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

2020 BICSI FALL Conference & Exhibition

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PANEL OF SPEAKERS

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

MODERATOR:
TYLER ANDREWS
PoE Texas

SPEAKER:
HANNAH WALKER
Sinclair Digital LLC

SPEAKER:
LARRY JONES
Baird, Hampton & Brown

SPEAKER:
DONALD WALKER
Newcomb & Boyd

SPEAKER:
LUIS SUAU
Luis Suau Consulting

SPEAKER:
JOSEPH HERBST
PoE Texas

SPEAKER:
ANDY RITTENHOUSE
Somfy Systems

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01 **Panel Discussion**
The PoE Intelligent Building Value Proposition

02 **Definition of Scope**
What is an Intelligent Building and What Is Achievable

03 **Roles and Responsibilities**
The New Roles of the Intelligent Building Designer

04 **Project Timeline**
Key Activities for Intelligent Building Project Success

05 **Network Architecture Models**
What Network Architecture Fits The Building Scope

06 **Operations and Facility Management**
Managing an Intelligent Building for Operations

07 **Sustainability and Wellness Standards**
Strategies for leveraging PoE Automation

YOUR VOICE MATTERS

COMMENT
Comment and ask questions during the presentation

OPINION POLL
Take the poll at the end of the session and we'll share the results with you

REACH OUT
Reach us at our social channels as we build a discussion where you contribute

SHARE
You build your credibility sharing this content with your partners and clients

WE WANT TO GET YOUR INPUT AND FEEDBACK TO HELP US ANSWER YOUR QUESTIONS AND IMPROVE OUR MESSAGE

VALUE PROPOSITION

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

WHY EXPERTS AND OWNERS ARE CHOOSING PoE AND INTELLIGENT BUILDINGS

SECTION BREAK

Courtesy of the Sinclair Marriott

ABOUT ME

Donny has over 20 years of engineering, project management, and partner-in-charge responsibilities in communications, security and integrated building automation systems. His experience includes aviation facilities, healthcare buildings, judicial facilities, advanced technology developments, military installations, data centers, mixed-use developments, performing arts facilities and college campuses.

Donny Walker, PE, RCDD

Partner
Newcomb & Boyd

Newcomb & Boyd

Intelligent Buildings

get organized, get connected, get value

get organized	get connected	get value
• Discovery / Assessment • Planning • Programming	• Field Evaluation / Drawing Review • Stakeholder Coordination • Generate Designs • Procurement Assistance • Standards Development	• Performance Optimization • Operational Efficiency • Occupant Benefits

SMART BUILDINGS

Smart Building Business Drivers

It's important to identify early on what business factors are driving the smart building program. It can be one or more of the following priorities.

- **Energy and Resource efficiency**
- **Operational efficiency**
- **Building performance**
- **Cybersecurity**
- **Occupant Wellness + Productivity**
- **Attracting + Retaining Talent**
- **Attracting + Retaining Tenants**
- **Digital Transformation**

It's important to understand the underlying business drivers and tailor language and solutions accordingly.

Smart Building Business Drivers

Smart Building Business Drivers

Smart Building Business Drivers

Smart Building Business Drivers

Core Smart Building Elements

The business drivers are diverse and application solutions may be as well, but there are some commonalities between all or most smart building and smart portfolio projects

- **Connected systems**
- **More sensor data (in most cases)**
- **More sophisticated controls (in most cases)**
- **Intentional flexibility for evolution**
- **Greater emphasis on building and portfolio lifecycle**
- **More appreciation for the value of data**
- **Evolved ways of operating and maintaining**

These core elements form the baseline for most conversations

CONSULTING + DESIGN

Smart Building Team

There are at least three key members on successful smart building projects.

 **Internal Champion**	A member of the Owner's team who has a vision and the influence to shape budgets, processes and multi-lateral buy-in within the customer organization.
 **Strategy Consultant**	In some rare cases, end users have a well-defined smart building strategy in place, but most often, a consultant is required to help bring stakeholders together and establish a vision and methodology.
 **Design Consultant**	The project design team will need consultants and engineers who can advocate for smart building, lead decision-making and implement the strategy with construction documents; specifications, drawings, etc.

Design Consultants & Engineers

Q **Do we really need a Smart Building Team?**

A **Much the same way you look to a LEED consultant to walk you through the process, answer questions, facilitate specialized meetings and prepare unique documents, it pays to have a smart building consultant on the team.**

SMART PROJECT DELIVERY

Delivering Smart Projects: Services

- Budgetary estimates
- Technology overview presentations/briefs
  - IAQ
  - People Counting
  - PoE Lighting
- MSI scope of work (RFP or spec)
- Peer reviews for smart building readiness/compliance
- Division 25 commissioning activities
- Emerging technology review
- Smart building/technology troubleshooting & consulting
- Existing conditions discovery / smart building readiness evaluation
- Standards/masters development
- Smart building program management/owner rep
- Smart building project management
- Pilot project planning

Delivering Smart Projects: Deliverables

- Div 25 specifications
- OT Drawing – architecture diagrams
- OT Drawing – division of scope
- OT Drawing – IoT device locations
- OT Drawing – IoT device install
- OT Drawing – OT network
- Div 22 Recommendations (plumbing)
- Div 23 Recommendations (HVAC)
- Div 26 Recommendations (electrical power / lighting)
- Div 27 Recommendations (structured cabling / AV)
- Div 28 Recommendations (security & life safety)
- Div 14 Recommendations (elevator)
- Div 12/26 Recommendations (automated shades)

Smart Building Thought Leadership

SAMPLE PROGRAMMING AGENDA ITEMS

1. **Unified User Interface – Single Pane of Glass Operational Platform**
    - **Building automation system**
    - **Lighting control system**
    - **Energy and water metering**
    - **Fire alarm system – information only, no control**
    - **Elevator system – status only, no control**
    - **Major equipment status – chiller, generators, UPS**
2. **Fault detection and diagnostics – operational analytics**
3. **IoT devices – supplemental information for informed operations**
    - **Occupancy information**
    - **People counting**
    - **Device tracking**
    - **Indoor air quality sensors**

Smart Building Thought Leadership

SAMPLE WORKSHOP FACILITATION

1. **Security Workshop**
   - Mobile credentialing & app interface
   - Visitor management system
   - Parking availability
2. **Information Technology Workshop**
   - Cloud vs on-premises for smart building application
   - Wired vs wireless devices
   - Indoor positioning technology (WiFi, BLE Beacons)
3. **Occupant Engagement & Satisfaction Workshop**
   - Occupant mobile application
   - User interface to operational systems (lighting, HVAC)
   - Wayfinding
   - Space reservation
   - Meal ordering or status

Smart Building Thought Leadership

SAMPLE PROGRAMMING AGENDA ITEMS

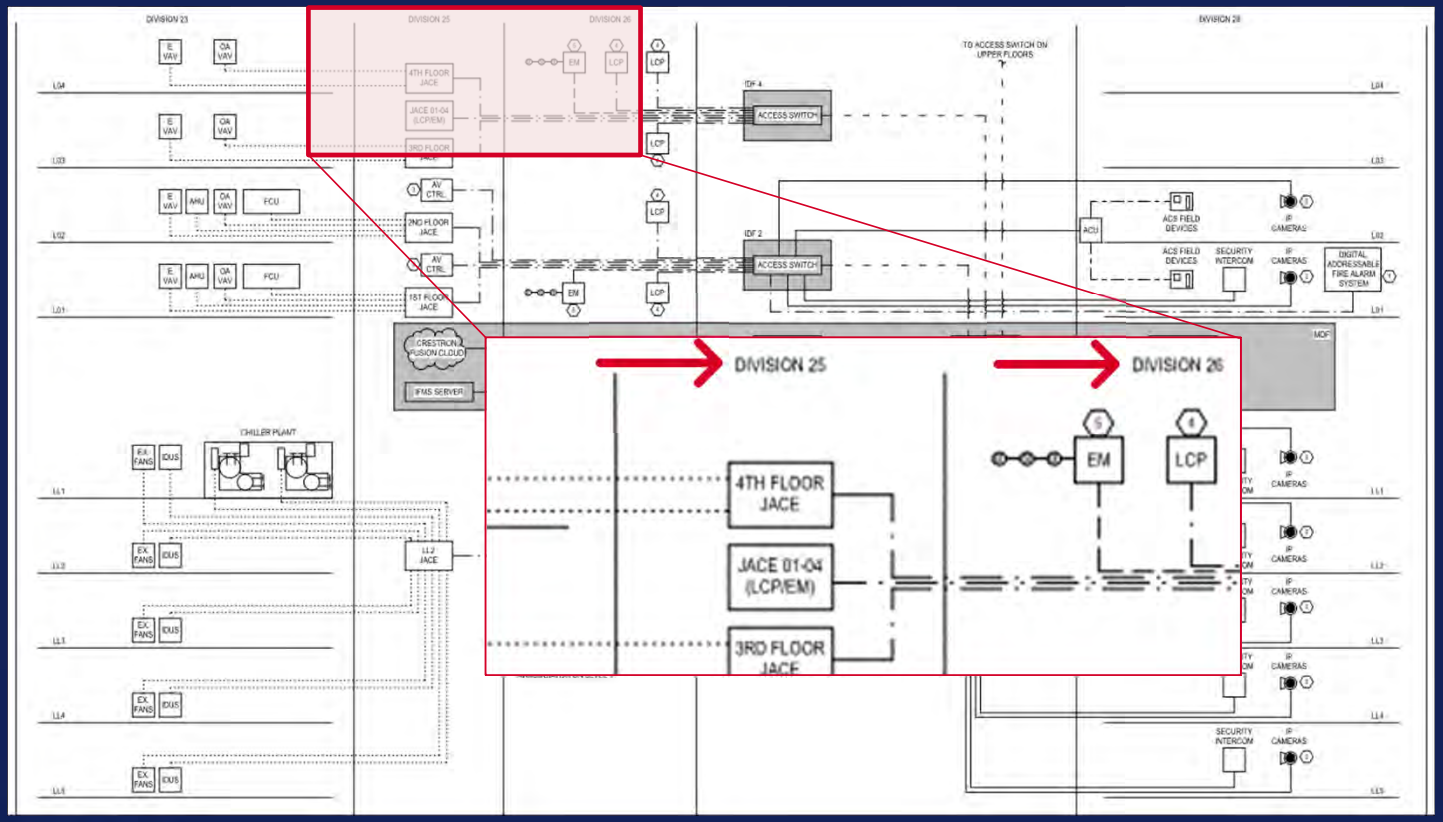
1. **Which features will be required in the Occupant Experience Application?**
2. **Should any additional features be listed as an alternative?**
3. **What level of granularity will be required for services?**
4. **Will occupants have “opt-in” for personalized services vs. anonymous usage of the App?**
5. **What other amenities should be included in the “near me” services or reservable?**
6. **Are there any other NS Applications that need to be integrated or accessible from the mobile App?**

Smart Building Thought Leadership

SAMPLE WORKSHOP DISCUSSION ITEMS

1. **Which systems will be considered for operational platforms?**
    - **Will an integration platform be provided on top or use a single manufacturer's system?**
    - **Will an MSI be needed?**
    - **Will a Smart Building Platform be the central data repository for all technology-related building systems?**
    - **Will analytics be applied to all systems or just FDD for HVAC?**
2. **What features are required for Lighting Control?**
    - **Occupancy sensors to cover each zone?**
    - **Additional BLE beacons for IPS?**
    - **People counting sensors in strategic areas or throughout?**
    - **Is individual control needed for any areas through the App?**
    - **Lighting control (shades, HVAC) controlled through AV interface in conference rooms?**
3. **Independent IAQ sensors or utilize sensors by BAS manufacturer?**

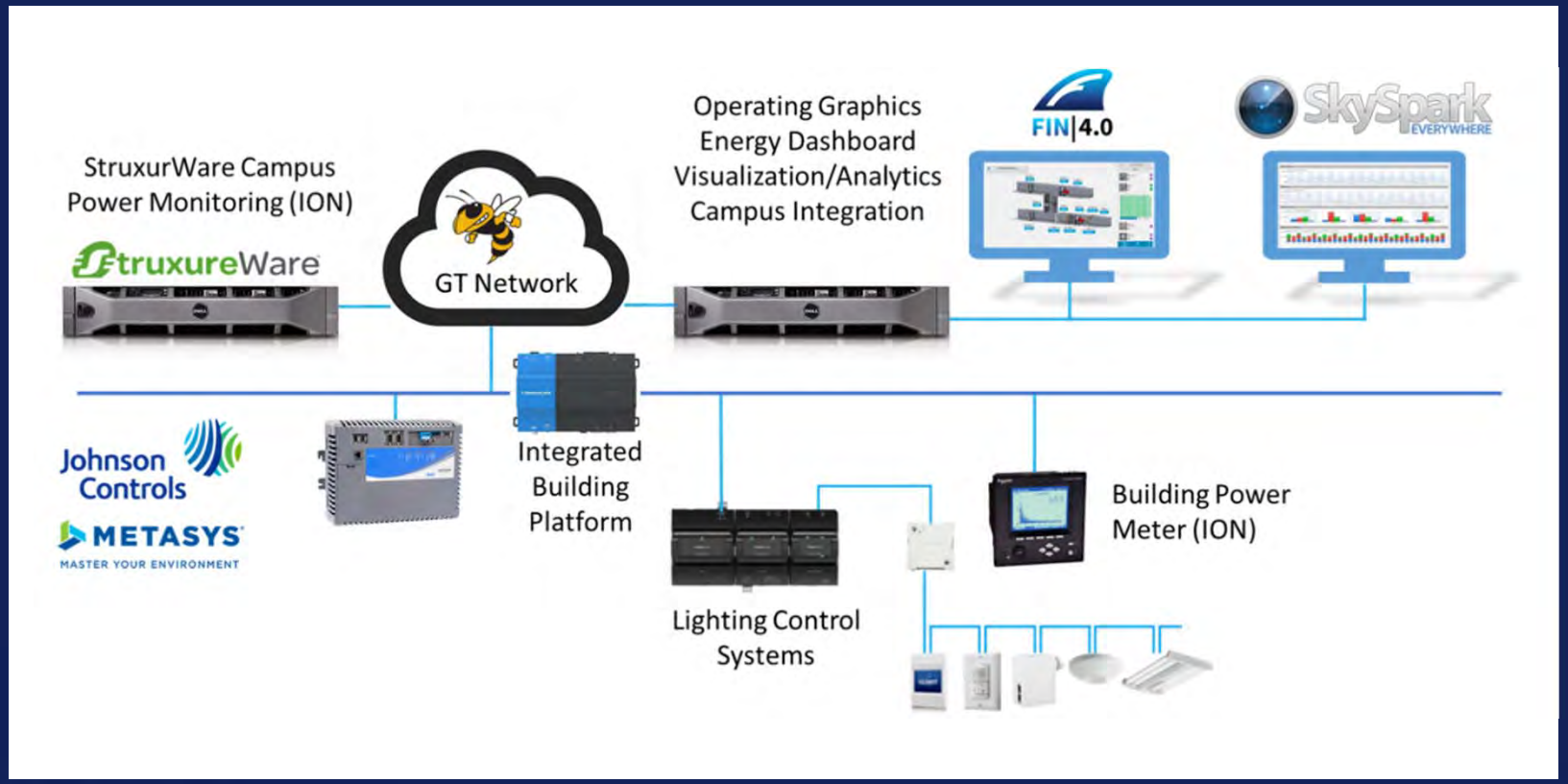
Identifying Division of Scope



BAS Open Protocol

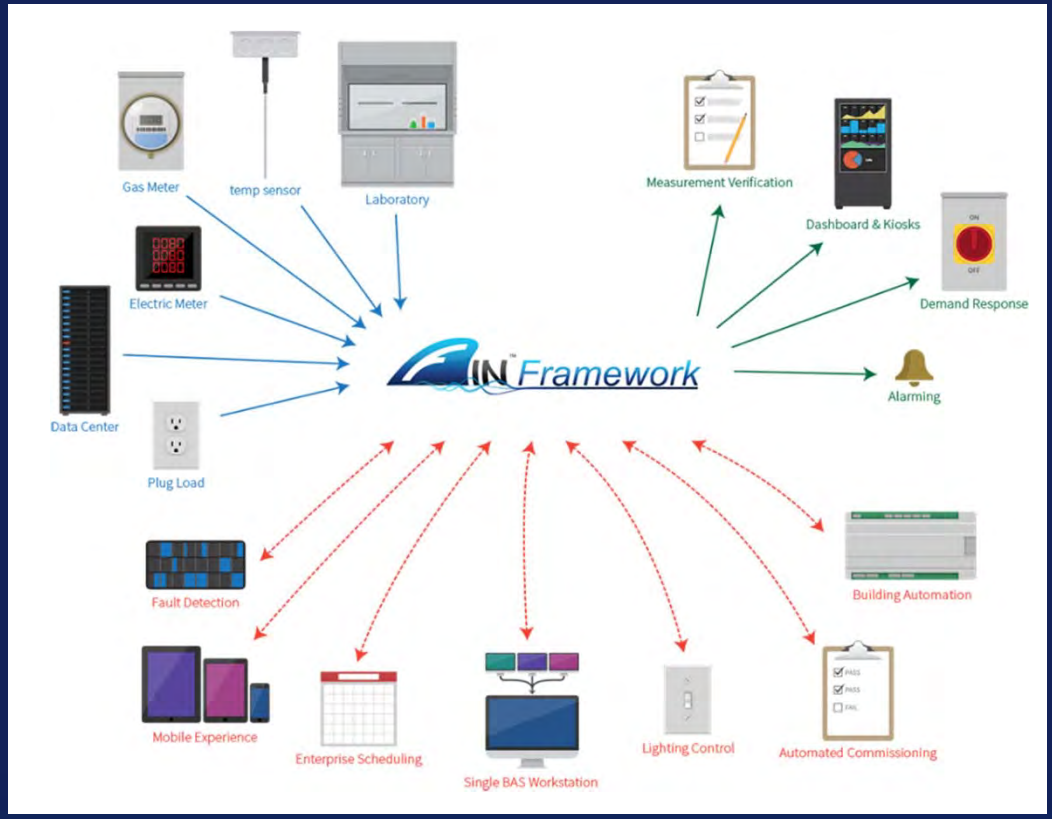
TECHNOLOGY HIGHLIGHTS

Integrated Systems



Integrated Systems

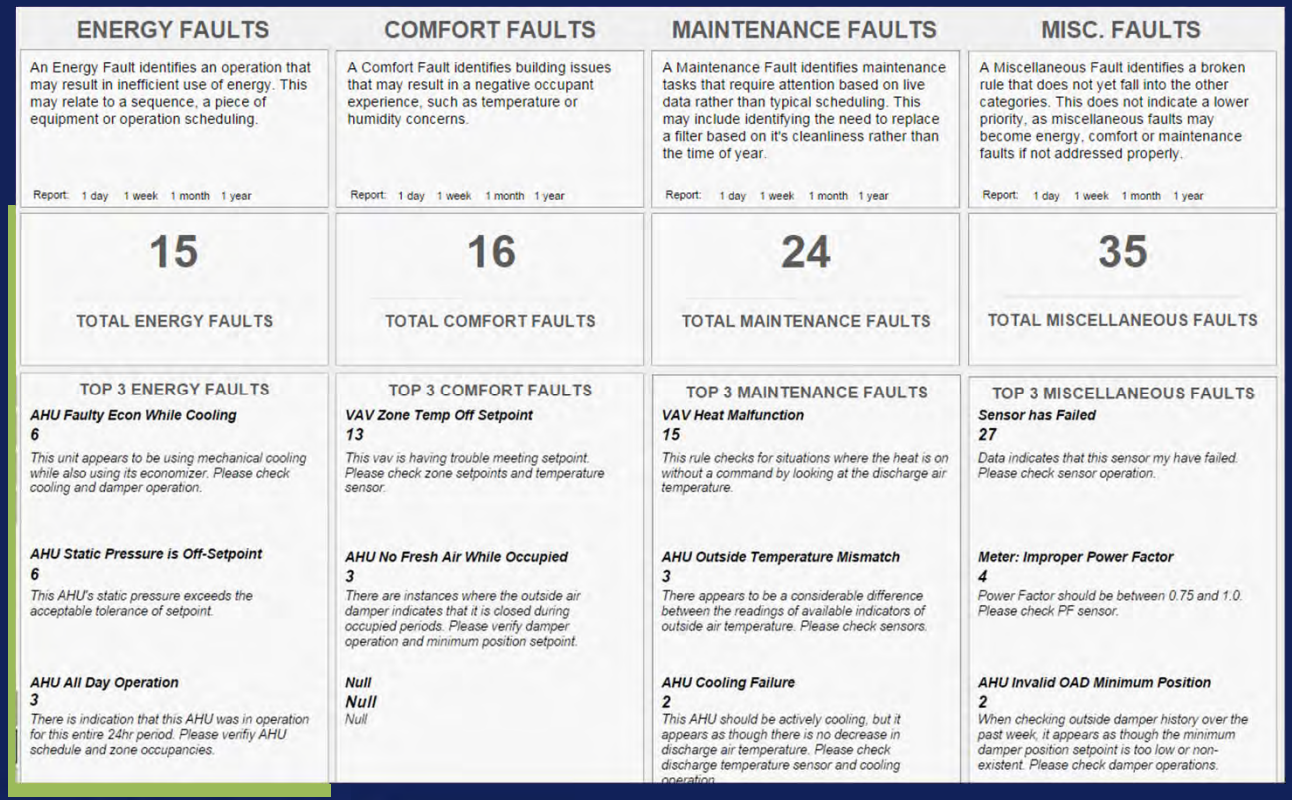
- Operations focused ecosystem



Haystack Tagging

- Normalized data via tagging
- Automating data visualization
- Automating analytics

Analytics



ENERGY FAULTS

An Energy Fault identifies an operation that may result in inefficient use of energy. This may relate to a sequence, a piece of equipment or operation scheduling.

Report: 1 day 1 week 1 month 1 year

15

TOTAL ENERGY FAULTS

TOP 3 ENERGY FAULTS

AHU Faulty Econ While Cooling
6
This unit appears to be using mechanical cooling while also using its economizer. Please check cooling and damper operation.

AHU Static Pressure is Off-Setpoint
6
This AHU's static pressure exceeds the acceptable tolerance of setpoint.

AHU All Day Operation
3
There is indication that this AHU was in operation for this entire 24hr period. Please verifiy AHU schedule and zone occupancies.

COMFORT FAULTS

A Comfort Fault identifies building issues that may result in a negative occupant experience, such as temperature or humidity concerns.

Report: 1 day 1 week 1 month 1 year

16

TOTAL COMFORT FAULTS

TOP 3 COMFORT FAULTS

VAV Zone Temp Off Setpoint
13
This vav is having trouble meeting setpoint. Please check zone setpoints and temperature sensor.

AHU No Fresh Air While Occupied
3
There are instances where the outside air damper indicates that it is closed during occupied periods. Please verify damper operation and minimum position setpoint.

Null
Null
Null

MAINTENANCE FAULTS

A Maintenance Fault identifies maintenance tasks that require attention based on live data rather than typical scheduling. This may include identifying the need to replace a filter based on it's cleanliness rather than the time of year.

Report: 1 day 1 week 1 month 1 year

24

TOTAL MAINTENANCE FAULTS

TOP 3 MAINTENANCE FAULTS

VAV Heat Malfunction
15
This rule checks for situations where the heat is on without a command by looking at the discharge air temperature.

AHU Outside Temperature Mismatch
3
There appears to be a considerable difference between the readings of available indicators of outside air temperature. Please check sensors.

AHU Cooling Failure
2
This AHU should be actively cooling, but it appears as though there is no decrease in discharge air temperature. Please check discharge temperature sensor and cooling operation.

MISC. FAULTS

A Miscellaneous Fault identifies a broken rule that does not yet fall into the other categories. This does not indicate a lower priority, as miscellaneous faults may become energy, comfort or maintenance faults if not addressed properly.

Report: 1 day 1 week 1 month 1 year

35

TOTAL MISCELLANEOUS FAULTS

TOP 3 MISCELLANEOUS FAULTS

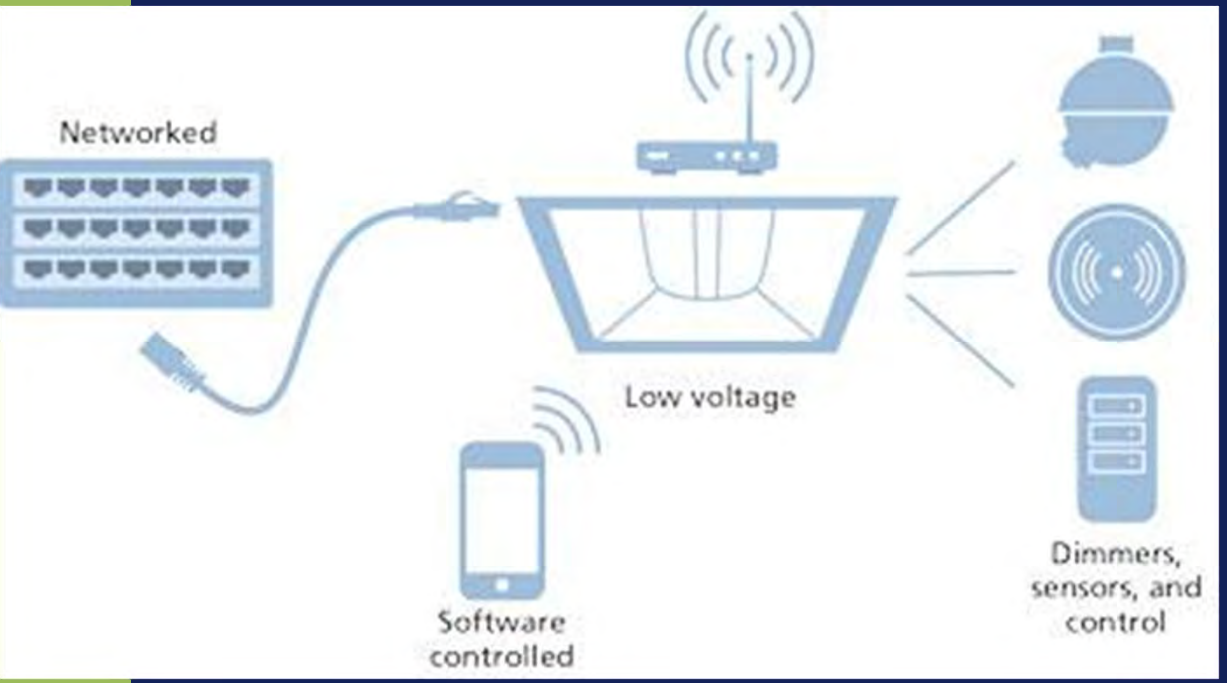
Sensor has Failed
27
Data indicates that this sensor my have failed. Please check sensor operation.

Meter: Improper Power Factor
4
Power Factor should be between 0.75 and 1.0. Please check PF sensor.

AHU Invalid OAD Minimum Position
2
When checking outside damper history over the past week, it appears as though the minimum damper position setpoint is too low or non-existent. Please check damper operations.

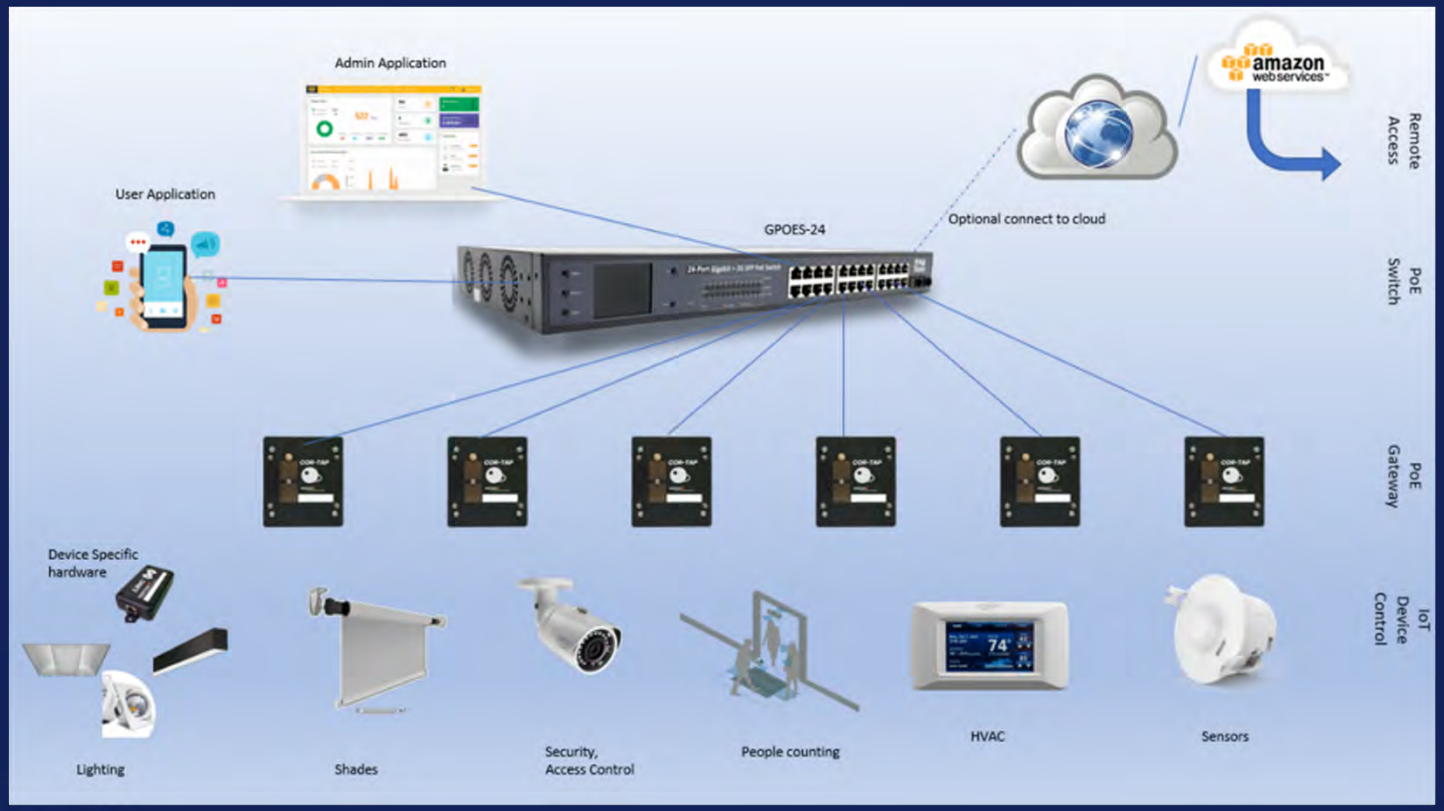
SkySpark by SkyFoundry

POE Lighting



- LED lighting fixtures powered and controlled over the network
- Single cable for both power and control

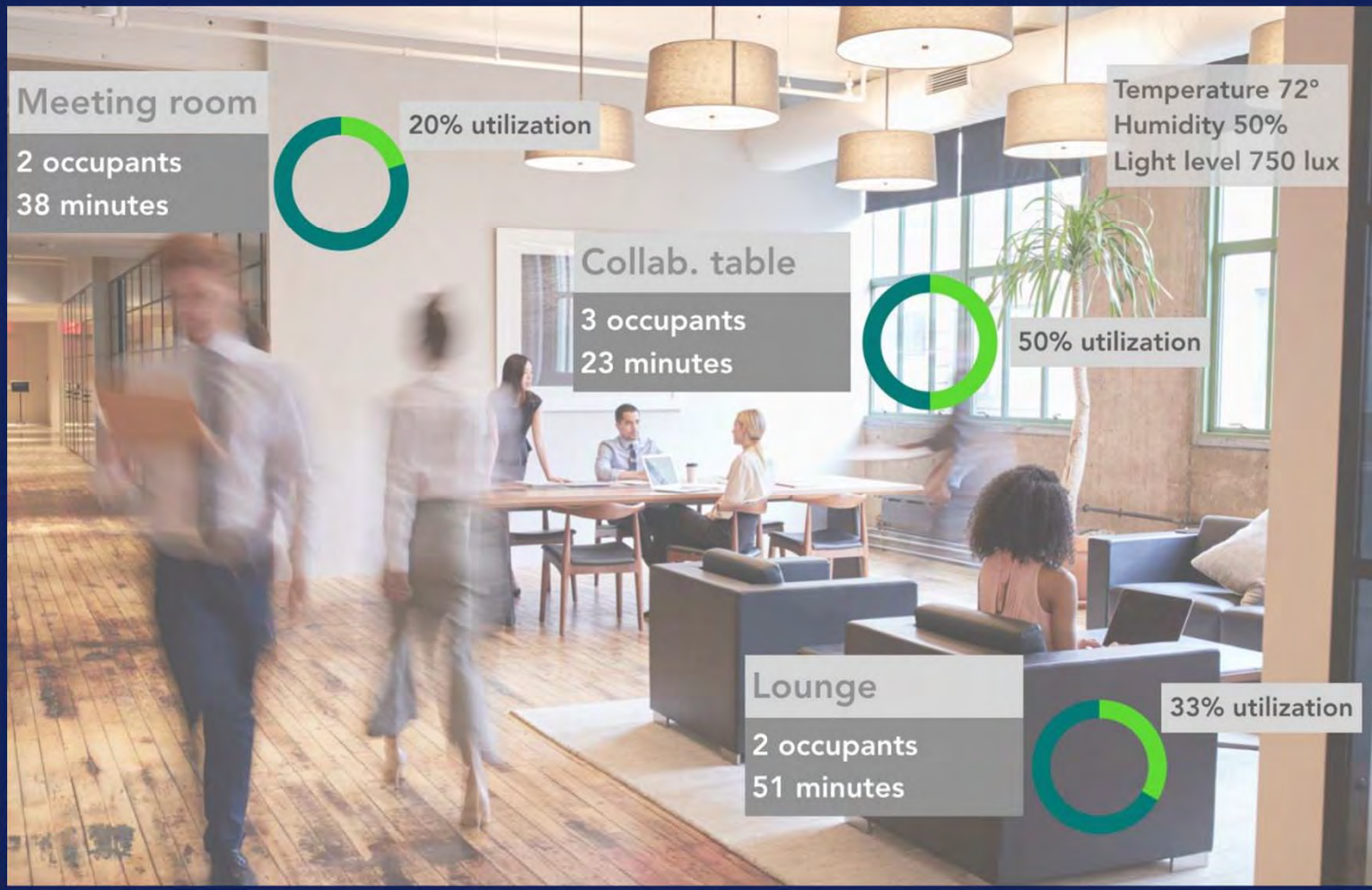
POE Lighting: TODAY



BAS IP Enabled

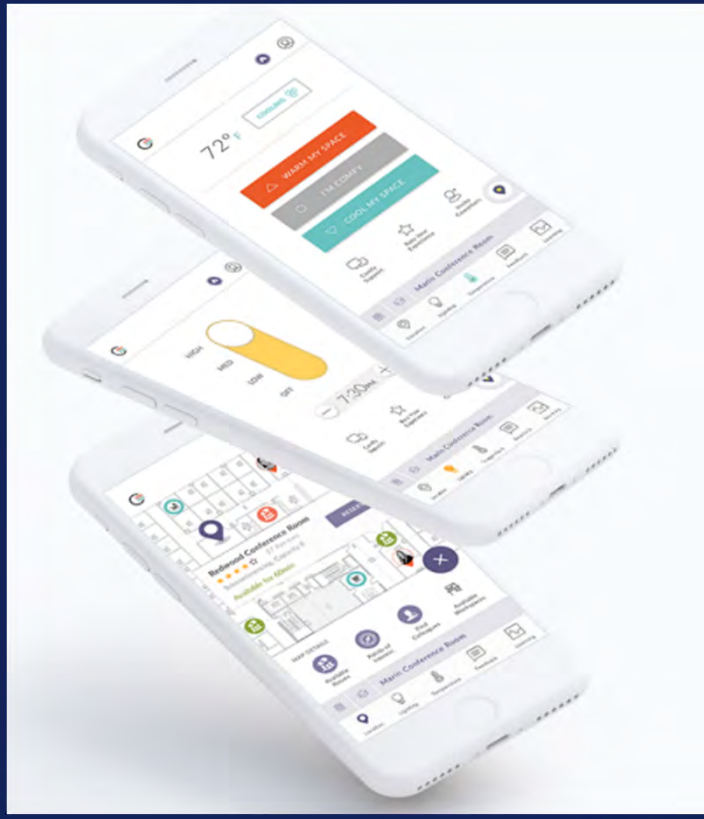
- Network connected vs network centric
- Data throughput
- Dual port switch vs POE powered

Space Utilization



Occupant Experience Mobile App

- Room reservations
- Wayfinding
- Occupant feedback
- Near-me services
- Personal temperature controls
- Lighting controls
- Food ordering (Food Vendor Integration)
- Parking availability (Parking Management Integration)



Lighting / HVAC Integration

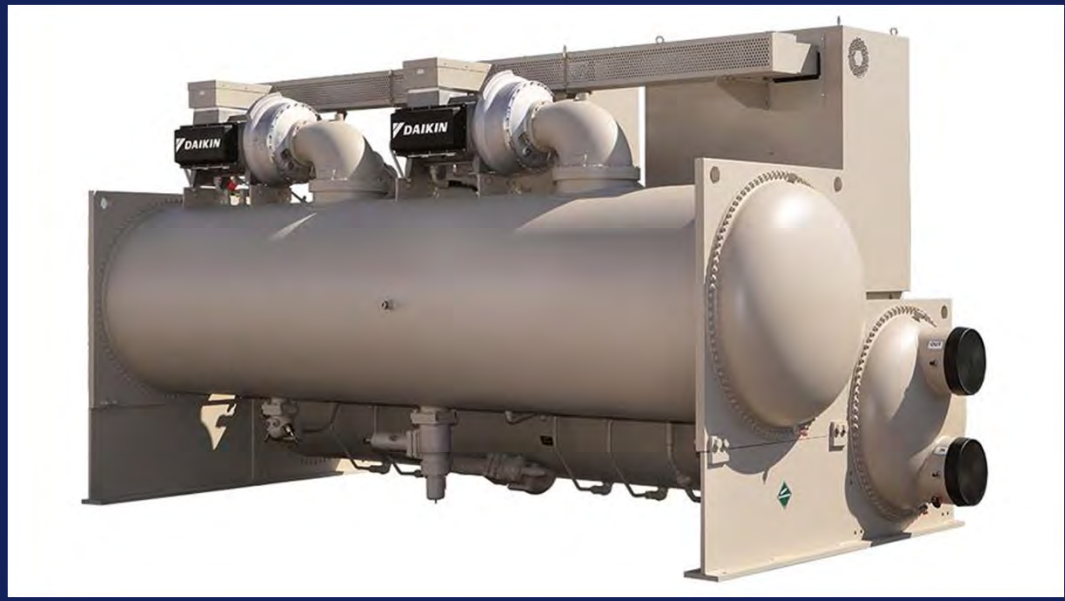
- Single sensor / multifunction
- AV equipment
- Lighting
- HVAC setbacks

Optimized System – Floor Level

- Controlling lights and plug loads
- Overcooling empty spaces
- Overcooling and reheating
- Over-pressurized systems
- Reduce fan speeds
- Reduce pump speeds

Optimized System – Building Level

- Understanding needs for the connected loads
- Optimizing chiller/boiler efficiency



IAQ Sensors

- Temperature
- Humidity
- CO2
- TVOCs
- Fine dust (PM2.5)
- Ambient light level
- Ambient noise level
- RESET Certified

Converged Cabling

- Single installation contractor
- Uniform cable management
- IP-based systems or technology over twisted pair
- Network, Wi-Fi, Security, AV

Converged Network

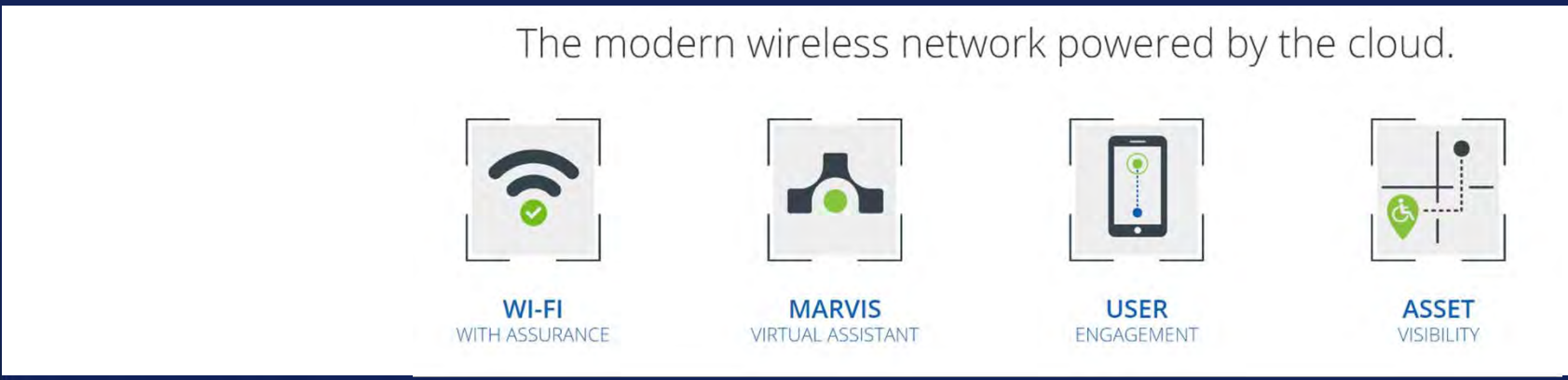
- Enterprise LAN
- Security LAN
- Facilities LAN
- IoT LAN
- Converged LAN with VLANs Firewalled
- Maintain security and manage remote access

Wireless Primary vs. Wireless Only

- Wireless users / wired devices
- Flexibility
- Single wire design
- Location services enabled
- Integrated Bluetooth Beacons

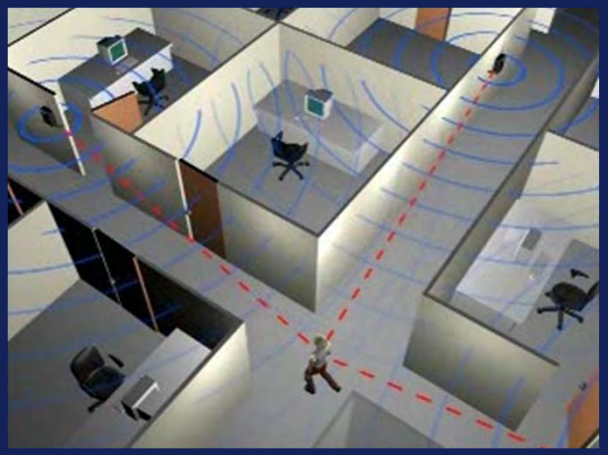
Indoor Positioning Systems

- **Wi-Fi with IPS**
- **Bluetooth beacons**
- **Integrated lighting control/fixtures**



Positioning: BLE vs WPS

- Bluetooth low energy requires beacons, often battery powered
- Wi-Fi positioning is software only – leverages existing system
- Can be used automatically



Positioning: Privacy

- Bluetooth requires opt-in
- Wi-Fi does not require opt-in
- Both enable users to choose how much data is gathered

Modern Office Space

System Control from Mobile Device

- Control AV, lighting, and HVAC
- Based on your credentials and location in the building

Space and Technology Reservation

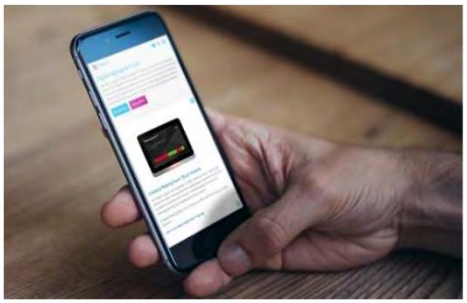
- Find peers
- Find technology

Reservations

- Central platform for reserving meeting spaces and hotdesks
- Native integration with common calendar systems, like Office 365
- Unify the experience

Device Agnostic Reservations

- Multi-platform reservations that support any workflow
- Use kiosk, scheduling panel, desktop, or mobile device



KEYS TO SUCCESS

Keys to Success

- Starting with strategy
- Alignment with GC and Procurement strategies
- Early budget setting
- Champion on the Client side
- Choosing an Integrator MSI
- Solve business challenges

There are many lessons learned and process improvements that a Smart Building Consultant and design team can offer.

Keys to Success: Strategy First

Smart Building and Portfolio projects often struggle without a strategic plan to serve as mandate. Without one, a project can suffer the following:

- **Ideas without action**
- **Lack of coordination**
- **Elements “VE’d” out easily**
- **No way to tell if a proposed system is ‘worth it’**
- **No way to define success**

Keys to Success: Procurement

Procurement strategy is a key area where smart building projects benefit from experienced professionals

- Contracting structure
- Scope guidance & gap analysis
- Direct-to-owner scope development

Budget strategy is equally critical

- Early project budget setting
- CapEX vs OpEX decisions
- Estimates for emerging technology not covered by most estimators

BUILDINGS vs PORTFOLIOS

Buildings vs Portfolios

Think big! Projects pursued at an enterprise or institution at the highest levels can be easier to find success. Portfolio-level projects offer:

1. **Have access to different, and often larger, funding vehicles**
2. **Decisions are made at higher levels, providing project mandates that are hard to "value engineer" out of projects**
3. **Bigger customer impacts**
4. **Greater scalability**

SECTION BREAK

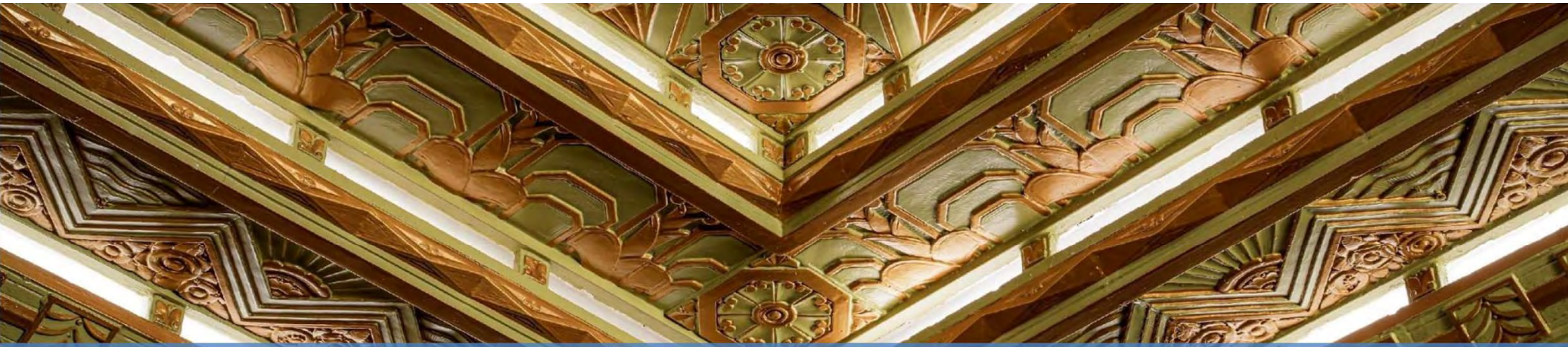
Courtesy of the Sinclair Marriott

ABOUT ME

Background in architecture, began working in Digital Buildings on the ownership and innovation side 3 years ago on the Sinclair Hotel team. Developed 2 successful PoE and Digital buildings featuring a luxury hotel, CVS, data center, and upscale office as an owner, and are now branching out to offer our services to other developers.

Hannah Walker, RCDD, CCNA

VP Sinclair Digital LLC



THINGS ARE CHANGING

As Low Voltage systems become more prevalent, and traditional High Voltage systems begin to phase out all areas of a project from Design to Operation are shifting. It's important to understand which roles are changing, and where the responsibility for different areas of the project will now fall. At the end of the day, every single member of the project is critical to a successful completion, and need to work together instead of against each other.

WHO IS THE CUSTOMER REALLY?

Questions to consider

- Who is the project champion?
- Whose Budget is affected?
- Who may be losing control?
- Who is risk averse?
- Who is leading innovation?

Politics make strange bedfellows

Electrical Engineer

Consults on Compliance with Electrical Codes

Low Voltage Designer

Expanded Drawing Scope and Code Compliance

Lighting Designer

PoE Light fixture specifications and selection responsibilities

Installers

Shared responsibility between electrician and low voltage installers based on jurisdiction

KEY PLAYERS

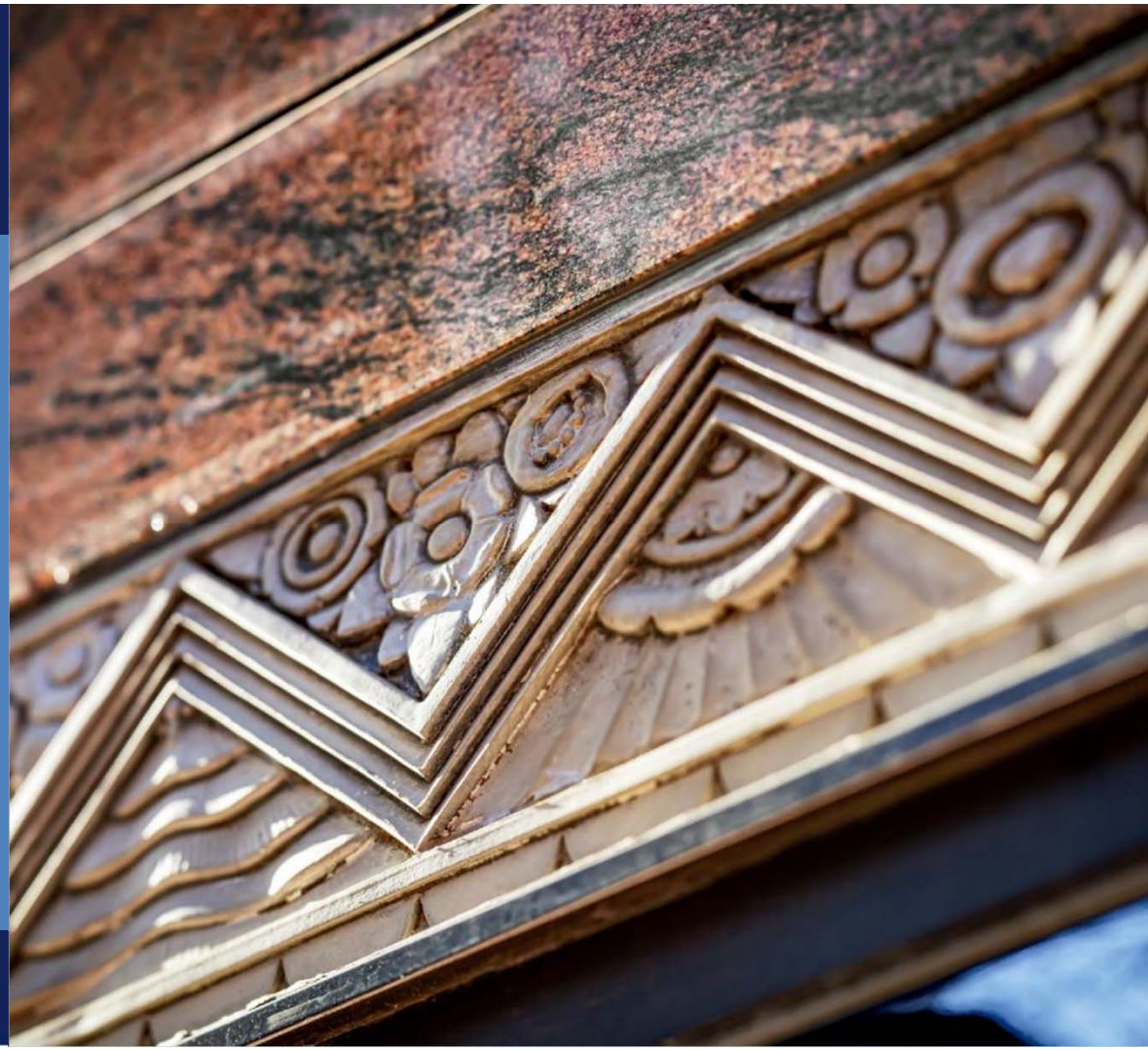
There are many people who will be affected by this transition, but these are the four groups who will be affected the most, and will need to be knowledgeable about their change in scope and responsibilities.

01 ***Pre Design***

02 **Design**

03 **Construction**

04 **Operations**



PRE DESIGN: *CODE COMPLIANCE*

Code Compliance

- International Building Code
- International Fire Code
- International Energy Conservation Code or ASHRAE 90.1 if applicable
- National Electrical Code
- NFPA 101,110,111 as applicable
- ASME Elevator Code
- Life Safety Code

IT Equipment

VS

Life Safety Systems

When making the jump to a “Smart Building” it’s essential for the **Electrical Engineer**, **Low Voltage Designer,** and **Architect** to address any and all code compliance issues. Especially in areas relating to life safety systems such as exit lighting, egress lighting, and required emergency lighting.

PRE DESIGN: *AHJ EDUCATION*

Code Compliance

Site Visits

AHJ EDUCATION

Before approaching an AHJ you have to already have done a thorough Code Compliance review and be able to verify that you are still meeting all of the required codes. You should also bring in the AHJ early in the project to provide comfort about this new technology and address directly any concerns that might come up later. This should be handled between the **Electrical Engineer**, **Low Voltage Designer**, and the **Architect**.

PRE DESIGN: *DESIGN RULES*

Design Rules

- Specify Constant current or constant voltage requirements
- Compatibility with selected Lighting Driver Company
- Address Network Design
- Compatibility with controls and sensor options
- Wattage limitations from power distribution

TO BE USED BY:

Lighting Designer

Electrical Engineer

Lighting Procurement

Once a scope has been established for the project, it will be up the Low Voltage Designer to set design rules for all equipment being specified by others such as lighting. **This must occur before design phase begins**. The design rules will consist of criteria to be met in the different areas to ensure a successful completion. It must keep in mind the total scope and the required coordination between chosen vendors.

01 Pre Design

02 *Design*

03 Construction

04 Operations

DESIGN: *DRAWING RESPONSIBILITIES*

Once the drawing phase begins, the Lighting Designer will begin to lay out the fixtures based on the design rules produced by the low voltage designer. Throughout the rest of the drawing phase there should be constant communication between the team as revisions and new requirements become known.

 **Lighting Designer**	 **Electrical Engineer**	 **Low Voltage Designer**
• Establish lighting levels required • Design lighting layout in coordination with architect • Identify which fixtures need to be on emergency power • Select preliminary light fixtures	• Place emergency lighting on drawings for permit • Coordinate with LV designer to ensure all distribution systems have adequate power • Coordinate with LV designer to supply required conduit	• Place distribution systems in drawings • Produce wiring/connection drawings for all LV systems • Ensure all systems are compatible for communication and collaboration

LV DESIGN: *THINGS TO CONSIDER*

Budget Limitations

Understand how the budget is going to affect what you can implement, and how you can get the end result with the right products

Network Design

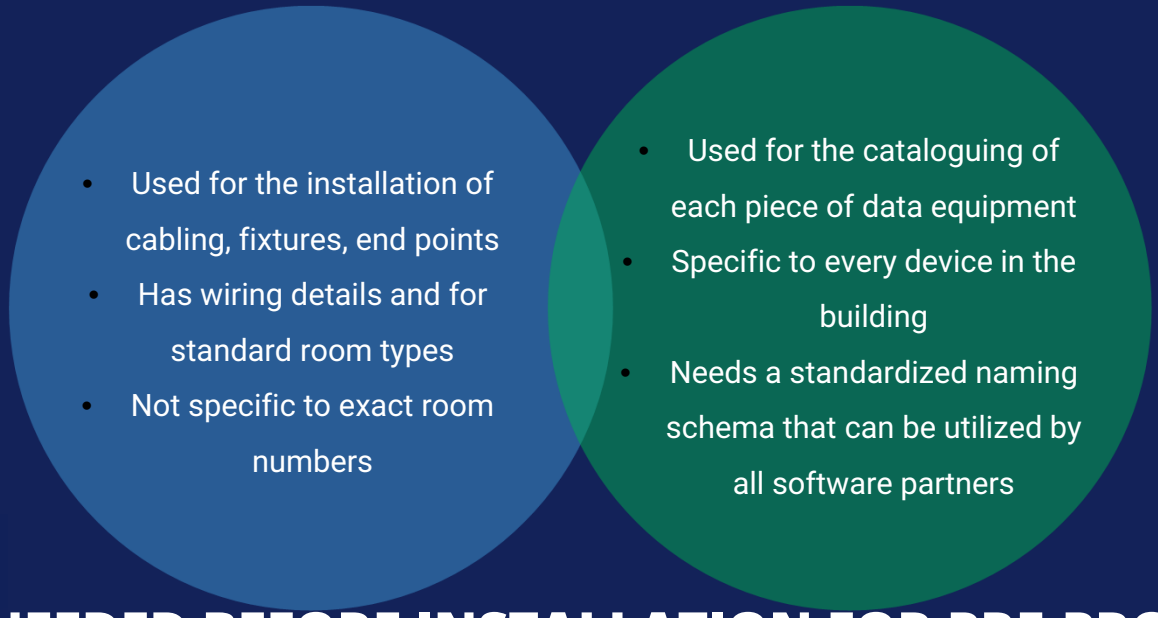
Understand what network design you recommend. There are pros and cons to both centralized and decentralized, and can result in a dramatic cost difference

Recurring Cost

Many Smart Devices are going to have recurring software or support costs. This can not be left out of the budget/design process.

LV DESIGN: *INSTALLATION DRAWINGS VS OPERATIONAL DOCUMENTATION*

Installation VS Operational



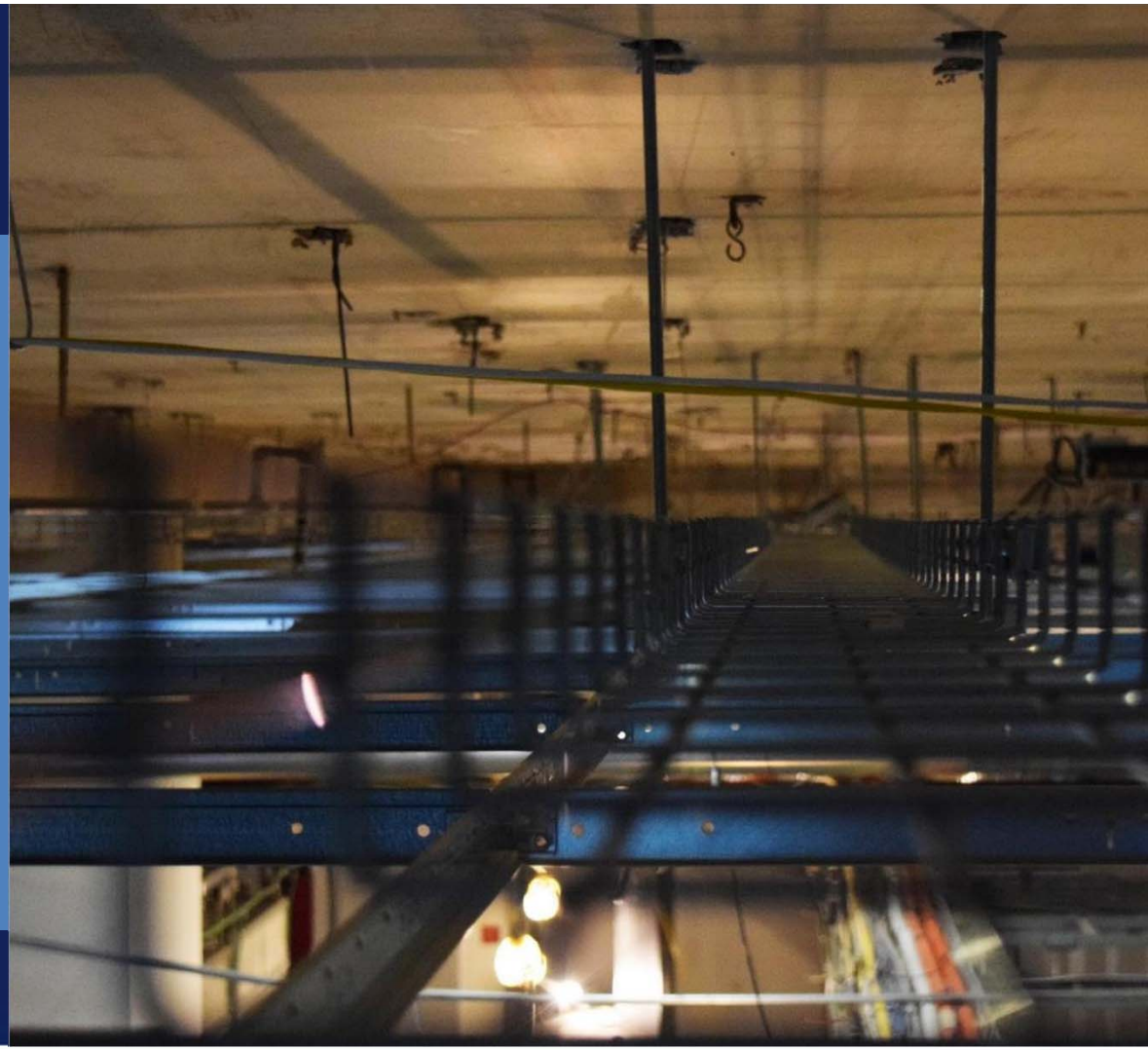
BOTH NEEDED BEFORE INSTALLATION FOR PRE-PROGRAMMING

01 Pre Design

02 Design

03 *Construction*

04 Operations



CRITICAL ROLES OF THE BUILDING PROCESS

Facilities Management

General Contractor & Project Manager

MEP's

Low Voltage & Structured Cable Contractor

Electricians

IT Consultant & Systems Integrator

Architect

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CONSTRUCTION: *INSTALLATION*

- Hard Metal Conduit for pathways
- High Voltage Devices and Wiring
- High voltage power to LV distribution systems
- Battery Backup System installation

ELECTRICIANS

Reduction/Shift of Scope

LOW VOLTAGE INSTALLER

Increase of Scope

- Lighting Wiring
- Light Fixture Installation
- Flex Conduit Installation
- All typical LV equipment and wiring

CONSTRUCTION SEQUENCING

01 ***Framing***
Framing Contractor

02 ***Flex Conduit Installation***
Low Voltage

03 ***Back Boxes/Cut In Rings***
Electrical

04 ***MEP Rough In***
Electrical/mechanical

HAPPENING AT THE SAME TIME

05 ***Low Voltage Wiring***
Low Voltage

06 ***Switching Installation***
Low Voltage

07 ***Drywall***
Drywall Contractor

08 ***Paint***
Painters

ARCHITECTURAL VS DECORATIVE

09 ***Trim Out/Light Install***
Low Voltage

10 ***FF&E Install***
FF&E Installers

11 ***Shade Install***
Shade Installers

12 ***Commissioning***
Low Voltage

01 Pre Design

02 Design

03 Construction

04 *Operations*

OPERATIONS

IT

Becoming more flexible

- Coordination with networking equipment between data deployment and power deployment
- Incorporate a larger budget to accommodate for smart building troubleshooting needs
- Assess the need to have an onsite team member

MAINTENANCE

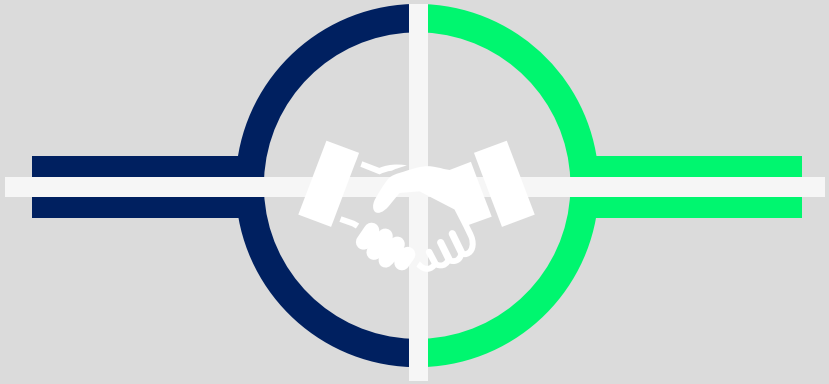
Becoming more technical

- New skills required for maintaining intelligent building features
- If possible, it's important to include team members in the commissioning process
- Shift from physical maintenance to digital troubleshooting
- Networking 101 Skills

WORKING TOGETHER

IT Functions

- IP Addressing/Subnet
- Network Connectivity
- Security Standards

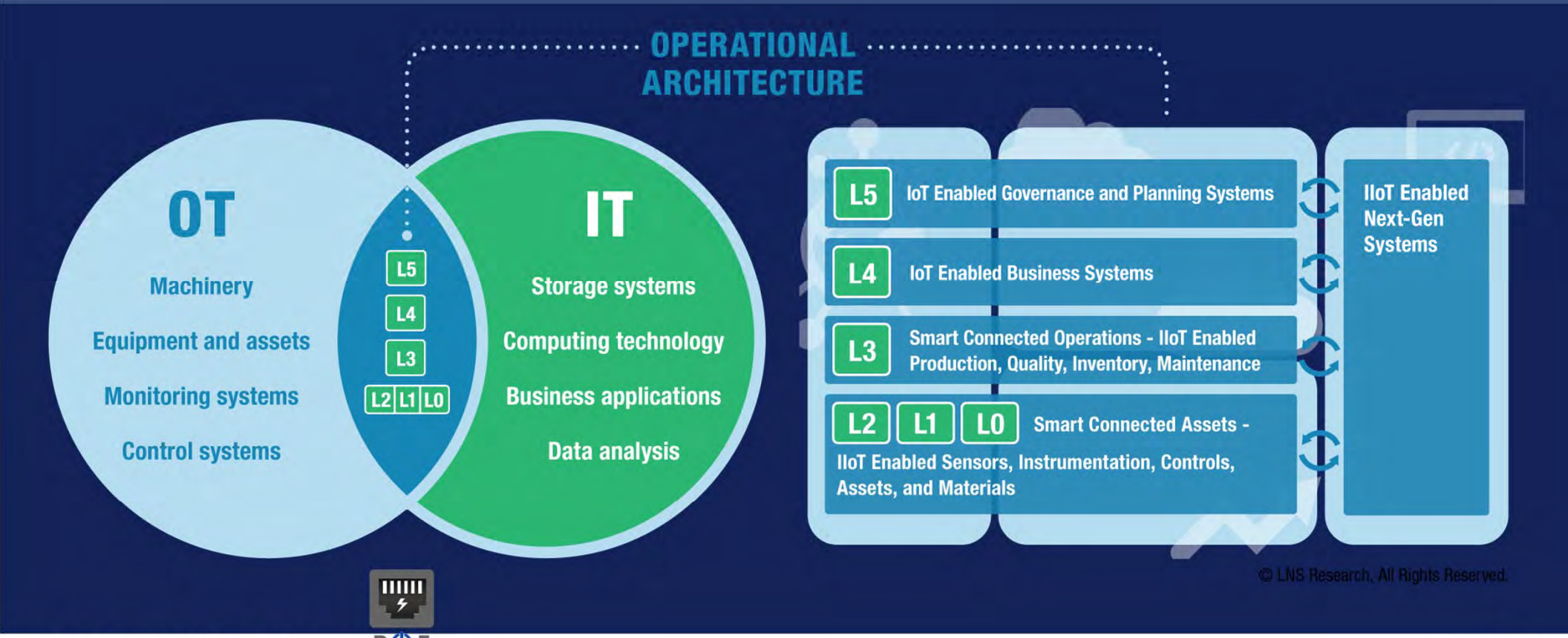


OT Functions

- Ceiling Access (OSHA)
- Contractor Management
- Code/Building Compliance

- 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

CONVERGENCE MODEL



TAKE AWAYS

- It takes a team to make an intelligent building successful
- Be aware of Code Compliances you need to adhere to
- Everyone needs to be aware of their role and also the roles of the other team members
- Budgets need to be addressed with the changing roles
- IT and OT will be having a convergence

SECTION BREAK

Courtesy of the Sinclair Marriott

ABOUT ME

Over 40 years of engineering experience in building design and construction, including electrical power distribution, lighting, and communications systems design for a wide variety of commercial, industrial, and institutional facilities.

Larry Jones, PE, MIES

Associate, Senior Electrical Engineer
Baird, Hampton & Brown

TYPICAL PROJECT PHASES

00 *Project Planning*

01 *Schematic Design*

02 *Design Development*

03 *Contract Documents*

04 *Bidding and Negotiation*

05 *Construction Administration*

PROJECT PLANNING PHASE

Architect and Owner Establish Design Parameters

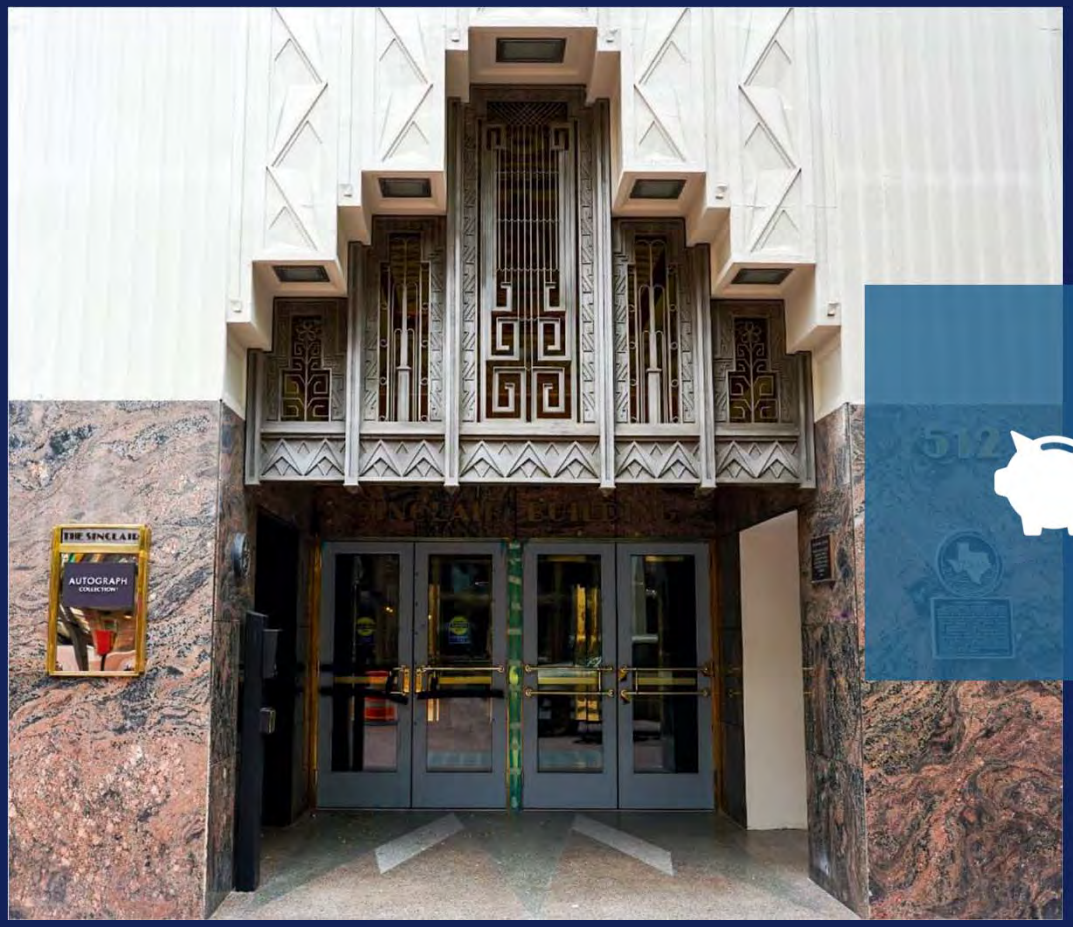
- What is needed
- When it is needed
- Quality desired
- Sustainability
- Project Budget

PROJECT PLANNING PHASE

Intelligent Building Tasks:

Commitment by Owner to an Intelligent Building

- Commit to additional scope
- Commit to which building systems will be intelligent
- Commit to involvement of IT and OT staff from the outset
- Commit to additional floor space required for equipment
- Commit to earlier involvement of consultants in design process



THE BIG QUESTION: WHAT ABOUT COSTS?

HOW DO THE COSTS COMPARE?

- *Historical cost data is limited since PoE lighting is new technology*
- *There are a number of factors that affect construction cost*
  - *Size of the project*
  - *Quality and completeness of the Contract Documents*
  - *Experience of the bidders and suppliers*
  - *Market at the time of bidding*

WHAT'S THE BOTTOM LINE?

When the design is clear and experienced contractors are used, the cost of a PoE lighting system is about the same or less than the cost of the equivalent line voltage lighting system

TWO BIGGEST FACTORS IN THE COST OF PoE

1. *Less manhours are required to install PoE lighting systems*
   - ✓ *Class 2 Wiring*
   - ✓ *Power and controls provided over a single cable*

2. *PoE lighting system eliminates the need for a separate control system that is required for line voltage lighting*

SCHEMATIC DESIGN PHASE

Architect Develops Conceptual Plan

- Conceptual floor plans, elevations, and sections to show scale and relationship of spaces
- Narrative description of materials, systems, and equipment proposed

SCHEMATIC DESIGN PHASE

Intelligent Building Tasks:

- Work with Owner's IT and OT groups to define requirements for intelligent building systems and equipment
- Research applicable local and national codes and standards
- Contact AHJ and involve them from the outset
- Determine approximate size and location of spaces required for intelligent building equipment
- Develop narrative description of proposed intelligent building systems
  - ✓ Topology
  - ✓ Functionality
  - ✓ Locations of equipment
  - ✓ Proposed level of systems integration

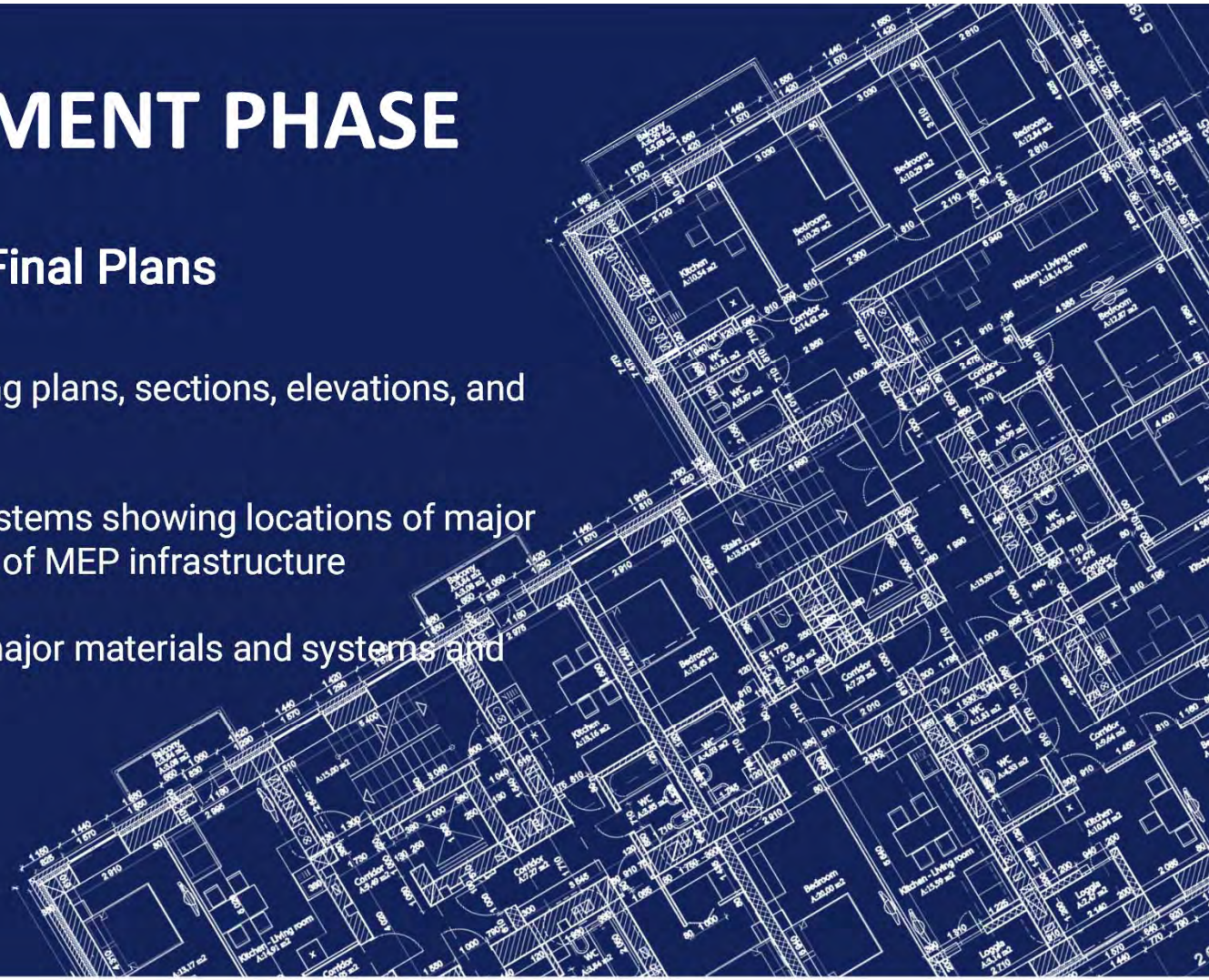
RECOMMENDED BEST PRACTICES

- *Plan for PoE lighting and other intelligent building systems from the outset of the project*
- *Conduct a design charrette involving all stakeholders*
  - ✓ *Stakeholder Responsibilities*
  - ✓ *Corporate Standards*
  - ✓ *Preferred Topology*
  - ✓ *Level of Systems Integration*

DESIGN DEVELOPMENT PHASE

Architect Starts to Develop Final Plans

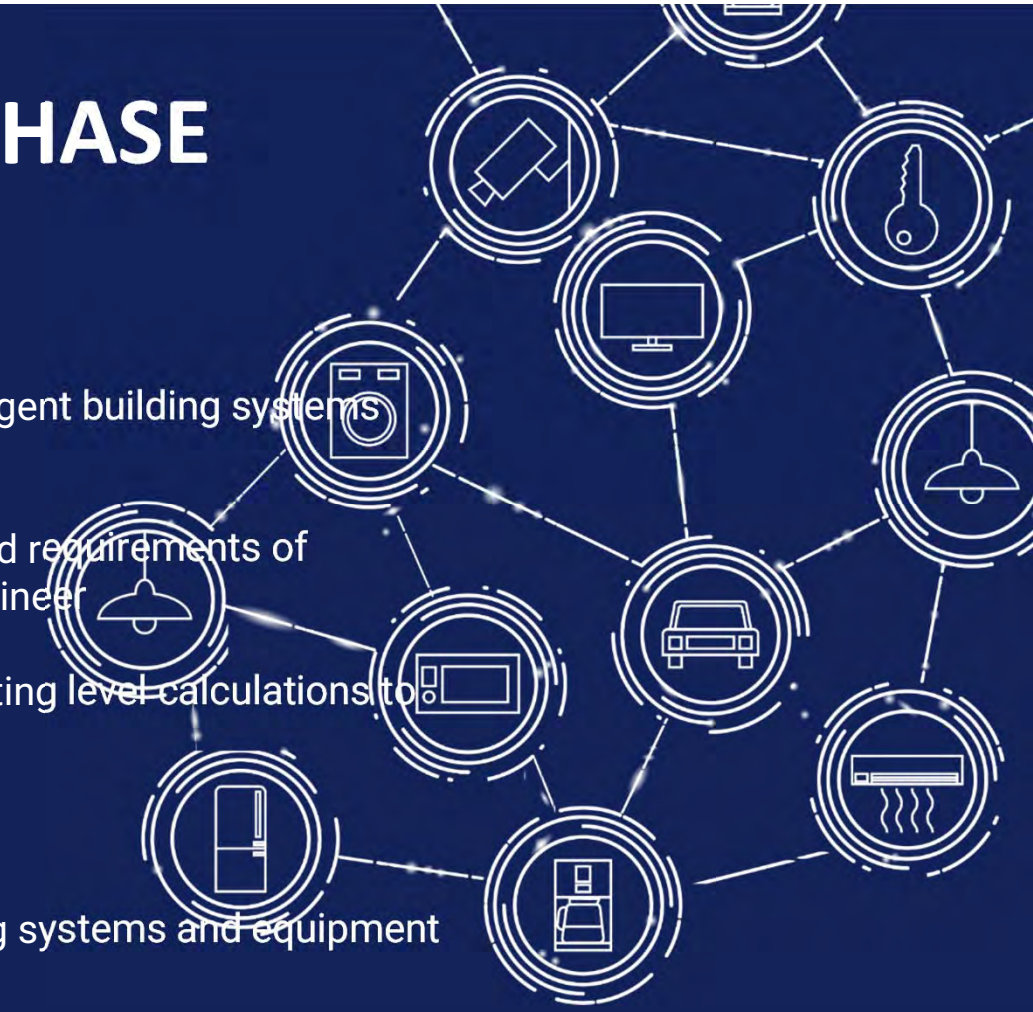
- Detailed floor plans, reflected ceiling plans, sections, elevations, and construction details
- Diagrammatic drawings of MEP systems showing locations of major components and proposed routing of MEP infrastructure
- Outline specifications identifying major materials and systems and establishing quality levels



DESIGN DEVELOPMENT PHASE

Intelligent Building Tasks:

- Finalize locations and space requirements for intelligent building systems equipment
- Provide preliminary electrical power and cooling load requirements of proposed intelligent building equipment to MEP Engineer
- Design team selects PoE light fixtures and runs lighting level calculations to validate fixture selection and layout
- Prepare preliminary Light Fixture Schedule
- Develop outline specifications for intelligent building systems and equipment



CONTRACT DOCUMENTS PHASE

A/E Team Completes Design and Issues Drawings for Bidding, Permitting and Construction

- Complete set of sealed construction drawings for all disciplines
- Project Manual with sealed specifications for all disciplines

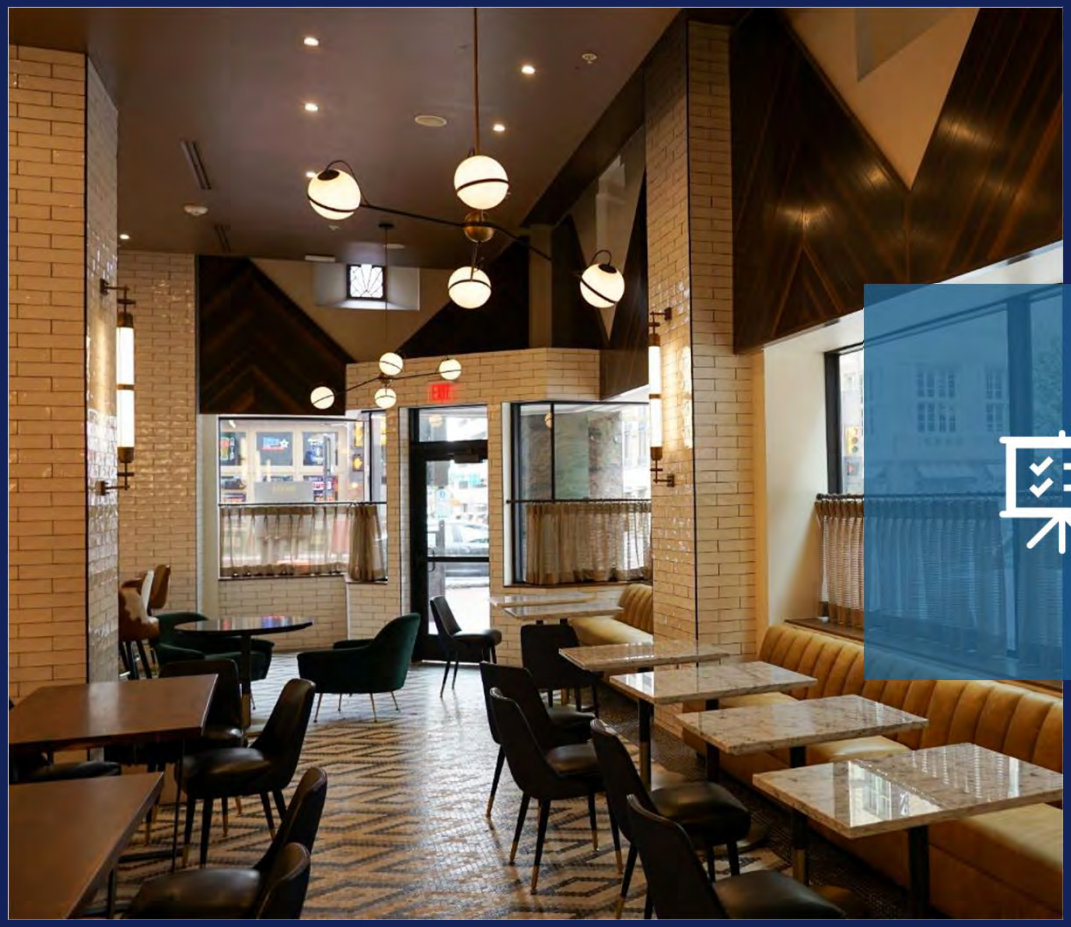
CONTRACT DOCUMENTS PHASE

Intelligent Building Tasks:

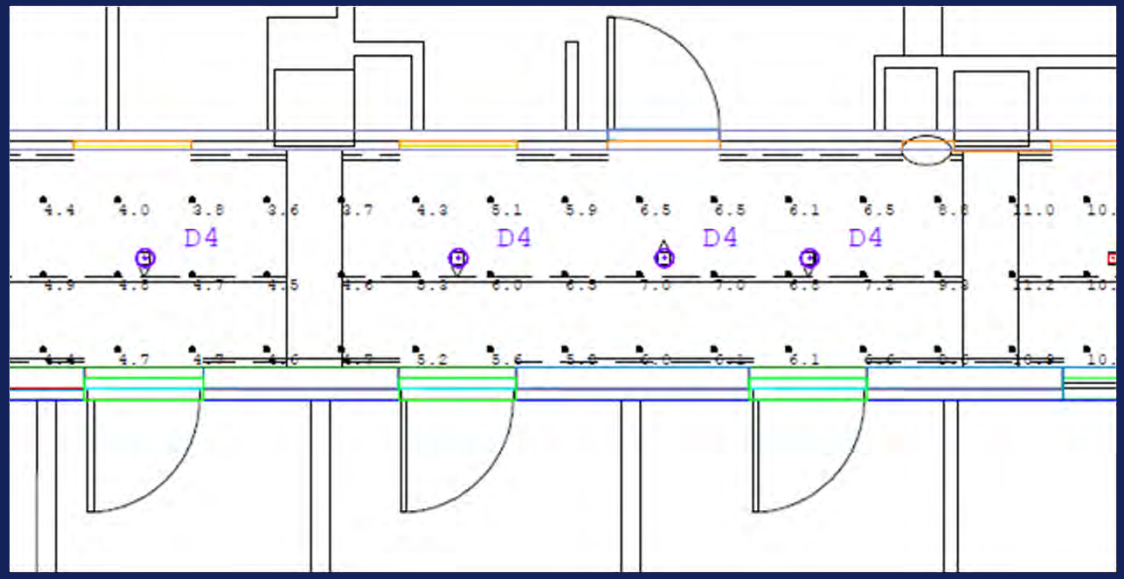
- Finalize PoE light fixture selections and locations
- Finalize equipment selections and update MEP Engineer on requirements
- Prepare COMcheck or other energy code Certificate of Compliance acceptable to the AHJ certifying that the PoE lighting systems and its controls comply with energy code requirements
- Show all PoE light fixtures, nodes, control devices, sensors and cabling on the drawings, including daylighting zones, if applicable
- Identify on the drawings which PoE switch port each node is served from and show switch locations if using a distributed topology
- Identify emergency lighting, emergency power source, and how local control of emergency fixtures is overridden upon loss of normal power

RECOMMENDED BEST PRACTICES

- *Show PoE lighting fixture locations on electrical drawings for coordination only*
- *Provide separate low voltage drawings showing PoE light fixtures and all associated wiring and devices, including Light Fixture Schedule and node schedule*
- *Add provision in the Specifications requiring that low voltage systems installer submit proof of prior experience and be BICSI Certified*



A FEW EXAMPLES



CORRIDOR LIGHTING

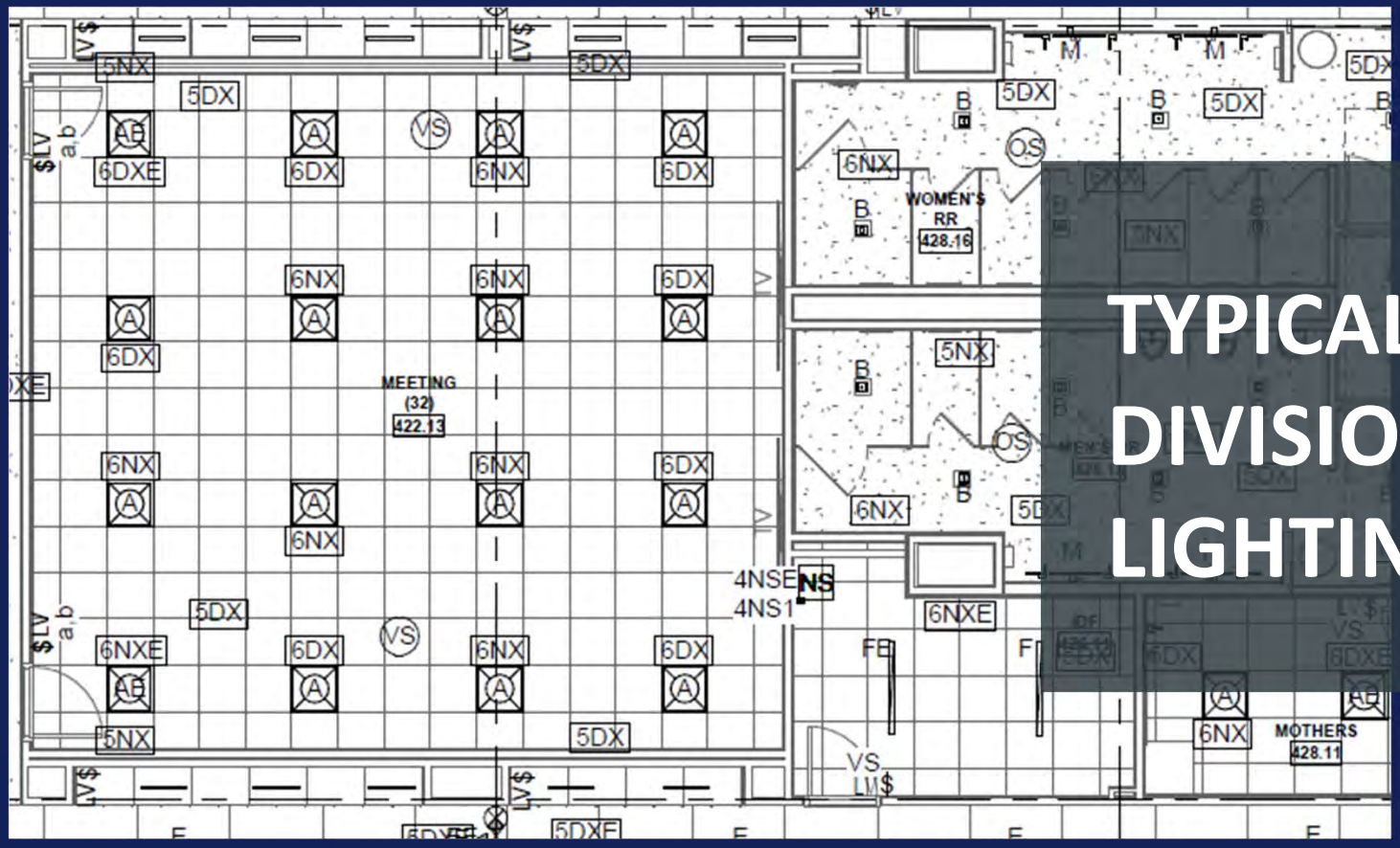
Calculated lighting levels (above)

Rendering (left)

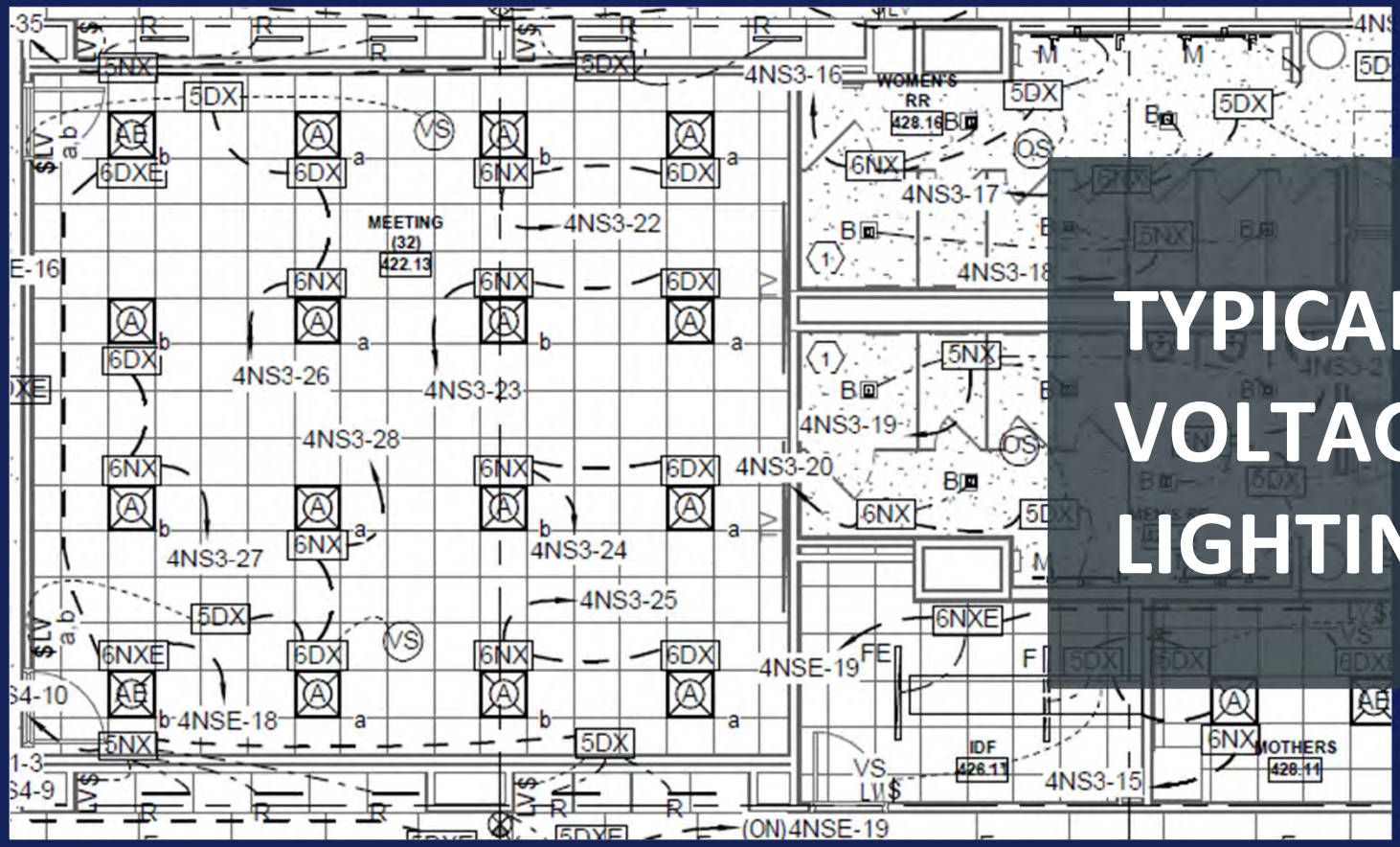
MORE EXAMPLES

Lobby lighting rendering (above)

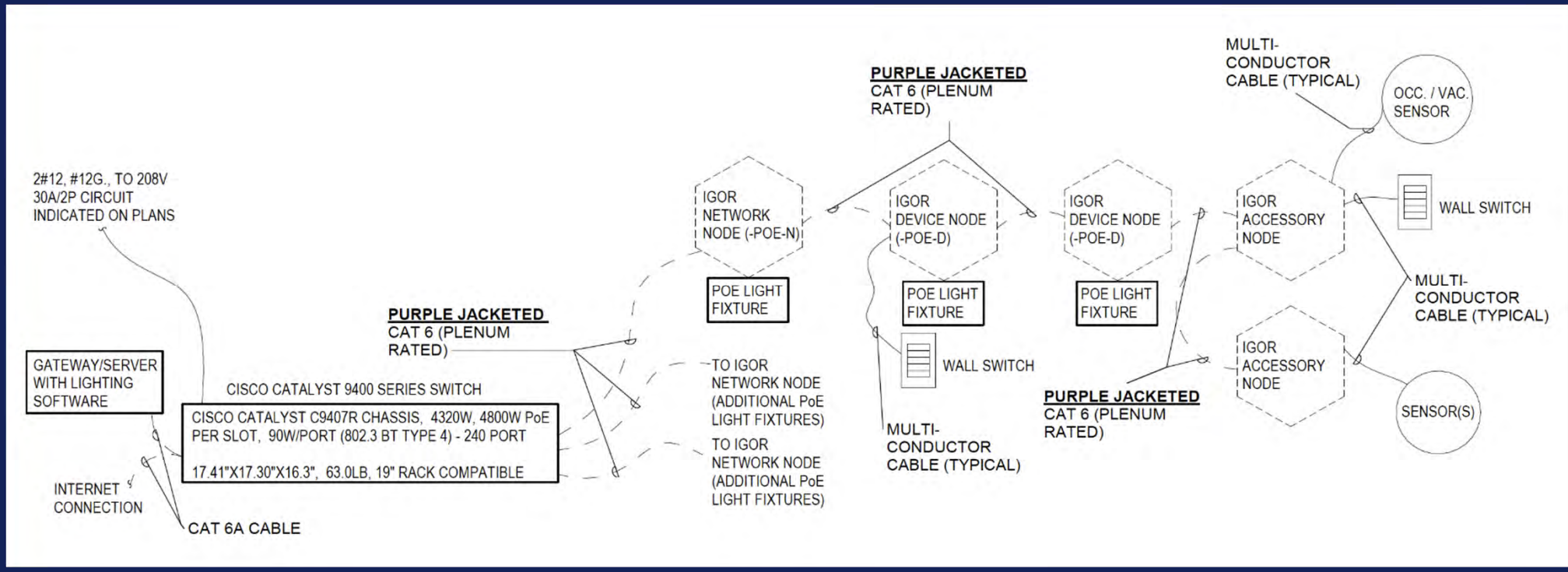
Corridor lighting rendering (left)



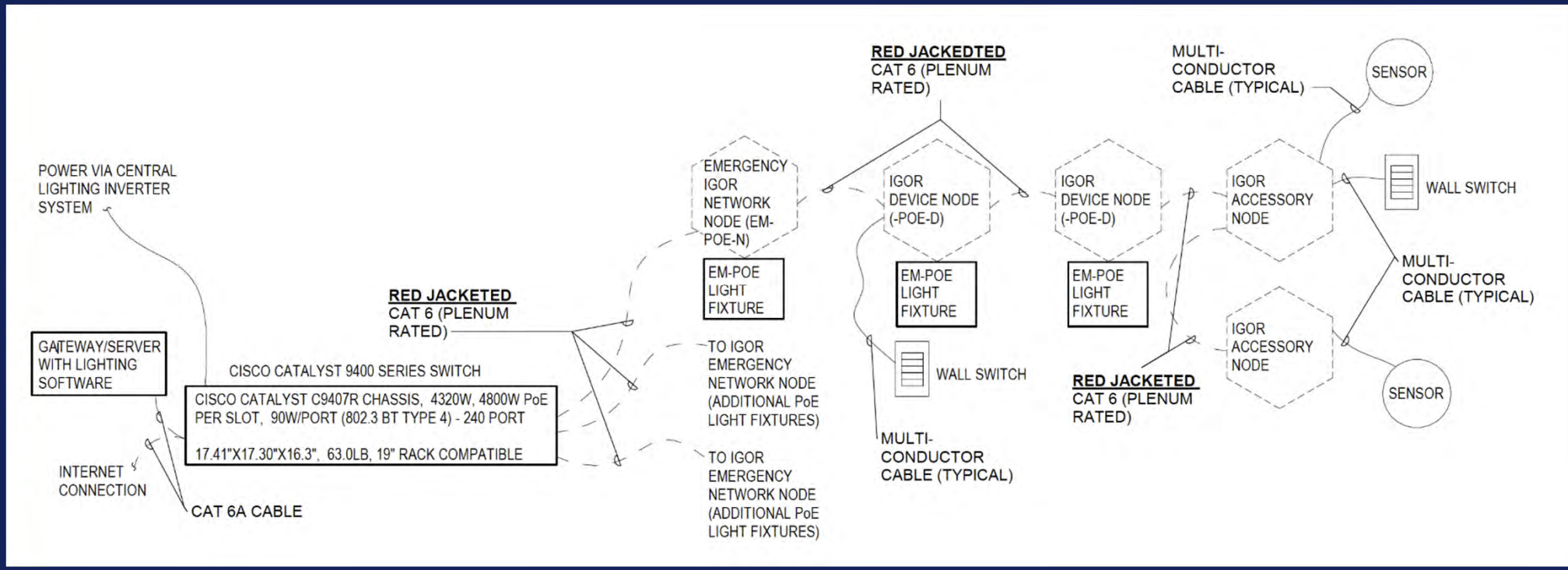
TYPICAL DIVISION 26 LIGHTING PLAN



TYPICAL LOW VOLTAGE LIGHTING PLAN



TYPICAL NORMAL SOURCE PoE CONNECTIONS



TYPICAL EMERGENCY SOURCE PoE CONNECTIONS

BIDDING AND NEGOTIATION PHASE

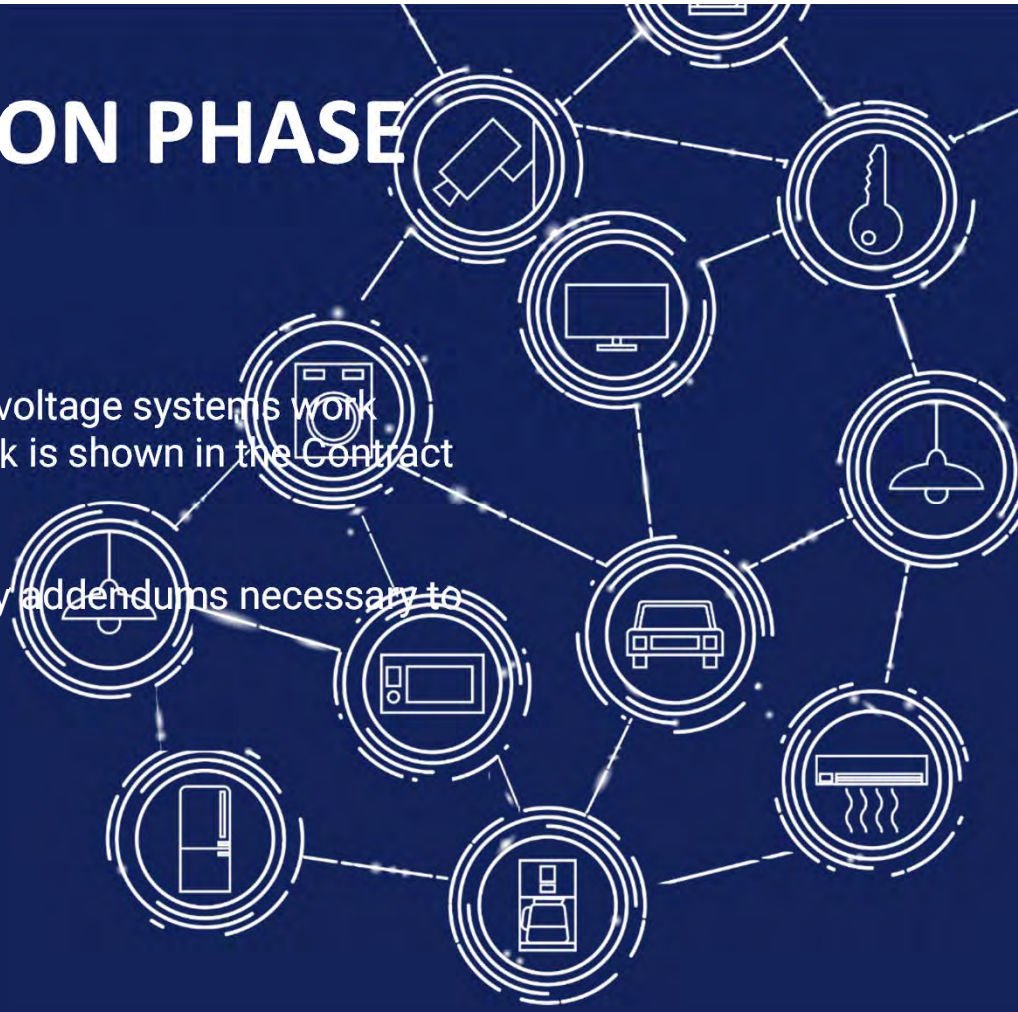
A/E Team Assists Owner with Bidding Process

- Conduct Pre-Bid Conference to acquaint prospective bidders with the content of the Contract Documents and with bidding procedures
- Respond to questions from bidders and prepare addendums if needed
- Assist Owner in reviewing bids

BIDDING AND NEGOTIATION PHASE

Intelligent Building Tasks:

- Make sure bidders are clear on the extent of the low voltage systems work included in the Contract and where and how that work is shown in the Contract Documents
- Respond to questions during bidding and prepare any addendums necessary to modify or clarify the bid documents



RECOMMENDED BEST PRACTICES

- *Encourage General Contractors to bid PoE lighting and other intelligent building systems Work separately from Work of other trades*

CONSTRUCTION ADMINISTRATION PHASE

A/E Team Assists Owner with Construction Process

- Review Contractor submittals
- Make periodic visits to the site to observe construction progress
- Answer Contractor RFIs
- Review and approve Contractor pay applications

CONSTRUCTION ADMINISTRATION PHASE

Intelligent Building Tasks:

- Contractor submits shop drawings and product data for intelligent building systems and equipment
- Installation of intelligent building systems and equipment by Contractor
- Start up and commissioning of intelligent building systems and equipment by Contractor in cooperation with Owner's IT and OT groups
- Owner training by intelligent building systems manufacturers and Contractor
- Commissioning by independent third-party Commissioning Agent when required

SECTION BREAK

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

01 Political Influences in the Project

02 Project Scope and the Network

03 Network Topology and Design

04 Planning Details

05 Observations and Lessons Learned

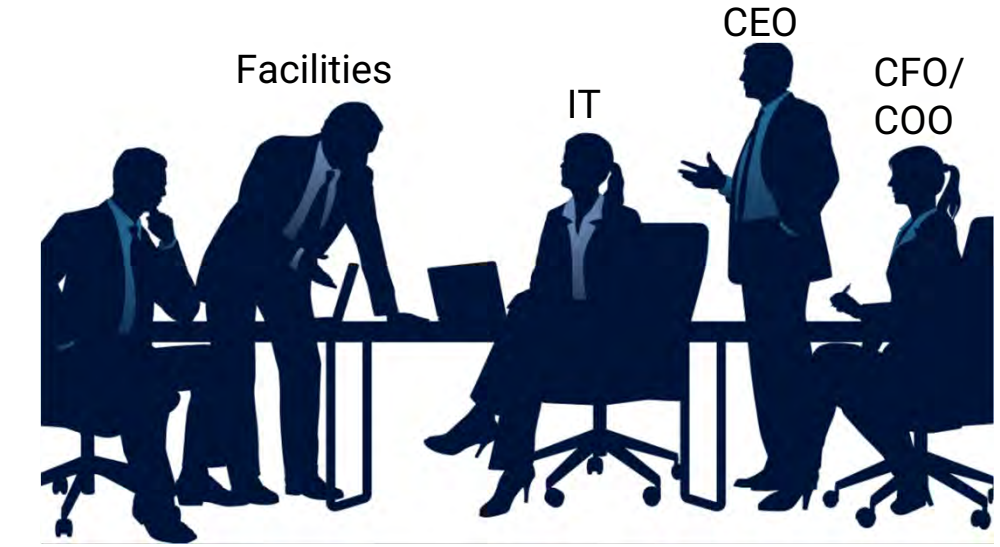
Politics and Influences

Who is your customer really?

Politics make strange bedfellows

Questions to consider

- Who is the project champion?
- Whose Budget is affected?
- Who may be losing control?
- Who is risk averse?
- Who is leading innovation?



Working Together

IT Functions

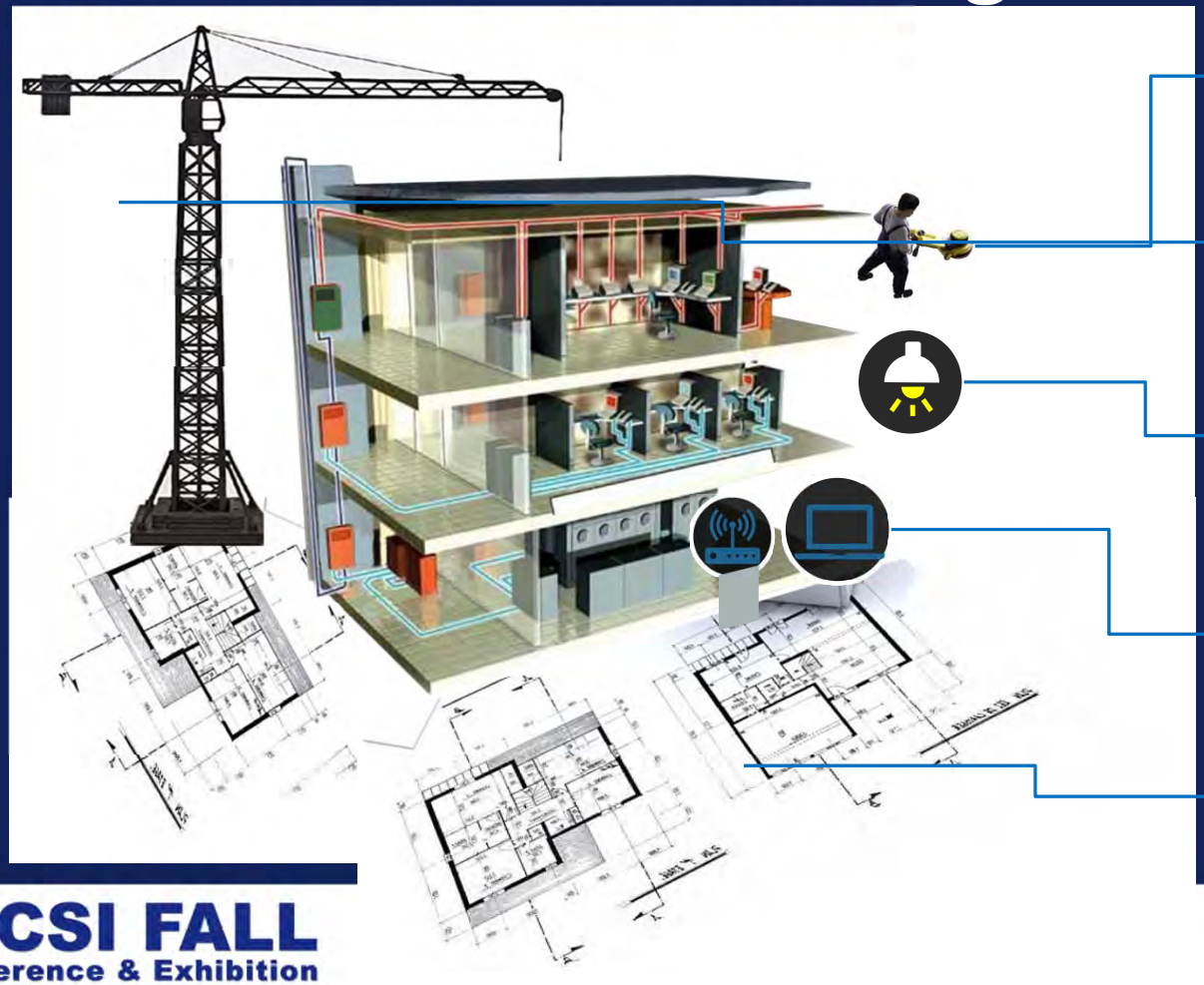
- IP Addressing/Subnet
- Network Connectivity
- Security Standards

OT Functions

- Ceiling Access (OSHA)
- Contractor Management
- Code/Building Compliance

- 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

Critical Roles of the Building Process



Facilities Management

General Contractor & Project Manager

MEP's

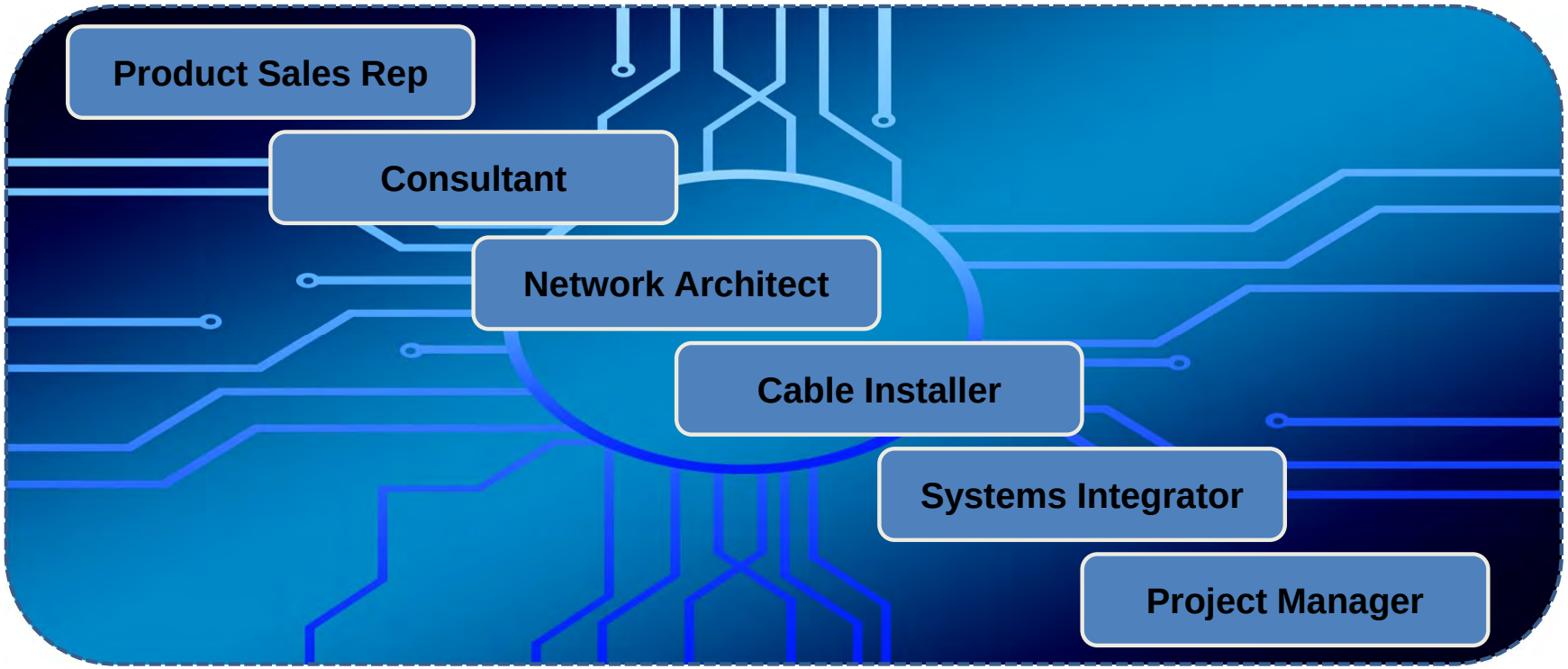
Low Voltage & Structured Cable Contractor

Electricians

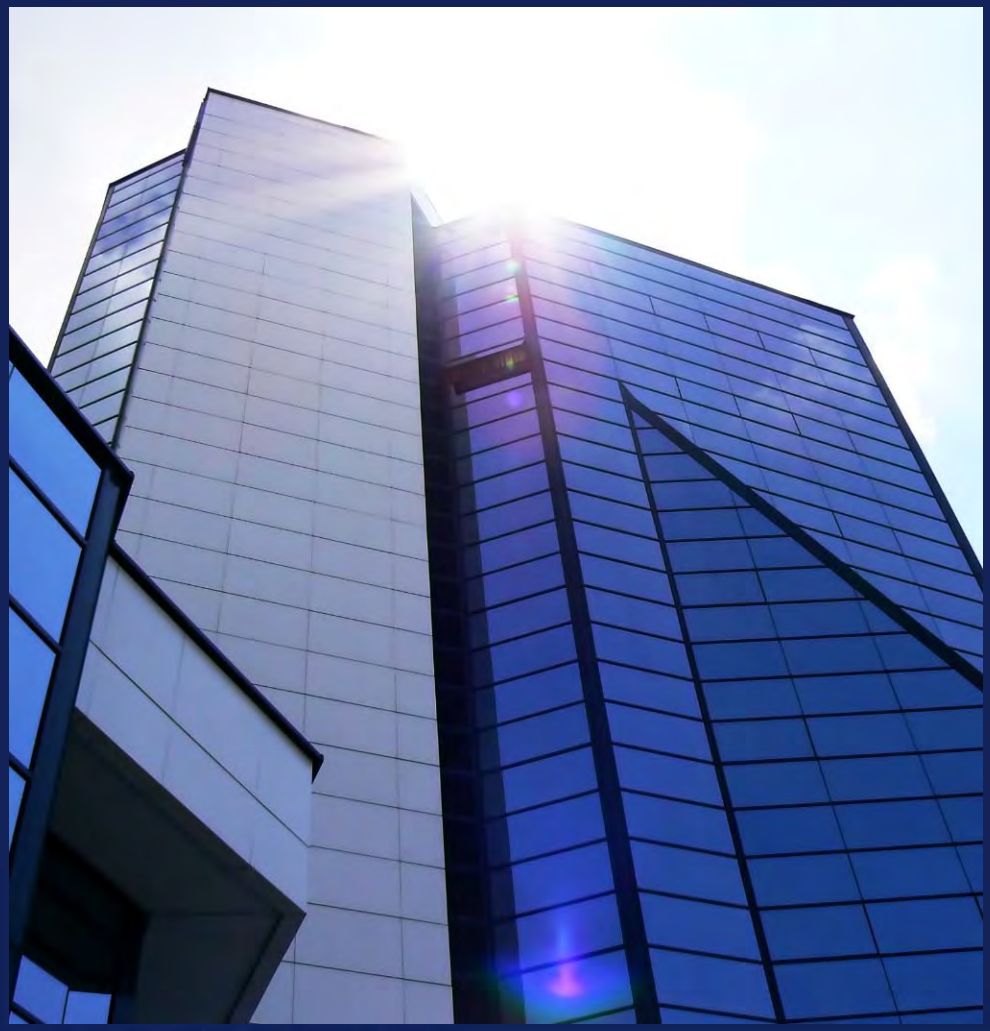
IT Consultant & Systems Integrator

Architect

What is your role?



Project Scope and the Network



Complexity tends to be proportional to project size

Existing IP/POE Digital Building Endpoints:

A Growing List of POE Products and Manufacturers


Intel NUCs


Shot Detection


RFID Reader


Raspberry Pi POE Hat


Hospital Room Patient Display


NFC Reader


Ceiling Fans


USB-C Chargers


Biometric Door Locks

Status Signs


Facial Recognition Systems


Access Points


Clocks


HVAC VAV's


Cameras


Window Blind Shade Motors



Horns and Sirens


Light Fixtures


Entry Barriers And Turnstiles


Badge Readers


Power Meter


Touchscreen PC's


IP Call Stations Phones


IP Call Tower

POE Displays

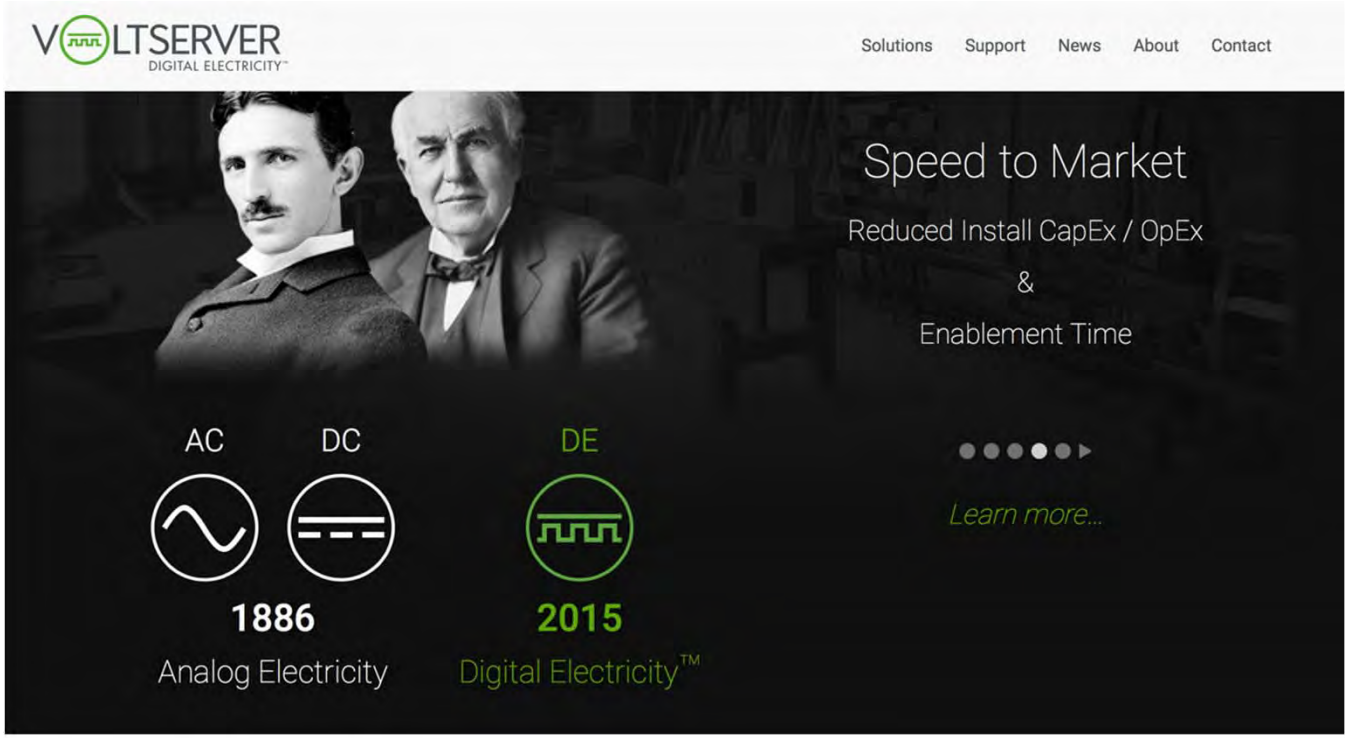
Temp Sensor


Environmental Sensor Hubs


Curtain Motors

Meeting Room Nameplate

Digital Electricity or similar emerging DC Power Distribution Technologies



VoltServer Digital Electricity:

- Pulsed (packetized) DC Power
  - Safe to Touch
  - NRTL Listed, IEC 62368-1 limited power source
    - Listed as a Limited Power Source and qualifies to be installed under Article 725 of NEC
  - Each Pulse packet checks for:
    - High Current
    - Ground Fault
    - Arc Fault
    - High Resistance (loose connection)
    - Touch (Resistive Load)
  - Range up to 2KM
  - 500W at 1K ft, 1 pair 18 AWG cable

A Path to a Building DC Microgrid

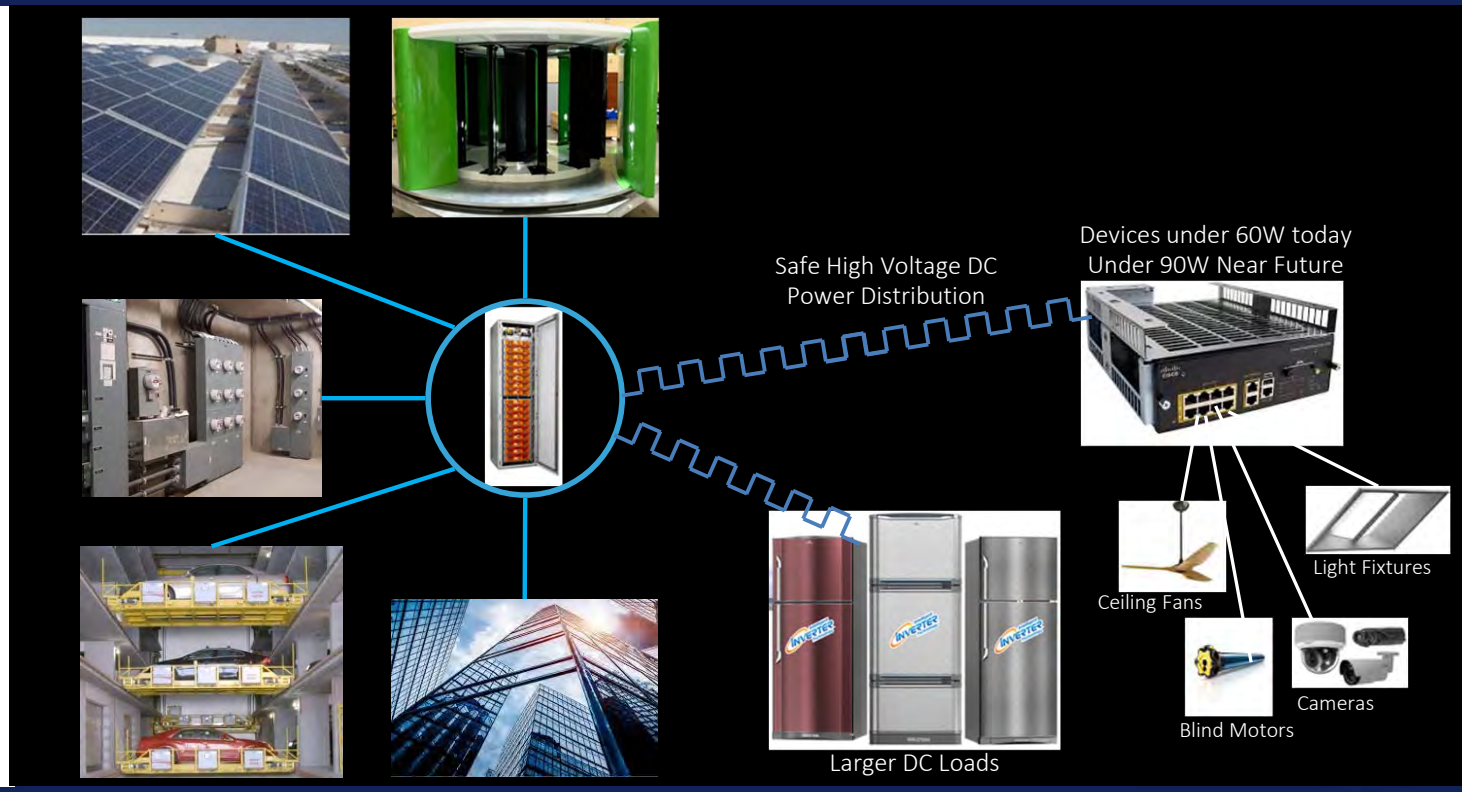
Building Materials Science continues to improve:

DC Powered
Connected
Sensor Rich

Commercial Inverter Based Appliances Continue to Emerge

Many Variable Speed/Frequency Drives can be DC Powered today (check with Manufacturers)

The DC Microgrid Emerges in the Building



Network Topology and Design

Is the Network Centralized or Distributed?

- More Cabling Required
- Controlled Access in IDF
- Greater IDF Cooling Requirements
- Power needed in IDF

- Less Cabling, patch cables to endpoints
- Ceiling is less secure, service requires ladder
- Less Cooling in IDF, lower cost switches
- Distributed Power required in ceiling

POE Lighting & UL-924

IOTA

Igor

Platformatics

The Emergency Lighting part of the network is generally designed by POE lighting partners such that **the network switch is passive and plays no control role; therefore the switch has no requirement to be UL-924 listed**. POE Lighting partners are aware of these design considerations. Local AHJ Acceptance will dictate option utilized. 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)
https://www.igor-tech.com/news-and-insights/news/igor-awarded-industrys-first-central-ul-924-certification-for-a-poe-solution
Note: Control Provided by Igor Software Platform

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.
https://www.iotaengineering.com/poecp12v1a.html
https://www.platformatics.com/wp-content/uploads/2019/03/ELN-CS-3-26-19v1.3-edd.pdf

4) Hybrid POE – Line Voltage Approach

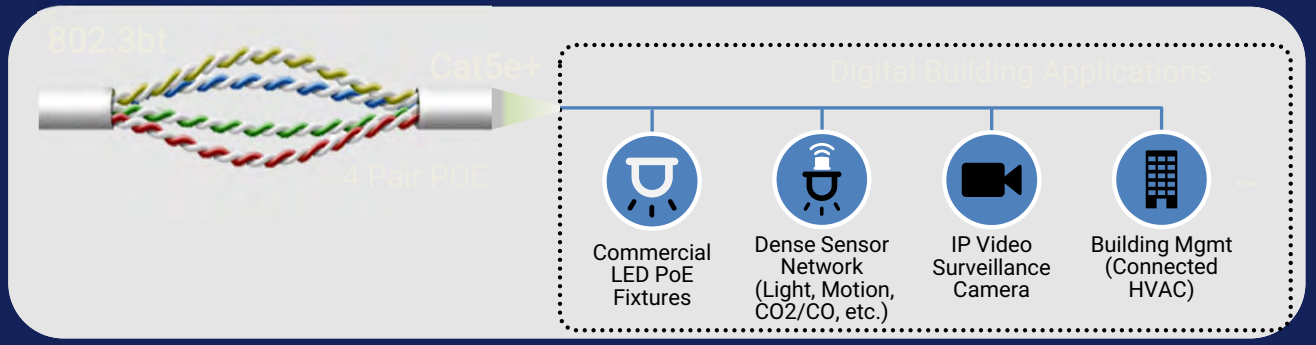
Enhanced PoE Capabilities on the Digital Building Switches Enable Scale

Cisco Catalyst 9400

Cisco Catalyst 9200/9300

Transition Networks SM24TBT2DPA

Cisco Catalyst CDB



Cisco: Perpetual POE or Transition: Soft Reboot

- Provides non-stop 802.3bt power
- Switch can continue to provide power during configuration and reboot

Cisco Fast POE/UPOE

- Restores power to powered device within 5 secs of power resumption

2+ Event Classification

- Simplified power negotiation without LLDP
- Physical layer negotiation < 1s based on class/type

Will the Network be Isolated or Integrated?

- Safer
- Harder to Manage and Upgrade
- Difficult to Integrate with IT systems

- Requires cooperation with IT
- Subject to IT policies and guidelines
- Allows for Integration with IT Systems
  AV/telephony, calendaring, access control, etc.

Network Architecture: Reference Topics

Network Segmentation and VLANs

- Use of VLANs, Firewalls, Policy/ACL's, and other networking features is fundamental to protect the network
- Understand partner system implementation and endpoint behavior.
  - Is control broadcast, unicast, multicast?
  - Is control autonomous, zoned, or cloud based?
  - Are control apps server, appliance, VM or cloud based
  - Understand system and component failure behavior. What are the redundancy plans?
  - What IP Ports are used? What data flows must be allowed?

DHCP vs Static Addressing

Advanced Topics

- Network Access Control (device profiling)
- IETF Manufacturer's Usage Description
- Software Defined Architecture

Rat Hole Alert!

The larger the project, the greater the complexity. Seek Network Architects and Consultants for help.

Systems Integration and Other Complexities

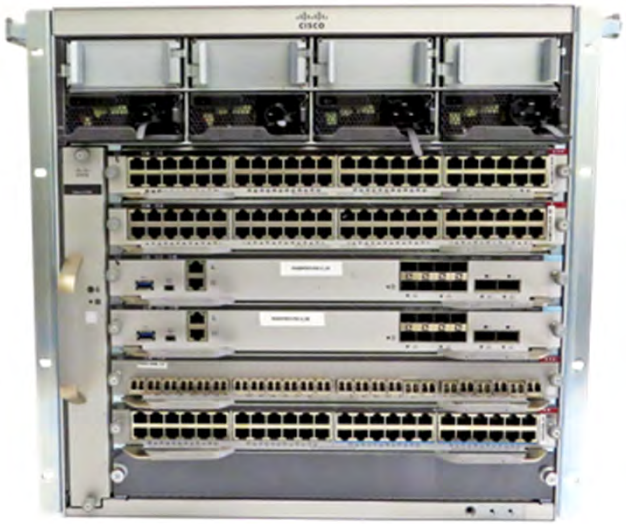
- Is integration led by the lighting partner or a 3rd party?
- Are API's well documented?
- Do API's meet security criteria?
- Is integration system to system or coordinated through middleware?
- What protocols may be involved?
  - https
  - COAP
  - MQTT
  - BACnet
  - ModBus
  - JSON

Rat Hole Alert!

The larger the project, the greater the complexity. Seek Network Architects and Consultants for help.

Planning and Details

Network Power Resilience



Cisco Catalyst 9400

- Resilient Architecture
- Dynamic Power Management
- High Cost

- Cisco StackPower provides a shared power architecture
- Dynamic Power Management
- Lower Cost

Ensure ordered power cords match outlets receptacle types

VoltServer: Digital Electricity

- VoltServer has been deployed several Digital Building projects
- Work with VoltServer on specific applications for design and testing for specific projects

Benefits

- Facilitates network installation by placing greater control on low voltage (minimized electrical labor).
- Improves Safety, less risk of shock
- Extends energy management upstream from the POE System
- Enables a digital fault management platform
- May reduce Total Cost of Installation

Complications (using DC Output)

- Switch Manufacturers:
  - Switch must be NRTL listed for high voltage DC input

Transmitter Shelf

Receivers

AC Output

DC Output

Ampacity and Heat Load Calculations

- MEP will need switch product datasheets and help to calculate load ampacity in order to determine electrical circuits to power the network and Heat Load (BTU's) for IDF/MDF cooling
- Higher Voltage is more efficient to drive the power supplies
- Tables in datasheet may not reflect all possible options (i.e., 208VAC)
- May need to have switch manufacturer contacts to obtain the right level of details

Table 20. Power specifications – platinum rated power supplies

Description	Specification		
	*PWR-C1-1100WAC-P	*PWR-C1-715WAC-P	PWR-C1-350WAC-P
Power supply rated maximum	1100W	715W	350W
Total output BTU (note: 1000 BTU/hr = 293W)	3754 BTU/hr, 1100W	2440 BTU/hr, 715W	1194 BTU/hr, 350W
Input-voltage range and frequency	115V to 240 VAC, 50 to 60 Hz	100 to 240 VAC, 50 to 60 Hz	100 to 240 VAC, 50 to 60 Hz
Input current	12-6A	10-5A	4-2A

Table 22. Power consumption of standalone 9300 Series Switches with platinum rated power supply (tested on Cisco IOS XE 16.8.1)

				Measured P(W)							
				Half port traffic					Full port traffic		
SKU	FEP	Uplink	Input	0.01%/EEE	10%	30%	50%	100%	0.01%/EEE	10%	30%
C9300-24P	715W-P	C9300-NM-8X	115Vac	89.2	94.3	99	100.1	100.7	92	98.9	103.5
			230Vac	86.7	91.8	96.4	97.5	98	89.4	97.1	101.4
C9300-24T	350W-P	C9300-NM-8X	115Vac	83.1	88.2	92.9	94	94.5	85.8	92.9	97.2
			230Vac	81.9	86.8	91.3	92.4	92.9	84.4	91.6	95.9
C9300-24U	1100W-P	C9300-NM-8X	115Vac	90.5	95.9	100.5	101.6	102.1	93.3	100.6	104.9
			230Vac	88.1	93.1	97.7	98.8	99.4	92.8	98	102.4

Observations and Lessons Learned

The importance of Lab Testing and Staging

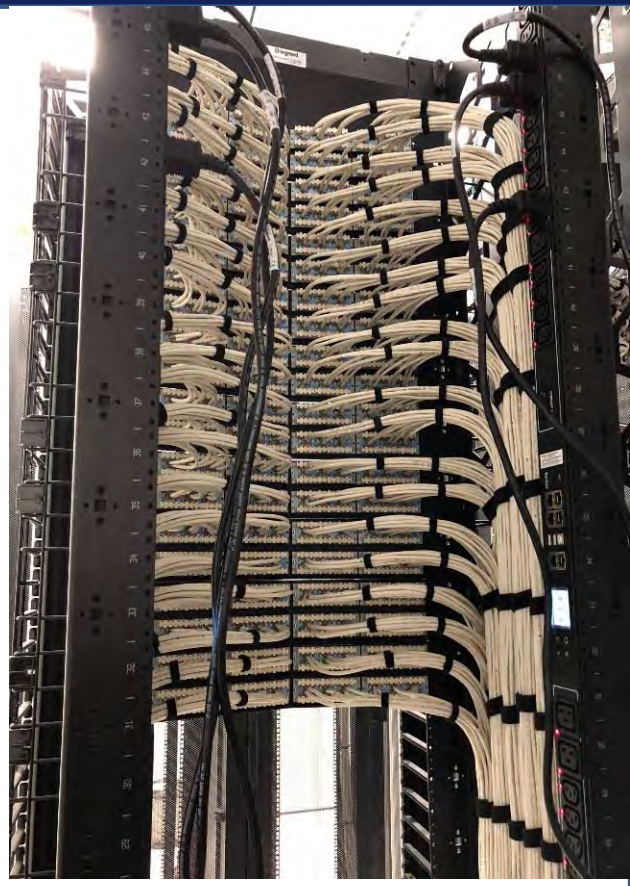
- Prototype the deployment
  - Reduces Risks, work out control details
- Validate network and endpoint connectivity and functionality

Plan, Plan, Plan!

- Preplan as much as possible:
  - Addressing, Labelling
- Preconfigure as much as possible
  - Reduces the number of times that devices must be touched along the installation process
- Maintain documentation along the way

Cabling

- Wire Gauge is important
- Digital Electricity
  - Vet cabling Digital Electricity cabling requirements with VoltServer. Cable Gauge will vary with distance and power load.
  - Prefer Outside rated cable in vertical riser applications to survive water leaks during construction.
- POE
  - Application is high-power, low-data. 22AWG Cat5e or Cat6 tends best for dealing with power loss over distance
  - Prefer UTP over STP. At longer distances STP have observed issues (possibly due to EMI)
  - Test and verify all field connections. Follow BICSI standards. If bundling pay attention bundle size, ampacity, and heat rise applicable to 2017 NEC®
  - Use factory made cables where possible to minimize field terminations. Improve reliability, speed installation.



18AWG Digital Electricity cabling

Digital Building – Centralized Deployment

Commissioning

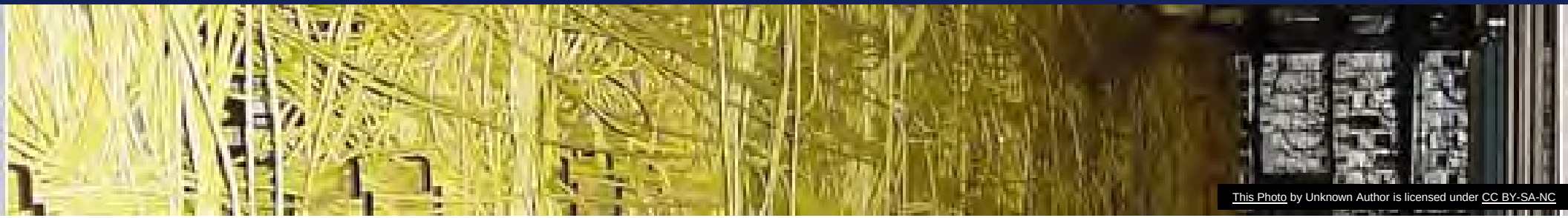
- Network Commissioning
  - Network Configuration
  - Connectivity Validation
  - Validate POE High Availability features
  - Validate Network failure behaviors
- Lighting System Commissioning
  - The process of configuring lighting system behavior
  - Described in written lighting controls narrative
    - Behavior of sensors, controls, and endpoints
    - What happens when you press a wall switch button
    - Grouping of Lights
    - Compliance: UL-924, ASHRAE 90.1
    - API integration of other systems:
      - HVAC
      - Shading
      - A/V room control

Documentation

- Lighting Specific:
  - Reflective Ceiling Plan (RCP)
  - Fixture Schedule
  - Sensor Documentation
  - Controls Narrative
  - API's
- Endpoint Documentation as available
  - IP Addresses (if static)
  - MAC Addresses
  - Configuration Details
- Integration Documentation
- Service Contacts and Support Details
- System High-Level Description
  - Description of Systems Installed and Behavior (particularly UL-924)
- Records Drawings:
  - Network Topology, Addressing, and Configuration Specifics
  - Cabling Layout, Pathway, and Space Designs
  - Electrical line diagrams and PDU configuration
- Other System Documentation and Manuals

Refer to ANSI/BICSI 0007-2020 ICT Design and Implementation Practices for Intelligent Buildings and Premises https://www.bicsi.org/standards/available-standards-store/single-purchase/bicsi-007-iot-intelligent-building

Labeling



- Labeling is fundamental to Verification, Testing, and Maintenance
- Key to project documentation
- Follow TIA-606-C
  https://global.ihs.com/doc_detail.cfm?&item_s_key=00142041&item_key_date=820611&input_doc_number=TIA%20606%2DC&input_doc_title=

SECTION BREAK

Courtesy of the Sinclair Marriott

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, MBA

Chief Technical Officer
PoE Texas

PoE Texas

OBJECTIVES:

- Guideline for Facility Managers (FM's) of smart/intelligent buildings that utilize a Power over Ethernet (PoE) backbone
- Highlight benefits and challenges of PoE systems and how to utilize and maintain the infrastructure from design to occupancy
- Highlight convergence of IT and OT and some of the new skills FM's will need to have moving forward

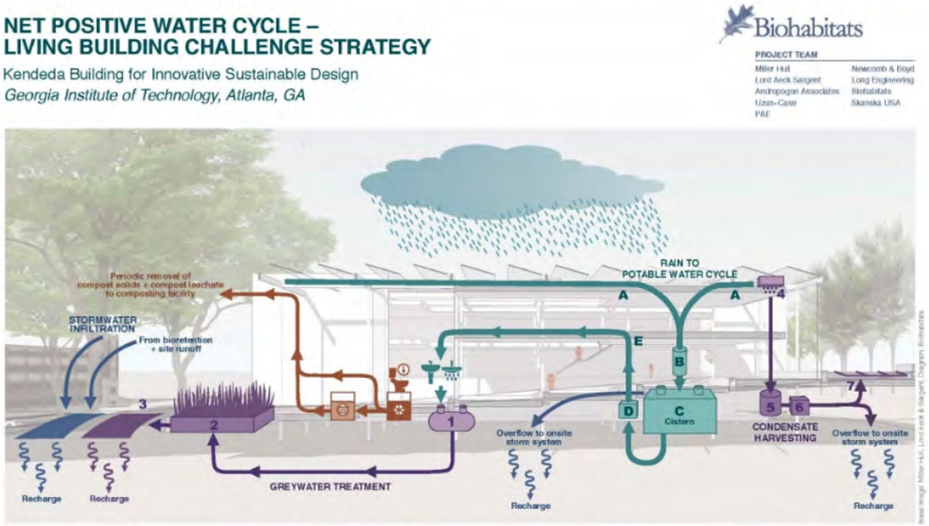
Digital Building Intelligence Examples

Living Walls

Real time feedback of:

- water consumption (with historicals)
- ambient light levels and auxiliary light support
- air sensors (CO2, O2)
- water quality sensors (ph)
- ventilation
- temperature control

Digital Building Intelligence Examples



Water collection & reuse
(ex Rain, HVAC condensation)

Real time feedback of:
- water collection levels (with historicals)
- water quality sensors (ph)
- ventilation
- temperature control
- humidity sensors

Independent Black and Grey water plumbing systems

Digital Building Intelligence Examples

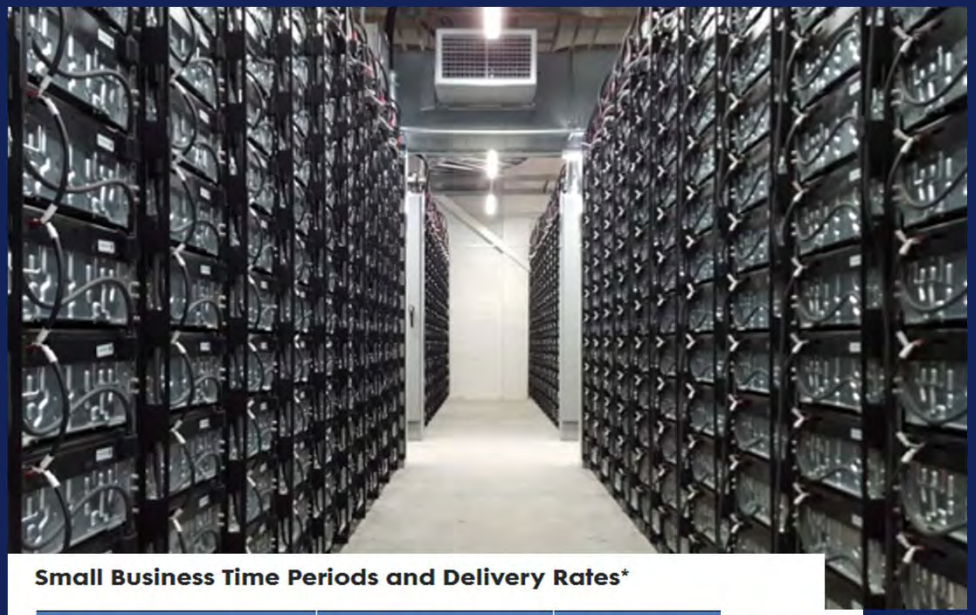
GeoThermal Heating & Cooling

Real time feedback of:
- water/air flow rates
- dynamic flow direction
- ventilation
- accelerometer
- temperature sensors and control

Electrical Pump maintenance

Weather prediction integration

Digital Building Intelligence Examples



Energy Storage Systems (ESS)

Charge during off-peak
Discharge during peak

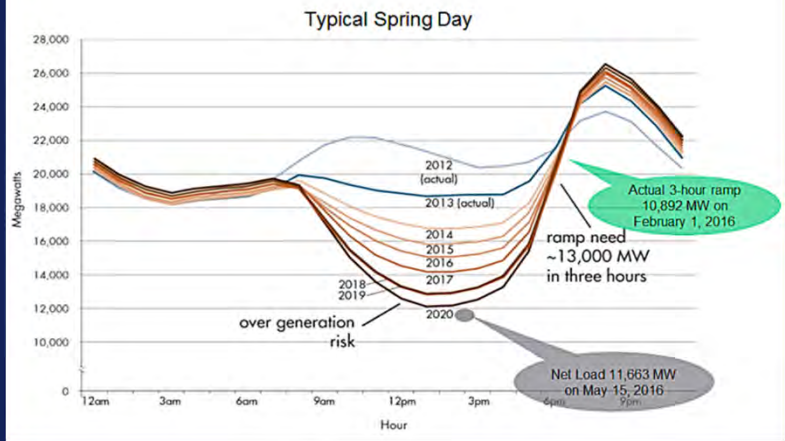
Small Business Time Periods and Delivery Rates*

ConEdison

Time-of-Use Periods	Peak Rates 8 a.m to 10 p.m	Off-Peak Rates Midnight to 10 p.m
June 1 to Sept 30	31.550 cents/kWh	1.15
All other months	15.530 cents/kWh	1.150 cents/kWh

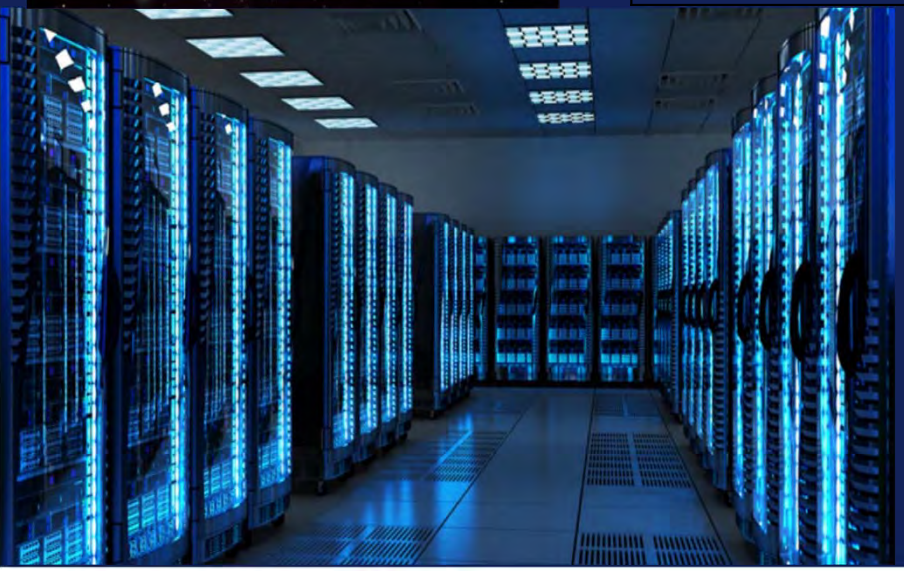
Off-Peak Rates Midnight to 8 a.m.

Figure 2: The duck curve shows steep ramping needs and overgeneration risk



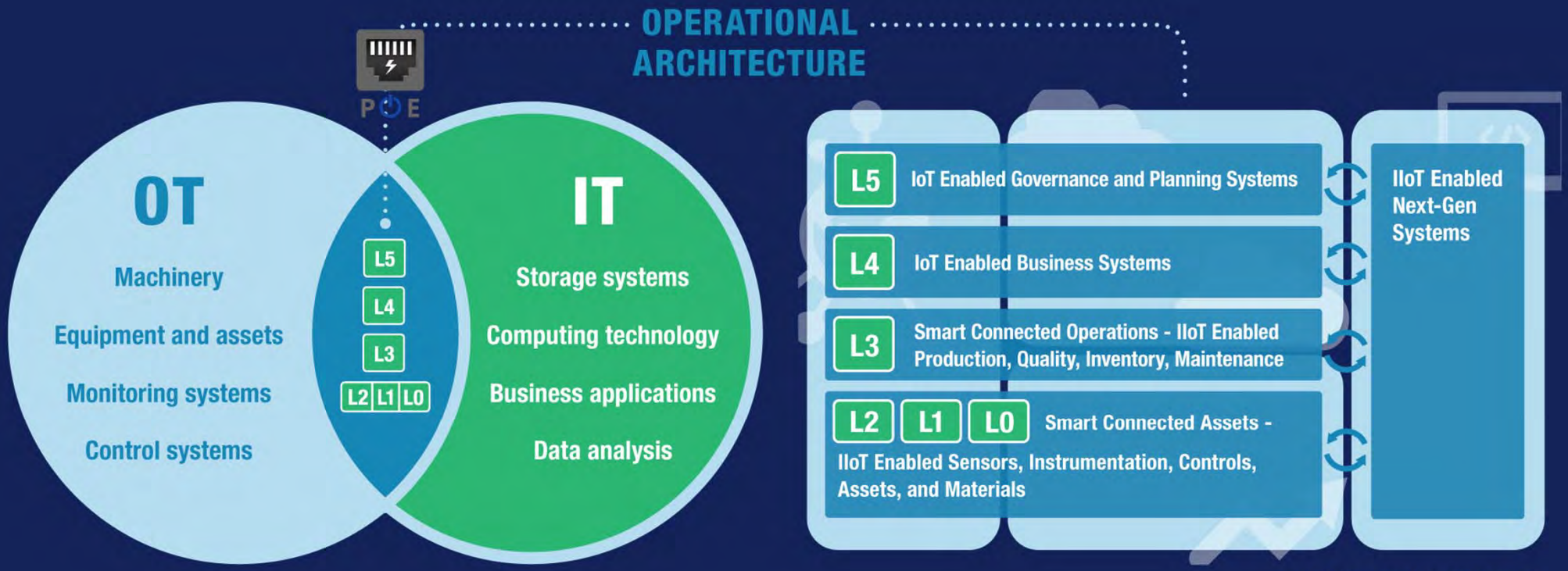
IT and OT universes

IT Domain	OT Domain
CyberSecurity	Reliability
Remote access	On site staff
Big Data management	SCADA structure
Analytics & Feedback	Life Safety
Automation	Uni-functional devices
Open Protocol	Proprietary Protocols

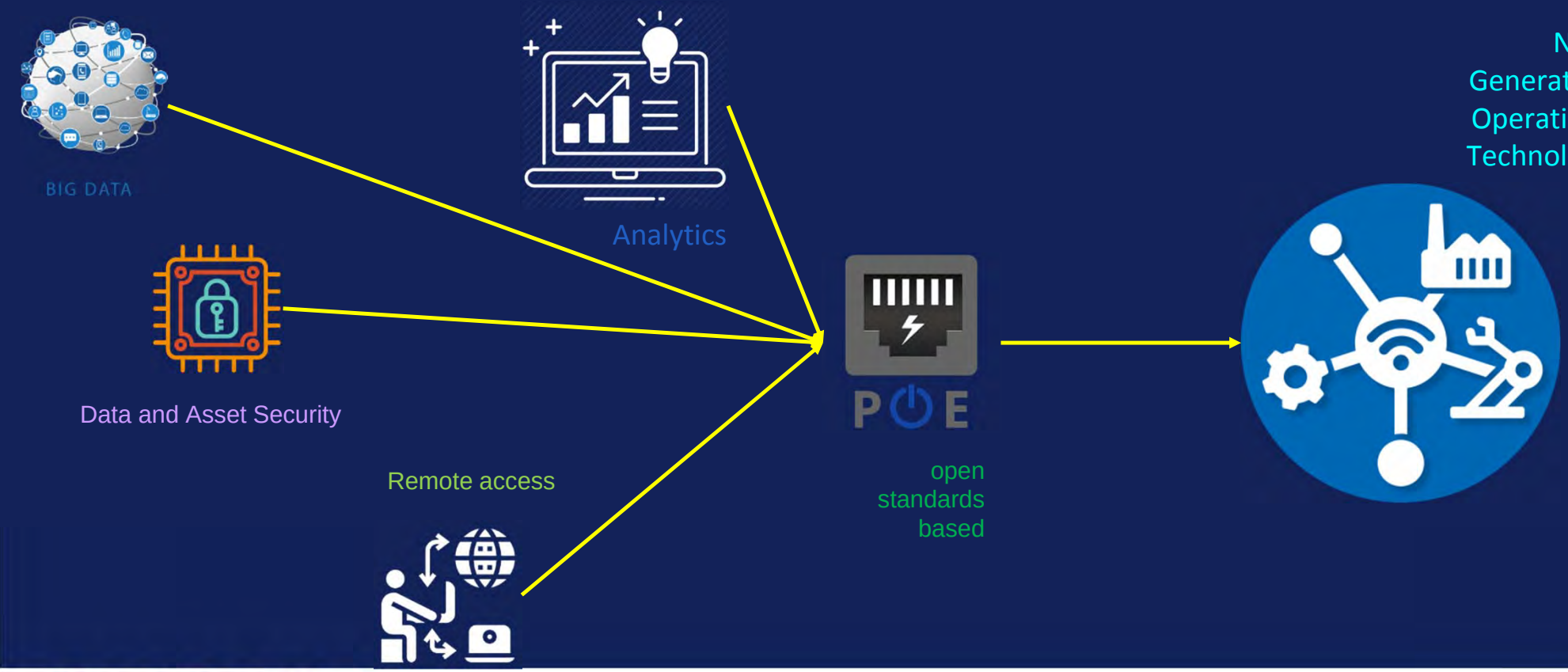


vs.

The Convergence Model

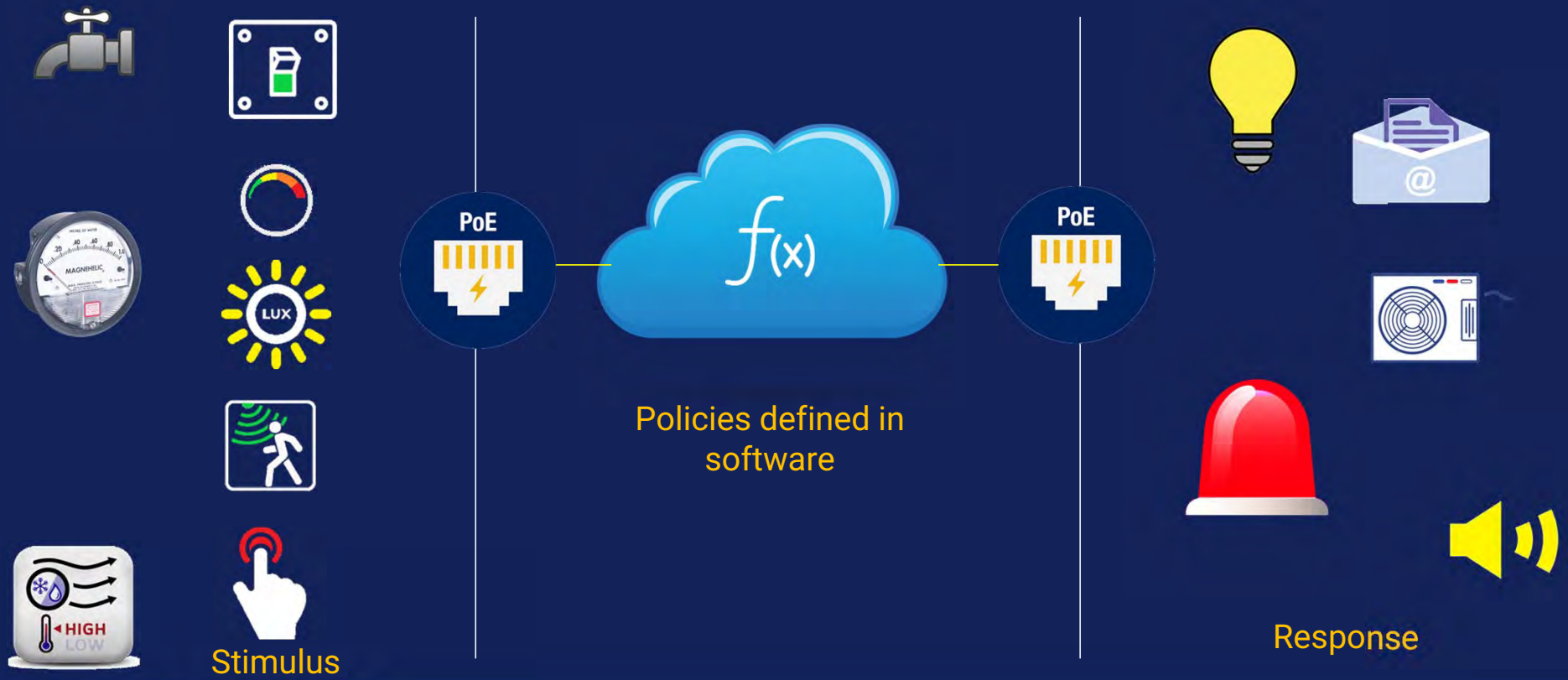


The Absorption Model



PoE unifies M-E-P….

Let's simplify the paradigm…



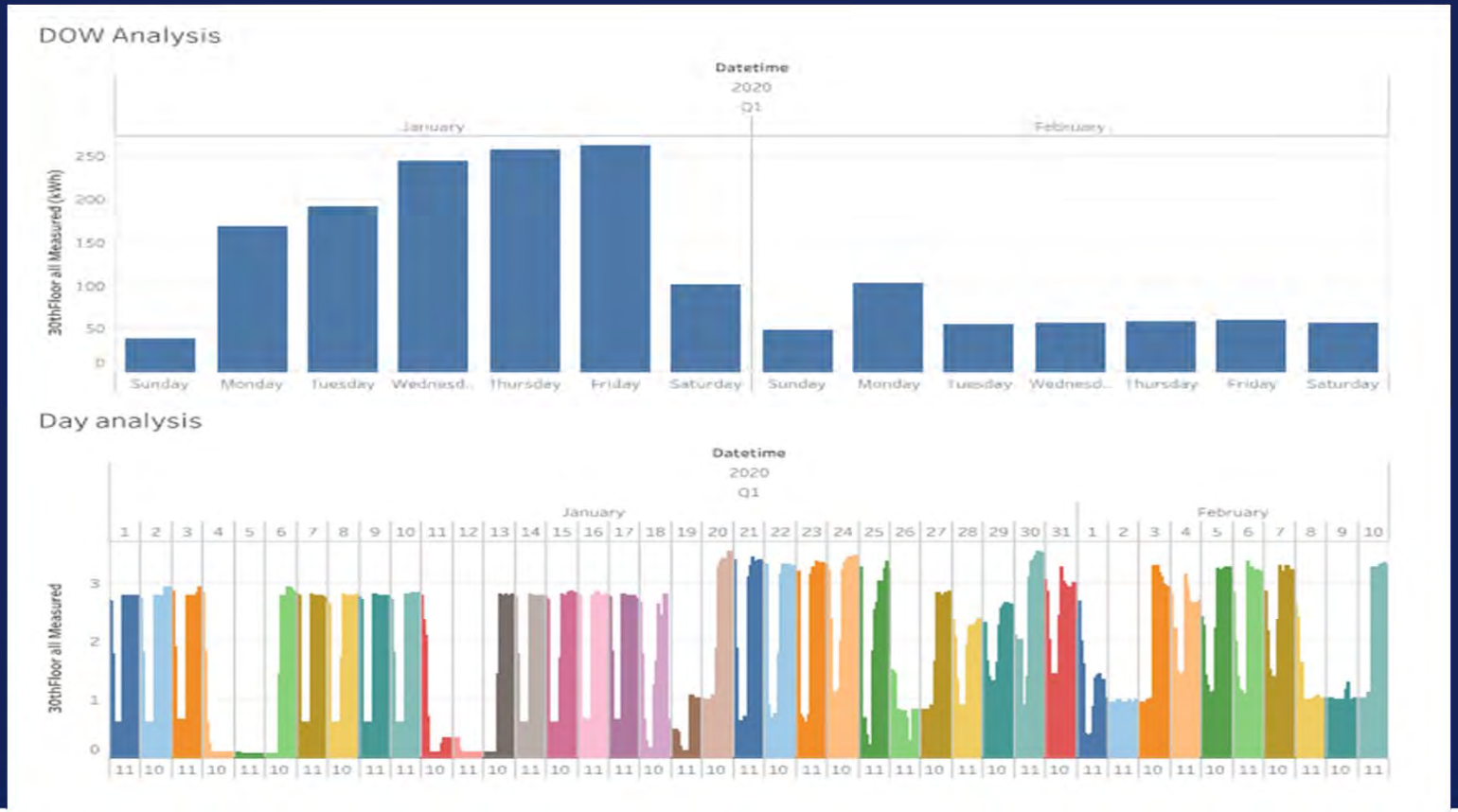

Global Replacement Options
Observability
Interoperability across many vendors
Benefits
Controllability
Space Utilization & Optimization
Increased Scope of Responsibility
More Technical (Training)
Challenges
Nascent, Changing
Needs to last 20+ years

Insight to your facility

Power meters, pressure meters, air flow meters et. al. provide feedback loops to changes in policy or input states

Software can aggregate and present the data in a meaningful way.

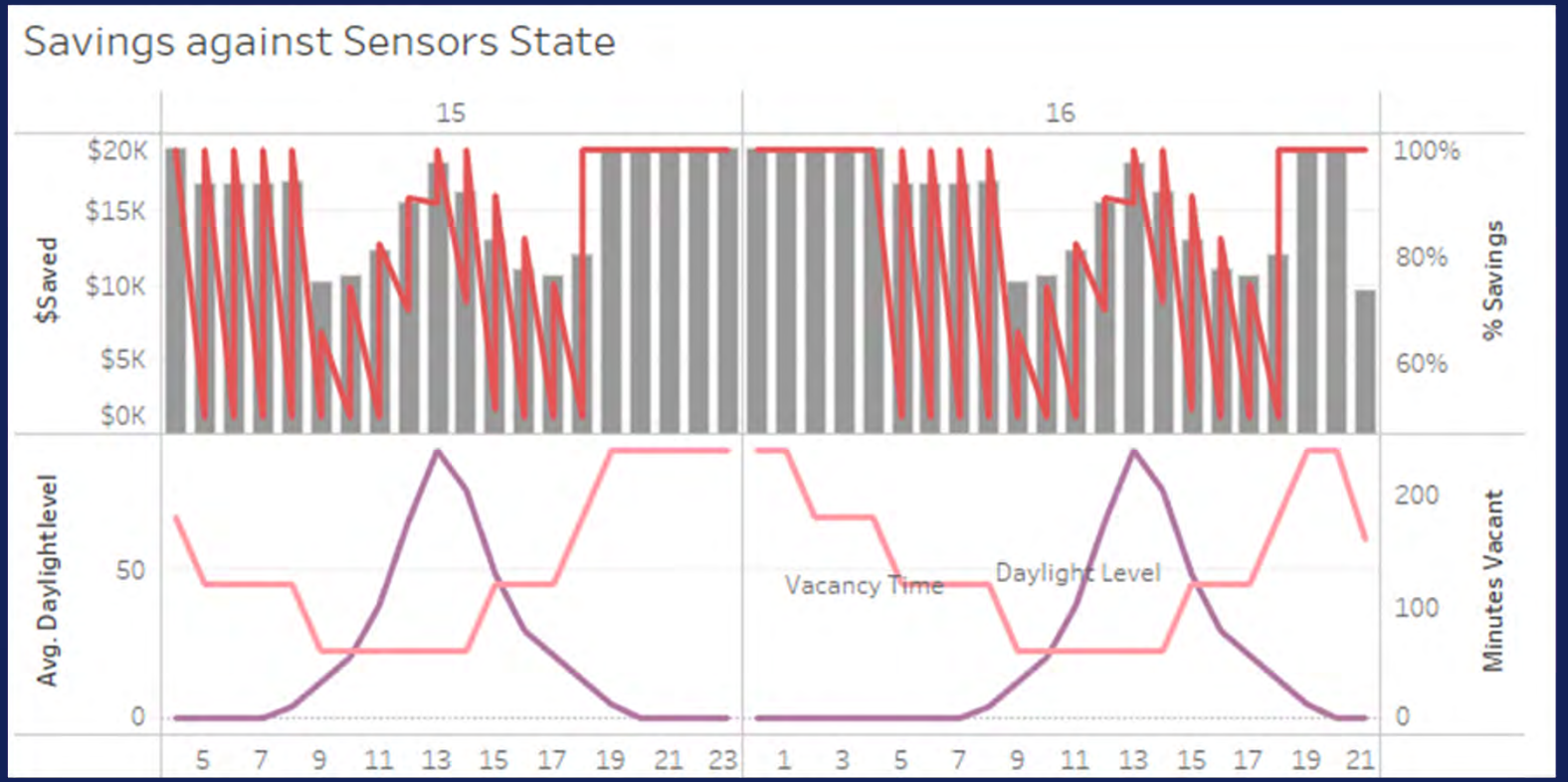
Sensor Feedback



Insight to your facility

Causality

Show which sensors are saving you the most or how time of day affects peak usage costs



Facilities / Operations Engagement Model

Design

Construction

Commissioning

Security

Maintenance

Services

Pre-Occupation

Post-Occupation

New Hire: Automation and Data Exchange (ADX) Engineer
New Committee: Must include CIO and COO and outside cyber security specialist

Pre-Occupancy Checklist

Design

- Participate in naming schema. Everything is now individually addressable and needs a name examples include: fixtures, wall switches, occupancy sensors, etc.
- Follow IT models – create separate VLAN's, subnets, VPNs – away from DATA networks
- Understand the **fidelity** of what you can ***observe*** and what you can ***control***

Construction

- Push/require for the "as-builts" to be autonomously generated. It eliminates (human) communication gaps.
- A PoE system should aggregate information of its subsystems
- Automate information collection – use humans for policy execution.

Commissioning

- PARTICIPATE in the startup process and use this as your training – do not wait until occupancy. Knowledge from training sessions is seldom retained.
- Make sure there is a process for recovering prior state to "undo" changes introduced.
- Secure "attic stock" and replacement strategies

Post-Occupancy Checklist

Security

- Integrate camera technology with lighting to ensure quality video capture, occupancy metrics
- Establish email/text policy notifications relative to specific areas at given times
- Track access to the PoE system and vigilance toward credentials integrity
- Use wired connections wherever possible – wireless can be inhibited by Denial of Service (DoS) or future additions of equipment

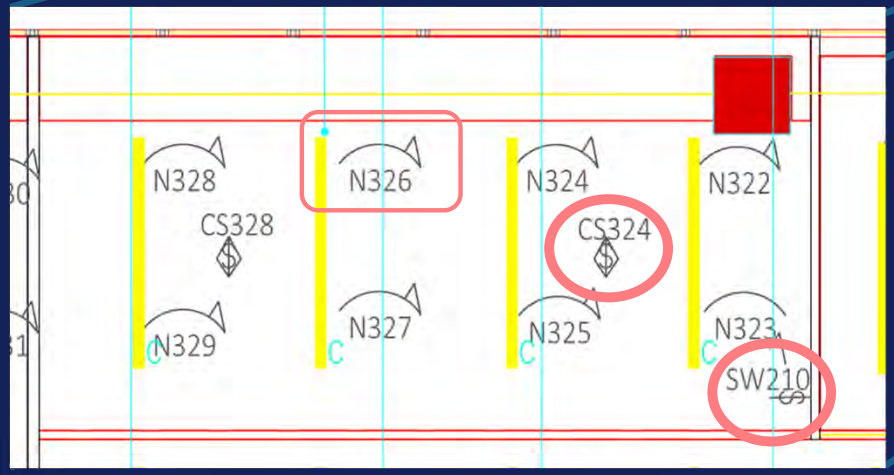
Maintenance

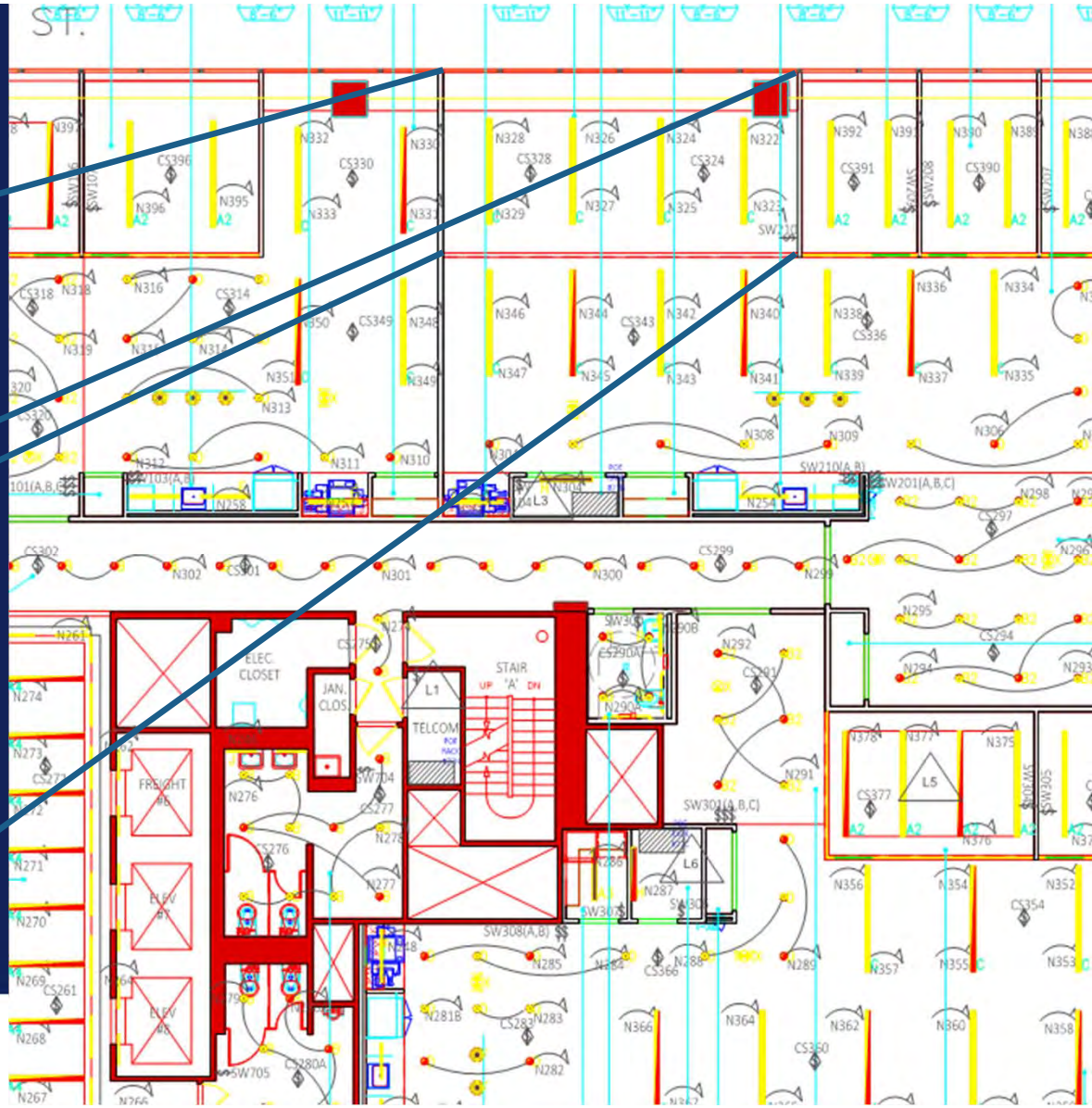
- Automate ticketing systems utilizing the name lexicons set up in DESIGN phase.
- Capture information autonomously; fix remotely
- Programmatic health checks – Power usage summaries (daily, weekly, monthly, yearly)
- Capture PREDICTIVE / PREVENTATIVE savings
- Secure HOT SWAP and REDUNDANT architectures
- Network engineer needed, close by or on hand
- Rapid Debug of technical interactions

Services

- Space utilization – ex conference room scheduling, status feedback
- Reduce response time on ticket resolution through accurate information acquisition
- Higher level engagement – Utility Demand Response load shedding
- Moves/space changes (re-commission of system)

Everything individually accessible ….needs a (predictable, consistent) name





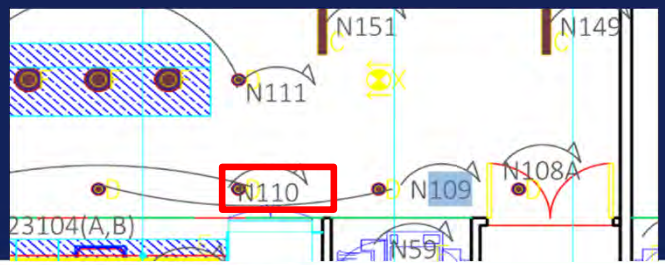
NAMING SCHEMA EXAMPLE

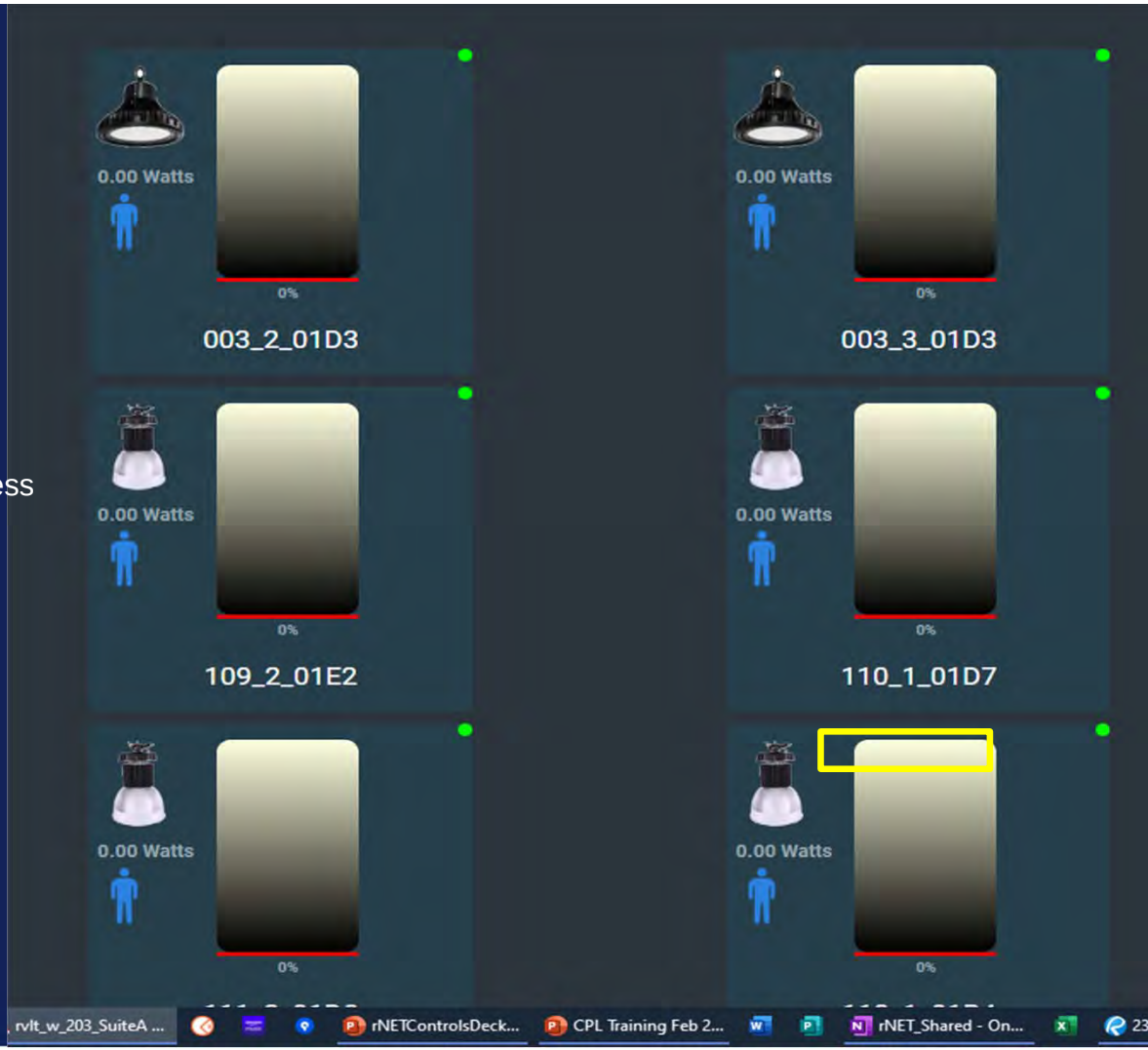
The name should link:

- the reflected ceiling plan (RCP) from the design
- the physical wire of its control node
- the MAC address of the control node

Node name 110_1_01D7

Node 110 on the RCP _ output wire 1 _ last 4 digits of MAC address





Example of automated “as built”

MACAddress	Output1	Output2	Output3	Output4	Input1	Input2	Input3	Input4
A0:22:4E:10:01:63	267_1_0163	267_2_0163						
A0:22:4E:10:01:74	246_1_0174_TL							
A0:22:4E:10:01:7B	268_1_017B		268_3_017B					
A0:22:4E:10:01:87	264_1_0187_TL							
A0:22:4E:10:01:88	263_1_0188_TL							
A0:22:4E:10:01:8B	265_1_018B_TL							
A0:22:4E:10:01:8D	261_1_018D_TL				261CS_1_018D			
A0:22:4E:10:01:8E	266_1_018E							
A0:22:4E:10:01:92	270_1_0192	270_2_0192						
A0:22:4E:10:01:93	269_1_0193	269_2_0193						
A0:22:4E:10:01:95	301_1_0195	301_2_0195	301_3_0195	301_4_0195	301CS_1_0195			
A0:22:4E:10:01:98	290A_1_0198	290A_2_0198	290A_3_0198	290A_4_0198	290ACS_1_0198	290WS_2_0198	290WS_3_0198	
A0:22:4E:10:01:99	271_1_0199	271_2_0199						
A0:22:4E:10:01:9A	273_1_019A	273_2_019A				273WS_2_019A	273WS_3_019A	
A0:22:4E:10:01:9B	280A_1_019B	280A_2_019B	280A_3_019B	280_4_019B_TL	280ACS_1_019B			
A0:22:4E:10:01:A8	274_1_01A8	274_2_01A8	274_3_01A8	274_4_01A8				
A0:22:4E:10:01:AC	277_1_01AC	277_2_01AC	277_3_01AC	277_4_01AC	277CS_1_01AC			
A0:22:4E:10:01:AD	279_1_01AD	279_2_01AD	279_3_01AD	279_4_01AD		279WS_2_01AD	279WS_3_01AD	
A0:22:4E:10:01:AF	278_1_01AF	278_2_01AF	278_3_01AF	278_4_01AF		278WS_2_01AF	278WS_3_01AF	
A0:22:4E:10:01:B0	272_1_01B0	272_2_01B0			272CS_1_01B0			
A0:22:4E:10:01:BF	299_1_01BF	299_2_01BF	299_3_01BF	299_4_01BF	299CS_1_01BF			
A0:22:4E:10:01:C0	302_1_01C0	302_2_01C0	302_3_01C0	302_4_01C0	302CS_1_01C0			
A0:22:4E:10:01:CF	276_1_01CF	276_2_01CF	276_3_01CF		276CS_1_01CF			
A0:22:4E:10:01:D1	300_1_01D1	300_2_01D1	300_3_01D1	300_4_01D1				

System self reports how it is programmed in a manner helpful toward debug of issues which removes communication issues introduced in handoff of occupancy

Conclusions:

- Get involved in the process early; hire an ADX engineer
- Ensure if the internet goes down, the ONLY thing you lose are data collection and remote access
- Plan to become proficient in networks and IT tools to manage and maintain assets
- Anticipate new services that tie together information and efficiencies (ex space utilization and conference rooms)
- Secure and plan replacement parts strategies and push interoperability between different systems
- Outside agency support for integration can help – but needs to work within budget
- Avoid recurring costs for software

SECTION BREAK

Courtesy of the Sinclair Marriott

ABOUT ME

Andy's focus is on commercial business solutions relating to window coverings and natural daylight management. Andy Achieved his WELL AP in January 2020. Andy started his career in the solar shading industry in 1999 in Houston, Texas. Andy served on the NFRC 100A and 200A 2010 window attachment subcommittees.

Andy Rittenhouse, LEED GA, WELL AP

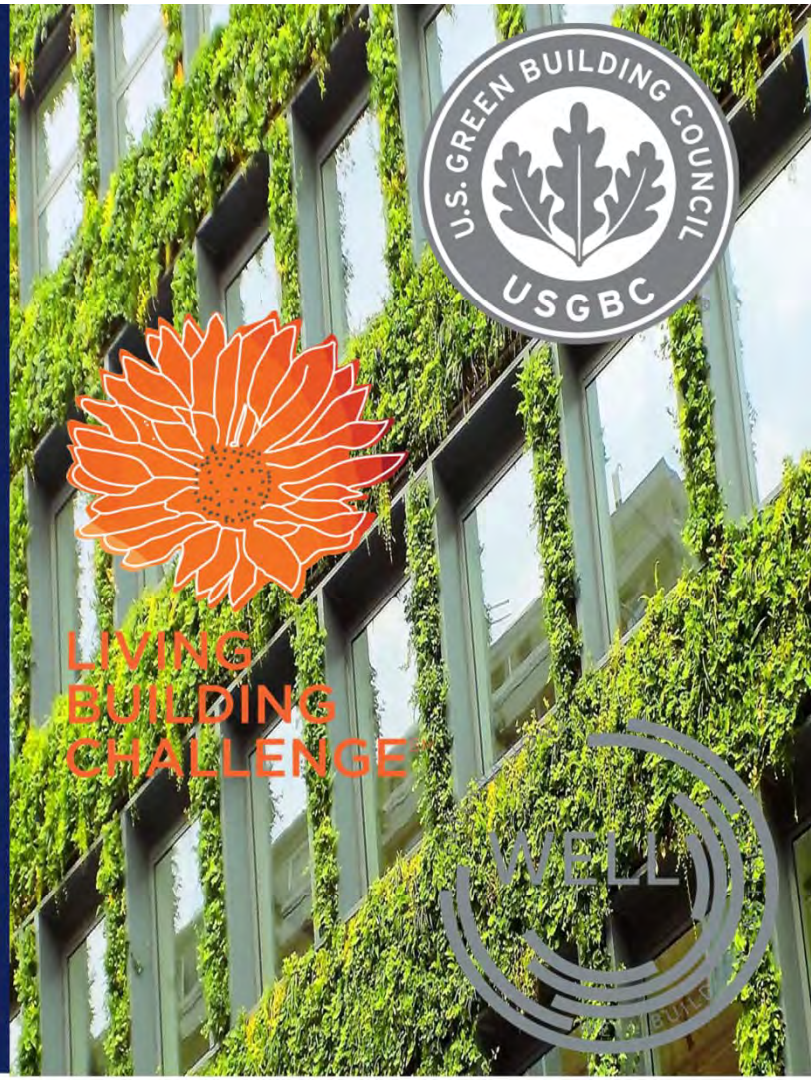
Specification Manager, South Central/Midwest US

somfy®

Green building rating systems and standards are being used to help create sustainable buildings.

These include:
LEED v4, WELL, and the Living Building Challenge

While the standards vary from program to program, integrated automated shades and lighting offer impressive synergies in achieving project certifications.



01 *WELL Building Standard*

02 **LEED Strategies**

03 **Practical applications**

04 **Standard Examples**

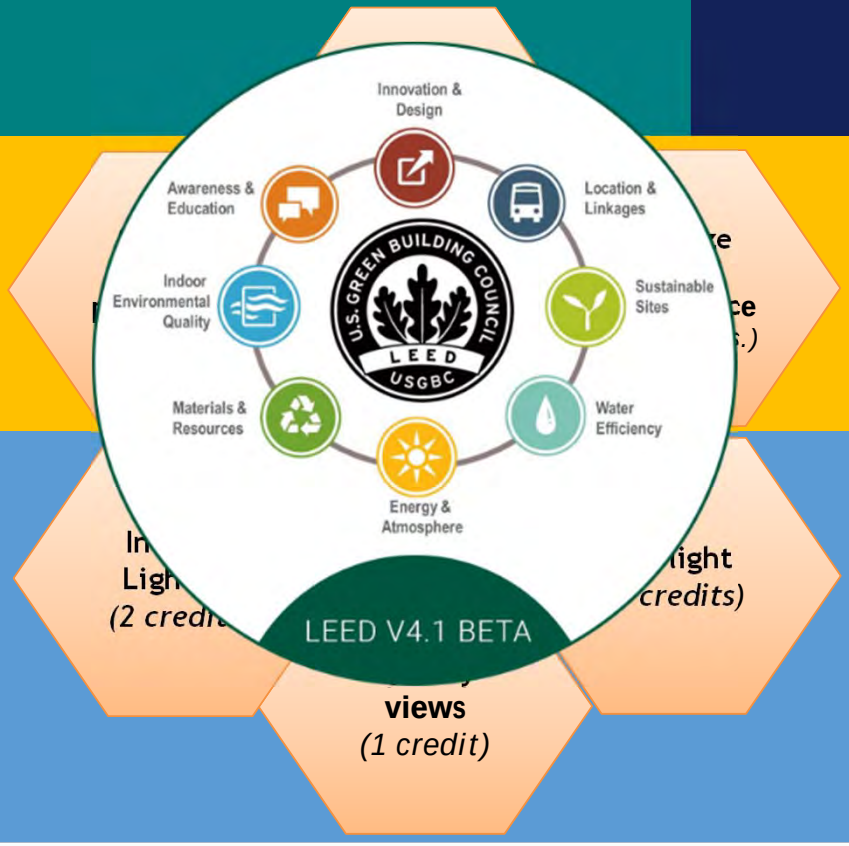
WELL Building Standard

INTERNATIONAL WELL BUILDING INSTITUTE™

IBWI is focused exclusively on the ways that buildings, and everything in them, can improve our comfort, drive better choices, and generally enhance, not compromise, our health and wellness.

United States Green Building Council

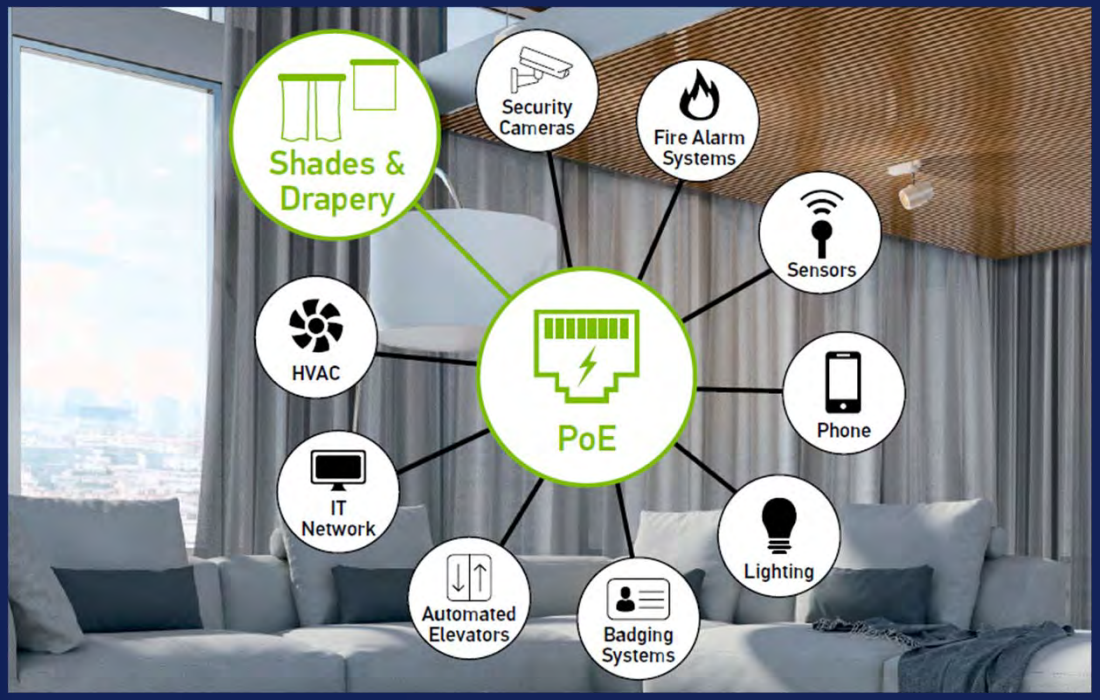
Integrative Process
Possible 33 points



ENERGY & ATMOSPHERE
Possible 33 points

Indoor Environmental Quality
Possible 16 points

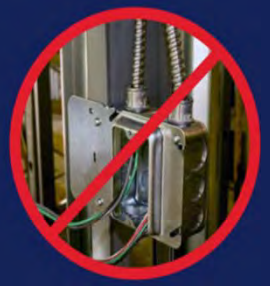
POE Shading Solutions



Savings up to

46%

on infrastructure cost & service for shading!



Cut costs:
Lower infrastructure costs and capital expenses by eliminating wall circuits for endpoints and consolidating continuous power supply systems.

Save time:
Shorten deployment time through reducing the stages of construction and installation.

Efficiency:
Simplifies the building code process for new construction or renovations.

Conserve energy:
Reduce energy expenditures using Cisco energy management systems.

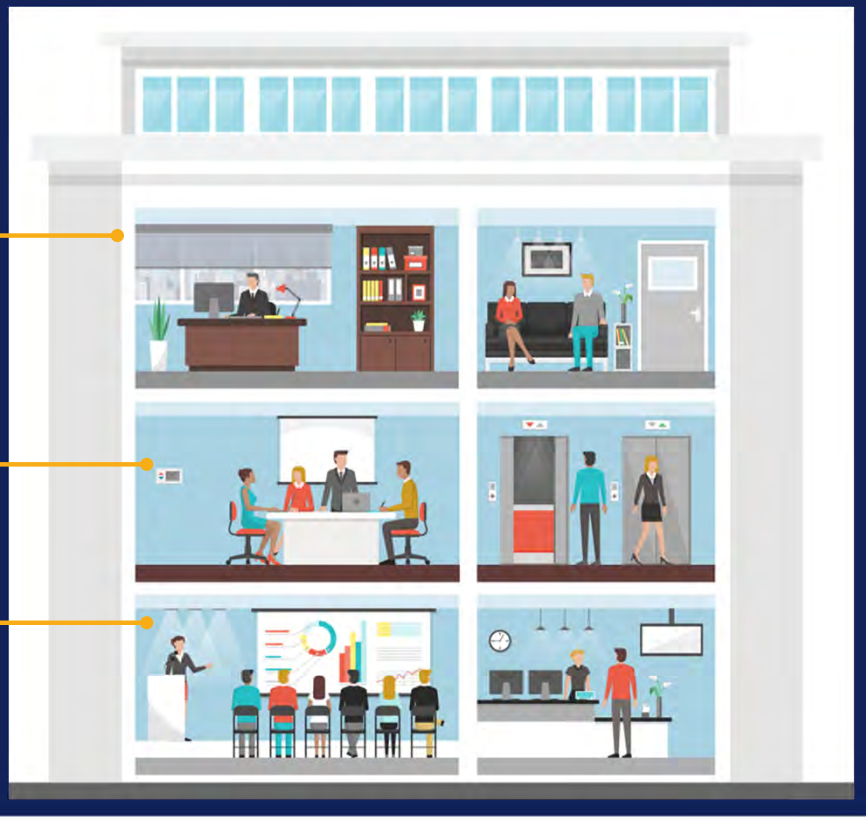
Improve performance:
Extend intelligent load-shedding capabilities to switch-connected devices.

This technology is being applied to many applications making buildings smarter and more efficient:

Shading

HVAC

Lighting



Automated power-saving adjustments based on time-of-day and weather:

Shade control based on user preference and conditions

Thermostat set to a comfortable temperature

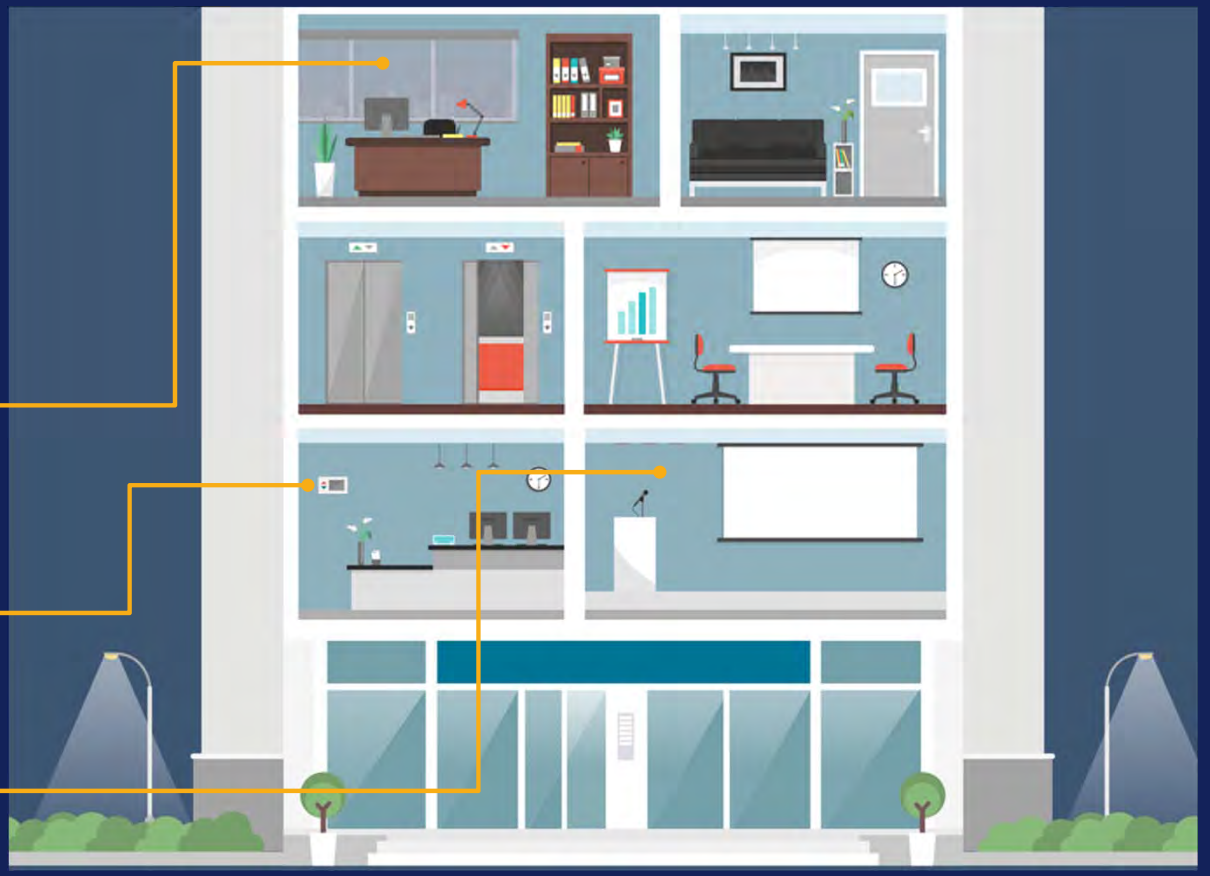
Lighting on where needed

Automated power-saving adjustments based on time-of-day and weather:

Shades closed at night

Thermostat set to a lower temperature to save power

Lighting off in most of the building



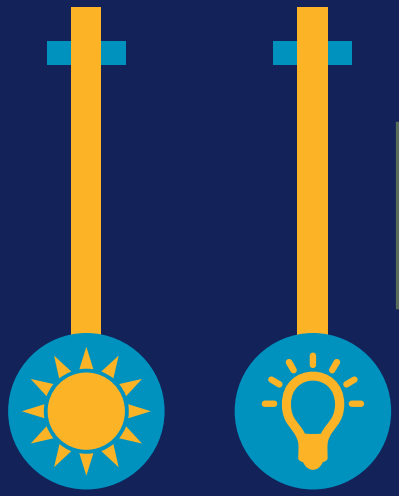
Enable data collection for cross system efficiencies:

Convenience of cloud based apps

Designing for Offices of the Future: Spatial Considerations

- Spatial design while maintaining access to natural light
- Badging Systems that manage smart workstations
- Custom Zones for localized occupant comfort and control

WELL Feature 53: Visual Lighting Design



Maintain an average light intensity of 215 lux or more

Measured on the horizontal work plane

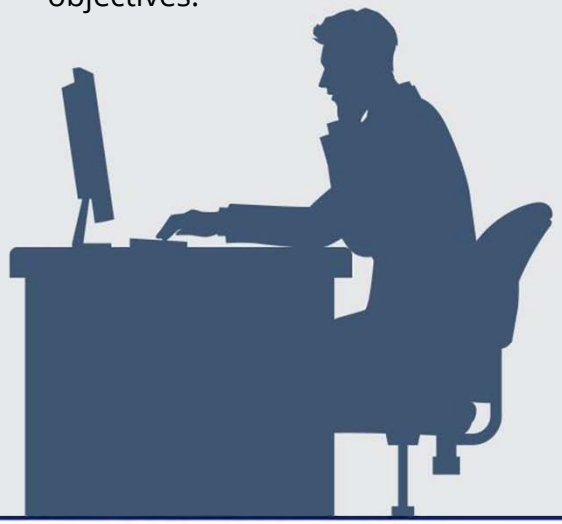
The lights may be dimmed in the presence of daylight

LEED

Credit 7: Daylight (1–3 Points)

The intent of this credit is to **connect building occupants with the outdoors, reinforce circadian rhythms, and reduce the use of electrical lighting** by introducing daylight into the space. Earning this credit requires the inclusion of manual or **automatic glare-control devices** in all regularly occupied spaces.

- In addition to the glare-control devices, **supporting simulations or measurements must be completed** to prove that the design achieves certain daylighting objectives.



4:00 PM

SECTION BREAK

Courtesy of the Sinclair Marriott

CONTACT US

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AND RESOURCES ON YOUR
FAVORITE SOCIAL CHANNELS

Connect With Us