

Creating Your Specific Live GNU/Linux Distribution with Debian Live Build

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<http://drbl.org>, <http://clonezilla.org>

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Outline

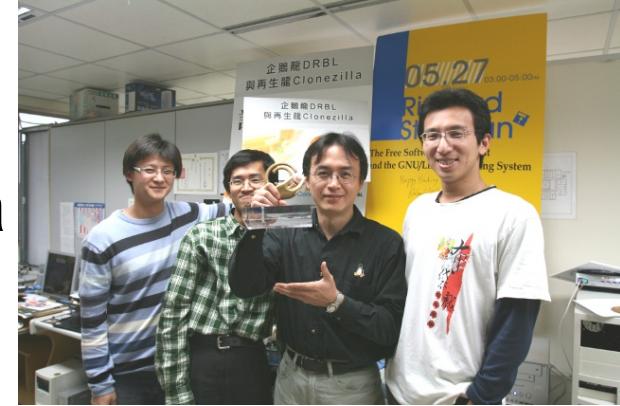
- GNU/Linux Live System
- Debian
 - Debian Live
- Creating Live System
 - Steps to Create with Debian Live Build
 - Some Hints
- Demo
 - Create a Clonezilla live
- Q&A



2

About us

- Developers of the free software DRBL and Clonezilla
- Steven is the maintainer of GParted live CD
- From Taiwan, working for the NPO NCHC (National Center for High-Performance Computing)



Taiwan image source: wikipedia.org



GNU/Linux Live System

- A GNU/Linux live system is **a storage media (CD, USB flash drive) containing a bootable computer operating system.**
- **No installation is required.** Just boot and use it.
- Unique: the ability to run a complete, modern operating system on a computer lacking secondary storage, such as a hard disk drive.
- Suitable for special, **one-time-use purpose**, e.g.
 - Privacy and anonymity
 - System rescue
 - Partitions tuning
 - Imaging or cloning

Source: http://en.wikipedia.org/wiki/Live_CD, and <http://gnu.org>



Debian

- A free operating system (OS) for your computer.
- Debian uses the **Linux kernel** (the core of an operating system), but most of the basic OS tools come from the GNU project; hence the name **GNU/Linux**.
- The latest stable Debian, Squeeze (6.0), was released in Feb, 2011.
 - Contains about **35k software packages**
 - **9 architectures** are supported
 - The most common architecture, i386, need **52 CDs, or 8 DVDs** to put all the software packages.

Source: <http://debian.org>.



Debian

- Multiple distributions: unstable, testing, and stable
 - **Unstable**: Active development. Every Debian developer can update his or her packages in this distribution at any time. Change from day to day.
 - **Testing**: generated automatically by taking packages from unstable if they satisfy certain criteria. Those criteria should ensure a good quality for packages within testing. The update to testing is launched twice each day, right after the new packages have been installed. No changes are allowed into testing except for bug fixes.
 - **Stable**: Testing → Frozen → Open issues solved → Released. It might takes 2 – 3 years.
- Code names now
 - Unstable: **Sid**, Testing: **Wheezy**, Stable: **Squeeze**

Ref: <http://www.debian.org/doc/manuals/developers-reference/resources#s4.6.4> 6



Debian Live



- A Debian Live system is a Debian operating system that does not require a classical installer to use it. It comes on various media, including CD-ROM, USB sticks, or via netboot.
- The Debian Live project is about the framework to create your own customized Live system.
- Tools from Debian Live Project:
 - **Live-build, live-boot, live-config**
 - Live-installer, live-manual, live-tools
- The creation can be fully automatic, unattended.

Ref: <http://live.debian.net/project/about/>

7

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Downstream of Debian Live

- Amnesic Incognito, Canaima, Canonical OEM Services, Clonezilla live, Debian Eee PC, Debian KDE, DRBL live, FAI, GParted, Grml...
- More on <http://live.debian.net/project/downstream/>



Ref: <http://live.debian.net/project/about/>

8

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DRBL, Clonezilla, GParted



DRBL

Diskless Remote Boot in Linux

Provides a “diskless” and/or “systemless” environment for client machines



Clonezilla

A partitioning and disk cloning utility similar to Ghost and True image



GParted

A free partition editor for graphically managing your disk partitions

Steps to create a live CD

- Here we focus on Debian live 2.x
- A GNU/Linux system with **live-build** and **bootstrap** (cdebootstrap or debootstrap) installed.
 - apt-get install live-build cdebootstrap
- **Configure the live CD**
 - lb config --archive-areas main
 - lb config --mirror-binary http://free.nchc.org.tw/debian --mirror-binary-security http://free.nchc.org.tw/debian-security
 - lb config --mirror-bootstrap http://free.nchc.org.tw/debian
 - lb config --mirror-chroot http://free.nchc.org.tw/debian --mirror-chroot-security http://free.nchc.org.tw/debian-security
 - lb config --bootstrap-flavour minimal --packages 'util-linux tar gzip bzip2 lzop pigz pbzip2 procps dialog rsync parted pciutils tcpdump bc gawk hdparm sdparm netcat file ethtool etherwake ssh syslinux mtools reiserfsprogs e2fsprogs psmisc locales wget disktype zip unzip patch iproute traceroute iputils-ping binutils expect partimage udpcast perl-modules less ntfs-3g screen ...
 - ...
- **Create the live CD iso file**
 - lb build

Ref: <http://live.debian.net/project/about/>



The Debian Live System

- Only unchanged, official packages
- No package configuration of the live system
 - All packages are used in their default configuration as they are after a regular installation of Debian.
- Two more packages are included in the live system:
 - Live-boot
 - The scripts that configure a Debian Live system during the boot process (**early userspace**, e.g. `initramfs` and part of `rcS.d`).
 - Live-config
 - The scripts that configure a Debian Live system during the boot process (**late userspace**, e.g. `rcS.d`).

Ref: <http://live.debian.net-devel/live-config/>

11



What if your package not in the Debian repository?

- Check if the package you need on Debian repository
 - [http://packages.debian.org/\\$NAME](http://packages.debian.org/$NAME)
- If not, you need to have your own repository, either on local disk (`chroot_local-packages`) or on a http/ftp server.
 - Package your own program as a deb package
 - Sign the package
 - Upload to your repository
 - Use `apt-ftparchive` to generate the index files
 - Sign the release
- Adding your own repository when configuring with live-build
 - Create a file `config/chroot_sources/your-repository.chroot`, e.g. [config/chroot_sources/drbl.chroot](#), and its content:
 - `deb http://free.nchc.org.tw/drbl-core drbl stable testing unstable live-stable live-testing live-unstable live-experimental`



Same package name, different version numbers in repositories

- Given a package available in two different repositories with different version numbers, APT will elect to install the package with the higher version number.
 - This can be used to have an updated version of a package which is not uploaded to Debian repository yet.
- Need an older version?
 - Use this format: \$package=\$version, e.g. live-boot=2.0.15-1.drbl3

Customization

- If the general Debian live tools do not meet your requirements → Customization
 - **Use hooks mechanism** of Debian live
 - This mechanism allows commands to be performed in the chroot and binary stages of the build in order to customize the image.
 - **Patch** live-build, live-boot, or live-config
 - The last choice. Better to make it with hooks, otherwise you will need to patch them frequently.



Use Sid, Wheezy or Squeeze as the underlying GNU/Linux operating system?

- **Squeeze**
 - Most reliable. However, might not work very well with new hardware.
- **Wheezy**
 - More reliable, however, might be buggy
- **Sid**
 - Most updated packages. Good for new hardware. Might be buggy.
 - Maintain your own Sid repository, freeze it, like what Ubuntu has done.
 - To mirror: debmirror -d sid --arch=i386 -s main,contrib,non-free,main/debian-installer --method=http -h free.nchc.org.tw -progress \$target_dir (Why not using rsync here?)
 - Only update your repository when it's required.
- **How about using Ubuntu?**
 - Live build 3.x will be ready for it.

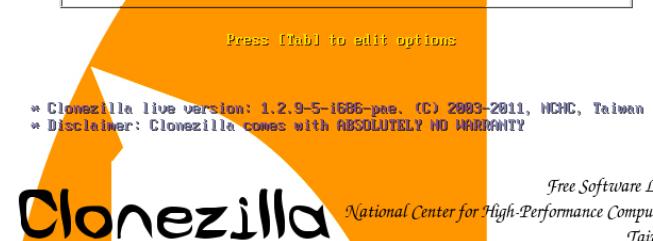
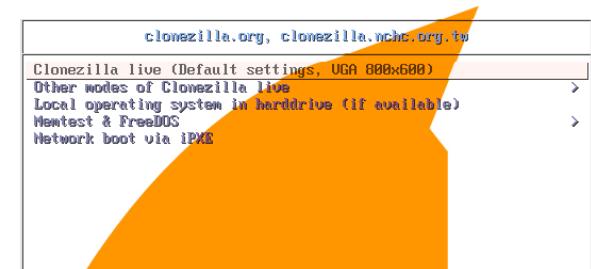


To make the created live system smaller?

- Remove unnecessary files in hooks
 - apt-get -y autoremove
 - Remove /usr/share/{info,man,doc}?
 - Remove /var/lib/apt/lists/
{*_Packages*, *_Source*, *_Release*, *_Translation*}
 - ...
- Use XZ compression instead of gzip
 - export MKSQUASHFS_OPTIONS="-b 1024k -comp xz -Xbcj x86 -e boot"
 - E.g. this option makes image size from 133 MB to 102 MB, $(133-102)/133=23\%$ smaller.
 - Side effect: it takes a little bit longer to boot (e.g. 17 secs -> 24 secs), as uncompressing XZ image takes longer than that of gzip.

Some cosmetics

- Put your own boot menu background
- Customize your own boot menu
 - Syslinux, isolinux



Test the created live system

- Using a virtual machine for testing



Source: <http://virtualbox.org>, <http://linux-kvm.org>, <http://qemu.org>

Put live system on USB stick

- The special format file for USB stick “binary.dmg” can be created when configuring:
 - lb config -b usb-hdd
- However, dumping the binary.dmg to an USB stick will **overwrite all the files** on that
 - \$ dd if=binary.img of=\${USBSTICK}
- To keep the existing files on USB stick, a better method can be used to **copy all the files** to the USB then **make it bootable**
 - \$ mount binary-hybrid.iso /mnt
 - \$ pmount /dev/sdg1 /media/USB
 - \$ cp * /mnt/ /media/USB
 - \$ syslinux -f -i /dev/sdg1

Reference

- Debian Live: <http://live.debian.net/manual/>
- Syslinux: <http://syslinux.zytor.com>
- DRBL: <http://drbl.org>
- Clonezilla: <http://clonezilla.org>
- GParted: <http://gparted.sf.net>



Demo - Create a Clonezilla live iso with live-build

- On an Ubuntu Lucid system, with a local repository mirrored 5 days ago
 - <http://localhost/debian>
 - <http://localhost/drbl-core>
- Patched live-build 2.0.12-2.drbl1
- apt-get install live-build cdebootstrap
- lb config ...
- lb build

Questions ?



Great!

?????