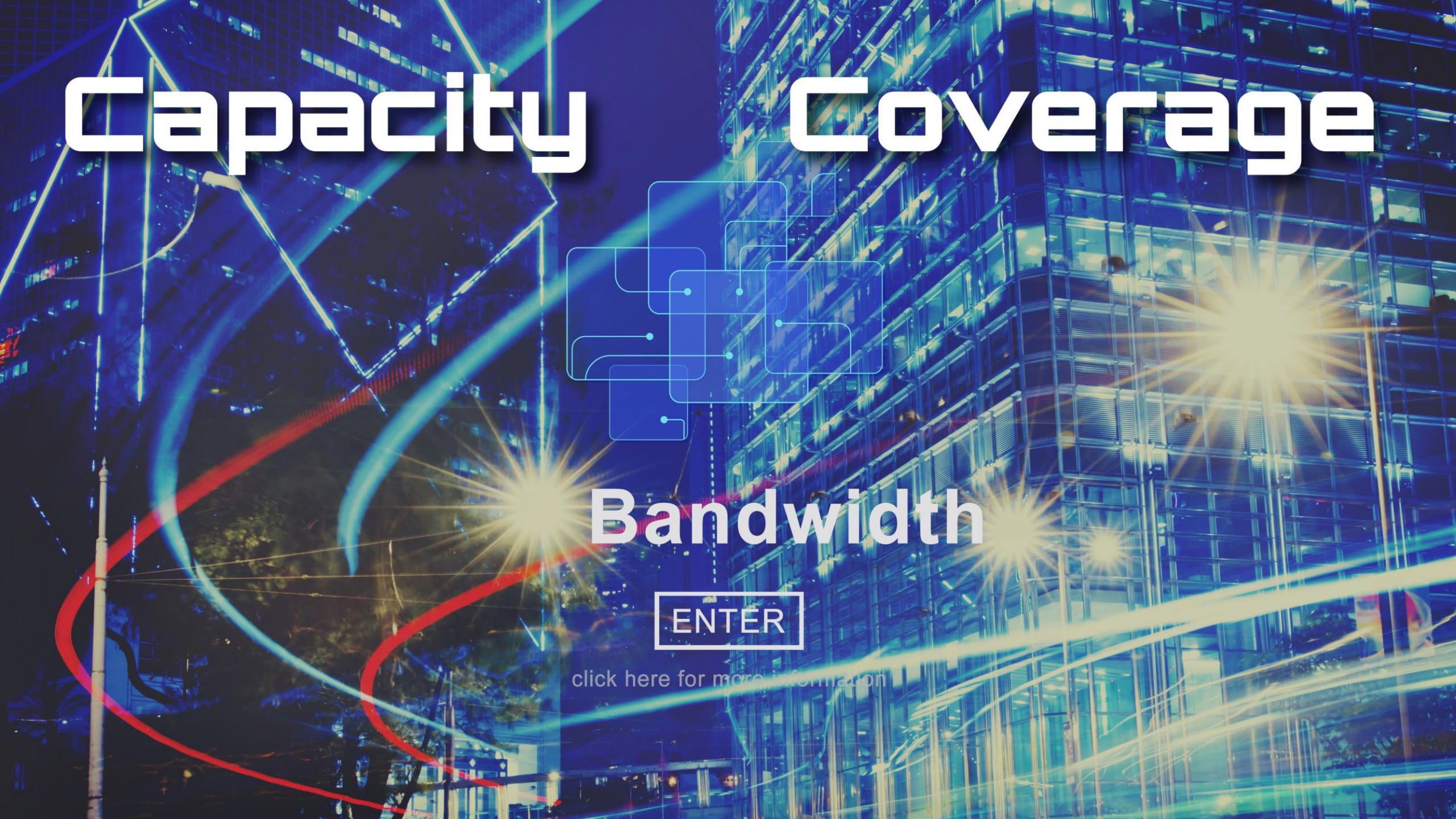
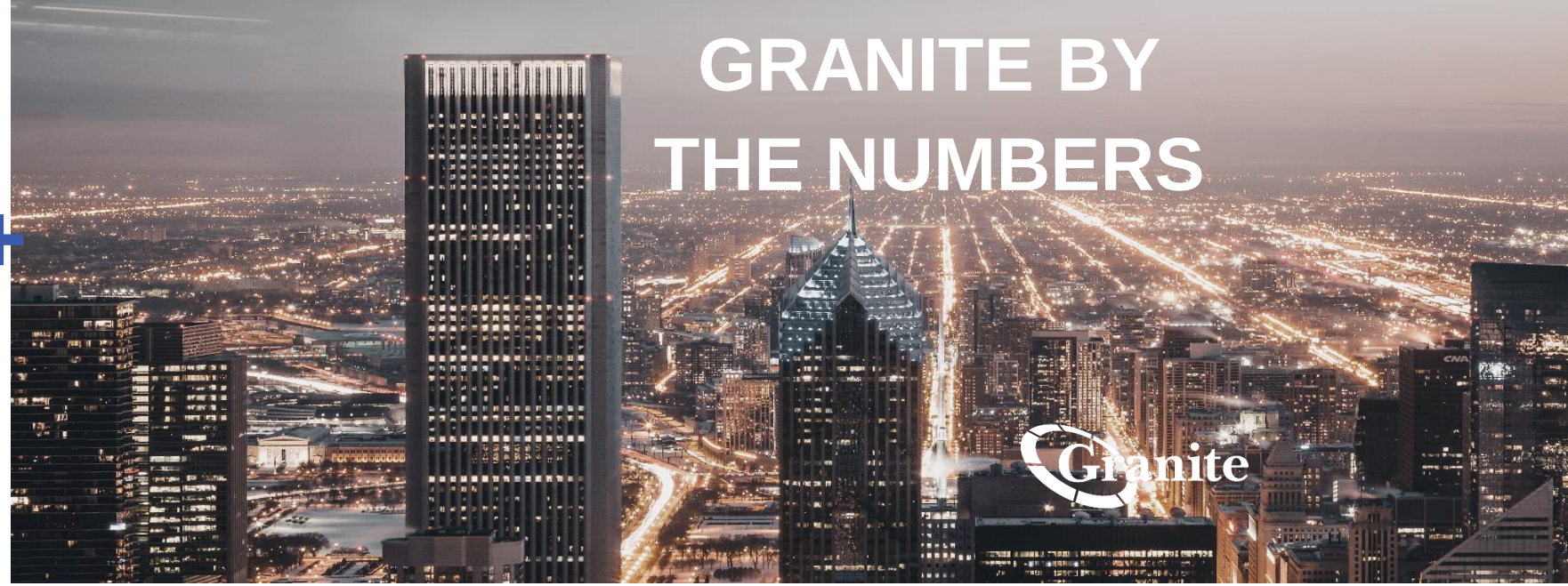

Capacity
Coverage
Bandwidth
ENTER
click here for more information

GRANITE BY THE NUMBERS

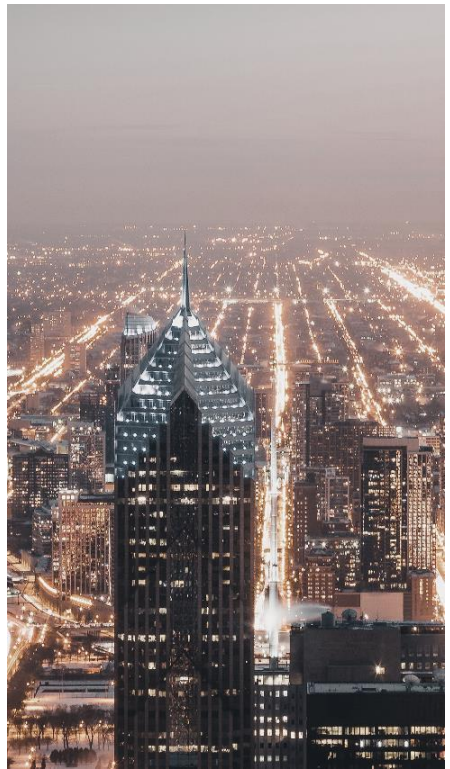


$1.35B+

No debt, annual revenue

650,000

Customer locations



7,000

Customers

Low-e Glass

SAFER BUILDINGS COALITION
www.saferbuildings.org

6 mm Glass Pane = -0.8 dB @ 900 MHz

Double Glazing w/ 2 coated Glass Pane = -23 dB @ 900 MHz

	Material	Source	Shielding effect / dB 900 MHz	1800 MHz	3 GHz
Glazing	Glass pane 6 mm	[8]	-0.8	-1.3	-1.9
	Double glazing 4 mm/air 12 mm/5mm	[5]	-0.8	-1.1	-1.2
	Double glazing with commercial low-e 4 mm coated/air 12 mm/5mm	[5]	-30.6	-26.8	-27
	Double glazing with 2 coated glass	[2]	-23	-30	-36
Glazing with pattemed low-e	Double glazing with square pattern (4 %) low-e coating 4 mm coated/air 12 mm/5mm (measured)	[5]	-1.3	-1.3	-1.9
	Double glazing with triangle pattern (2 %) low-e coating 4 mm coated/air 12 mm/5mm (measured/*simulated*)	This work	*-2.0/-2.0*	*-2.3/-2.2*	*-4.0/-3.9*
	Double glazing with triangle pattern (2 %) low-e coating 4 mm coated/air 8 mm/5mm (*simulated*)	This work	*-2.1*	*-3.2*	*-1.5*
	Double glazing with triangle pattern (2 %) low-e coating 4 mm coated/air 16 mm/5mm (*simulated*)	This work	*-1.8*	*-1.4*	*-7.1*

Source: Bouvard, Olivia & Lanini, Matteo & Burnier, Luc & Witte, Reiner & Cuttat, Bernard & Salvadè, Andrea & Schüler, Andreas. (2017). Mobile communication through insulating windows: a new type of low emissivity coating. Energy Procedia. 122. 781-786. 10.1016/j.egypro.2017.07.396.

U.S. COMMUNITIES
An OMNIA Partner

- Cooperative Contract Manager
- Lead Public Agency Managed Contracts
- Public Solicitation Process
- National Volume
- Nation's Largest Cooperative Program
- No Cost/ Non-Binding
- Best Overall Value
- Best in Class Vendors

GraybaR

Evolution of the RAN towards an All Software EdgeRAN Solution

100% ALL Software RAN operating a LIVE Commercial LTE Network Service

TIM

Bologna, Italy City Center Area
Approximately 40 Acres in downtown area

- Standard Intel Xeon servers
- JMA Wireless TEKO RF Distribution
- Supporting LTE Data, VoLTE, and IoT Services
- Multiple Bands, Multiple Sectors, MIMO
- More than 180K RRC Connected UEs & 40GB per day
- Handling more than 150K handovers per day

RAN Software by

JMA WIRELESS | XRAN Adaptive Baseband

Running on

intel inside Xeon

LAS VEGAS
CONNECTED

ALL WSP's Supported

350+ DNS Nodes

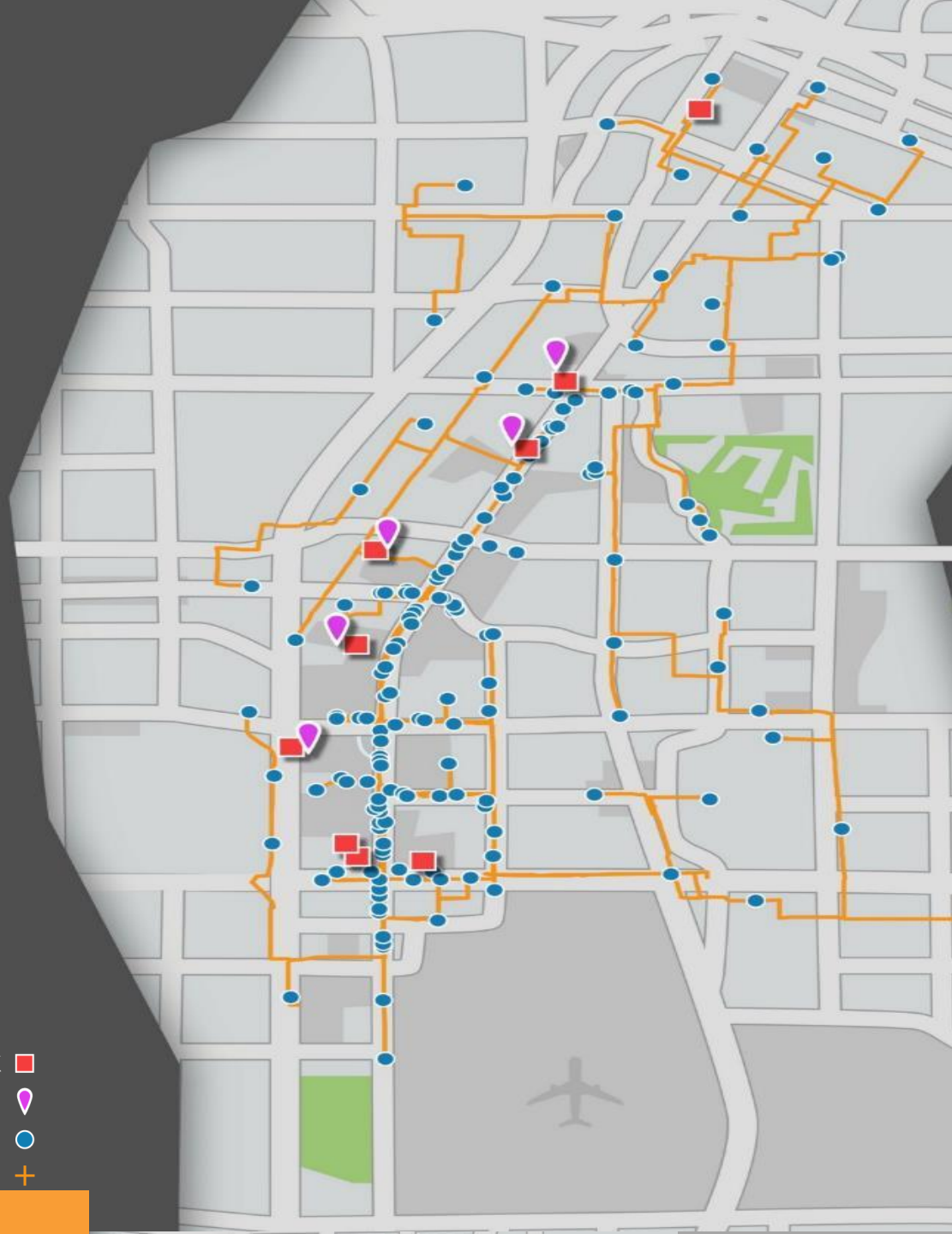
105+ Fiber Route Miles

22+ Million Sq. Ft. Covered

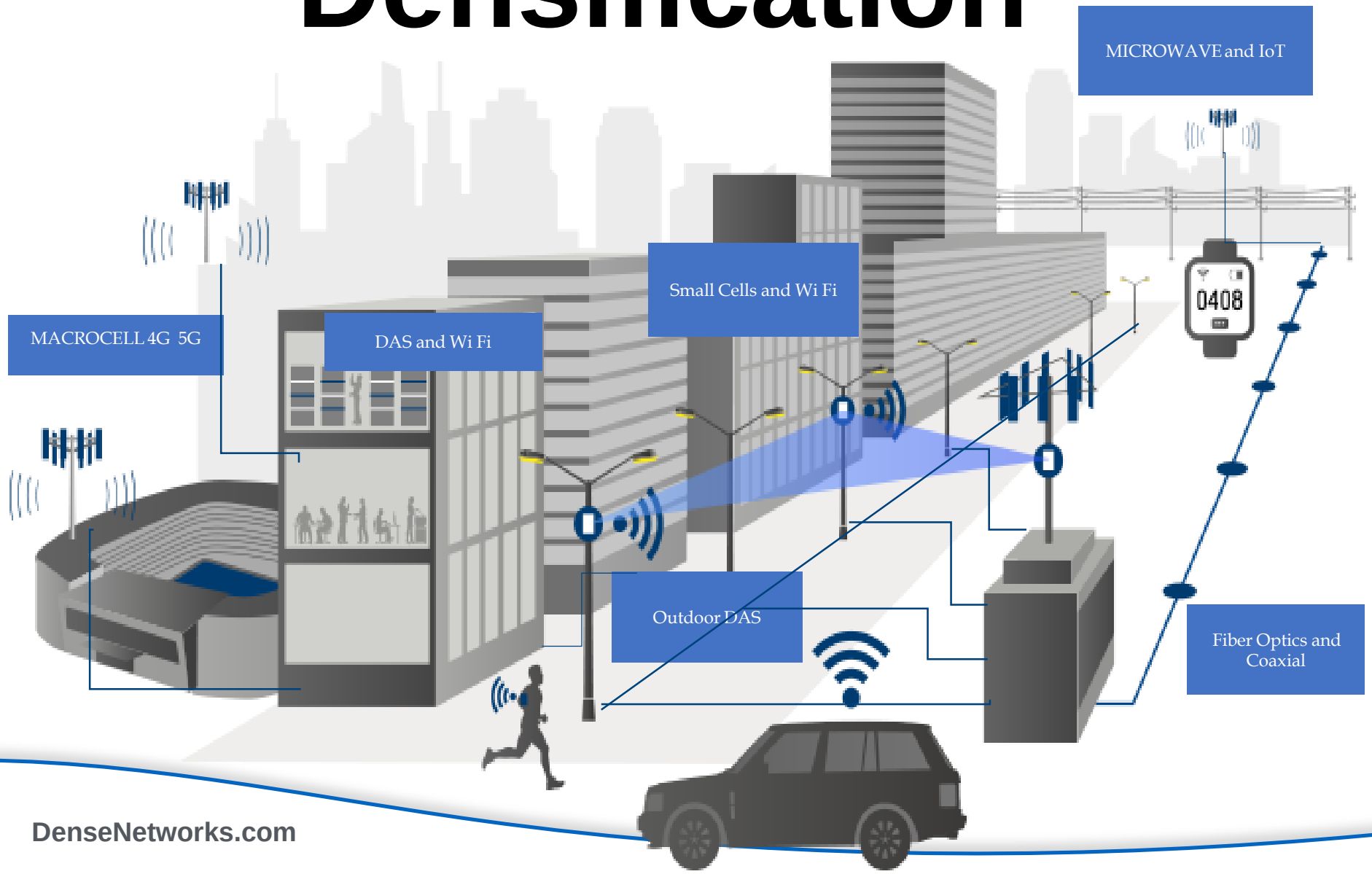
BY extenet SYSTEMS

Marquee Venues Include:

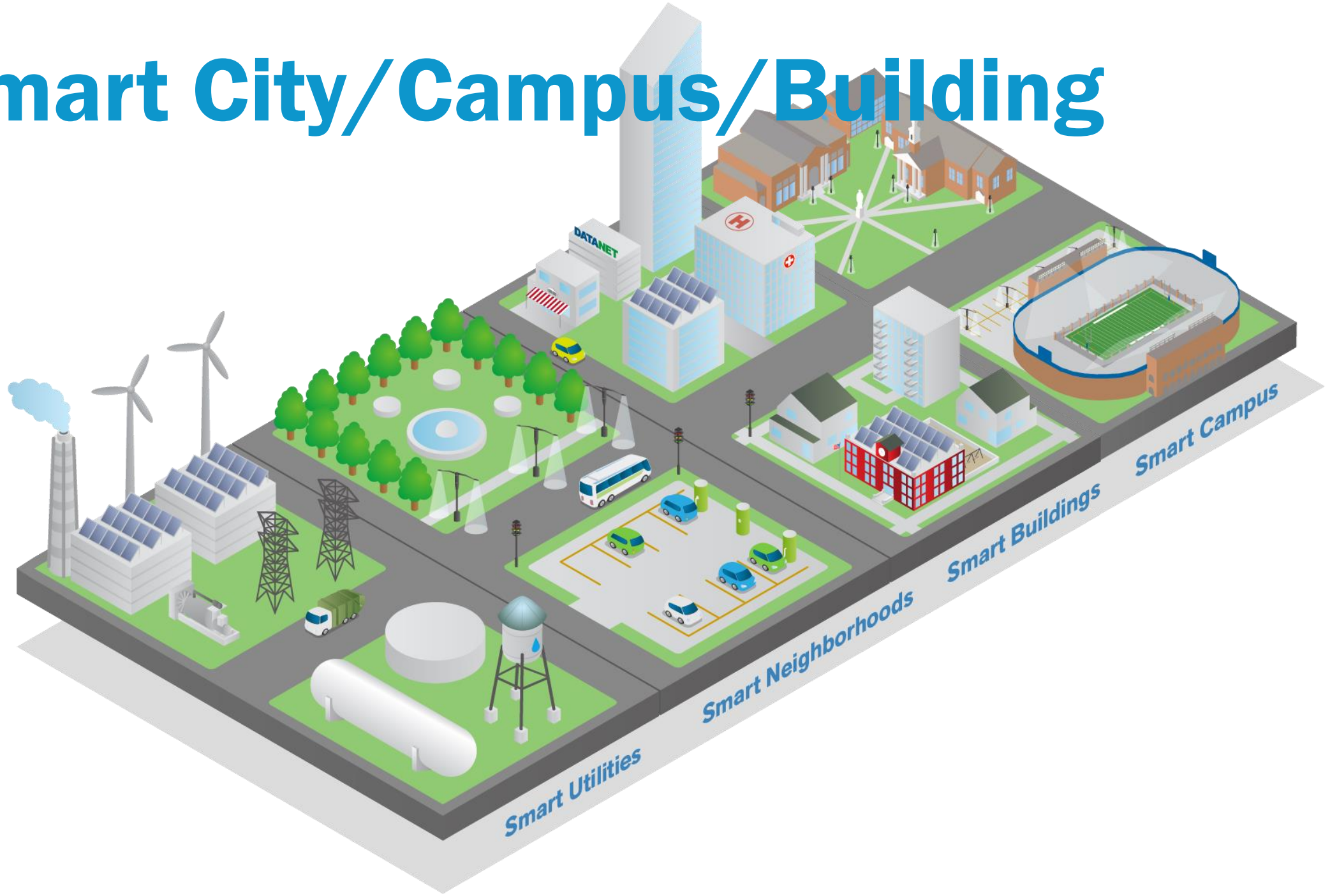
- SLS
- MIRAGE
- BELLAGIO
- THE PARK
- MGM GRAND
- TRUMP TOWER
- LUCKY DRAGON
- NEW YORK-NEW YORK



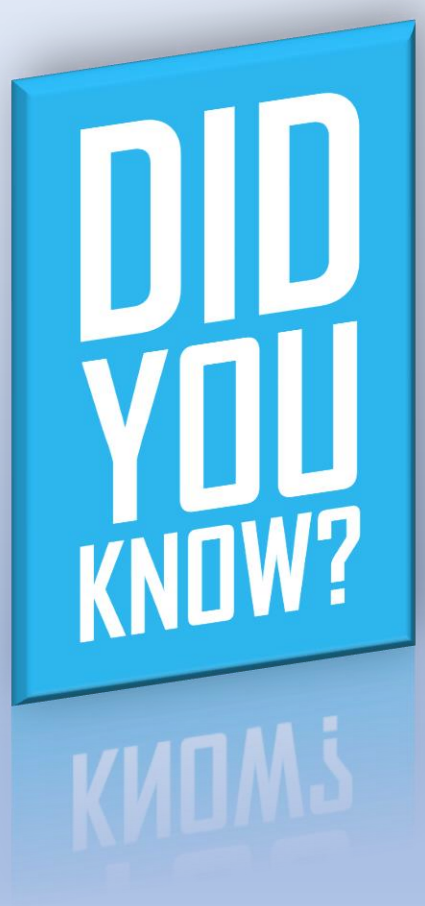
Densification



Smart City/Campus/Building



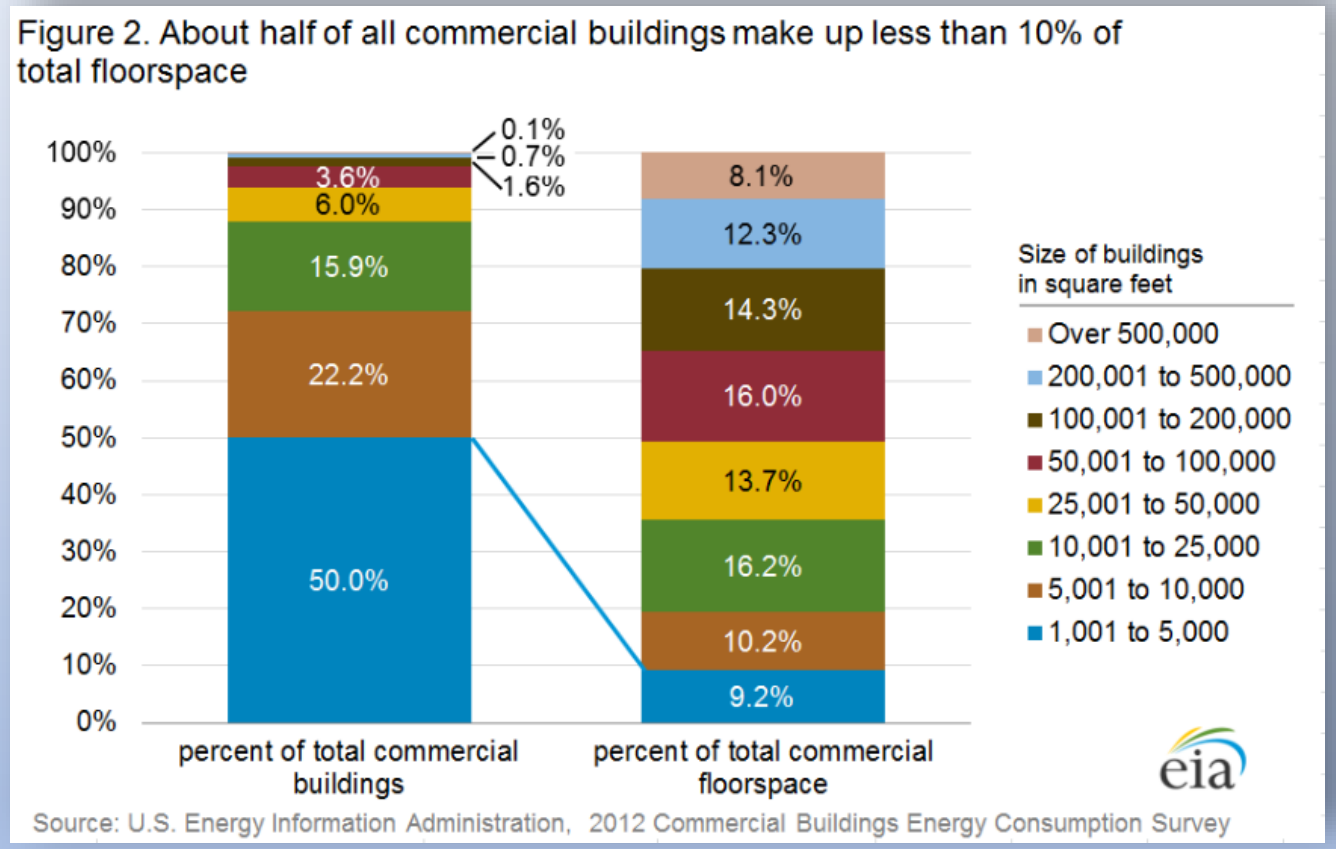
Driver: NG911 Location Accuracy



"The FCC estimates that a one minute improvement in 9-1-1 dispatch time could save 10,000 lives each year"

In-Building Public Safety – US Market Size

- 5.6 million commercial buildings in the United States in 2012
- 87 billion square feet of floorspace
- 14% increase in the number of buildings and a 21% increase in floorspace since 2003



Source:
Commercial Buildings Energy Consumption Survey (CBECS)

eia Independent Statistics & Analysis U.S. Energy Information Administration

Enabling the Smart Building

A | In-building **Fiber Backbone & Laterals** for **Converged Communication Services** for the building owners, tenants, wireless service providers, broadband carriers, IOT providers and others

B | **Distributed Network (DNS)** Nodes, Antennas and other Infrastructure deployed to enable **Indoor Cellular Service** for the wireless carriers and building owners

C | **Rooftop Antenna** deployed and provisioned for **Cellular, Broadband Services and Telemetry**

D | **Tenant Services** like Broadband Internet, VoIP, Video Conferencing, Cybersecurity etc. enabled and provisioned

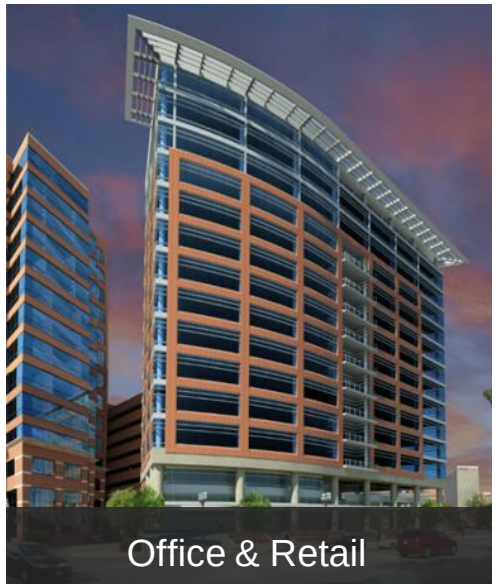
E | **Building Management Systems** controlling Elevators, Lighting, Security, Digital Signage, Environmental Control and other services

- IoT Sensors & Controls
- Security
- Access Controls
- IPTV
- Lighting Controls
- Building Automation
- Passive Optical Network
- WiFi
- Distributed Antenna Systems – cell, public safety, private radio, paging
- Voice
- Telemetry
- Any IP-based System

WIRELESS

THE 4TH UTILITY FOR IN-BUILDING SERVICES

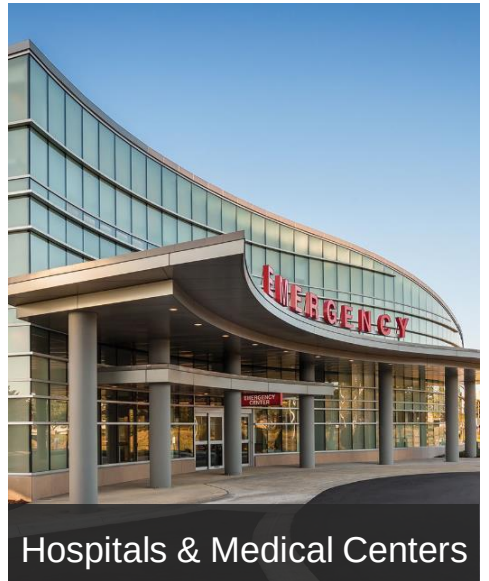
- We listen to our Customers!
- #1 Amenity for WIRELESS: the modern building
- Optimized wireless coverage throughout
- Enables Smart Buildings, Smart Retail and IoT initiatives
- Tenants pay higher rents in Smart Buildings
- Wireless as a Service drives affordability and efficiency



Office & Retail

Apartments & Condos

Student Housing



Hospitals & Medical Centers

GRANITE
WIRELESS AS A SERVICE

- Mid-Enterprise Focus 1K-500 K square footage
- Elimination of CapEx Burden
- 36 Month Term

Example Deployments

Manufacturing Office Space

Increase productivity

Boutique Hotel in Miami

Drive guest satisfaction

BMW Dealership in FL

No more lost calls

GETTING STARTED: BYOC STEP-BY-STEP

T-Mobile's network team and operational experts have deployed countless numbers of indoor wireless networks of every shape, size and configuration. Our BYOC team removes building professionals' pain points and streamlines the technology deployment process.

The first step is to find a strategic partner to help create a wireless infrastructure plan. We can help develop an RFP or find the right OEM or integrator.

Meet the local market and/or national BYOC team, learn more, and sign-up.

We will gather information including general system characteristics, proposed T-Mobile role and system signal power allocation, and backhaul requirements for budget approval.

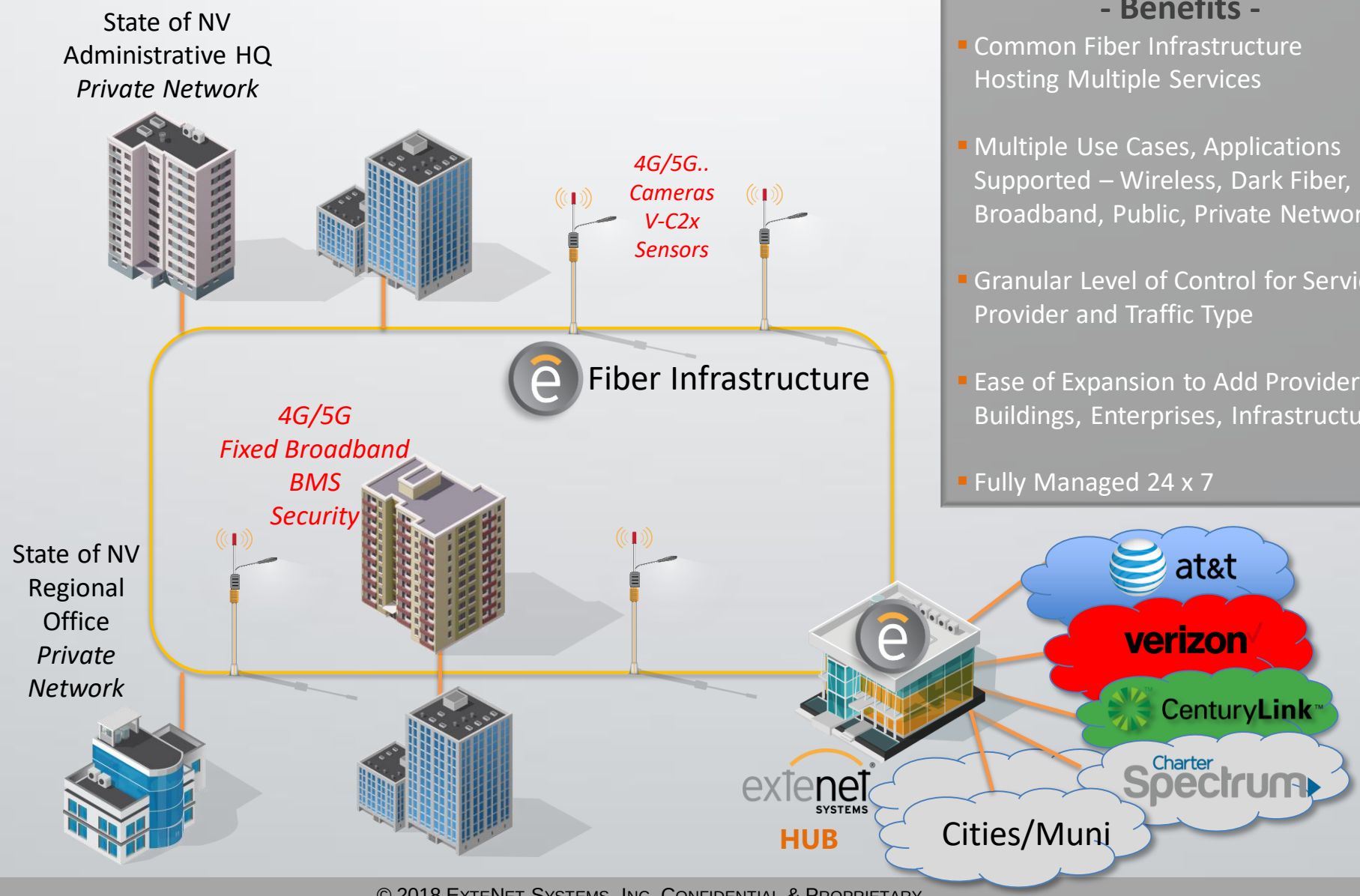
We will reach out to your integrators for design files in iBwave format based on broadcast channels and bands. We will then finalize the signal source T-Mobile will provide.

The BYOC License Agreement will need to be signed by both parties. During legal review and after design approval, our local market teams will visit the site to develop lease exhibit drawings.

Once the license is fully executed, we will move to the deployment phase.

Neutral Host Concept

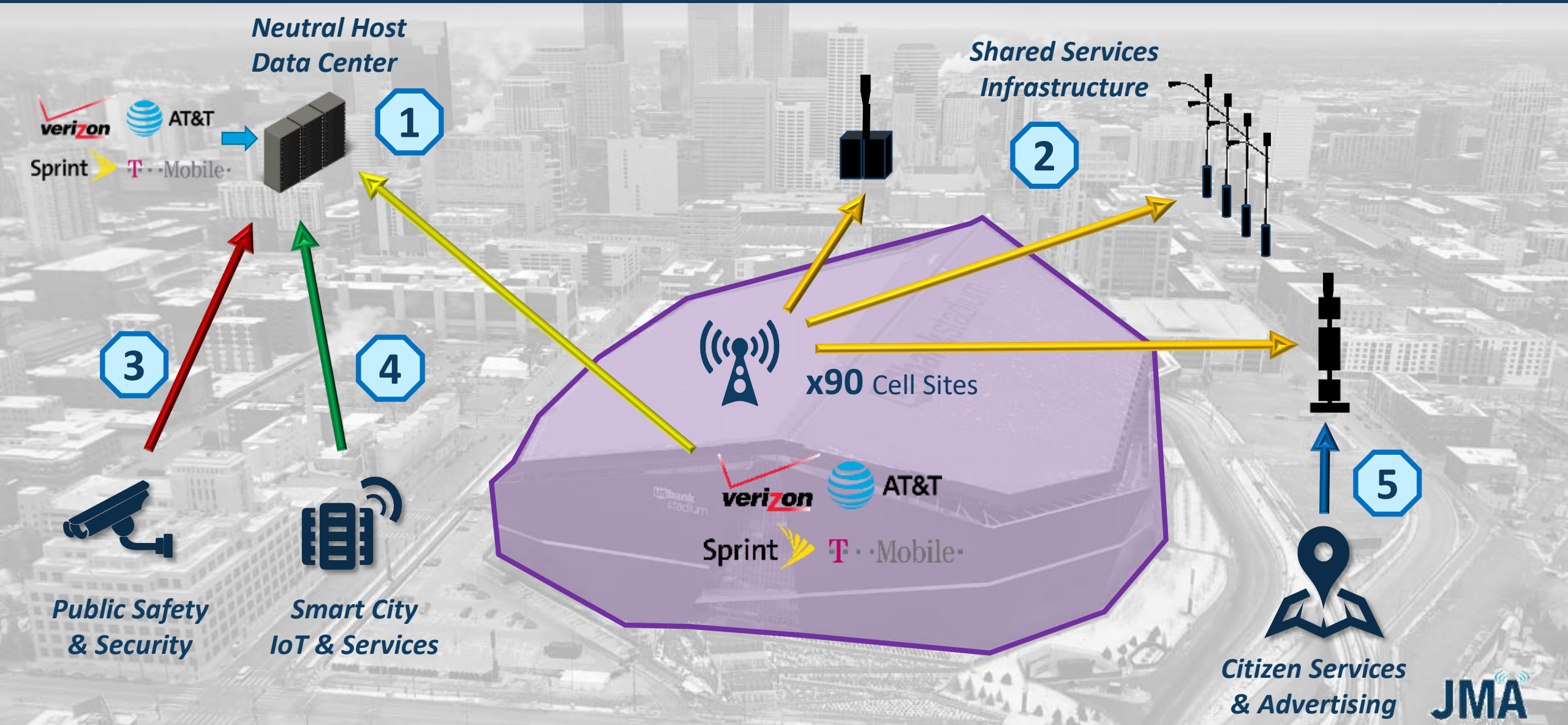
Enabling Smartly Connected Cities



- Benefits -

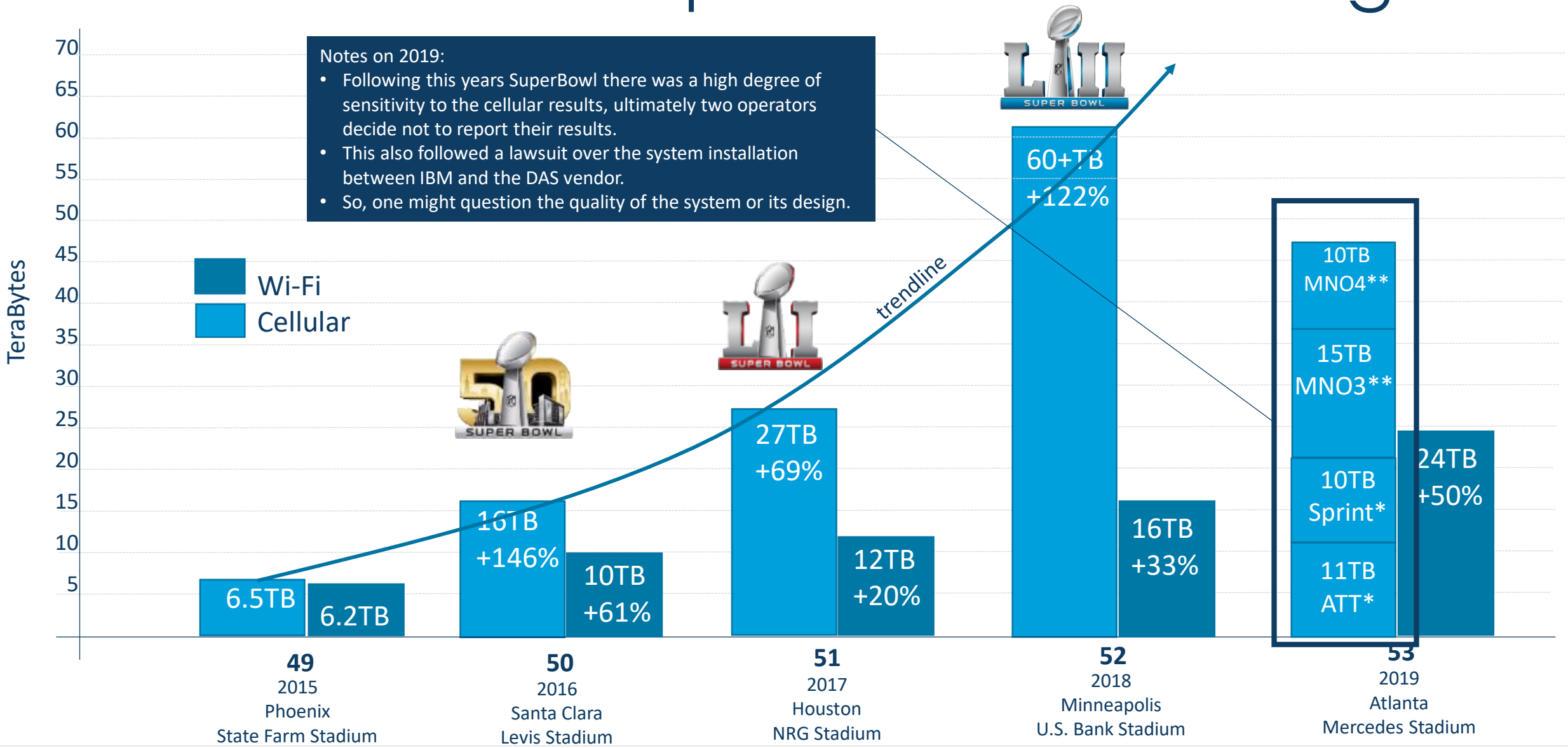
- Common Fiber Infrastructure Hosting Multiple Services
- Multiple Use Cases, Applications Supported – Wireless, Dark Fiber, Broadband, Public, Private Network
- Granular Level of Control for Service Provider and Traffic Type
- Ease of Expansion to Add Providers, Buildings, Enterprises, Infrastructure
- Fully Managed 24 x 7

Metro Area Neutral Host




Office Buildings
Industrial
Suburbs
Public Areas
Major Venues
Private Campus
Transportation Systems
Metro Area Neutral Host

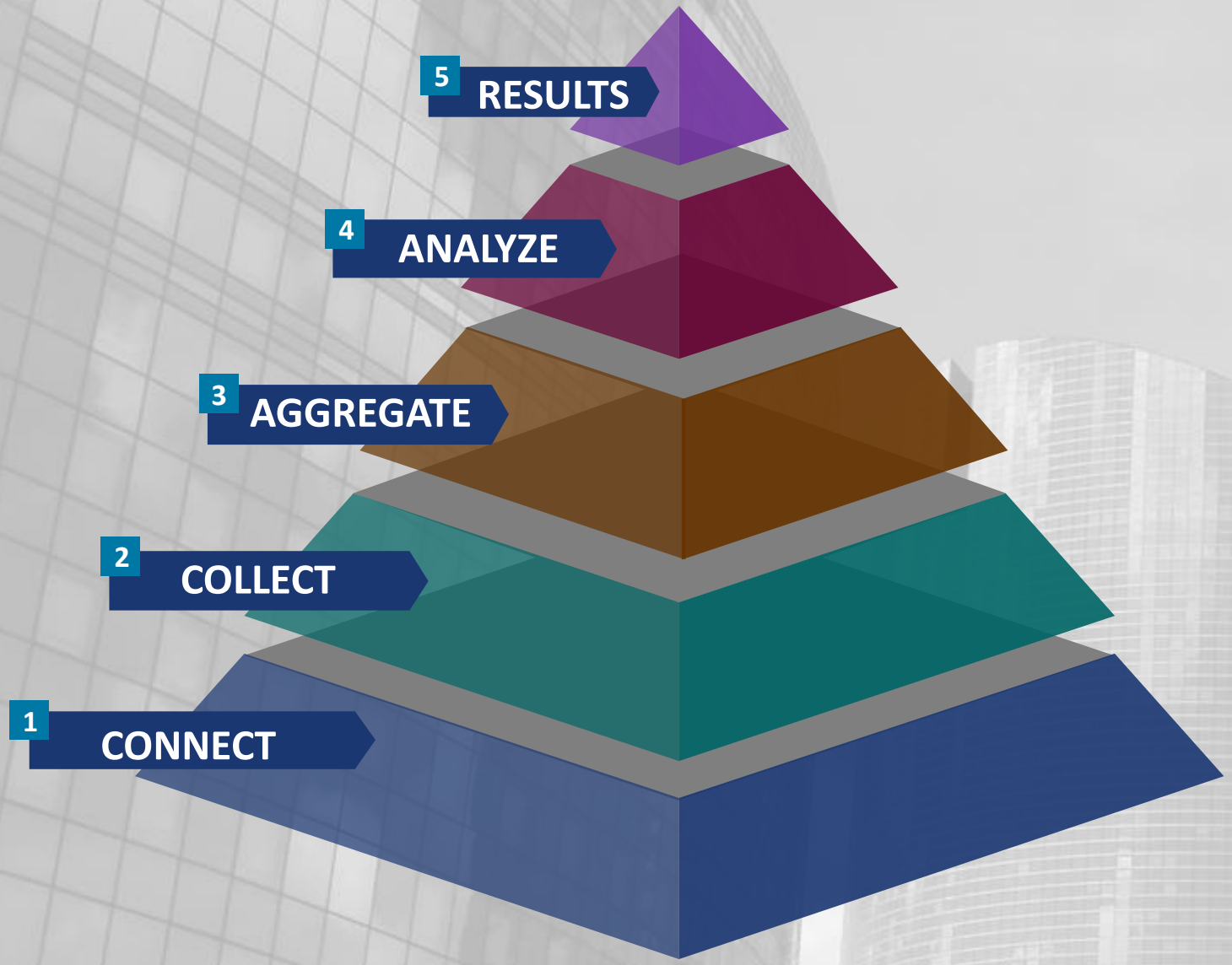
Reference: NFL Super Bowl Data Usage



JMA WIRELESS

* Reported by MNOs, ** Estimated

Building Smart City Infrastructure



USERS & CONSUMERS

Transform user and customer experience with engaging, enhanced and autonomous services

ANALYTICS & INTELLIGENCE

Transform data into insight, action and knowledge. Integrate into business and operational processes.

DATA FLOW & DEVICE CONTROL

Collect data and manage devices on the network. Use edge computing and gateways prior to sending to the cloud.

DEVICES & SENSORS

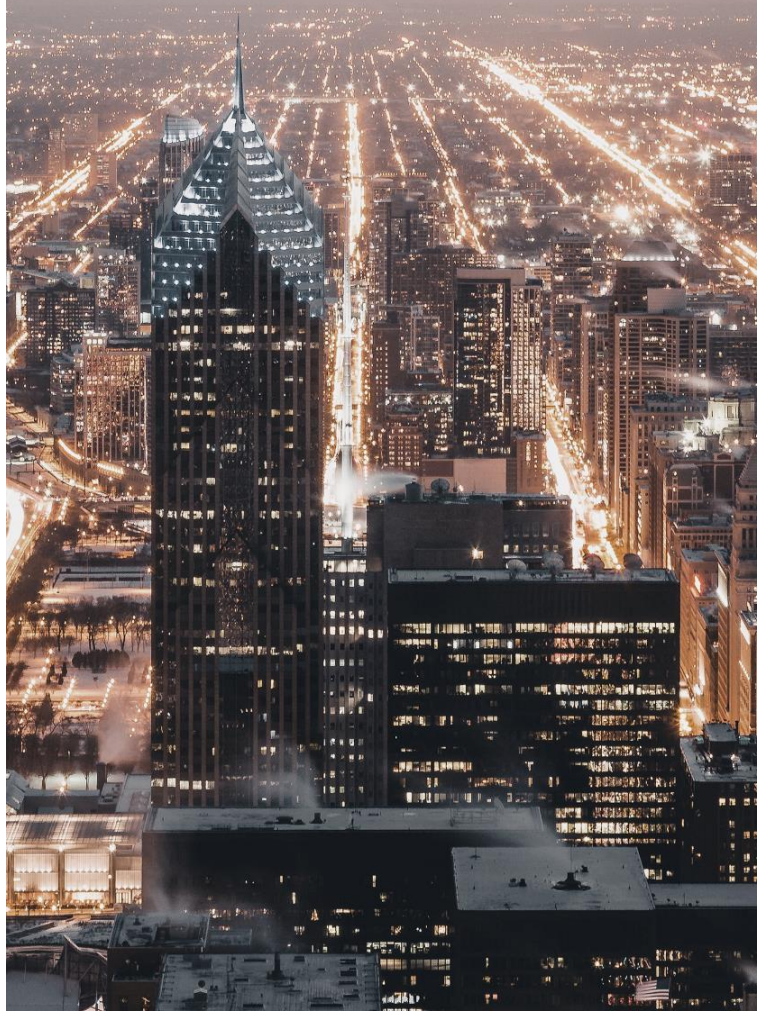
Deploy devices and sensors to measure existing and new data sets. Inventory assets that are not measured today.

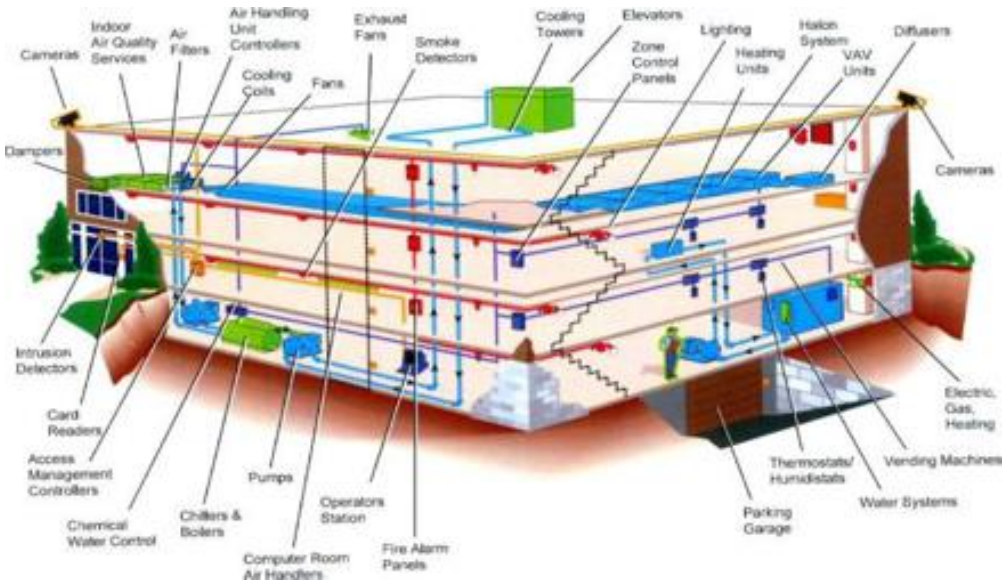
CONNECTIVITY & ACCESS

Build a network foundation for connectivity and access for more bandwidth, device types & mobility.

THE FUTURE

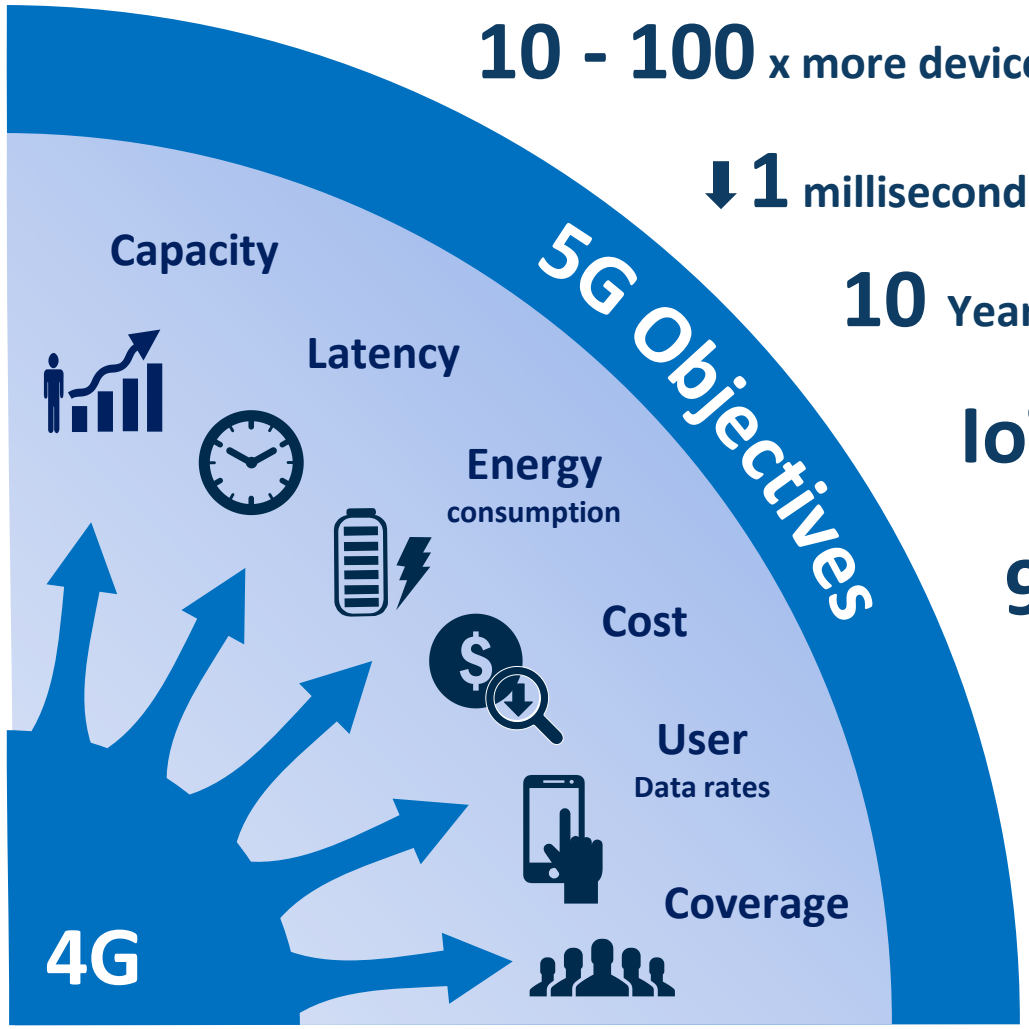
- CBRS and Private LTE
- Hybrid Networks
- Managed IoT Solutions






HOSPITAL
5G

5G Objectives



10000 x more traffic

10 - 100 x more devices

⬇ **1** millisecond latency

10 Years M2M battery life

IoT ultra low cost

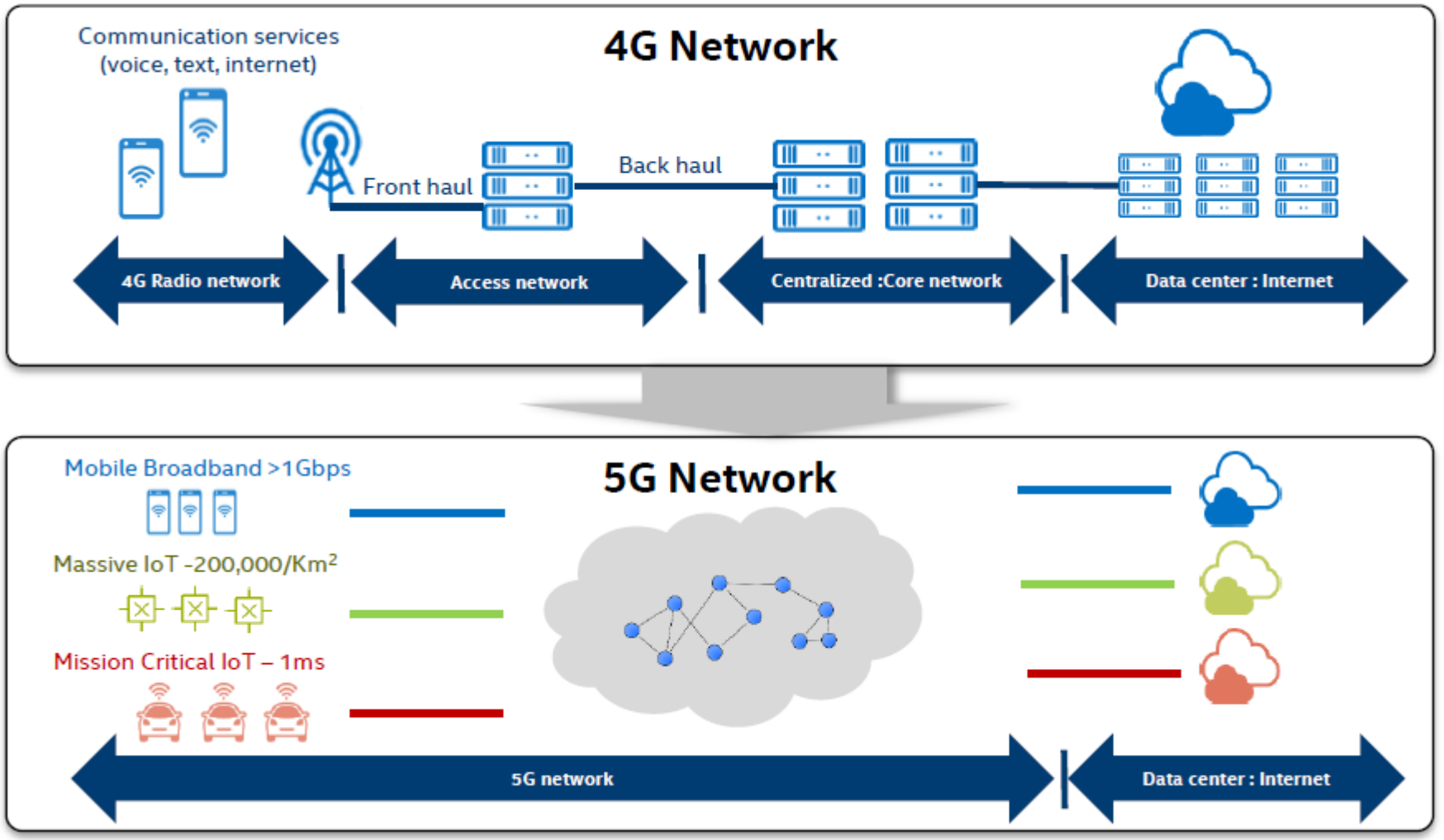
90% less network energy usage

⬆ **10** Gbit/s peak data rates

100 Mbit/s wherever needed

5-9s availability/reliability

Multiple Dimensions of 5G



Source: Intel

GRAYBAR'S ROLE WITH U.S. COMMUNITIES

- One Combined Contract # EV2370
  - Valid date February 1, 2018
    - 5 year initial term (with "three" two year extension options)
  - Electrical, Lighting, Utility
  - Data/Communications, Networking, Wireless, Service Provider, Security
  - Comprehensive Service Offering
  - Other Related Products & Services

- Graybar has a 21 year history with USC
- City of Kansas City, Lead Public Agency
- Large Breadth of Product - Consistent and competitive pricing
- Project & Volume Discounts Available
- No contracts to sign, no spend limits, non-binding & best overall value

GraybaR.

ELIGIBLE AGENCIES

- Over 98,000 eligible agencies can participate
  - Registration & MICPA
  - Over 60,000 registered with US Communities
  - Over 17,000 using Graybar's contracts

- Eligible Agencies Include:
  - State Agencies, Counties, Cities, Towns and Villages
  - Specials Districts: Water, MUD's, Transportation, Airports
  - Public and Private Higher Education
    - Colleges, Universities, Technical Schools
  - K-12 School Districts, Charter Schools & Other
  - Non-Profits Churches, Education, Hospitals, YMCA & Other

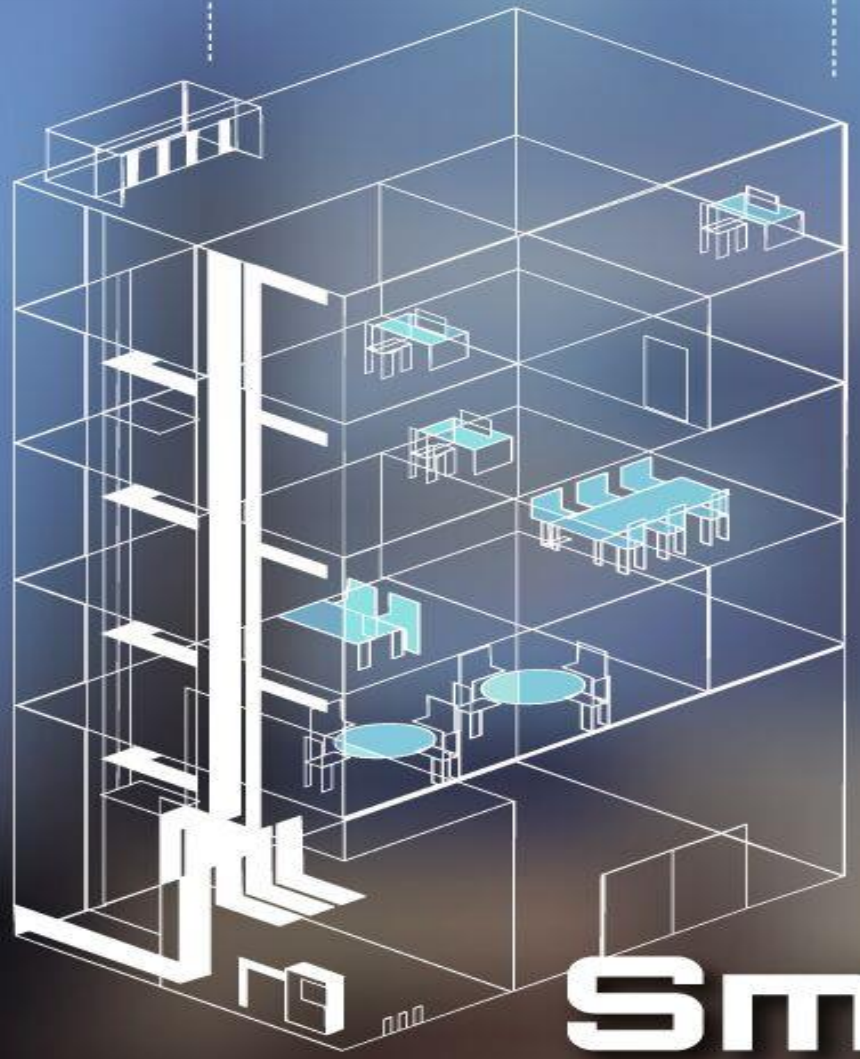
GraybaR.

SERVICES OVERVIEW

- Key areas for services are but not limited to:
  - Lighting & LED, Power & Energy, Technology, Networking & Wireless, Security, Repair
- Services performed by approved contractors and integrators
  - Agency Preferred Companies
  - Graybar suppliers, contractors, integrators
  - Manufacturers Approved Integrators
- Pricing is based on a Not to Exceed Cost Plus basis.
- Graybar acts as G.C.
- Sub-Contract and Service Owner Documents recommended

GraybaR.

BUILDING MANAGEMENT SYSTEM



Smart Buildings