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Setting Up A PXE Install Server For Multiple Linux Distributions With Ubuntu Edgy Eft

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This tutorial shows how to set up a PXE (short for **p**reboot e**x**ecution **e**nvironment) install server with Ubuntu 6.10 (Edgy Eft). A PXE install server allows your client computers to boot and install a Linux distribution over the network, without the need of burning Linux iso images onto a CD/DVD, boot floppy images, etc. This is handy if your client computers don't have CD or floppy drives, or if you want to set up multiple computers at the same time (e.g. in a large enterprise), or simply because you want to save the money for the CDs/DVDs. In this article I show how to configure a PXE server that allows you to boot multiple distributions: Ubuntu Edgy/Dapper, Debian Etch/Sarge, Fedora Core 6, CentOS 4.4, OpenSuSE 10.2, and Mandriva 2007.

I want to say first that this is not the only way of setting up such a system. There are many ways of achieving this goal but this is the way I take. I do not issue any guarantee that this will work for you!

1 Preliminary Note

It is important that you have a decent internet connection because your client computers will fetch all needed packages from the repositories in the internet (I tested this on a 16MBit ADSL2+ connection which seems to be fast enough. ;-)). It is possible to store all packages on the PXE server as well so that you don't need an internet connection (just the LAN connection to the PXE server), but then you need pretty much storage space on the PXE server (remember, it will serve multiple distributions), so I don't cover this here.

And the most important thig is that your client computers support booting over the network. You should check each computer's BIOS for this option.

On our system that should serve as the PXE server you should have already set up a basic Ubuntu 6.10 server system, for example as shown on pages 1 - 3 of this tutorial: **http://www.howtoforge.com/perfect_setup_ubuntu_6.10**

I prefer to do all the steps here as the `root` user. So if you haven't already created a root login, you should do so now:

```
sudo passwd root
```

Afterwards, log in as root:

```
su
```

If you would like to work as a normal user instead of root, remember to put `sudo` in front of all the commands shown in this tutorial. So when I run

```
apt-get update
```

you should run

```
sudo apt-get update
```

instead, etc.

2 Install All Necessary Packages

First we update our packages database by running

```
apt-get update
```

We need to install the packages `netkit-inetd`, `tftpd-hpa`, `dhcp3-server`, and `lftp`, so we run

```
apt-get install netkit-inetd tftpd-hpa dhcp3-server lftp
```

Afterwards run

```
netstat -uap
```

and check if you see something like this:

```
root@server1:~# netstat -uap
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
udp        0      0 *:tftp
```

If you don't see the *tftp* line, please open */etc/inetd.conf* and make sure you find the following in it:

```
vi /etc/inetd.conf
```

```
[...]
#:BOOT: Tftp service is provided primarily for booting.  Most sites
# run this only on machines acting as "boot servers."
tftp        dgram   udp     wait    root  /usr/sbin/in.tftpd /usr/sbin/in.tftpd -s /var/lib/tftpboot
[...]
```

Then restart inetd:

```
/etc/init.d/inetd restart
```

3 Configure The DHCP Server

We need a DHCP server in our local network. If there's no DHCP server in yor local network, just configure and use the one on your future PXE server. Simply edit */etc/dhcp3/dhcpd.conf*:

```
cp /etc/dhcp3/dhcpd.conf /etc/dhcp3/dhcpd.conf_orig

cat /dev/null > /etc/dhcp3/dhcpd.conf
```

```
vi /etc/dhcp3/dhcpd.conf
```

```
option domain-name-servers 145.253.2.75, 193.174.32.18;

default-lease-time 86400;
max-lease-time 604800;

authoritative;

subnet 192.168.0.0 netmask 255.255.255.0 {
        range 192.168.0.10 192.168.0.49;
        filename "pxelinux.0";
        option subnet-mask 255.255.255.0;
        option broadcast-address 192.168.0.255;
        option routers 192.168.0.1;
}
```

This will dynamically assign IP addresses from the range *192.168.0.10* to *192.168.0.49* to your client computers; the gateway is *192.168.0.1*. Of course, you must adjust this configuration to your own environment!

It is important that you have the line

```
filename "pxelinux.0";
```

in your configuration!

Then restart your DHCP server:

```
/etc/init.d/dhcp3-server restart
```

If you already have a DHCP server in your network, you must modify its configuration. Let's assume you have something like

```
subnet 192.168.0.0 netmask 255.255.255.0 {
        range 192.168.0.10 192.168.0.49;
        option subnet-mask 255.255.255.0;
        option broadcast-address 192.168.0.255;
        option routers 192.168.0.1;
}
```

in the configuration. You must add

```
filename "pxelinux.0";
next-server 192.168.0.100;
```

to it (where `192.168.0.100` is the IP address of our Ubuntu PXE server) so that it looks like this:

```
subnet 192.168.0.0 netmask 255.255.255.0 {
        range 192.168.0.10 192.168.0.49;
        option subnet-mask 255.255.255.0;
        option broadcast-address 192.168.0.255;
        option routers 192.168.0.1;
        filename "pxelinux.0";
        next-server 192.168.0.100;
}
```

Then restart your DHCP server.

4 Set Up Ubuntu Edgy Eft Netboot

Now we are ready to set up the netboot for our first distribution, Ubuntu Edgy Eft (i386). The necessary files for the netboot can be found on **http://archive.ubuntu.com/ubuntu/dists/edgy/main/installer-i386/current/images/netboot/**. We download the files now and copy them to the */var/lib/tftpboot* directory. This is the directory from where our PXE server will serve the installation images:

```
cd /tmp

lftp -c "open http://archive.ubuntu.com/ubuntu/dists/edgy/main/installer-i386/current/images/; mirror netboot/"

mv netboot/* /var/lib/tftpboot

rm -fr netboot
```

(You can download the files from any other Ubuntu mirror as well. Use one that is close to you.)

That's it already. Now have a look at the file */var/lib/tftpboot/pxelinux.cfg/default* to get familiar with its structure:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY ubuntu-installer/i386/boot-screens/boot.txt

F1 ubuntu-installer/i386/boot-screens/f1.txt
F2 ubuntu-installer/i386/boot-screens/f2.txt
F3 ubuntu-installer/i386/boot-screens/f3.txt
F4 ubuntu-installer/i386/boot-screens/f4.txt
F5 ubuntu-installer/i386/boot-screens/f5.txt
F6 ubuntu-installer/i386/boot-screens/f6.txt
```

```
F7 ubuntu-installer/i386/boot-screens/f7.txt
F8 ubuntu-installer/i386/boot-screens/f8.txt
F9 ubuntu-installer/i386/boot-screens/f9.txt
F0 ubuntu-installer/i386/boot-screens/f10.txt

DEFAULT install

LABEL install
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL linux
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL server
      kernel ubuntu-installer/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL expert
      kernel ubuntu-installer/i386/linux
      append priority=low vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL server-expert
      kernel ubuntu-installer/i386/linux
              append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL rescue
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

PROMPT 1
TIMEOUT 0
```

As you see, this file contains all valid installation options (*linux*, *server*, *expert*, etc.) for Ubuntu Edgy Eft, each in its own *LABEL* stanza. All paths in this file are relative to the */var/lib/tftpboot* directory, so *ubuntu-installer/i386/initrd.gz* translates to */var/lib/tftpboot/ubuntu-installer/i386/initrd.gz*. The output of

```
ls -la /var/lib/tftpboot
```

should look like this now:

```
root@server1:~# ls -la /var/lib/tftpboot/
total 25052
drwxr-xr-x  9 root root    4096 2006-12-14 19:25 .
drwxr-xr-x 21 root root    4096 2006-12-14 15:01 ..
-rw-r--r--  1 root root 8315725 2006-10-21 02:42 boot.img.gz
-rw-r--r--  1 root root 8849408 2006-10-21 02:42 mini.iso
-rw-r--r--  1 root root 8381337 2006-10-21 02:42 netboot.tar.gz
-rw-r--r--  1 root root   13156 2006-10-21 02:44 pxelinux.0
drwxr-xr-x  2 root root    4096 2006-12-14 19:39 pxelinux.cfg
drwxr-xr-x  4 root root    4096 2006-12-14 16:15 ubuntu-installer
```

When a client computer boots up over the network, it will look for the file */var/lib/tftpboot/pxelinux.cfg/default* and load it, so that's the file we have to modify later on when we add more Linux distributions to our PXE server.

5 Our First Test

(Please make sure that the computers that you don't want to reinstall have the network boot option disabled in their BIOS settings because otherwise it is possible that you or someone else accidentally installs Ubuntu over the existing operating system!)

Now you can boot up your first client computer. Make sure you specified in its BIOS settings that it should use the network as its first boot device. If everything goes well, you should see the usual Ubuntu installation screen, and you can choose from one of the installation options from the */var/lib/tftpboot/pxelinux.cfg/default* file, e.g. *linux* for a normal Ubuntu desktop, *server*, etc..

Don't forget to change the order of the boot devices after the successful installation (e.g. disable booting over the network and make the HDD the first boot

device) because otherwise you will start another installation!

6 Add Ubuntu Dapper Drake Netboot

Now let's add further distributions to our PXE server (you don't want to run one PXE server per distribution, do you?). Or current directory structure looks like this:

```
/var/lib/tftpboot
                |
                +ubuntu-installer
                                 |
                                 +i386
```

What I want is this instead which is more clearly arranged:

```
/var/lib/tftpboot
                |
                +centos
                |     |
                |     +4.4
                |        |
                |        +i386
                |
                +debian
                |     |
                |     +etch
                |     |   |
                |     |   +i386
                |     |
                |     +sarge
                |          |
                |          +i386
                |
```

```
+fedora
|     |
|     +6
|      |
|      +i386
|
+mandriva
|       |
|       +2007.0
|             |
|             +i386
|
+suse
|   |
|   +10.2
|       |
|       +i386
|
+ubuntu
      |
      +dapper
      |   |
      |   +i386
      |
      +edgy
           |
           +i386
```

So first we move the current *ubuntu-installer* directory (which contains Ubuntu Edgy) to *ubuntu/edgy/*:

```
mv /var/lib/tftpboot/ubuntu-installer /var/lib/tftpboot/edgy

mkdir /var/lib/tftpboot/ubuntu
```

```
mv /var/lib/tftpboot/edgy /var/lib/tftpboot/ubuntu/
```

Then we download the netboot files for Ubuntu Dapper Drake and move them to */var/lib/tftpboot/ubuntu/dapper/* like this:

```
cd /tmp

lftp -c "open http://archive.ubuntu.com/ubuntu/dists/dapper/main/installer-i386/current/images/; mirror netboot/"

cd netboot/

mv ubuntu-installer /var/lib/tftpboot/ubuntu/dapper
```

(You can download the files from any other Ubuntu mirror as well. Use one that is close to you.)

Still in the *netboot* directory, we have a look at Ubuntu Dapper Drake's *pxelinux.cfg/default* file. It looks like this:

```
vi pxelinux.cfg/default
```

```
DISPLAY ubuntu-installer/i386/boot-screens/boot.txt

F1 ubuntu-installer/i386/boot-screens/f1.txt
F2 ubuntu-installer/i386/boot-screens/f2.txt
F3 ubuntu-installer/i386/boot-screens/f3.txt
F4 ubuntu-installer/i386/boot-screens/f4.txt
F5 ubuntu-installer/i386/boot-screens/f5.txt
F6 ubuntu-installer/i386/boot-screens/f6.txt
F7 ubuntu-installer/i386/boot-screens/f7.txt
F8 ubuntu-installer/i386/boot-screens/f8.txt
```

```
F9 ubuntu-installer/i386/boot-screens/f9.txt
F0 ubuntu-installer/i386/boot-screens/f10.txt

DEFAULT install

LABEL install
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL linux
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL server
      kernel ubuntu-installer/i386/linux
                        append  base-installer/kernel/linux/extra-packages-2.6=  pkgsel/install-pattern=~t^ubuntu-standard$  pkgsel/language-pack-patterns=  pkgsel/install-language-support=false  vga=normal
initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL expert
      kernel ubuntu-installer/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL server-expert
      kernel ubuntu-installer/i386/linux
            append  base-installer/kernel/linux/extra-packages-2.6=  pkgsel/install-pattern=~t^ubuntu-standard$  pkgsel/language-pack-patterns=  pkgsel/install-language-support=false  DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL rescue
      kernel ubuntu-installer/i386/linux
      append vga=normal initrd=ubuntu-installer/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

PROMPT 1
TIMEOUT 0
```

Copy all the *LABEL* stanzas to your favourite text editor and replace *ubuntu-installer/* with *ubuntu/dapper/*. Also rename the *LABEL* names, e.g. *linux*

to *dapper_i386_linux*, etc. Then open */var/lib/tftpboot/pxelinux.cfg/default* and append the new *LABEL* stanzas to the ones for Ubuntu Edgy Eft. Also rename the Edgy Eft *LABEL* names to something more descriptive, e.g. from *linux* to *edgy_i386_linux*, and replace *ubuntu-installer/* with *ubuntu/edgy/*. Remove the F1 - F10 lines and replace the *DISPLAY* line with *DISPLAY boot.txt* so that the new file looks like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
      kernel ubuntu/edgy/i386/linux
```



```
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
      kernel ubuntu/dapper/i386/linux
                  append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_expert
      kernel ubuntu/dapper/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
      kernel ubuntu/dapper/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

PROMPT 1
TIMEOUT 0
```

Then delete the `/tmp/netboot` directory:

```
cd /tmp/
```



```
rm -fr netboot/
```

Now create the file */var/lib/tftpboot/boot.txt* which is a simple text file that lists all available installation methods. The contents of the file will be displayed on the monitor when you boot a client computer over the network, thus the user of the client computer can see all installation methods and choose the one he likes.

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install      edgy_i386_linux              edgy_i386_server
edgy_i386_expert       edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install    dapper_i386_linux            dapper_i386_server
dapper_i386_expert     dapper_i386_server-expert    dapper_i386_rescue
```

7 Add Debian Sarge Netboot

Next we download the Debian Sarge netboot files and put them in */var/lib/tftpboot/debian/sarge* like this:

```
cd /tmp

lftp -c "open http://ftp.de.debian.org/debian/dists/sarge/main/installer-i386/current/images/; mirror netboot/"

cd netboot/

mv debian-installer/ sarge

mkdir /var/lib/tftpboot/debian
```

```
mv sarge /var/lib/tftpboot/debian/
```

(You can download the files from any other Debian mirror as well. Use one that is close to you.)

Then open *pxelinux.cfg/default* again as described in chapter 6, copy the *LABEL* stanzas, modify them, and add them to */var/lib/tftpboot/pxelinux.cfg/default*. */var/lib/tftpboot/pxelinux.cfg/default* should now look like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append    base-installer/kernel/linux/extra-packages-2.6=    pkgsel/install-pattern=~t^ubuntu-standard$    pkgsel/language-pack-patterns=    pkgsel/install-language-support=false    vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append  base-installer/kernel/linux/extra-packages-2.6=  pkgsel/install-pattern=~t^ubuntu-standard$  pkgsel/language-pack-patterns=  pkgsel/install-language-support=false  priority=low  vga=normal
```

```
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
        kernel ubuntu/edgy/i386/linux
        append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
        kernel ubuntu/dapper/i386/linux
        append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
        kernel ubuntu/dapper/i386/linux
        append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
        kernel ubuntu/dapper/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_expert
        kernel ubuntu/dapper/i386/linux
        append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
        kernel ubuntu/dapper/i386/linux
                append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
        kernel ubuntu/dapper/i386/linux
        append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

LABEL sarge_i386_linux
        kernel debian/sarge/i386/linux
        append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
```

```
      kernel debian/sarge/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
      kernel debian/sarge/i386/2.6/linux
      append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
      kernel debian/sarge/i386/2.6/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --

PROMPT 1
TIMEOUT 0
```

Delete */tmp/netboot*:

```
cd /tmp/

rm -fr netboot/
```

and add the new installation options to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install     edgy_i386_linux              edgy_i386_server
edgy_i386_expert      edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install   dapper_i386_linux            dapper_i386_server
dapper_i386_expert    dapper_i386_server-expert    dapper_i386_rescue
sarge_i386_linux      sarge_i386_expert            sarge_i386_linux26
```

```
sarge_i386_expert26
```

8 Add Debian Etch Netboot

Next we download the Debian Etch netboot files and put them in */var/lib/tftpboot/debian/etch* like this:

```
cd /tmp

lftp -c "open http://ftp.de.debian.org/debian/dists/etch/main/installer-i386/current/images/; mirror netboot/"

cd netboot/

mv debian-installer/ etch

mv etch /var/lib/tftpboot/debian/
```

(You can download the files from any other Debian mirror as well. Use one that is close to you.)

Then open */pxelinux.cfg/default* again as described in chapter 6, copy the *LABEL* stanzas, modify them, and add them to */var/lib/tftpboot/pxelinux.cfg/default*. */var/lib/tftpboot/pxelinux.cfg/default* should now look like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
```

```
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
      kernel ubuntu/dapper/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_expert
```

```
      kernel ubuntu/dapper/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
      kernel ubuntu/dapper/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

LABEL sarge_i386_linux
      kernel debian/sarge/i386/linux
      append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
      kernel debian/sarge/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
      kernel debian/sarge/i386/2.6/linux
      append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
      kernel debian/sarge/i386/2.6/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --

LABEL etch_i386_install
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --
LABEL etch_i386_linux
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_expert
      kernel debian/etch/i386/linux
```

```
      append priority=low vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_rescue
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  rescue/enable=true --

LABEL etch_i386_auto
      kernel debian/etch/i386/linux
      append auto=true priority=critical vga=normal initrd=debian/etch/i386/initrd.gz  --

PROMPT 1
TIMEOUT 0
```

Delete */tmp/netboot*:

```
cd /tmp/

rm -fr netboot/
```

and add the new installation options to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install      edgy_i386_linux              edgy_i386_server
edgy_i386_expert       edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install    dapper_i386_linux            dapper_i386_server
dapper_i386_expert     dapper_i386_server-expert    dapper_i386_rescue
```

```
sarge_i386_linux       sarge_i386_expert          sarge_i386_linux26
sarge_i386_expert26    etch_i386_install          etch_i386_linux
etch_i386_expert       etch_i386_rescue           etch_i386_auto
```

9 Add Fedora Core 6 Netboot

Next we download the Fedora Core 6 netboot files and put them in */var/lib/tftpboot/fedora/6* like this:

```
cd /var/lib/tftpboot

mkdir -p fedora/6/i386

cd fedora/6/i386

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/fedora.redhat.com/linux/core/6/i386/os/images/pxeboot/initrd.img

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/fedora.redhat.com/linux/core/6/i386/os/images/pxeboot/vmlinuz
```

(You can download the files from any other Fedora mirror as well. Use one that is close to you.)

Then add a Fedora Core 6 *LABEL* stanza to */var/lib/tftpboot/pxelinux.cfg/default*. The file should now look like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
```

```
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                  append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
      kernel ubuntu/dapper/i386/linux
                  append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
```

```
LABEL dapper_i386_expert
      kernel ubuntu/dapper/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
      kernel ubuntu/dapper/i386/linux
            append  base-installer/kernel/linux/extra-packages-2.6=  pkgsel/install-pattern=~t^ubuntu-standard$  pkgsel/language-pack-patterns=  pkgsel/install-language-support=false  DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

LABEL sarge_i386_linux
      kernel debian/sarge/i386/linux
      append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
      kernel debian/sarge/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
      kernel debian/sarge/i386/2.6/linux
      append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
      kernel debian/sarge/i386/2.6/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --

LABEL etch_i386_install
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --
LABEL etch_i386_linux
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_expert
```

```
      kernel debian/etch/i386/linux
      append priority=low vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_rescue
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  rescue/enable=true --

LABEL etch_i386_auto
      kernel debian/etch/i386/linux
      append auto=true priority=critical vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL fedora6_i386_linux
       kernel fedora/6/i386/vmlinuz
       append initrd=fedora/6/i386/initrd.img

PROMPT 1
TIMEOUT 0
```

Add the new installation option to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install     edgy_i386_linux              edgy_i386_server
edgy_i386_expert      edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install   dapper_i386_linux            dapper_i386_server
dapper_i386_expert    dapper_i386_server-expert    dapper_i386_rescue
sarge_i386_linux      sarge_i386_expert            sarge_i386_linux26
sarge_i386_expert26   etch_i386_install            etch_i386_linux
```

```
etch_i386_expert      etch_i386_rescue      etch_i386_auto
fedora6_i386_linux
```

When you installl Fedora Core 6 over the network, the installer will ask you about the installation method. Select *HTTP* and enter *ftp-stud.fht-esslingen.de* as the host, *pub/Mirrors/fedora.redhat.com/linux/core/6/i386/os/* as the directory. Of course, you can use any other Fedora mirror as well; use one that is close to you.

10 Add CentOS 4.4 Netboot

Next we download the CentOS 4.4 netboot files and put them in */var/lib/tftpboot/centos/4.4* like this:

```
cd /var/lib/tftpboot

mkdir -p centos/4.4/i386

cd centos/4.4/i386

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/centos/4.4/os/i386/images/pxeboot/initrd.img

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/centos/4.4/os/i386/images/pxeboot/vmlinuz
```

(You can download the files from any other CentOS mirror as well. Use one that is close to you.)

Then add a CentOS 4.4 *LABEL* stanza to */var/lib/tftpboot/pxelinux.cfg/default*. The file should now look like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt
```

```
DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
      kernel ubuntu/dapper/i386/linux
```

```
                append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_expert
        kernel ubuntu/dapper/i386/linux
        append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
        kernel ubuntu/dapper/i386/linux
                append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
        kernel ubuntu/dapper/i386/linux
        append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

LABEL sarge_i386_linux
        kernel debian/sarge/i386/linux
        append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
        kernel debian/sarge/i386/linux
        append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
        kernel debian/sarge/i386/2.6/linux
        append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
        kernel debian/sarge/i386/2.6/linux
        append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --

LABEL etch_i386_install
        kernel debian/etch/i386/linux
        append vga=normal initrd=debian/etch/i386/initrd.gz  --
LABEL etch_i386_linux
        kernel debian/etch/i386/linux
```

```
      append vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_expert
      kernel debian/etch/i386/linux
      append priority=low vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_rescue
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  rescue/enable=true --

LABEL etch_i386_auto
      kernel debian/etch/i386/linux
      append auto=true priority=critical vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL fedora6_i386_linux
       kernel fedora/6/i386/vmlinuz
       append initrd=fedora/6/i386/initrd.img

LABEL centos4.4_i386_linux
       kernel centos/4.4/i386/vmlinuz
       append initrd=centos/4.4/i386/initrd.img

PROMPT 1
TIMEOUT 0
```

Add the new installation option to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
```



```
======================
edgy_i386_install     edgy_i386_linux              edgy_i386_server
edgy_i386_expert      edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install   dapper_i386_linux            dapper_i386_server
dapper_i386_expert    dapper_i386_server-expert    dapper_i386_rescue
sarge_i386_linux      sarge_i386_expert            sarge_i386_linux26
sarge_i386_expert26   etch_i386_install            etch_i386_linux
etch_i386_expert      etch_i386_rescue             etch_i386_auto
fedora6_i386_linux    centos4.4_i386_linux
```

When you installl CentOS 4.4 over the network, the installer will ask you about the installation method. Select *HTTP* and enter *ftp-stud.fht-esslingen.de* as the host, *pub/Mirrors/centos/4.4/os/i386/* as the directory. Of course, you can use any other CentOS mirror as well; use one that is close to you.

11 Add Mandriva 2007.0 Netboot

Next we download the Mandriva 2007.0 netboot files and put them in */var/lib/tftpboot/mandriva/2007.0* like this:

```
cd /var/lib/tftpboot

mkdir -p mandriva/2007.0/i386

cd mandriva/2007.0/i386

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/Mandrivalinux/official/2007.0/i586/isolinux/alt0/vmlinuz

wget http://ftp-stud.fht-esslingen.de/pub/Mirrors/Mandrivalinux/official/2007.0/i586/isolinux/alt0/all.rdz
```

(You can download the files from any other Mandriva mirror as well. Use one that is close to you.)

Then add a Mandriva 2007.0 *LABEL* stanza to */var/lib/tftpboot/pxelinux.cfg/default*. The file should now look like this:


```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server-expert
      kernel ubuntu/edgy/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_rescue
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  rescue/enable=true --

LABEL dapper_i386_install
      kernel ubuntu/dapper/i386/linux
```

```
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_linux
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server
      kernel ubuntu/dapper/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_expert
      kernel ubuntu/dapper/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --
LABEL dapper_i386_server-expert
      kernel ubuntu/dapper/i386/linux
            append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low
vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  --

LABEL dapper_i386_rescue
      kernel ubuntu/dapper/i386/linux
      append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw  rescue/enable=true --

LABEL sarge_i386_linux
      kernel debian/sarge/i386/linux
      append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
      kernel debian/sarge/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
      kernel debian/sarge/i386/2.6/linux
      append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
      kernel debian/sarge/i386/2.6/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
```

```
LABEL etch_i386_install
        kernel debian/etch/i386/linux
        append vga=normal initrd=debian/etch/i386/initrd.gz  --
LABEL etch_i386_linux
        kernel debian/etch/i386/linux
        append vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_expert
        kernel debian/etch/i386/linux
        append priority=low vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_rescue
        kernel debian/etch/i386/linux
        append vga=normal initrd=debian/etch/i386/initrd.gz  rescue/enable=true --

LABEL etch_i386_auto
        kernel debian/etch/i386/linux
        append auto=true priority=critical vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL fedora6_i386_linux
         kernel fedora/6/i386/vmlinuz
         append initrd=fedora/6/i386/initrd.img

LABEL centos4.4_i386_linux
         kernel centos/4.4/i386/vmlinuz
         append initrd=centos/4.4/i386/initrd.img

LABEL mandriva2007.0_i386_linux
         kernel mandriva/2007.0/i386/vmlinuz
         append initrd=mandriva/2007.0/i386/all.rdz

PROMPT 1
```

```
TIMEOUT 0
```

Add the new installation option to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install      edgy_i386_linux              edgy_i386_server
edgy_i386_expert       edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install    dapper_i386_linux            dapper_i386_server
dapper_i386_expert     dapper_i386_server-expert    dapper_i386_rescue
sarge_i386_linux       sarge_i386_expert            sarge_i386_linux26
sarge_i386_expert26    etch_i386_install            etch_i386_linux
etch_i386_expert       etch_i386_rescue             etch_i386_auto
fedora6_i386_linux     centos4.4_i386_linux         mandriva2007.0_i386_linux
```

When you installl Mandriva 2007.0 over the network, the installer will ask you about the installation method. Select *HTTP* and *Official586* and enter/select *gd.tuwien.ac.at* as the host, */pub/linux/Mandrakelinux/official/2007.0/i586/* as the directory. Of course, you can use any other Mandriva mirror as well; use one that is close to you.

12 Add OpenSuSE 10.2 Netboot

Next we download the OpenSuSE 10.2 netboot files and put them in */var/lib/tftpboot/suse/10.2* like this:

```
cd /var/lib/tftpboot

mkdir -p suse/10.2/i386
```



```
cd suse/10.2/i386

wget http://ftp.uni-ulm.de/pub/mirrors/opensuse/distribution/SL-OSS-factory/inst-source/boot/i386/loader/initrd

wget http://ftp.uni-ulm.de/pub/mirrors/opensuse/distribution/SL-OSS-factory/inst-source/boot/i386/loader/linux
```

(You can download the files from any other OpenSuSE mirror as well. Use one that is close to you.)

Then add an OpenSuSE 10.2 `LABEL` stanza to `/var/lib/tftpboot/pxelinux.cfg/default`. The file should now look like this:

```
vi /var/lib/tftpboot/pxelinux.cfg/default
```

```
DISPLAY boot.txt

DEFAULT edgy_i386_install

LABEL edgy_i386_install
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_linux
      kernel ubuntu/edgy/i386/linux
      append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
LABEL edgy_i386_server
      kernel ubuntu/edgy/i386/linux
                        append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal
initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --

LABEL edgy_i386_expert
      kernel ubuntu/edgy/i386/linux
      append priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw  --
```

```
LABEL edgy_i386_server-expert
	kernel ubuntu/edgy/i386/linux
		append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false priority=low vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw --

LABEL edgy_i386_rescue
	kernel ubuntu/edgy/i386/linux
	append vga=normal initrd=ubuntu/edgy/i386/initrd.gz ramdisk_size=16417 root=/dev/ram rw rescue/enable=true --

LABEL dapper_i386_install
	kernel ubuntu/dapper/i386/linux
	append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw --
LABEL dapper_i386_linux
	kernel ubuntu/dapper/i386/linux
	append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw --
LABEL dapper_i386_server
	kernel ubuntu/dapper/i386/linux
		append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw --

LABEL dapper_i386_expert
	kernel ubuntu/dapper/i386/linux
	append DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw --
LABEL dapper_i386_server-expert
	kernel ubuntu/dapper/i386/linux
		append base-installer/kernel/linux/extra-packages-2.6= pkgsel/install-pattern=~t^ubuntu-standard$ pkgsel/language-pack-patterns= pkgsel/install-language-support=false DEBCONF_PRIORITY=low vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw --

LABEL dapper_i386_rescue
	kernel ubuntu/dapper/i386/linux
	append vga=normal initrd=ubuntu/dapper/i386/initrd.gz ramdisk_size=14332 root=/dev/rd/0 rw rescue/enable=true --

LABEL sarge_i386_linux
```

```
      kernel debian/sarge/i386/linux
      append vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert
      kernel debian/sarge/i386/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/initrd.gz ramdisk_size=9458 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_linux26
      kernel debian/sarge/i386/2.6/linux
      append vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --
LABEL sarge_i386_expert26
      kernel debian/sarge/i386/2.6/linux
      append DEBCONF_PRIORITY=low vga=normal initrd=debian/sarge/i386/2.6/initrd.gz ramdisk_size=10938 root=/dev/rd/0 devfs=mount,dall rw  --

LABEL etch_i386_install
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --
LABEL etch_i386_linux
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_expert
      kernel debian/etch/i386/linux
      append priority=low vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL etch_i386_rescue
      kernel debian/etch/i386/linux
      append vga=normal initrd=debian/etch/i386/initrd.gz  rescue/enable=true --

LABEL etch_i386_auto
      kernel debian/etch/i386/linux
      append auto=true priority=critical vga=normal initrd=debian/etch/i386/initrd.gz  --

LABEL fedora6_i386_linux
       kernel fedora/6/i386/vmlinuz
```

```
        append initrd=fedora/6/i386/initrd.img

LABEL centos4.4_i386_linux
        kernel centos/4.4/i386/vmlinuz
        append initrd=centos/4.4/i386/initrd.img

LABEL mandriva2007.0_i386_linux
        kernel mandriva/2007.0/i386/vmlinuz
        append initrd=mandriva/2007.0/i386/all.rdz

LABEL suse10.2_i386_linux
        kernel suse/10.2/i386/linux
        append initrd=suse/10.2/i386/initrd splash=silent showopts

PROMPT 1
TIMEOUT 0
```

Add the new installation option to */var/lib/tftpboot/boot.txt*:

```
vi /var/lib/tftpboot/boot.txt
```

```
Available Boot Options:
=======================
edgy_i386_install      edgy_i386_linux              edgy_i386_server
edgy_i386_expert       edgy_i386_server-expert      edgy_i386_rescue
dapper_i386_install    dapper_i386_linux            dapper_i386_server
dapper_i386_expert     dapper_i386_server-expert    dapper_i386_rescue
sarge_i386_linux       sarge_i386_expert            sarge_i386_linux26
sarge_i386_expert26    etch_i386_install            etch_i386_linux
etch_i386_expert       etch_i386_rescue             etch_i386_auto
```

fedora6_i386_linux	centos4.4_i386_linux	mandriva2007.0_i386_linux
suse10.2_i386_linux		

When you installl OpenSuSE 10.2 over the network, the installer will ask you if CD 1 (?) is in the CD drive. As gthe purpose of our PXE server is not to use any CDs, select `Back`. As installation method, select `HTTP` and enter `ftp.uni-ulm.de` as the host, `/pub/mirrors/opensuse/distribution/10.2/repo/oss` as the directory. Of course, you can use any other OpenSuSE mirror as well; use one that is close to you.

13 Links

- PXE (Wikipedia): **http://en.wikipedia.org/wiki/Preboot_Execution_Environment**
- Ubuntu: **http://www.ubuntu.com**
- Debian: **http://www.debian.org**
- Fedora: **http://fedora.redhat.com**
- CentOS: **http://www.centos.org**
- Mandriva: **http://www.mandriva.com**
- OpenSuSE: **http://www.opensuse.org**