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Title

Proposed Changes to GERAN Stage-2 Description

Source

Drafting session*

*(AT&T, Ericsson, Lucent, Nokia)

Abstract

This contribution proposes changes to §§ 6.1.3, 6.1.4, 6.1.5, and 6.4.3.2 of the GERAN stage-2 description.

Recommendation

Adopt the changes and incorporate in the stage-2 description.

6.1.1 IMSI and P-TMSI

A unique International Mobile Subscriber Identity (IMSI) shall be allocated to each packet-domain subscribers.

A Packet Temporary Mobile Subscriber Identity (P-TMSI) shall be allocated to each (E)GPRS-attached MS.

IMSI and P-TMSI are defined in UMTS 23.003.

6.1.2 G-RNTI

A GERAN Radio Network Temporary Identity (G-RNTI) shall be allocated by the BSS when an RRC connection is established between the MS and GERAN. It identifies the MS within GERAN and may be used the same way TLLI is currently used over the radio interface in (E)GPRS. How the G-RNTI is constructed and the size of it is FFS.

6.1.3 NSAPI, RAB ID and RB ID

The UMTS definitions and mapping amongst NSAPI, RAB ID and RB ID shall be used for GERAN.

The Network layer Service Access Point Identifier (NSAPI) and IMSI are used for network layer routing. In the MS, NSAPI identifies the PDP-SAP. In the SGSN and GGSN, NSAPI identifies the PDP context associated with a MM context.

In communication with BSC across the Iu-ps and Um interfaces, the RAB ID is used to identify the radio access bearer and that information element shall be identical to the NSAPI value. In the BSS, RAB ID identifies the BSS RAB context. The RAB ID shall uniquely identify the RAB for a specific CN domain and a particular MS.

GERAN establishes exactly one radio bearer to realize each RAB. Within the MS and the GERAN, the RB ID shall uniquely identify the radio bearer for a particular MS.~~In GERAN, radio bearers are established to realize a RAB over the radio interface. Whether only one RB is needed to support a RAB is FFS~~

~~How RB ID is used over the GERAN radio interface is FFS.~~

6.1.4 RB ID and TFI

More than one TBF may be allocated to a single MS in any direction.

When establishing a TBF for a radio bearer, GERAN shall associate one unique TFI with the TBF.

An RB may live longer than its associated TBF.

At least the following are supported:

1. A TBF is established when there is traffic to send.
2. Each TBF carries data from one RLC instance.

~~The relationship between RB ID and TFI is FFS.~~

6.1.5 USF

An Up-link State Flag (USF) is used on PDCHs to allow multiplexing of uplink radio blocks from different MSs. USF is not needed when dedicated MAC is used. One or more USFs may be allocated to a single MS. One or more TBFs for one MS may be associated with each USF.

If fixed allocation is used, an MS may use one or more TBFs within its fixed allocation.~~USF and its usage need not to be changed, compared to previous releases, on shared MAC. It is, however, not needed when dedicated MAC is used.~~

6.1.6 ARI

The ARI (Access Request Identifier) is used for optional fast random access on random access channel(s) to uniquely identify an MS and associated bearer(s) that are already established. Design details are ffs.

- **Control of ciphering.** The RRC layer provides procedures for setting of ciphering (on/off) between the MS and GERAN.
- **Initial cell selection and re-selection in idle mode.** Selection of the most suitable cell based on idle mode measurements and cell selection criteria.
- **Integrity protection.** This function controls integrity protection and performs integrity protection those RRC messages that are considered sensitive and/or contain sensitive information. Integrity protection in GERAN is FFS.
- **Support for Location Services.** Signaling between MS and GERAN to support positioning of a MS.
- **Timing advance control.** The RRC controls the operation of timing advance.

6.3.2 Handover and Cell Reselection

This section is FFS.

See UMTS TR 25.936 for handover for real-time services from PS domain.

6.4 Packet Data Convergence Protocol (PDCP)

This section provides an overview on services and functions provided by the Packet Data Convergence Protocol (PDCP). A detailed description of the PDCP is given in [Ref: GERAN'00 PDCP – 25.323].

6.4.1 Services provided to upper layers

The following services are provided by PDCP to upper layers:

- PDCP SDU delivery

6.4.2 Services expected from RLC layer

- Data transfer in acknowledged mode.
- Data transfer in unacknowledged mode.
- Data transfer in transparent mode.
- Segmentation and reassembly.
- In-Sequence delivery.

6.4.3 PDCP Functions

For clarity reason, two PDCP modes are defined in this TS: transparent and non-transparent. The transparent and non-transparent modes relate respectively to the PDCP-no-header PDU and the PDCP-data PDU cases described in UMTS 25.323.

The functions performed by the PDCP are dependent on the PDCP mode used.

6.4.3.1 Transparent Mode

The name "transparent" means that the PDCP layer does not change the incoming service data units (SDU), i.e. no header is added and possible TCP/IP or RTP/UDP/IP headers in the data are left untouched.

The functionalities of the transparent mode of PDCP are:

- **Transfer of user data**
- **Relocation of PDCP buffer**
- **PDCP SDU buffering**

6.4.3.2 Non-Transparent Mode

The functionalities of the non-transparent mode of PDCP are:

- **Header adaptation** of the IP data streams
- **Transfer of user data**
- **PDCP SDU buffering**
- **Relocation support appropriate to applicable QoS requirements**
- **If adopted for UTRAN, Multiplexing of radio bearers onto RLC entities**

Different header adaptation mechanisms may be used by the PDCP:

- **Header compression.** Transport and network level headers (e.g. RTP/UDP/IP) are compressed in such a way that the decompressed headers are semantically identical to the original uncompressed headers. The IETF ROHC WG is responsible for standardising header compression schemes. Header compression is suited for standard internet applications that are not designed to work only with GERAN and especially for multimedia applications therefore the scheme will be used with generic realtime multimedia bearers.
- **Header removal.** Transport and network level headers (e.g. RTP/UDP/IP) headers are completely removed. Based on information submitted at call setup and based on information derived from lower layer (link & physical), the receiving entity can regenerate the headers. The primary application of header removal is the optimized speech bearer, and the regenerated header may not always be semantically identical to the original header.
- **No header adaptation.** Transport and network level headers (e.g. RTP/UDP/IP) headers are forwarded.

6.5 Radio Link Control (RLC)

This section provides an overview on services and functions provided by the Radio Link Control (RLC). A detailed description of the RLC is given in [Ref: GERAN'00 RLC – 04.60 + ffs].

6.5.1 Services provided to upper layer

- **Transparent data transfer.** This service transmits higher layer PDUs without adding any protocol information.
- **Acknowledged data transfer.** This service transmits higher layer PDUs and guarantees delivery to the peer entity.
- **Unacknowledged data transfer.** This service transmits higher layer PDUs without guaranteeing delivery to the peer entity.
- **Notification of unrecoverable errors**. RLC notifies the upper layer of errors that cannot be resolved by RLC itself by normal exception handling procedures, e.g. by adjusting the maximum number of retransmissions according to delay requirements.

There is a single RLC connection per Radio Bearer.

6.5.2 RLC Functions

6.5.2.1 Transparent Mode

RLC has no functionality when operating in transparent mode. The incoming SDUs are transfered to the MAC layer without being altered. No upper layer protocol information is removed. No RLC protocol information is added. All necessary signalling is made out of band.

6.5.2.2 Non-Transparent Mode

In non transparent mode, the RLC is responsible for ciphering user data blocks (RLC PDUs). This function prevents unauthorized acquisition of data.