




15th INTERNATIONAL OPERATIONS & MAINTENANCE CONFERENCE IN THE ARAB COUNTRIES
UNDER THE THEME: “**SMART MAINTENANCE**” CONICIDE WITH THE 15TH ARAB MAINTENANCE EXHIBITION

INTERNET OF THINGS: APPLICATIONS AND CHALLENGES IN BUILDING MAINTENANCE

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***“The Internet of Things
has the potential to
change the world, just
as the Internet did.
Maybe even more so.”***

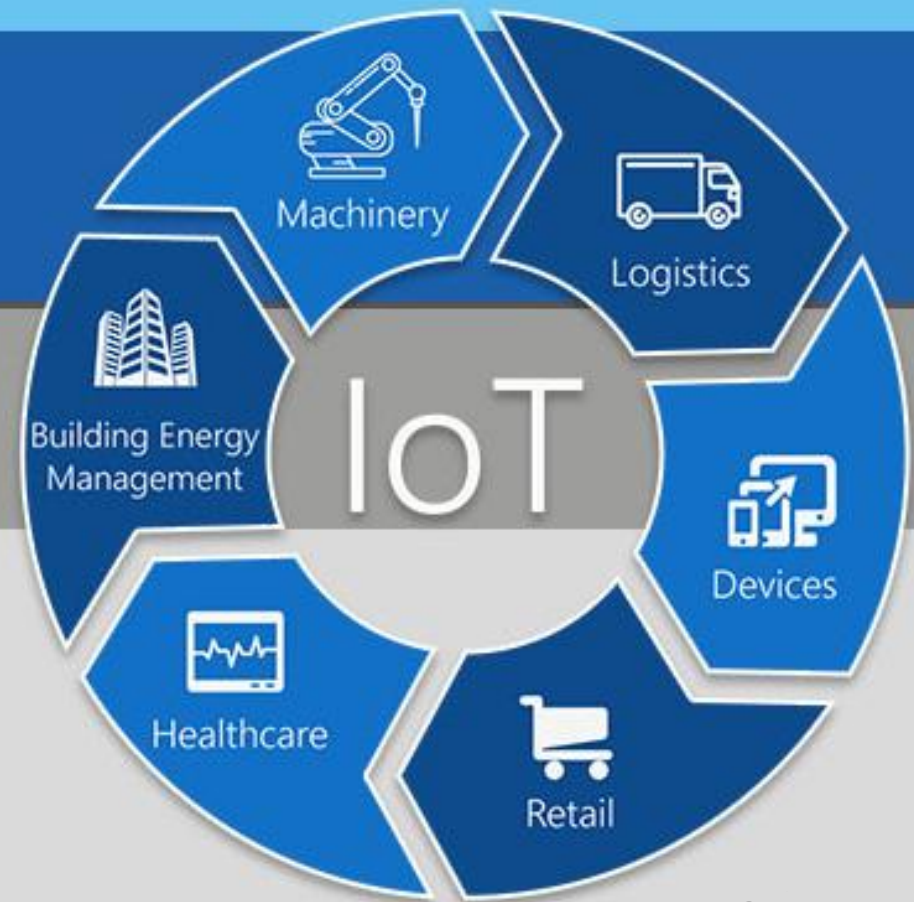
Kevin Ashton

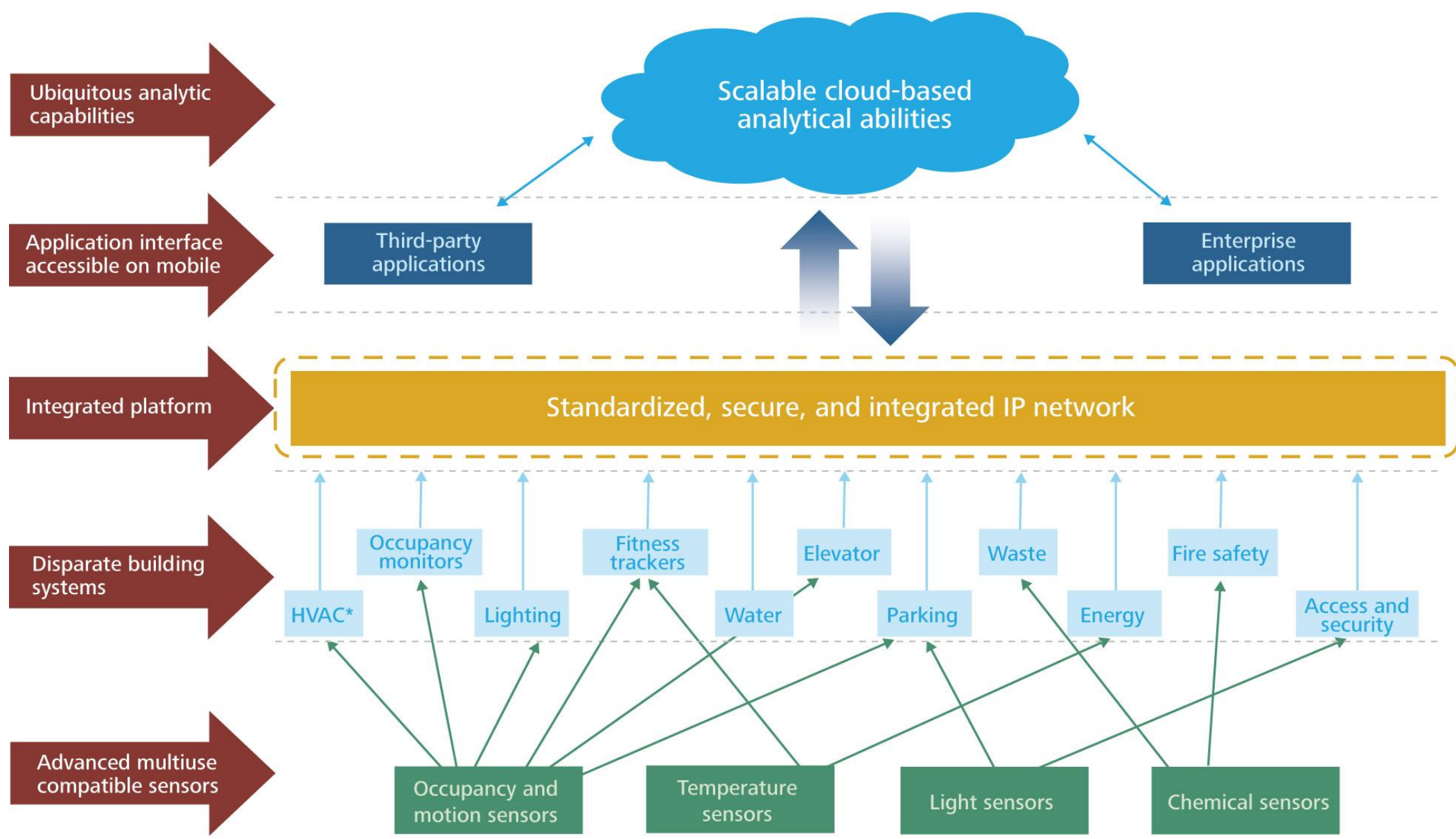
Cofounder, Auto-ID Center at MIT





IoT can Take Small Machine Manufactures to the Next Level!





What is the IoT?



The deep insights and advanced machine-to-machine (M2M) interfaces can enable BMS to take automated and informed decisions due to enhanced intelligence.

Analyze



Act



Different types of sensors that track features such as motion, pressure, light, temperature, and flow can collect a vast amount of data about building function, operations, and use.

Create



Magnitude:
Scale, scope, frequency

Risk:
Security, reliability,
accuracy

Time:
Timeliness, latency



The aggregated information can be analyzed through different analytical tools for descriptive, prescriptive, and predictive insights for building operations.

Aggregate



Communicate



Various parts of the BMS can communicate with each other, which generates a new set of information.



Structured and unstructured data from different internal and external systems can then be aggregated through a common platform and/or a set of interoperable standards.

VALUE DRIVERS

STAGES

TECHNOLOGIES



User Interface Devices

Control and Monitoring



Tablet, Web Access,
Smart Watch

Wi-Fi
Ethernet

3G/4G
Ethernet

Intel® IoT Gateway

HCL Building Automation System Software

Cloud

HCL* Building Automation
System Software

RFID
Module

ZigBee*

RFID
Tag



RFID



HVAC
Control



Energy
Meter



Light



Light
Sensor



Noise
Sensor



Smoke
Sensor



Temp
Humidity
Sensor

Video
Camera



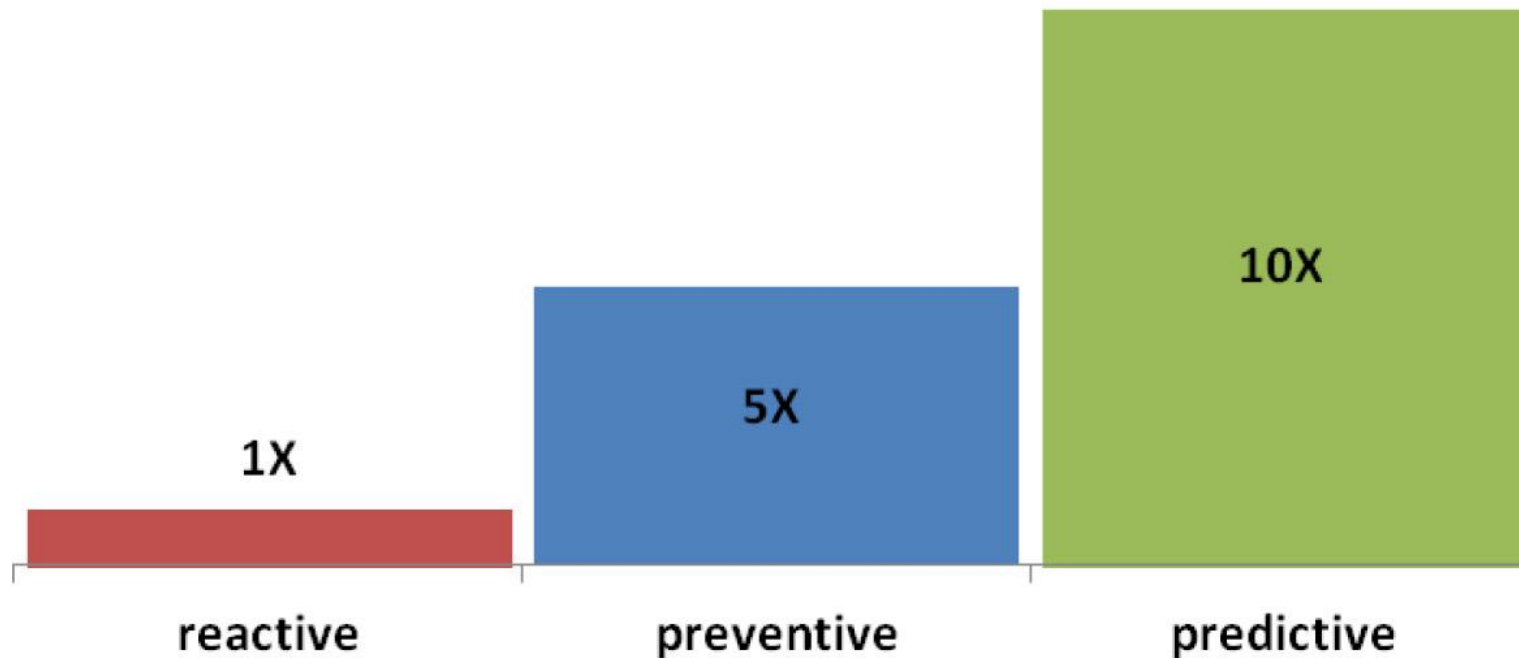
Wi-Fi

Wi-Fi Router

Applications of IoT for Building Automation solutions



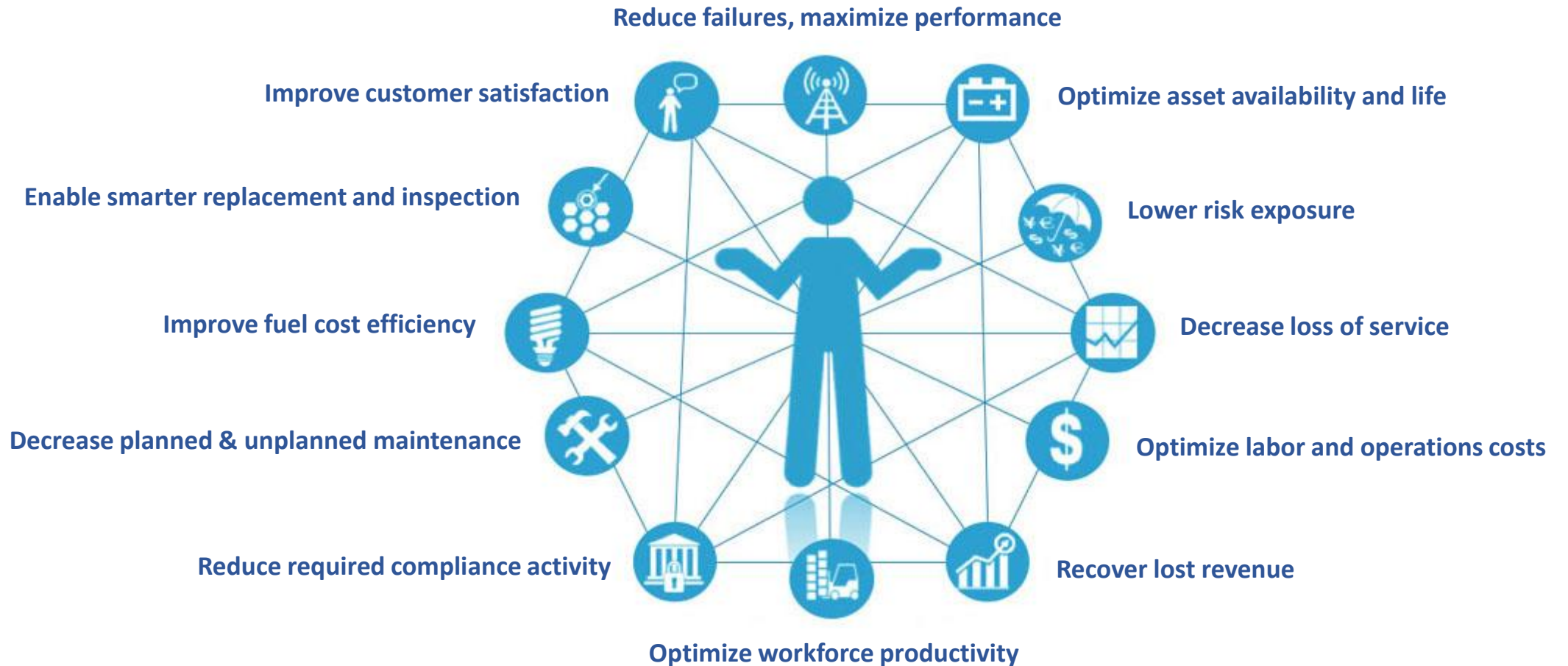
Lifetime ROI of Different Approaches to Maintenance



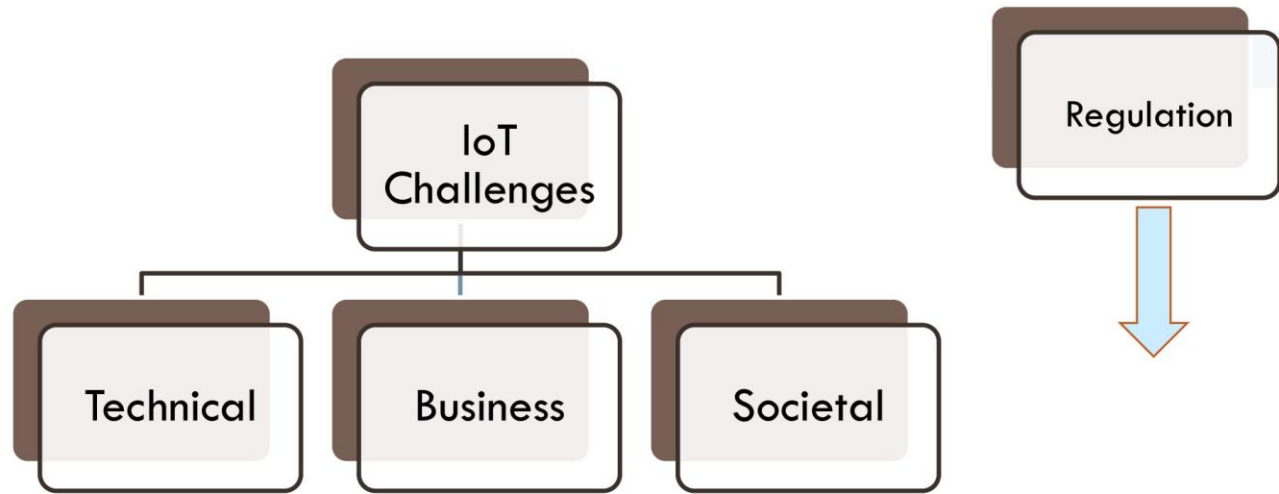
Predictive Maintenance with IoT



What if you could ... ?



Benefits of using IoT applications in building sector



- Platform
- Security
- Signaling and Protocols
- Data Management
- Cloud
- Large System Management
- Power Consumption
- Connectivity
- Programmability
- Complexity
- Standardization
- Virtualization
- Smart Objects
- Communication Paradigms (cooperation and gossiping)
- ...

- Market Value
- New Business Models
- New Ecosystem
- Applications Domains
- New Business Processes
- User Needs
- Market and solutions fragmentation
- ...

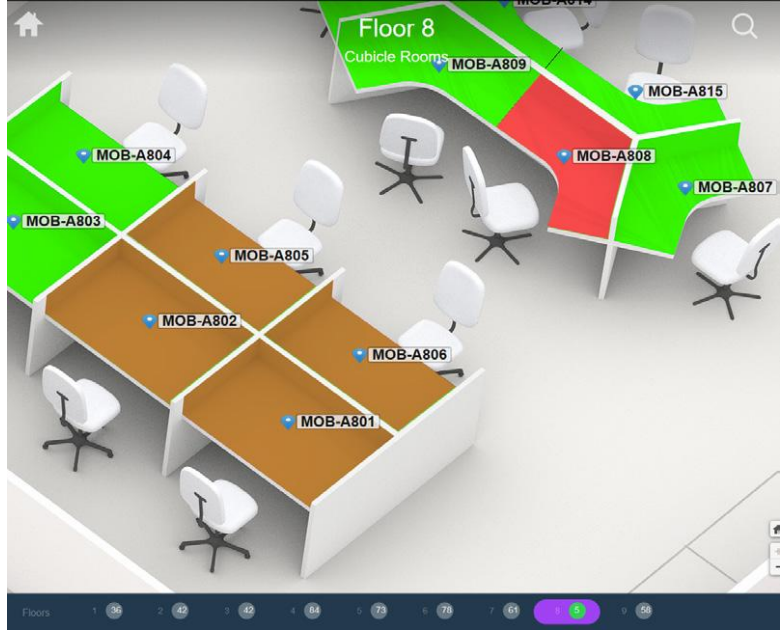
- Security
- Privacy
- Trust
- Usability
- Effectiveness
- Social Control
- ...

**A Major Challenge of IoT
Global Cooperation !!!**

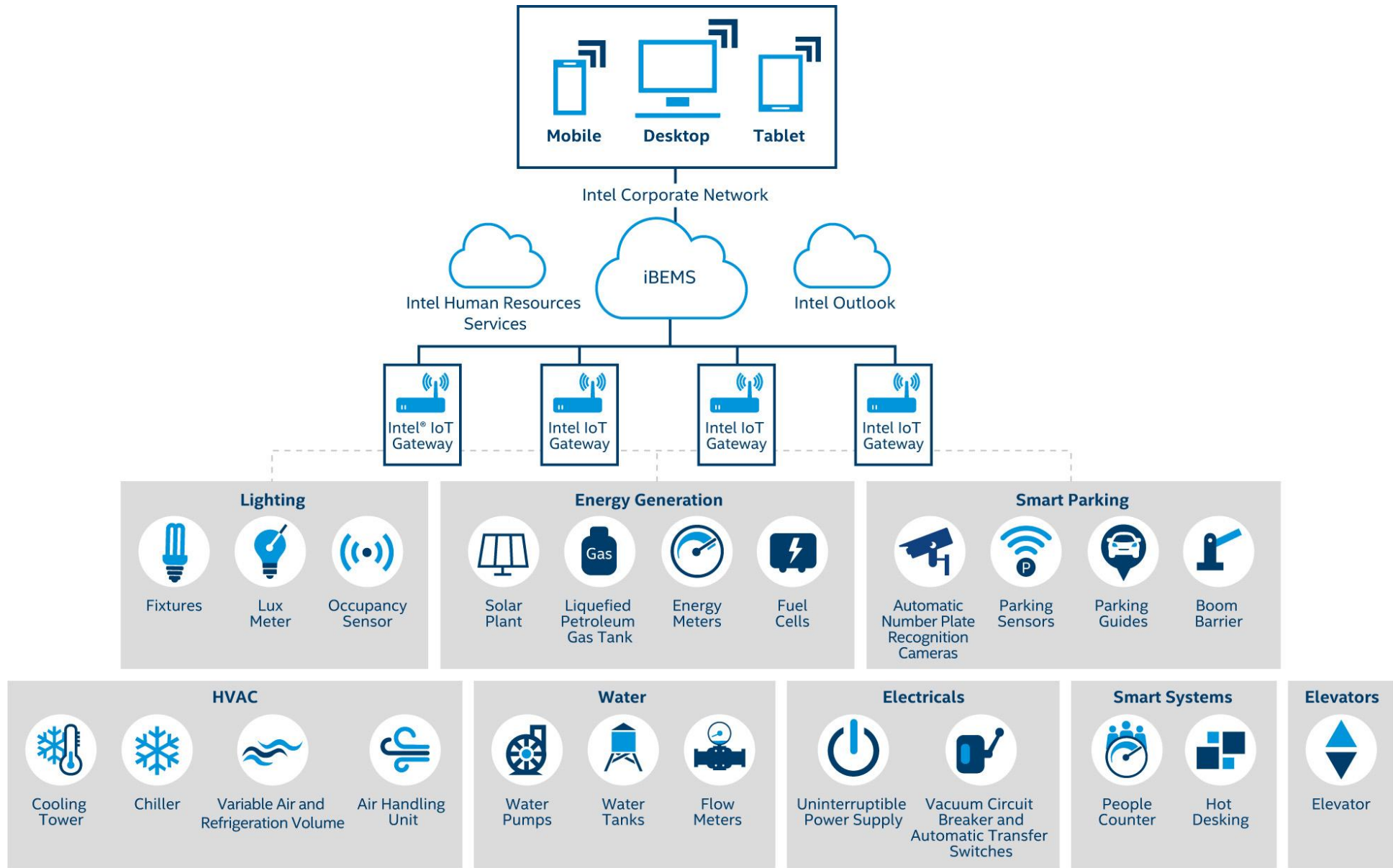
Challenges Facing Building IoT Adoption



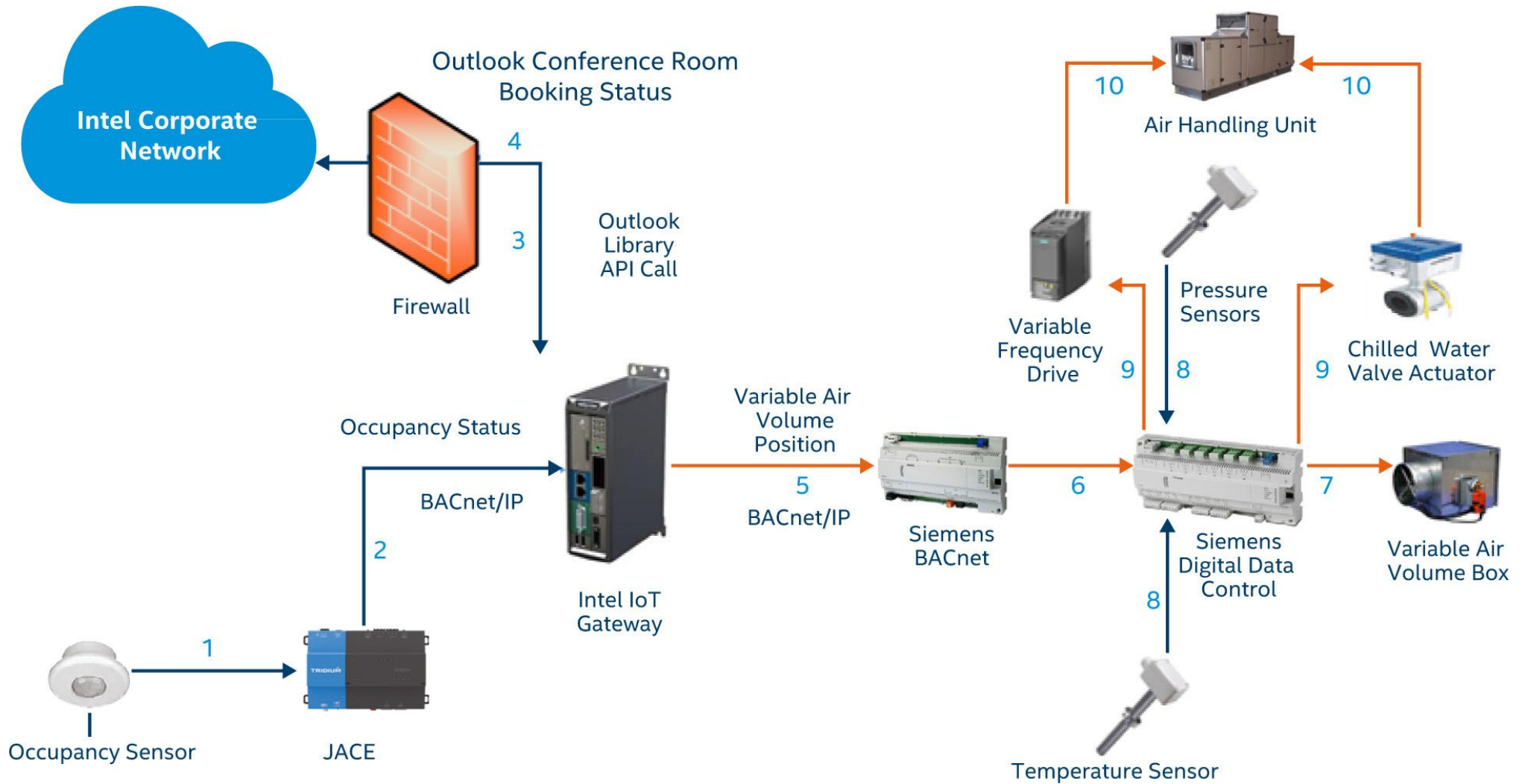
Case Studies / Intel Office Building, Bangalore, India



Case Studies / Intel Office Building, Bangalore, India



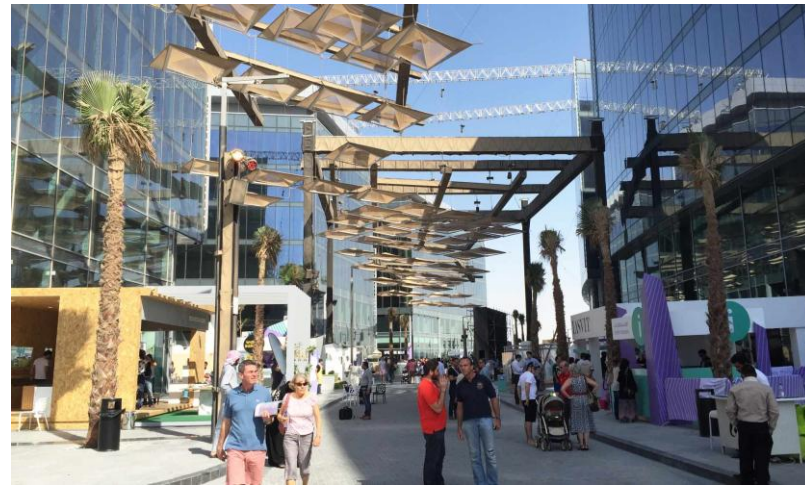
Case Studies / Intel Office Building, Bangalore, India



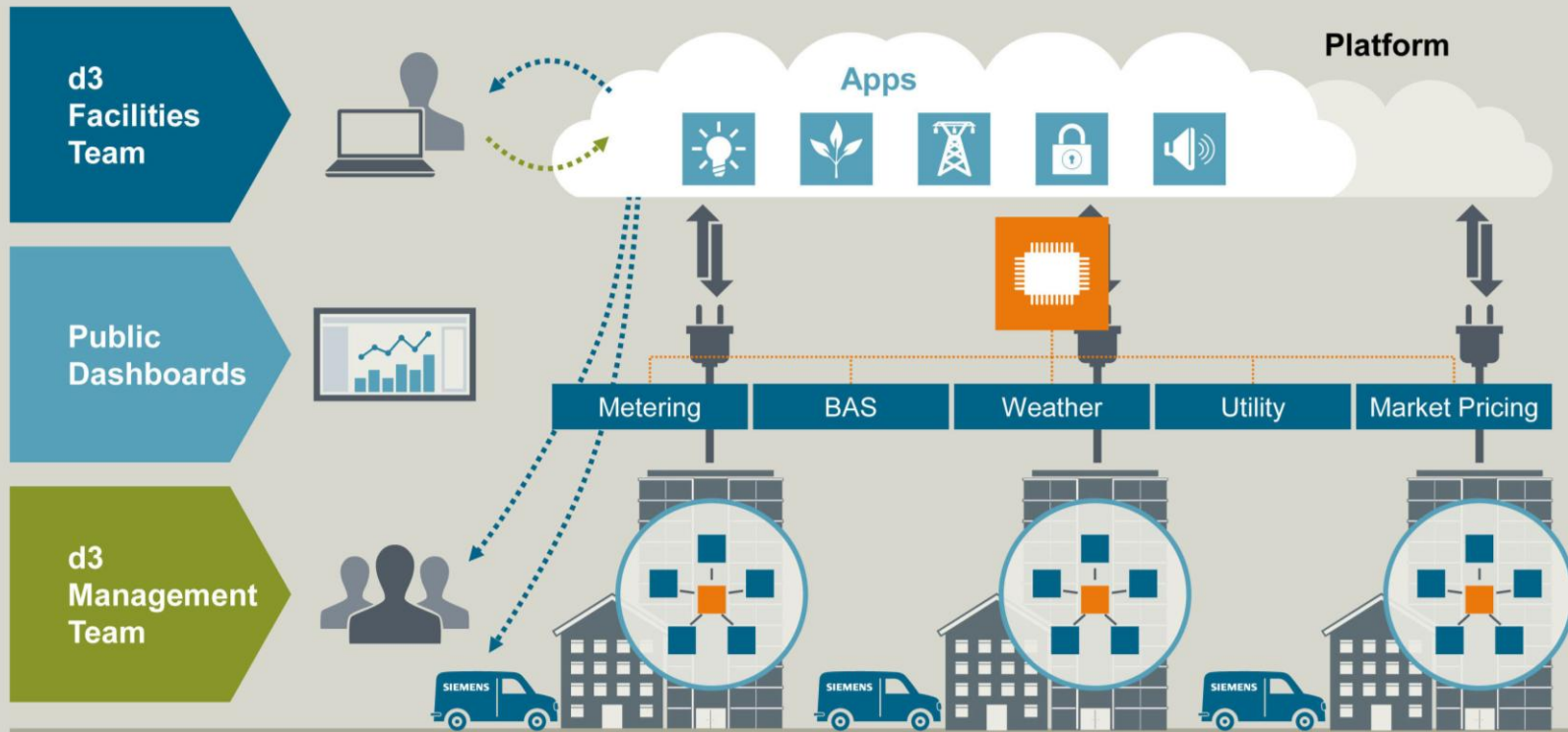
Case Studies / Intel Office Building, Bangalore, India



Case Studies / Dubai Design District (d3), Dubai, UAE



Case Studies / Dubai Design District (d3), Dubai, UAE



Characteristics

- 1. Connect:**
Allow data to be extracted from systems, equipment and sensing devices
- 2. Collect**
Centralize data from multiple systems/sources
- 3. Analyze**
People & technology use data to generate actionable information

Drive savings

- 4. Optimize**
People and technology enhance systems and operations based on actionable information
- 5. Communicate**
"Report" transparent results to various users

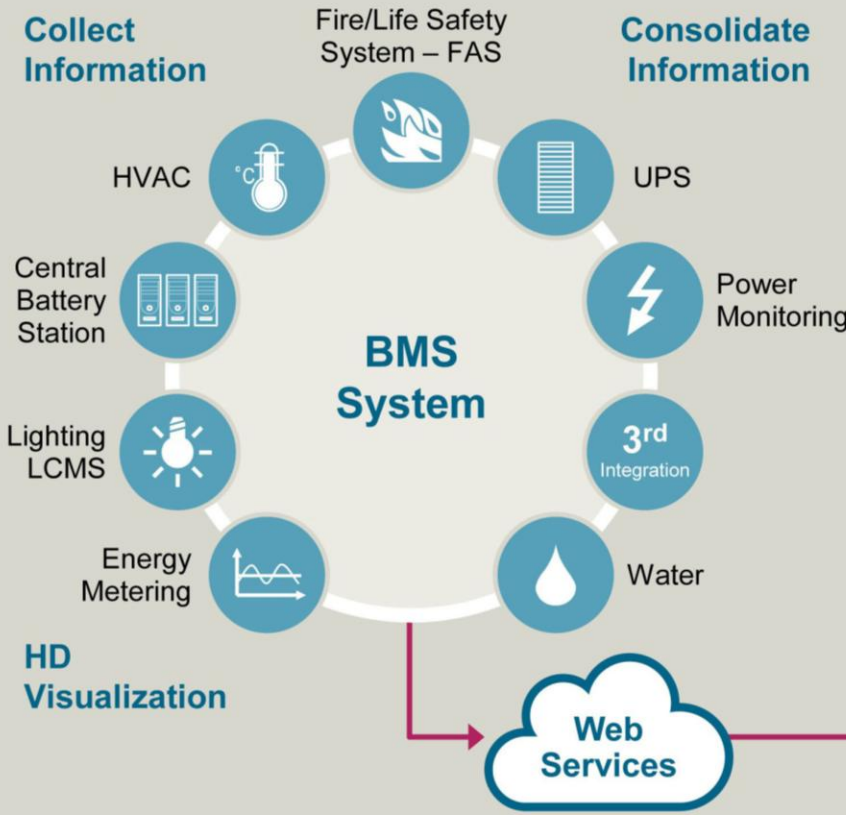
Siemens Cloud based Energy Analytics Dashboard



Total Room Automation



Intelligent Building Mgmt.



Smart Energy Analysis



Smart+Connected Digital Platform



This study demonstrates why we should acknowledge Building IoT (BloT) as a compelling component of future built environments. These discoveries show that IoT is expected to play an important role in shaping future cities. The prominent potential of BloT is represented in a host of values like the automation and digitalization of living environments and the integrated technological facilities.

All in all, the findings in this paper indicate that this new way of thinking about real estate, overlaying an IT network, connecting all our traditionally unconnected equipment, monitoring, analyzing and controlling business processes without much human intervention, will lead to much better-managed assets, which influences to happier residents and improved finances.

Conclusions

Thank you...

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