

Knowledge



# Introducing the National Digital Twin



@CambridgeCDBB #NDTDay #CDBBWeek2019 #ICEDigitalEng @ice\_BIM #NDTDay #CDBBWeek2019 [www.sli.do/#NDT](http://www.sli.do/#NDT)

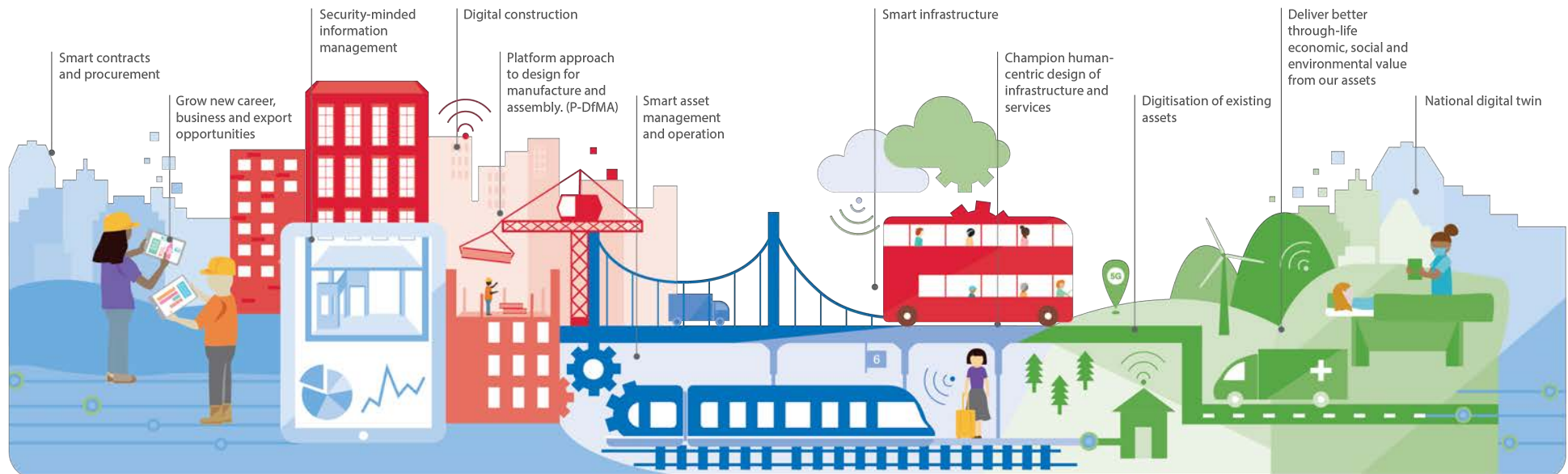
# **National Digital Twin** – An ecosystem of connected digital twins enabling better decisions faster across the built environment

**What is it?**

**Why do we want it?**

**What is being done to deliver it?**

# 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

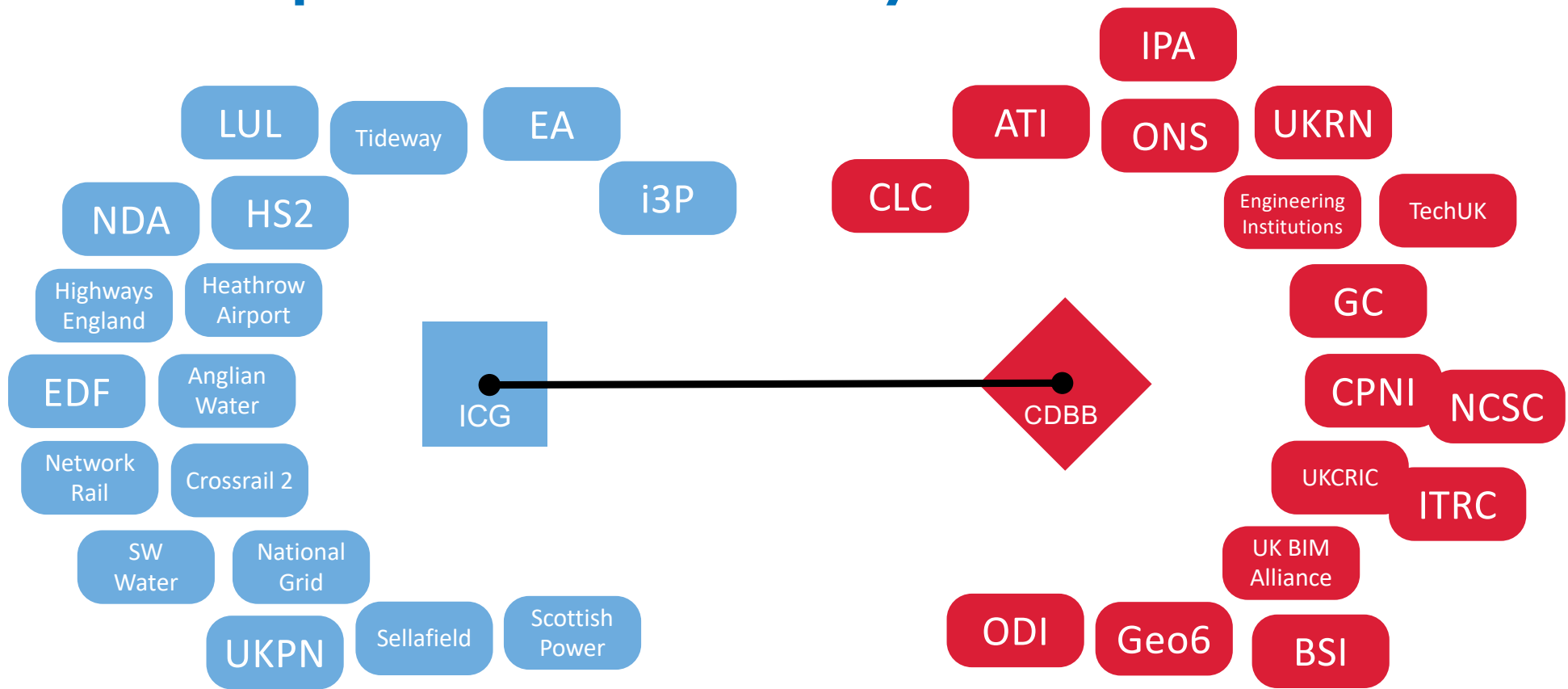
Understand how the built environment can improve citizens' quality of life and use that information to drive the design and build of our economic and social infrastructure and the operation and integration of the services they deliver.

# Benefits of the National Digital Twin

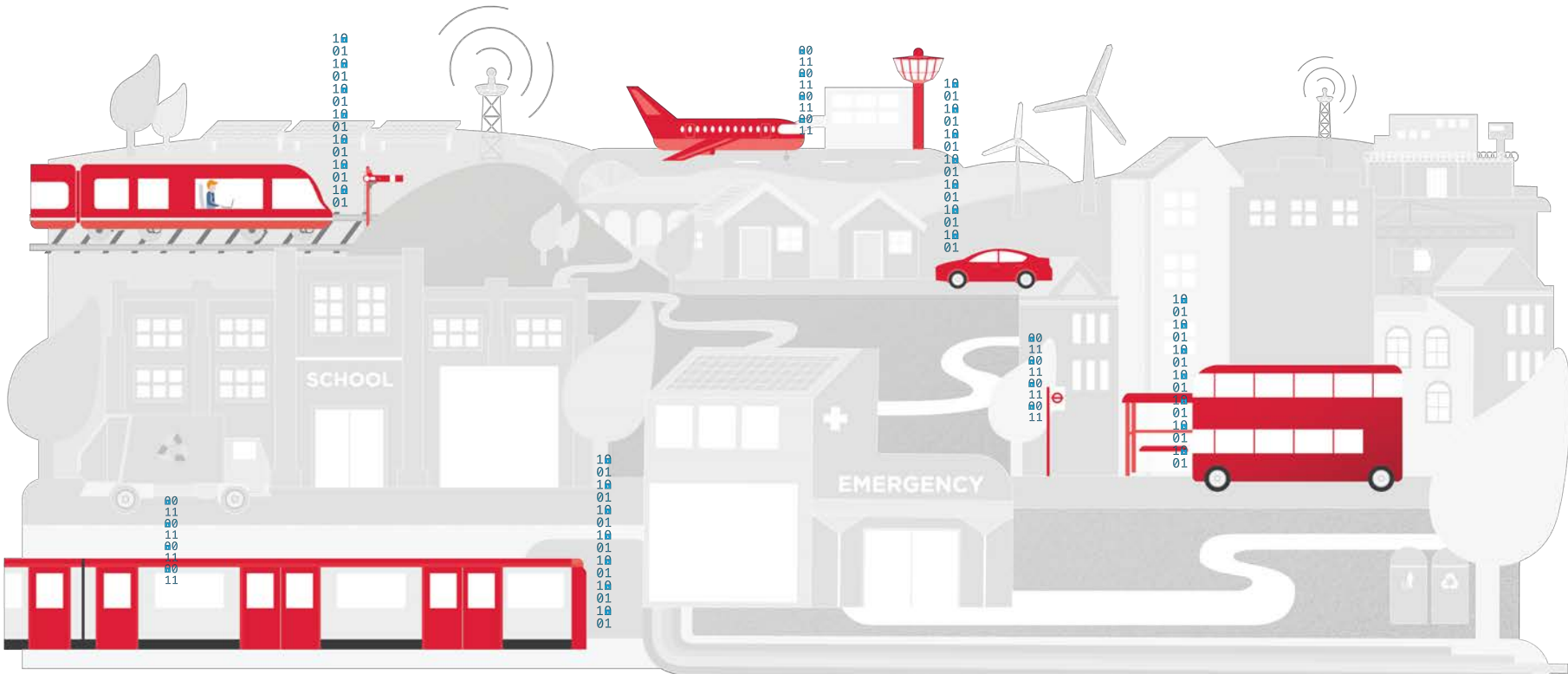
## Better outcomes for the public per whole-life pound

- **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.

# Development and delivery



# Transport

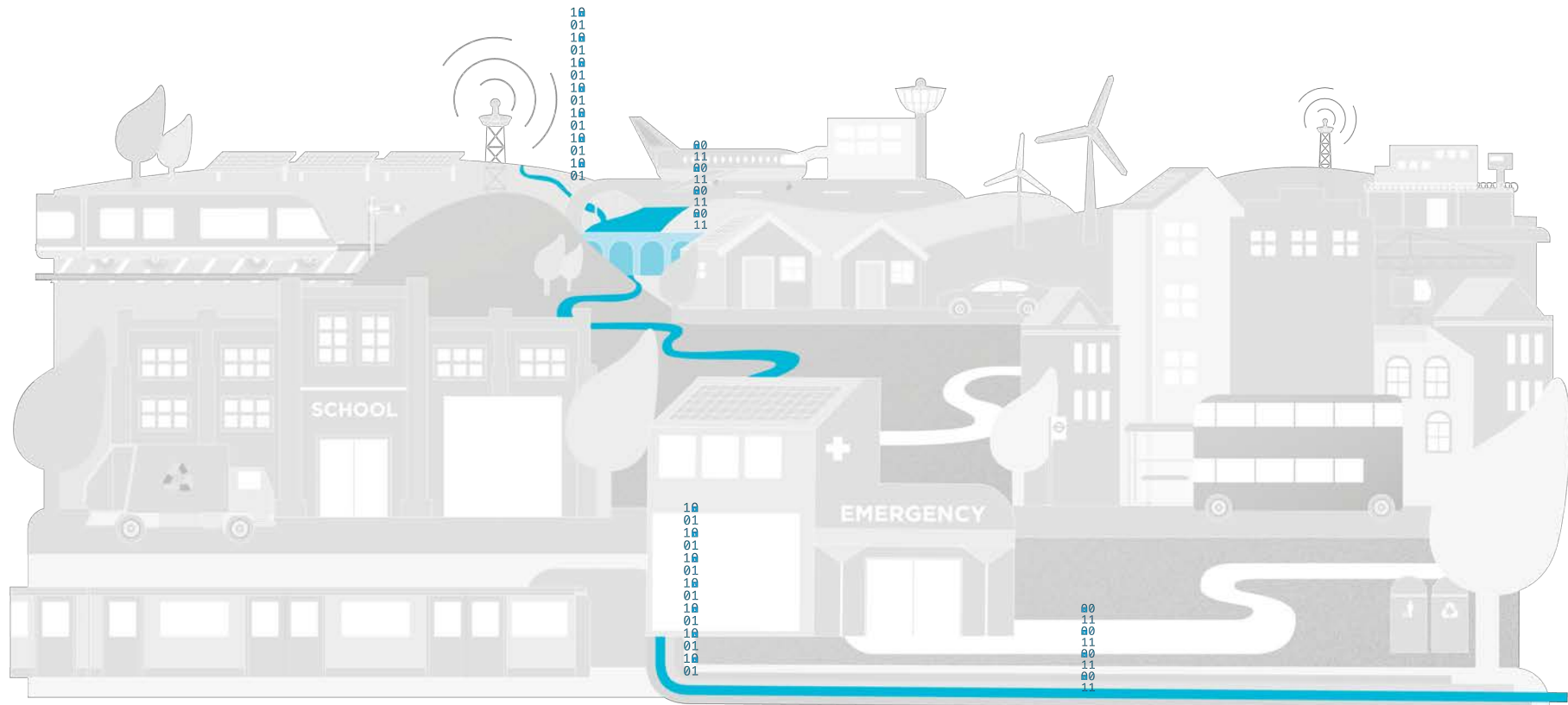




# Energy



# Water

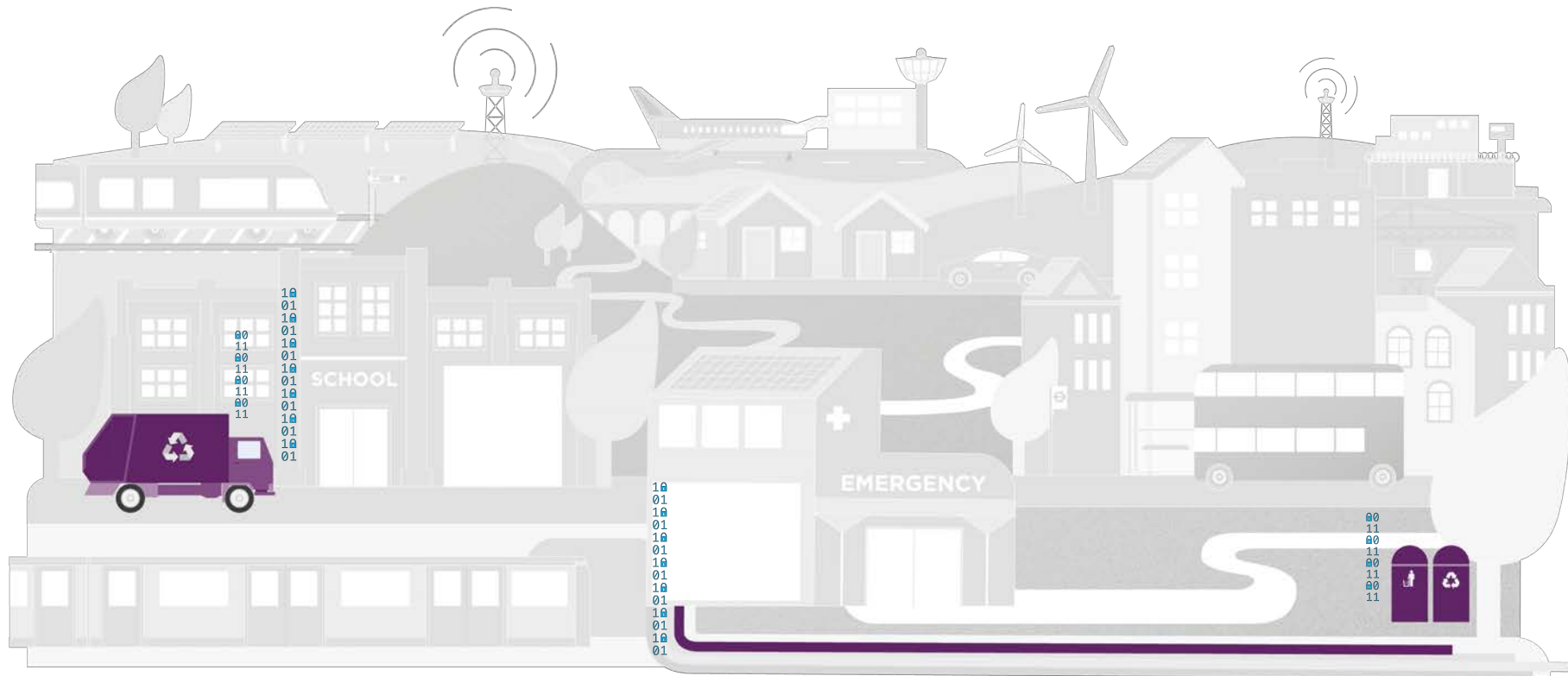




# Telecoms



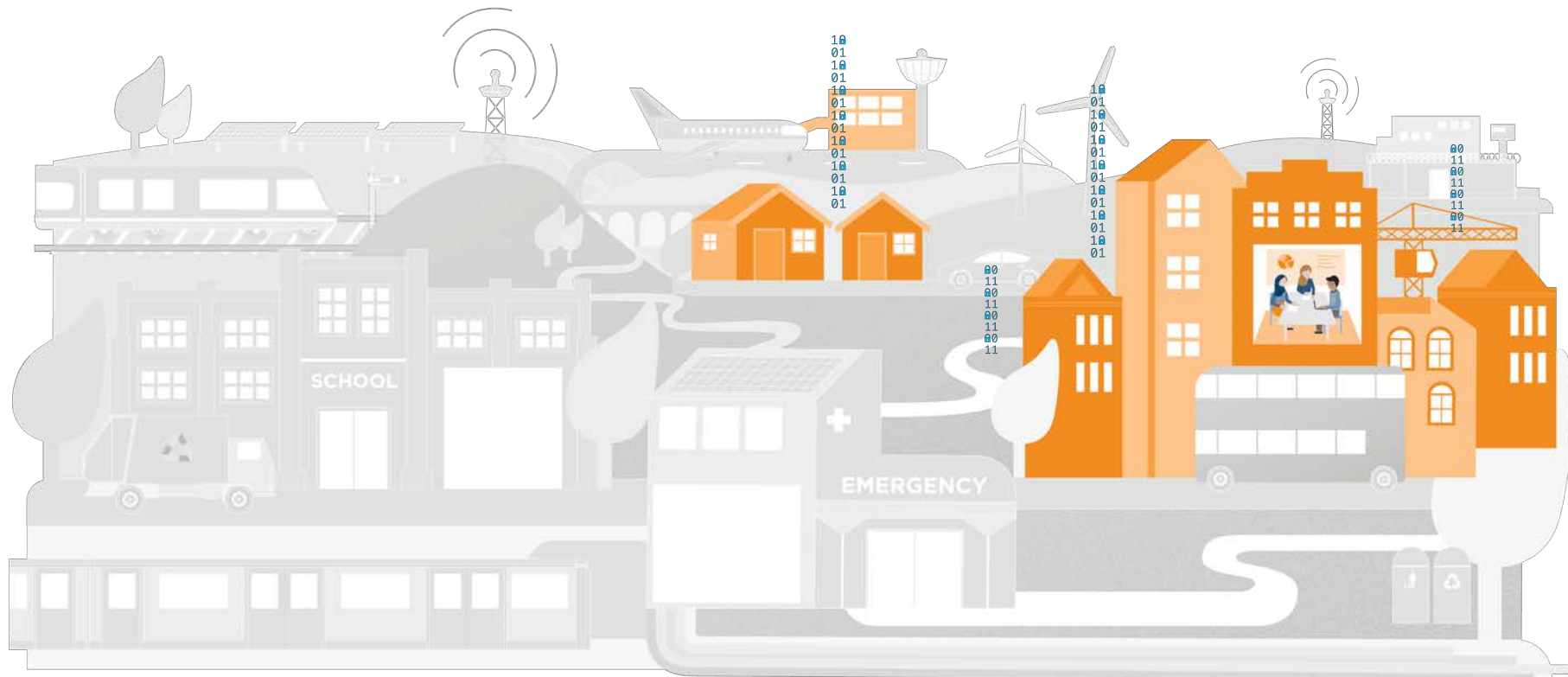
# Waste



# Social infrastructure



# Residential, commercial and industrial



# Interface with the natural environment

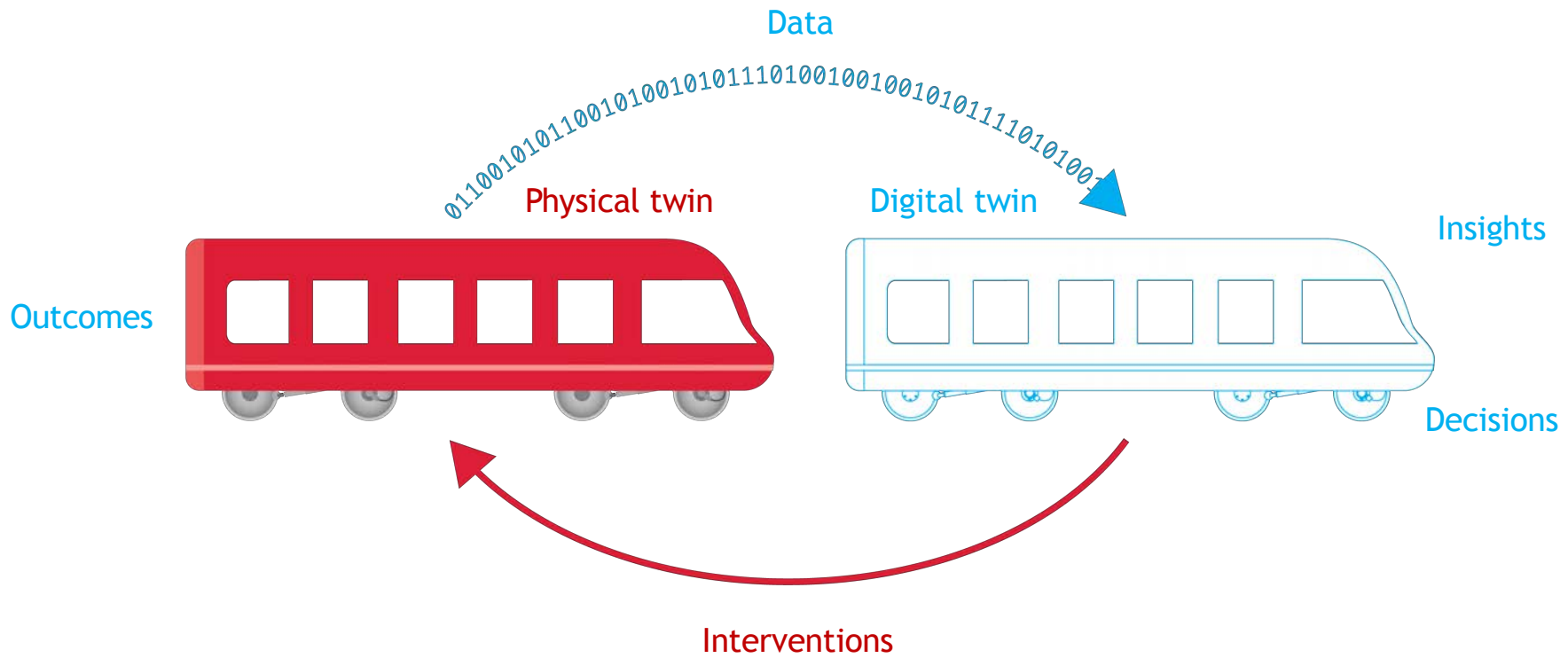


# Built environment

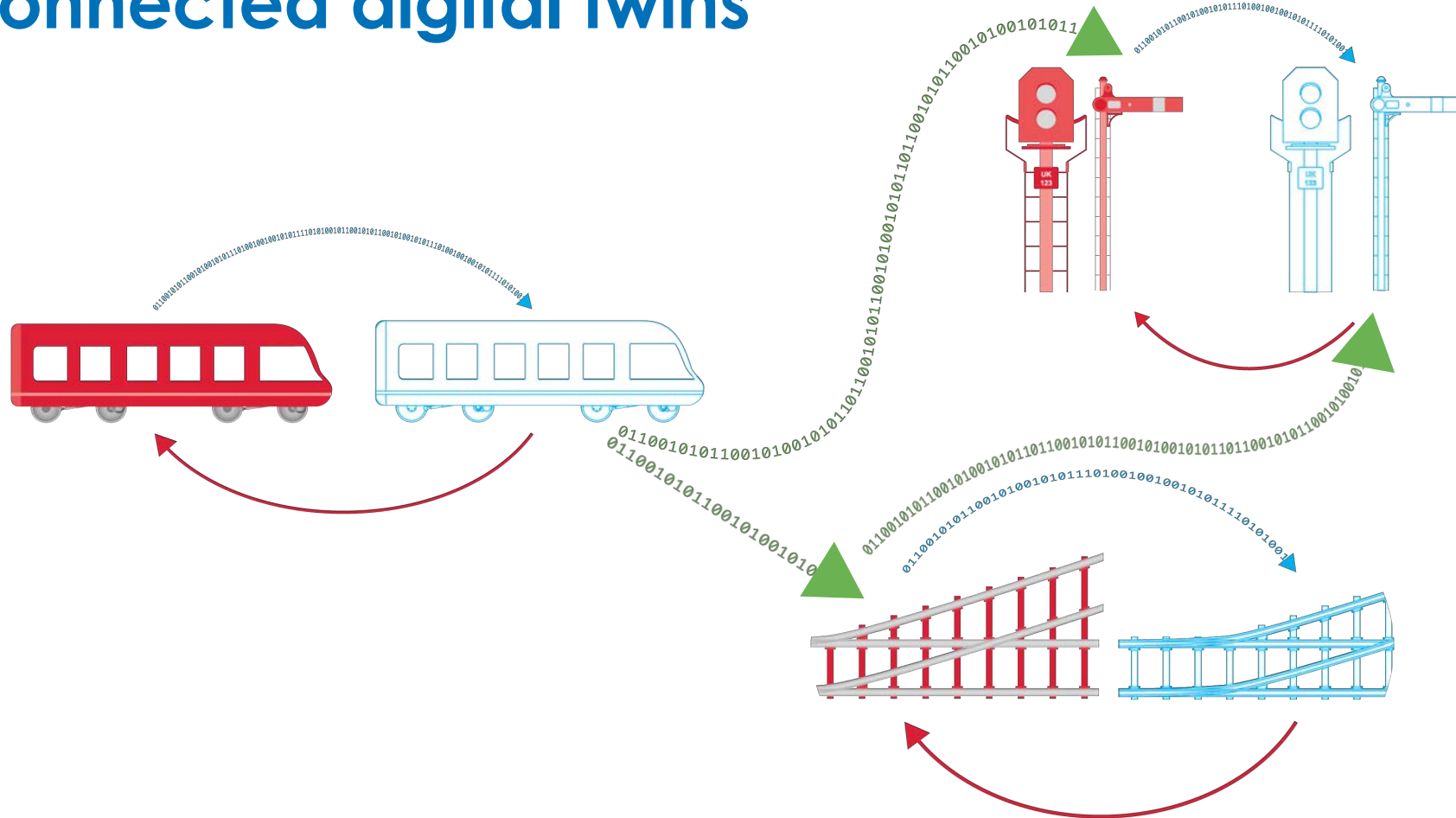




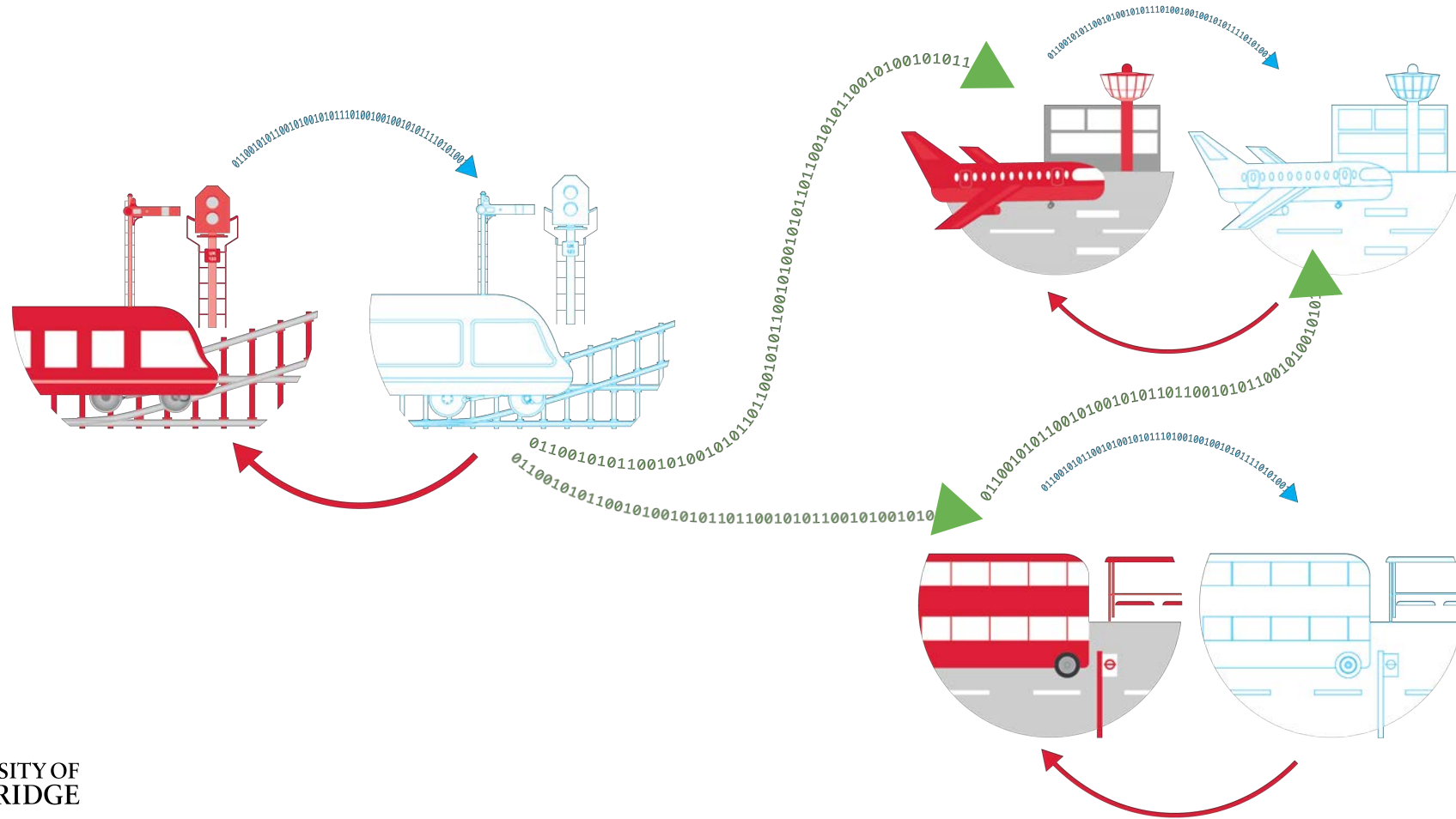
# Digital twins



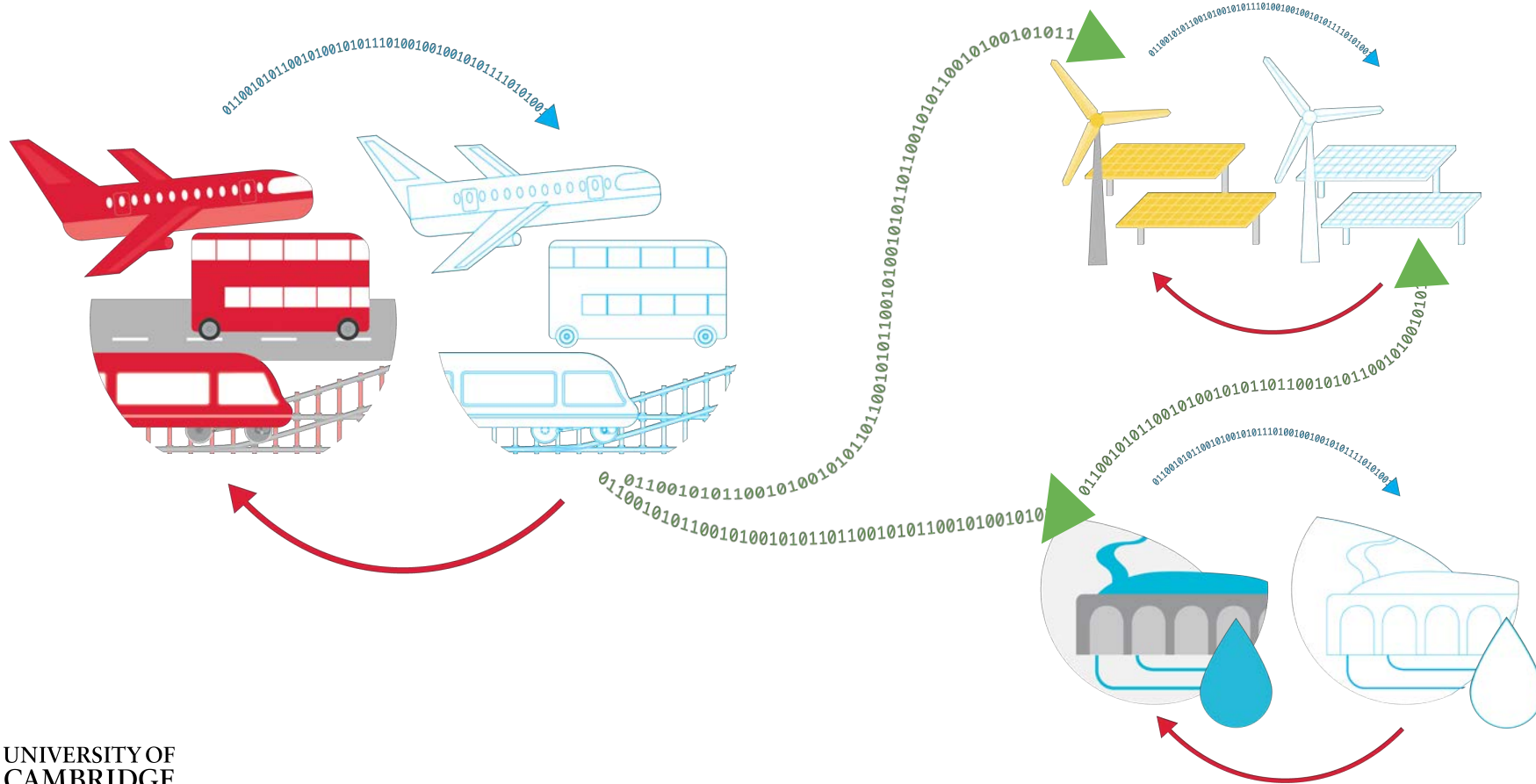
# Connected digital twins



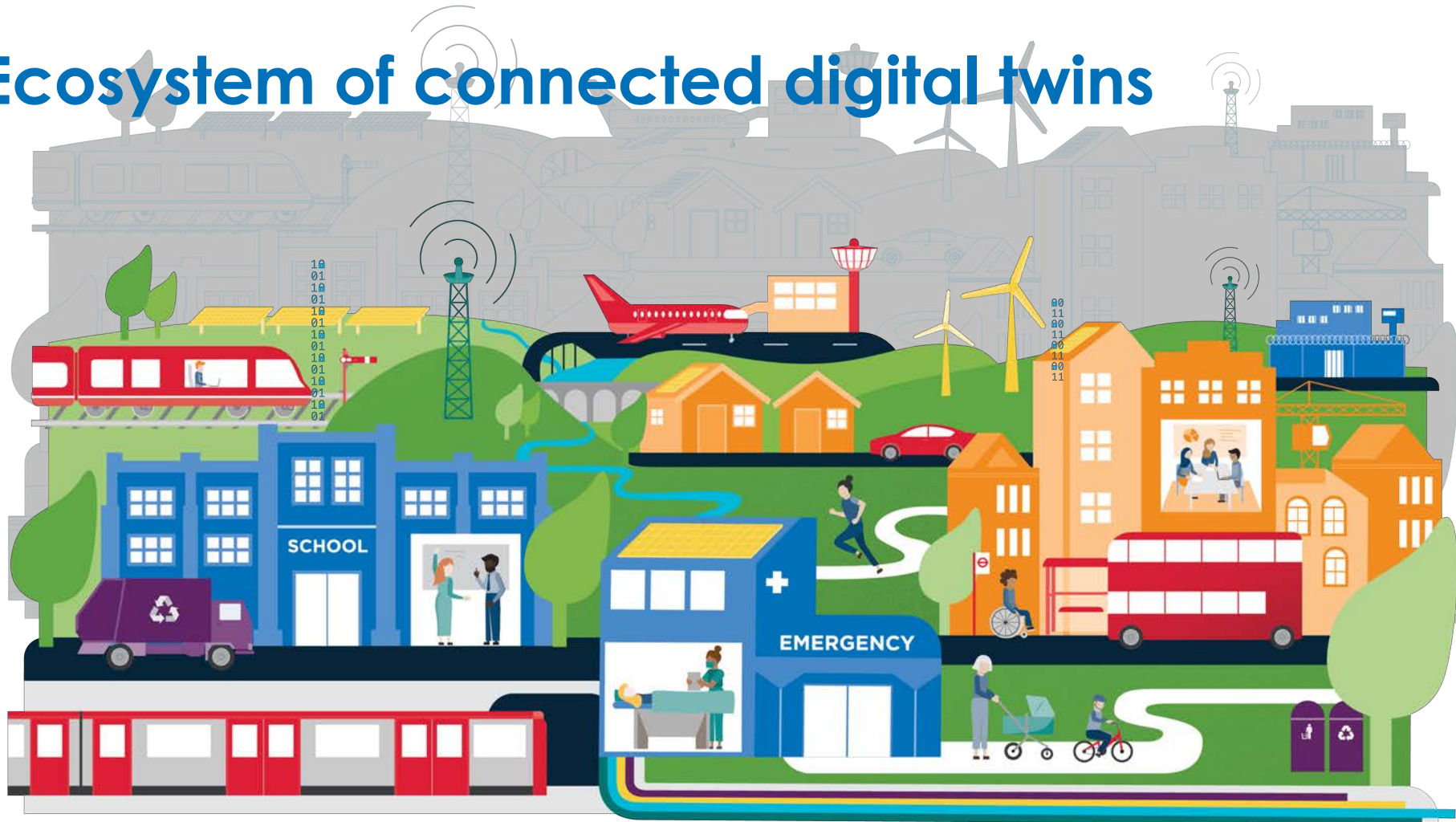
# Ecosystem of connected digital twins



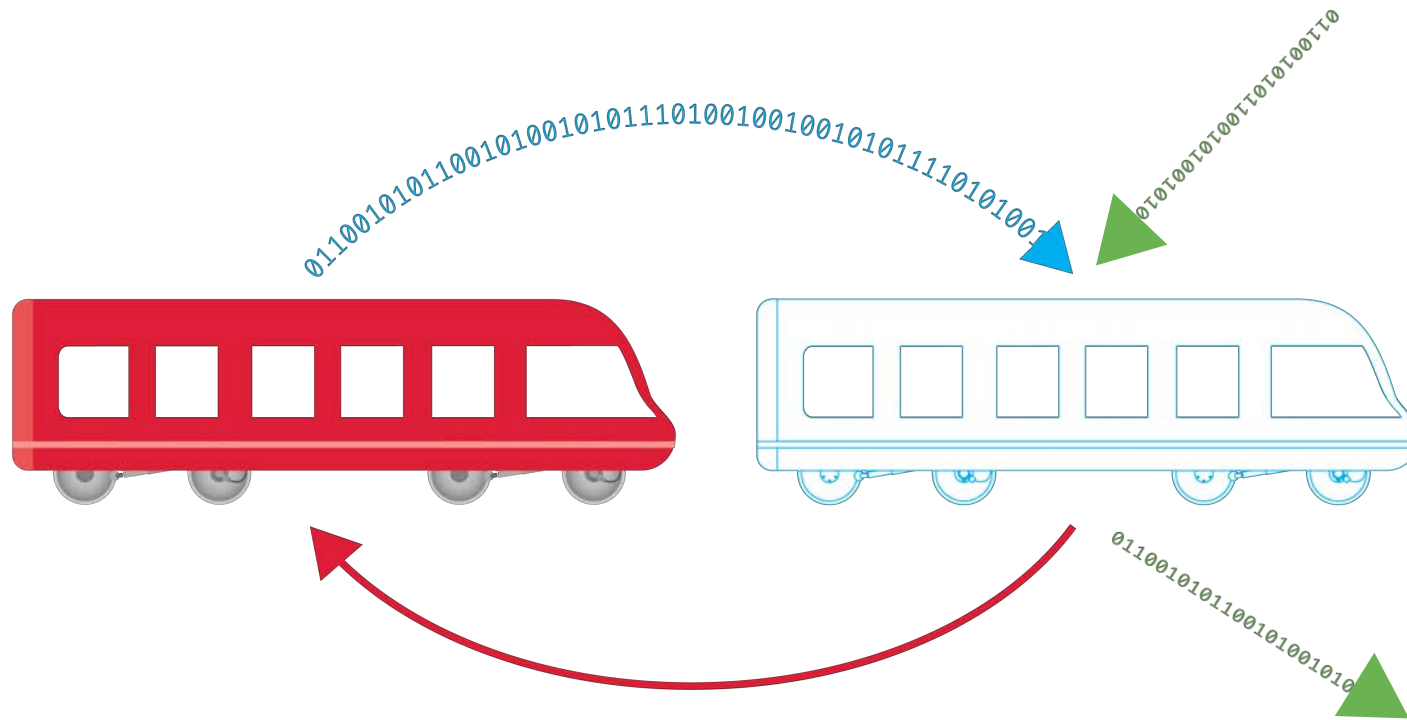
# Ecosystem of connected digital twins



# Ecosystem of connected digital twins



# Connectable digital twins





# The background to the approach

Top down  
(Authoritarian)

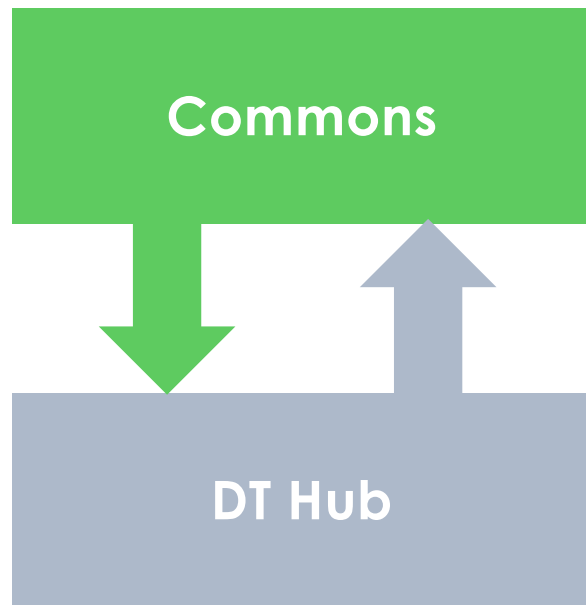


---

Bottom up  
(Darwinian)



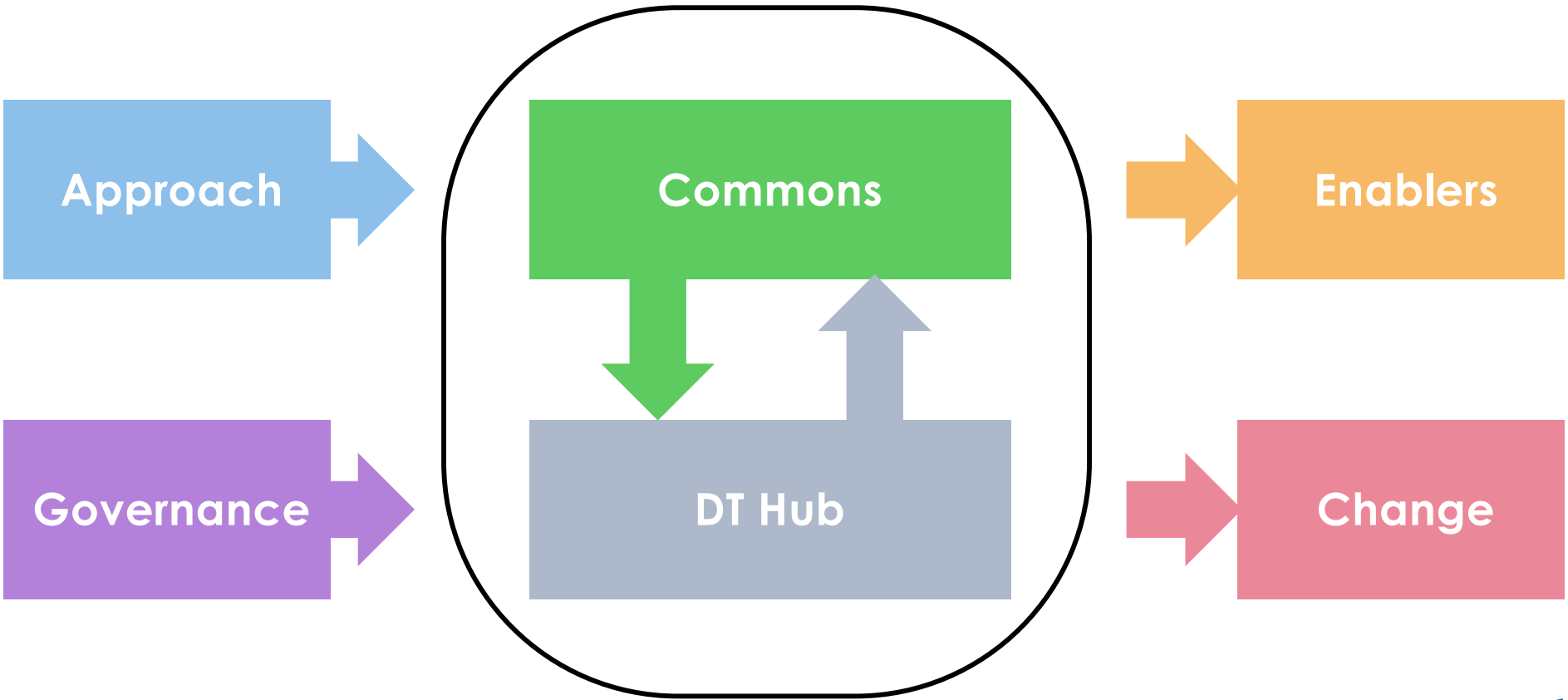
# The emerging approach



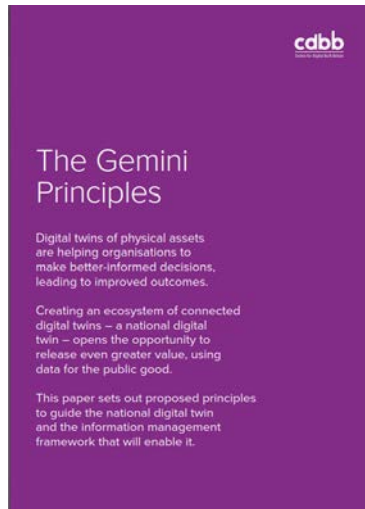
A national resource, held in common, that unlocks effective information management across the industry; the minimum necessary open standards/methodologies; expert led – the “ministry of all the talents”

Collaborative, web-enabled, learning community that learns by doing; captures and shares emerging best practice; turns experience into guidance and guidance into standards; practitioner led – those who own or are developing digital twins.

# The core streams of the Roadmap



# Guided by the Gemini Principles



**Purpose:**  
Must have clear purpose

**Public good**  
Must be used to deliver genuine public benefit in perpetuity

**Value creation**  
Must enable value creation and performance improvement

**Insight**  
Must provide determinable insight into the built environment

**Trust:**  
Must be trustworthy

**Security**  
Must enable security and be secure itself

**Openness**  
Must be as open as possible

**Quality**  
Must be built on data of an appropriate quality

**Function:**  
Must function effectively

**Federation**  
Must be based on a standard connective environment

**Curation**  
Must have clear ownership, governance and regulation

**Evolution**  
Must be able to adapt as technology and society evolve

Thank you