

Unapproved Minutes
IEEE Energy Efficient Ethernet Study Group
March 13-15, 2006
Orlando, FL

Prepared by: Bill Woodruff
Meeting convened at 9:04 am, March 13, 2007.

Attendees:

- | | |
|---------------------|-----------------------------|
| 1. Mike Bennett | LBNL |
| 2. Keith Holt | KeyEye |
| 3. David Law | 3Com |
| 4. Hugh Barrass | Cisco |
| 5. Kory Sefidvash | Broadcom |
| 6. Ken Christensen | University of South Florida |
| 7. George Clasemen | Micrel |
| 8. George Zimmerman | SolarFlare |
| 9. Bill Woodruff | Aquantia |
| 10. Mike McConnell | KeyEye |
| 11. Joseph Chou | Real Communications |
| 12. David Koenen | HP |
| 13. Mandeep Chadha | Vitesse |
| 14. Emily Qi | Intel |
| 15. Bob Grow | Intel |
| 16. Jeff Cain | Cisco |

Agenda & General Information

By – Mike Bennett

See – agenda_01_0307.pdf

- Introductions
- Chair appointed secretary – Bill Woodruff for this meeting
- Ground Rules
- IEEE Patent policy read to the body by Chair. Chair issued call for patents. There was no response.
- Inappropriate Topics for IEEE meetings read to the body by Chair.
- IEEE Standards Process Flow
- Presented possible Study Group Schedule
 - Chair mentioned that it possible that this Study Group may request an extension.

Title – Rapid PHY Selection (RPS): Emulation and Experiments using PAUSE

By –Ken Christensen, University of South Florida

See – christensen_02_0307.pdf

Discussion

- Congestion Management as a source of data may be of value in predicting and/or directing RPS.
- It was reiterated that EEE should not communicate to higher layer protocols, such as spanning tree. e.g. EEE should not be visible to these higher layer protocols
- One target for EEE is in the link from the end station to the 1st level switch
 - AV bridging needs to comprehend
 - Energy Star, for example, may not appreciate links “always on”

Title – Server Bandwidth Utilization plots

By – Mike Bennett

See – bennett_01_0307.pdf

Title – 10GBASE-T Power Budget Summary

By – Mike Bennett for Blaine Kohl

See – kohl_01_0307.pdf

Title – Considerations for Technical Feasibility of EEE with 10GBASE EEE with 10GBASE-T

By – George Zimmerman, Solarflare

See – zimmerman_01_0307.pdf

Discussion

- Data presented based on freezing both timing and equalization settings. Did not isolate effects from timing or taps
- If rapid thermal change while at GE, 10GE may need to go further back into state diagram, to PMA training. The implication is longer switch times, perhaps in the arena of 100ms
- This 10GBASE-T discussion generated the observation that each rate would require an equally deep look into requirements. Perhaps a subgroup would need to be formed for each.
- The control plane topic is separate from the discussion on how the PHY operates, once it has been instructed to switch.

Break at 10:40 AM

Reconvened at 11:00 AM

Title – A Brief Tutorial on Power Management in Computer Systems

By – David Chalupsky, Emily Qi, & Ilango Ganga, Intel Corporation, presented by Emily Qi

See – chalupsky_01_0307.pdf

Discussion

- Clarification was asked on the definition of “low latency”. Qi did not have a value to provide, but commented that zero would be a good value
- NIC cards today primarily operate in D0 and D3 modes. D1 and D2 rarely used today.

Title – End-Stations System Requirements and a proposal for EEE Objectives
 By – David Chalupsky & Ilango Ganga, Intel Corporation, presented by Bob Grow
 See – ganga_01_0307.pdf

Discussion

- Comment was made that the control policy is out of the scope of this effort. What EEE needs to provide is a description of the PHY behavior; such as switching time for each type of PHY

Break for lunch at 12:07 AM
 Reconvened at 1:33 PM

Title – Observations and Thoughts On Rate Switching
 By – Keith Holt, Mike McConnell
 See – mcconnell_01_0307.pdf

Discussion

- Continuous tuning of the equalizer at lower speeds can be conceived
- Is there a way to test stalled parameters more quickly?
 - In most cases, the 20mS latency is the “quick test”

Title – Energy Efficient Ethernet, Setting the bar
 By – Hugh Barrass, Cisco
 See – barrass_01_0307.pdf

Discussion

- A cost delta for added functionality may be dominated by testing costs, where added silicon area may be small, testing can be more significant.

Title – 10GEEE –Time to Switch
 By – Bill Woodruff, Aquantia
 See – woodruff_01_0307.pdf

Discussion

- How many decades to decrease? Maybe one for any PHY.
 - May want the “zero” rate added as an additional rate to all speeds
- If you do simplex, how to handle unused pairs. There may be ways to keep echo fresh on unused pairs
- What is the switching time above which EEE is not worth doing?

Break at 2:45 PM
Reconvened at 2:57 PM

Title – EEE for Backplane PHYs in Blade Server Environment
By – David Koenen, HP
See – koenen_01_0307.pdf

recessed 3:19

Reconvened Wednesday 3/14 at 9:07

- | | |
|-----------------------|-----------------------------|
| 1. Mike Bennett | LBNL |
| 2. Bill Woodruff | Aquantia |
| 3. David Koenen | HP |
| 4. Joseph Chou | Real Communications |
| 5. George Zimmerman | SolarFlare |
| 6. Jeff Lapak | UNH-IOL |
| 7. Wayne Mueller | NetEffect |
| 8. Kory Sefidvash | Broadcom |
| 9. Ken Christensen | University of South Florida |
| 10. Tatsuya Kawashimo | Hitachi |
| 11. Mandeep Chadha | Vitesse |
| 12. Jeff Cain | Cisco |

Mike Bennett presented a recap

Ken Christensen presented “outstanding questions”

Discussion

- We may see a request to modify 10BASE-T, for instance, to address the 5V supply artifacts
- Capability should exist for any multi-rate PHY.
 - Exchange capability
- If the system can exploit speed agility, and the PHY cannot, the system should have a way to benefit
- There may be rational to do two different PAR, one to establish Rapid PHY Switching
- There should be no communication to higher layer protocols.
- Mike Bennett will update “outstanding questions”

David Law presented RPS Scope. Straw Poll on resulting scope slide was Y:10, N:0, A:2.

Mike Bennett presented Questions.

Reviewed of straw polls from Monterrey.

- Definitions.
 - Discussion on settling time definition, but no changes.
- Zero frame corruption. Discussion as to “zero” being an artificial goal, an aspirational goal.
-

Break for Lunch at 12:05

Reconvene at 1:35

Discussion on broad market potential. Bill Woodruff started a spreadsheet to calculate possible energy savings in 2010 based on market analyst’s port shipment forecasts.

Mike Bennett will send the spreadsheet sent to Bruce Nordman for review and development to support the broad market criterion.

Break at 2:25 PM

Reconvened at 2:57 PM

Continued discussion on broad market potential.

Due to the number of people with commitments outside of the EEESG leaving during the afternoon session, the study group recessed at 3:40 PM. The chair directed the study group to watch for e-mail on the reflector to determine whether or not the meeting would continue on Thursday.

Reconvened Thursday 3/15 at 9:05

- | | |
|---------------------|---------------------|
| 1. Mike Bennett | LBNL |
| 2. Geoff Thompson | Nortel |
| 3. Bob Grow | Intel |
| 4. George Zimmerman | SolarFlare |
| 5. Kory Sefidvash | Broadcom |
| 6. Hugh Barrass | Cisco |
| 7. David Law | 3Com |
| 8. Mandeep Chadha | Vitesse |
| 9. Joseph Chou | Real Communications |
| 10. David Koenen | HP |
| 11. Bill Woodruff | Aquantia |
| 12. Mike McConnell | KeyEye |
| 13. Wayne Mueller | NetEffect |
| 14. Jeff Cain | Cisco |
| 15. Pat Thaler | Broadcom |

The chair presented motions for the study group to consider.

Motion: The 802.3 working group extend the Energy Efficient Ethernet Study Group

M: Geoff Thompson

S: Hugh Barrass

Yes unanimous – by voice

There were 13 people in the room

Motion: The EEESG should adopt the following project objective:

Define a mechanism to change between 10GBASE-T and 1000BASE-T operation more rapidly than auto-negotiation

Discussion: suggested to add *without loss of higher layer connection*

Motion: The EEESG should adopt the following project objective:

Define a mechanism to change between 10GBASE-T and 1000BASE-T operation more rapidly than auto-negotiation without loss of higher layer connection

Discussion: none

M: Geoff Thompson

S: Hugh Barrass

Yes 9 No 0 Abstain 2

Motion passed

Motion: The EEESG should adopt the following project objective:

Define a mechanism to change between 100BASE-TX and 1000BASE-T operation more rapidly than auto-negotiation without loss of higher layer connection

Discussion: none

M: David Koenen

S: Mandeep Chadha

Yes 8 No 0 Abstain 4

Motion passed

Motion: The EEESG should adopt the following project objective:

Define a mechanism to change between 10GBASE-KR & 1000BASE-KX more rapidly than auto-negotiation *without loss of higher layer connection*

Discussion: Suggested to add *without loss of higher layer connection*. Question regarding the commitment by the mover to do the work on backplane. The mover assured the group he would support the work

M: David Koenen

S: Hugh Barrass

Yes 7 No 0 Abstain 4

Motion passed

Motion: The EEESG should adopt the following project objective:

Define a mechanism to change between 10GBASE-KX4 & 1000BASE-KX more rapidly than auto-negotiation without loss of higher layer connection

Discussion: none

M: David Koenen

S: Hugh Barrass

Yes 9 No 0 Abstain 4

Motion passed

Motion: The EEESG should adopt the following project objective:

Any new twisted-pair and/or backplane PHY for EEE shall include legacy compatible auto negotiation

Discussion: Concern expressed that it was undesirable to be able to auto-negotiate to a new EEE PHY type that was not part of a multi-speed PHY. Mover was amazed that this was an issue.

M: Geoff Thompson

S: Mike McConnell

Yes 4 No 1 Abstain 7

Motion passed

Motion: The EEESG should adopt the following RPS scope components:

Define a protocol to allow symmetric request of change of link speed.

Changes within the capabilities of the PHY devices.

Ability to request decrease and demand increase.

Protocol will be PHY type independent

Define the ability to exchange transition time information.

This may be more than one parameter

Define transition times for the following PHY types.

10GBASE-T, 100GBASE-TX, 1000BASE-T, 10GBASE-T, 10GBASE-KX4,

10GBASE-KR, 1000BASE-KX

Additions as necessary to their start up state machines to define appropriate entry points determined by parameter durability (e.g. canceller coefficients).

Discussion: Question was raised as to whether or not 10GBASE-KX4, 10GBASE-KR and 1000BASE-KX should be added to the list of PHY types for definition of transition times. The mover's response is that the statement *Protocol will be PHY type independent* allows for new PHY types to use RPS however, after further discussion, agreed to amend the list to include the backplane PHY types.

M: David Law

S: Hugh Barrass

Yes: 9 No: 0 Abstain: 4

Motion passed

Motion: The EEESG should adopt the following project objective:

zero frame corruption due to transitioning between speeds

Discussion: concern raised that zero is unattainable, and that the objective should be realistic and measurable. One voter stated his regret of voting for this objective in the straw poll taken at the interim meeting. The objective was revised as follows:

Motion: The EEESG should adopt the following project objective:

No frames in transit shall be dropped or corrupted during speed change
(data transmission will be halted for sufficient time to allow speed change)

Discussion: none

M: George Zimmerman

S: Mike McConnell

Yes 9 No 0 Abstain 2

Motion passed

A request was made by Ilango Ganga via e-mail to conduct straw polls on his strawman objectives. The study group reviewed slide 8 of [ganga_01_0307.pdf](#). The following straw poll was proposed by Bob Grow:

Straw Poll: The EEESG should consider:

What is necessary to support wake up from a system standby state (almost no power)

Yes 11 No 0 Abstain 2

There was no more time to spend on straw polls on Ilango's slides

Motion: Approve the minutes of the January Interim meeting

M: David Law
S: Mike McConnell

Yes: by voice

Motion passed

Straw Poll: I will attend the May Interim in Geneva

About 6

Straw Poll: I will attend the September Interim in Seoul, Korea

About 8

Adjourn the EEESG

M: George Zimmerman
S: D. Law

Yes: by voice