20XW61 - MOBILE COMPUTING

GENERAL PACKET RADIO SERVICE

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What is GPRS?

General Packet Radio Service (GPRS) is a new bearer service for GSM that greatly improves and simplifies wireless access to packet data networks. GPRS applies packet radio principal to transfer user data packets in an efficient way between mobile station and external packet data network. Basically, it uses a packet switching technique that enables data transfer through cellular network GSM, providing end-to-end wide area wireless IP connectivity. The main benefits are that, the resources in the internet are used only when needed and are changed accordingly. Also, the connection set up time is reduced and it also enables new service opportunities.

GPRS vs GSM

GPRS reuses the existing GSM infrastructure to provide end-to-end packet-switched services. GSM is based on circuit-switched services.

	GSM	**GPRS**
Data rates	9.6 Kbps	14.4 to 115.2 Kbps
Modulation technique	GMSK	GMSK
Billing	Duration of connection	Amount of data transferred
System generation	2G technology	2.5G technology
Type of connection	Circuit – Switched Technology	Packet – Switched Technology

The data rate is the number of bits transmitted from one device to another or over a network per second. In GSM the maximum data rate is 9.6 kbps per time slot. GPRS offered more data transmission options for GSM-based devices, as GSM networks at the time could only use Short Message Service (SMS), for example, to transmit a small amount of data. GPRS made matters like streaming and gaming possible for customers. GMSK (Gaussian minimum shift-keying) is a form of continuous-phase frequency-shift keying (CPFSK) that uses a Gaussian filter to shape the modulating signal before it is used to modulate the carrier signal. GMSK modulation improves power and bandwidth efficiency. GMSK is often used in mobile communication systems because of its ability to reduce inter-symbol interference (ISI), which is caused by the overlapping of adjacent symbols. This is particularly important in mobile communications, where signals can experience fading and other distortions as they travel through the wireless channel.

In GSM, billing is based on duration of the voice call or SMS message. The cost is calculated based on the time that the call was active, and the rate varies depending on time of the day, location and user's subscription plan. In contrast, GPRS transmits data in small packets rather than a continuous stream of data and hence it may depend on the amount of data used. GSM (2G technology) was primarily designed for voice communication and also for SMS. It also establishes a dedicated channel for each call and channel remains open for the entire duration. GPRS (2.5G technology) enabled "always-on" data connectivity, which meant users could stay connected to the internet without having to establish a new connection for each data session. Circuit-switched technology establishes a dedicated communication path between two devices for the duration of the call or session, while packet-switched technology transmits data in small packets and dynamically allocates network resources based on demand. Packet-switched technology is more efficient for transmitting data and can support a higher volume of traffic.

GPRS Mobile Station

New Mobile Station are required to use GPRS services because existing GSM phones do not handle the enhanced air interface or packet data. The GPRS MS is a device that enables the users to connect to a GPRS network and access packet-switched data services. It consists of two main components: the Mobile Equipment (ME), which is a physical device that the user interacts with, such as smartphone or tablet, and a SIM card. GPRS MSs use radio frequency signals to communicate with the network. When a GPRS MS connects to the network, it establishes a wireless connection with the GPRS base station and is assigned a temporary IP address. The MS can then send and receive data packets over the GPRS network, allowing the user to access internet services, send and receive email, and use other data applications.