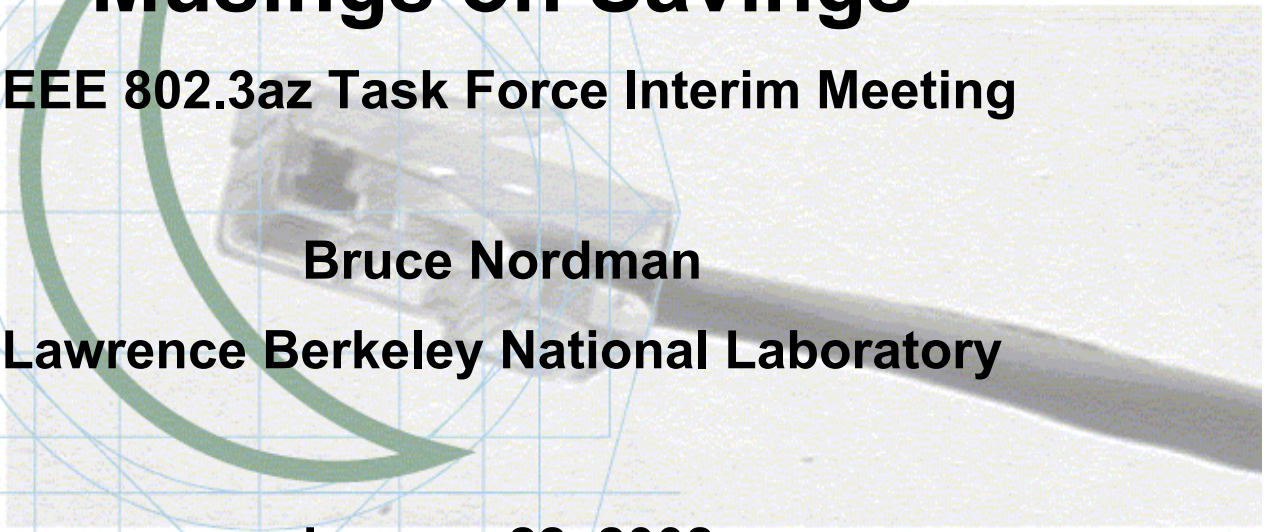
Musings on Savings

IEEE 802.3az Task Force Interim Meeting



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Why Consider Savings
(and audience)

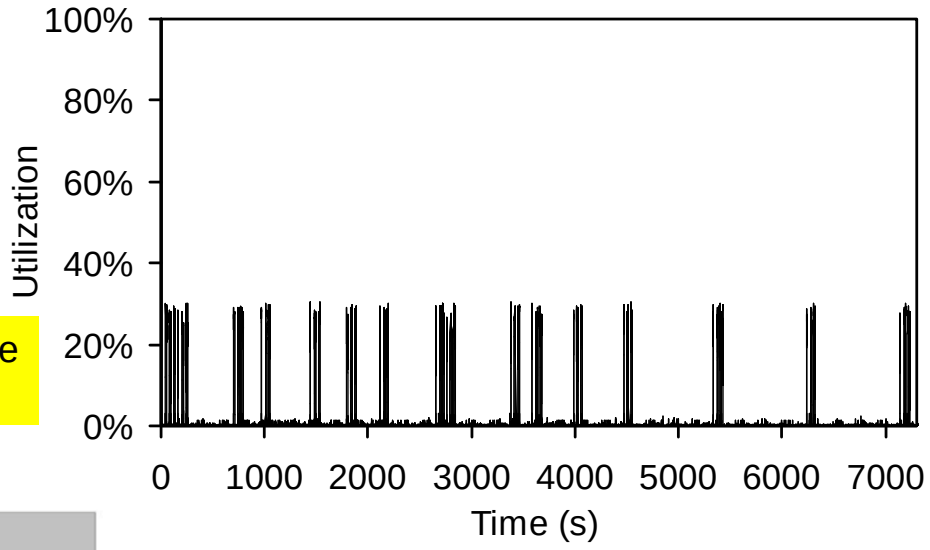
Savings: NIC vs. BOS (balance of system)

- Informing technology selections for .3az standard
  - –Us
- Communicating EEE NIC/link savings
  - –Product designers, purchasers/users, efficiency stakeholders
- Projecting aggregate savings
  - –General public / industry

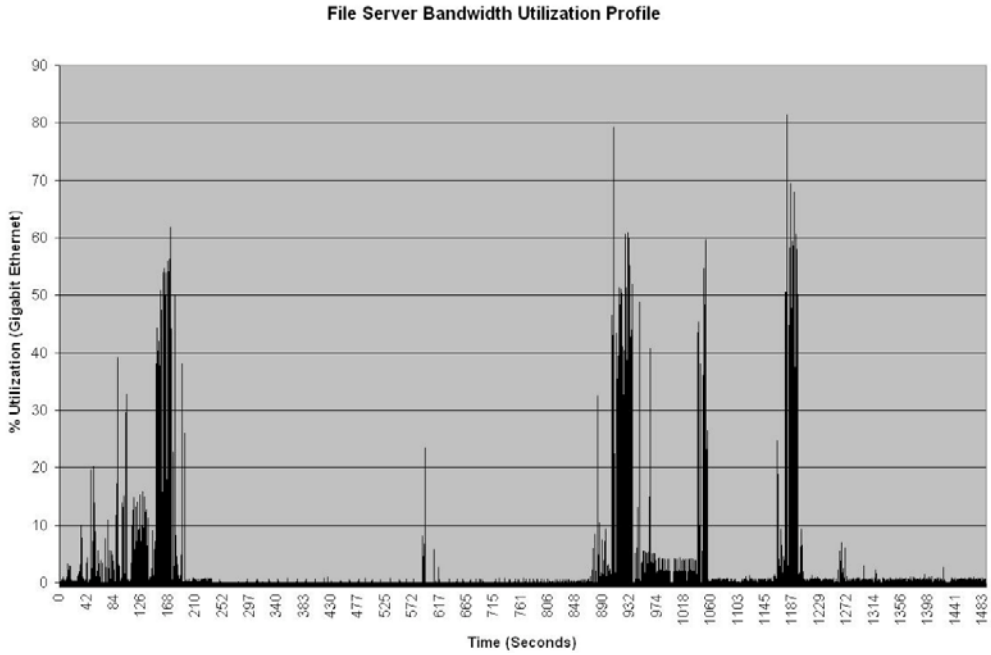
Savings are kWh/year and $$ (€€/ff/¥¥/…)

What utilization looks like: sample graphs

- **Snapshot of a typical 100 Mb Ethernet link**
  - **Shows time versus utilization (trace from Portland State Univ.)**



Typical bursty usage (utilization = 1.0 %)



- **File server link utilization (daytime)**

Most time is very low utilization (data center may be different)

Proposed Simplifications

- Use $0.10 / kWh
- Consider only components shipping when EEE NICs introduced to market
- Reference operation: groups of packets of 100 kbits, 0.1% total throughput
  - 1G: 10 packet clusters/second
- Key variables
  - Power: ∆ W between full rate and EEE operation
    ∆ W for BOS
  - Time: % of time in EEE mode
    % of time for BOS
  - Penetration: % of NICs / links using EEE

We'll Get

- Per NIC
  - –Power x Time
    - Average EEE link Savings *(W)* *(W)*
    - Annual EEE link Savings *(kWh/year)* *(kWh/year)*
  - –Power x Time x Penetration
    - Average Ethernet Savings *(W)* *(W)*
    - Annual Ethernet Savings *(kWh/year)* *(kWh/year)*
- All of these can be extrapolated to annual sales or existing stock of NICs/links
  - –U.S. or global

Where do we leverage more savings?

- Balance of system
  - –Enable slowing, stopping, sleeping
  - –Each has different savings and latencies
- Penetration — % of links that use EEE
  - –Not likely an issue for home/office use
  - –Key question is data centers

Key questions

- What latencies matter?
- How fast does traffic increase?
- What do we want specifically from non-.3az standards?
  - Negotiating latency tolerance
- What metaphor(s) should we use? (determines terminology)
  - Idle?
  - Low-power?
  - Sleep?

Thank you

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