

Wireless Telecommunication and Sensor Network Services

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Abstract

Wireless telecommunication is the transfer of information between two or more points that are not physically connected. Wireless operations permits services, such as a long range communications, that are impossible or impractical to implement with the use of wires. In this paper, we discuss about the wireless telecommunication systems, wireless networks, and its services along with its wireless sensor networks.

Keywords

Wireless Telecommunication, Wireless Networks, WSN, Services

I. Introduction

Today millions of people around the world use internet every day to communicate with others, follow the stock market, check the weather, keep up with the news, make travel plans, conduct business shop, entertain and learn and much more. Staying connected has become so important that it is hard to get away from your computer and your internet connection because you might miss an email message, an update on your stock or some news you need to know. With your business or your personal life growing more dependent on electronic communication over the internet, you might be ready to take the next step and get a device that allows you to access the internet on the go. That's where wireless internet comes in. with a wireless-enabled laptop or PDA you can access the internet throughout. You have probably seen news or advertising about cell phones and PDA's that let you receive and send email.

No longer need your broadband internet connection be limited to one computer, or even to one room in the house. Over the past few years, wireless internet has reached further into spaces it has not penetrated before and you often find connections in coffee shops, airports lounges and hotels. Some cities are even running wireless broadband network that covers whole districts and boroughs. Wireless technology allows us to our equipments without the hassles of cable connected devices. These devices work by sending data from one location to another by bouncing signals off antennas from the devices. In wireless internet, the wireless router sends the signals to the remote server and the server bounces the signals back to the wireless router so the connection can be made for the wireless internet service. Wireless LAN or Local Area Networks provides flexibility and reliability for business computer users.

II. Wireless Devices

Wireless internet provides super fast broadband speed. Wireless internet is more affordable and more reliable than satellite broadband, since satellite signals typically have to travel tens of thousand miles. Wireless internet is also incredibly responsive, when we are working over internet, browsing WebPages, downloading emails and engage in teleconferencing or video conferencing over the net, the wireless internet system will yield ultra super fast transmission. Weather, radio frequencies and traffic congestion can all impede wireless internet flow. Moreover, with a reasonable proximity of an urban area, we will be near to a

wireless internet tower.

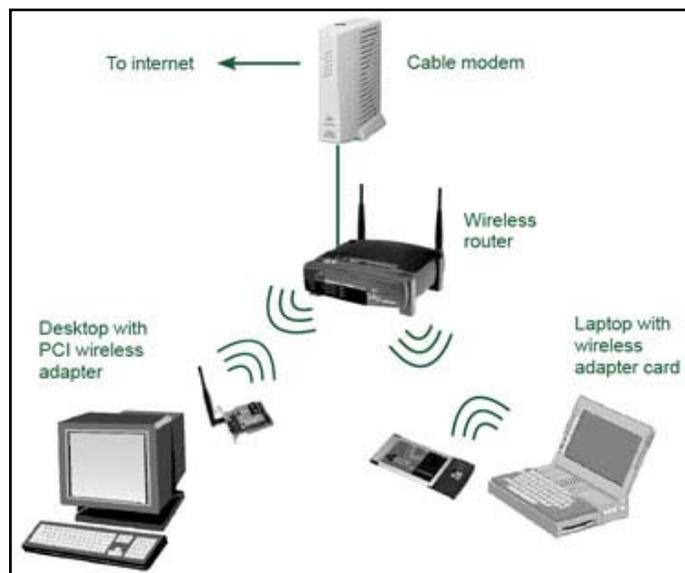


Fig. 1: Wireless Devices Connected Through Wireless Router

In wireless telecommunications is the transferring the data and information between two or more points that are not physically connected. Distances can be short such as a few meters for television remote control or as far as thousand or even millions of miles for deep-space radio communications. It encompasses various types of fixed, mobile, and portable two-way radios, cellular telephones, Personal Digital Assistant (PDA's) and wireless networking. In terms of other examples of wireless technology include GPS units, wireless computer mice, keyboards, headphones, radio receivers, satellite television, broadcast television and cordless telephones.

The term is commonly used in the telecommunications industry to refer to telecommunications system like radio transmitters and receivers, computer networks, network terminals etc. which use some form of energy e.g. Radio Frequency (RF), acoustic energy etc. to transfer information without the use of the wires. Information transferred in this manner over both short and long distances.

The term "wireless" should not be confused with the term "cordless", which is generally used to refer to powered electronic devices that are able to operate from a portable power sources ie battery pack, without any cable or cord to limit the mobility of the cordless device though a connection to the mains power supply. Some cordless devices, such as cordless telephones are also wireless in sense that information is transferred from cordless telephone to the telephone's base unit via some type of wireless communications link. This has caused some disparity in the usage of the term "cordless".

III. Equipments and Communication

One of the best known examples of wireless technology is the mobile phone, also known as a cellular phone. These wireless phones use radio waves to enable their users to make phone calls from many locations worldwide. They can be used within range of

the mobile telephone sites used to house the equipment required to transmit and receive the radio signals from these instruments. Wireless data communications are an essential components of mobile computing. The various available technologies differ in local availability, coverage range and performance, and in some circumstances, users must be able to employ multiple connection types and switch between them. To simplify the experience for the user, connection manager software can be used or a mobile VPN deployed to handle the multiple connections as a secure, single virtual network.

The supporting wireless technologies include Wi-Fi, which is a wireless local area network that enables portable computing devices to connect easily to the internet. Wi-Fi is standardized as IEEE 802.11. Cellular data service offers coverage within a range of 10-15 miles from the nearest cell site depending upon the geographical area. It includes GSM, CDMA, GPRS, and EDGE etc. Mobile satellite communications may be used where other wireless connections are unavailable, such as in largely rural area or remote locations. Satellite communications are especially important for transportation, aviation, maritime and military usage.

IV. Wireless Sensor Network

Wireless sensor network applications are diverse, that's ranging from habitat monitoring to surveillance and physical intrusion detection. Application can be on scientific or academic interest or commercial where the sensor network can have significant impacts. Wireless sensor network presents a comprehensive and tightly organized compilation based on the surveys. The availability of cheap, low power, and miniature embedded processors, radios, sensors and actuators, often integrated on a single chip, is leading to the use of wireless communications and computing for interacting with the physical world in applications such as security and surveillance applications, smart classrooms, monitoring of natural habitat and eco-systems, medical monitoring etc. the resulting system, often called wireless sensor networks, differ considerably from current networked and embedded systems. They combine the large scale and distributed nature of networked system such as the Internet with the extreme energy constraints and physically coupled nature of embedded control system. Their design requires a proper understanding of the interplay between network protocols, energy-aware design, signal processing algorithms, and distributed programming.

A Wireless Sensor Network (WSN) is a consisting of spatially distributed autonomous devices that use sensors to monitor physical or environmental conditions. These autonomous devices or nodes combine with routers and a gateway to create a typical WSN system. The distributed measurement nodes communicate wirelessly to a central gateway, which provides a connection to the wired world where we can collect, process, analyze and present the measurement data. To extend distance and reliability in a wireless sensor network, we can use routers to gain an additional communication link between end nodes and the gateway.

Embedded monitoring covers a large range of application areas, including those in which power or infrastructure limitations make a wired solution costly, challenging, or even impossible. We can position wireless sensor networks alongside wired systems to create a complete wired and wireless measurement and control system. A WNS system is ideal for an application like environmental monitoring in which the requirements mandate a long-term deployed solution to acquire water, soil, or climate measurements. For utilities such as the electricity grid, streetlights

and water municipals, wireless sensors offer a lower-cost method for collecting system health data to reduce energy usage and better manage resources. In structural health monitoring we can use wireless sensors to effectively monitor highways, bridges and tunnels. We can also deploy these systems to continually monitor office buildings, hospitals, airports, factories, power plants or production facilities as well.

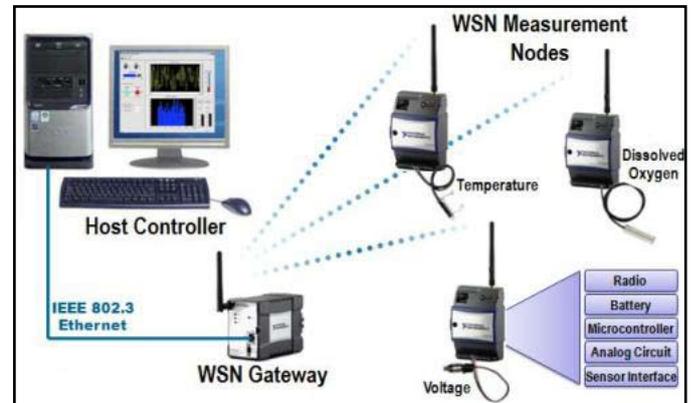


Fig. 2: Wireless Sensor Network Architecture

In WNS architecture, the measurement nodes are deployed to acquire measurements such as temperature, voltage or even dissolved oxygen. The nodes are part of a wireless network administrated by the gateway, which governs network aspects such as client authentication and data security. The gateway collects the measurement data from each node and sends it over a wired connection, typically Ethernet, to a host controller.

A WNS measurement node contains several components including the radio, battery, microcontroller, analog circuits, and sensor interface. In battery-powered system, we must make important trade-offs because higher data rates and more frequent radio use consume more power.

V. Conclusion

Wireless or not, each technology has its advantages and disadvantages. Wireless technologies often tend to increase convenience and decrease safety. Wired technologies are mostly used whenever reliability is of major importance. When an idea for some kind of new technology arises and the impact on the user can accurately is estimated the question: can this technology improve life quality? Should be the go or not to go criterion. Knowledge the advantages and disadvantages in advance should enable someone to answer this question. This go or not to go criterion is very different from a regular enumeration because in fact an intelligent weight factor is ascribed to each of the advantage and disadvantages.

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