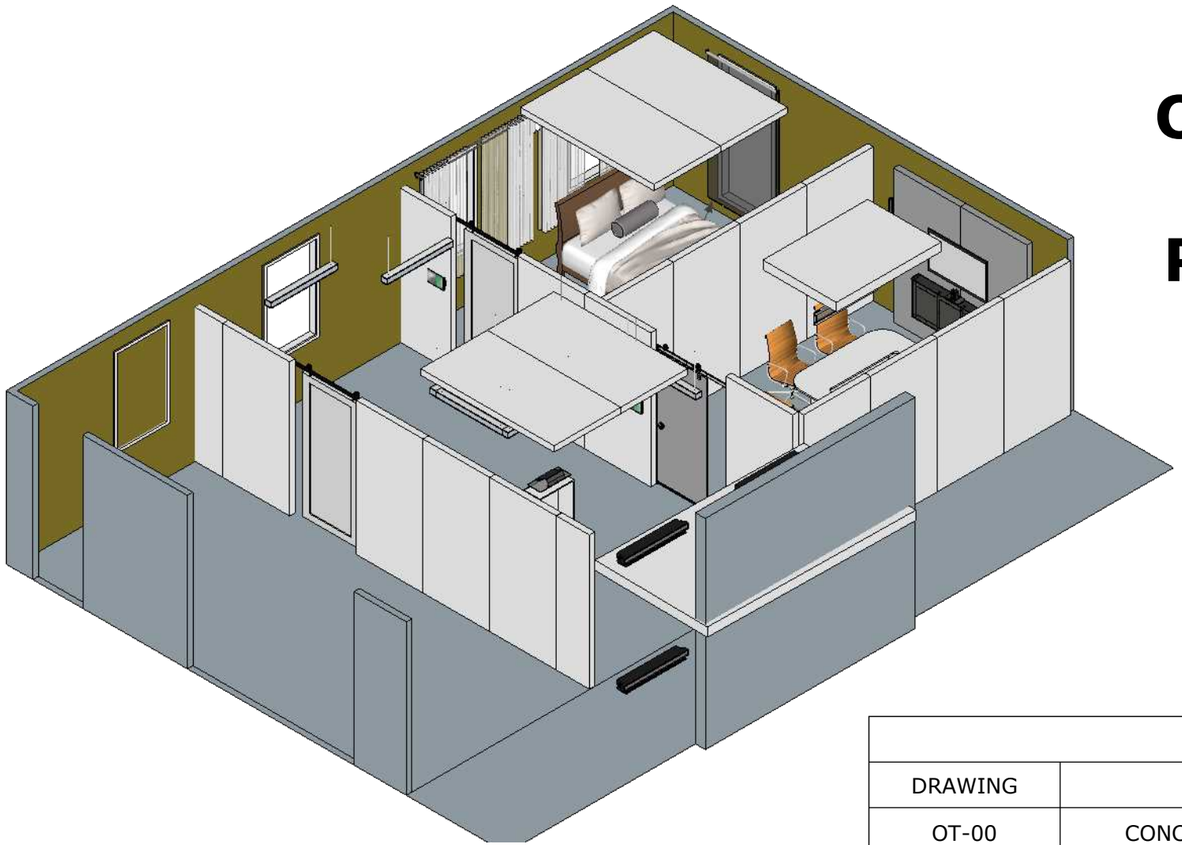


Concept Level Operational Technology (OT) Drawing Set for PoE Lighting and Automation

INDEX		
DRAWING	TITLE	DESCRIPTION
OT-00	CONCEPT DESIGN LEVEL DRAWINGS	COVER PAGE
OT-01	CONCEPT DESIGN CENTRALIZED	CONCEPT DESIGN ESTIMATING INFORMATION FOR A CENTRALIZED PoE NETWORK
OT-02	CONCEPT DESIGN DISTRIBUTED	CONCEPT DESIGN ESTIMATING INFORMATION FOR A DISTRIBUTED PoE NETWORK
OT-03	OT - IT NETWORK INTERFACE 1 OF 2	OT-IT INTERFACE MODEL OPTIONS FOR OWNER REVIEW AND DECISION
OT-04	OT - IT NETWORK INTERFACE 2 OF 2	OT-IT INTERFACE MODEL OPTIONS FOR OWNER REVIEW AND DECISION
OT-05	OT CENTRALIZED NETWORK DESIGN	CONCEPT DESIGN LAYOUT INFORMATION FOR A CENTRALIZED PoE NETWORK
OT-06	OT DISTRIBUTED NETWORK DESIGN	CONCEPT DESIGN LAYOUT INFORMATION FOR A DISTRIBUTED PoE NETWORK

PoE Texas

PoE Automation and Lighting Pre-Design

3616 Far West Blvd
Suite 117-294
Austin TX 78731

DATE:
October 12, 2022

TITLE:
CONCEPT DESIGN LEVEL DRAWINGS

DRAWING NUMBER:

OT-00

Centralized Power and Data Control
For 20,000-50,000 sqft or less

Intended for Concept Design Phase Only

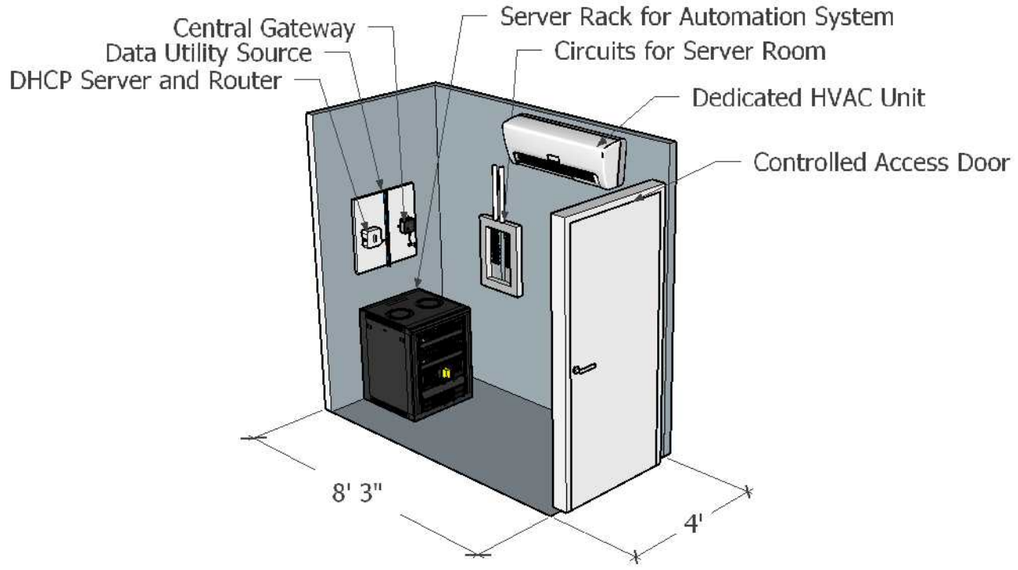
Guidelines for Concept Level Design of the Utility Space

PoE System Sizing Guidelines:
Lighting - 24 ports per 5,000 sqft
Blinds - 1 port per window
Access Control - 1.5 ports per door
Security Camera - 1 port per camera
Recommended Spares - 10%
Rack Size = (Total # Ports rounded units of 24)*2
Plus 5u for emergency lighting system for every 72 ports (min 1)

HVAC Load Sizing:
200 watts per 24 ports

Electrical Load Sizing:
20 amp circuit for 24 ports
+1 20 amp emergency circuit for every 48 ports

MDF Room Sizing:
Minimum 32 sqft upto 20,000 sqft office
100 sqft 20,000 to 50,000 sqft
Multiple MDF for 50,000 - 100,000 sqft



Key Features of the PoE Automation Utility Room

Controlled Access Door - Lockable door either through key locks or access control managed door

Dedicated HVAC Unit - See guidelines for sizing. This is a dedicated HVAC Unit for this room

Power Circuits for the Automation - See guidelines for sizing including emergency lighting power

Data Utility Source - Fire retardant wood panel wall mounted for bringing in the data source, mounting the localized router, and optionally one gateway controller

Fire Suppression System - Waterless fire suppression system for the room if sprinklers are required for the facility

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DATE:
October 12, 2022

TITLE:
CONCEPT DESIGN CENTRALIZED

DRAWING NUMBER:
OT-01

Distributed Power and Data Control
For 50,000 sqft or greater

Intended for Concept Design Phase Only

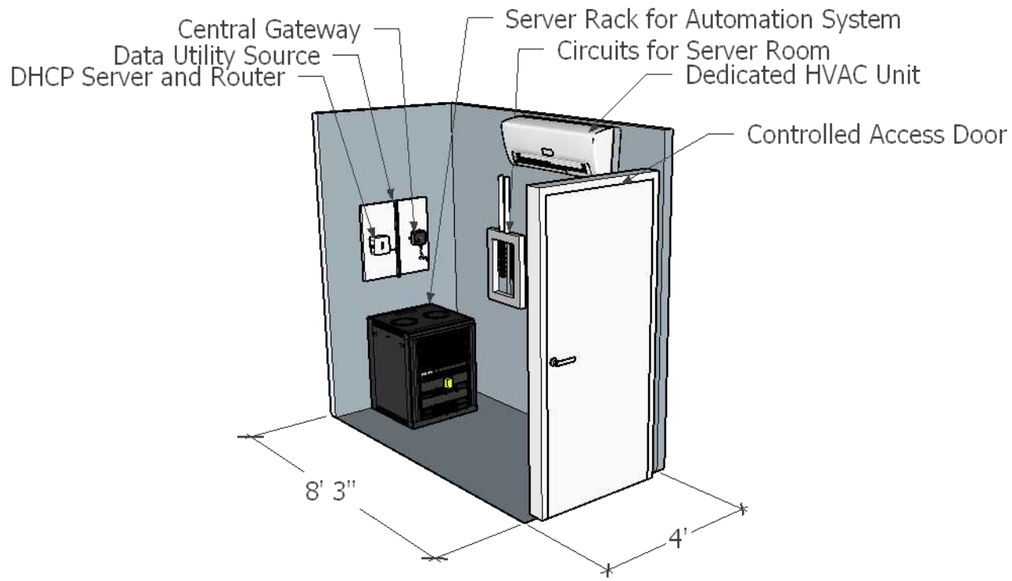
Guidelines for Concept Level Design of the Utility Space

PoE System Sizing Guidelines:
Lighting - 1x 8 port switch per 350-500 sqft
Blinds - 1 port per window
Access Control - 1.5 ports per door
Security Camera - 1 port per camera
Recommended Spares - 10%
Rack Size = (Total # Ports rounded units of 24)+(1 PSU per 6 switches)
Plus 5u for emergency lighting system for every 8 switches (min 1 unit)

HVAC Load Sizing:
150 watts per PSU

Electrical Load Sizing:
20 amp circuit per PSU
+1 20 amp emergency circuit for every 48 ports

MDF Room Sizing:
Minimum 32 sqft upto 100,000 sqft office space



Key Features of the PoE Automation Utility Room

Controlled Access Door - Lockable door either through key locks or access control managed door

Dedicated HVAC Unit - See guidelines for sizing. This is a dedicated HVAC Unit for this room

Power Circuits for the Automation - See guidelines for sizing including emergency lighting power

Data Utility Source - Fire retardant wood panel wall mounted for bringing in the data source, mounting the localized router, and optionally one gateway controller

Fire Suppression System - Waterless fire suppression system for the room if sprinklers are required for the facility

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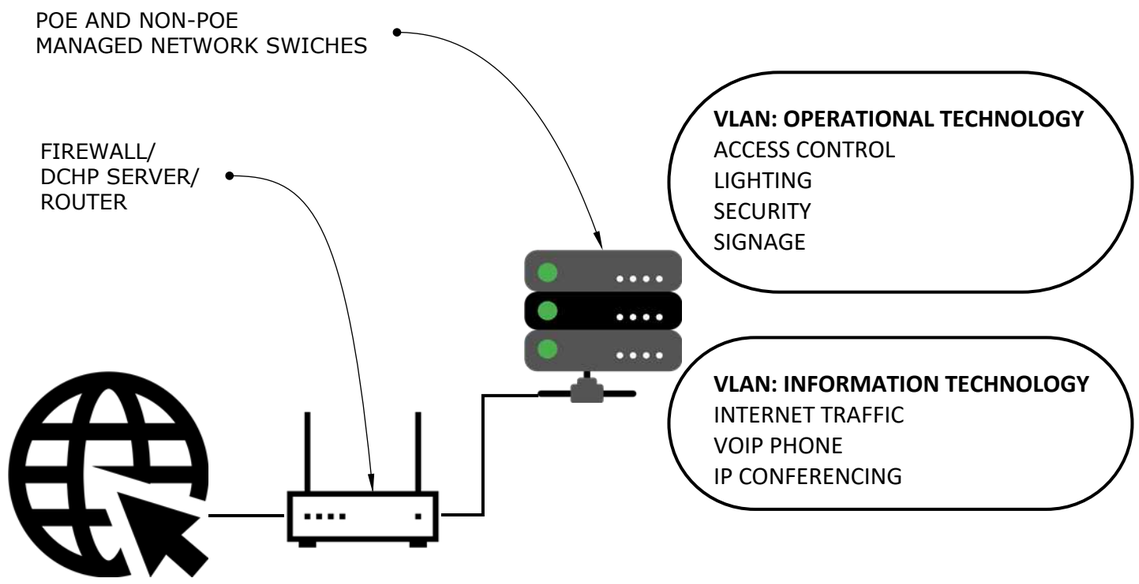
DATE:
October 12, 2022

TITLE:
CONCEPT DESIGN DISTRIBUTED

DRAWING NUMBER:
OT-02

OT (Operational Technology) and IT (Information Technology) Interface Configurations

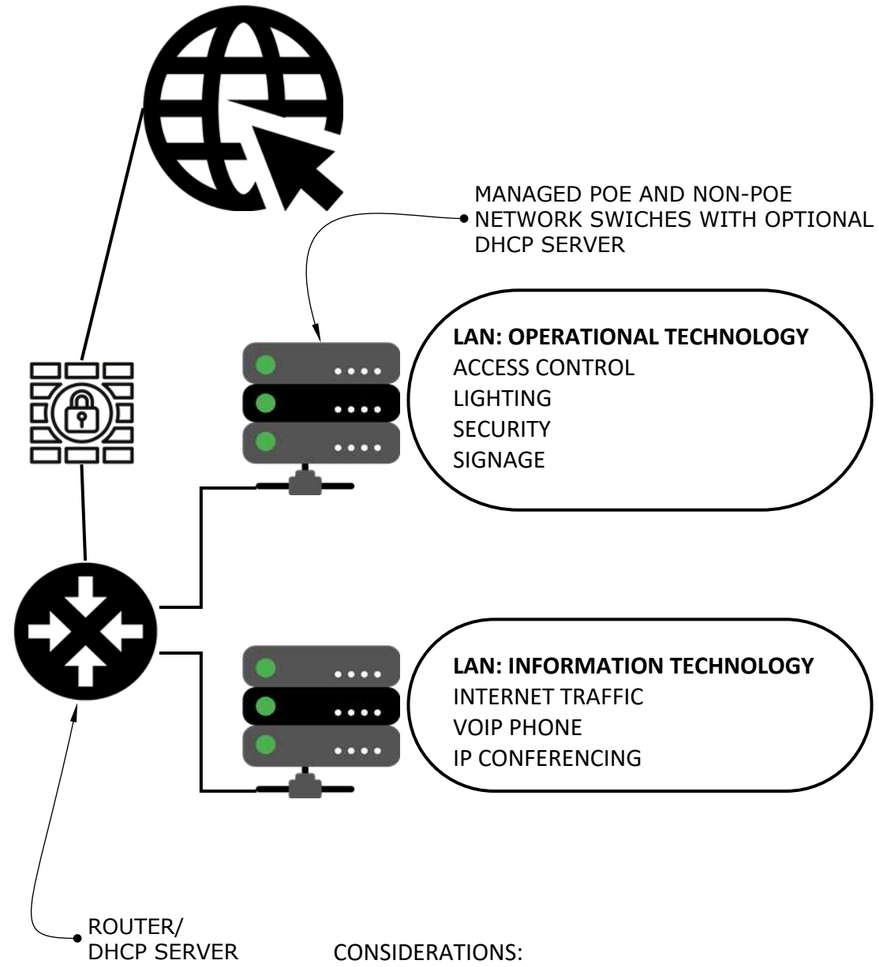


CONSIDERATIONS:
- NETWORK USERS ARE TRUSTED INSIDE NETWORK
- OPERATIONAL SECURITY THREAT IS LOW
- CYBER SECURITY THREAT IS LOW

SMALL, PRIVATE OFFICES WHERE PHYSICAL SECURITY PREVENTS GENERAL ACCESS TO THE NETWORK AND OPERATIONAL SYSTEMS AND IT MANAGES THE NETWORK SECURITY

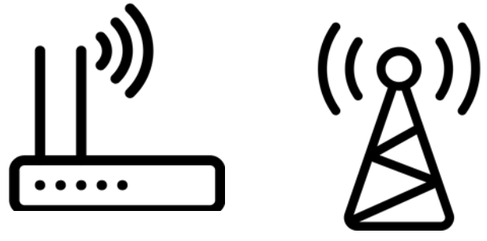
OPTION 1 - VLAN SEGREGATED OT/IT NETWORKS

OPTION 2 - PHYSICAL LAN SEGREGATED OT/IT NETWORKS



CONSIDERATIONS:
- NETWORK USERS MAYBE TEMPORARY CLIENTS OR OUTSIDE SECURITY PROTOCOLS
- OPERATIONAL SECURITY THREAT IS MODERATE
- CYBER SECURITY THREAT IS MODERATE

SPACES WITH NETWORK ACCESS FOR THE PUBLIC WHERE IT HAS RESPONSIBILITY TO MAINTAIN SECURITY OVER ALL NETWORK BASED FUNCTIONS



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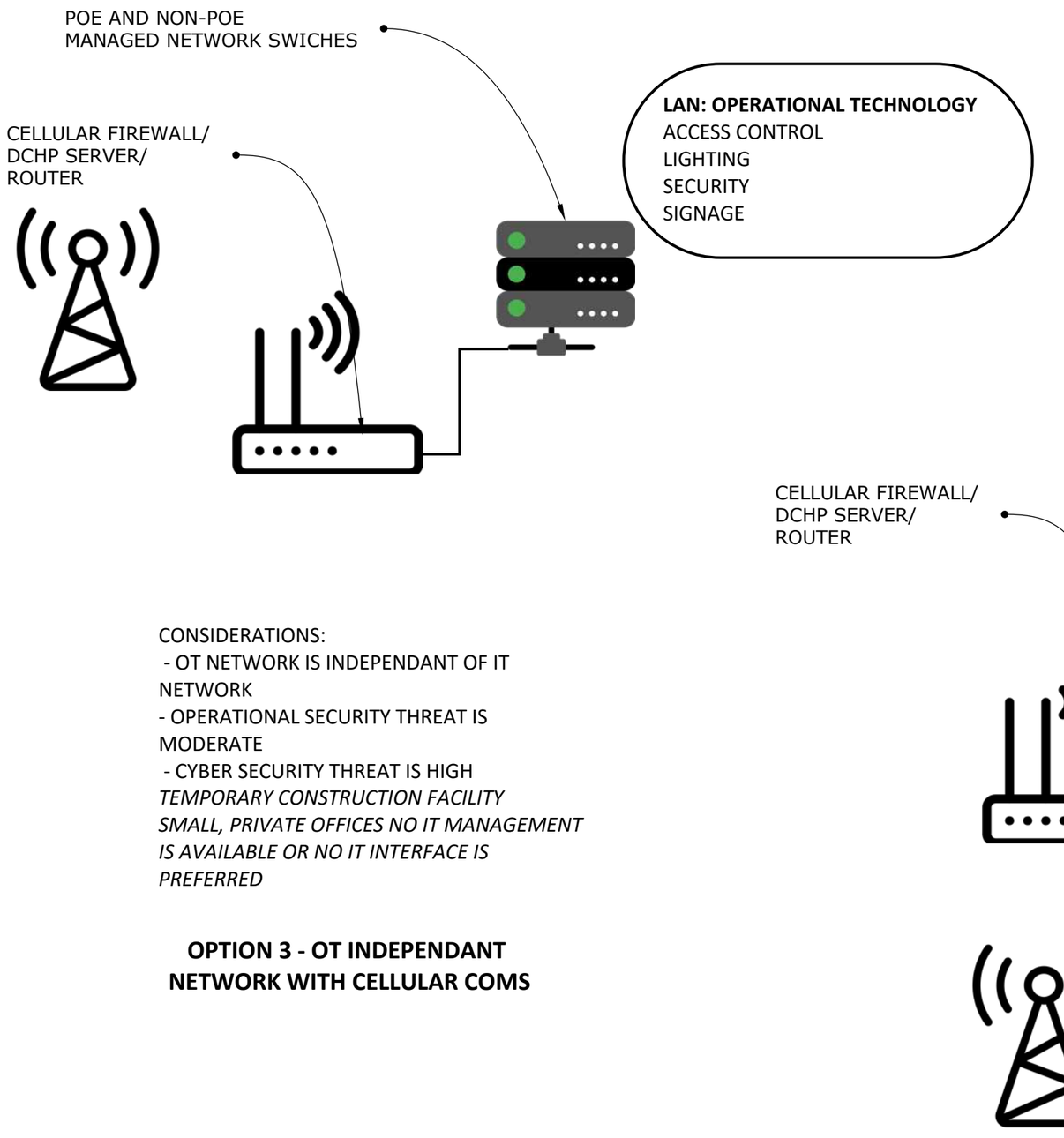
DATE:
October 12, 2022

TITLE:
OT - IT NETWORK INTERFACE 1 OF 2

DRAWING NUMBER:

OT-03

OT (Operational Technology) and IT (Information Technology) Interface Configurations

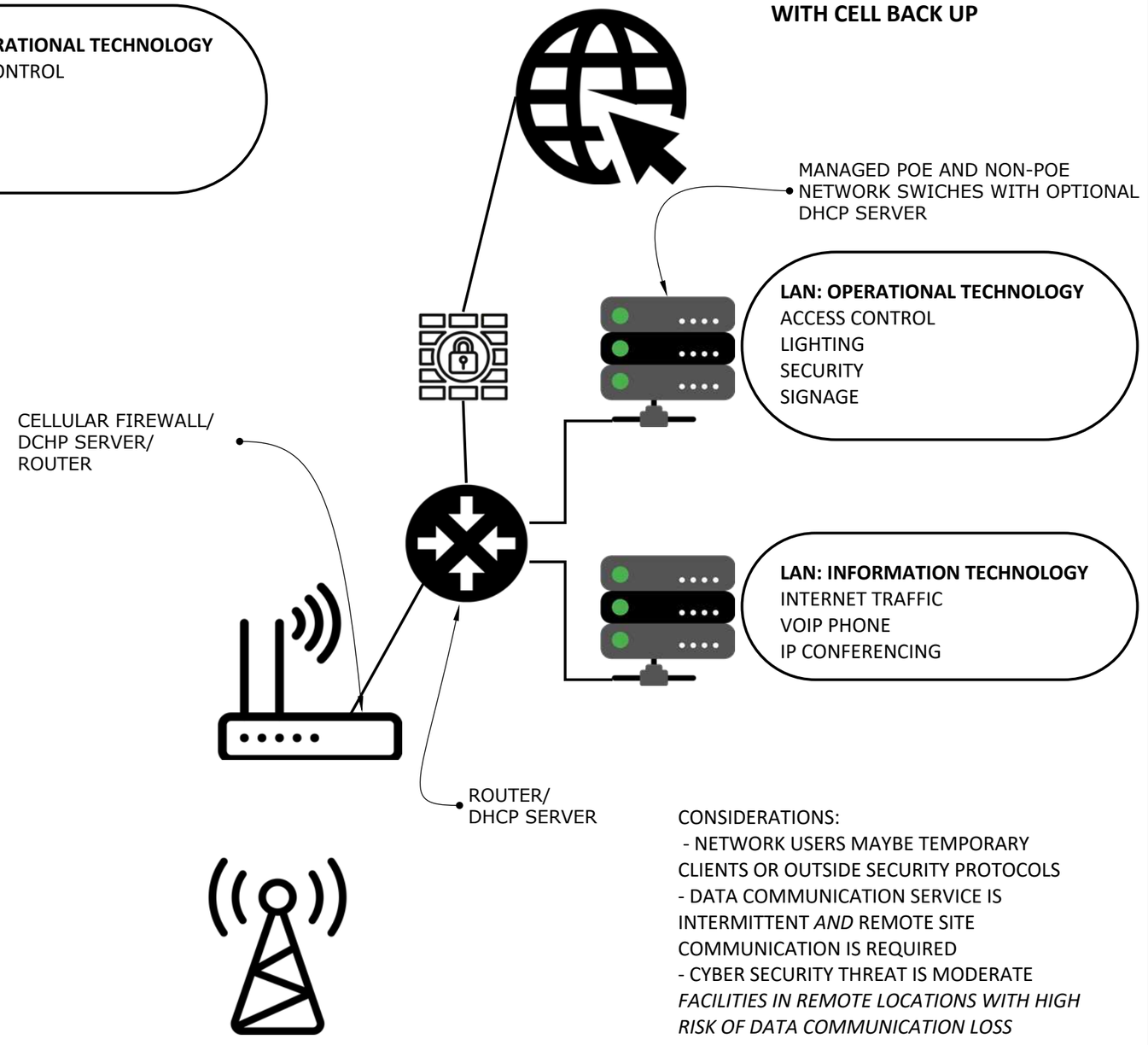


CONSIDERATIONS:
- OT NETWORK IS INDEPENDANT OF IT NETWORK
- OPERATIONAL SECURITY THREAT IS MODERATE
- CYBER SECURITY THREAT IS HIGH

TEMPORARY CONSTRUCTION FACILITY SMALL, PRIVATE OFFICES NO IT MANAGEMENT IS AVAILABLE OR NO IT INTERFACE IS PREFERRED

OPTION 3 - OT INDEPENDANT NETWORK WITH CELLULAR COMS

OPTION 4 - PHYSICAL LAN SEGREGATED OT/IT NETWORKS WITH CELL BACK UP



CONSIDERATIONS:
- NETWORK USERS MAYBE TEMPORARY CLIENTS OR OUTSIDE SECURITY PROTOCOLS
- DATA COMMUNICATION SERVICE IS INTERMITTENT *AND* REMOTE SITE COMMUNICATION IS REQUIRED
- CYBER SECURITY THREAT IS MODERATE

FACILITIES IN REMOTE LOCATIONS WITH HIGH RISK OF DATA COMMUNICATION LOSS

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DATE:
October 12, 2022

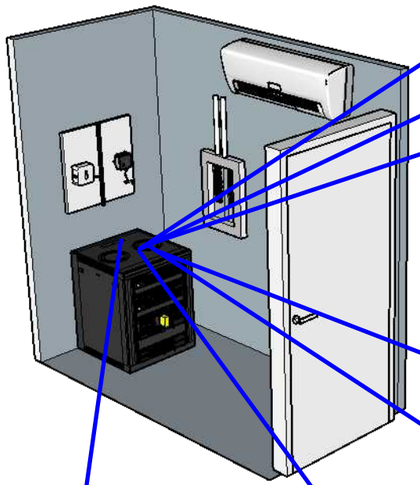
TITLE:
OT - IT NETWORK INTERFACE 2 OF 2

DRAWING NUMBER:
OT-04

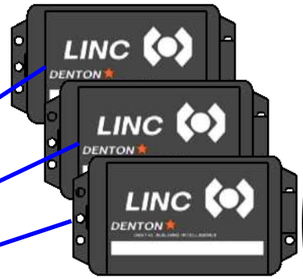
OT Network General Layout
Centralized Network Concept

CONSIDERATIONS:
- SIZE: Centralized Networks make sense for projects of moderate to small size where a larger Main Distribution Facility (MDF) is preferred, relatively high density power, and on a single floor
- TYPICAL APPLICATIONS: Moderate tenant finish out, small to medium retail

CENTRALIZED MDF ROOM



DENTON LINC NODE FOR NON-POE DEVICES



Outputs - 4
4x On/Off Lights
2x CCT Lights
1x RGBW Light
1x Access Control/Maglock
Any 24-48 DC Device

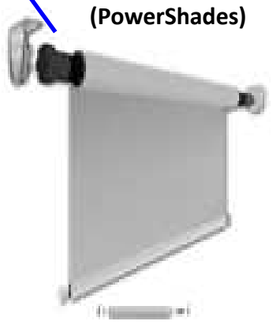
Inputs - 4
Motion Sensors
Push Buttons
Temp/Humidity Sensors
0-10 VDC
Dry Contact
24 VDC signal

DENTON COR-TAP
Technology Access Point

Access Point for:
Wifi
Enocean
ZigBee
DMX

PoE Camera
People Counting
Access Control
Occupancy Detection

Native PoE Shades (PowerShades)



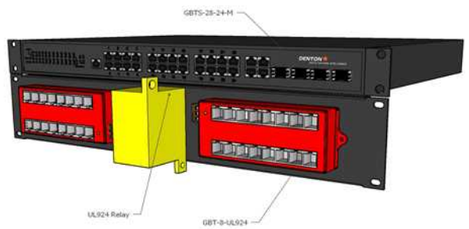
DENTON TAB 7 OR TABLET
PoE Tablet or iPad/Tablet Computers

RECOMMENDED NETWORK HARDWARE

GBTS-28-24-M
24 Port IEEE 802.3bt DC Powered Switch

GBT-24-M
24 Port IEEE 802.3bt DC Powered Midspan Injector

PS-53v3000w
UL62368-1 3,000 or 6,000 watt DC Power Supply



GBT-8-UL924
8 Port UL924 Power Transfer Device for PoE Lighting

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DATE:
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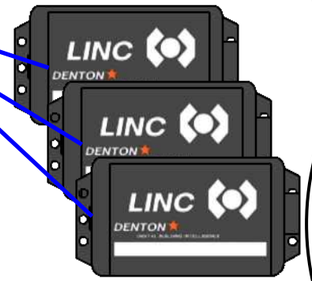
TITLE:
OT CENTRALIZED NETWORK DESIGN

DRAWING NUMBER:
OT-05

OT Network General Layout
Distributed Network Concept

CONSIDERATIONS:
- SIZE: Distributed Networks make sense for projects with smaller, discrete units like classrooms or hospitality where a more remote Main Distribution Facility (MDF) is preferred. Multi-floor, distributed architecture
- TYPICAL APPLICATIONS: Hospitality, Classrooms, corporate campuses

DENTON LINC NODE FOR NON-POE DEVICES



Outputs - 4
4x On/Off Lights
2x CCT Lights
1x RGBW Light
1x Access Control/Maglock
Any 24-48 DC Device

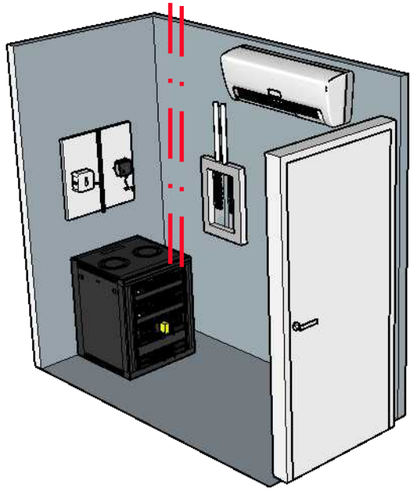
Inputs - 4
Motion Sensors
Push Buttons
Temp/Humidity Sensors
0-10 VDC
Dry Contact
24 VDC signal

DENTON TAB 7 OR TABLET
PoE Tablet or iPad/Tablet Computers

DENTON COR-TAP
Technology Access Point

Access Point for:
Wifi
Enocean
ZigBee
DMX

Hybrid Fiber/Power Class 2 Cable



CENTRALIZED MDF ROOM

Native PoE Shades (PowerShades)

PoE Camera
People Counting
Access Control
Occupancy Detection

RECOMMENDED NETWORK HARDWARE

GBTS-10-8-M
8 Port IEEE 802.3bt DC Powered Switch

24 Port SFP Fiber Switch

PS-53v3000w
UL62368-1 3,000 or 6,000 watt DC Power Supply

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DATE:
October 12, 2022

TITLE:
OT DISTRIBUTED NETWORK DESIGN

DRAWING NUMBER:
OT-06