
Title: Seamless Mac Handover

Date Submitted: 2004-11-04

Source(s):
Min-Sung Kim, Yongjoo Tcha, Seong-Choon Lee
KT
17 Woomyeon-dong, Seocho-gu, Seoul, 137-792, Korea
Voice: +82-2-526-6109
Fax: +82-2-526-5200
mailto: cyberk@kt.co.kr

Seung-Hun Oh, Young-Han Kim
SoongSil University
Sangdo-dong, Dongjak-Gu, Seoul, 156-743, Korea
Voice: +82-2-814-0151
mailto: yhkim@dcn.ssu.ac.kr

Re: IEEE P802.16e/D5-2004

Abstract: To prevent the loss of the PDUs at the serving BS during MAC hand-over.

Purpose: Discuss and adopt the suggestion into P802.16e/D6.

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.

Patent Policy and Procedures:
The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures (Version 1.0) <http://ieee802.org/16/ipr/patents/policy.html>, including the statement “IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing 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:r.b.marks@ieee.org> as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>. 
Seamless Mac Handover

Min-Sung Kim, Yongjoo Tcha, Seong-Choon Lee
KT

Seung-Hun Oh, Young-Han Kim
SoongSil University

1. Introduction

According to 802.16e, the serving BS will discard MAC PDUs associated with the MSS if one of two conditions is met: when the serving BS receives a MOB_HO-IND MAC management message with the HO_IND_type value indicating serving BS release with expiration of the resource retain timer, and when it receives backbone message from the Target BS indicating MSS Network Attachment at Target BS. However to achieve Seamless Mac handover for the strict requirement of QoS, any PDUs should not be dropped explicitly. Currently, in IEEE802.16e/D6, there is not any description of how to redirect (forward) these PDUs to the target BS so as to prohibit the loss. In this contribution, thus, we propose to make it clear when and how to forward the PDUs to the target BS.

2. Proposed Enhancements

When the serving BS receives MOB_HO-IND MAC management message from the MSS and backbone message from the target BS indicating MSS Network Attachment at Target BS, it already knows the final target BS to which the PDUs associated with the MSS should go through backbone network. Therefore, it is possible for the serving BS to forward the PDUs instead of discarding them.

Then, the proposed mechanism is as follows: whenever the serving BS is certain that the MSS is handover to the final target BS for the MSS by receiving MOB_HO-IND MAC, it tunnels these PDUs to the target BS. For this operation, IP tunneling mechanisms, such as generic routing encapsulation (GRE) [2], can be used at each BS, due to its simplicity.

This seamless MAC HO must not be always applied. It can be optionally chosen to work according to the quality of service by either the MSS or serving BS. Thus, when the MSS decides the seamless MAC HO, then it must indicate within MAC management messages such as MOB_MSSHO-REQ and MOB_MSSHO-RSP. Here are some example operations below.

Even though this operation is enabled, other operations are the same.
Fig. 1 Example Seamless MAC HO process by BS request
Fig. 2 Example Seamless MAC HO process with MSSs Resource Retain by BS Request
3. Proposed Changes

[Modify the table 106k by inserting one parameter after line 56 on Page 78]

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOB-MSSHO-REQ_Message_Format() {</td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>HMAC Tuple</td>
<td>21 bytes</td>
<td>See 11.1.2</td>
</tr>
<tr>
<td>Seamless HO</td>
<td>1 bit</td>
<td>Indicates if the serving BS can discard PDUs associated with the MSS or not.</td>
</tr>
<tr>
<td>}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Insert the following text after line 14 on page 79]

**Seamless HO**

It indicates whether the serving BS can tunnel the PDUs, associated with the MSS which is about to handover to the target BS, toward the target BS. When it is set 1, it means that it will support Seamless MAC HO.

[Insert the following text after line 46 on page 119]

When Seamless HO is set to work, the serving BS must forward all PDUs associated with the MSS to the target BS using IP tunneling mechanism through backbone network.

[In Page 119, line 38, change the context as below]

After the hand-over request/response handshake has completed, the MSS may begin the actual HO. At some stage during the HO process, the MSS terminates service with the serving BS. This is accomplished by sending a MOB_HO-IND MAC Management message with the HO_IND_type value indicating serving BS release. **In case the serving BS has received the MOB-MSSHO-REQ MAC management message with Seamless HO set before, it should forward the PDUs associated with the MSS to the target BS. For this operation, IP tunneling mechanisms, such as generic routing encapsulation (GRE), can be used at each BS, due to its simplicity.**

If the HO_IND_type field specifies Serving BS release, the BS shall start the Resource retain timer. If the resource retain type value is set to zero and the MOB-MSS-REQ MAC management message with Seamless HO set has been received before, the Serving BS shall close all connections and discard MAC state machines and MAC PDUs associated with the MSS immediately, otherwise the Serving BS shall retain the connections, MAC state machine and PDU associated with the MSS for service continuation until the expiration of Resource retain timer.

Reference
