

The National Digital Twin Programme

Unleashing the information economy



Data for the public good



Recommendations:

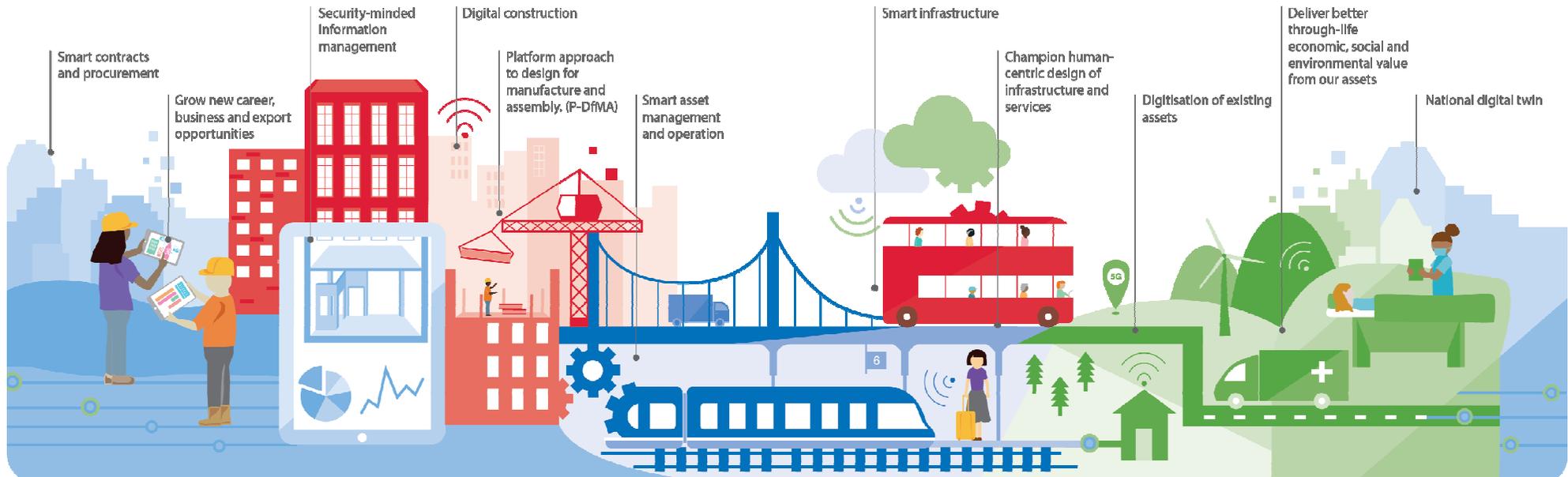
1. A National Digital Twin – an ecosystem of connected digital twins to enable better outcomes from our built environment
2. An Information Management Framework – to enable secure, interoperable data sharing and effective information management
3. A Digital Framework Task Group – to provide coordination and alignment among key players

Enable

Deliver

Align

This is Digital Built Britain



Design

Use best practice, secure by default, information management and digital techniques to get data right from the start and design better-performing homes, buildings and infrastructure.

Build

Exploit new and emerging digital construction, information management, and manufacturing technologies and techniques to improve safety, quality and productivity during construction.

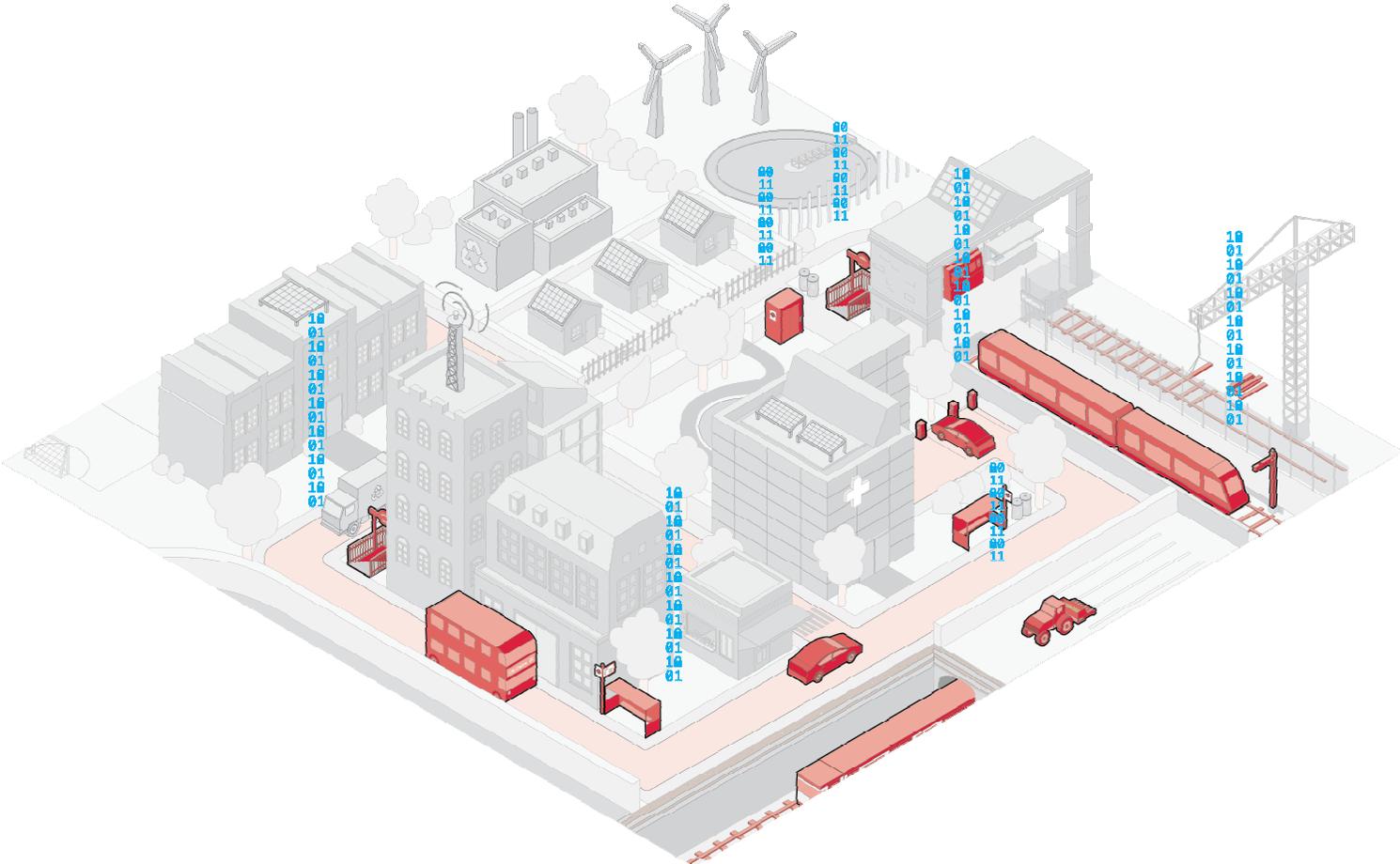
Operate

Use effective information management to transform the performance of the built environment and the services it delivers.

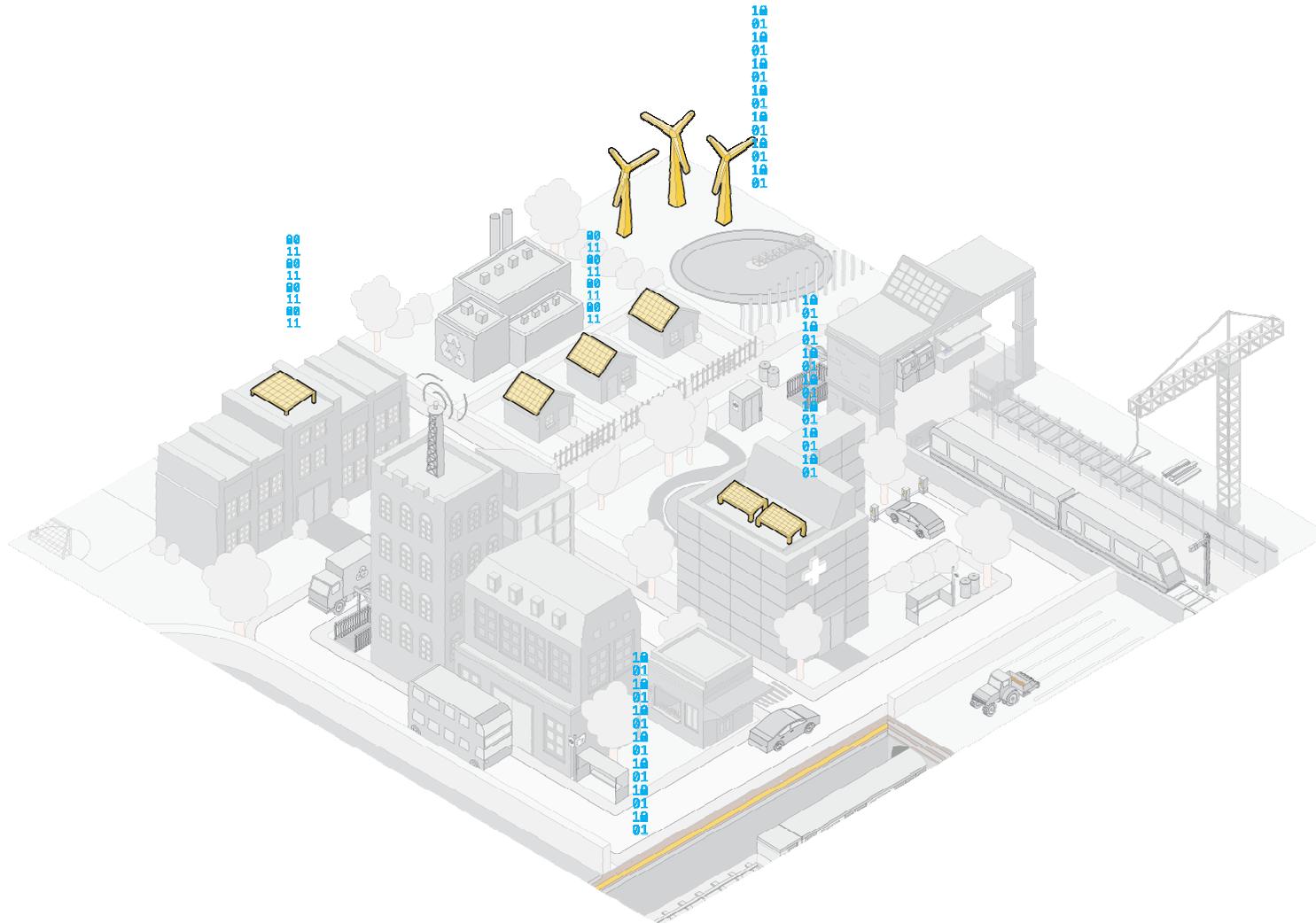
Integrate

Understand how the built environment can improve citizens' quality of life and use that information to drive the design and build of our economic and social infrastructure and the operation and integration of the services they deliver.

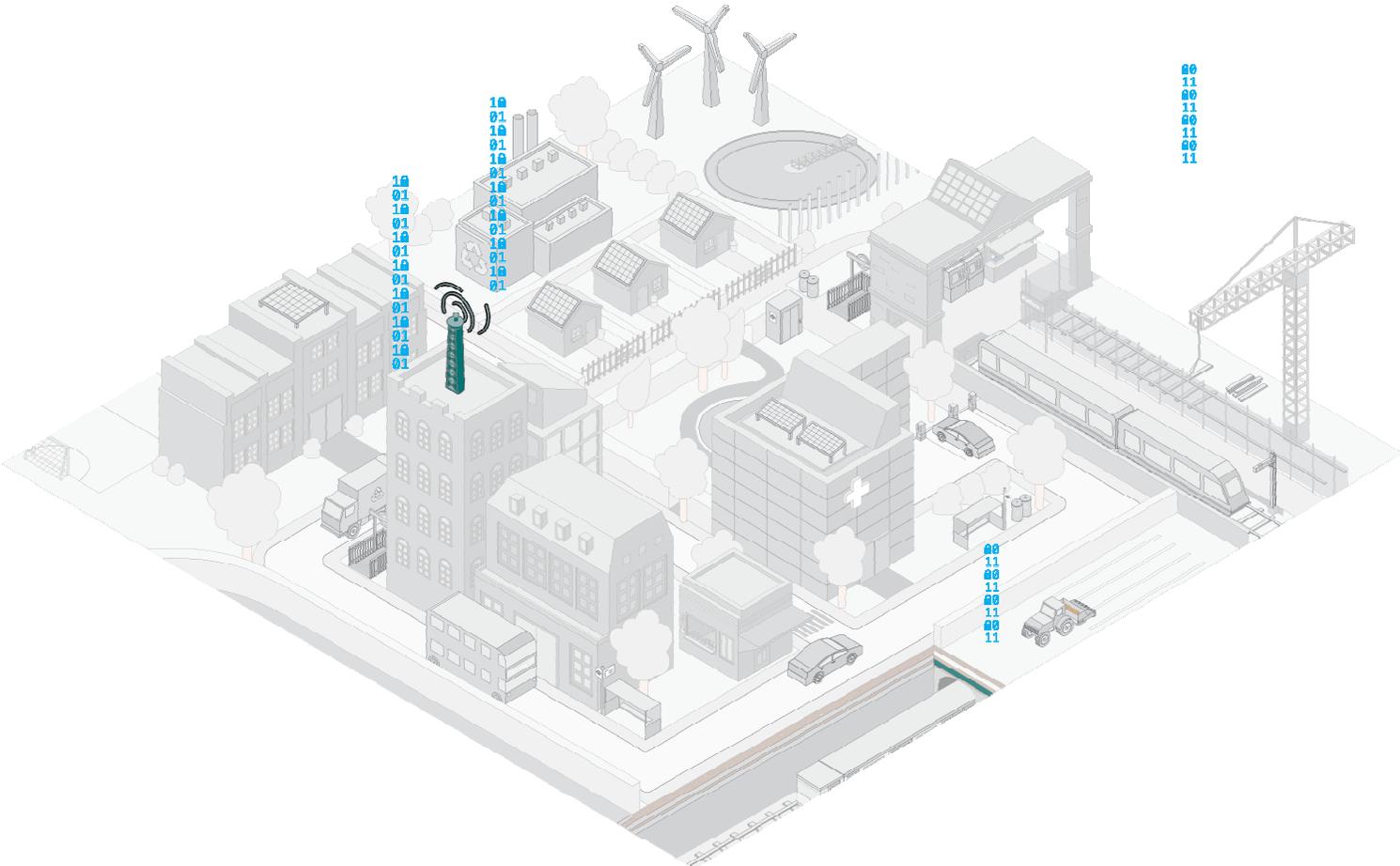
Transport



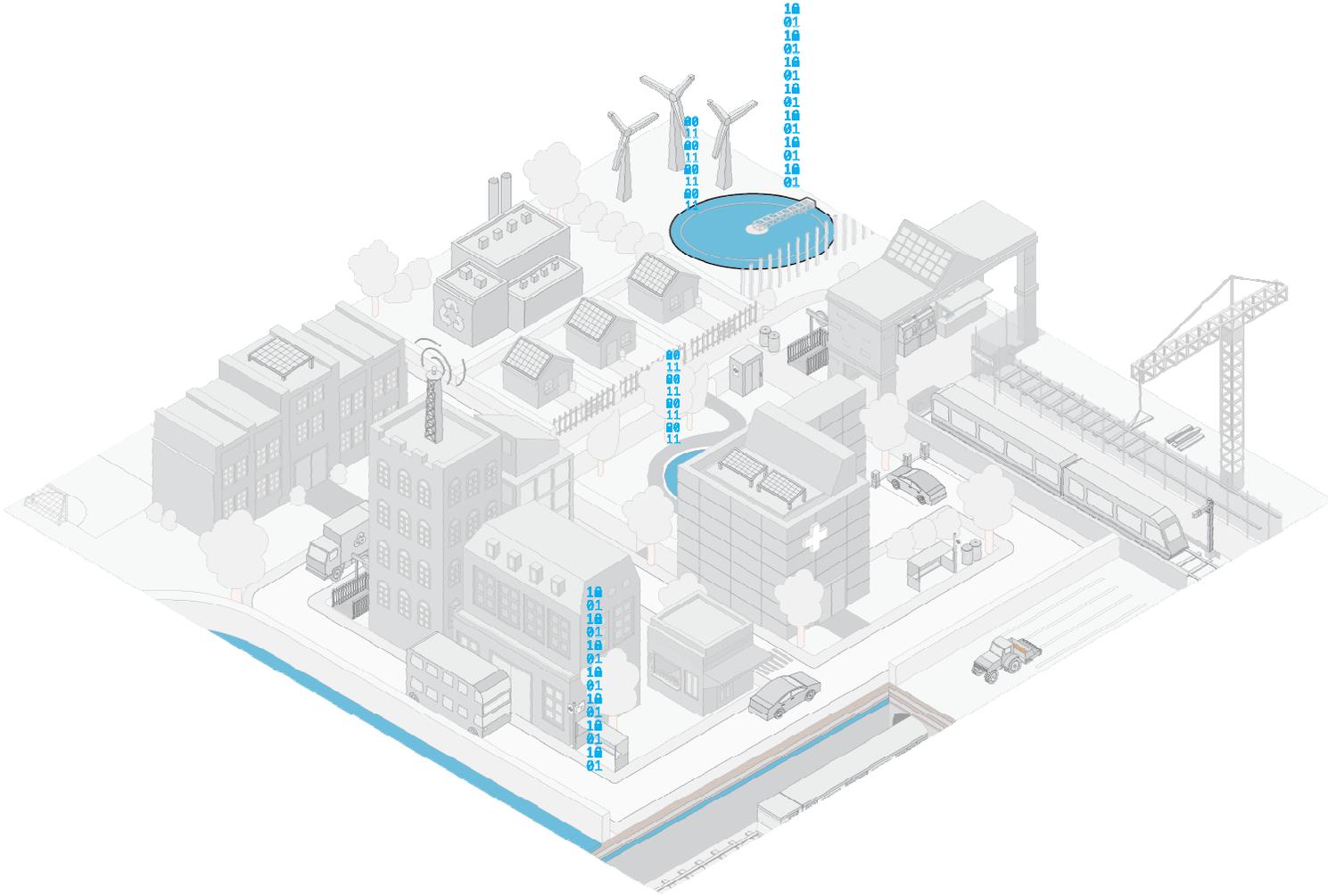
Energy



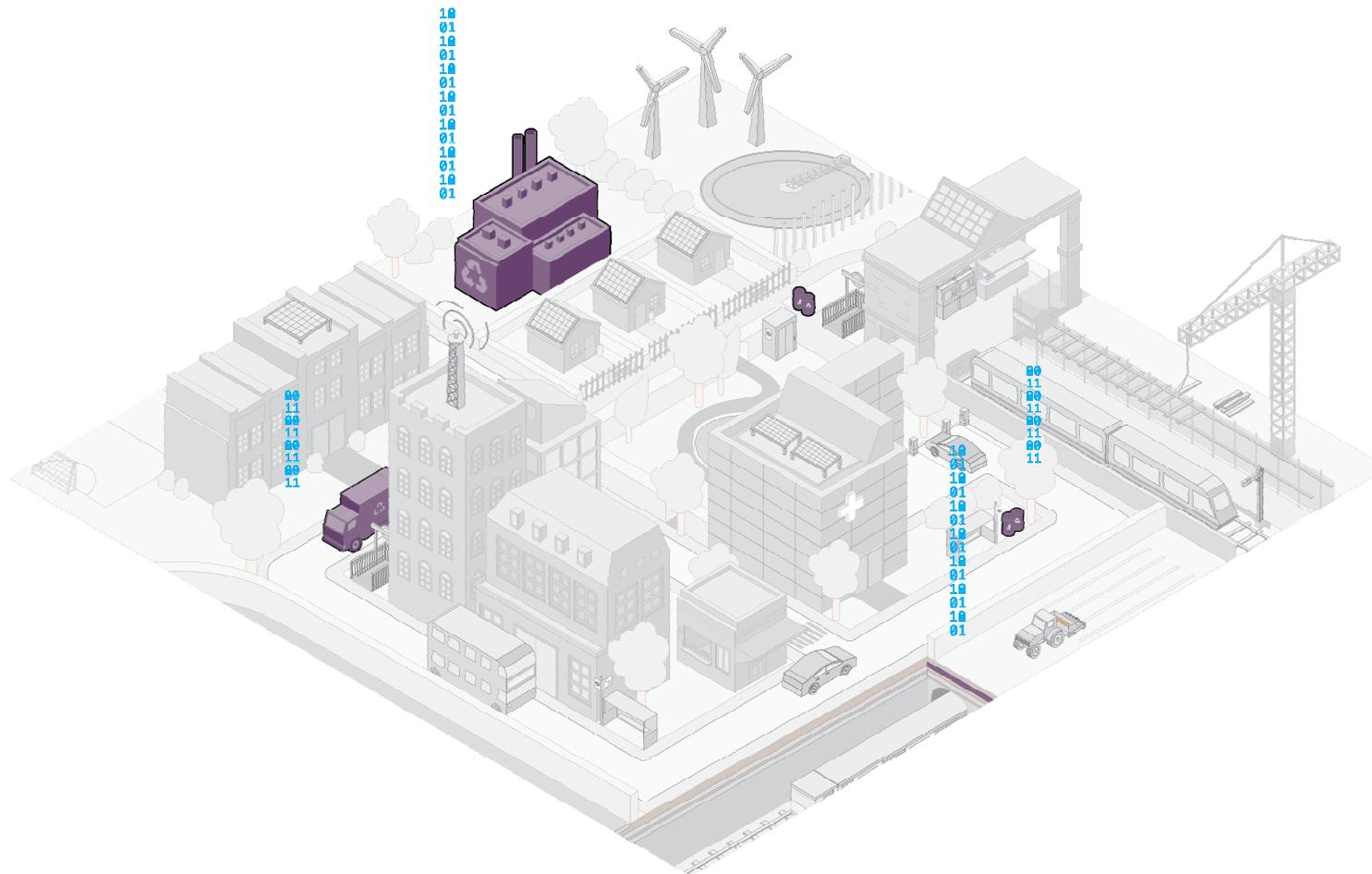
Telecoms



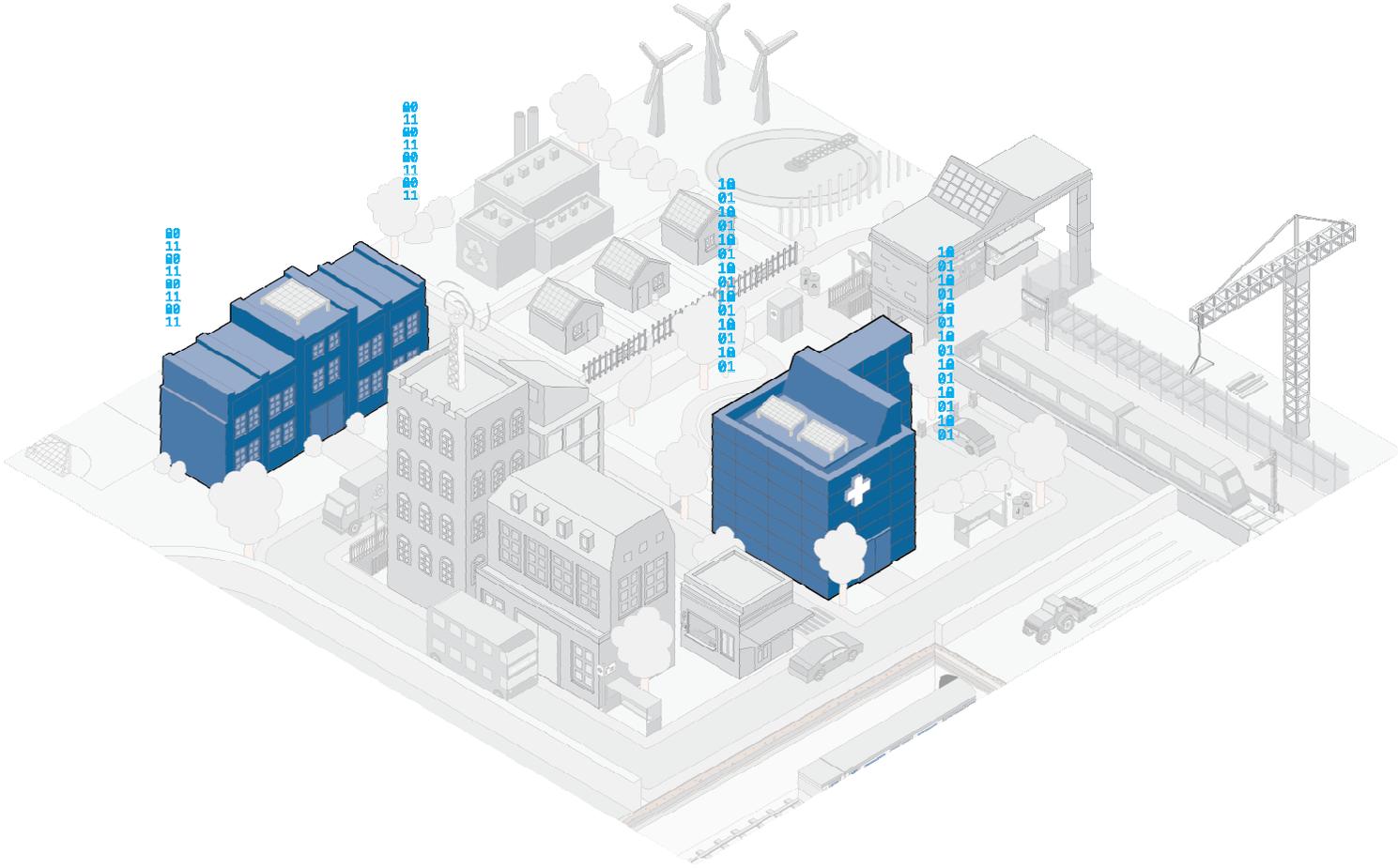
Water



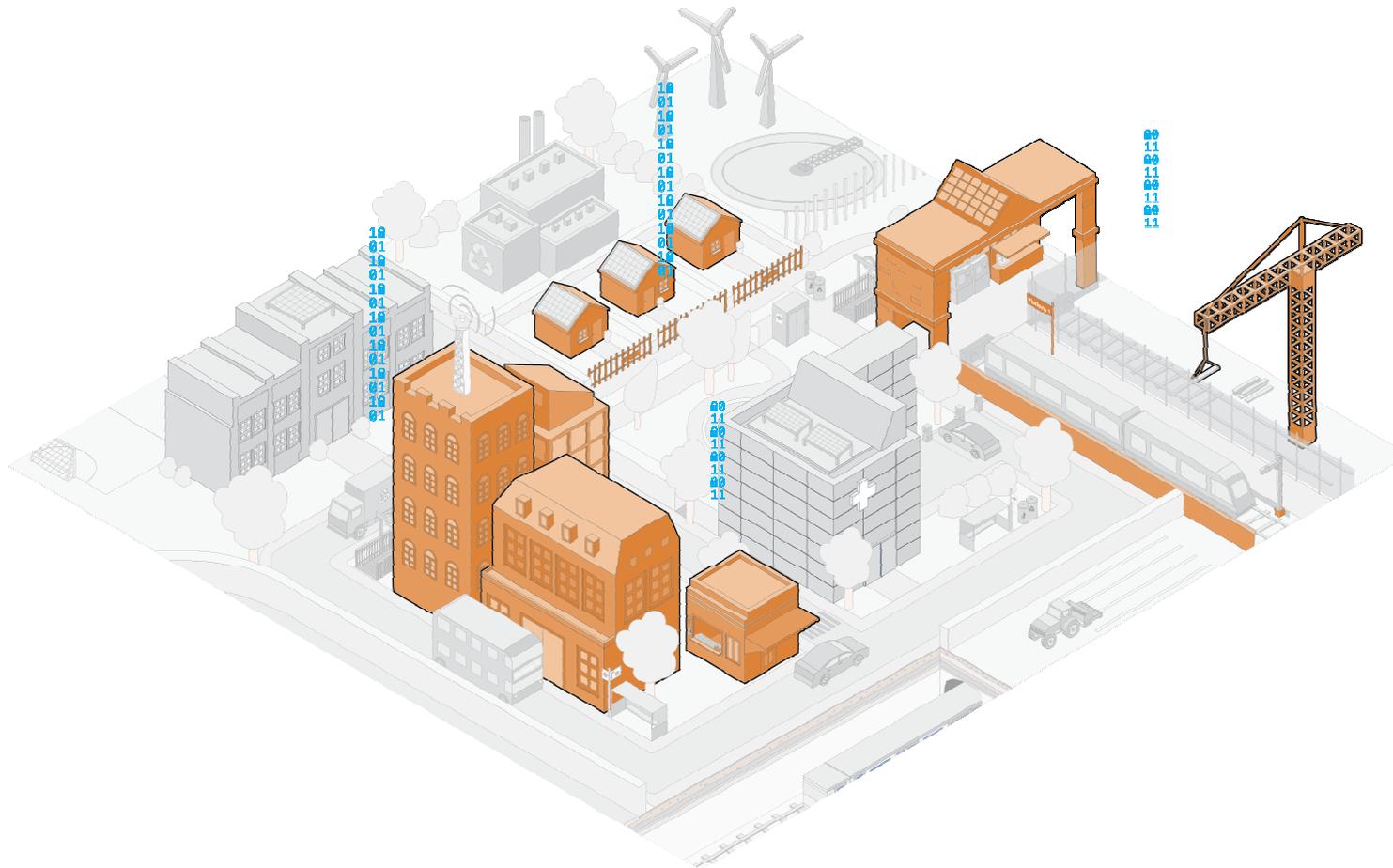
Waste



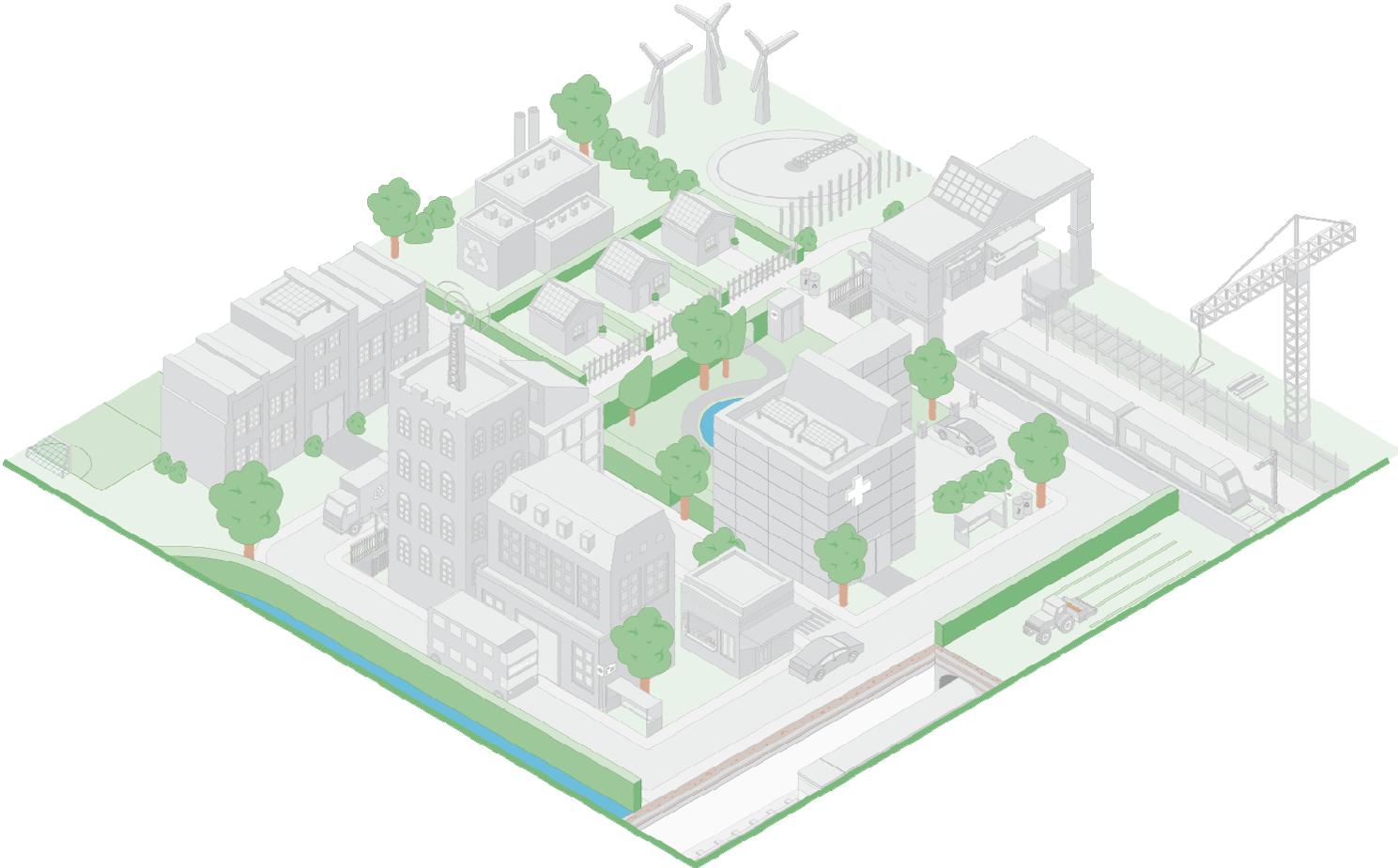
Social infrastructure



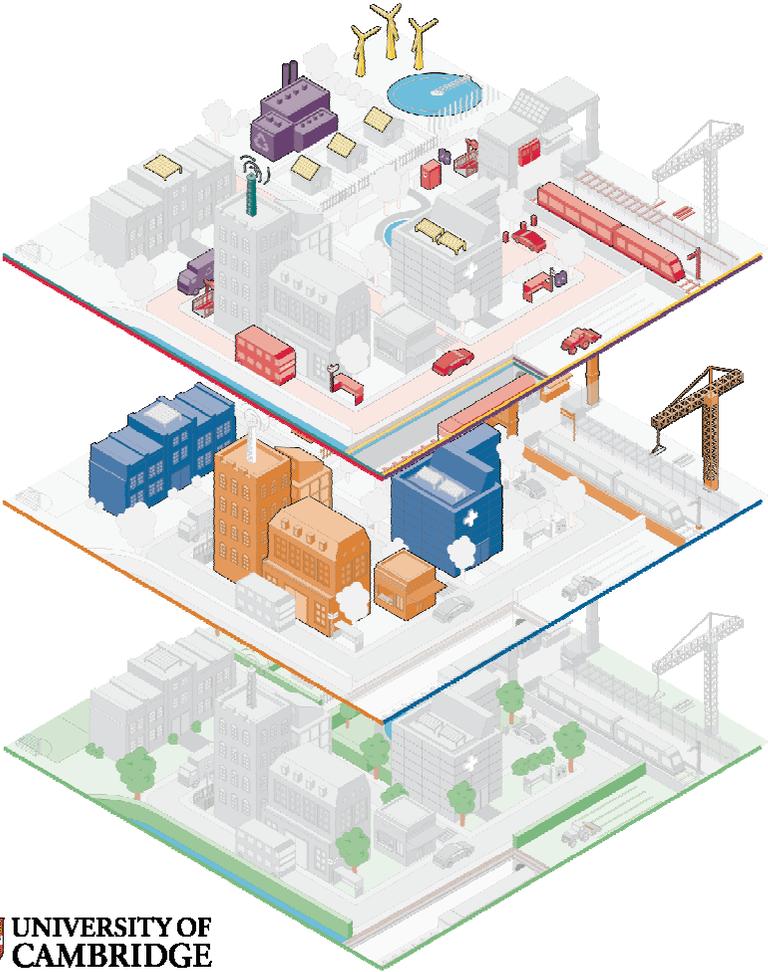
Residential, commercial and industrial



Interface with the natural environment



System of systems



Economic
infrastructure

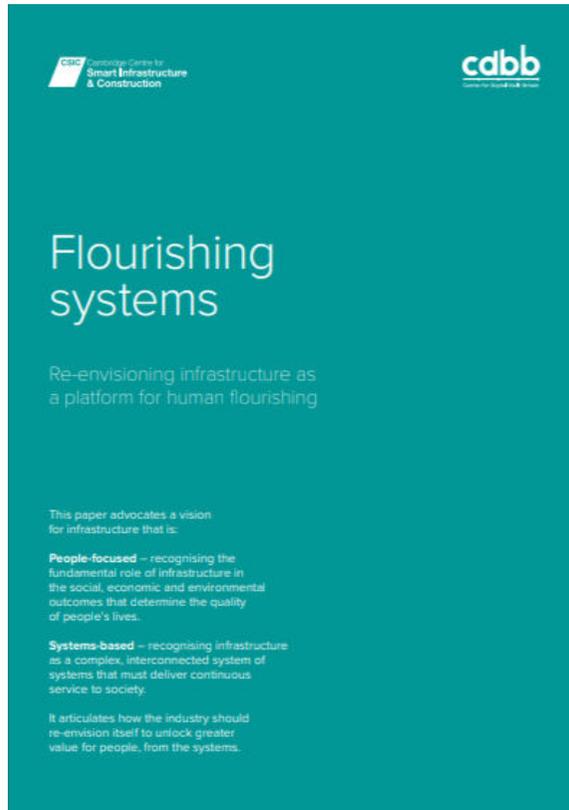
Social
infrastructure

Natural
environment



Built environment

Flourishing Systems

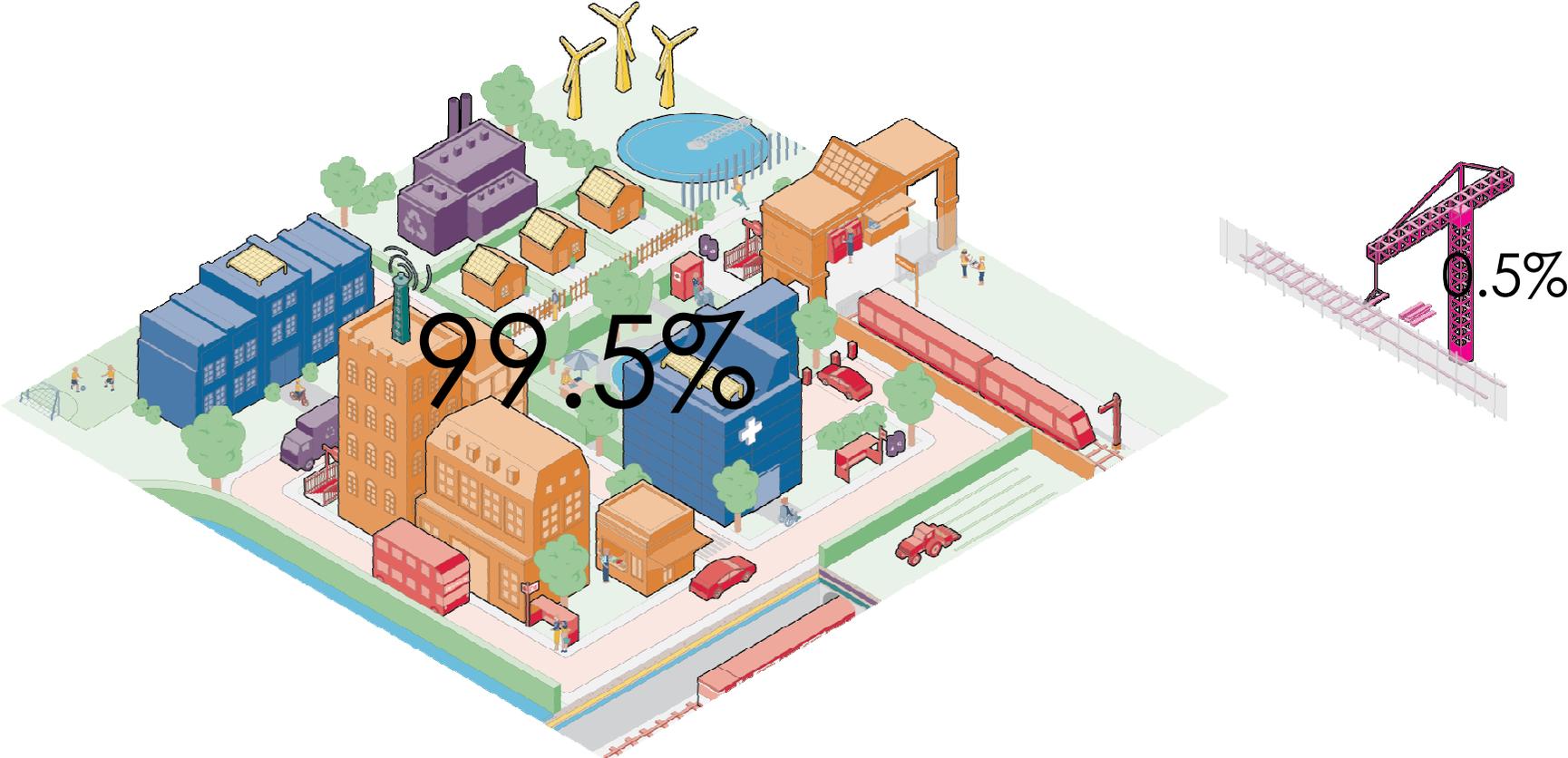


A vision for infrastructure that is:

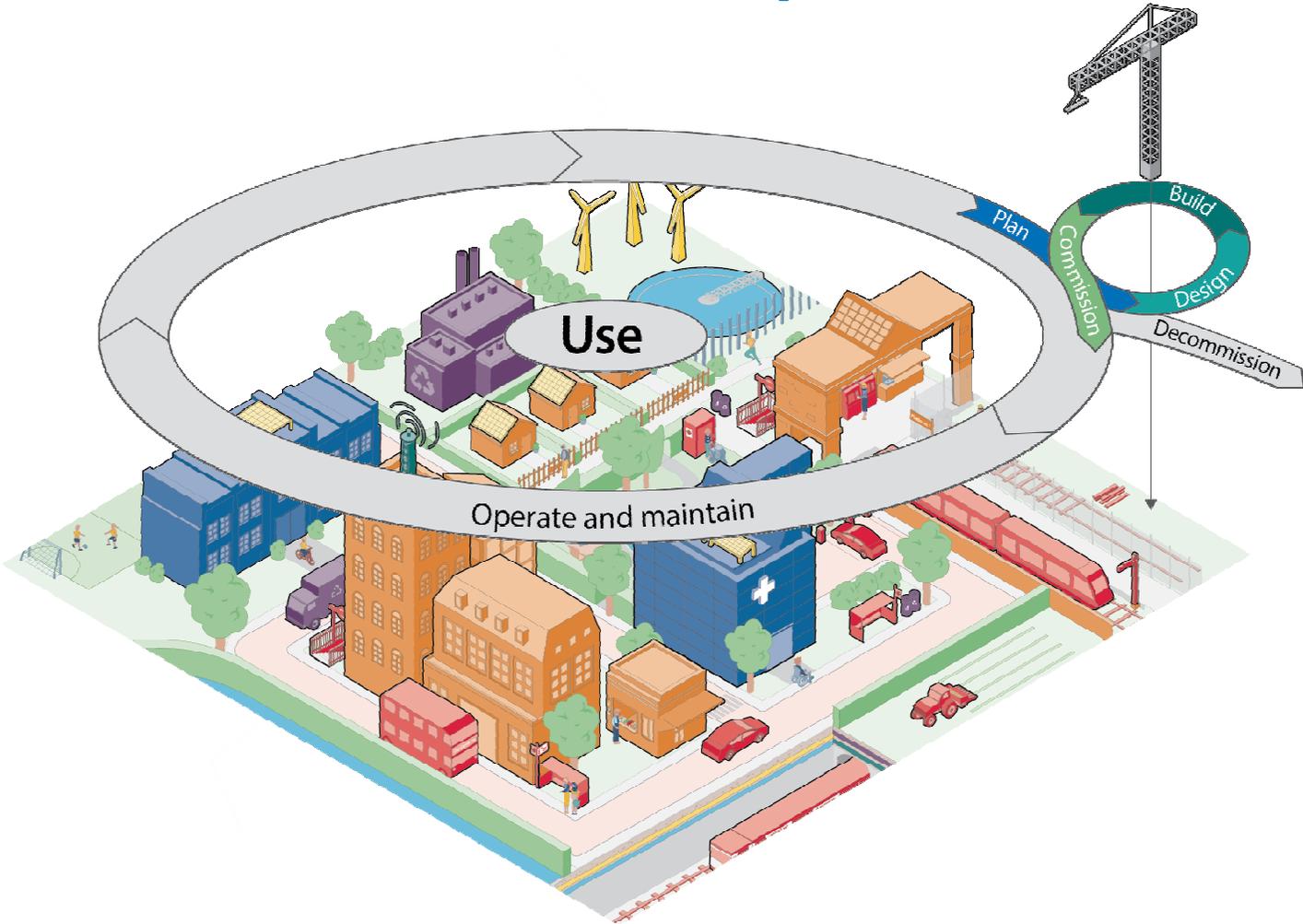
People-focused – recognising the fundamental role of infrastructure in the social, economic and environmental outcomes that determine the quality of people's lives.

Systems-based – recognising infrastructure as a complex, interconnected system of systems that must deliver continuous service to society.

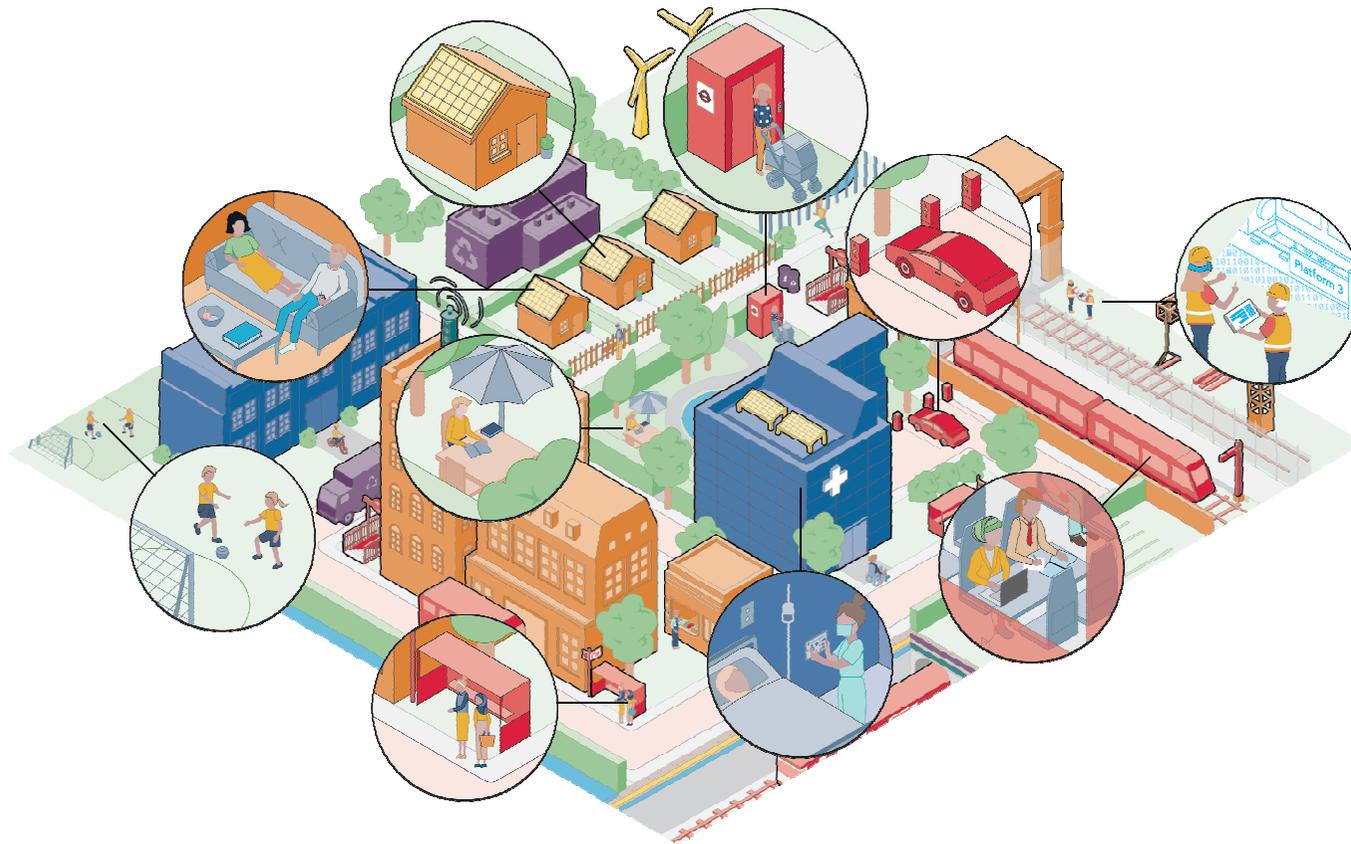
Systems-based view of the built environment



System processes and asset lifecycle



System of services



Outcomes

Social

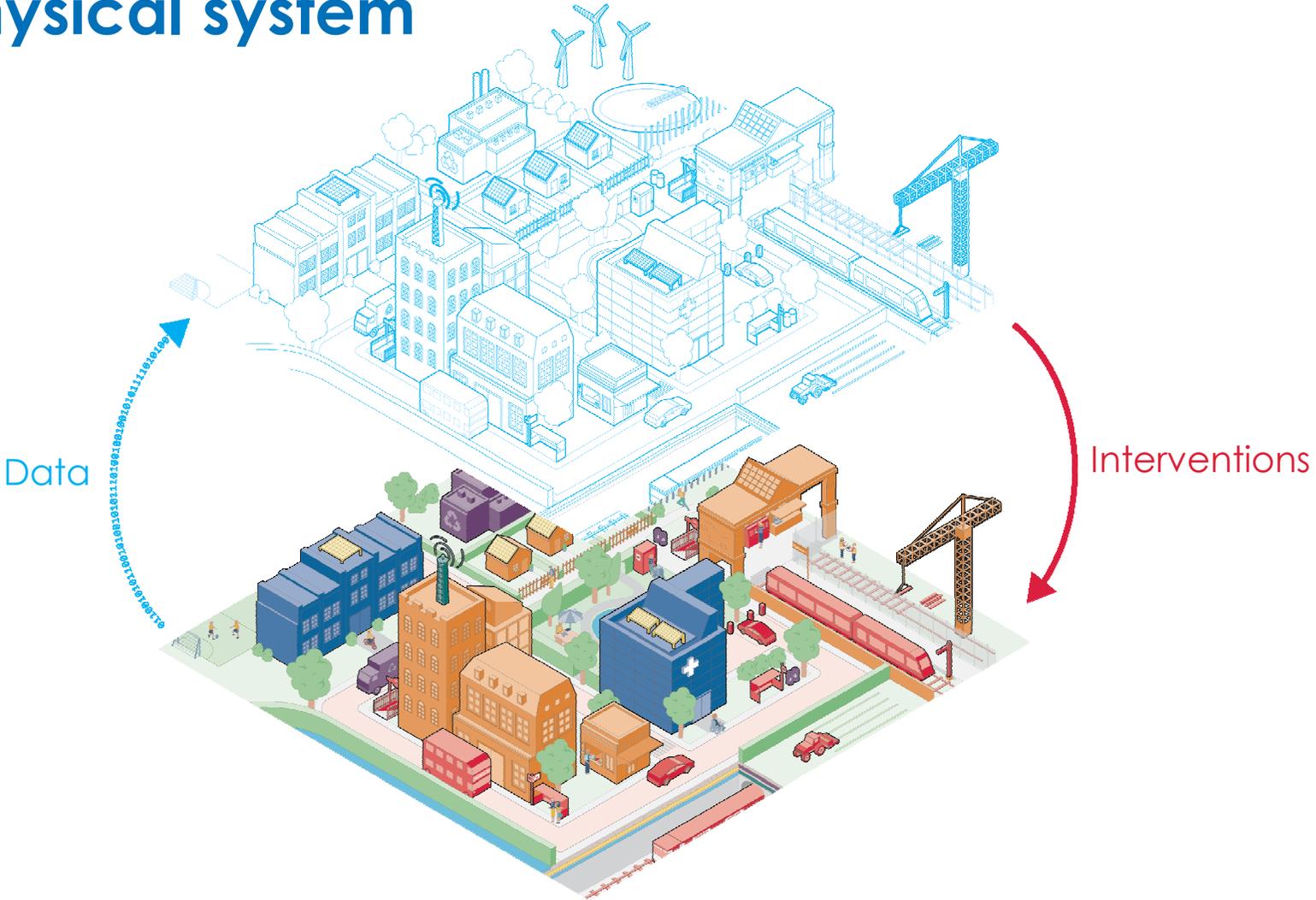
Economic

Environment

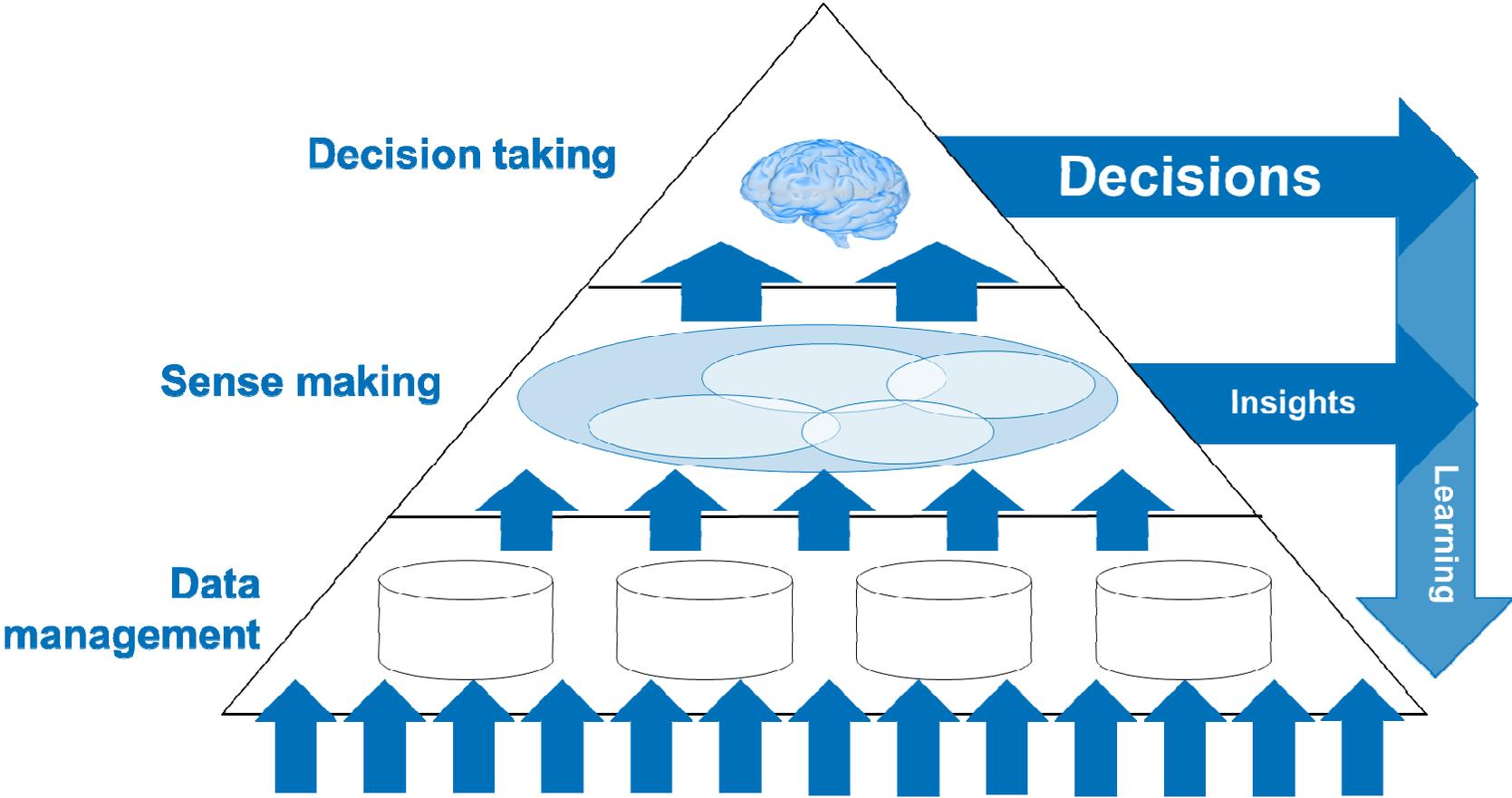
Sustainable system



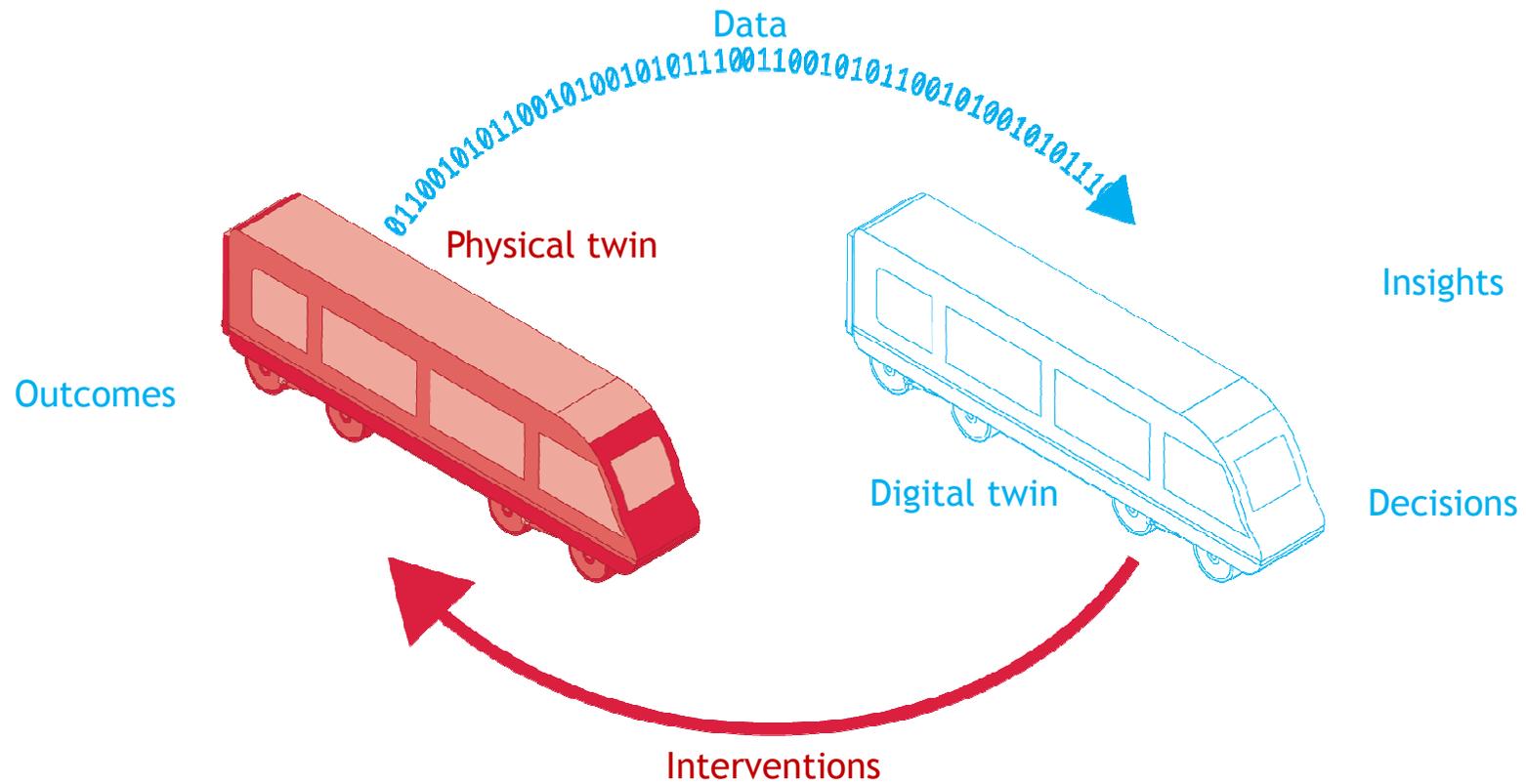
Cyber-physical system



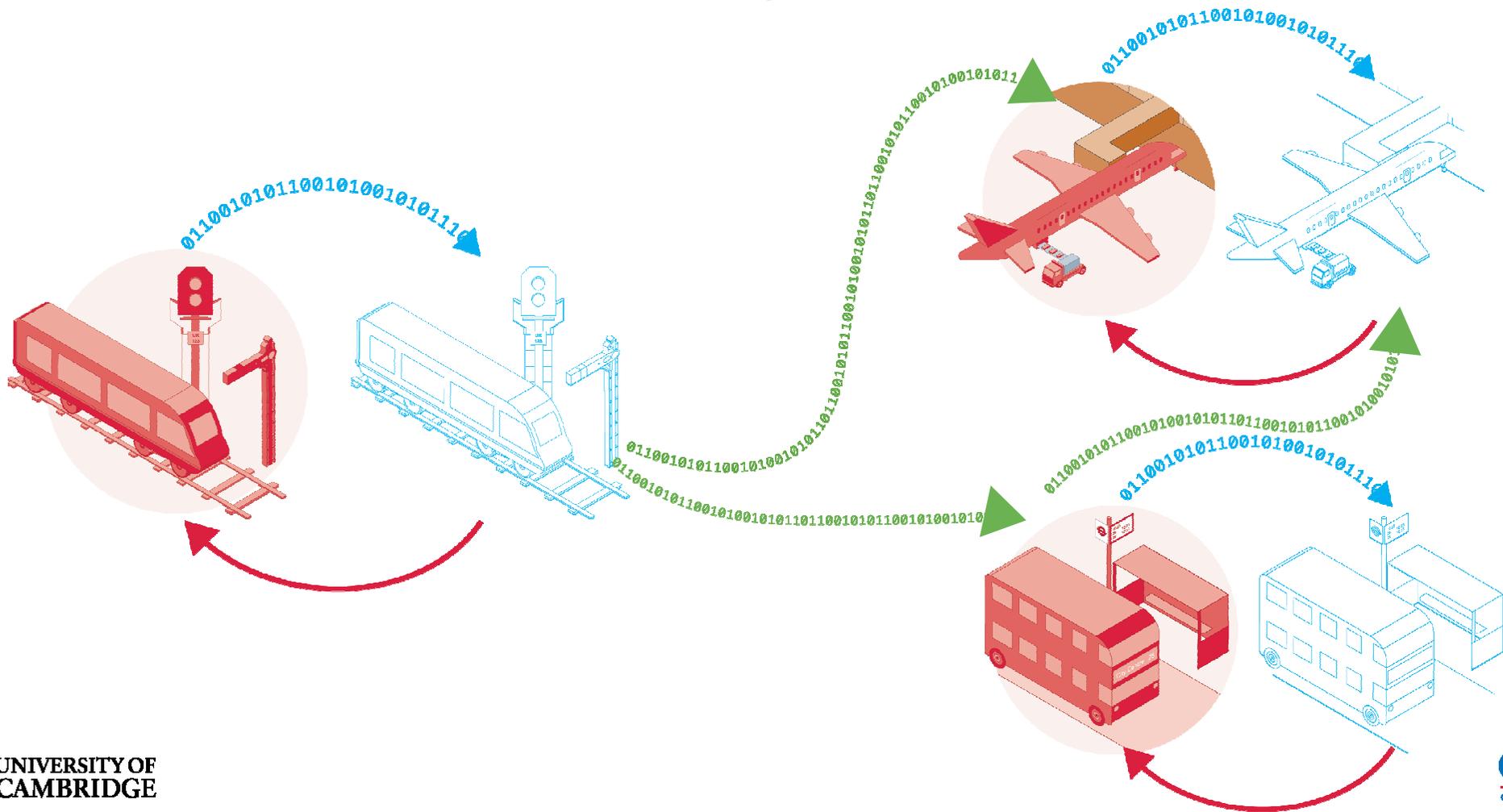
The information value chain



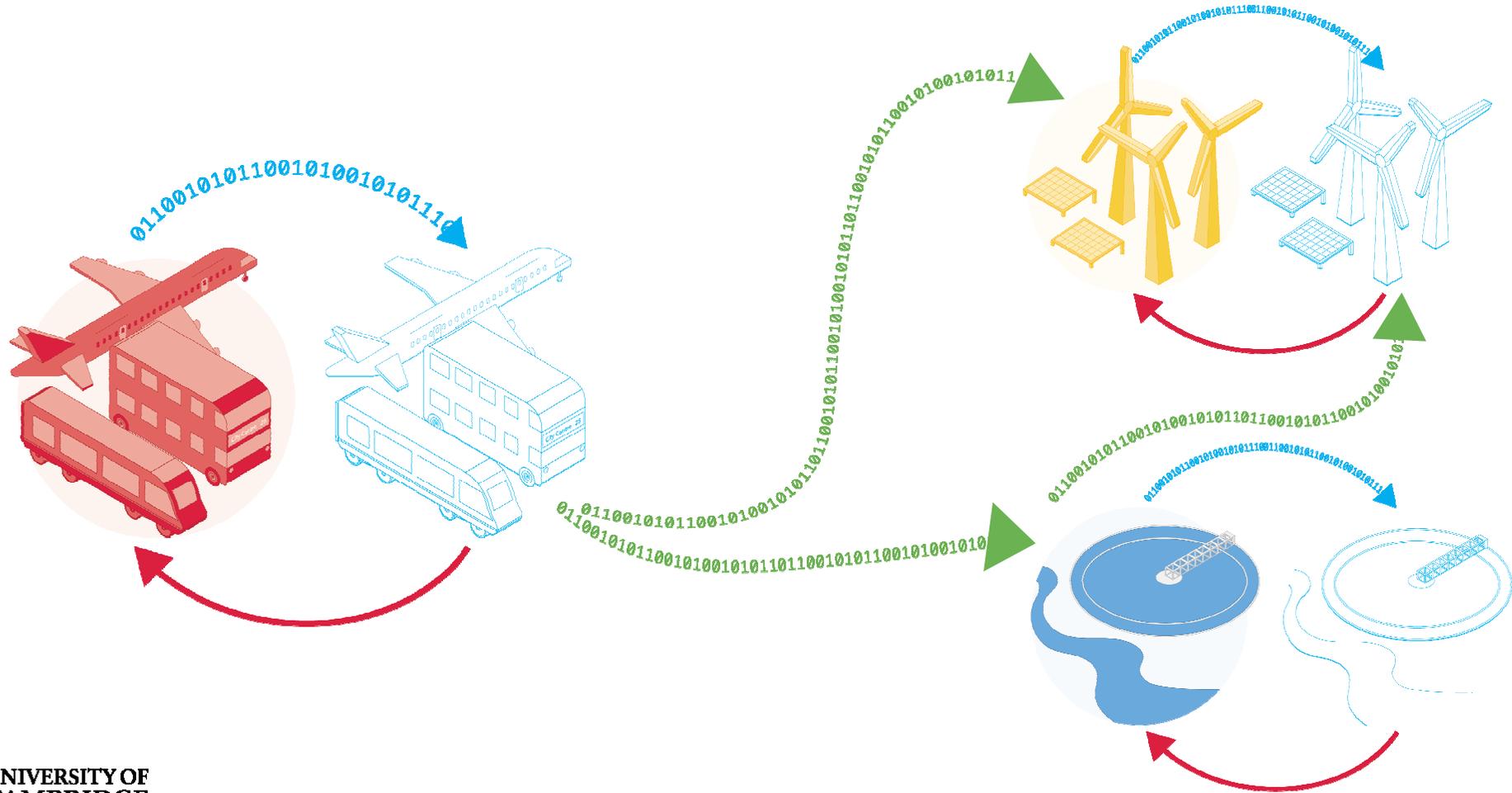
Digital twins



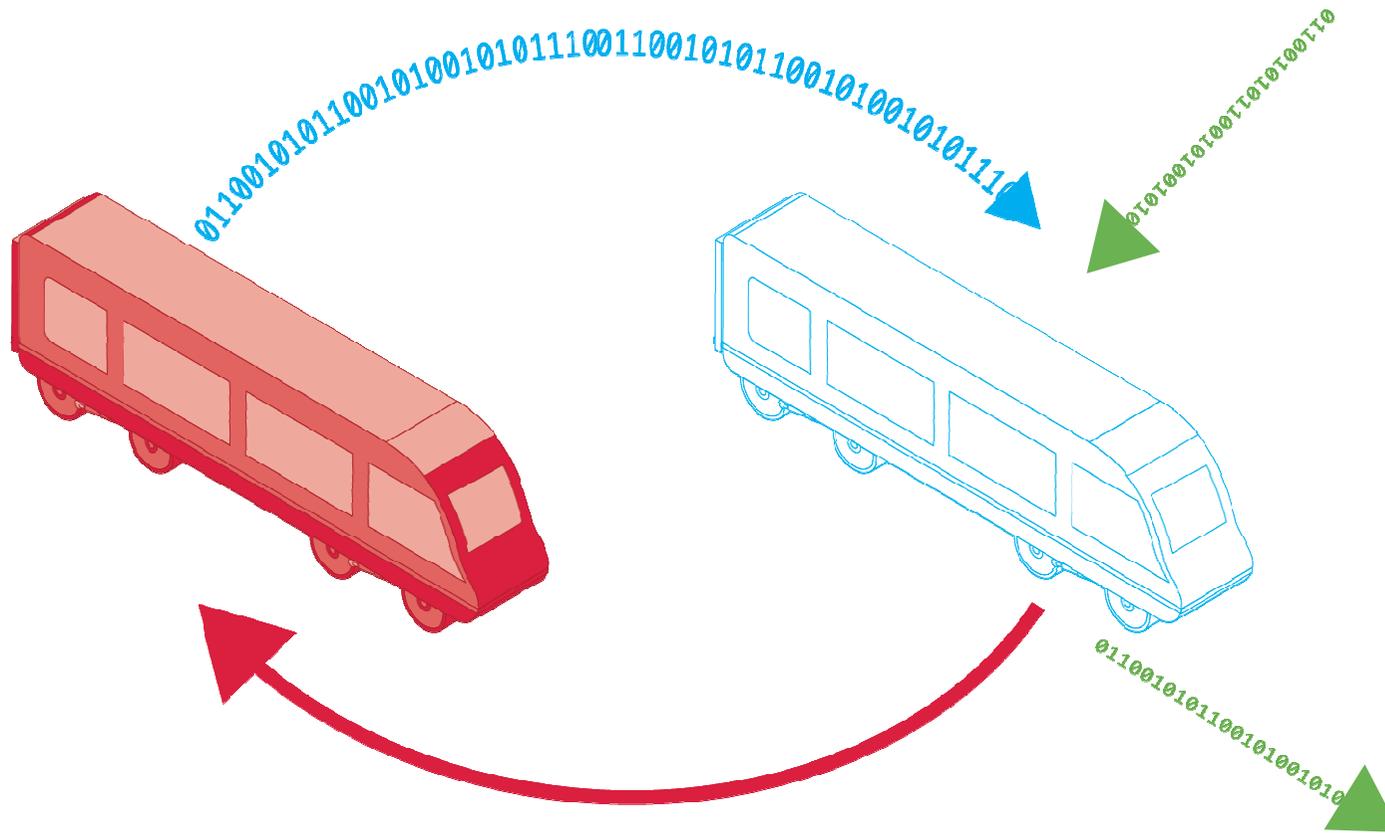
Ecosystem of connected digital twins



Ecosystem of connected digital twins



Connectable digital twins



Benefits of the National Digital Twin

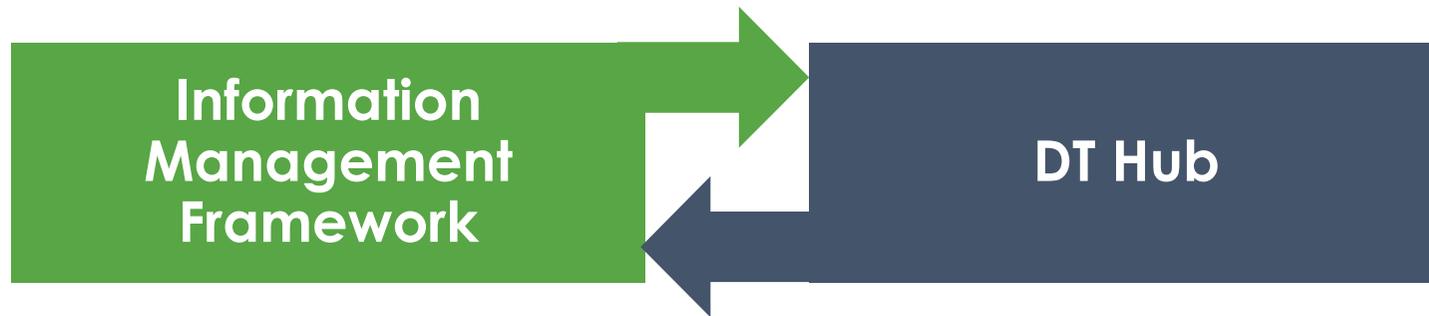
Better outcomes for the public per whole-life pound

- **Benefits to society:** Improved stakeholder engagement. Better outcomes for the ultimate customers (the public – taxpayers/bill payers/fare payers/voters). Improved customer satisfaction and experience through higher-performing infrastructure and the services it provides.
- **Benefits to the economy:** Improved national productivity from higher-performing and resilient infrastructure operating as a system. Improved measurement of outcomes. Better outcomes per whole-life pound. Improved information security and thereby personnel, physical and cyber security.
- **Benefits to business:** New markets, new services, new business models, new entrants. Improved business efficiency from higher-performing infrastructure. Improved delivery efficiency, benefiting the whole construction value chain – investors, owners, asset managers, contractors, consultants, suppliers. Reduced uncertainty and better risk management.
- **Benefits to the environment:** Less disruption and waste. More reuse and greater resource efficiency – a key enabler of the circular economy in the built environment.

The background to the approach



The core of the approach

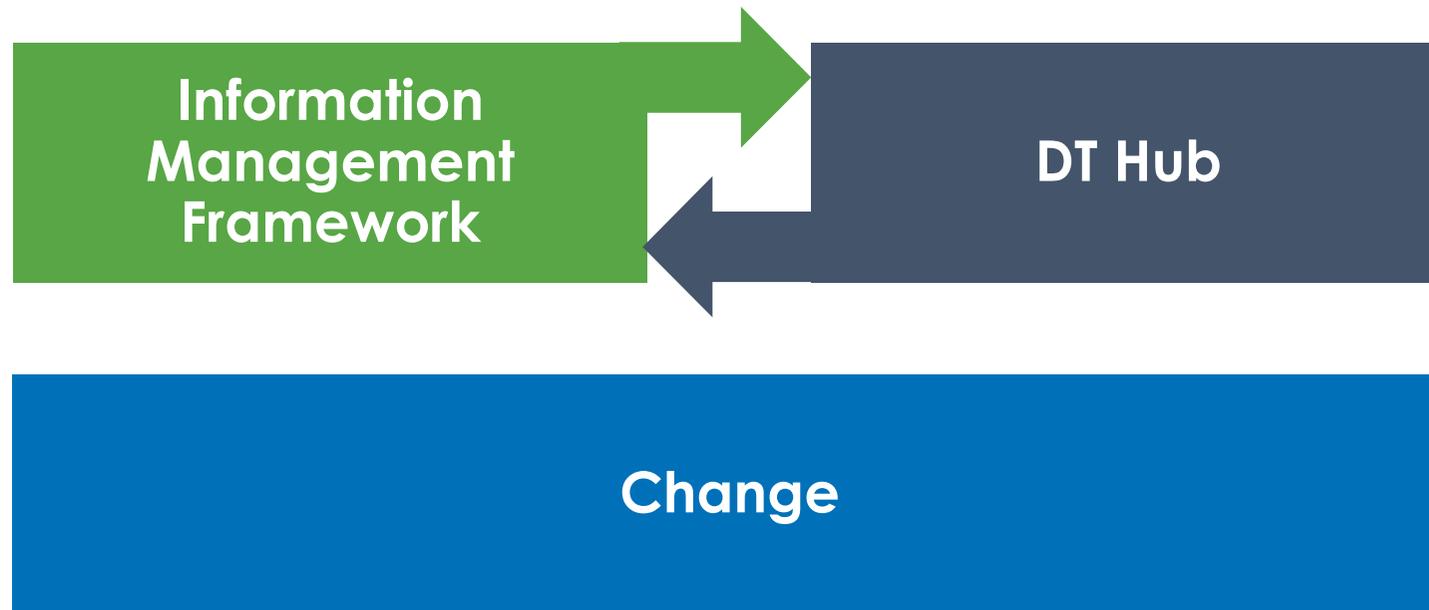


A national resource, held in common, that unlocks effective information management across the industry; expert led

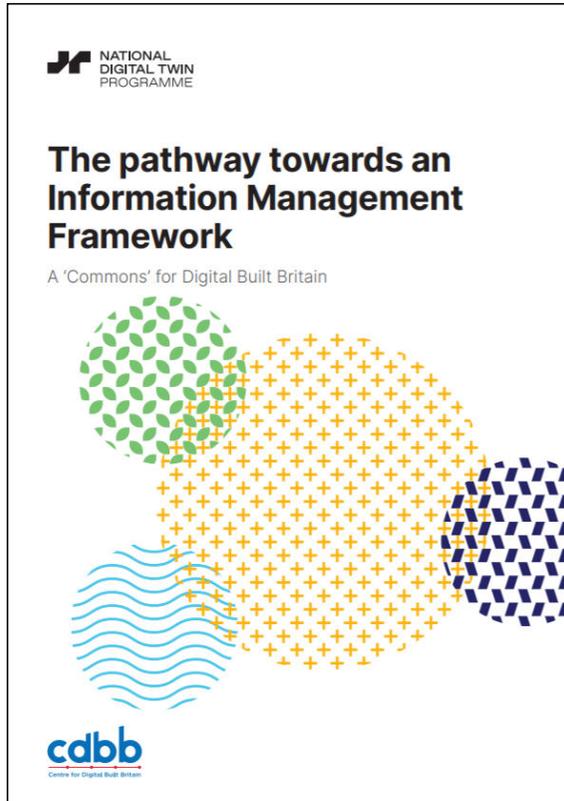
Collaborative, web-enabled, learning community; “learning by doing; progressing by sharing”; captures and shares emerging best practice; practitioner led

- experience >> good practice >> guidance >> standards
- experience >> use cases >> case studies >> business cases

The core of the approach

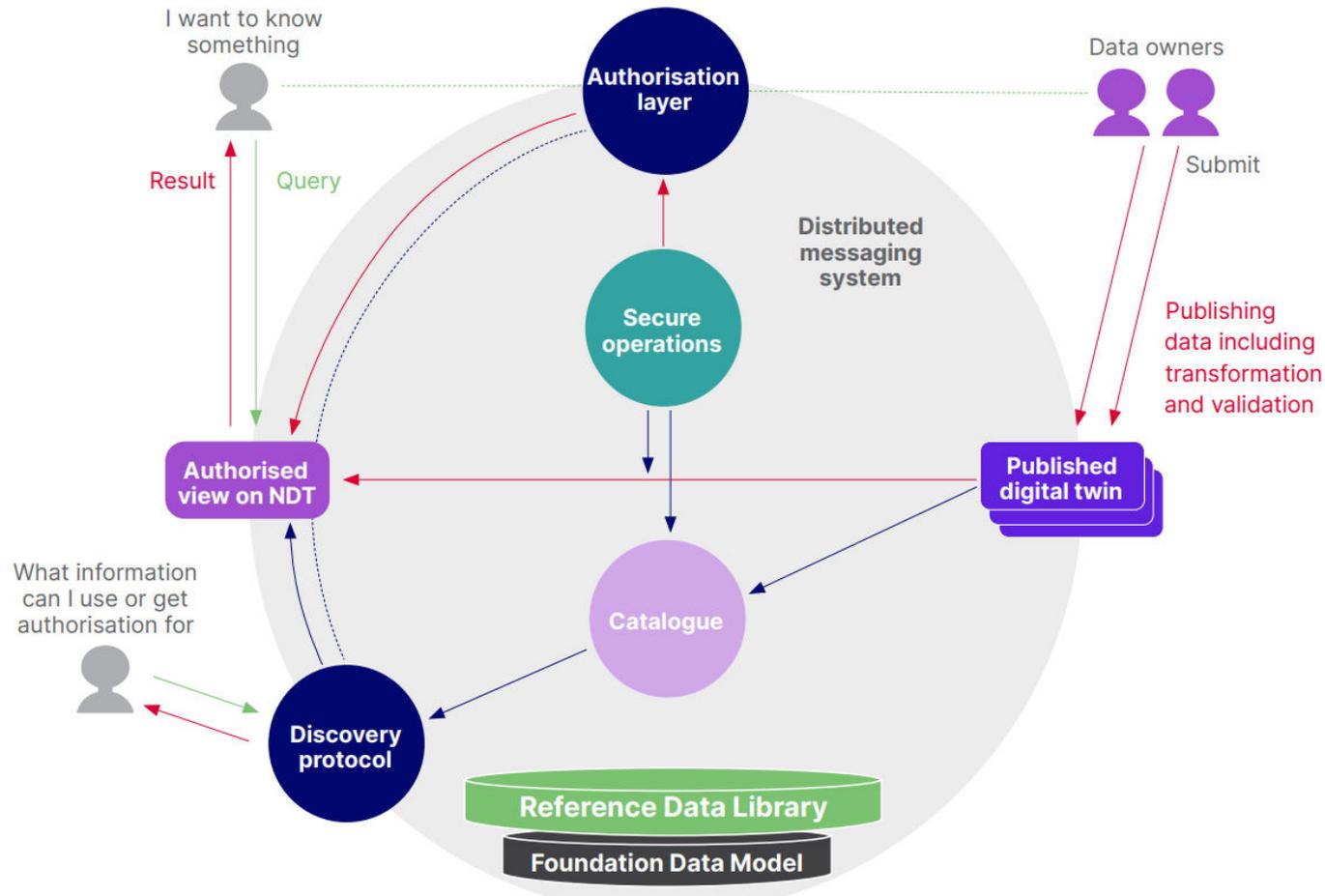


The pathway towards an Information Management Framework



1. **Foundation Data Model** – a consistent, clear understanding of what constitutes the world of digital twins
2. **Reference Data Model** – the particular set of classes and the properties we will want to use to describe our digital twins
3. **Integration Architecture** – the protocols that will enable the managed sharing of data

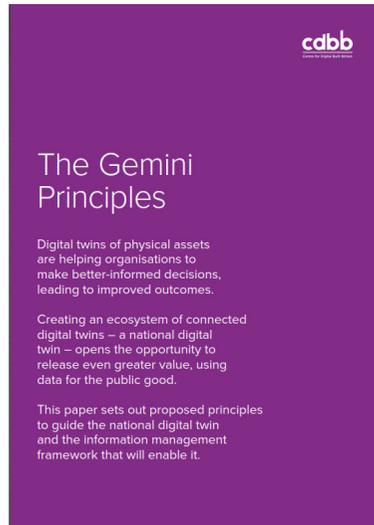
A National Digital Twin enabled by the IMF



A National Digital Twin enabled by the IMF



Guided by the Gemini Principles



Thank you