Wireless Access: Today And Tomorrow

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What We’ll Cover

• Wireless Use Cases
  1. Single Point Sensing (Temp Sensing)
  2. Component-To-Component (Mesh Network)
  3. Cellular Connectivity

• Economics Of Wireless
  ▶ Wired Vs Wireless
  ▶ Scenarios Where Wireless Is The Best Option
Why Consider Wireless For Retail Facilities?

• Reduces Cost
  ▸ 70% Of FMS Wiring Is For Networking/Sensors
  ▸ Eliminates Wires And Associated Cost/Time

• Improved Convenience And Flexibility
  ▸ Wireless Easily Accommodates Changes

• Open Stores Faster
  ▸ Shorten Time To Revenue
Why Consider Wireless For Retail Facilities?

- Operational Economics Drives Additional Connectivity
  - More Devices “Connected”
- Enhanced Reliability
  - Offer “Self Organizing” And “Self Healing” Capabilities
  - Solar Powered
- Addresses IT Security Concerns
- IoT (Internet Of Things) Trend Has Expanded Options And Technology

Balancing Costs With Capabilities Is Key
Use Case 1
Single Point Sensing (Temp Sensing)
Use Case 2
Component-To-Component Network (Mesh)
Use Case 3
Cellular Connectivity
Single Point Sensing

Sensing Applications

<table>
<thead>
<tr>
<th>Refrigeration</th>
<th>HVAC</th>
<th>Lighting</th>
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<tbody>
<tr>
<td>Temperature</td>
<td>Space Temp</td>
<td>Dimming</td>
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<tr>
<td>Door Switch</td>
<td>Outdoor Air Temp</td>
<td>Occupancy Sensor</td>
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<td>Humidity</td>
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<td>Light Level</td>
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Considerations

- Battery Life (Solar Has Changed The Game)
- Cost Of Pulling Wires Vs Cost Of Electronics
- Broadcast Rate Requirements (Affects Battery Life)
- Penetration Though Walls, Signage, And Other Obstacles
- Connectivity To Controller/Wireless Ecosystem
- Reliability Of Connection
Component To Component Wireless Networks

- Mesh Nodes Capable Of Re-transmitting Messages To/From Adjacent Nodes
- As The Network Organizes, Most Efficient Path Is Learned And Used
  - Based On Signal Strength, Latency, etc.
- Disruptions In Path (i.e. Loss Of Node) Force Nodes To Reconfigure Path Automatically
- Remodel Additions Seamlessly Join Existing Network
Component-To-Component Wireless Networks

- Works Well When Case Control Is Applied
  - Mesh Network Defined By Cases
- Self-Contained Case Control
  - Cases Can Easily Be Moved Anywhere In The Store
  - Connectivity Is Automatic
- Applying Wireless When Retrofitting A Store May Make Sense As Well
## Wireless Economics

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Wired</th>
<th>Wireless</th>
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<tbody>
<tr>
<td><strong>Small Format</strong></td>
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<td>1 Sensor</td>
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<td>- Saw Cutting</td>
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**Key:**
- Hardware
- Labor
Best Applications For Wireless Connectivity

**Connectivity Value**
- Food Quality
- Energy Management
- Inventory Risk
- Control
- Likelihood Of Layout Changes

**Connectivity Difficulty**
- Long Wire Runs
- Roof Penetrations
- Concrete Cutting
- Ceiling Conduit

Wireless Connectivity Is Most Compelling When Value Is Greatest And Connectivity Is Most Difficult.
Cellular Wireless Access Provides IT Enhanced Security

Current – Using Customer’s Network & The Internet

- Inbound Firewall Port – Security
- Network To Network Connectivity
- Assumes Robust Network
- Intense IT Engagement
- High Touch IT Support

Future – Cellular Connectivity

- Highly Secure, Private Cell Network Direct To The Cloud
- Data + Alarms Over Network
- Store Management System NOT Connected To Customers Network
- Completely Independent From Customers IT Infrastructure
Cellular Connectivity

• In The Past There Were Few Issues Monitoring Stores Through The Internet. No More!
• Ever Since The High Profile Hacks Into Retail Chains, IT Security Has Been Heightened.
• The Internet Used To Be The Only Way To Connect. Now Cellular Is An Option.
• Internet Of Things Has Really Spawned A Whole New Industry Around The Connectivity Of Devices, Providing New Options And Driving Down Costs.
Key Points to Take Away

- There Are Some Situations Where Wireless Solutions Are Very Compelling
- Wireless Is Not The Answer For All Situations
- Understand The Underlying Economics Of Running Wires, Moving Cases, Etc.
- The Technology Associated With Cellular Connectivity Has Really Advanced Lately
- Cellular Connectivity Is Becoming More Preferable As The Options Increase And IT Security Is Heightened
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