

National University of Computer and Emerging Sciences

Operating System Lab - 05

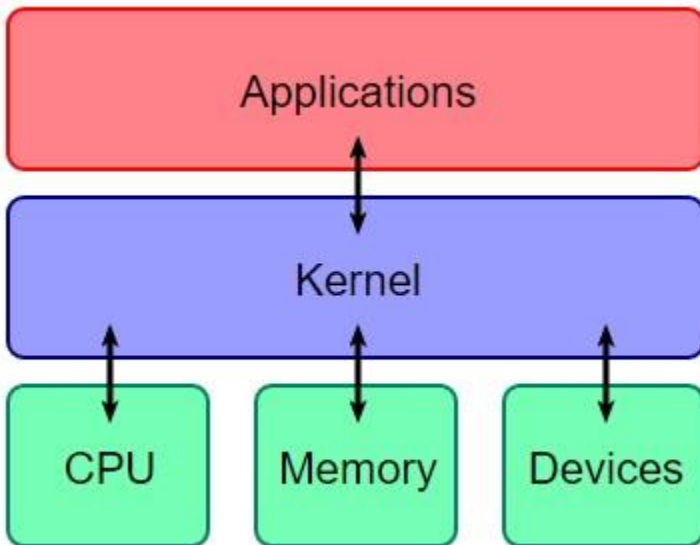
Lab Manual

Contents

| | |
|------------------------------|---|
| Content | 1 |
| Introduction to Kernel | 2 |
| Configuring New Kernel | 2 |
| Reference Link | 6 |

Introduction to Kernel

The kernel is a computer program that is the core of a computer's operating system, with complete control over everything in the system. On most systems, it is one of the first programs loaded on start-up (after the bootloader). It handles the rest of start-up as well as input/output requests from software, translating them into data-processing instructions for the central processing unit. It handles memory and peripherals like keyboards, monitors, printers, and speakers.



Configuring New Kernel

1. Know what your previous kernel version is

```
fast@ubuntu:~$ uname -msr
Linux 4.4.0-31-generic x86_64
fast@ubuntu:~$
```

2. Update your system with `$sudo apt update`

```
fast@ubuntu:~$ sudo apt update
[sudo] password for fast:
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 102 kB in 22s (4,555 B/s)
E: Could not get lock /var/lib/dpkg/lock - open (11: Resource temporarily unavailable)
E: Unable to lock the administration directory (/var/lib/dpkg/), is another process using it?
fast@ubuntu:~$
```

3. In case you are stuck with this error E: Could not get lock /var/lib/dpkg/lock. Grep that process which is holding your lock and kill that.

```
fast@ubuntu:~$ ps aux | grep apt
root      4555  1.2  5.0 295512 102180 ?        SNl   15:09   0:02 /usr/bin/python
3 /usr/sbin/aptd
 apt      5050  0.0  0.2  54144  5588 ?        SN    15:13   0:00 /usr/lib/apt/me
thods/http
 apt      5051  0.0  0.2  54144  5600 ?        SN    15:13   0:00 /usr/lib/apt/me
thods/http
 apt      5053  0.0  0.2  49784  5196 ?        SN    15:13   0:00 /usr/lib/apt/me
thods/gpgv
fast      5094  0.0  0.0   21292   1028 pts/18   S+    15:13   0:00 grep --color=au
to apt
fast@ubuntu:~$ sudo kill -9 5094
fast@ubuntu:~$ sudo kill -9 5053
fast@ubuntu:~$ sudo kill -9 5051
fast@ubuntu:~$ sudo kill -9 5050
fast@ubuntu:~$ sudo kill -9 4555
to apt
fast@ubuntu:~$ sudo apt update
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu xenial InRelease
Get:3 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]
Fetched 306 kB in 5s (56.5 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
```

4. After your system has been successfully updated. Login with root to make kernel changes.

```
fast@ubuntu:~$ sudo -i
root@ubuntu:~# mkdir -p ~/4.11.2
root@ubuntu:~# cd ~/4.11.2/
root@ubuntu:~/4.11.2#
```

5. Now you have to download packages using wget

```
wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/linux-headers-4.11.2-
041102_4.11.2-041102.201705201036_all.deb
wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/linux-headers-4.11.2-041102-
generic_4.11.2-041102.201705201036_amd64.deb
wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/linux-image-4.11.2-041102-
generic_4.11.2-041102.201705201036_amd64.deb
```

```
root@ubuntu:~/4.11.2# wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/
linux-headers-4.11.2-041102_4.11.2-041102.201705201036_all.deb
--2018-02-16 10:35:28-- http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/l
inux-headers-4.11.2-041102_4.11.2-041102.201705201036_all.deb
Resolving kernel.ubuntu.com (kernel.ubuntu.com)... 91.189.94.216
Connecting to kernel.ubuntu.com (kernel.ubuntu.com)|91.189.94.216|:80... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 10552216 (10M) [application/x-debian-package]
Saving to: 'linux-headers-4.11.2-041102_4.11.2-041102.201705201036_all.deb'

linux-headers-4.11. 100%[=====>] 10.06M 1.01MB/s in 12s

2018-02-16 10:35:41 (859 KB/s) - 'linux-headers-4.11.2-041102_4.11.2-041102.2017
05201036_all.deb' saved [10552216/10552216]

root@ubuntu:~/4.11.2#
```

Ubuntu Software

```
root@ubuntu:~/4.11.2# wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/
linux-headers-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
--2018-02-16 10:36:59-- http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/l
inux-headers-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
Resolving kernel.ubuntu.com (kernel.ubuntu.com)... 91.189.94.216
Connecting to kernel.ubuntu.com (kernel.ubuntu.com)|91.189.94.216|:80... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 664068 (649K) [application/x-debian-package]
Saving to: 'linux-headers-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64
.deb'

linux-headers-4.11. 100%[=====>] 648.50K 994KB/s in 0.7s

2018-02-16 10:37:00 (994 KB/s) - 'linux-headers-4.11.2-041102-generic_4.11.2-041
102.201705201036_amd64.deb' saved [664068/664068]

root@ubuntu:~/4.11.2#
```

```
root@ubuntu: ~/4.11.2
root@ubuntu:~/4.11.2# wget http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/
linux-image-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
--2018-02-16 10:56:09-- http://kernel.ubuntu.com/~kernel-ppa/mainline/v4.11.2/l
inux-image-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
Resolving kernel.ubuntu.com (kernel.ubuntu.com)... 91.189.94.216
Connecting to kernel.ubuntu.com (kernel.ubuntu.com)|91.189.94.216|:80... connect
ed.
HTTP request sent, awaiting response... 200 OK
Length: 50009788 (48M) [application/x-debian-package]
Saving to: 'linux-image-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.d
eb'

linux-image-4.11.2- 100%[=====>] 47.69M 1.44MB/s in 39s

2018-02-16 10:56:51 (1.21 MB/s) - 'linux-image-4.11.2-041102-generic_4.11.2-0411
02.201705201036_amd64.deb' saved [50009788/50009788]

root@ubuntu:~/4.11.2#
```

6. In case of successful download this will appear.

```
root@ubuntu: ~/4.11.2
root@ubuntu:~/4.11.2# ls
linux-headers-4.11.2-041102_4.11.2-041102.201705201036_all.deb
linux-headers-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
linux-image-4.11.2-041102-generic_4.11.2-041102.201705201036_amd64.deb
root@ubuntu:~/4.11.2#
```

7. Now install the packages with the dpkg command below.

```
dpkg -i *.deb
```

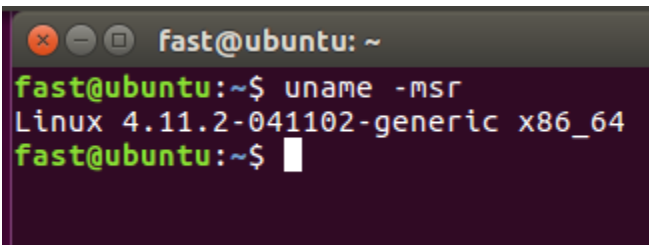
```
root@ubuntu:~/4.11.2# dpkg -i *.deb
Selecting previously unselected package linux-headers-4.11.2-041102.
(Reading database ... 172839 files and directories currently installed.)
Preparing to unpack linux-headers-4.11.2-041102_4.11.2-041102.201705201036_all.d
eb ...
Unpacking linux-headers-4.11.2-041102 (4.11.2-041102.201705201036) ...
Selecting previously unselected package linux-headers-4.11.2-041102-generic.
Preparing to unpack linux-headers-4.11.2-041102-generic_4.11.2-041102.2017052010
36_amd64.deb ...
Unpacking linux-headers-4.11.2-041102-generic (4.11.2-041102.201705201036) ...
Selecting previously unselected package linux-image-4.11.2-041102-generic.
Preparing to unpack linux-image-4.11.2-041102-generic_4.11.2-041102.201705201036
_amd64.deb ...
Done.
Unpacking linux-image-4.11.2-041102-generic (4.11.2-041102.201705201036) ...
Setting up linux-headers-4.11.2-041102 (4.11.2-041102.201705201036) ...
Setting up linux-headers-4.11.2-041102-generic (4.11.2-041102.201705201036) ...
Setting up linux-image-4.11.2-041102-generic (4.11.2-041102.201705201036) ...
Running depmod.
update-initramfs: deferring update (hook will be called later)
Examining /etc/kernel/postinst.d.
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.11.2-041102-generi
c /boot/vmlinuz-4.11.2-041102-generic
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.11.2-041102-generi
c /boot/vmlinuz-4.11.2-041102-generic
update-initramfs: Generating /boot/initrd.img-4.11.2-041102-generic
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.11.2-041102-generic /boot
/vmlinuz-4.11.2-041102-generic
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.11.2-041102-ge
neric /boot/vmlinuz-4.11.2-041102-generic
```

8. When the kernel package installation is complete, update grub and reboot the system.

```
root@ubuntu:~/4.11.2# sudo update-grub
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN_TIMEOUT is set is no longer supported.
Found linux image: /boot/vmlinuz-4.11.2-041102-generic
Found initrd image: /boot/initrd.img-4.11.2-041102-generic
Found linux image: /boot/vmlinuz-4.4.0-31-generic
Found initrd image: /boot/initrd.img-4.4.0-31-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:~/4.11.2#
```

```
root@ubuntu:~/4.11.2# sudo reboot
```

9. After server rebooting, check again the kernel version. Wooaahh Congo!!

A terminal window titled 'fast@ubuntu: ~' with standard window controls. The prompt is 'fast@ubuntu:~\$'. The command 'uname -msr' has been entered and executed, resulting in the output 'Linux 4.11.2-041102-generic x86_64'. The prompt is now 'fast@ubuntu:~\$' with a cursor.

```
fast@ubuntu:~$ uname -msr
Linux 4.11.2-041102-generic x86_64
fast@ubuntu:~$
```

Reference Link

<https://www.howtoforge.com/tutorial/how-to-upgrade-linux-kernel-in-ubuntu-1604-server/>