

# Elastix Application Note #201110081:

## Elastix Image Backups and Restores with Clonezilla



<b>Title</b>	Elastix Image Backups and Restores with Clonezilla
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<b>Date Written</b>	8 <sup>th</sup> October 2011
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<b>Tested on Elastix Version</b>	2.2RC3
<b>Backward Compatible</b>	Yes
<b>Elastix Level</b>	Intermediate to Experienced
<b>Linux Level</b>	Intermediate (knowledge of Linux Device Nomenclature)
<b>Network Level</b>	N/A
<b>Latest Document Source available from</b>	<a href="http://www.elastixconnection.com">www.elastixconnection.com</a>
<b>Credits</b>	Mark Glann (review)
<b>Licence</b>	GNU FDL

## Foreword

These application notes are intended to be a guide to implement features or extend the features of the Elastix IP PBX system.

Whilst many (but not all) guides available are basically a random collection of notes, usually while someone is implementing a feature for themselves, these guides are meant to be more definitive guide that has been tested in a lab with specific equipment, and particular versions of Elastix.

Finding information on the Internet can be haphazard due to the lack of document version control, lack of attention to software versions, and in some cases they are wrong. Then you have the cross pollination issues, where a guide has been done for another distribution, which may or may not be applicable to your Elastix system.

You will note on the front page of every Application note written in this way, will be an easy to read summary, regarding the Elastix system it was tested on, when the document was written, whether it is backward compatible, and the level of expertise needed to accomplish the implementation.

These application notes are written up and tested in a lab that has been specially setup to write these notes. This includes

- 5 x Elastix IP PBX Hardware with a mixture of SIP only, Digium, Sangoma, OpenVox Cards
- 1 x WAN Simulator (including latency, jitter, random disconnects, random packet drop)
- 8 x Consumer / Business routers, including Drayteks, Cisco 1842, Cisco 877, Linksys WRT54GL
- 2 x IBM XSeries servers running VMware with 8 images of various versions of Elastix IP PBX
- 1 x Standard Microsoft SBS Network providing DHCP and DNS and Mail system
- 2 x Linux Servers

The Elastix IP PBX systems, both hardware and Virtual based have image systems to refresh the systems to limit infection from other testing. Combined with a range of Phones, which include Aastra, Linksys, Cisco, Yealink, it provides a reasonable cross section of typical systems currently in the field.

These application notes are not just done in isolation either. Behind them is over 6-7 years of commercial implementation of IP PBX systems, utilising these methods and concepts. The Lab is just used to reconfirm the implementation in a less production like environment.

How you use these application notes is entirely up to you. However, it is highly recommended that in the first instance, that you follow the notes and configurations in their entirety (except for IP addresses) of course. If you follow it exactly, then it will be easier for others to assist you when you do have an issue.

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## Introduction

There are various ways of performing backups with Elastix. These include:

- 1) Elastix Backup and Restore
- 2) FreePBX Backup and Restore

They work well, and have evolved very well over the last few years capturing more and more data that is required to restore a system.

However, having been round for many years, I personally prefer the Bare Metal backup mentality, basically backing up the Hard Disk as a complete restorable image (a snapshot in time if you will). Virtualised systems make extensive use of this facility, which is in fact one of their strengths.

Part of this mentality, is no matter how good the above backup systems are, they are still prone to issues such as restoring a backup to the wrong kernel version, resulting in either a fatal error, or worse still and error that you can't see, and have to spend hours debugging or rebuilding the system.

Especially on the commercial level, you need some confidence that you can restore a system in the quickest possible time, with the confidence that your "rollback" works, especially if your upgrade or software installation failed. Your business or client won't accept anything less, including excuses why they are having issues after your upgrade failed.

So what this Application Note is about is using an Open Source product that has been around for years. This product is called CloneZilla, which can perform complete Disk images, and also partition images. Our interest is in Disk images.

Now this sort of backup is not going to suit everyone and suit every situation. In fact its strength is in using it in combination with the above backup tools (Elastix and FreePBX). For instance, with a Clonezilla image, you cannot restore individual files from the image. Its an all or nothing approach, but a very solid one.

As a guide, I personally use it in this way, I perform a Clonezilla Image Backup before the following:

- Installing the system onsite
- YUM Updates
- System Rebuilds (e.g. Elastix 1.6 to Elastix 2.2 upgrade)
- FreePBX Version upgrades (e.g. going from version 2.7 to 2.8)
- Installing Software/modifications that I am not confident with (e.g. information found on forums)
- Upgrading an Elastix component (e.g. Openfire 3.71 ) which is not part of the standard Elastix Build

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I perform Elastix/Freepbx Backups when:

- Changes to the Call Flow, especially where the system is complex
- After I have completed the Elastix installation onsite both before customisation and after.
- Before I make modifications to say a trunk configuration.

With this methodology, it means that you should be able to restore a system at all times within 30-40 minutes.

- Restoration of Clonezilla image – 20 minutes
- Upgrade the Freepbx modules to the latest versions for that Freepbx Release – 10 minutes
- Restore of last Freepbx Backup/Elastix Backup – 10 minutes

The confidence in knowing that you can bring the system back online is immensely satisfying especially when you are under the pump. It provides that confidence to get upgrades done and out of the way.

Another strength of Clonezilla is the ability to restore the image to hardware that is non-identical, which is useful when you don't have another system of similar ilk close by. The one rule with Clonezilla (in its current form) is that the hard disk that you restore to, cannot be smaller than the one you completed an image off.

There are many other features of Clonezilla which you can discover for yourself, especially when you are confident with the product, including creating Live Disk Restores. But get the basics understood first, and build that confidence.

This application note will take you step by step through a Image Backup and an Image Restore. However before you start, please read the following additional disclaimer.

- I. Your use of this application note is on the condition that it is a guide only, and is not accurate.**
- II. This document, while as accurate as possible, may have errors.**
- III. It is imperative that you test these notes and the Clonezilla product yourself on non-critical systems.**
- IV. The Clonezilla product, in the inexperienced hands has the ability to completely wipe your system rendering your Elastix system useless.**
- V. There are no guarantees that a backup image performed on a machine can be restored on that same machine or any other machine.**
- VI. As Clonezilla is software, like any other software based product, it could have bugs which may only show up on your system. It works for me, but it may not work for you.**
- VII. Clonezilla is kept reasonably up to date, and it works on a large number of systems, recognising hardware, and disk subsystems well. However, especially on newer systems with new chipsets, it may look like its working, but may fail miserably.**
- VIII. You have been warned!!!**

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## Preparation

### Download Clonezilla

I use the following version for the purpose of this application note

[http://sourceforge.net/projects/clonezilla/files/clonezilla\\_live\\_alternative/20110922-natty/clonezilla-live-20110922-natty.iso/download](http://sourceforge.net/projects/clonezilla/files/clonezilla_live_alternative/20110922-natty/clonezilla-live-20110922-natty.iso/download)

Basically this or anything newer than the release date of this version (22-09-2011) should work.

### Burn the Clonezilla to a CD

The file that you download from Clonezilla is an ISO image. It needs to be burnt as an ISO image to a CD. I personally use Nero (commercial) or CDBurnerXP (free) to perform this task. Hopefully, you already know this anyhow, as it is the same process you would have followed to burn your Elastix ISO.

### Obtain a Backup Device

There are many options in relation to what you use as a backup Device.

However, this Application Note has been written around using a External USB Hard Drive and/or USB Key. If you have basic 2.2 Elastix system (not in production use), then the minimum space you require is 2.0Gb. If you have a system in production, with voicemails, and CDR records, then as a minimum I would recommend is a device with 8Gb free space. However due to the variable nature of the size of Elastix and its files, I would recommend a 32Gb USB key for safety or make your life easy and obtain a 500Gb self powered External USB Drive.

If you do use a USB key, make sure it is formatted with NTFS. A lot of USB keys are formatted with FAT32 which has a maximum file size of 4G. Your image is very likely going to be larger than this.

### Ready to go

Print off this application note and follow through.

I apologise for the poor screen photos. As this was to be a legitimate guide, screenshots was not possible, but really the photos do not contain any information that is not written in this Application Note. There are there purely to provide confidence as you move through the process.

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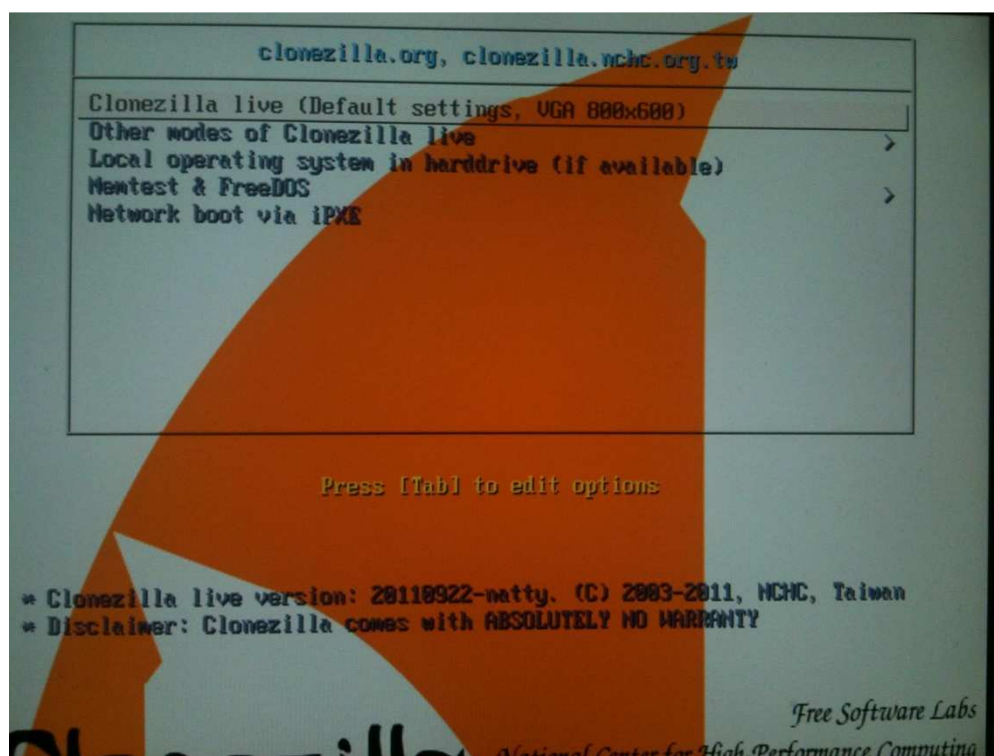
## Clonezilla Backup Procedure – A complete Disk Image Backup of your Elastix System

We assume that at this point you have created a bootable CloneZilla CD

Insert USB Hard Drive or USB key into your Elastix System that you want to backup. Make sure it is formatted with NTFS to handle large file sizes (Many USB keys come formatted with FAT32 which is limited to 4G File Sizes)

Restart your Elastix system with the CloneZilla CD inserted.

It will boot up to the following Screen



The default is **CloneZilla Live (Default Settings, VGA 800 x 600)**. Select this.

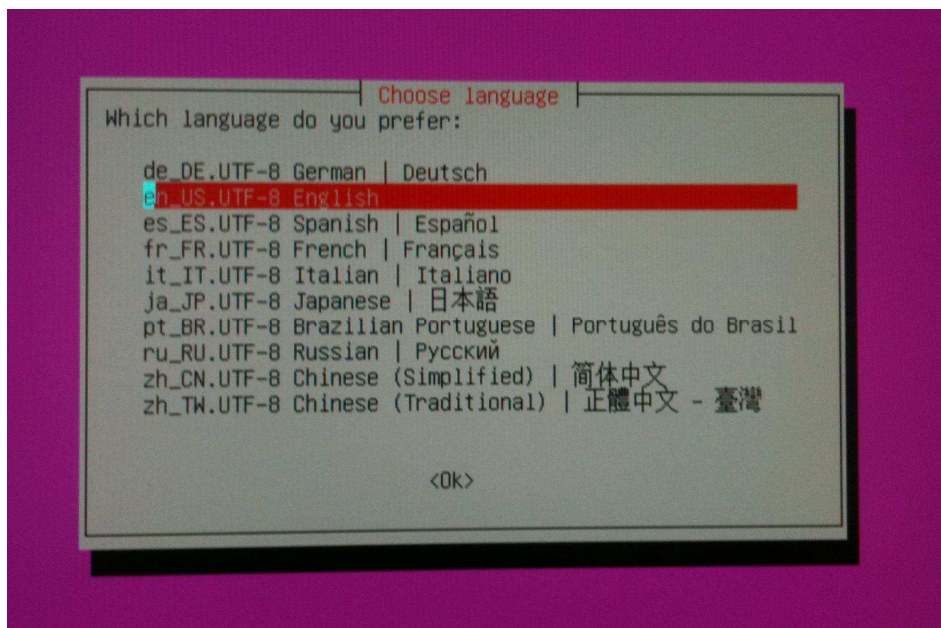
Don't Panic here if it does not appear to be doing anything. But basically it is booting.

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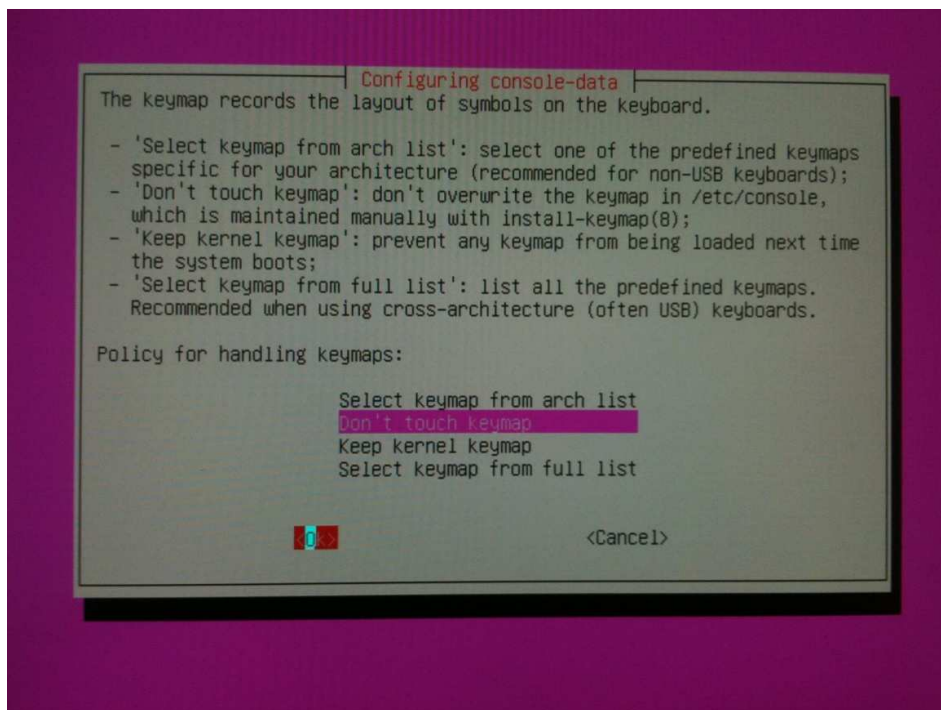


The next screen comes up asking you to choose language.



Again select Default (which should be **English**)

The Next screen to come up says Configuring Console Data

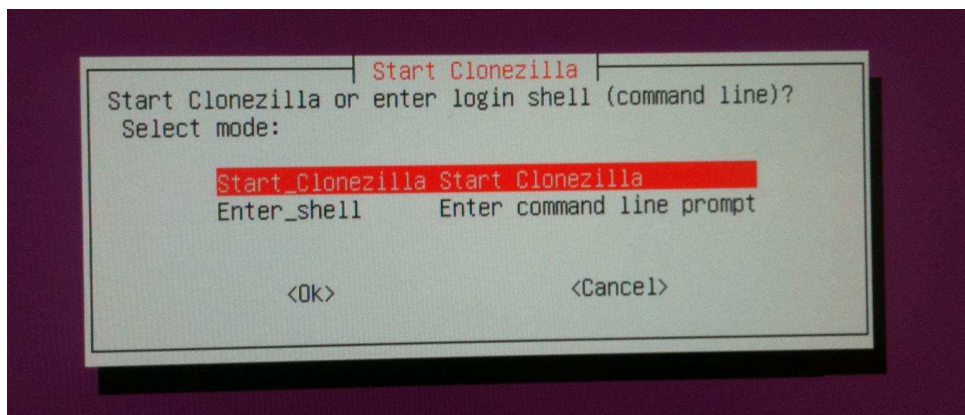


The Default is **Don't Touch Keymap**. Leave it as it is and select **OK**

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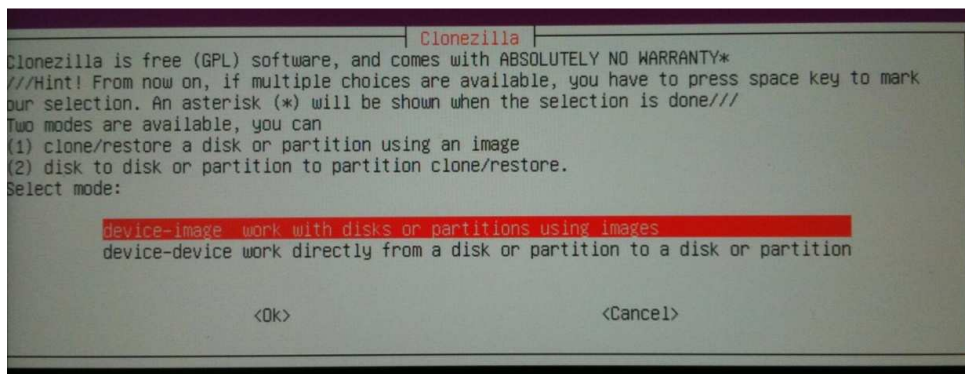
- \* Your application of these notes are entirely at your own risk.
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The next screen comes up which should be as follows



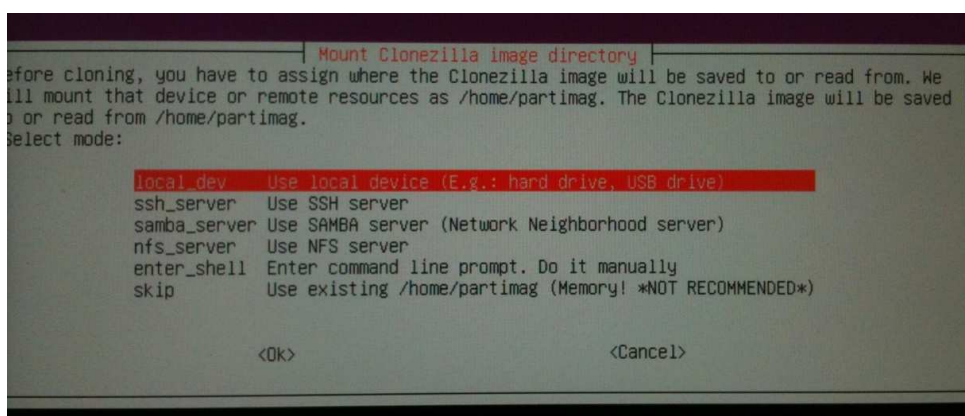
The default is **Start CloneZilla**. Leave it as it is and select **OK**

The Next screen will just be title CloneZilla.



The default is **Device-image**. Leave it as it is and select **OK**

The Next screen will come up headed Mount CloneZilla Image Directory



The Default is **Local\_dev**. Leave it as it is and select **OK**

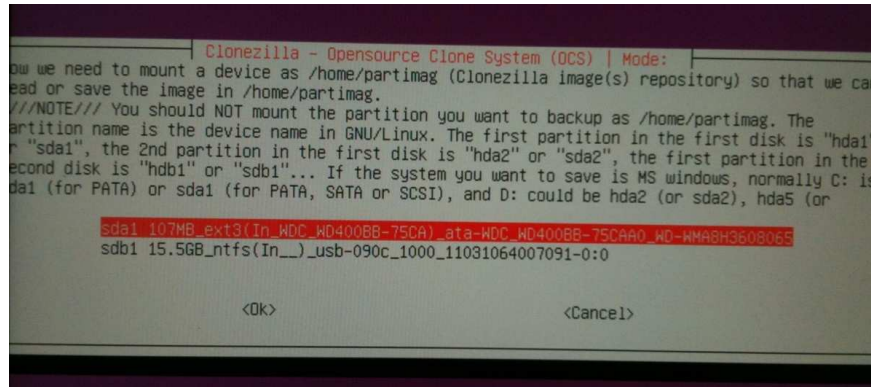
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You will see some text come up asking for you to insert your USB drive (which we already did before booting). So press **ENTER** and it should detect your USB Device which you will determine on the next screen.

The next screen will be titled CloneZilla – Open source Clone System (OCS) | Mode :



### Select your USB Drive as follows

The options will differ depending on your hardware (e.g. Hard Drive type) and what USB device you have attached. So some common sense is needed here and an understanding of what you have in your system. For most systems, it will display like the picture above which has the following info.

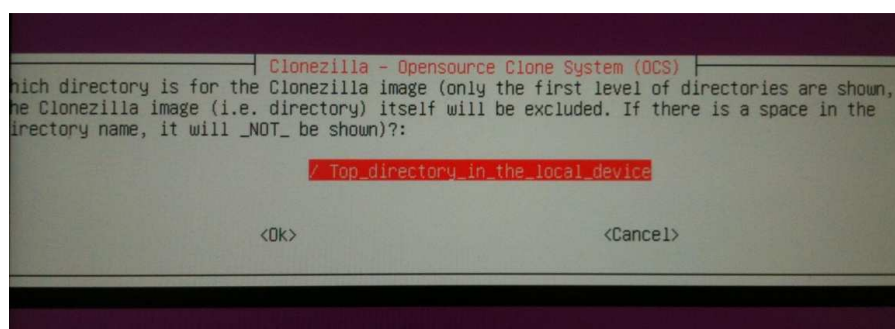
SDA1 , XXXGb\_Ext3 (Drive Model)and various other model numbers

SDB1, XXXGb\_NTFS (Model numbers etc)

What it is requesting here is where, is what device to mount so that it can save the image files.

Naturally we want to save it to the USB device, so we will select the second item (**note** : not the default).So Select your USB drive and select **OK**

The next screen will ask what directory you want to save the image into



There is only one option which is

**/ Top\_directory\_in\_the\_local\_device**

Select this and select **OK**

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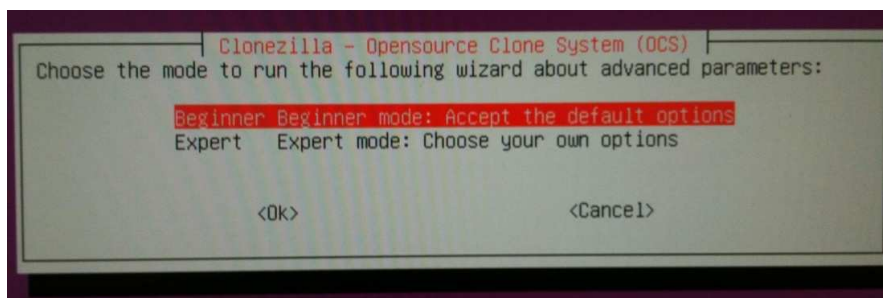
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It will then show you a file list similar to the screen shot below

```
file system disk space usage
*****
esystem      Size  Used Avail Use% Mounted on
s            248M  4.5M  243M   2% /
e            0      0      0 - /proc
e            0      0      0 - /sys
ectl        0      0      0 - /sys/fs/fuse/connections
e           242M  240K  242M   1% /dev
e            0      0      0 - /dev/pts
v/sr0       105M  105M    0 100% /live/image
fs           248M  4.5M  243M   2% /live/cow
fs           248M    0  248M   0% /live
e            0      0      0 - /sys/kernel/debug
e            0      0      0 - /sys/kernel/security
e           248M    0  248M   0% /dev/shm
fs           248M    0  248M   0% /tmp
e           248M   52K  248M   1% /var/run
e           248M    0  248M   0% /var/lock
v/sdb1       15G   87M   15G   1% /tmp/local-dev
p/local-dev  15G   87M   15G   1% /home/partimag
*****
ss "Enter" to continue.....
```

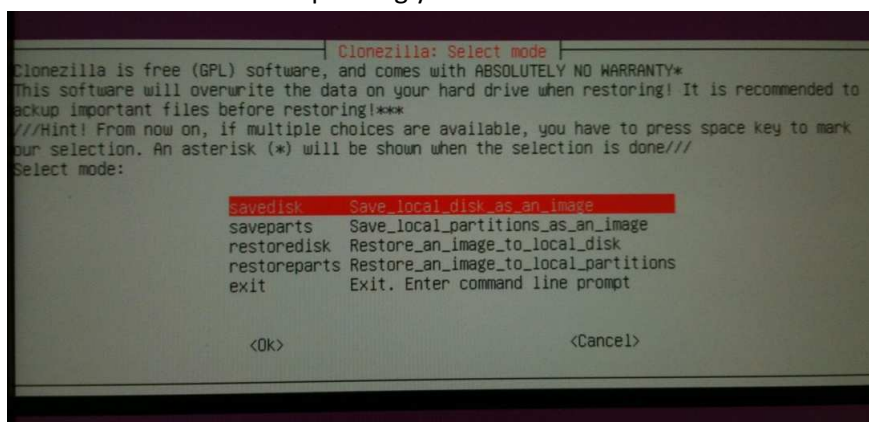
This screen is useful as you can gauge whether the USB device you have will have enough room. If you quickly/visually add the USED column, this will give you a very rough idea of how much space the image will require. Press **ENTER** when you are confident you have enough space

The following screen will come up



The default is **Beginner Mode**. Leave it as it is and select **OK**

Then a screen will come up asking you to Select Mode.

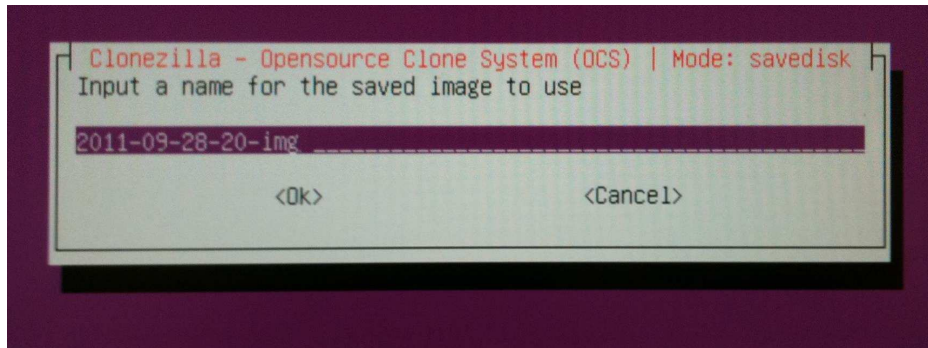


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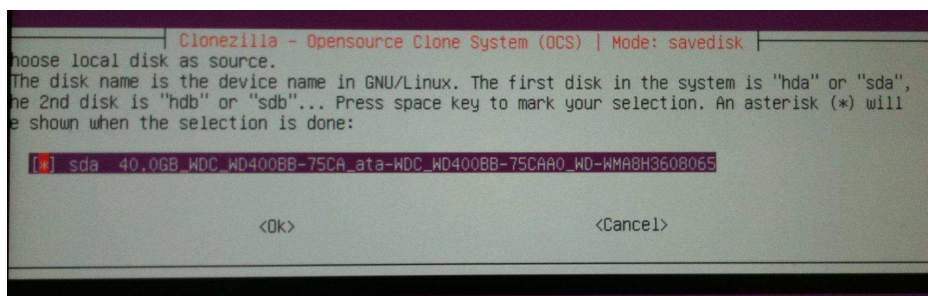
The default is **Savedisk – Save local disk as an image**. Leave it as it is and select **OK**

The next screen asks us for the filename



Leave as default which is usually the date. Select **OK**. But if you really need to add a dash and a more meaningful name e.g 2011-09-28-20-img-ElastixTest

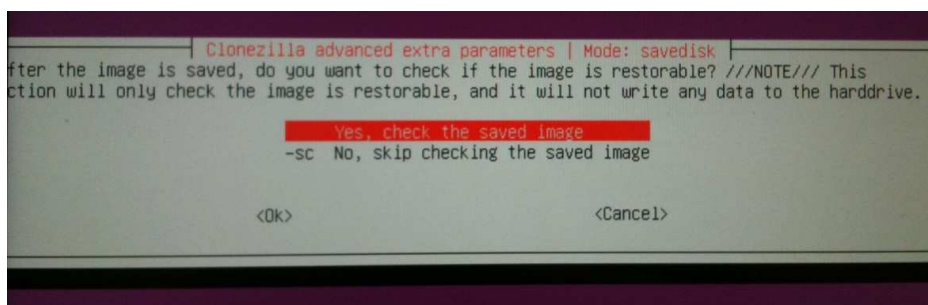
The next screen asks us to choose a local disk as a source



Normally you only have the one source....but in case you have a couple of hard drives, you need to select the right one. Usually your drive will be SDA (confirm by checking the size next to SDA)

Select your source drive, select **OK**

On the next screen, it will ask if you want to check the saved image



The default is **YES**. Leave it as it is and select **OK**

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This is asking if you want it to check/verify the saved image which is a good practice and not as long as creating the image

After this screen a bit of text comes up at the bottom of the screen providing you with a command line if you want to use it next time. We don't need it, but you may want to investigate this more once you are familiar with CloneZilla.....

Press **ENTER**

Some more text will come up and confirm that you want to save an image of the machine.

Confirm that it is the hard drive/partitions that you want to backup and press **Y & ENTER**

**Sit back and watch the backup run through.** It will do a backup of all partitions....Then it will save the machine info and then it will commence what looks like another backup, but it is checking the image to see if it matches. This will generally run faster than the backup...

Once this has completed it will provide some information....read it and press **ENTER** and finally press **ENTER** again which will return you to a linux prompt.

At this prompt type

**sudo shutdown -h now**

The system will shutdown, and you can remove your CD and USB Device and bring the system back online for normal operation again.

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### To Confirm you have an Image

Place the USB device into another workstation (e.g. Windows)

And in the root you should see the directory with the name you provided

Name	Type	Total size	Space free
 2011-09-28-20-img	File folder		

And if you drill down further, you should see the files it contains

Name	Type	Size
 disk	File	1 KB
 Info-dmi	Text Document	15 KB
 Info-lshw	Text Document	12 KB
 Info-lspci	Text Document	2 KB
 Info-packages	Text Document	1 KB
 lvm_logv.list	LIST File	1 KB
 lvm_vg_dev.list	LIST File	1 KB
 lvm_VolGroup00.conf	CONF File	2 KB
 parts	File	1 KB
 sda1.ext3-ptcl-img...	AA File	6,844 KB
 sda-chs.sf	SF File	1 KB
 sda-hidden-data-af...	File	31 KB
 sda-mbr	File	1 KB
 sda-pt.parted	PARTED File	1 KB
 sda-pt.sf	SF File	1 KB
 swappt-VolGroup00...	INFO File	1 KB
 VolGroup00-LogVol...	AA File	600,442 KB

So that's it

You have just backed up your Elastix system disk as an image.

If you need to put this saved image somewhere else, e.g. put it on another device for safe keeping. Copy the whole directory (in this case **2011-09-28-20-img**) to your other device.

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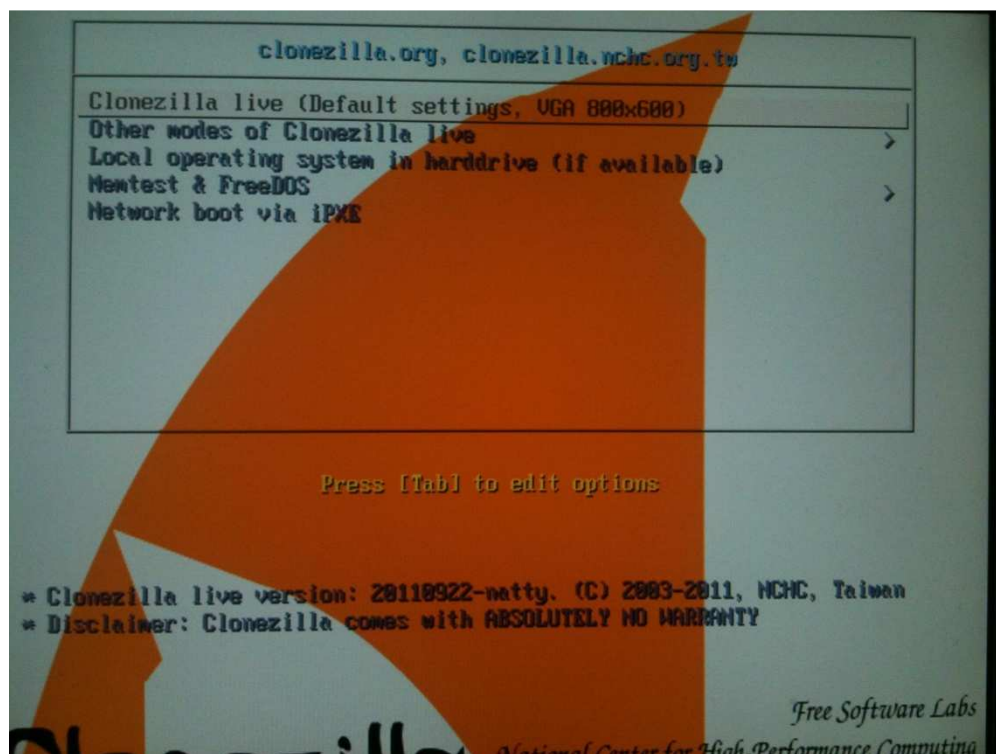
## Clonezilla Restore Procedure – A restore of a Disk Image Backup of your Elastix System

We assume that at this point you have created a bootable CloneZilla CD (as you would have for the backup procedure) and you have your image that you wish to restore on a USB Key or USB Hard Drive.

Insert USB Hard Drive or USB key into your Elastix System that you want to restore to.

Restart your Elastix system with the CloneZilla CD inserted.

It will boot up to the following Screen



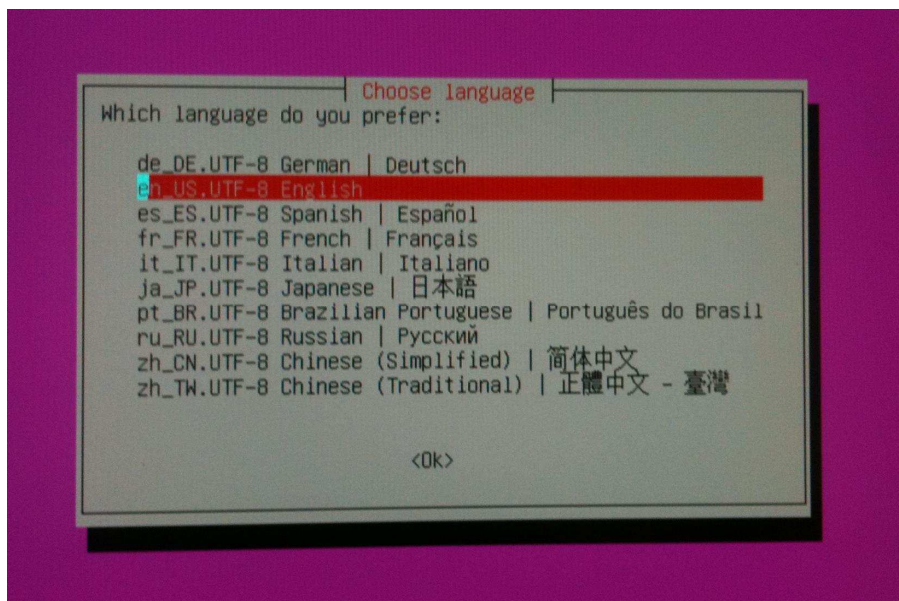
The default is **CloneZilla Live (Default Settings, VGA 800 x 600)**. Select this.

Don't Panic here if it does not appear to be doing anything. But basically it is booting.

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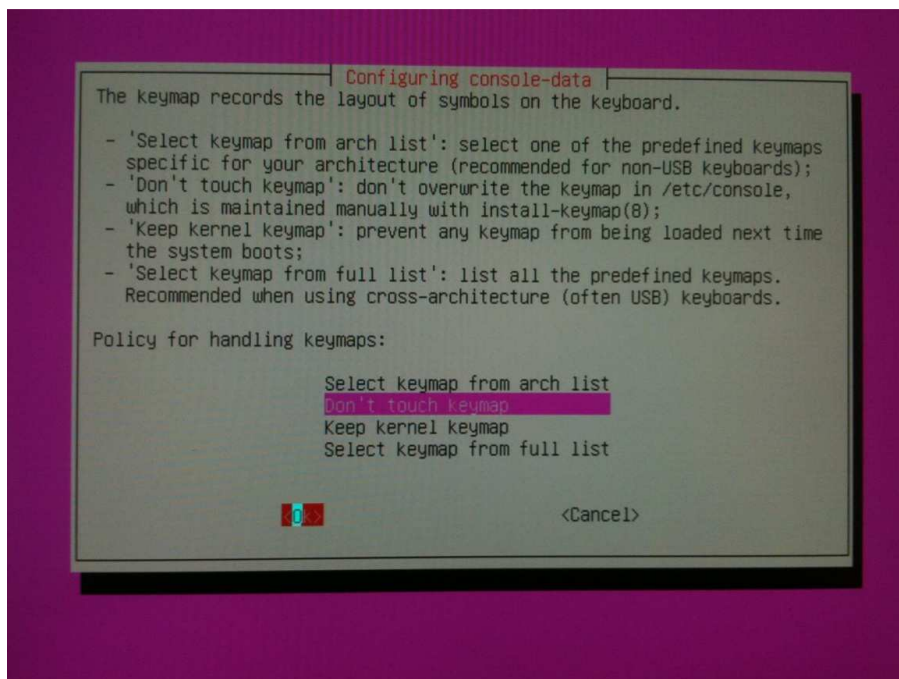
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The next screen comes up asking you to choose language.



Again select Default (which should be **English**)

The Next screen to come up says Configuring Console Data

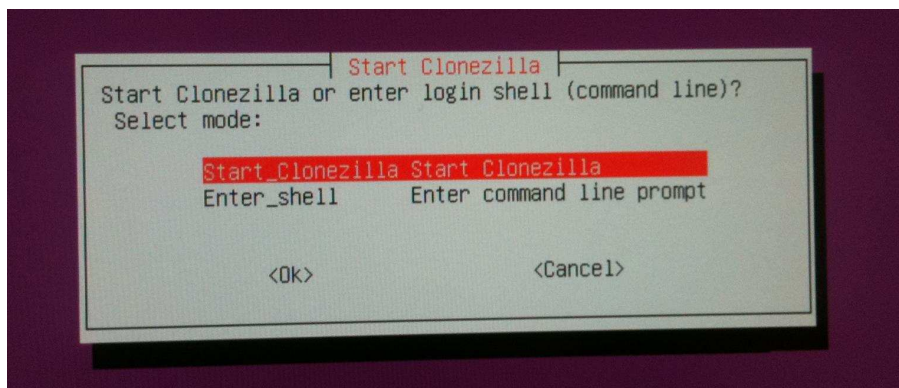


The Default is **Don't Touch Keymap**. Leave it as it is and select **OK**

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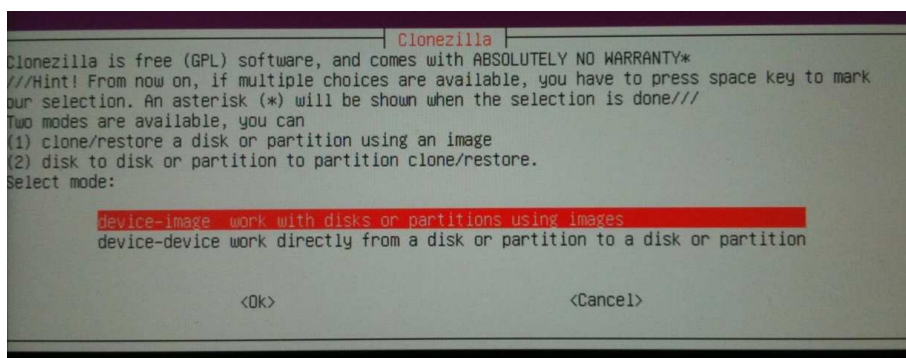
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The next screen comes up which should be Start CloneZilla



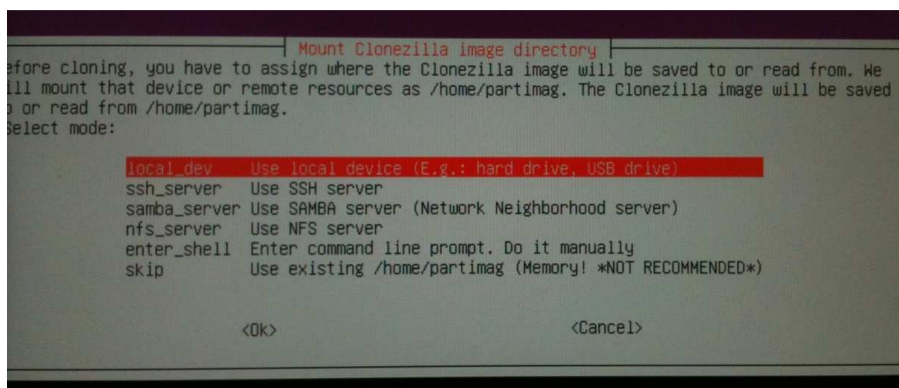
The default is **Start CloneZilla**. Leave it as it is and select **OK**

The Next screen will just be title CloneZilla.



The default is **Device-image**. Leave it as it is and select **OK**

The Next screen will come up headed Mount CloneZilla Image Directory



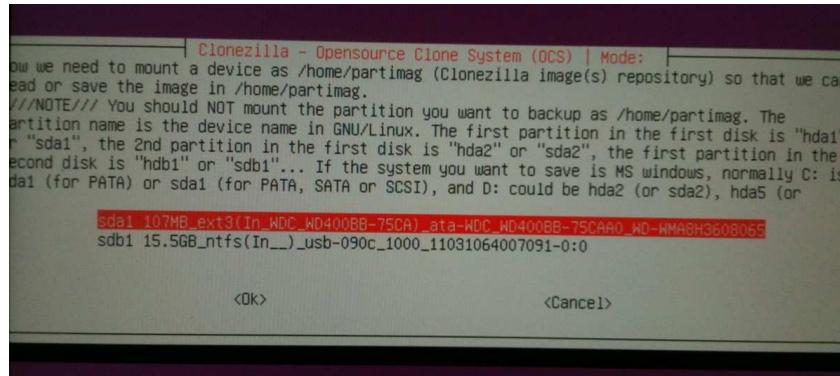
The Default is **Local\_dev**. Leave it as it is and select **OK**

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You will see some text come up asking for you to insert your USB drive (which we already did before booting). So press enter and it should detect your USB Device which you will determine on the next screen.

The next screen will be titled CloneZilla – Open source Clone System (OCS) | Mode :



### Select your USB Drive as follows

The options will differ depending on your hardware (e.g. Hard Drive type) and what USB device you have attached. So some common sense is needed here and an understanding of what you have in your system. For most systems, it will display like the picture above which has the following info.

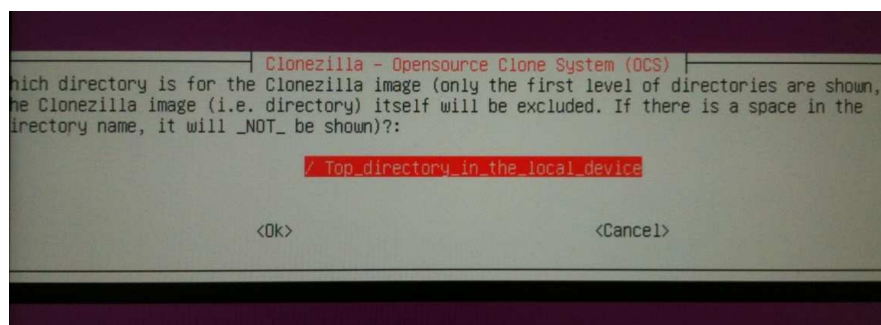
SDA1 , XXXGb\_Ext3 (Drive Model) and various other model numbers

SDB1, XXXGb\_NTFS (Model numbers etc)

What it is requesting here is where, is what device to mount so that it can save the image files.

Naturally we want to read it from the USB device, so we will select the second item (**note** : not the default). So Select your USB drive and select **OK**

The next screen will ask what directory you want to read the image from



There is only one option which is

**/ Top\_directory\_in\_the\_local\_device**

Select this and select **OK**

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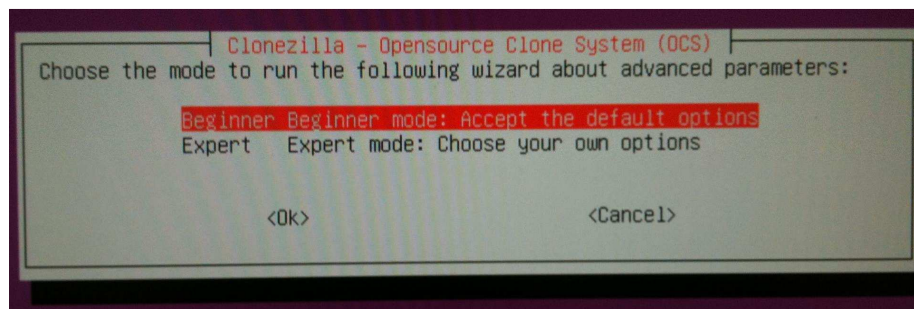


It will then show you a file list similar to the screen shot below

```
file system disk space usage
*****
esystem      Size  Used Avail Use% Mounted on
s            248M  4.5M  243M   2% /
e            0      0      0   - /proc
e            0      0      0   - /sys
ectl         0      0      0   - /sys/fs/fuse/connections
e           242M  240K  242M   1% /dev
e            0      0      0   - /dev/pts
v/sr0        105M  105M      0 100% /live/image
fs           248M  4.5M  243M   2% /live/cow
fs           248M      0  248M   0% /live
e            0      0      0   - /sys/kernel/debug
e            0      0      0   - /sys/kernel/security
e           248M      0  248M   0% /dev/shm
fs           248M      0  248M   0% /tmp
e           248M   52K  248M   1% /var/run
e           248M      0  248M   0% /var/lock
v/sdb1       15G   87M   15G   1% /tmp/local-dev
p/local-dev  15G   87M   15G   1% /home/partimag
*****
ss "Enter" to continue.....
```

....don't panic....just press **ENTER** to continue

The following screen will come up

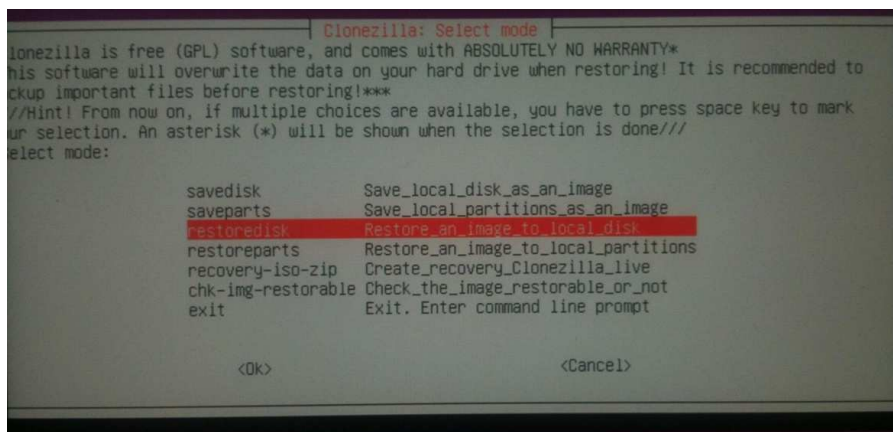


The default is **Beginner Mode**. Leave it as it is and select **OK**

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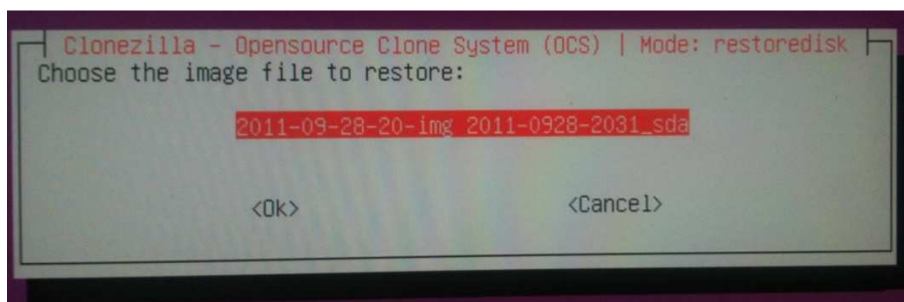
Then a screen will come up asking you to Select Mode.



**IMPORTANT:** This is the all important part. Up until now, this Restore procedure looked the same as the Backup Procedure.

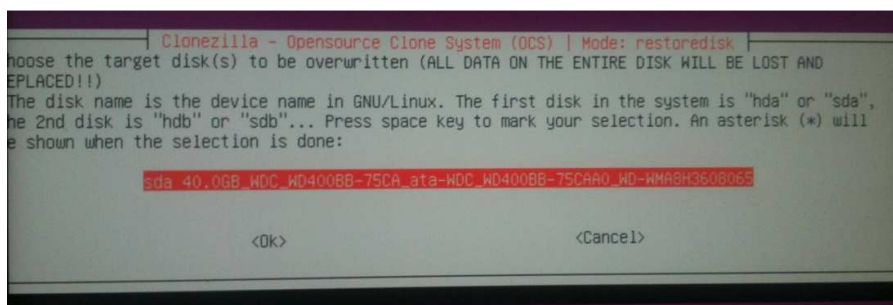
We are not going to select the default here, as we want to restore. So we select **RESTOREDISK** which will restore an image back to the hard drive.

The next screen asks us for the filename to Restore (which it has read from the USB Device). In our case it has one image, but if you have made several backups, you may see several images to restore



Select the image you want to restore and select **OK**

The next screen asks us to choose a local disk as the target for the restore.



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Normally you only have the one target....but in case you have a couple of hard drives, you need to select the right one. Usually your drive will be SDA (confirm by checking the size next to SDA)

Select your target drive (the drive you are restoring to), and select **OK**

After this screen a bit of text comes up at the bottom of the screen providing you with a command line if you want to use it next time. We don't need it, but you may want to investigate this more once you are familiar with CloneZilla.....

Press **ENTER**

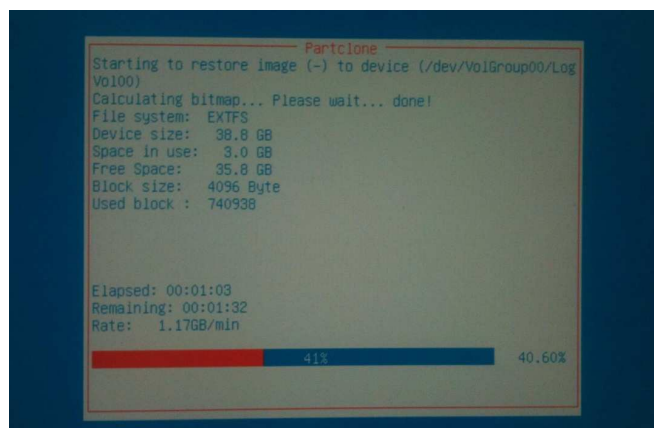
Some more text will come up and confirm that you want to restore the image to the machine. This screen has WARNING!! WARNING!!! WARNING!! Making it very clear you are about to overwrite the Hard disk/Partition.

```
*****
Next time you can run this command directly:
t/drbl/sbin/ocs-sr -g auto -e1 auto -e2 -c -r -j2 -p true restoredisk 2011-09-28-20-img sda
s command is also saved as this file name for later use if necessary: /tmp/ocs-2011-09-28-20-img-
1-10-08-14-56
ss "Enter" to continue...
ivating the partition info in /proc... done!
ting /dev/sda1 info...
ting /dev/sda2 info...
*****
following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
g/2011-09-28-20-img" -> "sda sda1 sda2"
NING!!! WARNING!!! WARNING!!!
NING! THE EXISTING DATA IN THIS HARDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
LOST:
*****
hine: OptiPlex GX260
(40.0GB_MDC_MD400BB-75CA0_ata-MDC_MD400BB-75CA00_MD-HMA8H3608065)
1 (107MB_ext3(In_MDC_MD400BB-75CA0_ata-MDC_MD400BB-75CA00_MD-HMA8H3608065)
2 (39.9GB_LVM2_member(In_MDC_MD400BB-75CA0_ata-MDC_MD400BB-75CA00_MD-HMA8H3608065)
*****
you sure you want to continue? ?
n] _
```

Press **Y** if you are sure.

It will then ask you the same question again. Press **Y** if you are really sure

It will do a restore of all partitions using PARTCLONE which looks similar to the following screen



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### **Sit back and watch the Restore run through**

Once this has completed it will provide some information....read it and press **ENTER** and finally press **ENTER** again which will return you to a linux prompt.

At this prompt type

**sudo shutdown -h now**

The system will shutdown, and you can remove your CD and USB Device and bring the system back online for normal operation again.

Start your Elastix system and check that the restore occurred successfully.

So that's it

You have just restored your Elastix System from a Image backup using CloneZilla

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# Frequently Asked Questions (FAQ's)

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## You appear to have gone overboard with the disclaimers. Is it really necessary?

I could not emphasize any more the possibility that something could go wrong. Like all human beings, we very much want to take the quickest path to get something done. I personally, when first using an earlier version of Clonezilla, relied on a backup that I performed (without having tested the restore). The backup ran well, no issues, no concerns. However when it came to the time to restore, it failed with a fatal error on the restore. I was later to find it was an issue with that hardware and Clonezilla, but it's not what you find when the pressure is on. Needless to say, that same machine several years later, works fine with Clonezilla.

## I have heard that I can create a Restore Live CD?

Yes you can. It is outside the scope of this Application Note, but it is possible to create a Live CD that will restore the image. This is absolutely indispensable, especially if you have a remote client. When you build the Elastix system, configure all the basic options, take a Clonezilla image and create a restore CD and leave on-site. This means that should a Hard Disk/Filesystem failure occur, it is a lot simpler to restore the system with very little IT knowledge.

## I have restored a Clonezilla image to another piece of hardware, and I cannot connect to it via the Network.

Several issues might be at play here.....

- 1) It is possible that your Network scripts contain a MAC address. If you are on different hardware, then naturally it is not going to find the Network card to configure.
- 2) Your new machine, may have a Network Card which does not have the drivers compiled into the Kernel. You may need to see if a loadable module exists for your Network card. If not, locate a basic Network Card (e.g. Realtek 6111 or similar, that the kernel does recognise) and reboot.

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