GPRS

Unit - III

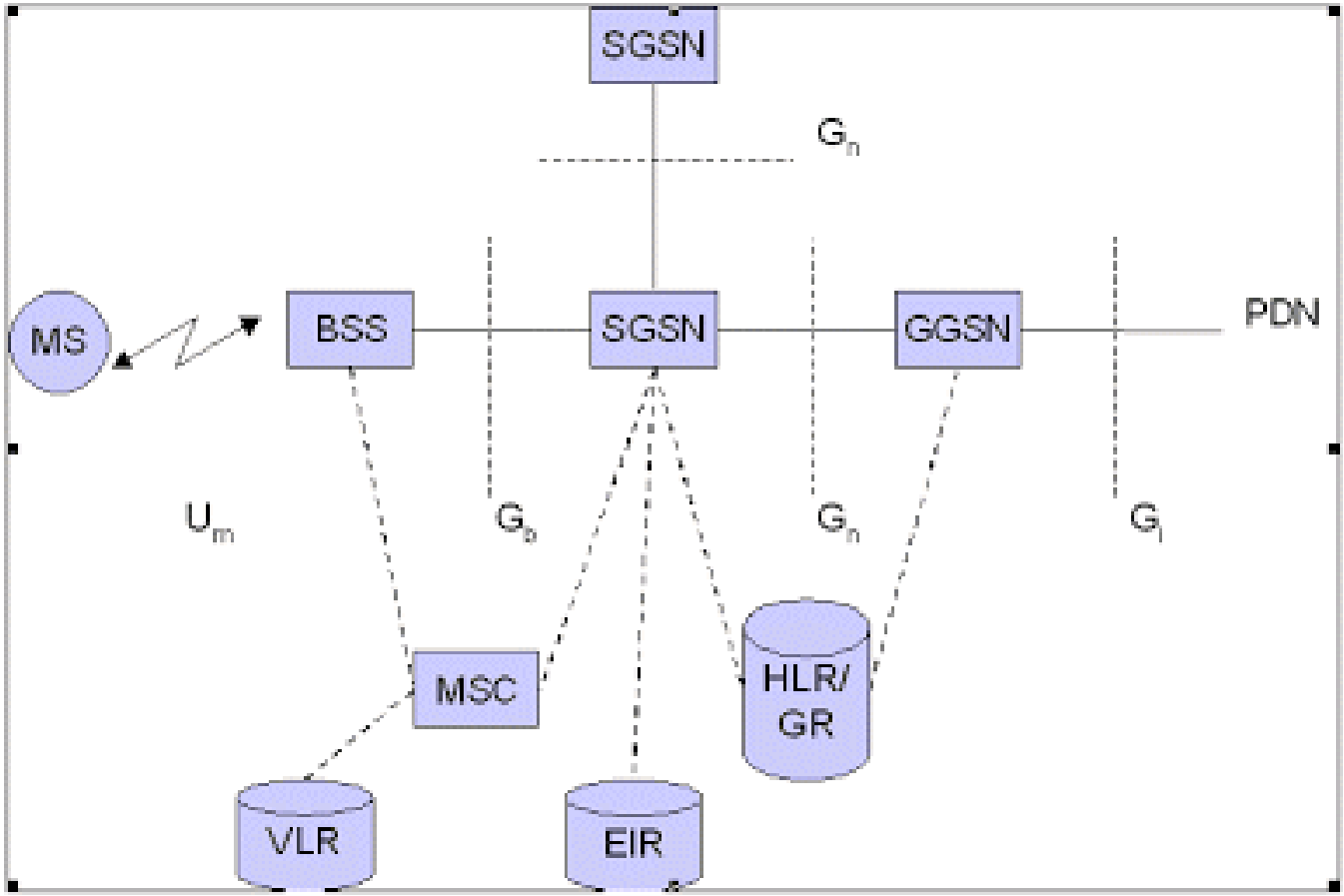
General Packet Radio Service (GPRS)

- GPRS added to GSM simplifies Internet Access
- Transfer data packet from GSM MS to external PDN
- Routed from GSM to packet-switched is still easy Internet Access
- GSM uses billing system based on **Connection time**
- GPRS billing system is based on amount of data transmitted, irrespective of connection time

GPRS Services

- GPRS offers 2 types of packet-switched end-to-end data transfer services:
  - Point-to-Point (PTP) Services
  - Point-to-Multipoint (PTM) Services
- PTP service – between 2 users –connectionless / connection-oriented
- PTM data transfer – one user to multiple users
- 2 types of PTM Services
  - Multicast – data packets broadcast in certain area
  - Group Call PTM – data packets addressed to group of users

GSM Architecture Reference Model



Contd...

- It introduces 2 new elements in GSM architecture:
  - Serving GPRS Support Node (SGSN)
  - Gateway GPRS Support Node (GGSN)
- SGSN:
  - It is a Router
  - All SGSN integrated in GSM and define many interfaces
  - It supports MS
  - SGSN connected to BSC through frame relay
  - It is same level as MSC
- GGSN:
  - It is an internetworking unit between GPRS and PDN

Contd...

- GGSN contains routing info about GPRS users
- Performs Address connection
- Tunnels data through encapsulation to the user
- GPRS Register (GR) is a part of HLR
- It stores GPRS data
- GGSN and SGSN is compared to HA and FA respectively
- Data packets transmitted to BSS and to MS through GGSN and SGSN
- MSC does traditional circuit-switched data transport in GSM

Advantage & Disadvantage

- Advantages:
  - Machine to Machine data communication at lower cost
  - Compatible with email, broadcast services and web browsing
  - High speed packet-switched enabled web-based services, e-commerce, Ad
- Disadvantages:
  - Reduced cell capacity – gets deployed for voice & GPRS call
  - Transit Delay – vulnerable to wireless link errors
  - No Store – does not support store and forward as in SMS

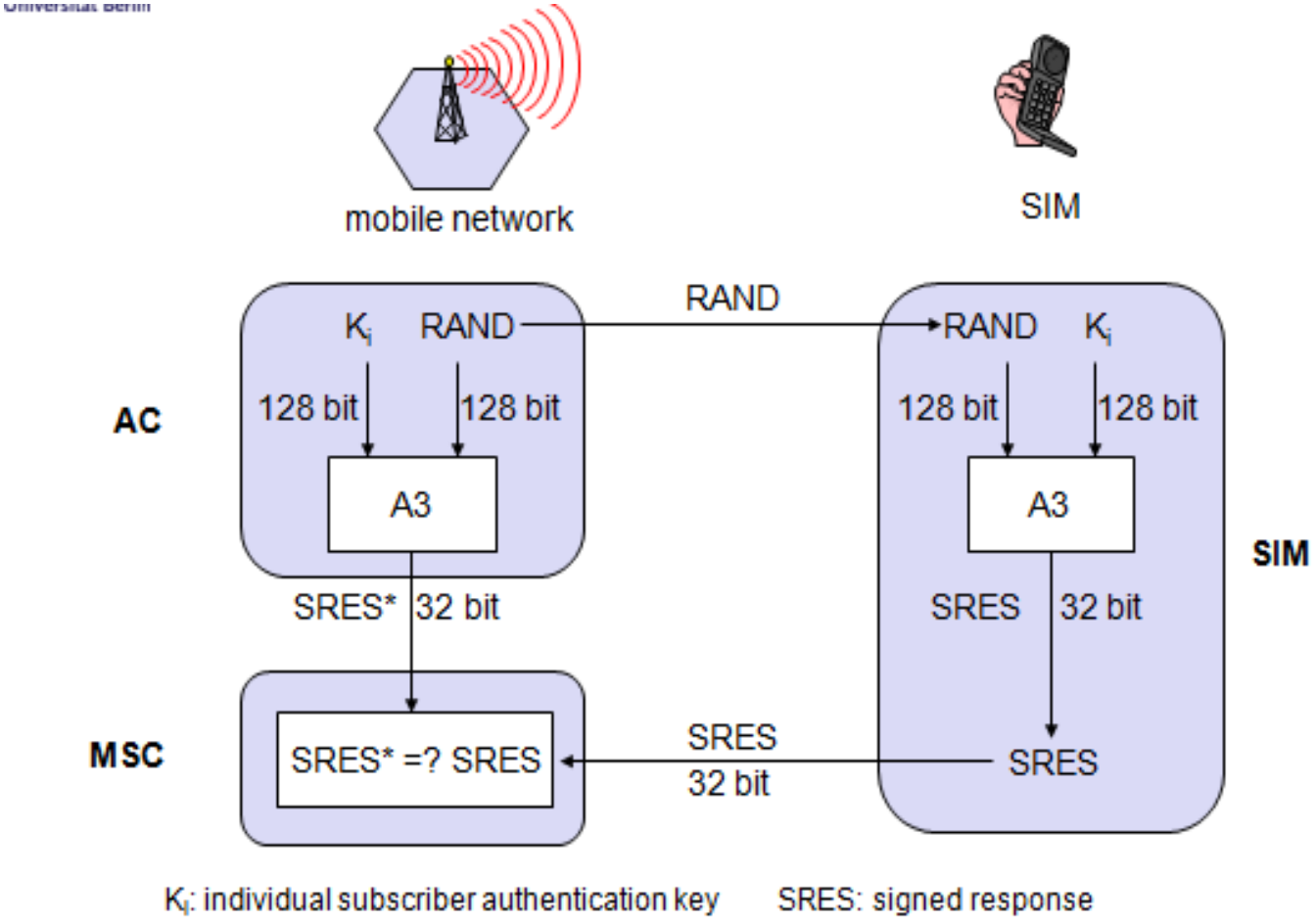
GSM Security

- Security services
  - access control/authentication
    - user ⇔ SIM (Subscriber Identity Module): secret PIN (personal identification number)
    - SIM ⇔ network: challenge response method
  - confidentiality
    - voice and signaling encrypted on the wireless link (after successful authentication)
  - anonymity
    - temporary identity TMSI
      (Temporary Mobile Subscriber Identity)
    - newly assigned at each new location update (LUP)
    - encrypted transmission

Contd...

- 3 algorithms specified in GSM
  - A3 for authentication (“secret”, open interface)
  - A5 for encryption (standardized)
  - A8 for key generation (“secret”, open interface)

GSM – Authentication



GSM – Key Generation & Encryption