Definition of GPRS / EDGE

Global System for Mobile Communications (GSM)

- Digitizes and compress voice or data and send it out over three frequency bands
    - 900 MHz (880-915[1] paired with 925-960[2] MHz)
    - 1800 MHz (1710-1785 paired with 1805-1880 MHz)
    - 1900 MHz (1850-1910 paired with 1930-1990 MHz)
- Provides global digital wireless carrier technology (operating in 200+ countries worldwide, with approximately 70% market share)
- Utilizes 900 MHz (880-915 paired with 925-960 MHz)
    - Europe and Asia
- Utilizes 1800 MHz (1710-1785 paired with 1805-1880 MHz)
    - Europe, Asia and Latin America
- Utilizes 1900 MHz (1850-1910 paired with 1930-1990 MHz)
    - North America
- Is the leading 2G standard for mobile communications in the world
- Leads in both market share (over two-thirds of all mobile phones are GSM phones) and availability (over 200+ countries are GSM enabled)
- Uses a combination of Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA)
    - FDMA "slices up" the available spectrum into 200 kHz channels and reuses them over the network
    - TDMA takes the digital bit stream carried in the 200 kHz channel and divides it up with a repeating pattern of frames, which repeats every eight time
        - Eight time slots, eight "calls" are connected at any one time
        - Each phone transmits/receives one-eighth of the time

General Packet Radio Service (GPRS)

- Delivers content at speeds up to 171 kbps (theoretical)
- Brings IP based services to the mobile network
- Enables instant connections through which information can be sent and received immediately as the need arises (i.e. Provides an "Always On" experience)
- Integrates with existing GSM systems and reuses the same radio network and transmission links
- GPRS packets only use a timeslot when needed
- Uses Subscriber Identity Module (SIM)
    - Electronic card inserted into mobile device
    - Contains user's identification information (i.e. phone number)
    - SIM must be valid to gain network access
    - Not device dependent (i.e. can move from one device to another)

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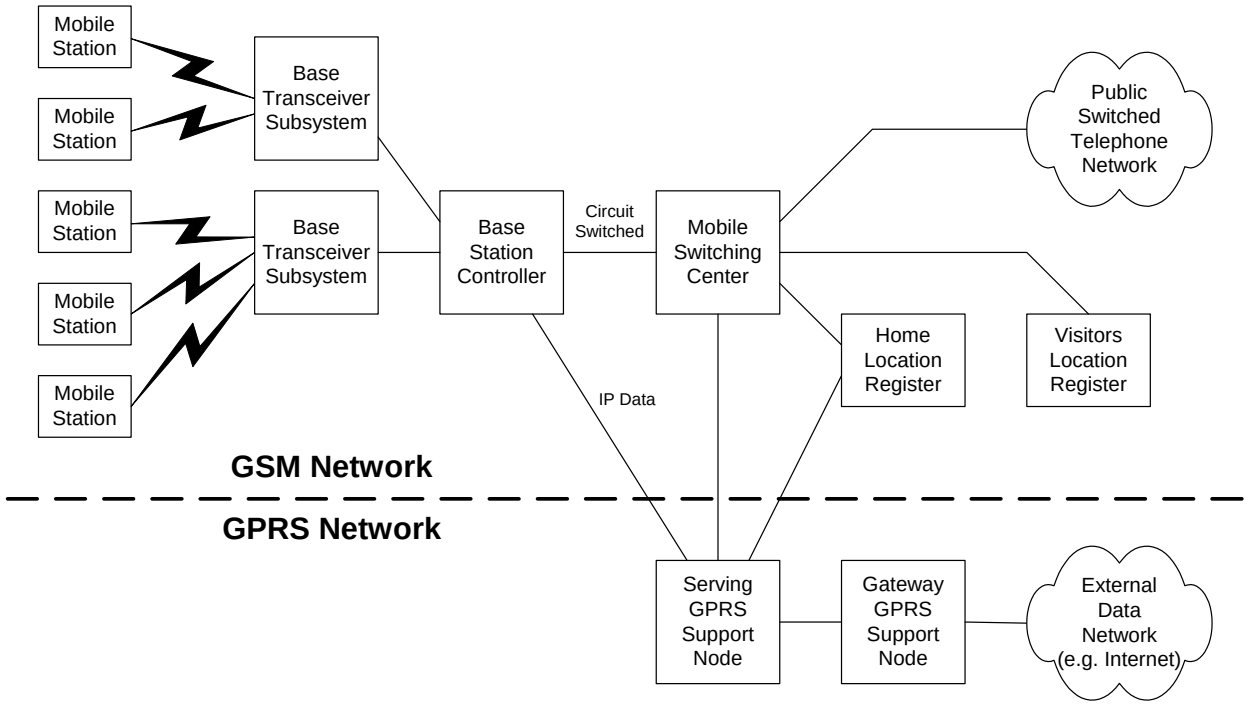
[1] Mobile Transmit Band, Base Station Receive Band
[2] Base Station Transmit Band, Mobile Receive Band

- Acts as an extension of the Internet
- Allows for dynamic IP Addressing
    - Assigns temporary IP addresses using Dynamic Host Configuration Protocol (DHCP)
- Supports Quality of Service (QoS) profiles
    - Precedence (High, Normal, Low)
    - Delay (maximum delay associated with packets)
    - Reliability (error rate tolerance)
    - Throughput (rate data moves across network)
- Has this key feature: When exchanging data with the network and a call comes in, the call is accepted, and data automatically resumes where it left off after call is complete
- Two major GPRS Support Nodes (GSN)
    - Serving GPRS Support Node (SGSN)
        - Serves the mobiles
        - Responsible for handling data packet traffic in a geographical area
        - Serves all mobiles attached to the GPRS service and located within the SGSN's service area
        - Provides authentication, mobility management, logical link management towards the mobiles, packet routing and transfer
        - Basically tracks the movement of the subscriber to know where to send data packets
    - Gateway GPRS Support Node (GGSN)
        - Provides interworking with external packet data networks
        - Acts as the interface towards external IP or private customer networks
        - Acts as an access server
        - Responsible for routing incoming traffic to the correct SGSN (i.e. setting up a logical link to the mobiles through the SGSN)
        - Translates between data formats and signaling protocols and address information to enable communications between the different networks



Enhanced Data Rates for GSM/GPRS Evolution (EDGE)

- Delivers content at speeds up to 384 kbps
- Provides an evolutionary path from GPRS to UMTS

Universal Mobile Telephone Service (UMTS)

- Utilizes broadband, packet-based digital wireless technology
- Based on GSM/GPRS/EDGE system
- Delivers content at speeds up to 2 Mbps
- Provides a single Universal Network Standard