

WIMAX - WIRELESS INTRODUCTION

Before we begin a real theory of WiMax, let's spend few minutes to understand background concepts on which WiMax has evolved.

Wireless means transmitting signals using radio waves as the medium instead of wires. Wireless technologies are used for tasks as simple as switching off the television or as complex as supplying the sales force with information from an automated enterprise application while in the field. Now cordless keyboards and mice, PDAs, pagers and digital and cellular phones have become part of our daily life.

Some of the inherent characteristics of wireless communications systems which make it attractive for users, are given below:

- **Mobility:** A wireless communications system allows users to access information beyond their desk and conduct business from anywhere without having a wire connectivity.
- **Reachability:** Wireless communications systems enable people to be better connected and reachable without any limitation of any location.
- **Simplicity:** Wireless communication system are easy and fast to deploy in comparison of cabled network. Initial setup cost could be a bit high but other advantages overcome that high cost.
- **Maintainability:** Being a wireless system, you do not need to spend too much to maintain a wireless network setup.
- **Roaming Services:** Using a wireless network system, you can provide service anywhere any time including train, buses, aeroplanes etc.
- **New Services:** Wireless communications systems provide new smart services like SMS and MMS.

Wireless Network Topologies:

There are basically three ways to set up a wireless network.

- **Point-to-point bridge:** As you know a bridge is used to connect two networks. A *point-to-point bridge* interconnects two buildings having different networks. For example, a wireless LAN bridge can interface with an Ethernet network directly to a particular access point.
- **Point-to-multipoint bridge:** This topology is used to connect three or more LANs that may be located on different floors in a building or across buildings.
- **Mesh or ad hoc network:** This network is an independent local area network that is not connected to a wired infrastructure and in which all stations are connected directly to one another.

Wireless Technologies:

Wireless technologies can be classified in different ways depending on their range. Each wireless technology is designed to serve a specific usage segment. The requirements for each usage segment are based on a variety of variables, including Bandwidth needs, Distance needs and Power.

Wireless Wide Area Network WWAN:

This network enables you to access the Internet via a wireless wide area network WWAN access card and a PDA or laptop.

These networks provide a very fast data speed compared with the data rates of mobile telecommunications technology, and their range is also extensive. Cellular and mobile networks based on CDMA and GSM are good examples of WWAN.

Wireless Personal Area Network *WPAN*:

These networks are very similar to WWAN except their range is very limited.

Wireless Local Area Network *WLAN*:

This network enables you to access the Internet in localized hotspots via a wireless local area network *WLAN* access card and a PDA or laptop.

It is a type of local area network that uses high-frequency radio waves rather than wires to communicate between nodes.

These networks provide a very fast data speed compared with the data rates of mobile telecommunications technology, and their range is very limited. Wi-Fi is the most widespread and popular example of WLAN technology.

Wireless Metropolitan Area Network *WMAN*:

This network enables you to access the Internet and multimedia streaming services via a wireless region area network *WRAN*.

These networks provide a very fast data speed compared with the data rates of mobile telecommunication technology as well as other wireless network, and their range is also extensive.

Issues with Wireless Networks:

There are following three major issues with Wireless Networks.

- **Quality of Service *QoS***: One of the primary concerns about wireless data delivery is that, like the Internet over wired services, *QoS* is inadequate. Lost packets, and atmospheric interference are recurring problems wireless protocols.
- **Security Risk**: This has been another major issue with a data transfer over a wireless network. Basic network security mechanisms like *the service set identifier SSID* and *Wireless Equivalency Privacy WEP*. These measures may be adequate for residences and small businesses but they are inadequate for entities that require stronger security.
- **Reachable Range**: Normally wireless network offers a range of about 100 meters or less. Range is a function of antenna design and power. Now a days the range of wireless is extended to tens of miles so this should not be an issue any more.

Wireless Broadband Access *WBA*:

Broadband wireless is a technology that promises high-speed connection over the air. It uses radio waves to transmit and receive data directly to and from the potential users whenever they want it. Technologies such as 3G, Wi-Fi, WiMAX and UWB work together to meet unique customer needs.

BWA is a point-to-multipoint system which is made up of base station and subscriber equipment. Instead of using the physical connection between the base station and the subscriber, the base station uses an outdoor antenna to send and receive high-speed data and voice-to-subscriber equipment.

BWA offers an effective, complementary solution to wireline broadband, which has become globally recognized by a high percentage of the population.

What is Wi-Fi ?

Wi-Fi stands for **Wireless Fidelity**. Wi-Fi is based on the IEEE 802.11 family of standards and is primarily a local area networking *LAN* technology designed to provide in-building broadband coverage.

For more detail on Wi-Fi, please look into our [Wi-Fi Tutorial](#).