

WiMAX (Worldwide Interoperability for Microwave Access) is a family of [wireless](#) communication standards based on the [IEEE 802.16](#) set of standards, which provide multiple physical layer (PHY) and Media Access Control (MAC) options.

The name "WiMAX" was created by the WiMAX Forum, which was formed in June 2001 to promote conformity and interoperability of the standard, including the definition of predefined system profiles for commercial vendors. The forum describes WiMAX as "a standards-based technology enabling the delivery of [last mile wireless broadband access](#) as an alternative to [cable](#) and [DSL](#)".^[2] [IEEE 802.16m](#) or WirelessMAN-Advanced was a candidate for the [4G](#), in competition with the [LTE Advanced](#) standard.

Terminology

WiMAX refers to interoperable implementations of the [IEEE 802.16](#) family of wireless-networks standards ratified by the WiMAX Forum. (Similarly, [Wi-Fi](#) refers to interoperable implementations of the [IEEE 802.11](#) Wireless LAN standards certified by the [Wi-Fi Alliance](#).) WiMAX Forum certification allows vendors to sell fixed or mobile products as WiMAX certified, thus ensuring a level of interoperability with other certified products, as long as they fit the same profile.

The original IEEE 802.16 standard (now called "Fixed WiMAX") was published in 2001. WiMAX adopted some of its technology from [WiBro](#), a service marketed in Korea.^[4]

Mobile WiMAX (originally based on 802.16e-2005) is the revision that was deployed in many countries, and is the basis for future revisions such as 802.16m-2011.

WiMAX is sometimes referred to as "Wi-Fi on steroids"^[5] and can be used for a number of applications including broadband connections, cellular [backhaul](#), [hotspots](#), etc. It is similar to [Long-range Wi-Fi](#), but it can enable usage at much greater distances.^[6]

Uses of WiMAX

The bandwidth and range of WiMAX make it suitable for the following potential applications:

- Providing portable mobile broadband connectivity across cities and countries through various devices
- Providing a wireless alternative to cable and [digital subscriber line](#) (DSL) for "[last mile](#)" broadband access
- Providing data, telecommunications (VoIP) and [IPTV](#) services ([triple play](#))
- Providing Internet connectivity as part of a [business continuity](#) plan
- Smart grids and metering

Internet access

WiMAX can provide at-home or mobile [Internet access](#) across whole cities or countries. In many cases this has resulted in competition in markets which typically only had access through an existing incumbent DSL (or similar) operator.

Additionally, given the relatively low costs associated with the deployment of a WiMAX network (in comparison with [3G](#), [HSDPA](#), [xDSL](#), [HFC](#) or [FTTx](#)), it is now economically viable to provide last-mile broadband Internet access in remote locations.

Middle-mile backhaul to fiber networks

Mobile WiMAX was a replacement candidate for [cellular phone](#) technologies such as [GSM](#) and [CDMA](#), or can be used as an overlay to increase capacity. Fixed WiMAX is also considered as a wireless [backhaul](#) technology for [2G](#), [3G](#), and [4G](#) networks in both developed and developing nations.^{[7][8]}

In North America, backhaul for urban operations is typically provided via one or more [copper wire](#) line connections, whereas remote cellular operations are sometimes backhauled via satellite. In other regions, urban and rural backhaul is usually provided by [microwave links](#). (The exception to this is where the network is operated by an incumbent with ready access to the copper network.) WiMAX has more substantial backhaul bandwidth requirements than legacy cellular applications. Consequently, the use of wireless microwave backhaul is on the rise in North America and existing microwave backhaul links in all regions are being upgraded.^[9] Capacities of between 34 Mbit/s and 1 Gbit/s^[10] are routinely being deployed with latencies in the order of 1 ms.

In many cases, operators are aggregating sites using wireless technology and then presenting traffic on to fiber networks where convenient. WiMAX in this application competes with [microwave radio](#), [E-line](#) and simple extension of the fiber network itself.

Triple-play

WiMAX directly supports the technologies that make [triple-play](#) service offerings possible (such as [quality of service](#) and [multicasting](#)). These are inherent to the WiMAX standard rather than being added on as [carrier Ethernet](#) is to [Ethernet](#).

On May 7, 2008 in the United States, [Sprint Nextel](#), [Google](#), [Intel](#), [Comcast](#), [Bright House](#), and [Time Warner](#) announced a pooling of an average of 120 MHz of spectrum and merged with [Clearwire](#) to market the service. The new company hopes to benefit from combined services offerings and network resources as a springboard past its competitors. The cable companies will provide media services to other partners while gaining access to the wireless network as a [Mobile virtual network operator](#) to provide triple-play services.