

# Thoughts About Possible Energy Savings for 100G Next Generation Optical Ethernet

100G Next Generation Optics Study Group

**Michael J. Bennett**  
Lawrence Berkeley National Laboratory

**Wael William Diab**  
Broadcom Corporation

# Topics

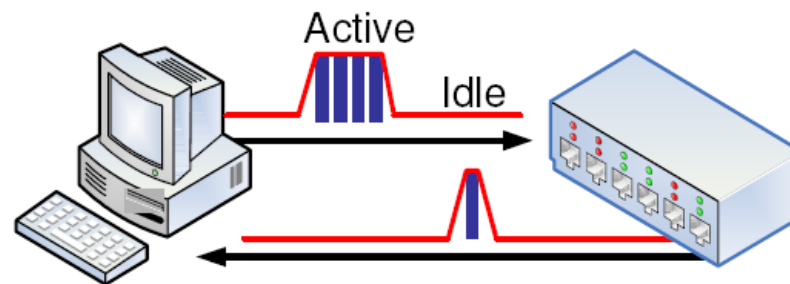
- (Very) Brief review of Energy-Efficient Ethernet
  - What is Low Power Idle?
- How could this apply to 100G NG Optics?
  - Options for communicating the protocol
    - Various wake options

# What is Energy-Efficient Ethernet?

- Energy Efficient Ethernet (EEE) is a method to reduce energy used by an Ethernet device during periods of low link utilization
- Specified in IEEE 802.3az-2010™
- The premise for EEE is that Ethernet links have idle time and thus opportunity to save energy
- Specified for copper interfaces
  - “BASE-T’s’
  - Backplane (except 40G)
- Being specified for 100GCU
- The method is called Low Power Idle (LPI)

# What is Low Power Idle?

- Concept: Transmit data as fast as possible, return to Low-Power Idle
- Saves energy by cycling between Active and Low Power Idle
  - Power reduced by turning off unused circuits during LPI
  - Scales energy use with bandwidth utilization



# How could this apply to 100G NG Optics?

- There are a variety of options to explore
  - Could allow LPI signaling to pass the lower utilization state to the link partner
    - Use it to reduce system power consumption
    - Can take advantage of the Ethernet switch port savings for a wider variety of port types

# How could this apply to 100G NG Optics?

- Possibilities include:
  - (a) Communicate signaling – no PMD power-down
  - (b) (a) + PMD power-down
  - (c) (b) with options for faster wake times
- EEE is showing up in switches and will likely be a feature in most, if not all Ethernet switches by the time this project is finished

If you're interested in exploring options

- Contact me at [mjbennett@lbl.gov](mailto:mjbennett@lbl.gov) or
- Contact Wael at [wdiab@broadcom.com](mailto:wdiab@broadcom.com)

# Thank You!