

# Remaster & Customize Knoppix

LILUG Meeting Tuesday May 10, 2005  
Farmingdale State, 150 Whitman Hall  
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# Remaster & Customize Knoppix Overview

- What is Knoppix? How does it work?
- What is remastering? Why remaster?
- Remastering Process explained.
- Customizing Knoppix, KDE, Linux OS
- Final Custom Knoppix 3.8.1

# What is Knoppix?

- Named after its creator, Klaus Knopper, Knoppix is a bootable CD with the freedom to copy it and give it away to anyone.
- It is a collection of GNU/Linux operating system software designed to automatically detect most hardware devices to ultimately give the user a live Linux system on CD.
- Knoppix can be used as a regular desktop OS, a Linux demo, educational CD, or rescue system. It is not necessary to install anything or write to a hard drive.

# How does it work?

- The PC boots off the CDRROM drive and finds the ISOLINUX boot loader It loads a splash image and displays a boot menu.
- This boot menu allows us to enter optional boot commands known as cheat codes which allow us direct how we want it to boot or to guide Knoppix if it fails to detect a piece of hardware.
- In `/boot/isolinux/` ISOLINUX loads the kernel and then loads a mini root file system from `minirit.gz`. The boot-control cheat codes are activated in the script `'linuxrc'` which also handles some HW detection.

# How does it work? 2

- Next the linuxrc script uses UnionFS to transparently mount a portion of the system's RAM as a ramdisk on top the compressed file system . This allows us to make 'changes' to what was once a read-only file system
- Then it unmounts the minrt disk and mounts the combined UnionFS compressed loopback disk as root and gives over control to init.
- A modified 'sysvinit' is used for controlling runlevels. The rest of the HW config & cheat codes are used in the scripts 'knoppix-autoconfig' 'mkxf86config'and 'hwsetup' a C program based on kudzu that Mr. Knopper wrote.

# How does it work? 3

- Once the video hardware is detected, the scripts in `/etc/X11/Xsession.d/` control the execution of Xfree86, populating the 'knoppix' user's `$HOME`, and running of the window manager or desktop environment.
- In most cases KDE is loaded it brings it's own set of configs & settings. Once KDE is fully loaded, the `/home/knoppix/Desktop/KNOPPIX.desktop` file is run. It opens up Konqueror and displays the `/cdrom/index.html`

# Remastering process

- Remastering means to make a new CD based off an existing CD. This is done for a variety of reasons: add/remove applications, too complex, too small, i18n, localize, etc.
- Knoppix Remastering history
  - Klaus Knopper's commands - 2002
  - Knoppix.net Remastering guide 2003
  - Fabian Franz & Ian Naylor create remastering menu scripts – 2004
- Boot PC with Knoppix, prep the HD, enable DMA, mount the partition, activate swap, run the knoppix-remaster script and create a new remaster.

# Remastering process 2

- The remaster scripts use dialog & Xdialog to wrap the numerous complicated commands in a easy to use menu
- `mkisofs -pad -l -r -J -v -V "KNOPPIX" -no-emul-boot -boot-load-size 4 -boot-info-table -b boot/isolinux/isolinux.bin -c boot/isolinux/boot.cat -hide-rr-moved -o /mnt/hda1/knx/knoppix.iso /mnt/hda1/knx/master`



# Remastering process 3

- We chroot into the remaster and begin to change the system: update the system's package lists and add/remove/upgrade packages with `dpkg`, `apt-get`, and `aptitude`.
- If necessary, load Xfree86 & KDE and use `synaptic` or `kpackage` instead of the console tools.
- When satisfied with all the changes, I exit the chroot and quit the remaster script. I tend to be cautious, so outside the chroot, I make a backup copy of the remaster directory – just a simple `cp -Rp remaster backup`.

# Remastering process 4

- Run the knoppix-remaster script and instead of chroot into the remaster, I choose to create the compressed file system It is also called a compressed loopback file system or cloop.
- Compression times
  - P3 450 MHz 384MB RAM ~ 1hr15min
  - Duron 1.6 GHz 768MB RAM ~. 25 min
  - Opteron 240 1GB RAM ~ 12 min
- Compresses 1833MB into 695MB = 62% reduction

# Remastering process 5

- With the compression complete, it returns to the menu and I create the ISO file. When that is done I quit the menu and return to the shell
- If the ISO is greater than 700MB
  - delete the 'remaster' directory and restore 'remaster' from the backup I had made.
  - Then I go back into the chroot to remove a package or two in hopes of shrinking the ISO file size to be less than 700MB.
- If the ISO image file is less than 700MB, I either burn it to CDR on that machine or copy it to another machine via scp/sftp/fish/smb.

# Remastering process 6

- Burn the CDR, boot it on a PC and test it out (on preferably more than 1 PC) to see if all your changes were successful in making a better Knoppix disc.
- At this point the remaster is complete. In order to 'eat my own dogfood' I usually use that new remastered CDR as the source to make a yet another remaster. Or I could also just use the backup 'remaster' directory.

# Customizing Knoppix, KDE, Linux OS

- Mr. Klaus Knopper makes Knoppix every release just under 700MB and also caters to a worldwide audience by including plenty internationalization & localization packages. IMHO, these packages limit the amount of software that can be included on a CD.
- In order to make space for my future additions to Knoppix, my first customization is to remove all KDE i18n and all German localized packages. Then I remove emacs, bacula and enigma.
- Then I install localepurge, aptitude, and synaptic

# Customizing Knoppix, KDE, Linux OS 2

- Knoppix ships with a poor choice of fonts & GUI elements
  - fonts are not TrueType, translucent menus enabled, translucent konsole enabled, Keramik widget & window decoration theme is used
- To improve the GUI, I set the fonts to Bitstream Vera Sans, install kdeartwork to get the Plastik widget theme, disable menu effects, disable translucent console, add English bookmarks to Konqueror & FireFox , reduce desktops from 4 to 2, removed left taskbar hider
- Updated the HD install script because of bugs

# Final Custom Knoppix 3.8.1

- Removed:
  - OpenOffice German, i18n for KDE & K3b, emacs, zile, kdestars, nessus, mozilla thunderbird, 3270 terminal, alevt, wine, libwin
- Added:
  - KDE 3.4, kdeartwork, kdenetwork, kdemultimedia, OpenOffice 1.1.3 + with spell check via aspell, vncserver, Xvncviewer, amarok, gstreamer plugins, superkaramba 0.36, smb4k, CrystalSVG icons, Nuvola icons, Crystal mouse cursors, inkscape, java-package, inkscape, dia

# Final Custom Knoppix 3.8.1 2

- Updated:
  - FireFox, alien, cupsys, foomatic, debconf, hpijs, ethereal, samba, gimp
- Changed:
  - changed Konqueror & FireFox bookmarks
- Custom content
  - New CD boot logo, New KDE splash, New KDE wallpaper, modified taskbar gradient wallpaper
- Outside Knoppix
  - QEMU 0.7.0-windows: to boot Knoppix in a QEMU virtual machine under MS Windows

# Final Custom Knoppix 3.8.1 3

- Testing the remaster:
  - With this CD I have booted into KDE on 9 separate systems: Pentium2/3/4, AMD Duron/Athlon/Opteron, systems with as little as 128MB of RAM
  - I have used this CD to resize a WinXPSP2 NTFS C: drive and then installed Knoppix to it.
  - This CD works under VMWare & also QEMU on Windows
- Knoppix's HW autodetection is great but it is necessary to use cheat codes. They are important if you want knoppix to work on a wide range of systems.

# Finished Remastering

- This presentation, my notes, the remastering scripts, the remaster HOWTO are all included on the CD. View the `index.html` off the root of the CD
- Happy remastering!