



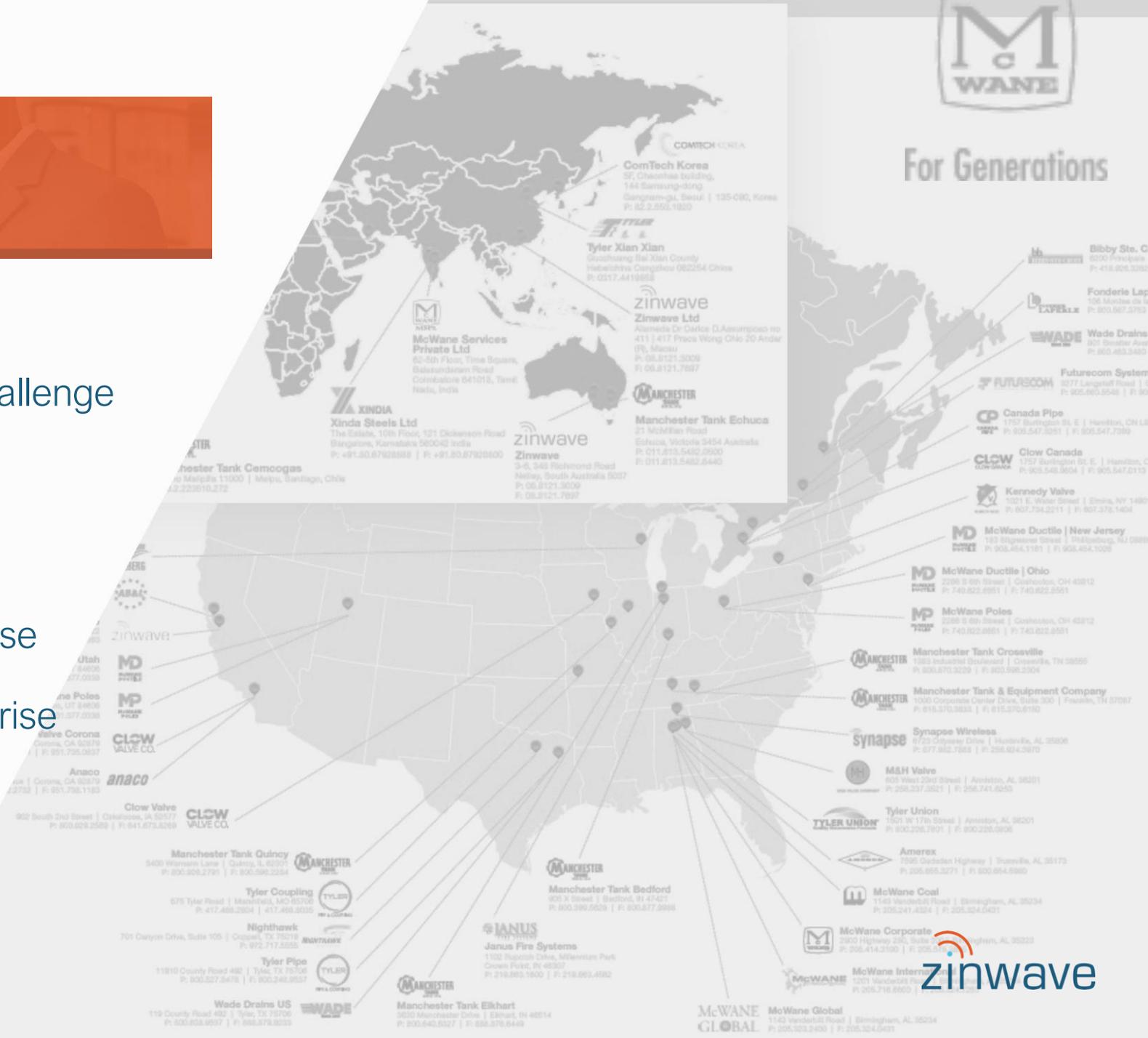
Learning Fiber Optic based Wireless Systems

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# Agenda

- Zinwave Introduction
- DAS Statistics/ Indoor Cellular Challenge
- Advantages of Fiber
- System Architecture Examples
- Today's Opportunity: The Enterprise
- Deployment Impact for the Enterprise
- Fiber Deployment Examples
- Q & A



# Introduction

- Zinwave is a proud member of the **McWane Technology Group**

- Based in Birmingham, AL
- Founded in 1921
- Part of McWane Technology Group
- Financial strength and global reach
- IoT, Public Safety, Product Design

- Unique integrated solution for **In-Building Wireless**

- Wideband Amplification – All Frequencies
- Fiber to antenna technology
- Solution targeted at multi-service, multi-band Enterprise Customers
- Licensed and Unlicensed Frequency Bands, Public Safety & Private Radio



# Zinwave Professional Services

## Pre-Sales Support

- Survey
  - RF Path Loss
  - Existing Coverage Survey
  - Detailed Site Survey
- RF Design
  - Coverage and Capacity Predictions
  - Detailed Bill of Materials
  - Service Propagation
- Post Sales Support
  - Commissioning
  - Optimization
  - Documentation

# DAS Statistics/Indoor Cellular Challenge

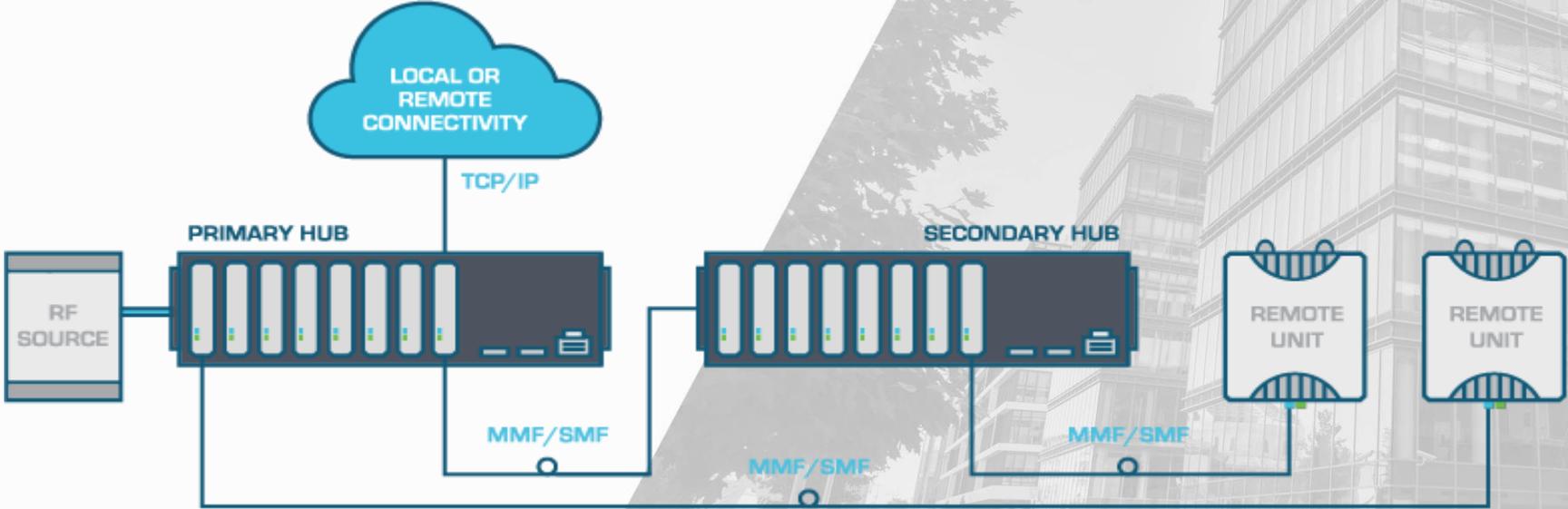
- Over 600% increase in cellular data traffic inside buildings by 2020
- 80%+ of all cellular data will be consumed indoors
- 2% of buildings have dedicated cellular solutions
- Coverage is needed today, capacity flexibility needed for the future

*Sources: ABI Research 2016; Market & Markets 2015; Infonetics 2015 In-Building Wireless – Big Market, Big Money!; Petrilla News, June 2015*

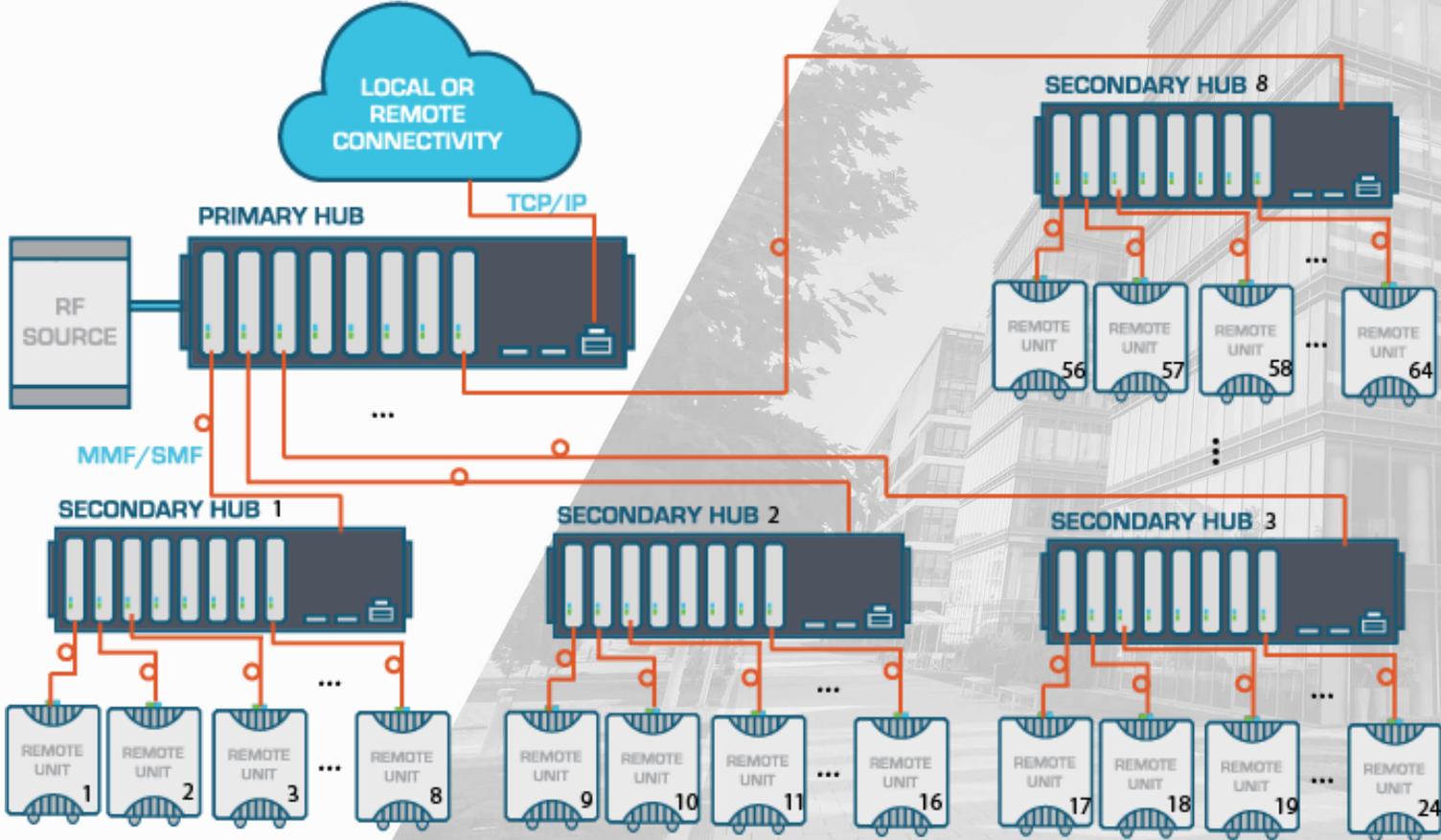
# Advantages of Fiber

- Extended reach vs Coax
- Minimal loss
- Flexibility
- Alarming to the antenna end point
- Faster install, least disruption to end client
- 5G, fiber a necessity
- Lower installation costs compared to coax cable
- Use of existing infrastructure

# System Architecture



# System Architecture



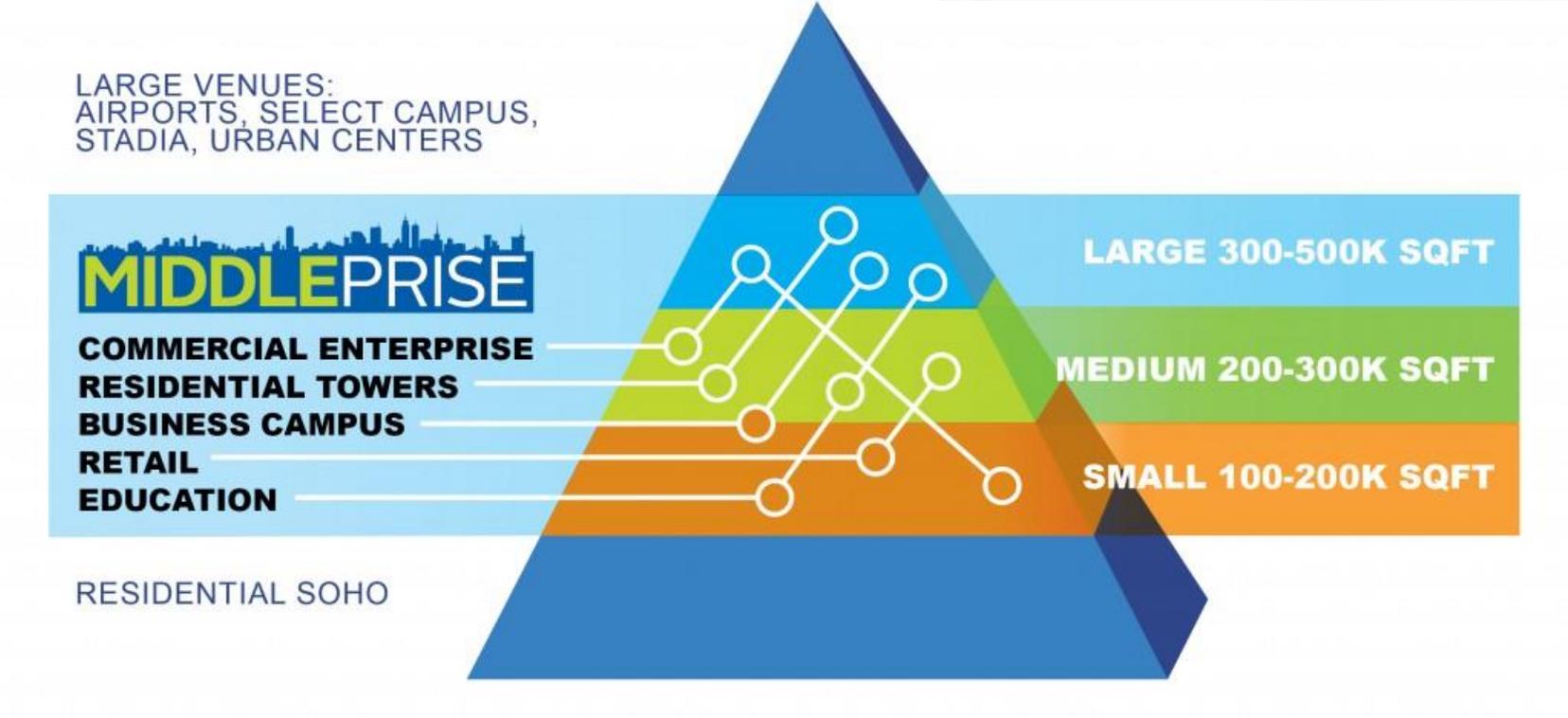
# Today's Opportunity: The Enterprise

- History Wireless Carriers build, no more \$
- Enterprise, largest growth opportunity \$20B market by 2020
- Venue Examples: Hotels, hospitals, colleges, retail, multi-level class A office towers
- Competitive Advantage
- Bring Your Own Device (BYOD)
- Increasing dependence on wireless apps
- Data/capacity demands

# Today's Opportunity: The Enterprise

- Key players
  - Property owners and managers
  - IT
  - Architects and engineers
- Cost effective solutions
- Shape how wireless service is designed, turned up

# Today's Opportunity: The Enterprise



# Enterprise Wireless Requirements

- Coverage everywhere
- Support of one or multiple wireless operators, to accommodate not only employees/staff, but “roaming” visitors
- Minimal disruption to operations during system installation
- Easily expandable
- Aesthetically unobtrusive (invisible)
- No safety hazards to the staff

# Deployment Impact

- BYOD
  - According to Microsoft, 67% of workers use their personal devices in the workplace. (Source: CBS MoneyWatch)
  - Mobile data will skyrocket 700% by 2021 (Cisco/ BI Intelligence)
- Coverage vs. Capacity
- Cost Conscious
- Fiber vs. Coax
- Customer Retention/ Customer Acquisition
- Maintenance, Preventative & Corrective

# Public Safety Advantages

- Alarming to the antenna end point
- 150MHZ Support (along with 450MHz, 700MHz & 800MHz)
- FirstNet 700MHz LTE support
- Campus Distribution
- Installation changes on the fly
- Fire Code Compliance



A low-angle, upward-looking photograph of several modern skyscrapers. The buildings are characterized by their glass and metal facades, with some featuring intricate geometric patterns. The sky is a pale, clear blue. A semi-transparent orange rectangular box is centered horizontally across the middle of the image, containing the text "Fiber Deployment Examples" in white, sans-serif font.

# Fiber Deployment Examples

# Leading Global Technology Company

## Challenge

- Largest active construction project in US
- “Pristine” floor plan
- No landlines, cellular voice and data requirements

## Solution

- Neutral Host
- 2.8M Sq ft office space, coverage and capacity
- 11,000 underground parking spaces
- 1,000 seat Theater
- Aesthetic solutions, no visible equipment
- Wireless Carriers: Verizon, AT&T, Sprint & T-Mobile



# Yale University

## Challenge

- Lack of coverage
- New construction design changes
- Fire department need

## Solution

- Cost conscious
- Multiple RF Sources, Carriers
- Fiber flexibility, primary hub relocation
- Wireless Carriers: Verizon, AT&T, T-Mobile & Sprint



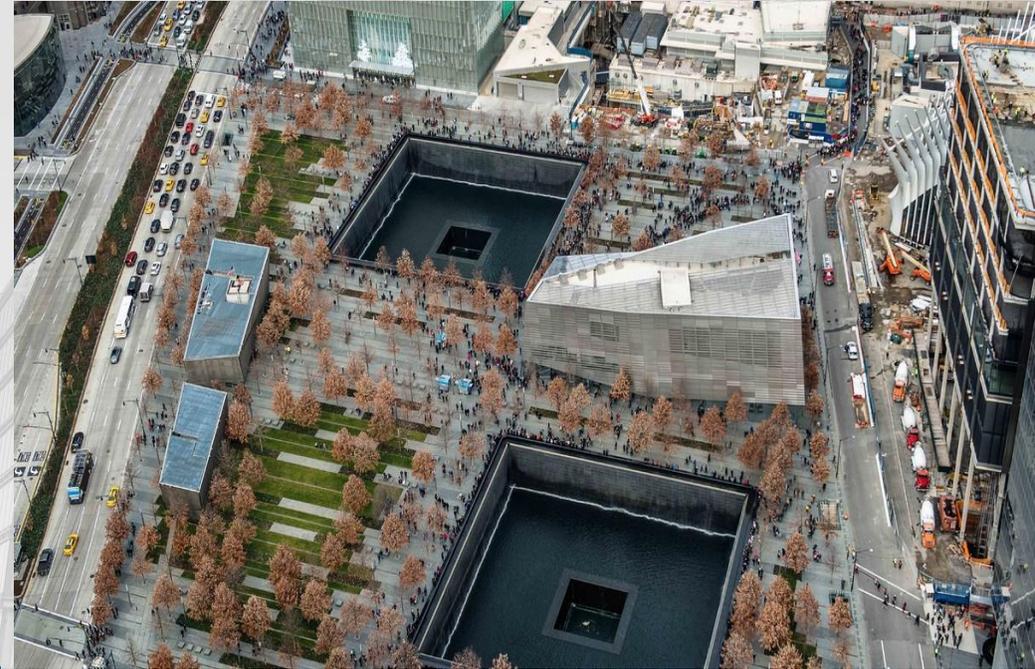
# 9/11 Memorial

## Challenge

- Underground environment
- Coverage and capacity

## Solution

- Neutral Host
- 110,000 Sq ft
- DAS extended throughout facility
- Wireless Carriers: Verizon, AT&T, Sprint & T-Mobile



# City of Bellevue, Washington

## Challenge

- Older DAS supported two Public Safety frequencies

## Solution

- 650,000 Sq ft City Hall
- Parking Garage
- Fiber flexibility
- New solution migrated 800Mhz Public Safety
- Cellular easily added, no additional equipment
- Wireless Carrier: Verizon Wireless



## RECENT CUSTOMER WINS

**Apple Headquarters**, Cupertino, CA & additional US corporate locations | **Pepsi Center**, Denver, CO

**Sky Headquarters**, London, UK | **Addenbrooke's Hospital**, Cambridge, UK

**Erasmus University Medical Center**, Rotterdam, Netherlands

**Saipan Casino**, Saipan | **Genentech Corporate Headquarters**, San Francisco, CA

**Jeddah Airport**, Jeddah, Saudi Arabia | **Yankee Stadium**, New York, NY | **MGM Resorts**, Macau

**City of Bellevue**, Bellevue, WA | **University of Utah**, Salt Lake City, UT





BREAK THROUGH.

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