IEEE P802.11
Wireless LANs

Tentative Minutes of the IEEE P802.11 Full Working Group

November 6 - 10, 2000

Hyatt Regency Tampa, Tampa, FL

Opening Session: Monday, November 6, 2000

1.1. Introduction

1.1.1. Meeting called to order by Stuart Kerry at 1300 hrs. Agenda of 64th session of 802.11 is in doc.: IEEE P802.11-00/358r1.

1.2. Review of 802.11 Organization

1.3. Objectives for this meeting:

1.3.1. TASK GROUP B-COR1- CORRIGENDUM MIB (CARL A.) Review, Resolve and Report to the Main WG Only if there are any Significant Comments from the IEEE Electronic Sponsor Ballot

1.3.2. TASK GROUP D - REGULATORY DOMAIN UPDATE (BOB O.)

1.3.2.1. - Nothing to be Discussed and No Meetings Specifications Required for this Meeting.

1.3.3. TASK GROUP E - MAC ENHANCEMENTS (JOHN F.)

1.3.3.1. - Continue Work on Baseline Drafts

1.3.3.2. - Address Any Technical Papers & Proposals

1.3.4. TGE(Q) - QOS SUB GROUP (JOHN F.)

1.3.4.1. - Proceed with QoS Baseline Drafts

1.3.5. TGE(S) - SECURITY SUB GROUP (DAVID H.)

1.3.5.1. - Follow-Up on Discussions for Integration of Proposals

1.3.6. TASK GROUP F - IAPP (DAVE B.)

1.3.6.1. - Complete First Draft of the Recommended Practice

1.3.6.2. - Review any New Submissions

1.3.7. TASK GROUP G - 802.11B DATA RATES >20 MBIT/S (MATTHEW S.)

1.3.7.1. - Accept Official Proposals

1.3.7.2. - Begin Selection Process

1.3.7.3. - Address Liaison Activities

1.3.8. SMA SUB GROUP - SPECTRUM MANAGED 802.11A (CARL T.)

1.3.9. - IEEE 802.11 WLAN (802.11h - Task Group H) Spectrum Managed 802.11a PAR

1.3.9.1. - Resolve Any Comments on PAR

1.3.9.2. - Begin Drafting Selection Process

1.3.9.3. - Begin Drafting Evaluation Criteria

1.3.9.4. - Begin Drafting Functional Requirements

1.3.9.5. - Call for Proposals

1.3.10. 5 GHZ GLOBALIZATION STUDY GROUP (RICHARD K.)

1.3.10.1. - Present Information Regarding ETSI-BRAN and MMAC Participation

1.3.10.2. - Formalize the Requirements Document

1.3.10.3. - Begin PAR and 5 Criteria

1.3.10.4. - Begin Functional Requirements, Selection Criteria and Selection Process Documents

1.3.11. 802 WIRELESS REGULATORY (VIC H.)

1.3.11.1. - 802 Rules Change for IEEE 802 Regulatory Position Papers
1.3.11.2. - IEEE SA - ITU-R Memorandum of Understanding
1.3.11.3. - Attention Items for each IEEE 802 Wireless WG
1.3.11.4. - 802 Regulatory Web Site Review
1.3.11.5. - Ad Hoc Meeting Schedule for other Specific Items
1.3.11.6. - Prepare position papers for National, Regional and Global regulatory bodies if needed.

1.3.12. MARKETING ADHOC (AL P.)

1.3.12.1. - Work on General Marketing Presentation for WG Web Site
1.3.12.2. - Produce WLAN Forecast Documentation
1.3.12.3. - Update Conference Calendar
1.3.12.4. - Continue to Work on Joint 802.11 / 802.15 Marketing Activities

1.3.13. WG CHAIRS ADHOC (STUART K.)

1.3.13.1. - Publish Revised IEEE 802.11 WG Operating Rules
1.3.13.2. - Produce Timeline Chart for All Current 802.11 WG PARs

1.3.14. OTHER WG ADHOC'S & ISSUES (ALL)

1.3.14.1. - IEEE 802.15 WPAN (802.15.4) Low Rate PAR - Review and WG Positioning
1.3.14.2. - IEEE 802.16 WirelessHUMAN (802.16.1b) PAR - Review and WG Positioning
1.3.14.3. - IEEE 802 RPR (802.17) PAR - Review and WG Positioning
1.3.14.4. - Joint IEEE 802.11 / 802.15 / 802.16 Co-Existence Issues in 2.4GHz & 5GHz
1.3.14.5. - IEEE 802.11 / ETSI BRAN / MMAC 5GHz Groups Co-Ordination and Harmonization

1.4. Approval of Agenda

1.4.1. Motion to approve the agenda
1.4.2. Motion ID 247
1.4.3. Moved Ivan Reede
1.4.4. Second Bob Kuwahara
1.4.5. Agenda Approved without objections

1.5. Roll Call

162 people in the room introduced themselves

1.6. Secretary, Document Officer, Attendance Book Officer

Tim Godfrey, Secretary
Harry Worstell, Document Officer
Al Petrick, Attendance Book Officer, delegated to Dennis Kuwahara.

1.7. Voting Rights

Stuart Kerry summarized the regulations regarding voting rights.

Participation in debates, moving and seconding, is only permitted by voting members, in all 802.11 meetings (at all levels of Plenary and Working Group).

- Chairs may permit observers to participate in debate
- In study groups all attendees have voting rights.

To become a voting member and to maintain voting member status:

- Participate in at least 2 out of 4 consecutive plenary meetings. An initial non-voting member obtains voting rights at the third meeting.
  - One interim may be substituted for a plenary
  - Participation in at least 75% of each meeting, in the room
  - Voting members will get a token to be used at votes

All members have voting rights at task group meetings

Voting rights may be lost:

- After failing to pay the conference fee
- After missing two out of three consecutive letter ballots

Current member status:

- Voting members: 124 at the beginning of this meeting
- Nearly voting members: 36
- Aspiring voting members: 129
- Non voters (over past 8 years) 439
- New Participants at this meeting 36

1.8. Attendance List; Registration

- Attendance List: The attendance list has to be recorded for voting membership registration. It was circulated with Dennis Kuwahara supervising.
- Members should verify their E-mail and addresses.
- Access to private area of web site is granted with 75% participation in a meeting week.

1.9. Logistics

(a) Coordinator – Face to Face Events

(b) Breaks: Coffee breaks are listed in the Agenda for 1000 and 1500. There is continental breakfast free for registered attendees. Lunches from 1200-1300 (exactly these times).

(c) Social evening Wednesday evening.

1.10. Documents

- Document distribution: Dissemination of documentation is via electronic file distribution controlled by Harry Worstell. Two mediums only will be used. They are 1) 802.11 network and 2) flash memory cards.
- All files must use the IEEE P802.11 templates for Word documents and PowerPoint. Stuart Kerry explained how to properly name and enter information into the documents including the document information, headers and footers. For presentations it is necessary to view header and footer, and slide master and update the date, name and document number.
- Documents must be in MS Office 97 format, not PDF.
- Inter – meeting documents must be sent directly to Harry Worstell, not only the reflector.
- Documents must be available on the network a meeting session before the agenda item is presented.

1.11. IEEE Patent Policy

Stuart Kerry, 802.11 Chair, explained the IEEE Patent Policy as per Clause 5 of the IEEE Standards Board Bylaws. He specifically asked attendees to notify the Working Group if they know about patents or patent applications that are (or may be) required to implement the standards, so the Chair can send out letters to patent holders to request the appropriate IP statements.

1.12. Individual Representation

All attendees are representing themselves as individuals and not companies and/or any special organization.

1.13. Anti-Trust Laws

Discussion of price is disallowed in 802.11 sessions due to the threat of price fixing. Price fixing discussions are governed by Anti-Trust Laws and are illegal.

1.14. Copyrights

If you know of copyrighted or proprietary material that is in the standard as we have drafts now, please let the group know so the Chair has the opportunity to request release.

Standards Publication shall constitute a "work made for hire" as defined by the Copyright Act. IEEE owns the copyright of the standards publication.

1.15. Approval of Minutes from Phoenix

1.15.1. Approved without objection

1.16. Reports

1.16.1. ExCom

- 1.16.1.1. 802.11d submitted to sponsor ballot – passed 11:0:0
- 1.16.1.2. Passed motion to purchase 3 more projectors.
- 1.16.1.3. Working on free standards issue.
- 1.16.1.4. Tutorials – electronic copies. The position of 802.11 is that we would like tutorials presentations available electronically.
- 1.16.1.5. Wednesday Y2K+ CDROM of published 802 standards will be available to registered voting members. At 1:00PM
  - 1.16.1.5.1. Suggestion that they be made available outside the meeting times
- 1.16.1.6. Warning for Hilton Head meeting – it may be a Marriott . There are two Hyatts so, please use the registration form in the pack.
- 1.16.1.7. Warning to let projector bulbs cool with the fan, and return them after meetings.

1.16.2. TGb-cor1 – Carl Andren

- 1.16.2.1. Just went out for Sponsor Ballot.
- 1.16.2.2. 17 no-comment approvals have come in, waiting for others.

1.16.3. TGd – Bob O'Hara

- 1.16.3.1. Forming a Sponsor Ballot Pool
- 1.16.3.2. Invitations to ballot were mailed at the end of last month.
- 1.16.3.3. If you haven't received the invitation to ballot, and want one, please contact the IEEE right away.
- 1.16.3.4. Estimated that it will be concluded in January, but probably not in time to deal with comments in the January meeting

1.16.4. TGe – John Fakatselis

- 1.16.4.1. There were many activities between meetings.
- 1.16.4.2. The goal for this meeting is to draft an initial cut of the standard.
- 1.16.4.3. TGe security – Dave Halasz
  - 1.16.4.3.1. Evaluation criteria
  - 1.16.4.3.2. Consideration of existing WEP formats
  - 1.16.4.3.3. Goal is to come up with an integrated proposal.
  - 1.16.4.3.4. Document 321, top down approach.

1.16.5. TGf – Dave Bagby

- 1.16.5.1. The first draft was not completed at the last meeting, so work will continue this week.
- 1.16.5.2. There is a need for the secretary for TGf

1.16.6. TGg – Matthew Shoemake

- 1.16.6.1. Four Proposals submitted
  - 1.16.6.1.1. Heegard, TI
  - 1.16.6.1.2. O'Farrell, Supergold
  - 1.16.6.1.3. Tan, 3com
  - 1.16.6.1.4. Webster, Intersil
- 1.16.6.2. Selection procedure document 309
- 1.16.6.3. Low hurdle vote – eliminate any proposal that doesn't have 25%.
- 1.16.6.4. Deadline of midnight tonight for proposals and criteria

1.16.7. SMa Study Group – Carl Temme

1.16.7.1. Expecting to receive some drafts of requirements and selection process, and selection criteria.

1.16.7.2. Approved motion in September to do re-affirmation

1.16.7.3. Motion on behalf of the group to take a re-affirmation vote for the Study Group

1.16.7.4. Moved Carl Temme

1.16.7.5. Motion ID

1.16.7.6. Vote: passes 80 : 0 : 4

1.16.8. 5G Study Group – Rich Kennedy

1.16.8.1. We conditional approved this SG to look at convergence in the 5GHz band. Conditional on ETSI and MMAC forming similar study groups.

1.16.8.2. We have received a letter from Tomoki Ohsawa. An ad-hoc study group has been formed and he is the chair in MMAC PC. They need more time to arrange internally, before the official notification.

1.16.8.3. Is this official enough to form the 5G SG?

1.16.8.4. Discussion

1.16.8.4.1. There are different levels of commitment?

1.16.8.4.2. If the letter is written to IEEE, it is acceptable, but if it is written to the IAG. That could be a problem.

1.16.8.4.3. IAG is not a standards body.

1.16.8.5. Tomoki – a new letter will be drafted to the IEEE this week. Do we need to wait another two months to start work?

1.16.8.6. Is there any objection to starting the Study group in this session?

1.16.8.7. No Objection – we will start the 802 part. The study group has been formed

1.16.8.8. Selection of Chair for Study Group.

1.16.8.9. Rich Kennedy is accepted as chair unanimously.

1.16.9. Marketing Activities Report – Al Petrick

1.16.9.1. Continue work on document 00/288 (general presentation to 802.11)

1.16.9.2. Work on generating WLAN forecast

1.16.9.3. WECA update

1.16.9.4. Common documents and articles from .11 and .15

1.16.9.5. Ad Hoc marketing is here on 1:30

1.16.10. Regulatory – Vic Hayes

1.16.10.1. Document 802RREG 00/001

1.16.10.2. ITUR adopted items at WARC 2003 meeting.

1.16.10.3. We have until then to prepare documents to be presented there, to maintain the existing rules for the 5GHz band.

1.16.10.4. Joint presentation by Dave Baddeley and Vic Hayes

1.16.10.5. Issue – 5GHz is not available globally. Different rules and frequencies in different places.

1.16.10.6. WLAN is the lowest class of users of these frequencies.

1.16.10.7. We need to lobby against other users that want this band.

1.16.10.8. Satellite industry has strong lobby in ITU-R.

1.16.10.9. The IT (WLAN) industry needs to establish lobby in our 2.5 year window.

1.16.10.10. We need to have as many sector members of ITU-R

1.17. Affirm Liaison representatives between 802 Working Groups

1.17.1. Update – Al Petrick

1.18. Review agenda for 802.15 joint meeting

1.18.1. Published on web site for review

1.18.2.	Motion to adopt the agenda for the joint 802.11 / 15 meeting

1.18.2.1.	Moved Ivan Reede
1.18.2.2.	Second Jason Flaks
1.18.2.3.	No Discussion
1.18.2.4.	Adopted without objection

1.18.2.5. Review of Submissions

1.18.2.6. 50 outstanding document – number have been assigned, but no documents have been received. Please submit documents to Harry as fast as possible.

1.18.2.7. All documents, and all revisions, must be submitted, including old revisions.

1.18.2.8. All documents from outside the meeting must be sent directly to Harry by email.

1.18.2.9. All documents from 2000 are on the server in ZIP files.

1.18.2.10. Documents up until today are in the “Pre-meeting” area.

1.18.2.11. Naming note – a single 0 is used for the year.

1.18.2.12.

1.19. New Business

1.19.1. 802.15 Low Rate PAR and 802.16 PAR Comments

1.19.1.1. We have until Tuesday 5:00 PM to make any comments before the vote in ExCom

1.19.1.2. Discussion

1.19.1.3. Can 802.11 make an official comment on the PAR? On Wednesday – so the comments must be in by Tuesday.

1.19.1.4.	Move that the 5G study group produce comments on the 802.15 low speed PAR and the 802.16 HUMAN PAR to be forwarded by 5:00PM Tuesday Nov 7th, 2000 to the 802 ExCom, and re-affirm on the Wednesday, November 8th Working Group Plenary.

1.19.1.4.1.	Moved Peter Ecclesine
1.19.1.4.2.	Second John Kowalski
1.19.1.4.3.	Motion ID 250
1.19.1.4.4.	Vote – Motion passes 55 : 1 : 19

1.19.2. 802.17 RPR PAR

1.19.2.1. No Discussion

1.20. Announcements

1.20.1. None

1.21. Recess for Subgroups.

2. Joint Session 802.11/15, Wednesday, November 08, 2000

2.1. Opening

2.1.1. Meeting called to order at 1:10PM

2.1.2. Roll Call banished from this session – 220 people in the room.

2.1.3. The afternoon break is at 3:30 today

2.1.4. When the plenary is closed, the 802.15 members should leave quickly

2.2. Agenda review

2.2.1. No new agenda items

2.2.2. Motion to approve the agenda

2.2.2.1. Ivan R

2.2.2.2. Vic H

2.2.2.3. Approved without objection

2.3. Report from 802.1

2.3.1. Butch Anton

2.3.1.1. 802.1X requests that a representative from 802.15 participate as well as 802.11

2.3.1.2. There will be a letter ballot as soon as those changes are integrated in the spec

2.3.1.3. Butch Anton appointed as 802.11 liaison to 802.1X

2.4. Matters arising from the minutes

2.4.1. No issues

2.4.2. Minutes approved unanimously

2.5. Old Business

2.5.1. Key Events

2.5.1.1. 802.15 – reducing .3 proposals

2.5.1.2. 802.11 – we have a new official study group for 5GHz globalization.

2.5.2. Interim Meetings

2.5.2.1. January 2001, Monterey, CA – There will be a registration form with venue and other information

2.5.2.2. Under registration on the 802.11 web site. Not currently a secure server.

2.5.2.3. Expecting ETSI and MMAC to participate also

2.5.2.4.

2.5.2.5. May Meeting planned for Orlando. The properties will be scouted within two weeks, and posted in early December

2.5.2.6. Week of May 15th.

2.5.2.7.

2.5.2.8. We have had a formal offer to host September in Sydney Australia

2.5.2.9. Straw Poll for approval of Sydney Australia – approximately 108 for, 11 against

2.5.2.10. Will be reported by the January Meeting

2.5.3. Scottsdale Financials

2.5.3.1. The revenues from fees was $78000, the expenses were $72000. The surplus of $6000.

2.5.3.2. We have spent approximately $3100 on the network
2.5.3.3. We have approximately $9500 surplus for the year. We will use it against fees for next year.

2.5.4. January Interim Planning

2.5.4.1. Host (Philips) commitment for January Interim. We need to estimate the attendees for Monterey – 116 total.
2.5.4.2. In May 802.16 will be joining us.

2.5.5. Wireless Network for meetings

2.5.5.1. Dick Eckhart will build cases
2.5.5.2. What about other WGs such as 802.3. They need server space.
2.5.5.3. Suggest a high speed Internet link for the Plenary meetings.

2.6. Task Group Reports

2.6.1. TGb-cor1 Carl Andren

2.6.1.1. Now out for sponsor ballot. We have 16 ballots back so far, with one No vote.
2.6.1.2. The ballot will be done on the 16th of the month.
2.6.1.3. Then the comments will be resolved.

2.6.2. TGd Bob O'Hara

2.6.2.1. TGd is forming a Sponsor Ballot pool.
2.6.2.2. Invitations have been mailed, and concludes on the 29th.
2.6.2.3. After the sponsor ballot group has been formed , and electronic ballot will begin.
2.6.2.4. It will not conclude before the January meeting, so there will be nothing to process until March.

2.6.3. TGe John Fakatselis

2.6.3.1. TGe has two subgroups – security and QoS. They will be integrated for ballots
2.6.3.2. The objective is to establish a baseline for the initial draft.
2.6.3.3. We are making progress to have baselines by the end of the week.
2.6.3.4. TGe has announced the end of the acceptance of proposals at the end of this week.
2.6.3.5. The next TGe full meeting is tomorrow at 10:30am
2.6.3.6. QoS subgroup
2.6.3.6.1. The QoS SubGroup has been proceeding as an ad hoc group to develop and edit the baseline. We have adjourned the ad hoc. We have 27:3:3 approval of the baseline among voters.
2.6.3.6.2. This afternoon we are going to have a formal motion to accept the ad hoc output as the QoS Baseline.
2.6.3.6.3. Current baseline is document 360r1
2.6.3.7. Security Subgroup – Dave Halasz
2.6.3.7.1. Worked on evaluation criteria doc 381
2.6.3.7.2. Discussed RC4 – insufficient currently.
2.6.3.7.3. Three proposals, but none had 75%. The motion was to develop a merged combinations
2.6.3.7.4. The combination of 363 and 182 was adopted
2.6.3.7.5. Output document 419 will be on the web by tonight and will be presented to the TGe group tomorrow.
2.6.3.8. The security proposal vote will be pushed into the full TGe session at 10:30AM tomorrow. The chair of TGe has agreed.

2.6.4. TGf Dave Bagby

2.6.4.1. Almost no progress this week due to simultaneous TGe and TGf sessions, and everyone has been attending TGe.

2.6.4.2. TGf is trying to figure out the work plan.

2.6.4.3. Recommendation to be made to the plenary tomorrow.

2.6.5. TGg Matthew Shoemake

2.6.5.1. Document 423

2.6.5.2. Continued the selection procedure 6 – 9

2.6.5.3. Heard all the proposals, finished this morning.

2.6.5.4. Next steps – comparison criteria in document 422 to be published.

2.6.5.5. Open questioning process, then final statements by all presenters.

2.6.5.6. There will be a low hurdle elimination vote tomorrow morning.

2.6.6. SMa Study Group – Carl Temme

2.6.6.1. The PAR was circulated to ExCom, and some minor edits have been made.

2.6.6.2. Working on requirements, proposal selection process, and evaluation criteria.

2.6.6.3. Selected a proposed chair – Mika Kaslin

2.6.6.4. Editor Evan Green

2.6.6.5. Motion in the 802.11 plenary to approve the PAR and 5 criteria.

2.6.7. 5G Study Group – Rich Kennedy

2.6.7.1. This group cannot be structured like a regular TG because of the work with ETSI and MMAC.

2.6.7.2. Decided to use 99/114 for definitions.

2.6.7.3. Came up with proposal to IEEE 802 to come up with coexistence and spectrum sharing guidelines that will be reviewed before new PARs can be granted. Passed 21:0:1

2.6.7.4. This group endorses the regulatory Ad Hoc Group and their activities.

2.6.7.5. The proposal was forwarded to the chair of 802.16 and 802.15 yesterday, and was discussed with the chairs.

2.6.7.6. The approval of new standards in the 5GHz band should be within the guidelines.

2.6.7.7. Without guidelines the broad market acceptance of all these products is threatened.

2.6.7.8. Discussion

2.6.7.8.1. The 5GHz globalization study group will meet with ETSI at the next meeting

2.6.7.8.2. This meeting is not been officially notified. There has been some thought that the first meeting should be in January.

2.6.7.8.3. 802.11 is becoming more interested in coexistence so there may be an opportunity to merge the coexistence groups

2.6.8. Marketing Activities – Bruce Kraemer

2.6.8.1. The marketing groups of 802.11 and 15 have been merged.

2.6.8.2. Reviewed articles in magazines

2.6.8.3. Reviewed status of the web site

2.6.8.4. Maintained and expanded a list of conferences of interest an relevant to 802.11 and 802.15.

2.6.8.5. Looking at press releases. Desires to promote the activities of 802.11 and .15. Press releases need to be generated in accordance to our milestones.

2.6.8.6. press kits for both .11 and .15

2.6.8.7. Forecasts – structure the market segmentation, solicit input from members. This is unit forecasts only.

2.6.8.8. Discussion

2.6.8.8.1. Document 405 is the input form? Yes. What about the useful life of the various products?

2.6.9. 802.15.1 – Ian Gifford

2.6.9.1. Will be summarizing the activity tomorrow

2.6.9.2. The current draft is 773 pages. The SDL is 400 pages, so the draft is over 1000 pages.

2.6.9.3. The next WG ballot is in January. We have added 12 months.

2.6.9.4. Current plan is to have December 2001 approval, with August approval internally.

2.6.9.5. Delays due to derivative nature of the work.

2.6.9.6. Ballot pool to be formed, with Sponsor Ballot by March 2001.

2.6.9.7. Discussion

2.6.9.7.1. Are you expecting to do 30 day sponsor ballots for a 1000 page document? Probably not.

2.6.10. 802.15.2 coexistence – Steve Shellhammer

2.6.10.1. Document 342

2.6.10.2. 6th report of the coexistence task group of 802.15

2.6.10.3. Working on coexistence mechanisms between WLAN and WPANs

2.6.10.4. Put out a call for submissions for coexistence mechanisms.

2.6.10.5. Presentations at this meeting, and in January 2001

2.6.10.6. Selection procedure – document 353.

2.6.10.7. Presentation on adaptive frequency hopping, and MDHA available on server.

2.6.11. 802.15.3 High Rate – John Barr

2.6.11.1. Document 343r0

2.6.11.2. Goal is to standardize MAC and PHY of a high rate WPAN.

2.6.11.3. Could be later adopted by Bluetooth Sig

2.6.11.4. Standard by end of 2001 or early 2002, if MAC and PHY can be selected.

2.6.11.5. 4 MAC proposals, and 7 PHY proposals.

2.6.11.6. Came back with Joint Proposal for MAC (multimedia type MAC)

2.6.11.7. 2nd round of PHY has been done down to last vote. Resolving No Votes. Current selection is between a 2.4GHz and 5GHz PHY.

2.6.11.8. Discussion

2.6.11.8.1. If a 5GHz phy is selected will it be compatible with 802.11a at 5GHz? Only in channel use and coding, plus DFS/TPC.

2.6.12. The 802.15 Radio 2 Study Group – Tom Seip

2.6.12.1. To provide input to and from Bluetooth.

2.6.12.2. This may have outlived its usefulness

2.6.12.3. This may be reactivated when Bluetooth 2 comes out to address 802.15.1a.

2.6.13. The 802.15 low rate study group – Pat Kinney

2.6.13.1. Completed its work on the draft PAR from September

2.6.13.2. The PAR already contained language on coexistence. Should there be a 5GHz low rate standard?

2.6.13.3. This PAR will be re-submitted to ExCom.

2.6.13.4. Working on criteria for call for proposals.

2.6.14. Radio Regulations– Vic Hayes

2.6.14.1. Documents RR00/006, and 007

2.6.14.2. Urgent need for active members to defend the 5GHz band at ITU-R

2.6.14.3. Showed the MOU between IEEE and ITU-R to reference each others documents.

2.6.14.4. Actions this week – follow up with FCC request to meet with 802.11 on part 15 rules. Mike Marcus was called, and assured us he will not rewrite part 15. But, the FCC is looking for a regular communication with 802 LMSC. He is looking for a change to 15.247 rules. There is a drive from industry to allow higher spectral efficiency in the 2.4GHz band.

2.6.14.5. To provide questions to FCC for a discussion in the February time frame. FCC will then make public announcement.

2.6.14.6. Ad Hoc agreed on three questions, and there was unanimous approval of the questions.

2.6.14.7. The proposal is in RR00/006r1

2.6.14.8. How should the rules be specified to allow the approval of devices to allow high performance but limited interference?

2.6.14.9. The intent is to minimize interference

2.6.14.10. Should the general class of digital modulations be added to the FCC Rules?

2.6.14.11. Motion – to approve doc RR00/006 draft 1 as a position paper bearing 802.11 and 802.15 support, and to empower the regulatory ombudsman to formant and edit the document according to style and support of 802.11 and 802 for the goal of obtaining the widest support possible.

2.6.14.11.1. Moved Vic Hayes

2.6.14.11.2. Second Ivan Reede

2.6.14.11.3. Discussion

2.6.14.11.3.1. Suggestion that the names of those who attended the meeting and their sponsor companies be added as a list. Straw poll – fails.

2.6.14.11.3.2. Vote for 802.11: passes 53 : 0 : 6

2.6.14.12. A teleconference with the FCC will occur after each Plenary starting in March 2001 (Friday, 10AM eastern time)

2.6.14.13. Discussion

2.6.14.13.1. The meeting notices for the US delegation – 6 December 2000

2.6.14.13.2. Is the conference call open? Yes everyone is allowed. How do you get the call in number? It will be announced at the plenary meeting.

2.6.15. CoExistence Task Group – Recommendation – Steve Shellhammer

2.6.15.1. An IEEE 802 wireless coexistence group for 802.11, 802.15, and 802.16 (HUMAN)

2.6.15.2. We put task group 2 within 802.15, but all 802.11 members could participate. Both 802.11 and 802.15 would vote on the recommended practice and both groups would have to pass with 75%.

2.6.15.3. The new proposal makes it a fully joint coexistence task group. It would be a joint task group under all three working groups.

2.6.15.4. Multiple co-chairmen from each WG.

2.6.15.5. New structure meets the requirements of the wireless WGs. Participants maintain membership in their home WG.

2.6.15.6. Discussion

2.6.15.6.1. Does this group also address backward compatibility within the existing working groups?

2.6.15.6.2. Coexistence needs to be reviewed up front at the proposal evaluation phase, not later.

2.6.15.7. This is a call for interest. At the next session we should be working on a formal motion to start this.

2.6.15.8. Any discussion should go to both reflectors.

2.6.16. 802.16 Wireless Human

2.6.16.1. We want to have the issue of coexistence explicitly in the PAR.

2.6.16.2. The Exec has asked the wireless group to come forward with a consistent position. It will be announced in the closing plenary.

2.7. New Business

2.7.1. None

2.8. Adjourn

2.8.1. Moved by Ian Gifford

3. Wednesday Afternoon 802.11 Plenary Session

3.1. Called to Order at 3:00PM

3.2. Review of Agenda

3.2.1. No Discussion

3.2.2. Agenda is unanimously accepted

3.3. Announcements

3.3.1. Ad Hoc Marketing group has been cancelled

3.3.2. Documentation update – Harry Worstell

3.3.2.1. Please use templates, and follow the rules.

3.3.2.2. Full web site will be on the server by the next meeting.

3.3.3. Currently reviewing the reflector membership – If you have attended one meeting for 75% you are added. Once you have voting rights you get access to the private area.

3.4. Conduct Votes As Required

3.4.1. Reaffirm PARs

3.4.2. Rich Kennedy –

3.4.3. Motion to Re-affirm the position of the empowered group of 5GSG as the position of 802.11 to the ExCom, as stated in document 00/415.

3.4.4. Moved Rich Kennedy

3.4.5. Second Frank Howley

3.4.6. Vote – passes 64 : 0 : 5

3.5. Announcements

3.5.1. Bring any motions in advance of the closing plenary

3.6. Recessed

4. Thursday Afternoon – 802.11 Closing Plenary Session

4.1. Called to order at 1:15PM

4.2. Opening

4.2.1. Agenda Review

4.2.2. No Agenda changes

4.2.3. Approval of Agenda

4.2.3.1. Motion to approve agenda
4.2.3.2. Moved Owen
4.2.3.3. Second Bob O
4.2.3.4. Approved without objection

4.3. Announcements

4.3.1. Chairs Telelconferences Dec 18 and Jan 8th

4.3.2. IEEE Rules

4.3.2.1. The revised rules will be on the server and the Web by the end of the days.

4.3.3. Updates and Reports from task groups and study groups to Tim Godfrey for update to web site.

4.3.4. Thierry Walrant to collect wireless net cards.

4.3.5. Record attendance - 958 people at 802 Plenary

4.3.6. Attendees List – The list is not available yet do to excessive number of new attendees.

4.4. Document List Update

4.4.1. Documents not on server (Steven Gray, Magis Networks, Alantro) – please see Harry.

4.4.2. 435 document so far this year, twice the number of last year.

4.4.3.

4.5. Closing Reports

4.5.1. TGb – Carl Andren

4.5.1.1. TGb-cor1 sponsor ballot ongoing. So far 16 yes votes and one No vote.

4.5.1.2. Comment resolution at the next meeting

4.5.2. TGd – Bob O'Hara

4.5.2.1. No work was done this week.

4.5.2.2. The IEEE believes the sponsor ballot can be started on the 1st of December. If that happens, we will have comment resolution at the January Meeting.

4.5.3. TGe – John Fakatselis / David Halasz

4.5.3.1. Good progress this week. Both subgroups approved their baseline. Vote passed 36:3:6 for Security, QoS vote was 38:4:8.

4.5.3.2. Motion to plenary to instruct editors to start work on drafts.

4.5.3.3. Announcing a November 28th meeting in Portland, OR to begin editing the draft baseline.

4.5.3.4. The QoS Group will continue the Ad Hoc teleconferences every week between meetings.

4.5.3.5. The simulations and metrics Ad Hoc group will continue teleconferences

4.5.3.6. The Objective is to complete the baseline draft and begin the balloting process.

4.5.3.7. The QoS Group approved a baseline and will start working towards an initial draft.

4.5.3.8. The Security group did approve a baseline (document 419) and it was adopted in TGe.

4.5.3.9. The interim meeting in Portland will be to assist the editor in writing the draft.

4.5.4. TGf – Dave Bagby

4.5.4.1. There have been ad hoc discussion on two conference calls.

4.5.4.2. Meeting progress was prevented due to overscheduling. The parallel meetings between TGe and TGf prevented any progress in TGf.

4.5.4.3. Attendance was very low, and mostly non voters.

4.5.4.4. Mahesh Venkatraaman – volunteered as secretary.

4.5.4.5. The draft was not completed

4.5.4.6. The plan to recover is to do some work between meetings.

4.5.4.7. The TGf Chair will Host an Ad Hoc meeting. Targeting the first week of December. Two days – location TBD.

4.5.4.8. Straw Poll for location – how many are willing to come? Approximately 4 people.

4.5.4.9. Preferences to be sent to Dave Bagby or on reflector.

4.5.4.10. If that meeting is schedule, we will have a revised schedule leading to a draft in January.

4.5.5. TGg – Matthew Shoemake

4.5.5.1. Document 441

4.5.5.2. Completed steps 11 and 12 of the selection process.

4.5.5.3. First elimination vote in step 13 was completed.

4.5.5.4. Ballot Results – Low Hurdle Vote:

4.5.5.4.1. Results in document 435.

4.5.5.4.2. Resulting in elimination of “Tan” proposal.

4.5.5.5. The IP statement notification has been made to the presenters.

4.5.5.6. The selection process will continue in the January 2001 meeting.

4.5.5.7. Does TGg need to be empowered to continue the process at an interim?

4.5.6. SMA Study Group – Carl Temme

4.5.6.1. Did a re-affirmation vote at the opening session for the PAR. 80:0:0

4.5.6.2. The study group accepted the PAR and 5 Criteria for forwarding to this group.

4.5.6.3. Completed the initial drafts of 3 document, and approved for submission:

4.5.6.3.1. Functional requirements

4.5.6.3.2. Selection Process

4.5.6.3.3. Comparison criteria

4.5.6.4. Nominee for Task Group Chair – Mika Kaslan

4.5.6.5. Nominee for Editor – Even Green

4.5.6.6. Communicated IPR policy.

4.5.6.7. Minutes and agenda will be on Server

4.5.6.8. Plans – prior to January Interim – conference call January 11th, details on reflector.

4.5.6.9. Objectives for January – refine documents and review any proposals received.

4.5.6.10. Three motions to be brought to Plenary.

4.5.7. 5G Study Group – Rich Kennedy

4.5.7.1. Vice Chair – Bruce Kraemer
4.5.7.2. Garth Hillman - Secretary
4.5.7.3. Working on critical definitions – the list has been started
4.5.7.4. Discussion
4.5.7.4.1. There is some thought of having all co-existence groups under 802 as an advisory group.

4.5.8. Wireless Regulatory – Vic Hayes
4.5.8.1. Plans for January Meeting
4.5.8.2. Depending on what comes in from bodies
4.5.8.3. Expecting to need to respond to questions from ETSI regarding industry forum on changing spread spectrum rules.
4.5.8.4. Responses also needed regarding 5GHz activities.
4.5.8.5. Questions
4.5.8.5.1. Is it possible to have a web page on the IEEE site for the Radio Regulatory issues, with pointers to other domains? Vic will have his own page. He will establish such links. Some links do go to private areas of ITU or ETSI.

4.5.9. Marketing – Al Petrick
4.5.9.1. Report in document 404
4.5.9.2. WECA update
4.5.9.2.1. 60 member companies
4.5.9.2.2. 50 certified products for 802.11b from 20 companies.
4.5.9.2.3. WECA is committed to testing 802.11a products.
4.5.9.2.4. Hawaii meeting in Feb 2001
4.5.9.3. Discussion
4.5.9.3.1. Can we have direct links to WECA off of our site?
4.5.9.4. Wireless LAN forecast model – anonymous survey. Document 407.
4.5.9.5. Expecting feedback from Comdex.
4.5.9.6. Discussion
4.5.9.6.1. Is there any additional information on the survey and how it is conducted? There is a document 407 that is the survey. To be filled out and brought to the next meeting in a sealed envelop to be turned in at January registration.
4.5.9.7. We have been directed to not use the term “Marketing”. Suggested terms are “education” or “Communications”.

4.6. Old Business

4.6.1. Motions from TGe
4.6.1.1. To instruct the editors to develop the initial TGe draft and make it available by the January 2001 Interim meeting based on the approved baselines by the two TGe subgroups.
4.6.1.2. (this motion passed in TGe with a vote of 39:0:1)
4.6.1.3. Moved John Fakatselis
4.6.1.4. Point of information (Parliamentarian)
4.6.1.4.1. What action does 802.11 need to take beyond what was done in TGe? None.
4.6.1.5. Motion is removed without objection.

4.6.2. Motions from TGf

4.6.2.1. Moved – 802.11F moves that future 802.11 meeting not repeat the experiment of scheduling overlapping 802.11E and 802.11F meetings sessions.

4.6.2.1.1. Moved Dave Bagby

4.6.2.1.2. Seconded Gary Speiss
4.6.2.1.3. Vote – passes 56 : 1 : 8

4.6.3. Motions from TGg

4.6.3.1. To affirm results of IEEE 802.11g ballot as recorded in document 00/435.
- 4.6.3.1.1. Moved Matthew Shoemake
- 4.6.3.1.2. Second Vic Hayes
- 4.6.3.1.3. Discussion
  - 4.6.3.1.3.1. Isn't this doing the same work twice? What is the action for 802.11?
  - 4.6.3.1.3.2. If the motion fails, what does it mean?
  - 4.6.3.1.3.3. This is a way of finding out where the group stands before balloting.
  - 4.6.3.1.3.4. How are we expected to vote yes or no without knowing the details?
  - 4.6.3.1.3.5. This is not to vote approval of the decision, but to affirm the procedure and ballot.
  - 4.6.3.1.3.6. We can't vote on that either, not being present in the Task Group where it took place.
  - 4.6.3.1.3.7. If the WG doesn't want these affirmations, TGg will withdraw the motion.
  - 4.6.3.1.3.8. The difference is that the Task Groups are chartered and authorized.
  - 4.6.3.1.3.9. Discussion among chairs and parliamentarians to decide the matter….
  - 4.6.3.1.3.10. The decision is that the motion should be withdrawn.
- 4.6.3.1.4. The mover and seconder are happy with withdrawing the motion.

4.6.3.2. The work done in TGg stands, according to the chair's ruling.

4.6.3.3. TGe results also stand under the same ruling.
- 4.6.3.3.1. Discussion
  - 4.6.3.3.1.1. Although TGe didn't eliminate proposals, they did close the opportunity for new proposals.

4.6.3.4. Does TGg need to be empowered to continue work in January?

4.6.3.5. Discussion

4.6.3.6. If someone were make a motion regarding TGe's work, at this point a motion to reject the baseline would be out of order. The WG chair agrees with this position.

4.6.3.7. The purpose of the reports of the parallel tracks is to keep the WG informed on the progress of each Task Group.

4.6.3.8. If we were to vote to affirm the work of TGg, and then they later wanted to reverse the decision, the reversal would also have to be made in the 802.11WG as well.

4.6.3.9. The open question is whether TGg needs to be empowered for the January meeting. Yes, it is required because of the Quorum rules.

4.6.3.10. Discussion
- 4.6.3.10.1. The discussion this morning – the problem with empowerment is that you have lost control. The procedure is that if there is no Quorum, you forward the results to the next Plenary.
- 4.6.3.10.2. The SMA group is going from Study Group to Task Group, and will need to be empowered.
- 4.6.3.10.3. The Chair rules that we do not have to empower work in the Task Groups for an Interim.
- 4.6.3.10.4.

4.6.4. Motions from the SMa Study Group

4.6.4.1. Move to affirm PAR 00/301r3 for submittal to ExCom.

4.6.4.1.1. Moved Carl Temme
4.6.4.1.2. Discussion

4.6.4.1.2.1. Could it be combined with the move to submit the 5 Criteria? No
4.6.4.1.2.2. Vote Passes 74 : 0 : 2

4.6.4.2. Move to affirm the Five Criteria 00/302r2 for submittal to ExCom

4.6.4.2.1. Moved Carl Temme
4.6.4.2.2. Discussion

4.6.4.2.2.1. None

4.6.4.2.3. Vote Passes 64 : 0 : 4

4.6.4.3. Parliamentary Enquiry

4.6.4.3.1. Can a motion for TGe be made now, based on the discussion we just had?
4.6.4.3.2. Any Objection to put motion in old business after Marketing Motions? None

4.6.4.4. Move to authorize SMa SG/TGh to call for proposals based on the documents 369r1, 284, and 421, and authorize TGh to post SMA SG documents to the 802.11 working group web site, and empower the continued work of SMa SG through the closing of the next 802 Plenary, or until TGh is formed, whichever comes first.

4.6.4.4.1. Moved Carl Temme
4.6.4.4.2. Discussion

4.6.4.4.2.1. You can't authorize a group that doesn't exist yet.
4.6.4.4.2.2. There is a precedence, this has been done before. The chair rules it is acceptable. No Objection

4.6.4.4.3. Vote Passes 54 : 0 : 2

4.6.4.5. Move to approve Mika Kasslin as proposed Task Group H Chair and Even Green as proposed Task Group H Editor.

4.6.4.5.1. Moved Carl Temme
4.6.4.5.2. Discussion

4.6.4.5.2.1. Are there any other nominees? None
4.6.4.5.2.2. No other discussion
4.6.4.5.2.3. Vote Passes 56 : 0 : 3

4.6.5. 5G Study Group

4.6.5.1. Move to empower the continued work of the 5GSG through the close of the next 802 plenary, in March 2001.

4.6.5.1.1. Moved Rich Kennedy
4.6.5.1.2. Discussion

4.6.5.1.2.1. None

4.6.5.1.3. Vote Passes 52 : 0 : 3

4.6.6. Wireless Regulatory

4.6.6.1. To empower the assembly at the January 2001 conference to submit position statements to regulatory or liaison organizations.

4.6.6.1.1. Move Vic Hayes
4.6.6.1.2. Second John Fakatselis
4.6.6.1.3. Discussion

4.6.6.1.3.1. I thought we have constraints about passing statements through 802? No, 802 recognized the Regulatory committee on this.

4.6.6.1.4. Vote 56 : 1 : 4

4.6.7. Marketing

4.6.7.1. None

4.6.8. 802.11E

4.6.8.1. To empower TGe, at the January 2001 Interim meeting to submit the draft to working group letter ballot.

4.6.8.1.1. Moved John Fakatselis
4.6.8.1.2. Seconded Harry Worstell
4.6.8.1.3. Discussion

4.6.8.1.3.1. None

4.6.8.1.4. Vote Passes 68 : 0 : 2

4.7. New Business

4.7.1. Is there any New Business?

4.7.1.1. None from the floor

4.7.2. New Motions from the Task Groups

4.7.2.1. None

4.7.3. Objectives for the January 2001 Meeting

4.7.4. Documents

4.7.4.1. Missing documents from Alantro and Steve Gray, and Magnus (formatting problems)

4.7.4.2. All other documents are on the server.

4.7.5. Return of WLAN cards

4.8. Adjourn at 2:50PM

Attendance list for the meeting held at
Hyatt Regency, Tampa, Florida

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Mr. Naotaka Maruyama ()	nonvoter	15		Temporary Dummy	naotka_maruyama@netcleus.co.jp
Dr. Bernard Aboba (Bernard)	nonvoter	75	+1 425 936 6605	Microsoft	bernarda@microsoft.com
Dr. Eric J. Addeo ()	aspirant	100	+1 201 348 7778	Panasonic	addeoe@panasonic.com
Dr. L Enrique Aguado (Enrique)	voter	75	+44 113 233 2004	Supergold Communication, Ltd	enrique@supergold.com
Dr. Reza Alavi ()	voter	100	+1 782 868 7122	Analog Devices	reza.alavi@analog.com
Mr. Richard Allen (Dick)	nonvoter	80	+1 408 974 5265	Apple Computer Inc.	rallen@apple.com
Mr. Keith Amann (Keith)	voter	100	+1 303 440 5330	Spectralink	kamann@spectralink.com
Mr. Merwyn Andrade ()	voter	100	+1 408 526 4628	Cisco Systems Inc.	mandrade@cisco.com
Mr. Carl F. Andren (Carl)	voter	100	+1 321 724 7535	Intersil Corporation	candren@intersil.com
Dr. Butch Anton	aspirant	75	+1 408 551 0909	hereUare Communciations, Inc.	butch@hereuare.com
Mr. Drayt Avera ()	nonvoter	15	(404) 876-7707	RF Solutions	davera@rf-solutions.com
Dr. Shahrnaz Azizi ()	aspirant	100	+1 858 385 4318	Intel Corporation	shahrnaz.azizi@intel.com
Mr. David Bagby	voter	100	+1 408 326 3762	3Com Corporation	david_bagby@3com.com
Mr. Jay Bain (Jay)	voter	100	+1 256 922 9229	Time Domain	jay.bain@tdsi.com
Mr. Gil Bar-Noy ()	aspirant	45	+972 9 743 9701 ext 200	hLAN	gilb@hlan.com
Mr. Anui Barra ()	nonvoter	100	(214) 480-4220	Texas Instruments Incorporated	batra@ti.com
Mr. Kevin M. Barry (Kevin)	voter	100	+1 516 244 4345	SITA	kevin.barry@sita.int
Mr. Bob Beach (Bob)	voter	100	+1 408 528 2602	Symbol Technologies Inc.	bobb@sj.symbol.com
Mr. Mathilde Benveniste ()	nonvoter	85	(973) 761-0988	AT&T Labs	benveniste@att.com
Mr. Brett Bernath ()	nonvoter	75	(858) 546-2404	Tioga Technologies	bbernath@tiogatech.com
Mr. Don Berry (Don)	voter	100	+1 425 936 8418	Microsoft	donbe@microsoft.com
Mr. Stuart Biddulph ()	aspirant	100	+1 801 320 7602	3COM	Stuart_Biddulph@3com.com
Mr. Simon Black (Simon)	aspirant	100	+44 1223 432406	Nokia	simon.black@nokia.com
Mr. Simon Blake-Wilson ()	nonvoter	65	(905) 501-3786	Certicom	sblakewilson@certicom.com
Mr. Jan Boer (Jan)	voter	100	+31 30 609 7483	Lucent Technologies Nederland	janboer@lucent.com
Mr. Robert Brummer ()	nonvoter	85	415 558 4709	Dolby Laboratories Inc	rdb@dolby.com
Mr. Kevin Burak ()	nonvoter	100	508 261 4726	Motorola	Kevin.Burak@Motorola.com
Mr. Patrick Busch ()	nonvoter	100	+31 35 687 5704	Lucent Technologies	busch@lucent.com
Dr. Alistar G. Buttar ()	aspirant	100	+41 22 7991 243	Motorola	alistair.buttar@motorola.com
Mr. Dominick Cafarelli ()	nonvoter	100	973 709 2004	Sniffer Technologies	
Mr. Colum Caldwell (Colum)	voter	100	+353 1 677 9555	Supergold Communication, Ltd	colum.caldwell@supergold.com
Mr. Bob Carlson ()	nonvoter	456	650 428 1081	Signal Processing Associates	rjc@sigpro.com
Mr. Bill Carney ()	aspirant	100	+1 707 521 3069	Texas Instruments	bcarney@ticom
Mr. Michael Carrafiello	nonvoter	100	978 684 1552	Enterasys Networks, Inc	carrafie@enterasys.com
Mr. Pat Carson (Pat)	aspirant	90	+1 408 467 5218	TDK Corporation of America	pcarson@tdktca.com

Full name	status	att. %	phone	company	e_mail
Mr. David Chauncey ()	nonvoter	30	716 631 6409	Clearwire	dchauncey@clearwire.com
Dr. Kwang-Cheng Chen ()	aspirant	75	+886 2 2363 5251 Ext 246	National Taiwan University	chenkc@cc.ee.ntu.edu.tw
Mr. Brian Cheng ()	voter	100	+ 1 613 592 2122	Mitel Corporation	brian_cheng@mitel.com
Dr. Greg Chesson ()	voter	75	+1 408 773 5258	Atheros Communications, Inc.	greg@atheros.com
Mr. Bong-Rak Choi ()	nonvoter	100	82 31 210 6100	Samsung	brchoi@samsung.co.kr
Dr. Sunghyun Choi (Sunghyun)	voter	100	+1 914 945 6506	Philips Research	sunghyun.choi@philips.com
Dr. John T. Coffey ()	voter	100	+1 707 284 2224	Texas Instruments	coffey@ti.com
Mr. Wm. Caldwell Crosswy (Caldwell)	voter	100	+1 281 514 2774	Compaq Computer Corporation	caldwell.crosswy@compaq.com
Mr. Barry Davis ()	voter	100	+1 503 264 7287	Intel	barry.r.davis@intel.com
Mr. Wim Diepstraten (Wim)	voter	100	+31 30 609 7482	Lucent Technologies Nederland	wdiepstraten@lucent.com
Mr. Roger Durand ()	nonvoter	15	+1 603 337 5170	Enterasys.	rdurand@enterasys.com
Mr. Dennis Eaton ()	voter	100	+1 321 729 4178	Intersil Corporation	deaton@intersil.com
Mr. Peter Ecclesine (Peter)	voter	100	+1 408 527 0815	Cisco Systems Inc.	petere@ieee.org
Mr. Hesham Elbakury ()	nonvoter	15		Temporary Dummy	helbakou@nortelnetworks.com
Mr. Greg Ennis (Greg)	voter	100	+1 408 358 5544		gennis@mindspring.com
Mr. Javier Espinoza (Harvey)	aspirant	100	+1 408 437 5230	TDK Corporation of America	hespinoza@tdktca.com
Mr. John Fakatselis (John)	voter	100	+1 407 729 4733	Intersil Corporation	jfakat01@intersil.com
Mr. Robert Fan ()	nonvoter	45	+1 408 392 7047	Neo Silicon	robert.fan@neo-silicon.com
Mr. Matthew James Fischer (Matt)	voter	90	+1 408 543 3370	BroadCom Corporation	mfischer@broadcom.com
Mr. Michael Fischer (Michael)	voter	100	+1 210 614 4096	Choice Microsystems	mfischer@choicemicro.com
Mr. Reed Fisher ()	nonvoter	15	+1 678 482 2471	Oki America, Inc.	rfisher@okitele.com
Mr. Jason Flaks	voter	100	+1 415 558 0373	Dolby Laboratories Inc	jsf@dolby.com
Mr. Jason Frannea ()	nonvoter	15	+1 972 684 7932	Nortel	jfrannea@nortelnetworks.c
Mr. Kenji Fujisawa ()	nearly voter	100	+81 3 5795 8507	Sony Corporation	fujisawa@sm.sony.co.jp
Mr. Keiji Fukuzawa (Keiji)	voter	100	+1 408 366 3008	Nitsuko Corporation	fukuzawa@nitsuko-bdo.co
Mr. Marcus Gahler (Marcus)	voter	100	+1 425 825 1770	NextComm, Inc.	mgahler@nextcominc.com
Mr. Atul Garg (Atul)	voter	100	+1 408 991 5755	Philips Semiconductors	atul.garg@philips.com
Mr. Amar Ghori (Amar)	voter	100	+1 916 939 9400	Sharewave Inc.	amar.ghori@sharewave.co
Mr. Monisha Ghosh ()	nonvoter	90	+1 914 945 6415	Philips Research	monisha.ghosh@philips.com
Mr. Tim Godfrey (Tim)	voter	100	+1 913 706 3777	Intersil	tgodfrey@choicemicro.com
Mr. Andrew J. Gowans ()	aspirant	100	+44 20 7211 0309	Wyndham House	gowansa@ra.gtnet.gov.uk
Dr. Steven D. Gray (Steven)	voter	100	+1 972 894 4422	Nokia Research Center	steven.gray@nokia.com
Mr. Evan Green (Evan)	voter	100	+1 503 264 8456	Intel Corporation	evan.r.green@intel.com
Mr. Patrick Green ()	aspirant	90	+1 408 749 4948	Advanced Micro Devices	patrick.green@amd.com
Dr. Rajugopal Gubbi (Rajugopal)	voter	100	+1 408 543 3470	BroadCom Corporation	rgubbi@broadcom.com
Mr. David Halasz (David)	voter	100	+1 330 664 7389	Cisco Systems, Inc	dhala@cisco.com

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Dr. Steve D. Halford ()	voter	100	+1 321 729 5130	Intersil Corporation	shalford@intersil.com
Dr. Christopher J. Hansen (Chris)	voter	100	+1 408 543 3378	BroadCom Corporation	chansen@broadcom.com
Mr. Yasuo Harada (Yasuo)	voter	100	+ 81 6 6900 9177	Matsushita Electric Industrial Co. Ltd.	yasuo@isl.mei.co.jp
Dr. Amer A. Hassan ()	nonvoter	45	+1 425 705 9590	Microsoft	amerh@microsoft.com
Mr. Victor Hayes (Vic)	voter	100	+31 30 609 7528	Lucent Technologies Nederland	vichayes@lucent.com
Dr. Chris Heegard (Chris)	voter	100	+1 707 521 3062	Texas Instruments	heegard@ti.com
Mr. Garth Hillman ()	nonvoter	100	+1 512 602 7869	AMD	garth.hillman@amd.com
Mr. Christopher Hinsz	voter	100	+1 408 528 2452	Symbol Technologies Inc.	chinsz@sj.symbol.com
Mr. Jin-Meng Ho (Jin-Meng)	voter	100	+1 214 480 1994	Texas Instruments Incorporated	jinmengho@ti.com
Mr. Maarten Hoeben (Maarten)	voter	100	+31 30 229 6083	Intersil N.L. B.V.	maarten.hoeben@nwn.nl
Mr. Frank P Howley, Jr (Frank)	voter	100	+1 650 494 7878	Atheros Communications, Inc.	fhowley@tspan.com
Mr. Robert Y. Huang (Bob)	voter	100	+1 201 358 4409	Sony	robert.huang@am.sony.com
Mr. Masataka Iizuka (Masataka)	voter	100	+81 468 59 8692	NTT Access Network Service Systems Labs.	iizuka@ansl.ntt.co.jp
Mr. Masayuki Ikeda (Masayuki)	voter	100	+81 266 52 3131	Seiko Epson Corp.	ikeda.masayuki@exc.epson.co.jp
Mr. Jeff Jan ()	aspirant	100	+1 408 867 6225	Cina	jeff_jan@hotmail.com
Dr. Srinivas Kandala (Sri)	voter	100	+1 360 817 7512	Sharp Laboratories of America,	srini@sharplabs.com
Mr. Isuke Karai ()	nonvoter	100	+81 468 47 6326	Seiko Epson Corporation	Karaki.Isuke@exc.epson.co.jp
Mr. Kevin Karcz	voter	100	+1 603 862 1008	University of New Hampshire	kjk@unh.edu
Mr. Mika Kasslin (Mika)	voter	100	+358 40 525 8932	Nokia Research Center	mika.kasslin@nokia.com
Mr. Dean M. Kawaguchi (Dean)	aspirant	90	+1 408 528 2629	Symbol Technologies Inc.	deank@sj.symbol.com
Mr. Toshi H. Kawai ()	aspirant	90	+81 3 5795 8503	Sony Corporation	kawai@sm.sony.co.jp
Mr. Eiji Kawase (Eiji)	aspirant	90	+81 42 581 5996	Epson Software Development Lab Inc.	kawase.eiji@exc.epson.co.j
Mr. Richard Kennedy ()	voter	100	+1 281 514 8695	Compaq Computer Corporation	richard.kennedy@compaq.com
Mr. Stuart J. Kerry (Stuart)	voter	100	+1 408 474 7356	Philips Semiconductors, Inc.	stuart.kerry@philips.com
Mr. Ryoji Kido (Ryoji)	voter	100	+81 92 852 1873	Kyushu Matshushita Electric Co., Ltd.	kido@tr.kme.mei.co.jp
Mr. Ken Kimura (Ken)	voter	100	+1 201 271 3039	Panasonic	kenkimur@bellatlantic.net
Mr. Duncan Kitchin (Duncan)	voter	100	+1 503 264 2727	Intel Corporation	duncan.kitchin@intel.com
Dr. John M. Kowalski (John)	voter	100	+1 360 817 7520	Sharp Laboratories of America	kowalskj@sharplabs.com
Mr. Bruce P. Kraemer (Bruce)	voter	100	+1 407 729 5683	Intersil Corporation	bkraemer@intersil.com
Mr. Thomas E. Krueger (Tom)	voter	100	+1 425 825 1770 ext 107	NextComm, Inc.	tkrueger@nextcomminc.com
Mr. Denis Kuwahara (Denis)	voter	100	+1 425 957 5366	Boeing	denis.kuwahara@pss.boeing.com
Mr. David S. Landeta (David)	voter	100	+1 407 729 5540	Intersil Corporation	dlandeta@intersil.com
Mr. George Landsburg	nonvoter	85	530 470 9131	Clare Micronix	glandsburg@clare.com

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Mr. Minfei Leng ()	nonvoter	30	+1 716 631 4584	Clearwire	mleng@clearwire.com
Mr. Onno Letanche ()	nonvoter	100	+31 30 6097 454	Lucent Technologies	oletanche@lucent.com
Mr. Sheung Li ()	nonvoter	100	+1 408 773 5295	Atheros Communications	sheung@atheros.com
Mr. William Li ()	aspirant	100	+1 510 647 1250 ext 28	ComSilica, Inc	wli@comsilica.com
Dr. Jie Liang ()	nonvoter	100	(214) 480-4105	Texas Instruments Incorporated	liang@ti.com
Mr. George Lin ()	nonvoter	15	+1 408 326 6846	3Com Corporation	george_lin@3Com.com
Mr. Scinivas Lingam ()	nonvoter	30	+1 408 733 4238	nBand Communications	lsri@nband.com
Mr. Rober Lo ()	nonvoter	75	+88 63 553 9128	IPC Taiwan Laboratories	rlo@inprocomm.com
Mr. Ralph Lombardo, Jr. ()	nonvoter	100	+1 978 684 1339	Digital Networks	lombardo@dnpg.com
Mr. Calvin Mai ()	nonvoter	100	+1 858 677 9981	Innocomm Wireless	cmai@innocomm.com
Mr. Douglas Makishima (Doug)	voter	100	+1 925 460 1929	ParkerVision, Inc.	doug@d2d.com
Mr. Leslie A. Martin ()	aspirant	100		Rockwell Collins	lamartin@collins.rockwell.com
Mr. Burhan Masood ()	nonvoter	100	(631) 435-6169	Standard Microsystems Corporation	burhan.masood@smsc.com
Mr. Gary McGarr ()	aspirant	100	+ 1 281 829 3706	Atheros Communications, Inc.	gmcgarr@atheros.com
Mr. Michael D. McInnis (Mike)	voter	25	+1 425 865 2840	The Boeing Company	michael.d.mcinnis@boeing.com
Mr. Pratik Mehta ()	aspirant	100	+1 512 723 6214	Dell Computer Corporation	Pratik_Mehta@Dell.com
Mr. Rober Meier ()	nonvoter	100	+1 330 664 7850	Cisco Systems, Inc	rmeier@cisco.com
Mr. Robert Miller (Bob)	nearly voter	90	+1 973 236 6920	AT&T Labs	rrm@att.com
Mr. Reiner Mim (Reiner)	voter	100	+1 408 731 2768	Proxim Inc.	rmim@proxim.com
Mr. Tim Moore (Tim)	nonvoter	90	+1 425 703 9861	Microsoft	timmore@microsoft.com
Dr. Brian Murray ()	nonvoter	65	+1 650 566 0477	Massana Inc.	brian.murray@massana.co
Mr. Peter Murray	voter	100	+1 908 232 9054	Intersil	pmurray99@home.com
Mr. Andrew Myles ()	nonvoter	100	+61 2 8874 5410	Radiata	andrew.myles@radiata.com
Mr. Marco Naeve ()	voter	85	+1 414 449 7270	Eaton Corporation	marconaeve@eaton.com
Mr. Kazuaki Naito (Kazuaki)	voter	100	+81 42 581 5996	Seiko Epson Corporation	naito.kazuaki@exc.epson.co.jp
Mr. Masami Nakamori ()	nonvoter	100	+1 818 830 7014	MNAK & Associates	masnaka@aol.com
Mr. Naotakamayama ()	nonvoter	100		Temporary Dummy	naotaka_maruyama@netcleus.co.jp
Dr. Ravi Narasimhan ()	voter	100	+1 408 522 2315	Marvell Semiconductor, Inc.	ravin@marvell.com
Mr. Danny Nissani ()	nonvoter	100	+972 9 766 7377	Commprize	danny@commprize.com
Mr. Gunnar Nitsche ()	nonvoter	100	+49 351 808 0054	Systematic AG	gunnar.nitsche@systemonic.de
Mr. Erwin R. Noble (Erwin)	voter	100	+1 281 719 1955	Telxon Corporation	enobl@telxon.com
Mr. Gerard Nourry ()	nonvoter	15	+1 978 250 0770	Enrichnet Inc.	gerard.nourry@cic.ca
Mr. Tzvetan D. Novkov (Tzvetan)	voter	100	+1 847 635 3247	Toko America Inc.	tnovkov@tokoam.com
Dr. Timothy O'Farrell ()	nonvoter	90	+1 353 1 677 9555	Supergold Communication, Ltd	tim.ofarrell@supergold.com
Mr. Bob O'Hara (Bob)	voter	100	+1 408 986 9596	Informed Technology Inc.	bob@informed-technology.com
Dr. Tomoki Ohsawa (Tomoki)	voter	90	+81 45 939 2179	NEC Corporation	t-ohsawa@cj.jp.nec.com
Mr. Dirk Ostermiller (Dirk)	aspirant	100	+1 801 278 6008	Micro Linear	dirko@xmission.com

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Mr. Mike Paljug (Mike)	aspirant	100	+1 321 729 5528	Intersil Corporation	mpaljug@intersil.com
Mr. Gregory Parks (Greg)	voter	100	+1 916 939 9400 X3211	Sharewave Inc.	greg.parks@sharewave.co
Mr. Ilan Peretz ()	nonvoter	100	+972 9 868 9110	Infineon Technologies	ilan.peretz@savan.com
Mr. Al Petrick (Al)	voter	100	+1 407 384 6149	ParkerVision, Inc.	apetrick@parkervision.com
Mr. William Picken ()	nonvoter	15	+1 650 210 0055	Kromos Technology, Inc.	willie@kromos.com
Mr. Terry Pierce ()	nonvoter	30	+1 321 729 5835	Intersil Corporation	tpierce@intersil.com
Mr. Ron Provencio (Ron)	voter	90	+1 707 284 2232	Texas Instruments	ronp@alantro.com
Mr. Greg Rawlins ()	nonvoter	100	+1 407 829 4440	ParkerVision	grawlins@signaltechnologies.com
Dr. Javad Razavilar ()	nearly voter	100	+1 858 674 8505	3COM	javad_razavilar@3com.com
Dr. David Reed (E.)	aspirant	100	+1 303 464 6637	Cirrus Logic, Inc	daver@colorado.cirrus.com
Mr. Ivan Reede (Ivan)	voter	100	+1 514 620 8522	AmeriSys Inc.	i_reede@amerisys.com
Dr. Stanley A. Reible (Stan)	voter	75	+1 781 224 4000	Micrilor Inc.	reible@compuserve.com
Mr. Danny Rettig ()	voter	100	+972 4 865 5579	Intel	dany.rettig@intel.com
Mr. David Richkas ()	voter	100		Intel	dave.richkas@intel.com
Mr. Maximilian Riegel (Max)	aspirant	100	+49 89 722 49557	Siemens	maximilian.riegel@icn.siemens.de
Mr. Carlos A. Rios (Carlos)	voter	100	+1 408 326 2844	LinCom	riosc@lincom.com
Mr. Benno Ritter ()	aspirant	75	+1 408 474 5115	Philips Semiconductors	Benno.Ritter@philips.com
Mr. Jon Rosdahl ()	nonvoter	100	+1 801 984 5866	Micro Linear Corporation	jrosdahl@freeport.com
Mr. Brian Rosnov ()	nonvoter	15	+1 978 266 3561	Agilent Technologies, Inc.	brian_rosnov@agilent.com
Mr. Rob Roy ()	voter	100	+1 503 681 8600 Ext 225	Mobilian Corporation	rob.roy@mobilian.com
Mr. Carl Ruzycki ()	aspirant	30	+1 978 250 0770	EnrichNet, Inc	cruzycki@enrighnet.com
Mr. Carl Ruzycki ()	nonvoter	30	+1 978 250 0770	Temporary Dummy	cruzycki@hotmail.com
Mr. Gunnar Rydnell (Gunnar)	voter	100	+46 31 344 63 20	Ericsson Mobile Data Design AB	gunnar.rydnell@erv.ericsson.se
Mr. Henry Saam	voter	85	+1 858 523 2314	Magis Networks, Inc.	hsaam@magisnetworks.co
Mr. Anil K. Sanwalka (Anil)	voter	100	+1 416 754 8007	Neesus Datacom, Inc	anil@neesus.com
Dr. Takuro Sato ()	nonvoter	15	+81 257 22 8130	Niigata Institute of Technology	tsato@iee.niit.ac.jp
Mr. Tom Schneider ()	aspirant	100	+1 972 934 3271	Texas Instruments	tschneider@4GNT.com
Mr. Sid Schrum (Sid)	voter	100	+1 919 319 1890 x	Texas Instruments	sschrum@ti.com
Mr. Matthew Sherman (Matthew)	voter	100	+1 973 236 6925	AT&T Labs	mjsherman@att.com
Dr. Matthew B. Shoemake (Matthew)	voter	100	+1 214 761 6987	Texas Instruments Incorporated	shoemake@ti.com
Dr. William Shvodian ()	aspirant	100	+1 703 749 0230	XtremeSpectrum	bshvodian@xtremespectrum.com
Mr. David Skellern (David)	voter	90	+61 2 8874 5404	Radiata Communications, Inc.	daves@radiata.com
Mr. Donald I. Sloan (Don)	voter	90	+1 330 664 7917	Aironet Wireless Communications Inc.	dons@cisco.com
Kevin Smart ()	aspirant	100	+1 801 984 5865	Micro Linear Corporation	keltypack@networld.com
Mr. Josep Sole ()	aspirant	100	+1 650 875 1533	France Telecom R&D	josep.soleitresserres@rd.francetelecom.com
Dr. V. Srinivasa Somayazulu	aspirant	100	+1 503 264 4423	Intel Corporation	v.srinivasa.somayazulu@intel.com

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Mr. Gary Spiess (Gary)	voter	100	+1 319 369 3580	Intermec Technologies Corp.	gary.spiess@intermec.com
Mr. Adrian Stephens ()	nonvoter	85	+44 771 276 3448	Mobilian Corporation	adrian.stephens@mobilian.com
Mr. Hitoshi Takanashi (Hitoshi)	voter	100	+1 650 833 3634	NTT Multimedia Communications Laborotories	takanashi@nttmcl.com
Mr. Katsumi Takaoka ()	nonvoter	30	+81468 36 1636	Victor Company of Japan, Ltd	ktakaoka@krhm.jvc-victor.co.ip
Mr. Teik-Kheong Tan (TK)	voter	100	+1 408 326 6524	3Com Corporation	teik_kheong_tan@3com.com
Mr. Law Teck ()	nonvoter	100	+65 381 5417	Panasonic Singapore	
Mr. Carl Temme (Carl)	voter	100	+1 650 494 7878	Atheros	ctemme@tspan.com
Mr. John Terry ()	nonvoter	90	972 894 5742	Nokia Research Center	john.terry@.nokia.com
Mr. Harold Teunissen ()	voter	100	+31 35 687 5711	Lucent Technologies	hteunissen@lucent.com
Mr. Yossi Texerman ()	aspirant	100	+972 9 743 0161 ext 309	hLAN	yossit@hlan.com
Mr. Mike Trompower (Mike)	voter	100	+1 330 484 7253		mtrompower@neo.rr.com
Mr. Clement Tse ()	nonvoter	15	+1 408 428 5065	Cadence Design Systems, Inc.	clementt@cadence.com
Dr. Chih C. Tsien (Chih)	voter	100	+1 858 385 4317	Intel	chih.c.tsien@intel.com
Mr. Tom Tsoulogiannis (Tom)	voter	100	+1 416 754 8007	Neesus Datacom Inc.	tomt@neesus.com
Mr. Khaled Turki ()	aspirant	100	+1 214 480 6907	Texas Instruments Incorporated	khaled@ti.com
Dr. Mahesh Venkatraman ()	aspirant	100	+1 510 647 1250 ext 27	ComSilica, Inc	mahesh@comsilica.com
Dr. Jesse R. Walker (Jesse)	voter	100	+1 503 712 1849	Intel Corporation	jesse.walker@intel.com
Mr. Thierry Walrant ()	voter	100	+1 408 617 4676	Philips Consumer Electronics	thierry.walrant@philips.com
Dr. Huayan Wang ()	nonvoter	100	+1 631 738 5356	Symbol Technologies Inc.	wanga@symbol.com
Mr. Shinichiro Wantanabe ()	voter	100	+81 42 581 5996	Seiko Epson Corporation	watanabe.shinichiro@exc.epson.co.jp
Dr. Fujio Watanabe ()	aspirant	85	+358 9 43761	Nokia Research Center	fwatanabe@ieee.org
Mr. Mark Webster (Mark)	voter	100	+1 321 724 7537	Intersil Corporation	mark.webster@intersil.com
Dr. Mathew Welborn ()	aspirant	100	+1 703 749 0230 ext 7134	XtremeSpectrum	mwelborn@extremespectrum.com
Mr. Menzo Wentink (Menzo)	voter	100	+31 30 225 97 52	Intersil N.L. B.V.	menzo@nwn.com
Mr. Dan Willey ()	nonvoter	100	+1 510 780 5329	Certicom Corp.	dwilley@certicom.com
Mr. Steven D. Williams (Steven)	voter	100	+1 503 264 2043	Intel Corporation	steven.d.williams@intel.com
Mr. Harry Worstell (Harry)	voter	100	+1 973 236 6915	AT&T Labs	hworstell@att.com
Mr. Liwen Wu ()	nonvoter	100	+1 408 853 4075	Cisco Systems, Inc.	liwwu@cisco.com
Mr. Hidehiro Yamashita (Hiro)	voter	100	+1 408 861 3921	Panasonic Technologies, Inc.	hyama@research.panasonic.com
Mr. Paul Yang ()	aspirant	90	+ 1 510 490 8228	OTC Telecom	pyang@ezylink.com
Dr. Vladimir Yanover ()	nearly voter	30	+972 3 645 7834	BreezeCom	viadimiry@breezecom.co.il
Mr. Tan Yew ()	nonvoter	100	65 381 5470	Panasonic Singapore	pytan@psl.com.sg
Dr. Wen-Ping Ying (Wen-Ping)	voter	100	+1 425 825 1770 x	NextComm, Inc.	wying@nextcomminc.com
Mr. Masashi Yoshida ()	nonvoter	100	+ 81 422 45 9231	Japan Radio Co.	m-yoshl@lab.jrc.co.jp
Mr. Albert Young (Albert)	voter	100	+1 408 326 6435	3Com Corporation	albert_young@3com.com

Full name	*status*	*att. %*	*phone*	*company*	*e_mail*
Dr. Yossi Zilberfarb ()	nonvoter	75	+972 9 766 7377	Commprize	yossi@commprize.com
Mr. Glen Zorn ()	aspirant	100	+1 425 471 4861	Cisco Systems	gwz@cisco.com
Mr. Jim Zyren (Jim)	voter	100	+1 407 729 4177	Intersil Corporation	jzyren@intersil.com

IEEE P802.11
Wireless LANs

Minutes of 802.11 Task Group E
MAC Enhancements

Date: November 6, 2000

Author: Tim Godfrey
Intersil
Phone: 913-706-3777
Fax: 913-664-2545
e-Mail: tgodfrey@intersil.com

Minutes of the IEEE P802.11 Task Group E MAC Enhancements

November 6 - 10, 2000

Hyatt Regency Tampa, Tampa, FL

1. Monday Afternoon

1.1. Secretary

1.1.1. Tim Godfrey

1.2. Call to order

1.2.1. 3:30 PM

1.3. Poll of new participants

1.3.1. First time at TGe (about 40)

1.4. Agenda

1.4.1. Proposed Agenda (for Joint activities of two subgroups)

1.4.1.1. Approval of Minutes
1.4.1.2. Overview of 802.11 policies
1.4.1.3. Voting Rights, debates, key motions
1.4.1.4. Schedule
1.4.1.5. Organization
1.4.1.6. Question on document 066
1.4.1.7. Call for papers
1.4.1.8. Recess for SubGroups
1.4.1.9. Presentation of papers

1.4.1.10. New Business

1.4.1.11. Next meeting agenda

1.4.1.12. Presentation to WG Plenary

1.4.2. Overall Objective

1.4.2.1. Develop initial draft

1.4.3. Discussion on Agenda

1.4.3.1. None

1.4.4. Adoption of Agenda

1.4.4.1. No Objection, adopted by unanimous consent.

1.5. Approval of the Minutes

1.5.1. Discussion

1.5.1.1. None

1.5.2. Minutes approved without objection

1.6. Policy Overview

1.6.1. Attendance book, voting rights

1.6.2. Voting rights in Ad Hoc groups are at the discretion of the chair

1.6.3. Debates – only voting members, but at the chairs discretion others may participate.

1.6.4. Key Motions

1.7. Schedule Overview

1.7.1. This group has been operating for about a year. The original goal was to have a WG ballot at the end of this meeting. We may be close. There is a lot of convergence towards a baseline, in both QoS and Security.

1.7.2. Next step is a draft for Working Group Ballot.

1.7.3. This group (TGe) will address the comments

1.7.4. The objective is to get 75% approval of WG members, but the unwritten rule is to get consensus in the 90% range before submitting for sponsor ballot.

1.7.5. Assuming we start the balloting process at end of this week, or the latest January 2001, we are on a good path.

1.7.6. Discussion / Question

1.7.6.1.

1.8. Organization of TGe

1.8.1. We divided the work into QoS and Security in September.

1.8.2. The TGe Editor is Michael Fischer

1.8.3. Sub Editors

1.8.3.1. Jesse Walker (Security)

1.8.3.2. Michael Fischer (QoS)

1.8.4. QoS and Security operate in parallel due to schedule constraints.

1.8.5. Report on QoS – John F

1.8.5.1. We have started drafting the sections. We have a solid proposal on PCF, and DCF is rapidly coming together, and there is consensus.

1.8.5.2. We have made the formal announcement that this week is the last opportunity for papers and proposal to be incorporated in the sponsor ballot.

1.8.5.3. Discussion

1.8.5.3.1. Will there be a full session for the vote?

1.8.5.3.2. This will be done in a Full TGe session.

1.8.5.3.3. TGe will consider the baseline after the Ad Hoc finished.

1.8.5.3.4. Wednesday AM, the QoS Ad Hoc group could present a motion to the full TGe session

1.8.6. Report on Security – Dave H

1.8.6.1. A number of proposals were reviewed at the last meeting.

1.8.6.2. Working on merging them now.

1.8.6.3. Consideration of whether RC4 is adequate, or if something else is needed

1.8.6.4. Looking at the merged proposals.

1.8.6.5. The group is still in the Ad Hoc group, but the QoS group may be a little ahead. If the baseline is not ready by the end of the week, there will be another meeting scheduled before the January meeting.

1.8.7. Editorial

1.8.7.1. Jesse and Michael to get together and work on draft integration.

1.8.7.2. Substitute Editor for Wednesday and Thursday (when Michael has to leave).

1.8.7.2.1. To be decided between Tom T, Anil K, and Simon B.

1.8.7.3. The editor is also cleaning up inconsistencies and errors in the existing MAC clauses. A list of such issues will be developed after this meeting.

1.8.7.3.1. If anyone is aware of clarification issues or problems in the existing standard, please direct it to Michael's attention.

1.8.8. Appointment of Vice Chair

1.8.8.1. This is getting to be a significant task, with lots of parallel activities and between meeting activities. It is too much for John as the Chair.

1.8.8.2. Is there any objection to appoint a vice chair to assist TGe?

1.8.8.2.1. No Objections

1.8.8.3. There is one volunteer – Duncan Kitchin.

1.8.8.4. Any other nominations?

1.8.8.4.1. None

1.8.8.5. Duncan Kitchin accepted as Vice Chair by acclamation.

1.8.9. Review of Document 066 questions on requirements?

1.8.9.1. There are no outstanding objections or issues with anyone in the group.

1.8.10. Call for Papers (for presentation to Joint TGe group)

1.8.10.1. Michael Fischer, document 337, "Generic Management Actions"

1.8.10.2. Duncan K Document ??? "A Network Enrollment Protocol"

1.8.11. Call for Papers (For QoS)

1.8.11.1. Jin Meng Ho, paper 363, "Graphic Description of 802.11E Performance.

1.8.11.2. Jin Meng Ho, paper 367 P-DCF

1.8.11.3. John Kowalski, document 377 "FEC Frame Formats for 802.11a"

1.8.11.4. document 383 "A consideration on FEC"

1.8.11.5. Michael Fischer document 358 and 360 "QoS Ad Hoc Baseline Proposal"

1.8.11.6. Document 336 "PIFS Ambiguity"

1.8.11.7. Wim D Document 398 "Baseline DQos Proposal"

1.8.11.8. Duncan Document ??? "FEC for QoS "

1.8.11.9. doc 387 "Scheduling for level 2 enhanced PCF"

1.8.11.10. Doc 375 "Tiered contention"

1.8.11.11.

1.8.12. Call for Papers (Security)

1.8.12.1. Bob Beach Doc 381 "Security Eval Criteria

1.8.12.2. Doc 382 "Joint Proposal for 802.11 Security"

1.8.12.3. Jesse Walker Doc 362 " WEP Analysis"

1.8.12.4. doc 376 "SAIN"

1.8.13. Other papers (no presentation)

1.8.13.1. Doc 370 "Minutes of Interim Teleconference"

1.8.13.2. Doc 368 "Mediaplex enhanced proposal for QoS driven wireless LANs"

1.9. Presentation of Papers

1.9.1. Document 337, Michael Fischer

1.9.1.1. "Generic Management Action"

1.9.1.2. Overview

1.9.1.2.1. There are a number of parallel activities that will need to have management information exchanges over the wireless medium

1.9.1.2.2. We are low on frame types, so this mechanism helps save codes.

1.9.1.2.3. This mechanism is in the QoS Baseline Proposal and only needs to be there once.

1.9.1.2.4. Categories can be assigned to sub groups like QoS and Security to allow parallel development with less required coordination.

1.9.1.3. Discussion

1.9.1.3.1. Does this intend to move away from the restriction of fixed fields word aligned headers? No, the field is a single 4 octet field.

1.9.2. Document 377, John Kowalski

1.9.2.1. "FEC Frame Formats"

1.9.2.2. Overview

1.9.2.2.1. From review of AV requirements of 802.11

1.9.2.2.2. Timing issues with adding FEC Coding to 802.11

1.9.2.2.3. The general requirement is an error rate of 1E-9 with minimal overhead.

1.9.2.2.4. Compatible with OFDM symbol sizes

1.9.2.2.5. Is this a MAC or PHY issue? The PHY would be a nice place – you could protect the PLCP header. However it would need a new PAR.

1.9.2.2.6. 802.11a timing (table 93) issues. In particular, an entire frame must be decoded and acked within a SIFS time.

1.9.2.2.7. It was not possible to demonstrated that this could be done with today's technology.

1.9.2.2.8. However there is a proposal for a delayed ACK in the proposal.

1.9.2.2.9. There are many coding schemes that meet the requirements.

1.9.2.2.10. AV formats are in multiples of 48 bytes.

1.9.2.3. Discussion

1.9.2.3.1. Aren't error mechanisms chosen for the types of expected errors? So they should correspond to 802.11a specific errors? And thus it would be 802.11a specific?

1.9.2.3.2. We are attempting to make changes to the 802.11a PHY for SMA in Europe. So there will be corresponding changes to the MAC.

1.9.2.3.3. RS codes do not stop at 255.

1.9.2.3.4. Why is there an FCS in the field? Isn't the FEC a better error check. If this code can correct these errors, it will exceed the hamming distance requirements.

1.9.2.3.5. How do you distinguish the different MPDU formats from the normal?

1.9.2.3.6. Regarding the interaction between security and QoS. How do we sort out whether the FEC protects the security, or vice versa? We need to figure this out as we go…

1.9.2.3.7. What error rate does the existing system offer? What is the undetected error rate? Very low due to ACKs. But if you want to maintain a small number of retries, then the existing system is insufficient.

1.9.2.3.8. In the existing standard the retry limit parameter allows control of latencies.

1.9.2.3.9. There was a proposal for sending MPDU fragments 5 times, and any 3 are enough to use it.

1.9.2.3.10. We cannot guarantee perfection, but we want to increase the envelope of what is workable.

1.9.3. document 383 "A consideration on FEC"

1.9.3.1. Matsushita

1.9.3.2. Overview

1.9.3.2.1. FEC is used in digital cable, satellite, etc

1.9.3.2.2. Concatenation of Viterbi and Reed Solomon codes.

1.9.3.2.3. The Viterbi Code in the 802.11a PHY and an FEC option in 802.11E provide an improvement.

1.9.3.3. Discussion

1.9.3.3.1. What does the implementation look like? There are four RS blocks interleaved.

1.9.3.3.2. Does the interleaver need to change with the PHY rate? No

1.9.3.3.3. The interleaver works reasonably well for 16QAM with rate ¾.

1.9.4. Recess for Ad Hoc Sub Groups

2. Monday Evening TGe QoS SubGroup

2.1. Called to Order at 6:30PM

2.2. Agenda

2.2.1. Proposed Agenda

2.2.1.1. Overview of activities

2.2.1.2. Recess for Ad-Hoc

2.2.1.3. Papers (Ad Hoc)

2.2.1.4. Draft Editing (Ad Hoc)

2.2.1.5. Adjourn Ad Hoc

2.2.1.6. Reconvene TGe QoS SubGroup

2.2.1.7. Draft Approval

2.2.1.8. Motions for TGe

2.2.1.9. Adjourn SubGroup

2.2.2. Discussion on Agenda

2.2.2.1. Does the Ad Hoc status give the submitted papers full 802.11 submission status?

2.2.2.2. Anything submitted is an official submission

2.2.3. Adoption of Agenda

2.2.3.1. Adopted without objection

2.3. Overview of Activities

2.3.1. Discussion

2.3.1.1. We will start by reviewing the baseline, and then any new papers to see how and if they can be integrated into the baseline.

2.3.1.2. The goal is to have an initial draft completed.

2.3.1.3. By Wednesday, we can decide what to do with the draft. We can consider whether it is ready to ballot, or determine a work plan between now and January to have it ready for ballot.

2.3.1.4. When do we present the papers? During the Ad Hoc.

2.3.2. Any Objection to recess for Ad Hoc

2.3.2.1. No Objections

2.4. Ad Hoc QoS Group

2.4.1. Presentation of Papers – Document 358, Michael Fischer

2.4.1.1. "Summary of the QoS Baseline Proposal"

2.4.1.2. Overview

2.4.1.2.1. Developed during the month of October during teleconferences and the New Jersey meeting.

2.4.1.2.2. The primary output documents are document 360r0. There will be an r1 with more clauses in the morning.

2.4.1.2.3. Clause 9 will need to be worked on this week.

2.4.1.2.4. Document 358 is a presentation of the document 360.

2.4.1.2.5. Why adopt a baseline?

2.4.1.2.5.1. To have a framework to evaluate proposals

2.4.1.2.5.2. To focus effort on areas that are incompletely defined

2.4.1.2.5.3. To move quickly to a draft for initial letter ballot.

2.4.1.2.6. Features of Baseline

2.4.1.2.6.1. Upward compatible and coexistent with 802.11-1999

2.4.1.2.6.2. Supports both prioritized and parameterized QoS

2.4.1.2.6.3. Provides QoS delivery under EDCF and EPCF

2.4.1.2.6.4. BSS overlap mitigation

2.4.1.2.6.5. New structural elements to extend BSS coverage and connectivity.

2.4.1.2.7. Conformance Levels

2.4.1.2.7.1. Conformance levels are attributes of the association.

2.4.1.2.7.2. Levels vary by style of QoS (prioritized and parameterized) and Coordination functions.

2.4.1.2.8. MAC SAP

2.4.1.2.8.1. No changes to service primitives

2.4.1.2.8.2. Priority parameter used to identify traffic category. (0-7)

2.4.1.2.8.3. With the existing standard, this field indicates delivery modality.

2.4.1.2.8.4. The interface is uniform across all conformance levels.

2.4.1.2.9. Enhanced Station Model

2.4.1.2.9.1. At least 4 Queues below MAC sap.

2.4.1.2.9.2. There is a conceptual scheduler below the queues to select the next TXop.

2.4.1.2.9.3. The channel access function (EDCF or EDCF) is independent of the scheduler.

2.4.1.2.10. Traffic Categories

2.4.1.2.10.1. Global per QBSS, as priorities for prioritized levels.

2.4.1.2.10.2. Level 0 is not the lowest priority in 802.1h. (It may make sense to order the priorities as 1, 2, 0, 3, 4, 5, 6, 7) where 0 is best effort.

2.4.1.2.11. Functional Improvements

2.4.1.2.11.1. Allowance of direct ESTA-ESTA transfers

2.4.1.2.11.2. Directed probe request to learn capabilities.

2.4.1.2.11.3. Improved Beacon reliability

2.4.1.2.11.4. Allow RTS/CTS during CFP

2.4.1.2.11.5. CF-Polls convey TxOps

2.4.1.2.11.6. Clarify ambiguous provisions in clause 9.

2.4.1.2.12. New Mechanisms

2.4.1.2.12.1. Transmit Opportunities

2.4.1.2.12.2. Traffic Category Identifiers

2.4.1.2.12.3. Aggregation

2.4.1.2.12.4. Burst Transfers

2.4.1.2.12.5. Delayed Acknowledgement

2.4.1.2.12.6. Centralized Contention and Reservation Request

2.4.1.2.12.7. Alternate EAP / EPC

2.4.1.2.12.8. BSS overlap mitigation

2.4.1.2.12.9. Bridge Portals

2.4.1.2.13. Enhanced DCF

2.4.1.2.14. Enhanced PCF (based on Joint Proposal)

2.4.1.2.14.1. Does not used BSS Unique VSID's nor external classifier entities.

2.4.1.2.15. MLME SAP

2.4.1.2.15.1. TSupdate to define and modify traffic specifications

2.4.1.2.15.2. Sense the state of the wireless medium.

2.4.1.2.16. Aggregation

2.4.1.2.16.1. New container frame is defined

2.4.1.2.17. Power Save

2.4.1.2.17.1. Basically in conflict with QoS. Today Power Save has priority, but QoS must be maintained in QBSS.

2.4.1.2.17.2. Listen Epoch – portions of beacon interval a station must be awake to listen.

2.4.1.2.18. Incomplete items and placeholders

2.4.1.2.18.1. FEC

2.4.1.2.18.2. EDCF access mechanism

2.4.1.2.18.3. BSS overlap mitigation

2.4.1.2.18.4. Bridge Portals

2.4.1.2.18.5. Interaction with Higher Layer end-end management entities (informative annex describing a recommended practice)

2.4.1.3. Discussion

2.4.1.3.1. Is overlap mitigation possible under 802.11E?

2.4.1.3.2. Yes, only and 802.11E AP will have the proper support and understand the necessary elements.

2.4.1.3.3. Are BSS overlap and DFS solving the same problem?

2.4.1.3.4. If you have DFS, it is far superior to move the BSS to another channel than to share the time on the air. True frequency planning is always better, but we need to support the 3 channel 2.4GHz band, and un-coordinated situations like multi-family homes.

2.4.1.3.5. Are the proxy beacons used for the mitigation algorithm, or do they affect APs in adjacent BSS's?

2.4.1.3.6. In the mitigation mode, they cause the CFPs to be offset in time. It also identifies stations in the overlap region and their frame loss rate.

2.4.1.3.7. A legacy station would set its NAV from a proxy beacon.

2.4.1.3.8. The intent of the proxy beacon in a QBSS is to set timing, not to set ESTA NAVs. This is under our control.

2.4.2. Areas needing more discussion in the baseline proposal

2.4.2.1. DCF part of baseline

2.4.2.2. Guaranteed Beacon

2.4.2.2.1. Fragmentation?

2.4.2.3. power save mechanism

2.4.2.4. Direct Probes

2.4.2.5. parameters that need to communicate to higher layers.

2.4.3. Call for papers

2.4.3.1. None currently available

2.4.4. Discussion of baseline issues

2.4.4.1. We cannot discuss DCF until presentations

2.4.4.2. Burst length – is there a limit to the burst length? Yes, the TxOp length, which is the same as the MAX MPDU of 2304 octets. The intent is to remove PHY overhead for short packets.

2.4.4.3. Power Save Mechanism

2.4.4.3.1. More background is needed for what happened between Joint Proposal and baseline Power Save

2.4.4.3.2. In legacy 802.11 it is easy since all traffic goes through AP. The challenge is when the source and dest are in the BSS and could use direct STA-STA. The AP has to schedule the TXoP, but also the Listen Epoch.

2.4.4.3.3. In the Joint proposal all stations know the streams, now we only have traffic category. The Listen Epoch from Joint proposal don't apply anymore.

2.4.4.3.4. Conclusions from New Jersey Ad Hoc –

2.4.4.3.4.1. Listen Epoch can work at Level 3.

2.4.4.3.4.2. Listen Epoch can be used via AP at any level (like today).

2.4.4.3.4.3. DCF – like today.

2.4.4.3.4.4. At any level below 3, you send PS traffic via the AP. The AP would send directly following the beacon.

2.4.4.3.4.5. Direct STA-STA could work at level 3.

2.4.4.3.5. Definition of PS non-poll :

2.4.4.3.5.1. The way PS is defined today is based on the DTIM – stay awake if your bit is on, until you recv a frame with the MoreData bit is 0, or CFend

2.4.4.3.5.2. The concept of "stay awake until you get your traffic" may be not much better than no power save at all.

2.4.4.3.5.3. Document 360, clause 7 defines this.

2.4.4.3.6. There were a number of people who want power save, but they have no opinion of what it should be. This seems to meet those criteria.

2.4.4.3.7. It is not seen as very useful to do IBSS power save. The new dynamic AP capability makes the IBSS "obsolete". This should wait until we have a stable DCF QoS mechanism.

2.4.4.4. Discussion of rigid limit at TBTT

2.4.4.4.1. Like there is a hard rule for the FH PHY that a transmission cannot extend across a dwell boundary into a hop time, we can make a rule that an 802.11E conformant devices will not be allowed to transmit across a TBTT (beacon transmission time).

2.4.4.4.2.

2.4.5. Presentation of Paper – document 336

2.4.5.1. Michael Fischer

2.4.5.2. "the PIFS ambiguity"

2.4.5.3. Overview

2.4.5.3.1. Practical limitations on the use of PIFS

2.4.5.3.2. PIFS is supposed to be a priority interframe space.

2.4.5.3.3. Two uses:

2.4.5.3.3.1. To provide the AP with priority access in the contention free period

2.4.5.3.3.2. To allow the PC to retain control of the medium in the case of non-response.

2.4.5.3.4. Some proposals have suggested to expand the use of PIFS, but it is not really useful.

2.4.5.3.5. There are two issues:

2.4.5.3.5.1. SIFS PIFS ambiguity – the PC may transmit another frame.

2.4.5.3.5.2. The absence of CCA busy at PIFS is not a good indication that nothing happened. Antennas may be sampled once per slot.

2.4.5.3.5.3. To mitigate – only use PHYs with PHYs that have fast CCA and check all antennas in a slot time.

2.4.5.3.5.4. PIFS – DIFS ambiguity

2.4.5.3.5.5. There is only one CCA measurement, so CCA idle after PIFS doesn't guarantee a clear

channel. A collision is possible if a station's backoff is a 1

2.4.5.4. Discussion

2.4.5.4.1. The issue is really the accuracy and timing of CCA.

2.4.5.4.2. Conclusion – PIFS is not a panacea – there is still a probability of a collision, just as in any DCF contention.

2.4.6. Recess until tomorrow

3. Tuesday Morning TGe QoS Session

3.1. Introduction

3.1.1. Plan for today

3.1.1.1. Cover papers this morning – presentation without debate

3.1.1.2. This afternoon, start with baseline establishment

3.1.1.3. We will have straw polls to gauge our progress on baseline acceptance

3.1.1.4. Once we have strong consensus, we will have a formal meeting to vote acceptance

3.1.1.5. During straw polls, "no" votes and abstainers must explain what issues are keeping them from a "yes" vote.

3.1.2. Call for Papers

3.1.2.1. Jin Meng Ho, paper 363, "Graphic Description of 802.11E Performance. (30 min)

3.1.2.2. Jin Meng Ho, paper 367 P-DCF (30 min)

3.1.2.3. document 383 "A consideration on FEC"

3.1.2.4. Wim D Document 399 "Baseline DQos Proposal" (1 hour)

3.1.2.5. Duncan Document ??? "FEC for QoS " (15 minutes)

3.1.2.6. Wen Ping Ying, doc 387 "Scheduling for level 2 enhanced PCF"

3.1.2.7. Matilde Benvenista. Doc 375 "Tiered contention"

3.2. Presentation of Papers

3.2.1. "A scheduling scheme for Level 2 enhanced PCF MAC Service

3.2.1.1. Doc 387, Wen Ping Ying, Nextcomm Inc

3.2.1.2. Overview

3.2.1.2.1. Based on Wim's Baseline to be presented later

3.2.1.2.2. To go through the bridging between level 1 and level 3 QoS.

3.2.1.2.3. Operation of level 2 PCF model

3.2.1.2.4. Intention is that same scheduling mechanism can be used in level 1 and level 2

3.2.1.2.5. Random number aspect of VDCF is used for scheduling mechanism to rank/order/prioritize frames for transmission during the CFP

3.2.1.2.6. CW vector from AP may be adopted by STA

3.2.1.3. Discussion

3.2.1.3.1. Why do you believe that level 0 PCF is fair? It depends on the Access Point. Fairness is not standardized.

3.2.1.3.2. Why you believe it is necessary to standardize the order the PC does things? Agrees that it is up to the implementation.

3.2.1.3.3. There was a suggestion that it was in address order.

3.2.1.3.4. Are there any other changes other than dropping all the advanced capabilities of Level 2? No

3.2.1.3.5. There was a suggestion that the scheduling mechanism was the same as VDCF. Aren't there cases where come queues would never get scheduled?

3.2.2. "Baseline D-QoS Proposal"

3.2.2.1. Document 399, Wim Diepstraten

3.2.2.2. Overview

3.2.2.2.1. Part of total layered QoS proposal

3.2.2.2.2. Enhanced DCF used in levels 1, 2, and 3

3.2.2.2.3. The class differentiation is only active when there is an active traffic load in higher priority classes.

3.2.2.2.4. Load feedback (monitoring and measurement) per priority class is needed.

3.2.2.2.5. Service rate control, and drop rate control regulate the offered load

3.2.2.2.6. Medium monitoring provides load per class in terms of CoX (contention offset) and CWx (contention window)

3.2.2.2.7. Contention offset allows more differentiation control (added after simulation work started on DQoS)

3.2.2.2.8. Retry mechanism – to temporarily reduce the load for stability reasons. .

3.2.2.3. Simulation Results – Greg Chesson

3.2.2.3.1. Limited scope environment in NS simulator.

3.2.2.3.2. Model 1 – simple uniform traffic, 4 access classes. Goal – observe differentiated service

3.2.2.3.3. Model 2 – 4 phones (higher access class) plus 8 tcp/ip streams (lower access class)

3.2.2.3.4. Common scenarios are needed between NS and OpNet environments.

3.2.2.3.5. Model 1 results show that there is differentiation of bit rate and latency/jitter from the classes.

3.2.2.4. Discussion

3.2.2.4.1. Load measurement and translation are up to the implementer? Yes, medium occupancy time should be the measure. The load monitor is put in the same category as the scheduler in level 3

3.2.2.4.2. Where is the burst/aggregation mechanism? Burst should be implemented in level 1. The baseline does not limit aggregation to any level. It is just a new frame type, usable anywhere.

3.2.2.4.3. What about re-ordering frames within a queue if a destination doesn't respond? That is in the proposal as a non-exhaustive retry provision, within a priority.

3.2.2.4.4. It seems that the only way this works if it is not loaded too much, so there must be a higher layer managing the load. Would it degrade so that there will be no service to any?

3.2.2.4.5. the DQOS proposal doesn't address all the QoS requirements. Which requirements does this attempt to address? This hasn't been done yet – but believe it to be good enough for many things.

3.2.2.4.6. These simulations show some differentiation. There are two mechanisms the scheduler and channel access mechanism. How much value is attributed to the differentiated queues vs channel access? The channel access is the primary effect. The mechanism is proposed to be used twice, but the simulations use it once. Using it twice will help with collisions on the medium.

3.2.2.4.7. Has enough attention been paid to the accidental overload condition?. The overload has been driven, and the problem comes from too many stations, not too much traffic. There are things that can be done to handle the overload case.

3.2.2.4.8. Could the contention free bursts be enhanced to give some of the features of PCF? Suggestion that the questioner write it up as a submission.

3.2.2.4.9. We need to distinguish between handling the offered load vs presenting the load in the first place. In some cases the offered load must be controlled.

3.2.3. "Tiered Contention, A QoS-Based Distribution MAC Protocol"

3.2.3.1. Document 375, Mathilde Benveniste, AT&T

3.2.3.2. Overview

3.2.3.2.1. Urgency classes – change arbitration time based on urgency.

3.2.3.2.2. The time the channel must be sensed idle changes with urgency.

3.2.3.2.3. In terms of slot time.

3.2.3.2.4. Congestion-adaptive, traffic-specific backoff

3.2.3.2.5. Collision resolution with collision avoidance.

3.2.3.3. Discussion

3.2.3.3.1. How often is the backoff counter computed? When the channel is idle for an arbitration time, the counter is decremented.

3.2.3.3.2. There is not infinite granularity of timing. The slots are there because of propagation delays. The solution is that you can avoid a finite set of countable values. But it might not be worth the effort for the small gain.

3.2.3.3.3. It will only result in the starvation of lower classes if there is no way to change the classification in the buffer.

3.2.3.3.4. What prevents a collision here if you don't synchronize the start of the countdowns? You could select the D and H variables properly.

3.2.3.3.5. If the start of the countdown isn't synchronized between stations, how does it work? You have to have

prior synchronization, but not packet by packet synchronization.

3.2.4. p-DCF scheme for prioritized services

3.2.4.1. Document 367, Jin Meng Ho

3.2.4.2. Overview

3.2.4.2.1. Probabilistic vs Backoff access

3.2.4.2.2. Proposal for pure probabilistic DCF access

3.2.4.2.3. Simulations underway

3.2.4.3. Discussion

3.2.4.3.1. There is no relevance of TxOp vs RxOp. The job of a MAC is TxOp control. But if it was, how would this be different in controlling RxOps? The difference is in resolving local collision. In this scheme no local collisions would occur. In VCDF all dcf's would have to back off. (But neither addresses the question 1 of RXop) agreed…

3.2.4.3.2. Have you looked at the jitter involved? The access time is geometrically distributed – which has a nice std dev probability.

3.2.4.3.3. Have you looked at the collision probabilities between the approaches? We have minimized collision probability by the estimation.

3.2.4.3.4. The VDCF is intrinsically fair, but it is possible to introduce unfairness if needed for special flows.

3.2.4.3.5. If we have a mixed BSS mixing this proposal with the existing DCF, how will this work? Yes, the existing NAV and RTS/CTS rules are retained.

3.2.4.3.6. In all the DCF proposals with backoff you increase the contention window after a failure. It seems that this proposal reduces the window? The reduction is in the contention probability, which is analogous to increasing the contention window.

3.2.4.3.7. Is there a mechanism for post backoff after a successful transmission? Yes, you reset the probability for that category.

3.2.5. Traffic Descriptions for 802.11 performance simulation

3.2.5.1.1. Document 363, Jin Meng Ho

3.2.5.1.2. Overview

3.2.5.1.2.1. Common simulation scenario for evaluation of 802.11e QoS MAC scenarios.

3.2.5.1.2.2. Multiple traffic sources.

3.2.5.1.2.3. Traffic sources are described with quantitative descriptions.

3.2.5.1.2.4. Delay and variation are considered.

3.2.5.1.3. Discussion

3.2.5.1.3.1. How realistic is these distribution? The are not real life, but capture major features of applications.

4. Tuesday Afternoon TGe QoS Session

4.1. Baseline Polling

4.1.1. Procedure Objective

4.1.1.1. Approve a baseline by the end of today or tomorrow.

4.1.1.2. Take several straw polls

4.1.1.3. If we have strong consensus >80% then we will take the baseline to a formal meeting, where we can get it accepted.

4.1.1.4. If anyone says no during a straw poll, they need to explain why, and what could be done to change their vote to yes.

4.1.1.5. The baseline can have "black boxes" at this point. Don't vote no because of missing detail, as long as the baseline allows for the concept to be discussed at a later time.

4.1.2. Discussion

4.1.2.1. Are non-voters allowed to participate in straw polls? Yes

4.1.2.2. Perhaps we should have two straw polls, so non voters don't make us think the wrong thing about the voters.

4.1.3. Are there any clarifications that are needed at this point on the baseline?

4.1.3.1. The different levels of QoS, how do they affect implementation? A device must support all lower levels.

4.1.3.2. What does 802.11E compliance mean then? What level? We have not resolved this yet. It was not critical to the baseline. This is a labeling issue.

4.1.3.3. A conformance group in the 802.11E PICS will be mandatory for 802.1E level 1, and another for group 1 or 2, and a group for 1 or 2 or 3.

4.1.3.4. Wouldn't this be the same compliance rule as the existing DCF / PCF in the standard? Yes, so is WEP.

4.1.3.5. Can we make suggestions for broadening certain specifications? Specifically the specification for scheduling and access of Wim and Michaels presentation.

4.1.3.6. It is better to decide a specific approach, people will start implementing, and it is more difficult to change later.

4.1.3.7. The VDCF is not a scheduler. We are getting confused over a scheduler. No one is proposing we standardize a scheduler. Lets move on.

4.1.3.8. Lets leave the access approach and the scheduler approach as a "black box"

4.1.3.9. Once we adopt a baseline, it will take 75% to change it. So making changes will be difficult. Lets not put something in and expect it will be easy to take it out.

4.1.3.10. It is easier to take things out than to add later (due to internal consistency issues)

4.1.3.11. What about fragmentation? Is something like that in the baseline? What you use it for is not specified. The plan is to remove the restriction on size and scheduling gaps.

4.1.3.12. What is our methodology to approve the baseline? Can we agree on the things we have broad consensus on? We will have a straw poll after these questions. We will record issues, and then address them.

4.1.3.13. In the nested architecture, the level 3 EAP shall support level 1? Yes

4.1.3.14.

4.1.4. Straw Poll

4.1.4.1. There are 39 Voting Members present

4.1.4.2. How many disapprove the baseline as presented?

4.1.4.2.1. Tom

4.1.4.2.2. Anil

4.1.4.2.3. Matthew

4.1.4.2.4. Bob

4.1.4.2.5. Raju

4.1.4.2.6. Sid

4.1.4.2.7. Jin Meng

4.1.4.2.8. Harry

4.1.4.2.9. Sunhyun

4.1.4.2.10. Matthew S

4.1.4.2.11. John Coffey

4.1.4.3. How many abstain?

4.1.4.3.1. Ca-Che

4.1.4.3.2. Wen-Ping

4.1.4.4. How many approve - 24

4.1.4.5. Current count 24:11:2

4.1.5. Straw Poll of Non-voters

4.1.5.1. Approve of baseline - 7

4.1.5.2. Disapprove of the baseline – 3

4.1.5.2.1. Brian

4.1.5.2.2. Khaled

4.1.5.2.3. Liwen

4.1.5.3. Abstain - 6

4.1.6. Resolution of Issues with Baseline

4.1.6.1. Raju

4.1.6.1.1. Eliminate QoS Null sub-types

4.1.6.1.2. Table 3 – data subtypes –0000 compatibility issue

4.1.6.1.3. Clause 7.2.1.1 – RTS / CTS

4.1.6.1.4. Clause 7.2.1.10- Feedback with AID or ESTA address

4.1.6.1.5. Clause 7.2.1.13 – TxOp Flags from joint proposal are absent. Record count =0 to cancel schedule.

4.1.6.1.6. Wants an advanced power management category

4.1.6.1.7. Clause 7.2.3.13 – references to superframe and TBTT

4.1.6.1.8. Duncan – need categorization of these points into show-stoppers and editorial.

4.1.6.1.9.

4.1.6.2. Anil

4.1.6.2.1. Why all the complexity in level 3 is there? We started with the most complex MAC ever, and this adds an order of magnitude of complexity. Do we need that complexity? Would like to drop Level 3

4.1.6.2.2. Persistent Polls – similar to TDMA. Has this been justified? Feels that it is complex to implement.

4.1.6.2.3. Aggregation – for the set of transactions it is used it, is it worth the effort.

4.1.6.2.4. Delayed acknowledgement – this is a can of worms. Very high level protocol don't implement them.

4.1.6.2.5.

4.1.6.3. Sid

4.1.6.3.1. It is premature to select a DCF access method.

4.1.6.3.2. We need more simulation results for enhanced DCF

4.1.6.3.3. We need one meeting period to find the best out of the three.

4.1.6.3.4. Would vote yes if we "black box" the DCF access method.

4.1.6.4. Harry, Bob, and Matt S

4.1.6.4.1. Agrees with black box concept for DCF

4.1.6.4.2. Doesn't care for nesting procedure – it could be better done with levels 1.5 and 2, merging 1 and 2 existing levels. It would have to include cf-pollable capabilities.

4.1.6.5. Tom

4.1.6.5.1. Related to Nesting – disagree with options within an option. All levels should be mandatory within 802.11E.

4.1.6.6. Sungyhun

4.1.6.6.1. too early to decide on DCF channel access

4.1.6.6.2. BSS overlap mitigation, but wants more details.

4.1.6.7. Jin Meng

4.1.6.7.1. Black Box the DCF and scheduler

4.1.6.8. Brian

4.1.6.8.1. wants more text on the baseline. Would change to Yes if the No voters now would change to Yes.

4.1.6.9. Wen-Ping

4.1.6.9.1. looking from the implementation, Level 0 is already there. Suggests to use the same level 0 frames for PCF and level 2 in PCF.

4.1.6.9.2. Either take out mandatory use of RR and CC or make it optional in Level 2.

4.1.6.9.3.

4.1.7. Non Voter's issues with baseline

4.1.7.1. Mathildhe

4.1.7.1.1. Covered by previous issues (black box for DCF access)

4.1.7.2. Khaled

4.1.7.2.1. the group should agree on one simulation framework in order to compare results. Therefore there has to be consensus on simulation.

4.1.7.3. Liwen

4.1.7.3.1. DCF black box

4.1.7.4. Adrian Stephens

4.1.7.4.1. The biggest concern is the number of things in a hardware implementation.

4.1.7.4.2.

4.1.7.5. John K changes yes to abstain over DCF channel access (concern over useful QoS in DCF)

4.1.7.6. Bob Mier

4.1.7.6.1. Concern over proxy beacon mechanism and OBSS mechanism

4.1.7.7.

4.1.8. Discussion

4.1.8.1. How will we deal with these concerns? We are still Ad Hoc, so we don't need motions.

4.1.8.2. Now, we will address areas that are non-controversial.

4.1.8.3. We will discuss the contentious issues, and try to convince the objector to reverse their vote.

4.2. Comment Resolution

4.2.1. Raju

4.2.1.1. Null QoS Data Subtypes

4.2.1.1.1. They are needed because a null data frame is reported to the LLC. A non-reported null is required to fill a TxOp to indicate status, and piggyback acks

4.2.1.2. RTS / CTS in CFP –

4.2.1.2.1. it is in document 360

4.2.1.3. Feedback with AID

4.2.1.3.1. Fixed in 360

4.2.1.4. txop flags are absent

4.2.1.4.1. because of change in continuation mechanism

4.2.1.5. Record Count – 0

4.2.1.5.1. It was overlooked, but will be put in , editorial

4.2.1.6. Advanced power category codes

4.2.1.6.1. This is to assign to subgroups so work can go on in parallel

4.2.1.6.2. Editor rejects category code, but will do action code. Accepted.

4.2.1.7. DFS / TPC element

4.2.1.7.1. In SMA subgroup.

4.2.1.8. TBTT / superframe in activation delay

4.2.1.8.1. Editor believes it is correct in the clause as written. (generic management action)

4.2.1.9. Container frame ack issue

4.2.1.9.1. Editor will check

4.2.1.10. Privacy capability bit

4.2.1.10.1. Gone , not QoS issue

4.2.1.11. Table 16 level 0

4.2.1.11.1. already in doc 360

4.2.1.12. TA, RA, TCID

4.2.1.12.1. already done in 360

4.2.1.13. Polling interval

4.2.1.14. retry interval in TU

4.2.1.15. Error statistics per TCIS

4.2.1.15.1. already done in 360

4.2.1.16. qbss activity change

4.2.1.16.1. will be made more clear

4.2.1.17. FEC frame format

4.2.1.17.1. already covered with placeholders

4.2.1.18. TBTT hard limit

4.2.1.19. Already there

4.2.2. Discussion from the floor

4.2.2.1. Do we need a black box on the Overlap mitigation mechanism?

4.2.2.2. Duncan has a resolution to propose:

4.2.2.3. Move that the specific definition of scheduling algorithm and channel access method to be used in level 1 QoS be temporarily replaced with a text placeholder in the baseline document; further to reiterate that as of the November 2000 meeting the call for proposals is closed, and text to replace the placeholder be based on existing proposals.

4.2.2.3.1. Moved Duncan

4.2.2.4. Discussion

4.2.2.4.1. The intention is to close the call for proposals.

4.2.2.4.2. Change to "call for QoS baseline proposals"

4.2.2.5. Move that the specific definition of scheduling algorithm and channel access method to be used in level 1 QoS be temporarily replaced with a text placeholder in the baseline document; further to reiterate that as of the November 2000 meeting the call for QoS baseline proposals is closed, and text to replace the placeholder be based on existing proposals.

4.2.2.6. Any objections to this resolution?

4.2.2.6.1. One concern – we might lock out a good proposal.

4.2.2.6.2. No, we could still entertain proposals, just not for the baseline.

4.2.2.6.3. Issue resolved

4.2.2.6.4. No further objections

4.2.2.7. Motion accepted

4.2.2.8. Is anyone else abstaining?

4.2.2.8.1. John K – over the whether QoS under DCF is useful.

4.2.3. Straw Poll

4.2.3.1. To the Previous "No" Voters, how many are still "No" votes?

4.2.3.1.1. Tom

4.2.3.1.2. Anil

4.2.3.1.3. Sunghyun

4.2.3.1.4.

4.2.3.2. How many have turned to "Abstained"

4.2.3.2.1. Raju and Matt F changed from No to Abstain.

4.2.3.2.2.

4.2.3.3. Now there are 8 "No's", and 5 Abstains

4.2.4. Discussion

4.2.4.1. John K – what would change abstain to yes would be to have objective comparison between levels.

4.2.4.2. Of those who object to Overlap BSS, would you be happier if OBSS was a black box?

4.2.4.3. In order to pass this baseline do we need 75% of all votes? Yes, abstains don't count.

4.2.5. Proposed Resolution

4.2.5.1. Matthew Sherman

4.2.5.2. Motion: Aggregate levels 1 and 2 into a level 1.5. in Level 1.5, support for both prioritized DCF and PCF would be mandatory. Note that while the CC/RR mechanism would be allowed at 1.5, their use would not be required. All STAs would need to support CF Poll.

4.2.5.3. Discussion

4.2.5.3.1. RR has nothing to do with the duration of the TXOP. It informs the PC that it wants TxOps.

4.2.5.3.2. This leaves the CF Poll and the TXOP limit.

4.2.5.3.3. Is the intent of this motion to replace level 1 with a requirement of implementing PCF and DCF? The intent is that adding CF Poll is a large overhead. A simple station can remain simple.

4.2.5.3.4. There is some disagreement of whether it is simple

4.2.5.3.5. The complexity is in the queues, not in being CF pollable. CF Pollable is trivial.

4.2.5.3.6. From the eyes of the consumer, there are still two QoS Levels. This partitions into prioritized and parameterized.

4.2.5.3.7. Does this affect the AP also? No, it is up to the implementer.

4.2.5.3.8. Edit Motion:

4.2.5.4. Motion: Aggregate levels 1 and 2 into a level 1.5. in Level 1.5, support for both prioritized DCF and PCF would be mandatory. Note that while the CC/RR mechanism would be allowed at 1.5, their use would not be required. All STAs would need to support CF Poll. The AP, as a practical matter could support either Prioritized PCF, prioritized DCF, or both.

4.2.5.5. Discussion

4.2.5.5.1. Is anyone ready to convert to a No Vote if this resolution is accepted?

4.2.5.5.2. Approximately 6

4.2.5.5.3. What is it that bothers the group?

4.2.5.5.4. The baseline specifies the PCF as an option. This forces the stations to implement both. Objects to that. This is contrary to the layering structure we agreed on.

4.2.5.5.5. We already have demonstrable systems on DCF now for simple apps.

4.2.5.5.6. The point is to gain consensus and make a standard. The ranges are making everything optional or everything mandatory. This is a reasonable compromise.

4.2.5.5.7. The purpose of the nesting is to insure interoperability.

4.2.5.5.8. Yes, we want one option, and it should be ours. Unfortunately, there are two differing groups

4.2.5.5.9. How do we judge what is difficult to implement?

4.2.5.5.10. The key requirement is interoperability

4.2.5.5.11. Anyone with PCF experience – if we were talking about CF-Poll as it is in the standard, would you have a problem? Yes.

4.2.5.5.12. Disagreement of whether you can implement a CF Pollable station.

4.2.5.5.13. One approach would be to bracket this issue, and wait until a decision process down the line.

4.2.5.5.14. If we can't agree, and find a way to resolve this, is it OK to allow the baseline with all the levels, and try to reduce the levels later.

4.2.5.5.15. The issue is the nesting, not the levels. We shouldn't assume that one possibility is in, or that any particular implementation is more complex.

4.2.5.5.16. Nesting is required for interoperability up and down the chain.

4.2.5.5.17. This is a question of what should be in the baseline. Not comfortable with a baseline that requires a DCF QoS.

4.2.5.5.18. Options are frowned upon and will generate No votes. Incompatible options will not be passed.

4.2.5.5.19. There is no dispute that the base compatibility level is DCF.

4.2.5.5.20. For the 11E standard, we cannot have incompatible options.

4.2.5.5.21. Comment on the NY times article on 802.11. When we argue about these issues, we are asking whether that we are ready to be a useful interoperable standard.

4.2.5.5.22. We agree that the goal is total interoperability. We are trying to move past a roadblock because of the two groups.

4.3. Recess until tomorrow

5. Wednesday Morning TGe QoS session

5.1. Opening

5.1.1. Objective

5.1.1.1. To have a baseline by the end of the week

5.1.1.2. It is better to have black box items in the baseline.

5.1.1.3. The security group has approved a baseline

5.2. Discussion

5.2.1. Level and Nesting Structure

5.2.1.1. Raju changes vote from Abstain to Yes

5.2.2. What can be done to make an acceptable baseline?

5.2.2.1. Could the motion of yesterday regarding level 1.5 be simplified to a requirement that all stations be able to support CF-Polling.

5.2.2.2. This would be OK, providing the CF-Polling response honors the TxOp opportunity time limits

5.2.2.3. How could an implementer who doesn't have a level 3 AP test their devices for CF-Polling?

5.2.2.4. WECA test equipment is being upgraded to verify CF-conformance. CF-Conformance will be required for WECA conformance.

5.2.3. Review of Matthew Sherman's motion for "Level 1.5

5.2.3.1. CF-Pollable stations must respond within time limit of

5.2.3.2. Suggestion that the "nesting" be deferred to later decision.

5.2.3.3. Leave the relative nesting of the solutions unspecified in the initial baseline proposal.

5.2.3.4. Discussion

5.2.3.4.1. All we are doing is deferring this decision until later.

5.2.3.4.2. We need to move forward, we can put off the fight until we have more information.

5.2.3.4.3. We need to be able to demonstrate that the proposal that is accepted allows for consumer AV products to work. We need more information

5.2.4. What is the data needed for a decision?

5.2.4.1. Data on relative complexity of implementation

5.2.4.2. Performance simulations

5.2.4.3. Before that, we need scenarios that define the problem.

5.2.4.4. The PCF group should clearly define what CF-pollable actually means in terms of implementation.

5.2.4.5. This applies to both sides – the DCF group needs to provide details of how DCF affects the PCF implementation.

5.2.4.6. Can a useful simulation be done? We will simulate the corner cases and stress cases.

5.2.4.7. Request for a "state diagram" to represent the operation of a CF-pollable

5.2.4.8. We know that under high load, the DCF schemes don't work well. The PCF group can accommodate higher load scenarios. We need to make the PCF support mandatory.

5.2.4.9. Belief that enhanced DCF can support an adequate application space.

5.2.4.10. Suggestion that a clause to require level 1 stations to be CF-pollable but bracket that clause for now.

5.2.4.11. No, if we bracket that clause, then bracket the whole thing.

5.2.4.12. The whole point is to get to two levels – we want to reduce the confusion.

5.2.4.13. If we take out the strict nesting, then interoperability becomes a problem.

5.2.5. Propose a compromise related to the 1.5 proposal.

5.2.5.1. Motion: Aggregate levels 1 and 2 into a level 1.5. in Level 1.5, support for both prioritized DCF and PCF would be mandatory. Note that while the CC/RR mechanism would be allowed at 1.5, their use would not be required. All STAs would need to support CF Poll. The AP, as a practical matter could support either Prioritized PCF, prioritized DCF, or both.

5.2.5.2. Levels 1 and 2 are replaced by 1.5

5.2.5.3. If you do this, the AP can still be built with DCF only.

5.2.5.4. From Matt's view, supporting DCF adds complexity to a PCF system.

5.2.5.5. There is a swap. If stations are CF-Pollable, the PCF systems will support DCF.

5.2.5.6. If level 1 allows CF-Pollable, how much difference is there with level 2? At the AP, there may not be PCF. Stations may be two levels, but APs can have 3.

5.2.5.7. We are asking for Stations to respond to CF-Polls, and limiting their response to the TxOp size.

5.2.5.8. The distinction is the Baseline CF-Pollable - call it QoS CF-Pollable

5.2.5.9. This does not make PCF mandatory

5.2.5.10. Instead of having the 4 levels as marketing issues, we can use them as semantics to describe features. We have already gone through the PCF DCF arguments. We have to allow some options there.

5.2.5.11. We were talking about adding a clause to require a station to respond to CF-Poll.

5.2.5.12. The question is supporting the CF-Poll time limit to a TXoP. What if the time isn't big enough? You send a QoS Null.

6. Wednesday AM Full TGe Working Group

6.1.1. Call to order the full TGe meeting

6.1.1.1. Full TGe called to order by John Fakatselis

6.1.2. Announcements

6.1.2.1. The security group has split into Ad Hoc

6.1.2.2. The TGe group will now recess for Ad Hoc also

6.1.2.3. Concerns

6.1.2.3.1. When will the full TGe meeting be held? Tomorrow.

6.1.2.4. Any objection to recess until tomorrow?

6.1.2.5. No Objections.

6.2. Recess of Full TGe until Thursday at 10:30AM

7. Wednesday AM QoS SubGroup

7.1. Review of open issues

7.1.1. Anil

7.1.1.1. Level 3 complexity

7.1.1.2. Persistent Polls

7.1.1.3. Aggregation

7.1.1.4. Delayed Acknowledgements

7.1.2. Sunghyhun

7.1.2.1. BSS overlap – request more details

7.1.3. Brian

7.1.3.1. More details of baseline

7.1.4. Wen-Ping

7.1.4.1. Levels

7.1.4.2. RR and CC mandatory or not

7.1.5. Khaled

7.1.5.1. Simulation Framework

7.1.6. Adrian

7.1.6.1. complexity of hardware implementation

7.1.7. Bob

7.1.7.1. Concern over Proxy Beacon and Overlapping BSS

7.2. Baseline Straw Polls

7.2.1. Straw Poll - voters

7.2.1.1. How many people object to the current baseline: 6

7.2.1.2. How many approve of the baseline – 0

7.2.1.3. How many abstain – 6

7.2.2. Straw Poll - voters

7.2.2.1. If the only change made to the baseline is Matthew's proposal of consolidating to level 1.5 how many object – 2

7.2.2.2. How many would approve - 5

7.2.2.3. How many would abstain – 9

7.2.3. Straw Poll – non voters. Original baseline

7.2.3.1. How many approve the baseline – 5

7.2.3.2. How many disapprove – 1

7.2.3.3. How many abstain – 9

7.2.4. Straw Poll – non voters, with Matthews proposal

7.2.4.1. Approve 0

7.2.4.2. Disapprove – 2

7.2.4.3. Abstain – 14

7.2.5. Straw Poll - voters

7.2.5.1. Putting levels/nesting aside, how many approve the baseline, with the compromises and issues that have been resolved (DCF in Black Box, and Raju's objections)

7.2.5.2. Approve - 12

7.2.5.3. Disapprove - 2

7.2.5.4. Abstain - 2

7.2.6. Straw Poll – non voters

7.2.6.1. Approve – 6

7.2.6.2. Disapprove – 0

7.2.6.3. Abstain – 10

7.3. Review of open issues

7.3.1. Anil's Complexity issue

7.3.1.1. There is a feeling that Level 3 is not needed to get QoS. Some new features are needed, but much is there for improved efficiency. Nobody has given any indication of the actual efficiency improvements.

7.3.1.2. We have a sub-group doing simulations. Their results will let us weigh the benefits. We will have results later today. The goal is to provide an efficient system that will provide prescribed QoS.

7.3.1.3. In terms of the schedule frame and the and the delayed ack, these parts of the baseline have been implemented, and in comparison to the existing 802.11, there is no comparison. The efficiency improvements from these enhancements are substantial.

7.3.1.4. Removing level 3 removes only parameterized QoS. Is that the intention?

7.3.1.5. No, the intention is to remove level 3 and put parameterization into level 2.

7.3.1.6. but that is the only difference.

7.3.1.7. Let's identify what you don't like in Level 3. ..

7.3.1.7.1. persistent polls

7.3.1.7.2. aggregation

7.3.1.7.3. delayed acknowledgement

7.3.1.8. Could these options be black-boxed?

7.3.1.9. The problem is with optioning things in QoS.

7.3.1.10. We don't want options within options

7.3.1.11. Wants one single QoS that meets all the needs.

7.3.1.12. Anil doesn't want to remove level 3, but he wants to remove the options.

7.3.1.13. Wants quantitative measures of efficiency improvements.

7.3.1.14. Greg P – The test work that has been done with schedule frames and persistent polls, and delayed acknowledgement, they work in a way that roughly doubles the channel utilization for MPEG streams compared to best-of-class 802.11b DCF AP devices.

7.3.1.14.1. 3Mbps using existing 802.11b

7.3.1.14.2. 6Mbps using these mechanisms.

7.3.1.15. This is especially effective for constant bit rate streams.

7.3.1.16. If these mechanisms are removed, then it is felt that level 3 would be useless for the required applications.

7.3.1.17. The reasons we have agreed to make level 3 an option is so that those who don't need the features don't have to implement them.

7.3.1.18. Level 3 requires a more complex AP, but not a station. The client gets more complex to decide how to best fill the TxOps.

7.3.1.19.

7.4. Procedural Clarification

7.4.1. The 802.11 Chair reviews the process of convening the full TGe Group and then recessing the Full TGe group into the two subgroups.

7.4.2. Everyone is still in full agreement with the procedure, with no objections.

7.5. Report from sidebar discussion

7.5.1. Proposed baseline modification

7.5.1.1. Modify the definition of level 1 ESTAs such that they will accept a QoS CF-Poll. The ESTAs will recognize the TxOP limit field and only respond with a data frame if it can accommodate that size. If not, the ESTA will respond with a Qos Null Frame which will include the priority of the highest

occupied queue and {the size of that queue or size of the frame at the head of that queue – TBD}. In addition, level 1 ESTAs will not need to recognize piggybacked Ack's. Instead an ACK will be used by the EAP for ESTAs that are level 1. However the ability to do so will be indicate by the ESTA during association.

7.5.2. Discussion

7.5.2.1. If the agree at association to support piggybacking they get both kinds of Ack's. If not, they just get regular acks.

7.5.2.2. Are there still 4 levels? Yes, and they are nested.

7.5.3. Straw Poll on the baseline

7.5.3.1. The baseline includes the compromises and changes yesterday, plus this resolution.

7.5.3.2. How many voters disapprove the baseline – 3

7.5.3.3. How many voters approve – 27

7.5.3.4. How many voters abstain – 3

7.5.4. Straw poll – non-voters

7.5.4.1. How many approve – 10

7.5.4.2. disapprove – 0

7.5.4.3. abstain – 10

7.5.5. Outstanding No Votes from voters

7.5.5.1. Anil

7.5.5.2. Tom

7.5.5.3. Jason

7.5.5.3.1. There should be one form of QoS to prevent marketing confusion

7.6. Review of open issues

7.6.1. Anil

7.6.1.1. Complexity at level 3

7.6.2. Tom

7.6.2.1. Wants no levels or options within 802.11E

7.6.3. Wen-Ping

7.6.3.1. Wants to use the same level 0 frames for PCF in level 2 and 3

7.6.4. Sunghyun

7.6.4.1. Needs details of BSS overlap.

7.6.5. Bob

7.6.5.1. Overlap BSS and Proxy Beacon mechanism

7.7. Recess the Ad Hoc

8. Wednesday Afternoon TGe SubGroup

8.1. Opening

8.1.1. Called to order at 4:00PM by John Fakatselis

8.1.1.1. This is the "real group" with official voting

8.2. Agenda

8.2.1. Proposed agenda for remainder of TGe QoS

8.2.1.1. Call to Order
8.2.1.2. Ad Hoc Submissions
8.2.1.3. Simulations Group Submissions
8.2.1.4. Comments and Issues on Baseline discussion
8.2.1.5. Motions for Plenary (full TGe)
8.2.1.6. Next Meeting Plans
8.2.1.7. Adjourn

8.2.2. Discussion on Agenda

8.2.2.1. None
8.2.2.2. Agenda adopted without objection

8.3. Ad Hoc Submissions

8.3.1. Matthew Sherman, Document 425

8.3.2. Resolution from sidebar discussion today:

8.3.2.1. Modify definition of level 1 ESTAs such that they will accept a QoS CF-Poll. The ESTA s will utilize the TxOP limit field, and only respond with a data frame if it can accommodate that size. If not, the ESTA will respond with a QoS Null frame, which will include the priority of the highest occupied queue, {and the size of that queue or size of the frame at the head of that queue - TBD}. In addition, level 1 ESTAs will not need to recognize piggybacked Ack's. Instead an Ack will be used by the EAP for ESTAs that are level 1. However, the ability to do so will be indicated by the ESTA during association.

8.4. Adoption of the QoS Baseline Proposal

8.4.1. Motion:

8.4.1.1. To accept Document 360r1, with modification by the following two resolutions, as the TGe QoS Baseline Proposal:

8.4.1.1.1. Move that the specific definition of scheduling algorithm and channel access method to be used in level 1 QoS be temporarily replaced with a text placeholder in the

baseline document; further to reiterate that as of the November 2000 meeting the call for QoS baseline proposals is closed, and text to replace the placeholder be based on existing proposals.

8.4.1.1.2. Modify the definition of level 1 ESTAs such that they will accept a QoS CF-Poll. The ESTAs will utilize the TxOP limit field and only respond with a data frame if it can accommodate that limit. If not, the ESTA will respond with a Qos Null Frame which will include the priority of the highest occupied queue and {the size of that queue or size of the frame at the head of that queue – TBD}. In addition, level 1 ESTAs will not need to recognize piggybacked Ack's. Instead an ACK will be used by the EAP for ESTAs that are level 1. However the ability to recognize piggybacked ACKs will be indicated by the ESTA during association.

8.4.1.2. Moved Matt Sherman

8.4.1.3. Second Duncan Kitchen

8.4.1.4. Discussion

8.4.1.4.1. Sunghyun - Motion to amend.

8.4.1.4.1.1. Withdraws Motion to amend

8.4.1.4.2. If we accept this motion, we have created a baseline document. We can still have subsequent motions to modify the baseline, even this week.

8.4.1.5. Vote on the main motion: passes 33:2:0

8.5. Simulation Results

8.5.1. Progress Report from Ad Hoc Simulation group

8.5.1.1. Matt Sherman

8.5.1.2. Document 372

8.5.1.3. Discussion

8.5.1.3.1. Matt requests a secretary for his meetings and conference calls

8.5.1.3.2. TCP/IP incorporates its own feedback mechanisms. Thus the TCP rate is interdependent on the MAC.

8.5.1.3.3. UDP is simple to model

8.5.1.3.4. We need to isolate the effects of the higher layer from the lower layer

8.5.1.3.5. To make the simulation results meaningful, we need the whole protocol stack.

8.5.1.3.6. You can't evaluate the MAC without evaluating TCP with it.

8.5.1.3.7. TCP is one thing, but we are trying to provide QoS to higher layer protocols, so we make sure we provide what the protocols need.

8.5.1.3.8. First we should look at the MAC on its own, and then higher layers.

8.5.1.3.9. Do we have a specific list of things that will be reported for each MAC? Greg came up with this – there is a question as to how much is enough.

8.5.2. 802.11 PCF Model Progress

8.5.2.1. Matt Sherman

8.5.2.2. Document 373

8.5.2.3. Overview

8.5.2.3.1. This work is not yet validated. We have work going on in OpNet and NS. We don't have a validation method yet.

8.5.2.3.2. Will plan to have a contributed model with our enhancements.

8.5.2.3.3. A number of modifications have been made to keep up with development, and to fix errors.

8.5.2.3.4. Currently simulating the model 3 scenario.

8.5.2.3.5. Dropped packets – when the DCF runs out of capacity, packets start to drop out of the buffers.

8.5.2.3.6. With the PCF, only the bulk data is dropped when the MAC is overloaded.

8.5.2.3.7. The PCF clearly maintains all QoS Streams.

8.5.2.3.8. The DCF couldn't maintain QoS, and the video was the first to be effected.

8.5.2.3.9. Dropped Packet is at the data interface, Dropped Frame is at the PHY interface. Retries are because of the Dropped Frames.

8.5.2.3.10. Delays – the lowest AID gets the best service in the PCF case. They are slightly differentiated, but all are very low delays on the order of 1mS. Bulk data is longer, but doesn't effect the QoS delays. This is not true in the DCF. Once the bulk data is added, all the streams suffer.

8.5.2.3.11. Video Conferencing and Audio. The streams in the AP when the bulk data was added were more effected.

8.5.2.3.12.

8.5.2.4. Discussion

8.5.2.4.1. The standard OpNet model has one queue. Matt added one additional for PCF. We will need to add more for the QoS MAC.

8.5.2.4.2. What is the differentiation between streams? We use AIDs, and the lowest get polled first.

8.5.2.4.3. What about the DCF? Any Differentiation? No

8.5.2.4.4. When the DCFs were run, was there a CFP? No the CFP was turned off.

8.5.2.4.5. This is a comparison of PCF vs DCF – does the PCF give good enough performance for those streams? In some sense, yes. There are a lot of other things that could make it better.

8.5.2.4.6. If this is good enough, and is not level 3, why do we need to have level 3?

8.5.2.4.7. Until we have level 3, we can't show the benefits.

8.5.2.4.8. This might be enough for a home network, but our applications are more challenging.

8.5.2.4.9. Just because the level of QoS is acceptable. Perhaps we could get more Mbps of data and still maintain the QoS.

8.5.2.4.10. The simulation group should show what the level 3 mechanisms buy us.

8.5.2.4.11. Some type of comparison with the EPCF would be interesting, and what conditions are specifically addressed.

8.5.2.4.12. We have conference calls every week. If someone has scenarios they want simulated, they should participate.

8.5.2.4.13. We had a document 2 meetings ago to create a flat playing field of the evaluation of the goodness of several alternative for a QoS MAC. What we have seen is the foundation for doing that. But we don't have the baseline modeled yet. This is a reasonable model of the existing standard's MAC.

8.5.2.4.14. Now there is a single baseline proposal. We will not be using it to evaluate competing proposals.

8.5.2.4.15.

8.6. Recess until tomorrow at 8:00AM.

9. Full TGe Thursday Morning Session

9.1. Call to order at 8:10 by John Fakatselis

9.2. Opening

9.2.1. Agenda Review

9.2.1.1. Security Reports

9.2.1.2. Qos Reports

9.2.1.3. Break

9.2.1.4. Motions

9.2.1.5. Activities between meetings

9.2.1.6. Next Meeting Agenda

9.2.2. Call for New Submissions

9.2.2.1. None

9.2.3. Agenda Adoption

9.2.3.1. No Objections

9.3. New Business

9.3.1. Report and Presentation from Security Subgroup

9.3.1.1. Document 419, Bernard Aboba, et al

9.3.1.2. Represents merger of proposals 163, 362, and 382

9.3.1.3. Discussion

9.3.1.3.1. If WEP keys are changed on the fly, why doesn't that provide adequate security?

9.3.1.3.2. The problem is the "wrapping" which can occur rapidly at high rates. Also, the enormous amount of known plaintext, which combined with key wrapping, causes significant weakness.

9.3.1.3.3. The only standardized mutual authorization method is Kerberos.

9.3.1.3.4. How would this work in a private environment? Home?

9.3.1.3.5. Kerberos would be moved into the access point. Then the users and passwords would have to be entered into the APs.

9.3.1.3.6. Diffie Hellman only derives a key, but does not do authentication.

9.3.1.3.7. What does it take to break AES or Radius?

9.3.1.3.8. The Security group will take an action item to quantify the weakness

9.3.1.3.9. Is Kerberos appropriate for the home market? How big is the code size? The Kerberos client is allegedly 10K. The server source is available, and is reported to be simple to incorporate, perhaps 20K of code.

9.3.1.3.10. Does this mean Kerberos is mandatory for 802.11? It is necessary for the AP to validate the keys.

9.3.1.3.11. Concern of whether we can standardize and specify higher level standards as part of a MAC standard? Recommended practice documents will be written to describe how the MAC works with them.

9.3.2. Report and Presentation from QoS Group

9.3.2.1. Document 358r1 (Michael Fischer)

9.3.2.2. Overview

9.3.2.2.1. Defining enhanced DCF and PCF mechanisms.

9.3.2.2.2. Current draft 360r1

9.3.2.2.3.

9.3.2.3. Discussion

9.3.2.3.1. What is the functional scale in the PCF mode? Scaling in terms of number of access points? It depends on the overlap management provisions, and how well they work.

9.3.2.3.2. Why was the max container length made 2 bytes smaller? For compatibility with the existing standard.

9.4. New Motions from SubGroups

9.4.1. Security Motion

9.4.1.1. Move to accept document 00/419 as the TGe Security Baseline

9.4.1.1.1. Moved Dave Halasz

9.4.1.1.2. Discussion

9.4.1.1.2.1. Is there a paper as well as the Powerpoint presentation? No, Before the full draft is written, the subgroup wants direction from the whole body.

9.4.1.1.3. Vote – passes 36 : 3 : 6

9.4.2. QoS Motion

9.4.2.1. To accept Document 360r1, with modification by the following two resolutions, as the TGe QoS Baseline Proposal:

9.4.2.1.1. Move that the specific definition of scheduling algorithm and channel access method to be used in level 1 QoS be temporarily replaced with a text placeholder in the baseline document; further to reiterate that as of the November 2000 meeting the call for QoS baseline proposals is closed, and text to replace the placeholder be based on existing proposals.

9.4.2.1.2. Modify the definition of level 1 ESTAs such that they will accept a QoS CF-Poll. The ESTAs will utilize the TxOP limit field and only respond with a data frame if it can accommodate that limit. If not, the ESTA will respond with a Qos Null Frame which will include the priority of the highest occupied queue and {the size of that queue or size of the frame at the head of that queue – TBD}. In addition, level 1 ESTAs will not need to recognize piggybacked Ack's. Instead an ACK will be used by the EAP for ESTAs that are level 1. However the ability to recognize piggybacked ACKs will be indicated by the ESTA during association.

9.4.2.1.3. Moved John Fakatselis

9.4.2.1.4. Second Duncan Kitchin

9.4.2.1.5. Discussion

9.4.2.1.5.1. This motion was approved in the QoS SubGroup 33:2:0

9.4.2.1.5.2. Do we need to re-ratify this as TGe? It doesn't hurt.

9.4.2.1.5.3. Is the closing of proposals for all or just EDCF? What was the intent? To take out the DCF mechanism. This text is reiterating something already decided.

9.4.2.1.5.4. What happens to proposals after this week? No one is prevented in bringing a proposal for discussion. They can still be considered.

9.4.2.1.5.5. Explain how the bridge portal would work. How do you make ESS's work if you bypass the distribution mechanism? The BP is a station that need not be an AP, but is connected to the DS.

9.4.2.1.5.6. The intention is to use the BP as an alternate DS. It is the only one there, not in addition.

9.4.2.1.5.7. Complaint that there are two subjects in the motion. Motion ruled out of order

9.4.2.1.5.8. New motion:

9.4.2.2. To accept Document 360r1, with modification by the following two resolutions, as the TGe QoS Baseline Proposal:

9.4.2.2.1. Move that the specific definition of scheduling algorithm and channel access method to be used in level 1 QoS be temporarily replaced with a text placeholder in the baseline document; and text to replace the placeholder be based on existing proposals.

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9.4.2.2.3. Moved John Fakatselis

9.4.2.2.4. Second John Kowalski

9.4.2.2.5. Discussion

9.4.2.2.5.1. Bridges are a TBD area. It will be filled in, and may be eliminated if it is a problem.

9.4.2.2.5.2. Concern that the BP is not in the baseline, not until it is fully thought out.

9.4.2.2.5.3. Move to amend the motion:

9.4.2.2.5.3.1. To add a resolution to remove bridge portals

9.4.2.2.5.4. Moved Dave Bagby

9.4.2.2.5.5. Seconded Bob O'Hara

9.4.2.2.5.6. Discussion

9.4.2.2.5.6.1. It is OK to have a bridge portal from a security and authentication perspective

9.4.2.2.5.6.2. All the bridge portal does is allow the portal to move to another location.

9.4.2.2.5.6.3. Against amendment, as it is useful for many environments.

9.4.2.2.5.6.4. The concept is related to a home network with one BSS with multiple paths to outside the BSS. EX a DSL modem and an Ethernet on another. But there is still one BSS. Against this amendment.

9.4.2.2.5.6.5. This is attempting to define a DS as part of the MAC, which conflicts with the MAC charter

9.4.2.2.5.6.6. Moves to call the question

9.4.2.2.5.6.7. moved Dave Bagby,

9.4.2.2.5.6.8. No opposition – question called.

9.4.2.2.5.7. Vote on the amendment – fails 2 : 35 : 10.

9.4.2.2.6. Discussion on the main motion

9.4.2.2.6.1. Anil's objections – related to complexity vs benefit of Level 3. The issue of scheduled TxOps. Doesn't support efficiency improvements. Believes there is a problem with delayed ack's also.

9.4.2.2.6.2. From the standpoint of getting AV devices to operate, some form of aggregation is necessary. This can be demonstrated at the next meeting. In favor of the motion.

9.4.2.2.6.3. The information should be presented to contrast aggregation with bursting to be presented at the next meeting.

9.4.2.2.6.4. Addressing the complexity of level 2. Wants to use level 0 channel access mechanism for level 2 PCF. Speaks for the motion.

9.4.2.2.6.5. Is it true that RR and CC are allowed in level 2? They are allowed but not required.

9.4.2.2.6.6. The formats in the baseline document are considered reasonable as proposed.

9.4.2.2.6.7. Call the question

9.4.2.2.7. Vote on the main motion – 38 : 4 : 8

9.4.3. Editorial Motion

9.4.3.1. Move to instruct the editors to develop the initial TGe draft and make it available by the January 2001 Interim meeting based on the approved baselines by the two TGe subgroups.

9.4.3.1.1. Moved Duncan Kitchin

9.4.3.1.2. Second Sri

9.4.3.1.3. No Discussion

9.4.3.1.4. Vote – passes 39 : 0 : 1

9.5. Planning for next meeting

9.5.1. Inter-meeting Ad Hoc Activities

9.5.1.1. Dave Halasz announces that the Security group will have an Ad Hoc meeting on November 28th, in Portland OR., for 1 day. The purpose is to work on drafting text for the baseline.

9.5.1.2. John Fakatselis announces the continuation of weekly Ad Hoc teleconferences for QoS.

9.5.1.2.1. Dates – Nov 15, Nov 29, Dec 6, Dec 13, Dec 20, Jan 3, Jan 10..

9.5.1.3. Matt Sherman announces that the QoS Simulations/Metrics and Criteria group will continue weekly conference calls. Next week will be off, but the following week will re-convent.

9.5.1.3.1. Date – Tuesday, Nov 21 at 1:00PM EST, and weekly thereafter.

9.5.2. Goal for the January Meeting and overall schedule.

9.5.2.1. By January we expect to start the balloting process within the TGe task group.

9.5.2.2. May is the projected date to go to Sponsor Ballot.

9.5.2.3. July to submit to the board for approval.

9.5.2.4. Discussion on schedule

9.5.2.4.1. None

9.6. Motions for the Plenary

9.6.1. Baseline will be passed to the plenary session for approval

9.7. Closing

9.7.1. Final Discussion

9.7.1.1. In the proposal to have the fix for WEP with RC4, we do not address weak key attacks. We didn't know whether peoples hardware could support the needed functions. What is necessary is that after the key schedule is initialized, you have to step through the key sequence by 256 bytes before encoding/decoding.

9.7.1.2. Asks for vendors to examine their hardware to see if they can support this for a short term fix.

9.7.1.3. There will be a discussion on the reflector.

9.7.2. Announcement

9.7.2.1. Everybody that has contributions must provide to IEEE an IP statement. From companies, not individuals. Talk to Al Petrick for guidance and examples. The statement to be addressed to Stuart and 802.11. The company position must be declared. It must be submitted by the beginning of the January meeting.

9.7.3. Adjourn at 11:45AM

IEEE P802.11
Wireless LANs

TGe Security Subgroup Minutes, Tampa

Date: Oct 27, 2000

Author: Jesse R. Walker
Intel Corporation
2211 NE 25th Avenue
Hillsboro, Oregon 97124
Phone: +1 503 712 1849
Fax: +1 503 264 4843
e-Mail: jesse.walker@intel.com

Monday PM

Agenda Discussion

Dave Halasz presented proposed agenda

- Evaluation criteria (Doc 381)
- WEP analysis (Doc 362)
- Integrated proposal (Doc 382)
- Review outline of Doc 321
- Next Meeting Goals

Agenda adopted without discussion

Doc 381 – Evaluation Criteria

Bob Beach reviewed requirements from document 245. Some are fuzzy. The evaluation criteria conversation has identified several new requirements not in 245:

- legacy authentication support,
- recognition of station and AP computational limitations,
- plug and play operation,
- protection against casual/rogue operation in the enterprise

Discussion of Evaluation Criteria

Bob O'Hara: some of these points provide no guidance for evaluation. Task Group e has not made some of the requirements optional. We are not done until we address all of them

Jesse Walker: What if we don't think some of these are requirements?

Bob O'Hara: Return to Task Group e and ask for an alteration of requirements for security.

Dave Halasz: I read evaluation criteria as something to use to differentiate between proposals.

Bob Beach: some of the requirements are fuzzy, so we need to come to a consensus on what they mean.

Dave Halasz: Make conference calls more formal: Take minutes, publish agenda, etc.

Bob Beach: are there people who have significant issues with evaluation criteria.

Bob O'Hara: yes; four or five. For example: the requirment for no more fixed keys. For example: how is 2.2.2 an evaluation criteria? For example: does per-packet authentication mean management packets too?

Bob Beach added sentence: "The authentication of management packets is a topic for further discussion."

We will defer question of whether to adopt these as our evaluation criteria until the document appears on server.

Doc 362 – WEP analysis

Jesse Walker presented this

Discussion:

Bernard Aboba: Primary reason for RC4 was efficientcy. What is the efficiency of Rijndael versus RC4?

Jesse Walker: WEP's usage today costs about 15 bytes per byte. AES implementations exist that encrypt a 16 byte block in about 240 on a Pentium Pro instructions, or about 15 instructions per byte. If we change WEP to discard the first 256 bytes of the generated key stream, RC4's cost goes to about 25 instructions per byte

Bob Beach: What instructions does AES use?

Jesse: MUX, XOR, S-Box are the only instructions on the critical path.

Bob O'Hara: AES can be very fast in hardware.

Doc 382 – Joint proposal

Presentation on \\Venus\Submissions

Bernard Aboba presented this, with some help from Dave Halasz

Discussion:

Bob O'Hara: Slide 16. EAP-Key is in a data frame, so MAC management has no idea this is a key frame.

Bernard: Station: Right, but station doesn't have an UDP/IP address, so needs some other encapsulation. Typically this will require some change to Kerberos client. The validation can still be done by 802.1X, who calls on 802.11 to unblock.

Bob O'Hara: Slide 27. If encryption is not required by AP. How does station determine whether to encrypt?

Bob Beach: In new model, associate first and then authenticate, to allow 802.1X to work.

Bob O'Hara: WECA has already standardized how to use privacy subfield bits. May want to use other bits to specify precisely what we want to do, so station will know when to encrypt and when not.

Bob O'Hara: How does MAC know which data frames to encrypt and which not? It can't encrypt until after it has gotten the EAP response.

Bernard: Message exchange tells when this will happen, but this will have to be made more explicit than in slides.

Jesse Walker: We need to add rekey to the issues list.

Bob O'Hara: Can your mother install this?

Bernard: You have to get username/password info to the system.

Issue: we need to agree on what to do

Bob O'Hara: how do you extend this to proprietary mechanisms?

Bernard: Both EAP and GSS-API provide mechanisms allowing proprietary extensions.

Adjourn for evening

Tuesday AM

Doc 376 – Using Seiko's KPS for MAC Layer Security

Presented by Shinichiro Watanabe

No Discussion

Discussion of agenda

We omitted an evaluation of proposals; must change agenda to permit this.

Proposals: 382, 163, 376

Evaluation criteria: 381

Agenda change approved without objection

Bob Beach move we accept 381 as our evaluation criteria; Jesse Walker seconds

Discussion of motion

Bob O'Hara: Bob's document is good, but it is not yet a set of evaluation criteria. We must meet the requirements, not comment on them. We either meet the requirements or not. We have to meet one of the requirements, but must meet all the requirements to finish the work. The document does not help us distinguish between proposals

Jesse Walker: point of information: how do we get a set of evaluation criteria?

Bob O'Hara: How well does a proposal meet the requirements is the right way to address this. We can dispense with evaluation criteria. We could have an up or down vote on the various proposals now.

Vote on motion: For: 3. Against: 2 Abstain: 2. Motion passes, as this is procedural

Evaluation of Proposals

Discussion: How to do this?

Bob O'Hara: let each proposer list how it meets the requirement, and then discuss whether the proposer's assertion is correct

Jesse Walker: Move that each proposer explains how their proposal meets the requirements, and then TGe Security subgroup votes to select one as the baseline.

Bob Beach seconds

Discussion of motion. None

Vote: For: 8. Against: 0 Abstain: 1; Motion passes

Evaluation of Proposal 163

Discussion

Bob Beach: Is this a framework? Its scaling should be NAs?

Bob O'Hara: the proposal does not fail to operate in any of these environments, so it meets the requirements

Simon: Negotiation at odds with ad hoc networking

Glen Zorn: "A certain degree" is not well defined.

Evaluation of Proposal 376

Discussion

Jesse: Does this really provide a flexible way to add new algorithms? It does not appear to address it.

Bob O'Hara: agree

Bob Beach: NA is turning out to be equivalent with No.

Dave Halasz: Is there negotiation?

Massayuki: Authentication is inherent in this scheme.

Bob Beach: How do I know I can trust the access point? How do I know it was not purchased and deployed by an adversary?

Dennis: If the device is stolen, how do you prevent the device from being used?

Massayuki: A revocation list must be maintained. The MAC address cannot be stolen, because it is paired with the private ID

Dave: we need a vote to decide whether the community thinks it provides mutual authentication.

Bob: I don't think there is any need to vote.

Bob: Can a customer configure its own value for G?

Massayuki: yes

Don: When is G installed? By manufacturer or by customer?

Massayuki: both can be supported.

Bob: If I make up a new MAC address and I know G, then can I compute the necessary private key?

Massayuki: Yes

Simon: This algorithm has the property that if G is compromised, then every system has to be reprogrammed with a new G. This is an undesirable property

Don: This mechanism does not check user credentials, so does not meet the access requirement.

Massayuki: aren't we talking about device authorization?

Don: if the card is lost, you can't prevent unauthorized access.

Bob, Dave: This could be achieved at a higher layer.

Jesse: but we haven't defined that these functions are done at a higher layer.

Simon: Strong authentication at the link layer can be appropriate

Glen: But there are lots of higher level standards. We've been talking about them all morning.

Don: The wireless medium does have different characteristics that are unique to wireless. This submission meets the exception.

Massayuki: there are systems for which higher level mechanisms may not be available, like dumb terminals. How to use existing assets is an important question.

Don: Move for a straw poll to gain consensus on KPS fulfillment of #16.

Mirv second

Discussion: None

Vote: Yes 5, No: 3, Abstain: 7. Motion passes

Massayuki: There is a per-packet key, sent in the packet

Bob Beach, Jesse: is this per-packet key for this packet?

Massayuki: KPS encrypts the session key.

Bob Beach: does not scale to home; we've already agreed it does not scale to ad hoc.

Don: it supports enterprises weakly.

Bob Beach: need multiple G's for public environment.

Massayuki: KPS does scale to simple environments and ad hoc, because it doesn't require higher layer services.

Bob Beach: No; it requires publication of G in ad hoc.

Bob Beach: what are the computational requirements for each element of the algorithm

Massayuki: the entire algorithm runs on a Z80, but there is special hardware to make it practical.

Why does this protect against rogue access points?

Adjourn Morning Session

Tuesday PM

Evaluation of Proposal 382

Discussion

Simon Blake-Wilson: Which of the Kerberos algorithm are you mandating?

Jesse: We haven't gone to that level of granularity yet.

Jesse: The proposal is vague on how to support IBSS

Dave: We need to incorporate a proposal to address the questions raised by Doc 362. None of the proposals explicitly address this today.

Simon: How is this envisioned for the home/SoHo?

Bob Beach: based on well-known construct: username/password

Glen Zorn: If 382 is vague for ad hoc, so is 163.

Amy Wang: What is meant by legacy authentication?

Bob Beach: RADIUS

Bob O'Hara: don't APs need a ticket in the scheme, so this can be used to protect against rogue APs?

Bob Beach: No, this doesn't address that problem. An AP configured for open authentication could still leak traffic from the wired net.

Evaluation of 362

RC4 discussion and backward compatibility: we can still use RC4, but we will probably have to have a short term fix as well as a long term solution, and we will also have to be backward compatible with existing WEP

ISSUE: What do we do about Multicast/Broadcast? None of the proposals address this really.

Simon: Couldn't IPsec provide this functionality at a higher layer?

Jesse: IPsec does not appear to be deployed in the LAN, and some deployments may not use IP, so cannot rely on IPsec.

Summation of evaluation

How well does each proposal meet the evaluation criteria?

163 MAC Mgmt Extensible Security: 24 yeses, 0 Nos, 11 NAs

376 KPS: 16 yeses, 3 Nos, 13 Nas, 2 Don't know, 1 no agreement

382 Joint Proposal: 32 yeses, 0 Nos, 3 NAs

362 WEP Analysis: 17 yeses, 0 Nos, 18 NAs

Baseline selection

Dave: We need a 75% vote to move forward

Bob O'Hara: describe voting procedure

Dave: If we can get 75% for some proposal, then we are done. Otherwise, we will need a plan B, such as further merging of proposals, selecting two proposals, etc.

Simon: Could 362 be integrated with the other proposals, or is it incompatible?

Jesse: 362 can fit with the other 3. We just need to deal with the issues.

Jesse withdraws Doc 362.

Bob: Does everyone get one vote, three votes, what?

Dave: Each voting member has one vote.

Bob: Doc 163 is compatible with both 376 and 382.

Gary: Does 382 scale down to smaller systems? It is supposed to scale down to the home.

Bob Beach: Yes, we believe it does, since it can use mechanisms known to most computer users.

Massayuki: 376 is also compatible with the other proposals.

Bob O'Hara: Since all of the proposals seem to be compatible with one another, can't we follow the lead of QoS and make one merged proposal.

Bob Beach: No, 382 is a complete proposal in and of itself. He wants to keep it that way.

Glen: 802.1X in the home with TLS and certs would be easier in the home than Kerberos.

Bernard: Agrees with Glen

Jesse: Agrees with Glen

Mahesh: Question about TLS

Bernard: It is used just for key management

Vote for Baseline selection

163 -- 4

376 -- 3

382 – 6

Since no one proposal receives 75%, no baseline selected, need plan B

Bob O'Hara: Move that we select a baseline based on combination of proposals, voted in pairs.

Jesse Walker: Second

Discussion:

Gary: What if you don't like any of the combinations?

Gary: Why can't we treat 163 like 362?

Glen: 163 claims to do more than 362.

Bob O'Hara: 163 sets and framework and defines a registration scheme for new algorithms.

Glen: If we combine 163 and 382, we will have three separate extension mechanisms. This will make for bad usability

Simon: seconds this, as well as such a design undermines security by allowing attacker to choose the weakest mechanism

Bernard: The combined proposal may not meet the criteria

Bob Beach: Combinine 163 and 382 violates duplication of functions requirements

Glen: Disagrees. A straightforward stitching together would violate, but we will need parts of 163 to make 382 work.

Jesse: Agrees with Glen

Glen: Kerberos doesn't negotiate key expiry, KDC just mandates what it is

Dave: we need to clarify what a merge will be

Bob O'Hara: Explains his view of how 163 fits in with the other two

Bob Beach: When would 163 negotiation executed?

Bob O'Hara: Whenever authentication takes place (on first contact with each AP).

Bob Beach: We get nothing back for the extra handshake on roam.

Bob O'Hara: sees position but disagrees.

Gary: There was an objection to requiring 802.11 authentication, because we are doing it at a higher level. Can't skip the association step.

Bob O'Hara: using 163 only on initial contact is sufficient.

Glen: We need another joint proposal.

Dave: We are trying to do that here.

Glen: Do we want to keep on?

Bob O'Hara: call the question

Bob Beach: second

Vote to call the question: 10 for, 0 against, 0 abstain; question is called

For 8, against 1, abstain 1; question is called

Bob O'Hara: Selection of one choice is just direction from group to authors to merge concepts from the various proposals

Vote for combination of pairs:

163+376 (Mgmt Msgs + KPS): 3

163+382 (Mgmt Msgs + Joint Proposal): 9

376+382 (KPS + Joint Proposal): 0

163+382 adopted with 75% of the vote

How to merge 163+382

Bob Beach: Form an ad hoc group to determine this and then adjourn.

Dave: We resume tomorrow at 8 AM. Room: Regency 4.

Bob O'Hara: to review how we are merging proposals

Don Berry: Do we need to adopt an agenda for tomorrow?

Don Barry: move to recess

John Hughes: second

Recess by unanimous consent

Tuesday PM, Ad Hoc Group to Consider Merging

Issue Discussion

Incompatibility between Kerberos keys and AES keys (cipher mismatch). We must work in the IETF to get this fixed

Negotiation of 40-bit RC4 with nothing, 104 bit WEP with nothing, 128-bit WEP with ??, or AES-128 with OCB. Separate cipher suite from key sizes?

Cipher suites for TLS? Very useful for home, ad hoc networks.

Key expiry: We can do rekeying at 802.11 without rekeying at higher layer? Do we want to allow this?

After authenticating, the station can communicate directly with the KDC instead of via the IAKERB/EAP proxy. This is extra complexity. Is it a problem?

Multi-realm AP's?

APs should advertise the crypto suites it supports. We can put this in the probe response, too, or in the beacon.

Capabilities of AP and cipher suite, realm, principal name can be inserted into probe/probe response; station has to ask for these; What station wants will be negotiated in the association/association response. With this, we don't need 163 frame exchanges at all any more, because we have moved the functionality into other messages.

Ad hoc group adjourn

Wednesday AM

Status Report

We voted to select 163, 376, or 382 as baseline, but no proposal received 75%

Then we voted to select a combination of 163+376, 163+382, or 376+382. 163+382 was adopted with 75%

Ad hoc group met last night to define how to combine 163 and 382

Report from the Ad Hoc Group on Baseline resolution

Jesse Walker reviewed minutes from ad hoc group.

Continuation of Baseline selection

Discussion

Bob O'Hara: Is the handshake just on first contact or is it used for roaming?

Bob Beach: we didn't talk about this. The roaming mechanism is sufficiently powerful that we get the benefits without requiring it on every roam.

Bob O'Hara: Thinks this is right, but this may eliminate the possibility of any authentication exchange using the authentication frame sub-type. Worried we are constraining all future extensions. Would like to see an exchange using authentication frames on initial contact, even if it is the only time this is done.

Bob Beach: Not sure what this means, since there is no way to convey information among APs

Dave: but 382 has a place for this if we need it.

Bob Beach: Doesn't understand a mechanism that is useful only for initial contact but not at other times. If we buy into the .1X model, this provides enough richness to do whatever is needed.

Tim Moore: You need to at least write an informational RFC to get an identifier for EAP.

Jesse Walker: I agree with Bob O'Hara. We didn't want any of this complexity for the mandatory to implement algorithms, but we didn't care about what people did in their proprietary extensions.

Dave Halasz: Let's start with the agreements from the ad hoc group as the basis of the baseline proposal. There are other comments, so as long as this (and other concerns) are not precluded by the baseline, let's move forward with it.

Bob O'Hara: What is a baseline?

Jesse Walker: That's our starting point.

Bob O'Hara: Then let's call it a draft. We have some text from 163 that needs to be heavily modified, but we are no longer at proposal.

Bob O'Hara: Move that we accept the recommendations of the ad hoc group as reported by Jesse, and expanded by this morning's discussion as the baseline for the enhanced security draft.

Bob Beach seconds.

Discussion

Dave: We have no text for today's discussion, so people should have difficulty voting on this item

Bob O'Hara: We have the text from the minutes. The purpose of the motion is to give new direction.

Vote on the motion: For: 7 Against: 0 Abstain: 0; motion passes

Dave: Should we create an ad hoc group to write our draft document?

Bob O'Hara: Before doing that, do we want to consider the 362 paper on privacy?

Dave: Prefer to put that off, as we need to produce a first draft. There is general consensus that we will introduce the concepts from 362, but we need to write first draft.

Bob O'Hara: but the proposal will say nothing about the privacy, and it is a non-overlapping problem.

Bob Beach: This is a really hot issue.

Dave: this could be part of ad hoc group's charter

Bob O'Hara: but it isn't

Bob Beach: Two issues: short term fix to save existing business, and long term solution.

Bob O'Hara: 362a gave alternatives for short term fix. We shouldn't leave it this way.

Dave: can we allow ad hoc group to make a recommendation?

Bob Beach: We may not be right body to propose short term fix to RC4. Other bodies might be able to get changes into products more quickly, e.g., WECA.

Dave: But we're the standard's body. Influencing outside bodies is ambitious.

Bob O'Hara: If ad hoc group actually selects an alternative, and security subgroup approves, then it's not just recommendation of an ad hoc subgroup.

Dave: Thinks this is dangerous.

Bob O'Hara: WECA is not really a separate group; same people as in this room. The people making decisions about what to put into products are already informed.

Dave: call for a motion for an ad hoc group

Bob Beach: Move to recess until 4 PM to allow an ad hoc group to create draft text.

Gary seconds

Discussion: none

Vote: For: 7 Against: 0 Abstain: 0 Motion passes

Wednesday PM

Presention of Baseline recommended by Ad Hoc group

Discussion

Jesse: Need to say 802.11 Association IDs map to 802.1X virtual ports

Bob O'Hara: do we want to protect the header?

Jesse: We should examine the fields of the header to see if there is really any value. If so, we need a different mode of operation than OCB mode, and we need a different message integrity code

Mahesh: Why do we need a sequence number?

Jesse: For replay protection. This is only meaningful for unicast frames under dynamic keys. The sequence number is not meaningful for multicast/broadcast frames or for frames encrypted under manually configured keys.

Mahesh: What is the MIC?

Jesse: message integrity code

Motion

Bob Beach: Move to accept document 419 as the TGe Security Subgroup baseline.

Bob O'Hara: second

Discussion:

None

Vote: For: 10 Against: 0 Abstain: 0, Motion passes

Next Steps

Bob Beach: we need to put together an outline

Bob O'Hara: Michael Fischer has taken 802.11-1999 and deleted the text. Or as part of Doc 163 we can generate instructions to the editor to add/modify/delete sections.

Dave: There are general sections as well.

Jesse: Most of the changes will occur in clause 8.

Bob O'Hara: 163 adds new subsections to 802.11-1999 as appropriate. Changes in frame formats in clause 7, MAC operation in clause 9 and MAC management in clause 11.

Bob O'Hara: having a large document that we edit line by line will not be productive, because it isn't in manageable pieces.

Dave: One or more pieces volunteer to define text to put into the draft.

Bob O'Hara: Also need to change 10 Layer Mgmt to specify new signaling between 802.11 and 802.1X.

Tim: We need a list of all external specs and understand their current state (for clause 2)

Glen: The documents that are not standards are problematic. We need to work

Bob O'Hara: Do we need to get Kerberos to support 128-bit RC4? Need to add support for 128-bit short term fix.

Jesse: Draft 0 should be the goal of next meeting.

Bob O'Hara: volunteer to go through Michael's document and indicate pieces of work to be done, so we then partition work.

Jesse: Volunteer to host an interim meeting in Portland on Tuesday, November 28, to assemble text and measure progress.

Bob O'Hara: Document is named "802.11e-D0 (Security).doc". No document numbers for drafts.

Adjourn

Appendix: Proposal Evaluation Matrix

The following matrix documents the position of the TGe Security Subgroup as to whether each proposal meets the adopted evaluation criteria.

	Doc 163	Doc 376	Doc 382	Doc 362
Any changes to the standard must remain compatible with legacy equipment (both APs and stations, and both DCF and PCF modes).	Yes	Yes	Yes	Yes
Changes to frame formats must be compatible with existing formats.	Yes	Yes	Yes	Yes
Association acceptance decisions must remain a policy decision of the AP or station and must not become requirements in the standard.	Yes	Yes	Yes	NA
Capabilities must fit in remaining bits of CIF	NA	NA	Yes	NA
Extensions to existing frames must use the information element data structure or existing reserved bits.	Yes	Yes	Yes	Yes
A flexible mechanism for adding interoperable security algorithms must be incorporated, so that the standard does not need to be revised to use new algorithms in the future.	Yes	NA	Yes	NA
Negotiation of authentication and privacy algorithms must be incorporated.	Yes	NA	Yes	NA
The standard should specify one set of algorithms as mandatory when security extensions are implemented.	NA	Yes	Yes	Yes
Security framework must allow for mutual authentication of STA and AP.	NA	Yes (weak)	Yes	NA
Security framework must be able to prevent unauthorized access by unauthenticated peers over the link.	NA	Yes (weak)	Yes	NA
Security framework must allow key distribution or derivation of per-link or per-session keys	NA	Yes	Yes	NA
The standard must add at least one extension to the authentication algorithms that provides mutual authentication in both Infrastructure and Independent BSSs.	NA	No (doesn't work for IBSS)	Yes, but still vague	NA
New frame subtypes of existing types should be used in preference to the currently reserved fourth frame type.	Yes	Yes	Yes	Yes
New frame formats should be kept to the minimum required to meet the requirements.	Yes	Yes	Yes	Yes

Do not duplicate functions provided by higher layer standards, except where the nature of the wireless medium breaks an assumption of the higher layer standard.	Yes	No agreement	Yes	Yes
Security framework must allow for authentication of the source of each packet, to prevent link hijacking or undetected insertion of rogue packets into the link.	NA	NA	NA	Yes
Security framework must protect network traffic from eavesdropping to a reasonable level compatible with the state of the art.	NA	Yes	Yes	Yes
Security framework must strongly protect keys and passwords from recovery by eavesdropper	NA	Yes	Yes	Yes
The following negotiations must be supported:				
authentication algorithm	Yes	NA	Yes	NA
privacy algorithm	Yes	NA	Yes	NA
data integrity algorithm	Yes	NA	Yes	NA
key establishment algorithm	Yes	NA	Yes	NA
one way hash function for sub key derivation algorithm	Yes	NA	Yes	NA
key expiration	Yes	?	Yes	NA
Inability to complete negotiations must be able to cause a failure to authenticate.	Yes	Yes	Yes	NA
Security framework must scale to:				
Simple environments (etc., home, SOHO)	Yes	No	Yes	Yes
Ad hoc wireless LANs	Yes, but still vague	No	Yes, but still vague	Yes
Enterprise environments (e.g., office campuses, factories)	Yes	Yes (weak)	Yes	Yes
Public environments (e.g., hotels, public services)	Yes	Yes (weak)	Yes	Yes
In the standard, security requirements are independent of QoS requirements. However, implementers should be aware of the potential interactions.	Yes	Yes	Yes	Yes
The extensions to the standard should not be constrained by QoS requirements.	Yes	Yes	Yes	Yes

Support for Legacy Authentication Systems	Yes	Yes	Yes	NA
Recognition of Station and AP computational limitations	Yes	?	Yes	Yes?
A Certain Degree of "Plug and Play" operation	NA	NA	NA	NA
Protection against casual/rogue AP operation in the enterprise	NA	NA	NA	NA

IEEE P802.11
Wireless LANs

802.11F minutes from November mtg

Date: November, 9th 2000

Author: Mahesh Venkatraman

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Minutes from November 2000 802.11F meeting.

11/6/2000
=========

* Meeting called to order

* Minutes - Mahesh Venkatraman (vol.)

* Chair enquired whether overlap between TgE and TgF affected attendence
      - YES

* Any corrections to previous meeting minutes
* Motion to approve september minutes
      - Bob O'Hara (motion)
      - No second
     This means the motion is not approved??

* Status report
      - Telephone call
            5 people - 1st call
            2 people - 2nd call

* Review schedule,
      - noted schedule slipping.
      - looking to see how to make progress
      - may have to make revision to schedule

* No contributions,  author of the orignal submission not present.

* Motion to recess till 10:30 tomorrow morning
      - Bob O'Hara (motion)
      - Bob Huang (second)

* Meeting adjourned

11/7/2000
=========
* Recap

* Presentation of 345

* recess for lunch, reconvine at 1:00
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*continuation of 345 discussion.

* motion passed:
Moved: That 802.11F recess until the scheduled Thurs morn session. In the meantime
the Chair (with the input of any interested parties) is to figure out a proposal for
continuing work in light of the 802.11 scheduling issues; this will be discussed with
11F on Thurs morn with the intent that 11F decide and recommend to the Plenary on
Thurs afternoon a revised work plan.
Moved: Bob O'Hara
2nd: Gary Spiess
Vote: unan

* Meeting recessed

11/9/2000
=========
Mtg convined – recovery plan reviewed. Few people present due to sched problem. Decided to request Plenary to not repeat parallel scheduling again for future meetings.

Mtg adjourned.

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Meeting Minutes for IEEE 802.11 TGg
November 2000 Session
Tampa, FL, USA

Date: October 7, 2000

Author: **Matthew B. Shoemake**
IEEE 802.11g Chairperson
shoemake@ti.com

Unless otherwise noted for the specific meeting, minutes kept by the chairperson, Matthew B. Shoemake.

Tuesday, 8:00AM – 10:00AM

1. Minutes for this meeting taken by Steven Gray of Nokia (steven.gray@nokia.com)

2. Motion: Approve the agenda for TGg, move: Jan Boer and second:TK Tan
   Vote: 19-0-0

3. The agenda calls for execution of steps 7 through 13 of the selection process. Step 7 calls for justification that functionsl requirements have been met. No objections were made on any of the four proposals. Step 8 was informational only concerning the merging of the proposals. Step 9 calls for presentation of the proposals. Presentation will proceed as shown below:

   Document Numbers for the Proposals:
   Intersil, Webster, Halford and Zyren
   - 388 – 397

   Supergold, O'Farrell
   - 366

   Texas Instruments, Heegard
   - 384 – 385

   3COM, TK Tan

4. Document 388 was presented, TGg Regulatory Approval Plan.
5. Document 389 was presented, Overview of OFDM for High Rate Extension

Tuesday, 3:30PM-5:30PM

6. Tim O'Farrell has time conflict due to 802.15.3. Webster, et.al. agree to allow Tim to present at this meeting.

7. Tim O'Farrell of Supergold presents document 00/366r1.

8. Mark Webster presents document 00/390.

Tuesday, 6:30PM-9:30PM

9. Continuing with agenda item to proceed through Selection Criteria. Current on Item 8, presentation of proposals and questioning.

10. Mark Webster presents document 00/391.

11. Steve Halford presents document 00/392.

12. Mark Webster presents document 00/393.

13. Mark Webster presents document 00/394.

14. Mark Webster presents document 00/395.

15. Steve Halford presents document 00/396.

16. Jim Zyren presents document 00/397.

17. Niels Van Erven presents document 00/418.

18. Recess for break

Wednesday, 8:00AM – 10:00AM

19. Motion made to approve minutes in documents 00/287 and 00/340. Motion made by Al Petrick and seconded by Sean Coffey. No discussion on motion. Motion passes 14-0-0.

20. Shoemake explains steps 9-13 of the *Selection Process* (doc. 00/209r3).

21. Chris Heegard presents document 00/384.

22. Recess for break

Wednesday, 10:30AM – 12:00Noon

23. Sean Coffey presents document 00/385.

24. Completed Selection Procedure Item 9, presentation of proposals.

25. Chair requests Comparison Criteria data to include in *Comparison Criteria Matrix*. Will present *Comparison Criteria Matrix* at next meeting.

26. Meeting adjourns.

Wednesday, 4:00PM-5:30PM

27. Chair presents document 00/422r1, the Comparison Criteria Matrix. Item 10 of Selection Procedure is completed.

28. Task Group formed panel discussion for the purpose of executing Item 11 of the Selection Procedure. Panel included Webster, Heegard, O'Farrell and Van Erven.

Thursday Morning 8:00AM-10:00AM

29. Minutes for meeting taken by: Rob Roy (robroy@mobilian.com)

30. Mtg started 8:27 am, delayed due to room change and setup

31. Chair brought mtg to order.

32. There were questions for the presenters from the audience.

33. Order of final presentation: same or reverse. straw poll

34. Same 15, Reverse 10, Abstaining 10 – decision same order as original presentation

35. Zyren, Intersil 10 min., O'Farrell, Supergold – 5 min; Tan – 5 min; Heegard, TI – 5min.

36. Panel went through QA session

37. Final statements

38. Time to vote: 9:35 am

39. Ballots were shown. One has to fill all the six items

40. The voting procedure was explained thoroughly. Several questions/clarifications answered.

41. Stuart Kerry came to oversee voting as impartial observer. He'll not cast a vote.

42. All voting members were asked to show their voting card or get verified on their voting status in the master database resident in Stuart's laptop.

43. Abstain is same as No

44. Ballot closed at 10:03 am.

45. Meeting recessed until 10:30AM for vote count

Thursday 10:30AM-12:00Noon

46. Shoemake calls meeting to order

47. Floor is given to Stuart Kerry to report the results of the balloting for step 13 of the selection procedure. The results are distributed in doc. 00/435. Results of voting are that Tan proposal will be removed from consideration. Webster, O'Farrell, Heegard proposal will remain.

    Vote results (Percentage voting YES): Webster, Intersil – 69.23%
    O'Farrell, Supergold – 34.61%
    Heegard, Texas Instruments – 84.62%
    Tan, 3COM – 19.23%

47. Heard doc. 00/386, Proposed Options to TI Proposal, Batra, Heegard, Shoemake, Rossin

48. Adjourned the session.

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Wireless LANs

Meeting Minutes of SMaSG

Date:

November 7, 2000

Author:

Steven D. Gray
Nokia
6000 Connection Dr
Irving, TX 75039

Phone: 972-894-4422
Fax: 972-894-4589
e-Mail: steven.gray@nokia.com

Chris Hansen
Broadcom
400 E. Caribbean Drive
Sunnyvale, CA 94089

Phone: 408-543-3378

email:chansen@broadcom.com

Nov 7, 2000

1. Motion: Approve the agenda for SMASG, move: Bruce Cramer and second:Barry Davis
   Vote: unanimous consent

2. Motion: Approve minutes from Phoenix meeting: move: Barry Davis and second: Chris Hansen
   Vote: unanimous consent

3. Motion: Approve Mika Kasslin as the proposed chair for TGh move:Gary McGarr and second: Bruce Kramer
   Vote: 18-0-1

4. Motion: Approve Evan Green as the proposed editor for TGh move: Barry Davis and second: Gary McGarr
   Vote: 13-0-0

5. A review took place of document 00/369, SMASG Functional Requirements Recommendations document. Changes were make to the document and the revision will be made available to the server.

Nov 8, 2000

1. A review took place of document 00/284, Draft SMa Study Group Proposal Selection Process. Changes were made to the document and the revised document will be made available to the server.

2. Motion: Approve the draft PAR (r3) and 5 criteria (r1) for submission to the working group.
   Move: Peter Ecclesine and Second: Evan Green
   Vote: 8-0-0

3. Motion: Approve the status report prepared by the chair for presentation to the IEEE802.11 plenary. Vote: Passed by unanimous consent

4. The plan for the group in the next meeting as a study group (if PAR fails) or as a Task Group (if the PAR passes) will be to refine the comparison matrix and review proposals.

5. Further review took place of document 00/369, SMASG Functional Requirements Recommendations document. It was decided that the work of this group was an optional supplement. Revisions to the functional requirements were made available to the server at the end of the meeting.

6. Motion: Affirm PAR 003018r3, and Five Criteria 00302r3 for submittal to ExCom and empower the continued work of SMa SG through the closing of the January, 2000 IEEE802.11 interim meeting
   Move: Frank Howley and Second: Evan Green
   Vote: 9-0-0

7. Motion: Empower the Task Group to begin work before the January 2001 Interim Meeting and call for proposals posted to 802.11 web site upon approval of the 802.11h Task Group, referencing the draft Requirements Document 00/369, Proposal Selection Process 00/284 and Comparison Criteria Matrix 00/421
   Move: Frank Howley and Second: Evan Green
   Vote: 9-0-0

November 9, 2000

1. The SMa SG and IEEE802.11 request individuals aware of IPR related to the subjects of transmit power control and dynamic channel selection (dynamic frequency selection) to notify IEEE802.11.

2. Motion: To reaffirm the approval of PAR 003018r3, Five Criteria 00302r3 and draft document: Requirements Document 00/369, Proposal Selection Process 00/284 and Comparison Criteria Matrix 00/421 and post to the reflector
   Move: Peter and Second: Frank Howley
   Vote:15-0-0

3. Motion: To reaffirm Mika Kasslin as Chair and Evan Green as the Editor of TGh upon approval of the PAR.
   Move: Peter and Second: Frank Howley
   Vote: 15-0-0

4. SMa SG/TG will ask IEEE802.11 to place a call for proposals on the IEEE802.11 website.

5. A conference call will be held on January 11, 2001 to discuss administrative issue for the interim. The call will be announced on the reflector.

IEEE P802.11
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Ad-Hoc Marketing Study Group

Meeting Minutes

Date: November 8, 2000

Author: Al Petrick
ParkerVision
Orlando, Florida
Phone: 407-384-6179
e-Mail: apetrick@parkervision.com

Meeting Minutes
Monday (Afternoon)
November 6, 2000

- Meeting called to order
- Chaired by Al Petrick, and Bruce Kraemer
- Secretary; Al Petrick

- Reviewed minutes from September –00 meeting Scottsdale, AZ

- Reviewed overview presentation on 802.11

    - Discussion: The group decided to bring contributions to the next meeting in Jan –2001.
- Reviewed marketing forecast reports on wirless LAN market
    - Discussion: The group decided to conduct an annomomous survey for the marketing study group as a test. The group decided to segment the market into 802.11a and 802.11b, with further segmentation into Enterprise and Consumer segments, doc: 00/405
- Calendar of events will be covered in the joint .11/.15 meeting.

Meeting Ajourned