

# HARQ Mechanism in Multi-hop Relay

## IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE S802.16j-06/292

Date Submitted:

2006-11-13

Source:

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Venue:

IEEE 802.16 Session #46, Dallas, TX, USA.

Base Document:

IEEE C80216j-06/292

Purpose:

. To propose HARQ in IEEE 802.16j

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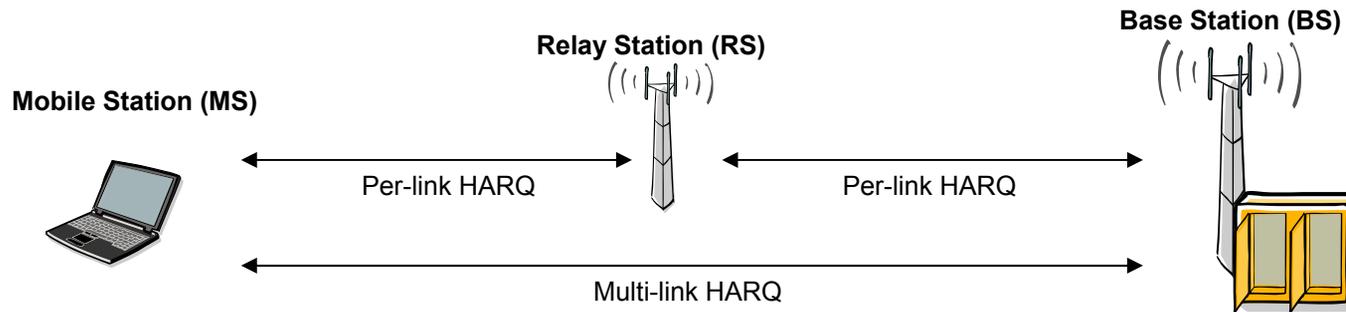
# Introduction

## Issues of HARQ mechanism in multi-hop networks

- Distinct propagation conditions and models of different hops possibly result in the difference of HARQ performances from hop to hop
- Drainage of air-interface resources and possible delay introduced by multiple re-transmissions over multiple hops

## Two HARQ mechanisms are proposed

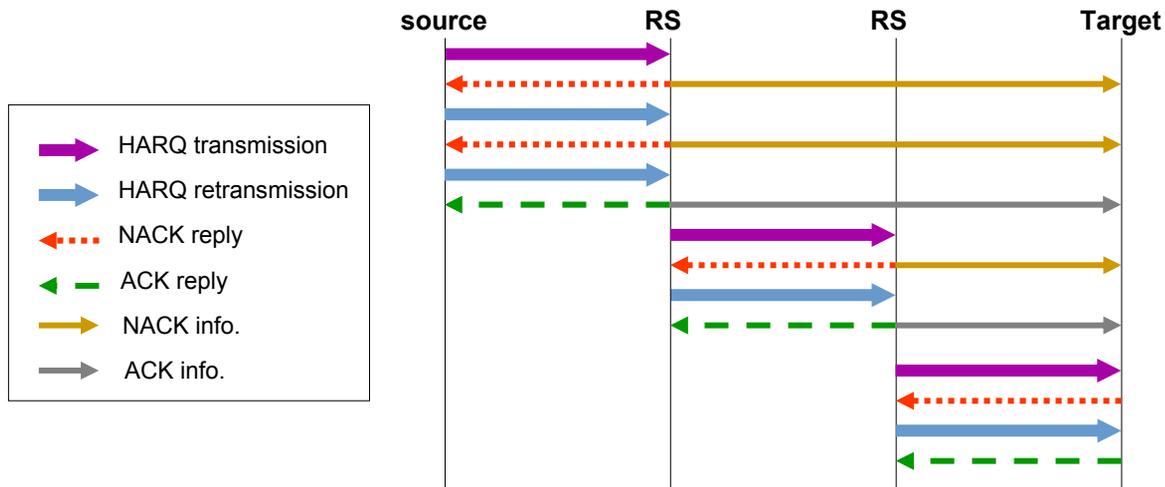
- Active HARQ mechanism
- Passive HARQ mechanism



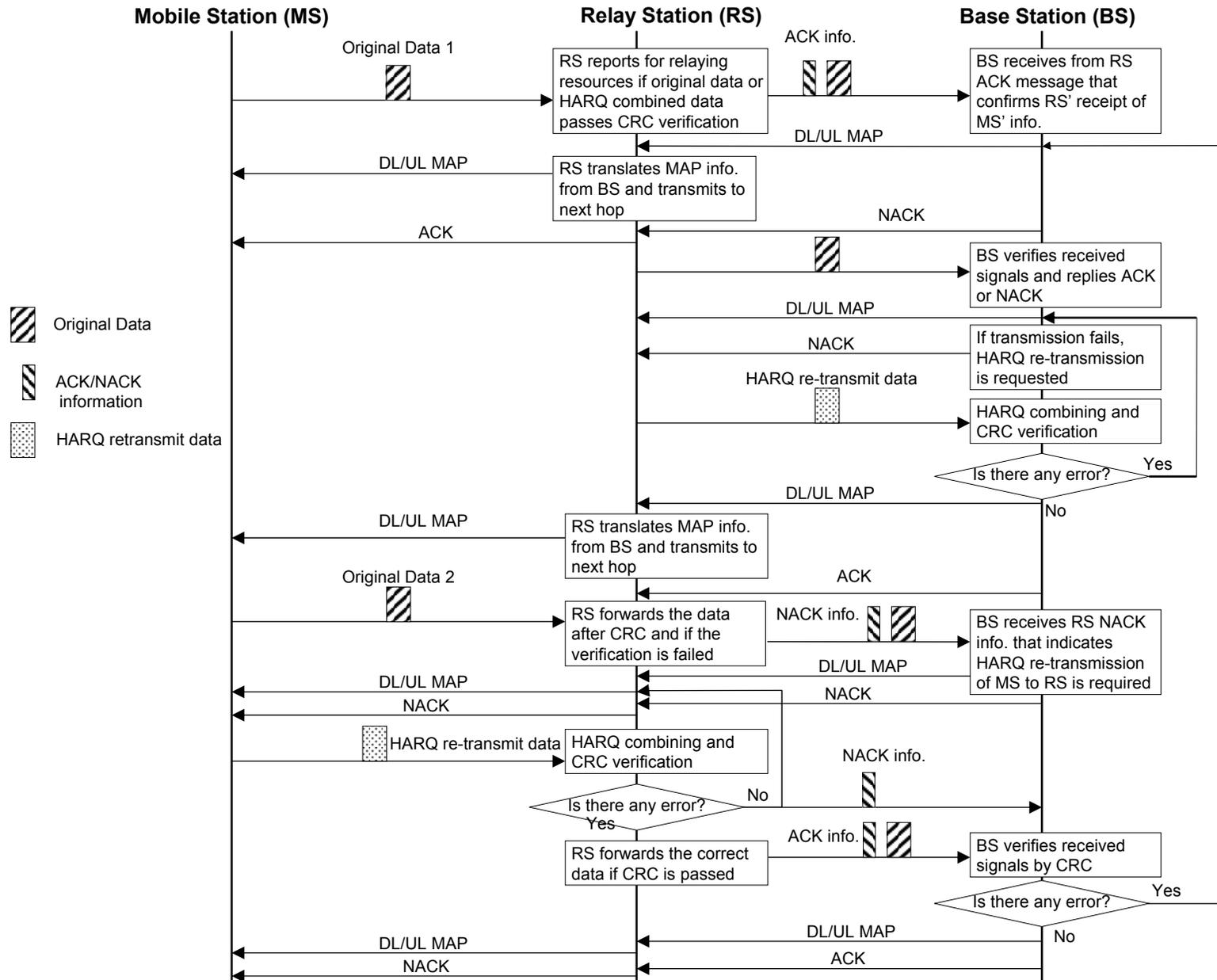
# Active HARQ Mechanism (1/2)

## Features of Active HARQ mechanism

- Actively report of the result of CRC verification to BS for HARQ retransmission resource allocation
- Centralized HARQ retransmission control
  - All HARQ retransmissions are allocated and triggered by BS or MS with the aid of RS
- Distributed HARQ combining performed hop by hop
  - HARQ retransmissions are received and combined until the frame passes CRC verification, then forwarding to next hop
- Per-link basis HARQ mechanism
  - Allowing for functions in RS, such as traffic congregation and CID update
  - Fewer radio resources consumed for relaying
- Additional message indicating CRC results “ACK/NACK info.” is required

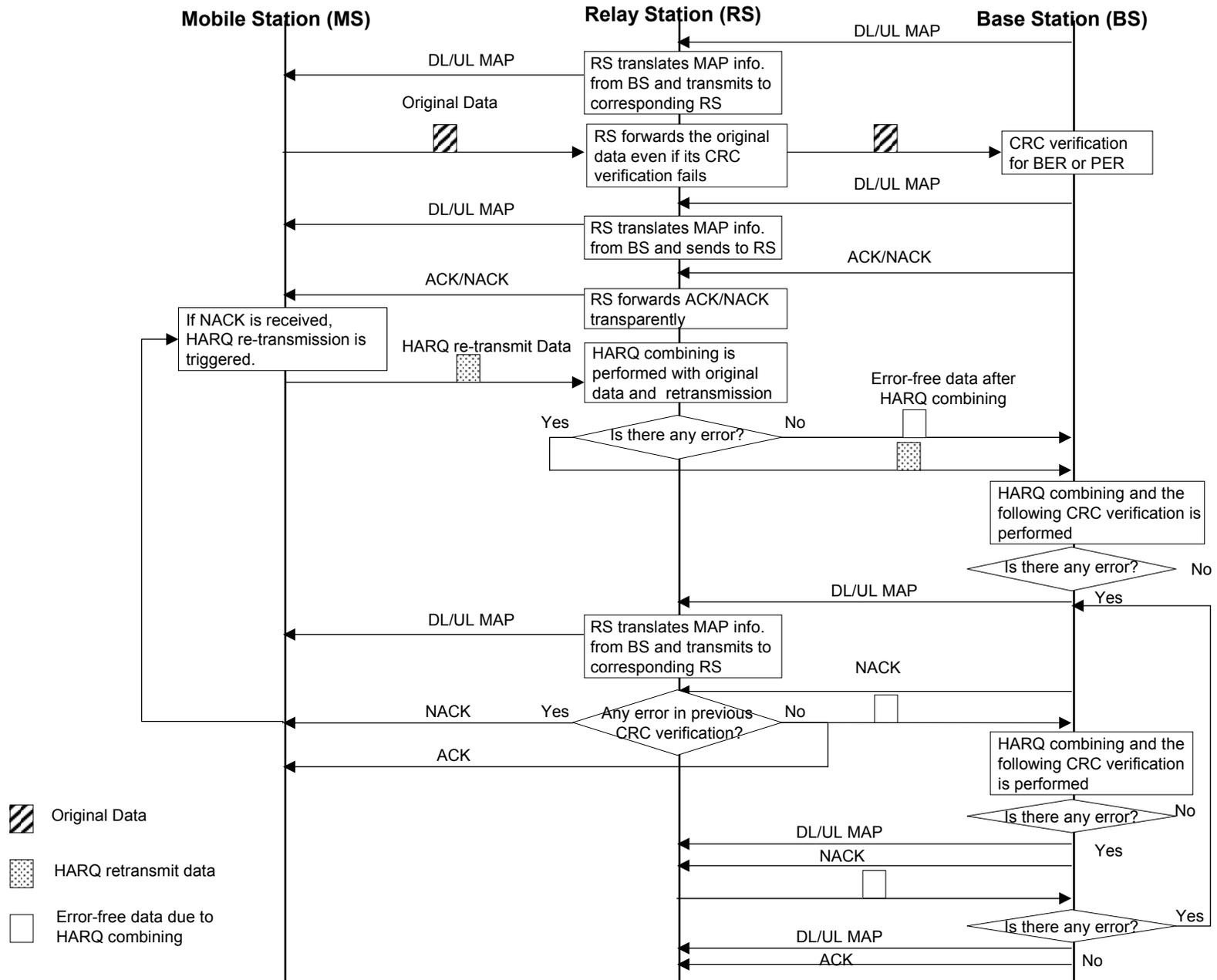


# Active HARQ Mechanism (2/2)





# Passive HARQ Mechanism (2/2)



# Summary

- Per-link and multi-link HARQ are proposed
  - Active HARQ mechanism
    - It is a per-link HARQ mechanism
    - It is supported whether CID is changed or not in relay stations (RS)
    - Relay stations report ACK/NACK information actively to the base station for HARQ scheduling
    - High spectrum efficiency
  - Passive HARQ mechanism
    - Relay stations forward ACK/NACK with or without any processing to the following hop passively
    - Multi-link HARQ mechanism
    - CID remains unchanged through relay stations
    - Cooperative relay can be supported