Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Changes on 802.16e Working Document for IP Address Allocation by Mobile IP**
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Re:	This is a response to a Call for Comments IEEE 802.16e-03/18 on IEEE 802.16e-03/07r3
Abstract	This document contains suggestions on the changes in IEEE 802.16e-03/07r3 that would help IP address allocation in Mobile IP Registration procedure.
Purpose	The document is submitted for review by Handoff/Sleep mode Ad Hoc Group and/or by 802.16 Working Group members
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Changes on 802.16e Working Document for

IP address Allocation by Mobile IP

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1. Introduction

IEEE 802.16e uses dynamic host configuration protocol (DHCP) in order to allocate IP addresses to mobile SSs (MSSs) and aims at providing mobility between BSs (i.e., inter-BS handoff) using Mobile IP. However, when an MSS which has obtained an IP address by DHCP performs the inter-BS handoff, an ongoing session is disconnected due to the inherent lack of mobility of DHCP address allocation. If Mobile IP handoff between BSs should be supported, a dynamic address allocation by the Mobile IP [IETF RFC 3344] has to be used instead of DHCP-based address allocation. In this contribution, in addition to the IP address allocation by DHCP, which is already proposed by the IEEE 802.16e for fixed SSs, we newly propose an additional IP allocation scheme based on Mobile IP for MSSs.

We also propose that the secondary management connection is used for transferring Mobile IP messages as in DHCP message transmission. In this case, when an MSS performs inter-BS handoff, the proposed method can reduce handoff delay as well as the number of CIDs because there is no need of additional transport connections for Mobile IP messages.

This Document describes changes suggested for 802.16e Working Document IEEE 802.16e-03/07r3 to allocate IP address by Mobile IP.

The following are main issues:
1. For IP address allocation by Mobile IP, secondary management connection is used by BS and MSS to transfer Mobile IP message;
2. To distinguish between IP address allocation by Mobile IP and by DHCP, a flag for IP allocation by Mobile IP is defined in IP version parameter in REG-REQ MAC message;
3. Mobile IP procedure to establish IP connectivity via Mobile IP is added;
4. Mobile IP configuration information for MSS is added.

2. Changes in IEEE 802.16e

[in 6.2.1]
Replace
    "Finally, the Secondary Management Connection is used by the BS and MSS to transfer delay tolerant, standard based (Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), SNMP, etc.) management messages."
to
    "Finally, the Secondary Management Connection is used by the BS and MSS to transfer delay tolerant, standard based (Dynamic Host Configuration Protocol (DHCP), Mobile IP, Trivial File Transfer Protocol (TFTP), SNMP, etc.) management messages."

[in 6.2.9.9.1]

6.2.9.9.1   IP Version Negotiation

Replace

   "The SS may include the IP Version (11.4.1.7) parameter in the REG-REQ to indicate which versions of IP it supports on the Secondary Management Connection. When present in the REG-REQ, the BS shall include the IP Version parameter (11.4.1.7) in the REG-RSP to command the SS to use the indicated version of IP on the Secondary Management Connection. The BS shall command the use of exactly one of the IP versions supported by the SS."

to

   "The SS may include the IP Version (11.4.1.7) parameter in the REG-REQ to indicate which versions of IP it supports on the Secondary Management Connection. When present in the REG-REQ, the BS shall include the IP Version parameter (11.4.1.7) in the REG-RSP to command the SS to use the indicated version of IP and/or Mobile IP on the Secondary Management Connection. The BS shall command the use of exactly one of the IP versions supported by the SS.

   IP Version parameter consists of the bitmap-fields; IPv4, IPv6, or Mobile IPv4."

[Add Under 6.2.9.10.1]

6.2.9.10.1   Establish IP Connectivity via Mobile IP Registration

   At this point, the Foreign Agent (FA) shall invoke Agent Advertisement message, and then the MSS shall invoke Mobile IP registration [IETF RFC 3344] in order to obtain an IP address and any other parameters needed to establish IP connectivity. The Mobile IP registration response message shall contain the MSS's IP address and a home agent address of the MSS and other configuration information. Establishment of IP connectivity shall be performed on the MSS's Secondary Management Connection ; see Table 62-b

Table 62-b   – Mobile IP Registration
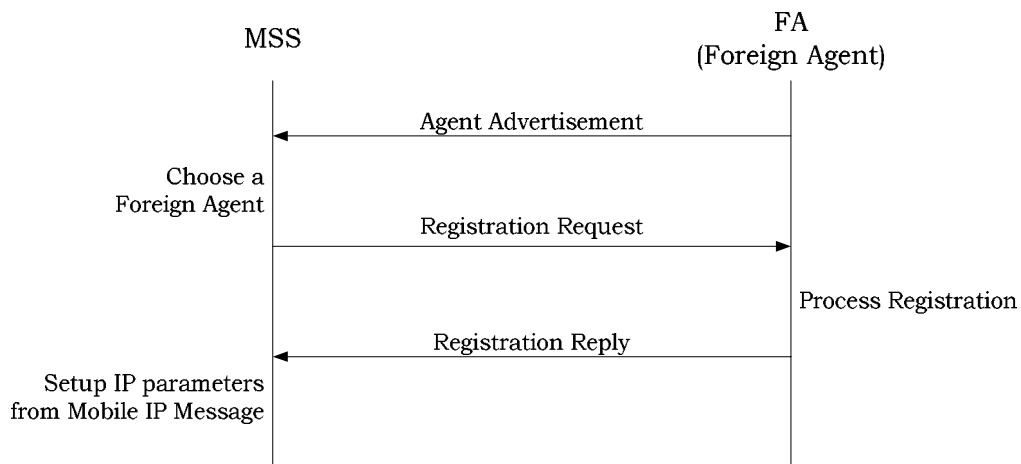
[Add Under 9.1]

9.2 Mobile IP Configuration

9.2.1 Mobile IP fields used by the MSS

The following fields shall be present in the Mobile IP registration request from the MSS and shall be set as described below and encoded according to IETF RFC 3344.

a) When the MSS (or Mobile Node (MN)) attempts to obtain an IP address dynamically, home address field shall be set to "0.0.0.0".

b) When the MSS (or MN) attempts to obtain an IP address in the visited network, the home agent address field shall be set to "0.0.0.0". On the other hand, when the MSS (or MN) attempts to obtain an IP address in the home network, the home agent address field shall be set to "255.255.255.255".

c) The Network Access Identifier (NAI) extension [IETF RFC 2789] shall be included for identifying the Mobile IP user.

d) The Challenge extension shall be included [IETF RFC 3012], if the Challenge extension is included in the Agent Advertisement message.

e) A 128-bit key may be shared between an MSS (or MN) and an AAA server during the initial Mobile IP registration, and the MSS (or MN)-AAA Authentication extension may be generated based on the shared key [IETF RFC 3012].

The following fields are expected in the Mobile IP registration response returned to the MSS. The MSS shall configure itself based on the Mobile IP registration response

a) The home address to be used by the MSS;

b) The MSS's NAI extension to identify a Mobile IP user [IETF RFC 2789];

c) The challenge extension if the foreign agent supports more strong security;

d) The MSS (or MN) and home agent authentication extension for authenticating the home agent;

e) The key reply extensions for security between the MSS and the HA, and between the MSS and FA, if the MSS requests keys between the MSS and the HA, and between the MSS and the foreign agent.

[in 11.4.1.7]
Replace

Type	Length	Value	Scope
5.9	1	bit #0: IPv4 bit #1: IPv6 bit#2-7:reserved; shall be sent to zero	REG-REQ, REG-RSP

to

Type	Length	Value	Scope
5.9	1	bit #0: IPv4 bit #1: IPv6 bit #2: Mobile IPv4 bit#3-7:reserved; shall be sent to zero	REG-REQ, REG-RSP