TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3)
Berlin, Germany, 25 - 28 May 1999

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Agenda item: 6.1

Source: Nortel Networks

Title: Optimisation of procedure for DCH modification by using asymmetric channel reconfiguration

Document for: Approval

Introduction

The current scheme for transport channel reconfiguration when old and new configurations are not compatible is the synchronised procedure, where the network decides of an activation time, which is sent to the UE and to all involved Node Bs. At the scheduled time, the new configuration is activated simultaneously in all entities. A drawback of this method is the delay incurred, as the activation time has to be the maximum time for the new configuration to be sent and activated in all entities. Also, once the Node Bs are committed to the activation time, there is no possibility to back-track.

The procedure described below allows for a faster, more flexible reconfiguration of channels.

Asymmetric channel reconfiguration

The RNC initially sends one or more channel configurations (cfg1, cfg2, cfg3...) to each Node B and to the UE, e.g. at RAB Setup.

When a DCH configuration is to be modified, the RNC sends a TRANSPORT CHANNEL RECONFIGURE message as acknowledged data to the UE, indicating the configuration to be applied (e.g. cfg2). The selected configuration is signalled to the Node Bs in Iub frame information. Each Node B can then configure its physical layer to receive in the new configuration mode at a pre-defined radio frame number.

Upon reception of the TRANSPORT CHANNEL RECONFIGURE message, the UE reconfigures uplink L1 and L2 resources and starts to transmit data with the new configuration. In downlink, the UE can switch to the new configuration after a certain time which corresponds basically to the round trip delay. To avoid any data loss, the UE can also temporarily perform double decoding.

When a Node B detects the new configuration at the specified radio frame, this is signalled to the RNC over the Iub. If the expected configuration cannot be decoded, then the Node B can revert back to the old configuration. When the RNC detects, from all Node Bs, that the new configuration is applied by the UE on the uplink, it starts sending to every Node B downlink DCH Iub frames with an indication of the new mode to be applied.

Note that exactly the same procedure can be applied to Physical Channel Reconfiguration.

Applications

This procedure could be used in case of a congestion situation, to reconfigure the transport formats or transport combinations of a channel. The Transport Format Combination Control procedure allows to do this with minimum signalling, but in a restricted manner, as the network can only signal a subset of current TFCS to the UE. This means in particular that the number of bits of the TFCI has to be enough to code the maximum number of TFCs, even though there may be only a small number of TFCs in use at the same time.

It is also possible to perform link adaptation using this procedure to switch quickly from one channel mode to another.

Attached is a proposed change to S25.303

7.2.2.2 Asymmetric transport channel reconfiguration

The RNC has initially sent one or more channel configurations (cfg1, cfg2, cfg3...) to each Node B and to the UE, e.g. at RAB Setup.

When a DCH configuration is to be modified, the RNC sends a TRANSPORT CHANNEL RECONFIGURE message as acknowledged data to the UE, indicating the new configuration to be applied (e.g. change from cfg3 to cfg2). The selected configuration is signalled to the Node Bs in Iub frame information. Each Node B can then configure its physical layer to receive in the new configuration mode at a given radio frame number.

Upon reception of the TRANSPORT CHANNEL RECONFIGURE message, the UE reconfigures uplink L1 and L2 resources and starts to transmit data with the new configuration. In downlink, the UE can switch to the new configuration after a certain time which corresponds basically to the round trip delay. To avoid any data loss, the UE can also temporarily perform double decoding.

When a Node B detects the new configuration at the specified radio frame, this is signalled to the RNC over the Iub. If the expected configuration is not detected, then the Node B can revert back to the old configuration. When the RNC detects, from all Node Bs, that the new configuration is applied by the UE on the uplink, it starts sending to every Node B, downlink DCH Iub frames with an indication of the new mode to be applied.

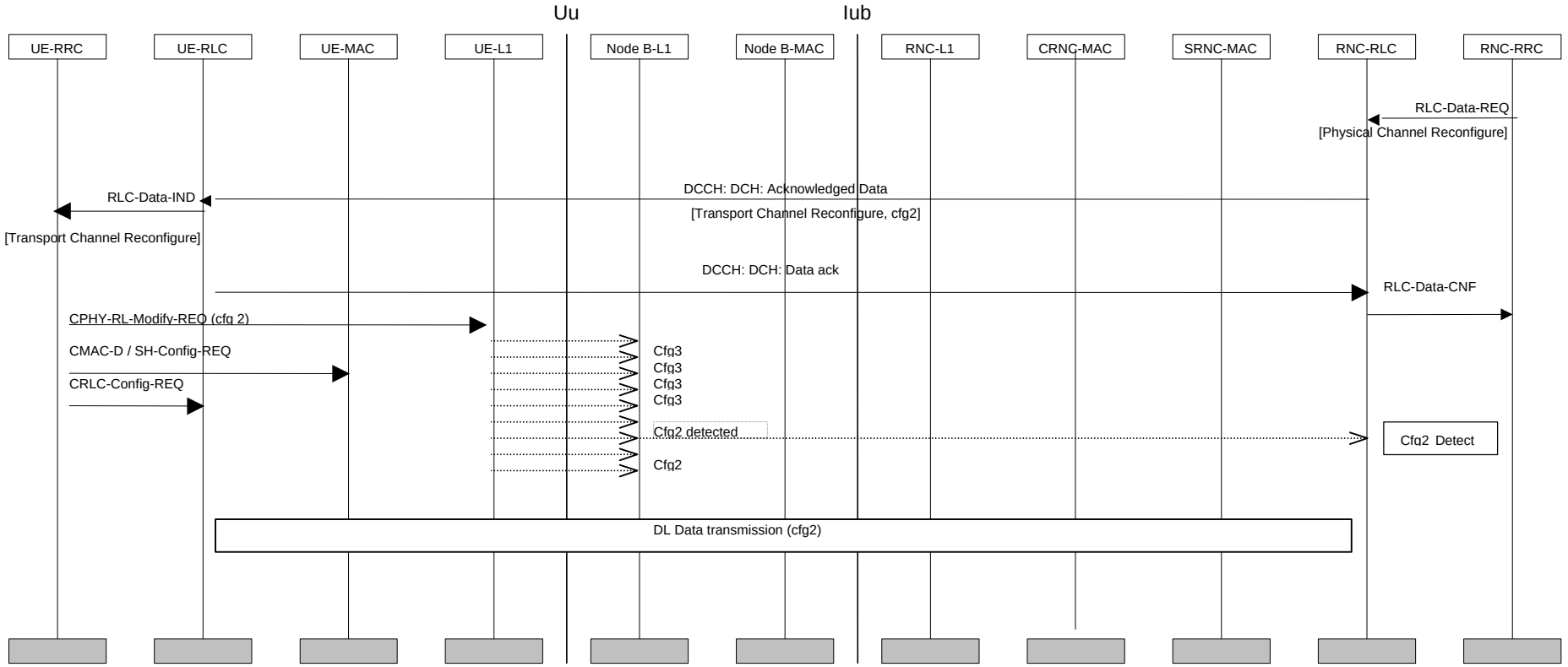

Figure 1: Asymmetric DCH Reconfiguration