



6G Will Combine AI With Real-Time Speeds Of 1 Terabyte/Sec.

If 5G is just a stepping stone to 6G, then hold on to your seat. AI plus instantaneous connections will enable ad-hoc networks of things and people to achieve unheard-of outcomes. □ TN Editor

Mobile-phone technology has changed the way humans understand and interact with the world and with each other. It's hard to think of a technology that has more strongly shaped 21st-century living.

The latest technology—[the fifth generation of mobile standards, or 5G](#)—is currently being deployed in select locations around the world. And that raises an obvious question. What factors will drive the development of the sixth generation of mobile technology? How will 6G differ from 5G, and what kinds of interactions and activity will it allow that won't be possible with 5G?

Today, we get an answer of sorts, thanks to the work of Razvan-Andrei Stoica and Giuseppe Abreu at Jacobs University Bremen in Germany. These guys have mapped out the limitations of 5G and the factors they

think will drive the development of 6G. Their conclusion is that artificial intelligence will be the main driver of mobile technology and that 6G will be the enabling force behind an entirely new generation of applications for machine intelligence.

First some background. By any criteria, [5G is a significant advance](#) on the previous 4G standards. The first 5G networks already offer download speeds of up to 600 megabits per second and have the potential to get significantly faster. By contrast, 4G generally operates at up to 28 Mbits/s—and most mobile-phone users will have experienced that rate grinding to zero from time to time, for reasons that aren't always clear.

5G is obviously better in this respect and could even replace many landline connections.

But the most significant benefits go beyond these headline figures. 5G base stations, for example, are designed to handle up to a million connections, versus the 4,000 that 4G base stations can cope with. That should make a difference to communication at major gatherings such as sporting events, demonstrations, and so on, and it could enable all kinds of applications for the internet of things.

Then there is latency—the time it takes for signals to travel across the network. 5G is designed to have a latency of just a single millisecond, compared with 50 milliseconds or more on 4G. Any gamer will tell you how important that is, because it makes the remote control of gaming characters more responsive. But various telecoms operators have demonstrated how the same advantage makes it possible to control drones more accurately, and even to perform telesurgery using a mobile connection.

All this should be possible with lower power requirements to boot, and current claims suggest that 5G devices should have 10 times the battery lives of 4G devices.

So how can 6G be better than that? 6G will, of course, offer even faster download speeds—the current thinking is that they could approach 1 terabit per second.

But what kind of transformative improvements could it offer? The answer, according to Stoica and Abreu, is that it will enable rapidly changing collaborations on vast scales between intelligent agents solving intricate challenges on the fly and negotiating solutions to complex problems.

Take the problem of coordinating self-driving vehicles through a major city. That's a significant challenge, given that some 2.7 million vehicles enter a city like New York every day.

The self-driving vehicles of the future will need to be aware of their location, their environment and how it is changing, and other road users such as cyclists, pedestrians, and other self-driving vehicles. They will need to negotiate passage through junctions and optimize their route in a way that minimizes journey times.

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