Better HPC, Better Living

NCHC@SC08 AUSTIN,TX

NCHC's DRBL/Clonezilla Project

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National Applied Research Laboratories

NCHC

Outline

- Introduction to DRBL/Clonezilla
  - About DRBL/Clonezilla
  - Users in Taiwan and Worldwide
  - Related Activities
  - Success Stories
  - Testimonials
- Demo
  - DRBL– Diskless MS Windows XP on Acer Asipre One
  - Clonezilla Live
- Q&A

Free Software Lab

- Free software projects developed by NCHC's Free Software Lab
- Our goal is to create a Free Software Smart Classroom (FSSC) based on our HPC experience
  - DRBL, Clonezilla, DRBL-WinRoll, Tux2Live, PartClone
  - Multicast VNC
  - Access Grid, eLearning
  - Cluster Computing
  - Grid Computing

Clonezilla

DRBL/Clonezilla

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

DRBL

- **Saves Money**
  - No HD required in the client machine(s)
  - Truly “Free” Software--freedom to improve upon and free to use
- **Saves Time**
  - All programs are installed on a single server
  - One command to Shutdown/Reboot/Power On/Off all client machines
- **Makes Life Easier**
  - No client disk failure
  - Client machines are plug-and-play
  - Computer classroom environment is extremely flexible
    - GNU/Linux & MS Windows co-exist

DRBL vs. LTSP

- What's the difference between DRBL and LTSP?:
  - DRBL: Distributed Resource vs. LTSP: Centralized Resource
  - DRBL: Powerful Client vs. LTSP: Thin Client
- DRBL allows 3D gaming and video playback in the client; ***LTSP does not***

Why DRBL?

- **DRBL** Special Features:
  - Clonezilla Server Edition (SE)
  - AoE service available using diskless MS Windows XP
  - A single command is required to switch the client environment
    - DRBL, FreeDOS, OS in local HD, memtest...
  - Linux network installation
- Not suitable for older machines and/or thin clients
- **//NOTE//** From version 5 (released '07), fat client mechanism is supported in LTSP

"Bare Metal" Backup and Restore

- "Bare metal" restore -> A technique in the field of data recovery and restoration where the backed-up data is available in a form which allows one to restore a computer system from "bare metal" (i.e. without any requirements as to previously installed software or operating systems). – Wikipedia
- Image-based backup & restore is different from file-based (e.g. 'cp', 'tar', 'rsync'...)

Clonezilla Features

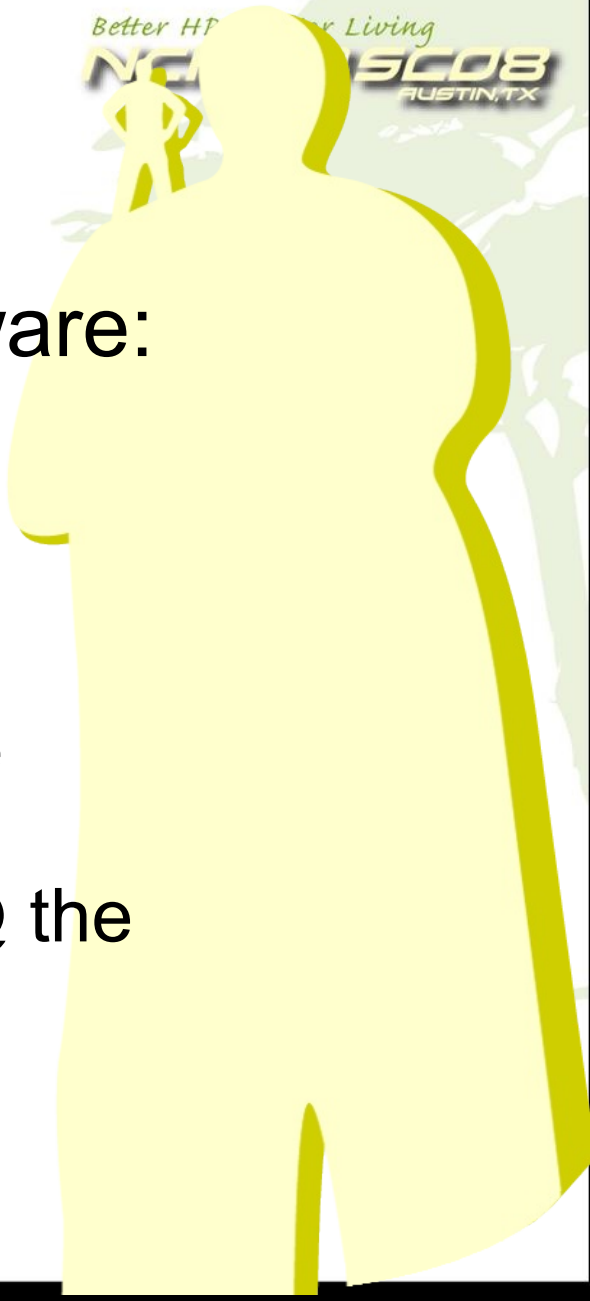
- Free (GPL) Software
- File systems supported: Ext2/3, ReiserFS, Reiser4, XFS, jfs, HFS+, FAT and NTFS
- Linux Logical Volume Manager 2 (LVM2) stackable block device is supported
- Multicast supported in Clonezilla Server Edition (SE)

Clonezilla Features

- Saves and restores partitions and entire disks
- If file system is supported, only the used blocks in the HD are saved and restored. For unsupported file systems, sector-to-sector copying is done via dd.
- DRBL-Winroll: The hostname, group, and SID of the cloned MS Windows machine can be changed automatically

Clonezilla

- Based on existing software:
  - Partimage
  - ntfsclone
  - dd
  - updcast
  - DRBL (used for massive cloning)
  - Partclone (Developed @ the NCHC, '07)
  - and more.....

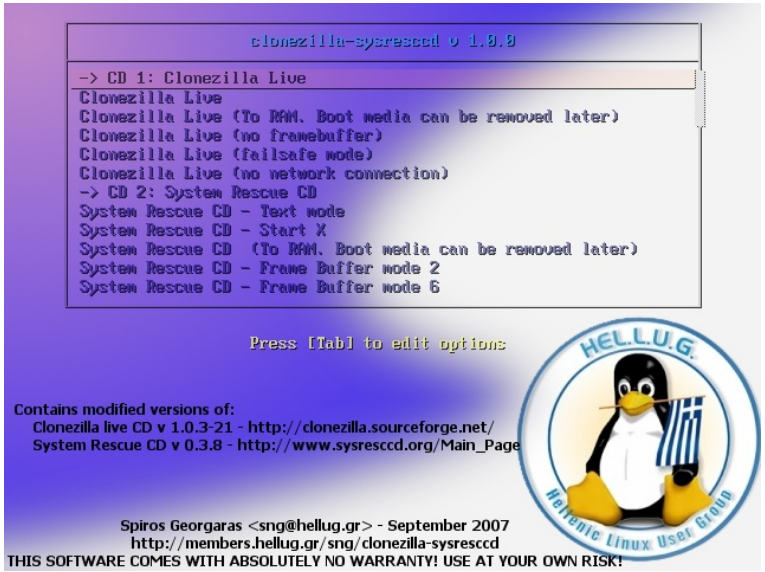


Partclone

- http://www.partclone.org
- Developed by Thomas Tsai and Jazz Wang
- Only the used blocks are saved and restored
- Supports Ext2, Ext3, ReiserFS, Reiser4, XFS, HFS+, NTFS & FAT
- Will support for ZFS and BTRFS in the future!

Two Clonezilla Types

- Clonezila Server Edition (SE)
  - Massive cloning
  - Network boot (PXE)
  - DRBL server is required



- Clonezilla Live
  - Single machine backup
  - Based on DebianLive (live-helper and live initramfs)
  - CD/USB flash drive is required
  - Also available in
    - Clonezilla-SysRescCD, created by Spiros Georgaras

DRBL (Includes Clonezilla SE)

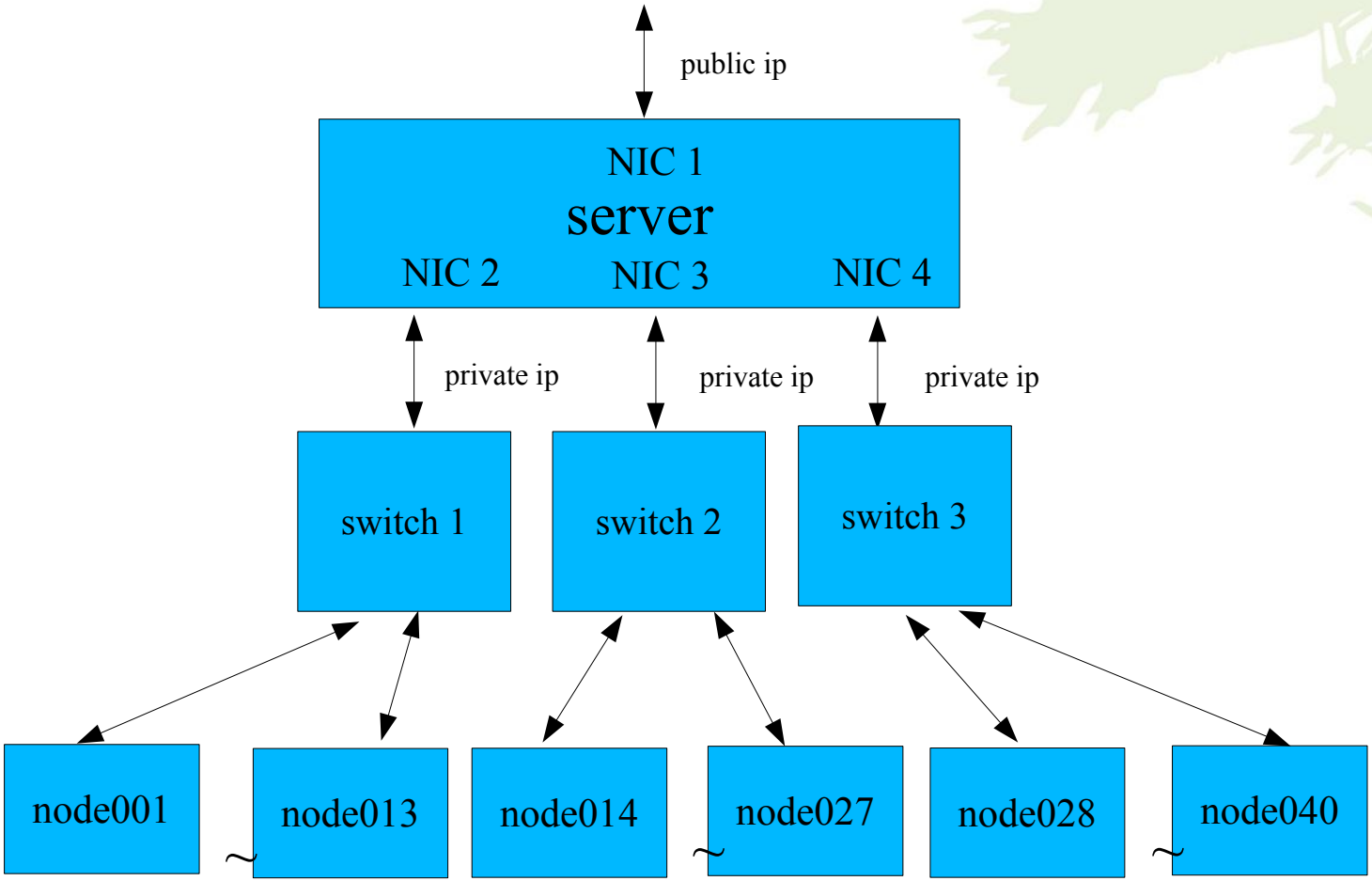
server

switch
pxe/etherboot

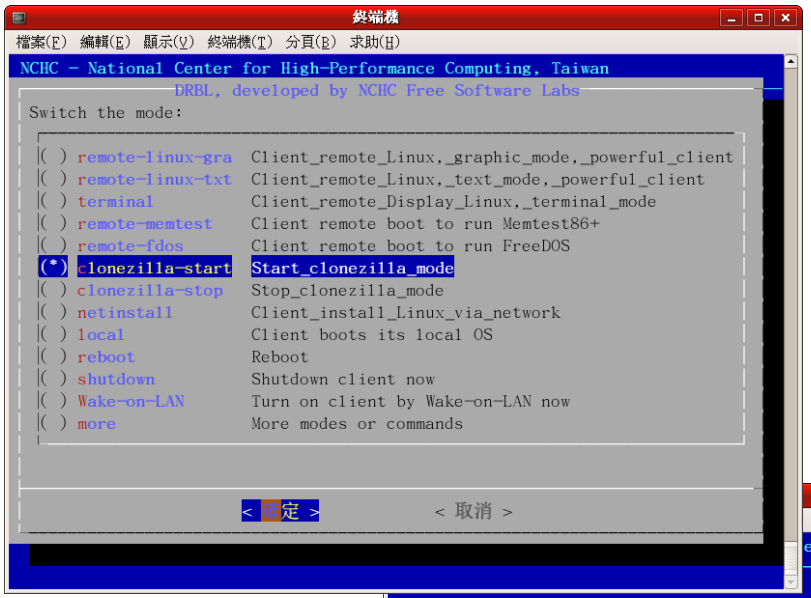
client nodes
pxe/etherboot

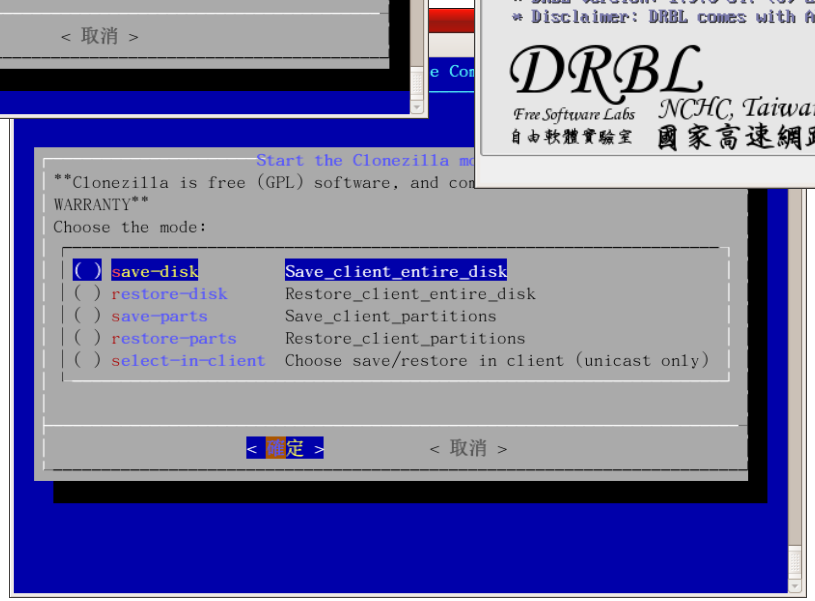
DHCP	IP	192.168.0.1	192.168.0.40
TFTP	kernel	boot	boot
NFS	file system	/, /usr, /home ...	/, /usr, /home ...
NIS	account	user login	user login

DRBL Schematic



DRBL



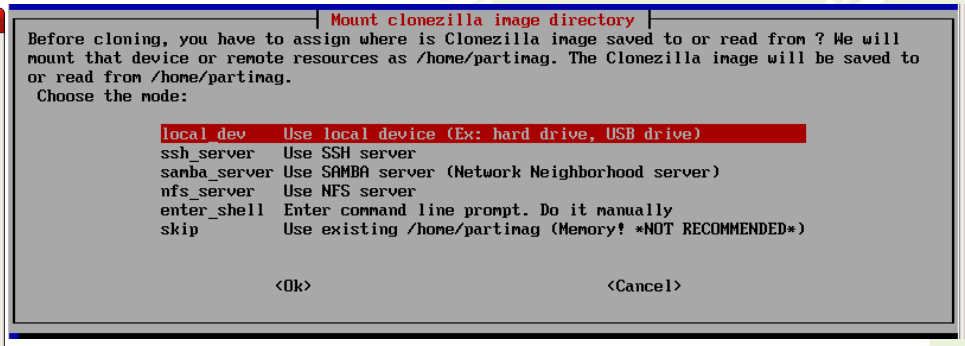


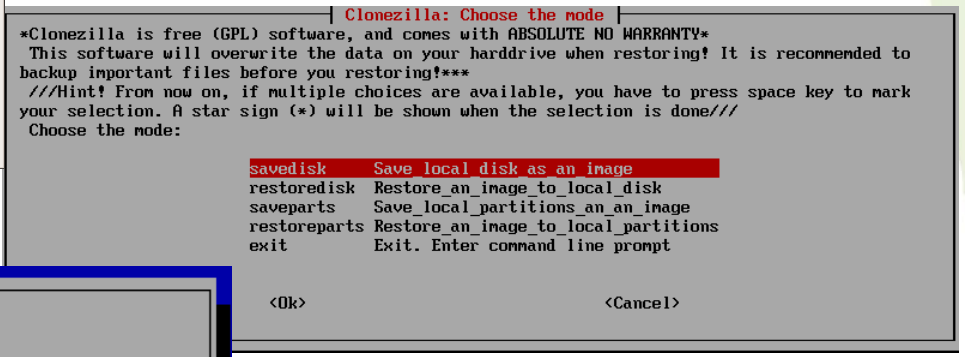
Clonezilla

Clonezilla Live

- On CD, USB flash drive, or PXE server
- Languages:
  - Traditional Chinese, Simplified Chinese (thanks to Zhiqiang Zhang and Liang Qi), English, French (thanks to Jean-Francois Nifenecker), Japanese (thanks to Akira Yoshiyama and Annie Wei)
- General Purpose Use- Save or restore interactively
- Special Purpose Use- Recovery CD/USB drive
  - Clonezilla image embedded in CD or USB drive
  - One command restores the entire image!
  - One key restores the entire image!
- Completely Customizable! Make Clonezilla Live work for you!

Clonezilla Live





DRBL/Clonezilla Use In Taiwan

- ✓ **Public Sector:**

Primary/High schools	295
Universities	95
Local governments	35
Hospitals	3
TV stations	1

- ✓ **SMBs** 124
- ✓ **Misc.** 2

Known sites/users >500!!!

DRBL/Clonezilla Use Worldwide

>400,000 DRBL/Clonezilla Downloads!!!

Related Activities

- Ubuntu Live Conference
  - Portland, Oregon, USA, July 23rd, 2007
  - Clonezilla: It's Better Than Ghost!
  - Speaker: Kristian Hermansen, Security Researcher/Developer, Cisco Systems, Inc.
  - http://www.ubuntulive.com/cs/ubuntu/view/e_sess/12510
- LinuxWorld Conference & Expo
  - San Francisco, USA, Aug, 2007
  - Dell booth
  - Massive Deployments
  - Speaker: Torsten Spindler, Canonical

Related Activities

- Libre Software Meeting (LSM) 2008
  - Mont-de-Marsan, France, July 1st~5th, 2008
  - "Clonezilla Live, the "Bare Metal" Backup and Recovery Tool"
  - Speaker: Steven Shiau
  - http://2008.rmll.info/Clonezilla-live-the-bare-metal.html?lang=en
- LinuxWorld Conference & Expo
  - San Francisco, USA, Aug, 2008
  - .org Pavilion (booth #: .org 3)
  - BoF: Clonezilla Hands-on Lab: The Universal "Bare Metal" Backup and Recovery Tool for Linux, Mac OS and MS Windows

Ubuntu Live, USA, Jul/07

LinuxWorld; “Massive Deployments;” Aug/07

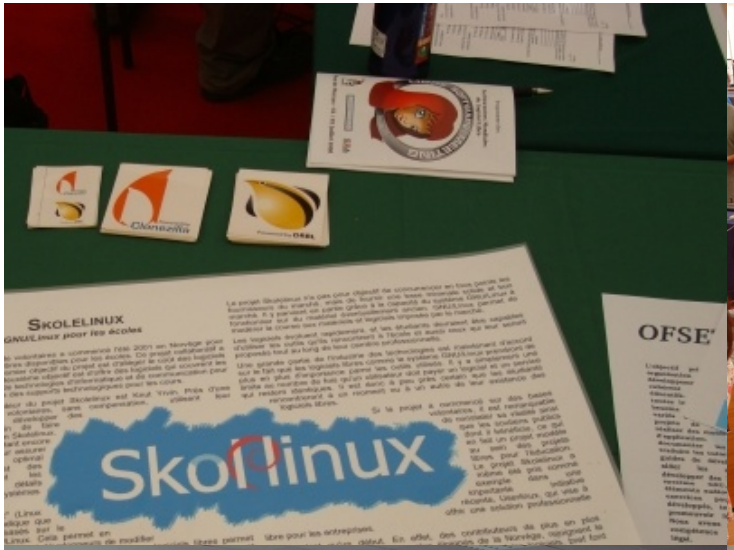
International Free Software Contest

- DRBL is the winner in the 'Public Sector Software' category at Les Trophees du Libre 2007 in France
  - Finals and awards ceremony: Nov. 29th, 2007
  - http://www.freesoftwareawards.com or http://tropheesdulibre.com/?lang=en

Les Trophées du libre 2007

Intrnl. Free Software Contest, France, Nov/07

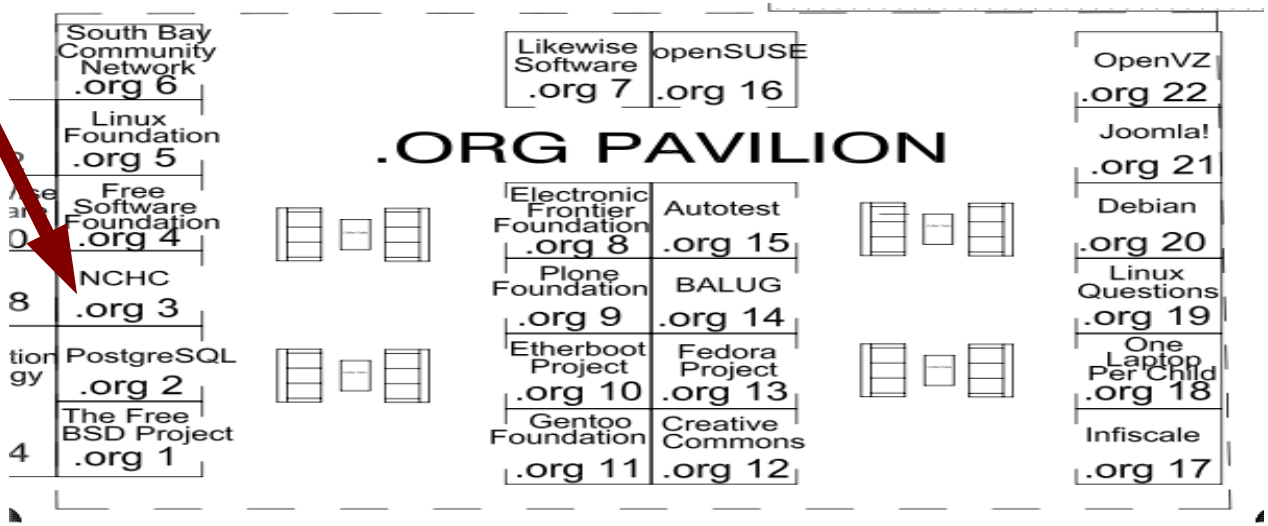
LSM 2008, France



LinuxWorld, San Fran, '08

Better HPC, Better Living
NCHC@SC08 AUSTIN,TX
Aug 4-7, 2008

- One of the largest Linux expos.
  - .org Pavilion (booth #: .org 3)
  - BoF: “Clonezilla Hands-on Lab: The Universal “Bare Metal” Backup and Recovery Tool for Linux, Mac OS and MS Windows” (Aug. 6th, '08)



National Applied Research Laboratories Award

- DRBL/Clonezilla team is the winner in the category 'Technology Development' for 2008

Success Stories

Da-Feng Elementary School, Taipei, Taiwan

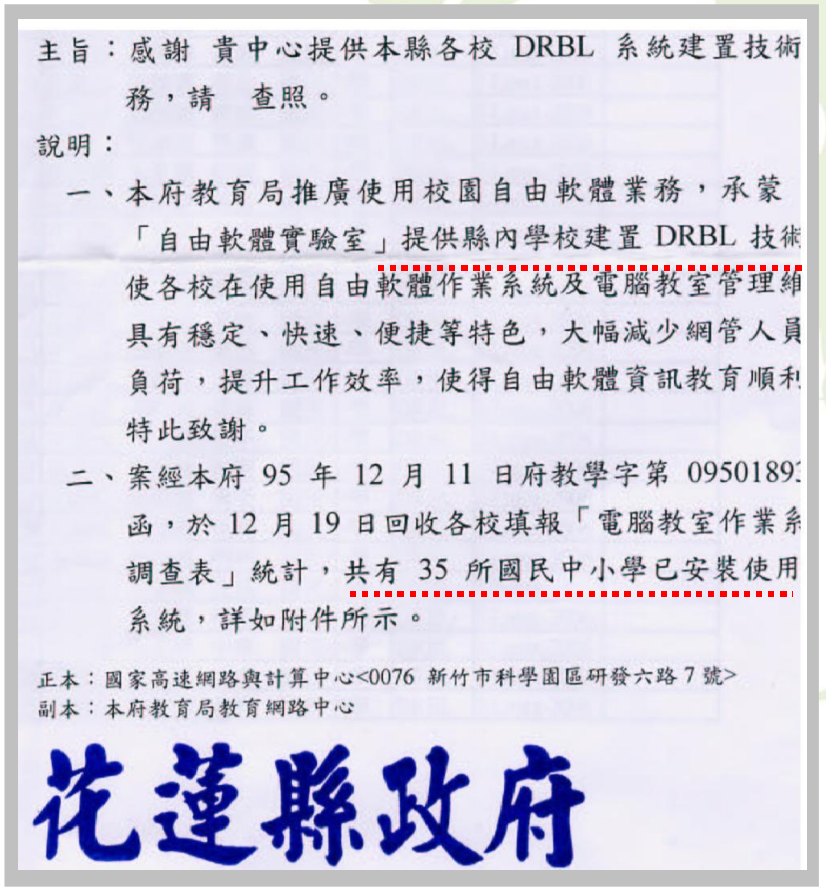
DistroWatch.com 重拾電腦操作的樂趣，使用Linux！

source: distrowatch.com

- DRBL/Clonezilla is used to manage computer classroom
- Special Report: Linux in Education, 2006 on distrowatch.com
- DRBL/Clonezilla press conference @ Da-Feng Elementary School 07/04/07

Success Stories
Hualien County, Taiwan

- Used Clonezilla Server Edition (SE) to clone GNU/Linux
- 145 schools (131 Primary/Jr.; 14 Senior High) use as of June '08
- Letter of Commendation from Hualien County Government



主旨：感謝 貴中心提供本縣各校 DRBL 系統建置技術
務，請 查照。

說明：

一、本府教育局推廣使用校園自由軟體業務，承蒙
「自由軟體實驗室」提供縣內學校建置 DRBL 技術
使各校在使用自由軟體作業系統及電腦教室管理維
具有穩定、快速、便捷等特色，大幅減少網管人員
負荷，提升工作效率，使得自由軟體資訊教育順利
特此致謝。

二、案經本府 95 年 12 月 11 日府教學字第 0950189
函，於 12 月 19 日回收各校填報「電腦教室作業系
調查表」統計，共有 35 所國民中小學已安裝使用
系統，詳如附件所示。

正本：國家高速網路與計算中心<0076 新竹市科學園區研發六路 7 號>
副本：本府教育局教育網路中心

花蓮縣政府

Clonezilla Used in Taiwan's "National PCs"

Source: De-Wen Huang

Testimonials

- Kristian Hermansen
- Cisco Systems, Boston, MA, Sept. '07
- Cloned a 5GB image to 64 machines in 5 under minutes!!!
  - "I used Clonezilla in the design of our Cisco Computational Cloud Cluster to multicast a 5GB disk image to 64 machines simultaneously and all in under five minutes! Amazing! Thanks Clonezilla!"

Testimonials

- Barny Sanchez
- Information Systems Security, Southbridge, Massachusetts
- Cloned 1,084 systems using DRBL (Clonezilla SE)
  - "I've used DRBL to clone 1,084 systems so far! It was simple! All I had to do was divide each system into groups of 80-100 PCs and then use multicasting to do the cloning. It took anywhere from 16-38 minutes to clone each system. The images of various operating systems averaged 1GB in size. DRBL has reduced the recovery/cloning factor by more than 500% as compared to the commercial solution I used previously! You can imagine how happy my project managers are!"

What's New Since SC07?

- DRBL
  - Supports newer GNU/Linux versions including Ubuntu 8.04/8.10, Fedora 9, Mandriva 2008.1, and OpenSuSE
  - Provides AoE booting mechanism in support of diskless MS Windows XP
- Clonezilla Live
  - Easier to create a recovery ISO/zip Clonezilla Live
  - Japanese, Simplified Chinese and French locales were added
  - Serial console is supported

Demo 1

- Diskless MS Windows XP on Acer Aspire One
  - DRBL 1.9.2-16 running on server, AoE Booting for client machines
    - http://drbl.name
    - Based on gPXE
  - Local HD has GNU/Linux installed on it
  - Running Windows XP (from DRBL Server) on Acer Aspire One

Demo 2

- Clonezilla Live
  - Clonezilla Live 1.2.1-17
    - http://www.clonezilla.org/clonezilla-live
  - Running on Virtualbox 2.0.4 from Sun
  - Scenario:
    - A working Debian Etch text mode (LVM2)
    - Backup Debian Etch using Clonezilla Live
    - Debian Etch crashes (delete partition table and MBR by: dd if=/dev/zero of=/dev/hda bs=1M count=10)
    - “Bare Metal” recovery

Questions ?