



**Presentation on  
Smart Money on Smart Buildings  
for**



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# Managing the 4 C's in Buildings



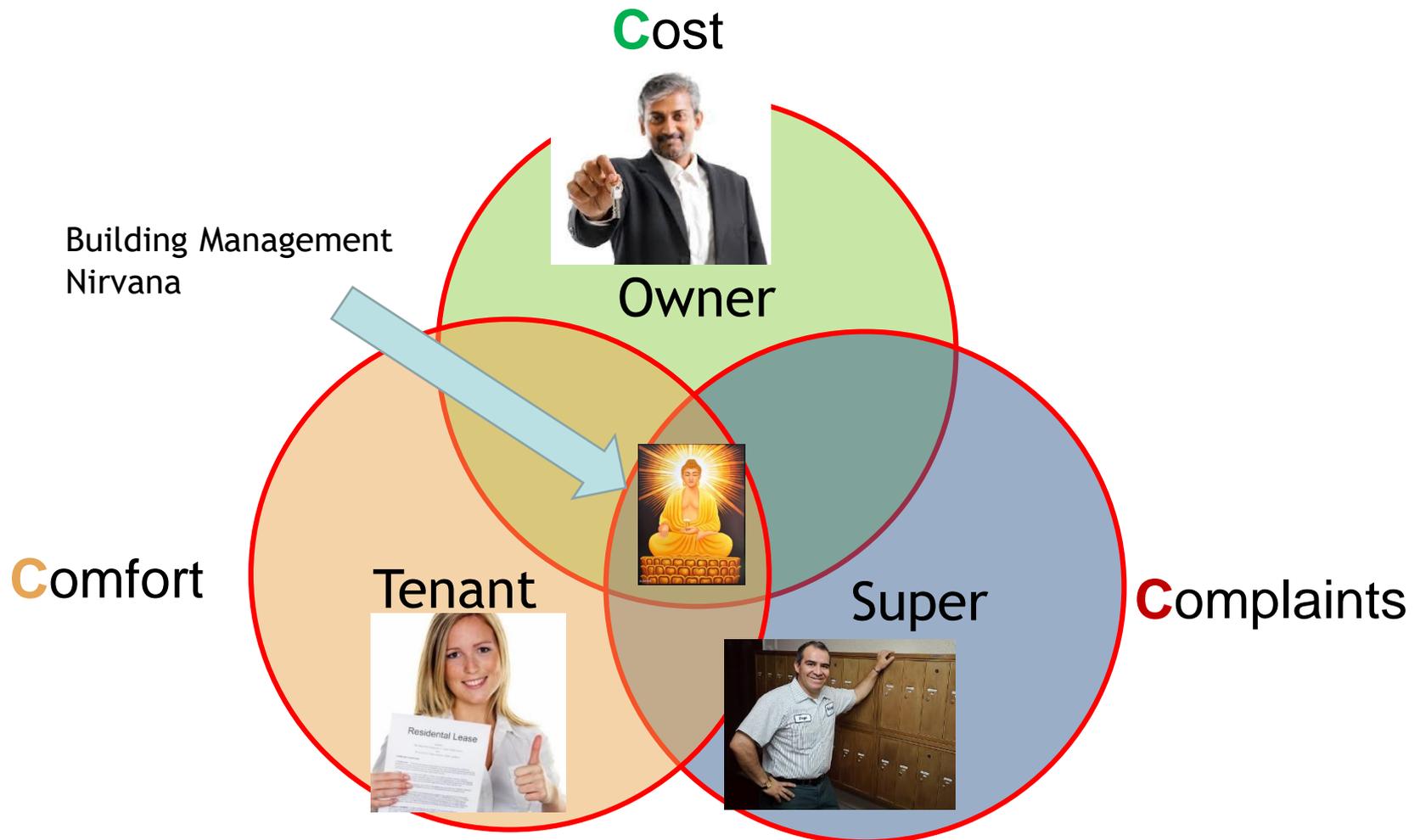
**C**ost

**C**omfort

**C**omplaints

**C**ontrol

# Aligning ALL Constituents



**CONTROL**

# Smart Building Wish List

- Use energy only when required
- Devices self report
- Network self heals
- Data maintains integrity
- Building Systems self optimize

# Smart Buildings Drive Value

- Reducing Energy Consumption / Managing Load
- Preventing/Identifying Problems
  - Detecting Leaks
  - Potential Equipment Failures
  - Sub-optimal performance
- Improving Comfort
- Providing Amenities
- Optimizing Performance

# Making a building SMART



2018 and Beyond

**Augment**

**Predict**

Current State

**Analyze / Understand**

**Control**

**Data / Device / Network**

# Smart Building Integration



# The Internet of Things

## NETWORKS



## THINGS



Moore's Law in Full Effect

**COSTS** ↓

**SPEED, PERFORMANCE, RELIABILITY** ↑

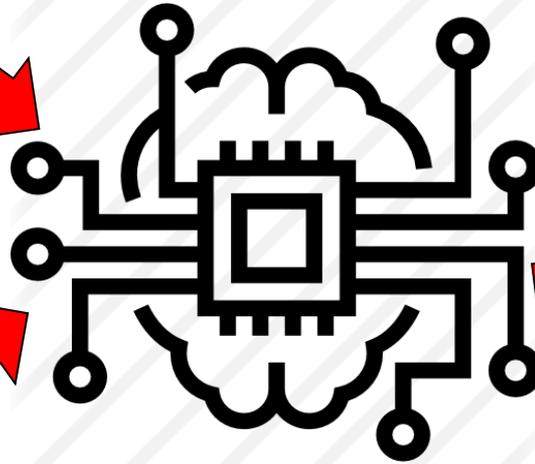
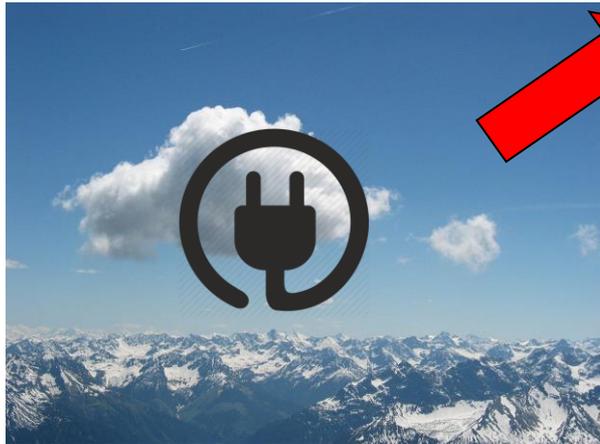
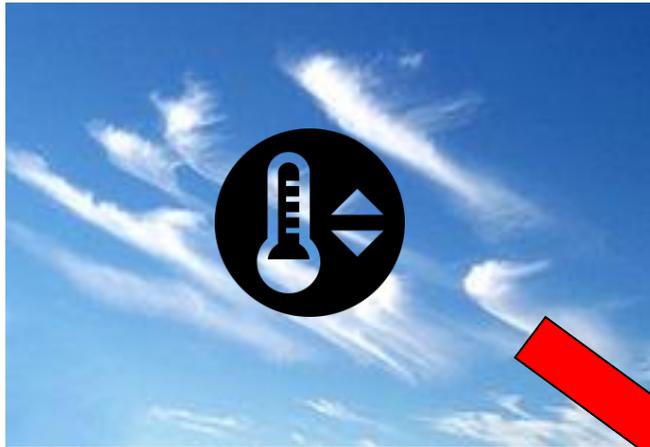


# Control of a Smart Building

- Occupancy
- Scheduling
- Temperature / Set Points
- Equipment Runtime/Operation
- Modulation/Actuation
- Lighting and Light Levels
- Energy Use
- Feedback / Sensors

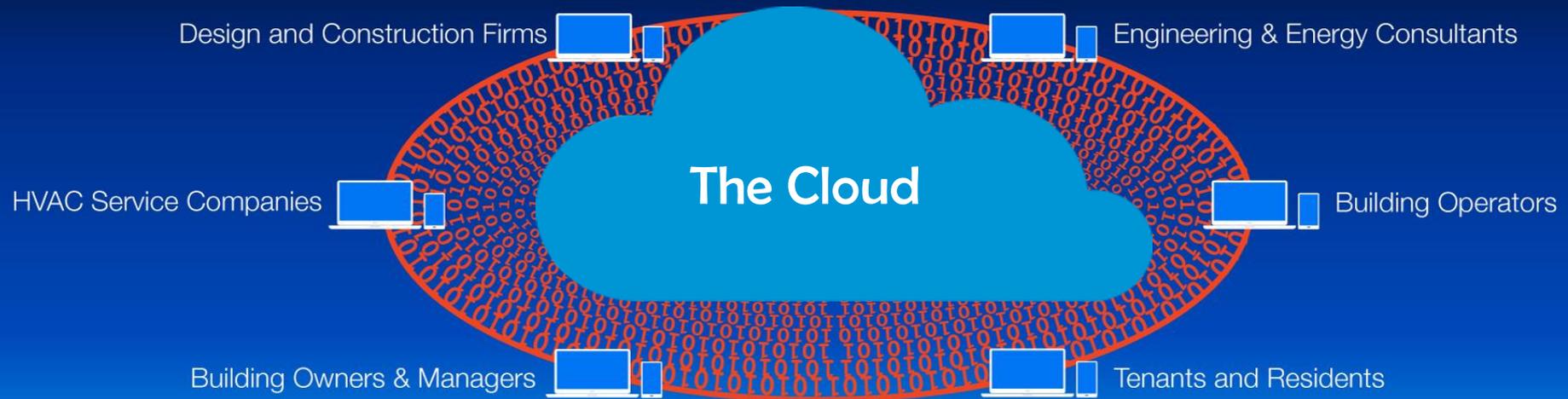


# In the Clouds



Holistic  
Predictive  
Analytics

# INVOLVING THE ECO-SYSTEM



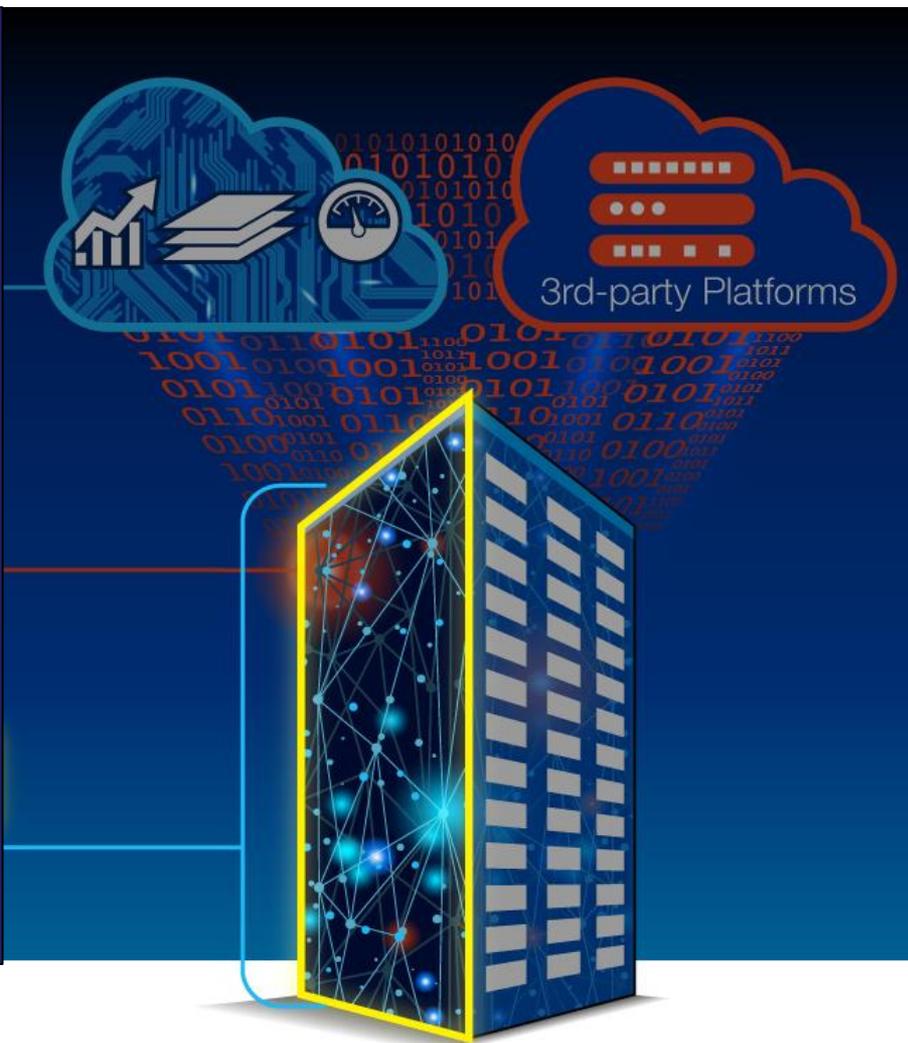
Human Intelligence drives Automated Intelligence

# Smart Device Networks

CLOUD

CONTROL

DEVICES

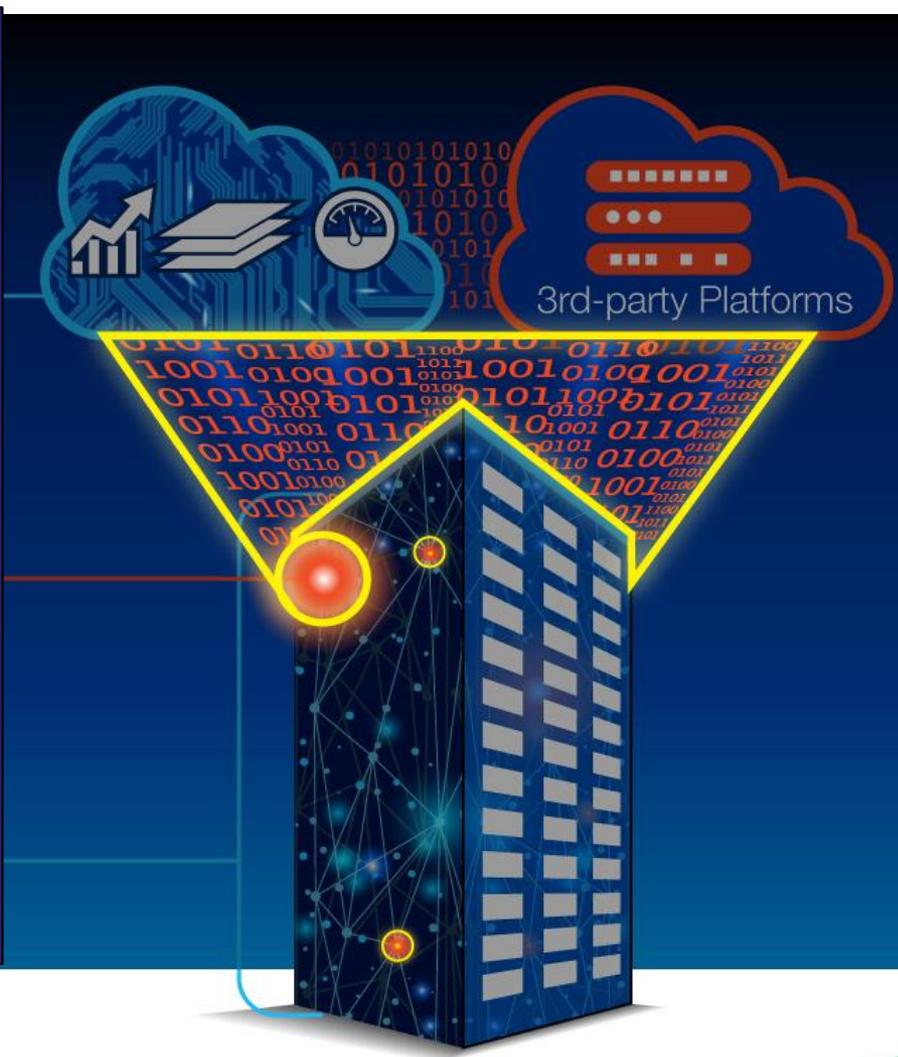


Open Protocols



# SMART CONTROLS – Integrating the Old & The New

CLOUD  
CONTROL  
DEVICES



Open Protocols

MQTT <sup>and</sup> BIX  
Project Haystack

LONMARK INTERNATIONAL  
ASHRAE BACnet  
Modbus

The power of unused energy  
enocean

Bluetooth 5

WiFi



# SMART CLOUD INTEGRATION – Cross Compatability

CLOUD  
CONTROL  
DEVICES



Open Protocols

MQTT  
Project  
BACnet  
Haystack

LONMARK  
INTERNATIONAL

ASHRAE  
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Modbus

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enocean

Bluetooth 5

WiFi



# Multi-Family Building Automation

## Wireless Products

- 1 Thermostat**  
Returns to preset temperature when room is unoccupied.

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- 2 Integrated Light Switch**  
Real value dimming allows management to control energy use and costs.

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- 3 Coming & Leaving Home**  
Coming Home & Leaving Home wireless switch.

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- 4 Occupancy Sensor**  
Control HVAC and lighting loads via occupancy status.

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- 5 TV Control**  
Automatically turns off when there is no occupancy.

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- 6 Window Sensor**  
Determines window status and sets HVAC into energy savings mode.

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- 7 Power Strip**  
Control plug loads in unoccupied rooms.



# Commercial Office Automation

## Wireless Products

- 1 Thermostat**  
Returns to preset temperature when room is unoccupied.
- 2 Light Control**  
Real value dimming & Daylight Harvesting allows management to control energy use and costs.
- 3 Power Strip**  
Control plug loads based on room occupancy.
- 4 Occupancy/LUX Sensor**  
Control HVAC and lighting loads via occupancy status.
- 5 TV Control**  
Automatically turns off when Key Card is removed.
- 6 Window Sensor**  
Determines window status and sets HVAC into energy savings mode.



# SENTIENT BUILDINGS: The Claridge House II



## Solution

- 400+ Luxury Condominium Unit retrofit in Verona, NJ
- Installed Mesh Network-Fan-Coil/Thermostatic Control
- Dual-Temperature Loop for Chillers & Boiler Plant
- Wireless Communication to Head-End BMS
- Operates on a single gateway with no repeaters installed in units or on floors
- Combined electric gas savings of 30% while maintaining adequate tenant comfort

## Challenges

- Owners association required that no repeaters or gateways to be installed in the apartments or in the corridors
- No wires to be installed for installation of thermostats
- Only three floors to be installed in initial phase



# SENTIENT BUILDINGS: The Starrett Lehigh



## Solution

- 8<sup>th</sup> Largest Commercial Office Building in NYC with over 2+ million rentable square feet
- Installed Base Building Automation System
- Wirelessly controlling over 500+ radiator valves and 300+ Thermostats, with communication to the central plant
- Largest EnOcean Wireless Deployment of its kind in NYC

## Challenges

- Control System was wiped out after Sandy
- Windows are extremely old allowing for significant infiltration
- Boilers had to run 11 pounds of pressure
- Required thermostatic control of perimeter radiation to help with significant imbalances

