

2026 Winter RocksDB Study

Linux on VM

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VirtualBox 설치

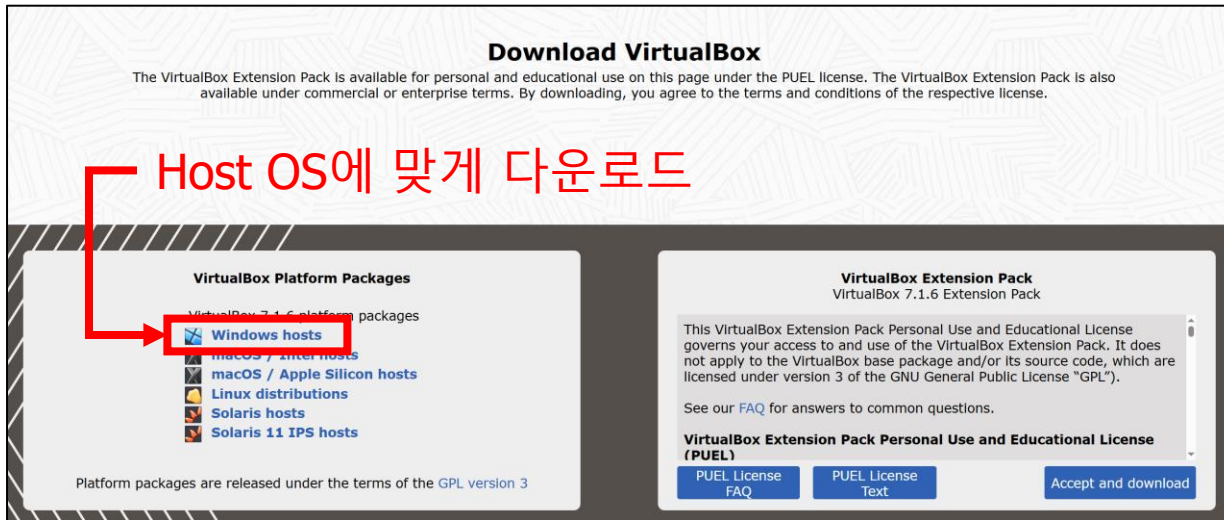
■ VirtualBox란?

- 오라클에서 개발한 오픈 소스 가상화 소프트웨어
- 하나의 운영 체제(OS)에서 다른 운영 체제를 가상 환경으로 실행할 수 있음
 - 강의에서는 Guest OS로 Linux Ubuntu를 사용
- Windows, macOS, Linux 등 다양한 운영 체제에서 사용 가능

1. Windows

1) VirtualBox 설치

- <https://www.virtualbox.org>



VirtualBox 다운로드 페이지

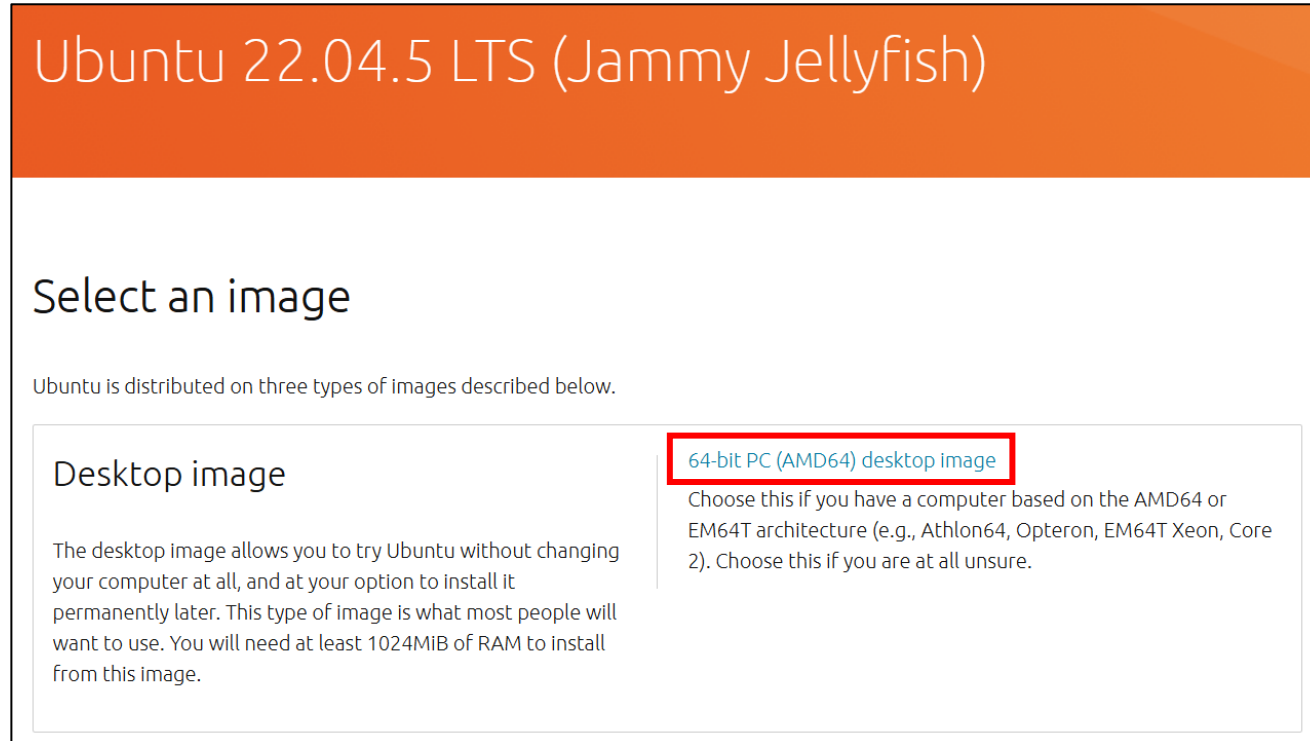


설치 후 VirtualBox 초기화면

1. Windows

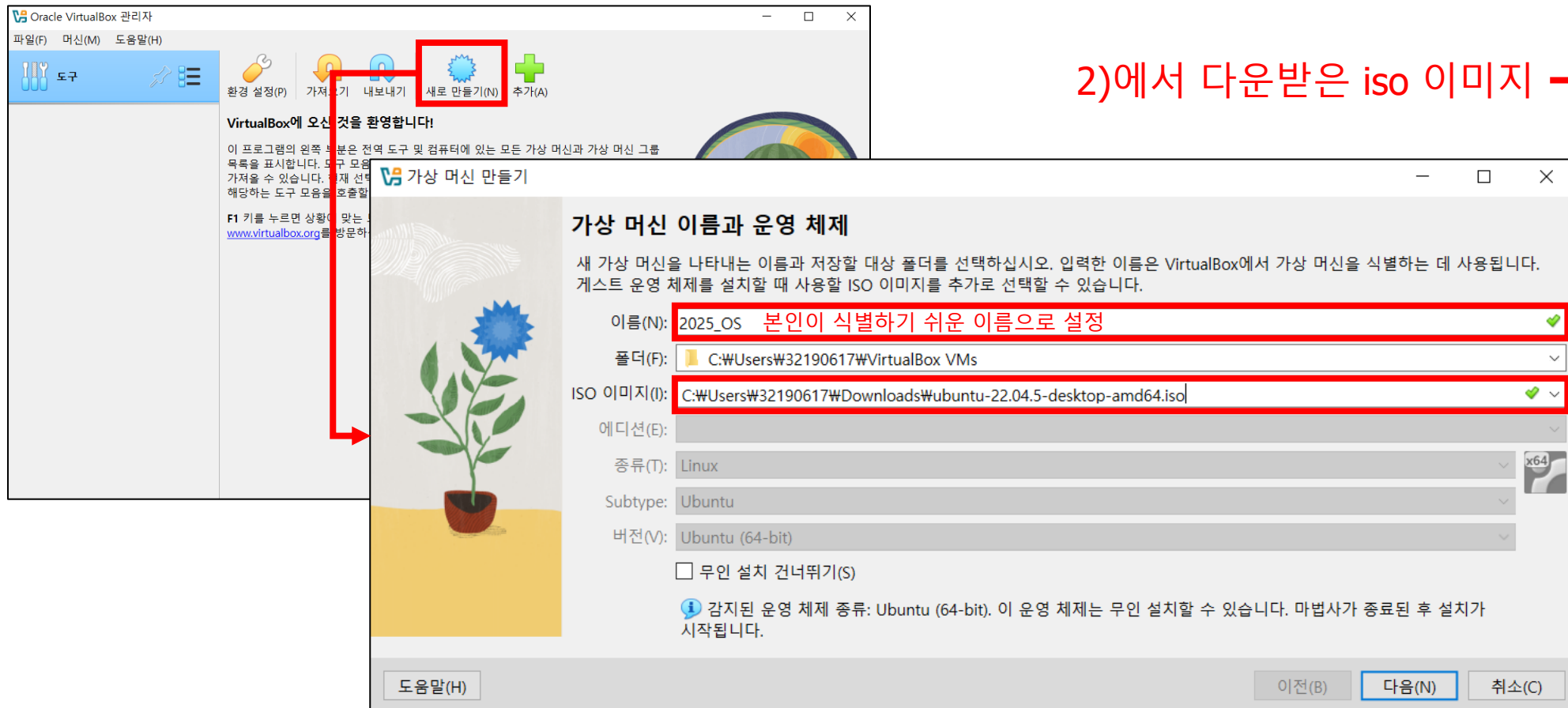
2) Ubuntu Desktop 22.04 이미지 다운로드 (AMD64)

- <https://releases.ubuntu.com/jammy/>



1. Windows

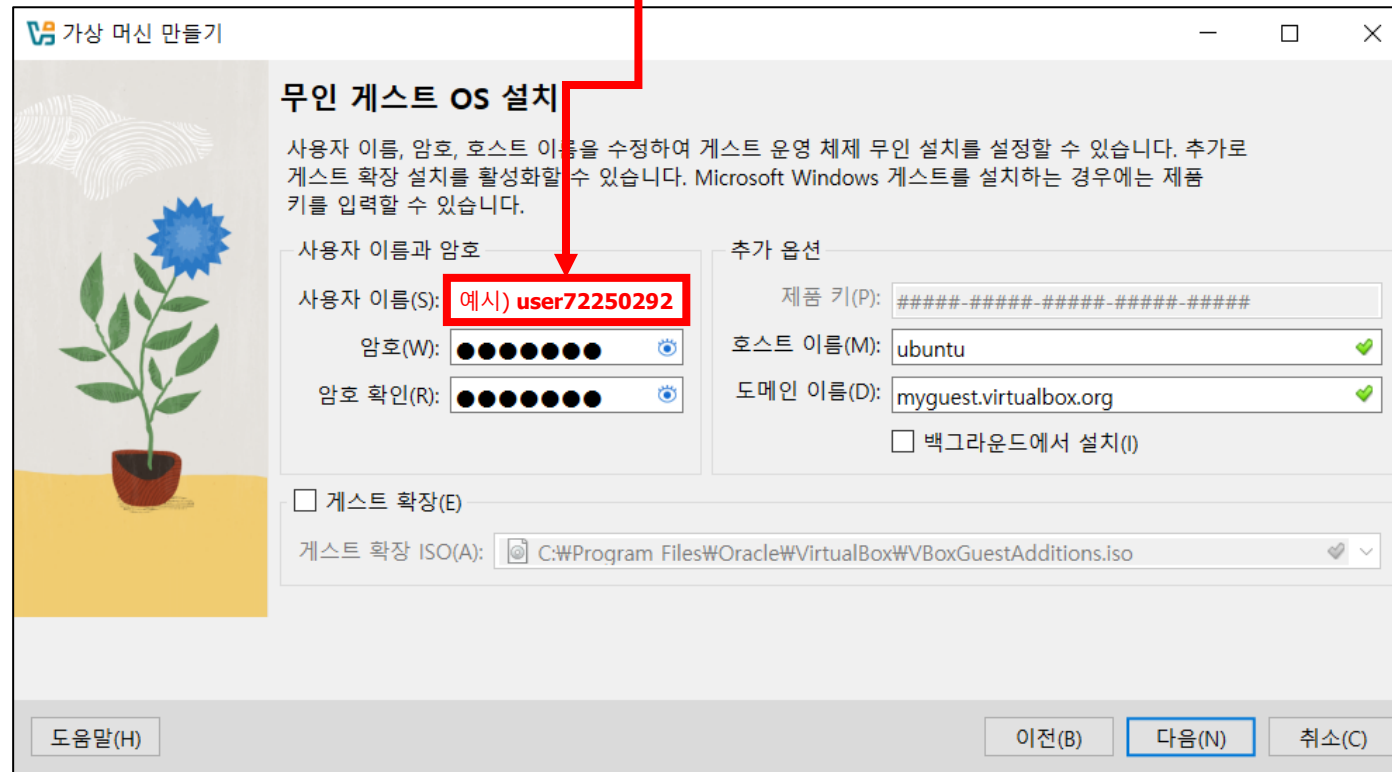
3) VM 생성 – VM 이름 및 ISO 이미지 선택



1. Windows

3) VM 생성 -계정 생성

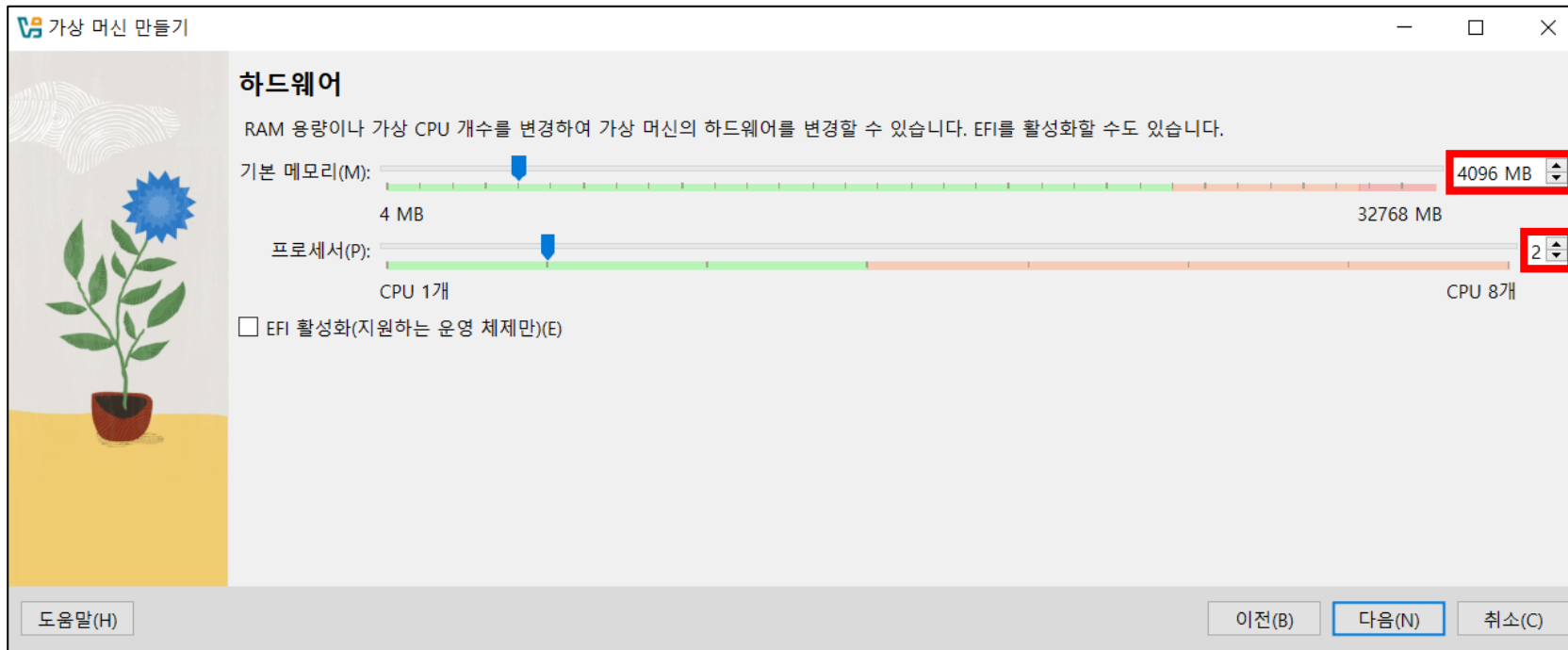
- 사용자 이름: **user + 학번으로 설정**



1. Windows

3) VM 생성 – 하드웨어 사양 선택

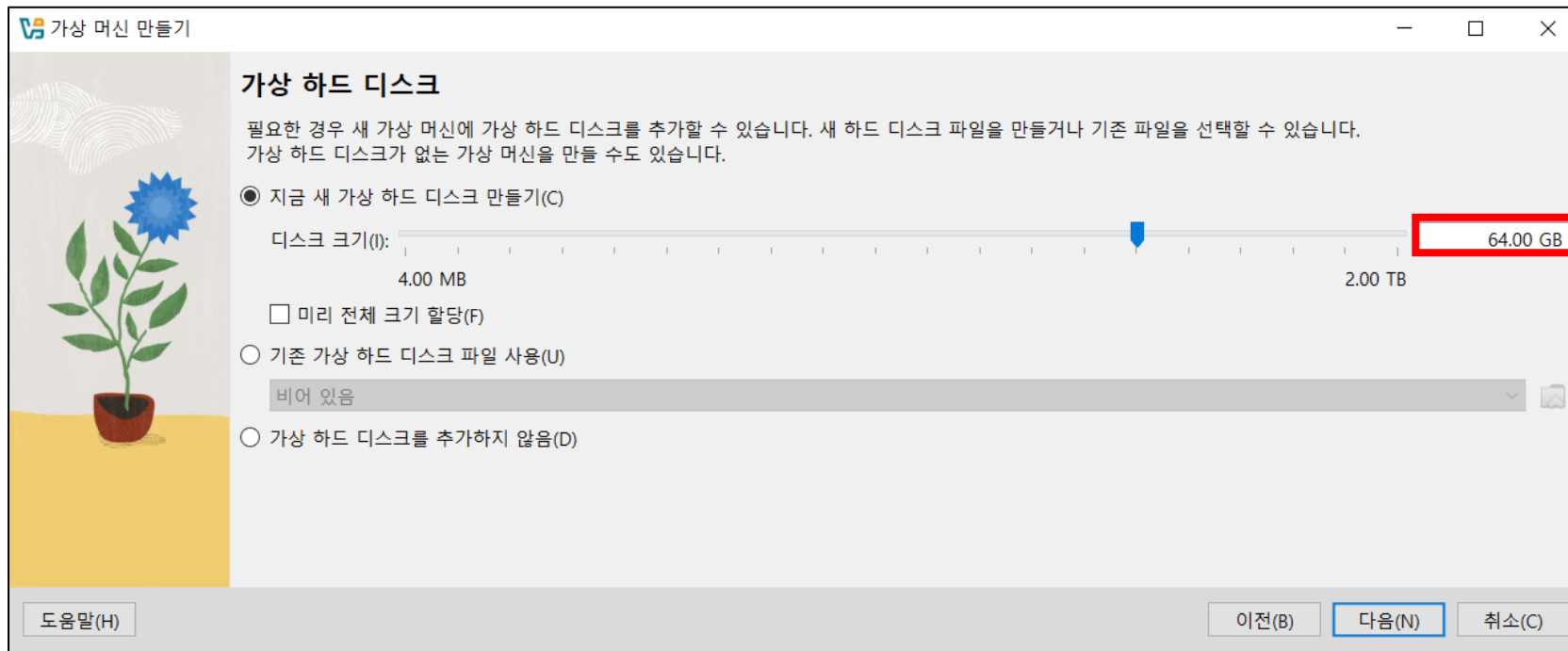
- 메모리: 4096MB, 프로세서: 2개
- 본인 컴퓨터 사양에 맞춰 설정 가능



1. Windows

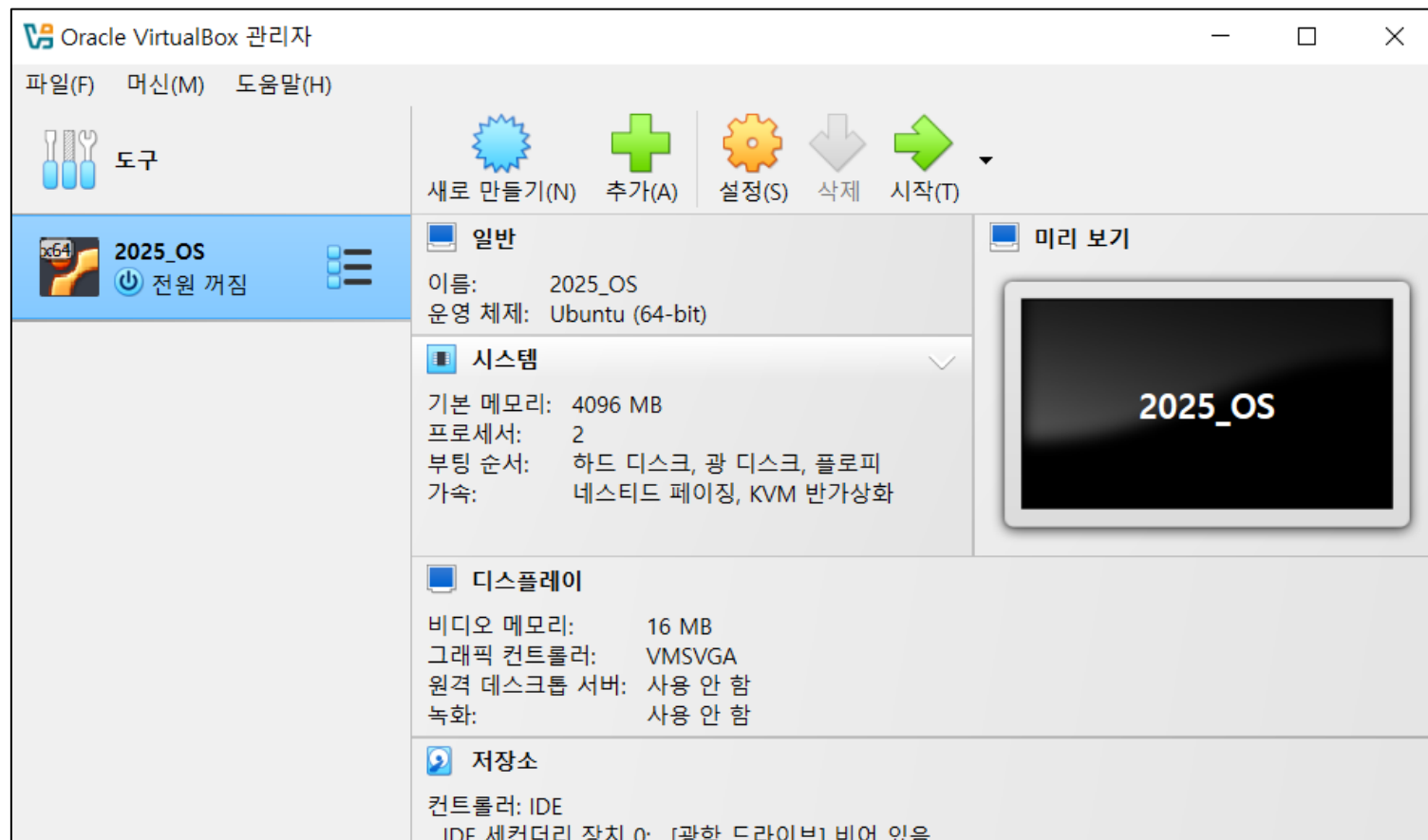
3) VM 생성 – 하드웨어 사양 선택

- 디스크 크기: 64GB
- 여유공간이 부족하다면 작게 설정



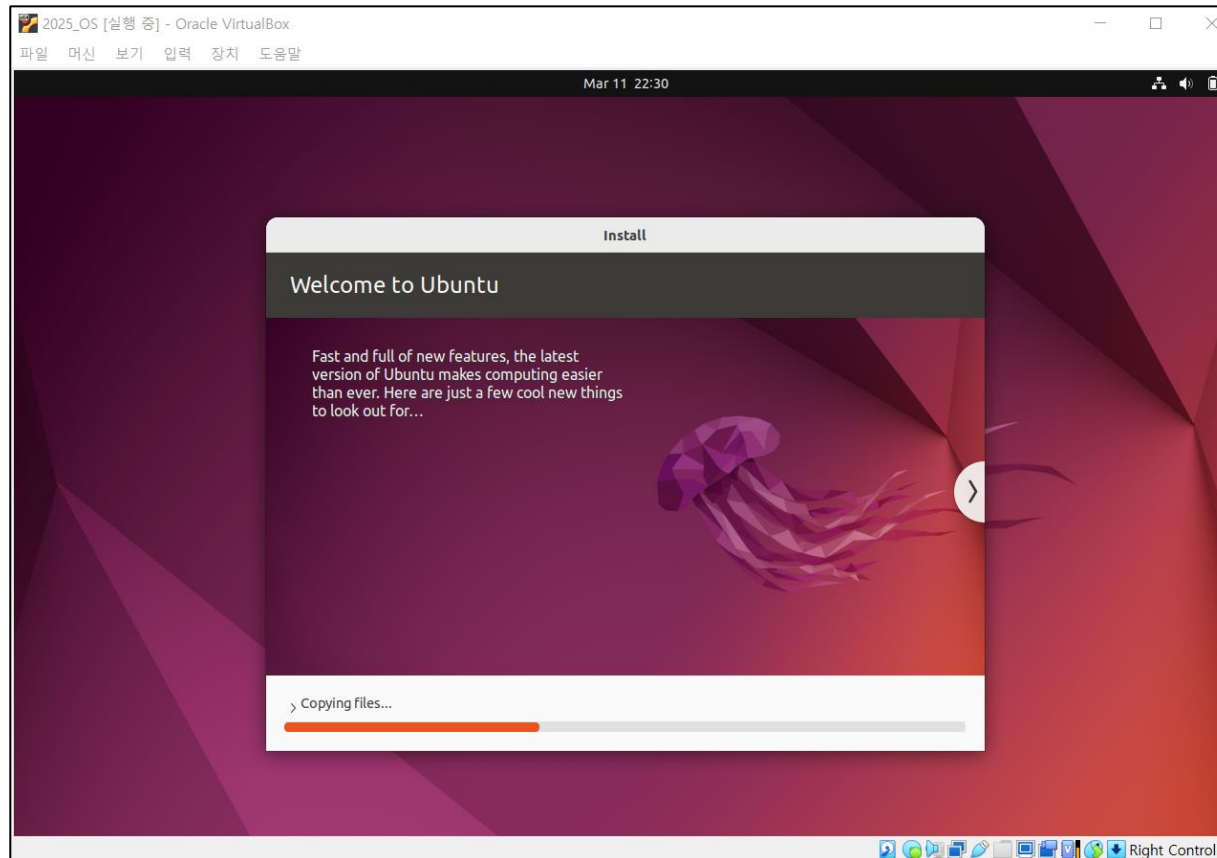
1. Windows

3) VM 생성 - 완료



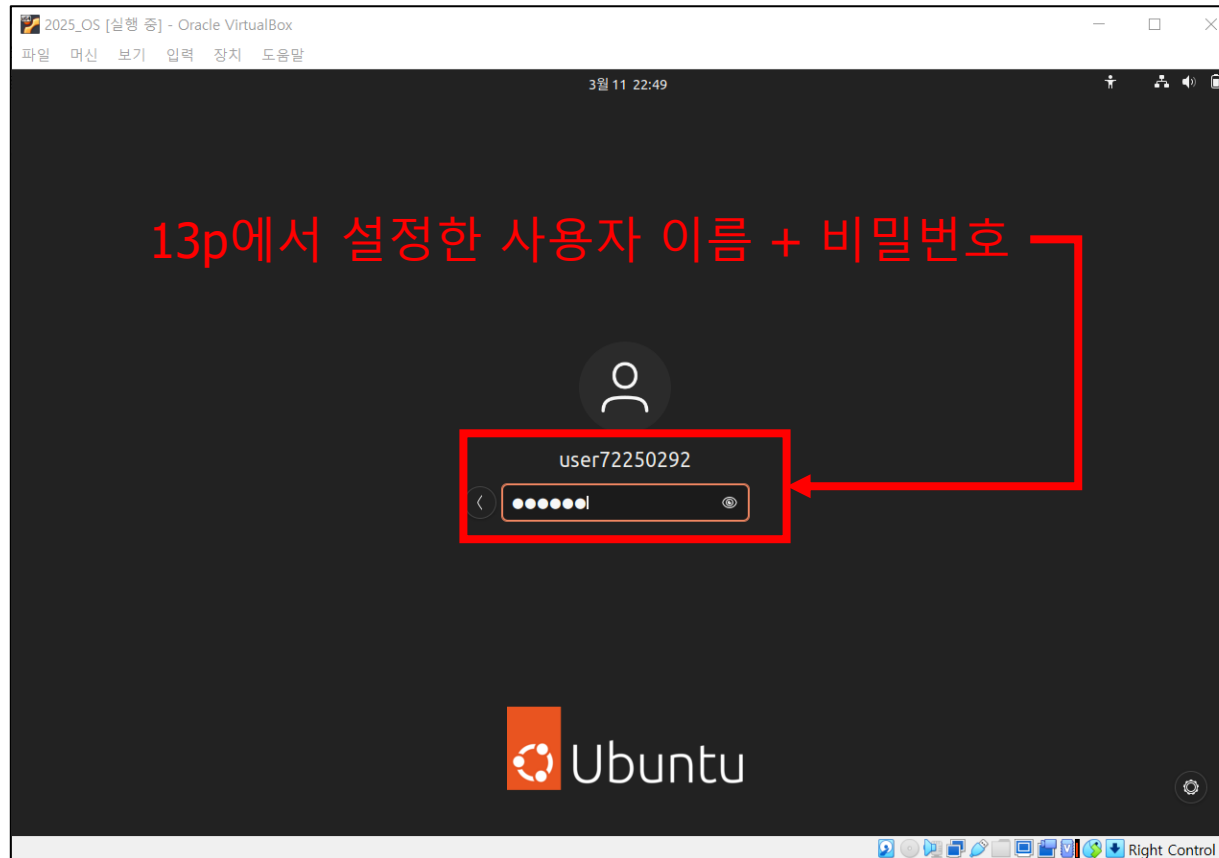
1. Windows

4) 초기 설정 – ubuntu 설치



1. Windows

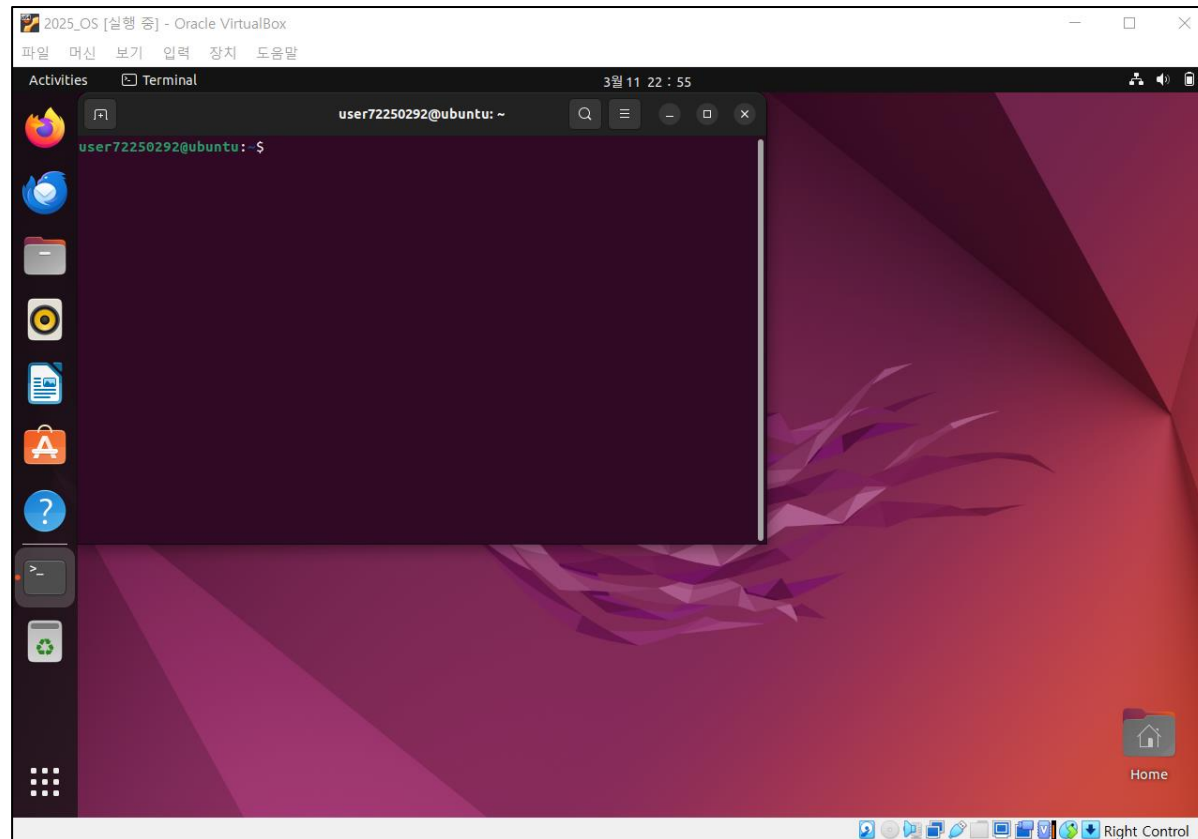
4) 초기 설정 - 계정 확인 및 로그인



1. Windows

4) 초기 설정 - 터미널 열기

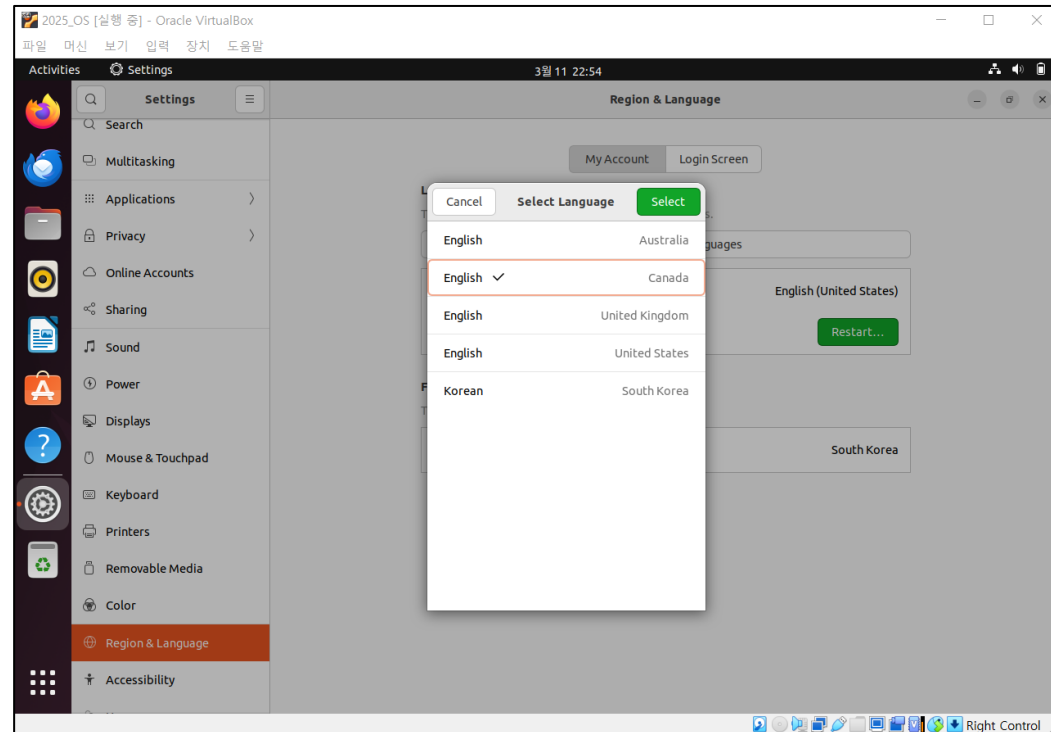
- 터미널 단축키: Ctrl + Alt + t



1. Windows

4) 초기 설정 – 터미널 열기

- 만약 터미널이 안 열린다면 Settings → Region & Language → Language
- English(United State)를 English(Canada)로 변경 후 restart



1. Windows

4) 초기 설정 – sudo 권한 설정

- sudo 명령어 실행 시 오류가 난다면 아래 과정 수행

```
user72250292@ubuntu:~$ sudo apt update
[sudo] password for user72250292:
user72250292 is not in the sudoers file. This incident will be reported.
```

- root로 전환 후 13p의 비밀번호 입력, {username}을 sudo 그룹에 추가하여 권한 부여
 - \$ su
 - \$ usermod -aG sudo {username}
 - \$ reboot
- 재부팅후 sudo 명령어 작동 확인

```
user72250292@ubuntu:~$ sudo apt update
[sudo] password for user72250292:
Ign:1 http://kr.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://kr.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://kr.archive.ubuntu.com/ubuntu jammy-backports InRelease
```

1. Windows

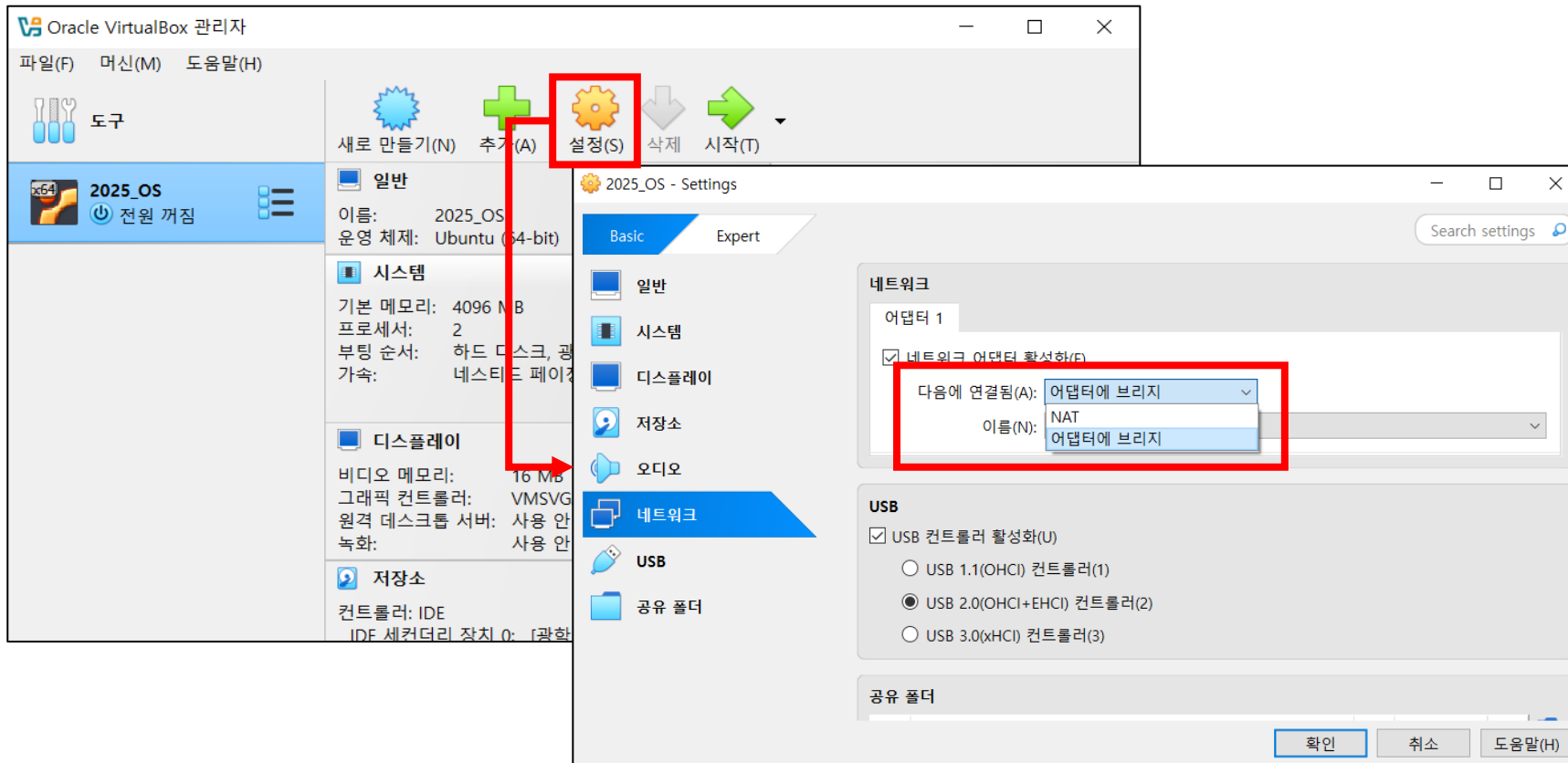
5) Optional – SSH 설정

- SSH: 다른 컴퓨터에 원격으로 접속하여 명령을 실행하고 정보를 주고받을 수 있는 프로토콜
- 호스트(윈도우)에서 VM(우분투)에 원격으로 접속해 터미널 사용가능

1. Windows

5) Optional – SSH 설정

- VirtualBox 네트워크 → 어댑터에 브릿지 설정



1. Windows

5) Optional – SSH 설정

- VM 실행 후 아래 명령어 실행
- \$ sudo apt install -y openssh-server net-tools
 - openssh-server: SSH 접속을 가능하게 해주는 패키지
 - net-tools: ip 정보 및 네트워크 관련 정보를 확인할 수 있는 패키지
- \$ systemctl status sshd
 - SSH 서버가 정상적으로 동작 중임을 확인
- \$ ifconfig
 - IP 주소 확인

```
user72250292@ubuntu:~$ systemctl status sshd
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled;
   Active: active (running) since Tue 2025-03-11 23:32:17 KS
   Docs: man:sshd(8)
         man:sshd_config(5)
```

```
user72250292@ubuntu:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
   inet 192.168.0.22 netmask 255.255.255.0 broadcast 192.168.0.255
   inet6 fe80::82b3:3427:b6c3:6741 prefixlen 64 scopeid 0x20<link>
   ether 08:00:27:de:b3:a2 txqueuelen 1000 (Ethernet)
```

1. Windows

5) Optional – SSH 설정

- Host(윈도우)에서 터미널 실행 (VM은 실행 중인 상태)
- > ssh {username}@{IP address}
- IP address: 24p에서 확인한 IP (VM 재시작시 바뀔 수 있으니 확인 필요)

```
PS C:\Users\Boseung> ssh user72250292@192.168.0.22
The authenticity of host '192.168.0.22 (192.168.0.22)' can't be established.
ED25519 key fingerprint is SHA256:Rr9M0oNx9L8ZtHU53pnmLsRasyxfG3ur5VgypctWvLc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.0.22' (ED25519) to the list of known hosts.
user72250292@192.168.0.22's password: 
```

UTM 설치

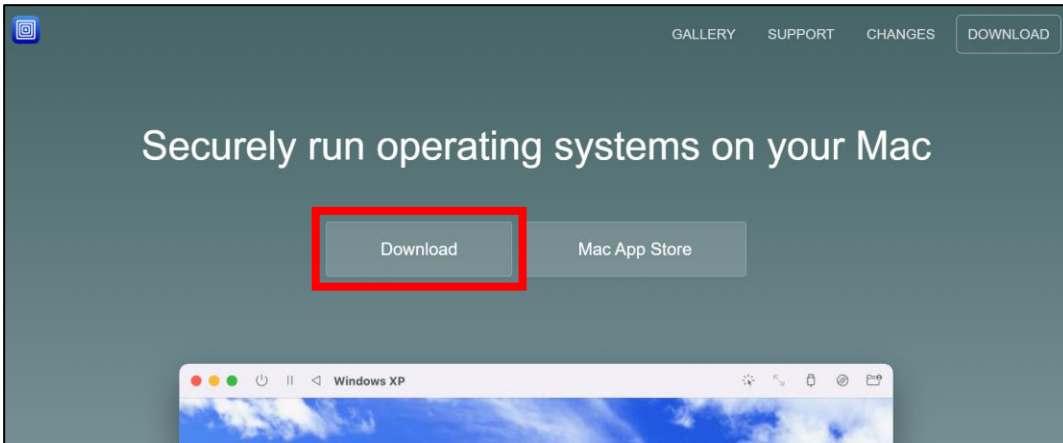
■ UTM이란?

- macOS에서 가상화를 지원하는 오픈 소스 가상화 소프트웨어
- Apple Silicon에서 다양한 운영 체제를 실행할 수 있음
- Windows, Linux 등 다양한 운영 체제를 가상 환경에서 실행 가능
 - 강의에서는 Guest OS로 Linux를 사용

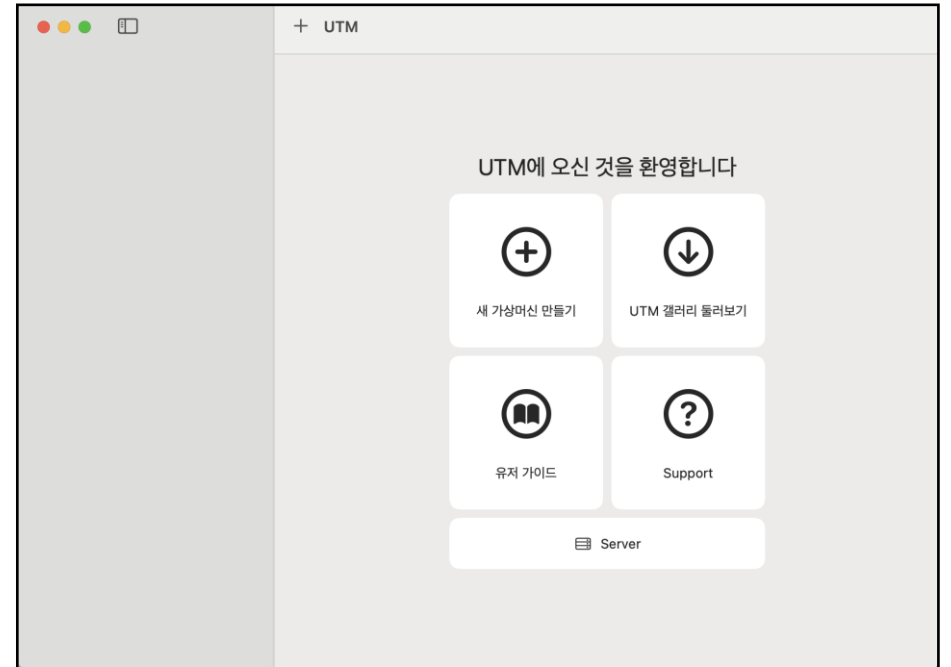
2. Mac (ARM)

1) UTM 설치

- <https://mac.getutm.app/>



UTM 다운로드 페이지



설치 후 UTM 초기화면

2. Mac (ARM)

2) Ubuntu Desktop 22.04 이미지 다운로드 (ARM)

- <https://cdimage.ubuntu.com/releases/jammy/release/>

Ubuntu 22.04.5 LTS (Jammy Jellyfish)

Select an image

Ubuntu is distributed on four types of Images described below.

Server install image

The server install image allows you to install Ubuntu permanently on a computer for use as a server. It will not install a graphical user interface.

64-bit ARM (ARMv8/AArch64) server install image

For 64-bit ARMv8 processors and above.

PowerPC64 Little-Endian server install image

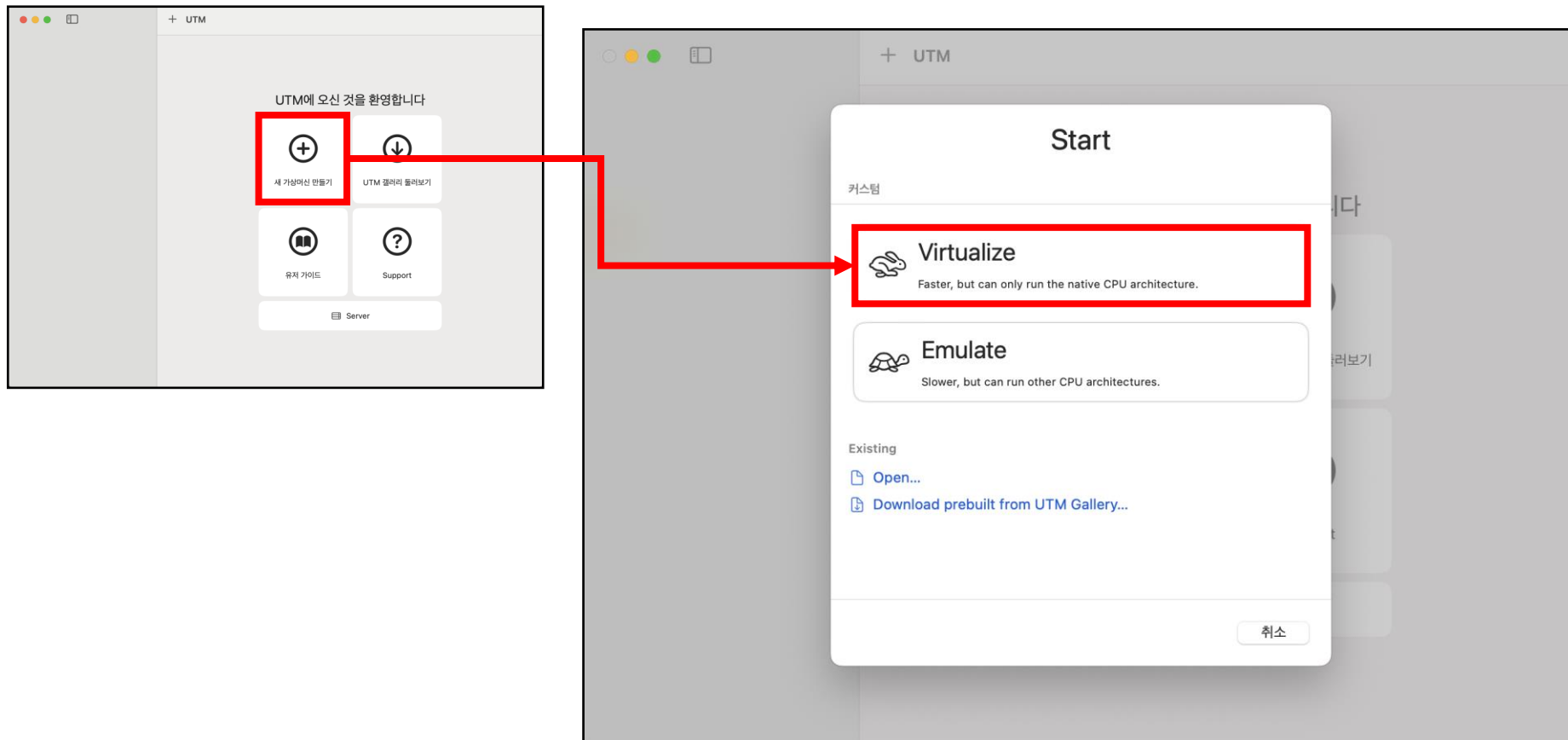
For POWER9 and POWER10 Little-Endian systems.

IBM System z server install image

For IBM System z series mainframes, such as IBM LinuxONE.

2. Mac (ARM)

3) VM 생성





2. Mac (ARM)


3) VM 생성

운영체제


Preconfigured

 macOS 12+

 Windows

 Linux

커스텀

 Other

취소 Go Back

Linux

Virtualization Engine

☐ Use Apple Virtualization
Apple Virtualization is experimental and only for advanced use cases. Leave unchecked to use QEMU, which is recommended.

Boot Image Type

☐ Boot from kernel image
[Ubuntu Install Guide](#)

Boot ISO Image

jammy-desktop-arm64.iso

초기화 탐색

취소 Go Back Continue

2)에서 다운받은 iso 이미지

2. Mac (ARM)

3) VM 생성

- 메모리: 4096MB, Core: 2개, 디스크: 64GB
- 본인 컴퓨터 사양에 맞춰 설정 가능

본인이 식별하기 쉬운 이름으로 설정

장치

메모리

4096 MiB

CPU

CPU Cores

2

Hardware OpenGL Acceleration

☐ Enable hardware OpenGL acceleration

There are known issues in some newer Linux drivers including black screen, broken compositing, and apps failing to render.

취소 Go Back Continue

Storage

크기

Specify the size of the drive where data will be stored into.

64 GiB

취소 Go Back Continue

Summary

이름 Ubuntu

☐ Open VM Settings

Engine QEMU

☒ Use Virtualization

☐ Legacy Hardware

아키텍처 ARM64 (aarch64)

시스템 QEMU 7.2 ARM Virtual Machine (alias of virt-7.2) (v

RAM 4GB

CPU 2 Cores

Storage 64GB

☐ Hardware OpenGL Acceleration

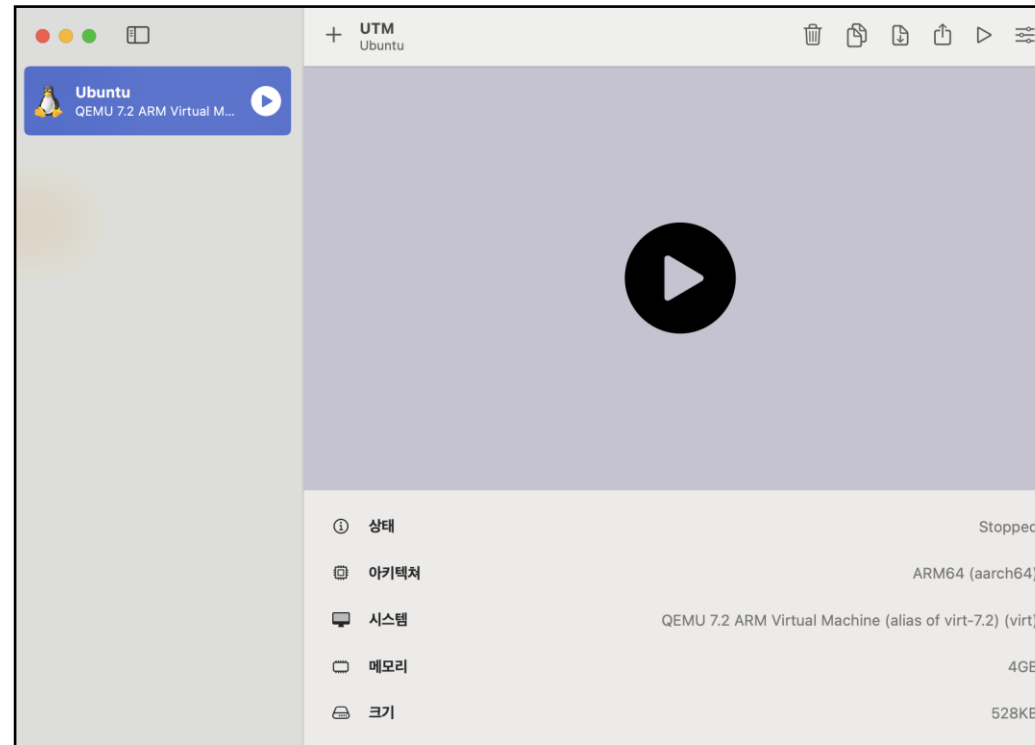
운영체제 Linux

Boot Image /Users/nk/Downloads/jammy-desktop-arm64.iso

취소 Go Back 저장

2. Mac (ARM)

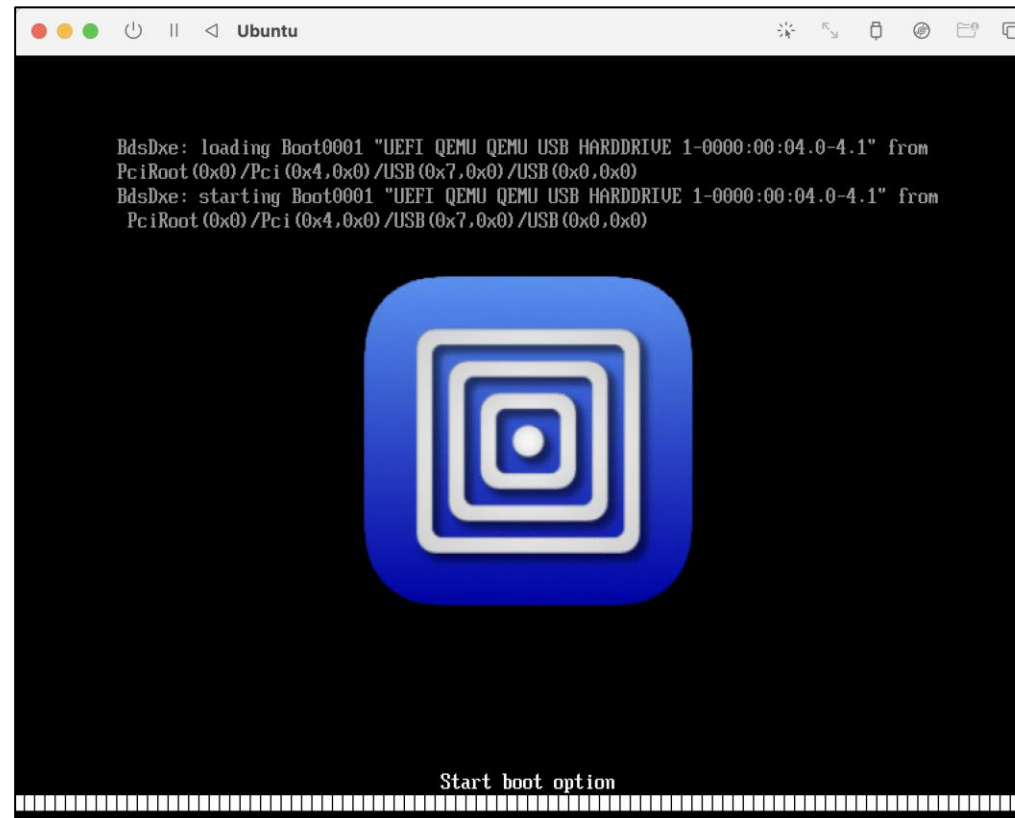
3) VM 생성 - 완료



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

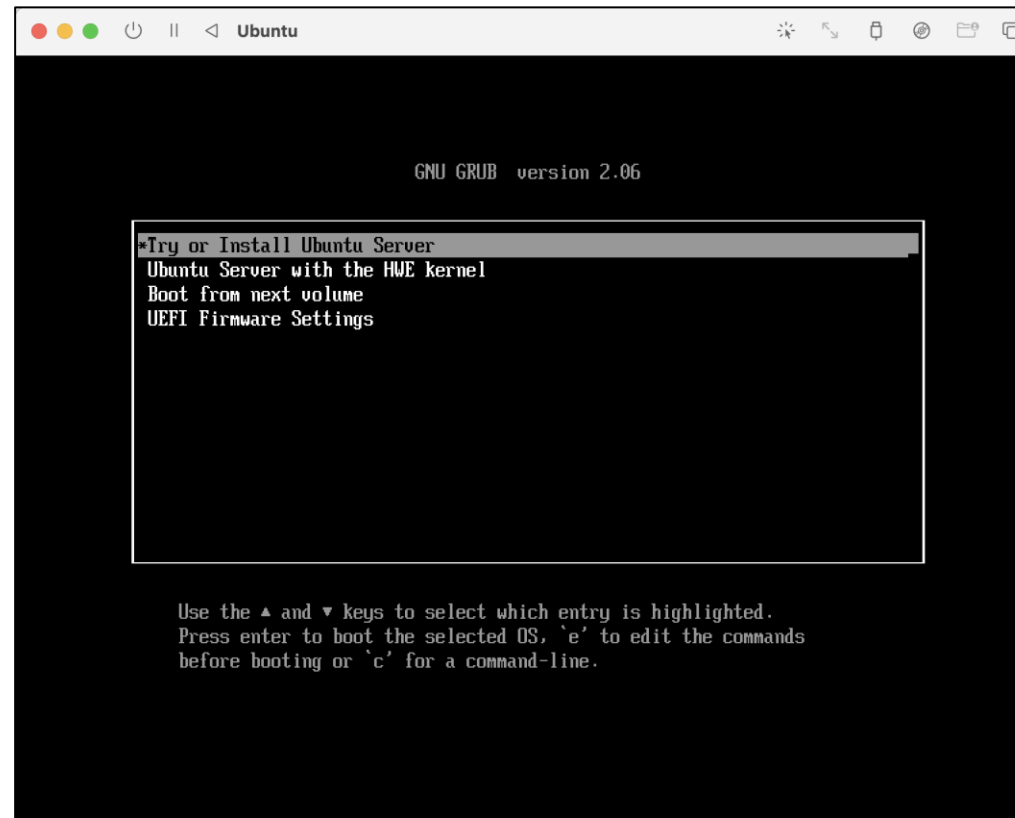
- 초기 VM 실행 화면



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

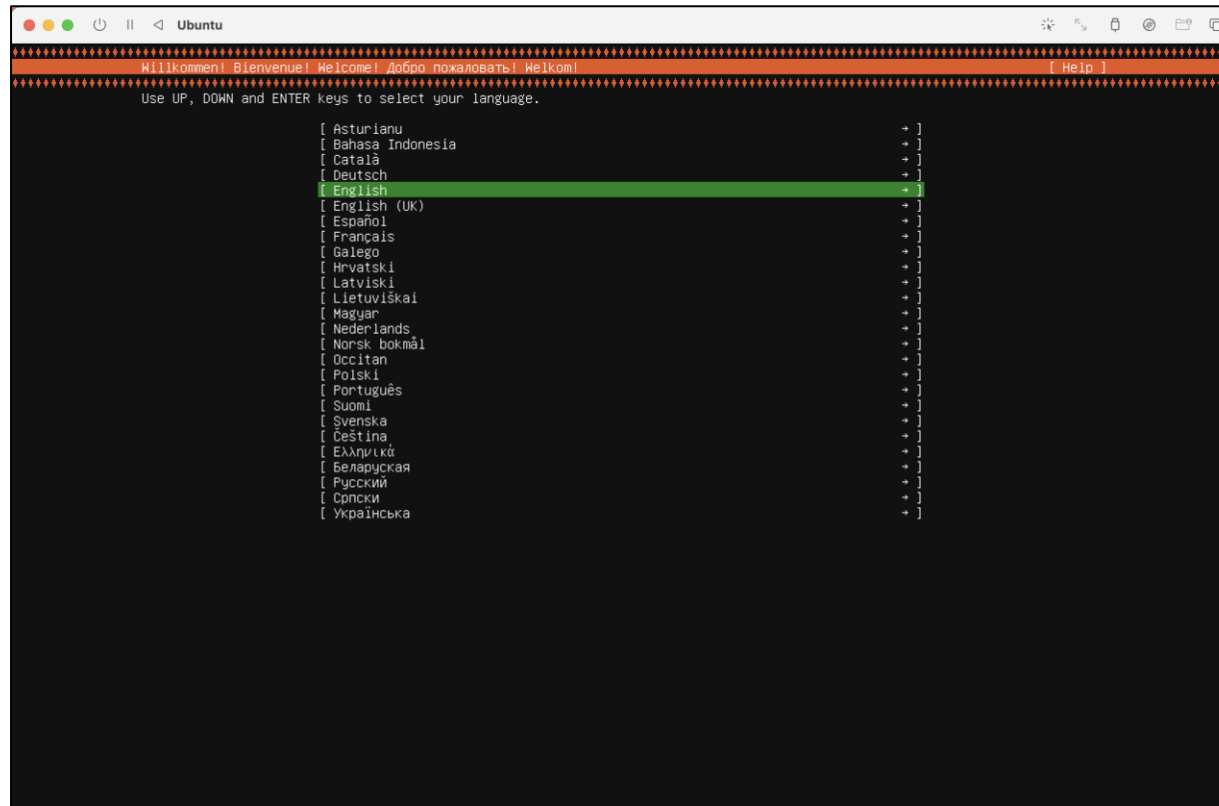
- 단계에 따라 설치 진행



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

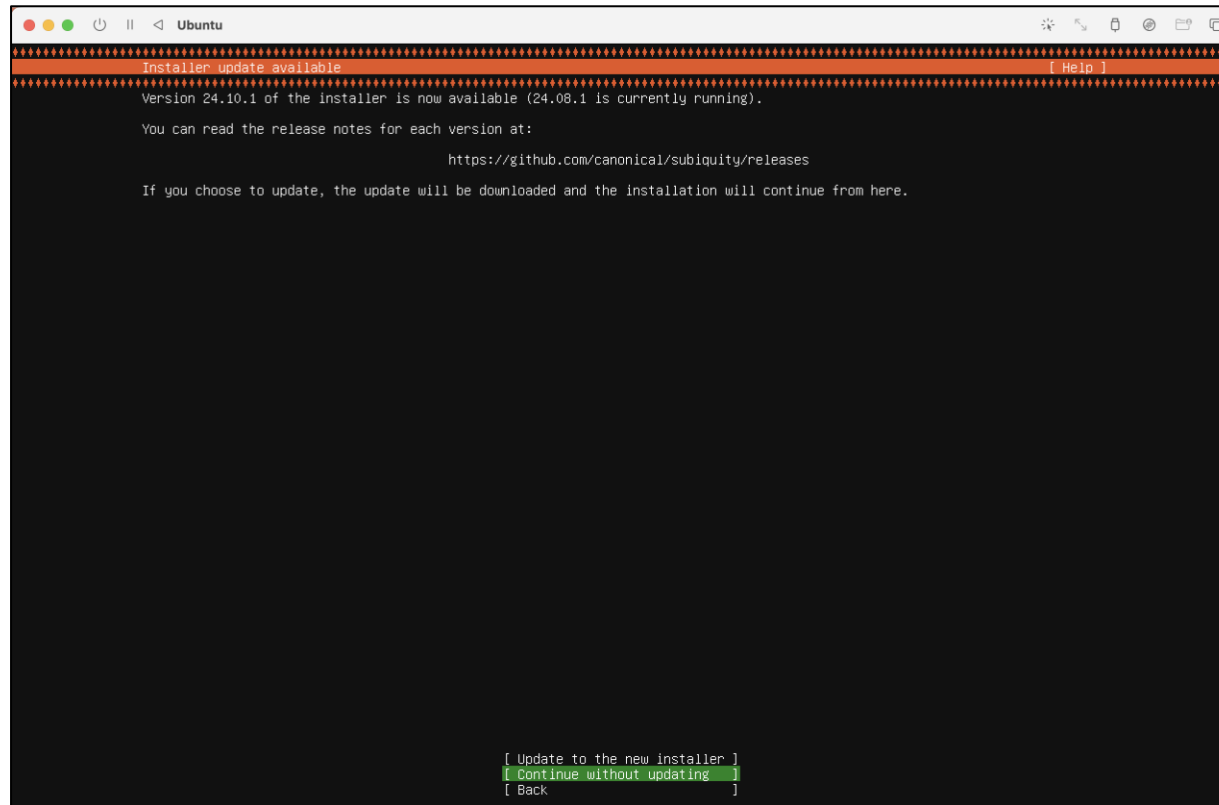
- 언어 설정: English



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

- 24버전으로 업데이트: 안함



The screenshot shows a terminal window titled "Ubuntu" with a dark background and orange borders. The text inside the window reads:

```
*****
***** Installer update available ***** [ Help ]
*****
Version 24.10.1 of the installer is now available (24.08.1 is currently running).

You can read the release notes for each version at:

    https://github.com/canonical/subiquity/releases

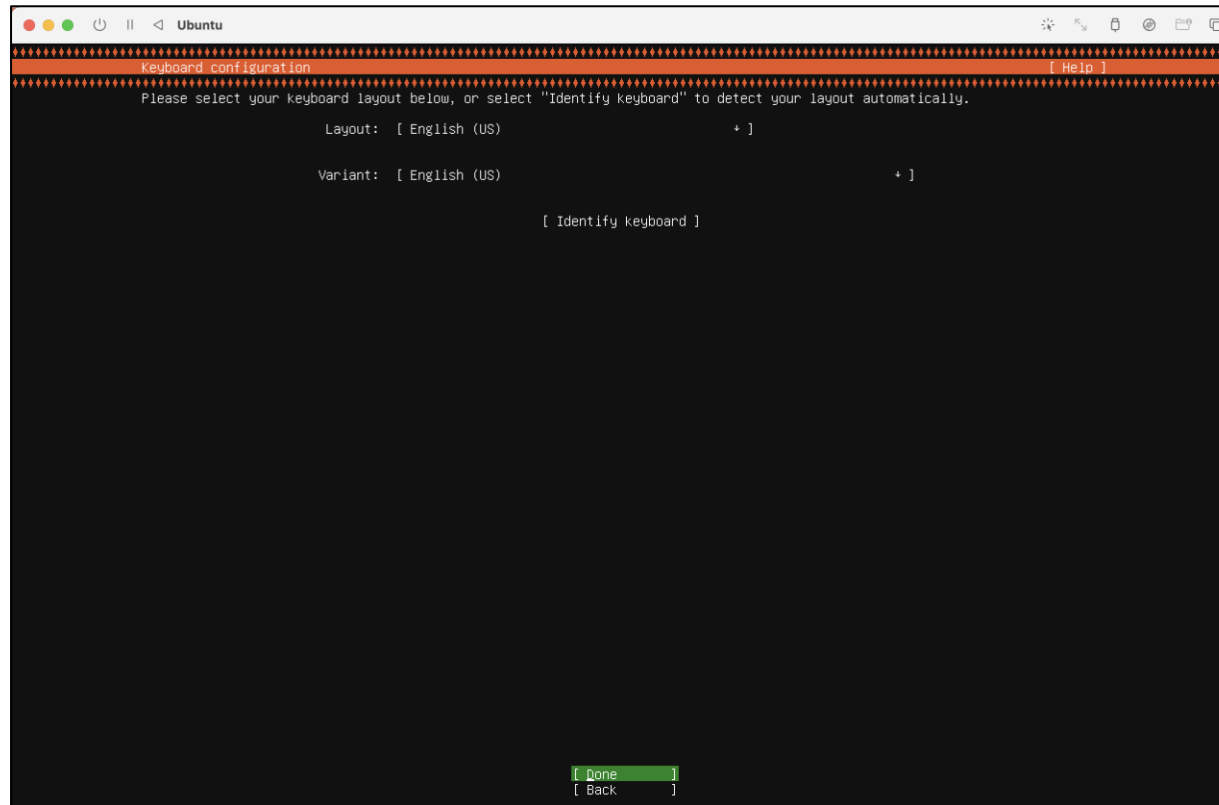
If you choose to update, the update will be downloaded and the installation will continue from here.

[ Update to the new installer ]
[ Continue without updating ]
[ Back ]
```

2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

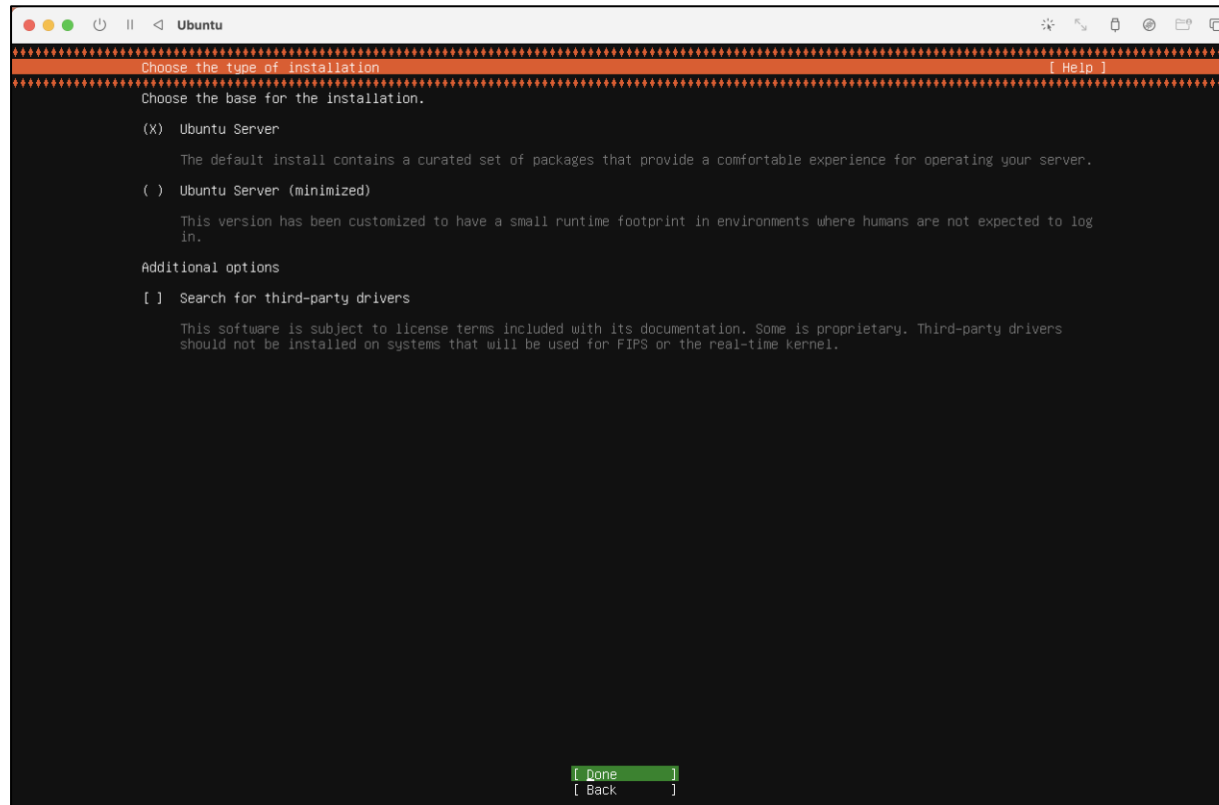
- 키보드 레이아웃: English



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

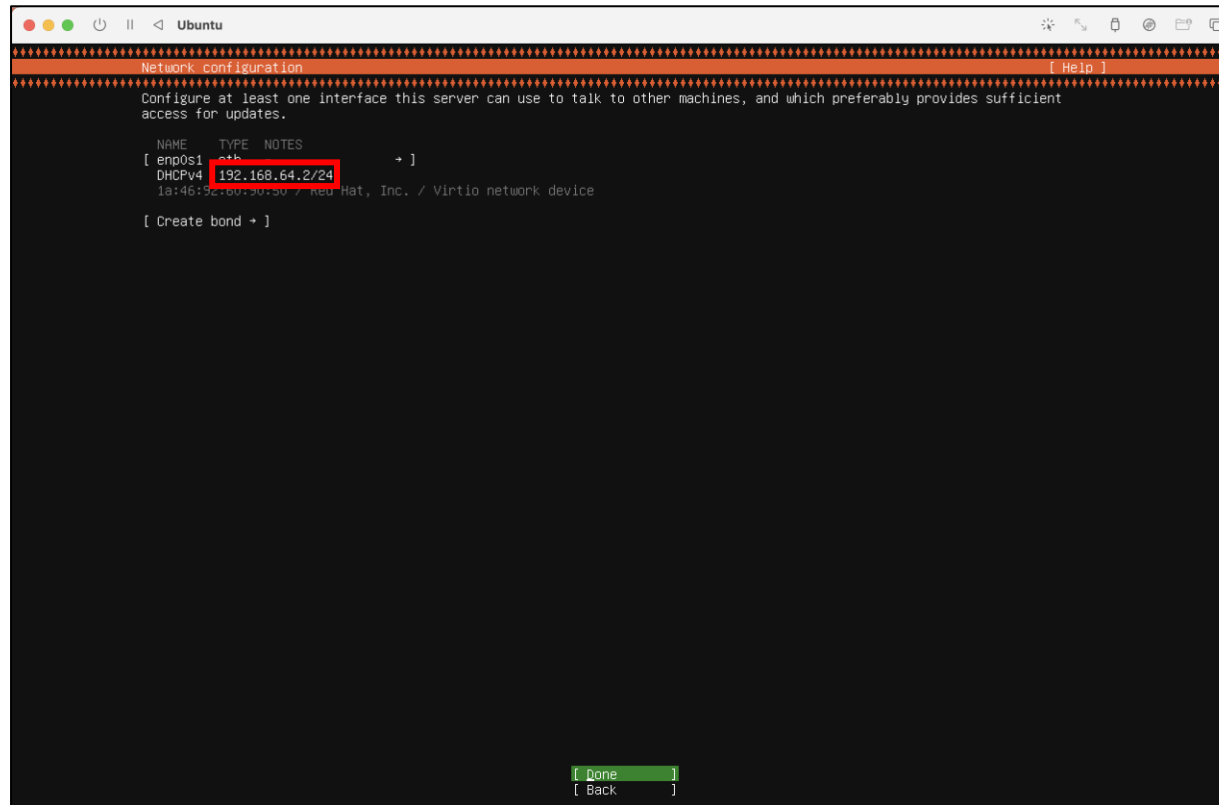
- Ubuntu 설치: Default



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

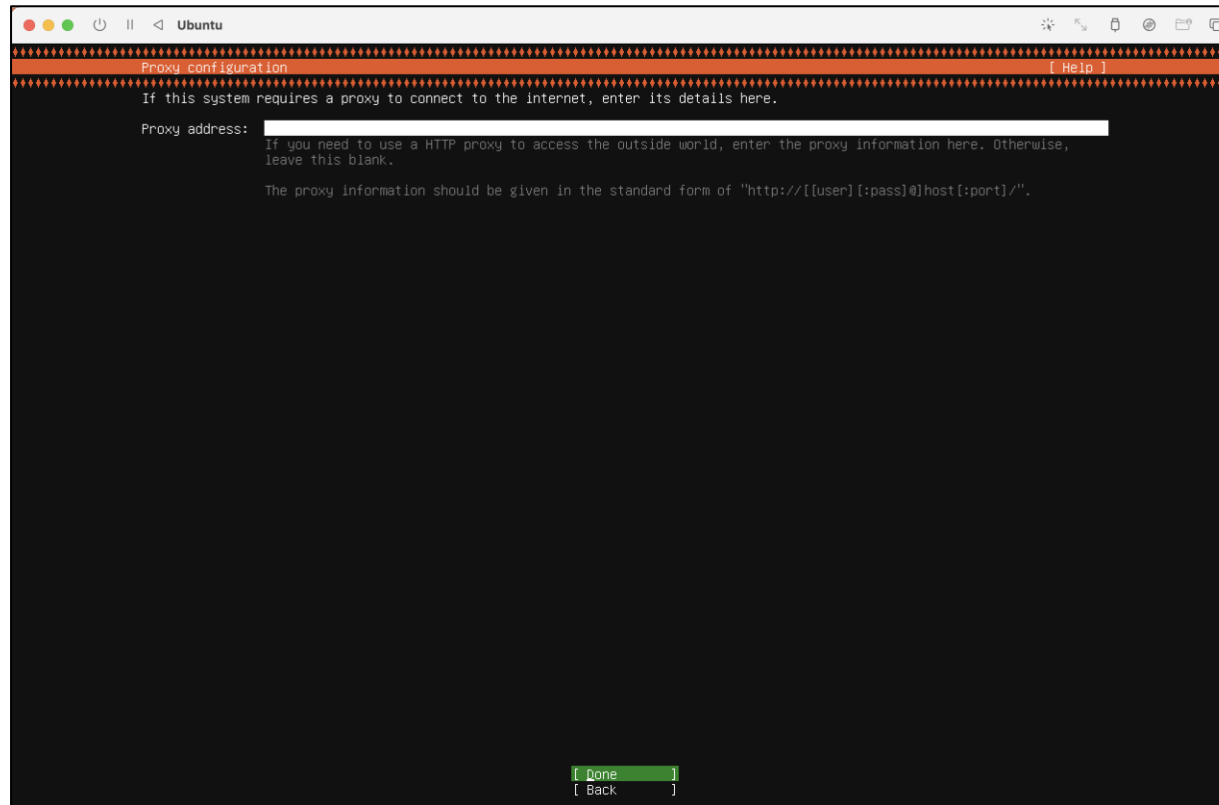
- 네트워크 설정: 그대로 진행, SSH를 사용할 것이라면 IP 주소 기억할 것



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

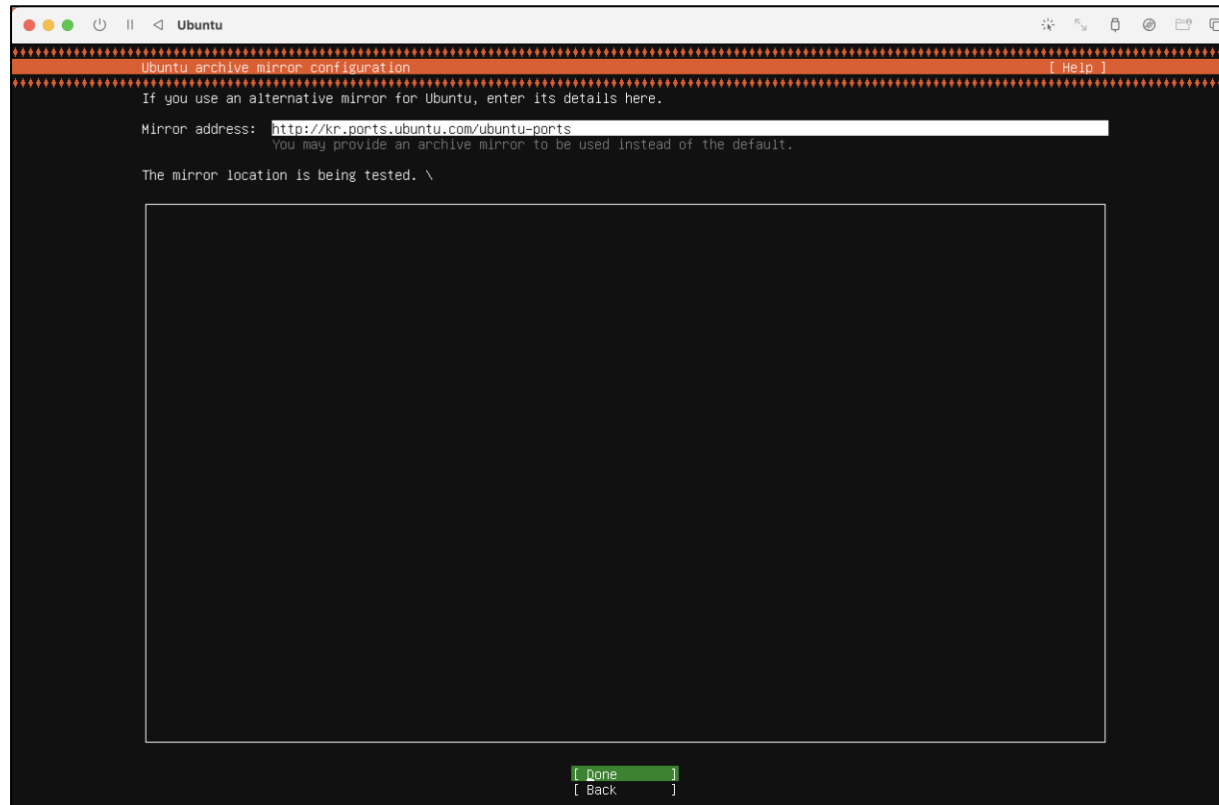
- Proxy 주소: 그대로 진행



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

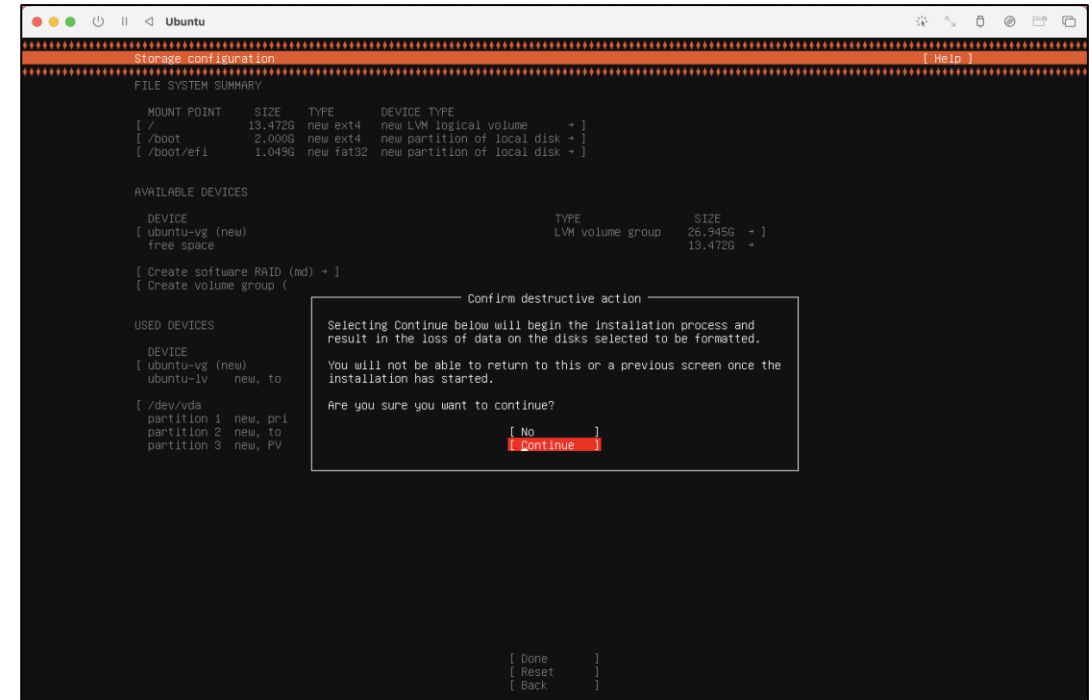
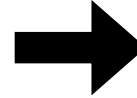
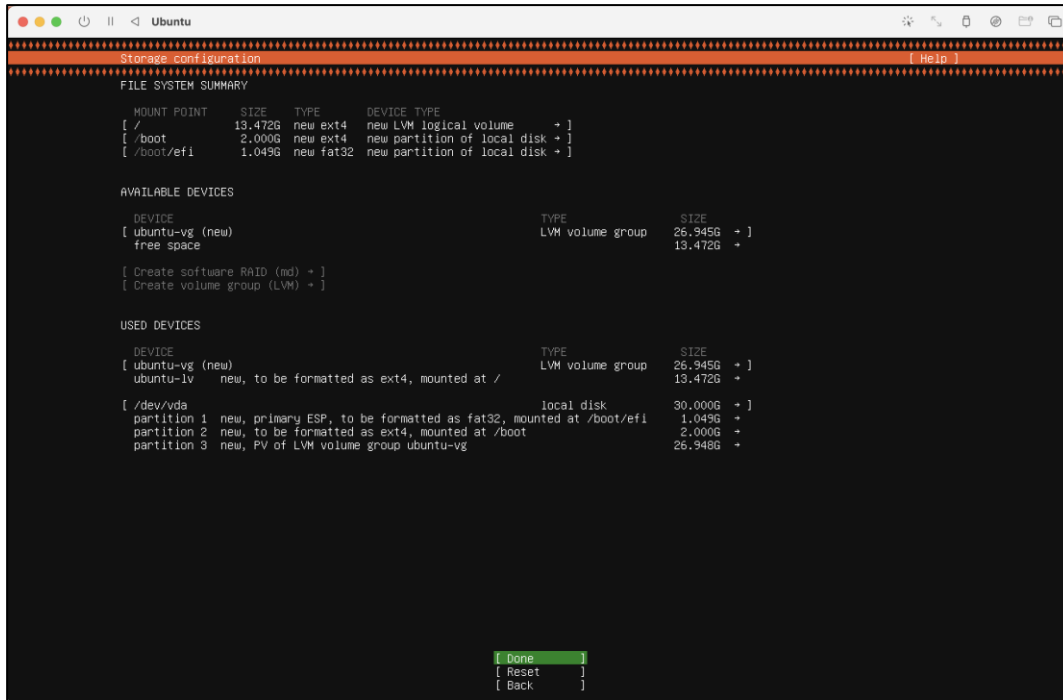
- Mirror 서버: 그대로 진행



2. Mac (ARM)

4) 초기 설정 - Ubuntu 설치

- 파일 시스템 설정: 그대로 진행



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

- 계정 설정

Profile configuration

Enter the username and password you will use to log in to the system. You can configure it later, but a password is still needed for sudo.

Your name: 예시) user72250292

Your servers name: ubuntu
The name it uses when it talks to other computers.

Pick a username: 예시) user72250292

Choose a password: ****

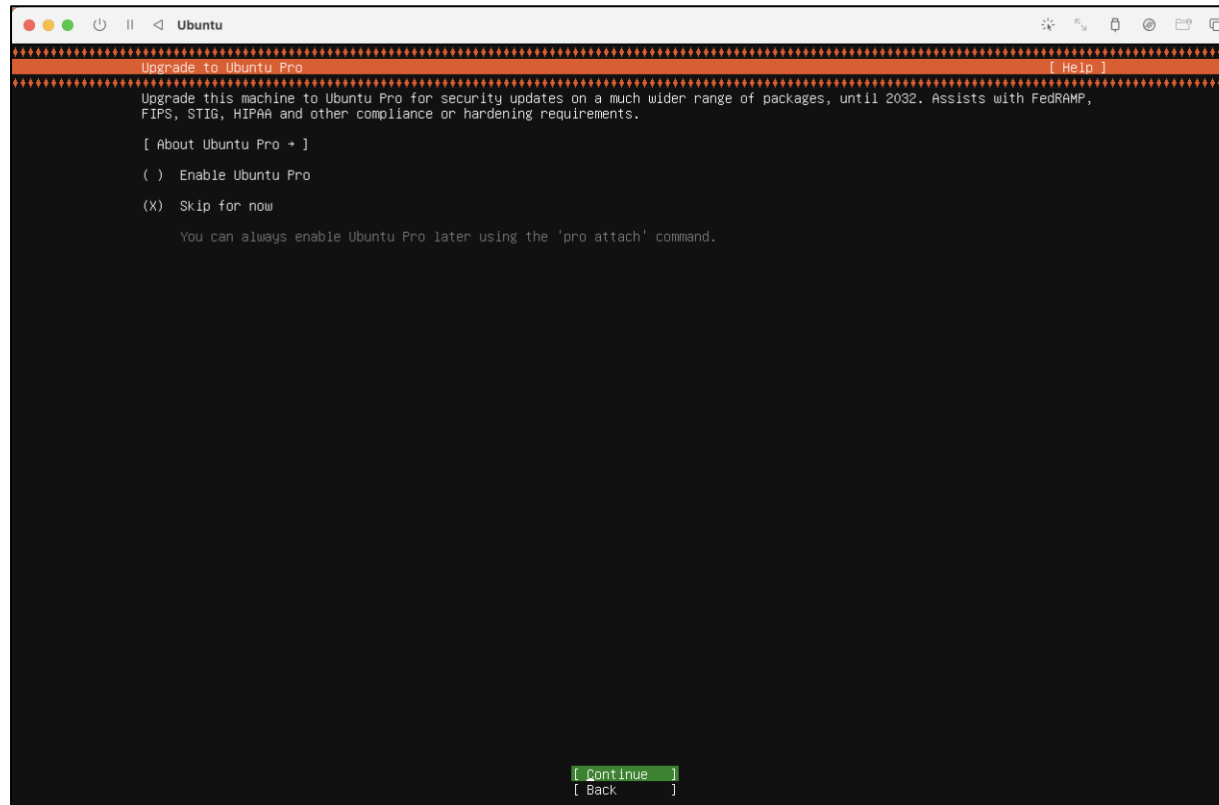
Confirm your password: ****

user + 학번으로 설정

2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

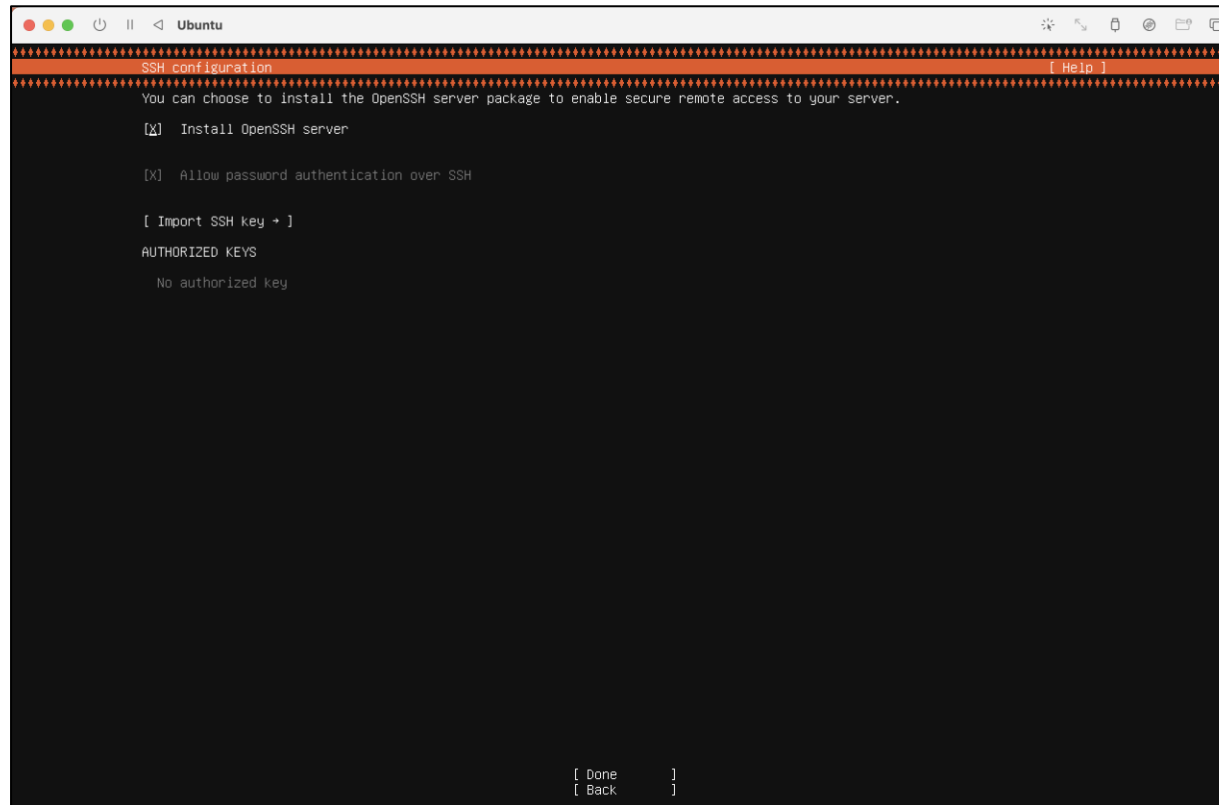
- Ubuntu pro로 업데이트: Skip



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

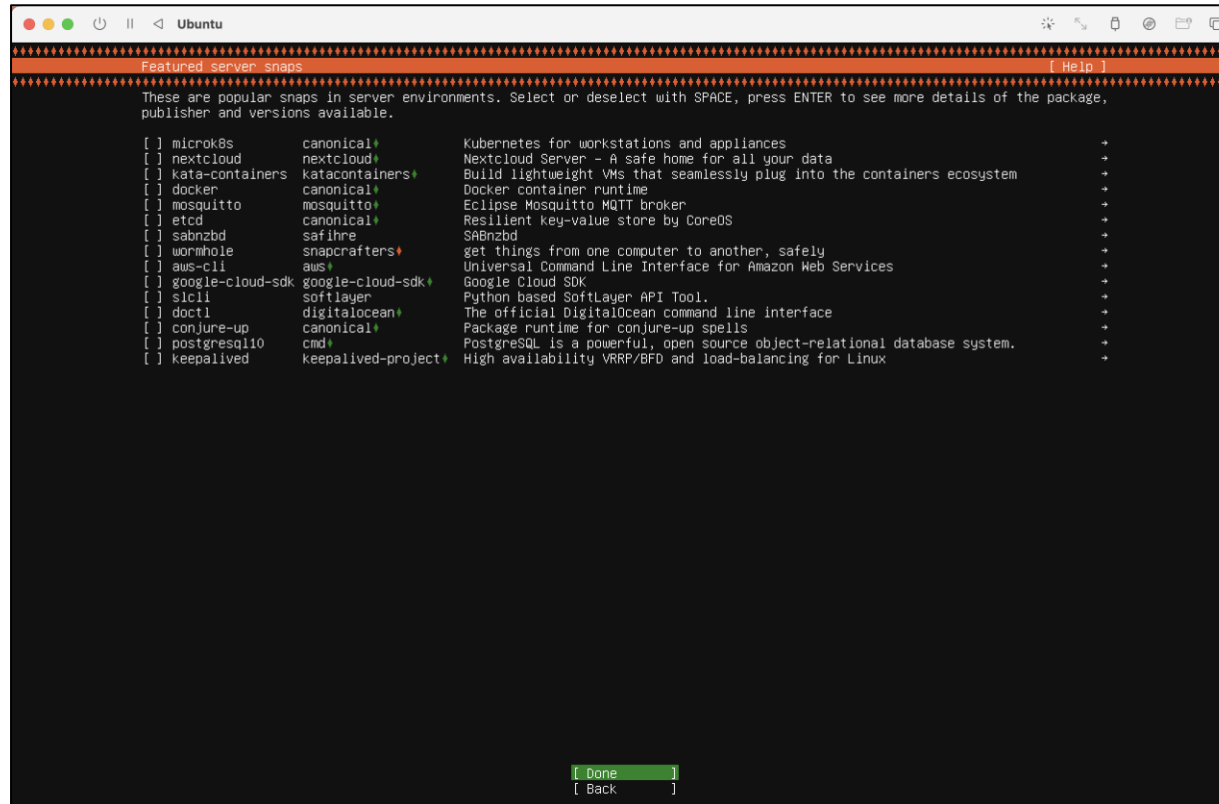
- SSH 서버 설정: SSH를 사용할 것이라면 체크 아니면 Skip



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

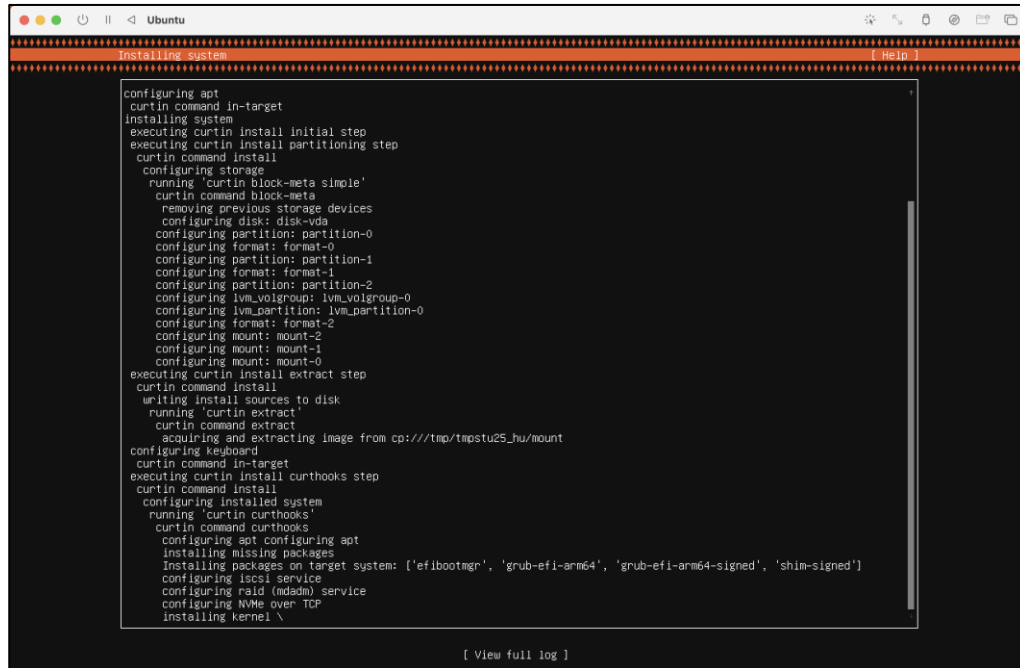
- 서버 snap 패키지 설치: Skip



2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

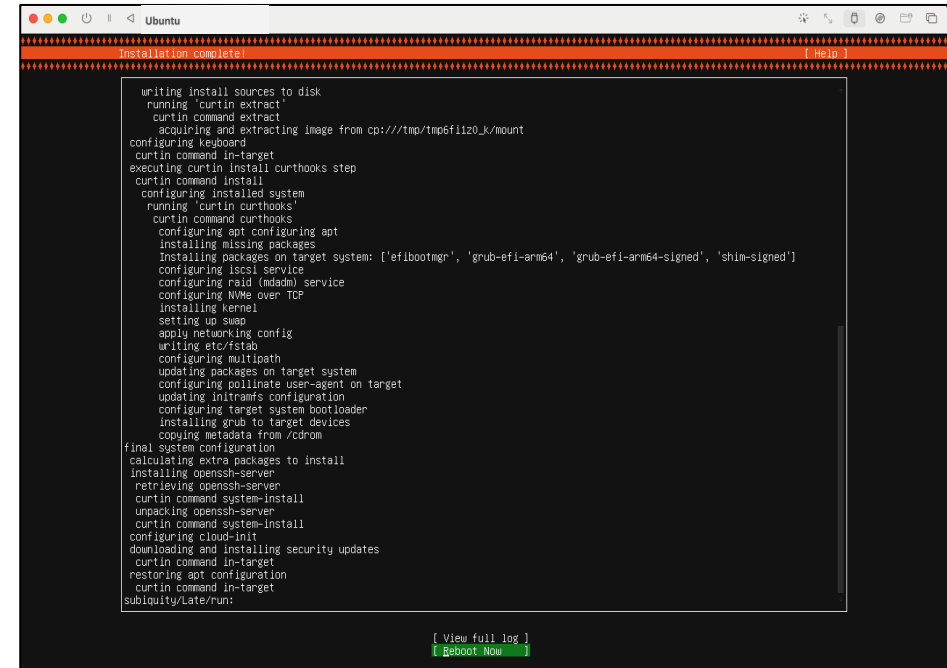
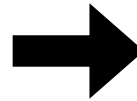
- Ubuntu 설치 진행 화면, 완료되면 reboot



```
Installing system
[Help]

configuring apt
curtin command in-target
installing system
executing curtin install initial step
executing curtin install partitioning step
curtin command install
  configuring storage
    running 'curtin block-meta simple'
    curtin command block-meta
      removing previous storage devices
      configuring disk: disk-vda
      configuring partition: partition-0
      configuring format: format-0
      configuring partition: partition-1
      configuring format: format-1
      configuring partition: partition-2
      configuring lvm_voigroup: lvm_voigroup-0
      configuring lvm_partition: lvm_partition-0
      configuring format: format-2
      configuring mount: mount-2
      configuring mount: mount-1
      configuring mount: mount-0
  executing curtin install extract step
  curtin command install
    writing install sources to disk
    running 'curtin extract'
    curtin command extract
      acquiring and extracting image from cp:///tmp/tmpst25_hu/mount
  configuring keyboard
  curtin command in-target
executing curtin install curthooks step
curtin command install
  configuring installed system
  running 'curtin curthooks'
  curtin command curthooks
    configuring apt
    installing missing packages
    installing packages on target system: ['efibootmgr', 'grub-efi-arm64', 'grub-efi-arm64-signed', 'shim-signed']
    configuring lscsi service
    configuring raid (mdadm) service
    configuring NVMe over TCP
    installing kernel \
```

[View full log]



```
Installation complete!
[Help]

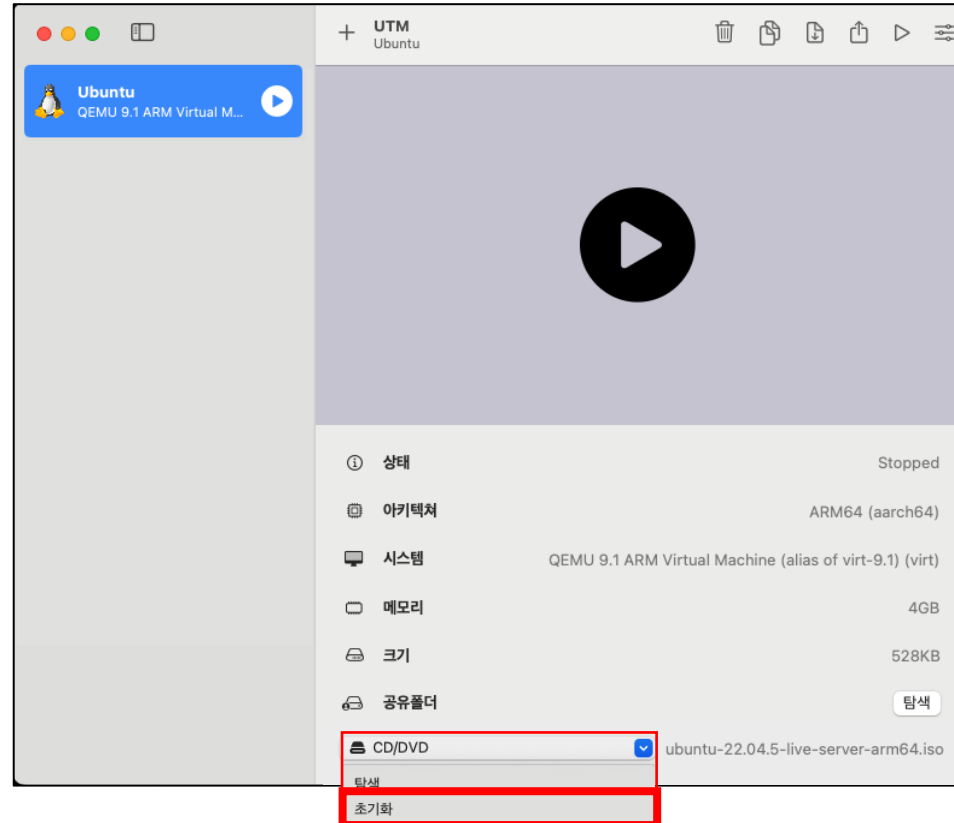
writing install sources to disk
  running 'curtin extract'
  curtin command extract
    acquiring and extracting image from cp:///tmp/tmp6f1iz0_k/mount
  configuring keyboard
  curtin command in-target
executing curtin install curthooks step
curtin command install
  configuring installed system
  running 'curtin curthooks'
  curtin command curthooks
    configuring apt
    installing missing packages
    installing packages on target system: ['efibootmgr', 'grub-efi-arm64', 'grub-efi-arm64-signed', 'shim-signed']
    configuring lscsi service
    configuring raid (mdadm) service
    configuring NVMe over TCP
  installing kernel
  setting up swap
  apply networking config
  writing etc/fstab
  configuring multipath
  updating packages on target system
  configuring pollinate user-agent on target
  updating initramfs configuration
  configuring target system bootloader
  installing grub to target devices
  copying metadata from /cdrom
final system configuration
calculating extra packages to install
installing openssh-server
retrieving openssh-server
curtin command system-install
unpacking openssh-server
curtin command system-install
  configuring cloud-init
  downloading and installing security updates
  curtin command in-target
  restoring apt configuration
  curtin command in-target
  subiquity/late/run
```

[View full log]
[Reboot Now]

2. Mac (ARM)

4) 초기 설정 – Ubuntu 설치

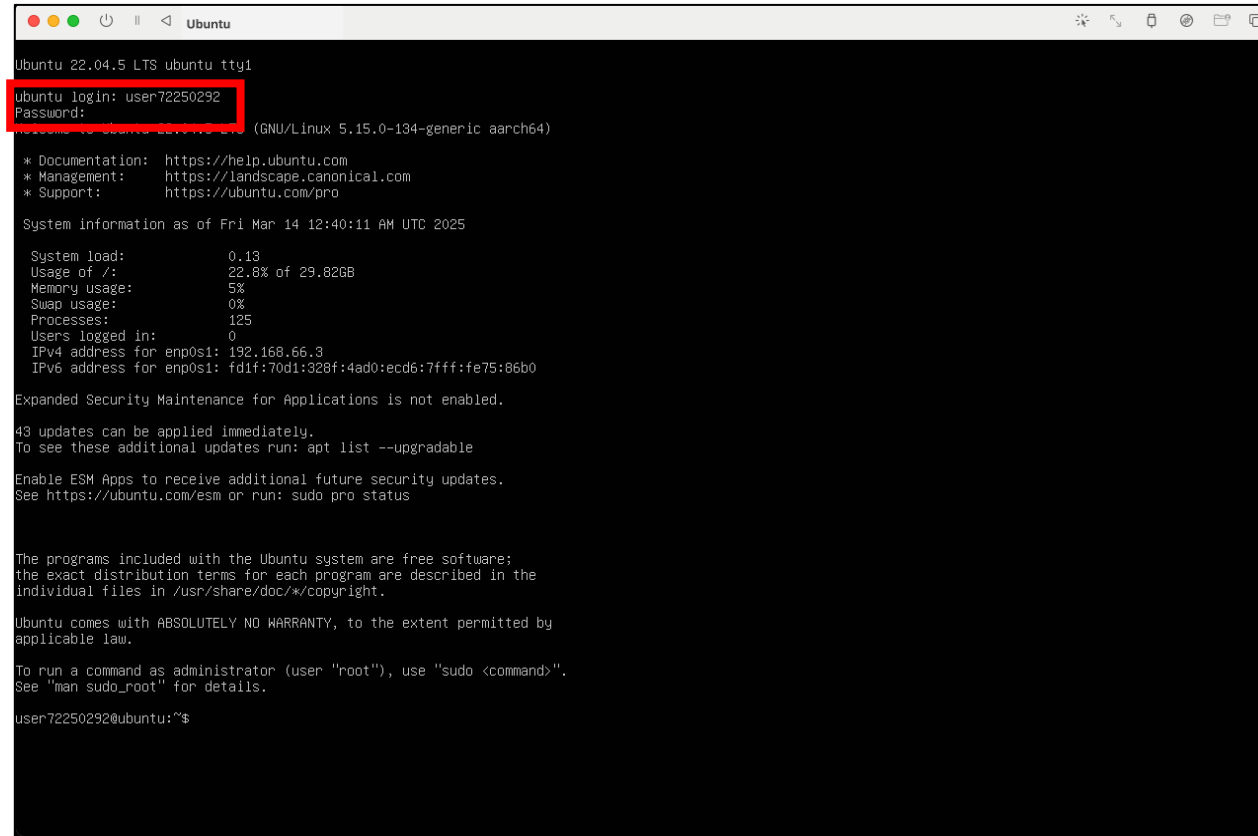
- 검은 화면이 뜬다면 VM 종료, CD/DVD 초기화 후 다시 시작



2. Mac (ARM)

4) 초기 설정 - 로그인

- {username} + 비밀번호 입력



```
Ubuntu 22.04.5 LTS ubuntu tty1
Ubuntu login: user72250292
Password:
(GNU/Linux 5.15.0-134-generic aarch64)

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

System information as of Fri Mar 14 12:40:11 AM UTC 2025

System load:          0.13
Usage of /:            22.8% of 29.82GB
Memory usage:         5%
Swap usage:           0%
Processes:            125
Users logged in:      0
IPv4 address for enp0s1: 192.168.66.3
IPv6 address for enp0s1: fd1f:70d1:328f:4ad0:ecd6:7fff:fe75:86b0

Expanded Security Maintenance for Applications is not enabled.

43 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

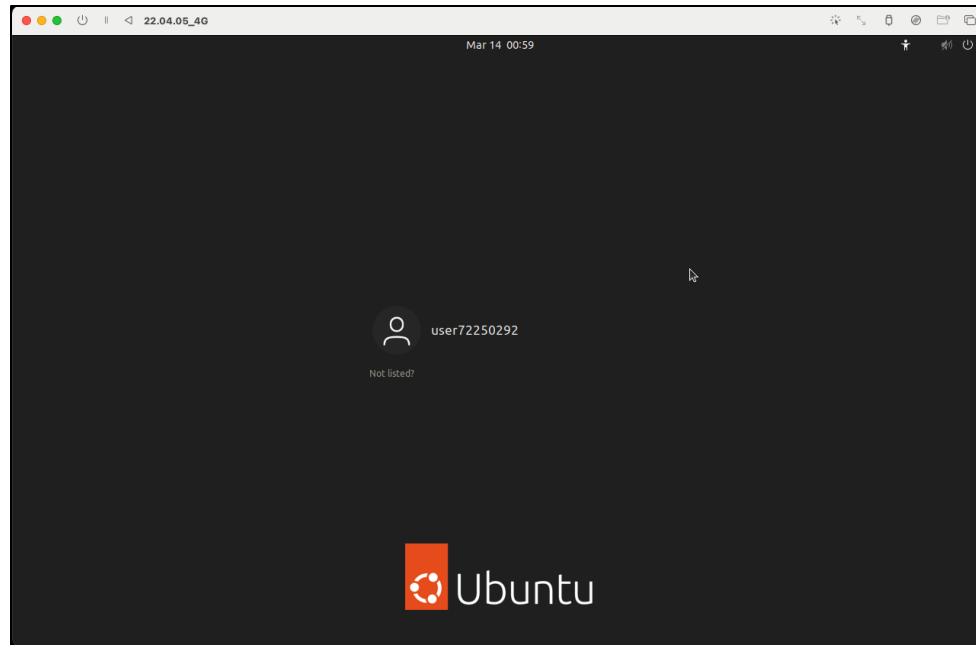
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

user72250292@ubuntu:~$
```

2. Mac (ARM)

5) Optional – GUI 환경으로 변경

- \$ sudo apt install ubuntu-desktop
- 설치 완료 후 \$ sudo reboot
- reboot 후 다음 화면이 나온다면 성공



2. Mac (ARM)

5) Optional – SSH 설정

- Host(macOS)에서 터미널 실행 (VM은 실행 중인 상태)
- ~ ssh {username}@{IP address}
 - 39p에서 알아낸 IP 주소 또는 \$ ip a로 알아낸 IP 주소

```
user72240257@ubuntu: ~  
~ ssh user72240257@192.168.67.11  
The authenticity of host '192.168.67.11 (192.168.67.11)' can't be established.  
ED25519 key fingerprint is SHA256:ipfR5BZ9uBzoU1CmMiGDnv3eml011mxQ009t650o7tU.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '192.168.67.11' (ED25519) to the list of known hosts.  
user72240257@192.168.67.11's password:  
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 6.8.0-44-generic aarch64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/pro  
  
Last login: Fri Sep  6 14:23:49 2024 from 192.168.67.1  
user72240257@ubuntu:~$
```

Thank you

2025.01.02

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