DESIGNING FOR POE AUTOMATION AND LIGHTING

Best Practices and Lessons Learned from Top Design Professionals and Subject Matter Experts on Designing and Constructing Power Over Ethernet Intelligent Buildings

Earn CE and GBCI Credits

NECA • BICSI Summit | San Antonio, Texas
PANEL OF SPEAKERS

TOP EXPERIENCED PROFESSIONALS AND SUBJECT MATTER EXPERTS FROM THE FIELDS OF POWER OVER ETHERNET AND INTELLIGENT BUILDINGS

SPEAKER:
LUIS SUAU
Sinclair Digital

SPEAKER:
JOSEPH HERBST
PoE Texas

MODERATOR:
TYLER ANDREWS
PoE Texas
WHY POWER OVER ETHERNET

THERE'S NO SINGLE REASON WHY OWNERS CHOOSE PoE FOR INTELLIGENT BUILDINGS

WHY EXPERTS AND OWNERS ARE CHOOSING PoE AND INTELLIGENT BUILDINGS

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Why PoE for Building Automation?

- 60% less Copper
- 100% less steel (no conduit)
- 30% lower Capex
- 30% lower operating cost (no AC to DC conversion)
- 100% more resilient to Change requests

PoE unifies M-E-P but.....it disrupts the classic model

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Top Reasons
You May Not Expect

Safer – Class 2 Power
Globally Accepted (Hospitality/Enterprise)
Software Based
IP facilitates integration

Courtesy of the Sinclair Marriott
About Me

Luis Suau

Background Summary: 40 Years of IT Expertise, 26 Year Cisco veteran who played a key role in the research, development, and commercialization of the Cisco Digital Building Solution (2011-2020). Resides in Fort Lauderdale, FL
Energy Efficiency drives Digital Infrastructure

- **POE**
  - Low Voltage Power
  - Facilitates adds, moves, changes
  - IP data driven

- **USB-C**
  - Low Voltage Power
  - Facilitates adds, moves, changes
  - Can facilitate data connectivity

- **Fault Managed Power**
  - Class 4 power
  - High Voltage, Pulsed DC
  - Safety Driven

802.3bt New

Std 3.2 Newer

NEC Article 726 Pending
Existing IP/POE Digital Building Endpoints:
A Growing List of POE Products and Manufacturers
POE Code Considerations

NFPA 70 – A Few Important Articles for PoE Lighting Systems

- 410 – Luminaires, Lampholders, and Lamps
- 411 – Low-Voltage Lighting
- 700 – Emergency Systems (see especially Part V. Control - Emergency Lighting Circuits, for light fixture controls and listing requirements)
- 725 – Part III. Class 2 and Class 3 Circuits
  - 725.121 for power sources
  - 725.144 for cables used for transmission of power and data, and Table 725.144 for ampacity of 4-pair twisted-pair cables
- 725 – Part IV. Listing Requirements
Article 700 - Emergency Systems

Emergency Lighting

POE Emergency Lighting has generally approved on case-by-case basis

Code Elements:

- Power Source
- Power Distribution (Cabling and associated elements)
- Driver (node/gateway/endpoint)
  700.2 Emergency Luminaire, Directly Controlled → ANSI/UL-924

POE Options:

1) Uncontrolled Emergency Lighting (lights always on, no control)
   Requires switch power from UL-924 Listed UPS

2) Controlled Emergency Lighting (UL-924 LED Driver)

3) Unit based battery pack on UL-924 light
   Dependent on POE Lighting partner. The network switch is passive just like an electrical junction box.

4) Hybrid POE – Line Voltage Approach
POE is a Class 2 Circuit:

POE Benefits:
- Circuit (port) is de-energized until the source detects a proper load
- Removes power on overcurrent fault or load removal
- Is efficient:
  - Only provides the power requested
  - Protects from faults by policing power supplied relative to what the device asked for

- 725.121(A)(3): The POE switch, as Power Source Equipment (PSE) must be listed
- 725.121(C): Required Marking
- NEC 725.144(A) requires Class 2 and Class 3 cables used to transmit power and data to comply with Table 725.144 to determine code-compliant ampacities for each conductor in an installation.
- NEC 725.144(B) permits the use of Class 2-LP or Class 3-LP cables to supply power to equipment at current levels up to the marked ampere limit located immediately following the -LP suffix.
Centralized vs Distributed Network

- More Cabling Required
- Must meet NEC 725.144 cable bundling requirements
- Controlled Access in IDF
- Greater IDF Cooling Requirements
- Power needed in IDF

- Less Cabling, patch cables to endpoints
- Allows for ring and daisy chain topologies
- Ceiling may be less secure, service requires ladder
- Less Cooling in IDF, lower cost switches
- Distributed Power required in ceiling
Marriott Sinclair Hotel Use Case, Ft. Worth, TX

The Sinclair Hotel Implementation:
Sinclair inspired and featured these products for the first time allowing for the first (low voltage) digital building DC Microgrid:

- Lithium Ion ESS (Life Safety Approved)
- Full Building Fault Managed Power (VoltServer Digital Electricity) Deployment for POE Switches
- Extensive use of POE for Digital Building Applications

POE Details:

- 350 Cisco 60W UPOE switches in distributed topology
- 150 POE Smart Mirrors
- 165 POE Minibars
- 1200+ Somfy Motors
- 1100+ POE Lighting Drivers
- 30 Cameras
- 180 Meraki AP’s
- 165 GPON ONT’s
- 8 POE Door Locks

Other Details:

- 110,000 Sq Ft
- 300 Tons of LG VRF HVAC
- Average Monthly Power Bill ~$7K
Marriott Sinclair Hotel, Ft. Worth, TX

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Marcel Hotel Use Case, New Haven, CT

First Net-Zero Hotel in the USA
- Passive House design
- Dual 500 KWHr Energy Storage Systems
- Solid State Transfer switch

Sinclair Digital Implemented:
Sinclair Hotel inspired digital building DC Microgrid:
- Lithium Ion ESS (Life Safety Approved)
- Fault Managed Power (Digital Electricity) for Lighting POE Systems
- POE for Lighting, Window Treatments, HVAC Integration
- Integration of HVAC controls in touchscreens

POE Details:
- 48 Transition SM24TBT2DPA 24 port 802.3bt 60/90W port switches (Lighting & Shading)
- 800+ PowerShade POE Shade Motors
- 800+ POE Lighting Drivers
- 50+ Cameras
- 180 Meraki AP’s
- 180 VoIP Phones
### IP/POE Digital Building Projects (as of 2020)

<table>
<thead>
<tr>
<th>Customer</th>
<th>Location</th>
<th>Size</th>
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<tbody>
<tr>
<td>Georgia Pacific Headquarters (22 Floors)</td>
<td>Atlanta, GA</td>
<td>750,000 Sq Ft</td>
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<tr>
<td>Austin Airport</td>
<td>Austin, TX</td>
<td>30,000 Sq Ft</td>
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<td>HP Data Center</td>
<td>Alpharetta, GA</td>
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<td>HP Data Center</td>
<td>Swaunee, GA</td>
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<td>HP DC &amp; Campus Offices</td>
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<td>FlyRight Headquarters</td>
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<td>Mindshift DC</td>
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<td>Intel Headquarters (10 Floors)</td>
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<td>GR8 Hotel Chain: 4 hotels</td>
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<td>Alliander</td>
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<td>Emera - NSPI (Nova Scotia Power Inc)</td>
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<td>Dymnq</td>
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<td>Bush Brothers Corporate headquarters:</td>
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Expect more pervasive use of Digital Building infrastructure and tenant systems in the future!
THANK YOU
ABOUT ME

Executive Entrepreneur with High Tech background with strong customer focus, Joe has worked extensively in networking, lighting, & consumer markets holding 16 patents. His passion is solving problems for customers.

Joe has successfully founded 4 companies and now brings his expertise to PoE Texas

Joseph Herbst MSEE, MBA
Chief Technical Officer
PoE Texas

PoE Texas
PoE connects initiatives toward better living

- Daylighting
- Thermal Zoning
- Circadian Lighting
- Dynamic Solar Shading
- Daylight Harvesting

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Real World Examples
Continental Gin - TX
Historic Building
Controllers, drivers live in Cable Tray
Every fixture individually controllable
Lighting costs < $30/day for 50kft²
The Hanger - UT

Hanger Retrofit
Dynamic CCT High Bays
Wireless temp/RH/light sensors
1776 By David Burk
High End Restaurant
RGBW, ambiance control
AWG 18-5 wiring to lights
Designing a Conference Room
Type A – dimmable luminaire
Type B – downlight
Type C – CCT Tunable Up/Down Linear
Type D – RGBW Cove Light
Pitfalls to avoid
Examples of good documentation
Example of BAD documentation

1.3 Led strip x2
1.4 hallway 1'2
1.5 pizza track
1.6 pizza pendant
1.7 bar track - TRACK

2.2 Big round
2.3 Big round
2.4 4 lights
2.5 pendant x3, bar, bays
2.6 west lights
2.7 3.2 bathroom hallway

3.1 wall sconce
3.4 ballroom bar back $10
3.5 wall sconce
3.6 bar track
3.7 ballroom bar led

5.1 outside
5.2 track
5.6 lagled star lights
5.7 entrance track

extra $3.75
Three high ROI tools for Installation Process

Label EVERY fixture (and make sure it stays on)

Finding and climbing ladders takes time & $$

Maximize the number of these < 1% failure rate

USE PoE Tester on these!
CONTACT US

YOU CAN FIND ALL THE TRAINING AND RESOURCES ON YOUR FAVORITE SOCIAL CHANNELS

Connect With Us

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