

Another Look at Powersave

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Background

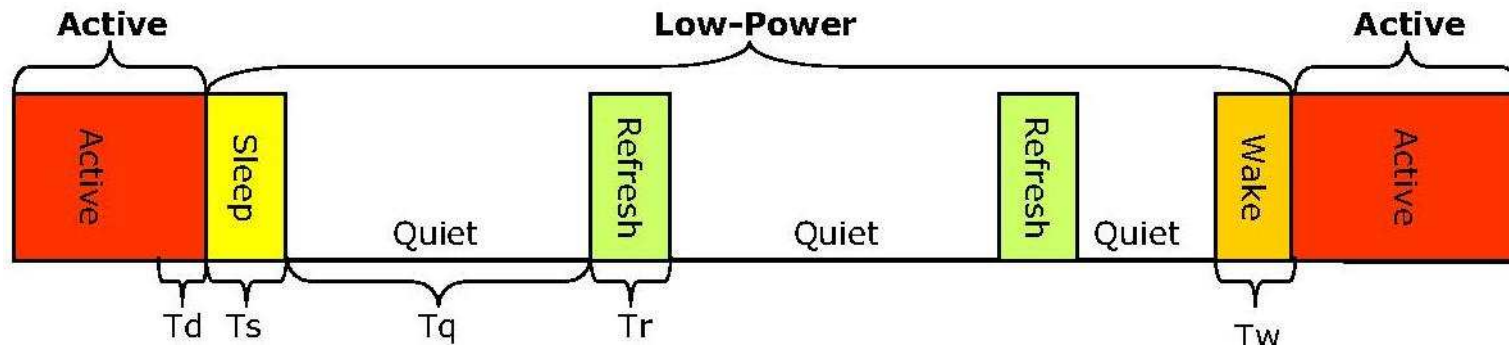
1. There has been interest in incorporating powersaving mechanisms into 10GEPON
 - ONUs spend a lot of time sitting idle

2. There is a TF dedicated to powersaving activity (ie. 802.3az) as well as some related work going on in 802.1
 - Behooves us to take a close look at how that work might be relevant to EPON
 - Caveat: summary provided here is based on sources other than mtg attendance

802.3az Approaches to Powersaving

1. Initial approach was “Subset PHY” ie. faster link switches to slower (more economical) rate when traffic level is appropriate
 - Not interesting to EPON for many obvious reasons
2. Currently however, a preference has emerged (for at least some PHYs) for “Low Power Idle” (LPI)

Low Power Idle (LPI)

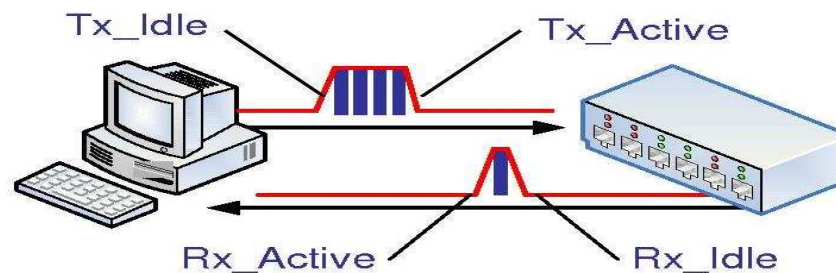


Source:

http://www.ieee802.org/3/az/public/mar08/hays_01_0308.pdf

1. Rather than transition between high-rate and low-rate, the link transitions between operating at its regular rate and going idle.
 - The characteristics of the link while in low-power idle is defined for each individual PHY
 - Wake (whether timed or signaled) and Refresh are PHY-specific
2. We can apply this model to an EPON downstream link:
 - After signalling "low-power" to an ONU, the OLT stops sending data to that ONU til it wakes.
 - In the interim it buffers data for the ONU as it always does

Transition Signaling to/from LPI mode



Source:
http://www.ieee802.org/3/az/public/mar08/hays_01_0108.pdf

Transition	Description	Transition Initiator
Tx_Active	Transmit data path resumes to Active when the system wants to send data	System Policy Manager (e.g. LAN Driver)
Tx_Idle	Transmit data path goes to Idle when there is no data to send	System Policy Manager (e.g. LAN Driver)
Rx_Active	Receive data path resumes to Active when link partner wants to send data	Link Partner
Rx_Idle	Receive data path goes to Idle when link partner has completed sending data	Link Partner

1. Tx and Rx control is separate (so EPON can use for DS only)
2. The particular control protocol is supposed to work with any PHY – including non-copper.
 - MAC control frame would be fine for EPON

Questions and Next Steps

- How much power savings could be achieved in the ONU with this scheme?
- What is the implementation complexity?
- If we are interested in this direction, what to do next?
 - Minimum would seem to be communicating w/ EEE to ensure that the PHY-independent aspects (control protocol, latency requirements etc.) are suitable so that EPON is not excluded from making use of the solution