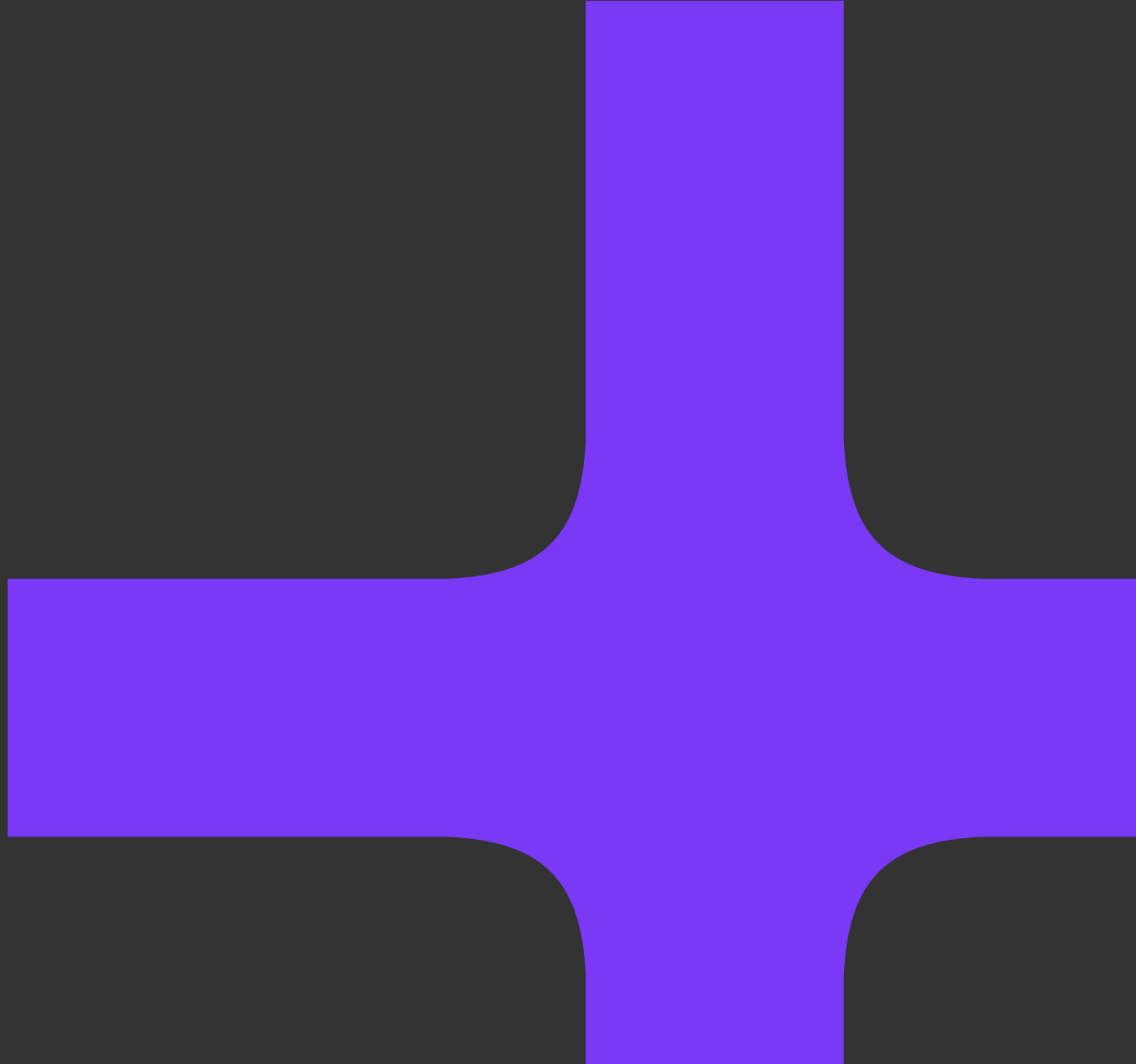


A way forwards for city digital twins

Mark Enzer OBE FREng

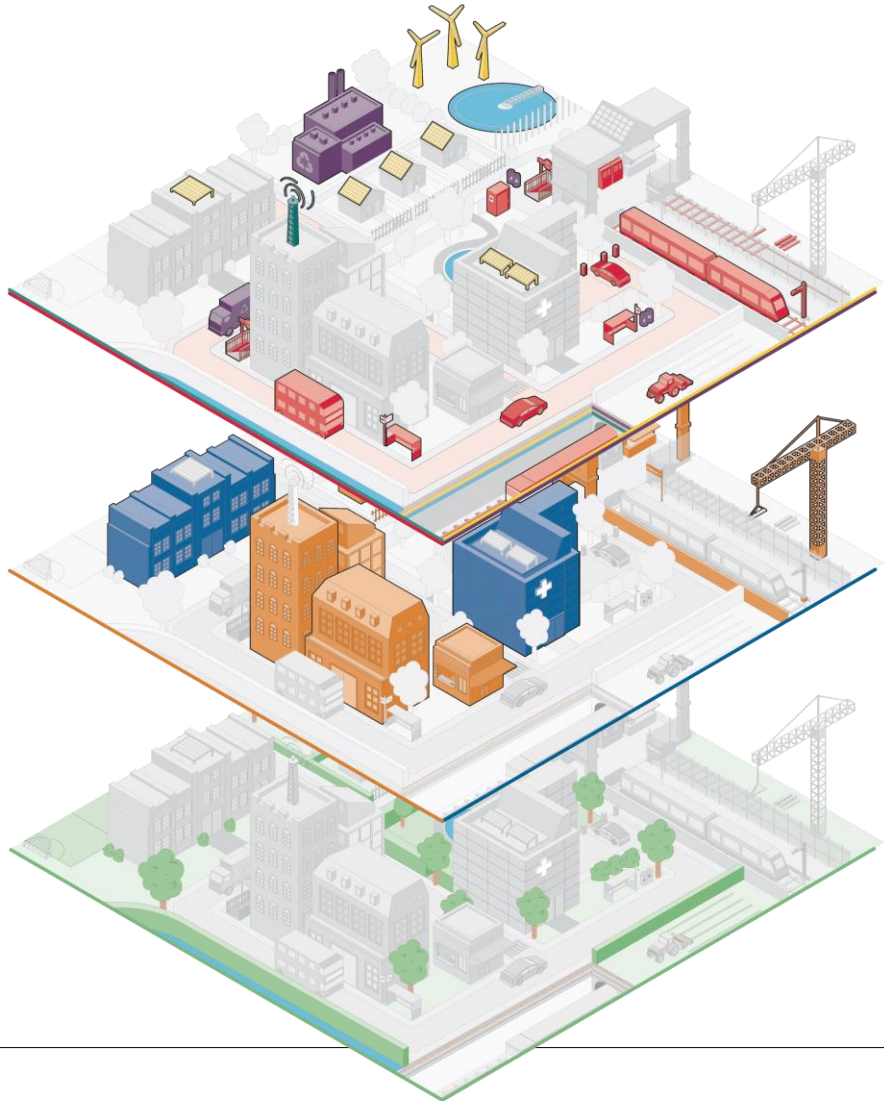
5th March 2024



Running order

- **Context – systems-thinking in the built environment**
- **Connected Digital Twins as part of the solution**
- **Looking forwards**

The built environment is a system of systems




Economic
infrastructure

Social
infrastructure

Natural
environment



Built environment

A globe of the Earth is centered in the image, showing the continents of Africa and Europe. It is surrounded by a thick, vibrant ring of fire with orange and yellow flames. The background is solid black.

Achieving net zero
Providing climate resilience
Delivering infrastructure equity
Creating a circular economy
Protecting biodiversity

Connections and disconnections

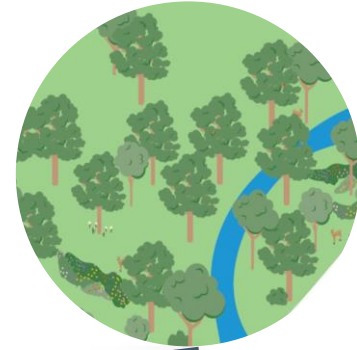
Connected

- **Systems** that our societies depend on
- **Challenges** that face the systems

Disconnected

- **Organisations** that run the systems
- **Data** that is needed to run the systems

The built environment really matters



...and so do we

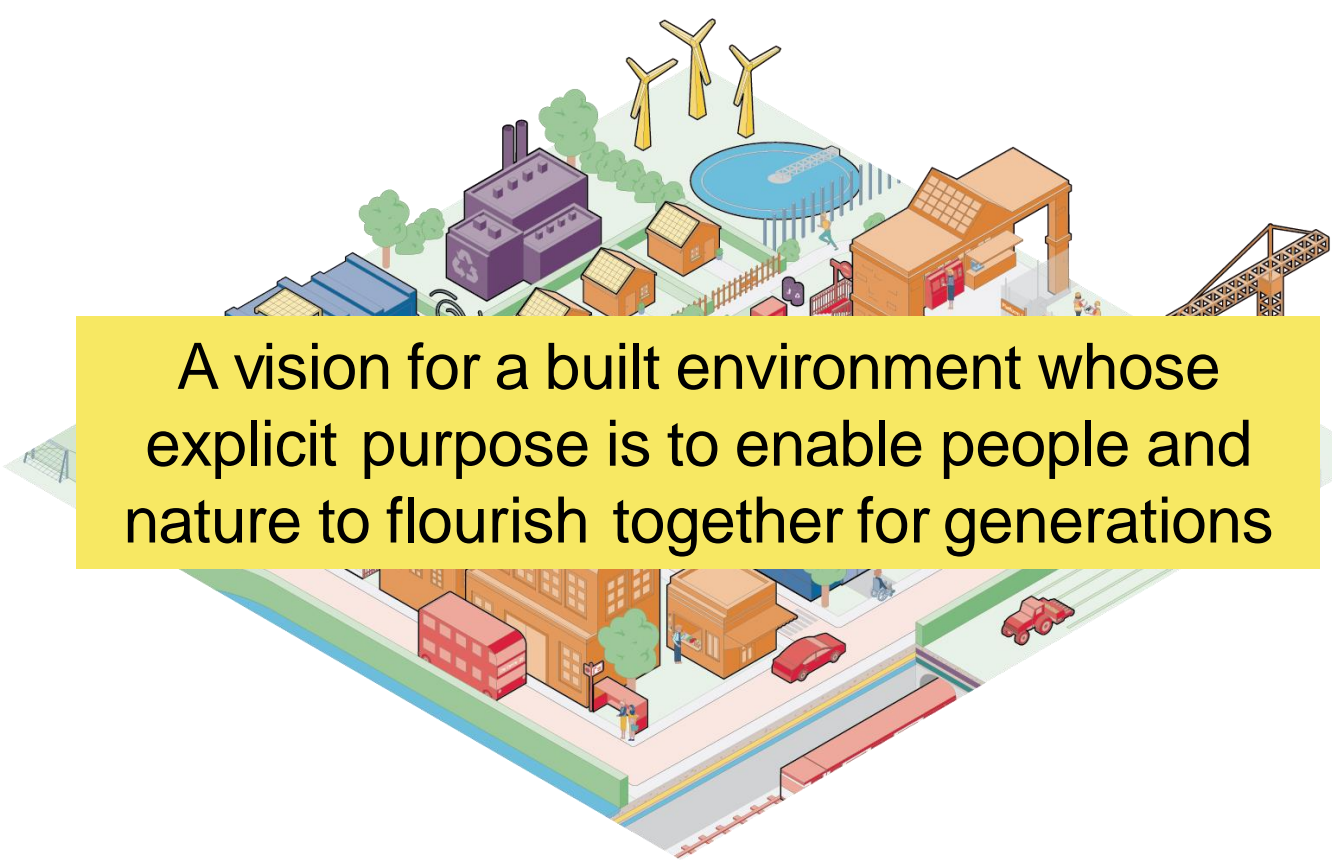
A big vision that is based on outcomes

Our **Vision** for the built environment

This Vision is not about predicting the future for the built environment.

It is about describing the future we want.

Making better decisions now will create a better future.

An isometric illustration of a sustainable built environment. It features a mix of urban and natural elements: modern buildings, a large circular water feature, wind turbines, trees, and a bridge. A yellow text box is overlaid on the scene.

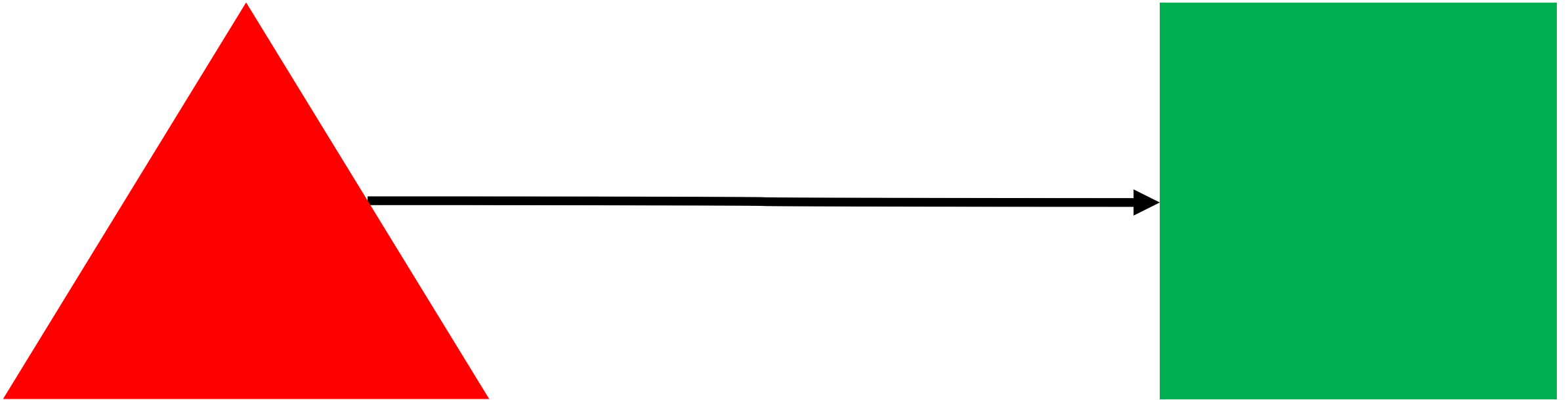
A vision for a built environment whose explicit purpose is to enable people and nature to flourish together for generations

An approach that is outcomes-focused and systems-based



Projects

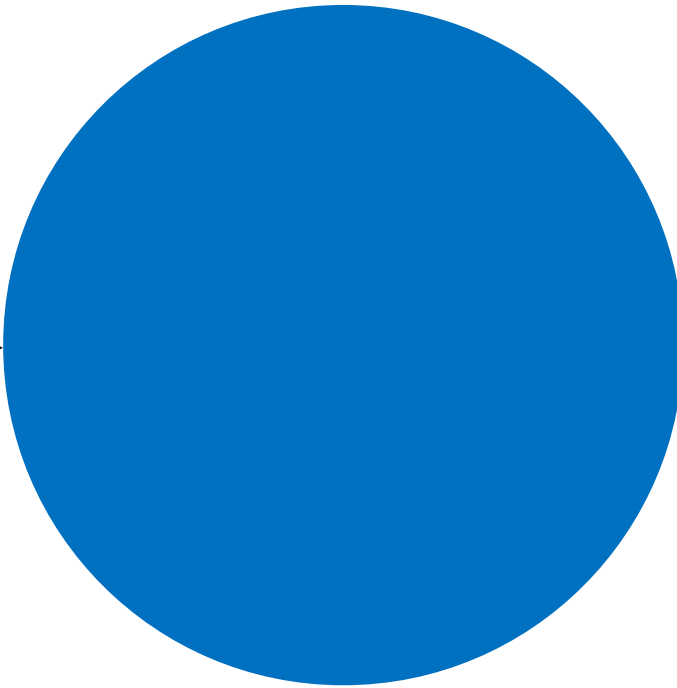
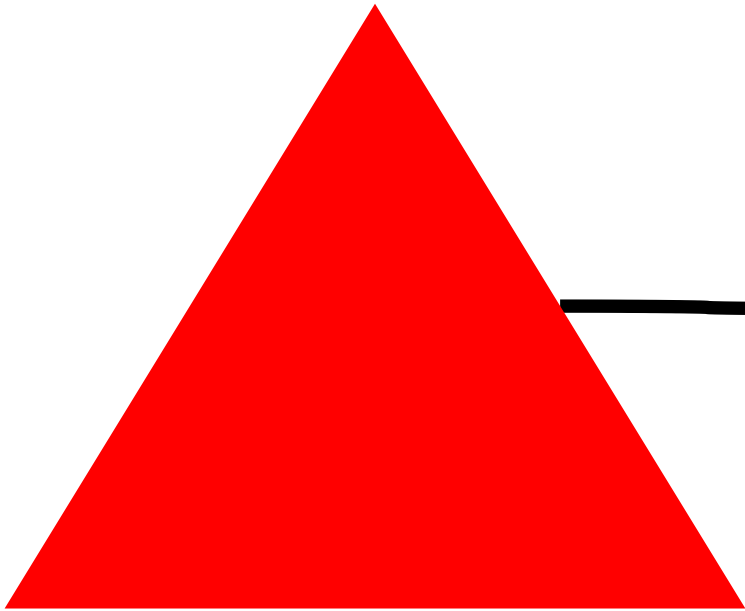
Outcomes



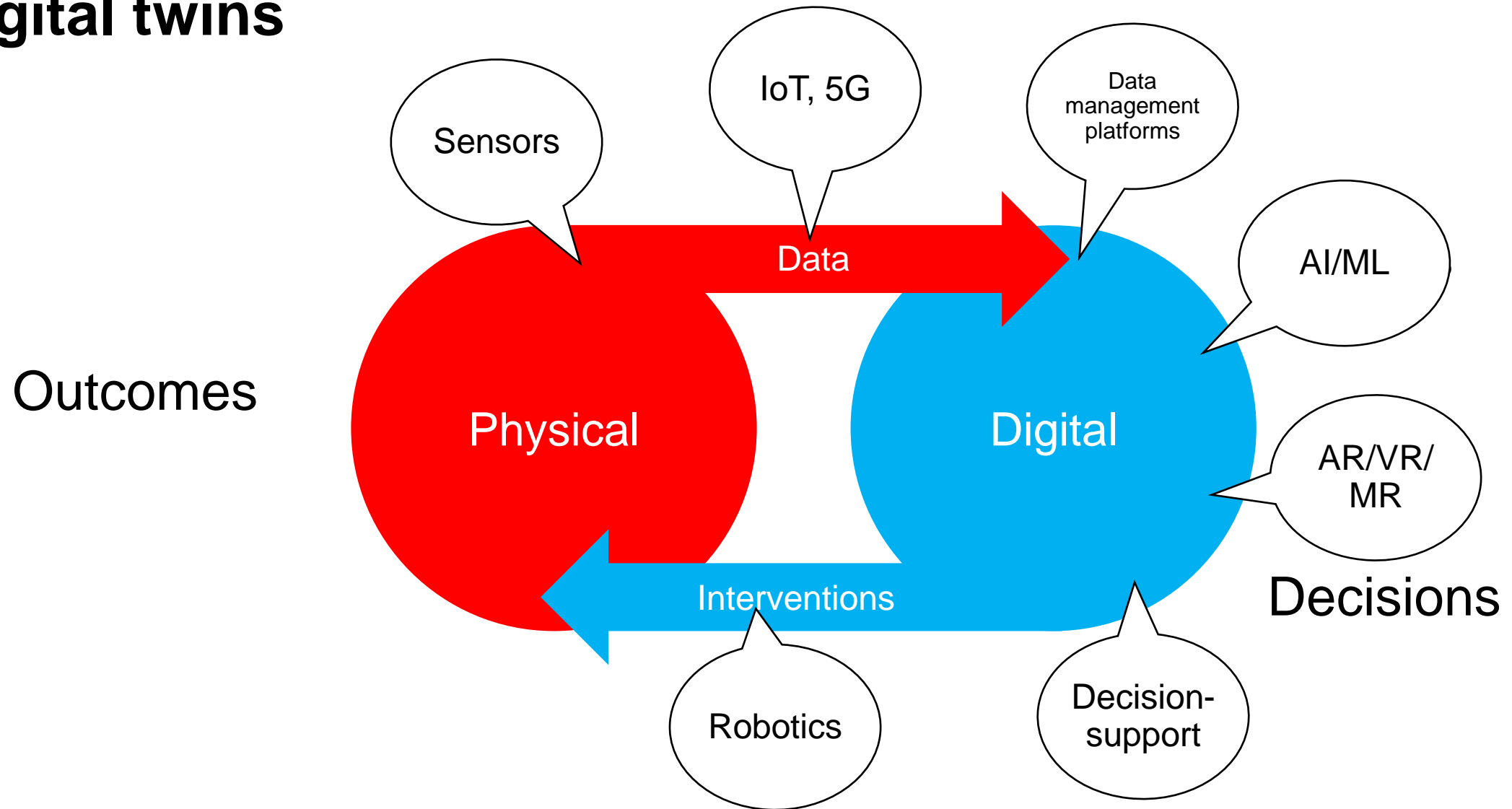
Interventions

Systems

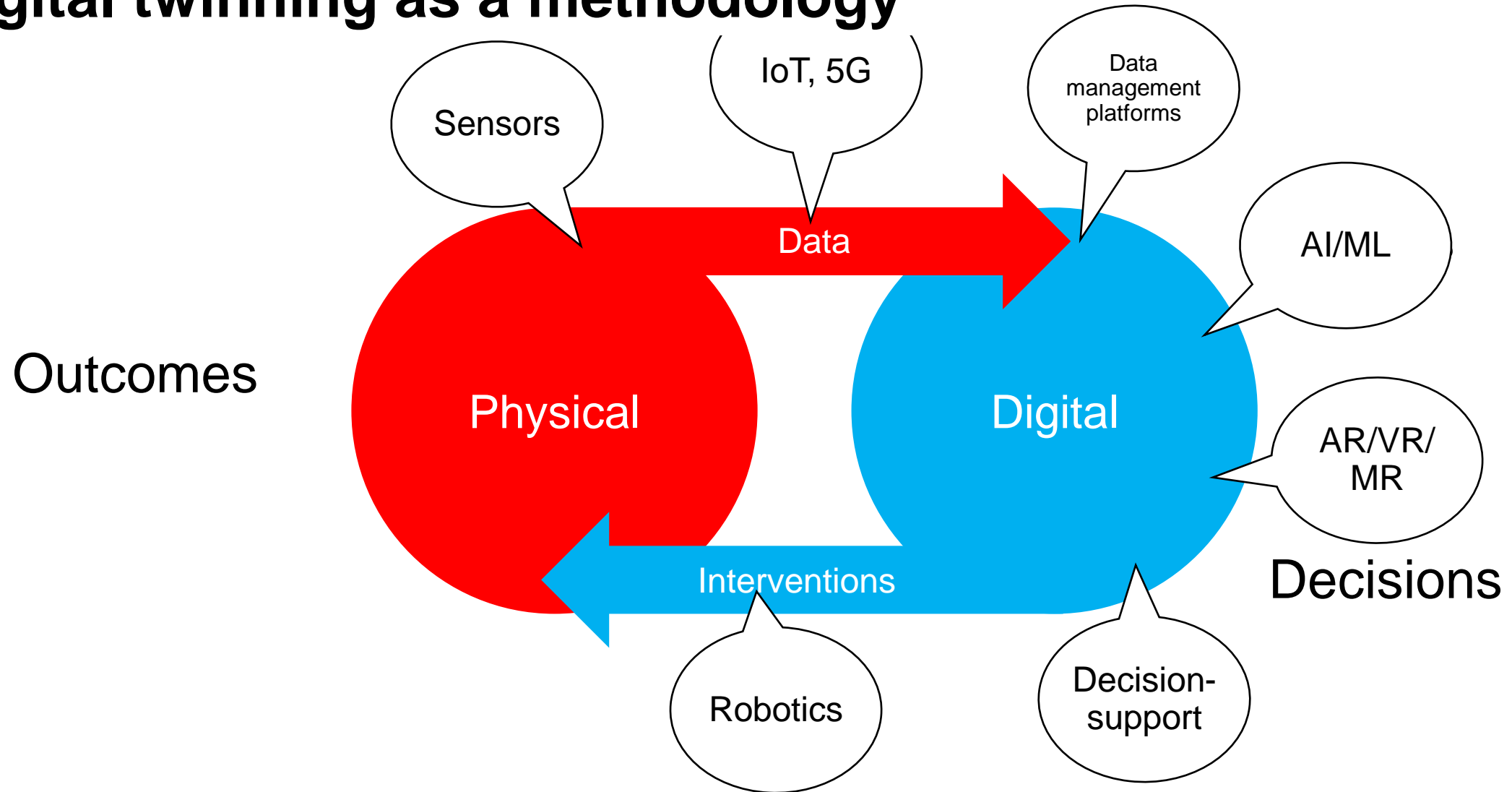
Outcomes



Digital twins

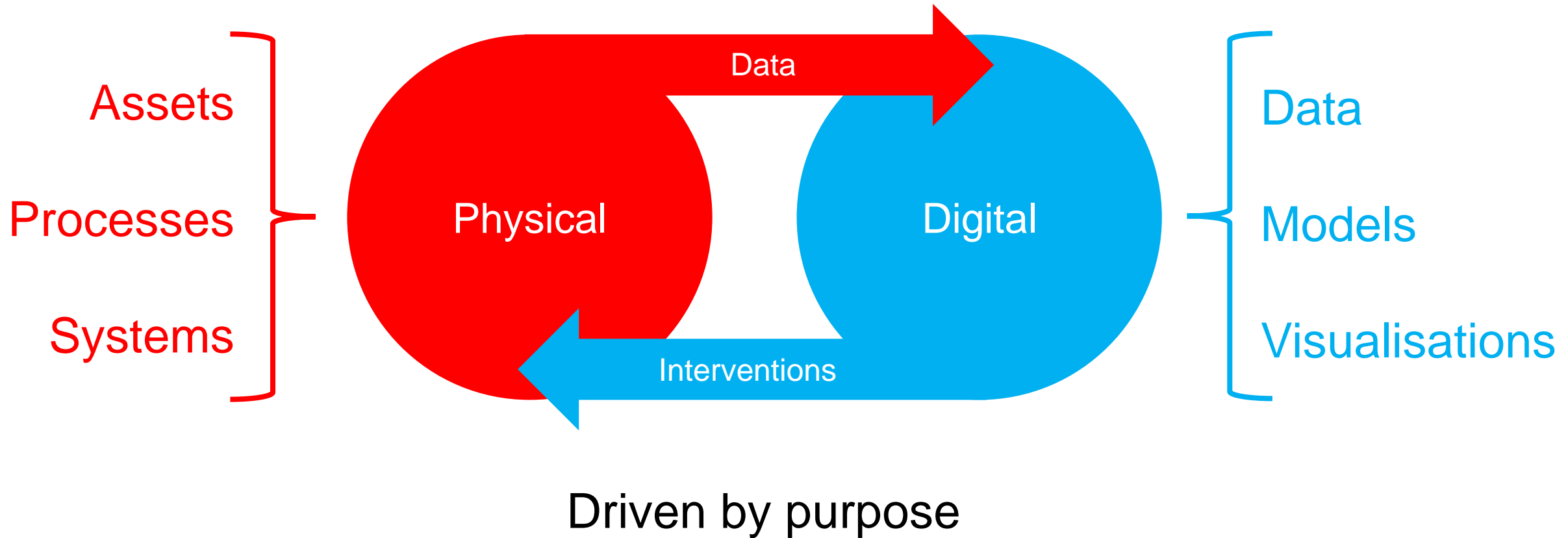


Digital twinning as a methodology

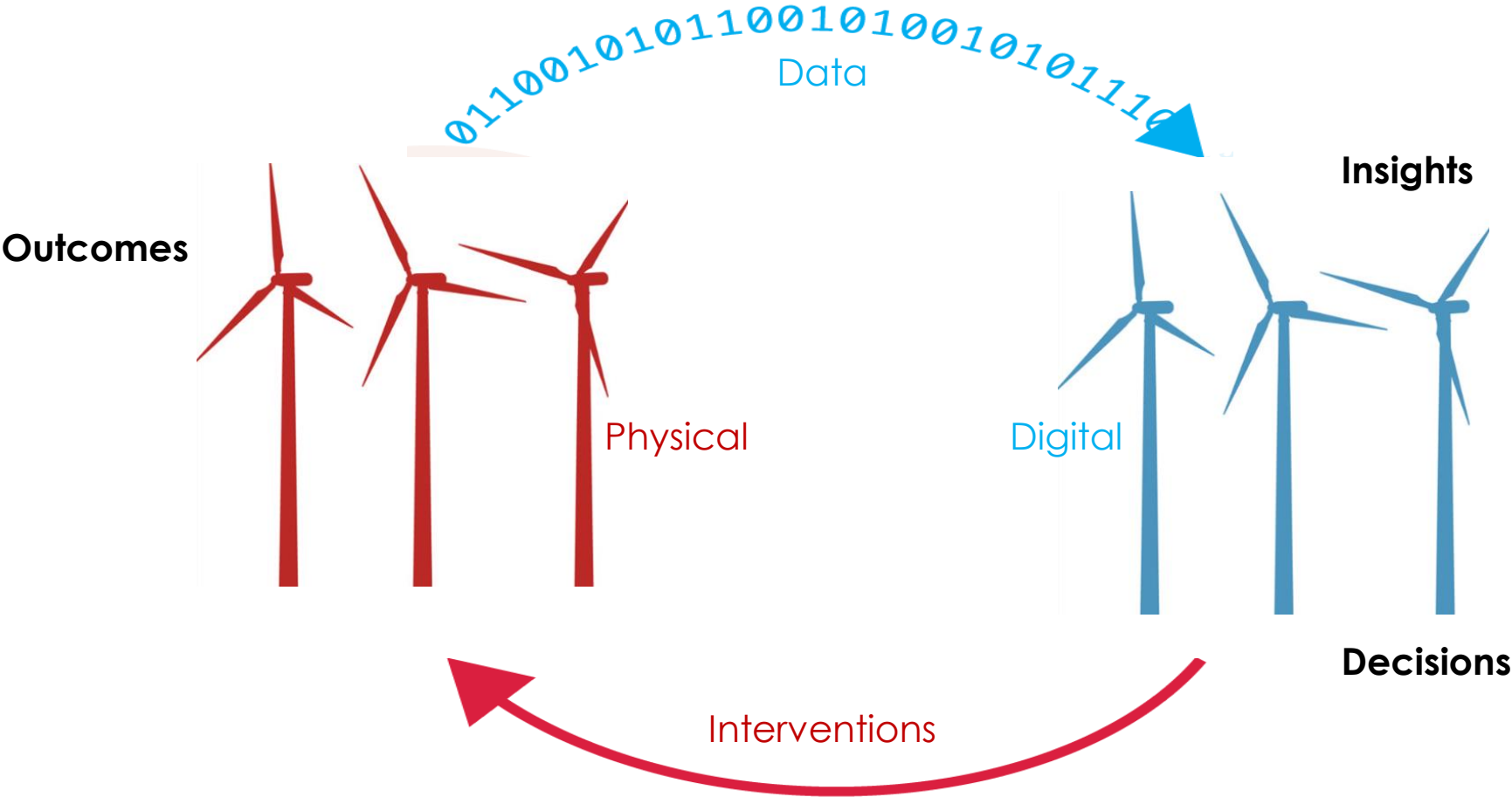


Digital twins – many digital twins for many purposes

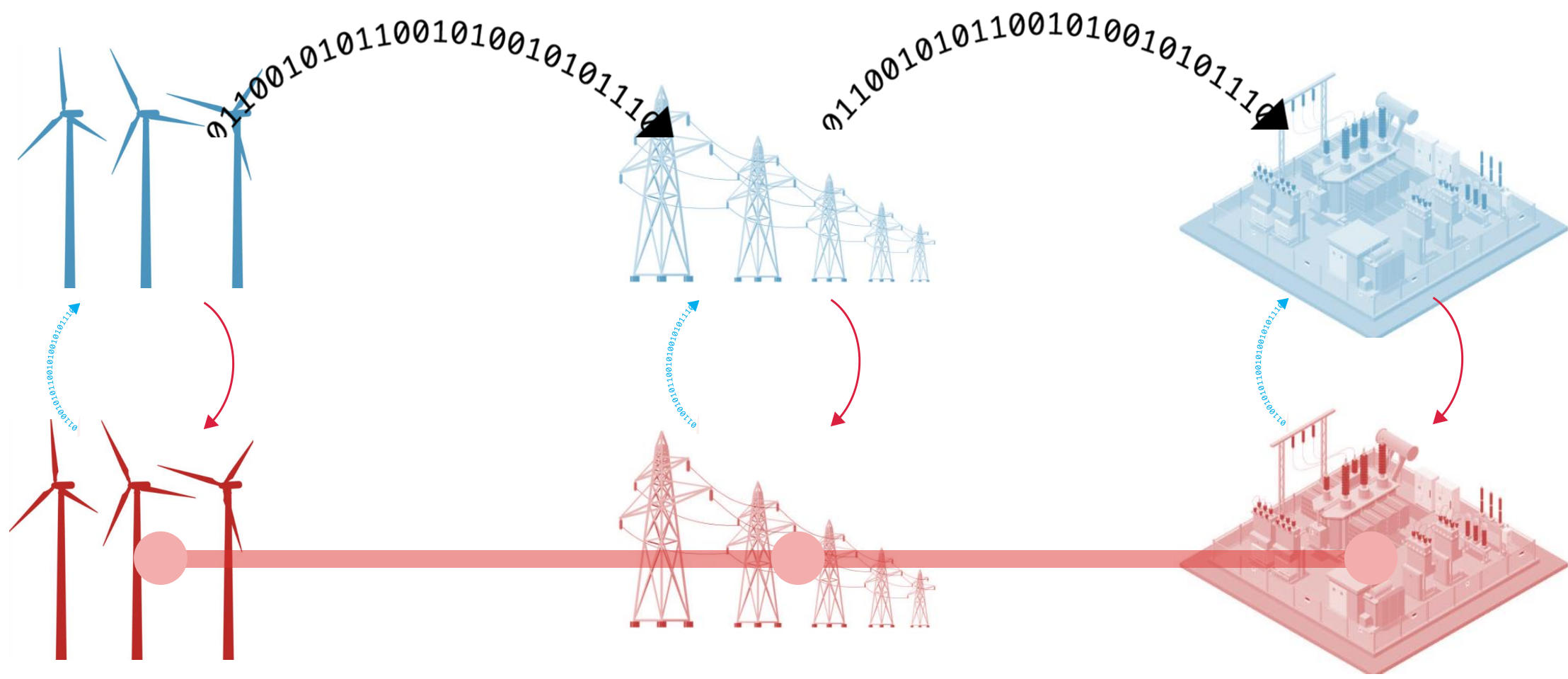
Delivering value: “better decisions faster”



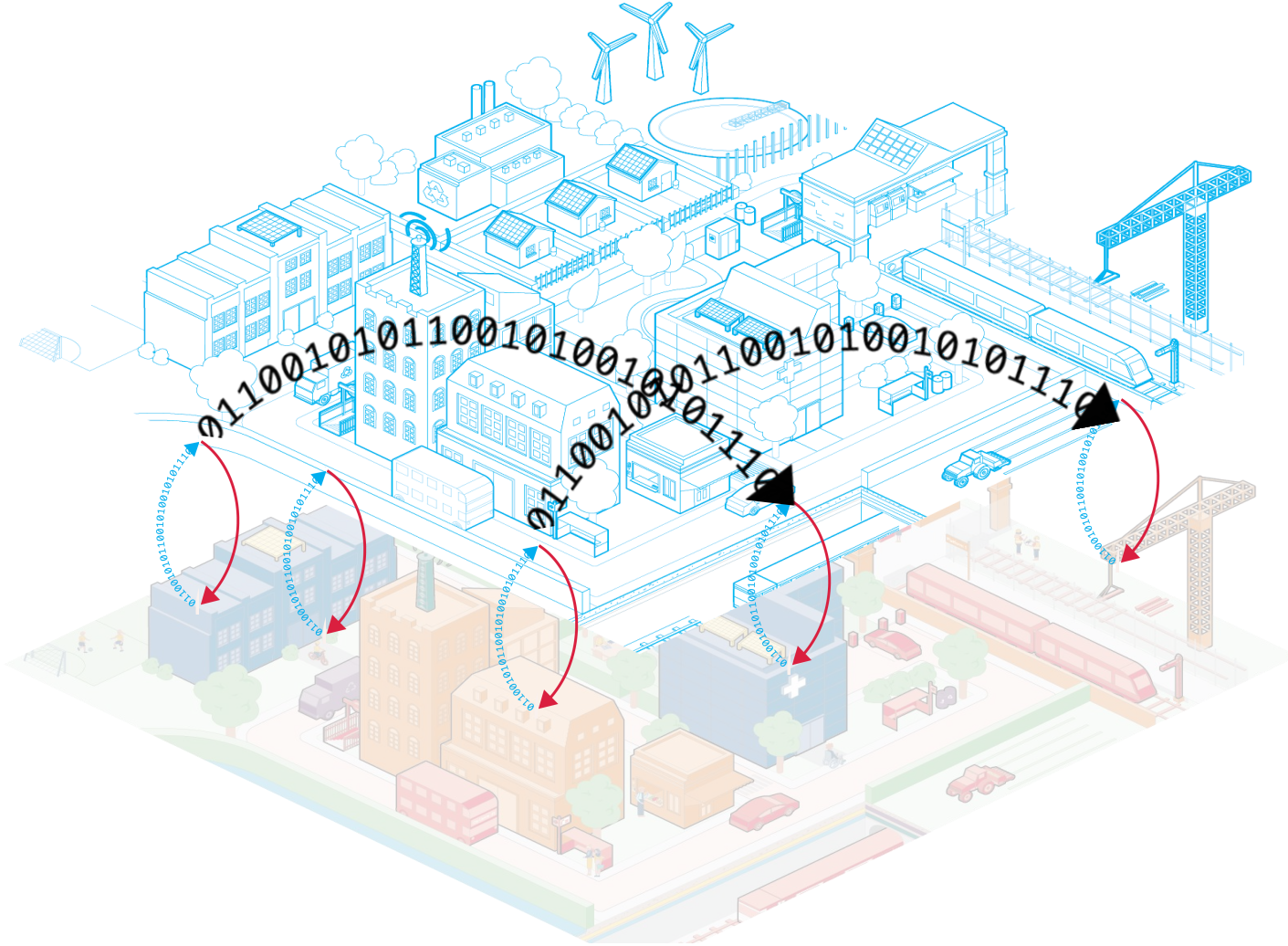
Individual digital twins



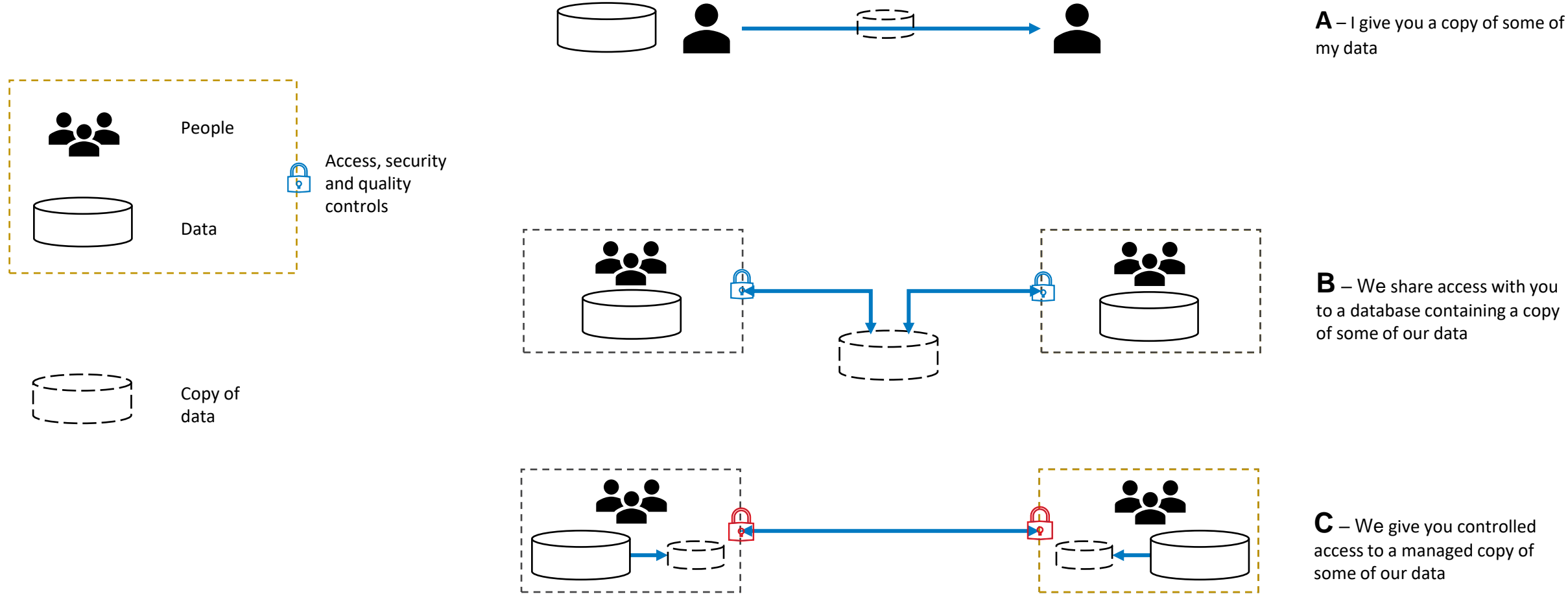
Connected digital twins



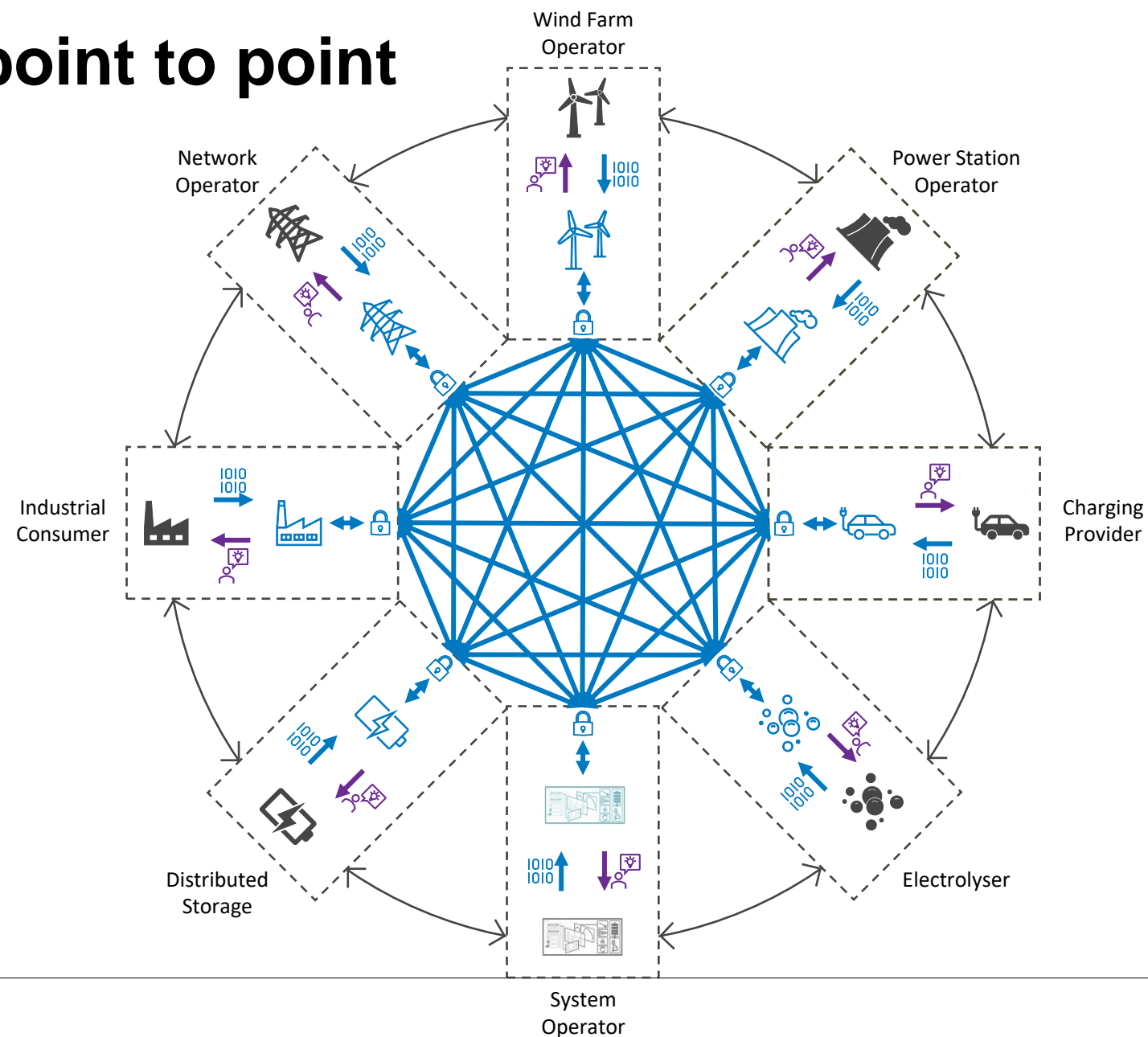
An ecosystem of connected digital twins



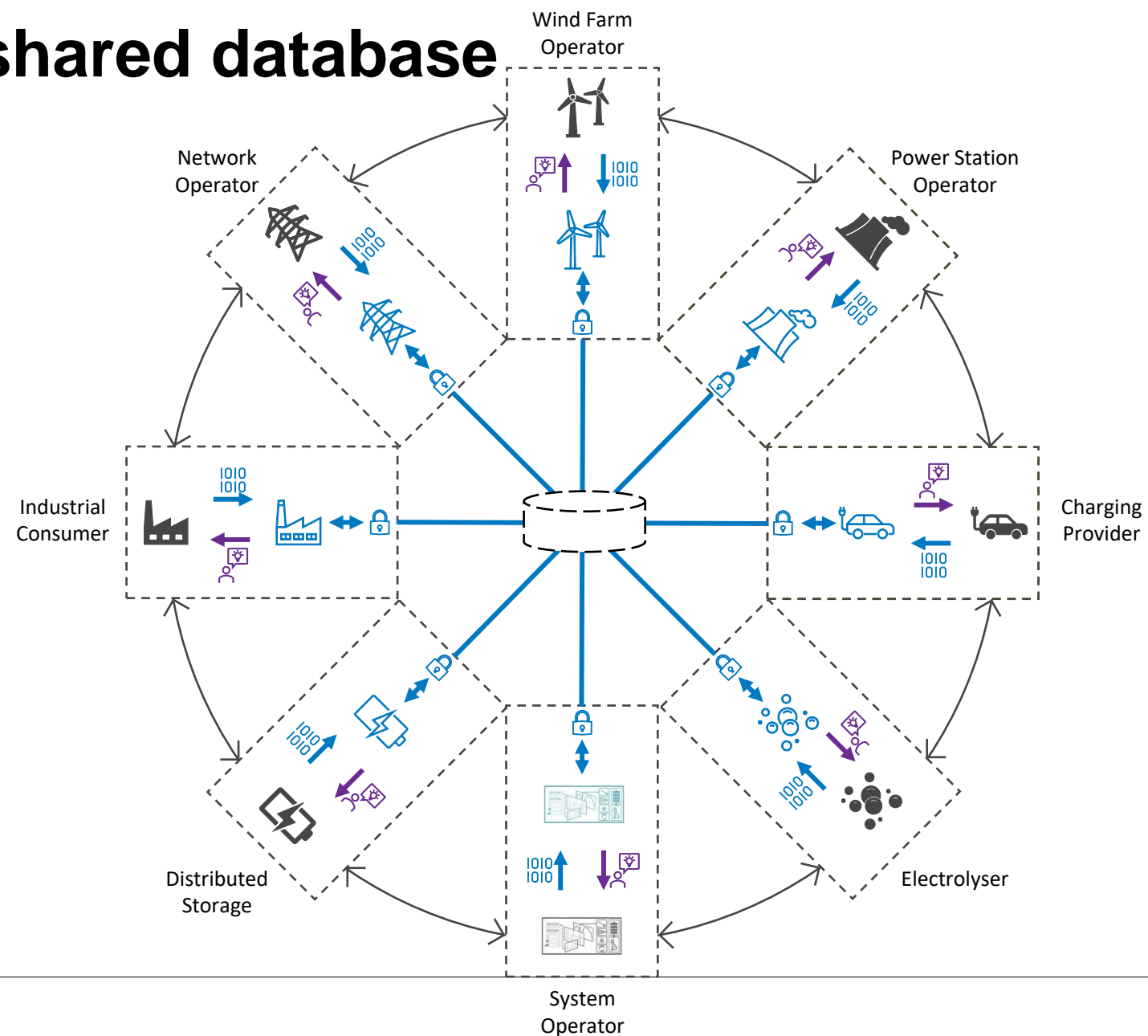
One to one data sharing



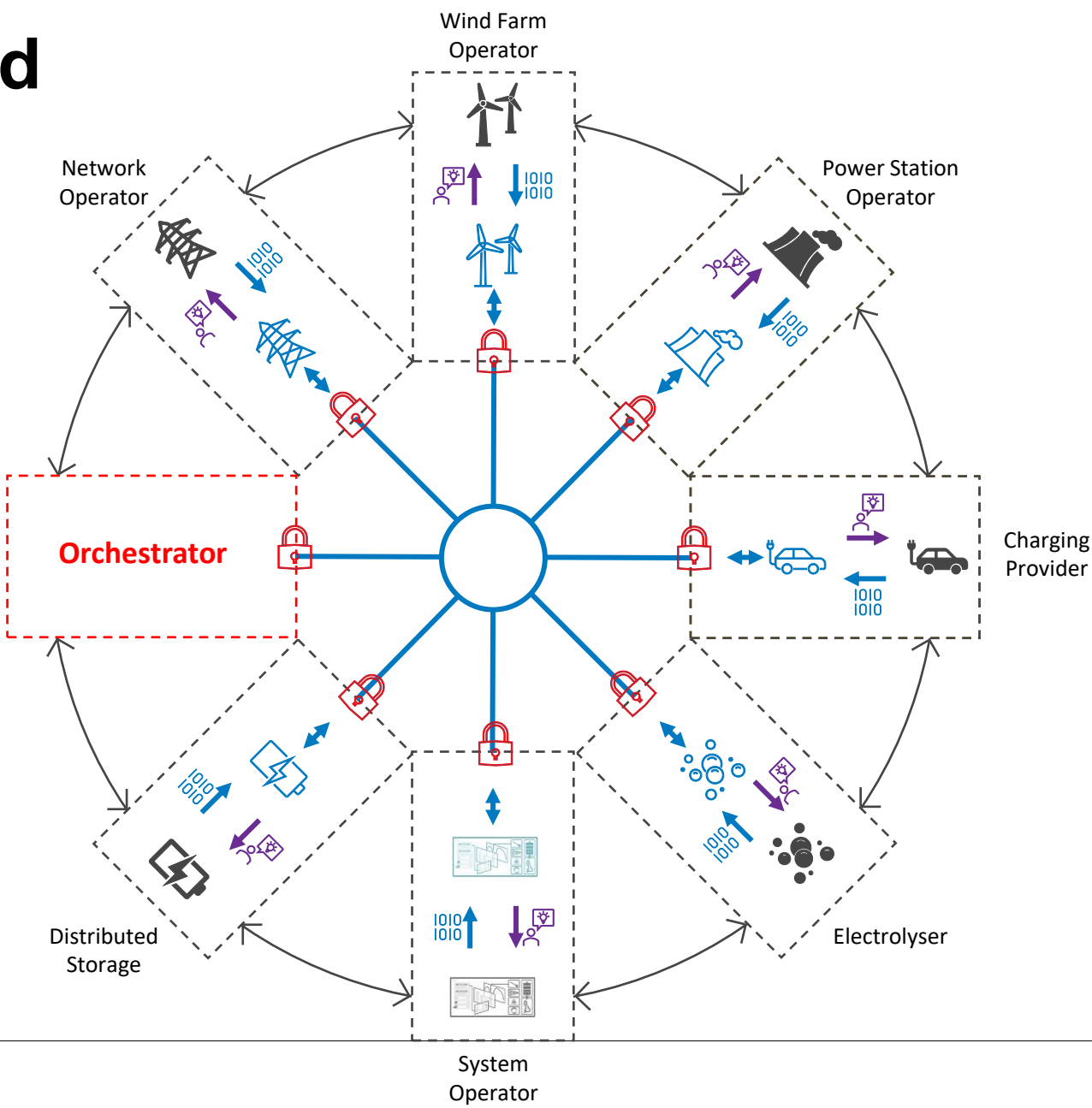
Many to many – point to point



Many to many – shared database



Distributed/connected

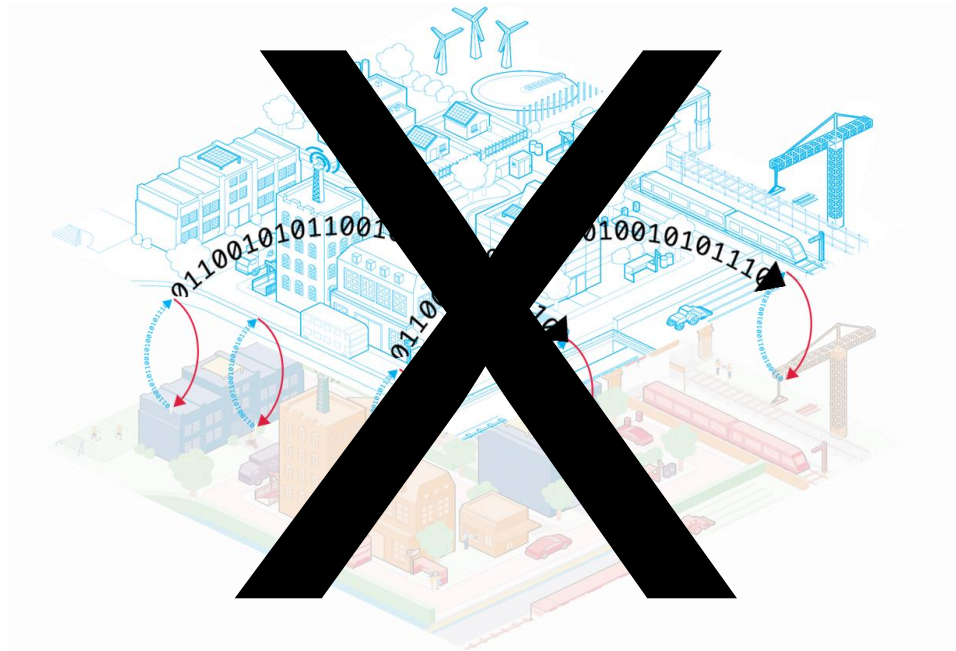


Sharing information helps address systems-level challenges

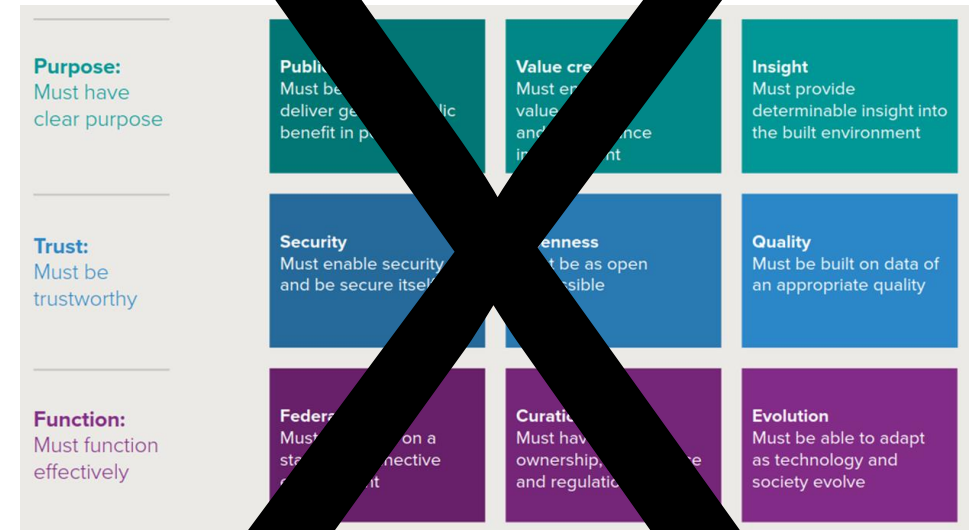


Potential market failure...

Federation failure



Ethical failure



The future we want

**Data for
public exploitation**



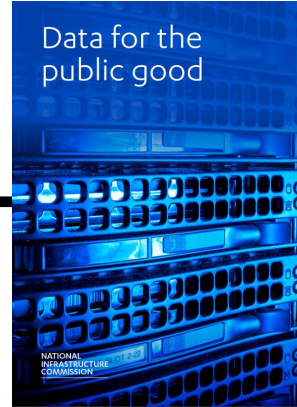
**Data for
public control**

The future we want

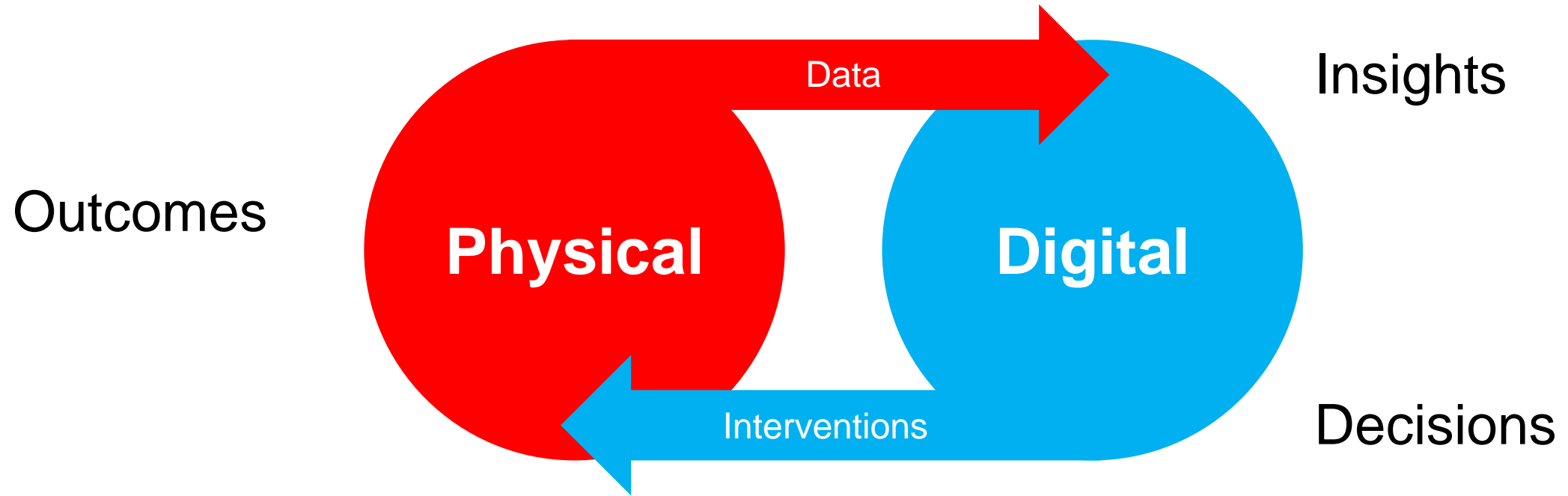
**Data for
public exploitation**

Data for the
public good

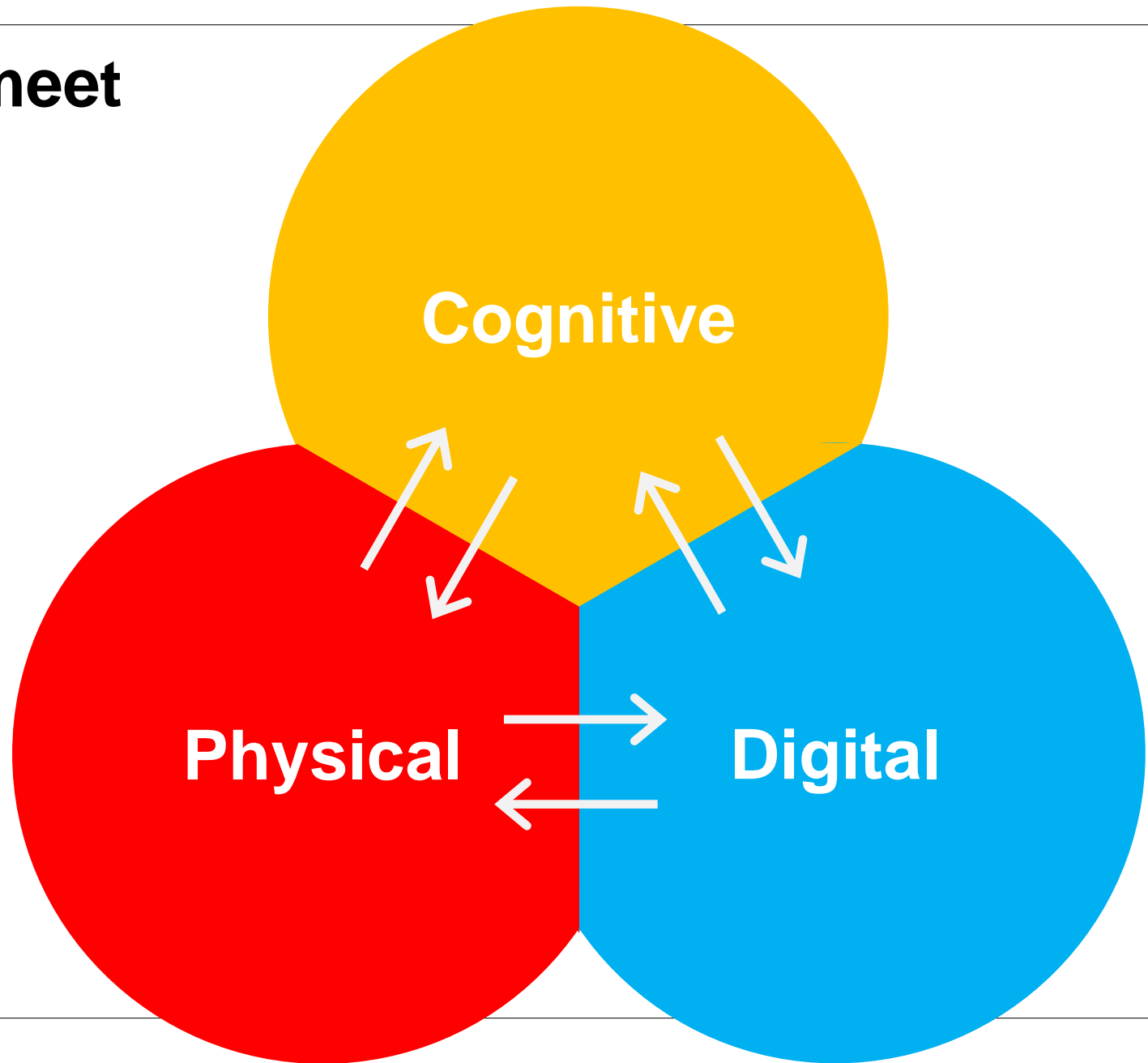
**Data for
public control**



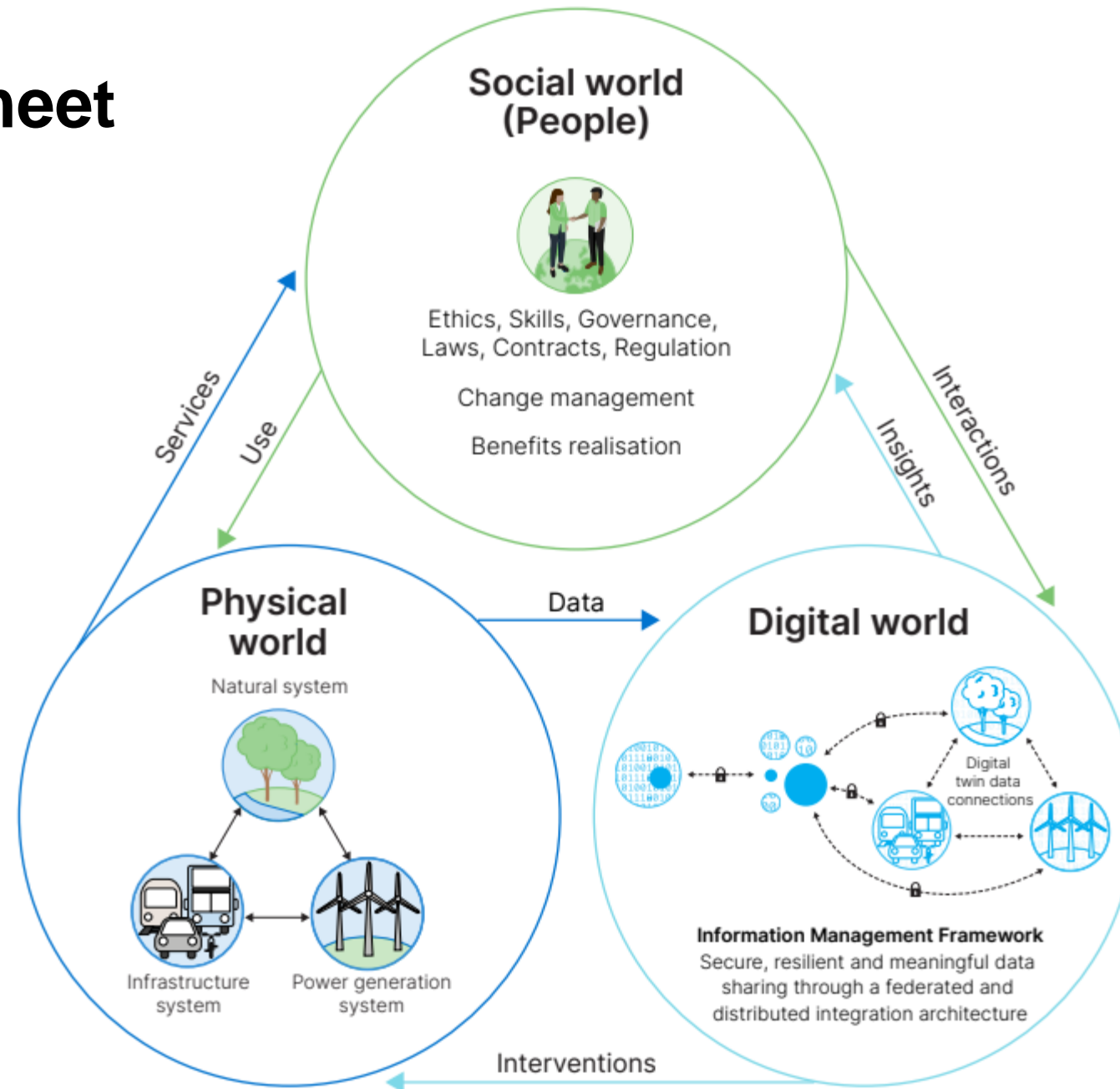
Digital twins



Where our worlds meet



Where our worlds meet



Building an ecosystem

Cyber Physical Infrastructure



Department for
Science, Innovation,
& Technology

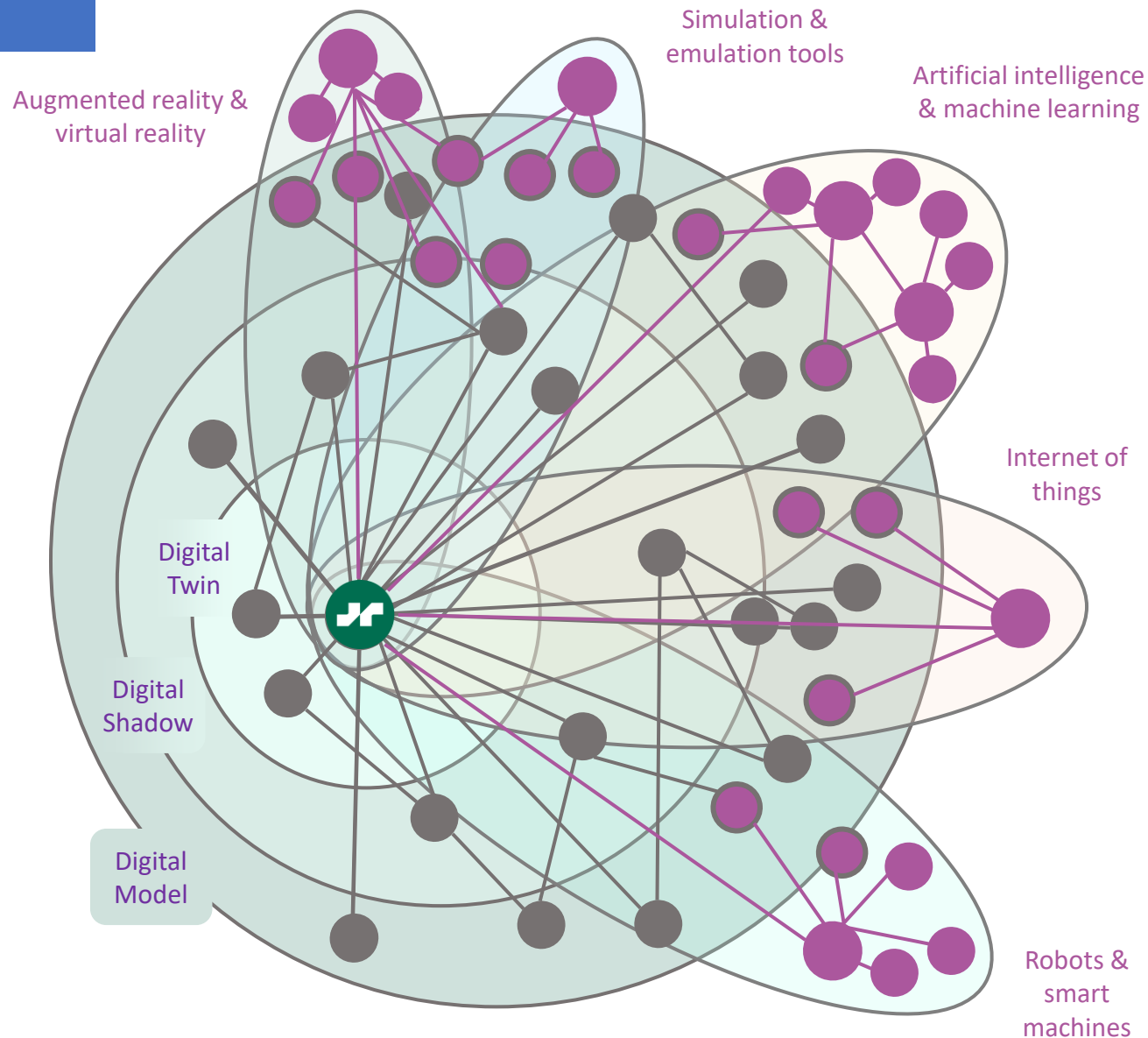


Shared building blocks:

Socio-tech

Human factors
User experiences
Interactions
Value propositions
Skills and competence
Living labs

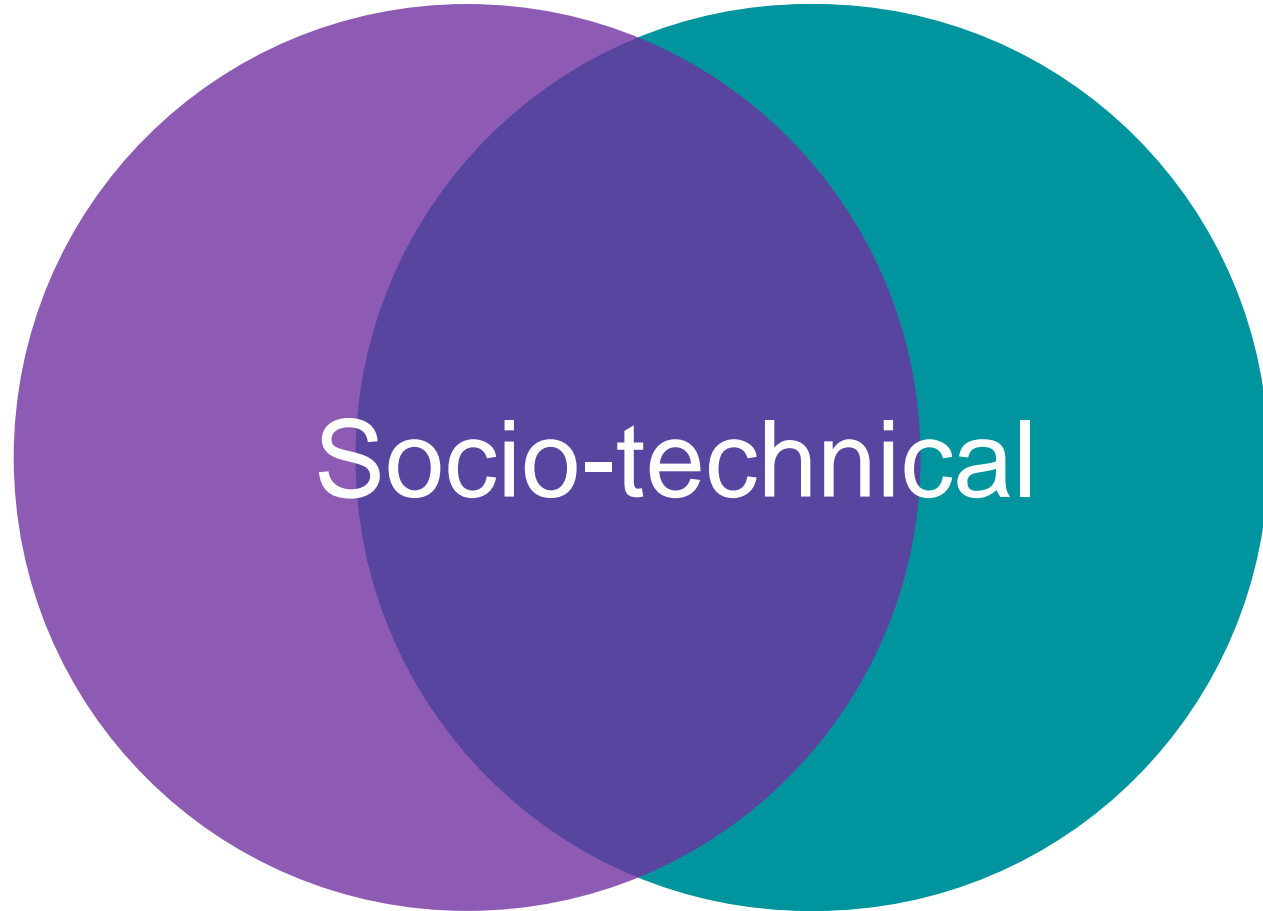
- Organisations & programmes
- Cyber physical system



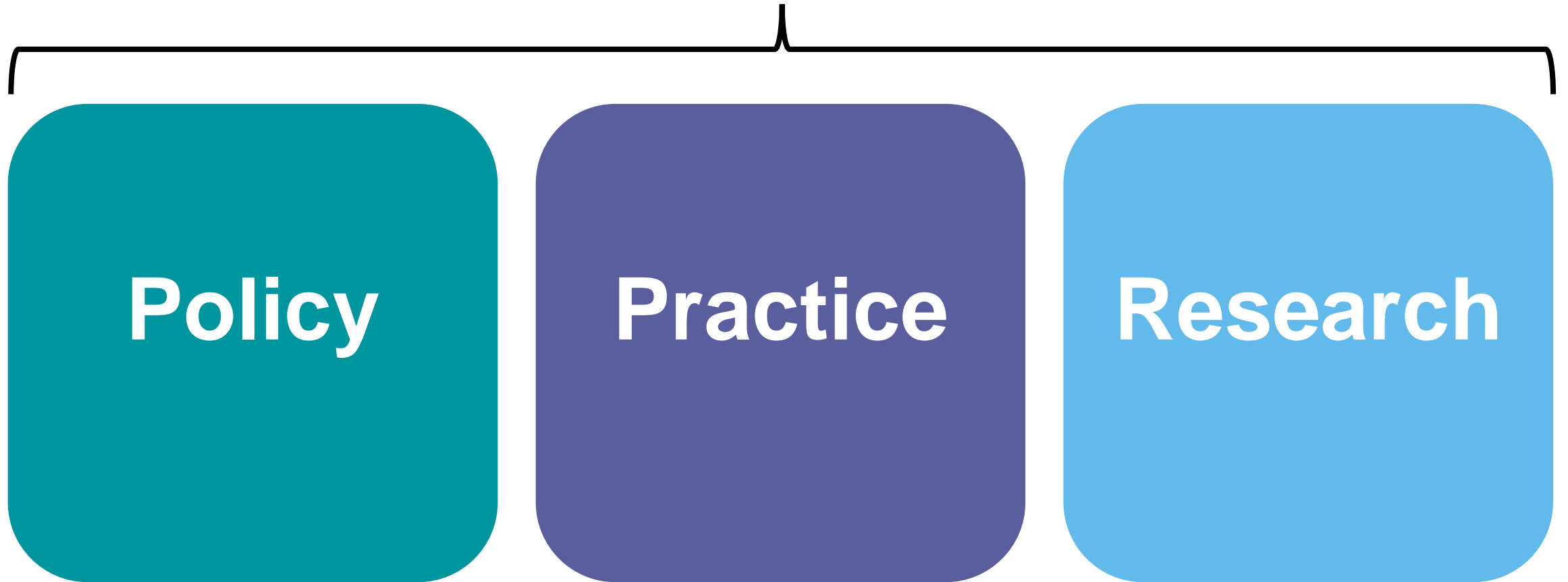
Shared building blocks: Infrastructure

Models
Algorithms
Frameworks
Standards
Applications
Data assets
APIs
Integration architecture

Socio-technical change



Convene | Connect | Coordinate





Thank you

