15th Anniversary HVM 2017
& 4th Graphene New
Materials Conference
2-3 November 2017
Cambridge, UK
www.cir-strategy.com/events

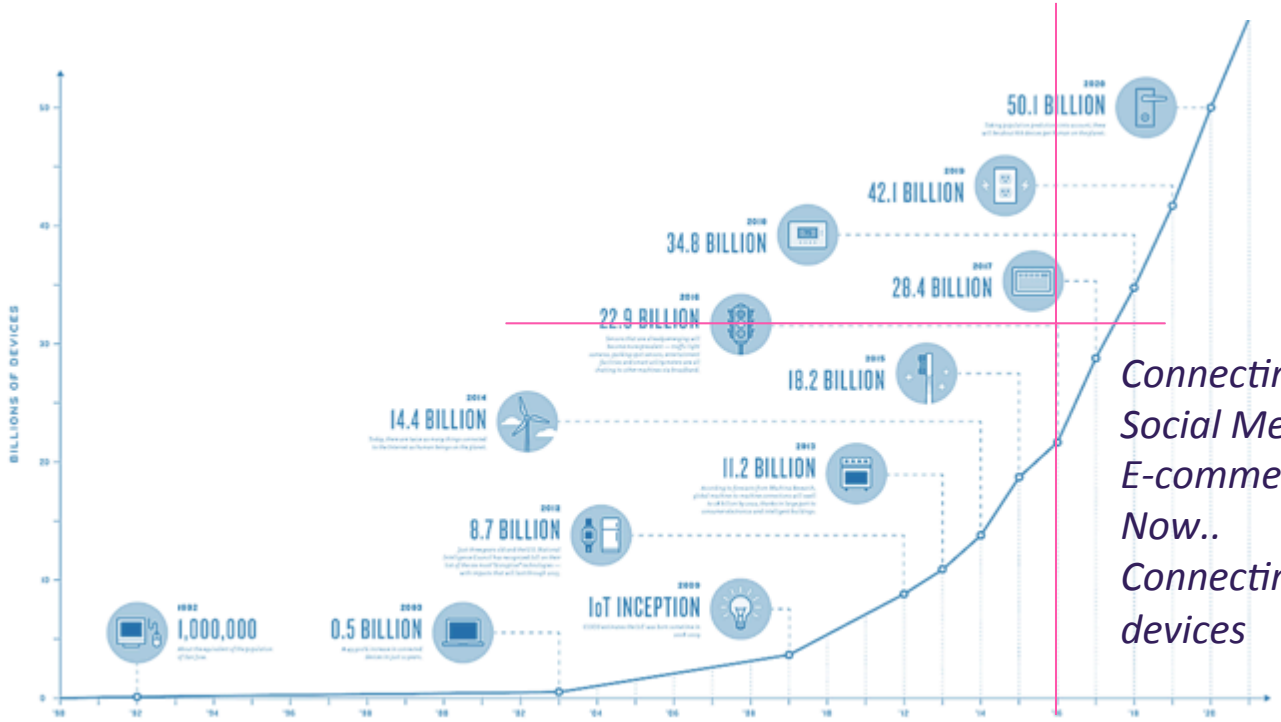
CONNECTIVITY AND INTEROPERABILITY: SMART CITY AGGREGATORS

CityVerve: An IoT ecosystem for Smart Manchester

Sandra Stinčić Clarke, Principal Researcher, BT TSO

BT

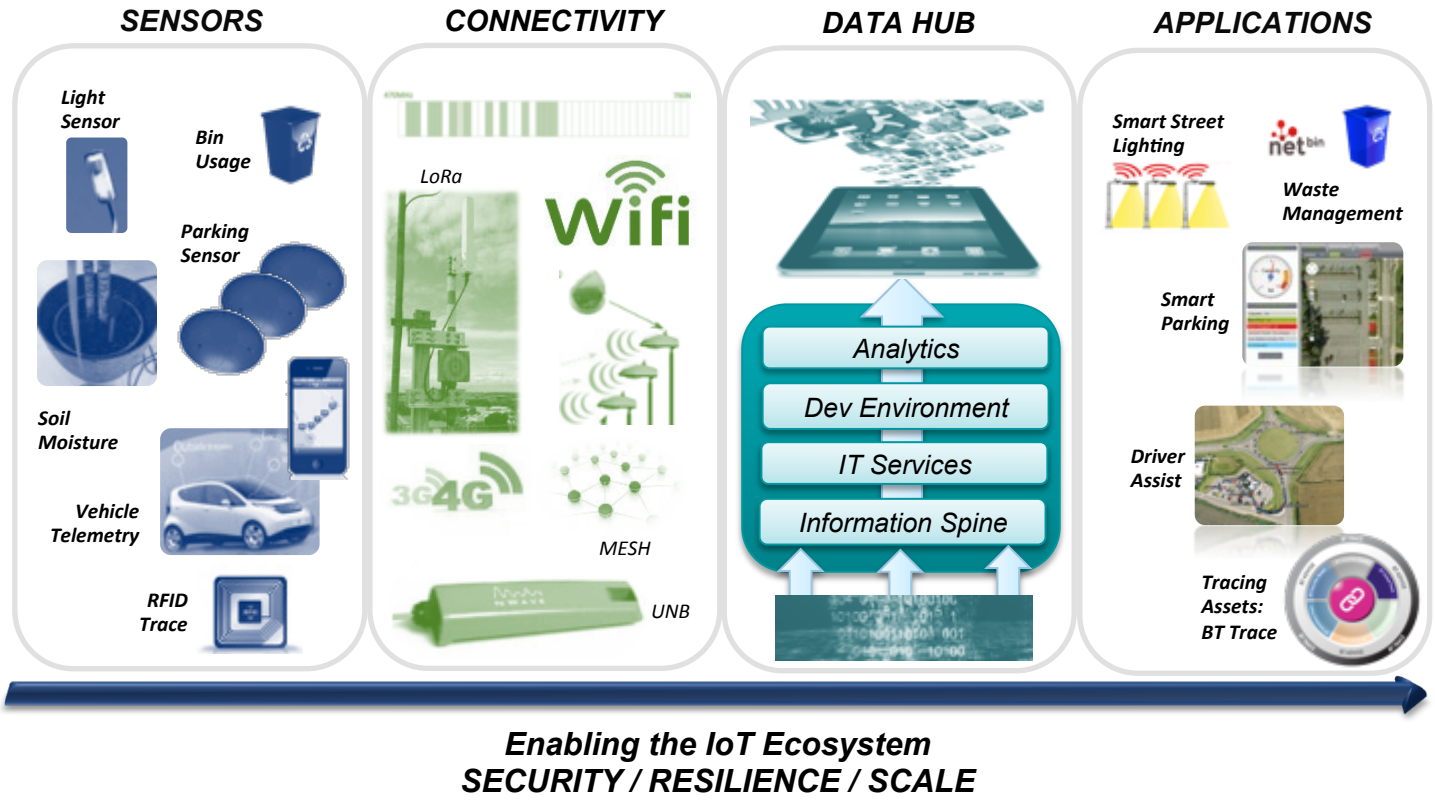
IoT – Internet of Things



Connecting computers
Social Media
E-commerce
Now..
Connecting smaller devices

*The **Internet of Things** (**IoT**) refers to the ever-growing network of physical objects that are connected to the internet and the **communication that occurs between these objects and other Internet-enabled devices and systems***

IoT technology layers



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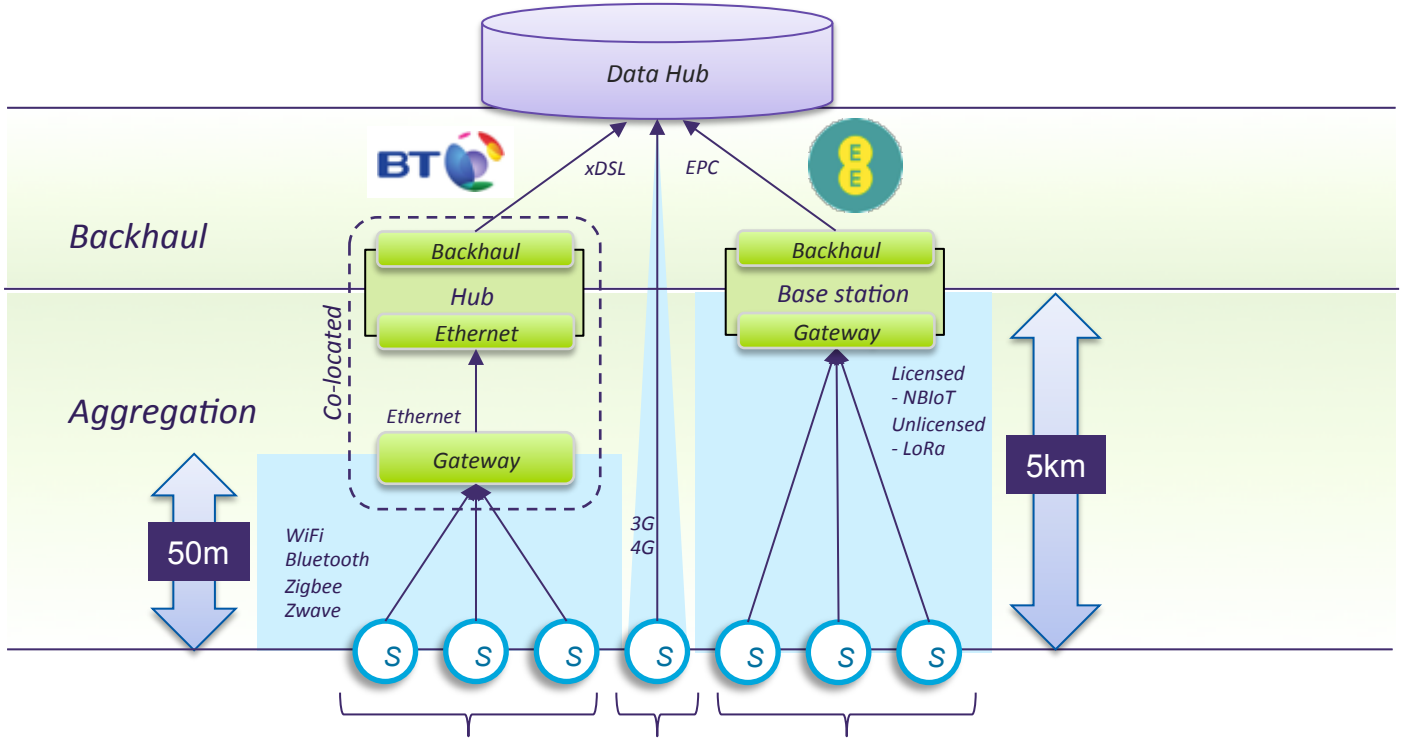
BT IoT Data Hub

Sensor to Data Hub Connectivity Options



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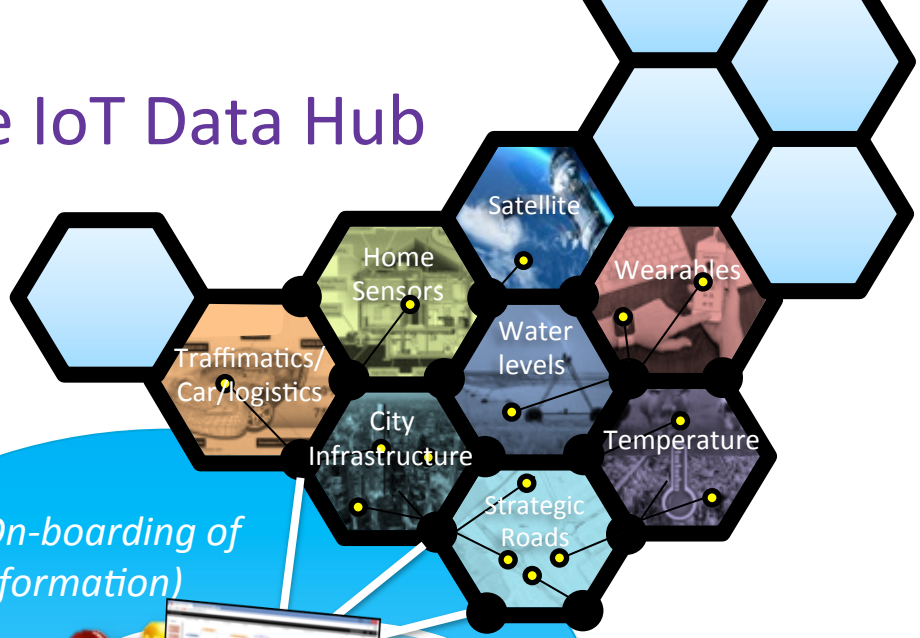
The IoT Data Hub



(On-boarding of Information)

Developers

Data Hub

(Connecting applications to information)

Applications

City Motion Map	Supply Chain	Smart Energy Usage	Smart Water Usage
Connected Buildings	Air Quality	Assisted Living	Smart Street Lighting
Connected Home	Smart Waste Management	Smart Parking	Connected Vehicles

The IoT Data Hub

- *Information Services*
- *IT Services*
- *Analytics*
- *Developer Environment*
- *Service Management*

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Business Models

Multi-sided: open ecosystem platform play

Data providers: Varying terms and conditions & pricing (inc. free)

BT's data hub - flexibility to support multiple models

Platform providers: Early example *transportapi.com*

Data consumers: Often become data providers as well

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IoT Hubs & interoperability

Data hubs lower the barrier to participation:

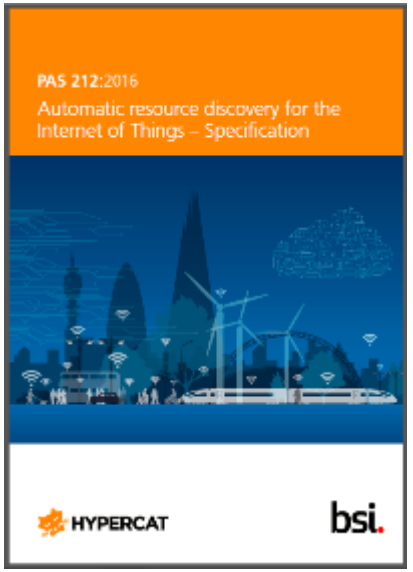
- Data published on clear terms to a wide audience
- Access to data from multiple heterogeneous sources

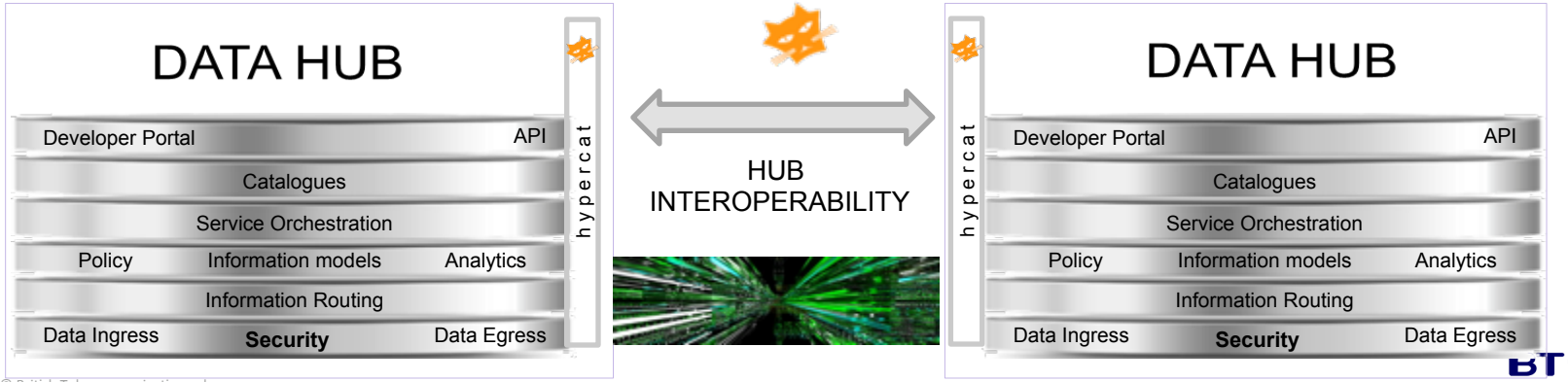
- Resource discovery and access (what data does this hub have and how do I get it?)
- Interoperation between hubs

HYPERCAT

Interoperability will be essential

- InnovateUK project driving data hub interoperability
- Hypercat specification → standard (BSI)
- A machine-readable data catalogue
- Breaking down silos
- Fostering innovation
- Maximising the value of data





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This is CityVerve.

CityVerve is Manchester's smart city demonstrator.

CityVerve is creating a blueprint for smart city implementation worldwide.

Led by Manchester City Council, it's made up of 21 organisations who have united to transform the city and create endless possibilities for the people there.


MANCHESTER
CITY COUNCIL


cisco


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Asset Mapping


COLLECTIVWORKS


Telensa


SIEMENS
Ingenuity for life


PRISMTECH
AN ADLINK COMPANY


MSP
MANCHESTER
SCIENCE
PARTNERSHIPS


satsafe

Republic Of Things


MANCHESTER
1824
The University of Manchester


Transport for
Greater Manchester


Future
Everything


Ordnance Survey


SPARTADIGITAL


Central Manchester
University Hospitals
NHS Foundation Trust
NHS


SmartGateways


C+L
Clicks+Links


Manchester
Metropolitan
University


Spice

CityVerve

- £15M collaborative R&D project, with UK government investing £10M
  - Large-scale deployment of IOT connecting everyday objects
  - Demonstrate benefits in Transport, Healthcare, Energy & Environment
- Led by Manchester City Council, CityVerve will build large scale Smart City demonstrators
- It will provide Smart City networks, platforms and infrastructure to enable open innovation
- Central to this will be **BT's data hub**, interoperating via **Hypercat** with a range of other platforms

REPLICABLE – SUSTAINABLE – SCALABLE

CityVerve's Use Cases – Themes

Transport and Travel

Energy & the environment

Health and Social Care

Culture & the public realm

Current Manchester data

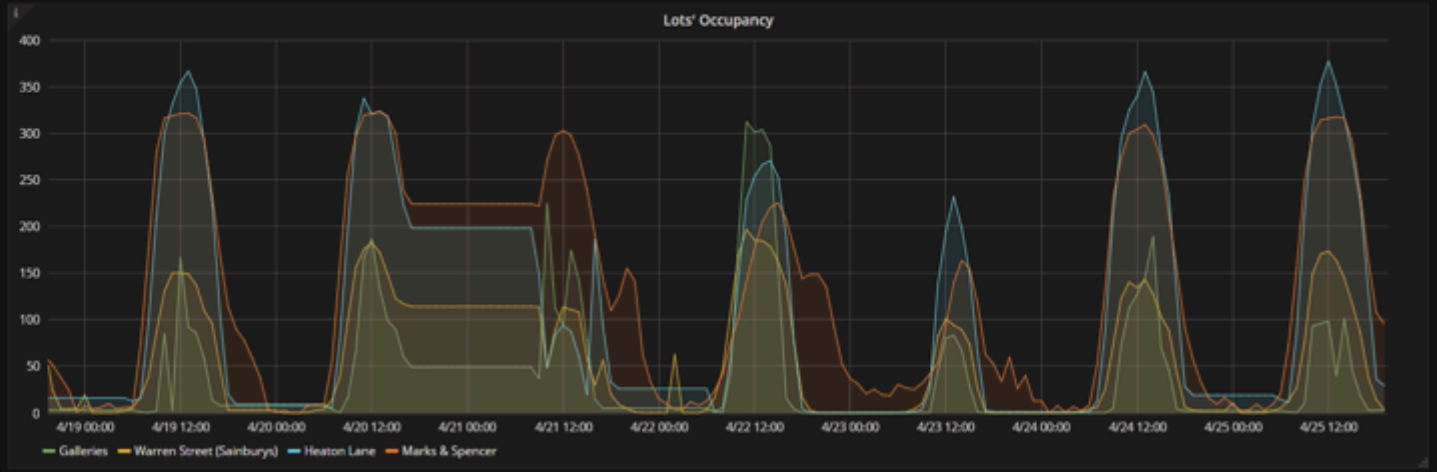
>100 data feeds

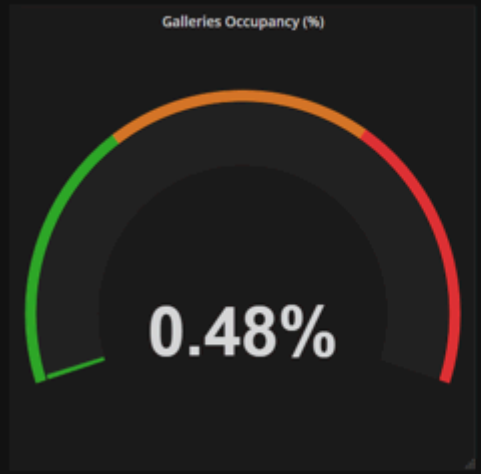
- Cycle usage patterns & infrastructure
- Automatic traffic counts
- Car parking data
- Air quality data
- Live and scheduled trains
- Live and scheduled buses and trams
- NAPTAN (bus stop locations)
- Met Office weather observations
- Highways England trunk route traffic speed and density
- …

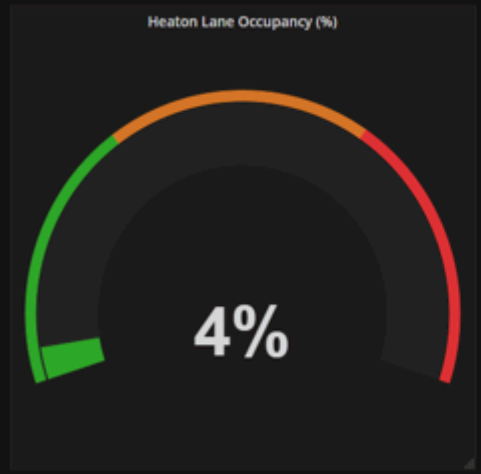
Car Parks

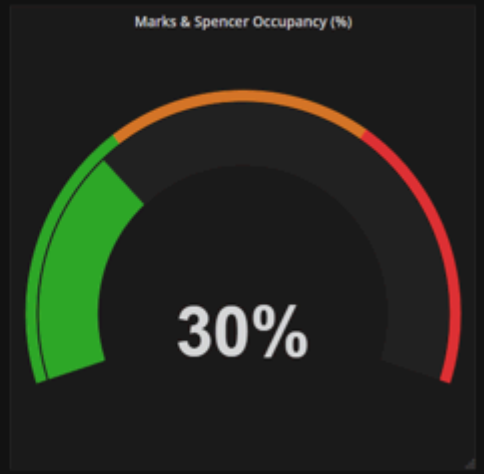
Available Spaces

Time	Metric	Value
2017-04-25 19:15:23	Heaton Lane	681
2017-04-25 19:15:25	Galleries	622
2017-04-25 19:15:21	Warren Street (Sainburys)	419
2017-04-25 19:15:07	Marks & Spencer	239









Insight

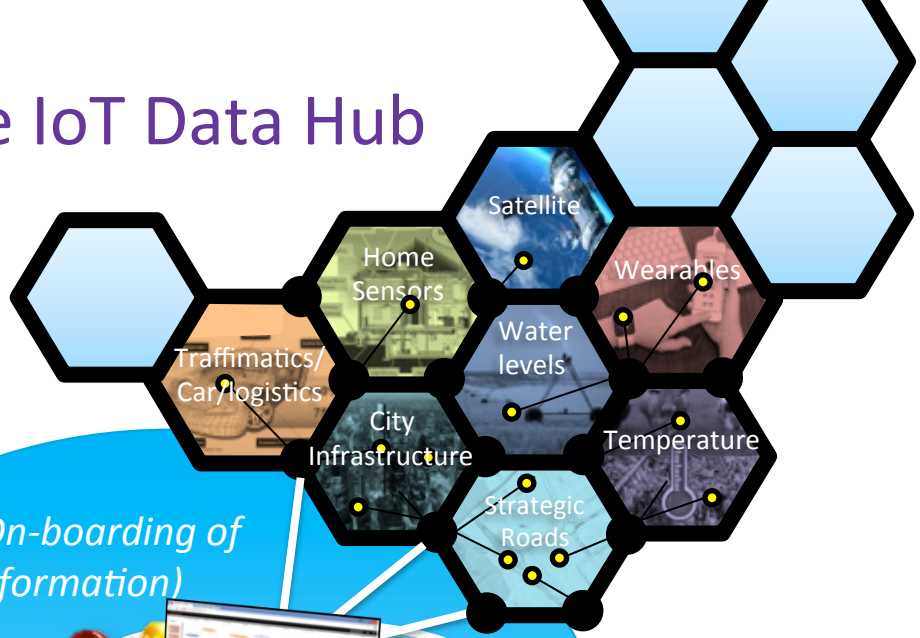
Infrastructure use
Future investment
Road quality

SEE.SENSE®

cityverve

HYPERCAT

The IoT Data Hub



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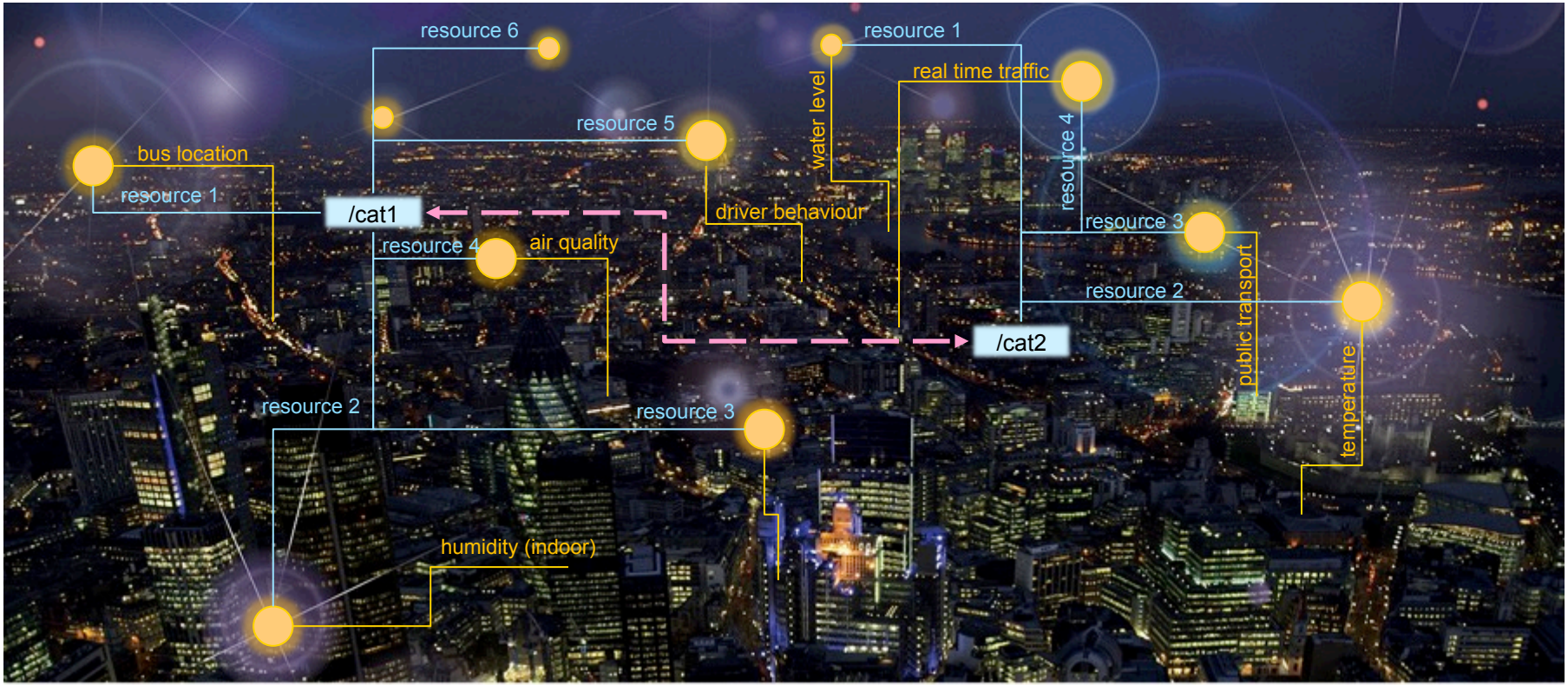
IoT enabled cities



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In summary

- Interoperability is crucial
- Several 100s of millions of sensors already deployed in UK (via smartphones)
- CSPs have key roles in the IoT ecosystem
  - Connectivity provider
  - Data platform – information broker
  - More widely, supporting ecosystem end-to-end through partnerships
- BT is deploying this model in CityVerve and elsewhere
  - Logistics (BT Global Trace), MK:Smart, Retail (Acuitas), …

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Thank you for your attention

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