

Introduction to GPRS

ZAHRA MANSOORI

Content

Introduction

History

GPRS Architecture

References

Introduction

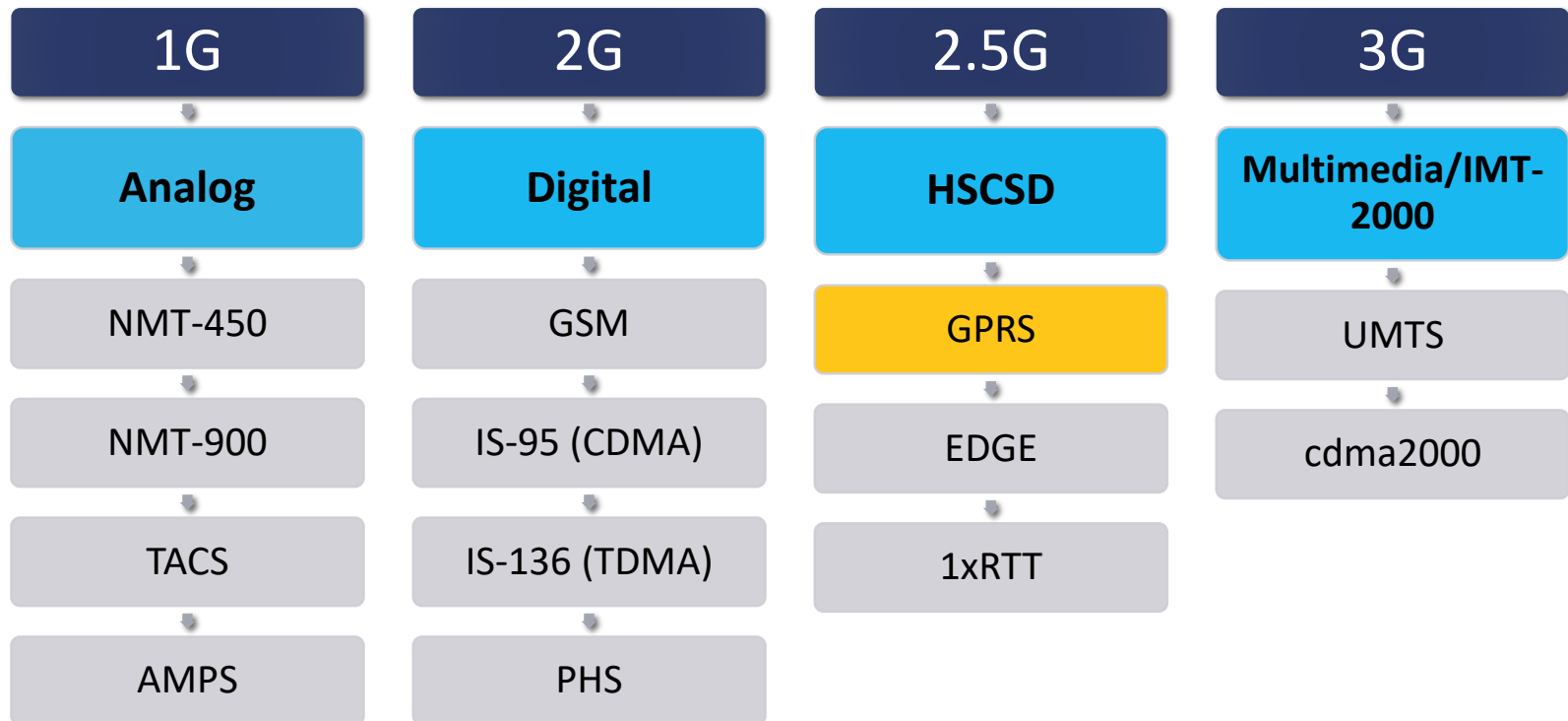
Stands for: **General Packet Radio Service**

Gateway to Third Generation Mobile Networks

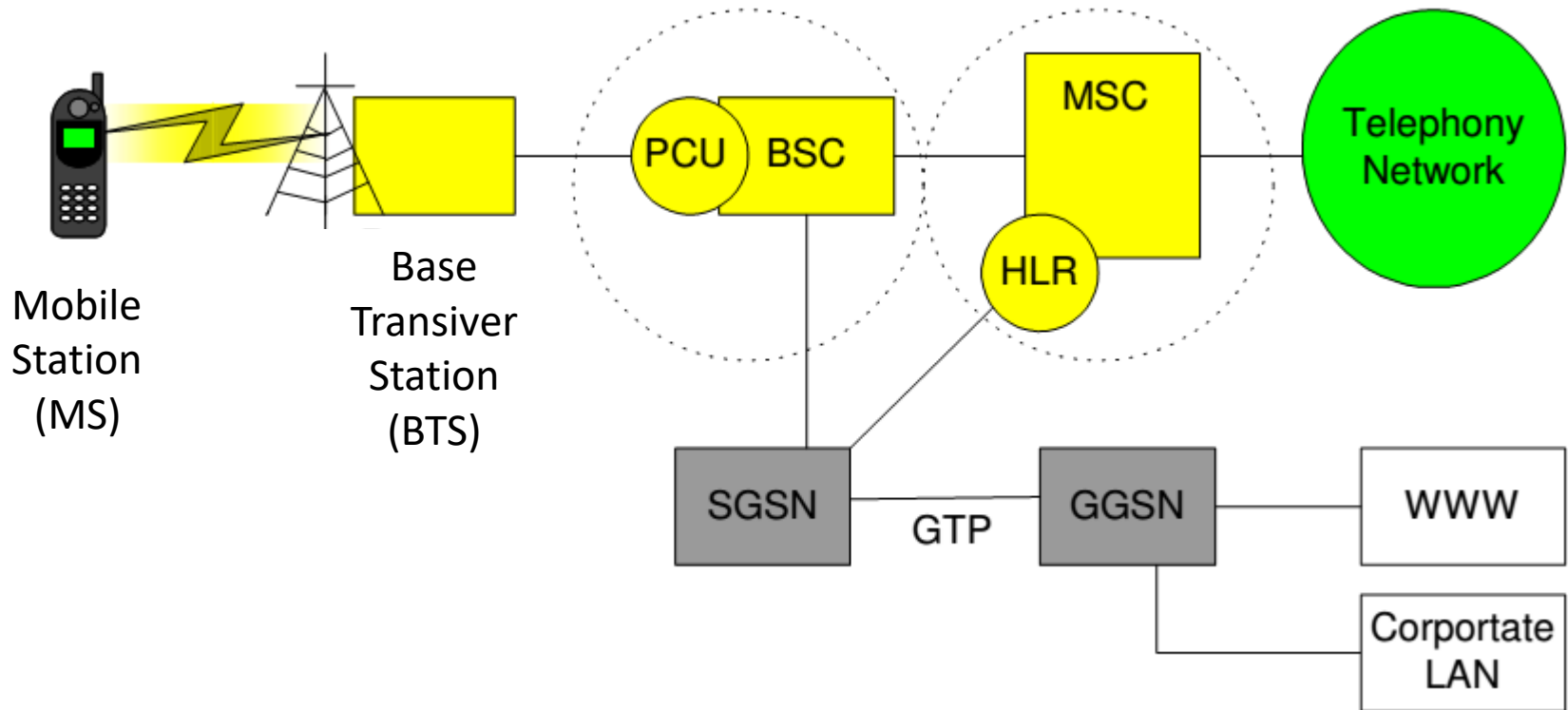
Enables transmission speed up to 160 Kbps

By adding GPRS to the GSM network, operators can offer efficient wireless access to external IP-based networks, such as the Internet and corporate intranets

History



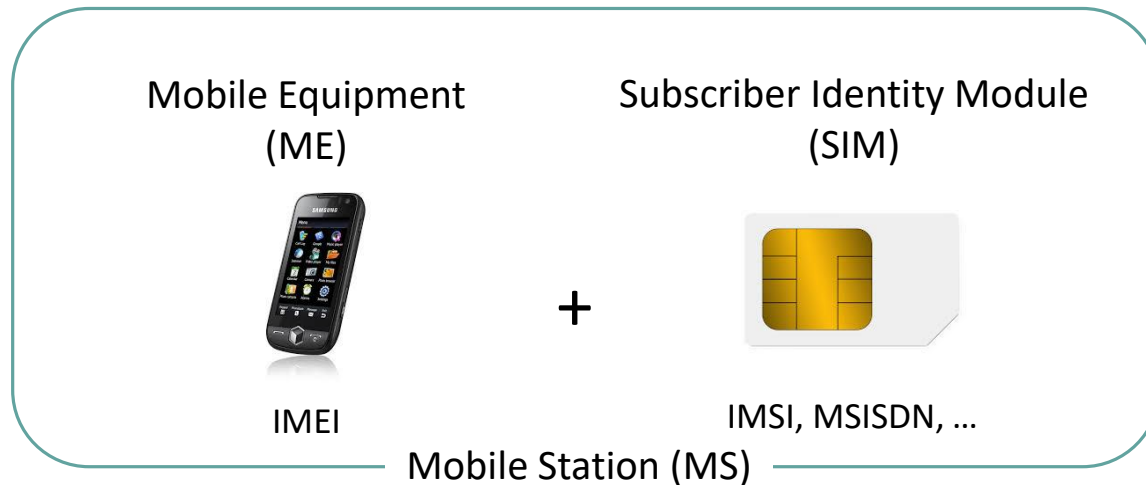
GPRS Architecture



Mobile Station (MS)

includes

- **Mobile Equipment** with **International Mobile Equipment Identity (IMEI)** Number
- **Subscriber Identity Module (SIM)** card with **International Mobile Subscriber Identity (IMSI)** Number



SIM card

a small chip provided by the network operator

contains all the important data about the subscriber such as International mobile subscriber identity (IMSI)

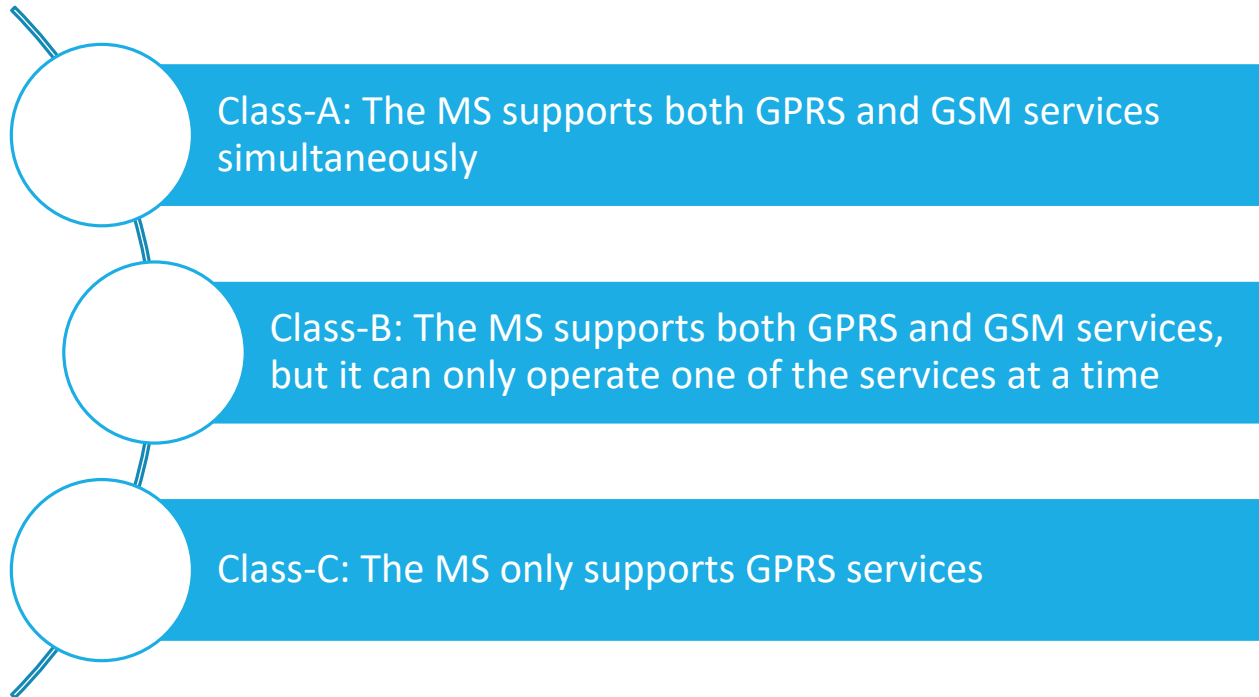
(IMSI) serves as the user identifier

The SIM also has an authentication key which serves as a password for the subscriber

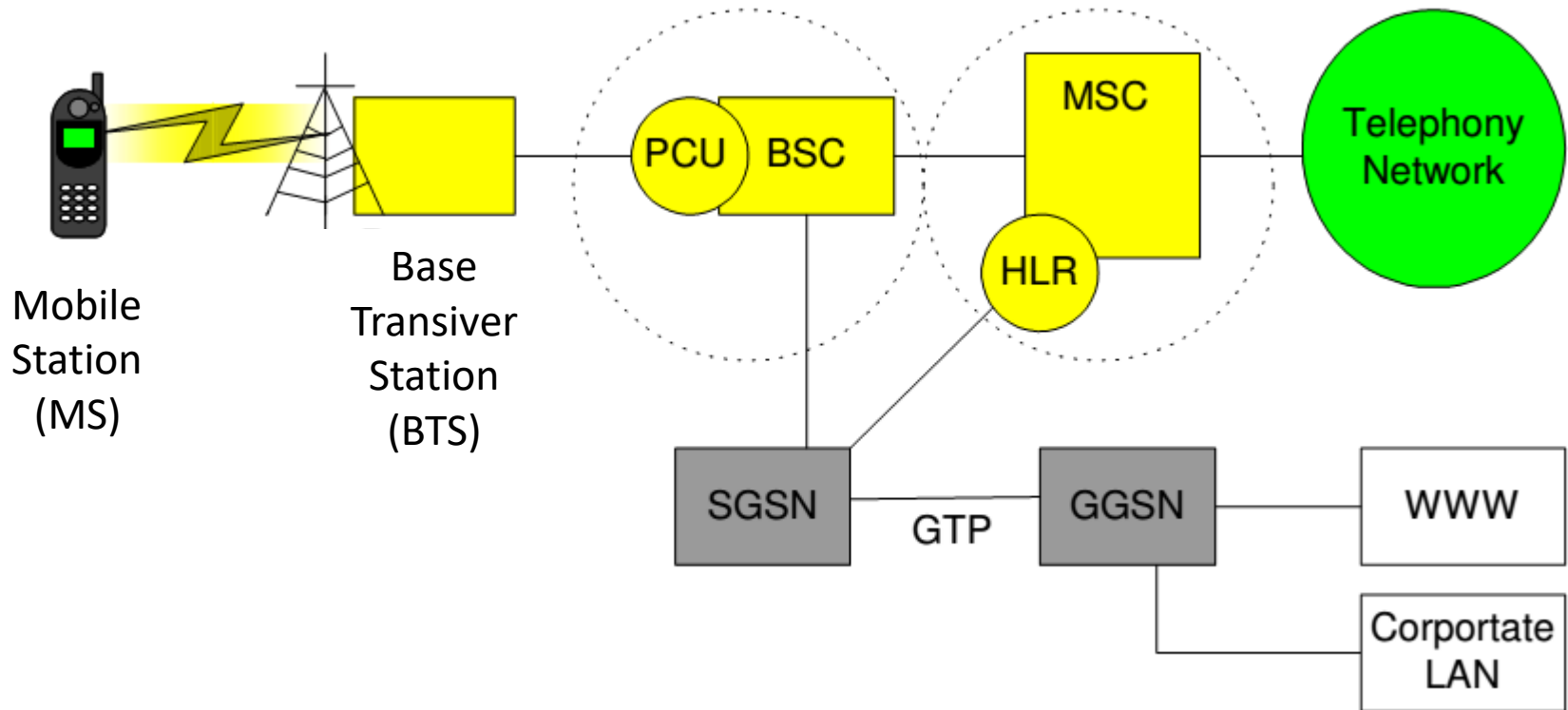


MS Modes of operation

An MS can operate in any one of the following three modes of operation



GPRS Architecture



Base Transceiver Station (BTS)

A hardware device

Allows an MS to connect over air interface

Is controlled by a BSC

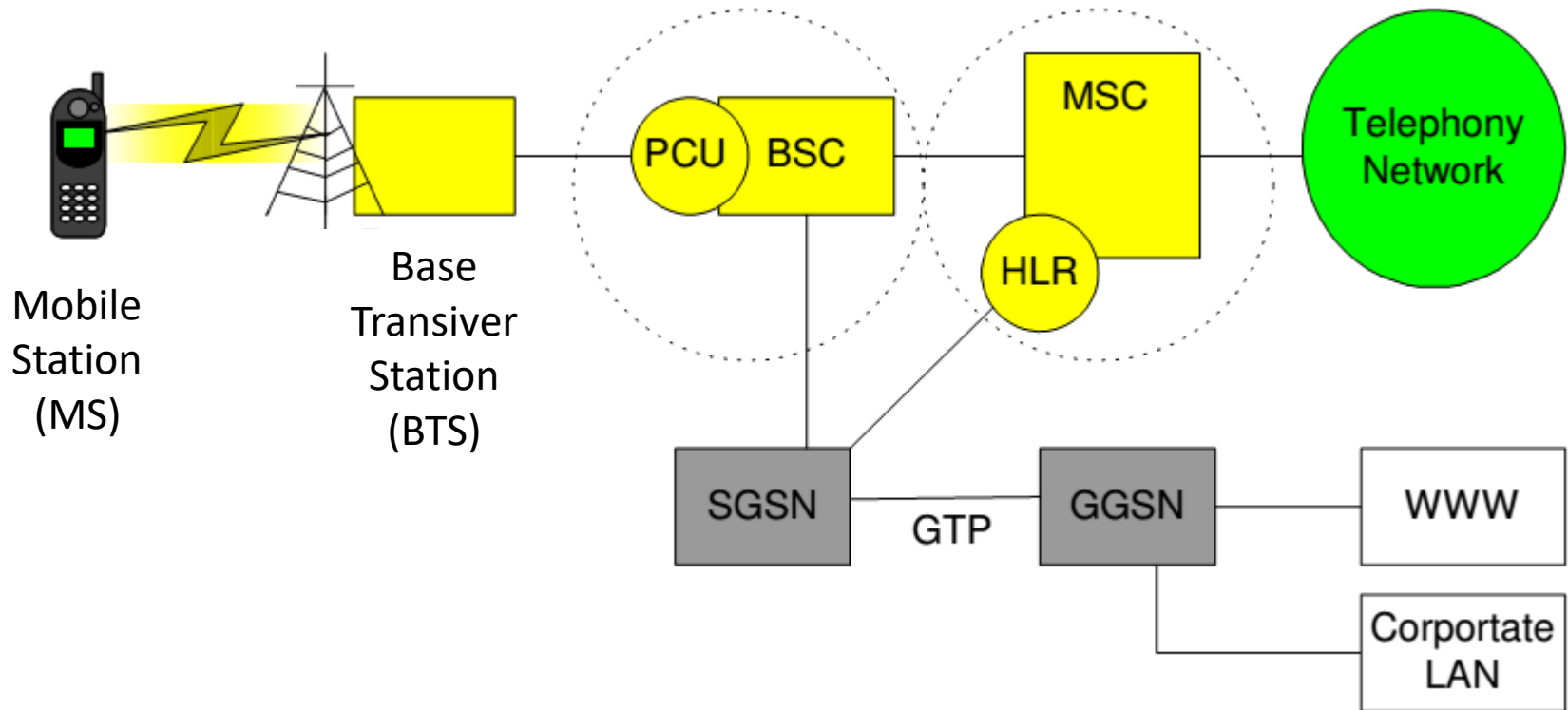
Acts as a connector between the MS and the network

Consists of transceiver (TRX), power amplifier (PA), duplex, antenna, combiner

Base station subsystem(BSS) includes BTS and BSC



GPRS Architecture



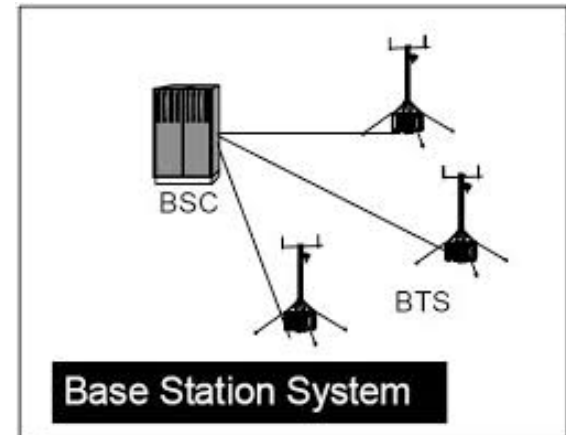
Base station controller (BSC)

Mainly deals with the communication with BTS and MSC

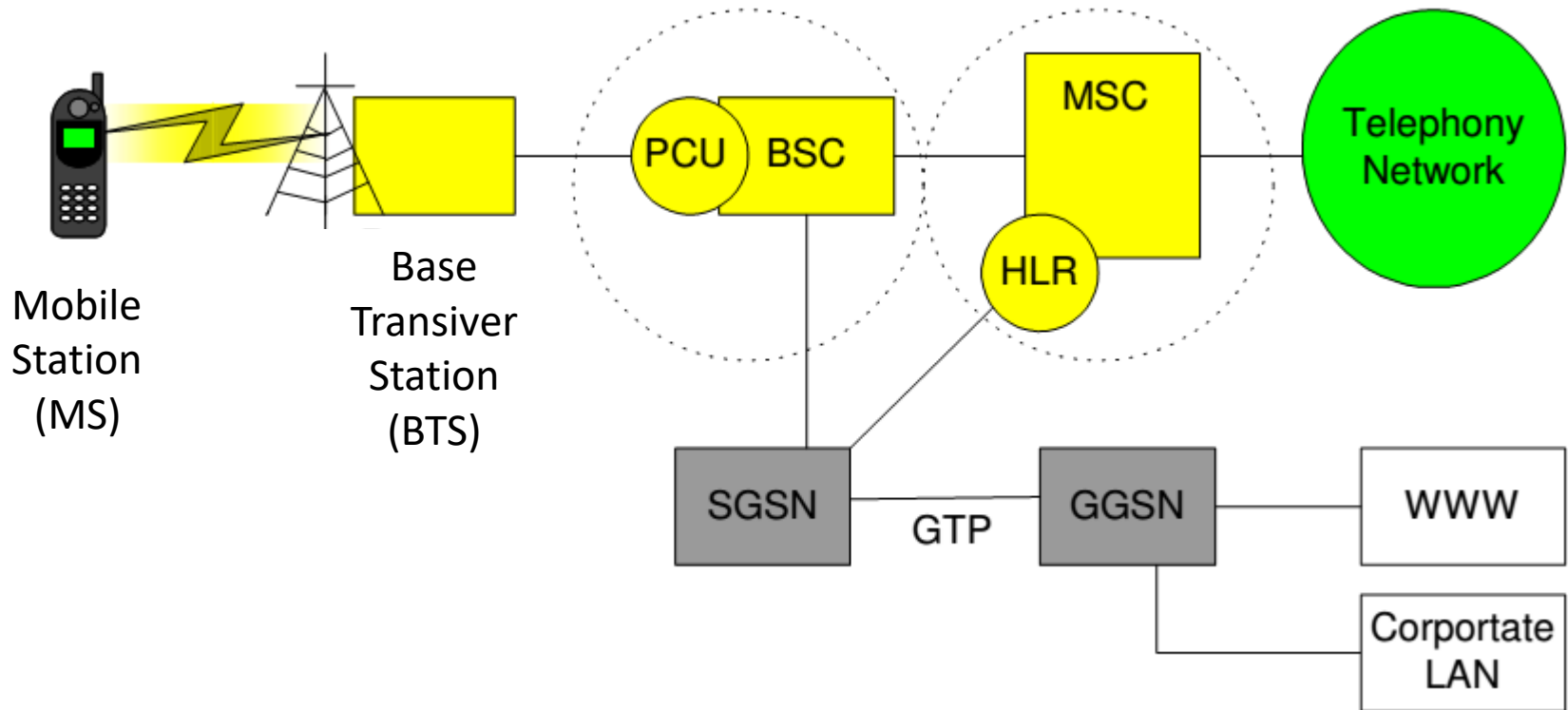
A BSC can control several BTS at the same time

BSC is smart module in GSM that handles the handover when the mobile phone moves from BTS to BTS

It also allocates the radio channels for the MS



GPRS Architecture



Mobile Switching Centre (MSC)

Take care of the

- SMS
- call

Functions like

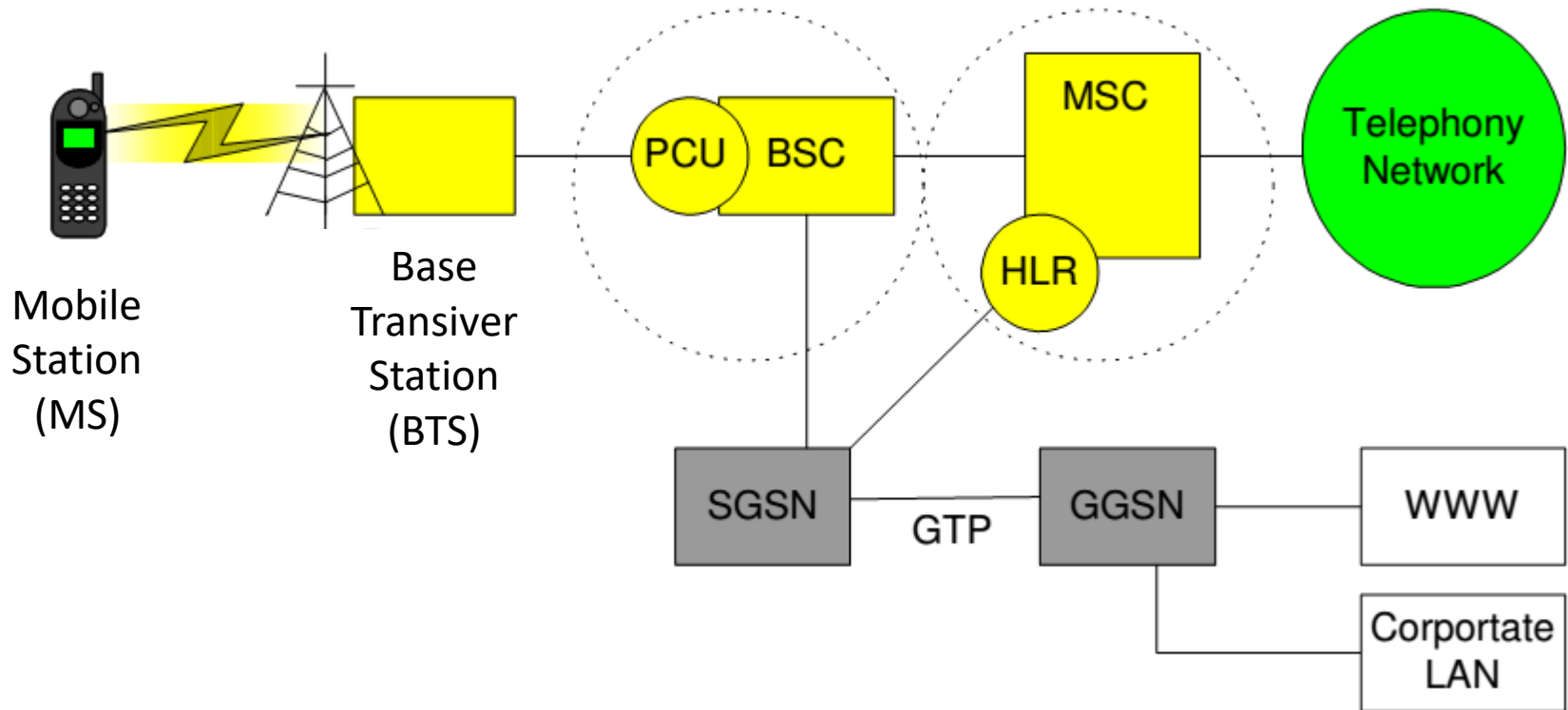
- ensuring the network connections
- handling of location related information
- maintaining the packet flow

communicates with

- VLR
- HLR
- SMSC



GPRS Architecture

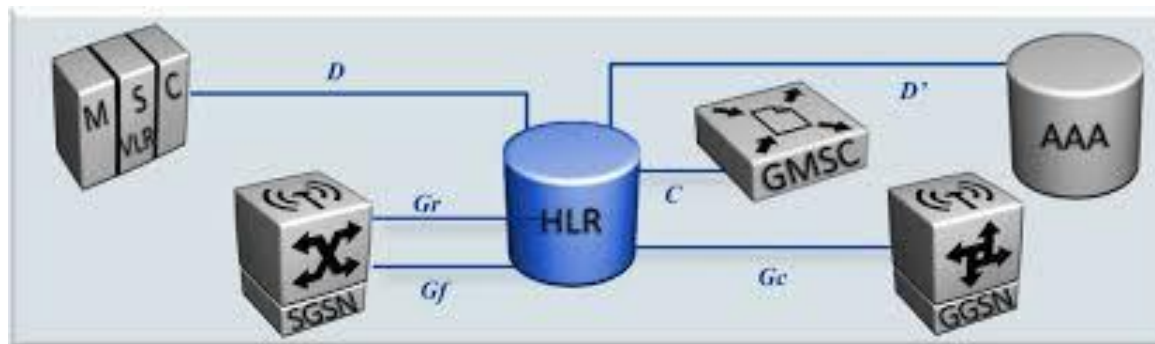


Home Location Register (HLR)

A network subscribers database

Contains all the information about the subscribers of the network

If the network requires any information about the subscriber it is the HLRs responsibility to provide the necessary information



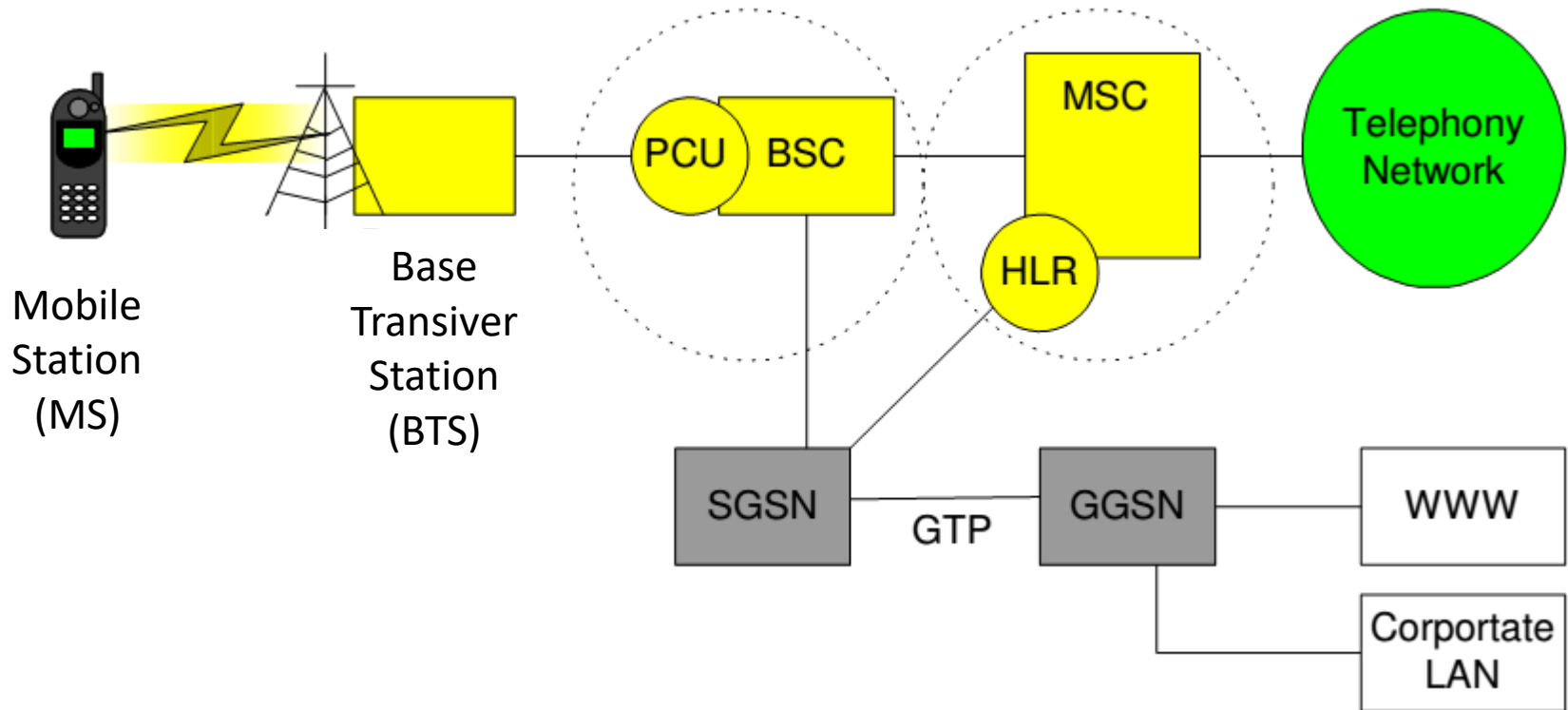
Short Message Service Centre (SMSC)

stores and forwards SMS messages

If the receiver is offline or unavailable due to any reason, then the SMSC stores the SMS and forwards the SMS as soon as it gets notified that the receiver is available again



GPRS Architecture

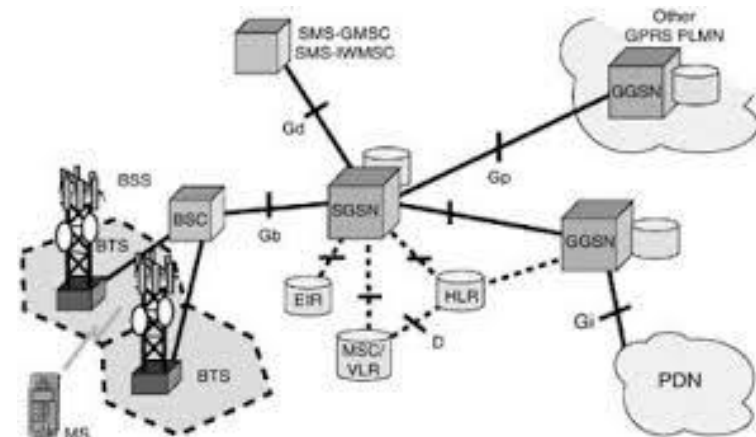


Serving GPRS Support Node (SGSN)

takes care of the delivery of data packets from and to the GPRS mobile stations that are connected to the network

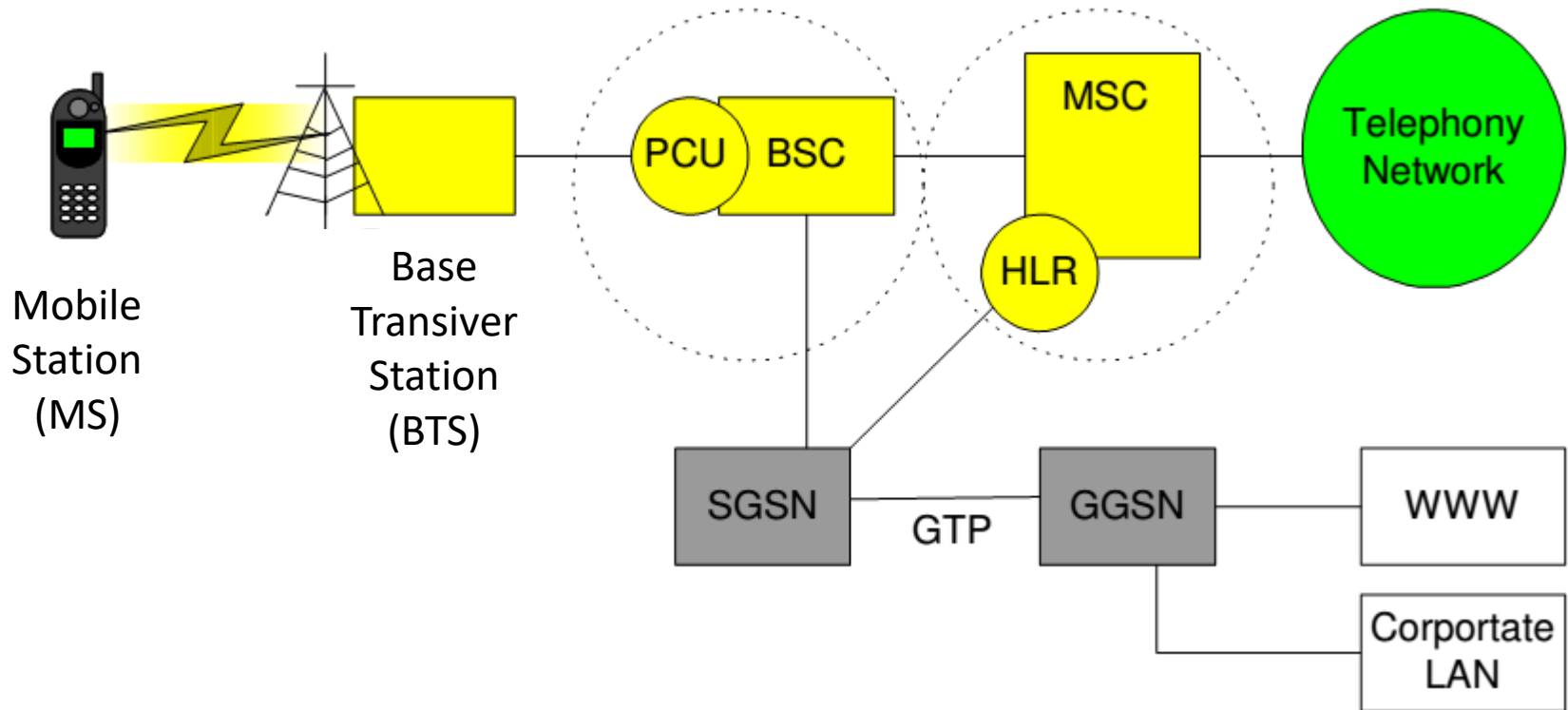
It is responsible for

- routing and packet transfer
- mobility management services
- session management functions
- logical link management
- services, authorization
- Authentication
- charging functions and SMS handling



The SGSN location register (SLR) stores subscriber-related information like the location information and the user profiles of all GPRS subscribers registered to the SGSN

GPRS Architecture



Gateway GPRS Support Node (GGSN)

Takes Care Of The Interworking between GPRS data network and external packet data networks

Acts as A gateway for the GPRS network

Hides the network from other external networks

Also enables the mobility of the users across the GPRS networks

GGSN communicates to SGSN and when it receives data that is addressed to a user, it checks if the user is active and then forwards it to the SGSN that serves the mobile user. Although, if the user is not active, the data will be discarded by GGSN.

References

1. Papanash Om Prakash Muthuswamy, “SGSN integration and implementation”, UPPSALA University
2. Gunnar Heine, Holger Sagkob, “Gprs: Gateway to Third Generation Mobile Networks”, Artech House (February 2003)