Connectivity toolkit

A comprehensive guide
for communities.
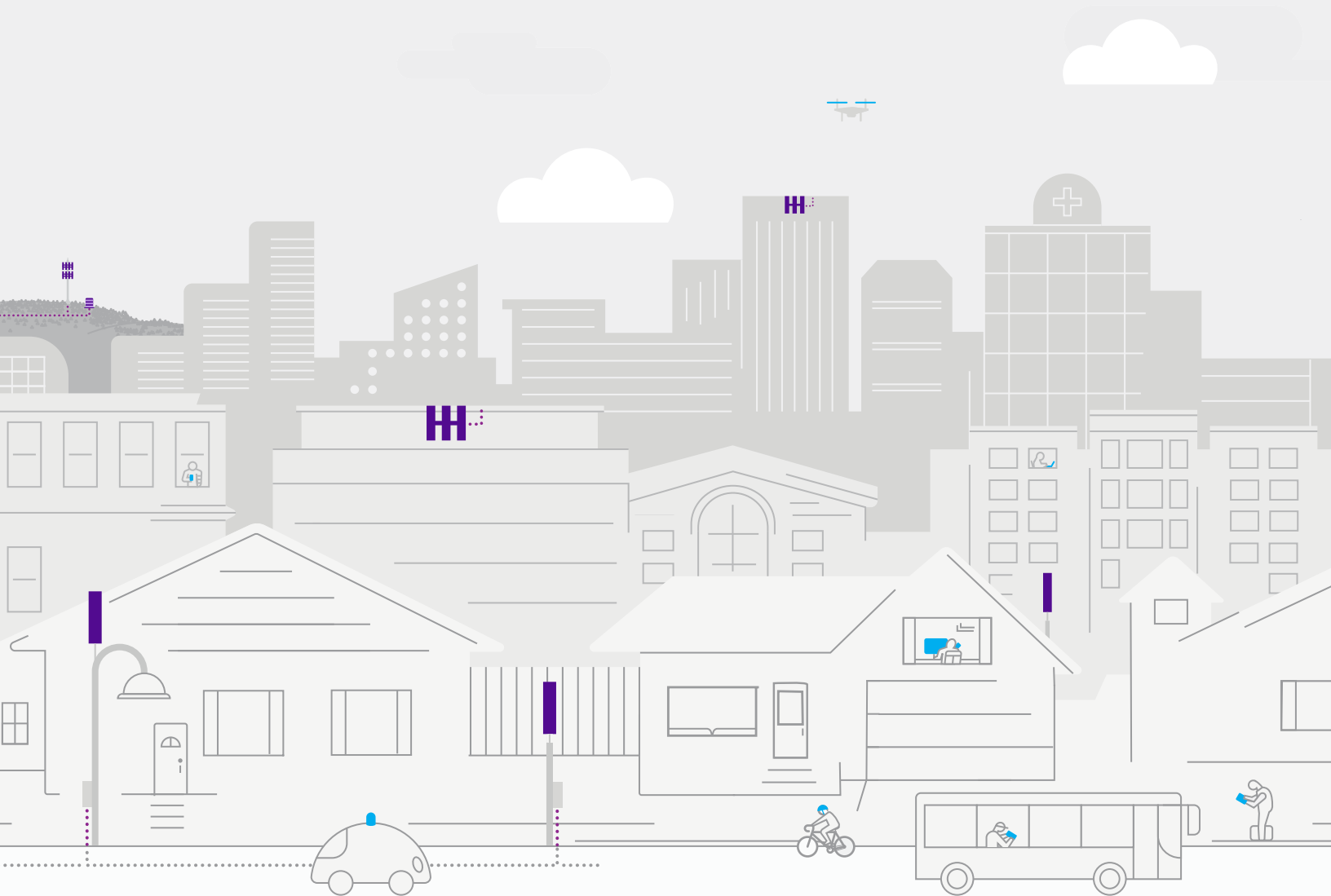
Contents.

About
this toolkit.

From social media and chat platforms that keep us connected to family and friends, to technology's ever-greater role in how we do business and stay safe, communications infrastructure is woven into the fabric of our everyday lives. We've created this toolkit to help you think about connectivity—how it's so essential to keeping your community thriving, safe, connected and ready for the future—and the infrastructure that can get you there.

Wireless demand is creating a need for new infrastructure.

Our communications infrastructure works together to meet unprecedented and growing data demand. It is essential to 5G and the many new technologies that communities and businesses will come to depend on.

1B+
wearable devices worldwide by 2022.[1]

41.8B
devices connected to an IoT platform worldwide by 2025.[2]

146M
5G-enabled US mobile devices by 2024.[3]

1 Statista, Number of connected wearable devices worldwide from 2016-2022, 2021.
2 IDC, IoT Growth Demands Rethink of Long-Term Storage Strategies, 2020.
3 IDC, U.S. 5G Smartphone Forecast, 2020–2024, 2020.

Our shared communications infrastructure.

Crown Castle's nationwide portfolio of towers, small cells and fiber makes us one of the largest US providers of shared communications infrastructure. With this unique and comprehensive portfolio, we help communities meet unprecedented data demand and prepare for exciting new advancements on the horizon. Since all of our infrastructure can be shared, we're able to accommodate multiple wireless carriers and serve more people and businesses with less equipment and disruption. Learn how our towers, small cells and fiber work together to keep communities like yours connected.

Towers

Cell towers are the most established type of communications infrastructure, and are still the most reliable way to deliver critical wireless coverage. That includes voice and data signals, of course, but increasingly, wireless broadband, TV and radio signals and more. Wireless carriers install antennas on our towers to provide wireless voice and data services to large geographic areas. Known for ushering in the modern mobile phone era, today cell towers are playing a large role in the future of networks.

Small Cells

Small cells are discreet, fiber-connected antennas, usually located on existing structures like streetlights and utility poles. They work in conjunction with tower infrastructure to provide greater wireless coverage and capacity. Because they use less power and can be placed closer together, they're often a good solution to relieve congestion. From Baltimore, MD to Palo Alto, CA, small cells are keeping people, businesses and communities connected.
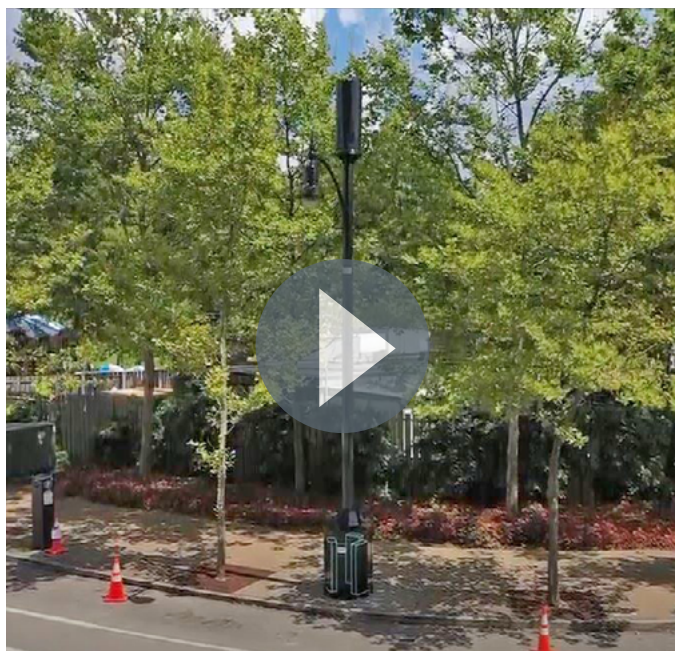
Take a tour to learn how small cells are helping communities stay safe, connected and ready for the future.

Fiber

All around the country, businesses, communities, hospitals, schools, libraries and more depend on the fast, reliable connections brought by fiber networks.

Fiber is the connective thread for next-gen networks such as 5G and smart city technologies that will make our communities stronger, safer and more efficient. And as the need for fiber networks continues to increase, innovative deployment techniques like microtrenching help us deploy this essential infrastructure faster—and with less disruption.

Microtrenching

Many cities are turning to microtrenching as an effective way to quickly install fiber.

Microtrenching offers:

> Less disruption
> Better restoration
> Faster deployments
> More precision and increased safety
> An environmentally friendly alternative to traditional methods

Learn how we've helped the City of Los Angeles stay on the cutting edge with microtrenching.

Go on a hosted walk-through of one of our microtrenching projects and learn all about this innovative technique and the benefits it brings to communities.

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How connectivity is delivered.

Delivering connectivity requires infrastructure and services that work seamlessly to ensure people, communities and businesses can get online.

Types of connectivity

Broadband
Broadband is the transmission of wide bandwidth data over a high-speed internet connection. According to the FCC, to be defined as broadband, a connection must provide a minimum of 25Mbps download and 3Mbps upload speeds. Broadband speed can be delivered using fiber optics, cable, wireless, DSL and satellite.

Wireless Broadband
Wireless broadband technology provides wireless high-speed internet access to portable devices that use antennas placed on telecommunications towers to transfer data. Wireless broadband can be fixed or mobile.

> **Fixed Wireless**
Wireless technologies using longer-range directional equipment provide broadband service where other services would be costly or difficult to provide. Fixed wireless is used in rural and urban settings.

> **Mobile Broadband**
Mobile broadband allows individuals to maintain an internet connection as they move from place to place without having to rely upon Wi-Fi hotspots.

Learn more about how connectivity is delivered here.

Understanding the benefits.

Infrastructure brings important benefits to your community. Communications technology has been woven into the fabric of our everyday lives—from staying connected to family and friends, to doing business and staying safe.

Necessary, reliable connections

We live in a world where connectivity is an absolute necessity. With more than 262 million smartphone users in the US, equivalent to 1.2 mobile device subscriptions per person, in addition to over 180 million other connected devices (e.g., fitness trackers, smart home devices, etc.), it is safe to say that mobile access is no longer a luxury, but a daily necessity.[1]

Economic growth

Similar to railroads, highways and airports generations ago, cutting-edge communications infrastructure is what modern communities and countries need to stay competitive today and in the future. Small cell and fiber technology enable the connectivity that is essential to providing our businesses with the access they need today—whether it's accepting payments on a mobile card reader, completing a sale on the go or reaching consumers.

Increased safety

When there's an emergency, the closest, most convenient phone is almost always a mobile device. So it's no surprise that 80% of 911 calls are made wirelessly.[2] And once that call is placed, fast, reliable connectivity helps police officers, firefighters, emergency medical personnel and other first responders do their jobs by providing access to the communications and information they need to respond quickly or to push out critical information at scale. And reliable wireless coverage allows us to connect with loved ones in emergency situations, providing peace of mind.

5G WILL CONTRIBUTE
$1.5T and create **4.5M jobs** in the next decade.[3]

US 5G DEPLOYMENT REQUIRES AS MUCH AS
$275B in cumulative telecommunications industry investment through 2024.[4]

1. Accenture, "How the Wireless Industry Powers the U.S. Economy," 2018.
2. NENA, "9-1-1 Statistics," 2021.
3. CTIA, "5G Promises Massive Job and GDP Growth in the US," 2021.
4. SAFE, "The Race to 5G: Advancing the Safety and Efficiency Benefits of Enhanced Mobile Connectivity," 2019.

Where we're headed.

Next-gen technologies are being deployed in neighborhoods across the country. With the right infrastructure in place, your community will stay ahead and be ready for whatever the future brings. From making everyday life simpler to keeping our cities safer and more efficient and businesses on the cutting edge, technology is bringing change like never before.

5G

5G is the fifth generation of wireless connectivity. Through a combination of technologies—including millimeter waves, small cells and fiber—5G is capable of delivering data rates up to 100x faster than current networks. This means it has the potential to fundamentally change the way we interact with each other—and the world—by making communities smarter, safer and more efficient.

A safer, healthier community. Faster, improved communications will bring new efficiencies to diagnosing and treating illnesses, and will make responding to emergencies more effective.
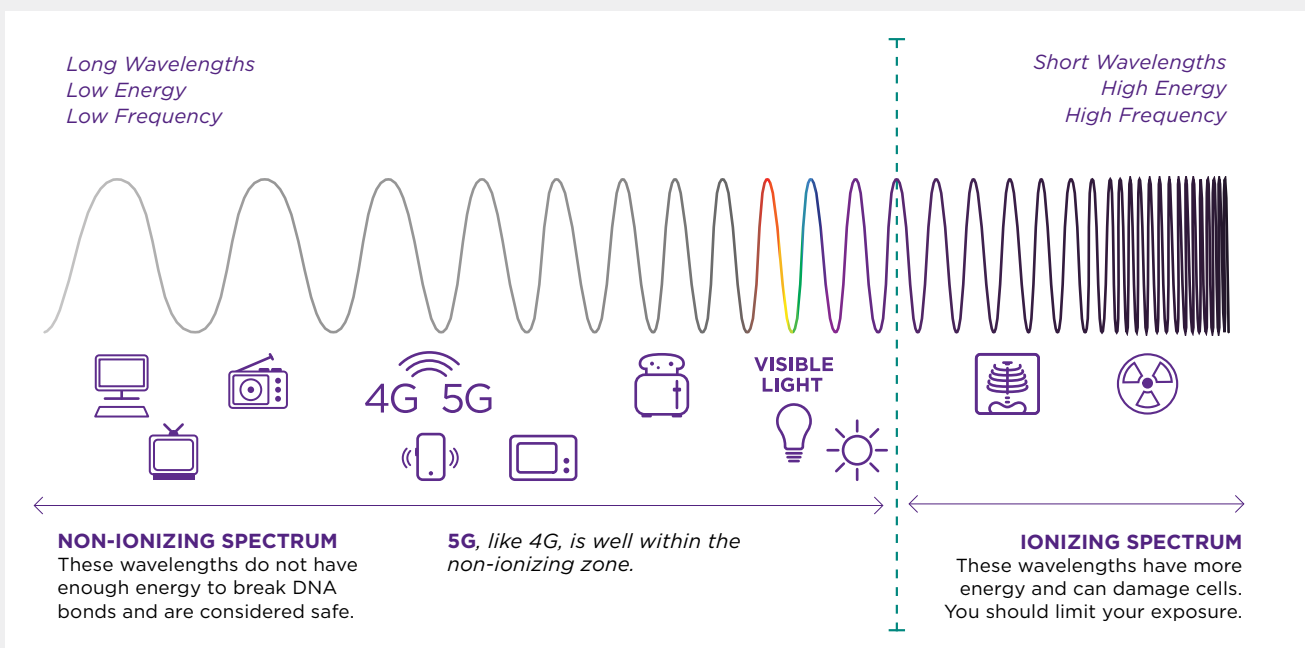
More efficient, faster-moving cities. 5G will support smart city technologies that allow traffic to move smoothly and efficiently, while responding to changing conditions.

New opportunities in business and commerce. Advanced AR and VR technologies will support new and existing industries while changing the way we interact with the world.

Understanding the safety of 5G

You've probably heard a lot about 5G networks, and it's only natural to wonder about their safety. Much like the signals for your TV, radio or Wi-Fi router, 5G travels to your device using electromagnetic energy—one of the most ubiquitous and well-studied phenomena in the universe. Learn more about the safety of 5G here.

Where 5G fits on the electromagnetic spectrum.

Long Wavelengths
Low Energy
Low Frequency

Short Wavelengths
High Energy
High Frequency

4G 5G

VISIBLE
LIGHT

NON-IONIZING SPECTRUM
These wavelengths do not have enough energy to break DNA bonds and are considered safe.

5G, *like 4G, is well within the non-ionizing zone.*

IONIZING SPECTRUM
These wavelengths have more energy and can damage cells. You should limit your exposure.

Smart communities

With the emergence of the Internet of Things (IoT) and continued deployments of 5G, smarter communities are here. From enhanced public transportation and environmental sensors to better monitoring of traffic and weather, smart city technologies are making the way we live more convenient, and of course, safer.

CBRS

Solutions that utilize newly available Citizens Broadband Radio Service (CBRS) spectrum allow organizations to set up a dedicated, private network. This can bring greater speed and capacity, better protection and increased flexibility and scalability to your community's network, benefiting schools, hospitals and other critical services.

Edge computing

The future of many municipalities is smart city technology. By deploying smaller, powerful data centers near where people live and work—at the edge of the network—rather than relying on massive data centers that cover large regions of the country, edge solutions will allow communities to adopt and deploy the many connected IoT devices needed for things like smart lighting, automated public services, advanced traffic management and enhanced first-responder capabilities—without causing network congestion for residents and businesses.

1.9B 5G subscriptions

are expected worldwide by 2024.[1]

1. Ericsson, "Ericsson Mobility Report," 2019.

Resources and case studies.

Infographics

Our role in your world

Community safety

Coverage and capacity

5G 101

Understanding the safety of 5G

Case Studies

Augusta Pines, TX: Finding the best solution, with the help of the community

Baltimore, MD: Supporting Baltimore's resurgence with upgraded infrastructure

Cleveland, OH: Engaging a local community through technology and art

Orlando & Orange County, FL: Working together to bring codes up to date

Palo Alto, CA: An innovative solution to a city's specific aesthetic requirements

Philadelphia, PA: Upgrading a historical area in anticipation of a historical event

Vail, CO: Making a winter destination safer

Learn more.

Ready to learn how we can partner with you to get your community ready for what's next?
Contact us at Communities@crowncastle.com.

CROWN CASTLE

Crown Castle owns, operates and leases more than 40,000 cell towers and approximately 90,000 route miles of fiber supporting small cells and fiber solutions across every major US market. This nationwide portfolio of communications infrastructure connects cities and communities to essential data, technology and wireless service—bringing information, ideas and innovations to the people and businesses that need them.