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 -5 / CONTEXT OF MOBILE NETWORK COMMUNICATION

Discovery:

- Discovery Refers to The Process by Which a Mobile Device or Node Identifies and Learns About the Available Networks and Services in Its Vicinity. In The Context of Mobile Network Communication, Network Discovery Is Essential for Mobile Devices to Locate and Connect to Suitable Access Points or Base Stations. This Process Is Crucial for Maintaining Continuous Connectivity and Ensuring Seamless Handovers Between Different Networks.

During network discovery:

- **Scanning**: The mobile device scans its environment for available networks, which may include Wi-Fi access points or cellular base stations. It listens for broadcasted signals and collects information about the networks, such as network names (SSIDs) and signal strengths.

- **Network Selection:** Based on the collected information, the mobile device selects the most suitable network to connect to. Factors considered during network selection include signal strength, security, network type (e.g., 3G, 4G, Wi-Fi), and available services.

- **Authentication and Association:** Once a network is chosen, the mobile device initiates the authentication and association process. This involves exchanging credentials and establishing a connection with the selected network.

Registration:

- Registration is a crucial step in mobile network communication, particularly in Mobile IP protocols like Mobile IPv4 and Mobile IPv6. It involves notifying the home network about the current location of a mobile device when it moves to a new network. Registration ensures that data can be properly routed to the mobile device's current location, even if it has changed networks.

Tunneling and Encapsulation:

- Tunneling and encapsulation are mechanisms used to route data between the home network and the current location of a mobile device. These techniques ensure that data packets intended for the mobile device are delivered correctly, regardless of the device's network attachment point.

- **Tunnel Creation:** A tunnel is established between the Home Agent (Mobile IPv4) or the Correspondent Node (Mobile IPv6) and the mobile device's current network attachment point. This tunnel serves as a virtual conduit for data traffic.

- **Encapsulation:** Data packets meant for the mobile device are encapsulated within a new packet, with the new packet's destination address set to the mobile device's current care-of address. This encapsulated packet is then forwarded through the tunnel to reach the mobile device.

- **Decapsulation:** Upon arrival at the mobile device's current location, the encapsulated packet is decapsulated, and the original data packet is delivered to the mobile device.

Optimizations:

- Optimizations in mobile network communication aim to improve the efficiency and performance of data transmission, reduce latency, and minimize overhead associated with mobility management. Two key optimizations are route optimization (specifically in Mobile IPv6) and handover optimization.

- **Route Optimization (Mobile IPv6):** In Mobile IPv6, route optimization aims to reduce triangular routing. The Correspondent Node communicates directly with the mobile device's new care-of address, eliminating the need to route data through the Home Agent. This direct communication streamlines data transmission and reduces delays.

- **Handover Optimization:** Handovers, or the process of switching network attachments, can cause interruptions in communication. Handover optimization techniques aim to minimize these interruptions by ensuring seamless transitions between networks. This may involve proactive handover initiation, prediction of optimal handover timing, and fast authentication and association procedures.