TSG-RAN Working Group 3 meeting #2
Utsikten 15th - 19th March 1999

TSGW3#2 (99)163

Agenda Item: 7.5

Source : NORTEL

Title : Iu interface Protocol Structure : independence of Radio Network and Transport Network protocols

Document for: UMTS S3.10 v 0.0.2 section 6

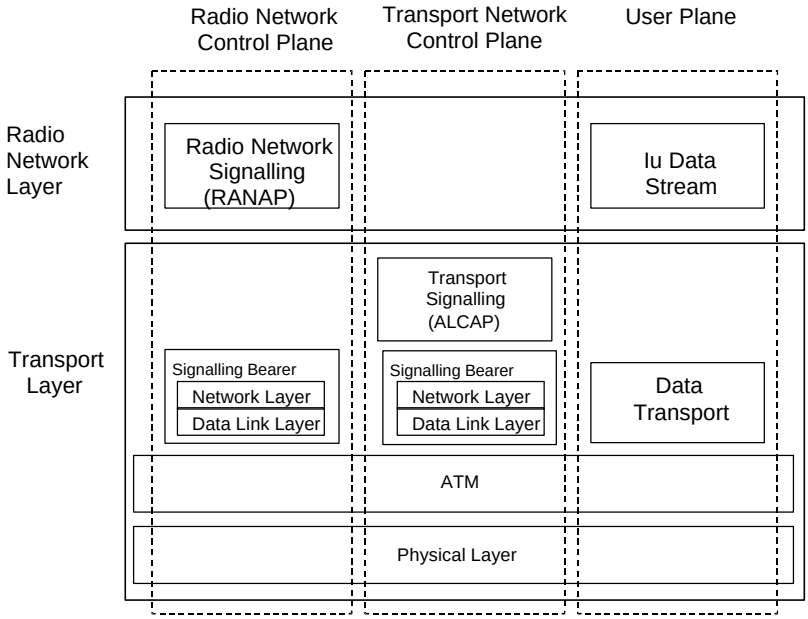
ABSTRACT

This contribution is relative to section 6 of S3.10 : Iu Interface Protocol Structure. A new model, which provides independence between Radio Network and Transport Network protocols is proposed to represent the Iu Interface Protocol. This contribution is aligned with the corresponding propositions made for the Iur and Iub Interface Protocol Structure.

BACKGROUND

In S3.30, section 4.3 : “Iub Interface Specification Objectives” and in S3.20, section 4.3 : “Iub Interface Specification Objectives”, it is stated that the specification shall facilitate : “Separation of Iub interface Radio Network functionality and Transport Network functionality to facilitate the introduction of future technology”. In S3.10 the corresponding paragraph is empty but it is assumed that the specification objective is the same.

However, in section 6, the Interface Protocol Structure model mixes Radio Network and Transport Network functions and refers to a specific ATM implementation :



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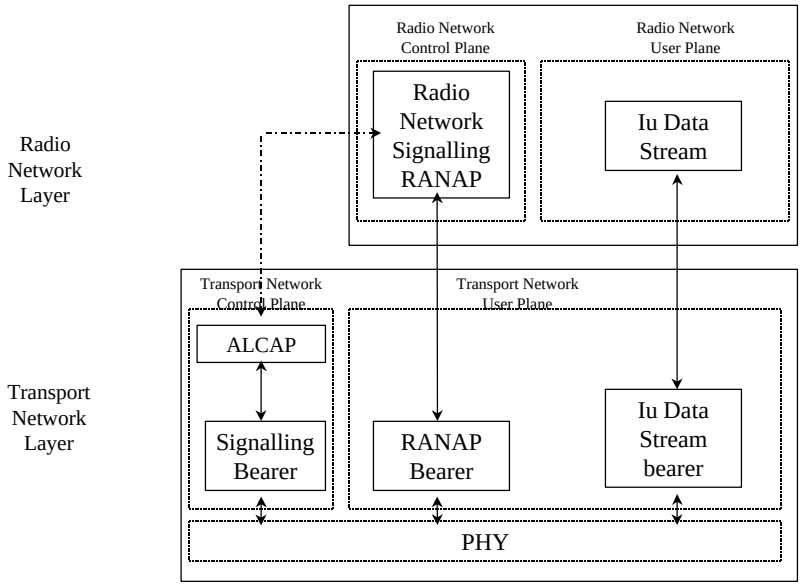
DISCUSSION

The proposed Iu Interface Protocol Structure clarifies the functional split between the Network User Plane and Network Control Plane :

PROPOSED PROTOCOL STRUCTURE



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The Transport Network Control Plane is split in Control Plane and User Plane. The Control Plane is used to establish the Transport Bearer in the Transport Network between Node B and RNC. The User Plane carries user information (payload) eg RANAP signalling or Iu data stream.

ALCAP is the protocol used to establish Transport Bearers in the Transport Network, ie a physical resource and the requested end to end service. In the case of an ATM based Transport Network which is the current working assumption, the physical resource is an ATM virtual channel (VP/VC) and if a further stage of AAL2 multiplexing is used, the physical resource is an AAL2 connection, defined by the VP/VC and the AAL2 CID. The end to end service is based on the adaptation layer. For data transmission it can be AAL5 if the virtual channel is an ATM VP/VC or SSSAR/SSTED/SSADT if the underlying virtual channel is an AAL2 connection. For a compressed voice application, either AAL5 or SSSAR/SSTED or even a null adaptation layer can be used (ie AAL0 over ATM VP/VC or AAL2 without SSAR/SSTED/SSADT).

RANAP uses the ALCAP protocol to obtain a transport bearer to carry either RANAP signalling or Iu Data stream and negociate the end to end service and multiplexing between Core Network and RNS.

The Protocol Structure Mapping on existing Transport Network as ATM, IP, GSM PCM is shown in the following paragraphs :

- **ATM**

In an ATM environment, Virtual Path are manually configured and Virtual Channels are setup using SAAL. The ALCAP protocol based on Qaal2 will be used :

- to create/destroy ATM VC using the reserved signalling link associated with each VP (identified by VC = 5) based on existing SAAL-UNI protocol.

- to create/destroy AAL2 connection associated to a specific VP/VC
- to define the adaptation layer above the virtual channel

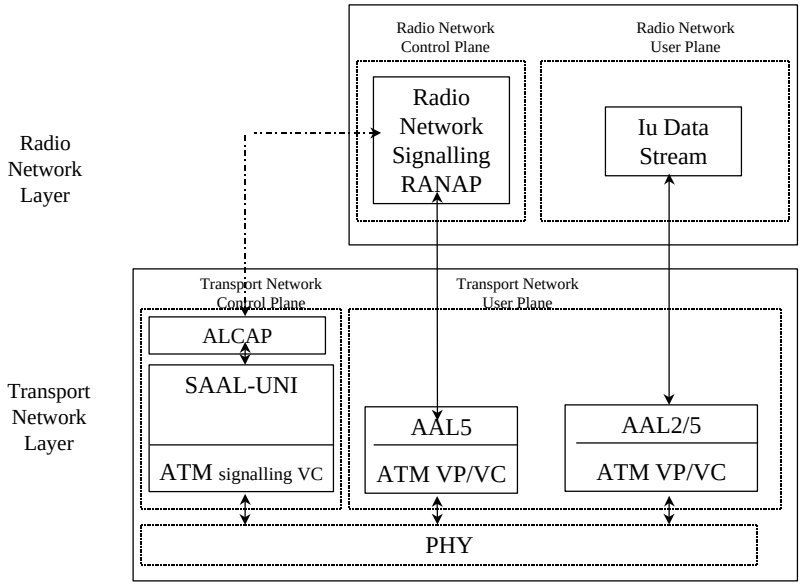

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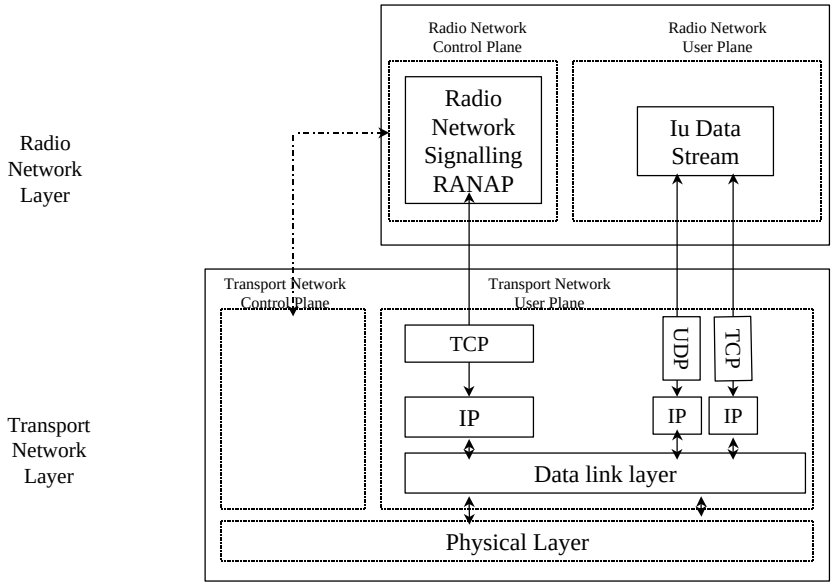
Figure Error! Unknown switch argument. **: Mapping of Iu Interface Protocol Structure on an ATM Transport Network**

Note : This protocol structure is aligned with the proposition of TTC/ARIB : SAAL is composed of SSCF-UNI+SSCOP+AAL5 and ALCAP is composed of Q.AAL2+Bearer converter

- **IP**

In an IP based network, using typically frame relay over n*64Kbit/s in a WAN environment, channels are allocated on a semi-permanent basis (n*64kbit/s) the data link layer is based on an HDLC protocol and user plane data are transmitted connection less using datagrams. The (IP) transport layer provides either connection oriented (TCP) or connection less service (UDP).
In that case, the Network Control Plane is not used.



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- **GSM PCM**

In a GSM PCM environment as used over the A interface between BSC and MSC, data bearers are 64Kbit/s channels. There are used to transport 64Kbit/s A or mu law voice or GSM data to the IWF.
The NBAP protocol uses one complete 64Kbit/s PCM time slot and LAPB frames over HDLC. The Network Transport Control Plane is empty since PCM links are established on a semi permanent basis.

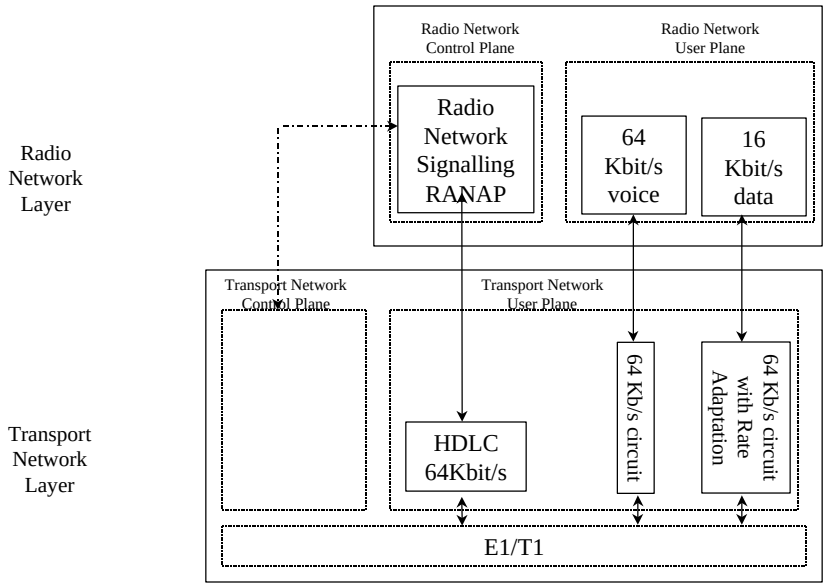

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Figure Error! Unknown switch argument. **: Mapping of Iu Interface Protocol Structure on a GSM Transport Network.**

PROPOSAL

This contribution has introduced a new model for the Iu Interface Protocol with a clear split between Radio Network and Transport Network functions. The Transport Network plane was split into Control and User Plane. Mapping of this protocol structure on existing transport network technology has been shown.
It is suggested to accept the following propositions :

Proposition 1 : replace the existing figure 1 of section 6 by the figure 2 of this contribution and add a the text which describes the Interface Protocol Structure in a similar way as in S3.30 and S3.20:
"The Iu interface protocol architecture consists of two functional layers :
1 – Radio Network Layer, defines procedures related to the operation of the RAN. The radio network layer consists of a radio network control plane and a radio network user plane.
2 – Transport Network layer, defines procedures for establishing physical and logical connections between the RAN and the Core Network. The transport network layer consist of transport network control plane and transport network user plane"

Proposition 2 : add the text and figure 3 relative to ATM mapping of the protocol structure in a subsection section 6 : Iu Protocol structure called "ATM protocol structure"

Proposition 3 : add the text and figure 4 and 5 relative to IP and GSM A interface mapping of the protocol structure in an informative annex of S3.10.

REFERENCES

[1] S3.10 v0.0.2, Description of Iu Interface
[2] S3.20 v0.0.2, Description of Iur Interface
[3] S3.30 v0.0.2, Description of Iub Interface