The magic of live CDs

What are live CDs, and how do they work?

Harish Pillay

A "Live CD" is a bootable CD, which contains pre-configured software, this allows the user to be productive without accessing any other hard drives (unless the user wants to store information).

Why would anyone want to have to carry around a CD, rather than having a desktop or laptop computer, which is fully installed and ready to go?

The value brought by live CDs is not immediately obvious to the majority of users, who have only known the reality of going through an installation process (or factory preinstalled), powering up the machine and using it.

Consider the scenario of wanting to purchase the top of the line computer (whether laptop or desktop) from an online store. You have chosen the best combination of hardware for your money and you get it shipped. The machine arrives and you drop in your live CD - in 30 or 45 seconds, you are up and running. You use the hard disk (if any) as your storage medium only, and when you log off, you remove the live CD and put it away knowing that if your machine is ever stolen, the data in the internal hard disk is useless to anyone for the entire drive is encrypted with your private key and secured. You could also save your information on a USB mass storage device.

From a corporate security aspect, your read-only CD is safe as it cannot be tampered or infected (it is read only after all).

A brief history

One of the earliest Live CDs was in the shape and size of a credit card and it was called The Linux Bootable Business Card (`http://www.lnx-bbc.org`). This project continues to thrive (it has now reached version 2.1). The Linux Bootable Business Card is a working system in 50MB (which is usually the capacity of a credit card sized CD).

A remarkable and popular live CD today is Knoppix, created by Klaus Knopper (`http://www.knopper.net`). The project was commissioned by Linux Tag (`http://www.linuxtag.org`) and has now reached version 3.7. Klaus Knopper's work has spawned a whole ecosystem of Knoppix-like live CDs with specific editions for different target audiences: bioinformatics, education, computer forensics, gaming and not forgetting the quintessential desktop. It's now entirely conceivable that an individual could have a bunch of these live CDs and use the right one according to his or her activities during the day.

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Almost all of today's live CDs run Linux. I only know of one non-Linux live CD, which uses FreeBSD, called Freesbie (`http://www.freesbie.org`) Normally all of the software available on live CD sites are released under a free license (GPL or BSD); however, some live CDs contain non-free software, and that could be a problem if you want to be free to copy and distribute its contents.

Today, we have the Morphix project (`http://www.morphix.org`), which builds upon the intelligence of Knoppix, and allows anyone to build a custom live CD with minimal effort. A quote from Morphix's site states:

> [Morphix is] a whole operating system, to install your programs on and give out. Why send out in-

stallation disks, give them a whole operating system with your files.

If you're an IT director you could create a live CD built on RPM or Debian, put the relevant applications into it, encrypt it and issue those CDs to your organization. This way, you could migrate an entire organisation and not worry about viruses, spyware, etc ever again.

When you're working on a system, you'll always create data and files that you'll want to store. If you're using a live CD, you have several options. You could use USB-based thumbdrives, available today with 1GB or more. You could also simply store the files remotely via the Internet (maybe connecting to the remote server via a secure virtual private network (VPN)). You could also use the clever technique of saving your files to your GMail folder (http://richard.jones.name/google-hacks/gmail-filesystem/gmail-filesystem.html)!

Live CD world tour

The freedom on which the free software community is based allowed the creation of an ever-expanding selection of live CDs. Here's a quick review of some of them:

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Adios (http://dc.qut.edu.au/)

Adios is built from the Fedora Core 2. Adios boots up into a system, which looks and feels a lot like the Red Hat Enterprise Linux environment, and includes all of the office automation tools (OpenOffice, Mozilla/Firefox, Evolution etc). However, this was not what Adios was set out for: it was meant to be a teaching tool for learning networking principles and distributed computing. It is a highly recommended live CD because it's based on Fedora Core 2.

Dyne:bolic (http://www.dynebolic.org/)

It is developed to meet the "needs of media activists, artists and creative people as a practical tool for multimedia production". With this live CD, you're able to both manipulate and broadcast audio and video over the Internet.

Naturally, you will be able to record, edit, encode and stream audio and video using the devices normally installed

Fig. 1: Dyne:bolic's web site

in modern computers. This live CD is remarkable: in 60 seconds you can get an Internet radio and TV station up and running.

Knoppix (http://www.knoppix.net/)

As I mentioned earlier, this is the gold standard of live CDs. Knoppix continues to inspire a rash of remastered versions for a wide spectrum of users and environments.

Slax (http://slax.linux-live.org/)

This CD is built using the Slackware distribution - one of the earliest Linux distributions. Slax continues to be true to the Slackware tradition and should be lauded for that.

GeeXboX (http://www.geexbox.org/)

It is another clever incarnation of Knoppix. This time you're given the ability to turn your computer into a media center and the ability to play DivX, DVD, VCD and SuperVCD (as well as audio) without any extra effort. Connect your TV to the output of your computer and with GeeXboX, you will have a full-fledged video player!

Educational live CDs

No one-paragraph description is going to do justice here. Educational settings are probably where the next wave of innovators will emerge. Here's a short list of projects, which definitely deserve attention:

- SkoleLinux (http://www.skolelinux.no/)
- The Open Source Education Foundation (http://www.osef.org/)
- Organization for Free Software in Education and Teaching (http://www.osfet.org)

- The K12 Project (kindergarten + 12 years) (http://www.k12os.org/)
- The SchoolForge (http://www.schoolforge.net/)

Conclusions

CD-based systems will grow in popularity, and in my opinion this is a trend that has to be watched.
While it is true that CDs are generally slower than hard disks, the innovative way in which live CDs can bring value to an organization should not be underestimated. Some of the innovations riding on this include the Stateless Linux project at Red Hat (http://people.redhat.com/dmalcolm/stateless/stateless-linux-HOWTO-en/) and the FreeNX project (http://www.nomachine.com/).

Bibliography

[1] A page which contains several useful links (http://www.linuxnews.ws/l/li/livecd.html)

[2] A comprehensive list of live CDs (http://www.frozentech.com/content/livecd.php)

Copyright information

About the author

Harish Pillay has been in the computer industry since 1982 having built his first computer, a 6502-based machine in 1980. He is currently employed as the Chief Technology Architect of Red Hat Asia Pacific based in Singapore. Harish helped found the Linux Users’ Group (Singapore) in 1993 and continues to be an active advocate of FOSS in Singapore and Asia in general. Harish holds a BS in Computer Science and a MS in Electrical and Computer Engineering, both from Oregon State University. He is a senior member of the Singapore Computer Society and a long-standing member of the IEEE. When he is not tinkering with technology, he spends his time with his wife and two sons, and is an active member of the Seletar Hash House Harriers “a drinking club with a running problem”.