REMOTE CONTROL: The Promise and Challenges of Home Automation
Presenters

• Karen Hollinger, VP Corporate Initiatives, AvalonBay Communities
• Patrick Sudderth, VP of IT, Monogram Residential Trust
• Mike Smith, Director – Building Tech. Services, Forest City
• Hasier Larrea, Founder & CEO - MorphLab, MIT Media Lab
Agenda

• Introduction: Why do we care about this technology?
• Smart Home Successes and Challenges:
  – Monogram
  – AvalonBay
  – Forest City
• The future of smart home technology @ MIT
The Importance of Starting From ‘Why’

**WHAT** = The Result

What do you do? The result of Why.

**HOW** = The Process

Specific actions to realize the Why.

**WHY** = The Purpose

What is your cause? What do you believe?
The Importance of Starting From ‘Why’

Outside-in = Conventional
When you move from the outside-in, you are simply following the same thing everyone else does.

Inside-out = Remarkable
When you move from the inside-out, you are empowering yourself and being remarkable.

WHY? HOW? WHAT?
The Importance of Starting with 'Why'

Which organization personifies 'Why'?
Why does a multifamily organization personify 'Why'? Why is IoT important for multifamily?
Diffusion of Innovation

- Innovators
- Early Adopters
- Early Majority
- Late Majority
- Late Majority
- Laggards

Market Penetration

Time

- 2.5%
- 13.5%
- 34%
- 34%
- 16%

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**Diffusion of Technology Adoption – Multifamily**

- **Innovators**
- **Early Adopters**
- **Early Majority**
- **Late Majority**
- **Laggards**

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### Market Penetration

- 100%
- 50%
- 0%

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### Time

- Millennials
- Gen-X
- Boomers
‘Internet of Things’ Predicted Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>World Population</th>
<th>Connected Devices</th>
<th>Connected Devices Per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>6.3 Billion</td>
<td>500 Million</td>
<td>0.08</td>
</tr>
<tr>
<td>2010</td>
<td>6.8 Billion</td>
<td>12.5 Billion</td>
<td>1.84</td>
</tr>
<tr>
<td>2015</td>
<td>7.2 Billion</td>
<td>25 Billion</td>
<td>3.47</td>
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<tr>
<td>2020</td>
<td>7.6 Billion</td>
<td>50 Billion</td>
<td>6.58</td>
</tr>
</tbody>
</table>

Source: Cisco VSN, April 2011
Not Just Resident Demand for This Technology...
Integration of Everything

Patrick Sudderth
Vice President of IT
Monogram Residential Trust
IoT
Internet of Things
IoE
Integration of Everything

Property Management System
API

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Voice-Activated Communities
Smart-Tours

Property Management System API

iBeacon

Sonos

nest

estimote

Wemo

Chromecast
Precognitive Customer Service

iBeacon → estimote → Property Management System API → splunk

sonos

hue
Automated Facilities

- Arduino
- Estimote
- Splunk
- Property Management System API
- SMS
Marketing Miracles

- Splunk
- Hue
- Google AdWords
- SMS
- Property Management System API

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Revenue-Generating Smarthomes
AvalonBay Communities

Smart Locks/Security & HVAC
AvalonBay

• Need for a Solution: Security
  – Growing volume of new developments with differing door technology
  – Growing volume of older assets with aging common area systems
  – Disconnect from resident turn data
  – Growing interest from developers and residents for more advanced solution
  – Need to reduce maintenance labor
  – Solve for lock-outs
  – Provide for basic visitor access to non-concierge communities
AvalonBay

• Need for a Solution: HVAC
  – Growing volume of new developments with differing apartment HVAC technology
  – Wi-Fi-based HVAC technology is only “smart” when the apt. is occupied
  – Disconnect from resident turn data
  – Some older communities include utilities with rent
  – Need to control utilities during vacancy/construction
AvalonBay

• Currently in pilot with both technologies as well as many other related technologies
• Pilot Lessons Learned:
  – Need for telecom design standards, early plan involvement, oversight
  – Turnover & Training
  – Community Differences
  – Integration
Forest City Enterprises, Inc.

Innovative Lighting Solution
What if your electrical closet looked like this?
Benefits of DC (Direct Current) Powered Lighting

- More efficient operation
- Lower maintenance costs
- Lower installation cost
- Safer
- IoT built into the fabric of the platform
- Open platform allows vendors to make their own modules
  - Software applications
  - Hardware components only
  - Complete hardware+software applications
Why DC vs AC?

• Local renewable sources (Photovoltaics) are DC
• Batteries are DC
• Electronics are DC
• Efficient motors (brushless) are DC

• Because Elon said so
Installation Examples
Forest City – Indy Wellness Center

• 30% Less Energy
• Lower Installation Cost
• The ability to get more data from your lights
This will become the new normal.....
Partners and Associations
Chestnut Wellness
Solar & Battery Storage Demonstration

Utility Grid

Bi-directional Battery Modulator

Solar Charge Controller

Solar Panels

Tesla Powerwall

LumenCache PDM

LED

LED

LED
Morph Lab, MIT Media Lab
600,000,000
15 years
Suburban Sprawl (Los Angeles)
Tower Sprawl (China)
#4
Here’s Where Millennials are Priced Out of the Housing Market
'Cool' London is dead

The cool, creative class has been priced out of London, which means the capital is becoming more bland and boring by the minute.
#5
hap/quirky china news/rex / rex usa
• Does Not Scale
• Price Prohibitive
• Cumbersome
• Unattractive
#9
Live Large in a Small Footprint.
Retrofit of Existing Apartments
Fitout of New Apartments
Modular Micro Apartments

Socializing  Sleeping + Walk-in-closet  Dining
#10
Questions?