

Relay Tunnel Connection for 802.16j

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE S802.16j-07/115r2

Date Submitted:

2007-01-16

Source:

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](mailto:tao@merl.com), [teo](mailto:teo@merl.com), [jzhang](mailto:jzhang@merl.com)}@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

Venue:

IEEE 802.16 Session #47, London, UK

Base Document:

None

Purpose:

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

Notice:

This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.

Release:

The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.

IEEE 802.16 Patent Policy:

The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <<http://ieee802.org/16/ipr/patents/policy.html>>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <<mailto:chair@wirelessman.org>> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <<http://ieee802.org/16/ipr/patents/notices>>.

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

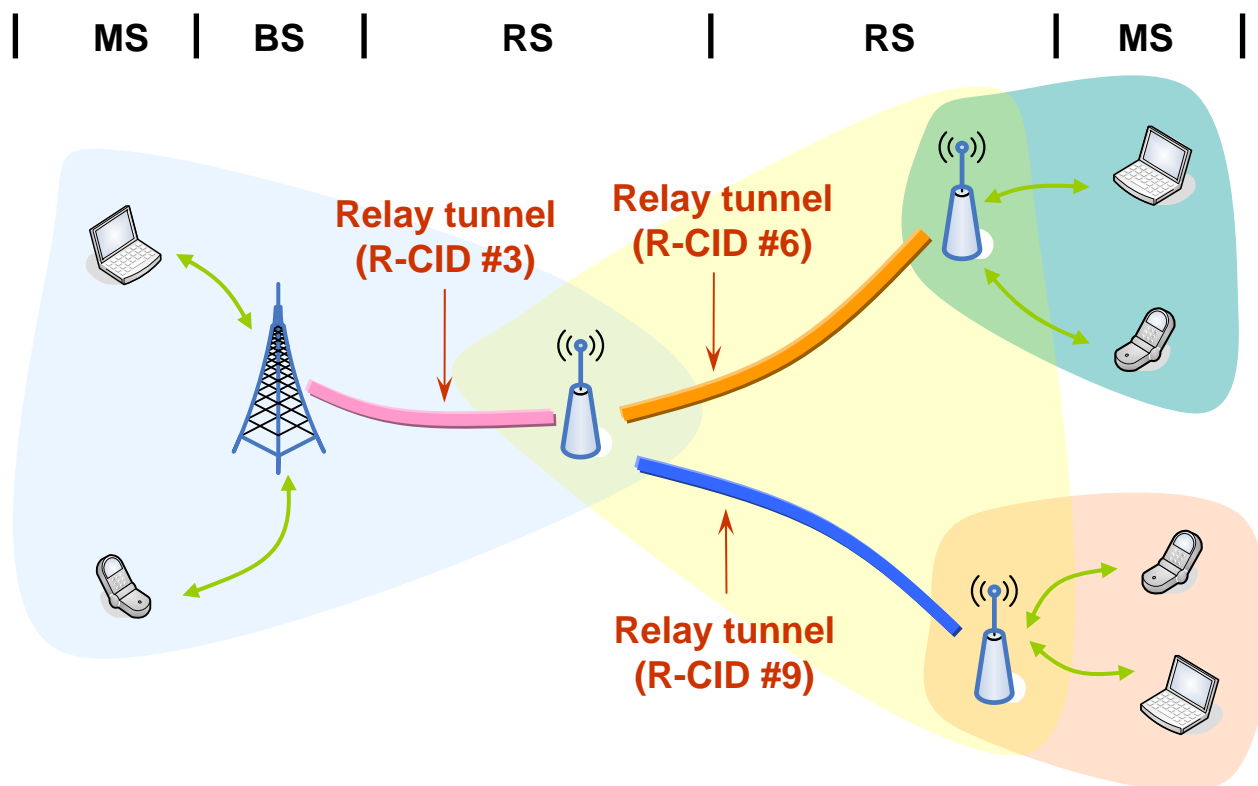
2478501, Japan

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.



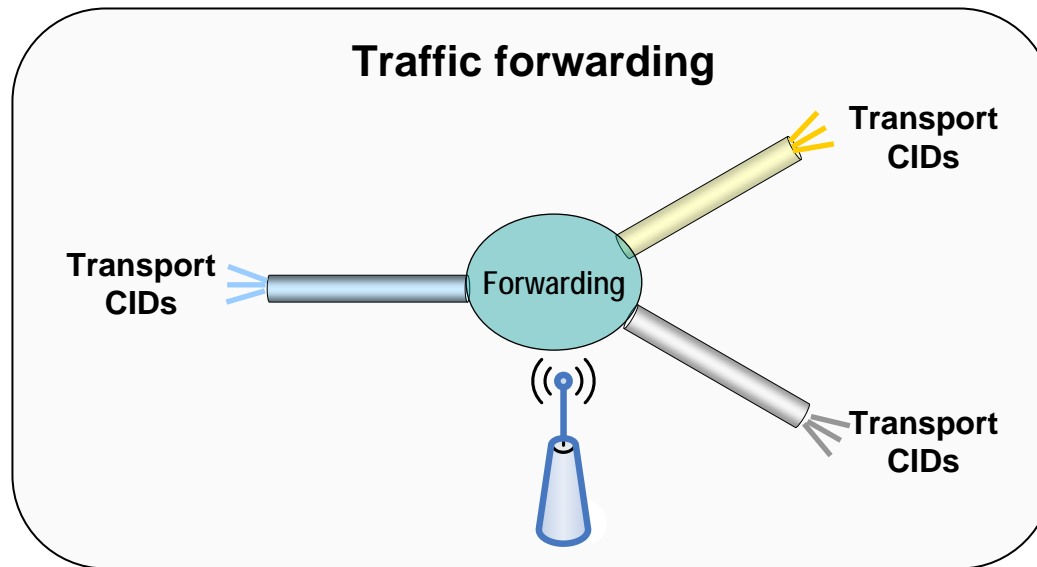
Relay Tunnel Connection

- 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**

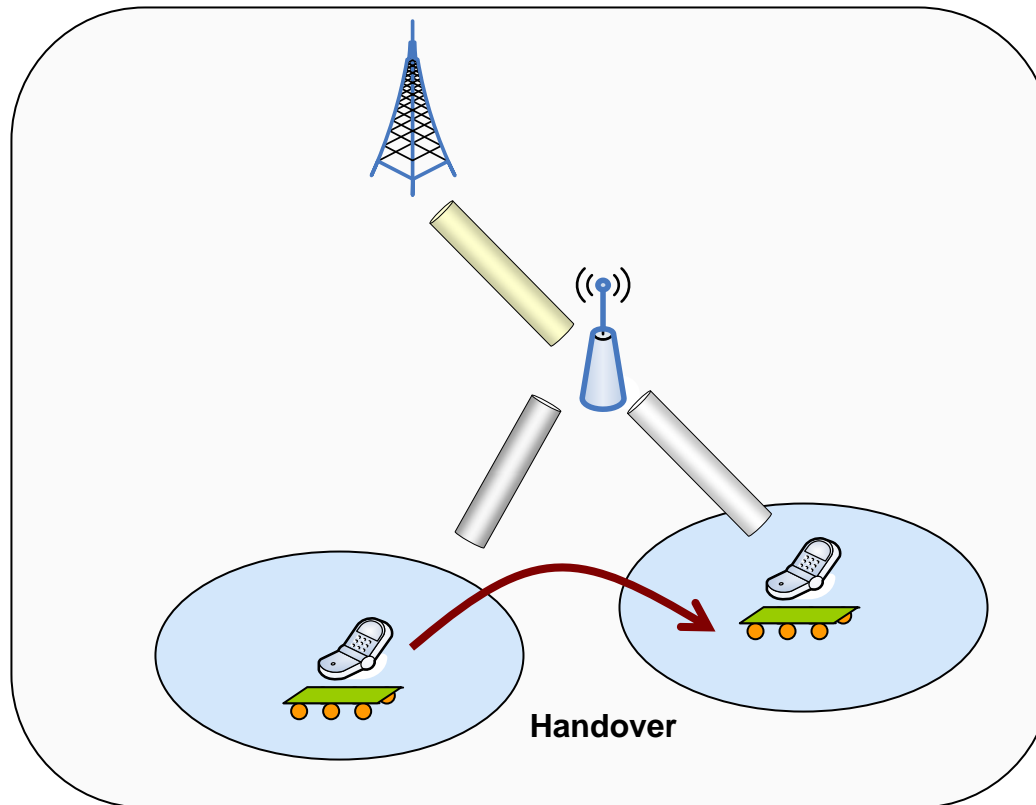
Relay Tunnel Connection

- 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.

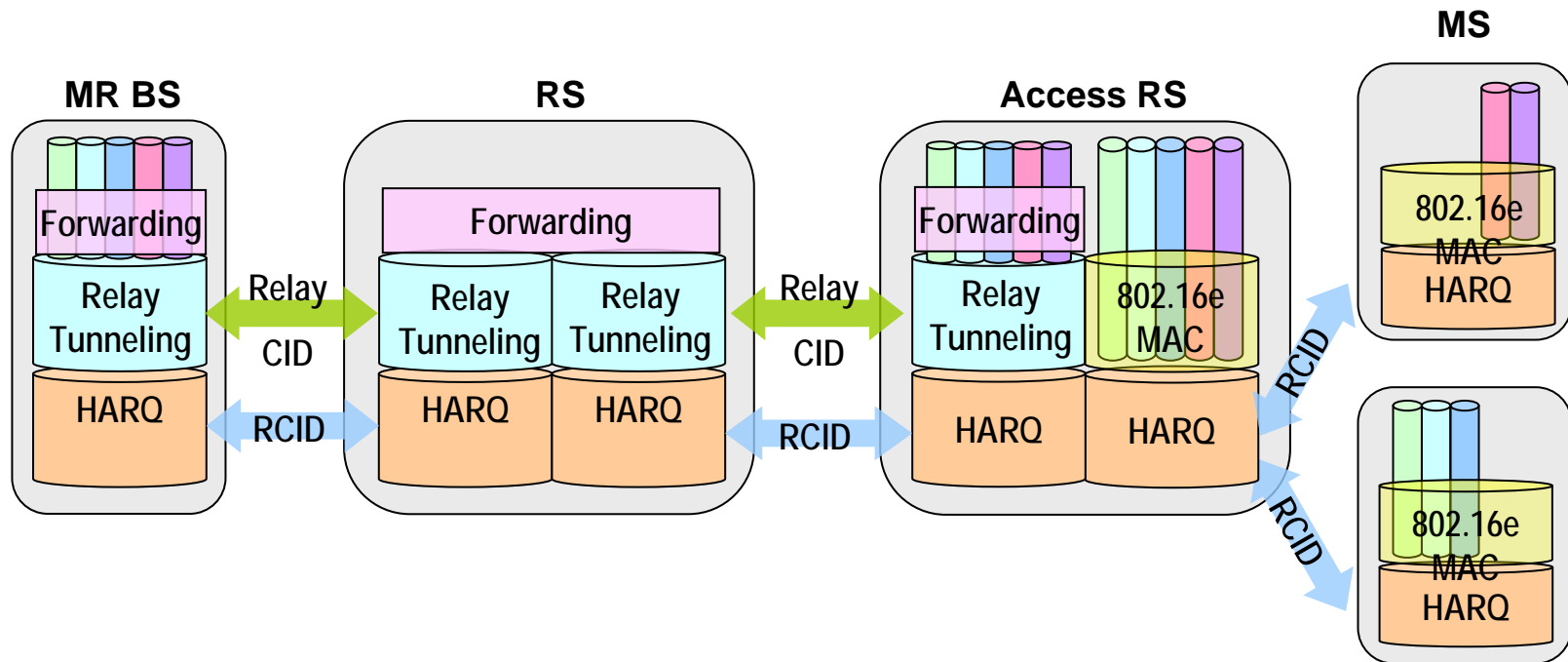


Relay-CID (R-CID)

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

CID	Value	Description
<i>Relay CID</i>	$n+1-k$	<i>Used by MMR-BS or RS for relay packets</i>
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.*

