FACULTY OF ENGINEERING & TECHNOLOGY

Brajesh Mishra
Assistant Professor
Department of Computer Science & Engineering

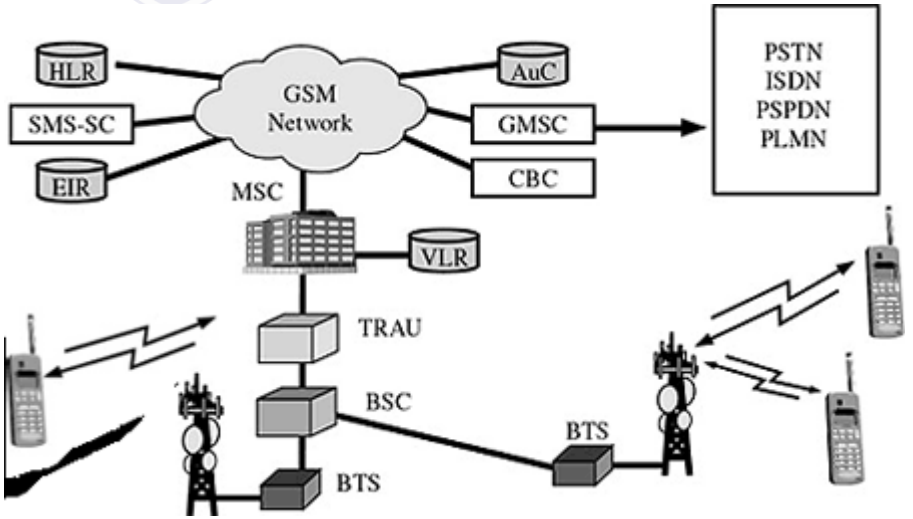
Topics Covered

GSM Architecture
Mobile Switching Center
Home Location Register (HLR)
Visitor Location Register (VLR)

GSM Architecture

The GSM network is divided into four major systems −
Switching System (SS)
Base Station System (BSS)
Mobile Station (MS)
Operation and Maintenance Center(OMC)

The switching system also called as Network and Switching System (NSS), is responsible for performing call processing and subscriber-related functions. The switching system includes the following functional units −
Mobile Switching Center
Home Location Register
Visitor Location Register
Equipment Identity Register
Authentication Center



Mobile Switching Center

Mobile Switching Center (MSC) performs all the switching functions for all mobile stations, located in the geographic area controlled by its assigned BSSs. Also, it interfaces with PSTN, with other MSCs, and other system entities.

Functions of MSC

Call handling that copes with the mobile nature of subscribers considering Location Registration, Authentication of subscribers and equipment, Handover and Prepaid service.

Management of required logical radio link channel during calls.

Management of MSC-BSS signaling protocol.

Handling location registration and ensuring interworking between mobile station and VLR.

Controls inter-BSS and inter-MSC hand overs.

Acting as a gateway MSC to interrogate HLR. The MSC which is connected to the PSTN/ISDN network is called as GMSC. This is the only MSC in the network connected to the HLR.

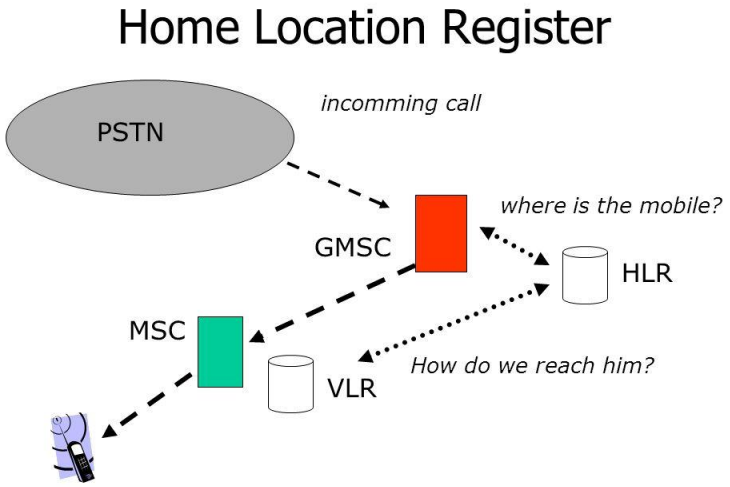
Standard functions of a switch like charging.

Home Location Register (HLR)

Home location register contains −

The identity of mobile subscriber called International Mobile Sub Identity (IMSI).
ISDN directory number of mobile station.
Subscription information on services.
Service restrictions.
Location Information for call routing.

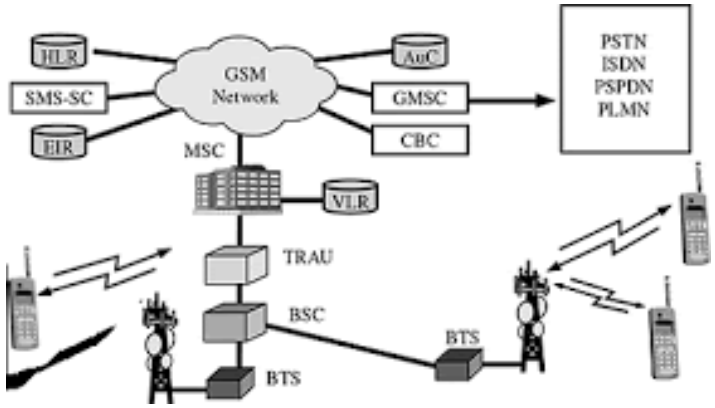
One HLR per GSM network is recommended and it may be a distributed database. Permanent data in HLR is changed by the man-machine interface. Temporary data like location information changes dynamically in HLR.



Visitor Location Register (VLR)

The VLR is always integrated with the MSC. When a mobile station roams into a new MSC area, the VLR connected to that MSC would request data about the mobile station from the HLR. Later, if the mobile station makes a call, the VLR has the information needed for call setup without having to interrogate the HLR each time. VLR contains information like the following −

Identity of mobile sub,
Any temporary mobile sub identity,
ISDN directory number of the mobile,
A directory number to route the call to the roaming station,
Part of the data of HLR for the mobiles that are currently located in MSC service area.



MCQ

11) MIN stands for
a. Mobile Identification Number
b. Mobile Internet
c. Mobility In Network
d. None of the above

The process of transferring a mobile station from one base station to another is
a. MSC
b. Roamer
c. Hand off
d. Forward channel

13) PCN is
a. Wireless concept of making calls
b. For receiving calls
c. Irrespective of the location of the user
d. All of the above
ANSWER: All of the above
14) IMT-2000 is a digital mobile system that functions as
a. Pager
b. Cordless
c. Low earth orbit satellites
d. All of the above
ANSWER: All of the above
15) The 2G cellular network uses
a. TDMA/FDD
b. CDMA/FDD
c. Digital modulation formats
d. All of the above
ANSWER: All of the above