

BLUETOOTH

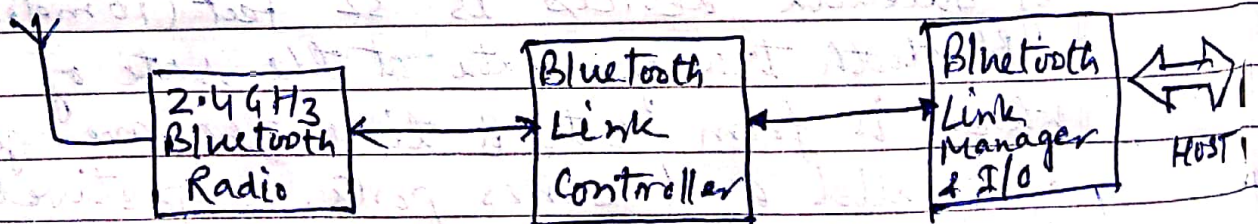
Bluetooth is a form of wireless communication and can be used to pass information to bluetooth enabled devices such as fixed computers, mobile phones, mobile computers, digital cameras etc. It is a high speed, low power microwave wireless link technology, to connect phones, laptops, PDAs and other portable equipment together with no work by the user. There are no charges for delivering a message using bluetooth. Bluetooth is a method of communication for sending and receiving information such as messages, files and data within short range of distance. It can be used wirelessly synchronise and transfer data among devices.

Bluetooth wireless technology is intended to replace the cables connecting portable and/or fixed devices while maintaining high level of security; operating at 2.4 GHz and is capable of transmitting voice and data. The effect range of bluetooth devices is 32 feet (10 meters).

Bluetooth transfer data at the rate of 1 Mbps, which is from 3 to 8 times the average speed of parallel and series ports, respectively.

It is also known as the IEEE 802.15 standards. Bluetooth technology has global acceptance. A fundamental bluetooth wireless technology strength is the ability to simultaneously handle both data and voice transmission.

→ This technology is inexpensive, short range transceivers into the electronic devices. The radio operates on the globally-available unlicensed radio band, 2.45 GHz (meaning there is no barrier for international travellers using bluetooth-enabled equipment); and support data speeds of up to 721 kbps, as well as three voice channels. The bluetooth modules can be ~~either~~ either built into electronic devices or used as an adaptor. Each device has a unique 48 bit address from the IEEE 802 standard. Connections can be point to point or multipoint. The maximum range is 10 meters, but can be extended to 100 meters by increasing the power. Bluetooth devices are protected from radio interference by changing their frequencies arbitrarily upto a maximum of 1600 times a second, a technique known as frequency hopping.



Bluetooth System Operation

Bluetooth radio modules avoid interferences from other signals by hopping to a new frequency after transmitting or receiving a packet.

⇒ Bluetooth Architecture →

→ An architecture of bluetooth is called as "Piconet" (A piconet is a collection of devices connected via Bluetooth technology in an adhoc fashion.)

→ Piconet offers the technology with the help of which data transmission occurs, based on its nodes; master node and slave nodes

→ A master node is a node from which data is being sent and slave node in which data is received.

→ Ultra high frequency and short wavelength radio waves, through which data transmission occurs.

→ The piconet used the concept of multiplexing and spread spectrum, i.e., It is a combination of CDMA and Frequency hopping Spread spectrum (FHSS).

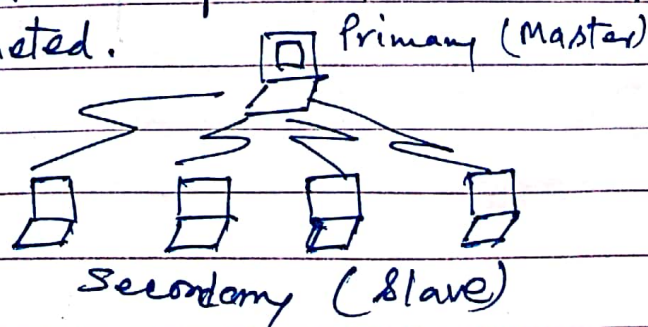
→ Bluetooth architecture defines two type of N/W
↳ Piconet ⇒ Scatter Net.

⇒ Piconet → It is a bluetooth N/W that consists of 1 Primary (Master) node and 7 active Secondary (Slave) nodes.

Max Devices that can be paired $\Rightarrow 2^8 - 1 = 255$

No of devices that can be parked (Waiting) → Infinite. (∞)

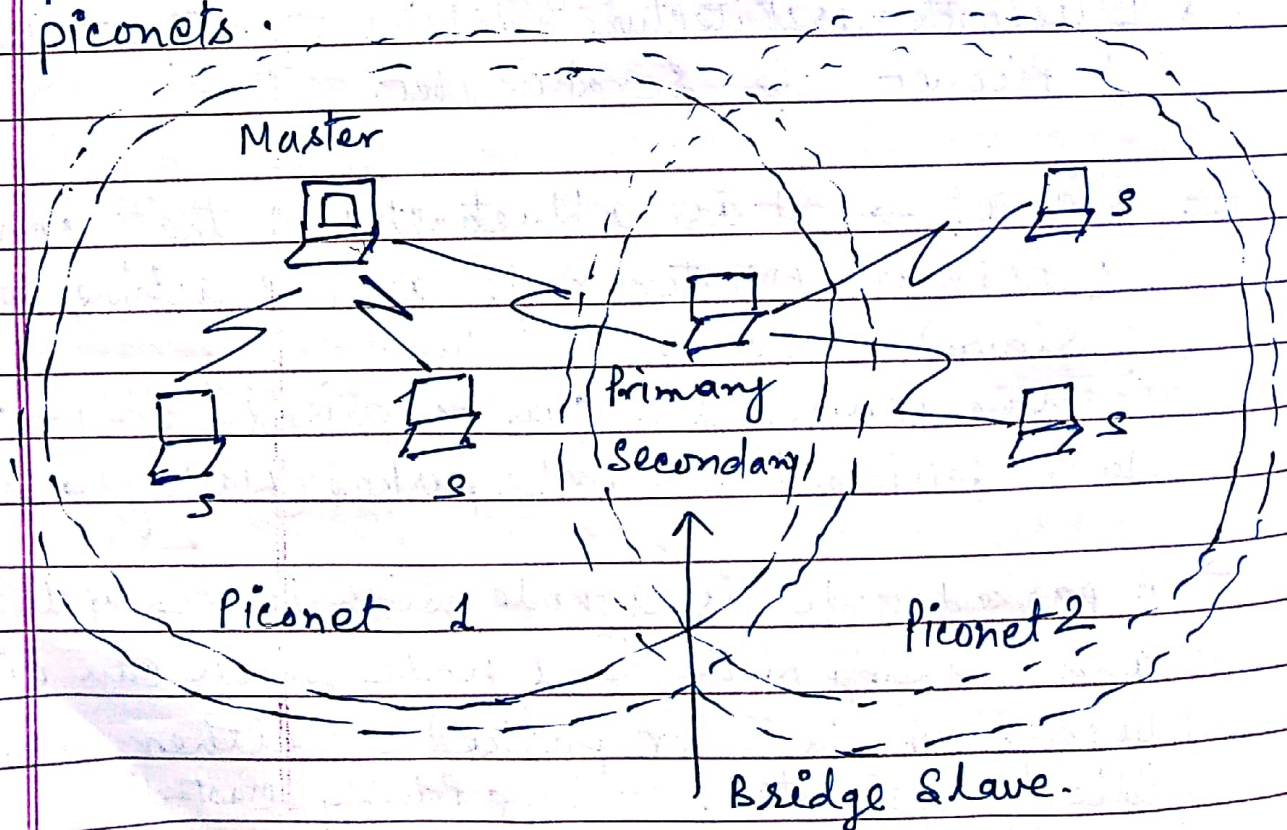
→ A parked node is a node which is ready to connected and standby Node is a node which can either become a slave or parked or either remains idle / disconnected.



- data transmission can occur b/w master and slave and not b/w slave and slave.
- If the connection from master node gets disconnected the whole piconet gets disconnected.

⇒ ScatterNet → It is formed by combination of piconets. A slave in one piconet can act as a master in other piconet. Such a station or node can receive messages from the master in the first piconet and deliver the message to its slave in other piconet where it is acting as master. This node is also called as bridge slave.

Thus a station can be member of two piconets. A station can not be a master of two piconets.



⇒ Security Modes of Bluetooth →

- 1) No Security → Device operates in free mode, allowing all other bluetooth devices to connect to it.
- 2) Service Level Security → Security measures are initiated AFTER the channel is established.
- 3) Link Level Security → Security measures are initiated BEFORE the channel is established.

Advantages of Bluetooth :->

- 1) Wireless communication.
- 2) Inexpensive
- 3) Automatic communicate.
- 4) Standardized Protocol.
- 5) Low Interference.
- 6) Low Energy consumption
- 7) Sharing Voice and Data
- 8) Upgradable.

⇒ IRDA (Infrared Data Association)

→ Infrared Data Association

⇒ Low cost

— Low power

— Half Duplex

— Support

— Walkup

— Point to Point

⇒ IRDA is a protocol for Personal Communication area N/W deploying Infrared rays. (For Short Distance)

⇒ IRDA Standard supports →

- Broad range of computing
- consumer devices.

⇒ IRDA Playing an important role in wireless data communication

— Laptop Computers

— PDAs (Personal Digital Assistance)

— Digital Cameras

— Mobile Phones,

⇒ IRDA's Possibilities —

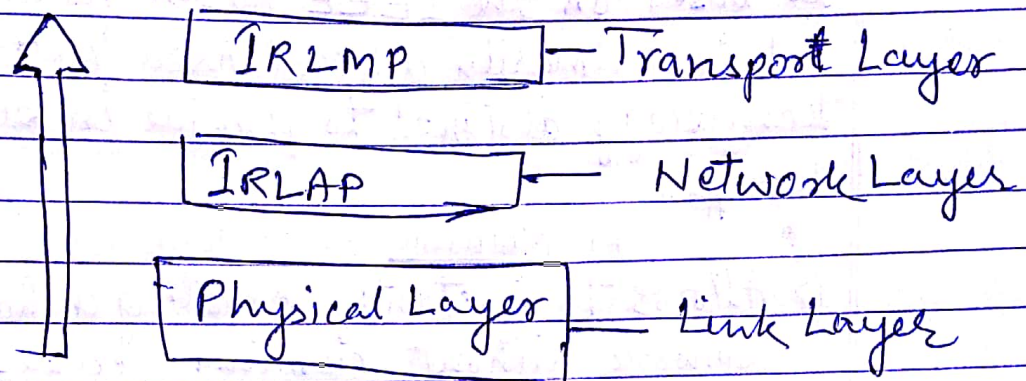
— Sending a documentations

— Exchanging Business Cards

— Coordinating schedules & telephone books

— Sending faxes.

⇒ IRDA Stack: IRDA protocol consists of 3 different Layers



1) Physical Layer - This is the Link layer.
(Convert binary to signal)

→ It deals directly with

- Bit Encoding
- Error checking & Correction
- Transmitting and receiving data

2) Link Access Protocol (IRLAP) -

- Uses services provided by physical layer.
- Defines Services provided by the protocol.
- Sets vocabulary, encoding and procedural rules.

3) Link Management Protocol (IRLMP) -

- It support walk-up and Point-to-Point connection between IrDA devices
- Provides and supports for multiple Software applications.
- Allows entities to operate independently.

⇒ IrDA's Advantages: → Prevalence (FHSS)

⇒ IrDA's disadvantages: → Short range

- High Risk of defect
- not to talk.