

Current trends and developments in Building Information Modelling (BIM)

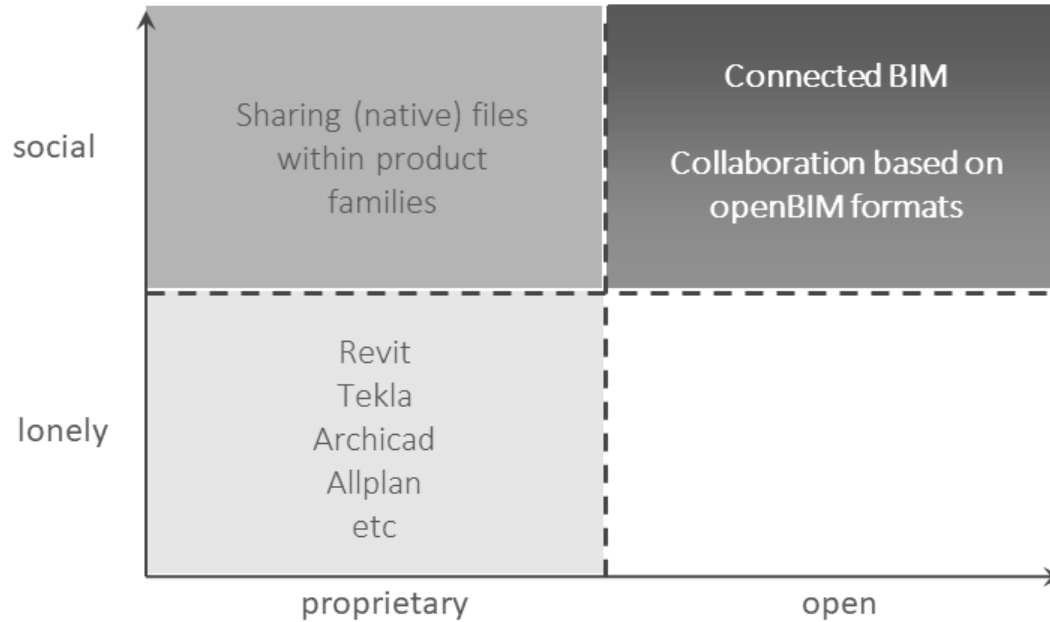
Arto Kiviniemi

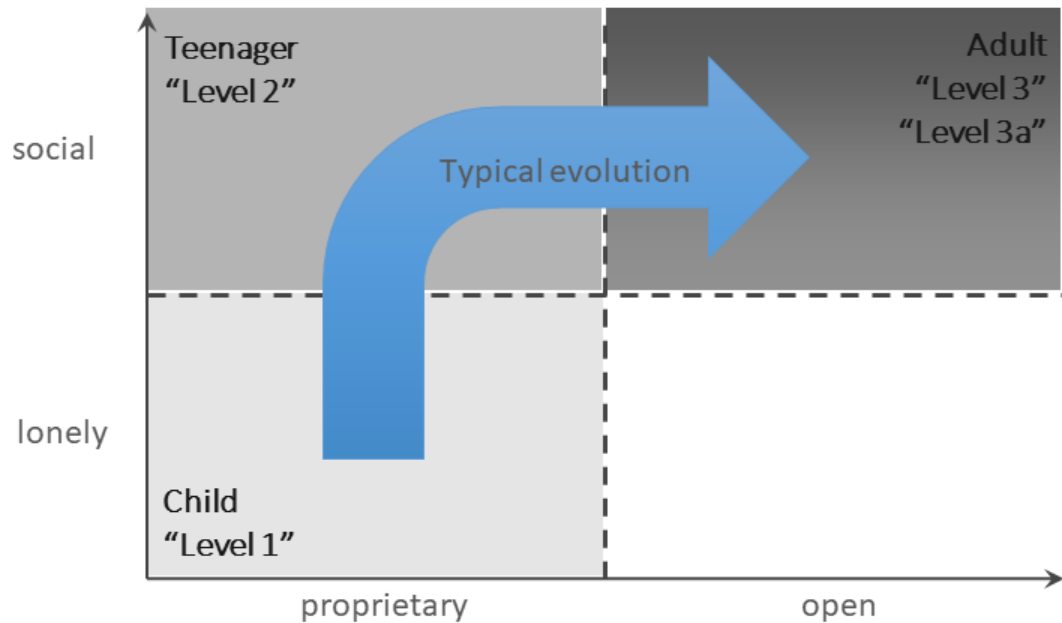
Honorary Research Senior Fellow, Retired Professor of Digital Architecture

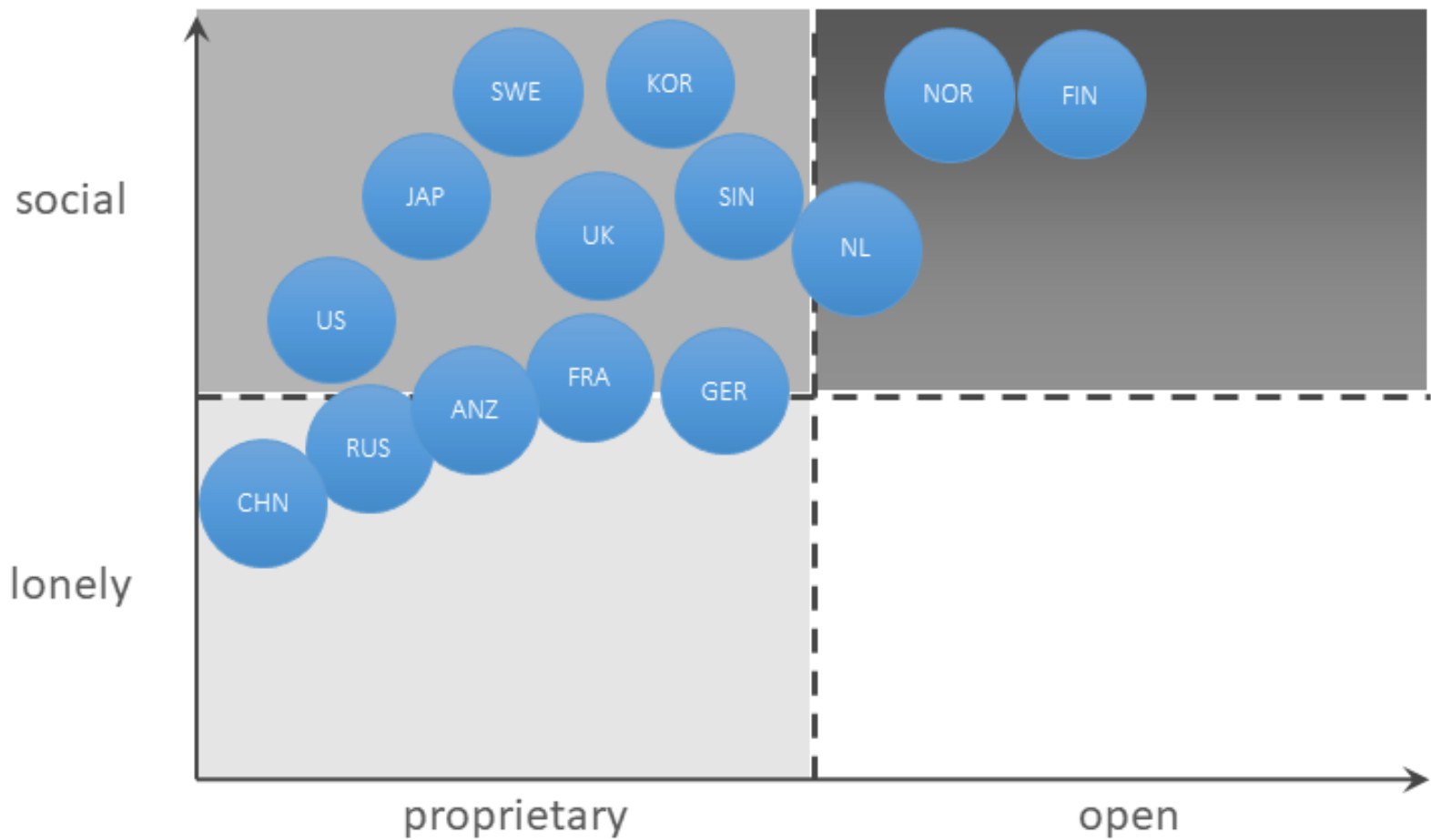
University of Liverpool

BIM adoption?

Evolution of BIM maturity

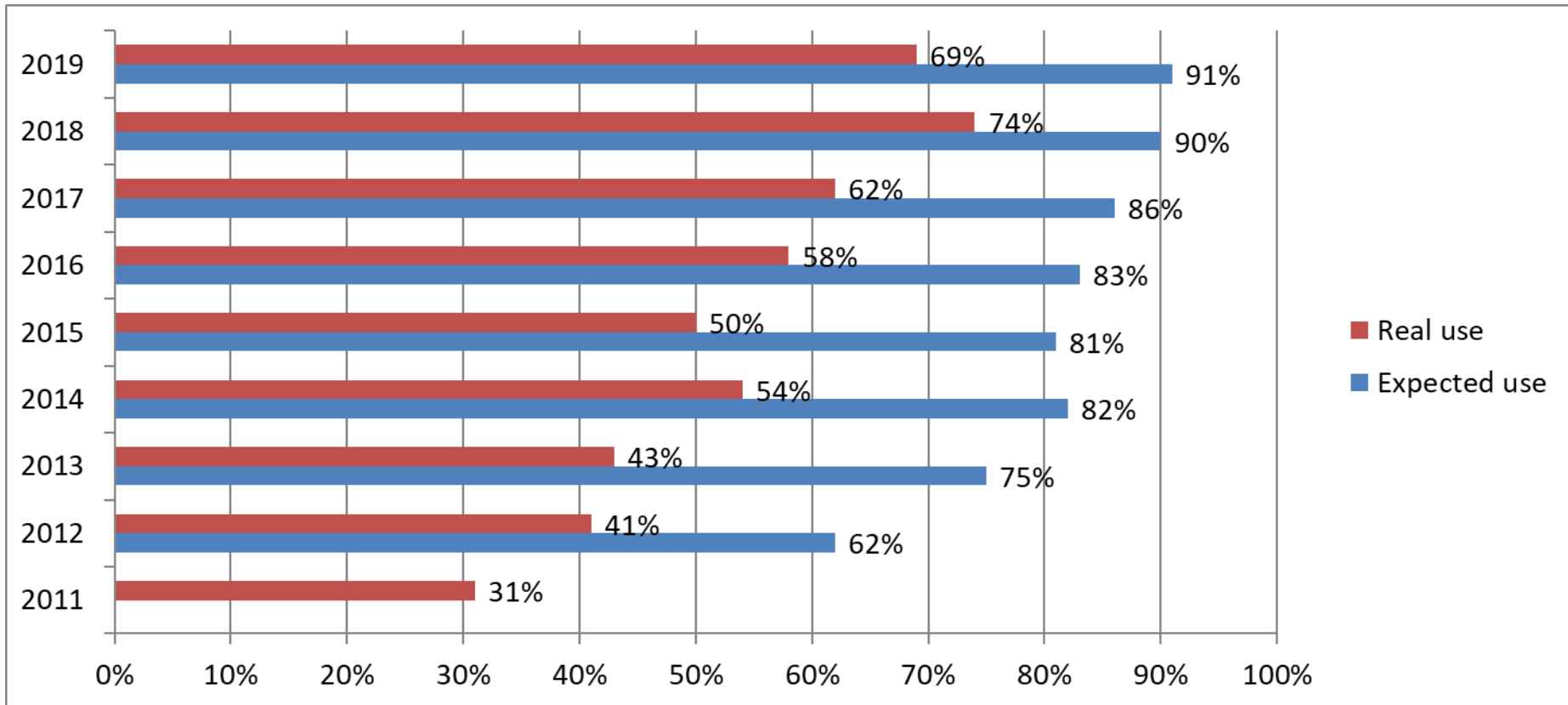






The industry wide adoption is **ALWAYS**
much slower than people expect

Expectations vs. reality – UK BIM adoption



Future ?



BIM is not the goal, just one of the tools in the on-going digitalisation of our built environment

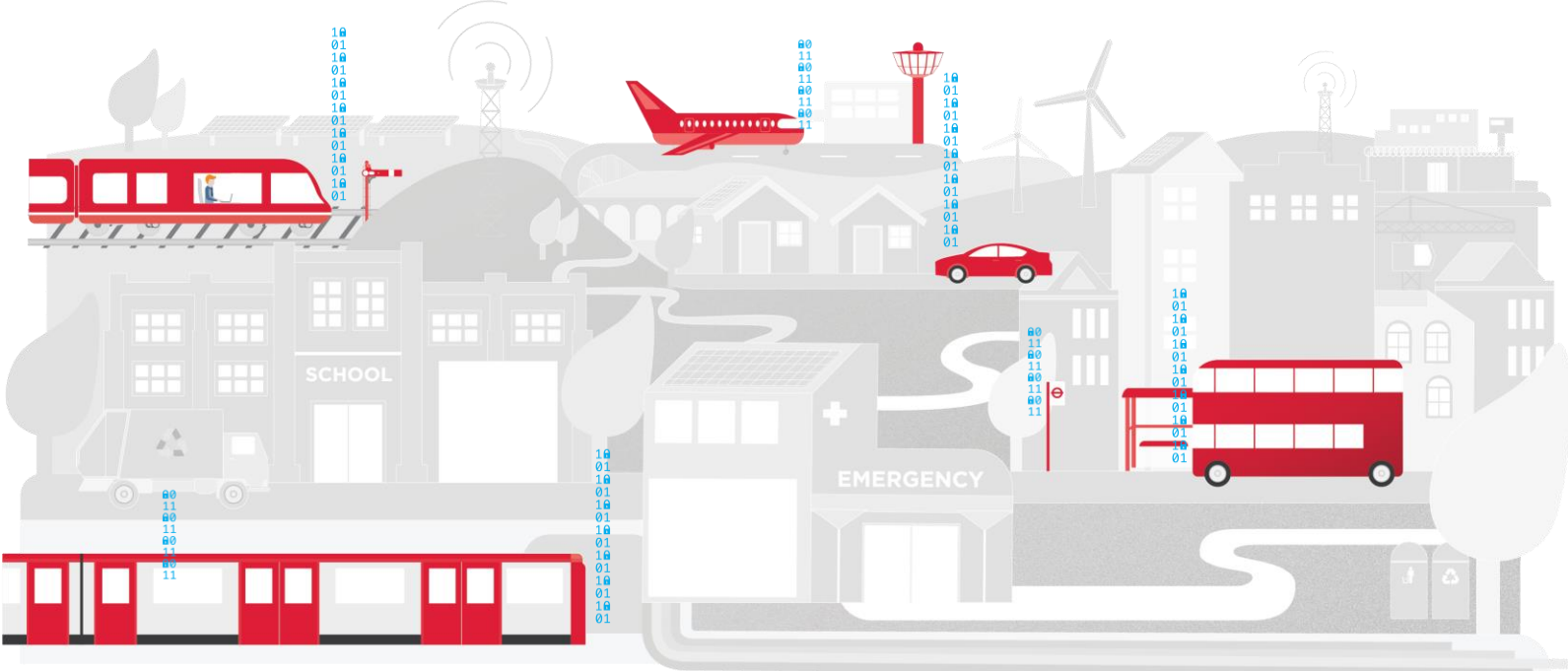
National Digital Twin – An ecosystem of connected digital twins enabling better decisions faster across the built environment

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.

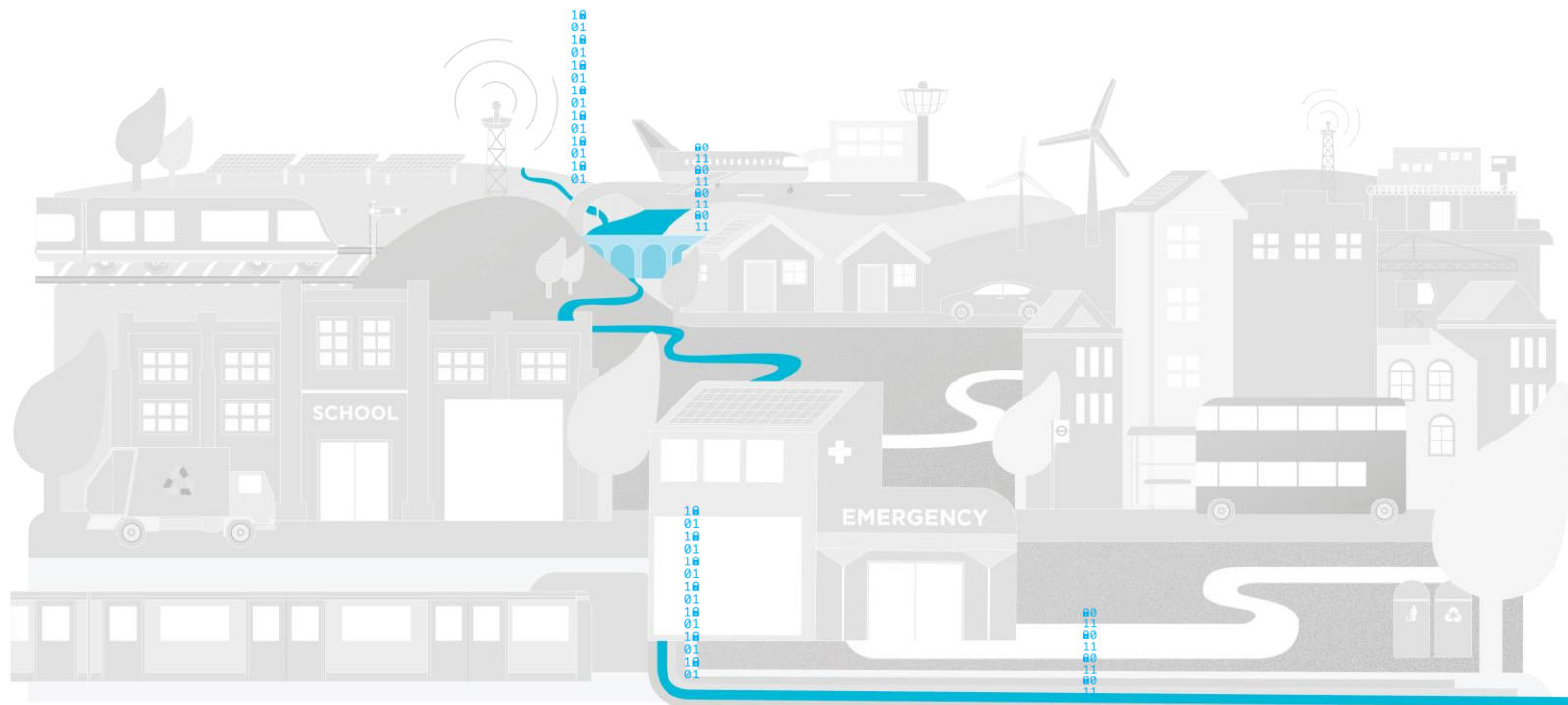
Transport



Energy



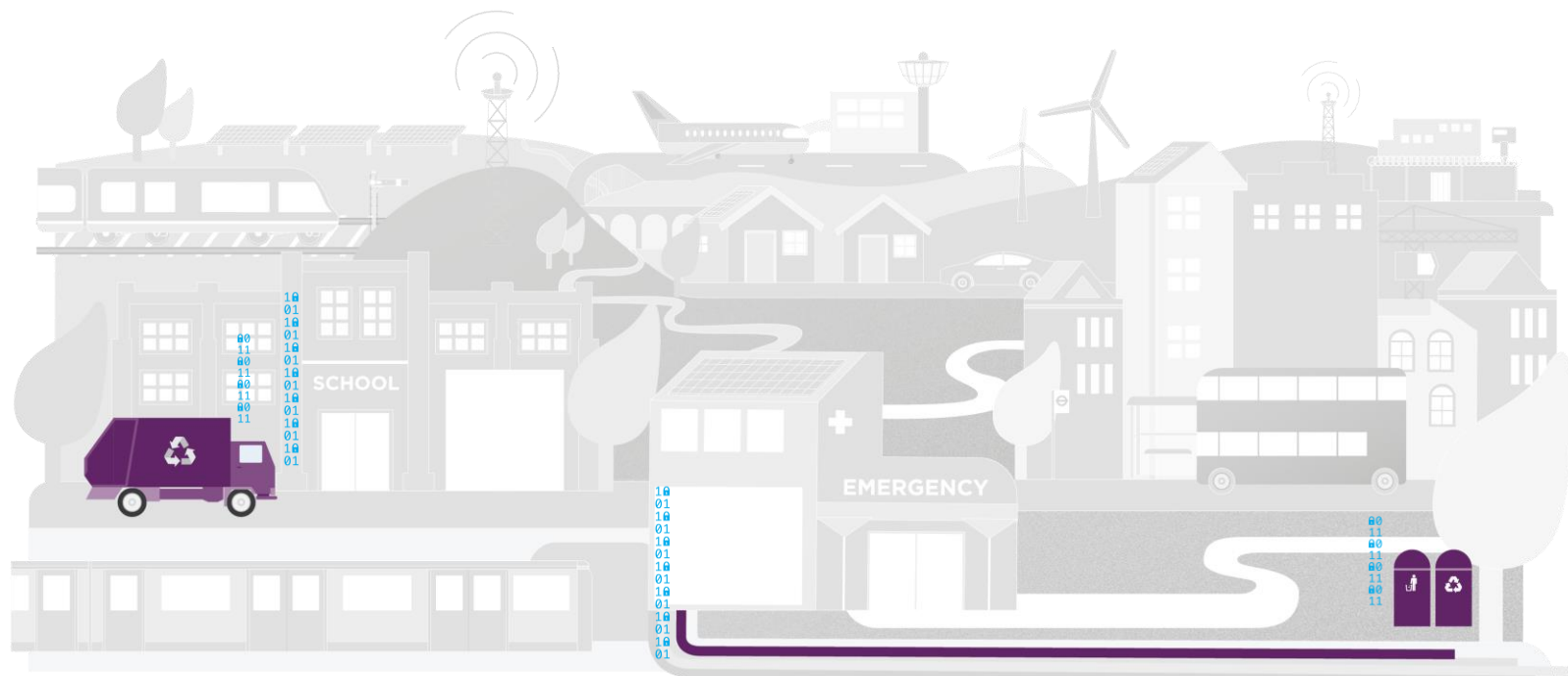
Water



Telecoms



Waste



Social infrastructure



Residential, commercial and industrial



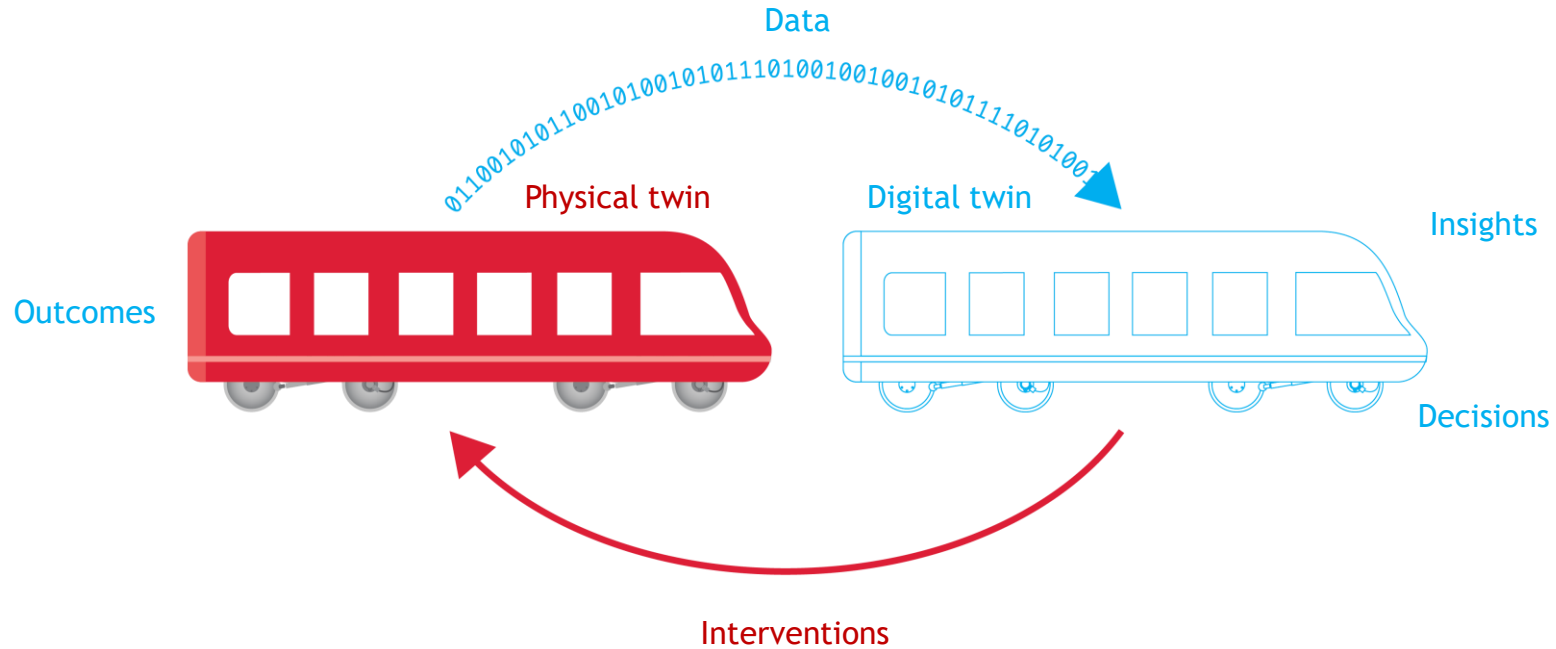
Interface with the natural environment



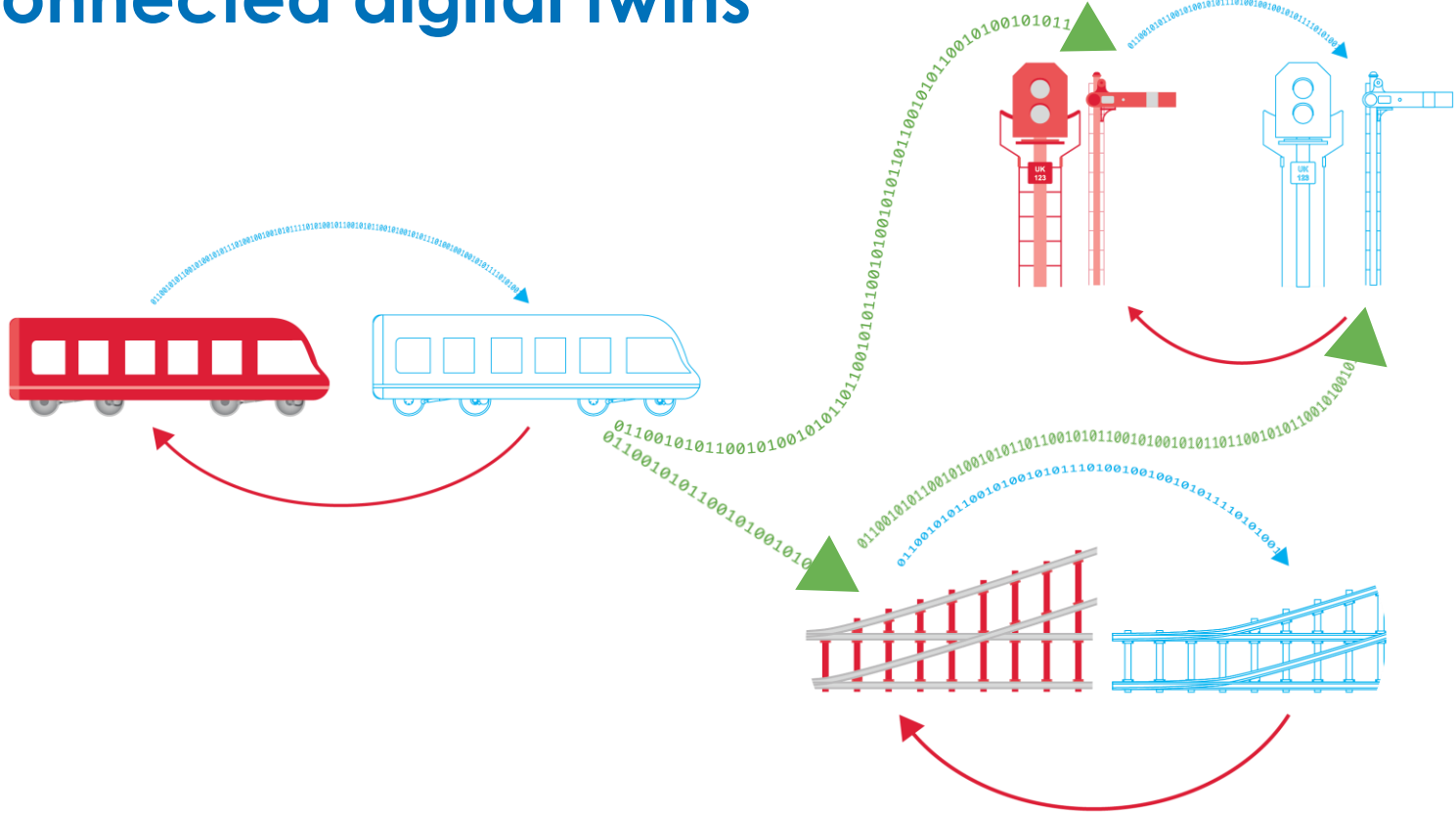
Built environment



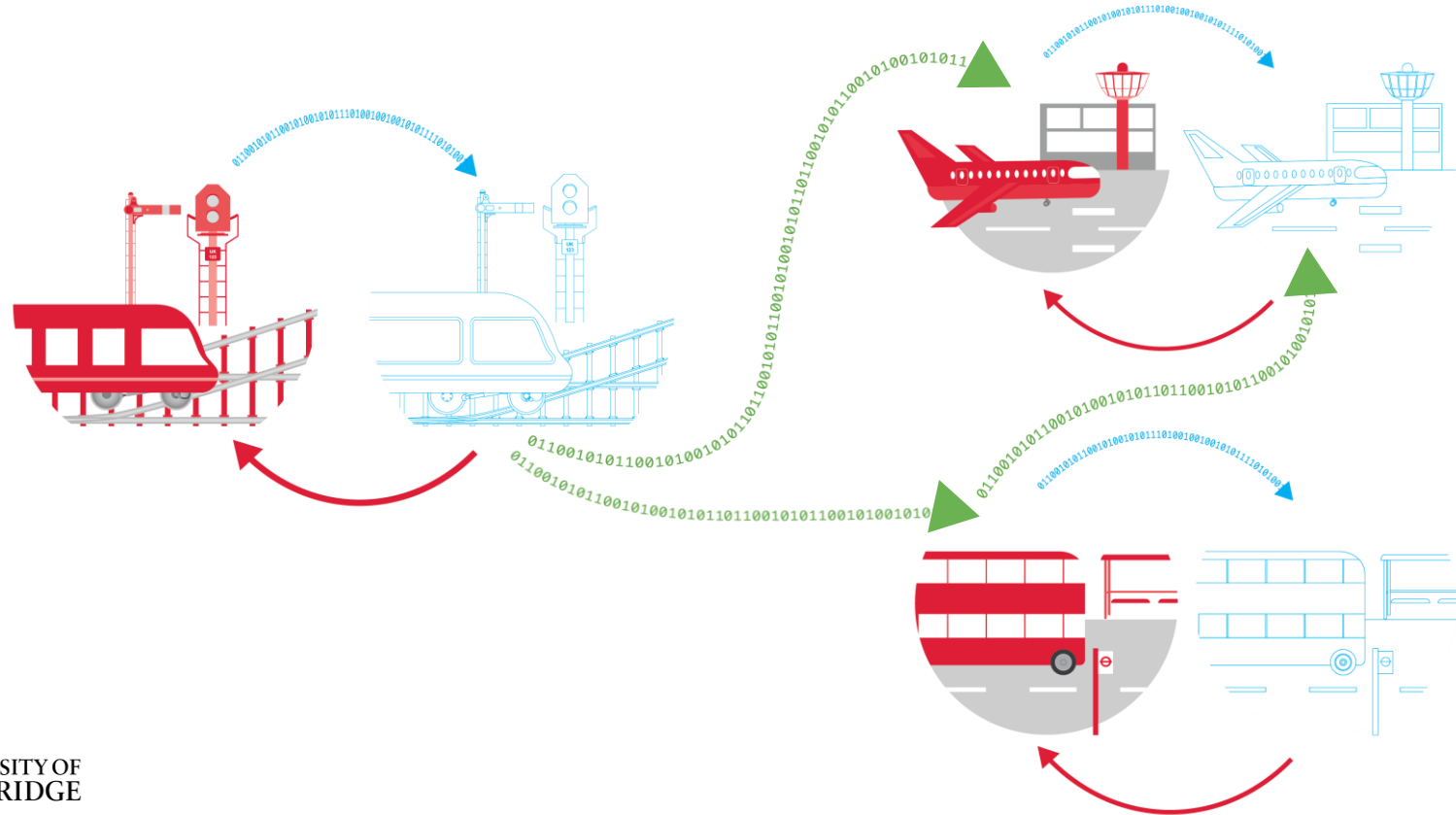
Digital twins



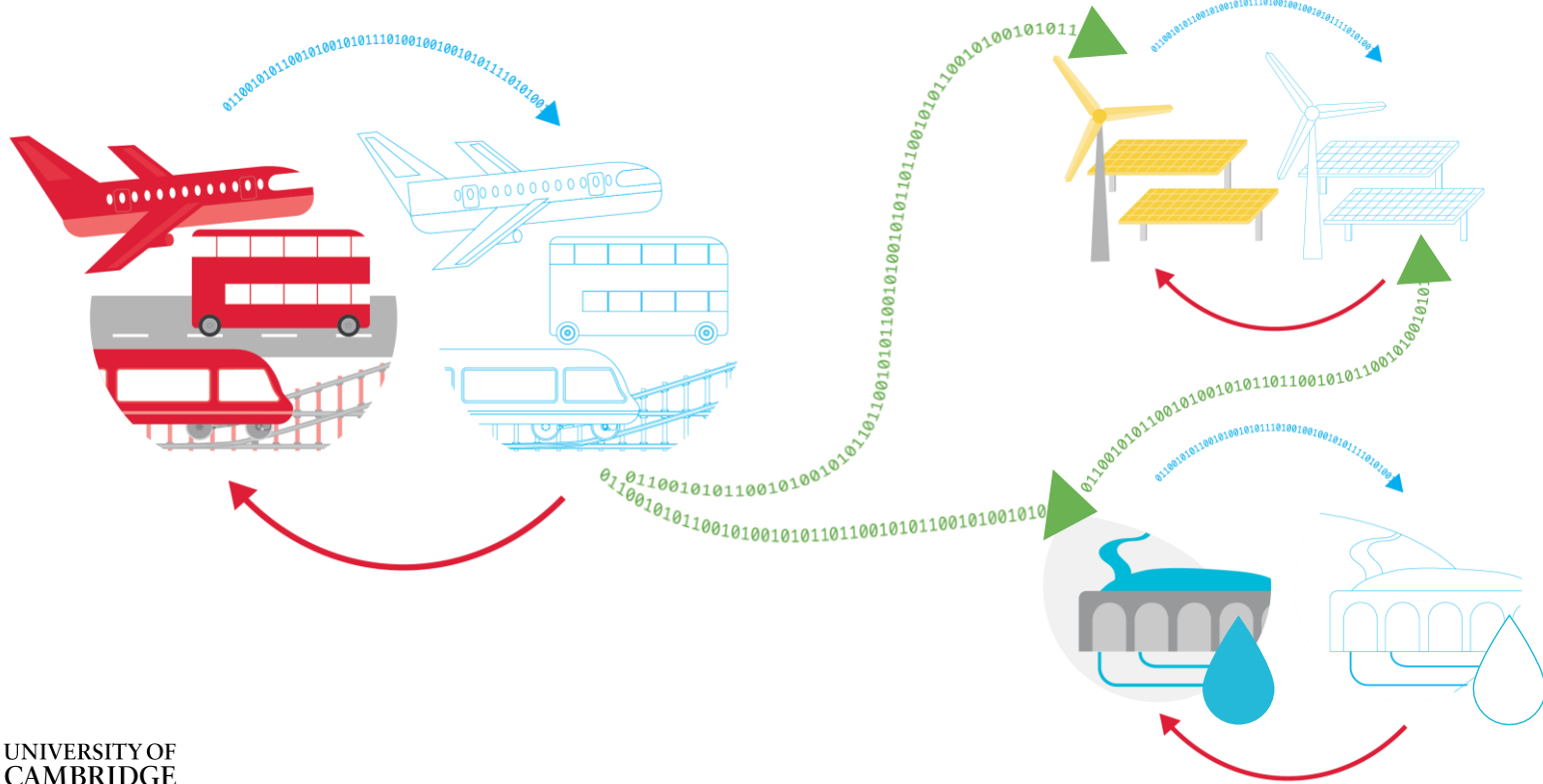
Connected digital twins



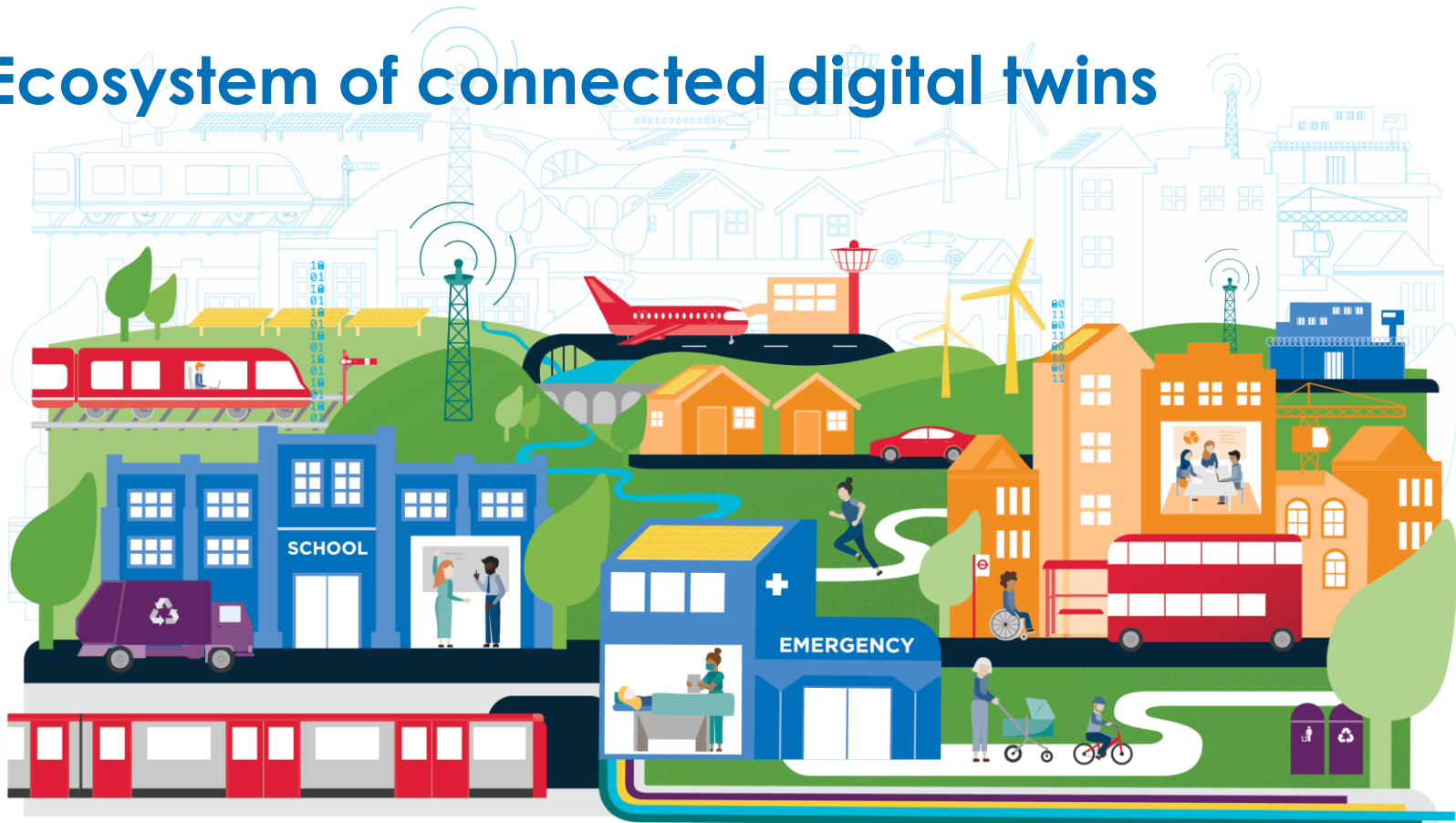
Ecosystem of connected digital twins



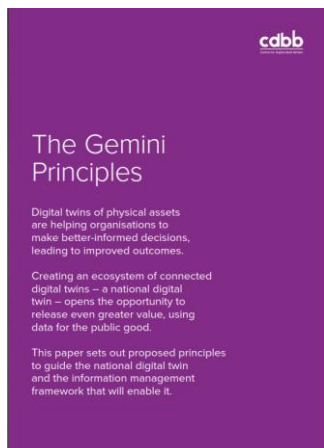
Ecosystem of connected digital twins



Ecosystem of connected digital twins

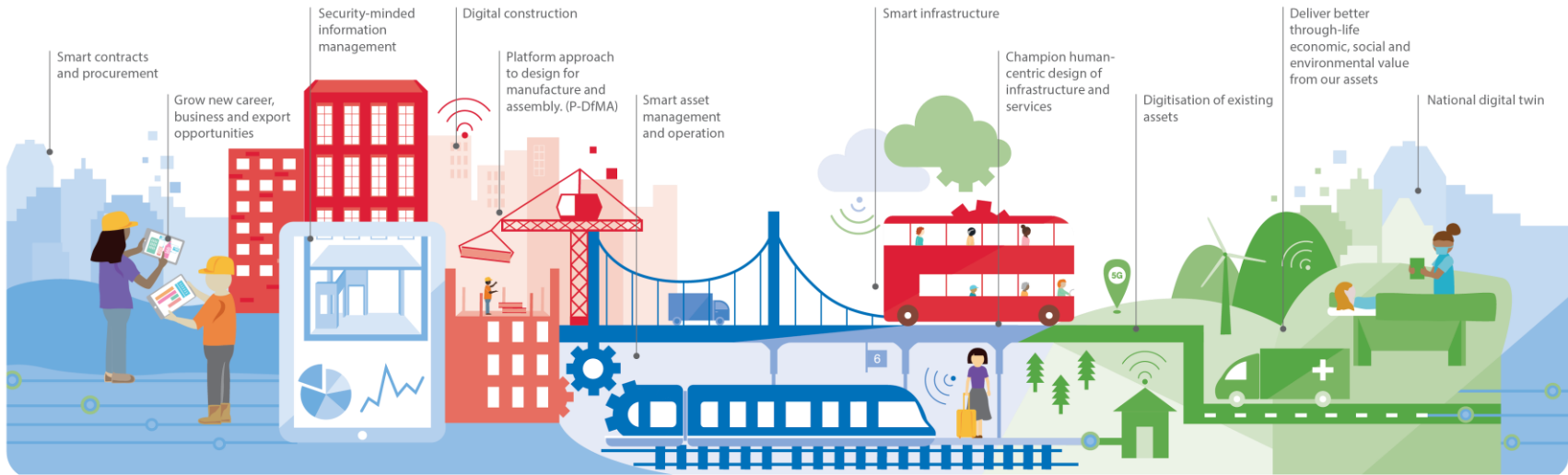


Guided by the Gemini Principles



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

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.

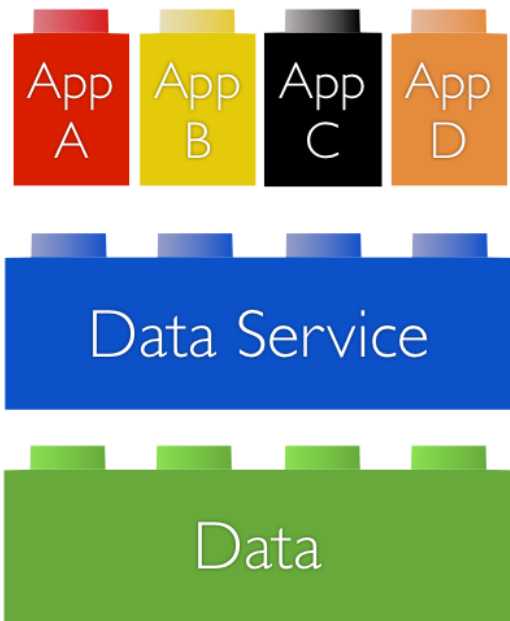
Integrate

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.

Modular apps – practically unlimited possibilities to use the ubiquitous data...

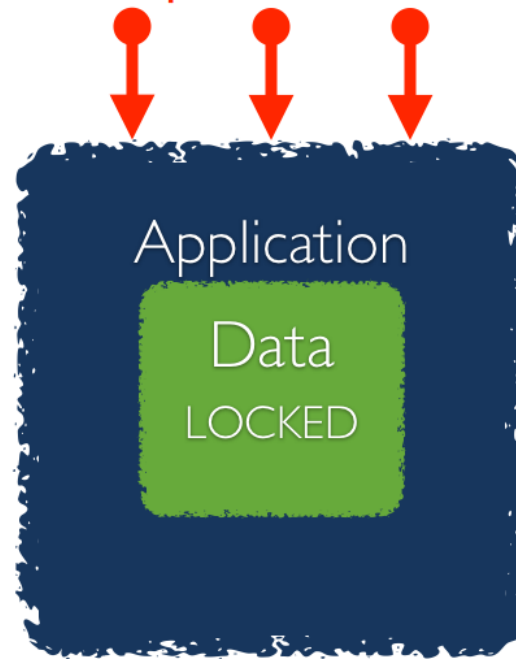
iFM MODULAR

Open Connections



MONOLITHIC

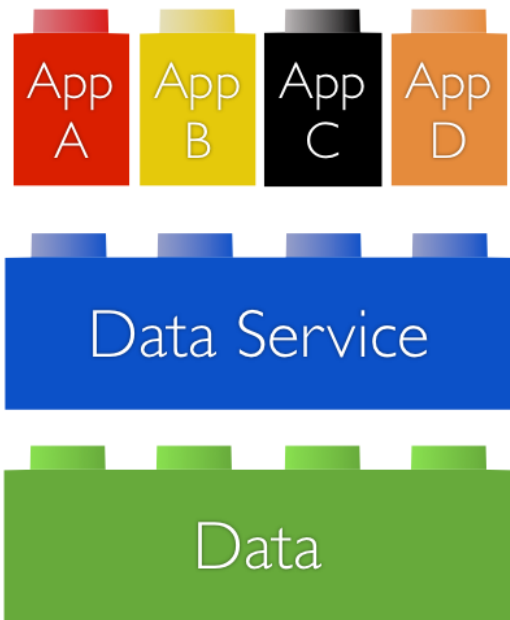
No Open Connections



NO ACCESS TO DATA

iFM MODULAR

Open Connections



MONOLITHIC

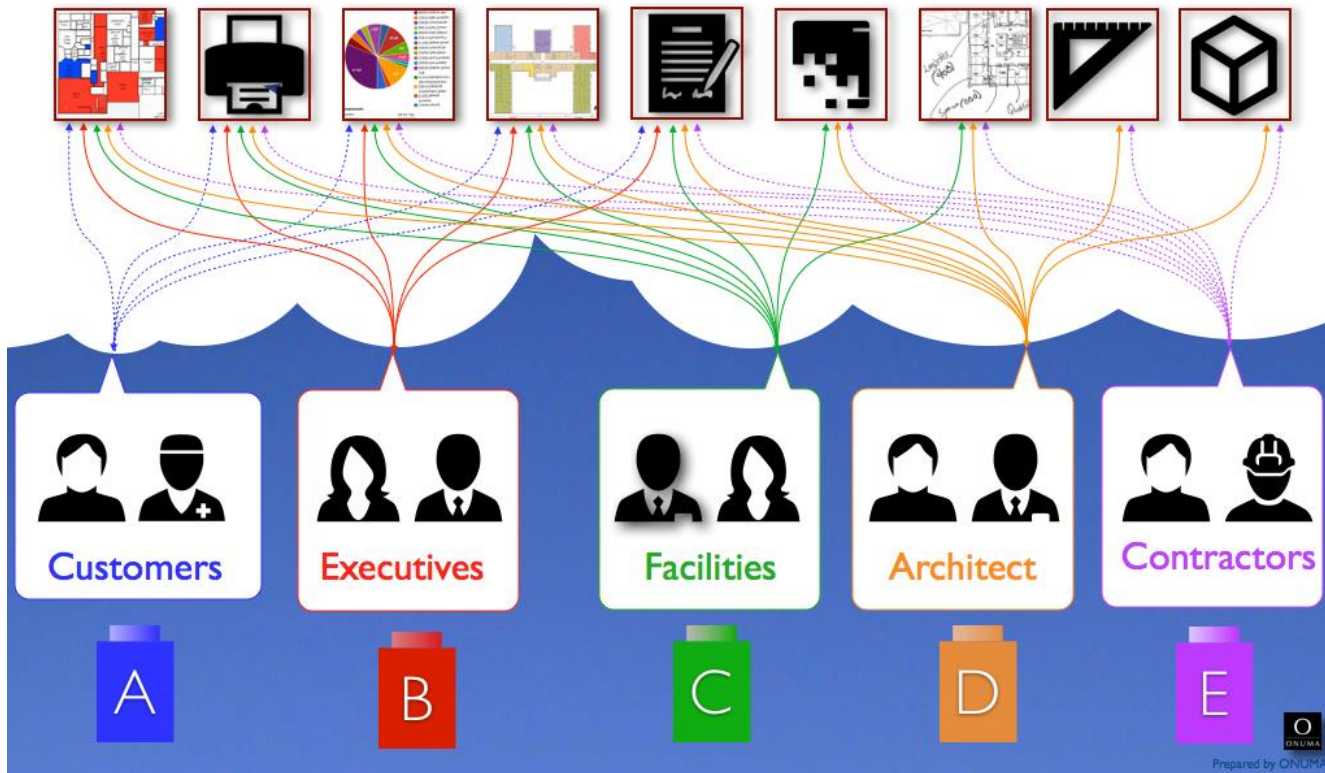
No Open Connections



NO ACCESS TO DATA



MANY USER - SIMPLE ACCESS TO COMPLEX DATA



SAME DATA



From IFC to Web of Data

	IFC	Web of Data
Reasoning	-	SWRL, SPIN, RIF
Dataset description	-	VoID
Linking	-	URI, RDF
Query	-	SPARQL
Access	-	HTTP/REST
Publication	Files	RDF, Stores, Files
Ontology/schema	EXPRESS	OWL
Data representation	IFC data	RDF graph
Serialization format	STEP File, ifcXML	JSON-LD, XML, ...
Identifiers	GUID	URI



1. Switching to more modern and flexible technologies
2. Enabling a range of new functionalities
3. **Keeping the most valuable part of IFC: the conceptual schema**

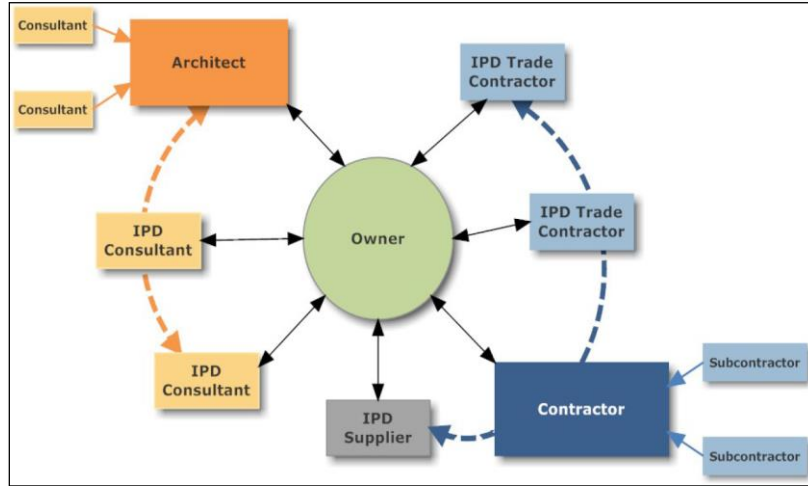


Ivan Krylov: Swan, Pike and Crayfish (1814)



How do we align the goals?

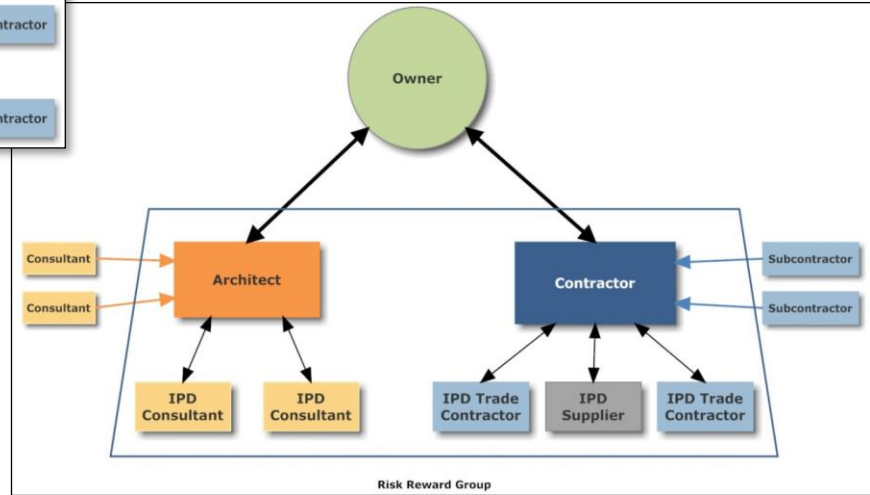
Need for new contractual models, e.g. IPD



Polyparty contract

“Sharing the pain
and the gain”

Multiparty contract



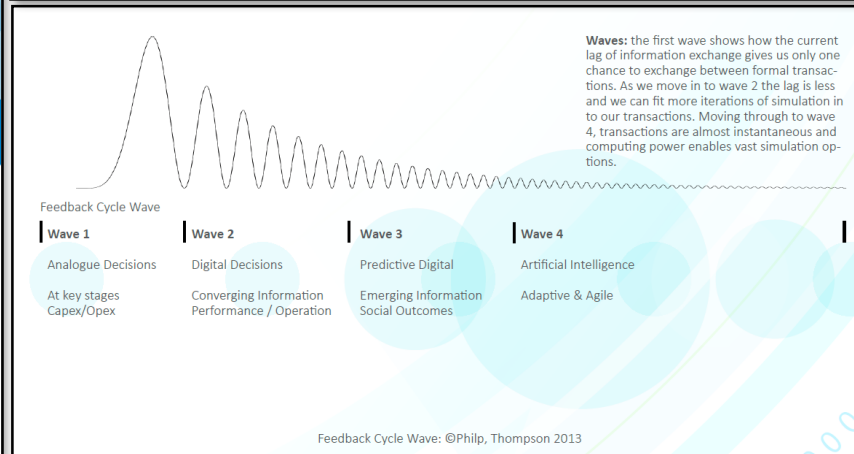
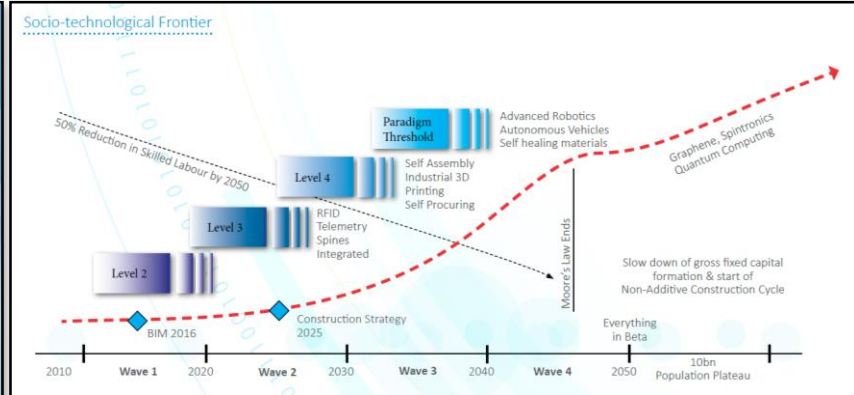
**Last, but not least, we must know
where we want to go!**

Technology is not a force of nature but made by humans.
We can define how it will develop!

We need a long term vision for the Built Environment...

Built Environment 2050
A Report on Our Digital Future

BIM2050



**“If you don't know where you want to go,
it doesn't matter which path you take!”**

(Alice in Wonderland)

