[0001] ~~SYSTEM FOR EFFICIENT RECOVERY OF NODE-B BUFFERED DATA FOLLOWING MAC LAYER RESET~~A METHOD FOR USE A RADIO NETWORK CONTROLLER (RNC) AND RADIO NETWORK CONTROLLER

[0002] FIELD OF INVENTION

[0003] The present invention relates to the field of wireless communications. More specifically, the present invention relates to efficient recovery of data transmission between a pair of Layer 2 automatic repeat request (ARQ) peer entities following MAC layer reset of an intermediate node from where data transmissions are distributed. One such example of this handover scenario is a system employing hybrid ARQ (H-ARQ) and adaptive modulation and coding (AM&C) techniques.

[0004] BACKGROUND

[0005] A third generation (3G) Universal Terrestrial Radio Access Network (UTRAN) comprises several radio network controllers (RNCs), each of which is associated with one or more Node Bs, and each Node B is associated with one or more cells.

[0006] The 3G FDD and TDD systems typically use the RNC to distribute, (i.e., buffer and schedule), data transmissions to the UE. However, for the high speed channels of 3G cellular systems, data is distributed by the Node B. One of these high speed channels, for example, is the High Speed Downlink Shared Channel (HS-DSCH). Since data is distributed by the Node B, it is necessary to buffer data for transmission in Node B. When the distributing entity (Node B) to which the UE is attached changes, there is a potential loss of data buffered in the distributing entity. The RNC does not have an up-to-date status of the transmissions of Packet Data Units (PDUs) since data is distributed by the intermediate point (Node B). It is necessary for the UE to detect the data loss and request retransmission, such as with a Status PDU, of lost PDUs from the RNC. If the generation of the Status PDU is delayed, as a consequence, the latency of data retransmission may be large and may not satisfy QoS requirements.

limited to, flushing out buffers for all configured H-ARQ processes, (i.e. flushing out the reordering buffers by disassembling all MAC-hs layer PDUs in the reordering buffers into MAC-d layer PDUs and delivering all MAC-d layer PDUs to the MAC-d layer and then to its associated RLC entities). Upon Inter-Node B handovers (and some Intra Node B handovers), it is necessary to reset the MAC-hs layer in the UE such that all H-ARQ processes and all the reordering buffers are reset for data reception from a new MAC-hs entity of the target Node B.

[0019] After a serving HS-DSCH cell change, the correct status of successful or unsuccessful received PDUs cannot be obtained until the procedure of the MAC layer reset is completed and the data blocks are processed by the RLC.

[0020] It would be desirable to have a system and method where data buffered in the UE can be accounted for in order to properly maintain user quality of service requirements.

[0021] SUMMARY

[0022] The present invention is a method and system for the UE and RNC to perform a series of actions in order to reduce transmission latency and potentially prevent loss of PDUs upon a MAC layer reset. UE generation of the status PDU is coupled with the MAC layer reset. The RNC generates a signaling message with a MAC reset indication. Following the MAC layer reset due to reception of a MAC layer reset request, all PDUs stored in the UE MAC layer reordering buffers are flushed to RLC entities and then processed by RLC entities prior to the generation of a PDU status report. The PDU status report provides the status of all successfully received PDUs to the RNC. This provides fast generation of a PDU status report. Upon reception of a PDU status report in the RNC, missing PDUs are realized and retransmitted to the UE.

[0022a] In one aspect, there is provided a method for use a radio network controller (RNC), the method comprising: transmitting a message to a user equipment (UE) providing information for a HS-DSCH cell change; transmitting a radio resource control (RRC) message to the UE, the RRC message having an identifier indicating that a medium access control high speed (MAC-hs) is to be reset; and receiving one or more radio link control (RLC) status report from the UE, wherein the RLC status report indicates the status of RLC protocol data units (PDUs) received by the UE; wherein the HS-DSCH cell change is triggered based on the sent RRC message; and wherein the MAC-hs reset requires the UE to flush buffers for configured HARQ processes, disassemble MAC-hs protocol data units (PDUs) in the reordering buffers, deliver MAC-d PDUs to a MAC-d layer, flush reordering buffers and configure the MAC-hs to receive new data.

[0022b] In another aspect, there is provided a radio network controller (RNC), the RNC comprising: a controller configured to send a message to a user equipment (UE) providing information for a HS-DSCH cell change; a transmitter configured to transmit a radio resource control (RRC) message to a UE, the RRC message having an identifier indicating that a medium access control high speed (MAC-hs) is to be reset; and a receiver configured to receive one or more radio link control (RLC) status report from the UE, wherein the RLC status report indicates the status of RLC protocol data units (PDUs) received by the UE; wherein the HS-DSCH cell change is triggered based on the sent RRC message; and wherein the MAC-hs reset requires the UE to flush buffers for configured HARQ processes, disassemble MAC-hs protocol data units (PDUs) in the reordering buffers, deliver MAC-d PDUs to a MAC-d layer, flush reordering buffers and configure the MAC-hs to receive new data.

[0023] BRIEF DESCRIPTION OF THE DRAWING(S)

[0024] Figure 1 is a block diagram of a prior art H-ARQ process.