One Laptop per Child

Laptop Power

September 18, 2008
Challenges

- Supplying power can be a large and difficult challenge in a deployment. Even in areas with a power grid.
- Lack of an established grid increased the difficulty significantly.
- No recipe solutions. Each site is unique.
How Much Power?

• 2 Primary modes
  − Charging battery
  − Not charging

• Charging battery
  − Max draw of 17 Watts

• Not charging
  − Less than 1 watt in sleep
  − Avg 4 – 7 watts while running w/ peaks up to 9W
Charging. How Long?

• Fastest. Laptop off
  − All power used to charge battery
  − 1 hour 46 Minutes

• Laptop on
  − Excess power used to charge power
  − About 2 and half hours
• Various solar panels at MAX output

• Laptop off
  - 5W 5 hours 15 minutes
  - 7W 3 hours 45 minutes
  - 10W 2 hours 40 minutes
Alternative Power Sources

• Solar
  − 5/7/10 Watt solutions

• Weza
  − Approx 30 Watt output
  − 2 Batteries in 2 hours
  − 7Ah LA battery. Will charge 2 batteries
    • Weza battery needs recharging after
Alternative Power Sources

• Crank
  - Still needs 2 hours of cranking.
  - Not really viable until Gen 2.

• Grass Roots
  - Cow power
  - Water, Wind, Pedal, Treadle
Multi-Battery Charger

- Charges 15 batteries in 2 hours
  - 300 Watt AC
  - 120 Watt DC option (10 – 28 Volt input)
    - 8 Batteries in 2 hours
    - Direct connection to 60W solar blanket(s)
Power Management

• Available today:
  − Hardware ready for suspend/resume
  − Current stable builds have support for sleep on lid close or button
  − About 4 hours of battery life during normal use
  − 14-16 hours of battery life in sleep mode
  − 8.2.x Has New “Extreme” power savings mode + additional power savings in sleep for non-mesh. (40+ hours of life in sleep)
Power Management

- Future:
  - Automatic management of suspend/resume
  - Aggressive CPU suspend
    - Suspend measurements are in the 2 watt range.
Helping OLPC

• Deployment Location Information
• Information we need
  – What is the climate and geography of deployment areas?
    • Names of closest large city.
  – What natural resources are available?
  – How many schools, how many kids, and how many kids per class?
Helping OLPC

• How many of those schools don't have a power grid or have unreliable power?
• Expected laptop usage. How often will you need to recharge the batteries?