IEEE P802.11

Wireless Access Method and Physical Layer Specification

Fixed Fragment Size per MSDU

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Summary

This submission contains modified text for a portion of section 6.4 of the D2.0 draft to remove the possibility of variation of fragment sizes for hop dwell optimization. Voters favoring this proposal can cite this document as the source of replacement text for their D2.0 letter ballot comments.

Modifications to Text in Section 6.4

The MAC may fragment and reassemble MSDUs, directed and multicast/broadcast. The primary reason for fragmenting an MSDU is that it is larger than the PHY is capable of sending in one MPDU. The fragmentation and reassembly mechanisms allows for fragments to be retransmitted.

All stations shall support the simultaneous reception of a minimum of 6 MSDUs.

~~The fragmentation design also allows for the characteristics of FH PHYs. For the purposes of this description a 'dwell time' will refer to the duration of time spent on a single frequency in a FH system. Therefore in a FH PHY the PHY will hop to the next frequency in the hop sequence at the end of the current dwell time.~~

The payload of a fragment shall be an even number of octets for all fragments except the last. The payload of a fragment shall never be larger than aFragment_Payload (including IV and ICV if WEP is invoked for the MPDU). However, it may be less than aFragment_Payload.

When an MSDU ~~data~~ is to be transmitted, the number of octets in the payload of each ~~the~~ fragment, other than the final fragment, shall be set to an equal value less than or equal to aFragment_Payload. The number of octets in the payload of the final fragment of an MSDU shall not be greater than the number of octets in the preceding fragments of the MSDU. ~~be determined based on the time at which the fragment is to be transmitted for the first time.~~ Once any fragments of an MSDU have been~~a fragment is~~ transmitted~~ for the first time~~, the fragment sizes~~its contents~~ shall be fixed for the remainder of the MSDU lifetime, including any retransmissions that may be necessary ~~until it is successfully delivered to the immediate receiving station~~.

~~The number of data octets in the payload of a fragment shall depend on the values of the following three variables at the instant the fragment is assembled to be transmitted for the first time:~~

~~a) aFragment_Payload~~
~~b) The time remaining in the current dwell time.~~
~~c) The number of octets in the MSDU that have not yet been transmitted for the first time.~~

~~Since the control of the channel will be lost at a dwell time boundary and the station will have to contend for the channel after the dwell boundary, it is required that the acknowledgment of a fragment be transmitted before the stations cross the dwell time boundary. Hence, if there is not enough time remaining in the dwell time to transmit a fragment with an aFragment_Payload payload, the number of octets in the payload may be reduced to the maximum number of octets that will allow the fragment plus the MAC acknowledgment to fit within the time remaining in the dwell time. This is shown in Figure 6-21 for an MSDU of 1500 octets.~~

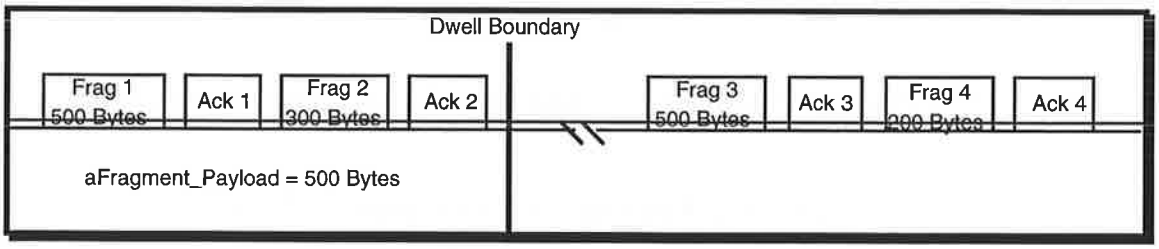

Figure 6-21: Fragmentation Near a Dwell Boundary

Referring to Figure 6-21, a 1500 octet MSDU is fragmented into four fragments with aFragment_Payload set at 500 octets. There is enough time left in the dwell to send two fragments, one of 500 octets and a second of 300 octets. After the dwell boundary, the rest of the MSDU is sent, one 500 octet fragment and one 200 octet fragment.

A station may elect not to adjust the size of the payload when approaching a dwell boundary. In this case, the station must wait until after the next dwell boundary to create and transmit a fragment with a aFragment_Payload octet payload (provided there are at least aFragment_Payload more octets remaining in the MSDU). A station must be capable of receiving fragments of varying size for a single MSDU.

If a fragment requires retransmission, its contents and length shall remain fixed for the lifetime of the MSDU at that station. In other words, after a fragment is transmitted once, contents or length of that fragment are not allowed to fluctuate to accommodate the dwell time boundaries. Let the fragmentation set refer to the contents and length of each of the fragments that make up the MSDU. The fragmentation set is created at a station as soon as the fragments are attempted for the first time. The fragmentation set remains fixed for the lifetime of the packet at the transmitting station. This is shown in Figure 6-22.

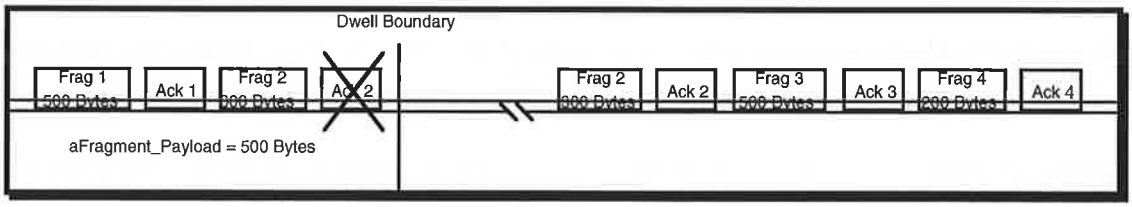

Figure 6-22: Fragmented MSDU with missed ACK Near a Dwell Boundary

In the example shown in Figure 6-22, the same 1500 octet MSDU is fragmented at the same point in the dwell time as in Figure 6-21 but the ACK for the second fragment is missed. After the dwell boundary, the fragment is retransmitted and the fragment size remains 300 octets.

Each fragment shall~~will~~ contain a Sequence Control Field, which is comprised of a Sequence Number and Fragment Number. When a station is transmitting an MSDU, the Sequence Number shall~~will~~ remain the same for all fragments of that MSDU. The fragments shall~~will~~ be sent in order of lowest Fragment Number to highest Fragment Number, where the fragment number value starts at zero, and increases by one for each successive fragment. The Frame Control Field also contains a bit, the Last Fragment bit, that is equal to one to indicates the last (or only) fragment of the MSDU.

If, when retransmitting a fragment, there is not enough time remaining in the dwell time to allow transmission of the fragment plus the acknowledgment, the station shall wait until after the next dwell boundary before retransmitting that fragment.

The source station will maintain a aTransmit_MSDU_Timer attribute for each MSDU being transmitted. There is also an attribute, aMax_Transmit_MSDU_Lifetime, that specifies the maximum amount of time allowed to transmit a MSDU. The aTransmit_MSDU_Timer starts on the attempt to transmit the first fragment of the MSDU. If aTransmit_MSDU_Timer exceeds aMax_Transmit_MSDU_Lifetime than all remaining fragments are discarded by the source station and no attempt is made to complete transmission of the MSDU.