

The Thinking Version of Things

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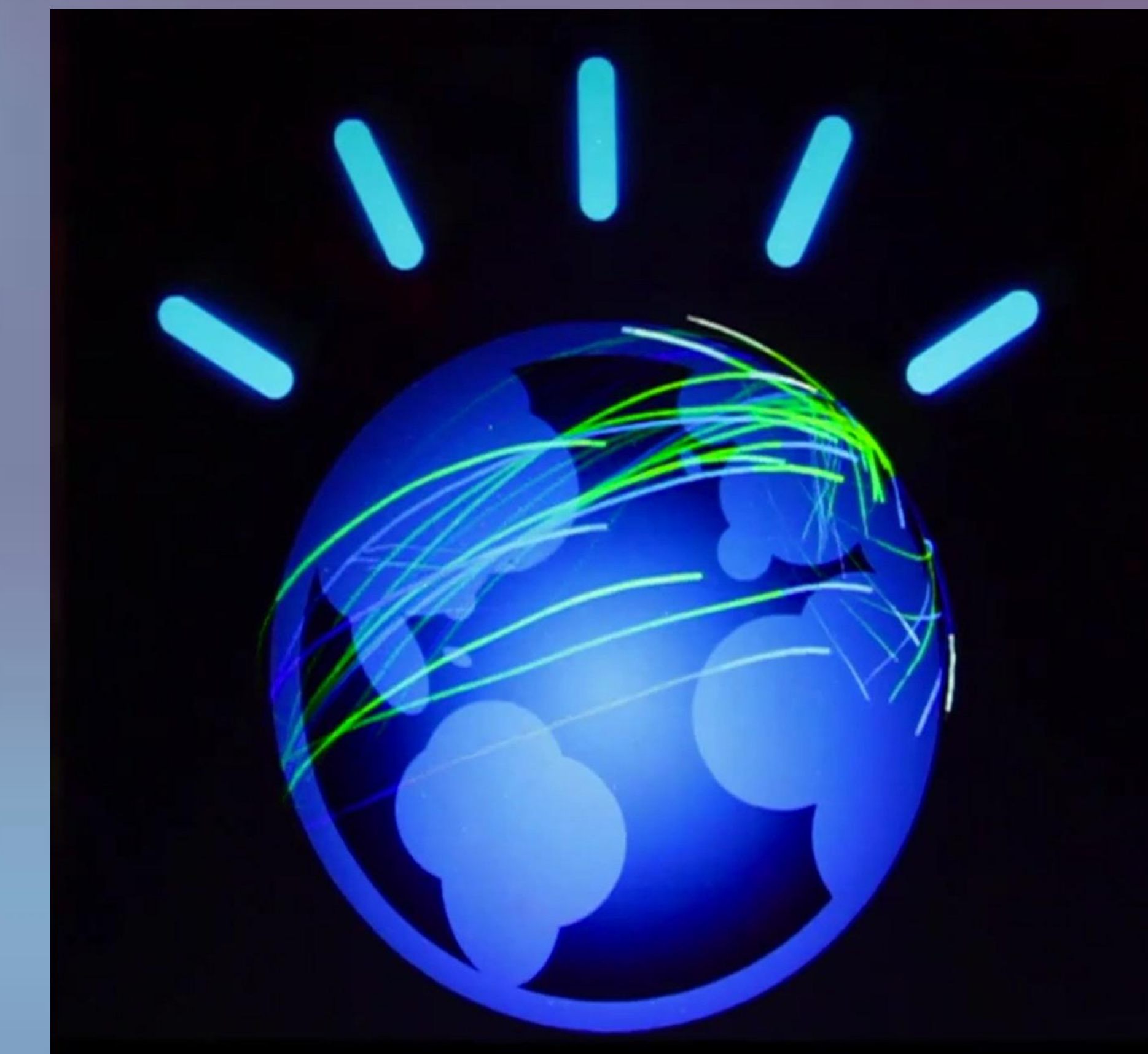
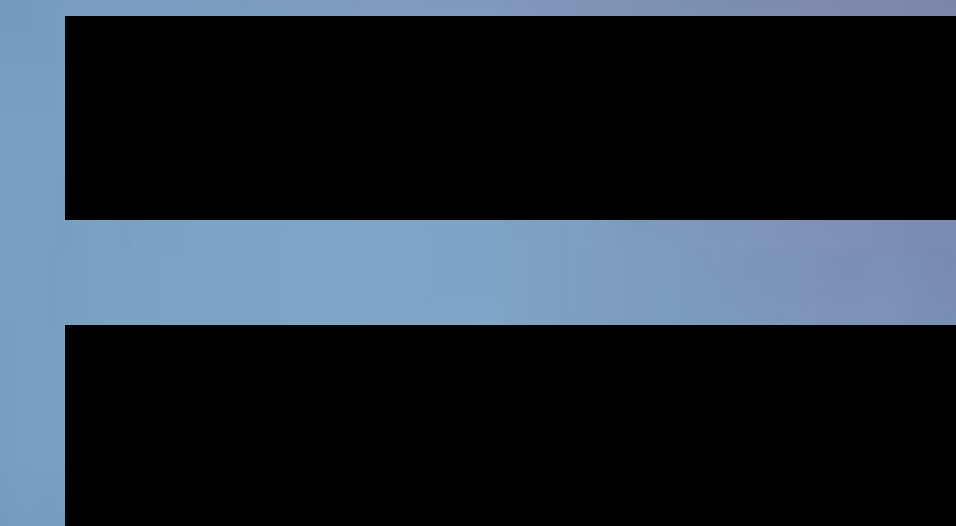
Intelligence of Internet of Things is as vital as brain for human body



Things



Think



Smart

A system with connected sensors and no intelligence is NOT Internet of things- It is just "Things"

Intelligence of IoT comes through Valued Services

- Connecting devices to internet alone does not qualify to be called "smart".
- What creates a distinction is the valued services which are associated with the connected devices.
- Enabling system to be intelligent and pre-emptive rather than reactive becomes the first qualifying criteria for calling a service "valuable".

Smart Buildings: An Use Case of Intelligent IoT

Different buildings have different needs



Shopping Malls



Office Buildings



Residential Buildings/Apartments

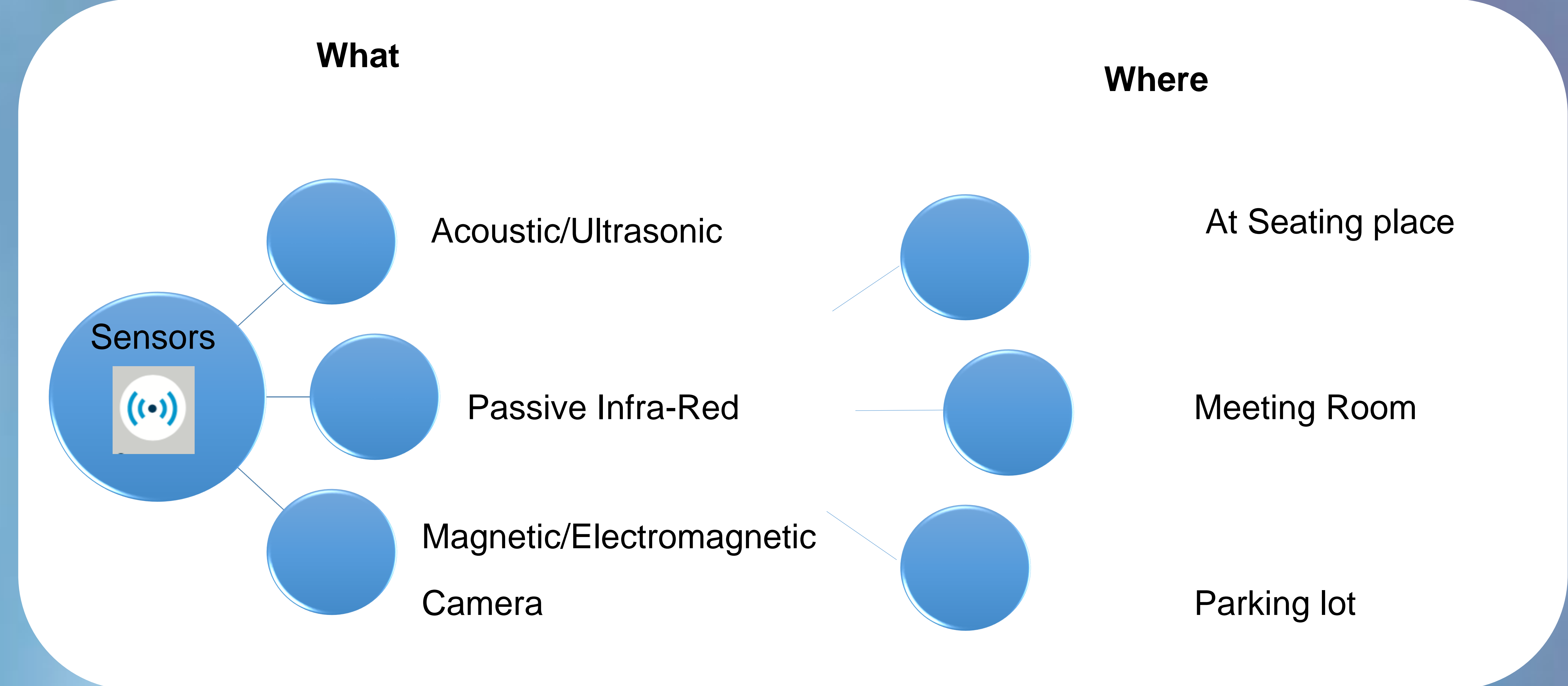
Common goals of all buildings

1. Energy efficient or reduce resource usage
2. Improve operational efficiency by predictive maintenance
3. Increase occupants' comfort and productivity

What are Smart Buildings?

- Smart buildings are fitted with multiple sensors responsible for controlling HVAC systems, lighting, water supply, counting occupancy, efficiently utilizing parking and seating space etc.
- Some of the key sensors involve detecting occupancy and hence modulate and/or optimize energy and resources. Be that for occupants inside building floors or their vehicles in the parking.

What makes buildings “Smart”?

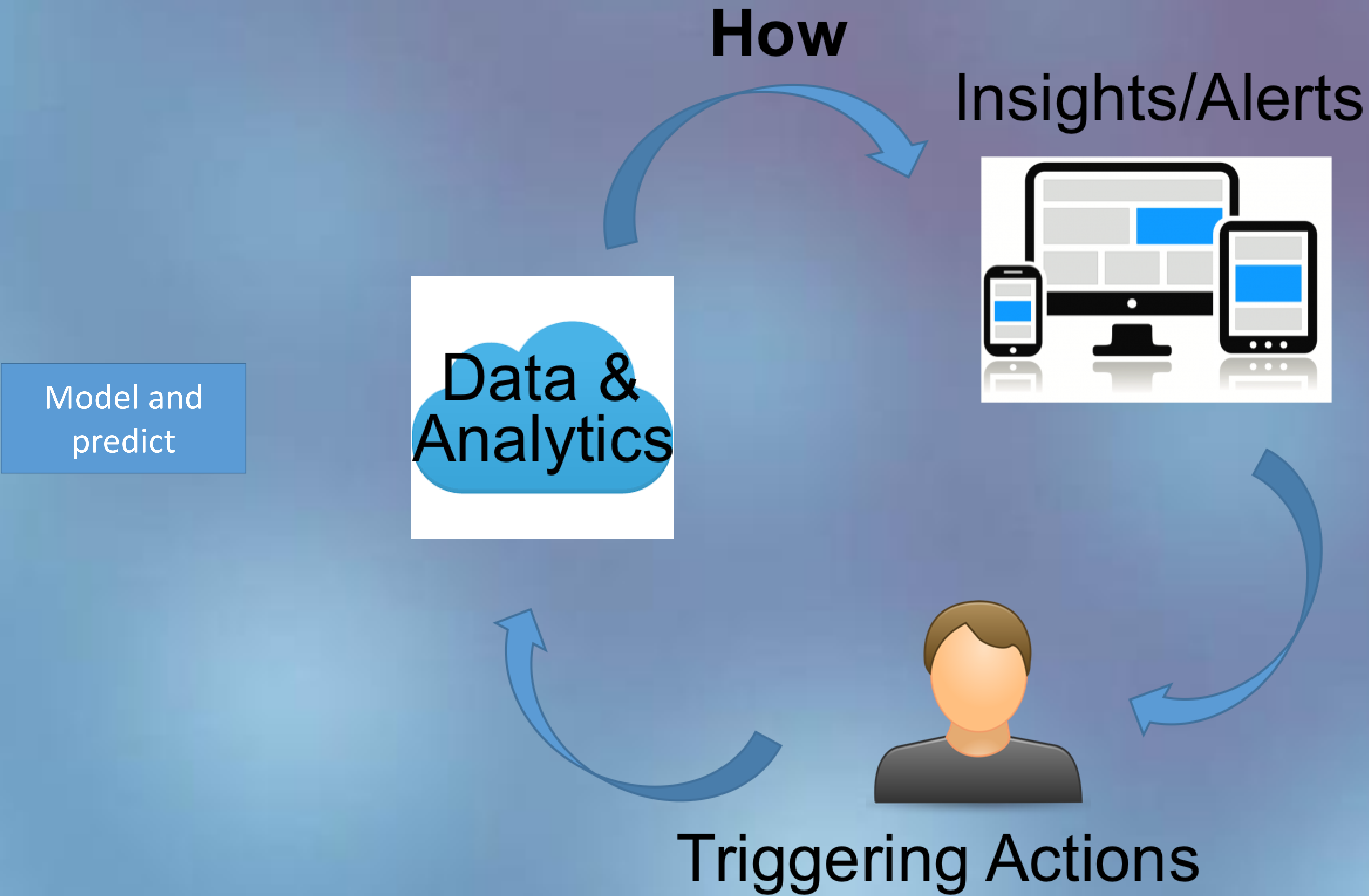


Smart Buildings: More than just being Energy Efficient

Enabling Smart Buildings

Reduce resource usage	Predictive maintenance	Increased Occupant comfort
<ul style="list-style-type: none"> • Occupancy Sensors • Intelligent Room/space utilization • Manpower optimization • Resource optimization through predictive maintenance 	<ul style="list-style-type: none"> • Detected anomalies in the meter reading and shooting alarm • Capturing occupant discomfort to translate into actionable insights 	<ul style="list-style-type: none"> • Machine learned model to set temperatures • Occupant expresses comfort/discomfort levels (this may trigger predictive maintenance)

How does Valued Services work?



Enabling Intelligent IoT is possible through AI

Making old buildings smart

How can old buildings without smart sensors be made smart?

Old buildings without smart sensors and fixtures still have energy meters

They can still be optimized for the energy usage with the help of intelligent systems of rule-based efficiency modules

Early fault detection through identification of abnormal usage

Achieving this has been made possible by the use of machine learnt algorithms

Enabling smart building using AI

1 Capture baseline usage using the consumption history by the individual influencers including exogenous factors.

2 Compare the real consumption with the prediction for historic data: residuals

3 Anomalies are detected if usage does not match with the trend that is modelled

4 Compute a forecast of the expected energy consumption using the model

5 The residuals are then modelled to capture any trend

1

2

3

4

5

Key Take Away

- Robust AI approaches can make old buildings capable of being intelligent even without smart sensors.
- The machine learning approach used to make “Things” in IoT “thinking”, is primarily an energy efficiency module. However, it has other key “smart” aspects like preventive maintenance through early alarm system.
- Energy efficiency comes not only with smart apparatus and systems but also essentially increased use of alternative renewable sources of energy. Monitoring use of different energy sources also becomes vital to detect any fault in the system.
- For buildings which are known to use 42% energy in western countries, IoT enabled systems can save up to 10-15% of annual energy cost and proactive maintenance can save 20-30% from of failures and downtime.

Questions and Answers



Thank You!

