

mkg

1.0

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# Chapter 1

## Usage

In a nutshell

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

See [Wiki](#) for details.

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## **Chapter 2**

**test**



## Chapter 3

### 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 mkgentoo.. &`

**Global `adjust_environment ()`**

Add more regional options by parametrization of commandline

**Global `install_software ()`**

Add a script to build R dependencies



## Chapter 4

# 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 5

# Module Index

### 5.1 Modules

Here is a list of all modules:

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## Chapter 6

# File Index

### 6.1 File List

Here is a list of all files with brief descriptions:

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## Chapter 7

# Module Documentation

### 7.1 Create Gentoo linux image and installer.

#### Functions

- [build\\_virtualbox](#) ()  
*Build VirtualBox from source using an unsquashed clonezilla CD as a chrooted environment.*
- [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.*
- [get\\_options](#) ()  
*Parse command line.*
- [test\\_cli\\_pre](#) ()  
*Check VirtualBox version and prepare commandline analysis.*
- [test\\_cli](#) (cli)  
*Analyse commandline.*
- [test\\_cli\\_post](#) ()  
*Check commandline coherence and incompatibilities.*
- [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.*
- [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](#) (mode)  
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.
- [vbox\\_img\\_works](#) ()  
Test if **vbox-img** is functional.
- [create\\_device\\_system](#) (Mode)  
Clone VDI virtual disk to external device (USB device or hard drive)
- [generate\\_Gentoo](#) ()  
Launch routines: fetch install IO, starge3 archive, create VM.
- [clonezilla\\_to\\_iso](#) (iso, dir)  
Create Gentoo linux clonezilla ISO installer out of a clonezilla directory structure and an clonezilla image.
- [add\\_guest\\_additions\\_to\\_clonezilla\\_iso](#) ()  
Download clonezilla ISO or recover it from cache calling [fetch\\_process\\_clonezilla\\_iso](#).  
Upgrade it with virtualbox guest additions.
- [clonezilla\\_device\\_to\\_image](#) ()  
Create CloneZilla xz-compressed image out of an external block device (like a USB stick)
- [main](#) ()  
Main function launching routines.

## Variables

- Exported String [ISO](#) = "downloaded.iso"  
Name of downloaded clonezilla ISO file.
- Exported String [CREATE\\_ISO](#) = false  
Custom name of ISO output. Default value is false Can be reversed by a name of type filename.iso on command line, previously created and reused to burn or dd to device installer.
- Exported String [ARR](#)  
global string array of switches and default values

### 7.1.1 Detailed Description

### 7.1.2 Function Documentation

#### 7.1.2.1 [add\\_guest\\_additions\\_to\\_clonezilla\\_iso](#)()

[add\\_guest\\_additions\\_to\\_clonezilla\\_iso](#) ( )

Download clonezilla ISO or recover it from cache calling [fetch\\_process\\_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 ISO↔FILES/home/partimag/image

Definition at line 1592 of file mkgentoo.sh.

**7.1.2.2 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 15 of file build\_virtualbox.sh.

**7.1.2.3 clone\_vm\_to\_device()**

```
clone_vm_to_device (
    mode )
```

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

**Parameters**

<i>mode</i>	Either "vbox-img" or "guestfish"
-------------	----------------------------------

**Warning**

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

**Note**

build vbox-img beforehand.

Definition at line 1362 of file mkgentoo.sh.

#### 7.1.2.4 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 1409 of file mkgentoo.sh.

#### 7.1.2.5 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

0	on success otherwise exits -1 on failure
---	--

Definition at line 1725 of file mkgentoo.sh.

#### 7.1.2.6 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 1543 of file mkgentoo.sh.

7.1.2.7 `create_device_system()`

```
create_device_system (
    Mode )
```

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.

## Parameters

<i>Mode</i>	Mode must be <code>vbox-img</code> , <code>guestfish</code> or <code>with-raw-buffer</code>
-------------	---

## Return values

<i>In</i>	the first two cases, the exit code of <a href="#">clone_vm_to_device</a>
<i>In</i>	the last case, the exit code of <a href="#">dd_to_usb</a> following <a href="#">clone_vm_to_raw</a>

## Note

Requires **hot\_install** on command line to be activated as a security confirmation. This function performs what a live CD does to a target disk, yet using the currently running operating system.

Definition at line 1478 of file `mkgentoo.sh`.

7.1.2.8 `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 [add\\_guest\\_additions\\_to\\_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 1222 of file `mkgentoo.sh`.

### 7.1.2.9 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 1053 of file mkgentoo.sh.

### 7.1.2.10 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 1419 of file mkgentoo.sh.

### 7.1.2.11 deep\_clean()

```
deep_clean ( )
```

Force-clean root VirtualBox registry.

Definition at line 897 of file mkgentoo.sh.

### 7.1.2.12 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 953 of file mkgentoo.sh.

**7.1.2.13 generate\_Gentoo()**

```
generate_Gentoo ( )
```

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

Definition at line 1516 of file mkgentoo.sh.

**7.1.2.14 get\_options()**

```
get_options ( )
```

Parse command line.

Definition at line 218 of file mkgentoo.sh.

**7.1.2.15 help\_()**

```
help_ ( )
```

Print usage to stdout.

Definition at line 190 of file mkgentoo.sh.

#### 7.1.2.16 help\_md()

```
help_md ( )
```

Print usage in markdown format.

##### Note

white space at end of echoes is there for markdown in post-processing

Definition at line 124 of file mkgentoo.sh.

#### 7.1.2.17 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 mkgentoo.. &`

Definition at line 1818 of file mkgentoo.sh.

#### 7.1.2.18 make\_boot\_from\_livecd()

```
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.

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 759 of file mkgentoo.sh.

**7.1.2.19 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 677 of file mkgentoo.sh.

**7.1.2.20 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 404 of file mkgentoo.sh.

**7.1.2.21 test\_cli\_post()**

```
test_cli_post ( )
```

Check commandline coherence and incompatibilities.

**Return values**

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

Definition at line 543 of file mkgentoo.sh.

#### 7.1.2.22 test\_cli\_pre()

```
test_cli_pre ( )
```

Check VirtualBox version and prepare commandline analysis.

##### Return values

<i>0</i>	otherwise exit 1 if VirtualBox is too old
----------	---

Definition at line 290 of file mkgentoo.sh.

#### 7.1.2.23 test\_vm\_running()

```
test_vm_running (
    vm )
```

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

##### Parameters

<i>vm</i>	VM name or UUID
-----------	-----------------

##### Return values

<i>Returns</i>	0 on success and 1 is VM is not listed or not running
----------------	---

Definition at line 887 of file mkgentoo.sh.

#### 7.1.2.24 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 205 of file mkgentoo.sh.

### 7.1.2.25 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

#### Note

Currently vbox-img is broken for --stdout. Using guestfish as an alternative. This test is there for when vbox-img is fixed.

Definition at line 1450 of file mkgentoo.sh.

## 7.1.3 Variable Documentation

### 7.1.3.1 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 81 of file `utils.sh`.

**7.1.3.2 CREATE\_ISO**

```
Exported String CREATE_ISO = false
```

Custom name of ISO output. Default value is false Can be reversed by a name of type `filename.iso` on command line, previously created and reused to burn or `dd` to device installer.

Definition at line 113 of file `mkgentoo.sh`.

**7.1.3.3 ISO**

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

Name of downloaded clonezilla ISO file.

Definition at line 105 of file `mkgentoo.sh`.

## 7.2 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 ()`

### 7.2.1 Detailed Description

and emerge software.

### 7.2.2 Function Documentation

#### 7.2.2.1 `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.

#### 7.2.2.2 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 173 of file mkvm\_chroot.sh.

#### 7.2.2.3 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 306 of file mkvm.sh.

#### 7.2.2.4 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: **sysklog**, **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 292 of file `mkvm_chroot.sh`.

**7.2.2.5 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 234 of file `mkvm_chroot.sh`.

**7.2.2.6 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 180 of file `mkvm.sh`.

### 7.2.2.7 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 95 of file mkvm.sh.

### 7.2.2.8 setup\_network()

```
setup_network ( )
```

Call net-setup and dhcpcd to enable networking.

Create file **setup\_network** on success for debugging purposes

#### Return values

<i>Otherwise</i>	exit 1 on failure
------------------	-------------------

Definition at line 29 of file mkvm.sh.

## 7.3 Auxiliary functions to check

lines, files, devices and burn disk.

### Functions

- declare i `ARRAY_LENGTH 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.*
- `send_mail` ()  
*Send an email to \$EMAIL at \$SMTP\_URL to warn about end of processing.*
- `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.*
- `cleanup` ()  
*Clean up all temporary files and directories (except for VirtualBox build)*

### 7.3.1 Detailed Description

lines, files, devices and burn disk.

### 7.3.2 Function Documentation

#### 7.3.2.1 burn\_iso()

```
burn_iso ( )
```

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

#### Note

**cdrecord** should have been installed beforehand

#### Return values

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

Definition at line 308 of file utils.sh.

### 7.3.2.2 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 386 of file utils.sh.

### 7.3.2.3 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 407 of file utils.sh.

**7.3.2.4 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 427 of file utils.sh.

**7.3.2.5 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 93 of file utils.sh.

### 7.3.2.6 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 447 of file utils.sh.

### 7.3.2.7 cleanup()

```
cleanup ( )
```

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

Definition at line 481 of file utils.sh.

### 7.3.2.8 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 358 of file utils.sh.

### 7.3.2.9 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 71 of file utils.sh.

### 7.3.2.10 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 468 of file utils.sh.

### 7.3.2.11 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 269 of file utils.sh.

**7.3.2.12 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 using \$EMAIL\_PASSWD which is not safe if mkg 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 133 of file utils.sh.

**7.3.2.13 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 109 of file utils.sh.



#### 7.3.2.14 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 119 of file utils.sh.



## Chapter 8

# File Documentation

### 8.1 build\_virtualbox.sh File Reference

#### Functions

- `build_virtualbox ()`

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

#### Variables

- Exported String `DEBIAN_FRONTEND` = noninteractive
- Exported String `LD_LIBRARY_PATH`

#### 8.1.1 Variable Documentation

##### 8.1.1.1 DEBIAN\_FRONTEND

Exported String `DEBIAN_FRONTEND` = noninteractive

Definition at line 27 of file `build_virtualbox.sh`.

##### 8.1.1.2 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 89 of file `build_virtualbox.sh`.

## 8.2 fetch\_functions.sh File Reference

### Functions

- `fetch_gentoo_install_iso ()`  
*Download minimal Gentoo install ISO file and caches it.*
- `fetch_clonezilla_iso ()`  
*Download clonezilla ISO file and caches it.*
- `cache_uncache_clonezilla_iso ()`  
*Either download clonezilla ISO file and caches it OR uncaches it.*
- `fetch_process_clonezilla_iso ()`  
*Download clonezilla ISO file and process it.*
- `fetch_livecd ()`  
*Downloads Gentoo install CD.*
- `fetch_stage3 ()`  
*Downloads a fresh stage3 Gentoo archive.*

### Variables

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

### 8.2.1 Function Documentation

#### 8.2.1.1 cache\_uncache\_clonezilla\_iso()

```
cache_uncache_clonezilla_iso ( )
```

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

Definition at line 107 of file `fetch_functions.sh`.

#### 8.2.1.2 fetch\_clonezilla\_iso()

```
fetch_clonezilla_iso ( )
```

Download clonezilla ISO file and caches it.

Definition at line 80 of file `fetch_functions.sh`.

### 8.2.1.3 fetch\_gentoo\_install\_iso()

```
fetch_gentoo_install_iso ( )
```

Download minimal Gentoo install ISO file and caches.q.

Optionaly checks MD5SUMS.

Definition at line 8 of file fetch\_functions.sh.

### 8.2.1.4 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 199 of file fetch\_functions.sh.

### 8.2.1.5 fetch\_process\_clonezilla\_iso()

```
fetch_process_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\_functions.sh.

#### 8.2.1.6 fetch\_stage3()

```
fetch_stage3 ( )
```

Downloads a fresh stage3 Gentoo archive.

Caches it as \${STAGE3}

Definition at line 244 of file fetch\_functions.sh.

### 8.2.2 Variable Documentation

#### 8.2.2.1 CLONEZILLACD

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

Definition at line 94 of file fetch\_functions.sh.

#### 8.2.2.2 LIVECD

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

Definition at line 64 of file fetch\_functions.sh.

## 8.3 mkgentoo.sh File Reference

Process options, create Gentoo VirtualBox machine and optionally create clonezilla install medium.

## 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.*
- [get\\_options](#) ()  
*Parse command line.*
- [test\\_cli\\_pre](#) ()  
*Check VirtualBox version and prepare commandline analysis.*
- [test\\_cli](#) (cli)  
*Analyse commandline.*
- [test\\_cli\\_post](#) ()  
*Check commandline coherence and incompatibilities.*
- [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.*
- [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**.*
- [clone\\_vm\\_to\\_device](#) (mode)  
*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.*
- [vbox\\_img\\_works](#) ()  
*Test if **vbox-img** is functional.*
- [create\\_device\\_system](#) (Mode)  
*Clone VDI virtual disk to external device (USB device or hard drive)*
- [generate\\_Gentoo](#) ()  
*Launch routines: fetch install IO, stage3 archive, create VM.*
- [clonezilla\\_to\\_iso](#) (iso, dir)  
*Create Gentoo linux clonezilla ISO installer out of a clonezilla directory structure and an clonezilla image.*
- [add\\_guest\\_additions\\_to\\_clonezilla\\_iso](#) ()  
*Download clonezilla ISO or recover it from cache calling [fetch\\_process\\_clonezilla\\_iso](#).  
Upgrade it with virtualbox guest additions.*
- [clonezilla\\_device\\_to\\_image](#) ()  
*Create CloneZilla xz-compressed image out of an external block device (like a USB stick)*
- [main](#) ()  
*Main function launching routines.*

## Variables

- Exported String `ISO` = "downloaded.iso"  
*Name of downloaded clonezilla ISO file.*
- Exported String `CREATE_ISO` = false  
*Custom name of ISO output. Default value is false Can be reversed by a name of type filename.iso on command line, previously created and reused to burn or dd to device installer.*
- Exported String `LOG`
- Exported String `ISOLINUX_DIR` = isolinux
- Exported String `PATH` = "\${PATH}":"\${VBPATH}"

### 8.3.1 Detailed Description

Process options, create Gentoo VirtualBox machine and optionally create clonezilla install medium.

#### Author

Fabrice Nicol [fabrnicol@gmail.com](mailto:fabrnicol@gmail.com)

#### Copyright

GPL v.3

#### Note

This file is not included into the clonezilla ISO liveCD.

#### USAGE

```
mkg [[switch=argument]...] filename.iso [1]
mkg [[switch=argument]...] [2]
mkg help[=md] [3]
```

Usage [1] creates a bootable ISO output file with a current Gentoo distribution.

Usage [2] creates a VirtualBox VDI dynamic disk and a virtual machine with name Gentoo.

Usage [3] prints this help, in markdown form if argument 'md' is specified.

#### Run:

```
mkg help
```

to print a list of possible switches and arguments.

#### Warning

you should have at least 55 GB of free disk space in the current directory or in vmpath if specified. Boolean values are either 'true' or 'false'. An option not followed by '=' is equivalent to **option=true**, except for help and a possible ISO file. For example, to build a minimal: `distribution,specify minimal` or `minimal=true` on command line.

#### Examples:

- Only create the VM and virtual disk, in debug mode, without R and set new passwords, for a French-language platform. Use 8 cores.  
`mkg language=fr minimal debug_mode ncpus=8  
nonroot_user=ken passwd='util!Hx&32F' rootpasswd='Hk_32!_CD' cleanup=false`
- Create ISO clonezilla image of Gentoo linux, burn it to DVD, create an installed OS on a USB stick whose model label starts with *PNY* and finally create a clonezilla installer on another USB stick mounted under `/media/ken/AA45E`  
`mkgento burn hot_install ext_device="PNY" device_installer  
ext_device="Sams" my_gentoo_image.iso`



## 8.3.2 Variable Documentation

### 8.3.2.1 ISOLINUX\_DIR

Exported String ISOLINUX\_DIR = isolinux

Definition at line 717 of file mkgentoo.sh.

### 8.3.2.2 LOG

Exported String LOG

Definition at line 225 of file mkgentoo.sh.

### 8.3.2.3 PATH

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

Definition at line 1055 of file mkgentoo.sh.

## 8.4 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.*

## 8.5 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

### 8.5.1 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.

### 8.5.2 Function Documentation

#### 8.5.2.1 finalize()

```
finalize ( )
```

Definition at line 355 of file mkvm\_chroot.sh.

### 8.5.3 Variable Documentation

#### 8.5.3.1 res

```
Integer res = 0
```

Definition at line 396 of file mkvm\_chroot.sh.

## 8.6 test.md File Reference

## 8.7 test.sh File Reference

## 8.8 utils.sh File Reference

Auxiliary functions.

### Functions

- declare i `ARRAY_LENGTH 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.*
- `send_mail` ()  
*Send an email to \$EMAIL at \$SMTP\_URL to warn about end of processing.*
- `test_cdrecord` ()
- `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.*
- `cleanup` ()  
*Clean up all temporary files and directpries (except for VirtualBox build)*

### Variables

- Exported String `ARR`  
*global string array of switches and default values*
- Exported String `ARRAY_LENGTH`

### 8.8.1 Detailed Description

Auxiliary functions.

#### Author

Fabrice Nicol [fabrnicol@gmail.com](mailto:fabrnicol@gmail.com)

#### Copyright

GPL v.3

#### Note

This file is not included into the clonezilla ISO liveCD.

### 8.8.2 Function Documentation

#### 8.8.2.1 test\_cdrecord()

```
test_cdrecord ( )
```

Definition at line 251 of file utils.sh.

### 8.8.3 Variable Documentation

#### 8.8.3.1 ARRAY\_LENGTH

```
Exported String ARRAY_LENGTH
```

Definition at line 82 of file utils.sh.

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