

## **MOBILE COMPUTING - ASSIGNMENT PRESENTATION**

**KARTHIK MANIAN S - 20PW16**

### **GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS**

#### **GSM overview**

GSM stands for Global System for Mobile Communications. It is a digital mobile network that is widely used for mobile communication in Europe and other parts of the world. It was developed in the 1980s and is based on time division multiple access (TDMA) technology. GSM networks use a SIM card to identify and authenticate the user, and they provide various services such as voice, messaging, and data.

#### **Characteristics of GSM**

- Communication
  - mobile, wireless digital communication; support for voice and data services
- Total mobility
  - international access, chip-card enables use of access points of providers
- Worldwide connectivity
  - one number, the network handles localization
- High capacity
  - better frequency efficiency, smaller cells, more customers per cell
- High transmission quality
  - uninterrupted phone calls at higher speeds (e.g., from cars, trains)
- Security functions
  - access control, authentication via chip-card and PIN

#### **Disadvantages**

- no end-to-end encryption of user data
- abuse of private data possible
- high complexity of the system
- several incompatibilities within the GSM standards

#### **Service Domains**

In GSM, a service domain refers to a set of services that are offered to the end-users based on their requirements. Service domains can be defined based on the type of service offered or the group of people who use the service.

Services offered by GSM.

- Supplementary Services
- Telematic Services
- Bearer Services

#### **Bearer Services**

- Telecommunication services to transfer data between access points.
  - R and S interfaces – interfaces that provide network independent data transmission from end device to mobile termination point.
  - U interface – provides the interface to the network.
- Specification of services up to the terminal interface (OSI layers 1-3)
  - Transparent – no error control of flow control, only FEC.
  - Non transparent – error control, flow control.

### **Tele Services**

- mobile telephony primary goal of GSM was to enable mobile telephony offering the traditional bandwidth of 3.1 kHz
- Emergency number common number throughout Europe (112); mandatory for all service providers; free of charge; connection with the highest priority.
- Multi Numbering several ISDN phone numbers per user possible.

### **Supplementary Services**

- identification: forwarding of caller number
- suppression of number forwarding
- conferencing with up to 7 participants
- locking of the mobile terminal (incoming or outgoing calls)

## **APPENDIX**

### **ISDN**

ISDN stands for Integrated Services Digital Network, which is a telecommunications network protocol used to transmit voice, video, and data simultaneously over digital lines.

### **TDMA**

In TDMA, each user is assigned a specific time slot during which they can transmit their data, and then the channel is released for use by another user during their assigned time slot. This allows multiple users to share the same channel without interfering with each other's transmissions.

### **Roaming**

Roaming is the ability of a GSM subscriber to use their mobile phone when traveling outside the coverage area of their home network, by connecting to another network. When a subscriber travels outside their home network, their phone registers with a foreign network, which is called the Visited Public Land Mobile Network (VPLMN). The subscriber's home network, which is called the Home Public Land Mobile Network (HPLMN), has an agreement with the VPLMN to allow their subscribers to roam on their network. When a subscriber roams on a foreign network, the subscriber's home network pays the foreign network for the use of their network, and the subscriber is charged for the usage.

### **Why is data not secure?**

- Eavesdropping: This refers to the interception of communication between two parties. Attackers can use tools to intercept GSM signals and can listen to the conversation.
- Spoofing: Attackers can spoof GSM networks and create a fake cell tower. This will make the mobile devices connect to the fake cell tower, and all the communication can be intercepted and modified.
- SMS Spoofing: Attackers can send SMS messages to GSM devices with fake sender IDs.
- Network Vulnerabilities: GSM networks have various vulnerabilities that can be exploited by attackers to gain access to the network and steal data

To prevent data abuse in GSM systems, network operators and device manufacturers must implement security measures such as encryption, authentication, and authorization. Mobile users can also protect themselves by using strong passwords and avoiding public Wi-Fi networks.

### **Is GSM still relevant today?**

GSM (Global System for Mobile Communications) is still used in the current era. Although it has been surpassed by newer technologies such as 4G LTE and 5G, many mobile networks still rely on GSM for voice and text communication. In fact, GSM is still the most widely used mobile communication standard in the world, with over 80% of the global mobile market using it. IoT devices still use GSM for communication. Eg. Smartwatches

