

# **When every bit is a bit closer to death**

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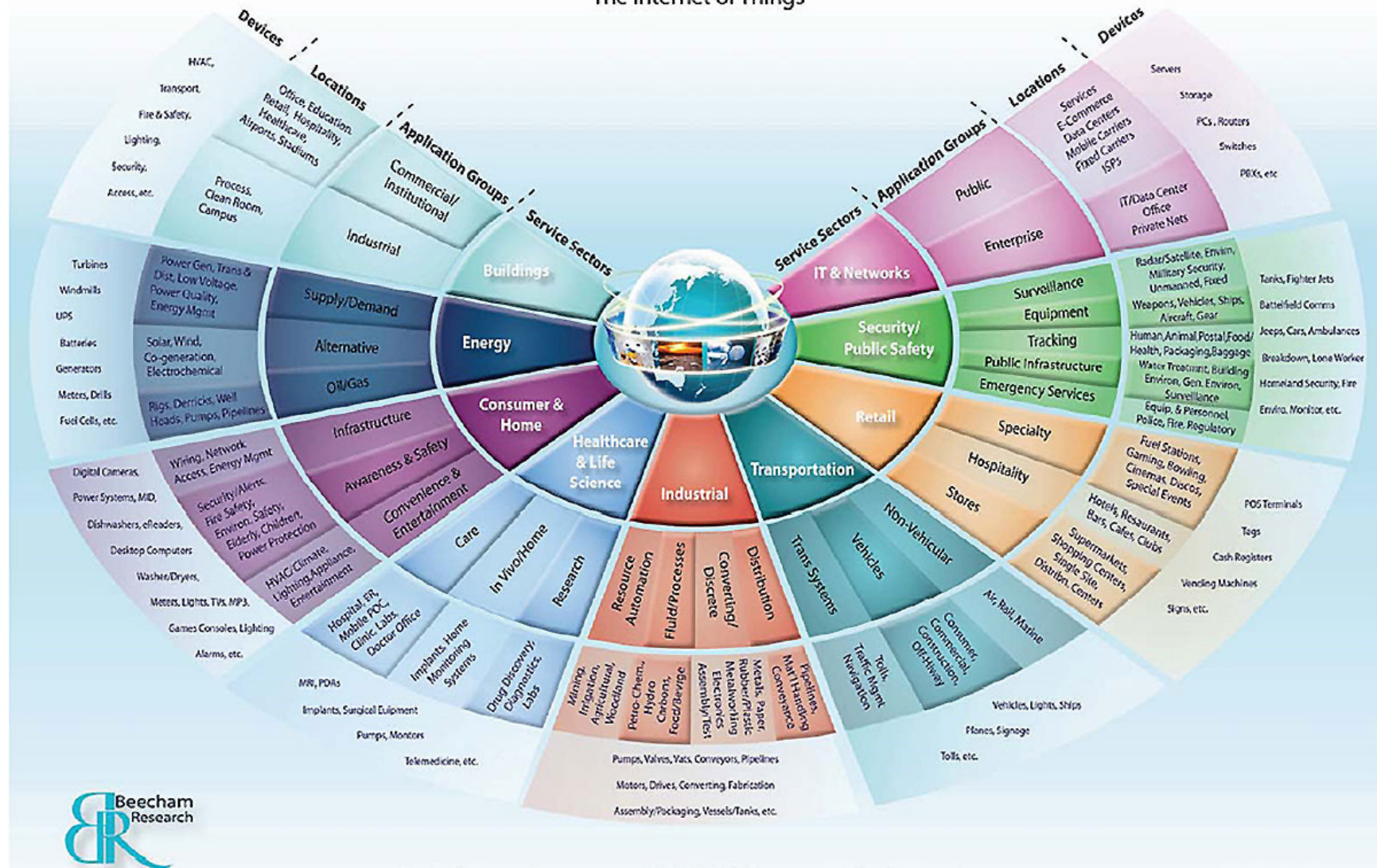
## Story-line

- The Internet of Things
- Weightless
- Other technologies
- Problems with using TCP/IP or CoAP
- Why IoT devices do not need to talk to each other
- Why IoT is a bad label
- Bridging the gap?

## How many different IoT spaces?



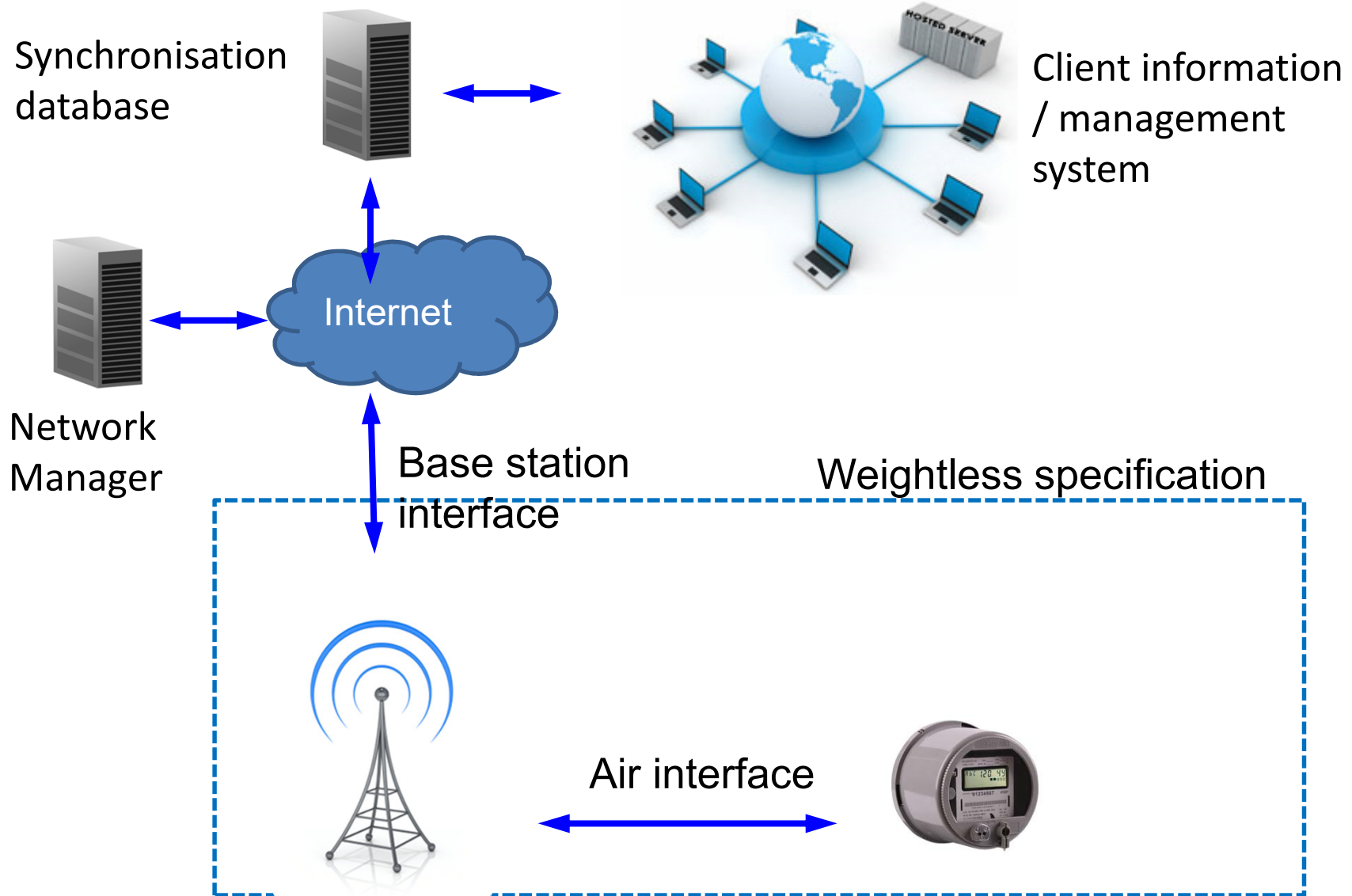
## The Internet of Things



## Weightless in outline

- Weightless is a standard for wireless communications by IoT devices over distances of up to 10km
- It operates in unlicensed spectrum and provides a rich feature set with uplink and downlink data rates of up to 100kbits/s and many broadcast, multicast, one-way and two-way transmission modes
- It is intended for use in any IoT device other than where streaming video or similar high data rate, high capacity requirements are important
- It allows for battery life of up to 10 years
- It can be deployed in any configuration from single base station to national network

# Architectural overview



## Technology summary

Name	Licenced?	Standard?	Deployed	Pros	Cons
Sigfox	No	No	Yes	Cheap, works	No downlink, limited uplink, operator model
LoRa	No	Partial	Yes	Can be self-deployed, large community	Interference concerns, proprietary at chip level
Weightless	No	Yes	Nearly	Well designed, flexible	Limited support
Ingenu	No	No	Yes	Global frequency band	Limited adoption
LTE-M	Yes	Yes	Yes	Fits well with LTE	Power hungry, expensive
NB-IoT	Yes	Yes	Nearly	Well designed	Breadth of support, fit with MNO business model

## Problems with IP protocols

- A monitoring device might only need to send a byte of information – a full IPv6 address is 16 times larger
- Some systems do not have downlink or aim to avoid using it so any message interchange is bad
- Delays can be very long due to extended sleep cycles causing many IP timers to fail or trigger unwanted adaptive behaviour
- When designing Weightless every bit was carefully scrutinised and only added where critical



## Do IoT devices need to talk to each other?

- No
  - Most just send information to a database
  - Where devices are controlled it is from a central controller, not another device
  - Of course, exceptions could be found but are they valuable?
- Removing a destination address keeps messages much shorter
- Privacy and security much simpler if devices only send/receive from a single location
- No need for any universal addressing – a closed scheme bespoke to the technology or application is fine

## **It is not really the Internet of things**

- There's no connection with the Internet, either in function or in implementation
- A better name would be machine-to-database

## **Any hope of achieving a compromise?**

- Very hard to imagine – the two worlds of the Internet and IoT are just too far apart
- But sometimes convenience beats logical design...