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Re:	Contribution on comments to IEEE P802.16e/D5
Abstract	In this contribution, we newly define a IP management CID to support the managed/unmanaged MSS should provide the IP management messages consistently and effectively.
Purpose	Adoption
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Enhancement of the Usage of Secondary Management Connection

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ETRI

1. Introduction

Current mechanism of the IP address management of the MSS has some problems. In the last meeting in Seoul, comment #580 for slightly change the usage of the Secondary management connection was adopted as the followings:

"Finally, the Secondary Management Connection is may be used by the BS and MSS to transfer delay tolerant, standard-based [Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), SNMP, ~~Mobile IP, Router Advertisement~~, etc.] management messages. These management messages are terminated at the MSS."

Thus, it can be considered as a Mobile IP and Router Advertisement messages cannot be transmitted on the secondary management connection. But, there is no reason for prohibiting to use the secondary management connection for Mobile IP and Router Advertisement messages.

Some people say that the secondary management connection can be used only for the standard IP-based external management of the subscriber station (i.e., SNMP). And the user traffic IP management should be used by Transport connections after the DSx procedures.

Figure 1 shows that approach to the usage of secondary management connection.

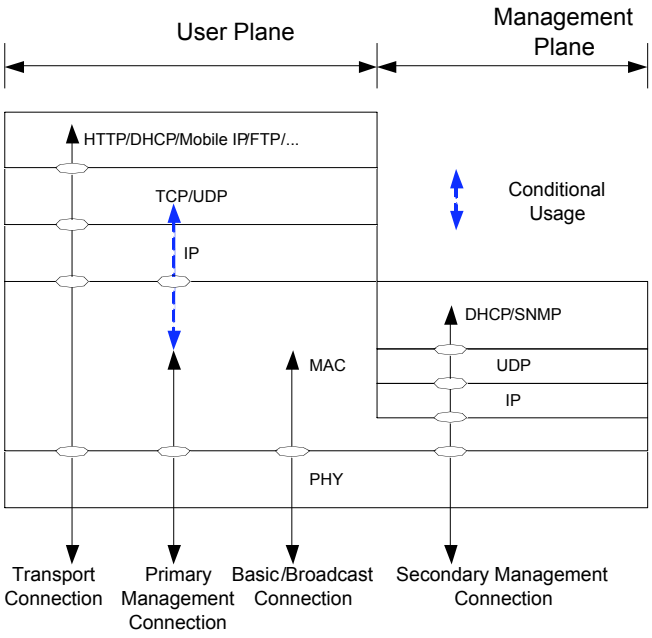

Figure 1. Usage of secondary management connection (1)
- Separate layered-structure of SS management

As you can see in Figure 1, the secondary management connection can be used only for the external management of the subscriber station (SNMP, and DHCP for IP address allocation for the SS). The IP address for the SS management is allocated via the DHCP on the secondary management connection. The Mobile IP or other IP layer protocols use the transport connection after the DSX procedures. And, the IP address for the user traffic transport can be allocated via the DHCP or Mobile IP on the (default) transport connection. Thus, there exists two different IP address allocation protocols, one for the SS management and the other for the IP traffic management.

But, this approach has a protocol layer violation because the IP layer protocols embedded in the MAC layer for the management purpose. And, the DSX procedure is always needed to perform the IP connectivity management. If we follow this approach of using the default transport connection, then the CID shall be notified before it is used. Therefore, I insist on pre-allocation of the (default) transport connection ID is required if we support the user traffic IP management using the (default) transport connection.

Figure 2 shows a second alternative for the usage of the Secondary Management Connection. In this approach, the user traffic IP management and the SS management are carried on using the secondary management connection.

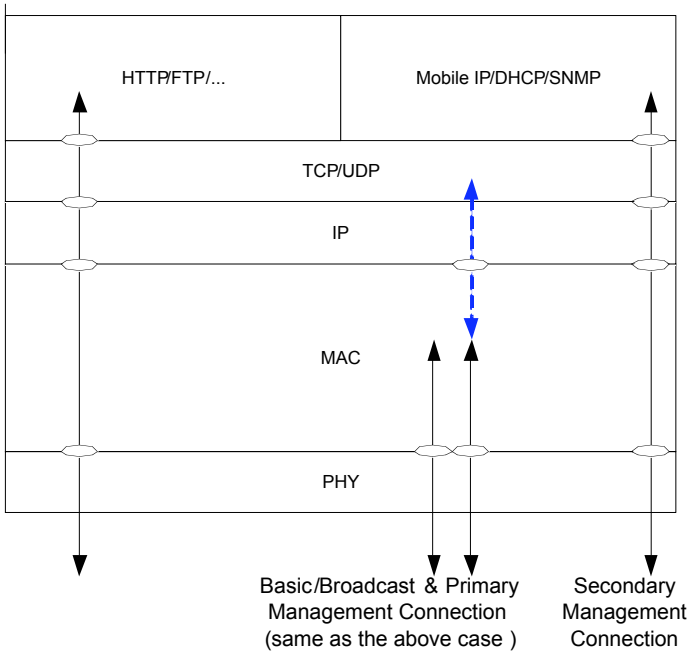

Figure 2. Usage of secondary management connection (2)
- Sharing of secondary management connection with SS management and the user traffic IP management

As we can see in this figure, the secondary management connection can be shared with the SS management (SNMP) and the user traffic IP management (MIP/DHCP). These protocols can be distinguished by protocol field (UDP/TCP, …) and port number (SNMP/DHCP/MIP, …) in IP header. In this case, the IP interface for the SS management

and the user traffic IP management is shared between them. So, the same IP address is used and the packets for them can be distinguished and used by different applications.

In other part (see section 9.1.2, 11.3.3.) of the current P802.16e/D5 specification, it is described as this second approach can be supported. So, using the secondary management connection the Mobile IP messages (RFC 3344) can be transmitted for using the user traffic IP management. This scheme is better than the first one on the point of the compatibility of the protocol layers (not having embedded IP layer in the MAC layer) and the same IP interface can be shared between IP-based SS management and the user traffic IP management.

But there is one problem on this approach. In the case of unmanaged SS (negotiated during the REG-REQ/RSP procedure), the secondary management connection can not be allocated and used by the SS, so the user traffic IP management on the secondary management CID can not be supported. (But, on some point of view, we can see that is the case of the higher layer application is not the TCP/IP but the Ethernet, so the IP address allocation is not required anyway.)

Another alternative is that we have to admit all the current problems in the 802.16 specification as it is, and to allocate the IP address for the user traffic for the unmanaged SS case, then the new CID (we call it a *IP management CID;* as a *unicast connection* for the SS) allocation is required in the same way as it is done to the secondary management CID. Thus the usage of the "IP management CID" can be negotiated on the REG-REQ/RSP step, and the "IP management CID" is allocated on the REG-RSP message in the case of it is supported. Then the IP management connection shall be used for the user traffic IP management if it is negotiated to support, and the the secondary management connection shall be used only for the SS management purposes. In Figure 3, the description for separating the user traffic IP management and the SS management, and newly define a new "IP management CID."

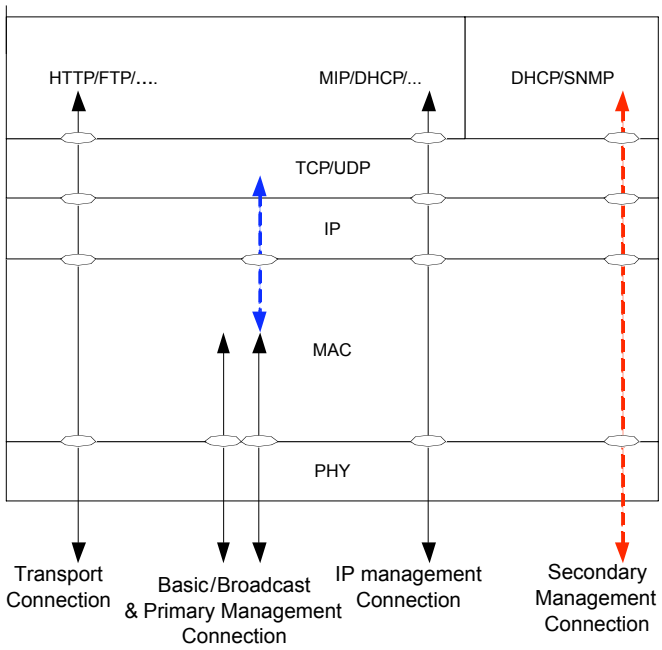

Figure 3. Usage of secondary management connection (3)
- Separating the use of secondary management connection for SS management and IP management connection for the user traffic IP management

The third approach needs to define a new CID (IP management connection) for each SS negotiated to support and use the secondary management connection only for the SS management. In this scheme, there is no problem on the protocol layer violation and the duplicated implementation of IP and upper layers. And, it can be supported by both the managed SS and the unmanaged SS. For the unmanaged SS, the secondary management connection (red line) is not exist, but the SS can provide the user traffic IP management using the IP management connection.

The only thing we do in this alternative is that "to define a IP management connection." The usage of the "IP management connection" is negotiated on the REG-REQ/RSP step, and the corresponding CID is allocated on the REG-RSP message, as in the case of secondary management connection.

2. Proposed Text Changes

[*Modify the corresponding sections as follows:*]

[In P802.16e/D5, Section 3.5.4, p. 9, line 18-19:]
3.5.4 Anchor BS:
Anchor BS should allocate resources to the MSS, i.e. assigned Basic CID, Primary Management CID, Secondary Management CID, IP management CID and data CIDs to the MSS.

[In P802.16e/D5, Section 3.7.7, p. 10, line 5-6:]
3.77 active BS: An Active BS may allocate resources to the MSS, i.e. assigned Basic CID, Primary Management CID, Secondary Management CID, IP Management CID and data CIDs to the MSS.

[In P802.16e/D5, Section 6.3, p. 13, line 9-12, modify the existing text in section 6.3.1.1 as shown below:]
6.3 Data/Control Plane
~~Finally, t~~The Secondary Management Connection is used by the BS and MSS to transfer delay tolerant, standards-based [Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), SNMP, etc.] messages. Finally, the IP Management Connection is used by the BS and MSS to transfer standard-based IP management [Mobile IP, Router Advertisement, etc.] messages.

[In P802.16e/D5, Section 6.3.2.3.43.3, p. 31, line 40-41, modify the existing text in section 6.3.2.3.43.3 as shown below:]
6.32.3.43.3 Reduced CID
The reduced CID can not be used instead of transport CID, primary management CID, IP management CID or secondary management CID.

[In P802.16e/D5, Section 6.3.9.10, p. 92, line 43-54, modify the existing text in section 6.3.9.10 as shown below:]

6.3.9.10 Establish IP Connectivity

For an MSS, if mobile IP is being used, the MSS may secure it's address on the ~~secondary~~ IP management connection using mobile IP.

Otherwise, for fixed SS and for MSSs using IPv4 and not using mobile IP, At this point, the SS/MSS shall invoke DHCP mechanisms [IETF RFC 2131] in order to obtain an IP address and any other parameters needed to establish IP connectivity. If the SS has a configuration file, the DHCP response shall contain the name of a file which contains further configuration parameters. For fixed SS and for MSSs using IPv6, the SS/MSS shall either invoke DHCPv6 [IETF RFC 3315] or IPv6 Stateless Address Autoconfiguration [IETF RFC 2462] based on the value of a TLV tuple in REG_RSP. Establishment of IP connectivity shall be performed on the SS's ~~Secondary~~ IP Management Connection; see Table 94.

[In P802.16e/D5, Section 10.4, p. 274, line 37-60, modify the existing text in Table 343 as shown below:]

Table 343 CIDs

CID	Value	Description
Initial Ranging	0x0000	Used by SS and BS during initial ranging process.
Basic CID	0x0001 – m	The same value is assigned to both the DL and UL connection.
Primary management	m+1 – 2m	The same value is assigned to both the DL and UL connection.
Transport CIDs, IP Management CIDs, and Secondary Mgt CIDs	2m+1 – 0xFE9F	For the secondary management connection, the same value is assigned to both the DL and UL connection. For the IP management connection, the same value is assigned to both the DL and UL connection.
Multicast CIDs	0xFEA0 – 0xFEFE	For the downlink multicast service, the same value is assigned to all MSSs on the same channel that participate in this connection.
AAS initial ranging CID	0xFEFF	A BS supporting AAS shall use this CID when allocating a Initial Ranging period for AAS devices.
Multicast polling CIDs	0xFF00 – 0xFFFD	A BS may be included in one or more multicast polling groups for the purposes of obtaining bandwidth via polling. These connections have no associated service flow.
Padding CID	0xFFFE	Used for transmission of padding information by SS and BS.
Broadcast CID	0xFFFF	Used for broadcast information that is transmitted on a downlink to all SS.

[In P802.16e/D5, Section 11.7.6, p. 286, line 20-24, modify the existing text in section 11.7.6 as shown below:]

11.7.6 Number of CID supported

This field shows the number of Uplink and downlink CIDs the MSS can support. The minimum value in the uplink is three for managed SSs and two for unmanaged SSs. An MSS shall support a Basic CID, a Primary Management CID, and 0 or more Transport CIDs. A managed MSS shall also support a Secondary Management CID. IP management supported MSS shall also support a IP Management CID.

[In P802.16e/D5, add the Section 11.7.9 as shown below:]

11.7.9 IP management Support

This field indicate whether or not the MSS's IP address is managed by standard-based IP [such as Mobile IP, etc.] messages over the IP management connection. When the MSS indicates in the REG-REQ that it is IP managed, the BS and MSS shall use this connection for handshaking the IP management messages.

Type	Length	Value	Scope
18	1	0: no IP management connection 1: IP management connection	REG-REQ REG-RSP

[In P802.16e/D5, Modify the text from the IEEE Std. 802.16-2004, Section 6.3.2.3.7, p. 52, line 7-11; modify the existing text in section 6.3.2.3.7 as shown below:]

6.3.2.3.7 Registration request (REG-REQ) message

For PMP operation, the REG-REQ shall contain the following TLVs:

Uplink CID Support (11.7.6)
SS management support (11.7.2)
IP management mode (11.7.3)
IP management support (11.7.9)

[In P802.16e/D5, Modify the text from the IEEE Std. 802.16-2004, Section 6.3.2.3.8, p. 53, line 10-18; modify the existing text in section 6.3.2.3.8 as shown below:]

6.3.2.3.8 Registration response (REG-RSP) message

The REG-RSP shall contain the following TLVs:

SS management support (11.7.2)
Response to REG-REQ indicating the mode of SS management operation.
Secondary Management CID (11.7.5)
Present only if the SS has indicated in the REG-REQ that it is a managed SS.
IP Management CID (11.7.9)
Present only if the MSS has indicated in the REG-REQ that it is IP management supported.
HMAC Tuple (11.1.2)
The HMAC Tuple attribute shall be the final attribute in the message's TLV attribute list.
In Mesh Mode, message digest is calculated using HMAC_KEY_D.

[In P802.16e/D5, add the Section 11.7.10 as shown below:]

11.7.10 IP Management CID

This parameter contains the IP Management CID issued to an MSS .

Type	Length	Value	Scope
19	2	IP Management CID	REG-RSP