WIMAX-
Worldwide Inter-operability for Microwave Access.

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What is WiMAX?

- WiMAX, which stands for Worldwide Interoperability for Microwave Access, is a wireless communication technology that was designed to provide high-speed broadband internet access over long distances.

- It is technology based on IEEE 802.16.

- It was initially developed as a wireless alternative to traditional wired broadband technologies like DSL and cable modem.

➢ COMPONENTS:

➢Physical Layer:

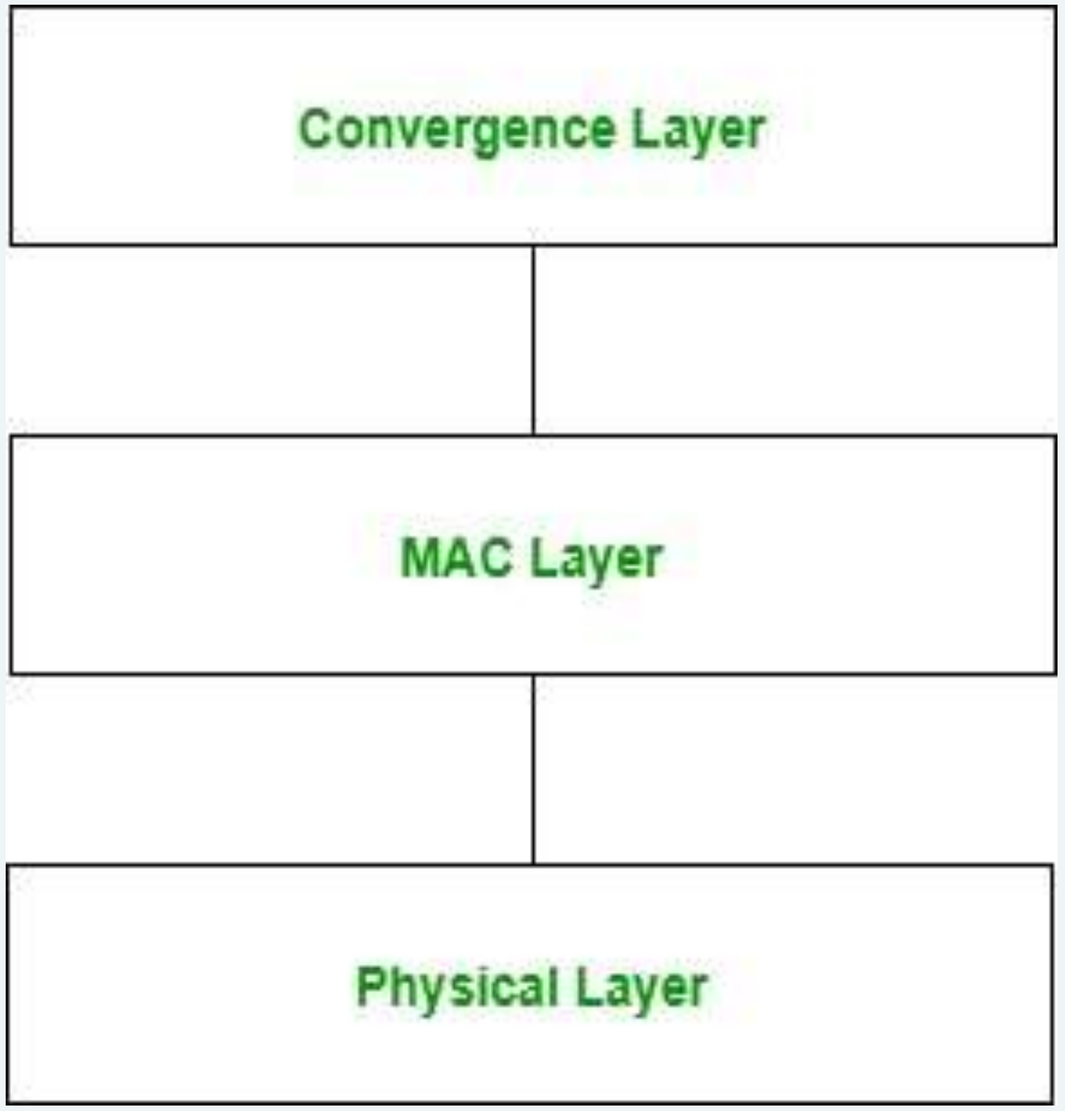
- This layer specifies frequency band, synchronization between transmitter and receiver data rate and multiplexing scheme.
- This layer is responsible for encoding and decoding of signals and manages bit transmission and reception.
- It converts MAC layer frames into signals to be transmitted.
- Modulation schemes which are used on this layer includes: QPSK, QAM-16 and QAM-64.

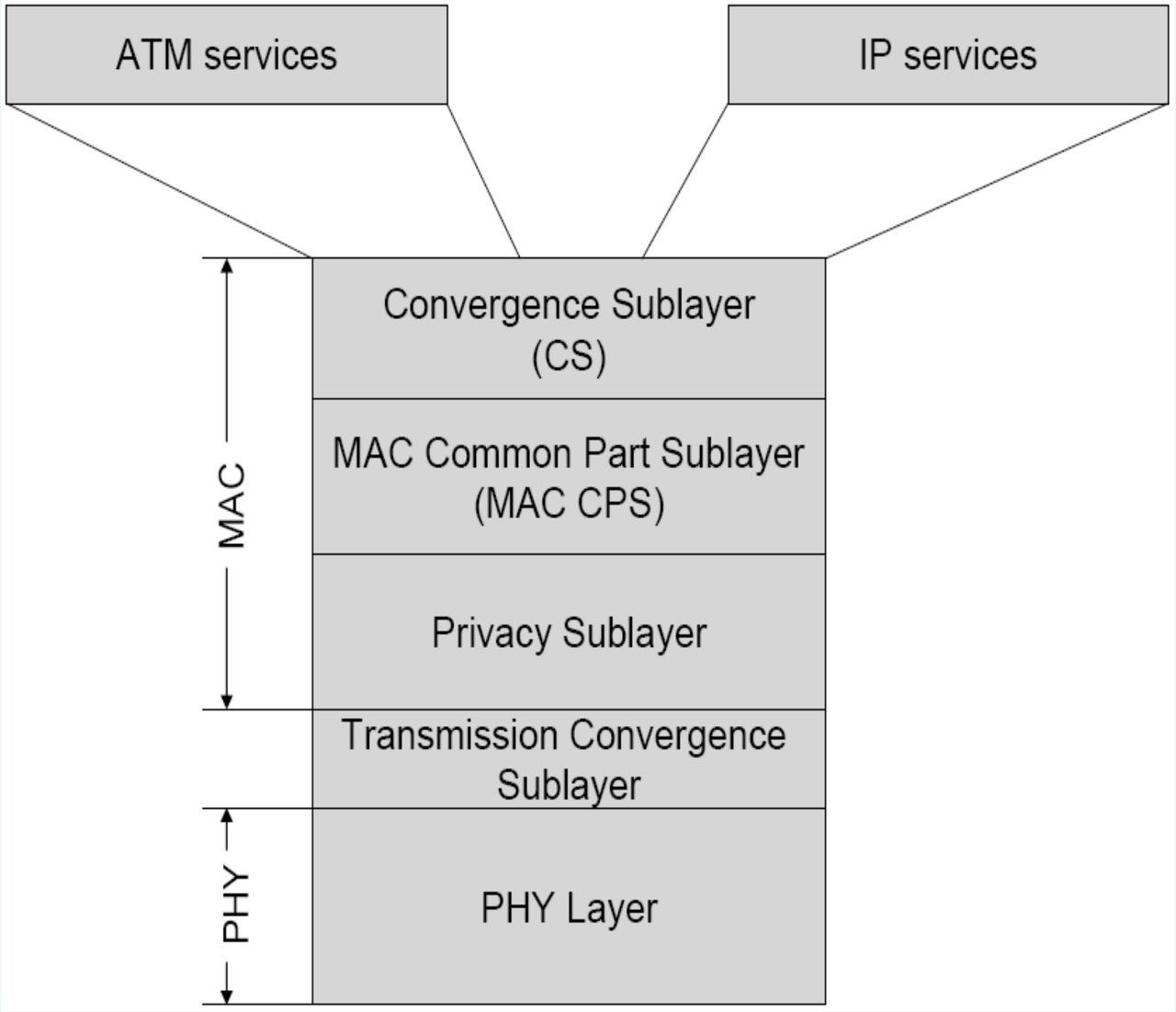
➢MAC Layer:

- This layer provides point to multipoint communication and is based on CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance).
- The MAC layer is responsible for transmitting data in frames and controlling access to shared wireless medium.
- The MAC protocol defines how and when a subscriber may initiate a transmission on the channel.

➢ Convergence Layer:

- This layer provides the information of the external network.
- It accepts higher layer protocol data unit (PDU) and converts it to lower layer PDU.
- It provides functions depending upon the service being used.


Convergence Layer
MAC Layer
Physical Layer

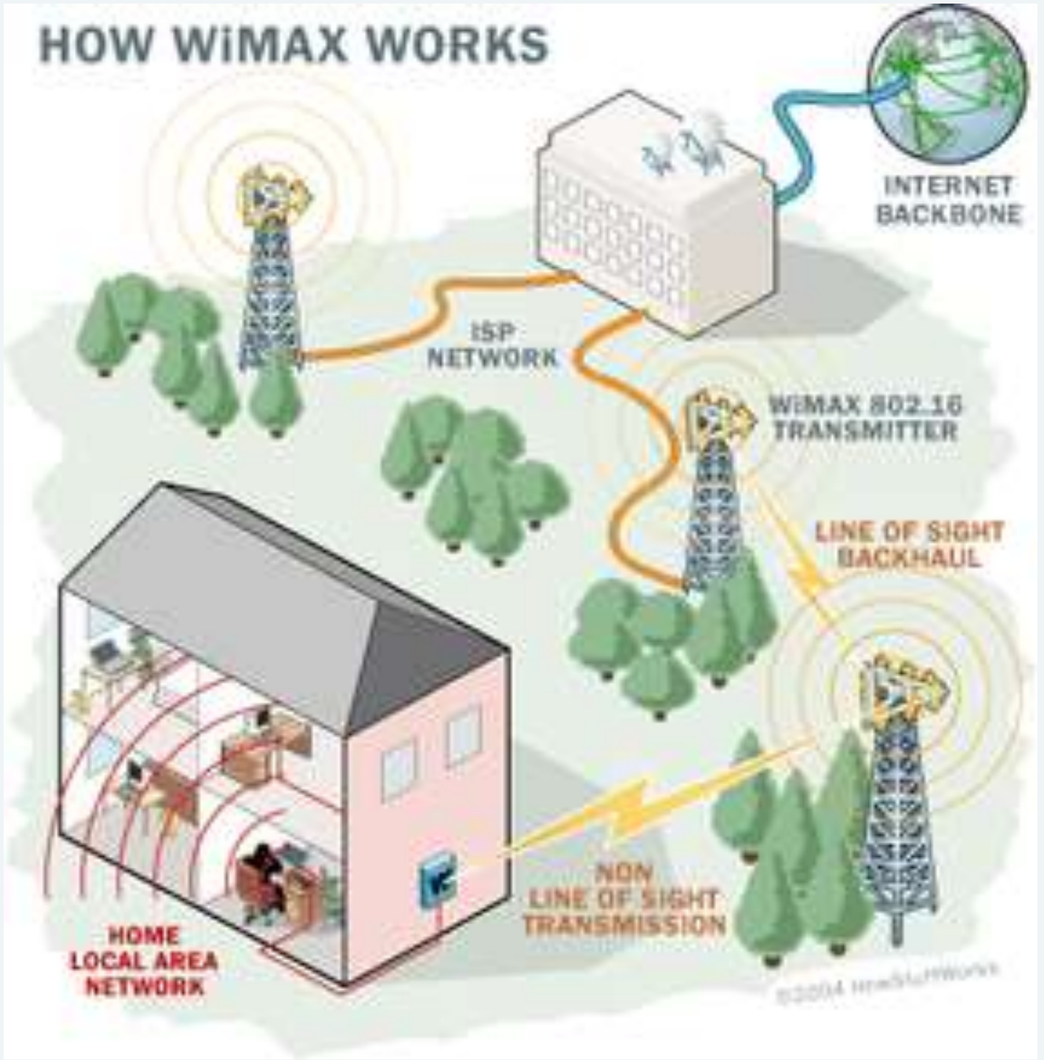

ATM services
IP services
Convergence Sublayer (CS)
MAC Common Part Sublayer (MAC CPS)
Privacy Sublayer
Transmission Convergence Sublayer
PHY Layer
MAC
PHY

How it works?

- WiMAX operates over the airwaves using radio frequencies, similar to Wi-Fi, cellular, and other wireless technologies

- These radio waves carry data from a transmitter (WiMAX base station) to a receiver (WiMAX subscriber station or device).

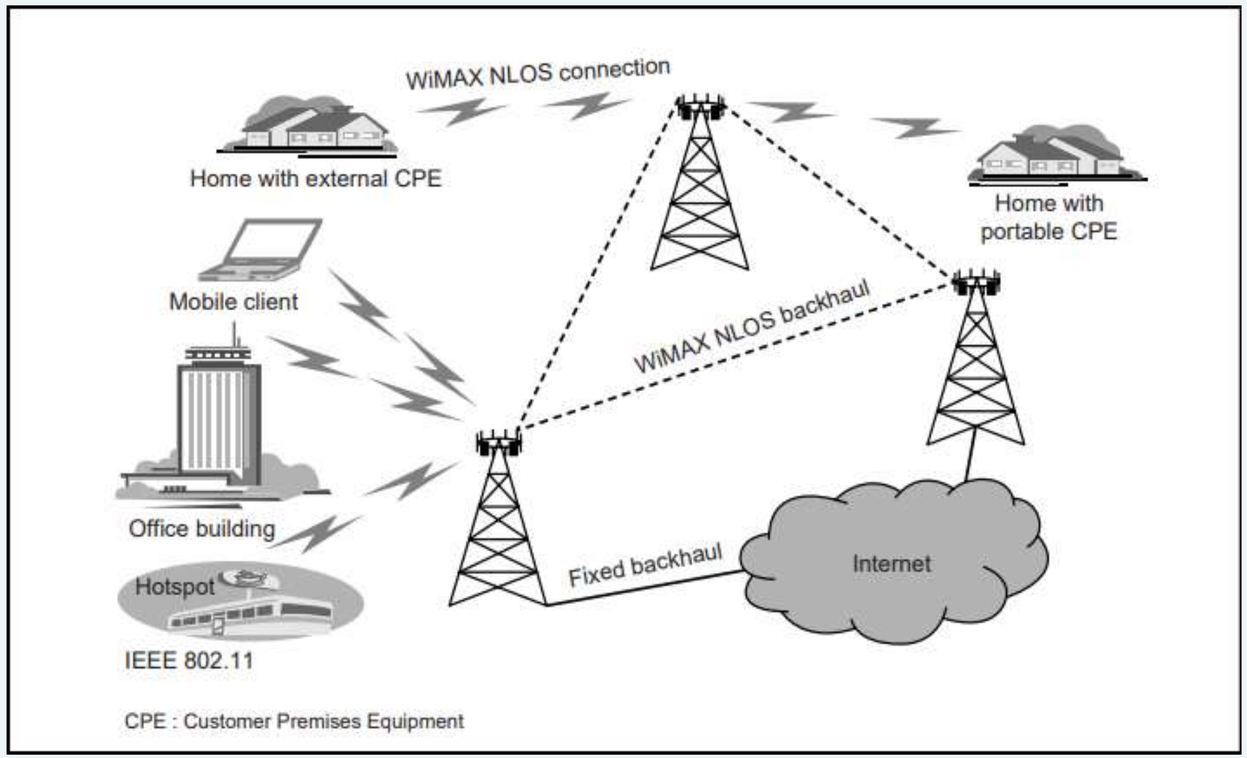
- WiMAX networks are typically organized with central base stations that serve as access points and equipped with high power antennas
- It first performs Handshake which involves the exchange of control signals to establish communication parameters.
- Once the connection is established, data can be transmitted in real-time.
- WiMAX uses acknowledgments to confirm the receipt of data packets.

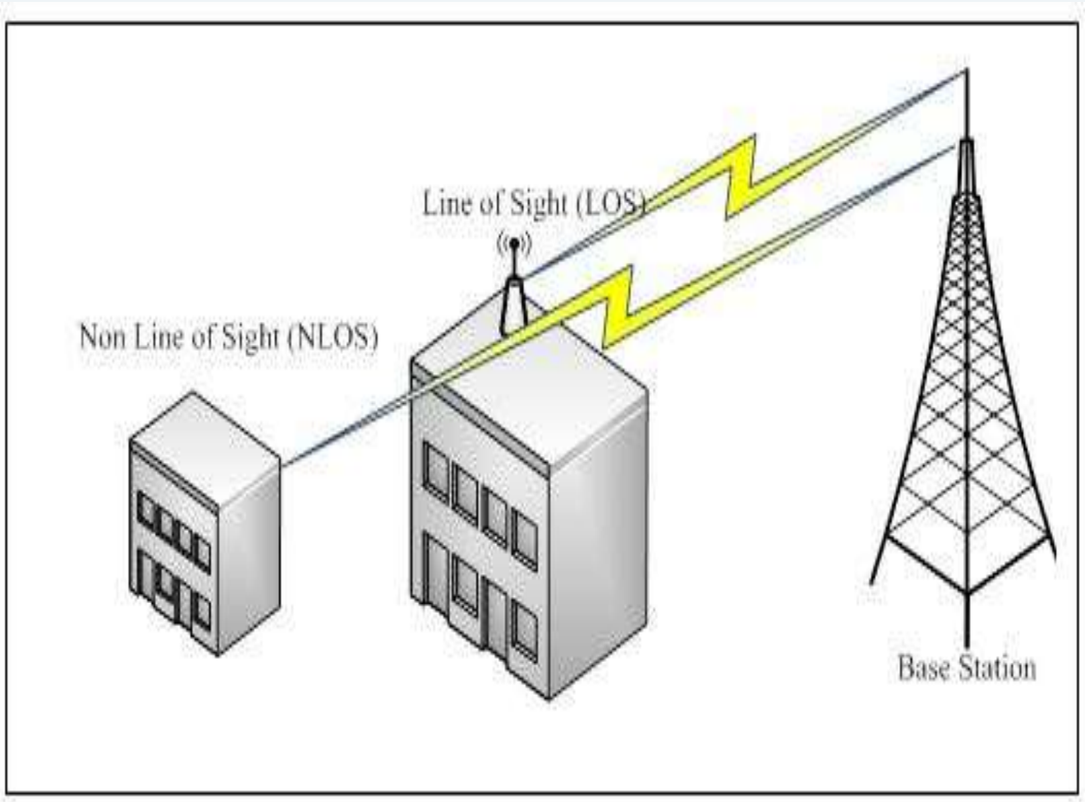


≥ SPECIAL FEATURES:

- **Fixed and Mobile WiMAX**

- **Non-Line-of-Sight (NLOS) Operation**





ADVANTAGES:

- Wide Coverage Area
- High Data Rates
- Scalability
- Non-Line-of-Sight (NLOS) Operation
- Cost-effective
- Spectrum Flexibility

DISADVANTAGES:

- Limited Mobility
- Interference
- Security Concerns
- Limited device availability
- Limited penetration
- High Latency

APPLICATIONS:

- Broadband Internet Access
- Wireless Backhaul
- Public Safety
- Smart Grid
- Telemedicine
- VoIP (Voice over Internet Protocol)
- Video Surveillance