Making a clone to be used with the Emmabuntüs refurbishing key

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The Emmabuntüs refurbishing USB flash drive (or refurbishing USB key) allows you to refurbish all sort of computer by cloning a pre-configured GNU/Linux system, delivered by Emmabuntüs, see this download **page**.
You may not find the version that suits you among the clones we provide and this tutorial explains how to make a clone compatible with our refurbishing USB key.

This tutorial accompanies the **Blabla Linux** video on how to make a clone for the refurbishing USB key.

1 - Clone principle

A clone is used to duplicate an operating system on other computers whose systems will then be strictly identical copies of the one used to make the clone.

To make the clone, the first operation to perform is to install your GNU/Linux operating system, then to customize it before proceeding to the realization of the clone thanks to the Clonezilla utility.

2 - Partitioning scheme for the clone drive

When installing your GNU/Linux operating system, in order for your clone to be supported by the refurbishing key, you must respect a partitioning scheme compatible with the one used by this refurbishing key.

For a 32 or 64 bits GNU/Linux operating system in "BIOS Legacy" mode, use the following partition scheme and in the same order :
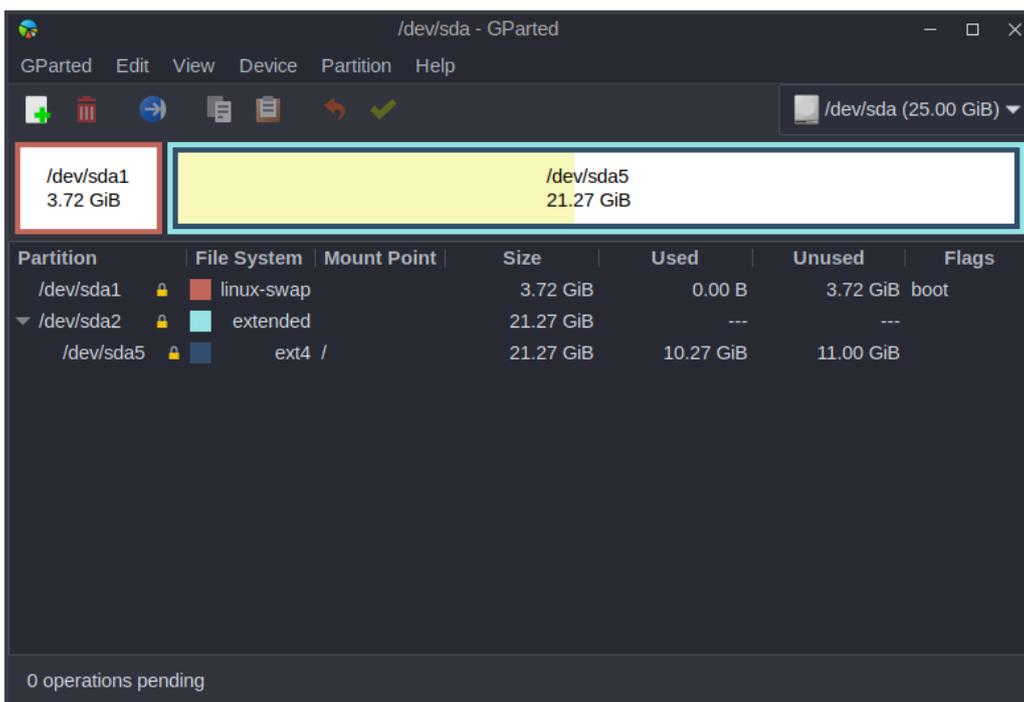
For a 32 or 64 bits GNU/Linux operating system in UEFI mode, use the following partition scheme in the same order :
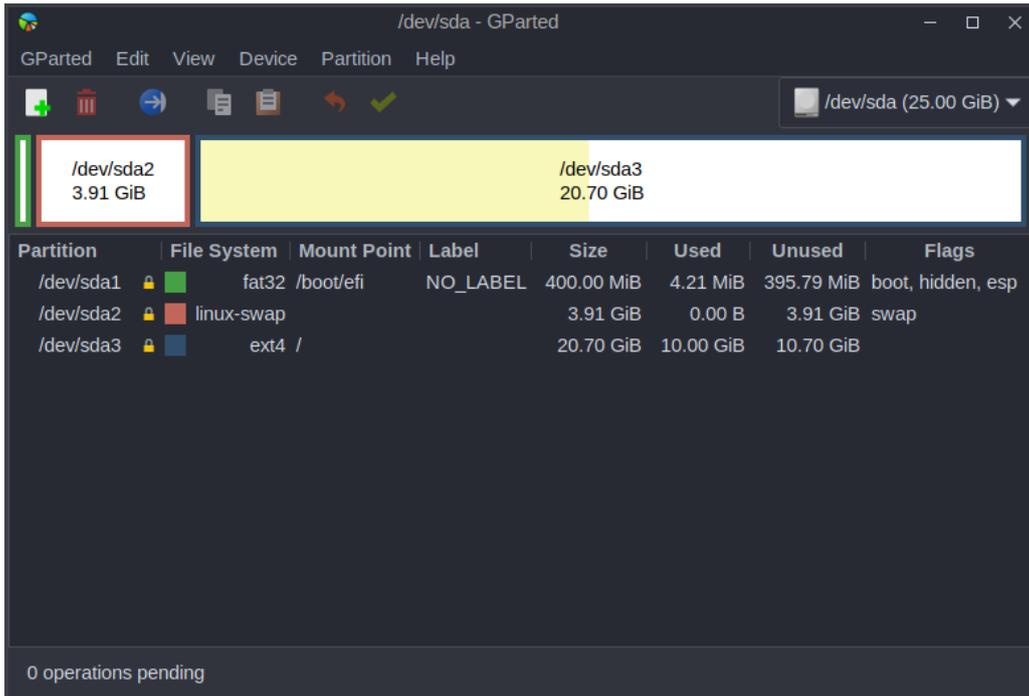
Note : in order to be able to duplicate your clone on hard disks of different sizes and especially small sizes, while you are using you a large physical hard disk to install your reference operating system, we advise you to oversize the SWAP partition, in order to be able to duplicate this future clone on smaller size disks, because the SWAP partition is assimilated by Clonezilla to a zero size partition, whatever its real size was.

3 - Hardware needed for the refurbishing key

To create your refurbishing key, you will need a USB flash drive that meets certain criteria:

- a minimum capacity of 16 GB

- being of good quality (Kingston Data Traveler, Transcend JetFlash 750...)

- if possible of the type USB-3 to take advantage of the maximum I/O speed when transferring files.

4 - Clone creation with Clonezilla

Before proceeding to the creation of your clone, we advise you to prepare your USB flash drive following our flash drive creation tutorials either with **MultiSystem** under Linux, or with **Ventoy** under Windows and Linux.

Then proceed to launch the USB key, and select Clonezilla to start the operation of copying the clone on the USB key. The screenshots below are based on a Ventoy refurbishing key usage.

Select a 64-bit version of Clonezilla for a UEFI reference operating system, and you can also use this 64-bit version of Clonezilla even if your reference operating system is 32-bit providing your processor has a 64-bit architecture.
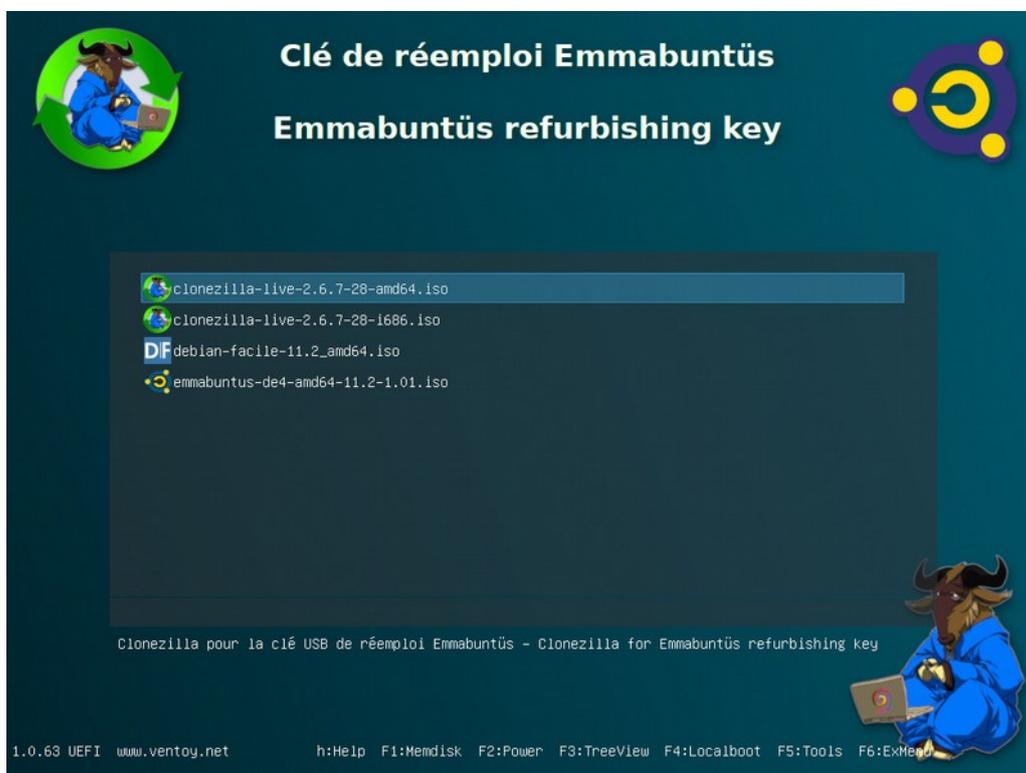
Note : you will only need to use the 32-bit version of Clonezilla if you are using a processor that is 32-bit only, i.e. a processor prior to Pentium 4.

4.1 - Creation in automatic mode

To save the clone in automatic mode, please select the 4th entry in the screen capture shown below :
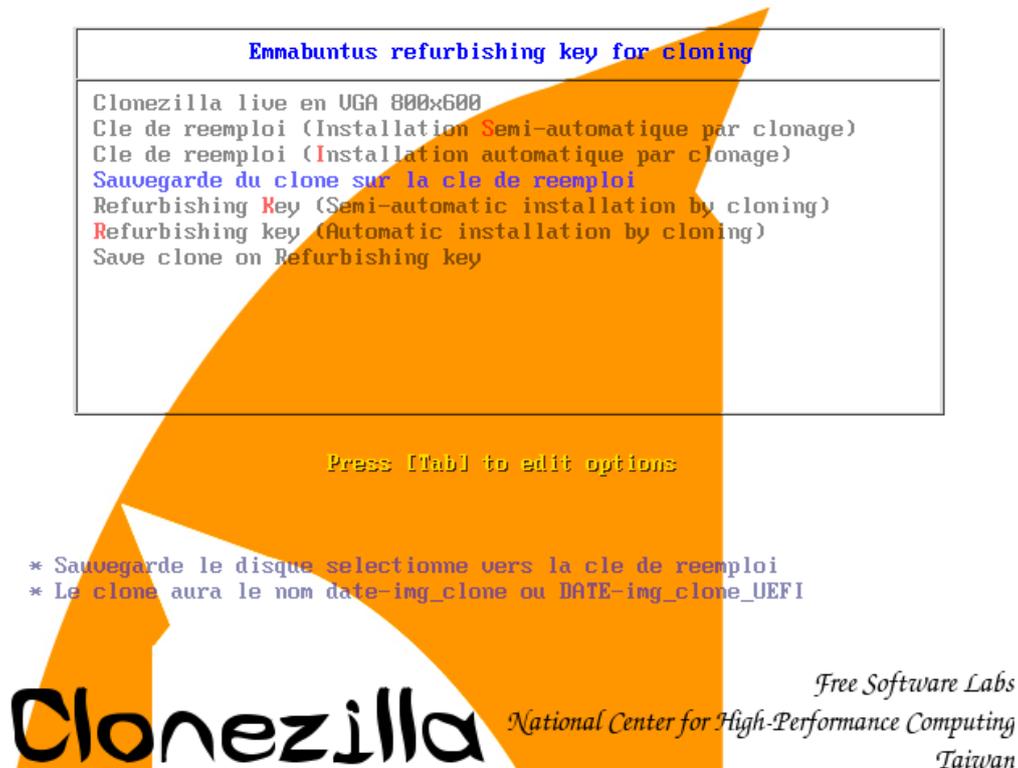
This script will save the clone on the refurbishing key and name it DATE-img_clone or DATE-img_clone_UEFI depending on the current Legacy/UEFI mode of the system.

You can customize some options of the copy or the backup of the clone, like the compression mode, the control files added to the clone, the clone image verification etc. by modifying the "save_clone.sh" file header, which resides in the "IMAGES" partition.

Note : in theory, the backup operation should take place without any intervention from the user, except in the case of anomalies detected by the script, which performs the following checks:

- compatibility of the partition scheme of the reference hard disk with our replacement key;
- size of the partitions on the reference hard disk compared to the limits of our partition scheme or to obtain a generic clone;
- available space on the reuse key to store the clone compared to the usable size of the system / partition of the reference hard disk.

During these checks the script offers advice in case of anomalies, so that you get a clone that is compatible with our reuse key, and as generic as possible, i.e. it can be used with different sizes of target hard drives.

Depending on the type of anomaly, the operator will have the choice to continue the backup or to stop the script.
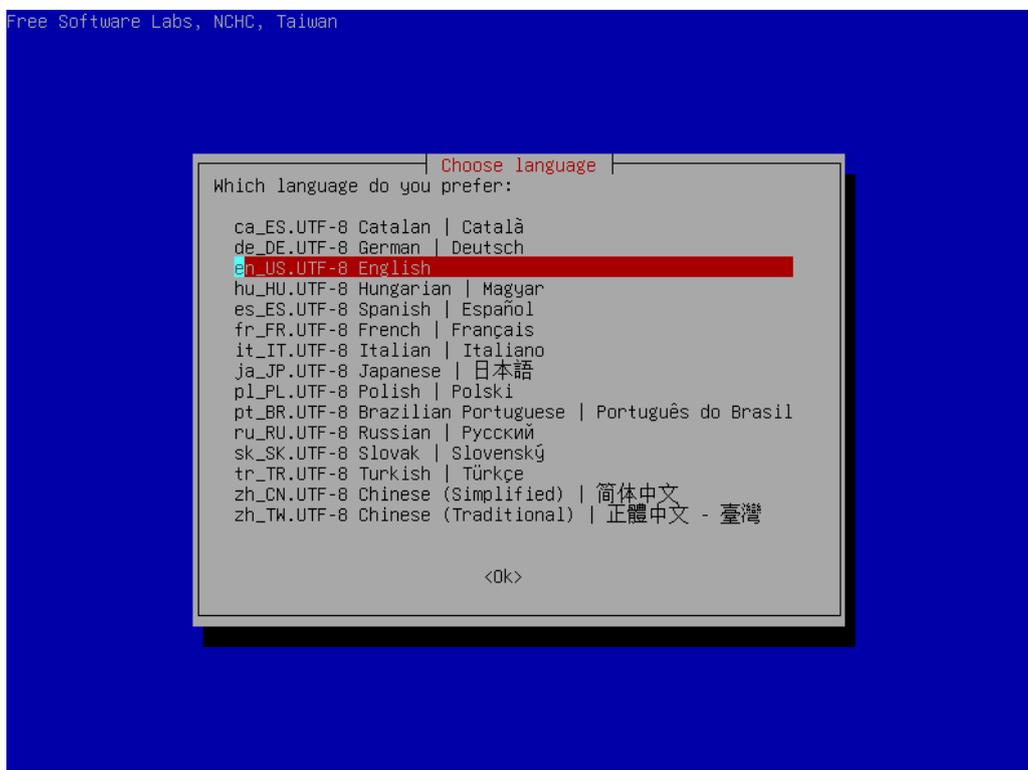
Note : If you make several clones, we advise you to rename their root directory with names allowing you to identify them easily, and to keep the suffix "UEFI", the clone is made on a UEFI computer, otherwise it will not be recognized by the refurbishing key on a UEFI system.
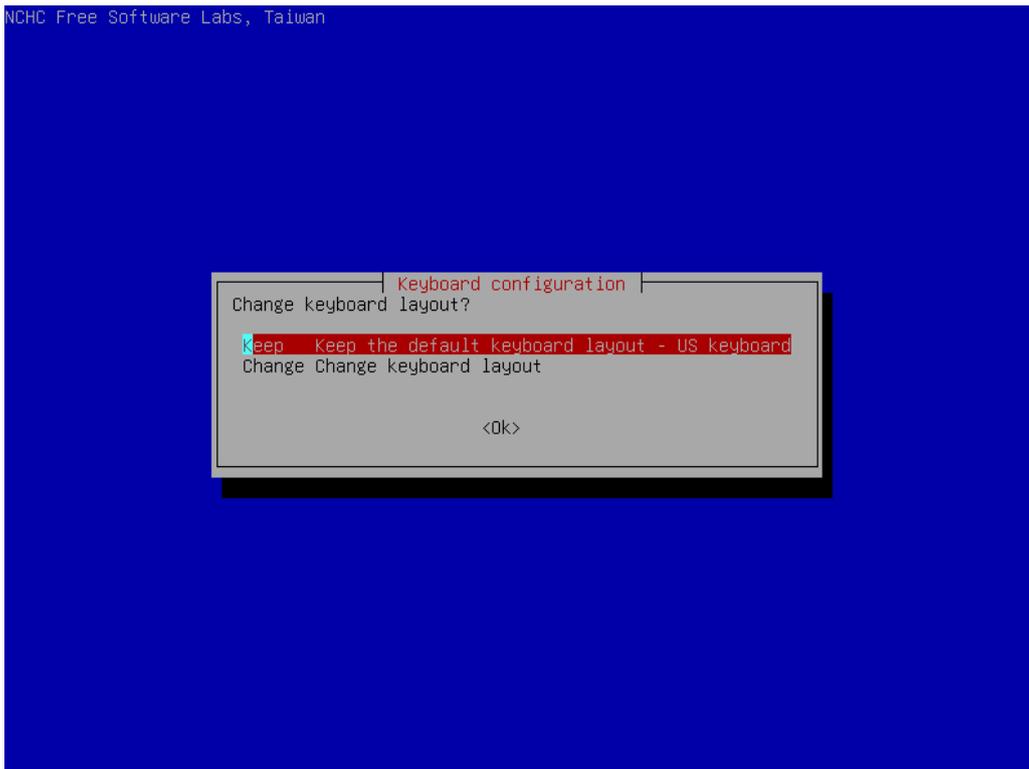
4.2 - Creation in manual mode

Select the first entry of the screenshot below to launch Clonezilla in classic mode. This entry was originally planned in our refurbishing key to realize clones in manual mode:
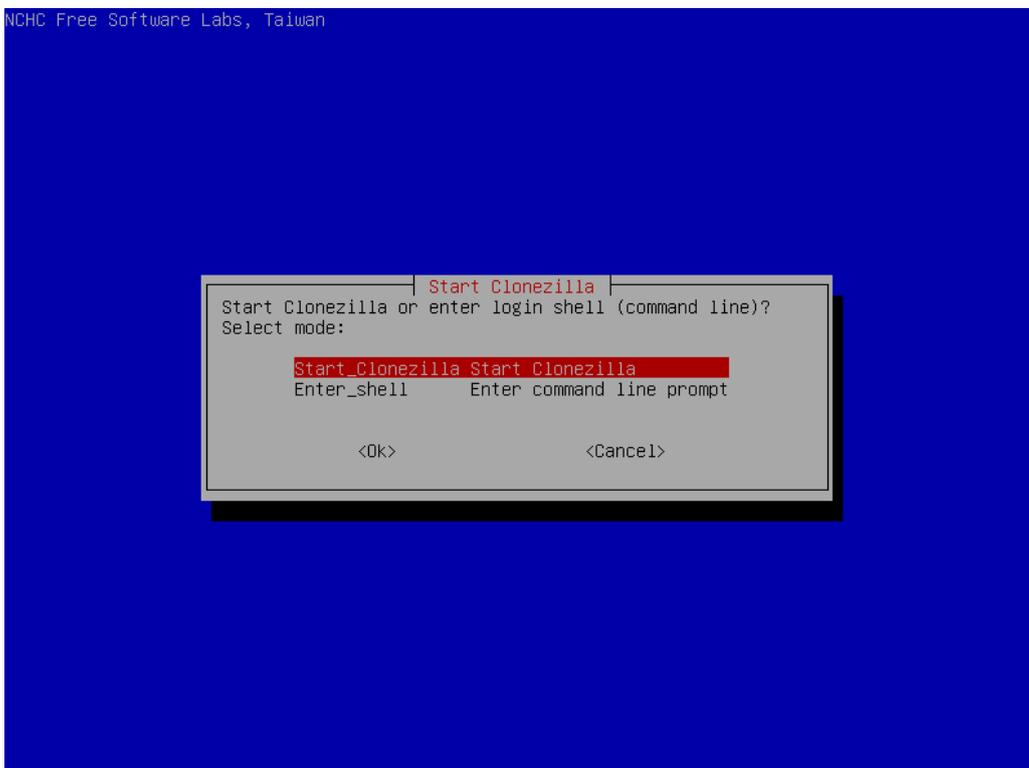

Select your language :

You can keep the keyboard English layout, or change it as you want :

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                        ┤ Keyboard configuration ├
            Change keyboard layout?
            keep   Keep the default keyboard layout - US keyboard
            Change Change keyboard layout


                              <Ok>
```

Then launch the "Start Clonezilla" command :

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                          ┤ Start Clonezilla ├
            Start Clonezilla or enter login shell (command line)?
            Select mode:

                  Start_Clonezilla Start Clonezilla
                  Enter_shell      Enter command line prompt


                      <Ok>                  <Cancel>
```

Select the "Device-image" copy mode to copy the entire disk containing your customized operating system to the USB stick :
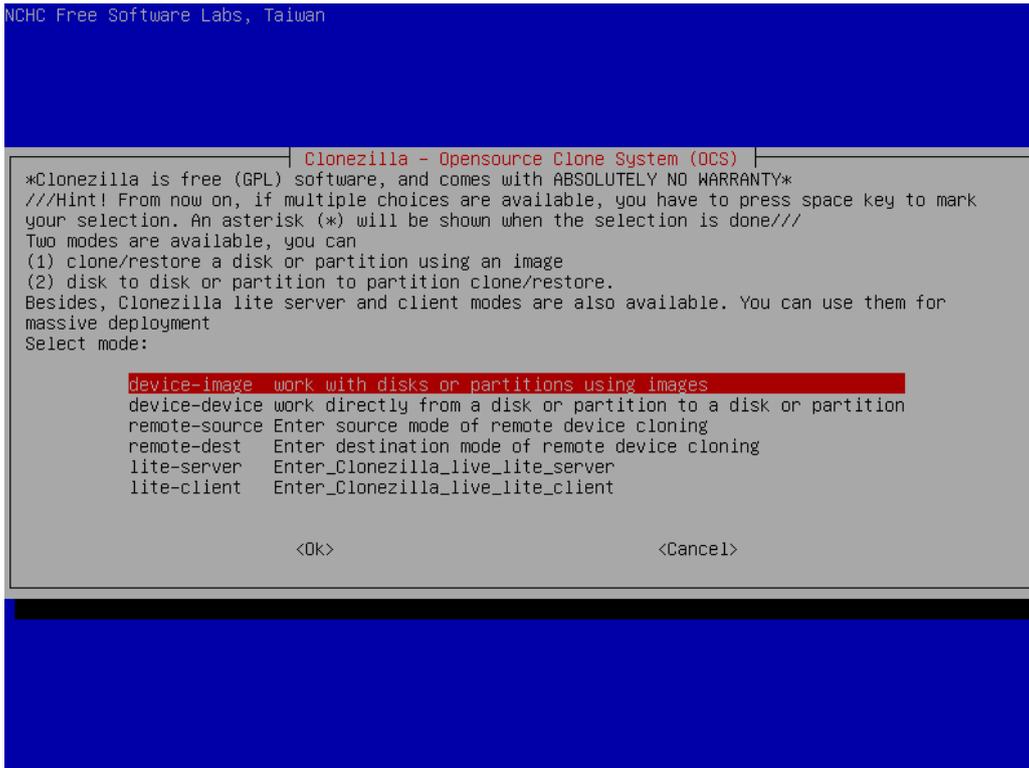
Now we are going to select the device where the clone will be copied, and for that select the "local_dev" mode since your USB key will be connected to your computer :
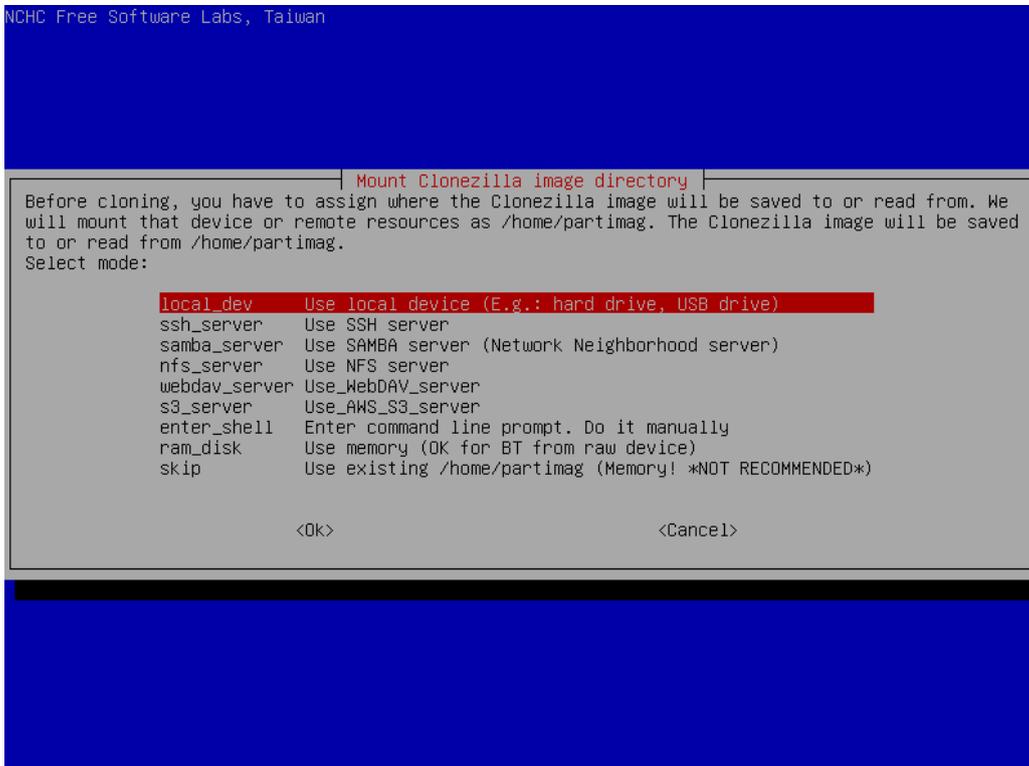
Clonezilla will now ask you to plug in your local device, and wait 5 seconds, then press "Enter" to continue:

Clonezilla will then identify the local devices on your computer, then click "Ctrl-C" to continue:

Now select the "sdb3" partition on your USB refurbishing key if, as here, you are using a refurbishing key under Ventoy. For a refurbishing key under MultiSystem, you will have to select the "sdb2" partition:
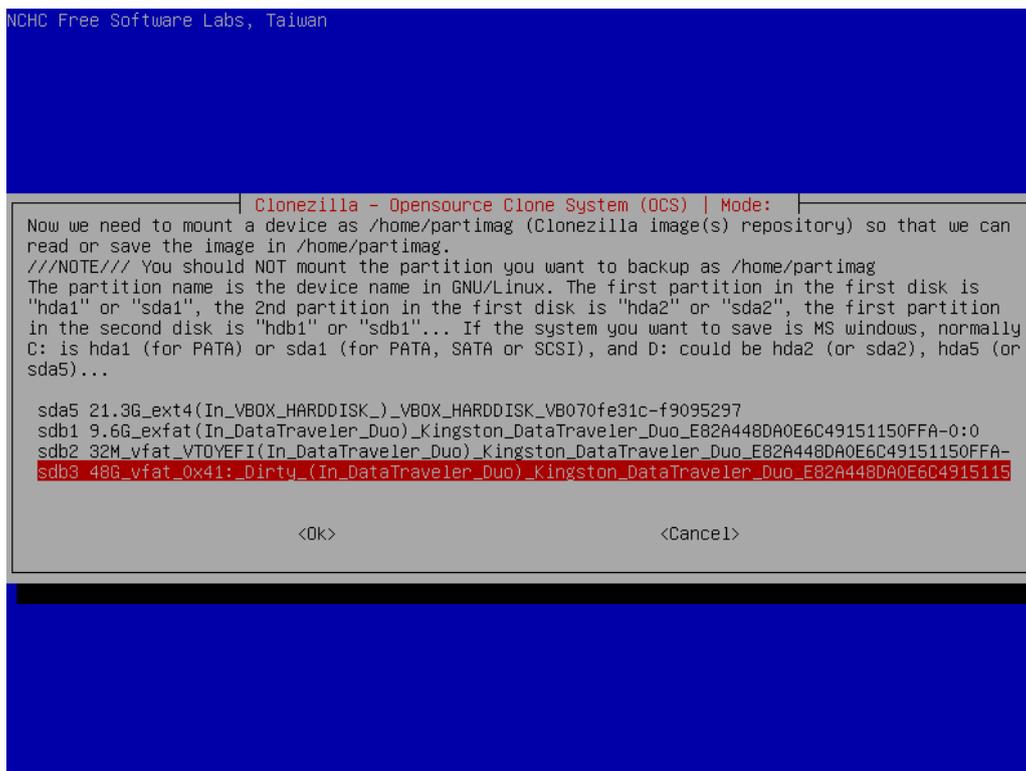
Then click on the tab key to activate the "Done" button and validate, because you are going to put your clone at the root of your partition :
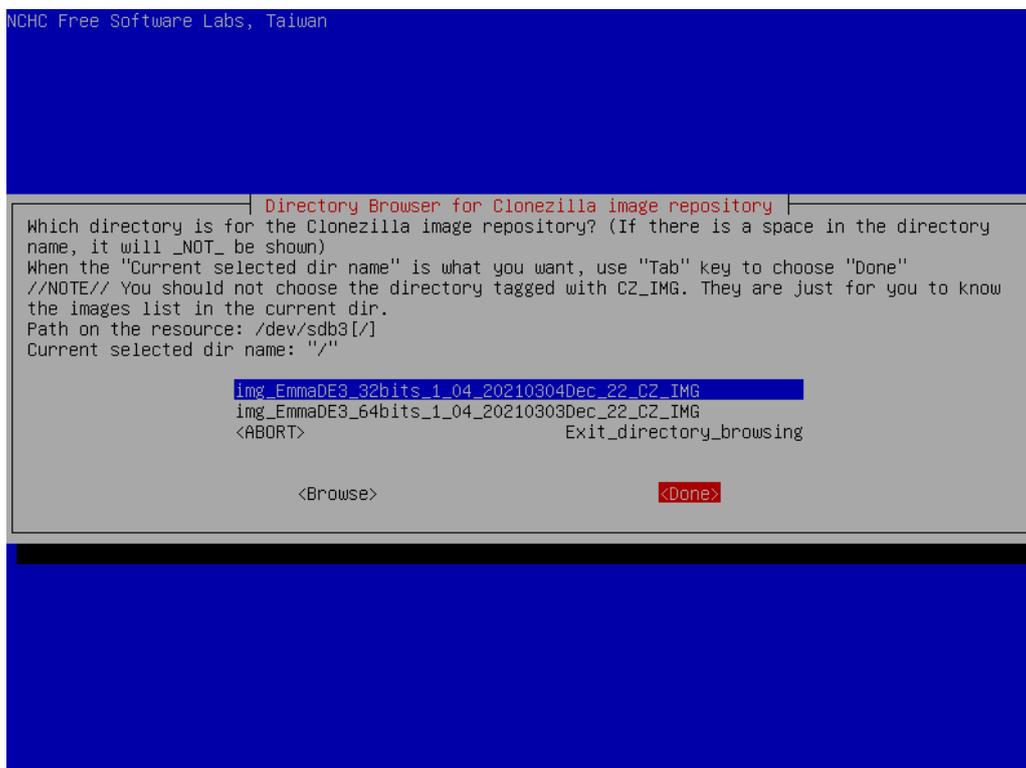
Select the beginner mode which is suitable for making the clone, and it is not necessary here to use the expert mode :

```
┌─────────────┤ Clonezilla - Opensource Clone System (OCS) ├─────────────┐
│ Choose the mode to run the following wizard about advanced parameters:  │
│                                                                         │
│         Beginner Beginner mode: Accept the default options              │
│         Expert   Expert mode: Choose your own options                   │
│         Exit     Exit. Enter command line prompt                        │
│                                                                         │
│                                                                         │
│                    <Ok>                        <Cancel>                 │
│                                                                         │
└─────────────────────────────────────────────────────────────────────────┘
```
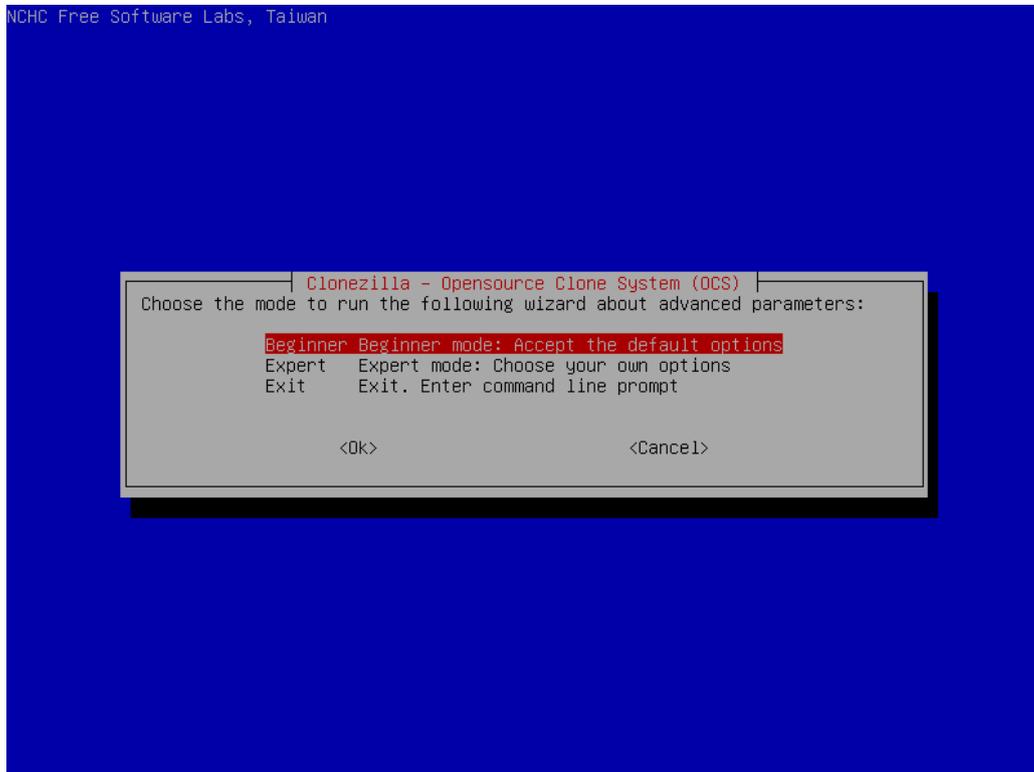
Select the "Savedisk" mode which allows you to save your entire disk containing your customized operating system, then <OK> to validate :

```
┌─────────┤ Clonezilla - Opensource Clone System (OCS): Select mode ├─────────┐
│ *Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*   │
│ This software will overwrite the data on your hard drive when restoring! It is recommended to │
│ backup important files before restoring!***                                 │
│ ///Hint! From now on, if multiple choices are available, you have to press space key to mark │
│ your selection. An asterisk (*) will be shown when the selection is done///  │
│                                                                             │
│          savedisk              Save_local_disk_as_an_image                  │
│          saveparts             Save_local_partitions_as_an_image            │
│          restoredisk           Restore_an_image_to_local_disk               │
│          restoreparts          Restore_an_image_to_local_partitions         │
│          1-2-mdisks            Restore_an_image_to_multiple_local_disks      │
│          recovery-iso-zip      Create_recovery_Clonezilla_live              │
│          chk-img-restorable    Check_the_image_restorable_or_not            │
│          cvt-img-compression Convert_image_compression_format_as_another_image │
│          encrypt-img           Encrypt_an_existing_unencrypted_image        │
│          decrypt-img           Decrypt_an_existing_encrypted_image          │
│          exit                  Exit. Enter command line prompt              │
│                                                                             │
│                    <Ok>                            <Cancel>                 │
│                                                                             │
└─────────────────────────────────────────────────────────────────────────────┘
```
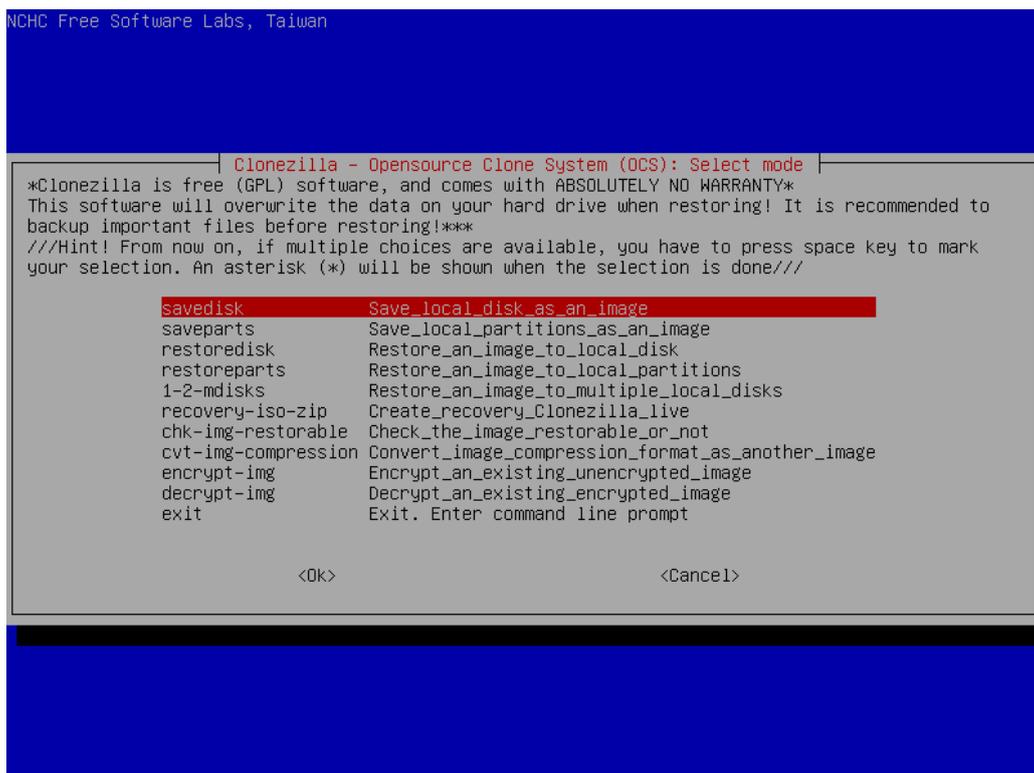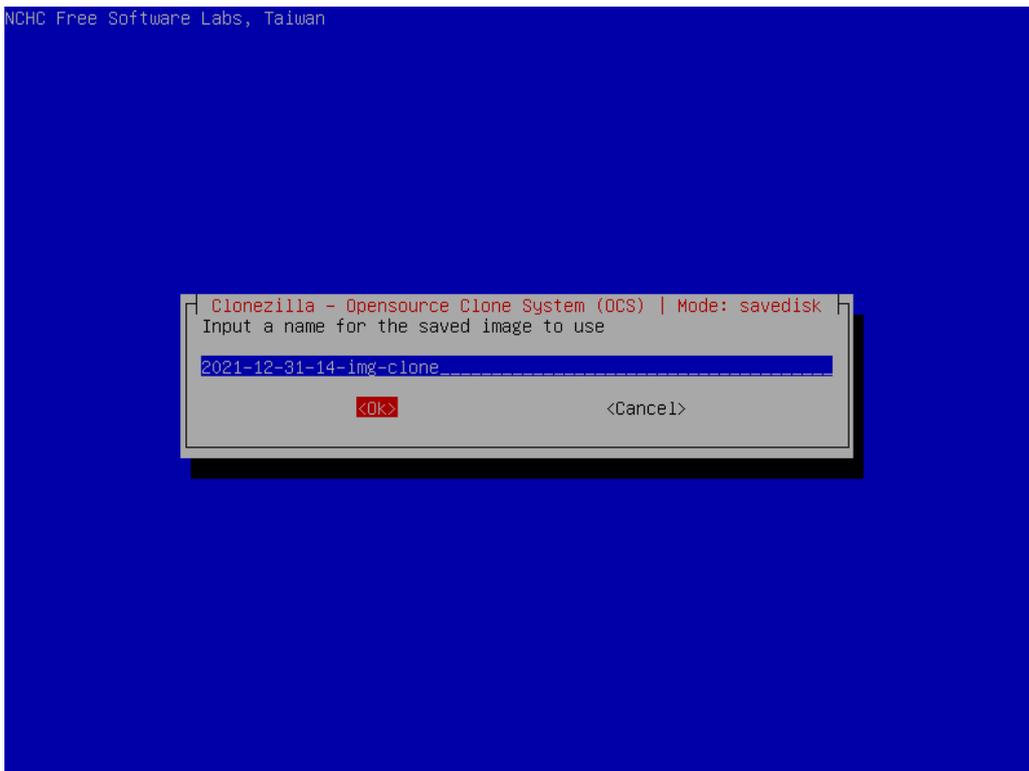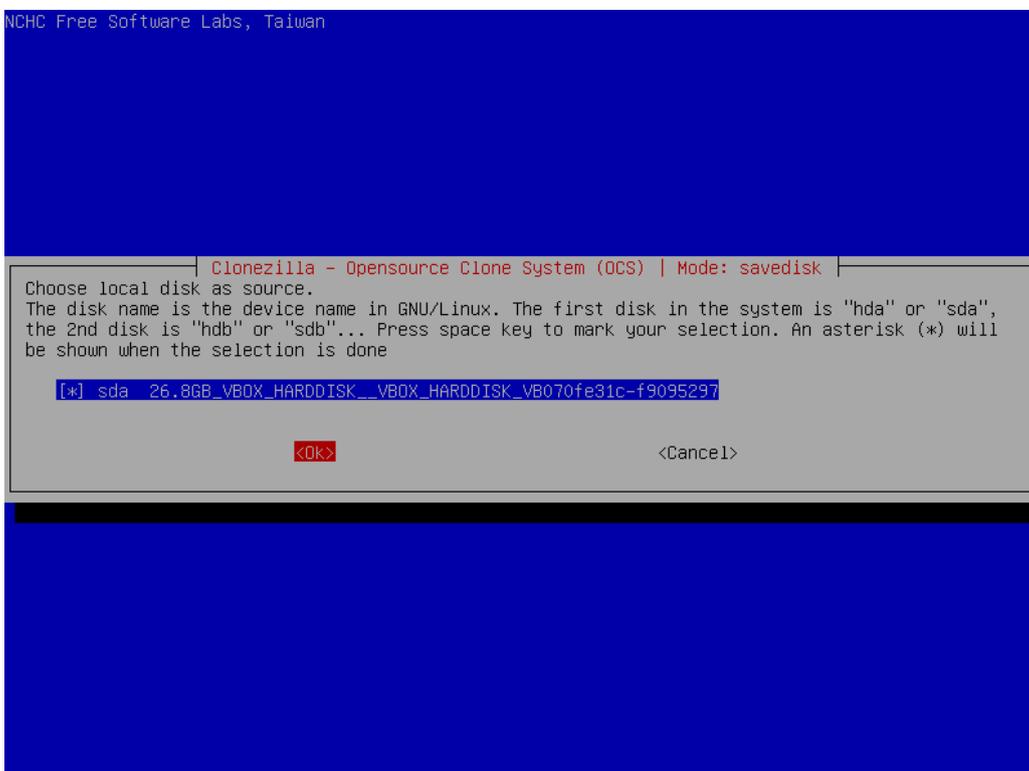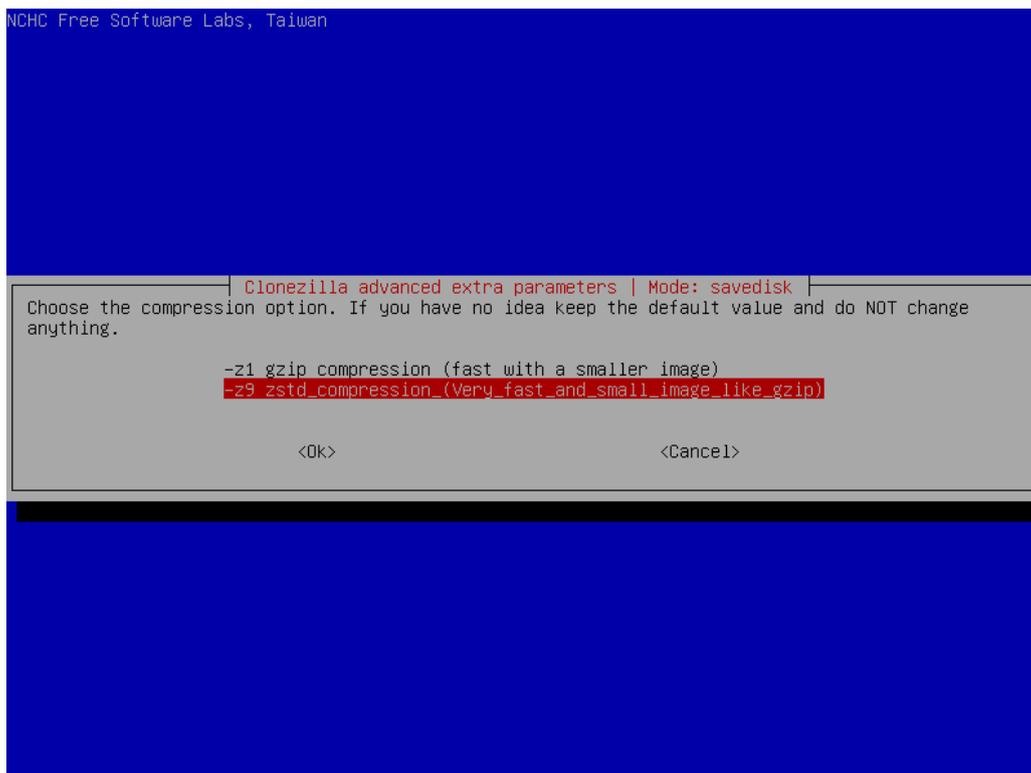
Enter the name of your clone, then <OK> to validate :

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```
┌─ Clonezilla - Opensource Clone System (OCS) | Mode: savedisk ─┐
 Input a name for the saved image to use

 2021-12-31-14-img-clone_____

          <Ok>                        <Cancel>
```
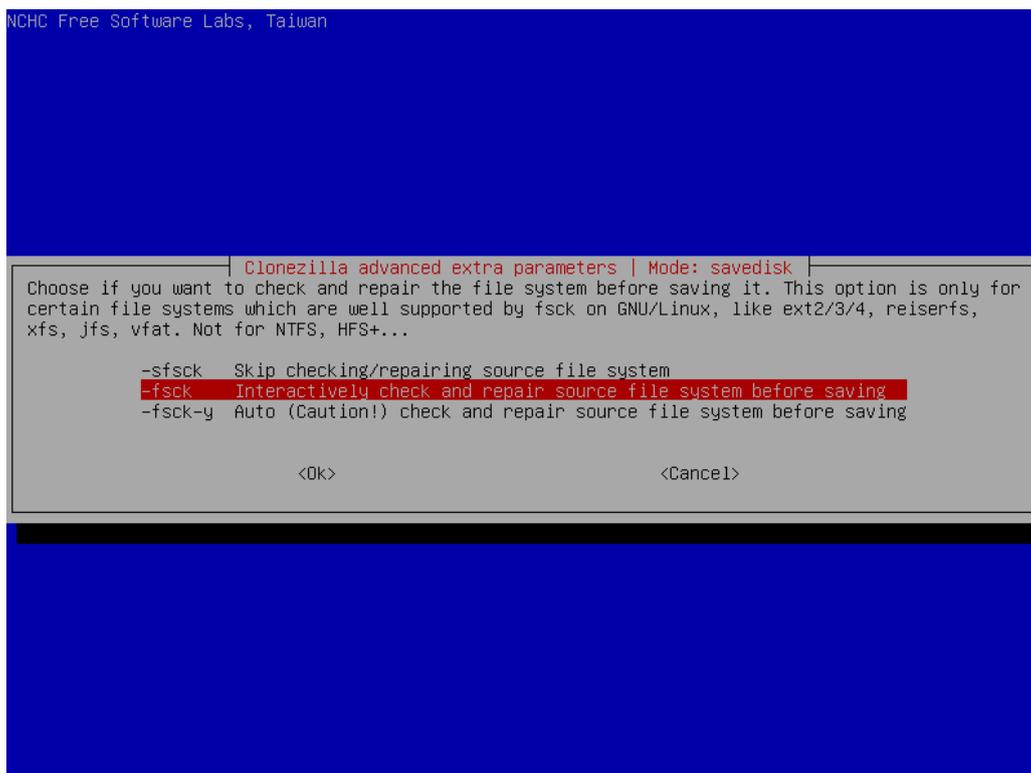
Now you need to select the hard disk containing your customized operating system. Usually there is only one hard drive already selected, unless you have several hard drives on your computer, and in that case you need to select the one you want to clone to the USB stick:

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```
┤ Clonezilla - Opensource Clone System (OCS) | Mode: savedisk ├
 Choose local disk as source.
 The disk name is the device name in GNU/Linux. The first disk in the system is "hda" or "sda",
 the 2nd disk is "hdb" or "sdb"... Press space key to mark your selection. An asterisk (*) will
 be shown when the selection is done

     [*] sda  26.8GB_VBOX_HARDDISK__VBOX_HARDDISK_VB070fe31c-f9095297

              <Ok>                        <Cancel>
```

Select the "-z9" compression mode which gives the best compression ratio, and validate:

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                  ┤ Clonezilla advanced extra parameters | Mode: savedisk ├
    Choose the compression option. If you have no idea keep the default value and do NOT change
    anything.

              -z1 gzip compression (fast with a smaller image)
              -z9 zstd_compression_(Very_fast_and_small_image_like_gzip)


                   <Ok>                              <Cancel>
```

Activate the verification and repair option, case of ...

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                  ┤ Clonezilla advanced extra parameters | Mode: savedisk ├
    Choose if you want to check and repair the file system before saving it. This option is only for
    certain file systems which are well supported by fsck on GNU/Linux, like ext2/3/4, reiserfs,
    xfs, jfs, vfat. Not for NTFS, HFS+...

              -sfsck   Skip checking/repairing source file system
              -fsck    Interactively check and repair source file system before saving
              -fsck-y  Auto (Caution!) check and repair source file system before saving

                   <Ok>                              <Cancel>
```

Ask for the verification of the clone after its backup, you can never be too careful with USB media ;)
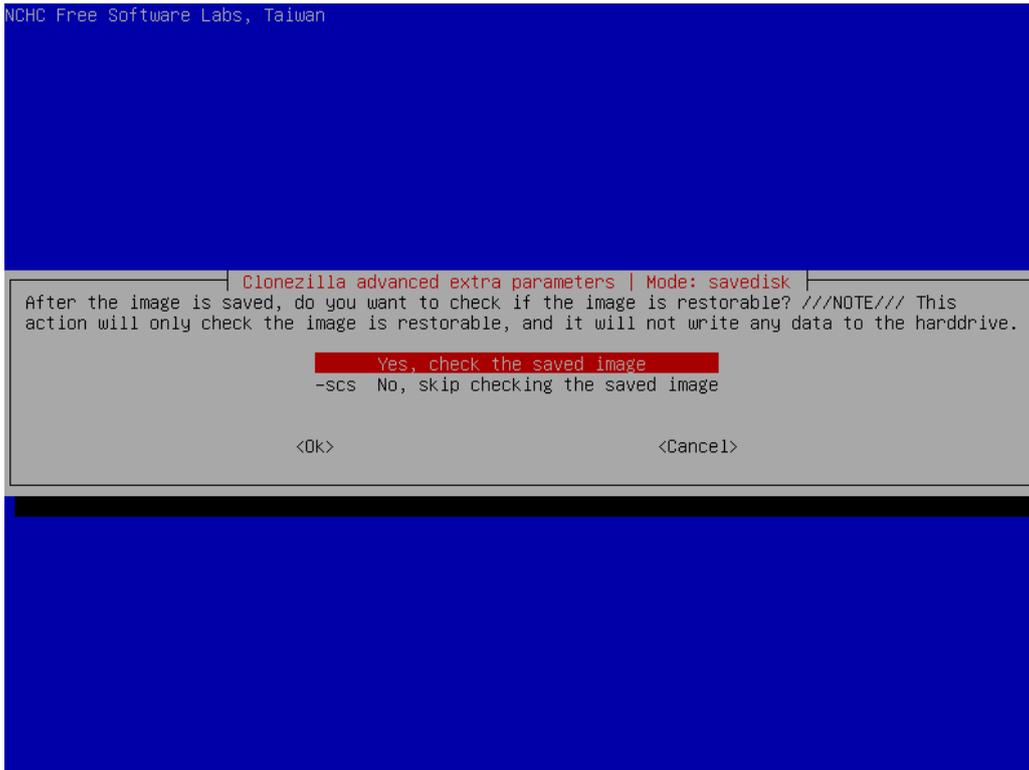
Do not encrypt your image, i.e. the clone, unless you want to protect it with a password :
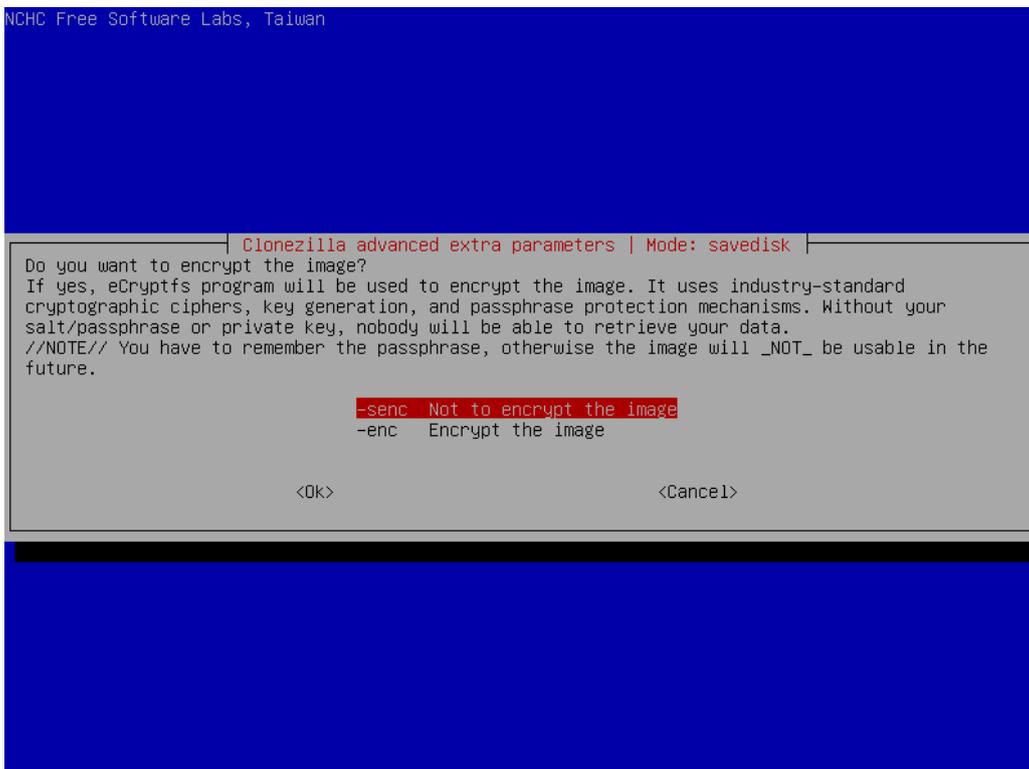
Choose the finish mode that is best for you:
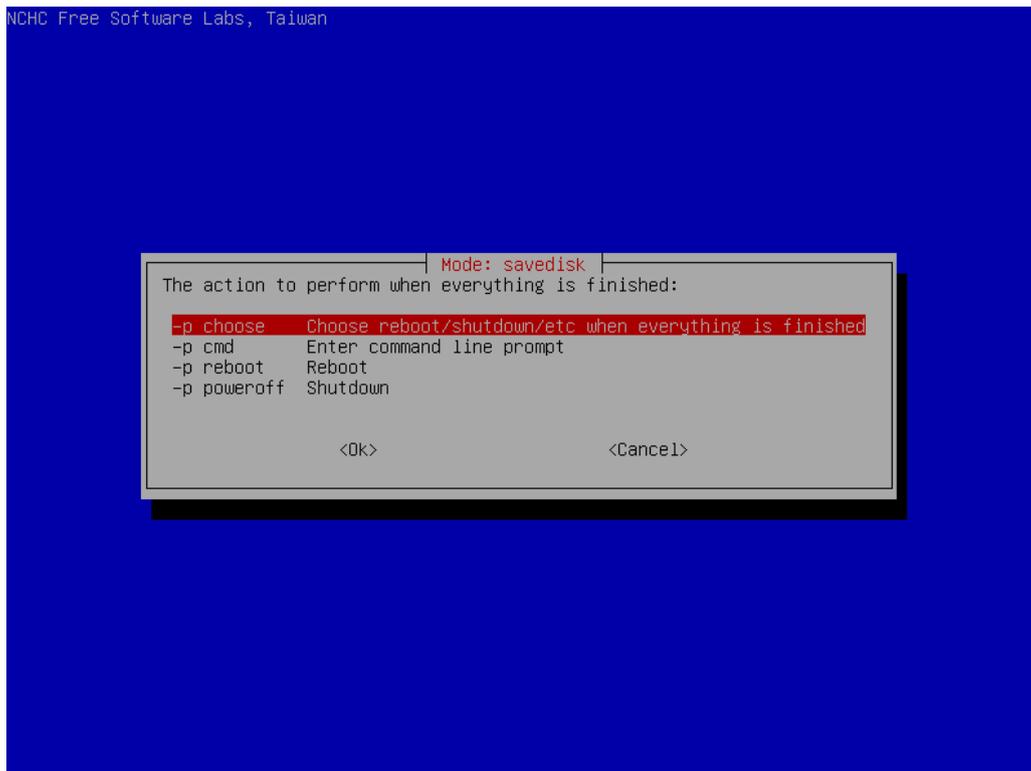
Clonezilla gives you the command line it will execute and a report. Type the letter "y" to accept and validate to continue :

The copy operation is starting :

Followed by the verification of the image just copied to the USB stick :
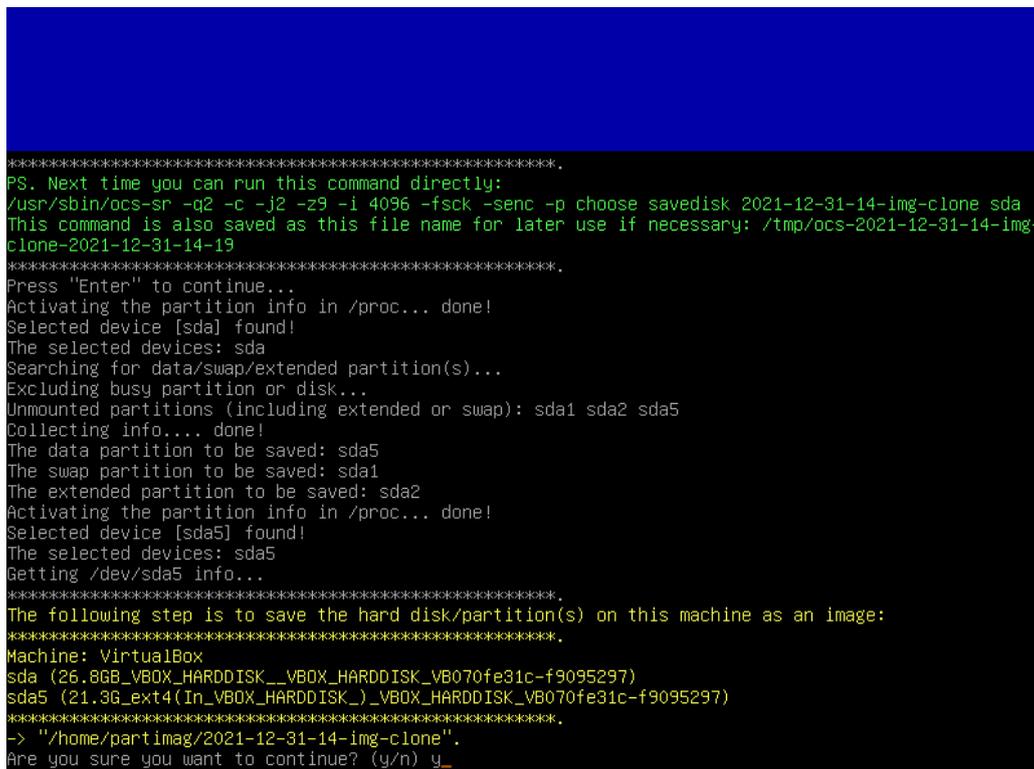
Your clone was successfully saved. Press "Enter" to continue :

You can stop Clonezilla, and now you just have to test your embedded clone on our refurbishing key to clone a new computer :)

5 - Tips and Advice

It is also possible to use a virtual machine like Oracle VM VirtualBox or VMware Workstation Pro to install your reference GNU/Linux operating system and then copy it via Clonezilla to your refurbishing key. The method for copying the clone to the reuse key is the same as the one used with a physical hard disk except that you need to use an ISO image of PLOP Boot Manager in your virtual machine's CD/DVD drive to allow the refurbishing USB stick to be launched in the virtual machine.

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