Relay Tunnel Connection for 802.16j

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Jeffrey Z. Tao, Koon Hoo Teo, Jinyun Zhang
Mitsubishi Electric Research Lab
201 Broadway, Cambridge, MA 02139, USA
Voice: 617-621-{7557, 7527}
Fax: 617-621-7550
Email: {tao, teo, jzhang}@merl.com

Toshiyuki Kuze, Shigeru Uchida, Kentaro Sawa
Mitsubishi Electric Corp.
5-1-1 Ofuna Kamakura, Kanagawa 2478501, JAPAN
Voice: +81-467-41-2885
Fax: +81-467-41-2486
Email: kuze.toshiyuki@ah.MitsubishiElectric.co.jp

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Purpose:

Propose to adopt the relay tunnel connection concept and mechanism described herein into IEEE 802.16j.

Relay Tunneling Connection for 802.16j

Authors:

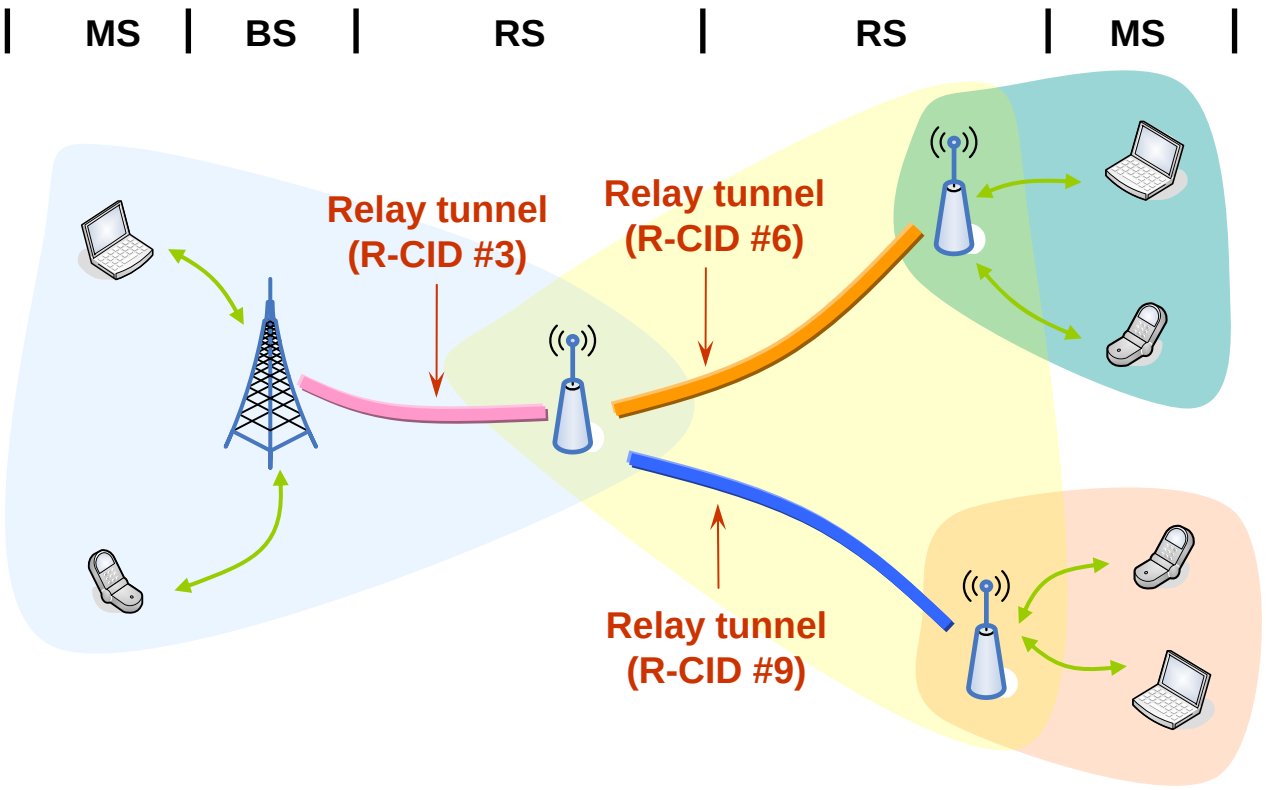
Jeffrey Z. Tao, Koon Hoo Teo, Jinyun Zhang
Mitsubishi Electric Research Lab
201 Broadway
Cambridge, MA 02139

Toshiyuki Kuze, Shigeru Uchida, Kentaro Sawa
Mitsubishi Electric Corp
5-1-1 Ofuna Kamakura, Kanagawa
2478501, Japan

Relay Tunnel Connection

Key proposals

- Link-by-link relay tunnel connection
- Address and clarify issues in HARQ so that relay tunnel can operate over HARQ
  - Use relay tunnel connection CID (R-CID) in HARQ operation
  - Use relay tunnel MAC header and PDU SN extended subheader to address the out-of-order delivery problem in HARQ.



Relay Tunnel Connection

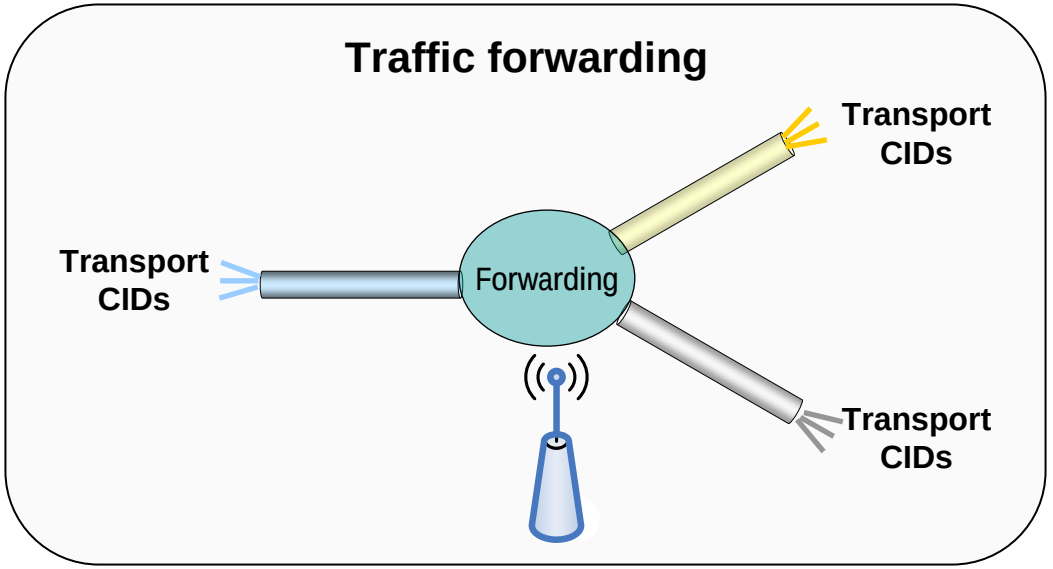
- This contribution proposes to establish a link-by-link **relay tunnel** connection on a **relay link.**
  - An alternative to the end-to-end tunnel idea.
  - For distributed scheduling system.

- Features
  - Simplify the management of growing number of individual connections on relay links by leveraging the statistic traffic multiplexing.
    - Resource allocation and QoS provisioning is performed on a per relay tunnel basis, rather than on a per transport MAC connection basis.
  - Provide more suitable support to network with distributed scheduling.
    - Since the scheduling is done by RS, which has more timely and accurate information about the wireless links, better scheduling decision can be made and system capacity can be improved.

* A relay link is the wireless link between an **MR BS** and **a RS**, between a pair of **adjacent RSs**, or between a **RS** and **an access RS**

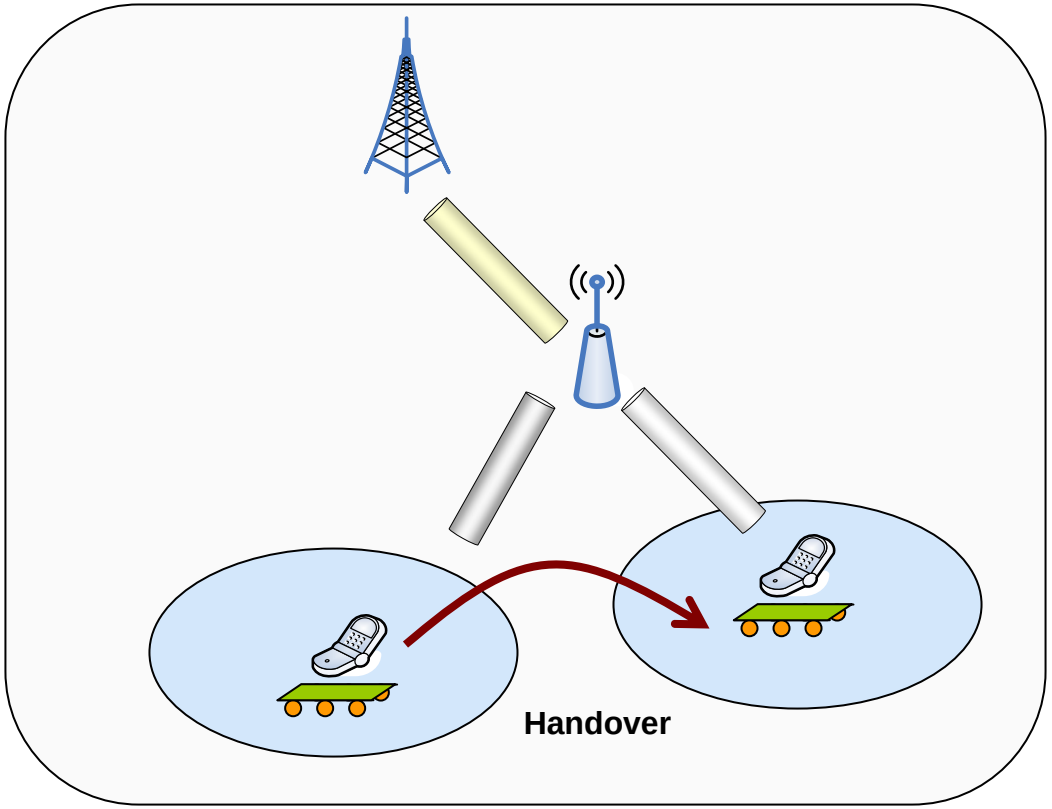
Relay Tunnel Connection

- The two end points of relay tunnel have the full information about the mapping between individual MAC connection (e.g., transport CIDs) and relay tunnel connection.
  - Forwarding is performed on a per individual MAC connection basis.



Relay Tunnel Connection

- Ease the mobility management
  - Especially for nomadic or mobile RS.
  - Adaptive and quick response to route change.

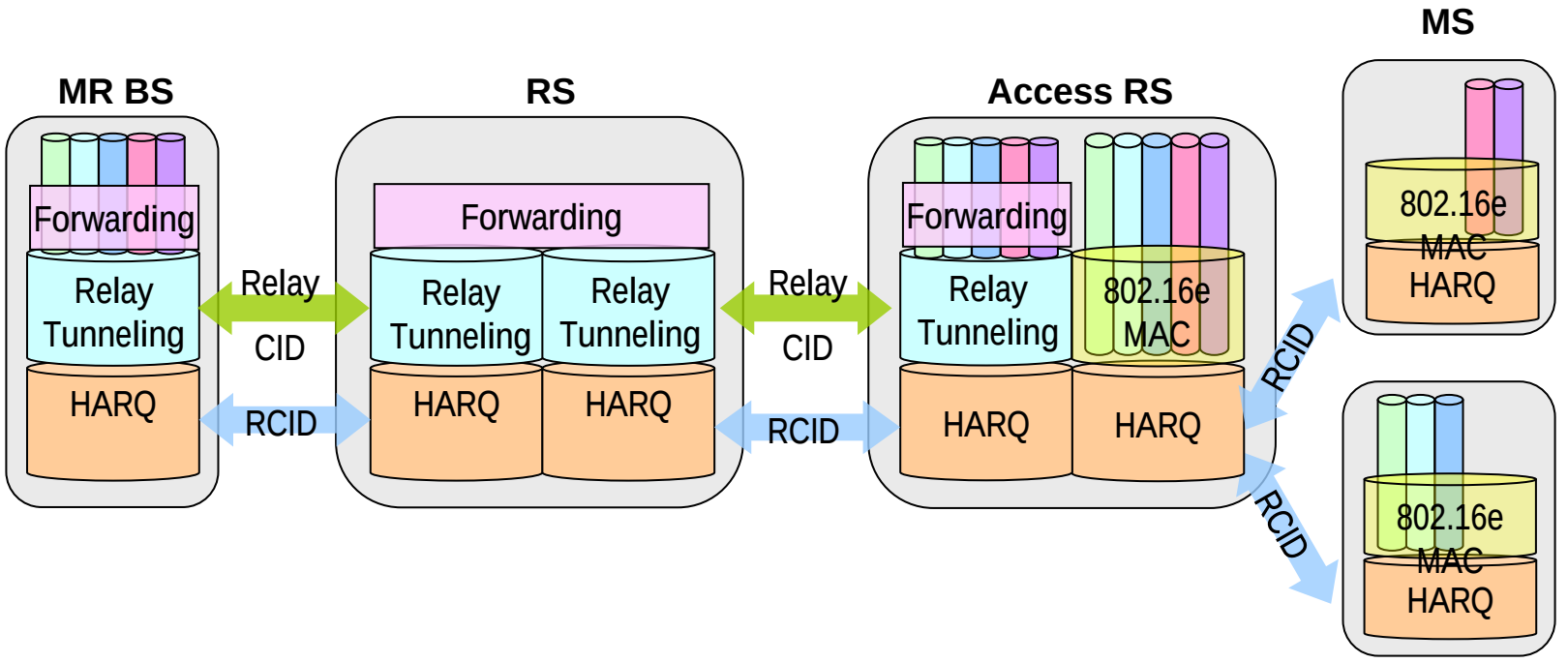


Relay-CID (R-CID)

- Link by Link Relay Tunnel Connection is uniquely identified by a R-CID (Relay CID)

CID	Value	Description
Relay CID	*n+1-k*	*Used by MMR-BS or RS for relay packets*
Transport CIDs, Secondary Mgt CIDs,		For the secondary management connection, the same value is assigned to both the DL and UL connection.

- When handled by HARQ, R-CID should be placed in the RCID_IE field for the corresponding HARQ sub-burst.



Relay Tunnel Connection over HARQ

- *Append tunnel MAC header and insert PDU Sequence Number (SN) extended subheader for HARQ MAC PDU to address the out-of-order delivery.*