

<http://membres-liglab.imag.fr/donsez/cours>

OLPC

One Laptop Per Child

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Motivation

- One Laptop Per Child
 - In under-developed (third world) countries
 - Educating poor people flourishes democracy

- Customers
 - Government of Argentina, Libya, Thailand, ...

- PC design
 - ~ \$100 for SW and HW
 - Objective : 5000000 OLPC to reach the cost (mass market effect)
 - Reliable
 - Outdoor usage (sunlight readable)
 - Sized for kids
 - ...

- OLPC
 - Non-profit organization
 - founded by Nicholas Negroponte, cofounder of the MIT
 - Design the OLPC, find sponsors and deals with the government

Introduction

- Current laptop market
 - Display 25%
 - Support of obese SW 25 %
 - Sale, Marketing, Distribution 50%

- How reduce the cost
 - No Sale, No Marketing, No Distribution
 - Dual mode display
 - Open-Source software and hardware (firmware)

Hardware (November 2006)

source : Wikipedia

- CPU: AMD Geode GX2-500 at 1.1 W, with integrated graphics controller
- CPU clock speed: 366 MHz
- SVGA 7.5" diagonal transmissive and reflective liquid crystal display used in one of two modes:
 - Reflective “sunlight readable” monochrome mode with 1200 by 900 screen resolution (for e-book reading outdoors—this is 200dpi)
 - Transmissive Color mode with approximately 800x600 pixel resolution with backlighting (for laptop use)
 - Depending on mode, power consumption of the display is between .1 and one watt.
- 128 MB of Dual – DDR266 – 133 MHz DRAM
- 1024 KB flash ROM with open-source LinuxBIOS
- 512 MB of SLC NAND flash memory
- External SD card slot
- Wireless networking using an “Extended Range” 802.11b/g wireless chipset run at a low bitrate (2 Mbit/s) to minimize power consumption.
- Marvell 8388 wireless chip, chosen due to its ability to autonomously forward packets in the mesh even if the CPU is powered off.
- Dual adjustable antennae for diversity reception.
- Keyboard, conventional(QWERTY) alphanumeric layout. Key imprinting & firmware localized for the country of use.
- Dual five-key cursor-control pads; four directional keys plus Enter
- Touchpad for mouse control and handwriting input
- Built-in color camera, to the right of the display, VGA resolution (640x480)
- Built-in stereo speakers
- Built-in microphone
- Audio based on the AC97 codec, with jacks for external stereo speakers and microphones, Line-out, and Mic-in
- 3 external USB2 ports.
- Power sources:
 - DC input, ± 10 –25 V
 - 5-cell rechargeable NiMH battery pack, 22.8 watt-hour (82 KJ) capacity



Dual mode display

- 30% in the screen backlight device

- SVGA 7.5" Dual mode display
 - 1200x900 Black & White
 - Sunlight readable for eBook mode
 - 800x600 Color
 - Video, Gaming ...

- Power consumption
 - between 0.1 and 1 watt.

Input

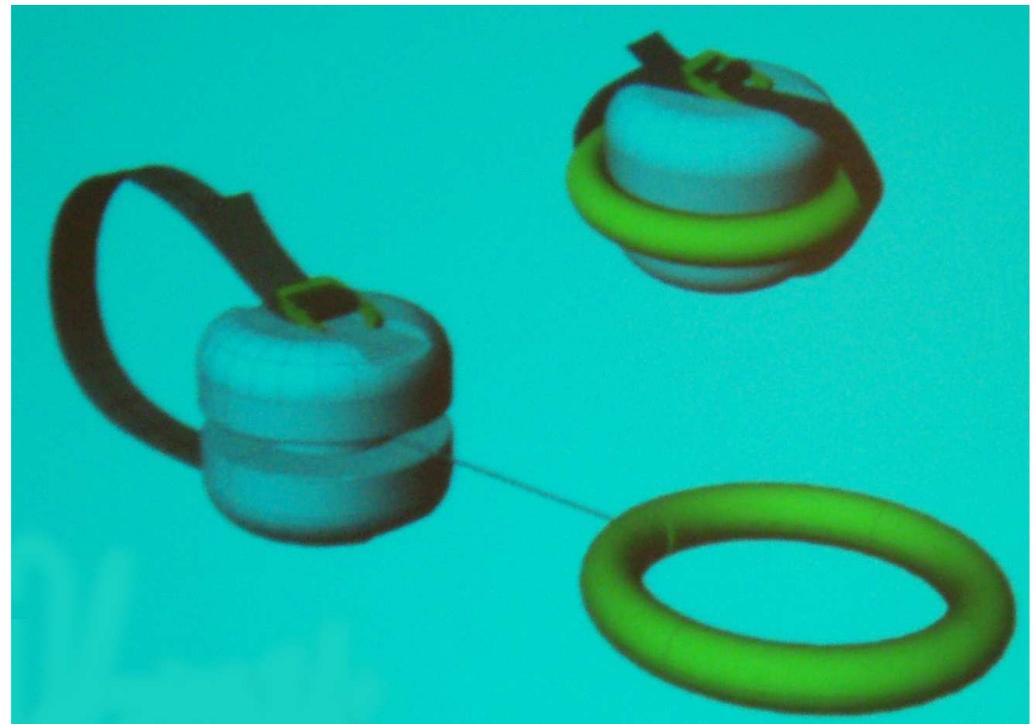
- Keyboard
- Touchpad
 - with stylus area for hand-writing
 - Touch screens are too expensive
- Microphone
- Built-in video camera (640×480; 30 FPS)

Power consumption

- 25-45W for conventional laptops
- Most of children have not electricity at home
- Consumptions
 - Mesh mode 0,5W
 - eBook mode 1W
 - eBook mode with backlight 2W
 - Web browsing and email mode 3W
 - Gaming 5W
 - ...

Low Power Operation

- Human power options (hands or feet)
 - 10 Watts « Yoyo » external generator
 - reliability



- Battery (2 hours lifetime)
 - Safety
 - Pollution issues

Storage

- No mechanical disk to improve reliability
- Flash disk
- SD slot
- USB disks

Software

- Operating system
 - Based on the Linux Fedora core

- Limits number of applications
- Application portfolio
 - eMail
 - Web browsing
 - Gaming
 - Education
 - Simple math tools

- Extensive use of Python

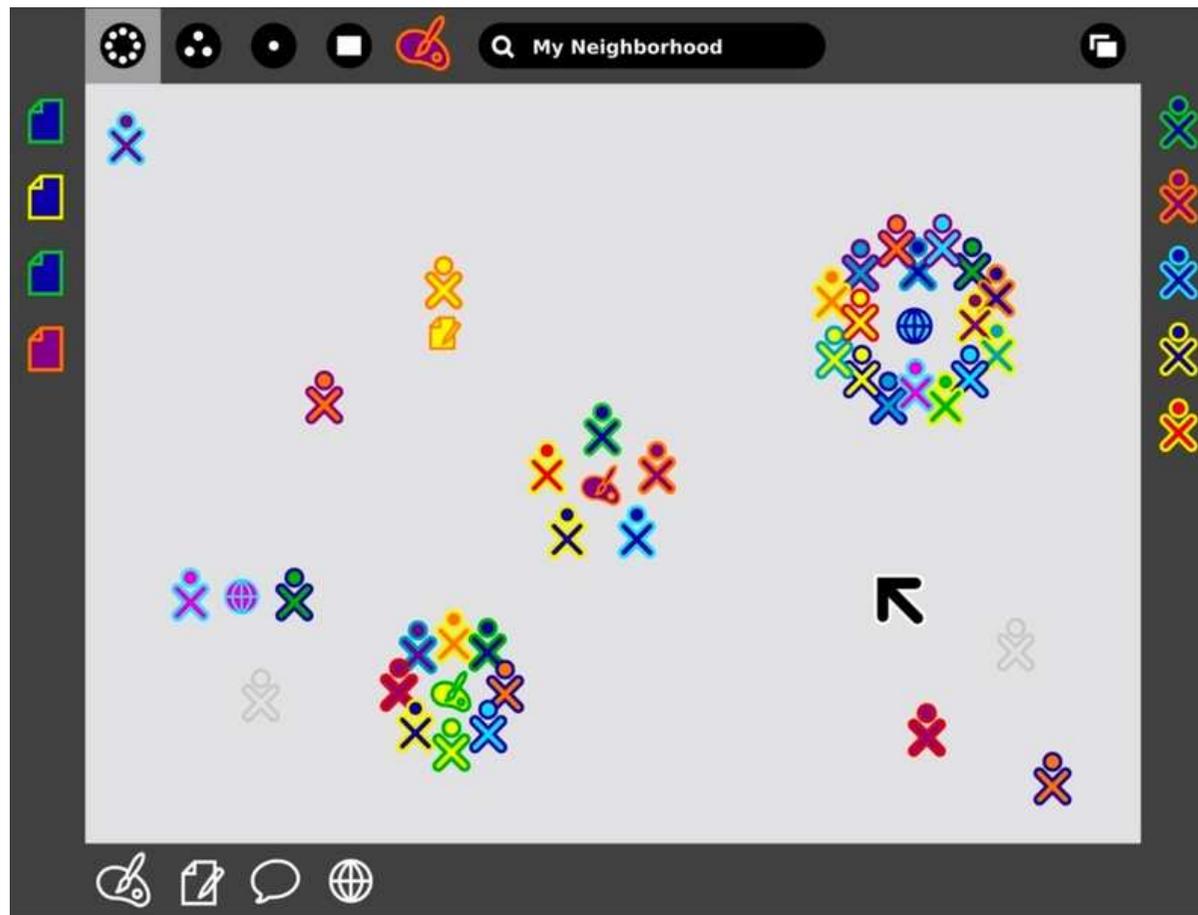
Network access

- No infrastructure
- So mesh network → 802.11s mesh

- Mesh networking
 - 2,5G, 3G
 - Satellite
 - Terrestrial WiFi/WiMax
 - ...

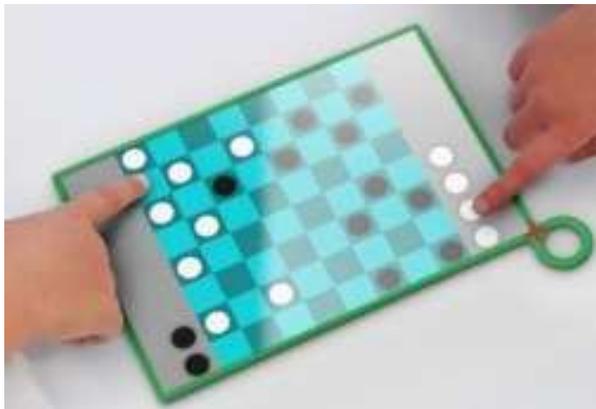
GUI

- Designed from children
- full frame display (no windows)



Next OLPC

- XO-1.75 (Marvell/ARM) early 2011
- XO-3 tablet in 2012



Didier Donsez, OLPC, 2007-2010

Source: eWeek

Social issues

- Only for kids
 - Avoid black market
- Only distributed by government

Own an OLPC if you are not a child or a teacher means that you are (or buy it from) a thief or a black-market reseller

References

- <http://www.laptop.org/>
- <http://wiki.laptop.org/go/Home>
- http://en.wikipedia.org/wiki/One_Laptop_per_Child



I, using an OLPC @ CCNC07



Michail Bletsas, Chief Connectivity Officer, presenting the OLPC @ CCNC07