

## Tugas UTS Administrasi & Desain Jaringan

Nama Kelompok :

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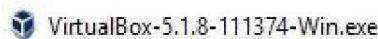
Berikut saya jelaskan langkah-langkah beserta tampilan *screenshot* dari masing-masing langkah.

1. Download dan Install VirtualBox.

- Akseslah situs <https://www.virtualbox.org/wiki/Downloads>. untuk mendapatkan virtual box.



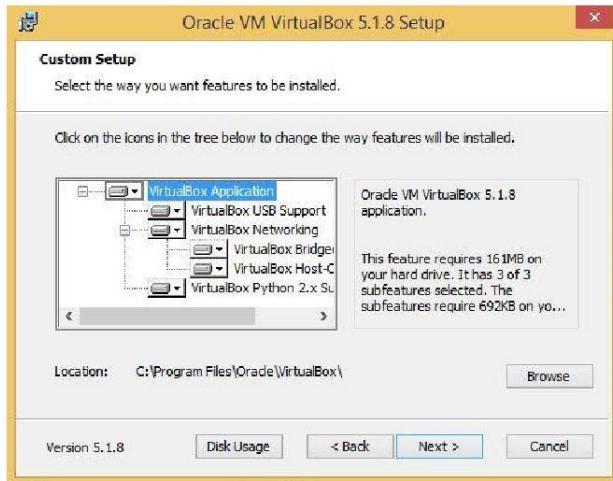
- Setelah proses download selesai, bukalah file tersebut untuk menginstall



- Klik next pada langkah ini



➤ Klik next



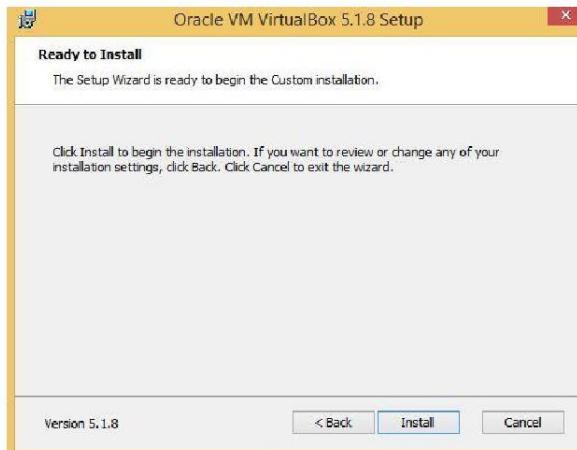
➤ Pastikan semua nya tercentang, lalu klik next



➤ Klik yes pada pilihan proceed installation now



- Klik install, dan tunggu proses instalasi selesai



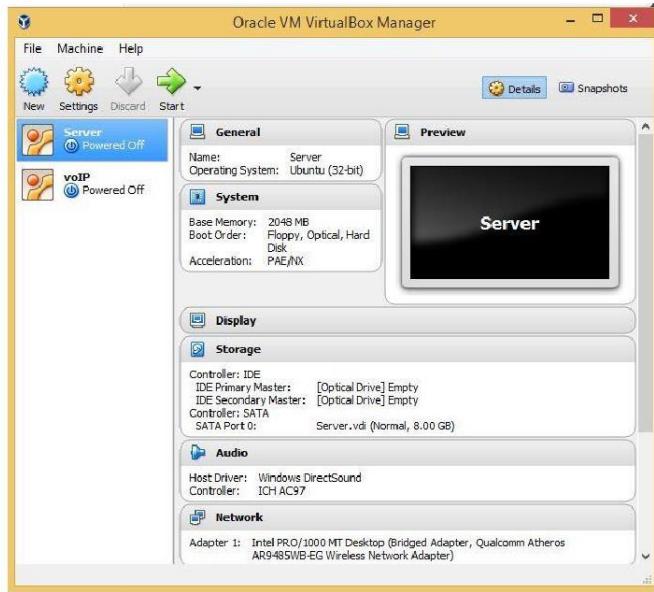
- Klik finish, dan proses instalasi virtual box sudah selesai.



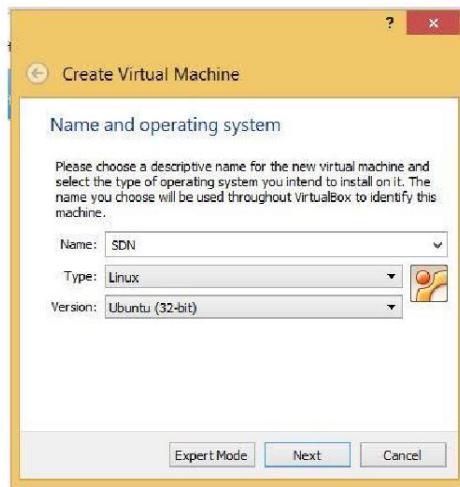
## 2. Download dan Install Ubuntu Server

Untuk mendapatkan package .iso Ubuntu server, akseslah situs [https://www.ubuntu.com/download/server.](https://www.ubuntu.com/download/server)

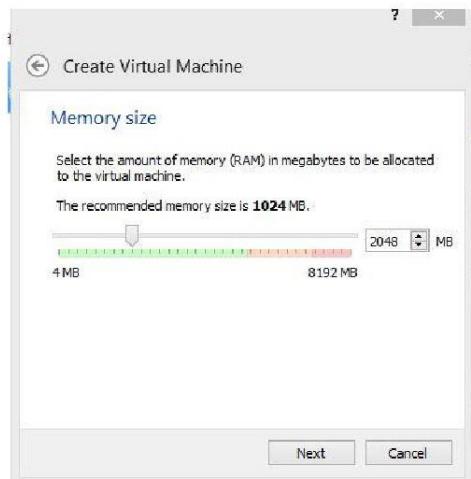
- Buka virtual box, lalu klik new



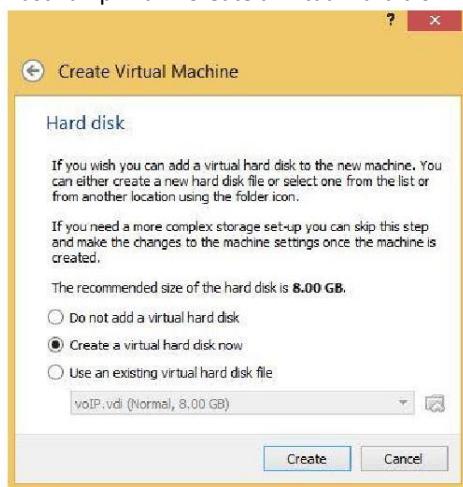
- Setting nama virtualnya (nama bebas, disini saya buat SDN), lalu setting type nya linux dan versionnya Ubuntu



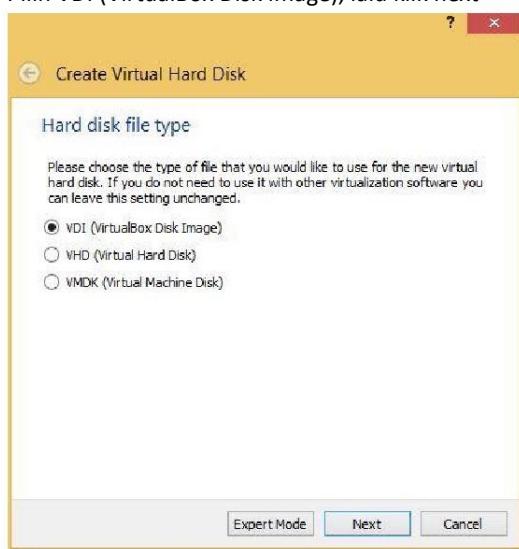
- Atur ukuran RAM nya, aturlah sesuai dengan kebutuhan anda (saya disini membuat RAM nya 2048)



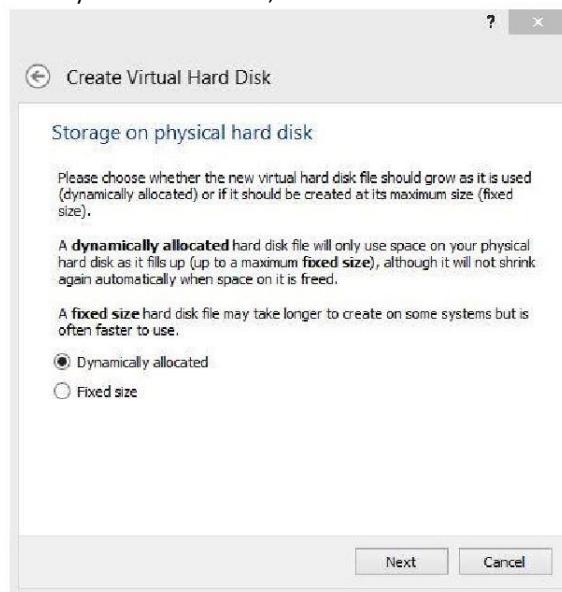
- Pastikan pilihan “Create a virtual hard disk now” tercentang, lalu klik create



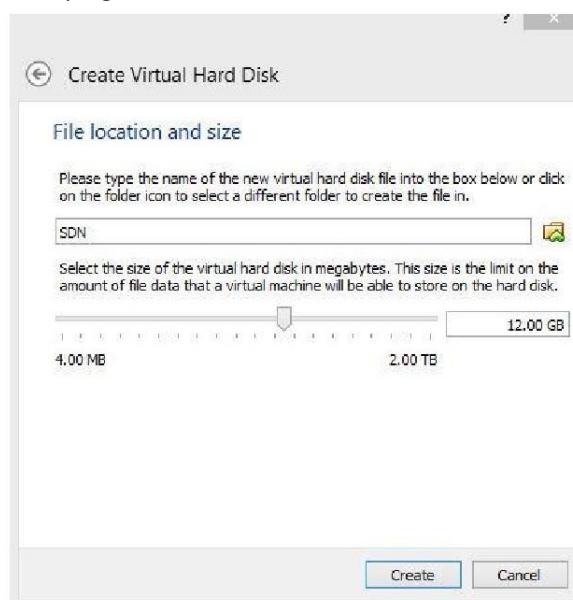
- Pilih VDI (VirtualBox Disk Image), lalu klik next



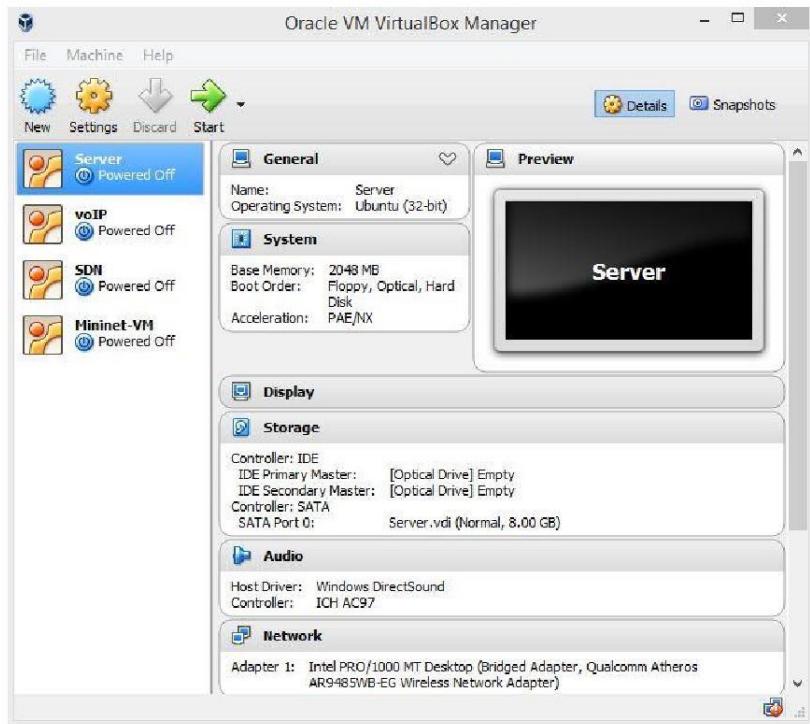
- Pilih Dynamical Allocated, lalu klik next



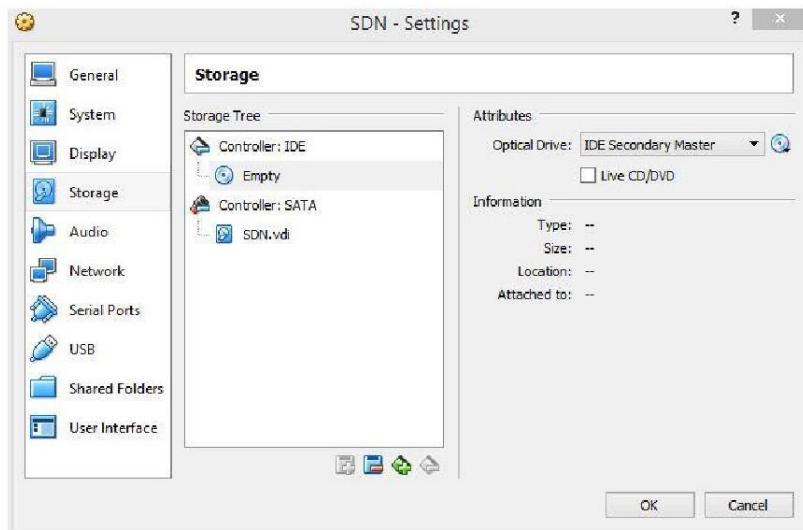
- Lalu aturlah dimana anda ingin menyimpan file virtualbox anda dana aturlah berapa memori yang anda butuhkan, lalu klik create



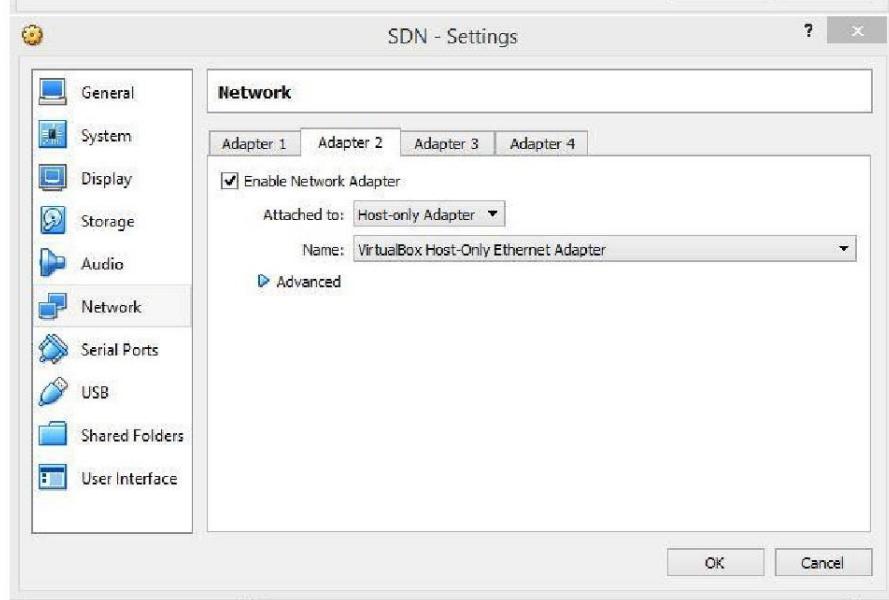
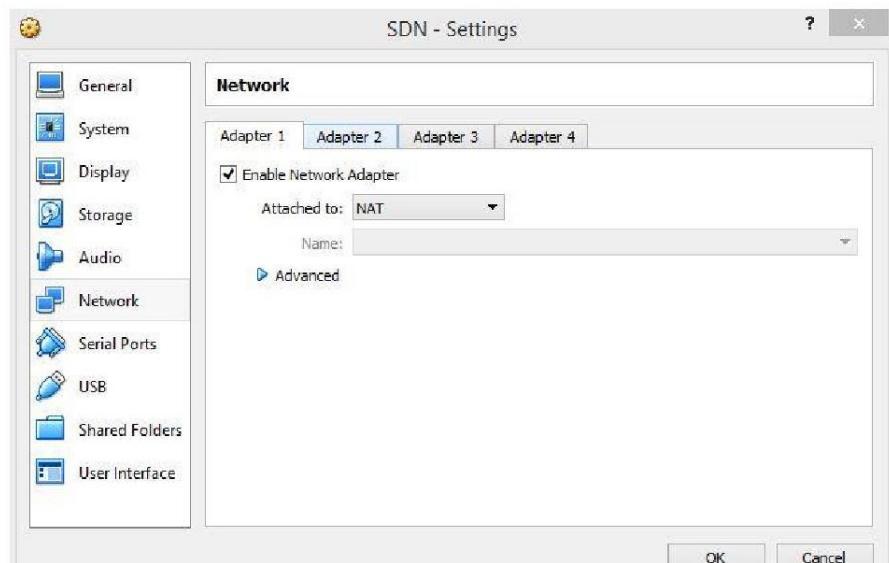
- Setelah proses selesai, klik nama virtual yang kita buat tadi, lalu klik setting.



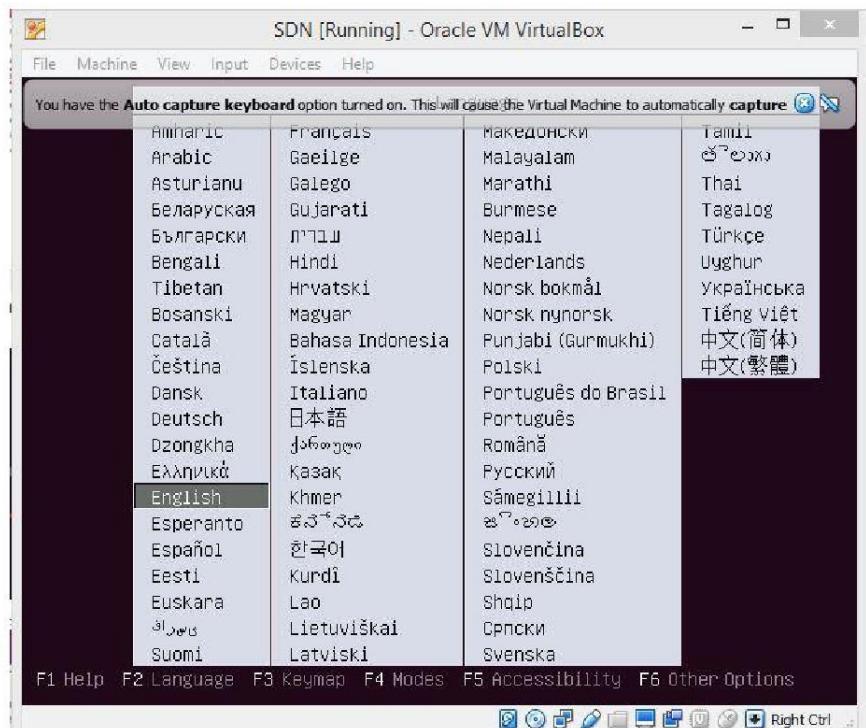
- Lalu klik storage, klik empty, lalu klik logo CD yang disamping tulisan IDE Secondary Master, lalu pilih file berformat .iso anda.



- Lalu, pindah ke bagian Network, pada adapter 1 tidak perlu diubah (default), lalu di adapter 2, centang Enable Network Adapter, ubah attached to menjadi Host-only Adapter, lalu klik OK.



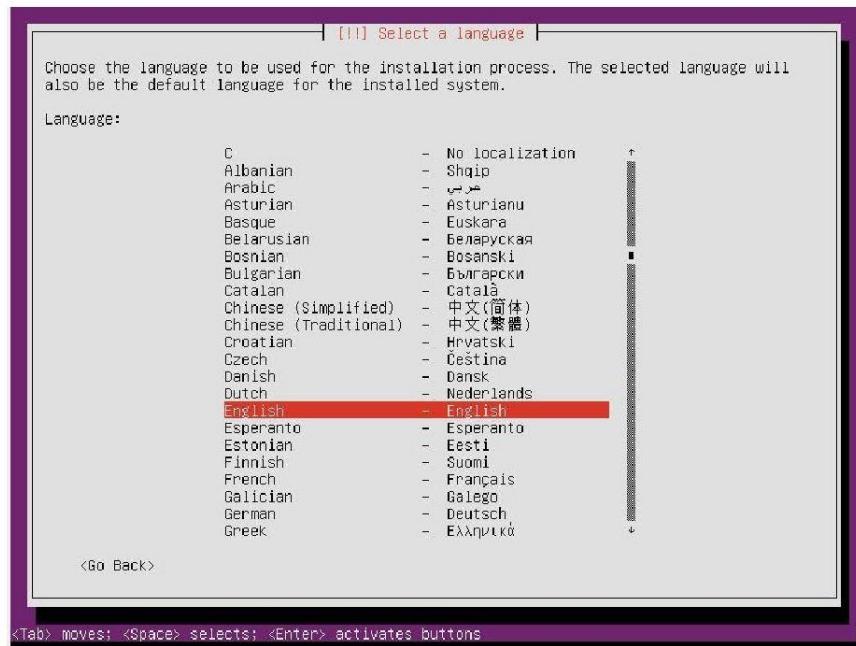
- Jalankan sistem nya dengan mengklik start, lalu tunggu sebentar hingga muncul menu pemilihan Bahasa. (disini saya memilih Bahasa Inggris)



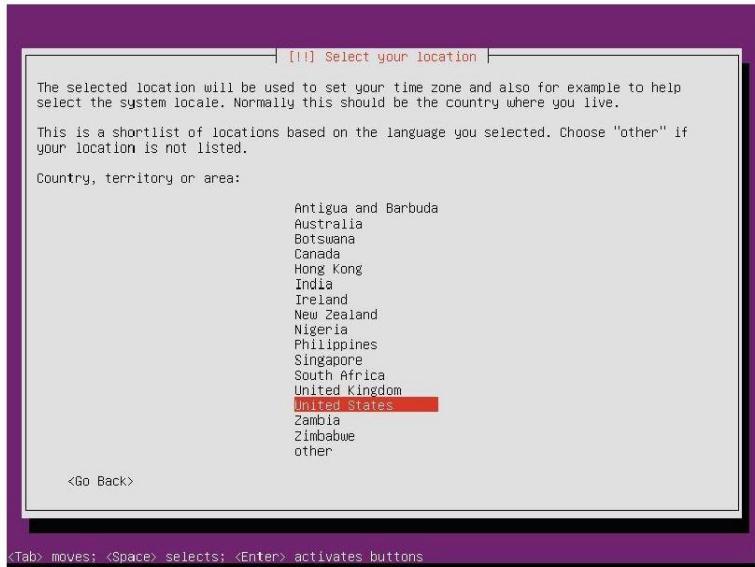
- Lalu pilih pilihan Install Ubuntu Server



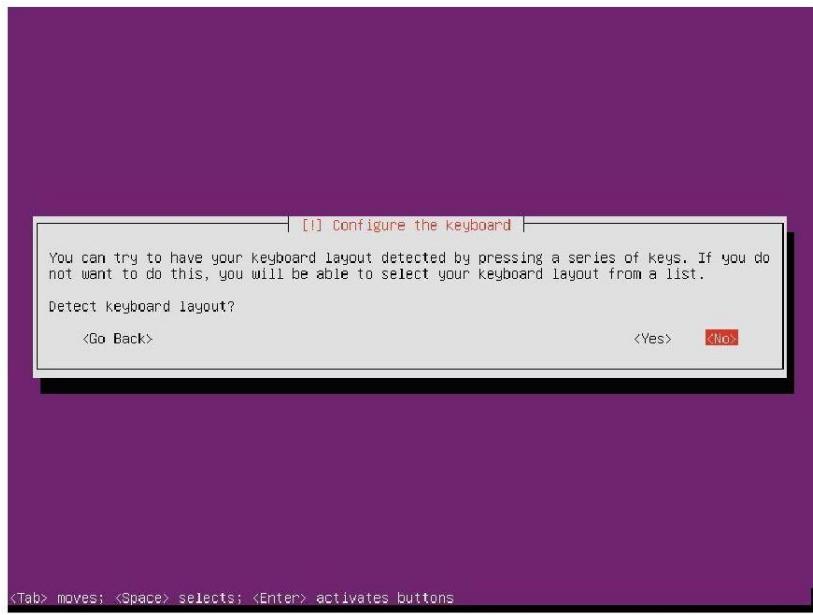
- ## ➤ Pilih Language



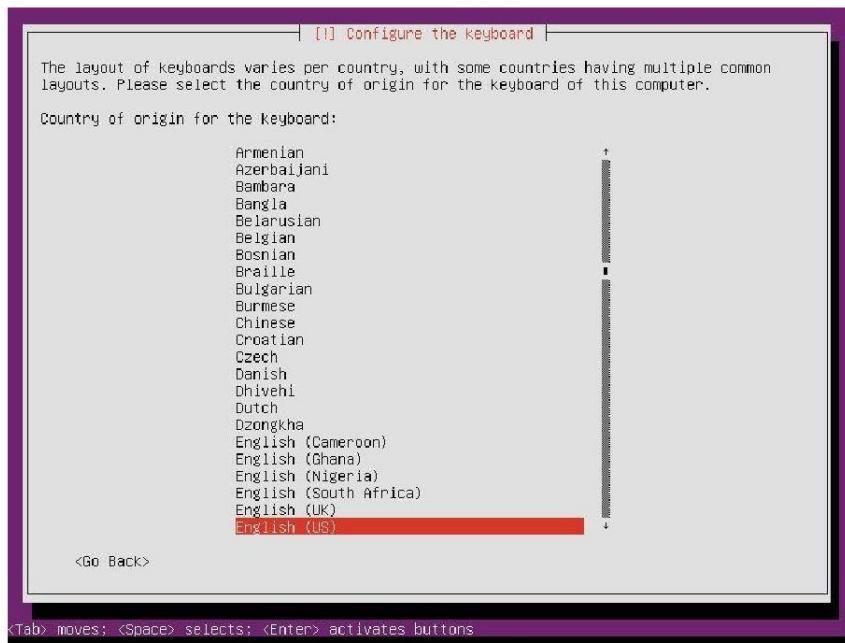
➤ Pilih country atau territory area

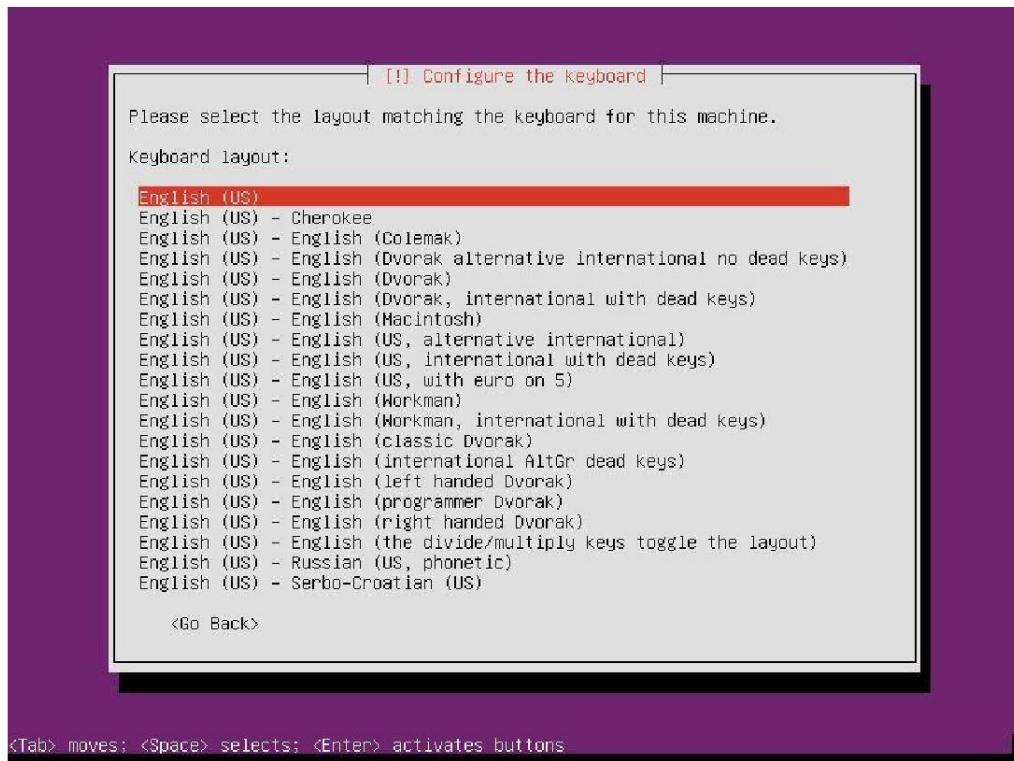


➤ Pilih No pada pengaturan Detect Keyboard Layout.

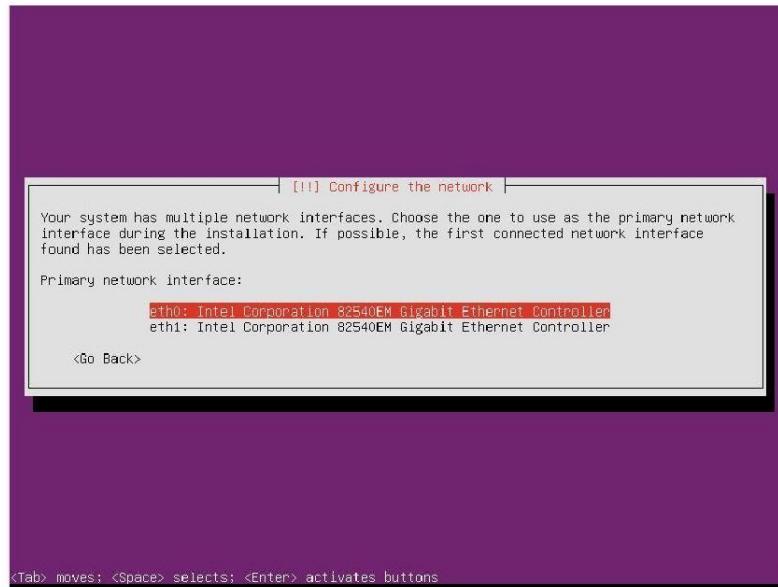


- Pilih pilihan English (US) untuk mengatur keyboard layout, lalu tunggu hingga proses selesai.

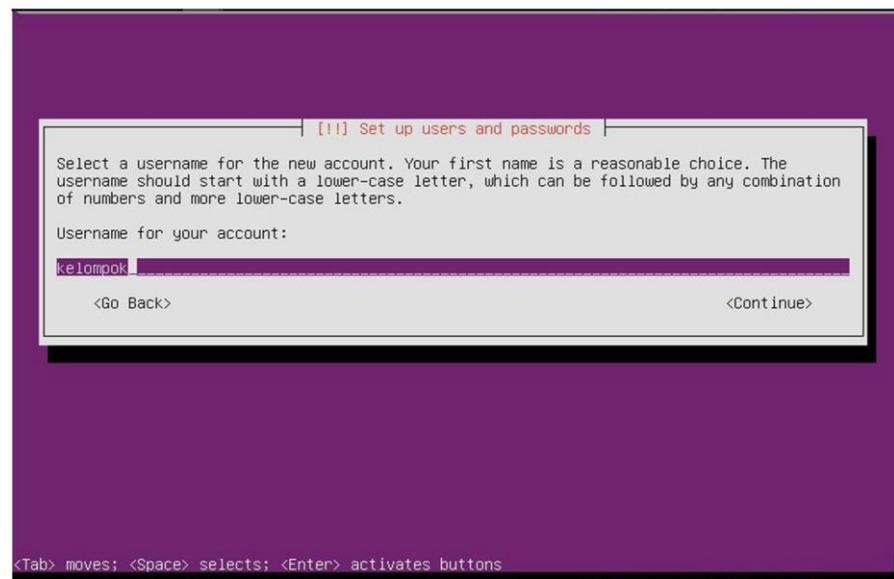
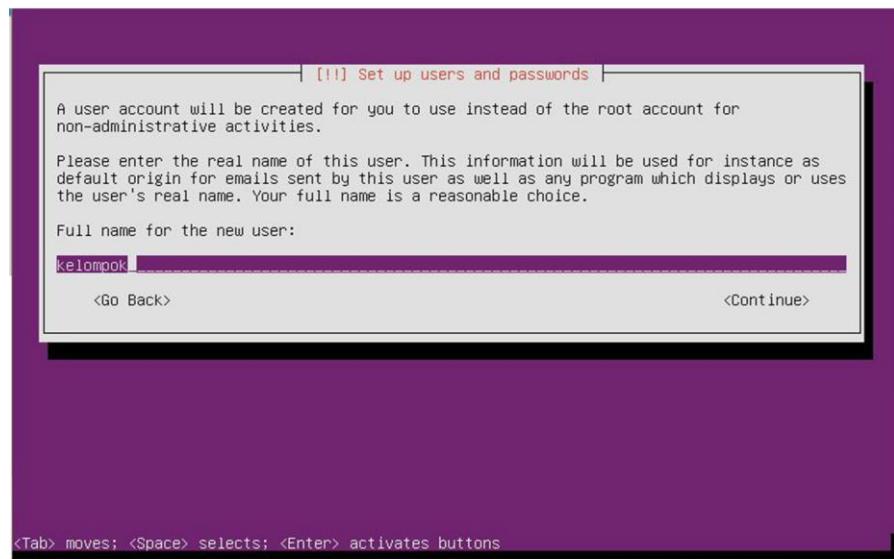
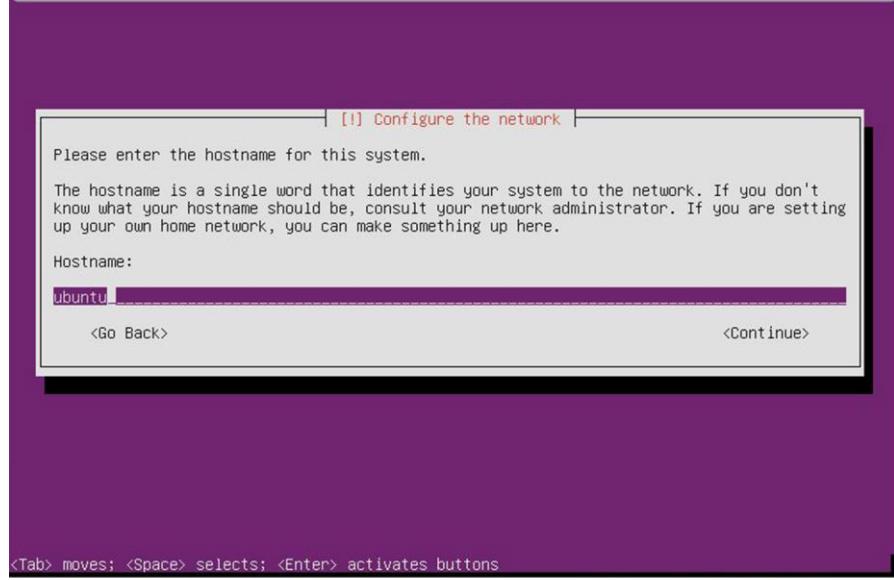


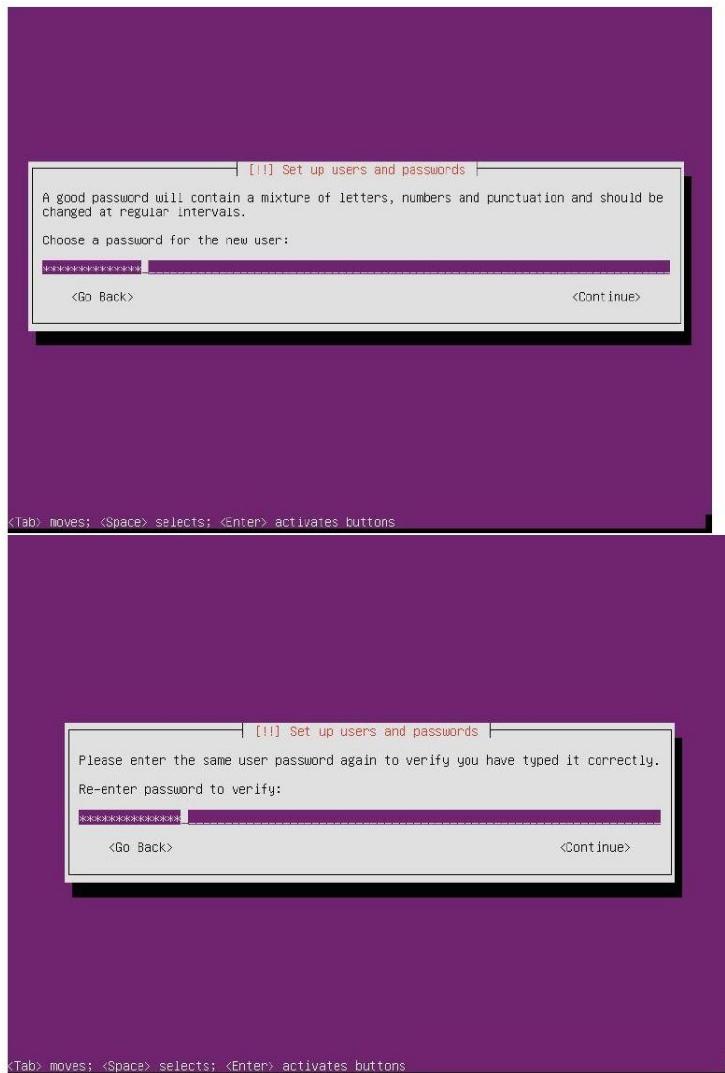


- Setelah proses selesai, pilih eth0 pada pengaturan primary network.



- Isilah nama hostname (disini saya mengisi hostname nya dengan nama Ubuntu), lalu isi Full Name anda, Username dan password untuk anda gunakan sewaktu login.





- Pilih no pada pengaturan Encrypt your Home Directory. Jika memilih No, maka semua user bisa melihat direktori home anda



- Pilih Zona Waktu



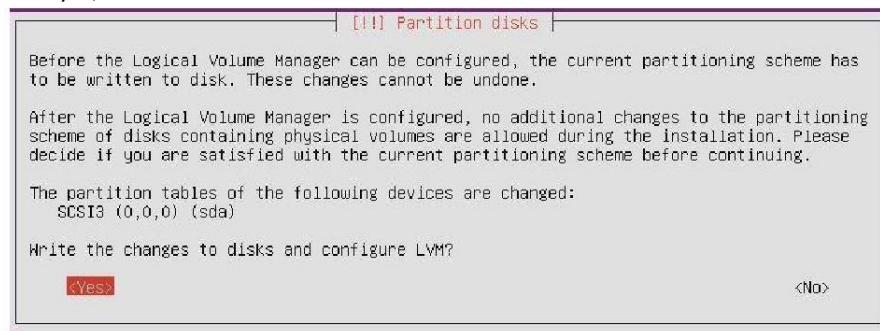
- Pilih Guided – use entire disk and set up LVM pada pengaturan partitioning method



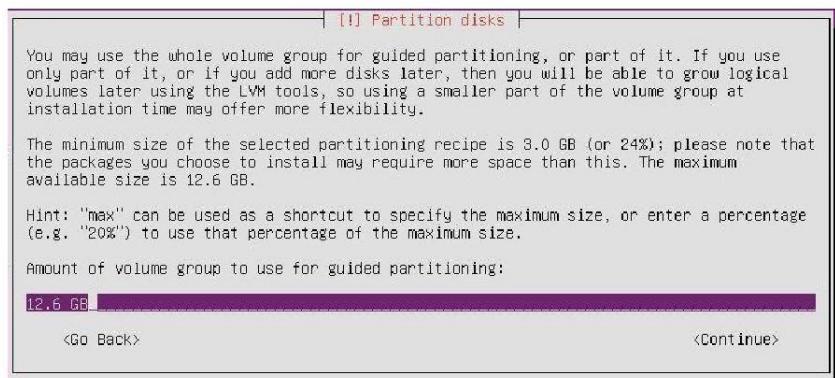
- Pilih disk untuk di partisi, lalu tekan enter.



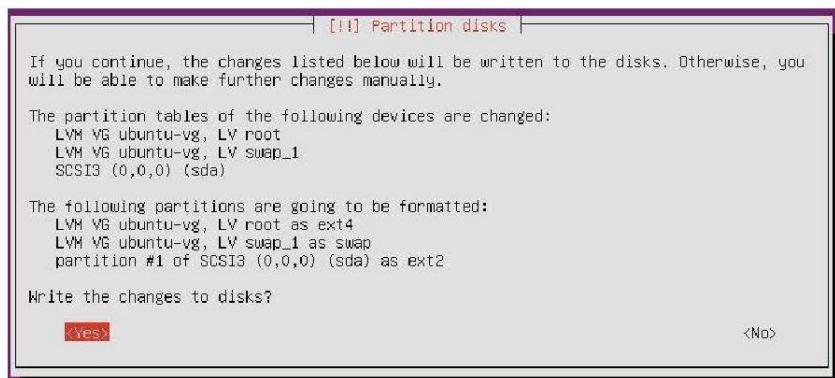
- Pilih yes, lalu enter



- Lalu, alokasikan lah memori yang akan digunakan. Disini saya tidak mengubah size nya, dan langsung mengenter pilihan continue.



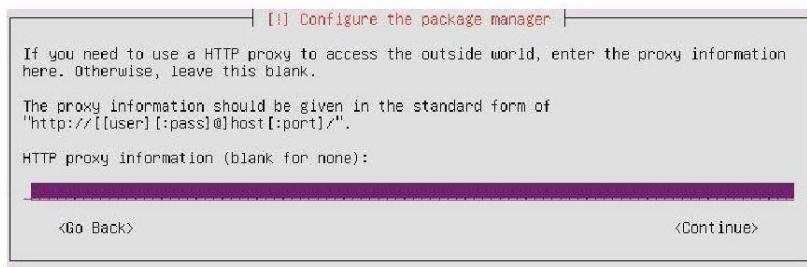
- Lalu pilih Yes



- Di bagian ini, kita diminta untuk mengisi HTTP Proxy Information, tidak perlu diisi. Apabila tidak mau diisi, kosongkan saja.



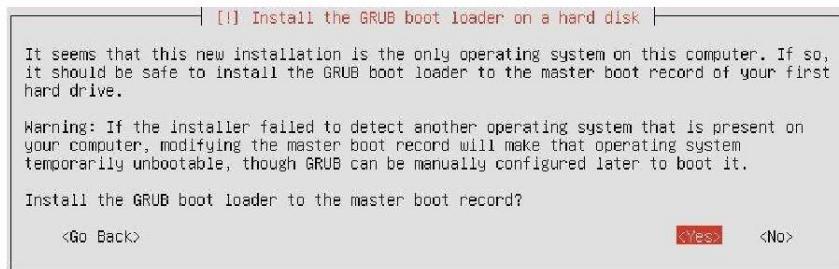
- Setelah menunggu beberapa proses, pilih No Automatic Updates, agar sistem operasi tidak mengupdate sistemnya secara otomatis.



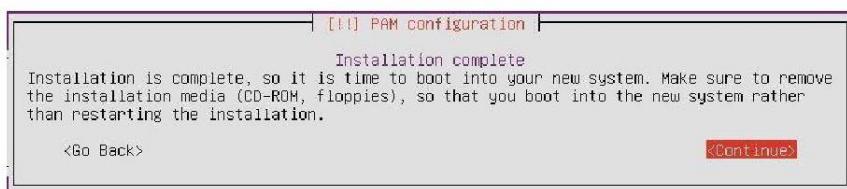
- Pilihlah software yang perlu diinstal. Software yang diinstal adalah : OpenSSH Server, DNS server, PostgreSQL database, Print server, Samba File Sercver, dan Virtual Machine Test.



- Tungguhlah beberapa proses, lalu apabila muncul permintaan GRUB LOADER, pilihlah Yes.



- Tungguhlah dalam proses instalasi Ubuntu server. Apabila perbaikan sudah selesai, maka akan muncul begini, lalu pilih continue. Proses instalasi selesai.



### 3. Download dan install prerequisites

- Pertama sekali, kita lihat dan konfigurasi IP Address di Ubuntu server dengan menggunakan perintah `ip addr show`

```
2014 [Berjalan] - Oracle VM VirtualBox
Berkas Mesin Tilik Masukan Peranti Bantuan
applicable law.

kelompok@ubuntu:~$ ifconfig
eth0      Link encap:Ethernet HWaddr 08:00:27:1b:cb:3a
          inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe1b:cb3a/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                  RX packets:119 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:192 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:81213 (81.2 KB) TX bytes:22225 (22.2 KB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING MTU:65536 Metric:1
                  RX packets:80 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:80 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:0
                  RX bytes:33541 (33.5 KB) TX bytes:33541 (33.5 KB)

virbr0   Link encap:Ethernet HWaddr d6:b0:0c:fd:b1:86
          inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

kelompok@ubuntu:~$ sudo nano /etc/network/interfaces
```

Terlihat pada gambar diatas eth1 belum memiliki IP Address. Jaringan eth1 harus kita konfigurasikan sebagai default host dengan cara mengedit file /etc/network/interfaces. Ketiklah perintah sudo nano /etc/network/interfaces, dan tambahkan baris :

```
# The host-only network interface
auto eth1
iface eth1 inet dhcp
```

```

SDN [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 2.2.6           File: /etc/network/interfaces      Modified

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp

# The host-only network interfaces
auto eth1
iface eth1 inet dhcp

```

The terminal window has a menu bar with 'File', 'Machine', 'View', 'Input', 'Devices', and 'Help'. Below the menu is the nano editor's status bar showing 'GNU nano 2.2.6', 'File: /etc/network/interfaces', and 'Modified'. At the bottom is a toolbar with various icons.

- Setelah anda menambahkan baris tersebut, save dengan menekan tombol **ctrl + O**, lalu ikuti perintah nya, dan tekan tombol **ctrl + X** untuk keluar dari editor. Restart kembali Ubuntu Server anda untuk melihat perubahan IP Address anda dengan mengetikkan **ifconfig**

```

eth1      Link encap:Ethernet HWaddr 08:00:27:02:75:2f
          inet addr:192.168.56.101 Bcast:192.168.56.255 Mask:255.255.255.0
                  inet6 addr: fe80::a00:27ff:fe02:752f/64 Scope:Link
                      UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                      RX packets:46 errors:0 dropped:0 overruns:0 frame:0
                      TX packets:89 errors:0 dropped:0 overruns:0 carrier:0
                      collisions:0 txqueuelen:1000
                      RX bytes:7341 (7.3 KB) TX bytes:13867 (13.8 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
                  inet6 addr: ::1/128 Scope:Host
                      UP LOOPBACK RUNNING MTU:65536 Metric:1
                      RX packets:41 errors:0 dropped:0 overruns:0 frame:0
                      TX packets:41 errors:0 dropped:0 overruns:0 carrier:0
                      collisions:0 txqueuelen:0
                      RX bytes:17761 (17.7 KB) TX bytes:17761 (17.7 KB)

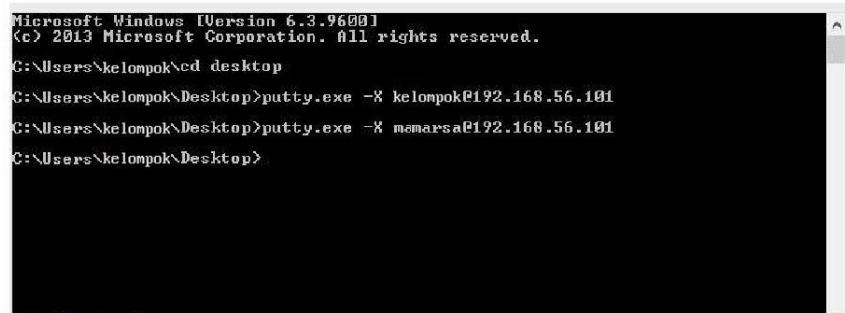
virbr0    Link encap:Ethernet HWaddr b2:33:00:cf:b7:9b
          inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
                      UP BROADCAST MULTICAST MTU:1500 Metric:1
                      RX packets:0 errors:0 dropped:0 overruns:0 frame:0
                      TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
                      collisions:0 txqueuelen:0
                      RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

marsa@ubuntu:~$ 

```

The terminal window has a menu bar with 'File', 'Machine', 'View', 'Input', 'Devices', and 'Help'. Below the menu is the status bar showing the user name 'marsa@ubuntu' and the prompt '\$'. At the bottom is a toolbar with various icons.

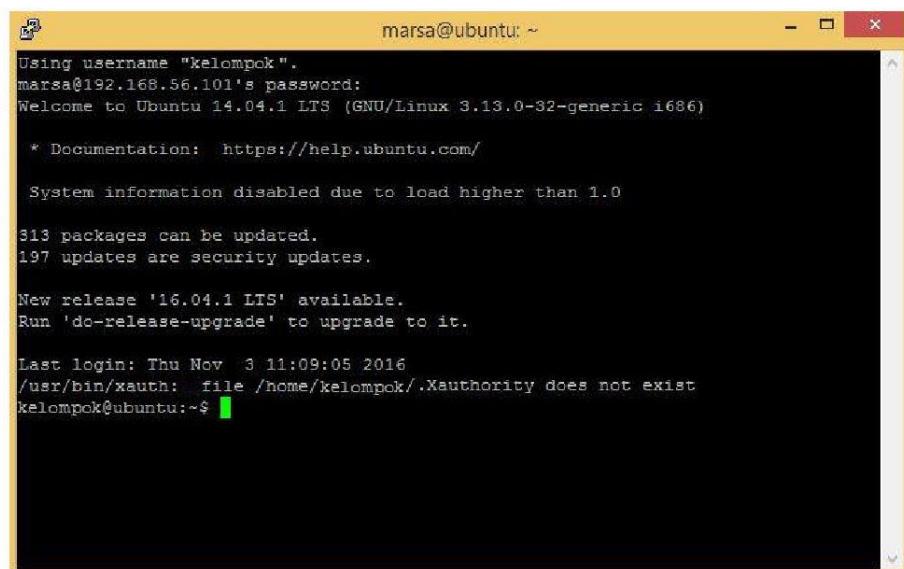
- IP Address sudah ada, untuk mengecek keaktifan dari jaringan tersebut, gunakan cara SSH IP Address dengan menggunakan Putty di windows.



```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\kelompok>cd desktop
C:\Users\kelompok\Desktop>putty.exe -X kelompok@192.168.56.101
C:\Users\kelompok\Desktop>putty.exe -X memarsa@192.168.56.101
C:\Users\kelompok\Desktop>
```

Buka Command Prompt di Windows, lalu arahkan lokasi anda ke tempat anda menyimpan file putty.exe, lalu ketikkan perintah diatas. Berikut tampilan jika sudah berhasil melakukan SSH



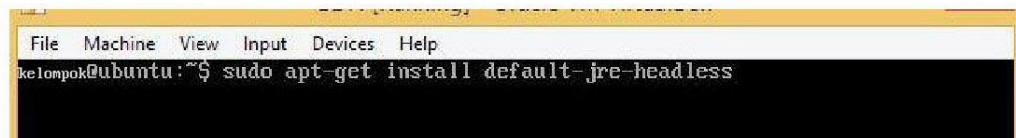
```
marsa@ubuntu: ~
Using username "kelompok".
marsa@192.168.56.101's password:
Welcome to Ubuntu 14.04.1 LTS (GNU/Linux 3.13.0-32-generic i686)

 * Documentation: https://help.ubuntu.com/
System information disabled due to load higher than 1.0
313 packages can be updated.
197 updates are security updates.

New release '16.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Thu Nov  3 11:09:05 2016
/usr/bin/xauth: file /home/kelompok/.Xauthority does not exist
kelompok@ubuntu:~$
```

- Setelah berhasil mengkonfigurasi IP Address, mari kita coba menginstall Prerequisites. Pertama, kita lakukan dengan melakukan instalasi Java di Ubuntu server. Ketikkanlah command `sudo apt-get install default-jre-headless`



```
File Machine View Input Devices Help
kelompok@ubuntu:~$ sudo apt-get install default-jre-headless
```

Tunggu proses selesai, lalu ketikkan perintah `nano ~/.bashrc`, lalu tambahkan **export JAVA\_HOME=/usr/lib/jvm/default-java**, dan jalankan file tersebut dengan perintah `source ~/.bashrc`

#### 4. Download dan Install OpenDayLight

- Ketik command ini di terminal Ubuntu server : `wget https://nexus.opendaylight.org/content/groups/public/org/opendaylight/integration/distribution-karaf/0.4.0-Beryllium/distribution-karaf-0.4.0-Beryllium.tar.gz` dan tunggu hingga proses selesai.

```

SDN [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kelompok@ubuntu:~$ wget https://nexus.opendaylight.org/content/groups/public/org/opendaylight/integration/distribution-karaf/0.4.0-Beryllium/distribution-karaf-0.4.0-Beryllium.tar.gz
--2016-11-03 11:25:19-- https://nexus.opendaylight.org/content/groups/public/org/opendaylight/integration/distribution-karaf/0.4.0-Beryllium/distribution-karaf-0.4.0-Beryllium.tar.gz
Resolving nexus.opendaylight.org (nexus.opendaylight.org)... 72.3.167.142, 2001:4800:1681:103:ff7a:1993:14ea:bc0d
Connecting to nexus.opendaylight.org (nexus.opendaylight.org):72.3.167.142:443...
.. connected.
HTTP request sent, awaiting response... 200 OK
Length: 293750321 (280M) [application/x-gzip]
Saving to: 'distribution-karaf-0.4.0-Beryllium.tar.gz'

26% [=====>                                         ] 78,700,214  92.6KB/s eta 27m 28s^
55% [=====*****->                               ] 162,635,446 138KB/s eta 18m 3s ^
77% [=====*****->                               ] 228,277,942 40.5KB/s eta 9m 21s ^
97% [=====*****->                               ] 287,506,102 116KB/s eta 57s ^
97% [=====*****->                               ] 287,514,294 118KB/s eta 55s ^
100%[=====*****->] 293,750,321 127KB/s in 43m 8s

2016-11-03 12:08:29 (111 KB/s) - 'distribution-karaf-0.4.0-Beryllium.tar.gz' saved [293750321/293750321]

kelompok@ubuntu:~$ clear

```

- Ketika sudah berhasil di download, extract file tar OpenDayLight tadi, dengan menggunakan perintah `tar -xvf distribution-karaf-0.4.0-Beryllium.tar.gz`

```

SDN [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kelompok@ubuntu:~$ tar -xvf distribution-karaf-0.4.0-Beryllium.tar.gz_

```

```

SDN [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
distribution-karaf-0.4.0-Beryllium/system/org/springframework/spring-webmvc/3.1.4.RELEASE/spring-webmvc-3.1.4.RELEASE.jar
distribution-karaf-0.4.0-Beryllium/system/org/springframework/spring-webmvc/maven-metadata-local.xml
distribution-karaf-0.4.0-Beryllium/system/org/uncommons/math//commons-math/1.2.2a_remote.repositories
distribution-karaf-0.4.0-Beryllium/system/org/uncommons/math/commons-math/1.2.2a/uncommons-math-1.2.2a.jar
distribution-karaf-0.4.0-Beryllium/system/org/uncommons/math/commons-math/maven-metadata-local.xml
distribution-karaf-0.4.0-Beryllium/version.properties
distribution-karaf-0.4.0-Beryllium/bin/
distribution-karaf-0.4.0-Beryllium/bin/client
distribution-karaf-0.4.0-Beryllium/bin/configure_cluster.sh
distribution-karaf-0.4.0-Beryllium/bin/instance
distribution-karaf-0.4.0-Beryllium/bin/karaf
distribution-karaf-0.4.0-Beryllium/bin/setenv
distribution-karaf-0.4.0-Beryllium/bin/shell
distribution-karaf-0.4.0-Beryllium/bin/start
distribution-karaf-0.4.0-Beryllium/bin/status
distribution-karaf-0.4.0-Beryllium/bin/stop
distribution-karaf-0.4.0-Beryllium/bin/client.bat
distribution-karaf-0.4.0-Beryllium/bin/instance.bat
distribution-karaf-0.4.0-Beryllium/bin/karaf.bat
distribution-karaf-0.4.0-Beryllium/bin/setenv.bat
distribution-karaf-0.4.0-Beryllium/bin/shell.bat
distribution-karaf-0.4.0-Beryllium/bin/start.bat
distribution-karaf-0.4.0-Beryllium/bin/status.bat
distribution-karaf-0.4.0-Beryllium/bin/stop.bat
kelompok@ubuntu:~$ 

```

- Setelah itu, masuk kedalam direktoriya dengan menggunakan perintah cd distribution-karaf-0.4.0-Beryllium

```
kelompok@ubuntu:~$ cd distribution-karaf-0.4.0-Beryllium
kelompok@ubuntu:~/distribution-karaf-0.4.0-Beryllium$ ./bin/karaf

```

## 5. Install features

- Install features di Open DayLight

```
opendaylight-user@root>feature:install odl-restconf odl-l2switch-switch odl-mdsal-apidocs odl-dlux-all

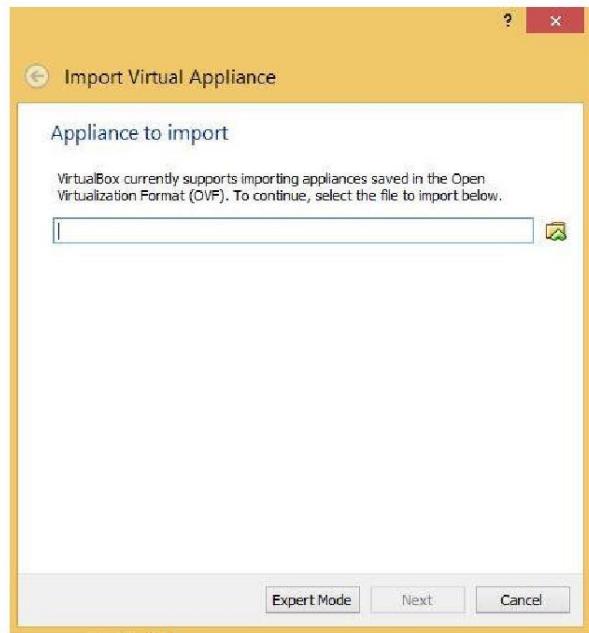
```

⌘

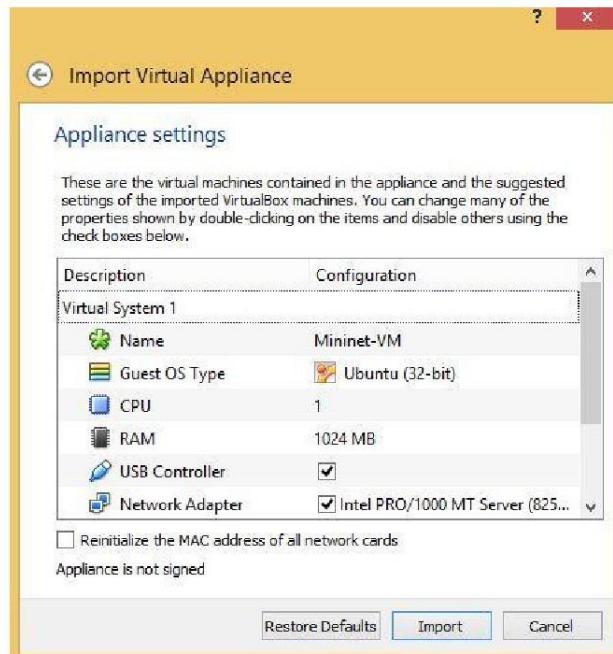
```
opendaylight-user@root>feature:install odl-l2switch-switch odl-mdsal-apidocs odl-dlux-all
Refreshing bundles com.google.guava (64), org.jboss.netty (15?), org.eclipse.persistence.moxy (121), org.eclipse.persistence.core (120)
opendaylight-user@root>
```

## 6. Download Mininet VM Image

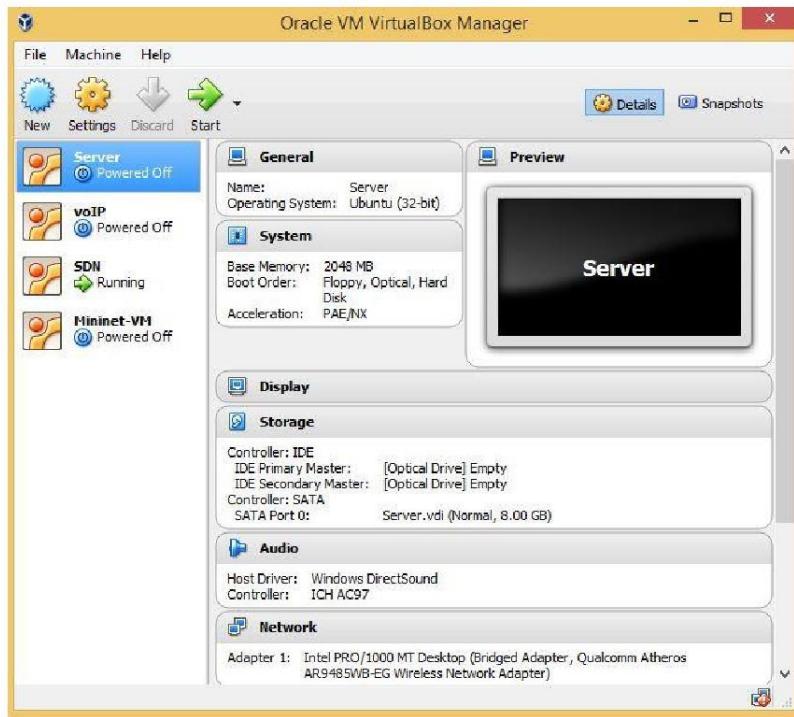
- Buka situs <https://mininet.org/download> untuk mendownload mininet.
- Extract file yang sudah didownload. Didalam folder tersebut terdapat 2 file, yang akan kita gunakan adalah file yang berformat .ovf
- Di virtualbox, klik file, lalu klik Import Appliance.
- Klik icon folder yang disebelah kanan, lalu carilah file mininet. Jika sudah dapat, klik next



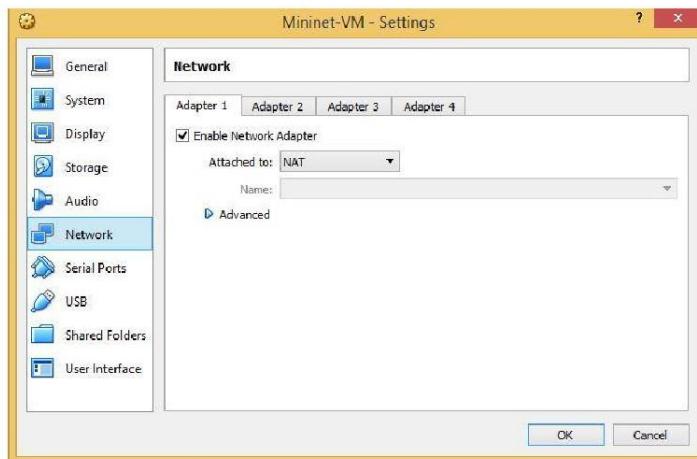
- Setelah itu, klik import

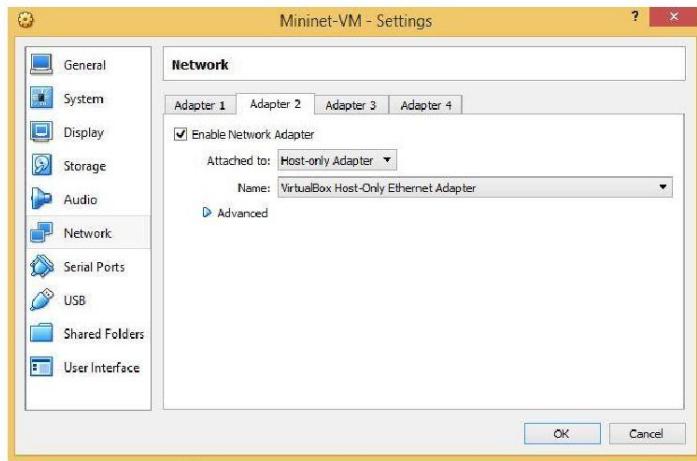


- Tunggu proses impornya selesai, apabila sudah selesai, maka akan muncul Virtual Machine yang baru

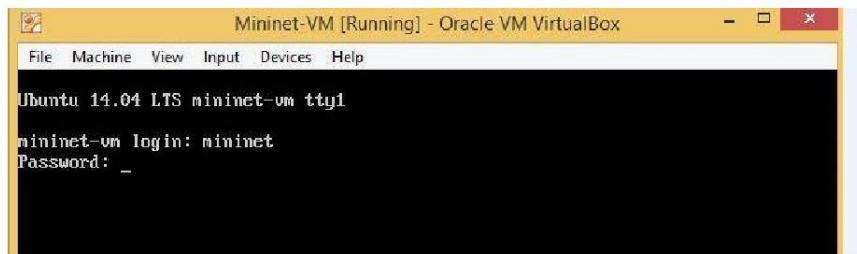


- Agar ODL bisa terintegrasi, ubahlah settingan network mininet, dengan cara klik Settings, lalu klik Network, di Adapter 1 biarkan saja default, di adapter 2 centang Enable Network Adapter, lalu Attached to Host-only Adapter.

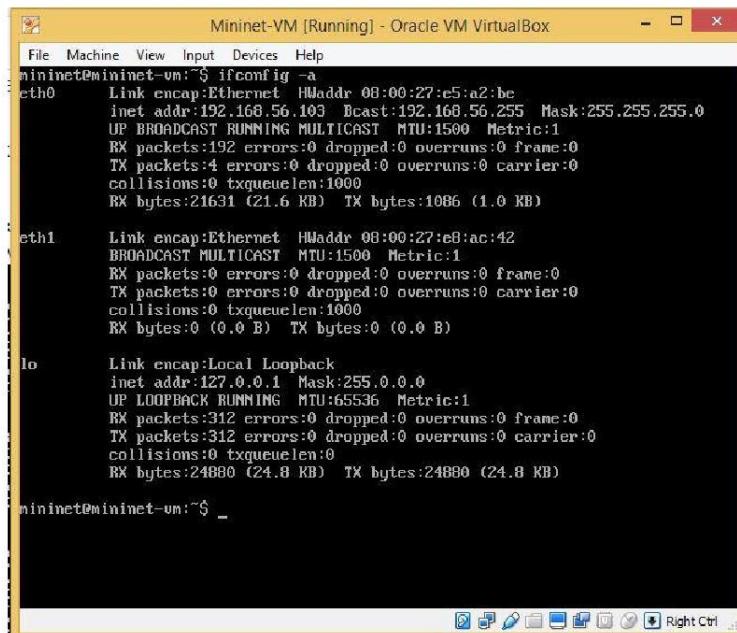




- Kemudian, klik start pada Virtual Machine mininet, lalu login dengan username : mininet, password : mininet



- Ketik perintah ifconfig -a untuk melihat IP Address nya, di eth0, IP Address saya adalah 192.168.56.103



- Coba ping IP nya untuk mengetahui apakah berfungsi atau tidak, dengan mengetikkan perintah ping -c 1 192.168.56.103

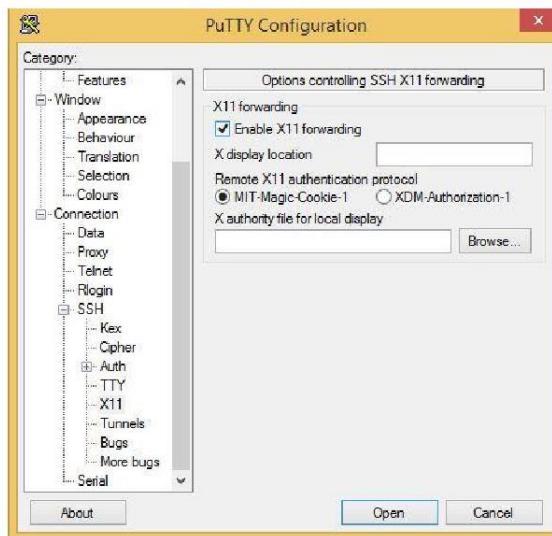
```

mininet@mininet-vm:~$ ping -c 1 192.168.56.103
PING 192.168.56.103 (192.168.56.103) 56(84) bytes of data.
64 bytes from 192.168.56.103: icmp_seq=1 ttl=64 time=1.67 ms

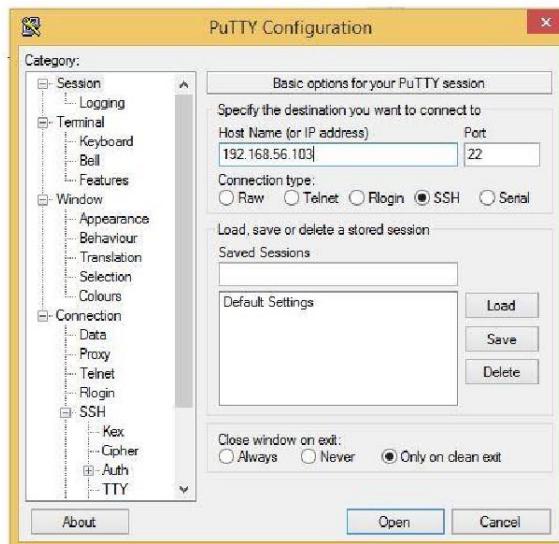
--- 192.168.56.103 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1.672/1.672/1.672/0.000 ms
mininet@mininet-vm:~$ 

```

- Remote mininet dengan SSH menggunakan putty
- Pastikan X ming X Server for Windows sudah terinstall dan sudah dijalankan.
- Setelah diinstall, buka aplikasi Putty.exe, klik tulisan SSH, lalu klik tulisan X11, lalu centang kan enable X11 Forwarding



- Kemudian kembali ke session, dan ketikkan IP mininet tadi



- Berikut tampilannya setelah berhasil melakukan SSH dari windows, lalu ketikkan **xterm -sb &** untuk meremote Mininet di terminal hasil SSH.

```

Using username "mininet".
mininet@192.168.56.103's password:
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.13.0-24-generic i686)

 * Documentation: https://help.ubuntu.com/
Last login: Fri Nov  4 14:56:51 2016
/usr/bin/xauth:  file /home/mininet/.Xauthority does not exist
mininet@mininet-vm:~$ xterm -sb &

```

- Berikut tampilan sesudah berhasil di remote, akan muncul tampilan X ming X server.



## 7. Konesikan GUI dengan ODL

Koneksikan GUI dengan ODL, disini kita akan mencoba membuat sebuah topologi jaringan.

- Ketikkan perintah **sudo mn --topo linear,3 --mac=controller=remote,ip=192.168.56.101,port=22 --switch ovs,protocols=OpenFlow13**, lalu tekan enter.

```
X mininet@mininet-vm: ~
mininet@mininet-vm:~$ sudo mn --topo linear,3 --mac --controller=remote,ip=192.168.56.101,port=22 --switch ovs,protocols=OpenFlow13
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3
*** Adding switches:
s1 s2 s3
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (s2, s1) (s3, s2)
*** Configuring hosts
h1 h2 h3
*** Starting controller
c0
*** Starting 3 switches
s1 s2 s3 ...
*** Starting CLI:
```

Gambar diatas merupakan hasilnya.

- Coba lakukan ping dengan menggunakan perintah pingall, berikut hasilnya jika berhasil.

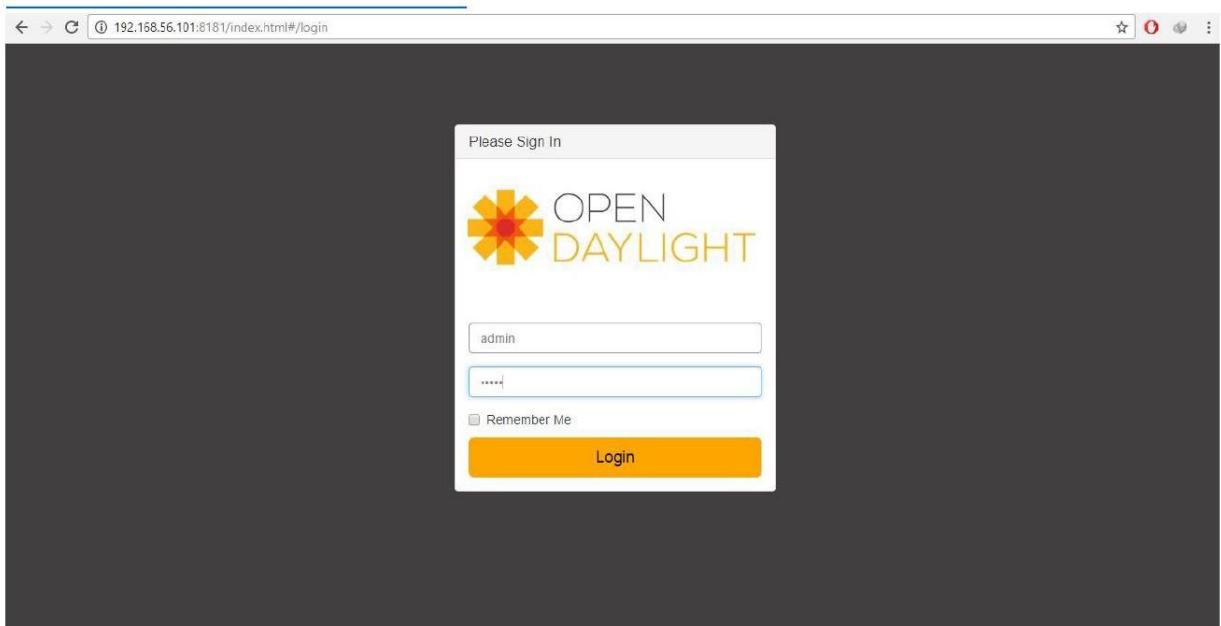
```
X mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3
h2 -> h1 h3
h3 -> h1 h2
*** Results: 0% dropped (6/6 received)
mininet> ■
```

Apabila sudah berhasil, maka topologi berhasil dibuat, dan bisa di ping semua. Sekarang integrasikan mininet dengan ODL.

#### 8. Integrasikan Mininet dengan ODL

Setelah berhasil membuat topologi,  
<http://192.168.56.101:8181/index.html>

buka browser dan bukalah link



Login dengan menggunakan username admin, dan password admin.

Setelah login, kita bisa melihat topologi yang sudah kita buat, seperti gambar berikut.

