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5G Deployment: The Long Road Ahead

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The hottest buzzword of the season? 5G. From telecommunications to healthcare, technologists are abuzz, speculating what a 5G network will mean for consumers and businesses alike. We're consumed by the possibilities of a truly connected network—medical advances, smart homes, lightning fast connections, self-driving cars—the list goes on. Yet, before we put the cart before the horse, we need to examine the technological realities of the 5G network.

The truth is, the road to 5G deployment will be long and the ride will be bumpy. Similar to the adoption trajectory of 4G—we've jumped head first into technological developments before the platform is complete. It's also worth noting that we're still developing 4G and 4G LTE technology—something that many are overlooking in the 5G discussion. However, now that we've embarked on this journey to a 5G network, we know that once we arrive at our destination, communication and connectivity will never be the same.

The 5G Roadmap

Many industry experts are slating mass availability of 5G technology by 2020. That seems overly optimistic considering the requirements for latency (1ms-10ms) and throughput (1G-100G). We will not see full deployment until sometime around the 2024 time-frame. Below is a more realistic timeline for the development, deployment and adoption of a 5G world:

2015-2017: Defining 5G & Proof of Concept Trials/Lab Designs

Currently, we're in the midst of concept trials and lab designs. Carrier, public, private and manufacturer labs are developing the technology to fuel the ultra-connected revolution.

More importantly, we're still trying to set a collective standard for "5G". As excitement percolates, it is becoming increasingly clear that "5G" is not solely focused on the air interface like 4G. At the moment, it's functioning as an umbrella term for the next phase of networked connectivity being controlled by smart applications and software. As the Internet of Things continues to grow, the need for high speed and low latency network is inarguable, but the detailed parameters of the technology remain hazily and tied to utopian benchmarks.

In the coming years, as lab designs and proof of concept trials continue, the communications industry will ultimately be tasked with defining the commercially reasonable 5G solution and to set expectations for the next phase of connected technology.

2018-2019: Standardization

Once the complete 5G network vision is standardized, the long process of protocol and signaling standardization can really begin to take shape. The greatest challenge here will be compartmentalizing and focusing industry standards, and recognizing that not all aspects of 5G will be tapped into right away. Many of the promises circulating around 5G's potential may need to be put on hold, and shelved for future incorporation once the technology has reached mass availability and service providers can deploy more expensive features in a financially responsible manner.

We're in the early stages of standardization debates—vendors, handsets, antennas, radios and network providers all need to coordinate efforts and streamline agendas to devise a clear set of industry standards. This process will undoubtedly be muddled as the craze for 5G connected technology continues, particularly in the enterprise and B2C spaces.

2020-2021: Handsets & Network Builds

By 2020, handsets and network builds will be architected and engineered for future release. This task will seem insurmountable at first, particularly if the low power millimeter wavelength technologies are included. Adding additional complexities will avoid interference with the yet deployed 4G LTE-A services that will most likely be in mass deployment by this time.

2022-2023: Network Trials

Although some are speculating that mass availability will launch as early as 2020—actual in the wild network trials will not begin until at least 2022. This step will require trials run across multiple manufacturers and markets—each process stretching for an indeterminate length of time. We could see trials lasting through 2024. Evaluations of successes and failures may send us back to the lab or simply force decisions about which portions of the 5G network are ready for mass deployment. Interestingly, this process may end up creating carrier specific versions of 5G networks, similar to what we have seen with WiMAX and LTE.

2024 and Beyond: Mass Availability

We should see the first glimmer of mass availability rounding the corner in 2024. At this point, the new networks will be deployed, 3G services will have finally been shelved and the carriers' race to roll out 5G will be underway, including the next round of great commercials!

It's important to note that the development process will be costly—remember that carriers are still spending millions daily on building out the 4G network and trying to get to LTE Advanced. Hopefully, by the time we reach mass availability, M2M and IoT developments will have created a painful need for 5G speeds and latency promises. From past experience, we can assume the B2C sector will be an early adopter of the technology, paving the road for network growth and enterprise deployment. Although at this point, BYOD will most likely be standard in the enterprise, and the B2C sector will be the enterprise user pool.

However, enterprise deployment may face its own set of challenges. As organizations continue to move towards towering levels of data consumption, it's possible that 5G may already be behind the market bandwidth requirements for enterprise use by the time we reach deployment. The current enterprise market is already starved for bandwidth. In the interim, WiFi 802.11ac Wave 2 should be addressing the wireless interface bottleneck providing actual multi-Gig throughput. This solution will drive the wired network expansion towards 5G standards and additional WiFi improvements may actually make the 5G air interface irrelevant, as it will not be enough to satiate the enterprise market in the 2020 decade.

As connected devices become more pervasive and 5G allowing consumers to connect to hundreds of devices simultaneously, the issue of BYOD will become orders of magnitude more complex for organizations to deal with. How will this affect the development of mobile device management (MDM) and enterprise mobility management (EMM) software? What does this mean for cyber security

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and identity and access management (IAM)? If our fitness trackers are connected to our key cards, which are linked to our smartphones, the issue of protecting corporate data becomes exponentially more complex.

One additional bump in the road to 5G deployment will be the elusive carrier "garden walls". Some network leaders have expressed interest in developing carrier closed networks, giving wireless carriers total control over personal meta-data and the OTT services. Providing all content, applications and unified communications only across this network may become a major point of contention, as many enterprise, consumer and OTT providers will likely take issue with this model. Will the carriers bearing the cost of deploying this new network allow themselves to just become an access method relegating them to a utility company?

Why it's Worth the Wait

If you're now asking yourself—"Is 5G really worth all the trouble?" The answer is unequivocally "yes". Consumers are allowed to get caught up in the connectivity hype, but it's up to the telecommunications industry to face these deployment challenges head on. 4G networks are already facing over-saturation, and the desire for 5G speeds exists in every industry. But for now, it's a waiting game as we enter the home stretch in the 4G world.