TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) ***TSGR2#6(99)879***
Sophia Antipolis 16th to 20th August 1999

Agenda Item: 9

Source: Nokia

Title: Proposal for CR to TS25.321 on support of variable rate codecs

Document for: Decision

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1. Introduction

During last meeting Nokia presents a contribution (Tdoc 601) wherein the basic principles of the AMR as an example of variable rate codec was introduced. Based on this contribution a few basic decisions were made.

The first decision concerned the network elements and their roles during the variable rate codec data transfer. The basic idea was that the control of data transmission is in UTRAN, whilst the transcoder performs the actual codec mode adaptation based on information, which has been received from the UTRAN.

In UTRAN the basic functional split was made between the RRC layer and MAC-d, which both locate in the SRNC. The RRC controls the quality of the data connection, and based on this control information RRC may initiate the Codec mode adaptation procedure.
The role of the MAC –d is to act as an intermediate layer between the RRC and the transcoder. Basically MAC –d relays the Codec mode request generated by the RRC to the corresponding transcoder, and adapts the new codec mode to the TF accordingly.

The last variable rate codec decision concerned the procedure to convey the Codec mode command generated by RRC from the MAC –d to the Transcoder. For the downlink data transfer the decision was to support inband signalling, whereas uplink the concept was left for further study.

In this paper has been presented the text proposal for TS25.321 referring the decisions, which were made during the last meeting.

The proposed primitive used between the RRC and MAC -d has been presented in TSGR2#6(99)880

References

[1] Tdoc TSGR2#6(99)706; Draft Minutes of WG2 meeting #5, Sophia Antipolis 5.-9.7.1999: Source: Temporary Secretary
[2] Tdoc TSGR2#6(99)601; July 1999: AMR mode adaptation in UTRAN; Source: Nokia

Text proposal for TS25.321

4.2 Overview on MAC architecture

4.2.3 Traffic Related Architecture - UE Side

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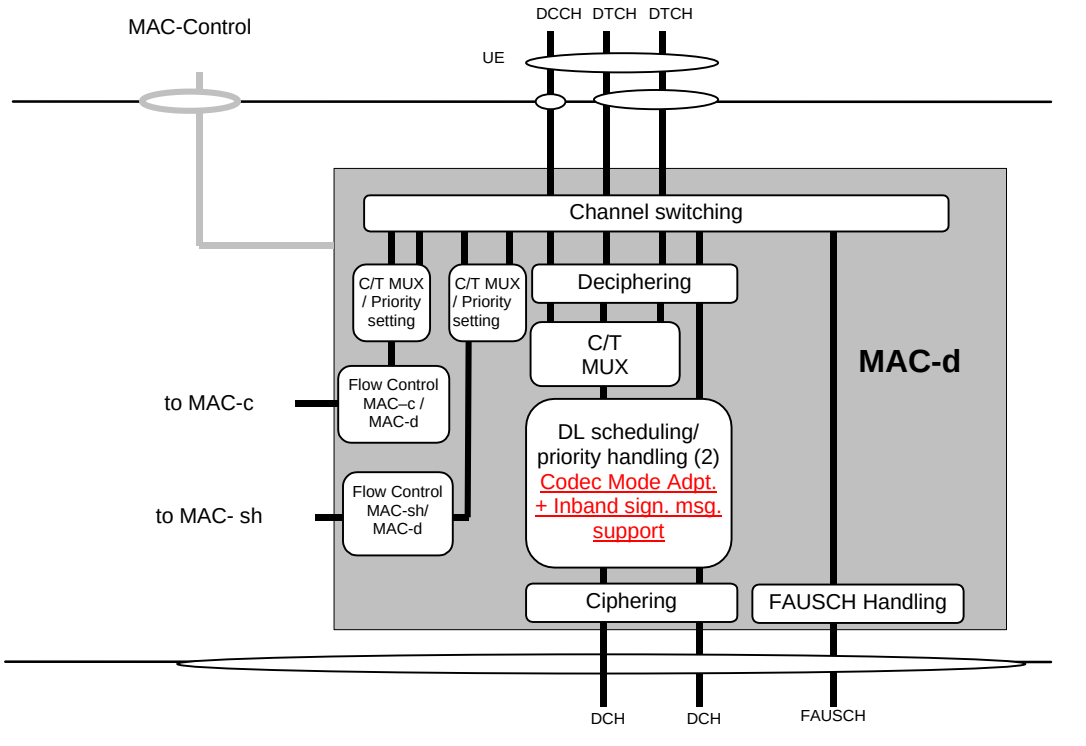
Figure 4.2.4.3 shows the UTRAN side MAC-d entity. The following functionality is covered:

- Dynamic transport channel type switching is performed by this entity, based on decision taken by RRC.
- The C/T MUX box is used when multiplexing of several dedicated logical channels onto one transport channel is used. C/T Mux is also responsible for priority setting on data received from DCCH / DTCH.
- Each MAC-d entity using common channels is connected to a MAC-c entity that handles the scheduling of the common channels to which the UE is assigned and DL (FACH) priority identification to MAC-c (priority identification of each PDU for DTCH NRT data is FFS).
- Each MAC-d entity using downlink shared channel is connected to a MAC-sh entity that handles the shared channels to which the UE is assigned and indicates the level of priority of each PDU to MAC-sh and to MAC-c.
- In the downlink, scheduling and priority handling of transport channels is performed within the allowed transport format combinations of the TFCS assigned by the RRC. This function supports the TFCI insertion in Node B .
- Codec Mode Adaptation and Inband signalling message support is used to relay the Codec Mode command request from UTRAN to the corresponding Transcoder.
- FAUSCH Handling indicates the function in the MAC-d supports the FAUSCH, details are ffs.
- Support of Ciphering / Deciphering for transparent RLC operation in MAC , see [2] for details on the concept.
- A flow control function exists toward MAC-c and MAC-sh to limit buffering between MAC-d and MAC-c or MAC-sh entities. This function is intended to limit layer 2 signalling latency and reduce discarded and retransmitted data as a result of FACH or DSCH congestion. It also allows to handle quality of service if MAC-d requires it.



DL Downlink
TF Transport Format
TFC Transport Format Combination
Note1 : for DCH and DSCH different scheduling mechanisms apply

RNTI Radio Network Temporary Identity
UE User Equipment
UL Uplink
(2) Support TFCI insertion in Node B
Note 3 : Ciphering is performed in MAC-d only for transparent RLC mode

Figure 4.2.4.3 UTRAN side MAC architecture / MAC-d details

5. Services provided to upper layers
6. Functions
6.1 Description of the MAC functions

The functions of MAC include:

- Mapping between logical channels and transport channels.
- Selection of appropriate Transport Format for each Transport Channel depending on instantaneous source rate
- Priority handling between data flows of one UE
- Priority handling between UEs by means of dynamic scheduling
- Priority handling between data flows of several users on the the DSCH and FACH
- Scheduling of broadcast, paging and notification messages
- Identification of UEs on common transport channels
- Multiplexing/demultiplexing of higher layer PDUs into/from transport blocks delivered to/from the physical layer on common transport channels
- Multiplexing/demultiplexing of higher layer PDUs into/from transport block sets delivered to/from the physical layer on dedicated transport channels
- Traffic volume monitoring
- Monitoring the links of the assigned resources
- Routing of higher layer signalling
- Maintenance of a MAC signalling connection between peer MAC entities
- Dynamic Transport Channel type switching
- Ciphering for transparent RLC
- Relay Codec mode command requests generated by the RRC (e.g. relay of the AMR mode command)
- Supports inband signalling (e.g. for AMR mode adaptation)

The following potential functions is regarded as further study items:

- Processing of messages received at common control channels
- Successive Transmission on RACH
- Access Service Class selection for RACH transmission.