Combined 3G GGSN and 4G S/PGW

with standard Interfaces for Flexible Charging and Policy Control

for MNOs and full MVNOs

Part of the Halys EPC suite of products, the combined GGSN/PGW provides the functional modularity and flexibility needed for a smooth evolution and optimisation of your mobile data services for subscribers at home, in roaming as well as for visitors.

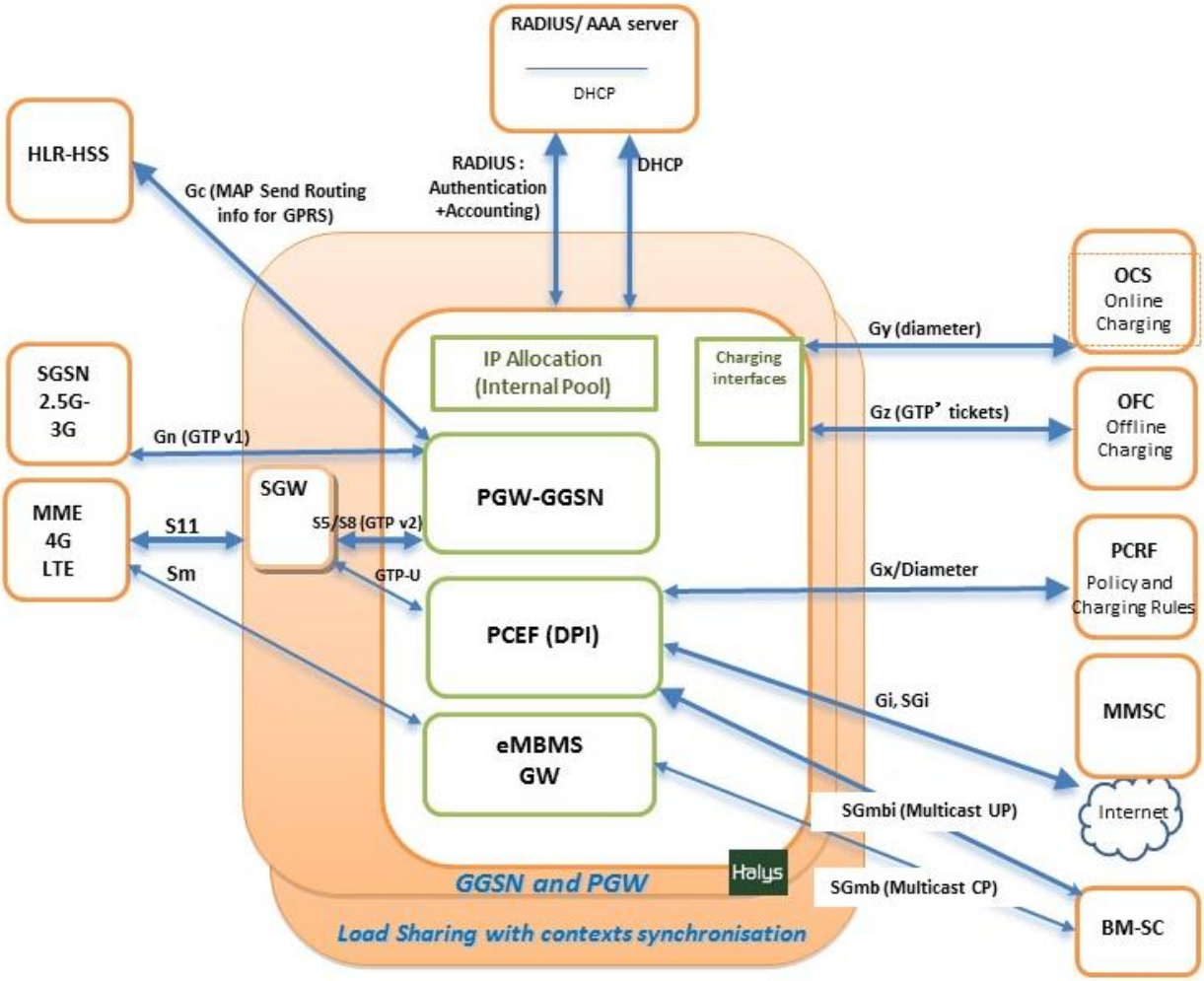

Fig. 1 Combined 3G GGSN and 4G S/PGW with 3GPP Charging and PCC Interfaces

1- Performance, Flexibility and Modularity with integrated functions

User traffic packet switching (GTP-U) is implemented at Linux OS Kernel level to allow the best performance and the use of Intel standard physical or virtual servers. Different server models and the clustering of multiple servers allow to provide an evolutive range of capacity by adding "cores". Local Break Out (patented Halys method) routing complements the usual Home based routing. Routes can be selected based on IMSI or APN. Cheaper Data Services for Visitors can be provided in association with local charging (compliant with European Union roaming rules).

The SGW is integrated for GTPv2 Bearer Context Release and Uplink Data Notifications to reactivate the Radio attachment when incoming data are resumed (example: SIP incoming calls).

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Quality of Service is supported with secondary PDP context (GTPv1) or dedicated bearers (GTP v2) and the enforcement of upload and download service level rate. *Static Policy Enforcement* and Charging Control using HLR/HSS profiles is provided with the integrated PCEF which will throttle the incoming downlink Data traffic based on the allocated QoS or QCI. The full set of standard quality parameters are supported. Full *dynamic Policy Enforcement* is obtained with the association of an external PCRF through the standard 3GPP Gx interface. Besides, Halys patented method provides Preemptive Priority for the management of the sharing of the available bandwidth in the Radio Cells.

The internal Shallow Packet Inspection of the PCEF (simplified DPI) allows to create dedicated bearers for voice and Visio without a PCRF. Radius and Gy/Diameter charging protocols are provided. The individual data usage, APN, UL and DL based is monitored. When a threshold is reached (configurable) the session is either disconnected or SMPP alarms with mails are triggered. A MIB is provided for standard integration with an SMPP supervision system.

2- Network based triggered PDP Context or Session Establishment

The GGSN supports network established context, session establishment or dedicated bearer creation through the Gx interface from an application server (AS) connected to the PCRF.

3- Integrated eMBMS Gateway to implement Multicast services

It implements all the interfaces with a separate BM-SC, SGmb for the Control Plane and SGmbi for the data.

4-Standards compliance for interoperability

The Halys product is standard based and compliant in particular with the following standards :

- GTPv0, GTPv1 3gpp TS 29.060 as well as GTPv2 (4G) 3gpp TS 29.274 for GTP-C and with TS 29.281 for GTP-U
- Gx diameter 3gpp 29.212
- Gy diameter with SDP RFC 3588, 4006, 3gpp 32.299, 32.296
- Gz GTP' tickets with the OFCS TS 32.295
- RADIUS RFC 2865 (Authentication), 2866 (Accounting)
- MAP 29.002 (Gc interface with HLR)

Technical Data:
Linux OS on Intel Servers or Virtual Machines
Scalability: typically up to 4 Gbps per server and clustering for higher capacities
Licensing: Pay-as-you-grow capacity license based on the throughput and the set of functions
Halys patents used:
EP14 155 594.6 - FR13 51 461 Local breakout for data services of roaming visitors
EP14 193 815.9 - FP10 00 217 621 Pre-emptive capability allocation management for GGSN and PGW