

Wi-Fi®: affordable connectivity for all



The inherent strengths of Wi-Fi® deliver digital inclusion at a low cost

With the total number of internet users worldwide estimated to grow from 3.9 billion in 2018 to 5.3 billion in 2023, global economies and societies are becoming increasingly digitized. However, connectivity is not consistently available to everyone. By relying on expensive cellular devices to access the internet, in conjunction with high monthly data fees, low-income communities are at risk of being excluded from the connection that has become an essential component of daily life. Through economies of scale and utilization of unlicensed spectrum, Wi-Fi produces affordable, inclusive connectivity to millions of users.

Sharing Wi-Fi within communities

Wi-Fi allows dozens of community members to share a single broadband internet connection, making the service more affordable for each individual. As such, Wi-Fi is the preferred source of internet connectivity for millions of people around the world, as it also enables the sharing of devices. In Africa, for example, where only 33% of individuals were using the internet in 2021 compared to 63% of individuals worldwide,¹ sharing broadband through Wi-Fi will be one of the most efficient ways to bring more people online.



Community Wi-Fi services across the developing world are experiencing exponential growth, bringing more and more people online. There will be nearly 628 million public Wi-Fi hotspots worldwide by 2023, up from 169 million hotspots in 2018, according to forecasts by Cisco.²

In rural areas, attempting to bury fiber in rugged terrain can present logistical challenges, and utilizing Wi-Fi in these regions is a cost-saving alternative.³ HFCL, for example, has deployed over 40,000 public Wi-Fi hotspots since 2020, creating a robust infrastructure that allows residents to access crucial services like telemedicine, remote learning, and government services, in rural India.⁴

Given the challenging economics of serving far-flung communities, it is vital that each broadband connection is shared as widely as possible. In South Africa, the 6,000 residents of the remote rural community of Mankosi can pay a small monthly fee to access a Wi-Fi-based community network.⁵ The Zenzeleni Networks project installs and maintains a dozen solar-powered Wi-Fi mesh network stations that are mounted on and inside houses around Mankosi to cover an area of 30 square kilometers.

In rural Ireland, Galway County Council has installed 40 Wi-Fi hotspots under the EU's WiFi4EU program, which promotes free access to Wi-Fi connectivity for citizens in public spaces, such as parks, squares, public buildings, libraries, health centers, and museums in municipalities throughout Europe. Peter Keaveney, Cathaoirleach

¹ <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2021.pdf>

² <https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html>

³ <https://wballiance.wpenginepowered.com/wp-content/uploads/2022/11/WBA-Rural-Wi-Fi-Connectivity-Whitepaper-Final-V1.0.0.pdf>

⁴ <https://www.marketscreener.com/quote/stock/HFCL-LIMITED-46728612/news/Wi-Fi-is-Essential-to-Bridge-the-Digital-Divide-in-Rural-Areas-42425050/>

⁵ <https://www.uwc.ac.za/news-and-announcements/news/zenzeleni-project-wins-social-innovation-award-727>

(Chairperson) of the Galway County Council, has described the provision of public Wi-Fi as “a key deliverable” for the county’s digital strategy, which includes making public services available online.⁶

In June 2020, the city of McAllen, Texas, installed 1,000 Wi-Fi access points to provide free wireless internet to 43% of the area.⁷ This service was crucial to delivering online education during the height of the pandemic. Superintendent J.A. Gonzalez noted that this implementation of free public Wi-Fi will “transform us for years to come with regard to how we’re delivering instruction and the way that we form habits around virtual environments.”

Sharing Wi-Fi within households and businesses

Private Wi-Fi hotspots also play a pivotal role in making the internet accessible and affordable to all. Because Wi-Fi operates in unlicensed spectrum, hotspots can be deployed without a potentially expensive license or registration by anyone who needs efficient, low-cost access to internet-based services, such as vital healthcare advice, educational resources, and financial information. Wi-Fi chipsets also provide an economic advantage as they are low-cost and have become a standard feature on almost every phone, tablet and laptop. By contrast, support for a cellular connection can add more than \$100 to the retail price of a tablet device.

The FCC has described⁸ Wi-Fi as “indispensable for providing low-cost connectivity in countless products”. The widespread availability and low cost of Wi-Fi devices delivers connectivity regardless of whether the internet backhaul is fiber, copper, cellular or via a satellite.

Indeed, Wi-Fi continues to make a positive impact on the daily lives of billions. With a technical architecture that is delivered through individual devices rather than being centrally managed, Wi-Fi has become increasingly ubiquitous, allowing it to benefit from global economies of scale. More than 18 billion Wi-Fi devices were in use in 2022 according to research firm IDC.⁹

Wi-Fi needs more spectrum

With Wi-Fi traffic doubling every three years and network congestion increasing,¹⁰ some governments are releasing new unlicensed spectrum in the [6 GHz band](#) that can alleviate this capacity crunch and [enable Wi-Fi 6E](#). This new spectrum will allow more people to get online using the [growing selection of Wi-Fi 6E devices](#), fast speeds, high performance, and reliable connectivity.

Wi-Fi provides superior connectivity in a static location and indoors, as most users connect to the internet in their homes, offices, and other buildings. As such, it is used more extensively than cellular connectivity in these locations. In Germany, for example, Wi-Fi networks carry approximately 17 times as much traffic as

"Over 40K Wi-Fi public hotspots have been deployed across rural India in the last two years.

The state-of-the-art network infrastructure is proving to be a game changer for the lives of thousands of village residents who can now access telemedicine, remote learning, government services, financial services, social networking, and entertainment."

- Bhuvnesh Sachdeva, Senior Vice President of Product Development at HFCL Limited

⁶ <https://digital-strategy.ec.europa.eu/en/news/wifi4eu-stories-interview-peter-keaveney-chairperson-galway-county-council-ireland>

⁷ <https://elpasomatters.org/2021/04/13/how-mcallen-closed-its-digital-divide-with-citywide-internet/>

⁸ <https://docs.fcc.gov/public/attachments/DOC-363945A1.pdf>

⁹ <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-2022-wi-fi-trends>

¹⁰ <https://lp.assia-inc.com/hubfs/summit-v7.7.pdf>

cellular/International Mobile Telecommunications (IMT)¹¹ in 2021, showing that Wi-Fi is the preferred choice of connectivity. In the absence of Wi-Fi hotspots, mobile operators would need to invest in network densification to meet user demand, deploying many more small cells in dense urban areas to provide high-speed throughput. As a result, replacing Wi-Fi with IMT would become increasingly expensive for end users.

As IMT equipment routinely supports Wi-Fi, there is no need to build out 4G and 5G small cells in places where Wi-Fi is available. Doing so would introduce unnecessary redundancy and add to equipment cost and energy consumption without providing tangible benefits to the users.

Wi-Fi is the key to making internet access affordable and widely accessible. By providing high-speed broadband access at low cost, Wi-Fi bridges the digital divide, allowing everyone to participate in our increasingly digital world.

Wi-Fi CERTIFIED™: Technology to trust

Since 2000, Wi-Fi Alliance® has been driving the adoption and evolution of Wi-Fi through the Wi-Fi CERTIFIED program. The Wi-Fi CERTIFIED logo designates products with proven interoperability, backward compatibility, and the highest industry-standard security protections in place. Wi-Fi CERTIFIED devices can communicate with previous and future generations of Wi-Fi technologies, enabling a seamless, interoperable experience with a multitude of other Wi-Fi devices for years to come.



Learn more: www.wi-fi.org

¹¹ <https://dynamicspectrumalliance.org/wp-content/uploads/2022/06/DSA-WhitePaper-How-do-Europeans-connect-to-the-Internet.pdf>