

Welcome to the

2008 BICSI FALL CONFERENCE

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Exhibition: Sept. 28-Oct. 1



“Are You Playing in the Zone”

Rodney Casteel, RCDD/NTS
CommScope Enterprise Fiber Solutions
Global Fiber Applications Manager
TIA FOLS Chair

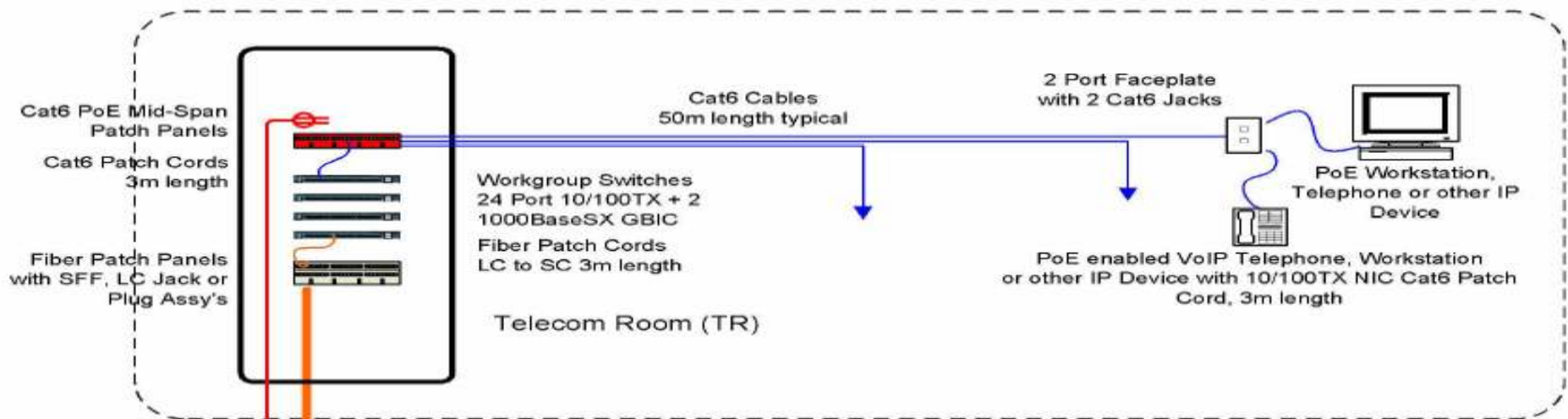


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The views expressed in this presentation, either written or implied, are the views of the presenter and may not be the views of anyone else in the room. All information is factual to the best of the presenter's knowledge and any errors or mistatements are due strictly to lack of sleep and/or insanity.

Outline

- Standard's Based Topologies
 - Hierarchical Star
 - Centralized
 - Zone (FTTE)
- Zone (FTTE) Architecture in Enterprise
- Zone Architecture in Data Center



Eighth Floor

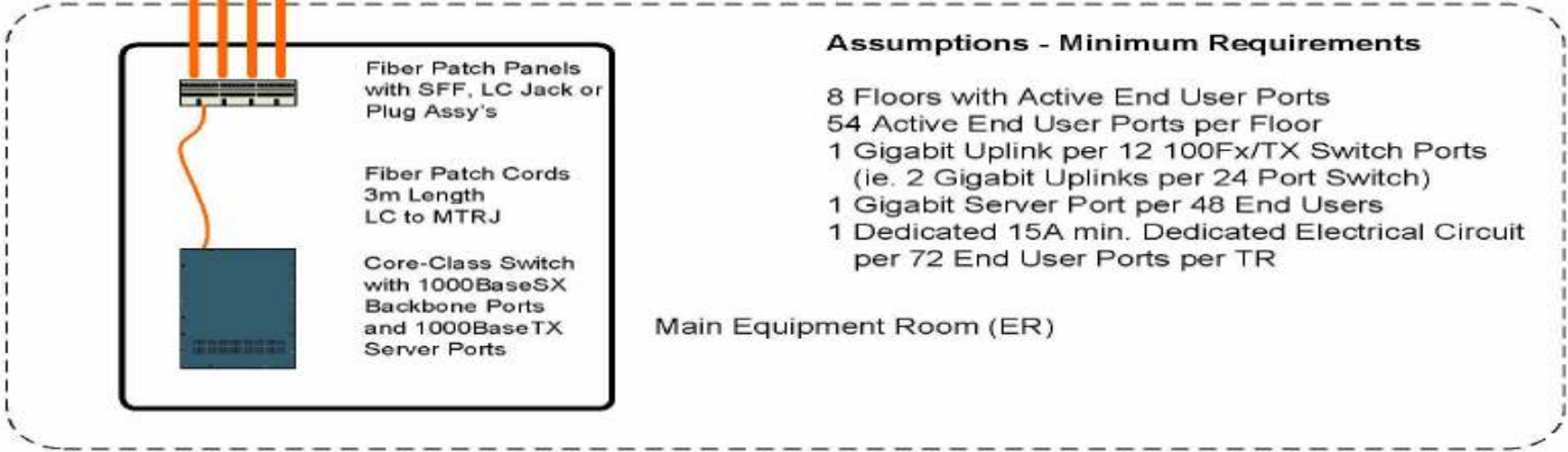
Hierarchical Star

Floors 1-7 Typical



15A Dedicated Electrical Circuit for PoE Equipment

12 Strand Fiber Riser Cable 30m length



Main Equipment Room (ER)

Assumptions - Minimum Requirements

- 8 Floors with Active End User Ports
- 54 Active End User Ports per Floor
- 1 Gigabit Uplink per 12 100Fx/TX Switch Ports (ie. 2 Gigabit Uplinks per 24 Port Switch)
- 1 Gigabit Server Port per 48 End Users
- 1 Dedicated 15A min. Dedicated Electrical Circuit per 72 End User Ports per TR

Main Floor

FOLS.org Cost Model

Hierarchical Star

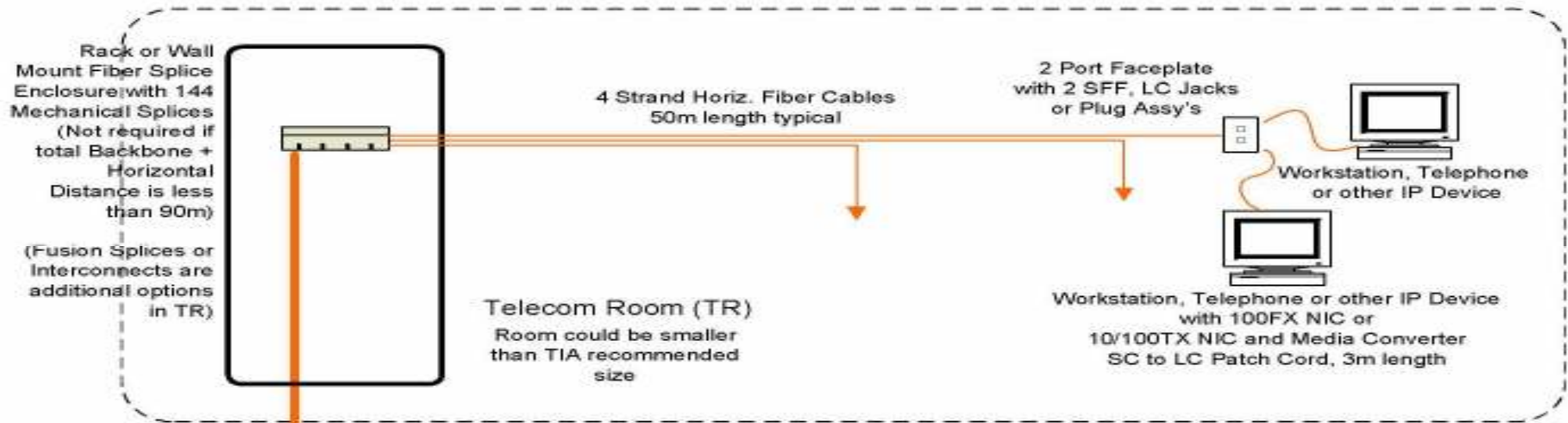
The original topology for TIA-568 standard

- **Pros**

- Keeps the horizontal cable short for multiple application deployments
- Allows for the deployment of multiple network topologies, i.e. ring, bus, star etc., without changing cabling plant layout
- Allows use of different cabling media
- Allows for segmentation of departments, clients and/or services
- Maintains two levels of cross connects for easier administration

Hierarchical Star

- **Cons**
 - Multiple sites within a facility to secure
 - More real estate is needed for implementation
 - More design considerations for services like dedicated HVAC
 - Typically, yields lower port utilization
 - By design, usually introduces one or more levels of network bottlenecks

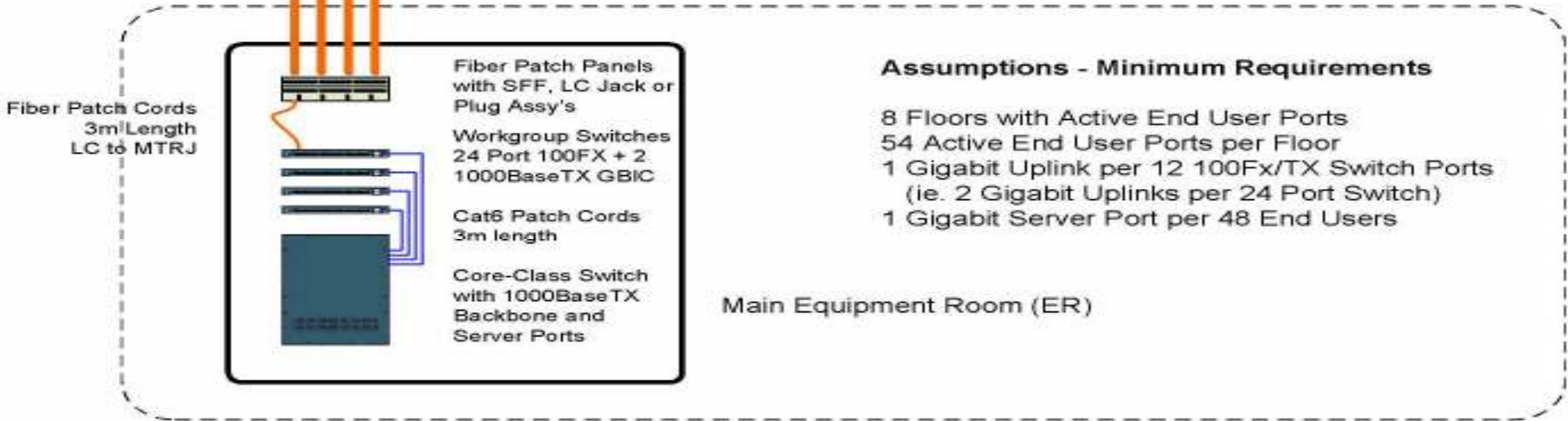


Eighth Floor

Centralized

144 Fiber Riser Cable (May use bundled 12 or 24 strand cables) 30m length

Floors 1-7 Typical



Assumptions - Minimum Requirements

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Main Floor

Centralized

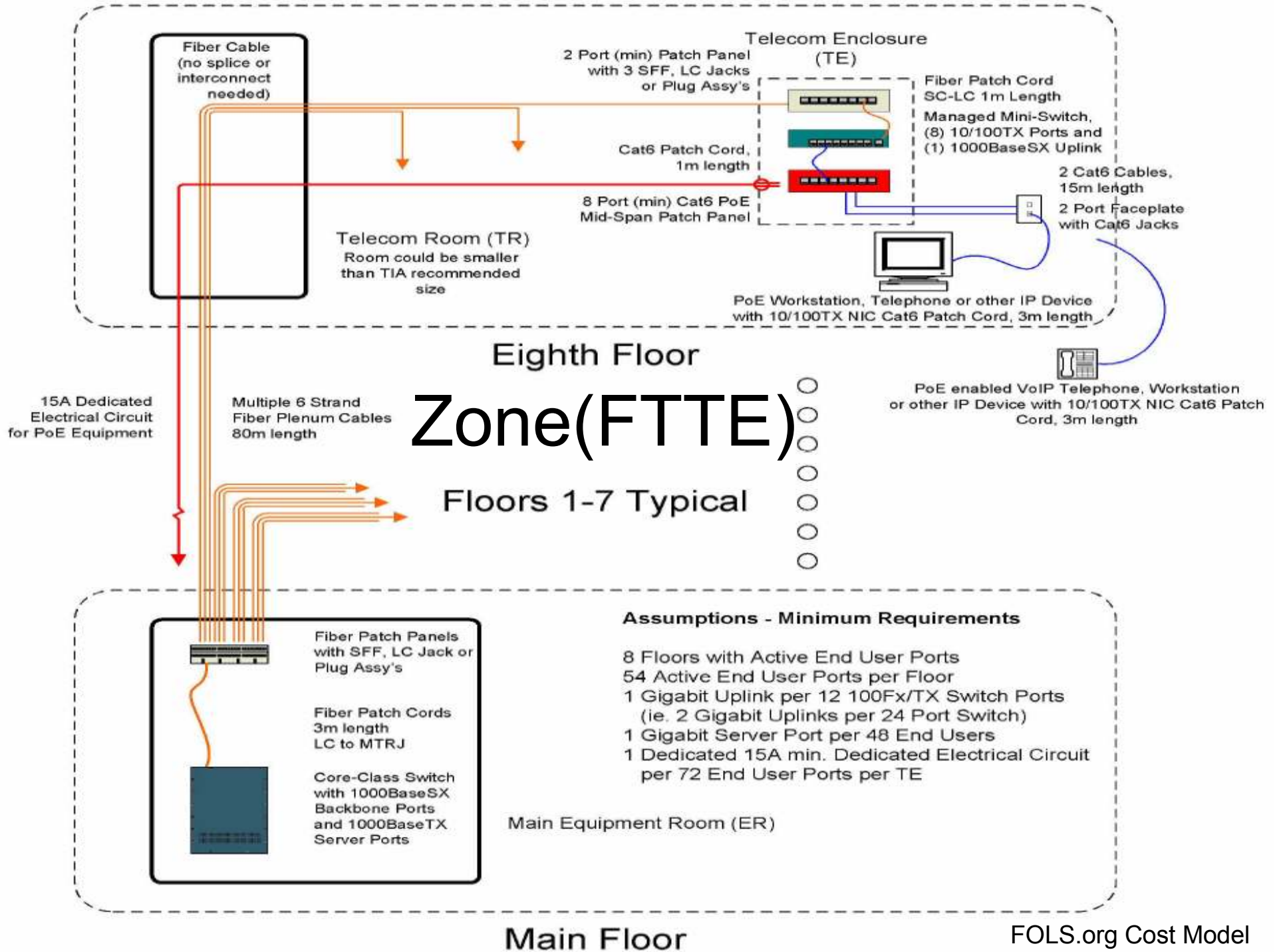
TIA/EIA TSB 72 published in October 1995

- **Pros**

- All equipment is centralized in one room making back-up power easier to handle
- Easier to secure
- Higher port utilizations
- Ease of implementing convergence
- Less real estate needed
- Typically, implemented with fiber, which gives other advantages
- Fewer design considerations for services like dedicated power, HVAC and bonding/grounding

Centralized

- **Cons**
 - Typically, only used with fiber media
 - PoE deployments require dedicated outlets
 - Currently, have to purchase and deploy fiber NICs separately for workstations or use media converters
 - TIA-568-B.1 limits pull-through to 90 meters unless used with a interconnect or splice



Zone (FTTE)

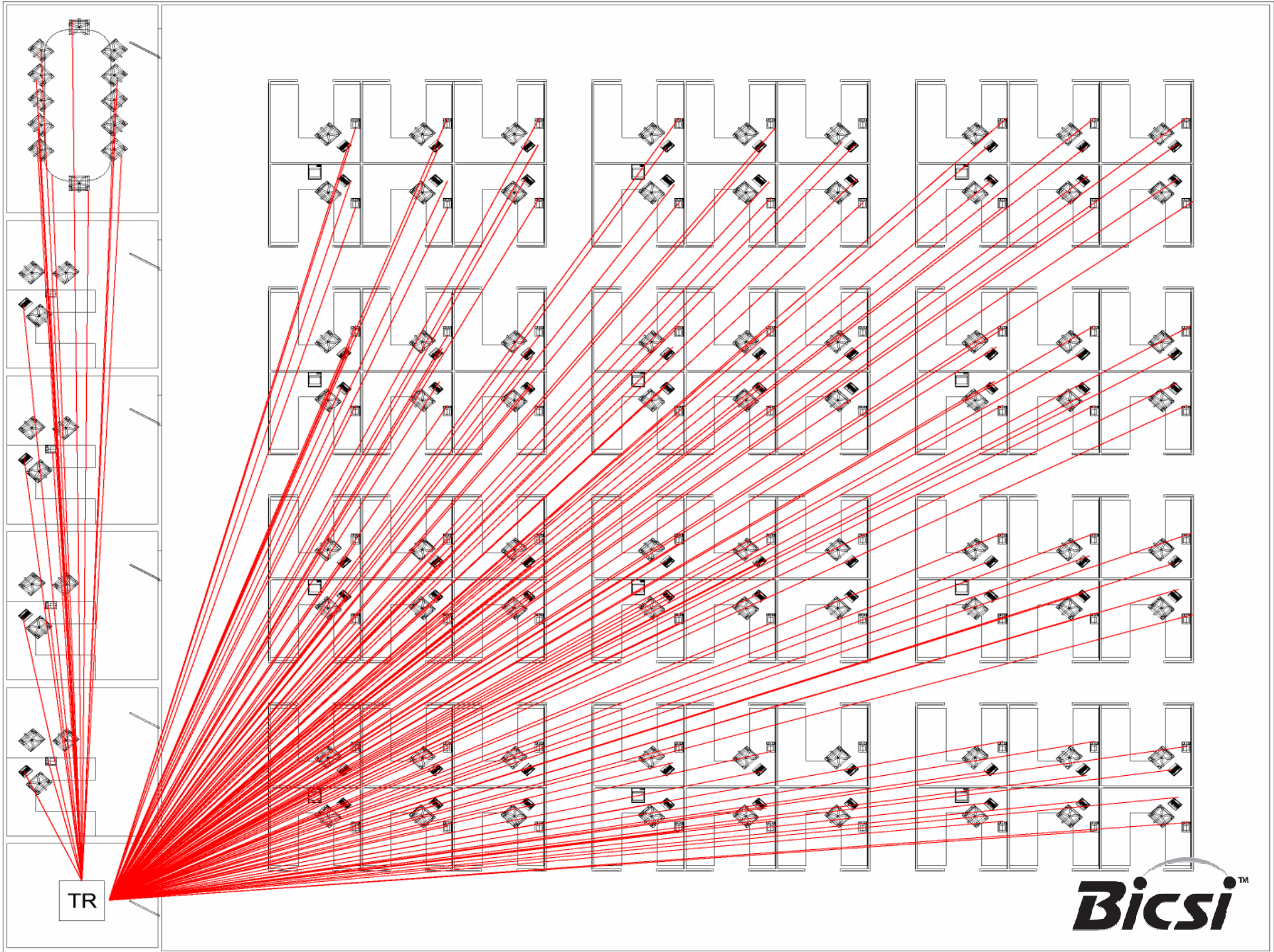
TIA-568-B.1-5 published March 2004
defines cabling for telecom enclosures

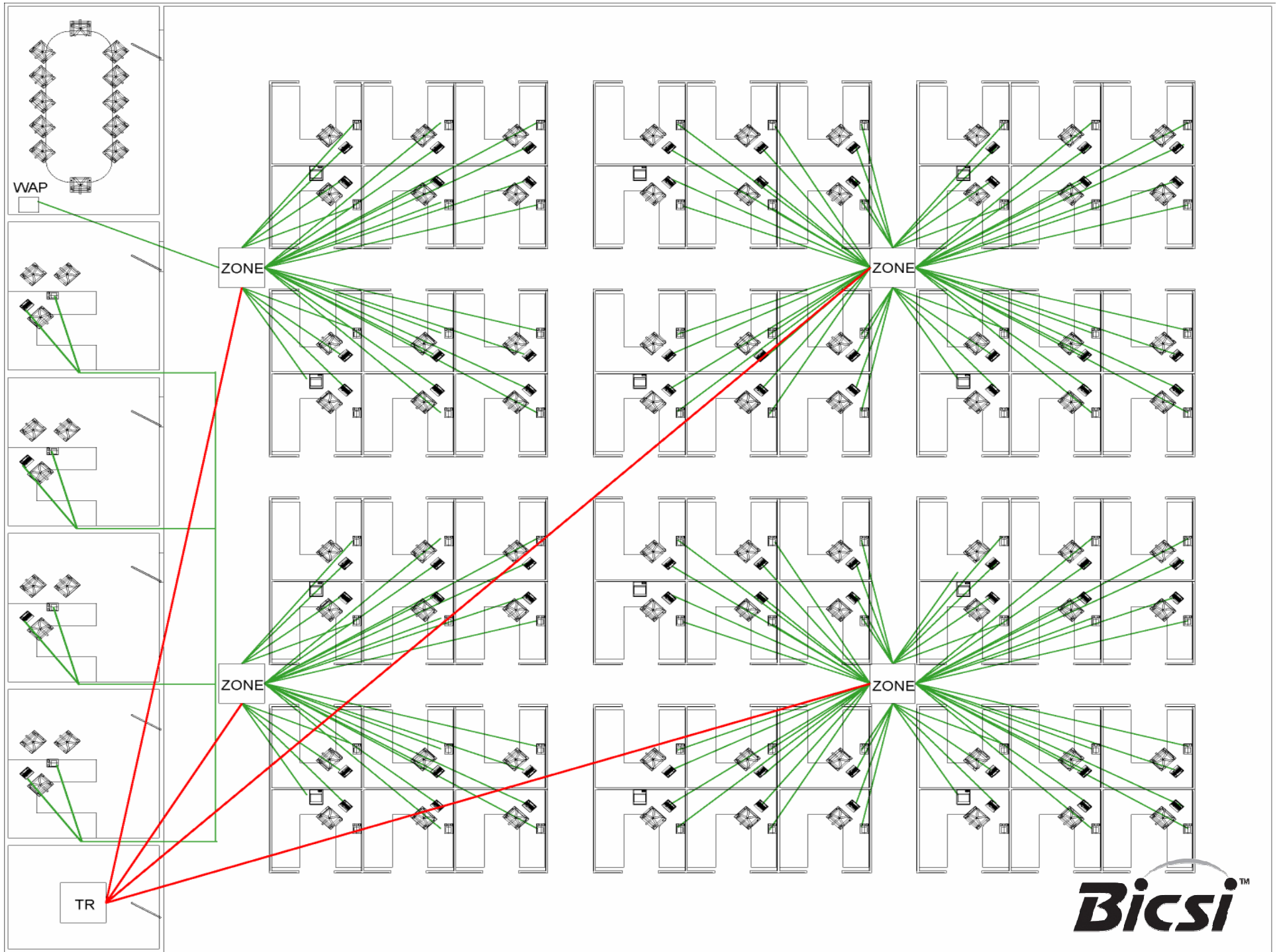
- **Pros**

- Can utilize the full 300m of multimode fiber
- Can be deployed as non-blocking architecture
- Utilize less real estate and pathway & spaces
- Less cable fuel load and weight in buildings
- Still utilizes UTP to the desk so no need for fiber NICS or media converters
- All MACs are done locally
- Ease of implementing convergence

Zone (FTTE)

- **Cons**
 - Dedicated power runs are longer
 - Equipment is distributed in work areas
 - Need to secure multiple enclosures
 - Enclosures could be mounted in ceilings where access may be more restricted





Zone (FTTE) Architecture in Enterprise



Zone (FTTE) Enterprise

Why use Zone (FTTE) in Enterprise Space

1. Economics
2. Environment
3. Convergence

FTTE Economics

- Initial cost
 - Real estate
 - Installation and testing
 - Products/material, i.e. electronics, cable, apparatus, fire stopping, pathway/spaces, bonding/grounding etc
 - Security
 - HVAC
 - TCO (Total Cost of Ownership)

FTTE Economics

- Example
 - 5 story building with 10,000 ft² of usable floor space per floor = 500 users or 1000 ports.
 - **Cost**
 - Real estate
 - Construction
 - Material/Labor (Cat 6 UTP & OM3 50um)
 - Electronics (Core Switches, Layer 3 switches in TE)
 - Power/lighting



Providing Information on the Use of Fiber in Customer-owned Networks

Horizontal Cabling Costs: Fiber vs. UTP
Interactive Cost Model

	Material	Labor	Total	
Total Cost Difference: Centralized Fiber vs. Hierarchical Star	\$ 205,426.14	\$ (2,465.00)	\$ 202,961.14	46.4%
Total Cost Difference: FTTE (Low Density) vs. Hierarchical Star	\$ (93,593.06)	\$ (6,390.00)	\$ (99,983.06)	(22.9%)
Total Cost Difference: FTTE (High Density) vs. Hierarchical Star	\$ (123,204.34)	\$ (10,425.00)	\$ (133,629.34)	(30.6%)
Hierarchical Star Network Totals	\$ 393,409.54	\$ 43,670.00	\$ 437,079.54	
Centralized Fiber Network Totals	\$ 598,835.68	\$ 41,205.00	\$ 640,040.68	
Fiber-To-The-Enclosure (Low Density) Totals	\$ 299,816.48	\$ 37,280.00	\$ 337,096.48	
Fiber-To-The-Enclosure (High Density) Totals	\$ 270,205.20	\$ 33,245.00	\$ 303,450.20	
Port Cost Difference: Centralized Fiber vs. Hierarchical Star	\$ 205.43	\$ (2.47)	\$ 202.96	
Port Cost Difference: FTTE (Low Density) vs. Hierarchical Star	\$ (93.59)	\$ (6.39)	\$ (99.98)	
Port Cost Difference: FTTE (High Density) vs. Hierarchical Star	\$ (123.20)	\$ (10.43)	\$ (133.63)	
Hierarchical Star Network Totals	\$ 393.41	\$ 43.67	\$ 437.08	
Centralized Fiber Network Totals	\$ 598.84	\$ 41.21	\$ 640.04	
Fiber-To-The-Enclosure (Low Density) Totals	\$ 299.82	\$ 37.28	\$ 337.10	
Fiber-To-The-Enclosure (High Density) Totals	\$ 270.21	\$ 33.25	\$ 303.45	

Print

View Cost Sheet

View Custom Ports Sheet

Go To Hierarchical Star Inputs View Layout

Go To Centralized Fiber Inputs View Layout

Go To FTTE (Low Density) Inputs View Layout

Go To FTTE (High Density) Inputs View Layout

The FOLS cost model requires the use of macros to run properly.

If the buttons do not work then change your Excel macro security to medium then close and reopen this workbook and

Common Inputs:

Check to Use Custom Pricing Market Pricing Used

Select the Proper Category Solution: **Cat6 Selected**

Cat 5e
Cat 6
Augmented Cat 6

Check to Use Custom Ports Standard Ports Used

Number Floors (Telecom Rooms) 5

Number Ports per Floor (Telecom Rooms) 200 (2 ports req'd per wallplate)

Total Number Ports 1000

UTP TR Closet Size 110 sq.ft.

Fiber TR Closet Size 9 sq.ft.

Closet Construction Rate \$ 150.00 \$/sq.ft.

Closet Power/Lighting Rate \$ 1.50 \$/sq.ft./yr

UTP TR Closet Construction Cost #####

UTP TR Closet Power Cost (\$/5 years) \$ 825.00

Fiber TR Closet Construction Cost \$ 1,350.00

Total Loaded Labor Rate \$ 60.00 \$/hour

Centralized and Hierarchical Star

Horizontal Plenum Cable Average Length 55 meters

Vertical Riser Cable Average Length 30 meters

Fiber-To-The-Enclosure

Horizontal Plenum Cable Average Length 15 meters

Vertical Plenum Cable Average Length (MC to Telecom Enclosure) 65 meters

Server Ports Required (1 per 48 user ports) 21

Workgroup Switch Port Utilization

Hierarchical Star Network 93%

Centralized Fiber Network 99%

Fiber-To-The-Enclosure Network (Low Density) 100%

Notice of Disclaimer and Limitation of Liability

- The Cost Model is designed to be used with your own data, and you must determine your own pricing to make the model work for you.
- The Cost Model does not calculate all costs of items common to the Hierarchical Star, Centralized Fiber, and FTTE Networks.
- The Cost Model is not to be used in place of your independent judgment.
- The information provided is taken from publicly available documents and web sites.
- The numbers provided are historical and are in no way an attempt to ascertain current prices.
- The cost model is not intended to preclude other approaches for financial modeling.
- The various scenarios contained in this model and the assumptions therein are examples only.
- The default fiber telecom room size used in this model are standards compliant and may be most appropriate for new construction and/or existing buildings where existing telecom real estate may be redeployed for other uses.
- TIA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the cost model.

For more information, call the Fiber Optics LAN Section (FOLS) of the Telecommunications Industry Association (TIA) at (781) 253-8584 or (703) 907-7723. Visit FOLS on the internet at <http://www.fols.org>

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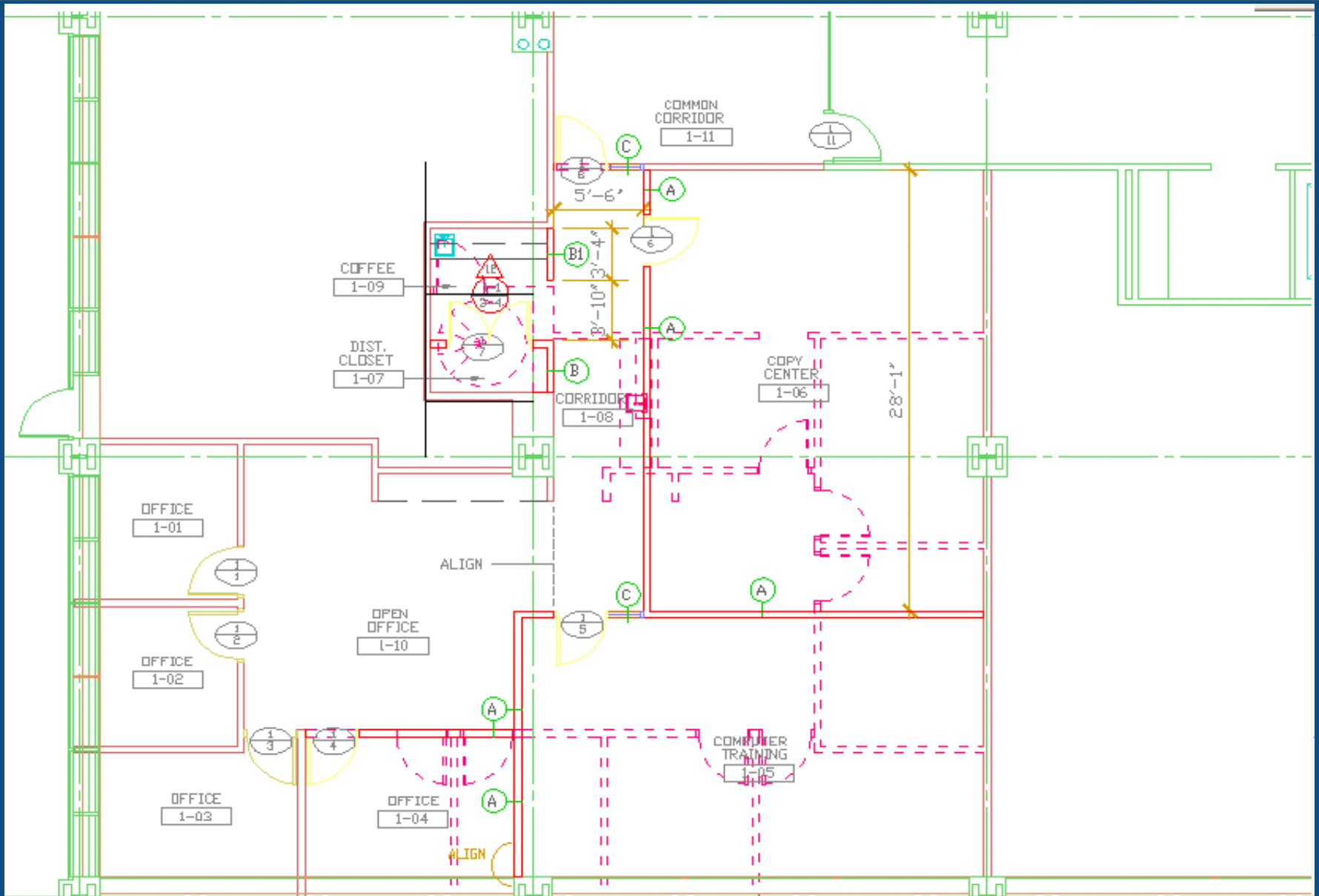
FTTE Environmental

- Fewer long cable runs = less fuel load
- Less abandoned cable over time = less scrap and better use of raw materials
- Fewer dedicated HVAC units = less power
- Utilizing mid-span patch panels for PoE = less heat, also utilizes DC power = energy efficiency
- Depending on nature of business, could power down zones not being used at night, over weekends and holidays = energy savings

Zone Convergence

- Commercial buildings today have multiple low voltage systems deployed all using different cabling infrastructure.
- With “IP” everywhere convergence, many of these additional systems could be deployed on a common infrastructure.
- The major focus of the TIA-862 standard is a standard platform for all the low voltage services.
- The recommendation is based on a “Zone” concept of locating zone boxes in centrally placed areas connected with a single cable back to the equipment room.

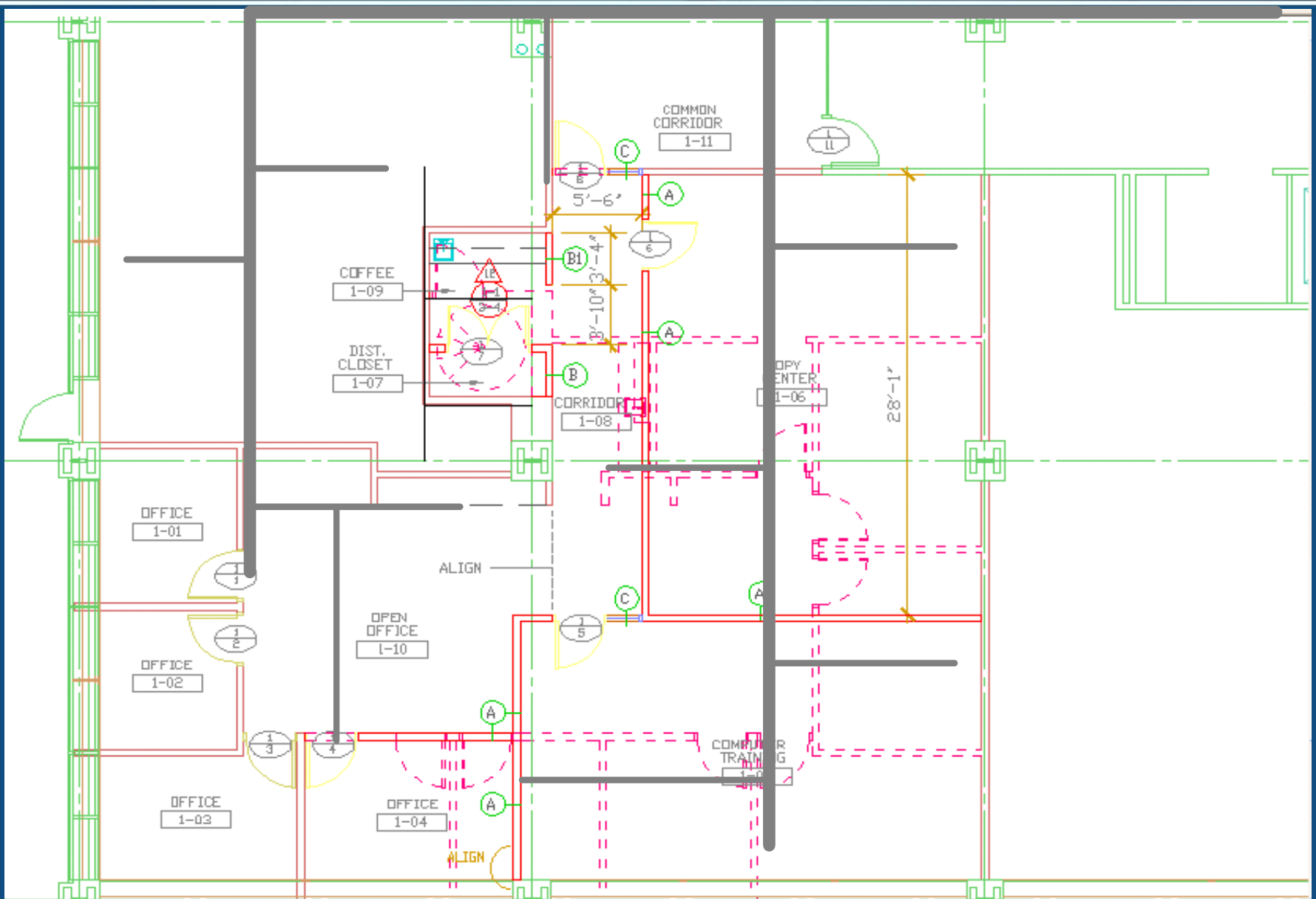
New Facility



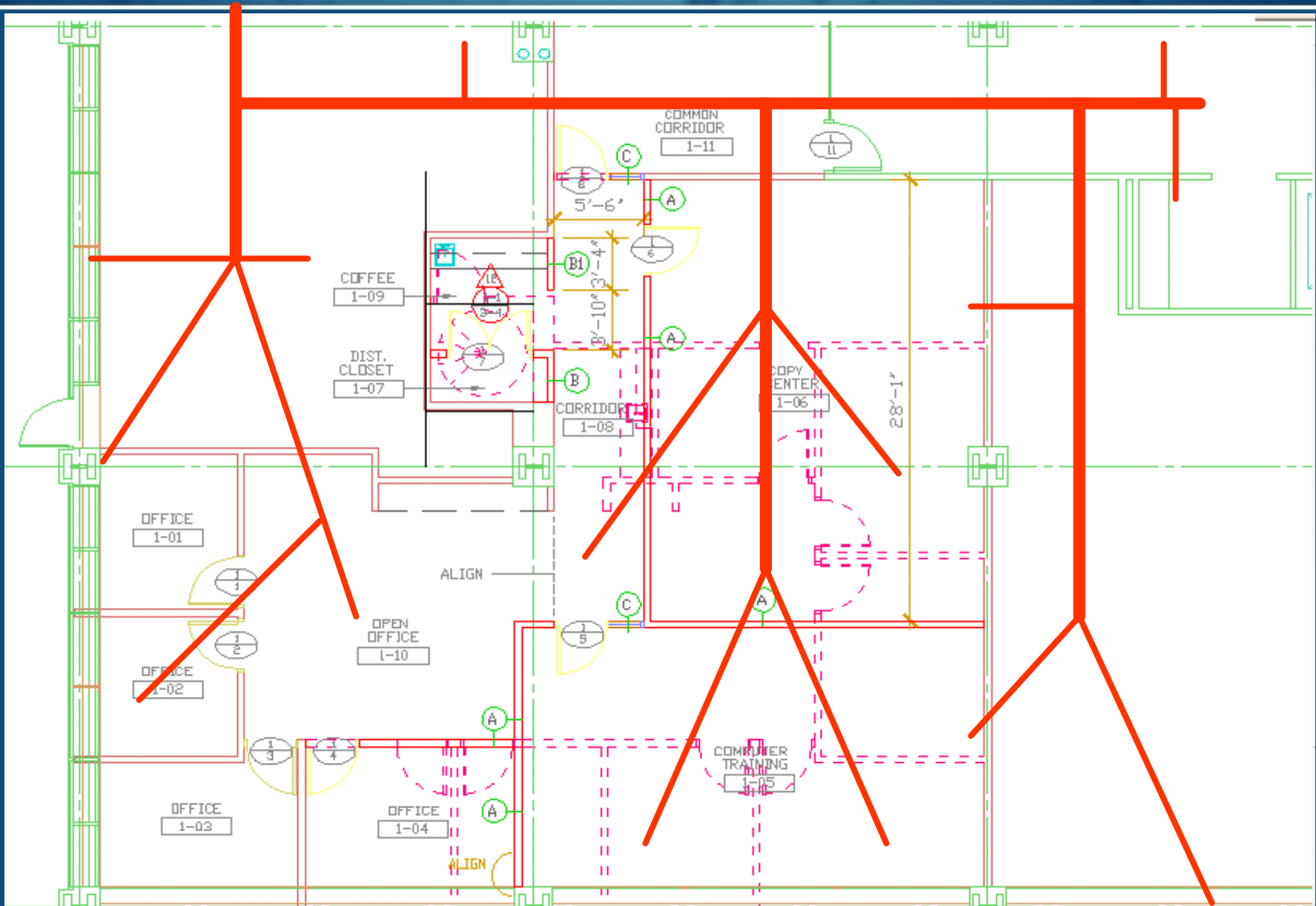
Courtesy, "CommScope IBIS Program"



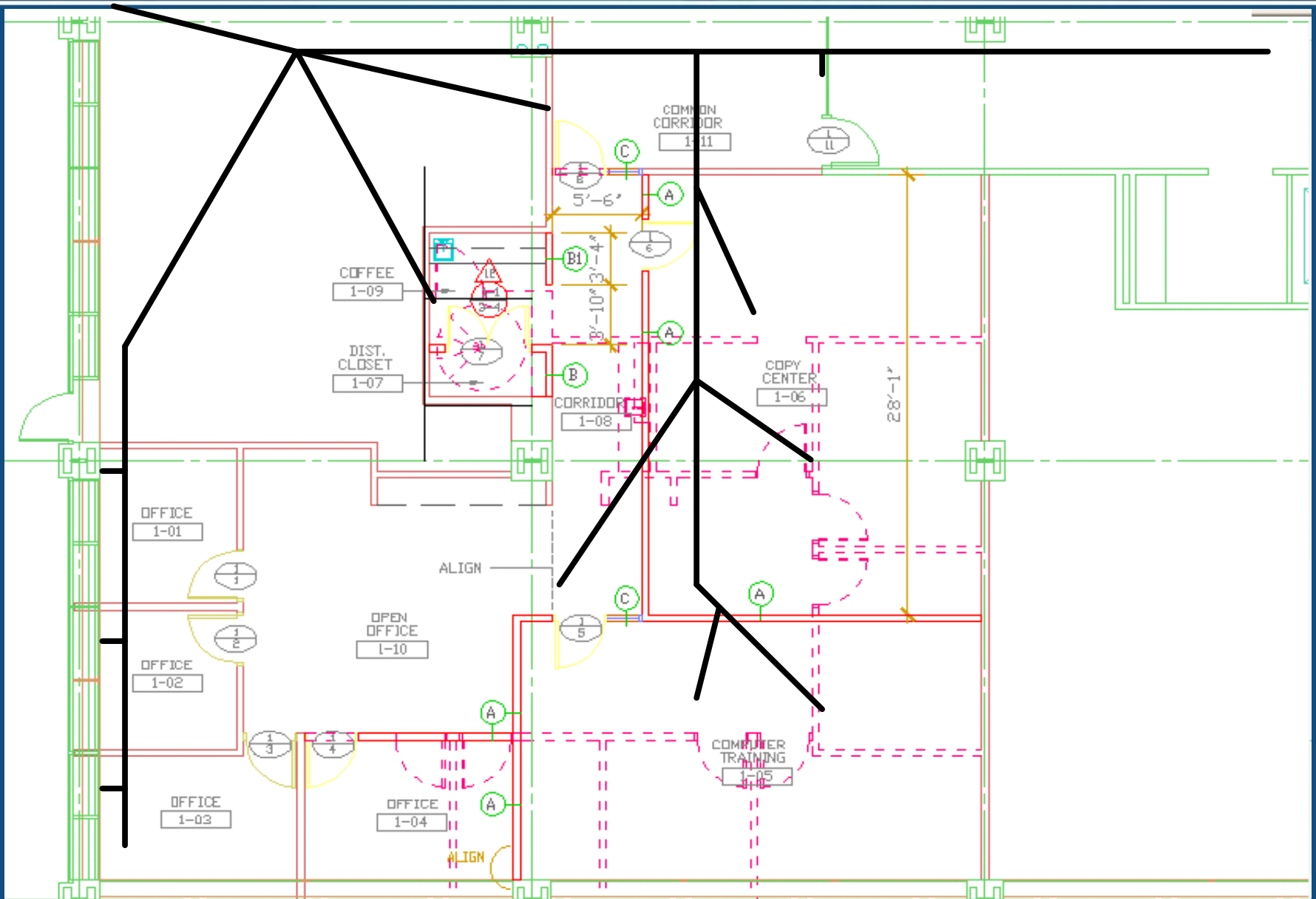
HVAC



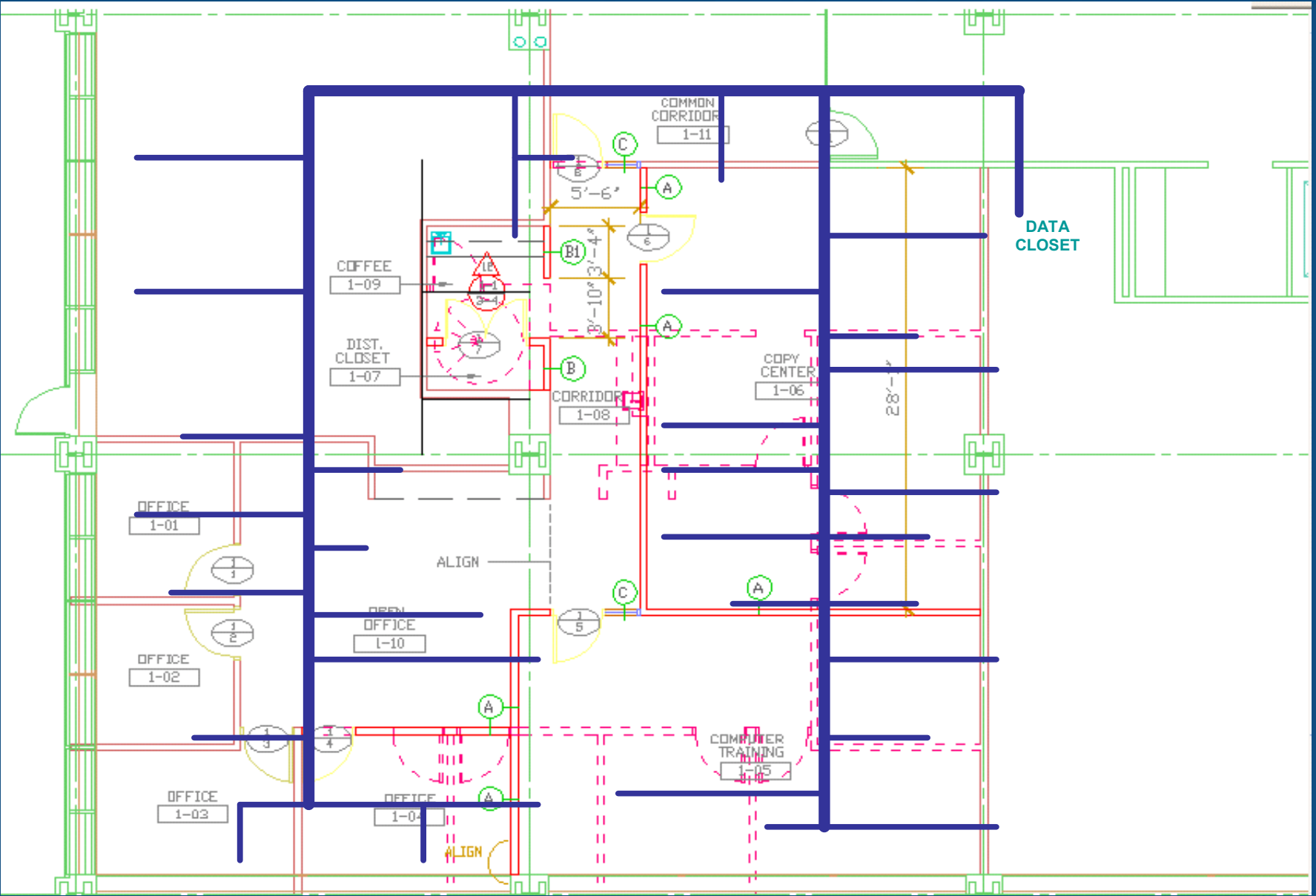
FLS



SECURITY



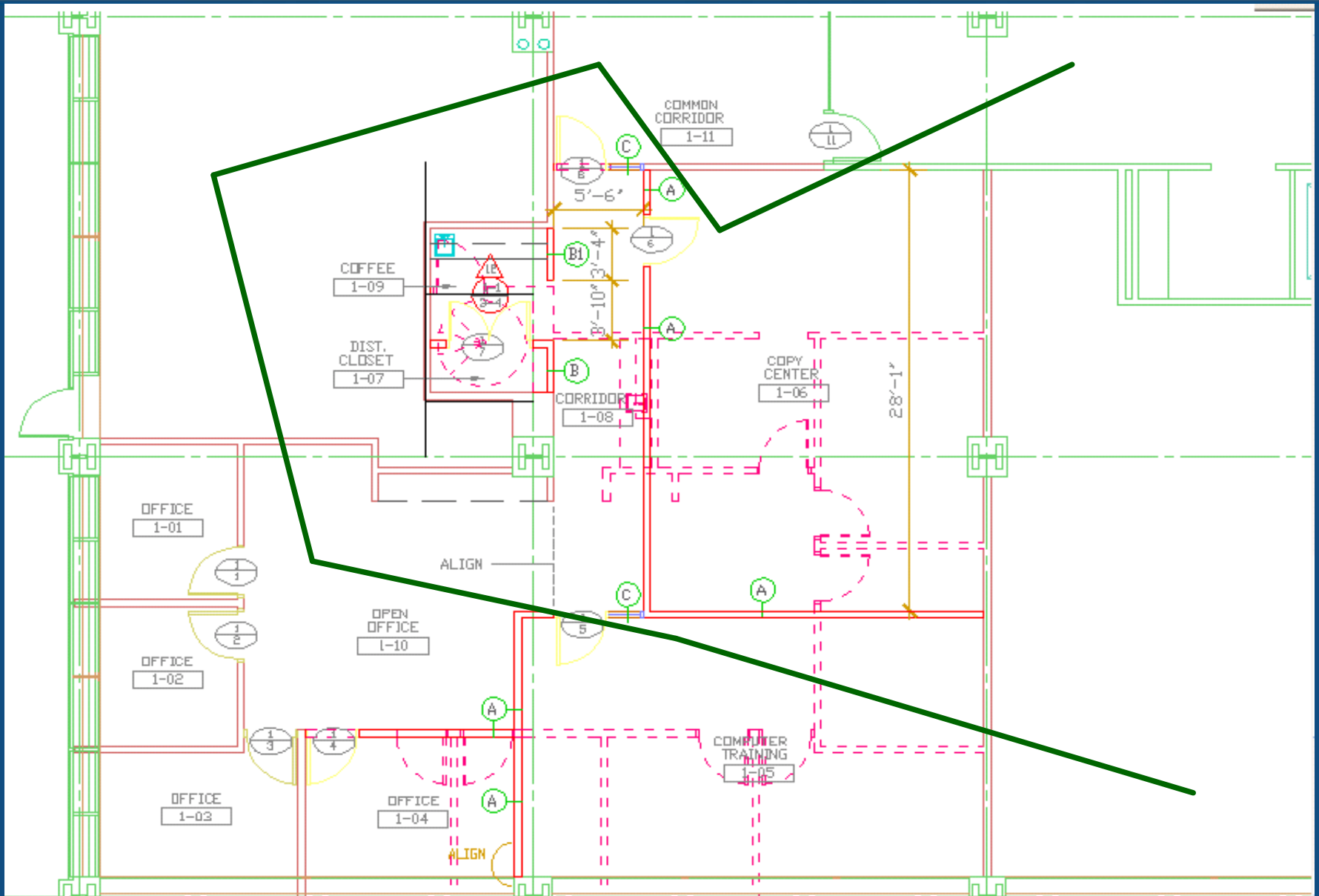
VOICE / DATA



Courtesy, "CommScope IBIS Program"



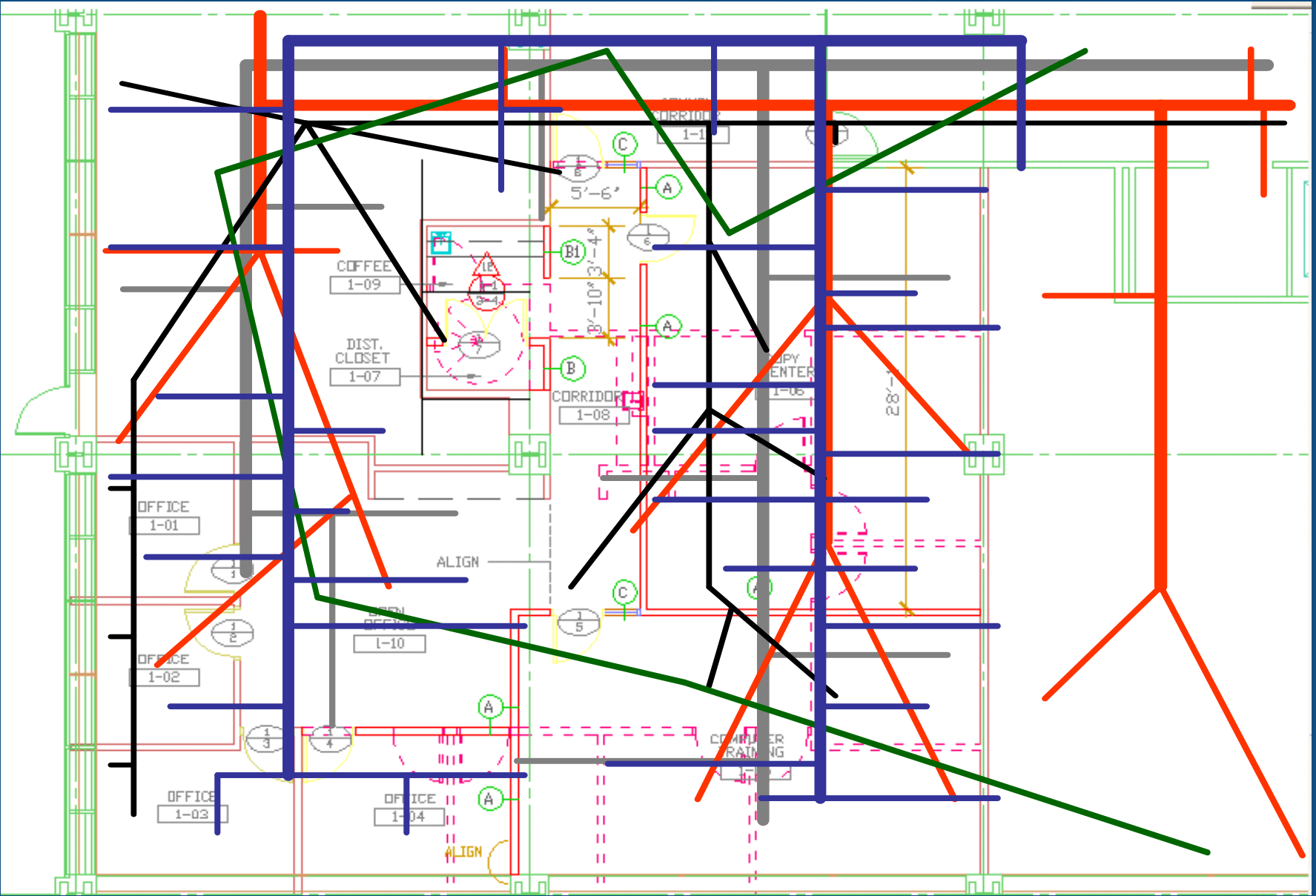
PAGING



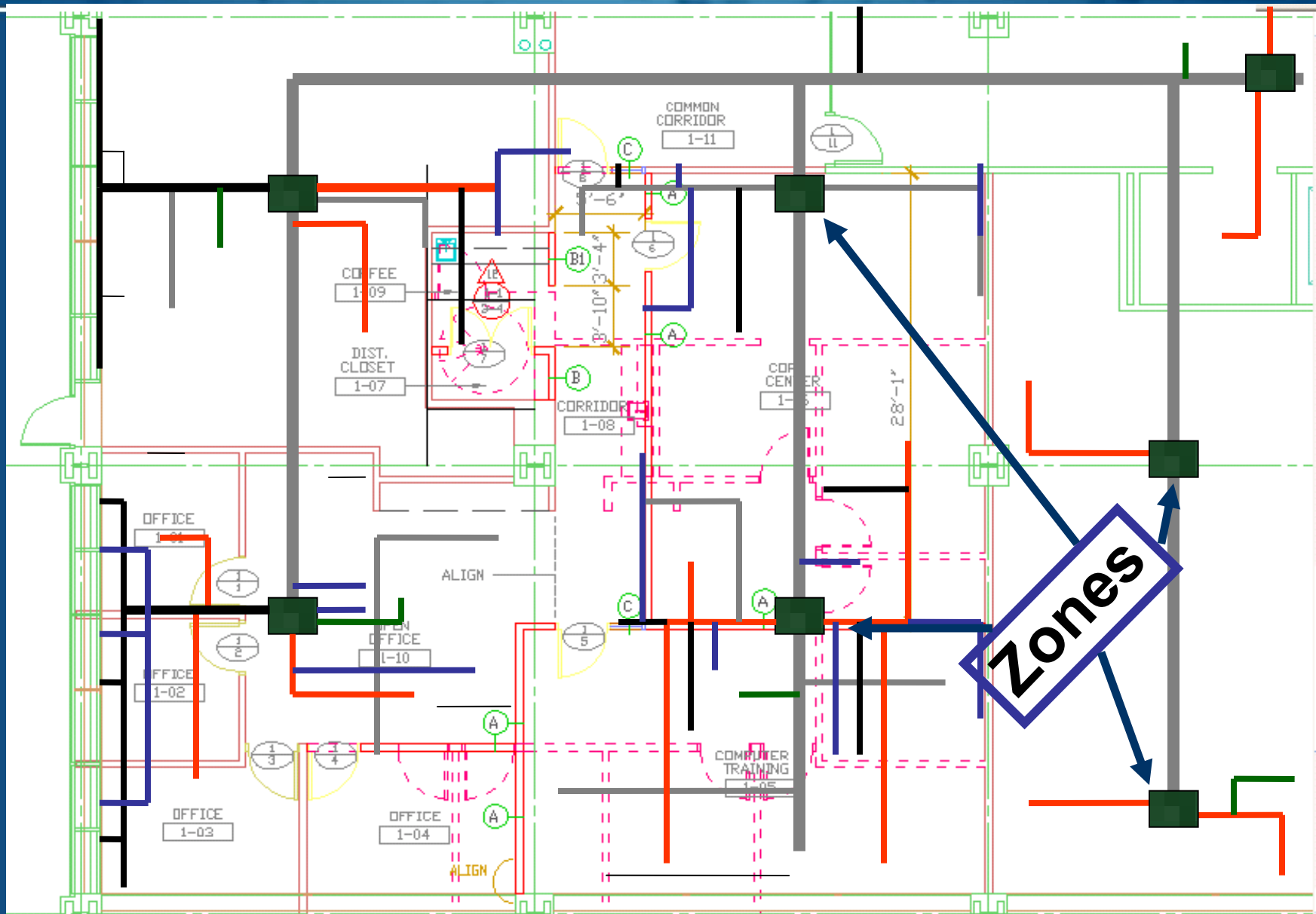
Courtesy, "CommScope IBIS Program"



5 SYSTEMS



IBIS



Zone “IP” Convergence

- Open architecture for multiple vendors
- A common standard cabling infrastructure
- Ease of implementing BAS and performing MACs
- Lower overall cost
- Easier to secure on one network versus multiple proprietary platforms
- Part of building assets
- More environmentally friendly

Data Center

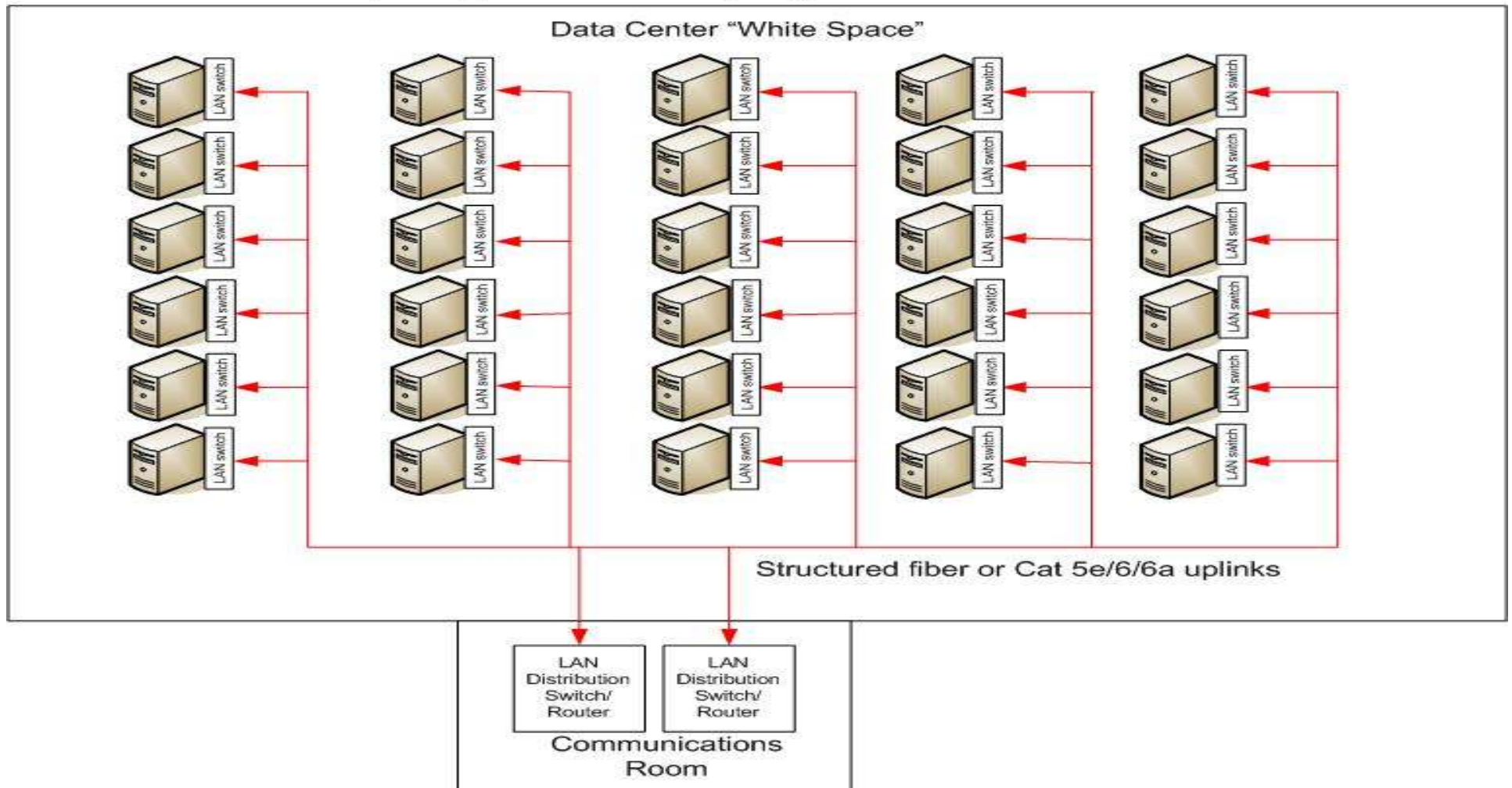


Data Center

- Distributed (Star)
 - Pros
 - Cons
- Centralized
 - Pros
 - Cons
- Zone
 - Pros
 - Cons

Data Center Distributed

- Notes:**
- Network LAN switches in or near every server rack
 - Server racks connected to Distribution switches via structured uplink cabling, typically fiber or Cat 6a, but could be other
 - Distribution Switch/Routers could be located in White Space
 - SAN may or may not use similar topology

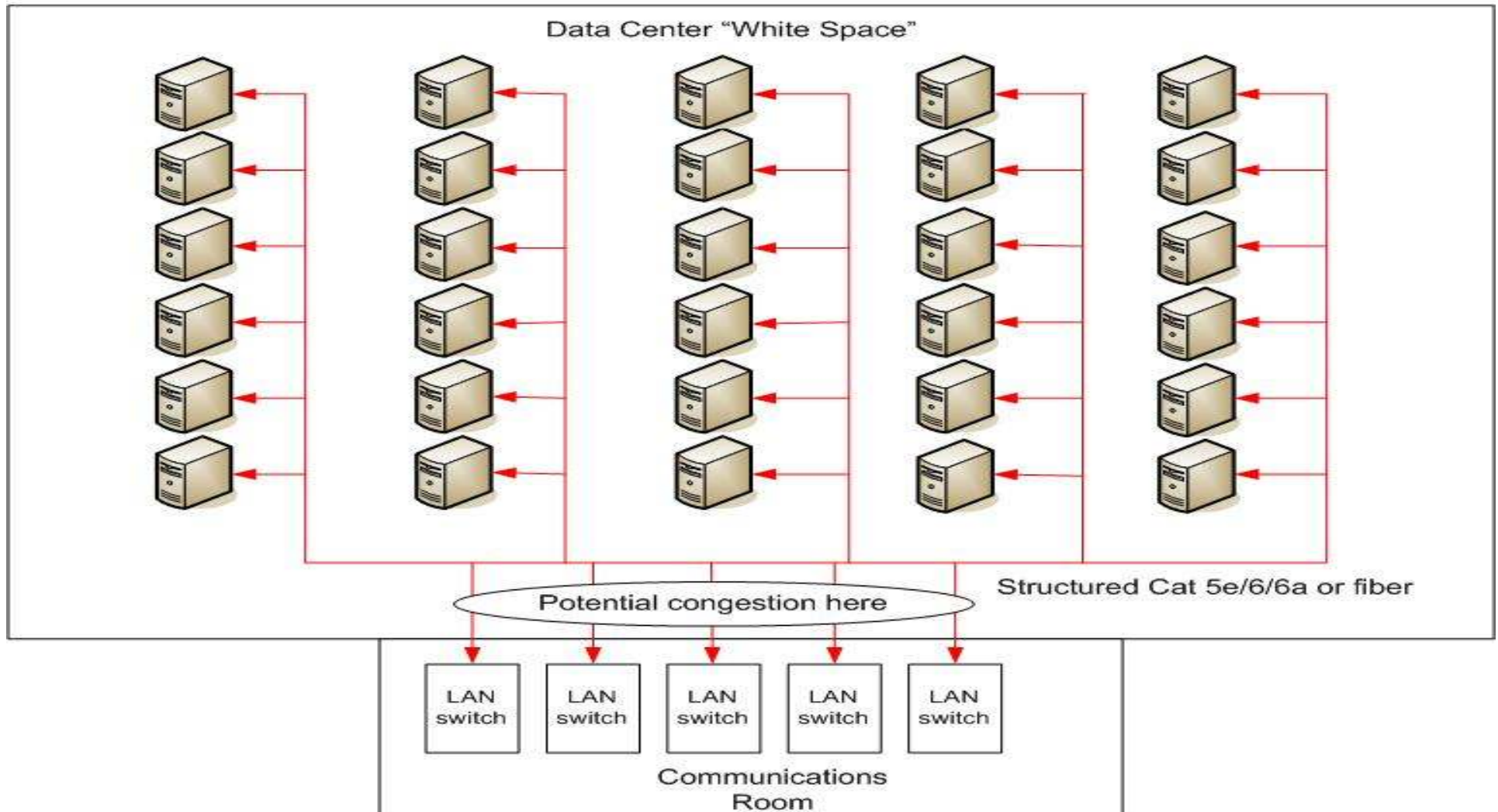


Data Center Distributed

- **Pros**
 - Most efficient use of network cabling
 - Efficient use of floor space as all Access switches are housed in server cabinets, or minimal floor locations as required
- **Cons**
 - Inefficient use of LAN switch ports
 - Difficult to manage large number of LAN switches in large deployments
 - Stability risks due to potential mixing of STP domains in a single access level switch
 - Potential overheating of LAN switch gear in server racks

Data Center Centralized

- Notes:**
- All Network LAN switches in one location, could be in White Space
 - Server racks connected to LAN switches via structured cabling, typically
 - 24-72 cables per server rack, depending upon requirements
 - Additional fiber structured cables also as required for LAN or SAN

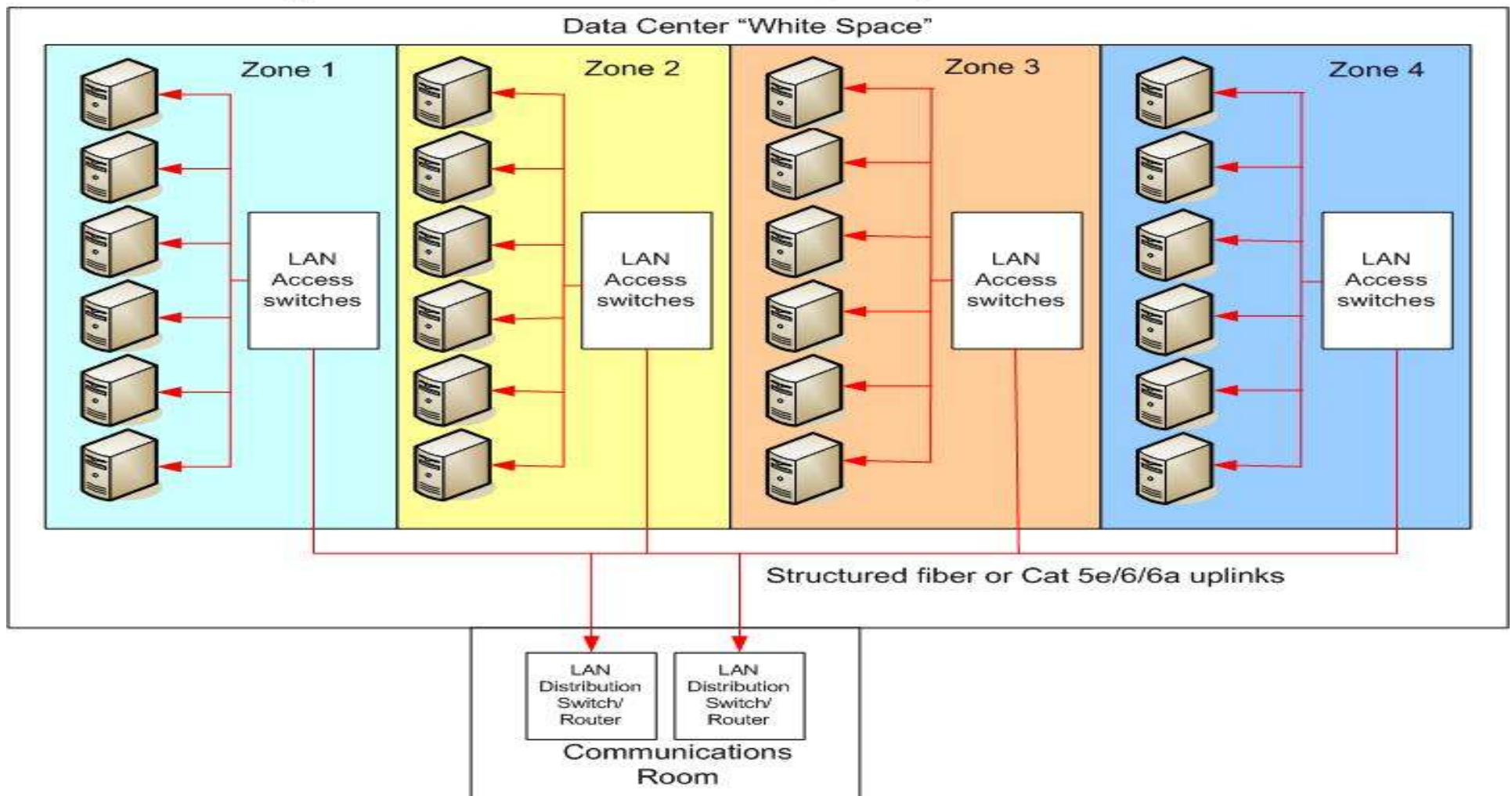


Data Center Centralized

- **Pros**
 - Simple to implement/maintain in smaller Data Centers
 - One location to make any cross connect or service activation
 - Tight control of physical access
 - Most efficient use of LAN switch ports
- **Cons**
 - Doesn't scale well
 - Limited by physical dimensions of conveyance pathways
 - Limited by physical length limitations of respective media
 - Most wasteful of network cabling

Data Center Zone

- Notes:**
- Network LAN Access switches in each Zone
 - Server racks connected to Access switches via structured copper
 - Distribution Switch/Routers could be located in White Space
 - SAN may or may not use similar topology
 - Highest cable counts confined to smaller, manageable Zones



Data Center Zone

- **Pros**

- Most scalable solution
- Most cost effective balance of moderate horizontal cable cost balanced with LAN switch port utilization
- Maintains copper/fiber physical length and physical bulk limitations
- Follows TIA 942 recommendations

- **Cons**

- Requires proper planning of zones
- Must maintain manageable size

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Summary

Utilizing Zone Concept Yields

- Lower overall cost
- Higher network efficiencies
- MAC efficiency
- Better utilization of higher bandwidth media
- More environmentally friendly
- Expandable for growth and convergence
- Better real estate utilization

Thank You For Your Time

Remember– Play In The Zone

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