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Published: 2009-01-20 20:39

Cloning Linux Systems With CloneZilla Server Edition (CloneZilla SE)

Version 1.0
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Last edited 01/14/2009

This tutorial shows how you can clone Linux systems with **CloneZilla SE**. This is useful for copying one Linux installation to multiple computers without losing much time, e.g. in a classroom, or also for creating an image-based backup of a system. I will install CloneZilla SE on a Debian Etch server in this tutorial. The systems that you want to clone can use whatever Linux distribution you prefer.

I do not issue any guarantee that this will work for you!

1 Preliminary Note

The Debian server on which I want to install CloneZilla SE is in the local network *192.168.0.0* (netmask *255.255.255.0*) and has the IP address *192.168.0.100*.

To clone a system, the target systems should use the same or at least similar hardware, otherwise cloning might not work!

2 Installing CloneZilla SE

First we import the GPG key of the DRBL (Diskless Remote Boot in Linux, needed to boot the client systems from the network (PXE) later on) and CloneZilla repository:

```
wget -q http://drbl.sourceforge.net/GPG-KEY-DRBL -O- | apt-key add -
```

Then we open */etc/apt/sources.list*...

```
vi /etc/apt/sources.list
```

... and add the DRBL/CloneZilla Debian repository to it:

```
[...]
deb http://drbl.sourceforge.net/drbl-core drbl stable
[...]
```

Run

```
apt-get update
```

afterwards.

Now we can install DRBL and CloneZilla like this:

```
apt-get install drbl
```

Then we run

```
/opt/drbl/sbin/drbl4imp
```

to configure DRBL and CloneZilla with default values (should work in most environments):

```
*************************************************.
  This script is for those impatient, it will setup the DRBL server by the default value which might not fit your
environment. Are you impatient ?
```

```
[Y/n] <-- ENTER

*************************************************.
  Ok, Laziness is a virtue! Let us setup DRBL server with the default values!!!
  Press "Enter" to continue... <-- ENTER

[...]

Starting the NAT services for DRBL clients... done!
  ip_forward is already on.
  The GDM or KDM config file is NOT found! Skip setting the DM! Maybe you will not be able to make this DRBL server as thin
client server!
  Clean all the previous saved config file if they exist...done!
  Turn on the boot prompt for PXE client...done!
  Turn off the thin client option in PXE boot menu...done!
  Modifying /tftpboot/nbi_img/pxelinux.cfg/default to let DRBL client use graphical PXE boot menu... done!
  Full DRBL mode. Remove clientdir opt for label drbl in pxelinux config...
  Setting drbl_mode="full_drbl_mode" in /etc/drbl/drbl_deploy.conf and /etc/drbl/drblpush.conf... done!
  Full clonezilla mode. Remove clientdir opt for label clonezilla in pxelinux config...
  Setting clonezilla_mode="full_clonezilla_mode" in /etc/drbl/drbl_deploy.conf and /etc/drbl/drblpush.conf... done!
  You have to use "/opt/drbl/sbin/dcs" -> clonezilla-start to start clonezilla serivce, so that there will be a clonezilla
menu when client boots
  *************************************************.
  Adding normal users to group "audio cdrom plugdev floppy video"........ done!
  *************************************************.
  Updating the YP/NIS for group...
  Note! If you add new or remove accounts in the DRBL server in the future, remember to run the following command again, so
that some group (EX:plugdev) will be updated:
  tune-debian-dev-group-perm -g "audio cdrom plugdev floppy video" -e
  *************************************************.
  Enjoy DRBL!!!
  http://drbl.nchc.org.tw; http://drbl.name
  NCHC Free Software Labs, Taiwan. http://free.nchc.org.tw
```

```
  **************************************************.
  If you like, you can reboot the DRBL server now to make sure everything is ready...(This is not necessary, just an
option.).
  **************************************************.
  DRBL server is ready! Now set the client machines to boot from PXE or Etherboot (refer to http://drbl.sourceforge.net for
more details).
  NOTE! If Etherboot is used in client machine, version 5.4.0 or newer is required!
  PS. The config file is saved as /etc/drbl/drblpush.conf. Therefore if you want to run drblpush with the same config again,
you may run it as: /opt/drbl/sbin/drblpush -c /etc/drbl/drblpush.conf
  server1:~#
```

That's it for the installation.

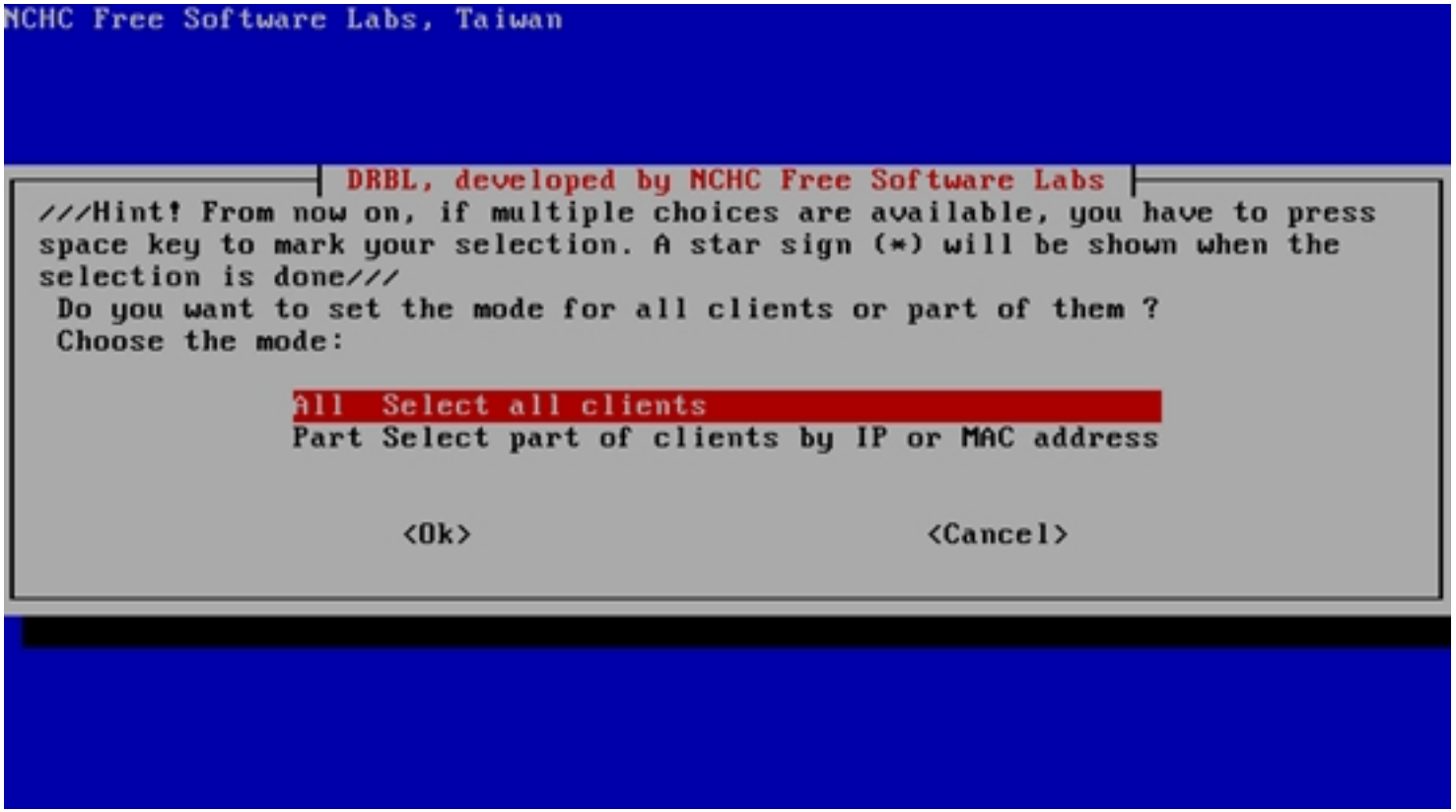
3 Creating An Image Of A Linux System

To create an image, we first start CloneZilla on the Debian system and tell it to store an image (the server will then wait until a client connects to store the image), and then we boot the client system of which we want to create the image from the network - it should then boot into a CloneZilla Linux system that connects to the server and creates the image.

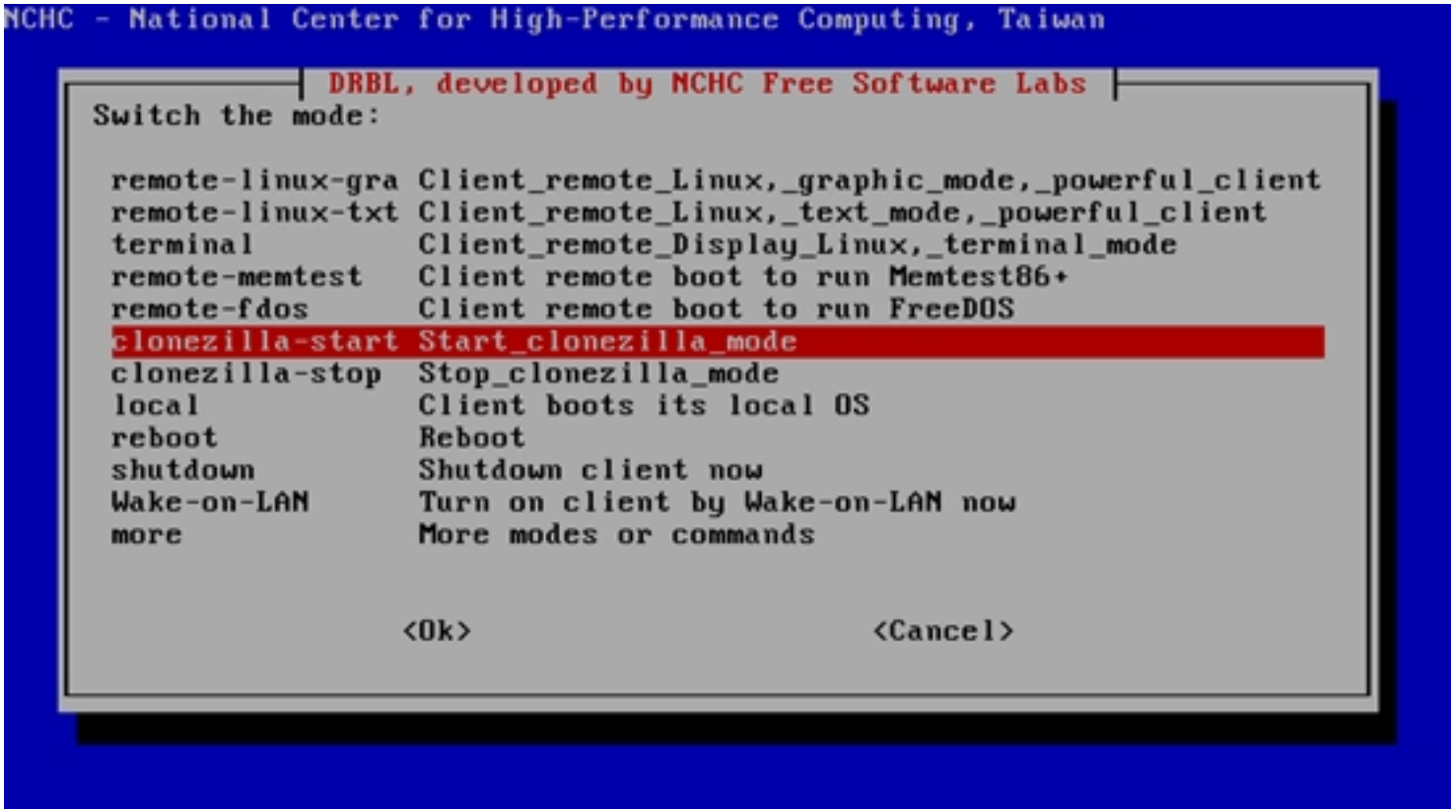
Run

```
/opt/drbl/sbin/dcs
```

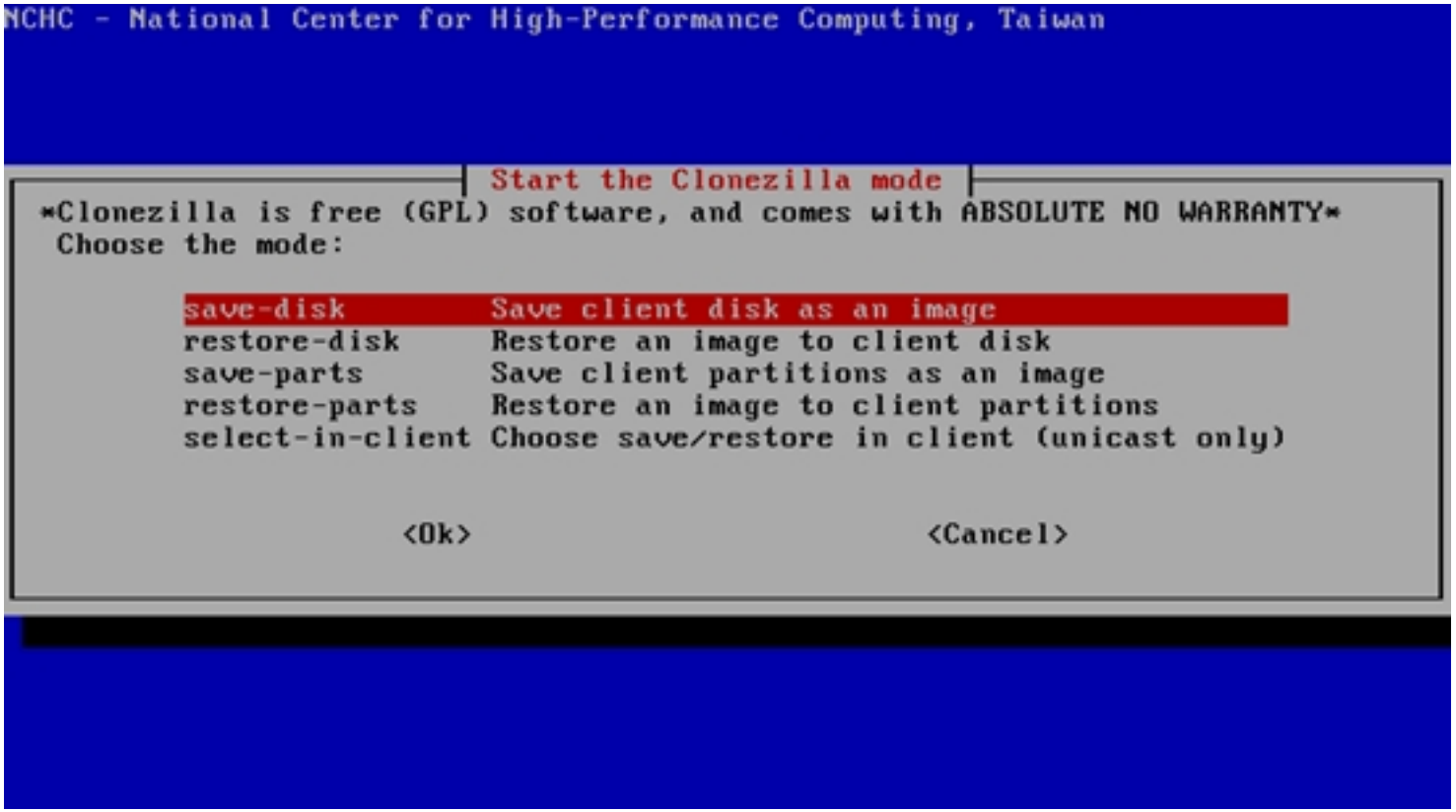
on the Debian server and select `All Select all clients`:



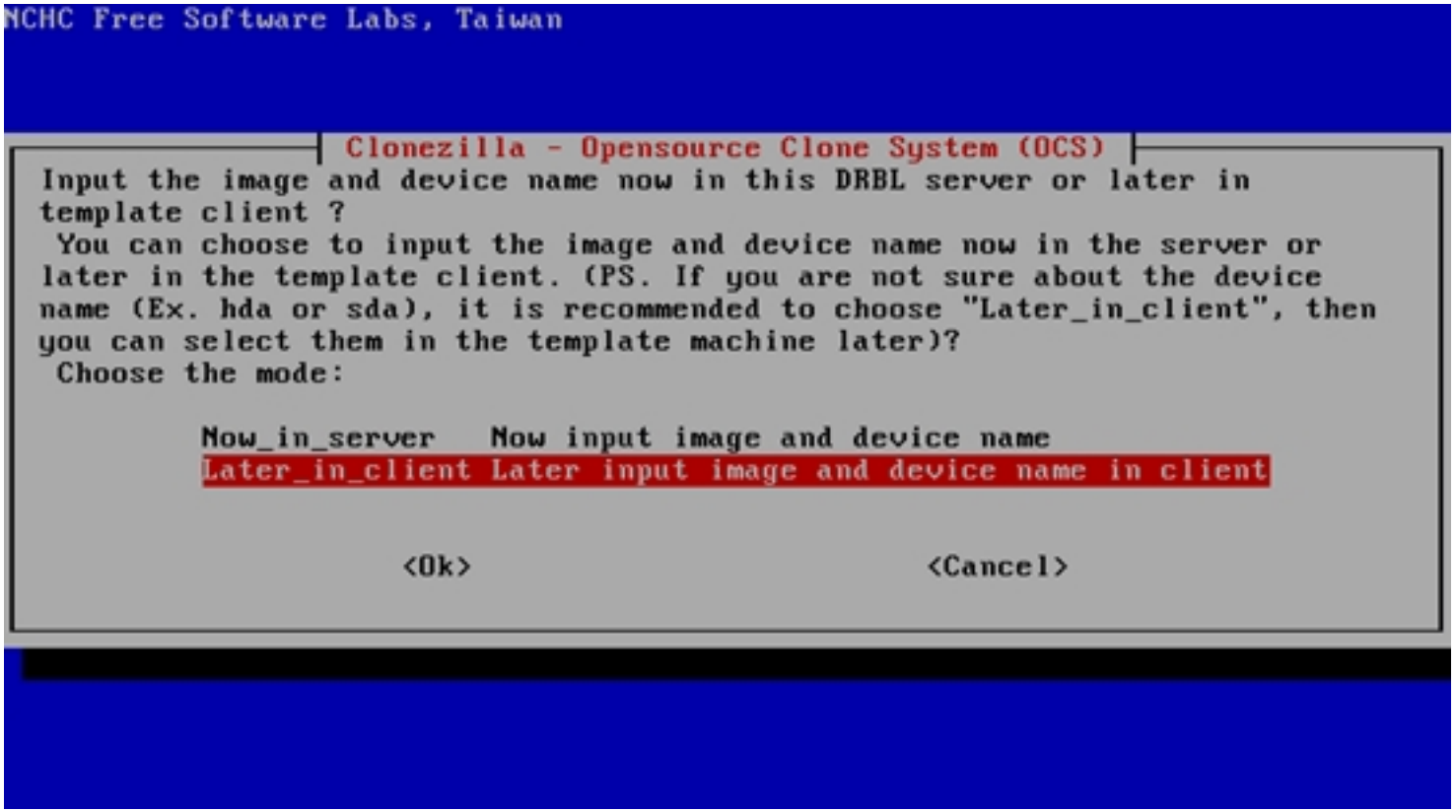
Next pick *clonezilla-start Start_clonezilla_mode*:



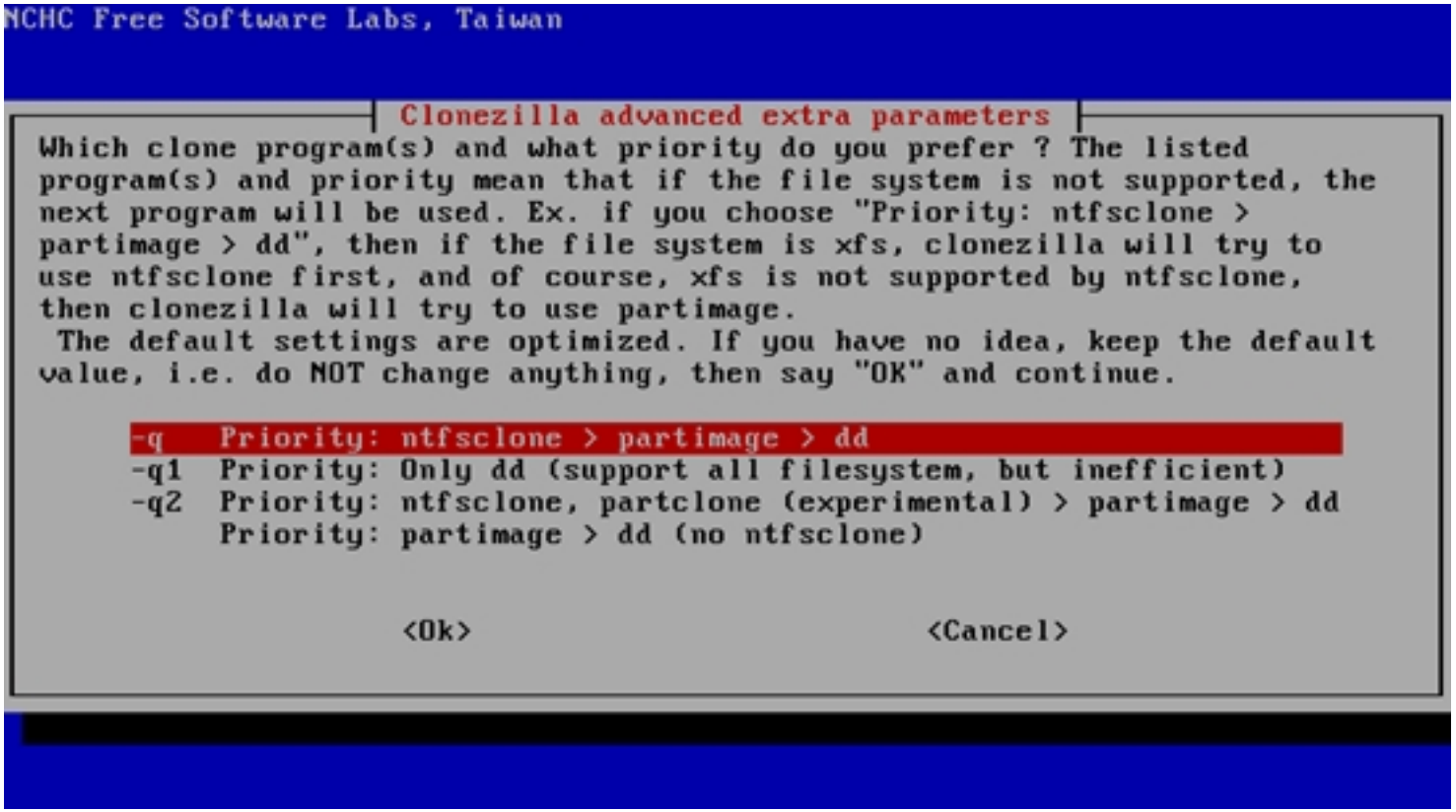
Choose *save-disk Save client disk as an image*:

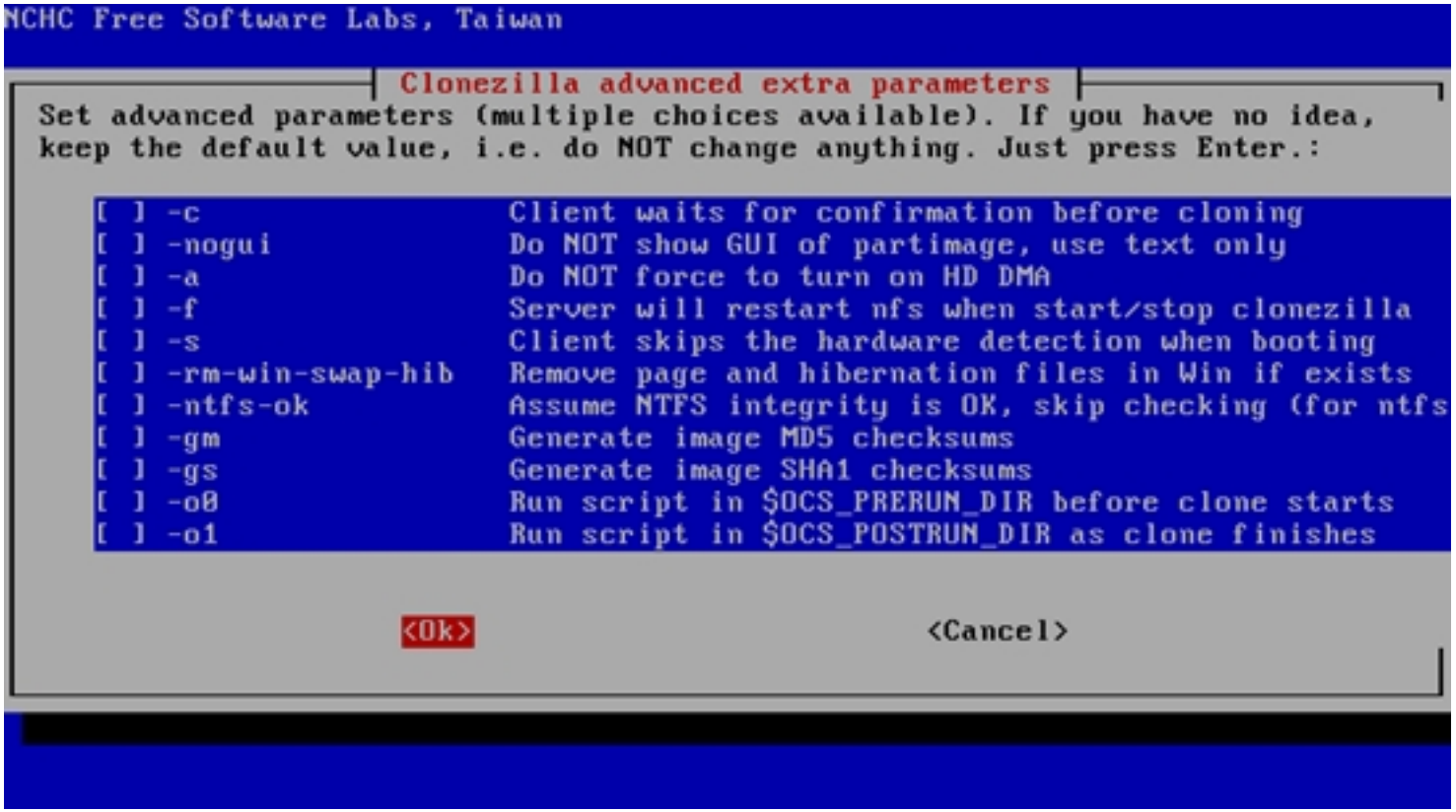


Select *Later_in_client Later input image and device name in client* (you will then be prompted for an image name later on the client, instead of having to provide an image name now):

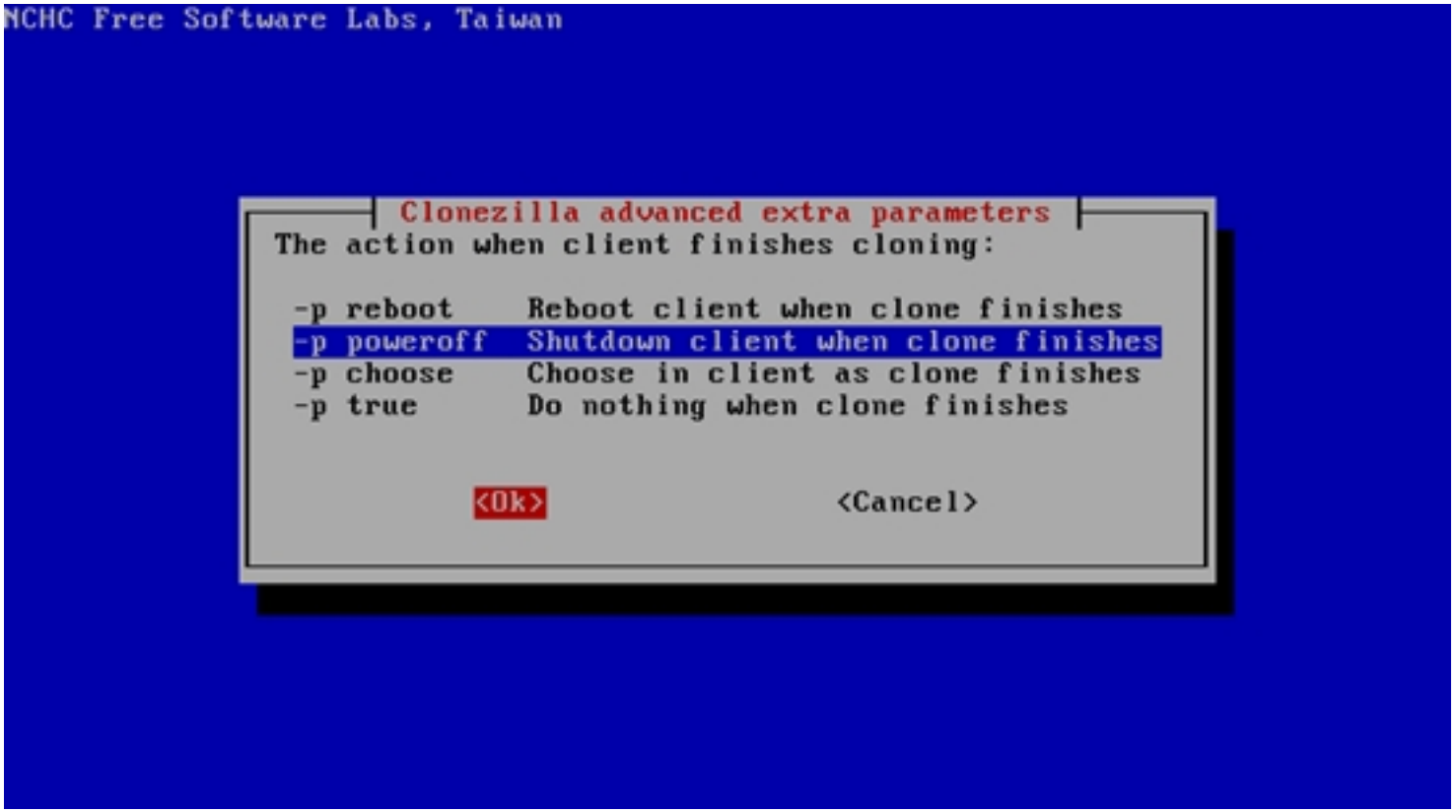


On the next two screens you can simply press *ENTER* to select the default values:

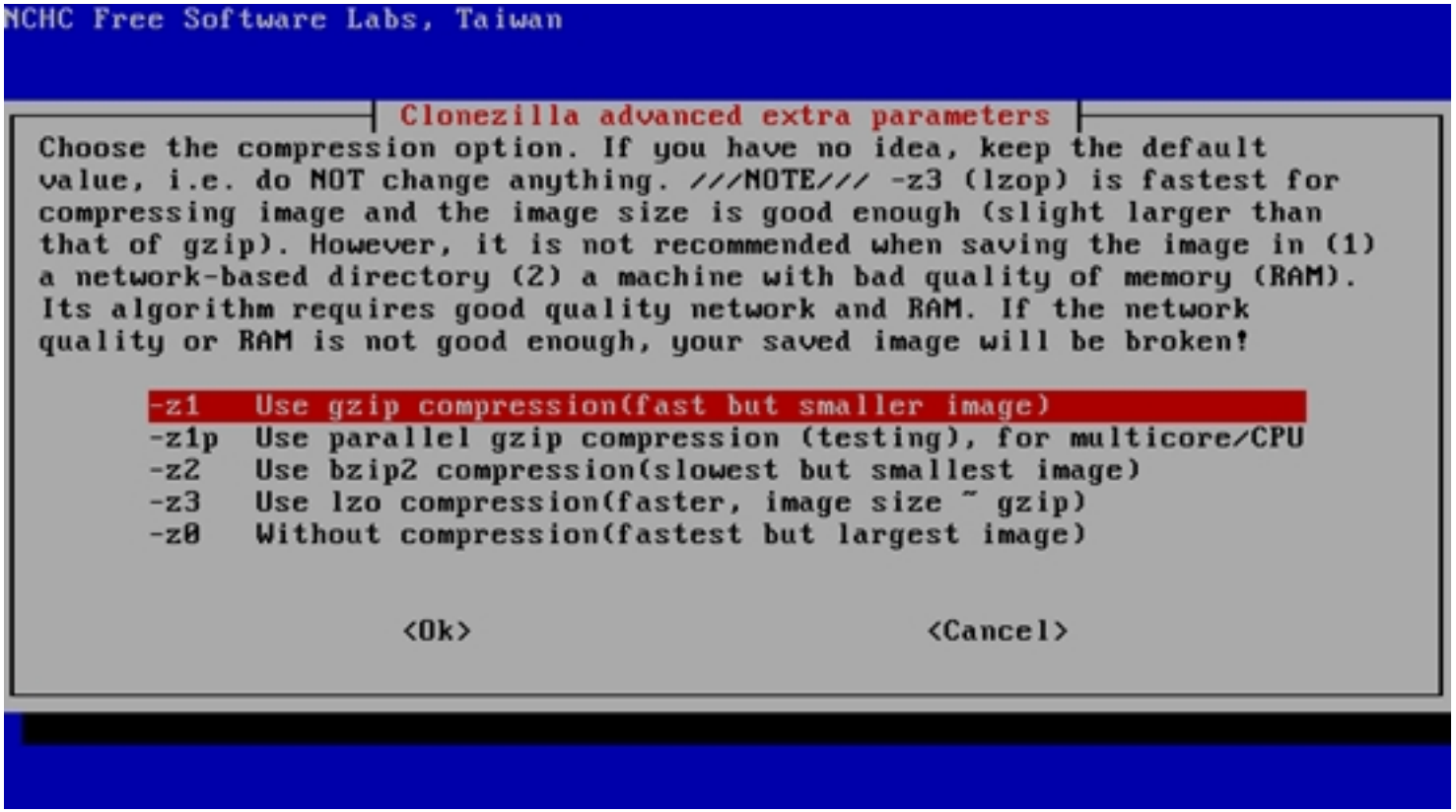


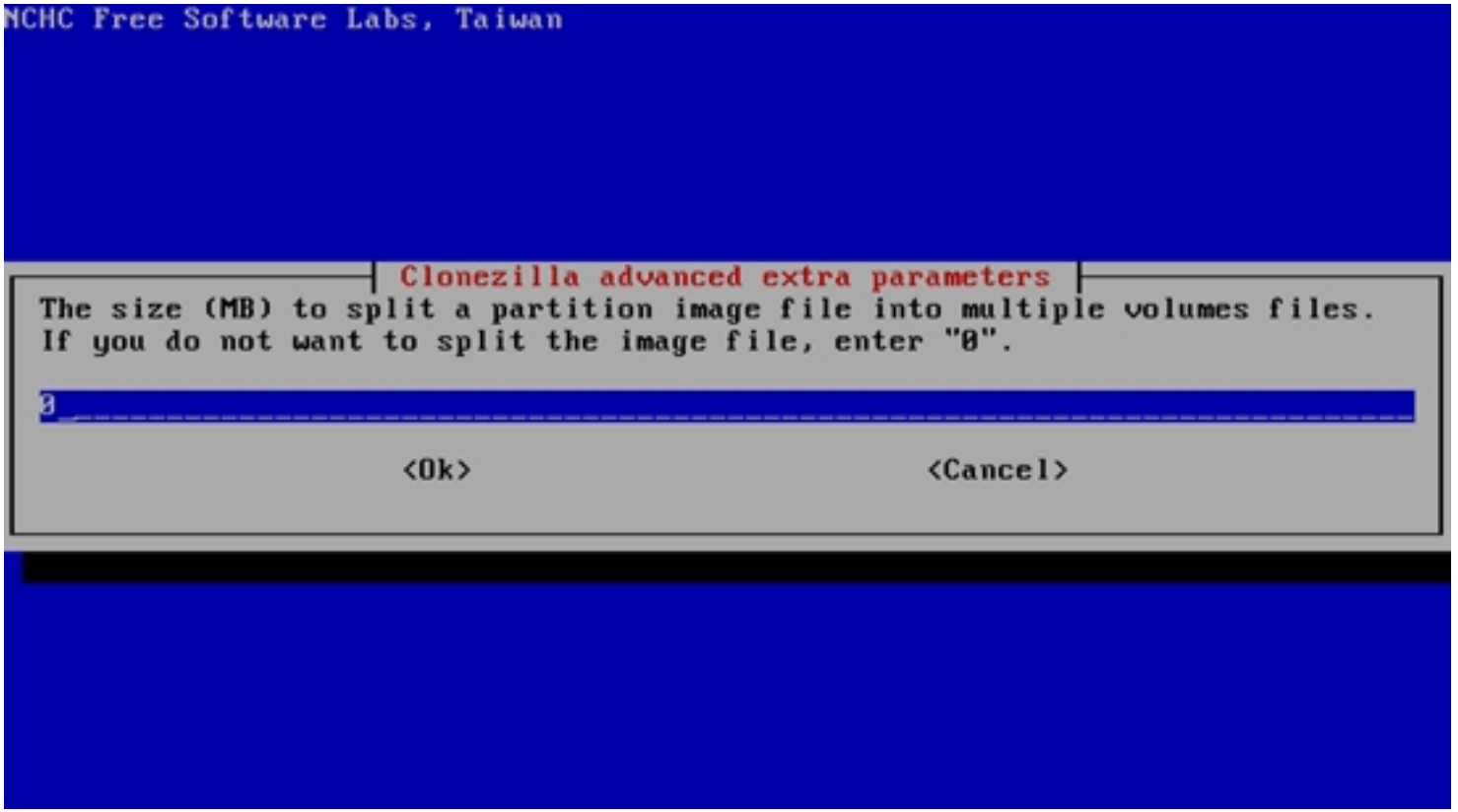


Select the action when the client finishes cloning (I want to shut down the client after the image has been created, so I select `-p poweroff`):

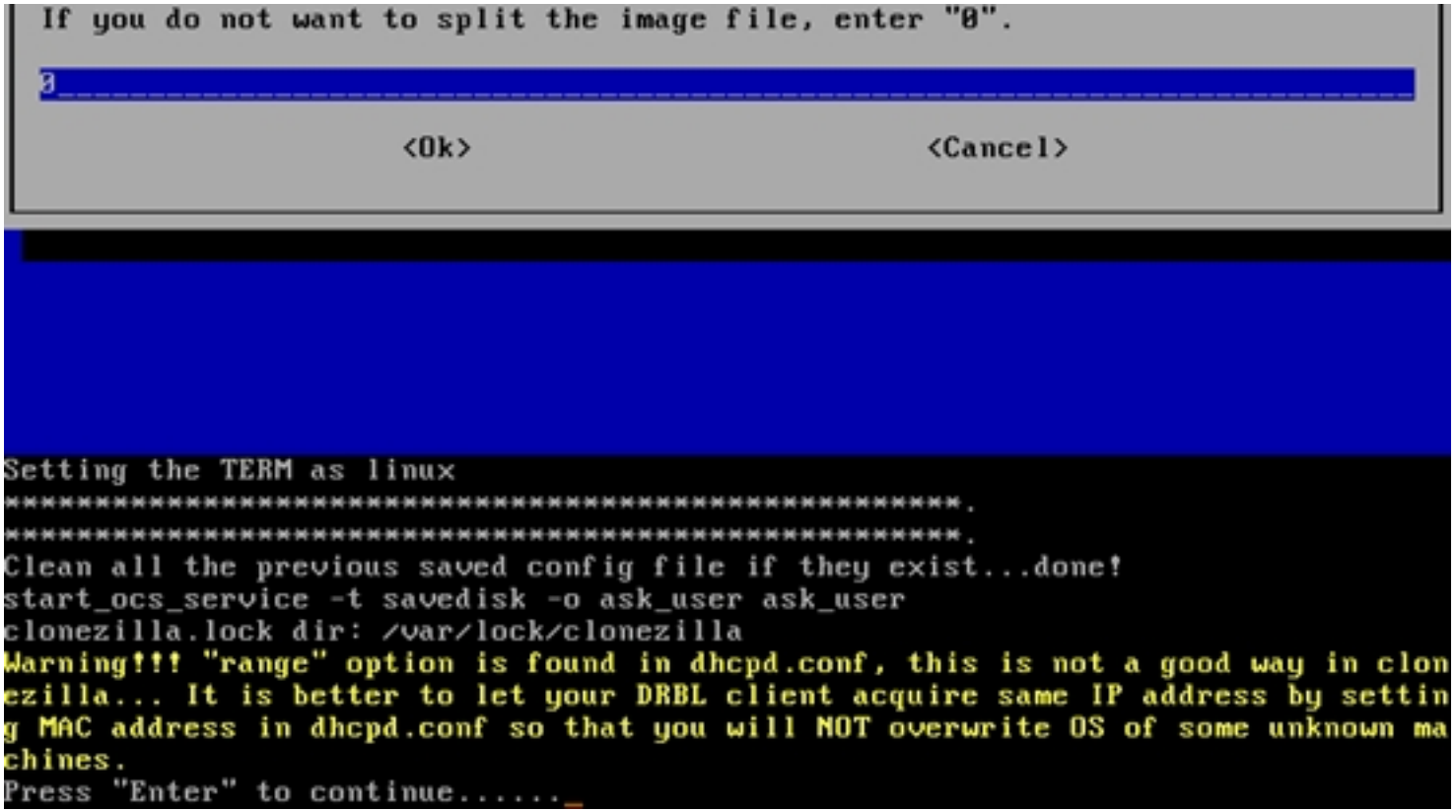


Press *ENTER* again on the next two screens to accept the default values:

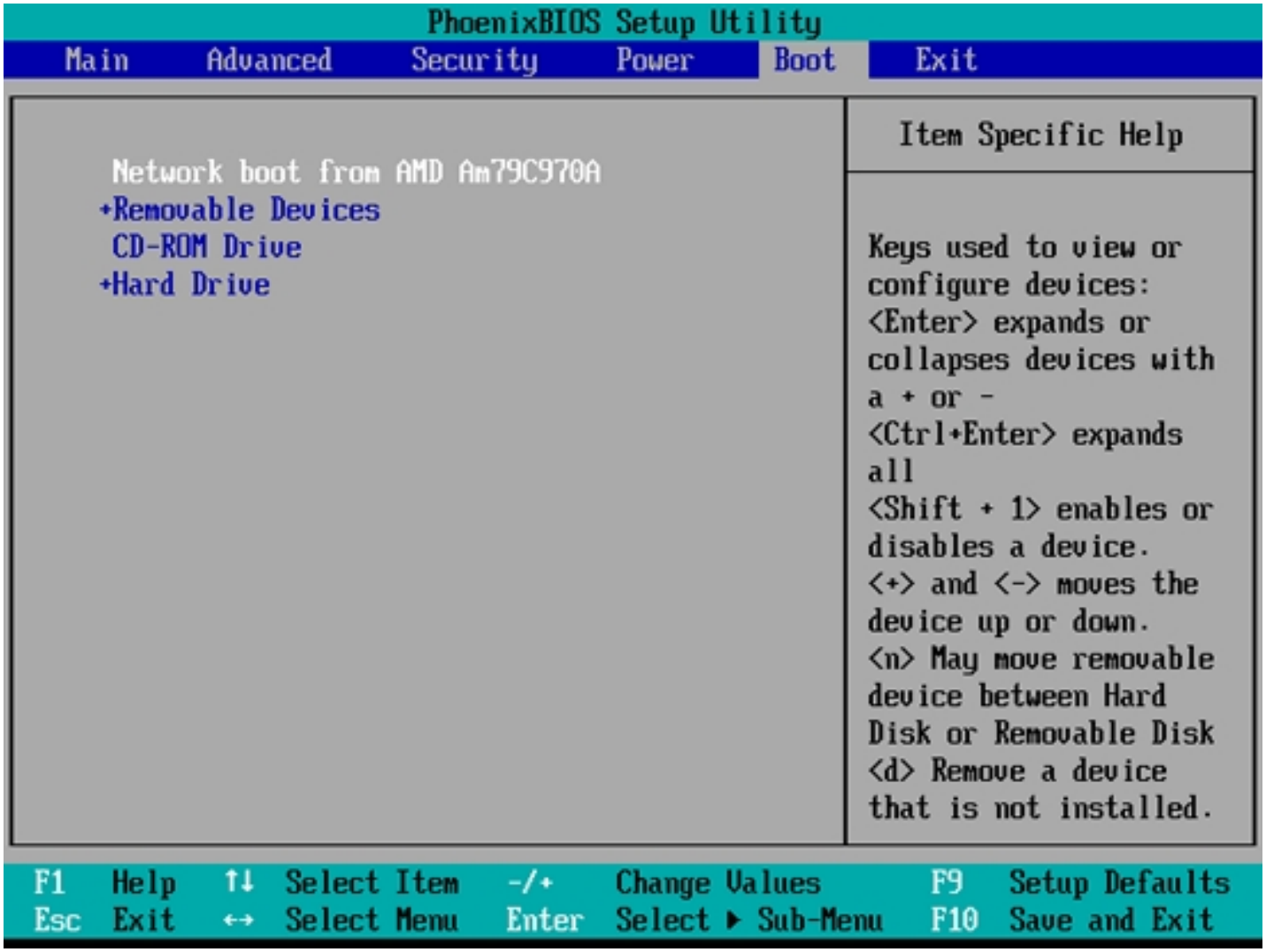




Press *ENTER* again:

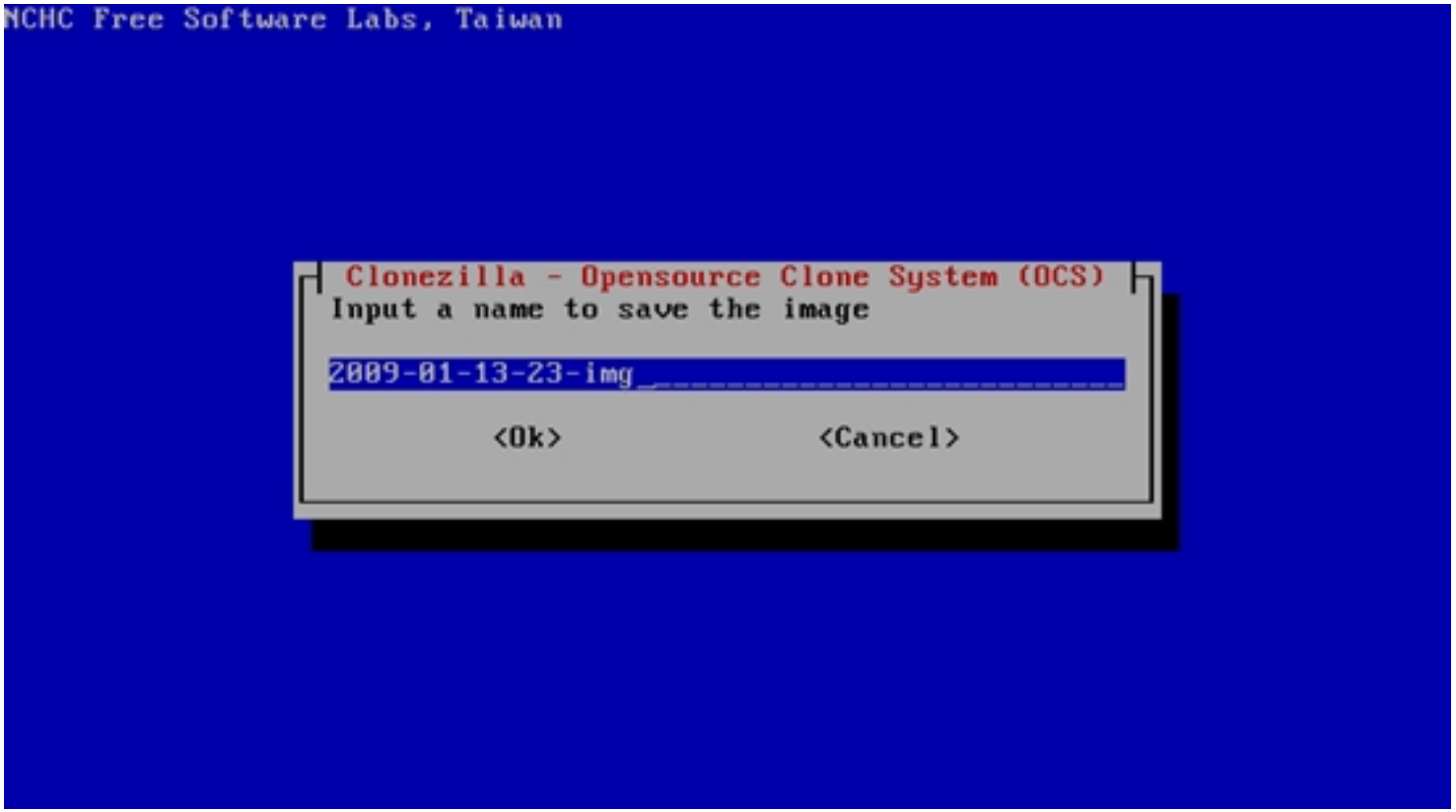


The server is now ready. Now start the client system that you want to clone. It is important that you boot it from the network (via PXE) - you might have to adjust the boot order in the client's BIOS so that it boots via PXE:

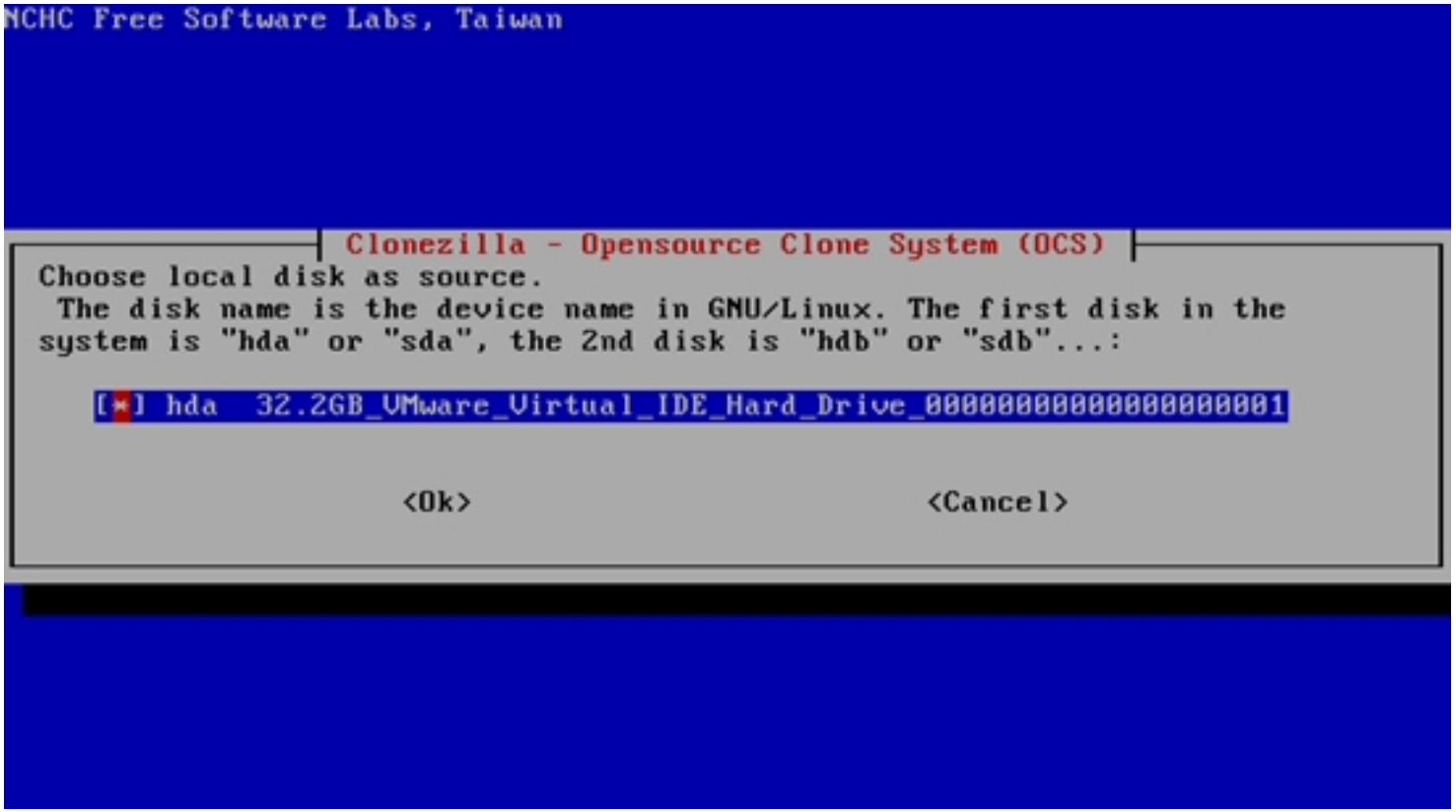


After you've configured the client to boot from the network, you should see a DRBL boot menu. Select *`Clonezilla: save disk (choose later) as image (choose later)`*:

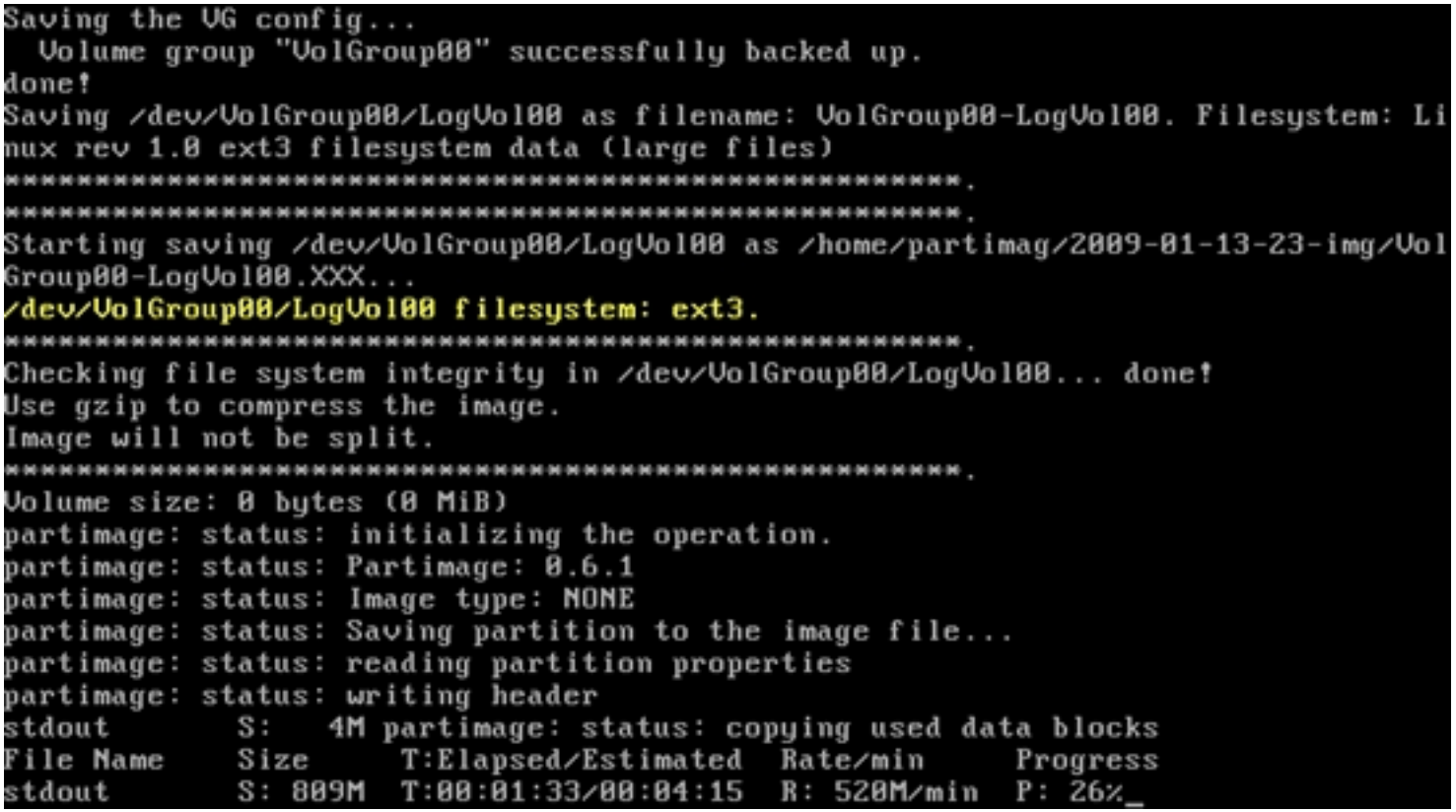
Next provide a name for the image (or accept the default value):



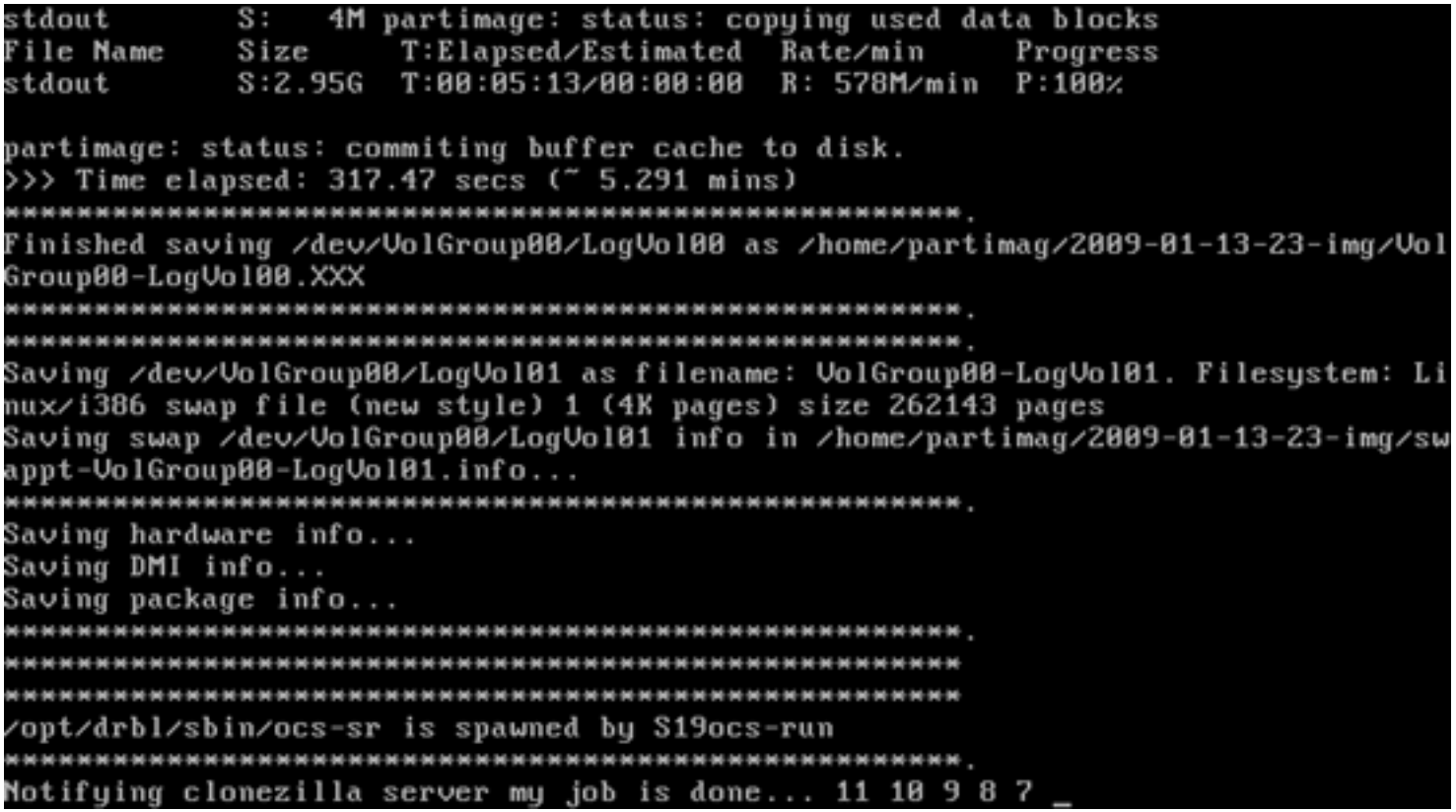
Select the source hard drive:



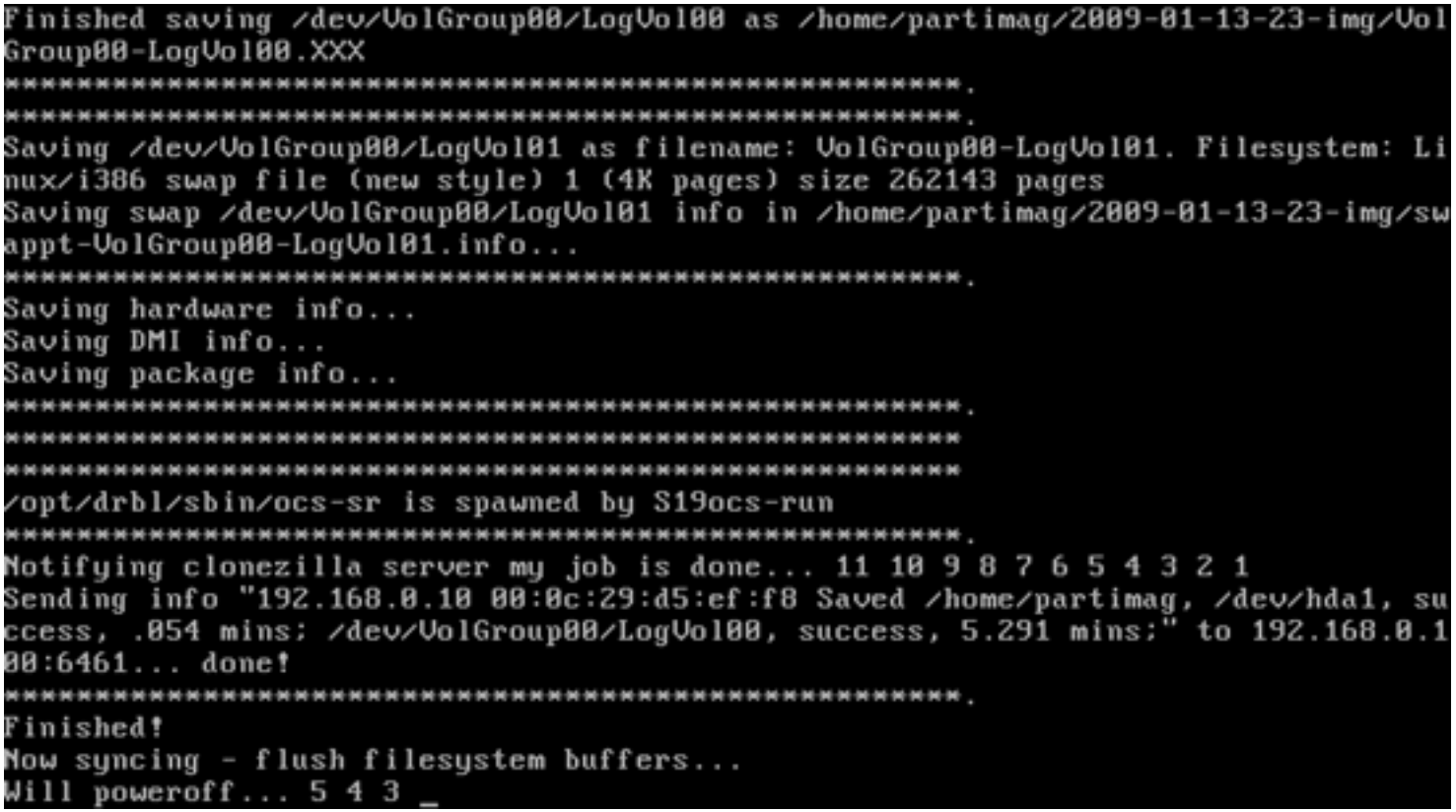
Afterwards, the image is being created and transferred to the CloneZilla server:



Then the CloneZilla server is notified that the image creation process has finished...



... and the client system is shut down (or rebooted - that depends on the action you've chosen on the server):



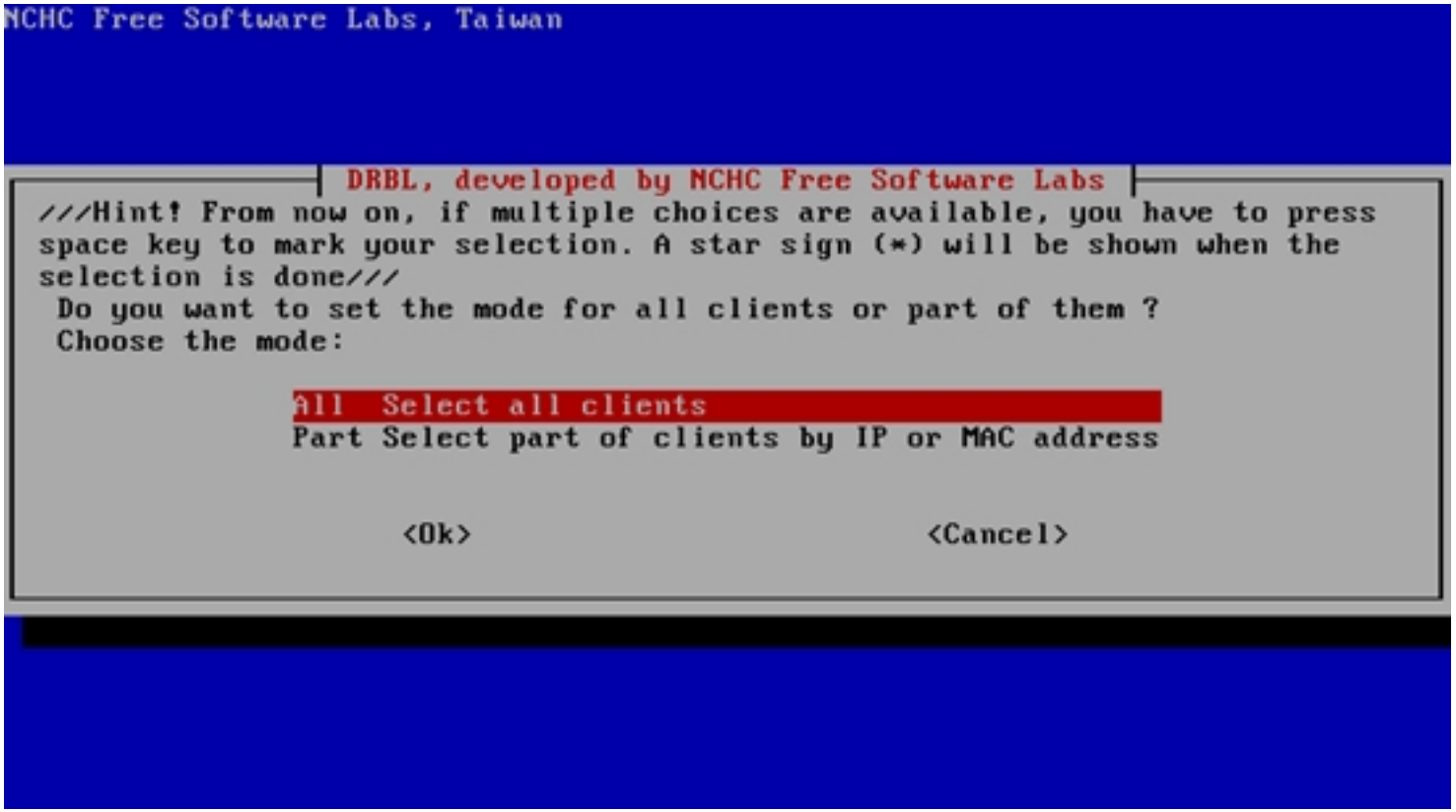
That's it, we now have an image of our Linux system that we can clone to other systems.

4 Cloning/Restoring The Image

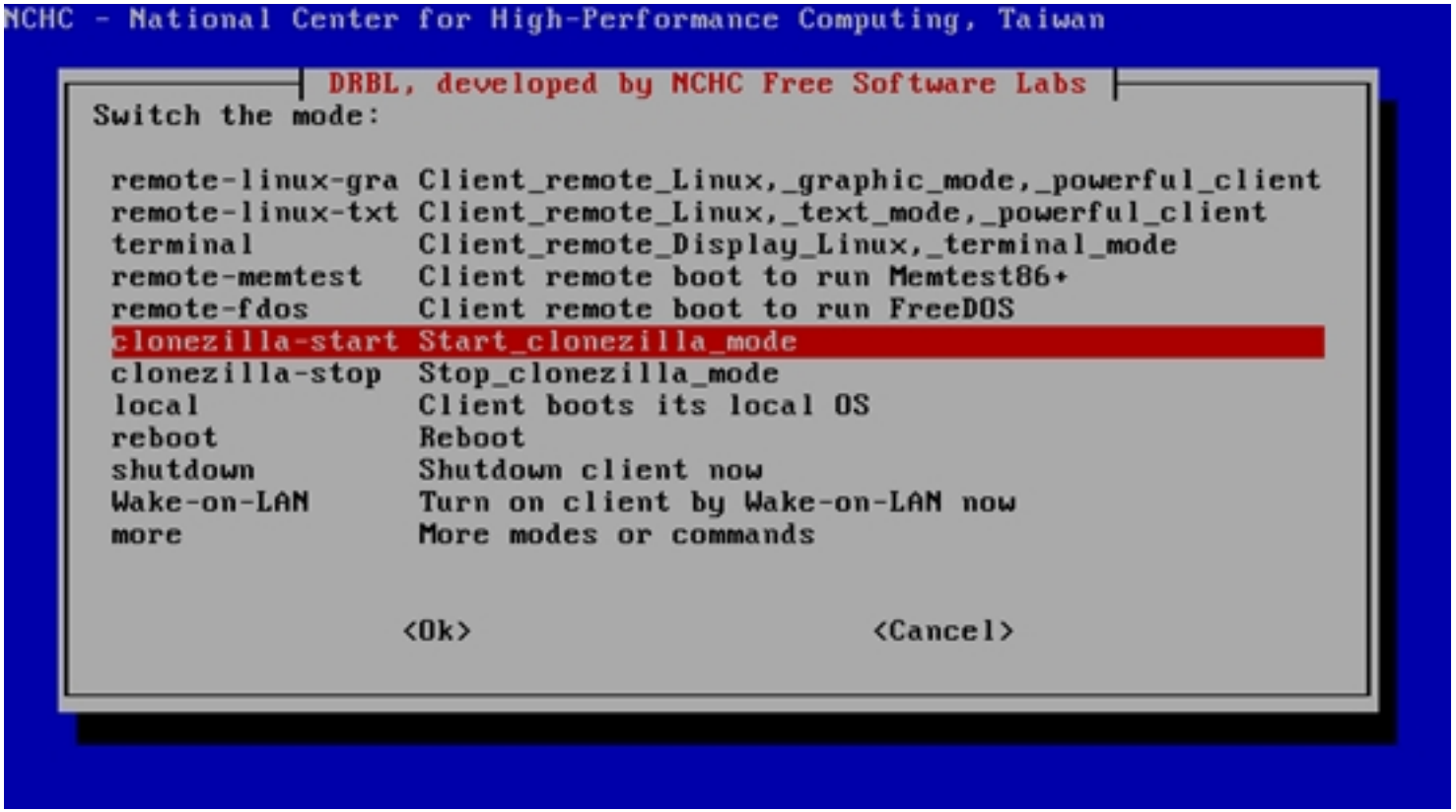
To clone or restore the image to other systems, run

```
/opt/drbl/sbin/dcs
```

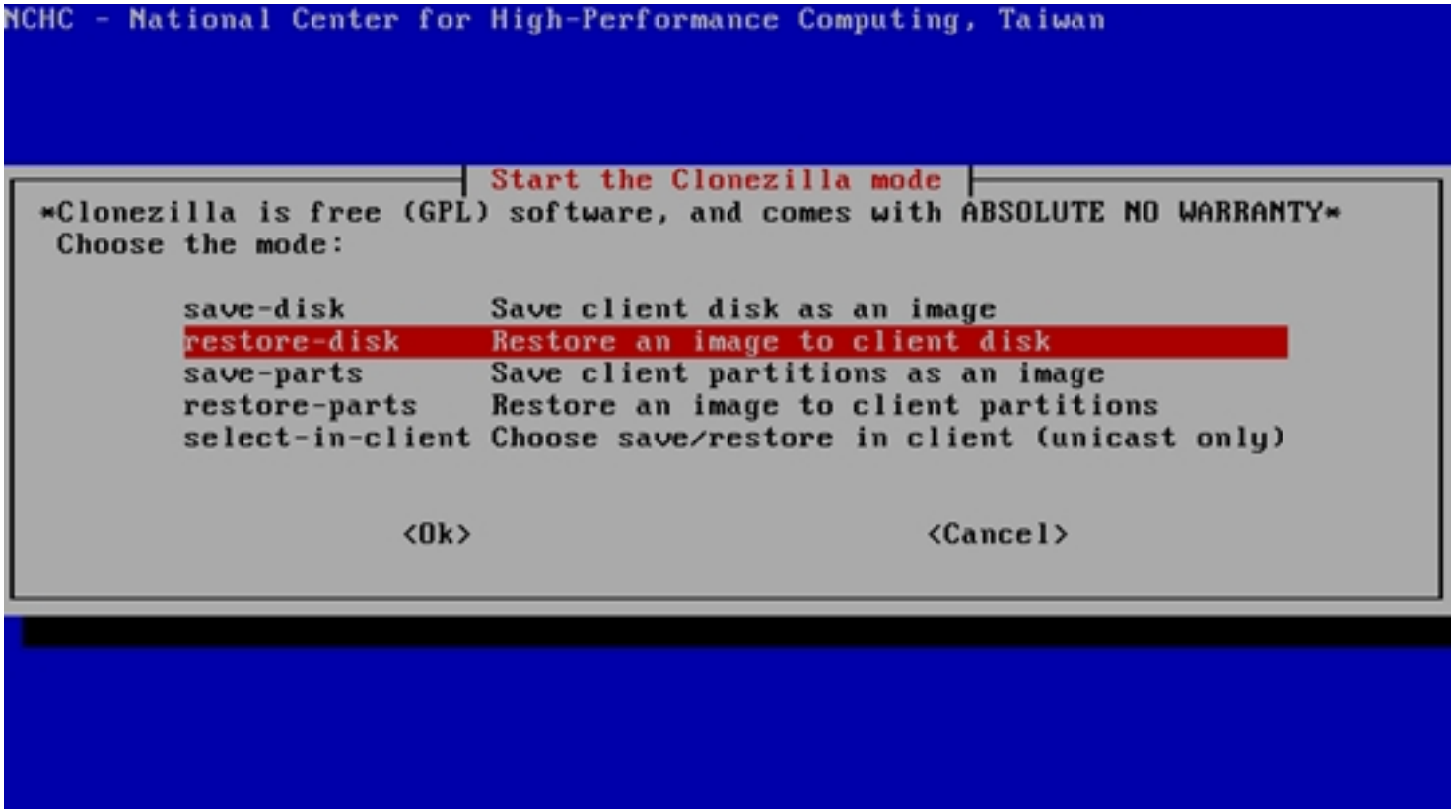
again on the CloneZilla Server. Select *All Select all clients*:



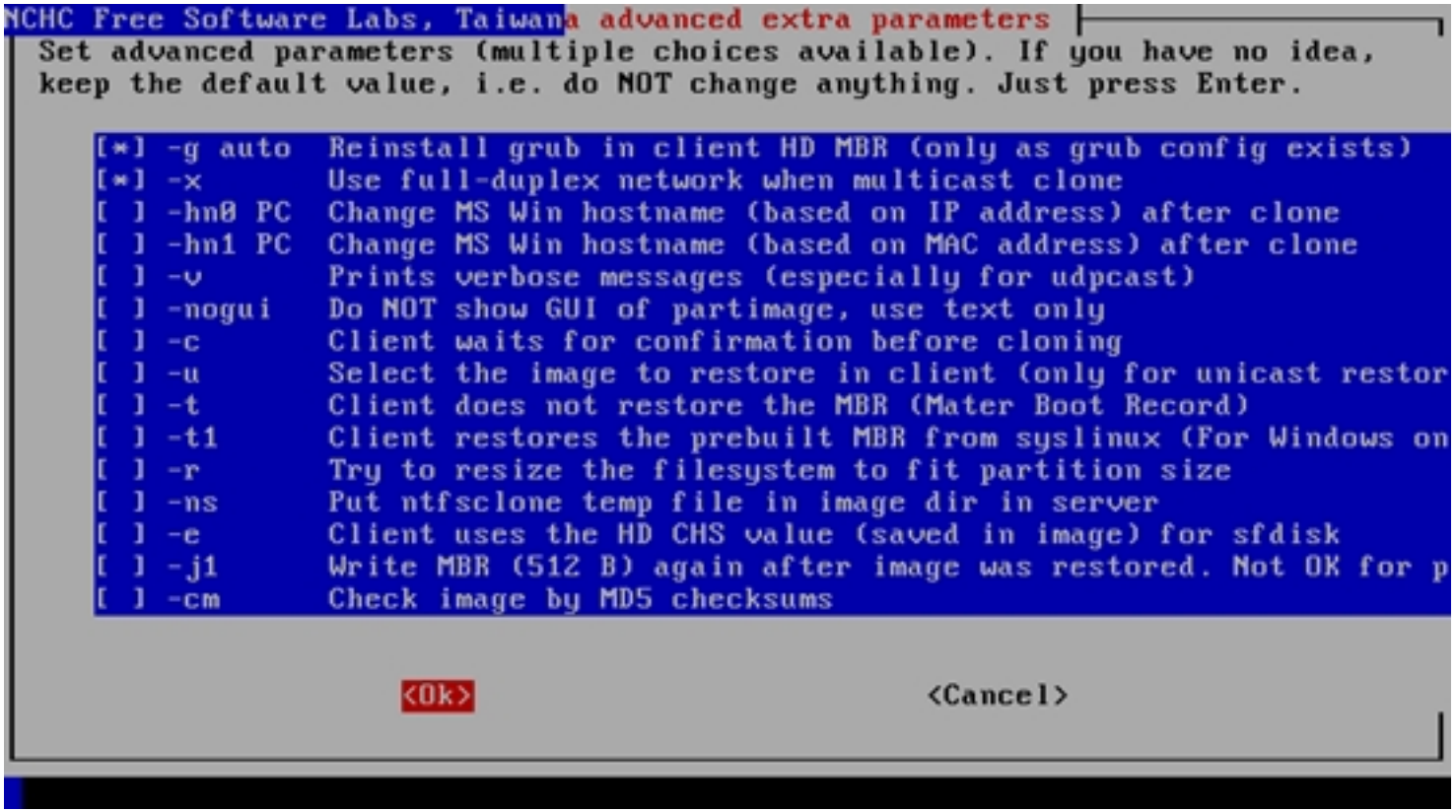
Choose *clonezilla-start Start_clonezilla_mode*:

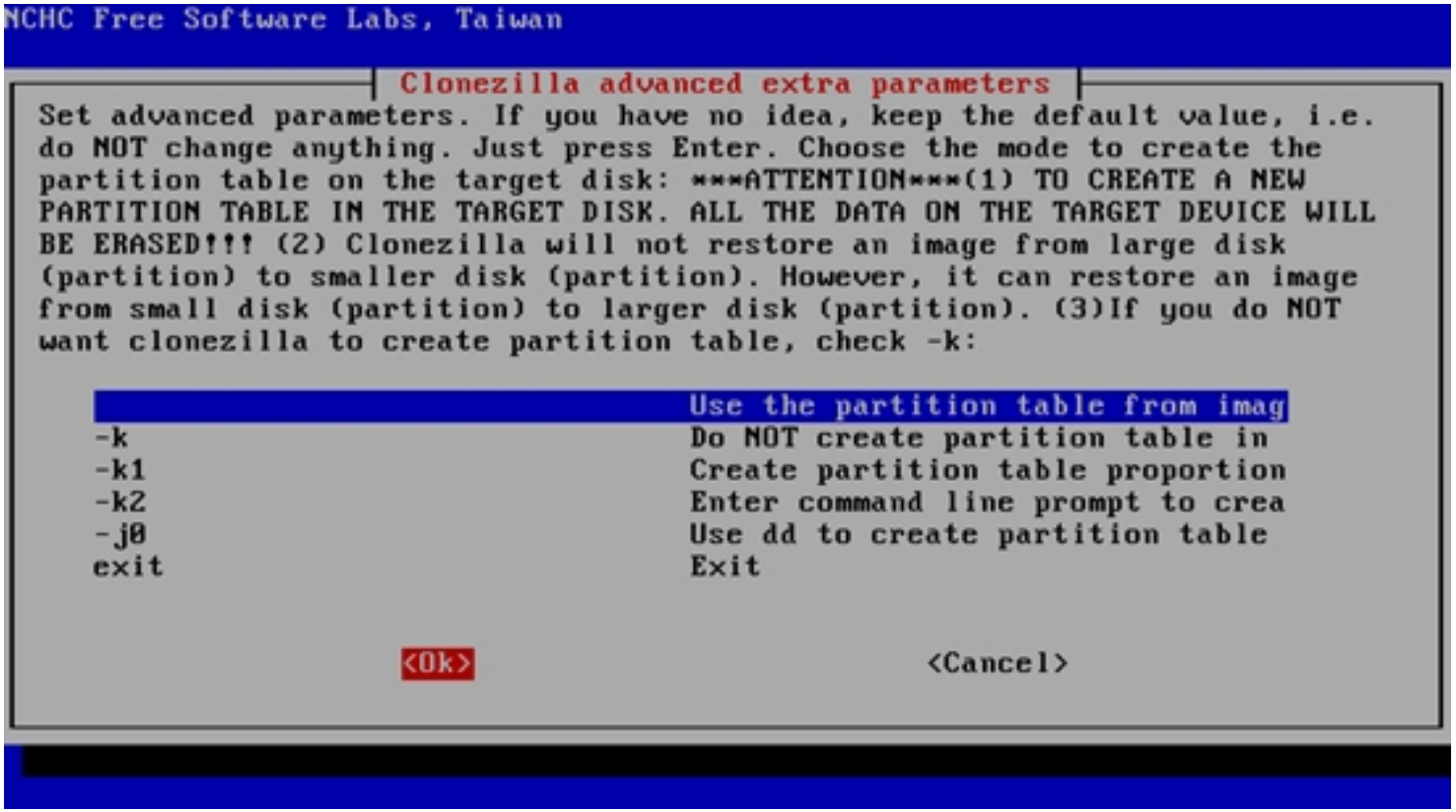


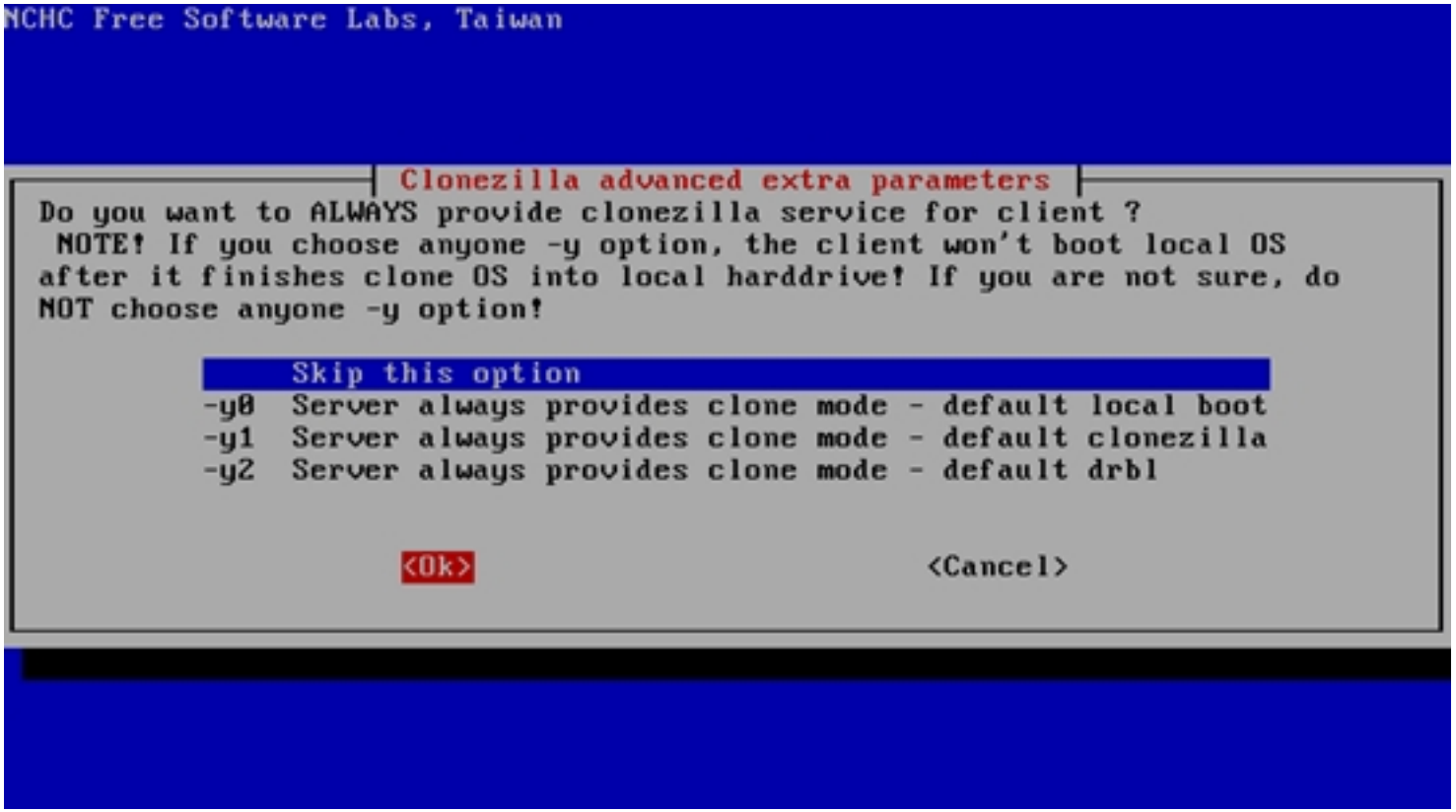
Select *restore-disk Restore an image to client disk*:

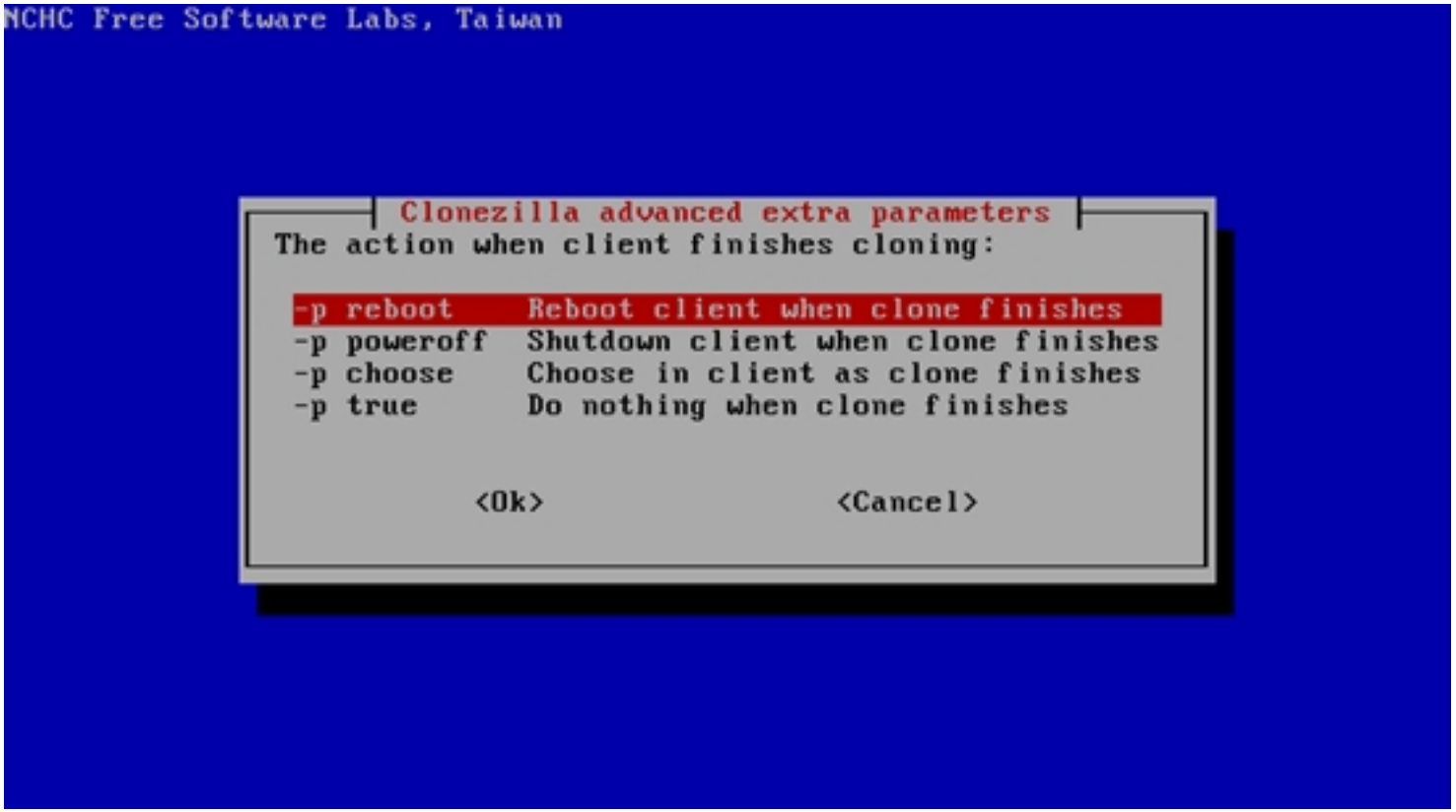


You can accept the default values on the next four screens by pressing *ENTER*:

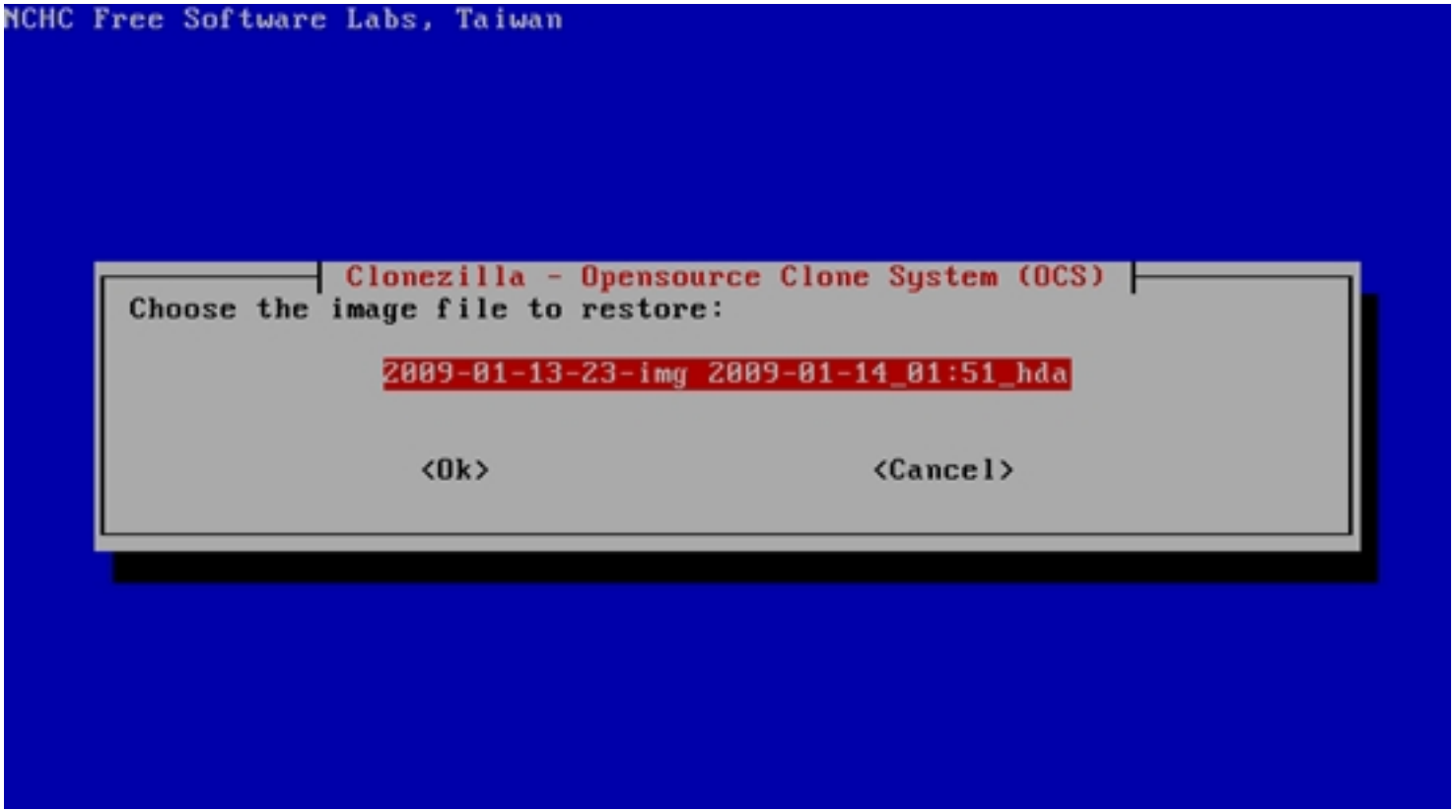




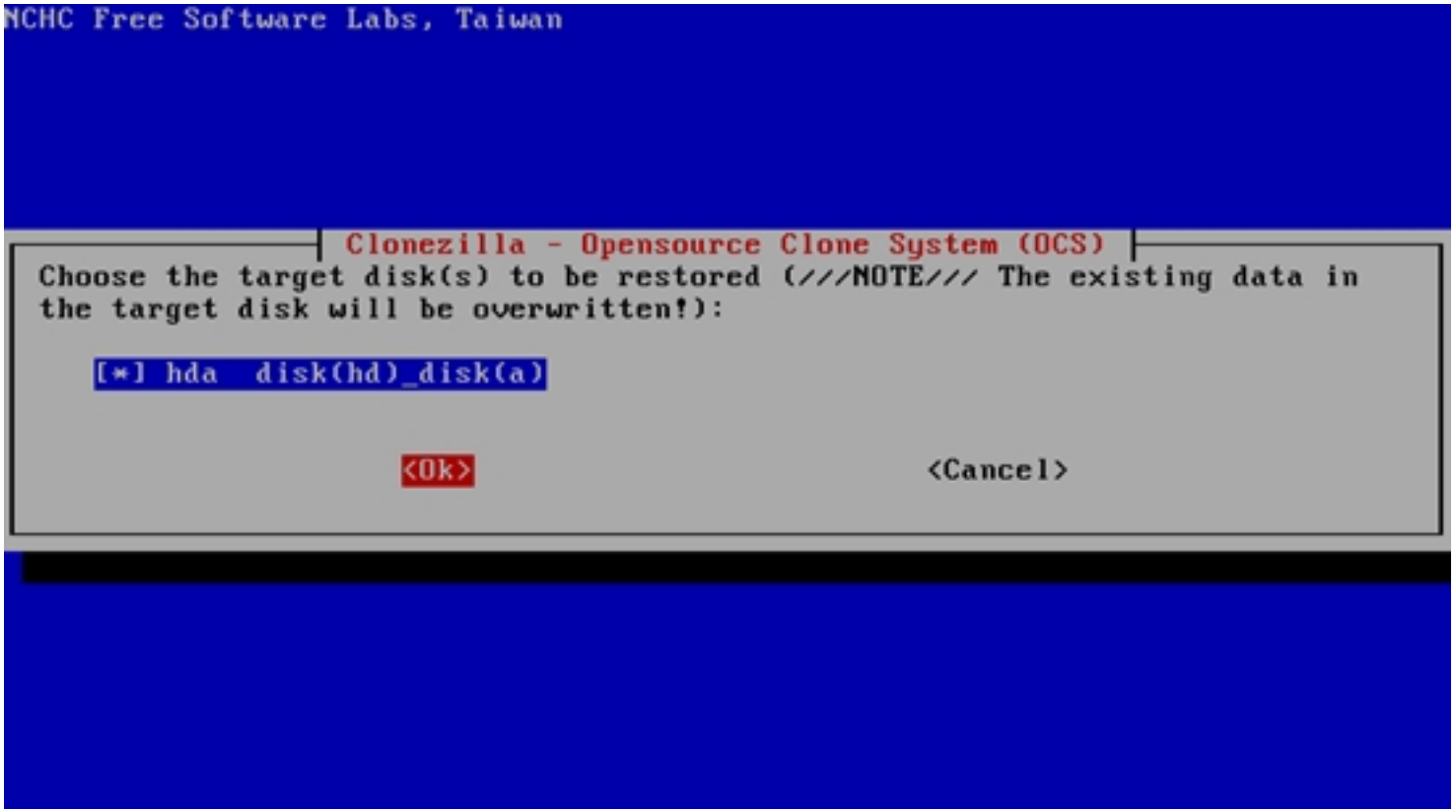




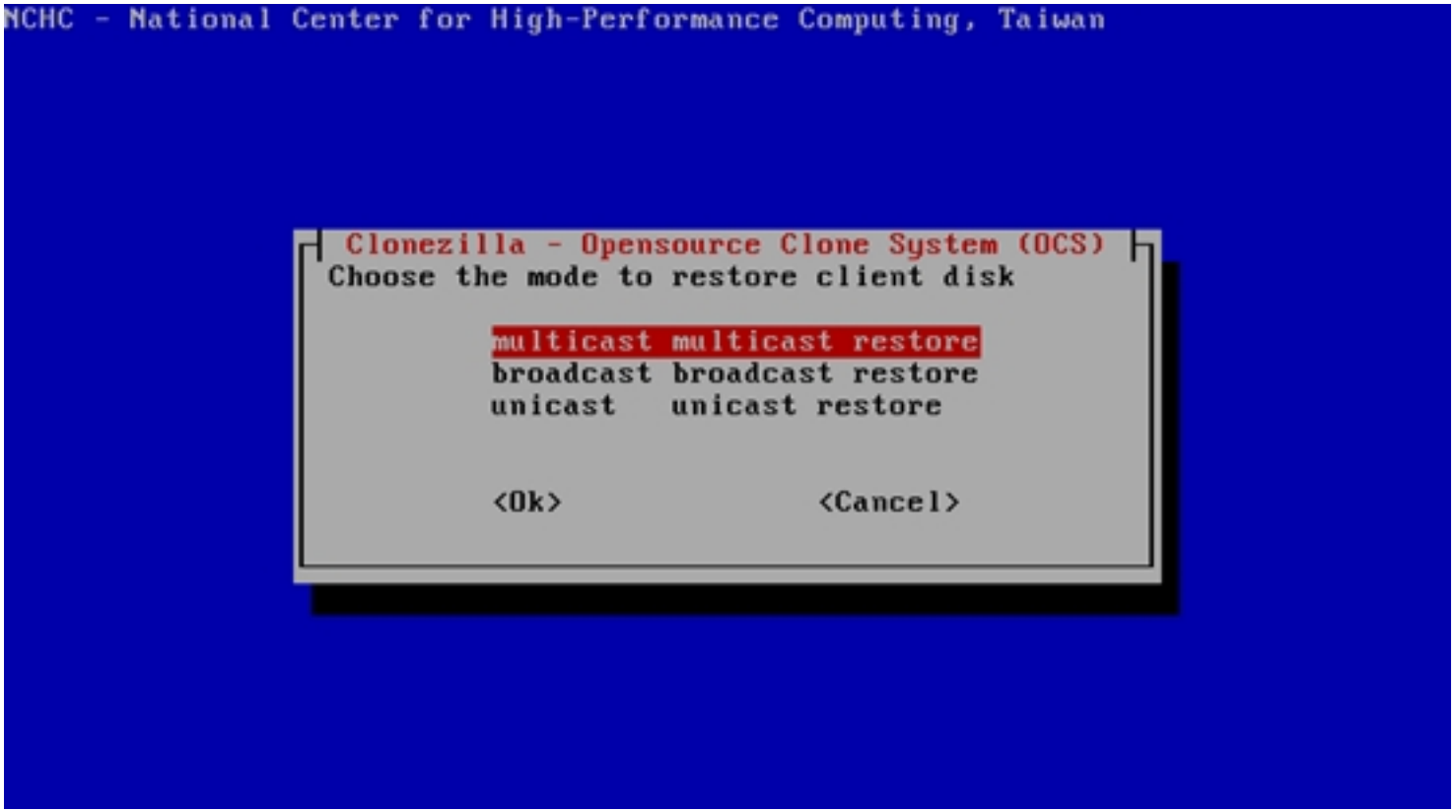
Pick the image that you want to restore:



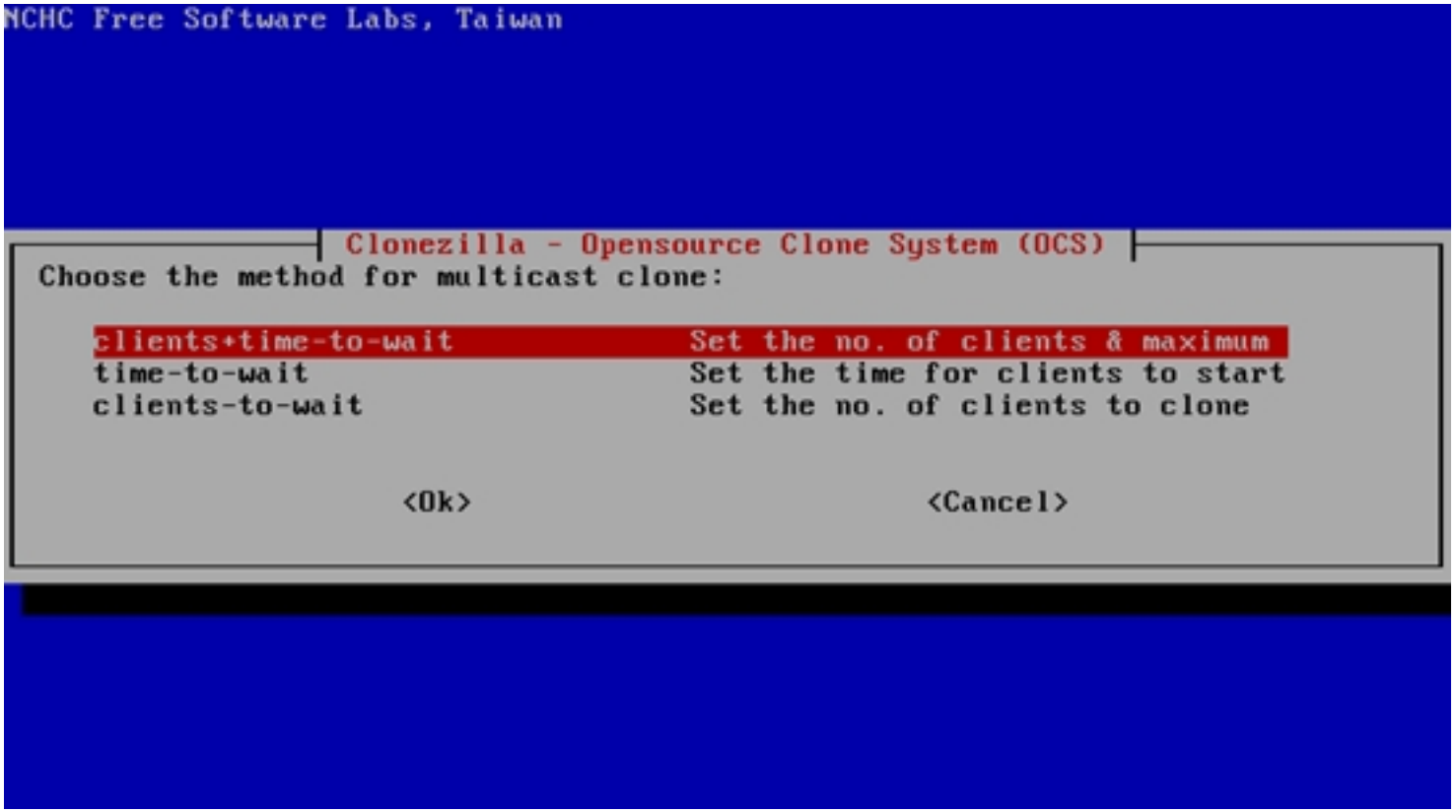
Choose the target hard drive:



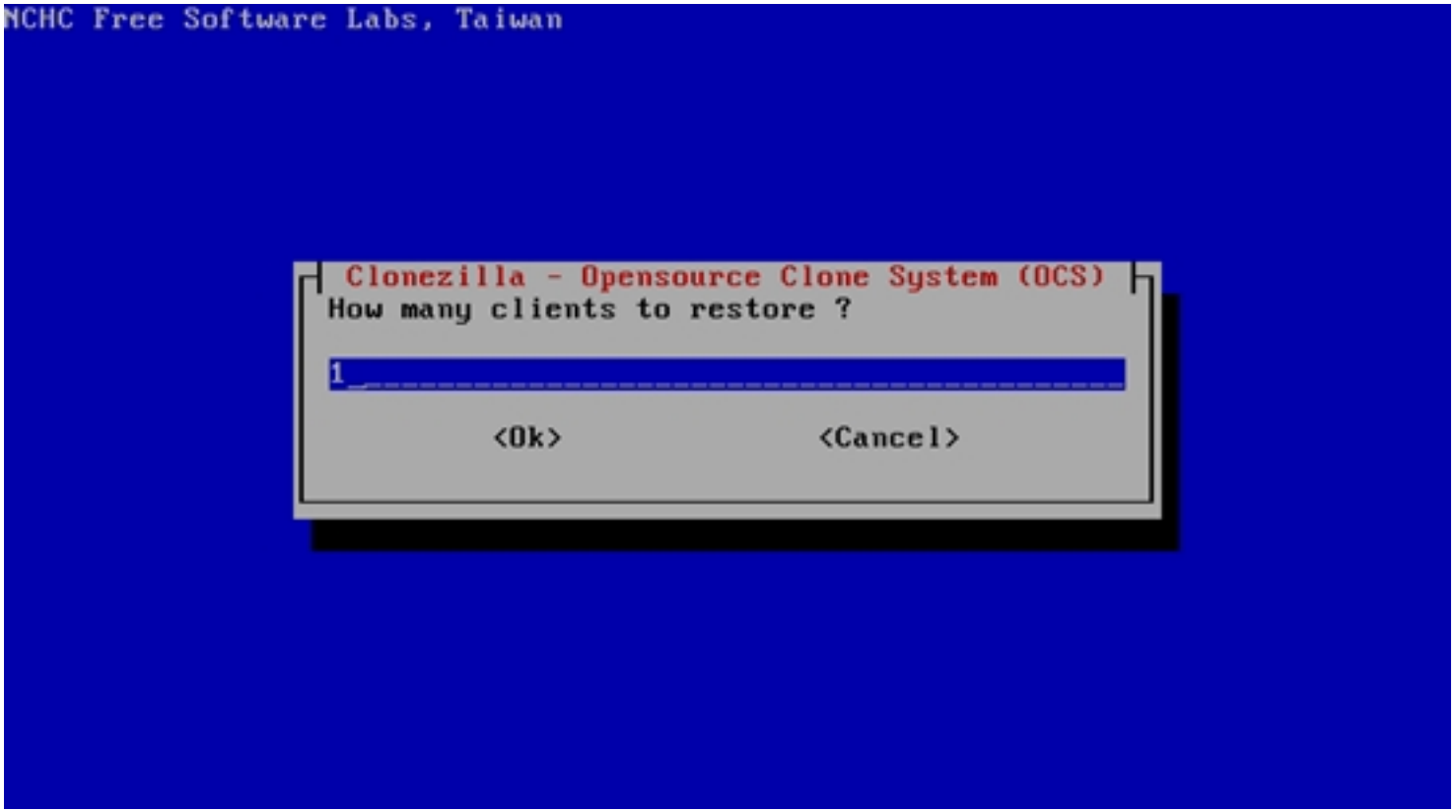
Select *multicast multicast restore*:



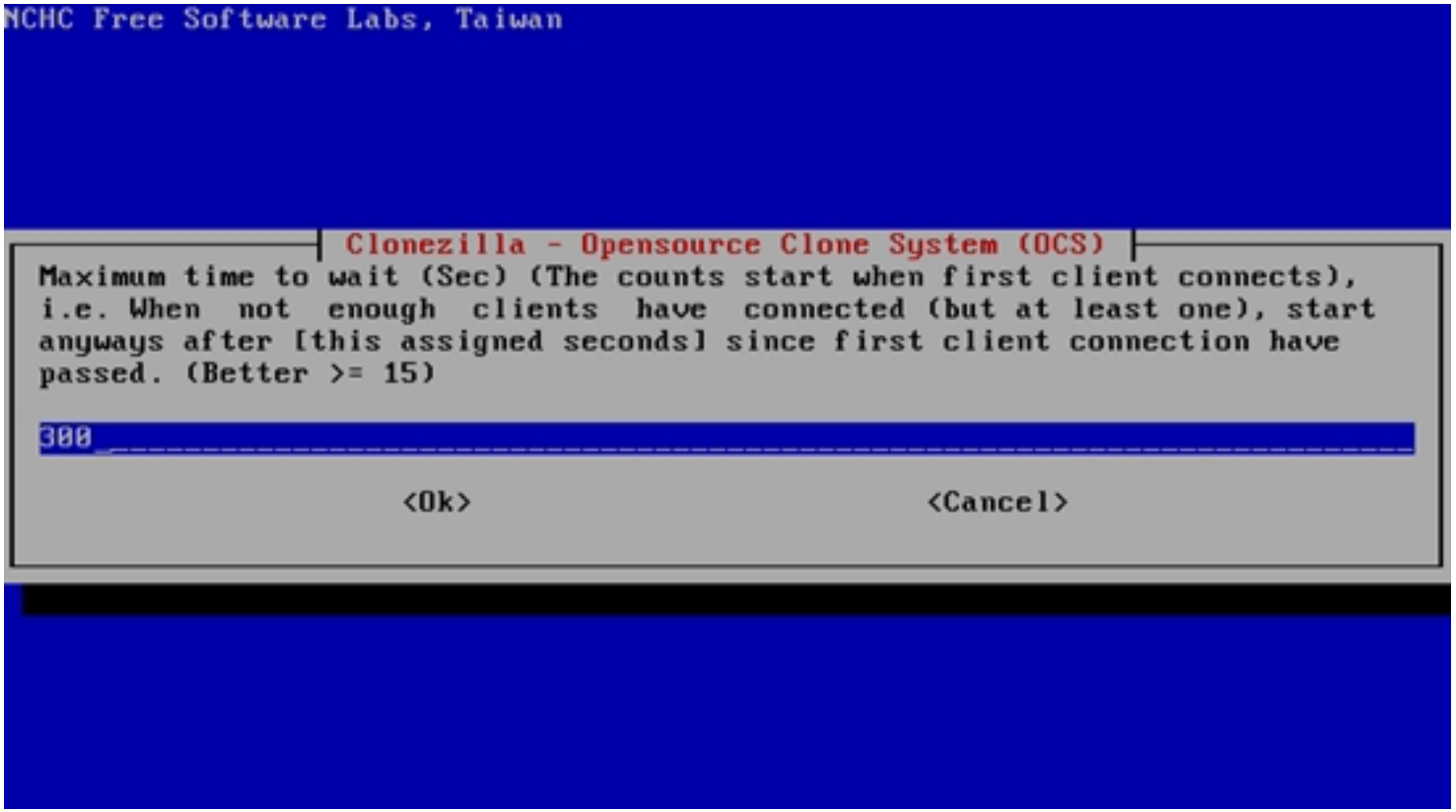
Choose *clients+time-to-wait*:



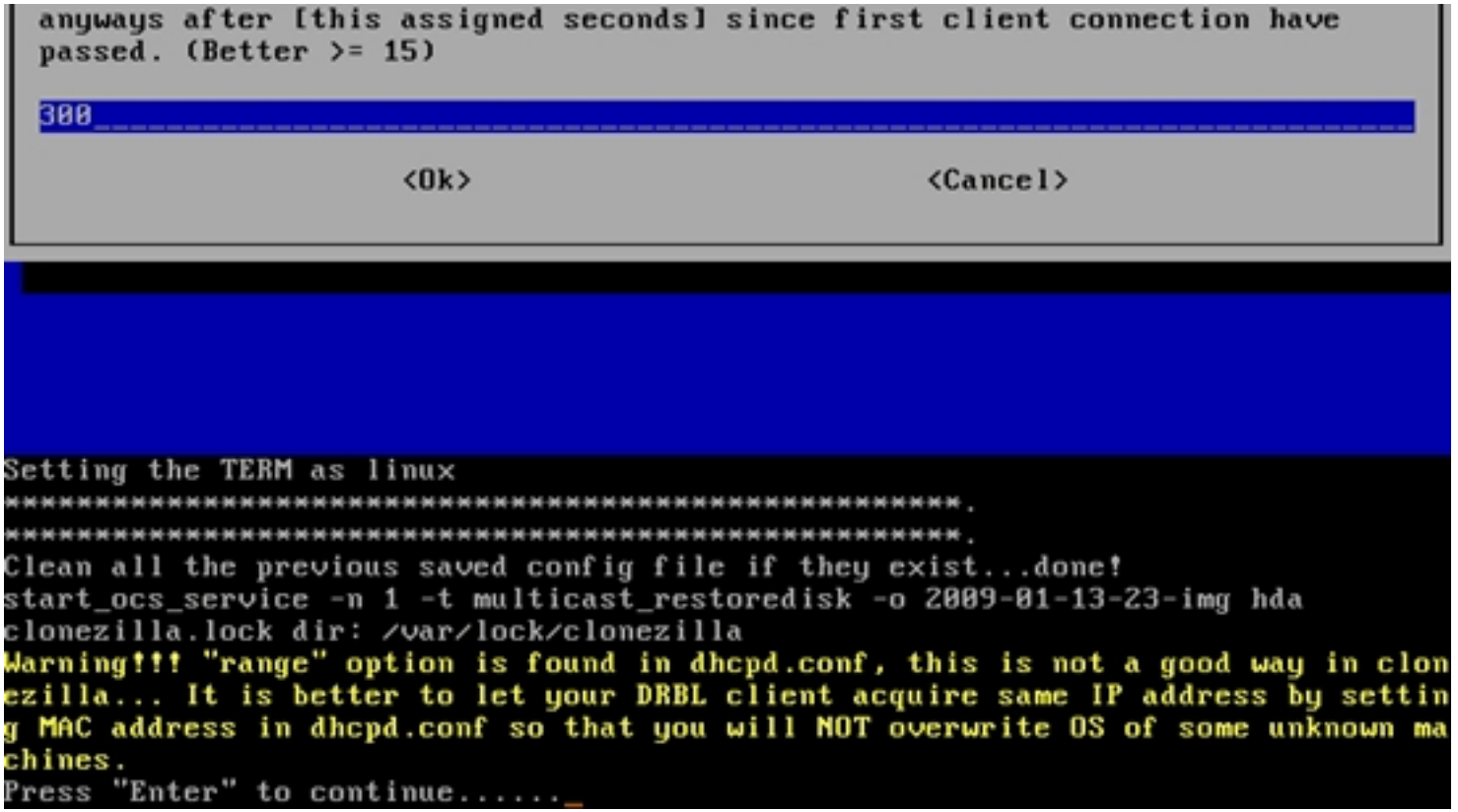
Fill in the number of systems on which you want to restore the image (I want to restore just one system in this example):

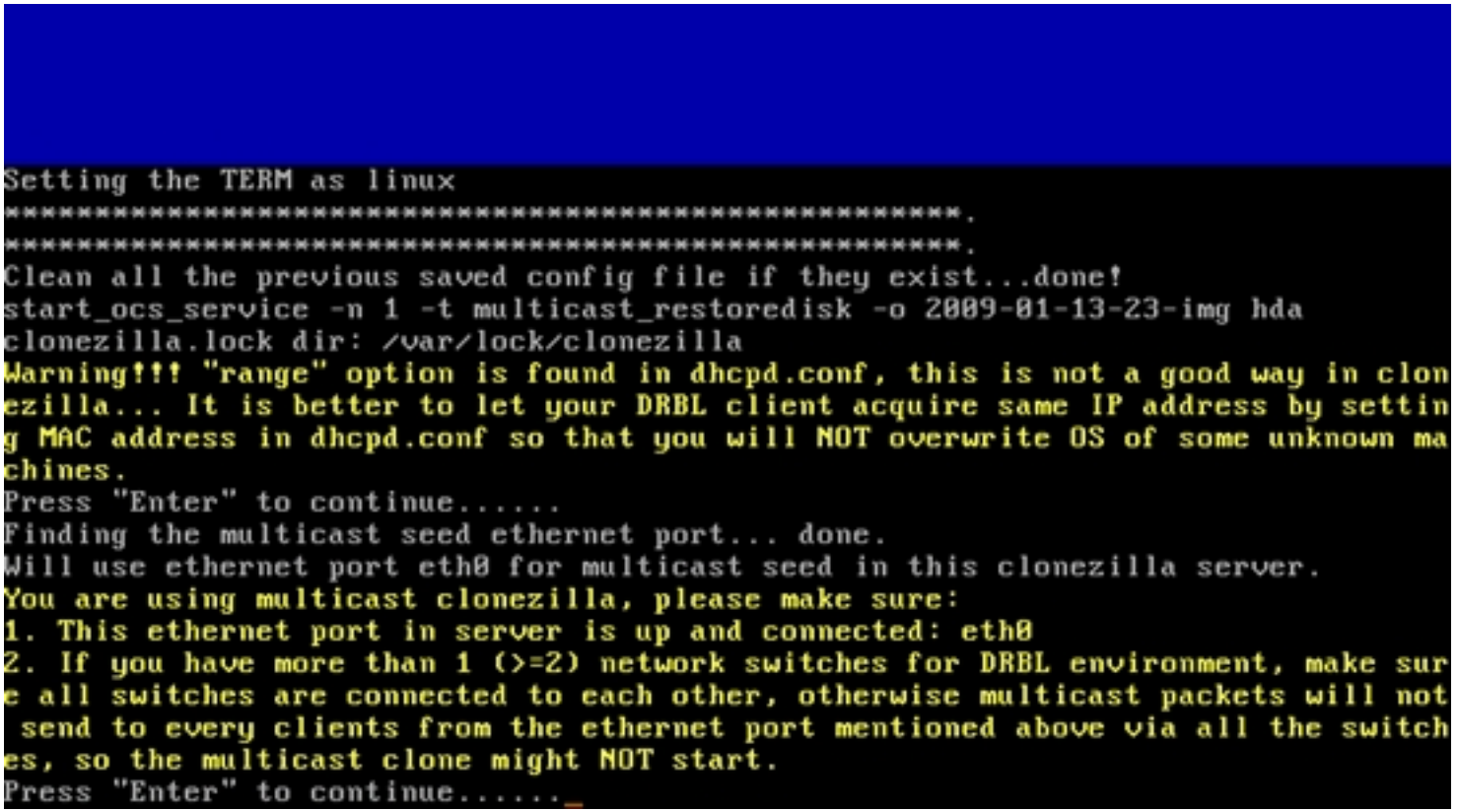


Fill in the max. time (in seconds) that the server will wait until all clients are powered on (i.e., if you want to restore the image on ten clients, you have 300 seconds to power on the other nine computers after you have powered on the first one - if you are too slow, CloneZilla will start to restore the image only on the systems that have been powered on in time):

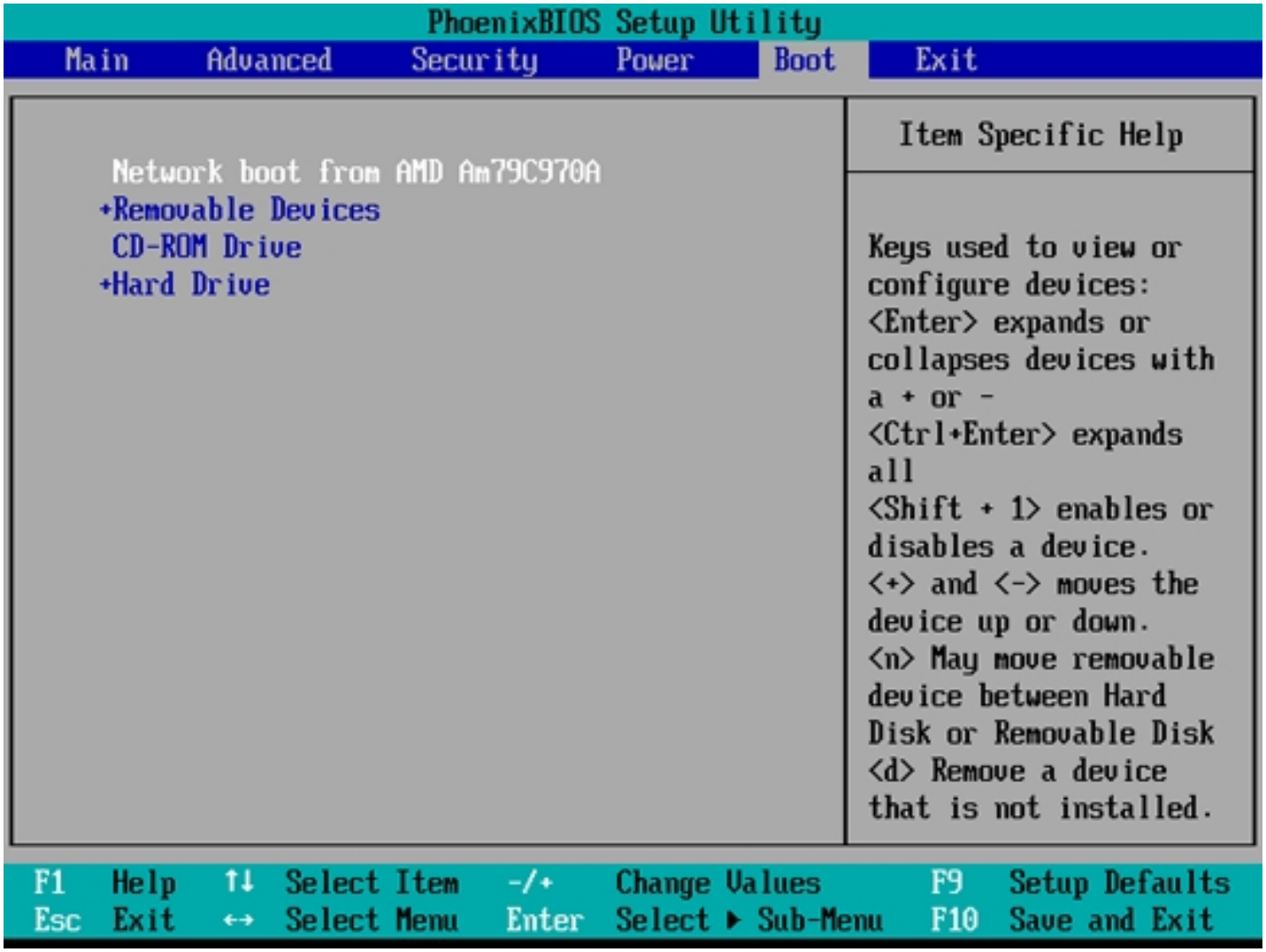


Afterwards, press *ENTER* twice:

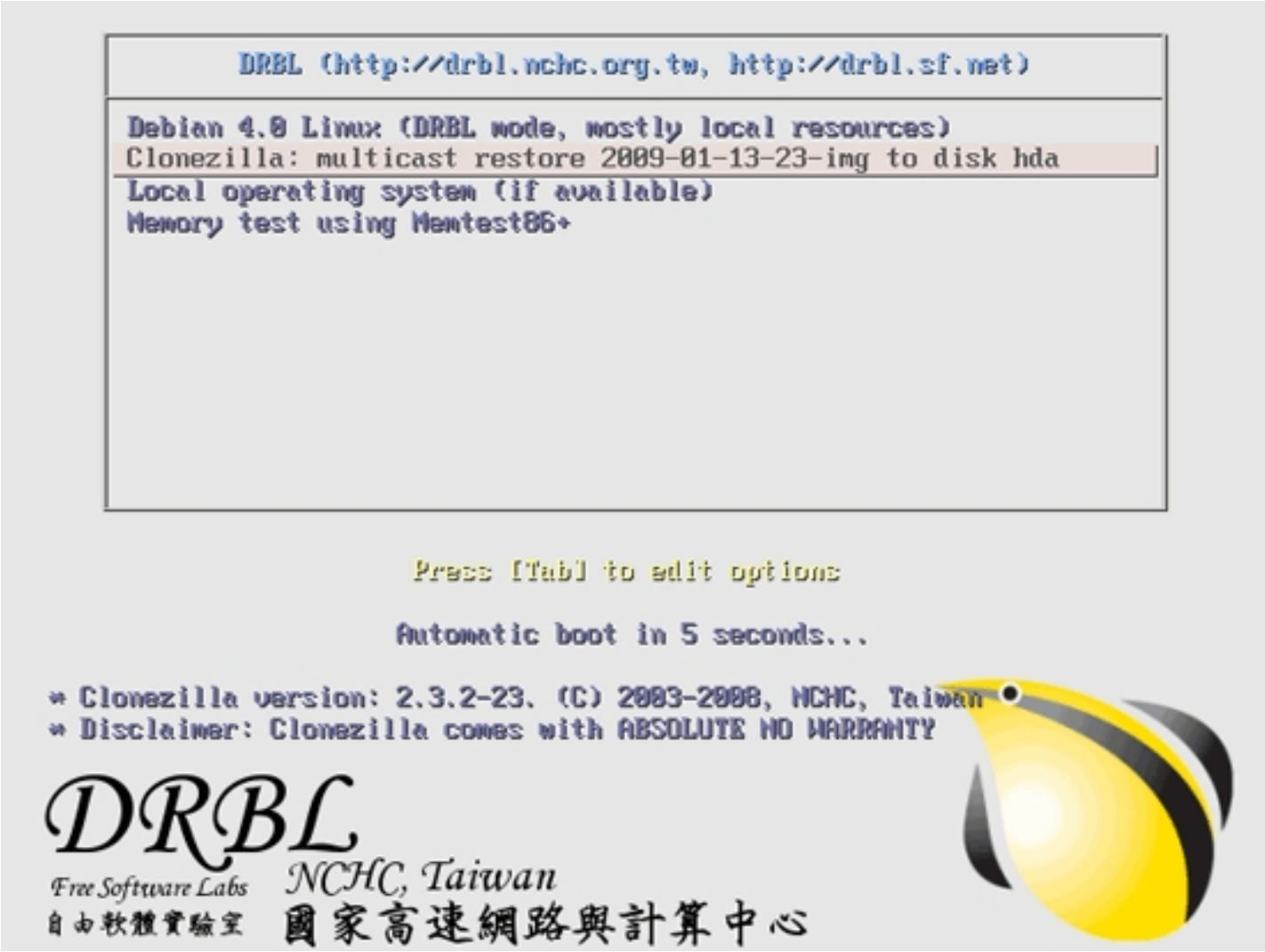




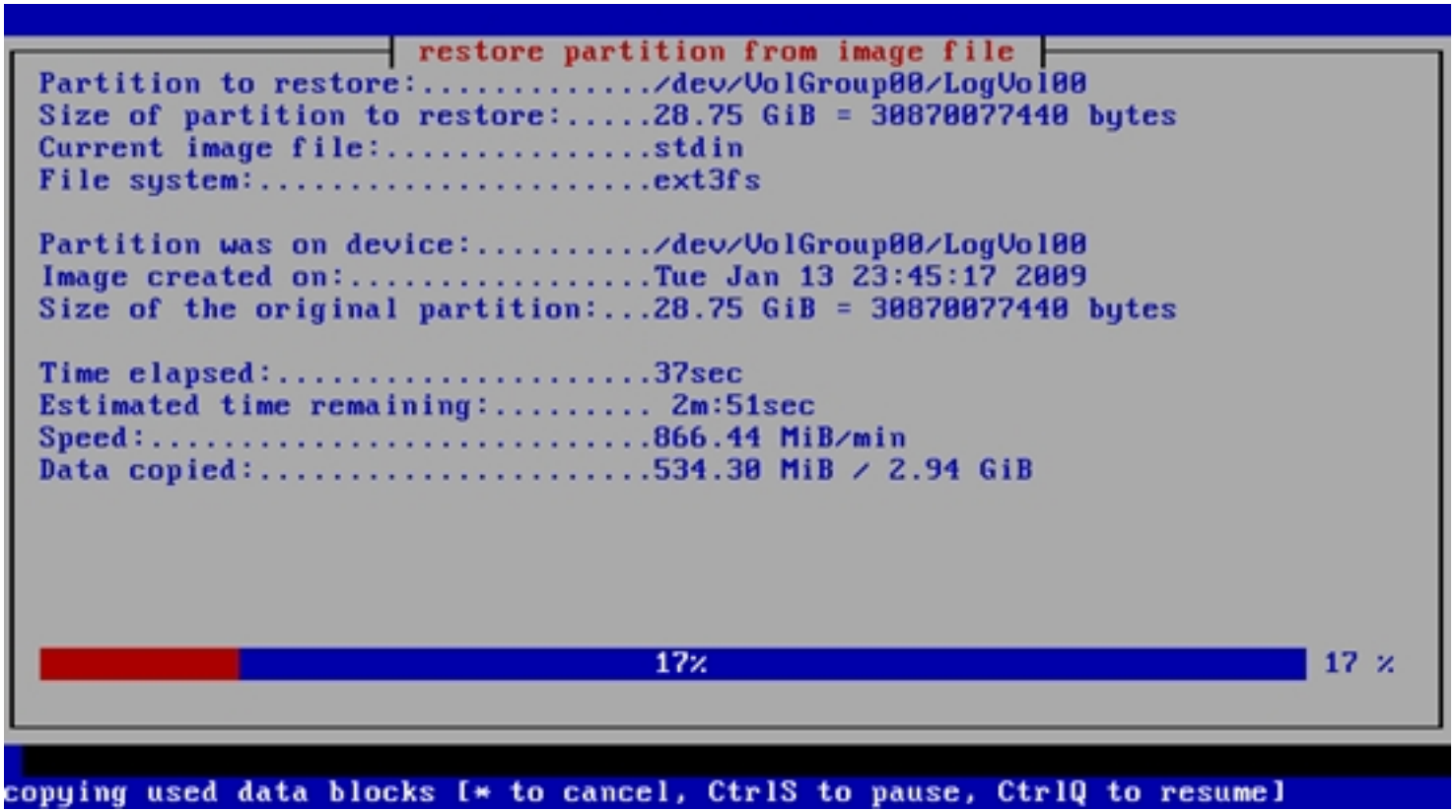
Now power on the clients. Make sure they are configured to boot from the network (via PXE):



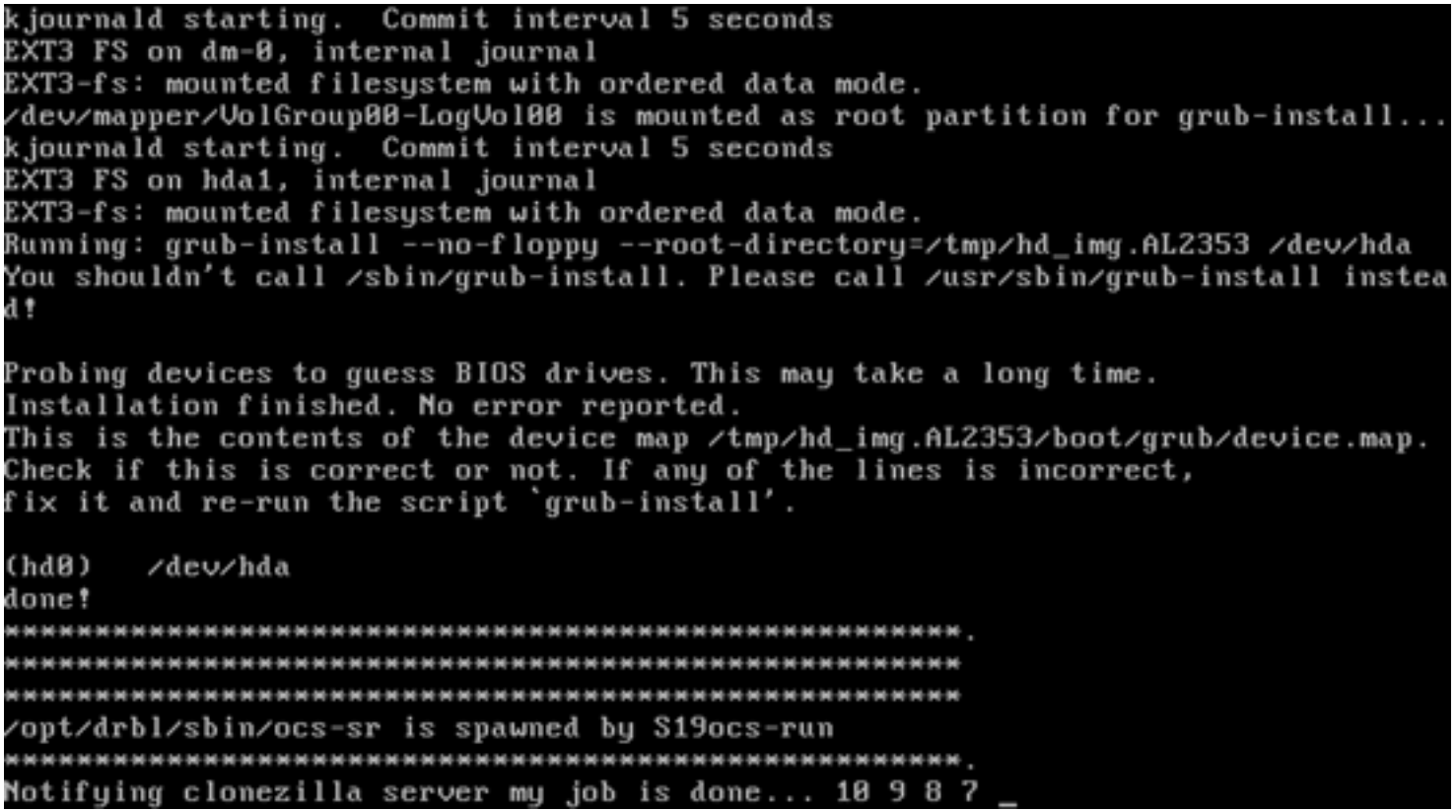
In the boot menu, select *`Clonezilla: multicast restore`*:



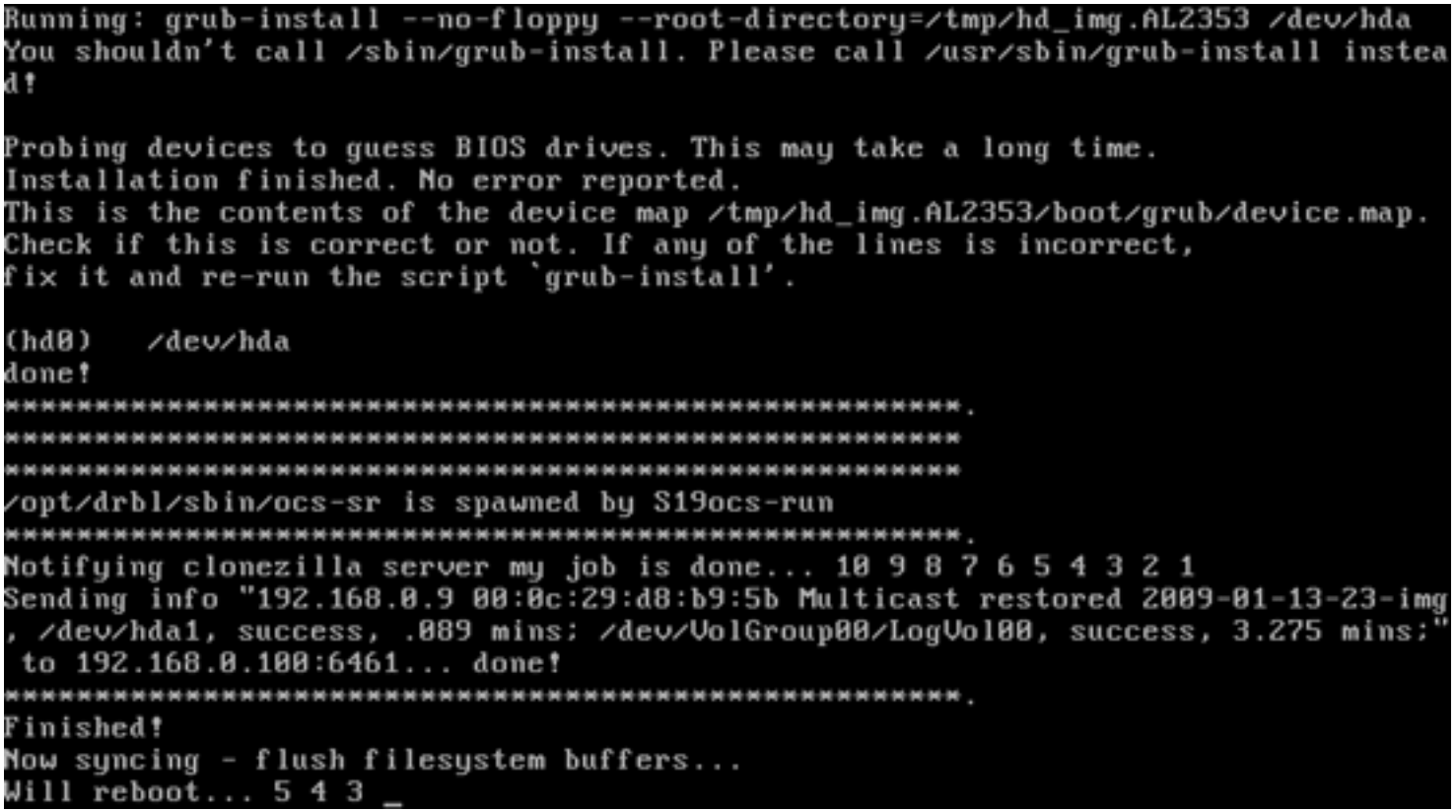
The cloning process will then begin:



Afterwards, the server will be notified that the process has finished...



... and the client system will reboot:



Before the client system boots, enter its BIOS again and configure it to boot from the hard drive!

If all goes well, the computer should boot into the cloned operating system.

5 Troubleshooting

It is possible that you see this message during the restore:

Failed to install grub

and that the system will not boot afterwards:

```
Grub
error 2
```

(I've had this with Ubuntu systems.)

The solution is to boot into a rescue system (e.g. **Knoppix** or the Ubuntu Live-CD) and install GRUB from the rescue system.

Once Knoppix or the Ubuntu Live system has started, open a terminal and become root:

Knoppix:

```
su
```

Ubuntu:

```
sudo su
```

Run

```
fdisk -l
```

to learn more about your partitioning:

```
root@Knoppix:~# fdisk -l

Disk /dev/sda: 32.2 GB, 32212254720 bytes
255 heads, 63 sectors/track, 3916 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1        3749    30113811   83  Linux
/dev/sda2            3750        3916     1341427+   5  Extended
/dev/sda5            3750        3916     1341396   82  Linux swap / Solaris
root@Knoppix:~#
```

In this example, I have one big partition (*/dev/sda1*) that also contains the */boot* directory (the *Boot* column is marked with a star).

I will now mount that partition to the */mnt* directory:

```
mount /dev/sda1 /mnt

mount -o bind /dev /mnt/dev

mount -o bind -t proc /proc /mnt/proc
```

(If you have a separate */boot* partition, e.g. */dev/sda2*, you'd mount it to */mnt/boot* after you have mounted */dev/sda1* to */mnt*.)

Now we install GRUB as follows:

```
chroot /mnt grub-install --no-floppy "(hd0)"
```

This will give you the following error:

```
root@Knoppix:~# chroot /mnt grub-install --no-floppy "(hd0)"
You shouldn't call /sbin/grub-install. Please call /usr/sbin/grub-install instead!

/dev/sda1 does not have any corresponding BIOS drive.
  root@Knoppix:~#
```

To overcome the error, run


```
chroot /mnt grub-install --no-floppy "(hd0)" --root-directory=/ --recheck
```

```
root@Knoppix:~# chroot /mnt grub-install --no-floppy "(hd0)" --root-directory=/ --recheck
You shouldn't call /sbin/grub-install. Please call /usr/sbin/grub-install instead!

Probing devices to guess BIOS drives. This may take a long time.
  Installing GRUB to (hd0) as (hd0)...
  Installation finished. No error reported.
  This is the contents of the device map //boot/grub/device.map.
  Check if this is correct or not. If any of the lines is incorrect,
  fix it and re-run the script `grub-install'.

(hd0) /dev/sda
  root@Knoppix:~#
```

That's it - now reboot...

```
reboot
```

... and don't forget to remove the Knoppix or Ubuntu CD from the CD drive. If everything goes well, the GRUB error should be gone, and the system should boot without any problems.

6 Links

- CloneZilla SE: **http://clonezilla.org/clonezilla-server-edition/**
- Debian: **http://www.debian.org/**