The business case for true 5G

Flyer

5G networks have the potential to revolutionize the way we work and do business. A Gartner survey reveals two-thirds of organizations intend to deploy 5G by 2020.[1] But, in the race to deliver 5G at scale, some carriers are investing more in hype than innovation. While there will always be a race to establish leadership and position, trying to do so through hype alone creates two serious risks.

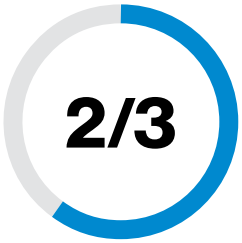
First, it creates confusion in the market and undersells the reality of 5G. Rebranding a 4G LTE Advanced network as a 5G service leaves customers with an experience less than the promise and potential of 5G. This perception of 5G as merely "a faster version of 4G" may be difficult to overcome as 5G networks come online.

Second, it has the potential to stall technology innovation and investment in 5G by commercial partners, due to lackluster network performance. These partnerships are critical to bringing actual 5G use cases to life in their respective industries.

In order to help business customers and partners overcome these real or perceived risks, Verizon has committed to only labeling networks as 5G if they meet the following criteria: if new device hardware connects to the network using new radio technology to deliver new capabilities. Our commitment to this transparency was recently shared by Kyle Malady, Chief Technology Officer at Verizon.[2] Not only did he make this promise, but he called for others to follow this path.

"When we say '5G,' we mean 5G."

—Kyle Malady, Verizon Chief Technology Officer



Gartner study reveals two-thirds of organizations intend to deploy 5G by 2020.[1]

As you work to differentiate between investments in hype versus investments in innovation, you should know that Verizon is building a 5G network that will eventually allow businesses to:

- Drive enhanced productivity
- Create new revenue streams
- Harness massive amounts of data that will improve operations
- Provide secure, mission-critical services
- Respond more quickly to changing business dynamics
- Deliver better value to customers

Anything less should call into question the motivations of the carrier or provider.

A better model: Eight Currencies of 5G

There are eight core currencies—or attributes—that you should consider when evaluating a 5G network. A network that delivers better capabilities in each of the eight currencies will be a network that provides a true platform for innovation.

1. Throughput

Verizon has reached speeds of 1.45 gigabits per second in 4G LTE Advanced.[3] 5G speeds have the potential to be many times faster than today's 4G LTE network. 5G networks will one day offer peak data rates of up to 10 Gbps.

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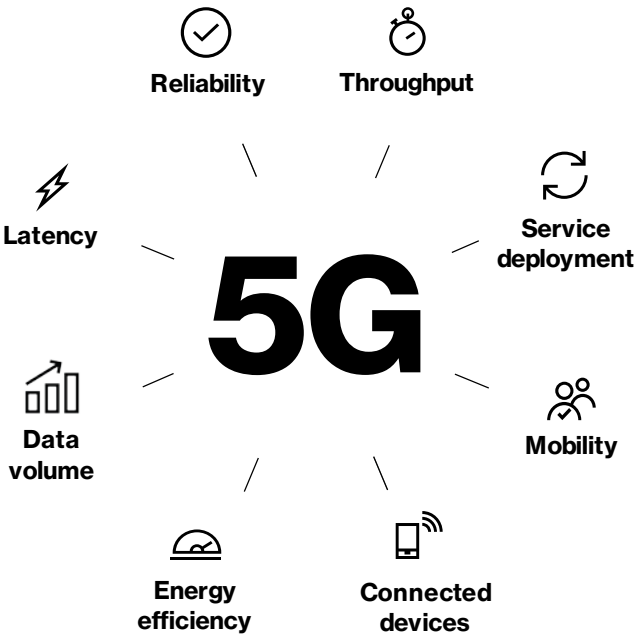

2. Service deployment

Network virtualization (i.e., using software to perform network functions) enables service application deployment without having to install additional hardware, reducing typical service deployment time from 6 months to 90 minutes.

3. Mobility

We've tested 5G network handoff techniques to enable passengers in fast-moving vehicles and trains to stay connected while moving. 5G technology is designed to enable devices that are traveling up to 500 kph (310 mph) to stay connected to the network.[4]

4. Connected devices

5G will eventually be capable of supporting up to 1 million devices in a square kilometer. With so much new data from these devices, a whole new world of services opens up.

5. Energy efficiency

5G will eventually have lower energy requirements for network operations (up to 90% less than 4G). 5G can enable edge computing—shifting complex computing to the network's edge—saving time and processing energy on end users' devices.[5]

6. Data volume

The 5G standard is designed to handle up to 10 TB/s/km.[2,6] This means the 5G network will eventually be able to carry a massive amount of data for a lot of simultaneous users.

7. Latency

Latency is the time it takes for data to travel from the user over the network to the central processor and back again. 4G LTE currently offers 40 to 50 ms latency. Verizon 5G Ultra Wideband should eventually offer less than 10 ms end-to-end response times.[7,8]

8. Reliability

Verizon offers the most reliable 4G LTE network in the nation—ranked #1 in overall network performance in the U.S. by RootMetrics, 12 times in a row.[9] Verizon is bringing that same expertise and focus as we architect and build our 5G Ultra Wideband network.

A roadmap for today and tomorrow

As Verizon 5G networks are rolled out, we will communicate and update business leaders on our work so you are able to take full advantage. In the meantime, the roadmap for businesses is clear.

First, if you are not currently using Verizon's 4G LTE network, we recommend doing so immediately. This gives you instant access to the largest and most reliable 4G LTE network in the United States and opens the door for critical use cases that are actionable today. And, as there are currently no plans to sunset Verizon 4G LTE, this is an investment in the long-term value of your business.

Second, as Verizon 5G networks are rolled out in markets where you do business, we recommend working with us to establish pilot programs or proofs of concept that allow you to realize the full value of 5G in your business.

You'll find an always-current list of cities with Verizon 5G Ultra Wideband at verizonwireless.com/5g/coverage-map/

For information on 5G Home availability, visit verizonwireless.com/5g/home/

4G LTE technologies compatible with 5G environments

- Category 1 (CAT-1) – Ideal for rich IoT applications
  - Uses fewer network resources and has better battery life than most smart devices
- LTE Category M1 (CAT-M1) – Shares capacity with other LTE devices
  - Uses fewer network resources and has better battery life than CAT-1 devices
- Narrowband IoT (NB-IoT) – Does not share capacity with other LTE devices
  - Less bandwidth, low data rate and better battery life than CAT-M1

What does it take to build a 5G Ultra Wideband network?

There are five network elements that are required to build out the Verizon 5G Ultra Wideband network.

Fiber

Verizon has spent years deploying a massive fiber network while densifying its 4G LTE network with fiber-fed small cells. Verizon has also agreed to spend $1.05 billion on new fiber-optic cable from Corning from 2018 to 2020.[11]

Small-cell deployment

Verizon has spent years densifying our 4G LTE network. Many 4G locations will be used for 5G. We have built relationships with municipalities of all sizes to accelerate network deployment.

Millimeter spectrum holdings

Verizon has secured a large portfolio of millimeter-wave spectrum, through company and license acquisitions, to help ensure that customers receive the best 5G network experience.

Edge computing

We have network locations nationwide that are ideally suited to house edge computing resources. Computing at the edge will deliver access to the tools, power and expertise to deploy at scale.

Virtualization

Virtualization began taking hold in 4G networks as a component of LTE Advanced evolution, but it will be critical as 5G networks roll out. Decoupling of software and hardware functionality instead of adding or upgrading single-purpose hardware leads to more flexibility, faster delivery of services, greater scalability and significant cost efficiency in networks. Using software-defined networking (SDN) and network function virtualization (NFV), some of the radio access network (RAN) and core network physical infrastructure is replaced with software. This also allows for an increase in interoperability using common-off-the-shelf (COTS) hardware.

For more information, reach out to your Verizon Wireless business specialist or visit verizonwireless.com/biz/5g

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1 Gartner Press Release, "Gartner Survey Reveals Two-Thirds of Organizations Intend to Deploy 5G by 2020." December 18, 2018. https://www.gartner.com/en/newsroom/press-releases/2018-12-18-gartner-survey-reveals-two-thirds-of-organizations-in
2 verizon.com/about/news/when-we-say-5g-we-mean-5g
3 In six-channel carrier aggregation
4 https://www.itu.int/md/R15-SG05-C-0040/en
5 verizon.com/about/our-company/5g/how-5g-will-pull-cloud-closer
6 https://5g-ppp.eu/wp-content/uploads/2015/02/5G-Vision-Brochure-v1.pdf
7 Latency improvements are due to lower latency in the 5G radio access network and the extension of the core network closer to end users.
8 verizon.com/about/news/verizon-ceo-hans-vestberg-keynotes-2019-consumer-electronics-show
9 Based on RootMetrics® by IHS Markit's RootScore® Reports: 1H 2019. Tested with best commercially available smartphones on four national mobile networks across all available network types. Experiences may vary. RootMetrics awards are not an endorsement of Verizon.
10 verizon.com/about/news/verizon-agrees-105-billion-three-year-minimum-purchase-agreement-corning-next-generation