IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| July-Nov 2009 Teleconference Meeting Minutes | | | | |
| Date: 2009-11-14 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Ganesh Venkatesan | Intel Corporation | 2111NE 25th Ave, Hillsboro, OR 97124 | 503 334 6720 | [ganesh.venkatesan@intel.com](mailto:ganesh.venkatesan@intel.com) |
|  |  |  |  |  |

Abstract

This document contains minutes of TGaa teleconferences between July-Nov 2009. There were four teleconferences during this period:

1. July 27, 2009
2. Aug 10, 2009
3. Aug 14, 2009
4. Oct 05, 2009

IEEE 802.11aa Teleconference July 27, 2009 1100-1230 Hrs EDT

***Agenda/Notes:***

* ***Administrivia [5]***
  + Questions on IEEE SA Policies and Procedures -- none
  + Essential Patents or knowledge of holders of Essential Patents – none
  + ***Internal Review comment spreadsheet is now in document: 09/0911r0***
  + ***July Meeting minutes is in document: 09/848r0***

* ***Brainstorm on EDCA bandwidth Factor and the disadvantage to the BSS-in-the-middle case [70]***

*QLoad advertisements can be limited to self-load and loads of all BSSs at distance 1 from self -- not at distance 1 and 2 as previously discussed*

*A form of denial of service with a 'fake AP' is possible (not necessarily a .11aa problem but most obvious with in .11aa environment)*

*Alex had proposed a co-operation based on 'prior history' strategy -- play nice and co-operate based on prior history*

*Need to think of a way of providing incentive to play fair -- only incentive would be a BSS could be 'B' at any time and playing fair provides for 'B' not to suffer while in a A-B-C scenario.*

*Allowing for A and C to transmit at the same time naturally provides for B to have better chances.*

*Could we think of an inverse TxOP -- inter-BSS Quiet element, to indicate when a BSS can and cannot transmit?*

*Look at 07/86r3 -- Alex's proposal (prisoner's dilemma) -- average 9% improvement.*

*Is it worth thinking of a timeshare scheme for EDCA?*

*How to device a incentive/penalty for playing fair/unfair?*

* ***Thoughts on OBSS -- Brian Hart [15]***
  + *QLoad as an IE in a Beacon -- how often does the information change? How often is this advertised? Should there be an on-demand mechanism?*
    - *Beacon bloat -- a two-stage beacon temporal info in each beacon and unchanging/static info in only few beacons (similar to Robust Header Compression)*
    - *We need to consider sending pertinent information*
    - *Need a probe request like mechanism for on-demand situation (public action frames)*
    - *Infrequently in Beacons and/or public action frames -- any prior specification using this? Does TGv do this?*

* *HCCAOP could be used by all (not necessarily by EDCA or EDCA-AC)*

Teleconference ended at 12:15 Hrs EDT

IEEE 802.11aa Teleconference August 10, 2009 1100-1230 Hrs EDT

Attendees: Ed Ruess (Plantronics), Joe Brennan (Apple), Hang Liu (Thomson), Ganesh Venkatesan (Intel Corporation), Brian Hart (Cisco), Craig Gunther, Philippe Klein (Broadcom) and Graham Smith

***Agenda/Notes:***

* ***Administrivia [5]***
  + Questions on IEEE SA Policies and Procedures -- none
  + Essential Patents or knowledge of holders of Essential Patents – none
* ***Input to 802.1Qat – 09/926r0 [40]***
* ***Continue discussions on OBSS solution – sharing load information without bloating Beacon, Use of public action frames between APs, etc. [40]***
  + ***How big should the QLOad element be? Now reduced to 14 octets long.Would this bloat beacons? Is this a constant? Or depends on the number of overlapping BSSs?*** 
    - ***Only advertises self-load. Hence a constant and does not depend on the number of overlapping BSSs.***
    - ***Adverise for 2-hops? If APs cannot hear each other but a client in between can hear each other. Is this a common scenario -- if the STA happens to be at the edge of it's APs range.***
    - ***We need to fix all gaps in the protocol, given the amount of work that has gone into this.***
    - ***What happens if 802.11ac starts using 80MHz channels?***
    - ***Interested in hearing about neighbors and neighbor's neighbors. With this the load information is large and would bloat the beacon.***
  + ***TxOP advertisements to provide BSSs an idea when transmissions within the BSS are allowed. How would legacy stations obey this? Quiet Element is not mandatory and may not be implemented.***
  + ***Incentive for co-operating (and giving up performance in some cases) -- any BSS can happen to be in the 'middle'. Co-operating always guarantees, that performance does not suffer when a BSS happens to be in the 'middle'.***
  + ***Are there elements in the Beacon that is sent only when information in the element changes (sent 4 times when it changes)?***
  + ***Graham would bring in a proposal that summarizes current thinking.***
  + ***Is Quiet Element widely supported? Probably in 2 years but we will still have STAs that do not support Quiet Elements.***

* ***Any other Business [5]***

Teleconference ended at 12:30 Hrs EDT

IEEE 802.11aa Teleconference August 24, 2009 1100-1230 Hrs EDT

***Agenda:***

* ***Administrivia***
* ***Update on input 802.1Qat (09/926r1)***
* ***QoS requirements from TVWS SG and 802.11aa PAR scope***
* ***Continue discussions on OBSS solution – sharing load information without bloating Beacon, Use of public action frames between APs, etc (09/757r6)***
* ***Any other Business***

Notes:

* ***Administrivia***
  + Questions on IEEE SA Policies and Procedures -- none
  + Essential Patents or knowledge of holders of Essential Patents – none
* ***Update on input 802.1Qat (09/926r1)***
  + ***Ganesh provided an overview of changes to 09/926r0 based on feedback from Phillipe Klien (802.1Qat)***
* ***QoS requirements from TVWS SG and 802.11aa PAR scope***
  + ***The chair summarized discussion with TVWS SG Chair on 802.11aa PAR and TVWS SG discussions,***
* ***Continue discussions on OBSS solution – sharing load information without bloating Beacon, Use of public action frames between APs, etc (09/757r6)***
  + Graham presented document 09/757r0
  + ***Brainstorming session on how to exchange QoS Load information from a BSS (both self and wht the BSS sees as load in its neighbors).***

 Teleconference ended at 12:25 Hrs EDT

IEEE 802.11aa Teleconference October 05, 2009 1100-1230 Hrs EDT

Chair: Alex Ashley (NDS Ltd)

Attendees:

Graham Smith (DSP Group)

Ed Reuss (Plantronics)

Brian Hart (Cisco)

Hang Liu (Thomson)

Jochen Miroll (Saarland University)

The chair opened the meeting at 11:03am US Eastern.

The chair reminded the group of the policies and procedures, as outlined in the links provided in the teleconference reminder.

The chair asked the group if there was any essential patents or knowledge of holders of essential patents – none

The agenda for the call:

* Listen to refinements/harmonization of proposals on Drop Precedence and Intra-AC prioritization

Brian gave a quick overview of his thoughts on the topic:

1) We can use finer EDCA parameters, and even fractional AIFS, and show that this AC had greater priority than that AC. Agreed so far. However, does this differential priority at the MAC layer actually translate into a differential user experience that can be perceived? (This is a case for accurate, long lived simulations, and reporting minimum PSNR, or some better metric, over the simulation duration; and in the presence of overlapped and/or legacy APs/clients, including 1,2Mbps devices sending 1500 byte packets). Our experience in the enterprise that large differential priorities are required to provide genuine (user-perceptible) differentiation. And we can't do that, is this the right path?

2) What are the use cases we want to address here? If there are neighbors 1 and 2, they'll both use max video priority, so that's not it. The flows basically have to originate in one household. Then are the flows arising from a) multiple non-co-located sources (home gateway + NAS attached to a repeater AP), or b) all from NAS, or c) all from the home gateway (i.e. IPTV), or d) all from a NAS wired into a home gateway? IMHO, I think realistically the vast majority of use cases are b), c) or d). In this case, does the prioritorization have to be over the air, or can it be done more traditionally within the AP, and so with greater thoroughness?

What I mean is a two stage queuing arch. The first stage is prioritorizes the multiple incoming video flows within the AP via weighted round robin queuing (or equivalent). This is the traditional way to provide QoS differentiation, & it is highly successful and mature. Then given that prioritorization from stage 1, the combined video streams are sent to AC\_VI (say) for stage 2, namely classic EDCA prioritorization, and individual packets are sent over the air when their CW counts down.

Benefits - doesn't clash with existing ACs, provides true video flow prioritorization versus slightly differentiated priority from finely spaced ACs, & IMHO meets all the important use cases.

Cons - some corner cases not addressed

Q: Does this include muxing in the AP?

A (Brian): Multiple flows enter the AP. The AP selects packets based upon its queuing algorithm and then sends data AC\_VI.

Q: Intra-AC is only useful for two hops?

A (Alex): For two hops, or when there are multiple sources that go over the air.

Q: Why would you want to signal that a video has lower priority?

A (Ed): It may be that you gain improvement by reducing same-AC collisions.

Q: How many queues

A (Hang): EDCA has 4 queues, each queue uses virtual contention between ACs.

Q: If we have intra-AC does this mean extra queues?

A (Brian): My proposal is to put extra queues in front of the AC\_VI queue.

Q: Do we know anything about the pros and cons of multi-level queues?

A: Might be easier from a legacy perspective than creating new ACs.

We need more analysis. Need to see use cases and to see the outcome of each choice.

Q: Are there other issues for adding extra ACs?

A (Brian): Maybe features such as 11k available admission capacity and access delay. Both of these split out AC with four fields. We might also need to look at admission control.

Chair closed the meeting at 11:58am Eastern.