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## Foreword

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# 1 Scope

The present document describes the signalling requirements and procedures used at network elements related to the GLR for GTP within the 3GPP system at the application level.

The present document gives the description of the systems needed only in the network utilising GLR as the delta document against 3GPP TS 29.060.

## 1.1 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description Stage2".
- [2] 3GPP TS 23.119: "Gateway Location Register (GLR) – stage2".
- [3] 3GPP TS 24.008: "Mobile radio interface layer 3 specification, Core Network Protocols – Stage 3".
- [4] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [5] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

# 2 Definitions and abbreviations

## 2.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

- Gateway Location Register:** this entity handles location management of roaming subscriber in visited network without involving HLR
- Intermediate GSN:** this entity is used as serving GSN towards home network and relay some PDU notification messages between serving GSN and Gateway GSN
- MM context:** information sets held in MS and GSNs for a GPRS subscriber related to mobility management (MM)
- MM Context ID:** IMSI or equivalent for use in conjunction with Anonymous Access (please refer to section GTP Header)
- Path:** UDP/IP path and TCP/IP path are examples of paths that may be used to multiplex GTP tunnels
- Path Protocol:** path Protocol is the protocol(s) used as a bearer of GTP between GSNs
- 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
- Signalling message:** GTP signalling messages are exchanged between GSN pairs in a path. The signalling messages are used to transfer GSN capability information between GSN pairs and to create, update and delete GTP tunnels
- T-PDU:** original packet, for example an IP datagram, from an MS or a network node in an external packet data network. A T-PDU is the payload that is tunnelled in the GTP tunnel
- Tunnel Endpoint Identifier (TEID):** this field unambiguously identifies a tunnel endpoint in the receiving GTP-U or GTP-C protocol entity. The receiving end side of a GTP tunnel locally assigns the TEID value the transmitting side has to use. The TEID values are exchanged between tunnel endpoints using GTP-C messages

## 2.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

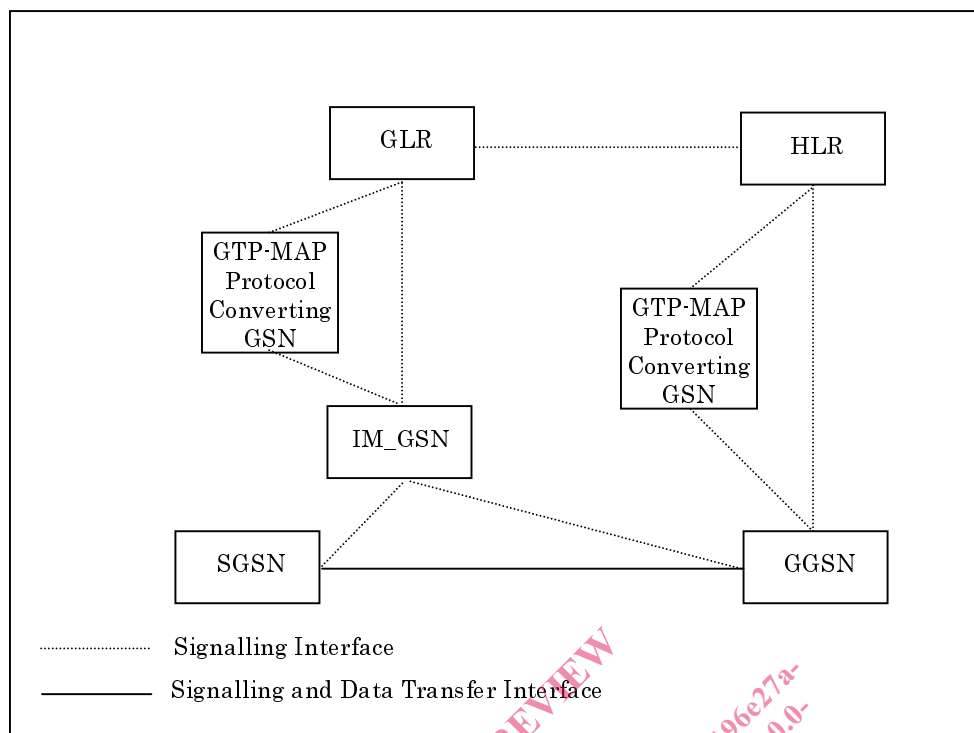
GGSN	Gateway GPRS support node
GLR	Gateway Location Register
GPRS	General Packet Radio Service
GTP	GPRS Tunnelling Protocol
IM_GSN	Intermediate GSN
IP	Internet Protocol
GLR	Gateway Location Register
SGSN	Serving GPRS support node
TEID	Tunnel Endpoint Identifier
UDP	User Datagram Protocol

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## 3 General

The present document defines the GPRS Tunnelling Protocol (GTP) specific to the network with the GLR, i.e. the protocol between IM\_GSN and other nodes (i.e. GGSN, SGSN and GTP-MAP protocol converting GSN). It includes only the GTP signalling but not data transfer procedures.

The interface between IM\_GSM and GGSN is either intra-PLMN interface or inter-PLMN interface.



**Figure 1: Logical Architecture for PS domain in the network with GLR**

The GTP protocol is implemented only by IM\_GSNs, SGSNs and GGSNs. No other systems need to be aware of GTP. GPRS MSs are connected to a SGSN without being aware of GTP.

It is assumed that there will be a many-to-many relationship between IM\_GSNs, SGSNs and GGSNs. An IM\_GSN may provide service to many GGSNs. A SGSN may provide service to many IM\_GSNs and GGSNs.

## 4 Transmission order and bit definitions

Transmission order and bit definitions on the interface between the IM\_GSN and other nodes in the network with GLR are the same as that used in the network without the GLR, see 3GPP TS 29.060.

## 5 GTP header

The GTP header used on interface between the IM\_GSN and other nodes in the network with GLR is the same as that used in the network without the GLR, see 3GPP TS 29.060.

## 6 GTP Message and Message Formats

The only signalling plane exists between the IM\_GSN and other nodes (i.e. GGSN, SGSN and GTP-MAP protocol converting GSN).

### 6.1 Signalling Message Formats

GTP defines a set of signalling messages between two associated GSNs. The signalling messages to be used between the IM\_GSN and other nodes are defined in the table below. For the GTP signalling messages to be used on other interfaces see 3GPP TS 29.060.

Table 1: Signalling messages

Message Type value (Decimal)	Signalling message	Reference
3	Version Not Supported	7.4.3 in 3GPP TS 29.060
27	PDU Notification Request	7.5.12 in 3GPP TS 29.060
28	PDU Notification Response	7.5.13 in 3GPP TS 29.060
29	PDU Notification Reject Request	7.5.14 in 3GPP TS 29.060
30	PDU Notification Reject Response	7.5.15 in 3GPP TS 29.060
32	Send Routing Information for GPRS Request	7.6.1 in 3GPP TS 29.060
33	Send Routing Information for GPRS Response	7.6.2 in 3GPP TS 29.060
34	Failure Report Request	7.6.3 in 3GPP TS 29.060
35	Failure Report Response	7.6.4 in 3GPP TS 29.060

## 6.2 Path Management messages

The messages, which are listed in following table, are used on the interface between the IM\_GSN and other nodes. For the definitions of these messages and other messages used on the other interfaces refer to the corresponding sections in 3GPP TS 29.060.

Messages	Sending node	Receiving node
Version Not Supported	IM_GSN	GGSN, SGSN
	GGSN, SGSN	IM_GSN

## 6.3 Tunnel Management messages

In following table, only the messages used between the IM\_GSN and GGSN and between the IM\_GSN and SGSN are listed. For the definitions of these messages and other messages used on the other interfaces refer to the corresponding sections in 3GPP TS 29.060.

Messages	Sending node	Receiving node
PDU Notification Request	GGSN	IM_GSN
	IM_GSN	SGSN
PDU Notification Response	SGSN	IM_GSN
	IM_GSN	GGSN
PDU Notification Reject Request	SGSN	IM_GSN
	IM_GSN	GGSN
PDU Notification Reject Response	GGSN	IM_GSN
	IM_GSN	SGSN