Backup as a service with Clonezilla

clonezilla.org

Q1, 2015

Outline

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

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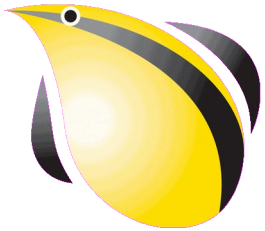
System imaging and cloning - backup

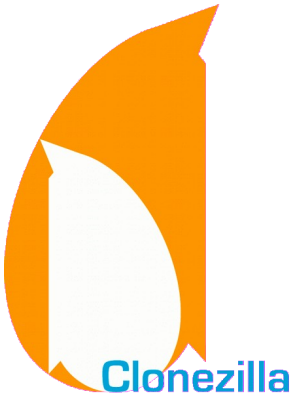
image source: maggiesfarm.anotherdotcom.com
www.compsults.com, and jervisdabreo.com

Massive system deployment

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)



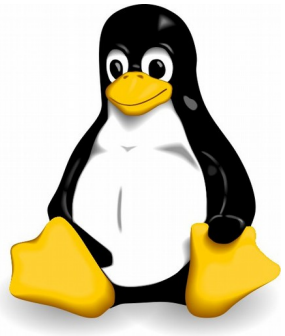


財團法人國家實驗研究院
國家高速網路與計算中心
National Center for High-Performance Computing
Better HPC Better Living

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

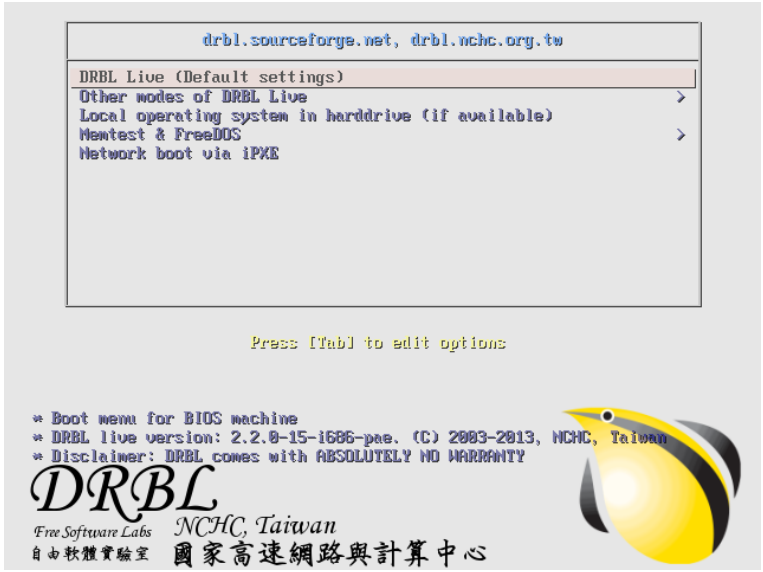
*6

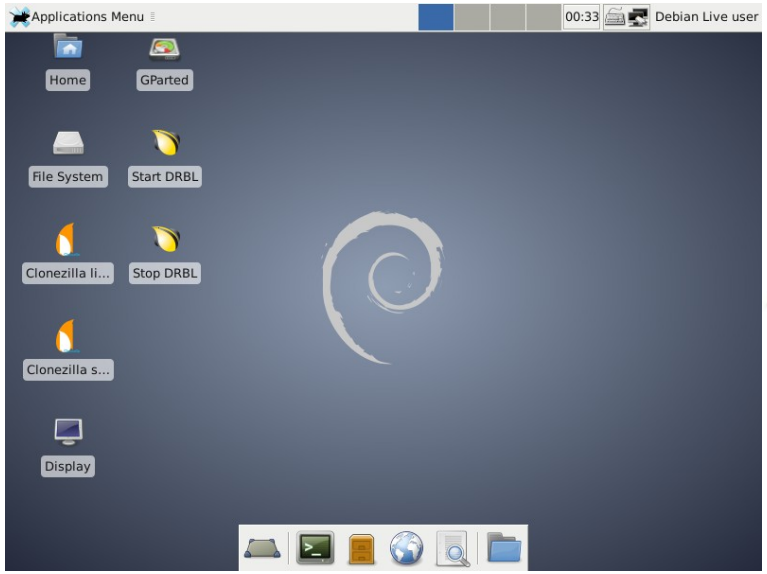
*Logo source: (1) Larry Ewing, Simon Budig and Anja Gerwinski, (2) Apple ,(3) Microsoft, (4) Marshall Kirk McKusick, (5) VMWare (6) Distrowatch.com

Clonezilla Feature

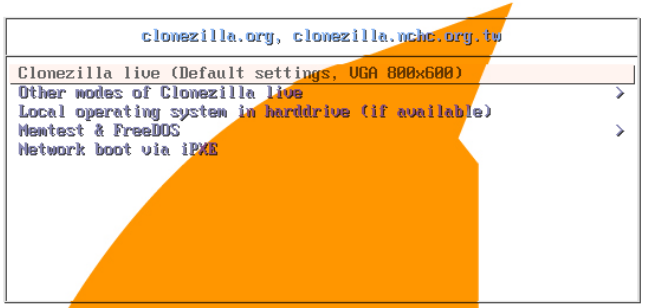
- Free (GPL) Software
- File systems supported:
  - Ext2/3/4, ReiserFS, Reiser4, XFS, JFS, HFS+, BrtFS, UFS, Minix, VMFS, F2FS, FAT and NTFS
  - Supports LVM2
  - Support some hardware RAID chips (by kernel)
- Smart copying for supported filesystem. For unsupported file systems sector-to-sector copying 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





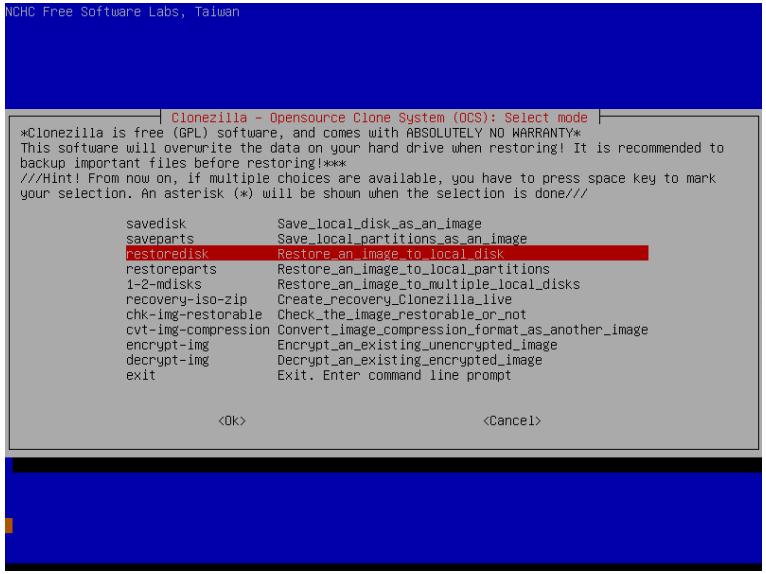
Clonezilla Live



* Boot menu for BIOS machine
* Clonezilla live version: 2.3.2-22-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



Developers

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

Language file contributors

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- Simplified Chinese (zh_CN): Zhiqiang Zhang and Liang Qi.
- Traditional Chinese (zh_TW): T. C. Lin.

Partners

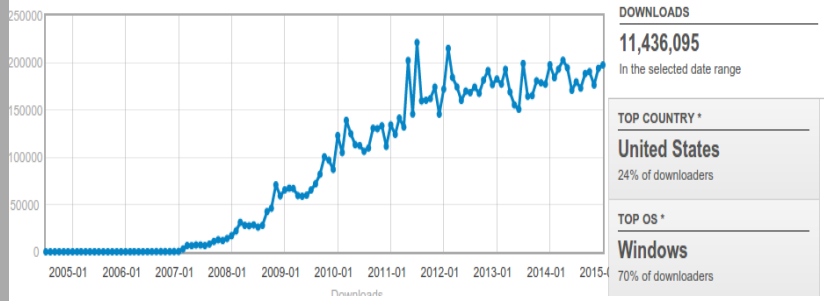
- The following companies either embed Clonezilla in their products or promote Clonezilla:
  - Linmin
  - eRacks Open Source Systems
  - Miracle Linux

Changes and features from Jan/2014

- Image encryption
- WebDAV 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 and Turkish locales were added

Clonezilla Users Worldwide

```
ca_ES.UTF-8 Catalan | Català
de_DE.UTF-8 German | Deutsch
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
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
```



>11,000,000 downloads

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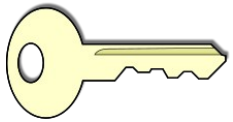
Backup as a service

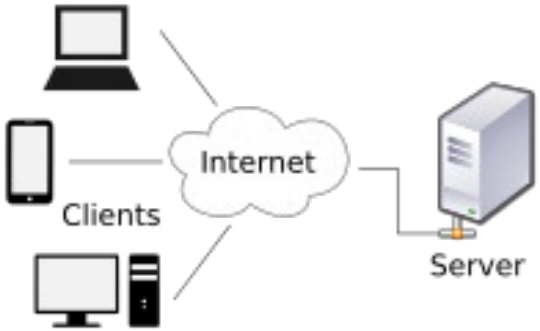
- Requirement for system backup:
  - Local and cloud backup
  - Security
  - Flexibility
  - Bare-metal recovery
- Image-based backup by Clonezilla
  - Image repo: local, NFS, CIFS, SSHFS, WebDAV
  - AES 128 bits (or 256 bits)



Images source: wikipedia.org

Backup as a service server side

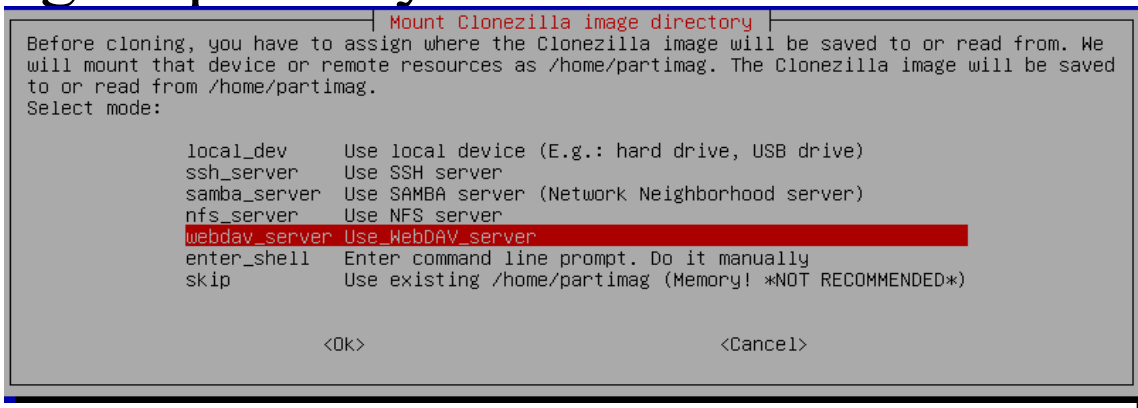
- BaaS server
  - Server provides one of the following service
    - WebDAV
    - SSHFS
    - CIFS
    - NFS



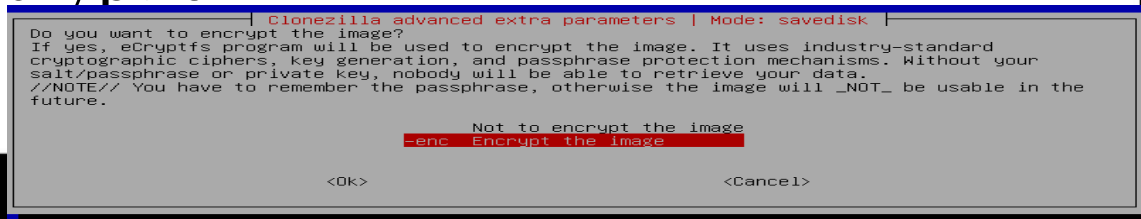
- FOSS solutions:
  - OwnCloud
  - FreeNAS
  - GNU/Linux + Apache WebDAV/SSHFS/CIFS/NFS
  - ...

Backup as a service client side: interactive mode

- Clonezilla live >= 2.3.2-22
  - Boot Clonezilla live on the machine you want to backup
  - Configure network connection
  - Choose image repository:
    - SSHFS
    - CIFS
    - NFS
    - WebDAV



  - Choose encryption



Backup as a service
client side: almost unattended

- Clonezilla live >= 2.3.2-22
  - 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

```
> /live/vmlinuz initrd=/live/initrd.img boot=live username=user config quiet n
oswap edd=on nomodeset nodmraid 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" o
cs_live_run="ocs-sr -q2 -j2 -z1p -enc -p true savedisk myimg sda" ocs_live_ext
ra_param="" ocs_live_batch=no vga=788 ip=  nosplash i915.blacklist=yes radeonh
d.blacklist=yes nouveau.blacklist=yes vmwgfx.enable_fbdev=1_
```

Clonezilla

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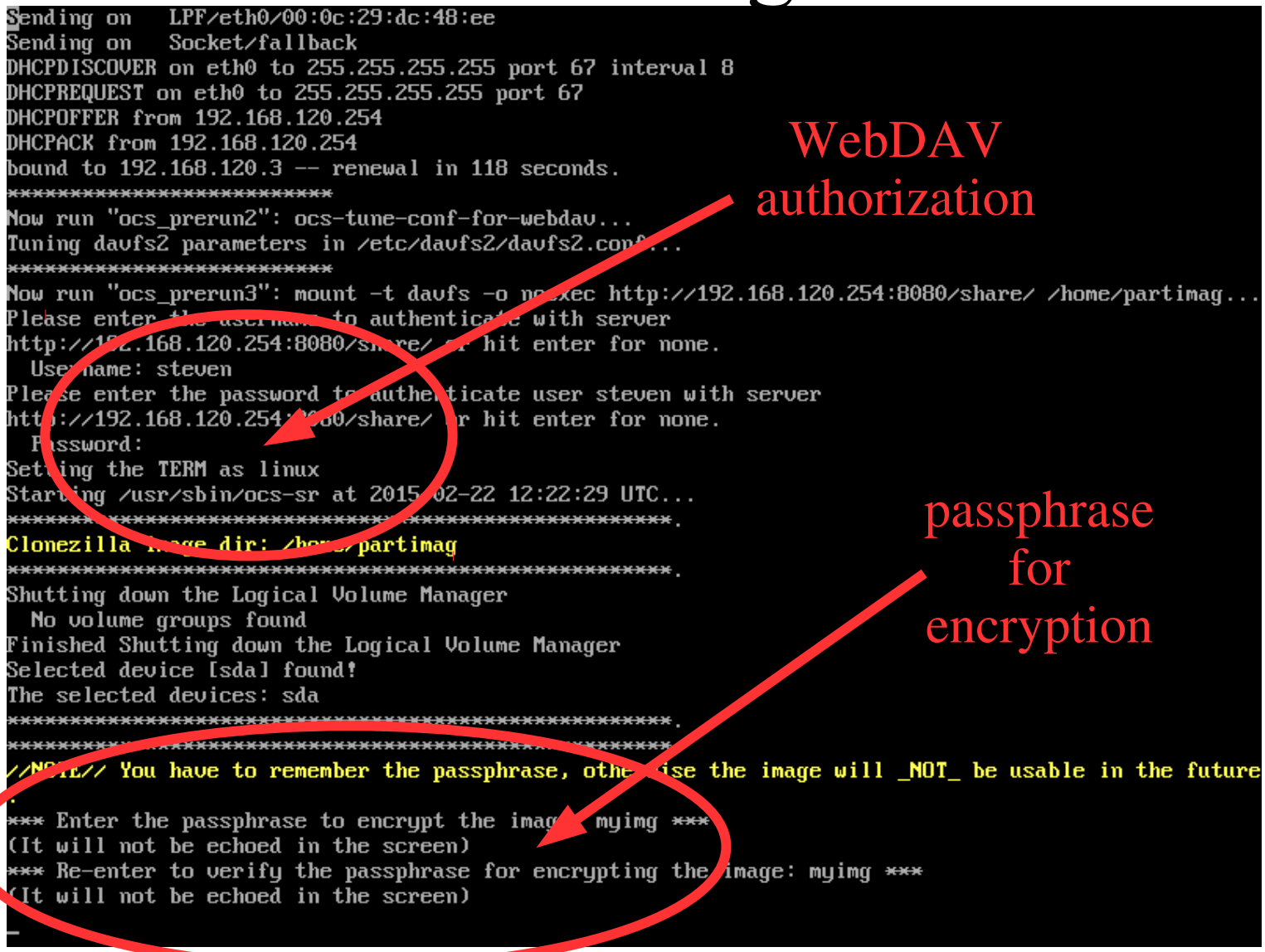
Booting


Sending on LPF/eth0/00:0c:29:dc:48:ee
Sending on Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 8
DHCPREQUEST on eth0 to 255.255.255.255 port 67
DHCPOFFER from 192.168.120.254
DHCPACK from 192.168.120.254
bound to 192.168.120.3 -- 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://192.168.120.254:8080/share/ /home/partimag...
Please enter the username to authenticate with server
http://192.168.120.254:8080/share/ or hit enter for none.
Username: steven
Please enter the password to authenticate user steven with server
http://192.168.120.254:8080/share/ or hit enter for none.
Password:
Setting the TERM as linux
Starting /usr/sbin/ocs-sr at 2015-02-22 12:22:29 UTC...
Clonezilla image 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 152K Feb 22 20:23 Info-dmi.txt
-rw-r--r-- 1 www-data www-data  48K Feb 22 20:23 Info-lshw.txt
-rw-r--r-- 1 www-data www-data  16K Feb 22 20:23 Info-lspci.txt
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 Info-packages.txt
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:24 Info-saved-by-cmd.txt
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 blkdev.list
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:22 blkid.list
-rw-r--r-- 1 www-data www-data  16K Feb 22 20:24 clonezilla-img
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 dev-fs.list
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:24 disk
-rw-r--r-- 1 www-data www-data  141 Feb 22 20:24 ecryptfs.info
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:24 parts
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:22 sda-chs.sf
-rw-r--r-- 1 www-data www-data 1.1M Feb 22 20:22 sda-hidden-data-after-mbr
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:22 sda-mbr
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 sda-pt.parted
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:24 sda-pt.parted.compact
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 sda-pt.sf
-rw-r--r-- 1 www-data www-data 192M Feb 22 20:24 sda1.ext4-ptcl-img.gz.aaa
-rw-r--r-- 1 www-data www-data 192M Feb 22 20:24 sda1.ext4-ptcl-img.gz.aab
-rw-r--r-- 1 www-data www-data  41M Feb 22 20:24 sda1.ext4-ptcl-img.gz.aac
-rw-r--r-- 1 www-data www-data 704K Feb 22 20:24 sda5.ext4-ptcl-img.gz.aaa
-rw-r--r-- 1 www-data www-data  12K Feb 22 20:23 swappt-sda6.info
```

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"
```

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

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

Demo - Save an image to WebDAV

- Server side:
  - WebDAV, provided by the running Ubuntu 14.04 system with enabled Apahce2 WebDAV
  - URL: http://192.168.56.1/share/
- Client side:
  - Use Clonezilla live to 2.3.2-22 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"

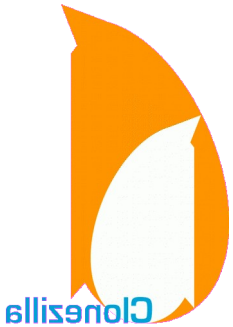
Conclusion

- With image encryption, you can provide BaaS for system imaging to multiple users in the same image repository.
- 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!

?????