IoT Takes a Village

TIA SPEC
Single Pair Ethernet Consortium

BUILDING THE SINGLE PAIR ETHERNET ECOSYSTEM

MODERATOR

Ronna Davis
Strategy and Technology
COMMSCOPE®

PANELISTS

Frank Straka
Product Management
PANDUIT®

Heath Stewart
Design Director
ANALOG DEVICES
AHEAD OF WHAT'S POSSIBLE™

Peter Jones
Distinguished Engineer
CISCO

Andrew Rogers
Co-Founder
ACE IoT SOLUTIONS

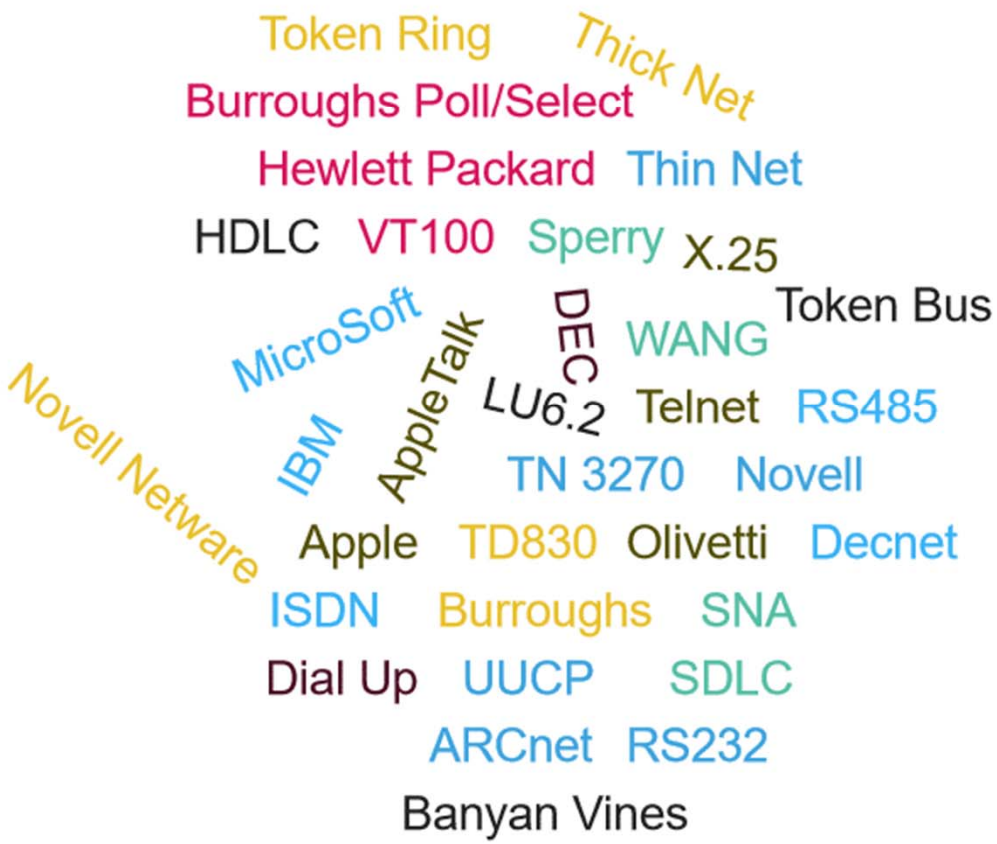
What's Happening with Building Automation Today?

It's all about the DATA
Accessing it.
Securing it.
Using it.

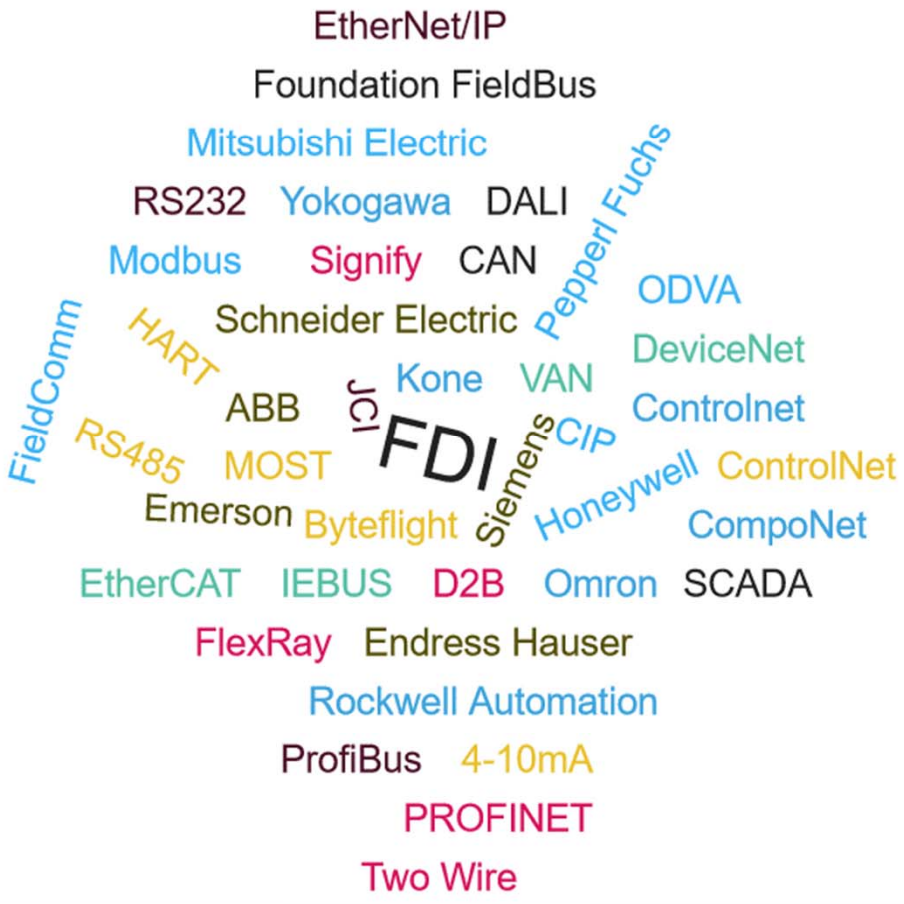
"Globally the Building Automation System Market is expected to grow at the rate of more than 13% from 2016 to 2022."

Market Watch, October 2018, marketwatch.com

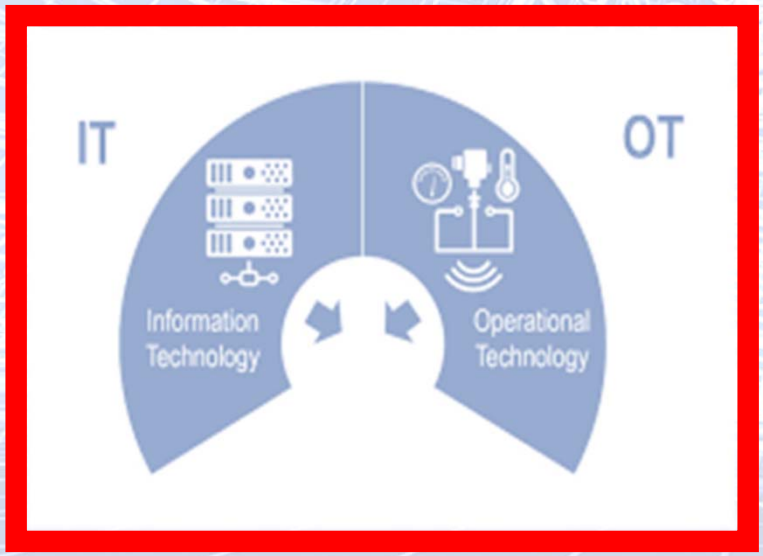
Remember This?



Automation Today



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

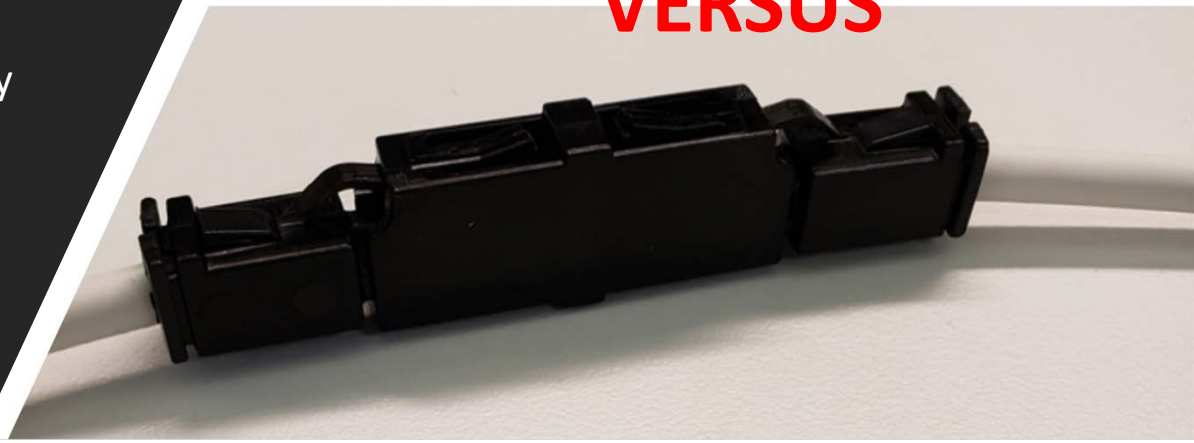
- Every Building OT Device Requires Power
- A single medium for data and power is preferred.
- Current battery technology isn't scalable
- Battery technology isn't as reliable as a wired connection.
- Building technology devices are often CRITICAL to building operations and the health and safety of the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

VERSUS



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.

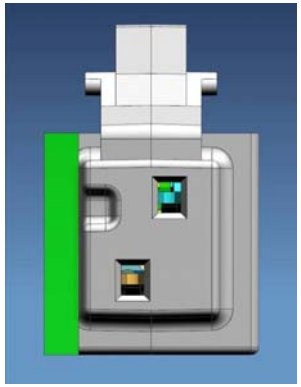
It’s all about ADOPTABILITY

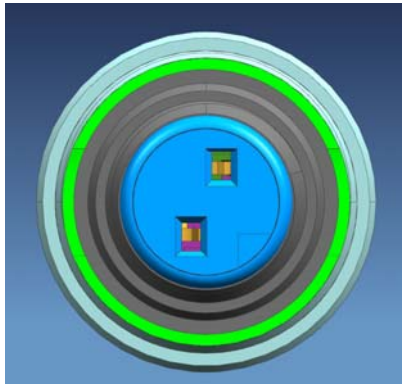
WORKING WITHIN EXISTING DESIGN PATENTS WILL HELP SPEED ADOPTION

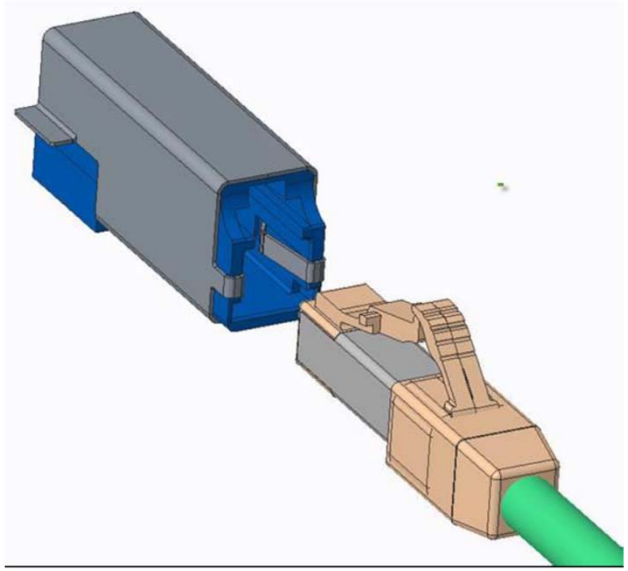
What is Single Pair Ethernet?

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

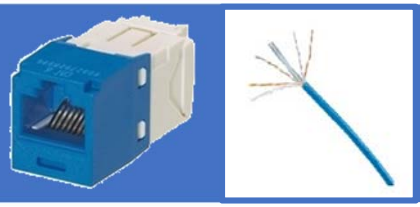
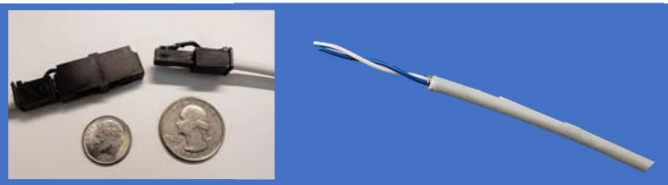






SPE is Unique

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

Parameter	4-pair 	Single Pair 
Data Rate	Up to 10 Gb/s (10GBASE-T)	10 Mb/s at 1000 m (1 Gb/s at shorter dist.)
Power Levels	Up to 71 W (PoE++)	Up to 15 W (TBD)
Reach	Up to 100 m	Up to 1000 m
Connector Type	RJ45	Modified LC

10BASE-T1L SPE System Overview

Data

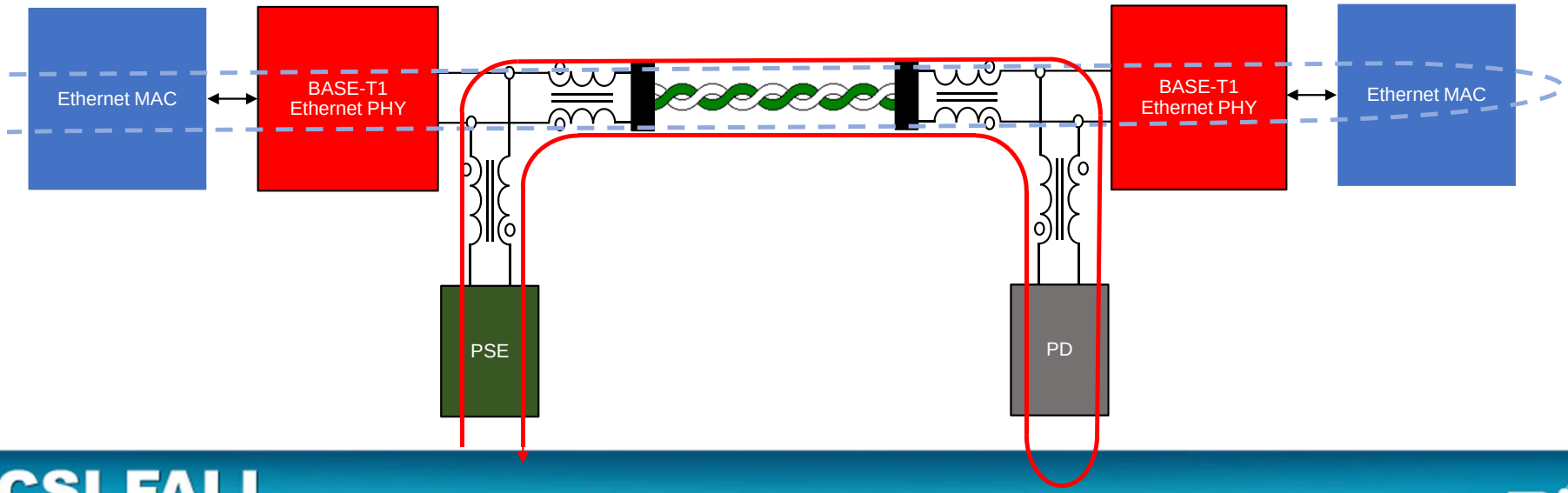
- 10Mbps
- Full duplex – Both sides transmit at the same time

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



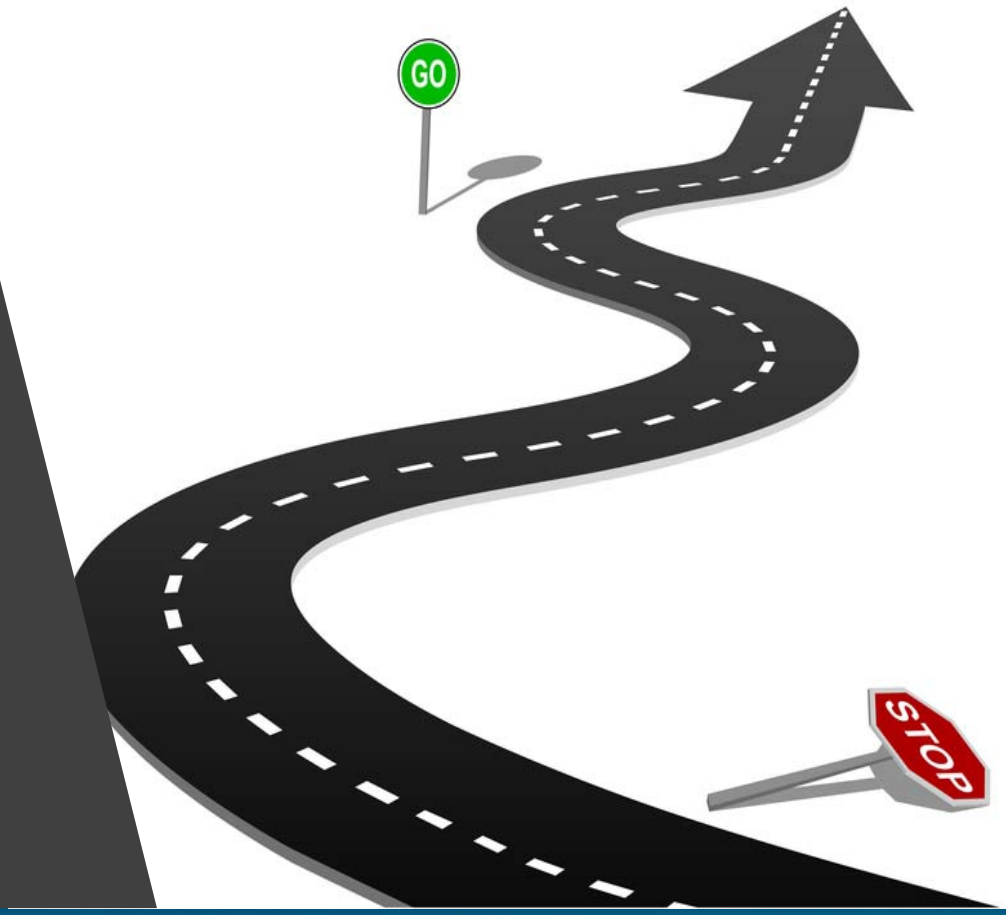
SDO Activity – 10SPE

SDO		Q2-2019	Q3-2019	Q4-2019	Q1-2020	Q2-2020	Q3-2020	Q4-2020	Q1-2021	Q2-2021	Q3-2021	Q4-2021
IEEE	802.3cg	SA balloting		RevCom	802.3cg published							
	Jul plenary	Pre-CFI		CFI - Multidrop enhancements			Task Group if CFI/Study Group is successful					
TIA	TR42.7	ANSI/TIA-568.5, draft 0.8b working draft*										
	TR42.9	ANSI/TIA-1005-A-3, draft 1.4 working draft*										
ODVA	Phy SIG	Add 10BASE-T1L, 10BASE-T1S & standardize In Cabinet Use Case										
	CIP specs			Work not scoped, no effort yet					CIP specifications support APL			
APL		Test Protocol Development – Fieldcomm Group					APL Test Protocols				APL product @ ACHEMA	

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

PANDUIT®

BELDEN

TIA SPEC
Single Pair Ethernet Consortium

SIEMON™

COMMSCOPE®

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.