

# Wireless Personal Area Network

A wireless personal area network (WPAN) is a type of personal network that uses wireless communication technologies to communicate and transfer data between the user's connected devices. It allows an individual to connect all or most of his or her devices together and access the Internet or a local network using any of the native/supported wireless communication techniques.

Wireless Personal Area Network in short known as WPAN. Actually WPAN is PAN (Personal Area Network) where the interconnected devices are centered around a person's workspace and connected through wireless medium. That's why it is also called as Person's centered short range wireless connectivity. Typically, the range is within about 10 meters means very short range.

As in WPAN mostly the connection between the devices happens within the building or in a room (short range) So, let's take an example of WiFi connection through which two friends are chatting, sharing documents with each other in room.

Some more examples of WPAN includes Wireless mouse, Wearable devices, USB flash drives, Digital cameras, Bluetooth, Wi-Fi, Thermostats, Security systems, Lighting controls, Motion sensors, Personal server and Leak sensors etc.

As per IEEE, Wireless Personal Area Network is classified into 3 classes i.e

1. High-rate WPAN (HR-WPAN) : It is defined in the IEEE 802.15.3 standard. Data throughput is > 20 Mbps.
2. Medium-rate WPAN (MR-WPAN) : It is defined in the IEEE 802.15.1 standard. Data throughput is 1 Mbps.
3. Low-rate WPAN (LR-WPAN) : It is defined in the IEEE 802.15.4 standard. Data throughput is < 0.25 Mbps.

**Here are the main characteristics of a WPAN:**

- Short-range communication
- Low power consumption
- Low cost

- Small personal networks
- Communication of devices within a personal space

While providing these features, a WPAN has to achieve two main goals: broad market applicability and device interoperability.

### **Applications of WPAN:**

- Short range connectivity for multimedia applications
- Hands free devices connection
- Industrial sensor applications

### **WPAN Topologies:**

As mostly use of WPAN is within short range so it is mainly used for general purpose uses and with little industrial requirement implementations which supports below network connectivity arrangements (network topology)

- Star Topology
- Mesh Topology
- Cluster Tree Topology

### **Technologies used in WPAN:**

- Bluetooth
- ZigBee
- Infrared
- Z-wave
- Wireless Body Area Network (WBAN)

### **Features of WPAN:**

- Low cost, Little or No infrastructure setup
- Short range communication
- Small personal network, use anywhere
- Wide range of devices

- Low power consumption
- No complex connectivity

**Advantages of WPAN:**

- Security
- Portability
- Easy Connectivity
- Stability

**Disadvantages of WPAN:**

Short range

Transfer speed

## **LAN(Local Area Network)**

**LAN** stands for **Local-area Network**. It is a [computer network](#) that covers a relatively small area such as within a building or campus of up to a few kilometers in size. LANs are generally used to connect personal computers and workstations in company offices to share common resources, like [printers](#), and exchange information.

**How Do LANs Work?**

A router serves as the hub where the majority of LANs connect to the Internet. Home LANs often utilise a single router, but bigger LANs may also use network switches to transmit packets more effectively.

LANs nearly always connect devices to the network via Ethernet, WiFi, or both of these technologies. Ethernet is a physical network connection protocol that calls for Ethernet cables. WiFi is a protocol for using radio waves to connect to a network.

Servers, desktop computers, laptops, printers, Internet of Things (IoT) devices, and even game consoles can connect to LANs. LANs are frequently used in offices to give internal staff members shared access to servers or printers that are linked to the network.

## Types of LAN

There are mainly two types of LANs exist.

- **Client/Server LANs:** Multiple devices (the clients) are connected to a main server in a client/server LAN. The server controls network traffic, device access, application access, and file storage. Any connected device that runs apps or accesses the Internet qualifies as a client. Clients can use wired or wireless connections to connect to the server.
- **Peer-to-Peer LANs:** Peer-to-peer LANs are often smaller because they lack a central server and can't support huge workloads like client/server LANs can. Every device on a peer-to-peer LAN contributes equally to the network's operation. Through wired or wireless connections to a switch or router, the devices share data and resources. Peer-to-peer networks are the norm in homes.

## What are the Benefits of a LAN?

- **Privacy:** LAN is a private network, thus no outside regulatory body controls it, giving it a privacy.
- **High Speed:** LAN offers a much higher speed(around 100 mbps) and data transfer rate comparatively to WAN.
- **Supports different transmission mediums:** LAN support a variety of communications transmission medium such as an Ethernet cable (thin cable, thick cable, and twisted pair), fiber and wireless transmission.
- **Inexpensive and Simple:** A LAN usually has low cost, installation, expansion and maintenance and LAN installation is relatively easy to use, good scalability.

## What are the Drawbacks of LAN?

- The initial setup costs of installing Local Area Networks is high because there is special software required to make a server.
- Communication devices like an ethernet cable, switches, hubs, routers, cables are costly.
- LAN administrator can see and check personal data files as well as Internet history of each and every LAN user. Hence, the privacy of the users are violated
- LANs are restricted in size and cover only a limited area
- Since all the data is stored in a single server computer, if it can be accessed by an unauthorized user, can cause a serious data security threat.