GPRS

general packet radio service

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About the Tutorial

General Packet Radio Service (GPRS) is a Mobile Data Service accessible to GSM and IS-136 mobile phones users. This service is packet-switched where several number of users can divide the same transmission channel for transmitting the data. This tutorial will help you understand the basics of GPRS.

Audience

This tutorial is prepared for beginners to help them understand the basic-to-advanced concepts related to GPRS.

Prerequisites

Before starting your practice with varied examples given in this reference, we assume that you are already aware of the basic terminologies used in Telecom domain.

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1. GPRS – OVERVIEW

General Packet Radio System is also known as **GPRS** is a third-generation step toward internet access. GPRS is also known as GSM-IP that is a Global-System Mobile Communications Internet Protocol as it keeps the users of this system online, allows to make voice calls, and access internet on-the-go. Even Time-Division Multiple Access (TDMA) users get benefit from this system, as it provides packet radio access.

GPRS also permits the network operators to execute an Internet Protocol (IP) based core architecture for integrated voice and data applications, which continues to be used and expanded for 3G services.

GPRS supersedes the wired connections, as this system has simplified access to the packet data networks like the internet. The packet radio principle is employed by GPRS to transport user data packets in a structural way between GSM mobile stations and external packet data networks. These packets can be directly routed to the packet switched networks from the GPRS mobile stations.

In the current versions of GPRS, networks based on the Internet Protocol (IP) like the global internet or private/corporate intranets and X.25 networks are supported.

Who Owns GPRS?

The GPRS specifications are written by the European Telecommunications Standard Institute (ETSI), the European counterpart of the American National Standard Institute (ANSI).

Key Features

Following three key features describe wireless packet data:

- **Always online feature -** Removes the dial-up process, making applications only one click away.

- **Upgrade to existing systems -** Operators do not need to replace their equipment; rather, GPRS is added on top of the existing infrastructure.

- **An integral part of future 3G systems -** GPRS is the packet data core network for 3G systems **EDGE** and **WCDMA**.

Goals of GPRS

GPRS is the first step toward an end-to-end wireless infrastructure and has the following goals:

- Open architecture
- Consistent IP services
- Same infrastructure for different air interfaces
- Integrated telephony and Internet infrastructure
- Leverage industry investment in IP
- Service innovation independent of infrastructure

Benefits of GPRS

Higher Data Rate

GPRS benefits the users in many ways, one of which is higher data rates in turn of shorter access times. In the typical GSM mobile, setup alone is a lengthy process, and equally rates for data permission are restrained to 9.6 kbps. The session establishment time offered while GPRS is in practice is lower than one second and ISDN-line data rates are up to many 10 kbps.

Easy Billing

GPRS packet transmission offers a more user-friendly billing than that of circuit switched services. In circuit switched services, billing is based on the duration of the connection. This is unsuitable for applications with bursty traffic. The user must pay for the entire airtime, even for the idle periods when no packet has been sent (e.g., when the user reads a Web page).

In contrast to this, with packet switched services, billing can be based on the amount of transmitted data. The advantage for the user is that he or she can be "online" over a long period of time but will be billed based on the transmitted data volume only.

2. GPRS – APPLICATIONS

GPRS has opened a wide range of unique services to the mobile wireless subscribers.

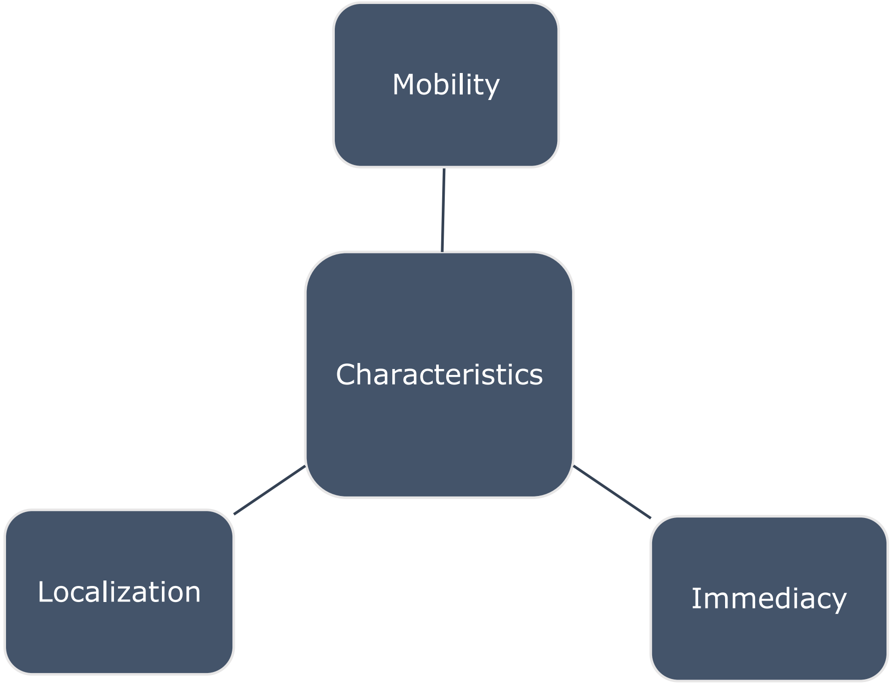
Characteristics of GPRS

Following are some of the characteristics that have opened a market full of enhanced value services to the users:

- **Mobility -** The ability to maintain constant voice and data communications while on the move.

- **Immediacy -** Allows subscribers to obtain connectivity when needed, regardless of location and without a lengthy login session.

- **Localization -** Allows subscribers to obtain information relevant to their current location.



Using the above three characteristics, varied possible applications are being developed for the mobile subscribers. These applications, in general, can be divided into two high-level categories:

- **Corporation**
- **Consumer**

These two levels further include:

- **Communications -** E-mail, fax, unified messaging, and intranet/internet access, etc.

- **Value-added services -** Information services, games, etc.

- **E-commerce -** Retail, ticket purchasing, banking and financial trading, etc.

- **Location-based applications -** Navigation, traffic conditions, airline/rail schedules, location finder, etc.

- **Vertical applications -** Freight delivery, fleet management, and sales-force automation.

- **Advertising -** Advertising may be location sensitive. For example, a user entering a mall can receive advertisements specific to the stores in that mall.

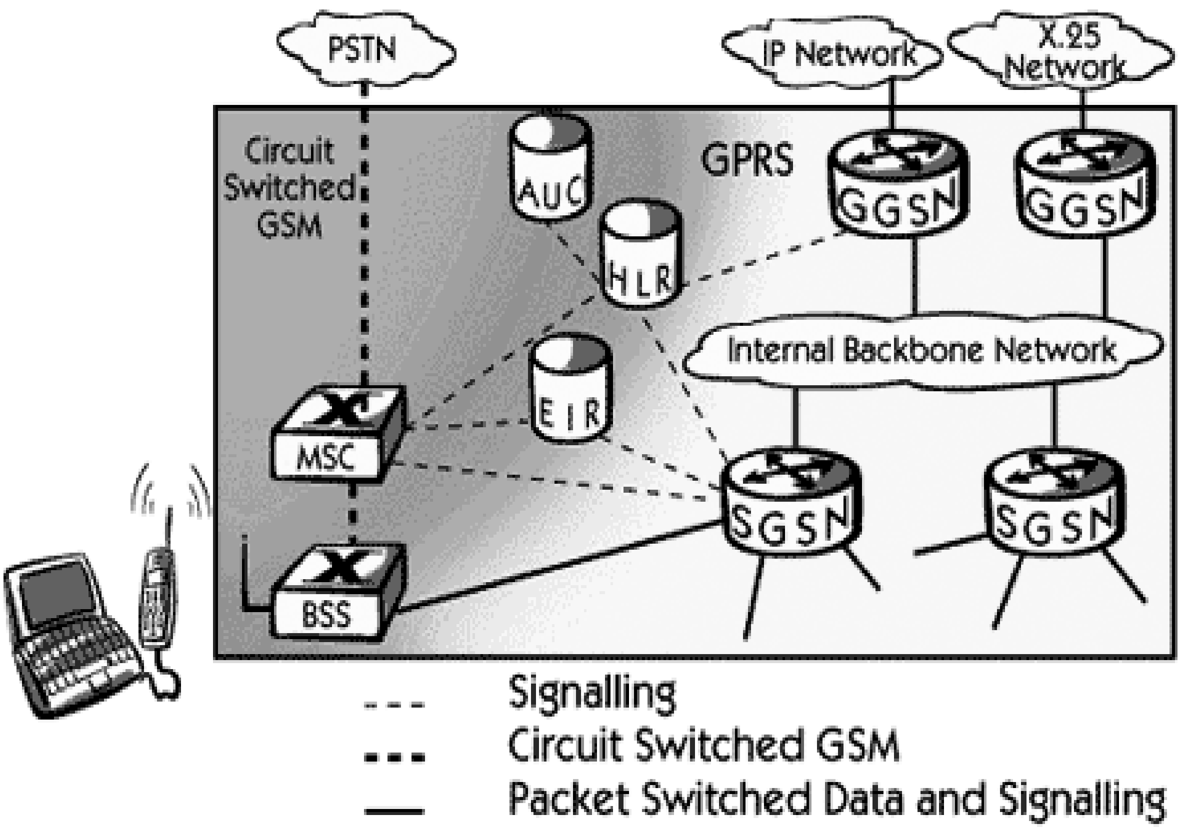
Along with the above applications, non-voice services such as SMS, MMS, and voice calls are also possible with GPRS. Closed User Group (CUG) is a common term used after GPRS is in the market. In addition, it is planned to implement supplementary services, such as Call Forwarding Unconditional (CFU), and Call Forwarding on Mobile subscriber Not Reachable (CFNRc), and Closed User Group (CUG).

3. GPRS – ARCHITECTURE

GPRS architecture works on the same procedure like GSM network, but it has some additional entities that allow packet data transmission. This data network overlaps a second-generation GSM network providing packet data transport at the rates of 9.6 to 171 kbps. Along with the packet data transport, the GSM network accommodates multiple users to share the same air interface resources concurrently.

GPRS Architecture Diagram

GPRS attempts to reuse the existing GSM network elements as much as possible, but to effectively build a packet-based mobile cellular network, some new network elements, interfaces, and protocols for handling packet traffic are required. The architecture diagram of GPRS is as follows:



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