Workplace and Building Trends
Digital Transformation and Buildings

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Topics

1. Building Transition
2. Digital Building Trends
3. Big Industry Questions
4. Pulling it All Together
“Revenue related to installations of sensor-equipped lighting, climate control equipment, thermostats and other automation systems could quadruple over the next decade to about $732 billion”

Navigant Research – December 2016
How Many Devices do you have connected at Home?

Personal Data Experiences

- Health Information
- Device Information
- Granular Energy Information

My wife and son challenge each other
Technology is Changing Buildings

Yesterday

Demand for new customer experiences & workforce innovation mandate improved efficiencies
• Building demands are changing
  - Lower operating expense
  - Increased functionality and interoperability
• Data is driving efficiencies and experiences
• IP closer to the edge
• Cybersecurity is paramount
• OT and IT worlds are interacting
• Significant shortage of qualified personnel
• The workforce experience is changing

• Lighting is disrupting channel and providing an anchor system for connecting building systems
• Building control systems are pulling in and controlling more sensors, actuators, and analytics
• Building control is being regulated through code
• Microgrid DC is becoming a feasible option; in many cases it can be low voltage
Big Industry Questions

- How fast is the industry going to move
- Who will own the generated data
- How do we keep everything secure
- Who is installing/commissioning/owning/managing
- What is the standard that will allow interoperability
- Why isn’t everything use wireless technology
Market Speed

Phone – TDM to IP


Building Sensors
Building Systems - Ventilation
Building Systems - Lighting
BACnet to IP
Physical Security to IP
Phone – TDM to IP

100% TDM  50/50 TDM  90% IP

You are Here!

Cloud Management and Analytics

OpEx

You are Here!

Experiences

Phone Transition Timeline --- $17B Industry
Data is King - No one owns the King

Data Creation and Transfer
- Data is everywhere
- We can’t give everyone access to all systems
- It’s going to be important to publish and subscribe

Data Collection and Organization
- Who is responsible for normalizing data
- What is normal
- Can we make interoperability simple
- Do we really need to collect data

Data Usage and Storage
- Historical archives, new use cases
- Everyone has a different idea on how to use data

2010 Google Flu Trends (#2 Wildfire)
Comprehensive Security

### Visibility & Analysis
- Device / User identity
- Visibility of connections and relationships

### Segmentation
- **Firewall** – Segment IT and OT environments
- **Policy** – Segment OT devices in the IT network
- **Profiling** – Align access with users / device
- **Switches** – Dynamic segmentation enforcement

### Remote Access
- Secure Connection in/out of OT network
- Dynamic access control
- Observe remote activities
- Remote site risk protection

### Security Services
- Risk assessment for baseline
- Deployment and Migration
- Incident response Service for breach situations
Security Zones

Physically Separate DMZs

Single DMZ with Logical OT and IT Security Contexts
The Digital Building is a “Networked Solution”
Greatest success occurs when IT & OT (Facilities) work closely together
Lack of cooperation means one side must make decisions for the other leading to conflict and political problems

Working Together – It’s Not Us and Them

IT Functions
- IP Addressing/Subnet
- Network Connectivity
- Security Standards

OT Functions
- Ceiling Access (OSHA)
- Contractor Management
- Code/Building Compliance
Integration – Things Change But Stay the Same

Physical Security
On the network, chain of custody maintained
Different Business Practice

Accounting
On the network, accounting does not report to IT
Different Business Practice

Building infrastructure is now coming on the network
Special skills are required to operate building systems
Building service become an application on the network
Standards

Def: Universally or widely accepted, agreed upon, or established means of determining what something should be. ANSI/BICSI 007-2017 is a great start on the physical design and implementation. Now we need some interoperability.

Figure 5. Internet users (1990–2012)

Source: comScore; Deloitte analysis.
**Why Not Wireless for Everything**

**Pros**
- Easy in retrofit
- Sensors on batteries
- Low cost to deploy

**Cons**
- Competes with tenant services
- Prone to interference
- Hard to service
- Difficult to troubleshoot

**Pros**
- Easy to implement (Planning)
- Less expensive than AC for Power
- Easy to maintain
- Easy to monitor
- Easy to troubleshoot

**Cons**
- More costly (retrofit)
- Limited power capability
- Requires process changes
Summary
Serial is Evolving to Ethernet

Layer 1: Application
Layer 2: Building Control
Layer 3: Zone/Area Control
Layer 4: Device

Yesterday
- IP
- Serial Data and possibly Power

Today
- IP

Tomorrow
- Wireless
  - Better for Retrofit
  - 802.15.4 (Thread)
  - 802.11 WIFI
  - Bluetooth
  - Parallel Power (AC)

- Wired
  - Global Standard PoE
  - Less Infrastructure
  - Native DC Power
  - Common Infrastructure
  - New Builds

Time
Increasing Number of IP/PoE Devices
Data Ownership

Who is reading the fine print on all those apps

Information wanted by the manufacture to improve their product or provide extended service

Data sharing across platforms, potential revenue streams??

Where does data management stop and start
Digital Transformation must be part of your Building Strategy

- Buildings are changing
  - IT and OT teams need to work together
  - Buildings are becoming digital and connected
  - Infrastructure is becoming IP based
  - Power is combined on the network cable

- Digital transformation is essential in the workplace of the future

- Digital building infrastructure will play a major role in the digital workplace