IEEE P802.11  
Wireless LANs

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| Limit on the number of MSDUs in an A-MSDU | | | | |
| Date: 2011-03-14 | | | | |
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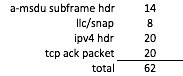
Abstract

# Comment

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| 6855 | 116.15 | 9.11 | There is no limit on the number of MSDUs that can be packed in an A-MSDU sent in a MPDU. Potentially the number of MSDUs can be very large. As an example, assuming small packets of 62Bytes (e.g. ~TCP ACK) an MPDU of 11454Bytes could include up to 184 MSDUs. For a max sized A-MPDU of 64 MPDUs this can potentially result in >11000 MSDUs. These numbers are exemplary to illustrate the problem. In general, processing a high and unpredictable number of MSDUs increases complexity of receiver | Add an optional indication for a receiver VHT STA to signal to a transmitter VHT STA that the number of MSDUs per MPDU shall be less than a given number; ability to limit the number of MSDUs in a MPDU to <= 16 is suggested. The indication can be in the form of a capability indication (TBD). The current operation mode (no limit) is also preserved; Restriction can only be signaled by a VHT STA to a VHT STA; restriction refers to number of MSDUs sent in any MPDU where A-MSDU is allowed. | REVISE. Adopt resolution as in DCN 12/xxxxrx (this document) |

# Discussion

In current specification there is no limit on the number of MSDUs that can be packed in an A-MSDU sent in a MPDU. Potentially the number of MSDUs can be very large. As an example, assuming small packets of 62Bytes



an MPDU of 11454Bytes could include up to 183 MSDUs.

[as] Also someone can launch denial of service by sending 11k AMSDU frame having all 0s (flood of 16bytes msdus) 

The way I interpret it is:

In a worse case, a rogue STA may send a 11454Bytes MPDU filled with QoS Null Data frame, resulting in up to X MSDUs.

Am I correct?

Processing a high and unpredictable number of MSDUs within a single MPDU increases complexity of receiver design. Note that in a MPDU there is only one FCS field at the end, which determines the correctness of all the MSDUs included in the MPDU; being the FCS at the end, by the time an error is detected a huge number of MSDUs may have been already processed, uselessly. The design though needs to account for the worst case, hence the increased memory requirement and processing complexity.

If we further consider that up to 64MPDUs can be aggregated, a PPDU could end up carrying thousands of MSDUs. Receiver design need also to take into account this total unpredictable number.

# Proposed solution:

Add an optional indication for a receiver VHT STA to signal to a transmitter VHT STA that the number of MSDUs per A-MSDU (i.e. per MPDU) shall be less than a given number.

The limit refers to A-MSDUs sent within any type of PPDU/frame where A-MSDU is allowed.

***Option 1. Options are for internal review only; I would prefer we pick one option only***

The preferred limitation can be indicated by one of the reserved bits of the VHT Capabilities Info field, such as B30.

The limitation can be defined as

* + B30=0 🡪 no limitations
  + B30=1🡪 any A-MSDU shall carry no more than 16 MSDUs.

***Option 1b. Options are for internal review only; I would prefer we pick one option only***

The preferred limitation can be indicated by one of the reserved bits of the VHT Capabilities Info field, such as B30.

The limitation can be defined as

* + B30=0 🡪 no limitations
  + B30=1
    - If  max MPDU/A-MSDU length = 3895 octets, then
      * Max 8 MSDUs in A-MSDU for HT and VHT PPDUs
      * Max 8 MSDUs in non-HT PPDU
    - If  max MPDU/A-MSDU length = 7991 octets, then
      * Max 16 MSDUs in A-MSDU for HT and VHT PPDUs
      * Max 8 MSDUs in non-HT PPDU
    - If  max MPDU length = 11 454 octets, then
      * Max 16 MSDUs in A-MSDU for VHT PPDUs
      * Max 8 MSDUs in non-HT PPDU

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***Option 2. Options are for internal review only; I would prefer we pick one option only***

The preferred limitation can be indicated by using two of the reserved bits of the VHT Supported MCS Set field, such as B29 and B30.

The limitation can be defined as

* [B29,B30]=0: No limit to number of MSDUs in A-MSDU
* [B29,B30]=1: max 16 MSDUs in A-MSDU
* [B29,B30]=2: max 8 MSDUs in A-MSDU
* [B29,B30]=3: max 4 MSDUs in A-MSDU

(End of options)

Note that the proposed limit is optional so that STAs that do not want to limit the number of A-MSDUs are free to preserve the operation with no limitations

Limiting the A-MSDU number to (16) anyway has NO impact to the throughput.

In fact assuming typical MSDUs of 1500Bytes, a limit of (16) MSDUs per MPDU would already exceed the maximum MSDU size of 11454.

For MSDUs of 500 Bytes, the limit of 16 MSDUs would result in ~8000Bytes A-MSDU i.e. it would exceed the maximum MPDUs size of 7991 Bytes, and it would be ~70% of the max MPDU size of 11454 Bytes: in the latter case the maximum efficiency loss is less than 30% (need to compute a more accurate number)