

Backup as a service with Clonezilla

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clonezilla.org

Q3, 2015

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www.nchc.org.tw





Outline

- Introduction to Clonezilla
 - Features
 - Updates since 2014 Summer
- Backup as a service with Clonezilla
 - Basic ideas
 - How
 - Use cases
- Q&A



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System imaging and cloning - backup



You want to crash!!!
I show you how to crash!!!

image source: maggiesfarm.anotherdotcom.com
www.compsults.com, and jervisdabreo.com

Massive system deployment



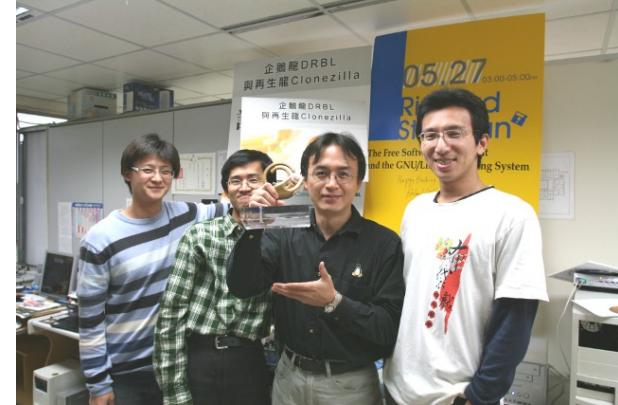
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About us

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



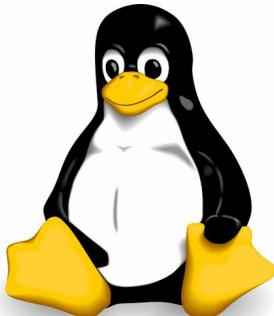
財團法人國家實驗研究院
國家高速網路與計算中心
National Center for High-Performance Computing
Better HPC Better Living

Taiwan image source: wikipedia.org



What is Clonezilla?

- A partition and disk imaging/cloning utility similar to True image® or Ghost®
- GPL license
- A bare metal recovery tool for



*1



*2



*3



*4

VMFS

VMware
ESX/ESXi

*5



MINIX

*6



*Logo source: (1) Larry Ewing, Simon Budig and Anja Gerwinski, (2) Apple , (3) Microsoft, (4) Marshall Kirk McKusick, (5) VMWare (6) Distrowatch.com

Clonezilla Feature

- Free ([GPL](#)) Software
- File systems supported:
 - Ext2/3/4, ReiserFS, Reiser4, XFS, JFS, HFS+, Btrfs, F2fs, UFS, Minix, VMFS, F2FS, FAT and NTFS
 - Supports LVM2
 - Support some [hardware RAID](#) chips (by kernel)
- [Smart copying](#) for supported filesystem. For unsupported file systems sector-to-sector copying is done via [dd](#).
- Boot loader : [syslinux](#), [grub 1/2](#) ; [MBR](#) and hidden data (if exist)
- [Serial console](#)
- Unattended mode
- One image restoring to multiple local devices
- [Multicast](#) supported in Clonezilla Server Edition (SE)
- The image format is transparent, open and flexible

DRBL live, i.e. Clonezilla Server Edition



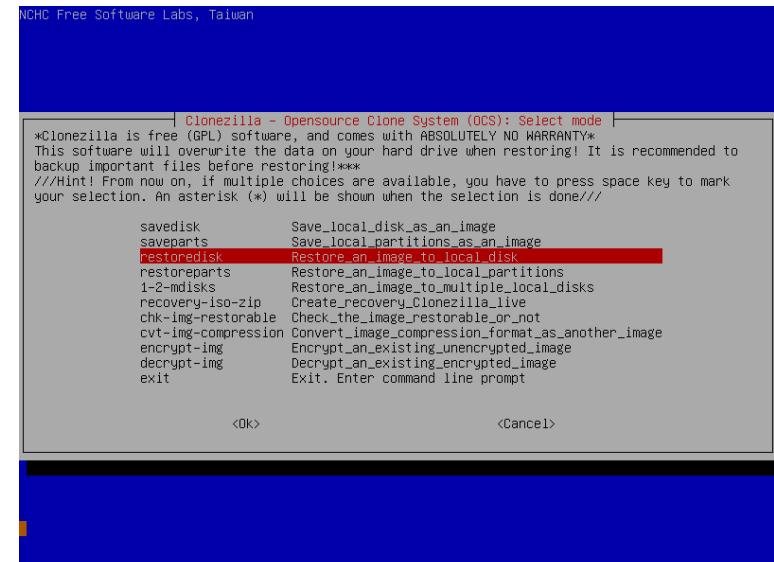
Clonezilla Live



* Boot menu for BIOS machine
* Clonezilla live version: 2.4.2-10-i686-pae. (C) 2003-2015, NCHC, Taiwan
* Disclaimer: Clonezilla comes with ABSOLUTELY NO WARRANTY

Clonezilla

Free Software Labs
National Center for High-Performance Computing
Taiwan



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Developers

- Steven Shiau
- K. L. Huang
- Ceasar Sun
- Jazz Wang
- Thomas Tsai
- Jean-Francois Nifenecker
- Louie Chen
- Nagappan Alagappan



Language file contributors

- English (en_US): Dylan Pack.
- German (de_DE): Michael Vinzenz.
- Hungarian (hu_HU): Greg Marki
- Spanish (es_ES): Juan Ramón Martínez and Alex Ibáñez López.
- French (fr_FR): Jean-Francois Nifenecker and Jean Francois Martinez.
- Italian (it_IT): Gianfranco Gentili.
- Japanese (ja_JP): Akira Yoshiyama and Annie Wei.
- Brazilian Portuguese (pt_BR): Marcos Pereira da Silva Cruz.
- Russian (ru_RU): Anton Pryadko and Igor Melnikov.
- Slovak (sk_SK): Ondrej Dzivy Balucha
- Turkish (tr_TR): Ömer YILDIZ
- Simplified Chinese (zh_CN): Zhiqiang Zhang and Liang Qi.
- Traditional Chinese (zh_TW): T. C. Lin.

Partners

- The following companies either embed Clonezilla in their products or promote Clonezilla:

- Linmin



- eRacks Open Source Systems



- Miracle Linux





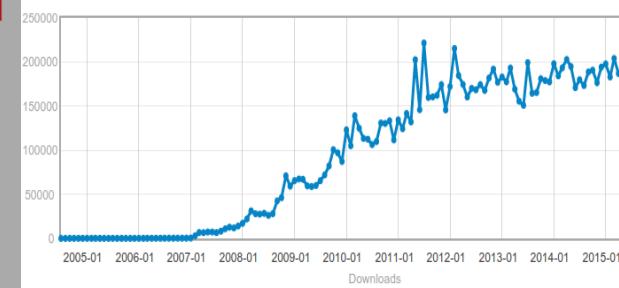
Changes and features from 2015 Summer

- Image **encryption**
- **WebDAV/S3/Swift** device as image repository
- **Chrome OS/Chromium OS** imaging
- Device like /dev/rd/c0d0 and /dev/ida/c0d0 RAID cards
- Support PV on disk, not only on partition
- Fake RAID/**firmware RAID** is now supported if its device naming style is **/dev/md**.
- The partition from an image could be now restored to different name device, e.g. sda1 could be restored to sdb5.
- File system **f2fs** support
- "ocs-img-2-vdk" was added. It can be used to **convert** **Clonezilla image as virtual disk file** (qcow2 and vmdk) via KVM
- **Slovak, Turkish and Hungarian locales** were added

Clonezilla Users Worldwide



ca_ES.UTF-8 Catalan | Català
de_DE.UTF-8 German | Deutsch
en_US.UTF-8 English
hu_HU.UTF-8 Hungarian | Magyar
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
pt_BR.UTF-8 Brazilian Portuguese | Português do Brasil
ru_RU.UTF-8 Russian | Русский
sk_SK.UTF-8 Slovak | Slovenský
tr_TR.UTF-8 Turkish | Türkçe
zh_CN.UTF-8 Chinese (Simplified) | 简体中文
zh_TW.UTF-8 Chinese (Traditional) | 正體中文 - 臺灣



DOWNLOADS
12,187,605
In the selected date range

TOP COUNTRY *
United States
24% of downloaders

TOP OS *
Windows
70% of downloaders

>12,000,000 downloads



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Backup as a service

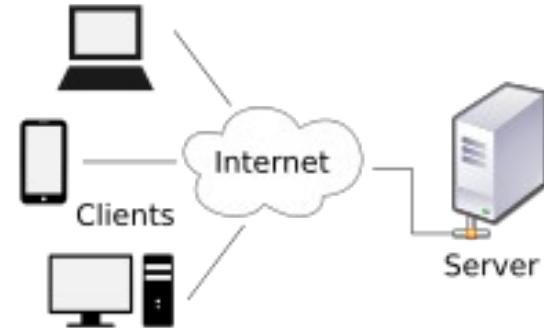
- Requirement for **system backup**:
 - Local and cloud backup
 - **Security**
 - Flexibility
 - Bare-metal recovery
- Image-based backup by Clonezilla
 - Image repo: local, NFS, CIFS, SSHFS, WebDAV
 - AES 128 bits (or 256 bits)



Images source: wikipedia.org

Backup as a service server side

- BaaS server
 - Server provides one of the following service
 - WebDAV
 - SSHFS
 - CIFS
 - NFS
 - OpenStack Swift
 - Amazon S3
- FOSS solutions:
 - OwnCloud
 - FreeNAS
 - GNU/Linux + Apache WebDAV/SSHFS/CIFS/NFS
 - OpenStack Swift
 - ...



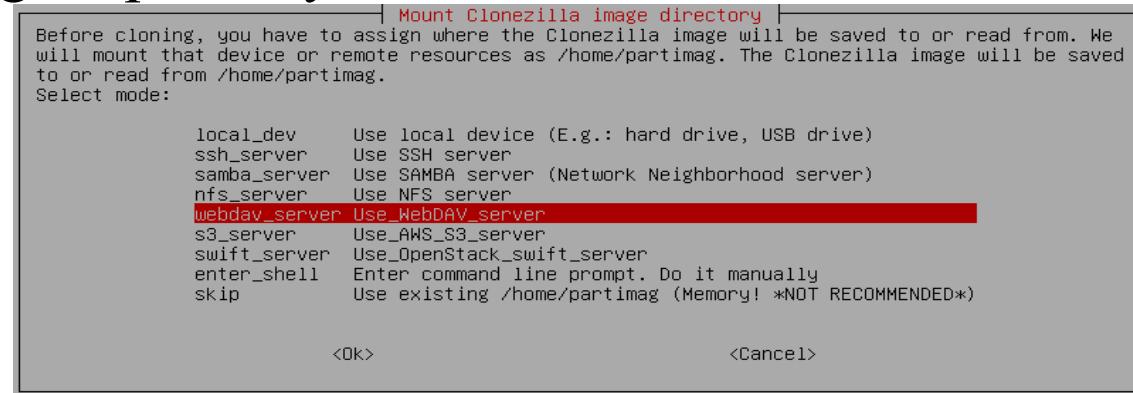
Backup as a service

client side: interactive mode



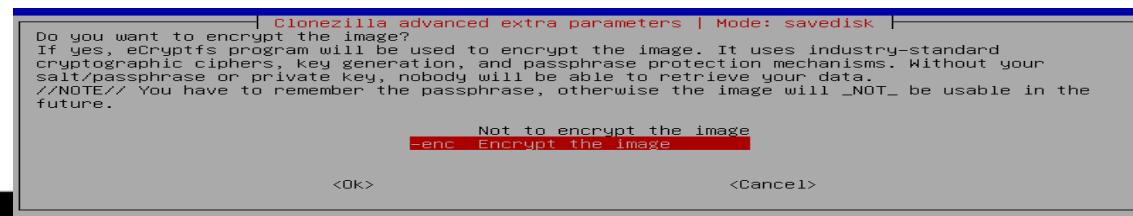
- Clonezilla live >= 2.4.2-10
 - Boot Clonezilla live on the machine you want to backup
 - Configure network connection
 - Choose image repository:

- SSHFS
- CIFS
- NFS
- WebDAV
- S3
- Swift



- Choose encryption

- Not ready
for S3 &
Swift



Backup as a service client side: almost unattended



- Clonezilla live >= 2.4.2-10
 - Pre-seed configuration in the boot parameters, e.g:
 - locales=en_US.UTF-8
 - keyboard-layouts=NONE
 - ocs_prerun1="dhclient -v eth0"
 - **ocs_prerun2="ocs-tune-conf-for-webdav"**
 - ocs_prerun3="mount -t davfs -o noexec http://192.168.120.254:8080/share/ /home/partimag"
 - ocs_live_run="ocs-sr -q2 -j2 -z1p -enc -p true savedisk myimg sda"
 - //NOTE// volume size is based on the free memory due to davfs2 cache mechanism limitation.

Boot parameters

clonezilla.org, clonezilla.nchc.org.tw

- Clonezilla live (Default settings, VGA 800x600)
- Other modes of Clonezilla live
- Local operating system in harddrive (if available)
- Memtest & FreeDOS
- Network boot via iPXE

```
> /live/vmlinuz initrd=/live/initrd.img boot=live union=overlay username=user config components quiet noswap edd=on nomodeset nodrmraid locales=en_US.UTF-8 keyboard-layouts=NONE ocs_prerun1="dhclient -v eth0" ocs_prerun2="ocs-tune-conf-for-webday" ocs_prerun3="mount -t davfs -o noeexec http://192.168.56.1/share/home/partimag" ocs_live_run="ocs-sr -q2 -j2 -z1p -enc -p true savedisk myimg sda" ocs_live_extra_params="" ocs_live_batch=no vga=788 ip= nosplash 1915.blaclklist=yes radeonhd.blacklist=yes nouveau.blacklist=yes vmmgfx.enable_fbdev=1_
```

Clonezilla
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Booting

```
Sending on Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 3
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
DHCPREQUEST on eth0 to 255.255.255.255 port 67
DHCPoffer from 192.168.56.1
DHCPACK from 192.168.56.1
bound to 192.168.56.3 -- renewal in 118 seconds.
*****
Now run "ocs_prerun2": ocs-tune-conf-for-webdav...
Tuning davfs2 parameters in /etc/davfs2/davfs2.conf...
*****
Now run "ocs_prerun3": mount -t davfs -o noexec http://192.168.56.1/share/ /home/partimag...
Please enter the username to authenticate with server
http://192.168.56.1/share/ or hit enter for none.
    Username: steven
Please enter the password to authenticate user steven with server
http://192.168.56.1/share/ or hit enter for none.
    Password:
Setting the TERM as linux
Starting /usr/sbin/ocs-sr at 2015-06-12 15:18:29 UTC...
*****
Clonezilla base dir: /home/partimag
*****
Shutting down the Logical Volume Manager
  No volume groups found
Finished Shutting down the Logical Volume Manager
Selected device [sda] found!
The selected devices: sda
*****
//NOTE// You have to remember the passphrase, otherwise the image will _NOT_ be usable in the future
*** Enter the passphrase to encrypt the image: myimg ***
(It will not be echoed in the screen)
*** Re-enter to verify the passphrase for encrypting the image: myimg ***
(It will not be echoed in the screen)
```

WebDAV
authorization

passphrase
for
encryption

Files in the encrypted image dir

```
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:21 blkdev.list  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:21 blkid.list  
-rw-r--r-- 1 www-data www-data 16K 6月 13 00:22 clonezilla-img  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 dev-fs.list  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 disk  
-rw-r--r-- 1 www-data www-data 141 6月 13 00:22 encryptfs.info  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 Info-dmi.txt  
-rw-r--r-- 1 www-data www-data 20K 6月 13 00:22 Info-lhw.txt  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 Info-lspci.txt  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 Info-packages.txt  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 Info-saved-by-cmd.txt  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 parts  
-rw-r--r-- 1 www-data www-data 95M 6月 13 00:22 sda1.ext4-ptcl-img.gz.aaa  
-rw-r--r-- 1 www-data www-data 95M 6月 13 00:22 sda1.ext4-ptcl-img.gz.aab  
-rw-r--r-- 1 www-data www-data 95M 6月 13 00:22 sda1.ext4-ptcl-img.gz.aac  
-rw-r--r-- 1 www-data www-data 89M 6月 13 00:22 sda1.ext4-ptcl-img.gz.aad  
-rw-r--r-- 1 www-data www-data 724K 6月 13 00:22 sda5.ext4-ptcl-img.gz.aaa  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:21 sda-chs.sf  
-rw-r--r-- 1 www-data www-data 1.1M 6月 13 00:21 sda-hidden-data-after-mbr  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:21 sda-mbr  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 sda-pt.parted  
-rw-r--r-- 1 www-data www-data 12K 6月 13 00:22 sda-pt.parted.compact
```

The only plain text file in the image dir,
Others are encrypted

```
# This image was saved with ecryptfs  
disk_of_img="sda"  
parts_of_img="sda1 sda5"  
time_of_img="2015-0220-0650"  
disks_size_all_of_img="_8590MB"
```

Volume size reset by
ocs-tune-conf-for-webdav

AES is not currently known to
be susceptible to known-plaintext
attacks.



Demo - Save an image to WebDAV

- Server side:
 - WebDAV, provided by the running Ubuntu 14.04 system with enabled Apache2 WebDAV
 - URL: `http://192.168.56.1/share/`
- Client side:
 - Use Clonezilla live to 2.4.2-10 with preseeded boot parameters to save a local disk as an image
 - `locales=en_US.UTF-8 keyboard-layouts=None`
 - `ocs_prerun1="dhclient -v eth0"`
 - `ocs_prerun2="ocs-tune-conf-for-webdav"`
 - `ocs_prerun3="mount -t davfs -o noexec http://192.168.56.1/share/ /home/partimag"`
 - `ocs_live_run="ocs-sr -q2 -j2 -z1p -enc -p true savedisk myimg sda"`

Conclusion

- With **image encryption**, you can provide BaaS for system imaging to **multiple users in the same image repository**.
- Due to the file system support issue, the encryptfs has a compatible issue with **s3fs** (for S3) and **cloudfuse** file (for Swift) systems. We will keep improving it.
- WebDAV service is **more flexible**. However, there might be some limits. E.g. single file size limit on the server side. Therefore you have to make sure it's compatible with Clonezilla.

Reference

- Clonezilla: <http://clonezilla.org>
- DRBL: <http://drbl.org>

Questions ?

Great!



?????

