

What are the benefits of 5G for the IoT

Introduction

5G, the latest cellular data technology, promises remarkable improvements in network speed, bandwidth, and latency on a global scale. This advancement is set to revolutionize Internet of Things (IoT) technologies, enhancing user experiences across various platforms.

IoT involves interconnected devices communicating to collect and share data, aiming to make machines smarter and more efficient. Leveraging big data analysis and connected sensors, 5G, including NB-IoT, facilitates the expansion of IoT into new realms.

With speeds of up to 5GB/s, 5G outpaces 4G LTE, utilizing high-frequency mm Wave bands for fast data transfer and low-frequency bands for extended coverage. This allows 5G networks to connect numerous devices simultaneously without compromising performance.

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Wireless for the next generation

Antenova is a leading innovator in wireless technology solutions. With a passion for connectivity, we specialize in designing and manufacturing high-performance antennas and radio frequency (RF) modules for a wide range of applications. Our mission is to empower the Internet of Things (IoT), providing seamless and reliable connectivity for smart devices, wearables, and more. At Antenova, we combine cutting-edge engineering expertise with a commitment to customer success, delivering compact, efficient, and reliable wireless solutions that enable the next generation of connected devices.

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Benefits of 5G for IoT

Connection speed is an obvious benefit for IoT devices. Not only will it enable IoT devices to connect to the internet faster, but it will allow super-fast communication between devices. Faster speeds and low latency will allow real-time feedback and interaction, as well as instant responses from other people or automated systems.

5G can reliably connect more devices than the current 4G networks, which can easily become busy and slow data speeds. 5G has greater bandwidth, so can transmit a greater amount in the same amount of time. We will no longer see these slow and delayed data issues caused by too many devices in a small area. Not being able to use your phone at a festival, New Year's Eve or other crowded events will be a thing of the past. For IoT this increased capacity means more devices, more sensors to collect data, more data to analyse, and better results. Ultra-Reliable Low Latency Communication (URLLC) is a term used to describe the new 5G technology, which means that (on test) 99.999% of 20-byte data packages are delivered within 1ms. Information is delivered quickly, regularly and consistently. The network itself will be more stable and more reliable compared to existing mobile networks.

So 5G can handle more devices at faster speeds. It also promises better network reliability. But are there any downsides to using 5G networks for IoT?



GUIDE

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Disadvantages of 5G for IoT

One of the major drawbacks of 5G at the moment is that it's not available worldwide. Western Europe, North America, and Australia's major cities, as well as technologically focussed nations such as Japan and the UAE have widespread 5G coverage. If you're looking to manufacture 5G devices for deployment across Africa, Asia, or South America, it could be some time before the infrastructure is available. 5G technology is expected to reach 60% of the global population by 2026, which is the fastest deployment of mobile communications technology we've ever seen.

Even when 5G technology becomes available in your region, coverage may still be an issue. The high frequency bands that provide excellent speed and latency characteristics will only have small coverage areas. The signal propagation can be interrupted by objects such as walls, vehicles and trees. This means that the individual cells that make up the 5G network must be small, with a high density of cell towers and additional femtocells for indoor coverage.

Finally, and crucially for IoT devices, battery life can be significantly affected when using the 5G network. Transmitting and receiving larger amounts of data will require more battery power. It's likely that many devices will require a step-change in battery performance to meet the demands of 5G usage.

So how can we use 5G for IoT?

Despite a few difficulties with introducing 5G networks for IoT devices, there are steps being taken to ensure that 5G will be a viable network option for this technology sector.

There are several ways that 5G can be adapted to improve coverage. **A signal processing technique called beamforming** is used to direct the radio waves to a specific device using multiple antennas. It uses constructive interference to carry the signal further, and in a directional "beam". If **integrated in the correct ways**, Multiple Input, Multiple Output (MIMO) will make it possible to transmit and receive more data streams at once, so multiple devices can be served at once, rather than waiting in a queue. This set up would benefit areas with high device density, enabling high data rates and spectral efficiency. The 5G network architecture means that from a single network connection you can create separate connections, or 'slices', that each provide different capacity level. This allows network operators to allocate and prioritise devices depending on their bandwidth and speed requirements. Take a 5G IoT logistics application for example, you might want a dashcam to stream live in HD video. You might also want a GPS receiver to record real-time location information. And then perhaps a sensor in the freight hold which records temperature, humidity, and other environmental parameters. Each of these applications has very different network requirements, which can be catered to using **network slicing**.

More considerations

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