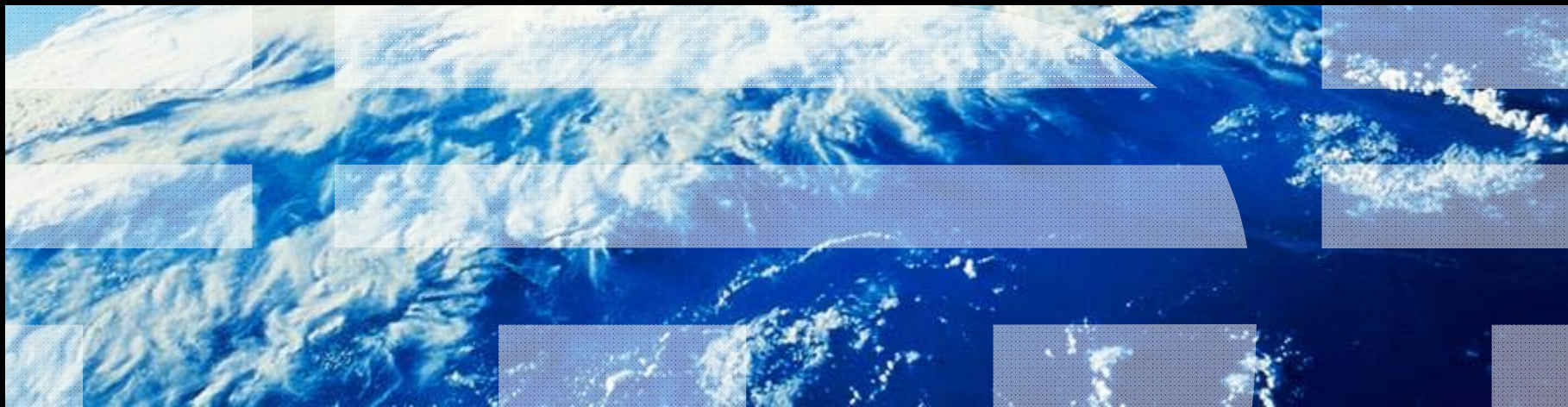


Dublin Research Lab, Dublin – October 25th 2012



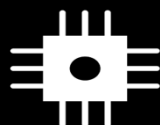
Making your Building Smarter : The Retrofit Challenge



Niall Brady, Smart Building Lead, IBM Research Lab Dublin

IBM Dublin Research Labs : Smart Cities Technology Centre Background

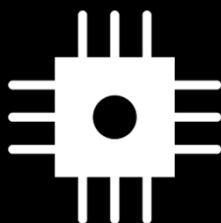
- The IBM Research and Development Labs –Ireland was established in July 2010. It's one of eleven IBM research laboratories worldwide. The lab is located on IBM's Dublin Technology Campus, in Mulhuddart, West Dublin
- Dublin Lab's Research mission is in the Smart Cities arena, as part of IBM's worldwide Smart Planet investment strategy

**INSTRUMENTED****INTERCONNECTED****INTELLIGENT**

- Targeted at 100-150 Smart City Researchers in the Sciences/Maths/Engineering/IT disciplines most to Ph.D level

IBM Dublin Research Labs : Smart Buildings Living Lab Environment Background

- Objective to create a living lab for Research into Smart Buildings – further development of IBM's Green Sigma™ 5 years of research effort into energy efficiency
- Began Smart Building Design engagement in Dec 2010 – business moved into building on August 8th 2011
- Building Level : 3,300 m² office space Retrofitted Warehouse Facility



4700 building level data
objects

2750 Sensor Nodes + 100
Wireless Temp Sensors



Our Smart Building Retrofit Challenges

Retrofit Challenges Summary

1. Smart Building Design
2. Prevailing Building Industry Culture
3. Green Technology Claim Overload
4. Technology Integration Challenge
5. The Baseline

1. Smart Building Design Challenges

➤ Three Primary Objectives

- ✓ Create a User Comfortable environment
- ✓ Reduce Energy/Water usage environment
- ✓ Keep within Budget

➤ Biggest Challenge ??

Constantly competing (& changing) objectives within the design and build cycles

What to include ? What is critical? Where to Invest ?

2. Prevailing Real Estate Building Industry Culture

- Design Team (Architect to M&E)
 - need a holistic view of the smart building approach
 - not just a bunch of technologies that have to be individually designed and provisioned

- Build Contractors
 - willingness to move outside their comfort zone
 - poor understanding of new technology installs for which customer pays a risk premium

- Site Managers mantra “nothing that will negatively impact my Build Schedule or Budget”

- Finance - processes for handling new smart building technologies
.....getting beyond the “*is it Fixture and Fittings or IT*” question

3. Green Technology Claim Overload

- Massive increase in companies offering new Green Technologies (or in some case rebranding existing offerings)
- The return on investment challenges (industry challenges)
Fabric Enhancement Example (ROI)

Area	Payback (years)
Roof (additional insulation)	284
Wall (additional insulation)	43
Glass (change to e glass)	36

- How to get beyond the Vendor performance claims – determining real technology leaders

4. Technology Integration Challenge

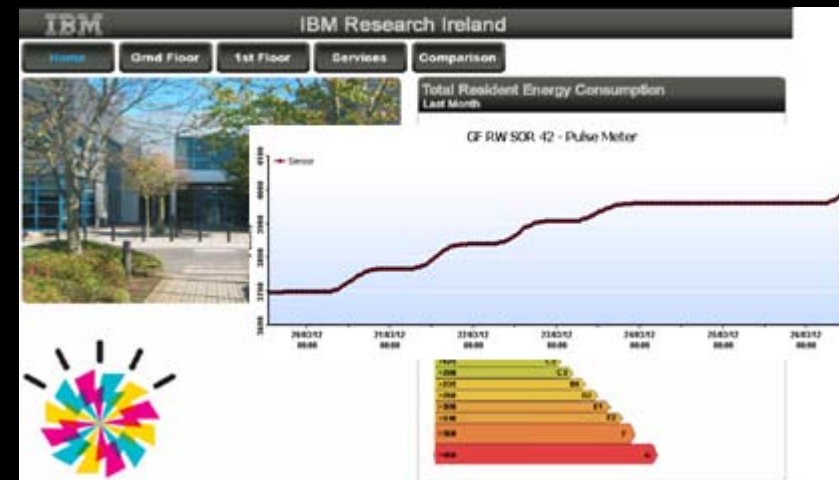
- Retrofits are tough technology integration environments - need to merge/operate with BMS and legacy systems
- Implemented technologies are optimised for their own application - can compete or interfere with each other or lead to a non overall optimised environment
- Building Sensor Networks – isolation of data and building networks for network security reasons
- How to manage the volumes of disparate realtime data to make it time synchronous and useful



INTELLIGENT

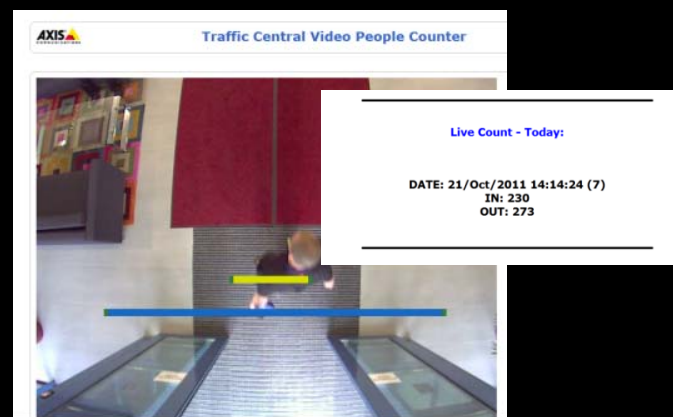
Baselining - \$64 million Q : What savings have we made

- Currently baselining our environment – the challenge of what is considered “normal” for the three sources of energy used within the building
 - Thermal Energy (Natural Gas)
 - Cooling Energy
 - Electrical Energy
- Water saving against the norm is 75% of EU average
- Living Lab Enablement – create a Research environment for Smart Buildings Research – already yielding extremely interesting results



Smart Building “Gotchas” Examples

- Emergency lighting signs in front of the PIRs
- Missing meeting room automated door closers to avoid triggering PIR’s on walk by
- Automated window shading system reacting to background radiation levels and competes with HVAC
- Footfall sensors triggering double counts when lights become activated





Questions ?