Acknowledgement

Carla Gomez Monroy + all at OLPC + thousands of other organizations and individuals making this dream reality
I'm teaching in primary 5

the children are really trying, because they are doing many things in the laptop, of which I, the teacher, cannot do.
“I love my laptop more than my life”

*Personal Email from Badmus in Nigeria, May 2007*
You can help us

wiki.laptop.org & dev.laptop.org
IRC: freenode #olpc

This works are licensed under a Creative Commons Attribution 2.5 License.
What it’s like

- Opportunity
- Education
- Those not in school
- Teachers

....Kids will own their own laptops
What is: One Laptop Per Child?

1) A non-profit entity with $25M funding for non-recurring engineering costs

2) About **scale, scale, scale** being **global** is crucial launch 3-5 million units in first year, as much as 50-150 million units in second year >5 large diverse countries

3) To provide to children: to own, to take home, to use seamlessly
World Wide Interest


- **Green** = Planned Launch Country
- **Red** = Post Launch Country
- **Orange** = Federal Level Discussion
- **Yellow** = Discussion
- **Gray** = No Active Contact

This work is licensed under a Creative Commons Attribution 2.5 License.
At end of 2005 we planned:

- Always-on and Instant-On
- Extreme low-power
- Mesh-networked
- Sunlight readable high resolution display
- 5 year lifetime
- E-book & Games machine mode
- Droppable, spillable, carry in the pouring rain
But Along the way we continued to invent

- Green
- New computer architecture
- Security
- Sugar
- Bunny ears
- 4X Battery Life
- 50C
- Power input range
And Incidentals

- extra screws in laptop
- analog input through microphone jack
- no caps lock key
- 640x480 still and video camera integration
- Dual mode touchpad
- Slanted desks

- Spill proof keyboard….
And Other Products

- $100 Server
- Multi-battery chargers
- Wifi repeaters
- Active antennae
- Compared to..
OLPC Server: Exploded Views

Top Cap
Perforated vent cover
Rubber gasket
Sleeve for Hard drive and components
Invert cap for flush top
Global Launch

Argentina, Belize, Brazil, Cambodia, Chad, Colombia, Costa Rica, El Salvador, Ethiopia, Guatemala, Honduras, Kazakhstan, Kenya, Libya, Mali, Mexico, Mongolia, Nicaragua, Niger, Nigeria, Pakistan, Peru, Panama, Paraguay, Romania, Russia, Rwanda, South Africa, Thailand, USA, Uruguay, Yemen

Millions of Laptops

This works are licensed under a Creative Commons Attribution 2.5 License.
Basic XO Configuration

LX-700 AMD x86 CPU
256M DRAM
1G FLASH
3 USB ports
Rugged
Stereo sound, mic,
2 audio out
Camera: full resolution and video
ChiMei/OLPC Dual Mode Display

Mode 1:
SUNLIGHT READABLE
1200x900 (200 dpi)
Greyscale

Mode 2:
BRIGHT at NIGHT
Up to 1024 x 768
Color

1) Extreme low Power \[i\]
2) Sunlight Readability
3) Ultra-high resolution (200dpi)
4) ~1/3 price of laptop LCD

\[i\] 1 Watt with backlight on, 0.1 Watt with backlight off, and enables the CPU + much of motherboard to be turned off without user noticing saving further power = ~5% power consumption of typical laptop.

This works are licensed under a Creative Commons Attribution 2.5 License.
Display Innovation
How the Screen works
Conceptual – to produce new performance

- Pixel layout
- Luminance/Chrominance
- Selective use of color gels
- Electronics
- LEDs
3X luminance as compared to chrominance
- MPG, TV (pal, ntsc) same principle
Impact: stunning resolution compared to alternative method:
- 3X pixels (cost)
- 4X increase in power
- No sunlight readability
Extreme Low Power:

A New Laptop Architecture

- CPU: 2-3Watts just to update the screen
- Turn off CPU + most of the motherboard
- Enabled by rethinking the screen and rewriting the software:
  - Put frame buffer into timing controller
    *We had to make a new timing controller chip anyway…*
  - Suspend/resume (1/10th of a second)
  - Software take advantage of this…all levels
Power

Gang, Solar, batteries, human power

- Solar Panel of power ratings from 50W-100W
- Waterproof protection
- Virtually unbreakable (No glass)
- Easy to install (No steel structure)
- AC dual voltage power supply
- Easy to operate
Power Savings = Money

50 Million laptops could be purchased for children in the developing world with energy conservation savings, if everyone in the world simply switched to an XO, or even an XO-like computer architecture.
Greenest Laptop ever Made

Environmental Impact

- Toxicity
- RoHS
- weight
- part count
- computer size
- computer lifetime
- battery life
- power consumption

EPEAT GOLD in Process (IEEE 1680)
Mechanical Design

- No moving parts
  - No harddrive, no fans

- Droppable
  - Extra rigid shell
  - Bumper (replaceable)
  - Shock mounted LCD

- Moisture/dust/dirt resistant
  - Keyboard
  - USB, microphone etc - protected

- Connector reinforcement
- Transformer hinge
Sugar

(1) Sharing and collaboration as part of core experience
(2) Ad-hoc or server-based
(3) Visibility into what others are doing
(4) Learning and building things together
Exploring, expressing, and sharing

- Web browser
- eBook reader
- Chat
- VOIP
- Email
- Multimedia / Music / Video
- Games

- Word processing
- Journal
- Wiki
- Web server
- Graphics
- Programming:
  - Logo; Etoys
  - Multimedia creation
Children will be both consumers and creators.
Learning learning by debugging.
Transparency is empowering. Open-source software gives children—and their teachers—the freedom to reshape, reinvent, and reapply their software, hardware, and content.
Security

• open design
• no lockdown; low-risk tinkering
• protection for the uninformed user
• secure BIOS
• protection against irreversible damage
• strong authentication between users
• scrutinizable software
Maintenance
Robustness

The tall bench (blue arrow) has a small inclination. The short bench (red arrow) has a steep inclination. However, there is another kind, the brown bench. The children store their materials and XOs under the writing board (yellow arrows), with parallel inclination. The black lines represent the inclination.

The floor is concrete and lots of dirt finds its way in.
Economics

Initial and launch:
- Central government funded
- Single big orders
- Developing countries, USA

Subsequently:
- One country paying for another
- Child-to-child funding
- Commercial subsidy
- Micro-philanthropy
  .......etc.
XO is a platform

1. Extremely Low Power
2. Sunlight Readable
3. Use in extreme heat (50C)
4. Mesh Networked
5. Green/Eco
6. All solid-state

OLPC technology useful from low-end to high-end
“I love my laptop more than my life”

*Personal Email from Badmus in Nigeria, May 2007*
You can help us

wiki.laptop.org & dev.laptop.org
IRC: freenode #olpc