

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



Digital World Forum on Accessible and Inclusive ICT

Digital World Forum is a FTI European research project focusing on the research and use of low cost ICT to leverage economic development in Africa and Latin America. DG INFSO International Relations Unit



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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...



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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/involve **Communities**



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Community Building

- **Industry** Players
- International **Research** Community
- Relevant **Political**/Government
- **Civil Society** (NGOs)
- **International** Organizations

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The beginning...of OLPC

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

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First Design Studies

THE US\$ 500 LAPTOP
DESIGN STUDIES



The crank




WSIS 2005 Tunis



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The XO



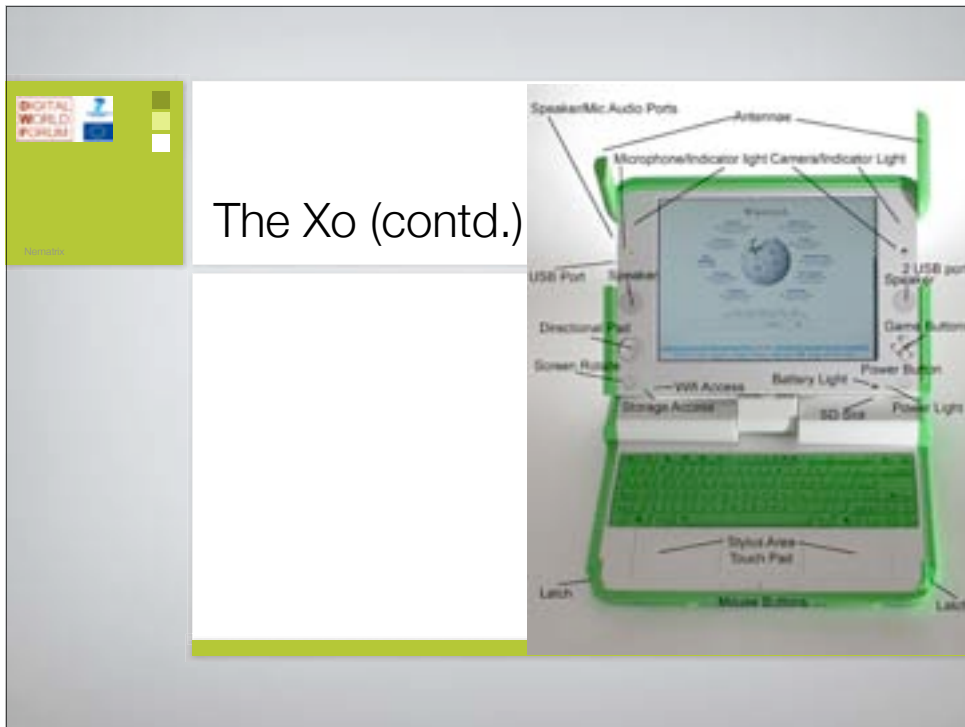
The image shows a green XO laptop, a low-cost, open-source computer. It features a green plastic casing with a screen in the center. The screen displays a blue logo, which is the XO logo. The laptop is shown from a three-quarter view, highlighting its compact and portable design.

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The A1 pre Motherboard




The image displays a green printed circuit board (PCB) labeled 'A1 pre Motherboard'. This is the main board of the XO laptop, featuring various electronic components such as a central processor, memory modules, and other integrated circuits. The board is shown from a top-down perspective, highlighting its complex layout and the various components mounted on it.



Specifications 1:


- CPU: x86-compatible processor with 64KB each L1 I and D cache; at least 128KB L2 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 (datasheet);
- Graphics controller: Integrated with Geode CPU; unified memory architecture;
- Embedded controller: ENE KB3700 or ENE KB3700B;
- DRAM memory: 256 MB dynamic RAM;
- Data rate: Dual — DDR333 — 166 Mhz;
- 1024KB SPI-interface flash ROM;
- Mass storage: 1024 MB 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 interfaces); Marvel 88ALP01



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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



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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;

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Details: LCD



The image shows two side-by-side LCD displays. The left display shows a grid of vertical lines in red, green, and blue, representing a horizontal LCD. The right display shows a grid of small, multi-colored squares (red, green, blue, yellow) arranged in a pattern, representing an OLPC XO LCD.


Horizontal LCDs address groups of 3 locations as pixels. Horizontal resolution can be increased via subpixel rendering, which is generally only done for text. (2400 dpi display)

The OLPC XO LCD addresses each location as a separate pixel. Resolution is then doubled in grayscale mode, in order to make the image is sharper to reduce color artifacts. (2400 dpi display)

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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



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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?



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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



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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



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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?

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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

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The next generation

- Announcement on May 20, 2008 at OLPC headquarters, 10am
- "State of the State address"



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Organizational changes at OLPC

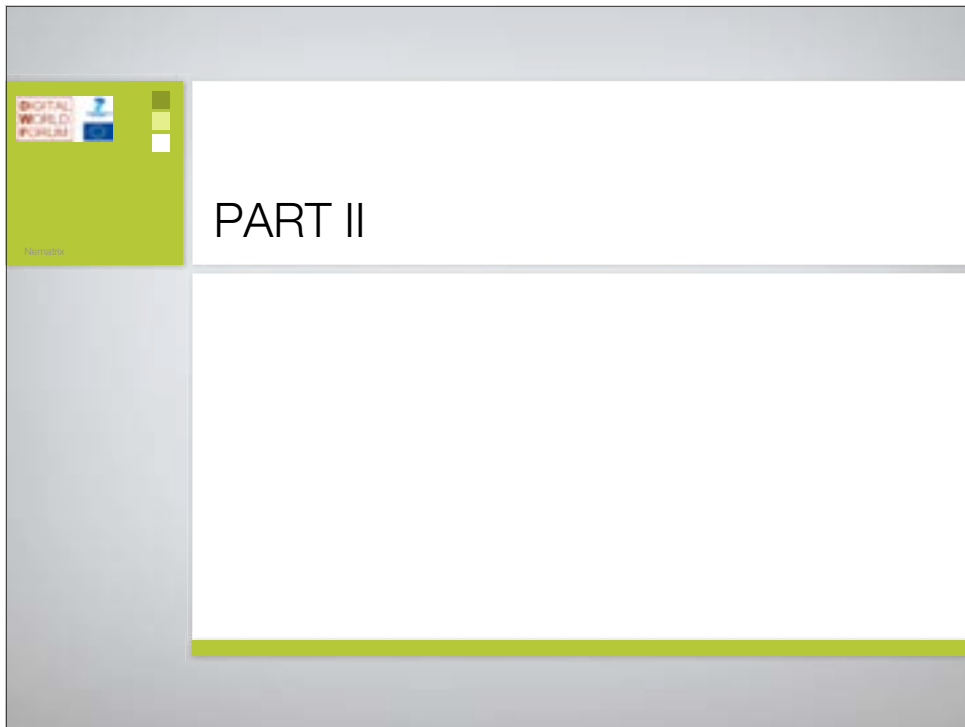
- End of 2007 Mary Lou Jepsen announced she quits OLPC and starts a new company
- Beginning of 2008 Walter Bender , President Software, quit, over disputes around Sugar
- Beginning of 2008 Ivan Kristic, Chief Security O., quit.

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

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






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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

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Classmate 2nd Generation




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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

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ASUS eeePC 1st generation 700

A photograph of a white ASUS eeePC 1st generation 700 netbook. The device is shown from a front-three-quarter perspective, open. The screen displays a desktop environment with several application icons. The keyboard and trackpad are visible below the screen.


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Asus 1G Specs:

- Type: Subnotebook, Developer ASUSTeK Computer Inc.
- Processor 900 MHz (factory underclocked to 630 MHz) Intel Celeron-M ULV 3 53, fan
- Memory 512 MB/512 MB/1 GB DDR2 SDRAM RAM (2G/4G/8G and 900 series)
- Media 2/4/8/12/20 GB (2G, 4G, 8 G, 900 Win, 900)
- Graphics Intel UMA
- Display 7 inch (diagonal) TFT LCD with LED backlight; 800x480 pixels
- Power 4 cell 4400 or 5200 (700 series, non-surf models) mAh battery
- Input Keyboard
- Touchpad
- Camera (Optional)
- Microphone
- 0.3 megapixel video camera (4G and 8 G models)ectivity 10/100 Mbit Ethernet
- 802.11b/g wireless LAN
- 3 USB 2.0 ports
- MMC/SD card reader
- Operating system Linux Xandros, Windows XP, others possible

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ASUS eeePC 2nd Generation 900



The image shows a silver ASUS eeePC 2nd Generation 900 laptop. The screen displays the 'Eee PC' logo on a blue background. The laptop is open, showing the keyboard and touchpad.

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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

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ELONEX




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Elonex 1 Specs:

- 7" High Resolution TFT LCD display; 800 x 480
- 0.95 kg
- LNK Code 8 Mobile 300MHz Processor
- Dedicated Linux Memory 128Mb DDR-II SD RAM (256Mb in upgraded model)
- On-board 1Gb 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

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VIA Nanobook



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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 800x480 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)

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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.




		<h3>New Chipsets</h3> <ul style="list-style-type: none"> -ARM -INTEL
		<h3>nComp UTMA Module</h3> <p>Office Station PC expansion</p>
		<h3>Zonbu Laptop</h3> <p>Processor: 1.5GHz, VIA C7-M Intel-compatible, low energy use</p>

		<h3>Solarlite</h3> <p>Another \$100 pc</p>
		<h3>villagePDA</h3> <p>Low cost internet ready device</p>
		<h3>Sinomanic</h3> <p>Based on the Godson-1 (Loongson) processor</p>

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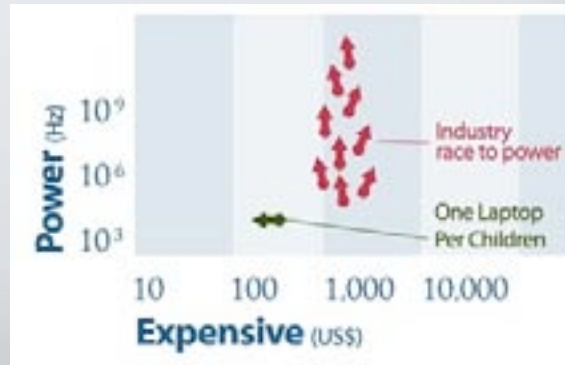
\$100 Dollar Server



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	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!

