Macro Diversity Handover and Fast Access Station Switching for MMR Network

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Purpose:

Propose new MAC management messages for MDHO and FASS for a mobile multi-hop relay network

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Introduction

- MDHO and FASS provides seamless and better handover performance for MS with higher speed mobility
- MDHO and FASS handover procedures are described for nine main classes of topology
- New MAC management messages over relay links are introduced
- Handover procedures are backward compatible to an IEEE802.16e compliant MS

- Note:
- MDHO (macro diversity handover): MS can communicate simultaneously with all active stations in diversity active set. In uplink (downlink), active stations (MS) are capable of diversity combining of received signals
- FASS (fast access station switching): The data are sent to all active stations in diversity active set but without diversity combining. Further the data are processed in anchor station only. An advantage of this handover type is not using of explicit handover signaling messages when anchor station is changed.

Topology of MDHO and FASS

- Nine cases and classified into two categories:

  - (1) Intra MR-BS handover
    - Case 1: the current anchor station and target anchor station is MR-BS
    - Case 2: the current anchor station is RS and target anchor station is MR-BS
   - Case 3: the current anchor station is MR-BS and target anchor station is RS
    - Case 4: the current anchor station and target anchor station is the same RS
    - Case 5: the current anchor station and target anchor station is the different RSs

  - (2) Inter MR-BS handover
    - Case 6: the current anchor station and target anchor station is the different MR-BSs
    - Case 7: the current anchor station is MR-BS and target anchor station is RS controlled by the different MR-BS
    - Case 8: the current anchor station is RS and target anchor station is MR-BS in a different MR-cell
    - Case 9: the current anchor station and target anchor station are the different RSs and also they are located in different MR-cells

    - Note:
    - Intra MR-BS HO: handover among group of RSs or the MR-BS controlled by the same serving MR-BS
    - Inter MR-BS HO: handover among group of RSs and two or more MR-BSs controlled by the two or more MR-BSs
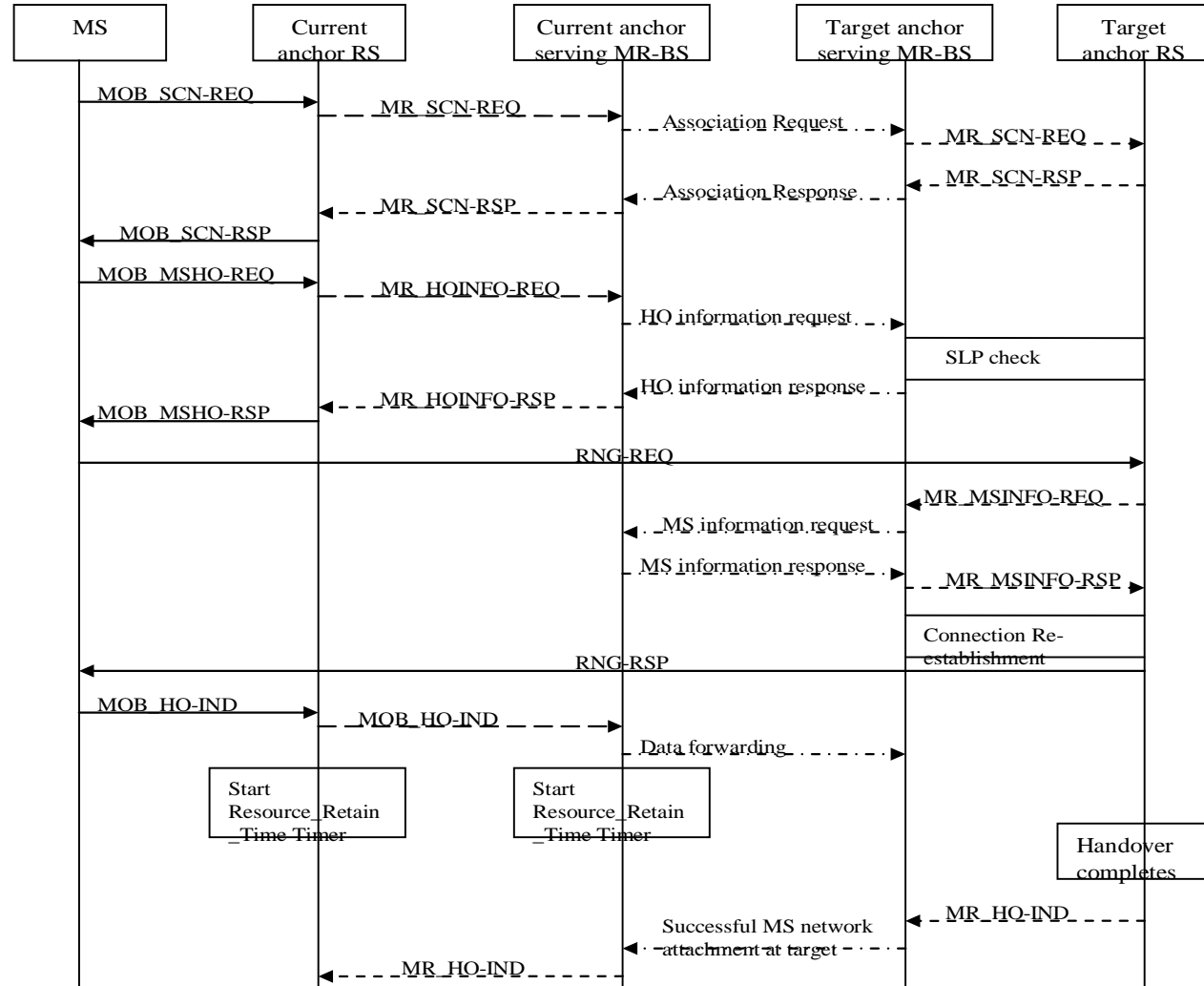
Case 5: Intra MR-BS handover, the current anchor station RS2 and target anchor station RS 6 in the same MR-BS cell
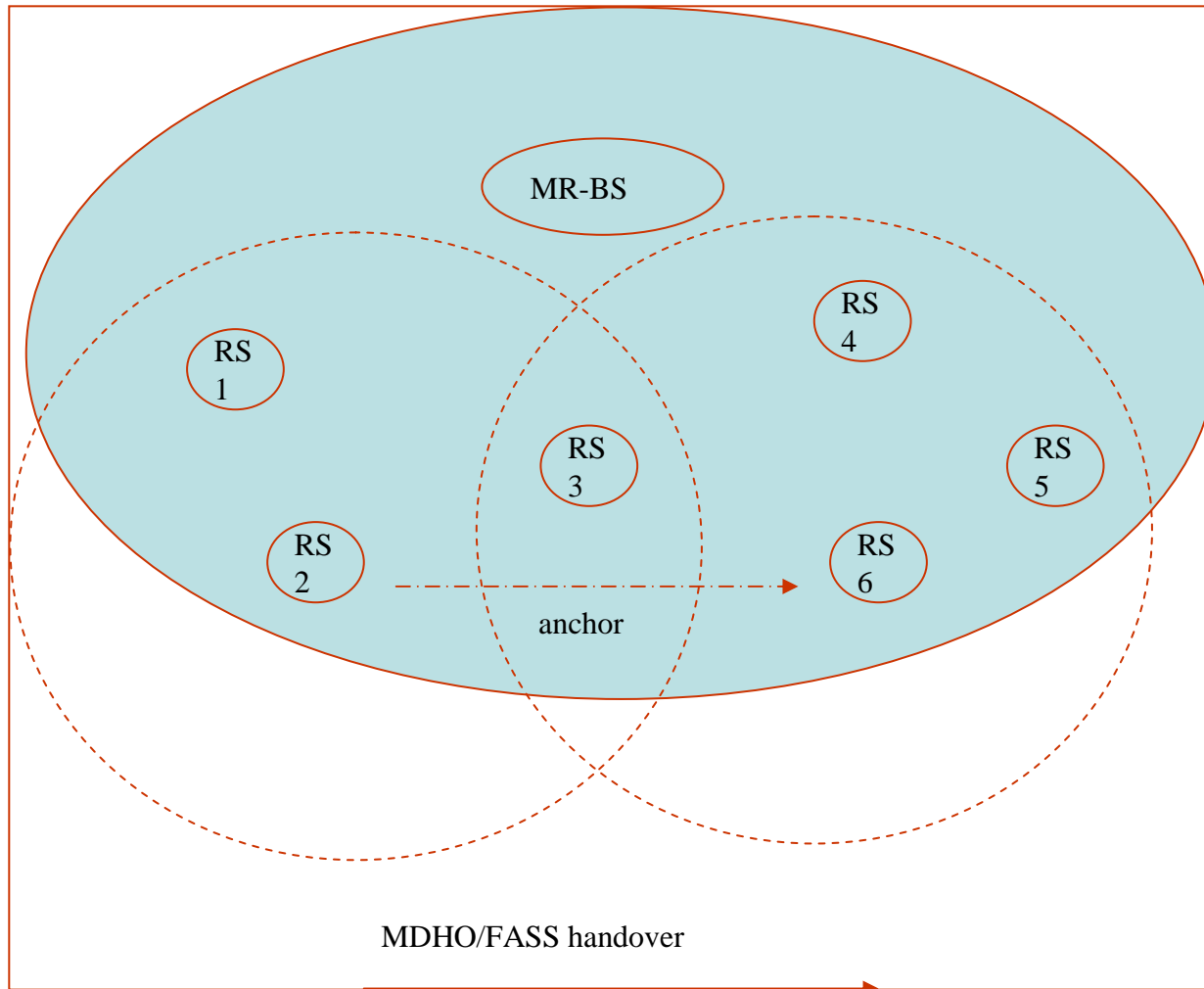
Case 9: Inter MR-BS handover, the current anchor station RS 3 and the target anchor station RS 5
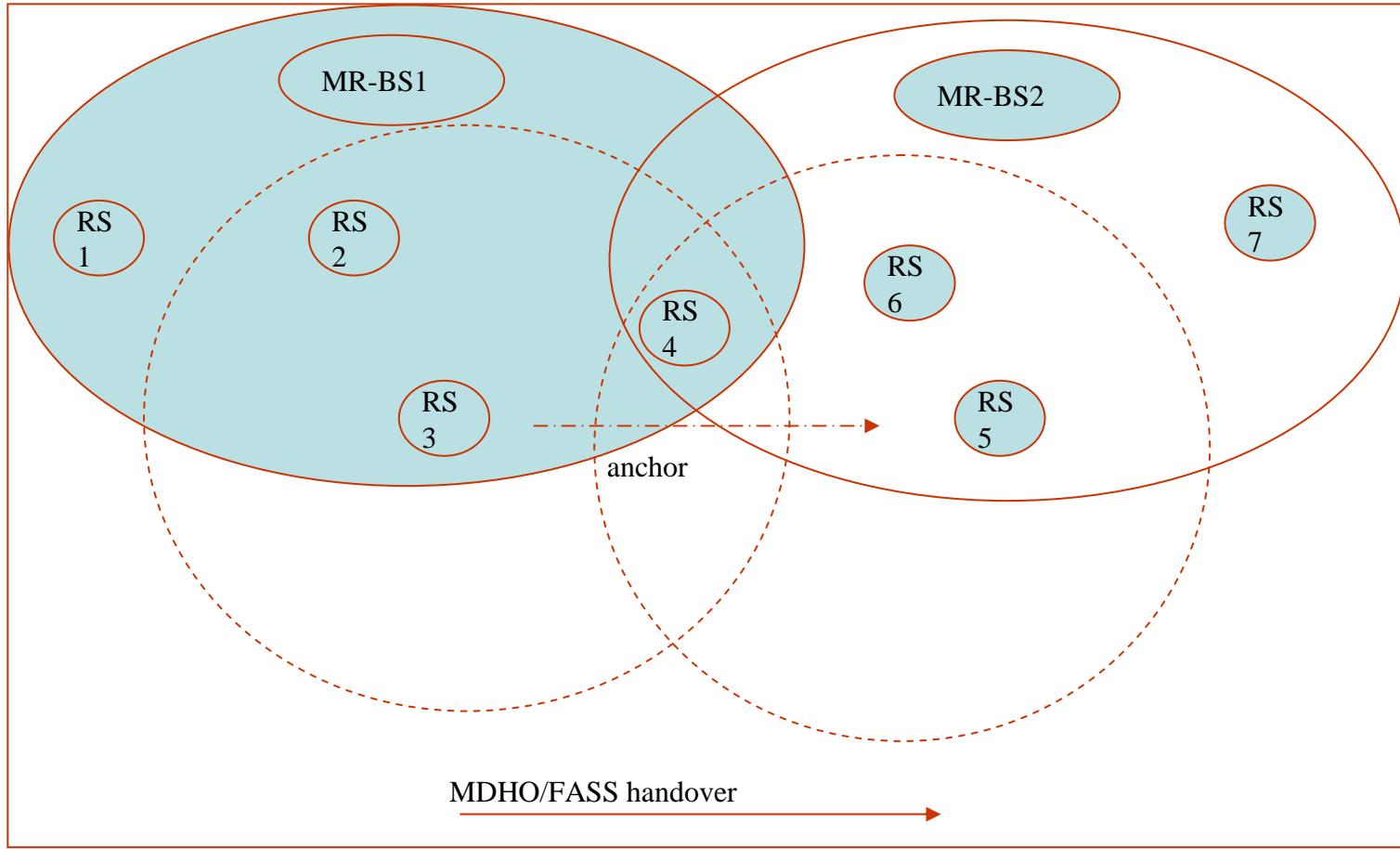
Case 9 Handover Procedures and New MAC Messages

Summary

- Handover procedures for MDHO and FASS
- New MAC management messages to support MDHO/FASS for nine main classes of topology
- New MAC messages are used for handover messages over the relay link

MAC management messages over relay links

New MAC messages	MS handover phase	Descriptions
MR_SCN-REQ MR_SCN-RSP	MS scanning	These two messages are used to coordinate an association for an MS at target anchor station
MR_HOINFO-REQ MR_HOINFO-RSP	MDHO/FASS decision and initiation	These two messages are used to pass the handover related information of potential target anchor station to the current anchor station over relay links
MR_MSINFO-REQ MR_MSINFO-RSP	Handover execution	These messages are used to pass MS information to new anchor and target anchor station when actual handover is performed.
MR_HO-IND	Handover termination	This message is used to notify successful handover to the current anchor station and to the target anchor station.