IoT Takes a Village

BUILDING THE SINGLE PAIR ETHERNET ECOSYSTEM
PANELISTS

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Product Management

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Design Director

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Distinguished Engineer

Andrew Rogers
Co-Founder

Ronna Davis
Strategy and Technology

COMMSCOPE®
What’s Happening with Building Automation Today?
It’s all about the DATA
Accessing it.
Securing it.
Using it.

“Globally the Building Automation System Market is expected to grow at the rate of more than 13% from 2016 to 2022.”

Market Watch, October 2018, marketwatch.com
Remember This?

Token Ring  Thick Net
Burroughs Poll/Select
Hewlett Packard  Thin Net
HDLC  VT100  Sperry  X.25
DEC  WANG  Token Bus
MicroSoft  AppleTalk
IBM  LU6.2  Telnet  RS485
TN 3270  Novell
Apple  TD830  Olivetti  Decnet
ISDN  Burroughs  SNA
Dial Up  UUCP  SDLC
ARCnet  RS232
Banyan Vines

Automation Today

EtherNet/IP  Foundation FieldBus
Mitsubishi Electric  FDI
RS232  Yokogawa  DALI
Modbus  Signify  CAN
Schneider Electric  Pepperl Fuchs
Hart  ABB  Signify
Kone  CAN
VAN  CIP
ODVA  DeviceNet
ControlNet
FieldComm
RS485
Honeywell  ControlNet
ABB  MOST
Emerson  Byteflight
ABB  Siemens
Kone  VAN
FlexRay  Endress Hauser
Rockwell Automation
ProfiBus  4-10mA
PROFINET
Two Wire

2019 BICSI FALL Conference & Exhibition
Building Operational Technology OT Today

- Has similarities to IT networking circa 1990
- OT Expectations Changing
  - Want the benefits of the IT evolution
    - system optimization
    - predictive maintenance
    - Software upgradability
    - cloud connected
- Industry leaders gaining clarity on key value propositions
  - Current protocols and network structures becoming barrier to innovation
  - Path forwards – adopt best of IT married to OT core strengths
Example

• Panduit World Headquarters
• 600,000 feet of 4-pair
• 500,000 feet of 2-wire
• What could it have been?
Why Single Pair Ethernet?
It’s all about the **POWER**

- Every Building OT Device Requires Power
- A single medium for data and power is preferred.
- Current battery technology isn’t scalable
- Battery technology isn’t as reliable as a wired connection.
- Building technology devices are often CRITICAL to building operations and the health and safety of the occupants.

Consider how PoE has significantly increased the availability of real world deployable technologies for IT, Security and AV.
It’s all about a **Simplified and Standardized Interface**

- Standardized interface offers a wide ecosystem of products & vendors
- Ensure wide product availability
- Standardization eliminates proprietary and non-compatible interfaces
- Standardization gives confidence to deploy for performance & safety
It’s all about the TRAINING

“Technical limitation and lack of skilled expertise is expected to hamper the growth of building automation system market during forecast period 2016-2022.”

-Market Watch, October 2018, marketwatch.com

Current Building Automation Systems infrastructure solutions and architectures vary by manufacturer.

Building systems integrators are tasked with understanding and implementing many infrastructure architectures and products.
It’s all about ADOPTABILITY

WORKING WITHIN EXISTING DESIGN PATENTS WILL HELP SPEED ADOPTION
What is Single Pair Ethernet?
Overview SPE

- 802.3cg defines 10Mb/s Ethernet over a single balanced pair
- Designed for Building and Industrial Automation
- Key Attributes
  - Power + Data (multidrop power not supported yet)
  - 2 point to point reaches – 15m and 1000m
  - Multidrop – 25m and 8 stations
  - Cable & Cabling Topology Reuse
  - Compact
  - Connectorization
SPE is **Unique**

- 50% more dense than RJ-45
- Low Power Low Data
- Expected to Support Longer Distance
- Investigating Multidrop Capabilities

<table>
<thead>
<tr>
<th>Parameter</th>
<th>4-pair</th>
<th>Single Pair</th>
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<tbody>
<tr>
<td><strong>Data Rate</strong></td>
<td>Up to 10 Gb/s (10GBASE-T)</td>
<td>10 Mb/s at 1000 m (1 Gb/s at shorter dist.)</td>
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<td><strong>Power Levels</strong></td>
<td>Up to 71 W (PoE++)</td>
<td>Up to 15 W (TBD)</td>
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<td><strong>Reach</strong></td>
<td>Up to 100 m</td>
<td>Up to 1000 m</td>
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<td><strong>Connector Type</strong></td>
<td>RJ45</td>
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10BASE-T1L SPE System Overview

Data
- 10Mbps
- Full duplex – Both sides transmit at the same time

Cabling/Connectors
- Up to 1000 meters
- Accommodate both data and power
- Can be bundled

Power
- 50-58V classes for maximum power transfer
  - Up to 52W
- 20-30V classes for low voltage applications
  - Up to 8.4W
# SDO Activity – 10SPE

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Cisco/JCI/Panduit SPE

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**LEGEND**

- Milestone
- Pre-CFI
- Effort in progress

*pending timeline updates
How do we get there?
## Market Awareness
- Clearly Defined SPE Benefits
- Universal / Consistent Messaging

## Design
- Gather current reference architectures and best practices for various OT systems.
- Develop SPE Reference Architectures
- Evolutionary infrastructure options to address the 80%

## Ecosystem Engagement
### WHO:
- OT Systems Manufacturers
- PHY
- MDI
- OT Endpoint / Devices
- OT Install and Integrators
- MEP & IT Design
- Sustainable Design Orgs

### HOW:
- Create list of other key organizations to interact with
- Webinars
- Conferences
- Trade Publications
- Whitepaper
- Education
- Use Cases
GET INVOLVED!

Participation in SPEC is open to all companies interested in accelerating the acceptance of SPE technologies in building automation technology and networks. SPEC will provide vendor neutral representation for technology leaders and users across the building automation technology ecosystem.