



UFU

**Universidade
Federal de
Uberlândia**

Sistemas Embarcados II

Utilização do Linux

Professor: Éder Alves de Moura

Matheus Menezes Pedrosa

11911EAU020

Faculdade de Engenharia Elétrica
Uberlândia

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1 Capítulo 1

Nesse capítulo temos uma introdução ao Linux e o uso de comandos como: **cd**, **ls**, **pwd**, **echo** e **history**.

```
matheus in ~/semb2-workspace
> ls
matheus in ~/semb2-workspace
> ls -lF
total 0
matheus in ~/semb2-workspace
> ls -a -l
total 8
drwxr-xr-x  2 matheus matheus 4096 Oct  3 21:59 .
drwxr-xr-x 10 matheus matheus 4096 Oct  3 22:03 ..
matheus in ~/semb2-workspace
> ls -all
total 8
drwxr-xr-x  2 matheus matheus 4096 Oct  3 21:59 .
drwxr-xr-x 10 matheus matheus 4096 Oct  3 22:04 ..
matheus in ~/semb2-workspace
> pwd --version
pwd: bad option: -v
matheus in ~/semb2-workspace
> cd --help
cd: no such file or directory: --help
matheus in ~/semb2-workspace
> grep -- -a /etc/hosts
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
matheus in ~/semb2-workspace
> echo $SHELL
/bin/zsh
matheus in ~/semb2-workspace
> cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/bash
/usr/bin/bash
/bin/rbash
/usr/bin/rbash
/bin/dash
/usr/bin/dash
/usr/bin/tmux
/usr/bin/screen
/bin/zsh
/usr/bin/zsh
```

Figura 1.1

```
matheus in ~/semb2-workspace
> echo 'teste'
teste
matheus in ~/semb2-workspace
> echo "teste"
teste
matheus in ~/semb2-workspace
> echo -e "string1\tstring2\nstring3"
string1 string2
string3
```

Figura 1.2

```
matheus in ~/semb2-workspace
> history | grep sshd
2925 sudo nano /etc/ssh/sshd_config
4051 history | grep sshd
matheus in ~/semb2-workspace
> echo $HISTSIZE
50000
matheus in ~/semb2-workspace
> export HISTSIZE=100000
matheus in ~/semb2-workspace
> echo $HISTSIZE
100000
matheus in ~/semb2-workspace
> export HISTSIZE=50000
matheus in ~/semb2-workspace
> echo $HISTSIZE
50000
```

Figura 1.3

```
matheus in ~/semb2-workspace
> cat ~/.bash_history
sudo apt update
sudo apt upgrade
clear
sudo apt install zsh
chsh -s /bin/zsh
exit
matheus in ~/semb2-workspace
> sudo apt install curl
[sudo] password for matheus:
Reading package lists... Done
Building dependency tree
Reading state information... Done
curl is already the newest version (7.68.0-1ubuntu2.13).
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Figura 1.4

2 Capítulo 2

Nesse capítulo não temos nenhum *screenshot* pois o mesmo se trata de comandos de desligamento e reinicialização do sistema. Assim, não se aplica ao meu uso, no caso o WSL2.

3 Capítulo 3

Nesse capítulo temos uma introdução aos comando de navegação, operação em diretórios, criação de arquivos, deleção, etc, tais como **cd**, **ls**, **pwd**, **cp** e **touch**, **mkdir**, **rmdir**, **cat** e **ln**.




```
matheus in /   
> ls  
bin boot dev etc home init lib lib32 lib64 libx32 lost+found media mnt opt proc  
root run sbin snap srv sys tmp usr var  
matheus in /   
> ls -l  
bin  
boot  
dev  
etc  
home  
init  
lib  
lib32  
lib64  
libx32  
lost+found  
media  
mnt  
opt  
proc  
root  
run  
sbin  
snap  
srv  
sys  
tmp  
usr  
var  
matheus in /   
> ls -l  
total 1940  
lrwxrwxrwx 1 root root 7 Apr 23 2020 bin → usr/bin  
drwxr-xr-x 2 root root 4096 Apr 23 2020 boot  
drwxr-xr-x 10 root root 3040 Oct 6 09:19 dev  
drwxr-xr-x 99 root root 4096 Oct 6 09:19 etc  
drwxr-xr-x 3 root root 4096 Oct 1 11:27 home  
-rwxrwxrwx 1 root root 1917896 Dec 31 1969 init  
lrwxrwxrwx 1 root root 7 Apr 23 2020 lib → usr/lib  
lrwxrwxrwx 1 root root 9 Apr 23 2020 lib32 → usr/lib32  
lrwxrwxrwx 1 root root 9 Apr 23 2020 lib64 → usr/lib64  
lrwxrwxrwx 1 root root 10 Apr 23 2020 libx32 → usr/libx32  
drwx----- 2 root root 16384 Apr 10 2019 lost+found  
drwxr-xr-x 2 root root 4096 Apr 23 2020 media  
drwxr-xr-x 7 root root 4096 Oct 1 11:27 mnt  
drwxr-xr-x 2 root root 4096 Apr 23 2020 opt  
dr-xr-xr-x 222 root root 0 Oct 6 09:19 proc
```

Figura 3.1

```

matheus in / 
> ls -l
total 1940
lrwxrwxrwx 1 root root 7 Apr 23 2020 bin → usr/bin
drwxr-xr-x 2 root root 4096 Apr 23 2020 boot
drwxr-xr-x 10 root root 3040 Oct 6 09:19 dev
drwxr-xr-x 99 root root 4096 Oct 6 09:19 etc
drwxr-xr-x 3 root root 4096 Oct 1 11:27 home
-rwxrwxrwx 1 root root 1917896 Dec 31 1969 init
lrwxrwxrwx 1 root root 7 Apr 23 2020 lib → usr/lib
lrwxrwxrwx 1 root root 9 Apr 23 2020 lib32 → usr/lib32
lrwxrwxrwx 1 root root 9 Apr 23 2020 lib64 → usr/lib64
lrwxrwxrwx 1 root root 10 Apr 23 2020 libx32 → usr/libx32
drwx----- 2 root root 16384 Apr 10 2019 lost+found
drwxr-xr-x 2 root root 4096 Apr 23 2020 media
drwxr-xr-x 7 root root 4096 Oct 1 11:27 mnt
drwxr-xr-x 2 root root 4096 Apr 23 2020 opt
dr-xr-xr-x 222 root root 0 Oct 6 09:19 proc
drwx----- 2 root root 4096 Apr 23 2020 root
drwxr-xr-x 6 root root 120 Oct 6 09:19 run
lrwxrwxrwx 1 root root 8 Apr 23 2020 sbin → usr/sbin
drwxr-xr-x 2 root root 4096 Apr 10 2020 snap
drwxr-xr-x 2 root root 4096 Apr 23 2020 srv
dr-xr-xr-x 11 root root 0 Oct 6 09:19 sys
drwxrwxrwt 5 root root 4096 Oct 6 09:19 tmp
drwxr-xr-x 14 root root 4096 Apr 23 2020 usr
drwxr-xr-x 13 root root 4096 Apr 23 2020 var
matheus in / 
> ls -l /etc/hosts
-rw-r--r-- 1 root root 408 Oct 6 09:19 /etc/hosts
matheus in / 
> ls -l /usr
total 96
drwxr-xr-x 2 root root 36864 Oct 1 11:56 bin
drwxr-xr-x 2 root root 4096 Apr 15 2020 games
drwxr-xr-x 6 root root 4096 Oct 1 11:49 include
drwxr-xr-x 74 root root 4096 Oct 1 11:49 lib
drwxr-xr-x 2 root root 4096 Apr 23 2020 lib32
drwxr-xr-x 2 root root 4096 Oct 1 11:48 lib64
drwxr-xr-x 3 root root 4096 Oct 1 11:49 libexec
drwxr-xr-x 2 root root 4096 Apr 23 2020 libx32
drwxr-xr-x 10 root root 4096 Apr 23 2020 local
drwxr-xr-x 2 root root 20480 Oct 1 11:49 sbin
drwxr-xr-x 115 root root 4096 Oct 1 11:50 share
drwxr-xr-x 2 root root 4096 Apr 23 2020 src

```

Figura 3.2

```

matheus in / 📁
> ls -ld /etc
drwxr-xr-x 99 root root 4096 Oct  6 09:19 /etc
matheus in / 📁
> cd
matheus in ~
> cd semb2-workspace
matheus in ~/semb2-workspace
> ls -all
total 8
drwxr-xr-x  2 matheus matheus 4096 Oct  3 21:59 .
drwxr-xr-x 10 matheus matheus 4096 Oct  6 09:30 ..
matheus in ~/semb2-workspace
> ls -ld /etc
drwxr-xr-x 99 root root 4096 Oct  6 09:19 /etc
matheus in ~/semb2-workspace
> cd
matheus in ~
> ls -all
total 436
drwxr-xr-x 10 matheus matheus  4096 Oct  6 09:30 .
drwxr-xr-x  3 root      root    4096 Oct  1 11:27 ..
drwxr-xr-x 16 matheus matheus  4096 Oct  1 12:19 .asdf
-rw-r--r--  1 matheus matheus   82 Oct  3 22:24 .bash_history
-rw-r--r--  1 matheus matheus  220 Oct  1 11:27 .bash_logout
-rw-r--r--  1 matheus matheus 3771 Oct  1 11:27 .bashrc
drwxr-xr-x  3 matheus matheus  4096 Oct  1 13:19 .cache
-rw-r--r--  1 matheus matheus   57 Oct  4 23:25 .gitconfig
drwxr-xr-x  2 matheus matheus  4096 Oct  1 11:27 .landscape
-rw-r--r--  1 matheus matheus    0 Oct  1 11:27 .motd_shown
drwxr-xr-x  5 matheus matheus  4096 Oct  4 21:58 .npm
drwxr-xr-x 12 matheus matheus  4096 Oct  1 11:58 .oh-my-zsh
-rw-r--r--  1 matheus matheus  807 Oct  1 11:27 .profile
drwxr-xr-x  2 matheus matheus  4096 Oct  3 11:19 .ssh
-rw-r--r--  1 matheus matheus    0 Oct  1 11:47 .sudo_as_admin_successful
-rw-r--r--  1 matheus matheus   15 Oct  1 12:18 .tool-versions
drwxr-xr-x  5 matheus matheus  4096 Oct  1 12:01 .vscode-server
-rw-r--r--  1 matheus matheus 49006 Oct  1 11:58 .zcompdump
-rw-r--r--  1 matheus matheus 50537 Oct  1 12:14 .zcompdump-matheus-g15-5.8
-r--r--r--  1 matheus matheus 116680 Oct  1 12:14 .zcompdump-matheus-g15-5.8.zwc
-rw-r--r--  1 matheus matheus 148187 Oct  6 09:30 .zsh_history
-rw-r--r--  1 matheus matheus  4466 Oct  1 12:13 .zshrc
drwxr-xr-x  2 matheus matheus  4096 Oct  3 21:59 semb2-workspace

```

Figura 3.3


```

matheus in ~
> ls -ld .*
drwxr-xr-x 16 matheus matheus 4096 Oct  1 12:19 .asdf
-rw-r--r--  1 matheus matheus   82 Oct  3 22:24 .bash_history
-rw-r--r--  1 matheus matheus  220 Oct  1 11:27 .bash_logout
-rw-r--r--  1 matheus matheus 3771 Oct  1 11:27 .bashrc
drwxr-xr-x  3 matheus matheus 4096 Oct  1 13:19 .cache
-rw-r--r--  1 matheus matheus   57 Oct  4 23:25 .gitconfig
drwxr-xr-x  2 matheus matheus 4096 Oct  1 11:27 .landscape
-rw-r--r--  1 matheus matheus    0 Oct  1 11:27 .motd_shown
drwxr-xr-x  5 matheus matheus 4096 Oct  4 21:58 .npm
drwxr-xr-x 12 matheus matheus 4096 Oct  1 11:58 .oh-my-zsh
-rw-r--r--  1 matheus matheus  807 Oct  1 11:27 .profile
drwxr-xr-x  2 matheus matheus 4096 Oct  3 11:19 .ssh
-rw-r--r--  1 matheus matheus    0 Oct  1 11:47 .sudo_as_admin_successful
-rw-r--r--  1 matheus matheus   15 Oct  1 12:18 .tool-versions
drwxr-xr-x  5 matheus matheus 4096 Oct  1 12:01 .vscode-server
-rw-r--r--  1 matheus matheus 49006 Oct  1 11:58 .zcompdump
-rw-r--r--  1 matheus matheus 50537 Oct  1 12:14 .zcompdump-matheus-g15-5.8
-r--r--r--  1 matheus matheus 116680 Oct  1 12:14 .zcompdump-matheus-g15-5.8.zwc
-rw-r--r--  1 matheus matheus 148213 Oct  6 09:32 .zsh_history
-rw-r--r--  1 matheus matheus  4466 Oct  1 12:13 .zshrc
matheus in ~
> ls -a | egrep '^\. '
.
..
.asdf
.bash_history
.bash_logout
.bashrc
.cache
.gitconfig
.landscape
.motd_shown
.npm
.oh-my-zsh
.profile
.ssh
.sudo_as_admin_successful
.tool-versions
.vscod-server
.zcompdump
.zcompdump-matheus-g15-5.8
.zcompdump-matheus-g15-5.8.zwc
.zsh_history
.zshrc

```

Figura 3.4

```

matheus in / 📁
> ls
bin  dev  home  lib  lib64  lost+found  mnt  proc  run  snap  sys  usr
boot  etc  init  lib32  libx32  media  opt  root  sbin  srv  tmp  var
matheus in / 📁
> ls -F
bin@  dev/  home/  lib@  lib64@  lost+found/  mnt/  proc/  run/  snap/  sys/  usr/
boot/  etc/  init*  lib32@  libx32@  media/  opt/  root/  sbin@  srv/  tmp/  var/
matheus in / 📁
> cd /usr/local
matheus in /usr/local 📁
> ls -s
total 32
4 bin 4 etc 4 games 4 include 4 lib 0 man 4 sbin 4 share 4 src
matheus in /usr/local 📁
> ls -alF
total 40
drwxr-xr-x 10 root root 4096 Apr 23 2020 ./
drwxr-xr-x 14 root root 4096 Apr 23 2020 ../
drwxr-xr-x 2 root root 4096 Apr 23 2020 bin/
drwxr-xr-x 2 root root 4096 Apr 23 2020 etc/
drwxr-xr-x 2 root root 4096 Apr 23 2020 games/
drwxr-xr-x 2 root root 4096 Apr 23 2020 include/
drwxr-xr-x 3 root root 4096 Apr 23 2020 lib/
lrwxrwxrwx 1 root root 9 Apr 23 2020 man → share/man/
drwxr-xr-x 2 root root 4096 Apr 23 2020 sbin/
drwxr-xr-x 6 root root 4096 Oct 1 11:56 share/
drwxr-xr-x 2 root root 4096 Apr 23 2020 src/
matheus in /usr/local 📁
> cd ../..
matheus in / 📁
> ls -ld
drwxr-xr-x 19 root root 4096 Oct 6 09:19 .

```

Figura 3.5

```

> cd /usr/local
matheus in /usr/local
> ls -R /etc/
/etc/:
ModemManager          initramfs-tools       protocols
NetworkManager        inputrc               pulse
PackageKit            iproute2              python3
X11                   iscsi                 python3.8
adduser.conf          issue                 rc0.d
alternatives          issue.net              rc1.d
apparmor              kernel                rc2.d
apparmor.d            kernel-img.conf        rc3.d
apport                landscape              rc4.d
apt                   ld.so.cache            rc5.d
at.deny               ld.so.conf             rc6.d
bash.bashrc           ld.so.conf.d           rcS.d
bash_completion       ldap                  resolv.conf
bash_completion.d     legal                  rmt
bindresvport.blacklist libaudit.conf          rpc
binfmt.d              libblockdev            rsyslog.conf
byobu                 locale.alias           rsyslog.d
ca-certificates       locale.gen             screenrc
ca-certificates.conf  localtime              security
ca-certificates.conf.dpkg-old logcheck                selinux
calendar              login.defs              sensors.d
cloud                 logrotate.conf          sensors3.conf
console-setup         logrotate.d            services
cron.d                lsb-release            shadow
cron.daily             ltrace.conf            shadow-
cron.hourly            lvm                     shells
cron.monthly           machine-id              skel
cron.weekly            magic                   sos
crontab               magic.mime              sos.conf
cryptsetup-initramfs  mailcap                 ssh
crypttab              mailcap.order           ssl
dbus-1                manpath.config          subgid
dconf                 mdadm                   subgid-
debconf.conf          mime.types              subuid
debian_version        mke2fs.conf             subuid-
default               modprobe.d              sudoers
deluser.conf          modules                 sudoers.d
depmod.d              modules-load.d          sysctl.conf
dhcp                  mtab                    sysctl.d
dpkg                  multipath.conf           systemd
e2scrub.conf          nanorc                  terminfo
ec2_version           netplan                 timezone
environment            network                 tmpfiles.d
ethertypes             networkd-dispatcher     ubuntu-advantage

```

Figura 3.6

```

matheus in ~
> cd /home/matheus
matheus in ~
> cd
matheus in ~
> echo ~
/home/matheus
matheus in ~
> cd ..
matheus in /home
> cd
matheus in ~
> pwd
/home/matheus
matheus in ~
> touch test1.txt
matheus in ~
> touch test2.txt

```

Figura 3.7

```

matheus in ~
> ls
semb2-workspace  test1.txt  test2.txt
matheus in ~
> cp test1.txt /home/matheus/semb2-workspace
matheus in ~
> ls -R
.:
semb2-workspace  test1.txt  test2.txt

./semb2-workspace:
test1.txt
matheus in ~
> touch test3.txt
matheus in ~
> ls
semb2-workspace  test1.txt  test2.txt  test3.txt
matheus in ~
> cp test2.txt test3.txt /home/matheus/semb2-workspace
matheus in ~
> ls -R
.:
semb2-workspace  test1.txt  test2.txt  test3.txt

./semb2-workspace:
test1.txt test2.txt test3.txt
matheus in ~
> cd semb2-workspace
matheus in ~/semb2-workspace
> cp test1.txt test2.txt
matheus in ~/semb2-workspace
> cp -i test1.txt test2.txt
cp: overwrite 'test2.txt'? yes
matheus in ~/semb2-workspace took 13.1s
> mkdir teste1
matheus in ~/semb2-workspace
> mkdir teste2
matheus in ~/semb2-workspace
> ls
test1.txt test2.txt test3.txt teste1 teste2
matheus in ~/semb2-workspace
> cp -r /home/matheus/semb2-workspace/test1 /home/matheus/semb2-workspace/teste2
cp: cannot stat '/home/matheus/semb2-workspace/test1': No such file or directory
matheus in ~/semb2-workspace
> cp -r /home/matheus/semb2-workspace/teste1 /home/matheus/semb2-workspace/teste2

```

Figura 3.8

```
matheus in ~/semb2-workspace
> rename test1.txt meu_arquivo.txt
Bareword "test1" not allowed while "strict subs" in use at (user-supplied code) line 3.
matheus in ~/semb2-workspace
> touch meu_arquivo.txt
matheus in ~/semb2-workspace
> ls
meu_arquivo.txt test1.txt test2.txt test3.txt teste1 teste2
matheus in ~/semb2-workspace
> TMPFILE=$(mktemp)
matheus in ~/semb2-workspace
> echo $TMPFILE
/tmp/tmp.rqlxy6vkbF
matheus in ~/semb2-workspace
> echo "temp_file" > $TMPFILE
matheus in ~/semb2-workspace
> cat $TMPFILE
temp_file
matheus in ~/semb2-workspace
> rm $TMPFILE
matheus in ~/semb2-workspace
> ls $TMPFILE
ls: cannot access '/tmp/tmp.rqlxy6vkbF': No such file or directory
matheus in ~/semb2-workspace
> ls
meu_arquivo.txt test1.txt test2.txt test3.txt teste1 teste2
matheus in ~/semb2-workspace
> rm meu_arquivo.txt
matheus in ~/semb2-workspace
> ls
test1.txt test2.txt test3.txt teste1 teste2
matheus in ~/semb2-workspace
> rm *.txt
matheus in ~/semb2-workspace
> ls
teste1 teste2
matheus in ~/semb2-workspace
> rm -R teste1
matheus in ~/semb2-workspace
> ls
teste2
```

Figura 3.9

```
matheus in ~/semb2-workspace
> ls
teste1 teste2 teste3
matheus in ~/semb2-workspace
> mkdir teste4
matheus in ~/semb2-workspace
> rmdir teste4
matheus in ~/semb2-workspace
> ls
teste1 teste2 teste3
matheus in ~/semb2-workspace
> mkdir teste4 teste5
matheus in ~/semb2-workspace
> ls
teste1 teste2 teste3 teste4 teste5
matheus in ~/semb2-workspace
> mkdir -p teste5/minhapasta
matheus in ~/semb2-workspace
> ls -R
.:
teste1 teste2 teste3 teste4 teste5

./teste1:

./teste2:
teste1

./teste2/teste1:

./teste3:

./teste4:

./teste5:
minhapasta

./teste5/minhapasta:
```

Figura 3.10

```
matheus in ~/semb2-workspace
> ls
matheus in ~/semb2-workspace
> touch arq1
matheus in ~/semb2-workspace
> echo 'Laranja' > arq1
matheus in ~/semb2-workspace
> cat arq1
Laranja
matheus in ~/semb2-workspace
> ln -s arq1 arq1-soft
matheus in ~/semb2-workspace
> ls -l arq1*
-rw-r--r-- 1 matheus matheus 8 Oct  6 10:08 arq1
lrwxrwxrwx 1 matheus matheus 4 Oct  6 10:08 arq1-soft -> arq1
matheus in ~/semb2-workspace
> cat arq1-soft
Laranja
matheus in ~/semb2-workspace
> mv arq1 arq2
matheus in ~/semb2-workspace
> ls
arq1-soft  arq2
matheus in ~/semb2-workspace
> cat arq1-soft
cat: arq1-soft: No such file or directory
matheus in ~/semb2-workspace
> ls -l arq1-soft
lrwxrwxrwx 1 matheus matheus 4 Oct  6 10:08 arq1-soft -> arq1
matheus in ~/semb2-workspace
> cat arq2
Laranja
matheus in ~/semb2-workspace
> ln arq2 arq2-hard
matheus in ~/semb2-workspace
> cat arq2-hard
Laranja
matheus in ~/semb2-workspace
> ls -l arq2*
-rw-r--r-- 2 matheus matheus 8 Oct  6 10:08 arq2
-rw-r--r-- 2 matheus matheus 8 Oct  6 10:08 arq2-hard
matheus in ~/semb2-workspace
> mv arq2 arq3
matheus in ~/semb2-workspace
> cat arq2-hard
Laranja
```

Figura 3.11

4 Capítulo 4

Nesse capítulo nos é apresentado os comandos de edição de texto, busca em arquivos etc. Sendo alguns deles: **echo**, **cat**, **cut**, **seq**, **expand**, **tr**, **fold**, **grep**, **egrep**, **fgrep**, **head**, **tail**, **iconv**, **look**, **more**, **nl**, **paste**, **rev**, **sort** e **unic**,

```
matheus in ~/semb2-workspace
> echo 'olá Éder!'
olá Éder!
matheus in ~/semb2-workspace
> echo -en 'olá\tÉder!'
olá      Éder!%
matheus in ~/semb2-workspace
> ls
matheus in ~/semb2-workspace
> rm arq1-soft arq2-hard
matheus in ~/semb2-workspace
> ls
arq3
matheus in ~/semb2-workspace
> cat arq3
Laranja
matheus in ~/semb2-workspace
> seq 1 5 > arq1.txt
matheus in ~/semb2-workspace
> seq 6 10 > arq2.txt
matheus in ~/semb2-workspace
> cat arq1.txt arq2.txt
1
2
3
4
5
6
7
8
9
10
matheus in ~/semb2-workspace
> echo 'alessandro vivas andrade' | cut -c 1-10
alessandro
```

Figura 4.1


```
matheus in ~/semb2-workspace
> rm arq1.txt arq2.txt arq3
matheus in ~/semb2-workspace
> ls
matheus in ~/semb2-workspace
> seq 3
1
2
3
matheus in ~/semb2-workspace
> seq 3 5
3
4
5
matheus in ~/semb2-workspace
> seq 1 0.5 2
1.0
1.5
2.0
matheus in ~/semb2-workspace
> vim cidades.txt
matheus in ~/semb2-workspace took 58.8s
> cat cidades.txt
cat: cidades.txt: No such file or directory
matheus in ~/semb2-workspace
> ls
matheus in ~/semb2-workspace
> nano cidades.txt
matheus in ~/semb2-workspace took 1m 24.2s
> cat cidades.txt
SP Sao Paulo:pedro
SP Campinas:andre
MG Belo Horizonte:marta
MG Diamantina:lucas
MG Lavras: rafael
MG Bom Sucesso:lisa
RJ      Rio de Janeiro:alexandro
matheus in ~/semb2-workspace
> cat cidades.txt | expand -t 1
SP Sao Paulo:pedro
SP Campinas:andre
MG Belo Horizonte:marta
MG Diamantina:lucas
MG Lavras: rafael
MG Bom Sucesso:lisa
RJ Rio de Janeiro:alexandro
```

Figura 4.2

```

matheus in ~/semb2-workspace
> cat cidades.txt
SP      Sao Paulo
SP      Campinas
MG      Belo Horizonte
MG      Diamantina
MG      Lavras
MG      Bom Sucesso
RJ      Rio de Janeiro
matheus in ~/semb2-workspace
> cat cidades.txt | tr '\t' ' '
SP Sao Paulo
SP Campinas
MG Belo Horizonte
MG Diamantina
MG Lavras
MG Bom Sucesso
RJ Rio de Janeiro
matheus in ~/semb2-workspace
> echo 'a{1}, b{2}' | tr '{}' '()'
a(1), b(2)
matheus in ~/semb2-workspace
> seq 9 | tr -d '3-7'
1
2

8
9
matheus in ~/semb2-workspace
> tr -dc 'aeiouAEIOU' < cidades.txt
aoauoaiiaeooioeiaaiaaaoueoioeaeio%

```

Figura 4.3

```
matheus in ~/semb2-workspace
> nano texto.txt
matheus in ~/semb2-workspace took 1m 10.4s
> fmt -w10 texto.txt
Antes da
chegada
dos
colonizadores
portugueses,
no
século
XVI (os
primeiros
relatos
dão
conta de
expedições
que
subiram
o Rio
Jequitinhonha
e São
Francisco)
,
Diamantina,
como toda
a região
do atual
estado
de Minas
Gerais,
era
ocupada
por povos
indígenas
do tronco
linguístico
```

Figura 4.4

```
matheus in ~/semb2-workspace
> fold -w 10 texto.txt
Antes da c
hegada dos
colonizad
ores portu
gueses, no
século X
VI (os pri
meiros rel
atos dão
conta de e
xpedição
s que subi
ram o Rio
Jequitinho
nha e São
Francisco
), Diaman
tina, como
toda a re
gião do a
tual estad
o de Minas
Gerais, e
ra ocupada
por povos
indígena
s do tronc
o linguis
tico
```

Figura 4.5

```

matheus in ~/semb2-workspace
> cat lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
MG Lavras : rafael
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> cat lista.txt | grep alexandro
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> grep '[0-9]' lista.txt
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
matheus in ~/semb2-workspace
> grep '[0-9]\{2,\}' lista.txt
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
matheus in ~/semb2-workspace
> dmesg | egrep "firmware|intel"
matheus in ~/semb2-workspace
> dmesg | egrep "firmware|Intel"
[ 0.000000] Intel GenuineIntel
[ 0.127500] smpboot: CPU0: Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz (family: 0x6, model: 0
xa5, stepping: 0x2)
[ 0.127500] Performance Events: Skylake events, 32-deep LBR, full-width counters, Intel PMU
driver.
matheus in ~/semb2-workspace
> dmesg | fgrep "@"
[ 0.000000] Linux version 5.15.57.1-microsoft-standard-WSL2 (oe-user@oe-host) (x86_64-msft-
linux-gcc (GCC) 9.3.0, GNU ld (GNU Binutils) 2.34.0.20200220) #1 SMP Wed Jul 27 02:20:31 UTC 2
022
[ 0.127500] smpboot: CPU0: Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz (family: 0x6, model: 0
xa5, stepping: 0x2)
[ 0.153748] pps_core: Software ver. 5.3.6 - Copyright 2005-2007 Rodolfo Giometti <giometti
linux.it>
[ 0.382613] Installing knfsd (copyright (C) 1996 okir@monad.swb.de).
[ 0.479793] wireguard: Copyright (C) 2015-2019 Jason A. Donenfeld <Jason@zx2c4.com>. All Ri
ghts Reserved.
[ 0.505521] device-mapper: ioctl: 4.45.0-ioctl (2021-03-22) initialised: dm-devel@redhat.co
m
[ 1.542848] virtiofs virtio2: Cache len: 0x200000000 @ 0xc00000000

```

Figura 4.6

```
matheus in ~/semb2-workspace
> iconv -f ascii -t utf-8 lista.txt > listautf8.txt
matheus in ~/semb2-workspace
> file listautf8.txt
listautf8.txt: ASCII text
matheus in ~/semb2-workspace
> head lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
MG Lavras : rafael
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> head -2 lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
matheus in ~/semb2-workspace
> tail -2 lista.txt
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> look Bom lista.txt
matheus in ~/semb2-workspace
> look SP lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
matheus in ~/semb2-workspace
> more lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
MG Lavras : rafael
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> nl lista.txt
 1 SP Sao Paulo : pedro
 2 SP Campinas : andre :(074) 2233 -1111
 3 MG Belo Horizonte : marta :010 1222 0011
 4 MG Diamantina : lucas :2
 5 MG Lavras : rafael
 6 MG Bom Sucesso : lisa
 7 RJ Rio de Janeiro : alexandro
```

Figura 4.7

```

matheus in ~/semb2-workspace
> cat lista.txt | cut -c 1-2
SP
SP
MG
MG
MG
MG
RJ
matheus in ~/semb2-workspace
> nano estados.txt
matheus in ~/semb2-workspace took 5.7s
> cat lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
MG Lavras : rafael
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> paste lista.txt estados.txt
SP Sao Paulo : pedro      SP
SP Campinas : andre :(074) 2233 -1111  SP
MG Belo Horizonte : marta :010 1222 0011      MG
MG Diamantina : lucas :2      MG
MG Lavras : rafael      MG
MG Bom Sucesso : lisa      MG
RJ Rio de Janeiro : alexandro      RJ
matheus in ~/semb2-workspace
> echo 'teste' | rev
etset
matheus in ~/semb2-workspace
> cat estados.txt | sort -n
MG
MG
MG
MG
RJ
SP
SP
matheus in ~/semb2-workspace
> cat estados.txt | sort | uniq
MG
RJ
SP

```

Figura 4.8

```

> cat lista.txt
SP Sao Paulo : pedro
SP Campinas : andre :(074) 2233 -1111
MG Belo Horizonte : marta :010 1222 0011
MG Diamantina : lucas :2
MG Lavras : rafael
MG Bom Sucesso : lisa
RJ Rio de Janeiro : alexandro
matheus in ~/semb2-workspace
> paste lista.txt estados.txt
SP Sao Paulo : pedro      SP
SP Campinas : andre :(074) 2233 -1111  SP
MG Belo Horizonte : marta :010 1222 0011      MG
MG Diamantina : lucas :2      MG
MG Lavras : rafael      MG
MG Bom Sucesso : lisa      MG
RJ Rio de Janeiro : alexandro      RJ
matheus in ~/semb2-workspace
> echo 'teste' | rev
etset
matheus in ~/semb2-workspace
> cat estados.txt | sort -n
MG
MG
MG
MG
RJ
SP
SP
matheus in ~/semb2-workspace
> cat estados.txt | sort | uniq
MG
RJ
SP
matheus in ~/semb2-workspace
> wc lista.txt
  7  40 196 lista.txt
matheus in ~/semb2-workspace
> wc -l lista.txt
7 lista.txt
matheus in ~/semb2-workspace
> wc -w lista.txt
40 lista.txt
matheus in ~/semb2-workspace
> wc -c lista.txt
196 lista.txt

```

Figura 4.9

5 Capítulo 5

Nesse capítulo temos acesso aos comandos de sistema, ou seja, comandos para obter informações sobre o próprio sistema e seus usuários, tais como: **compgen**, **whoami**, **pwd**, **finger**, **free**, **su**, **uname**, **uptime**, **version**, **PATH**, **timeout**, **w**, **whereis**, **locate**, **which**, **whatis** e **who**.

```
matheus in ~
> compgen -c
HashtagDS.dll
Windows.Devices.PointOfService.dll
findstr.exe
unattend.dll
SettingsHandlers_Pen.dll
SensorsUtilsV2.dll
keyring
msimg.dll
kpartx
sed
see
file-rename
fsck.vfat
seq
azroles.dll
wbem
Event.Format.ps1xml
wmpnetwk.mof
WpcApi.dll
QualityUpdateAssistant.dll
SecConfig.efi
adsmsext.dll
setupapi.dll
Windows.UI.Xaml.Resources.19h1.dll
gpg-zip
Windows.WARP.JITService.dll
wsepo.dll
AppHostRegistrationVerifier.exe
sg_readcap
umb.dll
NetAdapterCim.mof
unsquashfs
cimdmf.mof
FsIso.exe
D3DX9_40.dll
[
ltrace
BrokerFileDialog.dll
AuthHost.exe
xfs_rtcp
nohup
SystemSettings.SettingsExtensibility.dll
Win32_EncryptableVolumeUninstall.mof
KBDCHERP.DLL
dbus-daemon
SettingsHandlers_ClosedCaptioning.dll
```

Figura 5.1

```

matheus in ~
> whoami
matheus
matheus in ~
> pwd
/home/matheus
matheus in ~
> cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,:/var/lib/tpm:/bin/false
uidd:x:107:112:/run/uidd:/usr/sbin/nologin
tcpdump:x:108:113:/nonexistent:/usr/sbin/nologin
sshd:x:109:65534:/run/sshd:/usr/sbin/nologin
landscape:x:110:115:/var/lib/landscape:/usr/sbin/nologin
pollinate:x:111:1:/var/cache/pollinate:/bin/false
matheus:x:1000:1000:,,:/home/matheus:/bin/zsh
matheus in ~
> id
uid=1000(matheus) gid=1000(matheus) groups=1000(matheus),4(adm),20(dialout),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),117(netdev)

```

Figura 5.2

```
matheus in ~
> passwd
Changing password for matheus.
Current password:
passwd: Authentication token manipulation error
passwd: password unchanged
matheus in ~ took 14.8s
> users
matheus in ~
> sudo apt install finger
[sudo] password for matheus:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  finger
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 16.9 kB of archives.
After this operation, 51.2 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/universe amd64 finger amd64 0.17-17 [16.9 kB]
Fetched 16.9 kB in 1s (19.3 kB/s)
Selecting previously unselected package finger.
(Reading database ... 34044 files and directories currently installed.)
Preparing to unpack .../finger_0.17-17_amd64.deb ...
Unpacking finger (0.17-17) ...
Setting up finger (0.17-17) ...
Processing triggers for man-db (2.9.1-1) ...
matheus in ~ took 5.6s
> finger matheus
Login: matheus                               Name:
Directory: /home/matheus                     Shell: /bin/zsh
Never logged in.
No mail.
No Plan.
matheus in ~
> finger -l matheus
Login: matheus                               Name:
Directory: /home/matheus                     Shell: /bin/zsh
Never logged in.
No mail.
No Plan.
```

Figura 5.3

```

matheus in ~
> finger
No one logged on.
matheus in ~
> free
              total        used        free      shared  buff/cache   available
Mem:           8019260       350040       7344756         2488       324464       7436620
Swap:          2097152           0       2097152
matheus in ~
> su -
Password:
su: Authentication failure
matheus in ~ took 11.9s
> uname -s
Linux
matheus in ~
> uname -r
5.15.57.1-microsoft-standard-WSL2
matheus in ~
> uname -m
x86_64
matheus in ~
> uname -n
matheus-g15
matheus in ~
> uname -a
Linux matheus-g15 5.15.57.1-microsoft-standard-WSL2 #1 SMP Wed Jul 27 02:20:31 UTC 2022 x86_64
x86_64 x86_64 GNU/Linux
matheus in ~
> uptime
 17:36:43 up 10 min,  0 users,  load average: 0.01, 0.00, 0.00
matheus in ~
> ls --version
ls (GNU coreutils) 8.30
Copyright (C) 2018 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Richard M. Stallman and David MacKenzie.
matheus in ~
> echo $PATH
/home/matheus/.asdf/shims:/home/matheus/.asdf/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr
bin:/sbin:/bin:/usr/games:/usr/local/games:/usr/lib/wsl/lib:/mnt/c/WINDOWS/system32:/mnt/c/WIND
WS:/mnt/c/WINDOWS/System32/Wbem:/mnt/c/WINDOWS/System32/WindowsPowerShell/v1.0/:/mnt/c/WINDOWS/
system32/OpenSSH:/mnt/c/Program Files/dotnet:/mnt/c/Users/mathe/AppData/Local/Microsoft/Window
Apps:/mnt/c/Users/mathe/AppData/Local/Programs/Microsoft VS Code/bin

```

Figura 5.4

```
matheus in ~
> timeout 5 ping www.ufvjm.edu.br
PING www.ufvjm.edu.br (200.131.252.165) 56(84) bytes of data.
64 bytes from www.ufvjm.edu.br (200.131.252.165): icmp_seq=1 ttl=51 time=22.1 ms
64 bytes from www.ufvjm.edu.br (200.131.252.165): icmp_seq=2 ttl=51 time=26.1 ms
64 bytes from www.ufvjm.edu.br (200.131.252.165): icmp_seq=3 ttl=51 time=22.7 ms
64 bytes from www.ufvjm.edu.br (200.131.252.165): icmp_seq=4 ttl=51 time=23.2 ms
64 bytes from www.ufvjm.edu.br (200.131.252.165): icmp_seq=5 ttl=51 time=21.9 ms
matheus in ~ took 5.0s
> w
 17:38:13 up 11 min,  0 users,  load average: 0.04, 0.01, 0.00
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
matheus in ~
> whereis gcc
gcc: /usr/share/gcc
matheus in ~
> locate passwd
zsh: command not found: locate
matheus in ~
> which ls
ls: aliased to ls --color=tty
matheus in ~
> which gcc
gcc not found
matheus in ~
> whatis clear
clear (1)                - clear the terminal screen
matheus in ~
> whatis ps
ps (1)                   - report a snapshot of the current processes.
matheus in ~
> who
matheus in ~
> hostname; date; ls;
matheus-g15
Sun Oct  9 17:40:16 -03 2022
semb2-workspace test1.txt test2.txt test3.txt
matheus in ~
> whatis test
test (1)                 - check file types and compare values
```

Figura 5.5

6 Capítulo 6

Esse capítulo tem como foco os comandos de gerenciamento de processos, como: **ps**, **top** e **kill**.

```
matheus in ~
> ps -aef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1        0  0  17:26 ?           00:00:00 /init
root           7        1  0  17:26 ?           00:00:00 /init
root           8        7  0  17:26 ?           00:00:00 /init
matheus        9        8  0  17:26 pts/0       00:00:02 -zsh
matheus       5755        9  0  17:41 pts/2       00:00:00 -zsh
matheus       5830        9  0  17:41 pts/0       00:00:00 ps -aef
matheus in ~
> ps -u matheus
    PID TTY          TIME CMD
    9 pts/0        00:00:02 zsh
   5832 pts/1        00:00:00 zsh
   5918 pts/0        00:00:00 ps
matheus in ~
> ps -aef -r | head -5
    PID TTY          STAT TIME COMMAND
   6008 pts/0        D+    0:00 -zsh HOSTTYPE=x86_64 LANG=C.UTF-8 PATH=/usr/local/sbin:/usr/local/bi
:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/usr/lib/wsl/lib:/mnt/c/WINDOWS/syst
m32:/mnt/c/WINDOWS:/mnt/c/WINDOWS/System32/Wbem:/mnt/c/WINDOWS/System32/WindowsPowerShell/v1.0/
/mnt/c/WINDOWS/System32/OpenSSH:/mnt/c/Program Files/dotnet:/mnt/c/Users/mathe/AppData/Local/
icrosoft/WindowsApps:/mnt/c/Users/mathe/AppData/Local/Programs/Microsoft VS Code/bin TERM=xterm
256color XDG_RUNTIME_DIR=/mnt/wslg/runtime-dir DISPLAY=:0 WAYLAND_DISPLAY=wayland-0 PULSE_SERVE
=/mnt/wslg/PulseServer WSL2_GUI_APPS_ENABLED=1 WSLENV=WT_SESSION::WT_PROFILE_ID WT_SESSION=f4da
8ea-112b-4557-94fb-d112dd23a513 WT_PROFILE_ID={2c4de342-38b7-51cf-b940-2309a097f518} WSL_INTERO
=/run/WSL/8_interop NAME=matheus-g15 HOME=/home/matheus USER=matheus LOGNAME=matheus SHELL=/bin
zsh WSL_DISTRO_NAME=Ubuntu
   6007 pts/0        R+    0:00 ps -aef -r HOSTTYPE=x86_64 LANG=C.UTF-8 PATH=/home/matheus/.asdf/shi
s:/home/matheus/.asdf/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/gam
s:/usr/local/games:/usr/lib/wsl/lib:/mnt/c/WINDOWS/system32:/mnt/c/WINDOWS:/mnt/c/WINDOWS/Syste
32/Wbem:/mnt/c/WINDOWS/System32/WindowsPowerShell/v1.0:/mnt/c/WINDOWS/System32/OpenSSH:/mnt/c
Program Files/dotnet:/mnt/c/Users/mathe/AppData/Local/Microsoft/WindowsApps:/mnt/c/Users/mathe
AppData/Local/Programs/Microsoft VS Code/bin TERM=xterm-256color XDG_RUNTIME_DIR=/mnt/wslg/runt
me-dir DISPLAY=:0 WAYLAND_DISPLAY=wayland-0 PULSE_SERVER=/mnt/wslg/PulseServer WSL2_GUI_APPS_EN
BLED=1 WSLENV=WT_SESSION::WT_PROFILE_ID WT_SESSION=f4da98ea-112b-4557-94fb-d112dd23a513 WT_PROF
LE_ID={2c4de342-38b7-51cf-b940-2309a097f518} WSL_INTEROP=/run/WSL/8_interop NAME=matheus-g15 HO
E=/home/matheus USER=matheus LOGNAME=matheus SHELL=/bin/zsh WSL_DISTRO_NAME=Ubuntu SHLVL=1 PWD=
home/matheus OLDPWD=/ ZSH=/home/matheus/.oh-my-zsh PAGER=less LESS=-R LSCOLORS=Gxfxcxdxbxegedab
gacad LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01
or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.
gz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.
tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=01;31:*.lrz
01;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.bz=01;31:*.tbz=0
;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.ear=01;31:*.sar=0
;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;31:*.cab=01
31:*.wim=01;31:*.swm=01;31:*.dwm=01;31:*.esd=01;31:*.jpg=01;35:*.jpeg=01;35:*.mjpg=01;35:*.mjpe
=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xp
```

Figura 6.1

```

matheus in ~
> ps -aef -m | head -5
UID          PID    PPID  C STIME TTY          TIME CMD
root           1        0  0 17:26 ?           00:00:00 /init
root          -        -  0 17:26 -           00:00:00 -
root          -        -  0 17:26 -           00:00:00 -
root          -        -  0 17:26 -           00:00:00 -

matheus in ~
> ps -aef | grep firefox
matheus   6252      9  0 17:43 pts/0    00:00:00 grep --color=auto --exclude-dir=.bzz --exclude-
ir=CVS --exclude-dir=.git --exclude-dir=.hg --exclude-dir=.svn --exclude-dir=.idea --exclude-di
=.tox firefox
matheus in ~
> pstree
init--init--init--zsh--pstree
      |          |
      |          +--zsh
      +--2*[{init}]

matheus in ~
> top
top - 17:44:35 up 17 min,  0 users,  load average: 0.00, 0.00, 0.00
Tasks:  6 total,   1 running,  5 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.1 sy,  0.0 ni, 99.9 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :  7831.3 total,  7161.1 free,   351.6 used,   318.6 buff/cache
MiB Swap:  2048.0 total,  2048.0 free,    0.0 used.  7252.5 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
    1 root        20   0    2392    1784   1684 S   0.0   0.0   0:00.00 init
    7 root        20   0    2400     104     0 S   0.0   0.0   0:00.00 init
    8 root        20   0    2416     108     0 S   0.0   0.0   0:00.16 init
    9 matheus    20   0   14324   8332   4536 S   0.0   0.1   0:03.00 zsh
  6333 matheus    35  15   14388   6044   2212 S   0.0   0.1   0:00.00 zsh
  6406 matheus    20   0   10872   3652   3100 R   0.0   0.0   0:00.00 top

```

Figura 6.2

```

matheus in ~
> kill -l
HUP INT QUIT ILL TRAP ABRT BUS FPE KILL USR1 SEGV USR2 PIPE ALRM TERM STKFLT CHLD CONT STOP TST
TTIN TTOU URG XCPU XFSZ VTALRM PROF WINCH POLL PWR SYS
matheus in ~
> jobs -l
matheus in ~
> cd semb2-workspace
matheus in ~/semb2-workspace
> nano teste.c
matheus in ~/semb2-workspace took 34.3s
> sudo apt install build-essential
[sudo] password for matheus:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu cpp cpp-9 dpkg-dev fakeroot g++ g++-9 gcc
gcc-9 gcc-9-base libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl
libasan5 libatomic1 libbinutils libc-dev-bin libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0
libctf0 libdpkg-perl libfakeroot libfile-fcntllock-perl libgcc-9-dev libgomp1 libisl22
libitm1 liblsan0 libmpc3 libquadmath0 libstdc++-9-dev libtsan0 libubsan1 linux-libc-dev make
manpages-dev
Suggested packages:
  binutils-doc cpp-doc gcc-9-locales debian-keyring g++-multilib g++-9-multilib gcc-9-doc
gcc-multilib autoconf automake libtool flex bison gdb gcc-doc gcc-9-multilib glibc-doc bzip2
libstdc++-9-doc make-doc
The following NEW packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu build-essential cpp cpp-9 dpkg-dev
fakeroot g++ g++-9 gcc gcc-9 gcc-9-base libalgorithm-diff-perl libalgorithm-diff-xs-perl
libalgorithm-merge-perl libasan5 libatomic1 libbinutils libc-dev-bin libc6-dev libcc1-0
libcrypt-dev libctf-nobfd0 libctf0 libdpkg-perl libfakeroot libfile-fcntllock-perl
libgcc-9-dev libgomp1 libisl22 libitm1 liblsan0 libmpc3 libquadmath0 libstdc++-9-dev
libtsan0 libubsan1 linux-libc-dev make manpages-dev
0 upgraded, 41 newly installed, 0 to remove and 0 not upgraded.
Need to get 45.4 MB of archives.
After this operation, 202 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 binutils-common amd64 2.34-6ubu
tu1.3 [207 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libbinutils amd64 2.34-6ubunt
u1.3 [474 kB]
Get:3 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libctf-nobfd0 amd64 2.34-6ubun
t1.3 [47.4 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libctf0 amd64 2.34-6ubunt
u1.3 [

```

Figura 6.3


```

matheus in ~/semb2-workspace
> gcc --version
gcc (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0
Copyright (C) 2019 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

matheus in ~/semb2-workspace
> cat teste.c

#include <stdio.h>

int main()
{
    while (1)
    {
    }
}

matheus in ~/semb2-workspace
> gcc -c teste.c
matheus in ~/semb2-workspace
> gcc -o teste teste.o
matheus in ~/semb2-workspace
> cp teste teste1
matheus in ~/semb2-workspace
> ./teste & ./teste1 &
[1] 13224
[2] 13225
matheus in ~/semb2-workspace
> ps
  PID TTY          TIME CMD
    9 pts/0        00:00:04 zsh
 13224 pts/0        00:00:05 teste
 13225 pts/0        00:00:05 teste1
 13297 pts/0        00:00:00 ps
matheus in ~/semb2-workspace
> ps -l
 F S   UID     PID   PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
 4 S   1000      9      8    0  80   0 -  4301 sigsus pts/0        00:00:04 zsh
 0 R   1000  13224      9  96  85   5 -   590 -          pts/0        00:00:14 teste
 0 R   1000  13225      9  96  85   5 -   590 -          pts/0        00:00:14 teste1
 0 R   1000  13377      9    0  80   0 -  2634 -          pts/0        00:00:00 ps
matheus in ~/semb2-workspace
> kill -9 13224
[1] - 13224 killed      ./teste
matheus in ~/semb2-workspace
> kill -9 13225
[2] + 13225 killed      ./teste1

```

Figura 6.4

7 Capítulo 7

Esse capítulo traz informações sobre permissões e propriedades de arquivos no Linux, onde faz usos de comandos, como: **chmod** e **chown**.

```
matheus in ~/semb2-workspace
> ls -l
total 60
-rw-r--r-- 1 matheus matheus 21 Oct 6 11:04 estados.txt
-rw-r--r-- 1 matheus matheus 196 Oct 6 10:46 lista.txt
-rw-r--r-- 1 matheus matheus 196 Oct 6 10:58 listautf8.txt
-rwxr-xr-x 1 matheus matheus 16464 Oct 9 17:51 teste
-rw-r--r-- 1 matheus matheus 53 Oct 9 17:51 teste.c
-rw-r--r-- 1 matheus matheus 1360 Oct 9 17:51 teste.o
-rwxr-xr-x 1 matheus matheus 16464 Oct 9 17:51 teste1
matheus in ~/semb2-workspace
> touch arquivo.txt
matheus in ~/semb2-workspace
> ls -l cidades.txt
ls: cannot access 'cidades.txt': No such file or directory
matheus in ~/semb2-workspace
> ls -l arquivo.txt
-rw-r--r-- 1 matheus matheus 0 Oct 9 17:55 arquivo.txt
matheus in ~/semb2-workspace
> chmod g-r arquivo.txt
matheus in ~/semb2-workspace
> ls -l arquivo.txt
-rw----- 1 matheus matheus 0 Oct 9 17:55 arquivo.txt
matheus in ~/semb2-workspace
> chmod o-r arquivo.txt
matheus in ~/semb2-workspace
> ls -l arquivo.txt
-rw----- 1 matheus matheus 0 Oct 9 17:55 arquivo.txt
matheus in ~/semb2-workspace
> chmod u-r arquivo.txt
matheus in ~/semb2-workspace
> ls -l arquivo.txt
--w----- 1 matheus matheus 0 Oct 9 17:55 arquivo.txt
matheus in ~/semb2-workspace
> chmod a+r arquivo.txt
matheus in ~/semb2-workspace
> ls -l arquivo.txt
-rw-r--r-- 1 matheus matheus 0 Oct 9 17:55 arquivo.txt
```

Figura 7.1

8 Capítulo 8

Nesse capítulo vemos comandos de gerenciamento de usuários, utilizando comandos para listagem, adição, remoção e edição de usuários e grupos.

```
matheus in ~/semb2-workspace
> cat /etc/passwd | head -10
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
matheus in ~/semb2-workspace
> cut -d: -f1 /etc/passwd | head -10
root
daemon
bin
sys
sync
games
man
lp
mail
news
matheus in ~/semb2-workspace
> cat /etc/group | head -10
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,matheus
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
```

Figura 8.1

```
matheus in ~/semb2-workspace
> sudo adduser aluno
Adding user `aluno' ...
Adding new group `aluno' (1001) ...
Adding new user `aluno' (1001) with group `aluno' ...
Creating home directory `/home/aluno' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
No password supplied
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for aluno
Enter the new value, or press ENTER for the default
    Full Name []: Aluno
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] Y
matheus in ~/semb2-workspace took 21.9s
> passwd
Changing password for matheus.
Current password:
passwd: Authentication token manipulation error
passwd: password unchanged
matheus in ~/semb2-workspace took 7.8s
> sudo userdel aluno
matheus in ~/semb2-workspace
> userdel -r aluno
userdel: user 'aluno' does not exist
matheus in ~/semb2-workspace
> sudo groupadd professores
matheus in ~/semb2-workspace
> sudo groupdel professores
```

Figura 8.2

9 Capítulo 9

Esse capítulo nos apresenta comandos usados para redes de computadores. É visto comandos como: **hostname**, **arp**, **ifconfig**, **ping**, **dig**, **traceroute**, **netstat**, **nmap**, **ssh** e **lynx**.

```
matheus in ~/semb2-workspace
> apt install net-tools
E: Could not open lock file /var/lib/dpkg/lock-frontent - open (13: Permission denied)
E: Unable to acquire the dpkg frontend lock (/var/lib/dpkg/lock-frontent), are you root?
matheus in ~/semb2-workspace
> sudo apt install net-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/main amd64 net-tools amd64 1.60+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 2s (128 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 39671 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20180626.aebd88e-1ubuntu1_amd64.deb ...
Unpacking net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
matheus in ~/semb2-workspace took 3.6s
> cat /etc/hosts
# This file was automatically generated by WSL. To stop automatic generation of this file, add
# the following entry to /etc/wsl.conf:
# [network]
# generateHosts = false
127.0.0.1    localhost
127.0.1.1    matheus-g15.    matheus-g15

# The following lines are desirable for IPv6 capable hosts
::1        ip6-localhost ip6-loopback
fe00::0    ip6-localnet
ff00::0    ip6-mcastprefix
ff02::1    ip6-allnodes
ff02::2    ip6-allrouters
matheus in ~/semb2-workspace
> arp -a
matheus-g15.mshome.net (172.24.128.1) at 00:15:5d:76:70:35 [ether] on eth0
```

Figura 9.1

```
matheus in ~/semb2-workspace
> ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.24.128.61 netmask 255.255.240.0 broadcast 172.24.143.255
    inet6 fe80::215:5dff:fe20:e0d4 prefixlen 64 scopeid 0x20<link>
    ether 00:15:5d:20:e0:d4 txqueuelen 1000 (Ethernet)
    RX packets 37949 bytes 48713900 (48.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4539 bytes 306999 (306.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

matheus in ~/semb2-workspace
> ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.24.128.61 netmask 255.255.240.0 broadcast 172.24.143.255
    inet6 fe80::215:5dff:fe20:e0d4 prefixlen 64 scopeid 0x20<link>
    ether 00:15:5d:20:e0:d4 txqueuelen 1000 (Ethernet)
    RX packets 37979 bytes 48723050 (48.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4539 bytes 306999 (306.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

matheus in ~/semb2-workspace
> ifconfig eth0 down
SIOCSIFFLAGS: Operation not permitted
matheus in ~/semb2-workspace
> ifconfig eth0 up
SIOCSIFFLAGS: Operation not permitted
matheus in ~/semb2-workspace
> echo 'precisa estar como sudo'
precisa estar como sudo
```

Figura 9.2

```

matheus in ~/semb2-workspace
> ping www.ufu.br
PING www.ufu.br (200.19.145.55) 56(84) bytes of data.
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=1 ttl=55 time=26.9 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=2 ttl=55 time=27.1 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=3 ttl=55 time=27.2 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=4 ttl=55 time=30.5 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=5 ttl=55 time=26.7 ms
^C
— www.ufu.br ping statistics —
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 26.747/27.674/30.473/1.406 ms
matheus in ~/semb2-workspace took 4.4s
> ping -c 5 www.ufu.br
PING www.ufu.br (200.19.145.55) 56(84) bytes of data.
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=1 ttl=55 time=27.5 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=2 ttl=55 time=26.9 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=3 ttl=55 time=26.7 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=4 ttl=55 time=26.8 ms
64 bytes from bulma.dr.ufu.br (200.19.145.55): icmp_seq=5 ttl=55 time=26.9 ms

— www.ufu.br ping statistics —
5 packets transmitted, 5 received, 0% packet loss, time 4008ms
rtt min/avg/max/mdev = 26.721/26.973/27.535/0.286 ms
matheus in ~/semb2-workspace took 4.1s
> ping -i 5 -c 3 www.google.com
PING www.google.com (172.217.28.4) 56(84) bytes of data.
64 bytes from gru14s08-in-f4.1e100.net (172.217.28.4): icmp_seq=1 ttl=115 time=11.8 ms
64 bytes from gru14s08-in-f4.1e100.net (172.217.28.4): icmp_seq=2 ttl=115 time=12.0 ms
64 bytes from gru14s08-in-f4.1e100.net (172.217.28.4): icmp_seq=3 ttl=115 time=12.3 ms

— www.google.com ping statistics —
3 packets transmitted, 3 received, 0% packet loss, time 10011ms
rtt min/avg/max/mdev = 11.753/12.016/12.332/0.239 ms
matheus in ~/semb2-workspace took 10.1s
> host www.google.com
www.google.com has address 172.217.28.4
www.google.com has IPv6 address 2800:3f0:4001:810::2004

```

Figura 9.3

```
matheus in ~/semb2-workspace
> dig www.google.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 46503
;; flags: qr rd ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;www.google.com.                IN      A

;; ANSWER SECTION:
www.google.com.                 0       IN      A      172.217.28.4

;; Query time: 0 msec
;; SERVER: 172.24.128.1#53(172.24.128.1)
;; WHEN: Sun Oct 09 18:10:09 -03 2022
;; MSG SIZE rcvd: 62

matheus in ~/semb2-workspace
> nslookup www.google.com
Server:      172.24.128.1
Address:     172.24.128.1#53

Non-authoritative answer:
Name:   www.google.com
Address: 172.217.28.4
Name:   www.google.com
Address: 2800:3f0:4001:810::2004
```

Figura 9.4


```

matheus in ~/semb2-workspace
> traceroute www.google.com
traceroute to www.google.com (172.217.28.4), 30 hops max, 60 byte packets
 1 matheus-g15.mshome.net (172.24.128.1) 0.161 ms 0.152 ms 0.148 ms
 2 192.168.1.1 (192.168.1.1) 2.952 ms 3.160 ms 2.515 ms
 3 loopback0.bng-a-mx480.ula003.ctbc.com.br (200.225.196.88) 5.824 ms 5.821 ms 5.555 ms
 4 et-14-0-1-0.ptx-b.ula001.algartelem.com.br (168.197.22.98) 12.226 ms 13.234 ms 15.223
s
 5 100.127.6.98 (100.127.6.98) 15.174 ms 13.191 ms 13.416 ms
 6 et-4-0-0-0.core-a.fac001.algartelem.com.br (168.197.21.97) 14.609 ms 15.835 ms 16.897
s
 7 72.14.197.232 (72.14.197.232) 14.865 ms 13.100 ms 11.870 ms
 8 74.125.243.65 (74.125.243.65) 16.877 ms * 74.125.243.1 (74.125.243.1) 17.166 ms
 9 142.251.76.106 (142.251.76.106) 13.268 ms 216.239.46.226 (216.239.46.226) 13.511 ms 216.2
9.50.111 (216.239.50.111) 13.550 ms
10 gru14s08-in-f4.1e100.net (172.217.28.4) 12.393 ms 14.225 ms 13.233 ms
matheus in ~/semb2-workspace took 8.3s
> tracepath www.ufu.br
1?: [LOCALHOST] pmtu 1500
 1: matheus-g15.mshome.net 0.214ms
 1: matheus-g15.mshome.net 0.185ms
 2: 192.168.1.1 0.888ms
 3: 192.168.1.1 0.707ms pmtu 1492
 3: loopback0.bng-a-mx480.ula003.ctbc.com.br 6.659ms
 4: et-14-0-1-0.ptx-b.ula001.algartelem.com.br 12.921ms asymm 9
 5: 100.127.6.98 12.835ms asymm 8
 6: et-4-0-0-0.core-a.fac001.algartelem.com.br 16.520ms asymm 4
 7: as1916.sp.ix.equinix.net 13.717ms asymm 6
 8: csp2-mxsp2.bkb.rnp.br 15.692ms asymm 6
 9: 170.79.213.152 17.420ms asymm 6
10: mxmg-cmg1.bkb.rnp.br 17.447ms asymm 5
11: lanmg-mg.bkb.rnp.br 16.651ms asymm 6
12: ptp-almeirao-couve.pop-mg.rnp.br 17.004ms asymm 7
13: ptp-tropeiro-almeirao.pop-mg.rnp.br 16.707ms asymm 8

```

Figura 9.5

```
matheus in ~/semb2-workspace
> netstat -s
Ip:
    Forwarding: 2
    10225 total packets received
    0 forwarded
    0 incoming packets discarded
    10031 incoming packets delivered
    4716 requests sent out
Icmp:
    69 ICMP messages received
    0 input ICMP message failed
    ICMP input histogram:
        destination unreachable: 11
        timeout in transit: 40
        echo replies: 18
    61 ICMP messages sent
    0 ICMP messages failed
    ICMP output histogram:
        destination unreachable: 31
        echo requests: 30
IcmpMsg:
    InType0: 18
    InType3: 11
    InType11: 40
    OutType3: 31
    OutType8: 30
Tcp:
    4 active connection openings
    0 passive connection openings
    0 failed connection attempts
    0 connection resets received
    0 connections established
    7069 segments received
    4513 segments sent out
    4 segments retransmitted
    0 bad segments received
    0 resets sent
Udp:
    66 packets received
    36 packets to unknown port received
    0 packet receive errors
    138 packets sent
    0 receive buffer errors
    0 send buffer errors
    IgnoredMulti: 2791
UdpLite:
TcpExt:
```

Figura 9.6

```

matheus in ~/semb2-workspace took 32.0s
> netstat -i
Kernel Interface table
Iface    MTU     RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0     1500    42903 0      0 0      6944  0      0      0 BMRU
lo       65536   6      0      0 0      6      0      0      0 LRU
matheus in ~/semb2-workspace
> netstat -rn
Kernel IP routing table
Destination Gateway      Genmask      Flags   MSS Window  irtt Iface
0.0.0.0     172.24.128.1 0.0.0.0      UG        0 0        0 eth0
172.24.128.0 0.0.0.0      255.255.240.0 U         0 0        0 eth0
matheus in ~/semb2-workspace
> nmap www.ufu.br
Starting Nmap 7.80 ( https://nmap.org ) at 2022-10-09 18:14 -03
Nmap scan report for www.ufu.br (200.19.145.55)
Host is up (0.037s latency).
rDNS record for 200.19.145.55: bulma.dr.ufu.br
Not shown: 996 filtered ports
PORT      STATE SERVICE
80/tcp    open  http
113/tcp   closed ident
443/tcp   open  https
8008/tcp  open  http
Nmap done: 1 IP address (1 host up) scanned in 4.77 seconds

```

Figura 9.7

```

matheus in ~/semb2-workspace
> nmap -v localhost
Starting Nmap 7.80 ( https://nmap.org ) at 2022-10-09 18:15 -03
Initiating Ping Scan at 18:15
Scanning localhost (127.0.0.1) [2 ports]
Completed Ping Scan at 18:15, 0.00s elapsed (1 total hosts)
Initiating Connect Scan at 18:15
Scanning localhost (127.0.0.1) [1000 ports]
Completed Connect Scan at 18:15, 0.01s elapsed (1000 total ports)
Nmap scan report for localhost (127.0.0.1)
Host is up (0.000027s latency).
All 1000 scanned ports on localhost (127.0.0.1) are closed

Read data files from: /usr/bin/./share/nmap
Nmap done: 1 IP address (1 host up) scanned in 0.03 seconds
matheus in ~/semb2-workspace
> route
Kernel IP routing table
Destination Gateway      Genmask      Flags Metric Ref    Use Iface
default    matheus-g15.msh 0.0.0.0      UG        0      0        0 eth0
172.24.128.0 0.0.0.0      255.255.240.0 U         0      0        0 eth0
matheus in ~/semb2-workspace
> telnet www.ufu.br 80
Trying 200.19.145.55 ...
Connected to www.ufu.br.
Escape character is '^]'.

```

Figura 9.8

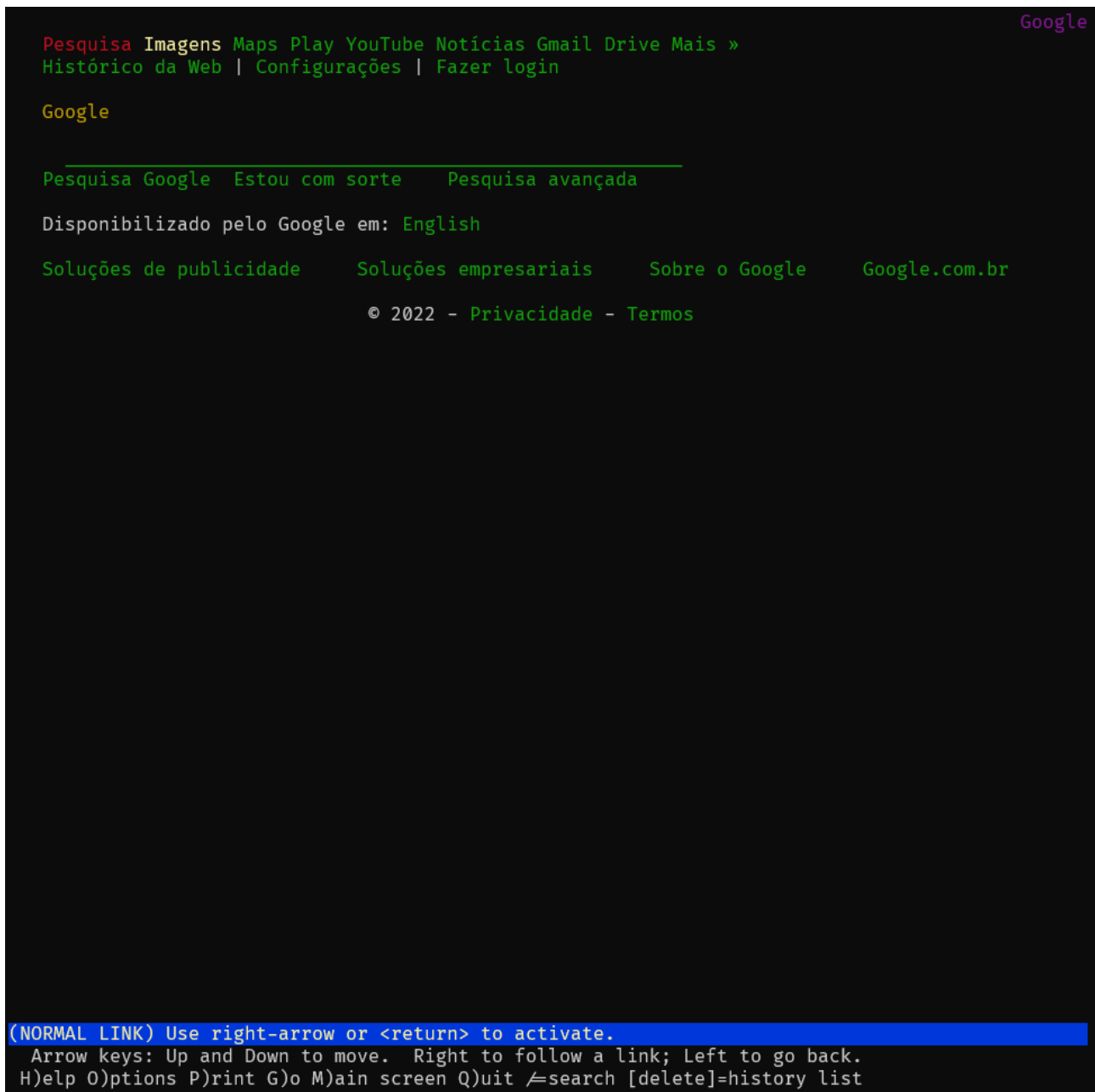


Figura 9.9

```
matheus in ~/semb2-workspace
> lynx www.google.com
matheus in ~/semb2-workspace took 49.7s
> wget www.vivas.eng.br
--2022-10-09 18:19:58-- http://www.vivas.eng.br/
Resolving www.vivas.eng.br (www.vivas.eng.br)... 92.242.140.6
Connecting to www.vivas.eng.br (www.vivas.eng.br)|92.242.140.6|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'index.html'

index.html          [  =>  ]      890  --.-KB/s   in 0s

2022-10-09 18:19:59 (189 MB/s) - 'index.html' saved [890]

matheus in ~/semb2-workspace
> ls
arquivo.txt  estados.txt  index.html  lista.txt  listautf8.txt  teste  teste.c  teste.o  teste1
```

Figura 9.10

10 Capítulo 10

Esse capítulo apresenta comandos básicos para gerenciamento de pacotes em sistemas baseados em Debian.

```
matheus in ~/semb2-workspace
> sudo apt update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1752 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [293 kB]
> sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following packages will be upgraded:
  isc-dhcp-client isc-dhcp-common ubuntu-advantage-tools zlib1g
4 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
2 standard security updates
Need to get 506 kB of archives.
After this operation, 112 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 zlib1g amd64 1:1.2.11.dfsg-2ubuntu1.4 [53.9 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 isc-dhcp-client amd64 4.4.1-2.1ubuntu5.20.04.4 [247 kB]
Get:3 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 isc-dhcp-common amd64 4.4.1-2.1ubuntu5.20.04.4 [45.0 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 ubuntu-advantage-tools amd64 27.11.2~20.04.1 [160 kB]
Fetched 506 kB in 2s (294 kB/s)
Preconfiguring packages ...
(Reading database ... 40741 files and directories currently installed.)
Preparing to unpack .../zlib1g_1%3a1.2.11.dfsg-2ubuntu1.4_amd64.deb ...
Unpacking zlib1g:amd64 (1:1.2.11.dfsg-2ubuntu1.4) over (1:1.2.11.dfsg-2ubuntu1.3) ...
Setting up zlib1g:amd64 (1:1.2.11.dfsg-2ubuntu1.4) ...
(Reading database ... 40741 files and directories currently installed.)
Preparing to unpack .../isc-dhcp-client_4.4.1-2.1ubuntu5.20.04.4_amd64.deb ...
Unpacking isc-dhcp-client (4.4.1-2.1ubuntu5.20.04.4) over (4.4.1-2.1ubuntu5.20.04.3) ...
Preparing to unpack .../isc-dhcp-common_4.4.1-2.1ubuntu5.20.04.4_amd64.deb ...
Unpacking isc-dhcp-common (4.4.1-2.1ubuntu5.20.04.4) over (4.4.1-2.1ubuntu5.20.04.3) ...
Preparing to unpack .../ubuntu-advantage-tools_27.11.2~20.04.1_amd64.deb ...
Unpacking ubuntu-advantage-tools (27.11.2~20.04.1) over (27.10.1~20.04.1) ...
Setting up isc-dhcp-client (4.4.1-2.1ubuntu5.20.04.4) ...
Setting up isc-dhcp-common (4.4.1-2.1ubuntu5.20.04.4) ...
Setting up ubuntu-advantage-tools (27.11.2~20.04.1) ...
Installing new version of config file /etc/ubuntu-advantage/help_data.yaml ...
Installing new version of config file /etc/ubuntu-advantage/uaclient.conf ...
```

Figura 10.1

```

matheus in ~/semb2-workspace
> sudo apt install vim
Reading package lists... Done
Building dependency tree
Reading state information... Done
vim is already the newest version (2:8.1.2269-1ubuntu5.9).
vim set to manually installed.
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
matheus in ~/semb2-workspace
> sudo apt remove vim
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  alsa-topology-conf alsa-ucm-conf libasound2 libasound2-data libcanberra0 libfwupdplugin1
  libltdl7 libpython3.8 libtdb1 libvorbisfile3 sound-theme-freedesktop vim-runtime
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  ubuntu-server vim
0 upgraded, 0 newly installed, 2 to remove and 0 not upgraded.
After this operation, 3164 kB disk space will be freed.
Do you want to continue? [Y/n] Y
(Reading database ... 40783 files and directories currently installed.)
Removing ubuntu-server (1.450.2) ...
Removing vim (2:8.1.2269-1ubuntu5.9) ...
update-alternatives: using /usr/bin/vim.tiny to provide /usr/bin/vi (vi) in auto mode
update-alternatives: using /usr/bin/vim.tiny to provide /usr/bin/view (view) in auto mode
update-alternatives: using /usr/bin/vim.tiny to provide /usr/bin/ex (ex) in auto mode
update-alternatives: using /usr/bin/vim.tiny to provide /usr/bin/rview (rview) in auto mode

```

Figura 10.2

11 Capítulo 14

Por último, vimos nesse capítulo comandos para obter informações de softwares e hardwares, tais como: **lscpu**, **lsusb**, **lsblk**, **fdisk**, **free**, **vmstat**, **htop** e **hwinfo**.

```
matheus in ~/semb2-workspace
> uname -a
Linux matheus-g15 5.15.57.1-microsoft-standard-WSL2 #1 SMP Wed Jul 27 02:20:31 UTC 2022 x86_64 x
86_64 x86_64 GNU/Linux
matheus in ~/semb2-workspace
> uname -s
Linux
matheus in ~/semb2-workspace
> uname -n
matheus-g15
matheus in ~/semb2-workspace
> uname -r
5.15.57.1-microsoft-standard-WSL2
matheus in ~/semb2-workspace
> uname -v
#1 SMP Wed Jul 27 02:20:31 UTC 2022
matheus in ~/semb2-workspace
> head -n1 /etc/issue
Ubuntu 20.04.5 LTS \n \l
matheus in ~/semb2-workspace
> lscpu
Architecture:                x86_64
CPU op-mode(s):              32-bit, 64-bit
Byte Order:                  Little Endian
Address sizes:               39 bits physical, 48 bits virtual
CPU(s):                      12
On-line CPU(s) list:        0-11
Thread(s) per core:         2
Core(s) per socket:         6
Socket(s):                   1
Vendor ID:                   GenuineIntel
CPU family:                  6
Model:                       165
Model name:                  Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
Stepping:                    2
CPU MHz:                     2496.007
BogoMIPS:                    4992.01
Virtualization:              VT-x
Hypervisor vendor:           Microsoft
Virtualization type:         full
L1d cache:                   192 KiB
L1i cache:                   192 KiB
L2 cache:                    1.5 MiB
L3 cache:                    12 MiB
Vulnerability Itlb multihit: KVM: Mitigation: VMX disabled
Vulnerability L1tf:          Not affected
Vulnerability Mds:           Not affected
Vulnerability Meltdown:      Not affected
```

Figura 11.1


```

matheus in ~/semb2-workspace
> grep "model name" /proc/cpuinfo
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
model name      : Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz
matheus in ~/semb2-workspace
> lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
matheus in ~/semb2-workspace
> lspci
1c69:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio console (rev 01)
369b:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio filesystem (rev 01)
5593:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio filesystem (rev 01)
5a0d:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio filesystem (rev 01)
9d6d:00:00.0 3D controller: Microsoft Corporation Device 008e
c5ec:00:00.0 System peripheral: Red Hat, Inc. Device 105a (rev 01)
c8c5:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio filesystem (rev 01)
cb7d:00:00.0 3D controller: Microsoft Corporation Device 008e
f01d:00:00.0 SCSI storage controller: Red Hat, Inc. Virtio filesystem (rev 01)
matheus in ~/semb2-workspace
> lsblk
NAME MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda   8:0    0 366.8M  1 disk
sdb   8:16   0    2G    0 disk [SWAP]
sdc   8:32   0   256G   0 disk /mnt/wslg/distro
matheus in ~/semb2-workspace
> cat /proc/partitions
major minor #blocks name
1         0      65536 ram0
1         1      65536 ram1
1         2      65536 ram2
1         3      65536 ram3
1         4      65536 ram4
1         5      65536 ram5
1         6      65536 ram6
1         7      65536 ram7
1         8      65536 ram8

```

Figura 11.2

```
matheus in ~/semb2-workspace
> sudo fdisk -l
Disk /dev/ram0: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram1: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram2: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram3: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram4: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram5: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram6: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/ram7: 64 MiB, 67108864 bytes, 131072 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
```

Figura 11.3

```

matheus in ~/semb2-workspace
> free
              total        used        free      shared  buff/cache   available
Mem:           8019260       363480       6855392        2492       800388       7407944
Swap:          2097152           0       2097152
matheus in ~/semb2-workspace
> free -m
              total        used        free      shared  buff/cache   available
Mem:             7831         351         6697           2           781           7237
Swap:             2048           0         2048
matheus in ~/semb2-workspace
> cat /proc/meminfo
MemTotal:        8019260 kB
MemFree:         6860340 kB
MemAvailable:    7412940 kB
Buffers:         35196 kB
Cached:          706316 kB
SwapCached:      0 kB
Active:          235916 kB
Inactive:        574124 kB
Active(anon):    1800 kB
Inactive(anon):  69228 kB
Active(file):    234116 kB
Inactive(file):  504896 kB
Unevictable:     0 kB
Mlocked:         0 kB
SwapTotal:       2097152 kB
SwapFree:        2097152 kB
Dirty:           32 kB
Writeback:       0 kB
AnonPages:       67864 kB
Mapped:          62416 kB
Shmem:           2492 kB
KReclaimable:    58892 kB
Slab:            110604 kB
SReclaimable:    58892 kB
SUnreclaim:     51712 kB
KernelStack:     3284 kB
PageTables:      1416 kB
NFS_Unstable:    0 kB
Bounce:          0 kB
WritebackTmp:    0 kB
CommitLimit:    6106780 kB
Committed_AS:    394156 kB
VmallocTotal:    34359738367 kB
VmallocUsed:     24108 kB
VmallocChunk:    0 kB
Percpu:          4352 kB

```

Figura 11.4

```

matheus in ~/semb2-workspace
> vmstat -s
 8019260 K total memory
 361536 K used memory
 235932 K active memory
 574012 K inactive memory
6857296 K free memory
 35212 K buffer memory
 765216 K swap cache
2097152 K total swap
   0 K used swap
2097152 K free swap
 3993 non-nice user cpu ticks
17957 nice user cpu ticks
 3912 system cpu ticks
5074795 idle cpu ticks
 236 IO-wait cpu ticks
   0 IRQ cpu ticks
 677 softirq cpu ticks
   0 stolen cpu ticks
379494 pages paged in
986964 pages paged out
   0 pages swapped in
   0 pages swapped out
598132 interrupts
1826539 CPU context switches
1665347197 boot time
 26915 forks
matheus in ~/semb2-workspace
> lsmem
RANGE                                SIZE  STATE REMOVABLE BLOCK
0x0000000000000000-0x00000000f7ffffff 3.9G online      yes  0-30
0x00000000100000000-0x00000000207ffffff 4.1G online      yes 32-64

Memory block size:      128M
Total online memory:    8G
Total offline memory:   0B

```

Figura 11.5

```

matheus in ~/semb2-workspace
> hwinfo --short
cpu:
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz
    Intel(R) Core(TM) i5-10500H CPU @ 2.50GHz, 2496 MHz

keyboard:
    /dev/hvc0          serial console

graphics card:
    Microsoft 3D controller
    Microsoft 3D controller

storage:
    Floppy disk controller
    Red Hat Virtio console
    Red Hat Virtio filesystem
    Red Hat Virtio filesystem
    Red Hat Virtio filesystem
    Red Hat Virtio filesystem
    Red Hat Virtio filesystem
    Virtual Storage 0

network:
    eth0              Virtual Ethernet Card 0
network interface:
    sit0              Network Interface
    dummy0            Ethernet network interface
    eth0              Ethernet network interface
    bond0             Ethernet network interface
    tunl0             Network Interface
    lo                Loopback network interface

disk:
    /dev/ram2          Disk
    /dev/ram0          Disk
    /dev/sdb           Msft Virtual Disk
    /dev/ram9          Disk
    /dev/ram14         Disk
    /dev/ram7          Disk
    /dev/ram12         Disk
    /dev/ram5          Disk

```

Figura 11.6