

Introduction to the GPRS standard

The **GPRS** (*General Packet Radio Service*) standard is an evolution of the GSM standard, and for that reason is sometimes called GSM++ (or GSM 2+). As it is a second-generation telephony standard that allows a transition to third generation (3G), the GPRS standard is generally classified as 2.5G.

GPRS extends the architecture of the GSM standard to allow packet data transfers with theoretical data rates on the order of 171.2 Kbit/s (up to 114 Kbit/s, in practice). Thanks to its packet transfer mode, data transmissions only use the network when necessary. The GPRS standard therefore allows the user to be billed by volume of data rather than by the duration of the connection, which means, in particular, that the user can remain connected at no extra cost.

For voice transport, the GPRS standard uses the GSM network architecture, and offers access to data networks (in particular the Internet) using the [IP protocol](#) or the X.25 protocol.

GPRS supports new features not available with the GSM standard, which can be generally categorised into the following service classes:

- Point to point services (PTP): the ability to connect in client-server mode to a machine on an IP network,
- Point to multipoint services (PTMP): the ability to send a packet to a group of recipients (*Multicast*).
- Short message services (SMS),

Architecture of the GPRS network

Integration of GPRS into a GSM architecture requires the addition of new network nodes called **GSN** (GPRS support nodes) located on a backbone network:

- the **SGSN** (*Serving GPRS Support Node*) router manages the addresses of the terminals in the cell and provides the packet transfer interface with the *GSN* gateway.
- the **GGSN** (*Gateway GPRS Support Node*) gateway interfaces with other data networks (the Internet). In particular, the GGSN is responsible for providing an IP address to the mobile terminals throughout the duration of their connection.

Quality of service

GPRS integrates the concept of Quality of Service (written **QoS**), in other words, the ability to adapt the service to the needs of an application. The service quality criteria are the following:

- priority
- reliability. GPRS defines 3 reliability classes
- delay
- throughput

The GPRS standard defines 4 encoding schemes, called CS-1, CS-2, CS-3 and CS-4. Each scheme defines the level of protection of the packets against interference so as to be able to degrade the

signal according to the distance of the mobile terminals from the base stations. The higher the protection, the lower the throughput:

Encoding scheme	Throughput	Protection
CS-1	9.05 Kbit/s	Normal (signalling)
CS-2	13.4 Kbit/s	Slightly lower
CS-3	15.6 Kbit/s	Reduced
CS-4	21.4 Kbit/s	No error correction