Toward 10x Improvement in Data Center Efficiency

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Do We Really Need 10x Improvement?

- Most data center growth is from Web2.0 based cloud computing applications

- Compared to traditional desktop apps, these programs are a big step backwards
  - Imagine if your desktop were as fragile as the net
  - Big brother isn’t snooping your data, he owns it
  - All upgrades are now mandatory
  - When you provider goes under, so does your data

- But value does exist (e.g., community, ubiquity)… so please step up the application innovation!
How To Get 10x Efficiency Improvement

Proposal #1: Rethink the Economics of Operation
- Efficiency reduces operating costs
- Efficiency protects the earth

Solution: Seek out more economical and greener energy and cooling…for instance:

- Nuclear power in Antarctica
- Geothermal power in Mariana Trench
- Solar power in space

How To Get 10x Efficiency Improvement

Proposal #2: Re-purpose data centers
- Most center components have high thermal efficiency
- A 17,500 node center with 300W blades and 4.75 CoP A/C has 80% thermal efficiency, higher with more solid state
- According to Sun, this is 80,000x greater efficiency than a center purposed for computing (at 0.001% efficiency)

Solution: utilize co-generation…

- Central Heating And Cooling
- Food Production And Preparation
- Power generation
How To Get 10x Efficiency Improvement

- **Proposal #3: Communal Computing**
  - Use idle cycles on the user’s computers
  - Data center is composed of a massive number of widely dispersed machines
  - Has great potential to address many performance, availability, and privacy issues

- **Solution: data centers @ home…**