Wi-Fi/WiMAX

K. Punna Reddy,
BVRIT (I MCA),
punna.konduri@gmail.com
Ph No. 9912460560.

T. Ram Babu,
BVRIT (I MCA),
rambabu.thanneru@gmail.com,
Ph No. 9951791050.

ABSTRACT:

Wi-Fi short for “Wireless Fidelity” is a set of standards for wireless local area networks (WLAN) based on the IEEE 802.11 specifications. It was developed in 1991 by Mr. Vic Hayes. Wi-Fi was intended to be used for wireless LANS, but is now often also used for internet access. It enables a person with a wireless-enabled computer or personal digital assistant to connect internet by moving. Wi-Fi has many flavors like 802.11b, 802.11a, 802.11g and more all these are the different flavors of Wi-Fi.

Before invention of Wi-Fi we didn’t have flexibility like viewing mobile TV, making video calls, accessing the internet without wires, connecting the systems without wires... all these are achievable with Wi-Fi only. Now we all are enjoying these facilities because of Wi-Fi. How it works in the sense, it consists of “hotspot”, from this hotspot the system receives signals and then we can access the system or something which uses the Wi-Fi technology. Wi-Fi has many flavors like 802.11b, 802.11a, 802.11g and more all these are the different flavors of Wi-Fi.

There are several products available in market. Which enable to connect to Wi-Fi Network around the area. Earlier when Wi-Fi was first started commercially, there were not many devices came built with Wi-Fi network card (Wireless card) which connects to Wi-Fi network. But now almost every handset device on mobile comes with Wi-Fi, Laptops comes with built in Wireless Connectivity, desktop computers comes along with Wireless connectivity. Following are few products which provide connectivity to Hotspots.

Come to the security by using Wi-Fi. It discovers different security tools such as Air snort pull through encryption keys when adequate packets have been collected. And data is encrypted, denial of service.

Come to advantages by using Wi-Fi, mobility, ease of installation, flexibility, cost, reliability, security.

WiMAX is short form of Worldwide Interoperability of Microwave Access. It performs about similar to some extent like Wi-Fi but at higher speed, at great distance and for greater number of users, WiMAX operates on 802.16 standards define by IEEE, Institute of Electric and Electronic Engineering. IEEE 802.16 standard is known to be WMAN, Wireless Metropolitan Area Network. It offers Security, roaming, speed. WiMAX is the 4G technology which helps us to design, to enable pervasive, high-speed mobile Internet access to the widest array of devices including notebook PCs, handsets, smart phones, and consumer electronics such as gaming devices, cameras, camcorders, music players, and more. As the fourth generation (4G) of wireless technology,

WiMAX has not yet deployed to its full potential and still lot and lots of room to use this technology to its potential. It is not yet put to use as commercialized technologies like Wi-Fi, GPRS, and 3G. WiMAX tower base station can cover up to 10km radius. In theory it suggests to cover a lot more distance than just 10km, it can reach some where about 50 km (30 miles), but in fact due to certain geographical limitations it goes as far as 10 km approx. 6 mils. Any wireless connecting device for WiMAX will connect to WiMAX network if fallen in to the range.
What Is Wireless Technology?

Wireless technology is used to transmit information from one place to another place without using wires, and the working style of the people become smart that’s why people need the technology like Wireless.

The wireless technology we can access while in traveling also at any place. It also gives reliability and the speed is good enough while accessing the Information. While we are using the wireless technology there is no chance to unauthorized access.

Why Wireless Technology:

Cost savings over wire line. Can not run wire to locations needed. To enable patrons to bring their own laptop, therefore reducing the cost of owning many PCs to enable you to easily move PCs. To be on the leading edge.

Generations in Wireless Technology:

In the last thirty years wireless communication technologies have seen a revolution, as people rediscover the uses for it, and its advantages. In the 1980s, wireless technologies were analogue signals (1G), in the 1990s they changed to digital (2G), in the 2002 they invented the high speed digital signals (3G), in the naughtiest they remained digital but became better quality and faster, and now the future is heading rapidly for 4G(WiMAX).

Need For Wi-Fi:

The drawbacks presented in the 1G and 2G, it uses analogue signals uses one way interaction thus we have to wait more time receive the information. To overcome this sort of communication we went for 3G By using this technology we can receive mobile services quickly, if we take service providers which gives 3G technology then we can use mms, we can download movies also we can view the TV in mobiles also. Wi-Fi comes under this 3G.WiMAX comes into the 4G. In 4G we can send or view video at high seep and incapacity, hi speed, wire less, internet protocols are the main features, but the main attractive thing is that 200 mbps band width internet facility.

History Of Wi-Fi:

When Vic Hayes was designing wireless networks inside Toronto auto plants, he had inkling about the potential for the technology. Throughout the 1990s, the Dutch native kept at his labor of love, which earned him the sobriquet of father of Wi-Fi.

Hayes, who oversaw the first working group to draft what became the 802.11b standard, has since played a leading role in shepherding the development of the Wi-Fi technology used by an estimated 8 million wireless networks in U.S. homes and offices. Although Wi-Fi has turned into one of the hottest young technologies, Hayes says the real excitement will start after the computer industry hurdles the
Wi-Fi is wireless technology which enables connection between two or more devices wirelessly for data sharing purposes. It is wireless networking which is based on IEEE 802.11 standards. It is now being used by millions of people using various devices such as personal computers, laptops, pdas', printers, camera, games, mp3 players etc, more and more gadgets are coming with built in feature of this amazing.

**Origin and meaning of the term "Wi-Fi":**

The Inter brand Corporation developed the brand "Wi-Fi" for the Wi-Fi Alliance to use to describe WLAN products that are based on the IEEE 802.11 standards. "Wi-Fi and the yin yang style logo were invented by Inter brand. We (the founding members of the Wireless Ethernet Compatibility Alliance, now called the Wi-Fi Alliance) hired Inter brand to come up with the name and logo that we could use for our interoperability seal and marketing efforts. We needed something that was a little catchier than 'IEEE 802.11b Direct Sequence'."

The Wi-Fi Alliance themselves invoked the term "Wireless Fidelity" with the marketing of a tag line, "The Standard for Wireless Fidelity," but later removed the tag from their marketing. The Wi-Fi Alliance now seems to discourage propagation of the notion that "Wi-Fi" stands for "Wireless Fidelity" but includes it in their knowledge base:

To understand the value of Wi-Fi Certification, you need to know that Wi-Fi is short for "Wireless Fidelity," and it is the popular name for 802.11-based technologies that have passed Wi-Fi certification testing. This includes IEEE 802.11a, 802.11b, 802.11g and upcoming 802.11 technologies.

**How It Works:**

The typical Wi-Fi setup contains one or more Access Points (APs) and one or more clients. An AP broadcasts its SSID (Service Set Identifier, "Network name") via packets that are called beacons, which are broadcast every 100 ms. The beacons are transmitted at 1 Mbit/s, and are of relatively short duration and therefore do not have a significant influence on performance. Since 1 Mbit/s is the lowest rate of Wi-Fi it assures that the client who receives the beacon can communicate at least 1 Mbit/s. Based on the settings (e.g. the SSID), the client may decide whether to connect to an AP. Also the firmware running on the client Wi-Fi card is of influence. Say two APs of the same SSID are in range of the client, the firmware may decide based on signal strength to which of the two APs it will connect. The Wi-Fi standard leaves connection criteria and roaming totally open to the client. This is strength of Wi-Fi, but also means that one wireless adapter may perform substantially better than the other. Since
Wi-Fi transmits in the air, it has the same properties as a non-switched Ethernet network. Even collisions can therefore appear like in non-switched Ethernet LAN's.

**Channels:**

Except for 802.11a, which operates at 5 GHz, Wi-Fi uses the spectrum near 2.4 GHz, which is standardized and unlicensed by international agreement; although the exact frequency allocations vary slightly in different parts of the world, as does maximum permitted power. However, channel numbers are standardized by frequency throughout the world, so authorized frequencies can be identified by channel numbers.

Following are the terms which are involved in Wi-Fi and wireless networks.

**Gigahertz**

Gigahertz is frequency measurement and its unit is GHz. Where as in radio communication GHz is refer as bands of electric spectrum. Different band different uses for example, 802.11b/g falls some where between 2.4GHz to 5.0GHz.Latest technologies like Bluetooth, cordless phones, Wi-Fi operates on S-bands Satellite communication and global possible system (GPS) operates on L-bands. There are other popular bands like Ku, Ka which have different uses.

**WiBro**

WiBro have nothing to do with Wi-Fi directly, but it can be called extended version of Wi-Fi. It is known as Wireless broadband. It is developed in South Korea and it is latest technology in mobile access of wireless broadband. Wi-Fi operates on 802.11 standards developed by IEEE; WiBro on the other hand operates on 802.16 just as WiMax do. WiBro is specially design for connectivity while on move, where as WiMax is not recommended on move connectivity.

**Hotspot**

Hotspot is the place where wireless network is available for public use. Devices like laptops, handsets, Pdas, Note books etc are mostly installed with Wireless network cards which are designed to connect to Wi-Fi network in surrounding area. The place where wireless network is available to access is called hotspot. HotSpots are mostly available for free at Coffee shops, Public libraries, Public grounds, Universities, Air ports, Railway Stations etc.

**Wi-Fi Finder**

As name suggests, it portable device to find Wireless network available for public use in certain area. This devices helps to find hotspots so laptop battery do not get waste just for finding Wireless network around. Wi-Fi finder is mostly battery operated device which is about a mouse size. When Wi-Fi find is turn on it stats searching wireless network around if Wi-Fi network found it turns on its LED which says network is around and ask if wants to connect to it. If no network is found LED remain turned off. A Wi-Fi finder operates on 802.11b/g bands. Different versions of Wi-Fi finders are available in market depending upon the additional features, Expensive modules come with built in antenna which enhance the range and connection capabilities. Wi-Fi finder Modules can ranges from 150 feet to 300 feet depending how sophisticated and expensive the module is. Wi-Fi finders once scan the network can be connected to laptops through USB.

**Access Point**
This is another important term which Wi-Fi users mostly heard. Access point is almost like HotSpot. It is also known as WAP, Wireless access point. WAP device connects wireless communication devices together to form a wireless network. WAP network are mostly connected to wire network and can provide interface between wireless devices with wired devices.

**PRODUCTS:**

There are several products available now which enable to connect to Wi-Fi Network around the area. Earlier when Wi-Fi was first started commercially, there were not many devices came built with Wi-Fi network card (Wireless card) which connects to Wi-Fi network. But now almost every handset device on mobile comes with Wi-Fi, Laptops comes with built in Wireless connectivity, desktop computers comes along with Wireless connectivity. Following are few products which provide connectivity to Hotspots.

**Desktop Wireless Wi-Fi Cards**

Desktop wireless Wi-Fi cards enable desktop computers to connect to Wi-Fi network available in the area. Wi-Fi network provides high speed internet if available and can share files with in the clients in the network. This kind of network is mostly used in Colleges and Universities, libraries etc. Wi-Fi desktop cards are mostly plugged in Mother board on PCI slot. Some mother board comes with built in Wi-Fi connectivity.

**Laptop/Notebook Wireless Wi-Fi Cards**

Wi-Fi cards uses in laptops / notebooks to connect to wireless internet around through Wi-Fi network. Most laptops now comes with built in Wi-Fi enable feature. Old model laptops which do not come along with built in Wi-Fi wireless card can plug in Wi-Fi PCMCI slot card to connect to hotspot.

**Wireless Wi-Fi Routers**

Wireless Wi-Fi routers is used to connect clients (having Wi-Fi cards) with server. Wi-Fi router is attached to server and configure with IP address or in some cases just with internet connection. Now this IP helps connect clients to the server for High speed internet and file sharing with server and other clients. Routers are mostly used when server is expected to handle multiple clients at given time.

**Wireless Wi-Fi USB Adapters**

There is easy solution for Desktop / laptop owners who do not have Wi-Fi card already into their systems, they can use USB Wi-Fi drive which connects to USB port on systems and performs as Wi-Fi cards. However USB Wi-Fi drive comes with relevantly lesser data transfer capability and lesser range.
Almost all handsets and PDAs manufactures install Wireless network card to their products. PDAs (Personal digital assistance) and other mobile devices scans Wi-Fi network around, if found can connect to network for Surfing and file sharing.

**Wi-Fi Security:**

When we talk about Wi-Fi Security then a detail list come in view to make our network more secure. Wi-Fi discovers different security tools such as Air snort pull through encryption keys when adequate packets have been collected. Air fart sense wireless devices and count their signal powers and make it easy for user to understand, AP Radar used to manage the configuration, Boingo Software helpful for you to include thousand of location all over the world. DStumbler offer a complete set for auditing, KisMAC one of the best security weapons, iStumbler used to analyze your dashboard, and MacStumbler display information about nearby network, MiniStumbler offering convenience, WirelessMon allows users to check the position of wireless and so on.

The Wi-Fi Alliance tests the wireless components to their own terms of reference. Products that pass become Wi-Fi certified and may carry the Wi-Fi logo. Only products of Wi-Fi Members are tested, because they pay membership and per-item fees. Absence of the Wi-Fi logo does not necessarily mean non-compliance with the standard

Wi-Fi Security for end clients offer a complete control over the entire network from design to development and including Air Magnet Street WISE offer automatically diagnose, Air Patrol Air Safe will turn off your network if sense any one interrupt in it, AirTight Spectra Guard SAFEdetect classically and make a solution,

**The Various Wi-Fi Standards:**

The IEEE 802.11 standard is actually only the earliest standard, allowing 1-2 Mbps of bandwidth. Amendments have been made to the original standard in order to optimize bandwidth (these include the 802.11a, 802.11b and 802.11g standards, which are called 802.11 physical standards) or to better specify components in order to ensure improved security or compatibility. This table shows the various amendments to the 802.11 standard and their significance:

It is also useful to note the existence of a standard called "802.11b+". This is a proprietary standard with improvements in data flow. However, this standard also suffers from gaps in interoperability due to not being an IEEE standard.

**Range And Data Flow:**

The 802.11a, 802.11b and 802.11g standards, called "physical standards" are amendments to the 802.11 standard and offer different modes of operation, which lets them reach different data transfer speeds depending on their range.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Frequency</th>
<th>Speed</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi A</td>
<td>5 GHz</td>
<td>54 Mbit/s</td>
<td>10 m</td>
</tr>
<tr>
<td>(802.11a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wi-Fi B</td>
<td>2.4 GHz</td>
<td>11 Mbit/s</td>
<td>100 m</td>
</tr>
<tr>
<td>(802.11b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wi-Fi G</td>
<td>2.4 GHz</td>
<td>54 Mbit/s</td>
<td>100 m</td>
</tr>
<tr>
<td>(802.11g)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**802.11a**

The 802.11 standard has a maximum theoretical data flow of 54 Mbps, five times that of 802.11b, but at a range of only about thirty meters. The 802.11a standard relies on a technology called OFDM (Orthogonal Frequency Division Multiplexing). It broadcasts in
the 5 GHz frequency range and uses 8 non-overlapping channels.

Because of this, 802.11a devices are incompatible with 802.11b devices. However, there are devices that incorporate both 802.11a and 802.11b chips, called "dual band" devices.

- **802.11b**

  The 802.11b standard allows for a maximum data transfer speed of 11 Mbps, at a range of about 100 m indoors and up to 200 meters outdoors (or even beyond that, with directional antennas.)

<table>
<thead>
<tr>
<th>Hypothetical speed (indoors)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>54 Mbits/s</td>
<td>10 m</td>
</tr>
<tr>
<td>48 Mbits/s</td>
<td>17 m</td>
</tr>
<tr>
<td>36 Mbits/s</td>
<td>25 m</td>
</tr>
<tr>
<td>24 Mbits/s</td>
<td>30 m</td>
</tr>
<tr>
<td>12 Mbits/s</td>
<td>50 m</td>
</tr>
<tr>
<td>6 Mbits/s</td>
<td>70 m</td>
</tr>
</tbody>
</table>

- **802.11g**

  The 802.11g standard allows for a maximum data transfer speed of 54 Mbps at ranges comparable to those of the 802.11b standard. What's more, as the 802.11g standard uses the 2.4GHz frequency range with OFDM coding, this standard is compatible with 802.11b devices, with the exception of some older devices.

<table>
<thead>
<tr>
<th>Hypothetical speed (indoors)</th>
<th>Range (indoors)</th>
<th>Range (outdoors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54 Mbits/s</td>
<td>27 m</td>
<td>75 m</td>
</tr>
<tr>
<td>48 Mbits/s</td>
<td>29 m</td>
<td>100 m</td>
</tr>
<tr>
<td>36 Mbits/s</td>
<td>30 m</td>
<td>120 m</td>
</tr>
</tbody>
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### Advantages Of Wi-Fi:

- Allows LANs to be deployed without cabling, typically reducing the costs of network deployment and expansion. Spaces where cables cannot be run, such as outdoor areas and historical buildings, can host wireless LANs.
- Wi-Fi networks support roaming, in which a mobile client station such as a laptop computer can move from one access point to another as the user moves around a building or area.
- Wi-Fi is a global set of standards. Unlike cellular carriers, the same Wi-Fi client works in different countries around the world.
- Widely available in more than 250,000 public hot spots and millions of homes and corporate and university campuses worldwide.
- As of 2006, WPA and WPA2 encryption are not easily crack able if strong passwords are used
- New protocols for Quality of Service (WMM) and power saving mechanisms (WMM Power Save)
make Wi-Fi even more suitable for latency-sensitive applications (such as voice and video) and small form-factor devices.

Disadvantages Of Wi-Fi:

- In Wi-Fi security is not at pleasing.
- Spectrum assignments and operational limitations are not consistent worldwide for any Wi-Fi used outside an operator's own premises, or require something akin to an operator registration.
- Power consumption is fairly high compared to some other standards, making battery life and heat a concern.
- Wireless encryption standard, Wired Equivalent Privacy, has been shown to be breakable even when correctly configured.
- Many 2.4 GHz 802.11b and 802.11g Access points default to the same channel, contributing to congestion on certain channels.
- Wi-Fi networks have limited range. A typical Wi-Fi home router using 802.11b or 802.11g with a stock antenna might have a range of 45 m (150 ft) indoors and 90 m (300 ft) outdoors.
- Wi-Fi creates pollution in the area, especially on the same or neighboring channel, can prevent access and interfere with the use of other open access points it causes decreased signal-to-noise ratio (SNR) between access points.
- Interoperability issues between brands or deviations from the standard can disrupt connections or lower throughput speeds on other user's devices within range.

As we have met several drawbacks in Wi-Fi technology. People want further technology which should meet all the requirements of human. Now we are going to sea global connector.

WiMAX:

WiMAX is the next-generation of wireless technology designed to enable pervasive, high-speed mobile Internet access to the widest array of devices including notebook PCs, handsets, smart phones, and consumer electronics such as gaming devices, cameras, camcorders, music players, and more. As the fourth generation (4G) of wireless technology, WiMAX delivers low-cost, open networks and is the first all IP mobile Internet solution enabling efficient and scalable networks for data, video, and voice. As a major driver in the support and development of WiMAX, Intel has designed embedded WiMAX solutions for a variety of mobile devices supporting the future of high-speed broadband on-the-go.

History of WiMAX:

The idea for WiMAX came about in the wake of the telecom bubble, when generating hype about what technologies could do was anathema. WiMAX is also by name as well as by function and association a cousin of Wi-Fi, which hasn't exactly become firmly ensconced as an indispensable technology tool in the telecom service provider quiver. When Wi-Fi's new maxed-out cousin came onto the scene, it already had that (perceived) strike against it. WiMAX technology was developed in earlier 2000 and it was named by WiMax Forums. In year 2004 this technology started to groom and eventually gets into lots of talk’s and
discussions around the world among major international institutes, in year 2004 advancements, enhancements were deployed to some extend. As mentioned above WiMAX has not yet deployed to its full potential and still lot and lots of room to use this technology to its potential. It is not yet put to use as commercialized technologies like Wi-Fi, GPRS, and 3G.

**WiMAX Authority:**

WiMax is short form of *Worldwide Interoperability of Microwave Access*. It performs about similar to some extend like Wi-Fi but at higher speed, at great distance and for greater number of users, WiMax operates on 802.16 standards define by IEEE, Institute of Electric and Electronic Engineering. IEEE 802.16 standard is known to be WMAN, Wireless Metropolitan Area Network.

Using WiMax technology broadband access can be provided to more rural and urban areas where wireless services can not be provided by other sources like fiber optics or by other regular telephonic cables. There are so many plus points of this technology out of which one is range, it ranges starts from minimum 30 miles, if we look in past, about 30 feet wireless connectivity is provided by Wi-Fi technology. WiMax range depends upon connectivity, if the connection is WiMAX offers a solution called “Last mile” it can be used as alternative of cable and DSL internet access.

WiMAX can provide data rate up to 70Mbps from larger distances which be can be reached up 30 miles. WiMax operates on two frequencies. IEEE 802 is very flexible standard and provides standard addresses frequencies ranges from 10 GHz to 66 GHz. IEEE 802.16 standard frequency stats that it will also support low latency applications like internet, video, voice all together.

**Working Of WiMAX:**

WiMAX technology works little different than Wi-Fi technology. In Wi-Fi computers can be connected through wireless LAN card to near by access point, wireless router or any Hotspot, it does not works this way when we talk about connectivity in WiMAX. WiMAX network connectivity constitutes of two parts, one can define as WiMAX tower or WiMAX booster, it is known as WiMAX Base station, whereas the other portion is WiMax receiver. Let’s talk about them in little details for better understanding the working.

**WiMAX Base Station**

As name explains base station is place where WiMax signals are broadcasted. It consists of electronic devices and WiMax Tower. This tower works exactly like GSM network phones towers standing high up in the air to broadcast radio signals. WiMAX tower base station can cover up 10Km radius. In theory it suggests to cover a lot more distance than just 10Km, it can reach some where about 50 km (30 miles), but in fact due to certain geographical
limitations it goes as far as 10 km approx. 6 mils. Any wireless connecting device for WiMAX will connect to WiMAX network if fallen in to the range.

**WiMAX Receiver**

It is device or devices which receives the signals from WiMAX base station and connects to the WiMAX networks. These devices are usually stand alone Antenna or PCMCIA slot card for laptops or computers. Connecting to WiMAX base stations works as similar as connection of Wi-Fi to access point works, the only difference is that WiMAX covers much wider area.

One WiMAX base stations can be connected to several other base stations using high speed microwave link, this link is usually known as backhaul. This way WiMAX roaming can be achieved and connections can be maintained on move.

WiMAX support many protocols like ATM, IPv4 Ethernet, VLAN etc, this makes WiMax a rich choice for full of services from data to voice.

**Security:**

WiMAX is the much-anticipated broadband wireless access mechanism for delivering high-speed connectivity over long distances, making it attractive to Internet and telecommunications service providers. Designed by the IEEE 802.16 committee, WiMAX was developed after the security failures that plagued early IEEE 802.11 networks. Recognizing the importance of security, the 802.16 working groups designed several mechanisms to protect the service provider from theft of service, and to protect the customer from unauthorized information disclosure.

**Authentication**

A fundamental principle in 802.16 networks is that each subscriber station (SS) must have a X.509 certificate that will uniquely identify the subscriber. The use of X.509 certificates makes it difficult for an attacker to spoof the identity of legitimate subscribers, providing ample protection against theft of service. A fundamental flaw in the authentication mechanism used by WiMAX's privacy and key management (PKM) protocol is the lack of base station (BS) or service provider authentication. This makes WiMAX networks susceptible to man-in-the-middle attacks, exposing subscribers to various confidentiality and availability attacks. The 802.16e amendment added support for the Extensible Authentication Protocol (EAP) to WiMAX networks. Support for EAP protocols is currently optional for service providers.

**Encryption**

With the 802.16e amendment, support for the AES cipher is available, providing strong support for confidentiality of data traffic. Like the 802.11 specification, management frames are not encrypted, allowing an attacker to collect information about subscribers in the area and other potentially sensitive network characteristics.

**Technically Speaking**

With those attributes, WiMax technology is expected to benefit from
the release this year of an embedded laptop platform by Intel. Many analysts believe the platform will trigger evaluations and adoption of the technology, which can pick up where Wi-Fi leaves off for road warriors traveling outside of areas not well-covered by cellular data services offered by either national or regional wireless carriers.

**Companies Releasing WiMAX:**

There are already WiMax cards available today, notably from players such as Clear wire Corp. Its deal with Sprint Nextel to work on a national network fell apart last November. For its part, Sprint has committed to using WiMax for its fourth-generation nationwide broadband network with a goal of reaching 100 million people in the United States by the end of this year. Its WiMax offering is called Xohm. In its camp are notables including Motorola, Nokia, Intel and Samsung, which will drive the development of various mobile devices that can ride on the service. Samsung has already begun shipping devices that work with the Korean version of WiMax, called Wibro, and it began demonstrating some of those devices for WiMax in the U.S. earlier this month at the Consumer Electronics Show.

**Watch This Space:**

WiMAX technology is especially compelling for rural areas that aren't well-served by broadband wireless.

WiMAX also presents an efficient alternative for multiunit dwellings, because it takes fewer access points to cover more space than Wi-Fi. WiMax will also improve on the quality of access because it doesn't deteriorate as quickly over distance. Notebooks will be the first natural devices to ride on WiMax networks, although consumer gaming systems, ultra mobile PCs and digital cameras might logically use WiMax in the future.

**WiMAX Benefits:**

WiMAX can provide shared data rates of up to 70 Mb/s. This is enough bandwidth to support more than 60 businesses at once with T1-type connectivity. It can also support over a thousand homes at 1 Mb/s DSL-level connectivity. Also, there will be a reduction in latency for all WiMAX communications.

**Wireless**

By using a WiMAX system, companies/residents no longer have to rip up buildings or streets or lay down expensive cables. WiMAX can provide users with two forms of wireless service:

**Non Line-of-Sight**

It operates at 2 to 11 GHz, which at a lower level frequency has the ability to bend around obstacles more easily. Here, a small antenna on a computer connects to the tower and is backwards compatible with existing Wi-Fi technologies.

**Line-of-Sight:**

Can go as high as 66 GHz since the signal is stronger and more stable, which leads to greater bandwidth. Here, a fixed dish antenna points straight at the tower or for communication between tower to tower.

**Differences Between Wi-Fi And WiMAX:**

Wi-Fi is used for developing wireless LAN to access high speed internet or access just a network for file sharing and software services.

WiMAX is quite latest technology and it can do far more than just developing wireless networks for high speed internet. It is also refer as Wireless
broadband access, which can transfer not only data, but voice data, video data etc and at much higher rates.

Wi-Fi is capably for short range data transfer, which can be within hundred of meters range using non licensed spectrum to access network. Wi-Fi is mostly connected to network in certain area which may not be connected to internet; it can be used for file sharing only.

WiMAX is designed for long distance coverage and it covers distance in kilometers, it uses licensed spectrum and unlicensed also in some case. WiMax delivers point-to-point connection to the internet from service provide to as user. In WiMax there are multiple standards of 802.16 a, b etc, so they are used for different types of access from mobile connectivity to fixed location connections.

Wi-Fi has introduced a quality of service similar to fixed Ethernet, where packets are priorities on their tags. This shows that quality of service (QoS) is relative to packet flow.

WiMAX uses technology based on setting up connection between end users device and base station. Special algorithm is scheduled for specific connection. This shows that Quality of Services (QoS) parameters can be guaranteed for each flow.

Wi-Fi is deployed much more than WiMax because of its ease of installation and cost effectiveness. It is easily deployed with in the building or room for providing internet access by third party internet service providers. Many public places, hotels, coffee shops have installed Wi-Fi access points providing high speed internet to their customers.

Wi-Fi:

We have to face some problems while using Wi-Fi.

WiMAX:

We can access the internet anywhere reliably.

Conclusion:

You will have an idea until now that WiMAX is not yet as commercialized as Wi-Fi, but lot of work is going on in WiMax market for capitalizing over it and put to its maximum use, this is will bring lot of
high tech advancements in not only Internet, but it will bring cutting edge enhancements in Voice and Video Data.

Before invention of Wi-Fi we didn’t have flexibility like viewing mobile TV, making video calls, accessing the internet without wires, connecting the systems without wires... all these are achievable with Wi-Fi only. Now we all are enjoying these facilities because of Wi-Fi. How it works in the sense, it consists of “hotspot”, from this hotspot the system receives signals and then we can access the system or something which uses the Wi-Fi technology.

What I’m hoping is in a couple of years all Indian colleges could set up Wi-Fi technology, and that the cellular phone carriers jump on it and start using WiMax for cellular service.

WiMAX is the 4G technology which helps us to design, to enable pervasive, high-speed mobile Internet access to the widest array of devices including notebook PCs, handsets, smart phones, and consumer electronics such as gaming devices, cameras, camcorders, music players, and more. As the fourth generation (4G) of wireless technology, the main attractiveness of WiMAX is its 200mbps internet access.

References: