1) Network switching subsystem :-

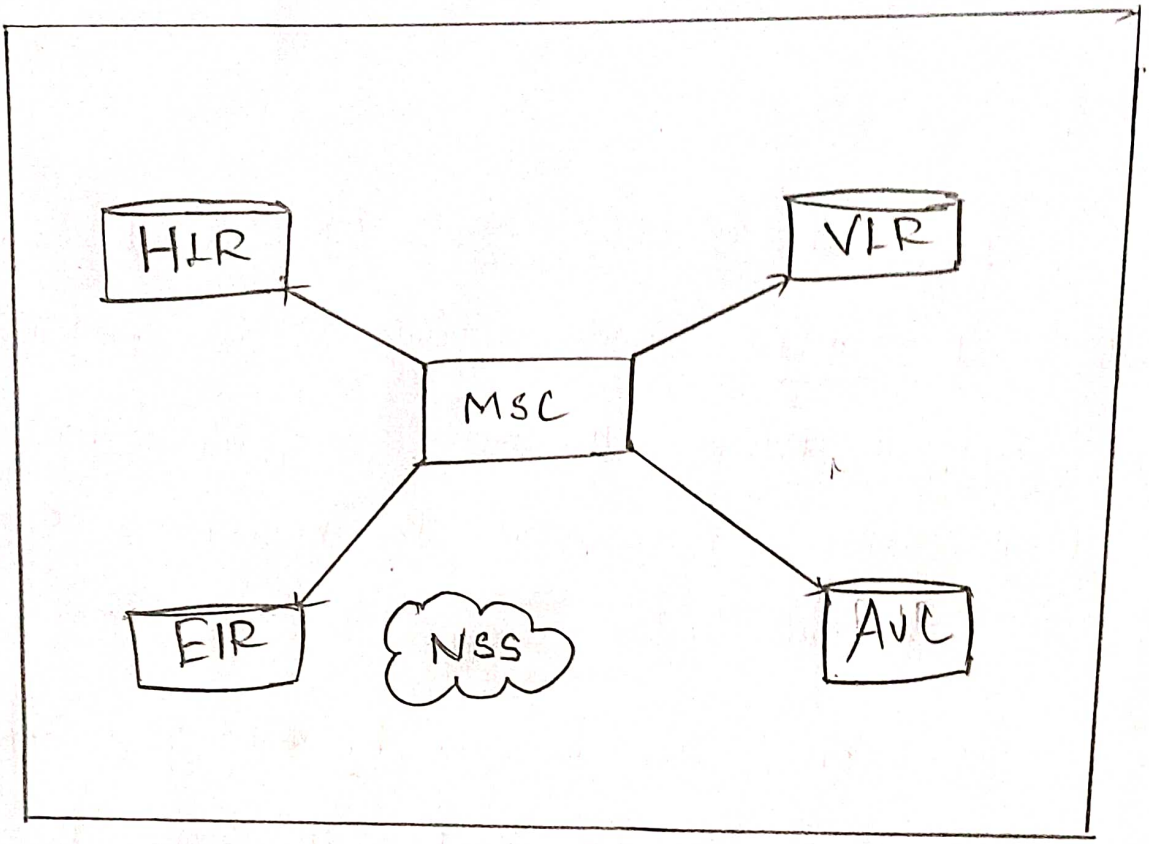
The Network switching System (NSS), the main part of which is the Mobile Switching Center (MSC), performs the switching of calls between the mobile and other fixed or mobile network users, as well as the management of mobile services such as authentication.

It is owned and deployed by mobile phone operators and allows mobile devices to communicate with each other and telephones in the wider Public Switched Telephone Network (PSTN).

NSS - Network switching system originally consisted of the circuit switched core network, used for traditional GSM services such as voice calls, SMS and circuit switched data calls.

The Switching System includes the following functional elements :-

i) MSC
ii) HLR
iii) VLR
iv) AuC
v) EIR



i) MSC → Mobile Services Switching Center

*) Central Component of NSS in the MSC.

*) It performs the switching of calls b/w the mobile and other mobile network users, as well as the management of mobile services such as registration, authentication, location updating, handovers and call routing to a roaming subscriber.

*) Every MSC is identified by a unique ID.

*) MSC is the hardware part of any wireless communication with the PSTN switch.

MSC is responsible for

*) Mobility Management and Registration
*) Location Updating Process.
*) Interconnecting BSS and MSC call handoff situations.

Data base in NSS

There are basically 3 data base in NSS of GSM network.

→ Home Location Register (HLR)
→ Visitor Location Register (VLR)
→ Authentication Centre (AuC)

ii) HLR → Home Location Register

*) It is responsible for containing the subscriber information and Location information for each user who reside in the same city as the city of the MSC.

*) Each subscriber is assigned a Unique (IMSI) International Identity.

*) This number which is used to identify the home user.

iii) VLR → Visitor Location Register

*) It temporarily stores the IMSI an customer information for each roaming subscriber who is visiting the coverage information for each and a particular MSC.

*) VLR is linked b/w several adjoining MSCs (or) geographical n/w.

*) VLR is always integrated with the MSC.

*) If the mobile station makes a call, the VLR will have the information needed for call setup without having to interrogate the HLR each time.

iv) AuC → Authentication Center

*) It is a protected database that stores a copy of the secret key stored in each subscriber SIM card, which is used for authentication.

*) It protects network operators from different types of fraud found in today's cellular world.

*) The security of the process depends upon a shared secret b/w the AuC and Sim called Ki.

*) Ki is never transmitted b/w Auc and Sim, but it is combined with the IMSI to produce a challenge/response for identification purposes.

v) Equipment Identity Register - (EIR):

*) This database is used in NSS in order to track the handsets using the IMEI number (International Mobile Equipment Identity).

*) It is made up of three sub-classes,

i) Whitelist → the device is allowed to register on the network

ii) Blacklist → the device is prohibited from registering on network.

iii) Greylist → the device is allowed to register on the network temporarily.