Installing Multiple Distributions Back to Back

Linux Allsorts

It is not always that easy to give a Linux distribution a trial run. On the one hand you might want to keep Windows and the original Linux system, but you still need access to your bookmarks and mail. This article explains how you can achieve that. **BY DANIEL COOPER**

The release of a new distribution is often quite a temptation: Should I really upgrade the old system, will the new Linux really be stable, and will it really support my hardware? Wouldn't it be wonderful just to install the new distribution without affecting the running system?

Well it is possible, but it does involve completely rebuilding your system first; as a structure of the required type is quite difficult to achieve. Your patience will be rewarded with a system that allows you to install, try out, and possibly remove new releases in the future, if you decide against keeping them. Additionally, the home directories of these distributions should be identical with the exception of a few distribution specific components to ensure that you have identical mail, Mozilla settings, and text files on each Linux system.

Running multiple, parallel distributions requires some careful planning, preferably before you start installing the first Linux system. Thus, we will be starting from scratch with a computer where Windows XP occupies the whole hard disk – after all, this is normally the case when you buy a new computer.

The first step is to make room for Linux by deleting the XP partition, creating a smaller partition and re-installing Windows. Re-installing can prove to be the first obstacle, because instead of a Windows XP CD many computers offer only a recovery CD that restores the original system – including the original partitioning in many cases.

Partition Magic, which is available for 99 Euro (£75) in a software bundle with SuSE Linux 8.1 Professional from the distributor, should help. Partition Magic comes on a bootable CD of its own, so you do not need to install the program. Simply insert the CD into the drive and reboot your computer. The Partition Magic desktop should appear after about a minute, allowing you to resize the existing Windows partition.

Planning for Partitions

The question is: How much space do I need for Linux? Most users can make do with 2 or 3 GB for a Linux system, although a full installation will need 5 or 6 GB. Let's work on the assumption that you intend to install a second distribution back to back with your working copy, and need more room for a third Linux system – that you possibly found on the Linux Magazine subscription CD. We'll add a swap partition that should be twice the size of your computer's memory – so that makes about 10 GB altogether.

We will be using Grub as the boot loader. For one thing, Grub is the standard boot loader for most current distributions, and for another Grub allows you to create a central boot configuration for all of your Linux systems. You will probably need a boot partition with about 20 to 50 MB where the kernels for all the distributions you use will reside later.

You can either create new /home directories for each distribution, or use a shared partition for all your Linux systems like we will be doing in this example. The home partition will need to be big enough; 500 MB, the size used in our examples, should thus be regarded as an absolute minimum.

A shared home partition has the advantage that bookmarks, browser, and email preferences can be shared by all your systems, meaning that you do not need to search several systems to find a bookmark.

After resizing the Windows partition, you can start to install the working system, in this case SuSE Linux 8.1. Boot from the first CD or the DVD, select your language preference, then choose *Partitioning*, *Custom Partitioning for experts*, and create the required partitions manually in the dialog box that appears. This is the only way to
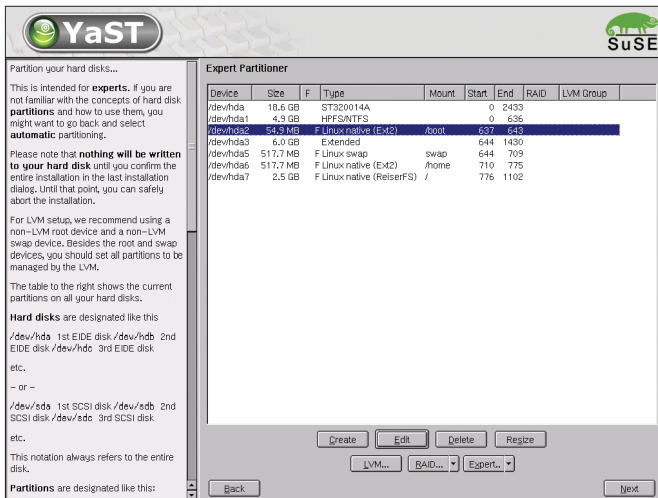
Figure 1: Partitions /dev/hda2 through /dev/hda6 are shared by all distributions; the system files for SuSE Linux 8.1 will reside on /dev/hda7, which is the seventh partition on the first IDE hard disk

Figure 2: Mandrake is installed on /dev/hda8 and merely uses /dev/hda5 as a swap partition. The partitions for /boot and /home will be merged manually after installing

completely ignore any suggestions made by the installation program.

Dividing Up the Hard Disk

The following partitioning may seem a little strange at first sight, but its value has been proved in practical applications. As you can see in Figure 1, Windows XP sits on the first partition, */dev/hda1*. Depending on your original setup, the numbers may be different – the important thing is that Windows occupies the start of the hard disk. Now create */boot* as the next primary partition, (*/dev/hda2*), and format it with *Ext2*, the size should be between 20 and 50 MB.

The remaining partitions occupy the larger area shown as */dev/hda3* in Figure 1; this is actually the total remaining hard disk space. The first so-called logical partition (*/dev/hda5*) is used as the swap area and will be shared by all of our Linux systems later. Swap is followed by the home partition */dev/hda6* (also *Ext2*, but only 500 MB in our example); again this partition will be shared.

Of course, you can use Ext3 or Reiser-FS instead of the Ext2 filesystem for the home partition – but make sure that all of your distributions understand the file system you choose. Ext2 is the smallest common denominator, and will be supported even by older distributions. Ext2 is also definitely recommended for the boot partition, as the boot loader has to understand it – and at least you are on

the safe side, if you decide to install Lilo or a completely different boot loader instead of Grub later.

A Partition for Each Distribution

Up to this point our partitioning is quite generic and independent of the working system we will be installing later. Now define */dev/hda7* as the root partition of your working system; this is where you will be installing your favorite distribution. In the case of SuSE 8.1 2.5 GB should be fine for a standard installation.

Figure 1 shows the final status after using SuSE to partition the hard disk as described so far. You can follow the normal steps to install SuSE; the defaults suggested by the installation routine will be just fine, thank you.

Rescuing Your SuSE Settings

After completing the installation and setup you will need to log on as a normal user to setup your desktop preferences. Following this, log off and then log back on again as *root* and launch Konqueror.

If multiple distributions will be sharing a home directory, you will need to save the standard user's desktop configuration; the standard user is called *mdoelle* in our example. The desktop configuration contains several generic and some distribution specific configuration options that need changing when you switch Linux systems. The *symlinker* script from [1] will take care of this task later, and will place distri-

bution specific files in the *.SuSE* directory in each user's home directory.

Rename the */home/mdoelle* directory to */home/.SuSE* first, and create a new, empty directory called */home/mdoelle*. If you really need to use Konqueror to do this, first enable *Show Hidden Files* in the *View* menu, as *.SuSE* is a hidden directory and will not be displayed otherwise. The next step is to modify the permissions for */home/mdoelle* (for example by typing *chown mdoelle:users /home/mdoelle*) and to move *.SuSE* into the directory by typing *mv /home/.SuSE /home/mdoelle*.

Of course you can perform this task more conveniently using Konqueror: right click on the *mdoelle* directory to open the drop-down menu, select *Properties* and then click on the *Permissions* tag. Enter *mdoelle* as the *Owner*, and *users* as the group and click on *OK* to confirm.

When you are done, move the *.SuSE* directory to *mdoelle*. This concludes the preparatory steps for running parallel distributions; you can now close the current session and get ready to install the second Linux system.

Installing a Second Linux System

Our second Linux system is Mandrake Linux 9.0. The important thing is to ensure that you perform an expert installation – a default installation would simply overwrite the SuSE Linux system you just installed.

Partitioning the second system is quite simple: you simply place everything in */dev/hda8*, a partition with 2.5 GB unused space, as shown in Figure 2. Most importantly, do not integrate the boot and home partitions you created previously, as this would overwrite the boot loader, kernel and user preferences you created for SuSE 8.1 without prompting you to confirm. We will be merging the systems manually at a later stage.

Boot Loader Trap

You can follow the defaults for the installation up to a certain point; but be careful when you reach *Bootloader installation*. Select the floppy disk drive, */dev/fd0*, as your boot device, and insert an empty formatted disk. This will ensure that the boot loader is not written to your hard disk, where it would inevitably overwrite your SuSE 8.1 boot loader. You will only require the floppy when booting Mandrake for the first time, so you can ignore the prompt to create a second boot disk.

After completing the installation and configuration steps, you can boot the Mandrake system by inserting the boot loader disk, and log on as a normal user, to set up the desktop with a little help from the First Time Wizard. Immediately after doing so, log off and log back on as *root* – a console with root privileges is no help, as the standard user cannot be logged on at this stage.

Grub – One for All

Let's add the Mandrake entries to the SuSE Linux 8.1 boot loader first. To do so, mount the boot partition by typing

```
mount /dev/hda2 /mnt/disk
```

and then type on the command line:

```
cp -a /boot /mnt/disk/mandrake
```

to copy the kernel and various configuration files to the *mandrake* subdirectory on the boot partition.

The boot preferences for Mandrake are stored in */boot/grub/menu.lst*. Use an editor to open the file, *KEdit*, for example. You only need the *title linux* entry and the following two lines:

```
title linux
kernel (hd0,7)/boot/vmlinuz ↵
root=/dev/hda8 quiet devfs=↵
mount vga=788
initrd (hd0,7)/boot/initrd.img
```

Select the appropriate lines (as shown in Figure 3) and copy them to the shared Grub configuration */mnt/disk/grub/menu.lst*. The next step is to modify the path to the *vmlinuz* and *initrd.img* files in the shared configuration so that the kernel and the initialization modules will be residing in the */mandrake* directory on the boot partition and not in */boot*.

You will also need to edit the boot partition entry, changing *(hd0,7)* (which actually refers to */dev/hda8*). The new boot partition is */dev/hda2* or *(hd0,1)* in Grub notation . Save the file and quit the editor.

Mounting the Boot Partition

Now we need to ensure that the boot partition is mounted when Mandrake is launched. To do so, open the */etc/fstab* file and enter the following in the second line:

```
/dev/hda2 /boot ext2 defaults 1 1
```

A final call to *umount /mnt/disk* followed by *mount -a* will mount the boot partition in the right position. If you prefer, you can remove all the files in */boot* first by typing *rm -fR /boot/** – but this is not necessary, as the boot partition will overwrite any existing entries.

On the contrary, keeping the */boot* directory on the Mandrake partition will allow you to boot Mandrake from the boot loader disk, if the worst comes to the worst.

Home Mergers

The next step assumes that you want to use the same user home directories on Mandrake as on SuSE – although some distribution specific menu customization will be required. This causes one or two issues, as both distributions use the same name for their desktop configuration files, although they contain completely different entries. So when you launch one system, the home directory will need to be customized to reflect the current distribution.

On the other hand, it is desirable to keep an identical configuration for some programs, as this means that you only need to set up KMail once, for example, or that Midnight Commander will be the same in both systems. To ensure that this merger works, some modifications to the second, and any other distribution you add, are inevitable.

During the installation procedure, Mandrake placed the home directory for the standard user on */dev/hda8*, that is the Mandrake system partition. To merge both distributions, first mount the home partition, */dev/hda6*, and then move the home directory belonging to the Mandrake user, *mdoelle* in this case, to the home partition. Symlinker [1] will also need to rename the directory to *.Mandrake*. Finally, unmount the home partition again:

```
mount /dev/hda6 /mnt/disk
mv /home/mdoelle ↵
/mnt/disk/mdoelle/.Mandrake
umount /mnt/disk
```

You will want to mount the home partition under */home* in future; to do so, add the following as the third line in */etc/fstab*:
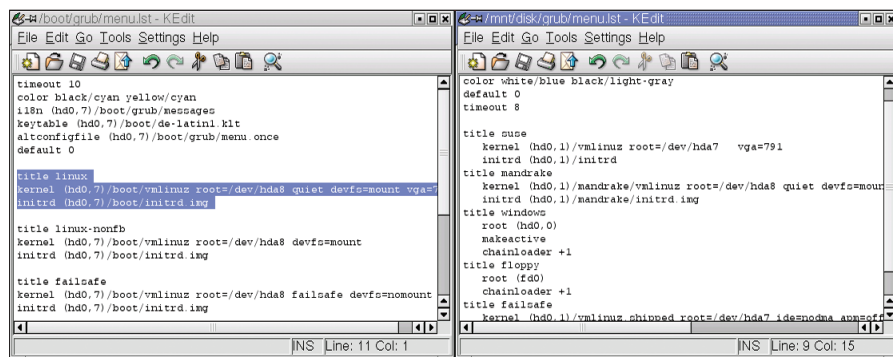

Figure 3: KEdit allows you to conveniently move the Mandrake boot configuration (left) to the shared Grub configuration */mnt/disk/grub/menu.lst* (right)

```
/dev/hda6 /home ext2 defaults 1 1
```

After saving the file, type *mount -a* to mount the home partition at the right position. Now it's time to look at synchronizing the user and group IDs, as SuSE and Mandrake go completely different ways in this respect. Mandrake creates a group, with the same name and ID as the user, for each user – the group ID for the first user is 501. Mandrake also has a common group for all users called *users* like the one SuSE uses, but there are no members in the group.

Normalizing Users

It makes sense to apply the user and group settings for your working system to the new distribution. To do so for Mandrake, you will need to edit the */etc/passwd* file manually.

Each line in the *passwd* file represents a user, and the fields are colon-separated:

```
mdoelle:x:501:501:Mirko Dölle:/
home/mdoelle:/bin/bash
```

The first field in each line contains the user name. The simplest way of doing this would be to copy the entry from SuSE Linux 8.1; but you could also add the new user ID (500) to the third column, and the new group ID (100) to the fourth.

The finished entry should read approximately as follows:

```
mdoelle:x:500:100:Mirko Dölle:/
home/mdoelle:/bin/bash
```

This does not complete the conversion: Linux uses numbers to specify the owner of a file, or to be more precise, it use the user and group ID.

Thus, any files with the user ID 501 and group ID 501 will need to change owner and group to 500 and 100 respectively to reflect the changes made in the */etc/passwd* file. The following two commands take care of this task on the whole system:

```
find / -gid 501 -exec chgrp 100 
"{}" \;
find / -uid 501 -exec chown 500 
"{}" \;
```

You can ignore any errors reported for CD or floppy drives, and for files in the */proc* directory.

Changing Distributions

Both distributions are now configured to expect the standard user *mdoelle*'s home directory in */home/mdoelle* – but in fact, the home directory created by Mandrake is in */home/mdoelle/.Mandrake*, and the one created by SuSE is in */home/mdoelle/.SuSE*. If *mdoelle* logged on in this state, the default configuration for KDE, GNOME, *bash*, and many other programs would be missing – the configuration details for most programs are stored in hidden files and directories when you start up a system for the first time (their names start with a period).

Enter the Symlinker program [1]: Symlinker has to be installed on any distributions you use, and will search user homes for hidden directories with distribution specific preferences – *.Mandrake* or *.SuSE* in this case, depending on the distribution that is currently running. If it finds preferences for the current distribution, Symlinker creates a symbolic link to the home directory of the current user, thus linking the files to their original position, and allowing programs to find their defaults.

When you down the system, the link is removed; thus leaving a clean home directory when you launch a different distribution, and allowing Symlink to create appropriate links.

The really impressive thing about Symlinker is the fact that it checks the users home directory first, to see whether it contains a configuration file.

If so, Symlink does not create a symbolic link – so if you copy the *.bashrc* file with the Bash preferences from */home/mdoelle/.SuSE* to */home/mdoelle*, Symlinker will simply leave *.bashrc* when you launch Mandrake. The same principle applies to configuration files for KDE programs, which are normally stored in the *.kde/share/config* directory.

Installing Symlinker

Symlinker installs automatically when you invoke *./symlinker install* as the root user. Manual installation is only required if the script fails which involves copying

symlinker to the directory with your init scripts, typically */etc/init.d* or */etc/rc.d/init.d*.

Also, you will need a symbolic link called *K01symlinker* in your runlevel directories 0 through 6, and a link called *S99symlinker* in runlevel directories 2 through 5; each link will point to the script. The runlevel directories *rc0.d* through *rc6.d* are typically found in */etc/rc.d* or */etc/init.d*.

After completing the installation you will need to customize the name of your distribution in the script; the variable is called *Distribution* and is at the start of the file. If you want details of how Symlinker works, you might like to read the comments for the important steps in the script file.

The *Documents* and *public_html* directories lend themselves to sharing, as they do not contain any distribution specific settings. If you like, you can also share your *.bashrc*, or your mailboxes (typically *Mail* or *mail*) to all your distributions.

To do so, first remove the symbolic link in the home directory, and then copy the required file or directory from the distribution directory, *.Mandrake* or *.SuSE*, directly to your home directory.

Conclusion

The scenario shown here may appear complex at first sight, and careful planning is required before partitioning and for creating user directories.

The procedure for installing a third or even fourth distribution is the same as outlined for Mandrake; first install the distribution in a partition of its own, and store the boot loader on a floppy, then extend Grub manually, and finally move the home directory for the standard user to the home partition.

Removing a distribution is extremely easy. To do so, simply remove the distribution specific partition and the Grub entry. Users then simply remove the distribution specific files from their home directory – this should not influence any other distributions you may have installed. ∎

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[1] Symlinker script: *http://www.linux-magazine.com/issue/28/Download*