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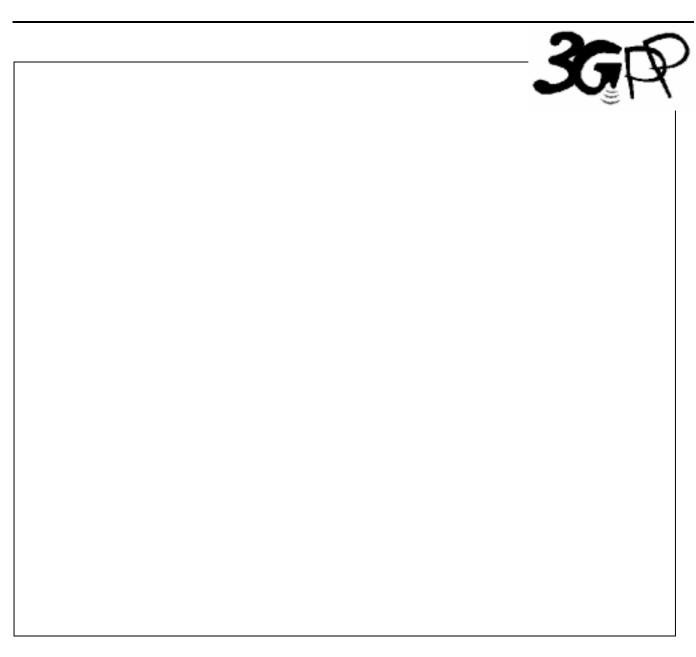
3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG) RAN;

IP Transport in UTRAN Work Task Technical Report

UMTS <spec>

Reference
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<Workitem> (<Shortfilename>.PDF)

Keywords
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<keyword[, keyword]>

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Contents

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Foreword

This Technical Report (TR) has been produced by the 3rd Generation Partnership Project (3GPP), Technical Specification Group RAN.
The contents of this TR are subject to continuing work within 3GPP and may change following formal TSG approval. Should the TSG modify the contents of this TR, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version m.t.e

where:

m indicates [major version number]

x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

y the third digit is incremented when editorial only changes have been incorporated into the specification.

1 Scope

The purpose of the present document is to help the TSG RAN WG3 group to specify the changes to existing specifications, needed for the introduction of "IP Transport" option in the UTRAN for Release 2000. It is intended to gather all information in order to trace the history and the status of the Work Task in RAN WG3. It is not intended to replace contributions and Change Requests, but only to list conclusions and make reference to agreed contributions and CRs. When solutions are sufficiently stable, the CRs can be issued.

It describes agreed requirements related to the Work Task, and split the Work Task into "Study Areas" in order to group contributions in a consistent way.

It identifies the affected specifications with related Change Requests.

It also describes the schedule of the Work Task.

This document is a 'living' document, i.e. it is permanently updated and presented to all TSG-RAN meetings.

2 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1.]   IP-Transport in UTRAN Work Task Description, TSGRP#6(99)836

[2.]   25.410, UTRAN I_u Interface: General Aspects and Principles

[3.]   25.420, UTRAN I_{ur} Interface: General Aspects and Principles

[4.]   25.430, UTRAN I_{ub} Interface: General Aspects and Principles

3 Definitions, symbols and abbreviations

3.1 Definitions

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

3.2 Symbols

3.3 Abbreviations

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

4 Introduction

4.1 Task Description

The work task is described in the contribution [1], which has been agreed at TSG-RAN#6. The purpose of this new work task is to enable the usage of IP technology for the transport of signalling and user data over Iu, Iur and Iub in the UTRAN.

4.2 Rationale for IP Transport

This section will describe some rationale for IP Transport option in the UTRAN.

5 Requirements

This section detail high level requirements for the IP UTRAN option.

5.1 General requirements

Whenever possible, preference for already standardised protocols should be used, e.g. IETF protocols for the IP related parts, in order to have wide spread acceptance and avoid double work. Relevant UTRAN recommendations may also be standardised in the IETF.

5.2 Independence to Radio Network Layer

The changes should only be made to the Transport Network Layer (TNL) since the Radio Network Layer should be independent of the TNL. The impact on the RNL shall be minimised but there could be some minor changes to the Radio Network Layer, e.g. addressing.Services required by the upper layers of user plane of Iu_CS

5.3 Services required by the upper layers of user planes of Iu

For the Iu_CS the requirement is transfer of user data (TS25.415)and in-sequence delivery is not required.

5.4 Services required by the upper layers of user planes of Iur and Iub

In the current specifications the AAL2/ATM provides the services to radio network layer. The services required by the radio network layer are:

- connection identification.
- in-sequence delivery of PDUs to upper layers (TS25.425, TS25.427). If this means re-ordering of PDUs or simply not sending data that have been received out-of-sequence is not clearly stated. This requirement needs to be verified.

5.5 Coexistence of the two transport options

In Release 00, UTRAN(s) may have both ATM and IP transport networks. Following requirements with regards to ATM and IP transport network coexistence shall be met:

− The specifications shall ensure the co-existence of ATM and IP Transport options within UTRAN, i.e. parts of UTRAN using ATM and parts of UTRAN using IP transport.
− In Release 2000, ATM and IP Transport Options shall rely on the same functional split between Network Elements

5.6 Quality of Service

The mechanisms to secure the quality of service parameters, timing aspects, and packet loss have to be considered.

Quality of service parameters include service class definition and congestion control requirements. Timing aspects include delay and delay-variation requirements.

5.7 Efficient utilisation of transport resources

Efficient use of the bandwidth of the transport network shall be considered, e.g. by reducing the protocol overhead (via Header compression, multiplexing, …).

Iub/Iur protocols shall operate efficiently on low speed point to point links which may be shared with other traffic (e.g. GSM/GPRS Abis, UMTS R99 compliant interfaces)

5.8 Layer 2 / Layer 1 independence

Higher layers should be independent from Layer2/Layer1. The IP network layer is defined for multiple layer 2s.

5.9 IP Transport Flexibility

By defining protocol stacks on Iur, Iub and Iu, one may not make any restrictive assumption on IP transport network topology. They shall adapt to a wide range of networks (LAN to WAN) and no preference shall be expressed on routed vs. point to point networks.

6 Study Areas

This section gives a summary of areas that have been identified where work needs to be performed to complete the work item.

As work proceeds in R00 with regard to IP in the UTRAN, the Work Task is divided in the following Study Areas:

6.1 External standardisation

There is a need for identifying supporting work required by other Standards Bodies. Certain protocols and /or QoS mechanisms may be indicated which are not currently supported in the industry. Appropriate liaisons should be identified. Procedure for LS's with IETF should be defined. RAN3 needs to start the IETF official communication channels.

6.2 QoS

This study area is related to the QOS mechanisms that may be in the upper layers. For example, an IP stack may use the IETF diffserv mechanisms to effect QOS. However, Diffserv provides the tools but does not define the policies of the QOS architecture. For example, QOS must be provided for individual user services, and packets must be marked accordingly.

At IP layer, Diffserv, RSVP or over-provisioning may be used.

6.3 Transport network bandwidth utilisation

This study area is related to the efficiency of bandwidth efficiency by e.g. multiplexing/header compression, resource management, and the use of segmentation. Lower speed links, such as E1, or shared higher speed links may require different techniques (e.g. header compression and multiplexing) than dedicated higher speed links.

6.4 User plane transport signalling

The use of IP based protocols for the user plane mandates compatible signalling in the control plane. The signalling must accommodate the appropriate mechanisms to specify, establish, and manage IP streams as opposed to virtual circuits/connections. For example, signalling for IP bearer might exchange IP addresses and UDP port numbers for each end of the bearer stream. If there is a need for user plane connections, it should be investigated how connections between UMTS nodes should be handled. It should be investigated whether an ALCAP protocol is required.

6.5 Layer 1 and layer 2 independence

This study area is related to the capability to allow multiple layer 1 and layer 2 technologies.

6.6 Radio Network Signalling bearer

This study area is related to the transport of Radio Network Signalling over an IP network.

6.7 Addressing

This study area is related to all addressing issues with regards to the introduction of IP Transport. For example, the advantages of using IPv6 should be investigated. Also, addressing issues relating to inter-working with AAL2/ATM nodes should be considered.

6.8 Transport architecture and routing aspects

6.9 Backward compatibility with R99/Coexistence with ATM nodes

It should be investigated how to inter-work the user plane between IP and AAL2/ATM interfaces including inter-working with a node that supports only AAL2/ATM interfaces, and how to interwork the control plane between IP and ATM interfaces.

6.10 Synchronisation

Node synchronisation requirements for an IP based UTRAN nodes should be investigated including minimising delay variation and clock frequency differences between an application source and sink.

6.11 Security

This study area is related to security aspects.

6.12 Iu-cs/Iu-ps harmonisation

This study area is related to the possibility of removing the Iu-cs/Iu-ps distinction in the user plane and in the control plane.

7 Agreements and associated agreed contributions

This section documents agreements that have been reached and makes reference to contributions agreed in RAN-WG3 with respect to this study item. This section is split according to the above mentioned Study Areas.

7.1 External standardisation

7.2 QoS differentiation

7.3 Transport network bandwidth utilisation

7.4 User plane transport signalling

7.5 Layer 1 and layer 2 independance

7.6 Radio Network Signalling bearer

7.7 Addressing

7.8 Transport architecture and routing aspects

7.9 Backward compatibility with R99/Coexistence with ATM nodes

7.10 Synchronisation

7.11 Security

7.12 Iu-cs/Iu-ps harmonisation

8 Specification Impact and associated Change Requests

This section is intended to list the affected specifications and the related agreed Change Requests. It also lists the possible new specifications that may be needed for the completion of the Work Task.

8.1 Specification 1

8.1.1 Impacts

This section is intended to make reference to contributions and agreements that affect the specification.

8.1.2 List of Change Requests

This section lists the agreed Change Requests related to the specification.

8.2 Specification 2

8.2.1 Impacts

8.2.2 List of Change Requests

9 Project Plan

9.1 Schedule

Date	Meeting	Scope	[expected] Input	[expected]Output

9.2 Work Task Status

	Planned Date	Milestone	Status
1.			
2.			

10 Open Issues

11 History

Document history		
V0.0.1	2000-05	First proposal
V 0.1.0	2000-06	Version agreed at RAN3#13 (Hawaii).
V0.1.1	2000-07	Version including changes agreed at RAN3#14 (Helsinki) in: -　R3-001706 (partially) -　R3-001712 (partially)
V0.2.0	2000-08	Version agreed at RAN3#15 (Berlin).
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