Energy Efficient Ethernet Study Group Meeting Minutes May-29-2007

Attendees:

Name	Employer	Affiliation
Mike Bennett	LBNL	LBNL
Hugh Barrass	Cisco	Cisco
Chris Diminico	MC Communications	Solarfare
Robert Grow	Intel	Intel
Kory Sefidvash	Broadcom Corporation	Broadcom Corporation
Jim Barnette	Vitesse	Vitesse
David Koenen	HP	HP
Bill Wordruff	Aquantia	Aquantia
Goeff Thompson	Nortel	Nortel
Steve Carlson	HSD	HSD
Blaine Kohl	Tehuti Networks	Tehuti Networks
Terry Cobb	Systimax/Comscope	Systimax/Comscope
Thomas Dineen	Self	Self
Howard Frazier	Broadcom Corporation	Broadcom Corporation
Wael Diab	Broadcom Corporation	Broadcom Corporation
Pat Thaler	Broadcom Corporation	Broadcom Corporation

- Move to approve minutes for Orland and Ottawa.
- With no vocal opposition the minutes are approved.
- Chair appointed secretary – Kory Sefidvash for this meeting
- IEEE-SA Standard Board Bylaws Patents in Standards

Agenda & General information
By – Mike Bennett
See – agenda_2_0507.pdf

- Chair read slides 1 and 5 of the patent slides, allowing time for meeting participants to read slides 2,4, and 4.

- Is there anyone in room that has not read Patents slides? There was no response, it was confirmed.

- Chair issued call for patents. There was no response.

- Chair asked for guide line proposal to uniform test procedure to measure switching time between speeds. The response to this question was that the test procedure was not ready but the proposal would be made at the July meeting.

Title- Potential Ethernet Controller Power Savings
By-David Koenen
See-Koenen_1_0507.pdf

Discusson:

- There were some comments that the IEEE does not define mechanism to inform upper layers.
- Some felt there is a need for a mechanism to have the status bit visible upper layer
- Others thought having specification at MAC-PHY level is sufficient.
- Another issue: need for a special packet between interfaces or an option of new signaling across the interface to put the PHY into the low power mode.
- Either option to initiate this mode requires the MAC to get involved.
    - Some did not think it was necessary to get buy-in from people working on higher layers
- A bit can be define that can be use by upper layers. It might be the case that the IETF define the control policy.
- Re: Link Aggregation. Work on Link Aggregation Protocol timing is not good due to the move from 802.3 to 802.1
- LACP rules are to have all the ports at the same speed. If we want to switch some of the ports to slower speeds, then it will require change to LACP. Distributors will be an issue. You have to send packet to distributor. You can't put the distributor on the standby mode.
- If we do a 0BASE-T then doing LACP is trivial. The state will be in the power down state.

Title-Presentation Power saving in networked systems.
By- Hugh Barras Cisco
See- barras_01_0507.pdf

Discussion:

- All the information in this presentation is for typical system.
- A typical switch system going from 1000 mb/s to 100 mb/s speed gain 4 times power saving over just the PHY power saving.
- On /off switching allows measurement before and after, enabling a way to standardize the bench marks
- The market may require a standard bench mark. Question is do we need a standard bench mark for protocol?
- It is good to have discussion to have a common control policy.
- Would like to see bounds on the policy.

Break at 10:55
Reconvene at 11:15

Title-Transmit Disable time in a packet based speed change protocol Impact on Objective
By-David Law 3Com
See-Law_1_0507

Discussion:

- Disable time means the link is not usable.
- Does this presentation take into the count transition time?
- slide 3 is the worst case. There is a difference in shifting up compare to down. Diagram needs to look at those cases.
- Packet delay timing is not too much of issue.
- Don't start transmit data when you go to intermediate stage from 10->100->1000. just go from 10 to 1000.
- Full duplex should be one of the objectives.

Break for Lunch 12:50
Reconvene at 1:30

Title-Efficiency and EEE Technical Feasibility
By-Bill Woodruff.
Woodhuff_01_05

Discussion:

- It is a nice goal to have no change to PHY and to be able to achieve the shifting.
- Present state diagrams are defining cold start point. New entry point can be defined that is not a cold start point.
- The amount of work it will take to implement changes is subjective.
- This is first time that we are talking about a PHY to be able to work at two different speeds. 10/100/1000 is not one PHY. They are three PHYs.
- PHYs will negotiate at the high speed to find capabilities of having a lower power option.
- Objective should allow us to evaluate options and then we need to look at the ramification.
- 10 ms is too long for the faster rate.
    - Higher data rate is more sensitive to transition time.
- EEE needs to be for a broad set of applications.
- Suggested that we need to come up with good terminology to be able compare different options.
- We shouldn't decide which way now. We should come up with objective that it does not rule out consideration.

Technical Considerations and Possible Solution Sets for IEEE – Broadcom.
By-Howard Frazier Broadcom
See-Powell_02_0507

Discussion:

- How often can the switching can be used?
- The lower the transition time, the greater the potential to save energy.

Title-EEE transition time constraints.
By- Howard Frazier
See-frazier_1_0507.pdf

Discussion:

- Amount of buffer require by consumer Ethernet Audio Video (EAV) switch was debated
- Clarification on the intention of the control policy on slide 6 requested.
- Hysteresis required to avoid switching up on down.
- New protocols that have QoS built in are latency sensitive
- EAV type of application in slide 5, consumer application will be more sensitive to power saving and latency.

Break 3:40
Reconvene 4:08

Title-Energy Efficient Ethernet, another Look at the Objectives
By- Wale Diab
See-diab_2_0507.pdf

Discussion:

- There has been discussion in previous meetings to have higher transition time.
    - Concern that there is a need to have upper bound.
- The link status should not change is a significant boundary condition.
- One concern is this new objective could open to new wild new PHY type.
- Some believe the TBD needs to be filled in before submitting PAR.
- Some believe removing TBD will get PAR approved.
- Some feel that the RPS should be put in there.
- Debate over 1000Base-KX as part of the objectives.
- Friendly amendment to remove the 1000-KX
- Offer amendments replace “and from the lower power state to link speed”.
    - Not friendly, withdrawn
- Amendment to replace the “state” with “level of “, accepted
- Calling the question.

- Modify Slide 7 of presentation diab_3_0507.pdf

-Chris amendment link speeds shall be reduced.

Multiple feelings were expressed that the first bullet is not exclusive of other PHY type can be added a later time.

Objective:

• Define a mechanism to reduce power consumption during
periods of low link utilization for the following PHYs
– 100BASE-TX (Full Duplex)
– 1000BASE-T (Full Duplex)
– 10GBASE-T
– 10GBASE-KR
– 10GBASE-KX4
• Define a protocol to coordinate transitions to or from a lower level of power consumption
• The transition time to and from the lower level of power consumption should be transparent to upper layer protocols and applications, no more than TBD
• The link status should not change as a result of the transition
• No frames in transit shall be dropped or corrupted during the transition to and from the lower level of power consumption

Motion:

M: W. Diab
S: H. Barrass
ALL Y: 11 N: 1 A: 0
802.3 Y: 10 N: 1 A: 0

Motion passes (5/29/07)

Meeting recessed.

Day-2 5-30-2007
Reconvene: 9:15

Attendees:

Name	Employer	Affiliation
Mike Bennett	LBNL	LBNL
Hugh Barrass	Cisco	Cisco
Chris Diminico	MC Communications	Solarfare
Robert Grow	Intel	Intel
Kory Sefidvash	Broadcom Corporation	Broadcom Corporation
Jim Barnette	Vitesse	Vitesse
David Koenen	HP	HP
Bill Wordruff	Aquantia	Aquantia
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Blaine Kohl	Tehuti Networks	Tehuti Networks
Terry Cobb	Systimax/Comscope	Systimax/Comscope
Wael Diab	Broadcom Corporation	Broadcom Corporation

Chair provided a recap of the work done on the previous day and discussed the impact of the CERN tour and work in HSSG on EEESG meeting schedule. Study Group members agreed to be flexible and work as late as necessary to complete the PAR and 5 Criteria for submission to the EC.

Motion: Modify the following objective

From:

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

To:

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

M: Wael Diab
S; Bill Woodruff

All: Y: 3 N:3 A:3
802.3 Y: 2 N:3 A:3
Motion fails

Motion:

Change TBD in the following objective to

The transition time to and from the lower level of power consumption should be transparent to upper layer protocols and applications, no more than 10 milliseconds.

M: Hugh Barras
S: Chris DiMinco

All: Y: N: A:
802.3 Y: N: A:

Discussion:

- It is too early to put a time. We need to have material to be able to come up with a number.
- There should not be a TBD. Just remove to the "no more than TBD"
- Some believe having 10 ms might put the solution for 10G out.
- We can not pass it without have a value TBD
- We have passed 1000BT as 100 meter copper if it was possible.
- Would like no more than 10 ms if possible.
- Would like to take TBD out.

Hugh: Withdraw the motion.

The transition time to and from the lower level of power consumption should be transparent to upper layer protocols and applications, no more than TBD

Motion:

Remove the phrase "no more than TBD" from the objective:

M: David Koenen
S: Chris DiMinico

All Y: 7 N: 0 A: 1
802.3 Y: 5 N: 0 A: 1

Motion passes 5-30-2007

Motion

Add the following objective:

Define a 10 megabit PHY with a reduced transmit amplitude requirement such that it shall be fully interoperable with legacy 10BASE-T PHYs over 100 m of Class D (Category 5) or better cabling to enable reduced power implementations.

M: J. Barnette
S: Geoff Thompson

All Y: 5 N: 0 A: 3
802.3 Y: 4 N: 0 A: 2
Motion passes 5-30-2007

- Comment that Category 3 cable can handle 63 meters with the reduced transmit output voltage.

Break: 10:31
Reconvene 10:45

Adopt an objective "Define a mechanism to reduce power consumption during periods of low link utilization by reduction of link speed

M: Bill Woodruff
M: Chris DiMinco

Discussion:

- The group stated that the above motion does not preclude other solution than only to change the speed to reduce power.
- Some have different interpretation of the meaning of this bullet.

All Y: 5 N: 3 A: 1
802.3 Y: 4 N: 2 A: 1

Motion fails (5/30/2007 11:16)

Discussion:

- there is enough consensus in the group to fall back to 0 BASE-T

- Comment that the dynamic of the room changed since the vote was taken since yesterday

Motion:
Move that EEESG modify the following objective from:

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

To:

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

M: Wael Diab
S: Bill Woodruff

All Y: 3 N: 3 A: 3
802.3 Y: 2 N: 3 A: 3
Motion fails 5/30/2007

Break 11:30
Reconvene 4:00

Review Compatibility slide.

Update the slides

Distinct Identity

Discussion:

- Objective is contract between Task force and the 802.3. SA believes you need 10 people.
- Paperwork should be bullet-proof. Meeting detail having 7 people will be adequate.
- When this is submitted, you still can edit. You need to explain the edit to the group.

Motion:
Move that the EEESG approve the Compatibility criterion

M: Bill Wooddruff
S: Jim Barnette

Discussion:

- Suggested text:
  It is expected that Energy Efficient Ethernet will conform to 802. Overview and Architecture and remain compatible with the 802.1D, 802.1Q and 802.if. The project will work with 802.1 to address any extensions to these standards if required and to encourage their work to take advantage of the features that this project will provide.

- Comment that when there is a project, the EAV should be informed and ask them to work with us to make sure their sensitive protocol will work with EEE.
- Suggested changed to the motion accepted

All Y: 6 N: 0 A: 2
802.3 Y: 8 N: 0 A: 0
Motion passes

Working on the Distinct Identity

Discussion:
- Energy efficiency in the first bullet is good enough or need additional description?
- We may introduce specifications to optimize existing PHYs that may only be access through EEE.
- Because of 10BT changes we don't want to change the second may to shall on the second bullet.
- This project will provide capabilities that are specifically for IEEE 802.3 links and add the next paragraph.

Motion: Adopt Distinct Identity

M: Jim Barnette
S: Bill Woodruff

All Y: 8 N: 0 A: 1
802.3 Y: 8 N: 0 A: 0

Motion passes

Break 17:50
Reconvene: 19:50

Technical Feasibility

- The reason for this bullet is because of the concern it might break the network.
- The last bullet is modified to reflect the above concern more specifically.
- There is a concern that the objectives will be too loose without having the text "Link Speed" included.

Bill made motion to vote

M: Bill Woodruff
S: Bob Grow
All: Y: 8 N: 0 A: 0
802.3 Y: 7 N: 0 A: 0

Economic Feasibility Slide

EEE will not materially impact component or installation costs, and may provide cost savings opportunities.

While EEE is within IEEE 802.3, the creation of EEE provides opportunities for power savings beyond the PHY, potentially of much greater magnitude than the PHY itself.

The control mechanism will use similar functions to those already included in most Ethernet equipment and therefore will not add any significant cost.

The energy savings achieved will result in lower operating costs.

Discussion:

None

M : Jim Barnette
S: David Law

All: Y: 8 N: 0 A: 0
802.3 Y: 7 N: 0 A: 0

Motion passes 20:20

Working on PAR Section

Note: Item 4.2 changed to 2009
The following items
"Remove "a" and "State" and "minimal" from the scope of proposed standard.

Purpose of Proposed standard
Most Ethernet links have significant periods of low utilization or no utilization for application data traffic. Multi-speed interfaces (10/100/1000 BASE-T) are now commonly included in a single network interface controller. The greater complexity of higher speed PHY types results in higher energy consumption. The proposed standard will provide an important additional component for system level power management with resulting reduction in total cost of operation. Minor modifications to existing PHY specifications will help improve energy efficiency.

Replace the above with the following:

Most Ethernet links have significant periods of low utilization for application data traffic. This project will take advantage of this to provide energy savings in the PHY and enable energy savings in the system which will deliver reduction in total cost of operation.

Need for the Project

Motion

Approve the PAR, with purpose replaced with the text above and other edits as recorded. It is requested the working group chair submit the PAR for 5 criteria for July 2007 consideration.

Discussion:

- Minor is not a clear word. Need to replace it.

All Y: 8 N: 0 A: 0
802.3 Y: 7 N: 0 A: 0

Motion passes (5/30/2007) 20:45

Meeting Adjourned 20:47