Discussion of MMR Protocol Stack

Document Number:
IEEE C802.16j-06/076
Date Submitted:
2006-07-03
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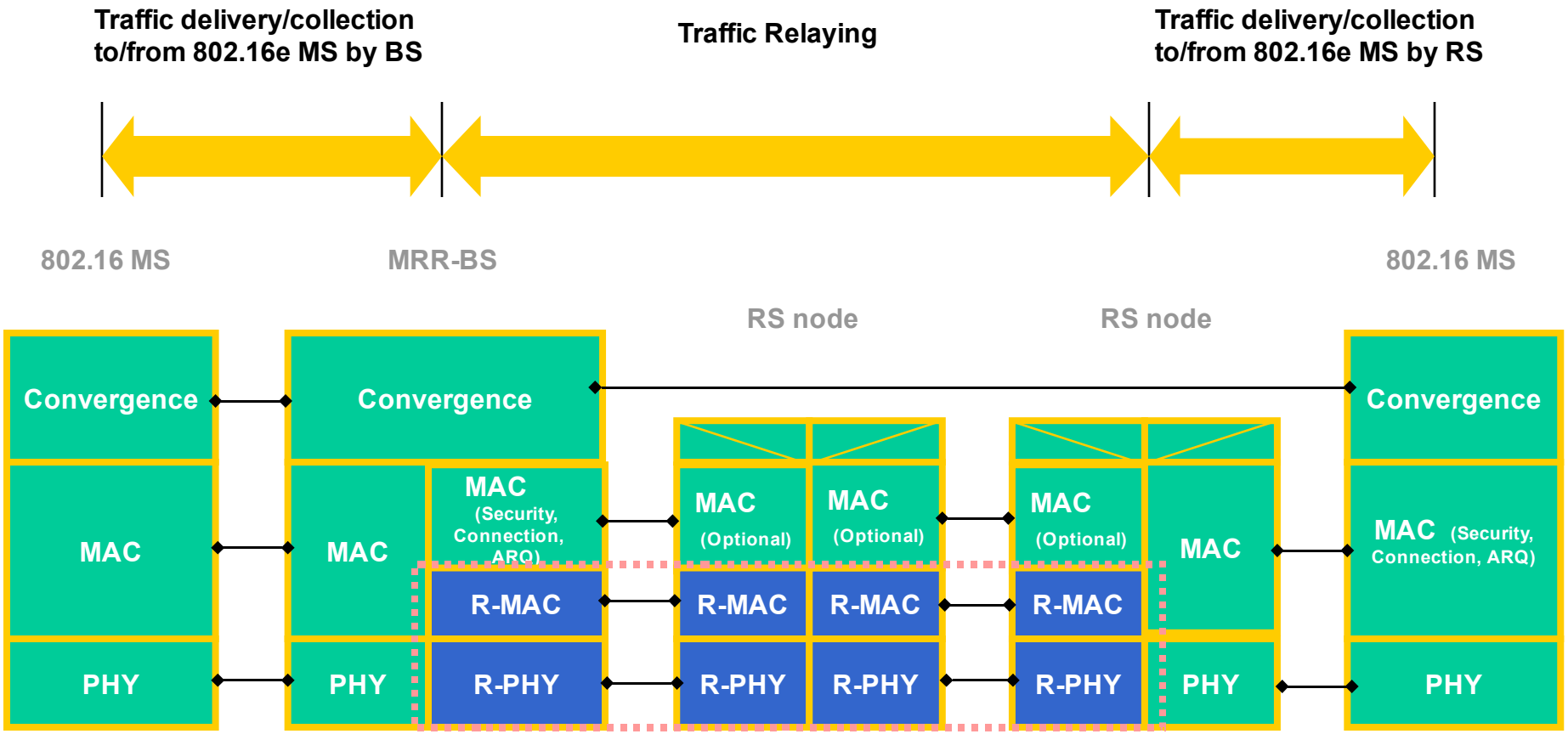
Venue:
IEEE 802.16 Session #44, San Diego, USA
Base Document: C80216j-06_041:"Harmonized definitions and terminology for Mobile Multihop Relay"
Purpose:
To further clarify the terminologies of R-DL, R-UL, R-PHY and R-MAC

Introduction and Background

- Based on IEEE802.16j PAR, in order to achieve backward compatibility, we propose to retain the IEEE802.16e-2005 protocol stack by defining two new sub-layers for MMR-BS and RS:
  - R-MAC
  - R-PHY
  - Both are interoperable with IEEE802.16e-2005
- We also retain the DL and UL PHY/MAC format intact for the connectivity with MS to achieve zero change on IEEE802.16e-2005 MS
- The link for MMR-BS ←→RS and RS ←→ RS are defined based on basic DL and UL with additional functionality and enhancement:
  - R-DL
  - R-UL

MMR Protocol Stack



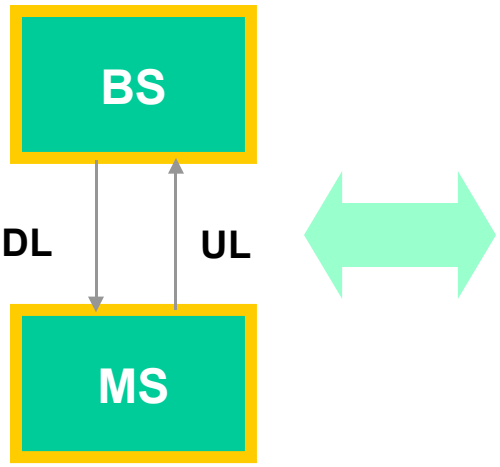
Scope for 802.16j

MMR protocol Stack: R-PHY and R-MAC

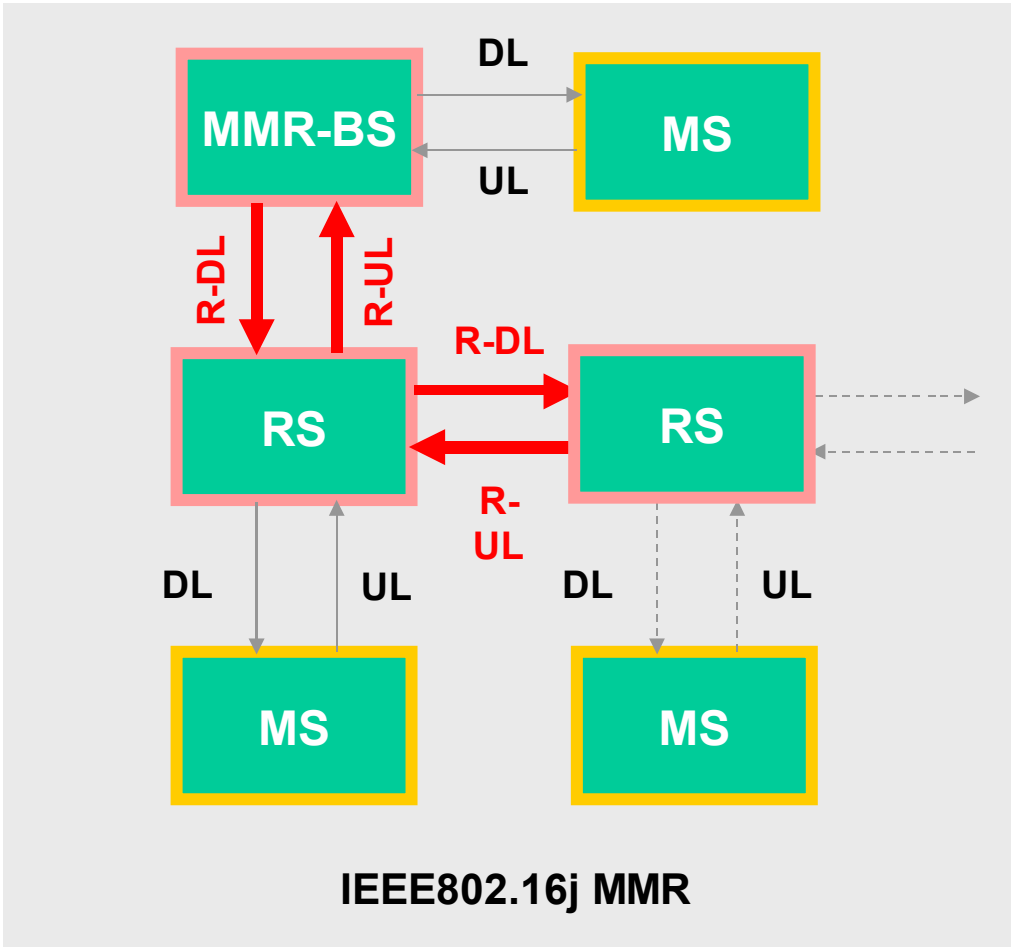
- Modify physical layer if needed: R-PHY sub-layer between
  - MMR-BS ←→RS
  - RS ←→RS
  - It uses current 802.16e-2005 PHY as baseline
  - It may be the enhanced 802.16e-2005 PHY
- Introduce a new MAC sub-layer: R-MAC sub-layer between
  - MMR-BS ←→RS
  - RS ←→RS
- Retain E2E 802.16e security
  - between MMR-BS ←→MS
- Retain E2E 802.16e connection
  - between MMR-BS ←→MS
- Retain E2E 802.16e ARQ
  - between MMR-BS ←→MS
- Retain and support per-link HARQ
- Access RS implements the complete 802.16e MAC functionality
- Relaying path RSs implements partial 802.16e MAC functionality

MMR Architecture – Link Level

- IEEE802.16j MMR basic link connectivity can be defined as:



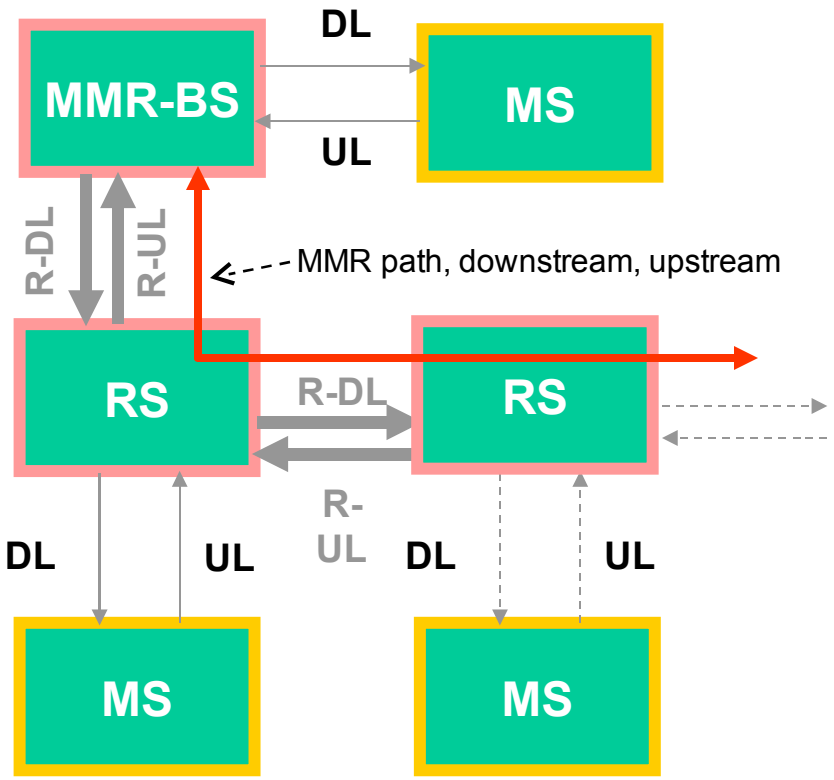
IEEE802.16e-2005



IEEE802.16j MMR

MMR Architecture – Path Level

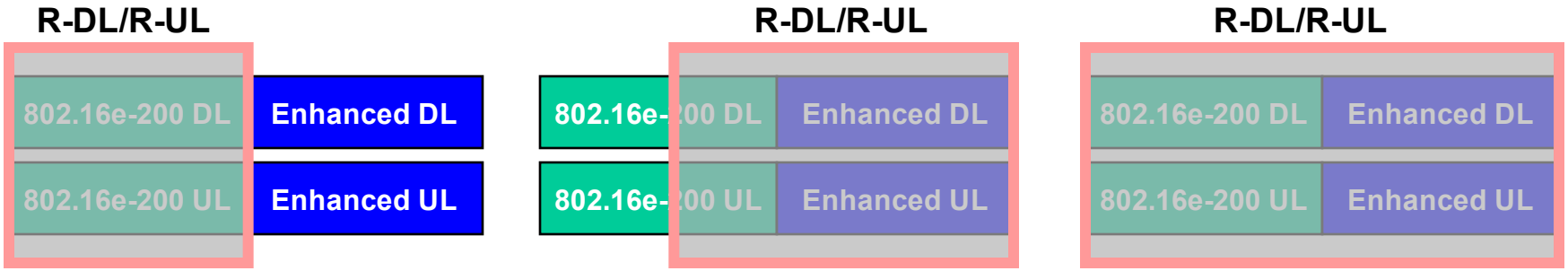
- IEEE802.16j MMR basic path connectivity can be defined as:



IEEE802.16j MMR

MMR Links: R-DL and R-UL

- Based on IEEE802.16j PAR, the legacy MS operation is not allowed to changed, therefore,
- The link for MS namely the DL and UL can not be modified:
  - We propose to retain the terminology as IEEE802.16e-2005
- The links for MMR-BS ←→ and RS ←→RS are defined as:
  - R-DL and R-UL,
- The relationship of DL/UL and R-DL/R-UL can be described as:



Same as 82.16e-2005

Partial 82.16e-2005 and Enhancement

Full 82.16e-2005 and Enhancement

Text Proposal

- R-MAC
  "MAC sub-layer to support multi-hop relay"
- R-PHY
  "Physical sub-layer to support multi-hop relay"
- R-DL
  "Down link between the MMR-BS and RS nodes or between RS nodes downstream relay"
- R-UL
  "Up link between the MMR-BS and RS nodes or between RS nodes for upstream relay"
- MMR path
  "Concatenation of k consecutive relay links (k >= 1) between the MMR-BS and the designated access RS"
- Downstream Traffic
  "data flow to be relayed from MMR-BS to targeting MS"
- Upstream Traffic
  "data flow to be relayed from MS to targeting MMR-BS"