

Wireless Fidelity—WiFi

Contributors: Vijay K. Varma



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WiFi is a short name for **Wireless Fidelity**. Generally, WiFi refers to any type of IEEE 802.11 Wireless Local Area Network (WLAN). More specifically, WiFi is the industry standard for products as defined by the [WiFi Alliance](#) and conforming to [IEEE 802.11 standard](#).

WLANs extend the reach of Local Area Networks (LANs) by providing wireless connectivity. Designed originally for cable replacement in corporate environments, WLANs have become very popular in providing IP connectivity in residential, small office and campus environments. WLANs have experienced phenomenal growth and are now a crucial part of the computer networks. There are two dominant WLAN standards; [IEEE 802.11](#) and [HiperLAN](#).

IEEE 802.11 standard belongs to the family of [IEEE 802 standards](#) that include Local Area Network standards and Metropolitan Area Network standards. [IEEE 802.11 standard](#) defines over-the-air protocols necessary to support networking in a local area. IEEE 802.11 specifications include physical layer and medium access control layer (MAC) and offer services to a common 802.2 logical link layer (LLC). IEEE 802.11 standard supports two configurations: ad hoc mode and infrastructure mode. There are several specifications in the 802.11 family:

- 802.11 - the original standard supporting 1 or 2 Mbps transmission in the 2.4 GHz band using either [frequency hopping spread spectrum \(FHSS\)](#) or [direct sequence spread spectrum \(DSSS\)](#).
- 802.11b - an extension to 802.11 that provides 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps) in the 2.4 GHz band. 802.11b uses only DSSS.
- 802.11a - an extension to 802.11 that provides up to 54 Mbps in the 5GHz band. 802.11a uses an orthogonal frequency division multiplexing (OFDM) encoding scheme rather than FHSS or DSSS.
- 802.11g - an extension to 802.11b that provides up to 54 Mbps in the 2.4 GHz band. 802.11g also uses OFDM.
- 802.11n - modifications to physical and MAC layers to provide over 100 Mb/s throughput in the 5 GHz band. 802.11n uses OFDM and MIMO technologies.

In addition, there are a number of [other 802.11 WG activities](#) that define inter access point protocol (802.11f), MAC enhancements for security (802.11i), MAC enhancements for QoS (802.11e), etc.

[The Wi-Fi Alliance](#) is a nonprofit international association formed in 1999 to certify interoperability of wireless LAN products based on IEEE 802.11 specifications. Currently the Wi-Fi Alliance has over 200 member companies from around the world, and over 1500 products have received Wi-Fi? certification since certification began in March of 2000. The goal of the Wi-Fi Alliance's members is to enhance the user experience through product interoperability.

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A recent phenomenon is the deployment of WiFi in populated areas known as hotspots. These include airports, coffee houses, hotels, and other public areas with a high demand for wireless internet access. The trend is widespread with Asia leading the way. South Korea is expected to have over [23,000 hotspots](#) by the end of 2004.

WiFi complements cellular technology in many respects. Work is going on in [3GPP](#) and [3GPP2](#) to define specifications for cellular/WLAN interworking. Cellular WiFi convergence gained further significance with the formation of [unlicensed mobile access \(UMA\)](#).