Digitalworld Forum WP2: From $100 laptop to the next generation Low Cost Laptops

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Low Cost Laptops
OLPC Laptop & Server, Classmate,...

Low Cost Mobile Phones
Motorola, Nokia, ZTE, ...

Low Cost Access
MeshWifi, Competitive Fiber, and Satellite...
Context

- **Technological Development** allows Low Cost solutions and low cost is the only way for developing countries to catch up
- Projects like OLPC have spurred innovation and similar offerings from commercial vendors are being presented one after another
- Mobile phones AND laptops for the developing World
- Need to harmonize and standardize solutions
- Need to create/invoke Communities

Community Building

- **Industry** Players
- International **Research** Community
- Relevant **Political/Government**
- **Civil Society** (NGOs)
- **International** Organizations
The beginning...of OLPC

- January 2005 first announcement
- May 2005 first mockup presentation
- November 2005 first prototype (external CPU)

First Design Studies
The crank

WSIS 2005 Tunis
The XO

The A1 pre Motherboard
Specifications 1:

- CPU: x86-compatible processor with 44KB level 1 I and D cache; at least 128KB level 2 cache; AMD Geode LX-700@0.8W
- CPU clock speed: 433 Mhz
- ISA compatibility: Support for both the MMX and 3DNow! x86 instruction-set extensions; Athlon instruction set (including MMX and 3DNow! Enhanced) with additional Geode-specific instructions
- Companion chips: PCI and memory interface integrated with CPU; North Bridge: PCI and Memory Interface integrated with Geode CPU; AMD CS5536 South Bridge (onboard);
- Graphics controller: Integrated with Geode CPU; unified memory architecture
- Embedded controller: ENE KB3700 or ENE KB3700B
- DRAM memory: 256 MiB dynamic RAM
- Data rate: Dual — DDR333 — 166 Mhz
- 1024KB SPI-interface flash ROM
- Mass storage: 1024 MiB SLC NAND flash, high-speed flash controller
- Drives: No rotating media
- CARE ASC Camera, Flash Enabler chip, provides high-performance Camera, NAND/FLASH and SD interfaces; Marvell 88ALP01
Specifications 2:

- Embedded controller: ENE KB3700 or ENE KB3700B;
- DRAM memory: 256 MiB dynamic RAM;
- Data rate: Dual — DDR333 — 166 Mhz;
- 1024KB SPI-interface flash ROM;
- Mass storage: 1024 MiB SLC NAND flash, high-speed flash controller;
- Drives: No rotating media;
- CAFE ASIC (Camera, Flash Enabler chip, provides high-performance Camera, NAND FLASH and SD interface)

Specifications 2: LCD

- Liquid-crystal display: 7.5" Dual-mode TFT display;
- Viewing area: 152.4mm × 114.3mm;
- Resolution: 1200 (H) × 900 (V) resolution (200 DPI);
- Monochrome display: High-resolution, reflective sunlight-readable monochrome mode; Color display: Standard-resolution, Quincunx-sampled, transmissive color mode;
- LCD power consumption: 0.1 Watt with backlight off; 0.2–1.0 Watt with backlight on;
- The display-controller chip (DCON) with memory that enables the display to remain live with the processor suspended;
Details: LCD

Specifications 3: Wifi Mesh

- Wireless networking: Integrated 802.11b/g (2.4GHz) interface; 802.11s (Mesh) networking supported; dual adjustable, rotating coaxial antennas; supports diversity reception;
- capable of mesh operation when CPU is powered down;
- Marvell Libertas 88W8388 controller and 88W8015 radio;
Batteries:

- Pack type: 2 or 4 cells LiFePO4; or 5 cells NiMH, approximately 6V series configuration;
- Capacity: 22.8 Watt-hours (LiFePO4); 16.5 Watt-hours (NiMH);
- Fully-enclosed “hard” case; user removable;
- Electronics integrated with pack provide:
  - Identification;
  - Battery charge and capacity information;
  - Thermal and over-current sensors along with cutoff switch to protect battery;
  - Minimum 2,000 charge/discharge cycles (to 50% capacity of new);
- Power management will be critical.

Lithium Iron Phosphate

- Lithium Iron Phosphate (LiFePO4) is generally considered to be the most promising new battery chemistry
- Although energy density is somewhat lower than Lithium Cobalt type cells (like those used in laptops and mobile phones)
- LiFePO4s are far more robust and offer much longer cycle life, in the order of 2000-3000 cycles
- This makes them a much safer and more economically viable option
Environmental Impact?

- RoHS (Restriction of Hazardous Substances Directive – EU) compliant
- But what will be the impact of millions of new laptops?
- How to decrease environmental impact?
- Raw materials shortage?

Case study: Argentina

- Children <15 yrs: 10 million
- Literacy at 15: 97.1 %
- Internet Users 2005: 10 Million
- XO @ $150 : Order of USD$ 150 Mio for 1 Million units
- Total Federal expenditures: $39.98 billion
- Public expenditure on education: $5.6 billion per year
- Number of students per teacher: 17
- Public expenditure on education minus teachers salaries: $300 million
**Pilots**

- Nigeria: One of the first pilot candidate countries. Small Pilot
- Peru
- Uruguay: Dec. 2007 became the first-ever real, non-pilot deployment site of OLPC XO laptops
- Brazil: Laboratory testing
- Lybia

**Distribution model OLPC**

- Initial Model B2G, Top Down approach
- Showed that it does not work
- New shift with G1G1 program November 2007
- New model for PPP?
- New Bottom up approach?
Was G1G1 a success?

- approximately 83,500 orders received during the G1G1 program
- The New York Times reported that OLPC announced a more precise figure: 167,000 laptops
- $399 price plus shipping
- Can be considered a success, but not enough

The next generation

- Announcement on May 20, 2008 at OLPC headquarters, 10am
- “State of the State address”
Organizational changes at OLPC

- End of 2007 Mary Lou Jepsen announced she quits OLPC and starts a new company
- Beginning of 2008 Walter Bender, President Software, quit, over disputes around Sugar

P.S.: Does it run Windows(tm)?

- Yes it does, and fast it is too...
PART II

Intel Classmate
Classmate 1G Specs:

- Type: Subnotebook, Developer: OEM
- Memory: 256MB of DDR2 RAM, Media: 2GB NAND flash memory
- Display: 7 inch diagonal LCD 800 x 480, Power 6-cell Li-ion battery
- Input: Keyboard, Touchpad
- Connectivity: 10/100M Ethernet, WLAN 802.11b/g
- Operating system: Mandriva Linux Discovery 2007
- Metasys Classmate 2.0
- Rxart
- Windows XP Professional

Classmate 2nd Generation
Classmate 2G Specs:

- 30GB PATA hard drive (in addition to 1, 2, and 4GB SSD)
- Built-in webcam
- Available 9" LCD (the 7" LCD is still available)
- Up to 512MB RAM
- 802.11s (mesh networking, currently only usable on Linux-based Classmates)
- Available 6-cell battery for up to 5 hours usage

ASUS eeePC 1st generation 700
## Asus 1G Specs:

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>900 MHz (factory underclocked to 630 MHz Intel Celeron-M ULV 353)</td>
</tr>
<tr>
<td>Memory</td>
<td>512 MB /512 MB /1 GB / DDR2 SDRAM RAM (2G/4G/8G and 900 series)</td>
</tr>
<tr>
<td>Media</td>
<td>2/4/8/12/20 GB (2G, 4G, 8G, 900 Win, 900)</td>
</tr>
<tr>
<td>Graphics</td>
<td>Intel UMA</td>
</tr>
<tr>
<td>Display</td>
<td>7 inch diagonal 800x600 pixels</td>
</tr>
<tr>
<td>Power</td>
<td>4 cell or 6 cell (700 series, non-surf models)</td>
</tr>
<tr>
<td>Input Keyboard</td>
<td>Trackpad</td>
</tr>
<tr>
<td>Connectivity</td>
<td>10/100 Mbit Ethernet, 802.11b/g wireless LAN</td>
</tr>
<tr>
<td>Operating system</td>
<td>Linux Xandros, Windows XP, others possible</td>
</tr>
</tbody>
</table>

## ASUS eeePC 2nd Generation 900

- 7 inch diagonal 800x600 pixels
- Memory: 2/4/8 GB
- Processor: Intel Celeron-M ULV 353
- Memory: 1 GB DDR2 SDRAM
- Media: 20 GB HDD
- Graphics: Intel UMA
- Display: 7 inch diagonal 800x600 pixels
- Power: 4 cell or 6 cell (700 series, non-surf models)
ASUS eeePC 2G Eee900

- 8.9" Display, 1024 x 600 resolution
- 4GB built-in + 8GB SSD (Windows XP)
- 4GB built-in +16GB SSD (Linux)
- 900 MHz Intel Celeron-M ULV 353
- Camera 1.3 megapixel

ELONEX
Elonex 1 Specs:

- 7” High Resolution TFT LCD display; 800 x 480
- 0.95 kg
- VIA Code II Mobile 330MHz processor
- Dedicated Linux Memory 128MB DDR-II SD RAM (256MB in upgraded model)
- On-board 1Gf Flash Memory; optimised for Linux (2Gb in upgraded model)
- Removable 1Gb, 2Gb, 4Gb, 8Gb, 16Gb wristvault (sold separately)
- Wi-Fi 802.11b/g (Wireless) (54Mbps)
- Ethernet (Wired) (10/100Mbps)
- Bluetooth (Wireless) in upgraded model
- 2 USB 2.0 ports
- 2 built-in speakers
- 3.5mm audio-in/mic
- 3.5mm headphones
- Splash-proof, removable QWERTY keyboard
- 2 Mouse emulators (one on keyboard and one on rear of device, advertised as for Tablet use)
- Integrated 3 cell Battery - approximately 4 hours usage
- Mains power adapter
- Linux - Linos 2.6.21 operating system, with pre-installed software bundle

VIA Nanobook
Nanobook Specs:

- Processor: 1.2 GHz VIA C7-M ULV (Ultra Low Voltage) Processor
- Chipset: VIA VX700 System Media Processor (integrated North & South Bridge)
- Memory: DDR2 SO-DIMM up to 1 GB, 30-GB HDD
- Display: 7-inch 800×480 touchscreen TFT-LCD
- Graphics: VIA UniChrome Pro II IGP Integrated 3D/2D Graphics with shared memory up to 64 MB, Audio: VIA Vinyl VT1708A HD Audio codec; 2 speakers
- Networking: Ethernet: Realtek RTL8100CL 10/100 Mbit/s, Wireless LAN: Azure Wave 802.11b/g (USB interface), Bluetooth: Billionton (USB interface)

CPU: Intel Atom

- Intel Atom is the brand name for a line of x86 CPUs
- Previously code-named Silverthorne and Diamondville processors,
- designed for a 45 nm CMOS process
- intended for use in ultra-mobile PCs, smart phone and
- other portable and low-power applications.
New Chipsets
- ARM
- INTEL

nComp UTMA Module
Office Station PC expansion

Zonbu Laptop
Processor: 1.5GHz, VIA C7-M
Intel-compatible, low energy use

Solarlite
Another $100 pc

villagePDA
Low cost internet ready device

Sinomanic
Based on the Godson-1 (Loongson) processor
$100 Dollar Server

Low Cost eHealth

Multiple Functions

Integrated Software
Power vs. Cost

Who is leading?
Workshop Laptops 2008 BRAZIL
WORKSHOP on Low Cost ICT for Development SP 5-6 June, 2008

- Multi-Stakeholder WORKSHOP (Around 40 selected participants)
- Grassroot Civil Society, Universities, Government, Int.Institutions, Industry
- Government representation
- Local Partners: PUSP, McKenzie University, APTEL, Fundacion FGV, PUC, Club of Rome Brazil
- Thematic topic: Laptops

Thank you!