SuSE Linux 6.4 for PPC on an IBM RS/6000 B50

STRONG AND BLACK

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The B50 is one of the first RS/6000 models available with the option of preinstalled Linux. We looked at what this computer has to offer and whether it lives up to the promise of its chic exterior.

The B50 reached us from IBM well-packaged in a large crate on a pallet (including several kilos of prospectus material – sadly the barbecue season is now over!) It arrived with Linux from SuSE (SuSE PPC 6.4) already installed. At the time of our test, version 7.0 of SuSE was only available for x86-based systems and (for the first time) SPARC. Owners of PowerPC and Alpha-based systems will have to wait a bit longer.

Hardware

The computer itself, at 89cm x 44.7cm x 61.2cm (W x H x D) looks well designed and is intended for installation in a 19-inch rack, preferably in large quantities (IBM likes to advertise the B50 with pictures of a 19-inch rack in which ten B50s are installed.) The 14.5 kg weight is, thanks to two fold-down handles cleverly fitted on the side, easy for a single system administrator to carry and shove into the 19-inch rack.

From the outside it appears that IBM has thought of everything when equipping the B50. It comes with interfaces for keyboard and mouse (PS/2), two serial ports, one parallel port, an

external Ultra SCSI connection and 10/100 Mbit Ethernet. As for mass storage, IBM offers a 1.44Mb diskette drive, a SCSI CD-ROM drive and two hard disk plug-in slots accessible from the front (behind a flap) for UW-SCSI hard disks. Plus, as with every RS/6000 there is an LED diagnostic display which after the system has been switched on displays a code indicating the self-test step or section of the boot procedure currently being executed – handy for diagnosing problems with the system that occur before screen output is possible.

But it's what's inside that really counts. The B50 is very engineer-friendly – most activities can be performed without a tool. For example, the casing cover is secured by three knurled screws. After removing the cover you find yourself looking at a very neatly constructed computer which also, thanks to PowerPC, manages with only three fans. (I was unable to determine precisely whether the hard disk slots had their own fans).

The RS/6000 came to us fully equipped: that is, with a 375 MHz PowerPC 604e CPU with 1 MB L2 cache, 1 GB RAM in 4 256 MB DIMM modules and two IBM DMVS18D U2W-SCSI hard disks each with 18 GB capacity. It also boasted a Matrox G200 graphics card (a PCI version) and an additional SMC PCNet32 FastEthernet card. The package was rounded off by a well-designed PS/2 keyboard in

Front with CD-ROM drive and plug-in slots for the hard disks

A fully-loaded rack

chic black (and with no Windows keys) and a remarkable little dual-key PS/2 mouse, which I found hard to get along with. But since the B50 is really mainly intended for rack installation, the keyboard and mouse will seldom come into play.

The SCSI controller in the B50 comes in the form of the tried and tested Symbios Logic 53C875 Onboard. The installed hard disks from the Ultrastar product line are high-tech too: with 10000 rpm, 2 MB Cache, SCA2 connection and seek-times of 4.9 milliseconds, they are ideal for a server machine like the B50.

Software

As mentioned, the B50 came with a pre-installed SuSE PPC 6.4 distribution. Unfortunately the root password was unknown, so after switching on for the first time the guessing game began – without success. We decided to try out the tried and tested kernel option **init=/bin/bash**. Just a minute, though: *how*? The B50 began to boot Linux immediately after the graphical start-up screen; there was no sign of a boot loader. Like all modern PowerPC systems, however, the B50 ought to have OpenFirmware. The long and the short of it is that a bit of a search on the Net produced the answer: when switching on the system you have to hold down the F8 key, then you are greeted by the OpenFirmware prompt and the machine can then be booted ″by hand″.

Once this little problem had been solved, there was no longer any obstacle to curiosity. SuSE installs a 2.2.14 series kernel which has compiled-in almost all the necessary drivers. After booting you are greeted by a nice penguin – so framebuffer support in the kernel is also present. A quick **ls -l > /dev/fb0**, which ought normally to produce coloured patterns on the console, however, on the

A glance at the inside
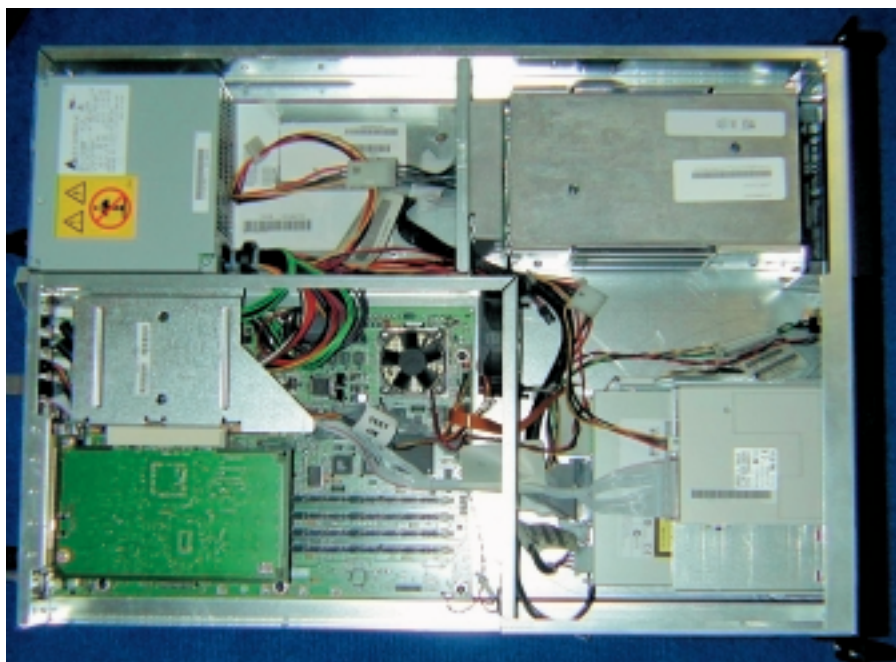
B50 led to a kernel panic. Not a pretty sight … One nice feature for long-term operation, however, came to light immediately – the B50 started again automatically a short time after the kernel panic.

On closer examination of the installation one notes that the machine has been installed by IBM. The LVM (Logical Volume Manager) from SuSE is straightforward to use and all partitions (apart from the boot partition) are arranged in a volume group named *rootvg* – AIX says hello. The use of the LVM certainly makes sense for server applications, since it can help to reduce downtime. The file system used, however, is still ext2, since ReiserFS at present only functions on x86 systems and IBM has still got work to do on its JFS implementation for Linux before it will be ready for the end user.

The X Window System was configured to play safe with a resolution of 640x480 pixels. As usual with SuSE, SaX can be used for additional configuration of X11. At this point it appeared that the graphics card was only supposed to have 2 MB video RAM. This would of course considerably restrict the choice of video modes for the X-Server (which is a framebuffer X-Server) and it seemed to us highly unlikely that a current graphics card would be delivered with such a small amount of video RAM. Another search on the Net proved that the problem is already known by IBM – a patch for this is already available which enables the video RAM to be correctly recognised (IBM designates the Matrox G200 as GXT130P).

There are a few other interesting patches for RS/6000 systems running with Linux, such as those which make it possible to compile IBM's JFS on PowerPC. A number of interesting tips are also starting to appear on SuSE's web site. Among other things, there is a description there of how the onboard sound chip, a Cirrus Logic CS4236+, which is not automatically recognised by the SuSE installation, can be configured (for the curious, we have immortalised it in the following table which shows the YaST parameters to be set). Why IBM uses an ISA sound card is still a mystery – maybe it's just a leftover from the old RS/6000 43P-model.

Network connections functioned straight away and the additional Ethernet card functioned immediately (both the onboard Ethernet and the extra card are based on the AMD PCnet 32-chipset.) If you want or have to use Token Ring this is also supported by IBM. A patch for Olympic and

YaST Parameters	
snd_port	0x534
snd_cport	0x538
snd_irq	5
snd_mpu_port	0x330
snd_mpu_irq	9
snd_fm_port	0x388
snd_dma1	1
snd_dma2	3
snd_isapnp	0

LanStreamer Token Ring cards is available but, lacking the card and TokenRing network (Ethernet, FDDI and ATM will have to do) we could not test it.

For installation in a 19-inch rack the computer will of course be used without a VGA monitor, keyboard and mouse since these take up space unnecessarily in the rack. IBM has thought of that. The B50 can be installed and used without any problem via a terminal on the first serial port. When booting up Linux you must not forget to enter the parameter **console=ttyS0** at the same time, otherwise there won't be much to look at. A plea to the developers – unless we are very much mistaken the console just used can be detected by querying an OpenFirmware environment variable which would enable Linux to select the console automatically.

All new ...

Unlike the kernel versions for most other processor platforms, the PowerPC port was developed with the aid of a version management tool. This step is to be welcomed in principle. Unfortunately, the tool used is not the normally-used (and standard for open source projects) CVS but a tool named "BitKeeper" which is available free from *www.bitkeeper.com.* Unfortunately it only appears to be available as a binary for the commonest Unix platforms and Windows. Even if the step towards version management is welcome, the use of a non-open source tool for this is to be deprecated.

The development method used is presumably the reason why current Standard 2.4 test kernel versions cannot be compiled without problems for PowerPC. Before the final release of kernel 2.4 there is surely still a bit of work to be done here. Current kernels (both the 2.2 and the 2.4 test series) are available (see Info box.) In order to use one of these kernels, however, you must first download BitKeeper, then after it has been installed, run it as follows: **bk clone bk://oss.software.ibm.com:***port version* The values to be used for ***port*** and ***version*** can be found in the following table:

Version	port	version
2.2, stable	8000	stable_2_2
2.2, development	8001	dev_2_2
2.4, stable	8002	stable_2_4
2.4, development	8003	dev_2_2

More info on LinuxPPC from IBM can be found at *http://oss.software.ibm.com/developerworks/ opensource/linux/projects/ppc/*

Applications

What can you use the B50 for, then? Certainly the B50 would work well as a workstation computer. But at a price of around £3,000 for even a basic configuration that could not be the main intended use. Rather, IBM sees the B50 under Linux being used as a server, especially as a webserver for ISPs. For other services on the network, such as a robust file server, high-speed router or firewall, however, the B50 would also work very well.

During our tests we pushed the system load up to 60, which didn't bother it in the slightest – though running at such a high system load does make things somewhat sluggish. Which brings us to a point that should not go unmentioned – the 604e processor used originated in the penultimate PowerPC generation and is really slow in comparison with the current PowerPC G4 and x86-compatible processors (not to mention 21264 series Alphas.) So perhaps it is not such a good idea to build up a Beowulf cluster for number-crunching with B50s.

Desirable

Apart from a few little flaws and components to be installed later in the installed SuSE version, the B50 in our test proved to be a problem-free and very reliable computer, with advantages for typical server applications compared with x86-based systems or even G4 PowerMac systems under Linux (you just have to think of the serial console which is used without any problems at all). But there are still a few wishes left …

Concerning SuSE we wish that the support for the B50 was completed. With the excellent support by IBM this should be no problem from the software side. However, the documentation on installation on non-PowerMacs could also easily be a bit more comprehensive, as this would certainly make it easier for a few AIX-spoilt administrators to get on board Linux. A boot loader that was easy to configure and use would be very nice, too: at the moment the kernel is lying raw on a special boot partition. A *yaboot* version has since become available from IBM's web site, but only as a the last resort. A functioning journalling file system would be wonderful. But it's probably just a question of time. Oh yes, it would also be a good idea if the whole memory could be recognised without any problem – anyone who orders the B50 with 1 GB will certainly be cross otherwise …

From IBM we would like to see a more up to date processor (a fast G4 would surely fit the bill) and perhaps even support for a second CPU. For a server in this performance class the prices are certainly reasonable and IBM also grants generous discounts to educational and research establishments removing the biggest obstacle to the use of the B50 with Linux.

We did have just have one last wish … but no: sadly, the B50 had to go back to IBM after our testing was completed. ■