

gentoo-creator

1.0

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Chapter 1

Usage

In a nutshell

```
./gentoolize [command=argument] ... [command=argument] [file.iso]
```

See [Wiki](#) for details.

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Chapter 2

Todo List

Global `create_vm ()`

Find a way to only compact on success and never on failure of VM.

Global `main ()`

Daemonize the part below `generate_Gentoo` when `#VMTYPE` is `headless` so that the script can be detached completely with `nohup gentoolize ... &`

Global `adjust_environment ()`

Add more regional options by parametrization of commandline

Global `install_software ()`

Add a script to build R dependencies

Chapter 3

Bug List

Global `partition ()`

Same issue with `mkswap` and `swapon`. Cleaning VBox config/settings, syncing and a bit of sleep fixed these issues for the *net-setup* method.

However if vm type is *'headless'* the *dhcpcd* method is consistently hampered by a VBox bug, which is tentatively circumvented by sending a `controlvm keyboardputscancode 1c` instruction. Tests show that this is linked to a requested user keyboard or mouse input by the Gentoo minimal install CD. This cannot be simulated owing to the lack of `/dev/uinput`. The reason why user input is requested has not been found. Without it, `/dev/sda2` and/or `sda4` are mistakenly identified as being mounted and/or busy, while this cannot be the case. With even a single keystroke for a `readcommand`, all falls back into place. This is why using the *net-setup* script, which forces user input, circumvents the issue. This may be caused by an aging kernel and/or incompatibilities with virtualization. Using a CloneZilla CD as a replacement solved the issue completely. It might be better to use a beefed-up Gentoo install CD.

Chapter 4

Module Index

4.1 Modules

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Chapter 6

Module Documentation

6.1 Create Gentoo linux image and installer.

Functions

- [get_gentoo_install_iso](#) ()
Download minimal Gentoo install ISO file and caches it.
- [get_clonezilla_iso](#) ()
Download clonezilla ISO file and caches it.
- [get_cache_clonezilla_iso](#) ()
Either download clonezilla ISO file and caches it OR uncaches it.
- [fetch_clonezilla_iso](#) ()
Download clonezilla ISO file and process it.
- [help_md](#) ()
Print usage in markdown format.
- [help_](#) ()
Print usage to stdout.
- [test_cli_pre](#) ()
Check VirtualBox version and prepare commandline analysis.
- [test_cli](#) (cli)
Analyse commandline.
- [test_cli_post](#) ()
Check commandline coherence and incompatibilities.
- [fetch_livecd](#) ()
Downloads Gentoo install CD.
- [fetch_stage3](#) ()
Downloads a fresh stage3 Gentoo archive.
- [mount_live_cd](#) ()
Mount Gentoo/Clonezilla live CD and unsquashfs the GNU/Linux system.
- [make_boot_from_livecd](#) ()
Tweak the Gentoo minimal install CD so that the custom- made shell scripts and stage3 archive are included into the squashfs filesystem.
- [test_vm_running](#) (vm)
Check if VM as first named argument exists and is running.
- [deep_clean](#) ()
Force-clean root VirtualBox registry.

- [delete_vm](#) (vm, ext)
Powers off, possibly with emergency stop, the VM names as first argument.
- [create_vm](#) ()
Create main VirtualBox machine using VBoxManage commandline.
- [clonezilla_to_iso](#) (iso, dir)
Create Gentoo linux clonezilla ISO installer out of a clonezilla directory structure and an clonezilla image.
- [process_clonezilla_iso](#) ()
*Download clonezilla ISO or recover it from cache calling [fetch_clonezilla_iso](#).
Upgrade it with virtualbox guest additions.*
- [build_virtualbox](#) ()
Build VirtualBox from source using an unsquashed clonezilla CD as a chrooted environment.
- [create_iso_vm](#) ()
*Create the new VirtualBox machine aimed at converting the VDI virtualdisk containing the Gentoo Linux distribution into an XZ-compressed clonezilla image uneder **ISOFILES/home/partimag/image**.*
- [clone_vm_to_device](#) ()
Directly clone Gentoo VM to USB stick (or any using block device)
- [clone_vm_to_raw](#) ()
Use.
- [dd_to_usb](#) ()
Bare-metal copy of temporary RAW disk to external device.
- [clonezilla_device_to_image](#) ()
Create CloneZilla xz-compressed image out of an external block device (like a USB stick)
- [vbox_img_works](#) ()
*Test if **vbox-img** is functional.*
- [create_device_system](#) ()
Clone VDI virtual disk to external device (USB device or hard drive)
- [cleanup](#) ()
Clean up all temporary files and directpries (except for VirtualBox build)
- [generate_Gentoo](#) ()
Launch routines: fetch install IO, starge3 archive, create VM.
- [main](#) ()
Main function launching routines.

Variables

- ReadOnly String Array [ARR](#)
global string array of switches and default values
- ReadOnly Integer [ARRAY_LENGTH](#) = $\$((\${\#ARR[*]}/4))$
Number of switches (true length of array divided by 4)
- Exported String [ISO](#) = "downloaded.iso"
Name of downloaded clonezilla ISO file.

6.1.1 Detailed Description

6.1.2 Function Documentation

6.1.2.1 build_virtualbox()

```
build_virtualbox ( )
```

Build VirtualBox from source using an unsquashed clonezilla CD as a chrooted environment.

Build scripts are copied from **clonezilla/build**

Note

This stage is only necessary if **vbox-img** is to be used to directly convert the VDI virtual disk into a block device, on account of a bug in Oracle source code (ticket #19901).

This is only needed to reduce disk space requirements and avoid a temporary RAW file on disk of about 50 GB. Otherwise it is simpler to use the distribution stock version.

Definition at line 1408 of file mkgentoo.sh.

6.1.2.2 cleanup()

```
cleanup ( )
```

Clean up all temporary files and directories (except for VirtualBox build)

Definition at line 1866 of file mkgentoo.sh.

6.1.2.3 clone_vm_to_device()

```
clone_vm_to_device ( )
```

Directly clone Gentoo VM to USB stick (or any using block device)

Warning

Requests the *patched* version of **vbox-img** on account of Oracle source code bug (ticket #19901)

Note

Either build it beforehand or specify on commandline:

```
build_virtualbox=true
```

Definition at line 1642 of file mkgentoo.sh.

6.1.2.4 clone_vm_to_raw()

```
clone_vm_to_raw ( )
```

Use.

```
VBoxManage clonemedium
```

to clone VDI to RAW file before bare-metal copy to device.

Definition at line 1670 of file mkgentoo.sh.

6.1.2.5 clonezilla_device_to_image()

```
clonezilla_device_to_image ( )
```

Create CloneZilla xz-compressed image out of an external block device (like a USB stick)

Image is created under ISOFILES/home/partimag/image under VMPATH

Return values

<i>0</i>	on success otherwise exits -1 on failure
----------	--

Definition at line 1707 of file mkgentoo.sh.

6.1.2.6 clonezilla_to_iso()

```
clonezilla_to_iso (
    iso ,
    dir )
```

Create Gentoo linux clonezilla ISO installer out of a clonezilla directory structure and an clonezilla image.

Parameters

<i>iso</i>	ISO output
<i>dir</i>	Directory to be transformed into ISO output

Note

ISO can be burned to DVD or used to create a bootable USB stick using dd on *nix platforms or Rufus (on Windows).

Definition at line 1245 of file mkgentoo.sh.

6.1.2.7 create_device_system()

```
create_device_system ( )
```

Clone VDI virtual disk to external device (USB device or hard drive)

Two options are available. If vbox-img (patched) is functional after building VirtualBox from source, then use it and clone VDI directly to external device. Otherwise create a temporary RAW file and bare-metal copy this file to external device.

Return values

<i>In</i>	the first case, the exit code of clone_vm_to_device
<i>In</i>	the second case, the exit code of dd_to_usb following clone_vm_to_raw

Note

Requires **hot_install** on command line to be activated. This function performs what a live CD does to a target disk, yet using the currently running operating system.

Definition at line 1825 of file mkgentoo.sh.

6.1.2.8 create_iso_vm()

```
create_iso_vm ( )
```

Create the new VirtualBox machine aimed at converting the VDI virtualdisk containing the Gentoo Linux distribution into an XZ-compressed clonezilla image under **ISOFILES/home/partimag/image**.

Register machine, create VDI drive, create IDE drive attach disks to controllers

Attach newly augmented clonezilla LiveCD to IDE controller.

Wait for the VM to complete its task. Check that it is still running every minute.

Note

VM may be visible (vm type=gui) or silent (vm type=headless, currently to be fixed). Wait for the VM to complete task.

A new VM is necessary as the first VM used to build the Gentoo filesystem does not contain clonezilla or the VirtualBox guest additions (requested for sharing folders with host). Calls [process_clonezilla_iso](#) to satisfy these requirements.

Warning

the **sharedfolder** command may fail with older version of VirtualBox or not be implemented. It is transient, so it disappears on shutdown and requests prior startup of VM to be activated.

Definition at line 1521 of file mkgentoo.sh.

6.1.2.9 create_vm()

```
create_vm ( )
```

Create main VirtualBox machine using VBoxManage commandline.

- Register machine, create VDI drive, create IDE drive attach disks to controllers
- Attach augmented clonezilla LiveCD to IDE controller.
- Wait for the VM to complete its task. Check that it is still running every minute.
- Finally compact it.

Note

VM may be visible (vm type=gui) or without GUI (vm type=headless, currently to be fixed)

Todo Find a way to only compact on success and never on failure of VM.

Definition at line 1090 of file mkgentoo.sh.

6.1.2.10 dd_to_usb()

```
dd_to_usb ( )
```

Bare-metal copy of temporary RAW disk to external device.

Note

Used only if vbox-img (patched version) has not been built.

Definition at line 1680 of file mkgentoo.sh.

6.1.2.11 deep_clean()

```
deep_clean ( )
```

Force-clean root VirtualBox registry.

Definition at line 936 of file mkgentoo.sh.

6.1.2.12 delete_vm()

```
delete_vm (
    vm ,
    ext )
```

Powers off, possibly with emergency stop, the VM names as first argument.

Parameters

<i>vm</i>	VM name
<i>ext</i>	virtual disk extension, without dot (defaults to "vdi").

- Unregisters it
- Deletes its folder structure and hard drive (default is "vdi" as a second argument)

Return values

<i>Returns</i>	0 if Directory and hard drive could be erased, otherwise the OR value of both erasing commands
----------------	--

Definition at line 990 of file mkgentoo.sh.

6.1.2.13 fetch_clonezilla_iso()

```
fetch_clonezilla_iso ( )
```

Download clonezilla ISO file and process it.

- Download iff [DOWNLOAD_CLONEZILLA](#) has value "true"
- Optionnally checks MD5 sum.
- Caches ISO download for later uses.
- Uncaches it if no fresh download.
- Mount ISO download. Copy ro mounted filesystem to rw directory.
- Unsquash ISO filesystem.squashfs.
- Copy clonezilla config file.
- Copy resolv.conf to unsquashed filesystem.

Return values

0	on success or exits -1 on failure.
---	------------------------------------

Definition at line 148 of file fetch_clonezilla_iso.sh.

6.1.2.14 fetch_livecd()

```
fetch_livecd ( )
```

Downloads Gentoo install CD.

Caches it as \${ISO}

Return values

<i>Returns</i>	0 on success or -1 on exit
----------------	----------------------------

Definition at line 614 of file mkgentoo.sh.

6.1.2.15 fetch_stage3()

```
fetch_stage3 ( )
```

Downloads a fresh stage3 Gentoo archive.

Caches it as \${STAGE3}

Definition at line 659 of file mkgentoo.sh.

6.1.2.16 generate_Gentoo()

```
generate_Gentoo ( )
```

Launch routines: fetch install IO, starge3 archive, create VM.

Definition at line 1888 of file mkgentoo.sh.

6.1.2.17 get_cache_clonezilla_iso()

```
get_cache_clonezilla_iso ( )
```

Either download clonezilla ISO file and caches it OR uncaches it.

Definition at line 107 of file fetch_clonezilla_iso.sh.

6.1.2.18 get_clonezilla_iso()

```
get_clonezilla_iso ( )
```

Download clonezilla ISO file and caches it.

Definition at line 80 of file fetch_clonezilla_iso.sh.

6.1.2.19 get_gentoo_install_iso()

```
get_gentoo_install_iso ( )
```

Download minimal Gentoo install ISO file and caches.q.

Optionaly checks MD5SUMS.

Definition at line 8 of file fetch_clonezilla_iso.sh.

6.1.2.20 help_()

```
help_ ( )
```

Print usage to stdout.

Definition at line 170 of file mkgentoo.sh.

6.1.2.21 help_md()

```
help_md ( )
```

Print usage in markdown format.

Definition at line 130 of file mkgentoo.sh.

6.1.2.22 main()

```
main ( )
```

Main function launching routines.

Todo Daemonize the part below generate_Gentoo when #VMTYPE is `headless` so that the script can be detached completely with `nohup gentoolize ... &`

Definition at line 1908 of file mkgentoo.sh.

6.1.2.23 make_boot_from_lived()

```
make_boot_from_lived ( )
```

Tweak the Gentoo minimal install CD so that the custom- made shell scripts and stage3 archive are included into the squashfs filesystem.

This function is returned from early if
`create_squashfs=false`

is given on commandline.

Note

Will be run in the \${VM} virtual machine

Return values

<i>Returns</i>	0 on success or -1 on failure.
----------------	--------------------------------

Definition at line 804 of file mkgentoo.sh.

6.1.2.24 mount_live_cd()

```
mount_live_cd ( )
```

Mount Gentoo/Clonezilla live CD and unsquashfs the GNU/Linux system.

Note

live CD is mounted under \$VMPATH/mnt and rsync'd to \$VMPATH/mnt2

Definition at line 721 of file mkgentoo.sh.

6.1.2.25 process_clonezilla_iso()

```
process_clonezilla_iso ( )
```

Download clonezilla ISO or recover it from cache calling [fetch_clonezilla_iso](#).

Upgrade it with virtualbox guest additions.

Chroot into the clonezilla Ubuntu GNU/Linux distribution and runs apt to build kernel modules and install the VirtualBox guest additions ISO image.

Upgrade clonezilla kernel consequently Recreates the quashfs system after exiting chroot. Copy the new **isolinux.cfg** parameter file: automates and silences clonezilla behaviour on disk recovery. Calls [clonezilla_to_iso](#)

Note

Installing the guest additions is a prerequisite to folder sharing between the ISO VM and the host. Folder sharing is necessary to recover a compressed clonezilla image of the VDI virtual disk into the directory `ISOFILES/home/partimag/image`

Definition at line 1293 of file mkgentoo.sh.

6.1.2.26 test_cli()

```
test_cli (
    cli )
```

Analyse commandline.

Parameters

<i>cli</i>	Commandline
------------	-------------

- Create globals of the form VAR=arg when there is var=arg on commandline
- Otherwise assign default values VAR=defaults (3rd argument in array [ARR](#))
- Also checks type of argument against types described for [ARR](#)

Definition at line 391 of file mkgentoo.sh.

6.1.2.27 test_cli_post()

```
test_cli_post ( )
```

Check commandline coherence and incompatibilities.

Return values

0	or exit 1 on incompatibilities
---	--------------------------------

Definition at line 529 of file mkgentoo.sh.

6.1.2.28 test_cli_pre()

```
test_cli_pre ( )
```

Check VirtualBox version and prepare commandline analysis.

Return values

0	otherwise exit 1 if VirtualBox is too old
---	---

Definition at line 275 of file mkgentoo.sh.

6.1.2.29 test_vm_running()

```
test_vm_running (
    vm )
```

Check if VM as first named argument exists and is running.

Parameters

vm	VM name or UUID
----	-----------------

Return values

Returns	0 on success and 1 if VM is not listed or not running
---------	---

Definition at line 926 of file mkgentoo.sh.

6.1.2.30 vbox_img_works()

```
vbox_img_works ( )
```

Test if **vbox-img** is functional.

vbox-img is a script; it refers to **vbox-img.bin**, which is a soft link to the VirtuaBox patched build.

Return values

0	if vbox-img --version is non-empty
1	otherwise

Definition at line 1790 of file mkgentoo.sh.

6.1.3 Variable Documentation

6.1.3.1 ARR

```
ARR
```

global string array of switches and default values

Structure is as follows:

```
{{"Commandline option", "Description", "Default value", "Type"}, {...},...}
```

'Type' is among the following values:

- **b** Boolean, 'false' or 'true'
- **d** An existing directory
- **e** Email address: regexp "[a-z]+@[a-z]+\.[a-z]+"
- **f** An existing file
- **n** Numeric value
- **o** 'on' or 'off', a VBoxManage custom Boolean
- **s** Non-empty string. Corresponding defaults may be empty however. This is the notably case for passwords. For such options, explicit commandline value after '=' is requested.
- **u** Url
- **x:y** Conditional type x: one of the above, with [-z "\$x"] <=> { ["\$y" = "false"] || [-z "\$y"]; } && ["\$y" != "true"]
- **vm** Restricted to the `vm` option: can be set to `@ code false` to bypass OS building and only perform burning/external device operations. A double-entry array will be simulated using indexes.

Note

`debug_mode` should be place up front in the array

Definition at line 117 of file mkgentoo.sh.

6.1.3.2 ARRAY_LENGTH

```
ARRAY_LENGTH = $(( ${#ARR[*]} / 4 ))
```

Number of switches (true length of array divided by 4)

Definition at line 124 of file mkgentoo.sh.

6.1.3.3 ISO

```
ISO = "downloaded.iso"
```

Name of downloaded clonezilla ISO file.

Definition at line 268 of file mkgentoo.sh.

6.2 Create Gentoo linux filesystem on VM disk

and emerge software.

Functions

- [setup_network](#) ()
Call net-setup and dhcpcd to enable networking.
- [partition](#) ()
*Create partition table, **/dev/sda1** (bios_grub), **/dev/sda2** (boot), **dev/sda3** (swap) and **/dev/sda4** (system)*
- [install_stage3](#) ()
- [finalize](#) ()
Unmount chrooted system, restore user rights and shutdown VM.
- [adjust_environment](#) ()
- [build_kernel](#) ()
- [install_software](#) ()
- [global_config](#) ()

6.2.1 Detailed Description

and emerge software.

6.2.2 Function Documentation

6.2.2.1 `adjust_environment()`

```
adjust_environment ( )
```

- Set **/etc/fstab**, sync portage tree, select desktop profile
- Set a set of per-package use files and keywords
- Oneshot emerge of **cmake** and **lz4**, prerequisites to `world` update.
- Update `world` . Log into emerge.build. Exit on error.
- Set keymaps, localization and time

Todo Add more regional options by parametrization of commandline

Return values

-1	on error at emerge stage.
----	---------------------------

Definition at line 40 of file mkvm_chroot.sh.

6.2.2.2 build_kernel()

```
build_kernel ( )
```

- Emerge **gentoo-sources**, **genkernel**, **pciutils** and **linux-firmware**
- Mount /dev/sda2 to /boot/
- Build kernel and initramfs. Log into kernel.log.

Return values

-1	on error.
----	-----------

Definition at line 172 of file mkvm_chroot.sh.

6.2.2.3 finalize()

```
finalize ( )
```

Unmount chrooted system, restore user rights and shutdown VM.

- Cleanup .bashrc
- Cleanup other files except for logs if debug mode is on.
- Write zeros as much as possible to prepare for compacting.

Definition at line 307 of file mkvm.sh.

6.2.2.4 global_config()

```
global_config ( )
```

- Cleanup log, distfiles (for deployment), kernel build sources and objects
- Log this into **log_uninstall_software**
- Update **eix** cache. Sets displaymanager for **xdm**.
- Add services: **sysklogd**, **cronie**, **xdm**, **dbus**, **elogind**
- Substitute **NetworkManager** to temporary networking setup.
- Adjust group and **sudo** settings for non-root user and **sddm**
- Install **grub** in EFI mode.
- Set passwords for root and non-root user.

Warning

Fix **sddm** startup keyboard issue using `setxkbmap`

Definition at line 328 of file `mkvm_chroot.sh`.

6.2.2.5 install_software()

```
install_software ( )
```

- Emerge list of ebuilds on top of stage3 and system utils already merged.
- Optionaly download and build RStudio

Return values

-1	on building errors
----	--------------------

Todo Add a script to build R dependencies

Definition at line 227 of file `mkvm_chroot.sh`.

6.2.2.6 install_stage3()

```
install_stage3 ( )
```

- Copy stage3 archive, ebuild list, kernel config and [mkvm_chroot.sh](#) to `/mnt/gentoo`
- Extract it, fix basic `make.conf` options
- Install `repos.conf` from liveCD (networking parameters)
- Mount liveCD `proc/sys/dev` files into new filesystem
- On failure, print error codes into file **partition**
- On success, create empty file **partition**
- `chroot` into new system

Definition at line 181 of file `mkvm.sh`.

6.2.2.7 partition()

```
partition ( )
```

Create partition table, **/dev/sda1** (bios_grub), **/dev/sda2** (boot), **dev/sda3** (swap) and **/dev/sda4** (system)

Create file **partition**.

On error, fill this file with successive exit codes of commands and exit.

On success, just create empty file.

Warning

The VM needs time to recognize /dev/sda in some cases, for unclear reasons. This may be a kernel issue or a VirtualBox issue.

Bug Same issue with mkswap and swapon. Cleaning VBox config/settings, syncing and a bit of sleep fixed these issues for the *net-setup* method.

However if vm type is *'headless'* the *dhcpcd* method is consistently hampered by a VBox bug, which is tentatively circumvented by sending a `controlvm keyboardputscancode 1c` instruction. Tests show that this is linked to a requested user keyboard or mouse input by the Gentoo minimal install CD. This cannot be simulated owing to the lack of /dev/uinput. The reason why user input is requested has not been found. Without it, /dev/sda2 and/or sda4 are mistakenly identified as being mounted and/or busy, while this cannot be the case. With even a single keystroke for a `readcommand`, all falls back into place. This is why using the *net-setup* script, which forces user input, circumvents the issue. This may be caused by an aging kernel and/or incompatibilities with virtualization. Using a CloneZilla CD as a replacement solved the issue completely. It might be better to use a beefed-up Gentoo install CD.

Note

It might be necessary with older machines to increase the amount of sleep.

Definition at line 96 of file mkvm.sh.

6.2.2.8 setup_network()

```
setup_network ( )
```

Call net-setup and dhcpcd to enable networking.

Create file **setup_network** on success for debugging purposes

Return values

Otherwise	exit 1 on failure
-----------	-------------------

Definition at line 29 of file mkvm.sh.

6.3 Auxiliary functions to check

lines, files, devices and burn disk.

Functions

- [validate_option](#) (option)
Check if argument is part of array [ARR](#) as a legitimate commandline option.
- [create_options_array](#) ()
*Read file **options** into a temporary array A which will contain command line specifications.*
- [check_md5sum](#) (filename)
Check md5sums in file MD5SUMS.
- [test_numeric](#) (number)
Test whether the input value is numeric.
- [test_URL](#) (Internet)
Test whether the input value is a valid URL.
- [test_email](#) (Email)
Test whether the input value is a valid email address.
- [send_mail](#) ()
Send an email to \$EMAIL at \$SMTP_URL to warn about end of processing.
- [list_block_devices](#) ()
List all non-loop block devices.
- [is_block_device](#) (label)
Test if argument is non-loop block device.
- [get_mountpoint](#) ()
Gives mount folder from device label input.
- [get_device](#) ()
Give device from mount folder input.
- [test_cdrecord](#) ()
*Test whether **cdrecord** is functional.*
- [recreate_liveCD_ISO](#) (dir)
Create ISO of liveCD out of directory.
- [burn_iso](#) ()
*Burn Gentoo clonezilla installer to DVD using **cdrecord**.*
- [create_install_ext_device](#) ()
Create USB-stick (or any external device) Gentoo clonezilla installer.
- [check_dir](#) ()
Checks existence of directories.
- [check_file](#) ()
Checks existence of file.
- [check_files](#) ()
Checks existence of files.
- [check_tool](#) ()
Checks existence of auxiliary tools.
- [if_fails](#) ()
Echoes a message and exit in case of previous command failure.

6.3.1 Detailed Description

lines, files, devices and burn disk.

6.3.2 Function Documentation

6.3.2.1 burn_iso()

```
burn_iso ( )
```

Burn Gentoo clonezilla installer to DVD using **cdrecord**.

Note

cdrecord should have been installed beforehand

Return values

<i>Return</i>	cdrecord return code
---------------	-----------------------------

Definition at line 236 of file utils.sh.

6.3.2.2 check_dir()

```
check_dir ( )
```

Checks existence of directories.

Parameters

<i>dirs</i>	Successive paths (relative or absolute) to directories.
-------------	---

Warning

Paths should be separated by spaces and quoted.

Return values

<i>Undefined</i>	or exit 2 if string is not a directory path
------------------	---

Definition at line 296 of file utils.sh.

6.3.2.3 check_file()

```
check_file ( )
```

Checks existence of file.

Parameters

<i>filepath</i>	Relative or absolute path to file to be checked for existence.
<i>msgs</i>	Successive message strings to be echoed if file not found.

Warning

Paths should be separated by spaces and quoted.

Return values

<i>Undefined</i>	or exit 3 if string is not a file path
------------------	--

Definition at line 317 of file utils.sh.

6.3.2.4 check_files()

```
check_files ( )
```

Checks existence of files.

Parameters

<i>files</i>	Successive paths (relative or absolute) to files.
--------------	---

Warning

Paths should be separated by spaces and quoted.

Return values

<i>Undefined</i>	or exit 3 if any string is not a file path
------------------	--

Definition at line 337 of file utils.sh.

6.3.2.5 check_md5sum()

```
check_md5sum (
    filename )
```

Check md5sums in file MD5SUMS.

Parameters

<i>filename</i>	Local name of file to be checked for md5sum.
-----------------	--

Return values

<i>Return</i>	0 on success otherwise -1 on exit
---------------	-----------------------------------

Definition at line 51 of file utils.sh.

6.3.2.6 check_tool()

```
check_tool ( )
```

Checks existence of auxiliary tools.

Parameters

<i>dirs</i>	Successive paths (relative or absolute) to helper binaries.
-------------	---

Warning

Paths should be separated by spaces and quoted.

Return values

<i>Undefined</i>	or exit 1 if binary not found.
------------------	--------------------------------

Definition at line 357 of file utils.sh.

6.3.2.7 create_install_ext_device()

```
create_install_ext_device ( )
```

Create USB-stick (or any external device) Gentoo clonezilla installer.

Warning

Use with care, check your EXT_DEVICE variable.

Return values

<i>Return</i>	value of <code>syncexit</code> code
---------------	-------------------------------------

Definition at line 278 of file utils.sh.

6.3.2.8 create_options_array()

```
create_options_array ( )
```

Read file **options** into a temporary array A which will contain command line specifications.

Later on A initializes the read-only array [ARR](#)

Definition at line 37 of file utils.sh.

6.3.2.9 get_device()

```
get_device ( )
```

Give device from mount folder input.

Definition at line 153 of file utils.sh.

6.3.2.10 get_mountpoint()

```
get_mountpoint ( )
```

Gives mount folder from device label input.

Definition at line 137 of file utils.sh.

6.3.2.11 if_fails()

```
if_fails ( )
```

Echoes a message and exit in case of previous command failure.

Parameters

<i>ret</i>	Return value of command to be tested. @param msg Message to be echoed inc case of a failure.
------------	--

Note

Command success is presumed to be identified by \$? == 0.

Return values

<i>Undefined</i>	or exit 1 if \$? != 0.
------------------	------------------------

Definition at line 378 of file utils.sh.

6.3.2.12 is_block_device()

```
is_block_device (
    label )
```

Test if argument is non-loop block device.

Parameters

<i>label</i>	Label of potential block device (e.g. sdc) to be tested.
--------------	--

Return values

<i>Return</i>	0 (true) if input is a block device otherwise 1.
---------------	--

Definition at line 127 of file utils.sh.

6.3.2.13 list_block_devices()

```
list_block_devices ( )
```

List all non-loop block devices.

Definition at line 116 of file utils.sh.

6.3.2.14 recreate_liveCD_ISO()

```
recreate_liveCD_ISO (
    dir )
```

Create ISO of liveCD out of directory.

Parameters

<i>dir</i>	Directory containing all files
------------	--------------------------------

Returns

0 on success or exits -1 on failure.

Note

An alternative xorriso solution could be considered

Definition at line 196 of file utils.sh.

6.3.2.15 send_mail()

```
send_mail ( )
```

Send an email to \$EMAIL at \$SMTP_URL to warn about end of processing.

Warning

Email password is entered in clear under \$EMAIL_PASSWD which is not safe if mkgentoo is run on any other platform than the user's own. Use with care in a private context.

Returns

Return value of 'curl' command.

Definition at line 101 of file utils.sh.

6.3.2.16 test_cdrecord()

```
test_cdrecord ( )
```

Test whether **cdrecord** is functional.

Try to scan the SCSI bus and exit on error

Warning

There may be a rights issue with versions of **cdrecord** built from original source as they sometimes request elevated rights to perform burning with some hardware configurations.

In such an event, either run script with elevated rights or modify **cdrecord** rights using:

```
chown root cdrecord && chgrp bin cdrecord && chmod 04755 cdrecord
```


Return values

0	on success otherwise -1 on failure.
---	-------------------------------------

Definition at line 178 of file utils.sh.

6.3.2.17 test_email()

```
test_email (  
    Email )
```

Test whether the input value is a valid email address.

Parameters

<i>Email</i>	address
--------------	---------

Returns

grep value against input string

Definition at line 89 of file utils.sh.

6.3.2.18 test_numeric()

```
test_numeric (  
    number )
```

Test whether the input value is numeric.

Parameters

<i>number</i>	in string form
---------------	----------------

Returns

grep value against input string

Definition at line 67 of file utils.sh.

6.3.2.19 test_URL()

```
test_URL (
    Internet )
```

Test whether the input value is a valid URL.

Parameters

<i>Internet</i>	URL
-----------------	-----

Returns

grep value against input string

Definition at line 77 of file utils.sh.

6.3.2.20 validate_option()

```
validate_option (
    option )
```

Check if argument is part of array [ARR](#) as a legitimate commandline option.

Parameters

<i>option</i>	String of option.
---------------	-------------------

Returns

true if legitimate option otherwise false.

Definition at line 181 of file mkgentoo.sh.

Chapter 7

File Documentation

7.1 build_virtualbox.sh File Reference

Variables

- Exported String `DOWNLOAD_CLONEZILLA = "true"`

7.1.1 Variable Documentation

7.1.1.1 DOWNLOAD_CLONEZILLA

Exported String `DOWNLOAD_CLONEZILLA = "true"`

Definition at line 10 of file `build_virtualbox.sh`.

7.2 fetch_clonezilla_iso.sh File Reference

Functions

- `get_gentoo_install_iso ()`
Download minimal Gentoo install ISO file and caches it.
- `get_clonezilla_iso ()`
Download clonezilla ISO file and caches it.
- `get_cache_clonezilla_iso ()`
Either download clonezilla ISO file and caches it OR uncaches it.
- `fetch_clonezilla_iso ()`
Download clonezilla ISO file and process it.

Variables

- Exported String `LIVECD` = `${ISO}`
- Exported String `CLONEZILLACD` = `"${clonezilla_iso}"`

7.2.1 Variable Documentation

7.2.1.1 CLONEZILLACD

```
Exported String CLONEZILLACD = "${clonezilla_iso}"
```

Definition at line 94 of file `fetch_clonezilla_iso.sh`.

7.2.1.2 LIVECD

```
Exported String LIVECD = ${ISO}
```

Definition at line 64 of file `fetch_clonezilla_iso.sh`.

7.3 mkgentoo.sh File Reference

Functions

- `help_md` ()
Print usage in markdown format.
- `help_` ()
Print usage to stdout.
- `validate_option` (option)
Check if argument is part of array `ARR` as a legitimate commandline option.
- `test_cli_pre` ()
Check VirtualBox version and prepare commandline analysis.
- `test_cli` (cli)
Analyse commandline.
- `test_cli_post` ()
Check commandline coherence and incompatibilities.
- `fetch_livecd` ()
Downloads Gentoo install CD.
- `fetch_stage3` ()
Downloads a fresh stage3 Gentoo archive.
- `mount_live_cd` ()
Mount Gentoo/Clonezilla live CD and unsquashfs the GNU/Linux system.
- `make_boot_from_livecd` ()

Tweak the Gentoo minimal install CD so that the custom- made shell scripts and stage3 archive are included into the squashfs filesystem.

- [test_vm_running](#) (vm)
Check if VM as first named argument exists and is running.
- [deep_clean](#) ()
Force-clean root VirtualBox registry.
- [delete_vm](#) (vm, ext)
Powers off, possibly with emergency stop, the VM names as first argument.
- [create_vm](#) ()
Create main VirtualBox machine using VBoxManage commandline.
- [clonezilla_to_iso](#) (iso, dir)
Create Gentoo linux clonezilla ISO installer out of a clonezilla directory structure and an clonezilla image.
- [process_clonezilla_iso](#) ()
*Download clonezilla ISO or recover it from cache calling [fetch_clonezilla_iso](#).
Upgrade it with virtualbox guest additions.*
- [build_virtualbox](#) ()
Build VirtualBox from source using an unsquashed clonezilla CD as a chrooted environment.
- [create_iso_vm](#) ()
*Create the new VirtualBox machine aimed at converting the VDI virtualdisk containing the Gentoo Linux distribution into an XZ-compressed clonezilla image uneder **ISOFILES/home/partimag/image**.*
- [clone_vm_to_device](#) ()
Directly clone Gentoo VM to USB stick (or any using block device)
- [clone_vm_to_raw](#) ()
Use.
- [dd_to_usb](#) ()
Bare-metal copy of temporary RAW disk to external device.
- [clonezilla_device_to_image](#) ()
Create CloneZilla xz-compressed image out of an external block device (like a USB stick)
- [vbox_img_works](#) ()
*Test if **vbox-img** is functional.*
- [create_device_system](#) ()
Clone VDI virtual disk to external device (USB device or hard drive)
- [cleanup](#) ()
Clean up all temporary files and directpries (except for VirtualBox build)
- [generate_Gentoo](#) ()
Launch routines: fetch install IO, starge3 archive, create VM.
- [main](#) ()
Main function launching routines.

Variables

- ReadOnly String Array [ARR](#)
global string array of switches and default values
- ReadOnly Integer [ARRAY_LENGTH](#) = $\$((\${#ARR[*]}/4))$
Number of switches (true length of array divided by 4)
- Exported String [CREATE_ISO](#) = false
- Exported String [LOG](#)
- Exported String [ISO](#) = "downloaded.iso"
Name of downloaded clonezilla ISO file.
- Exported String [ISOLINUX_DIR](#) = isolinux
- Exported String [PATH](#) = "\${PATH}":"\${VBPATH}"
- Exported String [DEBIAN_FRONTEND](#) = noninteractive
- Exported String [LD_LIBRARY_PATH](#)

7.3.1 Variable Documentation

7.3.1.1 CREATE_ISO

Exported String CREATE_ISO = false

Definition at line 202 of file mkgentoo.sh.

7.3.1.2 DEBIAN_FRONTEND

Exported String DEBIAN_FRONTEND = noninteractive

Definition at line 1420 of file mkgentoo.sh.

7.3.1.3 ISOLINUX_DIR

Exported String ISOLINUX_DIR = isolinux

Definition at line 761 of file mkgentoo.sh.

7.3.1.4 LD_LIBRARY_PATH

Exported String LD_LIBRARY_PATH

Initial value:

= "virtualbox/VirtualBox/out/linux.amd64/release/bin/\";

Exported String LD_LIBRARY_PATH = "virtualbox/VirtualBox/out/linux.amd64/release/bin/\";

Definition at line 1482 of file mkgentoo.sh.

7.3.1.5 LOG

Exported String LOG

Definition at line 212 of file mkgentoo.sh.

7.3.1.6 PATH

Exported String PATH = "\${PATH}":"\${VBSPATH}"

Definition at line 1092 of file mkgentoo.sh.

7.4 mkvm.sh File Reference

Functions

- [setup_network](#) ()
Call net-setup and dhcpcd to enable networking.
- [partition](#) ()
*Create partition table, **/dev/sda1** (bios_grub), **/dev/sda2** (boot), **dev/sda3** (swap) and **/dev/sda4** (system)*
- [install_stage3](#) ()
- [finalize](#) ()
Unmount chrooted system, restore user rights and shutdown VM.

7.5 mkvm_chroot.sh File Reference

Creating Gentoo filesystem in virtual disk.

Functions

- [adjust_environment](#) ()
- [build_kernel](#) ()
- [install_software](#) ()
- [global_config](#) ()
- [finalize](#) ()

Variables

- Integer [res](#) = 0

7.5.1 Detailed Description

Creating Gentoo filesystem in virtual disk.

Author

Fabrice Nicol

Copyright

GPL v.3

Note

This file is included into the clonezilla ISO liveCD, then copied to the root of the virtual disk.

7.5.2 Function Documentation

7.5.2.1 finalize()

```
finalize ( )
```

Definition at line 404 of file mkvm_chroot.sh.

7.5.3 Variable Documentation

7.5.3.1 res

```
Integer res = 0
```

Definition at line 418 of file mkvm_chroot.sh.

7.6 test.sh File Reference

7.7 utils.sh File Reference

Auxiliary functions.

Functions

- [create_options_array](#) ()
*Read file **options** into a temporary array A which will contain command line specifications.*
- [check_md5sum](#) (filename)
Check md5sums in file MD5SUMS.
- [test_numeric](#) (number)
Test whether the input value is numeric.
- [test_URL](#) (Internet)
Test whether the input value is a valid URL.
- [test_email](#) (Email)
Test whether the input value is a valid email address.
- [send_mail](#) ()
Send an email to \$EMAIL at \$SMTP_URL to warn about end of processing.
- [list_block_devices](#) ()
List all non-loop block devices.
- [is_block_device](#) (label)
Test if argument is non-loop block device.
- [get_mountpoint](#) ()

- Gives mount folder from device label input.*
 - [get_device](#) ()
- Give device from mount folder input.*
 - [test_cdrecord](#) ()
- Test whether **cdrecord** is functional.*
 - [recreate_liveCD_ISO](#) (dir)
- Create ISO of liveCD out of directory.*
 - [burn_iso](#) ()
- Burn Gentoo clonezilla installer to DVD using **cdrecord**.*
 - [create_install_ext_device](#) ()
- Create USB-stick (or any external device) Gentoo clonezilla installer.*
 - [check_dir](#) ()
- Checks existence of directories.*
 - [check_file](#) ()
- Checks existence of file.*
 - [check_files](#) ()
- Checks existence of files.*
 - [check_tool](#) ()
- Checks existence of auxiliary tools.*
 - [if_fails](#) ()
- Echoes a message and exit in case of previous command failure.*

Variables

- Exported String [A](#)

7.7.1 Detailed Description

Auxiliary functions.

Author

Fabrice Nicol fabrnicol@gmail.com

Copyright

GPL v.3

Note

This file is not included into the clonezilla ISO liveCD.

7.7.2 Variable Documentation

7.7.2.1 A

Exported String A

Definition at line 42 of file utils.sh.

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