Notebooks under the Linux spotlight
PORTABLE
ALTERNATIVES

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Linux has advanced in leaps and bounds in recent years. It can now be easily installed on almost any desktop computer alongside its traditional home of a server or enterprise workstation. But is the same true when it comes to installing Linux on notebooks? After all, the frequently quirky hardware configurations and generally less sophisticated hardware can cause problems. To find out, we got ten of the latest brand-name notebooks on the test-bench and put them through some rigorous testing.

For our test we sent invitations to all the well-known manufacturers, from Acer through to newcomer Wortmann. The result was a test field of eight products with prices ranging from around £1250 to £4000 or so. We deliberately concentrated on big-name manufacturers because they rarely change hardware specifications on a particular model. The reverse is true in the case of no name devices – although we might review a particular notebook, by the time you come to order it the hardware might have been changed, making our test results and conclusions irrelevant.

Buying a big-name product has drawbacks, of course. The most significant is a higher price. However, as a reward for spending a little bit extra it's fair to anticipate decent hardware support under Linux although this isn't always the case, especially

when a particular model makes use of state of the art hardware that may not yet be properly supported. But on the notebooks we looked at every single device was at the very least detected by Linux, though things like winmodems and some built in network adapters didn't respond, and we occasionally found that the X-server had some minor but usually solvable problems. You can easily circumvent these problems by adding modems or network cards via a notebook's PC Card slots if need be, though, so unsupported hardware like this is not a total disaster.

As well as good Linux compatibility, we were pleased to note that no notebook manufacturer used proprietary memory expansion; standard and easily available SDRAM SO-DIMMs were used on all the notebooks. We were also generally satisfied with

the notebooks in terms of specifications levels. Even the 12-inch display on the Sony Vaio was capable of running XGA resolution and, thanks to the 700 MHz Pentium III, it was bursting with power.

We were not particularly thrilled with the new plug standard used on most of the notebooks; standard "kettle" leads for notebook power supplies are now a thing of the past and have been replaced by idiosyncratic designs. A lost or misplaced power cable can therefore be a major problem and we found that we were unable to source any compatible replacement cables from anywhere. Nevertheless many of the notebooks – the Toshiba, for example – did use a the "figure of eight" lead often used by electric shavers, so you know what to do if disaster strikes.

By far the biggest disappointment we had was to discover that except the Wortmann none of the notebooks we looked at are available with Linux pre-installed. Even worse, most companies seems to be not aware of Linux in any way – Acer's Web site, for example, had not a single page refering to Linux. Hopefully this test will make some contribution towards breaking down the prejudices of many of these companies. ■

Notebook add-ons: We used a Nokia 6210 and Siemens S25 to test infrared ports and mobile Internet access. The black card at bottom left is the Calluna Type III PC Card hard disk.

The tests

All devices were weighed and measured immediately after unpacking. Then, wherever possible or necessary, the existing Windows partition was reduced in size to make room for Linux by using GNU/Parted. We used SuSE Linux 7.0 Professional for our tests, installing from CD (or DVD where possible). We decided to use SuSE because it is one of the most widely used distributions and to some extent also because it is available on DVD. Most importantly of all, though, we chose this operating system because, in our experience, anything that works with SuSE will generally also work with Red Hat, Mandrake or Debian, even if a bit of extra work is required in order to do so in some cases.

The installed hardware was catalogized using lspci or – if that failed or we were in doubt about the results – the Windows system info. As far as possible we left the X-configuration set to YaST2 during initial installation of the operating system. For notebooks fitted with the S3 Savage graphics chip, however, we first installed the patched XF86_SVGA-server and then used XF86Setup, which we stole from a copy of SuSE 6.4 as it isn't included in Version 7.0.

We had to skip a battery rundown test because so far we have found no realistic benchmark capable of reflecting a normal, day to day workload. And to quote the battery rundown time at full load, something we could do, isn't very informative, either. This is because power-saving options would not have any real impact during testing and therefore no sensible results would be produced – who would really leave the kernel to recompile on a battery-powered notebook all day long, or render time-consuming scenes on a journey to the office? We did not run any performance measurement benchmarks, either, as five percent or so more power in one device over another shouldn't have an effect on your buying decision. We did, however, measure temperature and noise levels.

For our temperature tests, we ran a PovRay scene (which can be seen on the photos of the notebooks) and measured temperatures in four places 90 minutes after the program had been started. The temperatures were recorded at the warmest point on the keyboard, the warmest place on the underside of the device, the outlet from the notebooks' main air vent and, finally, at the contacts on a PC Card slot (when a PC Card hard drive was in place). In the case of the IBM Thinkpad we had to fall back on an indirect measurement – the sensor would not fit into the slot with the drive installed, so we measured the temperature of the contacts immediately after ejecting the drive. We could not install the Type III hard disk into the Sony Vaio's slots at all so we used an ActionTec modem card during this test. We also had to measure indirectly, though, just as with the IBM, because again our probe wouldn't fit with the card installed. The actual operating temperatures in the PC Card slots of these two notebooks will therefore be a little higher than we measured them at.

Measurement of noise levels was done with an ELV 8921 sound level meter, which was used to determine criterion C levels at head height for a normal user – 25 cm in front and 35cm above the front edge of the notebook. In the results table, the peak values in full-load operation are all listed both with and without the CD/DVD drive spinning.

For PC Card compatibility testing we used a selection of PCMCIA- and CardBus cards from 3Com and AVM along with an ActionTec modem and Calluna 130MB Type III hard disk. We also tested infrared port operation and mobile Internet access using a Nokia 6210 and a Siemens S25 mobile phone. We'll be reporting on our experiences in more detail at a later date.