

Verizon/Florida Association of Counties

Network Presentation & Public Safety and Cyber Security

July 8, 2020

2PM to 3PM

Troy M. Dunning - Facilitator
Manager Business Development & Strategic Planning
Network Real Estate
Temple Terrace, Florida

Verizon Topics

Topics		Owner/s	Time	Meeting type
1.	Introductions	ALL	5 min.	Discuss
2.	Government Technology	Ryan Lopez	20min.	Discuss
3.	Small Cells	Jay Bidlack	10 min.	Discuss
4.	Smart Cities	Crystal Chubeck	10 min.	Discuss
5.	5G	Troy M. Dunning/Michael Buerki	5 min.	Discuss
6.	Closing/Thank you	Troy M. Dunning	5 min.	Wrap Up

Government Technology



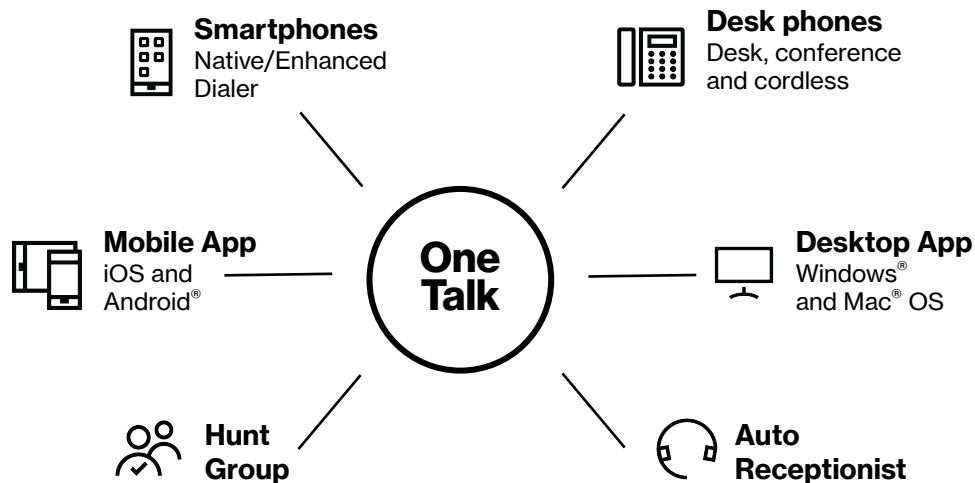
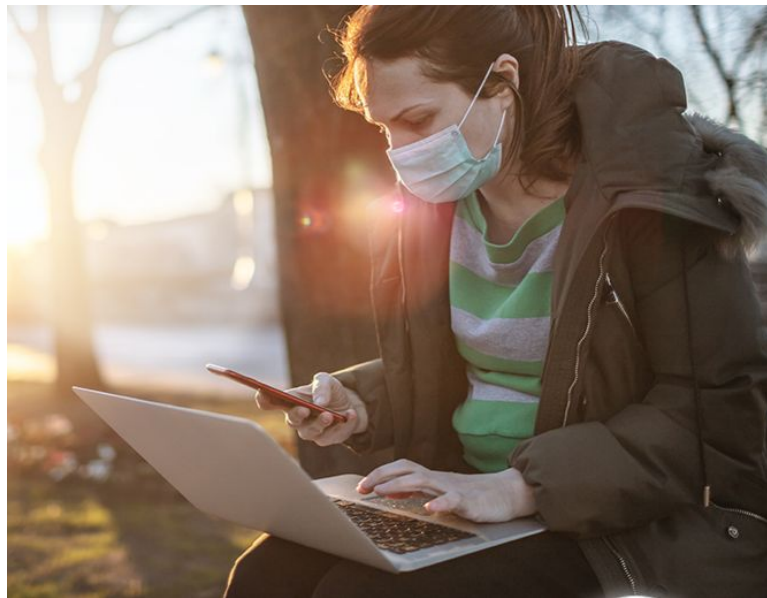
Ryan Lopez
Manager Solutions Architect
Government Sales
Central Florida
407-595-5044
ryan.lopez@vzw.com

Topics

Remote Worker/Distance Learning
Cyber Security
Disaster Recovery /COOP
Public Safety Priority & Preemption



Verizon One Talk Keeps You Connected Even When Away.



Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

Distance Learning



ANYTIME, ANYWHERE ACCESS

Portable, filtered Wi-Fi hotspots and embedded devices connect student outside the classroom. You choose the device and Education Broadband™ data plan that is right for you.

CHOOSE HOW STUDENTS CONNECT



SmartSpot®



Chromebook Bundle



Embedded Device

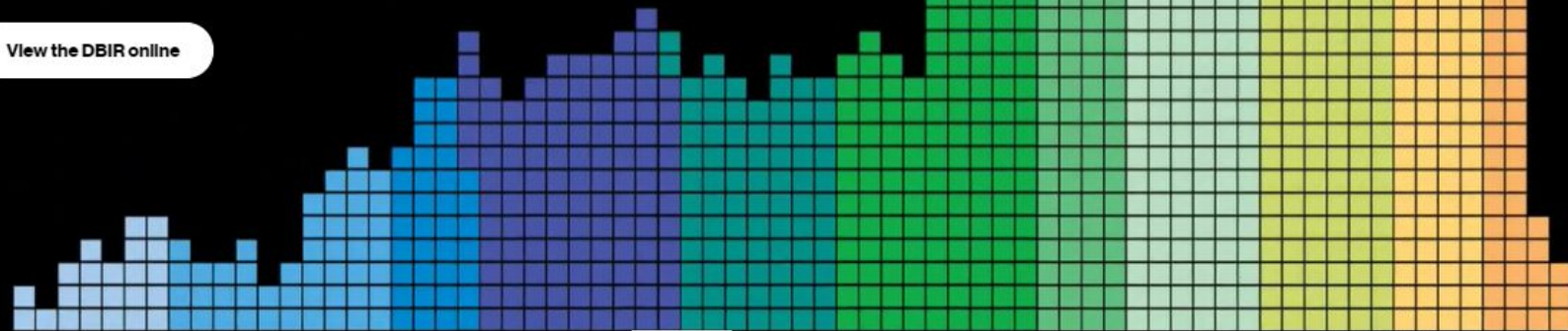


Cyber Security

2020 Data Breach Investigations Report

Stay ahead of threats with insights from 3,950 confirmed breaches.

[View the DBIR online](#)



[Download the report](#)

[Explore](#)

[Analysis](#)

[Summary](#)

[Industries](#)

[Data tool](#)

[Resources](#)

[Archives](#)



Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

Device Security

Mobile Device Management MDM

Enterprise Device Management

Bring Your Own Device BYOD

Mobile Threat Defense

Mobile Application Security

Windows Device Management

Unified Endpoint Management UEM

Content Filtering



IBM MaaS360 | With Watson

ASAVIE



SAMSUNG Knox

Verizon MDM Hotspots

Mobile Security & Policy

HIPAA CJIS CIPA

Txt Archiving

Deploy & Secure

Apple Business Manager

Samsung Knox Mobile

Google Zero Touch

SAMSUNG Knox

Coming soon

Secure Private Networks

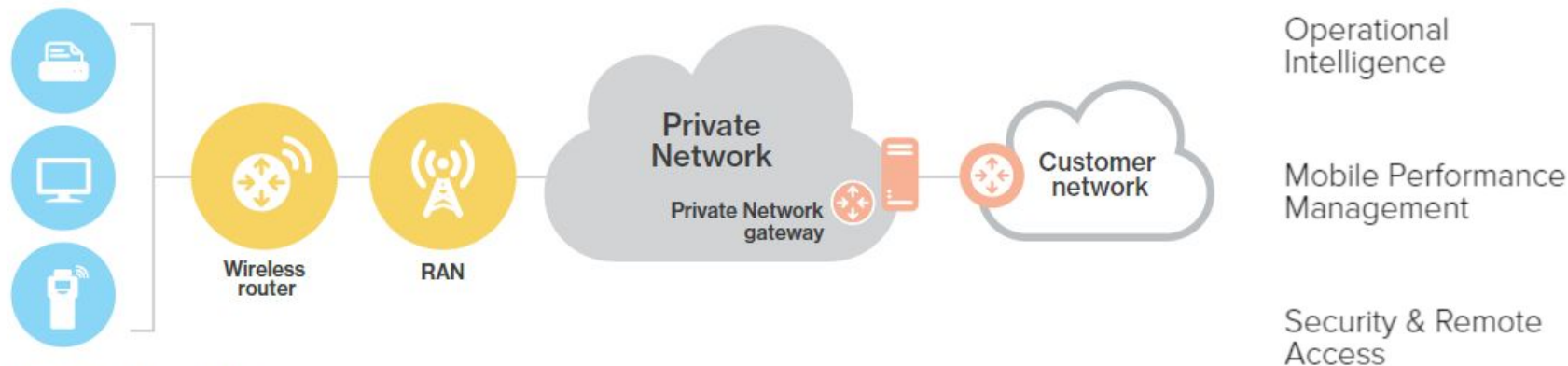


Figure 3: Dynamic Mobile Network Routing

DDoS Shield

DNS Safeguard

VNS-Security

**Software Defined
Perimeter (SDP)**



We run to a crisis, not away.

We've earned the trust of our public safety partners by providing mission-critical responses to help agencies deliver when it matters most.

98% | During Hurricane Harvey, 98 percent of our network remained operational.¹

97% | During Hurricane Florence, 97 percent of our network remained operational at our lowest service level. Restored to 99% within 48 hours.

<https://www.verizon.com/about/news/hurricane-florence-network-updates>

Verizon is a true partner. We can help you maintain and restore vital services and protect lives with our proven platforms, solutions and connectivity.

A dramatic, high-contrast photograph of a stormy sky with dark, swirling clouds and bright light breaking through near the horizon. The bottom of the image shows the dark silhouettes of trees.

**Verizon Public Safety Response
Team**

24/7 Hotline – 1-800-981-9558

¹ "Hurricane Harvey by the numbers," Verizon internal research, November 2017.
<http://www.verizon.com/about/sites/default/files/HarveyFinal11117.pdf>

Verizon Connect

Verizon Connect allows you to operate more efficiently utilizing a variety of products that bring many benefits to your organization.

- Locate valuable assets during critical times
- Improve driver behaviors with Integrated Video
- Improve driver safety with automated pre & post trip inspections
- Automate vehicle maintenance scheduling and improve vehicle health
- Simplify job management, scheduling and dispatching, and improve communication between technicians and dispatchers



Confidential and proprietary materials for authorized Verizon personnel and outside agencies only. Use, disclosure or distribution of this material is not permitted to any unauthorized persons or third parties except by written agreement.

Verizon Public Safety Product

Available Today

Coming Soon

Private Core



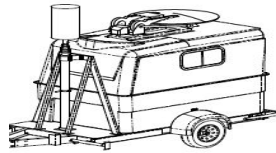
Dedicated Public Safety Core
No Additional Charge

Priority & Preemption



Enabled Preemption & Priority
No Additional Charge

Deployables



Mobile Connectivity Trailer

Applications



Developer Program App Store

Public Safety PTT



Critical Communications

We deliver the public safety promise

A Thank You for Those Who Serve

Contact us with any questions:

Ryan Lopez
407-595-5044
ryan.lopez@vzw.com



Small Cells

Jay Bidlack

Senior Manager

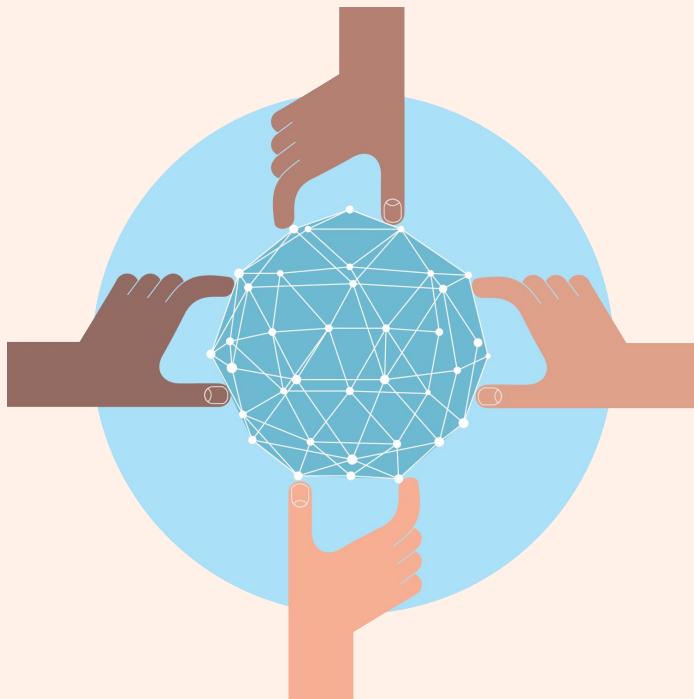
Network Real Estate

Temple Terrace, Florida



Connecting our homes, businesses and communities.

verizon✓

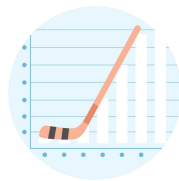


Why are we expanding the wireless network?

More people than ever before rely on wireless connections to manage their lives and businesses.

Verizon is expanding its wireless network to meet the growing demands of today and tomorrow.

But it takes time.



The average North American smartphone user will consume 48 GB of data per month in 2023, up from just 5.2 GB per month in 2016 and 7.1 GB per month in 2017.¹

Of American homes are wireless only.²

In North America, the average household has 13 connected devices with smartphones outnumbering tablets 6 to 1.³

1. Ericsson Mobility Report, November 2017

2. CDC's 2018 Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December, 2018

3. IHS Market Connected Device Market Monitor: Q1 2016 , June 7, 2016

What it takes to keep families and businesses connected.

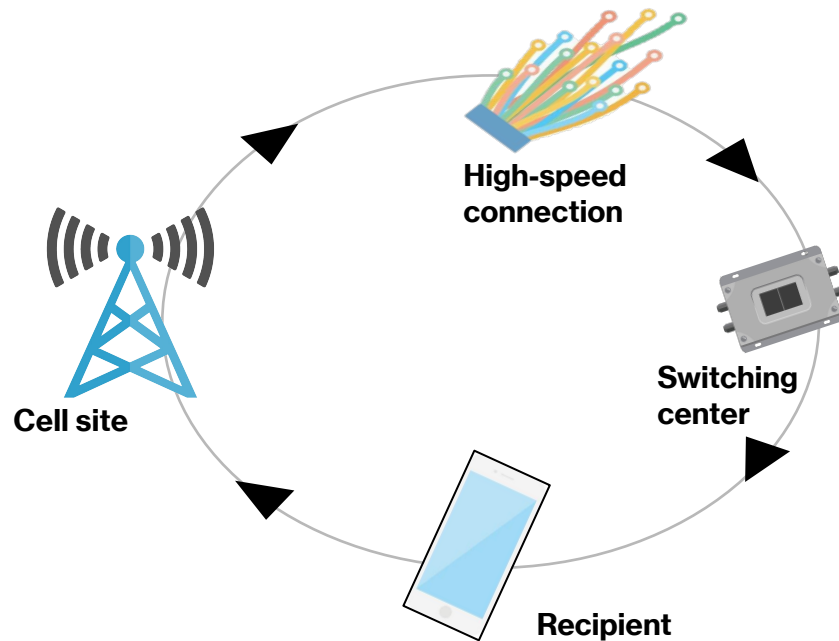
How does wireless service work?

Radio frequencies can carry signals from radios and televisions, to baby monitors, garage door openers, home Wi-Fi service, and cordless phones.

Cell service uses these radio frequencies to wirelessly connect a mobile device with the nearest antenna. That antenna may be hidden in a church steeple, sitting on a rooftop, attached to a building façade or mounted on a freestanding tower structure. All are known generically as cell sites.

From the cell site, the call or data session then travels through a high-speed connection to a network switching center where it is then directed to the recipient.

This all happens in fractions of a second.



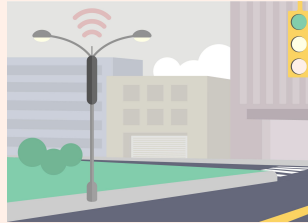
The many types of wireless technologies include cellular and fixed wireless, or Wi-Fi.

Different locations require different solutions.

Verizon uses a balanced approach to engineering the best possible network given the local community's needs.

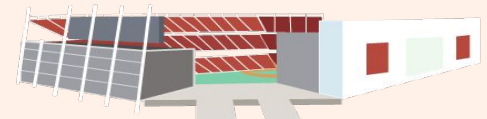


Traditional, or macro cell sites, are most often the best choice for meeting coverage and capacity needs. Macro sites are traditional cell sites or towers that provide coverage to a broad area, up to several miles.



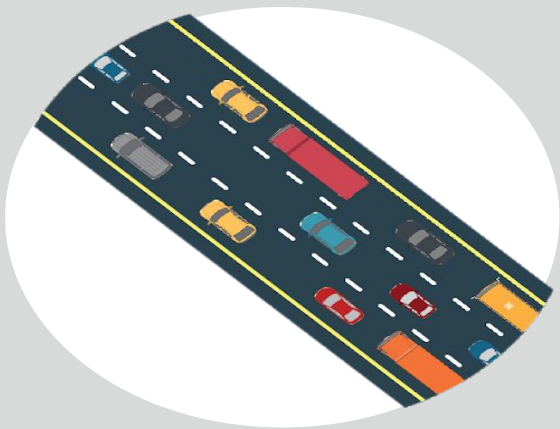
Small cells are just like the name implies – short range cell sites used to complement macro cell towers in a smaller geographic area ranging from a few hundred feet to upwards of 1,000 feet. These lower power antennas enhance capacity in high traffic areas, dense urban areas, suburban neighborhoods, and more. Small cells use small radios and a single antenna placed on existing structures including utility poles and street lights.

Distributed Antenna Systems (DAS) are a group of antennas in outdoor or indoor locations that connect to a base station. DAS systems are typically used in large venues including stadiums and shopping centers.



Staying ahead of demand.

A wireless network is like a highway system...



More wireless traffic needs more wireless facilities just like more vehicle traffic needs more lanes.

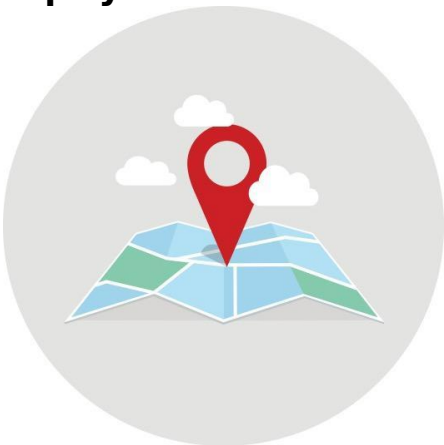
- Many wireless users share each cell site and congestion may result when too many try to use it at the same time.
- Wireless coverage may already exist in an area, but with data usage growth increasing exponentially each year, more capacity is needed.
- To meet capacity demands, we need to add more wireless antennas closer to users and closer to other cell sites to provide the reliable service customers have come to expect from Verizon.

In the United States, the gigabyte equivalent of all movies ever made will cross mobile networks every 1 hour by 2022.¹

¹ Cisco VNI Mobile Forecast Highlights Tool, October 2019

Finding the right location.

To meet customer needs and expectations, wireless providers need the ability to expand and enhance their networks where users live, work, travel and play.



Verizon gathers information from many sources including customer feedback, results of our own exhaustive network testing, and data from third parties.

When an area for improvement is identified, utilizing our existing network is always our first effort. If that is not possible, we then look at adding a new site.

Steps to finding a new site

Our engineers analyze the areas that need improvement to figure out the ideal location based on customer needs, terrain and modeling results.

Using existing structures is considered first.

Network teams perform exhaustive searches in the area needing improvement to find a location that will meet our technical needs. We also look at interest from property owners.

We pick a location that has the highest likelihood of meeting technical needs and works for the community.

Guidelines for new sites

We comply fully with all requirements for community notification and review, zoning and permitting.

Potential antenna locations must meet all local, state and federal regulations.

Verizon holds Federal Communications Commission (FCC) licenses for the frequencies utilized and we strictly follow their regulations.

Wireless facilities and property values.

Cell service in and around the home has emerged as a critical factor in home-buying decisions.



National studies demonstrate that most home buyers value good cell service over many other factors including the proximity of schools when purchasing a home.

75%

More than 75% of prospective home buyers said a good cellular connection was important to them.¹

83%

The same study showed that 83% of Millennials (those born between 1982 and 2004) said cell service was the most important fact in purchasing a home.

90%

90% of U.S. households use wireless service. Citizens need access to 911 and reverse 911 and wireless may be their only connection.²

1. RootMetrics/Money, The Surprising Thing Home Buyers Care About More than Schools, June 2, 2015

2. CTIA, June 2015

Health and safety background.

Health and safety organizations world-wide have studied potential health effects of RF emissions for decades, and studies continue.



Hundreds of times less

RF emissions exposure at ground level is well below Federal Communication Commission limits.



The Federal Communications Commission (FCC) guidelines for operating wireless networks are based on the recommendations of federal health and safety agencies including:

- The Environmental Protection Agency (EPA)
- The Food and Drug Administration (FDA)
- The National Institute for Occupational Safety and Health (NIOSH)
- The Occupational Safety and Health Administration (OSHA)
- The Institute of Electrical and Electronics Engineers (IEEE)
- The National Council on Radiation Protection and Measurements (NCRP)

Wireless technology, equipment and network operations are highly regulated.

More information can be found through these organizations:

Federal Communications Commission Radio Frequency Safety Program:

http://wireless.fcc.gov/siting/FCC_LSGAC_RF_Guide.pdf

<http://www.fcc.gov/oet/rfsafety/>

World Health Organization:

<http://www.who.int/peh-emf/publications/facts/fs304/en/>

American Cancer Society

<http://www.cancer.org/cancer/cancercauses/othercarcinogens/athome/cellular-phone-towers>

Building a wireless network you can rely on in a crisis.

The reliability of your cell phone is never more important than when crisis strikes. That's when a simple call or text message can make the difference between life and death.



We build reliability into every aspect of our wireless network to keep customers connected when you need it most.

Reliability starts when we choose the safest, most secure locations for our wireless equipment. The likelihood of earthquakes, and risk from wildfires, mudslides, floods, hurricanes and more are all considered.

When disaster strikes, we coordinate with first responders and can mobilize charging stations, special equipment, emergency vehicles and more to support local, state and federal agencies in all 50 states.

It's who we are.



With over 80% of 9-1-1 calls now coming from cell phones...¹

240 million

911 calls are made annually. In many areas, 80% or more are from wireless devices.¹

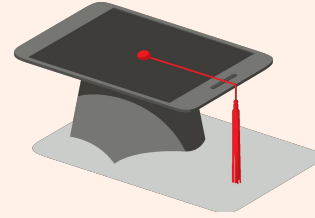
1. National Emergency Number Association, Enhancing 9-1-1 Operations With Automated Abandoned Callback & Location Accuracy (Motorola Solutions) (August 23, 2018)
2. National Emergency Number Association, 9-1-1 Statistics (January 7, 2019)

Verizon is part of your community. Because we live and work there too.

**We believe technology can help solve
our biggest social problems.**

**We're working with innovators,
community leaders, non-profits,
universities and our peers to
address some of the unmet
challenges in education, healthcare
and energy management.**

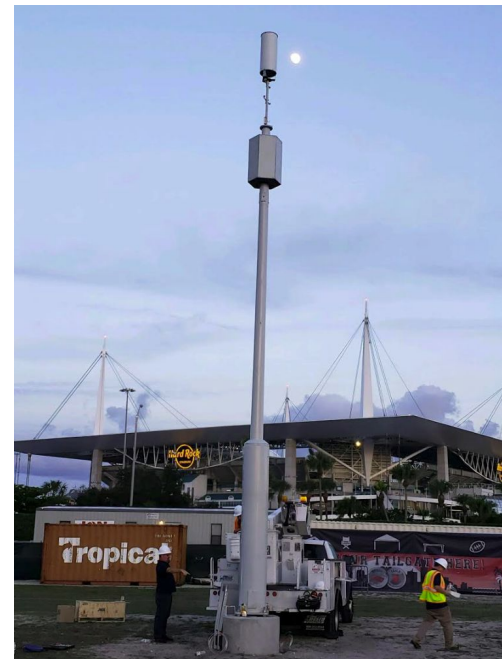
Learn more about our corporate social
responsibility at www.verizon.com.



Verizon Pole Designs



4G, 5G,
and CBRs



Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

Verizon Owned Small Cells



Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

Smart Cities

Crystal Chubeck

Manager Business Development & Strategic Planning

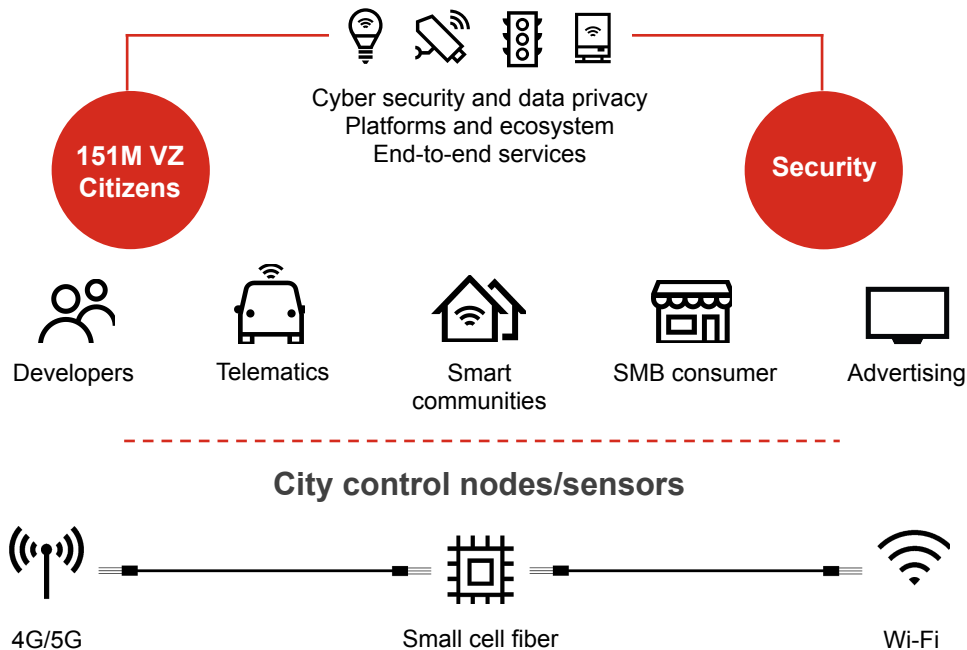
Verizon Business Group

Jacksonville, Florida



Verizon Smart Communities

Creating a positive impact on communities with innovative solutions designed to drive citizen engagement, economic development, and innovation while helping to improve safety, efficiency, environmental sustainability and bridging the digital inclusion.



Smart Communities strategic technology investments

5G[✓] 5G and V2I

Autonomous vehicles connected to city infrastructure and 5G

Lighting infrastructure as a sensor hub

Existing city assets used as a foundation for new smart-city solutions

Computer vision

Analytics that provide relevant information in a less bandwidth-intensive format

Netsense city data platform

Aggregates data from multiple sources to deliver insights to cities about trends in their area

Verizon offers a comprehensive set of solutions.



Lighting

- Intelligent Lighting



Traffic

- Traffic Data Services
- Intersection Safety Analytics



Parking

- Parking Optimization



Public Safety

- Intelligent Video
- Real-Time Response System
- Digital Evidence Management



Citizen Engagement

- Partner Digital Kiosk**

** Offered via referral partner kiosks

5G

Michael Buerki/Troy M. Dunning

Senior Manager/Manager Business Development & Strategic Planning

Central Florida Government Sales/Network Real Estate

Temple Terrace, Florida

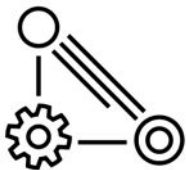


Ultimately, driving the Fourth Industrial Revolution

First Industrial Revolution

Water and steam power

The work one could do was no longer constrained by that individual's physical strength or endurance.

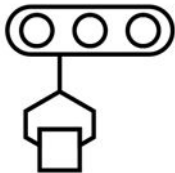


First mechanical loom, 1784

Second Industrial Revolution

Electrical energy and division of labor

Electrical energy means work can be done almost anywhere. Mass production becomes possible.



First conveyor belt, 1870

Third Industrial Revolution

Electronics and information technology

It becomes possible to offload mental work to machines, allowing businesses to do for thought what had been done for physical objects.



First programmable logic controller, 1969

Fourth Industrial Revolution

Cyber Physical Era

Massive change on the back of 5G technology shifts combining for a flywheel effect. AI, Next Gen Cloud, IoT, AR/VR/MR, and 5G. Pervasive intelligence, massive sensorization and immersive/augmented capabilities.



The real-time intelligent ecosystem, 2019

Evolution of Technology



1G

- Analog voice



2G

- Text messaging
- Digital voice
- Security



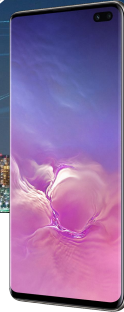
3G

- Data & applications



4G^{LTE}

- High speed data for phones and other mobile devices
- Internet of Things (CAT M)
- Expanding capabilities



5G^v



- Ultra-low latency
- Ultra-reliable transmission
- Massive Internet of Things scale
- Security by design
- High bandwidth (Spectrum width of hundreds of MHz)

The best network for public safety continues to get better.

Our network is the foundation for the products we offer and our ability to support our partners in public safety. Verizon is committed to remaining the nation's #1 network.



\$180 billion invested since 2000

Investment

We invest billions of dollars every year to expand our network services and capacity, and to prepare for tomorrow's even more powerful networks.

5G Launches in Panama City and Hard Rock Stadium in Miami

Design and Implementation of additional 5G markets

Coverage in N. Florida

Capacity in S. Florida



5G and Intelligent Edge Benefits (Compared with 4G)

Sample Use Cases

Billions of Connected Devices	Increased Mobile Data Volumes	Ultra Lower Latency	Significantly Higher Bandwidth	Faster Data Speeds	Long Battery Life
1M connected devices per km ²	Enables complex applications that require high data volume processing/transferring	Data travel time between nodes is ~1ms	Allows high rates of data transfer to the end-user (Throughput)	The amount of data successfully moved from one place to another	Devices send less control messages to the network, hence consume less power
<ul style="list-style-type: none"> Wearables Smart metering* Smart parking* 	<ul style="list-style-type: none"> Thin Client/virtual device Autonomous vehicle 4K/8K video streaming AR/VR 	<ul style="list-style-type: none"> Autonomous vehicle Thin Client/virtual device Robotic control Drone Monitoring 	<ul style="list-style-type: none"> AR/VR Video surveillance 4K/8K video streaming Rich video-conferencing 	<ul style="list-style-type: none"> AR/VR Video surveillance 4K/8K video streaming Rich video-conferencing 	<ul style="list-style-type: none"> Wearables Agriculture* Smart metering*



Millimeter Wave Spectrum	Deep - Fiber	Cloud RAN/CORE	Software Defined Networks
Multi-access Edge Compute	Virtualization	Automation	Analytics & Intelligence

Q&A

Thank you!

