IEEE P802.11
Wireless Access Method and Physical Layer Specifications

Title: Proposal to add a Data Aging field to the Association and Reassociation frame.

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Abstract:
This document proposes to add a Data Aging field to both the Association and Reassociation frame to allow efficient use of medium and AP resources.

Introduction:
Very diverse applications will make use of the 802.11 network infrastructure. As has been discussed in conjunction with the introduction of Power Management facilities in the protocol, there will be very diverse applications that may want to use the connectivity services of an 802.11 infrastructure.
On one hand there will be the traditional LAN applications that have very bursty traffic characteristics for Network Operating Systems that are suitable for handling file transfers, using different protocol stacks like LLC type 2, to assure reliable data transfer services.

On the other hand there can be applications that will handle very low traffic loads generated by handheld devices like scanners that may only need to transfer single frames, but which require very long battery lifetimes.
There can also be etreme low power devices which run from a few AA type batteries, and need battery lifetimes of months, which they can achieve by utilizing very long sleep intervals of tens of seconds. To achieve this applications need to utilize "Datagram" transfer services, and rely on 802.11 MAC level buffering and retry mechanisms for delivering its data.

Buffered Traffic aging requirements:

The applications described can all benefit from Power Save provisions in the protocol, and will use the buffering capabilities of the AP to store data temporarily untill the destination is awake.
They can however have very different requirements as to how long traffic needs to be buffered in the AP.

In the case where higher layers then the MAC are implementing lost frame recovery mechanisms, then these will usually use timeout mechanisms, after which frames are retransmitted.
In situations where an AP would buffer traffic considerably longer then the timeout values used in those higher layers, then this may result in extra buffering requirements in the AP, and extra traffic on the medium in cases where connectivity with that station is deteriorating.
On the other hand the stations operating in extreme low power mode with long sleep times, and reduced latency requirements require considerably longer buffering times in the AP.

AP's will need to implement a Buffer Aging function for managing of its resources, to prevent that "old (obsolete) traffic" is occupying the wireless medium and the AP buffer resources. The AP's will need information from the stations to set the buffer aging parameters to value's suitable for its applications, and the latency induced by their sleep intervals.

Aging range needed:

The range of the aging is expected to be between a few hundred msec till the order of several tens of seconds. A resolution of 10 msec is suggested, because that seems to be common in network management.
A single octet is not sufficient to cover the range described, so a double octet is needed.

Buffer Aging proposal:

The station needs to be able to specify its buffer aging requirements at (re)association time. To achieve this a Aging parameter should be added to the Association and Reassociation frames.
The proposal is to add a two octet buffer aging parameter. The following describes the text changes needed in the current section 4.

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4.2.3.4. Association Request Frame Format

The Frame Body of a Management frame of Subtype Association Request shall contain the following information:

Order	Information	Note
1	Capability Information	
2	Data Age Parameter	
~~3~~2	ESSID	
~~4~~3	Supported Rates	

4.2.3.5. Association Response Frame Format

The Frame Body of a Management frame of Subtype Association Response shall contain the following information:

Order	Information	Note
1	Capability Information	
2	Status Code	
3	Station ID (SID)	
4	Supported Rates	

4.2.3.6. Reassociation Request Frame Format

The Frame Body of a Management frame of Subtype Reassociation Request shall contain the following information:

Order	Information	Note
1	Capability Information	
2	Data Age Parameter	
~~3~~2	Current AP Address	
~~4~~3	ESSID	
~~5~~4	Supported Rates	

Section 4.4 Changes:

4.4.x.y Aging Parameter

The Aging Parameter field shall represent the limit in time that an AP should buffer traffic for the destination station requesting association. The two octet value will represent the time in multiple of 10 msec intervals.