

Loongson Lesson

211180192 韩天健

March 5, 2025

1 实验环境



Figure 1: Ubuntu 22.04

1. 交叉编译器使用 loongson-gnu-toolchain-8.3-x86_64-loongarch64-linux-gun-rc1.4

2. minicom 版本 2.8
3. 网络环境使用宿舍路由器，龙芯开发板分配 IP 为 192.168.124.11，主机分配 IP 为 192.168.124.3
4. Ubuntu 22.04 识别不到 ttyUSB0，在卸载 brltty 并重新插拔串口设备后可以正常识别，不知道虚拟机和实验室的电脑能否正常识别

2 Linux 内核移植和根文件系统

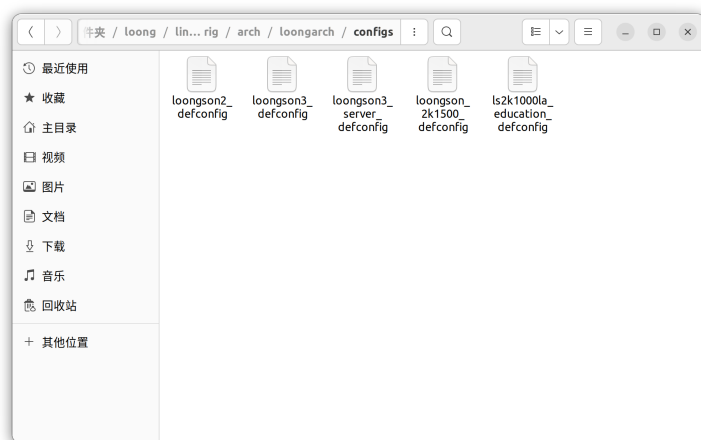


Figure 2: 缺省配置文件

linux_4.19.190.7.9.orig 源码中没有 2k1000 开发板的缺省配置文件，此处将收到的 ls2k1000a_education_config 后缀改为 defconfig 后可正确识别为 defconfig 缺省配置文件，后续对实验无影响。此处讲义有小 bug，位于 P29 复制缺省配置文件的代码中。

3.2.2 内核配置项介绍

首先复制缺省配置文件。龙芯教育派缺省配置文件是 loongson_2k1000_defconfig, 规范的操作是:

```
$ ARCH=loongarch make loongson_22k1000_defconfig
```

Figure 3: bug

当设置的服务 IP 范围为 192.168.124.* 时，无法成功挂载，设置为 192.168.124.11 时可以挂载，可能是通过路由器局域网连接产生的奇怪问题。

```
htj@htj-ThinkBook-14-G4-ARA: ~  
htj@htj-ThinkBook-14-G4-ARA:~$ cat /etc/exports  
# /etc/exports: the access control list for filesystems which may be exported  
# to NFS clients. See exports(5).  
#  
# Example for NFSv2 and NFSv3:  
# /srv/homes hostname1(rw,sync,no_subtree_check) hostname2(ro,sync,no_subtree_check)  
#  
# Example for NFSv4:  
# /srv/nfs4 gss/krb5l(rw,sync,fsid=0,crossmnt,no_subtree_check)  
# /srv/nfs4/homes gss/krb5l(rw,sync,no_subtree_check)  
#  
/mnt/test 192.168.124.*(rw,sync,no_subtree_check,no_root_squash)  
/srv/nfs4 192.168.124.*(rw,sync,no_subtree_check,no_root_squash)  
htj@htj-ThinkBook-14-G4-ARA:~$
```

Figure 4: 192.168.124.*

```
htj@htj-ThinkBook-14-G4-ARA: ~  
# mount 192.168.124.3:/srv/nfs4 /mnt -o nolock,proto=tcp  
mount: mounting 192.168.124.3:/srv/nfs4 on /mnt failed: Permission denied  
# [ 132.783375] random: crng init done
```

Figure 5: 挂载失败

```
htj@htj-ThinkBook-14-G4-ARA: ~  
htj@htj-ThinkBook-14-G4-ARA:~$ cat /etc/exports  
# /etc/exports: the access control list for filesystems which may be exported  
# to NFS clients. See exports(5).  
#  
# Example for NFSv2 and NFSv3:  
# /srv/homes hostname1(rw,sync,no_subtree_check) hostname2(ro,sync,no_subtree_check)  
#  
# Example for NFSv4:  
# /srv/nfs4 gss/krb5l(rw,sync,fsid=0,crossmnt,no_subtree_check)  
# /srv/nfs4/homes gss/krb5l(rw,sync,no_subtree_check)  
#  
/mnt/test 192.168.124.11(rw,sync,no_subtree_check,no_root_squash)  
/srv/nfs4 192.168.124.11(rw,sync,no_subtree_check,no_root_squash)  
htj@htj-ThinkBook-14-G4-ARA:~$ sudo exportfs -ra  
htj@htj-ThinkBook-14-G4-ARA:~$
```

Figure 6: 192.168.124.11

```
htj@htj-ThinkBook-14-G4-ARA: ~  
# mount 192.168.124.3:/srv/nfs4 /mnt -o nolock,proto=tcp  
mount: mounting 192.168.124.3:/srv/nfs4 on /mnt failed: Permission denied  
# [ 132.783375] random: crng init done  
# mount 192.168.124.3:/srv/nfs4 /mnt -o nolock,proto=tcp  
# df -Th  
Filesystem      Type      Size      Used Available Use% Mounted on  
/dev/root       ext4      187.4M    160.5M    16.8M   91% /  
devtmpfs        devtmpfs  671.6M      0    671.6M    0% /dev  
192.168.124.3:/srv/nfs4  
nfs            27.3G     16.6G     9.3G   64% /mnt  
#
```

Figure 7: 挂载成功

P42 讲义有小错误。

mke2fs 的 “-E” 选项设置文件系统格式化的用户权限。缺少这个选项, 文件系统挂载后, 普通用户没有写权限。

Figure 8: bug

3 Python 移植

readline 主页: <https://www.gnu.org/software/readline>
readline 源码: <ftp://ftp.cwru.edu/pub/bash/readline-8.0.tar.gz>

Figure 9: bug

该链接目前无法下载, 开了代理也下不了。

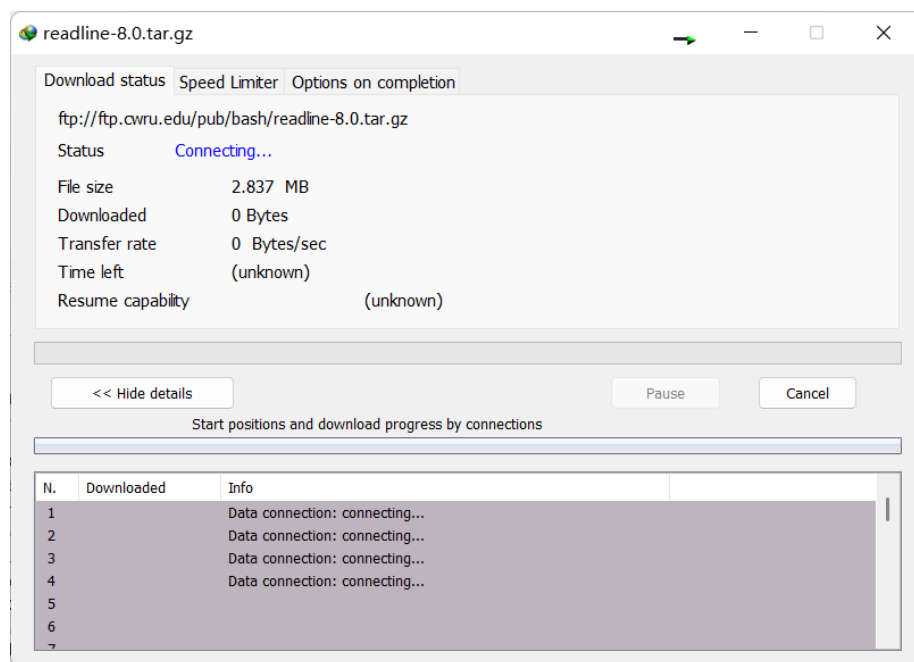
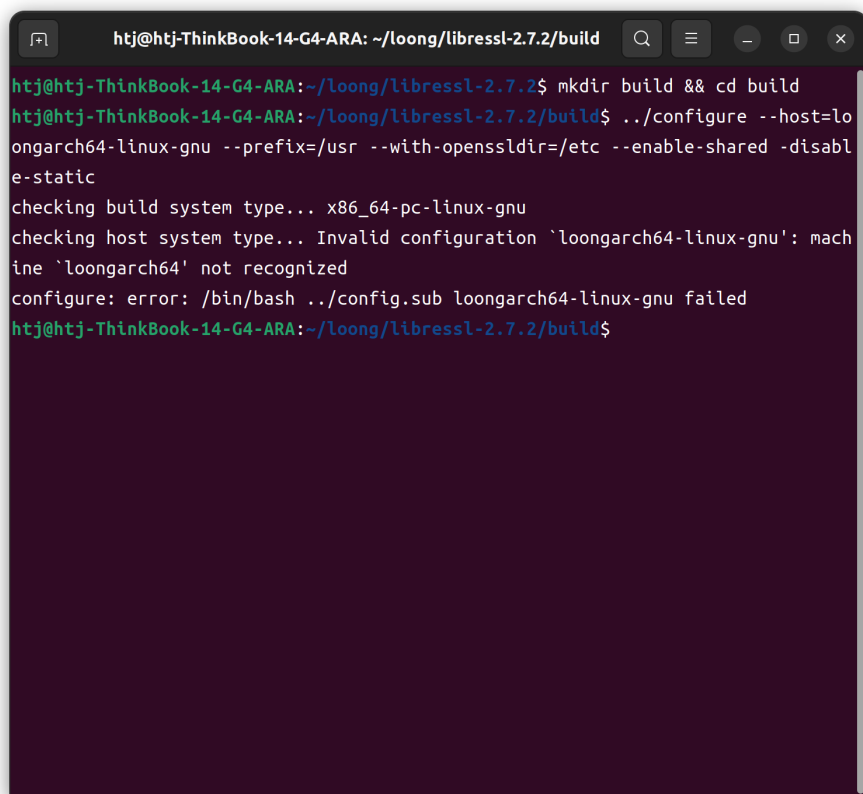


Figure 10: bug

ftp 站点挂了, 不过 git 仓库还能下载 <http://git.savannah.gnu.org/cgit/readline.git/snapshot/readline-master.tar.gz>
config.guess 和 config.sub 太旧, 导致 configure 无法获取系统类型

A terminal window with a dark background and light green text. The window title is 'htj@htj-ThinkBook-14-G4-ARA: ~/loong/libressl-2.7.2/build'. The terminal shows the following commands and output:

```
htj@htj-ThinkBook-14-G4-ARA:~/loong/libressl-2.7.2$ mkdir build && cd build
htj@htj-ThinkBook-14-G4-ARA:~/loong/libressl-2.7.2/build$ ./configure --host=loongarch64-linux-gnu --prefix=/usr --with-openssldir=/etc --enable-shared --disable-static
checking build system type... x86_64-pc-linux-gnu
checking host system type... Invalid configuration 'loongarch64-linux-gnu': machine 'loongarch64' not recognized
configure: error: /bin/bash ./config.sub loongarch64-linux-gnu failed
htj@htj-ThinkBook-14-G4-ARA:~/loong/libressl-2.7.2/build$
```

Figure 11: not recognized

```
1 $wget -O config.guess https://git.savannah.gnu.org/cgit/config.git/plain/config.guess
2 $wget -O config.sub https://git.savannah.gnu.org/cgit/config.git/plain/config.sub
```

更新 config.sub 和 config.guess 文件, 以支持 Loongson64 架构