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**Why GGSN AND SGSN?**

The mobile core network in the original GSM networks consists of MSC (Mobile Switching Centre) and Gateway MSC (GMSC) to connect the mobile network to external telephone networks like PSTN and ISDN. These core network components primarily facilitate voice calls and SMS but can also enable circuit-switched mobile data (internet) for CSD and HSCSD technologies. The original GSM core network did not have the packet-switched capability, and therefore enabling GPRS required a switching solution that could facilitate shared radio resources. The new switching solution was enabled by Serving GPRS Support Node (SGSN) and Gateway GPRS Support Node (GGSN).

**GGSN**

From an external network's point of view, the GGSN is a router to a sub-network, because the GGSN ‘hides’ the GPRS infrastructure from the external network. When the GGSN receives data addressed to a specific user, it checks if the user is active. If it is, the GGSN forwards the data to the SGSN zserving the mobile user, but if the mobile user is inactive, the data is discarded. In the other direction, mobile-originated packets are routed to the right network by the GGSN.

The GGSN converts the GPRS packets from the SGSN into the appropriate packet data protocol (PDP) format and sends them out on the corresponding packet data network. In the other direction, PDP addresses of incoming data packets are converted to the GSM address of the destination user. The readdressed packets are sent to the responsible SGSN. For this purpose, the GGSN stores the current SGSN address of the user and his or her profile in its location register. The GGSN is responsible for IP address assignment and is the default router for the connected user equipment. The GGSN also performs authentication and charging functions. Other functions include subscriber screening, [IP pool](https://en.wikipedia.org/wiki/Address_pool) management,  [address mapping](https://en.wikipedia.org/wiki/IP_address#Modifications_to_IP_addressing), [QoS](https://en.wikipedia.org/wiki/Quality_of_service), and PDP context enforcement.

**SGSN**

SGSN (Serving GPRS Support Node) is a key element in the GPRS (General Packet Radio Service) and 3G (Third Generation) mobile networks. It acts as a router and traffic manager for mobile data traffic, receiving and routing data packets from mobile devices to their intended destinations. SGSN also provides authentication, authorization, and accounting (AAA) services for GPRS/3G data sessions, ensuring that only authorized devices are allowed to connect to the network. SGSN is also responsible for tracking the location of mobile devices within the network. It records each device's location and routing information, enabling seamless handovers between different SGSNs as devices move between network areas. This allows devices to maintain their network connections even when moving between different coverage areas or when switching from one network operator to another.

**GPRS Register**

Each mobile device in a GPRS network is assigned a unique identifier known as the MSISDN (Mobile Station International Subscriber Directory Number). When a device connects to the GPRS network, it registers its location with the network by sending a location update message to the serving GPRS support node (SGSN). This information is used to route data packets to and from the device and to manage handovers between different SGSNs as the device moves within the network. The SGSN periodically checks the status of each registered device to ensure that it is still connected to the network. If a device is inactive for a specified period, the SGSN may deregister the device and release its network resources to other devices.