



SNS COLLEGE OF ENGINEERING

(Autonomous)



DEPARTMENT OF CSE – (IOT & CS INCLUDING BCT)

19EC51X – MOBILE COMPUTING

III YEAR/ V SEMESTER

UNIT 1 – INTRODUCTION TO MOBILE COMPUTING
TOPIC 3 - MOBILE NETWORK LAYER

MOBILE NETWORK LAYER,

- The mobile network layer, often referred to as the "Mobile IP layer" or "Network Layer Mobility," is a crucial component of mobile communication systems.
- It provides mechanisms for maintaining seamless connectivity and communication for mobile devices as they move between different network attachments, such as switching between Wi-Fi and cellular networks.
- The concept of a mobile network layer is integral to both Mobile IPv4 and Mobile IPv6, as well as other mobility management approaches.

KEY COMPONENTS AND FUNCTIONS:

- 1. **Mobile Node (MN):** The mobile device itself is known as the Mobile Node. It can change its point of attachment from one network to another while maintaining ongoing communication sessions.
- 2. **Home Network:** Each mobile device is associated with a Home Network, where its permanent home address (usually an IP address) is registered. The Home Network is responsible for routing data to the mobile device.
- 3. **Foreign Network:** The network to which the mobile device is currently attached is referred to as the Foreign Network. This network assists in forwarding data to the mobile device and acts as an intermediary during mobility events.
- 4. **Home Agent (HA):** In Mobile IPv4 and Mobile IPv6, the Home Agent resides in the Home Network. It maintains the current location of the mobile device and assists in forwarding data to the mobile device's current location.
- 5. **Foreign Agent (FA):** In Mobile IPv4, the Foreign Agent resides in the Foreign Network. It helps route data to and from the mobile device while it is away from its Home Network. Mobile IPv6 introduces the concept of a Correspondent Node (CN) instead of a Foreign Agent, which directly communicates with the mobile device.

KEY COMPONENTS AND FUNCTIONS:

- 6. **Binding Update:** When a mobile device moves to a new network, it informs its Home Agent (Mobile IPv4) or the Correspondent Node (Mobile IPv6) about its new location through a process called binding update. This allows the home network to keep track of the mobile device's current location.
- 7. **Tunneling:** Mobile IP protocols often involve encapsulating data packets meant for the mobile device within a tunnel, which is then routed through the appropriate agents or nodes to reach the device.
- 8. **Route Optimization:** In Mobile IPv6, route optimization aims to reduce triangular routing by allowing the Correspondent Node to send data directly to the mobile device's new location without relying on the Home Agent.
- 9. **Security Mechanisms:** Both Mobile IPv4 and Mobile IPv6 incorporate security features to protect against unauthorized access and ensure the integrity and confidentiality of communications during mobility events.

Process of Communication:

- 1. **Initial Registration:** When the mobile device is first powered on or enters a new network, it registers its current location with its Home Agent (Mobile IPv4) or the Correspondent Node (Mobile IPv6).
- 2. **Data Transmission:** As the mobile device communicates with other nodes, the Home Agent (or Correspondent Node) routes data to the current location of the mobile device using tunneling or route optimization.
- 3. **Mobility Event:** When the mobile device moves to a new network, it initiates a binding update process to inform its Home Agent (Mobile IPv4) or the Correspondent Node (Mobile IPv6) of its new location.
- 4. **Handover:** The mobile device switches its point of attachment from the old network to the new network. The old Foreign Agent (if using Mobile IPv4) or the old access point (if using Mobile IPv6) is released.

Process of Communication:

- 5. **Data Forwarding:** The Home Agent (Mobile IPv4) updates its binding information, and data can be forwarded to the mobile device's new location via tunneling. In Mobile IPv6, the Correspondent Node may use route optimization to send data directly.
- 6. **Continued Communication:** The mobile device maintains ongoing communication sessions while moving between networks, and data continues to be routed appropriately based on its current location.
- 7. The mobile network layer's primary goals are to ensure continuous connectivity, transparent mobility for users and applications, efficient routing, and security. Mobile IPv4 and Mobile IPv6 are two mobility management protocols that address these goals through slightly different mechanisms while both relying on the concept of a mobile network layer to facilitate seamless communication for mobile devices.