IEEE P802.11
Wireless LANs

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| Fragment Flushing BlockAckReq |
| Date: 2017-08-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Matthew Fischer | Broadcom |  |  | Matthew.fischer@broadcom.com |
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Abstract

Proposed language to create a mechanism for a transmitter to command a flush of incomplete MSDUs within the RX Buffer of a receiver using a new variant of the BAR frame. The motivation for this feature is to allow simplified implementation of transmitter side fragmentation.

Changes are referenced to TGax D1.4.

**REVISION NOTES:**

**R0**:

initial

**END OF REVISION NOTES**

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

**Discussion:**

This document proposes a mechanism for transmitter-commanded RX BUFFER Flush of incomplete MSDUs. It is selective in that the receipient only flushes incomplete MSDUs up to and including the indicated end sequence number. No receiver window move occurs. No BlockAck is transmitted in response. MSDUs and fragments of MSDUs that are not covered by the SEQ number range or which are completely assembled in the buffer are unaltered.

**Proposed Changes to TGax D1.4:**

**9.3.1.8 BlockAckReq frame format**

**9.3.1.8.1 Overview**

***TGax editor: within TGax D1.4, modify the last row of Table 9-22 – BlockAckReq frame variant encoding and the paragraph immediately preceding the table, as shown, noting that the header row is shown for orientation purposes:***

The values of the Multi-TID, Compressed Bitmap, and GCR subfields determine which of six possible BlockAckReq frame variants is represented, as indicated in Table 9-=22 (BlockAckReq frame variant encoding).

**Table 9-22 – BlockAckReq frame variant encoding**

|  |  |  |  |
| --- | --- | --- | --- |
| **Multi-TID subfield value** | **Compressed Bitmap subfield value** | **GCR subfield value** | **BlockAckReq frame variant** |
| 1 | 1 | 1 | Fragment Flushing BlockAckReq |

***TGax editor: within TGax D1.4, insert a new subclause and editing instruction, as shown:***

***Insert a new subclause as follows:***

**9.3.1.8.6a Fragment Flushing BlockAckReq frame format**

The TID\_INFO subfield of the BAR Control field of the Fragment Flushing BlockAckReq frame is reserved.

The BAR Information field of the Fragment Flushing BlockAckReq frame comprises a single Fragment Flushing TID Bitmap and one or more Fragment Flushing End Sequence Control subfields, as shown in Figure 9-31aa (BAR Information field format (Fragment Flushing BlockAckReq)), where the number of Fragment Flushing End Sequence Control subfields present is equal to the number of bits in the Fragment Flushing TID Bitmap that are equal to 1.

|  |  |  |
| --- | --- | --- |
| Octets: | 2 | 2 |
|  | Fragment Flushing TID Bitmap | Fragment Flushing End Sequence Control |

Repeat for each TID

**Figure 9-31aa – BAR Information field format (Fragment Flushing BlockAckReq)**

The Fragment Flushing TID Bitmap subfield is 16 bits in length and is a bitmap that indicates for which TID values a Fragment Flushing End Sequence Control subfield is present in the BlockAckReq frame. The lowest numbered bit of the Fragment Flushing TID Bitmap corresponds to the TID value of 0, the second lowest numbered bit of the Fragment Flushing TID Bitmap corresponds to the TID value of 1, and each successively higher-numbered bit in the bitmap corresponds to the next higher TID value. If a bit in the bitmap corresponding to a TID is equal to 1, then a Fragment Flushing End Sequence Control subfield is present for that TID; Otherwise, no Fragment Flushing End Sequence Control subfield is present for that TID.The Fragment Flushing End Sequence Control subfields that are present are ordered in monotonically increasing order per their corresponding TID values.

The Fragment Flushing End Sequence Control subfield indicates which contents are to be flushed by the recipient from the Rx Buffer for the TID associated with the Fragment Flushing End Sequence Control subfield value. The format of the Fragment Flushing End Sequence Control subfield is shown in Figure 9-31bb – Fragment Flushing End Sequence Control subfield.

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 B3 | B4 B15 |
|  | Flush All Fragments | Reserved | Fragment Flushing End Sequence Number |
| Bits: | 1 | 3 | 12 |

**Figure 9-31bb – Fragment Flushing Ending Sequence Control subfield**

The Flush All Fragments subfield indicates if the recipient of the Fragment Flushing BlockAckReq is instructed to flush all incomplete MSDU and A-MSDUs in the Rx Buffer. If the Flush All Fragments subfield is 1, the recipient is instructed to flush all incomplete MSDUs and A-MSDUs in the Rx Buffer. Otherwise, the recipient uses the Fragment Flushing End Sequence Number subfield to determine which incomplete MSDUs and A-MSDUs to flush.

The Fragment Flushing End Sequence Number subfield is used to indicate the last incomplete MSDU Rx Buffer entry that is to be flushed at the recipient. If the Flush All Fragments subfield has the value 1, then the Fragment Flushing End Sequence Number subfield is reserved, otherwise, the Fragment Flushing End Sequence Number subfield contains the value of the last incomplete MSDU Rx Buffer entry that is to be flushed at the recipient.

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instruction:***

**10.24.4 Receive buffer operation**

***Change the 4th paragraph as shown:***

If a BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame is received, all complete MSDUs and A-MSDUs with lower sequence numbers than the starting sequence number contained in the BlockAckReq frame shall be passed up to the next MAC process as shown in Figure 5-1 (MAC data plane architecture). Upon arrival of the BlockAckReq frame, the recipient shall pass up the MSDUs and A-MSDUs starting with the starting sequence number sequentially until there is an incomplete or missing MSDU or A-MSDU in the buffer. If no MSDUs or A-MSDUs are passed up to the next MAC process after the receipt of the BlockAckReq frame and the starting sequence number of the BlockAckReq frame is newer than the NextExpectedSequenceNumber for that block ack agreement, then the NextExpectedSequenceNumber for that block ack agreement is set to the starting sequence number of the BlockAckReq frame.

***Insert two new paragraphs immediately after the 4th paragraph as shown:***

If a Fragment Flushing BlockAckReq frame is received, and the Flush All Fragments subfield is equal to 0, then all incomplete MSDUs and incomplete A-MSDUs with sequence numbers that are equal to or lower than the Fragment Flushing End Sequence Number shall be discarded from the receive buffer for the block ack agreement with the TA and RA from the frame and with the TID corresponding to this Fragment Flushing End Sequence Number. The NextExpectedSequenceNumber for the corresponding block ack agreement is not modified. The recipient shall not transmit a BlockAck that is a response to the receipt of the Fragment Flushing BlockAckReq frame. Any full-state acknowledgement information stored at the recipient for a discarded frame shall be reset to an unacknowledged indication.

If a Fragment Flushing BlockAckReq frame is received, and the Flush All Fragments subfield is equal to 1, then all incomplete MSDUs and incomplete A-MSDUs shall be discarded from the receive buffer for the block ack agreement with the TA and RA from the frame and with the TID corresponding to this Fragment Flushing End Sequence Number. The NextExpectedSequenceNumber for the corresponding block ack agreement is not modified. The recipient shall not transmit a BlockAck that is a response to the receipt of the Fragment Flushing BlockAckReq frame. Any full-state acknowledgement information stored at the recipient for a discarded frame shall be reset to an unacknowledged indication.

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instruction:***

**10.24.7.3 Scoreboard context control during full-state operation**

***Change the 4th paragraph as shown:***

c) For each received BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame and that is related with a specific full state operation HTimmediate block ack agreement that is not a protected block ack agreement, the block acknowledgement record for that agreement is modified as follows, where SSN is the value from the Starting Sequence Number subfield of the received BlockAckReq frame:

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instructions:***

**10.24.7.4 Scoreboard context control during partial-state operation**

***Change the 7th paragraph as shown:***

d) For each received BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame and that is related with a specific partial-state operation HTimmediate block ack agreement that is not a protected block ack agreement, when no temporary record for the agreement related with the received frame exists at the time of the receipt of the frame, a temprory block acknowledgement record is created as follows, where *SSN* is the starting value of the Sequence Number subfield of the received BlockAckReq frame:

***Change the 8th paragraph as shown:***

e) For each received BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame and that is related with a specific partial-state operation HTimmediate block ack agreement that is not a protected block ack agreement, when a temporary record for the agreement related with the received frame exists at the time of the receipt of the frame, the temprory block acknowledgement record for that agreement is modified in the same manner as the acknowledgement record for a full-state agreement described in 10.24.7.3 (Scorebored context control during full-state operation).

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instructions:***

**10.24.7.5 Generation and transmission of BlockAck frames by an HT STA or DMG STA**

***Change the 1st paragraph as shown:***

Except when operating within a PSMP exchange, a STA that receives a PPDU that contains a BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame and in which the Address 1 field matches its MAC address during either full-state operation or partial-state operation shall transmit a PPDU containing a BlockAck frame that is separated on the WM by a SIFS from the PPDU that elicited the BlockAck frame as a response. A STA that receives an A-MPDU that contains one or more MPDUs in which the Address 1 field matches its MAC address with the Ack Policy field equal to Normal Ack (i.e., implicit block ack request) during either full-state operation or partial-state operation shall transmit a PPDU containing a BlockAck frame that is separated on the WM by a SIFS from the PPDU that elicited the BlockAck frame as a response.

***Change the last paragraph as shown:***

If a BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame is received and no matching partial state is available, the recipient shall send a null BlockAck frame in which the bitmap is set to all 0s.

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instructions:***

**10.24.7.6.3 Operation for each received BlockAckReq**

***Change the 1st paragraph as shown:***

For each received BlockAckReq frame that is not a Fragment Flushing BlockAckReq frame and that is related with a specific HT-immediate block ack agreement, the receive reordering buffer record is modified as follow, where SSN is the Starting Sequence Number subfield value of the received BlockAckReq frame:

***Insert two new paragraphs at the end of the subclause as shown:***

If a Fragment Flushing BlockAckReq frame is received and the Flush All Fragments subfield is equal to 0, then all incomplete MSDUs and A-MSDUs with sequence numbers that are equal to or lower than the Fragment Flushing End Sequence Number shall be discarded from the receive buffer for the block ack agreement with the TA and RA from the frame and with the TID corresponding to this Fragment Flushing End Sequence Number. The NextExpectedSequenceNumber for the corresponding block ack agreement is not modified. The recipient shall not transmit a BlockAck that is a response to the receipt of the Fragment Flushing BlockAckReq frame.

If a Fragment Flushing BlockAckReq frame is received and the Flush All Fragments subfield is equal to 1, then all incomplete MSDUs and A-MSDUs shall be discarded from the receive buffer for the block ack agreement with the TA and RA from the frame and with the TID corresponding to this Fragment Flushing End Sequence Number. The NextExpectedSequenceNumber for the corresponding block ack agreement is not modified. The recipient shall not transmit a BlockAck that is a response to the receipt of the Fragment Flushing BlockAckReq frame.

***TGax editor: in the appropriate location within the TGax Draft, insert the following text and editing instruction:***

**10.24.7.7 Originator’s behavior**

***Insert a new paragraph after the 7th paragraph as shown:***

The originator may send a Fragment Flushing BlockAckReq frame to force the recipient to discard incomplete MSDUs. The originator may restart the fragmentation of an MSDU for a block ack greement after receiving successful acknowledgement of a Fragment Flushing BlockAckReq frame for that agreement that commanded the recipient to flush that MSDU.

**End of proposed changes.**