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How Intelligent 5G Will Drive IoT Growth in 2021

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5G and the Internet of Things (IoT) will completely revolutionize our lives in the coming years. According to a recent study from Juniper Research, industrial IoT connections are projected to jump from 17.7 billion in 2020 to 36.8 billion in 2025. Along with connectivity, the number of IoT devices is poised to grow massively. According to data gathered by Statista, the number of IoT devices is expected to more than double to 21.5 billion in the next five years. While 5G is currently being introduced, there's been plenty of bandwidth available within 4G and Wi-Fi technology to keep rolling out devices.

With this in mind, it bears exploring how can enterprises make the most of the IoT in 2021 and beyond. The answer lies in artificial intelligence (AI) and Wi-Fi 6, the next evolutionary technology for Wi-Fi. Why Wi-Fi 6? The reason is that 5G is not quite ready to shoulder the global burden of 21.5 billion devices just yet.

It's a myth that future infrastructure will be solely dependent on wireless mobile data. Rather, it will need a blend of both 5G coverage and Wi-Fi 6 to attain the gold standard of seamless connectivity and interoperability the industry has been eagerly anticipating. With gigabit speeds like 5G, Wi-Fi 6 also offers enhanced security upgrades to deliver a comprehensive connectivity solution. And Wi-Fi 6 is already here.

Bridging the gap with AI and workflows

Rolling out connectivity isn't simply about increasing bandwidth so more devices can be added. It's about creating *targeted* bandwidth for IoT use cases. Think of connectivity as the arteries that

connect all the different IoT devices to their uses. Now consider the staggering amount of data that IoT generates. According to market research firm IDC, IoT devices will create nearly 80 ZB of data in 2025. From smart cities to smart energy and from aerospace to automotive, data from IoT devices will provide a treasure trove for enterprises to train their AI applications. AI in IoT will be worth billions over the next few years, adding value across the IoT ecosystem. ReportCrux Market Research expects it to produce around $15.72 billion in value by the end of 2027.

AI can be harnessed to add real value to IoT. It's done by introducing cognitive workflows that integrate machine learning (ML) and AI, automation and operational processes that continuously learn and are self-aware. Thanks to cognitive workflows, IoT sensors and devices will provide enterprises and operators with a lot more intelligence – from, say, the size, position and speed of a moving vehicle to the precise location and depreciation of a piece of factory equipment or the type of leak on a remote oil pipeline. This level of intelligence will lead to faster, more informed decision-making, all thanks to cognitive workflows.

DevOps will play a critical part in 2021 as enterprises ramp up their cognitive workflows. According to IDC, over the next few years, DevOps teams will look to reduce complexity by adopting toolkits and workflows focused on cloud services and infrastructure automation. New DevOps toolkits and workflows will enable application developers to easily deploy and integrate software systems into 5G-enabled IoT solutions. Of course, app developers cannot become overnight experts in AI- and 5G-specific features like network slicing or intelligent 5G RAN and core automation. Smart middleware entities like IBM or VMware are likely to bridge the skills gap between developers and operators – especially when it comes to leveraging technologies such as edge computing.

Driven to the edge in 2021

Infused with AI, edge is what will really energize IoT. By integrating and orchestrating AI and ML technologies to analyze data locally at the edge, applications will make decisions and react even faster. This need for speed requires ultra-fast connectivity. According to IBM research on speed and latency at the edge, 5G reduces device-to-cell-tower latency to around 4 milliseconds, compared to 9 milliseconds for 4G. What's more, IBM found that moving IoT workloads to the edge can reduce latency to 10 to 20 milliseconds. This dramatic cut in latency is what makes use cases such as automated and connected driving possible; in them, every millisecond counts.

Until a few years ago, connected cars were the stuff of science fiction. Only recently have they become feasible. In order for connected traffic to function effectively and safely, however, a great deal of computing power is needed at the edge or at the "point of delivery." Things like collision avoidance and advanced traffic warnings would need instant, sensor-driven, edge-based computing in order to be effective. In a world limited by 4G and scattered Wi-Fi connections, this simply isn't possible. Accelerated edge-based data processing could provide the performance, security and bandwidth to take advantage of real-time algorithm processing. 5G is not the only technology capable of bringing IoT to life.

Give Wi-Fi a chance

It may come as a surprise to some who fully expect 5G to eclipse Wi-Fi and become the new standard once the technology is mature enough. The thing is, Wi-Fi is evolving just as rapidly – or even faster – and the industry is slowly homing in on Wi-Fi 6, the next great milestone. And there have already been successful IoT use cases with W-Fi 6.

Wi-Fi 6 is nothing short of revolutionary in terms of Wi-Fi connectivity. It provides four times better performance than Wi-Fi 5 and represents the single greatest jump in capability compared to its previous iterations. If we truly want to live in a world with ubiquitous, unbroken coverage wherever we go, Wi-Fi is going to play a pivotal role in realizing this vision for the foreseeable future. And Wi-Fi 6 is getting an upgrade in 2021 thanks to new spectrum coming online with 6 GHz. The Wi-Fi Alliance, the industry body for Wi-Fi, has introduced Wi-Fi 6E, giving enterprises more options to expand their networks. The industry body expects more than 300 million Wi-Fi 6E devices in 2021, augmenting the billons of other IoT devices that will require a robust connection over the next few years.

Both fixed and mobile networks will provide the connectivity foundation. In fact, taking a hybrid approach will most likely get us to where we want to be much faster. There's no reason both 5G and Wi-Fi management stacks can't be incorporated into a single interoperable solution using Wi-Fi gateways and 5G cores to enable the rapid onboarding of devices. It may actually be the best way forward, so let's not put all of our eggs into the 5G basket just yet.

What's next?

Some might say we've already taken the first steps toward living the multi-connected life that has echoed through science fiction for decades. I would argue that we've actually taken several leaps and we're much further into that journey than we realize. The devices, talent and the innovation is there – all that's missing is a matured 5G and Wi-Fi 6 hybrid infrastructure to really unshackle its potential. That's why in 2021 the IoT industry's focus must turn toward integration of this next wave of applications rather than the specific devices themselves.

Thankfully, we're already seeing this happen, with system integrators working directly with verticalized enterprises to deploy AI along with advanced architectures in pursuit of some of these "next-generation" goals. We know that AI, automation and machine learning are going to play a critical role in the technological landscape in 2021 and for the next decade. Enterprises are already working hard to modernize their operations to take full advantage. By focusing on making the ecosystem and infrastructure "smarter," we can ensure a much more rapid time to market for these modern applications, removing all of the friction associated with innovating in this space.

The COVID-19 pandemic may have delayed the rollout of 5G, but it's little more than a bump in the road in the grand scheme of things for IoT and its AI future. If anything, AI deployment has been accelerated. In October, analytics firm RELX found that companies had increased their AI investment and adoption since the pandemic, up 81 percent from 2018. This growth in AI and digitization has been a shot in the arm for IoT, which will make it smarter and faster in 2021 and beyond. Put simply, IoT in 2021 must also be hybrid.