

Migrate to a virtual environment with Clonezilla

clonezilla.org

Q1, 2014



Outline

- Introduction to Clonezilla
 - Features
- Migrate to a virtual environment
 - 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!!!

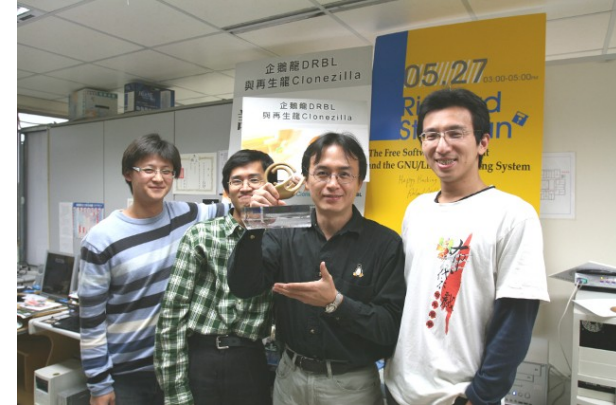
image source: maggiesfarm.anotherdotcom.com
www.compsults.com, and jervisdabreo.com

Massive system deployment



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)



Taiwan image source: wikipedia.org

TAIWAN

www.nchc.org.tw

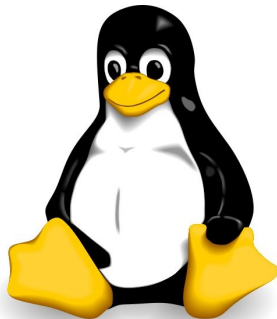


National Applied Research Laboratories



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



TAIWAN

www.nchc.org.tw

NTL National Applied
Research Laboratories



Clonezilla Feature

- Free ([GPL](#)) Software
- File systems supported:
 - [Ext2/3/4](#), [ReiserFS](#), [Reiser4](#), [XFS](#), [JFS](#), [HFS+](#), [BrFS](#), [UFS](#), [Minix](#), [VMFS](#), [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



drbl.sourceforge.net, drbl.nchc.org.tw


DRBL Live (Default settings)

- Other modes of DRBL Live >
- Local operating system in harddrive (if available) >
- Newtest & FreeDOS >
- Network boot via IPXE

Press [Tab] to edit options

* Boot menu for BIOS machine
* DRBL live version: 2.2.0-15-1686-pae. (C) 2003-2013, NCHC, Taiwan
* Disclaimer: DRBL comes with ABSOLUTELY 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



Applications Menu | 00:33 Debian Live user

Home GParted

File System Start DRBL

Clonezilla li... Stop DRBL

Clonezilla s...

Display

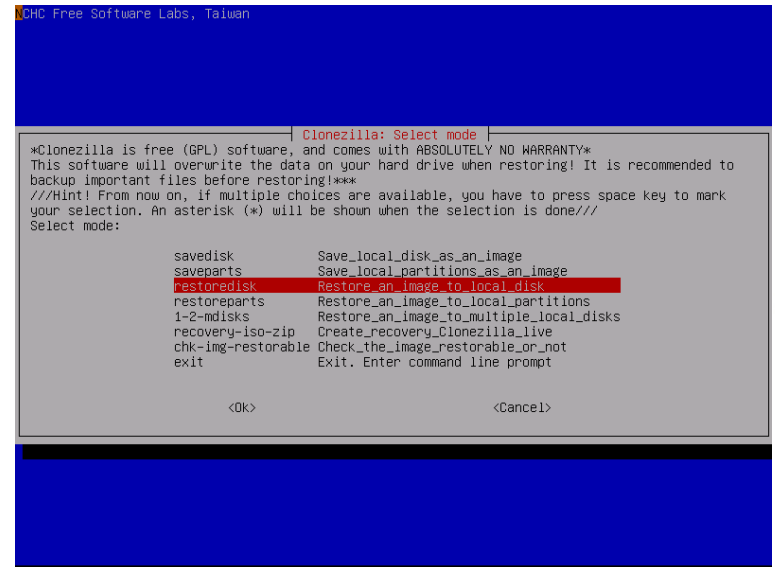
Clonezilla Live



Press [Tab] to edit options

- * Clonezilla live version: 2.1.2-43-1686-pae. (C) 2008-2013, 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



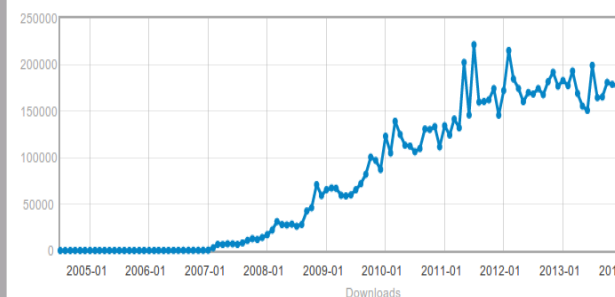
Language file contributors

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- Russian (ru_RU): Anton Pryadko and Igor Melnikov.
- Simplified Chinese (zh_CN): Zhiqiang Zhang and Liang Qi.
- Traditional Chinese (zh_TW): T. C. Lin.

Clonezilla Users Worldwide



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
zh_CN.UTF-8	Chinese (Simplified)		简体中文
zh_TW.UTF-8	Chinese (Traditional)		正體中文 - 臺灣

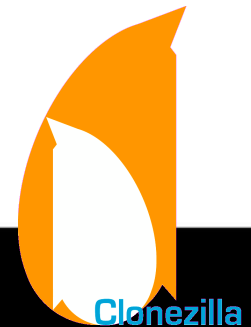


DOWNLOADS	9,188,249
In the selected date range	
TOP COUNTRY *	United States
	25% of downloaders
TOP OS *	Windows
	70% of downloaders

>9,000,000 downloads

Outline

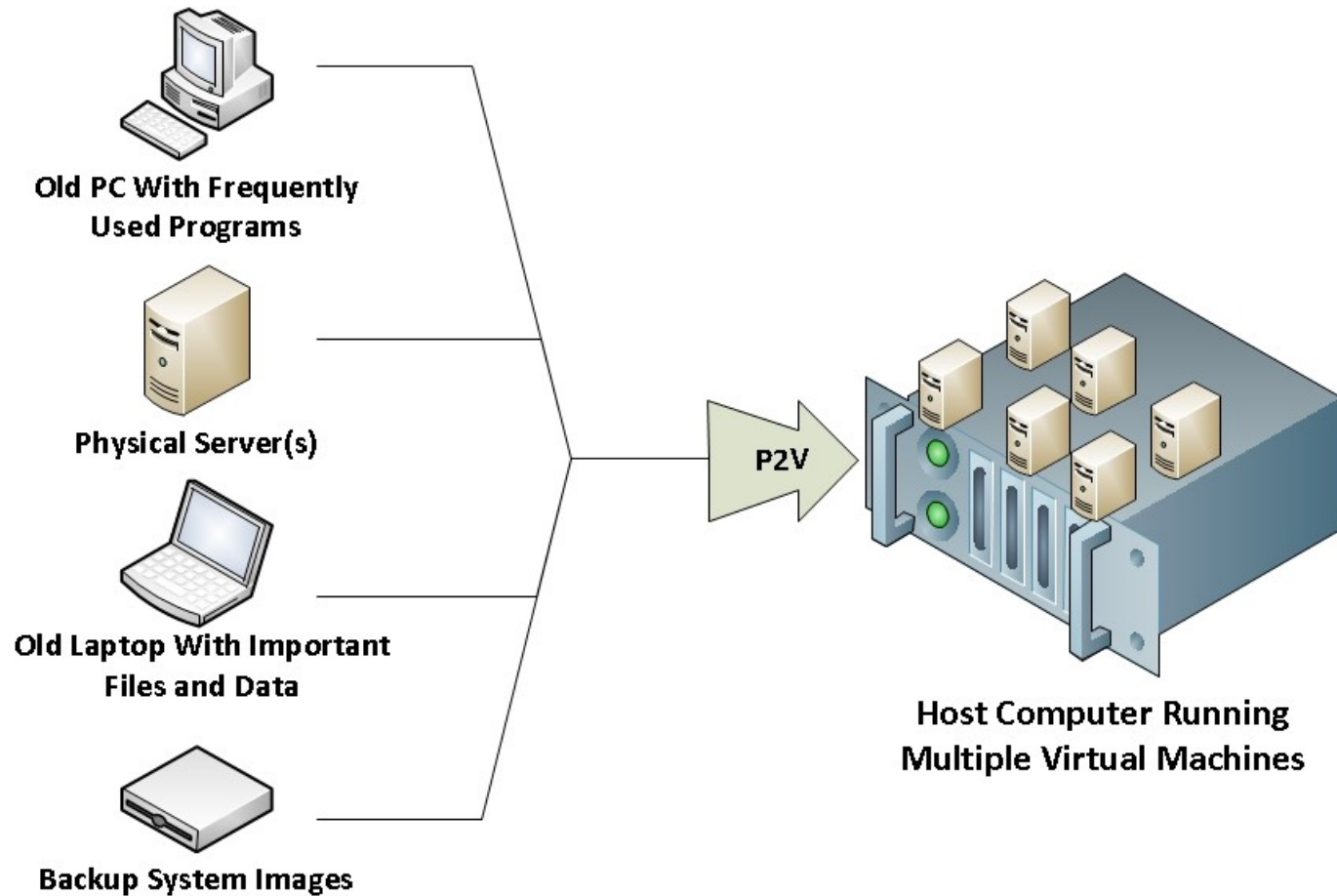
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Physical to Virtual (P2V)

- Migrating a physical server's operating system (OS), applications, and data from that physical server to a virtual-machine guest hosted on a virtualized platform – wikipedia
 - Hot migration
 - Source system is in **running** state
 - Recommended for static data, not good for mail server, SQL server
 - Cold migration
 - Source system is **offline**
- Clonezilla only works for **cold migration**

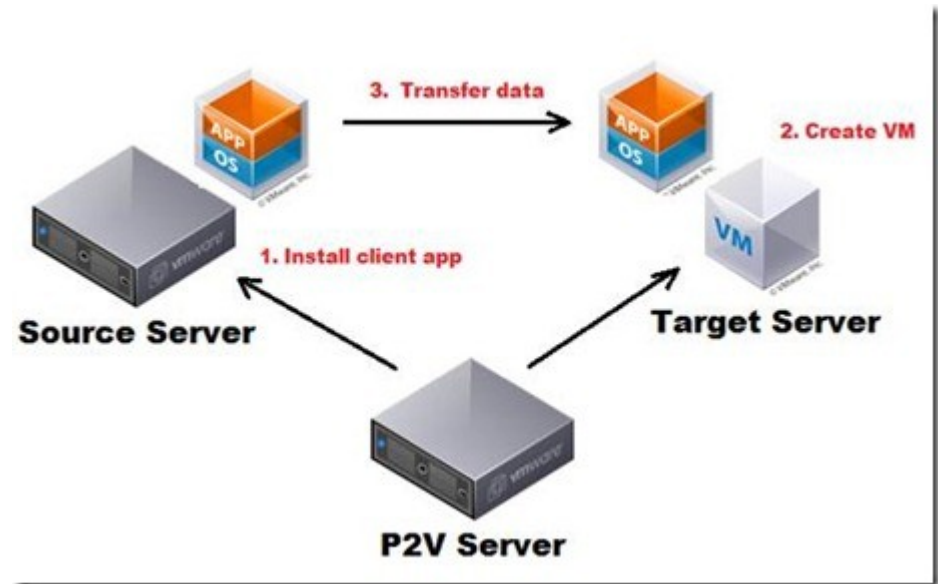
P2V



Source: <http://p2vsolutions.net/>

P2V – 3 steps

1. Decide the **destination VM**
 - Install the **required drivers of VM** on source machine (physical side)
2. **Create VM**
3. **Migrate**



Source <http://planetvm.net/blog/?p=2108>

Which Software Shall I Use?

- No clear answer, Every P2V software has its own strengths and weaknesses.
 - VMWare vCenter Convert
 - Virt-P2V
 - OpenQRM
 - ...
- Clonezilla can also be used to perform P2V, i.e. in the step 3 "migrate" in the previous page.



image sources: vmware.com, libguestfs.org, openqrm-enterprise.com/

P2V by Clonezilla live

Physical machine side

- Basic ideas
 - Before migrating, make sure the OS on the physical machine has the **required drivers for the virtual machine which you want to move to.**
- OS
 - GNU/Linux
 - Initrd is important
 - MS Windows
 - Sysprep

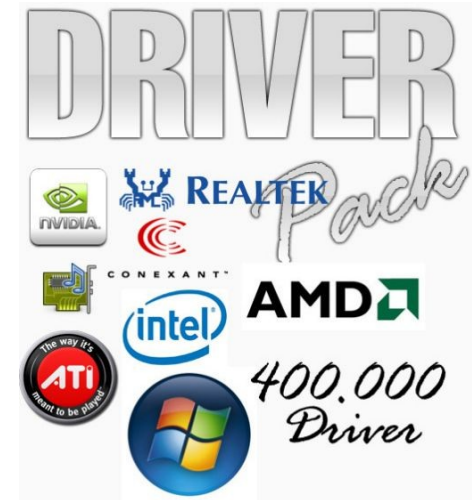


Image source: <http://img21.imageshack.us/img21/9902/400mildrivers.jpg>

Virtual Machine Side For x86/x86-64

- KVM/QEMU
- Xen
- VirtualBox



- https://www.virtualbox.org/wiki/Migrate_Windows
 - Make use of “MergeIDE” before migrating
- Enable “**CPU PAE**” and “**IO APIC**”

- VMWare (Workstation, Fusion, Player, ESX...)
- ...



vmware®

Image sources: linux-kvm.org, xenproject.org, www.virtualbox, vmware.com

“Migrate” by Clonezilla

- Once step 1 and step 2 are done, you can **migrate** the system by Clonezilla:

1. Imaging

Ref: <http://clonezilla.org/clonezilla-live-doc.php>

- Physical → Image → Restore to Virtual machine
- Recovery iso/zip → CD or USB flash drive

```
Clonezilla - Opensource Clone System (OCS): Select mode
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY 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///

savedisk Save_local_disk_as_an_image
saveparts Save_local_partitions_as_an_image
exit      Exit. Enter command line prompt

<Ok>
```

```
Clonezilla - Opensource Clone System (OCS): Select mode
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
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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
1-2-mdisks   Restore_an_image_to_multiple_local_disks
recovery-iso-zip Create_recovery_Clonezilla_live
chk-img-restorable Check_the_image_restorable_or_not
cvt-img-compression Convert_image_compression_format_as_another_image
exit          Exit. Enter command line prompt

<Ok>                                <Cancel>
```

P2V “migrate” by Clonezilla

- 2. **Cloning** Ref: <http://clonezilla.org/clonezilla-live-doc.php>
 - Physical A → local cable → Physical B
 - Physical A → network → Physical B

```
Clonezilla - Opensource Clone System (OCS)
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
This software will overwrite the data on your hard drive when cloning! It is recommended to
backup important files on the target disk before you cloning!***

disk_to_local_disk local_disk_to_local_disk_clone
disk_to_remote_disk local_disk_to_remote_disk_clone
part_to_local_part local_partition_to_local_partition_clone
part_to_remote_part local_partition_to_remote_partition_clone
exit Exit. Enter command line prompt

<Ok> <Cancel>
```

- Disk size:
 - Expert mode, choose “-k1” to create the partition table proportionally
 - Make sure the disk size is big enough



P2V by Clonezilla on Youtube

- Clonezilla restore from ISO, P2V
 - <http://www.youtube.com/watch?v=EMT81bgZMPA>
- CentOS / RHEL Linux Virtualization Part 1/3 : Creating VMWare Disk Partition using Clonezilla
 - http://www.youtube.com/watch?v=21QTnVw_EHo
- CentOS / RHEL Linux Virtualization Part 2/3: image migration to VMWare using Clonezilla - NFS
 - <http://www.youtube.com/watch?v=olJSXttInEo>

P2V fails?

- Possible reasons
 - Missing required **drivers**
 - E.g. “**Kernel panic – not syncing : Attempted to kill init!**”
 - No required modules in initrd
 - Rescue mode then

```
mkinitrd -v -f initrd- $\{kver\}$ .img  $\{kver\}$ 
```
 - Wrong **arch**, e.g. AMD64 OS → i686 VM
 - **MAC address** of network card
 - Network is down. Service fails to start
 - **Serial number** of proprietary software depends on hardware.
 - ...

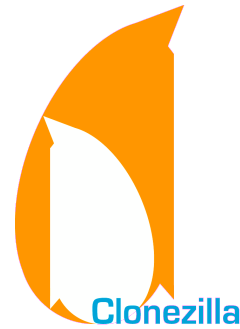
Reference

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



Questions ?

Great!



??????

