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Re:	Call for Technical Proposals regarding IEEE Project P802.16j (IEEE 802.16j-06/034)
Abstract	Using CIDs for addressing and multihop forwarding in the P802.16j context.
Purpose	Adoption of proposed text into P802.16j

Connections in a Multihop Relay Network

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1 Introduction

This contribution proposes a method of assigning CIDs to stations in a multihop relay (MR) network. This proposal also elaborates on how CIDs are used in addressing and multihop message forwarding in a MR network.

In order to facilitate the incorporation of this proposal in to IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026 are listed in Section 4.

2 General Description

In the current IEEE 802.16 standards, CIDs are 16-bit numbers used to identify connections between the BS and the MS. This proposal uses the same CIDs to identify connections between the MR-BS and the RS, the BS and the MS and the RS and the MS.

The different types of CIDs are listed in Table 345 of IEEE 802.16e-2005 document. This proposal reuses the same set of CIDs for a MR enabled network.

CIDs are unique in a MR cell.

2.1 CID Ownership

The MR-BS partitions its pool of basic CIDs and primary management CIDs and allots unique subsets of these CIDs to individual RSs that are associated to it so that the RSs may assign them to other RSs and MSs that enter the MR-cell through them.

The MR-BS allots a unique pool of basic CIDs and primary management CIDs to a RS during RS network entry. A RS further allots a subset of the received management CIDs to subordinate RSs. The messaging involved in making this assignment is described in C80216j-06_281r1.

The MR-BS or RS can allot additional basic CIDs and primary management CIDs to a RS at any time during the lifetime of the RS. An RS can request the BS or parent RS for additional allotment of basic CIDs and primary management CIDs.

The MR-BS retains ownership of the transport CIDs and the secondary management CIDs. Transport CIDs are assigned by the MR-BS to all MSs in its MR cell. Secondary management CIDs are assigned by the MR-BS to all managed MSs and RSs in its MR cell.

2.2 CID Assignment

2.2.1 Basic CID and Management CID Allocation

Basic CIDs and primary management CIDs are assigned to RSs and MSs during network entry. Optionally, secondary management CIDs may also be assigned to RSs and MSs during network entry. For both RSs and MSs, the secondary management CIDs are assigned directly by the MR-BS.

2.2.1.1 CID Assignment for RSs

A RS is assigned a basic CID and a primary management CID during network entry. A RS is also optionally assigned a secondary management CID during network entry.

The basic and primary management CIDs are assigned by the RS's access station. These CIDs are assigned from the unique pool of CIDs earmarked for assignment by the access station providing network entry. These CIDs are assigned using the RNG-RSP message transmitted by the access station providing network entry.

The MR-BS directly assigns the secondary management CID for managed RSs entering the network using the REG-RSP message.

Additionally, if the access station is an RS, it sends the Station Information MAC management message (STA-INFO) to the MR-BS informing it of the basic and primary management CID assignments. The MR-BS acknowledges the assignments by sending a station acknowledgement MAC management (STA-ACK) message on the downlink towards the access station.

RSs on the path between the MR-BS and the access RS providing network entry may learn of the basic and primary management CID assignments from the STA-INFO message. They may also learn of the secondary management CID assignments from the REG-RSP message sent by the MR-BS.

Learning of downstream CIDs through the STA-INFO and REG-RSP facilitates the process of multihop management MPDU forwarding in the MR network. This is elaborated in section 3, by means of an example.

2.2.1.2 CID Assignment for MSs

A MS is assigned a basic CID and a primary management CID during network entry. A MS is also optionally assigned a secondary management CID during network entry.

A MS is assigned the basic and primary management CIDs by its access station. These CIDs are assigned from the unique pool of CIDs earmarked for assignment by the access station providing network entry. These CIDs are assigned using the RNG-RSP message transmitted by the access station providing network entry.

The MR-BS directly assigns the secondary management CID for managed MSs entering the network using the REG-RSP message.
Additionally, if the access station is an RS, it sends the STA-INFO message to the MR-BS informing it of the basic and primary management CID assignments. The MR-BS acknowledges the assignment by sending the STA-ACK message on the downlink towards the access station.

RSs on the path between the MR-BS and the access RS providing network entry may learn of the basic and primary management CID assignments from the STA-INFO message. They may also learn of the secondary management CID assignments from the REG-RSP message sent by the MR-BS.

Learning of downstream CIDs through the STA-INFO and REG-RSP facilitates the process of multihop management MPDU forwarding in the MR network. This is elaborated in section 3, by means of an example.

2.2.2 Transport CID Allocation

For bearer services, MSs are assigned transport CIDs by the MR-BS. In the case of MR-BS initiated DSA, transport CIDs may be assigned using the DSA-REQ message. In the case of MS initiated DSA transport CIDs may be assigned using the DSA-RSP messages. These messages are transmitted by the MR-BS.

RSs on the path between the MR-BS and the access RS providing network entry may learn of the transport CID assignments and the corresponding service flow parameters from the DSA-REQ and DSA-RSP messages.

Learning of downstream transport CIDs through the DSA-REQ and DSA-RSP facilitates the process of multihop bearer data MPDU forwarding in the MR network. This is elaborated in section 3, by means of an example.

2.3 CID Usage in MPDU Transmission and Forwarding

2.3.1 DL MPDU Transmission and Forwarding

In order to transmit a packet on the downlink, the MR-BS must first determine the CID of the appropriate connection to the destination. The destination could be a RS or a MS.

For the transmission of downlink traffic, both bearer data and management, the MR-BS creates an MPDU with the destination's appropriate CID in the generic MAC header's CID field. The MR-BS additionally determines which station is the next hop towards the destination and schedules the transmission of a DL burst towards the next hop station. In the DL-MAP message the MR-BS includes a DL_MAP_IE for this burst with the CID of the next hop station. The MR-BS transmits the MPDU in this DL burst.

A RS receives and decodes any DL bursts scheduled for its CIDs in the DL-MAP. Upon receiving the burst, the RS processes MPDUs received in the burst, based on the CID field in the MPDU's generic MAC header. If the CID identifies one of the RS's connections, the RS process the MPDUs locally. (Note that receiving certain MAC management messages might prompt the RS to generate and transmit another MPDU with at least some of the contents of the received packet. Such protocol behavior will have to be defined by the TG based on the specific protocol objectives of individual MAC management messages.)

If the CID identifies a management connection to a station downstream from the RS, and the MPDU is unencrypted, the RS process the payload to determine if the message is of interest. Thereafter, it forwards the received MPDU to the next hop towards the destination with the originally received CID in the header. In the DL-MAP message, the RS includes a DL_MAP_IE for this burst with the CID of the next hop station.

If the CID in a received MPDU identifies a transport connection, the RS simply forwards the MPDU. When forwarding a MPDU received on a transport CID, the RS maintains the CID field in the generic MAC header as received. The RS additionally determines the next hop towards the destination (that is identified by the CID in the generic MAC header), and schedules the transmission of a DL burst towards the next hop station. In the DL-MAP message, the RS includes a DL_MAP_IE for this burst with the CID of the next hop station.

2.3.2 UL MPDU Transmission and Forwarding

In order to transmit a packet on the uplink, the RS and the MS must first determine the CID of the appropriate connection to the destination.

A MS transmits bearer data packets using one of its transport CIDs and management messages using either the basic CID or one of the management CIDs. Intermediate RSs, including the access RS are responsible for forwarding MPDUs received from MSs downstream from them. They receive UL bursts transmitted on any of the CIDs assigned to stations accessing the network through them.

When an RS receives UL MPDUs with a transport CID in the CID field of their generic MAC header, the RS schedules the UL transmission of the MPDU retaining the same CID in the generic MAC header. Uplink management messages received over the basic and primary management CIDs are received and processed locally at the access RS. This processing depends on the specific management message, and may involve reading the unencrypted management MPDU to determine if it is a message of interest. There after, the RS forwards the MPDU on the uplink by maintaining the CID value in the MAC header as originally received.

Local processing of specific management messages may also involve generating another MPDU with at least some of the contents from the received packet, and transmitting it on the UL towards the MR-BS. These transmissions are carried over the basic or primary management CID of the RS forwarding the MPDU.

2.4 CID allocation during mandatory handoffs

When a MS switches from one access node to another, it is assigned a new set of CIDs.
When a RS switches from one access node to another, it is assigned a new set of CIDs.
In the case of a intra-MR-cell RS handoff, where a RS switches from one access station to another, stations using this RS as the access node, or downstream from this RS, retain their CIDs.
In the case of a inter-MR-cell RS handoff, where a RS switches from one access station in one MR cell to another access station in another MR cell, stations using this RS as the access node, or downstream from this RS, will be assigned new CIDs.

3 CIDs in an exemplary MR network

This section presents an example to describe the assignment and usage of CIDs in a MR network. The example discussed here will walk through the formation of the network shown in Figure 1. The focus of the discussions is just the use of CIDs. The protocol aspects dealing with the assignment of the CIDs are dealt with in other contributions.

Figure 1 – Exemplary MR network

Step 1: RS1 ranges and registers (Figure 2)
Basic CID assigned by BS to RS1: CID1 (Not shown in Figure 2. Basic CIDs not shown in any figures)
Primary CID assigned by BS to RS1: CID2 (Only primary management CIDs are shown in Figure 2 and other figures)
RS1 initiates registration with the BS using CID2 in the MAC header of the request message
BS registers RS1 and assigns secondary CID if required.

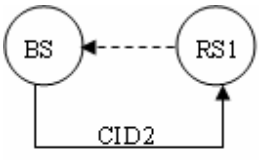

Figure 2 – RS1 is assigned CIDs

Step 2: RS2 ranges (Figure 3)
Basic CID assigned by RS1 to RS2: CID3
Primary CID assigned by RS1 to RS2: CID4

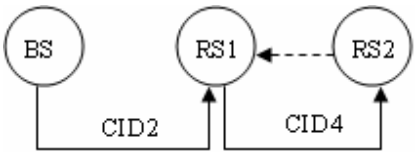

Figure 3 – RS2 is assigned CIDs

Step 3: RS1 informs BS of RS2 (Figure 4)
RS1 generates station information (STA-INFO) message with CID2 in the MAC header. STA-INFO includes CID4 to inform CID4 is assigned to RS2.
BS receives STA-INFO from RS1 with CID2 in MAC header.

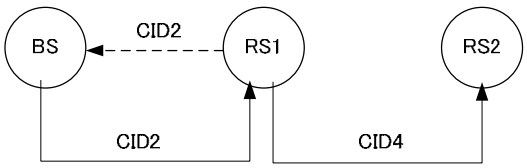

Figure 4 – RS1 informs BS about RS2

Step 4: BS acknowledges presence of RS2 (Figure 5)
BS accepts CID4 and understands that any information (here information refers to primary management message) destined for RS2 should be generated with MAC header carrying CID4 and should be forwarded against DL_MAP-IE record comprising CID2.
BS generates station acknowledge (STA-ACK) message with CID2 in MAC header. BS forwards STA-ACK to RS1 against DL_MAP-IE (CID2)

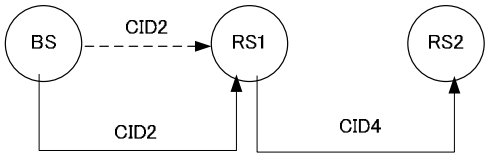

Figure 5 – BS acknowledges RS2

Step 5: RS2 initiates registration (Figure 6)
REG-REQ received at RS1 from RS2 with CID4 in the MAC header
REG-REQ is forwarded from RS1 to BS as it is (CID4 in MAC header)

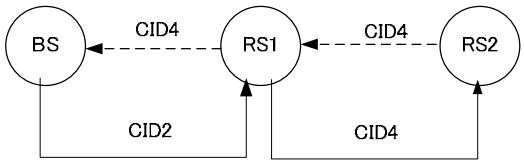

Figure 6 – RS2 initiates registration

Step 6: BS registers RS2 (Figure 7)
BS generates REG-RSP with CID4 in the MAC header and assigns secondary CID if requires for the RS2. BS forward REG-RSP to RS1 against DL_MAP-IE (CID2)
RS1 forwards REG-RSP (CID4 is in the MAC header) to RS2 against DL_MAP-IE (CID4). By reading the REG-RSP message, RS1 learns if additional CID is assigned to RS2.

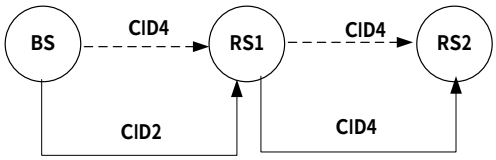

Figure 7 – BS registers RS2

Step 7: BS-to-RS2 end-to-end (ETE) path is set-up (Figure 8)
DL from BS: To reach RS2 transmit to RS1 using CID2 in DL-MAP_IE and use CID4 in the MAC header. At RS1, to reach RS2 use CID4.
UL from RS2: To reach BS, transmit to RS1 using CID4 in MAC header. RS1 forwards message to BS as it is (CID4 is still in MAC header).

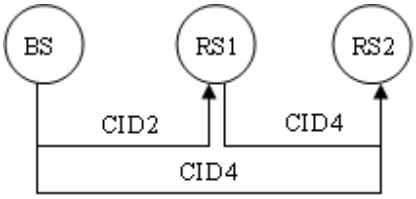

Figure 8 – BS-to-RS2 ETE path setup

Step 8: RS3 ranges (Figure 9)
Basic CID assigned by RS2 to RS3: CID5
Primary CID assigned by RS2 to RS3: CID6

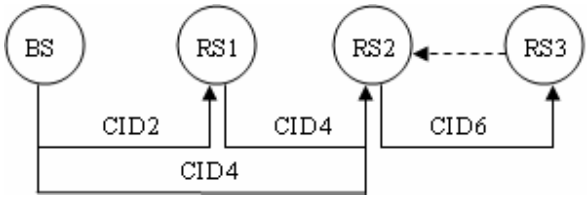

Figure 9 – RS3 ranges

Step 9: RS2 informs BS of RS3 (Figure 10)
RS2 generates STA-INFO message with CID4 in the MAC header. STA-INFO includes CID6 to inform CID6 is assigned to RS3.
RS1 receives STA-INFO from RS2 with CID4 in MAC header.
BS receives STA-INFO from RS1 with CID4 in MAC header

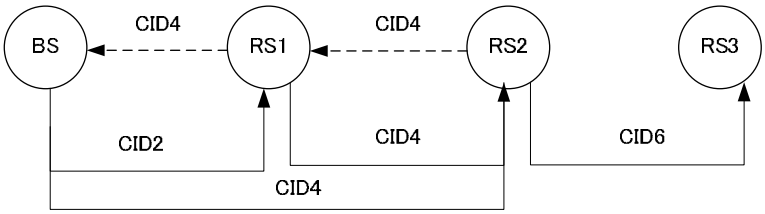

Figure 10 – RS2 informs BS about RS3

Step 10: BS acknowledges RS3 (Figure 11)
BS accepts CID6 and understands that any information (here information refers to primary management message) destined for RS3 should be generated with MAC header carrying CID6 and will be forward against DL_MAP-IE record comprising CID2.

BS generates STA-ACK message with CID4 in MAC header. BS forwards STA-ACK to RS1 against DL_MAP-IE (CID2)
RS1 receives STA-ACK from BS, and understands this acknowledgement refers to the STA-INFO which was received from RS2 and was forwarded to BS. RS1 includes CID6 in the list. Any information (here information refers to primary management message) carried with MAC header of CID6 will be forward against DL_MAP-IE record comprising CID4.

RS1 forwards STA-ACK to RS2 against DL_MAP-IE(CID4)

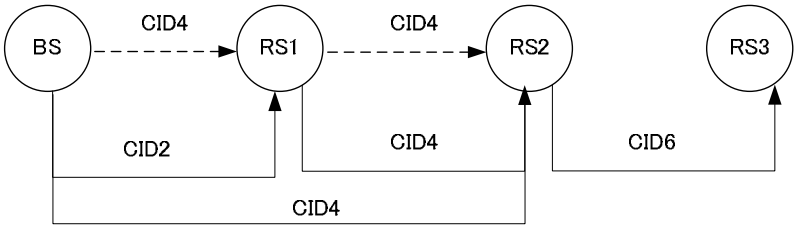

Figure 11 BS acknowledges RS3

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Step 11: RS3 initiates registration (Figure 12)
REG-REQ received at RS2 from RS3 with CID6 in the header
REG-REQ is forwarded from RS2 to RS1 as it is (CID6 in MAC header)
REG-REQ is forwarded from RS1 to BS as it is (CID6 in MAC header)

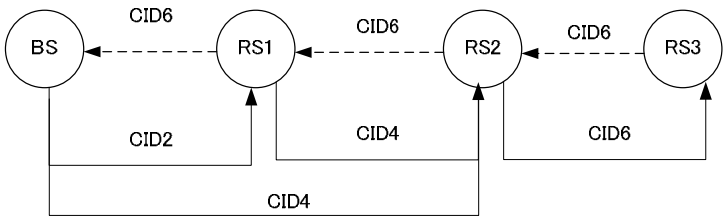

Figure 12 – RS3 initiates registration

Step 12: BS registers RS3 (Figure 13)
BS generates REG-RSP with CID6 in MAC header and assigns secondary CID if requires for RS3. BS forward REG-RSP to RS1 against DL_MAP-IE record comprising CID2
RS1 forwards REG-RSP to RS2 as it is (CID6 in MAC header) against DL_MAP-IE record comprising CID4. By reading the REG-RSP message, RS1 learns if additional CID is assigned to RS3.
RS2 forwards REG-RSP to RS3 against DL_MAP-IE record comprising CID6. By reading the REG-RSP message, RS2 learns if additional CID is assigned to RS2

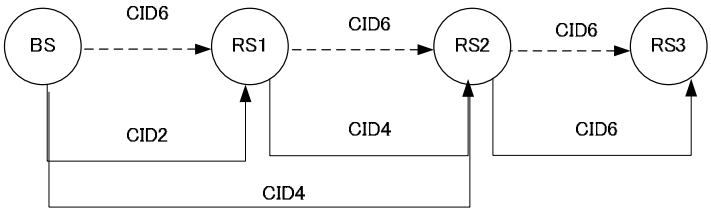

Figure 13 – BS registers RS3

Step 13: BS-to-RS3 end-to-end path is set-up (Figure 14)
DL from BS: To reach RS3 transmits to RS1 using CID2 in DL-MAP_IE and use CID6 in the MAC header. At RS1, to reach RS3 transmit to RS2 using CID4 in DL-MAP_IE and use CID6 in the MAC header. At RS2, to reach RS3 use CID6.
UL from RS3: To reach BS, transmit to RS2 using CID6 in the MAC header. RS2 forwards message to RS1 as it is (CID6 is still in MAC header). RS1 forwards message to BS as it is (CID6 is still in MAC header)

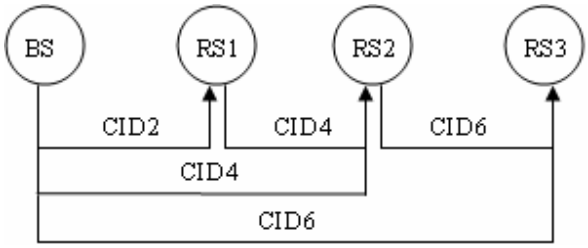

Figure 14 – BS-to-RS3 ETE path setup

Step 14: MS ranges (Figure 15)
Basic CID assigned by RS3 to MS: CID7
Primary CID assigned by RS3 to MS: CID8

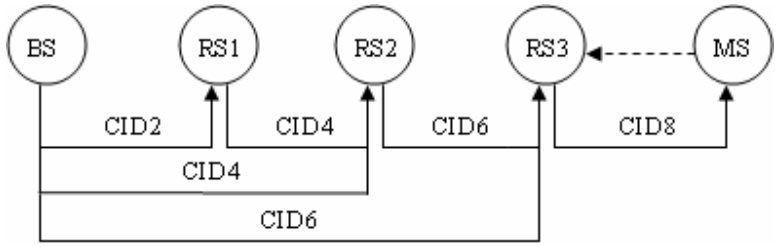

Figure 15 – MS ranges

Step 15: RS3 informs BS of MS (Figure 16)
RS3 generates STA-INFO message with CID6 in MAC header. STA-INFO includes CID8 to inform CID8 is assigned to MS.
RS2 receives STA-INFO from RS3 with CID6 in MAC header.
RS1 receives STA-INFO from RS2 with CID6 in MAC header.
BS receives STA-INFO from RS1 with CID6 in MAC header

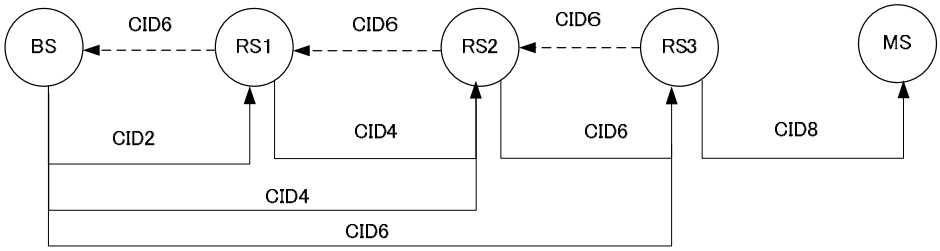

Figure 16 – RS3 informs BS about MS

Step 16: BS acknowledges MS (Figure 17)
BS accepts CID8 and understands that any information (here information refers to primary management message) to be destined for MS be generated with MAC header carrying CID8 and will be forward against DL_MAP-IE record comprising CID2.

BS generates STA-ACK message with CID6 in MAC header. BS forwards STA-ACK to RS1 against DL_MAP-IE (CID2). RS1 receives STA-ACK from BS, and understands this acknowledgement refers to the STA-INFO which was received from RS2 and was forwarded to BS. RS1 includes CID8 in the list. Any information (here information refers to primary management message) carried with MAC header of CID8 will be forwarded against DL_MAP-IE record comprising CID4

RS1 forwards STA-ACK to RS2 against DL_MAP-IE(CID4). RS2 receives STA-ACK from RS1, and understands this acknowledgement refers to the STA-INFO which was received from RS3 and was forwarded to RS1. RS2 includes CID8 in the list. Any information (here information refers to primary management message) carried with MAC header of CID8 will be forwarded against DL_MAP-IE record comprising CID6.

RS2 forwards STA-ACK to RS3 against DL_MAP-IE(CID6)

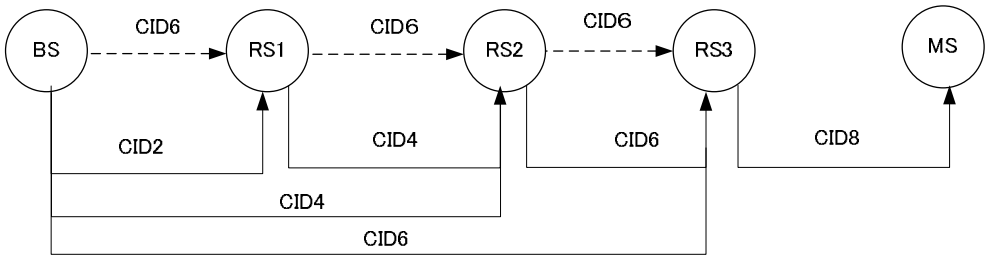

Figure 17 – BS acknowledges RS3

Step 17: MS initiates registration (Figure 18)
REG-REQ received at RS3 from MS with CID8 in the MAC header
REG-REQ is forwarded from RS3 to RS2 as it is (CID8 in MAC header)
REG-REQ is forwarded from RS2 to RS1 as it is (CID8 in MAC header)
REG-REQ is forwarded from RS1 to BS as it is (CID8 in MAC header)

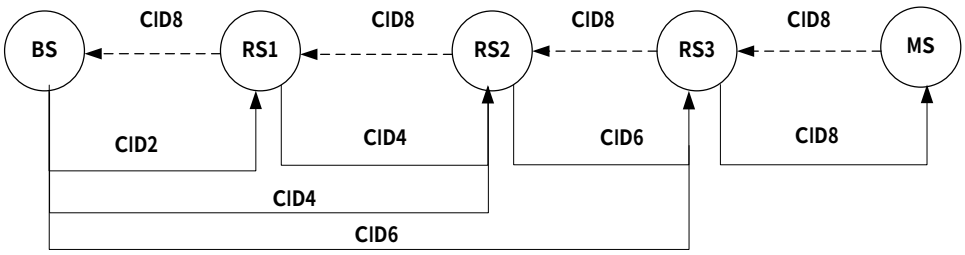

Figure 18 – RS3 initiates registration

Step 18: BS registers MS (Figure 19)
BS generates REG-RSP with CID8 in MAC header and assigns secondary CID if requires for MS. BS forward REG-RSP to RS1 against DL_MAP-IE record comprising CID2
RS1 forwards REG-RSP to RS2 as it is (CID8 in MAC header) against DL_MAP-IE record comprising CID4. By reading the REG-RSP message, RS1 learns if additional CID is assigned to MS.
RS2 forwards REG-RSP to RS3 against DL_MAP-IE record comprising CID6. By reading the REG-RSP message, RS2 learns if additional CID is assigned to MS
RS3 forwards REG-RSP to MS against DL_MAP-IE (CID8). By reading the REG-RSP message, RS3 learns if additional CID is assigned to MS

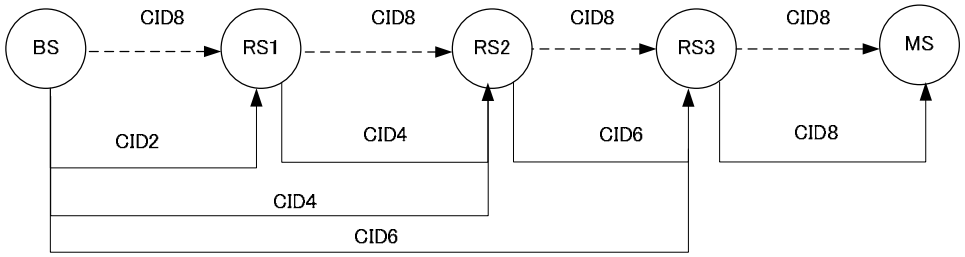

Figure 19 – BS registers MS

Step 19: BS-to-MS end to end path is set-up (Figure 20)
DL from BS: To reach MS transmit to RS1 using CID2 in DL-MAP_IE and use CID8 in the MAC header. At RS1 receive and forward to RS2 by using CID4 in DL-MAP_IE and retaining CID8 in the MAC header. At RS2 receive and forward to RS3 by using CID6 in DL-MAP_IE and retaining CID8 in the MAC header. At RS3 forward the MAC-PDU with CID8 in the MAC header and signal via DL-MAP IE on CID8.
UL from MS: To reach BS, transmit to RS3 using CID8. RS3 forwards message to RS2 as it is (CID8 in MAC header). RS2 forwards message to RS1 as it is (CID8 in MAC header). RS1 forwards message to BS as it is (CID8 in MAC header).

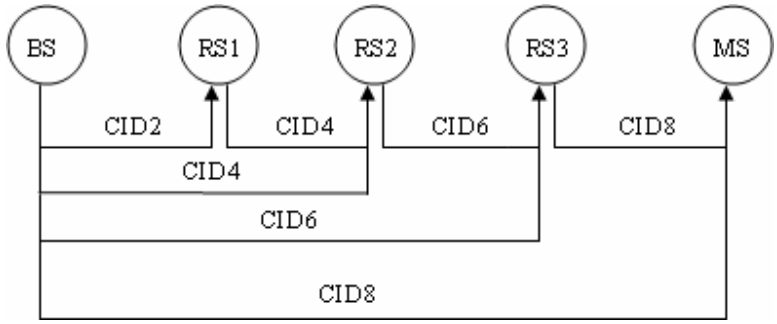

Figure 20 – BS-to-MS ETE path setup

Step 20: Multihop forwarding of bearer data over transport CIDs (Figure 21)
Intermediate RSs (RS1, RS2 and RS3) learn of the assignment of transport CID, CID9, to MS by the BS.
DL from BS: To reach MS transmit to RS1 using CID2 in DL-MAP_IE and use CID9 in the MAC header. At RS1 receive and forward to RS2 by using CID4 in DL-MAP_IE and retaining CID9 in the MAC header. At RS2 receive and forward to RS3 by using CID6 in DL-MAP_IE and retaining CID9 in the MAC header. At RS3 forward the MAC-PDU with CID9 in the MAC header and signal via DL-MAP IE on CID9.

UL from MS: To reach BS, transmit to RS3 using CID9 in the MAC header. At RS3 forward message to RS2 retaining CID9 in the MAC header. At RS2 forward message to RS1 retaining CID9 in the MAC header. At RS1 forward message to BS retaining CID9 in the MAC header.

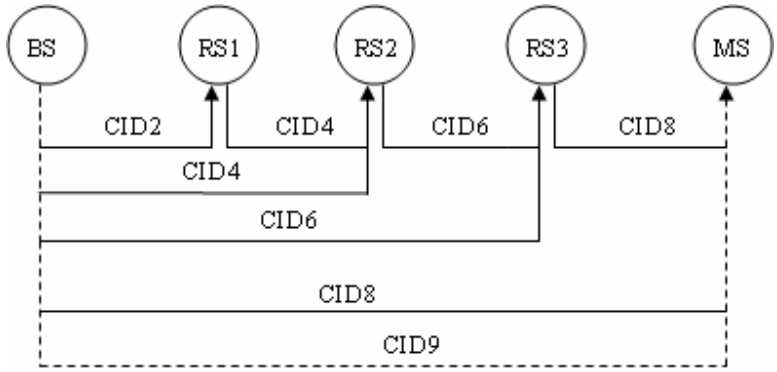

Figure 21 – BS-to-MS ETE bearer path setup

4 Proposed Text Changes

[Insert the following text in beginning of section 6.3.1.3]

Each air interface in a RS shall have a 48-bit universal MAC address, as defined in IEEE Std. 802-2001. This address uniquely defines the air interface of the RS. It is used during the initial ranging process to establish the appropriate connections for an RS. It is also used as part of the authentication process by which the MR-BS and RS each verify the identity of the other.

Connections are identified by a 16-bit CID. The use of a 16-bit CID permits a total of 64K connections within each downlink and uplink channel. Within an MR cell, the MR-BS and RSs capable of providing range extension, assign CIDs to stations entering the network through them. The MR-BS assigns such RSs unique pools of basic and primary management CIDs, which they then assign to stations using them as access stations. Transport CIDs and secondary management CIDs are assigned only by the MR-BS.

At RS initialization, two pairs of management connections (uplink and downlink) shall be established between the RS and the BS and a third pair of management connections may be optionally generated. The three pairs of management connections reflect the fact that there are inherently three different levels of QoS for management traffic between an SS and the RS.

The basic connection is used by the RS MAC and the access station MAC to exchange short, time-urgent MAC management messages. The primary management connection is used by the access station MAC and RS MAC to exchange longer, more delay-tolerant MAC management messages. Table 14 specifies which MAC Management messages are transferred on which of these two connections. In addition, it also specifies which MAC management messages are transported on the Broadcast Connection. Finally, the Secondary Management Connection is used by the BS and RS to transfer delay tolerant, standards-based [Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), SNMP, etc.] messages. Messages carried on the Secondary Management Connection may be packed and/or fragmented. Use of the secondary management connection is required only for managed RS.

A RS's basic connection and the primary management connection shall be created by the RS's access station during the ranging process and shall be assigned using the RNG-RSP message. If the access station is a RS, the creation of the connections shall be declared to the MR-BS and any other RS in its path to the MR-BS. This declaration shall be made using the STA-INFO and STA-ACK messages. The RS's secondary management connection shall be created directly by the BS and shall be declared to the access station and any intermediate RSs (if any) during RS registration using the REG-RSP message.

A SS's basic connection and the primary management connection shall be created by its access station during the ranging process and shall be assigned using the RNG-RSP message. If the access station is a RS, the creation of the connections shall be declared to the MR-BS and any other RS in its path to the MR-BS. This declaration shall be made using the STA-INFO and STA-ACK messages. The SS's secondary management connection shall be created directly by the MR-BS and shall be declared to the access station and any intermediate RSs (if any) during MS registration using the REG-RSP message.

For bearer services, transport CIDs shall be assigned to the SS by the MR-BS. If a SS is accessing the network through a different access station, any intermediate RSs, including the access RS shall also learn of the transport CID assignment and the associated service flow parameters.

[Insert new subclause 6.3.3.8]

6.3.3.8 Multihop transmission of MAC PDUs through RSs

[Insert the following text in 6.3.3.8]

6.3.3.8.1 DL MPDU Transmission and Forwarding

When preparing MPDUs for transmission on the downlink, the MR-BS must first determine the CID of the appropriate connection to the destination. The destination could be a RS or a MS.

For the transmission of DL MPDUs, both bearer data and management, the MR-BS shall use the destination's appropriate CID in the generic MAC header's CID field. The MR-BS shall additionally determine which station is the next hop towards the destination and shall schedule the transmission of a DL burst towards the next hop station. In the DL-MAP message the MR-BS shall include an entry in the DL-MAP_IE for this burst with the primary management CID of the next hop station.

A RS shall receive and decode any DL bursts scheduled for its CIDs in the DL-MAP. Upon receiving the burst, the RS shall process the MPDUs received in the burst, based on the CID field in the MPDU's generic MAC header.

If the CID identifies one of the RS's connections, the RS shall process the MPDUs locally.

If the CID identifies a management connection to a station downstream from the RS, and the MPDU is unencrypted, the RS shall process the payload to determine if the message is of interest. Thereafter, the RS must forward the received MPDU to the next hop towards the destination.

If the CID in a received MPDU identifies a transport connection, the RS must simply forward the MPDU.

When forwarding a MPDU received on a CID assigned downstream from the RS, the RS shall maintain the CID field in the generic MAC header as received. The RS shall additionally determine the next hop towards the destination (that is identified by the CID in the generic MAC header), and shall schedule the transmission of a DL burst towards the next hop station. In the DL-MAP message, the RS shall include an entry in the DL_MAP_IE for this burst with the CID of the next hop station.

6.3.3.8.2 UL MPDU Transmission and Forwarding

When preparing MPDUs for transmission on the uplink, the RS and the MS must first determine the CID of the appropriate connection to the destination. Intermediate RSs, including the access RS are responsible for forwarding MPDUs received from RSs and MSs downstream from them.

RSs shall receive UL bursts transmitted on any of the CIDs assigned to stations accessing the network through them.

When an RS receives UL MPDUs with a transport CID in the CID field of their generic MAC header, the RS shall schedule the UL transmission of the MPDU retaining the same CID.

Uplink management messages received over the basic and primary management CIDs shall be received and processed locally at the access RS. This processing shall depend on the specific management message, and may involve reading the unencrypted management MPDU to determine if it is a message of interest. There after, the RS may forward the MPDU on the uplink by maintaining the CID value in the MAC header as originally received.