

# Clonezilla

## Clone As Free As You Want

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Thomas Tsai, Kuo-Lien Huang, Jean-Francois  
Nifenecker

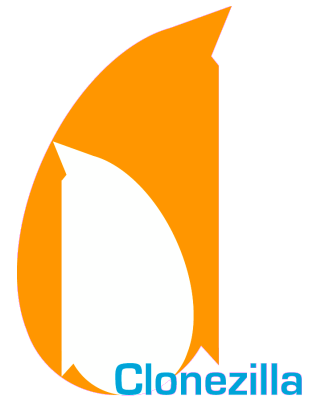
Clonezilla Project

Jul, 2010



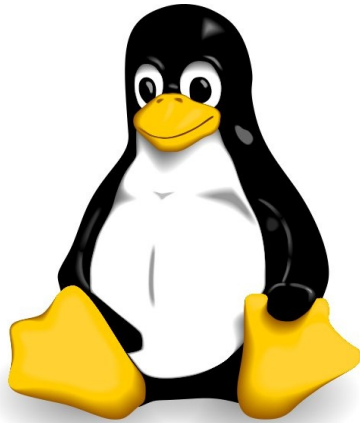
# Outline

- Introduction to Clonezilla project
  - About Clonezilla program
  - Testimonials
  - Awards
  - Users in Taiwan and worldwide
- Demo
  - Restore a System by Clonezilla live
  - Create an One-key Recovery CD
- Q&A



# What is Clonezilla?

- A partitioning and disk cloning utility similar to Ghost® and True image®
- A bare metal recovery tool for



\*1



\*2



\*3



\*4

\*Logo source: (1) Larry Ewing, Simon Budig and Anja Gerwinski, (2) Apple (3) Marshall Kirk McKusick, (4) Microsoft



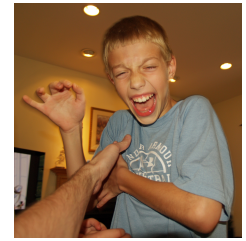
# “Bare Metal” Backup and Restore

- “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'...)

\* Photo source: [http://en.wikipedia.org/wiki/Hard\\_drive](http://en.wikipedia.org/wiki/Hard_drive)



# Clonezilla Features

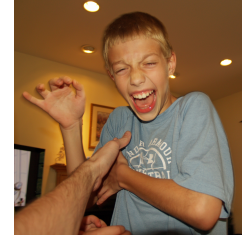


- Free (GPL) Software
- File systems supported: Ext2/3/4, ReiserFS, Reiser4, XFS, JFS, HFS+, FAT and NTFS
- Linux Logical Volume Manager 2 (LVM2) stackable block device is supported
- Grub 1 and grub 2 are supported
- Serial console is supported
- Multicast supported in Clonezilla Server Edition (SE)

\* Photo source: <http://en.wikipedia.org/wiki/Laugh>



# Clonezilla Features

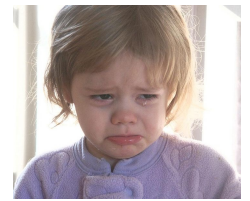


- Saves and restores MBR, partition table, partition(s) or entire disk(s)
- If file system is supported, **only the used blocks** in the disk are saved and restored. For unsupported file systems, **sector-to-sector copying** is done via dd.
- **DRBL-Winroll**: The hostname, group, and SID of the cloned MS Windows machine can be changed automatically

\* Photo source: <http://en.wikipedia.org/wiki/Laugh>



# Clonezilla Limitations



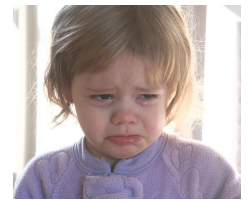
- The destination partition must be **equal or larger** than the source one.
- **Differential/incremental backup** is not implemented yet.
- **Online imaging/cloning** is not implemented yet. The partition to be imaged or cloned has to be unmounted.
- **Software RAID/fake RAID** is not supported by default. It's can be done manually only.

\* Photo source: <http://en.wikipedia.org/wiki/Cry>





# Clonezilla Limitations



- Due to the image format limitation, **the image can not be explored or mounted.** You can **\_NOT\_** recovery single file from the image. However, you still have workaround to make it.
- Recovery Clonezilla live with **multiple CDs or DVDs** is not implemented yet. Now all the files have to be in one CD or DVD if you choose to create the recovery iso file.

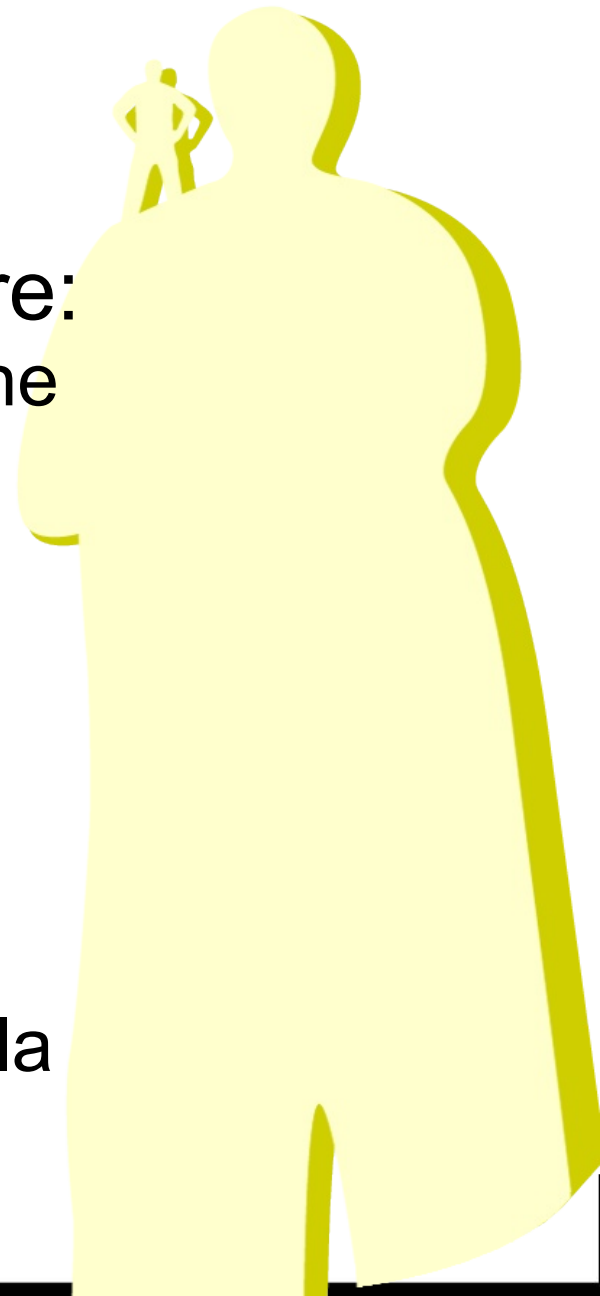
\* Photo source: <http://en.wikipedia.org/wiki/Cry>





# Clonezilla

- Based on existing software:
  - **Partclone** (Developed @ the NCHC, '07)
  - **DRBL** (Developed @ the NCHC, '03. Used for Clonezilla SE)
  - Partimage (optional)
  - Ntfsclone (optional)
  - dd
  - Updcast (used for Clonezilla SE)
  - and more.....



# Partclone



- <http://partclone.org>
- Developed by Thomas Tsai and Jazz Wang @ the NCHC
- Only the used blocks are saved and restored
- Supports Ext2/3/4, ReiserFS, Reiser4, XFS, HFS+, UFS, NTFS, FAT and VMFS.
- Will support new file system (e.g. BTRFS) in the future!



# Two Clonezilla Types

- Clonezilla Live
  - Single machine backup
  - Based on Debian Live (live-helper and live initramfs)
  - CD/USB flash drive is required
  - Works on hard drive or PXE
  - Also available in
    - Clonezilla-SysRescCD
    - Parted Magic
- Clonezilla SE (Server Edition)
  - Massive cloning
  - Network boot (PXE)
  - DRBL server is required.
  - DRBL live is available for running Clonezilla SE



# Clonezilla Live

- On CD, USB flash drive, hard drive or PXE server
- Languages:
  - Chinese, English, French, Italian, Japanese, Spanish
- 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

```

clonezilla.org, clonezilla.nchc.org.tw
Clonezilla live (Default settings, UGA 1024x768)
Other modes of Clonezilla live
Local operating system in harddrive (if available)
Newtest & FreeDOS
Network Boot

```

Press [F6] to edit options

\* Clonezilla live version: 1.2.3-27. (C) 2003-2010, NCHC, Taiwan  
 \* Disclaimer: Clonezilla comes with ABSOLUTE NO WARRANTY

# Clonezilla

Free Software Labs, NCHC, Taiwan  
 自由軟體實驗室

國家高速網路與計算中心

```

Mount clonezilla image directory
Before cloning, you have to assign where is Clonezilla image saved to or read from ? We will
mount that device or remote resources as /home/partinag. The Clonezilla image will be saved to
or read from /home/partinag.
Choose the mode:

local_dev Use local device (Ex: hard drive, USB drive)
ssh_server Use SSH server
samba_server Use SAMBA server (Network Neighborhood server)
nfs_server Use NFS server
enter_shell Enter command line prompt. Do it manually
skip Use existing /home/partinag (Memory! *NOT RECOMMENDED*)

<Ok> <Cancel>

```

```

Clonezilla: Select mode
*Clonezilla is free (GPL) software, and comes with ABSOLUTE NO WARRANTY*
This software will overwrite the data on your hard drive when restoring! It is recommended to
backup important files before restoring!***
///Hint! From now on, if multiple choices are available, you have to press space key to mark
your selection. An asterisk (*) will be shown when the selection is done///
Select mode:

savedisk Save_local_disk_as_an_image
saveparts Save_local_partitions_as_an_image
*restoredisk Restore_an_image_to_local_disk
restoreparts Restore_an_image_to_local_partitions
recovery-iso-zip Create_recovery_Clonezilla_live
exit Exit. Enter command line prompt

<Ok> <Cancel>

```

```

Choose language
Which language do you prefer:

en_US.UTF-8 English
es_ES.UTF-8 Spanish | Español
fr_FR.UTF-8 French | Français
it_IT.UTF-8 Italian | Italiano
ja_JP.UTF-8 Japanese | 日本語
zh_CN.UTF-8 Chinese (Simplified) | 简体中文
zh_TW.UTF-8 Chinese (Traditional) | 正體中文 - 台灣

<Ok>

```

# TAIWAN

www.nchc.org.tw



National Applied Research Laboratories





# DRBL Live (includes Clonezilla SE)

- Based on Debian Live
  - Created by live-helper, and live-initramfs is used
  - Includes:
    - DRBL server, the diskless server,
    - Clonezilla SE, the massive deployment server
    - Clonezilla live, the disk or partition image or clone tool
    - GParted, the GNOME partition editor for creating, reorganizing, and deleting disk partitions.
    - More programs, e.g. disk or partition rescue programs, web browser, picture viewer...
- Now DRBL supports Chinese, English, French, Italian, Japanese, and Spanish
- New option: Use Clonezilla live as the running OS of clients



# DRBL Live (includes Clonezilla SE)

```
終端機
檔案(F) 編輯(E) 顯示(V) 終端機(T) 分頁(B) 求助(H)
NCHC - National Center for High-Performance Computing, Taiwan
DRBL, developed by NCHC Free Software Labs
Switch the mode:
( ) remote-linux-gra Client_remote_Linux_graphic_mode_powerful_client
( ) remote-linux-txt Client_remote_Linux_text_mode_powerful_client
( ) terminal Client_remote_Display_Linux_terminal_mode
( ) remote-memtest Client_remote_boot_to_run_Memtest86+
( ) remote-fdos Client_remote_boot_to_run_FreeDOS
( *) clonezilla-start Start_clonezilla_mode
( ) clonezilla-stop Stop_clonezilla_mode
( ) netinstall Client_install_Linux_via_network
( ) local Client_boots_its_local_OS
( ) reboot Reboot
( ) shutdown Shutdown_client_now
( ) Wake-on-LAN Turn_on_client_by_Wake-on-LAN_now
( ) more More_modes_or_commands
< 確定 > < 取消 >
```

```
drbl client [Running] - VirtualBox OSE
Machine Devices Help
DRBL (http://drbl.nchc.org.tw, http://drbl.sf.net)
Ubuntu 8.04 Linux (DRBL mode, mostly local resources)
Local operating system (if available)
Memory test using Memtest86+
* DRBL version: 1.9.0-34. (C) 2003-2008, NCHC, Taiwan
* Disclaimer: DRBL comes with ABSOLUTE NO WARRANTY?
DRBL
Free Software Labs NCHC, Taiwan
自由軟體實驗室 國家高速網路與計算中心
Right Alt
```

```
Start the Clonezilla m
**Clonezilla is free (GPL) software, and comes with ABSOLUTE NO
WARRANTY**
Choose the mode:
( ) save-disk Save_client_entire_disk
( ) restore-disk Restore_client_entire_disk
( ) save-parts Save_client_partitions
( ) restore-parts Restore_client_partitions
( ) select-in-client Choose_save/restore_in_client_unicast_only
< 確定 > < 取消 >
```





# Testimonials

- Kristian Hermansen
- Cisco Systems, Boston, MA, USA, 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, USA
- 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!"

# Testimonials

- Alvin Su
- Shen-Mei Elementary School, Taiwan
- Cloned more than 100 USB flash drives , each with 3 GB OS and data. Every batch 8 USB flash drives, ~ 30 mins



# Testimonials

- Juergen Chiu
- Canonical Ltd. Taipei, Taiwan
- Clonezilla helps me a lot in system backup, recovery and ISO image creating
  - "In my job, I need to handle different type of system and create the ISO image for customers. Your great tool, Clonezilla, helps me a lot in system backup, recovery and ISO image creating. I only need to download the Clonezilla zip file, and create the bootable usb key in few easy steps, then I can use that key to backup the systems and create the ISO image by the same key. And the key is just the recovery partition as I need. All procedures take me only about 1 hour to finish all stuffs. I love your tool and that is really cover all functions what I need to have in Linux system recovery scope. Clonezilla is the best all-in-one tool that I have never seen before."



# International Free Software Contest (France)

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

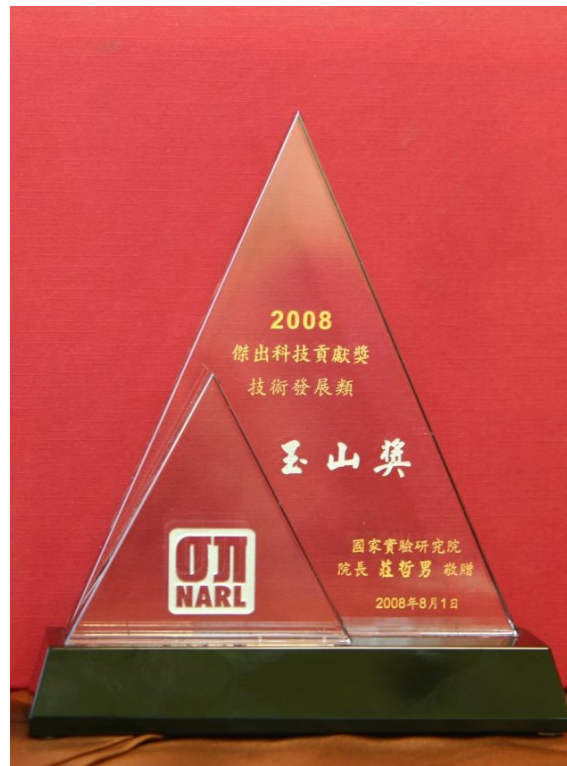


Les Trophées  
du libre 2007



# National Applied Research Laboratories Award (Taiwan)

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



# National Award (Taiwan)

**An award from Premier (Executive Yuan)**  
The 2008 Award for Outstanding Contributions in  
Science and Technology







# Project of the Month, January 2010

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Project of the Month, January 2010

## Clonezilla

Clonezilla is a partition or disk clone tool similar to Norton Ghost. It saves and restores only the used blocks in the hard drive. Two types of Clonezilla are available, Clonezilla live and Clonezilla SE (Server Edition). The filesystem supported by Clonezilla are: ext2, ext3, ext4, reiserfs, xfs, jfs of GNU/Linux, FAT, NTFS of MS Windows, and HFS+ of Mac OS. Therefore you can clone GNU/Linux, MS windows and Intel-based Mac OS whether they be 32-bit (x86) or 64-bit (x86-64) OS. For these file systems, only the used blocks in the partition are saved and restored. For unsupported file systems, a sector-to-sector copy is done by dd in Clonezilla.

### Why and how did you get started?

On the 29th of March, 2003, the computers in the computer classrooms at the National Center for High-Performance Computing (NCHC, <http://www.nchc.org.tw>) were all upgraded. However, the deployment software did not support the new hardware. That's why we started the Clonezilla project. In the beginning, we started the Clonezilla server edition first, then, in 2007, Clonezilla live was created.

### Who is the software's intended audience?

System administrators, that being, PC cluster administrators, computer classroom administrators, and of course anyone who needs a tool to clone or image his/her computer.

### What are a couple of notable examples of how people are using your software?

\* The National Computer Centre Wonen, Netherlands, used Clonezilla to, "clone a 3 GB image to 27 machines with an average speed was 2.4 GB/min."

\* Cisco Systems used DRBL, "...in the design of our Cisco Computational Cloud cluster to multicast a 5 GB disk image to 64 machines simultaneously."

\* Information Systems Security, Southbridge, Massachusetts, USA, said, "So far, I have cloned 1,084 systems using DRBL. By carefully following the instructions on the DRBL website, and using multicasting and dividing the number of systems into groups of 80-100 PCs at the time, it took me somewhere between 16-38 minutes for each group of PCs, using images of various operating systems that averaged 1 GB in size. DRBL has reduced the recovery/cloning factor by more than 500% as compared with the previous commercial solution [we were] using"

Project name: Clonezilla

Date founded: July 2004

Project page: <https://sourceforge.net/projects/clonezilla/>

### Project Leader

**Steven Shiau**

**Occupation:** Researcher at the NCHC, Taiwan

**Location:** Hsinchu, Taiwan

**Education:** M. S. (Nuclear Engineering), National Tsing Hua University, Taiwan



### Key Developers

**Blake, Kuo-Lien Huang**

**Occupation:** Open source hobbyist

**Education:** M. S.

**Location:** Hsinchu, Taiwan



**Chenkai (Ceasar) Sun**

**Occupation:** Associate Researcher at the NCHC, Taiwan

**Education:** M. S. (Department of Management Information System) National Sun Yat-Sen University, Kaohsiung, Taiwan

**Location:** Hsinchu, Taiwan



**Yao-Tsung (Jazz) Wang**

**Occupation:** Associate Researcher at the NCHC, Taiwan



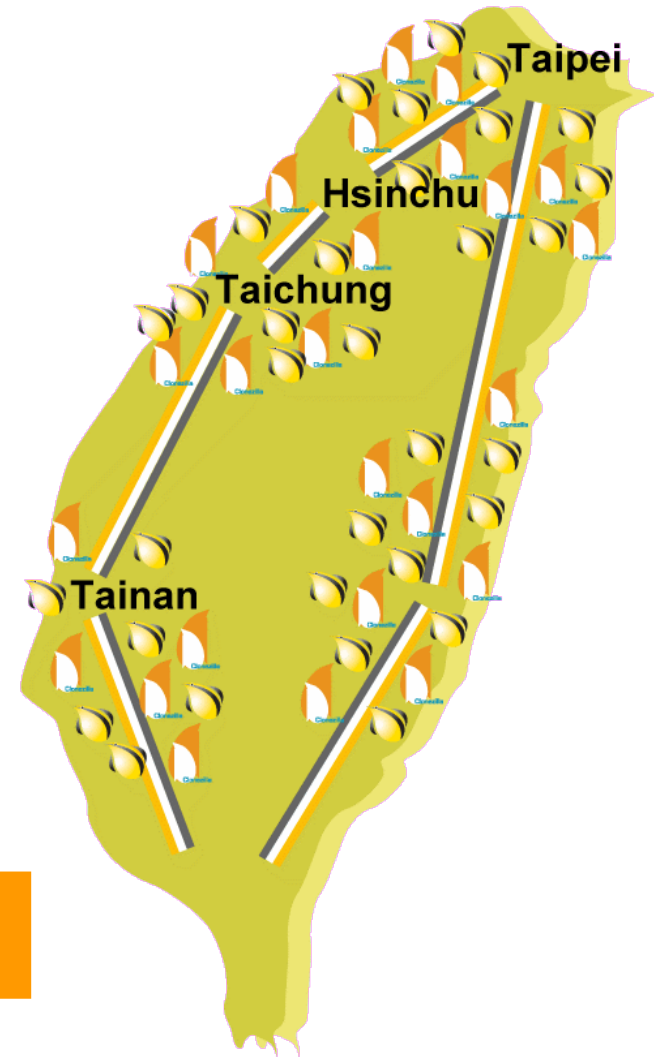
# DRBL/Clonozilla Use In Taiwan

## ✓ Public Sector:

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

✓ **SMBs** 124

✓ **Misc.** 2



Known sites > 500!!!

# DRBL/Clonezilla Users Worldwide



**>2,000,000** DRBL/Clonezilla Downloads



# Clonezilla Demo

- Clonezilla Live
  - <http://clonezilla.org/clonezilla-live>
- Demo I
  - A running Ubuntu 10.04 system
  - The system is destroyed.
  - Recover the system by Clonezilla live with a previous saved image
- Demo II
  - Create an one-key recovery CD
  - Test the recovery CD





# Clonezilla Demo (I)

- A running Ubuntu 10.04 system
  - Text mode only. The whole system uses about 800 MB space
  - /dev/sda1 for /boot (grub 2), /dev/sda5 for system. /dev/sda2 for swap.
- Destroy the system by:
  - `dd if=/dev/zero of=/dev/sda2 bs=1M count=30`
  - `dd if=/dev/zero of=/dev/sda5 bs=1M count=30`
  - `dd if=/dev/zero of=/dev/sda1 bs=1M count=30`
  - `dd if=/dev/zero of=/dev/sda bs=1M count=30`
- Recover the system by Clonezilla live with a previous saved image



# Clonezilla Demo (II)

- Create an one-key recovery CD (iso file)
  - An image was prepared
  - Guided by the TUI of Clonezilla live
- Test the recovery CD



# Questions ?

