

Socializing Urban Digital Twins: Critical Concepts from the [OGC Location Powers Urban Digital Twin Summit*](#)

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W3C Smart City Workshop
June 25, 2021

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*<https://www.locationpowers.net/events/2101urbanvirtual/>



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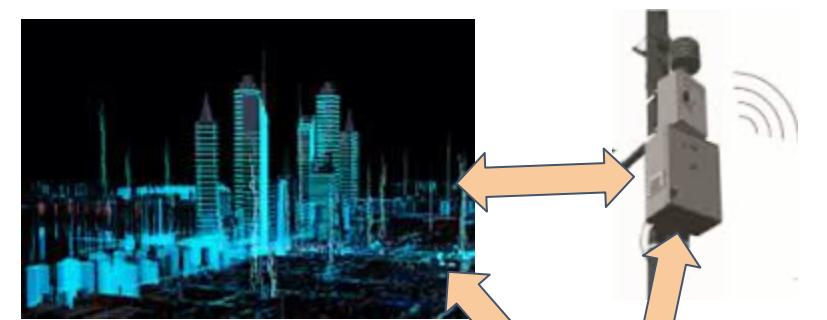
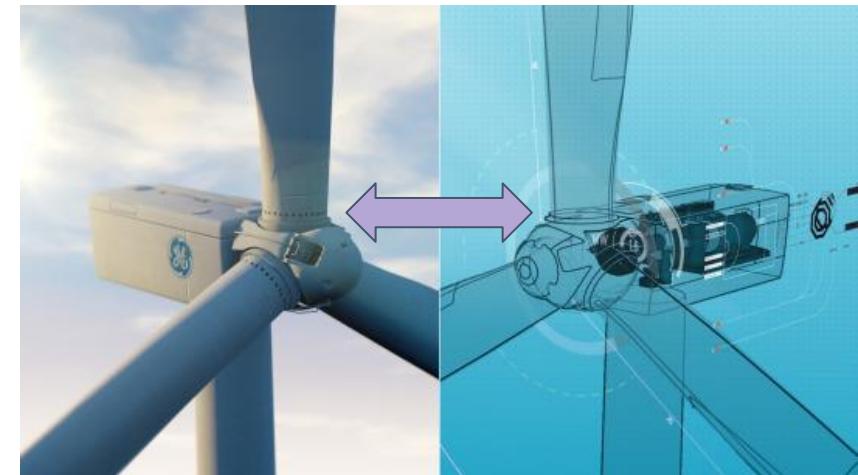
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Digital Twin Concept

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- Origins in mechanical engineering and FE modeling
- Concept of verisimilitude:
“looks the same” + “behaves the same”
- “is not the same” (e.g. safer)
- Static structures + dynamic properties
- Applications of a digital twin: visualization, interaction, simulation, prediction
- Limits of scale, complexity, and sensing to realization of the Digital Twin ideal at urban scales.



Location:	Salinity(ppm)	Conductivity(Millamps)
Ala Wai Canal	37,100	4.43
Waikiki Beach	33,200	3.74
Ala Moana Beach	31,700	3.56
North Shore	27,800	2.89
Self-Made(NaCl+H ₂ O)	20,000	1.75



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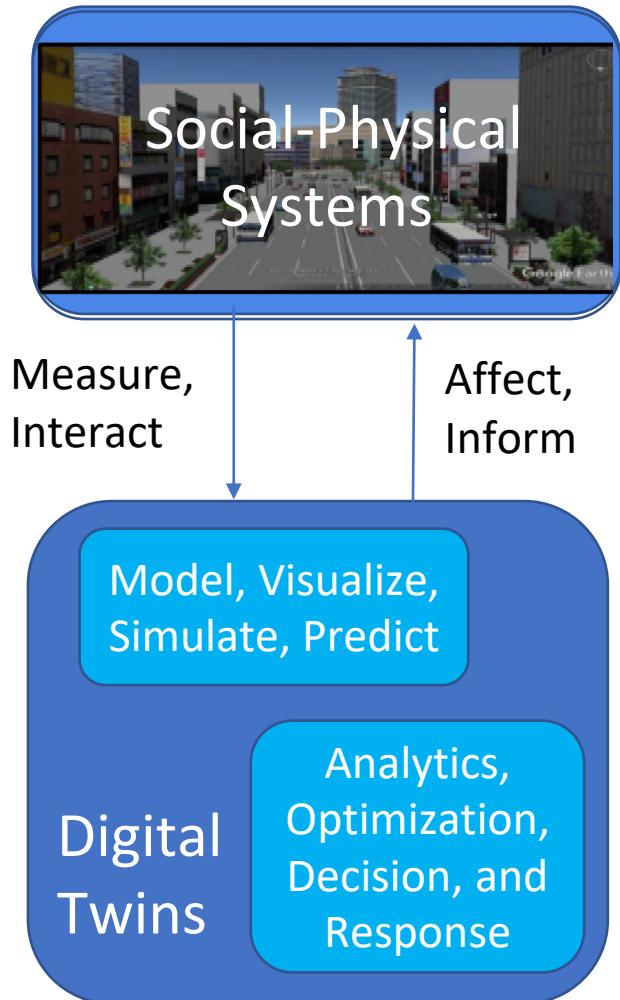
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Digital Twins at Urban Scale

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- **Goal** is to transform how cities are planned, built, and managed to better deliver services
- **Target** is more livable, inclusive, safe, resilient and sustainable urban environments
- **Mechanism** is responsive, interactive insight
- **Geospatial-temporal information technology**
 - City Models, Data Science, Cloud / Edge Computing
 - Sensor Web / IoT, VGI & Crowd Sensing, XR
- **Multiple Model Paradigms**
 - Visual, Functional, AI/ML, Agent-based, Hybrid
 - All are “wrong” so must be judged “useful” on multiple criteria

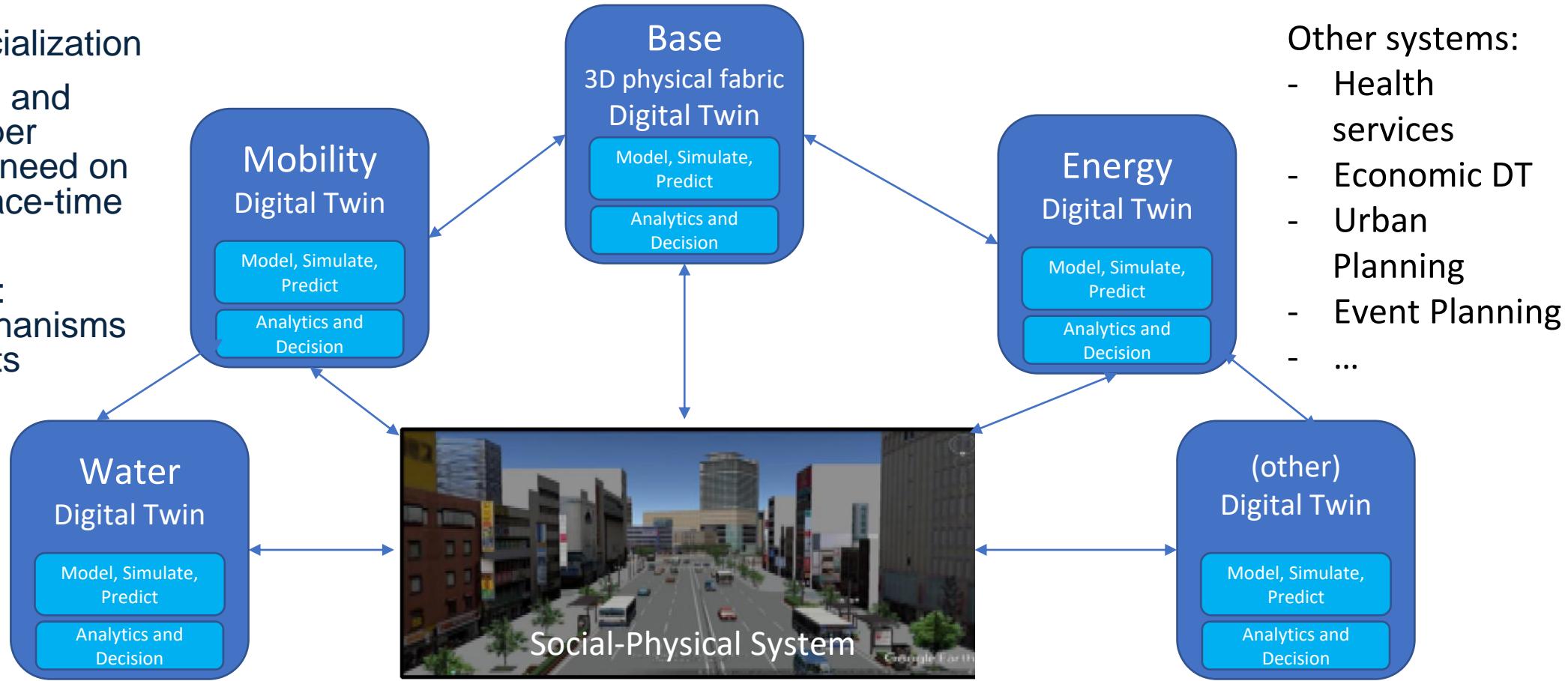


Multiple Themes for Urban Digital Twins

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- Thematic specialization
- Harmonization and convergence per efficiency and need on a common space-time framework
- Interoperability: Minimum Mechanisms & Pivotal Points
- Standards!



- From digital islands through pairwise coordination towards a system-of-systems
- Cities are emergent phenomena, so are their twins

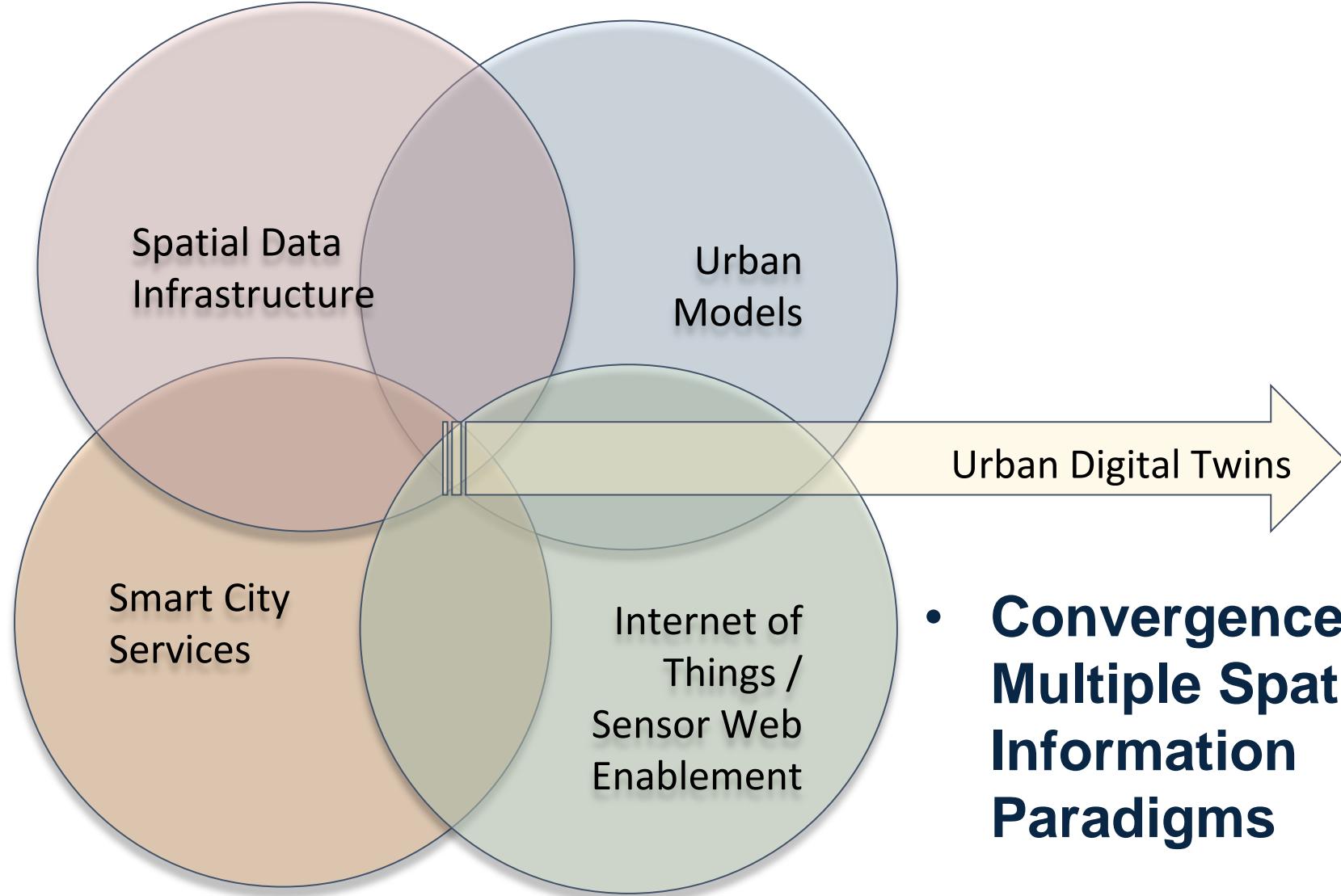
Other systems:
- Health services
- Economic DT
- Urban Planning
- Event Planning
- ...

Digital Twin as Convergence

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- **Urban
Digital Twin
Concept**



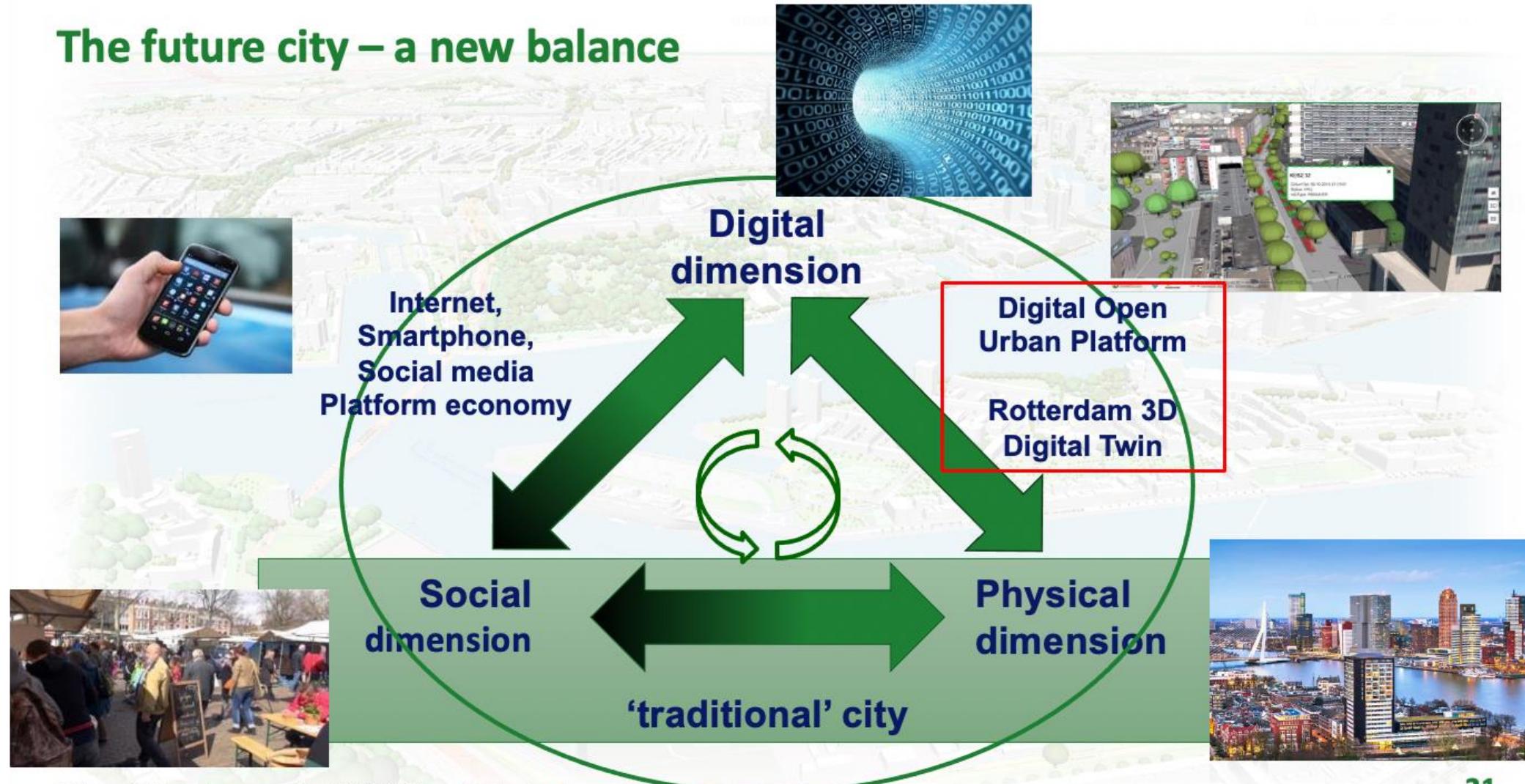
- **Convergence of
Multiple Spatial
Information
Paradigms**

Urban Digital Triplets?

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The future city – a new balance



Rotterdam 3D | Jane Hermans – van Ree | 12-01-2021 | www.3drotterdam.nl

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- Digital Twin at small scale: “looks the same” + “behaves the same”, but “is not the same” (e.g. safer)
- Digital Twin at urban scale: responsive, interactive insight based on geospatial-temporal information technology
- Thematic Digital Twins: specialization on water, energy, mobility, etc., with harmonization and convergence per efficiency and need on a common space-time framework
- UDT convergence of spatial data infrastructure, urban models, smart city services, and IoT / Sensor Web enablement information paradigms
- Urban Digital Triplets balance physical, digital, and social dimensions of city life

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Thank You!

Community

500+ International Members
110+ Member Meetings
60+ Alliance and Liaison partners
50+ Standards Working Groups
45+ Domain Working Groups
25+ Years of Not for Profit Work
10+ Regional and Country Forums

Innovation

120+ Innovation Initiatives
380+ Technical reports
Quarterly Tech Trends monitoring

Standards

65+ Adopted Standards
300+ products with 1000+ certified implementations
1,700,000+ Operational Data Sets Using OGC Standards

Contact info@ogc.org to schedule a meeting for an in-depth discussion with OGC staff and join our community today!

