

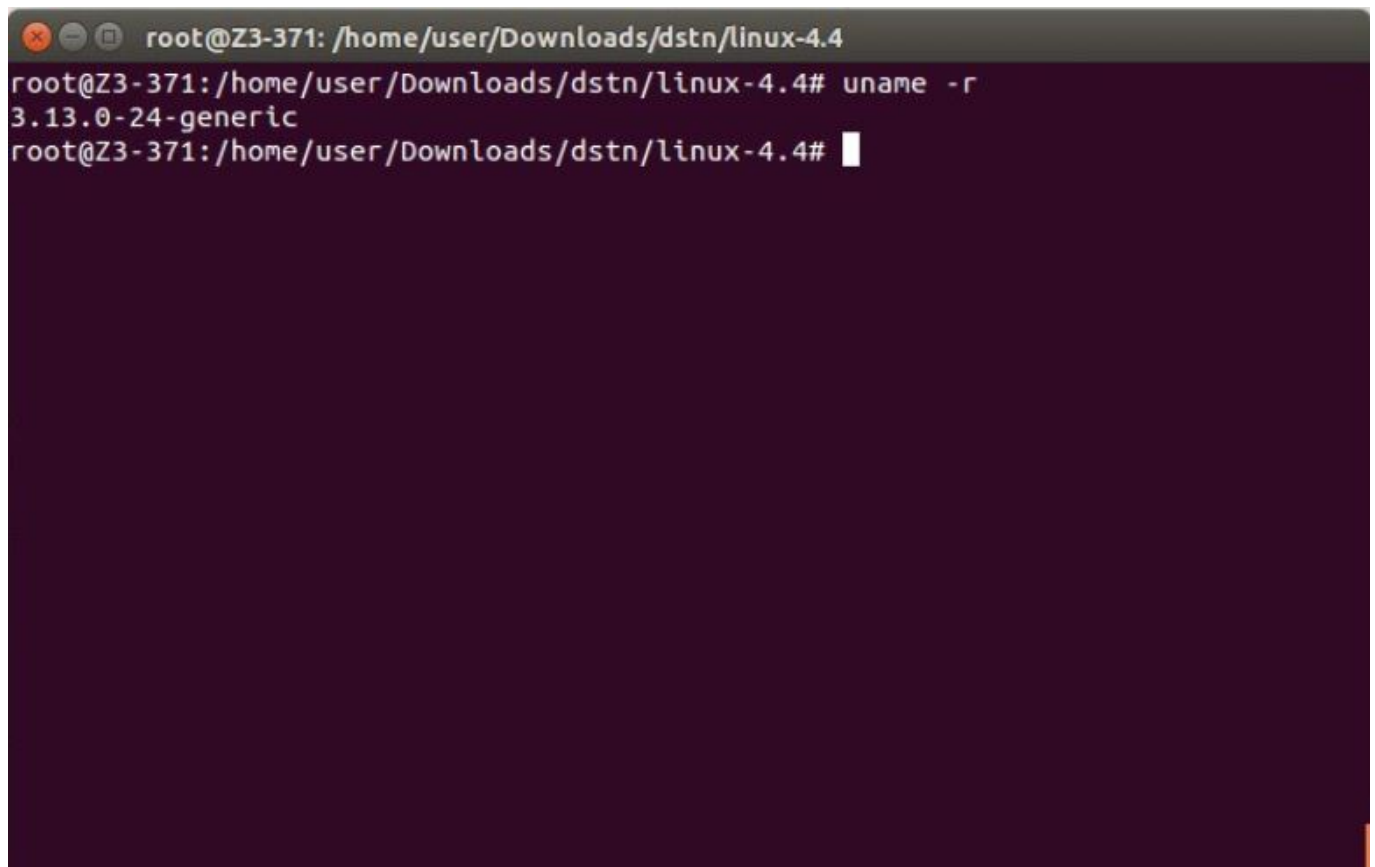
# Recompile 64bit Linux Kernel

Data Storage Technologies and Networks  
Assignment 2

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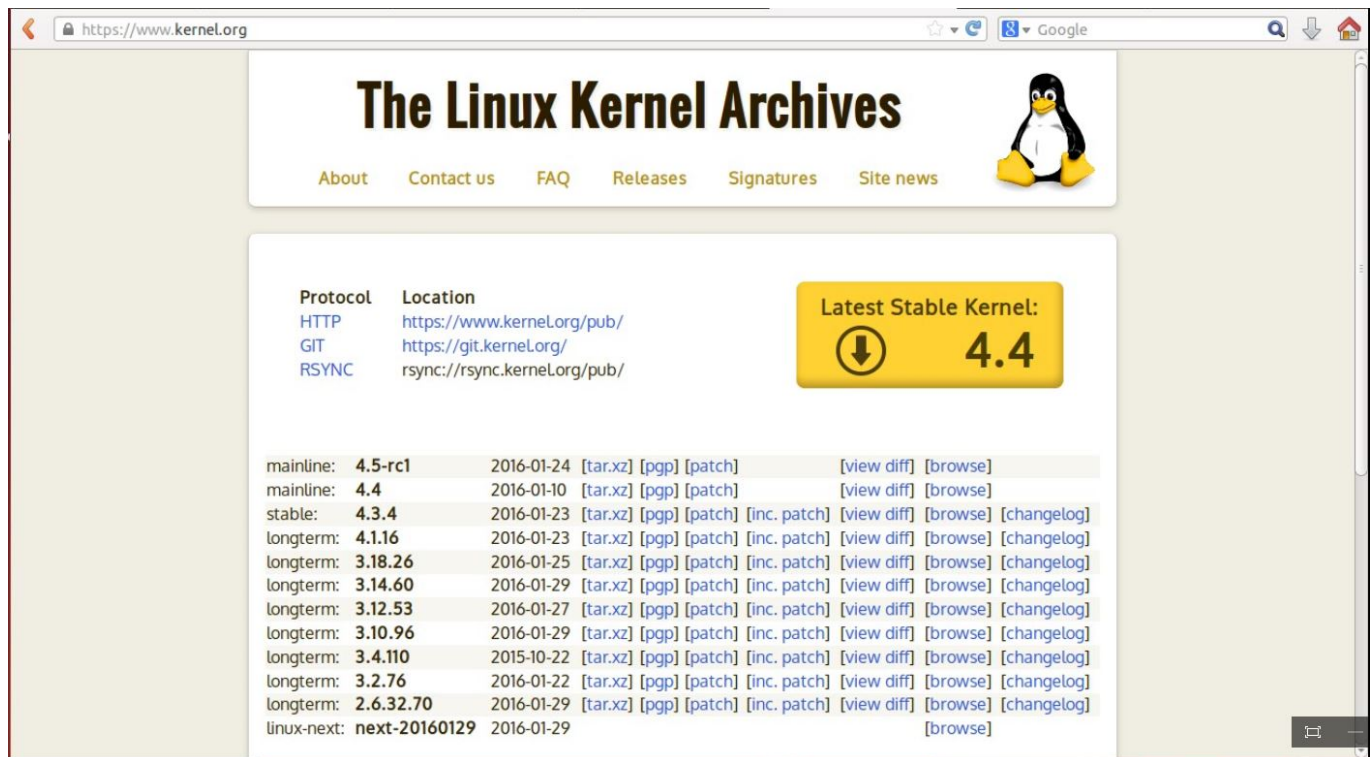
## Steps followed:

- Check the existing system kernel release using the command `uname -r`

A terminal window with a dark purple background. The title bar shows 'root@Z3-371: /home/user/Downloads/dstn/linux-4.4'. The terminal text shows the command 'uname -r' being executed, resulting in the output '3.13.0-24-generic'. The prompt 'root@Z3-371: /home/user/Downloads/dstn/linux-4.4#' is visible on both lines.

```
root@Z3-371: /home/user/Downloads/dstn/linux-4.4
root@Z3-371: /home/user/Downloads/dstn/linux-4.4# uname -r
3.13.0-24-generic
root@Z3-371: /home/user/Downloads/dstn/linux-4.4#
```

- Download latest kernel stable release from [The Linux Kernel Archives](#) (*Here we download version 4.4*)



Unzip the contents of the folder with the command `tar -xvJf linux-4.4.tar.xz`

- Install **fakeroor** (creates a psuedo root environment) and **libncurses** (to create user-interface in text mode) using the following commands `sudo apt-get install fakeroor kernel-package sudo apt-get install libncurses5-dev`

```

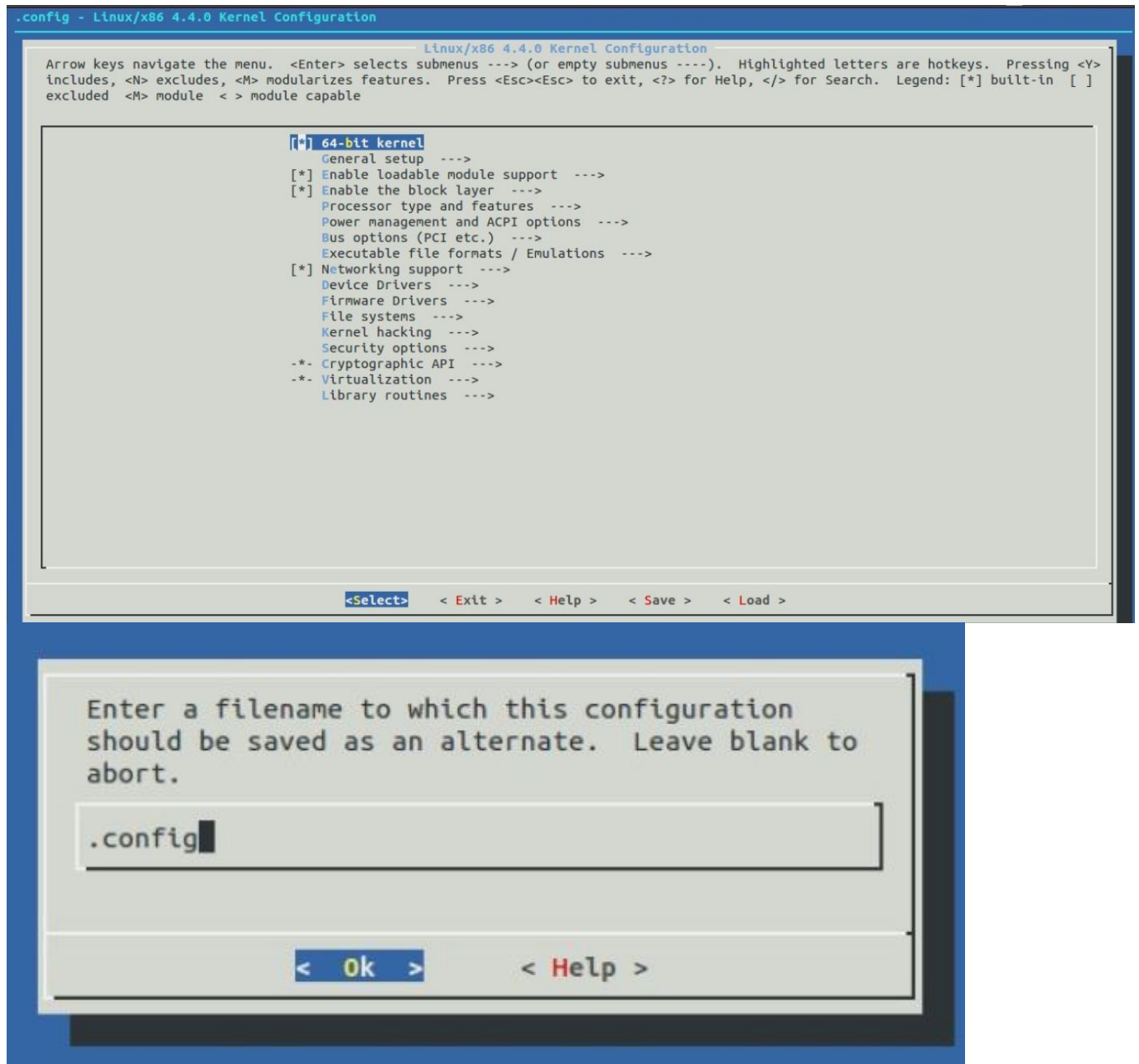
root@Z3-371: /home/user
Fetched 32.3 MB in 3min 50s (140 kB/s)
W: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/trusty/Release Unable
to find expected entry 'universe/binary-amd64/Packages' in Release file (Wrong
sources.list entry or malformed file)

E: Some index files failed to download. They have been ignored, or old ones used
instead.
root@Z3-371:/home/user# apt-get install libncurses5-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libtinfo-dev
Suggested packages:
  ncurses-doc
The following NEW packages will be installed:
  libncurses5-dev libtinfo-dev
0 upgraded, 2 newly installed, 0 to remove and 642 not upgraded.
Need to get 246 kB of archives.
After this operation, 1,479 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://mirror.cse.iitk.ac.in/ubuntu/ trusty/main libtinfo-dev amd64 5.9+20
140118-1ubuntu1 [76.3 kB]
28% [1 libtinfo-dev 69.8 kB/76.3 kB 91%]

```

- Inside the unzipped directory run `make menuconfig` and select `save` to save the configuration as a

.config file. (Without making modifications)



- Run the command `fakeroot make-kpkg -j 1 --initrd --append-to-version=your-name kernel-image kernel-headers` This command does the following
  1. builds the kernel
  2. creates the necessary .deb files for installation
  3. appends **your-name** string to the kernel release



```

lowercase dependencies and the characters . and - .
The current value is: 2012c6ps600g
Aborting.
root@Z3-371:/home/user/Downloads/dstn/linux-4.4# fakeroot make-kpkg --j 1 --initrd --append-to-version=2012c6ps600g kernel-image kernel-headers
exec make kpkg_version=12.036+nmu3 -f /usr/share/kernel-package/ruleset/minimal.mk debian APPEND_TO_VERSION=2012c6ps600g INITRD=YES
===== making target debian/stamp/conf/minimal_debian [new prereqs: ]=====
This is kernel package version 12.036+nmu3.
test -d debian || mkdir debian
test ! -e stamp-building || rm -f stamp-building
install -p -m 755 /usr/share/kernel-package/rules debian/rules
for file in ChangeLog Control Control.bin86 config templates.in rules; do
    cp -f /usr/share/kernel-package/$file ./debian/;
done
for dir in Config docs examples ruleset scripts pkg po; do
    cp -af /usr/share/kernel-package/$dir ./debian/;
done
test -f debian/control || sed -e 's/=V/4.4.02012c6ps600g/g' \
    -e 's/=D/4.4.0-10.00.Custom/g' -e 's/=A/amd64/g' \
    -e 's/=SA//g' \
    -e 's/=I//g' \
    -e 's/=CV/4.4/g'

```

- In the parent directory, the header and image .deb files are created. Install them using the `dpkg` `-i` command. In this case the commands were `dpkg -i`

```
linux-image-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb
```

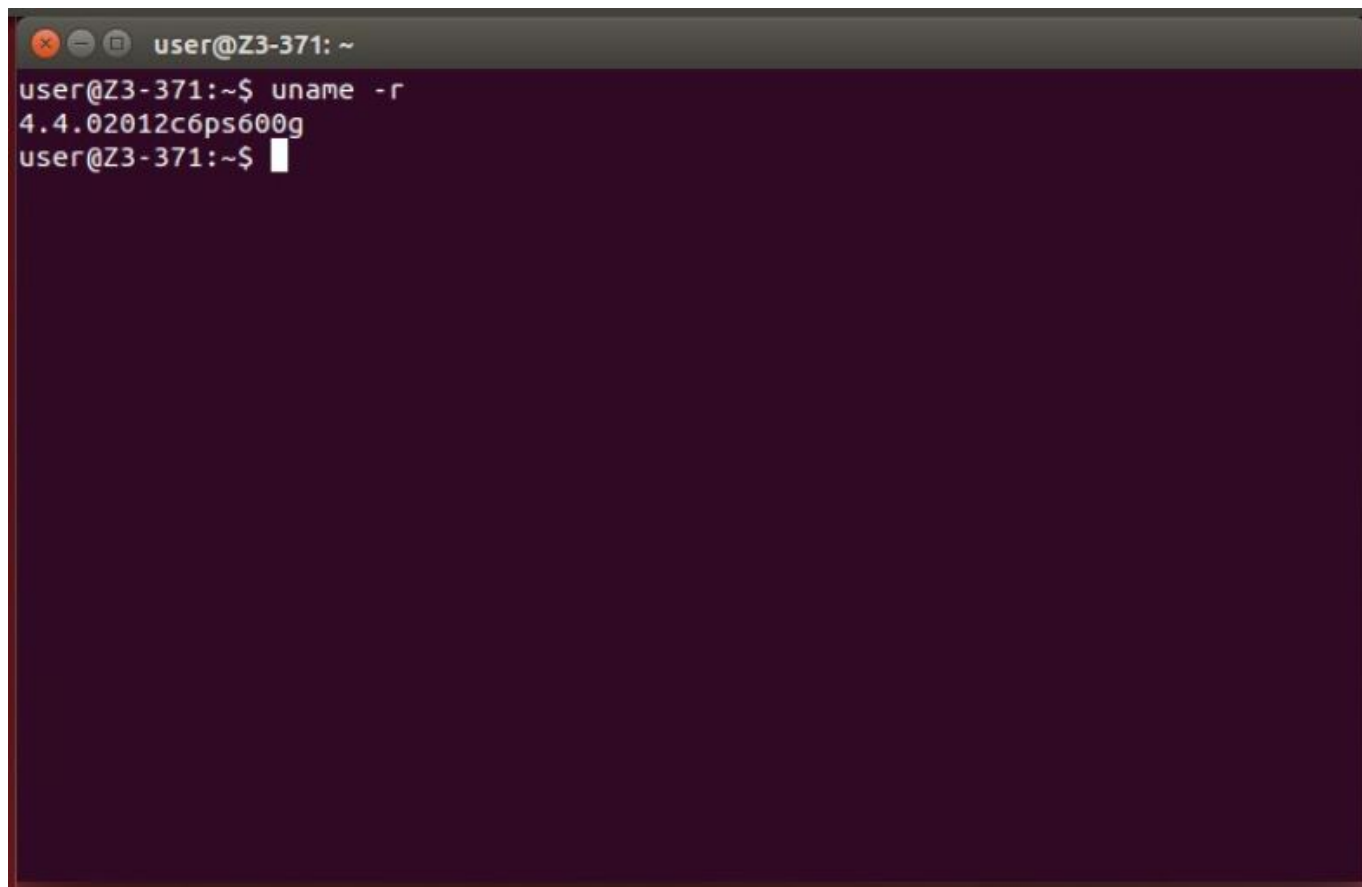
```
dpkg -i linux-headers-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb
```

```

Examining /etc/kernel/header_postinst.d.
root@Z3-371:/home/user/Downloads/dstn# dpkg -i linux-image-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb
Selecting previously unselected package linux-image-4.4.02012c6ps600g.
(Reading database ... 186098 files and directories currently installed.)
Preparing to unpack linux-image-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb ...
Done.
Unpacking linux-image-4.4.02012c6ps600g (4.4.02012c6ps600g-10.00.Custom) ...
Setting up linux-image-4.4.02012c6ps600g (4.4.02012c6ps600g-10.00.Custom) ...
Running depmod.
Examining /etc/kernel/postinst.d.
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.4.02012c6ps600g /boot/vmlinuz-4.4.02012c6ps600g
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.4.02012c6ps600g /boot/vmlinuz-4.4.02012c6ps600g
update-initramfs: Generating /boot/initrd.img-4.4.02012c6ps600g
W: Possible missing firmware /lib/firmware/rtl_nic/rtl8107e-2.fw for module r8169
W: Possible missing firmware /lib/firmware/rtl_nic/rtl8107e-1.fw for module r8169
W: Possible missing firmware /lib/firmware/rtl_nic/rtl8168h-2.fw for module r8169
W: Possible missing firmware /lib/firmware/rtl_nic/rtl8168h-1.fw for module r8169
run-parts: executing /etc/kernel/postinst.d/pm-utils 4.4.02012c6ps600g /boot/vmlinuz-4.4.02012c6ps600g
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.4.02012c6ps600g /boot/vmlinuz-4.4.02012c6ps600g
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.4.02012c6ps600g /boot/vmlinuz-4.4.02012c6ps600g
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.4.02012c6ps600g
Found initrd image: /boot/initrd.img-4.4.02012c6ps600g
Found linux image: /boot/vmlinuz-4.4.0
Found initrd image: /boot/initrd.img-4.4.0
Found linux image: /boot/vmlinuz-3.13.0-24-generic
Found initrd image: /boot/initrd.img-3.13.0-24-generic
Found memtest86+ image: /memtest86+.elf
Found memtest86+ image: /memtest86+.bin
Found Windows 8 (loader) on /dev/sda1
done
root@Z3-371:/home/user/Downloads/dstn# dpkg -i linux-headers-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb
(Reading database ... 190878 files and directories currently installed.)
Preparing to unpack linux-headers-4.4.02012c6ps600g_4.4.02012c6ps600g-10.00.Custom_amd64.deb ...
Unpacking linux-headers-4.4.02012c6ps600g (4.4.02012c6ps600g-10.00.Custom) over (4.4.02012c6ps600g-10.00.Custom) ...
Setting up linux-headers-4.4.02012c6ps600g (4.4.02012c6ps600g-10.00.Custom) ...
Examining /etc/kernel/header_postinst.d.
root@Z3-371:/home/user/Downloads/dstn# reboot

```

- Reboot the system and check if the new kernel has been installed

A terminal window with a dark purple background and a grey title bar. The title bar contains three window control icons (close, minimize, maximize) and the text 'user@Z3-371: ~'. The terminal shows the command 'uname -r' being executed, with the output '4.4.02012c6ps600g' displayed on the next line. The prompt 'user@Z3-371:~\$' is shown again on the third line, followed by a white cursor block.

```
user@Z3-371: ~  
user@Z3-371:~$ uname -r  
4.4.02012c6ps600g  
user@Z3-371:~$ █
```

**Note:** Check the necessary kernel modules in `/lib/modules` and the kernel files in `/usr/src` to make sure the correct kernel has been built.