



**VIRGINIA SMART  
COMMUNITY TESTBED  
STAFFORD, VA**



## CASE STUDY

# Virginia Innovation Partnership Corporation Leverages NFF's Network and Security Expertise for SMART Community Testbed

The Virginia Innovation Partnership Corporation (VIPC) has launched the Virginia Smart Community Testbed (Testbed) in Stafford County, the first Smart Community testbed deploying innovative infrastructure to support an IoT platform fully integrated with 5G, Wi-Fi 6, and other new and emerging technology solutions. The Testbed validates solutions that help bridge the digital divide, foster economic growth, conserve energy, save taxpayer dollars, accelerate public broadband Internet access, and modernize government services.

Stafford County and VIPC opened the Testbed in May 2021 as a public-private partnership involving multiple industry partners focused on relevant and practical use cases that produce innovative solutions using emerging and smart technologies.

The Virginia Smart Community Testbed is the home for developing smart community technology for the Commonwealth and a showcase for all 95 counties in the state.

## Challenge

Build a team of industry-leading partners with innovative technology solutions to produce replicable best practices for the deployment of broadband Internet and IoT solutions that can be easily implemented in the most challenging environments across cities and rural communities.

## Solution

Starting in September 2021, Networking For Future (NFF) pulled together a broad team of technology companies including Signify, Cisco, TRAXyL, Express-Tek, Helicore, and Uniiband for the Testbed pilot project.

The testbed project demonstrated how to efficiently and securely deploy a Smart connectivity grid, that includes innovative broadband fiber and wireless technologies, and Smart lighting that expands public access to the Internet and improves public services and safety. This infrastructure grid further enables IoT applications like sensors, meters, cameras, and building access control systems.

# Success Through Partnership

As a trusted technology partner, NFF provided architecture, engineering, and overall platform integration support, network and security installation, and is providing ongoing performance management and maintenance for the grid.



## NFF's industry-leading partners provided the following:

- › **Signify** – Broadband luminaires, IoT Smart Pole, and Interact software
- › **Cisco/Meraki** – Network and security appliances, WiFi access points and cameras
- › **TRAXyL** – FiberTRAX “painted” fiber
- › **Express-Tek** – Outside plant engineering and deployment
- › **Helicore** – Smart Pole foundation and structural package
- › **Uniiband** – Battery back-up/power converter system

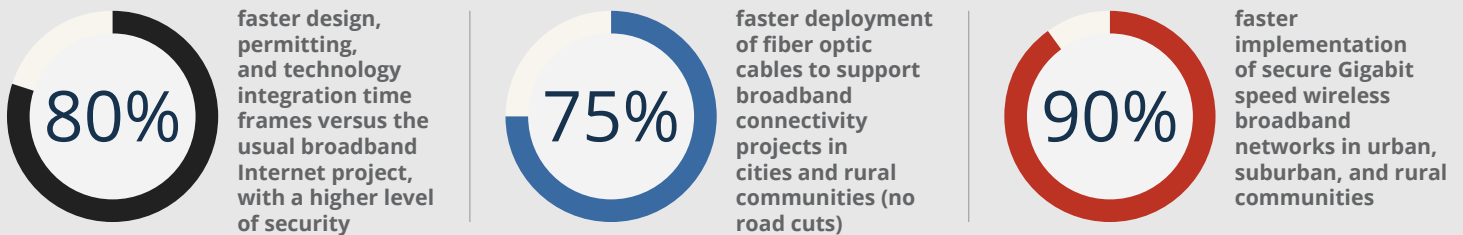
## NFF will continue to provide ongoing support to the Testbed including:

- › Network and security upgrades and optimization
- › Smart lighting, network, and security systems monitoring

## Results

The Testbed partners produced replicable best practices for the deployment of broadband Internet and IoT solutions that can be adopted and implemented by all levels of government and education as part of their Smart solutions planning and projects.

### Testbed project results ›



**Reduced Energy** and increased cost savings for municipalities via intelligent lighting

**Innovative** power solutions that ensure project success even in the most challenging environments

## Lessons Learned

The partners also shared product capabilities and best practices with one another and the Testbed team, providing deeper insight into how these innovative solutions solve broadband Internet and IoT challenges for communities and campuses.

CONTACT US AT **SALES@NFFINC.COM**

### ABOUT NETWORKING FOR FUTURE INC.

Networking For Future Inc. (NFF) is a Washington, DC-based company offering a performance-focused approach to delivering transformational IT business solutions. NFF, an ISO 9001:2015 certified company, is a Cisco Gold Partner, Riverbed Premier Partner, NetApp Gold Partner, VMware Enterprise Partner, Splunk Partner, Microsoft Partner, Gigamon Partner, Riverbed Premier Partner, Aternity Partner, Citrix Silver Solution Advisor Partner, and holds GSA Schedule 47QTCA21D0047 and numerous other contract vehicles.



# **Innovative Network Solutions For Government and Education**

## **Secure, Ready to Deploy SmartCommunity and SmartCampus Solutions**

# AGENDA

- **NFF Overview – Speaker Introductions**
- **Innovative Technologies To Accelerate The Journey**
  - **TRAXyL FiberTRAX “Paints” Optical Fiber Directly Onto Paved Surfaces**
  - **Cisco Ultra-Reliable Wireless Backhaul (formerly Fluidmesh)**
  - **Signify Broadband Luminaires, IoT Smart Poles, and Interact**
- **Where To See/Touch/Feel These Technologies Today.**
  - **Virginia Smart Communities Testbed**
- **Questions and Answers**



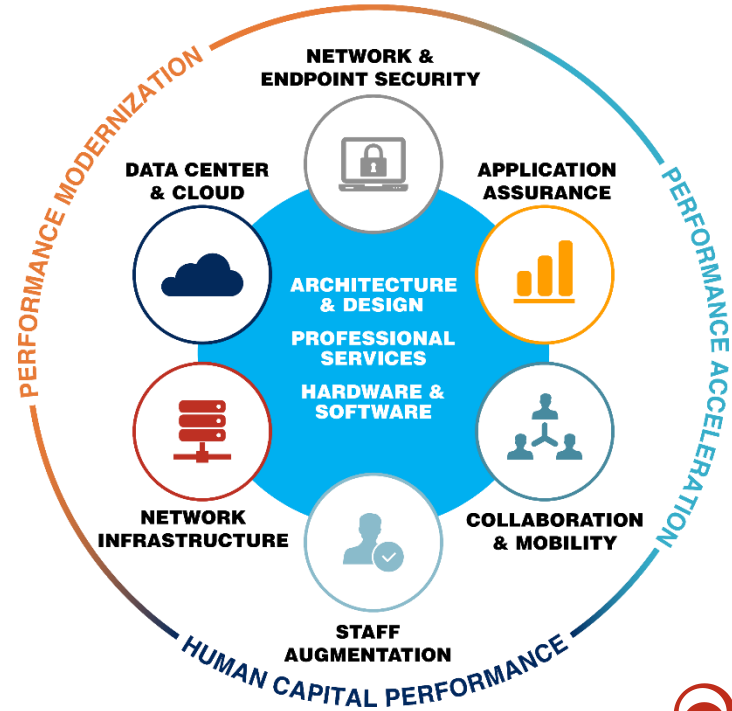
# OVERVIEW

## Networking For Future, Inc. (NFF)

- > Founded in 1996
- > Headquartered in Washington, DC
- > 130+ Employees
- > ISO 9001:2015 Certified
- > 77% of workforce hold industry certifications

Offering a performance-focused approach to IT business solutions for State and Local Government and Education.

## IT Business Solutions



# PARTNERS



# CLIENTS

FEDERAL GOVERNMENT	STATE AND LOCAL GOVERNMENT	EDUCATION AND LIBRARIES	
		K-12 AND LIBRARIES	HIGHER EDUCATION
<ul style="list-style-type: none"> <li>■ The MITRE Corporation</li> <li>■ United States Census Bureau</li> <li>■ Occupational Safety and Health Review Commission</li> <li>■ United Services Organizations</li> <li>■ United States Court of Appeals for Veteran Claims (USCAVC)</li> <li>■ Board of Governors of the Federal Reserve System</li> <li>■ United States Institute of Peace</li> <li>■ Federal Mine Safety and Health Review Commission</li> <li>■ United States Tax Court</li> </ul>	<ul style="list-style-type: none"> <li>■ City of Rockville, MD</li> <li>■ DC Courts</li> <li>■ DC Office of Chief Technology Officer (OCTO)</li> <li>■ DC Office of the Chief Financial Officer (OCFO)</li> <li>■ DC Dept. of Human Services</li> <li>■ DC Child and Family Services</li> <li>■ DC Dept. of Motor Vehicles</li> <li>■ DC Metropolitan Police Dept.</li> <li>■ DC Fire and Emergency Medical Services (FEMS)</li> <li>■ DC Dept. of General Services</li> <li>■ DC Office of Unified Communications (OUC)</li> <li>■ DC Homeland Security Agency</li> <li>■ Office of the DC Auditor</li> <li>■ Prince William County</li> <li>■ Montgomery County</li> <li>■ State of West Virginia Office of Technology</li> </ul>	<ul style="list-style-type: none"> <li>■ Alexandria Public Schools</li> <li>■ DC Public Schools</li> <li>■ Saint Stephen's School</li> <li>■ Trinity Christian School</li> <li>■ Prince George's County Memorial Library System</li> <li>■ DC Public Libraries</li> <li>■ Prince William County Libraries</li> <li>■ Washington International School</li> <li>■ French International School</li> </ul>	<ul style="list-style-type: none"> <li>■ Georgetown University</li> <li>■ Montgomery College</li> <li>■ The Catholic University of America</li> <li>■ University of the District of Columbia</li> <li>■ Morgan State University</li> <li>■ Maryland Research and Education Network (MDREN)</li> <li>■ University of Maryland Center for Environmental Science</li> <li>■ Virginia Tech Applied Research Corporation</li> <li>■ University of Maryland Applied Research Laboratory for Intelligence and Security</li> <li>■ Marymount University</li> <li>■ Allegany College of Maryland</li> <li>■ George Mason University</li> <li>■ New Jersey Institute of Technology</li> </ul>

# CLIENTS

## NON-PROFIT

- American Alliance of Museums
- NeighborWorks America
- National Association of College and University Attorneys (NACUA)
- Metropolitan Washington Council of Governments
- United Way
- DC Bar Association
- Radio Free Asia
- The American Institute of Architects (AIA)
- Virginia Housing Development Authority
- DC Housing Authority

## COMMERCIAL AND ENTERPRISE

- Cisco Systems
- Riverbed
- ManTech
- Perdue Farms, Inc
- CSSI Inc.
- United Parcel Service (UPS)
- Newseum
- Coleman Power Sports
- Donohoe Construction
- Polinger Company
- Incapsulate, LLC
- FEI Construction Company
- Hughes Network Systems
- Smoot Construction

## TRANSPORTATION AND UTILITIES

- Washington Metropolitan Area Transit Authority (WMATA)
- Metropolitan Washington Airports Authority (MWAA)
- DC Water
- Washington Suburban Sanitary Commission (WSSC)
- District Department of Transportation (DDOT)
- Maryland Department of Transportation (MDOT)

## HEALTHCARE

- United Medical Center
- Novant Health Systems
- DC Health Benefit Exchange Authority (HBX)
- DC Department of Health
- DC Department of Healthcare Finance
- Ascend Healthcare Systems LLC

# CONTRACT VEHICLES

## > Federal and National

- GSA Schedule 47QTCA21D0047
- National Association of State Procurement Officials (NASPO) ValuePoint Contract #AR3227
- Universal Service Administrative Company (USAC) E-Rate SPIN 143030044
- Federal Reserve Board 202000834

## > Maryland

- Maryland Education Enterprise Consortium (MEEC)
  - Hardware
  - IT Security Services and Solutions
- Maryland Consulting and Technical Services (CATS+)
- Maryland Department of Information Technology (DoIT) Hardware Master Contract
- Prince George's County Consulting and Technical Services (CATS II)



# CONTRACT VEHICLES

## > Virginia

- Cisco Virginia Association of State College and University Purchasing Professionals (VASCUPP)
- Fairfax County Public Schools
- Arlington County Government

## > District of Columbia

- District of Columbia Supply Schedule (MOBIS and ITES)
- Metropolitan Washington Airports Authority (MWAA)
- Washington Metropolitan Area Transit Authority (WMATA)

## > Certifications

- District of Columbia Certified Business Enterprise (CBE)
- MWAA Local Disadvantaged Business Enterprise (LDBE)
- U.S. Small Business Administration – Certified Small Business



U.S. Small Business  
Administration



# TODAYS SPEAKERS

- Daniel Turner – Chief Executive Officer and Founder, TRAXyL
- Malik Ishak – Director, Smart City Connectivity, Signify North America
- Chris Wigley – Cisco Ultra-Reliable Wireless Backhaul
- Chris Peabody – Chief Strategy Officer, Networking For Future



**~1985  
BROADBAND  
INNOVATION**

*Counting on cable TV  
in Washington, D.C.?*



*Count on C&P Telephone to build it...  
efficiently, economically and on time!*

# Broadband Innovation 2022





# Broadband Innovation 2022

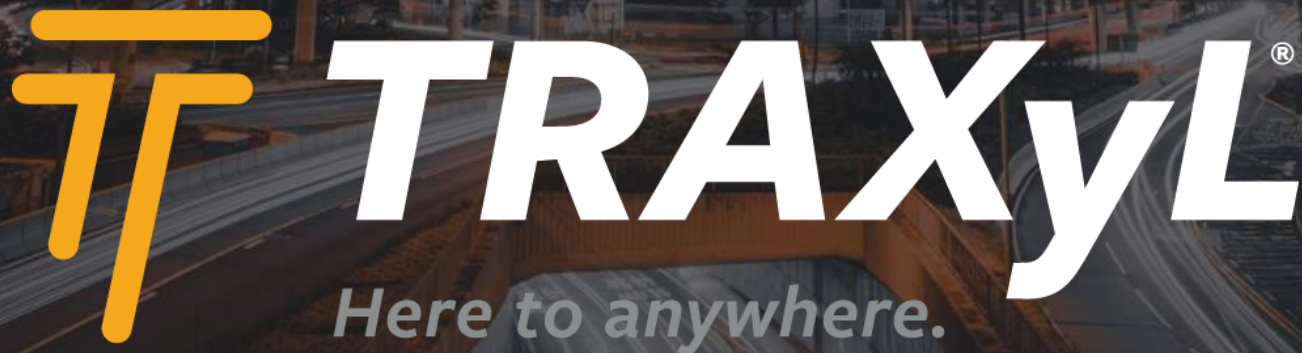


# Innovative Technologies To Accelerate The Journey

**TRAXyL FiberTRAX “Paints” Optical Fiber Directly Onto Paved Surfaces**

**Daniel Turner**  
Chief Executive Officer and Founder  
TRAXyL





[daniel@traxyl.com](mailto:daniel@traxyl.com)

+1 (844) 4 TRAXYL

## Leadership



Daniel Turner - *CEO*



Engineering



Telecommunications  
& optical fiber expert



Stephen Carter - *COO*



Business



Digital controls &  
system integration

A grayscale background image showing a hand placing puzzle pieces. The puzzle pieces are labeled 'Optical Fiber', 'ISPs', and '5 G'. The overall theme is network infrastructure and connectivity.

Optical  
Fiber

ISPs

5  
G

# ACCESS



Fiber is a key driver to new technologies, yet installation is:



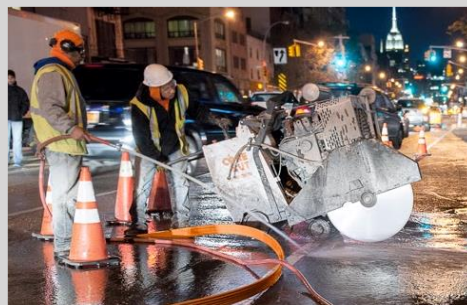
## Expensive

Months of time at \$15 to \$150 per foot



## Disruptive

Closures, detours, and delays



## Destructive

Property, utility, and environment damage

# FiberTRAX<sup>®</sup> :

“Painting” fiber on paved surfaces



# The *FiberTRAX* Advantage

Rapidly deployed  
surface mounted  
fiber protected by  
durable coatings.



## Efficient

On-demand install at low cost

## Convenient

Easy to use and deploy

## Versatile

New pathways for fiber



# FiberTRAX Cross-section



## DIMENSIONS:


FiberTRAX  
width: ~100 mm















FiberTRAX  
height: ~8 mm

Cable  
diameter: 3-5 mm

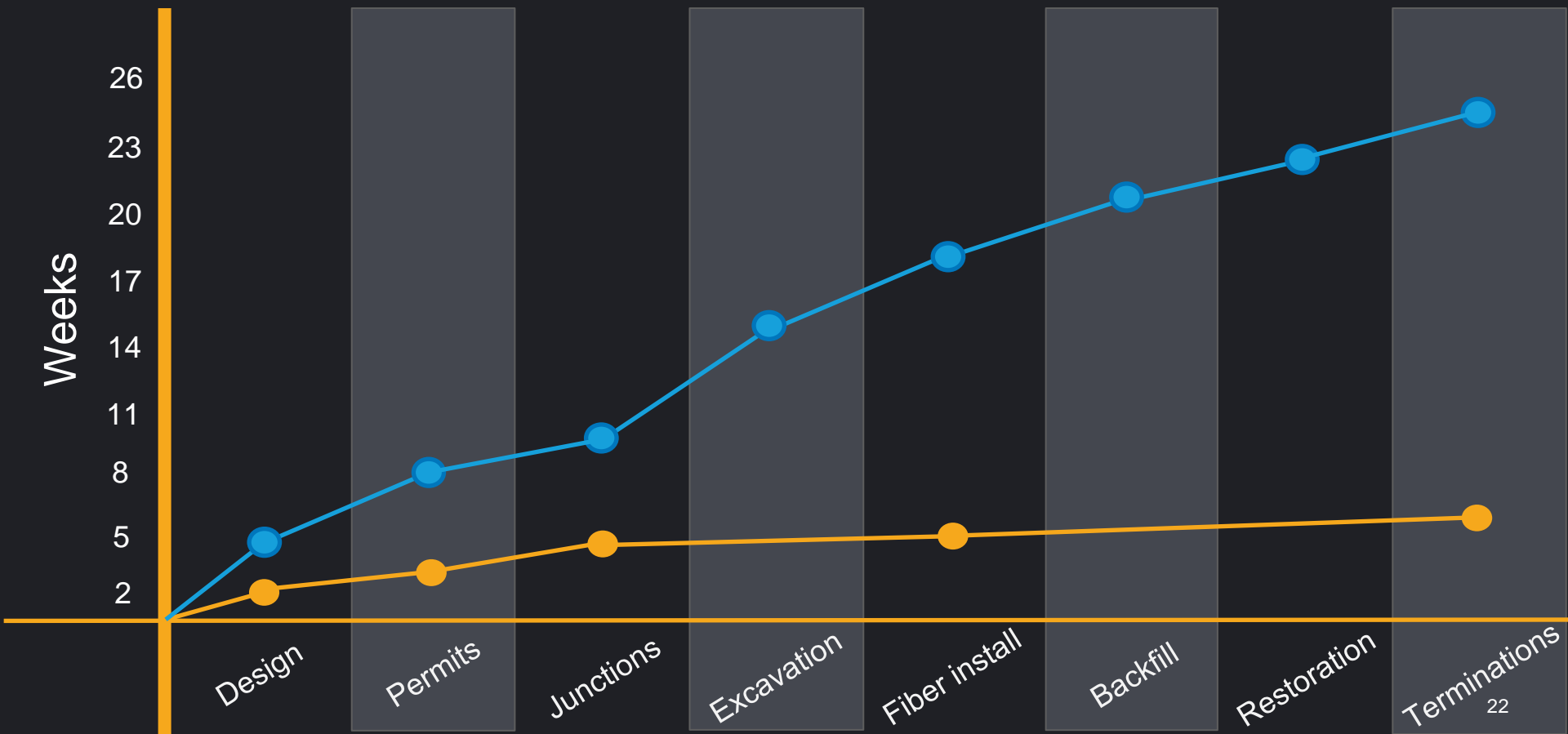
Size exaggerated, not to scale.

# FiberTRAX vs Conventional Methods



	 <b>TRAXyL</b> FiberTRA	Boring	Micro-trenching	Trenching	Utility Poles	Wireless
On-demand install						Varies Significantly
Safe to utilities						
Aesthetic						
High data capacity						

# Mile of FiberTRAX vs Conventional



## TRAXyL's Model:

- Lease Equipment
- Sell Fiber and Coatings
- Training & Certification



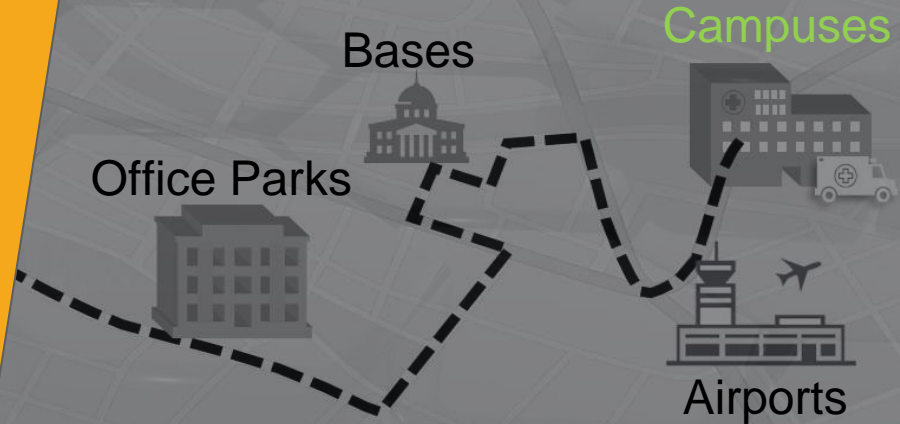


# Initial Customer Focus

Customer  
Needs

- Last mile
- Network extension
- Fast or immediate install

Customer  
Locations



Customer  
Acquisition

- Distribution & Channel Partners
- Education
- Partner with Installers & ISPs



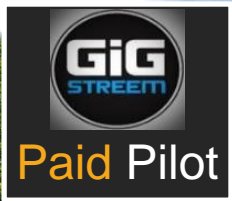
SBIR

Phase 1

Grant



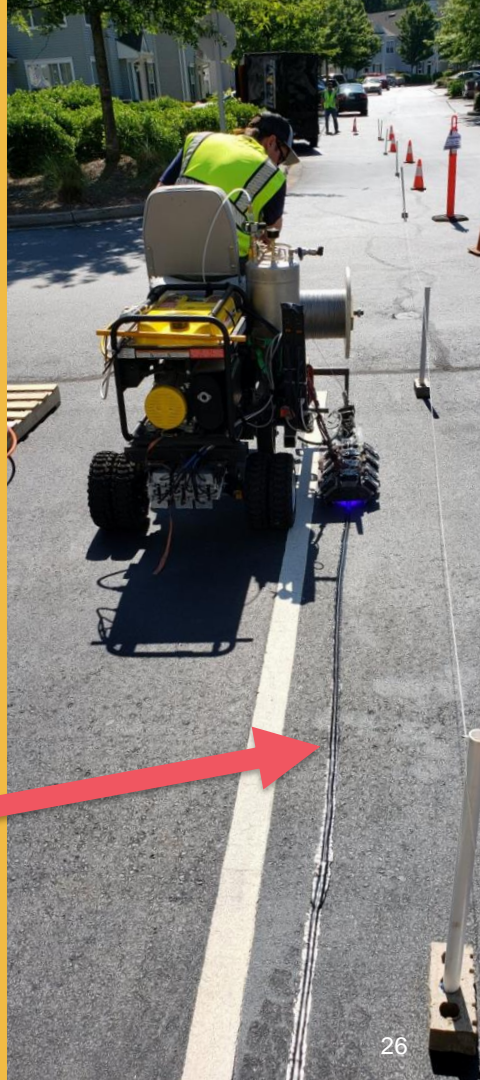




Completed  
FiberTRAX

FiberTRAX  
1st Pass

Shown above is an older prototype.  
New FiberTRAXtor shown on next slide.





# CASE STUDY: DULLES AIRPORT CAR RENTAL

## Overview

- Car Rental Agency – Dulles Airport

## Objective

- Provide network connectivity to two recently acquired buildings
- Time = \$\$\$
- Permitting / Approval challenges
- Avoid the things that could “blow up” under the surface (ex: fuel tanks)
- Limited budget

## Solutions Explored

- MicroTrenching
- TRAXyL

## Results

- TRAXyL deployed in one night
- No downtime
- No permitting issues – because no trenching

## Advice

- Explore all your deployment options, make sure you include TRAXyL



# CASE STUDY: OHIO BRIDGE

## Overview:

- Ohio DOT Bridge near West Milton, OH

## Objective:

- Connect ISP fiber to new home plan, cell tower, other businesses, and municipality
- Approaching Deadlines for Project Milestones
- Permitting / Approval challenges
- Limited budget

## Solutions Explored:

- Conduit on bridge
- HDD under river
- TRAXyL

## Results:

- TRAXyL deployed in two days
- Redundancy included
- Ohio DOT approval of FiberTRAX

## Advice:

- Utilize FiberTRAX for last-mile and be on lookout for high-count fiber developments





elys'an f'ber

Partner  
Training







# Data and Beyond



A man and a young boy are sitting together, looking at a laptop screen. The man is smiling and pointing at the screen, while the boy is looking intently. The background is a simple indoor setting with a lamp and some framed pictures on the wall.

Help **education**, government, businesses, and communities  
get **access** faster.

- Identify pilot projects
- Support industry adoption
- Schedule a FiberTRAX demo



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# Innovative Technologies To Accelerate The Journey

## Cisco Ultra-Reliable Wireless Backhaul (formerly Fluidmesh)

**Chris Wigley**

Cisco Ultra-Reliable Wireless Backhaul

Cisco Systems



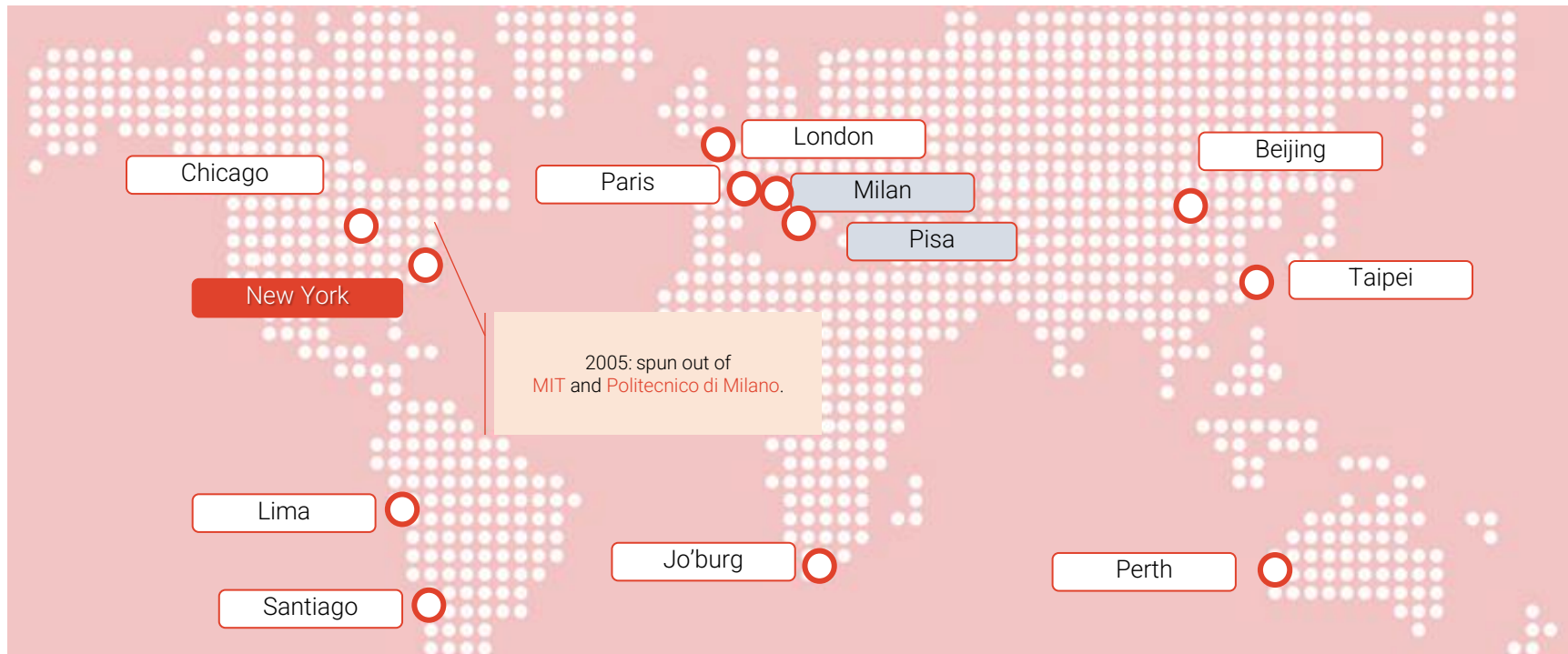




**FluidMesh** Cisco Ultra-Reliable Wireless Backhaul

Chris Wigley – CURWB Product Sales Specialist

# FLUIDMESH GLOBAL PRESENCE – ACQUIRED BY CISCO (JULY 2020)



Global Partnerships

6 Continents

75 Countries

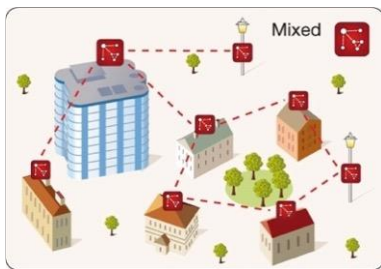
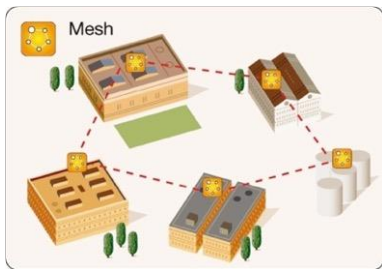
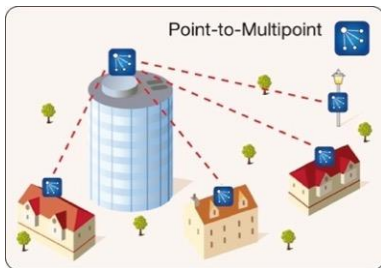
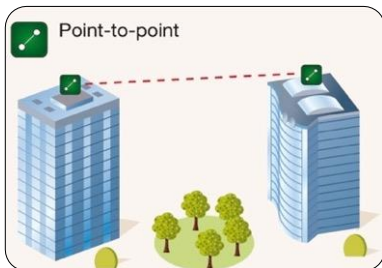
## Why did we choose Cisco Ultra-Reliable Wireless Backhaul?

- The market is clamoring for 5G
- The new name links the product to 5G's Ultra-Reliable Low-Latency Communications (URLLC) capabilities
- Makes it easier for customers to understand its value
- They can have 5G URLLC-like capabilities today!

# Technology Benefits

## Wireless Fiber-Like Connectivity

Extending highly reliable network connections where wired Layer 1 can't go.



Long Range and High Bandwidth Connectivity  
(up to 15 miles @ 500 MB)



**Fast and Accurate Roaming**  
(0ms handoff, up to 225 Mph)



Support for real-time sensitive traffic. Zero Loss-Low Latency.



Pay as you go bandwidth consumption model.



Support multiple backhaul topologies – PtP, PtMP, Mesh, and Mobility

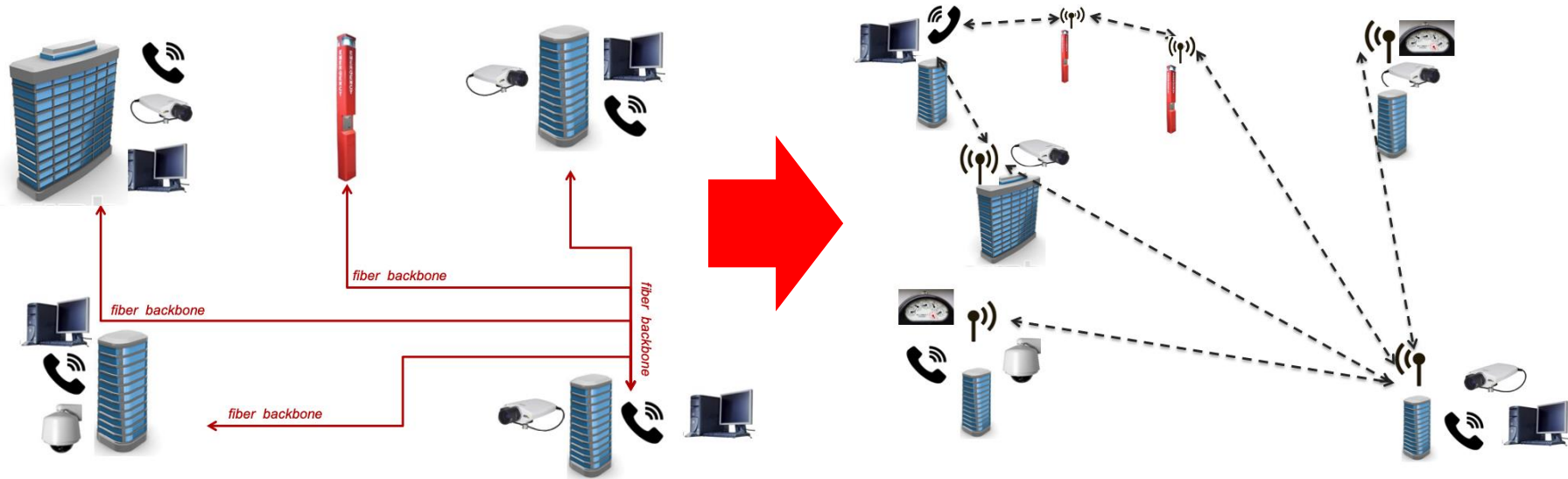


Secure MPLS based proprietary protocol with QoS support



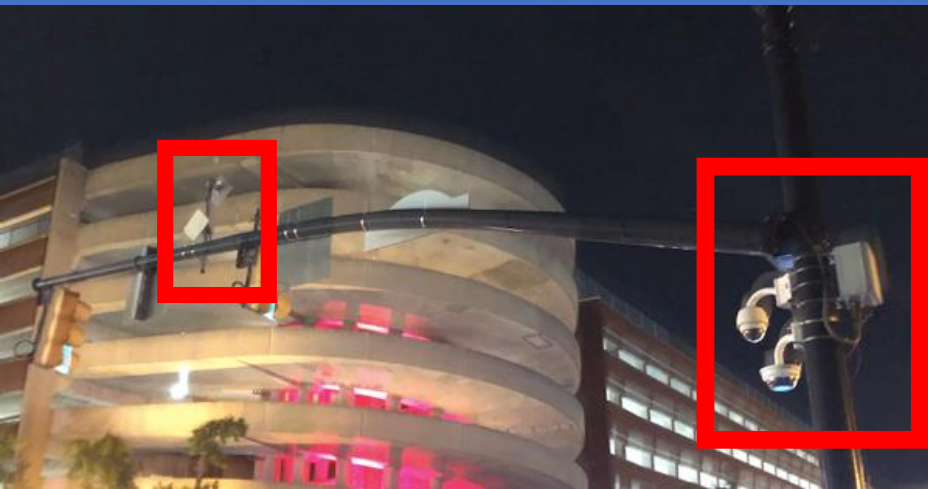
# Why Use Cisco Wireless Backhaul?

## Alternative or Replacement for Layer 1





ENTERPRISES REQUIRE NETWORK CONNECTIVITY OUTDOORS



# Radio Portfolio: 4.9-5.8GHz Solutions


Fixed / Backhaul

Mobility

Rugged

Environment


Normal



**FM Ponte**


- Up to 50 Mbps
- Up to 27 dBm
- 2x2 MIMO
- Integrated antenna
- H-Beam: 33 deg
- V-Beam 17 deg
- 2x 10/100 RJ45

50Mbps



**FM Volo**


- PtP, PtMP, Mesh
- Up to 150Mbps
- Up to 5 miles
- H-Beam: 33 deg
- V-Beam: 17 deg
- Tx Pwr: 27dBm
- 1 x RJ45 Port
- 1 x 24VDC PoE



**FM3200 Base**




- PtMP Mesh-End (Typ)
- Up to 150 Mbps
- 18dBi directional
- Up to 5 miles
- H-Beam120 deg
- V Beam: 10 deg
- Up to 27dBm
- 1 x RJ45
- 1 x 48VDC PoE

150Mbps



**FM4200F**

- Tx: 150Mbps
- Output Power: 27dBm
- 1x10/100/1000 M12
- SFP Fiber Port
- 1 x 48vdc input

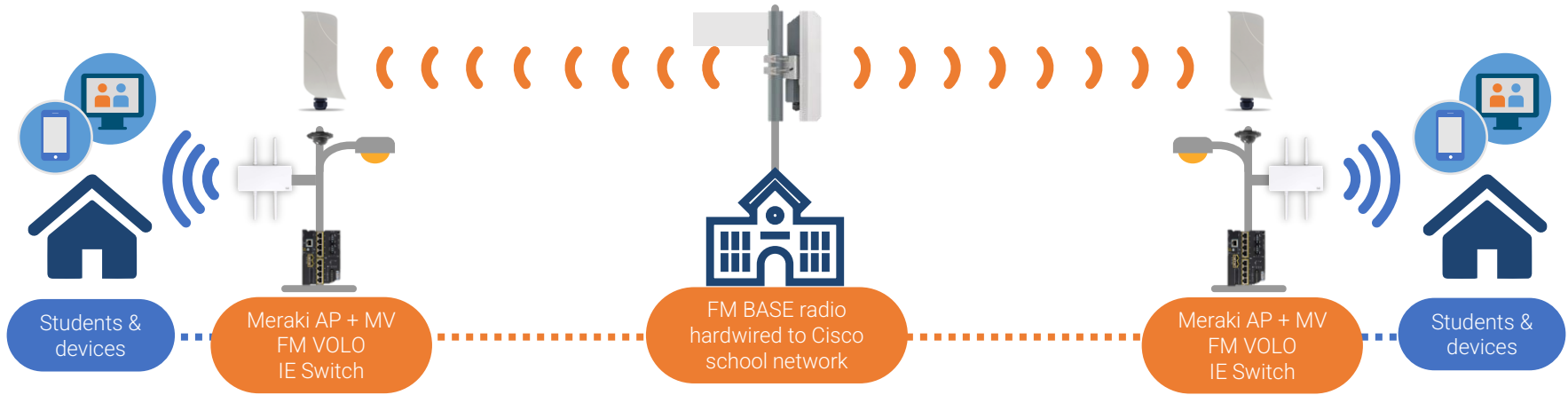




FM3500E	FM4500M	FM4500F
<ul style="list-style-type: none"> <li>• Throughput: up to 500 Mbps</li> <li>• Output Power: up to 30dBm</li> <li>• 1 x RJ45 Ethernet Port</li> <li>• 1 x 802.3at PoE Gigabit Port</li> </ul>	<ul style="list-style-type: none"> <li>• Max Tx: 500Mbps</li> <li>• Max RF: 30dBm</li> <li>• 2x10/100/1000 M12</li> <li>• 1 x 802.3at PoE Gb M12 Port</li> <li>• 1 x 48vdc input</li> </ul>	<ul style="list-style-type: none"> <li>• Throughput: 500 Mbps</li> <li>• Output Power: 30dBm</li> <li>• 1 x 10/100/1000 M12</li> <li>• SFP Fiber Port</li> <li>• 1 x Redundant 48vdc input</li> </ul>

500Mbps

# Bridging the Digital Divide

Challenge: Connect the Communities - Provide remote learning to every child during the pandemic

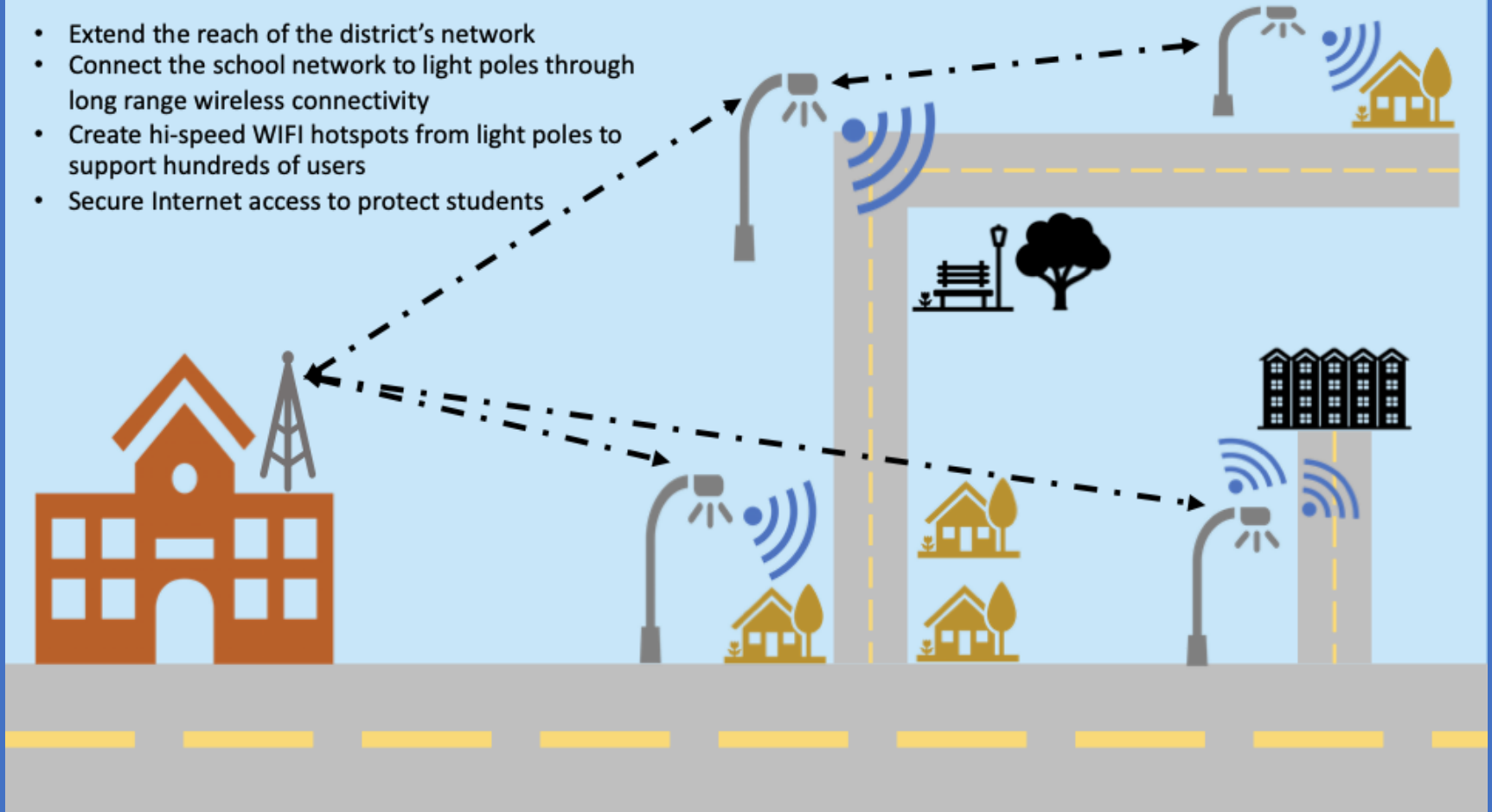


## Outcomes & benefits for our customers

- ✓ Extend the private, secure school network to students' homes
- ✓ Increased bandwidth parity across the student body
- ✓ Fiber-free backhaul across the district with directional RF coverage for maximum distance
- ✓ Enables safe, secure distance learning for all
- ✓ Allows students the flexibility to use any Wi-Fi device to connect and learn
- ✓ Gateway to additional opportunities for campuses, hospitals, and businesses.

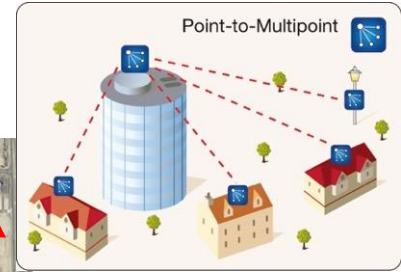
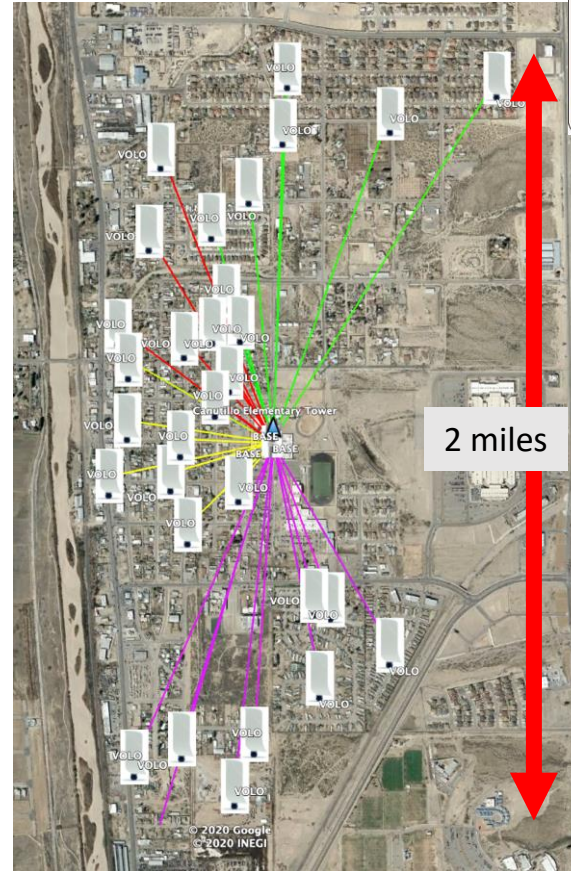
# Digital Divide - Extending WiFi Reach

- Extend the reach of the district's network
- Connect the school network to light poles through long range wireless connectivity
- Create hi-speed WiFi hotspots from light poles to support hundreds of users
- Secure Internet access to protect students

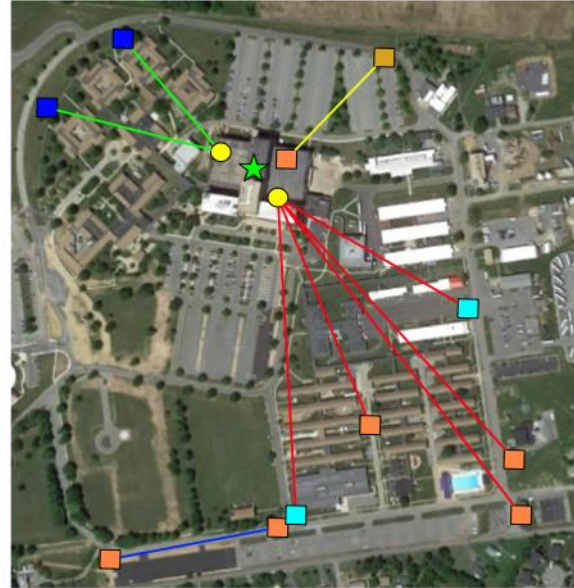
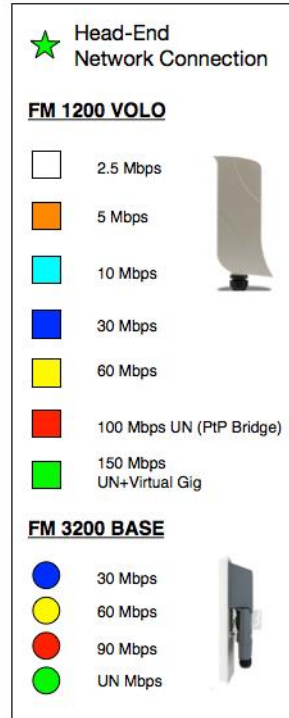




# Digital Divide - Extending WiFi Reach



# Typical Fixed Infrastructure - Mixed Architecture



**Typical Medical Center Design**  
Fixed Infrastructure Coverage

# Innovative Technologies To Accelerate The Journey

**Signify Broadband Luminaires, IoT Smart Poles, and Interact**

**Malik Ishak**  
Director, Smart City Connectivity  
Signify North America





The background is a vibrant night photograph of a city skyline, featuring several illuminated skyscrapers. In the foreground, a multi-lane highway shows long-exposure light trails from vehicles, creating a sense of motion. Overlaid on this scene is a complex digital network diagram. It consists of several circular nodes, some of which are glowing with a bright yellow light. These nodes are interconnected by a web of thin, white lines that crisscross the entire image, symbolizing a smart grid or digital infrastructure.

# @signify

Light becomes a new intelligent language

Smart grid of the future  
The digital pathway of the modern city



# BrightSites

by  Signify

## The Smart Grid of the Future

The Grid of the Future

Presented by:

Malik.Ishak@Signify.com

(571) 528-5910

Nov. 10, 2021

To learn more, go to  
[www.signify.com/brightsites](http://www.signify.com/brightsites)



# Signify is the world leader in lighting (2016 Spinoff of Philips professional Lighting Division)

We provide high-quality energy efficient lighting products, systems and services

## Light sources



## Luminaires



## Systems and Services



# No. 1

Connected, LED,  
Conventional

# €6.5bn

sales in 2020,  
~5% reinvested in R&D

# 38,000

people in 74 countries

# 100%

Carbon neutral operations

# Evolution of the wireless industry



**1G** or "first generation" wireless was an analog cellular system that launched commercially on October 13, 1983



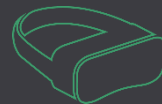
**2G** introduced digital technologies that used spectrum more efficiently so that it could serve more people and deliver more applications, such as text messages, helping us all communicate



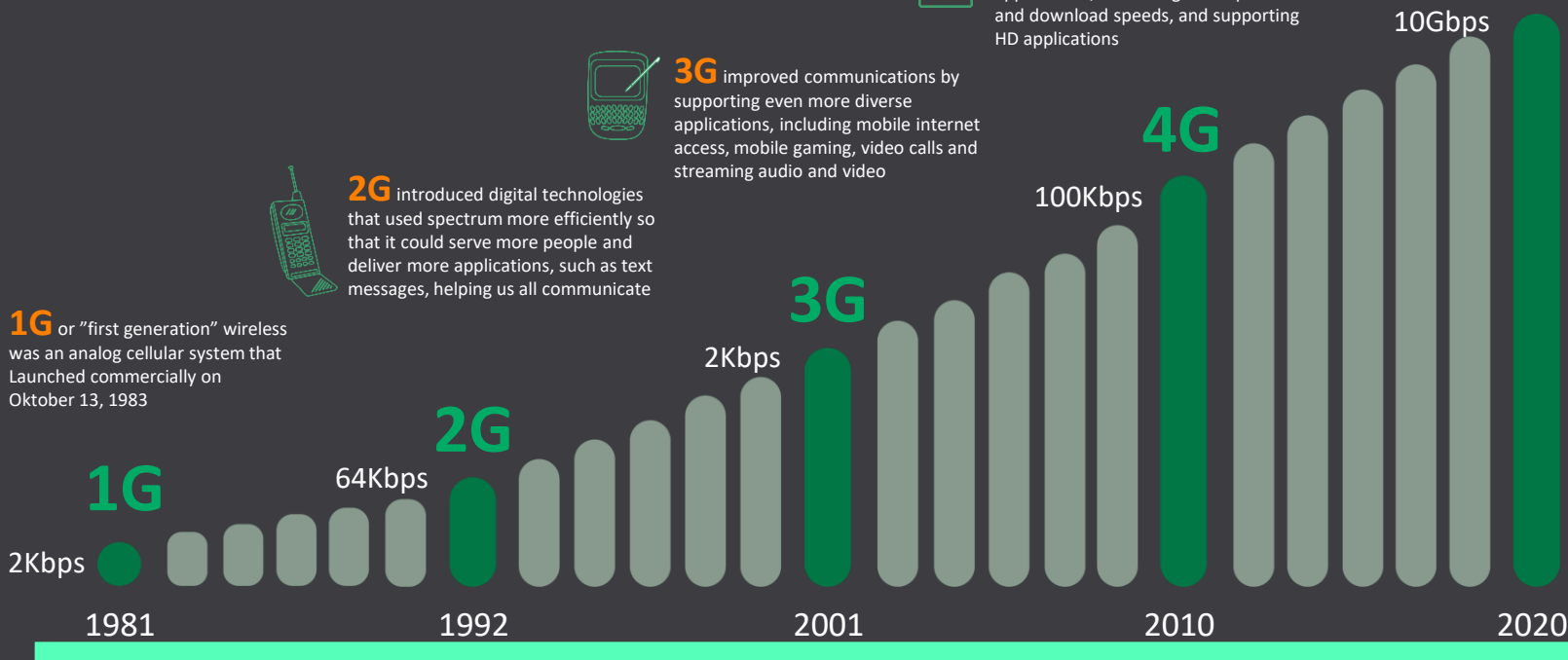
**3G** improved communications by supporting even more diverse applications, including mobile internet access, mobile gaming, video calls and streaming audio and video



**4G** delivered even faster speeds, improving experiences for customers when using data-intensive applications, increasing data upload and download speeds, and supporting HD applications

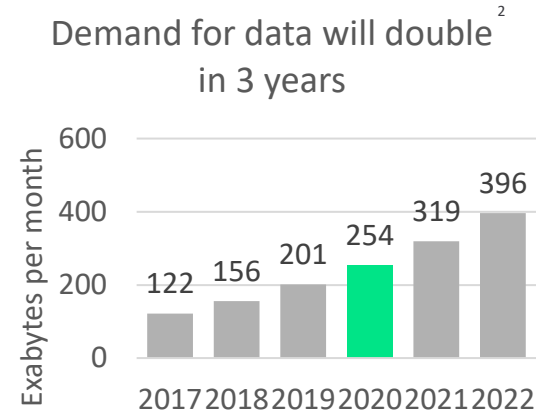
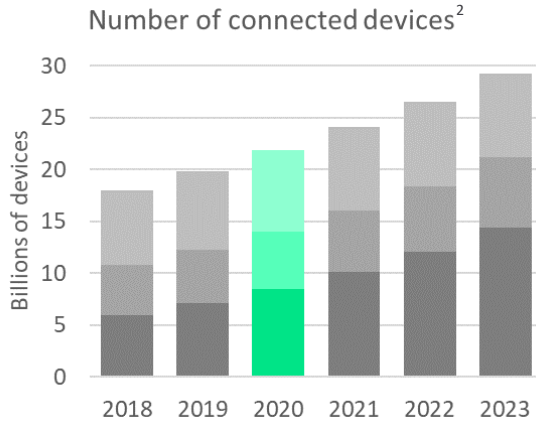


**5G** will support more diverse applications and more connections; providing more capacity, lower latency, and increased speed. 5G will handle the exponential growth in demand for capacity, connectivity, and capability – delivering a better, faster experience for all



## Demand for connectivity in cities

- 4 Four times growth by 2025<sup>1</sup>
- Number of connected devices grows to 30 Bn. in 3 years, driven by IOT devices (consumers, smart cities, autonomous vehicles etc.)
- 5G and WiFi6 are new standards to enable this growth.
- Many more antennas and radios closer together (100's meters vs of several miles).



<sup>1</sup> Source: Aparavi Research 2020

<sup>2</sup> Source: [Complete VNI IP Traffic Forecast Update, 2017-2022 white paper](#)



How do you Quickly & Cost Effectively Implement & Deploy THE LAST MILE  
As part of your Digital Transformation Strategy  
(and create a neutral host backbone that can be monetized)  
without trenching fiber and disrupting city landscapes, etc.?  
(Challenges = Aesthetics, Permitting, Fiber, Power, Metering)



There must be a better way



# Bright Sites

by Signify

Light becomes a new intelligent language





## Broadband Luminaire

The fastest and low TCO connectivity option for last mile coverage (without trenching fiber)

- No permit needed for aesthetic consideration
- Fastest way to deploy wireless mesh network
- Wireless backhaul and PoE completely integrated into fixture
- Plug'n play installation, no special training required
- $\leq 0.3$  mi. / 450 m Range
- 360° coverage, self optimizing mesh network
- Built-in PoE switch eliminated the need for external switch or 3<sup>rd</sup> party box
- Power Metering



4G/5G  
Small Cell  
Backhaul



Wi-Fi  
offloading



Fixed  
Wireless  
Access



Public Wi-Fi



Safety and  
Security



IoT  
Broadband  
Applications



### Broadband Luminaires

(sample designs)

Wireless fiber  
Self-optimizing mesh  
60GHz 3.8Gbps

# Bright Sites Hub Tower

- Connectivity: Telco grade WiFi / 4G-5G / CBRS
- HyperEdge Compute Power & IoT Gateway
- Single or dual kiosk display with touch
- Microphone, speakers, camera
- Security camera 2 x 360° (PTZ)
- USB/wireless charging for mobile phones
- NFC sensor for ticketing / payments
- Programmable light elements
- Uplink: fiber, ethernet or wireless
- Programmable push-button
- Customizable color schemes
- Optional: Sensors (e.g. environmental), cameras (thermal, crowd analytics)



## Hub Tower (neutral host)

- Height 4.5m + (15 Ft.)
- Diameter 0.7m
- 55" upper displays
- 32" kiosk
- Wireless charging docks

Height advantages:

- ✓ Unblockable
- ✓ Signal Propagation
- ✓ Oversight Surveillance

[40 Nieuwstraat - Google Maps](#)



Telecom Pole  
(LA Convention Center)



IOT Pole

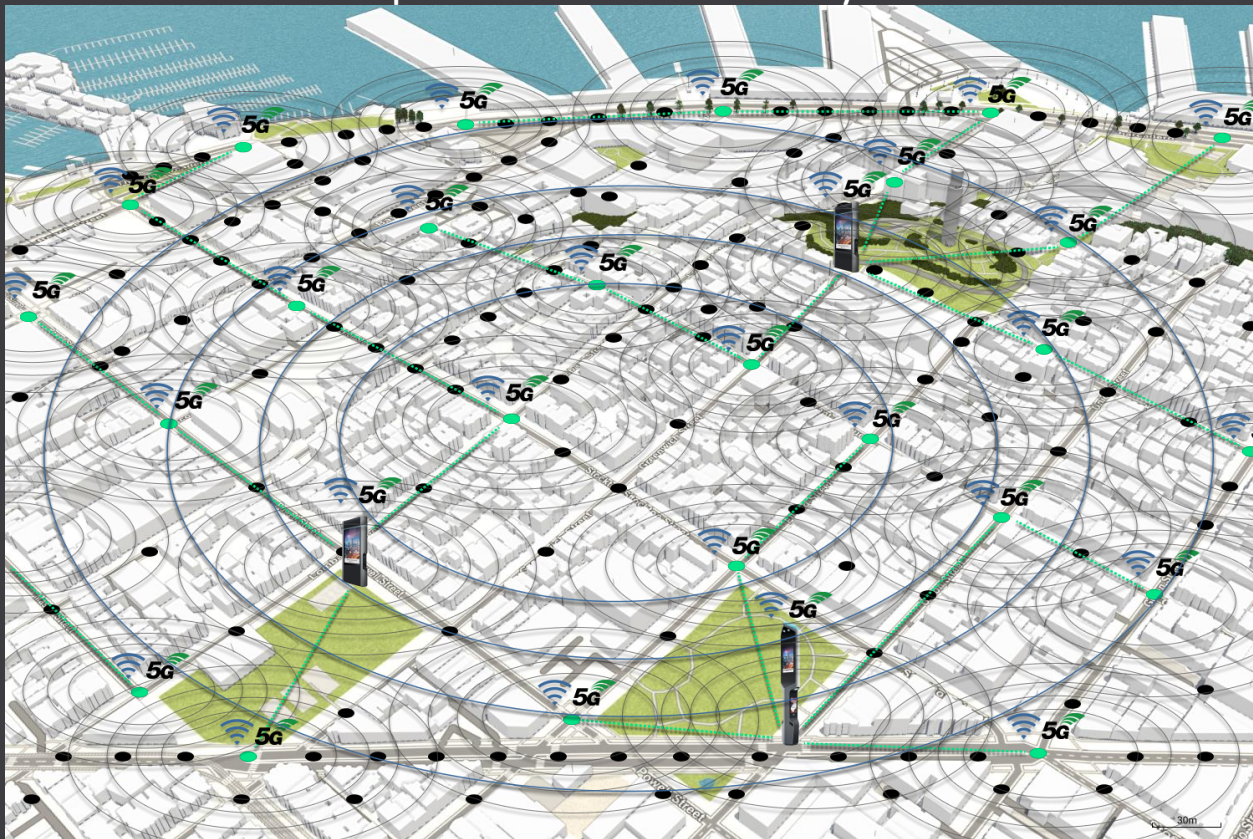




# Our vision: lighting as the connectivity grid of the future

Transforms lighting infrastructure into a platform of connectivity

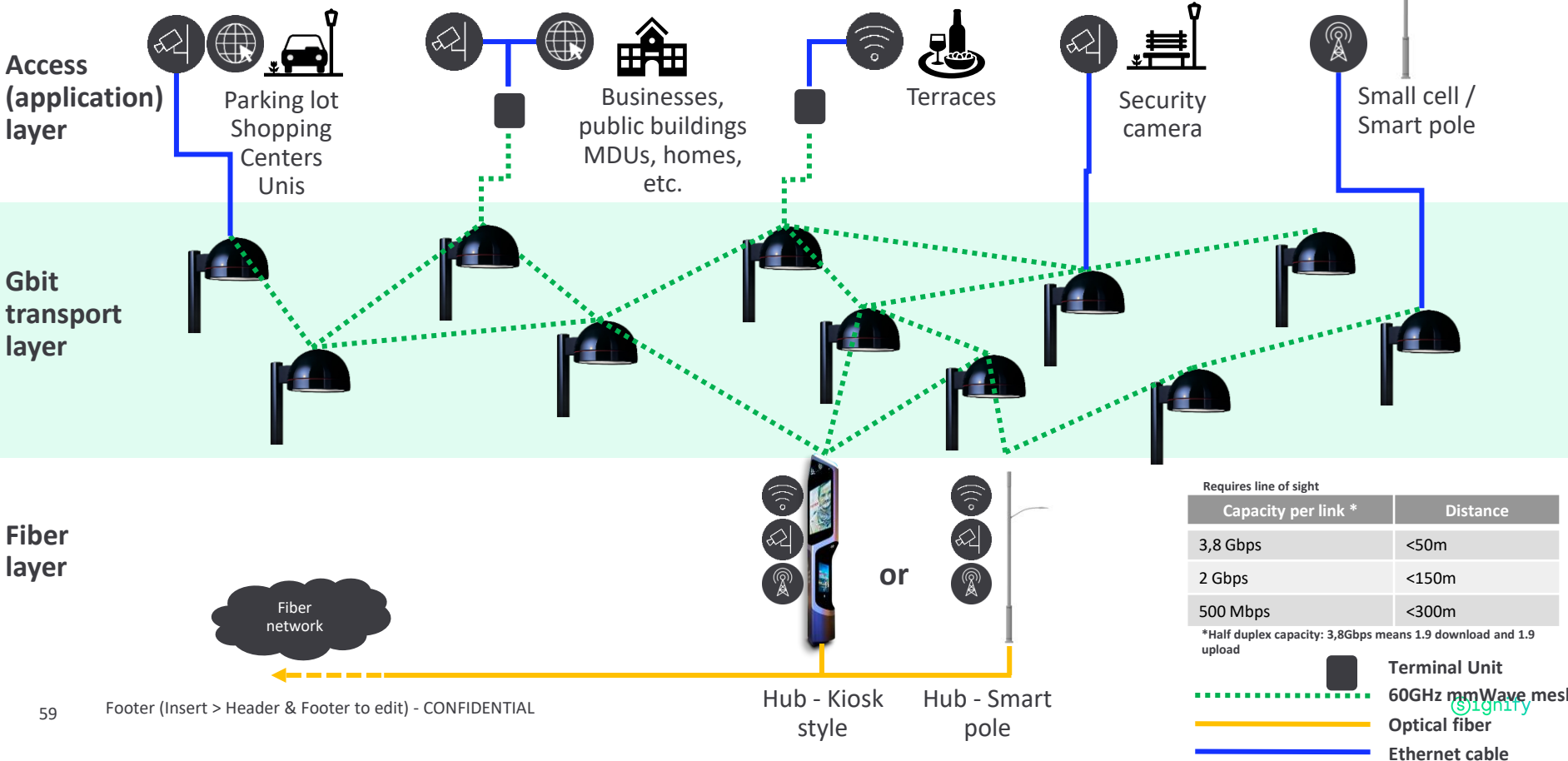
- 1 Light pole grid
- 2 Smart Hub
- 3 Upgrade pole
- 4 Activate pole
- 5 Meshed network /  
Neutral Host Backbone



## Lighting is Ideal.....















- **Proximity:** It is close to people and traffic
- **Scale:** It is already available
- **Granularity:** Spacing is 30-50m
- **Elevation:** For signal propagation, out-of-reach
- **Uniformity:** Enables general “blanket” permitting

# Network Architecture – Gbit luminaires (60GHz unlicensed)

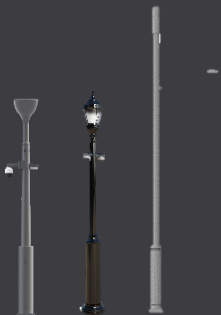




# Fiber vs Gbit Luminaire

	Fiber	Gbit luminaire
Security	 Secure	 Secure
Bandwidth	 Multi Gbps	 Multi Gbps
Network design	 accessibility	 Line of sight
Cost	 Expensive	 Affordable
Installation	 Slow, complex	 fast, Retrofit
Aesthetics	 Underground / across poles	 concealed
Bandwidth/Latency	 High bandwidth, ultra low latency	 High bandwidth, variable latency

# Product Portfolio Overview



## Smart poles

Everything needed for small cell tower and IoT

- Small cells (RRU for 4G LTE / 5G)
- Neutral host
- IoT applications



## Pole attachments

Economic solution for retrofitting existing poles

- Full size radome: 5G mmWave, CBRS/LAA + universal antenna
- Compact radome: CBRS/LAA + universal antenna



## Hub

Fiber hub with smart services for highly visible locations

- Neutral host for Telco and IoT devices
- Digital screens for advertising
- In kiosk or pole form factor



## Gb Luminaire

Wireless mesh for last mile coverage

- Utilizing ubiquitous lighting grid
- Up to 16Gbps aggregated capacity
- ≤ 0.3 mi. / 450 m Range



## Lighting

Energy efficiency connected luminares

- Energy efficient Existing sensor based connected luminares
- Lighting asset management
- Offer narrow band IoT services through Interact

[The Grid of the Future - YouTube](#)

[The Grid of the Future - YouTube](#)

@signify

# Final Thoughts

**Questions and Answers**  
(submit via chat)



**Your performance improvement  
is our measure of success.**

**Thank You!**