

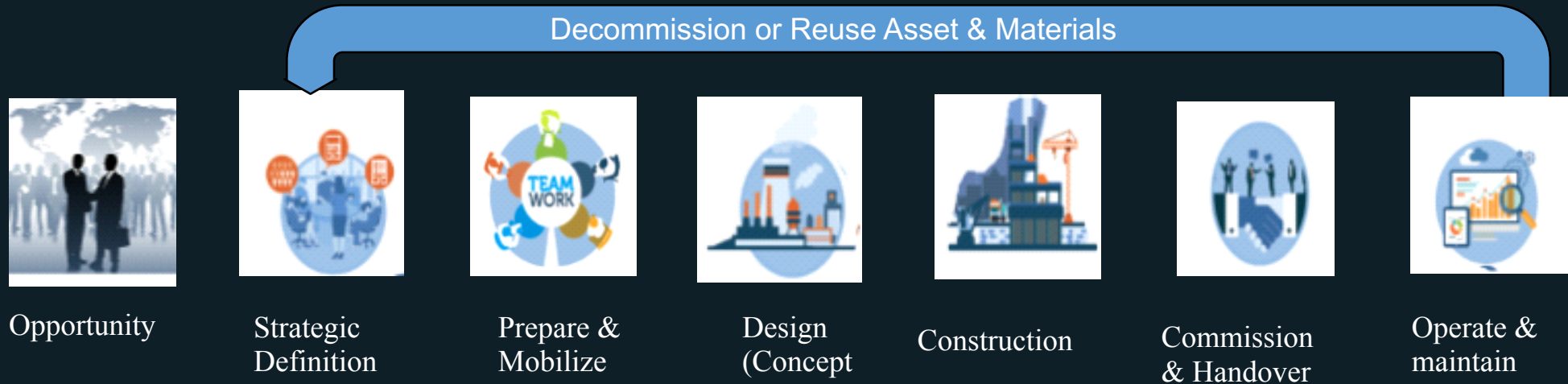
Big data and the Cognitive era What does it mean for our Buildings?

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[Dr Joern Ploennigs - IBM Research, Cognitive IoT]



We're all used to seeing these charts.



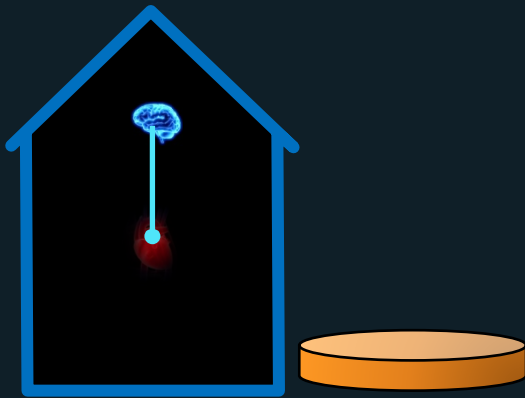
But what is missing?

How do we measure if it is working?

How do we measure if it the building is working for the occupants?

Building Management Evolution

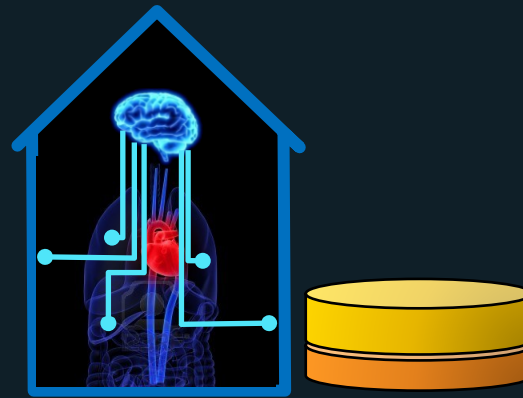
Automated Buildings (1980 – 2000)



Visualize KPI

- + Good for ratings
- + Allows identifying general issues
- Bad for identifying energy waste

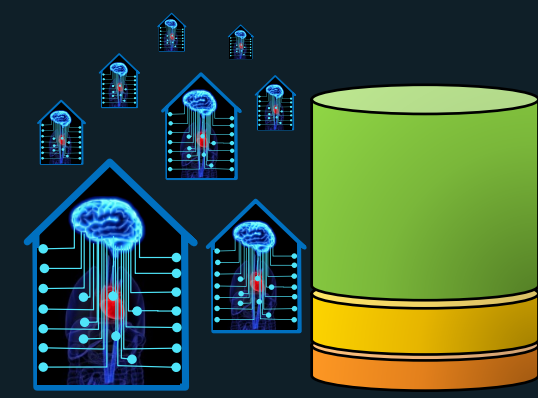
Smart Buildings (2000 – 2015)



Analyze Energy Consumers

- + Understand consumption of rooms and central assets
- Only primary datapoints are analyzed

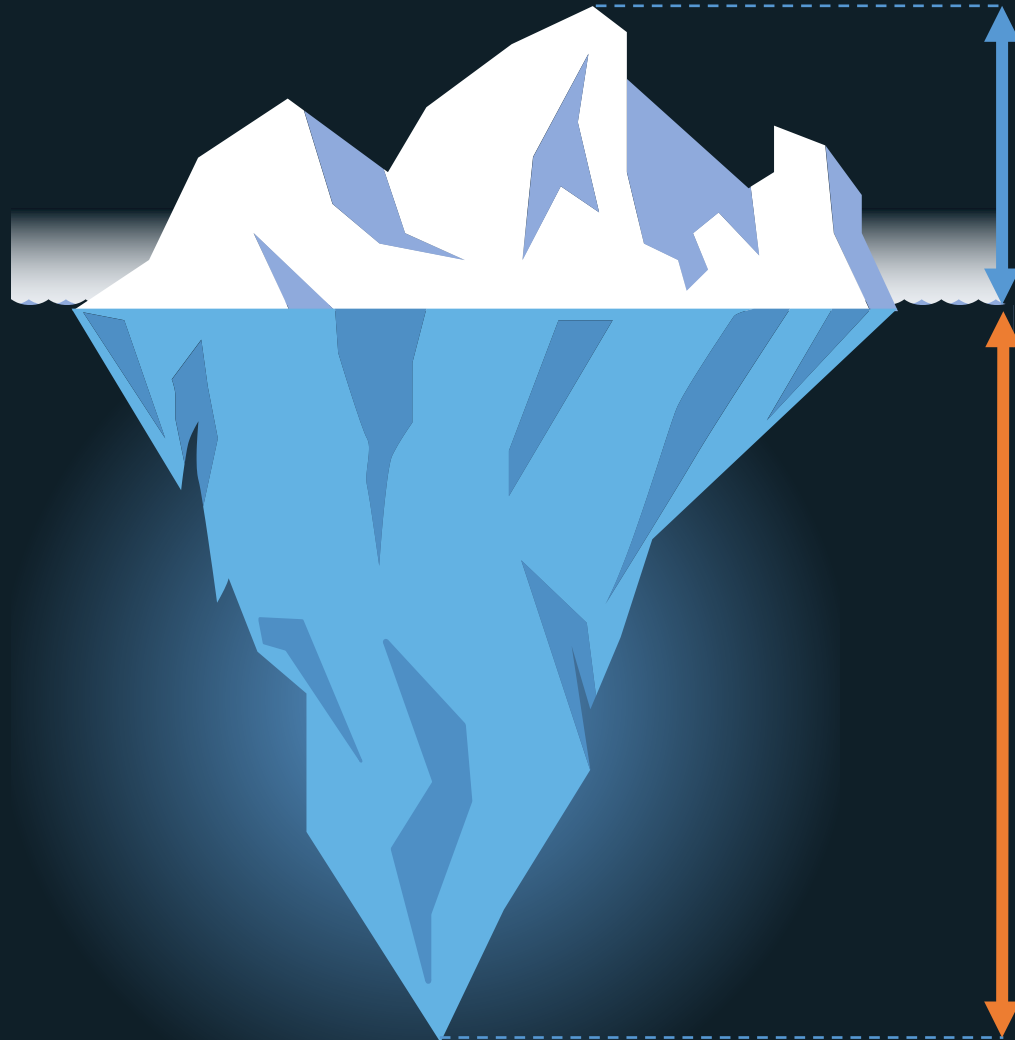
Cognitive Buildings (> 2015)



Learn Behaviour

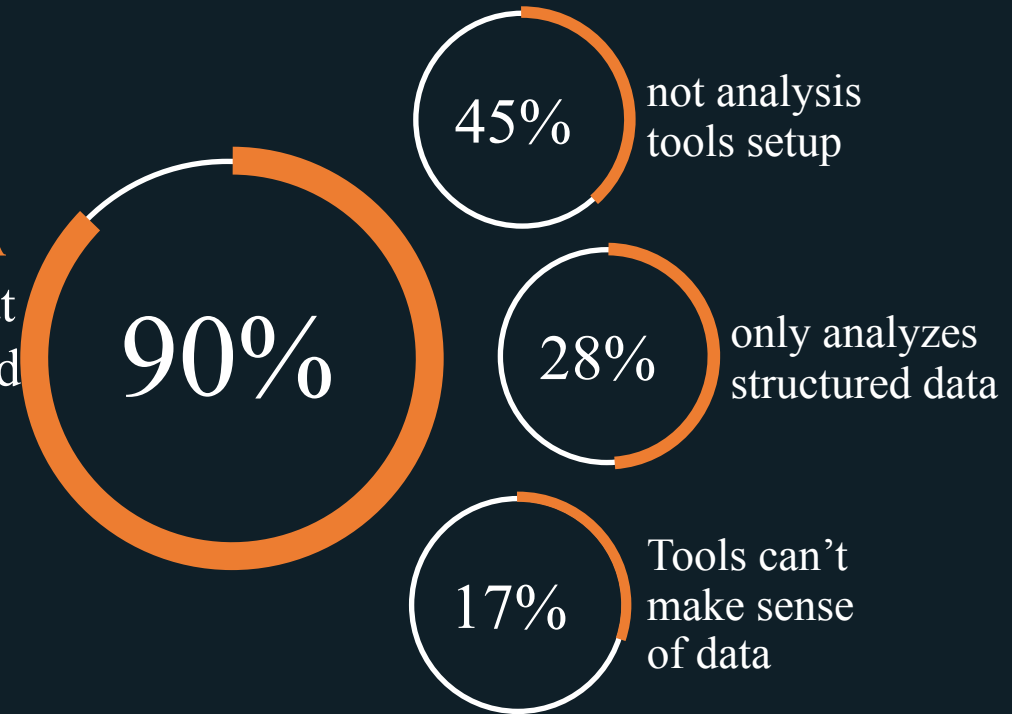
- + Predictive control down to desk level
- + Understand energy flow and building occupancy
- + Consider comfort preferences of users
- + Collect context such as weather and meetings
- Too data points even for advanced analytics

The Dark Side of Big Data



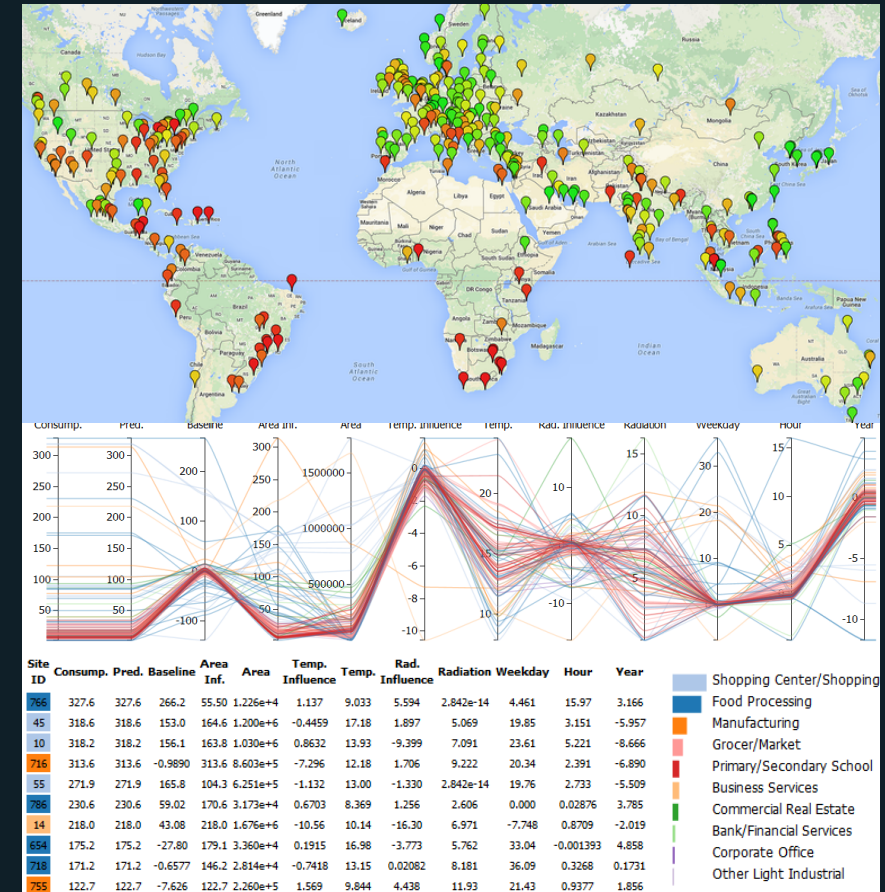
USED DATA

DARK DATA
sensor data that
is never utilised

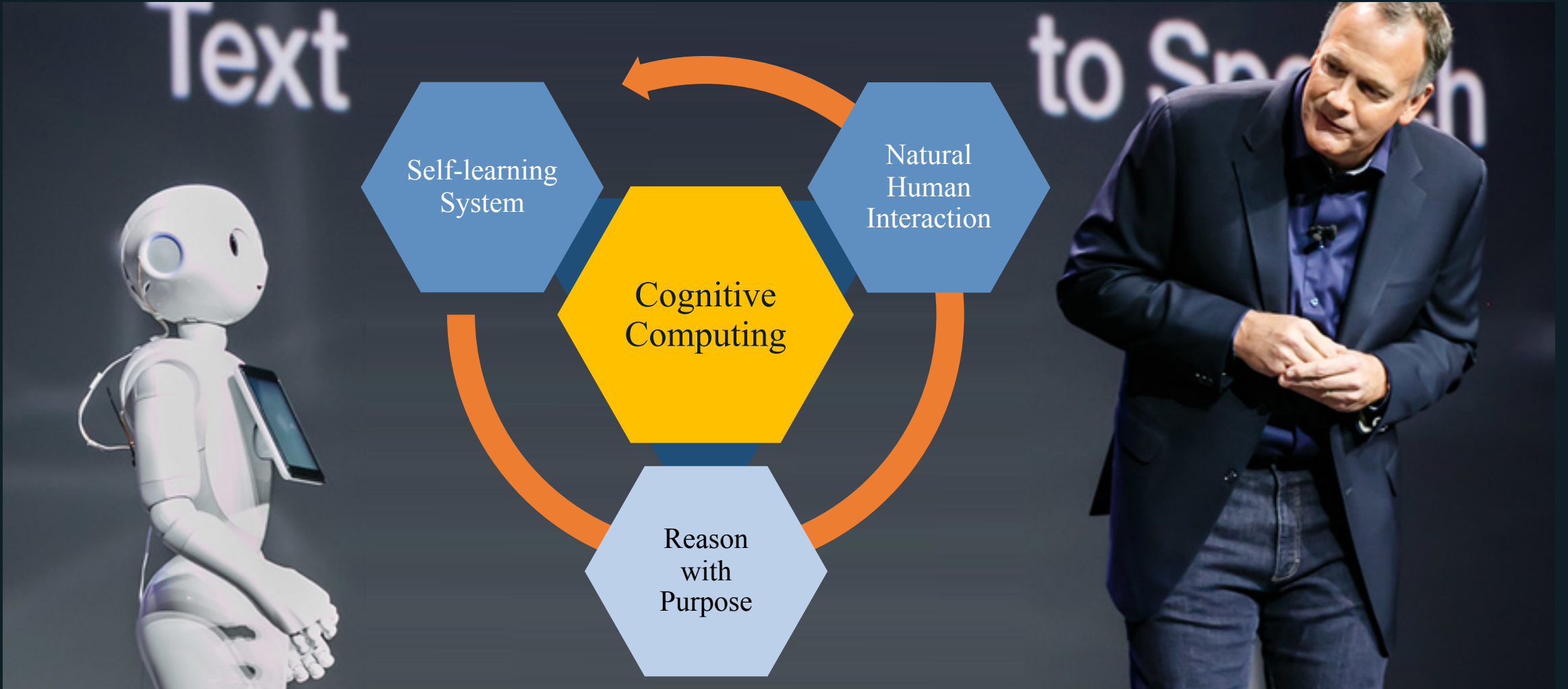


The scaling challenge in the Internet of Cognitive Buildings

- For multinationals building management happens on global scale
- One building can easily provide several thousands of data points
 - Solutions must scale to multiple sites and buildings distributed globally
 - Large amounts of data that needs to be integrated and processed
 - Ability to analyse unstructured data
 - Analysis of data at the edge is key



Cognitive Computing

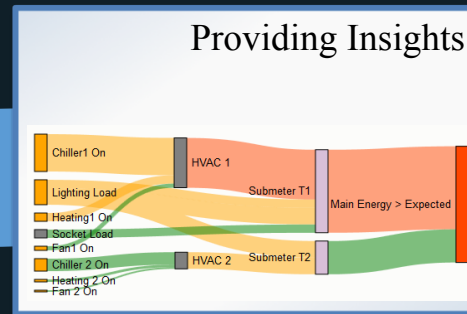
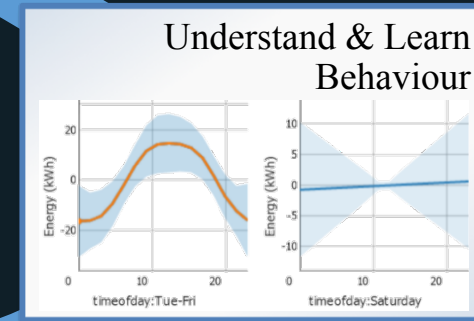
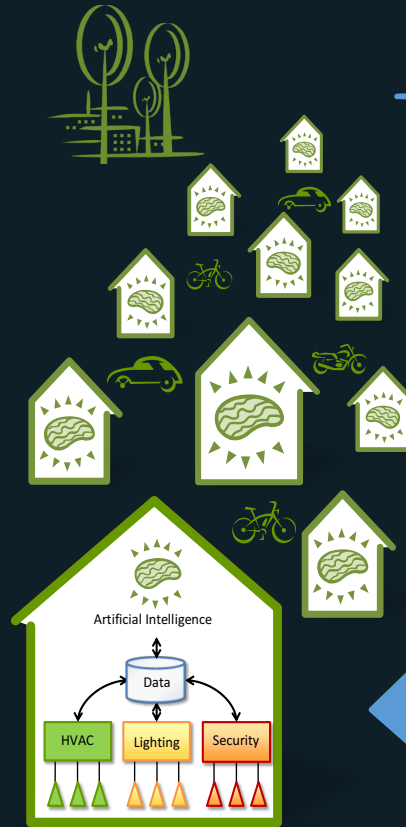


Cognitive Buildings

Buildings trade with providers

Buildings cooperate in neighbourhoods

Buildings are aware of their performance and users' comfort



The number of IoT devices in buildings is rapidly increasing along with new requirements for flexible operation. Cognitive Buildings are able to autonomously integrate IoT devices and learn system and user behaviour to optimize performance.

The IoT Platform

Everything you need to Innovate with IoT

Connect

Attach, Collect, & Organize, Device Management, Secure Connectivity, Visualization

Information Management

Storage & Archive, Metadata Management, Reporting, Streaming data, Parsing and Transformation, Manage unstructured data
Weather APIs

Analytics

Predictive, Cognitive, Real-time, and Contextual

Risk Management

Security Analytics, Data Protection, Auditing/Logging, Firmware Updates, Key/Certificate Mgmt, Org Specific Security.
Blockchain (Beta)

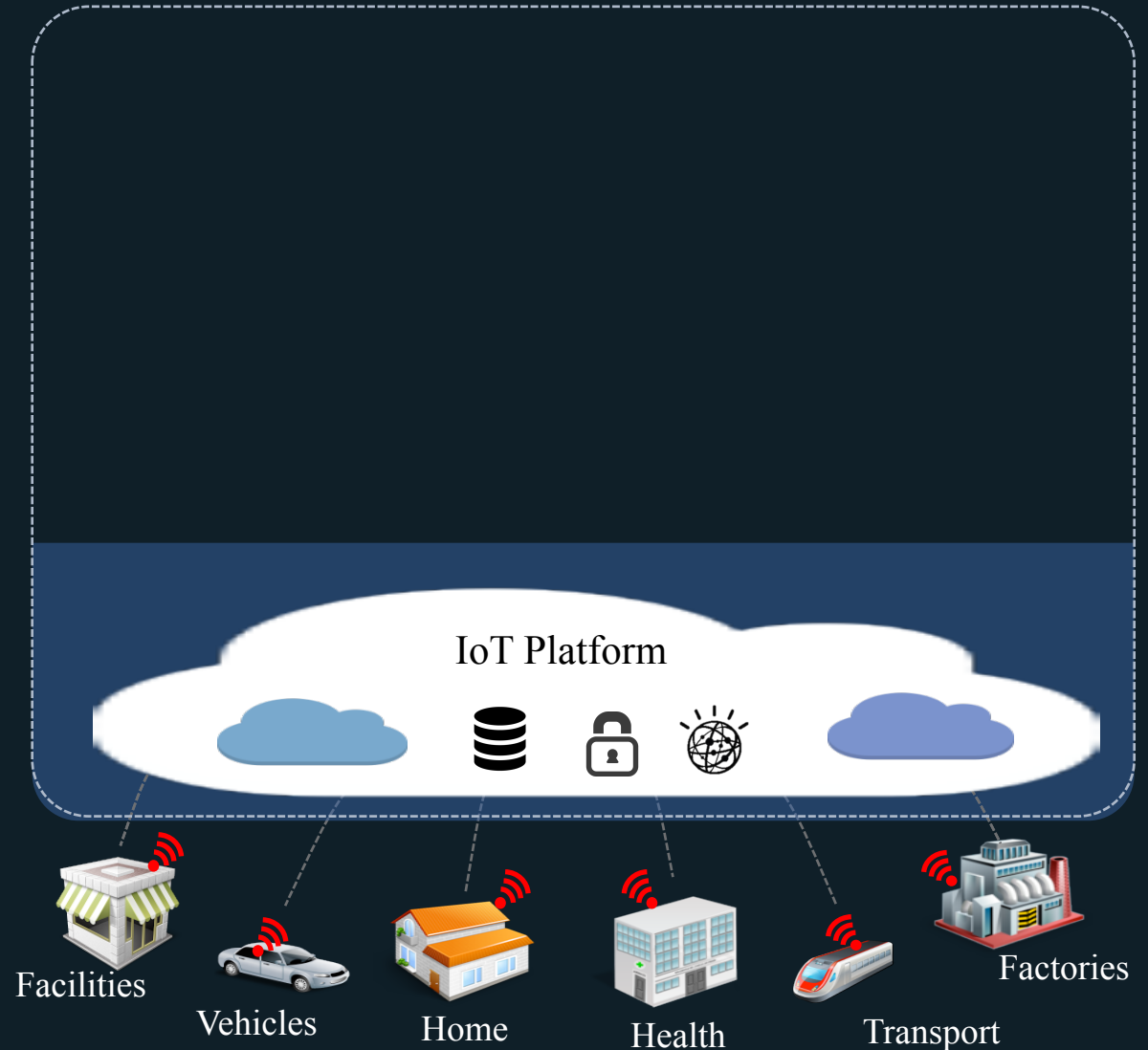


IoT Client Value Strategy

Looking to connect...

Devices? Equipment? People?

Connect	Connect to... Secure connectivity Manage devices
Information Management	Store and archive data Weather APIs Structure and unstructured
Analytics	Real time Predictive Cognitive
Risk Management	Data protection Security analytics Blockchain



IoT Client Value Strategy

Looking to optimize...

Assets? Product Development? Safety

Start with the IoT Applications

- 

Facility & Space

 - Improve space utilization
 - Reduce energy usage
- 

Real Estate

 - Reduce time to value
 - Improve lease management
- 

Product Development

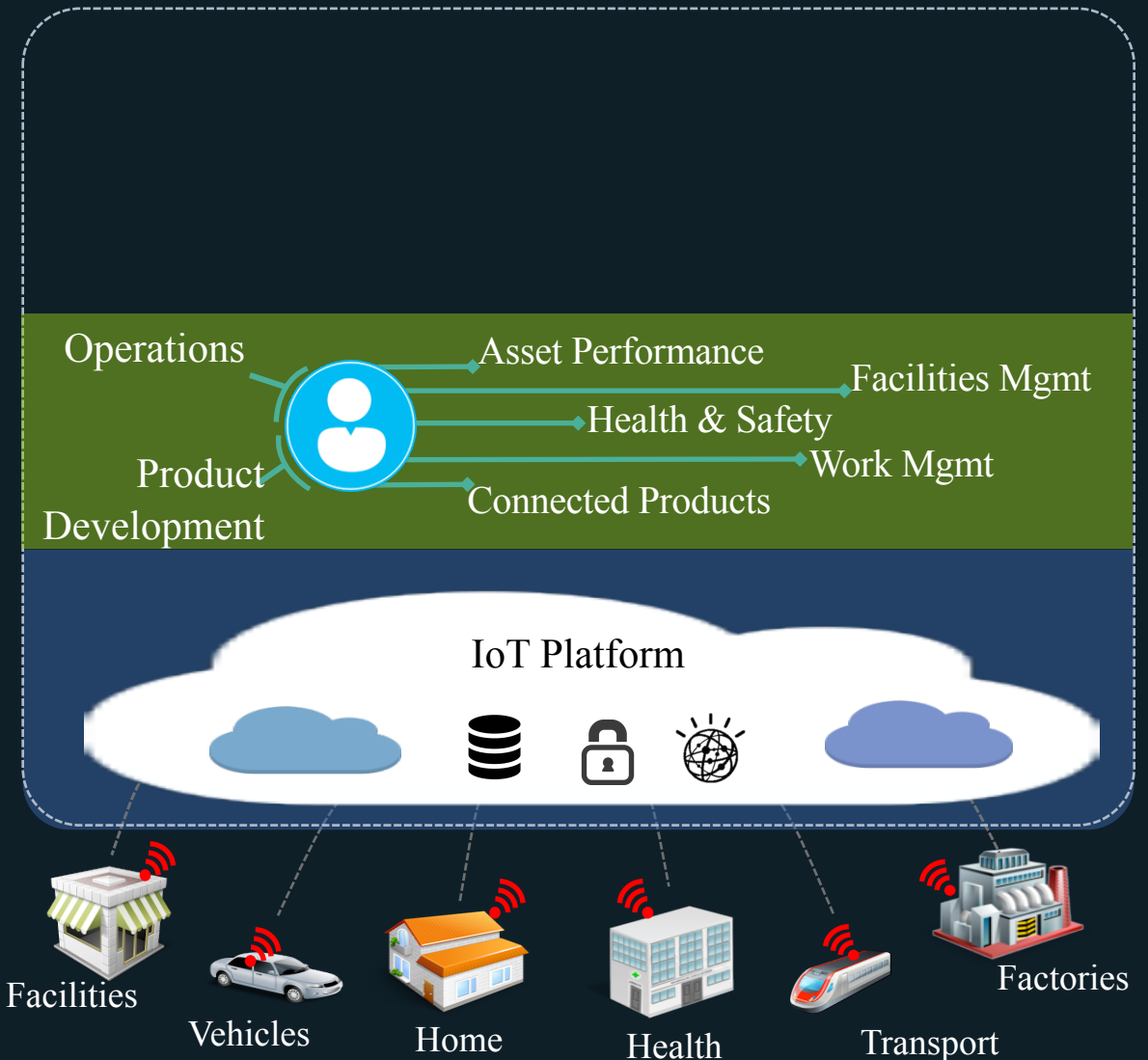
 - Optimize resources
 - Increase 're-use'
- 

Predictive Maintenance

 - Operational risk
 - Increase reliability
- 

Asset Management

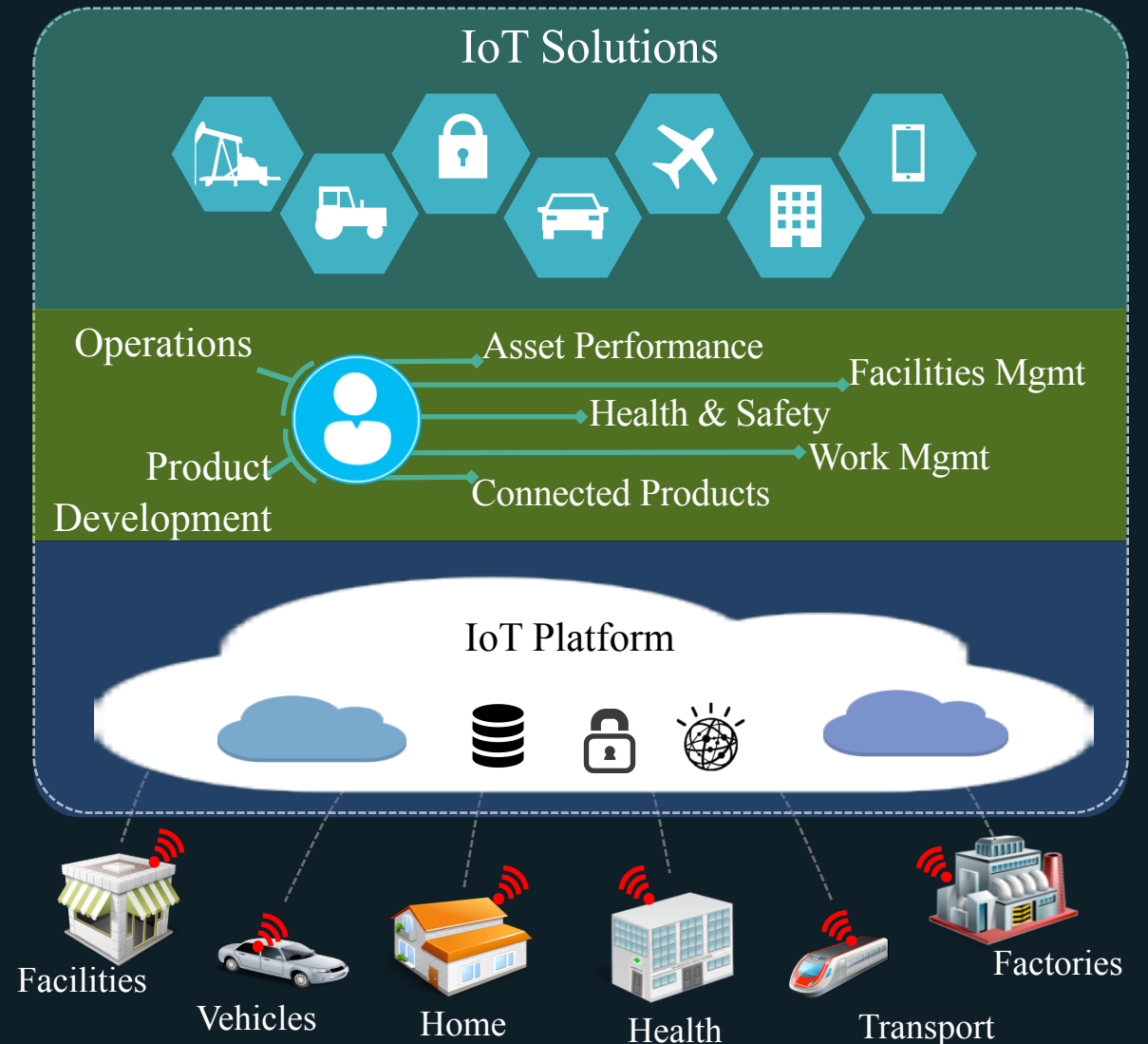
 - Life cycle management
 - Configuration management



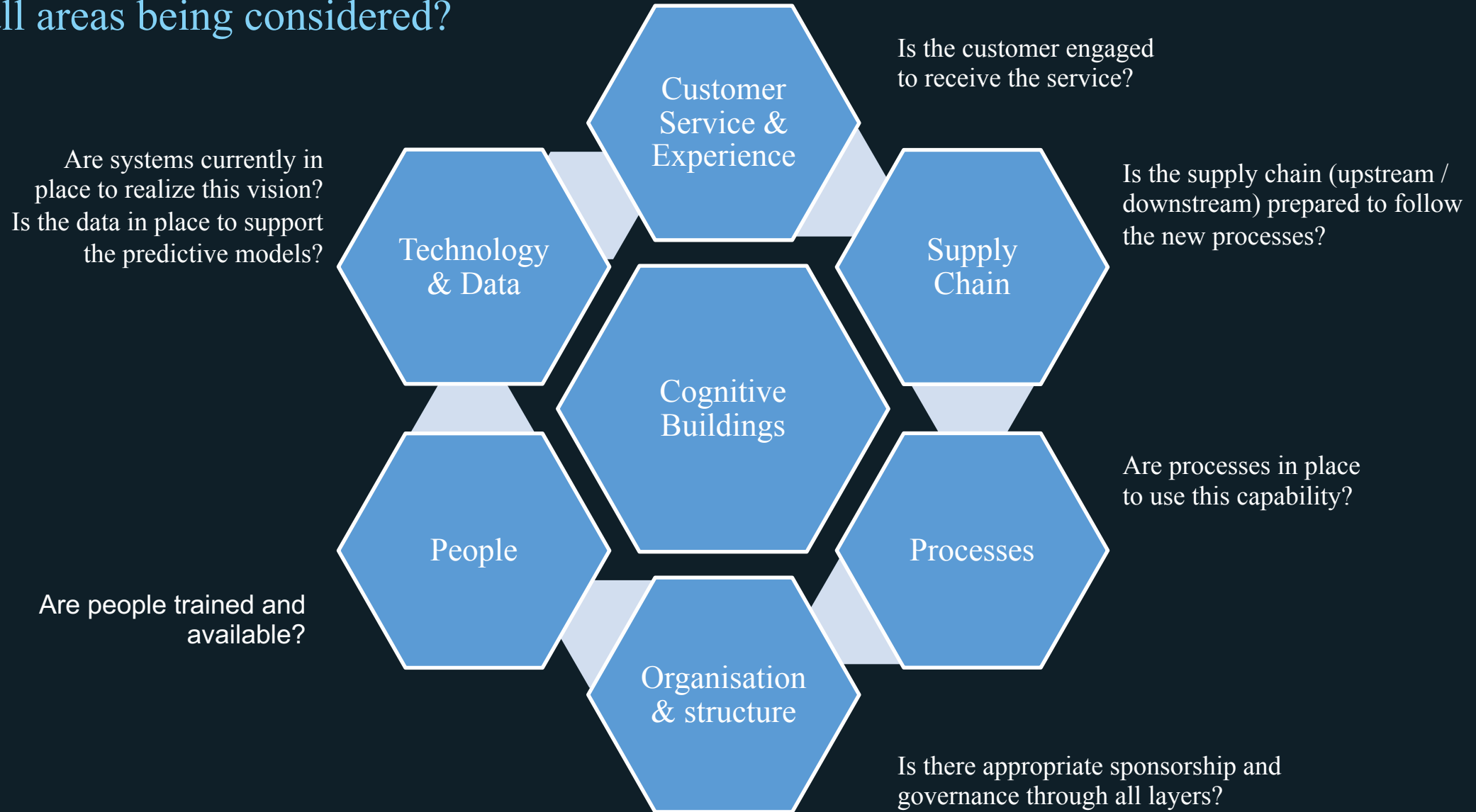
IoT Client Value Strategy

Looking to transform traditional business with IoT...

- Invent new business models
- Develop differentiated solutions
- Improve operational efficiency
- Drive better customer engagement
- Utilize IBM innovation and a Consult to Run partnership



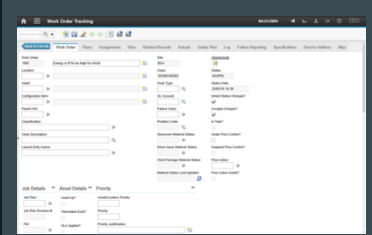
Are all areas being considered?



Where does this all start for buildings?

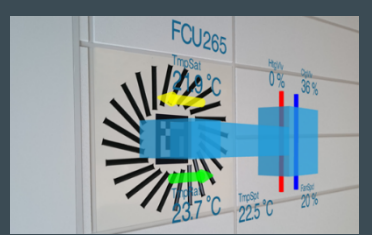


The use cases and opportunities are many and varied



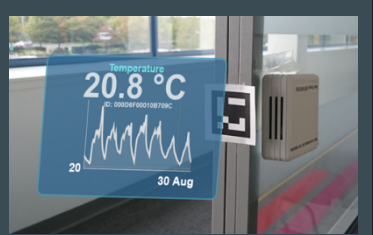
DIGITAL ASSET LIFECYCLE

The manual input of data into a maintenance system for thousands of assets is a costly, error prone process.



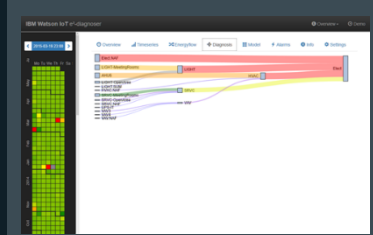
REAL TIME ASSET LOCATION

Finding assets and their relevant data is challenging, in particular when you are in the field.



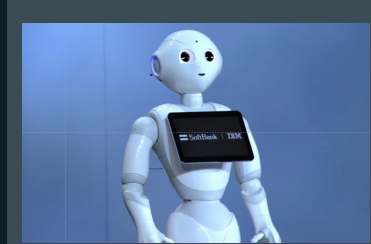
COGNITIVE ASSET HEALTH

Predictive and preventive maintenance are immanent to reduce operation costs, but, lack the required sensors.



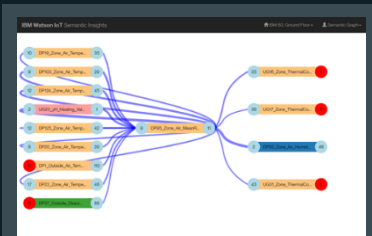
SELF-LEARNING ENERGY DIAGNOSER

Energy consumption has many influences and it is hard to detect and diagnose abnormal consumption.



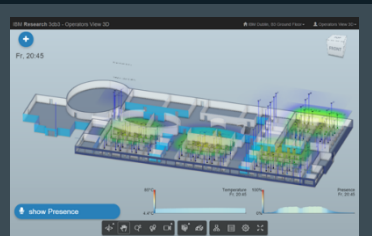
COGNITIVE CONCIERGE

Guiding people to their rooms and answering their questions is an central element of hospitality.



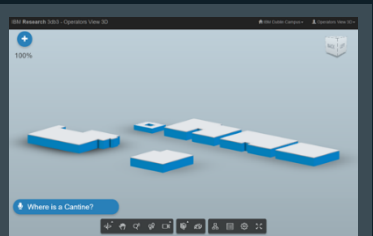
SEMANTIC INSIGHTS

Analyzing thousands of IoT devices cannot provide meaningful insights without a semantic method.



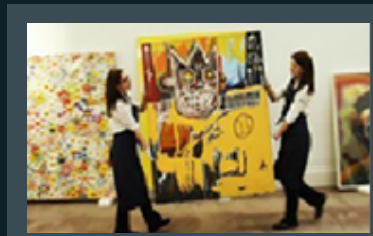
FLUID SPACES

The lack of real-time occupancy information within a building inhibits effective energy and space performance.



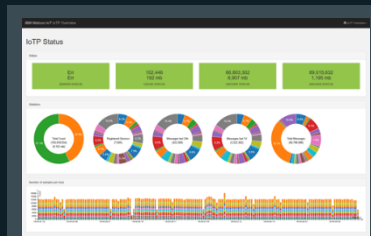
MY COGNITIVE CAMPUS

Increase productivity of teams by providing a comfortable environment and easy navigation.



MY ARTEFACT

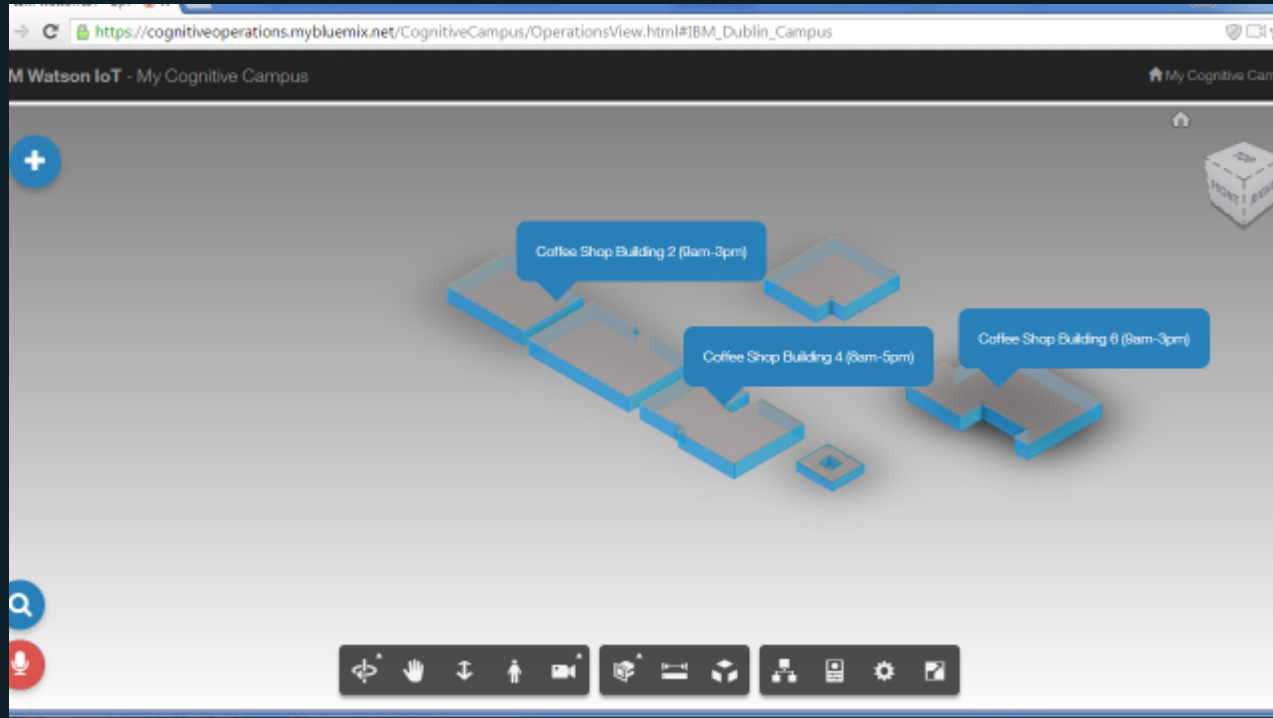
Maintaining the perfect environment for art galleries and museums is critical.



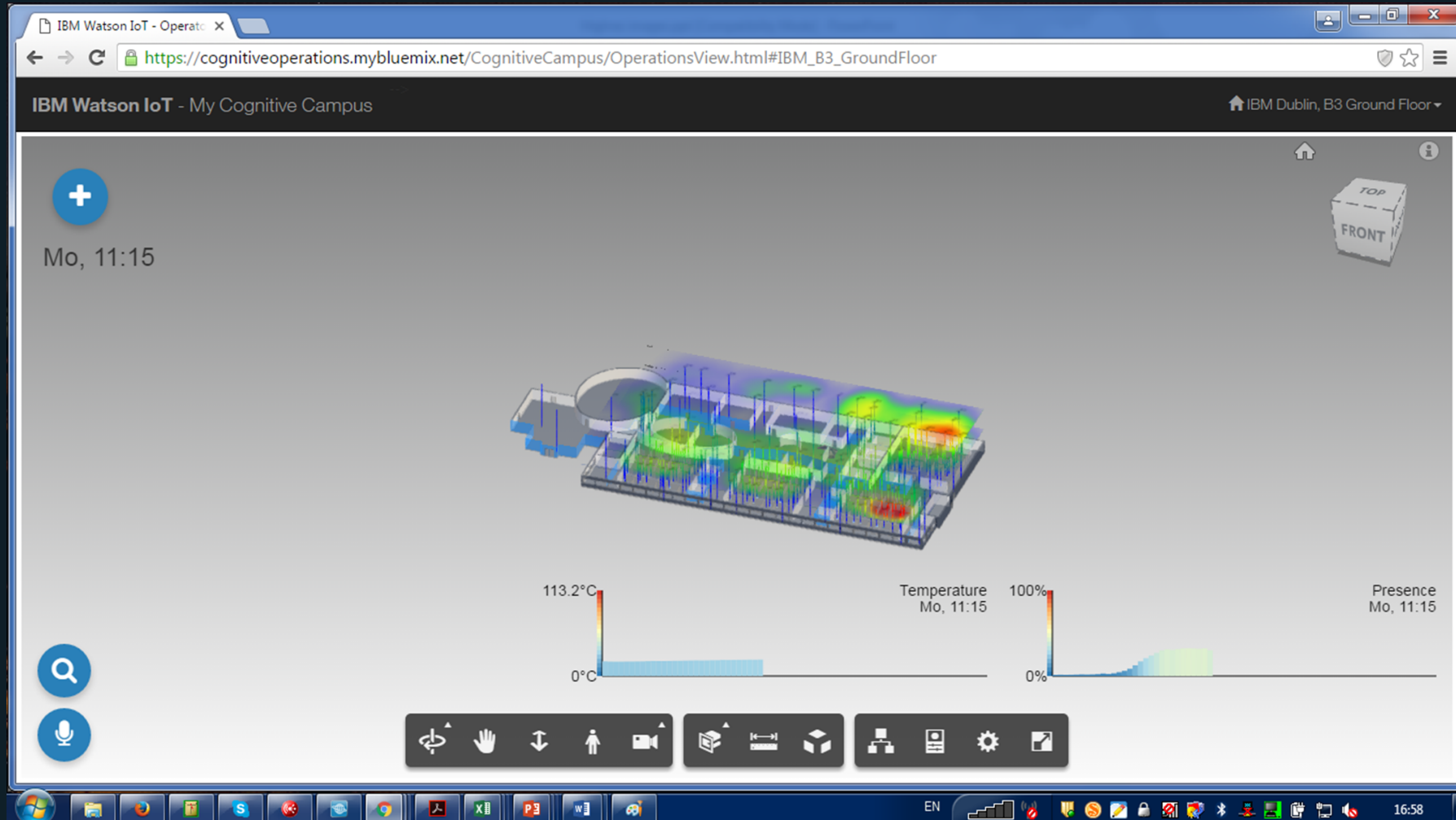
SCALABLE IoT PLATFORM

Cognitive Buildings require a highly scalable platform for data integration and analysis.

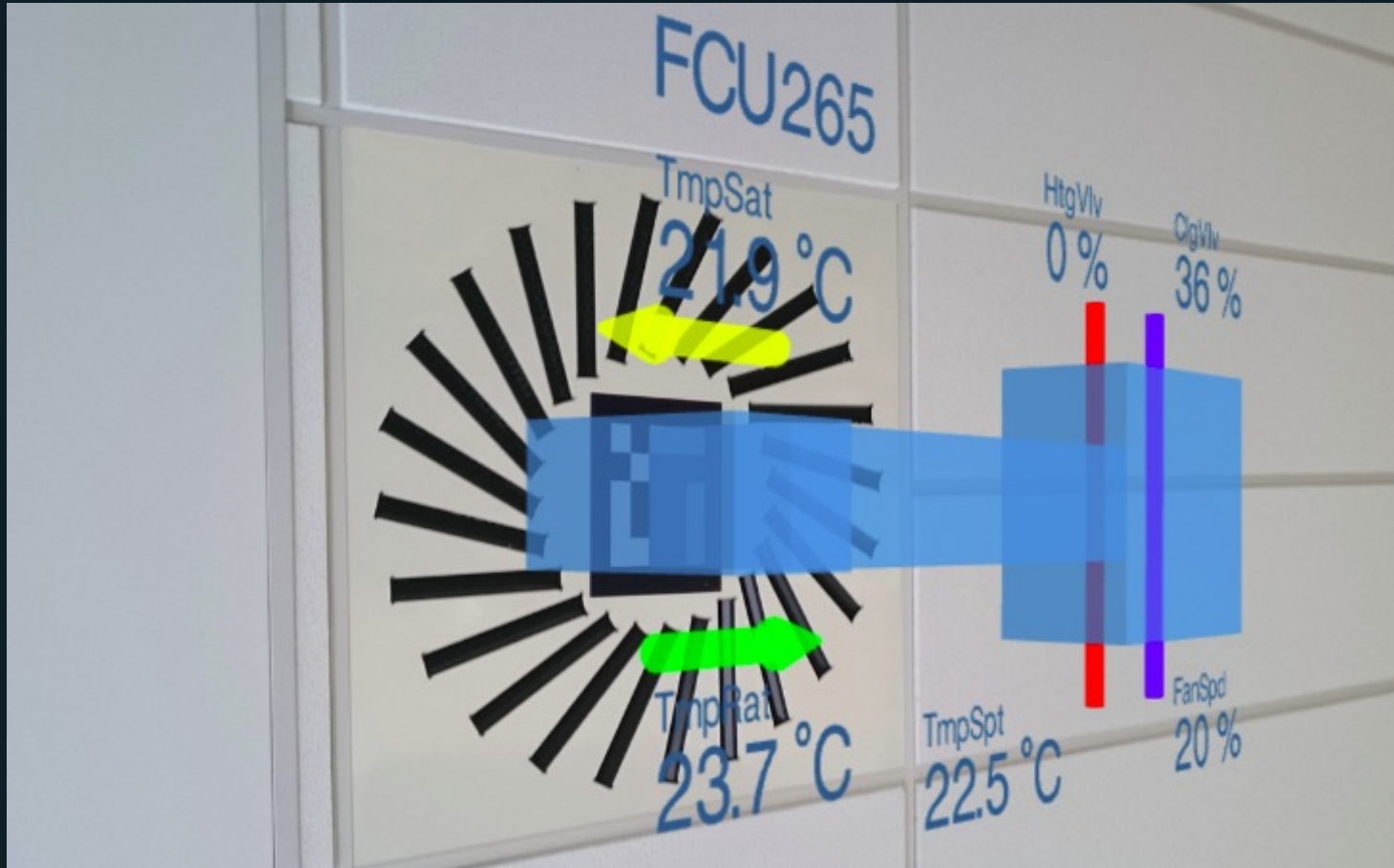
We need to be less asset centric and more people centric



Where is the value for people? Is it useful to know when the coffee shop is busy?



Building users should have real time information about their environment



We should be able to use our devices to find free spaces

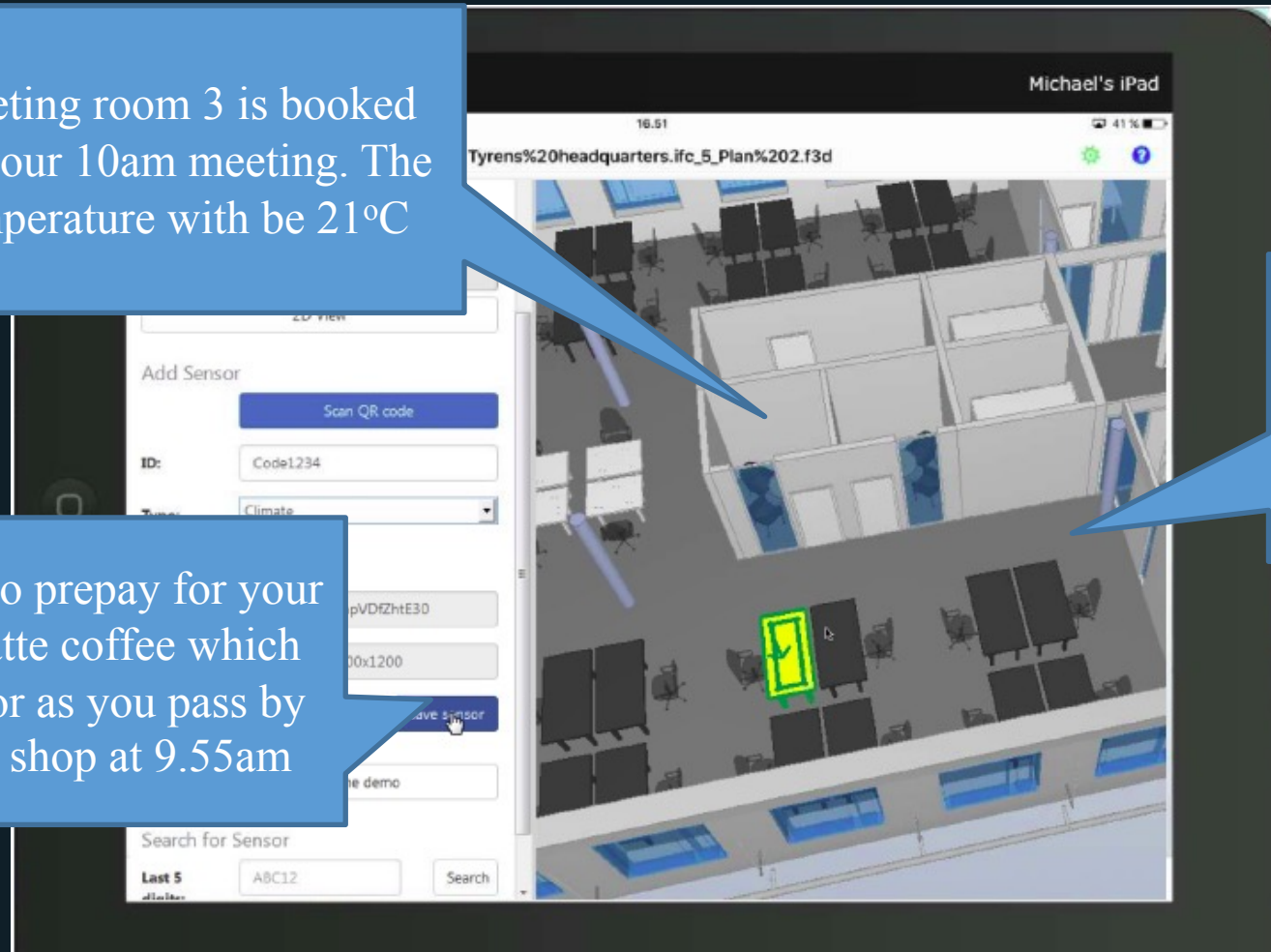


Buildings need to learn our behaviours and react accordingly

Meeting room 3 is booked for your 10am meeting. The temperature will be 21°C

Click here to prepay for your medium latte coffee which will be ready for as you pass by the coffee shop at 9.55am

Welcome Michael. We have a desk available for you on the 1st floor, area 5

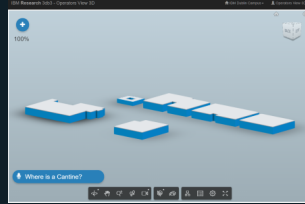


My Cognitive Campus

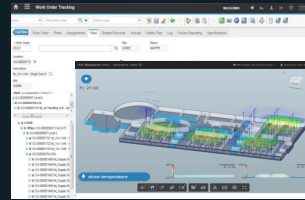
https://www.youtube.com/watch?v=38BJkQPhj_o

Pulling it together

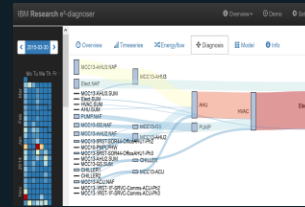
Cognitive analytics for deep insights to unlock new cost savings.



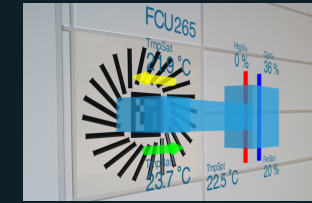
Navigate with speech



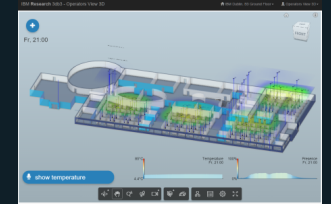
Manage and find your assets in 3D



Understand energy flow and diagnose anomalies with cognitive analytics

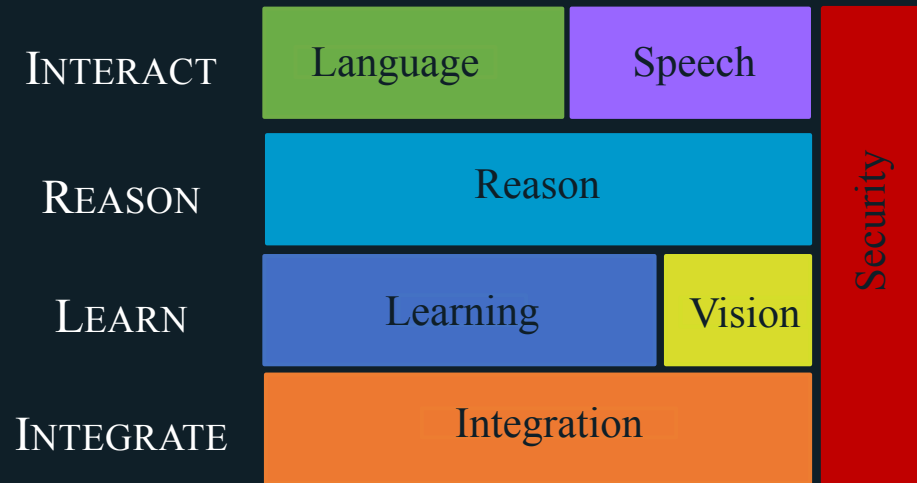


Easily monitor and maintain assets before they fail



Understand temperature, comfort and occupancy in buildings and data centers

Customizable IoT platform that provides simple integration and high scalability



Weather



Sentiment

Plug-and-play instrumentation with IoT devices



Vibration Data with IoT Sensors



Electricity with IoT Meter



Occupancy with PIR



Proximity with BLE



Desk Comfort Sensors



Rapid modelling with laser scanner

The bottom line

The Internet of Things (IoT) and its ability to transform business is not a new concept

The advent of cognitive computing means that the large volumes of data generated by IoT devices can now be understood, acted upon and monetized like never before.

This is a journey and we do not know the full impact yet.

It has to be easy!!

Questions

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