
**IEEE P802.11
Wireless LANs**

802.11 Task Group E Teleconferences

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**Minutes of the first IEEE P802.11 Task Group E
Inter-Meeting Teleconference**

May 24, 2000

Introduction

John Fakatselis, Chair
Agenda Review

Roll Call

Keith Amman – Spectralink kamann@spectralink
Donald Bowan - AT&T
Sunghyun Choi – Philips sunghyun.choi@philips.com
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Duncan Kitchen – Intel Duncan.kitchen@intel.com

Steve Williams – Intel steven.d.williams@intel.com

John Kowalski – Sharp kowalskj@sharplabs.com

Objectives

Task Group decided to hold 3 teleconferences to accelerate the agenda.

Today's teleconference is to discuss evaluation and testability based on document 00/125.

This is an Ad Hoc Group. No voting or decisions can be made. This is to prepare everyone with information on the topics. We will be ready to make motions in July.

The minutes will be published on the reflector tomorrow.

Discussion of document 00/125

Presented by Matt Sherman in place of Harry Worstell or Bob Miller.

Intended to make the simulation and performance quantification a tractable problem.

Need to look at actual MAC performance and system requirements.

A simpler approach is better – establish a flat playing field. Pick exemplary situations

Initially, separate multi-BSS question from the QoS questions.

Evaluate at two data points, 50% and 85% loading.

Suggested metrics – throughput, delay vs. Loading, Throughput over area (Km²)

Clarification Questions on the paper

Keith Amman – where did the 50% and 85% loading numbers come from? Matt - The key is to find moderate and high loading. 90% is probably too high to maintain QoS. 85% seems like a good high end. The numbers are kind of gut-feeling. They are open to further consideration. Maarten – a percentage was chosen to make it PHY independent. Amar – there originally a thought to measure continuous loading over a range, but it would result in excessive simulation requirements. Two points seemed to be more prudent.

Sunghyun Choi – on slide 3, what is the relation of STA/STA side traffic. Matt – Side traffic is between two stations without an access point. Amar – we were looking for a test case where multiple streams originate and terminate at various points in the network.

Sunghyun Choi – what is the meaning of “TCP like” in the data types. Matt – this is to distinguish from streaming media formats.

Evan Green – on slide 3, what is the definition of raw PHY throughput. Matt – it is the rated raw bit rate, IE for 802.11b, 11Mbps.

Keith Amman – on slide 3, there is a callout for voice streaming and best effort, is streaming MPEG MPEG2? Matt – Yes.

Dave Halasz – on slide 2, there is a statement “low loading doesn't need QoS”. You might still be concerned with latency. Matt – there may be cases in low loading that would have QoS issues. The assumption was that if it works for high loading, it will work for low loading as well.

Peter E – the criteria doesn't include a metric for jitter. Matt – Agrees that there should be a parameter for jitter. Steve Gray – we discussed jitter, and it is probably an oversight.

Peter E – Hiperlan says it can be robust in a 20% loss. Do we need to consider that? Matt – that is probably a question for the discussion phase. Maarten – we need to come up with a model for the PHY layer, but that adds to the simulation complexity. Amar – it is important to model error rate and have an error distribution model.

Discussion on the paper

Categories (formats for questions)

The following is missing...

The following needs to be modified...

The next step should be...

General Comment...

Peter E – Description of throughput needs to be modified.

MACs are built in terms of time. It should be 85% of time rather than 50% of bits.

Matt – as long as you are not comparing between PHYs, bit rate is adequate.

Maarten – loading in time is less ambiguous. Throughput will mean other things to some people. Just specify medium occupancy.

Please clarify what Peter means by time

Peter – in terms of what is on the air, the air would support N packets per second. The total load on the channel, including preamble time. What is possible in the air?

Jesse Walker – there are two things missing from this proposal. Error rate in the simulation, and elasticity of the bandwidth. What fallback mechanism is used? Simulations will need to take fallback into account.

Amar – are you talking of bit error rate, or more elaborate channel models.

Jesse – an error rate that will drop packets. (it amounts to a packet loss rate)

Amar – if we do error rates we should look at the bit level, which may not move upstream as far as its impact. It should be a very tractable and controlled simulation set.

Steve Gray – defining at the bit rate, and translating to packet error rate is very difficult.

Amar – we don't need to make a supposition of packet error rate, but we can look at known PHY behavior at the bit level.

Sunghyun - one possible error model is the two state Markov chain model, emulating the fading model. We could define the channel in a good state and a bad state, and a transition between them.

Peter – Hiperlan claims robustness in a 20% packet loss. We could model a one in N packet discarding loss rate. It would be simple.

Maarten – it may also break some schemes. This could be useful for testing protocols.

Evan – we need to discuss multiple rates and fall back

John Kowalski – you have to make sure the lost cells are randomly distributed.

Amar – a fixed packet loss is not very realistic in the actual systems we have measured. Would a fixed drop rate really tell us anything useful?

Peter – would a total loss for 2mS or 1mS be better?

Amar – do we pick a fixed loss of a packet at a time, or the Markov model.

Peter – RealAudio dynamically varies their rates based on conditions.

Amar – the variable rate will add a lot of simulation complexity with little payback.

Peter – list of comments

Let's get all the issues out since we cant cover them all on this call

Loading – it is not only a fixed number of stations, but the AP to STA ratio is significant, and the STA / STA traffic also. The directionality of the traffic needs to be specified.

Does anyone think they can make a model for HiperLan II as a comparison?

Intel might like to collaborate

Does anyone have access to HiperLan's benchmarks that we could use?

They have agreed to provide these, but they have not.

ETSI doesn't allow distribution of the documents outside of ETSI members.

They offer personal downloading from their web site.

802.16 is working with ETSI and exchanging documents.

John to Stuart – can we approach ETSI? Stuart- we need to talk to Jamshid for obtaining documents for use in 802.11 WGs.

Action item for 802.11 officers.

Amar – it is hard enough to do one model accurately, is it realistic to do two?

Matt – the goal is to learn from their model.

Matt – the intent of this document was not to totally specify the test environment. The next step is to create more detail

Khaled Amer. Is this meeting to establish evaluation criteria?

John F – we are at the initial stage

Peter – we are trying to simplify the required simulation.

Khaled – should we create a joint model we can all use?

Evan G – could we do a straw poll of who will actually be doing simulation work

For next agenda item

Sunghyun – in slide 3, the “TCP like” should be modified. It is not specific enough

Matt – We mean to show three basic data types.

We need to define high layer applications in detail.

Maarten – not only applications, but protocols are significant to these models.

That is why we mentioned the protocol types.

Victoria – from document 125, the simulation is based on channelization within a BSS, and not across BSS's . Are you going to take roaming into account in the simulation?

Matt – we intend to start with a single BSS and then extend to multiple BSS's.

Maarten – Do you mean the handover process, or interference from adjacent BSSes?

Victoria - Both

Maarten - We did take into account adjacent BSS, but we didn't go into handover. This is handled in higher layers.

Process of Ad Hoc Group

John F -There are two issues – the evaluation criteria, and the simulations themselves.

Call for volunteers of people to come up with version R1 on document 125. Working for 2 weeks and publish on the reflector for further discussion.

For simulation, a group of volunteers will work on evaluating the tools available. They will initiate a reflector discussion no later than 3 weeks from now.

Matt – taking a poll on who is planning to present simulation data. Perhaps also include tool use.

Straw Poll – how many intend to do simulations?

Sunghyun Choi - Philips, Op Net.

Raju – Sharewave, Op Net

Jesse – Intel, using OpNet with 802.11 model.

Victoria – Microsoft . (unsure)

John K – Sharp (limited). Op Net

Matt Sherman – AT&T. OpNet

Dave Halasz - Cisco will do modeling.

Maarten – NWN, Currently network simulator, but may move to Op Net.

Khaled – suggests SES workbench as another option.

This group will start a reflector discussion in three weeks.

Should this group meet separately?

Yes, a solid proposal should be posted to start discussion.

Peter – we have a call in two weeks. We should have a revised document 125 before that next call.

John – supports that recommendation. We will make the simulation group output a topic for the next teleconference.

The simulation group will have a posting on the reflector in one week.

We will try – we can post the status in a week.

We don't expect convergence, but at least capture the ideas before the next teleconference.

A volunteer is needed to coordinate the simulation group. Evan Green suggests a face to face meeting.

Evan will be the coordinator.

Evaluation Criteria

How many people want to work on 125r1 with the same timeline as the simulations work?

Greg Parks – Sharewave

Peter Ecclesine – Cisco

Keith Amman – Spectralink

Tim Godfrey – Intersil

Duncan Kitchen – Intel

Matt Sherman (or Harry) – AT&T

Greg Parks volunteers as coordinator.

John F – we will have an improved R1 paper, and an idea of how to move forward with simulations. Is anyone uncomfortable with what we are doing? None.

Next Teleconference Goals

June 8th, 1:00PM EDT

Agenda Item - Discuss evaluation criteria 125r1 and simulation approach, from input from teams.

Peter – Hiperlan II has a radio link control sublayer, including handover, frequency control, TX power, etc. Some of these will be required for CEPT approval. We need to address these regulatory requirements. We need to look at ETSI 761-2, and have a discussion in the next teleconference on MAC support

Is this relevant to QoS?

This is MAC enhancements, not just QoS.

Transmit power control can be related to adjacent BSS issues.

Duncan – The critical aspects are dynamic frequency selection and power control. (general agreement). We should have proposal on how those two should be addressed.

Agenda Item - Radio Link Control Sublayer. (DFS / TPC)

Is power control a MAC or PHY issue?

Regulatory knowledge is in the MAC.

Simulation and evaluation criteria teams will address what level of interaction of Hiperlan II we want.

Peter will be champion of Radio Link Control Sublayer discussion.

Agenda Item - Requirements document.

John – is there any objection to discuss requirements at the next teleconference.

Peter – we haven't agreed on the functional requirements.

John – we have a work in progress.

Amar – we need to continue the work so we can pick it up at the next meeting.

We will start with a review of document 130 – working draft TGe requirements.

Amar – we should post a notice of participation in the two volunteer teams (evaluation criteria, and simulation) on the reflector.

Tim G – will make notice to reflector.

Matt – would like to limit it to those who will actually perform simulations.

Agenda Summary:

Evaluation revision of paper 125r1

Simulation approach (team)

Radio Link Control Sublayer - Peter

Requirements Document – Document 130, Tim G.

Final Questions or comments?

None

Reminder that the discussions are to be open, and published on the reflector.

Roll call update for late joiners (inserted at top)

Adjourn