

CSUS, College of Engineering and Computer Science

Department of Computer Science

CSC 154 – Computer System Attacks and Countermeasures

Lab 1 – Workspace Setup

Introduction

In this lab you will install VirtualBox and three virtual machines (VMs) as test environments that support future lab coursework.

Estimated Time: 3-4 hours

Deliverable: One screenshot with all three running VM's desktop screen. It is important to submit only one screenshot to ensure your system can handle three concurrent machines running.

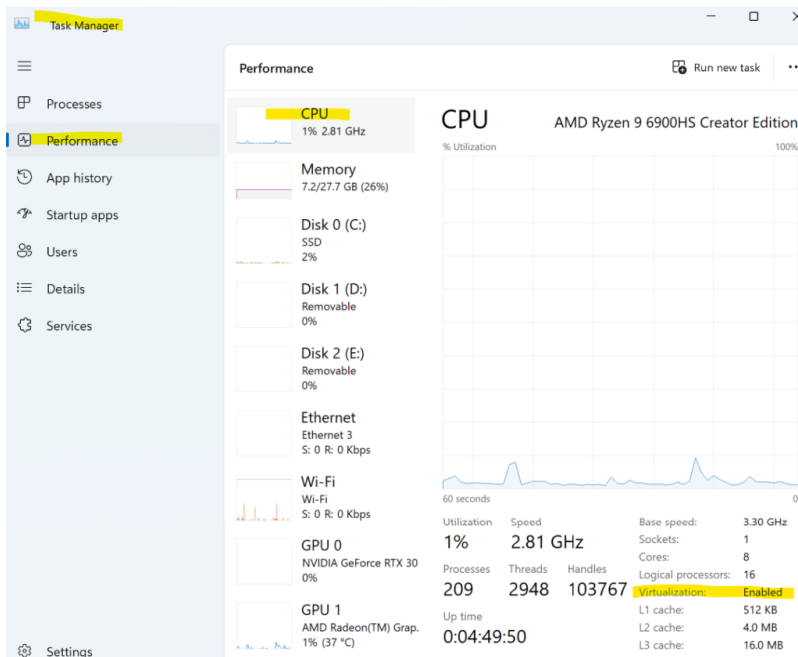
Note: The links, screenshots, and steps may not match your system or are no longer accurate due to software drift. Under such circumstances, students are expected to research and troubleshoot as necessary to achieve all stated objectives regardless of the accuracy of provided instructions.

Objectives

1. Download and Install VirtualBox
2. Download and Setup Kali VM
3. Download Ubuntu and Setup Ubuntu VM
4. Download Windows and Setup Windows VM

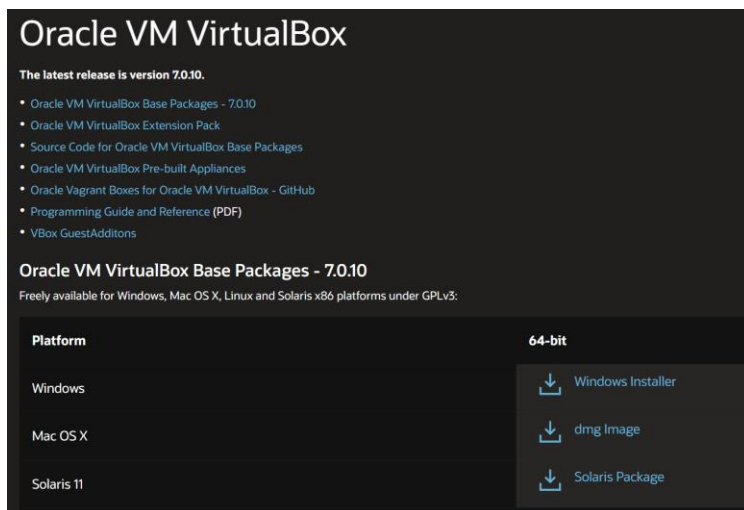
Download and Install VirtualBox

Ensure your processor supports virtualization that is enabled in the BIOS/UEFI. In Windows, this can be done using the Task Manager. You must enable virtualization. You will not be able to proceed with the course if your CPU does not support virtualization!

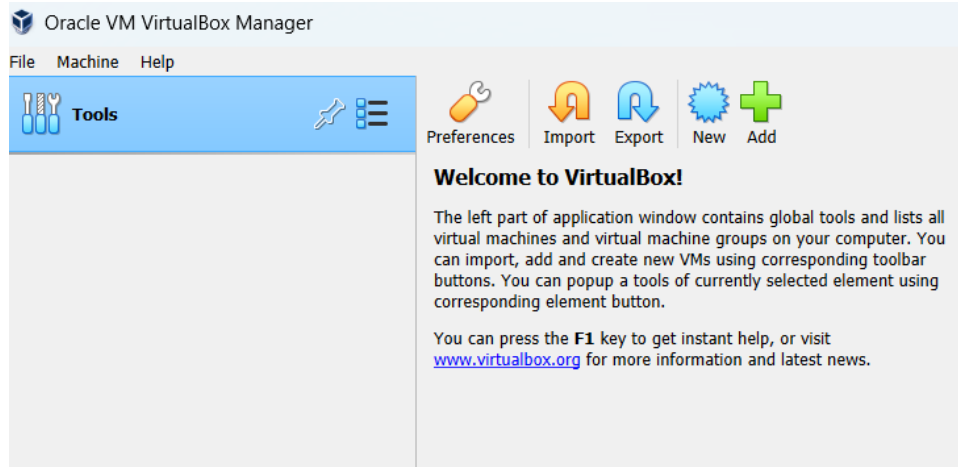


Navigate to <https://www.oracle.com/virtualization/technologies/vm/downloads/virtualbox-downloads.html>

Select Installer (Windows, Mac OS X, Linux):



Run the installer, follow the prompts, default settings should be fine. Launch VirtualBox:



Congrats, you've installed VirtualBox!

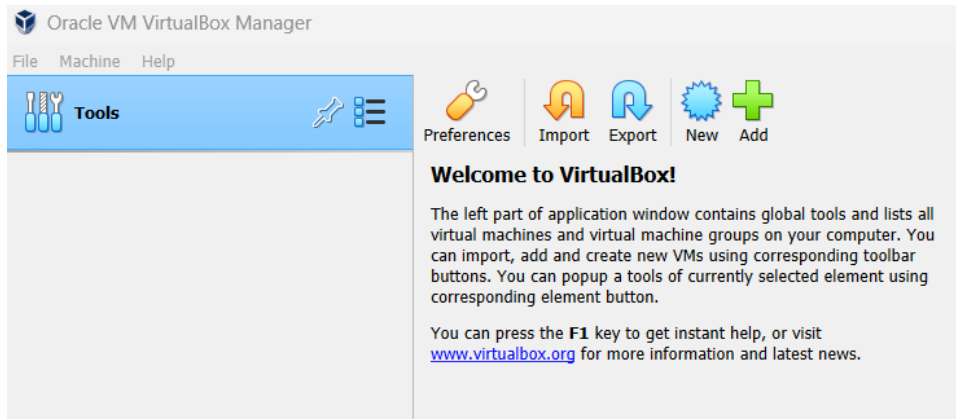
Download and Setup Kali

Navigate to <https://www.kali.org/get-kali/#kali-installer-images>

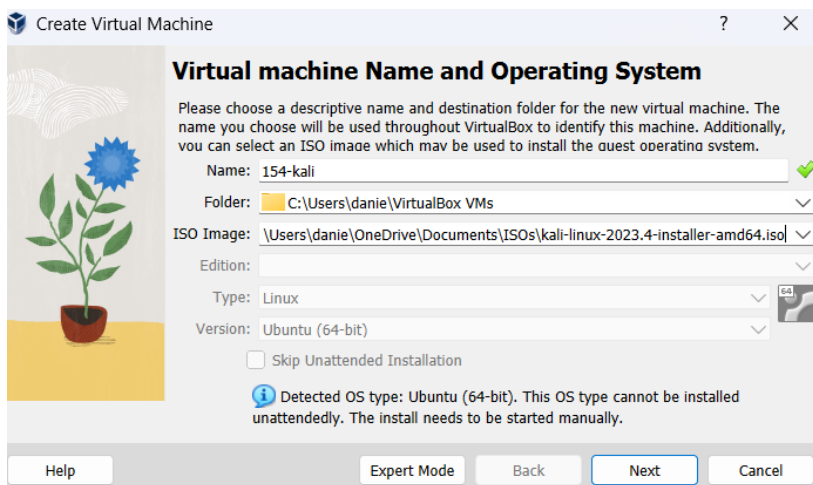
Select the download button for the 64-bit Installer image:



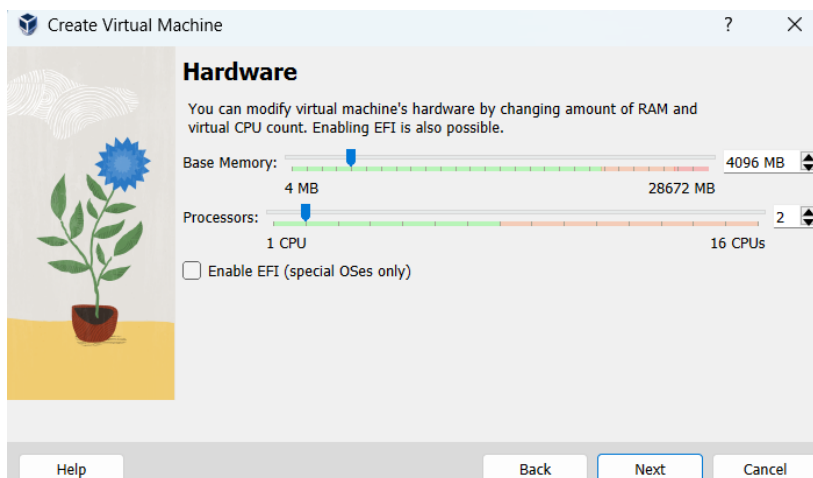
With the ISO for Kali fully downloaded (~10-20 minutes depending on internet speeds), navigate to the running VirtualBox application and select the "New" button:



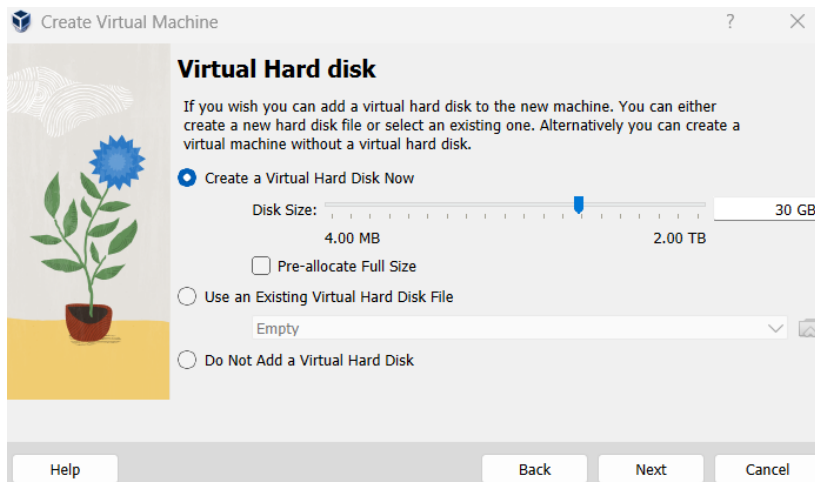
Name the VM “kali” and select the Kali ISO location downloaded in the previous steps:



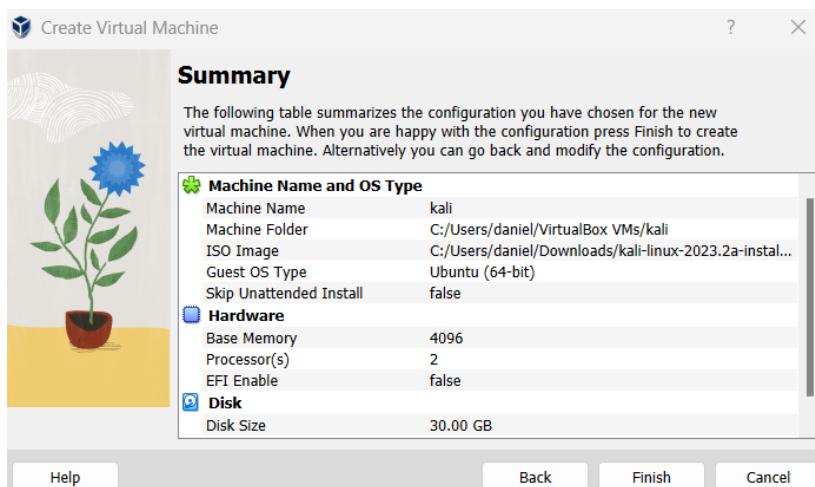
Supply the VM with 4GBs memory and 2 processors (note, these settings can be increased or decreased later if needed):



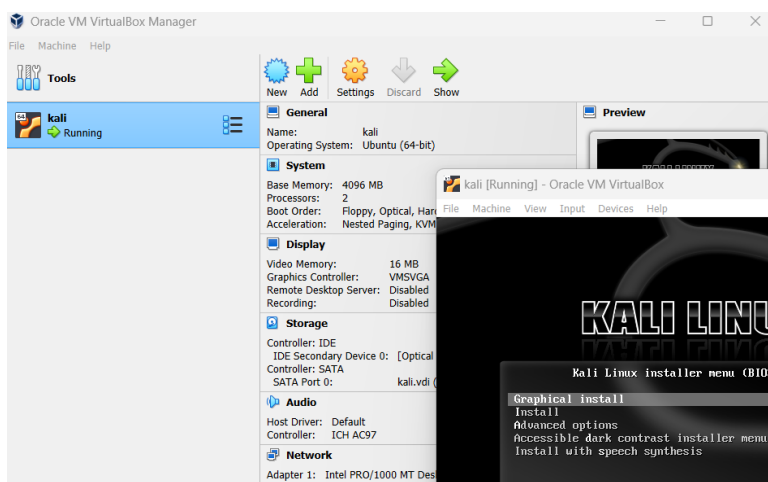
Create a Virtual Hard Disk with 30GB:



Review the settings and select “Finish”:



With the “kali” VM select, press the “Start” button to launch the VM in a new window:



Select “Graphical Install” to install the operating system. Select language English when prompted:



Select a language

Choose the language to be used for the installation process. The selected language will also be the default language for the installed system.

Language:


Chinese (Simplified)	- 中文(简体)
Chinese (Traditional)	- 中文(繁體)
Croatian	- Hrvatski
Czech	- Čeština
Danish	- Dansk
Dutch	- Nederlands
Dzongkha	- ཇོང་ཁྱེད་
English	- English
Esperanto	- Esperanto
Estonian	- Eesti
Finnish	- Suomi
French	- Français
Galician	- Galego
Georgian	- ქართული
German	- Deutsch

Screenshot

Go Back

Continue

Select Location United States:



Select your location

The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.

Country, territory or area:

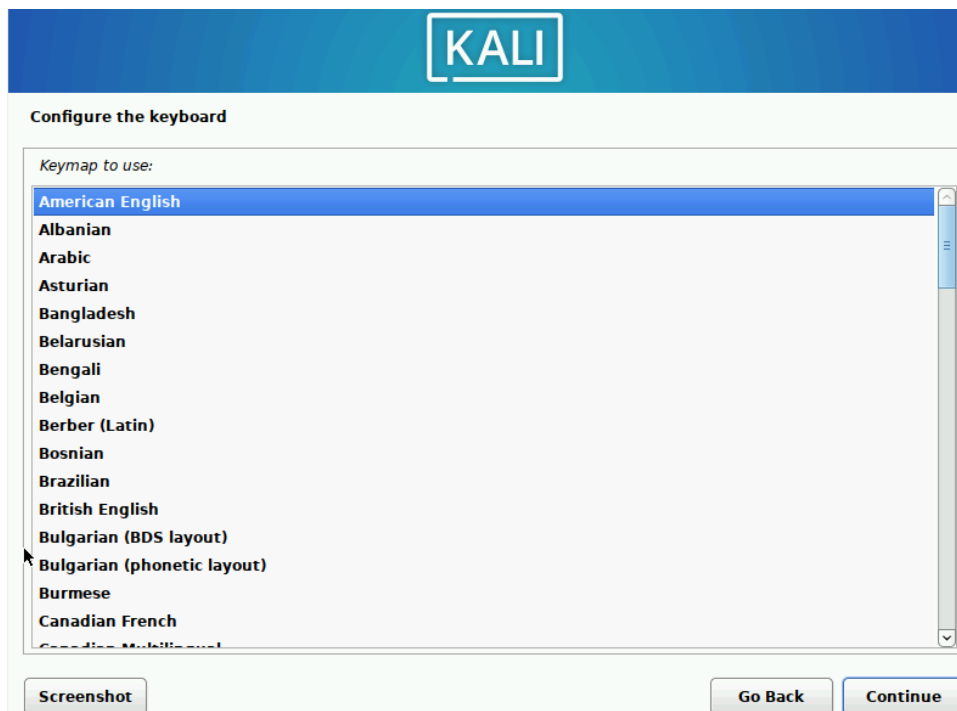
India
Ireland
Israel
New Zealand
Nigeria
Philippines
Seychelles
Singapore
South Africa
United Kingdom
United States
Zambia
Zimbabwe
other

Screenshot

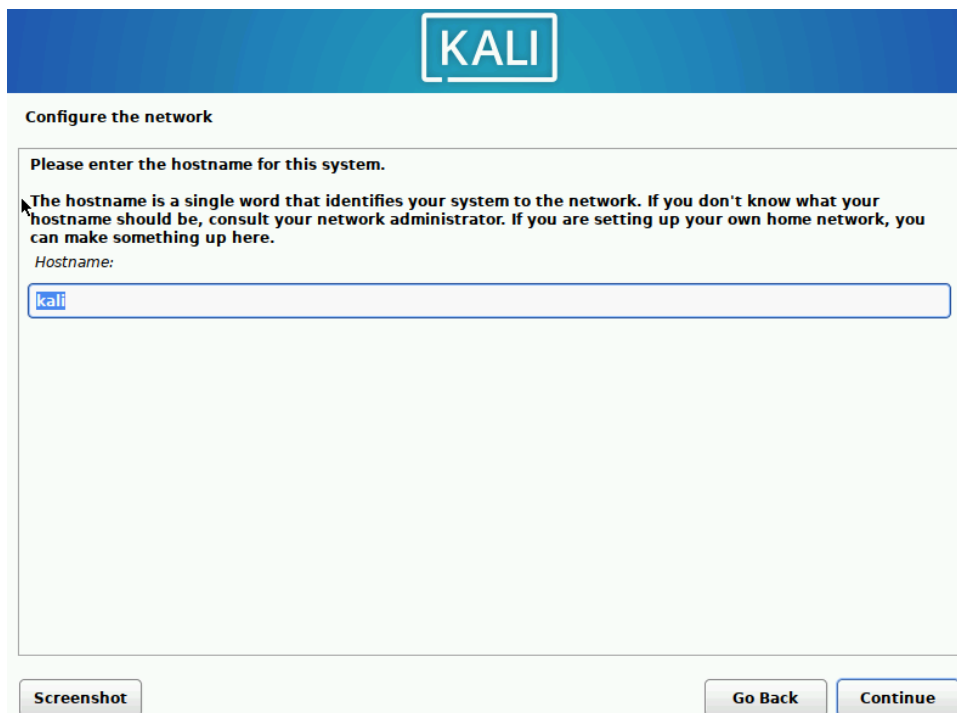
Go Back

Continue

Select keyboard layout American English:



Allow the kali installer to run. Use hostname "kali" when prompted:



Leave domain name empty and continue:

KALI

Configure the network

The domain name is the part of your Internet address to the right of your host name. It is often something that ends in .com, .net, .edu, or .org. If you are setting up a home network, you can make something up, but make sure you use the same domain name on all your computers.

Domain name:

Screenshot

Go Back

Continue

Enter your name:

KALI

Set up users and passwords

A user account will be created for you to use instead of the root account for non-administrative activities.

Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.

Full name for the new user:

daniel

Screenshot

Go Back

Continue

Enter any username:

KALI

Set up users and passwords

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Username for your account:

daniel

Screenshot

Go Back

Continue

Choose a password. Make sure it is a password you won't lose:

KALI

Set up users and passwords

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

Choose a password for the new user:

●●●●●●●●

☐ Show Password in Clear

Please enter the same user password again to verify you have typed it correctly.

Re-enter password to verify:

●●●●●●●●

☐ Show Password in Clear

Screenshot

Go Back

Continue

Select Pacific timezone:

KALI

Configure the clock

If the desired time zone is not listed, then please go back to the step "Choose language" and select a country that uses the desired time zone (the country where you live or are located).

Select your time zone:

Eastern

Central

Mountain

Pacific

Alaska

Hawaii

Arizona

East Indiana

Samoa

Screenshot

Go Back

Continue

Once disks are detected, select "Guided - use entire disk":

KALI

Partition disks

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.

Partitioning method:

Guided - use entire disk

Guided - use entire disk and set up LVM

Guided - use entire disk and set up encrypted LVM

Manual

Screenshot

Go Back

Continue

Use default partition:

KALI

Partition disks

Note that all data on the disk you select will be erased, but not before you have confirmed that you really want to make the changes.

Select disk to partition:

SCSI3 (0,0,0) (sda) - 32.2 GB ATA VBOX HARDDISK

Screenshot

Go Back

Continue

Select "All files in one partition":

KALI

Partition disks

Selected for partitioning:

SCSI3 (0,0,0) (sda) - ATA VBOX HARDDISK: 32.2 GB

The disk can be partitioned using one of several different schemes. If you are unsure, choose the first one.

Partitioning scheme:

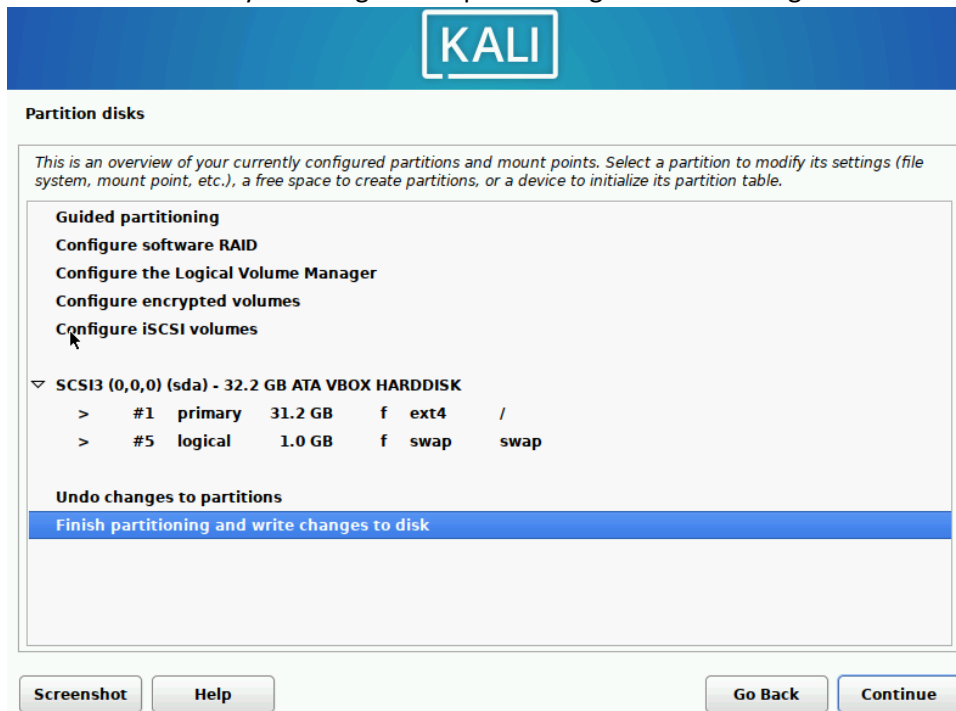
All files in one partition (recommended for new users)
Separate /home partition
Separate /home, /var, and /tmp partitions

Screenshot

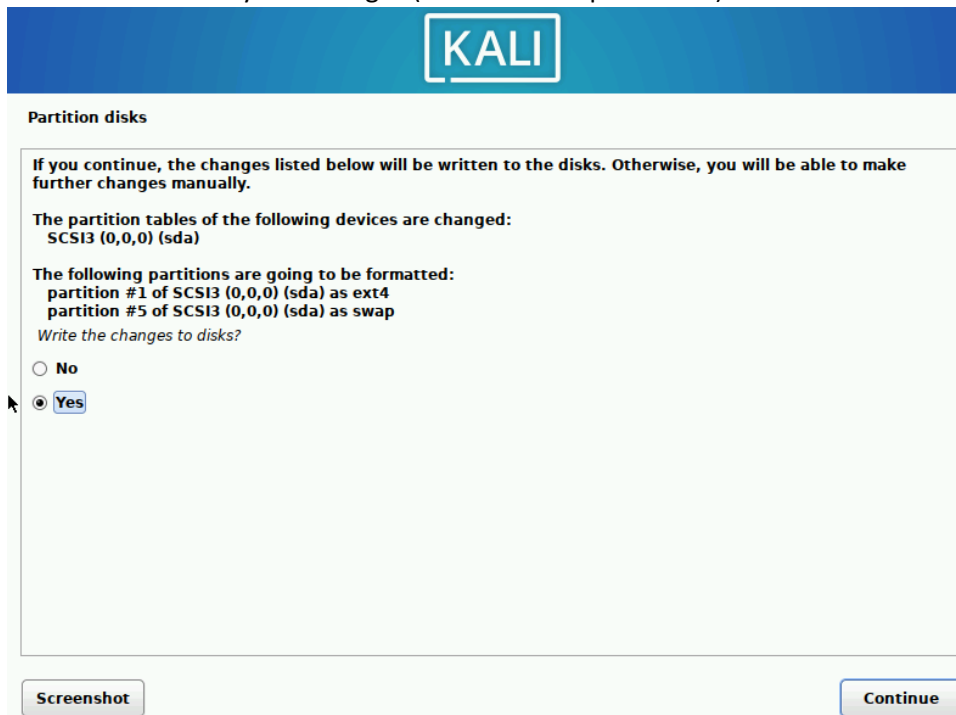
Go Back

Continue

Partition the disks by selecting “Finish partitioning and write changes to disk”:



Select “Yes” to verify the changes (note default option is no):



Wait for the system to install. Choose default software selection:

KALI

Software selection

At the moment, only the core of the system is installed. The default selections below will install Kali Linux with its standard desktop environment and the default tools.

You can customize it by choosing a different desktop environment or a different collection of tools.

Choose software to install:

☒ Desktop environment [selecting this item has no effect]

☒ ... Xfce (Kali's default desktop environment)

☐ ... GNOME

☐ ... KDE Plasma

☒ Collection of tools [selecting this item has no effect]

☒ ... top10 -- the 10 most popular tools

☒ ... default -- recommended tools (available in the live system)

Screenshot

Continue

Wait for software to install (~25 minutes). Install the GRUB boot loader when prompted:

KALI

Install the GRUB boot loader

It seems that this new installation is the only operating system on this computer. If so, it should be safe to install the GRUB boot loader to your primary drive (UEFI partition/boot record).

Warning: If your computer has another operating system that the installer failed to detect, this will make that operating system temporarily unbootable, though GRUB can be manually configured later to boot it.

Install the GRUB boot loader to your primary drive?

☐ No

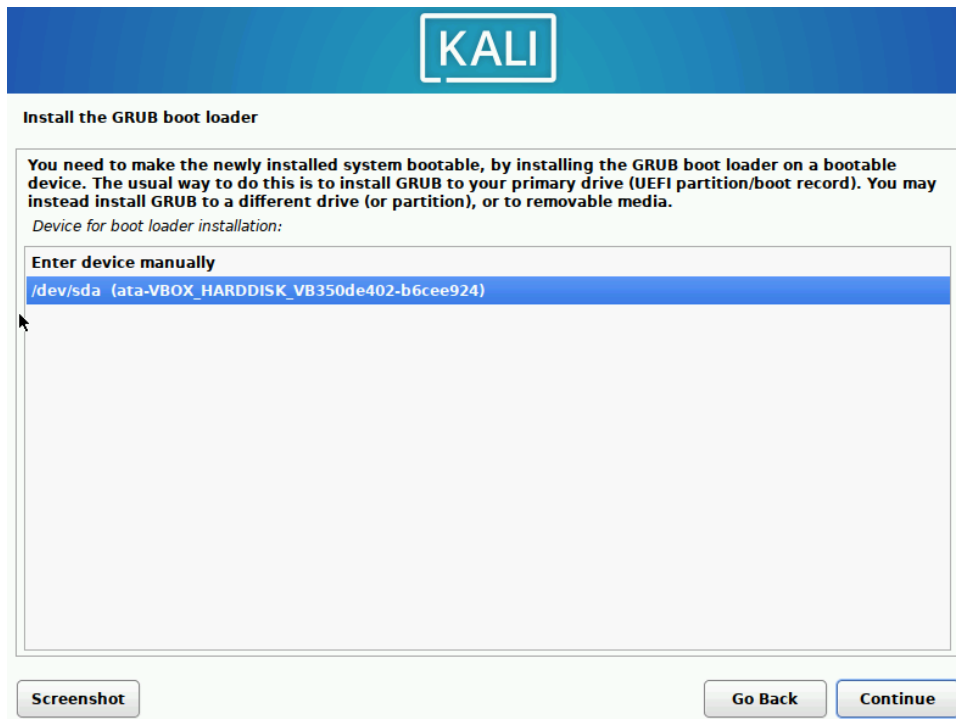
☒ Yes

Screenshot

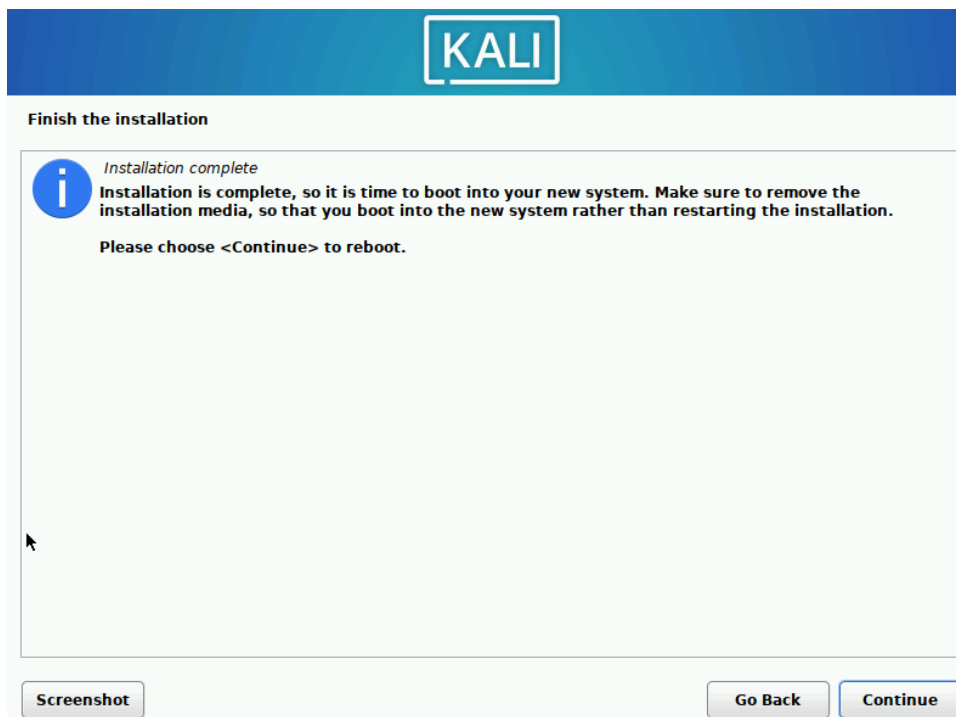
Go Back

Continue

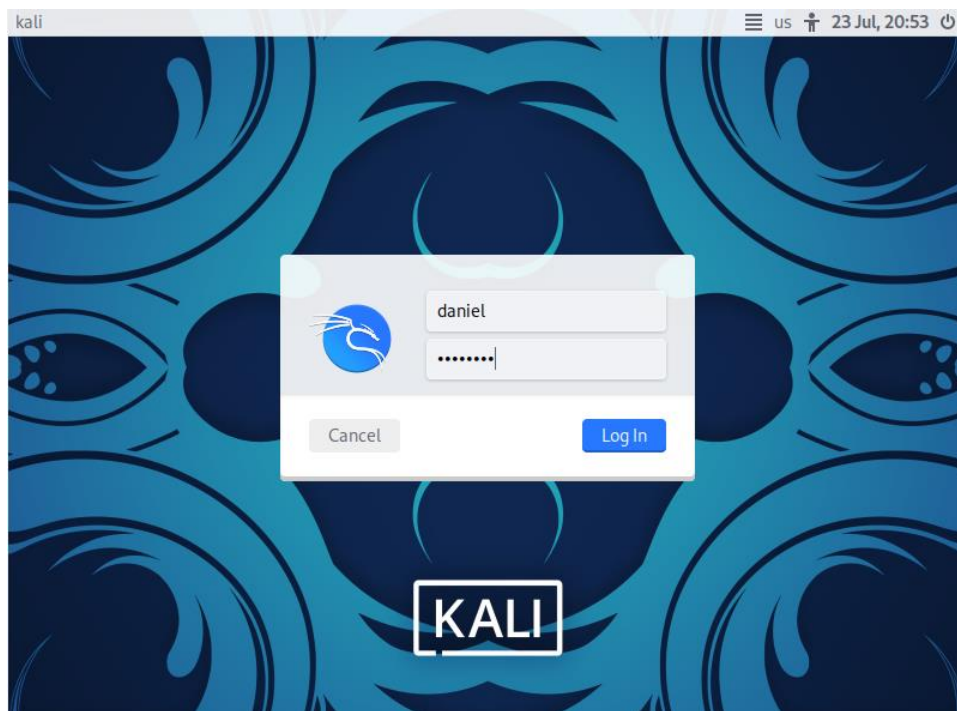
Select the available device (not "Enter device manually") to install the boot loader:



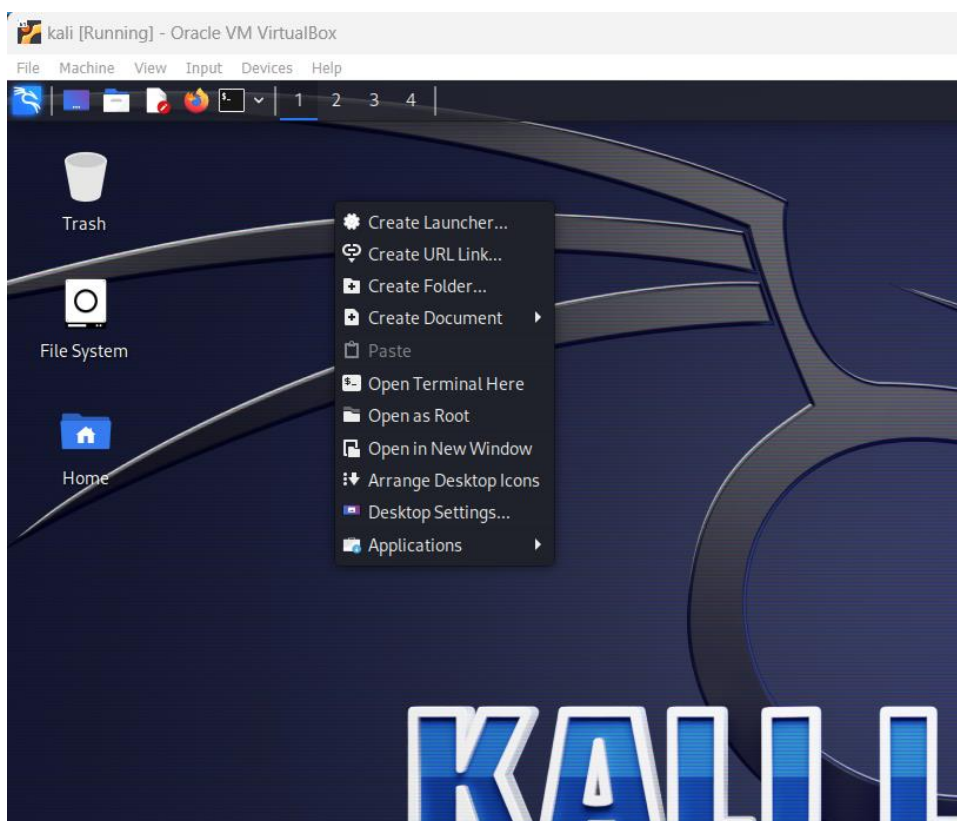
Wait for the installation to finish and choose continue:



The system will reboot and launch the login menu. Enter the username and password used during installation:

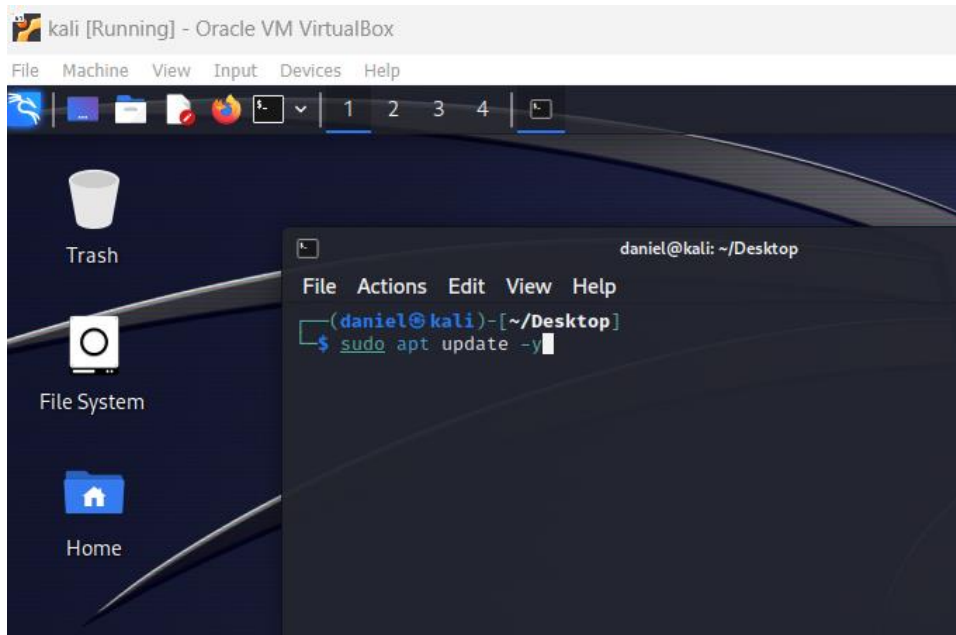


The system will log in and present the Kali desktop. Right click in the desktop and select “Open Terminal Here” from the context dropdown menu:



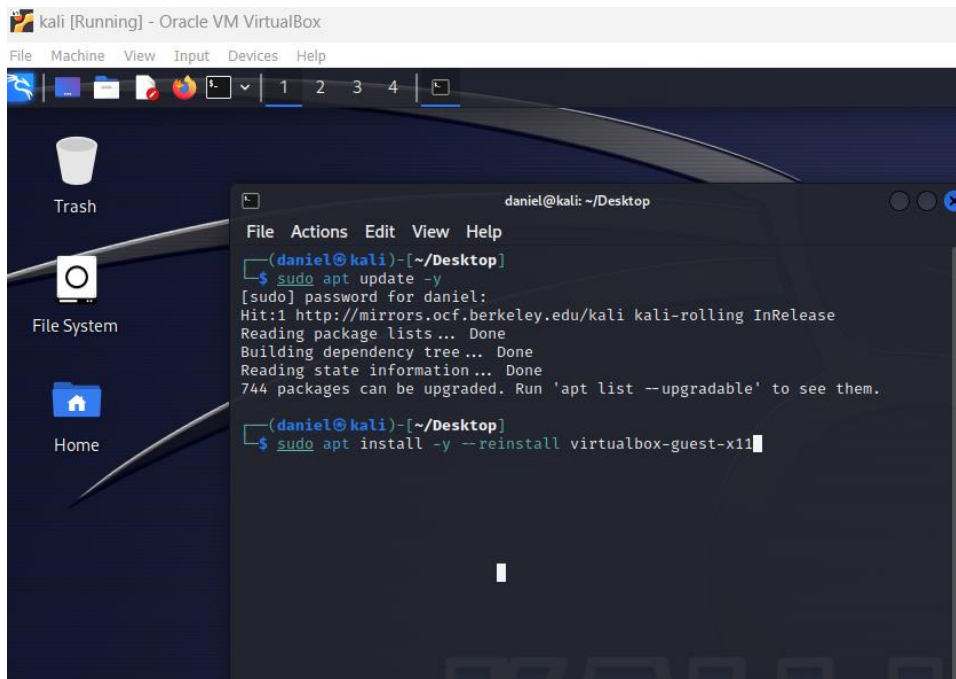
With the terminal open, run the apt update command and then enter your password to update the system:

```
sudo apt update -y
```

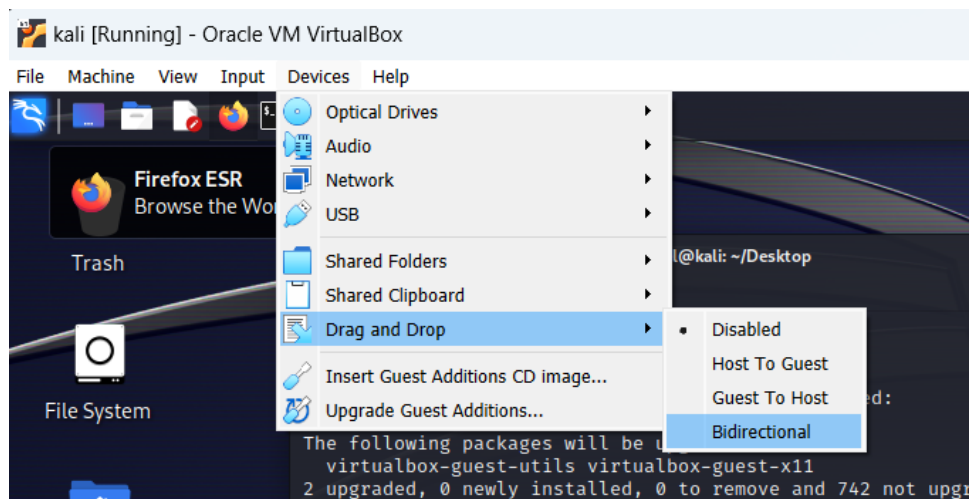


After updates have installed, install the virtualbox guest software using the following command:

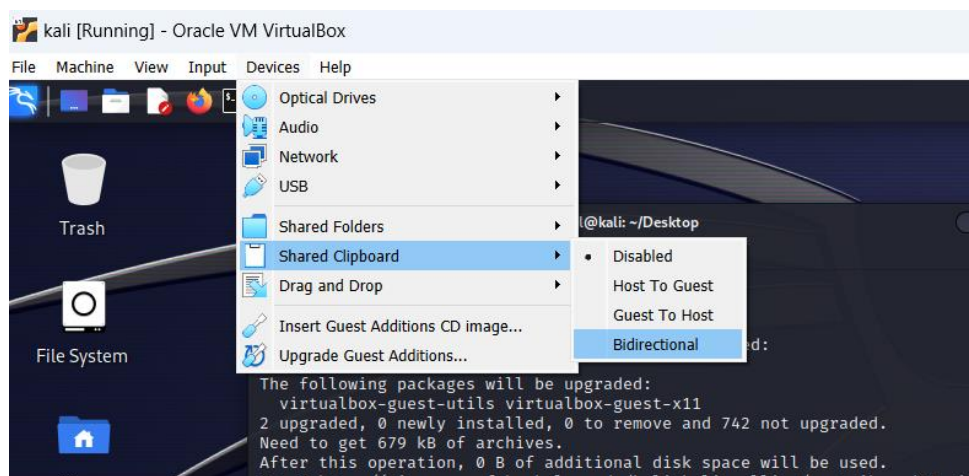
```
sudo apt install -y --reinstall virtualbox-guest-x11
```



After the guest software is installed, select the Devices menu -> Drag and Drop -> Bidirectional setting:

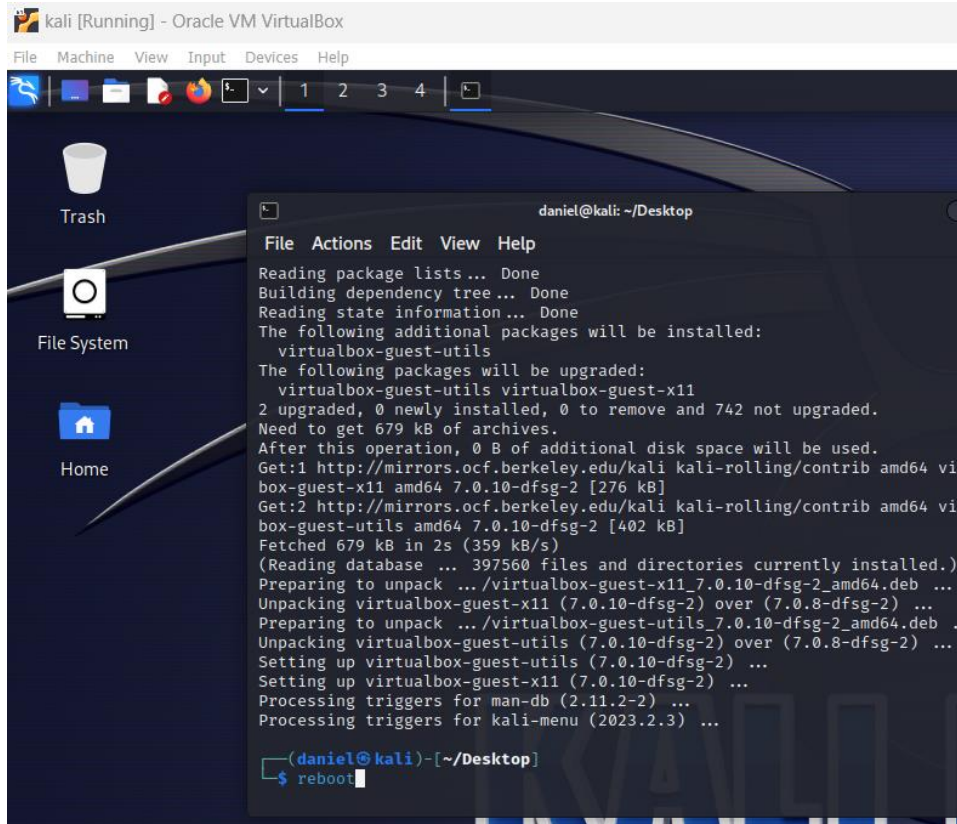


Then select the Devices menu -> Shared Clipboard -> Bidirectional setting:



Return to the kali terminal and reboot using the following command:

```
reboot
```

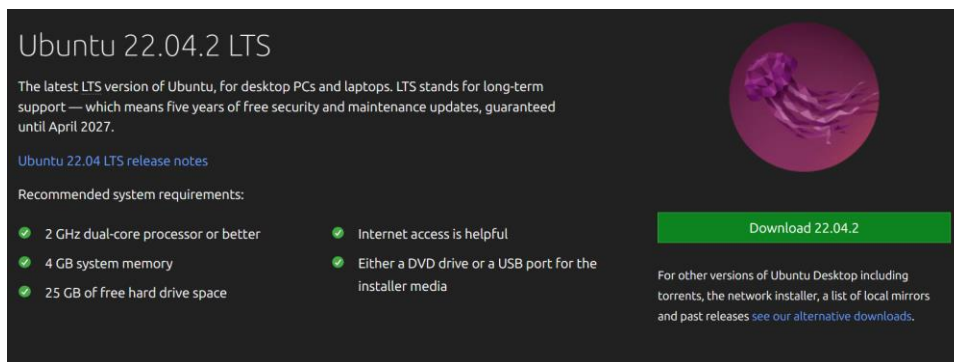


Congratulations, you've successfully setup Kali in VirtualBox! If you have adequate disk space (2x the recommended minimum) then you may consider taking a snapshot of the fresh install in case you ever want/need to start from a clean install.

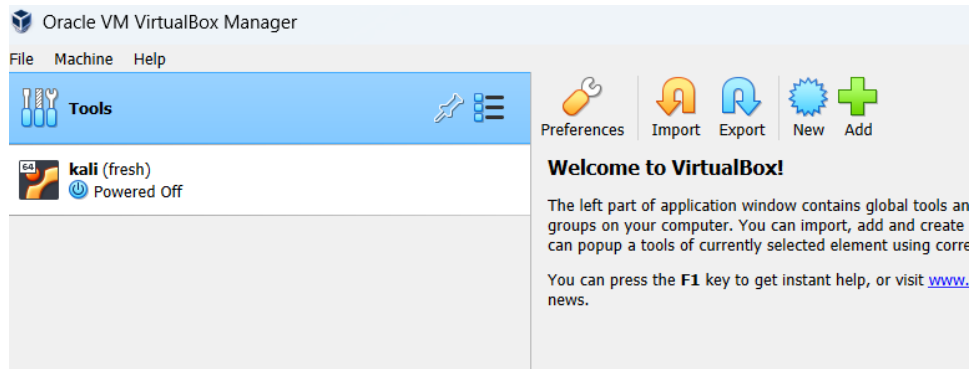
Download and Setup Ubuntu

Navigate to <https://ubuntu.com/download/desktop>

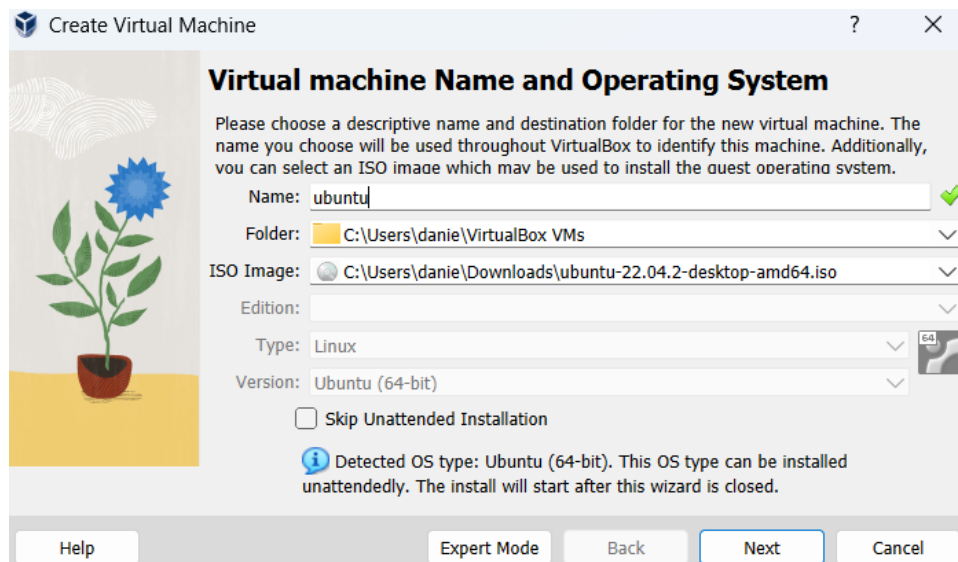
Download Ubuntu 22+ LTS image:



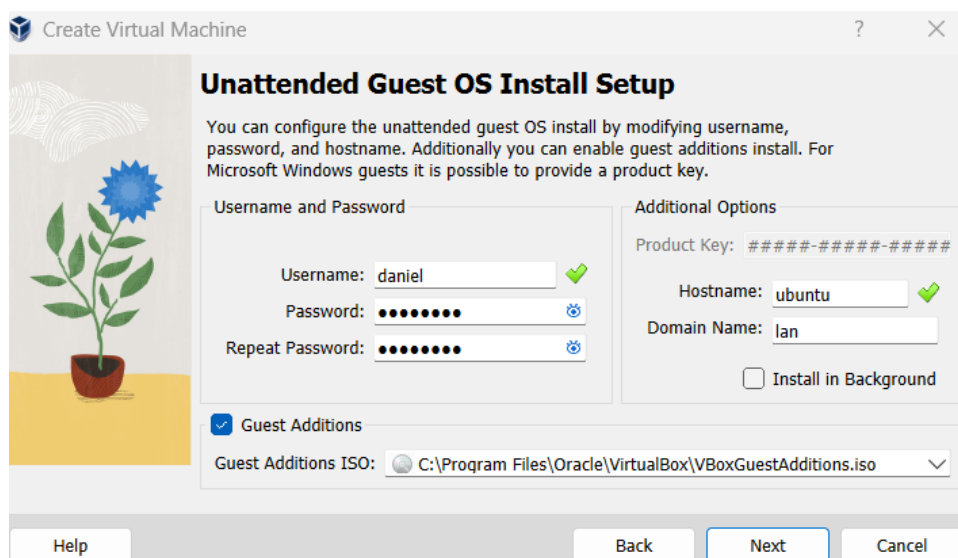
With the ISO for Ubuntu fully downloaded (~10-20 minutes depending on internet speeds), navigate to the running VirtualBox application and select the "New" button:



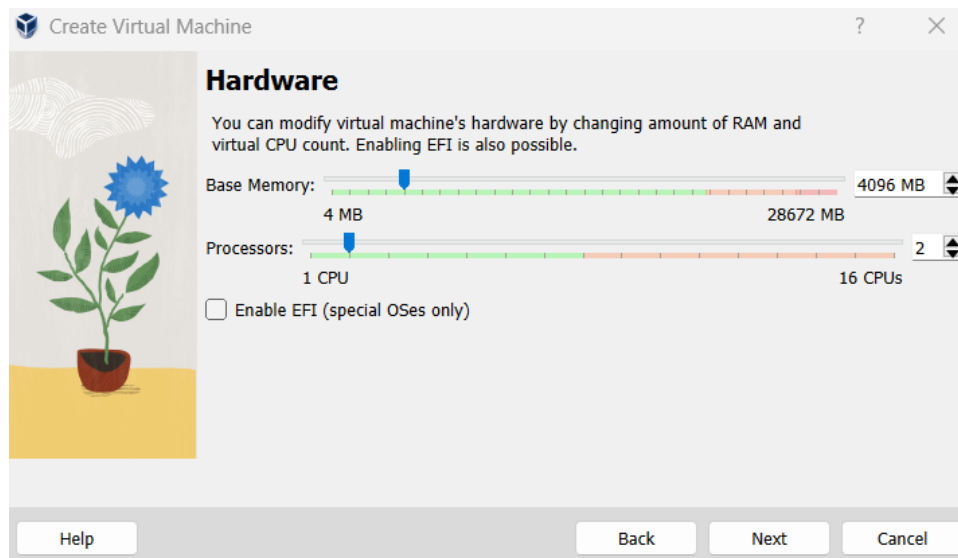
Enter ubuntu for the name and select the Ubuntu ISO image you downloaded in the previous step:



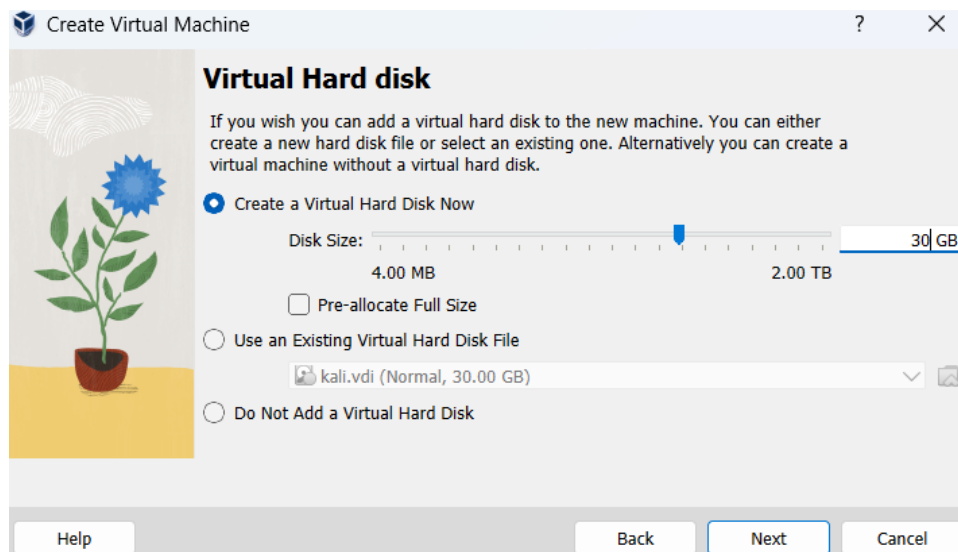
Within the unattended guest install setup, change the username and password, change the domain name to lan, and check Guest additions settings:



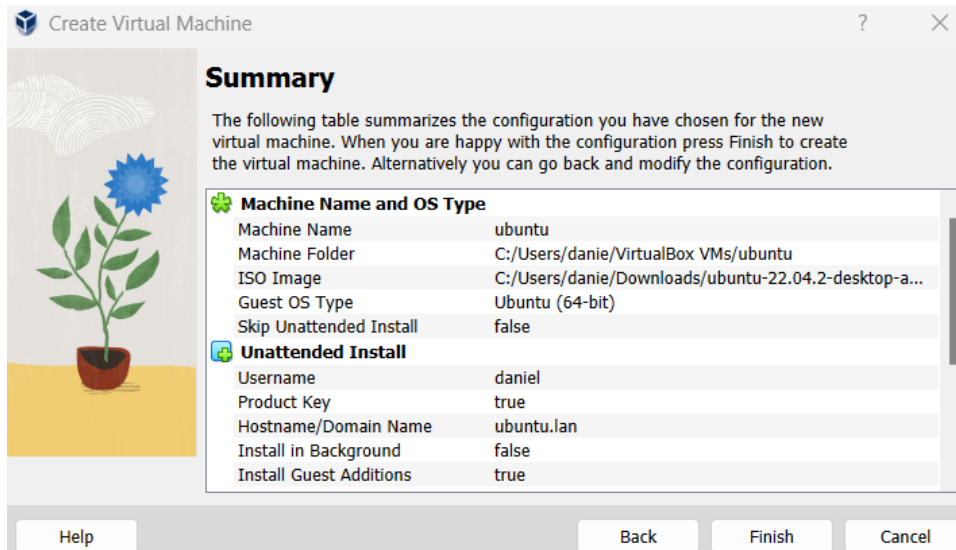
Set the hardware to have a minimum of 4GB of RAM and 2 CPUs (these settings can be adjusted later if more/less resources are needed):



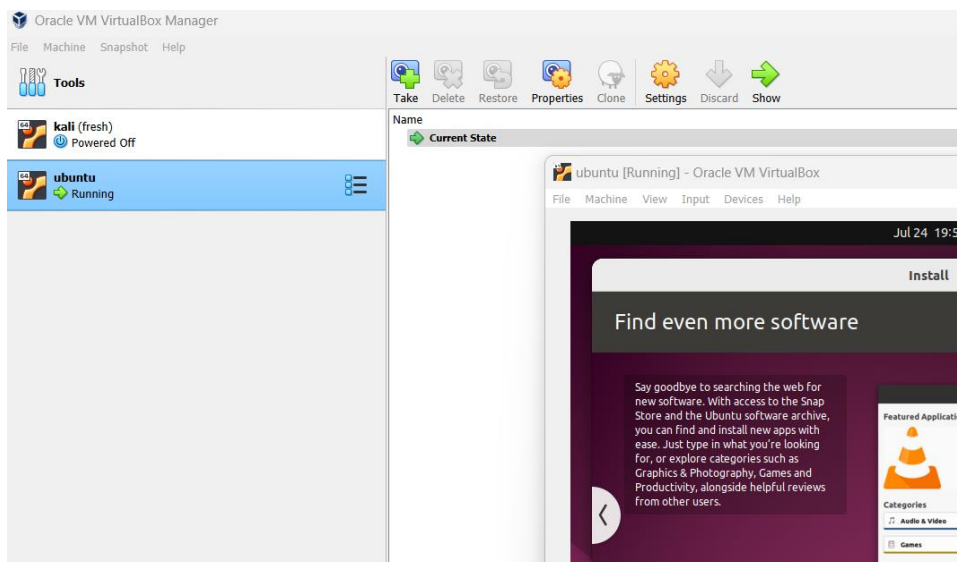
Create the virtual hard disk with 30GBs:



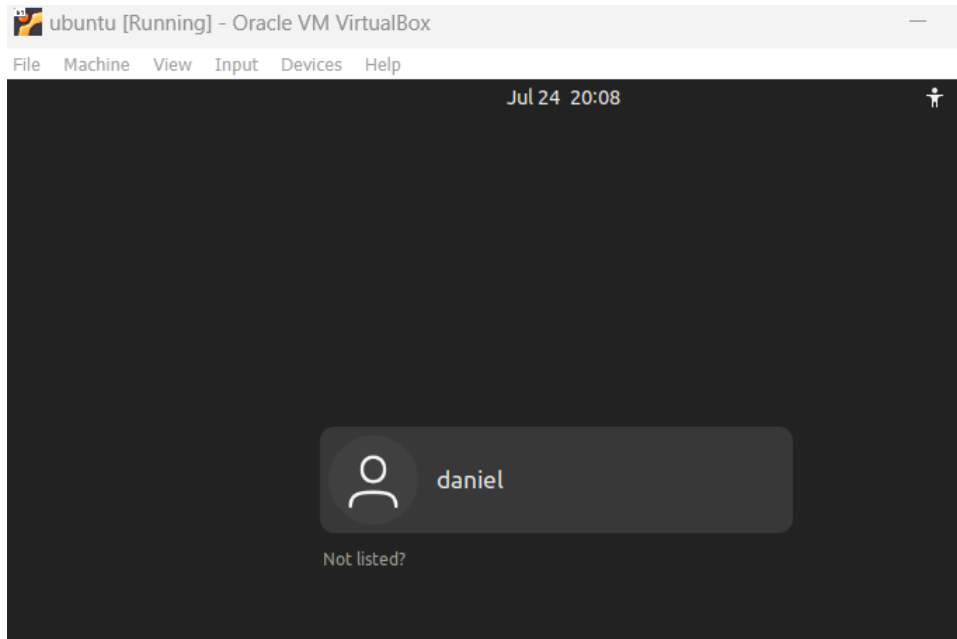
Select Finish to complete the setup:



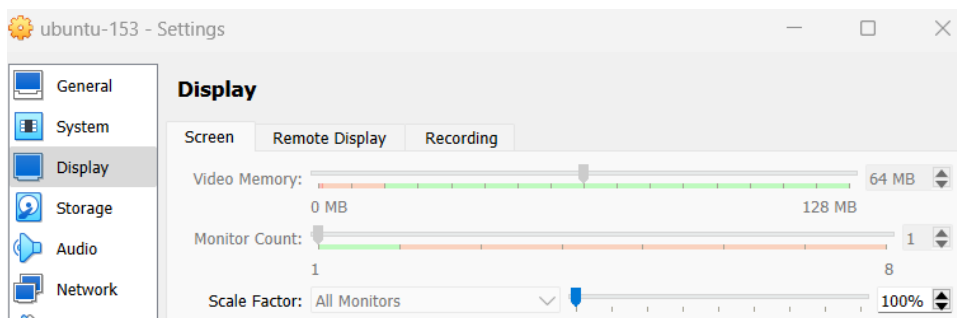
Observe the ubuntu VM has been configured and is running in the VirtualBox application. Select the ubuntu entry and then the Show button to watch the installation progress. The installation should take 20-30 minutes:



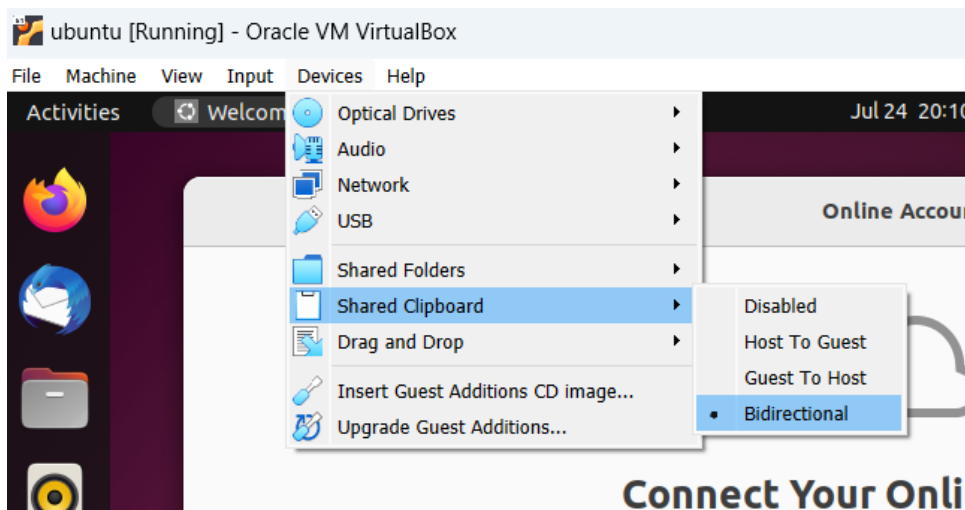
Once installation is complete the VM will reboot to the login screen. Login with the user account you setup.



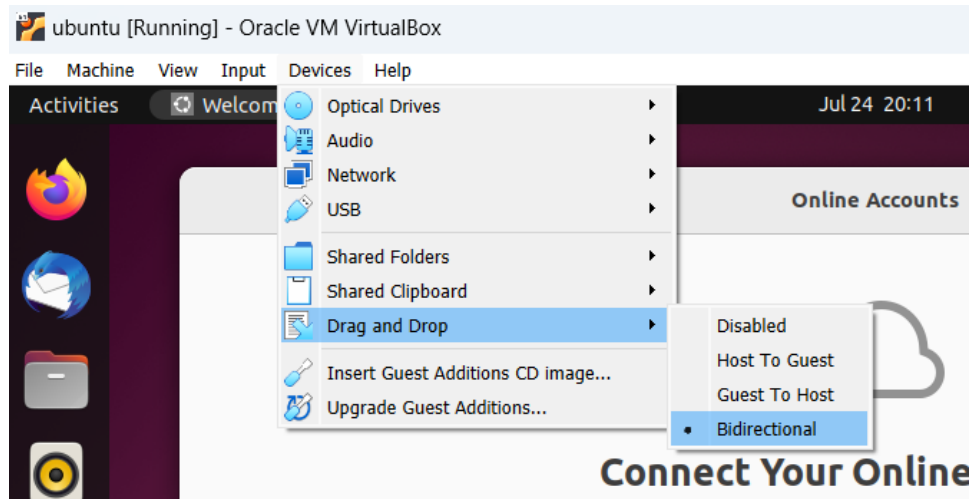
If you VM boots to a black screen, consider increasing the VM's video memory under the Display settings in Virtual Box.



Select Devices -> Shared Clipboard -> Bidirectional:



Select Devices -> Drag and Drop -> Bidirectional:

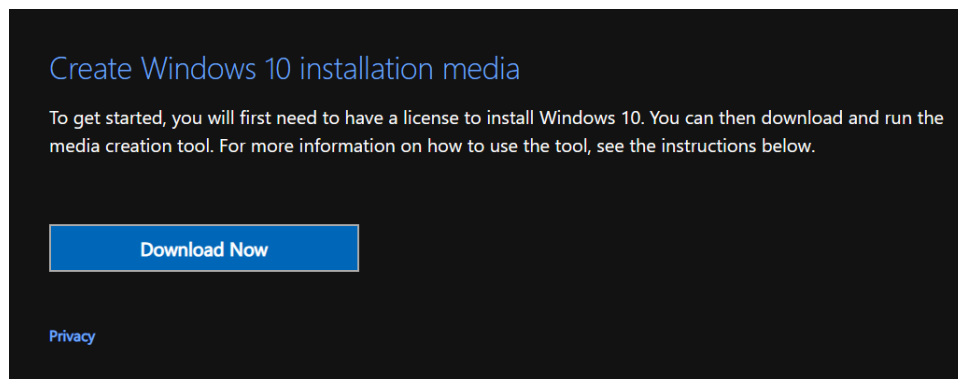


Congratulations, you have successfully installed the Ubuntu VM on VirtualBox! If you have adequate disk space (2x the recommended minimum) then you may consider taking a snapshot of the fresh install in case you ever want/need to start from a clean install.

Download and Setup Windows

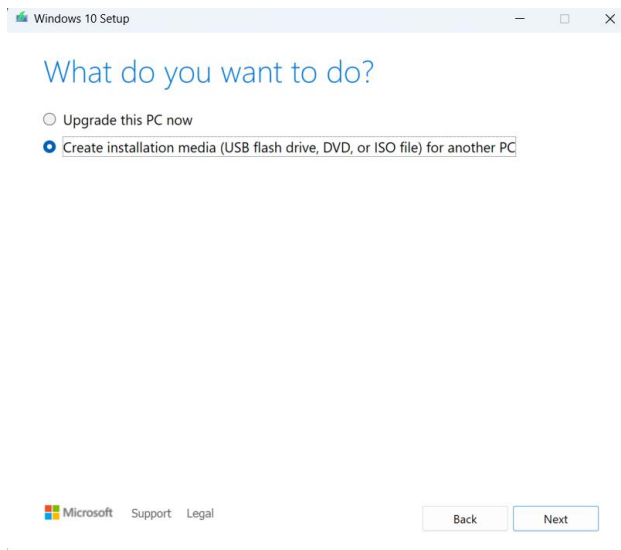
Navigate to <https://www.microsoft.com/en-us/software-download/windows10>

Press the “Download Now” button under “Create Windows 10 installation media” section:



Open the Downloads folder and run the Media Creation Tool executable

Accept licensing, and choose “Create installation media (USB flash drive, DVD, or ISO file) for another PC” option:



Use the recommended options and select ISO file:

Choose which media to use

If you want to install Windows 10 on another partition, you need to create and then run the media to install it.

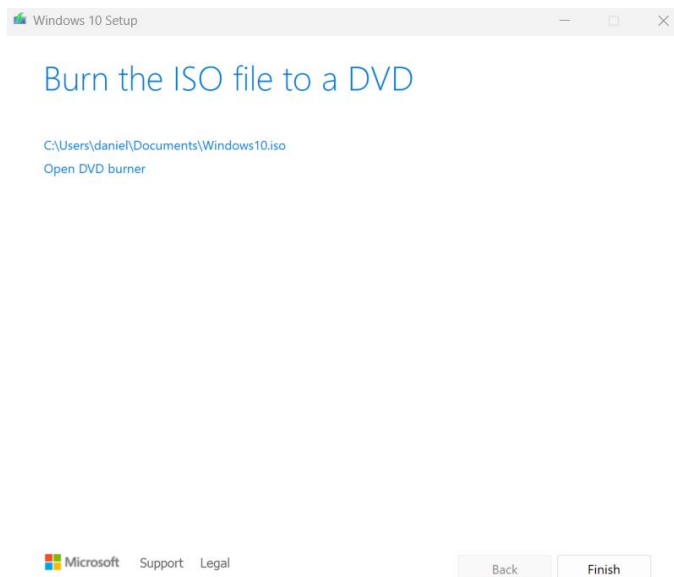
☐ USB flash drive

It needs to be at least 8 GB.

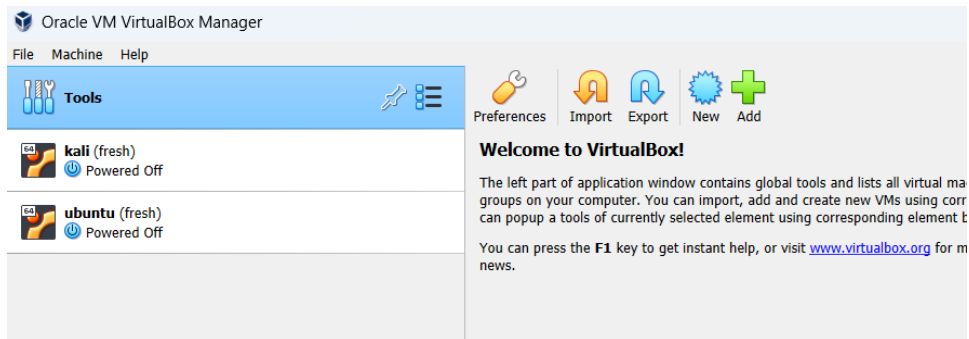
☒ ISO file

You'll need to burn the ISO file to a DVD later.

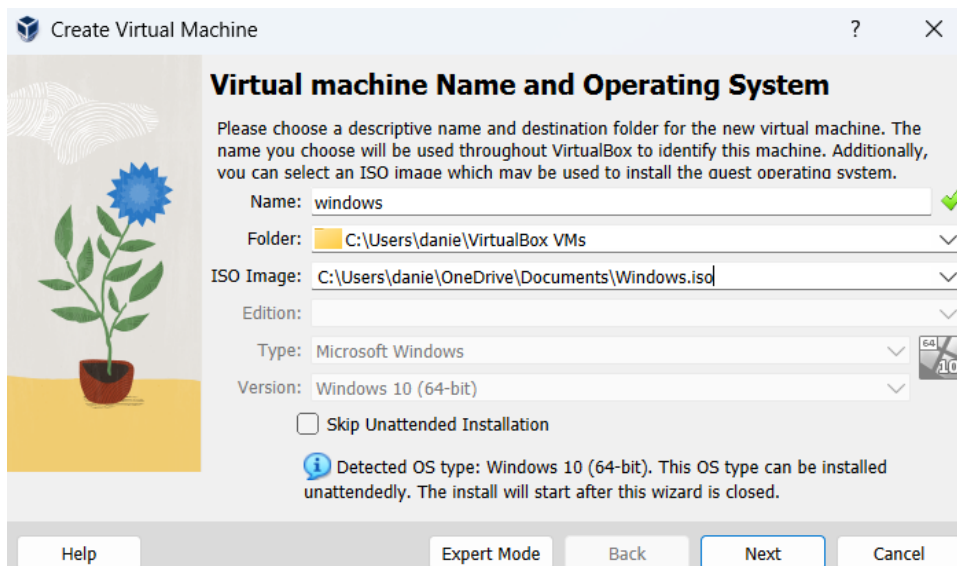
Select the location to save the ISO and the download will begin. Select Finish once complete (no need to burn to DVD):



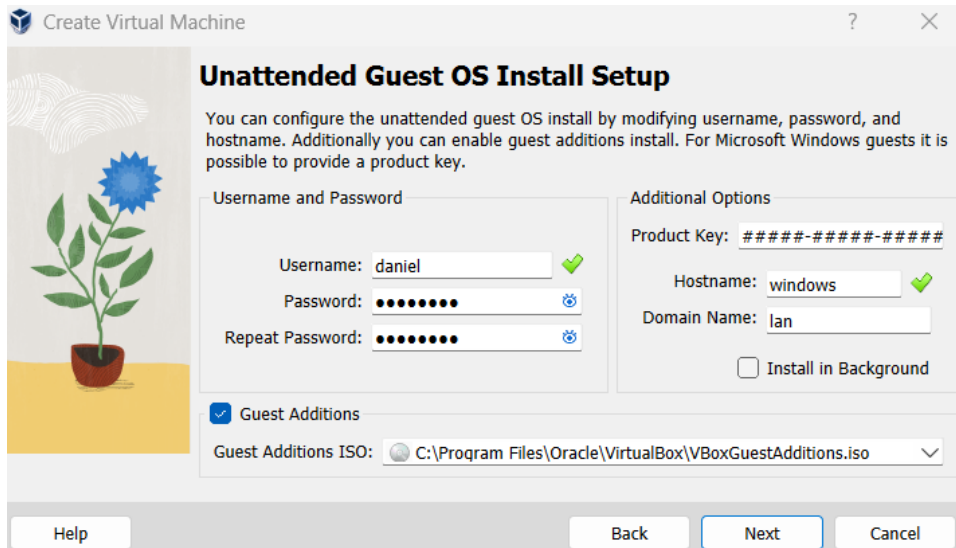
With the ISO for Windows fully downloaded (~10-20 minutes depending on internet speeds), navigate to the running VirtualBox application and select the “New” button:



Name the VM windows and select the ISO location you’ve just downloaded:



Adjust the unattended install setup with username and password of your choosing, set the Domain Name to lan, and check the Guest Additions. We won’t be licensing Windows so don’t worry about the Product Key:



Create Virtual Machine

Unattended Guest OS Install Setup

You can configure the unattended guest OS install by modifying username, password, and hostname. Additionally you can enable guest additions install. For Microsoft Windows guests it is possible to provide a product key.

Username and Password

Username: ✓

Password: ✓

Repeat Password: ✓

Additional Options

Product Key:

Hostname: ✓

Domain Name:

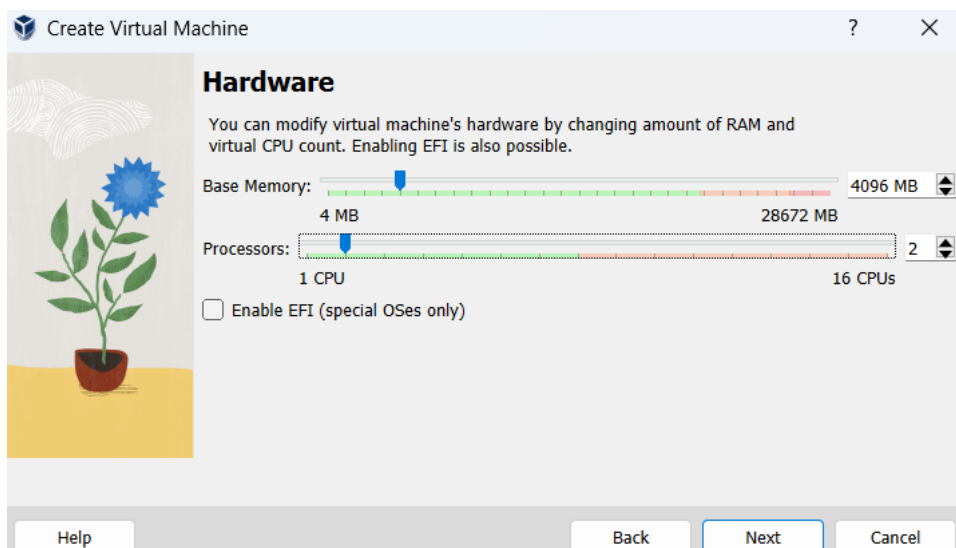
☐ Install in Background

☒ Guest Additions

Guest Additions ISO:

Help Back Next Cancel

Provide the VM with a minimum of 4GBs of RAM and 2 CPUs (these can be later increased/decreased as resources permit):



Create Virtual Machine

Hardware

You can modify virtual machine's hardware by changing amount of RAM and virtual CPU count. Enabling EFI is also possible.

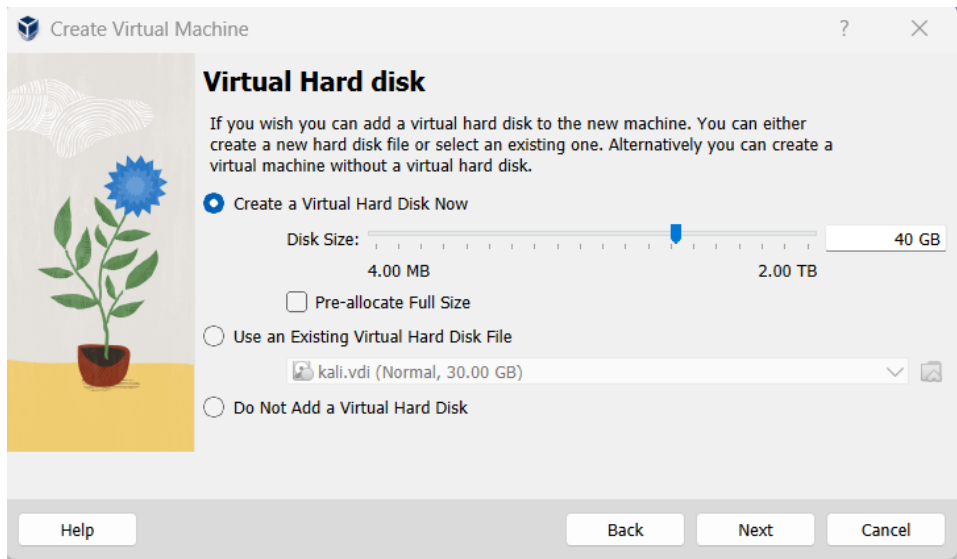
Base Memory: 4096 MB

Processors: 2

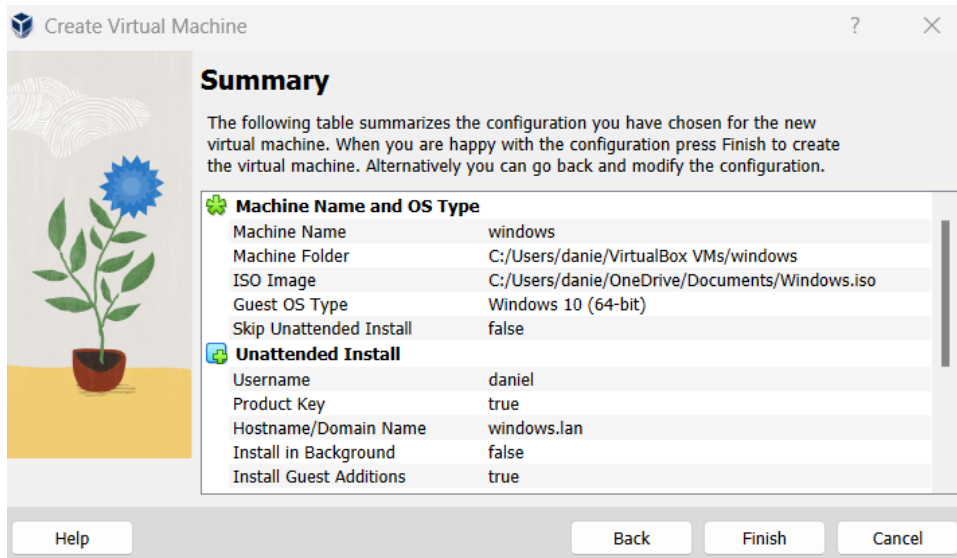
☐ Enable EFI (special OSes only)

Help Back Next Cancel

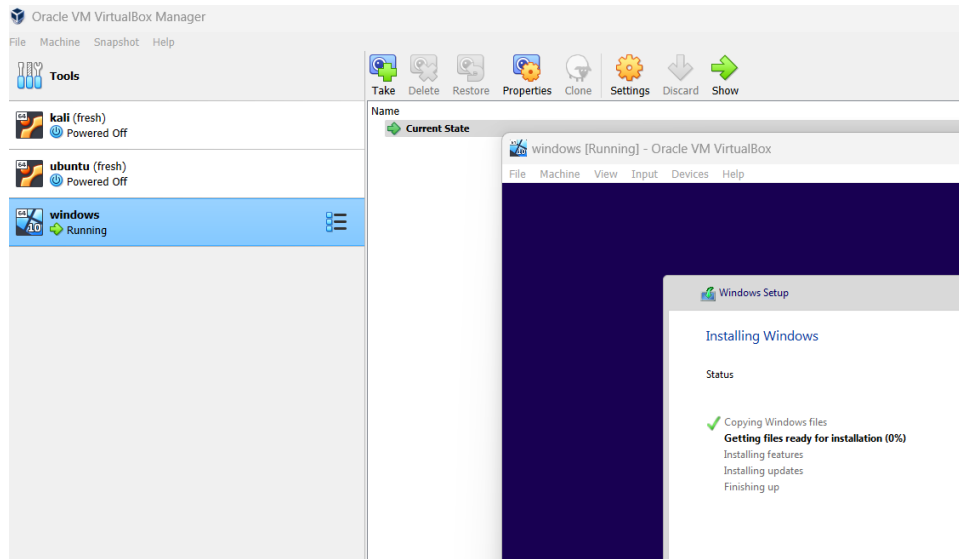
Create a virtual disk with 40GBs of space:



Select Finish to complete the configuration and launch the unattended installation:

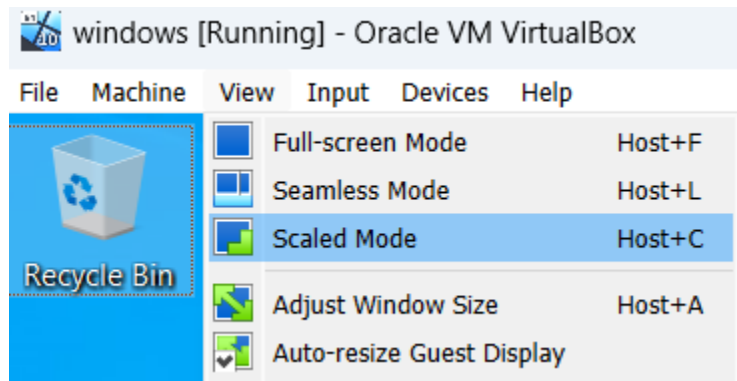


Windows should take 20-30 minutes to install and can be monitored by selecting Show in VirtualBox on the running windows VM:

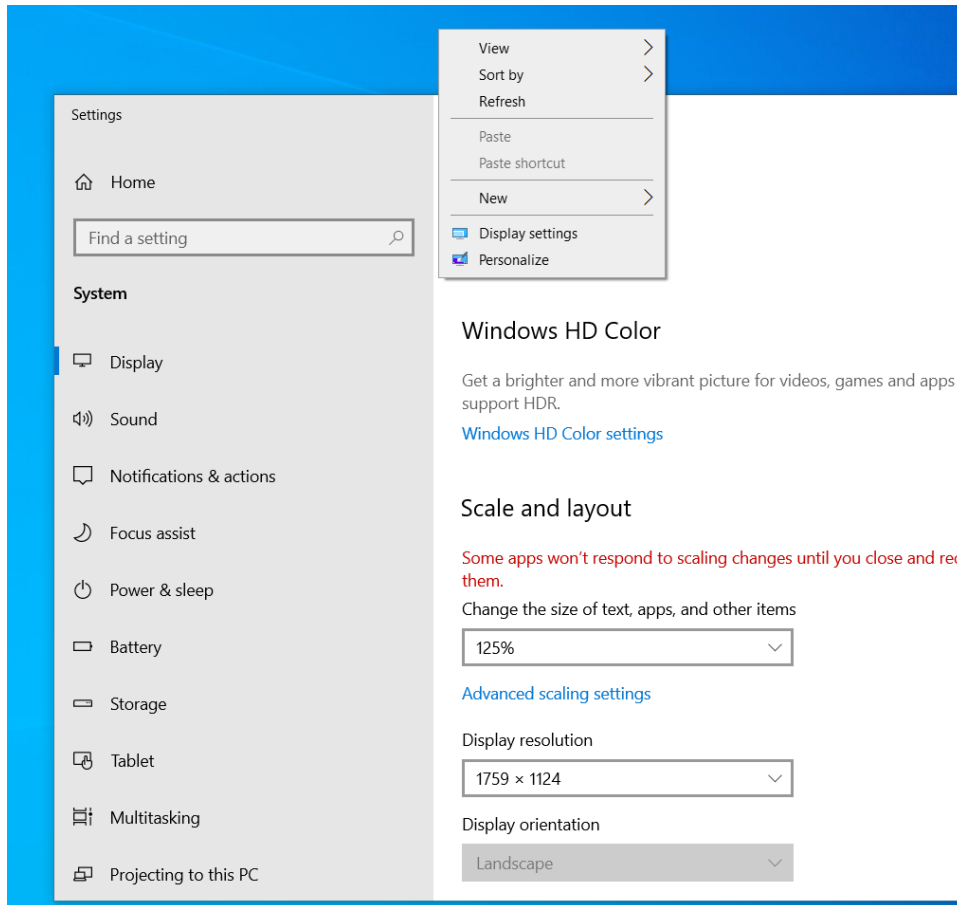


Windows will automatically load to the Windows desktop. You may have to adjust the VirtualBox View settings and/or the Windows display settings for the best experience. If your window does not show the file menu, try using VirtualBox shortcut keys to display (in Windows right CTRL + Home button).

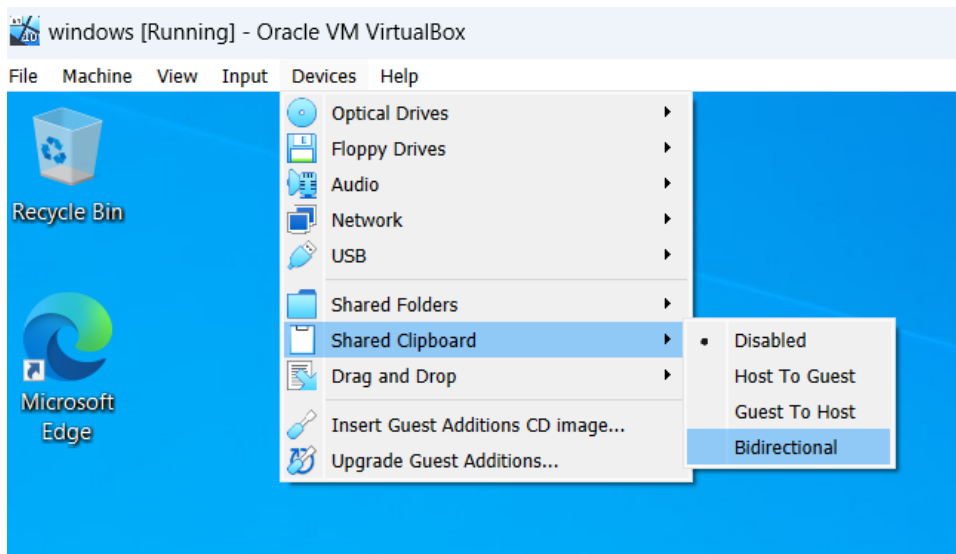
View -> Scaled Mode may be helpful:



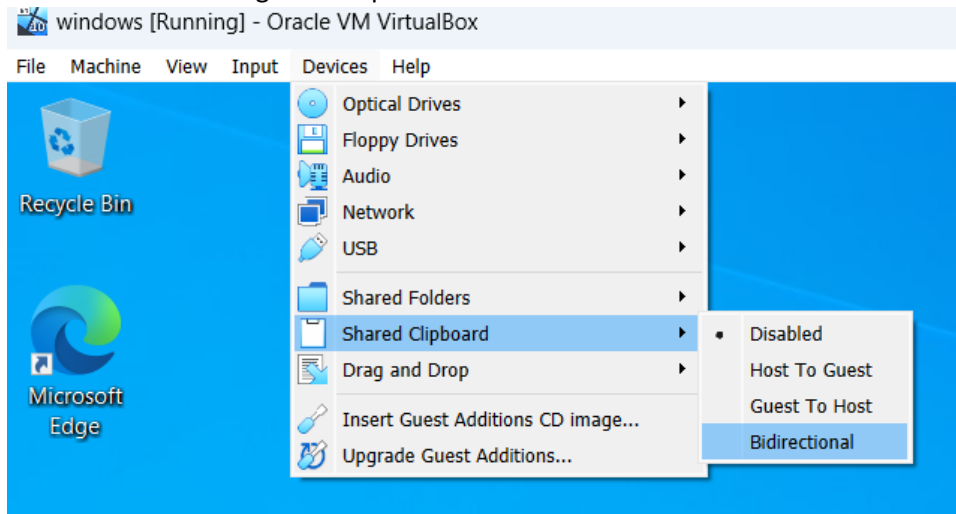
Right click in the Windows VM desktop and select “Display settings” to launch the settings window. Adjust the Display resolution and scaling as needed:



Select Devices -> Shared Clipboard -> Bidirectional:



Select Devices -> Drag and Drop -> Bidirectional:



Congratulations, you've successfully installed Windows in VirtualBox! If you have adequate disk space (2x the recommended minimum) then you may consider taking a snapshot of the fresh install in case you ever want/need to start from a clean install.