

# Next Generation Infrastructure

October 2023



# Speakers



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Positron Access  
Solutions

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# Agenda

- **Convergence**
- **Applications**
- **Infrastructure**
- **Wireless and Mobile Networks**
- **Recommendations**
- **Implementation and Support**



# Convergence

The merging of distinct technologies, applications, or devices into a unified whole.



# Call to Action

- **The Struggle is Real – Real challenges in the industry**
- **Convergence document previously created in 2005**
- **Thought Leadership**
- **Drive the Conversation**
- **Commercial Appeal and Separation**
- **Create a better future state**
- **Your participation is valued**

# Benefits of Convergence

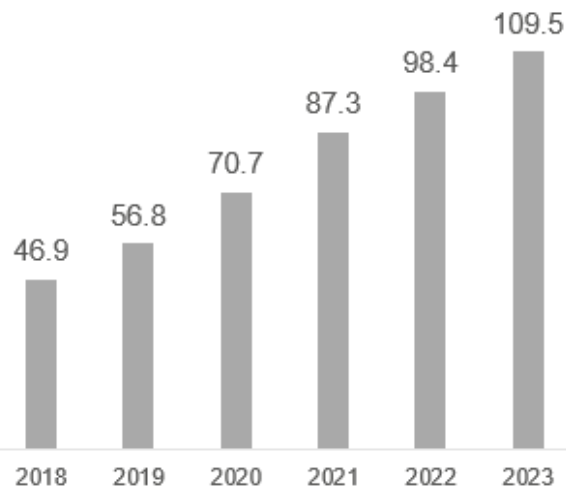
- **Convergence – Efficient, lower costs, and more head room**
- **Simplified Network Management**
- **Improved Security Protocols**
- **A Better Future State**
- **Focus on Operations and Applications**

# More ... More.... More

- **Something must change**

## Wi-Fi connections keep getting faster, consuming more bandwidth

Showing North America's Average device speed (Mbps):



## Average number of devices per person is expected to double by 2030

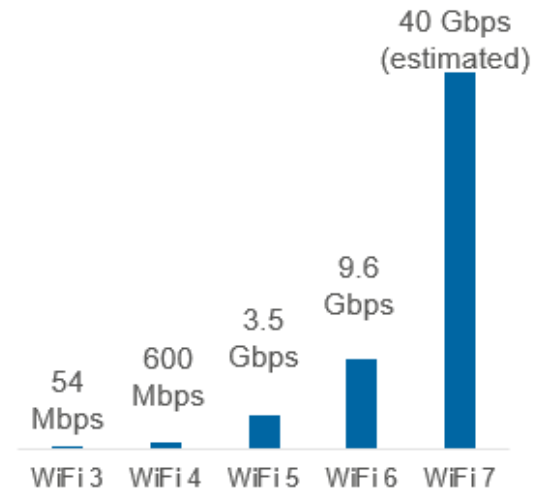


7 devices per person in 2020

15 devices per person in 2030

## Wi-Fi 7 rollout is estimated to begin in next two years and require 32-40 Gbps

IEEE Standard Maximum Throughput Speeds:



# Behind Every Great Wireless Network is...

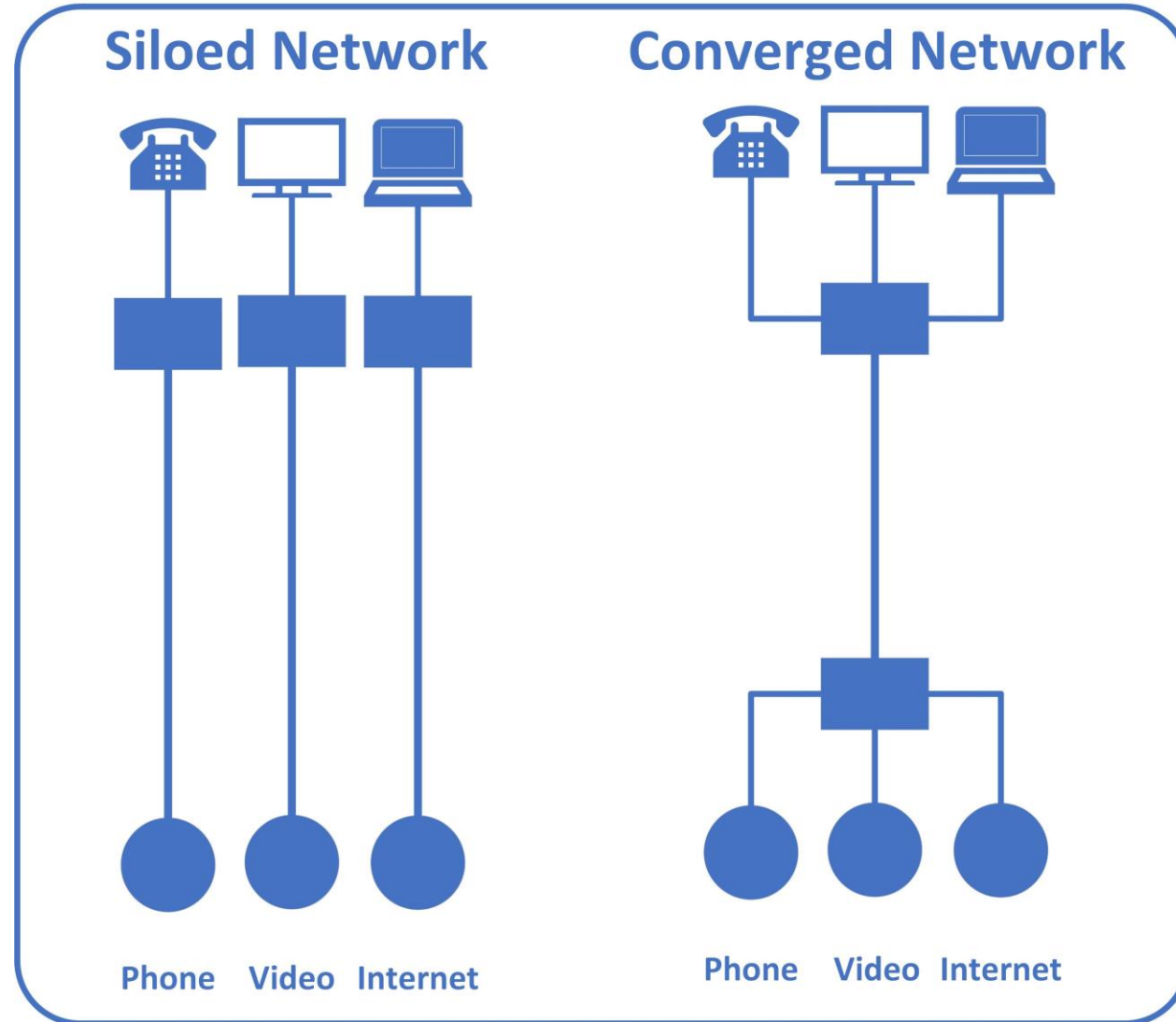




# A Great Wired Network...



# The Converged Network



# Property Types

- **Limited-Service Hotel**
- **Standard Branded High-Rise Hotel**
- **Luxury Branded High-Rise Hotel**
- **Luxury Mixed-Use High Rise Hotel and Residences**
- **Resort Style**
- **Small Boutique Hotel (no Brand)**
- **Historic Hotels or Buildings**





# Applications

Network Connected Property Services



# Applications Requiring Connectivity

## Live Streaming Platforms

Zoom, MSFT Teams, WebEx, Twitch, Mixer...



WiFi 5/6/6e/7  
Private LTE



## Device Specs

Displays, Cameras, CPU/GPU, Memory, Battery



## Social / Video Platforms

FB, Instagram, Netflix, TikTok, YouTube, AmazonPrime...

## Commercial Cellular 5G

mmWave & Sub 6GHz

Augmented and Virtual Reality

## Software Defined...

SD-WAN  
SD-LAN



## Network Powered Applications

Power over Ethernet (PoE)



## Voice Apps

Alexa, Siri, Podcasts...

## Smart Buildings

Increase in Networked Devices / Bldg Mgmt Controls

## Untethered workforce

Wireless First Designs

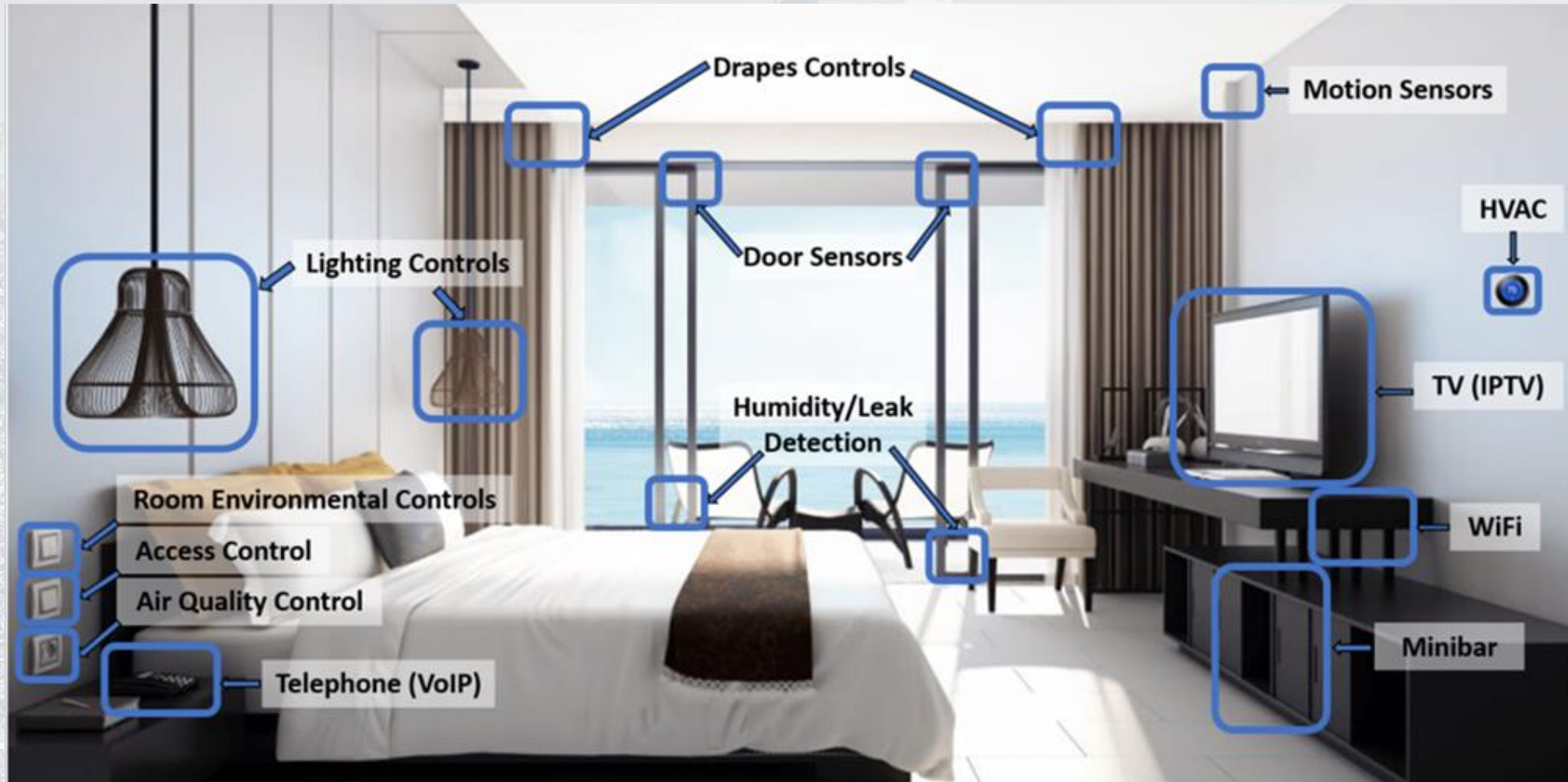
## Network Security

Facial Recognition



**Problem: Increasing Number of Networked Devices Driving Higher Bandwidth and Power**

# Applications Requiring Connectivity



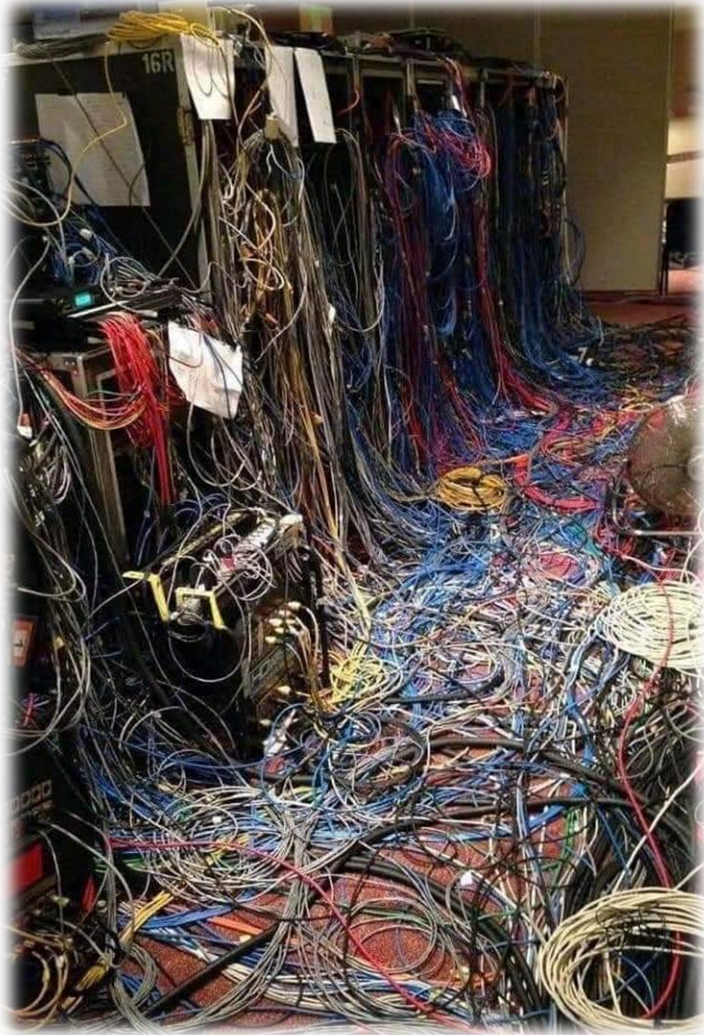


# Infrastructure

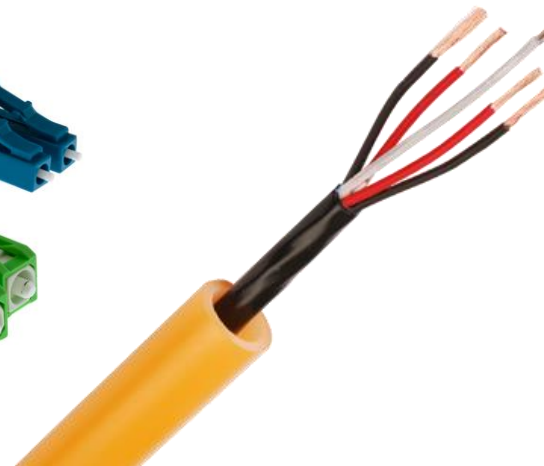
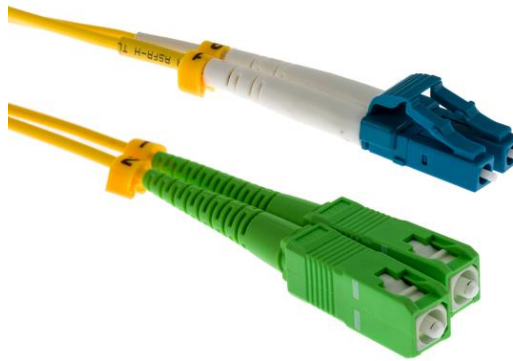
Property Cabling and Networking Options



# Infrastructure Cable Options

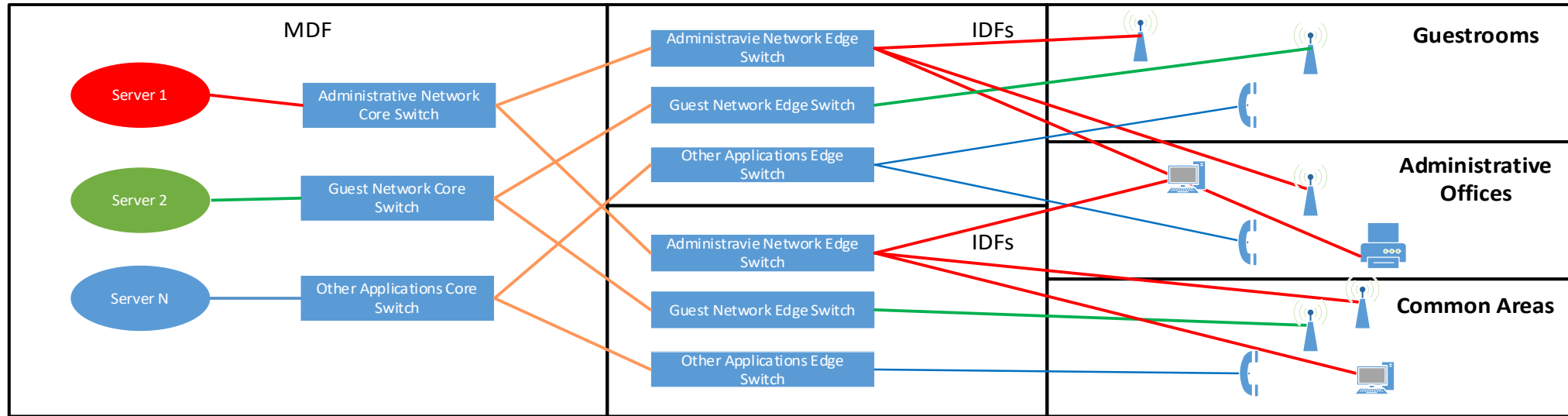


- **Structured Cable**
- **Coaxial Cable**
- **Optical Fiber Cable**
- **Hybrid Copper/Fiber Cable**



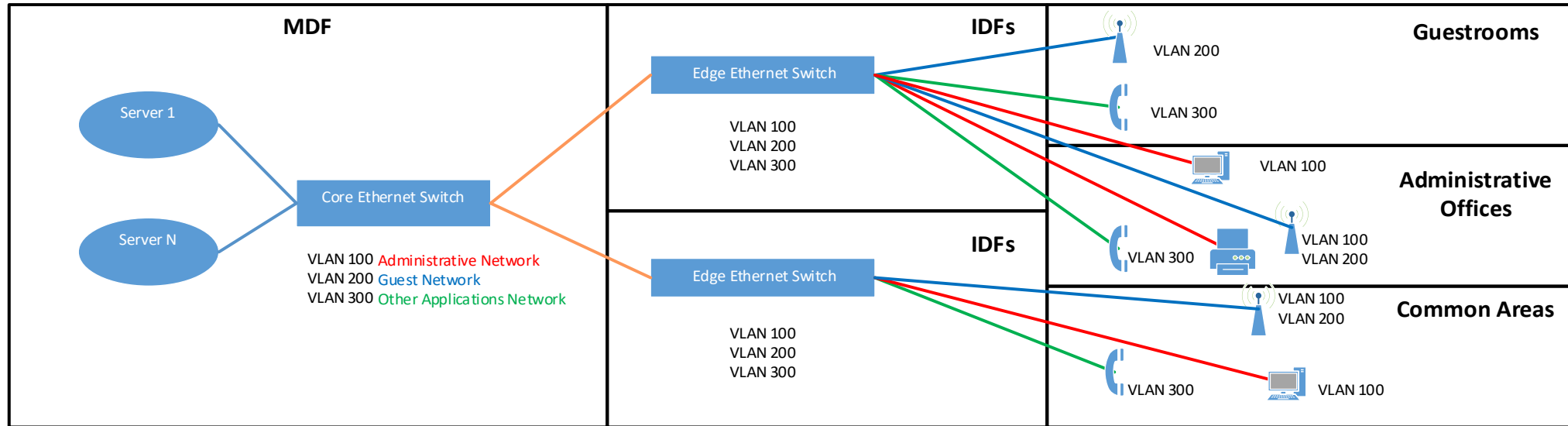


# Siloed Networks



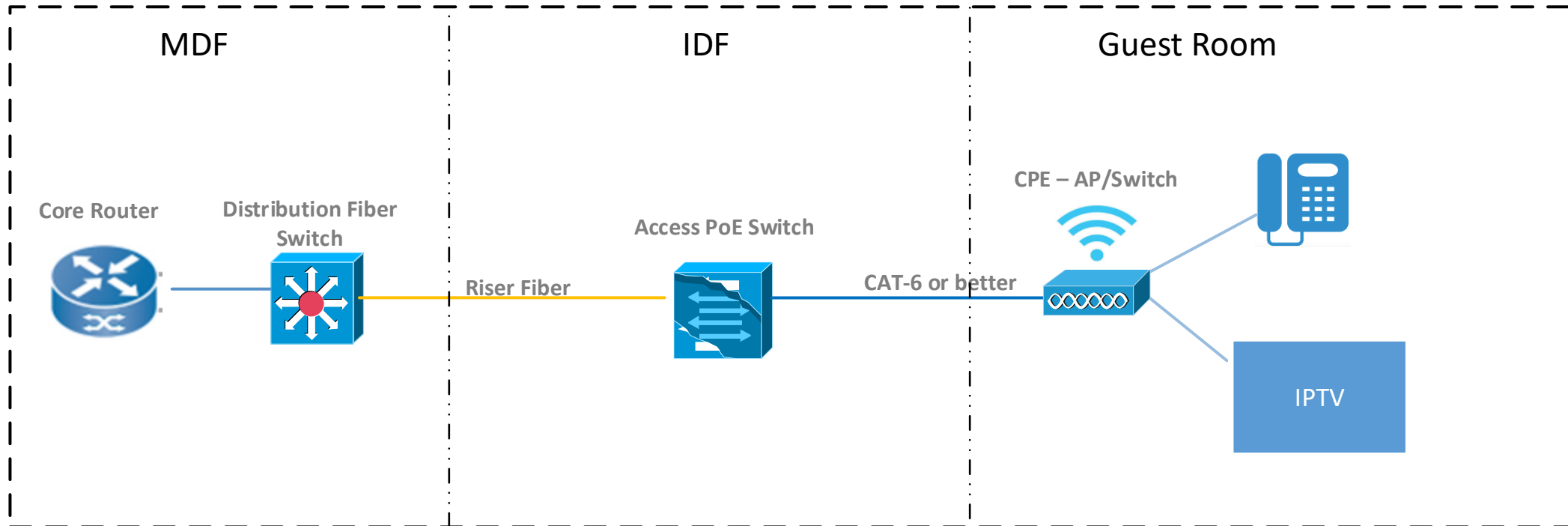
- Traditionally, each new application or service required a dedicated network
- Results in added complexity and cost
- Does not allow hotel to scale

# Converged Networks



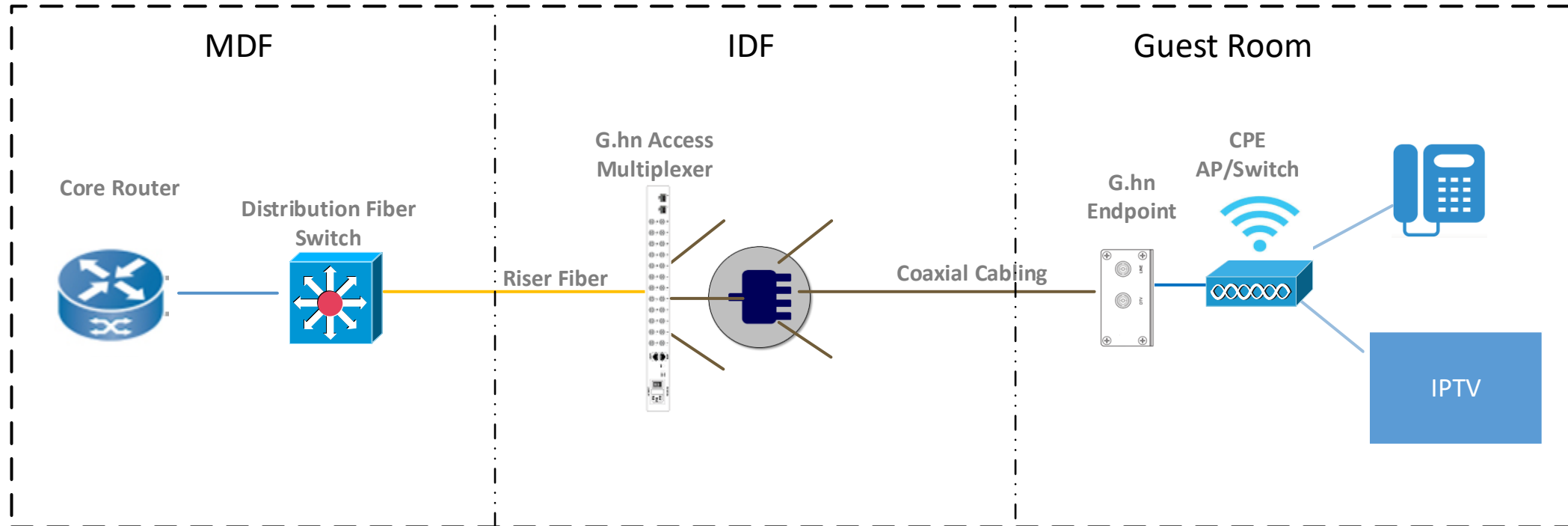
- Applications are almost exclusively IP based
- Allows multiple applications onto a single Ethernet infrastructure
- Easier to add new Applications and Services

# Structured Cable Networks



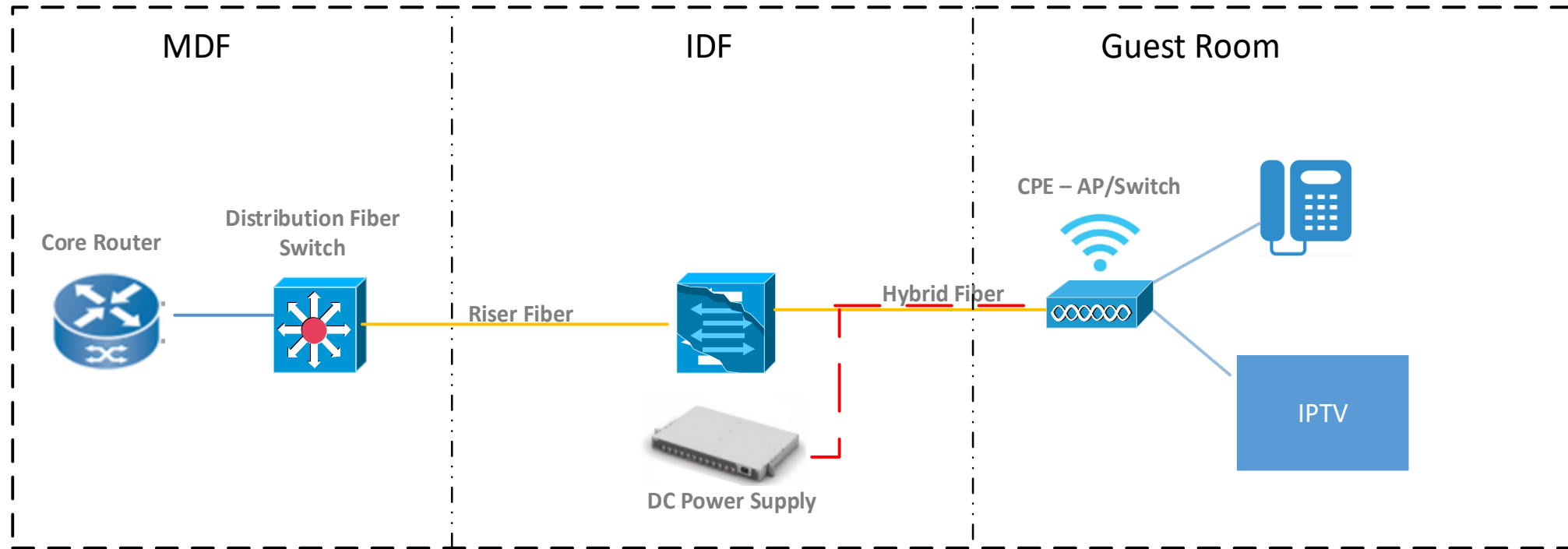
- **Proven Converged Ethernet infrastructure. MDF feeds multiple IDF, usually over dedicated fiber links.**
- **IDF serves each Guest Room over dedicated Ethernet links (with POE) to Wi-Fi Access Point acting as central hub for all Services**

# Coaxial Cable Networks



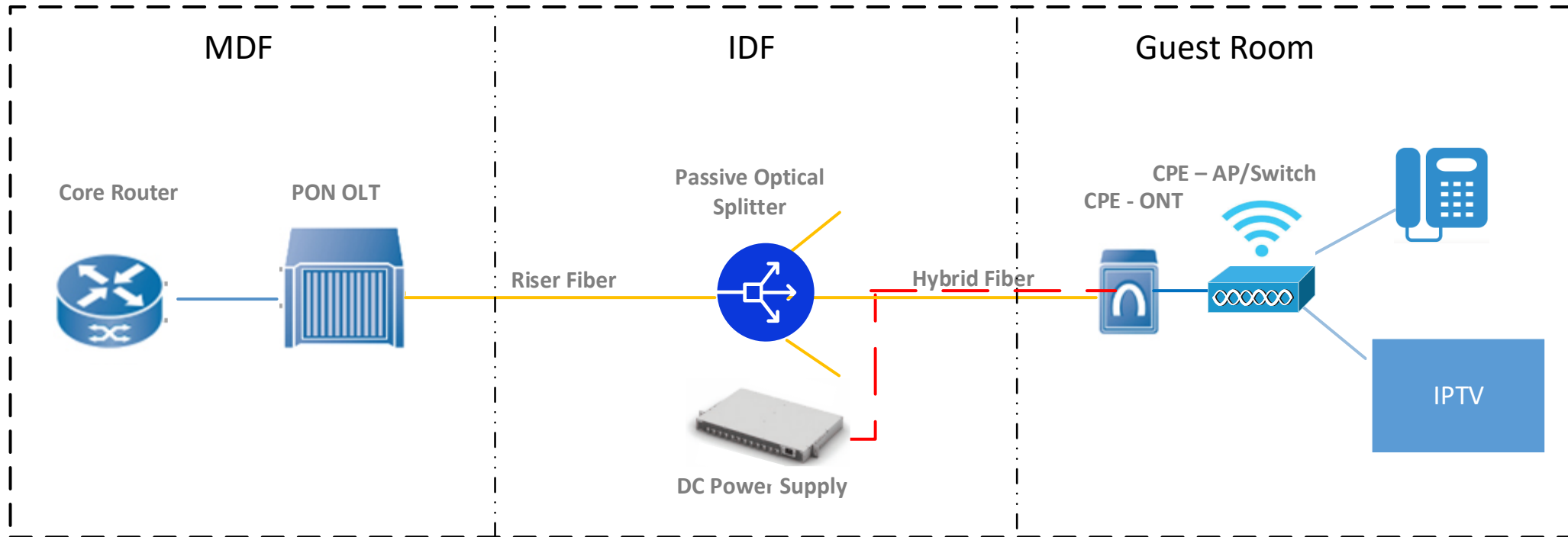
- **Ideal Wired Infrastructure for Legacy/Brownfield Hotels.** MDF uses dedicated fiber links to multiple IDFs
- **Point-to-MultiPoint Architecture:** Cost effective and simple. Multiple Guest Rooms served over a single coax segment. AP plays same hub role as with Structured Wiring
- **Guest Room is out of inventory for about 15-20 minutes**

# Active Ethernet Fiber Networks



- **AE is an all-fiber network, usually Single Mode Fiber**
- **This is a Point-to-Point network from the edge switch to the endpoint**
- **The electronics at the endpoint can be remotely powered**

# Passive Optical Fiber Networks



- A PON requires Single Mode Fiber throughout the network
- There is a Passive Optical Splitter typically in the IDF
- PON is a Point-to-MultiPoint network



# Wireless – Mobile Networks

Technology Options for Wireless Requirements



# Wireless Comes in Many Flavors

Protocol	Common/Best Use Case(s)
Wi-Fi	Building and campus-wide LAN, guest wireless
Bluetooth	Location services, mobile key, mobile and wearable devices
ZigBee	Building control and automation
Z-Wave	Home automation
SigFox	Asset tracking, utility monitoring, environmental sensors
LoRaWAN	Asset tracking, smart metering, door sensors
BacNet	Building automation and control systems
Thread	Building Automation and control systems
Mobile Networks	Mobile phones, devices in isolated locations





# The Latest WiFi 802.11 Standards

WiFi generations

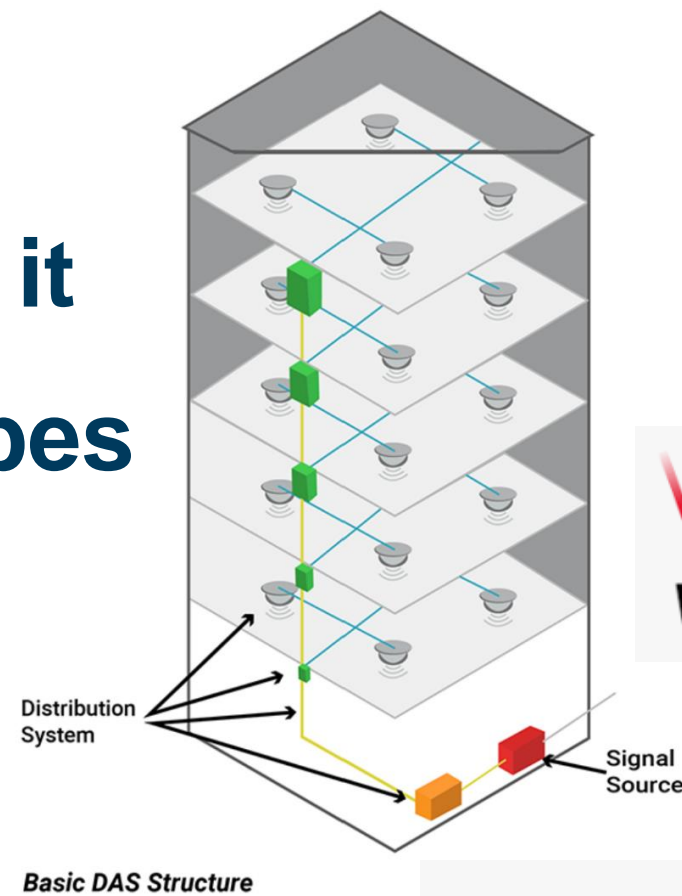
V·T·E

Generation	IEEE standard	Adopted	Maximum link rate (Mbit/s)	Radio frequency (GHz)
Wi-Fi 7	802.11be	(2024)	1376 to 46120	2.4/5/6
Wi-Fi 6E	802.11ax	2020	574 to 9608 <sup>[3]</sup>	6 <sup>[a]</sup>
Wi-Fi 6		2019		2.4/5
Wi-Fi 5	802.11ac	2014	433 to 6933	5 <sup>[b]</sup>
Wi-Fi 4	802.11n	2008	72 to 600	2.4/5
(Wi-Fi 3)*	802.11g	2003	6 to 54	2.4
	802.11a	1999		5
(Wi-Fi 2)*	802.11b	1999	1 to 11	2.4
(Wi-Fi 1)*	802.11	1997	1 to 2	2.4



# Mobile Networks – DAS

- Cellular DAS – What is it
- Key Components – Types
- Carrier Involvement

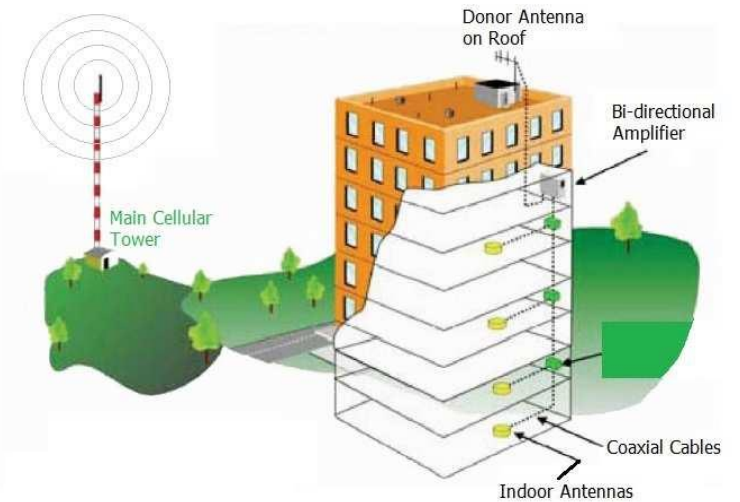


# Mobile Networks – First Responders

- What is it?
- Where is it used?
- How it is different than Cellular?
- What is covered in the guide?

Band	Frequency (MHz)	Mode(s)	Remarks
HF	25-30	TIA-603	
VHF	30-50	TIA-603	
	138-174	TIA-603, P25	
	220-222	Voice/Data (not TIA-603)	5 kHz
UHF	406-512	TIA-603, P25	
	764-776	TIA-603, TIA-902, P25, 802.16(e)	RL
	794-806	TIA-603, TIA-902, P25, 802.16(e)	FL
	806-817	TIA-603, P25	RL
	824-849	Cellular (many modes)	RL
800 MHz	851-862	TIA-603, P25	FL
	869-894	Cellular (many modes)	FL
PCS	1850-1990	PCS (many modes)	
ISM	2400-2483	IEEE 802.11	
4.9 GHz	4940-4990	IEEE 802.11, VoIP, UMTS/ TDD	

Frequency bands and modes for public safety mobile radio communications. RL= Reverse link (mobile to base), FL= Forward link (base to mobile).

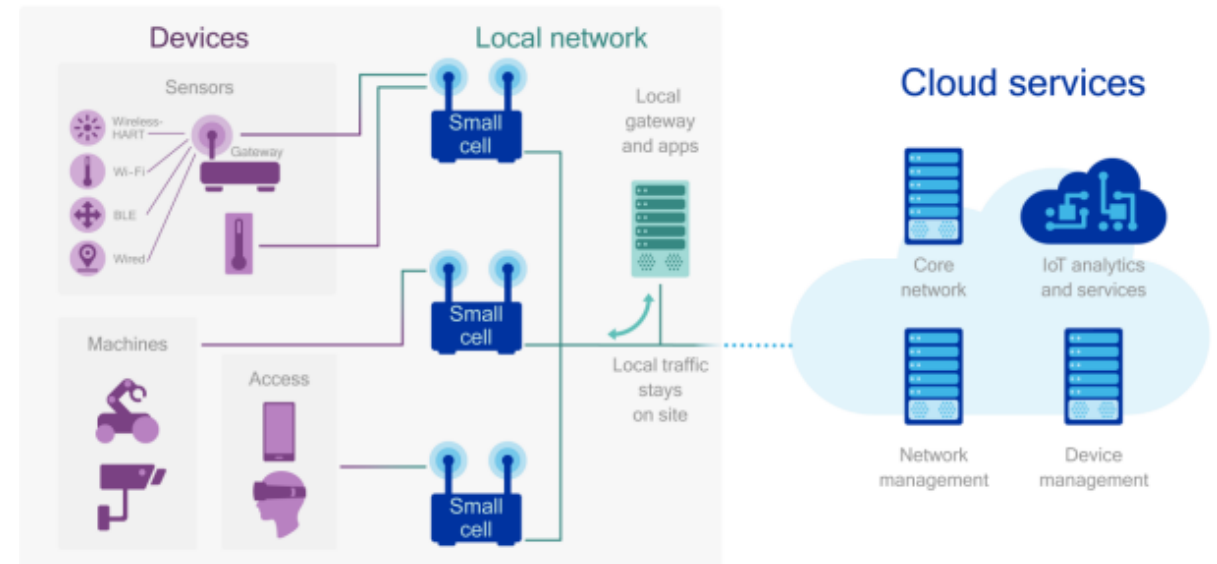


# Private 2 Way Radio and LTE Solutions

- **Traditional 2 Way Radio Solutions for Hotel Comms.**



- **Utilize Private LTE solutions to handle 2 Way and other Applications**





# Recommendations

What is the Best Solution for Me?



# Recommendation Considerations

- **Project Type: Greenfield or Brownfield**
- **Property Type: Size, Layout and Brand**
- **Infrastructure Choices / Options**
  - **Traditional Structured Cabling**
  - **Fiber to the Room: Active Ethernet or PON**
  - **Ethernet over Coax (EoC)**

# Technology Comparisons

Network Infrastructure	Traditional	Fiber	Coax
Supports 1-10Gbps	YES	YES	YES
Supports Long distance	Up to 100M	Up to 20km	800m
Cable Pathways and support	More cables	Less Cables	No Change
Reduces TR (IDF) space	NO	YES	No Change
In room POE output up to 71W	YES	YES	YES
IPTV / VOIP / HSIA Plus other IP based Technologies	YES	YES	YES
Broadband – Coaxial based TV (RF/QAM) ports	NO	YES	YES
Analog Phone	YES	YES	YES
Potential EMI (Electrical Magnetic Interference)	YES	NO	NO
Backhaul – DAS or Small Cell	YES	YES	YES
Recommended Property Types	Limited Service, Midsize Hotels	Full-Service Convention / Resort Hotels	Brownfield properties



# Implementation Considerations and Ongoing Support

Preparing for Problems





# Implementation Considerations

- **General Considerations**
  - Pull extra fiber to closets / zones
  - Sizing power per closet or remote power AWG
  - Pathways
- **Mobile Network Considerations**
- **Documentation**
- **Labeling**
- **Code Requirements**
- **Brand Standards**



# Day 2 Support Considerations

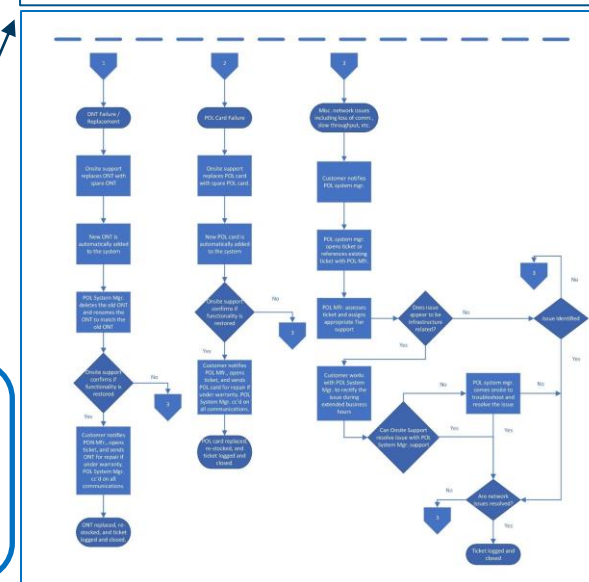
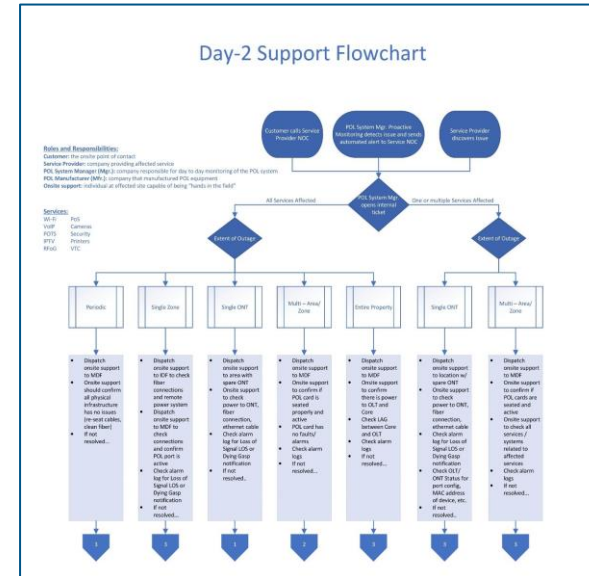


PREPARED

For this, I wasn't.

- **Documentation**
  - As-Builts
  - Network Diagrams
  - BOM
- **Training**
- **Software Manuals**
- **Moves/Adds/Deletes**
- **Troubleshooting**

Examples of Troubleshooting Flow Chart from Day 2 Support Work group



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Bill Gustafson	Director Global Hospitality	HPE Aruba Networking
Christian Weinholtz	VP, Network Technology	Allbridge
Dan Garton	Business Development Manager	IES Communications, LLC
Daryl Corral	Technology Innovation and Lab Manager	Hyatt Hotels Corporation
David Chisholm	Sr. Director	CST Core LLC
Dayna Kully	Co-Founder	5thGenWireless
Hank Matthews	Senior Sales Engineer	Tellabs, Inc.
Jeffrey Clement	VP, Hospitality Sales	Positron Access Solutions
Jessica Janis	Director, Business Development	Corning
Matthew Baio	Vice President of Sales	GuestTek
Mark Raiser	President	Michael Raiser Associates
Pierre Trudeau	President & CTO	Positron Access Solutions
Randy Currie	Chief Technology Officer	Solution Inc Limited
Richard Wagner	Director of Certification and Compliance	Nomadix
Ron Tellas	Technology and Applications Manager	Belden
Scott Fain	Principal Systems Engineer	Ruckus Networks
Ubair Javaid	CTO	Radair
William Buck	Director Business Development	Tellabs, Inc.

# Next Generation Infrastructure Technical Guide

- **Technical Guide**
- **Executive Summary**
- **Universal Infrastructure Glossary**



**Download the  
Documents Now!**

# How to Get Involved

- **Join the Hotel Infrastructure Community of Interest (Open to all)**
  - [https://www.ahla.com/communities\\_of\\_interest](https://www.ahla.com/communities_of_interest)
- **Not a Member, Consider Joining AHLA/HTNG**
  - Learn more about the benefits of membership - <https://www.ahla.com/join-today>
- **Attend a Conference**



Scan to Join the  
Community of Interest

# Questions and Answers



**Download the  
Documents Now!**



**Community of  
Interest**

**For Comments and/or additional questions,  
please send to Sandy Angel: [sangel@ahla.com](mailto:sangel@ahla.com)**

**THANK YOU**