Wi-Fi

wireless communication

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About the Tutorial

WiFi is primarily a local area networking (LAN) technology designed to provide in-building broadband coverage. It is based on IEEE 802.11 specification. This tutorial gives you a basic understanding on WiFi.

Audience

This tutorial has been prepared for readers to help them understand the concepts related to WiFi.

Prerequisites

Before you start proceeding with this tutorial, we are making an assumption that you are already aware of the basic telecom concepts such as LAN, Duplex, ISPs, etc.

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1. WHAT IS WIFI?

WiFi stands for **Wi**reless **Fi**delity. WiFiIt 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.

Current WiFi systems support a peak physical-layer data rate of 54 Mbps and typically provide indoor coverage over a distance of 100 feet.

WiFi has become the *de facto* standard for *last mile* broadband connectivity in homes, offices, and public hotspot locations. Systems can typically provide a coverage range of only about 1,000 feet from the access point.

WiFi offers remarkably higher peak data rates than do 3G systems, primarily since it operates over a larger 20 MHz bandwidth, but WiFiWiFi systems are not designed to support high-speed mobility.

One significant advantage of WiFi over WiMAX and 3G is its wide availability of terminal devices. A vast majority of laptops shipped today have a built-in WiFi interface. WiFi interfaces are now also being built into a variety of devices, including personal data assistants (PDAs), cordless phones, cellular phones, cameras, and media players.

WiFi is Half Duplex

All WiFi networks are contention-based TDD systems, where the access point and the mobile stations all vie for use of the same channel. Because of the shared media operation, all WiFi networks are half duplex.

There are equipment vendors who market WiFi mesh configurations, but those implementations incorporate technologies that are not defined in the standards.

Channel Bandwidth

The WiFi standards define a fixed channel bandwidth of 25 MHz for 802.11b and 20 MHz for either 802.11a or g networks.

2. WIFI – WORKING CONCEPTS

Radio Signals

Radio Signals are the keys, which make WiFi networking possible. These radio signals transmitted from WiFi antennas are picked up by WiFi receivers, such as computers and cell phones that are equipped with WiFi cards. Whenever, a computer receives any of the signals within the range of a WiFi network, which is usually 300 — 500 feet for antennas, the WiFi card reads the signals and thus creates an internet connection between the user and the network without the use of a cord.

Access points, consisting of antennas and routers, are the main source that transmit and receive radio waves. Antennas work stronger and have a longer radio transmission with a radius of 300-500 feet, which are used in public areas while the weaker yet effective router is more suitable for homes with a radio transmission of 100-150 feet.

WiFi Cards

You can think of WiFi cards as being invisible cords that connect your computer to the antenna for a direct connection to the internet.