MAC Management Message Transmission to RSs

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IEEE C802.16j-06/196 http://dot16.org/CSUpload//upload/Relay_db/C80216j-06_196.pdf

Purpose:

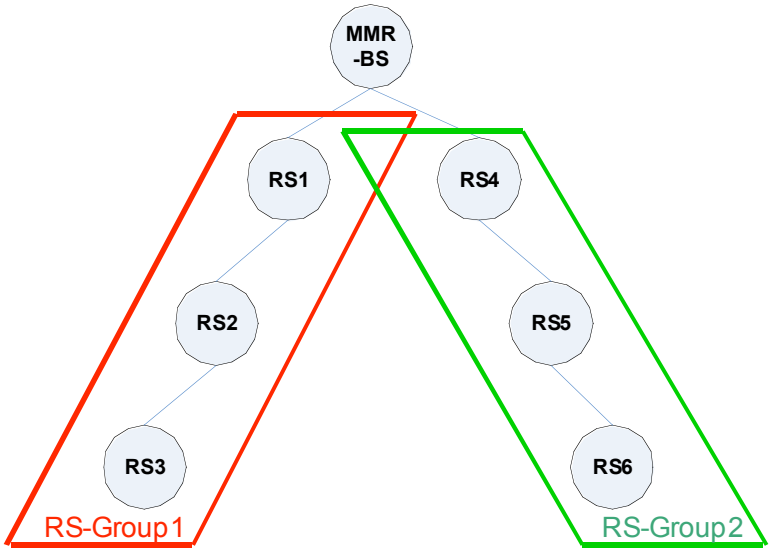
The purpose of this slide set is to introduce contribution C802.16j-06_196. This contribution is proposing Transmission Scheme of MAC Manage Message to RS Group in multi-hop relay system. Changes in the standard are described in contribution C802.16j-06_196.pdf.

Outline

- Introduction
- Transmission scheme for MAC-Mng-Msg to a group of RS.
  - End-to-End Unicast
  - Hop-by-Hop Unicast with end-to-end response
- Summary

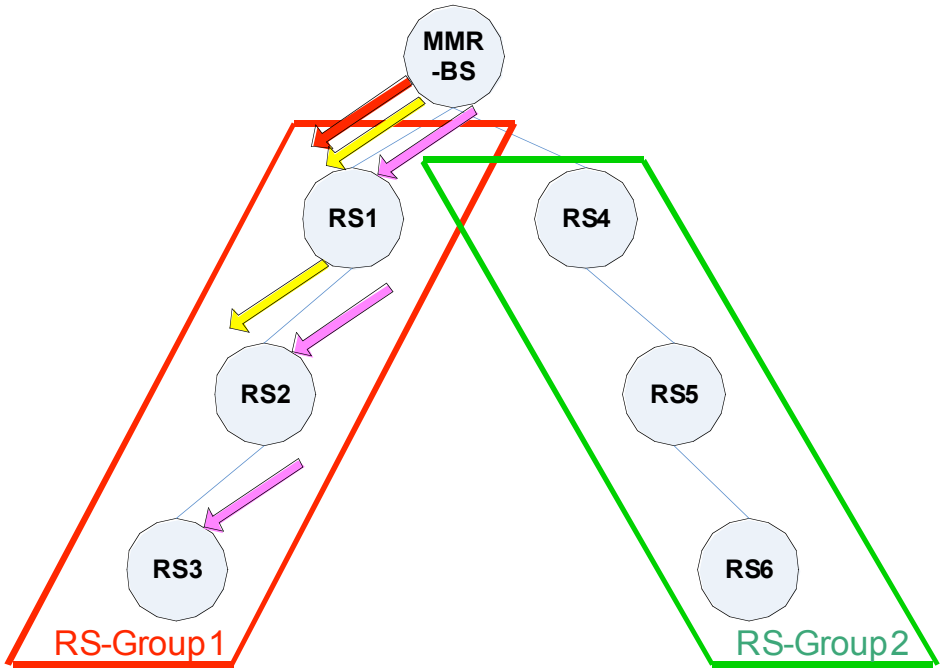
Introduction

- In single-hop system, the MAC management messages are transmitted b/w BS and MS
- In multi-hop relay system, MAC messages (termed as MAC-Mng-Msgs) are needed for the control function between MMR-BS and RSs.
- For certain functions, MMR-BS sends a MAC-Mng-Msg to a group of RSs. For example
  - MMR-BS may send the mapping information between an established relay path (e.g. RS-Grou 1 and RS-Group2) and CIDs for routing.
  - MMR-BS may send its reset/unavailable status to all the RS
- This contribution proposes two transmission schemes
  - End-to-end unicast
  - Hop-by-hop unicast



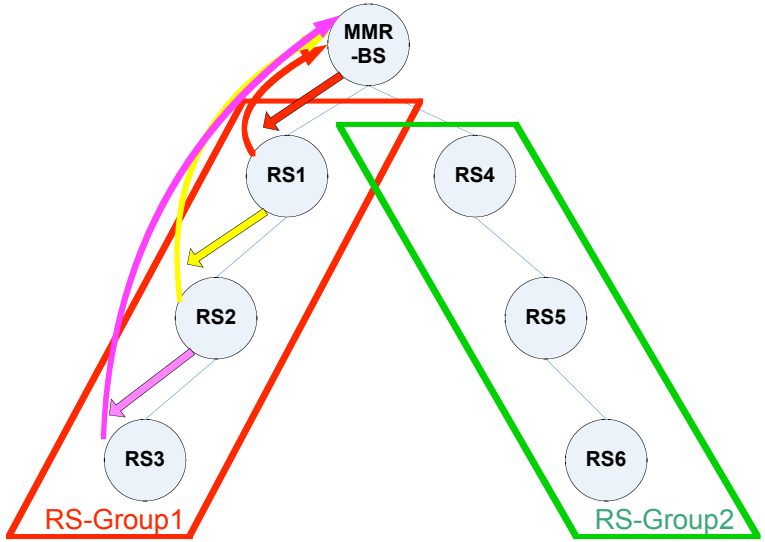
End-to-End Unicast with End-to-End Response

- MMR-BS unicasts the MAC-Mng-Msg to each RS in the RS-Group. The respor message from each RS is unicast directly to the MMR-BS.
- Procedure is simple and involves less complexity on RS.
- Overhead introduced by this scheme is non-trivial especially if the number of R on one relay path is large.



Hop-by-Hop Unicast with End-to-end Response

- The MAC-Mng-Msg is unicast on each hop and processed by each RS.
  - Message contains Path ID, which represents relay path. This is established across relays dui path establishment
- Upon receiving the MAC-Mng-Msg, each RS sends a response directly to the MMR-BS.
- If the response is success, the RS forwards it to the next hop. Otherwise, the procedure terminates.



Establishing Path ID

- MMR-BS determines path during topology discovery
- MMR-BS advertises the complete path to all the RSs on a particular path
- MMR-BS sends PATH-ADV-REQ (MAC-Mng-Msg) with the Action-Type field set to ESTABLISH with a uniquely assigned path id
- The complete path information and the path id are carried in the Path-Information TLV and Path-Id TLV.
- Each RS receiving the PATH-ADV-REQ message records the path id and the complete path information, and then responds with a PATH-ADV-RSP
- This path id is used directly in subsequent MAC-Mng-Msg

Transmission Failure

- MMR-BS maintains timers (MAC-Mng-Msg-RES-Timer) for the response
- The value of MAC-Mng-Msg-RES-Timer for each RS varies and depends on the possible transmission and processing latency between MMR-BS and the RS.
  - Latency could be estimated for example based on the number of hops between MMR-BS and the RS.
- If the timer expires or a failure is received, the MMR-BS determine that the RS doesn't receive the MAC-Mng-Msg and has failed the chained operation due to error processing or link loss.
- The MMR-BS may reissue the MAC-Mng-Msg and directly send it to the first failed RS.

Summary

- In multi-hop relay system, need of transmission scheme to a group of RS is described and two transmission schemes are proposed for different scenarios.
- **End-to-end response scheme**
  - Simple, less complexity on RS
  - More overhead compared to hop-by-hop response scheme
  - Applicable where the number of RSs is small (e.g., 2 hop relay); or the RSs have lo capability.
- **Hop-by-hop response scheme**
  - less bandwidth overhead, especially when the relay path contains a large number o RSs,
  - Increased complexity in the RSs.
  - Applicable for a large number of RS or high-capability RSs
- Scheme can be selected by the MMR-BS based on the scenario. MMR-BS indicates the scheme type by setting the Transmission Type field in the MAC-Mng-Msg
- Further details of the the transmission schemes and corrosponding specs changes are described in Contribution C**802.16j_196.pdf**.