FIFTH GENERATION NETWORK

The Future is awesome

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Introduction

What is it?

The future

5G is a Future networking system that has much higher speeds and capacity, and much lower latency, than existing cellular systems.



- 5G networks will use a type of encoding called **OFDM**, which is similar to the encoding that LTE uses. The air interface will be designed for **much lower latency** and greater flexibility than LTE, though.
- The new networks can use frequencies as low as old TV channels, or as high as "millimetre wave," which are frequencies that can **transmit huge amounts of data**, but only a few blocks at a time. 5G may also bring in Wi-Fi as a **seamless** part of a cellular network, or transmit LTE-encoded data over Wi-Fi frequencies, which is called LTE Unlicensed.

• 5G networks are much more likely to be networks of small cells, even down to the size of home routers, than to be huge towers radiating great distances. Some of that is because of the nature of the frequencies used, but a lot of that is to expand network capacity.

• So 5G networks need to be much **smarter** than previous systems, as they're juggling many more, smaller cells that can change size and shape

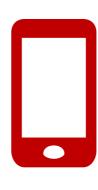


How it came to be





TIMELINE



1G — Early 1990's

- Speed: 2.4kbps
- Use Analog Signal
- Call in 1 Country only

2G - 1991



- Text Messages & MMS
 - Better Quality
 - Better Capacity



2.5G (2G with GPRS)

- Speed: 64 144 kbps
- Camera Phones
- Email Facility

3G – The big change



- Introduced in 2000's
 - Speed: 2 mbps
 - High Speed Web
 - Online Gaming



4G – Current

- Speed: 100 1000 mbps
 - High Speed
 - Low Latency

5G – The Future

- he Future
- Very low latency
- Speed: 10-40 GBPS
- Huge Databases & Traffic

WHY?

What's the need of 5G

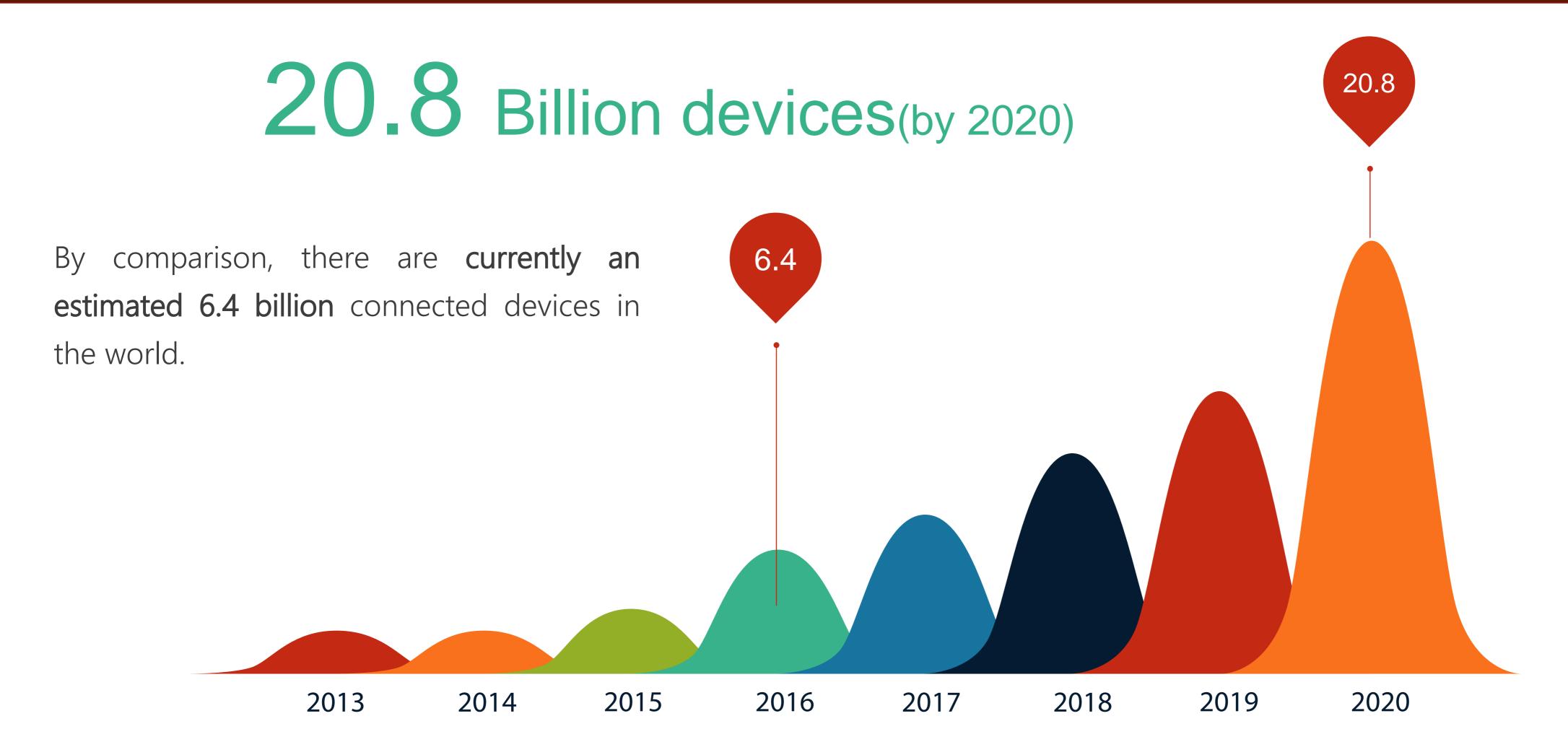
MORE NEED REQUIRES MORE POWER

With the rapid Advancement in the technology, the resources required to meet the growing demands is never enough.

In order to sustain a seamless experience for the users, we need to upgrade the technology.



ESTIMATE

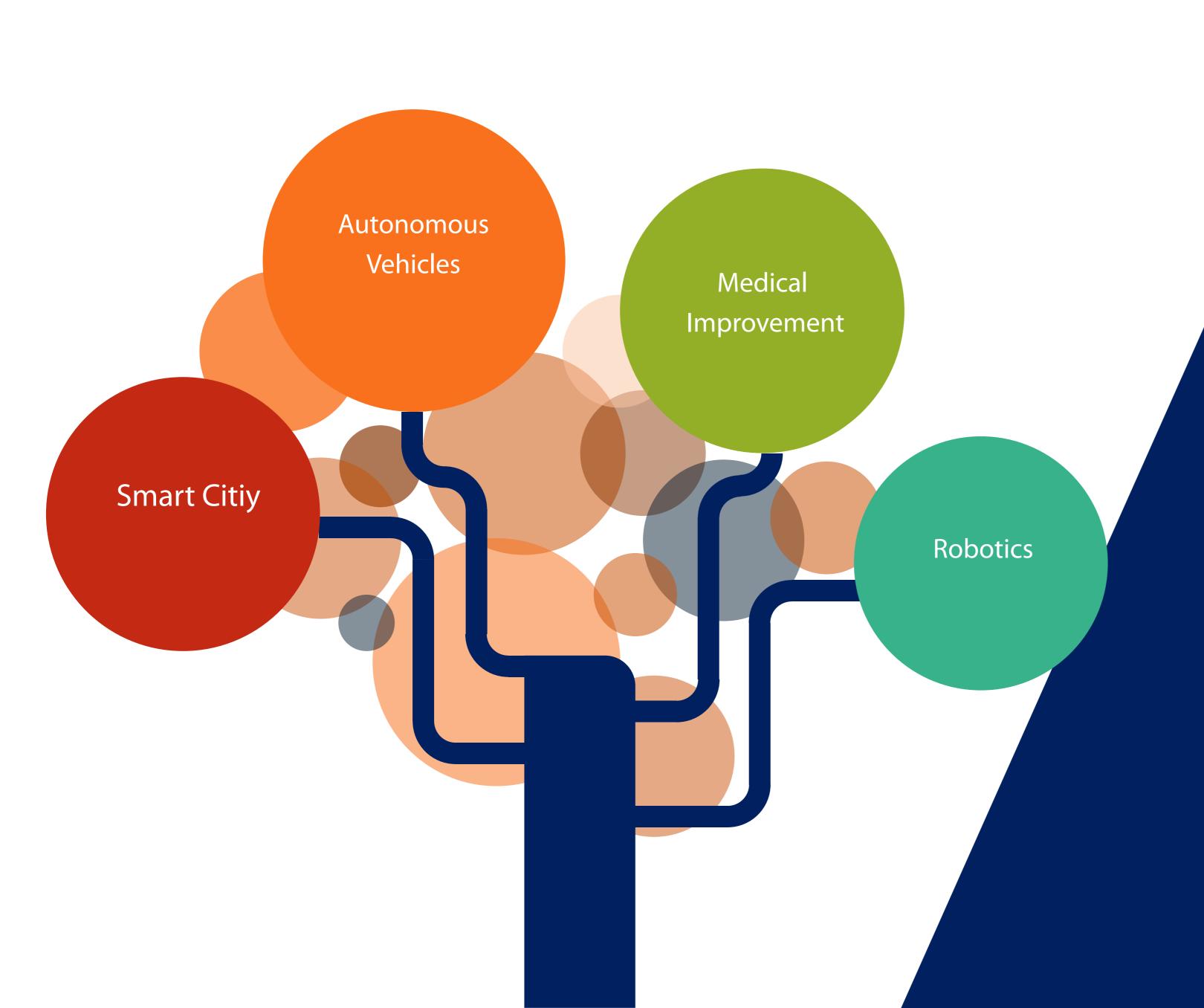


IT'S NOT JUST PHONES ANYMORE

Smartphones, watches, homes, and cars are **increasingly requiring** stable internet connections. In order to pipe in enough bandwidth for that precious wireless feed, we're going to need **an entirely new form of wireless signal**—that's where 5G comes in.

It's not just your phone and your computer anymore, either. Home appliances, door locks, security cameras, cars, wearables, dog collars, and so many other inert devices are beginning to connect to the web. That's a lot more devices asking for a quick connection.

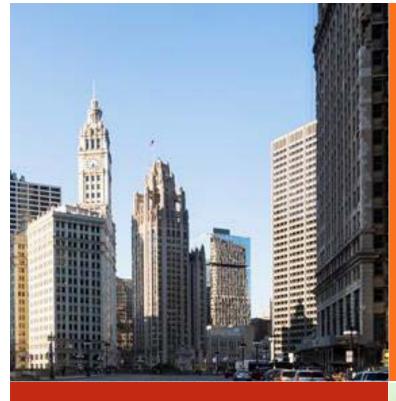




USES & POSSIBILITIES

CONNECTING TO THE MASSIVE IOT

With the help of 5G, the Internet Of Things can truly take it's form. The high capacity & server reliability make sure that everything goes as needed. Here we can see the various types & situations where the IOT works splendid with the help of 5G.



Smart Cities



Smart Homes



Utility Metering





Remote sensors / Actuators



Object tracking



ENHANCING MOBILE BROADBAND

Ushering in the next era of immersive experiences and hyper-connectivity!

With the help of 5G, Ultra HD Online Video playback, the least latency ever on internet & the perfect world of Augmented Reality is possible.



Tactile Internet

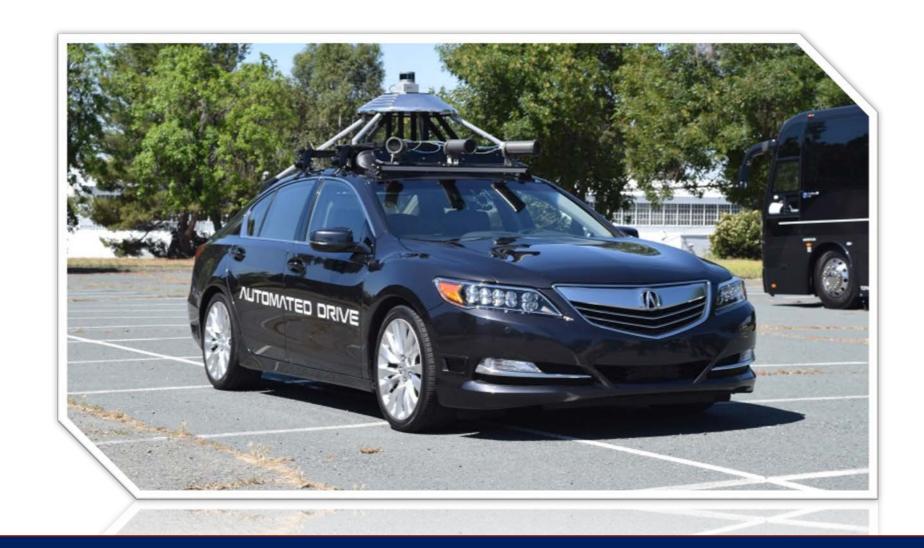


UHD Video Streaming



Virtual Reality

DRIVERLESS CARS



Driverless cars may need 5G to really kick into action. The first generation of driverless cars will be **self-contained**, but future generations will interact with other cars and smart roads **to improve safety and manage traffic**.

Basically, everything on the road will be talking to everything else on the road, and the road itself, silently.

ROBOTICS

Robotics is on a **high growth trajectory** within both industrial and consumer sectors.

The fifth generation (5G) of wireless technology will provide the **communications and bandwidth** necessary to allow various industries to leverage the next phase of robotics evolution.

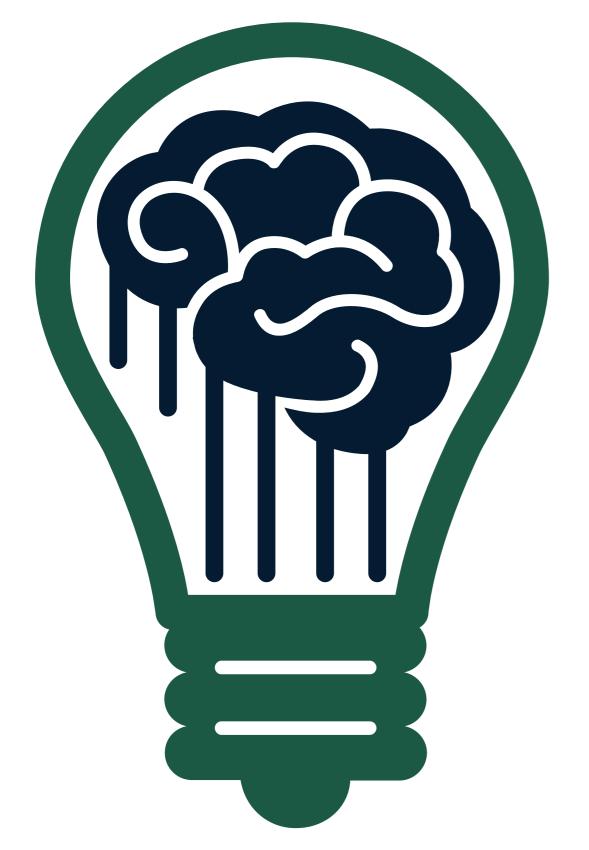


HOW IS 5G MADE POSSIBLE?

The 5th Gen Network Details

WORKING

There are already huge consortiums of major global telecoms working to create worldwide standards around 5G. Although most of those standards haven't been solidified, experts expect it to be backwards compatible (with 4G and 3G).



Challenge A next–level Tech

Analysis

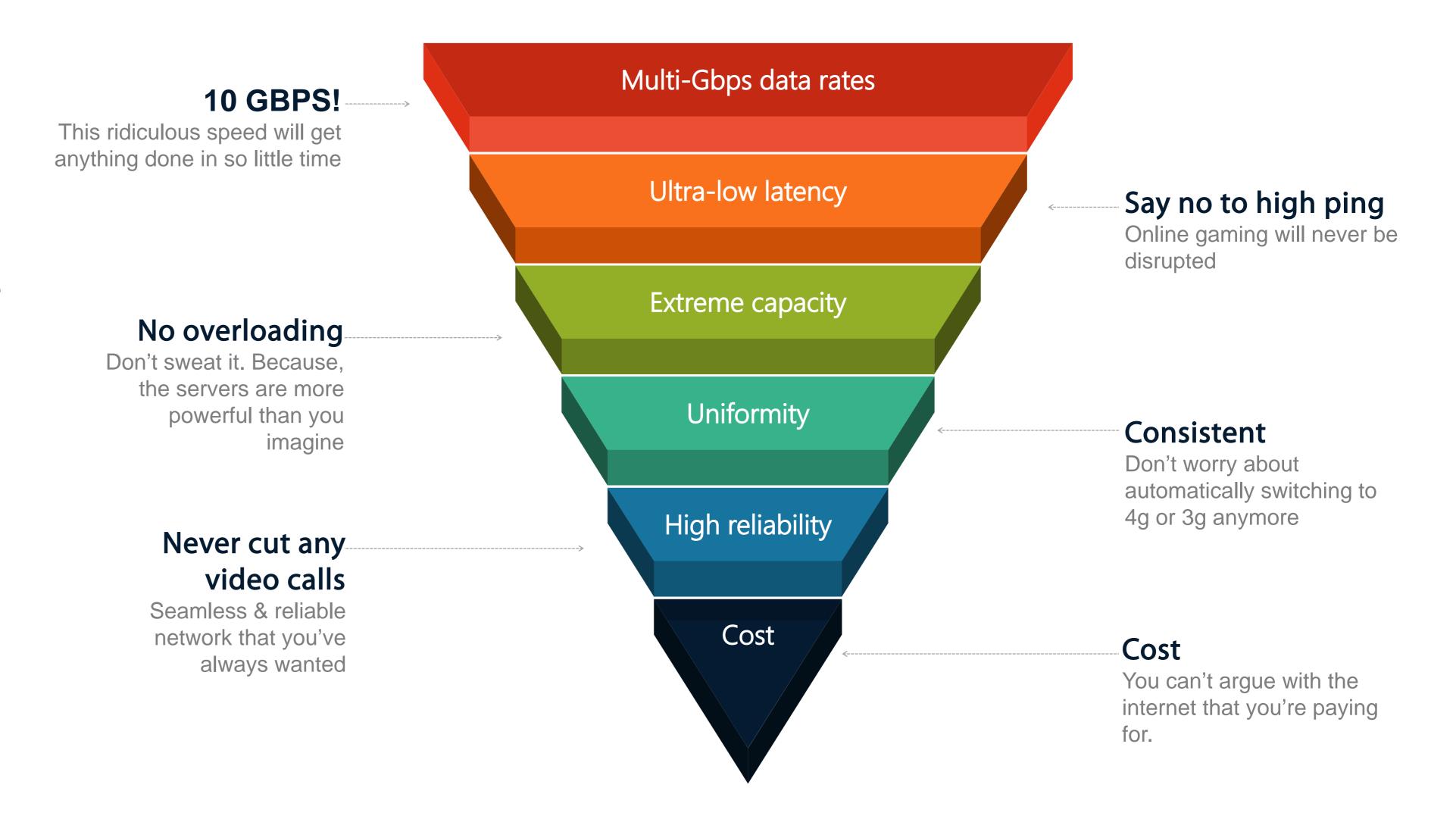
Typically when a new mobile wireless technology comes along (like 5G), it's assigned a higher radio frequency. For instance, 4G occupied the frequency bands up to 20 MHz. In the case of 5G, it will likely sit on the frequency band up to 6GHz.

The problem is that higher frequency signals don't travel as far as lower frequencies, so multiple input and output antennas (MIMOs) will probably be used to boost signals anywhere 5G is offered.

SPECIFICATIONS

These are the factors that shows how powerful & reliable 5G is.

It truly takes the networking experience to the next level



CURRENT RESEARCH

Few of the popular research methods currently ongoing

Millimetre-Wave technologies



Using frequencies much higher in the frequency spectrum opens up more spectrum and also provides the possibility of having much wide channel bandwidth - possibly 1 - 2 GHz.

Massive MIMO



Although MIMO is being used in many applications from LTE to Wi-Fi, etc, the numbers of antennas is fairly limited -. Using microwave frequencies opens up the possibility of using many tens of antennas on a single equipment becomes a real possibility because of the antenna sizes and spacing in terms of a wavelength.

Duplex methods



New possibilities are opening up for 5G including flexible duplex, where the time or frequencies allocated are variable according to the load in either direction or a new scheme called division free duplex or single channel full duplex.

Challanges & Difficulties

Difficulties

Capacities

To deliver 5G, carriers will need to boost network capacity between phones and the big antennas, called base stations, they install every few miles.

High Frequency Range

Radio waves at higher frequencies are harder to transmit over longer distances or if buildings and walls are in the way. To compensate, carriers will rely on advanced antenna technologies.

Expensive

Installing one Macrocell and getting it running costs hundreds of thousands of dollars, while mounting small cells every block on power poles costs tens of thousands of dollars apiece

FUND

It's too soon to say how much 5G will cost, but carriers' ongoing 4G build-out may total \$1.7 trillion through 2020, says Dan Warren, senior technologist for the GSMA mobile industry group.

When can we Expect 5G?

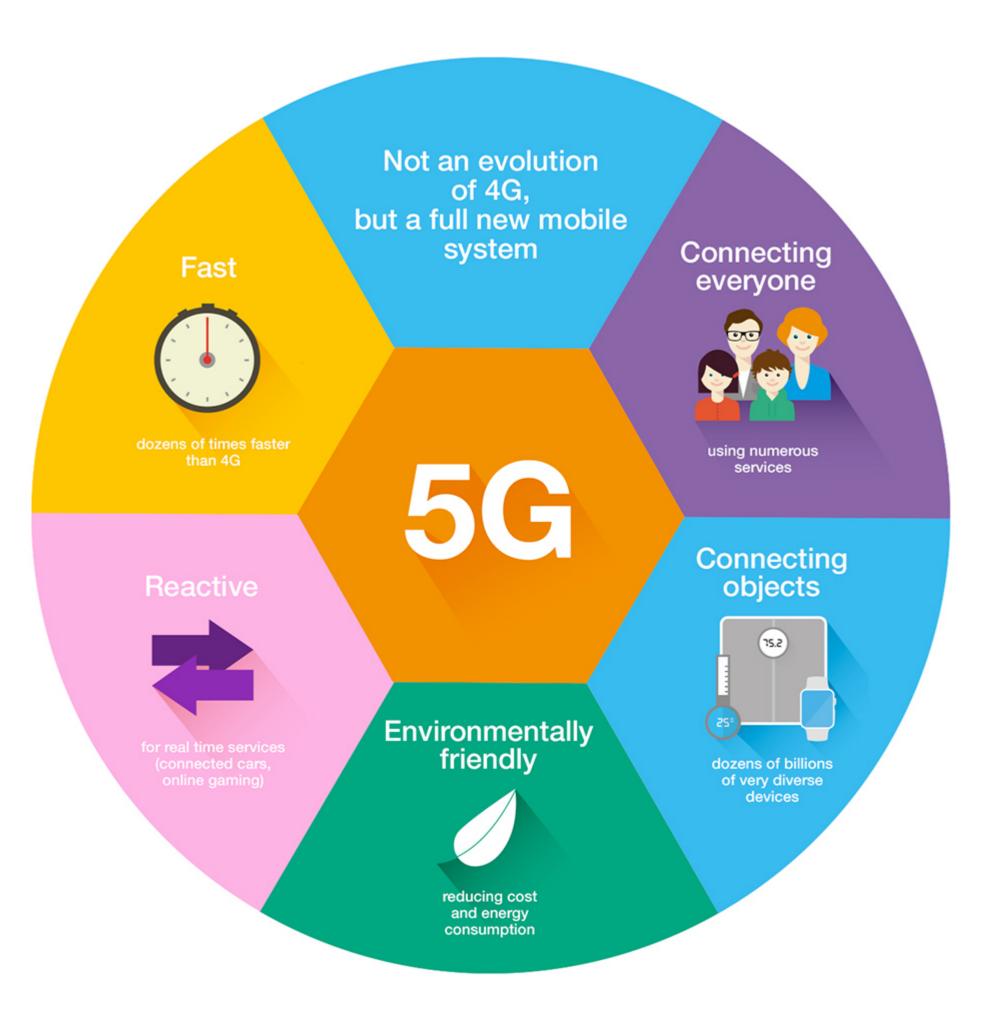
WHEN?

It's already available in some test locations around the **United States**. At this year's Mobile World Congress, Verizon announced that its begun limited trials of 5G in Texas, Oregon, and New Jersey.

The official 5G standard, known as **5G NR** (**new radio**), probably won't come out <u>until 2018</u>, with full commercial rollouts in 2019 or 2020. But that's not stopping the wireless carriers from getting a jump on the technologies.



COMPANIES WORKING ON 5G





These are the companies working hard to achieve the 5th Generation of Networking by 2020 Out of this, the prototypes brought out by NOKIA & Qualcomm looks the most promising ones.

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Thank You