

**5G will transform  
how business  
gets done.  
Are you ready?**



**ready** ✓

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# 5G is the fifth generation of cellular communications.



**1G**

mobile voice new communication technologies



**2G**

short-messaging layer (foundation of today's texting features)



**3G**

faster speeds and higher standards for reliability



**4G**

connected devices and high-quality streaming (foundation 5G is built on)



**5G**

faster speeds, lower latency and more bandwidth

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## Technically speaking.

- Built on an entirely new technology—5G New Radio (NR)
  - 5G NR: above 6 GHz and below 6 GHz
- There are different tools, technologies and frequencies that carriers can use
- Verizon has invested in the higher millimeter-wave (mmWave) spectrum
- mmWave spectrum can carry massive amounts of data at very high speeds with very minimal latency



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## 5G: It's a big deal.

- Data transfer rates faster than the blink of an eye
- Accommodates massive bandwidth
- Execute large-scale digital efforts in near in real time

5G isn't meant to replace 4G —  
it's meant to supplement it.



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# Business in the 5G age.



Drive enhanced productivity through virtualization.



Create new revenue streams with next-generation applications.



Harness massive amounts of data and make it actionable.



Improve operations by leveraging near real-time analytics.



Respond more quickly to changing business dynamics.



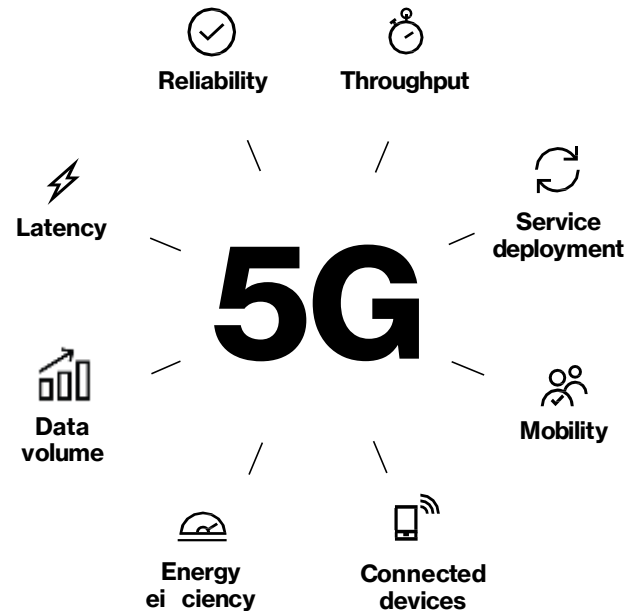
Deliver better customer experiences through omnichannel marketing integration.



Provide secure, lightning-fast access to mission-critical data.

# The Eight Currencies of 5G.

1. **Throughput:** 5G could reach up to **10 gigabits per second of data**
2. **Service deployment:** Networks with a virtualized network that can execute **updates through software instead of hardware** can stay secure and remain responsive to business needs.
3. **Mobility:** Being able to maintain reliable connections at high speed in a static situation is one thing, but if mobile is part of your business strategy, you need a network that delivers the **power of 5G even on the go**.
4. **Connected devices:** A true 5G network has the potential to support many more supported devices than 4G – up to **1 million connected devices** in a square kilometer.
5. **Energy efficiency:** A properly built 5G network will have lower requirements for network operations, meaning the end user's device will not need as much processing capability and will **consume less energy**, saving you money.
6. **Data volume:** Your 5G network should have the capacity to deliver **larger amounts of data to more users simultaneously**.
7. **Latency:** True 5G has the potential to reduce data send-and-response times **from 50 milliseconds to less than 10** milliseconds, making applications more responsive.
8. **Reliability:** It was true with 4G – and all the generations that came before – and it remains a critical quality for 5G: To deliver the performance that businesses demand takes a network with proven reliability.



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## Workforce productivity.

- When the network works faster, employees can work faster
- Better experiences for a mobile workforce
- Complex collaboration can happen almost instantly
- Augmented Reality (AR) or Virtual Reality (VR) technologies
- Industrial repairs - hands-on repair assistance without physically presence



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## Business intelligence.

- Capable of supporting up to 1,000 times more connected devices than 4G
- Able to capture more data faster and essentially make as-it-happens decisions
- Make business smarter and safer – 5G machine learning, combined with live video feeds and other sensors, can help almost immediately identify when an unauthorized person enters a site, or send alerts when conditions become hazardous.
- Smart communities can leverage solutions like intelligent video to help find a missing child or a fugitive



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## Customer experience.

- Help businesses create better customer experience by providing more and faster ways to connect and engage
- Real-time, location-based offer targeting and AR-enabled product information
- Personalized, data-driven experiences every time a customer interacts with a business
- Leveraged video surveillance to gain a better understanding of foot traffic patterns, linger and customer wins in stores



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# This is only the beginning.

Today's 5G implementations can lead to tomorrow's 5G innovations.

## Precision Manufacturing



- Enable advanced remote industrial robotics
- Enable remote controlled factory operations
- Enable more precision and less energy consumption

## Autonomous Supply Chain



- Transformation of the supply chain
- Automating routine and specialized functions
- Automated delivery trucks receiving near real-time access to data

## Augmented Reality (AR) Virtual Reality (VR)



- Telemedicine
- Surgical visualization - AR body scanning, 3D MRI holographic images

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# The future is now.

## Don't wait to start developing a 5G strategy.

- Migrate from a traditional network structure to a software-defined network infrastructure
- Start investing in the software, technology and internal systems (5G use cases)
- Be ready to leverage technology advances as they happen
- Better leverage data generated from distributed assets
- Adopt 5G innovations as they happen



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# Our 5G is built right for business.



## Fiber

5G can support a lot of data, which means it will need an infrastructure in place that can handle the load. We already have an enormous fiber footprint across the nation and are planning an additional \$1.05 billion in new fiber expansion.



## Millimeter-wave spectrum

Years ago, Verizon began securing large quantities of millimeter-wave spectrum. The ultrawide millimeter spectrum's massive bandwidth could move huge amounts of data at super-fast speeds.



## Small-cell deployment

This is key to improving the cellular experience because it will help strengthen coverage in locations where devices compete for bandwidth, such as dense, populated areas. We've spent years densifying our 4G LTE network, and many of those 4G node locations will be leveraged for 5G use.



## Edge computing

This technology enables cloud servers to run closer to endpoints, reducing latency and moving processing from the device to the edge. And we already have network locations nationwide that are ideally suited to house edge computing resources.

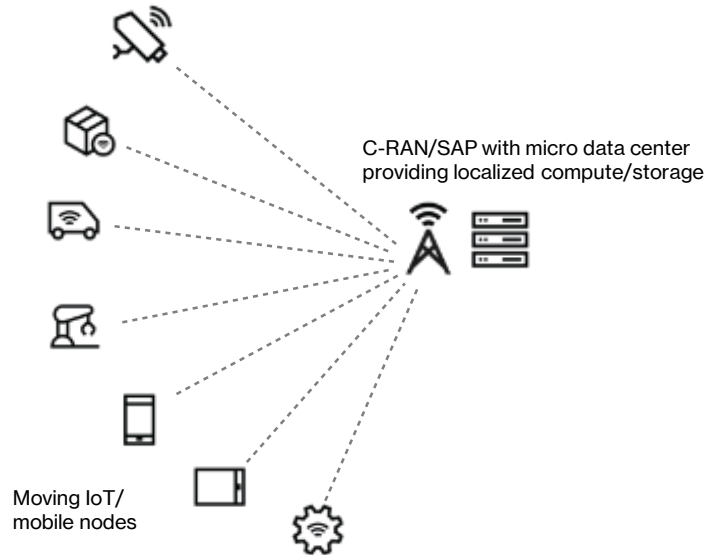
- Ultra-wide spectrum resources (strategic purchases of HF ultra-wide millimeter-wave spectrum)
- Massive fiber foundation (deployment of massive fiber network 4G/5G)
- Dense small-cell deployment (mitigate bandwidth competition)
- Intensive real-world testing (speed, distance and capacity)
- Path to 5G with the nation's best 4G LTE network



# Multi-access edge computing (MEC).

**“MEC moves application processing, storage and management to the cloud radio access network’s edge to deliver the desired low- latency experiences, thereby enabling new disruptive technologies.”**

– Adam Koeppe,  
Verizon SVP Network Planning



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# The 5G future is here.

Verizon 5G Ultra Wideband will be available in the following cities by the end of 2019:

Atlanta	Cleveland	Detroit	Memphis	San Diego
Boston	Columbus	Houston	Minneapolis	St. Paul
Charlotte	Dallas	Indianapolis	Phoenix	Washington, DC
Chicago	Denver	Kansas City	Providence	
Cincinnati	Des Moines	Little Rock	Salt Lake City	

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# The DOD 5G Initiative

“5G offers high speeds, quicker response times and it can handle many more wireless devices than 4G technology. Ultimately, 5G will provide ubiquitous connectivity for people and devices,” said Joseph Evans, technical director for 5G in the Office of the Under Secretary of Defense for Research and Engineering.

- DOD will roll out 5G in late October
- Initial testing around 5G high-speed, high-bandwidth networking protocols
- 5G will provide ubiquitous connectivity for people and devices
- 4 test bases –
  - Joint Base Lewis-McChord: Augmented Reality and Virtual Reality
  - Hill Air Force Base: dynamic spectrum sharing, a tool for switching between 5G and existing 4G assets.
  - Naval Base San Diego and at Marine Corps Logistics Base Albany: speed and bandwidth as a means to support “smart warehouse” functionality.

C4ISRNET, 9 DEC 19, How the Pentagon will experiment with 5G, By: [Adam Stone](#)

[https://www.c4isrnet.com/battlefield-tech/it-networks/5g/2019/12/09/how-the-pentagon-will-experiment-with-5g/?utm\\_source=Saillthru&utm\\_medium=email&utm\\_campaign=EBB%2012.10.19&utm\\_term=Editorial%20-%20Early%20Bird%20Brief](https://www.c4isrnet.com/battlefield-tech/it-networks/5g/2019/12/09/how-the-pentagon-will-experiment-with-5g/?utm_source=Saillthru&utm_medium=email&utm_campaign=EBB%2012.10.19&utm_term=Editorial%20-%20Early%20Bird%20Brief)



