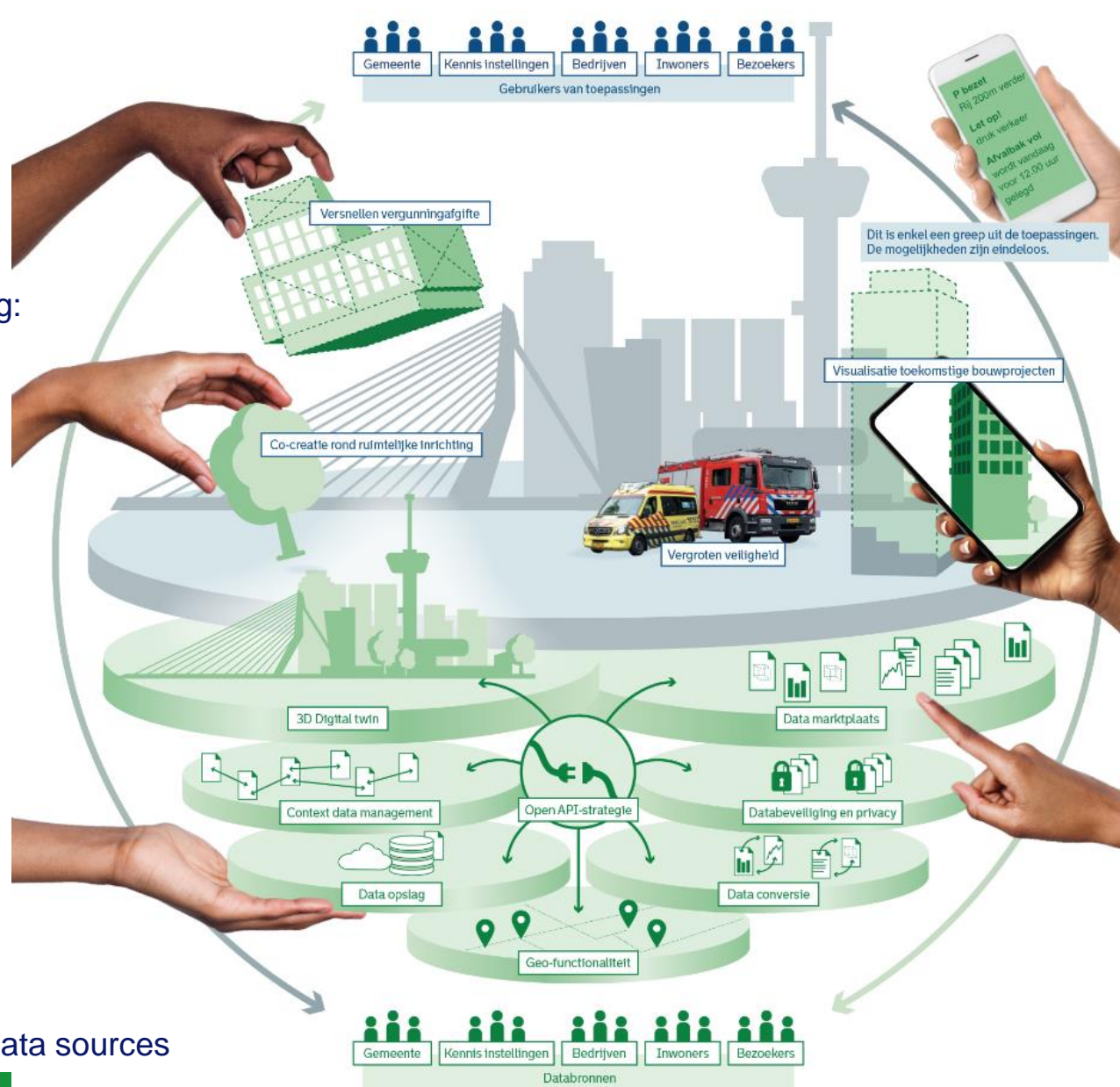


Smart spatial planning:

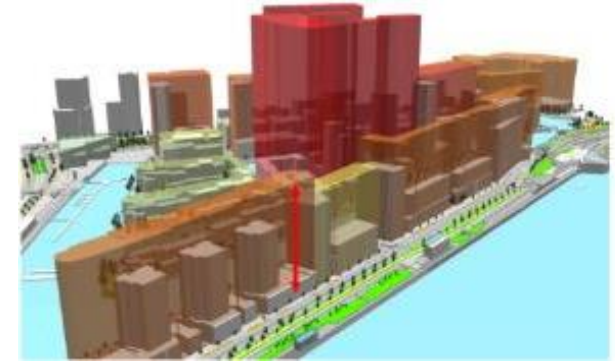
- Building permit check service
- Co-creation in the digital city



Digital Twin Sustainability & Generic, scalable and maintainable data sources



SAFE Rotterdam 3D

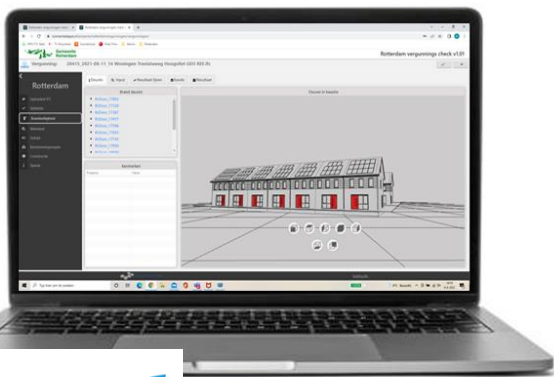


Smart Zoning plans (Smart planning rules)



Regional cooperation
'Borderless data landscape'





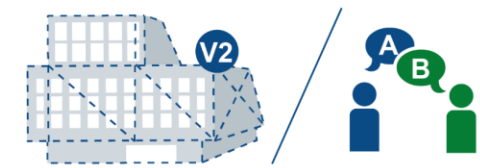
Meerwaarde 3D in het vergunningentraject



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



2. Detectie van conflicten tussen BIM, ondergrond en regelgeving

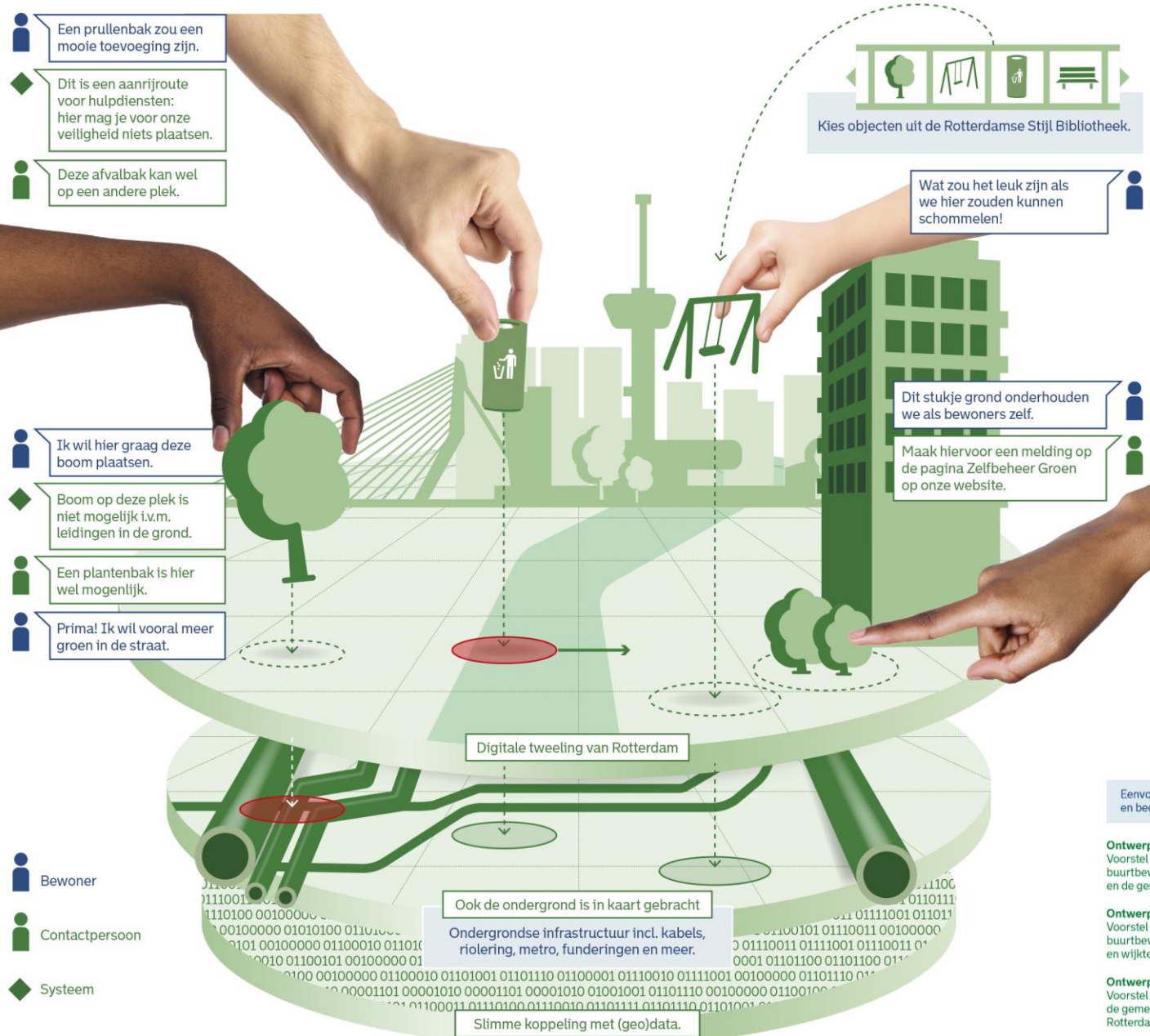


3. Aanpassingen en/of overleg



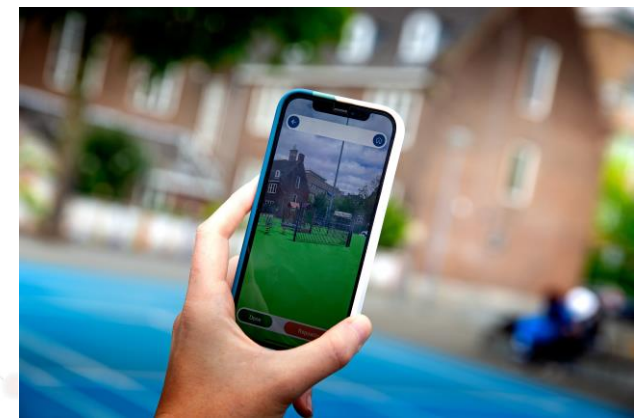
4. Passend ontwerp

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



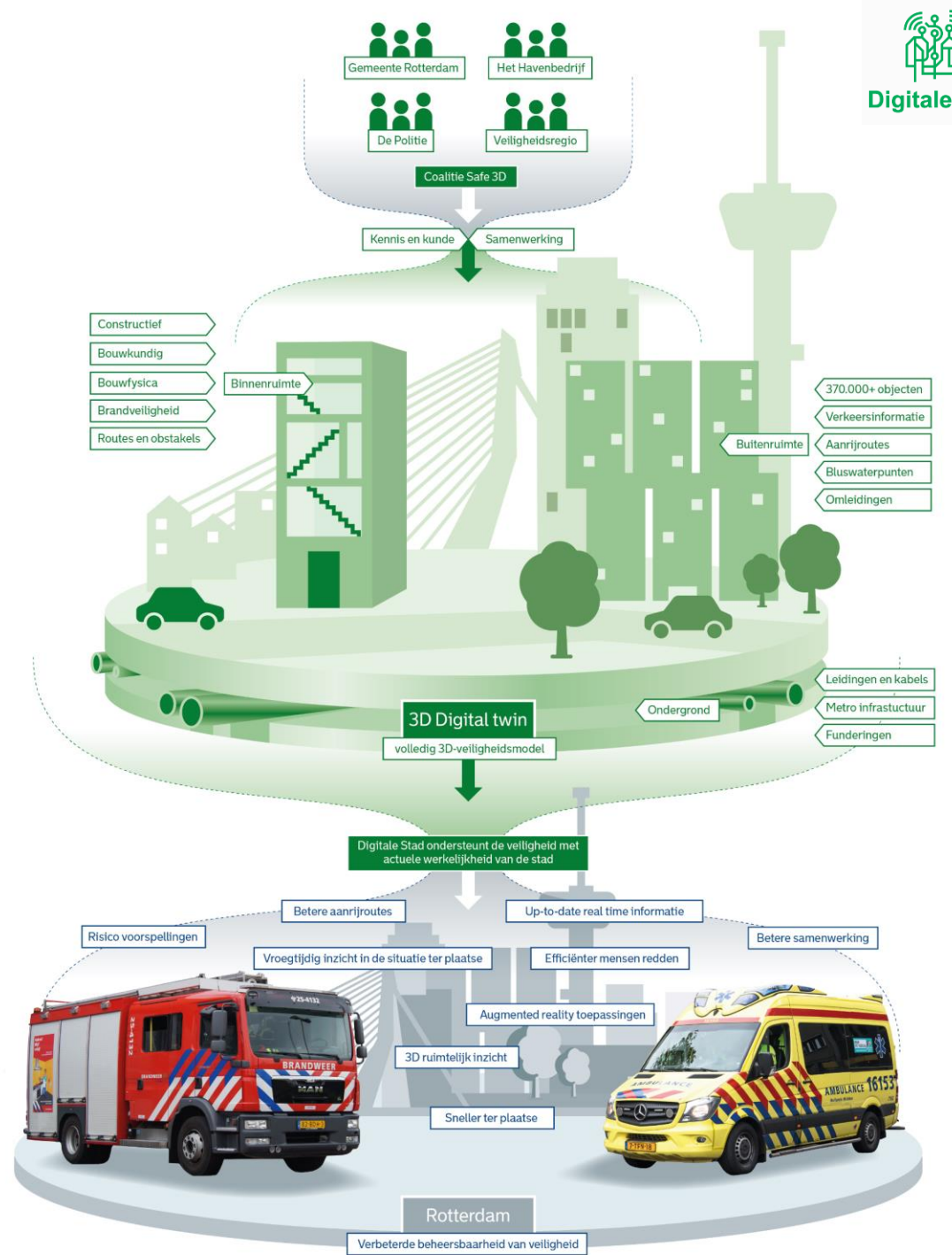
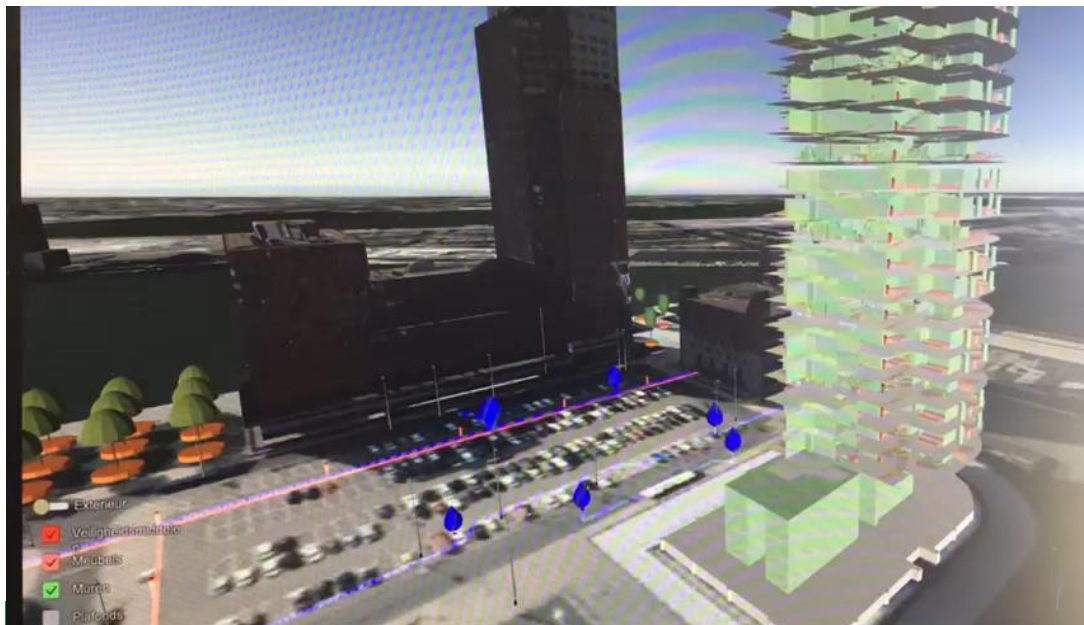
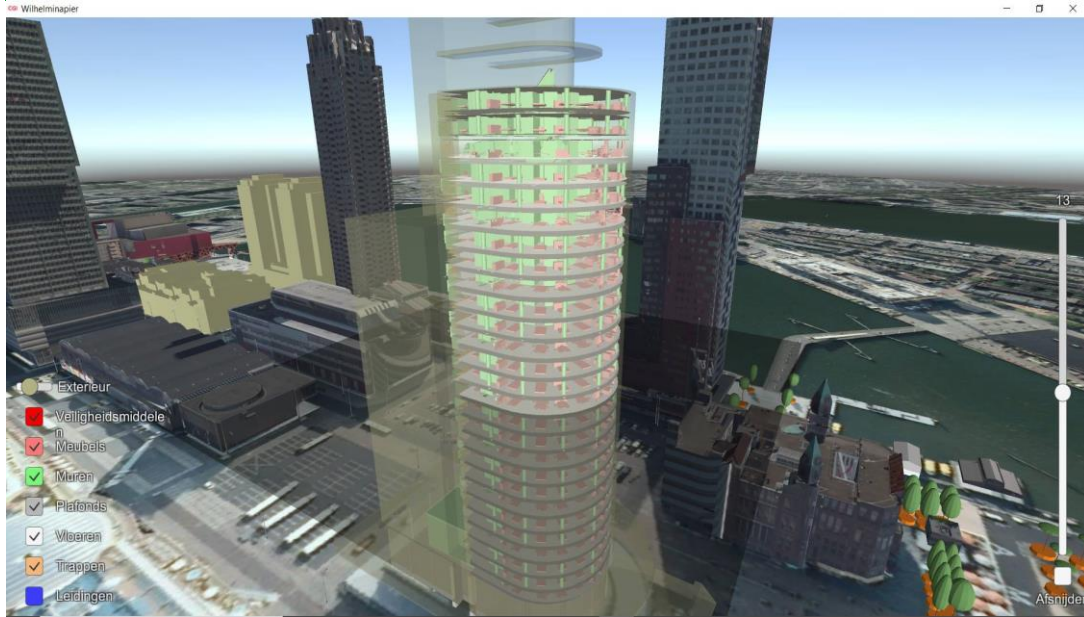
AR Geomagine

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
<p>Ontwerp 1 Voorstel van buurtbewoners en de gemeente.</p> <p>🌳 🗺️ 🗑️ 🛋️ 😊 1640 😞 12</p>	<p>€ 15k</p>	<p>Meerdere deel en preview mogelijkheden.</p> <p>QR VR AR</p>	<p>1. Digitaal concept plan Plannen zijn sneller te beoordelen door zowel de bewoners als de gemeente.</p>
<p>Ontwerp 2 Voorstel van buurtbewoners en wijkteam.</p> <p>🌳 🗺️ 🗑️ 🛋️ 😊 1360 😞 3</p>	<p>€ 20k</p>	<p>Bewoners kunnen online brainstormen over de inrichting van hun omgeving.</p>	<p>2. Toetsing en accordering Snel duidelijkheid over subsidievoorwaarden en benodigde vergunningen.</p>
<p>Ontwerp 3 Voorstel van de gemeente Rotterdam.</p> <p>🌳 🗺️ 🗑️ 🛋️ 😊 140 😞 79</p>	<p>€ 10k</p>	<p>Gemeente en bewoners kunnen makkelijk ruimtelijke ideeën uitwisselen en kennis delen.</p>	<p>3. Uitvoering Snel bij uitvoering door gebruik van één systeem door alle betrokkenen.</p>

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.

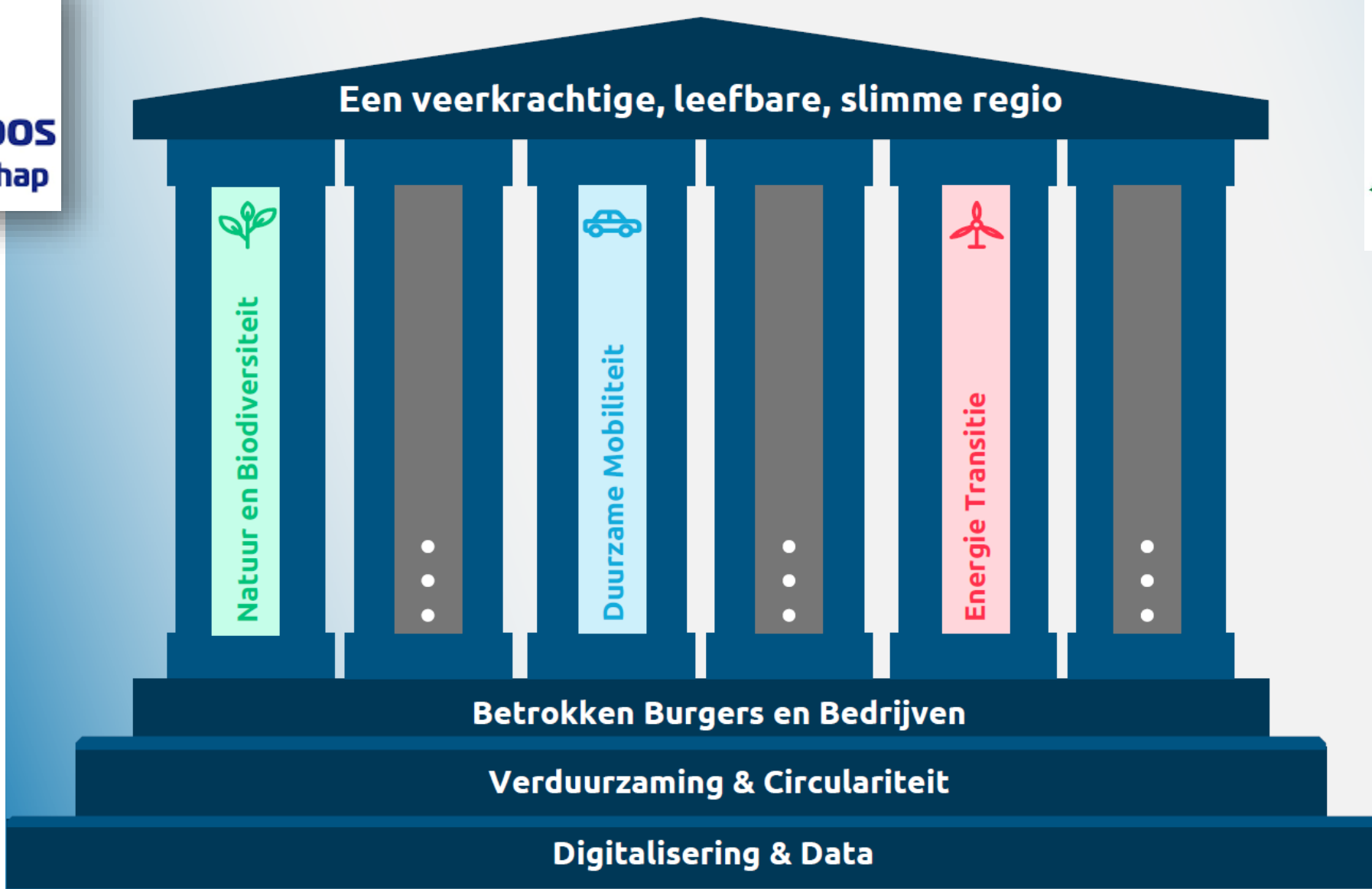
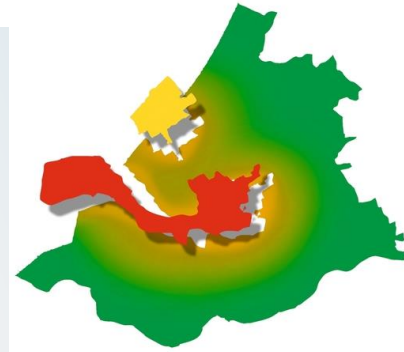
Bekijk de nieuwbouw in miniatuur op elke andere locatie.



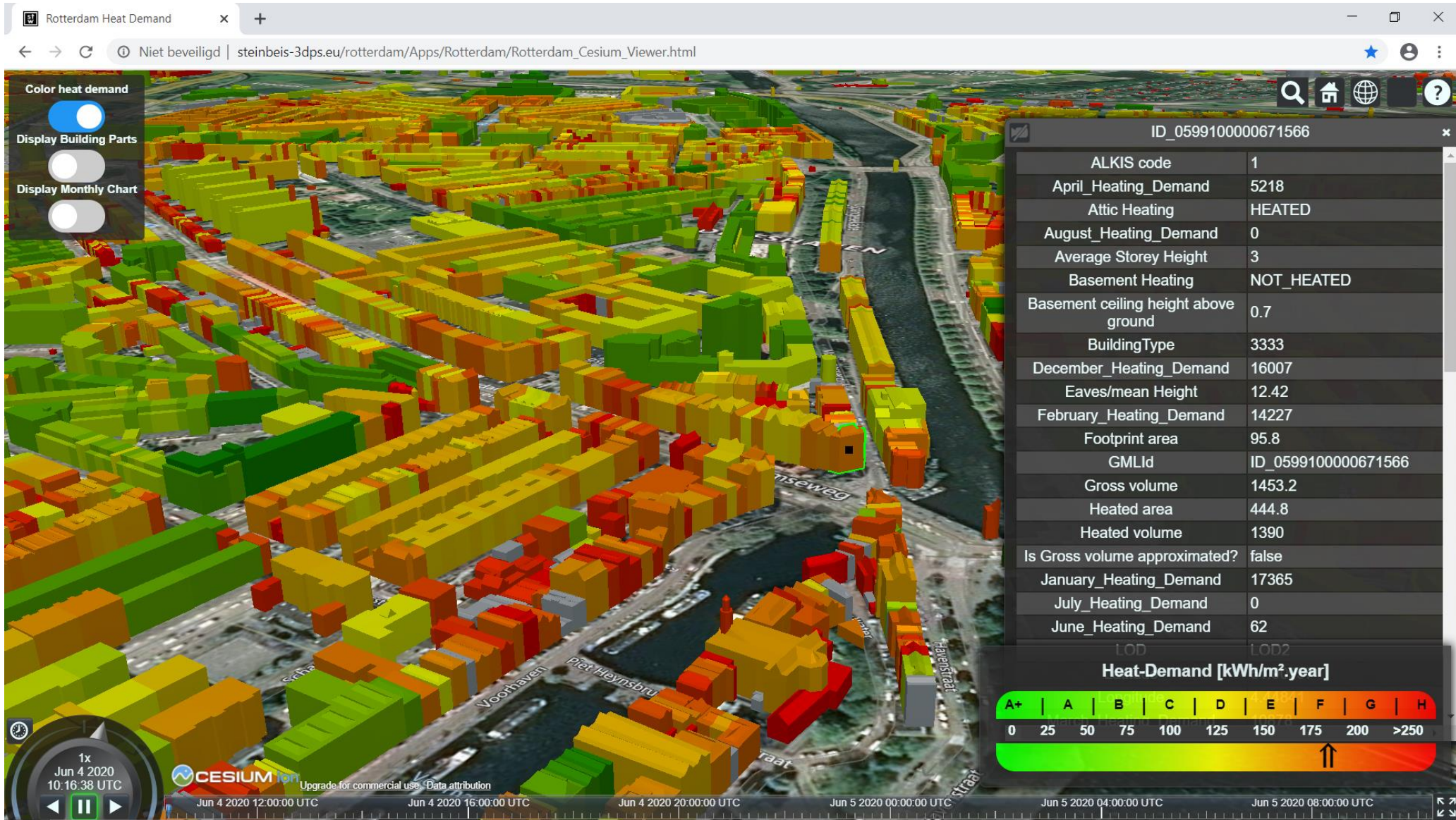
Regional cooperation 'Borderless data landscape'



DigitaleStad



Generic, scalable, maintainable & FAIR datasources

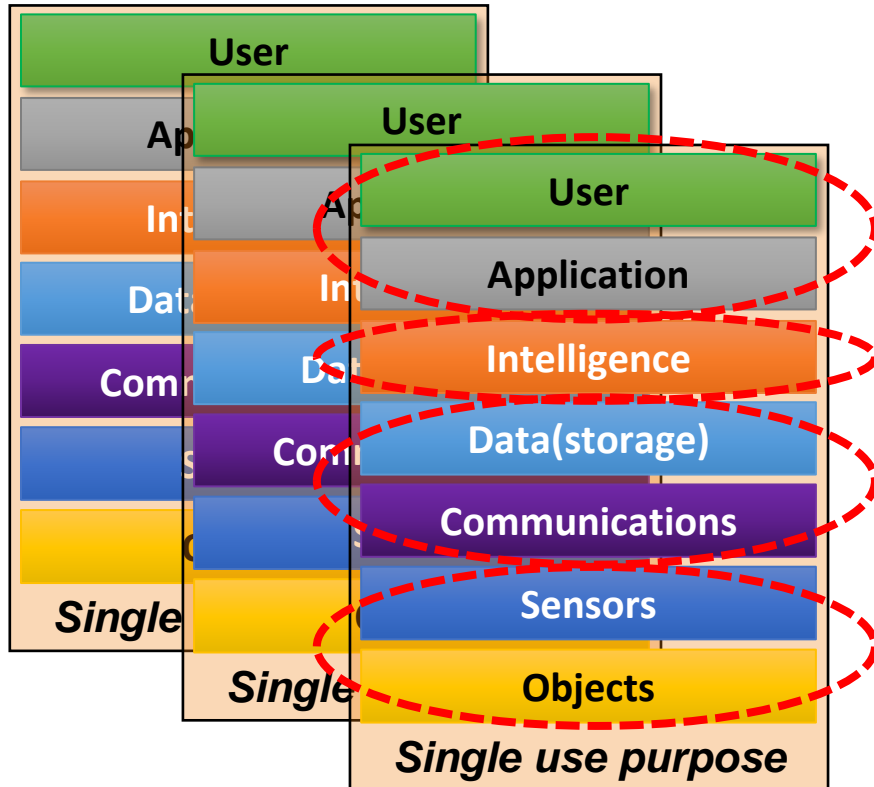


Advantages using the Urban Digital Twin concept

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

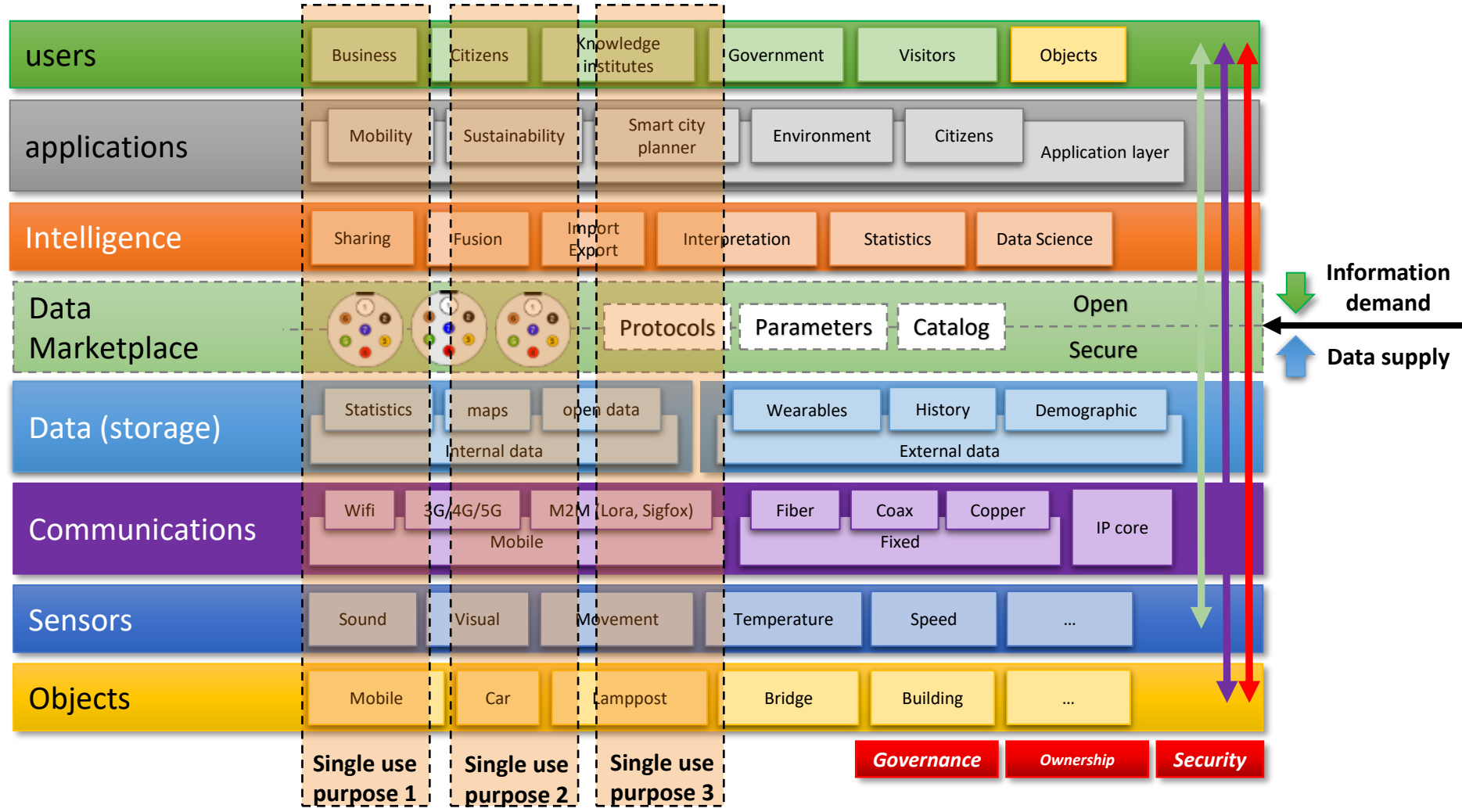


Current development 'smart solutions'

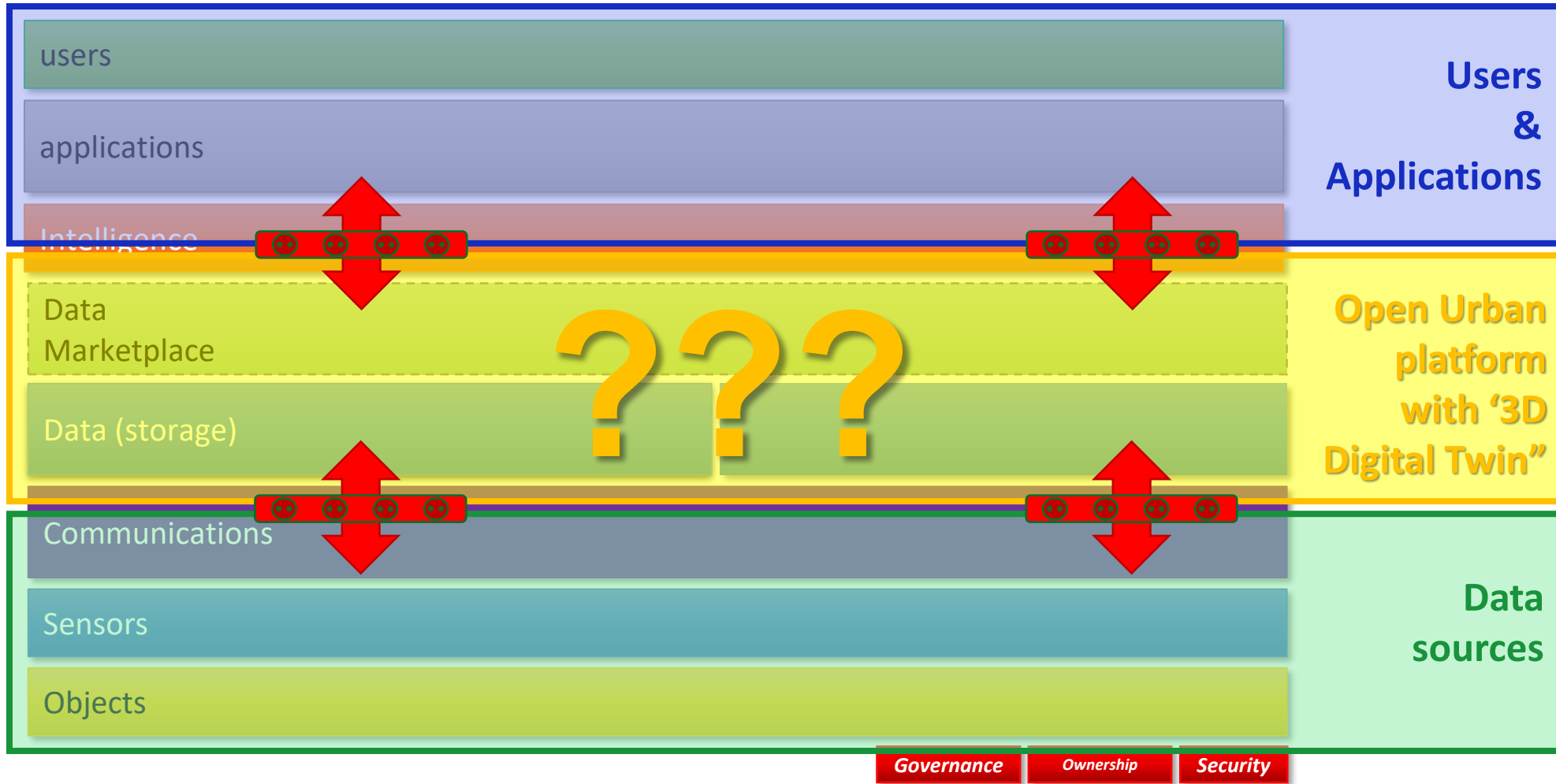


- 'Silo' developments
- Vendor lock-in
- No interaction/communication between applications
- Several infrastructures
- Exploding data management
- Suboptimal gains and higher (societal) costs
- No re use of data (except through connection with the 'owner')
- Data collection and development applications are connected to each other

Desired data architecture

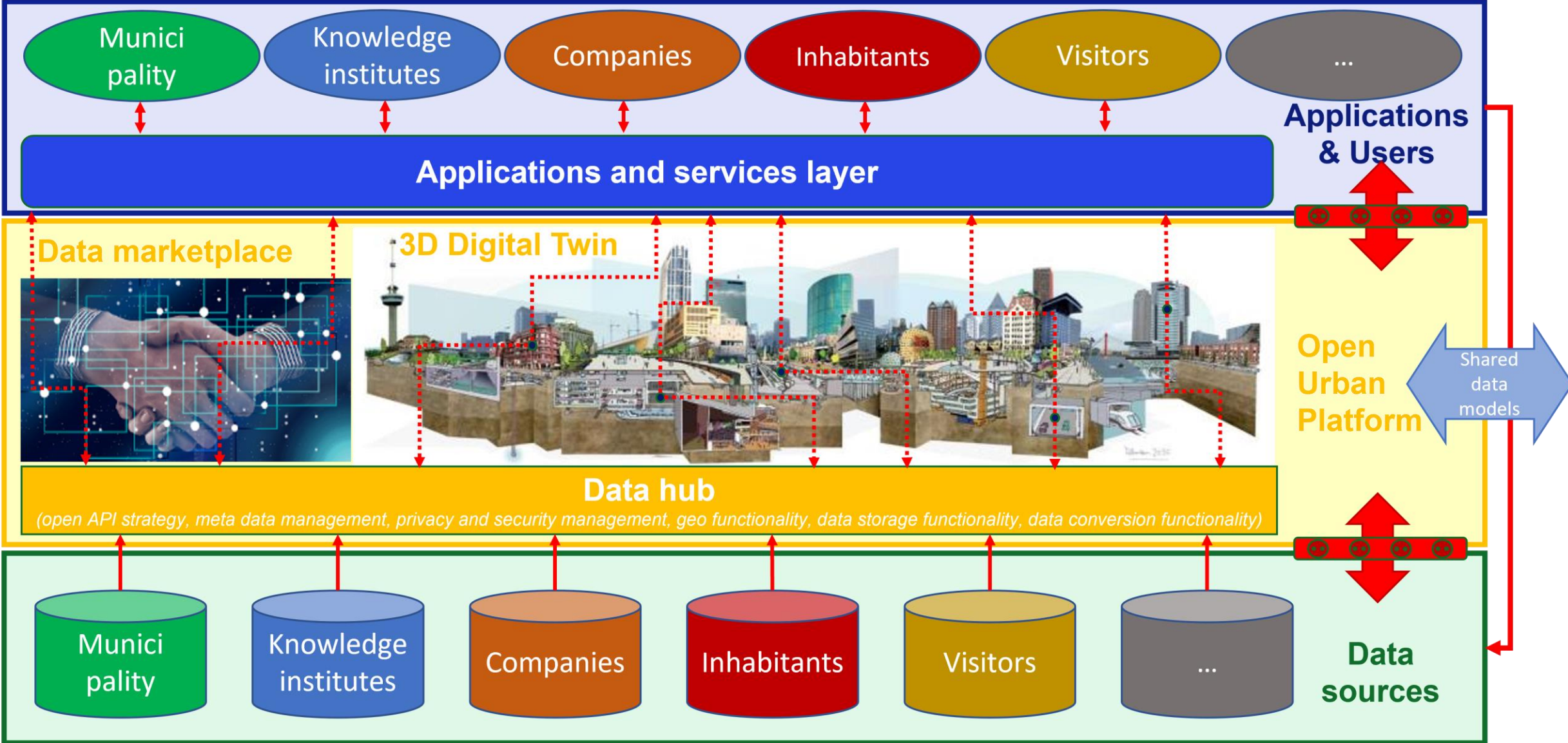


Data architecture and Digital City program

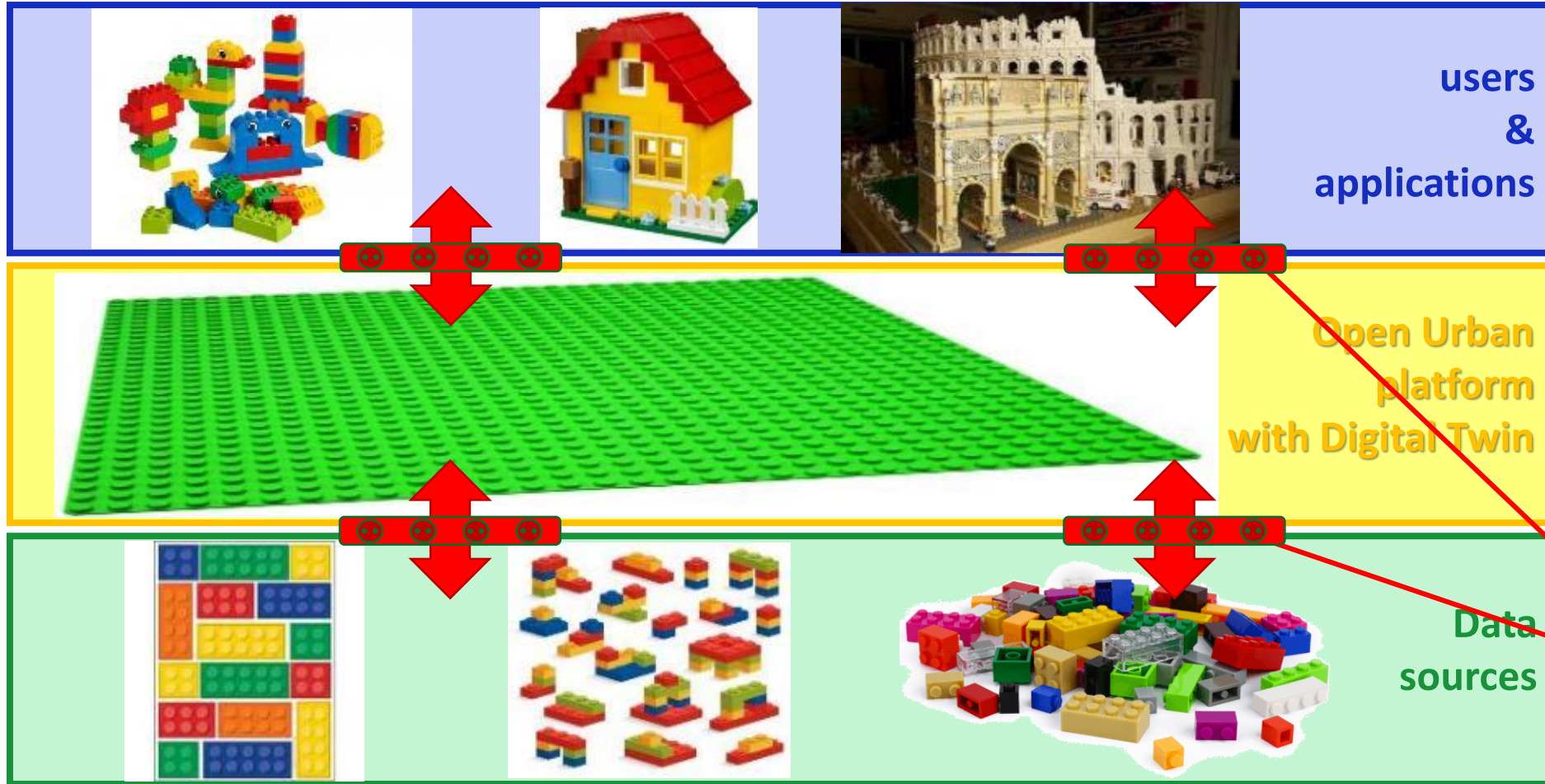


Digital infrastructure: Open Urban Platform with Digital Twin

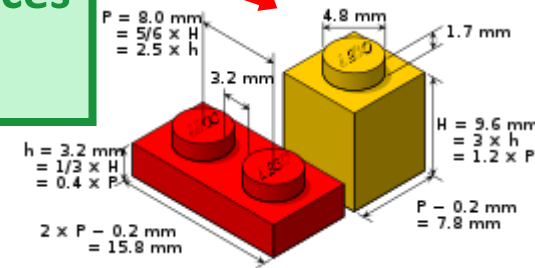
Urban digital ecosystem Rotterdam

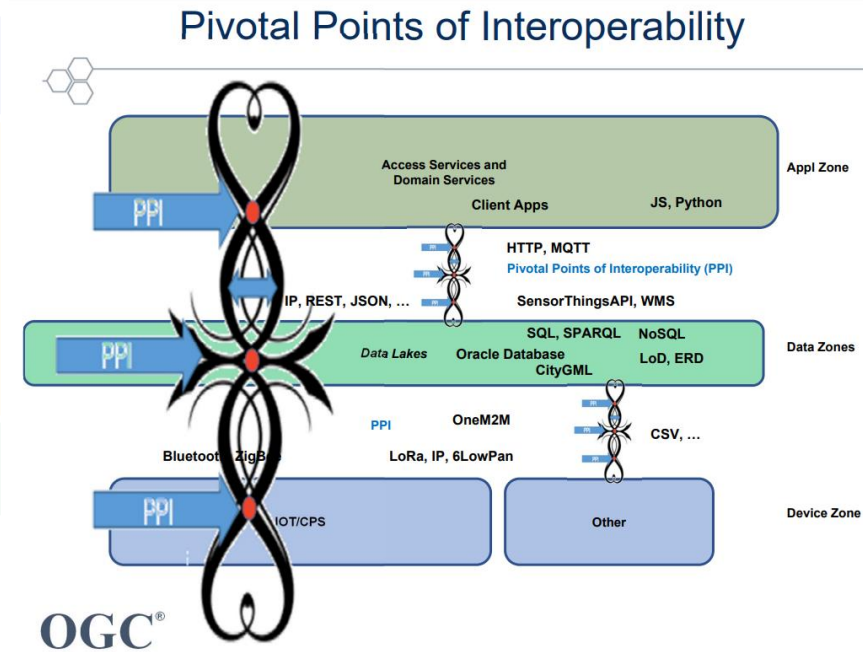
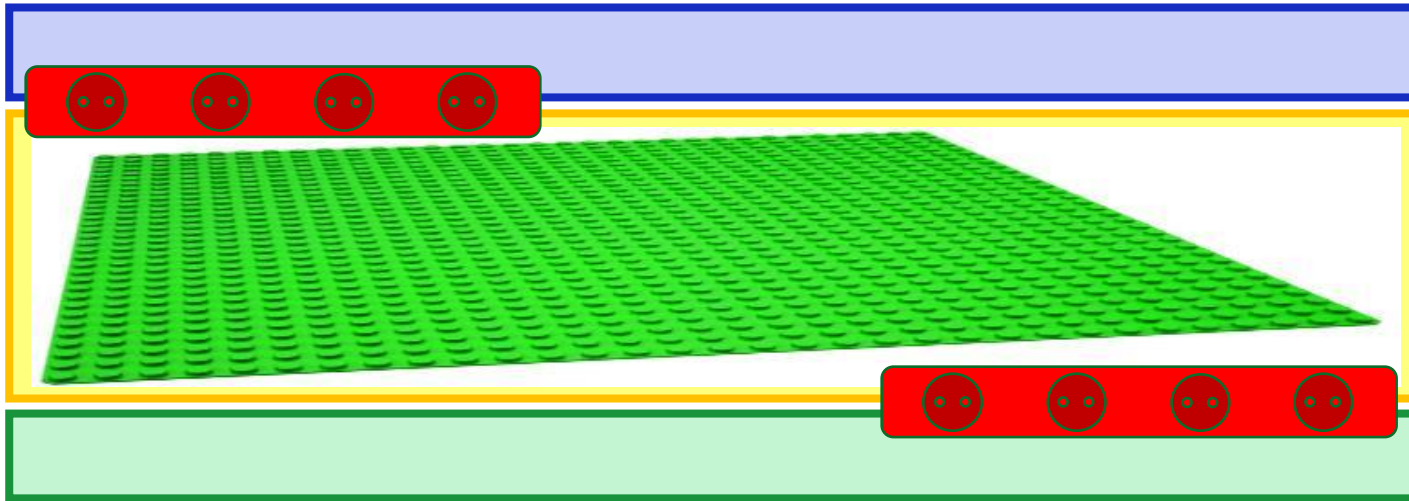


Open Urban Platform – design principles



Pivotal Points of Interoperability (PPI's)





Minimal Interoperability Mechanisms (MIM's):

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



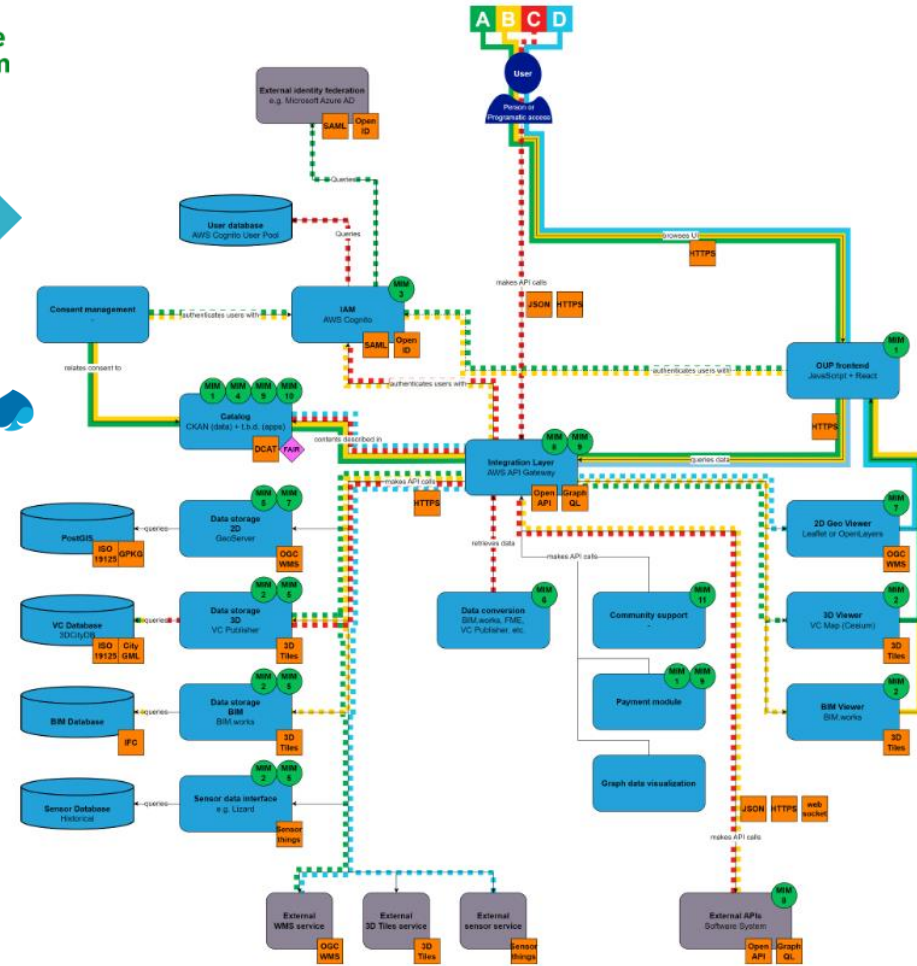
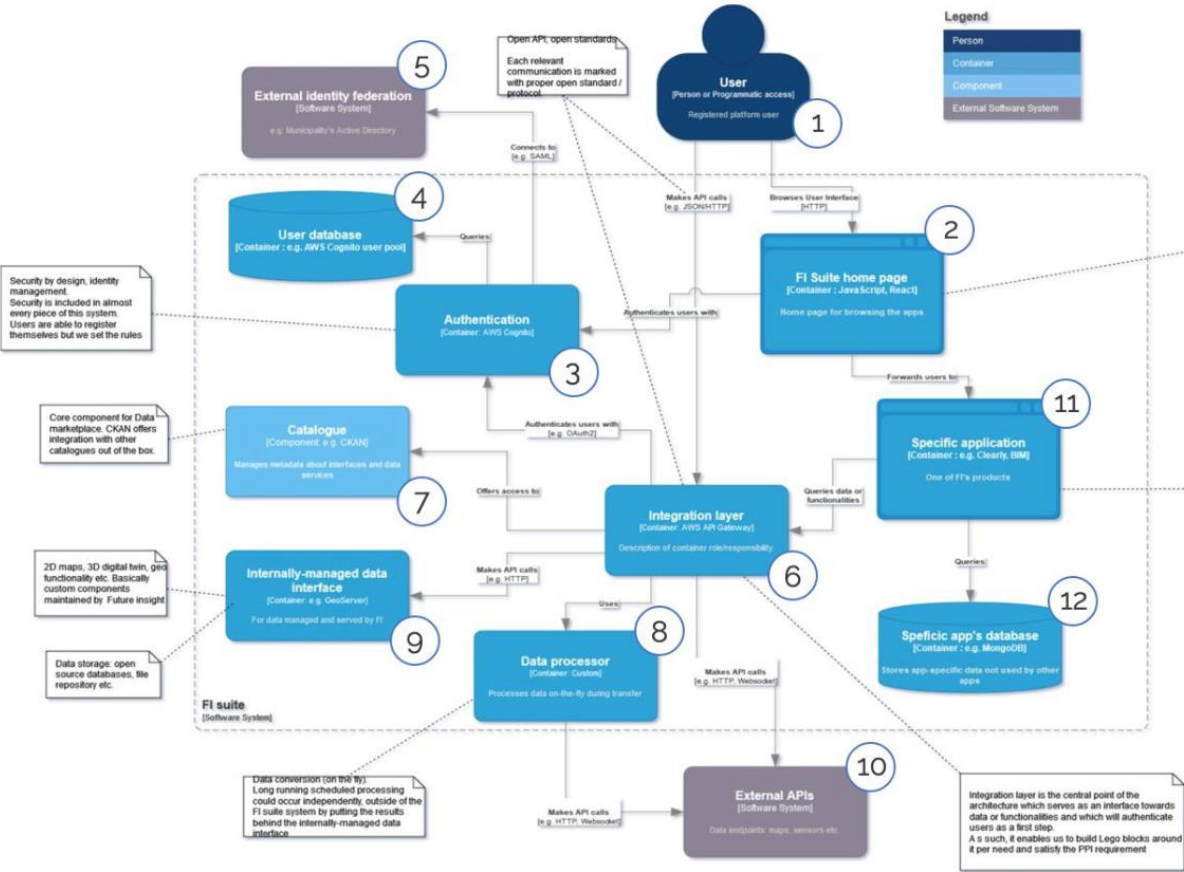
More information:

www.oascities.org

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: june 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)

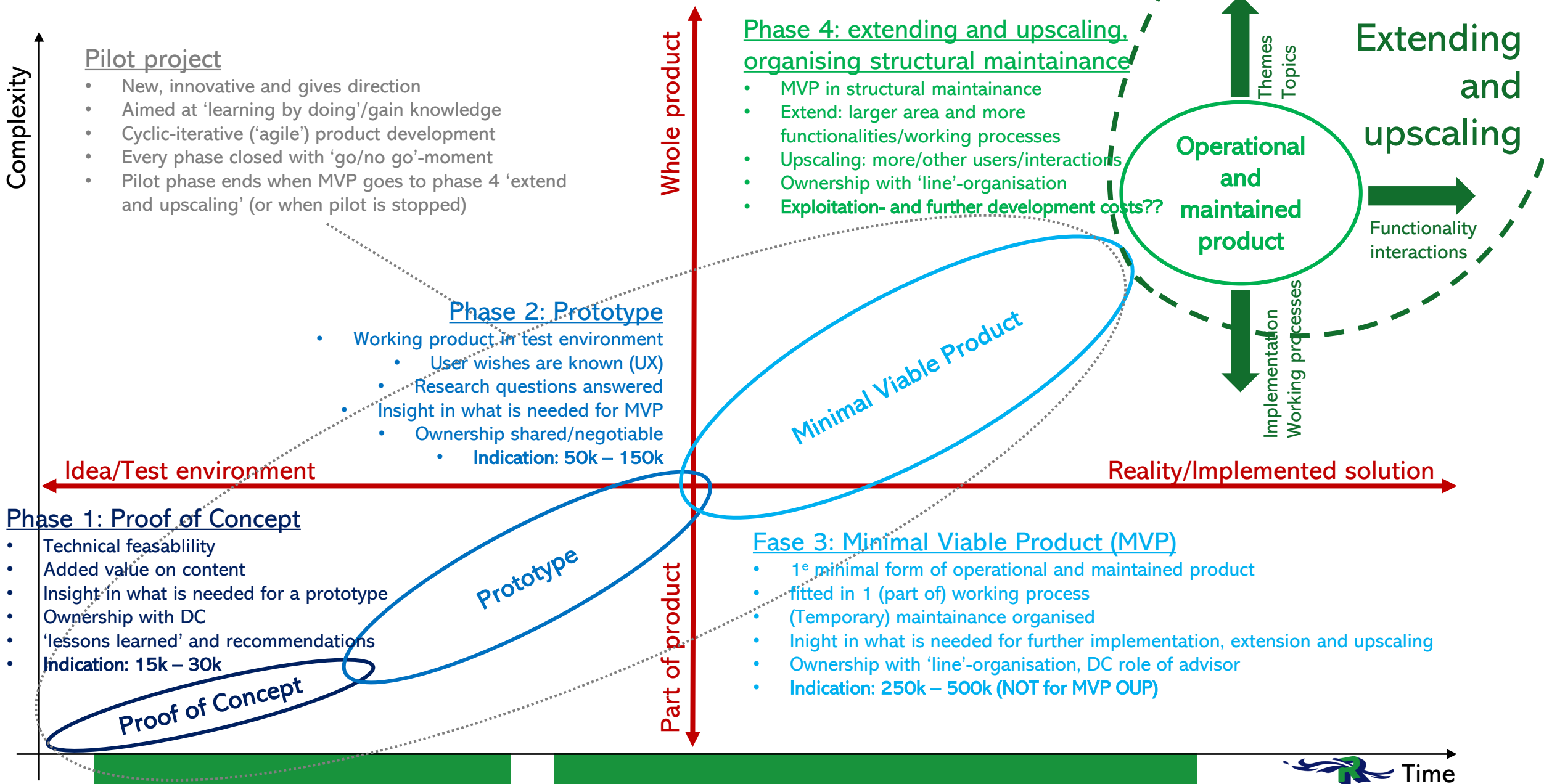


Important lessons learned

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!



Innovative product development within Digital City program



City of Rotterdam – some facts & figures

- Inhabitants: city - 656,000; metropolitan area – 2.2M (2022)
- Percentage youth (0-22 years): 26% (2020)
- Labourforce: 392,000 (2020)
- Almost 180 different nationalities
- 2nd city of the Netherlands
- Largest port in Europe (10th 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 – Dutch champion 2023!



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 \(OASC\)](#)