Putting the boots in

Chris Bidmead uses SuSE and YaST to achieve a dual-boot system with Linux.

Last month I hinted at problems with installing S.u.S.E 5.3 on the Dell PowerEdge. The snag is that the Linux kernel cannot find the hard drive. But it's nothing a quick download from the net can't solve. The trick is knowing where to get the download and what to do with it. If we cover the basics, all will become clear.

The Dell PowerEdge uses SCSI hard drives (appropriate for a server) and embeds the host bus adapter for them on the motherboard, rather than take up a PCI slot with a plug-in card. The new embedded Adaptec SCSI host bus adapter is a small chipset on the motherboard instead of the almost functionally equivalent AIC7xxx plug-in cards that Linux already knows and loves. The old AIC7xxx driver in the Linux kernel (or the equivalent loadable module) doesn't understand the new chipset and so cannot see the hard drive.

As soon as he realised this, Doug Ledford <dledford@redhat.com>, whose project this is, started work on a revision of the AIC7xxx code. A beta version appeared shortly after the arrival of S.u.S.E 5.3 with its 2.0.35 kernel, which is why it's not on our *PCW* CD-ROM. The AIC7xxx code is now complete and incorporated in a boot disk image which you can download from the S.u.S.E site at www.suse.com.

Having downloaded the new boot disk image, called aic7890, from the S.u.S.E site I made a boot disk under another version of Linux by running

```
dd if=aic7890 of=/dev/fd0
```

which transfers the image as a raw stream of bytes. The same can be done under DOS, using the rawrite DOS utility provided with most Linux distributions (it's under /dosutils on the S.u.S.E 5.3 CD number 1).

Put this diskette in the floppy drive and boot from it. As it boots, it discovers hardware features of the machine, streaming a log of its findings up the screen. Unless you're trying to diagnose a problem, like not being able to find the hard disk, you can ignore all this. S.u.S.E then kicks straight into a startup utility called linuxrc which takes us into a series of character-based screens like that in Fig 1. In my case there was no need to load a SCSI module, as the new SCSI driver is compiled into my temporary floppy-disk-loaded kernel. But I did need the eepro100.o module for the Intel EtherExpressPro 10/100 network card in the Dell PowerEdge.

◀FIG 1 THE INITIAL PART OF THE S.U.S.E INSTALLATION RUNS A ROUTINE CALLED LINUXRC WHICH OFFERS A NUMBER OF CHARACTER-BASED SCREENS SUCH AS THIS, WHICH SETS UP FEATURES LIKE SCSI ADAPTERS AND NETWORK CARDS

A full walk-through of S.u.S.E's installation would go over ground already covered with the installation of Red Hat on my friend Marcus's machine (*PCW*, Jan & Feb '99), so here's an outline.

YaST a little help

Once the all hardware is catered for, the S.u.S.E installation takes you into YaST (Yet another System Tool) which will help you configure everything and pick the software you want to install. You can even choose to install the live filesystem CD which S.u.S.E supplies with the 5-CD package [Fig 2]. Apparently, a number of S.u.S.E customers have complained that this CD is missing from their set: it's behind a flap at the back of the CD case. People have just failed to spot it.

It's worth trying out the live filesystem as it lets you run packages without transferring them to your hard disk. You can integrate the live filesystem CD once you have the S.u.S.E core fully installed, which is great for making the most of a system that's short of hard-drive space. If you run the live CD filesystem at this point in the installation you'll be able to access all the manual pages and the info system — a kind of character-based hypertext knowledge-base put together by the GNU community to document key utilities such as tar, emacs and so on. Type 'info' on the command line to get started.

The Dell PowerEdge 6.5Gb hard drive came with a couple of partitions already in place. The second partition, seen as /dev/sda2 by the S.u.S.E installation routine, was 2Gb's worth of Windows NT 4.0, while /dev/sda1 is a small 16Mb special Dell partition used to configure the hardware. I decided to leave these alone and create a small root partition for Linux and an extended partition for everything else Linux needed, along the lines discussed last month.

▶FIG 2 THE S.U.S.E 5.3 FIVE-CD PACKAGE INCLUDES A 'LIVE FILE SYSTEM' CD WHICH MINIMISES YOUR HARD DISK REQUIREMENT BY PROVIDING MOST OF THE ESSENTIALS READY-TO-RUN FROM YOUR CD DRIVE

YaST offers five main installation configurations depending on the amount you want to install. You can add or remove as much as you want from these. Obviously there'll be some packages which are dependent on the installation of other packages to work properly. The dependencies are something of which YaST is able to keep track.

Another handy thing YaST does is calculate your remaining potential disk space while you're selecting your packages. This avoids the problem Marcus and I got into in the first article in this series (*PCW*, Jan '99) — running out of space during the installation. If a partition is going to end up with less than five percent free space, YaST will warn you in advance, giving you a chance to back off and select fewer packages or even return to the partitioning part of the installation to change your partitions.

I should say that in the first cut of S.u.S.E 5.3 there was a bug on CD 1 which caused YaST to freeze if you were partitioning a drive with free space left over (see www.suse.de/Support/sdb_e/maddin_yast_fdisk.html). This only happens in the English-language version, so my fix was to re-run the installation in German. The general principle is: check with your Linux distributor's site for the latest news before installing.

The package installation prompts for changes of CD, and once it's finished you're asked to re-insert the first CD. Then YaST asks you to select an appropriate kernel for your system. Normally this will be the standard EIDE kernel, but if you have SCSI drives you'll need one with the appropriate SCSI driver compiled. Which brings us back to my AIC7xxx problem. Confusingly, an AIC7xxx kernel is offered by the menu at this point, but it came from the CD and I knew it wouldn't work with the Dell PowerEdge's on-board Adaptec chipset. The kernel I needed was on my boot floppy. To see how I did this, turn to the *Hands On Unix* column (p241).

Nearly there

Now the main S.u.S.E 5.3 installation is essentially complete. At this point, YaST takes you into a few configuration details along the lines we covered with the Red Hat installation (*PCW*, Jan '99). This time I opted for network installation.

It's just a matter of answering a few questions about the machine's IP address, its host name and the name of the IP domain. If you want to put your machine on a TCP/IP network and these terms mean nothing to you, catch up by reading the online Network Administrator's Guide supplied with the S.u.S.E disk set, or on the web at, say, www.linuxhq.com/guides/NAG/index.html.

▲ **Fig 3 If you're using a router, this is where you tell S.u.S.E 5.3 its IP address. If you don't have one, enter the address of the machine on which you are installing**

Name that network

On my network I don't use BOOTP or DHCP so I entered a static IP address and a netmask of 255.255.255.0 for a class C network. My XyXEL ISDN router is my network's "gateway" [Fig 3] but I'm going to set up a PPP dialup connection to my ISP for the purpose of this workshop, rather than the 'so-easy-it's-cheating' router connection. So I told YaST that the Dell was my, er, gateway (as it were). Yast invites you to fill in the address of the primary nameserver — this is a dotted quad number like 158.152.1.58 which you get from your ISP. You'll also need a name for your network; mine is cbidmead@home.edu, but it's completely arbitrary.

The Network Administrator's Guide gives you a 'guts and all' view of the Linux networking mechanisms, dealing with the various daemons and their configuration files. S.u.S.E front-ends this with a single configuration file called /etc/rc.config which also handles much of the system configuration. A tool called SuSEconfig reads this file and changes all the other config files accordingly. You can edit /etc/rc.config directly, once you know what you're doing, and then run SuSEconfig to fix the changes.

FIG4

Persuading Lilo to fork

```
# LILO Konfigurations-Datei
# Start LILO global Section
boot=/dev/sda3
#compact    # faster, but won't work on all systems.
read-only
prompt timeout=100
vga = normal
# force sane state
# End LILO global section
# Linux bootable partition config begins
image = /vmlinuz
root = /dev/sda3
label = Linux
# Linux bootable partition config ends
```

Just add the following to the end of this file:

```
# DOS bootable partition config begins
other = /dev/sda2
label = WinNT
table = /dev/sda
# DOS bootable partition config ends
```

For beginners, YaST simplifies this by providing a menu-driven front-end to /etc/rc.config which automatically runs SuSEconfig. A dedicated Linux hacker may dispense with this and edit the various core config files by hand. YaST helps you fix the LILO boot loader in much the same way as discussed in our Red Hat installation (*PCW*, Feb). Now it's time to remove the CD and the floppy disk, reboot and log in. Remember that login names are case sensitive.

Now I'm in the character-based terminal mode of Linux. I won't run through S.u.S.E.'s X installation: it's much like Red Hat's, with the additional option of running SaX (S.u.S.E. Advanced XF86-Configurator) which makes X installation even easier. I upgraded the Dell PowerEdge with a Matrox Mystique card, a very easy card to install X onto as it's well catered for by the XFree86 programmers.

Remember that the Dell PowerEdge came with a 2Gb Windows NT 4.0 partition (/dev/sda2, as viewed from Linux)? At the moment, the drive's Master Boot Record (MBR) is set to jump straight to /dev/sda3, where LILO is lurking. LILO boots straight into Linux, so we need a way of persuading LILO to fork optionally to the Windows NT kernel on /dev/sda2. You can do this via YaST's System Admin/Kernel and Boot Configuration/LILO configuration menu, but for some fun and excitement let's do it by hand. We need to log in as root and edit the /etc/lilo.conf file. Currently it looks like Fig 4 (p213). The NT partition isn't DOS, it's NTFS, but it is 'DOS bootable'. The new stanza means that if we enter the 'WinNT' string at the LILO boot prompt it will take us to /dev/sda2 and run the operating system it finds there. To achieve this, we need to run /sbin/lilo on the config file. It spits out

```
Added Linux *
Added WinNT
```

as confirmation. The * indicates Linux will be booted by default.

And that's it. A dual boot system that leaves the resident Windows NT installation untouched but adds the completely new dimension of Linux. I've learnt a lot sharing these installation experiences with you, and I hope you've found the exercise helpful, too.

Good luck when you try this for yourself — and you know where to find me if you need me (see 'PCW Contacts').

CONFIGURE THE ISP CONNECTION

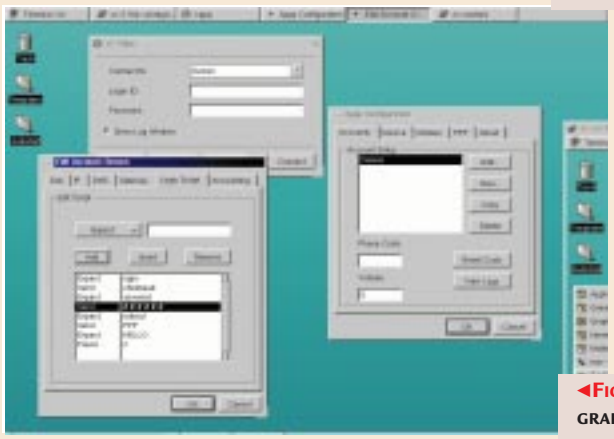
You can set up a PPP (point-to-point protocol) connection to your ISP from YaST, or by grunt-work on the relevant config files if you know what you're doing.

For the modem, it's helpful to invent a device called /dev/modem and symbolically link it to the actual I/O port where your modem is connected (mine is /dev/ttyS0). YaST does this under its System Administration/ Network configuration menu.

You can use Yast to enter full details of your ISP, but if you're going to use the Windows-friendly KDE desktop which S.u.S.E 5.3 installs by default [Fig 5] there's a nicer way.

The daemon linking you to your ISP is called pppd. One of the KDE utilities is a front-end to pppd, called kppp. This is not only a great graphical dialler, it's also a well-organised, menu-driven PPP configuration tool. And it comes with online help, making configuration easy [Fig 6]. Depending on your ISP you'll either authenticate with the remote server via a script, through PAP (Password Authentication Protocol) or CHAP (Challenge Handshake Authentication Protocol). See the Network Administrator's Guide for details and the PPP-HOWTO — they're both in the S.u.S.E disk-set. Here, too, kppp walks you through the setup. Fig 6 shows it helping me put together a script to connect to Demon

▲ **Fig 5** By default, S.u.S.E 5.3 installs KDE, the Windows-like desktop designed to make migrants from Microsoft feel at home. Unlike Windows you can use the buttons (bottom centre) to switch between four different desktops (configurable to a maximum of eight). You can also hit Ctrl-Alt-Fn (where Fn is a function-key number between 2 and 6 incl.) to switch into a choice of virtual terminals where you can be logged on as 'various users'



◀ **Fig 6** The kppp graphical dialler includes built-in utilities to set up your modem, organise your authentication and create your connection script

PCW CONTACTS

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