GLOBAL SYSTEM FOR MOBILE (GSM)

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ECE 4th YEAR

GSM

What ?

GSM: Global System for Mobile Communications.

Formerly: Group Special Mobile

When ?

1982: GSM created to set standard.

1988: Industrial development started.

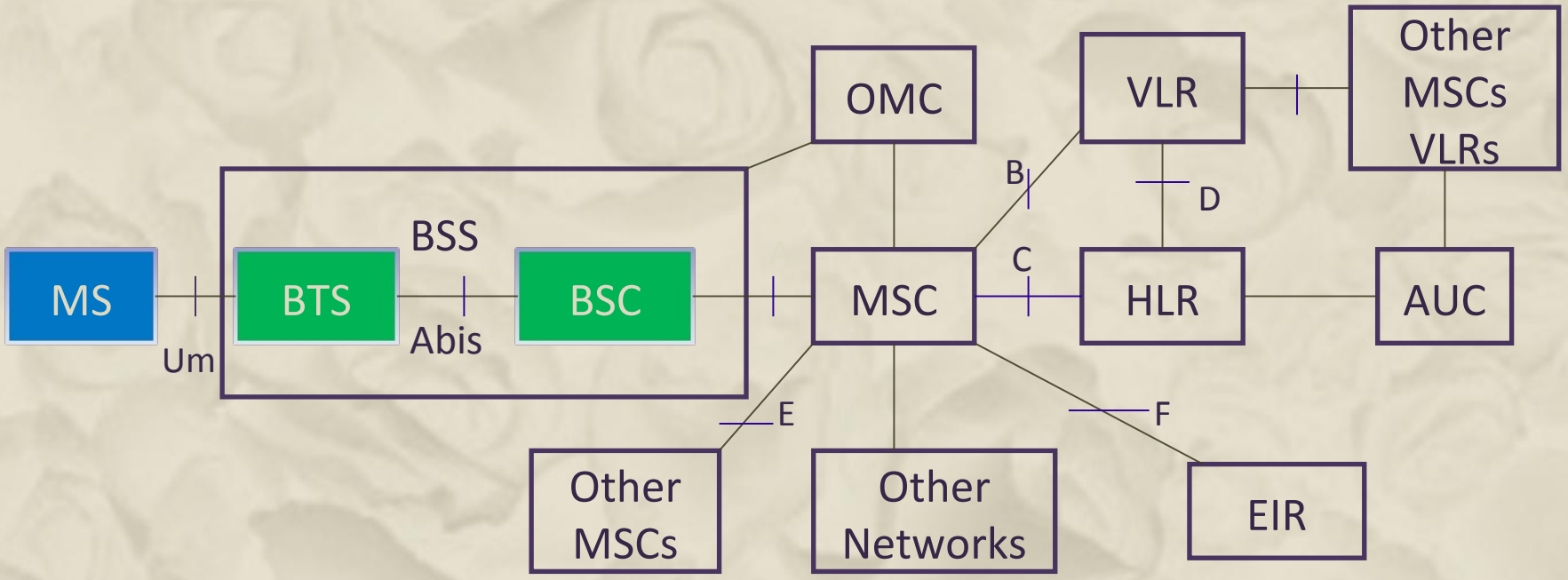
1991: First system deployed.

Why ?

Higher digital voice quality.

Low cost alternatives for making calls and sms.

GSM ARCHITECTURE



MOBILE STATION

- MS consists of 2 parts:
  - Mobile Equipment
  - SIM

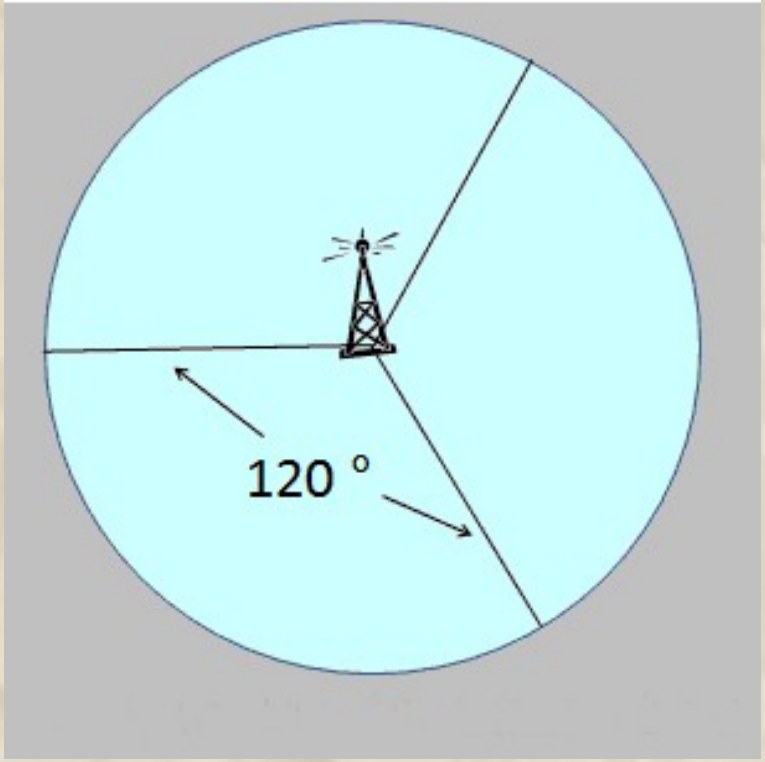
- **Mobile Equipment:**
  - Hardware used by the subscriber to access the network.
  - Uniquely identified by IMEI number.
- **Subscriber Identity Module (SIM):**
  - Smartcard containing the International Mobile Subscriber Identity (IMSI).
  - Allows user to send & receive calls and received other subscribed services.

BASE STATION SUB-SYSTEM (BSS)

- BSS connects the Mobile Station with MSC through A-interface.
- In charge of Transmission & Reception.
- Consists of 2 parts:
  - Base Transceiver Station (BTS)
  - Base Station Controller (BSC)

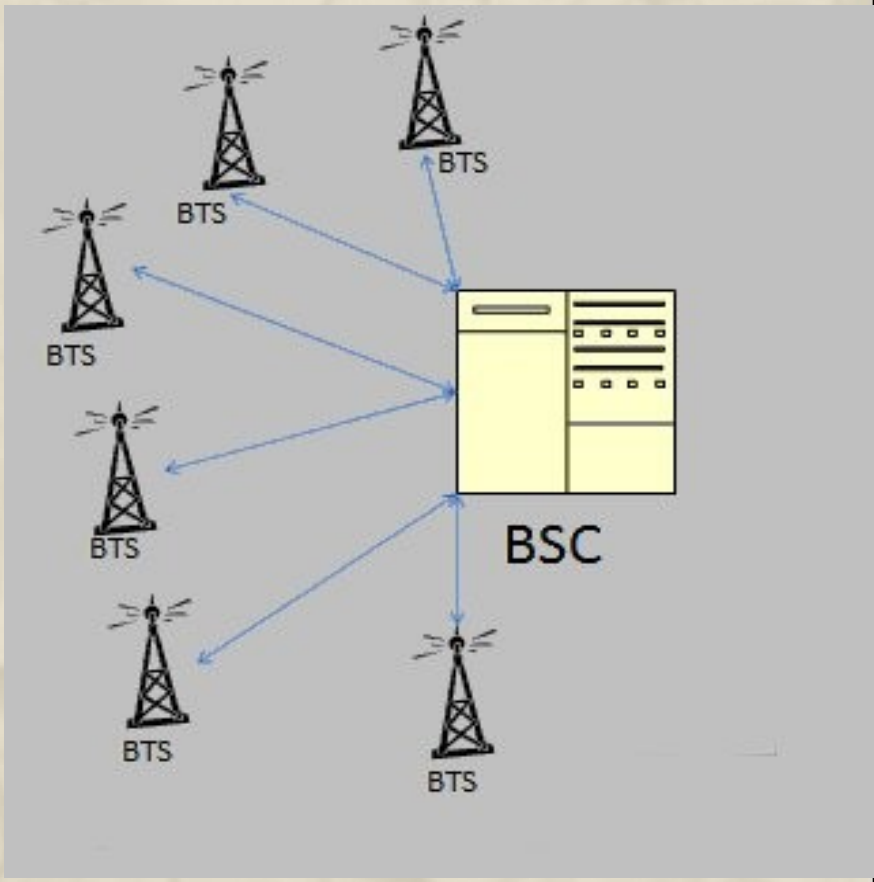
BASE TRANSCEIVER STATION (BTS)

- Consists of TRAU (Transcoder/Rate Adapter Unit).
- Handles Speech Encoding, Encryption, Multiplexing and Modulation/ Demodulation of radio signals.
- Usually covers a single 120 degree sector of an area.



BASE STATION CONTROLLER (BSC)

- Allocation of Channels.
- Frequency Administration.
- Controls the power transmission.
- Handovers from one BTS to another.

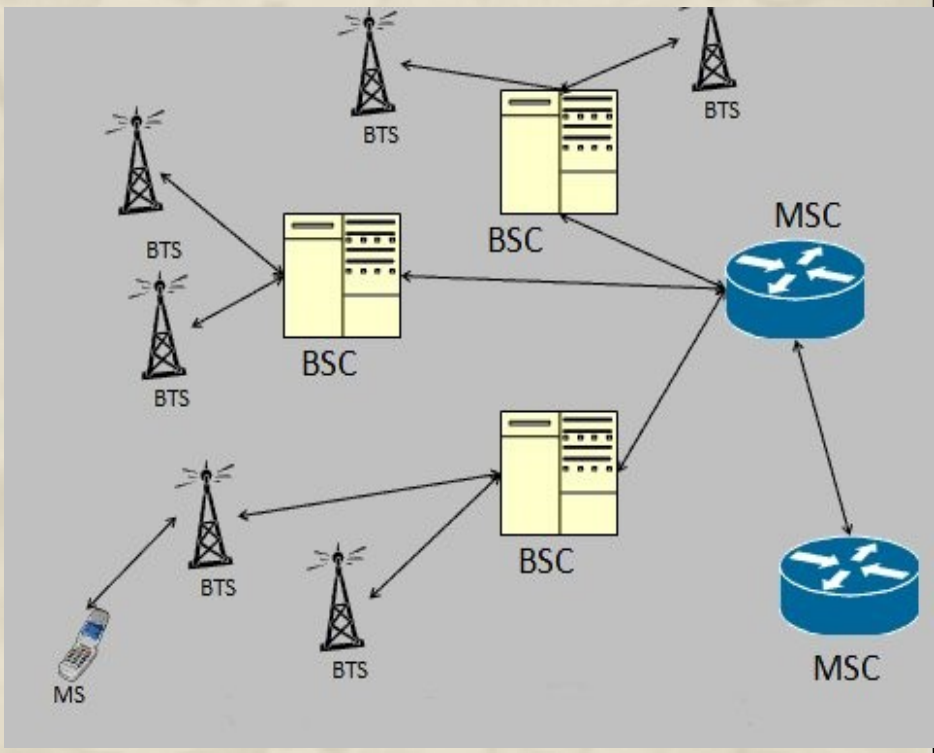


NETWORK & SWITCHING SUB-SYSTEM (NSS)

- Manages communication between the mobile user with the other users.
- Consists of different components as:
  - Mobile Switching Centre (MSC)
  - Gateway Mobile Switching Centre (GMSC)
  - HLR & VLR
  - AuC & EIR

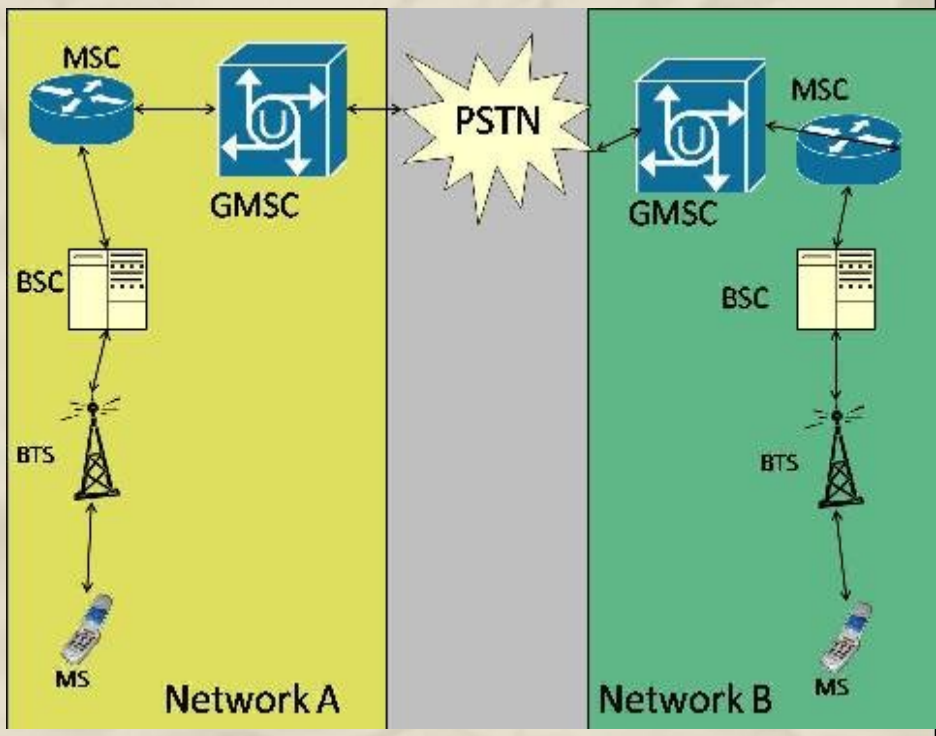
MOBILE SWITCHING CENTRE (MSC)

- Heart of the GSM Network.
- Performs Call Routing, Call set-up and basic switching functions.
- Generates CDR for each & every call.
- Communicates with HLR, VLR & other MSCs.



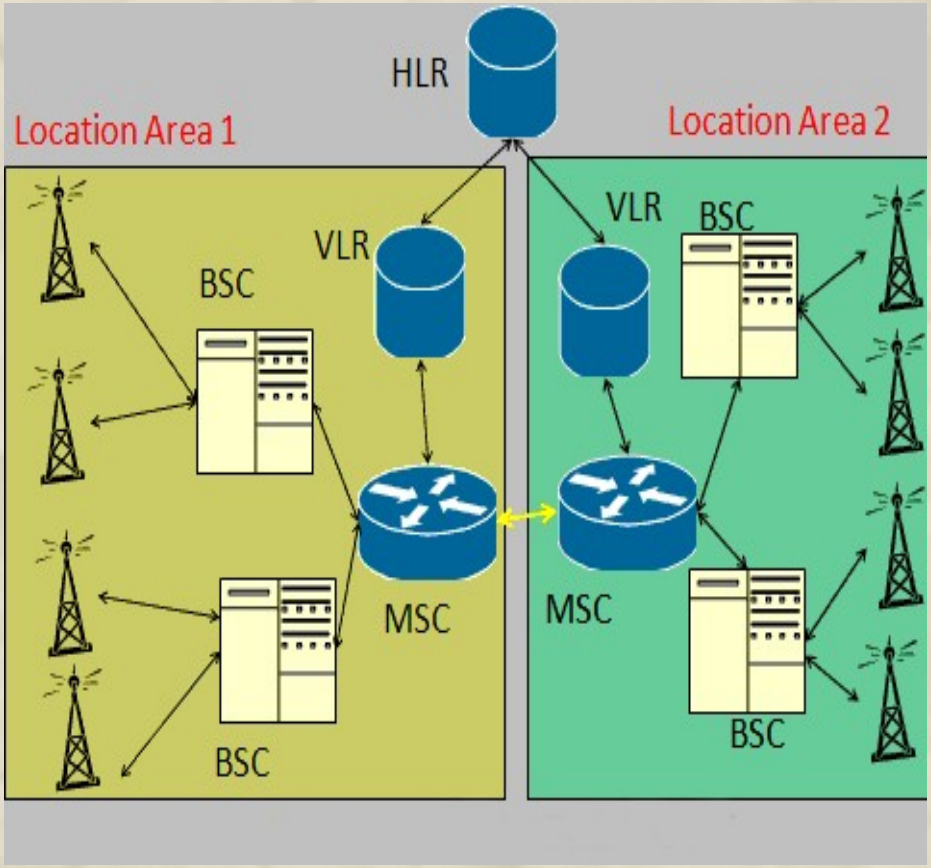
GATEWAY MOBILE SWITCHING CENTRE (GMSC)

- Functions as a gateway between 2 networks.
- Switch to the Public Switch Telephone Network (PSTN).



HLR &VLR

- HLR contains a database for subscriber specific information such as IMSI, current location of the MS, roaming restrictions etc.
- VLR contains a temporary database about all active subscribers and always integrated with the MSC.



EIR &AUC

- EIR is a database that keeps tracks of handsets on the Network using the IMEI number. It contains 3 lists:
  - White List
  - Grey List
  - Black List
- AuC handles the authentication and encryption task for the Network. It is mainly used for security reasons.

OPERATION & MAINTENANCE CENTRE (OMC)

- All the networks elements are connected to OMC.
- Keeps records of all the faults occurred.
- Provides a network overview and support the maintenance activities of different operations.

GSM FREQUENCY

- In India, GSM Network operates in 900 MHz & 1800 MHz bands.
- GSM- 900 uses
  - 890-915 MHz to send information from Mobile Station to the Base Station(Uplink).
  - 935-960 MHz for the other direction (Downlink).
  - Duplex Spacing is 45 MHz.
- GSM-1800 uses
  - 1710-1785 MHz for Uplink.
  - 1805-1880 MHz for downlink.
  - Duplex Spacing is 95 MHz.
- Providing 124 RF channels (Channel Numbers 1to 124) spaced at 200 KHz.

THANK YOU