



GPRS – a Mobile Internet Architecture

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Goals & Agenda

- Acronyms flood - 2G, 3G, GSM, GPRS
- Challenges of the Mobile IP
- GPRS basic architecture
- GPRS components
 - GGSN
 - SGSN
- GTP - GPRS Tunneling Protocol
- Charging for GPRS services
- Q&A

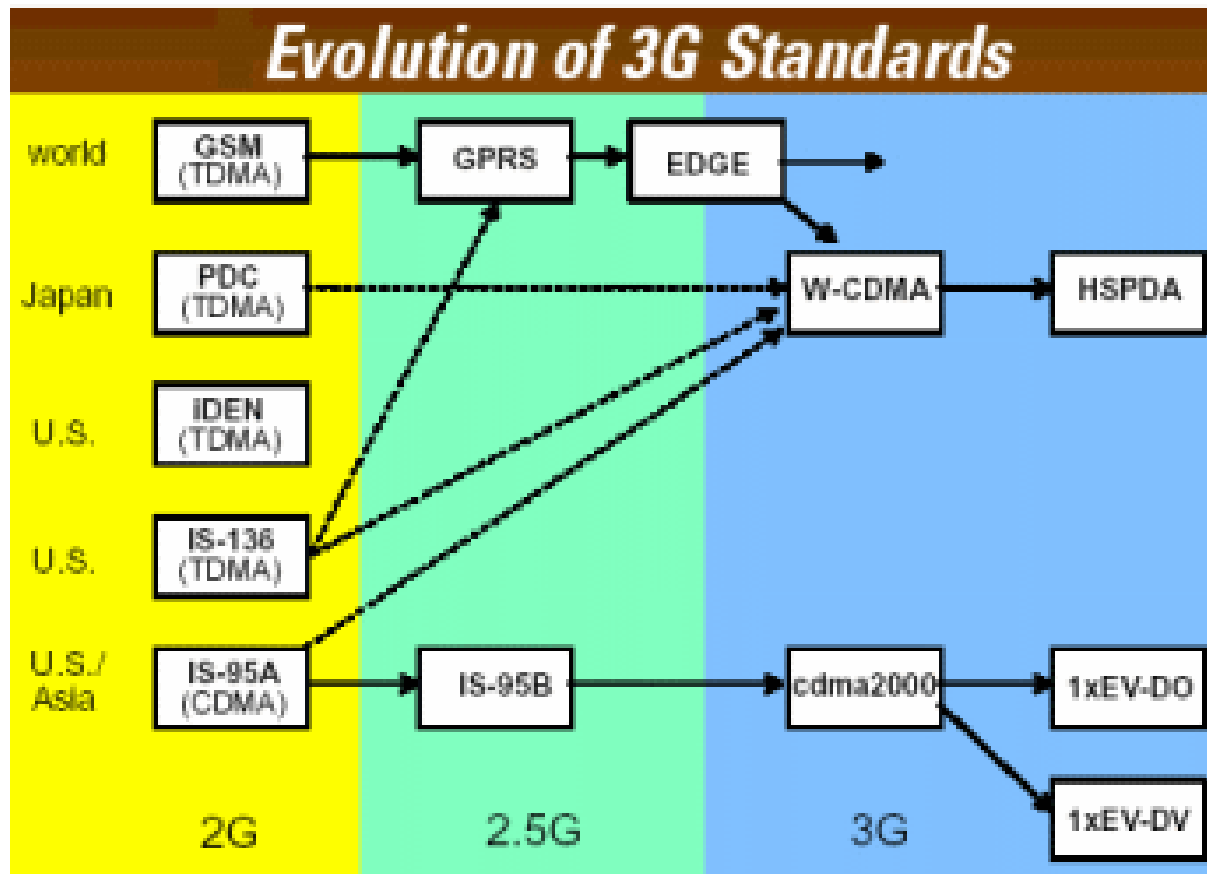


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Evolution 2G , 2.5G and 3G

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GSM/GPRS acronyms

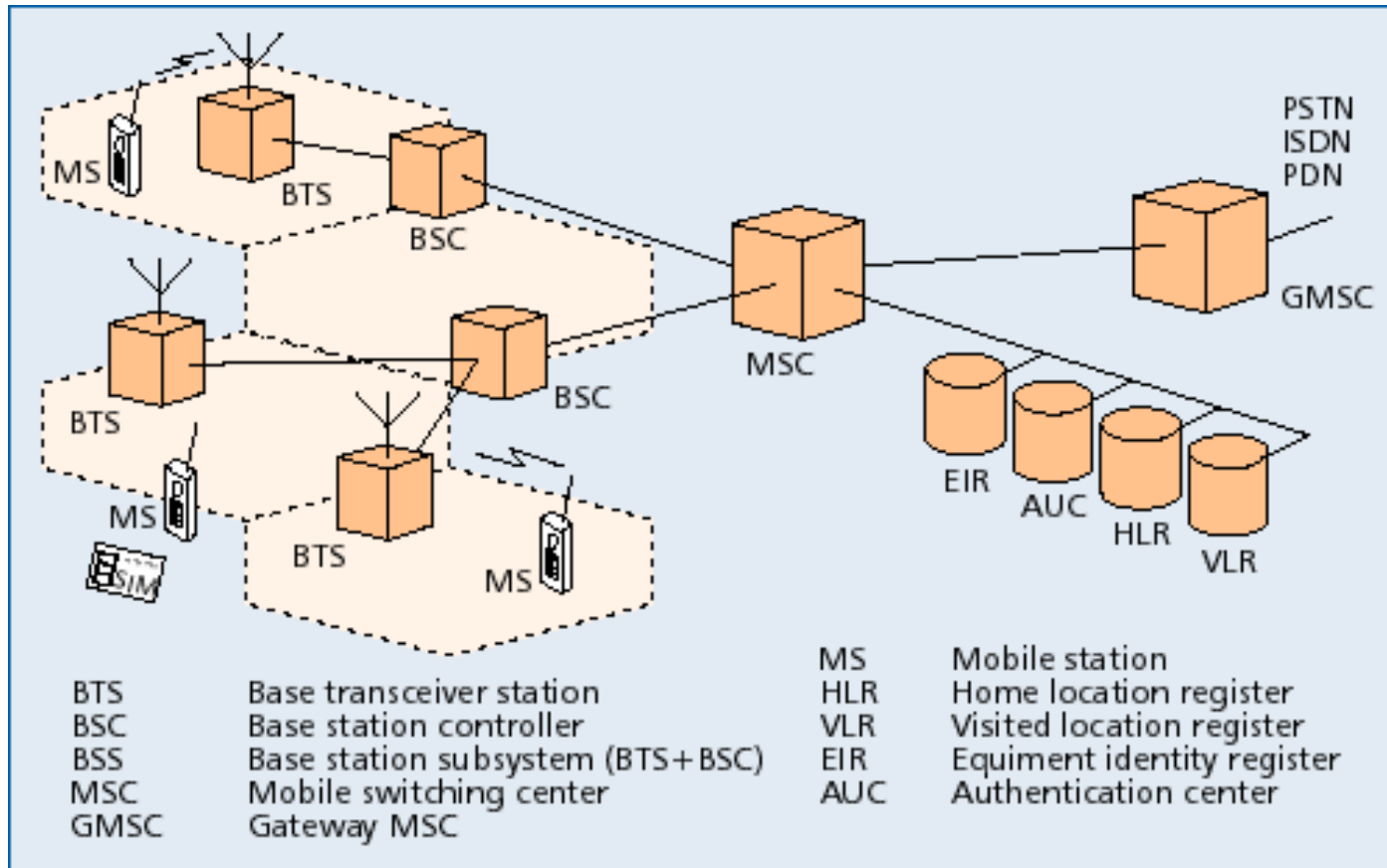
- GSM - Global System for Mobile communication
- GPRS – General Packet Radio Service
- IMSI - International Mobile Subscriber Identity
- SIM – Subscriber Identity Module
- IMEI – International Mobile station Equipment Identity
- IP – Internet protocol (often – address)



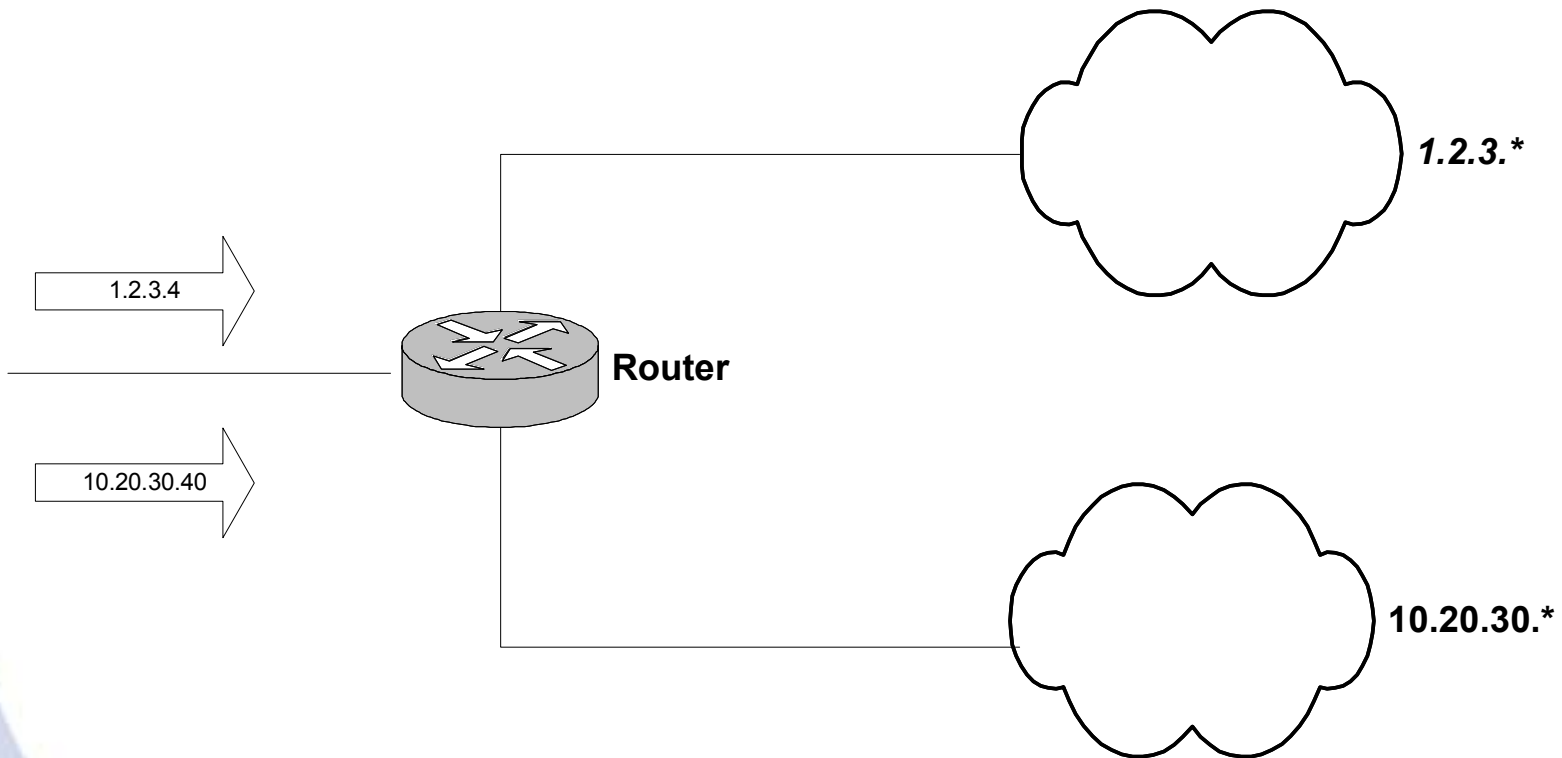
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GSM System Architecture



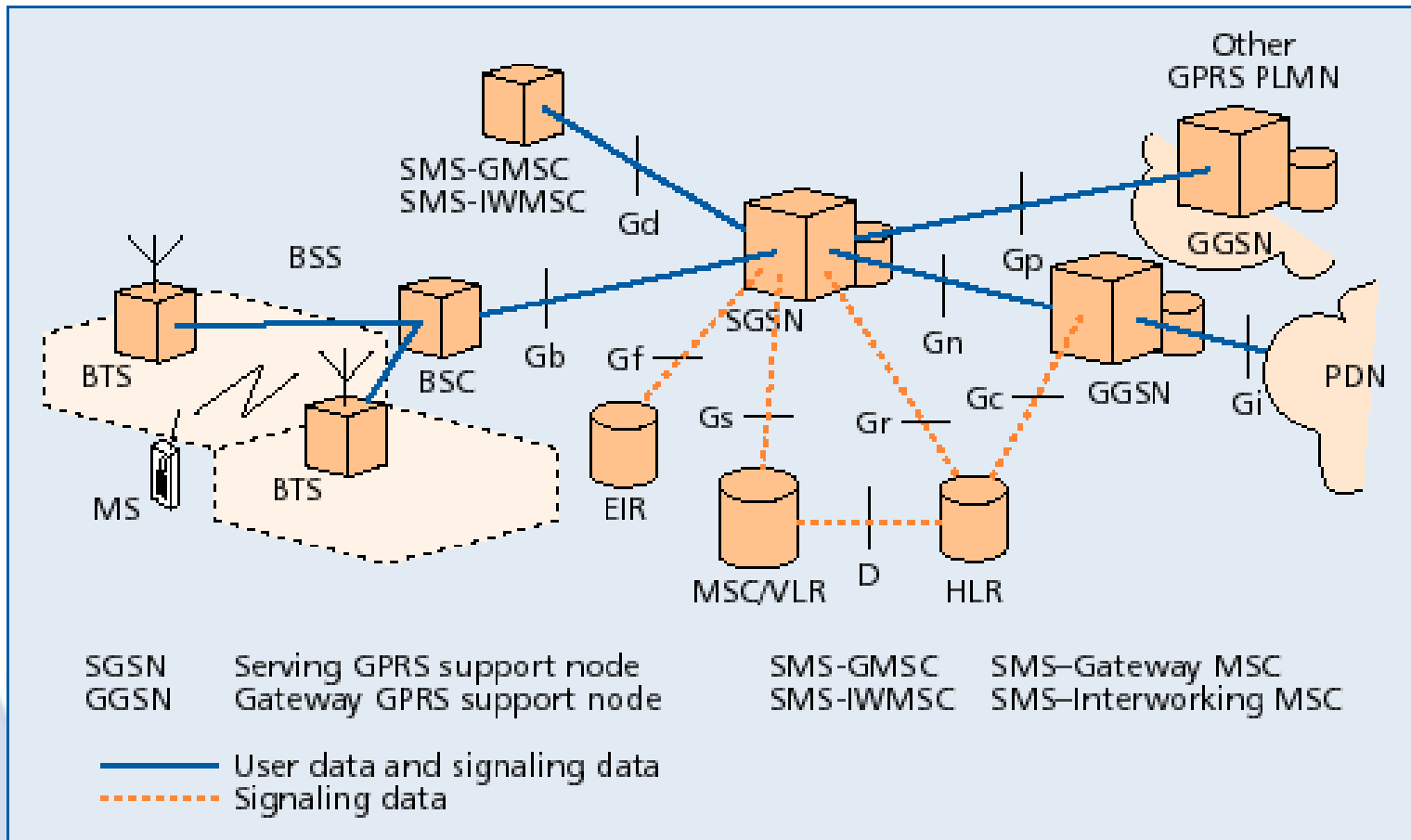
Mobile IP challenge



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GPRS System Architecture



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PDN - Public Data Network



GPRS Acronyms

- SGSN – Serving GPRS Supporting Node
- GGSN – Gateway GPRS Supporting Node
- CGF – Charging Gateway Functionality
- HLR – Home Location Register
- PDN – Packet Data Network
- PLMN – Public Land Mobile Network



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GPRS Logical Architecture

(GSM 09.60 version 7.4.0 Release 1998)

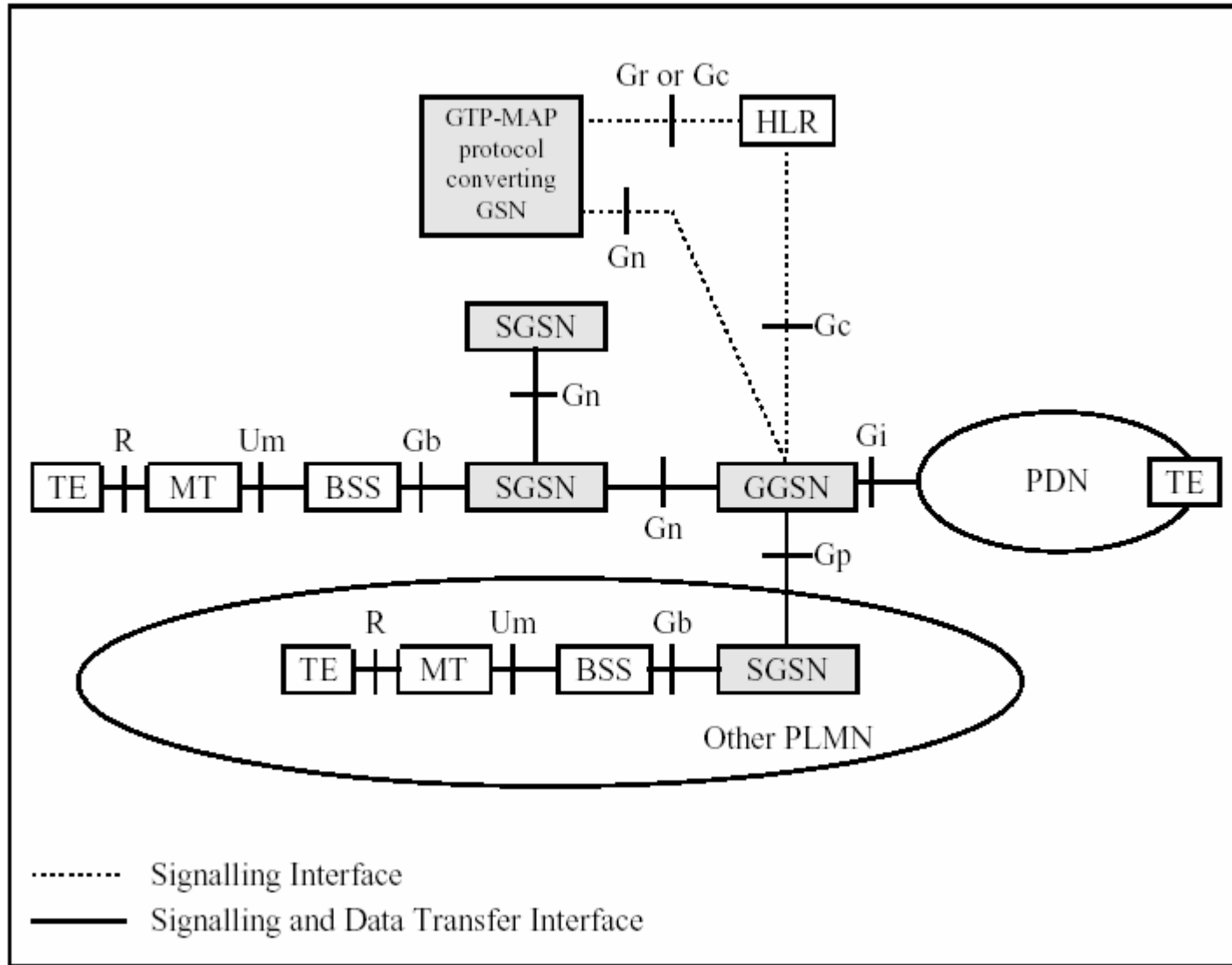


Figure 1: GPRS Logical Architecture with interface name denotations

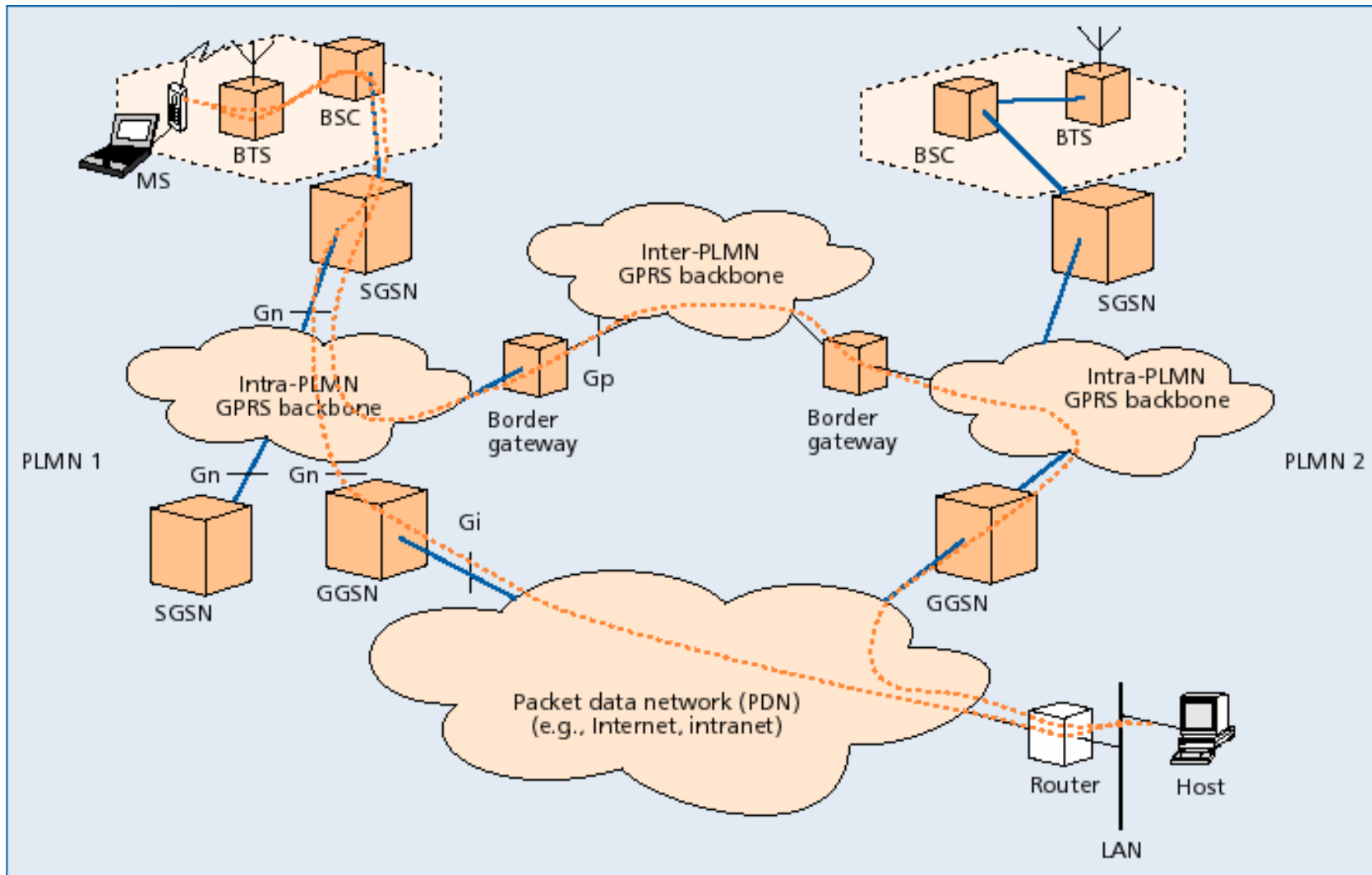


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GPRS Routing Example

Two IPs assigned



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PDP Context

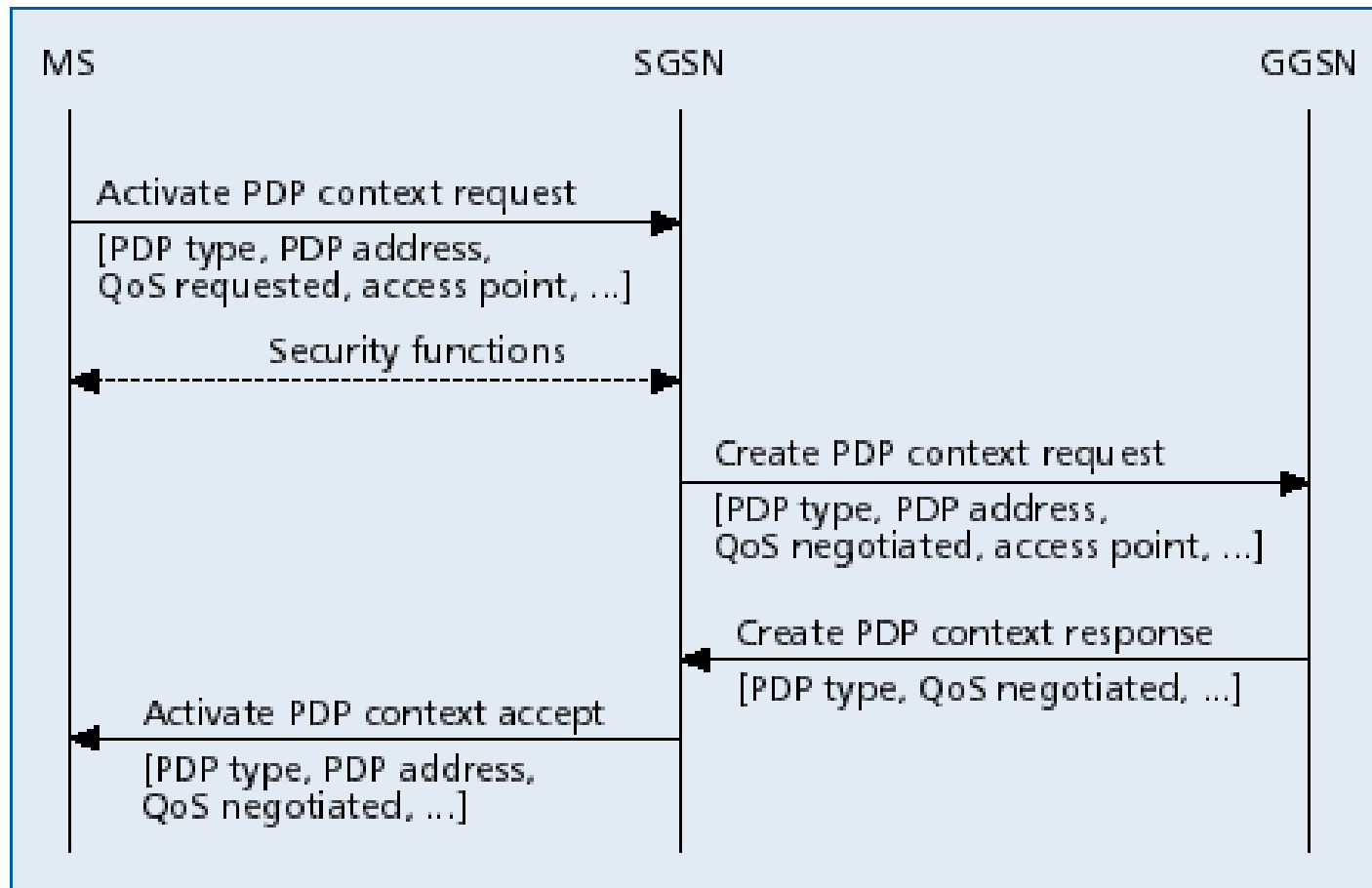
- **PDP:** Packet Data Protocol (PDP) is a network protocol used by an external packet data network interfacing to GPRS.
- **PDP Context:** Information sets held in MS and GSNs for a PDP address
- **NSAPI:** Network Service Access Point Identifier. An integer value in the range [0; 15], identifying a certain PDP Context.



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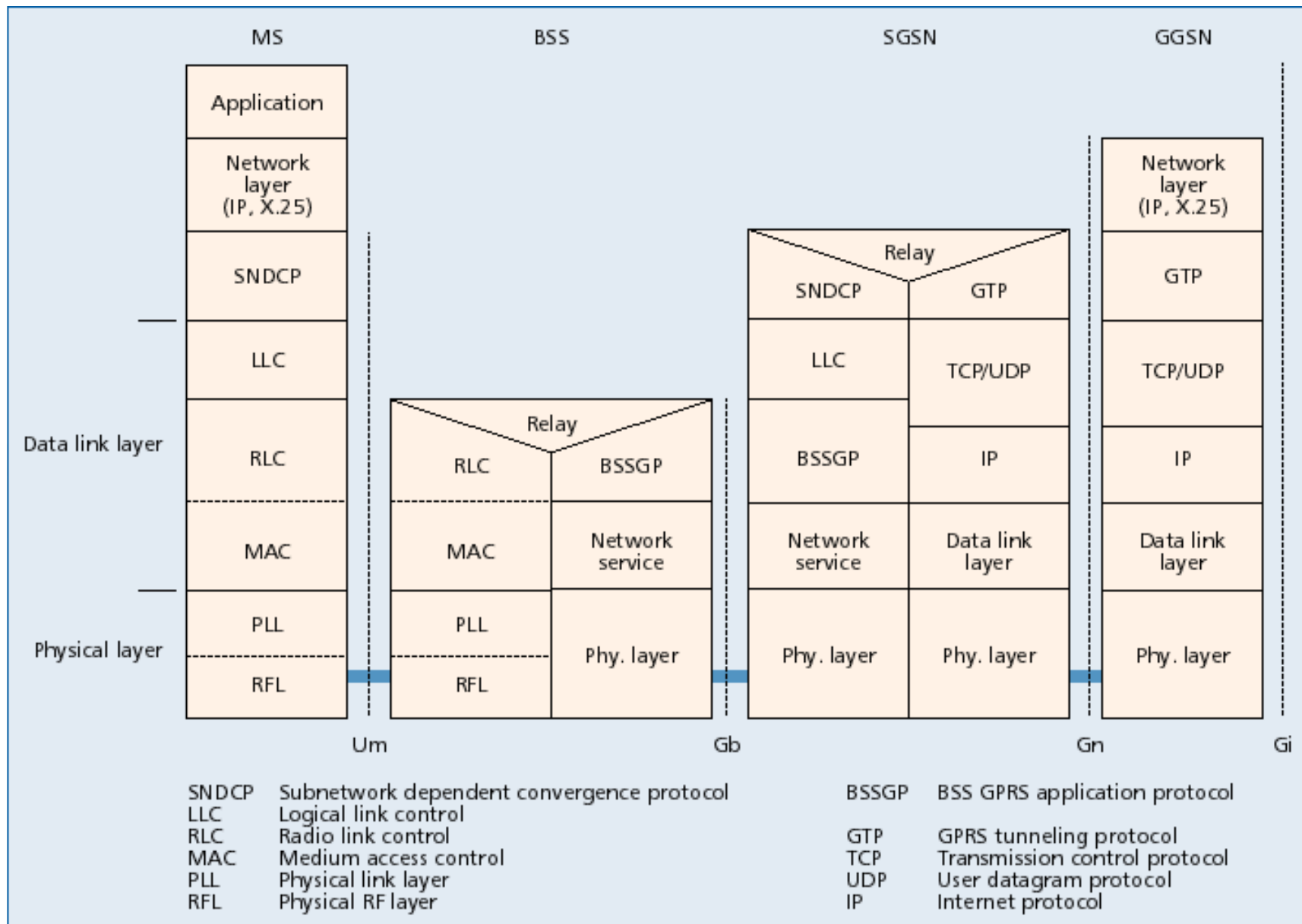


PDP Context Activation Procedure



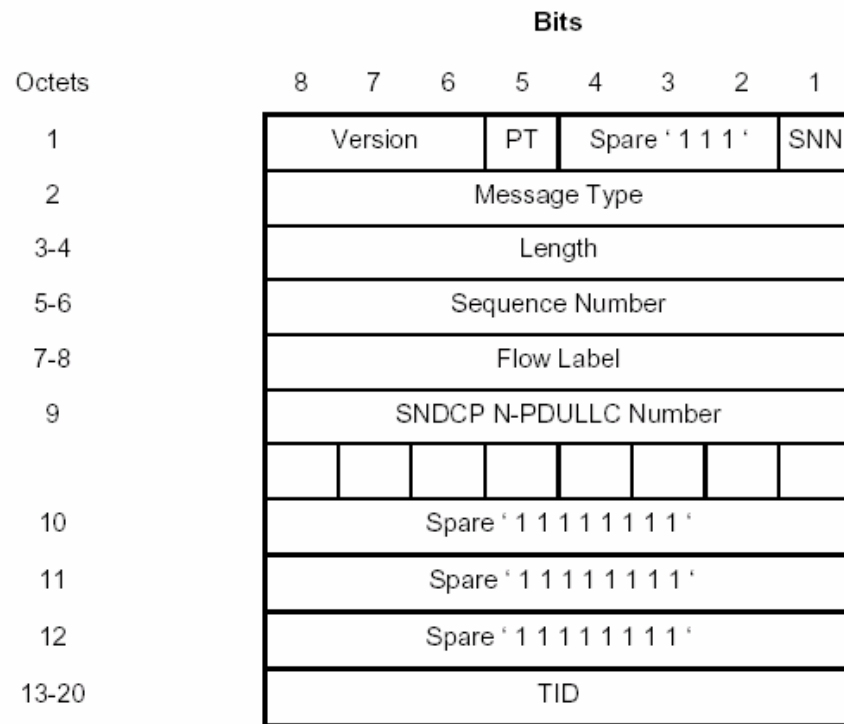
- + IP assignment
- + Roaming

GPRS Transmission Plane



GTP: GPRS Tunnelling Protocol

(GSM 09.60 version 7.4.0 Release 1998)

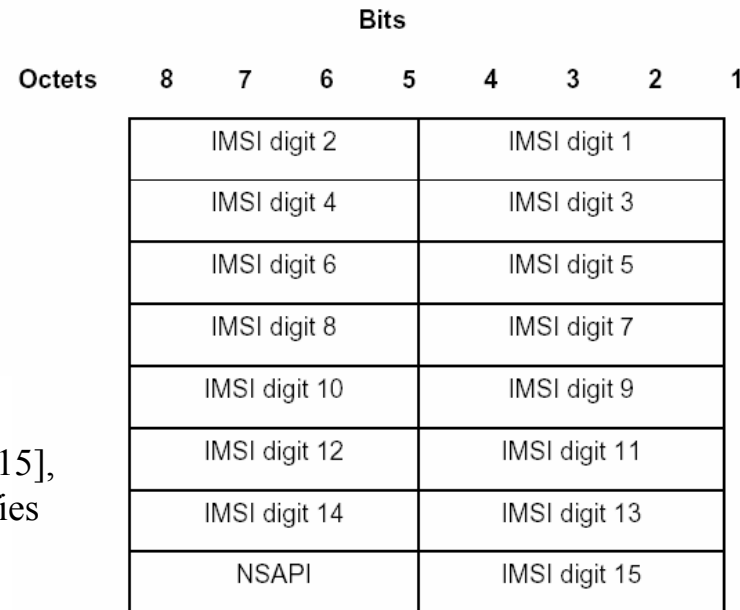


1) LLC frame number (continued)

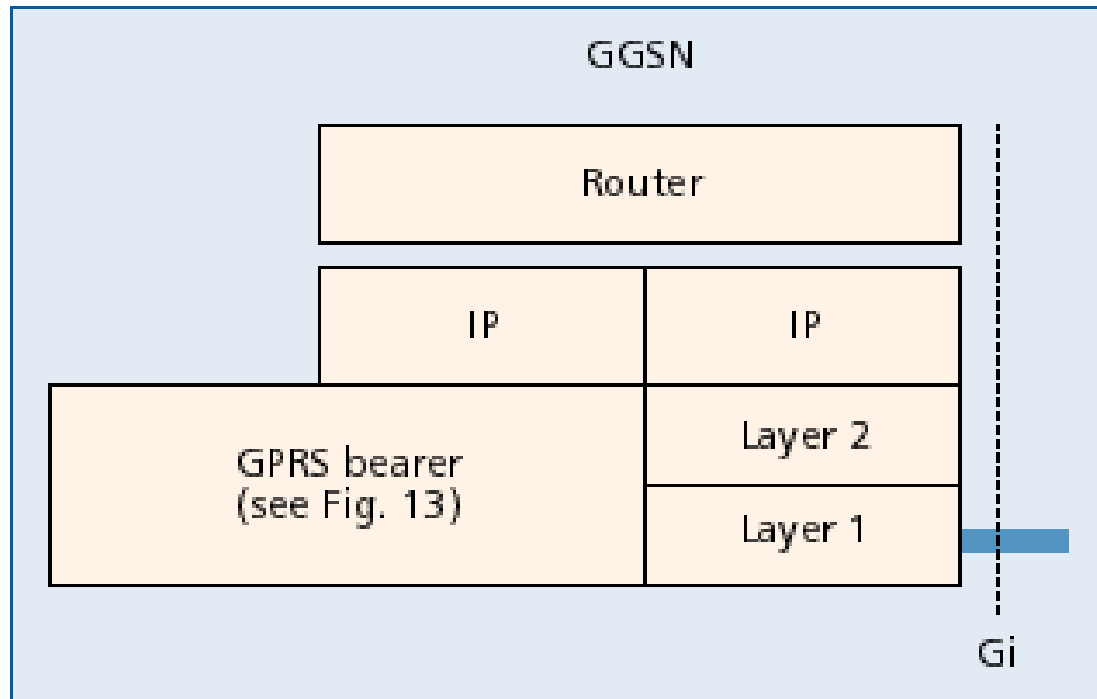
Figure 2: Outline of GTP header

NSAPI: Network Service Access Point Identifier. An integer value in the range [0; 15], identifying a certain PDP Context. It identifies a PDP context belonging to a specific MM Context ID.

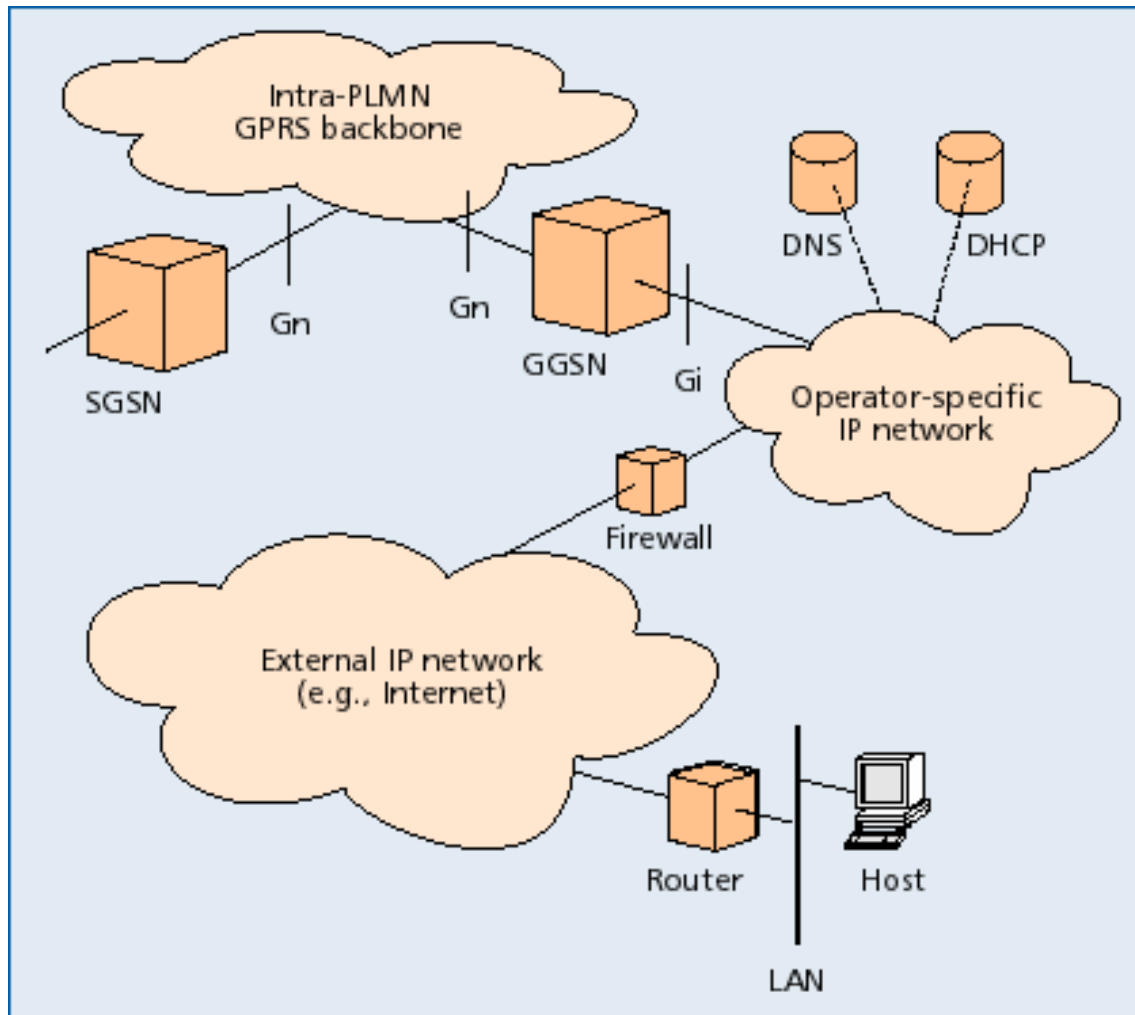
TID – Tunnel Identifier (IMSI + NSAPI)



Protocols at Gi interface



GPRS/Internet connection



GPRS Charging

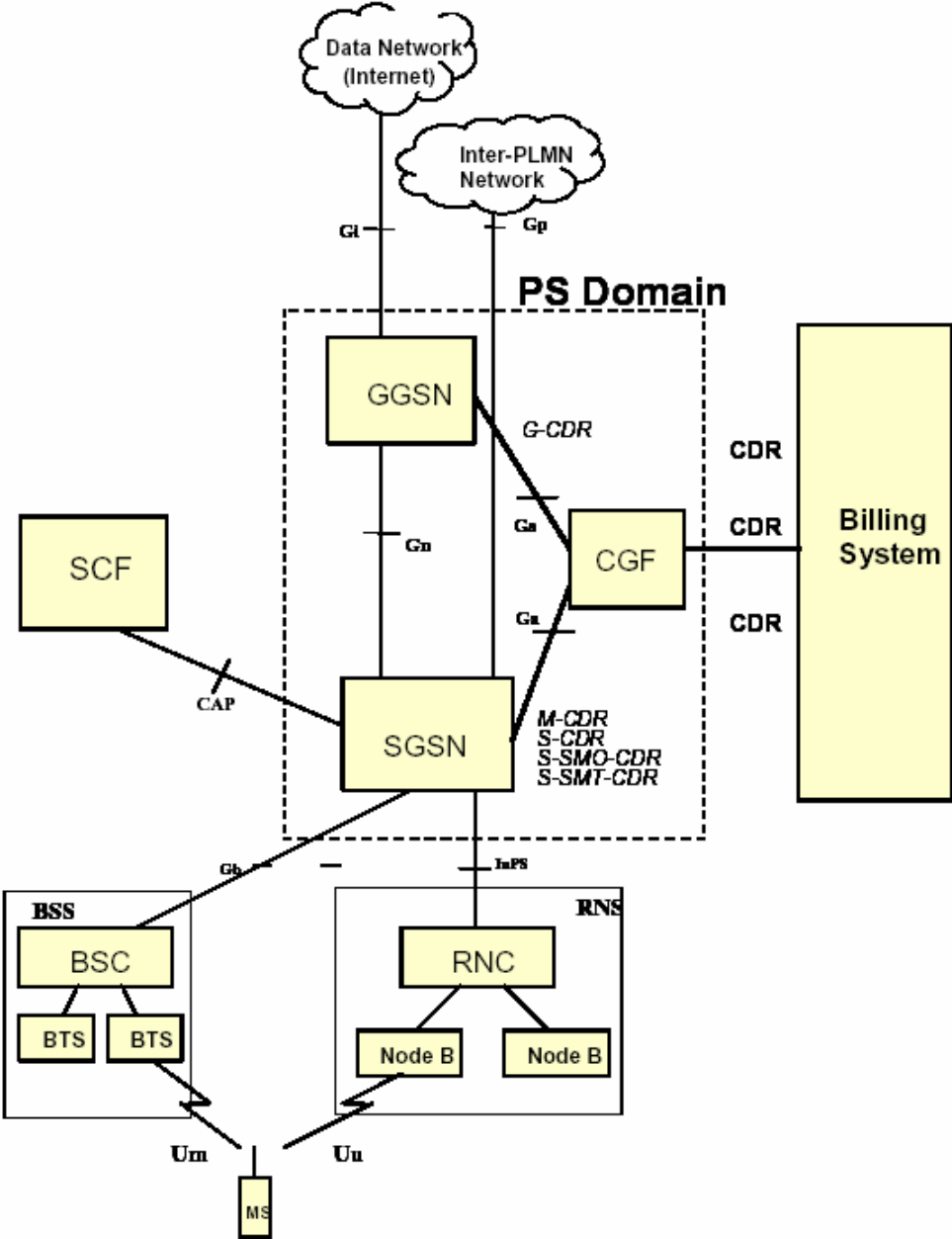
“IRS Definition”:
If you can't charge for you services,
it is a hobby, not a business!



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GPRS Charging



CGF: Charging Gateway Functionality

SCF: Service Control Function



Where to find specifications?

- ETSI - European Telecommunications Standards Institute
 - www.etsi.org - official specifications
- 3GPP - 3rd Generation Partnership Project
 - www.3gpp.org - free specifications (work in progress)
- <http://www.comsoc.org/livepubs/surveys/public/3q99issue/bettstetter.html> - very good IEEE article , excellent starting point



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Q & A



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