

**Wireless communication** is the transfer of information over a distance without the use of enhanced electrical conductors or "wires".<sup>[1]</sup> The distances involved may be short (a few meters as in television remote control) or long (thousands or millions of kilometers for radio communications). When the context is clear, the term is often shortened to "wireless". Wireless communication is generally considered to be a branch of [telecommunications](#).

It encompasses various types of fixed, mobile, and portable [two-way radios](#), [cellular telephones](#), [personal digital assistants \(PDAs\)](#), and [wireless networking](#). Other examples of *wireless technology* include [GPS units](#), [garage door openers and or garage doors](#), wireless [computer mice](#), [keyboards](#) and [headsets](#), [satellite television](#) and cordless [telephones](#).

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## [edit]Introduction



Handheld wireless radios such as this Maritime VHF radio transceiver use electromagnetic waves to implement a form of wireless communications technology.

**Wireless operations** permits services, such as long range communications, that are impossible or impractical to implement with the use of wires. The term is commonly used in the telecommunications industry to refer to telecommunications systems (e.g. radio transmitters and receivers, remote controls, computer networks, network terminals, etc.) which use some form of energy (e.g. [radio frequency](#) (RF), [infrared](#) light, [laser](#) light, visible light, acoustic energy, etc.) to transfer information without the use of wires.<sup>[2]</sup> Information is transferred in this manner over both short and long distances.

## [edit]Wireless communication



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The term "wireless" has become a generic and all-encompassing word used to describe communications in which electromagnetic waves or RF (rather than some form of wire) carry a signal over part or the entire communication path. Common examples of wireless equipment in use today include:

- Professional LMR ([Land Mobile Radio](#)) and SMR (Specialized [Mobile Radio](#)) typically used by business, industrial and Public Safety entities.
- Consumer [Two Way Radio](#) including FRS (Family Radio Service), GMRS (General Mobile Radio Service) and Citizens band ("CB") radios.
- The [Amateur Radio](#) Service ([Ham radio](#)).
- Consumer and professional [Marine VHF radios](#).
- [Cellular telephones](#) and pagers: provide connectivity for portable and mobile applications, both personal and business.
- [Global Positioning System](#) (GPS): allows drivers of cars and trucks, captains of boats and ships, and pilots of aircraft to ascertain their location anywhere on earth.
- [Cordless computer peripherals](#): the cordless mouse is a common example; keyboards and printers can also be linked to a computer via wireless.
- [Cordless telephone](#) sets: these are limited-range devices, not to be confused with cell phones.
- [Satellite television](#): allows viewers in almost any location to select from hundreds of channels.
- [Wireless gaming](#): new gaming consoles allow players to interact and play in the same game regardless of whether they are playing on different consoles. Players can chat, send text messages as well as record sound and send it to their friends. Controllers also use wireless technology. They do not have any cords but they can send the information from what is being pressed on the controller to the main console which then processes this information and makes it happen in the game. All of these steps are completed in milliseconds.

## [\[edit\]](#) **Situations Justifying Use of Wireless Technology**

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[Wireless networking](#) (i.e. the various types of unlicensed 2.4 GHz WiFi devices) is used to meet many needs. Perhaps the most common use is to connect laptop users who travel from location to location. Another common use is for mobile networks that connect via satellite. A wireless transmission method is a logical choice to network a LAN segment that must frequently change locations. The following situations justify the use of wireless technology:

- To span a distance beyond the capabilities of typical cabling,
- To provide a backup communications link in case of normal network failure,
- To link portable or temporary workstations,

- To overcome situations where normal cabling is difficult or financially impractical, or
- To remotely connect mobile users or networks.

## [\[edit\]](#) Modes of Wireless Communication

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*Wireless communication* can be via:

- [radio](#) frequency communication,
- [microwave](#) communication, for example long-range line-of-sight via highly directional antennas, or short-range communication, or
- [infrared](#) (IR) short-range communication, for example from [remote controls](#) or via [Infrared Data Association](#) (IrDA).

Applications may involve [point-to-point communication](#), [point-to-multipoint communication](#), [broadcasting](#), [cellular networks](#) and other [wireless networks](#).

## [\[edit\]](#) Difference between Wireless and Cordless

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cable or cord to limit the mobility of the cordless device through a connection to the mains power The term "wireless" should not be confused with the term "[cordless](#)", which is generally used to refer to powered electrical or electronic devices that are able to operate from a portable power source (e.g. a battery pack) without any supply. Some cordless devices, such as cordless telephones, are also wireless in the sense that information is transferred from the 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", for example in [Digital Enhanced Cordless Telecommunications](#).

In the last fifty years, wireless communications industry experienced drastic changes driven by many technology innovations.

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## History

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### [\[edit\]](#) Photophone

*Main article: [Photophone](#)*

The world's first, wireless telephone conversation occurred in 1880, when [Alexander Graham Bell](#) and [Charles Sumner Tainter](#) invented and patented the [photophone](#), a telephone that conducted audio conversations wirelessly over modulated [light beams](#) (which are narrow projections of [electromagnetic waves](#)). In that distant era when utilities did not yet exist to provide [electricity](#), and [lasers](#) had not even been conceived of in [science fiction](#), there were no practical applications for their invention, which was highly limited by the availability of both sunlight and good weather. Similar to [free space optical communication](#), the photophone also required a clear line of sight between its transmitter and its receiver. It would be several decades before the photophone's principles found their first practical applications in [military communications](#) and later in [fiber-optic communications](#).

## **[edit]**Radio

*Main article: [History of radio](#)*

The term "wireless" came into public use to refer to a radio receiver or [transceiver](#) (a dual purpose receiver and transmitter device), establishing its usage in the field of wireless telegraphy early on; now the term is used to describe modern wireless connections such as in cellular networks and wireless broadband Internet. It is also used in a general sense to refer to any type of operation that is implemented without the use of wires, such as "wireless remote control" or "wireless energy transfer", regardless of the specific technology (e.g. [radio](#), [infrared](#), [ultrasonic](#)) that is used to accomplish the operation. While [Guglielmo Marconi](#) and [Karl Ferdinand Braun](#) were awarded the 1909 [Nobel Prize for Physics](#) for their contribution to wireless telegraphy.

## **[edit]**Early wireless work

[David E. Hughes](#), eight years before Hertz's experiments, transmitted radio signals over a few hundred yards by means of a clockwork keyed transmitter. As this was before Maxwell's work was understood, Hughes' contemporaries dismissed his achievement as mere "Induction". In 1885, [T. A. Edison](#) used a vibrator magnet for induction transmission. In 1888, Edison deployed a system of signaling on the Lehigh Valley Railroad. In 1891, Edison obtained the wireless patent for this method using inductance ([U.S. Patent 465,971](#)).

In the *history of wireless technology*, the demonstration of the theory of [electromagnetic waves](#) by [Heinrich Hertz](#) in 1888 was important.<sup>[3][4]</sup> The theory of electromagnetic waves was predicted from the research of [James Clerk Maxwell](#) and [Michael Faraday](#). Hertz demonstrated that electromagnetic waves could be [transmitted](#) and caused to travel through space at straight lines and that they were able to be [received](#) by an experimental apparatus.<sup>[3][4]</sup> The experiments

were not followed up by Hertz. [Jagadish Chandra Bose](#) around this time developed an early wireless detection device and help increase the knowledge of millimeter length electromagnetic waves.<sup>[5]</sup> Practical applications of wireless radio communication and radio remote control technology were implemented by later inventors, such as [Nikola Tesla](#).

*Further information: [Invention of radio](#)*

## **[edit]**The electromagnetic spectrum

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Light, colors, AM and FM radio, and electronic devices make use of the electromagnetic spectrum. In the US, the frequencies that are available for use for communication are treated as a public resource and are regulated by the [Federal Communications Commission](#). This determines which frequency ranges can be used for what purpose and by whom. In the absence of such control or alternative arrangements such as a privatized electromagnetic spectrum, chaos might result if, for example, airlines didn't have specific frequencies to work under and an [amateur radio](#) operator were interfering with the pilot's ability to land an [airplane](#). Wireless communication spans the spectrum from 9 kHz to 300 GHz. (Also see [Spectrum management](#))

## **[edit]**Applications of wireless technology

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### **[edit]**Security systems

Wireless technology may supplement or replace hard wired implementations in security systems for homes or office buildings.

### **[edit]**Television remote control

Modern televisions use wireless (generally infrared) remote control units. Now radio waves are also used.

### **[edit]**Cellular telephone (phones and modems)

Perhaps the best known example of wireless technology is the [cellular telephone](#) and [modems](#). These instruments use radio waves to enable the operator to make phone calls from many locations worldwide. They can be used anywhere that there is a cellular telephone site to house the equipment that is required to transmit and receive the signal that is used to transfer both voice and data to and from these instruments.

### **[edit]**Wi-Fi

*Main article: [Wi-Fi](#)*

Wi-Fi is a wireless [local area network](#) that enables portable computing devices to connect easily to the [Internet](#). Standardized as [IEEE 802.11 a,b,g,n](#), Wi-Fi approaches speeds of

some types of wired [Ethernet](#). Wi-Fi hot spots have been popular over the past few years. Some businesses charge customers a monthly fee for service, while others have begun offering it for free in an effort to increase the sales of their goods.<sup>[6]</sup>

## [edit] **Wireless energy transfer**

*Main article: [Wireless energy transfer](#)*

Wireless energy transfer is a process whereby electrical energy is transmitted from a power source to an electrical load that does not have a built-in power source, without the use of interconnecting wires.

## [edit] **Computer Interface Devices**

Answering the call of customers frustrated with cord clutter, many manufactures of computer peripherals turned to wireless technology to satisfy their consumer base. Originally these units used bulky, highly limited transceivers to mediate between a computer and a keyboard and mouse, however more recent generations have used small, high quality devices, some even incorporating [Bluetooth](#). These systems have become so ubiquitous that some users have begun complaining about a lack of wired peripherals.<sup>[who?]</sup> Wireless devices tend to have a slightly slower response time than their wired counterparts, however the gap is decreasing. Initial concerns about the security of wireless keyboards have also been addressed with the maturation of the technology.

Many scientists have complained that wireless technology interferes with their experiments, forcing them to use less optimal peripherals because the optimum one is not available in a wired version.<sup>[who?]</sup> This has become especially prevalent among scientists who use [trackballs](#) as the number of models in production steadily decreases.

## [edit] **Categories of wireless implementations, devices and standards**



Look up *wireless* in Wiktionary, the free dictionary.

- [Radio communication system](#)
- [Broadcasting](#)
- [Amateur radio](#)
- [Land Mobile Radio](#) or [Professional Mobile Radio](#): [TETRA](#), [P25](#), [OpenSky](#), [EDACS](#), [DMR](#), [dPMR](#)

- **Communication radio**
- **Cordless telephony:**DECT (Digital Enhanced Cordless Telecommunications)
- **Cellular networks:** 0G, 1G, 2G, 3G, Beyond 3G (4G), Future wireless
- **List of emerging technologies**
- **Short-range** point-to-point communication : **Wireless microphones**, **Remote controls**, **IrDA**, **RFID (Radio Frequency Identification)**, **Wireless USB**, **DSRC (Dedicated Short Range Communications)**, **EnOcean**, **Near Field Communication**
- **Wireless sensor networks:** **ZigBee**, **EnOcean**; **Personal area networks**, **Bluetooth**, **TransferJet**, **Ultra-wideband (UWB from WiMedia Alliance)**.
- **Wireless networks:** **Wireless LAN (WLAN)**, (**IEEE 802.11** branded as **Wi-Fi** and **HiperLAN**), **Wireless Metropolitan Area Networks (WMAN)** and **Broadband Fixed Access (BWA)** (**LMDS**, **WiMAX**, **AIDAAS** and **HiperMAN**)

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## Wireless Technologies

To support networking solutions that consumer electronic devices and appliances can plug into, Microsoft is working on a range of wireless technologies to enable a robust set of user scenarios for local area networks (LANs), personal area networks (PANs), and wide area networks (WANs).

Windows provides extensive Native 802.11 support, which is the widely adopted standard for high-speed networking across wireless local area networks (WLANs).

Windows includes built-in support for Bluetooth wireless technology. Compatible hardware complies with the H:2 (USB) HCI specification for Bluetooth wireless technology. The hardware vendor does not have to provide a separate driver. Bluetooth L2CAP protocol drivers should use KMDF or a device-class-specific driver model such as AVStream. Drivers for RFCOMM devices should use UMDf.

## WiFi - Wireless fidelity - Wifi Technology - Wi-Fi Networks

**Wi-Fi** is wireless technology which enable connection between two or more devices wirelessly for data sharing puposes.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 **wireless technology**.

Computer usage has dramatically increased in past few years which in result brought immense technology enhancement in every field possible. Technology has reached to its heights but thirst of knowledge is still in race and will always be till end of the world. Wireless communication between computers is certainly one of the most appreciated and used technology globally. In "Computers" Wi-Fi replaced traditional wired networks between two or more computers, it enabled file transferring from server to clients and vice versa possible without wires, networking cards, hubs and other important networking related hardware. Using Wi-Fi internet connection can be shared among computers with minimum usage of hardware, **WLAN** cards enable feature of **wireless networking** among devices, wireless routers help to broadcast wireless networking signals in given area.

WiFi is a long-distance, transportable connectivity technology for individual, business or for certain geographical area. Millions of people all over the world use WiFi in their homes to converse to anyone on the planet with WiFi connected devices. This technology was make-believe by the **Institute of Electrical and Electronic Engineers** in 1997. Through wifinotes.com you can take pleasure in the experiencing precisely what is all about wireless networks. Here you can get detailed information about WiFi, how it works, WiFi Security which tools protect your wireless network more etc. Enjoy knowledge of broad selection of W-Fi product such as Desktop Wireless Wi-Fi Cards, Laptop / Notebook Wireless Wi-Fi Cards, Wireless Wi-Fi Routers, Wireless Wi-Fi USB Adapters, and Handhelds and PDAs.

Wifinotes.com comprehended the wifi limitations as security concerns, interference from other devices, and lacking high-quality media streaming, terminologies such as **gigahertz**, wibro, hotspot, wifi finder, and access point, features, pan including loss of confidentiality, loss of integrity, loss of avaiability, and solution like management solutions, operational solutions, and technical solutions and types of network as you get more about wifi. If you are going to make a wireless network and you are looking for how to do it ? then you are at very right place here you will spend less time and learn more because we are here for those who want a bit more . Now days every one has crazed of wireless network due to services beyond imagination. Here you will find all features of wifi where you can understand how much useful they are for you. Browse each section of website to understand concept of wireless networking.

Wi-Fi is on going technology, every now and then some thing new in wireless technology shows up. Wi-Fi technology is by far the most used technology world wide as every one is realizing growing needs for being wireless which is impacting our daily lives and our businesses. In below section we will talk about latest news related to Wi-Fi from around the world wide.

## Security of wireless network - Wireless network security

As we know that wireless, technology becomes very famous among all the aspects of different technologies of computer networking of present era. Wireless networks really provide the convenient and easy approach to communications between different areas. In this technological World, there are many networking technologies

present in the field of computer networking for the sake of benefit of humanity such as internet, Ethernet, DSL and many more. Among these wired technologies, some wireless technologies are also present for example broadband wireless networking, WiFi etc. Wireless technologies basically designed to reduce the time and different type of obstacles created by the cables.

Therefore, wireless networks have more convenient working as compared to other type of wired networking. Wireless network is the type of the computer networking in which computer is connected with the different telecommunication devices wirelessly. It is used for the sake of different purposes such as communication or data transmission etc. these all types of transmission that is related to the wireless networks are carried out with help of different types of waves which have micro wavelength in nature.

### **Types of Wireless networks**

Wireless networks are categorized into three basic types that are almost used in every configuration of the networks wirelessly. These types are as follows

- Wide Area Network (WAN)
- Local Area Network (LAN)
- Personal Area Network (PAN).

### **Wireless Network Security:**

As there are different technologies that are very sensitive to small viruses as well as the viruses of dangerous types. For securing these kind of threats wireless networking designed a special setup that is called as wireless network security. It is defined as the protection of the security provided to different types of networking technologies and also to the networking media from the unspecified and unauthenticated access to the network and avoid the destruction of the network is referred to as wireless network security. As we know that there are different types of threats and spam come from different types of browsers and corrupt the whole networking media and slows down the working of the computer and the network. But the wireless networking technology suggests different types of hardware and the software ways to get rid of such kind o security problems.

### **Different Ways to Secure the Wireless Network:**

As wireless technology develop[s different ways to get rid of the critical problems created by the wireless network security. Some important ways to securing your wireless networks from different types viruses Trojans and also some kind of dangerous spam are as follows

1. Wireless Encryption Privacy (WEP)
2. Limitations of Access Points
3. Authentication

### **Wireless Encryption Privacy (WEP):**

First method to secure the wireless network security is the encryption of the data that has to be transmitted on the wireless network for the transferring the information from one place to another. Different types of encryption processes are used to secure the data and the whole network form different types of destruction from security problems such as hardware solutions, software solutions, in some other solutions the whole mechanism of the access points would be change etc. but to the complications in setting the encryption it fails in walk of securing the wireless network.

### **Authentication:**

Another important way to secure the network is the authentication. It is the process in which the default password of the wireless networking device is changed and assigns the new and the secret password and the username again. If we cannot change the default password any one can use your private data and information on the network.

#### **Limitation of Access Points:**

Limitation of access points is the fast and the safer way to secure the whole network from different types of threats. In this process different types of securities take part specially MAC security plays a vital role in securing the complete wireless networking system.

#### **How to Setup Wireless network:**

##### **Required Hardware:**

To configure the wireless network on your personal computer we need different types of hardware. This hardware is connected with the computer in such a way that it can provide the easy and the convenient access to the network. The hardware that is used in setting up the wireless network is as follows

- Wireless Router
- Ethernet cable or modem
- DSL broadband connection
- Different type of network adapter cards
- Second Ethernet cable

##### **Setting up the Network:**

In this step, we have to arrange the above given hardware in such a way that it runs the network wirelessly and provide the users the easiest approach to the network. First of all, make the connection between the router and your system by connecting the required Ethernet cable with the wireless local area network router through the routing port present at the backside of the wireless routing device. When this connection is complete then connect the second given Ethernet cable with wide area network port of the router. After these connection start the router and do initialization requirements of the router. In this step if your connection to the internet has been configured then move to connect the internet wirelessly and if you are not able to connect to the internet then check out the cable connected between the system and the router. Then again, turn on the router and check the connectivity.

##### **Router Configuration:**

After the successful connection between hardware and the system then it's time to configure the router, that is the main source of networking wirelessly. Open the configuration wizard and follow the instructions given on the screen. Once you complete the configuration of the router then you personalize your router from other resources and have a safe networking access to the internet technology.

##### **Configure the Networking Adapters:**

The final and the last step in setting up the wireless network is the installation of the different types of the networking adapters or cards. There are different types of wireless access cards such as PCI or USB wireless card etc. First, install the card in the system and then install its required software by following the instructions given in the opening wizard of the software.

##### **Receiver:**

The last and the final device that is required for wireless networks is the receiver. It is the type of device that receives the signals in the form of radio signals transmits from the wireless router is called as receiver. It only receives those data transferring signals that are emitted from the routing device and carried out its required working.



## WiFi Products - Wireless networking hardware - WLAN Products

There are several products available now which enable to connect to Wi-Fi Networks around the area. Earlier when WiFi was first started commercially, there were not many devices came built with Wifi network card (Wireless card) which connects to wifi network. But now almost every handset device on mobile comes with Wifi, 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 wifi cards enable desktop computers to connect to wi-fi network available in the area. Wifi 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. Wifi desktop cards are mostly plugged in Mother board on PCI slot. Some mother board comes with built in wifi connectivity

### Laptop / Notebook Wireless Wi-Fi Cards



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

### Wireless Wi-Fi Routers



Wireless WiFi routers is used to connect clients( having WiFi cards ) with server. Wifi 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 wifi card already into their systems, they can use USB Wifi drive which connects to USB port on systems and performs as WiFi cards. However USB wifi drive comes with relevantly lesser data transfer capability and lesser range.

### Handhelds and PDAs

Almost all handsets and PDAs manufactures install Wireless network card to their products. PDAs(Personal digital assistance) and other mobile devices scans WiFi network around, if found can connect to network for Surfing and file sharing.

## Wireless Internet Technology

The internet technology was established by the scientists or the people of 1960s. At that time they observe that different people want to share different kind of information and researches with others almost in every field. As a result of these thinking internet become so popular among the people and now a days it become powerful and useful technology of communication. Few years back Wireless has grown rapidly and the people especially travelers search for the WIFI 'hot spots' to use the internet technology wirelessly.

An internet technology which operates wirelessly with high speed, high data transfer rate at any location any time is referred to as Wireless Internet technology. This technology is being into use as a result of wireless networks and telecommunication network. 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 technology allows us to use our equipment 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 device. Wireless Internet operates with two basic tools: 1) a type of card in your computer that receives the wireless signal and 2) a nearby device called an access point or base station that emits the wireless signals. With these explanations we can think about to do work on internet wirelessly.

### **Applications of Wireless Internet Technology:**

Wireless internet is applicable almost on all types of communication networks such as telecommunication networks, browsing etc. There are different kinds of residential applications of this technology such as fast internet, good downloading speed, voice chat easily and television also. It is also applicable on different types of businesses like web hosting, ASPs, video conference, data transferring, VPNs, PBX etcetera are many more emerging technologies which enhances the wireless internet technology such as Gigabit Ethernet, passive optical network, optical switching, mobile IP and Video IP. As wireless Internet technology advances, personal digital assistants, blackberry devices, and other cell phones or personal computer hybrids will likely increasingly on non-fiber based transmissions. Over the past two years wireless networking has reached further into spaces it has not penetrated before, and you can often find connections in coffee shops, airport lounges and hotels. Some cities are even running wireless broadband networks that cover whole districts and boroughs.

### **Main Reasons of Popularity :**

Some of the main reasons which make the wireless internet popular are

1. Convenience as you can use this network interface at home, the office or anywhere else without hassle.
2. If you are moving to a new location, you can transfer the interface and install it at your new location easily.
3. There is no need for an Ethernet cable to connect computers to each other.
4. W LANs are available anywhere in the world at an affordable cost.

### **Pros of Wireless Internet Technology:**



1. Wireless internet provides super fast broadband speed with no wires and cables.
2. Lot of computers can be attached at the same time with the help of router.
3. Initial costs to the service provider too are reduced as they do not have to lay out expensive cables or pay highly for satellite transmission.
4. Mobility supports productivity.
5. Wireless solutions can provide users with access to real-time information from more places in their organization.

#### **Cones of Wireless Internet Technology:**

1. The technology can be un predictable.
2. There are large chances of disturbance of wireless traffic and hacking up your connection.
3. Your neighbor can steel your internet off by sharing it and your connection becomes slowly hacked.

## **Types of Wireless Technology**

### **There May Be More Than You Think**

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**Among these types of wireless technology you'll likely find some important ones that you didn't even know existed.**

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There are several ways of categorizing the different *types of wireless technology*.

To create types that are easy to recognize and easy to understand, rather than perfect technical definitions...

**Here are the main types, listed as *applications***

- **Voice Communications**
- **Remote Control**
- **Remote Measurement**
- **Item Tracking**
- **Entertainment**
- **Navigation and Location**
- **Quality Management**
- **Risk Management**

- **Networking**
- **Monitoring**
- **Energy Management**
- **Wireless Power Transfer**

There is some overlap between these types of wireless technology...

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- **Voice Communications**

This is where it all started... people just talking to each other over radios, each the size of about a hundred cellphones! While it was nice to communicate with an actual person, it was a very *slow* way to exchange information.

And wireless is good for *much more* than just a two-way voice conversation. Cellphones are now the preferred means of voice communication, but they also allow texting and internet access.

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- **Remote Control**

There are many types of wireless technology remote controllers and you'll already know about some of these... but some are a bit less well-known...

- Wireless doorbell
- TV remote
- Car remote access key ring
- Garage door opener
- Heat pump remote
- Wireless dog fence
- CD and DVD player controller
- Interactive games controller
- Remote control of your house lights using your cellphone
- Remote control of spacecraft from an earth station

Some control applications are more sophisticated than others, and usually require the thing they are controlling to *acknowledge* that it has correctly received the command... and acted on it!

Otherwise it's just a case of *send, and hope the other party received what you sent*. Not ideal, but now we can do better than this.

Getting that *acknowledgement* tells you the *command was successful*. Not getting it allows you the option of trying again... as many times as you like, to get the result you want. And if you *don't* get it? Well, at least you know!

If the sender and the receiver have an agreed set of rules (protocol) on how they'll communicate with each other, things go much more smoothly. A bit like people driving cars ... road rules are the protocol that keeps the traffic flowing smoothly.

Most types of wireless technology share this hidden, but very important function. Wireless protocols do the same for wireless traffic, minimizing collisions between packets of data traveling on the same wireless superhighway.

*Wireless protocols* are allowing wireless devices to co-operate at ever-increasing levels of sophistication – making the whole wireless world, not just controllers, more efficient, reliable and dependable.

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- **Remote Measurement**

This is a rapidly growing area of wireless technology that allows things that we're already measuring to be measured more cheaply, and make measurements that were just too expensive before...

And we can now measure things we technically *couldn't* before...



And soon we'll be able to measure things we don't yet even know we want to measure!

Here's an example of one of the *types of wireless technology* that's growing fast...

- Electricity Utility Companies are increasingly reading house supply meters remotely, using a wireless link between the electricity meter and the company.

This reduces costs because a meter reader doesn't have to go to each house to read, and record, the display on each meter. It also allows accurate billing as it's based on an *actual* reading, rather than the *estimate* presented if the meter reader wasn't able to get access to read the meter.

If you'd like more information on remote measurement, or measuring something at a distance, check out [wireless telemetry](#).

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- **Item Tracking**

You can now track items easily, accurately and cheaply by attaching wireless **R**adio **F**requency **I**Dentification (RFID) tags to them.

A special *RFID reader* is used to read the tags.

Each tag has a unique number and allows you to track...

- Products
- Items in a store
- Vehicles
- Assets
- Animals



- Laboratory samples
- and even patients in a hospital... this type of wireless technology can significantly reduce the risk of misadventure when things get busy and resources are scarce!

You can probably already think of some other uses for RFID tags.

RFID tags minimize the risk of getting items mixed up. Identification is positive and instant and if needed, additional information can be added to, and read from, the tag.

[Here's an answer to the question, what is RFID?](#)

[Here are some ways you can use RFID, in an RFID System](#)

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- **Entertainment**

Entertainment is one of the types of wireless technology that is going to allow us to have some quite surreal experiences in the years to come. But a simple application, being able to record or listen to music without being tethered by a wire lets you do other things at the same time and is great if you need to move around.

Here are some products that are popular for wireless entertainment...

- Wireless speakers
  - Wireless headphones
  - Wireless earbuds
  - Wireless Microphone
  - Wireless home theatre
  - Interactive wireless games
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- **Navigation and Location**

Global Positioning Systems are becoming one of the more popular types of wireless technology for navigation and location.

A GPS works out its position from the time it takes radio signals to travel to (usually) three satellites in space. The position of the satellites is accurately known at this time. And if you use a local reference station, the position can be pinned down to within two meters.

- A GPS, with display and voice instruction, can help you navigate your car.
- It can minimize the time for services to reach the scene of an emergency.
- You can use one to locate objects, to keep them inside a specified area.
- You can use a GPS to measure movement in bridges, or buildings, to monitor the effects of wind and vehicle loading.
- GPS is indispensable for land surveying and mapping physical features.
- GPS is also useful for mapping air currents when installed in a balloon, or ocean currents when installed in a free-floating buoy.

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- **Quality Control**

- **Damage to fragile products**

If you're a supplier, your reputation depends on the care, skill and integrity of the company that transports your products to the customer. Sometimes this can be a bit of a lottery. With the right sensors and wireless connections you can now track their progress.

While goods *can* be insured, the insurance company may not cover you for late delivery... or loss of reputation. Now *blind faith* can be replaced by *remote assurance*.

Rough handling can easily damage fruit, vegetables and breakable items. But now you can remotely monitor and record any rough treatment that takes place when you send your produce, whether locally or internationally.

- **Exposure to excessive temperature**

Heat can spoil food items but it's easy to record the temperature that the goods are exposed to and send an alarm via a wireless link if the temperature exceeds an amount that's been specified by you and programmed into the system.

- **Exposure to excessive humidity**

High humidity may encourage the growth of mould on some types of fruit, especially if the minimum temperature has also been exceeded. This is another *easy to measure* condition that can be used to generate a wireless alarm.

- All of these can be *continuously* monitored.

Monitoring *acceleration* can tell you a lot about the conditions that may have led to the bruising of a cargo of fruit, or *temperature* if it arrives in an over-ripe condition. Or *humidity and temperature* might explain the cause if it's been affected by mould.

This type of wireless technology, monitoring, is in the interests of both parties...

**The shipping agent**

Can prove that the goods have been handled reasonably during transport.

**The producer**

Can prove that the goods have *not* been handled reasonably during transport.

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- **Risk Management**

Of all the types of wireless technology sensors have the widest range of possible applications. Wireless sensor networks can provide early warning of an Impending catastrophe and they can also provide valuable information on its progress to let you to respond in an informed way, so you don't have to guess – guessing isn't the best when lives and property are at risk.

Here are some examples of one of the least direct types of wireless technology...

- Tracking and monitoring vital signs of firefighters in a burning building
- Monitoring river water levels in a catchment to provide flood warning
- Monitoring sea level in strategic locations to provide Tsunami warning
- Monitoring structures such as bridges for overloading
- Monitoring for toxic substances in waterways

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- **Networking**

Of all the *types of wireless technology*, wireless networking underpins the others, as each can potentially become part of a wireless network.

- **Personal Area Network (PAN)**. This covers your immediate working area and you can use it to wirelessly connect your computer, keyboard, mouse and printer. Then on a larger scale...
- **Local Area Network (LAN)**. This covers an area such as a building and allows several computers to share a single Internet connection. Then on an even larger scale...
- **Metropolitan Area Network (MAN)** This may cover the area of a city and is often used to connect LANs to the Internet.
- **Wide Area Networks (WAN)** are nation wide or even international. The world's largest WAN is the Internet.
- **Sensor networks** You may have several clusters of sensors, where each sensor is connected to a LAN and the LAN may be connected to the Internet.

- **Cellular networks** This is one of the more important types of wireless technology and is commercially unstoppable due to the massive worldwide demand. Your cellphone connects through a local radio cellular transceiver (sometimes called a node). The local nodes are interconnected nationally via a WAN. The main difference between this and other networks is that when a mobile phone goes out of range of one node, it has to be handed over to another nearer node or your phone conversation will stop abruptly!
- **The Internet** This is the largest network in the world. It's a network of networks that uses many different types of wireless technology.

[Here's an answer to the question, \*\*how does wireless Internet work?\*\*](#)

Check here for information on [wireless networking standards](#)

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- **Remote Monitoring**

This type of wireless technology, remote monitoring, always involves the use of some kind of sensor. Here are a few examples of wireless monitoring...

- The monitoring of patients' heartbeat, blood pressure and other vital signs.
  - Monitoring buildings for signs of fire, by sensing smoke, heat or flame.
  - Monitoring the security of premises using video or Passive Infrared sensors.
  - Monitoring pets to ensure they stay in certain areas, and stay out of others.
  - Monitoring machinery for overheating or excessive vibration.
  - Monitoring water for level, flow rate, dissolved oxygen, suspended sediment, electrical conductivity, acidity or presence of living organisms.
  - Monitoring the air temperature, humidity, wind speed and direction.
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- **Energy Management**

- **Maintaining a comfortable environment**

In a working environment, such as a large office, careful management using a closed loop system with distributed wireless sensors, allows you to use energy more efficiently... minimizing waste caused by raising the air temperature excessively, allowing it to become uncomfortably hot, while maintaining adequate ventilation and humidity levels.

- **Controlling Processes**

Closely controlling energy-intensive processes, such as some factory production lines, can bring about a significant savings in energy and reduction in costs.

Many of these processes are partially or fully automated these days, but often this is to save labour costs rather than energy.

To improve your energy efficiency you first have to establish a bench mark... record the amount of energy you're using now... *before* implementing energy saving methods. Otherwise you won't know how much (or how little) energy and dollars you're saving after you put the energy saving changes in place.

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- **Power Transfer**

Here are some examples of types of wireless technology that are used to supply power...

- A computer mouse receiving energy wirelessly from a special active mouse pad.
  - Wireless stereo headphones with internal batteries recharging via a re-charge docking station where they are placed when not in use.
  - An electric toothbrush wirelessly receiving energy from its docking holder to charge its batteries.
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