

# 20HT – 1DV512 – Operating Systems Group

## Assignment 1



# FreeBSD

i

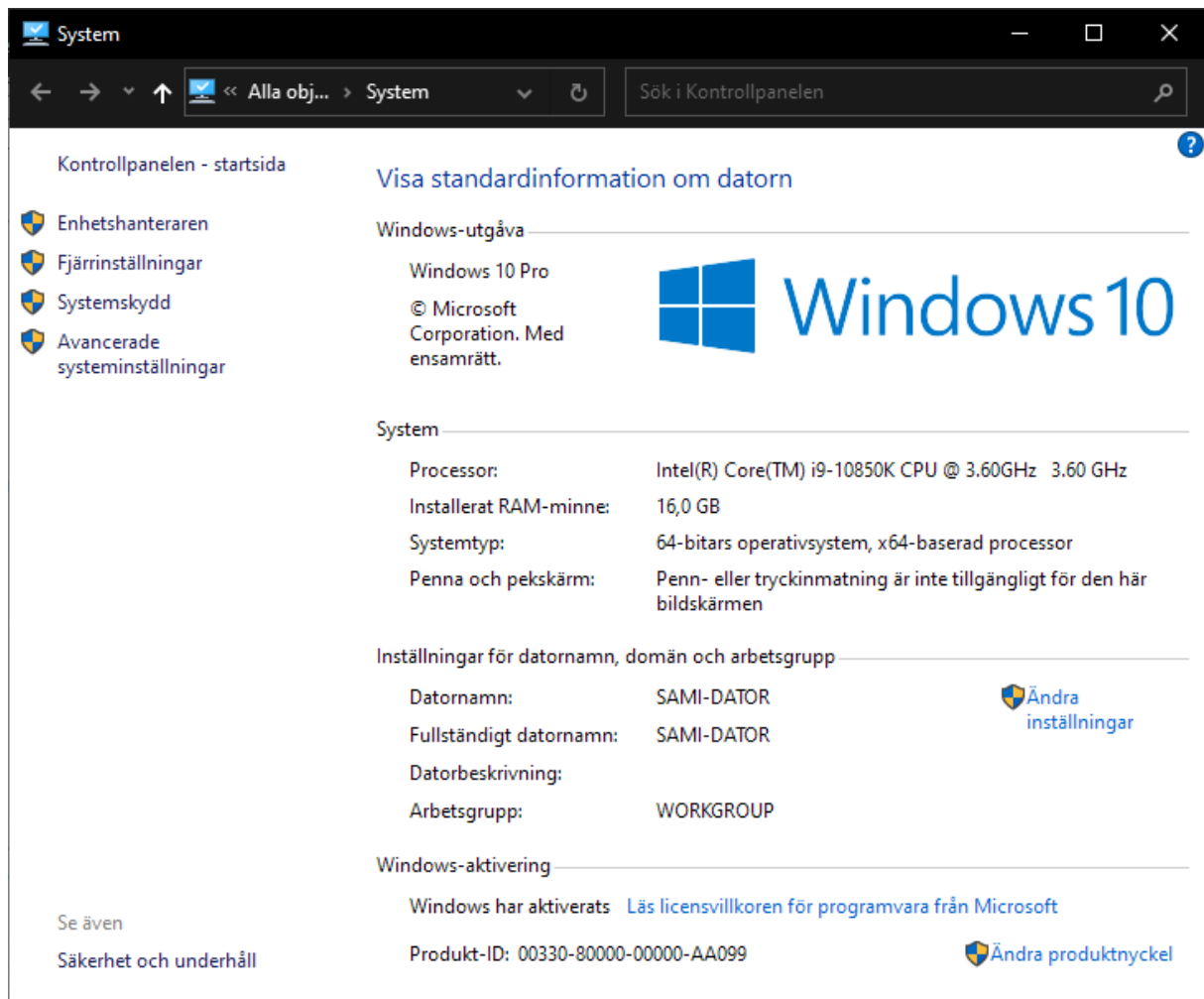
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Assignment date: 2020-12-06

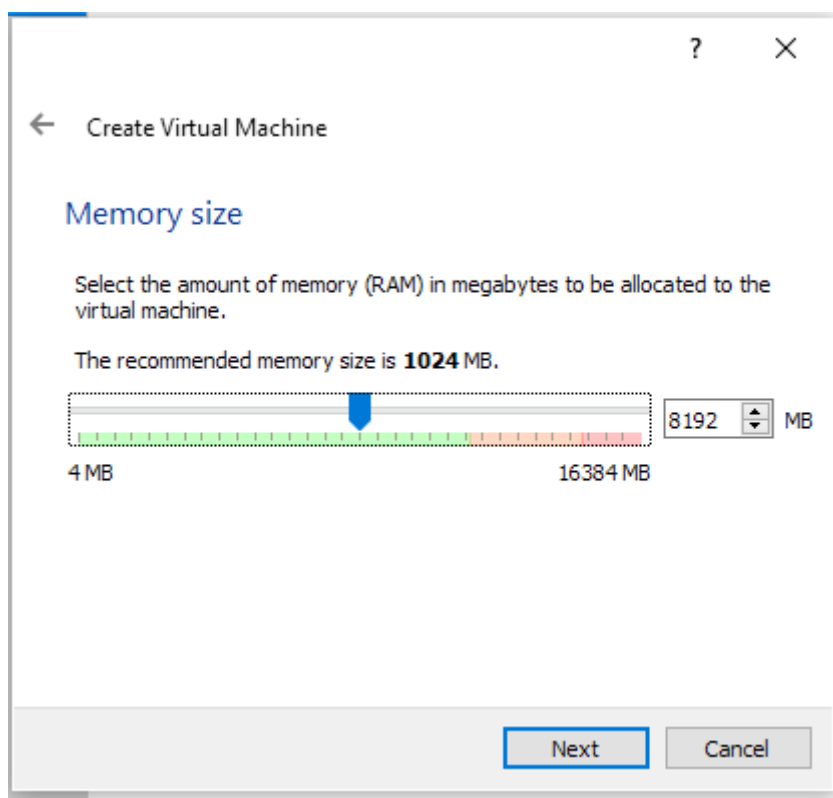
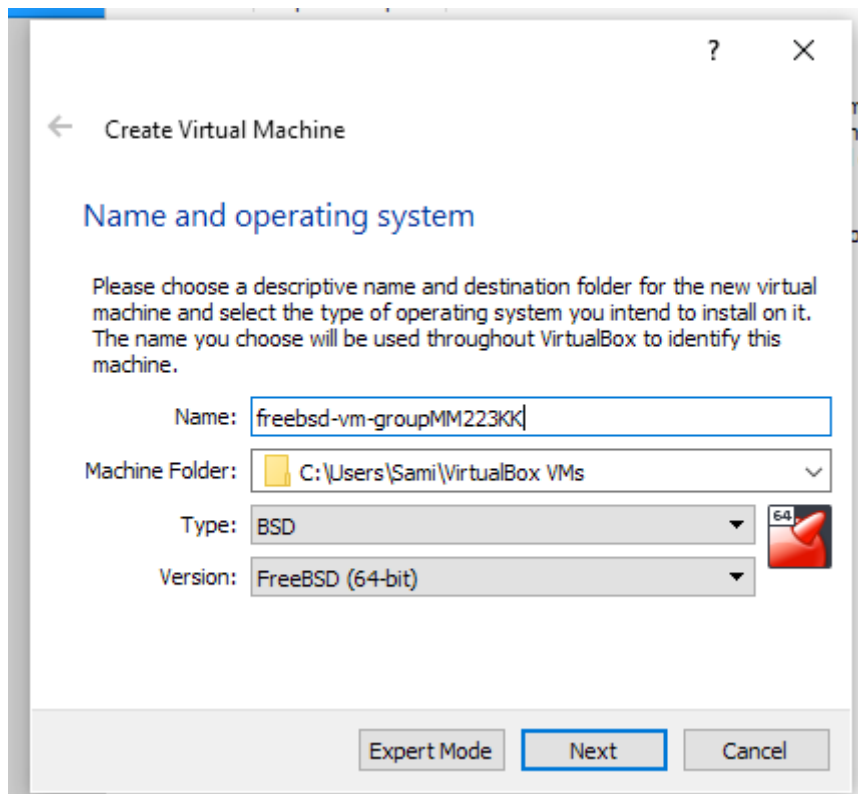
Hand in date: 2021-06-18

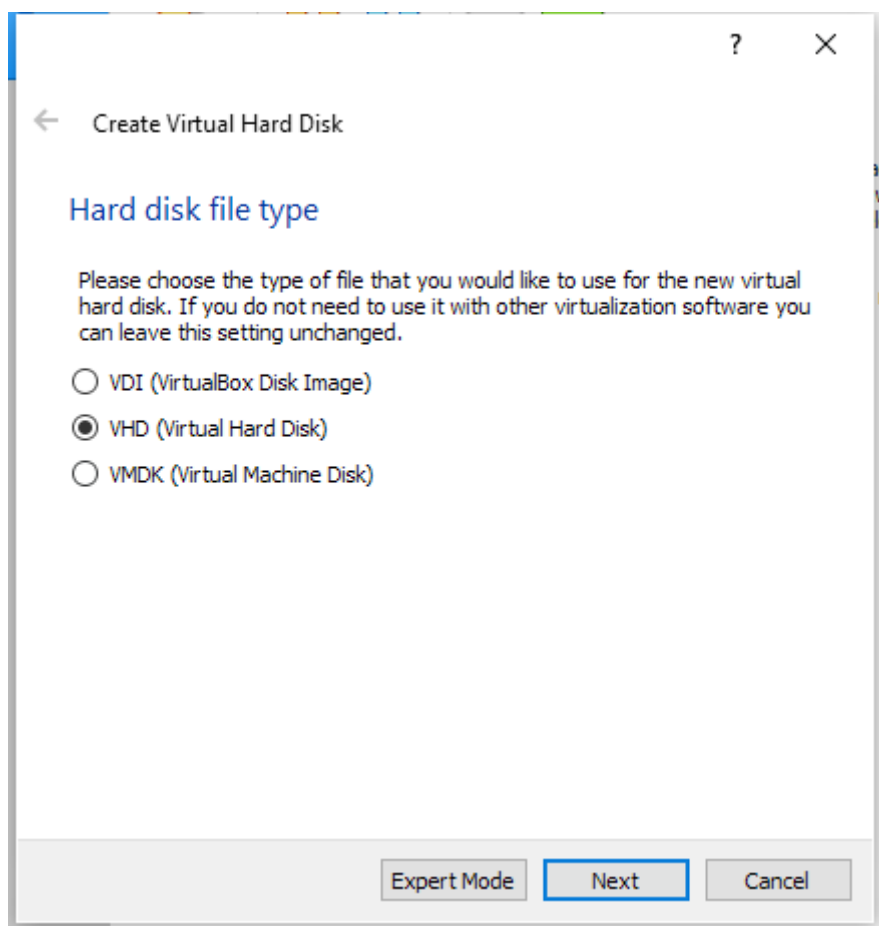
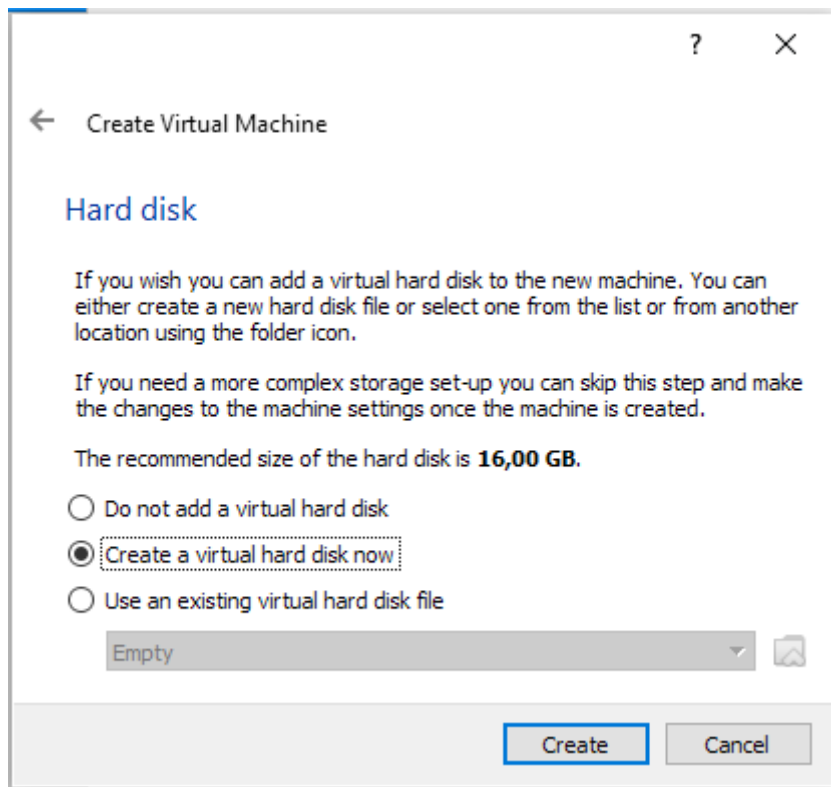
## Task 1:



I choose to use VirtualBox for the FreeBSD VM. This was the simplest to install on my machine. Here is the information about the host that the VM will run on. Intel Core i9-10850k CPU @ 3.60 GHZ. 10 cores, 20 threads. Windows 10 Pro 64-bit.

## Task 2:





← Create Virtual Hard Disk

## Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

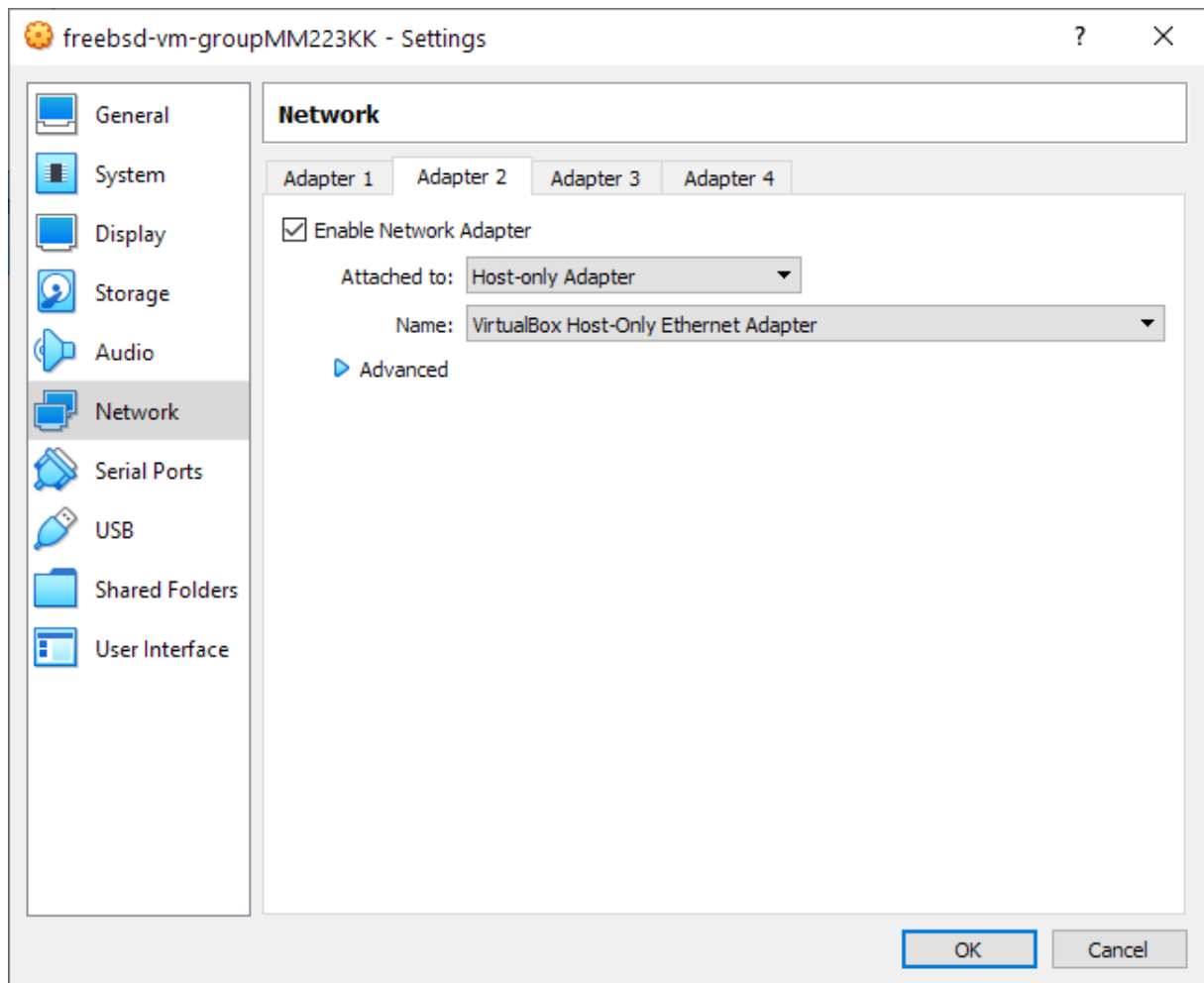
A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

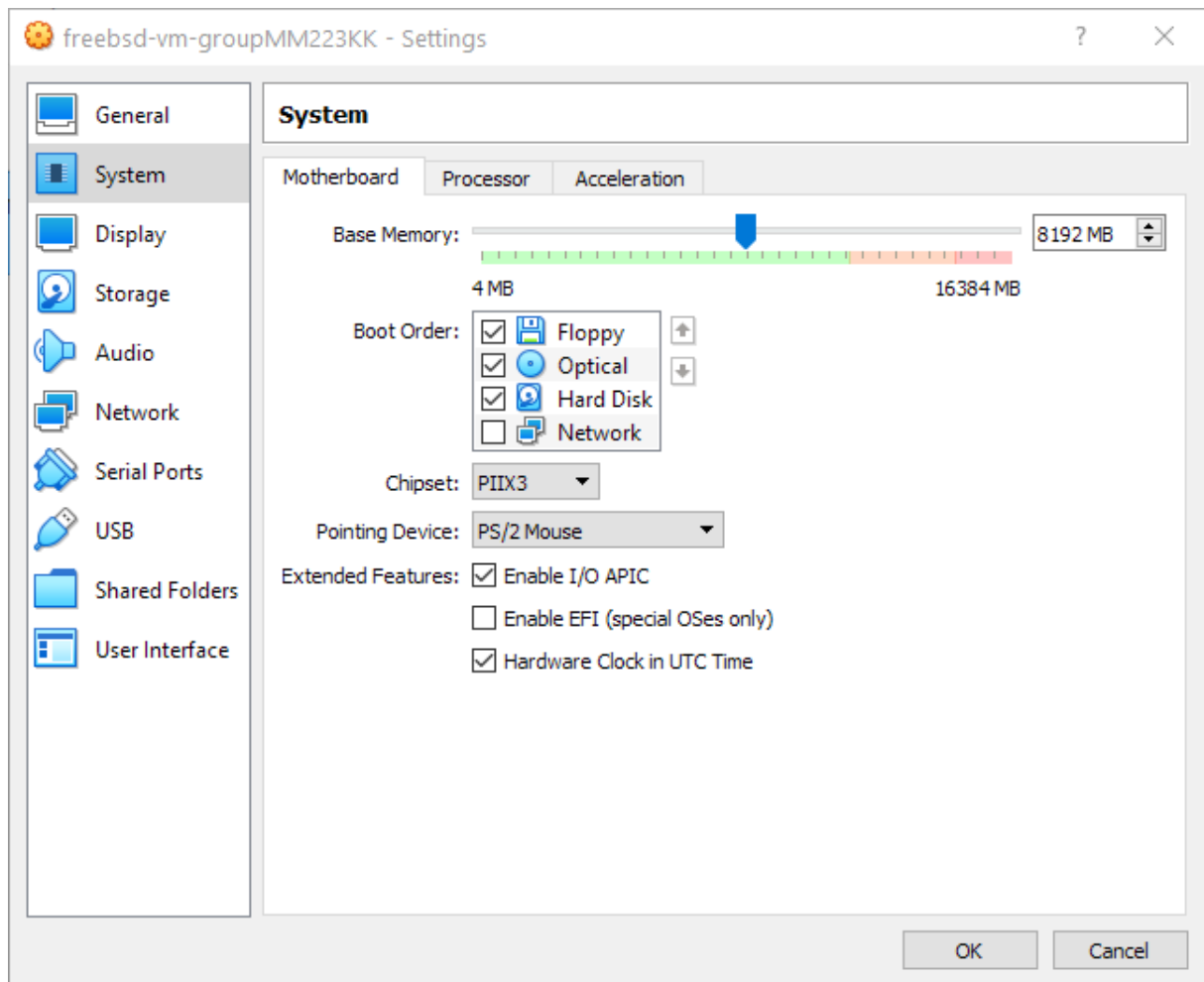
A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

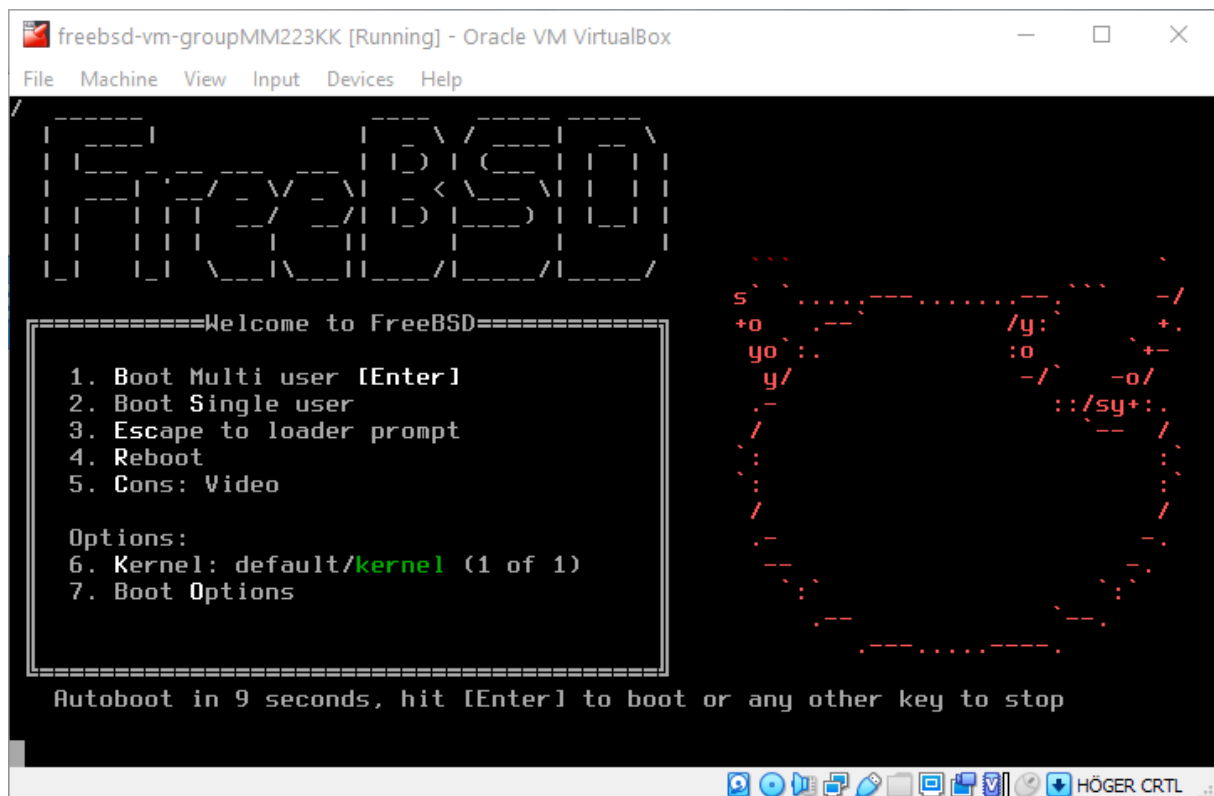
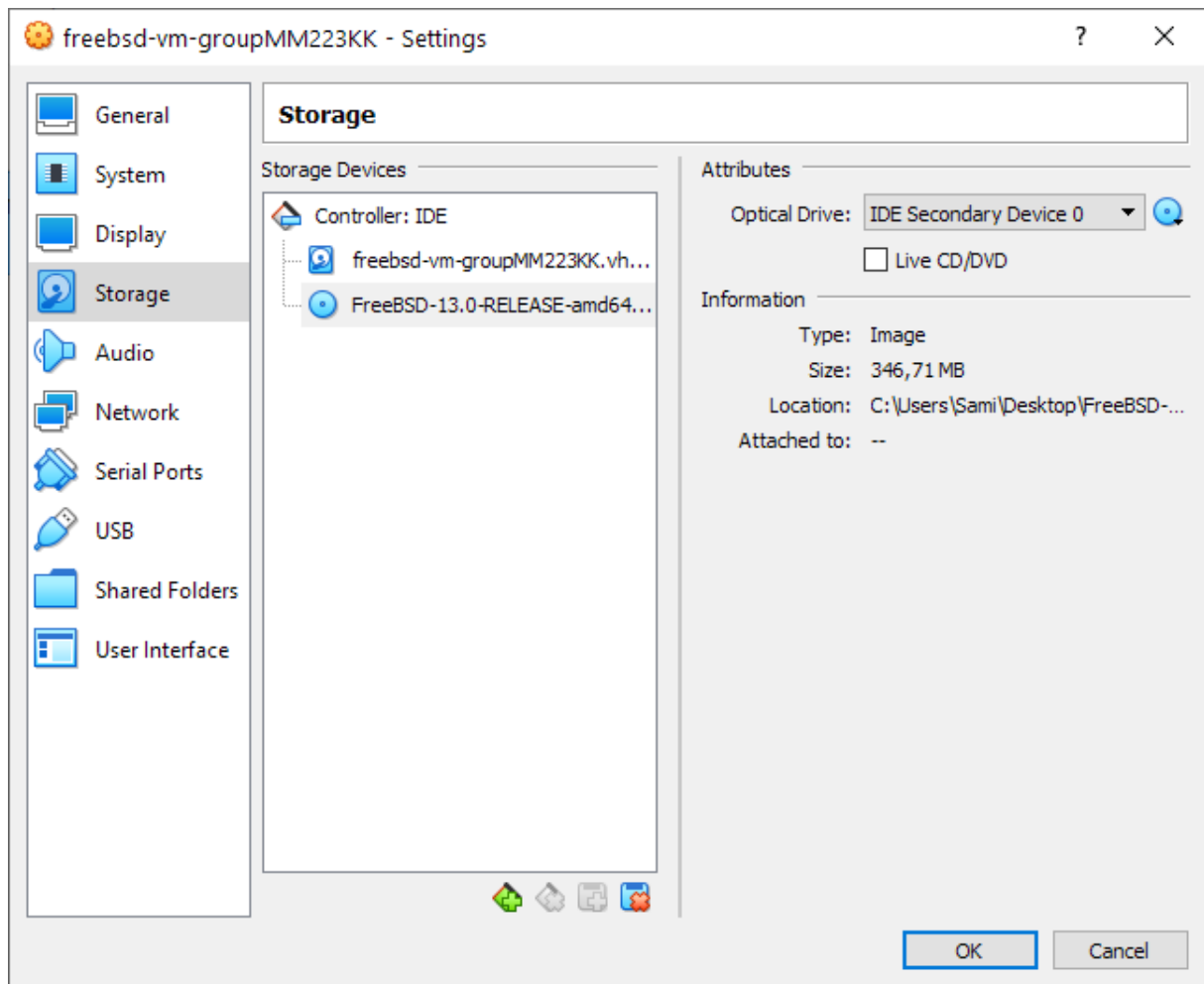
- ☒ Dynamically allocated  
☐ Fixed size

Next

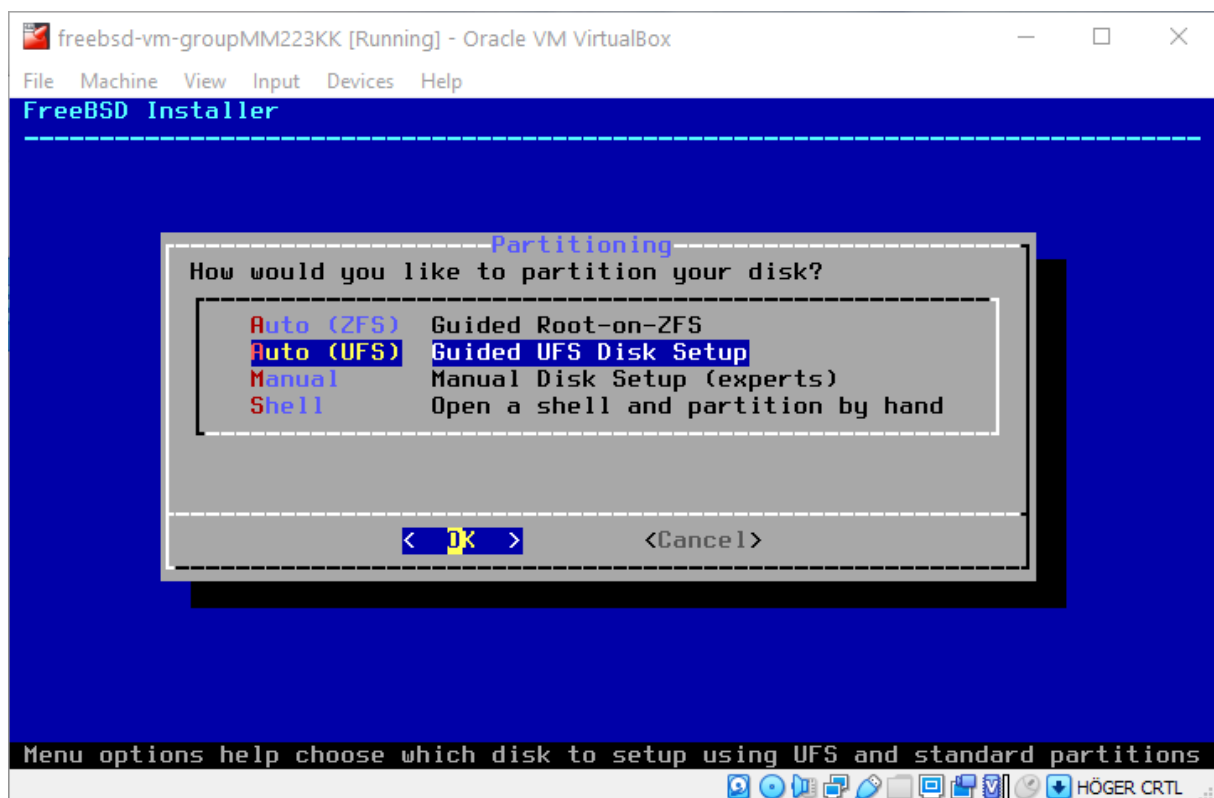
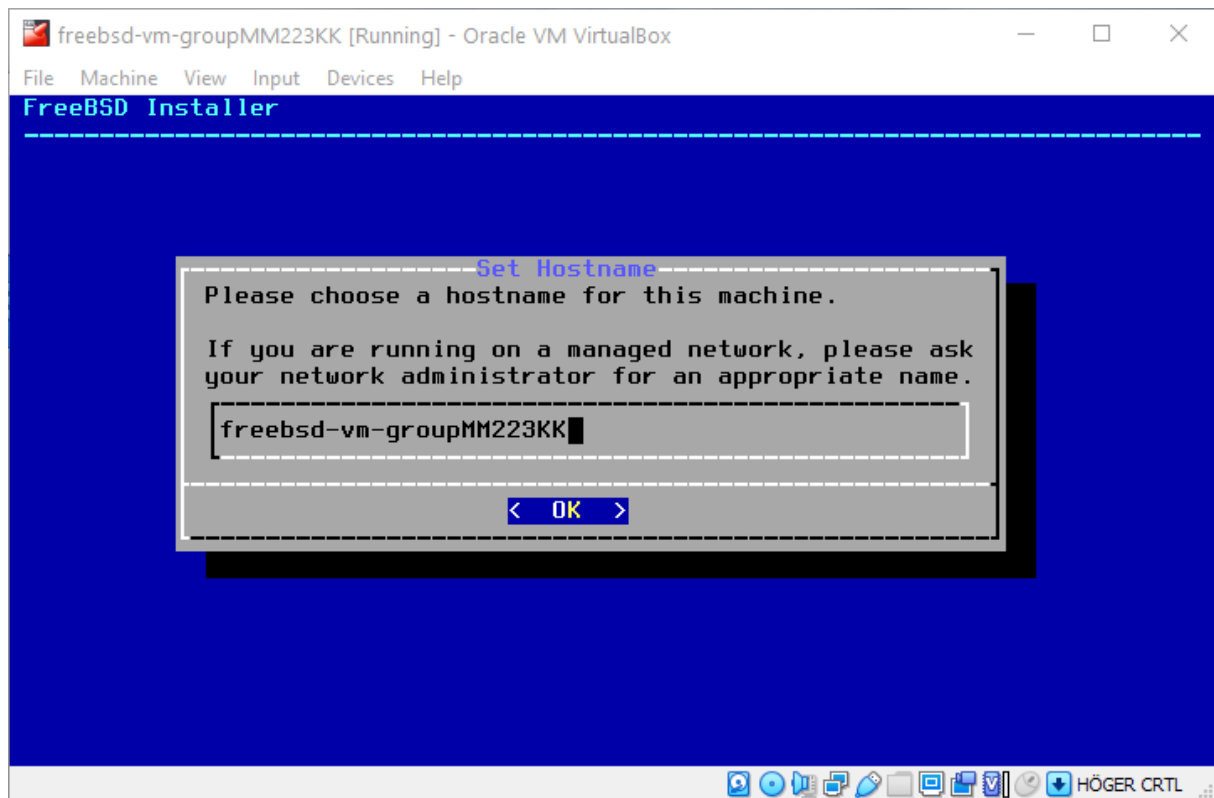
Cancel

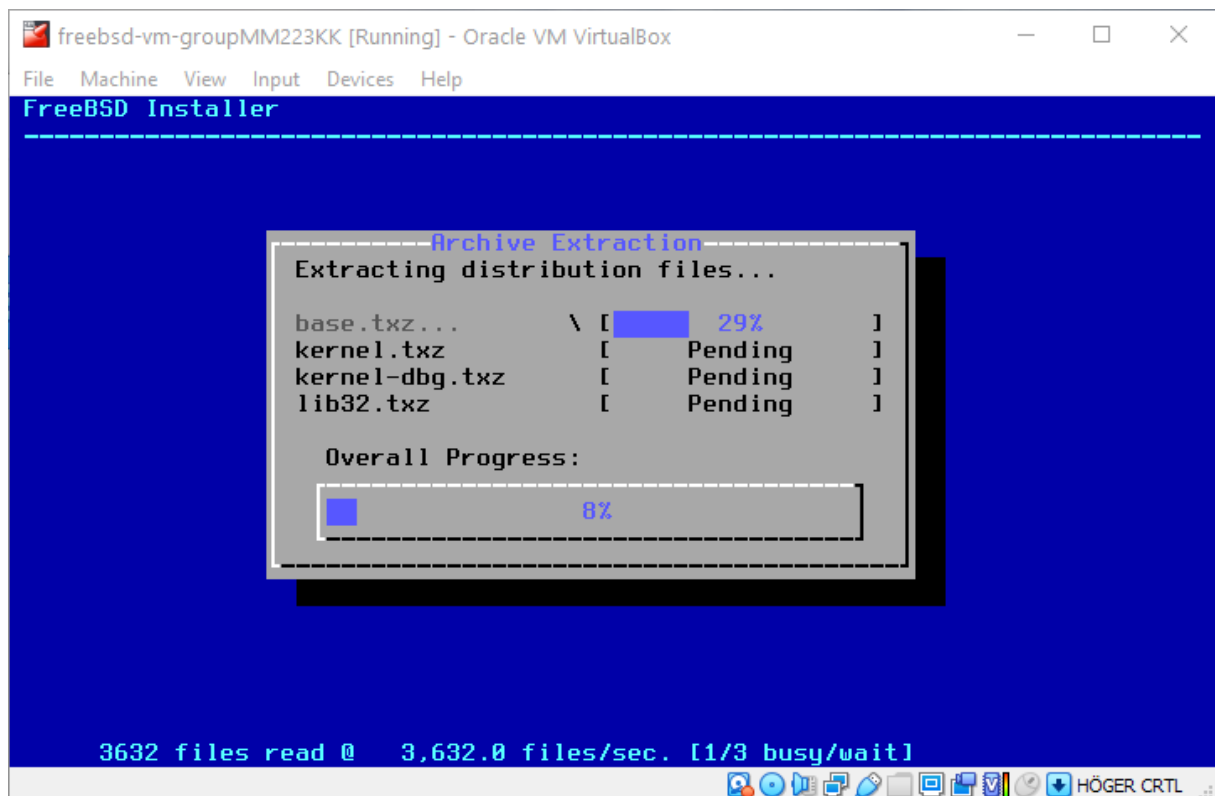
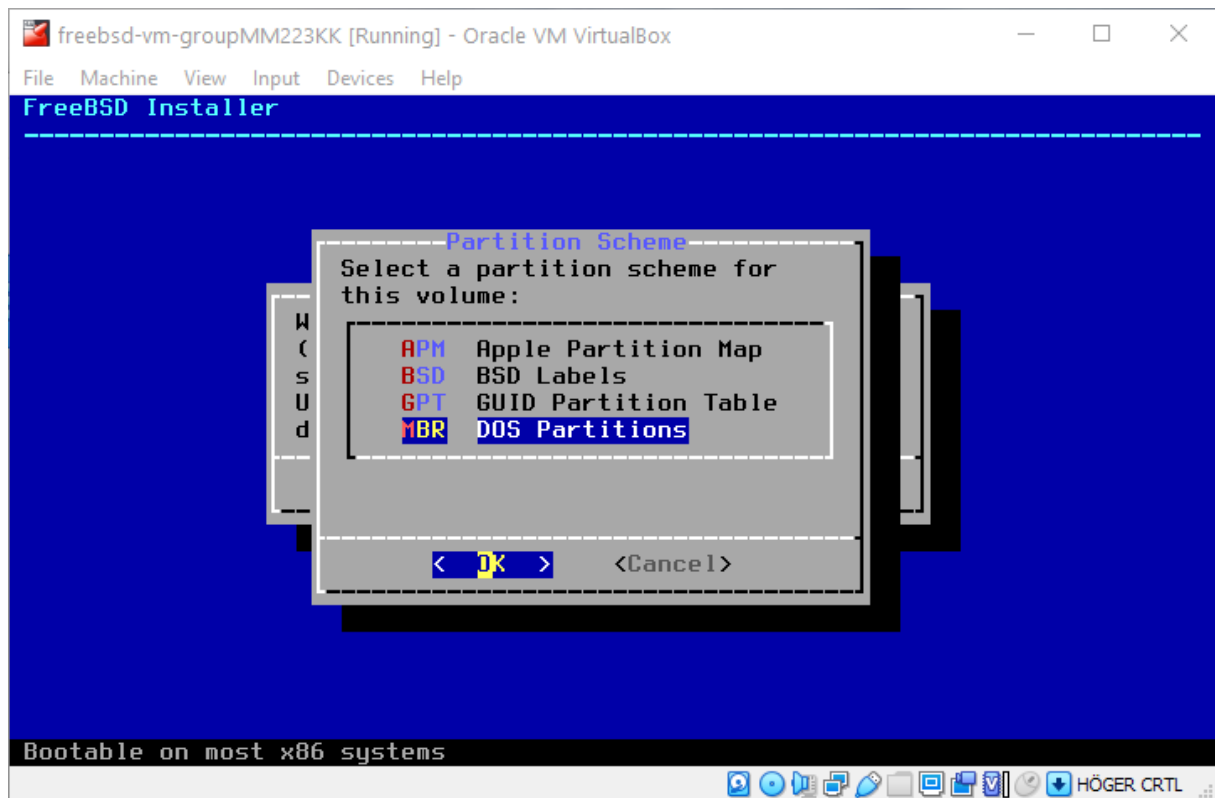


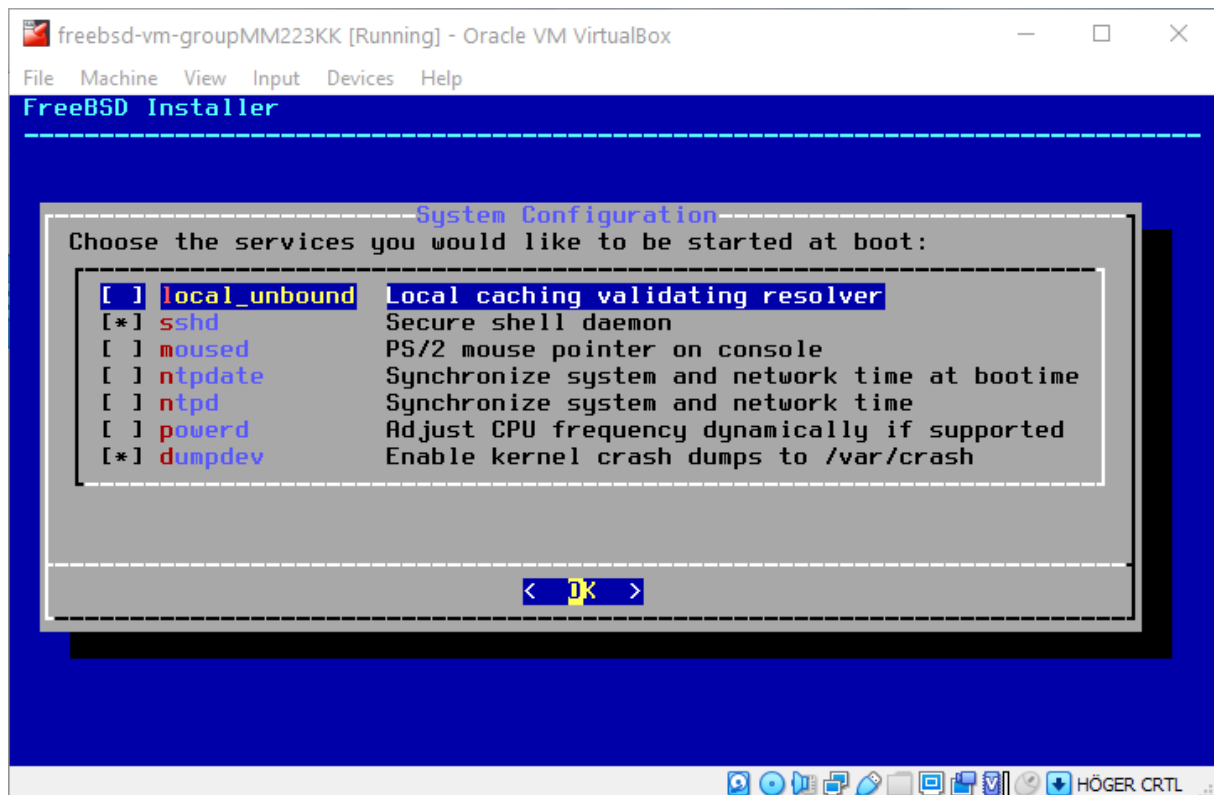
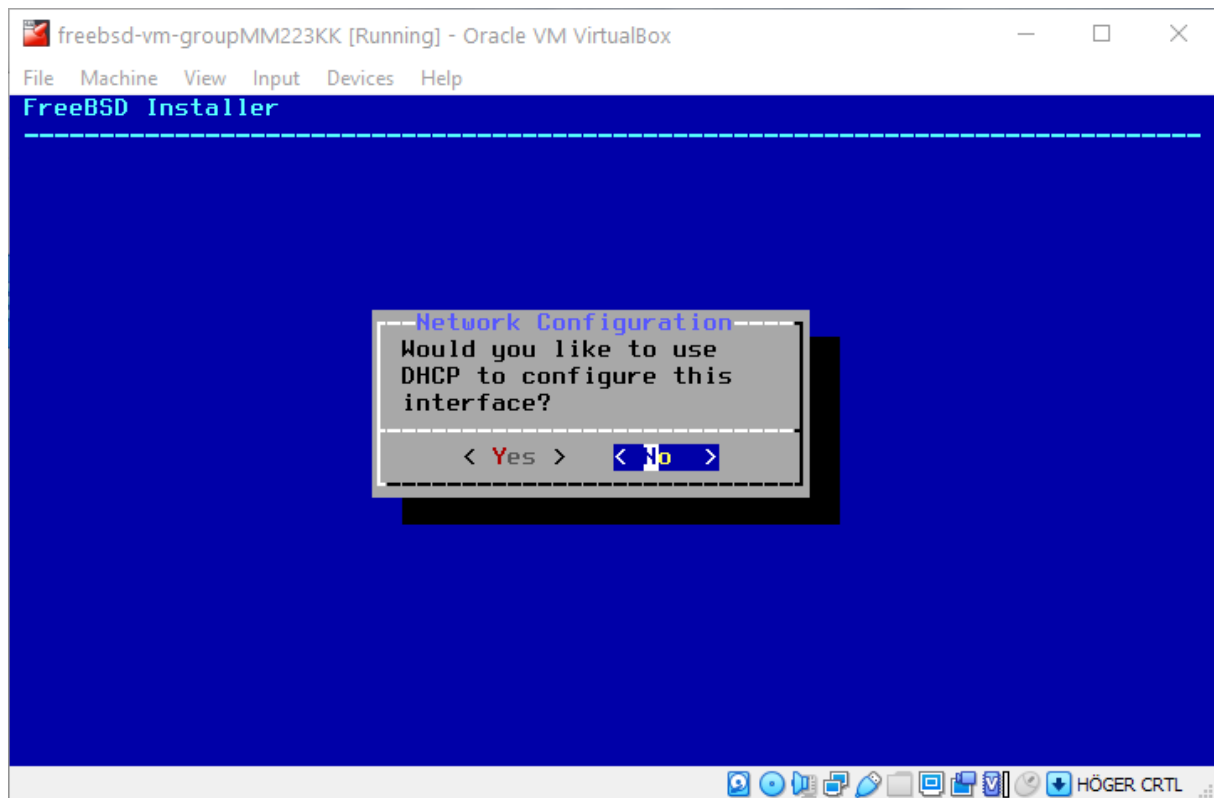


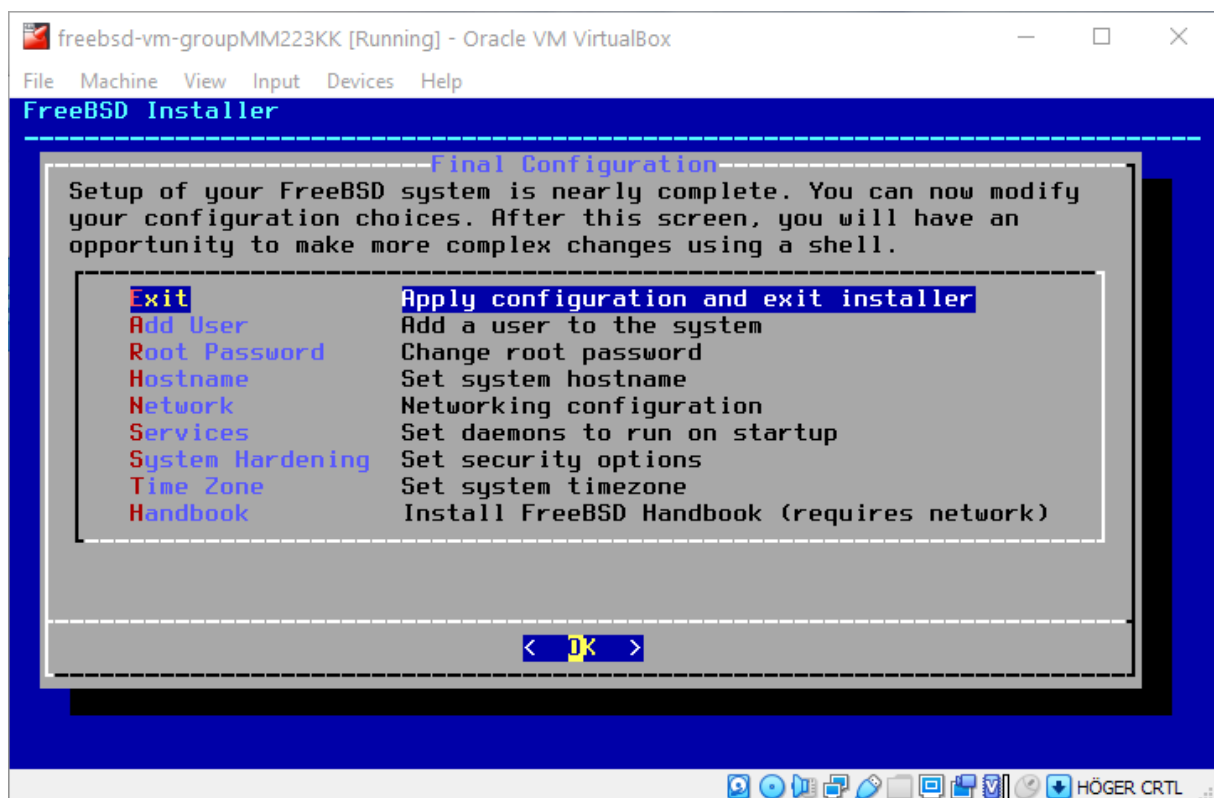
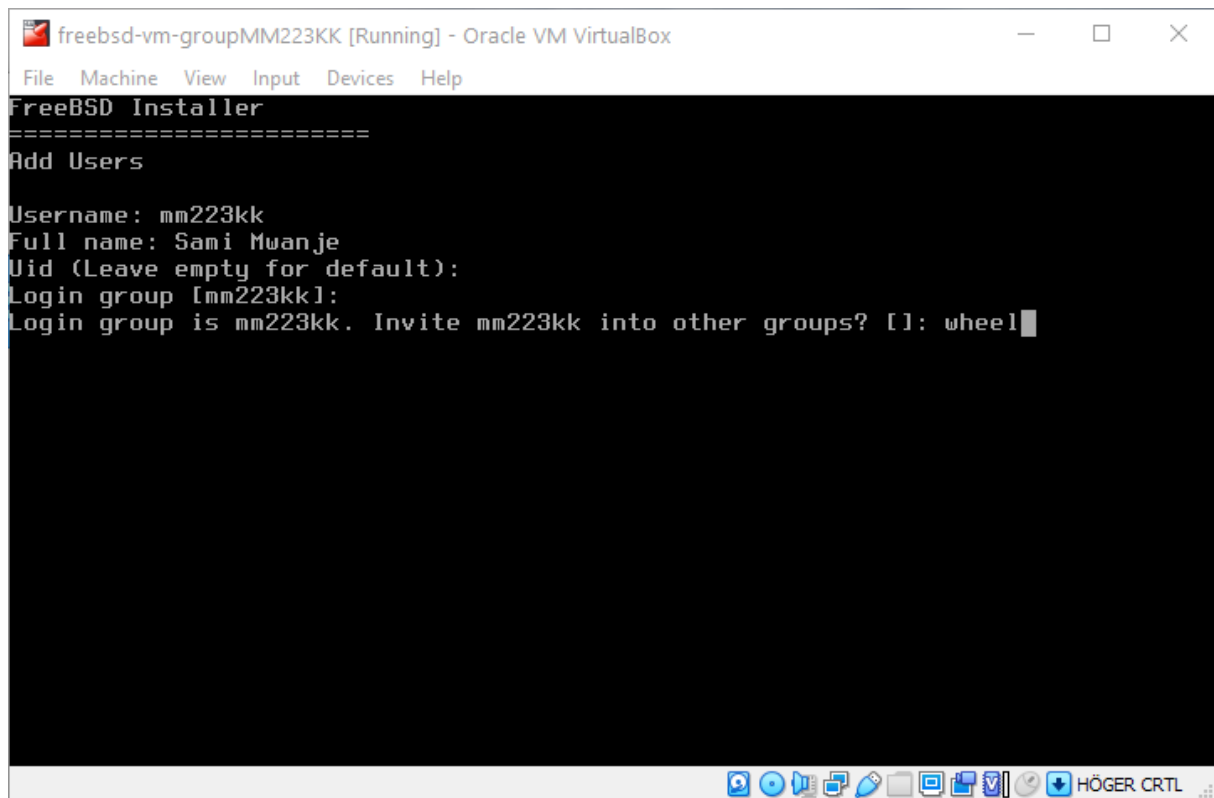












I choose to install it using **8192** of **memory**, which is maybe not needed. I had some problems with the internet setup on the “**bootonly**” version, so I installed it using the “**1disc**” version which went smoothly. The internet was then setup later on in the VM. Since I am working alone, I created two users. **Admin** and **mm223kk**.

Sami Mwanje  
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### Task 3.1:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Starting syslogd.
No core dumps found.
Mounting late filesystems:.
Starting sendmail_submit.
Starting sendmail_msp_queue.
Generating RSA host key.
2048 SHA256:rPXFniVTBRPQvoXv5G4NIwtjXlVu2dEuD9eqAMIZZts root@freebsd-vm-MM223KK (RSA)
Generating ECDSA host key.
256 SHA256:3PVV7Qana6X5WEi4HYz0uG+4qwNLdmZNocqhbD1dTe8 root@freebsd-vm-MM223KK (ECDSA)
Generating ED25519 host key.
256 SHA256:A59r02zfaubKJK+qtU5TEFyS5EuAXaG1qeVuD5n2brQ root@freebsd-vm-MM223KK (ED25519)
Performing sanity check on sshd configuration.
Starting sshd.
Configuring vt: keymap blanktime.
Starting cron.
Starting background file system checks in 60 seconds.

Wed Jun  2 21:16:06 CEST 2021

FreeBSD/amd64 (freebsd-vm-MM223KK) (ttyv0)

login: 
```

Signing into the account “mm223kk”.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
.. .login .mail_aliases .profile
mm223kk@freebsd-vm-MM223KK:~ $ ls -l
total 0
mm223kk@freebsd-vm-MM223KK:~ $ ls -la
. .cshrc .login_conf .mailrc .shrc
.. .login .mail_aliases .profile
mm223kk@freebsd-vm-MM223KK:~ $ ls -ld
.
mm223kk@freebsd-vm-MM223KK:~ $ ls -ld -l
drwxr-xr-x  2 mm223kk  mm223kk  512 Jun  2 21:12 .
mm223kk@freebsd-vm-MM223KK:~ $ ls -la -l
total 36
drwxr-xr-x  2 mm223kk  mm223kk  512 Jun  2 21:12 .
drwxr-xr-x  4 root     wheel    512 Jun  2 21:13 ..
-rw-r--r--  1 mm223kk  mm223kk  962 Jun  2 21:12 .cshrc
-rw-r--r--  1 mm223kk  mm223kk  323 Jun  2 21:12 .login
-rw-r--r--  1 mm223kk  mm223kk   91 Jun  2 21:12 .login_conf
-rw-r--r--  1 mm223kk  mm223kk  301 Jun  2 21:12 .mail_aliases
-rw-r--r--  1 mm223kk  mm223kk  267 Jun  2 21:12 .mailrc
-rw-r--r--  1 mm223kk  mm223kk  978 Jun  2 21:12 .profile
-rw-r--r--  1 mm223kk  mm223kk  695 Jun  2 21:12 .shrc
mm223kk@freebsd-vm-MM223KK:~ $ ls -la
. .cshrc .login_conf .mailrc .shrc
.. .login .mail_aliases .profile
mm223kk@freebsd-vm-MM223KK:~ $ 
```

Listing the files in the home directory, using “ls -a -l”. “ls -a -l” will list complete file contents of the current directory including the hidden files and file permissions.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
mm223kk@freebsd-vm-MM223KK:~ $ su -root
su: illegal option -- r
usage: su [-] [-flms] [-c class] [login [args]]
mm223kk@freebsd-vm-MM223KK:~ $ su - root
Password:
Jun  3 17:02:14 freebsd-vm-MM223KK su[963]: mm223kk to root on /dev/ttyv0
root@freebsd-vm-MM223KK:~ # ls -a -l
total 28
drwxr-x---  2 root  wheel   512 Apr  9 08:26 .
drwxr-xr-x 19 root  wheel  1024 Jun  3 15:34 ..
-rw-r--r--  2 root  wheel  1023 Apr  9 08:17 .cshrc
-rw-r--r--  1 root  wheel   80 Apr  9 08:26 .k5login
-rw-r--r--  1 root  wheel  328 Apr  9 08:17 .login
-rw-r--r--  2 root  wheel  507 Apr  9 08:17 .profile
-rw-r--r--  1 root  wheel  865 Apr  9 08:17 .shrc
root@freebsd-vm-MM223KK:~ #
```

The command "**su - root**" is used to change from one user to another. Here I am changing from "mm223kk" to the user **root**. After that the "**ls -a -l**" is used once again to display the complete list of the current home directory. We can see 28 files in root and 36 in mm223kk.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
^t top of text      ^e end of line      ^r restore word     ^f forward char
^c command          ^d delete                               ESC-Enter: exit
=====line 1 col 13 lines fr=====
Group MM223KK

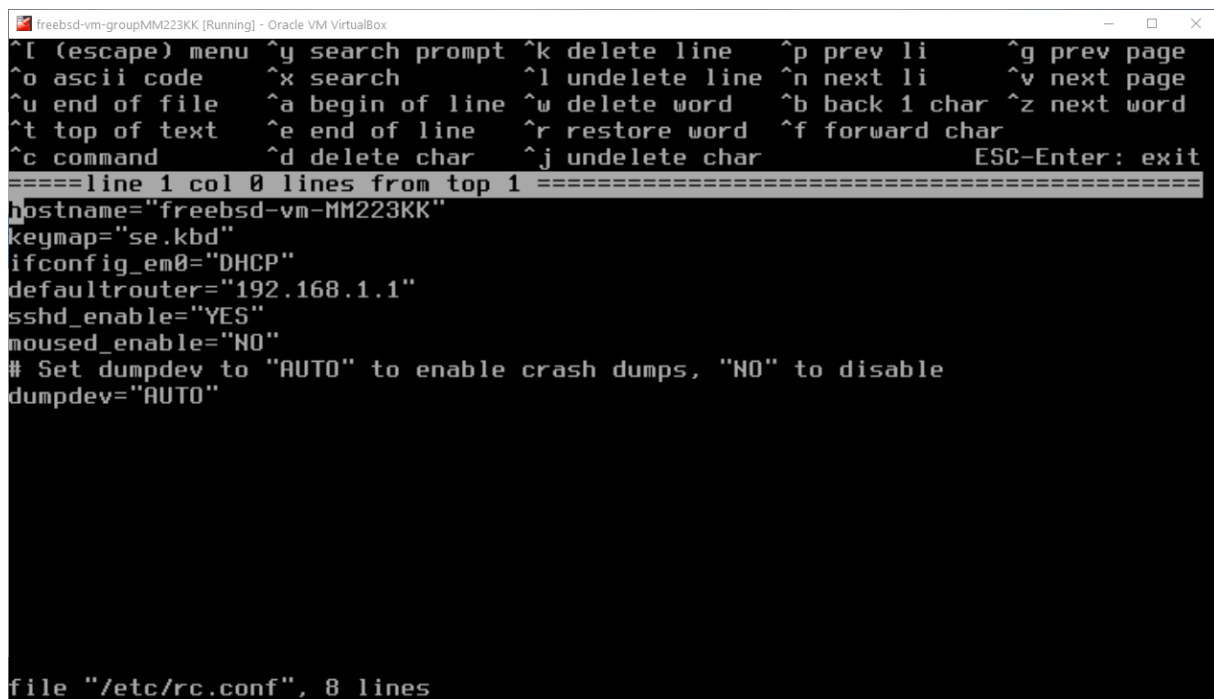
"text_file.txt" 1 lines, 14 characters
mm223kk@freebsd-vm-MM223KK:~ $ cp -i text_file.txt /home/admin/
cp: /home/admin/text_file.txt: Permission denied
mm223kk@freebsd-vm-MM223KK:~ $
```

Here I am creating a new text file using the command "**ee**". The file will have the content "**Group MM223KK**". After the content has been added the file gets the name "**text\_file.txt**".

An attempt to copy the file from the current directory to the user "**admin**" is denied. This is done with the command "**cp -i text\_file.txt /home/admin/**".

The command is denied because the user “mm223kk” do not have the permissions to write a file to another user. It may have worked if the user was calling the command through the root.

### 3.2:



```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
^[ (escape) menu ^y search prompt ^k delete line ^p prev li ^g prev page
^o ascii code ^x search ^l undelete line ^n next li ^v next page
^u end of file ^a begin of line ^w delete word ^b back 1 char ^z next word
^t top of text ^e end of line ^r restore word ^f forward char
^c command ^d delete char ^j undelete char ESC-Enter: exit
=====line 1 col 0 lines from top 1 =====
hostname="freebsd-vm-MM223KK"
keymap="se.kbd"
ifconfig_em0="DHCP"
defaultrouter="192.168.1.1"
sshd_enable="YES"
moused_enable="NO"
# Set dumpdev to "AUTO" to enable crash dumps, "NO" to disable
dumpdev="AUTO"

file "/etc/rc.conf", 8 lines
```

Did not get the network to work on the first try so I had to edit some stuff in the “rc.conf”. This was done by signing into root and using the command “**ee /etc/rc.conf**” After that the line **ifconfig\_em0=“DHCP”** was edited and the **“defaultrouter= ”** was set to my home router address.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
Updating database digests format: 100%
The following 3 package(s) will be affected (of 0 checked):

New packages to be INSTALLED:
  gettext-runtime: 0.21
  indexinfo: 0.3.1
  sudo: 1.9.6p1

Number of packages to be installed: 3

The process will require 7 MiB more space.
1 MiB to be downloaded.

Proceed with this action? [y/N]: y
[1/3] Fetching sudo-1.9.6p1.txz: 100% 1 MiB 1.4MB/s 00:01
[2/3] Fetching gettext-runtime-0.21.txz: 100% 166 KiB 169.8kB/s 00:01
[3/3] Fetching indexinfo-0.3.1.txz: 100% 6 KiB 5.7kB/s 00:01
Checking integrity... done (0 conflicting)
[1/3] Installing indexinfo-0.3.1...
[1/3] Extracting indexinfo-0.3.1: 100%
[2/3] Installing gettext-runtime-0.21...
[2/3] Extracting gettext-runtime-0.21: 100%
[3/3] Installing sudo-1.9.6p1...
[3/3] Extracting sudo-1.9.6p1: 100%
root@freebsd-vm-MM223KK:~ #
```

After the network setup the command “**pkg install sudo**” could now be used to install the sudo package. The installation went on smoothly without any errors.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
root@freebsd-vm-MM223KK:~ # pw groupadd sudoers
root@freebsd-vm-MM223KK:~ # pw group show sudoers
sudoers:*:1003:
root@freebsd-vm-MM223KK:~ # pw group mod sudoers -m mm223kk,admin
root@freebsd-vm-MM223KK:~ # pw group show sudoers
sudoers:*:1003:mm223kk,admin
root@freebsd-vm-MM223KK:~ # id mm223kk
uid=1001(mm223kk) gid=1001(mm223kk) groups=1001(mm223kk),0(wheel),1003(sudoers)
root@freebsd-vm-MM223KK:~ # id admin
uid=1002(admin) gid=1002(admin) groups=1002(admin),0(wheel),1003(sudoers)
root@freebsd-vm-MM223KK:~ #
```

First, I created a new group called “**sudoers**” using “**pw group add sudoers**”, and then I listed the members in the group using “**pw group show sudoers**”. The group was first empty, so I added the user mm223kk and admin to the group with full privileges using “**pw group mod sudoers -m mm223kk,admin**”.



```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
^_ (escape) menu ^y search prompt ^k delete line ^p prev li ^g prev page
^o ascii code ^x search ^l undelete line ^n next li ^v next page
^u end of file ^a begin of line ^w delete word ^b back 1 char ^z next word
^t top of text ^e end of line ^r restore word ^f forward char
^c command ^d delete char ^j undelete char ESC-Enter: exit
=====line 92 col 0 lines from top 92 =====
###
### User privilege specification
###
root ALL=(ALL) ALL

### Uncomment to allow members of group wheel to execute any command
# %wheel ALL=(ALL) ALL
%sudoers ALL=(ALL) ALL

### Same thing without a password
# %wheel ALL=(ALL) NOPASSWD: ALL

### Uncomment to allow members of group sudo to execute any command
# %sudo ALL=(ALL) ALL

### Uncomment to allow any user to run sudo if they know the password
### of the user they are running the command as (root by default).
# Defaults targetpw # Ask for the password of the target user
```

The last thing was to run the command “**ee /usr/local/etc/sudoers/**” and create a new line with “**%sudoers ALL=(ALL) ALL**”. This allowed all members of the group sudoers to execute any command.

### 3.3:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
mm223kk@freebsd-vm-MM223KK:~ $ hexdump -n 32 /dev/ada0
hexdump: /dev/ada0: Permission denied
mm223kk@freebsd-vm-MM223KK:~ $ sudo hexdump -n 32 /dev/ada0

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

00000000 31fc 8ec0 8ec0 8ed8 bcd0 7c00 1abe bf7c
00000010 061a e6b9 f301 e9a4 8a00 f631 bebb b107
00000020
mm223kk@freebsd-vm-MM223KK:~ $ █
```

First, I run the command **“hexdump -n 32 /dev/ada0”**. This is called without any privileges directly from the “mm223kk” user. Running the same command with **“sudo”** takes use of the privileges that the user was granted. The **“hexdump”** command is used to display the specified files in hex. The **“-n 32”** decides how many bytes that are going to be printed out in this case 32. The **“sudo”** command allow the user to use a certain command as a supervisor or another user, therefore **“sudo hexdump -n 32 /dev/ada0 “** gives no permission denied message.

### 3.4:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
mm223kk@freebsd-vm-MM223KK:~ $ ls -a -l
total 40
drwxr-xr-x  2 mm223kk  mm223kk  512 Jun  3 16:31 .
drwxr-xr-x  4 root    wheel    512 Jun  2 21:13 ..
-rw-r--r--  1 mm223kk  mm223kk  962 Jun  2 21:12 .cshrc
-rw-r--r--  1 mm223kk  mm223kk  323 Jun  2 21:12 .login
-rw-r--r--  1 mm223kk  mm223kk   91 Jun  2 21:12 .login_conf
-rw-----  1 mm223kk  mm223kk  301 Jun  2 21:12 .mail_aliases
-rw-r--r--  1 mm223kk  mm223kk  267 Jun  2 21:12 .mailrc
-rw-r--r--  1 mm223kk  mm223kk  978 Jun  2 21:12 .profile
-rw-r--r--  1 mm223kk  mm223kk  695 Jun  2 21:12 .shrc
-rw-r--r--  1 mm223kk  mm223kk   14 Jun  3 16:31 text_file.txt
mm223kk@freebsd-vm-MM223KK:~ $ sudo cp -i text_file.txt /home/admin/
mm223kk@freebsd-vm-MM223KK:~ $
```

Trying to copy the “text\_file.txt” file to **/home/admin/** using **sudo** from mm223kk. As stated earlier, mm223kk now has the privileges to run the command **sudo** and can now write files to other users. On the image below we can see that the copy was successful.

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
admin@freebsd-vm-MM223KK:~ $ ls -a -l
total 40
drwxr-xr-x  2 admin  admin  512 Jun  6 15:17 .
drwxr-xr-x  4 root  wheel  512 Jun  2 21:13 ..
-rw-r--r--  1 admin  admin  962 Jun  2 21:13 .cshrc
-rw-r--r--  1 admin  admin  323 Jun  2 21:13 .login
-rw-r--r--  1 admin  admin   91 Jun  2 21:13 .login_conf
-rw-----  1 admin  admin  301 Jun  2 21:13 .mail_aliases
-rw-r--r--  1 admin  admin  267 Jun  2 21:13 .mailrc
-rw-r--r--  1 admin  admin  978 Jun  2 21:13 .profile
-rw-r--r--  1 admin  admin  695 Jun  2 21:13 .shrc
-rw-r--r--  1 root   admin   14 Jun  6 15:17 text_file.txt
admin@freebsd-vm-MM223KK:~ $
```

3.5:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
^o ascii code      ^x search          ^l undelete line  ^n next li        ^v next page
^u end of file     ^a begin of line  ^w delete word    ^b back 1 char    ^z next word
^t top of text     ^e end of line    ^r restore word   ^f forward char
^c command         ^d delete
=====line 2 col 0 lines fro=====
kern.vty=sc

"/boot/loader.conf" 2 lines, 13 characters
root@freebsd-vm-MM223KK:~ #
```

I first got an error about **"Inappropriate ioctl for device."** So, I had to go to the **"`/boot/loader.conf`"** and create a new line that stated **"`kern.vty=sc`"**.

Running the **"`vidcontrol -i adapter`"** command displayed this:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
root@freebsd-vm-MM223KK:~ # vidcontrol -i adapter
fb0:
  vga0, type:VESA VGA (5), flags:0x2700ff
  initial mode:24, current mode:24, BIOS mode:3
  frame buffer window:0xb8000, buffer size:0x8000
  window size:0x8000, origin:0x0
  display start address (0, 0), scan line width:80
  reserved:0x0
root@freebsd-vm-MM223KK:~ #
```

```

freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
273 (0x111) 0x0000000f G 640x480x16 D 8x16 0xa0000 64k 64k 0xe0000000 600k
274 (0x112) 0x0000000f G 640x480x24 D 8x16 0xa0000 64k 64k 0xe0000000 900k
275 (0x113) 0x0000000f G 800x600x15 D 8x16 0xa0000 64k 64k 0xe0000000 937k
276 (0x114) 0x0000000f G 800x600x16 D 8x16 0xa0000 64k 64k 0xe0000000 937k
277 (0x115) 0x0000000f G 800x600x24 D 8x16 0xa0000 64k 64k 0xe0000000 1406k
278 (0x116) 0x0000000f G 1024x768x15 D 8x16 0xa0000 64k 64k 0xe0000000 1536k
279 (0x117) 0x0000000f G 1024x768x16 D 8x16 0xa0000 64k 64k 0xe0000000 1536k
280 (0x118) 0x0000000f G 1024x768x24 D 8x16 0xa0000 64k 64k 0xe0000000 2304k
281 (0x119) 0x0000000f G 1280x1024x15 D 8x16 0xa0000 64k 64k 0xe0000000 2560k
282 (0x11a) 0x0000000f G 1280x1024x16 D 8x16 0xa0000 64k 64k 0xe0000000 2560k
283 (0x11b) 0x0000000f G 1280x1024x24 D 8x16 0xa0000 64k 64k 0xe0000000 3840k
320 (0x140) 0x0000000f G 320x200x32 D 8x16 0xa0000 64k 64k 0xe0000000 250k
321 (0x141) 0x0000000f G 640x400x32 D 8x16 0xa0000 64k 64k 0xe0000000 1000k
322 (0x142) 0x0000000f G 640x400x32 D 8x16 0xa0000 64k 64k 0xe0000000 1200k
323 (0x143) 0x0000000f G 800x600x32 D 8x16 0xa0000 64k 64k 0xe0000000 1875k
324 (0x144) 0x0000000f G 1024x768x32 D 8x16 0xa0000 64k 64k 0xe0000000 3072k
325 (0x145) 0x0000000f G 1280x1024x32 D 8x16 0xa0000 64k 64k 0xe0000000 5120k
326 (0x146) 0x0000000f G 320x200x8 P 8x16 0xa0000 64k 64k 0xe0000000 62k
327 (0x147) 0x0000000f G 1600x1200x32 D 8x16 0xa0000 64k 64k 0xe0000000 7500k
328 (0x148) 0x0000000f G 1152x864x8 P 8x16 0xa0000 64k 64k 0xe0000000 972k
329 (0x149) 0x0000000f G 1152x864x15 D 8x16 0xa0000 64k 64k 0xe0000000 1944k
330 (0x14a) 0x0000000f G 1152x864x16 D 8x16 0xa0000 64k 64k 0xe0000000 1944k
331 (0x14b) 0x0000000f G 1152x864x24 D 8x16 0xa0000 64k 64k 0xe0000000 2916k
332 (0x14c) 0x0000000f G 1152x864x32 D 8x16 0xa0000 64k 64k 0xe0000000 3888k
root@freebsd-vm-MM223KK:~ #

```

Here I used “**vidcontrol -i mode**” to decide which mode I preferred. After some tries with editing “**vidcontrol MODE\_XXX**” in “**ee etc/rc.conf**” I chose 280.

```

freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
^I (escape) menu ^Y search prompt ^K delete line ^P prev li ^G prev page
^O ascii code ^X search ^L undelete line ^N next li ^V next page
^U end of file ^A begin of line ^W delete word ^B back 1 char ^Z next word
^T top of text ^E end of line ^R restore word ^F forward char
^C command ^D delete char ^J undelete char ESC-Enter: exit
=====line 1 col 0 lines from top 1=====
hostname="freebsd-vm-MM223KK"
keymap="swedish_iso.kbd"
ifconfig_em0="DHCP"
defaultrouter="192.168.1.1"
sshd_enable="YES"
moused_enable="NO"
# Set dumpdev to "AUTO" to enable crash dumps, "NO" to disable
dumpdev="AUTO"
vidcontrol MODE_280

main menu
a) leave editor
b) help
c) file operations
d) redraw screen
e) settings
f) search
g) miscellaneous
press Esc to cancel

```

```

hint.sc.0.at="isa"
hint.sc.0.flags="0x100"
hint.sc.0.vesa_mode="0x103"
hint.uart.0.at="isa"

```

I also added the line “**hint.sc.0.vesa\_mode=0x103**” into “**ee /boot/device.hints**”. In order to fully fix the syncons.

```
root@freebsd-vm-MM223KK:~ # vidcontrol -i adapter
fb0:
  vga0, type:VESA VGA (5), flags:0x1700ff
  initial mode:24, current mode:280, BIOS mode:3
  frame buffer window:0xe0000000, buffer size:0x240000
  window size:0x240000, origin:0x0
  display start address (0, 0), scan line width:3072
  reserved:0xe0000000
root@freebsd-vm-MM223KK:~ # vidcontrol show

0      8 grey      0 BACKGROUND  8 BACKGROUND
1 blue  9 lightblue 1 BACKGROUND  9 BACKGROUND
2 green 10 lightgreen 2 BACKGROUND 10 BACKGROUND
3 cyan  11 lightcyan 3 BACKGROUND 11 BACKGROUND
4 red   12 lightred  4 BACKGROUND 12 BACKGROUND
5 magenta 13 lightmagenta 5 BACKGROUND 13 BACKGROUND
6 brown 14 yellow   6 BACKGROUND 14 BACKGROUND
7 white 15 lightwhite 7 BACKGROUND 15 BACKGROUND

root@freebsd-vm-MM223KK:~ #
```

A run of “vidctrontol -i adapter” and “vidcontrol show”.

### 3.6:

```

New packages to be INSTALLED:
    zsh: 5.8

Number of packages to be installed: 1

The process will require 19 MiB more space.
4 MiB to be downloaded.

Proceed with this action? [y/N]: y
[1/1] Fetching zsh-5.8.txz: 100%    4 MiB    4.6MB/s    00:01
Checking integrity... done (0 conflicting)
[1/1] Installing zsh-5.8...
[1/1] Extracting zsh-5.8: 100%
=====
Message from zsh-5.8:

--
=====

By default, zsh looks for system-wide defaults in
/usr/local/etc.

If you previously set up /etc/zprofile, /etc/zshenv, etc.,
either move them to /usr/local/etc or rebuild zsh with the
ETCDIR option enabled.

=====
root@freebsd-vm-MM223KK:~ #

```

The first thing I did was installing the new **zsh shell** by running the command “**pkg install zsh**”. As can be seen the installation went smoothly.

```

root@freebsd-vm-MM223KK:~ # chsh -s zsh root
chsh: user information updated
root@freebsd-vm-MM223KK:~ # chsh -s zsh mm223kk
chsh: user information updated
root@freebsd-vm-MM223KK:~ # chsh -s zsh admin
chsh: user information updated
root@freebsd-vm-MM223KK:~ #

```

```

freebsd-vm-MM223KK# grep admin /etc/passwd
admin:*:1002:1002:Administrator:/home/admin:/usr/local/bin/zsh
freebsd-vm-MM223KK# grep mm223kk /etc/passwd
mm223kk:*:1001:1001:Sami Mwanje:/home/mm223kk:/usr/local/bin/zsh
freebsd-vm-MM223KK# grep root /etc/passwd
root:*:0:0:Charlie &:/root:/usr/local/bin/zsh
toor:*:0:0:Bourne-again Superuser:/root:
daemon:*:1:1:Owner of many system processes:/root:/usr/sbin/nologin
freebsd-vm-MM223KK#

```

I installed the new shell for all the users using “**chsh -s zsh “username”** “. The zsh was also set for all users with grep.

```

^_ (escape) menu ^y search prompt ^k delete line ^p prev li ^g prev page
^o ascii code ^x search ^l undelete line ^n next li ^v next page
^u end of file ^a begin of line ^w delete word ^b back 1 char ^z next word
^t top of text ^e end of line ^r restore word ^f forward char
^c command ^d delete char ^j undelete char ESC-Enter: exit
=====line 1 col 0 lines from top 1 =====
PS1='%n%M:%/%# '

```

First, I had to edit the file “.zshrc” for all users. This file was located in home. And could be edited with the command “**ee .zshrc**”. In this file I created a new line **PS1='%n%M:%/%# '**. “%n” displays the current user. “%M” the host name.

“%/” prints the current location/path. %# checks if the current user has root privileges and displays “#”. If the user **does not** have root privileges “%” will be displayed. Here is a test on the account:

```

admin@freebsd-vm-MM223KK:/home/admin% su - mm223kk
Jun 7 01:13:04 freebsd-vm-MM223KK su[974]: admin to mm223kk on /dev/ttyv0
mm223kk@freebsd-vm-MM223KK:/home/mm223kk% su - root
Password:
Jun 7 01:13:20 freebsd-vm-MM223KK su[976]: mm223kk to root on /dev/ttyv0
root@freebsd-vm-MM223KK:/root#

```

```

## Created by newuser for 5.8
PS1='%n%M:%/%# '
HISTFILE=/home/mm223kk/.zsh_history
HISTSIZE=10000
SAVEHIST=10000
setopt INC_APPEND_HISTORY

```

Finally, the history settings were set. These settings were found on the internet and were recommended. This was done for all users. “**HISTFILE = /home/username/.zsh\_history**” will be the location for the history files.

### 3.7:



```
hostname="freebsd-vm-MM223KK"
keymap="swedish.iso.kbd"
ifconfig_em1="192.168.56.2/24"
ifconfig_em0="DHCP"
defaultrouter="192.168.1.1"
network_interfaces="em0 em1"
sshd_enable="YES"
moused_enable="NO"
# Set dumpdev to "AUTO" to enable crash dumps, "NO" to disable
dumpdev="AUTO"
vidcontrol MODE_280
```

I configured the host-only card by adding two new lines "**ifconfig\_em1=192.168.56.2/24**" and "**network\_interfaces="em0 em1"**". The address was found by using windows **cmd** and **ipconfig** which displayed **192.168.56.1** so I changed it to **192.168.56.1**.

```
root@freebsd-vm-MM223KK:/root# ping 192.168.56.1
PING 192.168.56.1 (192.168.56.1): 56 data bytes
64 bytes from 192.168.56.1: icmp_seq=0 ttl=128 time=0.486 ms
64 bytes from 192.168.56.1: icmp_seq=1 ttl=128 time=0.223 ms
64 bytes from 192.168.56.1: icmp_seq=2 ttl=128 time=0.230 ms
64 bytes from 192.168.56.1: icmp_seq=3 ttl=128 time=0.241 ms
64 bytes from 192.168.56.1: icmp_seq=4 ttl=128 time=0.220 ms
64 bytes from 192.168.56.1: icmp_seq=5 ttl=128 time=0.264 ms
64 bytes from 192.168.56.1: icmp_seq=6 ttl=128 time=0.891 ms
64 bytes from 192.168.56.1: icmp_seq=7 ttl=128 time=0.838 ms
64 bytes from 192.168.56.1: icmp_seq=8 ttl=128 time=0.292 ms
64 bytes from 192.168.56.1: icmp_seq=9 ttl=128 time=0.016 ms
64 bytes from 192.168.56.1: icmp_seq=10 ttl=128 time=0.242 ms
64 bytes from 192.168.56.1: icmp_seq=11 ttl=128 time=0.205 ms
64 bytes from 192.168.56.1: icmp_seq=12 ttl=128 time=0.180 ms
64 bytes from 192.168.56.1: icmp_seq=13 ttl=128 time=0.199 ms
64 bytes from 192.168.56.1: icmp_seq=14 ttl=128 time=0.229 ms
64 bytes from 192.168.56.1: icmp_seq=15 ttl=128 time=0.180 ms
^[[J
```

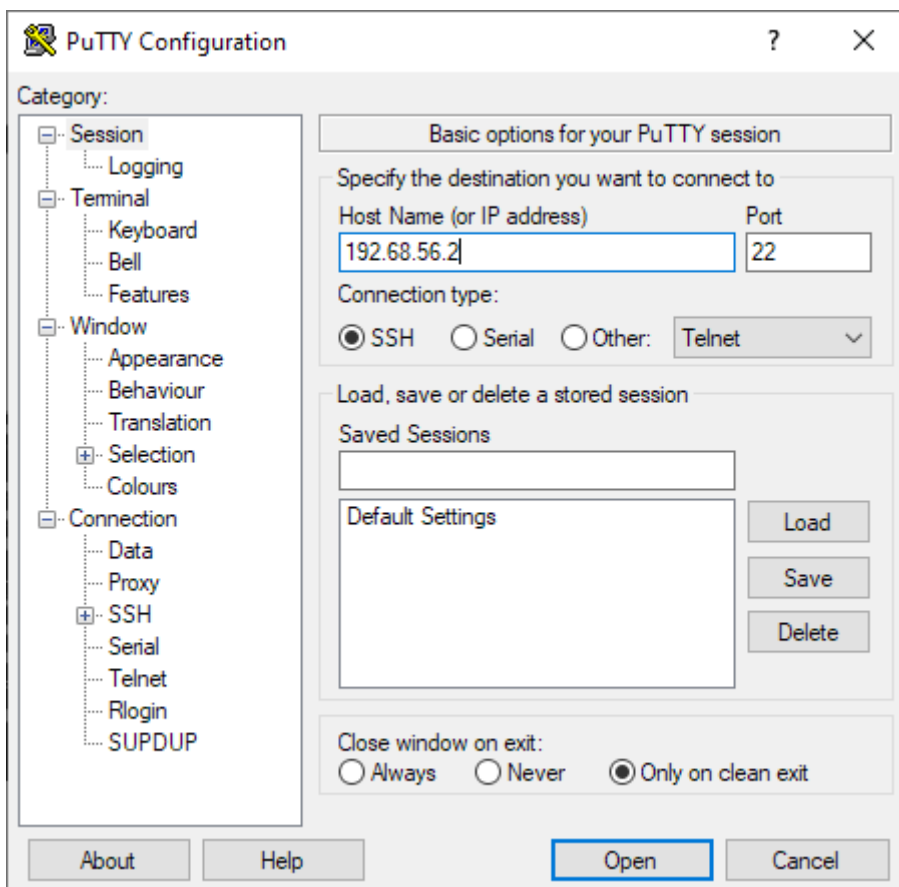
The "ping 192.168.56.1" displayed an established connection to the vm-static-ip-address.

### 3.8:

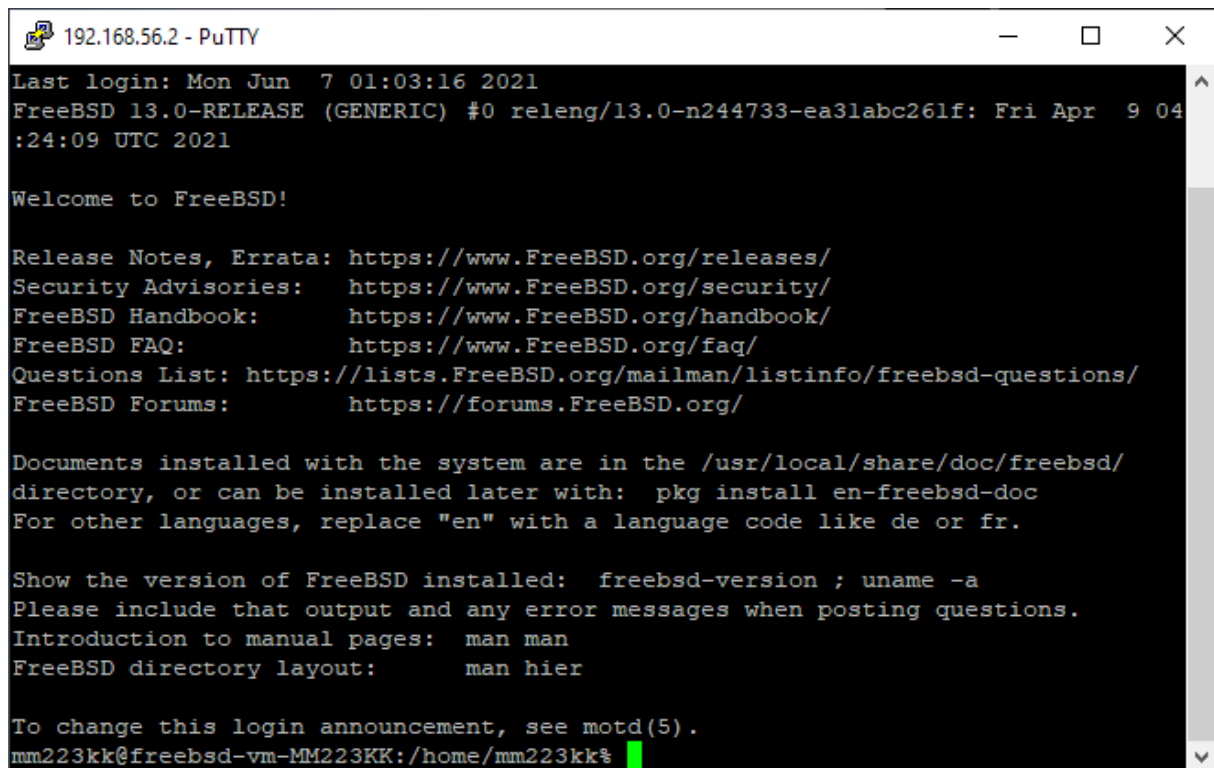
```
hostname="freebsd-vm-MM223KK"
keymap="swedish.iso.kbd"
ifconfig_em1="192.168.56.2/24"
ifconfig_em0="DHCP"
defaultrouter="192.168.1.1"
network_interfaces="em0 em1"
sshd_enable="YES"
moused_enable="NO"
# Set dumpdev to "AUTO" to enable crash dumps, "NO" to disable
dumpdev="AUTO"
vidcontrol MODE_280
```

```
#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10
```

As it can be seen in the “**ee etc/rc.conf**” file the “**sshd\_enable**” is set to yes. The **PermitRootLogin** option is also set to yes in “**ee /etc/ssh/sshd\_config**”. Now it is up to **PutTy**.



The Host IP address is set to the same address as the one that was set in **ifconfig\_em1= 192.168.56.2/24**



```
192.168.56.2 - PuTTY
Last login: Mon Jun  7 01:03:16 2021
FreeBSD 13.0-RELEASE (GENERIC) #0 releng/13.0-n244733-ea31abc261f: Fri Apr  9 04:24:09 UTC 2021

Welcome to FreeBSD!

Release Notes, Errata: https://www.FreeBSD.org/releases/
Security Advisories:  https://www.FreeBSD.org/security/
FreeBSD Handbook:     https://www.FreeBSD.org/handbook/
FreeBSD FAQ:          https://www.FreeBSD.org/faq/
Questions List: https://lists.FreeBSD.org/mailman/listinfo/freebsd-questions/
FreeBSD Forums:       https://forums.FreeBSD.org/

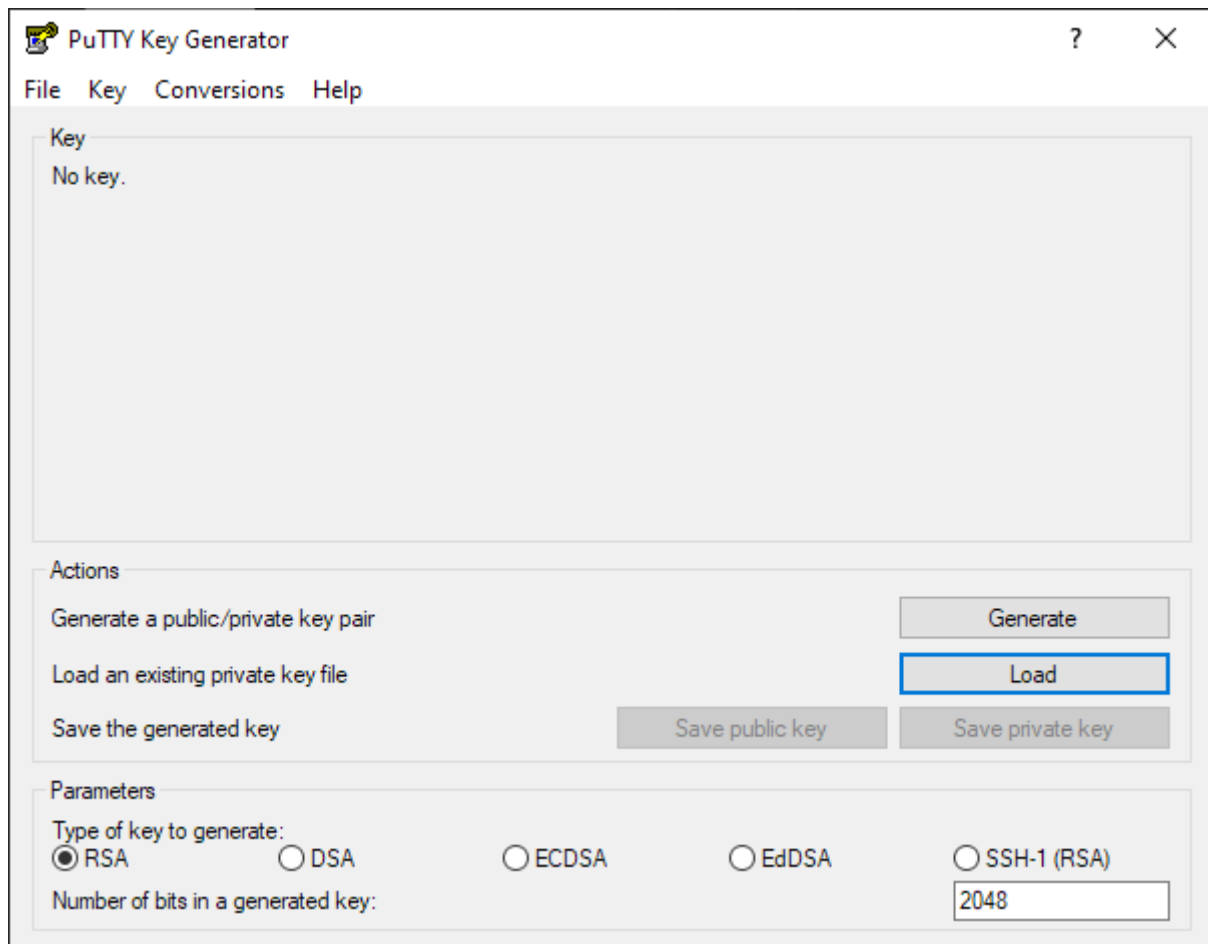
Documents installed with the system are in the /usr/local/share/doc/freebsd/
directory, or can be installed later with:  pkg install en-freebsd-doc
For other languages, replace "en" with a language code like de or fr.

Show the version of FreeBSD installed:  freebsd-version ; uname -a
Please include that output and any error messages when posting questions.
Introduction to manual pages:  man man
FreeBSD directory layout:      man hier

To change this login announcement, see motd(5).
mm223kk@freebsd-vm-MM223KK:/home/mm223kk% 
```

The PutTy terminal now pops up and asks for login information. After that the information has been entered, I can now have access to the VM using PutTy.

### 3.9:



First, I need to create an .ppk file for a **“Secure Shell Key Authentication”** with **PuTTYGen**.

When this was done some settings were needed to be changed in **“/etc/ssh/sshd\_config”** so the authentication did not ask for password every time a transfer was waiting. **“PasswordAuthentication no”**, **“ChallengeResponseAuthentication no”** and **“UsePAM no”**.

```
C:\ProgramData\Microsoft\Windows\Start Menu\Programs\PuTTY (64-bit)>pscp.exe -i C:\Users\Sami\Desktop\t  
ransfer\private_key.ppk C:\Users\Sami\Desktop\transfer\transfer.txt root@192.168.56.2:/home/mm223kk/
```

Now I need to download pscp.exe from PuTTY’s webpage and export it to PuTTY directory. From the PuTTY directory I used windows CMD with the line **“ pscp.exe -i C:\Users\Sami\Desktop\transfer\private\_key.ppk C:\Users\Sami\Desktop\transfer\transfer.txt root@192.168.56.2:/home/mm223kk/ ”** pscp.exe is to run pscp. -i is to locate and use the earlier created authentication file and then comes the location to pull from and to.

```
mm223kk@freebsd-vm-MM223KK:/home/mm223kk% ls -a -l
total 52
drwxr-xr-x  3 mm223kk  mm223kk  512 Jun  8 03:41 .
drwxr-xr-x  4 root    wheel    512 Jun  2 21:13 ..
-rw-r--r--  1 mm223kk  mm223kk  962 Jun  2 21:12 .cshrc
-rw-r--r--  1 mm223kk  mm223kk  323 Jun  2 21:12 .login
-rw-r--r--  1 mm223kk  mm223kk   91 Jun  2 21:12 .login_conf
-rw-----  1 mm223kk  mm223kk  301 Jun  2 21:12 .mail_aliases
-rw-r--r--  1 mm223kk  mm223kk  267 Jun  2 21:12 .mailrc
-rw-r--r--  1 mm223kk  mm223kk  978 Jun  2 21:12 .profile
-rw-r--r--  1 mm223kk  mm223kk  695 Jun  2 21:12 .shrc
drwx-----  2 mm223kk  mm223kk  512 Jun  8 02:29 .ssh
-rw-----  1 mm223kk  mm223kk 2103 Jun  8 03:41 .zsh_history
-rw-r--r--  1 mm223kk  mm223kk  139 Jun  7 01:50 .zshrc
-rw-r--r--  1 mm223kk  mm223kk   14 Jun  3 16:31 text_file.txt
-rw-r--r--  1 root    mm223kk    0 Jun  8 03:35 transfer.txt
mm223kk@freebsd-vm-MM223KK:/home/mm223kk%
```

When it comes to the VM location I used the root account and then pointed it to the home directory of mm223kk. Here the file newly transferred file can be seen as **transfer.txt**.

## TASK 4:

```
freebsd-vm-groupMM223KK [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
This OpenJDK implementation requires fdscfs(5) mounted on /dev/fd and
procfs(5) mounted on /proc.

If you have not done it yet, please do the following:

    mount -t fdscfs fdsc /dev/fd
    mount -t procfs proc /proc

To make it permanent, you need the following lines in /etc/fstab:

    fdsc /dev/fd      fdscfs      rw      0      0
    proc /proc        procfs      rw      0      0
root@freebsd-vm-MM223KK:/root# pkg install openjdk11-jre
Updating FreeBSD repository catalogue...
FreeBSD repository is up to date.
All repositories are up to date.
The following 1 package(s) will be affected (of 0 checked):

New packages to be INSTALLED:
  openjdk11-jre: 11.0.10+9.1_1

Number of packages to be installed: 1

The process will require 118 MiB more space.
23 MiB to be downloaded.

Proceed with this action? [y/N]: y
[1/1] Fetching openjdk11-jre-11.0.10+9.1_1.txz: 100% 23 MiB 24.3MB/s 00:01
Checking integrity... done (0 conflicting)
[1/1] Installing openjdk11-jre-11.0.10+9.1_1...
[1/1] Extracting openjdk11-jre-11.0.10+9.1_1: 100%
=====
Message from openjdk11-jre-11.0.10+9.1_1:
--
This OpenJDK implementation requires fdscfs(5) mounted on /dev/fd and
procfs(5) mounted on /proc.

If you have not done it yet, please do the following:

    mount -t fdscfs fdsc /dev/fd
    mount -t procfs proc /proc

To make it permanent, you need the following lines in /etc/fstab:

    fdsc /dev/fd      fdscfs      rw      0      0
    proc /proc        procfs      rw      0      0
root@freebsd-vm-MM223KK:/root#
```

```
=====line 5 col 57 lines from top 5 =====
# Device      Mountpoint      FStype  Options  Dump    Pass#
/dev/ada0s1a  /                ufs     rw       1        1
/dev/ada0s1b  none            swap    sw        0        0
fdsc          /dev/fd         fdscfs  rw        0        0
proc          /proc           procfs  rw        0        0
```

I Installed the “**openjdk11**” using “**pkg install openjdk11**” and “**openjdk11-jre**” using “**pkg install openjdk11-jre**”,the installation went smoothly as it can be seen above.

I also had to add the last two lines in the file “**/etc/fstab**” to make the settings permanent.

## 4.1:

```
public static void main(String[] args) throws InterruptedException {

    ProcessBuilderHelp PB = new ProcessBuilderHelp();

    PB.newLine("help", "id");

    PB.setDirectory("/etc/");

    PB.newLine("find", ".", "-name", "rc*");

    PB.newLine("sudo", "hostname", "freebsd-vm-mm223k-updk");

}

}
```

First, I created the java code with a main and a ProcessBuilderHelp class.

```
Microsoft Windows [Version 10.0.19042.985]
(c) Microsoft Corporation. Med ensamrätt.

C:\Users\Sami>cd C:\ProgramData\Microsoft\Windows\Start Menu\Programs\PuTTY (64-bit)

C:\ProgramData\Microsoft\Windows\Start Menu\Programs\PuTTY (64-bit)>pscp.exe -i "C:\Users\Sami\Desktop\transfer\private
key.ppk" C:\Users\Sami\Desktop\transfer\1DV512.ZIP root@192.168.56.2:/home/mm223kk/1DV512.ZIP
1DV512.ZIP          | 4 kB |   4.7 kB/s | ETA: 00:00:00 | 100%

C:\ProgramData\Microsoft\Windows\Start Menu\Programs\PuTTY (64-bit)>
```

The files that I created during the implementation were zipped and then transferred to the VM. The zipping was needed in order to save time and not send the files file by file.

```
root@freebsd-vm-MM223KK:/root# su - mm223kk
mm223kk@freebsd-vm-MM223KK:/home/mm223kk% ls -la -l
total 60
drwxr-xr-x  3 mm223kk  mm223kk   512 Jun  8 19:32 .
drwxr-xr-x  4 root    wheel     512 Jun  2 21:13 ..
-rw-r--r--  1 mm223kk  mm223kk   962 Jun  2 21:12 .cshrc
-rw-r--r--  1 mm223kk  mm223kk   323 Jun  2 21:12 .login
-rw-r--r--  1 mm223kk  mm223kk    91 Jun  2 21:12 .login_conf
-rw-----  1 mm223kk  mm223kk   301 Jun  2 21:12 .mail_aliases
-rw-r--r--  1 mm223kk  mm223kk   267 Jun  2 21:12 .mailrc
-rw-r--r--  1 mm223kk  mm223kk   978 Jun  2 21:12 .profile
-rw-r--r--  1 mm223kk  mm223kk   695 Jun  2 21:12 .shrc
drwx-----  2 mm223kk  mm223kk   512 Jun  8 02:29 .ssh
-rw-----  1 mm223kk  mm223kk  2131 Jun  8 19:32 .zsh_history
-rw-r--r--  1 mm223kk  mm223kk   139 Jun  7 01:50 .zshrc
-rw-r--r--  1 root     mm223kk  4850 Jun  8 19:30 1DV512.ZIP
-rw-r--r--  1 mm223kk  mm223kk    14 Jun  3 16:31 text_file.txt
-rw-r--r--  1 root     mm223kk     0 Jun  8 03:35 transfer.txt
mm223kk@freebsd-vm-MM223KK:/home/mm223kk%
```

The files can be seen as "1DV512.ZIP".

```
mm223kk@freebsd-vm-MM223KK:/home/mm223kk% unzip 1DV512.ZIP
Archive: 1DV512.ZIP
  extracting: 1DV512/.classpath
  extracting: 1DV512/.project
    creating: 1DV512/.settings/
  extracting: 1DV512/.settings/org.eclipse.jdt.core.prefs
    creating: 1DV512/bin/
    creating: 1DV512/bin/mm223kk_groupassignment_1/
  extracting: 1DV512/bin/mm223kk_groupassignment_1/Main.class
  extracting: 1DV512/bin/mm223kk_groupassignment_1/ProcessBuilderHelp.class
    creating: 1DV512/src/
    creating: 1DV512/src/mm223kk_groupassignment_1/
  extracting: 1DV512/src/mm223kk_groupassignment_1/Main.java
  extracting: 1DV512/src/mm223kk_groupassignment_1/ProcessBuilderHelp.java
mm223kk@freebsd-vm-MM223KK:/home/mm223kk%
```

```
drwxr-xr-x  5 mm223kk  mm223kk   512 Jun  8 19:33 1DV512
```

The files were then unzipped and could be found in the location 1DV51.

```
mm223kk@freebsd-vm-MM223KK:/home/mm223kk/mm223kk_groupassignment_1/src/mm223kk_groupassignment_1% javac Main.java ProcessBuilderHelp.java
mm223kk@freebsd-vm-MM223KK:/home/mm223kk/mm223kk_groupassignment_1/src/mm223kk_groupassignment_1% cd ..
mm223kk@freebsd-vm-MM223KK:/home/mm223kk/mm223kk_groupassignment_1/src% java mm223kk_groupassignment_1.Main mm223kk_groupassignment_1.ProcessBuilderHelp
```

After this I changed the current path to the location of **Main** and the **processBuilderHelp** class. The files first had to be compiled this was done using the line “**javac Main.java ProcessBuilderHelp.java**”. The compilation went well without any errors after a little misspell.

```
Command id:
uid=1001(mm223kk) gid=1001(mm223kk) groups=1001(mm223kk),0(wheel),1003(sudoers)

Exited with error code: 0

Command find . -name rc*:
./rc.initdiskless
./rc.sendmail
./rc.firewall
./rc.d
./rc.d/rcctl
./rc
./rc.suspend
./rc.bsdxextended
./rc.conf.d
./rc.shutdown
./rc.subr
./defaults/rc.conf
./rc.resume
./rc.conf

Exited with error code: 1

Command sudo hostname freebsd-vm-mm223kk-upd:
Password:

Exited with error code: 0

mm223kk@freebsd-vm-MM223KK:/home/mm223kk/mm223kk_groupassignment_1/src% hostname
freebsd-vm-mm223kk-upd
mm223kk@freebsd-vm-MM223KK:/home/mm223kk/mm223kk_groupassignment_1/src%
```



I had some issue with running the code after the competition. After some googling I found out that I had to go one directory backwards and run the codes using “**java groupassignment\_1.Main groupassignment\_1.ProcessBuilderHelp**” The process went successfully, and the system asked for the password in order to change the VM-host name. The new hostname can be seen here below with a little misspell. Though this is enough to confirm that the code was working and complied successfully.

Due to the fact that I had many courses behind me under this year and the last led to that I missed the first group assignment dates and had to do this one alone. except that the work went smoothly, and I learned a lot of new things while completing the assignment. I am currently hosting some servers from my apartment at home and with this information it comes in handy to create more advanced scripts and controlling the server using PuTTY only. In the future I may switch to Linux-VM-servers due the terminal that is a powerful tool with knowledge and the power to separate each server over various VMs.

---

<sup>i</sup> <https://blog.desdelinux.net/sv/sl%C3%A4ppt-freebsd-9-0/>