

آزمایشگاه سیستم‌های عامل

نام استاد: دکتر حمید بیگی

تابستان ۱۴۰۴

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آشنایی با دستورات پایه‌ای

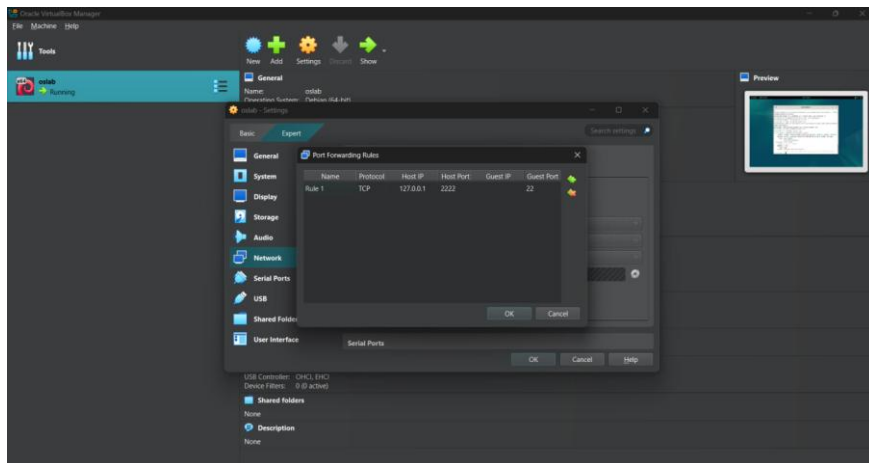
ما در این آزمایش از Debian 12 استفاده کردیم که روی virtual box بالا آمده‌است. از داخل تنظیمات virtual box یک port forwarding انجام می‌دهیم تا با ssh زدن به localhost بتوانیم به این vm متصل شویم برای سادگی استفاده از شل ویندوز.

```
moein@vbox: ~
Microsoft Windows [Version 10.0.26100.4652]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Moein>ssh moein@127.0.0.1 -p 2222
The authenticity of host '127.0.0.1:2222 ([127.0.0.1]:2222)' can't be established.
ED25519 key fingerprint is SHA256:8d51JHkEReW22huLCzuYqC+Y50LnX2adB0++Ruar5U.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '127.0.0.1:2222' (ED25519) to the list of known hosts.
moein@127.0.0.1's password:
Linux vbox 6.1.0-37-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.140-1 (2025-05-22) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
moein@vbox:~$
```



ورژن فعلی کرنل:

```
moein@vbox: ~
moein@vbox:~$ uname -r
6.1.0-37-amd64
moein@vbox:~$ |
```

استفاده از دستورات mv و cp و mkdir و cd و pwa و ..:

```
moeen@vbox: /tmp/oslab1 x + v
moeen@vbox:~$ pwd
/home/moeen
moeen@vbox:~$ cd /tmp
moeen@vbox:/tmp$ mkdir oslab1
moeen@vbox:/tmp$ cd oslab1/
moeen@vbox:/tmp/oslab1$ nano information.txt
moeen@vbox:/tmp/oslab1$ mv information.txt myinformation.txt
moeen@vbox:/tmp/oslab1$ cp myinformation.txt backupinfo.txt
moeen@vbox:/tmp/oslab1$ cat myinformation.txt
moeen aali - samin akbari
401105561 - 401105594
moeen@vbox:/tmp/oslab1$ |
```

```
moeen@vbox: /tmp/oslab1 x + v
moeen@vbox:/tmp/oslab1$ echo "Hello There!" > myinformation.tx
moeen@vbox:/tmp/oslab1$ cat myinformation.tx
Hello There!
moeen@vbox:/tmp/oslab1$ echo "Hello There!" >> myinformation.tx
moeen@vbox:/tmp/oslab1$ cat myinformation.tx
Hello There!
Hello There!
moeen@vbox:/tmp/oslab1$ |
```

تفاوت دستورهای فوق این است که یکی از آن‌ها append می‌کند و دیگری جایگزین می‌کند. اگر از ۲ تا < استفاده کنیم append می‌شود.

استفاده از cat برای ساخت فایل:

```
moeen@vbox: /tmp/oslab1 x + v
moeen@vbox:/tmp/oslab1$ cat myinformation.tx > testfile.txt
moeen@vbox:/tmp/oslab1$ cat testfile.txt
Hello There!
Hello There!
moeen@vbox:/tmp/oslab1$ |
```

لیست process های موجود با استفاده از دستور ps aux :

```
moeen@vbox: /tmp/oslab1
root      6402  0.0  0.0 165180 10780 ?        Ssl   14:40   0:00 gdm-session-worker [pam/gdm-launch-environment]
Debian+   6434  0.0  0.0 159288  7908 ?        Ssl   14:40   0:00 /usr/libexec/gdm-wayland-session dbus-run-session -- gnome-session --autostart /usr/share
Debian+   6439  0.0  0.0   6264  1492 ?        S     14:40   0:00 dbus-run-session -- gnome-session --autostart /usr/share/gdm/greeter/autostart
Debian+   6441  0.0  0.0   9572  5412 ?        S     14:40   0:00 dbus-daemon --nofork --print-address 4 --session
Debian+   6446  0.0  0.1  725268 20376 ?        Sl    14:40   0:00 /usr/libexec/gnome-session-binary --autostart /usr/share/gdm/greeter/autostart
Debian+   6473  0.4  1.5 4107132 216740 ?        Sl    14:40   0:04 /usr/bin/gnome-shell
Debian+   6540  0.0  0.0  311428  9904 ?        Sl    14:40   0:00 /usr/libexec/at-spi-bus-launcher
Debian+   6545  0.0  0.0   9128  4440 ?        S     14:40   0:00 /usr/bin/dbus-daemon --config-file=/usr/share/defaults/at-spi2/accessibility.conf --nofor
Debian+   6551  0.0  0.4 228944 66524 ?        S     14:40   0:00 /usr/bin/Xwayland :1026 -rootless -noreferrer -accessx -core -auth /run/user/112/.mutter-Xwa
Debian+   6561  0.0  0.0  236704  8836 ?        Sl    14:40   0:00 /usr/libexec/xdg-permission-store
Debian+   6580  0.0  0.1 2456860 26724 ?        Sl    14:40   0:00 /usr/bin/gjs /usr/share/gnome-shell/org.gnome.Shell.Notifications
Debian+   6582  0.0  0.0  164328  9384 ?        Sl    14:40   0:00 /usr/libexec/at-spi2-registryd --use-gnome-session
Debian+   6593  0.0  0.0  463468 12484 ?        Sl    14:40   0:00 /usr/libexec/gsd-sharing
Debian+   6598  0.0  0.1  338988 24772 ?        Sl    14:40   0:00 /usr/libexec/gsd-wacom
Debian+   6602  0.0  0.1  339976 24992 ?        Sl    14:40   0:00 /usr/libexec/gsd-color
Debian+   6605  0.0  0.1  338328 24236 ?        Sl    14:40   0:00 /usr/libexec/gsd-keyboard
Debian+   6611  0.0  0.0  247220 13592 ?        Sl    14:40   0:00 /usr/libexec/gsd-print-notifications
Debian+   6613  0.0  0.0  454768  8416 ?        Sl    14:40   0:00 /usr/libexec/gsd-rfkill
Debian+   6620  0.0  0.0  385784 12212 ?        Sl    14:40   0:00 /usr/libexec/gsd-smartcard
Debian+   6621  0.0  0.0  355452 13892 ?        Sl    14:40   0:00 /usr/libexec/gsd-datetime
Debian+   6626  0.0  0.2  668244 29524 ?        Sl    14:40   0:00 /usr/libexec/gsd-media-keys
Debian+   6628  0.0  0.0  233184  8092 ?        Sl    14:40   0:00 /usr/libexec/gsd-screensaver-proxy
Debian+   6629  0.0  0.0  319572 11464 ?        Sl    14:40   0:00 /usr/libexec/gsd-sound
Debian+   6633  0.0  0.0  307556  8608 ?        Sl    14:40   0:00 /usr/libexec/gsd-ally-settings
Debian+   6637  0.0  0.0  382852  9220 ?        Sl    14:40   0:00 /usr/libexec/gsd-housekeeping
Debian+   6644  0.0  0.2  450248 29688 ?        Sl    14:40   0:00 /usr/libexec/gsd-power
Debian+   6705  0.0  0.1  341912 17300 ?        Sl    14:40   0:00 /usr/libexec/gsd-printer
Debian+   6756  0.0  0.0  386168 14148 ?        Sl    14:40   0:00 ibus-daemon --panel disable -r --xim
Debian+   6760  0.0  0.0  234196  8312 ?        Sl    14:40   0:00 /usr/libexec/ibus-dconf
Debian+   6762  0.1  0.2  344280 30452 ?        Sl    14:40   0:01 /usr/libexec/ibus-extension-gtk3
Debian+   6766  0.0  0.5  396856 74348 ?        Sl    14:40   0:00 /usr/libexec/ibus-x11 --kill-daemon
Debian+   6772  0.0  0.0  234164  9268 ?        Sl    14:40   0:00 /usr/libexec/ibus-portal
Debian+   6802  0.0  0.1 2587928 27372 ?        Sl    14:40   0:00 /usr/bin/gjs /usr/share/gnome-shell/org.gnome.ScreenSaver
Debian+   6815  0.0  0.0  160364  9044 ?        Sl    14:40   0:00 /usr/libexec/ibus-engine-simple
root      6832  0.0  0.0   0 0 ?        I     14:41   0:00 [kworker/0:3-ata_sff]
root      6843  0.0  0.0   0 0 ?        I     14:46   0:00 [kworker/0:1-ata_sff]
Debian+   6860  0.0  0.0  156356 5496 tty1  Sl+   14:50   0:00 /usr/libexec/dconf-service
root      6875  0.0  0.0   0 0 ?        I     14:51   0:00 [kworker/0:0-events]
root      6902  0.0  0.0   0 0 ?        I     14:55   0:00 [kworker/u8:2-events_unbound]
moeen    6904 200  0.0 11220 4848 pts/1  R+   14:55   0:00 ps aux
moeen@vbox: /tmp/oslab1$
```

لیست آن‌هایی که a دارند با استفاده از دستور grep :

```
moeen@vbox: /tmp/oslab1
/gdm/greeter/autostart
Debian+   6439  0.0  0.0   6264  1492 ?        S     14:40   0:00 dbus-run-session -- gnome-session --autostart /usr/share/gdm/greeter/autostart
Debian+   6441  0.0  0.0   9572  5412 ?        S     14:40   0:00 dbus-daemon --nofork --print-address 4 --session
Debian+   6446  0.0  0.1  725268 20376 ?        Sl    14:40   0:00 /usr/libexec/gnome-session-binary --autostart /usr/share/gdm/greeter/autostart
Debian+   6473  0.3  1.5 4111292 216744 ?        Sl    14:40   0:04 /usr/bin/gnome-shell
Debian+   6540  0.0  0.0  311428  9904 ?        Sl    14:40   0:00 /usr/libexec/at-spi-bus-launcher
Debian+   6545  0.0  0.0   9128  4440 ?        S     14:40   0:00 /usr/bin/dbus-daemon --config-file=/usr/share/defaults/at-spi2/accessibility.conf --nofor
Debian+   6551  0.0  0.4 228944 66524 ?        S     14:40   0:00 /usr/bin/Xwayland :1026 -rootless -noreferrer -accessx -core -auth /run/user/112/.mutter-Xwy
landauth.86B492 -listenfd 4 -listenfd 5 -displayfd 6 -initfd 7
Debian+   6561  0.0  0.0  236704  8836 ?        Sl    14:40   0:00 /usr/libexec/xdg-permission-store
Debian+   6580  0.0  0.1 2456860 26724 ?        Sl    14:40   0:00 /usr/bin/gjs /usr/share/gnome-shell/org.gnome.Shell.Notifications
Debian+   6582  0.0  0.0  164328  9384 ?        Sl    14:40   0:00 /usr/libexec/at-spi2-registryd --use-gnome-session
Debian+   6593  0.0  0.0  463468 12484 ?        Sl    14:40   0:00 /usr/libexec/gsd-sharing
Debian+   6598  0.0  0.1  338988 24772 ?        Sl    14:40   0:00 /usr/libexec/gsd-wacom
Debian+   6602  0.0  0.1  339976 24992 ?        Sl    14:40   0:00 /usr/libexec/gsd-color
Debian+   6605  0.0  0.1  338328 24236 ?        Sl    14:40   0:00 /usr/libexec/gsd-keyboard
Debian+   6611  0.0  0.0  247220 13592 ?        Sl    14:40   0:00 /usr/libexec/gsd-print-notifications
Debian+   6613  0.0  0.0  454768  8416 ?        Sl    14:40   0:00 /usr/libexec/gsd-rfkill
Debian+   6620  0.0  0.0  385784 12212 ?        Sl    14:40   0:00 /usr/libexec/gsd-smartcard
Debian+   6621  0.0  0.0  355452 13892 ?        Sl    14:40   0:00 /usr/libexec/gsd-datetime
Debian+   6626  0.0  0.2  668244 29524 ?        Sl    14:40   0:00 /usr/libexec/gsd-media-keys
Debian+   6628  0.0  0.0  233184  8092 ?        Sl    14:40   0:00 /usr/libexec/gsd-screensaver-proxy
Debian+   6629  0.0  0.0  319572 11464 ?        Sl    14:40   0:00 /usr/libexec/gsd-sound
Debian+   6633  0.0  0.0  307556  8608 ?        Sl    14:40   0:00 /usr/libexec/gsd-ally-settings
Debian+   6637  0.0  0.0  382852  9220 ?        Sl    14:40   0:00 /usr/libexec/gsd-housekeeping
Debian+   6644  0.0  0.2  450248 29688 ?        Sl    14:40   0:00 /usr/libexec/gsd-power
Debian+   6705  0.0  0.1  341912 17300 ?        Sl    14:40   0:00 /usr/libexec/gsd-printer
Debian+   6756  0.0  0.0  386168 14148 ?        Sl    14:40   0:00 ibus-daemon --panel disable -r --xim
Debian+   6760  0.0  0.0  234196  8312 ?        Sl    14:40   0:00 /usr/libexec/ibus-dconf
Debian+   6762  0.1  0.2  344280 30452 ?        Sl    14:40   0:01 /usr/libexec/ibus-extension-gtk3
Debian+   6766  0.0  0.5  396856 74348 ?        Sl    14:40   0:00 /usr/libexec/ibus-x11 --kill-daemon
Debian+   6772  0.0  0.0  234164  9268 ?        Sl    14:40   0:00 /usr/libexec/ibus-portal
Debian+   6802  0.0  0.1 2587928 27372 ?        Sl    14:40   0:00 /usr/bin/gjs /usr/share/gnome-shell/org.gnome.ScreenSaver
Debian+   6815  0.0  0.0  160364  9044 ?        Sl    14:40   0:00 /usr/libexec/ibus-engine-simple
Debian+   6860  0.0  0.0  156356 5496 tty1  Sl+   14:50   0:00 /usr/libexec/dconf-service
root      6875  0.0  0.0   0 0 ?        I     14:51   0:00 [kworker/0:0-ata_sff]
root      6916  0.0  0.0   0 0 ?        I     14:56   0:00 [kworker/0:1-ata_sff]
moeen    6919 200  0.0 11220 4788 pts/1  R+   14:59   0:00 ps aux
moeen    6920  0.0  0.0   6336 2040 pts/1  S+   14:59   0:00 grep a --color=always
moeen@vbox: /tmp/oslab1$
```


برای این کار نیاز است تا ls را با grep با هم ترکیب کنیم:

```
moeen@vbox: /usr/bin$ ls -lh | grep -e fs -e ld --color=always
-rwxr-xr-x 1 root root 47K Mar 29 2022 buildhash
-rwxr-xr-x 1 root root 43K Sep 20 2022 fold
-rwxr-xr-x 1 root root 682 May 7 2024 gnome-shell-extension-prefs
lrwxrwxrwx 1 root root 21 Jan 14 2023 gold -> x86_64-linux-gnu-gold
-rwxr-xr-x 1 root root 932K Oct 2 2023 grub-fstest
lrwxrwxrwx 1 root root 34 Oct 2 2023 grub-ntldr-img -> ../lib/grub/i386-pc/grub-ntldr-img
-rwxr-xr-x 1 root root 67K Sep 9 2023 gtk4-builder-tool
-rwxr-xr-x 1 root root 35K Oct 25 2024 gtk-builder-tool
lrwxrwxrwx 1 root root 19 Jan 14 2023 ld -> x86_64-linux-gnu-ld
lrwxrwxrwx 1 root root 23 Jan 14 2023 ld.bfd -> x86_64-linux-gnu-ld.bfd
-rwxr-xr-x 1 root root 5.3K Mar 7 02:16 ldd
lrwxrwxrwx 1 root root 24 Jan 14 2023 ld.gold -> x86_64-linux-gnu-ld.gold
lrwxrwxrwx 1 root root 27 Mar 7 02:16 ld.so -> /lib64/ld-linux-x86-64.so.2
-rwxr-xr-x 1 root root 115K Oct 27 2024 lowntfs-3g
-rwxr-xr-x 1 root root 735 Mar 2 19:39 lsinitramfs
-rwsr-xr-x 1 root root 159K Oct 27 2024 ntfs-3g
-rwxr-xr-x 1 root root 15K Oct 27 2024 ntfs-3g.probe
-rwxr-xr-x 1 root root 35K Oct 27 2024 ntfsfat
-rwxr-xr-x 1 root root 39K Oct 27 2024 ntfscluster
-rwxr-xr-x 1 root root 39K Oct 27 2024 ntfscomp
-rwxr-xr-x 1 root root 51K Oct 27 2024 ntfsdecrypt
-rwxr-xr-x 1 root root 39K Oct 27 2024 ntfsfallocate
-rwxr-xr-x 1 root root 43K Oct 27 2024 ntfsfix
-rwxr-xr-x 1 root root 59K Oct 27 2024 ntfsinfo
-rwxr-xr-x 1 root root 36K Oct 27 2024 ntfsls
-rwxr-xr-x 1 root root 39K Oct 27 2024 ntfsmove
-rwxr-xr-x 1 root root 115K Oct 27 2024 ntfsrecover
-rwxr-xr-x 1 root root 91K Oct 27 2024 ntfssecaudit
-rwxr-xr-x 1 root root 43K Oct 27 2024 ntfstruncate
-rwxr-xr-x 1 root root 39K Oct 27 2024 ntfsusermap
-rwxr-xr-x 1 root root 51K Oct 27 2024 ntfswipe
-rwxr-xr-x 1 root root 23K Apr 12 21:56 pdfseparate
-rwxr-xr-x 1 root root 35K Apr 12 21:56 pdfsig
-rwxr-xr-x 1 root root 125 Oct 1 2024 perldoc
-rwxr-xr-x 1 root root 23K Mar 7 02:16 pldd
lrwxrwxrwx 1 root root 9 Mar 23 2023 psfstriptable -> psfxtable
-rwxr-xr-x 1 root root 3.6K Apr 24 19:10 unmkinitramfs
```

Ls -lh | grep -e fs -e ld -color=always

فعالیت‌ها

دستور cut

برای جدا کردن بخش‌های خاص هر خط یک فایل استفاده می‌شود.

با فلگ f می‌شود اندیس مورد نظر را انتخاب کرد و از فلگ d برای مشخص کردن جداکننده استفاده می‌شود.

مثلا:

cut -f1 -d", " file.csv

ستون اول فایل CSV را نشون میده.

دستور find

برای جستجوی فایل‌ها و پوشه‌ها در یک مسیر خاص بر اساس نام، اندازه، تاریخ تغییر و غیره استفاده می‌شود.

مثلا:

"find /home -name "*.txt

تمام فایل‌های متنی داخل مسیر home را نشان می‌دهد.

دستور head

چند خط اول یک فایل را نشان می‌دهد.

مثلاً:

head -n 5 file.txt

5 خط اول فایل را چاپ می‌کند.

دستور tail

مشابه دستور head است اما از پایین فایل چاپ می‌کند.

دستور touch

برای ایجاد یک فایل خالی یا به‌روزرسانی زمان آخرین تغییر یک فایل استفاده می‌شود.

مثال:

touch newfile.txt

دستور WC

برای شمارش خطوط، کلمات و کاراکترهای یک فایل استفاده می‌شود.

مثال:

wc -l file.txt

تعداد خطوط فایل را نشان می‌دهد.

دستور kill

برای پایان دادن به یک process با استفاده از سیگنال استفاده می‌شود.

مثال:

kill 12345

```
moeen@vbox: /tmp/oslab1$ wc -l myinformation.tx
2 myinformation.tx
moeen@vbox: /tmp/oslab1$ |
```

```
moeen@vbox: /tmp/oslab1$ find . -type f -name "A*" | wc -l
0
moeen@vbox: /tmp/oslab1$ |
```

```
moeen@vbox: /tmp/oslab1$ wc -c myinformation.tx
26 myinformation.tx
moeen@vbox: /tmp/oslab1$ |
```

اعمال تغییرات و کامپایل مجدد هسته‌ی سیستم عامل

به ترتیب دستورات زیر را اجرا می‌کنیم:

```
moeen@vbox: ~$ sudo apt update
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
moeen@vbox: ~$ sudo apt install build-essential fakeroot
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  dpkg-dev g++ g++-12 libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libdpkg-perl libfakeroot
  libfile-fcntllock-perl libstdc++-12-dev
Suggested packages:
  debian-keyring g++-multilib g++-12-multilib gcc-12-doc bzr libstdc++-12-doc
The following NEW packages will be installed:
  build-essential dpkg-dev fakeroot g++ g++-12 libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libdpkg-perl
  libfakeroot libfile-fcntllock-perl libstdc++-12-dev
0 upgraded, 12 newly installed, 0 to remove and 0 not upgraded.
Need to get 14.9 MB of archives.
After this operation, 61.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://deb.debian.org/debian bookworm/main amd64 libstdc++-12-dev amd64 12.2.0-14+deb12u1 [2,047 kB]
Get:2 http://deb.debian.org/debian bookworm/main amd64 g++-12 amd64 12.2.0-14+deb12u1 [10.7 MB]
Get:3 http://deb.debian.org/debian bookworm/main amd64 g++ amd64 4:12.2.0-3 [1,356 B]
```



```
moein@vbox: ~  
Running mktexlsr /var/lib/texmf ... done.  
Building format(s) --all.  
This may take some time... done.  
moein@vbox:~$ apt source linux  
Reading package lists... Done  
NOTICE: 'linux' packaging is maintained in the 'Git' version control system at:  
https://salsa.debian.org/kernel-team/linux.git  
Please use:  
git clone https://salsa.debian.org/kernel-team/linux.git  
to retrieve the latest (possibly unreleased) updates to the package.  
Need to get 140 MB of source archives.  
Get:1 http://security.debian.org/debian-security bookworm-security/main linux 6.1.140-1 (dsc) [291 kB]  
Get:2 http://security.debian.org/debian-security bookworm-security/main linux 6.1.140-1 (tar) [138 MB]  
Get:3 http://security.debian.org/debian-security bookworm-security/main linux 6.1.140-1 (diff) [1,752 kB]  
Fetched 140 MB in 1min 14s (1,889 kB/s)  
dpkg-source: info: extracting linux in linux-6.1.140  
dpkg-source: info: unpacking linux_6.1.140.orig.tar.xz  
dpkg-source: info: unpacking linux_6.1.140-1.debian.tar.xz  
dpkg-source: info: using patch list from debian/patches/series  
dpkg-source: info: applying debian/gitignore.patch  
dpkg-source: info: applying debian/dfsg/arch-powerpc-platforms-8xx-ucode-disable.patch
```

sudo apt install build-essential fakeroot

sudo apt build-dep linux

apt source linux

```
moein@vbox: ~/linux-6.1.140  
block/ Documentation/ init/ lib/ .pc/ security/ virt/  
certs/ drivers/ io_uring/ LICENSES/ rust/ sound/  
crypto/ fs/ ipc/ mm/ samples/ tools/  
moein@vbox:~$ cd linux-6.1.140/  
arch/ debian/ include/ kernel/ net/ scripts/ usr/  
block/ Documentation/ init/ lib/ .pc/ security/ virt/  
certs/ drivers/ io_uring/ LICENSES/ rust/ sound/  
crypto/ fs/ ipc/ mm/ samples/ tools/  
moein@vbox:~$ cd linux-6.1.140/^C  
moein@vbox:~$ ^C  
moein@vbox:~$ ls  
Desktop Downloads linux_6.1.140-1.debian.tar.xz linux_6.1.140.orig.tar.xz Pictures simple-container Videos  
Documents linux-6.1.140 linux-6.1.140-1.dsc Music Public Templates  
moein@vbox:~$ cd linux-6.1.140/  
moein@vbox:~/linux-6.1.140$ ls  
arch COPYING debian fs io_uring Kconfig LICENSES mm rust security usr  
block CREDITS Documentation include ipc kernel MAINTAINERS net samples sound virt  
certs crypto drivers init Kbuild lib Makefile README scripts tools  
moein@vbox:~/linux-6.1.140$ uname -r  
6.1.0-37-amd64  
moein@vbox:~/linux-6.1.140$
```

در تصویر فوق ورژن فعلی و نسخه دانلود شده قابل مشاهده است.

مراحل کامپایل و نصب کرنل جدید:

ابتدا کانفیگ کرنل جدید را از روی کرنل فعلی می‌سازیم:

```
moeen@vbox: ~/linux-6.1.140$ cp /boot/config-$(uname -r) .config
moeen@vbox:~/linux-6.1.140$ make oldconfig
*
* Restart config...
*
*
* General setup
*
Compile also drivers which will not load (COMPILE_TEST) [N/y/?] n
Compile the kernel with warnings as errors (WERROR) [N/y/?] n
Local version - append to kernel release (LOCALVERSION) []
Automatically append version information to the version string (LOCALVERSION_AUTO) [N/y/?] n
Build ID Salt (BUILD_SALT) [] (NEW)
Kernel compression mode
  1. Gzip (KERNEL_GZIP)
  2. Bzip2 (KERNEL_BZIP2)
  3. LZMA (KERNEL_LZMA)
> 4. XZ (KERNEL_XZ)
  5. LZ0 (KERNEL_LZ0)
  6. LZ4 (KERNEL_LZ4)
  7. ZSTD (KERNEL_ZSTD)
choice[1-7?]: 4
Default init path (DEFAULT_INIT) []
Default hostname (DEFAULT_HOSTNAME) [(none)] (none)
System V IPC (SYSVIPC) [Y/n/?] y
POSIX Message Queues (POSIX_MESSAGE) [Y/n/?] y
General notification queue (WATCH_QUEUE) [N/y/?] n
Enable process_vm_readv/writev syscalls (CROSS_MEMORY_ATTACH) [Y/n/?] y
uselib syscall (for libc5 and earlier) (USELIB) [Y/n/?] y
Auditing support (AUDIT) [Y/?] y
```

سپس با استفاده از تمامی تردهای Cpu آن را کامپایل می‌کنیم:

```
#
moeen@vbox:~/linux-6.1.140$ make -j$(nproc)
SYNC include/config/auto.conf.cmd
SYSHDR arch/x86/include/generated/uapi/asm/unistd_32.h
SYSHDR arch/x86/include/generated/uapi/asm/unistd_64.h
SYSHDR arch/x86/include/generated/uapi/asm/unistd_x32.h
SYSTBL arch/x86/include/generated/asm/syscalls_32.h
SYSHDR arch/x86/include/generated/asm/unistd_32_ia32.h
SYSHDR arch/x86/include/generated/asm/unistd_64_x32.h
SYSTBL arch/x86/include/generated/asm/syscalls_64.h
SYSTBL arch/x86/include/generated/asm/syscalls_x32.h
HYPERCALLS arch/x86/include/generated/asm/xen-hypercalls.h
WRAP arch/x86/include/generated/uapi/asm/bpf_perf_event.h
WRAP arch/x86/include/generated/uapi/asm/errno.h
WRAP arch/x86/include/generated/uapi/asm/fcntl.h
WRAP arch/x86/include/generated/uapi/asm/ioctl.h
WRAP arch/x86/include/generated/uapi/asm/ioctls.h
WRAP arch/x86/include/generated/uapi/asm/ipcbuf.h
WRAP arch/x86/include/generated/uapi/asm/poll.h
WRAP arch/x86/include/generated/uapi/asm/param.h
WRAP arch/x86/include/generated/uapi/asm/resource.h
WRAP arch/x86/include/generated/uapi/asm/socket.h
WRAP arch/x86/include/generated/uapi/asm/termios.h
WRAP arch/x86/include/generated/uapi/asm/sockios.h
WRAP arch/x86/include/generated/uapi/asm/types.h
HOSTCC arch/x86/tools/relocs_32.o
HOSTCC arch/x86/tools/relocs_common.o
HOSTCC arch/x86/tools/relocs_64.o
WRAP arch/x86/include/generated/asm/early_ioremap.h
```

در تصویر زیر کامپایل کرنل به پایان رسیده است:

```
moein@vbox: ~/linux-6.1.140
BTF [M] sound/core/snd-pcm.ko
LD [M] sound/core/snd.ko
BTF [M] sound/core/snd-timer.ko
BTF [M] sound/core/snd-seq-device.ko
LD [M] sound/pci/ac97/snd-ac97-codec.ko
BTF [M] sound/core/snd.ko
BTF [M] sound/pci/ac97/snd-ac97-codec.ko
LD [M] sound/soundcore.ko
LD [M] sound/pci/snd-intel8x0.ko
BTF [M] sound/soundcore.ko
BTF [M] sound/pci/snd-intel8x0.ko
MKPIGGY arch/x86/boot/compressed/piggy.S
AS arch/x86/boot/compressed/piggy.o
LD arch/x86/boot/compressed/vmlinux
OBJCOPY arch/x86/boot/vmlinux.bin
ZOFFSET arch/x86/boot/zoffset.h
AS arch/x86/boot/header.o
LD arch/x86/boot/setup.elf
OBJCOPY arch/x86/boot/setup.bin
BUILD arch/x86/boot/bzImage
Kernel: arch/x86/boot/bzImage is ready (#1)
moein@vbox:~/linux-6.1.140$
```

مراحل نصب:

```
moein@vbox: ~/linux-6.1.140
sudo: a password is required
moein@vbox:~/linux-6.1.140$ sudo make modules_install
[sudo] password for moein:
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/aesni-intel.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/aesni-intel.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/crc32-pclmul.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/crc32-pclmul.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/crc32c-intel.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/crc32c-intel.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/crct10dif-pclmul.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/crct10dif-pclmul.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/ghash-clmulni-intel.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/ghash-clmulni-intel.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/shal-ssse3.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/shal-ssse3.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/sha256-ssse3.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/sha256-ssse3.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/crypto/sha512-ssse3.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/crypto/sha512-ssse3.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/events/rapl.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/events/rapl.ko
INSTALL /lib/modules/6.1.140/kernel/arch/x86/kernel/msr.ko
SIGN /lib/modules/6.1.140/kernel/arch/x86/kernel/msr.ko
INSTALL /lib/modules/6.1.140/kernel/block/t10-pi.ko
SIGN /lib/modules/6.1.140/kernel/block/t10-pi.ko
INSTALL /lib/modules/6.1.140/kernel/crypto/crc32c-generic.ko
SIGN /lib/modules/6.1.140/kernel/crypto/crc32c-generic.ko
INSTALL /lib/modules/6.1.140/kernel/crypto/crc64-rocksoft-generic.ko
SIGN /lib/modules/6.1.140/kernel/crypto/crc64-rocksoft-generic.ko
INSTALL /lib/modules/6.1.140/kernel/crypto/crct10dif-common.ko
SIGN /lib/modules/6.1.140/kernel/crypto/crct10dif-common.ko
```



```

moeen@vbox: ~/linux-6.1.140$ sudo make install
INSTALL /boot
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 6.1.140 /boot/vmlinuz-6.1.140
update-initramfs: Generating /boot/initrd.img-6.1.140
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 6.1.140 /boot/vmlinuz-6.1.140
Generating grub configuration file ...
Found background image: /usr/share/images/desktop-base/desktop-grub.png
Found linux image: /boot/vmlinuz-6.1.140
Found initrd image: /boot/initrd.img-6.1.140
Found linux image: /boot/vmlinuz-6.1.0-37-amd64
Found initrd image: /boot/initrd.img-6.1.0-37-amd64
Found linux image: /boot/vmlinuz-6.1.0-35-amd64
Found initrd image: /boot/initrd.img-6.1.0-35-amd64
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
moeen@vbox:~/linux-6.1.140$ |

```

در نهایت grub را آپدیت می کنیم:

```

moeen@vbox: ~/linux-6.1.140$ sudo make install
INSTALL /boot
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 6.1.140 /boot/vmlinuz-6.1.140
update-initramfs: Generating /boot/initrd.img-6.1.140
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 6.1.140 /boot/vmlinuz-6.1.140
Generating grub configuration file ...
Found background image: /usr/share/images/desktop-base/desktop-grub.png
Found linux image: /boot/vmlinuz-6.1.140
Found initrd image: /boot/initrd.img-6.1.140
Found linux image: /boot/vmlinuz-6.1.0-37-amd64
Found initrd image: /boot/initrd.img-6.1.0-37-amd64
Found linux image: /boot/vmlinuz-6.1.0-35-amd64
Found initrd image: /boot/initrd.img-6.1.0-35-amd64
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
moeen@vbox:~/linux-6.1.140$ sudo update-grub
[sudo] password for moeen:
Generating grub configuration file ...
Found background image: /usr/share/images/desktop-base/desktop-grub.png
Found linux image: /boot/vmlinuz-6.1.140
Found initrd image: /boot/initrd.img-6.1.140
|

```

حال سیستم را reboot کرده و با کرنل جدید بالا می آوریم. مشاهده می کنیم که ورژن کرنل فعلی ارتقا یافته است:

moein@vbox: ~

Microsoft Windows [Version 10.0.26100.4652]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Moein>ssh moein@127.0.0.1 -p 2222

moein@127.0.0.1's password:

Linux vbox 6.1.140 #1 SMP PREEMPT_DYNAMIC Thu Jul 24 17:33:23 +0330 2025 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

Last login: Thu Jul 24 17:00:13 2025 from 10.0.2.2

moein@vbox:~\$ uname

Linux

moein@vbox:~\$ uname -mrs

Linux 6.1.140 x86_64

moein@vbox:~\$ |