

# 5 Myths About 5G

By Amy Nordrum

Posted 25 May 2016 | 13:15 GMT



Illustration: iStockphoto

Without a doubt, 5G is the hottest topic in wireless circles today. Many of the field's most celebrated researchers and highest-paid executives are focused on forging this ultra-fast and high-bandwidth successor to 4G LTE. Among them, this opportunity to construct the next generation of wireless is often compared to Halley's Comet: It comes around only once or twice in a person's career.

5G enthusiasts say the widely heralded future wireless network will deliver lightning-quick mobile data speeds with virtually unlimited capacity, blanket cities with high-quality Internet access, provide low bandwidth IoT connections to billions of devices, and even enable autonomous driving. But the industry has only just begun to set standards that will define 5G's capabilities and launch very early trials that will establish its parameters.

But in many cases, the term "5G" is bandied about as a panacea that already exists. That's why Seizo Onoe, CTO of NTT DOCOMO, Japan's largest mobile carrier, is traveling around to conferences trying to keep everyone's expectations in check. "In the early 2000s, there was a concrete 4G technology but no one called it 4G," Onoe laments. "Today, there are no contents of 5G but everyone talks about 5G, 5G, 5G."

At first glance, Onoe may seem like an unlikely messenger. If 5G lives up to the hype, the world's mobile carriers stand to benefit most from the new demand and services it will create. On the other hand, Onoe's industry ties also make it within his best interest to keep his collaborators grounded in reality so 5G can be deployed as quickly and successfully as possible. "I want to right the direction for where 5G is going," he says.

On Wednesday, Onoe presented a keynote at the [IEEE International Conference on Communications](#) in Kuala Lumpur, Malaysia. He sought to dispel some of the most pervasive myths about 5G. It was the second time in two months that he attempted to spread this message. In April, [he gave the same talk](#) to a group of industry professionals at the Brooklyn 5G Summit in New York City.

Here are a few of the falsehoods about 5G that Onoe is eager to debunk:

### **1. 5G will be a "hot spot" system**

Many experts believe telecom operators will deploy 5G over so-called small cell networks. Unlike cell towers of the past that broadcast signals indiscriminately over a wide area, they envision new base stations being affixed to rooftops and lampposts to serve hyper-local areas. In theory, this design should provide better and faster coverage to those fortunate enough to live in said areas (mainly, cities in wealthy countries).

Onoe says this belief is an unfortunate self-fulfilling prophecy. By labeling 5G as a small cell or "hot spot" system at this stage, the industry is closing itself to other innovations. That's a problem, he says, because such a "hot spot" system may not be so convenient to build in rural areas. Without a commercially viable strategy, the small cell structure of 5G could end up widening the digital divide.

Onoe says it would be better to keep an open mind to other technologies that could someday bring 5G to rural customers—or leave room for brilliant business models that could perhaps justify building far-reaching networks comprised of small cells. "At this point, I don't believe we can achieve that," he says. "But in the past, [the industry ultimately] realized what I thought was impossible."

### **2. 5G will require substantial investment**

One of the boldest statements in Onoe's speech was that deploying 5G will not require a ton of investment. This is counterintuitive to anyone listening to predictions for widespread deployment of cutting-edge technologies from massive MIMO to millimeter wave, or projections for the number of base stations required to build out a small cell network.

But rather than requiring a complete overhaul of existing networks as some imagine, Onoe believes 5G will be deployed largely on existing infrastructure. Better service, he insists, does not always correlate with greater capital expenditures. NTT DOCOMO's 600 billion yen in capital expenditures last year marked a 15-year low, even as the data traffic across its networks grew 6300 percent since 2000.

In fact, Onoe actually expects capital expenditures for NTT DOCOMO to drop throughout 5G deployment, which he says would keep with trends for earlier wireless generations. To illustrate his point, Onoe opened a chart of the company's capital expenditures over the past 20 years and asked the audience to guess when the company rolled out 3G and 4G LTE service. It's impossible to tell based on expenditures alone. "For LTE, there was no increase in CapEx before the LTE launch," he says. "That's a fact"

### **3. 5G will replace 4G**

Another assumption that Onoe loves to challenge is that 5G networks will quickly render 4G obsolete. Not so, he says. The dominance of a new wireless network is more of an evolution than a sudden debut. "Of course this happens eventually but not overnight," he says.

In this case, too, history is on his side. No wireless network has ever wholly replaced its predecessor, if only because there are so many areas of the world such as India where 3G and even 2G service is still the norm.

And though 5G promises perks that ride in on the coattails of high speed and capacity, there are plenty of cases where 4G networks will still be more than sufficient. For example, many IoT devices such as sensors may only need to transmit small amounts of data once every hour or day. These can operate on low bandwidth and do not require ultra-fast connections.

### **4. 5G will require more spectrum**

There's an oft-repeated line in the wireless world: With more smartphone users consuming more bandwidth per user, the portion of spectrum dedicated to mobile data is getting crowded—and we need more of it! But Onoe maintains that carriers can find plenty of existing spectrum to support 5G and free up more through re-farming, or the recycling of that which is currently dedicated to other uses.

To support his point, he again points to his experiences over more than 30 years in the industry. For example, he says, most people assumed 4G LTE service would require new spectrum, but NTT DOCOMO launched it in 2010 using only existing spectrum.

### **5. For 5G, everything will need something new**

Many researchers and industry professionals are eager to find as many future uses for 5G as possible, and to enhance or expand existing services on the new network. Onoe insists that just because a new generation of wireless is in the works, it does not mean that it can or should serve every possible need under the sun—whether it's autonomous driving, IoT, or mobile broadband service. "This is the most frustrating to me," he says.

He admits to feeling a bit of déjà vu, with today's hype reminding him of conversations about how 4G would suddenly enable new technologies and services. At the end of the day, says Onoe, 5G will eventually deliver on many of the promises that the industry has dreamt up—and possibly even a few others it has yet to consider. But it's just too early, he says, for the industry to tout it as the path to so many potential futures.

*Editor's note: This post was corrected on May 27 to reflect NTT DOCOMO's capital expenditures in billions of yen instead of American dollars.*