Linux Frequently Asked Questions with Answers

Robert Kiesling <kiesling@terracom.net> *Date* : 1998/01/0606 : 16 : 26

This is the list of Frequently Asked Questions about Linux, the free Unix for 386/486/586, Alpha, MIPS, and some 680x0 and PPC processors. (See the question, "1.1" below.) This document should be read in conjunction with the Linux Documentation Project's HOWTO series. (See, "2.5" and "2.1") The `INFO-SHEET` and `META-FAQ`, which are found in the same place, also list sources of Linux information. Please look at these documents, and "11.1", before posting your question to a newsgroup. See, "12.2" for details of where to get the PostScript, Emacs Info, HTML and plain ASCII versions of this document. A new version of the Linux FAQ appears approximately monthly. If this copy is more than a month old, it may be out of date.

Contents

1 Introduction and General Information

1.1 What is Linux?

Linux is the free Unix written from scratch by Linus Torvalds with assistance from a loosely-knit team of hackers from across the Internet. Linux aims towards POSIX compliance, and has all of the features you would expect of a modern, fully-fledged Unix: true multitasking, virtual memory, shared libraries, demand loading, shared, copy-on-write executables, proper memory management, and TCP/IP networking.

Linux runs mainly on 386/486/586-based PCs, using the hardware facilities of the 386 processor family (TSS segments, et al.) to implement these features. Ports to other architectures are underway. (See "1.4")

See the Linux `INFO-SHEET` for more details. (See "2.1")

The Linux kernel is distributed under the GNU General Public License. (See, “1.6”)

——————————————————————————-

1.2 What software does Linux support?

Linux has GCC, Emacs, X-Windows, all the standard Unix utilities, TCP/IP (including SLIP and PPP) and all the hundreds of programs that people have compiled or ported for it.

There is a DOS emulator (available at tsx-11.mit.edu/pub/linux/ALPHA/dosemu) which can run DOS itself and some (but not all) DOS applications. Be sure to look at the `README` file to determine which version of dosemu you should get. Also, see the `DOSEMU-HOWTO` (slightly dated at this point – it doesn't cover the most recent version of the program), which is located at sunsite.unc.edu/pub/Linux/docs/HOWTO.

Work has been progressing on an emulator for Microsoft Windows binaries. (See “3.9”)

iBCS2 (Intel Binary Compatibility Standard) emulator code for SVR4 ELF and SVR3.2 COFF binaries can be included in the kernel as a compile-time option. See the file tsx-11.mit.edu/pub/linux/BETA/ibcs2/README.

For more information see the `INFO-SHEET`, which is one of the the HOWTOs (See “2.1” See also “5.1.”

Some companies have commercial software available, including Motif. They announce their availability in comp.os.linux.announce – try searching the archives. (See “2.9”)

——————————————————————————-

1.3 Does Linux run on my computer? What hardware is supported?

You need a 386, 486 or 586, with at least 2Mb of RAM and a single floppy, to try Linux. To do anything useful, more RAM (4Mb to install most distributions, and 8Mb is highly recommended for running X) and a hard disk are required.

VESA local bus and PCI are supported.

MCA (IBM's proprietary bus) and ESDI hard drives are mostly supported. There is further information on the MCA bus and what cards Linux supports on the Micro Channel Linux web page, http://glycerine.itsmm.uni.edu/mca.

Linux runs on 386 family based laptops, with X on most of them. There is a relevant Web page at http://www.cs.utexas.edu/users/kharker/linux-laptop/.

For details of exactly which PC's, video cards, disk controllers, etc. work see the `INFO-SHEET` and the `Hardware-HOWTO`. (See “2.1”)

There is a port of Linux to the 8086, known as the Embeddable Linux Kernel Subset (ELKS). This is a 16-bit subset of the Linux kernel which will mainly be used for embedded systems. See http://www.linux.org.uk/Linux8086.html for more information. Linux will never run fully on an 8086 or '286, because it requires task-switching and memory management facilities not found on these processors.

Linux supports multiprocessing with Intel MP architecture. See the file `Documentation/smp.tex` in the Linux kernel source code distribution.

1.4 What ports to other processors are there?

A project has been underway for a while to port Linux to suitable 68000-series based systems such as Amigas and Ataris. This has now reached beta-test quality, and there is an X server.

There is a linux-680x0 mailing list. (See "2.8")

The Linux/68k FAQ is located at ftp.uni-erlangen.de/pub/Linux/680x0/FAQ, which is also the Linux/68k archive. It is mirrored at tsx-11.mit.edu/pub/linux/680x0.

There are several mailing lists for the Linux/68k port – mail <majordomo@phil.uni-sb.de> with a body containing the word "lists" – without the quotes – on a line by itself for a listing, and the word "help" on a line by itself for instructions how to subscribe.

There is also a FTP area on ftp.phil.uni-sb.de/pub/atari/linux-68k.

One of the Linux-PPC project pages has moved recently. Its location is http://www.linuxppc.org, and the archive site is ftp.linuxppc.org/linuxppc.

There is a Linux-PPC support page at www.cs.nmt.edu/ linuxppc. There you will find the kernel that is distributed with Linux.

Apple now supports MkLinux development on Power Macs, based on OSF and the Mach microkernel. See http://www.mklinux.apple.com.

A port to the 64-bit DEC Alpha/AXP is at http://www.azstarnet.com/ axplinux/. There is a mailing list at vger.rutgers.edu. (See "2.8")

Ralf Baechle is working on a port to the MIPS, initially for the R4600 on Deskstation Tyne machines. The Linux-MIPS FTP sites are ftp.fnet.fr/linux-mips and ftp://ftp.linux.sgi.com/pub/mips-linux. Interested people may mail their questions and offers of assistance to <linux@waldorf-gmbh.de>.

There is also a MIPS channel on the Linux Activists mailserver and a linux-mips mailing list. (See "2.8")

There are currently two ports of Linux to the ARM family of processors ongoing; one of these is to the ARM3 as fitted to the Acorn A5000, and includes I/O drivers for the 82710/11 as appropriate, and the other is to the ARM610 as fitted to the Acorn Risc PC. The Risc PC port is currently in its early to middle stages, owing to the need to rewrite much of the memory handling. The A5000 port is in restricted beta testing; a release is likely fairly soon.

For more up-to-date information, watch the newsgroup `comp.sys.acorn.misc`. There is a FAQ at ftp.ecs.soton.ac.uk/pub/armlinux/FAQs/general-faq

The Linux SPARC project is a hotbed of activity. There is a FAQ available from Jim Mintha's Linux for SPARC Processors page, http://www.geog.ubc.ca/sparclinux.html. The SPARC/Linux archives are at vger.rutgers.edu/pub/linux/Sparc.

1.5 How much hard disk space does Linux need?

10Mb for a very minimal installation, suitable for trying it out and not much else.

You can squeeze a more complete installation including X Windows into 80Mb. Installating almost all of Debian 0.93R6 takes around 500Mb, including some space for user files and spool areas.

——————————————————————————-

1.6 Is Linux public domain? Copyrighted?

The Linux kernel copyright belongs to Linus Torvalds. He has placed it under the GNU General Public License, which basically means that you may freely copy, change, and distribute it, but you may not impose any restrictions on further distribution, and you must make the source code available.

This is not the same as Public Domain. See the Copyright FAQ, rtfm.mit.edu/pub/usenet/news.answers/law/copyright, for details.

Full details are in the file `COPYING` in the Linux kernel sources (probably in `/usr/src/linux` on your system).

The licenses of the utilities and programs which come with the installations vary. Much of the code is from the GNU Project at the Free Software Foundation, and is also under the GPL.

Note that discussion about the merits or otherwise of the GPL should be posted to `gnu.misc.discuss` and not to the `comp.os.linux` groups.

===

2 Network sources and resources.

——————————————————————————-

2.1 Where can I get the HOWTOs and other documentation?

Look in the following places, and on sites that mirror them.

- ftp.funet.fi (128.214.6.100) : /pub/OS/Linux/doc/HOWTO
- tsx-11.mit.edu (18.172.1.2) : /pub/linux/docs/HOWTO
- sunsite.unc.edu (152.2.22.81) : /pub/Linux/docs/HOWTO

For a complete list of Linux FTP sites, "2.5"

If you don't have access to FTP, try the FTP-by-mail servers at <ftpmail@decwrl.dec.com>, <ftpmail@doc.ic.ac.uk> or <ftp-mailer@informatik.tu-muenchen.de.>.

A complete list of HOWTO's and Mini-HOWTO's is available in the file `HOWTO.INDEX` in the `docs/HOWTO` directory at the FTP sites, or on the Web at http://sunsite.unc.edu/pub/Linux/HOWTO/HOWTO-INDEX.html, but here is a (possibly incomplete) list:

```
AX25-HOWTO                       Access-HOWTO
Assembly-HOWTO                   Benchmarking-HOWTO
BootPrompt-HOWTO                 Bootdisk-HOWTO
CD-Writing-HOWTO                 CDROM-HOWTO
Chinese-HOWTO                    Commercial-HOWTO
Consultants-HOWTO                Cyrillic-HOWTO
DNS-HOWTO                        DOS-to-Linux-HOWTO
DOSEMU-HOWTO                     Danish-HOWTO
Distribution-HOWTO               ELF-HOWTO
Emacspeak-HOWTO                  Ethernet-HOWTO
Finnish-HOWTO                    Firewall-HOWTO
Ftape-HOWTO                      GCC-HOWTO
German-HOWTO                     HAM-HOWTO
HOWTO-INDEX                      Hardware-HOWTO
Hebrew-HOWTO                     IPX-HOWTO
ISP-Hookup-HOWTO                 Installation-HOWTO
Intranet-Server-HOWTO            Italian-HOWTO
Java-CGI-HOWTO                   Kernel-HOWTO
Keyboard-and-Console-HOWTO       MGR-HOWTO
MILO-HOWTO                       Mail-HOWTO
NET-3-HOWTO                      NFS-HOWTO
NIS-HOWTO                        News-HOWTO
Optical-Disk-HOWTO               PCI-HOWTO
PCMCIA-HOWTO                     PPP-HOWTO
Pilot-HOWTO                      Polish-HOWTO
Printing-HOWTO                   Printing-Usage-HOWTO
RPM-HOWTO                        Reading-List-HOWTO
SCSI-HOWTO                       SCSI-Programming-HOWTO
SMB-HOWTO                        Serial-HOWTO
Serial-Programming-HOWTO         Shadow-Password-HOWTO
Slovenian-HOWTO                  Sound-HOWTO
Sound-Playing-HOWTO              Spanish-HOWTO
TeTeX-HOWTO                      Thai-HOWTO
Tips-HOWTO                       UMSDOS-HOWTO
UPS-HOWTO                        UUCP-HOWTO
User-Group-HOWTO                 VAR-HOWTO
VMS-to-Linux-HOWTO               XFree86-HOWTO
XFree86-Video-Timings-HOWTO
3-Button-Mouse
```

The following Mini-HOWTO's are available from http://sunsite.unc.edu/pub/Linux/HOWTO/mini:

```
ADSM-Backup                        AI-Alife
Advocacy                           Backup-With-MSDOS
Battery-Powered                    Boca
BogoMips                           Bridge
Bridge+Firewall                    Clock
Colour-ls                          Comeau-C++
DHCPd                              Dial-On-Demand
Diald                              Dip+SLiRP+CSLIP
Diskless                           Dynamic-IP-Hacks
Ext2fs-Undeletion                  GTEK-BBS-550
HTML-Validation                    IO-Port-Programming
IP-Alias                           IP-Masquerade
IP-Subnetworking                   JE
Jaz-Drive                          Kerneld
Key-Setup                          LBX
LILO                               Large-Disk
Linux+DOS+Win95                    Linux+DOS+Win95+OS2
Linux+NT-Loader                    Linux+OS2+DOS
Linux+Win95                        Loadlin+Win95
Locales                            MIDI+SB
Mail-Queue                         Mail2News
Man-Page                           Multiple-Disks-Layout
Multiple-Ethernet                  NFS-Root
NFS-Root-Client                    Netscape+Proxy
Offline-Mailing                    Online-Support
PLIP                               PPP-over-minicom
Pager                              Partition
Print2Win                          Process-Accounting
Proxy-ARP                          Public-Web-Browser
Qmail+MH                           Quota
RCS                                Remote-Boot
Remote-X-Apps                      SLIP+proxyARP
SLIP-PPP-Emulator                  Sendmail+UUCP
Software-Building                  Software-RAID
Soundblaster-16                    Soundblaster-AWE64
StarOffice                         Swap-Space
Term-Firewall                      Tiny-News
Token-Ring                         Upgrade
VPN                                Virtual-wu-ftpd
Visual-Bell                        Win95+Win+Linux
Windows-Modem-Sharing              WordPerfect
X-Big-Cursor                       XFree86-XInside
```

`Xterm-Title`	`Xterminal`
`ZIP-Drive`	`ZIP-Install`

In addition, translations of the HOWTO's are available from sunsite.unc.edu/pub/Linux/docs/HOWTO/translations and mirrors worldwide. Translations in the following languages are available:

`French (fr)`	`German (de)`
`Italian (it)`	`Japanese (jp)`
`Polish (pl)`	`Spanish (es)`
`Swedish (sv)`	`Turkish (tr)`

The HOWTO's are also on the Web, at the Linux Documentation Project's home page, http://sunsite.unc./edu/LDP, and are posted monthly to the Usenet newsgroup `comp.os.linux.answers`.

More of these documents are always in preparation. Please get in touch with Greg Hankins, <gregh@cc.gatech.edu>, the HOWTO coordinator, if you are interested in writing one. The file sunsite.unc.edu/pub/Linux/HOWTO/HOWTO-INDEX contains guidelines for writing a HOWTO.

The Guide Series produced by the Linux Documentation Project is available from http://sunsite.unc.edu/LDP. Please read them if you are new to Unix and Linux. Here is a list of those available so far:

- The Linux Documentation Project Manifesto, by Matt Welsh.
- Installation and Getting Started Guide, by Matt Welsh.
- The Linux Kernel, by David Rusling.
- The Network Administrator's Guide, by Olaf Kirch.
- The Linux Programmer's Guide, by Sven Goldt, Sven van der Meer, Scott Burkett, and Matt Welsh.
- The Linux System Administrator's Guide, Version 0.5, by Lars Wirzenius.

———————————————————————————————-

2.2 Where should I look on the World Wide Web for Linux stuff?

Greg Hankins, gregh@cc.gatech.edu, maintains the Linux Documentation Project Home Page, at http://sunsite.unc.edu/LDP.

This page refers to all the FAQs and HOWTOs, both those which are available in HTML (WWW) format, and those which aren't.

———————————————————————————————-

2.3 What newsgroups are there for Linux?

There are ten international Usenet newsgroups devoted to Linux.

`comp.os.linux.announce` is the moderated announcements group; you should read this if you intend to use Linux. Submissions for that group should be emailed to <linux-announce@news.ornl.gov>.

`comp.os.linux.answers` contains all the FAQs, HOWTOs and other important documentation. You should subscribe to this too.

Also worth reading are the other groups in the `comp.os.linux.*` hierarchy – you may find that many common problems are too recent to find in this FAQ but are answered in the newsgroups. These groups are

```
comp.os.linux.setup
comp.os.linux.hardware
comp.os.linux.networking
comp.os.linux.x
comp.os.linux.development.apps
comp.os.linux.development.system
comp.os.linux.advocacy
comp.os.linux.misc
```

Remember that since Linux is a Unix clone, most all of the material in `comp.unix.*` and `comp.windows.x.*` groups will be relevant. Apart from hardware considerations, and some obscure or very technical low-level issues, you'll find that these groups are the right place to start.

Please read "11.1" before posting, and make sure you post to the right newsgroup – see 'Welcome to the `comp.os.linux.*` hierarchy' which is posted every two weeks to `comp.os.linux.announce`, `comp.os.linux.answers`, and other groups.

Crossposting between different `comp.os.linux.*` groups is rarely a good idea.

There may well be Linux groups local to your institution or area – check there first.

The groups `comp.os.linux.development`, `comp.os.linux.admin`, and `comp.os.linux.help` were superseded in a recent newsgroup reorganisation. You should no longer use them.

See also "2.7"

Other regional and local newsgroups also exist – you may find the traffic more manageable there. The French Linux newsgroup is `fr.comp.os.linux`. The German one is `de.comp.os.linux`. In Australia, try `aus.computers.linux`. In Croatia there is the moderated group `hr.comp.linux.m`. In Italy, `it.comp.linux`.

——————————————————————————-

2.4 How do I install Linux?

There are several pre-packaged releases of Linux available, including Debian, Red Hat and Slackware. Each contains the software you need to run Linux, ready to install and use. The exact details of which software is included and how to install them vary from release to release.

You should read the `Installation-HOWTO` for more details on how to go about installing Slackware. Red Hat and Debian are both more recent and less buggy, and have more sophisticated installation schemes, but they are less widely used and don't contain quite as wide a range of software.

All of those releases are available via anonymous FTP from various Linux archive sites. See "2.5" There are also a large number of other releases which are distributed less globally, which suit special local and national requirements (for example, better internationalisation support).

———————————————————————————————-

2.5 Where can I get Linux material by FTP?

There are three main archive sites for Linux:

- ftp.funet.fi (Finland, 128.214.6.100) : /pub/OS/Linux
- sunsite.unc.edu (US, 152.2.22.81) : /pub/Linux
- tsx-11.mit.edu (US, 18.172.1.2) : /pub/linux

The best place to get the Linux kernel is ftp.cs.helsinki.fi/pub/Linux_Kernel. Linus Torvalds uploads the most recent kernel versions to this site.

The Debian distribution is available at ftp.debian.org/pub/debian, and the Red Hat distribution at ftp.redhat.com.

The contents of these sites is mirrored (copied, usually approximately daily) by a number of other sites. Please use one close to you – that will be faster for you and easier on the network.

- ftp.sun.ac.za/pub/linux/sunsite/ (South Africa)
- ftp.is.co.za/linux/sunsite/ (South Africa)
- ftp.cs.cuhk.hk/pub/Linux/ (Hong Kong)
- ftp.cs.cuhk.hk/pub/Linux/ (Hong Kong)
- ftp.spin.ad.jp/pub/linux/sunsite.unc.edu/ (Japan)
- ftp.nuri.net/pub/Linux/ (Korea)
- ftp.jaring.my/pub/Linux/ (Malaysia)
- ftp.nus.sg/pub/unix/Linux/ (Singapore)
- ftp.nectec.or.th/pub/mirrors/linux/ (Thailand)
- ftp.dstc.edu.au/pub/linux/ (Australia)
- sunsite.anu.edu.au/pub/linux/ (Australia)
- ftp.monash.edu.au/pub/linux/ (Australia)

- ftp.sydutech.usyd.edu.au/pub/linux/ (Australia)
- ftp.univie.ac.at/systems/linux/sunsite/ (Austria)
- ftp.fi.muni.cz/pub/UNIX/linux/ (Czech Republic)
- ftp.funet.fi/pub/Linux/sunsite/ (Finland)
- ftp.univ-angers.fr/pub/Linux/ (France)
- ftp.iut-bm.univ-fcomte.fr (France)
- ftp.ibp.fr/pub/linux/sunsite/ (France)
- ftp.loria.fr/pub/linux/sunsite/ (France)
- ftp.dfv.rwth-aachen.de/pub/linux/sunsite/ (Germany)
- ftp.germany.eu.net/pub/os/Linux/Mirror.SunSITE/ (Germany)
- ftp.tu-dresden.de/pub/Linux/sunsite/ (Germany)
- ftp.uni-erlangen.de/pub/Linux/MIRROR.sunsite/ (Germany)
- ftp.gwdg.de/pub/linux/mirrors/sunsite/ (Germany)
- ftp.rz.uni-karlsruhe.de/pub/linux/mirror.sunsite/ (Germany)
- ftp.ba-mannheim.de/pub/linux/mirror.sunsite/ (Germany)
- ftp.uni-paderborn.de/pub/Mirrors/sunsite.unc.edu/ (Germany)
- ftp.uni-rostock.de/Linux/sunsite/ (Germany)
- tp.rus.uni-stuttgart.de/pub/unix/systems/linux/MIRROR.sunsite/ (Germany)
- ftp.uni-tuebingen.de/pub/linux/Mirror.sunsite/ (Germany)
- ftp.rz.uni-ulm.de/pub/mirrors/linux/sunsite/ (Germany)
- ftp.kfki.hu/pub/linux/ (Hungary)
- linux.italnet.it/pub/Linux/ (Italy)
- ftp.unina.it/pub/linux/sunsite/ (Italy)
- giotto.unipd.it/pub/unix/Linux/ (Italy)
- cnuce-arch.cnr.it/pub/Linux/ (Italy)
- ftp.flashnet.it/mirror2/sunsite.unc.edu/ (Italy)
- ftp.nijenrode.nl/pub/linux/sunsite.unc-mirror/ (Netherlands)
- ftp.LeidenUniv.nl/pub/linux/sunsite/ (Netherlands)

- ftp.nvg.unit.no/pub/linux/sunsite/ (Norway)
- ftp://sunsite.icm.edu.pl/pub/Linux/sunsite.unc.edu/ (Poland)
- ftp.rediris.es/software/os/linux/sunsite/ (Spain)
- sunsite.rediris.es/software/linux/ (Spain)
- ftp.cs.us.es/pub/Linux/sunsite-mirror/ (Spain)
- ftp.etse.urv.es/pub/mirror/linux/ (Spain)
- ftp.etsimo.uniovi.es/pub/linux/ (Spain)
- ftp.luna.gui.es/pub/linux.new/ (Spain)
- ftp.switch.ch/mirror/linux/ (Switzerland)
- ftp.metu.edu.tr/pub/linux/sunsite/ (Turkey)
- unix.hensa.ac.uk/mirrors/sunsite/pub/Linux/ (UK)
- ftp.maths.warwick.ac.uk/mirrors/linux/sunsite.unc-mirror/ (UK)
- ftp.idiscover.co.uk/pub/Linux/sunsite.unc-mirror/ (UK)
- sunsite.doc.ic.ac.uk/packages/linux/sunsite.unc-mirror/ (UK)
- ftp.dungeon.com/pub/linux/sunsite-mirror/ (UK)
- ftp.io.org/pub/mirrors/linux/sunsite/ (Canada)
- ftp.cc.gatech.edu/pub/linux/ (US)
- ftp.cdrom.com/pub/linux/sunsite/ (US)
- ftp.siriuscc.com/pub/Linux/Sunsite/ (US)
- ftp.engr.uark.edu/pub/linux/sunsite/ (US)
- ftp.infomagic.com/pub/mirrors/linux/sunsite/ (US)
- linux.if.usp.br/pub/mirror/sunsite.unc.edu/pub/Linux/ (Brazil)
- farofa.ime.usp.br/pub/linux/ (Brazil)

Not all of these mirror all of the other 'source' sites, and some have material not available on the 'source' sites.

————————————————————————————-

2.6 I don't have FTP access. Where do I get Linux?

The easiest thing is probably to find a friend with FTP access. If there is a Linux users group near you, they may be able to help.

If you have a reasonably good email connection you could try the FTP-by-mail servers at <ftpmail@ftp.sunet.se>, <ftpmail@garbo.uwasa.fi> or <ftpmail@ftp.uni-stuttgart.de>.

Linux is also available via traditional mail on diskette, CD-ROM and tape. The file sunsite.unc.edu/pub/Linux/docs/HOWTO/Installation-HOWTO, and the file sunsite.unc.edu/pub/Linux/docs/distributions/Distribution-HOWTO contain information on these distributions.

2.7 I don't have Usenet access. Where do I get information?

A digest of comp.os.linux.announce is available by mailing the word "subscribe" (without the quotes) as the body of a message to <mailto:linux-announce-REQUEST@news-digests.mit.edu>. You are strongly advised to subscribe to this list, as it carries important information and documentation about Linux.

Please remember to use the `*-request` addresses for your subscription and unsubscription messages; mail to the other address is posted to the newsgroup!

2.8 What mailing lists are there?

The Linux developers now mainly use the Majordomo server at <majordomo@vger.rutgers.edu>. Send a message with the word "lists" (without the quotes) in the body to get a list of the lists there; add a line with the word "help" to get the standard Majordomo help file which has instructions for subscribing and unsubscribing.

Note that most of these lists are used by the developers of Linux to talk about technical issues and future developments. These are not intended for new users' questions.

There is a `linux-newbie` list where "no question is too stupid"; unfortunately it seems that few of the experienced users read that channel. It does have very low volume.

There used to be a multi-channel Linux mailing list server on `niksula.hut.fi`. This shut down during the summer of 1995.

2.9 Are the newsgroups archived anywhere?

sunsite.unc.edu//pub/Linux/docs/linux-announce.archive contains archives of `comp.os.linux.announce`. These are mirrored from src.doc.ic.ac.uk/usenet, which also archives `comp.os.linux`, `comp.os.linux.development.apps`, and `comp.os.linux.development.system`.

There is an "easy to access" archive of `comp.os.linux.announce` on the World Wide Web at http://www.leo.org/archiv/linux/archiv/ann_index.html. It supports searching and browsing.

==

3 Compatibility with other operating systems.

——————————————————————————————-

3.1 Can Linux share my disk with DOS? OS/2? 386BSD? Win95?

Yes. Linux uses the standard MS-DOS partitioning scheme, so it can share your disk with other operating systems. Note, however, that many of these other operating systems are rather picky. DOS's `FDISK.EXE` and `FORMAT.EXE`, for example, can sometimes overwrite data in a Linux partition, because they sometimes incorrectly use partition data from the partition's boot sector rather than the partition table.

In order to prevent programs like these from doing this, it is a good idea to zero out – under Linux – the start of a partition you created, before you use MS-DOS – or whatever – to format it. Type:

```
$ dd if=/dev/zero of=/dev/hdXY bs=512 count=1
```

where `hdXY` is the relevant partition; e.g., `hda1` for the first partition of the first (IDE) disk.

Linux can read and write the files on your DOS and OS/2 FAT partitions and floppies using either the DOS filesystem type built into the kernel or mtools. There is kernel support for the VFAT filesystem used by Windows 95 and Windows NT.

"1.2" for details and status of the emulators for DOS, MS Windows, and System V programs.

See, "3.5" and, "3.8" "3.6" "3.7"

——————————————————————————————-

3.2 How do I access files on my DOS partition or floppy?

Use the DOS filesystem; i.e., type, for example:

```
$ mkdir /dos
$ mount -t msdos -o conv=text,umask=022,uid=100,gid=100 /dev/hda3 /dos
```

If it's a floppy, don't forget to umount it before ejecting it!

You can use the `conv=text/binary/auto`, `umask=nnn`, `uid=nnn`, and `gid=nnn` options to control the automatic line-ending conversion, permissions and ownerships of the files in the DOS filesystem as they appear under Linux. If you mount your DOS filesystem by putting it in your `/etc/fstab`, you can record the options (comma-separated) there, instead of defaults.

Alternatively, you can use mtools, available in both binary and source form on the FTP sites – "2.5".

A kernel patch (known as the fd-patches) is available which allows floppies with nonstandard numbers of tracks and/or sectors to be used; this patch is included in the 1.1 alpha testing kernel series.

——————————————————————————————-

3.3 Can I use my Stacked/DBLSPC/etc. DOS drive?

Not very easily. You can access DOS 6.X volumes from the DOS emulator (“1.2”), but it’s harder than accessing a normal DOS volume via the DOS kernel module or mtools.

There is a module available for the Linux kernel which can do read-only access of the compressed volume. Look in sunsite.unc.edu/pub/Linux/system/filesystems/dosfs for this package.

——————————————————————————————-

3.4 Can I access OS/2 HPFS partitions from Linux?

Yes, but Linux access to HPFS partitions is read-only. HPFS filesystem access is available as an option when compiling the kernel or as a module. See the `Documentation/filesystems/hpfs.txt` file in the kernel source distribution. “7.6”). Then you can mount HPFS partition, using, for example:

```
$ mkdir /hpfs
$ mount -t hpfs /dev/hda5 /hpfs
```

——————————————————————————————-

3.5 Can Linux access Amiga filesystems?

The Linux kernel has support for the Amiga Fast File System (AFFS) version 1.3 and later, both as a compile-time option and as a module. The file `Documentation/filesystems/affs.txt` in the Linux kernel source distribution has more information.

See “7.6”).

Linux supports AFFS hard-drive partitions only, though: floppie access is not supported due to incompatibilities between Amiga floppy controllers, and PC and workstation controllers. The AFFS driver can also mount disk partitions used by the Un*x Amiga Emulator, by Bernd Schmidt.

——————————————————————————————-

3.6 Can Linux access BSD, SysV, etc. UFS?

Recent kernels can mount (read only) the UFS filesystem used by System V; Coherent; Xenix; BSD and derivatives like SunOS, FreeBSD, NetBSD, and NeXTstep. UFS support is available as a kernel compile-time option and a module.

See “7.6”).

——————————————————————————————————-

3.7 Can Linux access SMB filesystems?

Linux supports read/write access of Word for Windows and Windoze NT SMB volumes. See the file Documentation/filesystems/smbfs.txt of the Linux kernel source distribution, and "7.6" in this FAQ.

There is also a suite of programs called Samba which provide support for Word for Windows networked filesystems (provided they're for TCP/IP). Information is available in the README file at sunsite.unc.edu/pub/Linux/system/network/samba.

There is a SMB web site at samba.canberra.edu.au/pub/samba.

——————————————————————————————————-

3.8 Can Linux access Mac filesystems?

There is a set of user-level programs that read and write the Macintosh Hierarchical File System (HFS). It is available at sunsite.unc.edu/pub/Linux/utils/disk-management.

——————————————————————————————————-

3.9 Can I run Microsoft Windows programs under Linux?

Not yet. There is a project, known as WINE, to build a MS Windows emulator for Linux, but it is still not ready for general distribution. If you want to contribute to its development, look for the status reports in the `comp.emulators.ms-windows.wine` newsgroup.

A commercial, working product known as WABI is said to provide full MS-Windows emulation under Linux. It is available from SunSoft, Inc.

There is also a FAQ, compiled by P. David Gardner, at sunsite.unc.edu/pub/Linux/docs/faqs/Wine-FAQ/.

In the meantime, if you need to run MS Windows programs, the best bet – seriously – is to reboot. LILO, the Linux bootloader, can boot one of several operating systems from a menu. See the LILO documentation for details.

——————————————————————————————————-

3.10 How can I boot Linux from OS/2's Boot Manager?

1. Create a partition using OS/2's `FDISK.EXE` (Not Linux's `fdisk`).

2. Format the partition under OS/2, either with FAT or HPFS. This is so that OS/2 knows about the partition being formatted. (This step is not necessary with OS/2 "warp" 3.0.)

3. Add the partition to the Boot Manager.

4. Boot Linux, and create a filesystem on the partition using `mkfs -t ext2` or `mke2fs`. At this point you may, if you like, use Linux's `fdisk` to change the code of the new partition to type 83 (Linux Native) – this may help some automated installation scripts find the right partition to use.

5. Install Linux on the partition.

6. Install LILO on the Linux partition – NOT on the master boot record of the hard drive. This installs LILO as a second-stage boot loader on the Linux partition itself, to start up the kernel specified in the LILO config file. To do this, you should put

```
boot = /dev/hda2
```

(where `/dev/hda2` is the *partition* you want to boot from) in your `/etc/lilo/config` or `/etc/lilo.config` file.

7. Make sure that it is the Boot Manager partition that is marked active, so that you can use Boot Manager to choose what to boot.

——————————————————————————————-

3.11 How can I share a swap partition between Linux and MS Windows?

See the Mini-HOWTO on the subject by H. Peter Anvin, <hpa@yggdrasil.com>. It is available at sunsite.unc.edu/pub/Linux/docs/HOWTO/mini/Swap-Space.

==

4 Linux's handling of filesystems, disks and drives

——————————————————————————————-

4.1 How can I get Linux to work with my large disk?

If your disk is an IDE or EIDE drive, you should read the file `/usr/src/linux/drivers/block/README.ide` (part of the Linux kernel source code). This README contains many helpful hints about IDE drives. Many modern IDE controllers do translation between 'physical' cylinders/heads/sectors and 'logical' ones.

SCSI disks are accessed by linear block numbers. The BIOS invents some 'logical' cylinder/head/sector fiction to support DOS.

DOS will usually not be able to access partitions which extend beyond 1024 logical cylinders, and will make booting a Linux kernel from such partitions using LILO problematic at best.

You can still use such partitions for Linux or other operating systems that access the controller directly.

It's recommend that you create at least one Linux partition entirely under the 1024-logical-cylinder limit, and boot from that. The other partitions will then be okay.

—————————————————————————————-

4.2 How can I undelete files?

In general, this is very hard to do on Unices because of their multitasking nature. Undelete functionality for the ext2fs is being worked on, but don't hold your breath.

There are a number of packages available which instead provide new commands for deleting and copying which move deleted files into a 'wastebasket' directory. The files can be recovered until cleaned out automatically by background processing.

Alternatively, you can search the raw disk device which holds the filesystem in question. This is hard work, and you will need to be root to do this.

—————————————————————————————-

4.3 Is there a defragmenter for ext2fs etc.?

Yes. There is `defrag`, a Linux filesystem defragmenter for ext2, minix and old-style ext filesystems. It is available at sunsite.unc.edu/pub/Linux/system/filesystems/defrag-0.70.tar.gz.

Users of the ext2 filesystem can probably do without `defrag`, because ext2 contains extra code to keep fragmentation reduced even in very full filesystems.

—————————————————————————————-

4.4 How do I format and create a filesystem on a floppy?

To format a 3.5-inch, high density floppy:

```
$ fdformat /dev/fd0H1440
$ mkfs -t ext2 -m 0 /dev/fd0H1440 1440
```

For a 5.25 inch floppy, use `fd0h1200` and `1200` as appropriate. For the 'B' drive use `fd1` instead of `fd0`.

The `-m 0` option tells `mkfs.ext2` not to reserve any space on the disk for the superuser – usually the last 10% is reserved for root.

The first command performs a low-level format. The second creates an empty filesystem. You can mount the floppy like a hard disk partition and simply `cp` and `mv` files, etc.

Device naming conventions generally are the same as for other Unices. They can be found in Matt Welsh's *Installation and Getting Started Guide.* (See ("2.1") A more detailed and technical description is *Linux Allocated Devices* by H. Peter Anvin, <hpa@zytor.com>, which is included in LaTeX and ASCII form in the kernel source distribution (probably in `/usr/src/kernel/Documentation`), as `devices.tex` and `devices.txt`.

—————————————————————————————-

4.5 I get nasty messages about inodes, blocks, and the suchlike.

You probably have a corrupted filesystem, probably caused by not shutting Linux down properly before turning off the power or resetting. You need to use a recent shutdown program to do this – for example, the one included in the util-linux package, available on sunsite and tsx-11.

If you're lucky the program fsck (or e2fsck or xfsck as appropriate if you don't have the automatic fsck front-end) will be able to repair your filesystem; if you're unlucky the filesystem is trashed and you'll have to reinitialise it with mkfs (or mke2fs, mkxfs, etc.) and restore from a backup.

NB: don't try to check a filesystem that's mounted read-write - this includes the root partition if you don't see

```
VFS: mounted root ... read-only
```

at boot time.

——————————————————————————-

4.6 My swap area isn't working.

When you boot (or enable swapping manually) you should see

```
Adding Swap: NNNNk swap-space
```

If you don't see any messages at all you are probably missing swapon -av (the command to enable swapping) in your `/etc/rc.local` or `/etc/rc.d/*` (the system startup scripts), or have forgotten to make the right entry in `/etc/fstab`:

```
/dev/hda2       none       swap       sw
```

for example.

If you see

```
Unable to find swap-space signature
```

you have forgotten to run **mkswap**. See the manpage for details; it works much like **mkfs**.

Check the Installation HOWTO for detailed instructions of how to set up a swap area.

——————————————————————————-

4.7 How do I remove LILO so my system boots DOS again?

Using DOS (MS-DOS 5.0 or later, or OS/2), type `FDISK /MBR` (which is not documented). This will restore a standard MS-DOS Master Boot Record. If you have DR-DOS 6.0, go into FDISK in the normal way and then select the 'Re-write Master Boot Record' option.

If you don't have DOS 5 or DR-DOS you need to have the boot sector that LILO saved when you first installed it. You did keep that file, didn't you ? It's probably called `boot.0301` or some such. Type

```
dd if=boot.0301 of=/dev/hda bs=445 count=1
```

(or `sda` if you're using a SCSI disk). This may also wipe out your partition table, so beware! If you're desperate, you could use

```
dd if=/dev/zero of=/dev/hda bs=512 count=1
```

This will erase your partition table and boot sector completely: you can then reformat the disk using your favorite software. But this will render the contents of your disk inaccessible – you'll lose it all unless you're an expert.

Note that the DOS MBR boots whichever (single!) partition is flagged as 'active'. You may need to use `fdisk` to set and clear the active flags on partitions appropriately.

——————————————————————————-

4.8 Why can't I use fdformat except as root?

The system call to format a floppy may only be done as root, regardless of the permissions of `/dev/fd0*`. If you want any user to be able to format a floppy, try getting the `fdformat2` program. This works around the problems by being setuid to root.

——————————————————————————-

4.9 Is there something like Stacker or Doublespace for Linux?

Currently none of the Linux filesystems can do compression in the filesystem.

There is a program called Zlibc which allows existing applications to read compressed (GNU zipped) files as if they were not compressed. After installing it, you can compress files using `gzip`, and programs will still find them, without having to change the programs. Look on sunsite.unc.edu in /pub/Linux/libs. The author is <Alain.Knaff@imag.fr>.

There is a compressing block device driver that can provide filesystem-independent, on-the-fly disk compression in the kernel. It is called 'DouBle'. There is a source-only distribution on sunsite.unc.edu in /pub/Linux/kernel/patches/diskdrives; the author is Jean-Marc Verbavatz <jmv@receptor.mgh.harvard.edu>. Note that since this compresses inodes (administrative information) and directories as well as file contents any corruption is quite likely to be serious.

There is also a package available called tcx (Transparently Compressed Executables) which allows you to keep infrequently used executables compressed and only uncompress them temporarily while you use them. You'll find it at sunsite.unc.edu/pub/Linux/utils/compress

Note: this is not the same as `gzexe`, which is an inferior implementation of the same concept.

——————————————————————————-

4.10 My ext2fs partitions are checked each time I reboot.

See “8.12”.

————————————————————————————-

4.11 My root filesystem is read-only!

Remount it. If `/etc/fstab` is correct, you can simply `mount -n -o remount /`. If `/etc/fstab` is wrong you must give the device name and posibly the type too: e.g. `mount -n -o remount -t ext2 /dev/hda2 /`. To understand how you got into this state, see “8.12”

————————————————————————————-

4.12 I have a huge /proc/kcore! Can I delete it?

None of the files in /proc are really there - they're all ”pretend” files made up by the kernel, to give you information about the system, and don't take up any hard disk space.

/proc/kcore is like an ”alias” for the memory in your computer; its size is the same as the amount of RAM you have, and if you ask to read it as a file the kernel does memory reads.

————————————————————————————-

4.13 My AHA1542C doesn't work with Linux.

The option to allow disks with more than 1024 cylinders is only required as a workaround for a DOS misfeature and should be turned *off* under Linux. For older Linux kernels you need to turn off most of the ”advanced BIOS” options – all but the one about scanning the bus for bootable devices.

==

5 Porting, compiling and obtaining programs

————————————————————————————-

5.1 How do I port XXX to Linux?

In general, Unix programs need very little porting. Simply follow the installation instructions. If you don't know – and don't know how to find out – the answers to some of the questions asked during the installation procedure, you can guess, but this tends to produce buggy programs. In this case, you're probably better off asking someone else to do the port.

If you have a BSD-ish program, you should try using `-I/usr/include/bsd` and `-lbsd` on the appropriate parts of the compilation lines.

———————————————————————————————-

5.2 What is ld.so and where do I get it?

`ld.so` is the dynamic library loader. Each binary using shared libraries used to have about 3K of start-up code to find and load the shared libraries. Now that code has been put in a special shared library, `/lib/ld.so`, where all binaries can look for it, so that it wastes less disk space, and can be upgraded more easily.

`ld.so` can be obtained from tsx-11.mit.edu/pub/linux/packages/GCC and mirror sites. The latest version at the time of writing is `ld.so.1.9.5.tar.gz`.

`/lib/ld-linux.so.1` is the same thing for ELF "(7.14)" and comes in the same package as the `a.out` loader.

———————————————————————————————-

5.3 Has anyone ported / compiled / written XXX for Linux?

First, look in the Linux Software Map – it's at sunsite.unc.edu/pub/Linux/docs/linux-software-map, and on the other FTP sites. A search engine is available on the World Wide Web at http://www.boutell.com/lsm/.

Check the FTP sites "2.5" first – search the `ls-lR` or `INDEX` files for appropriate strings.

Also look at the Linux Projects Map, ftp.ix.de/pub/ix/Linux/docs/Projects-Map.gz.

If you don't find anything, you could either download the sources to the program yourself and compile them. See "5.1" If it's a large package which may require some porting, post a message to `comp.os.linux.development.apps`.

If you compile a large-ish program, please upload it to one or more of the FTP sites, and post a message to `comp.os.linux.announce` (submit your posting to <linux-announce@news.ornl.gov>).

If you're looking for an application program, the chances are that someone has already written a free verson. The `comp.sources.wanted` FAQ has instructions for finding the source code.

———————————————————————————————-

5.4 Can I use code or a compiler compiled for a 486 on my 386?

Yes, unless it's the kernel.

The -m486 option to GCC, which is used to compile binaries for x486 machines, merely changes certain optimisations. This makes for slightly larger binaries which run somewhat faster on a 486. They still work fine on a 386, though, with a small performance hit.

However, from version 1.3.35 the kernel will use 486- or Pentium-specific instructions if configured for a 486 or Pentium, thus making it unusable on a 386.

GCC can be configured for a 386 or 486; the only difference is that configuring it for a 386 makes -m386 the default and configuring for a 486 makes -m486 the default; in either case these can be overriden on a per-compilation basis or by editing /usr/lib/gcc-lib/i*-linux/n.n.n/specs.

There is an Alpha version of GCC which knows how to do optimisation well for the 586, but it is quite unreliable, especially at high optimisation settings. The Pentium GCC can be found on tsx-11.mit.edu in /pub/linux/ALPHA/pentium-gcc. I'd recommend using the ordinary 486 GCC instead; word has it that using -m386 produces code that's better for the Pentium, or at least slightly smaller.

——————————————————————————————-

5.5 What does gcc -O6 do?

Currently the same as -O2 (GCC 2.5) or -O3 (GCC 2.6, 2.7); any number greater than that currently does the same thing. The Makefiles of newer kernels use -O2, and you should probably do the same.

——————————————————————————————-

5.6 Where are linux/*.h and asm/*.h?

These are in the directories `/usr/include/linux` and `/usr/include/asm`. However, they should be symbolic links to your kernel sources in `/usr/src/linux`, *not* actual directories.

If you don't have the kernel sources, download them – see, "ref id="How do I upgrade/recompile my kernel?"¿"

Then, use `rm` to remove any garbage, and `ln` to create the links:

```
rm -rf /usr/include/linux /usr/include/asm
ln -sf /usr/src/linux/include/linux /usr/include/linux
ln -sf /usr/src/linux/include/asm /usr/include/asm
```

`/usr/src/linux/include/asm` is a symbolic link to an architecture-specific asm-<arch> directory – if you have a freshly unpacked kernel source tree you must use make symlinks. You'll also find that you may need to do make config in a newly-unpacked kernel source tree, to create <linux/autoconf.h>.

——————————————————————————————-

5.7 I get errors when I try to compile the kernel.

See the previous question regarding the header files.

Remember that when you apply a patch to the kernel, you must use the `-p0` or `-p1` option: otherwise the patch may be misapplied. See the `patch` manual page for details.

If you're patching to a kernel more recent than 1.1.44, you should find that there are new directories `/usr/src/linux/include/asm-i386.` The directory `asm` there should be removed. The symlinks Makefile target will make these be symbolic links to `asm-i386` and `arch/i386/boot`, respectively. The easiest way to make sure all this gets done is not to try to patch 1.1.44 to make 1.1.45, but to download linux-1.1.45.tar.gz instead.

`ld: unrecognised option '-qmagic'` means that you should get a newer linker, from ftp://tsx-11.mit.edu/pub/linux/packages/GCC, in the file `binutils-2.8.1.0.1.bin.tar.gz`.

——————————————————————————————————————-

5.8 How do I make a shared library?

For ELF,

```
gcc -fPIC -c *.c
gcc -shared -Wl,-soname,libfoo.so.1 -o libfoo.so.1.0 *.o
```

For `a.out`, get tools-n.nn.tar.gz from tsx-11.mit.edu, in /pub/linux/packages/GCC/src. It comes with documentation that will tell you what to do. Note that `a.out` shared libraries are a very tricky business. Consider upgrading your libraries to ELF shared libraries. See the ELF HOWTO, at sunsite.unc.edu/pub/Linux/docs/HOWTO/

——————————————————————————————————————-

5.9 My executables are (very) large.

With an ELF compiler (see Q8.2 'What's all this about ELF ?') the most common cause of large executables is the lack of an appropriate .so library link for one of the libraries you're using. There should be a link like libc.so for every library like libc.so.5.2.18.

With an `a.out compiler` (see, "7.14") the most common cause of large executables is the `-g` linker (compiler) flag. This produces (as well as debugging information in the output file) a program which is statically linked, i.e. one which includes a copy of the C library instead of using a dynamically linked copy.

Other things worth investigating are `-O` and `-O2` which enable optimisation (check the GCC documentation) and `-s` (or the strip command) which strip the symbol information from the resulting binary (making debugging totally impossible).

You may wish to use `-N` on very small executables (less than 8K with the `-N`), but you shouldn't do this unless you understand its performance implications, and definitely never with daemons.

——————————————————————————————————————-

5.10 Does Linux support threads or lightweight processes?

As well as the Unix multiprocessing model involving heavyweight processes, which is of course part of the standard Linux kernel, there are several implementations of lightweight processes or threads, most of which are generic packages for any Unix:

- In sipb.mit.edu:/pub/pthread or ftp.ibp.fr:/pub/unix/threads/pthreads. Documentation isn't in the package, but is available on the World Wide Web at http://www.mit.edu:8001/people/proven/home_page.html. Newer Linux libcs contain the pthreads source; the GNU Ada compiler on sunsite.unc.edu in /pub/Linux/devel/lang/ada/gnat-3.01-linux+elf.tar.gz contains binaries made from that source code.
- In ftp.cs.washington.edu:/pub/qt-001.tar.Z is QuickThreads. More information can be found in the technical report, available on the same site as /tr/1993/05/UW-CSE-93-05-06.PS.Z.
- In gummo.doc.ic.ac.uk:/rex is lwp, a very minimal implementation.
- In ftp.cs.fsu.edu:/pub/PART, an Ada implementation. This is useful mainly because it has a lot of PostScript papers that you'll find useful in learning more about threads. This is not directly usable under Linux.

Please contact the authors of the packages in question for details.

Kernel version 1.3.35 contains some support for kernel threads, but this code has not been well-tested.

——————————————————————————————————-

5.11 Where can I get 'lint' for Linux?

Roughly equivalent functionality is built into the GNU C compiler (gcc) which is used by Linux systems. Use the -Wall option to turn on most of the useful extra warnings. Check the GCC manual for more details (type control-h followed by i in Emacs and select the entry for GCC).

There is a freely available program called 'lclint' that does much the same thing as traditional lint. The announcement and source code are available at on larch.lcs.mit.edu in /pub/Larch/lclint; on the World Wide Web look at http://larch-www.lcs.mit.edu:8001/larch/lclint.html.

——————————————————————————————————-

5.12 Where can I find 'kermit' for Linux?

Kermit is distributed under a non-GPL copyright that makes its terms of distribution somewhat different. The sources and some binaries are available on kermit.columbia.edu as

```
kermit/archives/ckermit-6.0.192-7.i386.rpm        # RedHat
kermit/archives/ckermit-6.0.192-7.sparc.rpm
kermit/archives/ckermit-6.0.192-7.alpha.rpm
kermit/archives/ckermit-6.0.192-7.src.rpm
kermit/archives/cku192.debian.tar                 # Debian
kermit/archives/cku192.slackware-i386.tgz         # Slackware
```

Other Linux binaries are available in

```
kermit/bin/ckuker.linux-2.0-alpha
kermit/bin/ckuker.linux-2.0.27-sparc
kermit/bin/ckuker.linux-2.0.28-mklinux-mach3.0-ppc
kermit/bin/ckuker.linux-1.2.13-i386-elf
kermit/bin/ckuker.linux-2.1.13-i386-elf
```

The files `/kermit/READ.ME` and `/kermit/c-kermit/READ.ME` have further details.

The WWW Home Page of the Columbia University Kermit project is http://www.columbia.edu/kermit

==

6 Solutions to common miscellaneous problems.

——————————————————————————-

6.1 free dumps core.

In Linux 1.3.57 and later the format of /proc/meminfo was changed in a way that the implementation of free doesn't understand.

Get the latest version, from sunsite.unc.edu in /pub/Linux/system/Status/ps/procps-0.99.tgz.

——————————————————————————-

6.2 My clock is very wrong.

There are two clocks in your computer. The hardware (CMOS) clock runs even when the computer is off and is used to when the system starts up and by DOS (if you use it). The ordinary system time, shown and set by date, is maintained by the kernel while Linux is running.

You can display the CMOS clock time, or set either clock from the other, with /sbin/clock program - see man 8 clock.

There are various other programs that can correct either or both clocks for systematic drift or transfer time across the network. Some of them may already be installed on your system. Try looking at or for adjtimex (corrects for drift), netdate and getdate (simply get the time from the network) or xntp (accurate fully-featured network time daemon).

——————————————————————————-

6.3 Setuid scripts don't seem to work.

That's right. This feature has been deliberately disabled in the Linux kernel because setuid scripts are almost always a security hole. If you want to know why read the FAQ for comp.unix.questions.

——————————————————————————-

6.4 Free memory as reported by free keeps shrinking.

The 'free' figure printed by free doesn't include memory used as a disk buffer cache - shown in the 'buffers' column. If you want to know how much memory is really free add the 'buffers' amount to 'free' - newer versions of free print an extra line with this info.

The disk buffer cache tends to grow soon after starting Linux up, as you load more programs and use more files and the contents get cached. It will stabilise after a while.

——————————————————————————-

6.5 When I add more memory it slows to a crawl.

This is quite a common symptom of a failure to cache the additional memory. The exact problem depends on your motherboard.

Sometimes you have to enable caching of certain regions in your BIOS setup. Look in the CMOS setup and see if there is an option to cache the new memory area which is currently switched off. This is apparently most common on a 486.

Sometimes the RAMs have to be in certain sockets to be cached.

Sometimes you have to set jumpers to enable the caching.

Some motherboards don't cache all the RAM if you have more RAM per amount of cache than they expect. Usually a full 256K cache will solve this problem.

If in doubt, check your motherboard manual. If you still can't fix it because the documentation is inadequate you might like to post a message to comp.os.linux.hardware giving *all* the details - make, model number, date code, etc. so that other Linux users can avoid it.

——————————————————————————-

6.6 Some programs (e.g. xdm) won't let me log in.

You are probably using non-shadow-password programs but are using shadow passwords.

If so, you have to get or compile a shadow password version of the program(s) in question. The shadow password suite can be found in (amongst other places):
tsx-11.mit.edu:/pub/linux/sources/usr.bin/shadow-* This is the source code; you will probably find the binaries in .../linux/binaries/usr.bin.

——————————————————————————-

6.7 Some programs let me log in with no password.

You probably have the same problem as in "6.6", with an added wrinkle:

If you are using shadow passords you should put a letter x or an asterisk in the password field of /etc/passwd for each account, so that if a program doesn't know about the shadow passwords it won't think it's a passwordless account and let anyone in.

——————————————————————————-

6.8 My machine runs very slowly when I run GCC / X / ...

You may not have any swap enabled. You need to enable swapping to allow Linux to page out bits of data programs aren't using at the moment to disk to make more room for other programs and data. If you don't Linux has to keep data in memory and throw away in-memory copies of programs (which are paged straight from the filesystem) and so less and less program is in memory and everything runs very slowly.

See the Installation HOWTO and the Installation and Getting Started Guide (See "2.1") for details of how to set up a swap partition or swapfile; see also "4.6".

Alternatively, you may have too little real memory. If you have less RAM than all the programs you're running at once, Linux will use your hard disk instead and thrash horribly. The solution in this case is to not run so many things at once or to buy more memory. You can also reclaim some memory by compiling and using a kernel with less options configured. See "7.6".

You can tell how much memory and/or swap you're using by using the free command, or by typing

```
cat /proc/meminfo
```

If your kernel is configured with a ramdisk this is probably wasted space and will cause things to go slowly. Use LILO or rdev to tell the kernel not to allocate a ramdisk (see the LILO documentation or type `man rdev`).

——————————————————————————-

6.9 I can only log in as root.

You probably have some permission problems, or you have a file /etc/nologin.

If the latter, put `rm -f /etc/nologin` in your `/etc/rc.local` or `/etc/rc.d/*` scripts.

Otherwise, check the permissions on your shell, and any filenames which appear in error messages, and also the directories containing these files all the way up the tree, up to and including the root directory.

——————————————————————————-

6.10 My screen is all full of weird characters instead of letters.

You probably sent some binary data to your screen by mistake. Type `echo '\033c'` to fix it. Many Linux distributions have a command reset that does this.

——————————————————————————-

6.11 I have screwed up my system and can't log in to fix it.

Reboot from an emergency floppy or floppy pair, for example the Slackware boot- and root-disk pair (in the install subdirectory of the Slackware mirrors) or the MCC installation boot floppy. There are also two do-it-yourself rescue disk creation packages in sunsite.unc.edu/pub/Linux/system/Recovery. These are better because as they have your own kernel on them, so that you don't run the risk of missing devices, filesystems, and so forth.

Get to a shell prompt and mount your hard disk with something like

```
>   mount -t ext2 /dev/hda1 /mnt
```

Then your filesystem is available under the directory `/mnt` and you can fix the problem. Remember to unmount your hard disk before rebooting (`cd` back down to `/` first, or it will say it's busy).

——————————————————————————————-

6.12 I've discovered a huge security hole in `rm`!

No you haven't. You are obviously new to Unix and need to read a good book on it to find out how things work. Clue: ability to delete files under Unix depends on permission to write the directory they are in.

——————————————————————————————-

6.13 `lpr(1)` and/or `lpd(8)` don't work.

First make sure that your `/dev/lp*` port is correctly configured. Its IRQ (if any) and port address need to match the settings on the board. You should be able to dump a file directly to the printer; e.g.:

```
$ cat the_file >/dev/lp1
```

If lpr gives you a message like "myname@host: host not found", it may mean that the TCP/IP loopback interface, lo, isn't working properly. Loopback support is compiled into most distribution kernels. Check that the interface is configured with the `ifconfig` command. By Internet convention, the network number is 127.0.0.0, and the local host address is 127.0.0.1. If everything is configured correctly, you should be able to telnet to your own machine and get a `login` prompt.

If your machine has a network-aware `lpd`, like the one that comes with LPRng, make sure that the `lpd.perms` file is configured correctly.

Check also the `Printing-HOWTO` "2.1".

——————————————————————————————-

6.14 Timestamps on files on msdos partitions are set incorrectly.

There is a bug in the program `clock(8)` (often found in `/sbin`) – it miscounts a timezone offset, confusing seconds with minutes or some such. Get a new version of it.

——————————————————————————-

6.15 How do I get LILO to boot the `vmlinux` file?

In kernel versions 1.1.80 and later, the compressed kernel image, which is what LILO needs to find, has been moved to `arch/i386/boot/zImage`. The `vmlinux` file in the root directory is the uncompressed kernel, and you shouldn't try to boot it.

This change has been made to make it easier to build the versions for several different processors from the same source tree.

==

7 How do I do this or find out that ... ?

——————————————————————————-

7.1 How can I get scrollback in text mode?

With the default US keymap you can use Shift with the PageUp and PageDown keys (NB: these must be the grey ones, not the ones on the numeric keypad!). With other keymaps check the maps in `/usr/lib/keytables`; you can remap the ScrollUp and ScrollDown keys to be whatever you like – for example, in order to remap them to keys that exist on an 84-key AT keyboard.

You can't increase the amount of scrollback, because of the way it is implemented using the video memory to store the scrollback text, though you may be able to get more scrollback in each virtual console by reducing the total number of VC's – see <`linux/tty.h`>.

——————————————————————————-

7.2 How do I switch virtual consoles? How do I enable them?

In text mode, press Left Alt-F1 to Alt-F12 to select the consoles `tty1` to `tty12`; Right Alt-F1 gives `tty13` and so on. To switch out of X windows you must press Ctrl-Alt-F1, etc; Alt-F5 or whatever will switch back.

If you want to use a VC for ordinary login you need to list it in `/etc/inittab`, which controls which terminals and virtual consoles have login prompts. NB: X needs at least one free VC in order to start.

Kernels earlier than around 1.1.59 have a compiled-in limit on the number of consoles, for which the default is 8. See `NR_CONSOLES` in `linux/include/linux/tty.h`. Newer kernels allocate them dynamically, up to a maximum of 63.

——————————————————————————-

7.3 How do I set the timezone?

Change directory to `/usr/lib/zoneinfo`; get the timezone package if you don't have this directory. The source is available as sunsite.unc.edu/pub/Linux/system/admin/time/timesrc-1.2.tar.gz.

Then make a symbolic link named `localtime` pointing to one of the files in this directory (or a subdirectory), and one called `posixrules` pointing to `localtime`. For example:

```
ln -sf US/Mountain localtime
ln -sf localtime posixrules
```

This change will take effect immediately – try `date(1)`.

Don't try to use the `TZ` variable – leave it unset.

You should also make sure that your Linux kernel clock is set to the correct `GMT` time – type `date -u` and check that the correct universal time is displayed.

——————————————————————————-

7.4 What version of Linux and what machine name am I using?

Type:

```
uname -a
```

——————————————————————————-

7.5 How can I enable or disable core dumps?

Linux now has `corefiles` turned `off` by default for all processes.

You can turn them `on` or `off` by using the `ulimit(1)` command in `bash(1)`, the `limit` command in `tcsh(1)`, or the `rlimit` command in `ksh(1)`. See the appropriate manual page for details.

This setting affects all programs run from that shell (directly or indirectly), not the whole system.

If you wish to enable or disable coredumping for all processes by default, you can change the default setting in `<linux/sched.h>` – see the definition of `INIT_TASK`, and look also in `<linux/resource.h>`.

Version 1.2.13 of the kernel will produce a.out core dumps "7.14".

——————————————————————————-

7.6 How do I upgrade/recompile my kernel?

See the Kernel HOWTO or the README which comes with the kernel release on ftp.cs.helsinki.fi, in /pub/Software/Linux/Kernel and mirrors thereof (Q2.5 'Where can I get Linux material by FTP ?'). You may already have a version of the kernel source code installed on your system, but if you got it as part of a standard distribution it is likely to be somewhat out of date (this is not a problem if you only want a custom-configured kernel, but it probably is if you need to upgrade.)

Remember that to make the new kernel boot you must run LILO after copying the kernel into your root partition – the Makefile in recent kernels has a special zlilo target for this; try make zlilo.

Kernel version numbers with an odd minor version (ie, 1.1.x, 1.3.x) are the testing releases; stable production kernels have even minor versions (1.0.x, 1.2.x). If you want to try the testing kernels you should probably subscribe to the linux-kernel mailing list $Q2.8`What mailing lists are there?'$.

——————————————————————————-

7.7 Can I have more than 3 serial ports by sharing interrupts?

Yes, but you won't be able to use simultaneously two ordinary ports which share an interrupt (without some trickery). This is a limitation of the ISA bus architecture.

See the Serial HOWTO for information about possible solutions to and workarounds for this problem.

——————————————————————————-

7.8 How do I make a bootable floppy?

Make a filesystem on it with bin, etc, lib and dev directories – everything you need. Install a kernel on it and arrange to have LILO boot it from the floppy (see the LILO documentation, in lilo.u.*.ps).

If you build the kernel (or tell LILO to tell the kernel) to have a ramdisk the same size as the floppy the ramdisk will be loaded at boot-time and mounted as root in place of the floppy.

See the Bootdisk HOWTO.

——————————————————————————-

7.9 How do I remap my keyboard to UK, French, etc.?

For recent kernels, get /pub/Linux/system/Keyboards/kbd-0.90.tar.gz from sunsite.unc.edu. Make sure you get the appropriate version; you have to use the right keyboard-mapping package to go with your kernel version. 0.90 should work with kernel versions from 1.0.

For older kernels you have to edit the top-level kernel Makefile, in /usr/src/linux.

You may find more helpful information in The Linux keystroke and console HOWTO, by Andries Brouwer, at sunsite.unc.edu/pub/Linux/docs/HOWTO

——————————————————————————-

7.10 How do I get NUM LOCK to default to on?

Use the setleds program, for example (in /etc/rc.local or one of the /etc/rc.d/* files):

```
for t in 1 2 3 4 5 6 7 8
do
     setleds +num < /dev/tty$t > /dev/null
done
```

setleds is part of the kbd package (see Q7.9 'How do I remap my keyboard to UK, French, etc?').

Alternatively, patch your kernel. You need to arrange for KBD_DEFLEDS to be defined to (1 ¡¡ VC_NUMLOCK) when compiling drivers/char/keyboard.c.

——————————————————————————-

7.11 How can I have more than 128Mb of swap?

Use several swap partitions or swapfiles – Linux supports up to 16 swap areas, each of up to 128Mb.

Very old kernels only supported swap area sizes up to 16Mb.

==

7.12 Miscellaneous information and questions answered.

——————————————————————————-

7.13 How do I program XYZ under Linux?

Read the manuals, or a good book on Unix. manpages (type man man) are usually a good source of reference information on exactly how to use a particular command or function.

There is also a lot of GNU Info documentation, which is often more useful as a tutorial. Run Emacs and type C-h i, or type info info if you don't have or don't like Emacs. Note that the Emacs libc node doesn't exactly describe the Linux libc (which is more like a traditional Unix libc, not having some of the GNU oddities), but it's close enough to make a fair tutorial in Unix C programming.

The latest release of the Linux manpages and a collection of useful GNU Info documentation various other information related to programming Linux can be found on sunsite.unc.edu in /pub/Linux/docs/man-pages.

——————————————————————————-

7.14 What's all this about ELF?

See the ELF HOWTO by Daniel Barlow – note, this is not the file move-to-elf, which is a blow-by-blow account of how to upgrade to ELF manually.

Linux has two different formats for executables, object files, and object code libraries, known as 'ELF' (the old format is called 'a.out'). This will have many advantages, including better support for shared libraries and dynamic linking.

Both a.out and ELF binaries can coexist on a system. However, they use different shared C libraries, both of which will have to be installed to do this.

If you want to find out whether your system can run ELF binaries, look in /lib for a filename libc.so.5. If this exists it probably can. If you want to know whether your installation actually *is* ELF you can pick a representative program, like ls, and run file on it:

```
-chiark:~> file /bin/ls
/bin/ls: Linux/i386 impure executable (OMAGIC) - stripped

valour:~> file /bin/ls
/bin/ls: ELF 32-bit LSB executable, Intel 80386, version 1, stripped
```

There is a patch to get 1.2.x to compile using the ELF compilers, and produce ELF coredumps, on tsx-11.mit.edu in /pub/packages/GCC. You do not need the patch merely to run ELF binaries. 1.3.x and later do not need a patch at all.

——————————————————————————————-

7.15 What is a .gz file ? And a .tgz ? And ... ?

.gz (and .z) files have been compressed using GNU gzip. You need to use gunzip (which is as a symlink to the gzip command which comes with most Linux installations) to unpack the file.

.taz and .tz are tarfiles (made with Unix tar) compressed using standard Unix compress.

.tgz (or .tpz) is a tarfile compressed with gzip.

.lsm is a Linux Software Map entry, in the form of a short text file. Details about the LSM and the LSM itself are available in the docs subdirectory on sunsite.unc.edu.

.deb is a Debian Binary Package - the binary package format used by the Debian GNU/Linux distribution. It is manipulated using dpkg and dpkg-deb (available on Debian systems and from ftp.debian.org).

.rpm is a Red Hat RPM package, which is used in the Red Hat distribution. These can be found on ftp.redhat.com.

The file command can often tell you what a file is.

If you find that gzip complains when you try to uncompress a gzipped file you probably downloaded it in ASCII mode by mistake. You must download most things in binary mode - remember to type binary as a command in FTP before using get to get the file.

——————————————————————————————-

7.16 What does VFS stand for?

Virtual File System. It's the abstraction layer between the user and real filesystems like ext2, minix and msdos. Amongst other things, its job is to flush the read buffer when it detects a disk change on the floppy disk drive:

```
VFS: Disk change detected on device 2/0
```

——————————————————————————————-

7.17 What is a BogoMip?

'BogoMips' is a contraction of 'Bogus MIPS'. MIPS stands for (depending who you listen to) Millions of Instructions per Second, or Meaningless Indication of Processor Speed.

The number printed at boot-time is the result of a kernel timing calibration, used for very short delay loops by some device drivers.

As a very rough guide the BogoMips will be approximately:

```
386SX           clock * 0.14
386DX           clock * 0.18
486Cyrix/IBM    clock * 0.33
486SX/DX/DX2    clock * 0.50
586             clock * 0.39
```

If the number you're seeing is wildly lower than this you may have the Turbo button or CPU speed set incorrectly, or have some kind of caching problem (as described in Q6.5 'When I add more memory it slows to a crawl.'.)

For values people have seen with other, rarer, chips, see the BogoMips Mini-HOWTO, on sunsite.unc.edu in /pub/Linux/docs/howto/mini/BogoMips.

——————————————————————————————-

7.18 What is the Linux Journal and where can I get it?

Linux Journal is a monthly magazine (printed on paper) that is available on newsstands and via subscription worldwide. Email <linux@ssc.com> for details. Their URL is http://www.ssc.com/.

——————————————————————————————-

7.19 How many people use Linux?

Linux is freely available, and no one is required to register their copies with any central authority, so it is difficult to know. Several businesses are now surviving solely on selling and supporting Linux, and very few Linux users use those businesses, relatively speaking. The Linux newsgroups are some of the most heavily read on the Net, so the number is likely in the hundreds of thousands, but firm numbers are hard to come by.

However, one brave soul, Harald T. Alvestrand <Harald.T.Alvestrand@uninett.no>, has decided to try, and asks that if you use Linux, you send a message to <linux-counter@uninett.no> with one of the following subjects: 'I use Linux at home', 'I use Linux at work', or 'I use Linux at home and at work'. He will also accept 'third-party' registrations – ask him for details.

Alternatively, you can register using the WWW forms found at
http://domen.uninett.no/ hta/linux/counter.html.

He posts his counts to comp.os.linux.misc each month; alternatively look on aun.uninett.no in /pub/misc/linux-counter or at the web page above.

——————————————————————————-

7.20 How should I pronounce Linux?

This is a matter of religious debate, of course!

If you want to hear Linus himself say how he pronounces it download english.au or swedish.au from ftp.funet.fi (in /pub/OS/Linux/PEOPLE/Linus/SillySounds). If you have a soundcard or the PC-speaker audio driver you can hear them by typing

```
cat english.au >/dev/audio
```

The difference isn't in the pronunciation of Linux but in the language Linus uses to say hello. The English version was parodied very well by Jin Choi as "Hi, my name is Leenoos Torvahlds and I pronounce Leenooks as Leenooks."

For the benefit of those of you who don't have the equipment or inclination: Linus pronounces Linux approximately as Leenus, where the ee is as in feet but rather shorter and the u is like a much shorter version of the French eu sound in peur (pronouncing it as the u in put is probably passable).

When speaking English I pronounce it Lie-nucks (u as in bucket) — this is an anglicised pronunciation based on the analogy with Linus' name, which in English is usually pronounced Lie-nus (u as in put). It is of course quite acceptable and common to modify the pronunciation of a proper noun when it changes languages.

I think I can safely say that the pronunciation Linnucks (short i as in pit, short u as in bucket) is wrong in English, as it is not the original Swedish pronunciation, not a sensible direct anglicisation of it, and not based on the anglicised version of Linus' name.

==

8 Frequently encountered error messages.

——————————————————————————-

8.1 Unknown terminal type linux and similar.

In an early 1.3.x kernel the default console terminal type has changed from console to linux. You must edit /etc/termcap to change the line reading:

```
console|con80x25:\
```

to

```
linux|console|con80x25:\
```

(there may be an additional dumb in there – if so it should be removed.)

In order to get the editor to work you may need say TERM=console (for bash and ksh) or setenv TERM console (csh, tcsh) first.

Some programs use /usr/lib/terminfo instead of /etc/termcap. For these programs you should upgrade your terminfo, which is part of ncurses.

———————————————————————————-

8.2 During linking I get Undefined symbol mcount

This is usually due to a bad interaction between a brokenness in SLS and the C library release notes. Your libc.a has been replaced by the profiling library. You should remove libc.a, libg.a and libc_p.a and once again install the new libraries (following the release notes, of course).

———————————————————————————-

8.3 lp1 on fire

This is a joke/traditional error message indicating that some sort of error is being reported by your printer, but that the error status isn't a valid one. It may be that you have some kind of I/O or IRQ conflict - check your cards' settings. Some people report that they get this message when their printer is switched off. Hopefully it isn't really on fire ...

In newer kernels this message reads lp1 reported invalid error status (on fire, eh?).

———————————————————————————-

8.4 INET: Warning: old style ioctl... called!

You are trying to use the old network configuration utilities; the new ones can be found on ftp.linux.org.uk in /pub/linux/Networking/PROGRAMS/NetTools (source only, I'm afraid).

Note that they cannot be used just like the old-style programs; see the NET-2 HOWTO for instructions on how to set up networking correctly.

———————————————————————————-

8.5 ld: unrecognized option '-m486'

You have an old version of ld. Install a newer binutils package – this will contain an updated ld. Look on tsx-11.mit.edu in /pub/linux/packages/GCC for binutils-2.6.0.2.bin.tar.gz.

8.6 GCC says Internal compiler error.

If the fault is repeatable (ie, it always happens at the same place in the same file – even after rebooting and trying again, using a stable kernel) you have discovered a bug in GCC. See the GCC Info documentation (type Control-h i in Emacs, and select GCC from the menu) for details on how to report this – make sure you have the latest version though.

Note that this is probably not a Linux-specific problem; unless you were compiling a program many other Linux users also compile you should not post your bug report to any of the comp.os.linux groups.

If the problem is not repeatable you are very probably experiencing memory corruption – see Q9.7 ‘make says Error 139’.

8.7 make says Error 139

Your compiler driver (gcc) dumped core. You probably have a corrupted, buggy or old version of GCC – get the latest release. Alternatively you may be running out of swap space – see Q6.8 ‘My machine runs very slowly when I run GCC / X / ...’ for more info.

If this doesn't fix the problem you are probably having problems with memory or disk corruption. Check that the clock rate, wait states and refresh timing for your SIMMs and cache are correct (hardware manuals are sometimes wrong, too). If so you may have some dodgy SIMMs or a faulty motherboard or hard disk or controller.

Linux, like any Unix, is a very good memory tester — much better than DOS-based memory test programs.

Reportedly some clone x87 maths coprocessors can cause problems; try compiling a kernel with maths emulation $Q7.6`HowdoIupgrade/recompilemykernel?'$; you may need to use the no387 kernel command line flag on the LILO prompt to force the kernel to use it, or it may be able to work and still use the 387, with the maths emulation compiled in but mainly unused.

Much more information about this problem is available on the WWW at http://einstein.et.tudelft.nl/ wolff/sig11/.

8.8 shell-init: permission denied when I log in.

Your root directory and all the directories up to your home directory must be readable and executable by everybody. See the manpage for chmod or a book on Unix for how to fix the problem.

8.9 No utmp entry. You must exec ... when I log in.

Your /var/run/utmp is screwed up. You should have

```
> /var/run/utmp
```

in your /etc/rc.local or /etc/rc.d/*. See Q6.11 'I have screwed up my system and can't log in to fix it.' for how to be able to do this. Note that utmp may also be found in /var/adm/utmp or /etc/utmp on some older systems.

——————————————————————————————-

8.10 Warning – bdflush not running.

Modern kernels use a better strategy for writing cached disk blocks. In addition to the kernel changes, this involves replacing the old update program which used to write everything every 30 seconds with a more subtle daemon (actually a pair), known as bdflush.

Get bdflush-n.n.tar.gz from the same place as the kernel source code (Q7.6 'How do I upgrade/recompile my kernel ?') and compile and install it; it should be started before the usual boot-time filesystem checks. It will work fine with older kernels as well, so there's no need to keep the old update around.

——————————————————————————————-

8.11 Warning: obsolete routing request made.

This is nothing to worry about; it just means that the version of route you have is a little out of date compared to the kernel. You can make the message go away by getting a new version of route from the same place as the kernel source code (Q7.6 'How do I upgrade/recompile my kernel ?').

——————————————————————————————-

8.12 EXT2-fs: warning: mounting unchecked filesystem.

You need to run e2fsck (or fsck -t ext2 if you have the fsck front-end program) with the -a option to get it to clear the 'dirty' flag, and then cleanly unmount the partition during each shutdown.

The easiest way to do this is to get the latest fsck, umount and shutdown commands, available in Rik Faith's util-linux package (Q2.5 'Where can I get Linux material by FTP?'). You have to make sure that your /etc/rc* scripts use them correctly.

NB: don't try to check a filesystem that's mounted read-write – this includes the root partition if you don't see

```
VFS: mounted root ... read-only
```

at boot time. You must arrange to mount the root filesystem readonly to start with, check it if necessary, and then remount it read-write. Read the documentation that comes with util-linux to find out how to do this.

Note that you need to specify the -n option to mount to get it not to try to update /etc/mtab, since the root filesystem is still read-only and this will otherwise cause it to fail!

——————————————————————————-

8.13 EXT2-fs warning: maximal count reached.

This message is issued by the kernel when it mounts a filesystem that's marked as clean, but whose 'number of mounts since check' counter has reached the predefined value. The solution is to get the latest version of the ext2fs utilities (e2fsprogs-0.5b.tar.gz at the time of writing) from the usual sites (Q2.5 'Where can I get Linux material by FTP ?').

The maximal number of mounts value can be examined and changed using the tune2fs program from this package.

——————————————————————————-

8.14 EXT2-fs warning: checktime reached.

Kernels from 1.0 onwards support checking a filesystem based on the elapsed time since the last check as well as by the number of mounts. Get the latest version of the ext2fs utilities (see Q9.13 'EXT2-fs warning: maximal count reached').

——————————————————————————-

8.15 df says Cannot read table of mounted filesystems.

There is probably something wrong with your /etc/mtab or /etc/fstab files. If you have a reasonably new version of mount, /etc/mtab should be emptied or deleted at boot time (in /etc/rc.local or /etc/rc.d/*), using something like

```
rm -f /etc/mtab*
```

Some versions of SLS have an entry for the root partition in /etc/mtab made in /etc/rc* by using rdev. This is incorrect – the newer versions of mount do this automatically.

Other versions of SLS have a line in /etc/fstab that looks like:

```
 /dev/sdb1   /root   ext2   defaults
```

This is wrong. /root should read simply /.

——————————————————————————-

8.16 fdisk says Partition X has different physical/logical ...

If the partition number (X, above) is 1 this is the same problem as Q9.17 'fdisk: Partition 1 does not start on cylinder boundary'.

If the partition begins or ends on a cylinder numbered beyond 1024 this is because standard DOS disk geometry information format in the partition table can't cope with cylinder numbers with more than 10 bits. You should see Q4.1 'How can I get Linux to work with my large disk ?'.

——————————————————————————————-

8.17 fdisk: Partition 1 does not start on cylinder boundary

The version of fdisk that comes with many Linux systems creates partitions that fail its own validity checking. Unfortunately if you've already installed your system there's not much you can do about this, apart from copying the data off the partition, deleting and remaking it, and copying the data back.

You can avoid the problem by getting the latest version of fdisk, from Rik Faith's util-linux package (available on all good FTP sites). Alternatively, if you are creating a new partition 1 that starts in the first cylinder, you can do the following to get a partition that fdisk likes.

1. Create partition 1 in the normal way. A p listing will produce the mismatch complaint.

2. Type u to set sector mode and do p again. Copy down the number from the "End" column.

3. Delete partition 1.

4. While still in sector mode recreate partition 1. Set the first sector to match the number of sectors per track. This is the sector number in the first line of the p output. Set the last sector to the value noted in 2. above.

5. Type u to reset cylinder mode and continue with other partitions.

Ignore the message about unallocated sectors - they refer to the sectors on the first track apart from the Master Boot Record, which are not used if you start the first partition in track 2.

——————————————————————————————-

8.18 fdisk says partition n has an odd number of sectors.

The PC disk partitioning scheme works in 512-byte sectors, but Linux uses 1K blocks. If you have a partition with an odd number of sectors the last sector is wasted. Ignore the message.

——————————————————————————————-

8.19 mtools says cannot initialise drive XYZ

This means that mtools is having trouble accessing the drive. This can be due to several things.

Often this is due to the permissions on floppy drive devices (/dev/fd0* and /dev/fd1*) being incorrect – the user running mtools must have the appropriate access. See the manpage for chmod for details.

Most versions of mtools distributed with Linux systems (not the standard GNU version) use the contents of a file /etc/mtools to discover which devices and densities to use, in place of having this information compiled into the binary. Mistakes in this file often cause problems. There is often no documentation about this – distribution packagers please note that this is *evil*.

For the easiest way to access your DOS files (especially those on a hard disk partition) see Q3.2 'How do I access files on my DOS partition or floppy ?'. Note – you should never use mtools to access files on an msdosfs mounted partition or disk !

——————————————————————————-

8.20 At the start of booting: Memory tight

This means that you have an extra large kernel that means that Linux has to do some special memory-management magic to be able to boot itself from the BIOS. It isn't related to the amount of physical memory in your machine. Ignore the message, or compile a kernel containing only the drivers and features you need (Q7.6 'How do I upgrade/recompile my kernel ?').

——————————————————————————-

8.21 You don't exist. Go away.

This is not a viral infection :-). It comes from various programs such as write, talk and wall, if your invoking uid doesn't correspond to a valid user (probably due to /etc/passwd being corrupted), or if the session (pseudoterminal, specifically) you're using isn't properly registered in the utmp file (probably because you invoked it in a funny way).

==

9 The X Window System.

——————————————————————————-

9.1 Does Linux support X Windows?

Yes. Linux uses XFree86 (the current version is 3.3.1, which is based on X11R6). You need to have a video card which is supported by XFree86. See the Linux XFree86 HOWTO for more details.

Most Linux distributions nowadays come with an X installation.

However, you can install or upgrade your own, from /pub/Linux/X11/Xfree86-* on sunsite.unc.edu and its mirror sites. Read the XFree86 HOWTO for installation instructions.

——————————————————————————-

9.2 Where can I get an XF86Config for my system?

See the Linux XFree86 HOWTO.

You'll need to put together your own XF86Config file, because it depends on the exact combination of video card and monitor you have. It's not that hard to do – read the instructions that came with XFree86, in /usr/X11R6/lib/X11/etc. The file you probably most need to look at is README.Config.

You should *not* use the sample XF86Config.eg file which is included with newer versions of XFree86 verbatim, because the wrong video clock settings can damage your monitor.

For a quick start, you may run the program xf86config. Note that ConfigXF86 is now obsolete and you shouldn't use it.

Please don't post to comp.os.linux.x asking for an XF86Config, and please don't answer such requests.

———————————————————————————-

9.3 xterm logins show up strangely in who, finger.

The xterm that comes with XFree86 2.1 and earlier doesn't correctly understand the format that Linux uses for the /var/adm/utmp file, where the system records who is logged in. It therefore doesn't set all the information correctly.

XFree86 3.1 fixes this problem.

———————————————————————————-

9.4 I can't get X Windows to work right.

Read the XFree86 HOWTO – note the question and answer section.

Try reading comp.windows.x.i386unix – specifically read the the FAQ for that group.

Please don't post X Windows or XFree86 related questions to comp.os.linux.x unless they are Linux-specific.

==

10 Questions applicable to very out-of-date software.

The questions in this section are only relevant to users of software that is at least 3 months old.

Please let me know if you find the answer to a problem you had here, as unused questions in this section will eventually disappear (Q13.1 'Feedback is invited').

———————————————————————————-

10.1 Emacs just dumps core.

You probably have a version of Emacs that was compiled to work with X11; this requires the X11 libraries to work. If you're using Slackware you can change the /usr/bin/emacs symbolic link to point to emacs-19.29-no-x11 instead (see man ln). This is in the file emac_nox.tgz on Slackware 3.0's E6 disk.

———————————————————————————————-

10.2 fdisk says cannot use nnn sectors of this partition.

Originally Linux only supported the Minix filesystem, which cannot use more than 64Mb per parition. This limitation is not present in the more advanced filesystems now available, such as ext2fs (the 2nd version of the Extended Filesystem, the 'standard' Linux filesystem).

If you intend to use ext2fs you can ignore the message.

———————————————————————————————-

10.3 GCC sometimes uses huge amounts of virtual memory and thrashes.

Older versions of GCC had a bug which made them use lots of memory if you tried to compile a program which had a large static data table in it.

You can either upgrade your version of GCC to at least version 2.5, or add more swap if necessary and just grin and bear it; it'll work in the end.

———————————————————————————————-

10.4 My keyboard goes all funny after I switch VC's.

This is a bug in kernel versions before 0.99pl14-alpha-n. Sometimes Linux loses track of what modifier keys (Shift, Alt, Control etc.) are pressed or not, and believes that one or more are pressed when they are not. The solution is to press and release each of the modifier keys (without pressing any other keys) – this will ensure that Linux knows what state the keyboard is actually in.

This problem often occurs when switching out of X windows; it can sometimes be avoided by releasing Ctrl and Alt very quickly after pressing the F-key of the VC you are switching to.

===

11 How to get further assistance.

———————————————————————————————-

11.1 You still haven't answered my question!

Please read all of this answer before posting. I know it's a bit long, but you may be about to make a fool of yourself in front of 50000 people and waste hundreds of hours of their time. Don't you think it's worth it to spend some of your time reading and following these instructions ?

If you think an answer is incomplete or inaccurate, please e-mail Robert Kiesling at <kiesling@terracom.net>.

Read the appropriate Linux Documentation Project books – see Q2.1 'Where can I get the HOWTOs and other documentation ?'.

If you're a Unix newbie, read the FAQ for comp.unix.questions, and those for any of the other comp.unix.* groups that may be relevant.

Linux is a Unix clone, so almost everything you read there will apply to Linux. Those FAQs can, like all FAQs, be found on rtfm.mit.edu in /pub/usenet/news.answers (the <mail-server@rtfm.mit.edu> can send you these files, if you don't have FTP access). There are mirrors of rtfm's FAQ archives on various sites - check the Introduction to *.answers posting, posted, or look in news-answers/introduction in the directory above.

Check the relevant HOWTO for the subject in question, if there is one, or an appropriate old-style sub-FAQ document. Check the FTP sites.

Try experimenting – that's the best way to get to know Unix and Linux.

Read the documentation. Check the manpages (type man man if you don't know about manpages. Try man -k <subject>– it often lists useful and relevant manpages.

Check the Info documentation (type C-h i, i.e. Control H followed by I in Emacs) – NB: this isn't just for Emacs; for example the GCC documentation lives here as well.

There will also often be a README file with a package that gives installation and/or usage instructions.

Make sure that you don't have a corrupted or out-of-date copy of the program in question. If possible, download it again and reinstall it – perhaps you made a mistake the first time.

Read comp.os.linux.announce – this often contains very important information for all Linux users.

General X-Windows questions belong in comp.windows.x.i386unix, not in comp.os.linux.x. But read the group first (including the FAQ), before you post!

Only if you have done all of these things and are still stuck should you post to the appropriate comp.os.linux.* newsgroup. Make sure you read the next question, Q12.2 'What to put in a request for help', first.

——————————————————————————-

11.2 What to put in a request for help.

Please read carefully the following advice about how to write your posting or email. Taking heed of it will greatly increase the chances that an expert and/or fellow user reading it will have enough information and motivation to reply.

This advice applies both to postings asking for advice and to personal email sent to experts and fellow users.

Make sure you give full details of the problem, including:

- What program, exactly, you are having problems with. Include the version number if known and say where you got it. Many standard commands tell you their version number if you give them a –version option.
- Which Linux release you're using (MCC, Slackware, Debian or whatever) and what version of that release.
- The *exact* and *complete* text of any error messages printed.
- Exactly what behaviour you were expecting, and exactly what behaviour you observed. A transcript of an example session is a good way of showing this.
- The contents of any configuration files used by the program in question and any related programs.
- What version of the kernel and of the shared libraries you are using. The kernel version can be found by typing uname -a, and the shared library version by typing ls -l /lib/libc.so.4.
- Details of what hardware you're running on, if it seems appropriate.

You are in little danger of making your posting too long unless you include large chunks of source code or uuencoded files, so err on the side of giving too much information.

Use a clear, detailed Subject line. Don't put things like 'doesn't work', 'Linux', 'help' or 'question' in it – we already know that! Save the space for the name of the program, a fragment of the error message, summary of the unusual behaviour, etc.

If you are reporting an 'unable to handle kernel paging request' message, follow the instructions in the Linux kernel sources README for turning the numbers into something more meaningful. If you don't do this noone who reads your post will be able to do it for you, as the mapping from numbers to function names varies from one kernel to another.

Put a summary paragraph at the top of your posting.

At the bottom of your posting, ask for responses by email and say you'll post a summary. Back this up by using Followup-To: poster. Then, do actually post a summary in a few days or a week or so. Don't just concatenate the replies you got – summarise. Putting the word SUMMARY in your summary's Subject line is also a good idea. Consider submitting the summary to comp.os.linux.announce.

Make sure your posting doesn't have an inappropriate References header line. This marks your article as part of the thread of the article referred to, which will often cause it to be junked by the readers with the rest of a boring thread.

You might like to say in your posting that you've read this FAQ and the appropriate HOWTOs – this may make people less likely to skip your posting.

Remember that you should not post email sent to you personally without the sender's permission.

———————————————————————————————————-

11.3 I want to mail someone about my problem.

Try to find the author or developer of whatever program or component is causing you difficulty. If you have a contact point for your Linux distribution, you should use it.

Please put everything in your email that you would put in a posting asking for help.

Finally, remember that despite the fact that most of the Linux community are very helpful and responsive to emailed questions, you'll be asking for help from an unpaid volunteer, so you have no right to expect an answer.

==

12 Administrative information and acknowledgements.

——————————————————————————-

12.1 Feedback is invited.

Please send me your comments on this FAQ.

I accept submissions for the FAQ in any format; All contributions, comments, and corrections are gratefully received.

Please send them to <kiesling@terracom.net>.

If you wish to refer to a question(s) in the FAQ it's most useful for me if you do so by the question heading, rather than the number, as the question numbers are generated automatically and I don't see them in the source file I edit.

I prefer comments in English to patchfiles – I write the FAQ in a different internal format anyway, so I can't use a patchfile.

——————————————————————————-

12.2 Formats in which this FAQ is available.

This document is available as an ASCII text file, an Emacs Info document, an HTML World Wide Web page, PostScript and as a USENET news posting.

The ASCII, Emacs Info, HTML and posted versions and a Lout typesetter file (from which the PostScript is produced) are generated automatically by a Perl script which takes as input a file in the Bizarre Format with No Name.

The output files linux-faq.ascii, .info and .ps and a tarfile linux-faq.source.tar.gz, containing the BFNN source and Perl script converter, are available in the docs directories of the major Linux FTP sites.

The HTML version of this FAQ is available as http://www.cl.cam.ac.uk/users/iwj10/linux-faq/index.html and is mirrored at www.li.org and other sites.

The USENET version is posted regularly to comp.os.linux.announce, comp.os.linux.answers, comp.answers and news.answers.

——————————————————————————————-

12.3 Authorship and acknowledgements.

This FAQ is compiled by Robert Kiesling <kiesling@terracom.net>, with assistance and comments from others too numerous to mention.

Special thanks are due to Matt Welsh, who moderated comp.os.linux.announce and comp.os.linux.answers, used to coordinate the HOWTOs and has written substantial portions of many of them, to Greg Hankins, who currently coordinates the HOWTOS, to Lars Wirzenius, who currently moderates comp.os.linux.announce, to Marc-Michel Corsini, who wrote the original Linux FAQ, and to Ian Jackson, the previous FAQ-maintainer.

Thanks also to the many people who have sent comments and suggestions. They are too numerous to list here but their contributions are invaluable.

Last but not least, thanks to Linus Torvalds and the other contributors to Linux for giving us something to write about!

——————————————————————————————-

12.4 Disclaimer and Copyright.

Note that this document is provided "as is". The information in it is *not* warranted to be correct. Use it at your own risk.

Linux Frequently Asked Questions with Answers is copyright (C) 1997 by Robert Kiesling <kiesling@terracom.net>. Portions are Copyright 1994, 1995, 1996 by Ian Jackson, the previous Linux FAQ maintainer.

Linux Frequently Asked Questions with Answers may be reproduced and distributed in its entirety (including this authorship, copyright, and permission notice), provided that no charge is made for the document itself, without the author's consent. Portions may be reproduced for such purposes as reviews, advertising, and derivative works like translations, with the author's consent.

Note that this restriction is not intended to prohibit charging for the service of printing or copying a document supplied by your customer.

Exceptions to these rules may be granted. I would be happy to answer any questions about this copyright. Email me at <kiesling@terracom.net>. These restrictions are here to protect the contributors, not to restrict you as educators and learners.