HP HOWTO

Configuration Guide and Use of HP Products under Linux (Version 0.94)

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This document describes the use of products available in the Hewlett−Packard (HP) catalog with Linux and some free software. It gives the state of the support for hardware, software to use, answers to some frequently asked questions and gives elements of sizing. The goals are to offer a general view of free software functions and their use at best with HP products; as well as to make new users of HP products rapidly operational and also to allow others to choose their products knowing facts.

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Chapter 1. Introduction

1.1. Presentation

This document is a guide on the use of products proposed by the hardware manufacturer Hewlett−Packard (HP) under Linux. It's a quick reference guide, covering all what you need to know to size, install and configure your products under Linux, or which complementary software will be useful for their use. Frequently Asked Questions find answers, and references are given concerning other sources of information related to HP technologies and applications.

Opinions expressed here are those of the author, and don't commit both Medasys or Hewlett−Packard . Informations are provided in the aim to be useful to the readers. However, there can't be, through this document, any warranty of any kind either from Medasys or HP on these systems under Linux, as well as from myself. Neither Medasys, nor HP, nor the author could be responsible for any problem caused by the use of this information. However, software editors don't guarantee you a lot either (re−read the contracts).

1.1.1. New versions of this document

New versions of this document will be announced regularly on the Usenet groups news:fr.comp.os.linux.annonces and news:comp.os.linux.annonces. They will also be updated on the various anonymous ftp sites which archive such information, mainly ftp://ftp.ibiblio.org/pub/Linux/docs/HOWTO/.

Hypertext versions of this and other Linux HOWTO are available on many web sites, including http://www.linuxdoc.org/HOWTO and http://www.freenix.org/unix/linux/HOWTO. Most Linux distributions on CD−ROM include the HOWTO, often under the `/usr/share/doc`, directory, and you can also buy printed copies from several vendors. Sometimes the HOWTO available from CD−ROM vendors, ftp sites or printed format are out of date. If the date on this HOWTO is more than 6 months in the past, then a newer copy is probably available on the Internet. The site of reference for this HOWTO is http://www.hyper−linux.org/HP−HOWTO/current

Old versions of this document are also available at

If you make a translation of this document into another language, please let me know so that I can include a reference to it here. The following versions are currently available : http://www.HyPer−Linux.org/HP−HOWTO/old

- French by `<Bruno@HyPer−Linux.org>`
- English by `<Bruno@HyPer−Linux.org>`
- Japanese by `<junichi_shimoda@hp.com>`

As english isn't a native language for me, I would really appreciate any correction on the english version.

1.1.2. Suggestions and contributions

I rely on you, the reader, to make this HOWTO useful. If you have any suggestions, corrections, or congratulations :−) don't hesitate to send them to me `<Bruno@HyPer−Linux.org>`, and I will try to

incorporate them in a next revision.

I've created a mailing−list dedicated to this document. Every person interested to contribute can register at mailto:sympa@eurolinux.grenoble.hp.com?subject=subscribe%20hp−howto,

I am also willing to answer general questions on HP hardware and software with Linux, as best I can. Before doing so, please read all of the information in this HOWTO, and then send me detailed information about the problem.

If you publish this document on a CD−ROM or in hardcopy form, a complimentary copy would be appreciated; mail me for my postal address. Also consider making a donation to the Linux Documentation Project to help support free documentation for Linux. Contact the Linux HOWTO coordinator, Guylhem AZNAR <guylhem@rrremovethis.oeil.qc.ca>.

1.2. Aknowledgements

Most of the information provided here come from research made in HP documentations, files provided with Linux kernel sources, the FAQ of the Usenet newsgroup news:comp.sys.hp.hpux with a HTML version available on all mirror sites like the CICT, my own experience on HP products, a lot of tests and deployments realised, and remarks from Linux users as well as many HP's engineers.

Numerous people have contributed to this document and augmented its contents. You'll find the most complete possible list in the Chapter 8. I would like to thank just now, without any particular order, those without whom this document would simply not exist :

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Chapter 2. Presentation of Linux and Free Software

2.1. Some definitions

Before going into more details in the presentation, it could be useful to give some definitions of terms and software mentionned in that HOWTO.

2.1.1. Free Software or Open Source software

A *free software (or Open Source software)* is a software distributed with its source code, allowing its study, its transmission, its adaptation. The problem, in english, is the use of free, which has both meanings of "at no cost" and "without constraint". Here, it's the second use which has to be considered, hence the use of Open Source. To remember, think of free as speech, not beer.

Depending on the licenses used for its development, the constraints for users of such a software are various. The most open licenses (like the BSD one) allow code appropriation by third parties, including the resell of the resulting software (with or without modification) in commercial products, without any problem, and without owing something else to the originators than the mention of their copyright. Other licenses (like the GNU Public License or GPL) force every modified GPL software to be free GPL software itself ; this doesn't allow the use of such programs in a commercial one. Many other licenses exist, more or less open: the Artistic License (perl), the NPL one (mozilla), the QPL one (Qt) ...

A vast majority of free software is today under the GPL license, even if the BSD world takes always a great place, however less visible, mainly in the press. Linux is placed under the GPL. To have more information on these definitions and the licenses, please refer to the following reference sites :

GNU project Web site

> You find there all information on the GNU project, including the licenses produced (GPL and LGPL) and various discussions on free software.

Open Source project Web site

> This site proposes a new definition, a bit less restrictive, of free software – called here OpenSource Software – by well–known people.

FreeBSD project Web site

> Here are explained the advantages of the very open BSD license.

2.1.2. Examples and counter–examples

First of all, free software and *freeware* shouldn't be mixed up. A freeware is not necessarily a software provided with its sources, on the contrary of a free software. On the other side, on the contrary of a freeware, you may be charged to obtain a free software (it's not in contradiction with the license used). The ambiguity, as stated before, comes from the word "free" . A freeware is then free of charge, but not necessarily "free of

sources". (As well, the *shareware* has nothing to do with free software).

So examples of important and well−known free software are the Linux and FreeBSD operating systems, the Apache Web server, the SaMBa SMB server, GNU C and C++ compilers ... A contrario, examples of well−known freeware are the Internet Explorer browser, the Eudora Light mail reader, ...

2.1.3. Linux

Linux is a free operating system, superset of the POSIX norm. "Linux" points out the kernel alone. By extension, the name is also given to distributions based on that kernel plus a set of tools from the GNU project.

Linux is by consequence a Unix system, except that it doesn't use any proprietary code and is furnished under the GPL license, implying the availability of the sources. As every Unix system, Linux is multi−tasking and multi−user. It's also extremely portable, and it is available officialy today on processors such as Intel (i386 to Pentium IV), Alpha, Motorola (680x0 and PowerPC), Sparc, StrongArm, Mips. Without mention of the ports, operational or in process on PalmPilot, Itanium (ex−Merced), PA−Risc, Crusoe ...

The system is today perfectly stable and mature. Versions "x.y.z" of the Linux kernel, where "y" is an even number, are stable and only bug corrections are generaly applied when "z" increases. Versions "x.y.z" of the Linux kernel, where "y" is an odd number, are development versions which may be instable and are reserved to developers or intrepids.

From time to time, when the kernel development stabilizes a "freeze" is announced to furnish a new "stable" version (even), and the development goes on on a new version (odd).

The current stable version is the version 2.4.16 (this last number may evolve following the rythm of corrections). Development has on the other side begun again with a 2.5 version.

Numerous presentations of Linux are currently available. Among them, you should consult the one made by Michael Johnson at http://www.linuxdoc.org/HOWTO/INFO−SHEET.html

2.1.3.1. Linux technical characteristics

The system offers the following technical characteristics :

- Multi−tasking : executes several programs in pseudo−parallel.
- Multi−users : many users acting on the same machine at the same time (without worrying on licenses).
- Portable and interoperable : works on several hardware architectures. All the sources are available. Linux supports a lot of file systems, outside the native ext2 : System V, BSD, Sun, MS−DOS, VFAT, NTFS, Mac, HPFS, EFS, ISO9660. On the network side, it supports the following protocols TCP/IP v4 and v6, Appletalk, Netware (client and server), Lan Manager SMB (client and server), X−Window, NFS, PPP, SLIP, UUCP.
- Performant architecture : modular kernel, built at will, execution in protect mode on 80x86 processors, page load on demand, page share between executables when reading, virtual memory with swap on disk, use of a dynamical disk cache in memory, dynamic libraries, process management, pseudo terminals, virtual consoles.

- Security : protection of memory between processes: one user program can't compromise the whole system operation. The kernel may also, on the other hand, filter network packets.
- Respect of norms and standards : Posix, with System V and BSD extensions. Support of COFF and ELF binaries. Binary compatibility with SCO, SVR3/4 through the iBCS2 module. Native Language Support as well as national keyboards, fonts...

2.2. Free software concepts

Once the definitions are given, it is important to stay on at ideas promoted by the free software movement. It's important as well to clear some wrong ideas hawked on these software. This section gives then a various set of elements in favour of the introduction of free software and ends on the real problems remaining to solve.

2.2.1. Free software philosophy

In fact, the philosophy promoted by the free software movement is not that different from the one proposed by the scientific movement till a long time already: to put in common ideas and collective knowledge to allow the progression of the research and the growth of this knowledge. The knowledge of the human genome is one of the examples of such a collaborative work.

The computer engineering environment, and especially the software one, seems to have turn away till the last 20 years from these base concepts of the scientific world. It prefers on the contrary to keep the customer captive instead of giving him the information needed to exploit his computing environment the best he can. That's indeed following such a problem at the begining of the 80's that Richard Stallman, who was doing researches in artificial intelligence at the MIT, decided to create the GNU project. This project is the foundation of the current free software movement.

The main ideas promoted by this movement and stated by Richard Stallman himself are :

- Liberty: every user should be free to copy, diffuse, modify a program, either to share it with others, or to adapt it to his own needs. As well, he should be able to analyse it to understand, imitate, improve, verify its operations, as well as every scientific result is published and seen by the peers for verification, study, understanding and realisation of derived works. Could you imagine a vaccine against the liver cancer that another laboratory couldn't derive to make a vaccine against the pancres cancer. Of course, the negative impact of patents at that level is obvious.
- Equality: every person should have the same rights on the software. Thus the provider isn't priviledged and can't keep customers to whom he furnished his work captive. Could you think that only the producer of our vaccine could use it ? With software patents, if you don't pay, you cannot use them (think to discussions around RANT and W3C standards).
- Fraternity: this mode of working encourages the whole computer engineering community to cooperate and thus to produce software more and more reliable and useful to all. Could you imagine that a discovery like the vaccine above couldn't help everyone and favour other discoveries. Again with software patents, nothing like that is possible.

More over the utopy of these ideas, we can find other reasons which allowed free software to spread so widely today. They are detailed in Section 2.2.2.

The free software movement materializes itself also through a community of people. That community, informal meeting of personnalities, is heterogeneous in its contents, actions, ideas, even if all share the same belief in the freedom of the software. That community created for itself the tools needed to its communication : Internet and Usenet. And these communication tools are based of course on a lot of free software to work. Among the outstanding persons of this movement, we can present :

- Linus Torvalds, conceptor of Linux.
- Richard Stallman, GNU project conceptor.
- Eric S. Raymond, writer of several and excellent articles, which inspired so many vocations.
- Larry Wall, author of Perl and of the patch tool, and philosopher.
- Alan Cox, mister "do everything".
- Tim O'Reilly <ask_tim@oreilly.com>, free software advocate and editor of several books dedicated to them.

All these personalities are, above all, excellent computer engineers, which allows them to be recognized as major actors of the free software movement. Their human and communication qualities are also strong characteristics of their nature. In any case they aren't considered for their power, but for their knowledge.

Of course, the free software community is built of thousands of programmers, whose complete list would be too tedious. All share the will of producing useful work, free, and to be recognized for their technical qualities above all.

2.2.2. The choice of free software

To use free software to bring solutions in a computing environment is a choice. First, it is in favour of a plurality of solutions, mainly in the personal computer world which tends to be monopolistic. Then, the choice is made, and that's what is finally important, on the own qualities of free software, which are detailed just below.

Source code access

> This point is the most important of the choice, because it allows the undestanding, adaptation, correction, distribution, improvement of the software.

Reliability

> That quality is derived from the previous one: the free software is the combined result of the experience and the intelligence of all the participants. Its reliability increases then as time passes, with all the corrections which are made. More over, no marketing pression requires the software's producer to deliver it to its customers before it is in a satisfactory state.

Portability

> This quality is not intrinsic to free software, but is very often seen in a free software. Indeed if a softawre meets success, it will necessarily be adapted to other environments than those initialy considered. Thus by increasing its disponibility, its portability and reliability are also increased. linux works today on a HP Jornada or IBM watch, as well as on s390 or SuperDome.

Universality

One essential quality of free software is the character naturaly universal of the data format used. Even if they don't follow standards, the availibility of the source code assures the user that he will understand them, and more over be able to write any filter needed to reuse these data or exchange them with other software. This allows also users to stabilize their environment, because they are not required to migrate due to incompatibility of data formats in their applications. Don't forget that your data are precious ans thet it's better to archive them under a *ML format (HTML, XML, SGML, ...) rther than a proprietary one.

Performance

Resulting from a lot of examinations, the use of algorithms coming from advanced research works, as well as tested by various usages, free software have good performances by nature. Frequently large portions of code are rewritten to allow the reuse of the original ideas with a better code and thus to increase performances. Several tests made by various organisms tend to prove it also

Table 2–1. Performances of Free Software

Subject	URL
Apache Web Server and competitors	http://www5.zdnet.com/products/content/pcmg/1709/305867.html
SMB SaMBa server vs Windows NT	http://www.zdnet.com/sr/stories/news/0,4538,2196106,00.html

Once more, there is no obligation to diffuse an application whose performances would be bad.

Interoperability

Interoperability is a reality of today's enterprises. Historically, Unix environment was always a ferment for interoperability with other systems (big or medium size systems, as well as personal computers). The support in Linux, for example, of a lot of network protocols, filesystem formats, and even binary compatibility modes assures a good interoperability. By the way, interoperability requires 2 actors, and having only one open is generally not sufficient. That's the goal of having RFCs, norms, standards, ...

Reactivity

When considering the more and more longer development cycles of the software editors, the reactivity brought by the free software movement is interesting for a lot of sites, concerned by the rapid obtention of corrections to a given problem. Thus, during the recent discoveries of IP problems (ping of the death,...), patches were always available within the next 3 days. And above that, only the patch correcting the hole found was delivered. There were no functionality added, which could have create other instabilities.

Security

The best computing security possible is ensured by a robust construction, public and reknown algorithms, a quick communication around flaws, ... In other words by transparency. Obscurity is in this domain bad, useless and even dangerous. In the free software world, the reactivity described in the previous paragraph is a garanty of increased security, ... at the condition that patches are applied

regularly.

Independantly of its qualities, it's possible to give other reasons of various nature, in favor of free software, depending on the type of the person met.

2.2.2.1. Marketing argumentation

Studies from IDC bring to light the irresistible rise of Linux as a server operating system. In 1998, Linux is credited with 17% of market share, with an increase of 212%, which is the most important in that domain. The following graphics give the whole market share repartition.

Figure 2–1. Server operating system repartition in 1998 (IDC).

This was confirmed in 1999 with a market share climbing to 24% and an ancrease of 93%, always more than four times the increase of the follower.

Figure 2–2. Server operating system repartition in 1999 (IDC).

Dataquest estimates on its side that Linux servers will represent, with 1.1 million of units, 14% of the servers sold in 2003.

The Net itself produces marketing tools to demonstrate the superiority of free software. Counters are regularly updated by Netcraft and others, on web server software, and another was done by IOS Counter for the servers on Internet. Results, reproduced below, show the importance taken by Apache with more than 16 millions of operational sites (among them 30% run Linux), crushing the competition, as well as the free operating systems Linux and *BSD which dominate the world of Internet servers.

Figure 2–3. Web server software by Netcraft between 1995 and 2001.

Figure 2–4. Repartition of Internet servers by IOS Counter in April 1999.

A detailed explanation based on the most precise numbered results is also regularly updated, showing the advantages to use free and open source software, Cf: http://www.dwheeler.com/oss_fs_why.html.

2.2.2.2. Financial argumentation

Financial factors also speak for free software. And first the price to aquire them is low. Low, because it's never zero. Even if you can find it on the Internet, you have to consider the costs related to that link. However costs are greatly less expensive than for commercial software. So a RedHat 7.2 Linux distribution, delivered with more than 1400 software packages, costs about 60 USD when you have to pay more than 800 USD to obtain Windows 2000 server, delivered only with IIS.

On the other side, free software don't have the notion of license by user or by supplmentary service. Thus there is no additional cost when you have to increase the use of these software in your entity. That's of course not the case with commercial software whose economical logic is often based on the number of licenses.

Free software bring in addition a better mastering of the TCO (Total Cost of Ownership), mentionned so frequently in the massive deployment of personal computers. Thus administration costs are reduced because systems like Linux or FreeBSD, as Unix, are managed completely remotely, either through command line orders (with **telnet** or **ssh**) or in graphical mode by using X−Window. More over, we benefit from a true multi−users mode, improving these management operations. Always in this domain, it's also possible to do remote management, either through the own hardware capacities of the machine (as the Remote Assistant card integrated in most HP NetServers), or by doing a remote connexion (through modem, ISDN adapter or a permanent link) thanks to the native PPP protocol and secure connexion systems as tunneling or ssh. This managemnt could even be realised by an external entity, in outsourcing.

At last, the costs due to the hardware themselves could be controled; on one side, if by chance free software don't meet the needs, it's always possible to buy then commercial software solutions to cover the rest on the same hardware. On the other side, solutions based on free software have good performances by nature, and can use hardware platforms which would be considered as obsolete, if installed following the standard criterias of other operating systems or applications. The fact to separate the graphical interface from the rest of the working system is here key. It's so possible to use "old" hardware, mainly to model. It's then possible to invest, with a fine knowledge, when puting the solution in operation, if needed. The power increase may naturaly take place progressively.

2.2.2.3. Technical argumentation

This argumentation was already given in the previous sections. I think nevertheless that some notions may be explained with complementary information.

So concerning the reliability aspects of free software based solutions, it's important to note that it implies an operational running time very high (standard characteristic of Unix systems in general). This is mesured by the command **uptime**. One of Medasys and HP customers, Saint−Michel Hospital in Paris, has a Vectra VL5 acting as router under Linux since more than 300 days. And that's not a isolated case.

Respect of standards and norms, as well as the extreme portability of free software assures also to applications developed on these platforms the same qualities. And notably, if after their use, the performances or services brought by free software based architectures were insufficient (it may be caused by architecture problems such as PCI bandwidth, number of processors available, ...), it would be easy to migrate to machines offering more performances and capacities of evolution, as the HP 9000 systems, running HP−UX.

At last a development plan centered around performances implies a modularity, such as it's possible to resize the system kernel nearest to the capacities of the hardware or to use dynamically loaded modules following the needs. A packages installation may vary from 40 MB for a minimal system up to many GB for a complete distribution. The system linearity allow also the support of multi−processors machines (SMP) (tested up to 32 processors on a Sparc machine). The system modularity allows also to obtain an operational system on a 1.44 MB floppy disk, either to realize a minimal repair environment, or to provide a perfectly operational router. The world of embedded systems shows besides more and more interest for systems such as Linux, because above it's modularity, source availability makes communication with dedicated peripherals easier (acquisition cards, sonde, ...). Entities as CERN or Thomson already use such solutions.

2.2.2.4. Solutions argumentation

That argumentation is probably the most important of all, because it's useless to have free software if it's not to make something useful with it or to offer solutions to demands of entities willing to use it. In which sectors free softawre may bring solutions today ? Well, you have to admit it's in nearly all the sectors of enterprise computing.

Historically, Open Source Software were used to realise Internet/Intranet servers, because their growth was following the one of the Net. It's so possible to cover all aspects linked to the Internet, from the Web server (Apache), FTP server (Wu−Ftpd), DNS server (Bind), the E−Mail server (Sendmail or PostFix), the Usenet groups server (INN), the proxy server (IPmasqadm), the firewall (IPChains or IPTables), Virtual Private Network (OpenSSH), the Cache server for the Web (Squid) or also the Time server (NTP) or as directory service(LDAP) server, or as content management(Midgard) server ... All these software are available in standard in a Linux distribution. The client computer should be equiped with the software corresponding to the application used (mail reader, news reader, web browser, ...) whatever its operating system. The choice of the client is free, as all these tools respect the standards decreed in the RFCs.

The second preferential domain for free software is the file and print server domain. For these services, clients may be multiple: Unix type (use of NFS and KNFS or also Coda and Inter−Mezzo, for file sharing and of **lpd** or CUPS for print service), Microsoft Windows type (use of SaMBa , which allows also the use of local client printers), Novell type (use of Mars_nwe) or MacIntosh type (use of NetAtalk). All these software are provided in standard in a Linux distribution and don't need any modification at the client level to work.

The other domains where a system such as Linux may bring solutions is the computation one, with support of multiprocessor, linked to the realisation of clusters with multiple nodes with Mosix or BeoWulf with high−speed network interfaces (100 Mbit/s, Gigabit or Myrinet); those of data security with the support of HP NetRaid$^{Rem.}$ cards, allowing Raid level of 0, 1, 3, 5, 10, 50, and HotSpare disks, managed by the harware; those of centralized fax server, with a free software like HylaFAX or also as an archive/backup server with HP SureStore DAT or DLT libraries thanks to a GPL software like Amanda or a commercial one like Arkeia or at last as a database server with free solutions like PostgreSQL,MySQL or commercial like Oracle, to speak only of these three.

On the client side, even if it's less highlighted for the moment, possibilities to use solutions based on free or commercial software are numerous. Here also the Internet part is the main one, with tools like graphical web browsers (Netscape, Mozilla or Konqueror) or textual (lynx or w3m), a lot of graphical mail readers (Kmail, XFMail, ...) or textual (mutt, elm, ...). But you also have the whole panel of indispensable tools for a personal computer today as a PDF reader (Acrobat Reader or xpdf), image manipulation tools (ImageMagick, the Gimp, RealPlayer tools ...), word processors (LyX, LaTeX, SGMLTools, Wordperfect, ...), commercial office suites (ApplixWare, StarOffice), or opensource (Koffice, OpenOffice, ...), sound management tools (Xmms, eplaymidi, xmcd, ...), CD burning tools (cdrecord, BurnIT, ... with complements as mkisofs, cdparanoia, cdrdao), free and commercial emulators for various systems (Wine, Executor, WABI, DOSEmu,Win4Lin, VmWare...), compilers and interpretors for all the languages (C, C++, Pascal, Fortran, Basic, Tcl/Tk, Perl, Python, Ada, Eiffel, Lisp, Scheme, Prolog...), including commercial versions (PGI, Intel...), graphical environments (Gnome, KDE, Motif, OpenMotif, ...). The evolution of these last tools indicates that the 2000's may be the years where Linux and free software will break through at their turn on the client.

I want to mention that this document was realised on an HP Brio BAx, then on a Vectra VL400 equiped only with a Linux distribution, with the help of tools like DSSSL style sheet, OpenJade and DocBook, ViM which allowed to generate from a single source the formats HTML, Txt, RTF, PostScript, and PDF.

2.2.2.5. Service argumentation

This one was for a long time a blocking point to the expansion of free software in the firms. It's not the case today. Many service providers or hardware manufacturers, like HP, control today these solutions and propose support around them, uoto missions critical if requested.

Other sources of information are also available, in abundance, through several web sites dedicated to these solutions, specialised mailing−lists, and various Usenet groups, such as for Linux, the international groups under **comp.os.linux.*** or for the french speaking people under **fr.comp.os.linux.***.

Concerning competences, more and more young engineers or academics finish their learning cycle being trained to the use of free applications and operating systems. This wealth of competences arrives now on the labour market and will contribute to increase the movement of generalisation of these tools. At last, many firms have internaly ignored competences. In fact, their employees often install this software at home, and have a good mastering, usable when arrives the deployment of the software in their professional structure.

2.2.3. Wrong ideas on free software

Advocating free software consists also to mention some generally accepted ideas concerning them and to fight them.

"There is no support, no training"

> As seen previously, support is currently structuring itself. A firm like RedHat provides today support for their solutions. Only in France, we may mention firms like Medasys , Atrid, Alcove which assure support on free software. Likewise, always in France, training on free software may be given by HP France, Learning Tree, the IUT de Vélizy, without mentioning generic network and Unix trainings (besides proposed also by the same organizations) which represent a fundamental base in a training course. And at last, we should mention the ability of each of us to self−train, mainly thanks to the huge documentation available (See the Chapter 7).

"There is no documentation"

> There is a whole set of manuals, the Linux Documentation Project, made of FAQ (Frequently Asked Questions) and HOWTO, counting more than 300 documents around Linux, the main being translated in french, and in japanese available as free documentation. This documentation has a various quality, more or less up to date, following the subjects, certainly but it makes a corpus allowing to apprehend alone a Linux distribution and all its components. For myself, I always found in it everything I needed to do my job with free software. And, in case of complementary information, a lot of web sites and Usenet groups may again bring some of the elements needed. And without counting the innumerable manual pages available on line. Each distribution comes also with a comprehensive set of manual covering all the tasks of installing, handling and managing them.
>
> On the other side, the editors O'Reilly and SSC have specialised in providing books around free software, written generaly by the writers of the software themselves. Their books are considered as reference books in their respective domains.

"A free or nearly free product is a toy"

You should always make a difference between free (as speech) and free (as beer). Too many freeware in Microsoft environment are in fact toys and of poor quality. It's absolutely not the case for free software, as stated in the previous sections. Remember just that they are reliable by construction.

"Linux is difficult to install"

Linux is a professional operating system. At that title, it requires competences to install it, as well as any other professional operating system, like the other Unix or Windows NT for example. But it isn't more difficult to install than those either, mainly thanks to distributions as RedHat, Mandrake, ... You need about 30 minutes to realize a complete installation of such distributions, so quite the same as for HP−UX and noticeably less than for Windows NT Server.

On the other hand, as before installing a server with Windows NT you have to verify its compatibility with the Hardware Compatibility List of Microsoft, for Linux it's also greatly recommended to verify the Hardware HOWTO, and for HP machines to refer to Section 3.2.

"Free Software are not adequate for heavy tasks"

This is less and less true and this criticism has been obsoleted with the latest versions of the Linux kernel which will include a journalised filesystem, allowing a true application cluster. But already Linux authorises the use of multi−processors, several nodes to realise computation clusters. And don't forget it's used by the portal Voila (France Telecom) or the engine Google among other prestigious references. As well, FreeBSD is used with success as the world biggest ftp server : Walnut Creek CDROM server Useful projects to consult in this area of high availability are http://www.linux−vs.org, http://www.opengfs.org and http://www.linux−ha.org

"What appeal do I have in case of problem with the editors ?"

There is no appeal, because software licences deny all responsabilities for the writers, in case of problem. But, in reality developers are always ready to help in case of problem and try to correct as soon as possible the bugs encountered (for the F00F bug of the pentium, a patch for the Linux kernel was published within 3 days, for example). On the other side, commercial editors guarantee very badly users against problems other than packaging errors. Please read the notes furnished with your software to judge.

2.2.4. Real problems around free software

It would not be honest to negate certain remaining problems linked to free software. Some have begun to disappear, other are inherent to the system, other at last will take time to diappear.

The first problem, inherent to the model of free software, is the multiplicity of tools and distributions available. So, if you want to setup a mail server, you have to choose between Sendmail, Exim, PostFix, Qmail, Smail. As well if you want to install Linux, you may choose between the distributions RedHat , SuSE, Slackware, Mandrake, Turbo Linux, Debian. This represents often a problem for the newcomer, but the esperienced user will always prefer to have a large choice he will confront to his particularities and to his experience. As long as an actor respects the rules by freeing his code (it's the case of the rpm and deb formats for example), there is little risk from the comunity point of view. The key point is that the choice is made only taking in account technical criterias.

The second problem, inherent also to the free software birth, is the necessity to have strong Unix and Internet competences, to manage such solutions. The power available through these systems is proportional to the competence of their administrators. And that will stay true even with the growth of more and more grahical solutions to manage them. On the other side, you capitalize the investment in time to learn their functions and that doesn't disappear, because you don't have to re−learn eveything from one version to the other (I use the same editor, vi, for the last 15 years). Don't forget that systems you use daily seem to be simple, uniquely because you passed enough time to learn them. For Internet competences, it's a statement of the obvious to say that this investment isn't lost. At last, even with the work of translators to provide information in french and other languages, a good knowledge in technical english is definitively a plus.

The last problem met in the implementation of free software solutions is to suceed in convincing some managers to go against the prevailing opinion. The aim of this chapter is precisely to give all sorts of argumentations to achieve that goal, but you need each time to show conviction to get his way in the end. As soon as these solutions will be adopted by big firms principaly, resistances will disappear.

2.3. Linux and other operating systems

The aim is not to examine completely or to compare the functions of the various operating systems available. It's more upon looking at the respective positions of Linux in comparaison with other systems. Only systems having a sufficient representation on the market are considered.

2.3.1. Linux and other proprietary Unix (HP−UX, Tru64, AIX, Solaris, Irix)

The situation taken by all the hardware manufacturers places Linux today in the entry level (when it's taken in account) and their own Unix system in the middle and high level. Reality is sometimes more cruel than the situation wanted by the marketing department :−). Technically, a Linux distribution has no cause to be envious of the manufacturers Unix solutions, except for the moment the set of commercial applications and some high−end hardware configuration support. And we can often see that users dope their Unix workstations with free software to complete their usage.

To be precise in the talk, we should consider manufacturers Unix solutions as split in stations and servers.

On the station side, there's no doubt in my mind: for a customer, the only reason today to buy one is linked to the availability of a software or a hardware which wouldn't exist in the free environment, or due to intrinsic performances of the machine. In the first case, we can see that this argument should have a short life time, because logically every software editor (except maybe hardware manufacturers) and every hardware manufacturer has interest in porting their applications or allowing the use of their hardware on all the major environments in the market. As shown by Oracle, Informix, Sybase, ... Linux becomes today one of the major environments. In the second case, the difference in term of performances between the Linux dominant platform (IA−32) and the other competitors decreases and will disappear with the generalisation of the IA−64 architecture, which seems to be adopted largely by a majority of actors. More over, Linux is often available natively on the processors of these actors (Sparc, Mips, PowerPC, 68xxx, Alpha, Crusoe, PA−Risc). I think Linux may represent the famous unique and standard Unix that everybody dreamed of from a long time, without succeeding to impose it (the open and free characteristics brought by Linux are not without influence on that). I think that at the end hardware manufacturer Unix workstations will be restricted to some niches such as high end computation, virtual reality, ... and that as long as solutions are not available on a free environment. Linux offers all the functional qualities of the other Unix systems, and thus of the workstation, on a more various hardware platform and potentially at a better price, if on PCs. So it is the natural choice of

every computer engineer with a strong Unix culture (old customer of the workstation) who will prefer that solution to the migration to a Microsoft system typically. With IA−64, we can see that Linux was the first operating system available (including graphical support).

On the server side, in addtion to the points mentionned previously for the stations, problems are more complex. Ram, disks, processors capacities, extensions of every kind make them difficultly repleacable by machines with a IA−32 architecture for example. More over, certain solutions such as high availability clusters for example have just been put in production in a Linux environment, compared to years of operation under Unix. The other brake is often linked to investments already done around software solutions deployed on these servers. Whatever their natural life time is much higher than those of the stations. Changes will thus be made more slowly in that domain. Here we can consider rightly Linux solutions as an entry/middle level solutions, when hardware manufacturer Unix servers are the middle/high level. The introduction of Linux in place of these machines will begin only with a massive availability of applications, mainly in the management sector. Again IA−64, with increased SMP capabilities (16 processors today), higher bandwidth, ... will make things change.

The advantages of the hardware manufacturer solutions, explaining why they are so often chosen when applications are critical, are linked to the homogeneity of the solution (hardware and software mastered by the same entity, which can't invoke a third party in case of problem), and to the support and maintenance guarantees furnished.

Finally, there is not so much antagonism between these systems, because they are full cousins. Their association allows today to computer teams "pro−Unix" to have solutions from start to finish, without having to lose in functions, as it's so often the case with other operating systems available for personal computers.

2.3.2. Linux and SCO/Caldera

The comparaison between Linux and the SCO systems seems to me quite unbalanced. First, all the previous points are vaild here also. More over, SCO isn't a hardware manufacturer, so the homogeneity advantage disappears. The IA−32 Intel platform is supported by both systems, so cost is identical. On the other hand, the software solution has a disproportionate cost (few software provided in the base install, thus a lot of expenses to extend, as well as to increase the number of users). Having to manage one OpenServer, I can say that performances are far beyond those of a Linux system. More over, its conception is older, abounds of symbolic links which makes management complex. The hardware supported by SCO is less numerous than those Linux supports. Only stay as an advantage the installed base and the set of applications available. But for how long ? Caldera now owns both SCO software (Openserver and Unixware) and its own Linux distribution. But instead of trying to free technologies from SCO, they are proprietarizing their linux (1 license per server).

2.3.3. Linux and Windows NT/2000/XP

The comparaison is here more difficult, because Windows NT/2000/XP isn't an open system, as the precedings, which is already redhibitory for certain users. An excellent comparaison was made by John Kirch between Unix and Windows NT Server. I recommend to people searching to have an enlightened opinion on this subject to read it; it's updated regularly and was written by a specialist of both Microsoft and Unix operating systems. Financially, obvious advantage for the free software. And it's more obvious, as for SCO, if you consider the set of complementary software you need to use a server. The author evaluates the difference from 1 to 100 all the same ! Technically, either on the functions provided or on the reliability, the

administration, the performances, the hardware supported, and more over the security, Unix systems and particularly free systems outperform what is proposed by Windows NT/2000/XP. The fact to have a GUI non independant from the kernel contributes greatly to the instability of NT/2000/XP, because it's more difficult to avoid errors in a GUI (there is no mastering possible of the user comportment in front of it) rather than in a kernel.

Which are the real advantages of Windows NT ?: the marketing power of Microsoft which persuades the world that computers equal Windows and which leans on the enormous installed base; its office applications (a monopolistic situation on the market) only available in this environment; the confusion maintained between the various flavours of Windows (95/98, NT, 2000), and between the server and client functions; its agreements with the biggest hardware manufacturers which often require them to provide a Microsoft system with their platforms; its technological initiatives to occupy the market in first, based on proprietary code and that often without respect of known or documented standards, or its policy to embrace for killing a movement (described in the "Haloween documents").

The lack of hegemony in the servers sector is the best reason to hope that a plurality of solutions may exist in the future for computers users, also at the desktop. The new XP licensing schema, the passport tool, the registering mechanism during installation are real brakes for users thinking to migrate from a current platform to a new one, as well as the hardware costs linked. In that perspective, an opensource solution should and will be more and more considered.

Chapter 3. Linux and HP products

To maintain such a chapter is an endless task :−).

3.1. Informations on HP products and Linux

3.1.1. General information

HP became recently concious of the importance taken by Linux and free software in general, and on its machines particularly. Thus a web site dedicated to Linux in HP environment is now available at http://www.hp.com/go/linux.

In France, there is for a longer time a site on these themes, under the responsability of Jacques Misselis <Jacques_Misselis@hp.com>, hosted by l'École Centrale de Lyon at the address http://hpwww.ec−lyon.fr/hpeduc/education.

On the other side, the firm Medasys for which I worked between 1996 and 2000, put at disposition of the community a certain number of information since 1997, available at http://www.medasys.fr/linux. This HOWTO is the result of this work.

HP also realised a synthesis document (PDF format) concerning his position in front of Linux, the White Paper HP Linux Strategy (1999−04).

HP is a member or sponsor of Linux International,Open Source Development Lab, and Linux Standard Base.

3.1.2. Particular announces

HP also communicates through its web site around Linux and free software. You'll find some links here.

- FireHunter announce (10/06/1998)

  http://www.hp.com/communications/solutions/isp/tools/pressroom/releases/pr032999a.html

- Covision program announce (01/27/1999)

  http://www.hp.com/pressrel/jan99/27jan99b.htm

- Linux support on NetServers and IA−64 announce (01/27/1999)

  http://www.hp.com/pressrel/jan99/27jan99.htm

- PA−Risc port announce (03/01/1999)

  http://www.hp.com/pressrel/mar99/01mar99e.htm

- Informix HP association announce (03/02/1999)

http://www.hp.com/pressrel/mar99/02mar99i.htm

- Kayak Linux support (03/17/1999)

  http://www.hp.com/pressrel/mar99/17mar99e.htm

- World Linux support announce (04/20/1999)

  http://www.hp.com/pressrel/apr99/20apr99a.htm

- HP OpenView announces (05/17/1999)

  http://www.openview.hp.com/solutions/itsm/press/press.asp?docid=314

- Availability of Apache on HP 3000 (Summer/1999)

  http://www.businessservers.hp.com/falladvisor/sum99/Summer99/apache.html

- Visualize Linux support announce (06/21/1999)

  http://www.hp.com/pressrel/jun99/21jun99g.htm

- Open Source Software commitment by HP (08/09/1999)

  http://internetsolutions.enterprise.hp.com/linux/news/PRelease4.html

- Aberdeen group analysis on HP position on free software (08/09/1999)

  http://internetsolutions.enterprise.hp.com/linux/news/aberdeen_white_paper.html

- HP Linux vision (01/01/2000)

  http://www.hp.com/visualize/programs/news/archive/linuxvision.html

- HP announces the certification of its DAT and DLT products under Linux (02/02/2000)

  http://www.hp.com/pressrel/feb00/02feb00c.htm

- HP Brings Award−winning 3−D VISUALIZE Graphics to Linux Desktop (02/02/2000)

  http://www.hp.com/pressrel/feb00/02feb00b.htm and
  http://internetsolutions.enterprise.hp.com/linux/feb02page.html

- HP and Intel Release IA−64 Developer's Kit for Linux (06/13/2000)

  http://www.hp.com/pressrel/jun00/13jun00a.htm

- HP Announces Linux Support for State−of−the−art 3−D Graphics Accelerators (07/25/2000)

  http://www.hp.com/pressrel/jul00/25jul00b.htm

- HP Expands Commitment to Linux (08/14/2000)

  http://www.hp.com/pressrel/aug00/14aug00.htm

- HP adds Linux support for its Chai appliance platform Software (09/26/2000)

  http://www.linux.hp.com/news_events/press_releases/linux_chai.html

- HP NetServers make Linux Hum for Solid State Design

  http://netserver.hp.com/netserver/docs/download.asp?file=cs_solid.pdf

- Medasys chosen by Hewlett−Packard France Education/Research as Linux competence center

  http://hpwww.ec−lyon.fr/hpeduc/education/offre/linux/educ_linux.html

- Hewlett−Packard France Education/Research announces commitment to Linux promotion

  http://hpwww.ec−lyon.fr/hpeduc/education/offre/linux/hp_linux.html

- HP's open letter to the Open source Community (10/18/2000)

  http://www.linux.hp.com/news_events/open_letter.html

- HP Ultrium Tape Drives Certified to be Linux Compatible (11/21/2000)

  http://www.hp.com/hpinfo/newsroom/press/21nov00b.htm

- Bruce Perens, Open Source advocate, joins HP (12/04/2000)

  http://www.itworld.com/Comp/2362/LWD010404hpdrivers/:w!

- OSDL opens today with 19 sponsors including HP (01/24/2001)

  http://www.hp.com/hpinfo/newsroom/press/24jan01b.htm

- HP Extends Linux Support for Enterprise Solutions (01/31/2001)

  http://www.hp.com/hpinfo/newsroom/press/31jan01a.htm

- HP's commitment for Linux during Linux−Expo Paris 2001 (02/02/2001)

  http://www.france.hp.com/main/une/temoignages/linux/expo.php3

- HP opens print driver source code (04/04/2001)

  http://www.linux.hp.com/news_events/perens.html

- EMEA announces around Linux (Trusted Linux, Mandrake Certification, ...) (08/2/2001)

  http://www.HyPer−Linux.org/HP−HOWTO/mirror/Press/PREMEA20010822.pdf

- B. Maillard Interview (HP France) (08/24/2001)

  http://solutions.journaldunet.com/itws/010824_it_hp_maillard.shtml

- HP Expands Open Source Offerings with Linux Security Software and Embedded Software Platform for Intelligent Devices (08/27/2001)

  http://www.hp.com/hpinfo/newsroom/press/27aug01b.htm

- HP Builds Supercomputer from Off−the−Shelf Parts (Oct. 2001)

  http://www.hpl.hp.com/news/2001/oct−dec/supercomputer.html

- HP's Linux stratégy

  http://www.hpbriefingroom.com/north_america/linux/index.html

- HP, Red Hat Provide Selected Universities Worldwide with Grants of Red Hat Linux Software

  http://www.hp.com/hpinfo/newsroom/press/06nov01a.htm

- I've participated to a conference organised by Cyperus during the Linux−Expo Paris 2001. You could see it at this address rtsp://discovery.oleane.net:554/2001/janvier/linuxexpo/linux207.rm

HP France has also published an article on Linux and free software in its May 1999 issue of HP Computer News, an article on HP Linux support in the September 1999 issue, and an article on Linux RedHat solutions on HP Visualize workstation in the November 1999 issue.

3.2. HP hardware supported by Linux

This section presents HP hardware supported today by Linux. Informations are based on the latest stable version of the Linux kernel, which is currently version 2.4.16. A development kernel (version 2.5) is also available but doesn't offer any guarantee of stability.

3.2.1. Intel based computer range

Page last updated the 2001−12−21.

That computer range is today the main set of HP machines supported by Linux, and that till many years. In case you didn't already do it before, some preliminaty readings are recommended before to try to install Linux on these platforms.

The Linux Installation HOWTO contains a great number of information to install Linux. If you bought linux on a CD−ROM, chances are that installation instructions are provided with it (the little booklet inside the disk case, and/or files on the CD).

The Linux Kernel HOWTO should be read to have details on kernel construction. I will just mention here points which are specific to HP hardware.

Outside particular indication, Linux support means during the installation of a RedHat/Mandrake type distribution. In special cases, a kernel rebuild will be necessary to support completely some hardware elements. You should note that what is true for one distribution is generally true for another, as these functions are linked to the kernel or the XFree86 server, and not to the distribution itself.

In case of problem, the first reflex should be to update the BIOS of the HP machine, and to verify whether the problem is always there. If yes, you may then contact HP support, if your configuration is supported by HP (This document focus on what is working, superset of what is supported, and has no value in that area). On the other hand, if your machine is working correctly, don't update the BIOS without reason, this is always a risked operation. BIOS updates are available from http://www.hp.com/cposupport/software.html

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3.2.1.1. The desktop range (Brio, Vectra, Kayak)

HP has a new program called "Freedom of Choice" on the whole desktop range. Linux is thus one of the operating systems pushed by HP. Cf: http://www.hp.com/desktops/linux/ and http://www.hp.com/pressrel/aug00/14aug00.htm.

A FAQ is also available.

HP insures the support of certified Linux hardware by the following method : all the machines have the Diagtool utility. If this utility indicates a problem, it's taken in account by HP maintenance. If it doesn't, it's considered as a software problem and should be reported to the distribution provider.

The following tables indicate the state of Linux support by these platforms :

Table 3–1. Brio and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
Brio (D5522A, D5526A, D5857A, D6665A, D5838A, D5848A, D6514A, D5527A, D5528A, D6666A, D6675A, D5849A, D5839A, D5859A, D6666A, D6510A, D6515A, D6667A, D5840A, D5861A, D6668A, D5840C, D5841A, D6516B)	S3 Trio 64V2 PCI	Yes XFree 3.3.6[Rem.] (S3)	None	N/A	None	N/A	???	???	Yes
Brio (D6810A, D6812A)	ATI Rage Pro ZX AGP	Yes XFree 4.1.0[Rem.] (ati)	None	N/A	None	N/A	???	???	No
			None	N/A	None	N/A	???	???	No

Brio (D6638A, D6639A, D6640A, D6644A, D7901A, D7902A, D6645A, D6646A) Chipset BX[Rem.]	ATI Rage Pro ZX AGP	Yes XFree 4.1.0[Rem.] (ati)							
Brio (D5841A, D6516B)	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Brio (D6760A, D7671A, D6908A, D7930A, D7672A, D7925T, D6776A, D6769A, D6755A, D6895A, D6896A, D6897A, D7931A)	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Brio BA (D7581A, D7584A, D7585A, D7587A, D7586A, D7591A, D7594A, D8411A)	Sis 5595 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Brio BAx (D7600A, D7603A, D7624A, D7625A, D7630A, D7610A)[Rem.]	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Brio BAx (D7605A)[Rem.]	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	???	???	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Brio BA400 (D8760A, D8761A, D8763A, D8764A, D8767A, D8768A, D8769A, D8934A, D8935A, D8936A, D8943A, D8947A, D8952A, D8953A, D9720A, D9721A, D9724A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	None	N/A	None	N/A	???	???	Yes
Brio BA410 (P1682A, P1683A, P1686A, P1687A, P1689A, P1692A, P1694A, P1710A, P1711A, P1718A, P1719A, P1720A,	S3 Savage AGP[Rem.]	Yes XFree 4.1.0[Rem.] (savage)	None	N/A	None	N/A	VIA 82C686	Yes driver Alsa[Rem.]	Yes

P1722A, 03237A, P2738A, P2739A, P2741A, P2743A, P2745A, P2746A, P3235A, P3263A, P3264A, P3265A, P3266A, P3267A, P3268A, P3269A, P3271A, P3272A, P3662A, P3663A, P3664A, P3665A, P3666A, P4848B, P4849B, P4855B, P4869A, P4870A, P4872A, P5816B, P5817B, P5821B, P5822A)									
Brio BA410 (P1716A, P1721A, P1723A, P3270A, P3273A, P4873A)	S3 Savage AGP[Rem.]	Yes XFree 4.1.0[Rem.] (savage)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	VIA 82C686	Yes driver Alsa[Rem.]	Yes
Brio BA410 (P2744A, P3274A, P3667A)	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	None	N/A	None	N/A	VIA 82C686	Yes driver Alsa[Rem.]	No
Brio BA600 (D8770A, D8771A, D8772A, D8773A, D8778A, D8780A, D8783A, D8784A, D8785A, D8788A, D8789A, D8963A, D9070A, D9072A, D9080A, D9082A, D9085A, D9091A) Chipset BX[Rem.]	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Brio BA600 (D8406A, D8774A, D8781A, D8787A, D8967A, D9075A) Chipset BX[Rem.]	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	???	???	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No

Table 3–2. Vectra and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
Vectra xe310 (P5829A, P5833A, P5881A, P5902A, P5904A, P6014B, P6015B, P6016A, P6138A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	None	N/A	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	Mandrake 8.1
Vectra xe310 (P5865B, P5891A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	Mandrake 8.1
Vectra xe310 (P6137A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	Preload Mandrake 8.1
Vectra VE5 (D5592A, D5602A, D5603A, D5604A, D5606N, D5608A, D5612A, D5615A, D5618A, D5607A, D5617A)	S3 Trio 64V2 PCI	Yes XFree 3.3.6[Rem.] (S3)	None	N/A	None	N/A	???	???	Yes
Vectra VE7 (D6530A, D6531A, D6533A, D6610A, D6611A, D6615A, D6616A, D6613A)	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	None	N/A	None	N/A	???	???	Yes
Vectra VE7 (D6532A, D6612A, D6617A, D6618A)	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	???	???	Yes
Vectra VE8	Matrox	Yes XFree	None	N/A	None	N/A	AZTEC	Yes	Yes

(D6550A, D6560A, D6570A, D6554A, D6584A, D6540A, D6541A, D6544A, D6543A, D6578A, D6573A, D6574A, D6580A,D6581A, D6584A, D6583A, D6593A, D6597A, D6598A) Chipset BX[Rem.]	Productiva G100 AGP[Rem.]	4.1.0[Rem.] (mga)					2320[Rem.]	driver Alsa[Rem.]	
Vectra VE8 (D6552N, D6562N, D6565N, D6542A, D6572A, D6575A, D6582A, D6595A, D6582A, D6585N, D6599A) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	AZTEC 2320[Rem.]	Yes driver Alsa[Rem.]	Yes
Vectra VEi7 (D8112A, D8117A, D8121A, D8123A, D8124A, D8126A, D8128A, D8129A, D8131A, D8133A, D8134A, D8136A, D8138A, D8139A, D8141A, D8143A,	Sis 5595 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	None	N/A	None	N/A	???	???	Yes

D8144A, D8145A, D8148A, P1618A, P1619A)									
Vectra VEi7 (D8118N, D8122A, D8127N, D8132A, D8137A, P1620A)	Sis 5595 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	???	???	No
Vectra VEi8 (D8166A, D8168A, D8151A, D8153A, D8155A, D8169A, D8171A, D8173A, D8174A, D8181A, D8183A, D8184A, D8186A, D8188A, D9784A, D9785A, D9786A, D9788A, D9791A, D9793A, P1626A, P1628A, P1633A)	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Vectra VEi8 (D8167N, D8152N, D8172N, D8182N, D8187N, D9787N, D9789A, D9792N, P1627A)	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	???	???	No
Vectra VL5 (D4552A, D4543A, D4554A, D4555A, D4556A, D4557A,	S3 Trio 64V2 PCI	Yes XFree 3.3.6[Rem.] (S3)	None	N/A	None	N/A	???	???	Yes

D4558A, D4559A, D4560A, D4567A, D4562A, D4563A, D4572A, D4574A, D4576A, D4579A, D4577A)									
Vectra VL6	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	None	N/A	None	N/A	???	???	Yes
Vectra VL6	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Vectra VL7 (D5710A, D5711N, D5725A, D5720A, D5721N, D5731N, D5797N, D5737A, D5799N)	Cirrus Logic GD 5465 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (cirrus)	None	N/A	None	N/A	???	???	Yes
Vectra VL7 (D5734N, D5729N, D5739N, D5728N, D5798N)	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Vectra VL7 (D5724N, D5796N)	Cirrus Logic GD 5465 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (cirrus)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	None	N/A	???	???	No
Vectra VL8 (D5880A, D5882A, D5890A, D5891A, D5893A, D5896A, D5898A,	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No

D5900A, D5902A, D6945A) Chipset BX[Rem.]									
Vectra VL8 (D5881A, D5883A, D5894A, D5888A, D5892A) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	???	???	No
Vectra VL8 (D5887A) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	???	???	???	???	No
Vectra VL8 (D6944A) Chipset BX[Rem.]	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Vectra VL8 (D6940A, D6941A, D6942A) Chipset BX[Rem.]	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	None	N/A	???	???	No
Vectra VL8 (D6943A) Chipset BX[Rem.]	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	???	???	Yes
Vectra VLi8 (D7941A, D7943A, D7945A, D7948A, D7951A, D7953A, D7955A, D7961A, D7963A, D7965A, D7958A, D7968A, D7969A, D7973A, D7976A, D9459A, D9460A, D9463A,	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes

D9467A, D9774A, D9810A, P1894A, P1898A)									
Vectra VLi8 (D7826A, D7836A, D7837A, D7846A, D7847A, D7848A, D7856A, D7857A, D7866A, D7867N, D7876A, D7877N, D7942A, D7949A, D7952A, D7959A, D7962A, D7969A, D7972A, D8696A, D8697A, D8950A, D9456A, D9457N, D9461A, D9462A, D9770N, D9771N, D9775A, D9778A, D9779N, D9809A, P1896A, P1899A)	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Vectra VL400 (D9815A, D9816A, D9817A, D9818A, D9819A, D9820A, D9821A, D9822A, D9824A, D9826A,	Intel i815 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	Yes

D9828A, D9829A, D9830A, D9831A, D9833A, P1555A, P1556A, P1557A, P1558A, P1560A, P2260A, P2261A, P2266A, P2265A, P2778A, P2779A, P3351A, P3353A, P3389A, P3390A, P3391A, P3394A, P3614A, P3615A, P3616A, P3618A, P3687A, P3691A, P3694A, P3697A, P3698A, P3699A, P3700A, P3702A, P3704A, P3728A, P3730A, P3732A, P3733A, P3734A, P3735A, P3736A, P3737A, P3738A, P3739A, P3740A, P3743A, P3744A, P3745A, P3746A, P3747A, P4110A, P4116A, P4119A, P4120A, P4121A, P4128A, P4129A, P4130A, P4134A, P4136A, P4137A, P4138A, P4140A, P4352A, P4354A, P4355A, P4368A, P4369A, P4370A, P4371A, P4745A, P4746A, P4747A, P4748A, P4752A, P4753A, P5060A, P5069A, P5075A, P5120A, P5121A, P5123A, P5125A, P5126A, P5133A, P5144A, P5598A) Chipset i820[Rem.]									
Vectra VL400 (D9825A,	Matrox Millenium	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX	Yes driver	None	N/A	Intel 82810	Yes driver	RedHat 7.0

D9827A, D9832A, D9834A, P1554A, P1559A, P1561A, P1562A, P3352A, P3384A, P3686A, P3701A, P3703A, P3617A, P3619A, P3688A, P3689A, P3690A, P3692A, P3693A, P3695A, P3696A, P4112N, P4113N, P4114N, P4115A, P4117A, P4118A, P4122A, P4123N, P4124N, P4125N, P4126N, P4127N, P4133A, P4356A, P4357A, P4358A, P4359A, P4360A, P4361A, P4362A, P4363A, P4364A, P4365A, P4366A, P4167A) Chipset i820[Rem.]	G450D AGP[Rem.]		10/100 BT	3c59x[Rem.]			Audio	Alsa[Rem.]	
Vectra VL400 (P2257A) Chipset i820[Rem.]	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	No
Vectra VL400 (P5083A) Chipset i820[Rem.]	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	No
Vectra VL410 (D4768A, P5622A, P5957A, P5958A, P5959A, P5960A, P5962A, P5963A, P6096A, P6097A, P6098A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	None	N/A	Analog Device 1885	Yes driver AD1885	No
Vectra VL410 (P5964A)	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	None	N/A	Analog Device 1885	Yes driver AD1885	No
Vectra VL420 (P5754A, P5755A, P5756A,	ATI Rage 128	Yes XFree 4.1.0[Rem.] (ati)	Intel PRO 10/100	Yes driver eepro100	None	N/A	Analog Device 1885	Yes driver AD1885	No

P5757A, P5761A, P5762A, P5764A, P5765A, P5767A, P5769A, P5770A, P5956A, P5962A, P5967A, P5978A, P5985A, P5988A, P5991A)	AGP 8MB		BT	or e100					
Vectra VL420 (P5760A, P5763A, P5766A, P5768A, P5986A, P5990A)	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	None	N/A	Analog Device 1885	Yes driver AD1885	No
Vectra VL600 (D9733A, D8643A, D8653A, D8657A, D8663A, D8667A, D9737A, D8647A, D8677A, P2780A, P3285A, P3288A) Chipset i820[Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Vectra VL600 (D7543N, D8644N, D8648N, D8654N, D8658N, D8664N, D8668N, D8678A, D9734N, D9738N, P2786A, P3286N, P3289N, P3604N, P3705N) Chipset i820[Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Vectra VL600 (D8635A, D8645A, D8649N, D8655A, D8659N, D8665A, D8669N,	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes

D8679N, D9735A, D9739N, P2787A, P3287A, P3290N, P3344N, P3345N, P3605N, P3606N, P3607N, P3608N, P3610N) Chipset i820[Rem.]									
Vectra VL600 (P3609N) Chipset i820[Rem.]	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Vectra VL600 (D8656N) Chipset i820[Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	???	???	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Vectra VL800 (P2059A, P2074A, P2076A, P2077A, P2078A, P2080A, P2693A, P3631A, P3633A, P3635A, P3637A, P3638A, P3643A, P3644A) P4 Chipset i850[Rem.]	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	No
Vectra VL800 (P2057A, P2060A, P2075A, P2079A, P2081A, P2694A, P2695A, P3632A, P3634A, P3636A, P3642A) P4 Chipset i850[Rem.]	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	RedHat 7.1
Vectra VL800 (P2696A, P2697A, P3642A) P4 Chipset i850[Rem.]	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Sound Blaster Live!	Yes driver emu10k1[Rem.]	No
Vectra VL800 (P2058A, P3223A, P3224A, P3225A, P3226A, P3640A) P4 Chipset i850[Rem.]	ATI Rage 128 AGP 8MB	Yes XFree 4.1.0[Rem.] (ati)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	No

Vectra VL800 (P3639A) P4 Chipset i850[Rem.]	ATI Rage 128 AGP 8MB	Yes XFree 4.1.0[Rem.] (ati)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	Preload Mandrake 8.0
Vectra XA (D3986A, D3989A, D3990A, D3991A, D3993A, D4770N, D4771N, D4773N, D4774N, D3994N, D3995N, D4776N)	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	None	N/A	???	???	No
Vectra XA (D4777A)	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	???	???	Yes

Table 3−3. e−PC and Linux

Machine	**Graphic Card**	**Linux support**	**Network Card**	**Linux support**	**SCSI Card**	**Linux support**	**Sound Card**	**Linux support**	**Tested**
e−Vectra (D9896T, D9897T, D9898T, D9899T, P2024T, P2025T, P2027T, P2706T, P2707T)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	Yes
e−PC (P2321A, P2760A, P2761A, P2763A, P2765A, P2791A, P2792A, P2793A, P2794A, P2795A, P3355A, P3362A, P4229A, P4230A, P4256A, P4265A, P4266A, P4269A, P4271A, P4272A, P4273A, P4274A, P4278A, P4941A, P4946A, P4949A)	Intel i810 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	None	N/A	Intel 82810 Audio	Yes driver Alsa[Rem.]	RedHat 7.0
					None	N/A			

e–PC (P4315A, P4327A, P4328A, P4329A, P5802A)	Intel i815 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (i810)	Intel PRO 10/100 BT	Yes driver eepro100 or e100			Intel 82810 Audio	Yes driver Alsa[Rem.]	RedHat 7.1, Mandrake 8.0, 8.1

Table 3–4. Kayak and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
Kayak XA (D4792A, D4795N)	Cirrus Logic GD 5465 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (cirrus)	None	N/A	None	N/A	???	???	No
Kayak XA (D4807N, D4796N, D6491N, D6492N, D4806N, D4808N, D6493N)	Cirrus Logic GD 5465 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (cirrus)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	None	N/A	???	???	Yes
Kayak XA (D4798N, D6490N, D4799N, D4803N, D6494N)	Cirrus Logic GD 5465 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (cirrus)	AMD 79C974 KC 10/100 BT + SCSI	Yes driver pcnet32	Symbios Logic 8751SP with network card	Yes driver ncr53c8xx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	Yes
Kayak XA (D4796S, D6493S)	Matrox Millenium II AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Kayak XA (D4803S)	Matrox Millenium II AGP	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C974 KC 10/100 BT + SCSI	Yes driver pcnet32	Symbios Logic 8751SP with network card	Yes driver ncr53c8xx[Rem.]	???	???	No
Kayak XA (D6720N, D6721N, D6723N, D6726N, D6724N, D6730N, D6731N, D6735N, D6736N,	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	AZTEC 2320[Rem.]	Yes driver Alsa[Rem.]	No

D6738N, D6739N, D7994N)									
Kayak XA (D6722N, D6729N, D6734N)	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	None	N/A	None	N/A	???	???	Yes
Kayak XA (D6725N, D6732N, D6737N, D7993N)	Matrox Millenium G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	Yes
Kayak XA (D6727N)	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	No
Kayak XA (D6728N, D6733N)	Accel Galaxy AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	None Not interesting	N/A	None	N/A	???	???	No
Kayak XA−s (D5751N, D5752N, D5753N, D5755N, D5754N, D5756N, D5759N) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	No
Kayak XA−s (D5757N, D5758N) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	Yes
Kayak XA−s (D5765N, D5763N,	Matrox Productiva G200	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	???	???	Yes

D5766N, D5769N, D7982N, D7986N, D7991N, D7987N) Chipset BX[Rem.]	AGP								
Kayak XA−s (D5768N, D5767N) Chipset BX[Rem.]	Matrox Productiva G200 AGP	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	No
Kayak XA−s (D5762N, D7984N, D7988N) Chipset BX[Rem.]	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	Yes
Kayak XA−s (D5764N, D7983N, D7989N) Chipset BX[Rem.]	Accel Galaxy AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.] Not interesting	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	No
Kayak XA−s (D7990N) Chipset BX[Rem.]	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	???	???	No
Kayak XA−s (D7992N) Chipset BX[Rem.]	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	Yes
Kayak XM600 (D9531N, D9533N, D9535N, D9541N, D9549N,	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No

D9552N, D9553N, D9555N, D9556N, D9557N, D9559N, P1642N, P1645N, P1653N, P1655N, P1658N, P2055N, P2191N, P2202N)									
Kayak XM600 (P1650N, P1652N, P1656N)	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XM600 (D8350N, D9554N, D9558N)[Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XM600 (P2054N)[Rem.]	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XM600 (D9563N)	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	None	N/A	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XM600 (D9536N, D9537N, D9538N, D9544N, D9548N, P1646N, P1648N, P2192N, P2193N, P2203N, P2204N, P2204N, P2192N, P2193N)	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XM600 (D9539N, D9565N,	Matrox Millenium G400D	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card	Yes driver rtl8139	Symbios Logic 53C895	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS	Yes driver Alsa[Rem.]	No

P1651N, P1657N, P2190N, P2194N)	AGP		10/100 BT		PCI		4614		
Kayak XM600 (D9550N, D9567N)	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Kayak XM600 (D9534N, D9540N, D9543N, D9546N, D9564N, P1644N, P1647N, P1649N, P2053N, P2056N, P2195N, P2210N, P2211N)	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Kayak XM600 (D9545N, D8366N)	3DLabs Oxygen GVX1 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Kayak XU (D4691N, D4692N, D4695N, D4701N, D4693N, D4694N, D4702N, D4705N)	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7860 PCI + Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	???	???	Yes
Kayak XU (D5680N, D5682N, D5683N, D5684N) Chipset BX[Rem.]	Matrox Millenium II PCI	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7860 PCI + Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	Yes
Kayak XU (D5702, D5704, D5686N,	Matrox Millenium G200	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C972 10/100	Yes driver pcnet32	Symbios Logic 53c875	Yes driver ncr53c8xx	???	???	Yes

D6336N, D6348N, D8431N, D8920N)	AGP		BT + SCSI (D6692A)[Rem.]		with network card (D6692A) + Adaptec AIC 7880 PCI	and driver aic7xxx			
Kayak XU (D5687N, D6333N, D6334N, D8432N, D6345N, D8923N)	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C972 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A) + Adaptec AIC 7880 PCI	Yes driver ncr53c8xx and driver aic7xxx	???	???	No
Kayak XU (D6337N, D6346N)	Accel Galaxy AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.] Not interesting	AMD 79C972 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A) + Adaptec AIC 7880 PCI	Yes driver ncr53c8xx and driver aic7xxx	???	???	No
Kayak XU (D6347N)	Matrox Productiva G100 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C972 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A) + Adaptec AIC 7880 PCI	Yes driver ncr53c8xx and driver aic7xxx	???	???	No
Kayak XU (D8924N)	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	AMD 79C972 10/100 BT +	Yes driver pcnet32	Symbios Logic 53c875 with	Yes driver ncr53c8xx and driver	???	???	No

			SCSI (D6692A)[Rem.]		network card (D6692A) + Adaptec AIC 7880 PCI	aic7xxx			
Kayak XU700 (A7185C)	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	???	???	None	N/A	???	???	No
Kayak XU700 (A7186C)	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	???	???	???	???	???	???	No
Kayak XU800 (D8019N) [Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XU800 (D8021N, P1586N, P1661N) [Rem.]	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XU800 (D8000N, D8001N) [Rem. Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XU800 (D8002N, D8010N, D8016N, P1585N, P1589N, P1663N, P1664N, P1668N) [Rem.]	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XU800 (D8003N, D8006N, D8012N, P1587N, P1665N, P1669N) [Rem.]	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Kayak XU800 (P1667N) [Rem. Rem.]	Matrox Millenium G400D	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card	Yes driver rtl8139	Symbios Logic 53C895	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS	Yes driver Alsa[Rem.]	No

	AGP		10/100 BT		PCI		4614		
Kayak XU800 (D8007N, D8013N, D8020N, D8022N, P1588N, P1590N, P1662N, P3220N, P3221N) [Rem.]	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	No
Kayak XU800 (D8009N, D8015N) [Rem.]	3DLabs Oxygen GVX1 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Cirrus Logic CS 4614	Yes driver Alsa[Rem.]	Yes
Kayak XW (D6475N)	Elsa Gloria Synergy[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7860 PCI + Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem]	???	???	No
Kayak XW (D5505N, D5507N, D5509N)	Accel Eclipse PCI	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.] Not interesting	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7860 PCI + Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem]	???	???	No
Kayak XW (D5510N, D5514N, D6485N)	HP Fx−4 AGP	Yes HP X Server[Rem.]	AMD 79C971 KC 10/100 BT	Yes driver pcnet32	Adaptec AIC 7860 PCI + Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem]	???	???	No
Kayak XW (D6480N, D6481N, D6482N) Chipset BX[Rem.]	Accel Eclipse PCI	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	??? Not	???	???	???	???	???	No

		interesting							
Kayak XW (D6797N)	HP Fx−6 AGP	Yes HP X Server[Rem.]	???	???	???	???	???	???	No
Kayak XW (D6486N, D6487N, D6488N) Chipset BX[Rem.]	HP Fx−4 AGP	Yes HP X Server[Rem.]	???	???	???	???	???	???	No

The health monitoring system HP Kayak Maxilife, available on the whole Kayak range, is supported by Linux with the tool Lm_sensors

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3.2.1.2. Desktop computer accessories

The following table provides all information on the support for this hardware by Linux.

Table 3−5. Desktop computer accessories

Reference	Card type	Chipset	Linux support	Tested
D1553A	Extension	ISA Slots Extension kit	Yes	Yes
D5480A	FastRaid Card	Adaptec ARO Raidport	No	No
D6690A	FastRaid Card	Adaptec ARO Raidport	No	No
D6951A	SCSI Card	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	Yes
D9528A	SCSI Card	Symbios Logic 8952U Ultra2 Wide PCI	???	No
D9529A	SCSI Card	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Yes
D9663A	SCSI Card	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	Yes
D9561A	SCSI Card	???	???	No
P2280A	SCSI Card	Adaptec AIC 29160 PCI	Yes driver aic7xxx[Rem.]	No
D6936A	Network Card	AMD 79C972 AKC 10/100 BT	Yes driver pcnet32	Yes
D7504A	Network Card	3Com 905B−TX 10/100 BT[Rem.]	Yes driver 3c59x[Rem.]	Yes
D7506A	Network Card	Intel PRO 10/100 BT	Yes driver eepro100 or e100	No
D7508A	Network Card	???	???	No

D7522A	Network Card	3Com 905C−TX 10/100 BT	Yes driver 3c59x[Rem.]	Yes
D7531A	Network Card	Carte HP chipset RealTek	Yes driver RealTek	Yes
D6657A	Sound Card	???	???	No
D5183A	Sound Card	???	???	No
P1552A	Video Card	Matrox Millenium G250 AGP	Yes XFree 4.1.0[Rem.] (mga)	Yes
D9521A	Video Card	Matrox Millenium G400D AGP	Yes XFree 4.1.0[Rem.] (mga)	Yes
D9509A, D9522A, D9522B	Video Card	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	Yes
D9523A	Video Card	3DLabs Oxygen GVX1 AGP	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem.]	Yes
P1971A, P2289A (MX)	Video Card	nVidia GeForce 2 GTS AGP	Yes XFree 4.1.0[Rem.] (nv)	No

CD−ROM, DVD and ZIP drives are supported by Linux kernel. Read the various HOWTO for their use, following the interface type.

3.2.1.3. The workstation range (Visualize, HP workstation)

Visualize systems come in two flavors: the p and x class systems are preinstalled, supported, and configured with Windows; the pl and xl class systems are preinstalled, supported, and configured with Linux. There is no hardware difference between the base systems, but the Linux image that is preinstalled on the pl and xl is customized so that all drivers for the systems are preconfigured −− there's no need to specify or tune the box and drivers.

Table 3−6. Visualize and Linux

Machine	**Graphic Card**	**Linux support**	**Network Card**	**Linux support**	**SCSI Card**	**Linux support**	**Sound Card**	**Linux support**	**Tested**
Visualize P (A1296A, A5015A) Chipset BX[Rem.]	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	RedHat 6.0, 6.1
Visualize P (A1296A, A5015A) Chipset	Elsa Gloria Synergy	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC	Yes driver pcnet32	Symbios Logic 53c875	Yes driver ncr53c8xx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	RedHat 6.0, 6.1

BX[Rem.]	II AGP		10/100 BT + SCSI (D6692A)[Rem.]		with network card (D6692A)				
Visualize P (A6034A, A6038A)	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2
Visualize P (A6034A, A6038A)	HP Fx−5 AGP	Yes HP X Server[Rem.]	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2
Visualize P (A6034A, A6038A)	HP Fx−10 AGP	Yes HP X Server[Rem.]	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2
Visualize X (A1297A, A5014A) Chipset BX[Rem.]	Elsa Gloria Synergy + AGP[Rem.]	Yes XFree 4.1.0[Rem.] (glint)	AMD 79C971 KC 10/100 BT + SCSI (D6692A)[Rem.]	Yes driver pcnet32	Symbios Logic 53c875 with network card (D6692A)	Yes driver ncr53c8xx[Rem.]	Analog Device 1816	Yes driver AD1816[Rem.]	RedHat 6.0
Visualize X (A1280A, A6020A)	Elsa Gloria Synergy II AGP	Yes XFree 4.1.0[Rem.] (glint)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2
Visualize X (A1280A, A6020A)	HP Fx−5 AGP	Yes HP X Server[Rem.]	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2
Visualize X (A1280A, A6020A)	HP Fx−10 AGP	Yes HP X Server[Rem.]	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4280	Yes driver Alsa[Rem.]	RedHat 6.2

A page dedicated to these machines and their support under Linux is available at the following address : http://www.hp.com/workstations/products/linux/index.html

A page of questions and answers on these machines is also available at the following address : http://www.hp.com/visualize/programs/news/archive/qa1.html

In particular, it's recommended to use a kernel 2.2.16 at least to support correctly the SCSI controller of these machines.

A beta X server for the FX2+, FX4+ and FX6+ cards is available at the following address : http://www.hp.com/workstations/support/software/drivers/linux/video/fxvideo/fx6/driver.html?

An X server for the FX5 and FX10 cards is available at the following address : http://www.hp.com/workstations/support/software/drivers/linux/video/fxvideo/fx10/index.html

Table 3–7. HP workstation and Linux

Machine	**Graphic Card**	**Linux support**	**Network Card**	**Linux support**	**SCSI Card**	**Linux support**	**Sound Card**	**Linux support**	**Tested**
X1000 (A7778A)	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	No
X1000 (A7779A, A7780A)	nVidia Quadro2 Pro AGP	Yes XFree 4.1.0[Rem.] (nv)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4299	Yes driver cs4299	No
X2000 (A7236A, A7236B)	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	None	N/A	Cirrus Logic CS 4299	Yes driver cs4299	RedHat 7.1
X2000 (A7237A)	nVidia Quadro2 Pro AGP	Yes XFree 4.1.0[Rem.] (nv)	SMC 1211 TX EZ Card 10/100 BT	Yes driver rtl8139	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4299	Yes driver cs4299	RedHat 7.1
X2000 (A7238A, A7862A)	ATI fireGL2 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (fireGL)	SMC 1211 TX EZ Card 10/100 BT[Rem.]	Yes driver rtl8139	Adaptec AIC 7892 PCI	Yes driver aic7xxx[Rem.]	Cirrus Logic CS 4299	Yes driver cs4299	RedHat 7.1
X2000 (A7805A)	None	N/A	SMC 1211	Yes driver	Adaptec AIC	Yes driver aic7xxx[Rem.]	Cirrus Logic	Yes driver	RedHat 7.1

			TX EZ Card 10/100 BT	rtl8139	7892 PCI		CS 4299	cs4299	
X4000 (A7264A, A8034A)	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Symbios Logic 53C810 PCI	Yes driver ncr53c8xx[Rem.]	???	???	RedHat 7.1
X4000 (A7265A, A8037A)	None	N/A	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Symbios Logic 53C810 PCI	Yes driver ncr53c8xx[Rem.]	???	???	RedHat 7.1
X4000 (A7266A, A8035A)	nVidia Quadro2 Pro AGP	Yes XFree 4.1.0[Rem.] (nv)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Symbios Logic 53C810 PCI	Yes driver ncr53c8xx[Rem.]	???	???	RedHat 7.1
X4000 (A7267A, A8036A)	ATI fireGL2 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (firegl[Rem.])	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Symbios Logic 53C810 PCI	Yes driver ncr53c8xx[Rem.]	???	???	RedHat 7.1

3.2.1.4. Workstations accessories

The following table provides all information on the support for this hardware by Linux.

Table 3–8. Workstations accessories

Reference	Card type	Chipset	Linux support	Tested
A6076A	Video Card	ATI fireGL2 AGP[Rem.]	Yes XFree 4.1.0[Rem.] (firegl[Rem.])	No
A7192A	Video Card	Matrox Millenium G450D AGP[Rem.]	Yes XFree 4.1.0[Rem.] (mga)	Yes
A6064A, A6065A (MXR)	Video Card	nVidia Quadro2 Pro AGP	Yes XFree 4.1.0[Rem.] (nv)	No

CD−ROM, DVD and ZIP drives are supported by Linux kernel. Read the various HOWTO for their use, following the interface type.

There are 4 supported graphics cards with XFree86 on HP x2000 and x40000 systems with Linux: SynergyPlus, Synergy2, Matrox G450, and FireGL2/4. There are also 4 rpms that are associated with these cards and they must be present on your system in order to have a supported graphics environment: synergyplus, synergy2, firegl2 and mgag450. For example, to check for the existence of the firegl2 rpm, run

```
#rpm -q firegl2
```

Once you have installed the new card and rebooted, run `/usr/X11R6/bin/graphicsconfig` to configure the card. If it is a recognized card supported by your Linux system, the function will return the name of the card and it will be configured to run. At this point you may start up your X window environment.

If it returns "UNKNOWN", then your graphics card either is not one of the 4 currently supported cards, or it is a newer/older version of the card than is supported. In either case you will need to run `Xconfigurator` to set it up.

3.2.1.5. The mobile computer range (OmniBook)

To suspend to disk the current session, you need to not have deleted the hibernation partition (type a0), which size should be the size of the RAM, to have support for APM in the kernel, and to use the key combination Fn+F12.

To send the video signal, either to an external screen, or through the docking station, it is be necessary to add the following parameter to your XFree86 configuration file `/etc/X11/XF86Config`:

```
[...]
Section "Device"
[...]
Options "crt_screen"
[...]
```

This concerns mobile computers using ATI chipsets. The switch is done by pressing simultaneously on Fn−F5.

Most of the OmniBook have in option a "Port Replicator" system allowing, according to the model, to support PCI cards, complementary ports, ...

A Web page dedicated to Omnibook under Linux is available at:
http://www.swiss.ai.mit.edu/projects/omnibook/

The following table provides all information on the support for this hardware by Linux.

Table 3−9. OmniBook and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
OmniBook Sojourn (F1430A)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	???	???	No
OmniBook XE (F1719W, F1720W, F1721W, F1722W)[Rem.]	Silicon Motion LynxE SM810[Rem.]	Yes XFree 4.1.0[Rem.] (siliconmotion)	None	N/A	None	N/A	ESS Maestro 2	Yes driver maestro[Rem.]	Yes
OmniBook XE2 (F1664W,	Silicon Motion	Yes XFree 4.1.0[Rem.] (siliconmotion)	None	N/A	None	N/A	ESS Maestro 3	Yes[Rem.]	Yes

F1666W|N F1667W|N, F1674W, F1675W, F1753W, F1756W, F1755W|N, F1772W, F1774W|N, F1775W|N, F1962W, F2051W, F2052W|K, F2053W|K, F2055W|K, F2065W|K, F2068W, F2069W|K) Rem.	LynxE SM810 Rem.								
OmniBook XE3 (F2113W|K, F2114W|K, F3877W) Rem. Rem.	S3 Savage AGP Rem.	Yes XFree 4.1.0 Rem. (savage)	None	N/A	None	N/A	ESS Maestro 3	Yes Rem.	Yes
OmniBook XE3 (F2115W|K, F2116W|K, F2117W|K, F2302W|K, F2303W|K, F2305W|K, F2306W|K, F2308W|K, F2321W|K, F2331W|K, F2334W|K, F2335W|K, F2336W|K, F2396W|K, F2400W|K, F2402W|K, F3708W|K, F3863W|K, F3937H, F3939H, F4139W) Rem. Rem.	S3 Savage AGP Rem.	Yes XFree 4.1.0 Rem. (savage)	Accton EN2242 minipci	Yes driver tulip	None	N/A	ESS Maestro 3	Yes Rem.	Yes
OmniBook 500 (F2158W|K, F2159W|K, F2161W|K,	ATI Rage Mobility	Yes XFree 4.1.0 Rem. in Frame Buffer mode	None	N/A	None	N/A	ESS Maestro 3	Yes Rem.	RedHat 7.1, Debian 2.2,

F2162W|K)		(FBDEV)[Rem. Rem.]							SuSE 7.1, 7.3
OmniBook 500 (F2164W|K, F2165W|K, F2167W|K, F2168W|K, F2974W|K, F2975W|K, F3477W|K, F3478W|K, F3483W|K, F3488W|K)	ATI Rage Mobility	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem. Rem.]	3Com 3C556 10/100 BT	Yes driver [Rem.]	None	N/A	ESS Maestro 3	Yes[Rem.]	RedHat 7.1, Debian 2.2
OmniBook 600 ()[Rem.]	Chips & Technologies CT65545	Yes XFree 4.1.0[Rem.] (chips)	None	N/A	None	N/A	???	???	RedHat 6.x, Debian 2.2
OmniBook 800 (F1360A, F1175A, F1174A, F1173A, F1172A, F1171A)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	SCSI Card	Yes driver ncr53c8xx[Rem.]	SoundBlaster compatible	Yes driver sb	Mandrake 8.0, Debian 2.2
OmniBook 900 (F1711W|N, F1712W|N, F1760W|N)	Neomagic MagicGraph 256AV NM2200	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	Analog Device 1848	Yes driver AD1848	Mandrake 8.1
OmniBook 900 (F1769W|N|K, F1770W|N|K, F1979W|N|K, F1980W|N|K, F2007W|N|K)	ATI Rage Mobility	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem. Rem.]	None	N/A	None	N/A	ESS Maestro 2	Yes driver maestro[Rem.]	Mandrake 8.1
OmniBook 2000 (F1356A, F1397A)	Chips & Technologies CT65554	Yes XFree 4.1.0[Rem.] (chips)	None	N/A	None	N/A	???	???	No
OmniBook 2100 (F1584W, F1580W, F1581W, F1597W, F1598W, F1599W, F1600W, F1729W)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	Crystal CS 4232	Yes	Yes
			None	N/A	None	N/A		Yes	No

OmniBook 3000 (F1391A, F1392A, F1393A)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)					Crystal CS 4232		
OmniBook 3100 (F1582W)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	SoundBlaster compatible	Yes driver sb	No
OmniBook 4000 ()	WD90C24 PCI	Yes XFree 3.3.6[Rem.] (SVGA)	None	N/A	None	N/A	???	???	No
OmniBook 4100 (F1462W, F1463W, F1479W, F1464W, F1703W)	Neomagic MagicGraph 128XD NM2160	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	???	???	Yes
OmniBook 4150[Rem.] (F1629W|N, F1640W|N, F1641W|N, F1642W|N, F1647W|N, F1648W|N, F1663W|N)	Neomagic MagicGraph 256AV NM2200	Yes XFree 4.1.0[Rem.] (neomagic)	None	N/A	None	N/A	???	???	Mandrake, Debian
OmniBook 4150 (F1649W|N|K, F1650W|N|K, F1658W|N, F1660W|N, F1662W|N|K, F1976W|N|K, F1983W|N|K, F2000W|N|K)	ATI Rage Mobility	Yes XFree 4.1.0[Rem.] in Frame Buffer mode (FBDEV)[Rem. Rem.]	None	N/A	None	N/A	ESS Maestro 2	Yes driver maestro[Rem.]	Yes
OmniBook 5000 ()	Chips & Technologies CT65545	Yes XFree 4.1.0[Rem.] (chips)	None	N/A	None	N/A	Crystal CS 4232	Yes	Yes
OmniBook 5500 ()	Chips & Technologies CT65548	Yes XFree 4.1.0[Rem.] (chips)	None	N/A	None	N/A	Crystal CS 4232	Yes	Yes
OmniBook 5700 (F1352A, F1353A, F1396A, F1354A, F1355A)	Chips & Technologies CT65554	Yes XFree 4.1.0[Rem.] (chips)	None	N/A	None	N/A	???	???	RedHat 7.0, 7.1, 7.2, Mandrake 7.1

OmniBook 6000 [Rem.] (F2072W|K, F2079W|K, F2081W|K, F2083W|K, F2087W|K, F2090W|K, F2140W|K, F2144W|K, F2148W|K, F2150W|K, F2186W|K, F2182W|K, F2184W|K, F2188W|K, F2197W|K, F2200W|K, F2202W|K, F2205W|K)	ATI Rage Mobility	Yes XFree 4.1.0 [Rem.] in Frame Buffer mode (FBDEV) [Rem. Rem.]	3Com 3C556 10/100 BT	Yes driver [Rem.]	None	N/A	ESS Maestro 3	Yes [Rem.]	RedHat 6.2, 7.0, 7.1, Debian 2.2, Mandrake 7.1, 8.0
OmniBook 6100 [Rem.] (F3251W|K, F3253W|K, F3257W|K, F3259W|K, F3260W|K, F3262W|K, F3263W|K, F3265W|K, F3266W|K, F3268W|K)	ATI Radeon Mobility AGP	Yes XFree 4.1.0 [Rem.] (ati)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	None	N/A	ESS Maestro 3	Yes [Rem.]	RedHat 7.2, Mandrake 8.1
OmniBook 7100 (F1441W, F1442W)	ATI Rage LT Pro	Yes XFree 4.1.0 [Rem.] (ati)	None	N/A	None	N/A	SoundBlaster compatible	Yes driver sb	RedHat 7.0
OmniBook 7150 (F1443W)	ATI Rage LT Pro	Yes XFree 4.1.0 [Rem.] (ati)	None	N/A	None	N/A	ESS Maestro 2	Yes driver maestro [Rem.]	No

3.2.1.6. Mobile computer accessories

The cards mentionned below are PCMCIA or PC−Card cards.

The following table provides all information on the support for this hardware by Linux.

Table 3−10. Mobile computer accessories

Reference	Card type	Chipset	Linux support	Tested
F1623A	Modem/Net Card	Xircom CEM56−100 56Kb 10/100 BT	Yes driver xirc2ps_cs	Yes
F1625A	Modem Card	???	???	No
F1626A	Network Card	3Com 3CXFE575BT 10/100 BT	???	No
F1626B	Network Card	???	???	No
F2136B	Network Card	Lucent 802.11b wireless	???	No
F1643A	Modem/Net Card	???	???	No
F1782A	Modem/Net Card	???	???	No

3.2.1.7. The handheld range (Jornada)

The following table provides all information on the support for this hardware by Linux.

Table 3−11. Jornada and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
Jornada 710 (F1889A)	???	???	None	N/A	None	N/A	None	N/A	No
Jornada 720 (F1816A, F1430A)	???	???	None	N/A	None	N/A	None	N/A	No

For this machine look at : http://www.arm.linux.org.uk/developer/machines/?action=list&id=49

Models 620, 680 and 690, equiped with a superH processor are also supported by the Linux Kernel.

The other models of Jornada can not run Linux.

3.2.1.8. The server range (NetServer)

A page on how Linux works on HP NetServers is available at
http://www.netserver.hp.com/netserver/products/highlights_linux.asp

An official compatibility matrix of HP NetServers with Linux and other operating systems is available at :
http://netserver.hp.com/products/highlights_nos.asp

Documents (in japanese) written by Junichi Shimoda concerning management of AMI Megaraid cards and HP Instant TopTools under Linux are respectively available at
http://www.jpn.hp.com/biz/products/pcserver/linux/document/pdf/rh70_lp1000r_megamgr.pdf and

http://www.jpn.hp.com/biz/products/pcserver/linux/document/pdf/instanttt−rh62.pdf

Official documents to help configuring NetServers under Linux RedHat 5.2 and 6.0 are also available.

The following table provides all information on the support for this hardware by Linux.

Table 3−12. NetServers and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
NetServer E45 (D4973A, D4974A, D4975A, D4976A, D5971A)	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 2910bui (7860) PCI	Yes driver aic7xxx[Rem.]	None	N/A	No
NetServer E50 (D6034A, D6033A, D6035A, D6031A, D6030A, D6032A)	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer E55 (D9337A)	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7895H PCI	Yes driver aic7xxx[Rem.]	None	N/A	No
NetServer E60 (D7140A, D7142A, D7144A, D7146A, D7148A, D9123A, D9127A, D9128A, D9129A)	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7895H PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer E200 (P4595A, P5404A, P5447A)	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	None	N/A	None	N/A	No
NetServer E200 (P1205A, P2448A, P4594A,	ATI Rage II C	Yes XFree 4.1.0[Rem.] (ati)	Intel i82557 / i82558	Yes driver eepro100	Adaptec AIC 7880	Yes driver aic7xxx[Rem.]	None	N/A	No

P5403A)	AGP		10/100 BT (D5013A/B)	or e100	UW PCI				
NetServer E800 (D9400A, D9402A, D9404A, D9408A, D9409, D9411A, P1195A, P1200A, P2457A, P2458A, P2460A, P2477A, P2502A, P2503A, P2504A, P3428A, P3432A, P5368A, P5370A, P5372A, P5374A, P5551A, P5553A, P7655A) [Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C896 PCI	Yes driver ssym53c8xx[Rem.]	None	N/A	RedHat 7.0, Mandrake 7.2
NetServer LC (D3343A)	Trident TVGA 9000i	Yes XFree 3.3.6[Rem.] (SVGA)	None	N/A	Adaptec AIC 7770 EISA	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer LCII (D4907A, D4909A, D5014A, D5015A, D5016A, D5969A, D5970A, D5959A, D5961A)	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer LC3 (D6123A, D7018A, D6125A, D7020A, D7028A, D7025A, D7126A, D8594A) Chipset BX[Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer LC2000 (D8514A, D8515A, D8519A,	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C897 PCI	Yes driver ncr53c8xx[Rem.]	None	N/A	RedHat 6.2, 7.0, Mandrake 7.2, 8.1

D8520A, D8524A, D8525A, D9162A, D9163A, D9164A, D9165A, P1802A, P1802B, P1804A, P1804B, P2478A, P2478B, P2479A, P2479B, P3493A, P3493B, P5364B, P5550B) Chipset i820[Rem. Rem. Rem.]									
NetServer LDPro (D4944A, D4946A, D4961A, D4962A)	Trident TVGA 9000i	Yes XFree 3.3.6[Rem.] (SVGA)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	No
NetServer LHPro (D4979A, D4980A, D4981A, D4982A)	Trident TVGA 9000i	Yes XFree 3.3.6[Rem.] (SVGA)	None	N/A	2 Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer LHII (D5017A, D5953A, D5021A, D5023A, D6047A, D6048A)	Trident TVGA 9000i	Yes XFree 3.3.6[Rem.] (SVGA)	None	N/A	2 Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	Yes
NetServer LH3 (D4998A, D5002A, D5000A, D5004A, D7033A, D7034A, D8503A, D8504A, D8567A, D8568A, D9343A, D9344A) Chipset BX[Rem. Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	2 Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	None	N/A	Yes

NetServer LH3000 (D8228A, D8230A, D8236A, D8238A, D8244A, D8246A, D9176A, D9178A, D9180A, D9182A, P1794A, P1794B, P1796A, P1796B, P2482A, P2482B, P2483A, P2483B) Chipset BX[Rem. Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7880 PCI + 2 Symbios Logic 53C896 PCI	Yes driver aic7xxx and driver sym53c8xx	None	N/A	RedHat 6.2, 7.0, Mandrake 7.2, 8.1
NetServer LH4 (D7092A, D7093A, D7094A, D7095A, D6971A, D6972A, D6973A, D6974A, D7103A, D7104A, D8552A, D8553A, D8556A, D8557A, D8560A, D8561A, P1225A, P1227A) Chipset BX[Rem. Rem.Rem. Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	2 Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	None	N/A	RedHat 6.0, 6.1, 6.2, 7.0, *NOT 7.1*, 7.2
NetServer LH6000 (D9103A, D9104A, D9107A, D9108A, D9190A, D9190B, D9192A, D9192B, D9194A,	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7880 PCI + 2 Symbios Logic 53C896 PCI	Yes driver aic7xxx and driver sym53c8xx	None	N/A	RedHat 6.2, 7.0, Mandrake 7.2, 8.1

D9194B, D9196A, D9196B, P1816B, P1817B, P2622A, P2623A) Chipset BX[Rem. Rem. Rem. Rem. Rem.]									
NetServer LPr (D6130A, D6131A, D7171A, D9133A, D9348A, D9431A, D9434A, P1736A, P1738A, P1820A, P3417A) Chipset BX[Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	None	N/A	RedHat 6.2
NetServer LP1000r (P1810A, P1812A, P2465A, P4632A, P4634A) [Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	2 x Intel i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C1010 PCI	Yes driver sym53c8xx[Rem.]	None	N/A	RedHat 6.1, 6.2, 7.0, 7.1, Mandrake 7.2, 8.1, SuSE 7.0
NetServer LP1000r (P3573A) [Rem. Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	2 x Intel i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C1010 PCI	Yes driver sym53c8xx[Rem.]	None	N/A	Preload RedHat 7.0 based
NetServer LP1000r (P3574A) [Rem. Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	2 x Intel i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C1010 PCI	Yes driver sym53c8xx[Rem.]	None	N/A	Preload SuSE 7.0 based
NetServer LP2000r (P1824A, P1827A, P1830A, P3576A, P4636A, P4638A) [Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	2 x Intel i82559 10/100 BT	Yes driver eepro100 or e100	2 Symbios Logic 53C1010 PCI	Yes driver sym53c8xx[Rem.]	None	N/A	RedHat 6.1, 6.2, 7.0, 7.1, Mandrake 7.2, 8.1, SuSE

									7.0
Cluster NetServer LPr (D6131A, P1133A)[Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	Symbios Logic 53C895 PCI	Yes driver ncr53c8xx[Rem.]	None	N/A	Yes
NetServer LT6000r (D9143A, D9145A, P1756A, P1756B, P1758A, P1758B, P1821B, P2621A, P3460) Chipset BX[Rem. Rem. Rem. Rem. Rem.]	ATI Rage II C AGP	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Adaptec AIC 7880 PCI + 2 Symbios Logic 53C896 PCI	Yes driver aic7xxx and driver sym53c8xx	None	N/A	RedHat 6.2, 7.0, Mandrake 7.2, 8.1
NetServer LXePro/LXPro (D4920B, D4925B, D6036A, D4311B, D4312B, D6037A, D4315B, D4958B, D6014A, D6015A, D4964B, D4898A, D6016A, D4899A, D6017A, D4900A, D6018A)	Cirrus Logic GD 5424 PCI	Yes XFree 3.3.6[Rem.] (SVGA)	None	N/A	2 Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	None	N/A	RedHat 7.0
NetServer LXrPro8 (D5028A)	?	?	None	N/A	Symbios logic UW	?	None	N/A	No
NetServer LXr8000 (D6021A, D6022A, D6136A, D6137A, D7000A, D8256A, D8257A, D8258A,	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0[Rem.] (cirrus)	None	N/A	2 Symbios Logic 53C896 PCI	Yes driver sym53c8xx[Rem.]	None	N/A	Yes

D8546A, D8548A) [Rem.]									
NetServer LXr8500 (D8540A, D8542A, D9317A, D9417A, D9418A, P1230A, P1765A, P3461A) [Rem.]	Cirrus Logic GD 5446 PCI	Yes XFree 4.1.0 [Rem.] (cirrus)	None	N/A	2 Symbios Logic 53C896 PCI	Yes driver sym53c8xx [Rem.]	None	N/A	No

3.2.1.9. NetServers accessories

The following table provides all information on the support for this hardware by Linux.

Table 3−13. NetServers accessories

Reference	Card type	Chipset	Linux support	Tested
NetRaid 1 D4992A	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid [Rem.]	RedHat 6.0, 6.1, 6.2, 7.0, 7.1, 7.2, Mandrake 7.2, 8.0, 8.1, SuSE 7.0
NetRaid 1Si D2140A	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid [Rem.]	RedHat 6.0, 6.1, 6.2, 7.0, 7.1, Mandrake 7.2, 8.0, SuSE 7.0
NetRaid 1M P3410A [Rem.]	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid [Rem.]	RedHat 6.1, 6.2, 7.0, 7.1, 7.2, Mandrake 8.1
NetRaid 2M P3411A, P3475A [Rem.]	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid [Rem.]	RedHat 6.1, 6.2, 7.0, 7.1, 7.2, Mandrake 8.1

NetRaid 3 D4943A	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid[Rem.]	RedHat 6.0, 6.1, 6.2, 7.0, 7.1, 7.2, Mandrake 7.2, 8.0, 8.1, SuSE 7.0
NetRaid 3Si D5955A	NetRaid Card	AMI Megaraid (Raid 0, 1, 3, 5, 10, 50)	Yes driver megaraid[Rem.]	RedHat 6.0, 6.1, 6.2, 7.0, 7.1, 7.2, Mandrake 7.2, 8.0, 8.1, SuSE 7.0
NetRaid 4M D9161A/D9351A	NetRaid Card	Strong ARM (Raid 0, 1, 3, 5, 10, 50)	Yes driver aacraid[Rem.]	RedHat 7.0, 7.1, Mandrake 8.0, 8.1
C1578B	SCSI Card	Adaptec AIC 7895H PCI	Yes driver aic7xxx[Rem.]	No
C7430A	SCSI Card	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	No
D5025A	SCSI Card	Adaptec AIC 7880 UW PCI	Yes driver aic7xxx[Rem.]	Yes
D5252A	SCSI Card	Adaptec AIC 7880 UWD PCI	Yes driver aic7xxx[Rem.]	Yes
P3413A	SCSI Card	Adaptec AIC 29160 PCI	Yes driver aic7xxx[Rem.]	RedHat 6.2, 7.0
D5013A, D5013B	Network Card	Intel i82557 / i82558 10/100 BT (D5013A/B)	Yes driver eepro100 or e100	RedHat 6.2, 7.0, 7.1, Mandrake 7.2, 8.0, 8.1
P3482A	Network Card	3Com ??? 10/100/1000 BT	Yes driver bcm5700[Rem.]	RedHat 7.0, 7.1, 7.2, Mandrake 8.0, 8.1
P3492	Network Card	???	???	No
J2585B	Network Card	Carte 100VG (J2585B)	Yes driver hp100	Yes
D6977A	Fibre Channel Card	???	???	No

D5246A	Fibre Channel Card	???	???	No
D8602A	Fibre Channel Card	???	???	No
D8602B	Fibre Channel Card	???	???	No
D6028A	Top Tools Card	???	Yes	Yes
P1979A	USB Modem	???	???	No
D8384B	USB Modem	Aztech UM9800	driver Aztech	Yes

For TopTools Remote Control Cards (TTRCC), the B.02.02 firmware release shows some strange symptoms at boot time, namely you get no data in your browser (Netscape on Linux) until way past selftest and LILO, so it's kind of hard to boot an alternate kernel. The fix is to 'downgrade' your firmware on the TTRCC to B.02.00. You can see what revision you're running on the TopTools 'Identity Screen'. You can flash the eeprom on the TTRCC anytime (unless you really want to make a DOS floppy and reboot) by tftping the right firmware (ttrc0200.bin) in the 'Configuration' tab –> 'Card Info' area, and press 'Update'. It takes a minute or so to download/verify/and reset the TTRCC. (Information from Lee Mayes)

3.2.1.10. HP Server Appliances

Information concerning these machines are available at
http://www.hp.com/products1/servers/serverappliances/

The "Web hosting" SA1100 (P4533A) and SA1120 (P4534A) machines are equiped with a RedHat based distribution of Linux.

The "Web caching" SA2100 (P4535A), SA2150 (P4651A), SA2200 (P4536A) and SA2250 (P4537A) machines are equiped with a RedHat based distribution of Linux and of the Inktomi software. The hardware base is a LP1000r.

3.2.1.11. HP Blade Server

Information concerning these machines are available at
http://www.hp.com/products1/servers/blades/index.html

- Debian: 2.2r3 kernel 2.2.19
- Red Hat: 7.0 kernel 2.2.16
- SuSE: 7.1 kernel 2.4.0

3.2.1.12. UPS

Hp doesn't make UPS anymore, but has a world−wide agreement with APC. APC distributes a free software (no cost, not open−source), to manage its UPS under Linux. It's available at
http://www.apcc.com/products/management/pcp_linux.cfm.

3.2.1.13. Complementary information

Please refer to the Hardware Howto and Ethernet Howto for other details concerning the support of some hardware elements by Linux.

For video chipsets support, a fundamental page is the one of XFree86 with its supported chipsets list.

Commercial servers are also available, as those of X−Inside and MetroLink

Netvectra are not supported by Linux.

Driver supporting the HP GPIB cards (IEEE 488) HP 27209 (= HP 82990, HP 61062, HP 88500) and HP 82335 is available at the following address : ftp://ftp.llp.fu−berlin.de/pub/linux/LINUX−LAB/IEEE488.

Another GPIB driver may be found at this address http://www.inesinc.com/linux.htm.

XFree86

The latest version of XFree86 is the 4.1.0, available from this server.

G100 card

To use the MGA G100 AGP card, with a version of XFree86 before the 3.3.2 one, you have to use an option in the file `XF86Config` : Option "no_accel".

Section example :

```
Section "Device"
[...]
      VendorName "Matrox"
      VideoRam 4096
      Option "no_accel"
EndSection
```

G450 card

This card can support up to two displays. These displays can be configured in two different ways.

For uniquely independent screen operation, you can configure displays for "multi−screen" work. In this mode, the X server reports two independent screens for client connections. These are numbered using the "minor" display number (e.g. <hostname>:0.0 and <hostname>:0.1). There is no support to move client windows between the screens.

The other configuration option uses the XINERAMA extension. This configuration links multiple screens to behave as one logical screen. In this mode, the X server reports one screen for all client connections. X clients can move between screens and the overall screen resolution is doubled width or height depending upon the desired setup.

The following examples demonstrate these possibilities through the configuration file `/etc/X11/XF86Config−4` :

```
  Section "Device"
    Identifier   "G450_0"
```

```
    Driver       "mga"
    Screen       0
  EndSection

  Section "Device"
    Identifier   "G450_1"
    Driver       "mga"
    Screen       1
  EndSection

  Section "Screen"
    Identifier   "Screen0"
    Device       "G450_0"
    Monitor      "Monitor0"
    DefaultDepth 24

    SubSection "Display"
      Depth    24
      Modes    "1280x1024"
      Viewport 0 0
    EndSubsection

  EndSection

  Section "Screen"
    Identifier   "Screen1"
    Device       "G450_1"
    Monitor      "Monitor1"
    DefaultDepth 24

    SubSection "Display"
      Depth    24
      Modes    "1280x1024"
      Viewport 0 0
    EndSubsection

  EndSection

  Section "ServerLayout"
    Identifier  "MyLayout"
    Screen      "Screen0" LeftOf "Screen1"
    Screen      "Screen1"
    InputDevice "Keyboard0" "CoreKeyboard"
    InputDevice "Mouse0"    "CorePointer"
  EndSection
```

To enable the XINERAMA extension, you may use one of two ways. The first is by adding a command–line option to the X server. This can be done as follows:

```
#startx -- +xinerama
```

The second method is by adding an option to `/etc/X11/XF86Config-4`:

```
  Section "ServerFlags"
    Option "Xinerama" "on"
  EndSection
```

The Matrox driver supports several XFree86 options through the file `/etc/X11/XF86Config-4`. The example below describes two such options that contribute to improved graphics performance:

```
  Section "Device"
    Identifier "Matrox G450"
        Driver     "mga"
# Use this option to enable AGP 2X mode
```

```
# In default mode AGP 1x, the host to graphics bandwidth is about 500 MB/sec
# This will increase the host to graphics bandwidth to about 1 GB/sec
# This mode is recommended by HP for X2000/X4000
        Option     "AGPMode4x"    "on"
# Use this option to enable AGP 4X mode
# This will increase the host to graphics bandwidth to about 2 GB/sec
# This mode is recommended by HP for X2000/X4000
  EndSection
```

ATI Rage Mobility video card

The maximum resolution supported by this chipset in frame−buffer mode is 800x600 in 16 bpp (vga=0x315 in `/etc/lilo.conf`)

This chipset is also supported by XFree 3.3.6 with the Mach64 driver and a patch available at http://www.staikos.on.ca/~staikos/tp1460/XFMa64−Rage−Thinkpad.patch.

A precompiled X server is available at this address : http://www.0wned.org/XFMa64−Rage−Thinkpad.tar.gz.

FireGL 2/4 card

This serveur is available from the ATI site at http://support.ati.com/drivers/

To enable multi−screen with FireGL4, set the monitor resolution to a supported multi−screen resolution like 2560x1024 in the `/etc/X11/XF86Config-4` file. The firegl driver recognizes this and sets up multi−screen when the Xserver starts. Make sure you have two monitors set up and connected to the two DVI ports on the FireGL4 card.

The firegl driver supports several XFree86 options through the file `/etc/X11/XF86Config-4`. Values indicated in the example correspond to the default values.

```
  Section "Device"
    Identifier "FIRE GL2"
        Driver     "firegl"
        Option     "Overlay"    "off"
# Use this option to enable limited overlay plane support.
# NOTE: currently this is not intended to support the running of applications in the overlay p
# Number of 4k DMA buffers used per OpenGL context.
# number of 4k DMA buffers used per OpenGL process by texture manager.
# parameter command line passed to firegl kernel module
# Example:Option "KernelModuleParm" "maxlockedmem=64;agpgart=2"
# Option list:
# maxlockedmem: Maximum locked DMA memory
# Maximum locked display list memory
# Value 0, use firegl built-in support, value 2, disable firegl built-in AGP GART support if a
# agp_try_unsupported: try unsupported chipsets
        Option     "OffScreenPixmaps"   "no"
# enables the use of frame buffer memory to save/generate pixmaps.
        Option     "BIOSInfo"   "no"
# enable BIOS version output to the XFree86.0.log file
        Option     "HW Cursor"   "yes"
# Enable HW Cursor
        Option     "enable DVI"   "no"
# enable DVI connector(s) (always enabled in dual mode (Fire GL3/4)
        Option     "no_accel"   "no"
# Disable XAA hardware acceleration
        Option     "NoDDC"   "no"
```

```
# disables PnP Monitor functionality such as automatic mode configuration (This important for
        Option     "AGPSpeed"   "-1"
# 0 for AGP off, 1 for AGP 1x, 2 for AGP 2x, 4 for AGP 4x, -1 for "Query Chipset"
#
  EndSection
```

GD 5465 video card

To use a Cirrus Logic GD 5465 AGP card, with a version below Xfree86 3.3.3, you have to use an option in the file `XF86Config` : Option "xaa_no_color_exp".

Section example :

```
Section "Device"
[...]
       Identifier "CL-GD5465"
       VendorName "Cirrus"
       BoardName  "GD5465"
       VideoRam   2048
       Option     "xaa_no_color_exp"
EndSection
```

Some users who had problems with the support of this chipset were more satisfied with the use of the "sw_cursor" option.

Elsa Gloria Synergy card

Specifications of that card should be consulted on Elsa web site. This card is equiped with an hardware OpenGL accelerator. Under Linux, there is an OpenGL compatible layer called Mesa. This layer begins to support hardware accelerators, and among them the 3DLabs chipset which is on Elsa Gloria cards.

- Elsa web site
- OpenGL web site
- Mesa web site

Silicon Motion LynxE card

This card is only supported by the 3.3.6 version of XFree86 and upper. Nevertheless, even in that version, this is a preliminary support, which isn't as stable as the Frame Buffer mode.

On the other hand, to be able to install a RedHat 6.1 version, you should do that in text mode, because the server provided (3.3.5) doesn't support this card.

If you have a dual−boot system, booting first on Windows, and initialize the card through its driver seems to improve the operations then under Linux (warm reboot).

Versions of XFree86 above 4.0.2 also offer the support of this chipset.

Intel i810/i815 card

(Informations provided by Frédéric Dubuy <F.Dubuy@atrid.fr>, Anne−Marie Mahfouf <a−m.mahfouf@lineone.net> and Jean−Bernard Chaffardon <Jean−Bernard_Chaffardon@hp.com>)

These cards are only supported with a specific X server XFCom_i810/5 downloadable in both format RPM or tar.gz and a complementary module for the kernel agpgart, downloadable in both format SRPM or tar.gz (old).

Detailed documentations on the installation are provided at
http://www.linux−france.org/article/x/GuideIntel810/book1.html and
ftp://download.intel.com/support/graphics/intel815/release_linux.pdf

To summarize, once the X server installed, the module compiled and installed, it's sufficient to modify with the following parameters the file `/etc/X11/XF86Config` :

```
Section "Device"
[...]
      Identifier "i810"
[...]
EndSection

[...]
Section "Screen"
[...]
      Driver "svga"
      Device "i810"
[...]
EndSection
```

You have to note that the agpgart module provided by Intel should replace the one delivered in the kernel so that it works. You then have to reinstall it, particularly when a kernel update occurs.

S3 Savage 4 card

This card is only supported with a specific X server downloadable at
ftp://ftp.s3.com/pub/s3/desktop/395/395_xf86_1011.tar.gz

For the installation, please read the following document

Frame Buffer

To use the Frame Buffer mode, please consult the following documents
http://www.medasys−digital−systems.fr/linux/framebuffer.html and
http://www.linuxdoc.org/HOWTO/Framebuffer−HOWTO.html.

Dual head with XFree86

It's possible to use XFree86 in dual−head mode. The following example of configuration is provided by S. Eranian for a Matrox G200 AGP and a ATI Rage 128 PCI card. "The key element is that you must specify the PCI id for both cards."

```
# /etc/X11/XF86Config-4

# File generated by xf86config.

#
# Copyright (c) 1999 by The XFree86 Project, Inc.
#
```

```
# Permission is hereby granted, free of charge, to any person obtaining a
# copy of this software and associated documentation files (the "Software"),
# to deal in the Software without restriction, including without limitation
# the rights to use, copy, modify, merge, publish, distribute, sublicense,
# and/or sell copies of the Software, and to permit persons to whom the
# Software is furnished to do so, subject to the following conditions:
#
# The above copyright notice and this permission notice shall be included in
# all copies or substantial portions of the Software.
#
# THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
# IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
# FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT.  IN NO EVENT SHALL
# THE XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY,
# WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF
# OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
# SOFTWARE.
#
# Except as contained in this notice, the name of the XFree86 Project shall
# not be used in advertising or otherwise to promote the sale, use or other
# dealings in this Software without prior written authorization from the
# XFree86 Project.
#

# **********************************************************************
# Refer to the XF86Config(4/5) man page for details about the format of
# this file.
# **********************************************************************

# **********************************************************************
# Module section -- this  section  is used to specify
# which dynamically loadable modules to load.
# **********************************************************************
Section "Module"

# This loads the DBE extension module.

    Load        "dbe"   # Double buffer extension

# This loads the miscellaneous extensions module, and disables
# initialisation of the XFree86-DGA extension within that module.
#    SubSection  "extmod"
#      Option    "omit xfree86-dga"   # don't initialise the DGA extension
#    EndSubSection
       Load "extmod"

# This loads the Type1 and FreeType font modules
    Load        "type1"
    Load        "freetype"
# This loads the GLX module
    Load       "glx"

#    Load       "dri"
EndSection

Section "DRI"
        Mode 0666
EndSection
# **********************************************************************
# Files section.  This allows default font and rgb paths to be set
# **********************************************************************
```

```
Section "Files"

# The location of the RGB database.  Note, this is the name of the
# file minus the extension (like ".txt" or ".db").  There is normally
# no need to change the default.

    RgbPath     "/usr/X11R6/lib/X11/rgb"

# Multiple FontPath entries are allowed (which are concatenated together),
# as well as specifying multiple comma-separated entries in one FontPath
# command (or a combination of both methods)
#
# If you don't have a floating point coprocessor and emacs, Mosaic or other
# programs take long to start up, try moving the Type1 and Speedo directory
# to the end of this list (or comment them out).
#

    FontPath   "/usr/X11R6/lib/X11/fonts/local/"
    FontPath   "/usr/X11R6/lib/X11/fonts/misc/"
    FontPath   "/usr/X11R6/lib/X11/fonts/75dpi/:unscaled"
    FontPath   "/usr/X11R6/lib/X11/fonts/100dpi/:unscaled"
    FontPath   "/usr/X11R6/lib/X11/fonts/Type1/"
#    FontPath   "/usr/X11R6/lib/X11/fonts/Speedo/"
    FontPath   "/usr/X11R6/lib/X11/fonts/75dpi/"
    FontPath   "/usr/X11R6/lib/X11/fonts/100dpi/"
    FontPath   "/opt/fonts"

# The module search path.  The default path is shown here.

    ModulePath "/usr/X11R6/lib/modules"

EndSection

# ****************************************************************
# Server flags section.
# ****************************************************************

Section "ServerFlags"

# Uncomment this to cause a core dump at the spot where a signal is
# received.  This may leave the console in an unusable state, but may
# provide a better stack trace in the core dump to aid in debugging

#    Option "NoTrapSignals"

# Uncomment this to disable the <Ctrl><Alt><BS> server abort sequence
# This allows clients to receive this key event.

#    Option "DontZap"

# Uncomment this to disable the <Ctrl><Alt><KP_+>/<KP_-> mode switching
# sequences.  This allows clients to receive these key events.

#    Option "Dont Zoom"

# Uncomment this to disable tuning with the xvidtune client. With
# it the client can still run and fetch card and monitor attributes,
# but it will not be allowed to change them. If it tries it will
# receive a protocol error.

#    Option "DisableVidModeExtension"
```

```
# Uncomment this to enable the use of a non-local xvidtune client.

#    Option "AllowNonLocalXvidtune"

# Uncomment this to disable dynamically modifying the input device
# (mouse and keyboard) settings.

#    Option "DisableModInDev"

# Uncomment this to enable the use of a non-local client to
# change the keyboard or mouse settings (currently only xset).

#    Option "AllowNonLocalModInDev"

EndSection

# **********************************************************************
# Input devices
# **********************************************************************

# **********************************************************************
# Core keyboard's InputDevice section
# **********************************************************************

Section "InputDevice"

    Identifier  "Keyboard1"
    Driver      "Keyboard"
# For most OSs the protocol can be omitted (it defaults to "Standard").
# When using XQUEUE (only for SVR3 and SVR4, but not Solaris),
# uncomment the following line.

#    Option     "Protocol"      "Xqueue"

    Option "AutoRepeat" "500 30"

# Specify which keyboard LEDs can be user-controlled (eg, with xset(1))
#    Option     "Xleds"      "1 2 3"

#    Option "LeftAlt"     "Meta"
#    Option "RightAlt"    "ModeShift"

# To customise the XKB settings to suit your keyboard, modify the
# lines below (which are the defaults).  For example, for a non-U.S.
# keyboard, you will probably want to use:
#    Option "XkbModel"    "pc102"
# If you have a US Microsoft Natural keyboard, you can use:
#    Option "XkbModel"    "microsoft"
#
# Then to change the language, change the Layout setting.
# For example, a german layout can be obtained with:
#    Option "XkbLayout"   "de"
# or:
#    Option "XkbLayout"   "de"
#    Option "XkbVariant"  "nodeadkeys"
#
# If you'd like to switch the positions of your capslock and
# control keys, use:
#    Option "XkbOptions"  "ctrl:swapcaps"

# These are the default XKB settings for XFree86
#    Option "XkbRules"    "xfree86"
```

```
#    Option "XkbModel"    "pc101"
#    Option "XkbLayout"   "us"
#    Option "XkbVariant"  ""
#    Option "XkbOptions"  ""

#    Option "XkbDisable"

    Option "XkbRules"   "xfree86"
    Option "XkbModel"   "pc101"
    Option "XkbLayout"  "us"

EndSection


# **********************************************************************
# Core Pointer's InputDevice section
# **********************************************************************

Section "InputDevice"

# Identifier and driver

    Identifier  "Mouse1"
    Driver      "mouse"
#    Option "Protocol"    "PS/2"
    Option "Protocol"    "imps/2"
Option "ZAxisMapping" "4 5"
    Option "Device"      "/dev/mouse"

# When using XQUEUE, comment out the above two lines, and uncomment
# the following line.

#    Option "Protocol"  "Xqueue"

# Baudrate and SampleRate are only for some Logitech mice. In
# almost every case these lines should be omitted.

#    Option "BaudRate"  "9600"
#    Option "SampleRate"        "150"

# Emulate3Buttons is an option for 2-button Microsoft mice
# Emulate3Timeout is the timeout in milliseconds (default is 50ms)

#    Option "Emulate3Buttons"
#    Option "Emulate3Timeout"    "50"

# ChordMiddle is an option for some 3-button Logitech mice

#    Option "ChordMiddle"

EndSection


# **********************************************************************
# Other input device sections
# this is optional and is required only if you
# are using extended input devices.  This is for example only.  Refer
# to the XF86Config man page for a description of the options.
# **********************************************************************
#
# Section "InputDevice"
#    Identifier  "Mouse2"
```

```
#    Driver      "mouse"
#    Option      "Protocol"      "MouseMan"
#    Option      "Device"        "/dev/mouse2"
# EndSection
#
# Section "InputDevice"
#    Identifier "spaceball"
#    Driver     "magellan"
#    Option     "Device"        "/dev/cua0"
# EndSection
#
# Section "InputDevice"
#    Identifier "spaceball2"
#    Driver     "spaceorb"
#    Option     "Device"        "/dev/cua0"
# EndSection
#
# Section "InputDevice"
#    Identifier "touchscreen0"
#    Driver     "microtouch"
#    Option     "Device"        "/dev/ttyS0"
#    Option     "MinX"          "1412"
#    Option     "MaxX"          "15184"
#    Option     "MinY"          "15372"
#    Option     "MaxY"          "1230"
#    Option     "ScreenNumber"  "0"
#    Option     "ReportingMode" "Scaled"
#    Option     "ButtonNumber"  "1"
#    Option     "SendCoreEvents"
# EndSection
#
# Section "InputDevice"
#    Identifier "touchscreen1"
#    Driver     "elo2300"
#    Option     "Device"        "/dev/ttyS0"
#    Option     "MinX"          "231"
#    Option     "MaxX"          "3868"
#    Option     "MinY"          "3858"
#    Option     "MaxY"          "272"
#    Option     "ScreenNumber"  "0"
#    Option     "ReportingMode" "Scaled"
#    Option     "ButtonThreshold"       "17"
#    Option     "ButtonNumber"  "1"
#    Option     "SendCoreEvents"
# EndSection

# **********************************************************************
# Monitor section
# **********************************************************************

# Any number of monitor sections may be present

Section "Monitor"

    Identifier  "HP4331D"

# HorizSync is in kHz unless units are specified.
# HorizSync may be a comma separated list of discrete values, or a
# comma separated list of ranges of values.
# NOTE: THE VALUES HERE ARE EXAMPLES ONLY.  REFER TO YOUR MONITOR'S
# USER MANUAL FOR THE CORRECT NUMBERS.
```

```
    HorizSync   30-82

#    HorizSync  30-64         # multisync
#    HorizSync  31.5, 35.2    # multiple fixed sync frequencies
#    HorizSync  15-25, 30-50  # multiple ranges of sync frequencies

# VertRefresh is in Hz unless units are specified.
# VertRefresh may be a comma separated list of discrete values, or a
# comma separated list of ranges of values.
# NOTE: THE VALUES HERE ARE EXAMPLES ONLY.  REFER TO YOUR MONITOR'S
# USER MANUAL FOR THE CORRECT NUMBERS.

    VertRefresh 48-150

++vsync
EndSection


# **********************************************************************
# Graphics device section
# **********************************************************************

# Any number of graphics device sections may be present

# Standard VGA Device:

Section "Device"
    Identifier  "Standard VGA"
    VendorName  "Unknown"
    BoardName   "Unknown"

# The chipset line is optional in most cases.  It can be used to override
# the driver's chipset detection, and should not normally be specified.

#    Chipset    "generic"

# The Driver line must be present.  When using run-time loadable driver
# modules, this line instructs the server to load the specified driver
# module.  Even when not using loadable driver modules, this line
# indicates which driver should interpret the information in this section.

    Driver     "vga"
# The BusID line is used to specify which of possibly multiple devices
# this section is intended for.  When this line isn't present, a device
# section can only match up with the primary video device.  For PCI
# devices a line like the following could be used.  This line should not
# normally be included unless there is more than one video device
# intalled.

#    BusID      "PCI:0:10:0"

#    VideoRam   256

#    Clocks     25.2 28.3

EndSection

# Device configured by xf86config:

Section "Device"
    Identifier  "G200"
    Driver      "mga"
```

```
    BusID       "PCI:4:0:0"
    #VideoRam    8192
    VideoRam 8192
#    Option     "SWCursor"
#    Option      "ShadowFB"
#    Option      "PciRetry"
    # Insert Clocks lines here if appropriate
EndSection

Section "Device"
    Identifier  "permedia2"
    Driver      "glint"
    BusID       "PCI:1:8:0"
    #VideoRam    4096
    #VideoRam 4096
    # Insert Clocks lines here if appropriate
EndSection

Section "Device"
    Identifier  "rage"
    Driver      "r128"
    BusID       "PCI:01:08:00"
EndSection


# **********************************************************************
# Screen sections
# **********************************************************************

# Any number of screen sections may be present.  Each describes
# the configuration of a single screen.  A single specific screen section
# may be specified from the X server command line with the "-screen"
# option.
Section "Screen"
    Identifier  "Screen 1"
    Device      "rage"
    Monitor     "HP4331D"
    DefaultDepth 16

    Subsection "Display"
        Depth       8
        Modes       "640x480" "800x600" "1024x768" "1280x1024"
        ViewPort    0 0
    EndSubsection
    Subsection "Display"
        Depth       16
#        Modes       "800x600" "1024x768" "1280x1024"
        Modes        "1024x768" "1280x1024" "640x480" "800x600"
        ViewPort    0 0
    EndSubsection
    Subsection "Display"
        Depth       24
#        Modes       "640x480" "800x600" "1024x768" "1280x1024"
        Modes       "1280x1024" "1024x768" "800x600" "640x480"
        ViewPort    0 0
    EndSubsection

EndSection

Section "Screen"
    Identifier  "Screen 2"
    Device      "G200"
```

```
    Monitor     "HP4331D"
    DefaultDepth 16

    Subsection "Display"
        Depth       8
        Modes       "640x480" "800x600" "1024x768" "1280x1024"
        ViewPort    0 0
    EndSubsection
    Subsection "Display"
        Depth       16
#        Modes       "800x600" "1024x768" "1280x1024"
        Modes      "1280x1024"  "640x480" "800x600" "1024x768"
        ViewPort    0 0
    EndSubsection
    Subsection "Display"
        Depth       24
        Modes       "640x480" "800x600" "1024x768" "1280x1024"
        ViewPort    0 0
    EndSubsection
EndSection


# **********************************************************************
# ServerLayout sections.
# **********************************************************************

# Any number of ServerLayout sections may be present.  Each describes
# the way multiple screens are organised.  A specific ServerLayout
# section may be specified from the X server command line with the
# "-layout" option.  In the absence of this, the first section is used.
# When now ServerLayout section is present, the first Screen section
# is used alone.

Section "ServerLayout"

# The Identifier line must be present
    Identifier  "Simple Layout"

# Each Screen line specifies a Screen section name, and optionally
# the relative position of other screens.  The four names after
# primary screen name are the screens to the top, bottom, left and right
# of the primary screen.  In this example, screen 2 is located to the
# right of screen 1.

#   Screen "Screen 1"
    Screen "Screen 1" "" "" "" "Screen 2"
    Screen "Screen 2" "" "" "Screen 1" ""
#    Screen "Screen 2"

# Each InputDevice line specifies an InputDevice section name and
# optionally some options to specify the way the device is to be
# used.  Those options include "CorePointer", "CoreKeyboard" and
# "SendCoreEvents".

    InputDevice "Mouse1" "CorePointer"
    InputDevice "Keyboard1" "CoreKeyboard"

EndSection
```

Aic7xxx

The latest version of the aic7xxx driver is available from the reference site.

Ncr53c8xx

The latest version of the ncr53c8xx driver is available from the reference site.

A driver disk for the RedHat distribution is available at the following address for the versions 6.2 and 7.0.

To use a driver disk on a RedHat 6.2 distribution, you need to boot with the latest boot disk made by RedHat. Either by remaking a CD−ROM containing it, or by using it directly. It"s available at the following address
ftp://ftp.redhat.com/pub/redhat/linux/updates/6.2/en/os/images/i386/boot−20000407.img

D6692A card

To use the D6692A card, you need to use a 2.1.122 kernel at least. Previous kernels didn't handled correctly the shared IRQ between the network and SCSI parts of the card. In particular, a standard RedHat 5.2 version doesn't allow to the network part to be supported. You have to update your kernel with a recent one (preferably 2.4.16) and the distribution with the complementary packages needed.

3C59x

The latest version of the 3c59x driver is available from the reference site.

There is also a version provided and supported by 3Com, available at
http://support.3com.com/infodeli/tools/nic/linuxdownload.htm.

There are also other drivers available at ftp://ftp.scyld.com/pub/network/test/3c59x.c and
http://www.uow.edu.au/~andrewm/linux/#3c59x−bc.

3C556

This card is supported by kernel 2.2.17 and upper.

e100 Intel driver

A driver is provided by Intel to support its cards based on the PRO/100 model, in its various versions. Depending on the model, you'll have a better support with this one, or with the standard eepro100 provided in the Linux kernel. It should allow a systematic support of the latest models. It's available at ftp://download.intel.com/df−support/2896/eng/e100−1.6.22.tar.gz

If you use the e100 driver, you could also use the ANS tools (Advanced Network Services) allowing you to do AFT (Adapter Fault Tolerance), ALB (Adaptive Load Balancing, including AFT), FEC or 802.3ad (Link Aggregation). For more details on these modes, please refer to the file associated with the file to download called `readme.txt`. It's available at
ftp://download.intel.com/df−support/2895/eng/ians−1.4.27.tar.gz

To use this functionality, proceed as follow:

```
#ifconfig ethx down # For all adapters of the team
#ianscfg −a −tTEAM # Create the team
#ianscfg −C −tTEAM −Mmode # Determine the mode of the team
```

```
#ianscfg -a -tTEAM -methx # Add the interface ethx to the team
#ianscfg -a -tTEAM -vveth0 # Create the virtual interface veth0 associated to the team
#ianscfg -c -tTEAM # Activate the team
#ianscfg -w -f/etc/ians.conf # Save the configuration
#ifconfig veth0 xxx.yyy.zzz.ttt ... # Configure the virtual interface as usual
```

Other tools around this driver may be found on Intel's web site:
http://appsr.intel.com/scripts-df/filter_results.asp?strOSs=39&strTypes=PLU%2CDRV%2CSPH%2CUTL&Produ

Wake on Lan

The Intel Pro/100 and 3Com 3C59x network cards used in majority in HP machines support the Wake on Lan function (WOL). All the details on http://www.scyld.com/expert/wake-on-lan.html,

Sound Chipset ESS Maestro

The chipset 2EM (Vendor id: 125d – device id: 1978) is supported in 2.2.14 kernel and upper. Version 3 (Vendor id: 125d – device id: 1998) on the other side is supported in 2.2.19pre5 kernel and upper. Cf : the site of the maestro3, driver, the Alsa[Rem.] project (version >= 0.5.10) driver, and the commercial software Open Sound System . The latest version of the ESS Maestro driver is available from the reference site.

Sound Chipset AD1816

The latest version of the AD1816 driver is available from the reference site.

For Visualize workstations, it's recommended by HP to put in `/etc/conf.modules` :

```
alias sound ad1816
pre-install sound /sbin/insmod sound dmabuf=1
options ad1816 io=0x500 irq=5 dma=0 dma2=3 ad1816_clockfreq=33000
alias midi opl3
options opl3 io=0x388
```

(Source : http://www.hp.com/visualize/support/technotes/linux)

Sound Chipset SB Live

The latest version of the SB Live driver is available from the reference site.

Alsa Sound Drivers

The Alsa project has for primary goals to develop drivers to support sound cards in Linux, being fully compatible with current OSS drivers, bringing more functionalities and supporting more hardware.

All the information on this project, as well as sources under the GPL license, are available from their home page http://www.alsa-project.org

RPMs for RedHat 6.2 and Turbo Linux 6.0 distribution are available at the address
http://hp-linux.org/aau/alsa

Sound Chipset Aztec 2320

For machines equipped with this chipset, Chuck Slivkoff reports that it works when you put the

following parameters in /etc/conf.modules :

```
alias           char-major-116          snd
alias           char-major-14           soundcore

post-install    snd                     /sbin/modprobe snd-card-azt2320
pre-install     snd-card-azt2320        /sbin/modprobe isapnp
post-remove     snd-card-azt2320        /sbin/modprobe -r isapnp
post-install    snd-card-azt2320        bash -c '       /sbin/modprobe snd-mixer-oss;   /sbin
```

DOS models

These models are delivered with MS−DOS only, in order to have a Linux Machine at the best price.

Turbo Linux models

These models are delivered ready to be installed with Turbo Linux, in order to have a Linux Machine at the best price (2 CDs + 30 days of support).

RedHat models

These models are delivered preloaded with a improved distribution based on RedHat (shameless plug, as I did it :−)

XU800

On that machine, the Bios doesn't give the right amount of memory which is in the machine to Linux. You need to use a line such as append="mem=xxxM" at the begining of /etc/lilo.conf where xxx is your RAM in MB.

The support of "big size" IDE disks (for example, 27 GB disks provided for the XU 800) on these machines needs a kernel 2.2.15 at least.

Omnibook XE

If you intend to use both the sound chipset and a PCMCIA card in this laptop, in order to avoid conflicts at input/output ports level, you'll have to modify the file /etc/pcmcia/config.opts to change the line 6 to

```
include port 0x300-0x4ff, port 0x1000-0x17ff
```

The NSC PC87108/338 chipset controlling IrDA on this model is supported by the 2.4.16 kernel. (Source : http://www.bits.bris.ac.uk/madmatt/laptop.shtml)

Some users had to apply the same tric for their Omnibook 4150 with success.

Omnibook XE3

It is recommended to not launch /sbin/halt under X11. The integrated modem card is not supported under Linux (ESS ES56CVM−PL).

The installation of a RedHat 6.2 distribution gives a problem when rebooting the system, at the PCMCIA initialisation. You have to install the latest version of the pcmcia−cs package at ftp://pcmcia−cs.sourceforge.net/pub/pcmcia−cs/

To use the network with this distribution, you need a tulip driver modified by P. "goldpenguin" Depouilly, and available at http://www.math.u−bordeaux.fr/~depouill/XE3/tulip.tar.gz

Omnibook 600

Pop−up mouse is supported. Olivier Florent wrote the original linux code. Grant Grundler rewrote it and published it. See obmouse.sourceforge.net

Omnibook 4150

If you use the Adaptec APA−1480 SCSI PCMCIA card, It must be in the top slot. If you don't put it in the top slot, the card that is in the top slot will not work. Also, even though the APA−1480 was supported long before this, the first time it worked on an Omnibook was kernel 2.2.16. There was some problems with the earlier cardbus drivers and the Omnibook. (Information from Bruce Kives)

Omnibook 6000

`reboot` doesn't work correctly on this machine, which remains blocked instead of rebooting. Use the poweroff button to reset it. (Information from Yuthay Yean)

Omnibook 6100

Soon more info ;−)

B models

B models use Ultra 3 SCSI sym53c1010 (A models use ultra 2).

To use the native SCSI bus of this machine, it"s necessary to use the sym53c8xx driver with a version upon 1.6c. A driver disk for RedHat distributions is available for versions 6.1, 6.2 and 7.0.

For the SuSE 7.0 distribution, you have to enter the manual mode to load the driver, as autodetection doesn"t work correctly.

LC 2000

In order to use the native SCSI controler you need to disable in the Bios the option "Reserve PCI Bus Numbers", in the menu PCI Device Setting (Indication of Gillynn Couch). Models P3493B and P5364B are equiped with an additional NetRaid 1M card.

LP1000r/LP2000r

To use the native SCSI bus of this machine, it"s necessary to use the sym53c8xx driver with a version upon 1.6c. A driver disk for RedHat distributions is available for versions 6.1, 6.2 and 7.0.

For the SuSE 7.0 distribution, you have to enter the manual mode to load the driver, as autodetection doesn"t work correctly.

LH 6000

In order to use the native SCSI controler you need to desactivate in the Bios the "reserver PCI Bus #s", in the menu PCI Device Setting. The PS/2 system doesn't work correctly with a RedHat 6.1 or 6.2 distribution. In order to correct that you need to either put the machine in MPS 1.1, in the BIOS, or use a kernel above 2.3.47 in MPS 1.4 mode. The network card doesn't work correctly with the kernel of the RedHat 6.2 distribution.

LT 6000r

In order to use the native SCSI controler you need to desactivate in the Bios the "reserver PCI Bus #s", in the menu PCI Device Setting.

BX Chipset

Intel BX Chipset (Memory Bus at 100 MHz) is supported by kernels above 2.0.34/2.1.103.

i820 Chipset

Coppermine 0.18 µm technology – 256 kB synchronous cache – Intel i820 Chipset

P4 – i850 Chipset

These machines are equiped with a Pentium IV processor, supported by kernels 2.2.18/2.4.0 and above. The RedHat 7.0, Mandrake 7.2 and TurboLinux 6.1 distributions, e.g., can be installed correctly on this kind of machines.

BAx

Attention, the XF86_SVGA server works correctly with this mother board embedded version only above XFree86 3.3.5, due to the use of different frequencies (In particular, use the updates for RedHat 5.2/6.0).

Boot disk for 3Com card

Creation of a custom RedHat 5.1 Boot disk

To be able to boot with the RedHat 5.1 boot disk, and to have the support of the 3C905B–TX card, you need to do the following :

```
Log as root. Go in the home directory  (~root)
#cd ~
Put there the 3c59x.c source module for the 3Com card
#ncftp ftp://ftp.scyld.com/pub/network/3c59x.c
Compile it
#gcc -DMODULE -D__KERNEL__ -Wall -Wstrict-prototypes -O6 -c 3c59x.c `[ -f /usr/include/linux/
put the RedHat 5.1 floppy boot disk in the drive
you have to copy the initrd.img file from the floppy disk
#mcopy a:initrd.img /tmp
then uncompress it
#gzip -cd /tmp/initrd.img > /tmp/initrd.ext2
Mount the "file" filesystem thus obtained
#mount -t ext2 /tmp/initrd.ext2 /mnt/floppy -o loop
uncompress the modules provided
#gzip -cd /mnt/floppy/modules/modules.cgz > /tmp/modules.cpio
```

```
extract the modules
#cd /tmp ; mkdir modules ;
cd modules ; cat /tmp/modules.cpio | cpio -i
Copy the new updated module for the 3Com card
#cp ~/3c59x.o .
recreate the compressed cpio file
#ls | cpio -o | gzip -c9 > ../newmodules.cgz
replace the modules by their update
#cp ../newmodules.cgz /mnt/floppy/modules/modules.cgz
unmount the "file" filesystem
#umount /mnt/floppy
compress the "file" filesystem
#gzip -c9 /tmp/initrd.ext2 > /tmp/initrd.img
copy it on the floppy disk
#mcopy /tmp/initrd.img a:
```

3Com 996/Broadcom 5700 card (10/100/1000BT)

This driver is provided with latest RedHat 7.1, 7.2/Mandrake 8.0, 8.1 distributions, as kernel patches, but isn't included yet in the standard 2.4 kernel.

Boot/Driver disk for RedHat distribution

To be able to boot with a RedHat distribution (>6.1), and to have the recognition of a peripheral non supported in standard in the distribution, you need to do the following :

Download the delopment toolkit to create driver disk for the RedHat distribution at the following address: http://people.redhat.com/dledford

Install the sources of the driver in a directory and follow the instructions of the README file of the kit to create the modules necessary for the various kernel of the distributions.

```
Log as root. (~root)
put the RedHat floppy boot disk to modify in the drive
you have to copy the initrd.img file from the floppy disk
#mcopy a:initrd.img /tmp
then uncompress it
#gzip -cd /tmp/initrd.img > /tmp/initrd.ext2
Mount the "file" filesystem thus obtained
#mount -t ext2 /tmp/initrd.ext2 /mnt/floppy -o loop
create a temporary directory
#cd /tmp ; mkdir modules ; cd modules
uncompress and extract the modules provided
#gzip -cd /mnt/floppy/modules/modules.cgz | cpio -ivdum
Copy the new updated module. In case you add it, remove also other useless modules of the sam
#cp ~/.../mod_devel_kit/rhxx/modules/x.y.z-iBOOT/module.o x.y.z-iBOOT
Also in case you add it, copy the modules needed for the installed kernel during reboot, and
#cp -a ~/.../mod_devel_kit/rhxx/modules/x.y.z-i ~/.../mod_devel_kit/rhxx/modules/x.y.z-ismp .
#vi /mnt/floppy/modules/pcitable /mnt/floppy/modules/module-info /mnt/floppy/modules/modules.
recreate the compressed cpio file
#find * -print -depth | cpio -ov -H crc | gzip -c9 > /mnt/floppy/modules/modules.cgz
unmount the "file" filesystem
#umount /mnt/floppy
compress the "file" filesystem
#gzip -c9 /tmp/initrd.ext2 > /tmp/initrd.img
copy it on the floppy disk
#mcopy /tmp/initrd.img a:
```

LH 4

The LH4 doesn't seem to work correctly when not in Raid. Even with the latest Bios available at the time of the test (16.00), the problem remains. If you desactivate the Raid management, during the boot, the ncr53c8xx driver in Linux detects 4 controlers instead of 2 and boot doesn't end. To avoid that, you have to activate the Raid in the Bios and use each of the disk in Raid0 mode, which is quite the same as the solution without Raid at all.

This machine can not be installed correctly with RedHat 7.1 or Mandrake 8.0 distributions.

NetRaid card

These cards are equiped with an AMI Megaraid chipset and may support the following Raid levels : 0, 1, 3, 5, 10, 30 and 50.

AMI has recently sold his Megaraid division to LSILogic and information is now available from http://www.megaraid.lsilogic.com/

Some NetRaid cards, as well as the chipset integrated on the LH3 and LH4 mother boards are supported by recent version of the Linux kernel (2.0.36/2.2.19/2.4.16 typically – don't use 2.0.37/38).

For the RedHat 5.2 distribution, it's not possible to install the system on this type of controler, because it's not detected by the installation program. You have to use a specific floppy disk . This floppy disk should be used as input to the **rawrite** tool, for example. It works for systems with less than 1 GB of memory.

For the RedHat 6.0 distribution, you have to manually declare the existence of this card as a supplementary SCSI adapter, in order to use it directly during the installation. The megaraid driver isn't automatically detected.

To avoid strange messages during the boot printed by the megaraid driver, it's necessary to recompile it with the option –DHP (before kernel 2.4.2) or –DMEGA_HP_FIX (after) or even nothing now (> 2.4.13).

For the RedHat 6.1 distribution, the megaraid driver provided by the kernel does support only the first logical drive. In order to obtain the others, please recompile a 2.2 standard kernel.

You have to note that the integrated card of the LH3/4 realises a software parity checks and performs thus less efficiently than the NetRaid daughter cards. On the other side, LH3000/6000 are equiped with an integrated card doing hardware checks.

In the driver provided by AMI there is a Raid management tool `megamgr`, usable within Linux, and equivalent to the tool included in the software embedded on the controler. It's downloadable from http://www.ami.com/support/prodsearch.cfm?InpProdID=17

In case of problem, old versions are available there
http://www.HyPer–Linux.org/HP–HOWTO/mirror/Software/107.zip,
http://www.HyPer–Linux.org/HP–HOWTO/mirror/Software/1e08.zip and
http://www.HyPer–Linux.org/HP–HOWTO/mirror/Software/mega115.tgz,.

Kernel patches and utility to monitor logical/physical drives on MegaRAID (NetRAID) Adapters have been made by Katsuyuki Yumoto. "This can detect physical drive failure, send E–Mail and syslog it. NetRAID–1Si/3Si, embeded NetRAID and NetRAID–1M/2M are okay to use. Don't use

this for NetRAID−4M." You'll find the code at this address http://www.jpn.hp.com/biz/products/pcserver/linux/tech/megascan−20011113.tar.gz. Use with care as the versions I tried have conducted to kernel panic.

The NetRaid 1Si card isn't recognized correctly by RedHat 7.2.

NetRaid 1M/2M models

In addition to what is mentionned above, these models require a 1.14 version of the megaraid driver to work correctly. You may find a version of the sources of this driver at this address http://www.HyPer−Linux.org/HP−HOWTO/mirror/Software/ami−mr114b.tar.gz.

A driver disk for the RedHat distribution is available at the following address for the versions 6.2 and 7.0.

To use a driver disk on a RedHat 6.2 distribution, you need to boot with the latest boot disk made by RedHat. Either by remaking a CD−ROM containing it, or by using it directly. It"s available at the following address ftp://ftp.redhat.com/pub/redhat/linux/updates/6.2/en/os/images/i386/boot−20000407.img

You'll have data corruption by using these cards with the standard kernel of the RedHat 7.1 distribution. You necessaraly need this driver disk to use it correctly. This has been seen with both H.01.07 and H.01.08 firmware. Sources of the patch required to make this card work correctly with kernels 2.4.x (x < 7) are available here http://www.HyPer−Linux.org/HP−HOWTO/mirror/Software/mega115hp.tgz. The same problème is true with the Mandrake 8.0, but the 8.1 has the right driver.

NetRaid 4M card

These cards are equiped with a StrongARM Chipset and correspond to the Adaptec card AAC−3642. A driver is available at http://domsch.com/linux. The RedHat 7.0 includes in standard the driver even if that release of the kernel doesn't handle it normaly. Information are also available on the HP Navigator L.19.00.

Second IDE bus

On these machines, when the second ide bus is probed by the kernel, there is a timeout, which doesn't hurt, but is useless. To avoid it, just add to your `lilo.conf` the following line :

```
append="ide1=noprobe"
```

Processors

To desactivate processors on a Linux server, you need to give an option during the boot to the kernel such as :

```
Lilo boot: linux maxcpus=3
```

where the number of processors given in option is less by one of the number of processors wanted. For example, here we activate 4 processors.

HA Cluster

To use a High Availability Custer under Linux, you need to use additional software, such as :

- HP MC Service Guard (Commercial)
- Linux−HA project (free) and ext3

Multimedia keyboards

Some of the PCs provided by HP are equiped with a multimedia keyboard. You may use the additional keys thanks to the HotKeys daemon (Cf: http://freshmeat.net/projects/hotkeys/)

3.2.2. The monitors range

The following table provides all information on the support for this hardware by XFree86.

Table 3−14. HP Monitors and Linux

Reference	Name	Vert. F. (Hz)	Hor. F. (kHz)	Bandwidth (MHz)	Resol.	Freq. (Hz)	Tested
D2825A, D2825S	15" HP Ultra VGA 1024	50−110	31−54	65	640x400, 640x480, 800x600, 1024x768	70, 60−72−75−85, 60−72−75−85, 60	Yes
D2826A, D2826S	15" HP 50	50−120	31−54	65	640x400, 640x480, 800x600, 1024x768	70, 60−75−85, 60−75−85, 60	Yes
D2827A	15" HP 51	50−120	31−54	???	???	???	No
D2828A	15" HP 52	50−120	30−54	65	640x400, 640x480, 800x600, 1024x768	70, 60−75−85, 60−75−85, 60	No
D8897A	15" HP 55	???	30−54	???	???	???	No
P4795A	15" HP 56	???	30−54	???	???	???	No
D2832A	15" HP M500	50−120	30−70	110	640x400, 640x480, 800x600, 1024x768, 1280x1024	70, 60−75−85, 72−75−85, 70−75−85, 60	No
D2807A	17" Ultra 1280	50−160	30−64	???	???	???	Yes
D2837A	17" HP70	50−120	30−70	110	640x400, 640x480, 800x600, 1024x768, 1280x1024	70, 75−85, 75−85, 75−85, 60	Yes

D2838A	17" HP M700	50–160	30–86	???	???	???	No
D8906A	17" HP P700	50–160	30–86	140	???	???	No
D8907A	17" HP P720	???	30–85	???	???	???	No
D2840A	17" Ergo 1280	50–150	31–92	160	512x384, 640x480, 800x600, 1024x768, 1152x864, 1280x1024, 1440x1080, 1600x1200	85, 100, 100, 100, 100, 85, 72, 60	Yes
D8901A, D8902A	17" HP71	50–120	30–60	110	640x400, 640x480, 800x600, 1024x768, 1280x1024	70, 60, 75–85, 75–85, 60	No
D8904A, D8905A	17" HP72	???	30–70	???	???	???	No
D8900A	17" HP75	50–160	30–86 (30–64 real)	150	640x400, 640x480, 800x600, 1024x768, 1280x1024	70, 60–75–85, 75–85, 75–75–85, 75	Yes
D2842A, D2842W	19" HP90	50–200	30–96	203	640x400, 640x480, 800x600, 1024x768, 1280x1024, 1600x1200	70, 75–85, 75–85, 75–85, 75–85, 75	Yes
D8910A	19" HP P910	50–150	29–107	230	640x400, 640x480, 800x600, 1024x768, 1280x1024, 1600x1200	70, 60–85, 85, 75–85, 75–85, 75–85	No
D8911A	19" HP91	???	30–96	???	???	???	No
D8912A	19" HP P920	???	30–107	???	???	???	No
A4031A	20"	48–150	30–82	???	???	???	Yes
D2846A, A4576A	21" HP P1100	50–160	30–107	???	???	???	No
D2847A	21" P1110	50–180	29–121	300	???	???	Yes
D8915A	21" P1120	???	30–121	???	???	???	No
A4819A	21" P1130	???	???	???	???	???	No

A4033A	21"	50−120	30−80	???	???	???	Yes
A1295A	24" Wide Aspect	50−160	30−96	???	???	???	No
D5061A	15,1" LCD HP	???	???	N/A	???	???	No
D5062A	15" LCD HPL1510	???	??−75	N/A	???	???	No
D5063A	15" LCD HPL1520	???	???	N/A	???	???	No
D5064A	17" LCD HPL1720	???	???	N/A	???	???	No
D5065A	18,1" LCD HP L1800	56−85	30−80	N/A	640x350, 640x480, 720x400, 800x600, 832x624, 1024x768, 1152x870, 1152x900, 1280x1024	70, 60−75−85, 70, 60−75−85, 75, 60−75−85, 75, 66, 60−75	Yes
D5069A, D5069C, D5069J, D5069L	18" LCD HPL1810	???	??−75	N/A	???	???	No
P4829A	18" LCD HPL1820	???	???	N/A	???	???	No

3.2.3. PA−Risc based computer range

The PA−Risc range is achitectured around a processor designed and realised by HP. First versions were produced in 1987. Currently the versions are named PA−8000 (8200, 8500, ...).

The initiative to port Linux on the PA−RISC architecture was taken during the Atlanta Linux exhibition in October 1998. HP has announced in February 1999 its sponsorship to to this port of Linux. This port is a native one, which is different from a preceding project which used MkLinux on machines based on PA−7200. The work is currently done with The Puffin Group bought by Linuxcare, and more precise information on the status may be found on the official Web site. In particular, interesting starting points may be found on http://www.parisc−linux.org/faq.html and http://www.parisc−linux.org/hw.html. Consult also ESIEE site (712 on Linux/PA) which participates actively to the port : http://mkhppa1.esiee.fr/en/ The last version is 0.9.3. It supports the following systems L1000, L2000, A500, A180, B, C, J, D, R, 742, 725, 735, 755, 705, 710, 720, 730, 750, 712, 715.

This version supports 32 and 64 bits modes, SMP (1−4 way), RAM up to 16 GB, HP−UX compatibility, X−Window, KDE, Gnome, 80% of Debian packages.

Debian has accepted PA−RISC as a supported architecture for the upcoming Debian GNU/Linux 3.0 (woody) stable release. http://www.debian.org/ports/hppa/.

Thomas Marteau has written a HOWTO on the way to boot concretely a Pa−Risc suystem. It's available at http://www.linuxdoc.org/HOWTO/PA−RISC−Linux−Boot−HOWTO/index.html.

FAQ is also available at
http://dsportal.eservices.hp.com/dspp/tech/tech_TechDocumentDetailPage_IDX/1,1701,276,00.html.

There is on the other side for these machines a Linux project based on the MkLinux micro−kernel. This project as developped within OSF. The web site mentionning information is at
http://www.gr.opengroup.org/mklinux/hppa/mkpa−rel.html. Links to more parisc ports are at
http://parisc.workstations.org/.

3.2.4. The IA−64 range

HP has developed in collaboration with Intel a new generation of 64 bits processors called Itanium (IA−64). The first processor of this new generation, called Itanium, was born in September 2001. The initial port of Linux on IA−64 was published the 2nd of february, 2000 and the sources of the project are available through ftp://ftp.kernel.org/pub/linux/kernel/ports/ia64. This is the place of the latest sources for this project. More information on this topic may be found on these pages:
http://www.hp.com/products1/linux/itanium/index.html (LSO),
http://devresource.hp.com/devresource/Topics/IA64/IA64.html and
http://www.hpl.hp.com/techreports/index.html (HP Labs) or on the reference site http://www.linuxia64.org

HP, as a founding member of the IA−64 Linux project, works on the port of the kernel, the initial version of gcc, gas, ld and emacs. Another major contribution of HP to this project is the availability of the software development kit available at http://www.software.hp.com/ia64linux. It allows to develop applications as well as kernel code on Linux/IA32 for IA64 platforms and moreover to test them through a simulator.

You may find some useful tools for IA−64 architecture on the ftp site of the HP labs.

Debian has accepted IA−64 as a supported architecture for the upcoming Debian GNU/Linux 3.0 (woody) stable release. Cf: http://www.debian.org/ports/ia64/. The IA−64 installer CD image is now available by either HTTP or FTP from these locations: http://gluck.debian.org/ia64/cd−20010810.iso.gz and ftp://gluck.debian.org/ia64/cd−20010810.iso.gz.

MandrakeSoft has announced that its Mandrake 8.1 for IA−64 version supports perfectly HP Itanium configurations as related on http://www.mandrakesoft.com/company/press/pr?n=/pr/products/1444en=en

The following key features which are all unique to IA−64 are described by Stéphane Eranian:

- IA−64/EPIC goes beyond pure VLIW. Code is portable from one implementation to another. The timing dependencies are protected by stop bits. This allow unmodified code to run with no recompilation. Of course better performance is achieved by recompilation.
- Very large register set: 128 floating point, 128 general registers.
- Predication: a very elegant way of removing the cost of branch in if−then−else statments.
- Speculation: a elegant mechanism to hide memory access latency by allowing load instructions to be hoisted from the location where they are needed without risking unwanted faults (like NULL pointer).
- Register Stack Engine: a mechanism similar to the register window found a SPARC but much more powerful and dynamic. The window size varies on demand. Take advantage of the large register set and is used on function calls.
- Hardware support for software pipelined−loop: this is the most powerful construct which takes advantages of : predication, large registers. This is a renaming scheme for general, floating point or

predication registers which allows one to unroll loops without incuring the code expansion seen on other architectures.
- All the multmedia−type instructions are support in IA−64 mode.
- IA−32 hardware emulation: possibility to run unmodified Linux/ia32 applications on Linux/ia64 (requires some OS support).
- On the system level: full 64 bit address space. Hardware walker to TLB misses.
- Banked registers (16 of them) to help speed up interrupt processing.

Stéphane Eranian and David Mosberger will publish begining of 2002 a book called 'Design and implementation of the Linux/ia64 kernel' (Prentice Hall)

3.2.4.1. The IA64 server range

The following tables indicate the state of Linux support by these platforms :

Table 3−15. HP IA−64 Servers and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
rx4610 (A6153A, A6447A)	ATI Rage 128 AGP 8MB	Yes XFree 4.1.0[Rem.] (ati)	Intel S82093A / i82559 10/100 BT	Yes driver eepro100 or e100	Qlogic Ultra3 Wide PCI	Yes driver qla1280	None	N/A	RedHat 7.0, 7.1, Mandrake 8.0, 8.1

3.2.4.2. The IA64 workstation range

The following tables indicate the state of Linux support by these platforms :

Table 3−16. HP IA−64 Workstations and Linux

Machine	Graphic Card	Linux support	Network Card	Linux support	SCSI Card	Linux support	Sound Card	Linux support	Tested
i2000 (A7202A, A7203A)	nVidia Quadro2 Pro AGP	Yes XFree 4.1.0[Rem.] (nv)	Intel PRO 10/100 BT	Yes driver eepro100 or e100	Qlogic Ultra3 Wide PCI	Yes driver qla1280	Cirrus Logic CS 4281	Yes driver Alsa[Rem.]	RedHat 7.1, Mandrake 8.1

3.2.4.3. Complementary information

To boot Linux on this kind of machine, you need to type in the initial environment

```
Verify the correspondance between logical drives and peripherals
Shell>map
Go to the logical drive corresponding to the CD-ROM
Shell>fs1:
Boot the system
fs1:>eli linux
Install your distribution as usual
The only difference is that you need to create a so-called 'EFI' partition of type FAT32 (Id:b) of a
After the installation, reboot and redo the initial sequence, verifying again the correspondance (wh
Shell>map
Shell>fs0:
Shell>dir
Verify the name of the kernel to boot
fs1:>eli linux-up
To automize the boot, you need to remove all options from the EFI boot except the EFI Shell and crea
fs0:
eli linux-up
fs0:
```

(From information provided by S. Eranian. Only mistakes are mine :–)

David Mosberger reports that recent versions (7.2) of Red Hat install a GPT partition and that you must enable the following two config options for the kernel to recognize them:

```
CONFIG_PARTITION_ADVANCED=y
CONFIG_EFI_PARTITION=y
```

3.2.5. X Terminals

HP proposes now NCD X terminals to replace the Envizex/Entria range.

The HP X terminal range (Entria, Envizex) is usable with a Linux server. More over, a Linux server may be a boot server for X terminals. To do it, a certain number of operations are mandatory.

We suppose we have a HP–UX machine named hpux, on which is installed Enware, a Linux server, named linux and an X Terminal with MAC address 08:00:09:db:8d:1c. The gateway on the network is at IP address 192.168.1.254, and the DNS name server at 192.168.1.1.

Commands to do are :

```
Enware Home Directory
hpux #cd /opt/hpxt/enware/xthome


Creation of a tar archive of this software
hpux #tar cvf ~ftp/en.tar * .??*


Download of the tar archive
linux #ftp hpux
Connected to hpux.
220 hpux  FTP server (Version wu-2.5.0(1) Wed Aug 25 12:50:08 EDT 1999) ready.
Name (ftp:Root):ftp
331 Password required for  ftp.
Password:(type your mail address here)
230-
[...]
```

```
230-
230 User ftp logged in.  Access restrictions apply.
ftp>lcd /tmp
Local directory now /tmp
ftp>get en.tar
200 PORT command successful.
150 Opening BINARY mode data connection for en.tar (57638340 bytes).
226 Transfer complete.
57638340 bytes received in [...]
ftp>quit
[...]


Creation of the target directory on the linux machine
linux #mkdir -p /tftpboot


Go there
linux #cd /tftpboot


untar the archive
linux #tar xvf /tmp/en.tar


Launch the X Font Server working on port 7100
linux #/usr/X11R6/bin/xfs -port 7100


Creation of the bootpd configuration file
linux #cat >> /etc/bootptab << EOF
global.prof::sm=255.255.255.0::ds=192.168.1.1::gw=192.168.1.254::ht=ethernet::bf=bin/C3253A:     # A
tx1:hd=/tftpboot:tc=global.prof:ha=080009db8d1c:ip=192.168.1.100:
EOF
Install bootpd say from  http://rpmfind.net
linux #rpm -Uvh bootp-2.4.3-7.i386.rpm


Verify the existence of such a line in  /etc/inetd.conf, and restart if needed the server by killall
linux #grep bootps /etc/inetd.conf
bootps dgram   udp     wait    root    /usr/sbin/tcpd  bootpd


Now enkoy your X terminal by booting it
```

For a more detailed description, as well as the software related to that operation, consult also the page http://www.cb3rob.net/~sven/xterm.

3.2.6. The printing product range

3.2.6.1. General points

Printers may be connected directly to a machine through either a parallel port (generally), or a serial port, or even (more recently) through a USB port. They may also be directly wired to the network, for a global access; this is done thanks to a card put in a slot of the printer, or through the connexion of the parallel port of the printer to a sharing network box.

HP provides such boxes, called JetDirect, which allow thus to share personnal printers on the network, directly, without going through a machine. They exist for various network topologies (10 BT, 10/100 BT, Localtalk, 10B2) and offer the ability to access to the printer directly from machine which like Linux support the LPD protocol, by using a remote printer in the `/etc/printcap` file. The name of the queue to use is then `raw`.

An example of `/etc/printcap` file allowing to access to a printer, equiped with such a box or card, named lj4000 on the network is given below :

```
# REMOTE POSTSCRIPT 1200x1200 a4 {} PostScript Default {}

lj4000::sd=/var/spool/lpd/lj4000::rm=lj4000::rp=raw::if=/var/spool/lpd/lj4000/filter::mx#0::sh:
```

The configuration access to the box is done either through the WebJetAdmin tool provided also under Linux now, or by the **telnet** command. The default address of these products is 192.0.0.192. To connect to them initially, you just have to add an IP alias on your network interface, typically by :

```
#ifconfig eth0:0 192.0.0.1
```

and a route to that network (if not automatically created) typically by :

```
#route add -net 192.0.0.0
```

The access to the equipment is thus done simply by :

```
#telnet 192.0.0.192
```

Please pay attention to have only one such equipment on the network, at the same time, or you'll have duplicate IP addresses, which always causes problems. Note that HP manageable network equipments also use the same default address. The reading of the IP Alias mini HOWTO may be useful if you don't understand the previous paragraph :–).

It is of course possible to access through the network to an HP printer attached and declared directly on a Linux machine, thanks to the **lpd** service for the other Unix clients, through SaMBa for the clients of Microsoft systems (Win9x ou WinNTx) or through NetAtalk for the MacIntosh clients.

At last, SaMBa offers a tool, **smbclient**, which allows to print from a Unix/Linux machine to a printer wired directly on a Microsoft based PC, without any need to use a JetDirect system. All the details useful to realize this operation are described in the example file of **smbprint** provided with the SaMBa package and on the page http://www.medasys–digital–systems.fr/linux/samba–truc.html.

Communication between a Linux machine and a printer needs also, outside a network dialog, a discussion with an exchange language between the two elements. There are a lot of languages of that sort, such as PCL, Postscript or HPGL. To be able to print correctly, the tool providing the datas to print has to generate code known by the printer. Filters exist which allow to easily transform an output in one given format to another one. Thus the Ghostscript software authorizes the transformation of Postscript source in a great variety of output formats, as indicated by its invocation in the 'Available devices' part :

```
#gs -h
GNU Ghostscript 6.51 (2001-03-28)
Copyright (C) 2001 artofcode LLC, Benicia, CA.  All rights reserved.
Usage: gs [switches] [file1.ps file2.ps ...]
```

```
Most frequently used switches: (you can use # in place of =)
 -dNOPAUSE           no pause after page   | -q       `quiet', fewer messages
 -g<width>x<height>  page size in pixels   | -r<res>  pixels/inch resolution
 -sDEVICE=<devname>  select device         | -dBATCH  exit after last file
 -sOutputFile=<file> select output file: - for stdout, |command for pipe,
                                        embed %d or %ld for page #
Input formats: PostScript PostScriptLevel1 PostScriptLevel2 PDF
Available devices:
   x11 bbox x11alpha x11cmyk x11gray2 x11gray4 x11mono bmpmono bmpgray
   bmpsep1 bmpsep8 bmp16 bmp256 bmp16m bmp32b deskjet djet500 laserjet
   ljetplus ljet2p ljet3 ljet3d ljet4 ljet4d lj5mono lj5gray cdeskjet
   cdjcolor cdjmono cdj550 pj pjxl pjxl300 uniprint omni bj10e bj200 bjc600
   bjc800 faxg3 faxg32d faxg4 pcxmono pcxgray pcx16 pcx256 pcx24b pcxcmyk
   pbm pbmraw pgm pgmraw pgnm pgnmraw pnm pnmraw ppm ppmraw pkm pkmraw pksm
   pksmraw tiffcrle tiffg3 tiffg32d tiffg4 tifflzw tiffpack tiff12nc
   tiff24nc psmono psgray psrgb bit bitrgb bitcmyk pngmono pnggray png16
   png256 png16m jpeg jpeggray pdfwrite pswrite epswrite pxlmono pxlcolor
   dmprt cdj880 ap3250 appledmp atx23 atx24 atx38 bmpa16 bmpa16m bmpa256
   bmpa32b bmpamono bmpasep1 bmpasep8 ccr cdj1600 cdj500 cdj670 cdj850
   cdj890 cdj970 cfax cgm24 cgm8 cgmmono cljet5pr coslw2p coslwxl cp50
   declj250 dfaxlow dfaxhigh djet500c dl2100 dnj650c eps9high eps9mid epson
   epsonc escp fs600 hl1250 hl7x0 ibmpro imagen inferno iwhi iwlo iwlq
   jetp3852 la50 la70 la75 la75plus lbp8 lj250 lj3100sw lj4dith ln03 lp2563
   lp8000 lq850 lxm5700m m8510 mgr4 mgr8 mgrgray2 mgrgray4 mgrgray8 mgrmono
   miff24 necp6 oce9050 oki182 okiibm paintjet photoex pjetxl plan9bm sgirgb
   r4081 sj48 st800 stcolor sunhmono t4693d2 t4693d4 t4693d8 tek4696 xes
   x11cmyk2 x11cmyk4 x11cmyk8 x11rg16x x11rg32x ljet4pjl lj4dithp dj505j
   picty180 pr201 pr150 pr1000 pr1000_4 jj100 bj10v bj10vh mag16 mag256
   mj700v2c mj500c mj6000c mj8000c fmpr fmlbp ml600 lbp310 lbp320 lips2p
   bjc880j lips4 lips4v escpage lp2000 npdl md50Mono md50Eco md1xMono hpijs
   DJ630 DJ6xx DJ6xxP DJ8xx DJ9xx DJ9xxVIP AP21xx hpdj md2k md5k stp lxm3200
   lx5000 lex7000 lex5700 lex3200 lex2050 gdi epl5800 epl2050 epl2050p
   alc8500 alc2000 cljet5 cljet5c nullpage
Search path:
   . : /usr/share/ghostscript/6.51/lib : /usr/share/ghostscript/6.51/vflib :
   /usr/share/ghostscript/fonts : /usr/share/fonts/default/ghostscript :
   /usr/share/fonts/default/Type1 : /usr/share/fonts/default/amspsfnt/pfb :
   /usr/share/fonts/default/cmpsfont/pfb
For more information, see /usr/share/doc/ghostscript-6.51/Use.htm.
Report bugs to bug-gs@ghostscript.com, using the form in Bug-form.htm.
```

This represents only the output formats compiled in the program. Other are also available. You may find a complete list of all the printers known by this software at http://www.cs.wisc.edu/~ghost/printer.html.

A ghostscript driver for supporting pcl3 is also available at
http://home.t–online.de/home/Martin.Lottermoser/pcl3.html.

A list of HP printers supported may be found on the following pages :
http://www.linuxprinting.org/printer_list.cgi?make=HP and http://hp.sourceforge.net/.

HP has published in April 2001 improved drivers to support inkjet printers. Cf:
http://hpinkjet.sourceforge.net/.

3.2.6.2. Control codes

Ink or laser printers may be controled through control codes. The following table gives some of them :

Table 3−17. Printer Control codes

Code	Function
ESC&l1H	Tray 2
ESC&l2H	Manual tray, sheet
ESC&l3H	Manual tray, envelope
ESC&l4H	Tray 1
ESC&l5H	Tray 3
ESC&l7H	Automatic selection
ESC&l0O	Portrait
ESC&l1O	Landscape
ESC&l5A	A4
ESC(8U	HP Roman 8
ESC(10U	IBM PC−8 (CP437)
ESC(12U	IBM PC−850 (CP850)

Other control codes for PCL3 language are given on HP's Web site for deskjet and laserjet.

HP printers are of two kind of technologies : inkjet or laserjet which are detailed below.

3.2.6.2.1. Inkjet printers range (DeskJet)

Inkjet HP printers use either an own language for page description, or the PPA protocol, or also the Postscript or PCL language.

The reference site for InkJet printer is http://hpinkjet.sourceforge.net

For PPA printers, consult also http://sourceforge.net/projects/pnm2ppa

Note that most inkjet printers are limited to a 600x600 resolution when used from Unix/Linux.

3.2.6.2.2. The InkJet range

LaserJet HP printers use PCL or Postscript page description language.

The reference site for LaserJet printer is http://hp.sourceforge.net

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3.2.7. Digital imaging product range

3.2.7.1. The scanners range (ScanJet)

The main tool available in Linux environment to manage scanners is SANE (Scanner Access Now Easy). This software provides in particular a driver for HP scanner management: hpbackend.

The following table provides all information on the support for this hardware by Linux.

Table 3–18. Scanners and Linux

Reference	Scanner	Interface	Linux support	Tested
C9195A	ScanJet Plus	HP Parallel Interface Card	SANE and driver	No
C1750A	ScanJet IIc	SCSI	SANE	No
C2500A, C2507A, C2508A, C2509A	ScanJet IICX	SCSI	SANE	No
C1790A, C1797A, C1798A, C1799A	ScanJet IIP	SCSI	SANE	No
C2520A, C2527A, C2528A, C2529A	ScanJet 3C	SCSI	SANE	No
C2570A	ScanJet 3P	SCSI	SANE	No
C2520B, C2527B, C2527D, C2528B, C2529B	ScanJet 4C	SCSI	SANE	No
C1130B	ScanJet 4P	SCSI	SANE	No
C5110A, C5116A, C5117A, C5119A	ScanJet 5P	SCSI	SANE	No
C5160A, C5167A	ScanJet 5S	???	???	No
	ScanJet 2100C	driver USB	???	No
C8500A	ScanJet 2200C	Parallel Port	???	No
C7167A	ScanJet 3200C	Parallel Port	???	No
C7680A	ScanJet 3300C	USB	SANE and driver USB	No
C7727A	ScanJet 3400C	Parallel Port or USB	SANE and driver PPSCSI or driver USB	No
C6290A, C6292A, C6293A, C7297A	ScanJet 4100C, Cse, Cxi	USB	SANE and driver USB	No
C7177A	ScanJet 4200C	USB	SANE and driver USB	No
C7737A	ScanJet 4300C	Parallel Port or USB	SANE and driver PPSCSI or driver USB	No
C9877A, C9887A	ScanJet 4400C	???	???	No
C5190A, C5192A, C5193A, C5197A	ScanJet 5100C, Cse, Cxi	Parallel Port	SANE and driver PPSCSI	No
C5190A, C7192A, C7193A	ScanJet 5200C	Parallel Port or USB	SANE and driver PPSCSI or driver USB	Yes
C7697A, C8477A	ScanJet 5300C, 5370C	Parallel Port or USB	SANE and driver	No

			PPSCSI or driver USB (driver hp5300)	
C8517A, C9857A, C9867A	ScanJet 5400C	???	???	Yes
C6260A, C6266A, C6267A, C6269A	ScanJet 6100C	SCSI	SANE	No
C6270A, C6272A, C6273A, C6274A, C6275A, C7277A, C6278A	ScanJet 6200C, Cse, Cxi, 6250C	SCSI or USB	SANE or driver USB	Yes
C7677A, C7678A, C7679A	ScanJet 6300C, Cse, Cxi, 6350C, 6390C	SCSI or USB	SANE or driver USB	Yes
C7717A, C7718A, C7719A	ScanJet 7400C	???	???	Yes
C5100A	PhotoSmart PhotoScanner	SCSI	SANE	Yes

A FAQ dedicated to HP scanners support under Linux with SANE is available at the address :
http://www.kirchgessner.net/sanehpfaq.html

Some usefull adresses for USB scanners should be consulted :
http://www.buzzard.org.uk/jonathan/scanners−usb.html and
http://www.qbik.ch/usb/devices/search_res.php3?pattern=hp

3.2.7.2. Digital photo cameras

To use these peripherals, you have to compile SCSI support with your kernel, and turn on mass storage device in USB support. Then mount the `/dev/sdxx` device as usual.

The following table provides all information on the support for this hardware by Linux.

Table 3−19. Cameras and Linux

Reference	Camera	Interface	Linux support	Tested
C8890A	PhotoSmart 215	driver USB	???	No
C8452A	PhotoSmart 315	driver USB	gPhoto	Yes
C8908A	PhotoSmart 612	driver USB	???	No
C6324A	PhotoSmart 618	driver USB	gPhoto	Yes
C8913A	PhotoSmart 715	driver USB	???	No
C6326A	PhotoSmart 912	driver USB	gPhoto	Yes

3.2.7.3. The Digital Sender

This product is a scanner, able to send the result of the digitalisation through e−mail, by sending the digitalised document as an attachement in PDF format. It may so well be used with a Linux (or other) mail server (sendmail, postfix, ...), as well as with clients reading their messages under Linux, providing they have a tool to display PDF file such as Acrobat Reader or xpdf.

The Digital Sender can also send images as black and white or colour TIFF files. The black and white images work fine, however, there is a problem with the coloured TIFF files. These are sent in an obsolete format which is not supported by libtiff, which is the basis of support for the TIFF format for nearly all Linux software. This means that you cannot directly open colour TIFF images created by the Digital Sender using Linux software (e.g. The GIMP, ImageMagick).

3.2.7.4. The CapShare

THere is an application for the Window Maker window manager to manage the CapShare. More information at http://www.netjunki.org/projects/index.php

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3.2.8. All−in−one range (OfficeJet)

These products gather many functions : printing (all), scanning (all), copying (all), and faxing (some).

More information from their dedicated web site : http://hpoj.sourceforge.net/suplist.shtml

---

3.2.9. The Storage products range

3.2.9.1. Tape based products

Most HP SCSI tape drives (DAT 1, 2, 3, 4, DLT, LTO) work with Linux. the driver file to use is `/dev/st0` for the first drive, `/dev/st1`, for the second...

More information may be found on the certification site http://www.linuxtapecert.org/

HP provides the tapeware software with its drives, including a Linux version.

Colorado Trakker 250 and 350 are supported with ftape (>= 4.02) T1000 should also work correctly. Colorado 5GB are supported with the paride driver.

3.2.9.1.1. HP libraries

Tools to manage such drives may be found on http://mtx.sourceforge.net/ or http://www.arkeia.com/ or http://www.strusel007.de/linux/changer.html. I had the chance to test models 6x24, 418, 718, 818 with arkeia without problem.

3.2.9.2. HP SureStore Virtual Array

These systems are supported in a mixed environment Windows NT/2K, HP−UX 11.0 and Linux. They are connected through Fibre Channel controlers to the SAN. Among all FC cards supported on Linux, HP supoprts those provided by Emulex and QLogic. HP sells a Linux version of the management software for these arrays. Supported models are VA7100 (A6183A), VA7400.

3.2.9.3. HP XP Storage Systems

Here are the configurations supported by HP for these Storage Systems:

```
Redhat 6.0/6.1
Qlogic QLA2100F or QLA2200F with driver V2.23
Private Loop or Direct Fibre Attach
No boot support
XP256 has to have firmware >= 44.14.00 Mode 00
For direct attach XP512/48 has to have firmware >= 11.22.00 Mode 00
For attachment to a switch XP512/48 has to have firmware >= 12.19.00

Redhat 6.2
Emulex LP8000 with driver V4.10g
Private Loop or Direct Fibre Attach
No boot support
For attachment to a switch use Brocade 2400/2800 with firmware >= V2.1.9f)
XP512/48 has to have firmware >= 12.19.00 Mode 00
```

Khalid Aziz reports that there may be a problem with XP512 support of Linux due to a hole in LUN numbers. If the LUNs were numbered continuously, you would see all LUNs. Some folks in HP have written patches for this. Essentially all that is needed is to add an entry in device_list[] in scsi_scan.c for the XP512 and set the flag BLIST_SPARSELUN. The entry would look something like:

```
{ "HP", "XP512", "*", BLIST_SPARSELUN}
```

The first field is the vendor name as reported by XP512 and second field is the model name as reported by XP512. These two need to match what XP512 returns in Inquiry command, exactly.

3.3. HP software and free software

This section presents rapidly some HP applications which can be used under Linux. These are either commercial applications or freeware applications.

It proposes also links to free software available for other operating systems (HP−UX, MPE/IX).

3.3.1. HP softwares under Linux

FireHunter

> This commercial software targetted to the ISP manages services levels and is available for RedHat version 5.2 distributions. http://www.firehunter.com.

HP Eloquence

This commercial software is an IDE for management applications for small business firms and is available under Linux since 1997. A lot of distributions are supported by a third party firm to which HP has given the support. Complementary information exist on the site http://www.hp−eloquence.com.

HP WebJetAdmin

This freeware allows to manage HP network printers through the installation of a service on a Linux server, and is accessible from any browser running on any client machine. HP has announced the availability of this product the fisrt time in 5.1 version in February 1999. Then were released version 5.6 in December 1999, 6.0 version in June 2000, 6.1 version in August 2000, 6.5 version in October 2001. You may download the latest version at ftp://ftp.hp.com/pub/networking/software/hpwebjet_linux.selfx. All information on this product are available from the addresses : http://www.hp.com/go/webjetadmin and http://www.hp.com/pond/wja/live/manual/html/wjacomp_linux.html.

The 5.6 version in RPM format is also available at http://www.HyPer−Linux.org/HP−HOWTO/mirror/Software/hpwebjet−5.6−1.i386.rpm.

HP WebQoS

This commercial software allows to manage Internet Quality of Service by stabilizing performances during high loads, by optimizing used resources, and by managing priorities at applications and users levels. HP has announced the availability of this product during summer 1999. Complementary information exist on the site http://www.hp.com/go/webqos.

HP OpenView

This commercial software is a complete network management platform. An NNM (Network Node Manager) has been announced, as well as ITO. NNM and ITO agents are currently available for Linux. An Omniback client is available for Redhat 5.2 distributions (Cf http://www.hp.com/storage/event/openview_hl.html).

Precision from F. Lorrain: The Omniback II (A.03.50) client run without problem under debian potato (2.2r3) and Mandrake 7.2. But on debian, you need the libnns1−compat.

HP OpenMail

A version of this commercial mail and work group management tool is available since the first of september, 1999 under Linux. Till November the 13th, 2001, the software has been taken over by Samsung SDS. Informations concerning it are available on the page : http://www.openmail.com.

HP E−Speak

E−Speak, the open software platform for creating, composing, mediating, managing, and accessing Internet−based e−services. E−speak allows a resource (computing device, application, or data content) to be virtualized and re−deployed as an Internet−based e−service. All information concerning it are available on the page : http://www.e−speak.hp.com/.

HP MC Service Guard

This commercial software allows to manage a high availability cluster of applications. HP has announced the availability of this product for the 15th of November 2001. Complementary information exist on the site http://www.unixsolutions.hp.com/products/ha/prod/ar/mcsg.html. Reference : T1521A.

Plug−in Scheduler policies for Linux

This patch enables you to write and use loadable kernel modules to change your Linux machine's scheduler policies without rebooting. It's available at http://resourcemanagement.unixsolutions.hp.com/WaRM/schedpolicy.html.

PRM for Linux

This commercial tool allows you to monitor CPU ressources on your machine by partitioning it. http://resourcemanagement.unixsolutions.hp.com/WaRM/prm_linux/index.html.

HP TopTools Agent for Linux

This freeware is a DMI agent increasing the ease of management of HP Machines under Linux. Downlaodable from http://hp−linux.org/toptools and http://www.hp.com/toptools/download/server_agents.html.

dummynet

This free software is FTP server perf measurement tool. Downloadable at ftp://ftp.cup.hp.com/dist/networking/tools/dummynet/.

netperf

This free software is a perf measurement tool for benchmarks. Downlaodable from ftp://ftp.cup.hp.com/dist/networking/benchmarks/netperf.

hp−lx (aka Trusted Linux aka Secure Linux)

This commercial software is a modified version of a RedHat distribution, containing kernel patches and daemons (GPL), as well as a set of management commands (commercial) allowing you to create jail compartments to execute applications, running so in an absolute secure environment. The software also controls file access, inter−process and network communications, ... More information on http://www.hp.com/security/products/linux/.

Chai Server

This free software is an embedded Web−based application server. More information on https://devnet.hp.com/projects/csopen/.

Jupiter/Kelvin

Kelvin is an application programming interface (API) project dedicated for the interactive visualization of large geometric models. http://www.gris.uni−tuebingen.de/~bartz/kelvin/.

Service Control Manager

This commercial software is a secure single−point of adminstration for both Linux and HP−UX multi−system environments. http://www.hp.com/products1/linux/software/scm.html.

HP AS (Bluestone)

This commercial software is a service−oriented application server. http://www.bluestone.com.

3.3.2. Third party softwares linked to HP for Linux

GNUPro

HP and Cygnus Solutions have announced the 8th of March, 1999 a partnership to provide the GNUPro tools on all the HP machines, including Linux.

Arkeia

Arkeia is a network backup solution supporting perfectly all HP storage peripherals (autoloader, libraries, ...)

3.3.3. Free softwares under HP−UX

Numerous free software for HP−UX are available at http://hpux.cs.utah.edu/. HP hosts also a certain number of free software tools for HP−UX at http://h21007.www2.hp.com/dspp/tech/tech_TechTypeListingPage_IDX/1,1704,10312,00.html

Hp proposes also tools to help porting Linux applications to HP−UX. Cf: http://devresource.hp.com/LPK/ and http://devresource.hp.com/STKL/index.html.

An open source version of hpterm may be found on http://sourceforge.net/projects/hpterm/.

KDE 2.1 s also available for HP−UX.

3.3.4. Free softwares under MPE/IX

Numerous free software for MPE/IX are available at http://jazz.external.hp.com/src

An HP700/92 terminal emulator is available at http://www.aics−research.com/qcterm/

3.4. Support of HP solutions under Linux

HP proposes since May 1999 a worldwide support offer on Linux. This offer includes up to the possibility to answer 24x7, in a delay of 2 hours after taking the call. The reference of this product is : HP LNXIA32A

HP proposes since 2001 a "Mission Critical support" contract for his Linux customers.

HP has also online ressources to help people using Linux with its products :

Online Linux incidents

http://hp3.m0.net/m/s.asp?H1409133998X725229

Linux training courses

http://hp3.m0.net/m/s.asp?H1409133998X725230

Linux discussion Forum

http://hp3.m0.net/m/s.asp?H1409133998X725231

Third party firms also propose Linux and free software support on HP platforms :

Medasys

Contact : Sylvain Bergé <Sylvain.Berge@medasys.fr>

Atrid

Contact : Bruno Deschandelliers <B.Deschandelliers@atrid.fr>

Alcove

Contact : Lucien Petit <Lucien.Petit@alcove.fr>

Andago

Contact : <info@andago.com>

3.5. Training on HP Linux solutions

HP proposes since June 1999 a worldwide training offer on Linux. It's detailed on the page http://education.hp.com/curr−linux.htm. The detail of all the training courses for France is available at : http://www.france.hp.com/formation/f_linux_00.html.

3.6. HP as an Open Source Software user and contributor

HP doesn't make a lot of noise in the free software world, even if it is an actor and also a user for its own IT infrastructure. For example, all the incoming mail in HP goes through PostFix servers

```
#dig hp.com -t mx | grep MX
;;      hp.com, type = MX, class = IN
hp.com.                 21m28s IN MX    50 cossmtp.hp.com.
```

```
hp.com.                 21m28s IN MX    50 palsmtp.hp.com.
hp.com.                 21m28s IN MX    20 postal.agilent.com.
hp.com.                 21m28s IN MX    10 envelope.hp.com.
hp.com.                 21m28s IN MX    10 letter.hp.com.
hp.com.                 21m28s IN MX    20 stamp.agilent.com.
hp.com.                 21m28s IN MX    30 cossmtpx.hp.com.
hp.com.                 21m28s IN MX    50 atlsmtp.hp.com.
#telnet envelope.hp.com 25
Trying 192.151.10.4...
Connected to envelope.hp.com.
Escape character is '^]'.
220 envelope.hp.com ESMTP Postfix
QUIT
221 Bye
Connection closed by foreign host.
#telnet letter.hp.com 25
Trying 192.151.10.3...
Connected to letter.hp.com.
Escape character is '^]'.
220 letter.hp.com ESMTP Postfix
QUIT
221 Bye
Connection closed by foreign host.
#telnet postal.agilent.com 25
Trying 192.6.9.3...
Connected to postal.agilent.com.
Escape character is '^]'.
220 postal.agilent.com ESMTP Postfix
QUIT
221 Bye
Connection closed by foreign host.
```

Identically, for its institutional Web server, HP uses Apache as more than 15 millions of other sites.

```
#wget -S http://www.hp.com/
--15:09:45--  http://www.hp.com:80/
           => `index.html.1'
Connecting to www.hp.com:80... connected!
HTTP request sent, awaiting response... 200 OK
2 Date: Fri, 05 May 2000 13:12:25 GMT
3 Server: Apache/1.3.9 (Unix) mod_fastcgi/2.2.2
[...]
```

Agilent (old−HP branch) uses also the free software Perl for CAD as related at http://perl.oreilly.com/news/agilent_0300.html

HP also worked on the improvement of the proxy−cache Squid , as related at http://www.hpl.hp.com/techreports/1999/HPL−1999−142.html

In another domain, HP produces also documents to help convincing to the use of Open Soure Software, as this HP Labs report available on http://lib.hpl.hp.com/techpubs/2001/HPL−2001−233.html

A lot of HP people work on open source projects. They deserve a particular notice because, as in every open source project, their tenacious and constant comportment make these projects alive. Among them:

David Mosberger and Stéphane Eranian

Port of the Linux kernel on IA−64 http://www.linuxia64.org/.

Grant Grundler, John S. Marvin and Paul Bame

Major contributor of the Linux kernel port on Pa−Risc http://www.parisc−linux.org/.

Jean Tourrilhes

Wireless Tools for Linux http://www.hpl.hp.com/personal/Jean_Tourrilhes/Linux/Tools.html.

John H. Oleinik and David Suffield

Projet HP imprimante jet d'encre http://hpinkjet.sourceforge.net/.

Dann Frazier

System Imager http://www.systemimager.org.

Peter Mellquist

SNMP++ http://rosegarden.external.hp.com/snmp++.

Chapter 4. Solutions and Sizing

This chapter proposes an help for sizing NetServers under Linux, depending on the different kind of use.

You have to consider that exercise as a bit perilous. Indeed, only the reality allows to test such previsions. Nevertheless, using the experience acquired by deploying solutions in the past, we can give some useful rules.

We may apply a certain number of rules valid for the sizing of classical Unix servers, considering that CISC systems (the majority in Linux environment) need 2.5 less times resources in memory than RISC systems, due to the fact that binaries used are smaller (Intel platforms are for the moment 32 bits architectures). This has also influences on disk and swap space.

It's obvious you have to consider, whatever the system, bottlenecks of the solution put in place, because they will determine the weakest link in the chain.

You have to look particularly at the following points :

- The number and the speed of disks (the I/O rate of 10.000 rpm disks may go up to 20 MB/s, and 25 for 15.000 rpm disks),
- The number and the speed of SCSI controlers (the I/O rate of Ultra2 LVD of the LC2000 – LH3/4/3000/6000 may go up to 80 MB/s, and latest B model up to 160 MB/s),
- The addition of a supplementary SCSI card supported, when adding slow peripherals (DAT, DLT, CD writer ...) in order to avoid that the controler slow down in compatible mode, and that I/O performances drop significantly.

You have also to be suspicious of the extensible functions of machines. Indeed, it's often better for a customer to add a new server, rather than to increase the capacities of the one in place. The first reason is a financial one, on one side, because the costs of add−ons on an already old system may be near those of a new system, whose prices are becoming cheaper and cheaper. And the same for maintenance. On the other hand, technically, it could be more interesting to benefit from the latest technologies to obtain a machine more equilibrate, powerful and to reuse the old one for secondary tasks (secondary DNS, ...) or to split processes from the other one. For example, when Ultra2 LVD was introduced, it was more interesting to buy a new server to benefit from the 80 MB/s SCSI bus speed, rather than to update a server which had 40 MB/s Ultra Wide SCSI. This implies that it's interesting to size correctly the server, from the begining, for the whole forseeable period of life of its use (typically 3 years nowadays).

In the same kind of ideas, you have to examine closely the choice between a bi−processors and two mono−processors machines. 2 different systems imply 2 disk controlers, 2 disks set, 2 separate RAM busses thus better performances, but more administration. On the other hand, a unique system renders it easier, allows for a quicker communication between processors, which could be necessary for certain applications, but makes the environment more fragile (more downtime in case of an hardware problem). In fact, there are more losses intrinsically on a multi−processor model, in communications at the system level. This question should mainly be considered for the addition of a processor (necesseraly obsolete) on a machine *a posteriori*, rather than to add a new server.

On memory aspects, Linux can manage today up to 64 GB in stable kernels. Linux takes the maximum from the memory you give to it, mainly by the constitution of a cache disk which improves greatly system performances. You may thus oversize the quantity of RAM installed, because it's preferable to a situation where the server would be forced to swap (which drop performances dramatically). The minimum RAM size provided on the NetServers (128 ou 256 MB) matches perfectly a normal use of a system, and doesn't need

any particular addition. You have to take in account that there is no graphical environment used on production servers. Concerning the swap, under Linux, it comes in addition to the RAM to give the complete virtual memory available for the server. As a base rule, it's recommanded to give the same amount of swap space as the amount of RAM, to allow the system to put on disk nearly all the running processes in case of need. But the rule which exists for System V Unix (such as HP−UX) consisting of reserving twice the amount of RAM for swap isn't useful under Linux. You may note that Linux may swap certain inactive processes to free the maximum RAM possible. So having a system whose swap is partially used isn't necesseraly a proof of lack of memory, nor lack of performances.

You'll find below recommandations depending of the type of use made by the HP NetServer under Linux. It's possible to cumulate several functions on the same server. You'll take care to add at least in that case the resources needed to give the services.

Some generic rules have to be considered :

- We consider that the number of simultaneous users is the same as half the whole number of users on the server.
- The minimal RAM size needed for a usable Linux server is 32 MB, which is less than the minimum amount of RAM available on the NetServers (128 MB). In case you use X−Window with KDE or Gnome on this machine, you need to have 64 MB in supplement, thus 96 MB as a minimum.
- The minimal disk size needed for a usable Linux server is 2 GB, which is less than the minimum amount of disk available on the NetServers (9 GB).
- In case of use of Raid 1, you have to double the amount of disk space useful to obtain the disk space needed. In case of use of Raid 5, you need to add 1 disk to obtain the disk space needed (up to 8 disks).
- Except in particular cases (computing server), the amount of swap is the same as the amount of RAM.
- The minimal processor needed for a usable Linux server is a Pentium 133, which is less than the minimum processor available on the NetServers (Pentium III 933).
- Each X−Window user excuting a client on the server uses in average 2 MB.
- It may be useful to add network cards in this type of machine to smooth the traffic, depending on the number of clients. Using the bonding option provided by the Linux kernel may also be very useful.

You may also consult the linux performance tuning document provided by Adrian Likins

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4.1. Linux as file and print server

4.1.1. Linux as file server

The sharing service uses 2 MB of RAM, and 2 more MB per share. In case of a unique share (users space for example), it leads to a 2 MB consumption per user. In the proposed case, we estimate that each user has 100 MB of disk space on the server, with an evolution to 200 MB 3 years later. Processor resources used are relativeley small, an entry level model will be sufficient from that point of view. We will priviledge the I/O speed with Ultra 3 LVD SCSI at 160 MB/s, if the budget allows it, and 15.000 RPM disks.

Table 4−1. Sizing of a file server

Simultaneous users	RAM size	Disk size	Machine example
1 – 100	312 MB	27 GB	E800
100 – 500	1 GB	117 GB	LC2000
500 – 1000	2 GB	216 GB	LH3000

4.1.2. Linux as print server

The sharing service uses 2 MB of RAM, and 2 more MB per printer shared. In case of a unique share (One printer per user typically), it leads to a 2 MB consumption per user. In the proposed case, we estimate that each user prints simultaneously files of 5 MB in average, thus we need to have that space available on the server. Processor resources used are relativeley small, an entry level model will be sufficient from that point of view.

Table 4–2. Sizing of a print server

Simultaneous users	RAM size	Disk size	Machine example
1 – 100	312 MB	9 GB	E800
100 – 500	1 GB	9 GB	E800
500 – 1000	2 GB	9 GB	LC2000

4.2. Internet/Intranet Linux server

4.2.1. Web Server

The Web service uses 2.5 MB of RAM, in static mode (simple HTML pages) and 5 MB of RAM in dynamic mode (HTML pages generated from perl, PHP, ...) per user. The disk space needed is function of the nature of the server, knowing that most of the consumption comes from images. Processor resources used are important, thus it could be useful to consider the increase in frequency and the addition of processors, because this type of traffic could be quite well done in parallel. With Apache 2.0 and the support of threads, it will become even more obvious. We will priviledge also the I/O speed with Ultra 2 LVD SCSI at 80 MB/s, if the budget allows it, and 10.000 RPM disks.

Table 4–3. Sizing of a static Web server

Simultaneous users	RAM size	Disk size	Machine example
1 – 100	256 MB	9 GB	E800
100 – 500	1 GB	9 GB	LC2000 Bi–processor
500 – 1000	2 GB	9 GB	LH6000 Quadri–processor

Table 4−4. Sizing of a dynamic Web server

Simultaneous users	RAM size	Disk size	Machine example
1 − 100	512 MB	9 GB	E800
100 − 500	2 GB	9 GB	LC2000 Bi−processor
500 − 1000	4 GB	18 GB	LH6000 Quadri−processor

4.2.2. Mail Server

Generally, this machine is used as both SMTP (sending and reception of messages) and POP/IMAP server (keeper of messages and manager of client accesses). The SMTP Mail service uses 2 MB of RAM per user. The POP/IMAP Mail service uses 2 MB of RAM per user. The disk space needed becomes more and more important as long as attachments (images, various documents) take the greatest place in exchanges via e−mail. We consider in that case that an average mail box size is 50 MB. Processor resources used are important, thus it could be useful to consider the increase in frequency and the addition of processors, because this type of traffic could be quite well done in parallel.

Table 4−5. Sizing of an e−mail server

Simultaneous users	RAM size	Disk size	Machine example
1 − 100	400 MB	9 GB	E800
100 − 500	2 GB	27 GB	LC2000 Bi−processor
500 − 1000	4 GB	54 GB	LH6000 Quadri−processor

4.2.3. Firewall/Proxy/Web−Cache server

Generally, this machine is both a Firewall server, a proxy (in both directions) and a cache for the Web because all requests go through it. The Firewall service uses 1 MB of RAM. The Proxy service uses 0.3 MB per incoming relay. The Web cache service uses 0.5 MB per user. The disk space needed is function of the parameters of the cache Web server. In that case, we consider 20 MB per user. Processor resources used are important, due to the analysis of IP packets. Thus it could be useful to consider the increase in frequency.

Table 4−6. Sizing of a Firewall/Proxy/Web−Cache server

Simultaneous users	RAM size	Disk size	Machine example
1 − 100	128 MB	9 GB	E800
100 − 500	512 MB	18 GB	E800

500 – 1000	1 GB	27 GB	E800

4.2.4. Directory server

Generally, this machine use a software like OpenLDAP to fulfill its goals. The LDAP service uses 1 MB of RAM and 10 kB of RAM per user. The disk space needed is of the same kind, so 10 kB per user. Processor resources used are moderated.

Table 4–7. Sizing of a LDAP server

Simultaneous users	RAM size	Disk size	Machine example
1 – 100	64 MB	9 GB	E800
100 – 500	64 MB	9 GB	E800
500 – 1000	128 MB	9 GB	E800

4.3. Linux as computing server

Generally, this machine is extremely stressed, mainly on the processor and RAM aspects. Sometimes this is combined with intensive I/O needs. We thus equip such a machine with high–end processors (nowadays Pentium III Xeon) with the greatest level 2 cache possible (nowadays 2 MB). In RAM, we would tend to reach the maximum possible, thus 4 GB. For this type of server, we should adapt the swap such as it covers all the needs in memory required by the computing codes to execute. There is often no specific constraint on network performances, except in case of a computing cluster, in which case we may consider to equip the machines with 100 Mb/s cards with a switch between them, even with Myrinet, Dolphin or Gigabit products. Typically, a LP1000 2*PIII 1.4GHz 1 GB/2*9GB is the target of this type of server. The choice is extremely variable depending on the nature of the computation to do. We should underline that there are processors, such as PA–Risc, much more performant in floating point computation than today Intel processors (up to 6 times). The new IA–64 Itanium family seems also to bring a better compromise for price/performances for that environment.

This is by the way not the only approach as shown by the i–cluster project. Cf: http://www.hpl.hp.com/techreports/2001/HPL–2001–206.html

4.4. Linux as an office server

This kind of server is for the moment rare in the free software world. It's more frequent in Microsoft world, by association with Metaframe solutions of Citrix. An office server needs 50 MB of RAM per user. Intrinsically, this machine has no requirements in term of disk, if it's not at the same time a file server. Processor resources used are important, thus it could be useful to consider the increase in frequency and the addition of processors, because this type of traffic could be quite well done in parallel.

Table 4–8. Sizing of an office server

Simultaneous users	RAM size	Disk size	Machine example
1 – 10	512 MB	9 GB	E800
10 – 50	2 GB	9 GB	LC2000 Bi–processor
50 – 100	4 GB	18 GB	LH6000 Quadri–processor

Chapter 5. Frequently Asked Questions (FAQ)

5.1. "What's new in kernel 2.2 ?"
5.2. "What's new in kernel 2.4 ?"
5.3. "How to have more than 1 GB of RAM on my NetServer ?"
5.4. "How to have more than 128 MB of swap on my NetServer ?"
5.5. "How to use the other procesors of my NetServer ?"
5.6. "Is Linux Y2K compatible ?"
5.7. "How to increase the number of processes managed by the kernel ?"
5.8. "How to increase the number of loopback devices managed by the kernel ?"
5.9. "How to have files bigger than 2 GB on ext2 ?"

5.1. *"What's new in kernel 2.2 ?"*

Read Wonderful World of Linux 2.2 or the same in french.

5.2. *"What's new in kernel 2.4 ?"*

Read Wonderful World of Linux 2.4.

5.3. *"How to have more than 1 GB of RAM on my NetServer ?"*

The following information are adapted from the page of Rik van Riel. They concern 2.0.x as well as 2.2.x kernels, and 2.4.x.

First of all, the IA32 Intel architecture is limited by construction in its memory management to 4 GB. Space which should be divided into virtual memory and physical memory. Which means that if you choose to recognize more RAM, the maximum size for a program decreases.

But Linux can't manage more than 1 GB by default. To go above that, in fact up to 2 GB today, because Linux can't manage more memory for the moment, you need to modify 2 files provided with kernel sources and recompile it. Those 2 sources are `/usr/src/linux/include/asm-i386/page.h` and `/usr/src/linux/arch/i386/vmlinux.lds`.

From 2.0.37 and 2.2.12 kernels on, the patch was integrated in the kernel and may be activated when doing a **make {menu,x}config**.

The maximum Ram managed in the i386 version was ported to 64 GB after 2.3.23.

5.4. *"How to have more than 128 MB of swap on my NetServer ?"*

Up to the version 2.8x of the util−linux package, the **mkswap** command could create swap partitions only up to 128 MB maximum. You then had to create as much partitions as necessary. Till the 2.9 version, included in standard in RedHat 6.0 and following distributions, it's possible to create directly swap partitions up to 2 GB and to 8 partitions.

5.5. *"How to use the other procesors of my NetServer ?"*

Multi−processing is supported by Linux operationnaly till the 2.0 version of the kernel. For a 2.0.x kernel, you have to recompile it and set up the SMP variable in the Makefile to 1. For a 2.2.x or 2.4.x kernel, you

have to set it up during the **make {menu,x}config**. For more details, please consult the SMP−HOWTO.

5.6. *"Is Linux Y2K compatible ?"*

Generally, Linux is Y2K compatible. For more information please consult the FAQ.

5.7. *"How to increase the number of processes managed by the kernel ?"*

For 2.2.x kernels, you need to edit the file `/usr/src/linux/include/linux/tasks.h`, modify the value of the constant NR_TASKS (512 by default) and set it to a value which doesn't exceed 4092 or 4090 if APM is configured. It could be useful to set MAX_TASKS_PER_USER at the same time to an appropriate value. Then recompile the kernel as usual.

5.8. *"How to increase the number of loopback devices managed by the kernel ?"*

You need to edit the file `/usr/src/linux/drivers/block/loop.c`, For 2.2.x kernels, you need to modify the value of the constant MAXLOOP (8 by default). For 2.4.x kernels, you need to modify the value of the static int max_loop variable. Then recompile the kernel as usual.

5.9. *"How to have files bigger than 2 GB on ext2 ?"*

You need to have a kernel 2.4.x, glibc 2.1.3 at least and that all necessary tools have been recompiled. Look at http://www.suse.de/~aj/linux_lfs.html

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Chapter 6. Customer References

Here is a list of HP/Linux references:

- Amazon: Mix of HP−UX and Linux solutions as related on http://www.zdnetindia.com/techzone/linuxcentre/stories/42345.html.
- Checkpoint: HP Secure OS for Linux (aka Trusted linux).
- Side Effects: Port of their software Houdini on Linux.
- Nothing Real: Port of their software Shake on Linux.
- Boeing: Linux and HP clusters help Boeing R&D reduce costs as related on http://www.hp.com/products1/linux/infolibrary/boeing.html.
- ViaWest: a hp/Linux ISP as related on http://www.hp.com/products1/linux/infolibrary/viawest.html.
- Israel Aircraft Industry: a hp/Linux performance cluster user as related on http://www.hp.com/products1/linux/infolibrary/israel.html.
- SpeedEra: a hp/Linux ISP as related on http://www.hp.com/products1/linux/infolibrary/speedera.html.
- Dreamworks: The Shreck movie realised on HP netserver/Linux as related on http://www.zdnet.com/zdnn/stories/news/0,4586,2761566,00.html.
- Cern: Performance cluster realised with HP netserver/Linux as related on http://hp−linux.cern.ch.

Chapter 7. References

I already mentioned the documentation files, installed typically under the directory `/usr/src/linux/Documentation`. They are a real gold mine of useful information.

The following FAQ (Frequently Asked Questions) are periodically posted in the group news:news.answers and archived on FTP servers like ftp://rtfm.mit.edu :

- FAQ of the group news:comp.os.linux.announce
- FAQ of the group news:comp.sys.hp.hpux

A lot of other Linux HOWTO contain information useful related to our subject :

- Linux SCSI HOWTO
- Linux CD−Writing HOWTO
- Linux Hardware HOWTO
- Linux Distribution HOWTO
- Linux Kernel HOWTO
- Linux Sound HOWTO
- Linux PCMCIA HOWTO
- Linux SMP HOWTO
- USB under Linux
- Linux Laptop Guide
- Linux on HP Laptops

The following Usenet groups cover subjects related to HP :

- news:comp.sys.hp.hardware
- news:comp.sys.hp.misc

You may also consult the groups mentioned in Section 2.2.2.5.

On Internet, you may consult with a great benefit the following sites :

Table 7−1. Web sites of HP

Subject	URL
HP Linux Portal	http://www.hp.com/go/linux
HP and Linux	http://www.hp−linux.org
HP France Education Linux	http://hpwww.ec−lyon.fr/hpeduc/education/offre/linux/educ_linux.html
HP Support	http://www.hp.com/hps/support/h_linux.htm
HP HOWTO	http://www.HyPer−Linux.org/HP−HOWTO/current/index.html
Linux Pa−Risc (Puffin Group)	http://www.parisc−linux.org
Linux Pa−Risc (ESIEE)	http://mkhppa1.esiee.fr/en/
PA−RISC/Linux Boot HOWTO	http://mkhppa1.esiee.fr/parisc−linux−boot/parisc−linux−boot/index.html
Linux and HP Labs	http://www.hpl.hp.com/research/comp_systems.html#Linux Technology

Linux IA64	http://www.linuxia64.org
Linux IA64 (HP Labs)	http://dtf.external.hp.com/dtf/swdev/1999/08/feature1_a.html
HP embedded software developer's network	http://devnet.hp.com
HP printer drivers	http://hp.sourceforge.net/
HP RedHat certification	http://bugzilla.redhat.com/certification/cert−report.php3?mod_company=Hewlett+Packard
HP Linuxcare certification	http://www.linuxcare.com/labs/certs/C1F5.epl
SAP HP Netserver certification	http://www.sap.com/solutions/technology/linux/hp−hw.htm
HP Utigroup	http://www.hputigroup.com

Table 7−2. Other fundamental sites on Linux and Open Source Software

Subject	URL
Linux Documentation Project	http://www.linuxdoc.org
Linux Weekly News − Summary of 1998	http://lwn.net/1999/features/1998timeline/
Linux Weekly News − Summary of 1999	http://lwn.net/1999/features/Timeline/
Linux Weekly News − Summary of 2000	http://lwn.net/2000/features/Timeline/
IOS Counter	http://www.leb.net/hzo/ioscount/index.html
Comparaison MS−Windows NT Server 4.0 −− Unix	http://www.linux−france.com/article/these/unix−vs−nt/unix−vs−nt.html
Netcraft studies	http://www.netcraft.com/survey/
L'AFUL (Association)	http://www.aful.org
APRIL (Association)	http://www.april.org
Linux Center	http://www.linux−center.org
Linux France	http://www.linux−france.com/
Linux Journal	http://www.linuxjournal.com
Linux Gazette	http://www.linuxgazette.com/
Linux Magazine France	http://www.linuxmag−france.com/
Linux Start	http://linuxstart.com/index.html
Da Linux French Page	http://linuxfr.org/news/
RedHat Hardware support	http://www.redhat.com/cgi−bin/support
Mandrake Hardware support for HP	http://www.linux−mandrake.com/fr/hardware.php3?F_FAMILY=all&F_MANUFACTURER=HP&
Mobilix : Linux Mobile	http://mobilix.org/
Linmodems	http://linmodems.org/
	http://www.linux−notebook.org/laptops/

Notebook HQ : Linux Mobile	
Developers Servers	http://www.linuxmama.com/dev−server.html
IA−64 project leader Web site at Cern	http://sverre.home.cern.ch/sverre/SJ.html
IA−64 Intel Web site	http://developer.intel.com/design/itanium/index.htm
Medasys Linux	http://www.medasys−digital−systems.fr/linux

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Chapter 9. Future versions

This chapter gives indications on elements which should be taken in account in future versions of this document. It should be taken more as a reminder for the author, than as an engagement of what he will really do !

Version 0.95

Images path.

Better management of the size of tables (PS).

Place of the footer (PS).

One line paragraph management.

Management of the size of papers, margins and images (PS).

Paragraph on TX/e−vectra management

Rework the printer paragraph

Info script to pass on machines and create a new entry

Integrate LinuxCare certif

Version 0.96

URLs verification in function of the language. Use of official addresses and paragraph on mirrors.

Rework the cluster part

Paragraph on APM for mobiles computer

Linux as a backup server (Arkeia)

Remote Assistant − Remote Control. Management

Put the Argumementations in the TOC (HTML).

Avoid titles in end of page (PS).

Paragraph on network products

Version 0.97

Detail limitations of evolution from Unix to Linux

Rework the example of the vaccine :−)

Rework chapter 1 (put there history and new versions)

Glossary/Abbreviations