TSG-RAN Working Group 3, meeting #2 ***TSGW3#2(99)223***

Stockholm, Sweden, 15-19 March 1999

Agenda Item: 7.1, 7.5, 7.6, and 7.7

Source: Nokia

Title: **General Protocol Model for UTRAN Interfaces, Iu, Iur and Iub, Revised**

Document for: Approval (Revised version of Tdoc 221)

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1 Introduction

The presentation of protocol models in RAN WG3 documentation has been discussed widely in meeting #2, but no conclusion was reached. This contribution proposes a way forward by introducing a general protocol model to be included in S3.01 UTRAN Overall Description. It also describes what level of detail is to be added to the General Aspects and Principles of each interface, but these details are outside the scope of this contribution.

This contribution is a revised version of R3-99221. It has been discussed and agreed offline with some of the companies (Nortel and Ericsson) that were active in the discussion during the meeting.

2 The general idea of the modifications

Two types of protocol models are defined:

- A general model which is completely independent of technology selection for each part of the protocol model is defined in one place. This protocol model is accompanied with detailed description of the different logical parts of the model, e.g. by describing the vertical and horizontal planes and layers, and the flow of process for the different planes. The natural place for this information is in the S3.01 UTRAN Overall Description. Currently all protocol models are the same and there is no reason to multiply this information. In the future, if need arises, the general structure may be split again.
- More detailed, and interface specific protocol models for each interface are described in the interface documentation. The specific models are presented in the same fashion as the general model, but they reflect all the working assumptions and technology selections for the given interface. This information is included in section 6 of General Aspects and Principles of each interface. Furthermore, if other technologies than the working assumption are considered e.g. for the future or backwards compatibility, those could be documented in informative annexes of each interface.

  It should be noted that there are even more detailed protocol descriptions in the Signalling Transport and Data Transport Specifications of each interface, and the level of detail in the section 6 of General Aspects and Principles of each interface should still be on principle level (if only possible, to avoid duplication of information).

3 The detailed modifications for S3.01 UTRAN Overall Description

It is proposed that the Interface specific protocol structures in S3.01 UTRAN Overall Description are replaced with one general structure, with proper definitions (as described above). Sections to be replaced are 11.1.3.3, 11.2.1.4 and 11.2.2.4.

A new level 2 section “General Protocol Model for UTRAN Interfaces” is introduced to Section 11, preferably before section 11.1, but it could also be added between 11.2 and 11.3 (following sections to be shifted downwards). This section contains the following information:

11.X General Protocol Model for UTRAN Interfaces

11.X.1 General

The general protocol model for UTRAN Interfaces is depicted in figure XX, and described in detail in the following sub-sections. The structure is based on the principle that the layers and planes are logically independent of each other, and if needed, protocol layers, or the whole protocol stack in a plane may be changed in the future by decisions in the standardisation.

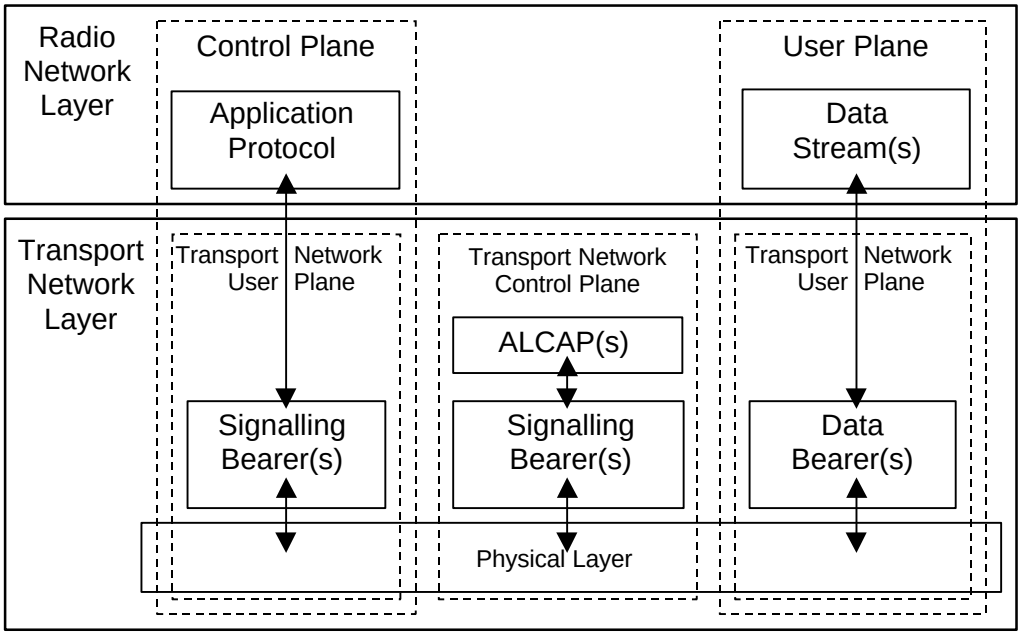

Figure XX: General Protocol Model for UTRAN Interfaces

11.X.2 Horizontal Layers

The Protocol Structure consists of two main layers, Radio Network Layer, and Transport Network Layer. All UTRAN related issues are visible only in the Radio Network Layer, and the Transport Network Layer represents standard transport technology that is selected to be used for UTRAN, but without any UTRAN specific requirements.

11.X.3 Vertical Planes

11.X.3.1 Control Plane

The Control Plane Includes the Application Protocol, i.e. RANAP, RNSAP or NBAP, and the Signalling Bearer for transporting the Application Protocol messages.

Among other things, the Application Protocol is used for setting up bearers for (i.e. Radio Access Bearer or Radio Link) in the Radio Network Layer. In the three plane structure the bearer parameters in the Application Protocol are not directly tied to the User Plane technology, but are rather general bearer parameters.

The Signalling Bearer for the Application Protocol may or may not be of the same type as the Signalling Protocol for the ALCAP. The Signalling Bearer is always set up by O&M actions.

11.X.3.2 User Plane

The User Plane Includes the Data Stream(s) and the Data Bearer(s) for the Data Stream(s). The Data Stream(s) is/are characterised by one or more frame protocols specified for that interface.

11.X.3.3 Transport Network Control Plane

The Transport Network Control Plane does not include any Radio Network Layer information, and is completely in the Transport Layer. It includes the ALCAP protocol(s) that is/are needed to set up the transport bearers (Data Bearer) for the User Plane. It also includes the appropriate Signalling Bearer(s) needed for the ALCAP protocol(s).

The Transport Network Control Plane is a plane that acts between the Control Plane and the User Plane. The introduction of Transport Network Control Plane makes it possible for the Application Protocol in the Radio Network Control Plane to be completely independent of the technology selected for Data Bearer in the User Plane.

When Transport Network Control Plane is used, the transport bearers for the Data Bearer in the User Plane are set up in the following fashion. First there is a signalling transaction by the Application Protocol in the Control Plane, which triggers the set up of the Data Bearer by the ALCAP protocol that is specific for the User Plane technology.

The independence of Control Plane and User Plane assumes that ALCAP signalling transaction takes place. It should be noted that ALCAP might not be used for all types Data Bearers. If there is no ALCAP signalling transaction, the Transport Network Control Plane is not needed at all. This is the case when pre-configured Data Bearers are used.

It should also be noted that the ALCAP protocol(s) in the Transport Network Control Plane is/are not used for setting up the Signalling Bearer for the Application Protocol or for the ALCAP during real time operation.

The Signalling Bearer for the ALCAP may or may not be of the same type as the Signalling Bearer for the Application Protocol. The Signalling Bearer for ALCAP is always set up by O&M actions.

11.X.3.2 Transport Network User Plane

The Data Bearer(s) in the User Plane, and the Signalling Bearer(s) for Application Protocol, belong also to Transport Network User Plane. As described in the previous section, the Data Bearers in Transport Network User Plane are directly controlled by Transport Network Control Plane during real time operation, but the control actions required for setting up the Signalling Bearer(s) for Application Protocol are considered O&M actions.

4 Proposal

It is proposed that the new section introduced in Section 3 of this document is incorporated to section 11 of S3.01 UTRAN Overall Description.

5 References

[1]: R3-99108, S3.01 UTRAN Overall Description v.0.0.3. source: Editor

[2]: R3-99215, Iu interface Protocol Structure : independence of Radio Network and Transport Network protocols. source: Nortel

[3]: R3-99218, Iub & Iur interface Protocol Structure : independence of Radio Network and Transport Network protocols. source: Nortel

[4]: R3-99221, General Protocol Model for UTRAN Interfaces, Iu, Iur and Iub. source: Nokia