XO-LiveCD

One Laptop Per Child Live-CD

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Mission

One Laptop Per Child is one of the most ambitious education projects ever attempted. The idea is simple: children in developing nations receive special laptops that enable them to learn and get access to our connected world.

The mission of the non-profit „One Laptop Per Child“ project is to provide children around the world with new opportunities to explore, experiment, and express themselves.

Before you continue reading, we recommend you to visit http://laptop.org for more information.

This CD targets the goals:

- give children, students, teachers and parents the opportunity to participate OLPC and use this educational software on a common PC
- demonstration of OLPC software to non-developers
- for developers the CD provides an easy maintainable Live-System, which could be used to develop and test activities on the sugar desktop

Ready to use ISO images are available at:

http://dev.laptop.org/pub/livebackupcd/

as XO-LiveCD_<date>.iso and mirrored on:

ftp://rohrmoser-engineering.de/pub/XO-LiveCD/

We encourage everybody to try this CD out and give feedback for improvements. Please join the mailing list at: http://lists.laptop.org/listinfo/livebackup-xo-cd
Current state of the XO-LiveCD

This XO-LiveCD uses the LiveBackup (https://sourceforge.net/projects/livebackup) framework. The CD contains an official OLPC development snapshots

- update.1, build number 708
- joyride, build number 2020

available from:

http://pilgrim.laptop.org/~pilgrim/olpc/streams/

This operating system image - which is designed to run on the XO-Laptop hardware - is adapted to run as a live system on a wide range of PC hardware.

We have added many activities from http://wiki.laptop.org/go/Activities which you will find on the CD in the Activity_Bundles/ directory. Here are some examples:

- Etoys: Learning / programming / authoring environment
- GCompris: a suite of children’s activities that has won a prize for educational software
- Words: Translating dictionary with speech synthesis
- TamiTam: Music composition and synthesis
- Pippy: Python Programming language/environment
- Scratch: An easy-to-learn, multimedia programming language.
- Cartoon Builder: Animate a cartoon character by creating a sequence of poses inside a filmstrip
- Turtle Art: Pseudo-Logo graphical programming language

HINT: Activities are designed for XO-Laptop hardware, therefore not all may run on your PC as expected.

Know problems:

- Some activities do not scale for a screen resolution less than 1200x900, we recommend to use video hardware with a higher resolution.
- The record activity does not work with an external USB web-cam yet.
- The XO-LiveCD does not contain additional firmware. If you use hardware (i.e. Intel® PRO/Wireless 2200BG), which driver will depend on firmware, it will fail to load.
How to start

Hardware Requirements

This CD image was tested on different hardware, and virtual PC's. Currently it bests supports Intel PC hardware which has a standard IDE controller and is connected to an ATAPI CDROM drive. Hardware requirements:

- Intel-compatible CPU ( > 800 MHZ CPU )
- > 512MB Ram, recommended 1GB (to use all extra activities)
- VESA-compatible video card
- Monitor 1024x768, recommended 1280x1024
- sound card with support for Advanced Linux Sound Architecture

Booting

This system boots from CD, no hard-disk access is required. To start this OLPC demo, burn the ISO image on a blank CD and boot your PC from CD-ROM drive. Alternate you can also use a virtual PC like Vitualbox, qemu, kvm or try any other software out of this category.

When the boot screen appears select your language and press <enter>. If you are a developer you may like to use the <TAB> key and add the single or lb_debug options which permits you to look deeper into this software.
Customization

Customization works by unpacking the ISO-image content, add/remove/change files and recreate the ISO-image again. The important parts of the directory structure are:

Activity_Bundles/ # here you place activity bundles to be installed
RPMs/ # if you need additional RPM packages place them here
config/ # image configuration scripts and data, probably no need to change these
system/ # squashfs filesystems of official XO builds
tools/ # here you find the tool to make a bootable USB-memory-stick
boot/ # linux kernel and boot loader
lib/ # linux kernel modules
hwdetect/ # if your hardware does not work you may want to improve here

Additional Activities

The official OLPC image has already many activities preinstalled. Additional activities can be obtained from:

http://wiki.laptop.org/go/Activities

To add them permanent on the Live-CD copy the bundle files *.xo into the CD top level directory Activity_Bundles/. When the CD starts, these bundles get automatically installed as long as they fit into RAM memory. To use all activities on the current CD you should have about 1GB of ram.

Additional RPM packages

Some activities require additional libaries or programs to be available. Because the distribution is based on Fedora you need to get RPM packages and copy them into the RPMs folder. On startup these packages get automatically installed.

Example: If you want to use the Adobe Flash Player with the Browser Activity, go to the Adobe Website and download the flash-plugin-9.0.124.0-release.i386.rpm file.

Boot from USB Memory-Stick or SD/MMC card

Speed and comfort can be increased by using external USB memory devices to start the XO-LiveCD.

On a Linux Computer you insert an empty and preformatted USB device. Then you open a console window and change into the directory to tools/. Next you execute:

`.make_usbstick.sh -h`

which gives further instructions how to use this command and make your USB device bootable.
Installation

If you like to provide your children the opportunity to use this software frequently, you might consider to install it on hard-disk and configure a multiboot setup.

General Hard Disk Installation

This can be achieved by a simple copy of the CD content into a separate directory and modification of boot loader settings.

Here is an example how this could read on a Linux based PC.

```
cd /opt
mkdir olpc
# assume CD is mounted under /media/cdrom
cp -a /media/cdrom/* /opt/olpc/
# copy/move kernel and initrd
cp /opt/olpc/boot/*2.6.24.4-lb* /boot
```

Now look for the device which is mounted as /opt

```
mount
....
/dev/hda6 on /opt type ext3 (rw)
...
```

For this example this is /dev/hda6. Now you could add a grub boot-loader entry like

```
title           OLPC (update.1)
root            (hd0,2)
kernel          /olpc/boot/vmlinuz-2.6.24.3-lb-i386 quiet
                vga=0x317 video=vesafb:ypan
                lb_hwdetect xmodule=vesa
                lb_device=/dev/hda6:ext3:/olpc
                lb_symlinks=256M lb_toram=no lb_config=update.1
                lb_system=build-679
initrd          /olpc/boot/initrd-2.6.24.3-lb-i386
boot
```

to the configuration menu.lst. To adapt this example for your PC, you likely have to change:

- **root (hd0,2)** your boot device
- **lb_device=/dev/hda6:ext3:/olpc** this setting allows the initrd to locate the XO-LiveCD copy, it has three parts
  - **/dev/hda6** hard disk device name
  - **ext3** file system type, supported are ext2, ext3, vfat and ntfs
  - **/olpc** the directory which holds the CD copy

Similar configurations should also work for other combinations of disks, file-systems, and boot-loaders. It should even be possible to get a OLPC multiboot setup on a MS Windows OS on a NTFS file-system.

Installation on an ASUS Eee-PC

The same procedure as above could be applied on an ASUS Eee-PC. Because of some pitfalls on this special hardware the procedure is described in more detail. We recommend to have basic Linux knowledge to understand what is going on. There is always a risk to destroy data if you make mistakes! You have been
warned!

**Known Eee-PC related Problems:**

The Asus EeePC support is in an early stage, many things are not working yet, i.e.:

- Eee-PC does only support a screen resolution of 800x480 pixels. This is much less than the 1200x900 resolution on the XO-Laptop. Many activities are optimized for the high resolution and do not scale on the Eee-PC screen. We did not succeed to configure a larger working virtual screen yet, which could solve this problem.

- The internal web-cam is not working yet
- the atl2 NIC driver is not included yet
- the wlan madwifi driver is not included yet

If you decide to try it by yourself continue reading.

**Install the system on Solid State Disk**

Because the Eee PC does not have a CDROM drive, you may want to prepare an USB or SD/MMC memory device as described above. Now plug the USB memory stick before you switch power on. You need to press ESC during BIOS startup and enter the boot device selection menu. Select the OLPC (single user) boot entry.

When you look at the partition layout `fdisk -l` you will notice that two SSD partitions are used by ASUS Kantonix in a unionfs file system overlay configuration. You need to mount both.

```
mkdir /tmp/hdc1
mkdir /tmp/hdc2
mount /dev/hdc1 /tmp/hdc1
mount /dev/hdc2 /tmp/hdc2
```

Create a new directory and copy the XO-LiveCD content on device hdc2

```
mkdir -p /tmp/hdc2/usr/local/olpc
cp -a /mnt/media/* /tmp/hdc2/usr/local/olpc/
```

Next copy the linux kernel and initrd into the boot partition on hdc1:

```
cp /tmp/hdc2/usr/local/olpc/boot/isolinux/vmlinuz  
/tmp/hdc1/boot/vmlinuz-2.6.24.3-lb-1386
cp /tmp/hdc2/usr/local/olpc/boot/isolinux/vmlinuz  
/tmp/hdc1/boot/initrd-2.6.24.3-lb-1386
```

Finally you need to add an OLPC boot-loader entry in `/tmp/hdc1/boot/grub/menu.lst`

```plaintext
title olpc
root (0x80,0)
kernell /boot/vmlinuz-2.6.24.3-lb-1386 quiet lb_hwdetect
    lb_device=/dev/hdc2:ext3:/usr/local/olpc
    lb_symlinks=auto:256M lb_toram=no
    lb_config-update.1 lb_system=build-695 lb_country=4
    initrd /boot/initrd-2.6.24.3-lb-1386
```

Hint: You could use the boot menu by pressing F9 during start up. If you like to see the menu every time you have to remove the hiddenmenu entry in the boot-loader configuration.
Support

„One Laptop Per Child“ is a huge project which is developed by people all around the world. To find support and get more information the URL http://wiki.laptop.org/ is our recommended starting point.

The creation of this XO-LiveCD is a non profit project supported by http://www.rohrmoser-engineering.de. If you have questions related to this XO-LiveCD, we invite you to join us on the the mailing list:

http://lists.laptop.org/listinfo/livebackup-xo-cd

Professional support is available. Please contact us and use our knowledge and experience to solve your tasks efficiently.
Success Stories

The XO-LiveCD may not run on any computer hardware. We are continuously improving it and we are testing on various hardware and different virtualization systems. Here are some examples which worked:

Table of tested virtual PC's

The tables below lists some experiences.

<table>
<thead>
<tr>
<th>boot media</th>
<th>graphics/monitor</th>
<th>network</th>
<th>audio</th>
<th>remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>linux&gt; Virtualbox (version 1.5.2)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE/ATAPI CD-ROM</td>
<td>1024x768</td>
<td>yes</td>
<td>yes</td>
<td>virtual machine setup with default settings, 256MB and ALSA driver</td>
</tr>
<tr>
<td><strong>WindowsXP&gt; VMWare Player 2.0.2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD ISO-Image</td>
<td>1024x768 (VMWare SVGA Adapter)</td>
<td>yes</td>
<td>yes (Ensoniq Audio PCI)</td>
<td>VM with 256MB Ram, tested on a DELL XPS Laptop</td>
</tr>
<tr>
<td><strong>WindowsXP&gt; Qemu 0.9</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD ISO-Image</td>
<td>1280x1024</td>
<td>yes</td>
<td>no, silent</td>
<td>VM with 256MB Ram</td>
</tr>
<tr>
<td><strong>linux&gt; QEMU_AUDIO_DRV=oss qemu-0.9 -soundhw es1370 -m 256 -cdrom olpc.iso</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE/ATAPI CDROM</td>
<td>1280x1024</td>
<td>yes</td>
<td>yes, but csound did not work</td>
<td>you can select the screen resolution between 1024x768 and 1280x1024</td>
</tr>
</tbody>
</table>

Examples of tested PC hardware

<table>
<thead>
<tr>
<th>boot media</th>
<th>graphics/monitor</th>
<th>network</th>
<th>audio</th>
<th>remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Samsung X10plus Laptop, 1.6GHz, 512MB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE/ATAPI CDROM</td>
<td>1024x768</td>
<td>yes</td>
<td>yes</td>
<td>runs fast</td>
</tr>
<tr>
<td><strong>Medion PC, 1.8GHz, 768MB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE/ATAPI CDROM</td>
<td>1280x1024</td>
<td>OK, RealTek RTL8139</td>
<td>OK, C-Media PCI CMI8738-MC6</td>
<td>runs very fast from RAM</td>
</tr>
<tr>
<td><strong>Dell PC, 3GHz, 2GB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>network PXE boot</td>
<td>1280x1024</td>
<td>yes</td>
<td>yes</td>
<td>runs very fast</td>
</tr>
<tr>
<td><strong>Shuttle PC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE/ATAPI CDROM</td>
<td>1024x768</td>
<td>yes</td>
<td>yes</td>
<td>-</td>
</tr>
<tr>
<td><strong>DELL XPS gen2 Laptop</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDROM</td>
<td>1024x768</td>
<td>yes</td>
<td>yes</td>
<td>-</td>
</tr>
<tr>
<td><strong>Lenovo X61s installed on hard disk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDROM</td>
<td>1024x768</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td><strong>Sony Vaio VGN CDROM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDROM</td>
<td>1280x800</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td><strong>Asus Eee PC USB Memory or SSD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB Memory or SSD</td>
<td>800x480</td>
<td>yes</td>
<td>yes, but csound does not work well</td>
<td>many activities are not usable because of low screen resolution</td>
</tr>
</tbody>
</table>
License

This project is covered by the GNU General Public License, the source code for OLPC software is available at http://dev.laptop.org. The sources for the XO-LiveCD specific software is maintained in the git repository at http://dev.laptop.org/git?p=projects/livebackup-xo-cd;a=summary.

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