

Installing an Operating System

Using the graphical installer and a few terminal commands, we can get an operating system installed and up-to-date. This process is different depending on the type of computer you are using.

- [Traditional Computer](#)
- [Single-Board Computers](#)

Traditional Computer

Installing Debian on a traditional desktop computer requires us creating a USB flash drive we can boot into during computer startup.



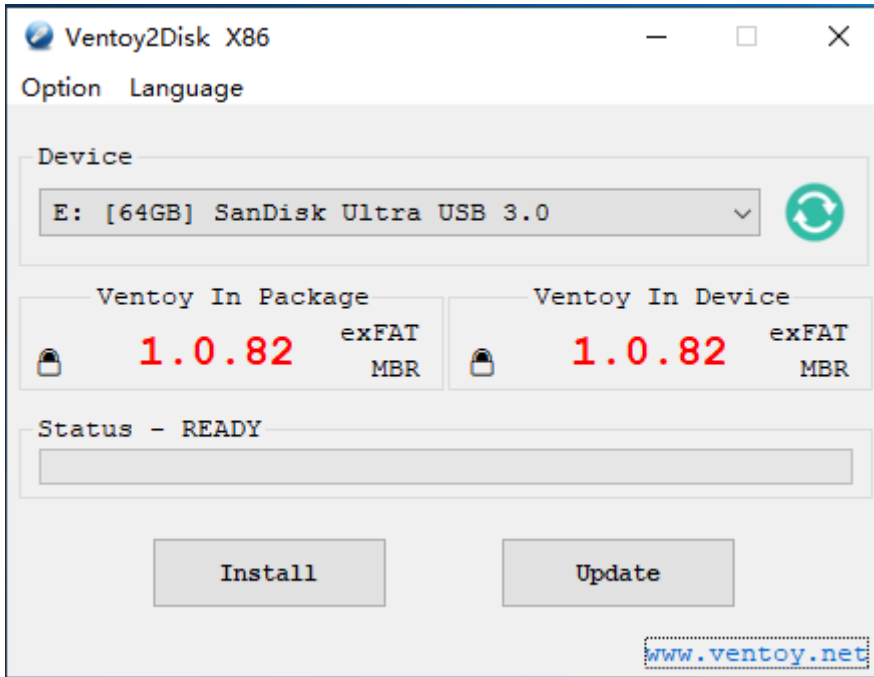
Preparing a USB Boot Disk

We need to create a USB flash drive that has everything required to boot into an operating system installation. You will need to obtain a USB flash drive that is at least 4GB. We will use [Ventoy](#), an open-source utility that makes it easy to create a bootable USB flash drive.



First, we will need to download the latest version from their [downloads page](#). We need to download the Windows ZIP and extract it with the Windows compression utility. Using the Ventoy application, we can install it onto our flash drive.

They [provide more in-depth installation procedures](#) should you need them.



Downloading Debian

Next, we need to get an installation disk image for our desired Linux distribution. For the broadest compatibility we'll be using [Debian, the "universal operating system"](#).

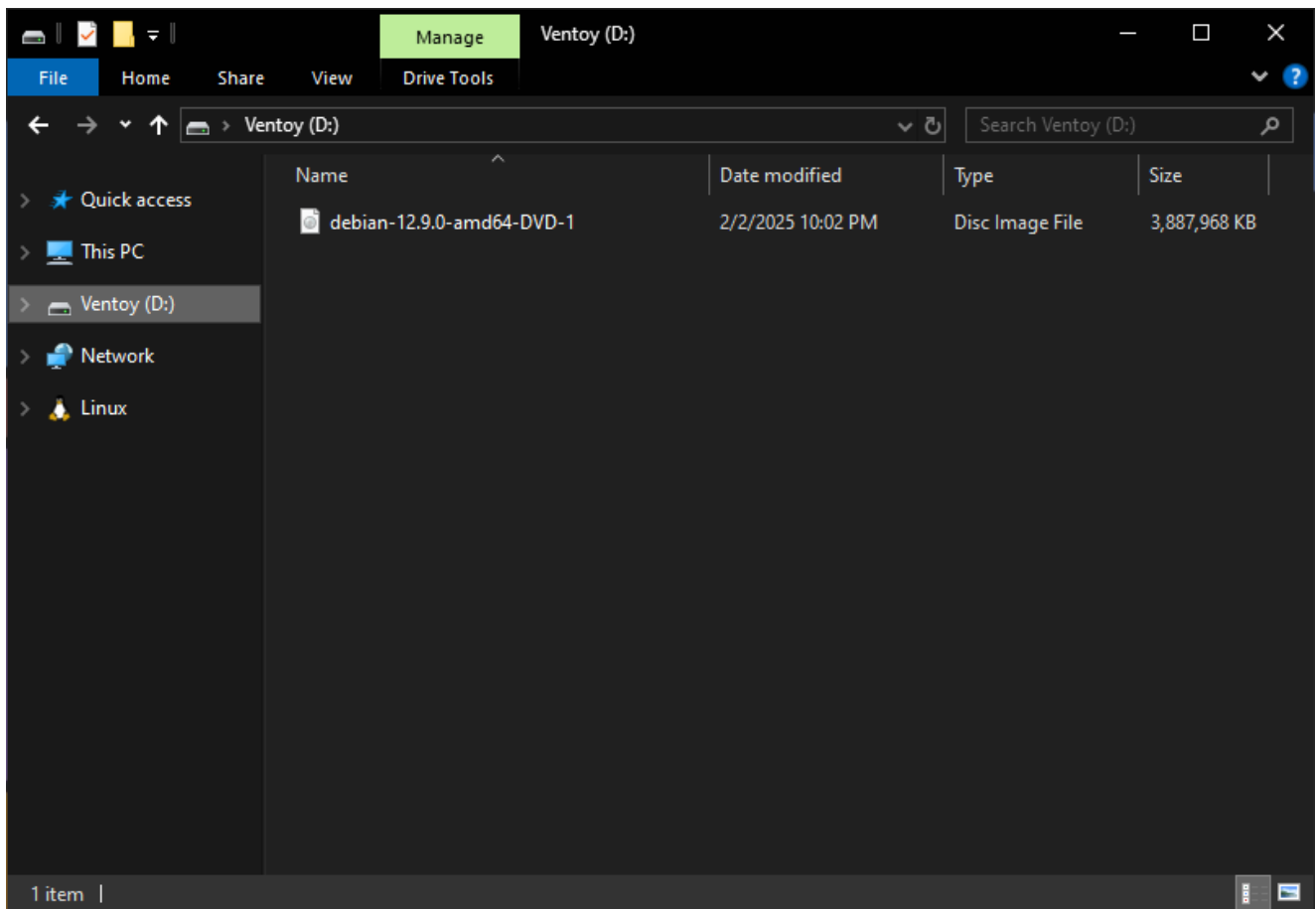
Before we can install Debian on our computer, we must first download the appropriate installation image.

The [AMD64 DVD installer](#) will work for most cases.

Download the appropriate ISO file using your web browser.

Finalizing the USB Boot Disk

Once downloaded, it needs to be copied to the USB flash drive. This can be accomplished by opening Windows Explorer and navigating to the USB drive named Ventoy. Copy the downloaded ISO file to this mounted drive.



You now have a USB flash drive that can be used to install Debian Linux on most traditional computer systems.

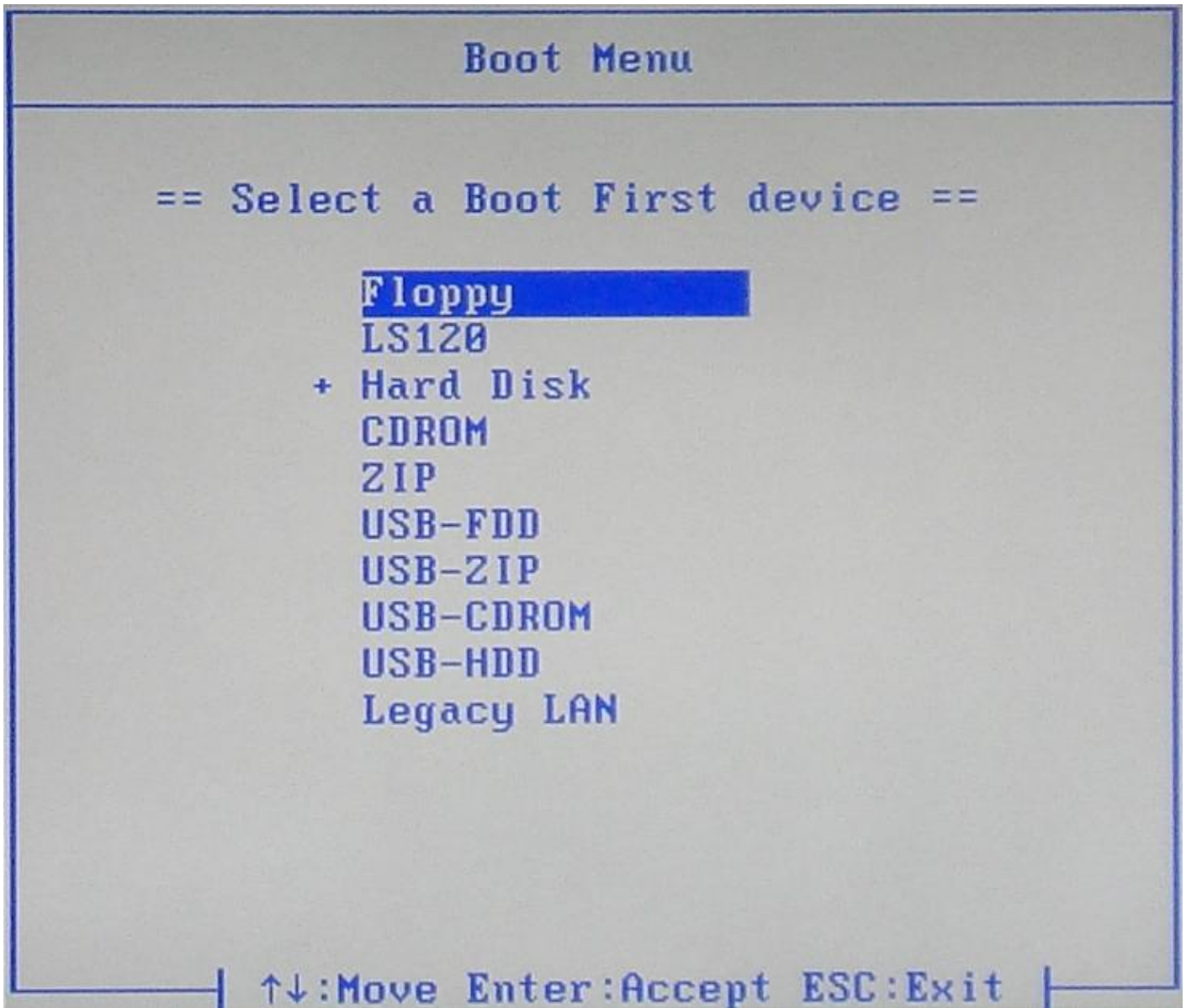
This USB flash drive can be used to install other user-friendly distributions

Starting the Installer

In order to install Debian Linux, we need to boot into our [newly created Ventoy flash drive](#). Due to a lack of standardization, different hardware will go about this differently.

Disable or unplug any hard drives that will not be used for the operating system. This includes media, documents, and other data storage.

Most commonly, the boot device can be selected by hitting a specific key while the computer is starting up.



Refer to your computer or motherboard manual for more information.

These are some common keyboard commands to enter the boot menu by manufacturer:

ASRock	F11
Asus	F8
Acer	Esc, F9 or F12
Dell	F12
Gigabyte	F12
HP	Esc or F9
Intel	F10
Lenovo	F8 or F12
MSI	F11

Samsung Esc or F2

Toshiba F12

Some media keyboards require that you press an FN key located along the bottom row in order to activate the function keys.

Through the Boot Menu, we use the keyboard to navigate down to your USB flash drive. Depending on your system's manufacturer, the boot menu could list your USB flash drive as:

- "USB-HDD"
- Model Number (i.e. KingstonDT)
- Partition Name (i.e. Ventoy)

Make sure to boot in UEFI mode if this is presented as an option.

Installing Debian Linux

Once your computer has been booted using the USB flash drive, we should be presented with the Ventoy boot screen.

We should only have one option available "debian-12.9.0-AMD64-1" or similar, depending on the current Debian version.

Select this option by hitting Enter, then select "Boot in Normal Mode" to begin loading the Debian installer program.

Connect a hardwired Ethernet cable to your server directly from the router.
This is required for automatic updates and driver installation, including your wireless internet card.

The Debian Installer will now ask us the preferred installation method and we will opt to use the "Graphical install."

```
Graphical install
```

```
Install
```

```
Advanced options ...
```

```
Accessible dark contrast installer menu ..
```

```
Install with speech synthesis
```

```
Enter: Select
```

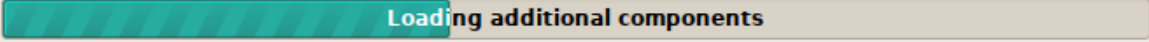
```
E:      Edit Selection
```

```
C:      GRUB Command line
```

We can then select our preferred language, our geographic location, and which keyboard language we want to use.

If you are unsure, "Generic 104-key PC" is a good default setting for any keyboard with a Windows key.

After we input this information, the installer will detect your computer's hardware and begin loading the required files for installation.

Load installer components from installation media **Loading additional components***Retrieving pkgssel*

Once this is finished, we'll be asked to configure our network connection. We will be using LAN which requires your computer to be hardwired to your router with an Ethernet cable. The Debian installer should automatically get an IP address and connect to the internet.

Configure the network

Please enter the hostname for this system.

The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.

Hostname:

Screenshot

Go Back

Continue

We can set the **Host Name** for our server, which affects how it is identified on the local network. Choose a name that is meaningful to you, or simply name it "home-server". Additionally, we can leave the **Domain Name** blank.

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

Next, we will set a password for the Root account, which is the most powerful account on the server that has direct access to and control over all system functions.

Set up users and passwords

You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.

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

The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.

Note that you will not be able to see the password as you type it.

Root password:

Show Password in Clear

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

Re-enter password to verify:

Show Password in Clear

Screenshot

Go Back

Continue

We recommend using a password you've never used before that contains letters, numbers and special characters. Store this password in a secure place.

After the **Root** account is secured, we can make our user account. This profile will have fewer access privileges by default to increase server security. As needed, we can log in as Root to do server administrative tasks. Enter your full name, or the friendly name displayed during login, as well as an account user name. On the next page, we can choose and verify this user account's password.

We recommend using a different password for your user and root accounts for increased security.

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:

Screenshot

Go Back

Continue

Once our accounts are finalized, we can choose our server's time zone.

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

Ensure all non-system hard drives are physically disconnected.

This includes media, documents, and other data storage.

Next, we will need to begin setting up our storage drives for an operating system. The Debian installer will detect any hard drives available in your system.

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

We will be choosing "Guided - Entire disk" which will reformat the entire drive for use by the Linux operating system. There should only be one disk available because we disconnected the others.

We are erasing the selected disk.

Always make sure you have backed up all important files from this drive.

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) - 21.5 GB ATA VBOX HARDDISK

Screenshot

Go Back

Continue

Once we confirm we will installing Debian on this disk drive, we will be asked how we want to partition the drive. We will select "Contiguous - all files in one partition" for simplicity. This is what Debian recommends for users who are new to Linux-based operating systems.

Partition disks

Selected for partitioning:

SCSI3 (0,0,0) (sda) - ATA VBOX HARDDISK: 21.5 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

Once we hit Continue, we will be given a quick overview of the changes being made. We should have three partitions being created on the hard disk.

Partition disks

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.

Guided partitioning

Configure software RAID

Configure the Logical Volume Manager

Configure encrypted volumes

Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 21.5 GB ATA VBOX HARDDISK

>		1.0 MB			FREE SPACE	
>	#1	536.9 MB	B	f	ESP	
>	#2	19.9 GB	f	ext4		/
>	#3	1.0 GB	f	swap		swap
>		1.0 MB			FREE SPACE	

Undo changes to partitions

Finish partitioning and write changes to disk

Screenshot

Help

Go Back

Continue

After we select Continue, we will be given one final warning about the changes being written to our disk. You will need to select 'yes' before you can move on to the next step.

Partition disks

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed:
SCSI3 (0,0,0) (sda)

The following partitions are going to be formatted:

partition #1 of SCSI3 (0,0,0) (sda) as ESP
partition #2 of SCSI3 (0,0,0) (sda) as ext4
partition #3 of SCSI3 (0,0,0) (sda) as swap

Write the changes to disks?

No

Yes

Screenshot

Continue

Final Warning

Hitting Continue will erase your drive.

Debian will format your hard drive and begin to install the base operating system on it.

Install the base system

Installing the base system

Configuring libncursesw6:amd64...

You will receive a prompt about configuring the package manager. This is because we are installing from a USB flash drive and we have the option to load additional installation files from another disk. We will select 'no' and continue.

Configure the package manager

Scanning your installation media finds the label:

Debian GNU/Linux 12.9.0 _Bookworm_ - Official amd64 DVD Binary-1 with firmware 20250111-10:55

You now have the option of scanning additional media for use by the package manager (apt). Normally these should be from the same set as the one you booted from. If you do not have any additional media, this step can just be skipped.

If you wish to scan more media, please insert another one now.

Scan extra installation media?

No

Yes

Screenshot

Go Back

Continue

On the next page, we can choose to use a network mirror.

Configure the package manager

A network mirror can be used to supplement the software that is included on the installation media. This may also make newer versions of software available.

You are installing from a DVD image. Even though it contains a large selection of packages, some may be missing. If you have a reasonably good Internet connection, use of a mirror is suggested if you plan to install a graphical desktop environment.

Use a network mirror?

No

Yes

Screenshot

Go Back

Continue

It can improve update download speeds by retrieving them from a server closer to your location. This mirror will also be used to download software updates during the install process. Select 'Yes'.

Configure the package manager

The goal is to find a mirror of the Debian archive that is close to you on the network -- be aware that nearby countries, or even your own, may not be the best choice.

Debian archive mirror country:

- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- Türkiye
- Ukraine
- United Kingdom
- United States**
- Uruguay
- Vietnam

[Screenshot](#)[Go Back](#)[Continue](#)

Select your country and hit 'next'. From here, we can safely choose the network mirror listed at the top.

Configure the package manager

Please select a Debian archive mirror. You should use a mirror in your country or region if you do not know which mirror has the best Internet connection to you.

Usually, `deb.debian.org` is a good choice.

Debian archive mirror:

- deb.debian.org**
- ftp.us.debian.org
- debian.csail.mit.edu
- mirrors.lug.mtu.edu
- debian.cc.lehigh.edu
- mirror.us.oneandone.net
- mirrors.bloomu.edu
- mirrors.namecheap.com
- mirrors.ocf.berkeley.edu
- debian.mirror.constant.com
- mirrors.advancedhosters.com
- mirror.cogentco.com
- mirror.us.leaseweb.net
- mirrors.accretive-networks.net

Screenshot

Go Back

Continue

Hit 'continue' and you will be asked about an HTTP proxy. We can leave this empty and hit 'continue' again.

Configure the package manager

If you need to use a HTTP proxy to access the outside world, enter the proxy information here. Otherwise, leave this blank.

The proxy information should be given in the standard form of "http://[[user][:pass]@]host[:port]/".

HTTP proxy information (blank for none):

Screenshot

Go Back

Continue

The Debian Installer will select software to install and begin the process of retrieving updates from the internet as required.

Configure the package manager

Configuring apt

Retrieving file 7 of 9

Cancel

Next, we can choose to opt-in to the "[popularity contest](#)" which periodically returns anonymized software install and usage metrics to Debian for use by developers.

Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the most used packages on this system. This information influences decisions such as which packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week, sending statistics to the distribution developers. The collected statistics can be viewed on <https://popcon.debian.org/>.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

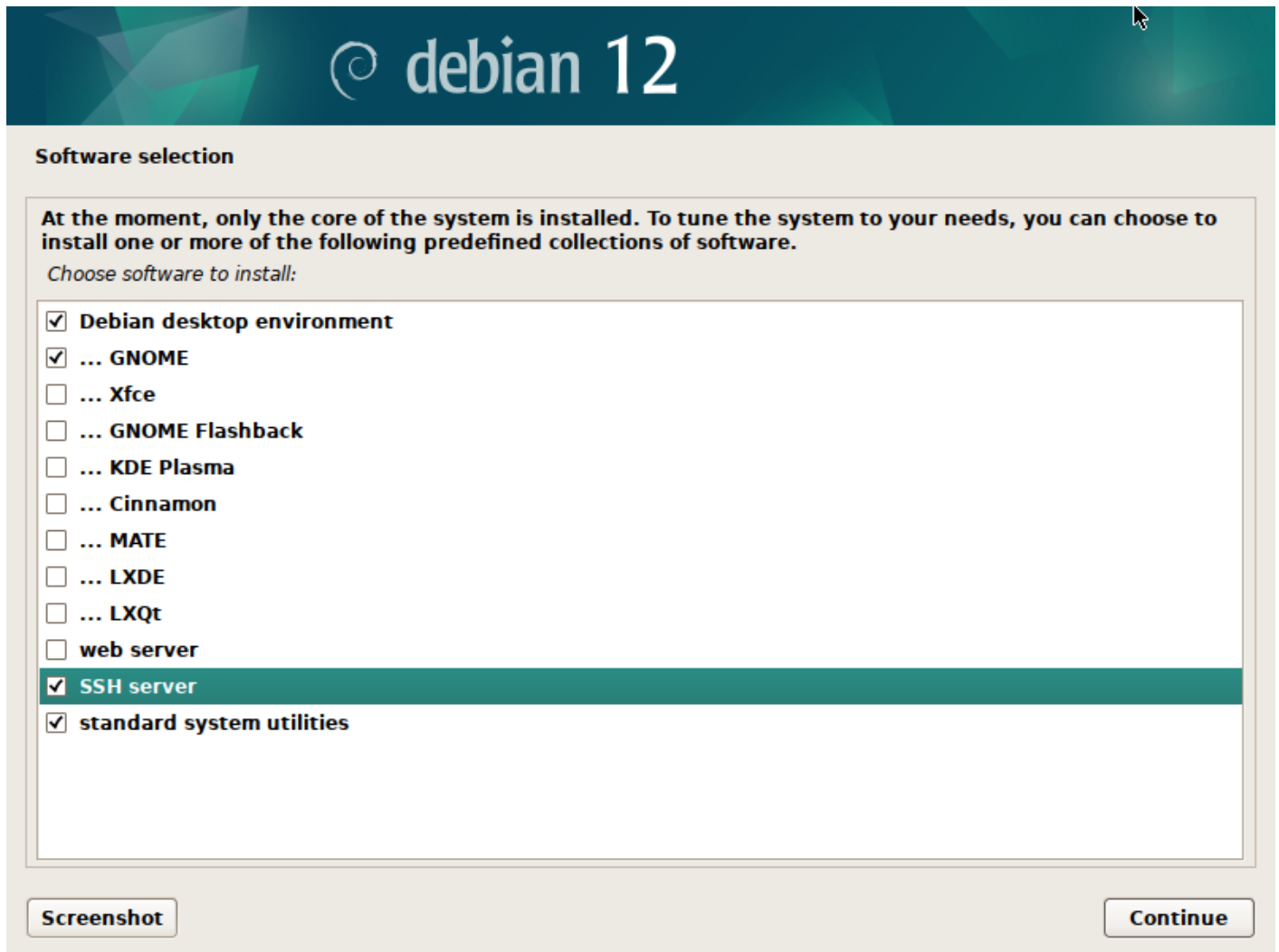
No

Yes

Finally, we will be choosing our Desktop Environment. This operating system can act as the foundation for many different Desktop Environments which control the user interface and experience. This is a matter of personal preference that can affect which software is installed by default.

For simplicity sake, we will use the default Desktop Environment and select Gnome.

On this last screen, we can also choose to install SSH to allow for remote access. We will chose to install it and save a step later.



We can hit 'Continue' one final time now that everything is configured.

Debian will begin the installation process.

Select and install software



Retrieving file 982 of 1402

If you are using a BIOS motherboard that doesn't support UEFI, you may have an additional step asking where to install the GRUB bootloader. Select 'Yes'.

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

You should select the same storage drive as you installed Debian. This should be the only storage drive listed.

Install the GRUB boot loader

You need to make the newly installed system bootable, by installing the GRUB boot loader on a bootable device. The usual way to do this is to install GRUB to your primary drive (UEFI partition/boot record). You may instead install GRUB to a different drive (or partition), or to removable media.

Device for boot loader installation:

Enter device manually

`/dev/sda (ata-VBOX_HARDDISK_VB62360d69-d4730887)`

Screenshot

Go Back

Continue

Once the files are copied, the installer will tell us to remove the USB flash drive before restarting the computer to finish the installation.

Finish the installation*Installation complete*

Installation is complete, so it is time to boot into your new system. Make sure to remove the installation media, so that you boot into the new system rather than restarting the installation.

Please choose <Continue> to reboot.

Screenshot**Go Back****Continue**


Finalizing Installation

Once the computer has started, we should be able to see the GRUB boot loader. After five seconds, it will automatically boot into the Debian operating system.

GNU GRUB version 2.06-13+deb12u1

```
*Debian GNU/Linux
Advanced options for Debian GNU/Linux
UEFI Firmware Settings
```

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, `e` to edit the commands before booting or `c` for a command-line. ESC to return previous menu.
The highlighted entry will be executed automatically in 5s.

 debian 12

Now, we need to login with the user account and password we set up during the installation.

Feb 14 18:01



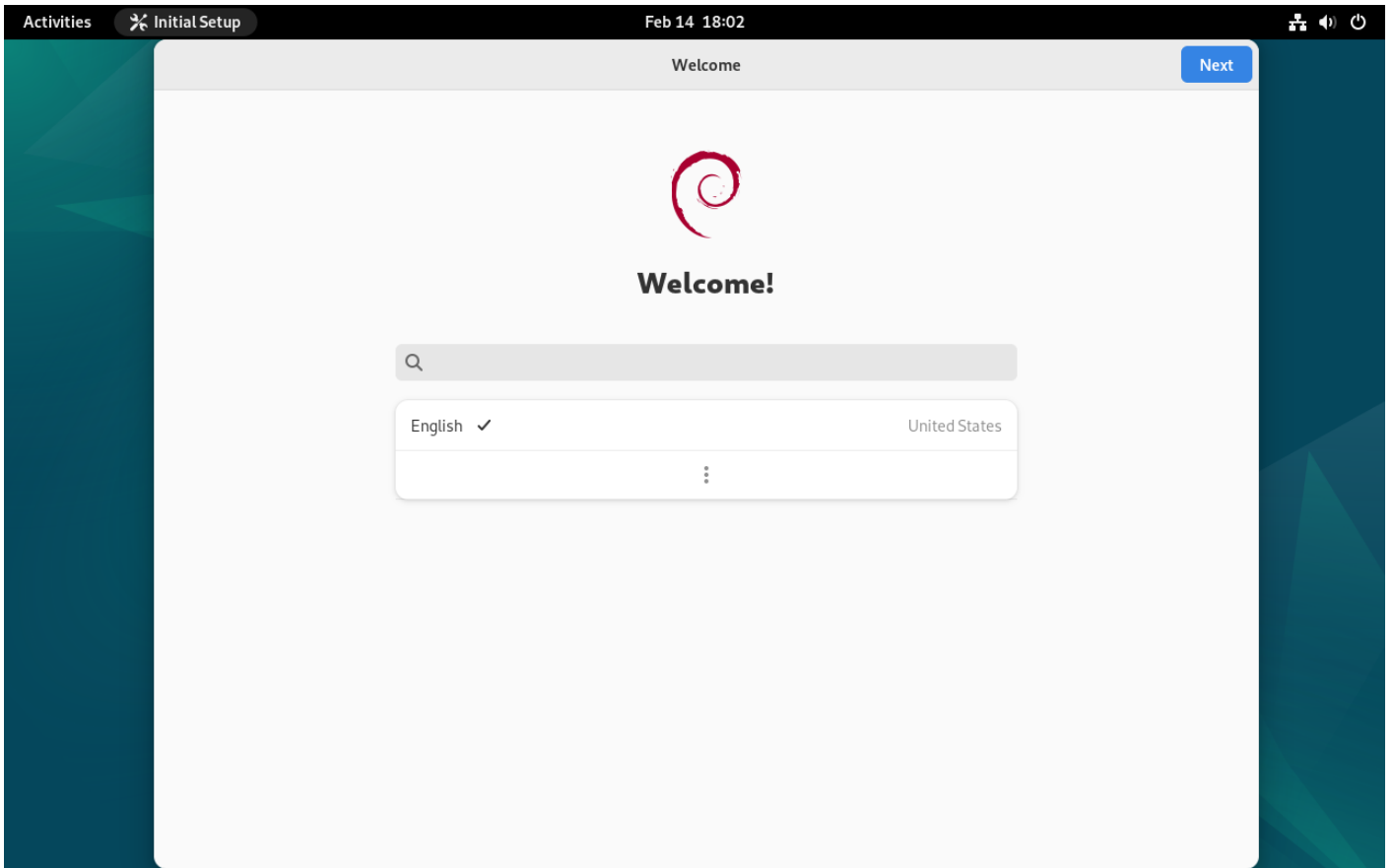
Joshua

 **debian 12**

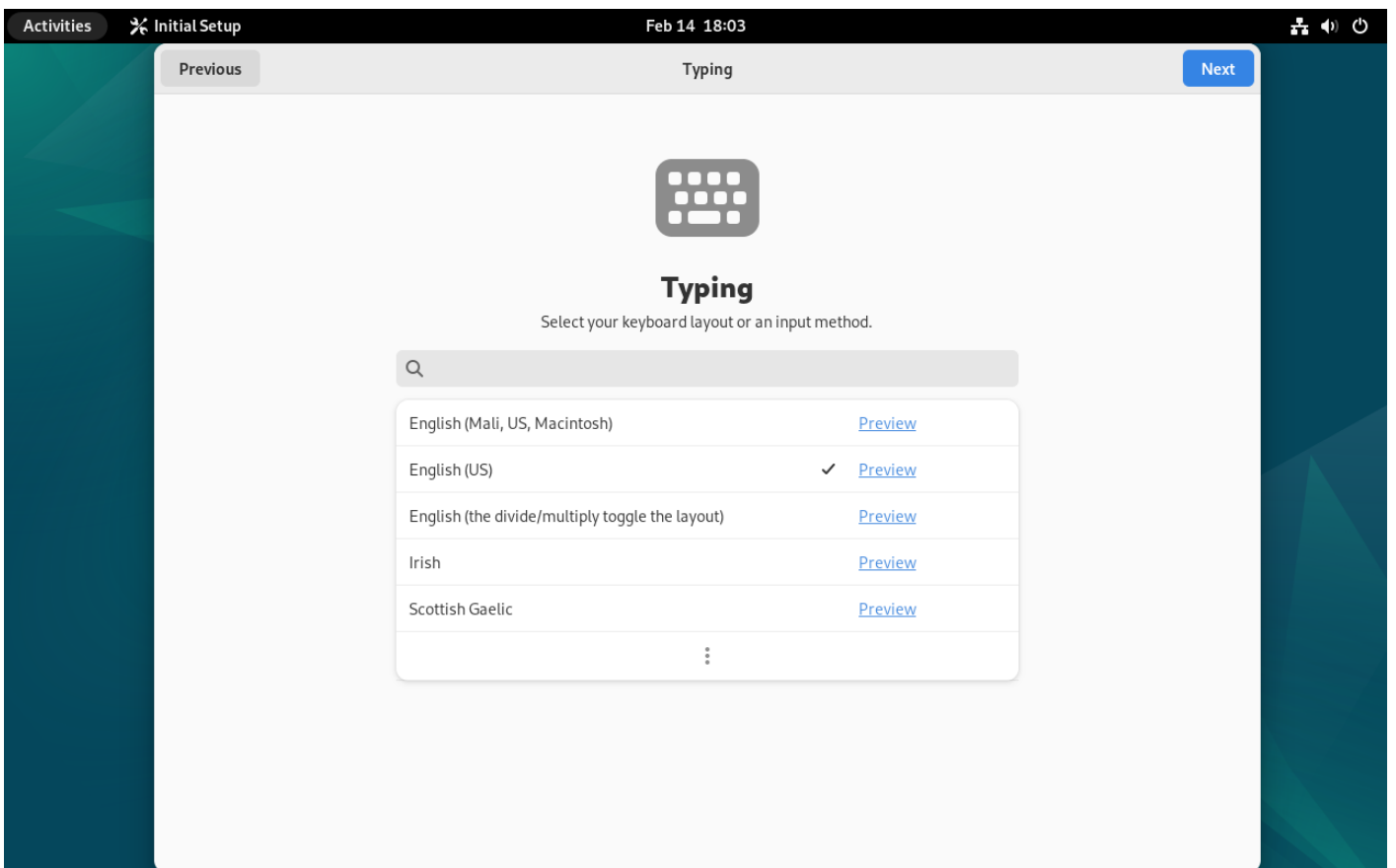


You cannot access the root account through this login screen.

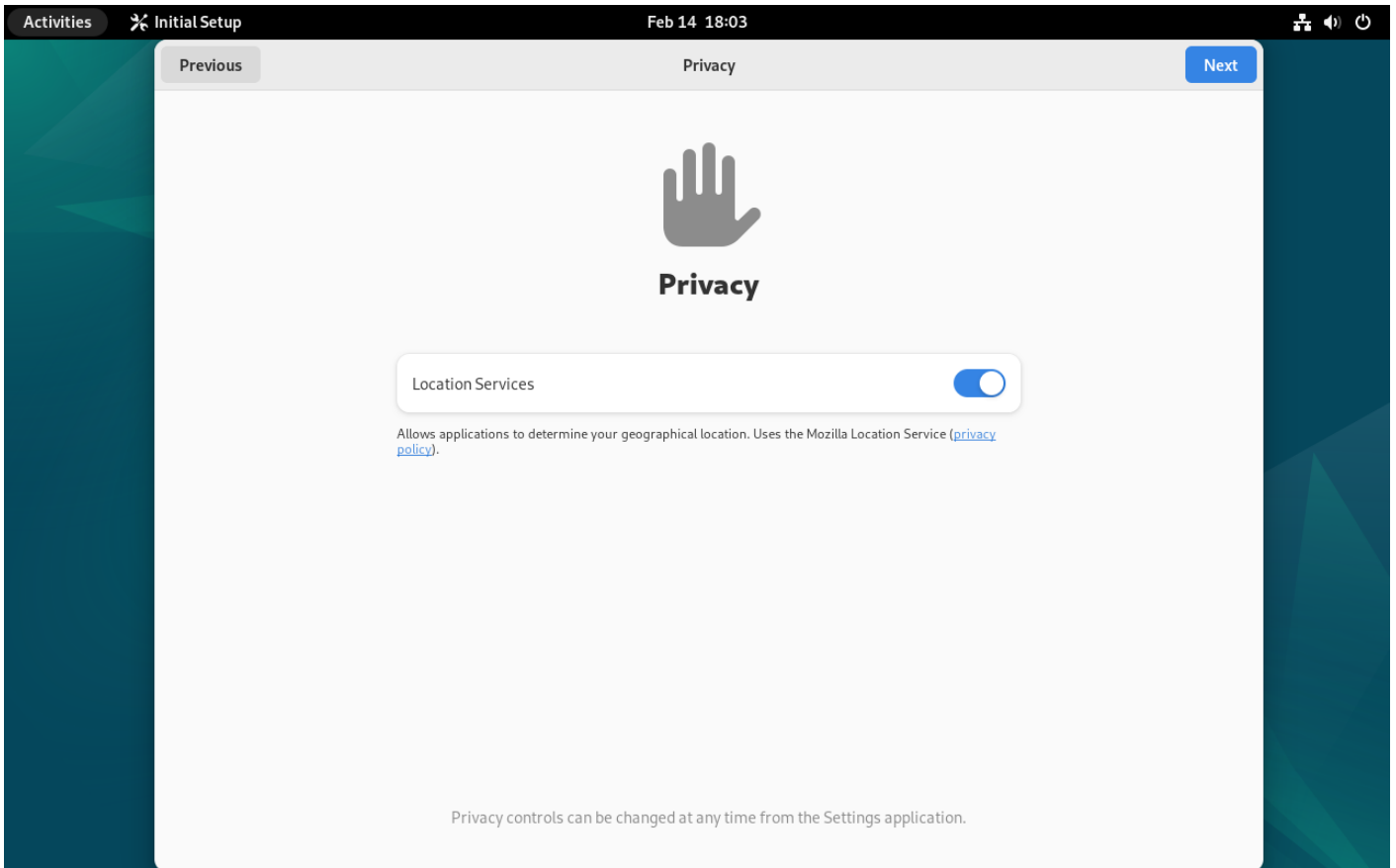
After logging in, we will be greeted with the welcome screen for our user account setup process.



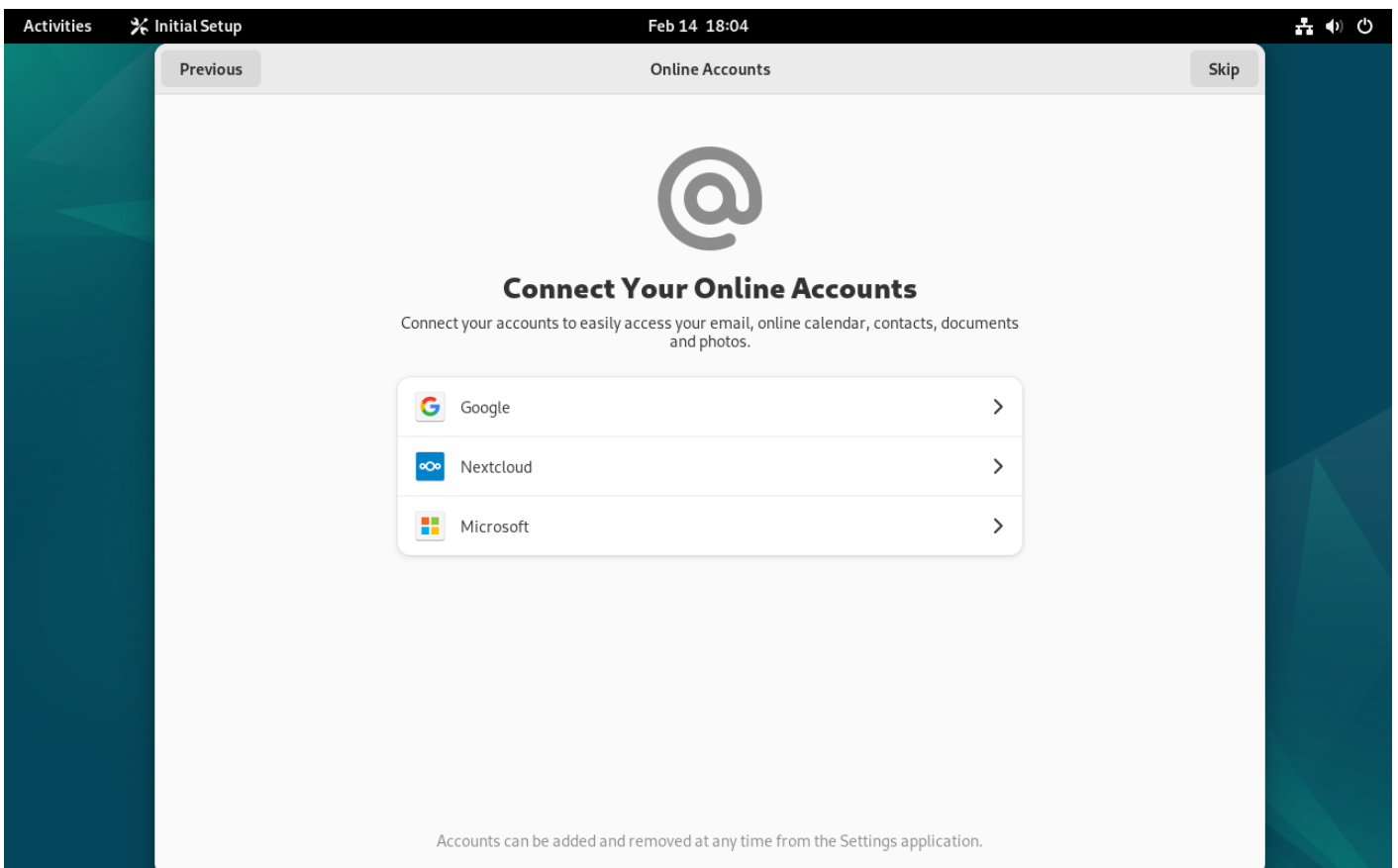
We can select our keyboard language settings.



We can also choose to leave "Location Services" enabled, or disable it for increase privacy.



We will be asked to login to our online accounts, but we can skip this.



We can now start using Debian and installing the software necessary to host a home server.

Setup Complete

**All done!**

Debian GNU/Linux is ready to be used. We hope that you love it!

[Start Using Debian GNU/Linux](#)

Configure the Operating System `keyboard_arrow_right`

Single-Board Computers

Raspberry Pi computers use an SD card that needs to be "flashed" with an operating system. This process writes files to the SD card while it's connected to a Windows, MacOS or Linux machine through a USB connection.

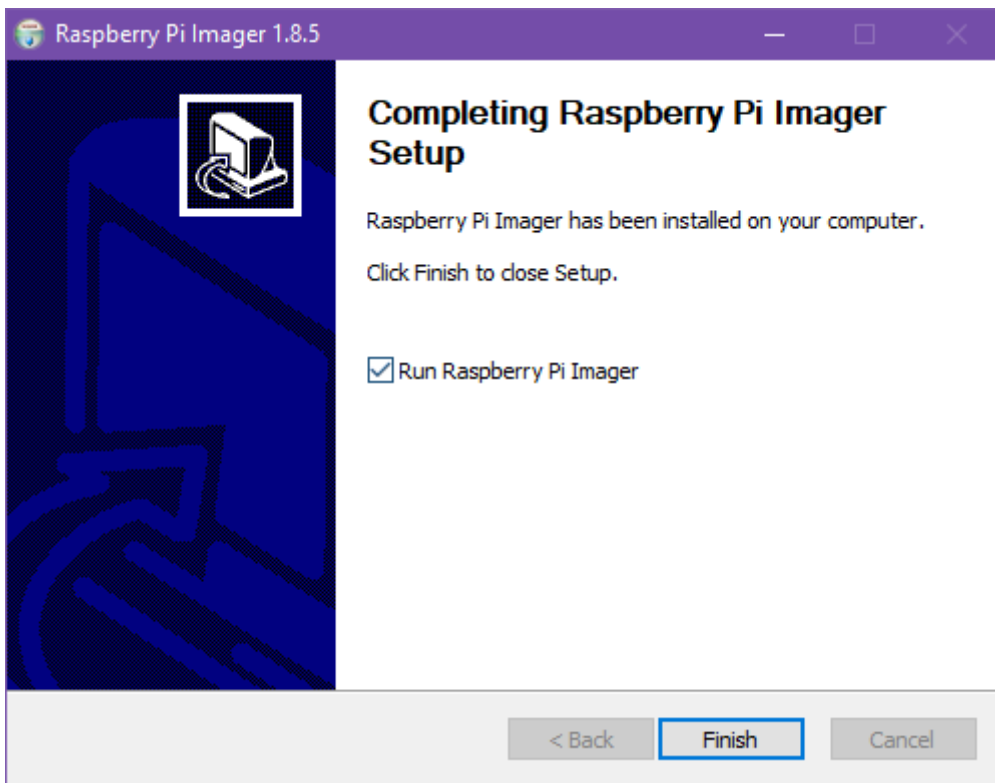


Raspberry Pi Imager

This is the official Raspberry Pi solution for flashing image files to the SD card, which is an integral part of the microcomputer ecosystem. This also allows you to quickly configure Raspberry Pi OS, such as configuring Wi-Fi, changing the computer's host name, and enabling SSH for remote access. By default, Wi-Fi and Bluetooth are enabled.

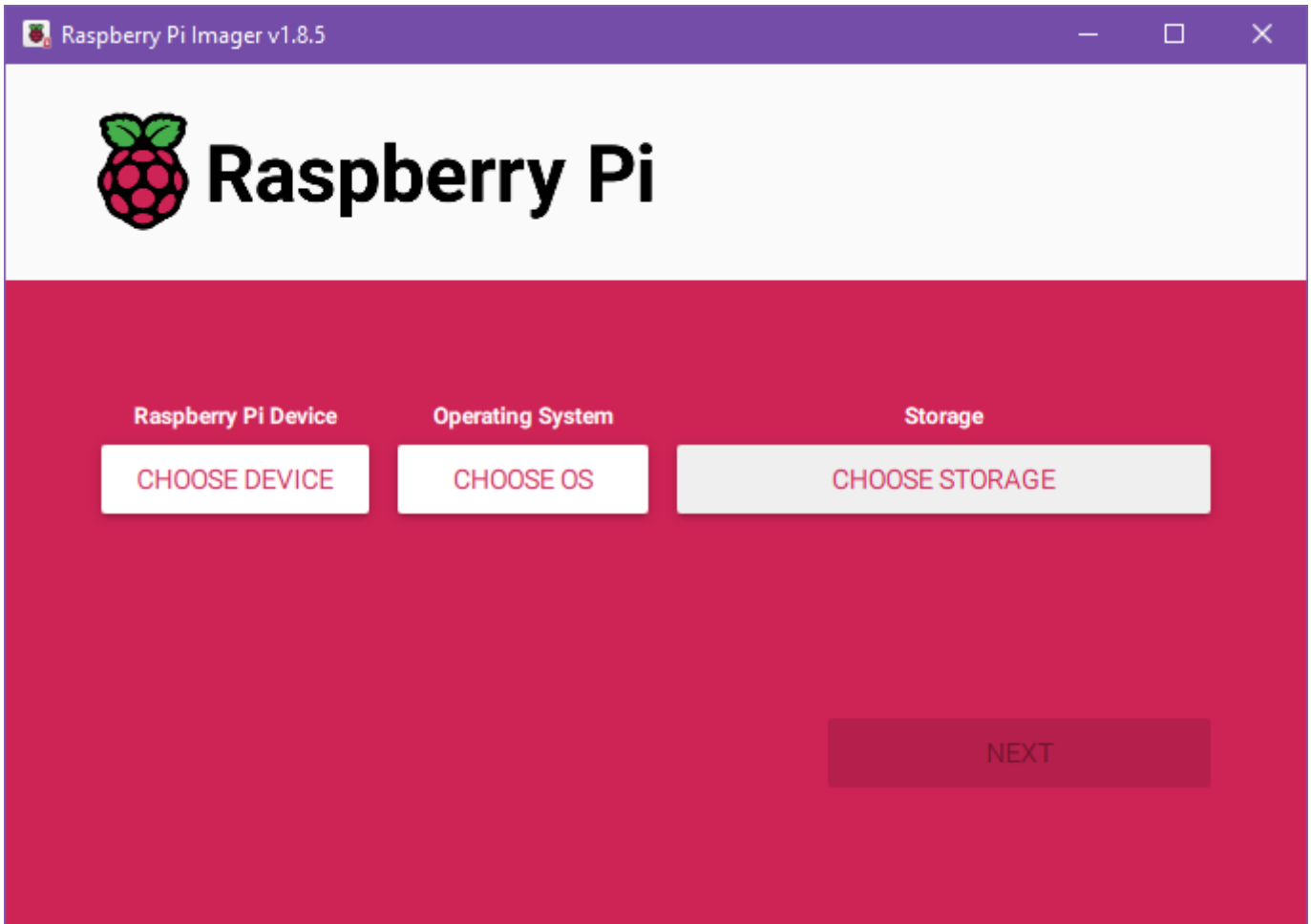
You can download [Raspberry Pi Imager](#) from their website.

First, you will need to install the Raspberry Pi Imager.

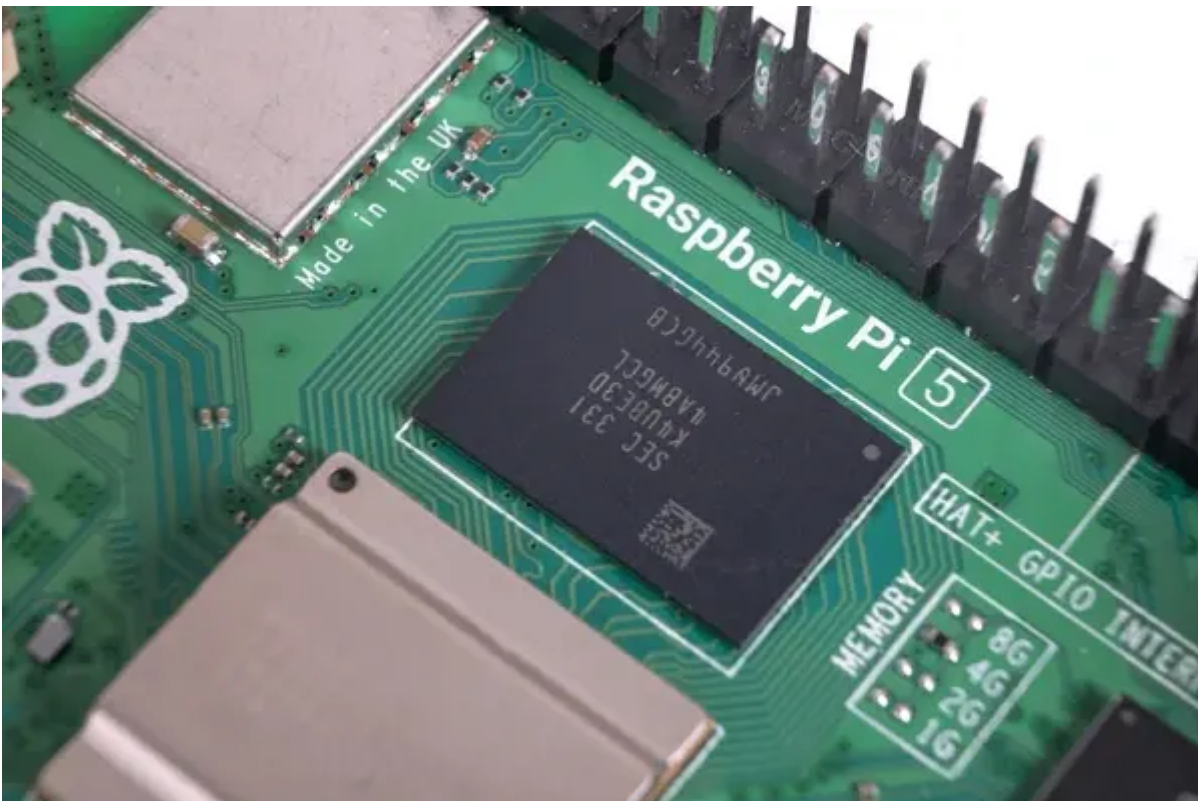


Once the install process is completed, you can open the Raspberry Pi Imager software.

You will be prompted for administrator access to the computer.

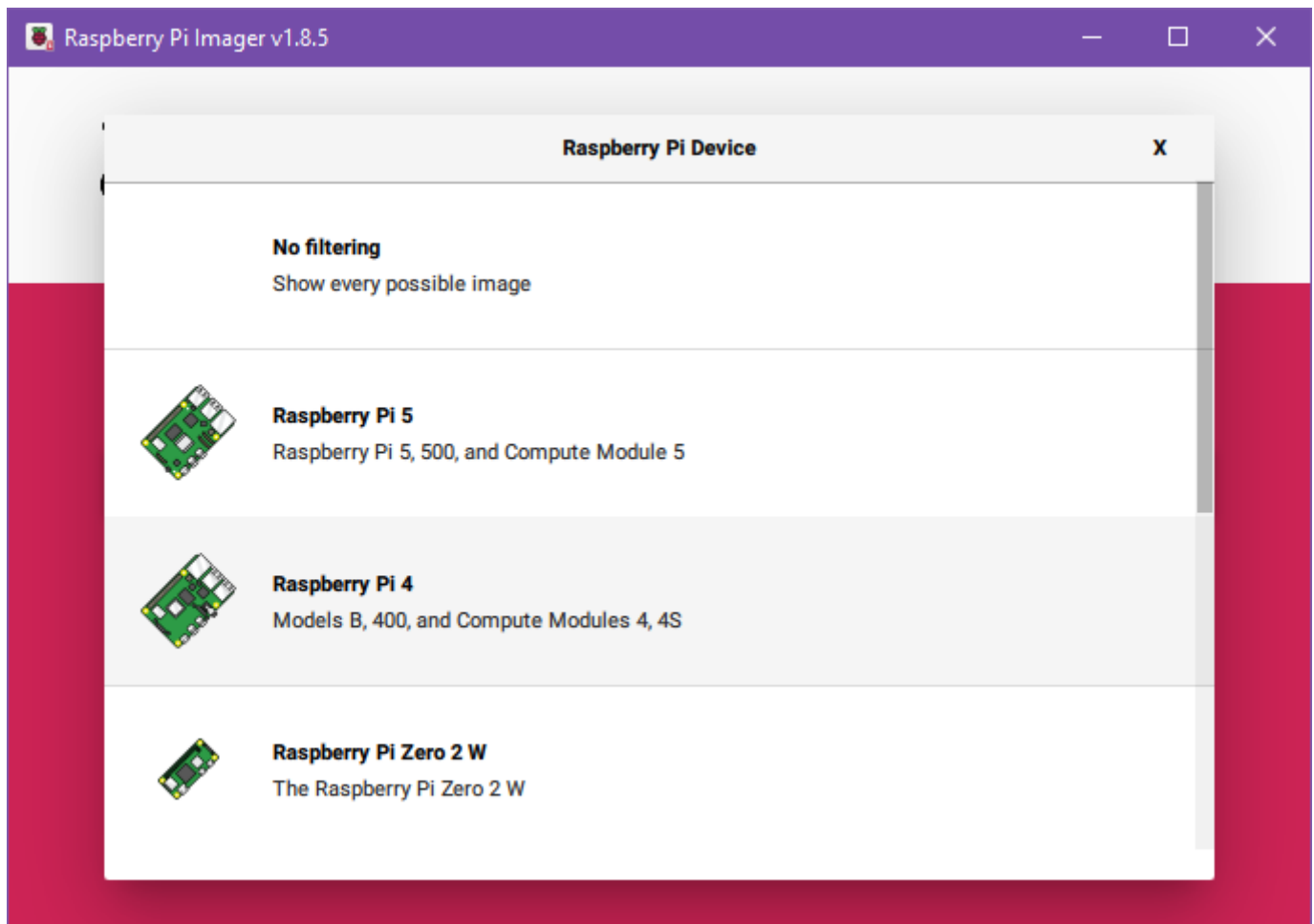


Now we can attach our MicroSD card to the computer using a USB to MicroSD card adapter. Once we have connected the drive, we can click "Choose Device" to model of Raspberry Pi we are using.



Be sure to select your correct model for best performance. If you are unsure, the model number is printed on the board itself below the GPIO pins.

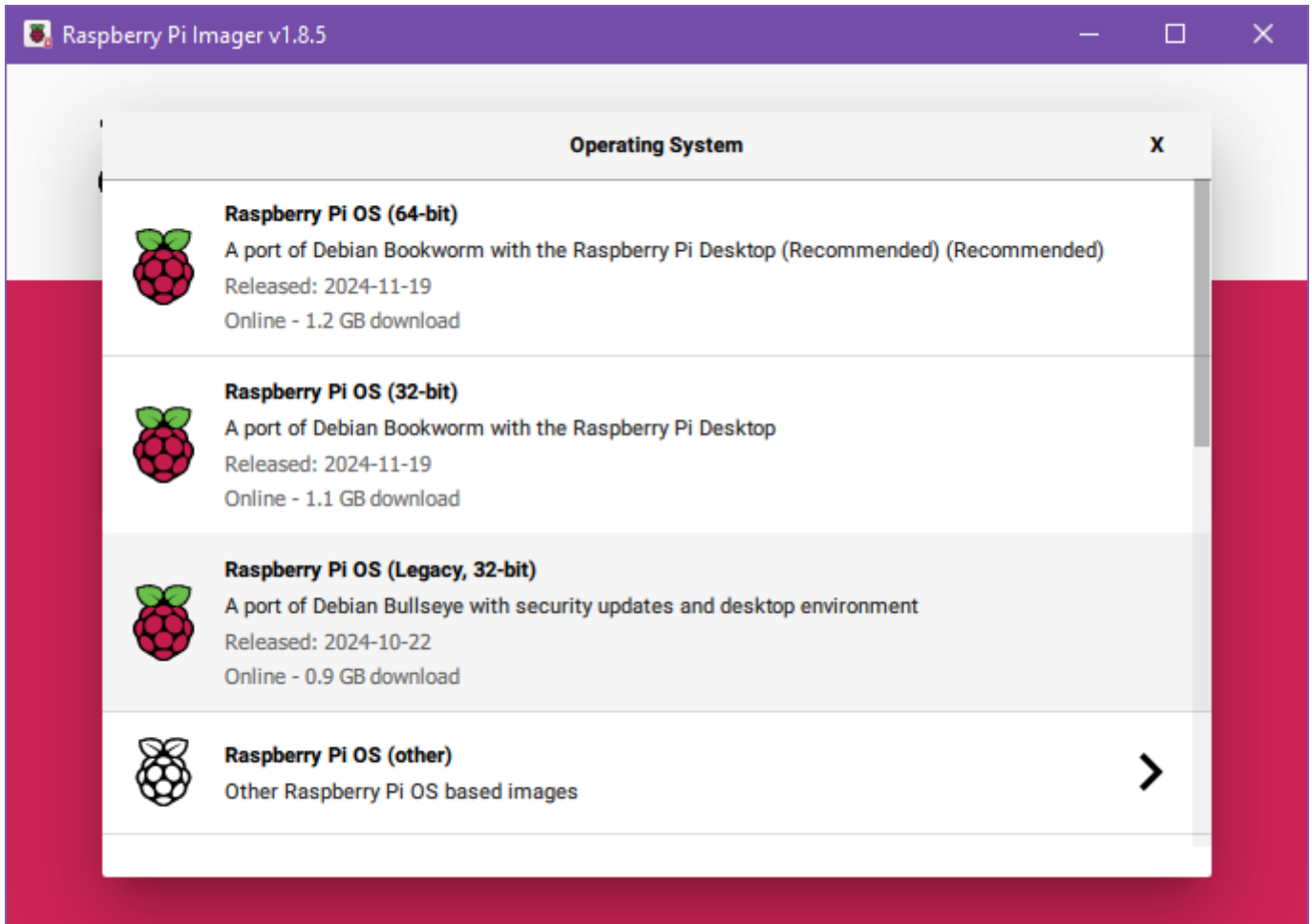
[Raspberry Pi Official installation video](#)



With our model selected, we can move on to selecting our operating system.



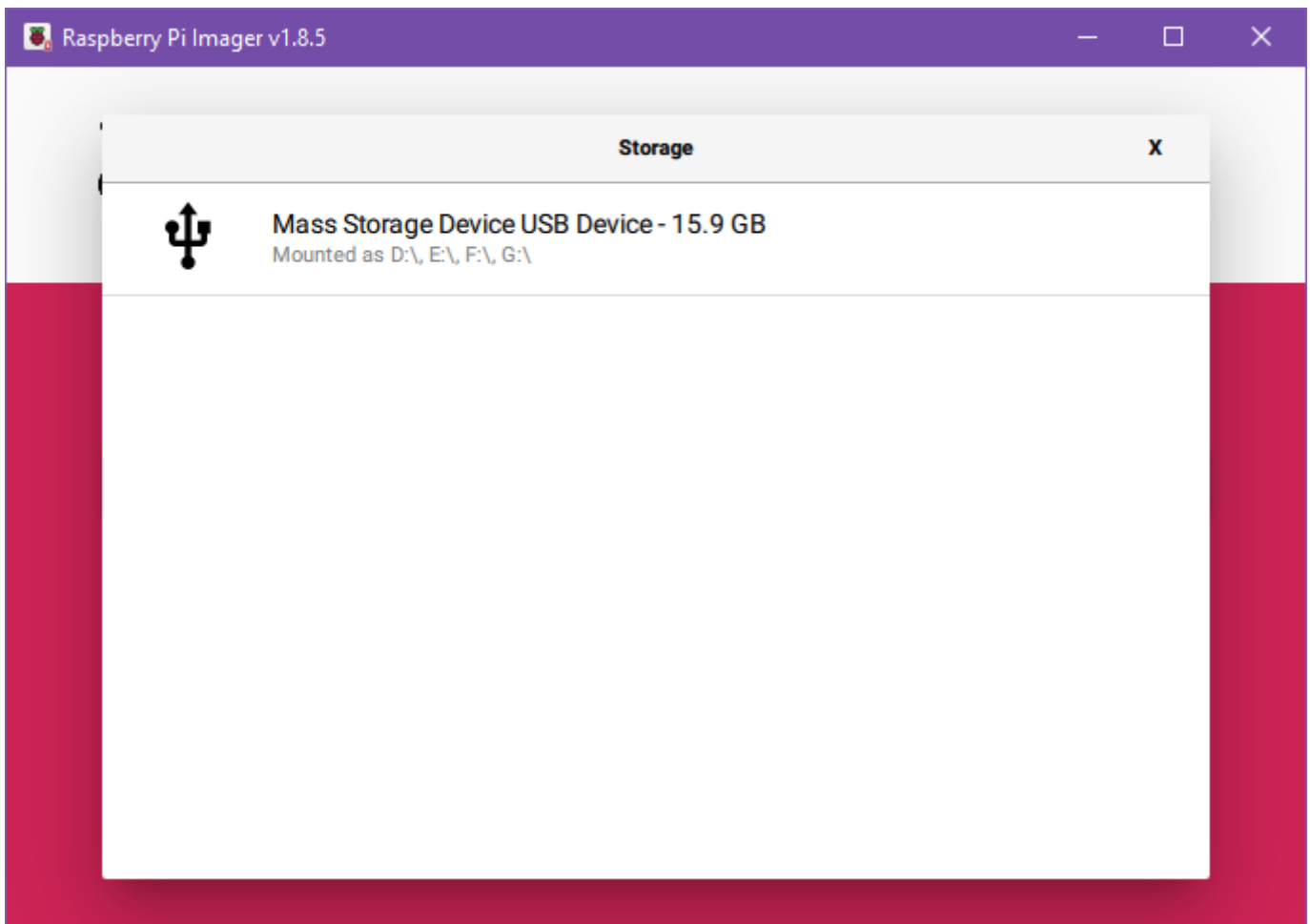
We will be using the recommended Raspberry Pi OS (64-bit). Some services do not work on the Raspberry Pi using a 64-bit operating system and this will require using the 32-bit edition, but this should be avoided if not required.



Finally, we can select the storage device we want to install our operating system. This is the USB to MicroSD card adapter we plugged in. The Raspberry Pi Imager will hide system and internal hard drives. We will select our USB drive.

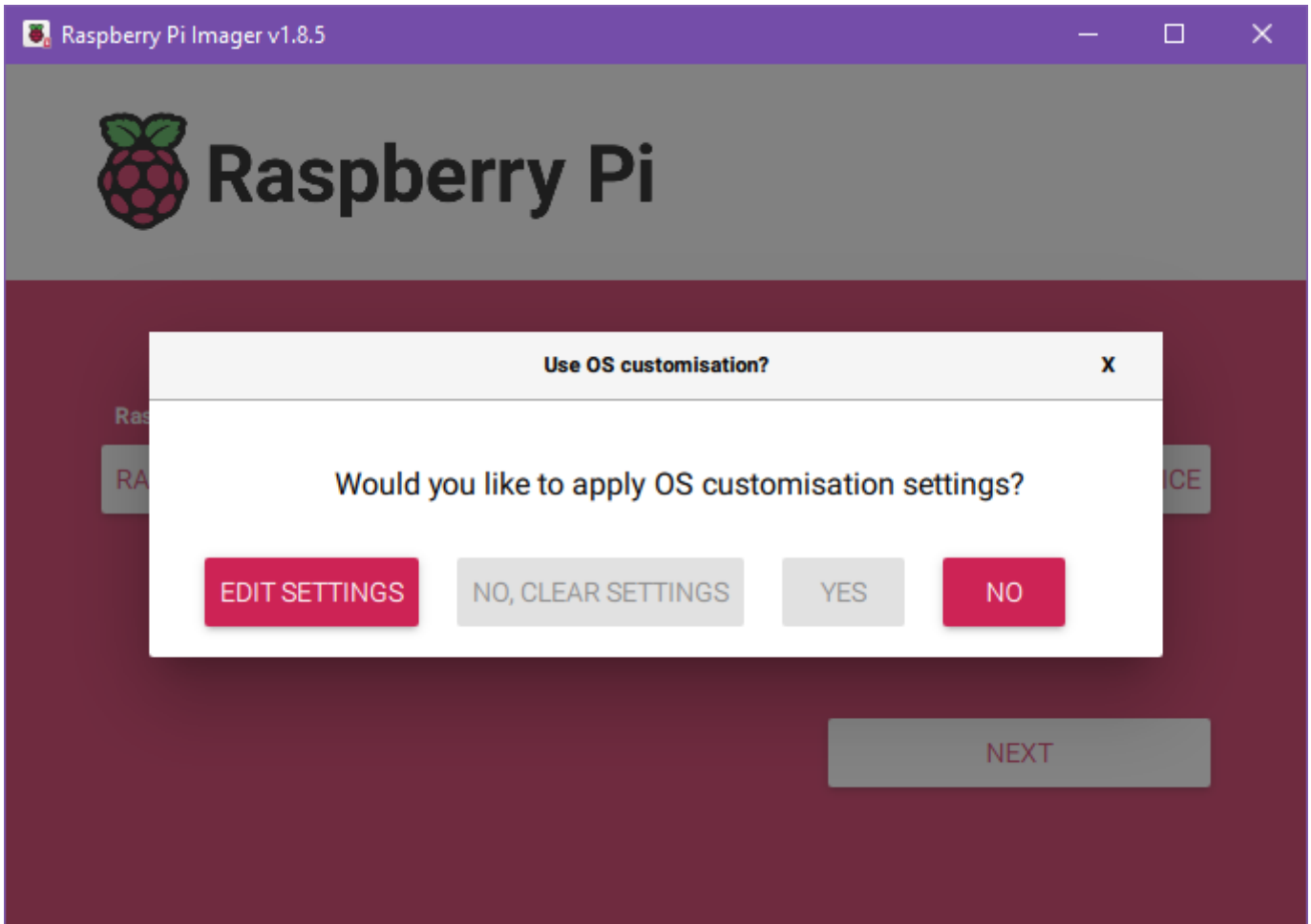


Depending on how your MicroSD card is formatted and how many devices you have plugged in, this screen may look different. Verify that you are selecting the correct drive.



This process will irrevocably erase the data on this SD card. Ensure all important data has been backed up first.

Once our SD card is selected, we can hit "Next" to begin the configuration process. We will be presented with a pop-up asking us if we want to apply OS customization settings. Select "Edit Settings".



First, we will need to configure general settings. Our "hostname" signifies how our server will report itself to the local network. Next, we will need to set our username and password. We will not be using Wi-Fi for our server, so we can leave this section blank. Optionally, we can also set the time zone and keyboard layout to use.

OS Customisation

GENERAL SERVICES OPTIONS

Set hostname: .local

Set username and password

Username:

Password:

Configure wireless LAN

SSID:

Password:

Show password Hidden SSID

Wireless LAN country:

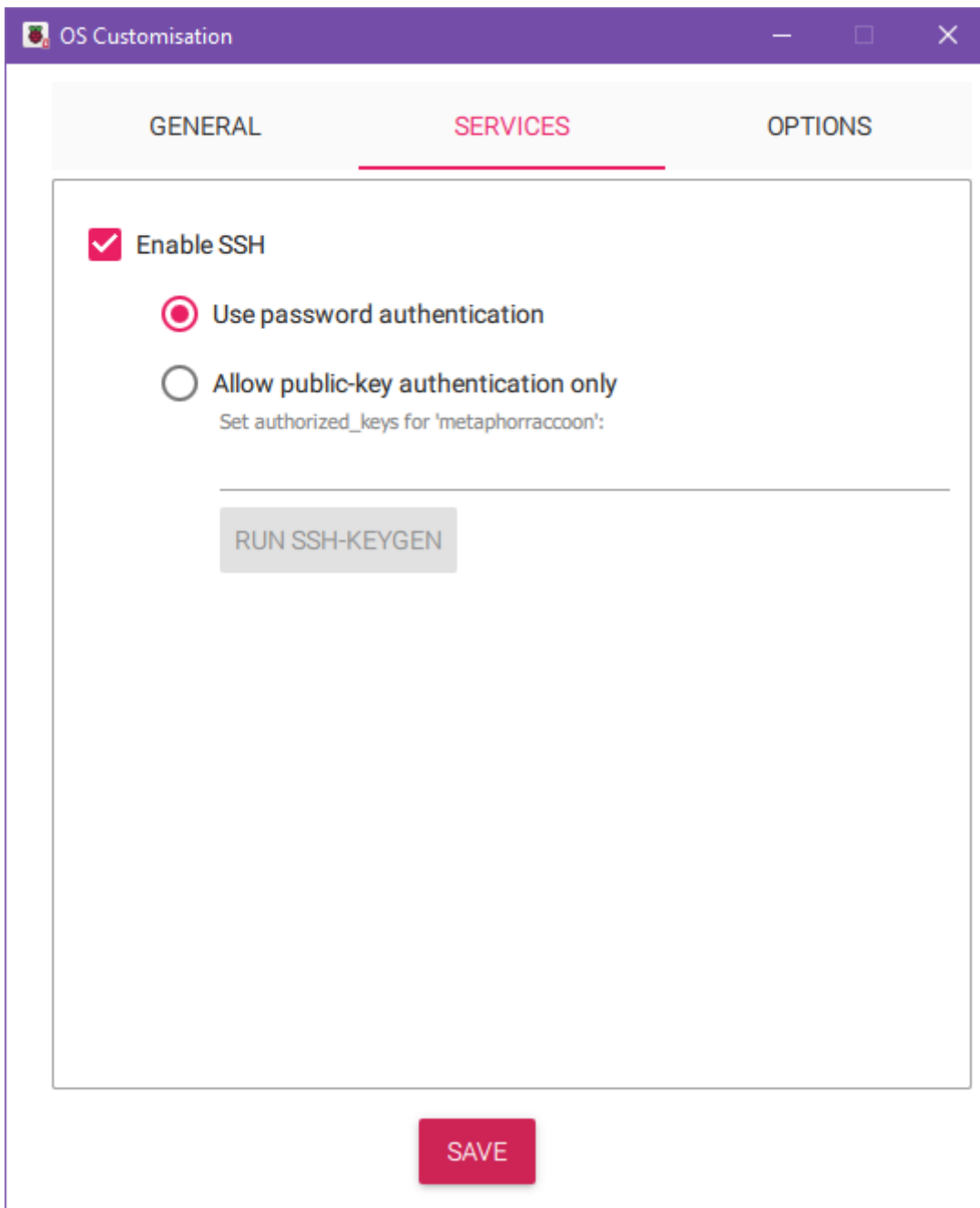
Set locale settings

Time zone:

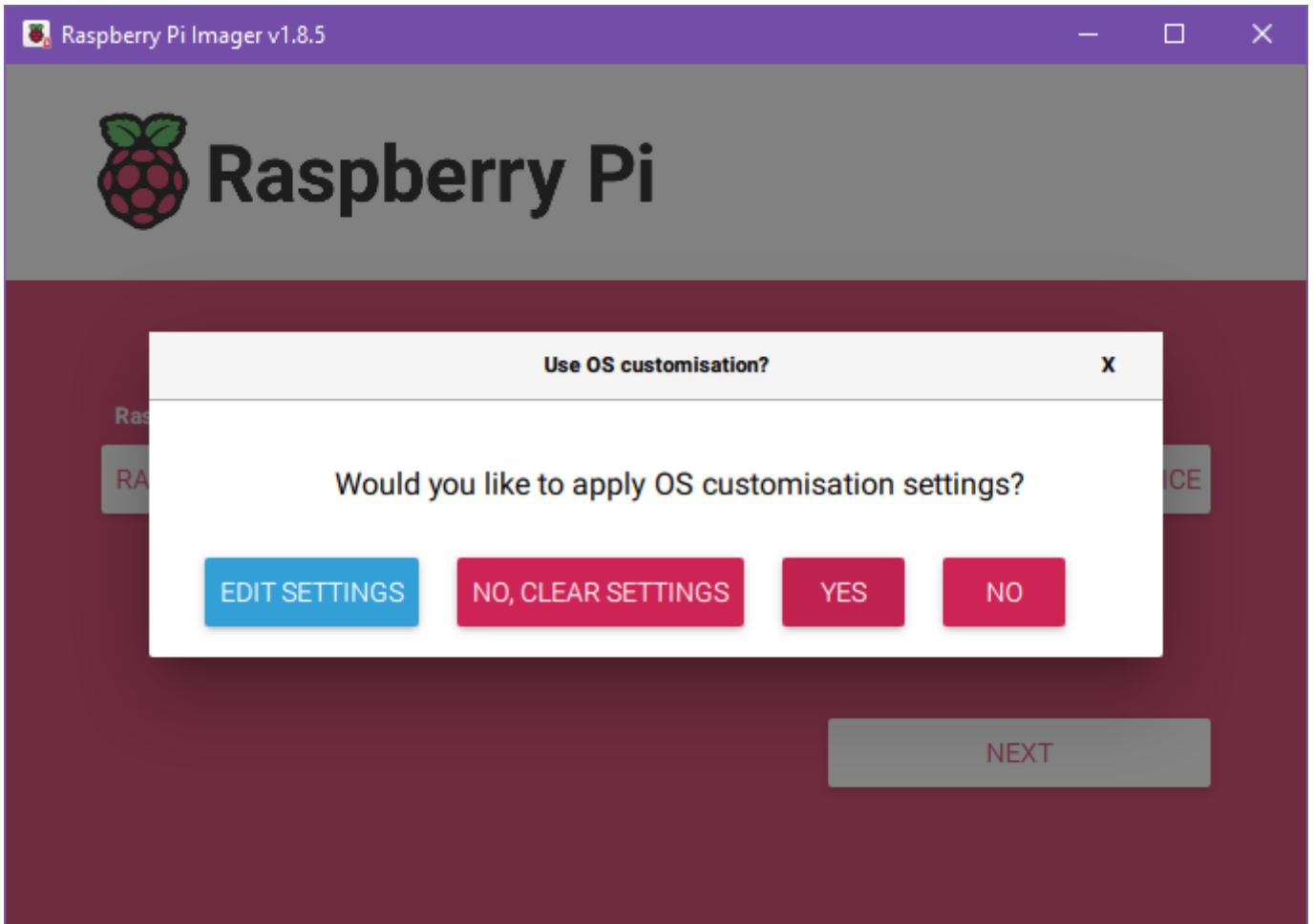
Keyboard layout:

SAVE

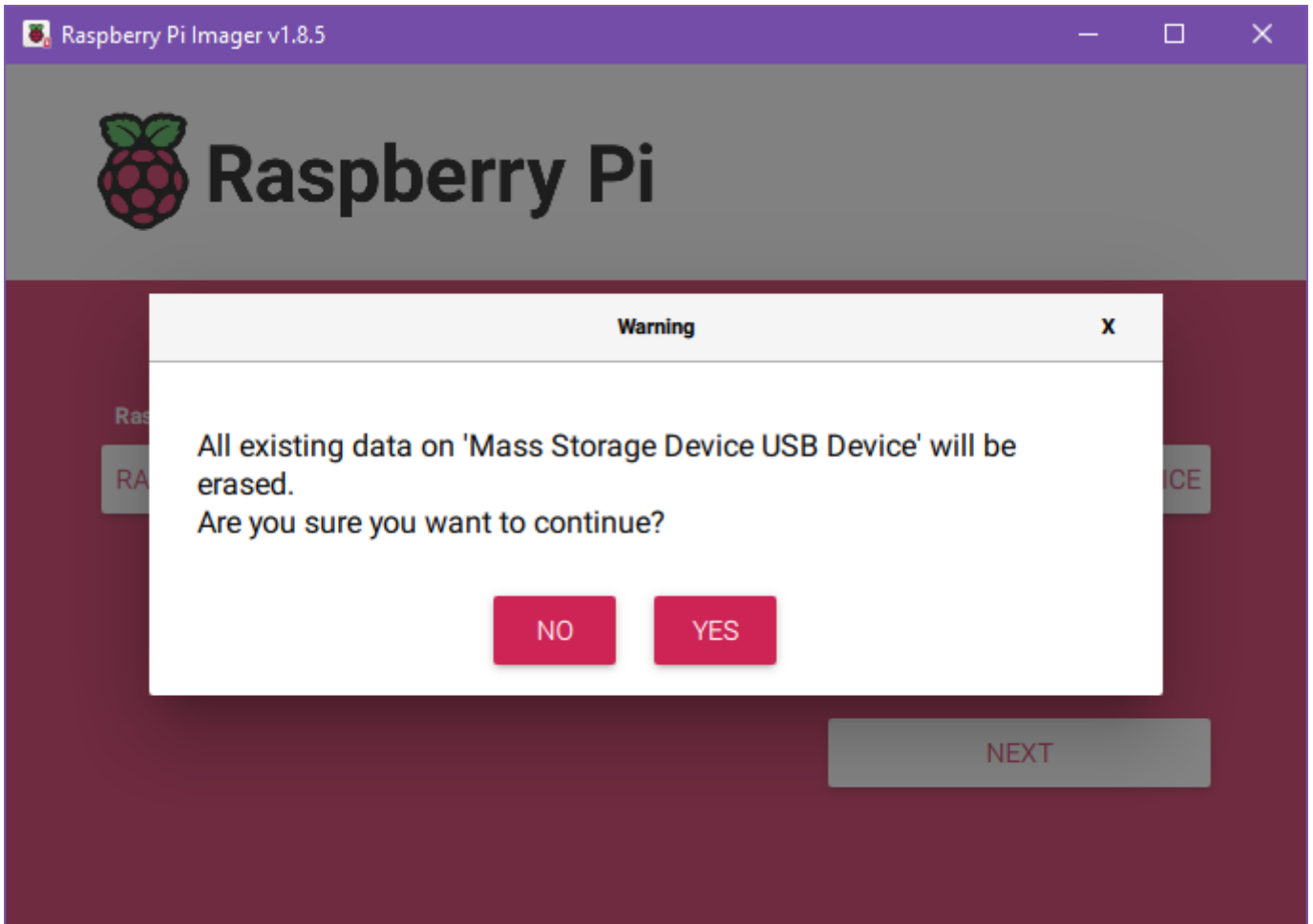
Under the Services tab, we will be enabling SSH. We can leave this with the default setting to "Use password authentication".



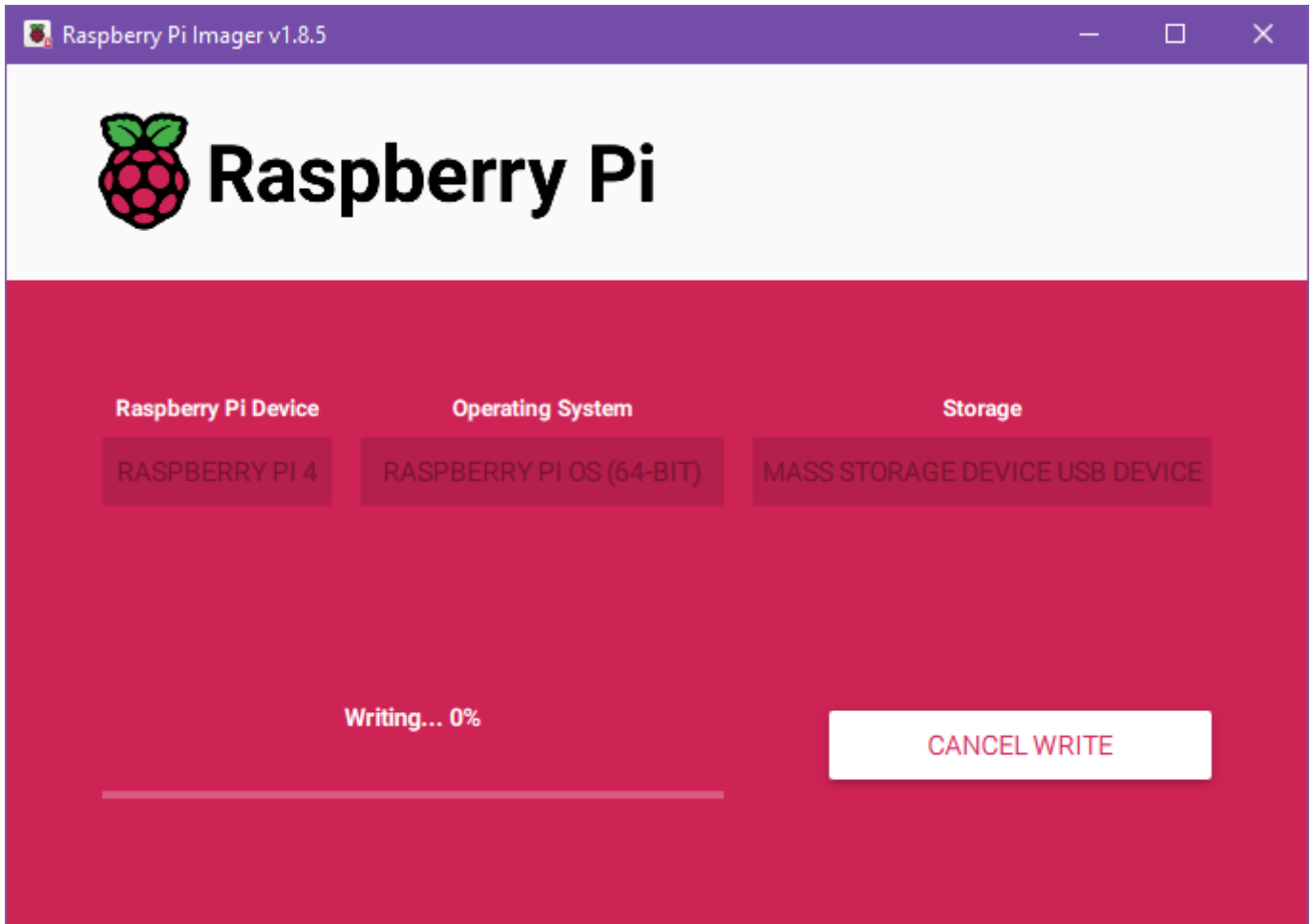
Now, we can hit save to commit these settings. Now, we can hit 'Yes' to proceed with the installation process.



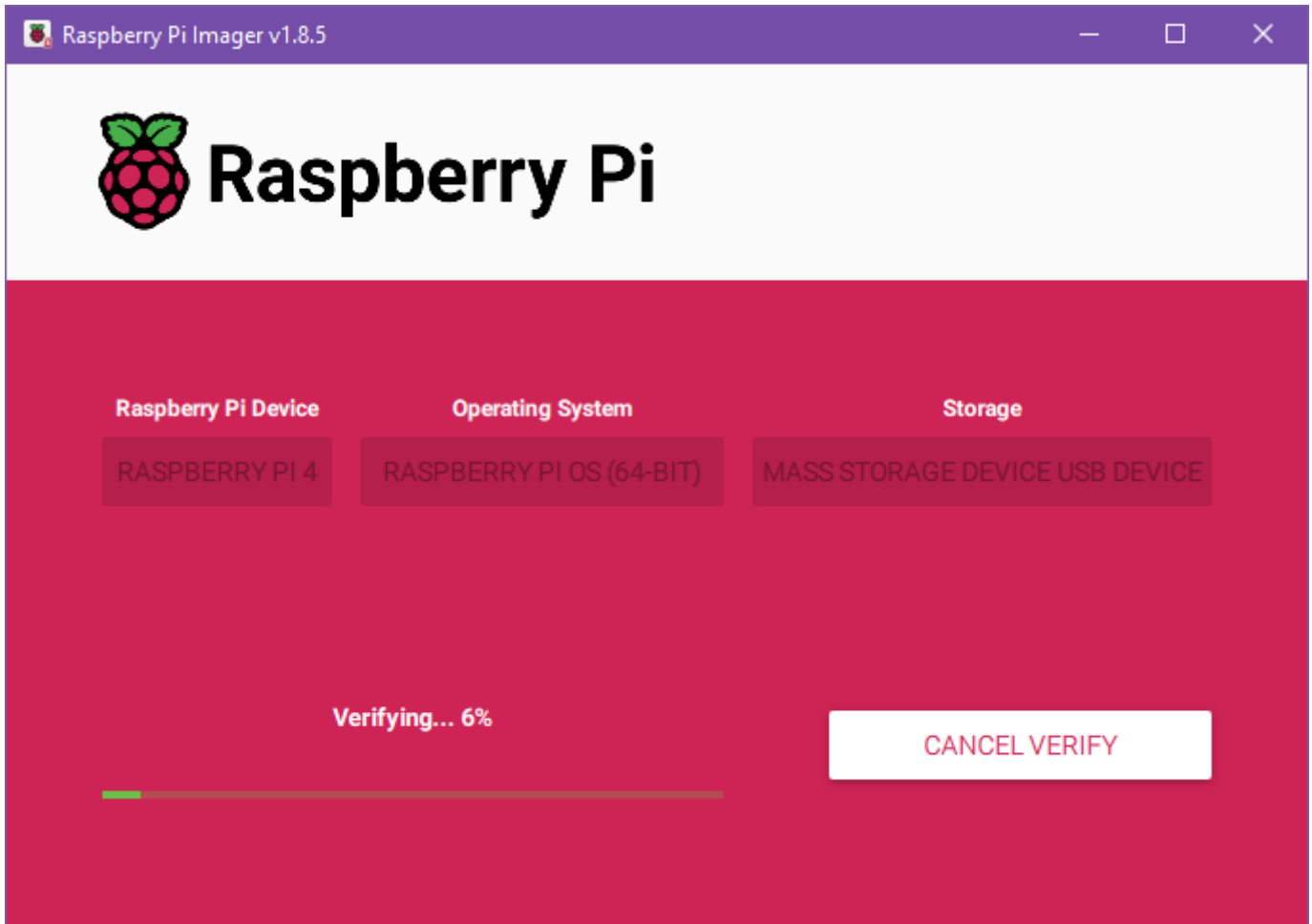
The Raspberry Pi Imager will warn us that all existing data will be erased. If you are sure that this drive can safely be erased, press 'yes' to continue.



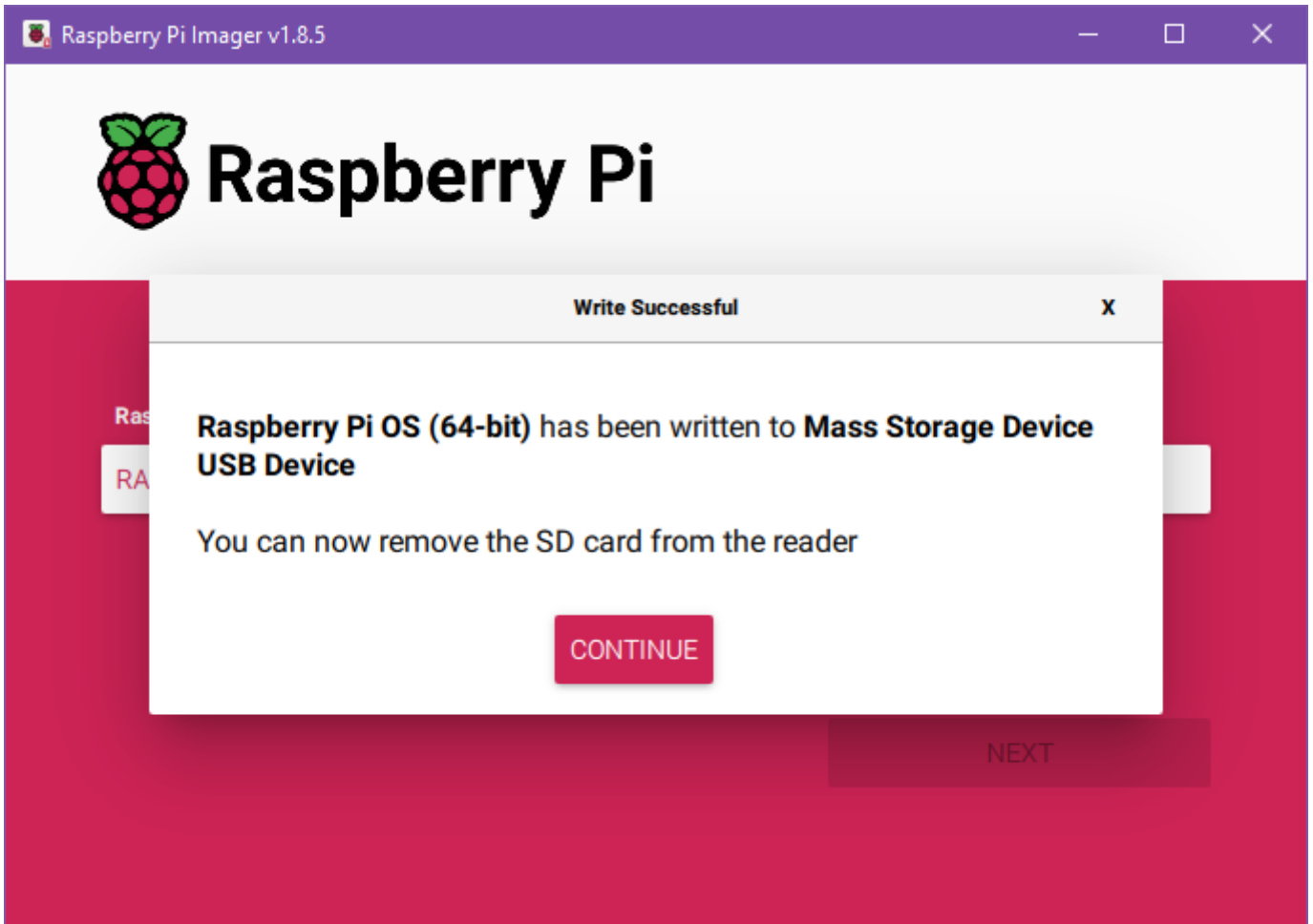
This will begin the installation process where the drive is formatted and the appropriate files are copied to the MicroSD card.



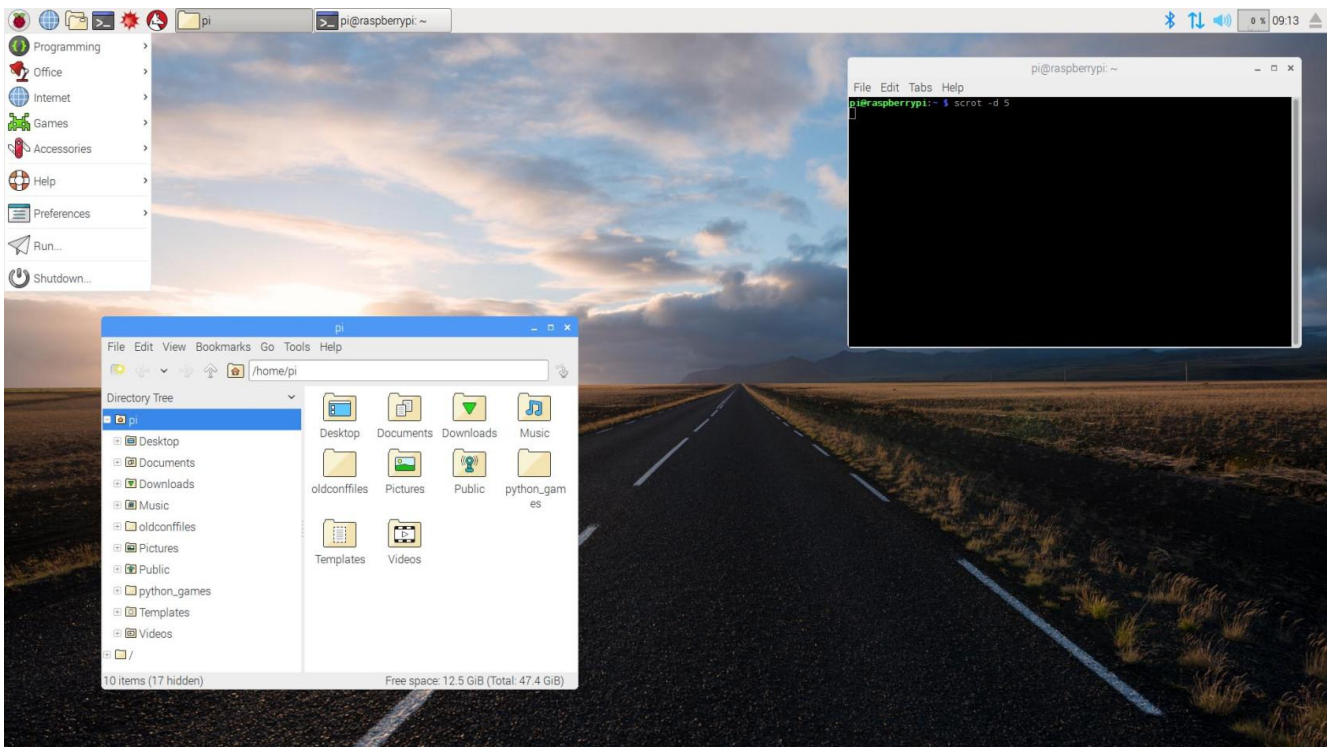
After the files are copied, the Imager will verify that the files were copied correctly and they were not corrupted.



Once it is finished verifying, we will be alerted that we can remove the MicroSD card by disconnecting the USB adapter.



Now, we can put the MicroSD card into the Raspberry Pi and power it on to begin configuring our operating system.



Configure the Operating System `keyboard_arrow_right`