

Hot Spots: More than Mobile

When we think of “Hot Spots,” we often think of wireless devices, but they’re only a small part of a larger solution for access.

What IS a Hot Spot?

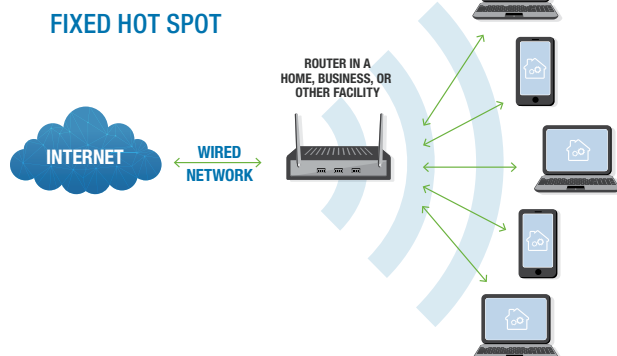
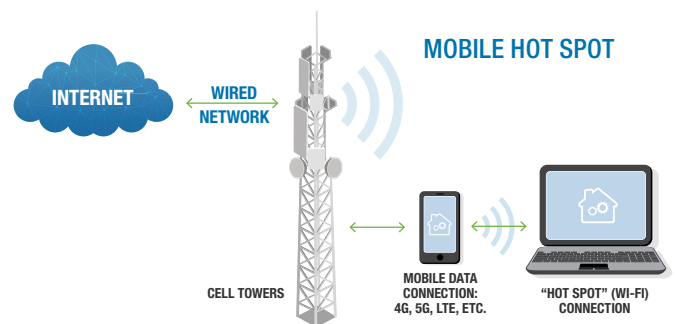
A Hot Spot is a (“Hot”) wireless on-ramp to the Internet that covers a small local area (“Spot”). Devices connect to Hot Spots over a wireless network, but each Hot Spot device then connects to the internet via wireline (fixed) or cellular (mobile) technology.

The term “Hot Spot” has been used to refer to an area where Wi-Fi is available for a laptop or other device to connect to the internet. Today, many cell phones have the ability to “become” a hot spot to extend the cellular internet service to other devices. Because of this popular use, many people associate the idea of Hot Spots with cellular networks but this is an incomplete picture of Hot Spot technology that should not guide policymakers as they consider how to ensure everyone has sufficient broadband connections.

Cellular vs. Wi-Fi Traffic: According to a 2017 study, consumers often rely on fixed Wi-Fi networks to avoid expensive cellular data caps. A 2017 US Telecom Study found that this resulted in over three-fourths of all smart phone data use being routed over Wi-Fi networks – not cellular signals.

Fixed vs. Mobile

In a **mobile** Hot Spot, the data signal travels: (1) from the device to the phone via the Hot Spot (Wi-Fi); (2) from the phone to a cellular tower via a mobile data connection; and (3) from the tower to the Internet via optical fiber. The wireless components – from the tower to the phone, and from the phone to the laptop – are only a very small part of the overall connection.



In contrast, a **fixed** Hot Spot is created by a Wi-Fi router connected to a fixed connection (rather than a cellular connection). These connections are often optical fiber, copper, coax, or DSL. Wi-Fi networks in homes, coffee shops, offices, and public parks are all examples of fixed Hot Spots. Because of their direct wired connections and ability to support many connections at once, fixed Hot Spots are powerful – and have been a popular means of providing Internet access during the COVID-19 pandemic, as cities, businesses, schools, and others have unleashed hundreds of public Hot Spots across the country.

Wireless Needs Wires

Wireless networks offload traffic as soon as possible onto wired networks, which carry nearly all traffic we consider “the Internet.” These wired networks may be optical fiber, copper, coax, or DSL.

The need for data to promptly get “off” wireless signals and “on” a fiber network has grown in importance as data usage has increased. This is why having “deep fiber” — a fiber connection as close as possible to the wireless access point — is such a critical network strategy.

Evolution of Wi-Fi

Over time, spectrum and improved modulation technologies have improved Wi-Fi capacity.

802.11 (1997) – Up to 2 Mbps

802.11b (1999) – 11 Mbps

802.11g (2003) – 54 Mbps

802.11n – (2009) Up to 450 Mbps

802.11ac (Wi-Fi 5) Up to 1300 Mbps

802.11ax (Pending) - Maximum of 10 Gbps

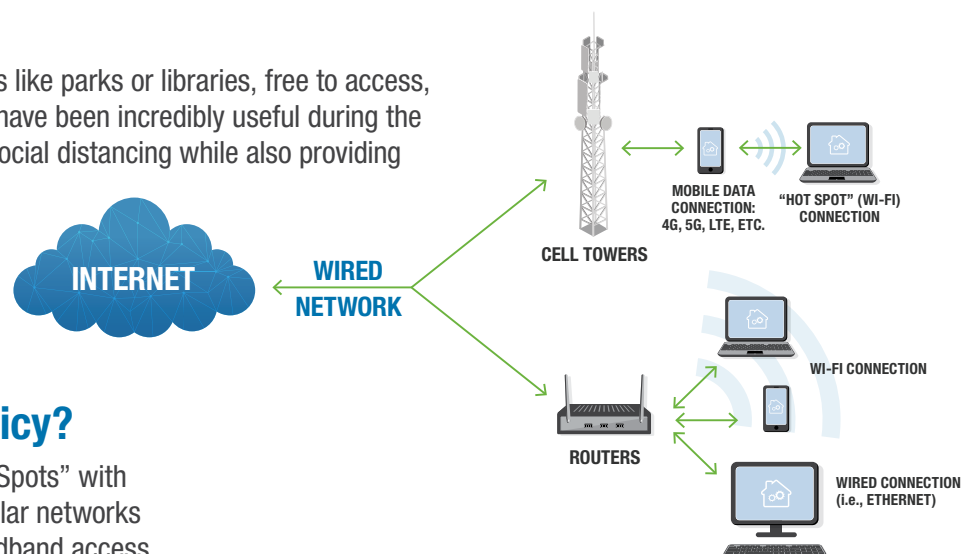
What is Wi-Fi?

Both mobile and fixed Hot Spots use Wi-Fi to provide internet access to the user device. Wi-Fi is a standards-based wireless technology that all cellular and PC manufacturers comply with to speak a universal wireless signal “language.” That standardization is why a laptop can connect to Wi-Fi from a smart phone or a wireless router in an international airport or your home: it’s all the same language.

Wi-Fi has evolved over time, with improvements to both capacity and distance. Depending on spectrum and environment, today’s commonly used standards generally reach up to 300 feet. However, as with any wireless technology, signal strength deteriorates rapidly with distance. In short, Wi-Fi provides you perhaps a few hundred feet of connectivity to the Hot Spot, where you either need to get onto a cellular or fixed network to connect to the internet.

Public Wi-Fi

Public Wi-Fi Hot Spots are generally in places like parks or libraries, free to access, and fed from a fiber-connected router. They have been incredibly useful during the COVID-19 pandemic, allowing for adequate social distancing while also providing critical access for education, healthcare, employment, and other needs.



What does this mean for policy?

Because of the association of the term “Hot Spots” with mobile phones, it’s easy to think only of cellular networks when setting policy aimed at improving broadband access. In reality, much more traffic goes over fixed Hot Spots than mobile; and in fact, most mobile devices actually rely on fixed Hot Spots to communicate. Hence fixed Hot Spots continue to be a significant tool for providing access to underserved communities.

When developing state and national plans to support broadband access, it’s important to note that any wireless technology – including Wi-Fi Hot Spots and even cellular services – will ultimately require a wired network to connect

to the internet: Hence the saying *Wireless Needs Wires*. Any wireless network offloads data traffic to a wired network as soon as possible to avoid congesting the spectrum available and to ensure signals can be carried over longer distances. Investing in the interconnecting network infrastructure – especially fiber optic networks – will not only support more fixed Hot Spots, but also help close the digital divide.