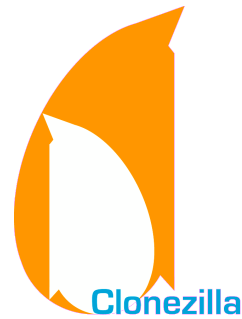# System deployment and bare metal recovery by Clonezilla
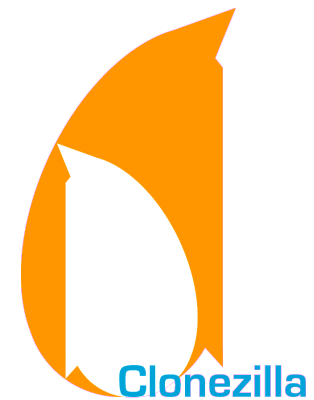
Steven Shiau, Ceasar Sun, Jazz Wang,
Thomas Tsai
National Center for High-Performance Computing
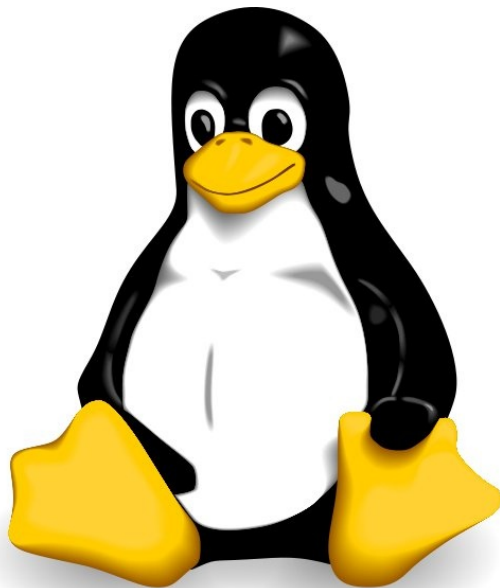Taiwan

Jan, 2010

Outline

- Introduction to Clonezilla project
    - About Clonezilla program
    - Testimonials
    - Awards
    - Users in Taiwan and worldwide
- Demo
    - Clonezilla live demo
- Q&A

Clonezilla

What is Clonezilla?

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

*1   *2   *3

*Logo source: (1) Larry Ewing, Simon Budig and Anja Gerwinski, (2) Apple (3) 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'...)

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)

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

Clonezilla

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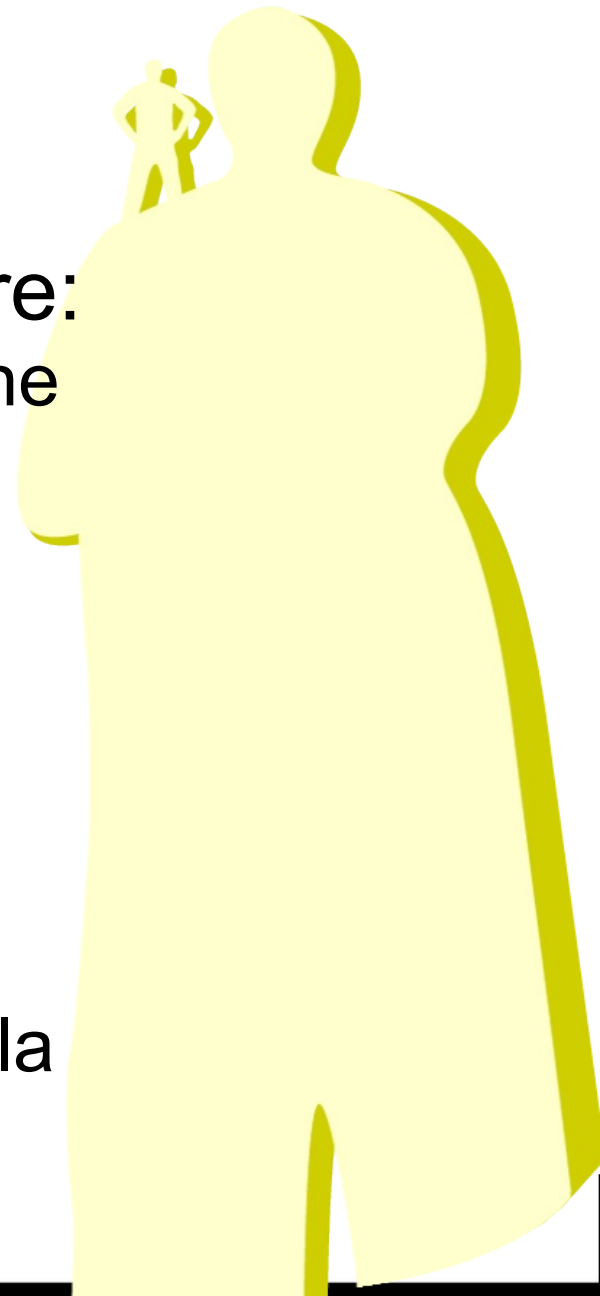
Partclone

- 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
- Will support new file system (e.g. VMFS, 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

- **Clonezila 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, VGA 1024x768)
Other modes of Clonezilla live   >
Local operating system in harddrive (if available)
Memtest & FreeDOS   >
Network Boot   >

Press [Tab] to edit options

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

Free Software Labs, NCHC, Taiwan
自由軟體實驗室
國家高速網路與計算中心

Clonezilla

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/partimag. The Clonezilla image will be saved to or read from /home/partimag.
 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/partimag (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   NCHC

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

DRBL Live (includes Clonezilla SE)

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 Trophees du Libre 2007 in France
  - Finals and awards ceremony: Nov. 29th, 2007
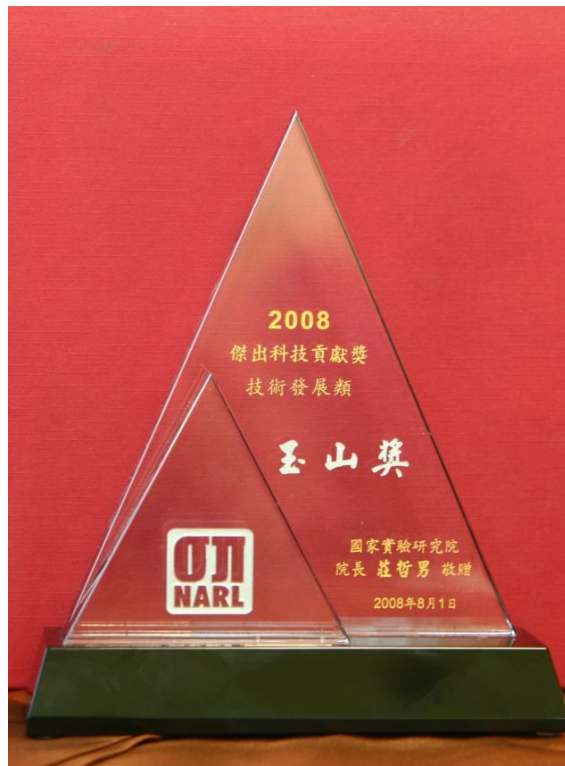 - http://www.freesoftwareawards.com or http://tropheesdulibre.com/?lang=en

Les Trophées du libre 2007

National Applied Research Laboratories Award (Taiwan)

- DRBL/Clonezilla 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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SourceForge.net > Blog
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
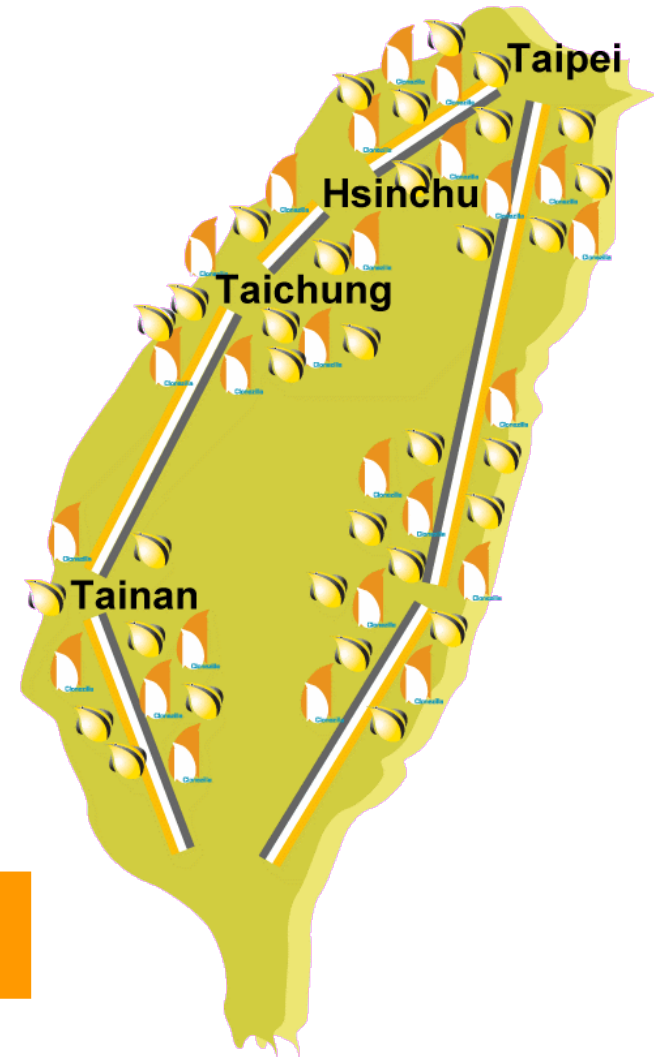
DRBL/Clonezilla Use In Taiwan

✓ **Public Sector:**

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

✓ **SMBs**   124

✓ **Misc.**   2

Known sites > 500!!!

Taipei

Hsinchu

Taichung

Tainan

DRBL/Clonezilla Users Worldwide

>1,400,000 DRBL/Clonezilla Downloads

Clonezilla Demo

- Clonezilla Live
  - http://clonezilla.org/clonezilla-live
- A running Ubuntu 9.10 system
  - Text mode only. The whole system uses about 800 MB space
  - /dev/sda1 for /boot (grub 2), /dev/sda2 for system. /dev/sda3 for swap.
- Destroy the system by:
  - dd if=/dev/zero of=/dev/sda3 bs=1M count=30
  - dd if=/dev/zero of=/dev/sda1 bs=1M count=30
  - dd if=/dev/zero of=/dev/sda2 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

Questions ?

Great!   ?????

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