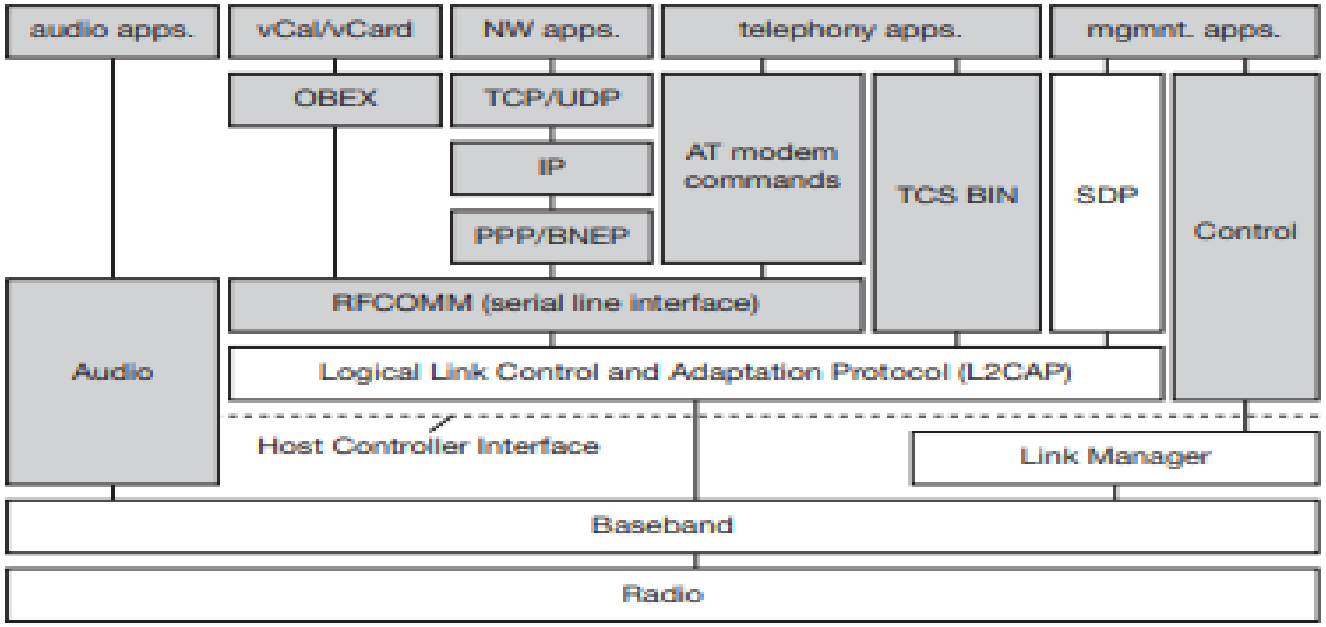
Bluetooth Protocol Stack

Bluetooth Protocol

- The Bluetooth stack protocol refers to the software architecture and layers responsible for managing Bluetooth communication between devices.
- Used To implement a personal area network.
- Enables various Bluetooth functionalities, such as data transfer, device discovery, pairing, and communication between different types of devices.

Protocol Architecture



AT: attention sequence
OBEX: object exchange
TCS BIN: telephony control protocol specification – binary
BNEP: Bluetooth network encapsulation protocol
SDP: service discovery protocol
RFCOMM: radio frequency comm.

1. **Physical Layer**: This layer deals with the actual transmission of data over the air using radio frequencies. It handles tasks such as modulation, frequency hopping, and power control.

2. **Link Layer**: The link layer manages the establishment, maintenance, and termination of connections between Bluetooth devices. It handles tasks such as device discovery, pairing, authentication, encryption, and packet framing.

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3. **Logical Link Control and Adaptation Protocol (L2CAP)**: L2CAP is responsible for multiplexing higher-level protocols and segmenting large packets into smaller ones for transmission. It also provides error detection and retransmission capabilities.

4. **Host Controller Interface (HCI)**: HCI serves as the interface between the Bluetooth hardware and the higher layers of the protocol stack. It allows higher-layer protocols to control the Bluetooth radio hardware and access various functionalities provided by the Bluetooth controller.

5. **Service Discovery Protocol (SDP)**: SDP allows Bluetooth devices to discover and advertise the services they offer. It enables devices to understand each other's capabilities and establish connections for specific services.

6. **RFCOMM**: RFCOMM emulates serial port communication over Bluetooth, allowing legacy applications designed for serial ports to communicate over Bluetooth connections.

7. **Bluetooth Network Encapsulation Protocol (BNEP)**: BNEP provides a way to transmit network-layer protocols (such as IP) over Bluetooth connections. It allows Bluetooth devices to form ad-hoc networks and share network resources.

8. **Object Exchange (OBEX)**: OBEX facilitates the exchange of objects (such as files, contact cards, and calendar events) between Bluetooth devices. It defines a set of common protocols and formats for object exchange.