



JUST ADD SOURCE!

About the cook . . .

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What is Linux From Scratch?

It's not . . .

- . . . from scratch, *per se*.
 - there's no *re-writing* of the software
- . . . really a *distro*.^{*}
 - At least as we now know that word
 - no package management
 - no repos

^{*}Though, technically, one might call it a *distribution* of the Linux kernel)

What is Linux From Scratch?

- A bit of his story
- His purposes

It's a series of projects

[LFS](#)[BLFS](#)[ALFS](#)[CLFS](#)[News](#)[Support](#)[Mailing Lists](#)[Wiki](#)[Search](#)[Credits](#)[Contribute](#)[Website Mirrors](#)[Site Map](#)

Welcome to Linux From Scratch!

Linux From Scratch (LFS) is a project that provides you with step-by-step instructions for building your own custom Linux system, entirely from scratch.

Currently, the Linux From Scratch organization consists of the following subprojects:

[LFS](#) :: Linux From Scratch is the main book, the base from which all other projects are derived.

[BLFS](#) :: Beyond Linux From Scratch helps you extend your finished LFS installation into a more customized and usable system.

[ALFS](#) :: Automated Linux From Scratch provides tools for automating and managing LFS and BLFS builds.

[CLFS](#) :: Cross Linux From Scratch provides the means to cross-compile an LFS system on many types of systems.

[HLFS](#) :: Hardened Linux From Scratch focuses on building an LFS system with heightened security.

[Hints](#) :: The Hints project is a collection of documents that explain how to enhance your LFS system in ways that are not included in the main book.

[LiveCD](#) :: The LiveCD project provides a CD that is useful as an LFS build host or as a general rescue CD.

[Patches](#) :: The Patches project serves as a central repository for all patches useful to an LFS user.

It's a book in multiple versions

Current Stable

This is the latest released LFS book, considered stable. Most people will want to read this book.

As a result of bugs and security warnings, please be sure to read the errata page for any modifications needed to the LFS build.

[Stable LFS Errata](#) (important!)

[Stable LFS](#)

Current Development

This is the LFS Book in its current development state. Whilst it may provide more features and updated upstream packages than the stable book, it is more prone to bugs and security vulnerabilities. Use with care.

Security vulnerabilities and other bugs may be present in the [bug database](#) but there may be others not yet reported.

[Development LFS](#)

Note: There is an automatically generated [wget list](#) available to fetch all LFS Book packages automatically.

Systemd version of LFS

Current Stable

This is the latest released LFS systemd book, considered stable. Most people will want to read this book.

As a result of bugs and security warnings, please be sure to read the errata page for any modifications needed to the LFS systemd build.

[Stable LFS systemd Errata](#) (important!)

[Stable LFS systemd](#)

Current Development

This is the LFS systemd Book in its current development state. Whilst it may provide more features and updated upstream packages than the stable book, it is more prone to bugs and security vulnerabilities. Use with care.

[Development LFS systemd](#)

It's also in multiple languages

Czech

[LFS 6.1](#)

Translated by [Filip Bartmann](#)

French

[Website](#) | [Download](#) | [Stable Version](#)

Translated by [Traduc.org](#)

German

[Website](#) | [LFS 6.4](#)

Translated by [Thomas Reitelbach](#)

Italian

[Website](#) | [LFS 6.0](#) | [LFS 6.0 \(Mirrored\)](#)

Translated by ILDP

[Website](#) | [LFS 6.1.1](#) | [LFS 6.1](#) | [LFS 6.0](#)

Translated by [Giulio Daprelà](#)

Japanese

[Website](#) | [LFS 6.5](#) | [Download](#)

Translated by [Michio Matsuyama](#)

Russian

[LFS 6.0 \(HTML\)](#) | [LFS 6.0 \(Tarball\)](#)

Translated by [Sergey Kamynski](#), based on Vitaly Katraev's translation of LFS 5.0.

[LFS 5.0](#)

Translated by [Vitaly Katraev](#)

[Website](#) | [LFS 4.0](#)

Translated by Denis Kaledin, Nick Frolov, Alex Kazankov

Caveats & Qualifications

- Layers of complexity
 - The Linux Universe consists of worlds within worlds.
- No less true for LFS.
- What follows is a high(-light) view, with a few glimpses and tips tossed your way.

Preface to LFS (i.e., the book)

- Target architectures
 - x86 & x86_64
- Standards (POSIX.1-2008, FHS, LSB)
- Prerequisite knowledge & skills
- Host System Requirements

Preface: Host System Requirements

- **Bash-3.2** (/bin/sh should be a symbolic or hard **link** to bash)
- **Binutils-2.17** (Versions greater than 2.25 are **not recommended** as they have not been tested)
- **Bison-2.3** (/usr/bin/yacc should be a **link** to bison or small script that executes bison)
- **Bzip2-1.0.4**
- **Coreutils-6.9**
- **Diffutils-2.8.1**
- **Findutils-4.2.31**
- **Gawk-4.0.1** (/usr/bin/awk should be a **link** to gawk)
- **GCC-4.1.2** including the C++ compiler, **g++** (Versions greater than 4.9.2 are **not recommended** as they have not been tested)
- **Glibc-2.5.1** (Versions greater than 2.21 are **not recommended** as they have not been tested)
- **Grep-2.5.1a**
- **Gzip-1.3.12**
- **Linux Kernel-2.6.32**
- **M4-1.4.10**
- **Make-3.81**
- **Patch-2.5.4**
- **Perl-5.8.8**
- **Sed-4.1.5**
- **Tar-1.18**
- **Texinfo-4.7**
- **Xz-5.0.0**

Host Sys Req's, Cont'd

```
cat > version-check.sh << "EOF"
#!/bin/bash
# Simple script to list version numbers of critical development tools

export LC_ALL=C
bash --version | head -n1 | cut -d" " -f2-4
echo "/bin/sh -> `readlink -f /bin/sh`"
echo -n "Binutils: "; ld --version | head -n1 | cut -d" " -f3-
bison --version | head -n1

if [ -h /usr/bin/yacc ]; then
    echo "/usr/bin/yacc -> `readlink -f /usr/bin/yacc`";
elif [ -x /usr/bin/yacc ]; then
    echo yacc is ` /usr/bin/yacc --version | head -n1 `
else
    echo "yacc not found"
fi

bzip2 --version 2>&1 < /dev/null | head -n1 | cut -d" " -f1,6-
echo -n "Coreutils: "; chown --version | head -n1 | cut -d")" -f2
diff --version | head -n1
find --version | head -n1
gawk --version | head -n1

if [ -h /usr/bin/awk ]; then
    echo "/usr/bin/awk -> `readlink -f /usr/bin/awk`";
elif [ -x /usr/bin/awk ]; then
    echo yacc is ` /usr/bin/awk --version | head -n1 `
else
    echo "awk not found"
fi

gcc --version | head -n1
g++ --version | head -n1
ldd --version | head -n1 | cut -d" " -f2- # glibc version
grep --version | head -n1
gzip --version | head -n1
cat /proc/version
m4 --version | head -n1
make --version | head -n1
patch --version | head -n1
echo Perl `perl -V:version`
sed --version | head -n1
tar --version | head -n1
makeinfo --version | head -n1
xz --version | head -n1

echo 'main(){}' > dummy.c && g++ -o dummy dummy.c
if [ -x dummy ]
    then echo "g++ compilation OK";
    else echo "g++ compilation failed"; fi
rm -f dummy.c dummy
EOF

bash version-check.sh
```

me@mine:~\$ bash version-check.sh

bash, version 4.3.11(1)-release

/bin/sh -> /bin/bash

Binutils: (GNU Binutils for Ubuntu) 2.24

bison (GNU Bison) 3.0.2

/usr/bin/yacc -> /usr/bin/bison.yacc

bzip2, Version 1.0.6, 6-Sept-2010.

Coreutils: 8.21

diff (GNU diffutils) 3.3

find (GNU findutils) 4.4.2

GNU Awk 4.0.1

/usr/bin/awk -> /usr/bin/gawk

gcc (Ubuntu 4.8.4-2ubuntu1~14.04) 4.8.4

g++ (Ubuntu 4.8.4-2ubuntu1~14.04) 4.8.4

(Ubuntu EGLIBC 2.19-0ubuntu6.6) 2.19

grep (GNU grep) 2.16

gzip 1.6

Linux version 3.13.0-57-generic (buildd@brownie) (gcc version 4.8.2 (Ubuntu 4.8.2-19ubuntu1)) #95-Ubuntu SMP Fri Jun 19 09:28:15 UTC 2015

m4 (GNU M4) 1.4.17

GNU Make 3.81

GNU patch 2.7.1

Perl version='5.18.2';

sed (GNU sed) 4.2.2

tar (GNU tar) 1.27.1

makeinfo (GNU texinfo) 5.2

xz (XZ Utils) 5.1.0alpha

g++ compilation OK

Chapter 2: Preparing the Partition

- Size: 10 GB (more than enough for LFS & BLFS)
- Appended the following to /etc/fstab:
 /dev/sda5 none swap sw 0 0
 /dev/sda6 /mnt/lfs ext4 rw 0 2
- export /mnt/lfs (appended to my .bashrc, and to root's as well)

Chapter 3: Source Packages & Patches

- Source directory in \$LFS (\$LFS/sources)
- Make it writeable & sticky (chmod a+wt \$LFS/sources)
- `wget --input-file=wget-list --continue --directory-prefix=$LFS/sources`

Chapter 3: Packages & Patches, cont'd

<http://download.savannah.gnu.org/releases/acl/acl-2.2.52.src.tar.gz>
<http://download.savannah.gnu.org/releases/attr/attr-2.4.47.src.tar.gz>
<http://ftp.gnu.org/gnu/autoconf/autoconf-2.69.tar.xz>
<http://ftp.gnu.org/gnu/automake/automake-1.15.tar.xz>
<http://ftp.gnu.org/gnu/bash/bash-4.3.30.tar.gz>
<http://alpha.gnu.org/gnu/bc/bc-1.06.95.tar.bz2>
<http://ftp.gnu.org/gnu/binutils/binutils-2.25.tar.bz2>
<http://ftp.gnu.org/gnu/bison/bison-3.0.4.tar.xz>
<http://www.bzip.org/1.0.6/bzip2-1.0.6.tar.gz>
<http://sourceforge.net/projects/check/files/check/0.9.14/check-0.9.14.tar.gz>
<http://ftp.gnu.org/gnu/coreutils/coreutils-8.23.tar.xz>
<http://ftp.gnu.org/gnu/dejagnu/dejagnu-1.5.2.tar.gz>
<http://ftp.gnu.org/gnu/diffutils/diffutils-3.3.tar.xz>
<http://dev.gentoo.org/~blueness/eudev/eudev-2.1.1.tar.gz>
<http://anduin.linuxfromscratch.org/sources/other/eudev-2.1.1-manpages.tar.bz2>
<http://downloads.sourceforge.net/project/e2fsprogs/e2fsprogs/v1.42.12/e2fsprogs-1.42.12.tar.gz>
<http://prdownloads.sourceforge.net/expat/expat-2.1.0.tar.gz>
<http://prdownloads.sourceforge.net/expect/expect5.45.tar.gz>
<ftp://ftp.astron.com/pub/file/file-5.22.tar.gz>
<http://ftp.gnu.org/gnu/findutils/findutils-4.4.2.tar.gz>
<http://prdownloads.sourceforge.net/flex/flex-2.5.39.tar.bz2>
<http://ftp.gnu.org/gnu/gawk/gawk-4.1.1.tar.xz>
<http://ftp.gnu.org/gnu/gcc/gcc-4.9.2/gcc-4.9.2.tar.bz2>
<http://ftp.gnu.org/gnu/gdbm/gdbm-1.11.tar.gz>
<http://ftp.gnu.org/gnu/gettext/gettext-0.19.4.tar.xz>
<http://ftp.gnu.org/gnu/glibc/glibc-2.21.tar.xz>
<http://ftp.gnu.org/gnu/gmp/gmp-6.0.0a.tar.xz>
<http://ftp.gnu.org/gnu/gperf/gperf-3.0.4.tar.gz>
<http://ftp.gnu.org/gnu/grep/grep-2.21.tar.xz>
<http://ftp.gnu.org/gnu/groff/groff-1.22.3.tar.gz>
<http://alpha.gnu.org/gnu/grub/grub-2.02-beta2.tar.xz>
<http://ftp.gnu.org/gnu/gzip/gzip-1.6.tar.xz>
<http://anduin.linuxfromscratch.org/sources/LFS/lfs-packages/conglomeration/iana-etc/iana-etc-2.30.tar.bz2>
<http://ftp.gnu.org/gnu/inetutils/inetutils-1.9.2.tar.gz>
<http://launchpad.net/intltool/trunk/0.50.2/download/intltool-0.50.2.tar.gz>
<https://www.kernel.org/pub/linux/utils/net/iproute2/iproute2-3.19.0.tar.xz>
<https://www.kernel.org/pub/linux/utils/kbd/kbd-2.0.2.tar.gz>
<https://www.kernel.org/pub/linux/utils/kernel/kmod/kmod-19.tar.xz>

<http://www.greenwoodsoftware.com/less/less-458.tar.gz>
<http://www.linuxfromscratch.org/lfs/downloads/7.7/lfs-bootscripts-20150222.tar.bz2>
<https://www.kernel.org/pub/linux/libs/security/linux-privs/libcap2/libcap-2.24.tar.xz>
<http://download.savannah.gnu.org/releases/libpipeline/libpipeline-1.4.0.tar.gz>
<http://ftp.gnu.org/gnu/libtool/libtool-2.4.6.tar.xz>
<https://www.kernel.org/pub/linux/kernel/v3.x/linux-3.19.tar.xz>
<http://ftp.gnu.org/gnu/m4/m4-1.4.17.tar.xz>
<http://ftp.gnu.org/gnu/make/make-4.1.tar.bz2>
<http://download.savannah.gnu.org/releases/man-db/man-db-2.7.1.tar.xz>
<https://www.kernel.org/pub/linux/docs/man-pages/man-pages-3.79.tar.xz>
<http://www.multiprecision.org/mpc/download/mpc-1.0.2.tar.gz>
<http://www.mpfr.org/mpfr-3.1.2/mpfr-3.1.2.tar.xz>
<http://ftp.gnu.org/gnu/ncurses/ncurses-5.9.tar.gz>
<http://ftp.gnu.org/gnu/patch/patch-2.7.4.tar.xz>
<http://www.cpan.org/src/5.0/perl-5.20.2.tar.bz2>
<http://pkgconfig.freedesktop.org/releases/pkg-config-0.28.tar.gz>
<http://sourceforge.net/projects/procps-ng/files/Production/procps-ng-3.3.10.tar.xz>
<http://downloads.sourceforge.net/project/psmisc/psmisc/psmisc-22.21.tar.gz>
<http://ftp.gnu.org/gnu/readline/readline-6.3.tar.gz>
<http://ftp.gnu.org/gnu/sed/sed-4.2.2.tar.bz2>
<http://pkg-shadow.alioth.debian.org/releases/shadow-4.2.1.tar.xz>
<http://www.infodrom.org/projects/syslogd/download/syslogd-1.5.1.tar.gz>
<http://download.savannah.gnu.org/releases/sysvinit/sysvinit-2.88dsf.tar.bz2>
<http://ftp.gnu.org/gnu/tar/tar-1.28.tar.xz>
<http://downloads.sourceforge.net/project/tcl/Tcl/8.6.3/tcl8.6.3-src.tar.gz>
<http://ftp.gnu.org/gnu/texinfo/texinfo-5.2.tar.xz>
<http://www.iana.org/time-zones/repository/releases/tzdata2015a.tar.gz>
<http://anduin.linuxfromscratch.org/sources/other/udev-lfs-20140408.tar.bz2>
<https://www.kernel.org/pub/linux/utils/util-linux/v2.26/util-linux-2.26.tar.xz>
<ftp://ftp.vim.org/pub/vim/unix/vim-7.4.tar.bz2>
<http://cpan.metacpan.org/authors/id/T/TODD/XML-Parser-2.44.tar.gz>
<http://tukaani.org/xz/xz-5.2.0.tar.xz>
<http://www.zlib.net/zlib-1.2.8.tar.xz>
http://www.linuxfromscratch.org/patches/lfs/7.7/bash-4.3.30-upstream_fixes-1.patch
http://www.linuxfromscratch.org/patches/lfs/7.7/bc-1.06.95-memory_leak-1.patch
http://www.linuxfromscratch.org/patches/lfs/7.7/bzip2-1.0.6-install_docs-1.patch
<http://www.linuxfromscratch.org/patches/lfs/7.7/coreutils-8.23-il8n-1.patch>
<http://www.linuxfromscratch.org/patches/lfs/7.7/glibc-2.21-fhs-1.patch>
<http://www.linuxfromscratch.org/patches/lfs/7.7/kbd-2.0.2-backspace-1.patch>
http://www.linuxfromscratch.org/patches/lfs/7.7/mpfr-3.1.2-upstream_fixes-3.patch
http://www.linuxfromscratch.org/patches/lfs/7.7/readline-6.3-upstream_fixes-3.patch

Chapter 4. Final Preps: Build Environment Setup

- Tools Directory (“mkdir \$LFS/tools”)
 - Symlink this to / (“ln -s \$LFS/tools /”)
 - Ensures toolchain will always refer to \$LFS/tools to cleanly complete the bootstrapping process.
- LFS user
 - groupadd lfs
 - useradd -s /bin/bash -g lfs -m -k /dev/null lfs

Chapter 4. Final Preps: Build Environment Setup

- `.bash_profile`

```
lfs@taylor-lfs:~$ cat > ~/.bash_profile << "EOF"
> exec env -i HOME=$HOME TERM=$TERM PS1='\u:\w\$ ' /bin/bash
EOF
lfs@taylor-lfs:~$
```

- `.bashrc`

```
lfs@taylor-lfs:~$ cat > ~/.bashrc << "EOF"
| set +h
> umask 022
> LFS=/mnt/lfs
> LC_ALL=POSIX
> LFS_TGT=$(uname -m)-lfs-linux-gnu
> PATH=/tools/bin:/bin:/usr/bin
> export LFS LC_ALL LFS_TGT PATH
> EOF
```


Chapter 5: Constructing a Temporary System

- Just enough tools to construct the final system
- Temporary area that contains a known-good set of tools that can be isolated from the host system
- Two step process
 - 1. Build a host-independent toolchain.
 - 2. Use this toolchain to build other tools.
- This ensures clean risk-free build-space into

Chapter 5: Constructing a Temporary System, cont'd

[Binutils-2.25 - Pass 1](#)

[GCC-4.9.2 - Pass 1](#)

[Linux-3.19 API Headers](#)

[Glibc-2.21](#)

[Libstdc++-4.9.2](#)

[Binutils-2.25 - Pass 2](#)

[GCC-4.9.2 - Pass 2](#)

[Tcl-8.6.3](#)

[Expect-5.45](#)

[DejaGNU-1.5.2](#)

[Check-0.9.14](#)

[Ncurses-5.9](#)

[Bash-4.3.30](#)

[Bzip2-1.0.6](#)

[Coreutils-8.23](#)

[Diffutils-3.3](#)

[File-5.22](#)

[Findutils-4.4.2](#)

[Gawk-4.1.1](#)

[Gettext-0.19.4](#)

[Grep-2.21](#)

[Gzip-1.6](#)

[M4-1.4.17](#)

[Make-4.1](#)

[Patch-2.7.4](#)

[Perl-5.20.2](#)

[Sed-4.2.2](#)

[Tar-1.28](#)

[Texinfo-5.2](#)

[Util-linux-2.26](#)

[Xz-5.2.0](#)

Chapter 5: Constructing a Temporary System

In chroot environment, keep these separate `/mnt/lfs/tools` and `/mnt/lfs/sources`

Outline for building:

1. Change to `/mnt/lfs/sources` directory.
2. As `lfs` user, extract the package to a new directory using `tar` (I like keeping it verbose, if only for psychological & emotional comfort)
3. Change to the directory created when the package was extracted.
4. Follow the book's instructions for building the package.
5. Change back to the `sources` directory.
6. Delete the extracted source directory and any `<package>-build` directories that were created in the build process unless instructed otherwise.

| | (Core2Duo) Architecture | Build Time | Build Size |
|--------|-------------------------|---------------|------------|
| 32-bit | | 198.5 minutes | 648 MB |
| 64-bit | | 190.6 minutes | 709 MB |

Ch. 6: Installing Basic System Software

- Create mountpoints for our virtual filesystems
- Enter the chroot environment
- Create our directory structure
- Rebuild our toolchain for this permanent environment
- Install the basic utilities that we've come to know and love

Ch. 6: System Software Install--VFS mounts & chroot

```
mkdir -pv $LFS/{dev,proc,sys,run}
mknod -m 600 $LFS/dev/console c 5 1
mknod -m 666 $LFS/dev/null c 1 3
mount -v --bind /dev $LFS/dev

mount -vt devpts devpts $LFS/dev/pts -o gid=5,mode=620
mount -vt proc proc $LFS/proc
mount -vt sysfs sysfs $LFS/sys
mount -vt tmpfs tmpfs $LFS/run

if [ -h $LFS/dev/shm ]; then
    mkdir -pv $LFS/$(readlink $LFS/dev/shm)
fi

chroot "$LFS" /tools/bin/env -i \
    HOME=/root \
    TERM="$TERM" \
    PS1='\u:\w\$ ' \
    PATH=/bin:/usr/bin:/sbin:/usr/sbin:/tools/bin \
    /tools/bin/bash --login +h|
```

Ch. 6: System Software Install--directory tree

```
mkdir -pv /{bin,boot,etc}/{opt,sysconfig},home,lib/firmware,mnt,opt}
mkdir -pv /{media/{floppy,cdrom},sbin,srv,var}
install -dv -m 0750 /root
install -dv -m 1777 /tmp /var/tmp
mkdir -pv /usr/{,local/}{bin,include,lib,sbin,src}
mkdir -pv /usr/{,local/}share/{color,dict,doc,info,locale,man}
mkdir -v /usr/{,local/}share/{misc,terminfo,zoneinfo}
mkdir -v /usr/libexec
mkdir -pv /usr/{,local/}share/man/man{1..8}

case $(uname -m) in
    x86_64) ln -sv lib /lib64
            ln -sv lib /usr/lib64
            ln -sv lib /usr/local/lib64 ;;
esac

mkdir -v /var/{log,mail,spool}
ln -sv /run /var/run
ln -sv /run/lock /var/lock
mkdir -pv /var/{opt,cache,lib/{color,misc,locate},local}
```

Ch. 6: System Software Install--/etc/passwd & /etc/group

```
cat > /etc/passwd << "EOF"
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/dev/null:/bin/false
daemon:x:6:6:Daemon User:/dev/null:/bin/false
messagebus:x:18:18:D-Bus Message Daemon User:/var/run/dbus:/bin/false
nobody:x:99:99:Unprivileged User:/dev/null:/bin/false
EOF
```

```
cat > /etc/group << "EOF"
root:x:0:
bin:x:1:daemon
sys:x:2:
kmem:x:3:
tape:x:4:
tty:x:5:
daemon:x:6:
floppy:x:7:
disk:x:8:
lp:x:9:
dialout:x:10:
audio:x:11:
video:x:12:
utmp:x:13:
usb:x:14:
cdrom:x:15:
adm:x:16:
messagebus:x:18:
systemd-journal:x:23:
input:x:24:
mail:x:34:
nogroup:x:99:
users:x:999:
EOF
```

Ch. 6: System Software Install -- Toolchain & Software

[Linux-3.19 API Headers](#)

[Man-pages-3.79](#)

[Glibc-2.21](#)

[Adjusting the Toolchain](#)

[Zlib-1.2.8](#)

[File-5.22](#)

[Binutils-2.25](#)

[GMP-6.0.0a](#)

[MPFR-3.1.2](#)

[MPC-1.0.2](#)

[GCC-4.9.2](#)

[Bzip2-1.0.6](#)

[Pkg-config-0.28](#)

[Ncurses-5.9](#)

[Attr-2.4.47](#)

[Acl-2.2.52](#)

[Libcap-2.24](#)

[Sed-4.2.2](#)

[Shadow-4.2.1](#)

[Psmisc-22.21](#)

[Procps-ng-3.3.10](#)

[E2fsprogs-1.42.12](#)

[Coreutils-8.23](#)

[iana-Etc-2.30](#)

[M4-1.4.17](#)

[Flex-2.5.39](#)

[Bison-3.0.4](#)

[Grep-2.21](#)

[Readline-6.3](#)

[Bash-4.3.30](#)

[Bc-1.06.95](#)

[Libtool-2.4.6](#)

[GDBM-1.11](#)

[Expat-2.1.0](#)

[Inetutils-1.9.2](#)

[Perl-5.20.2](#)

[XML::Parser-2.44](#)

[Autoconf-2.69](#)

[Automake-1.15](#)

[Diffutils-3.3](#)

[Gawk-4.1.1](#)

[Findutils-4.4.2](#)

[Gettext-0.19.4](#)

[Intltool-0.50.2](#)

[Gperf-3.0.4](#)

[Groff-1.22.3](#)

[Xz-5.2.0](#)

[GRUB-2.02~beta2](#)

[Less-458](#)

[Gzip-1.6](#)

[IPRoute2-3.19.0](#)

[Kbd-2.0.2](#)

[Kmod-19](#)

[Libpipeline-1.4.0](#)

[Make-4.1](#)

[Patch-2.7.4](#)

[Sysklogd-1.5.1](#)

[Sysvinit-2.88dsf](#)

[Tar-1.28](#)

[Texinfo-5.2](#)

[Eudev-2.1.1](#)

[Util-linux-2.26](#)

[Man-DB-2.7.1](#)

[Vim-7.4](#)

Ch. 7: System Configuration & Bootscripts

- Installing the LFS bootscripts package
 - checkfs, cleanfs, console, functions, halt, ifdown, ifup, localnet, modules, mountfs, mountvirtfs, network, rc, reboot, sendsignals, setclock, ipv4-static, swap, sysctl, sysklogd, template, udev, and udev_retry
- Helpful high-level overviews
 - Device & module naming history (makedev → devfs → sysfs)

Ch. 7: Sys Config & Bootscripts, cont'd

- networking config files
 - ifconfig.eth0, resolv.conf, hostname, hosts, etc
- Bash shell startup files
- inputrc
 - used for Readline, software library providing line-editing and history capabilities for bash and other shells
- shells
 - acceptable login shells

Ch. 8: Making it Bootable

- `fstab`
- building the kernel
- `grub`

Ch. 8: Making it Bootable -- fstab

```
cat > /etc/fstab << "EOF"
```

```
# Begin /etc/fstab
```

| # file system | mount-point | type | options | dump | fsck order |
|---------------|-------------|------|---------|------|---------------|
|---------------|-------------|------|---------|------|---------------|

| | | | | | |
|------------|---|-------|----------|---|---|
| /dev/<xxx> | / | <fff> | defaults | 1 | 1 |
|------------|---|-------|----------|---|---|

| | | | | | |
|------------|------|------|-------|---|---|
| /dev/<yyy> | swap | swap | pri=1 | 0 | 0 |
|------------|------|------|-------|---|---|

| | | | | | |
|------|-------|------|---------------------|---|---|
| proc | /proc | proc | nosuid,noexec,nodev | 0 | 0 |
|------|-------|------|---------------------|---|---|

| | | | | | |
|-------|------|-------|---------------------|---|---|
| sysfs | /sys | sysfs | nosuid,noexec,nodev | 0 | 0 |
|-------|------|-------|---------------------|---|---|

| | | | | | |
|--------|----------|--------|----------------|---|---|
| devpts | /dev/pts | devpts | gid=5,mode=620 | 0 | 0 |
|--------|----------|--------|----------------|---|---|

| | | | | | |
|-------|------|-------|----------|---|---|
| tmpfs | /run | tmpfs | defaults | 0 | 0 |
|-------|------|-------|----------|---|---|

| | | | | | |
|----------|------|----------|------------------|---|---|
| devtmpfs | /dev | devtmpfs | mode=0755,nosuid | 0 | 0 |
|----------|------|----------|------------------|---|---|

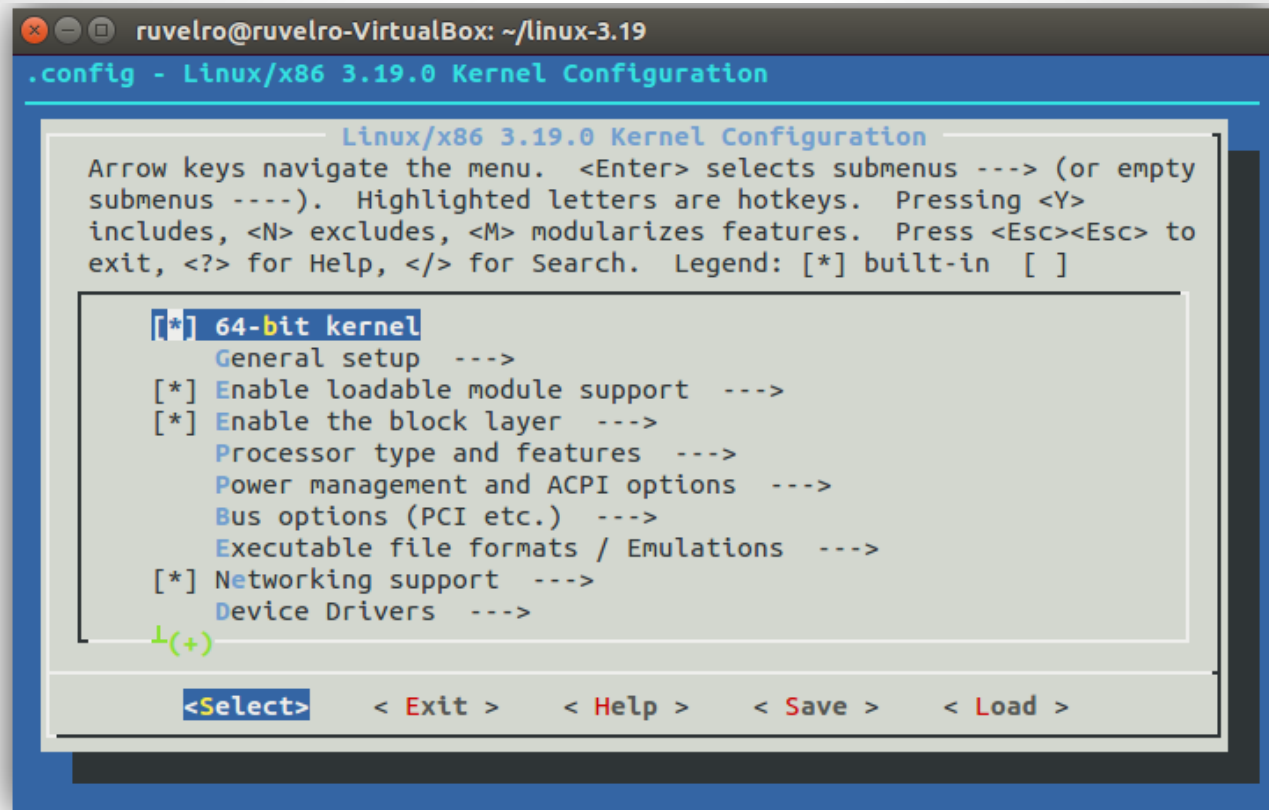
```
# End /etc/fstab
```

```
EOF
```

Ch. 8: Making it Bootable -- the kernel

- **make menuconfig**
 - generates a menu tree w/ help page for each item
 - make xconfig gives you gui version
- **make oldconfig**
 - port an old kernel config file to the new kernel
- **make defconfig**
 - creates a config file based on the default values of your cpu architecture.

menuconfig



Ch. 8: Making it Bootable -- GRUB

- If hosting w/ existing system, make a grub backup disk (links & install instructions to xorriso . . .
- . . . because of this little command: `grub-install /dev/sda`

Ch. 8: Making it Bootable -- GRUB

```
cat > /boot/grub/grub.cfg << "EOF"
# Begin /boot/grub/grub.cfg
set default=0
set timeout=5

insmod ext2
set root=(hd0,2)

menuentry "GNU/Linux, Linux 3.19-lfs-7.7" {
    linux /boot/vmlinuz-3.19-lfs-7.7 root=/dev/sda2 ro
}
EOF
```


Demo on two not-so-sexy laptops

Development LFS

32-bit

Dell Inspiron 1520 (ca.
2007)

Intel Core2Duo 1.5
GHz

2 GB RAM

Stable LFS 7.7

64-bit

Dell Inspiron 5720
(ca. 2012)

Intel Core i7
2.2GHz

8 GB RAM

Conclusion:

Thoughts, Impressions, & Next Steps

