



## 5G: What Is It, What Does It Bring and Who Stands to Benefit?

By now, most of us have heard of 5G. It's the fifth generation of wireless networks. When most people think about 5G, they think about a faster wireless connection. Yes, 5G is expected to provide much faster connectivity, but it's so much more than that. 5G is expected to usher in the 4th Industrial Revolution. The First Industrial Revolution was about coal, water and steam, bringing with it the steam engine and innovations that enabled the large-scale manufacturing of goods and products. The Second Industrial Revolution came about with the invention of electricity and enabled mass production facilities. The third was all about computers and digital systems enabling new ways of processing and sharing information. The Fourth Industrial Revolution, also referred to as Industry 4.0, according to the World Economic Forum, is one of "cyber-physical systems" – that is, the merging of the capabilities of both human and machine. This is the era of artificial intelligence, genome editing, biometrics, renewable energy, 3D printing, autonomous vehicles and the Internet of Things. And 5G is the technological backbone that will help support it all.

Unlike previous generations of wireless networks that were primarily improvements to their predecessors, 5G offers several core components that is expected to create a whole new level of technological advancements and a better experience for the end-user. Faster speed is the one thing we all hear about. 5G technology provides wireless communication roughly 10x faster<sup>1</sup> than previous generations, rivaling fiber-optic cable speed. 5G also promises lower latency, allowing near real-time connectivity without any lag. It also offers greater bandwidth creating a virtual super-highway that facilitates faster transmission of massive data streams, even in extreme use conditions. And finally, 5G is designed to connect a far greater number of devices helping to facilitate the Internet of Things ("IoT") and connected technologies such as autonomous vehicles, augmented reality, smart cities, manufacturing, 3D video, remote healthcare, regenerative medicine and so much more.

Make no mistake, we are witnessing the infancy of 5G but it is expected to be transformational as it develops and matures. As 5G roll-outs occur, we'll see many new IoT applications. And many more new use cases will be enabled by the higher bandwidth and faster throughput. Autonomous vehicles are one of the most anticipated 5G applications and that technology is advancing rapidly to support what is expected to be a huge market going forward. 5G networks will be an enormous enabler for autonomous vehicles, due to the dramatically reduced latency, as vehicles will be able to communicate in real time with each other and respond 10-100 times faster<sup>2</sup> than they could over current cellular networks.

Smart city infrastructure and traffic management is another area 5G is expected to push forward. Management of vehicle traffic, parking and electrical grids could help

reduce energy usage, traffic congestion and fuel costs. These 5G attributes can help cities reduce commute times, improve public safety and generate significant smart grid efficiencies.

The robotics and automation behind today's smart manufacturing facilities require cables, as Wi-Fi does not provide the range, mobility, low latency and quality of service required for industrial control. 5G can help organizations "cut the cord" and monitor various aspects of the production process in real time – from the assembly line to quality control to equipment troubleshooting – correcting costly inefficiencies and shortening the production cycle.

The low latency of 5G will help further enhance and enable augmented reality (AR) and virtual reality (VR) applications. We've already seen this take shape in the medical field. Using 5G networks, doctors in China have used virtual reality technology and 3D imaging to allow a surgeon to help in an operation taking place thousands of kilometers away.

Smart agriculture will likely also advance with 5G. In addition to automated machinery, sensors can collect information on soil moisture, fertilization, weather and transmit that data over wireless networks to provide farmers real time access to information and analysis on their land, crops, livestock, logistics and machinery.



Companies and countries are forging ahead and the race is on to have the largest, functional 5G network. That's because the benefits of the new technology are expected to fuel transformative new technologies, not just for consumers but also for businesses, infrastructure and defense applications. Intel predicts that by 2025 over 1 billion 5G devices will be in use and that by 2035, 5G will create approximately \$10 trillion in economic output.<sup>3</sup>

Cell towers (and cell sites on rooftops, billboards, water towers and more) are the physical foundation of nearly all wireless connectivity. Wireless carriers lease space on this "vertical real estate" to mount their equipment and provide coverage to their customer bases. 5G will initially utilize the existing sites operating 3G and 4G today. However, it will require significant expansion of cell sites and existing infrastructure over the next decade to make 5G a reality. According to FCC Commissioner Brendan Carr, the U.S. will need to ramp up to roughly 60,000 new cells sites a year.<sup>4</sup> In addition to these traditional "macro sites," small cells are expected to be a significant component of 5G. A small cell is a radio access point with low power output and short range. Roughly the size of a briefcase, they are often hidden in plain site on street lamps, telephone poles, traffic lights and sides of buildings, connecting to local data centers via underground fiber. Small cells complement the larger macro tower sites to improve coverage, add capacity in areas of traffic congestion and provide a better customer experience. CTIA, a leading advocate in the wireless industry, estimates there will be approximately 800,000 small cells<sup>5</sup> in the USA by 2026. Both towers and small cells are typically leased by the large, high-credit-quality wireless carriers, as well as others, and are generally accentuated by inelastic demand for services, long-term leases and relatively predictable income.

Data centers serve as the landlord to the cloud and our digitized world. They are often heavily secured, both physically and virtually, and contain unique floorplans designed to house network equipment and servers that are critical for data storage, processing delivery and cloud connectivity. These facilities provide sophisticated

technical amenities like backup generators, industrial air conditioners and fiber optic connections for linking to business partners and service providers. These essential properties serve as critical components to thousands of companies across the globe and often represent their most important piece of real estate. 5G, and the new technologies it will support, is expected to bring faster and denser streams of data, a trend that is likely to drive demand for more data center capacity. According to New Street Research, the secular tailwinds for data centers are powerful and the thirst for data consumption seems unrelenting. Our continued reliance on digital platforms and new emerging technologies paint a pleasant backdrop for the data center real estate sector.



5G certainly represents an exciting time in our technological development and with that, brings compelling investment opportunities. While there is bound to be both winners and losers in the equity market as 5G grows and matures, investments in the tangible assets that serve as the underlying foundation for 5G have garnered a lot of attention. Digital infrastructure assets like cell towers and data centers have evolved from niche sectors to a significant portion of today's public and private investment markets, highlighting the demand for real assets underpinned to the information economy.

1. <https://www.law.com/legaltechnews/2020/06/29/5g-is-unleashing-the-fourth-industrial-revolution-heres-what-it-means-for-legal-systems/?sreturn=20200726131255>
2. <https://www.digi.com/blog/post/5g-applications-and-use-cases>
3. Intel 5G Summit – Video, 2018 <https://www.technologyforyou.org/5g-will-create-10-trillion-in-economic-output-by-2035/>
4. Inside Towers, October 3, 2018; Carr: U.S. Needs to Ramp Up to 60,000 Cell Sites a Year.
5. <https://www.rcwireless.com/20200513/opinion/readerforum/why-small-cells-are-a-big-part-of-5g-capacity-reader-forum>

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