mkg

1.0

Generated by Doxygen 1.9.1

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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

Bug List

Global create_vm (VM)

VB bug note Unfortunately

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 `read`command, 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 3

Todo List

Global adjust_environment ()

Add more regional options by parametrization of commandline

Global create_vm (VM)

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

Global install_software ()

Add a script to build R dependencies

Global main ()

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

Chapter 4

Module Index

4.1 Modules

Here is a list of all modules:

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Chapter 5

File Index

5.1 File List

Here is a list of all files with brief descriptions:

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Chapter 6

Module Documentation

6.1 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.
- manpage ()

  Print help to man page.
- htmlpage ()

  Print help to html page.
- pdfpage ()

  Print help to pdf page.
- 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 commanline 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, mode)

  Powers off, possibly with emergency stop, the VM names as first argument.
- create_vm (VM)

  Create main VirtualBox machine using VBoxManage commandline.
- log_loop ()

  Loop log tags every minute and optionally plot virtual disk size.
- 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)
- create_device_system (Mode)

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

  Fetches the clonezilla ISO. mount it to mnt, rsync it to mnt2 and ISOFILES bind-mount mnt2 live filesystem after unsquashfs.
- unmount_clonezilla_iso ()

  Unmount the clonezilla filesystem after exiting chroot. Restore the squashfs filesystem.
- clonezilla_device_to_image ()

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

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

6.1.1 Detailed Description

6.1.2 Function Documentation

6.1.2.1 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 ISOFILES/home/partimag/image

Definition at line 2095 of file mkgentoo.sh.

6.1.2.2 bind_mount_clonezilla_iso()

```
bind_mount_clonezilla_iso ( )
```

Fetches the clonezilla ISO. mount it to mnt, rsync it to mnt2 and ISOFILES bind-mount mnt2 live filesystem after unsquashfs.

Definition at line 2166 of file mkgentoo.sh.

6.1.2.3 build_virtualbox()

```
build_virtualbox ( )
```

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

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

Definition at line 30 of file build_virtualbox.sh.

6.1.2.4 clone_vm_to_device()

```
clone_vm_to_device (
            mode  )
```

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

Parameters

mode	Either "qemu" or "guestfish"

Definition at line 1963 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

0	on success otherwise exits -1 on failure

Definition at line 2237 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

iso	ISO output
dir	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 2045 of file mkgentoo.sh.

6.1.2.7 create_device_system()

```
create_device_system (
            Mode  )
```

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

Two options are available, qemu or guestfish.

Parameters

Mode	Mode must be qemu or guestfish.

Return values

0	on success, 1 on error.

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 2015 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 uneder **ISOFILES/home/partimag/image**.

Register machine, create VDI drive, create IDE drive attach disks to controlers
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 vith 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 1631 of file mkgentoo.sh.

6.1.2.9 create_vm()

```
create_vm (
              VM  )
```

Create main VirtualBox machine using VBoxManage commandline.

- Register machine, create VDI drive, create IDE drive attach disks to controlers
- 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.

Parameters

VM	Name of the virtual machine.

Note

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

Bug VB bug note Unfortunately

```
 VBoxManage modifyvm --cpu-profile host @encode
is not fail-safe.
For example, this option detects my CPU (Intel core-i7 5820K) vendor,
model name, number of cpus etc. yet the list of flags is erroneous
and does not contain flags **fma, bmi, bmi2** necessary to compile with
@code -march=haswell
```

. The guest /**proc**/**cpuinfo** lacks these flags, which are listed in the host /proc/cpuinfo, so the VB flag import capability is buggy or incomplete. Borrowing partial solution from: https://superuser.com/questions/625648/ virtualbox-how-to-force-a-specific-cpu-to-the-guest This added code does not unfortunately enables -march=haswell (+)

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

Definition at line 1360 of file mkgentoo.sh.

6.1.2.10 deep_clean()

```
deep_clean ( )
```

Force-clean root VirtualBox registry.

Definition at line 1190 of file mkgentoo.sh.

6.1.2.11 delete_vm()

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

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

Parameters

vm	VM name
ext	virtual disk extension, without dot (defaults to "vdi").
mode	"" for standard VM or "ISO_STAGE" for ISO-creating VM.

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

Return values

Returns	0 if Directory and hard drive could be erased, otherwise the OR value of both erasing commands

Definition at line 1247 of file mkgentoo.sh.

6.1.2.12 generate_Gentoo()

```
generate_Gentoo ( )
```

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

Definition at line 2373 of file mkgentoo.sh.

6.1.2.13 get_options()

```
get_options ( )
```

Parse command line.

Definition at line 281 of file mkgentoo.sh.

6.1.2.14 help_()

```
help_ ( )
```

Print usage to stdout.

Definition at line 226 of file mkgentoo.sh.

6.1.2.15 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.

6.1.2.16 htmlpage()

```
htmlpage ( )
```

Print help to html page.

Definition at line 243 of file mkgentoo.sh.

6.1.2.17 log_loop()

```
log_loop ( )
```

Loop log tags every minute and optionally plot virtual disk size.

Customizable suing options: plot_color, plot_period, plot_position, plot_pause, plot_span

Definition at line 1555 of file mkgentoo.sh.

6.1.2.18 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 2423 of file mkgentoo.sh.

6.1.2.19 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

Returns	0 on success or -1 on failure.

Definition at line 1073 of file mkgentoo.sh.

6.1.2.20 manpage()

```
manpage ( )
```

Print help to man page.

Definition at line 234 of file mkgentoo.sh.

6.1.2.21 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 758 of file mkgentoo.sh.

6.1.2.22 pdfpage()

```
pdfpage ( )
```

Print help to pdf page.

Definition at line 252 of file mkgentoo.sh.

6.1.2.23 prepare_for_iso_vm()

```
prepare_for_iso_vm ( )
```

Short version of add_guest_additions_to_clonezilla_iso when the ISO has already been pre-authored.

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 2332 of file mkgentoo.sh.

6.1.2.24 test_cli()

```
test_cli (
            cli  )
```

Analyse commandline.

Parameters

cli	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 436 of file mkgentoo.sh.

6.1.2.25 test_cli_post()

```
test_cli_post ( )
```

Check commanline coherence and incompatibilities.

Return values

0	or exit 1 on incompatibilities

Definition at line 590 of file mkgentoo.sh.

6.1.2.26 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 353 of file mkgentoo.sh.

6.1.2.27 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 is VM is not listed or not running

Definition at line 1180 of file mkgentoo.sh.

6.1.2.28 unmount_clonezilla_iso()

```
unmount_clonezilla_iso ( )
```

Unmount the clonezilla filesystem after exiting chroot. Restore the squashfs filesystem.

Definition at line 2215 of file mkgentoo.sh.

6.1.2.29 validate_option()

```
validate_option (
            option  )
```

Check if argument is part of array ARR as a legitimate commandline option.

Parameters

option	String of option.

Returns

true if legitimate option otherwise false.

Definition at line 268 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 81 of file utils.sh.

6.1.3.2 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.

6.1.3.3 ISO

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

Name of downloaded clonezilla ISO file.

Definition at line 105 of file mkgentoo.sh.

6.2 Create Gentoo linux filesystem on VM disk

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 ()

  -— PATCH -—
- 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 ( )
```

-— PATCH -—

-— End of patch -—

- 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 204 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 311 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 display for **display-manager**.
- Add services: **sysklog, cronie, display-manager, 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 350 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 265 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 180 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 `read`command, 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.

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

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 directpries (except for VirtualBox build)
- bind_filesystem (root)

  Bind-mounts the host live filesystem (proc/sys/dev/run) to a future chrooted OS-like tree of similar nature.

6.3.1 Detailed Description

lines, files, devices and burn disk.

6.3.2 Function Documentation

6.3.2.1 bind_filesystem()

```
bind_filesystem (
            root  )
```

Bind-mounts the host live filesystem (proc/sys/dev/run) to a future chrooted OS-like tree of similar nature.

Parameters

root	Root directory of the subordinate filesystem.

Definition at line 520 of file utils.sh.

6.3.2.2 burn_iso()

```
burn_iso ( )
```

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

Note

cdrecord should have been installed beforehand

Return values

Return	**cdrecord** return code

Definition at line 310 of file utils.sh.

6.3.2.3 check_dir()

```
check_dir ( )
```

Checks existence of directories.

Parameters

dirs	Successive paths (relative or absolute) to directories.

Warning

Paths should be separated by spaces and quoted.

Return values

Undefined	or exit 2 if string is not a directory path

Definition at line 388 of file utils.sh.

6.3.2.4 check_file()

```
check_file ( )
```

Checks existence of file.

Parameters

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

Warning

Paths should be separated by spaces and quoted.

Return values

Undefined	or exit 3 if string is not a file path

Definition at line 409 of file utils.sh.

6.3.2.5 check_files()

```
check_files ( )
```

Checks existence of files.

Parameters

files	Successive paths (relative or absolute) to files.

Warning

Paths should be separated by spaces and quoted.

Return values

Undefined	or exit 3 if any string is not a file path

Definition at line 429 of file utils.sh.

6.3.2.6 check_md5sum()

```
check_md5sum (
              filename  )
```

Check md5sums in file MD5SUMS.

Parameters

filename	Local name of file to be checked for md5sum.

Return values

Return	0 on success otherwise -1 on exit

Definition at line 93 of file utils.sh.

6.3.2.7 check_tool()

```
check_tool ( )
```

Checks existence of auxiliary tools.

Parameters

dirs	Successive paths (relative or absolute) to helper binaries.

Warning

Paths should be separated by spaces and quoted.

Return values

Undefined	or exit 1 if binary not found.

Definition at line 449 of file utils.sh.

6.3.2.8 cleanup()

```
cleanup ( )
```

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

Needs
`CLEANUP=true`

. If
`FULL_CLEANUP=true`

then erase ISO files with names containing **clonezilla**, **install** or **downloaded** names.

Definition at line 491 of file utils.sh.

6.3.2.9 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

Return	value of `sync`exit code

Definition at line 360 of file utils.sh.

6.3.2.10 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.

6.3.2.11 if_fails()

```
if_fails ( )
```

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

Parameters

ret	Return value of command to be tested.
msg	... Message(s) to be echoed inc case of a failure.

Note

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

Return values

Undefined	or exit 1 if $? != 0.

Definition at line 470 of file utils.sh.

6.3.2.12 recreate_liveCD_ISO()

```
recreate_liveCD_ISO (
             dir  )
```

Create ISO of liveCD out of directory.

Parameters

dir	Directory containing all files

Returns

0 on success or exits -1 on failure.

Note

An alternative xorriso solution could be considered

Definition at line 271 of file utils.sh.

6.3.2.13 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.

6.3.2.14 test_numeric()

```
test_numeric (
             number  )
```

Test whether the input value is numeric.

Parameters

number	in string form

Returns

grep value against input string

Definition at line 109 of file utils.sh.

6.3.2.15 test_URL()

```
test_URL (
             Internet  )
```

Test whether the input value is a valid URL.

Parameters

Internet	URL

Returns

grep value against input string

Definition at line 119 of file utils.sh.

Chapter 7

File Documentation

7.1 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

7.1.1 Variable Documentation

7.1.1.1 DEBIAN_FRONTEND

```
Exported String DEBIAN_FRONTEND = noninteractive
```

Definition at line 42 of file build_virtualbox.sh.

7.2 fetch_functions.sh File Reference

Functions

- fetch_gentoo_install_iso ()

  Download minimal Gentoo install ISO file and caches.q.
- 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_preprocessed_gentoo_install ()

  Download automatic output of preprocessed_gentoo_install.iso from Github Actions at fabnicol/mkg.git.
- fetch_clonezilla_with_virtualbox ()

  Download automatic output of Github Actions at fabnicol/clonezila_with_virtualbox.Github.
- fetch_livecd ()

  Downloads Gentoo install CD.
- fetch_stage3 ()

  Downloads a fresh stage3 Gentoo archive.

Variables

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

7.2.1 Function Documentation

7.2.1.1 cache_uncache_clonezilla_iso()

```
cache_uncache_clonezilla_iso ( )
```

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

Definition at line 128 of file fetch_functions.sh.

7.2.1.2 fetch_clonezilla_iso()

```
fetch_clonezilla_iso ( )
```

Download clonezilla ISO file and caches it.

Definition at line 101 of file fetch_functions.sh.

7.2.1.3 fetch_clonezilla_with_virtualbox()

```
fetch_clonezilla_with_virtualbox ( )
```

Download automatic output of Github Actions at fabnicol/clonezila_with_virtualbox.Github.

Note

URL is: GITHUB_RELEASE_PATH/WORKFLOW_TAG

Definition at line 261 of file fetch_functions.sh.

7.2.1.4 fetch_gentoo_install_iso()

```
fetch_gentoo_install_iso ( )
```

Download minimal Gentoo install ISO file and caches.q.

Optionaly checks MD5SUMS.

Definition at line 29 of file fetch_functions.sh.

7.2.1.5 fetch_livecd()

```
fetch_livecd ( )
```

Downloads Gentoo install CD.

Caches it as ${ISO}

Return values

Returns	0 on success or -1 on exit

Definition at line 301 of file fetch_functions.sh.

7.2.1.6 fetch_preprocessed_gentoo_install()

```
fetch_preprocessed_gentoo_install ( )
```

Download automatic output of preprocessed_gentoo_install.iso from Github Actions at fabnicol/mkg.git.

Note

URL is: GITHUB_RELEASE_PATH2/WORKFLOW_TAG2

Definition at line 220 of file fetch_functions.sh.

7.2.1.7 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 169 of file fetch_functions.sh.

7.2.1.8 fetch_stage3()

```
fetch_stage3 ( )
```

Downloads a fresh stage3 Gentoo archive.

Caches it as ${STAGE3}

Definition at line 349 of file fetch_functions.sh.

7.2.2 Variable Documentation

7.2.2.1 CLONEZILLACD

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

Definition at line 115 of file fetch_functions.sh.

7.2.2.2 LIVECD

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

Definition at line 85 of file fetch_functions.sh.

7.3 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.
- manpage ()
  Print help to man page.
- htmlpage ()
  Print help to html page.
- pdfpage ()
  Print help to pdf page.
- 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 commanline coherence and incompatibilities.
- mount_live_cd ()
  Mount Gentoo/Clonezilla live CD and unsquashfs the GNU/linux system.
- move_auxiliary_files ()
- 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.
- prepare_bash_rc ()
- 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, mode)

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

- create_vm (VM)

  Create main VirtualBox machine using VBoxManage commandline.

- log_loop ()

  Loop log tags every minute and optionally plot virtual disk size.

- 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**.*

- mount_vdi ("w")

  Use qemu to mount VDI file to host folder.

- unmount_vdi (mountpoint)

  Unmount connection to virtual disk (using qemu) to host folder.

- clone_vm_to_device (mode)

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

- create_device_system (Mode)

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

- 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.

- bind_mount_clonezilla_iso ()

  Fetches the clonezilla ISO. mount it to mnt, rsync it to mnt2 and ISOFILES bind-mount mnt2 live filesystem after unsquashfs.

- unmount_clonezilla_iso ()

  Unmount the clonezilla filesystem after exiting chroot. Restore the squashfs filesystem.

- clonezilla_device_to_image ()

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

- prepare_for_iso_vm ()
- generate_Gentoo ()

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

- 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

  -— PATCH -—

- Exported String PATH = "${PATH}":"${VBPATH}"
- Exported String SHARE_ROOT
- Exported String SHARED_DIR

7.3.1 Detailed Description

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

Author

Fabrice Nicol 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 no 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 vm_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
```

7.3.2 Function Documentation

7.3.2.1 mount_vdi()

```
mount_vdi (
              "w"  )
```

Use qemu to mount VDI file to host folder.

Parameters

w	for enabling read-write mode, otherwise read-only.

Warning

May involve security issues, especially if "w" is enabled.

Note

Uses global variable ${SHARED_ROOT_DIR}

See also

Guestfish and qemu websites for security issues.

Definition at line 1774 of file mkgentoo.sh.

7.3.2.2 move_auxiliary_files()

```
move_auxiliary_files ( )
```

Definition at line 1012 of file mkgentoo.sh.

7.3.2.3 prepare_bash_rc()

```
prepare_bash_rc ( )
```

Prepare the .bashrc file by exporting the environment this will be placed under /root in the VM

Definition at line 1147 of file mkgentoo.sh.

7.3.2.4 unmount_vdi()

```
unmount_vdi (
              mountpoint  )
```

Unmount connection to virtual disk (using qemu) to host folder.

Parameters

mountpoint	Optional mountpoint path parameter.

Note

Uses global variable ${SHARED_ROOT_DIR}

See also

Guestfish and qemu websites for security issues.

Definition at line 1875 of file mkgentoo.sh.

7.3.3 Variable Documentation

7.3.3.1 ISOLINUX_DIR

```
Exported String ISOLINUX_DIR = isolinux
```

-— PATCH -—

-— End of patch -—

Definition at line 951 of file mkgentoo.sh.

7.3.3.2 LOG

```
Exported String LOG
```

Definition at line 288 of file mkgentoo.sh.

7.3.3.3 PATH

```
Exported String PATH = "${PATH}":"${VBPATH}"
```

Definition at line 1362 of file mkgentoo.sh.

7.3.3.4 SHARE_ROOT

```
Exported String SHARE_ROOT
```

Definition at line 2501 of file mkgentoo.sh.

7.3.3.5 SHARED_DIR

`Exported String SHARED_DIR`

Definition at line 2502 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 ()

  -— PATCH -—
- 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 438 of file mkvm_chroot.sh.

7.5.3 Variable Documentation

7.5.3.1 res

```
Integer res = 0
```

Definition at line 481 of file mkvm_chroot.sh.

7.6 run_mount_shared_dir.sh File Reference

Variables

- Exported String SHARED_ROOT_DIR = "${SHARED_DIR}"

7.6.1 Variable Documentation

7.6.1.1 SHARED_ROOT_DIR

```
Exported String SHARED_ROOT_DIR = "${SHARED_DIR}"
```

Definition at line 12 of file run_mount_shared_dir.sh.

7.7 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)
- bind_filesystem (root)

  Bind-mounts the host live filesystem (proc/sys/dev/run) to a future chrooted OS-like tree of similar nature.

Variables

- Exported String ARR

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

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 Function Documentation

7.7.2.1 test_cdrecord()

```
test_cdrecord ( )
```

Definition at line 253 of file utils.sh.

7.7.3 Variable Documentation

7.7.3.1 ARRAY_LENGTH

```
Exported String ARRAY_LENGTH
```

Definition at line 82 of file utils.sh.

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