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What is Cellular IoT?



The [cellular IoT](#) is a method of connecting physical devices (sensors, etc.) to the Internet, and transmits physical devices (sensors, etc.) on the same mobile network as smartphones. With its simple infrastructure and the advent of 5G, the Cellular IoT has become a strong participant in the field of connectivity.

The [cellular network](#) connects your iPhone to WeChat, Weibo, and Douyin and spreads your voice in the air. But the days of just wanting to connect with friends and family are gone.

Now you can also see the value of connecting with surrounding physical objects such as street lights, parking fee systems, hospitals that occupy everyday urban life, or myriad industrial applications (such as manufacturing and agriculture). All of these can strengthen the connection. ...

Ericsson predicts that the total number of connected [IoT](#) devices will exceed 20 billion in 2023. Specifically, the number of IoT devices connected via [LTE](#) and [5G](#) exceeds 3.5 billion, mainly in China and Northeast Asia.

Two major forms of cellular Internet of Things: LTE-M and NB-IoT

In fact, all current cellular IoT applications use either [LTE-M](#) or [NB-IoT](#) technologies.

There are important application-specific differences between the two types of cellular IoT, but the choice is usually based on whether the standard in your area is LTE or [GSM cellular](#) infrastructure.

While only the United States, the Netherlands, Ireland, and Australia cover national LTE, [GSM](#) has become the norm in many non-Western regions such as Eastern Europe and Africa.

(1) LTE-M

As mentioned earlier, LTE is covered nationwide in the United States, the Netherlands, and Ireland, with deployment and regional testing underway in most major countries/regions. For cellular IoT applications, it has the potential to exceed GSM.

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LTE-M stands for Long Term Evolution for Machines and is a network standard that allows IoT devices to be mounted on existing cellular networks. LTE-M enabled devices can communicate with the cloud with only a software update.

In general, LTE-M devices are ideal for mission-critical applications where real-time data transmission plays an important role, such as smart city self-driving cars and emergency equipment.

(2) NB-IoT

NB-IoT is an abbreviation of [Narrowband IoT](#) and only sends a small amount of information such as areas with poor LTE coverage, when using soil sensors in smart agriculture, or when using smart energy consumption monitors. Ideal when it is okay. NB-IoT uses only a small portion of the total bandwidth of the base station tower.

It is expected that GSM will only need to send small amounts of data on a regular basis over the Internet if it is deployed in areas where GSM is a standard cellular technology, especially in developing regions of Europe, Africa, and Asia. If so, NB-IoT may be for you.

The future of the New 5G and cellular IoT

[5G NR](#) is better, faster, and more powerful. [5G New Radio](#) is ready to work with LTE and GSM cellular networks to change the outlook for the Internet of Things.

When it comes to the Industrial Internet of Things, ultra-secure private [5G NR](#) networks can provide convenience to thousands of devices in a manufacturing or logistics environment, operating 10 times faster than existing networks.

On the consumer side, the [New 5G](#) can free up the data gates needed to enable self-driving cars and immersive virtual reality and AR environments.

Benefits of Cellular IoT

IoT developers and the companies that support them have a vested interest in using the best network connectivity options available (both in terms of developer experience and cost). For many, [Wi-Fi](#) is a natural choice when high bandwidth is required. This connection method has also been established for others building fixed solutions with easy access to wired Ethernet.

However, the rest of the members may be willing to implement the following [IoT solutions](#):

Dynamic or occasionally mobile,

Deployed all over the world

You need a redundant offsite network gateway.

Or you need a reliable and secure connection.

Advantages of Cellular IoT

The benefits of cellular connectivity and the Internet of Things are widespread.

Coverage: Cellular networks are ubiquitous, mature, and reliable.

Global Scope: No other network technology covers cellular networks.

Security: SIM-based authentication and the use of virtual network tunnels make cellular networks the most secure option.

Installation: Out of the box, no local installation or technical expertise is required.

Low Power / No Power: The cellular module can consume about 8mA of power and the network is available in the event of a power outage.

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It is difficult to compete with cellular networks in terms of security, coverage, and availability.

Global cellular coverage

For global IoT deployments, cellular connectivity is widely regarded as the most logical and reliable connectivity option. No need to build new infrastructure or add network gateways to support remote deployment. All you have to do is connect to the signal tower that is already installed.

Cellular roaming is another consideration.

Do you offer solutions that allow you to deploy to unknown locations in the world or move between regions? When a cellular IoT project moves from one location to another, the cellular provider must reach an agreement with a partner operator, a region without changing SIM.

Cellular security

Cellular networks use SIM cards to verify their identity, making it difficult to impersonate a device. Let's compare it with WiFi. When you connect to a public WiFi network, the device shares the connection with all other devices on the network. If one device has a security issue, all devices are at risk. Cellular isolates each device from the other to ensure the security of data transmission.

Cellular reliability

Due to the importance of cellular connectivity today, the cellular IoT protocol can take advantage of existing performance characteristics. The cell operates in an authorized frequency band that determines the performance and reliability of communications. Cellular also provides a known number of connections to each tower. These connections are actively managed in the background to provide a guarantee of service and reliability.

Low power consumption

Historically, the main limitations of cellular adoption have been power consumption and battery life (or lack of it!). The latest cellular protocols allow cellular IoT modules to save power when not in use and send relatively small amounts of data with minimal power.

Both LTE-M and NB-IoT are designed to provide years of operation on battery-powered power. Due to limited data throughput (although usually sufficient to relay sensor data), reducing power requirements requires simpler signal modulation schemes and less complex wireless modems. Advances in wake/sleep mode on modern hardware offer only these benefits.

The benefits of cellular IoT are clear. Unmatched global coverage, embedded device security, ready-to-use installation methods, and very low power requirements make it a clear choice for the Internet of Things.

You may also be interested in the below articles.

[About Wi-Fi, You Did Not Know](#)

[What is the difference between WIFI and WLAN?](#)

[Summary of 41 Basic Knowledge of LTE](#)

[What Spectrum Is Used In 5G?](#)

[What Is Wi-Fi 7?](#)

[How To Choose 2.4G And 5G?](#)

[What Are The Advantages And Characteristics Of NB-IoT And LoRa?](#)

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