Agenda Item: 8.3

Source: Ericsson

Title: Iu Interface User Plane for the IP Domain

Document for:

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1.   INTRODUCTION

The Iu reference point for UMTS phase 1 is currently discussed in both SMG12 and SMG2 ARC EG. When defining the Iu interface for UMTS phase 1 it is important to consider the evolution and migration from existing GSM/GPRS standards as well as taking into account the new enhanced services that the introduction of WCDMA in UTRAN will provide.
This contribution proposes a solution for multiplexing of user flows over the Iu interface. Further, it proposes a possible solution for a protocol architecture for the User plane of the IP domain.

2.   DISCUSSION

2.1   Iu Interface User Plane for the IP Domain

The Iu interface is defined as the Access Stratum (AS) part of the RNS-to-CN node (Radio Network Sub-system to Core Network node) interface.

The Radio Access Bearer (RAB) service provides the user data transport between CN and UE. The RAB service has to be established before user data transport takes place. It is assumed that a single AS signaling protocol (RANAP) shall be used between CN and UTRAN to control the RAB service. The RAB service is requested through the I_u signaling link in the control plane. Between an UE and the CN, several RABs with different QoS characteristics may be established.

To comply with the structure of the GPRS service, a multiplexing layer on top of common layer 2 resources is proposed for packet mode services. The user traffic of all RABs over a peer of Iu access points, are proposed to be multiplexed on one or several AAL5/ATM VCs to/from the 'IP domain'.

The annex of this contribution illustrates one possible solution of a protocol architecture for the user plane used by the 'IP domain'.

3.   PROPOSAL

It is proposed that the following statements are included in a new sub-section of section 11.2.1 'Iu reference point' of UMTS ZZ.11 [1].
11.2.1.x Iu reference point - User plane towards IP domain
- The standard shall support that the user data flows transported over the Iu reference point to/from the 'IP domain' shall be multiplexed on top of common layer 2 resources.

- One or several AAL5/ATM Permanent VCs may be used as the common layer 2 resources between the UTRAN and the 'IP domain' of the CN. The reason for usage of several permanent AAL5/ATM VCs may e.g. be for load sharing and redundancy.
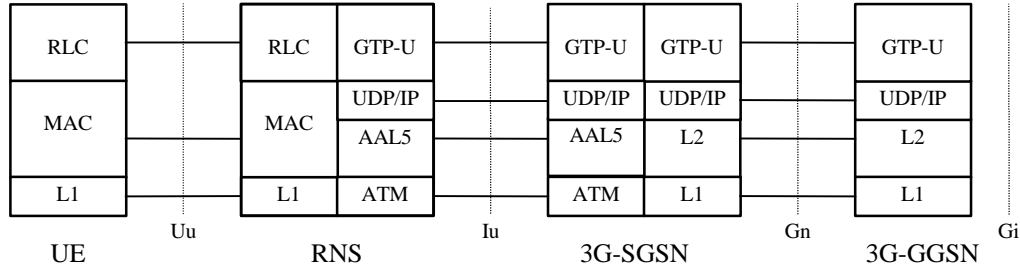
It is further proposed that the contents of annex A is added to UMTS ZZ.11 [1] as an informative annex as one possible user plane protocol architecture for the IP domain. This, at least until a decision on the user plane protocol architecture for the IP domain is reached.

4.   REFERENCES

[1]   UMTS ZZ.11, Description of Iu Interface, version 0.1.0.

Annex A - Possible solution for user plane protocol architecture for the IP domain

Figure 1 illustrates one possible solution of a protocol architecture for the user plane used by the 'IP domain'.

RLC		RLC	GTP-U		GTP-U	GTP-U		GTP-U
MAC		MAC	UDP/IP		UDP/IP	UDP/IP		UDP/IP
			AAL5		AAL5	L2		L2
L1		L1	ATM		ATM	L1		L1
UE	Uu	RNS		Iu	3G-SGSN		Gn	3G-GGSN	Gi

Note: Protocol layers above RLC and GTP-U are outside the scope of this contribution and FFS

Figure 1: UMTS user plane protocol architecture for the 'IP domain'

- **GTP-U:** GTP-U is a tunnel protocol used for the tunnelling of end-to-end IP packets over UMTS. Each RAB uses one GTP-U tunnel. GTP-U is an evolved protocol of the user plane part of GTP, the GPRS Tunneling Protocol (GSM 09.60), defined for GPRS. The requirement is that the syntax of GTP-U over Iu shall be identical to the syntax of the user plane parts of an evolved GTP on Gn. This will require some additions to GTP/Gn (GSM 09.60) in releases after GPRS release 97, additions that anyhow are under discussion in SMG12 (e.g. support of QoS).

- **UDP/IP:** The PDUs of the GTP-U tunnels are carried as datagrams over Iu using standard UDP/IP.

GTP-U/UDP/IP makes use of AAL5/ATM on lower layers. The exact mapping of GTP-U/UDP/IP to AAL5/ATM is FFS.

A.1   Motivations for the proposed protocol architecture

The merits of this possible solution are that:

- This protocol architecture is well suited to the RAB concept of handling different user flows, by establishing a GTP tunnel per RAB.

- The performance for packet routing in the 'IP domain' can be significantly increased. This compared to the current GSM GPRS protocol architecture, where the 3G-SGSN must do a protocol conversion between GTP and BSSGP.

- The proposed solution also makes it possible to benefit from the global IP evolution as regards high performance routing technologies.