Bluetooth Technology

- Bluetooth is used for short-range wireless voice and data communication.
- It is a Wireless Personal Area Network (WPAN) technology and is used for data communications over smaller distances.
- Bluetooth stages up to 10 meters. Depending upon the version,

- **A Bluetooth network is called a piconet and a group of interconnected piconets is called a scatter net.**
- Bluetooth simply follows the principle of transmitting and receiving data **using radio waves.**
- It can be paired with the other device which has also Bluetooth but it should be within the estimated communication range to connect.
- When **two devices start to share data**, they form a network called **Piconet**

Features of Bluetooth

- Bluetooth is a wireless device.
- Bluetooth is a Low-cost and short-distance radio communications standard.
- Bluetooth is robust and flexible.
- The basic architecture unit of Bluetooth is a piconet.

Architecture of Bluetooth

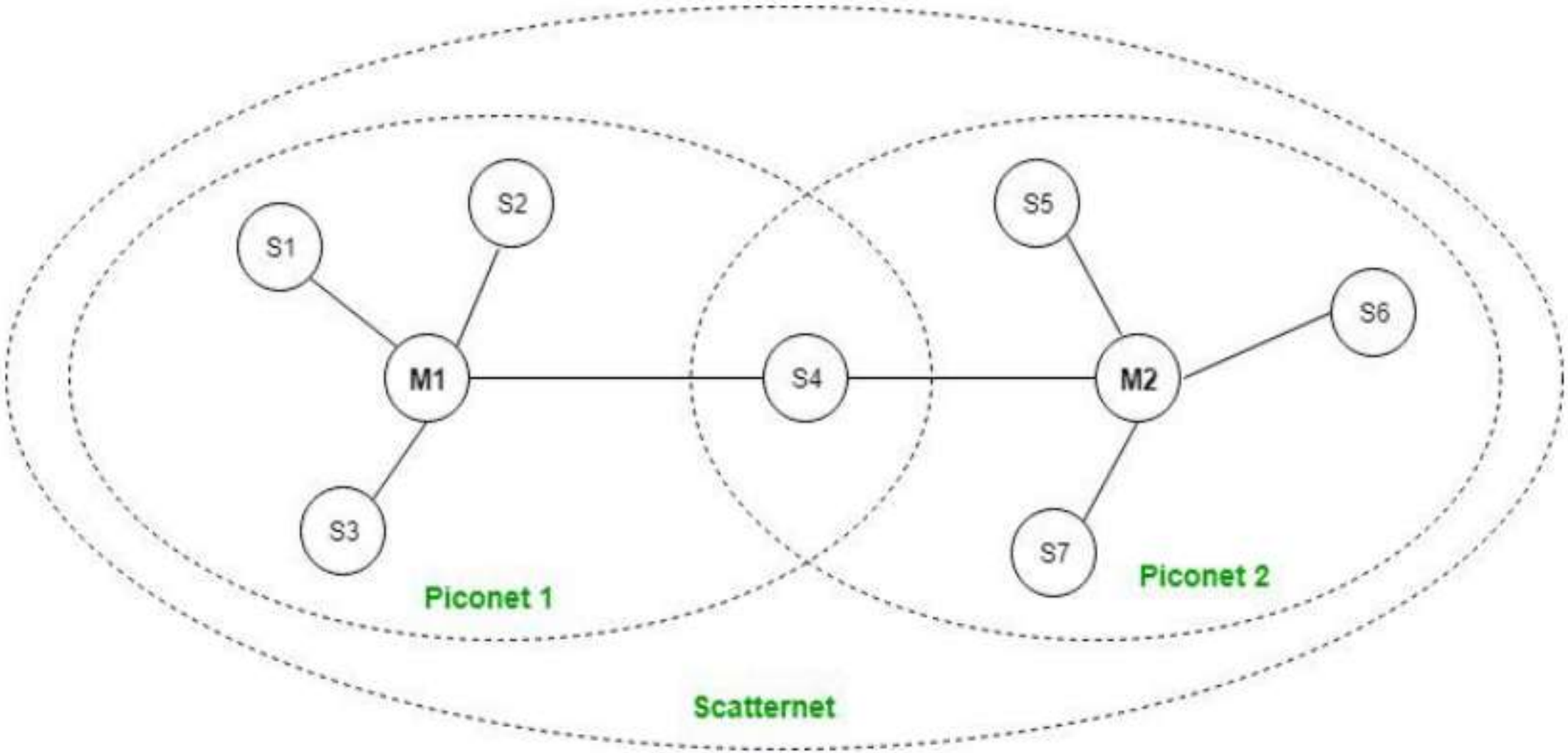
- The architecture of Bluetooth defines two types of networks:
- **Piconet**
- **Scatternet**

Piconet

- Piconet is a type of Bluetooth network that contains one primary node called the **master node** and seven active secondary nodes called **slave nodes.**
- Thus, we can say that there is a **total of 8 active nodes** which are present at a distance of 10 meters.
- The communication between the primary and secondary nodes can be one-to-one or one-to-many.
- Possible communication is **only between the master and slave**;
- **Slave-slave** communication is **not possible**.
- It also has 255 parked nodes, these are secondary nodes and cannot take participation in communication unless it **gets converted to the active state.**

Scatternet

- It is formed by using **various piconets**.
- A slave that is present in one piconet can act as master or we can say primary in another piconet.
- This kind of node can receive a message from a master in one piconet and deliver the message to its slave in the other piconet where it is acting as a master.
- This type of node is referred to as a **bridge node**.
- Note-A station cannot be mastered in two piconets.



Bluetooth Architecture

Layers in Bluetooth Technology

Radio (RF) Layer:

- It specifies the details of the **air interface**
- t performs **modulation/demodulation of the data** into RF signals.
- It defines the physical characteristics of Bluetooth transceivers.
- It defines two types of physical links: **connection-less and connection-oriented.**

Baseband Link Layer:

- The baseband is the digital engine of a Bluetooth system.
- It performs the connection establishment within a piconet, addressing, packet format, timing, and power control.

Link Manager Protocol Layer:

- It performs the **management of the already established links**.
- It is responsible for creating the links, monitoring their health, and terminating them gracefully upon command or failure.

Logical Link Control and Adaption (L2CAP) Protocol Layer:

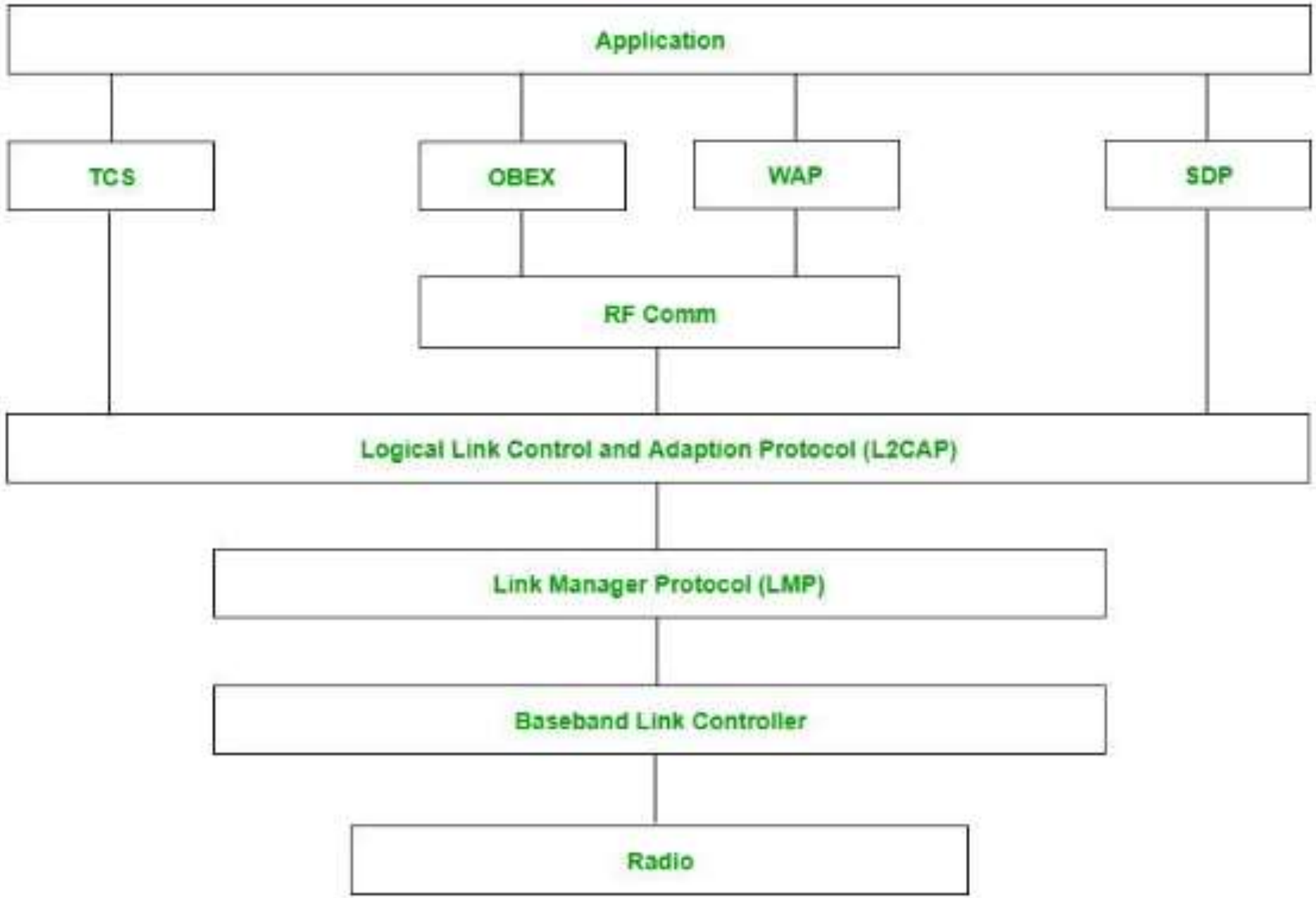
- It is also known as the **heart** of the Bluetooth protocol stack.
- It allows the **communication between** upper and lower layers of the Bluetooth protocol stack.
- . It also performs **segmentation and multiplexing.**

- **Service Discovery Protocol (SDP) Layer:** It is short for Service Discovery Protocol. It allows discovering the services available on another Bluetooth-enabled device.
- **TCS:** It is short for Telephony Control Protocol. It provides telephony service. The basic function of this layer is **call control** (setup & release) and **group management for the gateway** serving multiple devices.

RF Comm Layer:

- It is short for Radio Frontend Component.
- it is a set of transport protocols that allows for serial data transfer between two points
- It provides a serial interface with WAP and OBEX.

- **OBEX:** It is short for Object Exchange. It is a communication protocol to exchange objects between 2 devices.
- **WAP:** It is short for Wireless Access Protocol. It is used for internet access.
- **Application Layer:** It enables the user to interact with the application.


Application
TCS
OBEX
WAP
SDP
RF Comm
Logical Link Control and Adaption Protocol (L2CAP)
Link Manager Protocol (LMP)
Baseband Link Controller
Radio