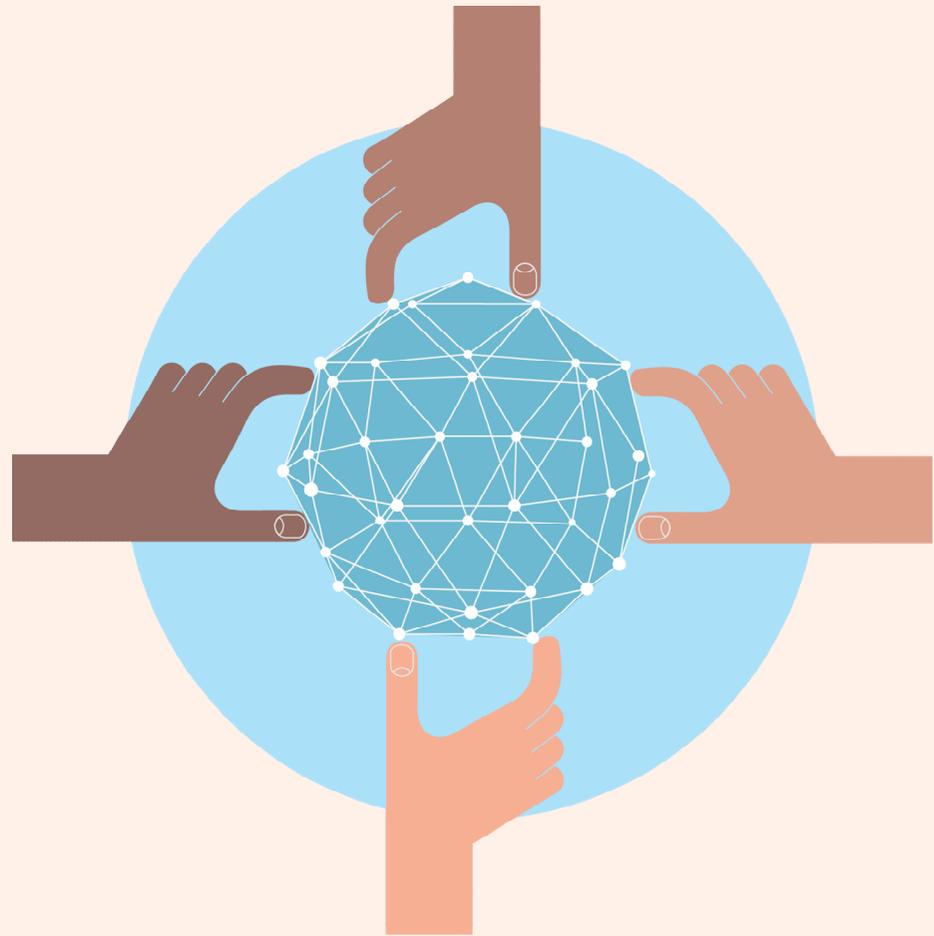


**Connecting
our homes,
businesses
and communities.**

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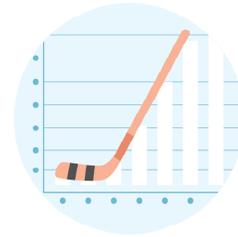


Why are we expanding the wireless network?

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.

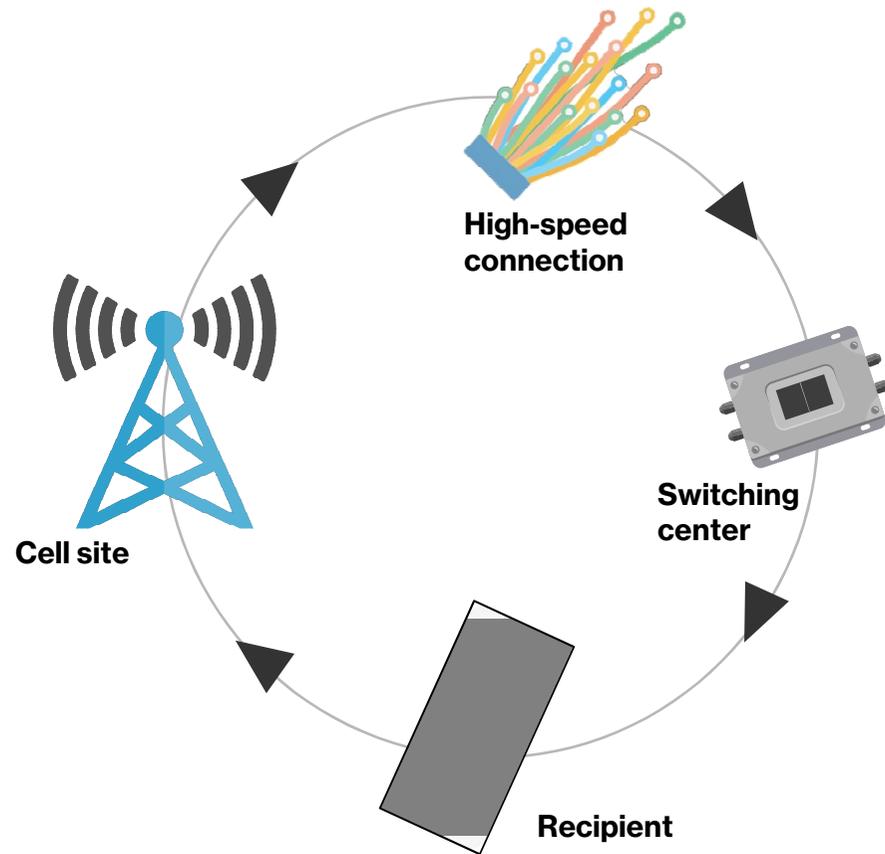
How does wireless service work?

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.

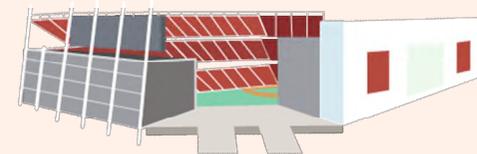


Traditional, or macro cell sites, are most often the best choice for meeting coverage and capacity needs. Macro sites are traditional cell sites or towers that provide coverage to a broad area, up to several miles.



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...



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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 US, mobile data traffic was 1.3 Exabytes per month in 2016, the equivalent of 334 million DVDs each month or 3,687 million text messages each second.*

*Cisco VNI Mobile Forecast Highlights, 2016-2021, February 2017

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.



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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.



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



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



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% 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 worldwide 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.



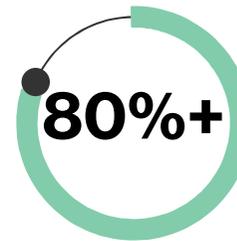
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We build reliability into every aspect of our wireless network to keep customers connected when you need it most.

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)

Did You Know?

Wireless and Education

Wireless connectivity is critical in schools and communities.



Wireless is a critical component in schools and for today's students.



20,000 learning apps are available for iPads. 72% of iTunes top selling educational apps are designed for preschoolers and elementary students.



600+ school districts replaced text books with tablets in classrooms.



77% of parents think tablets are beneficial to kids.



74% of school administrators feel digital content increases student engagement.



70% of teens use cellphones to help with homework.

Source: CTIA's Infographics Today's Wireless Family, October, 2017

Did You Know?

Wireless and Medicine

Wireless is a critical component in today's medical fields.



Smart pill bottles and cases can help patients and their care-givers track medication usage, ensuring medications are taken on time and correctly. This supports increased medical compliance, provides more consistent care, and enables preventative care, keeping patients in their homes longer and reducing the number of emergency visits to the doctor's office or hospital.



Wireless connected glucose monitors, blood-pressure cuffs, and EKGs can track a patient's vital signs and catch an issue before it turns into an emergency.



Pace makers and sleep apnea monitors can be tracked remotely.



Routine eye exams can be conducted with a wireless device connected to a smart phone, bringing solutions and services to low-income and remote areas that would otherwise go unsupported.

Did You Know?

Wireless in Communities

Wireless is a critical component in today's communities.



Wireless smart city solutions are being used to track available parking and minimize pollution and wasted time.



These same solutions are being used to track pedestrian and bike traffic to help planning and minimize accidents.



Smart, wireless connected lighting enables cities to control lighting remotely, saving energy and reducing energy costs by 20%.



4G technology is utilized to track and plan vehicle deliveries to minimize travel, maximize efficiency, and minimize carbon footprint.



4G technology is also used to monitor building power usage down to the circuit level remotely, preventing energy waste and supporting predictive maintenance on machines and equipment.



Wireless sensors placed in shipments are being used to track temperature-sensitive medications, equipment, and food. This is important for preventing the spread of food-borne diseases that kill 3,000 Americans each year.

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.

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