Linux Frequently Asked Questions with Answers

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This is the list of Frequently Asked Questions about Linux, the free Unix for 386/486 [see Q1.1 (page 3) 'What is Linux ?' for more details]. It should be read in conjunction with the HOWTO documents, which are available in

```
nic.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
```

and mirror sites thereof – see Q2.4 (page 7) 'Where can I get Linux material by FTP ?'. See Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?' for a list of the HOWTOs and more information. The INFO-SHEET and META-FAQ, found in the same place, also list other sources of Linux information.

The Linux Documentation Project documentation is available on `sunsite.unc.edu` in `/pub/Linux/docs/LDP`. These documents (more are in preparation) are invaluable to the newcomer or for use as a reference work.

Please check out these documents and this FAQ, especially Q9.1 (page 22) 'You still haven't answered my question !', before posting your question to the newsgroup `comp.os.linux.help`.

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Section 1. Introduction and General Information

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Question 1.1. What is Linux ?

Linux is a Unix clone for 386/486-based PCs written from scratch by Linus Torvalds with assistance from a loosely-knit team of hackers across the Net. It aims towards POSIX compliance.

It has all the features you would expect in a modern fully-fledged Unix, including true multitasking, virtual memory, shared libraries, demand loading, shared copy-on-write executables, proper memory management and TCP/IP networking.

It uses the hardware features of the 386 processor family (TSS segments et al) to implement these features.

Linux is still considered to be in beta testing; due to the rapid pace of development new bugs are often introduced. Despite this, Linux is very stable if you don't always immediately use the latest alpha-release kernel software.

See the Linux INFO-SHEET [Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?'] for more details.

It is distributed under the GNU General Public License - see Q1.5 (page 4) 'Is Linux PD ? Copyrighted ?' for more details.

Question 1.2. What software does it support ?

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

There is a DOS emulator and work is progressing on a facilities to allow SVR4 ELF, SVR3.2 COFF and Microsoft Windows binaries to be run under Linux and X Windows.

For more information see the INFO-SHEET, which is one of the the HOWTOs — see above, or Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?'. See also Q5.2 (page 12) 'How do I port XXX to Linux ?'.

Question 1.3. Does it run on my computer ? What hardware is supported ?

You need a 386 or 486, with at least 2Mb of RAM and a single floppy, to try it out. To do anything useful more RAM and a hard disk are required.

Linux doesn't currently work on machines using MCA (IBM's proprietary bus), because of lack of available documentation. You may be able to it to work if you your hard disk is on certain kinds of controller (some SCSI controllers work, I understand), but you're on your own.

It should work with VESA local bus machines, provided that the local bus cards really are equivalent to the equivalent ISA ones. Linux is reported to run on 386/486-based laptops, with X on most of them.

For details of exactly which PC's, video cards, disk controllers, etc. work see the INFO-SHEET and the Hardware Compatibility List [Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?'].

Linux will never run on a 286, because it uses task-switching and memory management facilities only found on 386/486 processors.

A project is underway to port Linux to suitable 68000-series based systems, but this is still at a very early stage of development. Don't post asking about it unless you think you can contribute to it, and don't hold your breath.

Question 1.4. 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. The SLS 1.03 distribution (which I would recommend you stay well clear of - it has a number of serious and annoying bugs) takes around 100Mb.

Question 1.5. Is Linux PD ? Copyrighted ?

The Linux kernel is copyrighted by Linus Torvalds. He has placed it under the GNU General Public Licence, which basically means that you may freely copy, change and distribute it, but that you may not impose any restrictions on further distribution.

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

The copyright 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.

Question 1.6. How should I pronounce Linux ?

Linus says: 'li' is pronounced with a short (ee) sound: compare prInt, mInImal etc. 'nux' is also short, non-diphtong, like in pUt. It's partly due to Minix: Linux was just my working name for the thing, and as I wrote it to replace Minix on my system, the result is what it is... Linus' minix became Linux.

I originally intended it to be called freax (although buggix was one contender after I got fed up with some of the more persistent bugs :) and I think the kernel makefiles up to version 0.11 had something to that effect ('Makefile for the freax kernel' in a comment). But arl called the linux directory at **nic.funet.fi pub/OS/Linux**, and the name stuck. Maybe just as well: freax doesn't sound too good either (freax is obviosly free + freak + the obligatory -x).

(Rik Faith's note for English speakers: Linux — 'LIH-nuhks'.)

Section 2. Network sources and resources

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Question 2.1. Where can I get the HOWTOs and other documentation ?

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

```
nic.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 see Q2.3 (page 6) 'How do I install Linux ?'.

If you don't have access to FTP try using one of the FTP-by-mail servers, such as **mail-server@rtfm.mit.edu** or **ftpmail@decwrl.dec.com**.

A complete list of HOWTO's is available in the file **HOWTO.INDEX** in the **docs/HOWTO** directory at the FTP sites, but here is an incomplete and somewhat provisional list:

Installation HOWTO
Linux INFO-SHEET
Linux META-FAQ
NET-2 HOWTO
Ethernet HOWTO
News HOWTO
Mail HOWTO
UUCP HOWTO
SCSI HOWTO
Printing HOWTO
Hardware Comaptibility List

More of these documents are in preparation; many of them are being updated from existing documents containing very similar information. You should check for one of those documents in nearby directories on the FTP sites as well as looking for one of the new-style HOWTOs.

The `HOWTO.INDEX` also contains information on how to write a new HOWTO.

The HOWTOs are managed by Matt Welsh, `<mdw@sunsite.unc.edu>`.

The 'books' produced by the Linux Documentation Project are available in `/pub/Linux/docs/LDP` on `sunsite.unc.edu`. Please read them if you are new to Unix and Linux, especially the Installation and Getting Started Guide.

Question 2.2. What newsgroups are there for Linux ?

There are five 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@tc.cornell.edu`.

`comp.os.linux.help`, `comp.os.linux.development`, `comp.os.linux.admin` and `comp.os.linux.misc` are also worth reading – you will find that many common problems are too recent to find in this FAQ but are answered in the newsgroups.

Since Linux is a Unix clone, many of the `comp.unix.*` and `comp.windows.x.*` groups will also contain relevant material.

Please read Q9.1 (page 22) 'You still haven't answered my question !' before posting, and make sure you post to the right newsgroup. Crossposting is rarely a good idea.

See also Q2.6 (page 7) 'I don't have Usenet access. Where do I get information ?'.

Question 2.3. How do I install Linux ?

There are several pre-packaged releases of Linux available, including the MCC-Interim release, the TAMU release and the SLS release. 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 Linux. Note, though, that despite its heavy emphasis on the SLS release I would not recommend using SLS for any new Linux installation; you should consider using MCC-Interim, TAMU or Slackware instead.

All of these releases are available via anonymous FTP from the Linux archive sites [Q2.4 (page 7) 'Where can I get Linux material by FTP ?'].

Question 2.4. Where can I get Linux material by FTP ?

There are three main archive sites for Linux:

```
nic.funet.fi (128.214.6.100)    /pub/OS/Linux
tsx-11.mit.edu (18.172.1.2)     /pub/linux
sunsite.unc.edu (152.2.22.81)   /pub/Linux
```

The MCC-Interim release is available from:

```
ftp.mcc.ac.uk (130.88.200.7)    /pub/linux
```

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.

```
src.doc.ic.ac.uk                wuarchive.wustl.edu
ftp.eecs.umich.edu
ftp.informatik.tu-muenchen.de
ftp.ibr.cs.tu-bs.de             monu1.cc.monash.edu.au
ftp.dfv.rwth-aachen.de          kuis.kyoto-u.ac.jp
ftp.informatik.rwth-aachen.de   cair.kaist.ac.kr
```

Not all of these mirror all of the other 'source' sites.

Question 2.5. 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 **mail-server@rtfm.mit.edu** or **ftpmail@decwrl.dec.com**, or, if you're in Europe, **ftp-mailer@informatik.tu-muenchen.de**.

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

You could also try Zane Healy **<healyzh@holonet.net>**'s list of Linux BBS's, which is posted regularly (1st and 15th of each month) to **comp.os.linux.announce** and occasionally to the Fidonet and RIME UNIX echoes.

Question 2.6. I don't have Usenet access. Where do I get information ?

Digests of postings to the **comp.os.linux.*** groups are available by subscribing to the bidirectional gateway at **linux-*-request@news-digests.mit.edu**, where * is one of **announce**, **development**, **help**, **misc** or **admin**.

You are strongly advised to subscribe to at least **linux-announce-request@news-digests.mit.edu**, as this 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 !

Question 2.7. What's this mailing list thing at niksula.hut.fi ?

It's a multi-channel mailing list, mainly used by the developers of Linux to talk about technical issues and future developments. Most of the channels are not intended for new users to ask their questions on.

The **ANNOUNCE** channel is a digest of postings to **comp.os.linux.announce**, for the benefit of those without Usenet access. However since **niksula.hut.fi** is slow and overloaded I'd recommend subscribing to the MIT digestifier instead [Q2.6 (page 7) 'I don't have Usenet access. Where do I get information ?'].

There is also a **NEWBIE** channel where 'no question is too stupid'; unfortunately it seems that few of the experienced users read that channel, probably because of all the 'stupid' questions !

If you want to subscribe to one or more of the channels at the multi-channel list, send an empty mail message to **linux-activists-request@niksula.hut.fi** and you'll receive the instructions for operating the list subscription software.

If you want to unsubscribe send a mail message like this

```
From: you@domain.org
To: linux-activists-request@niksula.hut.fi
Subject: irrelevant

X-Mn-Admin: leave CHANNEL
```

to leave a channel called **CHANNEL**. Do *not* put an **X-Mn-Key** line in your message - that will cause it to be posted to the list.

Note that you *must* remember to unsubscribe *before* you change your email address, as due to a design flaw in the list server it is virtually impossible to get yourself unsubscribed after such a change.

Question 2.8. Are the newsgroups archived anywhere ?

Yes. **nic.funet.fi** and **tsx-11.mit.edu** contain archives of both **comp.os.linux** and **comp.os.linux.announce**, in their Linux areas. The **comp.os.linux.announce** archives are mirrored from **/usenet** on **src.doc.ic.ac.uk** (which also contains an archive of **comp.os.linux**).

Section 3. Compatibility with other operating systems

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Question 3.1. Can Linux coexist with DOS ? OS/2 ? 386BSD ? Minix ?

Yes. Linux uses the standard PC partitioning scheme, so it can share your disk with other operating systems. NB, though, if you use OS/2 you have to use OS/2's fdisk to create Linux partitions if you don't want OS/2's fdisk to mess them up later. Then you can use Linux's fdisk to change the type to Linux. See the Installation HOWTO for more details.

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 a DOS emulator which can run DOS itself and some (but not all) DOS applications.

Linux can also access Minix filesystems.

Question 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
```

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.

Alternatively you can use 'mtools', available in both binary and source form on the FTP sites – see Q2.3 (page 6) 'How do I install Linux ?'.

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

Not easily. You can access them from within the DOS emulator, but not as a normal filesystem under Linux or using mtools.

Question 3.4. Can I access OS/2 HPFS, BSD FFS, Mac, Amiga, etc filesystems ?

There is no support for those yet.

Section 4. Linux's handling of filesystems, disks and drives

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Question 4.1. How do I format and create a filesystem on a floppy ?

For a 3.5 inch high density floppy:

```
fdformat /dev/fd0H1440
mke2fs /dev/fd0H1440 1440
```

For a 5.25 floppy inch use **fd0h1200** and **1200** as appropriate. For the 'B' drive use **fd1** instead of **fd0**. Full details of which floppy devices do what can be found in the Linux Device List [Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?'].

The first command low-level formats the floppy; the second creates an empty filesystem on it. After doing this you can mount the floppy like a hard disk partition and simply **cp** and **mv** files, etc.

Question 4.2. 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.

If you're lucky the program **fsck** (or **e2fsck** or **xfsck** as appropriate if you don't have the fsutils package) 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.) it 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.

Question 4.3. 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** or **/etc/rc.local** (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.

Question 4.4. How can I have more than 16Mb of swap ?

You have to set up more than one swap partition or swapfile. Linux only supports swap area sizes up to 16Mb, but you can set up and configure several swap areas and Linux will use them all.

Question 4.5. 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**. 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
```

(or **sda** if you're using a SCSI disk). This will also wipe out your partition table, so beware !

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.

Question 4.6. 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 this by being setuid to root.

Question 4.7. Is there something like Stacker or Doublespace for Linux ?

No, none of the Linux filesystems currently support any (transparent) compression.

Unless you're a wizard and want to try writing it yourself you're best bet is probably to simply compress the file using a program like GNU gzip and uncompress it again when you want to use it.

There is 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 on the Linux FTP sites [Q2.4 (page 7) 'Where can I get Linux material by FTP ?']; it was also announced in **comp.os.linux.announce**.

Section 5. Porting, compiling and obtaining programs

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Question 5.1. Has anyone ported / compiled / written XXX for Linux ?

First, look in the Linux Software Map — it's in the `docs` directory on `sunsite.unc.edu`, and on the other FTP sties.

Check the FTP sites (see Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?') first — search the `find-ls` or `INDEX` files for appropriate strings.

If you don't find anything, you could either download the sources to the program yourself and compile them – see Q5.2 (page 12) 'How do I port XXX to Linux ?' – or, if it's a large package which may require some porting, post a message to the newsgroup.

If you compile a largeish 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@tc.cornell.edu`).

If you're looking for an application-type program the chances are someone has already written a free verson. Try reading the FAQ in `comp.sources.wanted` for instructions on how to find sources.

Question 5.2. 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 or by 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.

Question 5.3. Can I use code or a compiler compiled for a 486 on my 386 ?

Yes.

The `-m486` option to GCC, which is used to compile binaries for 486 machines, merely makes GCC change certain optimisations. This makes for slightly larger binaries which run somewhat

faster on a 486. They still work fine on a 386, though, with little performance hit.

This applies to GCC, as well. 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`.

Question 5.4. GCC sometimes uses huge amounts of virtual memory and thrashes

GCC has a bug which makes it use lots of memory if you try to compile a program which has a large static data table in it. Add more swap if necessary and just grin and bear it; it'll work in the end.

This bug will be fixed when GCC 2.5 comes out.

Question 5.5. What does `gcc -O6` do ?

The same as `-O2`; any number greater than 2 works just like 2. It's put there for luck, I think.

Question 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` and not real directories.

If you don't have the kernel sources download them — see Q6.14 (page 17) 'How do I upgrade my kernel ?'.

Then use `ln` to create the links:

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

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

Make sure that `/usr/include/linux` and `/usr/include/asm` aren't actual directories but instead symbolic links to `/usr/src/linux/include/linux` and `/usr/src/linux/include/asm` respectively.

If necessary, delete them using `rm` and then use `ln -s` to make the links as in Q5.6 (page 13) 'Where are `<linux/*.h>` and `<asm/*.h>` ?'.

Section 6. Miscellaneous questions and problems

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Question 6.1. 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'.

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.

Question 6.2. 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 delay loops by some device drivers.

As a very approximate guide for a 486DX (not clock doubled), the BogoMips will be approximately the clock rate * 0.5; for a 386DX (no coprocessor) it will be more like the clock rate * 0.24 - 1.9.

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 (page 15) 'When I add more memory it slows to a crawl.'.]

Question 6.3. How do I set the timezone ?

Change directory to `/usr/local/zoneinfo` (get the timezone package if you don't have this directory).

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**.

Don't try to use the **TZ** variable - leave it unset.

Question 6.4. What version of Linux and what machine name am I using ?

Type:

```
uname -a
```

Question 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 giving *all* the details - make, model number, date code, etc. so that other Linux users can avoid it.

Question 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**.

Question 6.7. Some programs let me log in with no password.

You probably have the same problem as in Q6.6 (page 15) 'Some programs (e.g. `xdm`) won't let me log in.', with an added wrinkle:

If you are using shadow passords you should put 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.

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

You probably don't 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 [Q2.1 (page 5) 'Where can I get the HOWTOs and other documentation ?'] for details of how to set up a swap area; see also Q4.3 (page 10) 'My swap area isn't working.'.

Alternatively you may have too little real memory. If you have less RAM than all the programs you're running at once use 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 Q6.14 (page 17) 'How do I upgrade my kernel ?'.

Question 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` or `/etc/rc.local`.

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 back up the tree to the root directory.

Question 6.10. How do I stop producing `core` files ?

If you use `bash` put

```
ulimit -c 0
```

in your `.shrc` or `.bashrc`; if you use `tcsh` put

```
limit coredumpsize 0
```

in your `.cshrc`. For other shells check the shell's manpage.

Question 6.11. My screen is all full of weird characters instead of letters.

You probably sent some binary data to your screen by mistake. Type **echo ^V^O** (that's **E C H O** space control-**V** control-**O** return) to fix it.

Question 6.12. What is a .gz file ? And a .tgz ? And ... ?

.gz (and **.z**) files have been compressed using GNU **gzip**. You have to get a copy of **gunzip** (included in the **gzip** distribution and 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**.

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 things in binary mode - remember to type **binary** as a command in FTP before using **get** to get the file.

Question 6.13. I have screwed up my system and can't log in to fix it.

Reboot from an emergency floppy, for example the SLS a1 disk or the MCC installation boot floppy. 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).

Question 6.14. How do I upgrade my kernel ?

See the **README** which comes with the kernel release, in

```
nic.funet.fi:/pub/OS/Linux/PEOPLE/Linus
```

and mirrors thereof. Try to get it from a closer site if possible; **nic.funet.fi** is a very busy site and therefore slow – see Q2.3 (page 6) 'How do I install Linux ?'.

Remember that to make the new kernel boot you must run LILO after copying the kernel into your root partition.

Question 6.15. Can I have more than 3 serial ports by sharing interrupts ?

Not without some trickery. This is a limitation of the ISA bus architecture.

See the Serial HOWTO for information about how to work around this problem.

Question 6.16. Emacs just dumps core.

You probably have the X version of Emacs that comes with SLS. It doesn't work without the X libraries. The solution is to install X Windows or get a newer Emacs binary without any X Windows support.

Question 6.17. How do I make a bootable floppy ?

Make a filesystem on it with **bin**, **etc** and **lib** 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.

Question 6.18. How do I remap my keyboard to UK, French, etc. ?

For recent kernels, get **kbd*.tar.gz** from the same place as you got the kernel source. Make sure you get the appropriate version; you have to use the right keyboard-mapping package to go with your kernel version. The latest at the time of writing is **kbd-0.81.tar.gz**, for kernel version 0.99pl12.

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

Section 7. Frequently Encountered Error messages

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Question 7.1. INET: Warning: old style ioctl(IP_SET_DEV) called!

You are trying to use the old network configuration utilities; the new ones can be found on **tsx-11.mit.edu** in **/pub/linux/packages/net/net-2/binaries**.

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.

Question 7.2. `ld: unrecognized option '-m486'`

You have an old version of `ld`. Install a newer binutils package – this will contain an updated `ld`:

```
tsx-11.mit.edu:/pub/linux/packages/GCC/binutils.tar.z
```

Question 7.3. GCC says `Internal compiler error`

If the fault is repeatable (ie, it always happens at the same place in the same file) 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.

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 Q7.4 (page 19) '`make` says `Error 139`'.

Question 7.4. `make` **says** `Error 139`

Your compiler driver (`gcc`) dumped core. You probably have a buggy or old version of GCC — get the latest release.

If this doesn't fix the problem you are probably having problems with memory corruption. Check that the clock rate, wait states and refresh timing for your SIMMs are correct. If so you may have some dodgy SIMMs. Linux, like any Unix, is a very good memory tester.

Question 7.5. `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` or `/etc/rc.local`), 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 `/`.

Question 7.6. `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.

Question 7.7. `No utmp entry. You must exec ...` when I log in.

Your **/etc/utmp** is screwed up. You should have

```
> /etc/utmp
```

in your **/etc/rc** or **/etc/rc.local**. See Q6.13 (page 17) 'I have screwed up my system and can't log in to fix it.' for how to be able to do this.

Question 7.8. `EXT2-fs: warning: mounting unchecked filesystem`

You need to run **e2fsck** (or **fsck -t ext2** if you have the fsutils package) 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 bootutils package, available on **sunsite** and **tsx-11**.

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.

Question 7.9. `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) and xiafs (Qi Xia's filesystem).

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

Question 7.10. `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.

Section 8. X Windows

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Question 8.1. Does Linux support X Windows ?

Yes. You need to have a video card which is supported by XFree86 (or XS3 for S3-based cards). See the FAQs referred to below for more details.

Some of the Linux releases – MCC, for example – don't come with X Windows already included; however you can easily download and install it from **/pub/Linux/X11/Xfree86-1.3** on **sunsite.unc.edu** and its mirror sites. There is a **README** file there with more information. Other releases – TAMU, Slackware and SLS, for example – come with X Windows already included

Once you have unpacked it onto your system (either as part of the installation of a release or after downloading it separately as above) some documentation can be found in **/usr/X386/lib/X11/etc**.

You should also check the Frequently Asked Questions list for **comp.windows.x.i386unix**, which is available on **rtfm.mit.edu** in **/pub/usenet/news.answers/Intel-Unix-X-Faq**, and the more general FAQ on X in **x-faq** in the same directory.

Please don't post X Windows related questions to **comp.os.linux.help**.

Question 8.2. Where can I get an XConfig for my video card and monitor ?

It's not that hard to roll your own.

Read the instructions that came with XFree86-1.3, in **/usr/X386/lib/X11/etc**. The files you probably need to look at are the **README**, and **ModeDB.txt** which contains sample **XConfig** extracts for various monitors and cards.

If your monitor isn't listed try the VESA standard timings.

Near the end of **VideoModes.doc** there is a section on moving and resizing the image, in case that's all that needs fixing; this file also gives complete details of how to calculate the timings from scratch.

If none of this helps try reading **comp.windows.x.i386unix** – specifically the FAQ for that group (see Q8.1 (page 21) 'Does Linux support X Windows ?'). Please don't post your X Windows related question to **comp.os.linux.help**.

Question 8.3. I can't get my mouse to work with X Windows.

You probably have the wrong mouse type in the **XConfig**, or are using the wrong device in **/dev**.

You can check that you have the right device in **/dev** by using **cat**. Type **cat /dev/**whatever (while X isn't running !) and you should see characters come out, either continuously or when you move the mouse. If none of the plausible devices work and you have a busmouse, make sure that your kernel was compiled with busmouse support enabled and that it detected the busmouse

at boot-time (it prints a message when it does).

Note that the protocol used (which is what you specify in the **XConfig** file) is not necessarily named after the manufacturer of the mouse. For example, many Logitech mice use Microsoft or Mouse Systems protocols.

Also, there is not really any such thing as a 3-button Microsoft-compatible mouse. If you have a 3 button mouse which claims to be Microsoft compatible there will probably be a way to switch it into 3 button mode, which may well use the Mouse Systems protocol or an extension to the Microsoft protocol. Check your mouse manual and experiment.

Please don't post X Windows related questions to **comp.os.linux.help**.

Section 9. How to get further assistance

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Question 9.1. 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 mail Ian Jackson at **<ijackson@nyx.cs.du.edu>**.

Read the Installation and Getting Started Guide [Q2.1 (page 5) '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**.

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) and 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 giving 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 sometimes contains very important information for all Linux users.

X-Windows questions belong in `comp.windows.x.i386unix`, not in `comp.os.linux.help`. 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 `comp.os.linux.help`; alternatively you could send email to `linux-support@sunsite.unc.edu`. Make sure you read the next question, Q9.2 (page 23) 'What to put in a posting to `comp.os.linux.help`', first.

Question 9.2. What to put in a posting to `comp.os.linux.help`

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

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, SLS, whatever).
- 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 knew 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.

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. If you use (t)rn you must make sure that when you post you use the lowercase **f** key; using uppercase **F** and deleting the quoted text doesn't do the same thing. However Some versions of trn 2.x have a bug which produces this effect effen if you use **f**. If this applies to your version you can edit out the References line in the message before you post, or just use plain Pnews to make a new posting. You should always read the header before posting anyway.

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

Section 10. Administrative information and acknowledgements

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Question 10.1. 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 **<ijackson@nyx.cs.du.edu>**.

Question 10.2. Formats in which this FAQ is available

This document is available as ASCII text, an Emacs Info document and PostScript.

The ASCII and Emacs Info 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.

Question 10.3. Authorship and acknowledgements

This FAQ was compiled by Ian Jackson `<ijackson@nyx.cs.du.edu>`, with assistance and comments from others too numerous to mention. It was loosely based on the original Linux FAQ by Marc-Michel Corsini.

Special thanks are due to Matt Welsh, who coordinates the HOWTOs and has written substantial portions of many of them, and to Marc-Michel Corsini. Thanks also to the contributors to the previous Linux FAQ, and to those sent me comments about this FAQ, and who answered questions on the newsgroup.

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

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