

CS3530 Networking Hands-on

Module-1: VM Hosts Installation

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Objective and Contents

- Objective
 - Getting prepared for Module 2 and beyond
- Contents
 - Installing 2 VM instances of a Linux server on your Ubuntu desktop

Prerequisites

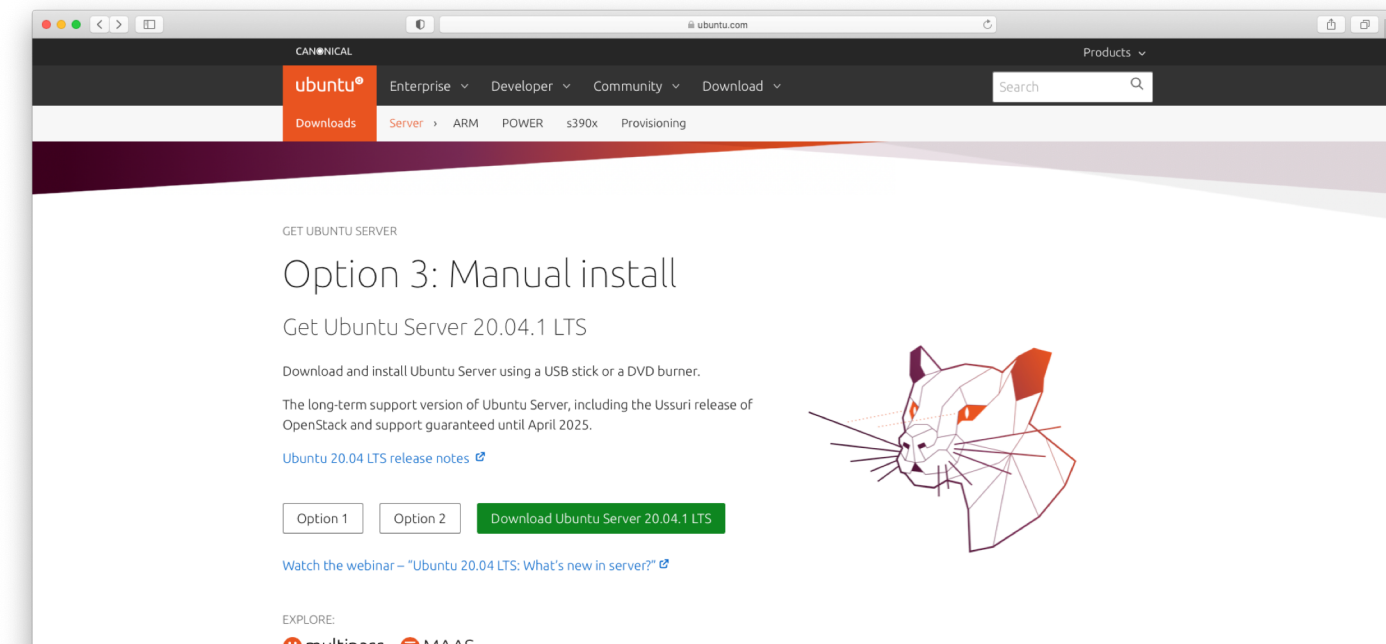
- This hands-on is assuming that you have Ubuntu Desktop as the native OS on your laptop or desktop computer.
- Mac and Windows users are recommended to enable dual boot on your laptop or desktop computer so that the hands-on can be performed properly.
- You may also use the free compute services (such as Amazon AWS) to run VMs.

Steps

- Downloading Ubuntu “Server” ISO Image
- Installing “virt-manager”
- Installing 2 VM instances of Ubuntu Server using virt-manager
- Performing post-installation configuration of Ubuntu Servers

Downloading Ubuntu “Server” ISO Image

- By the way, why “server”?
 - Less system requirement to run
 - CLI is good enough to perform the hands-on



Installing “virt-manager” to your Ubuntu Desktop

- Works for Ubuntu Desktop 20.04 LTS

```
sudo apt-get update
```

```
sudo apt-get install qemu-kvm libvirt-clients libvirt-daemon-  
system bridge-utils virt-manager vlan
```

```
sudo apt-get install iperf traceroute
```

- Used to Work for Ubuntu Desktop 18.04 LTS

```
sudo apt-get update
```

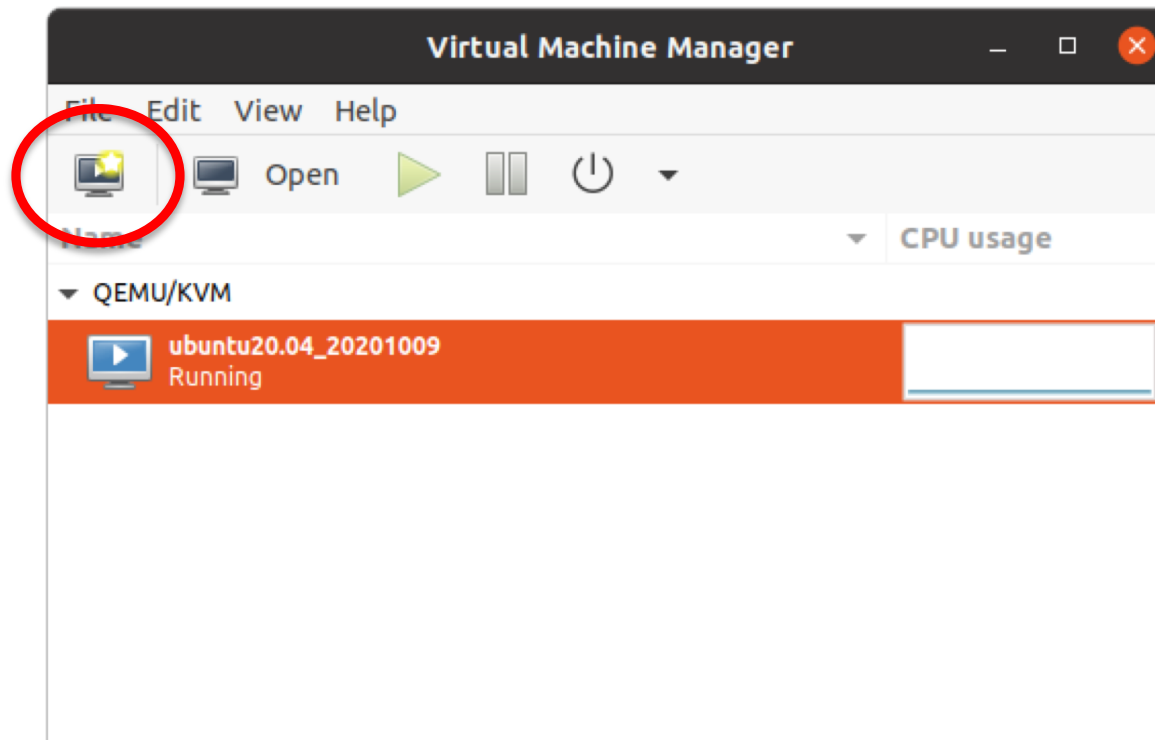
```
sudo apt-get install kvm libvirt-bin bridge-utils virt-manager  
vlan
```

```
sudo apt-get install iperf traceroute
```

Installing Ubuntu Server as a VM (1/4)

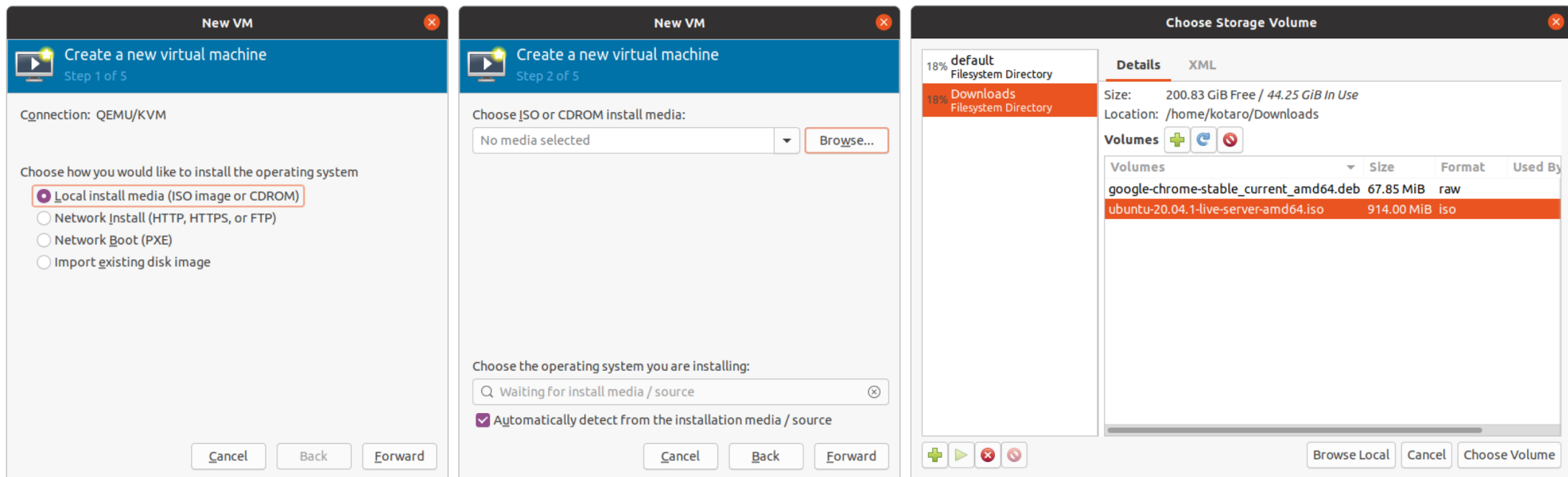
- Launch virt-manager and install a VM

`sudo virt-manager`



Installing Ubuntu Server as a VM (2/4)

- Default configuration works



Installing Ubuntu Server as a VM (3/4)

The image displays three sequential screenshots of the 'New VM' wizard in Oracle VM VirtualBox, showing the final steps of creating a new virtual machine for Ubuntu Server.

Step 3 of 5: Choose Memory and CPU settings:

- Memory: 1024 (Up to 31776 MiB available on the host)
- CPUs: 1 (Up to 8 available)

Step 4 of 5: Create a disk image for the virtual machine

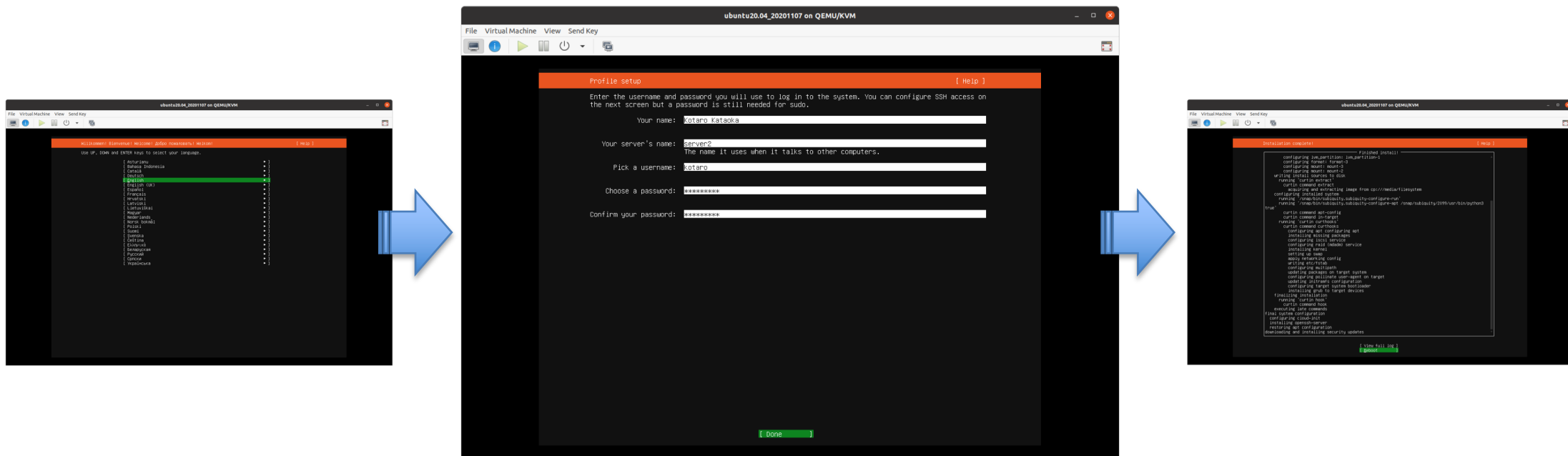
- ☒ Enable storage for this virtual machine
- ☒ Create a disk image for the virtual machine
 - 8.0 GiB (200.8 GiB available in the default location)
- ☐ Select or create custom storage

Step 5 of 5: Ready to begin the installation

- Name: ubuntu20.04_20201107
- OS: Ubuntu 20.04
- Install: Local CDROM/ISO
- Memory: 1024 MiB
- CPUs: 1
- Storage: 8.0 GiB ...ages/ubuntu20.04_20201107.qcow2
- ☐ Customize configuration before install
- ▶ Network selection

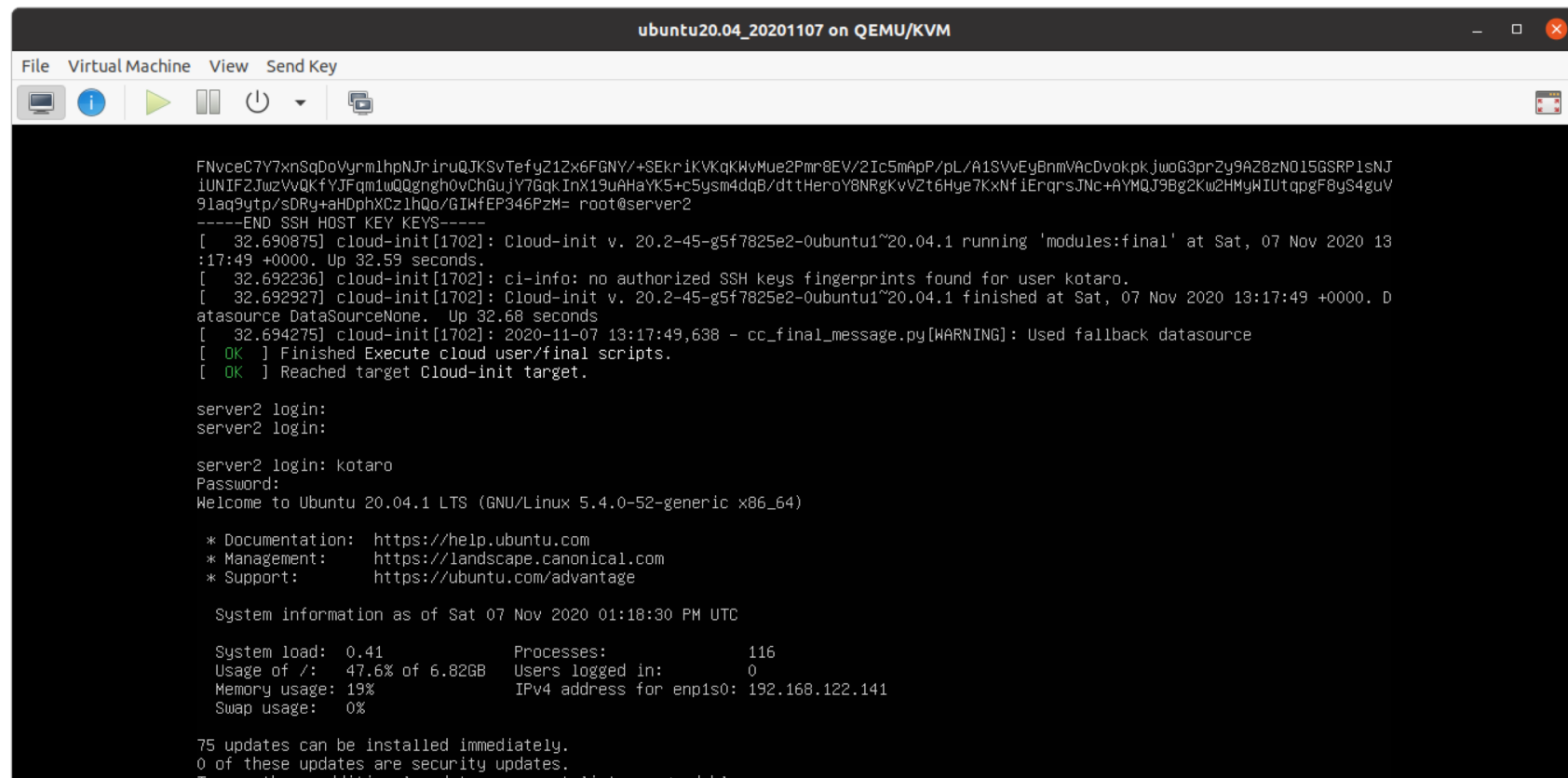
Installing Ubuntu Server as a VM (4/4)

- No need of specific configuration other than specifying a host name and a user account



Console Window (CLI) of Ubuntu Server VM

- Let the system reboot and login to the system



```
ubuntu20.04_20201107 on QEMU/KVM
File Virtual Machine View Send Key

FNvce07Y7xnSqDoVyrmlhpNJriruQJKSvTefyZ12x6FGNY/+SEkriKVkqKwMue2Pmr8EV/2Ic5mApP/pL/A1SVvEyBnmVAcDvokpkJwoG3prZy9A28zN015GSRP1sNJ
iUNIF2JwzVvQKfYJFqm1wQQnggh0vChGuJY7GqkInX19uAHaYK5+c5ysm4dqB/dtHteroY8NRgKvVZt6Hye7KxNf iErqrsJNc+AYMQJ9Bg2Kw2HMyHIutqpgF8yS4guV
91aq9ytp/sDRy+aHDphXCz1hQo/GIWfEP346PzM= root@server2
-----END SSH HOST KEY KEYS-----
[ 32.690875] cloud-init[1702]: Cloud-init v. 20.2-45-g5f7825e2-0ubuntu1~20.04.1 running 'modules:final' at Sat, 07 Nov 2020 13
:17:49 +0000. Up 32.59 seconds.
[ 32.692236] cloud-init[1702]: ci-info: no authorized SSH keys fingerprints found for user kotaro.
[ 32.692927] cloud-init[1702]: Cloud-init v. 20.2-45-g5f7825e2-0ubuntu1~20.04.1 finished at Sat, 07 Nov 2020 13:17:49 +0000. D
atasource DataSourceNone. Up 32.68 seconds
[ 32.694275] cloud-init[1702]: 2020-11-07 13:17:49,638 - cc_final_message.py[WARNING]: Used fallback datasource
[ OK ] Finished Execute cloud user/final scripts.
[ OK ] Reached target Cloud-init target.

server2 login:
server2 login:

server2 login: kotaro
Password:
Welcome to Ubuntu 20.04.1 LTS (GNU/Linux 5.4.0-52-generic x86_64)

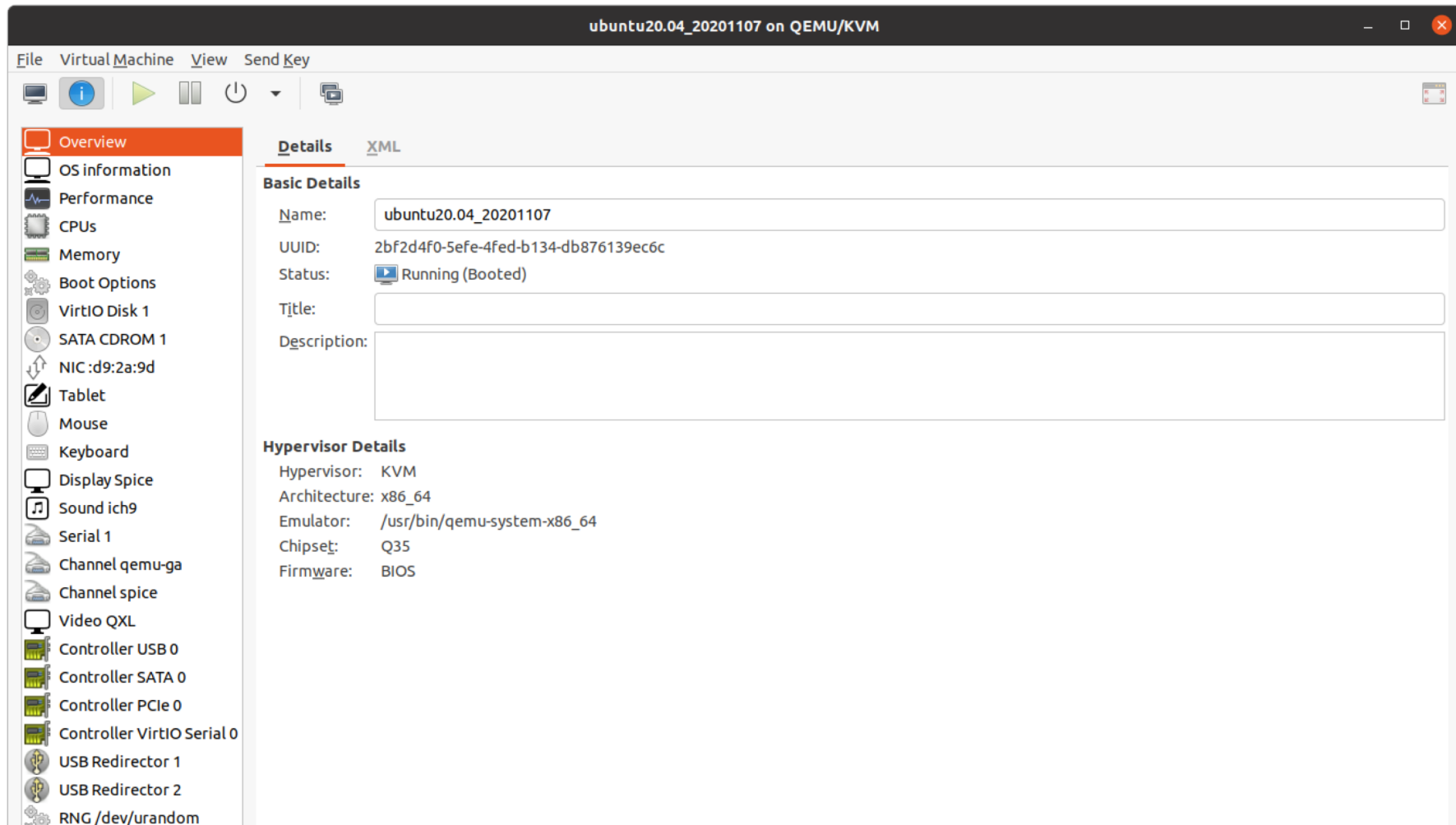
 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Sat 07 Nov 2020 01:18:30 PM UTC

System load: 0.41          Processes:                  116
Usage of /:  47.6% of 6.82GB Users logged in:              0
Memory usage: 19%          IPv4 address for enp1s0: 192.168.122.141
Swap usage:  0%

75 updates can be installed immediately.
0 of these updates are security updates.
To see these additional updates run: apt list --upgradable
```

Information (Property) of Ubuntu Server VM



Network Interface Card (NIC) Information on CLI and Information Property of virt-manager

- Use the following command to show the NIC information
`ip addr show`

The image displays two windows from the virt-manager application. The left window shows a terminal session with the command `ip addr show` executed, displaying details for the loopback interface `lo` and the ethernet interface `enp1s0`. The right window shows the GUI for the virtual machine's network settings, specifically the 'Details' tab for the 'NIC:d9:2a:9d' interface, showing it is connected to the 'default' NAT network with a 'virtio' device model.

Terminal Output (CLI):

```
kotaro@server2:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:d9:2a:9d brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.141/24 brd 192.168.122.255 scope global dynamic enp1s0
        valid_lft 3374sec preferred_lft 3374sec
    inet6 fe80::5054:ff:fed9:2a9d/64 scope link
        valid_lft forever preferred_lft forever
kotaro@server2:~$
```

GUI Details (NIC:d9:2a:9d):

- Network source: Virtual network 'default': NAT
- Device model: virtio
- MAC address: 52:54:00:d9:2a:9d
- IP address: 192.168.122.141
- Link state: ☒ active

Performing post-installation configuration of Ubuntu Servers

- Check the Internet connectivity from your VM

```
ping www.iith.ac.in
```

- Install some important network utilities

```
sudo apt-get install iperf traceroute
```

Installing 2nd Ubuntu Server

- Repeat the same installation procedure
or
- Copy the VM image with a different name and activate it
- If virt-manager uses “Virtual network ‘default’ : NAT” as Network Source, 2 VMs cannot communicate with each other. This situation is correct.

Done!!