Potential Ethernet Controller Power Savings

David Koenen

david.koenen@hp.com

HP Server Network Technology

A Good Start

- EEE for PHY link layer good start.
- Greater opportunity for power saving in MAC & NIC controller, upstream of PHY.
- Pending workload defines whether to request speed reduction but..
- PHY speed reduction should trigger lower power Ethernet Controller state.

Power Reduction in Controller

- Ethernet Controller needs to know actual PHY speed to lower is own power.
- Set goal(s) for Ethernet Controller power reduction when in EEE low power mode.
- Opportunity to save Power in NICs with offload technology.
  - Disable all but 1 Embedded NP
  - Reduce:
    - External XAUI lanes or equivalent internal I/F
    - Internal buffers, queues, data bus widths, & muxes.
    - Separate clock domains for full speed .vs. reduced speed.
  - PCIe Bus to L0s or L1 link state

Lower Power Link Aggr

- Coordinate with Link Aggregation Protocol
- Add lower power mode to LACP.
- Put Standby Controller in lower power State. (Controller, MAC & PHY)
- Define a lower power device state D1 or D2 for Standby + EEE low power mode.
- May wake periodically for keep alive signal.

Conclusion

- Much more opportunity for Power saving than just the PHY.
- LAG & LACP
- Low power modes for Ethernet Controllers