

## **Have You Heard Of Li-Fi? In Future We May Be Using Light to Transmit Data**

In an era where data is considered one of the most valuable commodities for a business, and its vitally important to be always connected to the internet, technologies and tools are under constant development to improve speed and scope.

Wi-Fi 6, the newest version of wireless communication, was announced last month by Wi-Fi Alliance, and will offer two main improvements to the current version of Wi-Fi. The first is the speed of data transfer, which will be faster by 40% compared with the current generation. The second is reducing power consumption. Moreover, as new devices are being produced, manufacturers have started to implement Wi-Fi 6 hardware, as Apple did with the iPhone 11.

However, these technologies still face many issues, and new ideas are rising to overcome them. One such technology is Li-Fi (Light Fidelity), which is the process of utilizing light waves to transmit data at high speeds.

This technology is not new. It actually dates back to 1880, when Alexander Bell and Charles Tainter were able to use sunlight to transmit voice over distance, creating the first phone ever to use photo beam instead of radio waves—they called it Photophone.

Skipping ahead to this century, and in the year 2000 the Japanese Research Center in Nakagawa started a research project to transmit data at high speed using light photons. Nine years later, they succeeded in transferring data at a speed of 100MB/s—this was at a time where 4G technologies couldn't reach 80MB/s yet.

In 2011, Professor Harald Haas announced in his TED talk the first-ever use of Li-Fi, using LED lights as routers used to send and receive data from and to connected devices. During the event, Haas was able to transmit data at a speed of 350MB/s.

To date, only six companies around the world have announced ongoing research to use this technology and make it consumer-ready and available.

In Estonia, Li-Fi is being used to improve factory automation, by providing high-speed communication between servers and machines. Li-Fi speed has reached 1GB/s, which is five times faster than current Wi-Fi speed.

Li-Fi, like any other new technology, is still facing some problems. For example, Wi-Fi can cover a radius of 30-50 meters, while Li-Fi can cover only 10-15 meters. Also, Li-Fi cannot penetrate walls to transmit data, unlike Wi-Fi. However, Li-Fi is considerably lower in cost to implement, and power consumption is lower by 50-60% compared to Wi-Fi.

Li-Fi can offer precise positioning, as it can pinpoint a user's location with an error margin of eight centimeters, while current GPS technologies give an error margin starting from 40 centimeters. It could also replace cables used to enable submarines to discover and explore

seabeds—currently, the depth a submarine can dive to is limited by the cable length, while with Li-Fi or VLC (Visible Light Communication) a submarine could dive to up to 1,100 meters without any cables.

The new technology is also considered more secure than current Wi-Fi technologies, as it requires any user to be within the light beam, in the same room as the data—a clear deterrent for hackers.

Although Li-Fi is considerably new, it shows a promising future, especially considering the development of smart homes and connected cars. The technology provides higher-speed communication, better security, and lower power consumption, which will be the main factors to make this technology flourish.

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