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Tech Insights

Ubuntu Starter Guide

This article collections provides Ubuntu tips for beginners, including how to install Ubuntu on a computer or virtual machine, set up Ubuntu virtual machines, and use commands to monitor system resources.

By Brien Posey

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INTRODUCTION

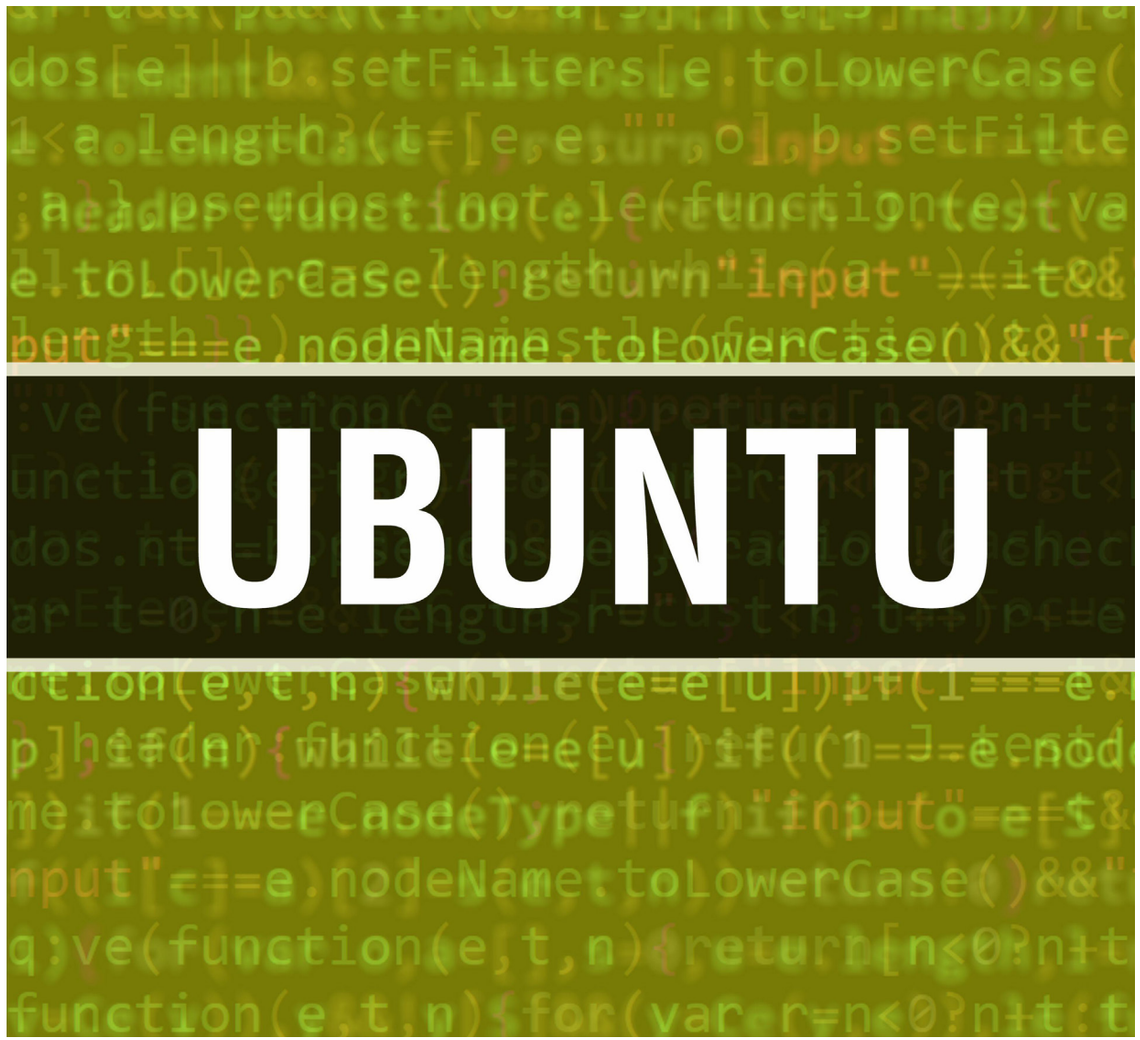
Ubuntu is frequently touted as an attractive alternative to Windows and a smart way for users to get started with Linux. As an operating system, it is free, user friendly, and backed by an enthusiastic user and developer community.

Taking your first steps into Ubuntu doesn't have to be intimidating. In fact, installing Ubuntu Desktop can take just a few minutes to complete.

The articles in this guide offer a general introduction to Ubuntu. First, we explain what you need to know about this Linux distribution, including Ubuntu's main benefits and drawbacks. We then walk you through the process of installing Ubuntu on a computer or virtual machine. Next, we illustrate how to set up an Ubuntu virtual machine on a Windows desktop. We also show how to install Docker on Ubuntu. Finally, you will learn Ubuntu commands for monitoring system resource usage.

What Is Ubuntu?

Learn about the Ubuntu Linux distribution, as well as the pros and cons associated with its use.



Ubuntu is a Linux distribution from software developer Canonical. In recent years, Ubuntu has become one of the most popular Linux distributions.

Canonical makes four editions of Ubuntu:

Ubuntu Desktop is designed for use on desktop and laptop systems, similarly to the way that you might run Windows 10 or Windows 11 on a desktop system;

Ubuntu Server is Canonical's server product, which can be configured for a variety of use cases;

Ubuntu Core is an operating system engineered for IoT devices and embedded environments; and

Ubuntu distributions optimized for public clouds, including AWS, Google Cloud Platform, Microsoft Azure, and Oracle Cloud.

In addition, Ubuntu's developer community have created a range of "Ubuntu flavors" – unique versions of Ubuntu designed for a specific type of desktop experience, use case, or theme. Popular Ubuntu flavors include Kubuntu, Lubuntu, and Ubuntu Studio. Lubuntu, for example, is a lightweight version of Ubuntu that has basic system requirements. Ubuntu Studio, meanwhile, is customized for amateur and professional content creators. UBports offers a mobile version of Ubuntu called Ubuntu Touch.

What Are the Benefits of Using Ubuntu?

For the purposes of this article, the discussion will focus on Ubuntu Desktop.

Ubuntu Desktop is an operating system that is free and open source, which makes it an attractive option for many users. Ubuntu can be downloaded from Canonical's website or a torrent website. Additionally, Ubuntu is not supported by ads, so users generally won't have to worry about having the operating system's graphical user interface (GUI) cluttered by ads, as is sometimes the case with the Windows Start menu.

Another appealing Ubuntu Desktop feature is that it is easy to use, making it a good operating system for people who are unfamiliar with Linux. Linux has long had a reputation for being difficult to operate, largely because many Linux distributions are primarily command line environments. While it is true that Ubuntu Server (see in Figure 1) is designed for command line operations, Ubuntu Desktop comes equipped with a full GUI that looks and feels a lot like Windows. It is worth noting that Ubuntu is not the only Linux distribution for which a GUI is available, but its GUI is one of the easier ones to use.

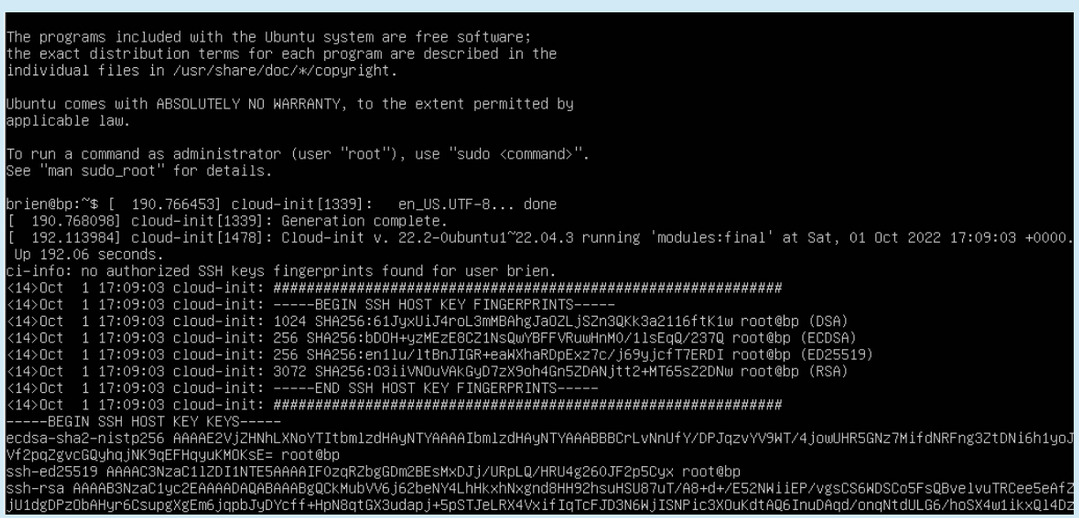


Figure 1: This is what Ubuntu Server looks like.

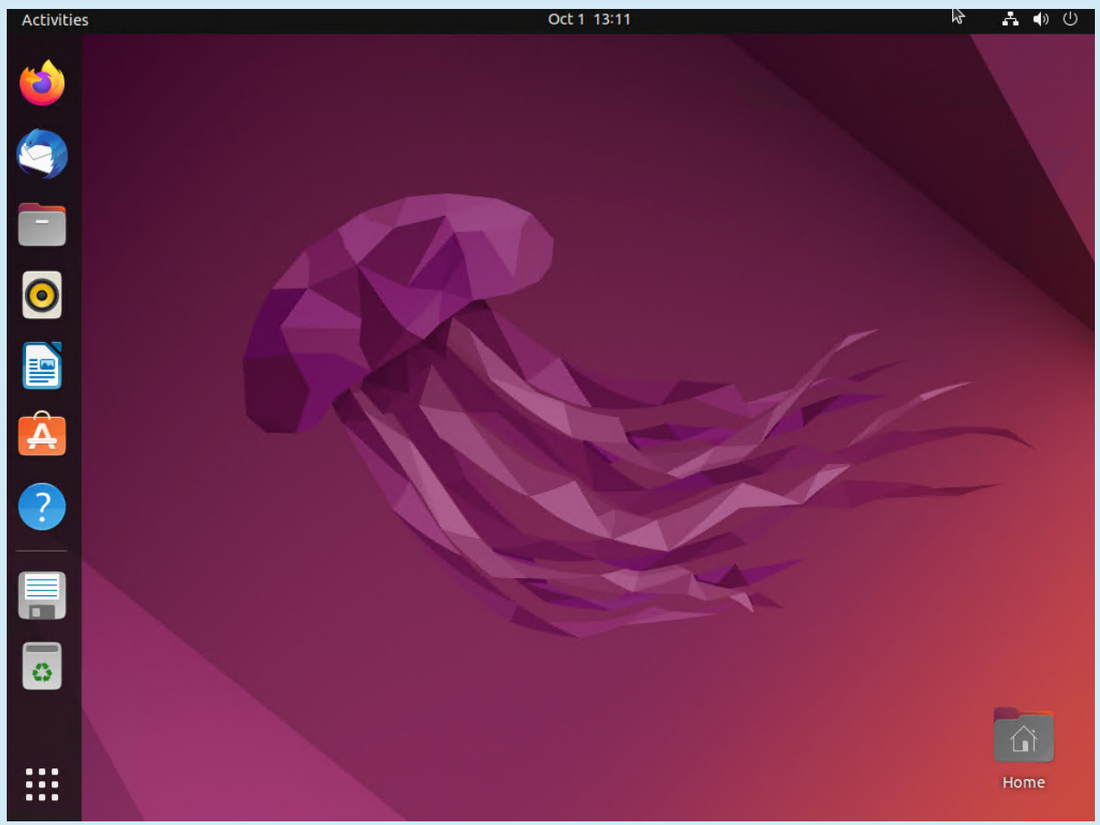


Figure 2: Ubuntu Desktop is characterized by its GUI interface.

Despite its user-friendly desktop, Ubuntu is a true Linux build, which means you can interact with Ubuntu from the command line. To do so, just click on the Apps icon and then double-click on the Terminal icon. You can see what the command line environment looks like in Figure 3.

This brings up another important advantage to using Ubuntu Desktop. Ubuntu Desktop comes preloaded with multiple applications and basic utilities (such as the Calculator, a text editor, and a few games). The most noteworthy application that is included with Ubuntu is LibreOffice, which might best be described as a free, open-source alternative to Microsoft Office. You can see the LibreOffice Writer application in Figure 4.

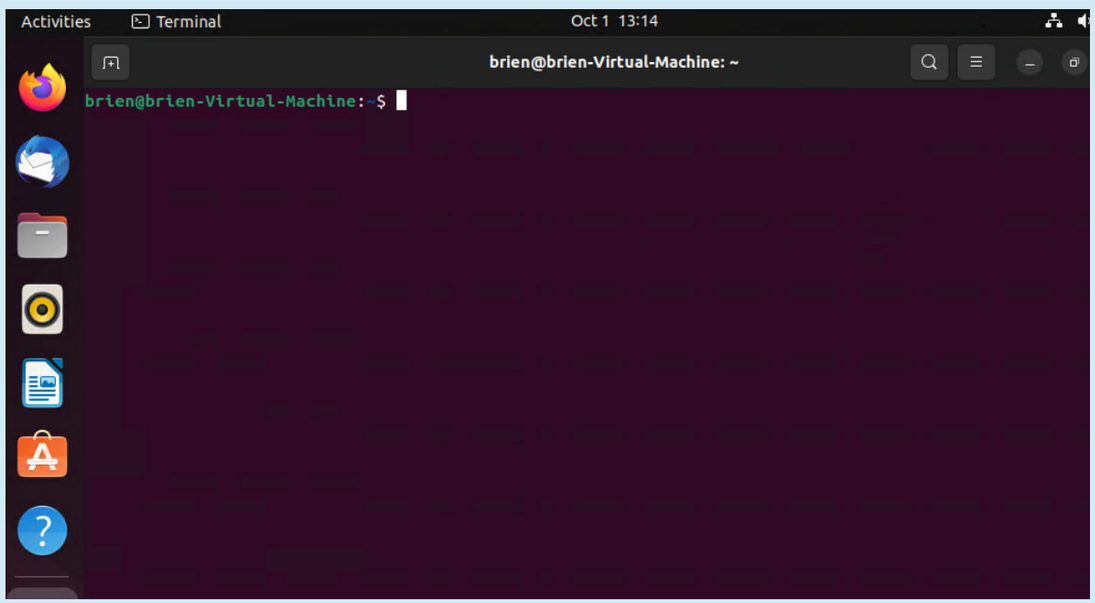


Figure 3: You can interact with Ubuntu Desktop from the command line by using the Terminal app.

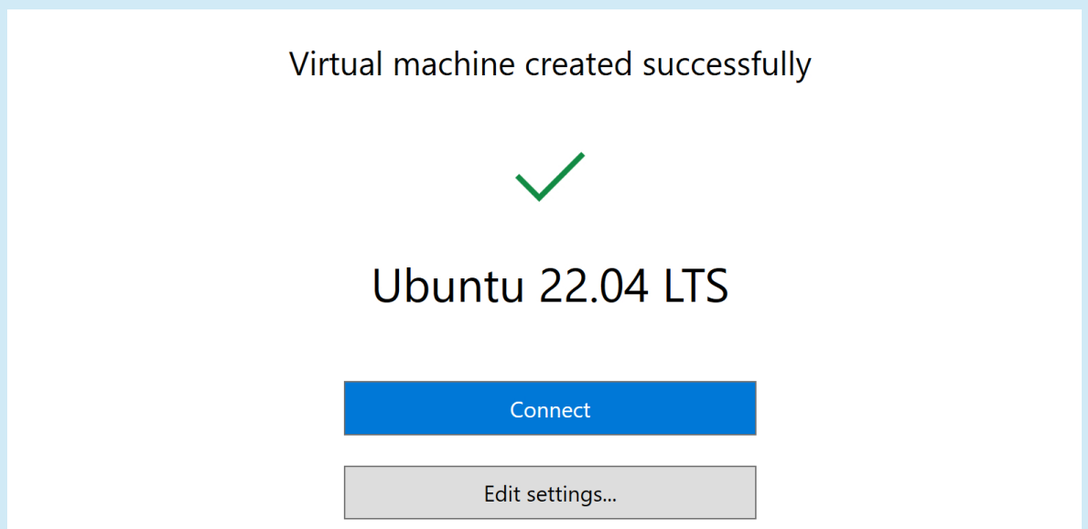


Figure 4: LibreOffice Writer is a free, open-source alternative to Microsoft Word.

The Ubuntu operating system also comes preloaded with the FireFox web browser. You can easily download other browsers such as Google Chrome, however.

Other Ubuntu benefits include the following:

• It's easy to install. An entire Ubuntu Desktop installation can be completed in a few minutes.

• Canonical developed Ubuntu with strong security features and provides security updates regularly.

• Like other Linux-based operation systems, Ubuntu is highly customizable. Users can customize the desktop environment to suit their needs and preferences.

• Ubuntu users can tap into a large user and developer community. Many of the communities focus on a specific Ubuntu flavor.

Overall, Ubuntu is a great option for individuals and for businesses alike. The operating system is stable, secure, and available for free.

What Are the Drawbacks of Using Ubuntu?

Individual and business users must consider a few potential disadvantages of Ubuntu before adopting the system.

The first disadvantage is that if you install Ubuntu onto a physical machine, you may have difficulties getting it to recognize some of your hardware. Some hardware vendors simply do not offer Linux device drivers. Realistically, you probably won't have any issues with hardware compatibility so long as you are running Ubuntu on mainstream hardware. If you have anything special, however, you could encounter problems. You may find that you need to use a more mainstream operating system such as Windows.

Another potential drawback: Not all software has a Linux version available. That means Ubuntu may not be compatible with all the applications you need to run. While it is becoming much more common for software vendors to create Linux versions of their products, many applications run only on Windows or MacOS.

This is not to suggest that there is no software available for Ubuntu. Many commercial

software vendors do build Linux versions of their applications. Additionally, there are countless open-source applications available through the Ubuntu Software Center. However, you may find that some of your favorite applications are Windows only.

Where Can I Find More Information About Ubuntu?

There are plenty of online resources available to learn more about Ubuntu.

Here are a few examples:

• The Official Ubuntu Documentation (available on help.ubuntu.com)

• Ubuntu Forums

• The Ubuntu Wiki

Conclusion

Ubuntu Desktop is a free, open-source desktop operating system that can make for a compelling alternative to Windows. Ubuntu Desktop is widely known for its ease of use. The primary disadvantage to using Ubuntu, however, is that Windows software will not natively run on Ubuntu. ■

How To Install Ubuntu on a Computer or Virtual Machine

As a lightweight operating system, the entire Ubuntu Desktop installation can be done in a few minutes.

As far as desktop operating systems go, Ubuntu is extremely easy to install. In this article, you will learn how to deploy Ubuntu Desktop on a system.

What You Need To Know Before You Install Ubuntu

Unlike Windows, MacOS, and other commercial operating systems, Ubuntu is free and open source. You can download Ubuntu Desktop at ubuntu.com.

The download consists of a single ISO file, from which you can create a bootable DVD or USB memory stick. If you are going to be installing Ubuntu to a virtual machine, you can use the ISO file without having to create boot media. Hypervisors such as VMware and Microsoft's Hyper-V can install guest operating systems directly from an ISO file.

The current Ubuntu build (Ubuntu 22.04.1 LTS) has relatively modest system requirements. Assuming you will deploy Ubuntu Desktop to an X86 / X64 system, you will need a PC with at least a 2 GHz, dual core CPU, and 4 GB of RAM. Additionally, you will need 25 GB of hard disk space and either a DVD drive or a USB port from which the installation media can be mounted. Internet access is recommended but is not required.

Figure 1: Select the option to Try or Install Ubuntu.

How To Install Ubuntu Desktop

Installing Ubuntu Desktop is a relatively straightforward process.

Begin by inserting the boot media that you have created and powering up the computer or virtual machine on which you will install Ubuntu. Some PCs may require you to press a key to boot from the installation media.

At this point, you will see a screen like the one shown in Figure 1. Select the Try or

Install Ubuntu option and press Enter.

At this point, the installer will display an Ubuntu splash screen that is displayed for a couple of minutes while the installer loads the required binaries. When this process completes, a couple of other installer screens will briefly appear, then you will be taken to the screen that is shown in Figure 2.

Select your preferred language from the list on the left side of the screen and then click Install Ubuntu. Make sure not to choose the Try Ubuntu option because it does not actually install Ubuntu. Instead, the Try Ubuntu option causes Ubuntu to run directly from the installation media. This option is intended for those who have never used Ubuntu before and want to try it out prior to installing it.

At this point, you will be taken to a screen that asks you to choose your keyboard layout. You can usually use the default options without any problem. When you have made your selection, click Continue.

The next screen asks you what you want to install. The default option, which you can see in Figure 3, installs a variety of software, including a web browser, various games and utilities, a media player, and LibreOffice. You can opt to perform a minimal installation instead. A minimal installation installs a web browser and some basic utilities but forgoes the games and the Office software.

This same screen also includes two checkboxes. The first checkbox gives you the option of downloading updates during the installation process. The second checkbox installs third-party software (usually drivers) based on your system's hardware. If you are installing Ubuntu to physical hardware, it is a good idea to select this checkbox.

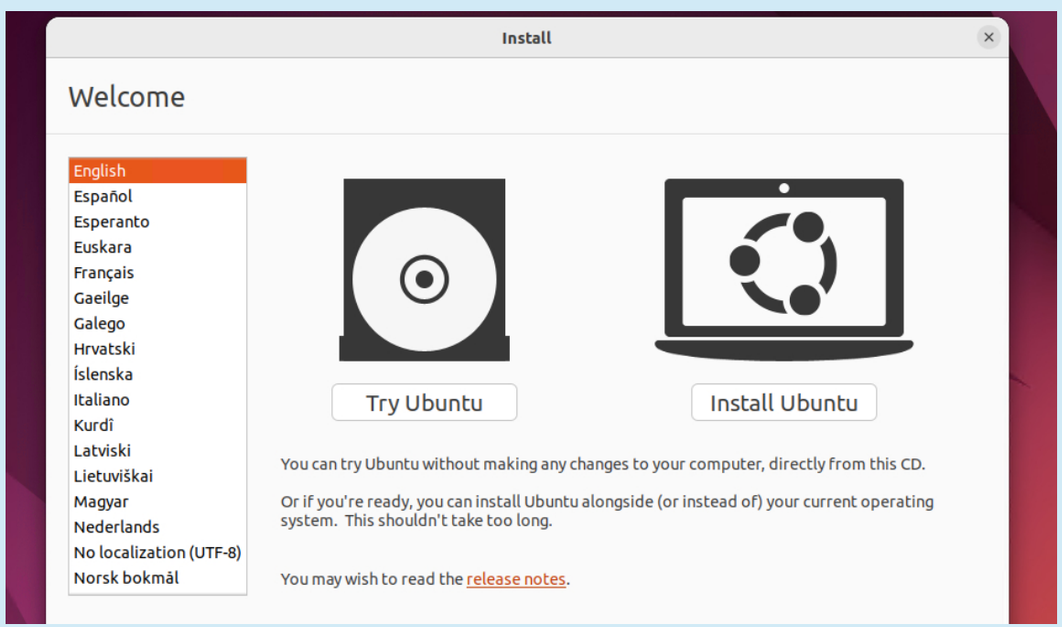


Figure 2: Select your language and click Install Ubuntu.

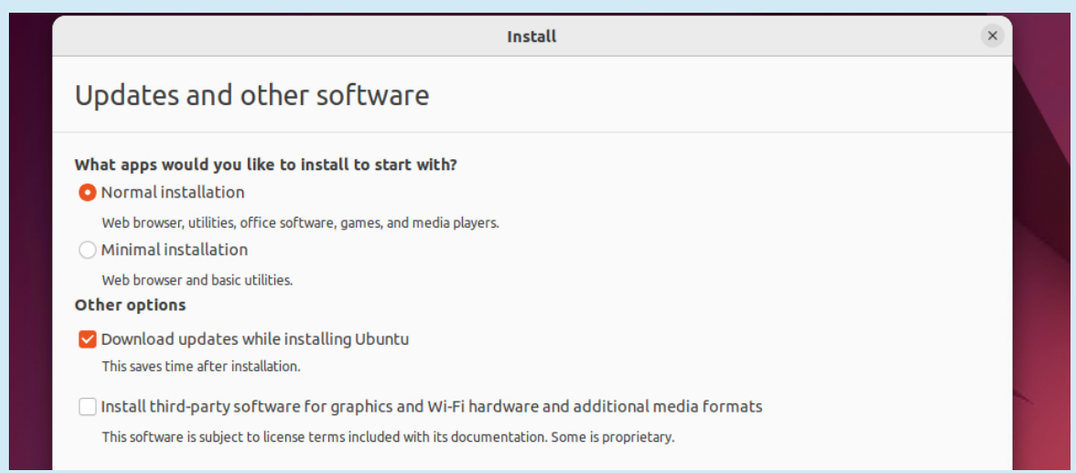


Figure 3: You can perform either a normal or a minimal installation.

Click Continue and you will be taken to a screen that asks you to choose your installation type. Normally, you should choose the Erase Disk and Install Ubuntu option, shown in Figure 4. However, other options exist in case you want to encrypt the disk, perform a dual boot installation, or use a nontraditional storage configuration.

When you have made your selection, click the Install Now button. After you do this, a warning message will tell you that the disk's partition table is about to be changed. Assuming that you are OK with the change, click the Continue button.

Even though it seems like Ubuntu is about to be installed, you must work through a couple more screens before the installation can start. The first of these screens simply asks you to choose your time zone. After doing so, click Continue. You will then be taken to the Who Are You screen, shown in Figure 5.

The screen shown in Figure 5 is self-explanatory. You will need to enter your name, then assign yourself a username and password. You will also need to confirm a password. The one thing that you should note here is that unless you choose the Active Directory option, usernames must be lower case.

When you are finished, click Continue and Ubuntu will be installed. When the process finishes, click the Restart Now button.

As you can see, deploying Ubuntu Desktop is a simple process. Because Ubuntu Desktop is such a lightweight operating system, the entire installation process can be completed in just a few minutes. Of course, you can also evaluate Ubuntu first without installing it by simply booting from the installation media, then choosing the Try Ubuntu option. ■

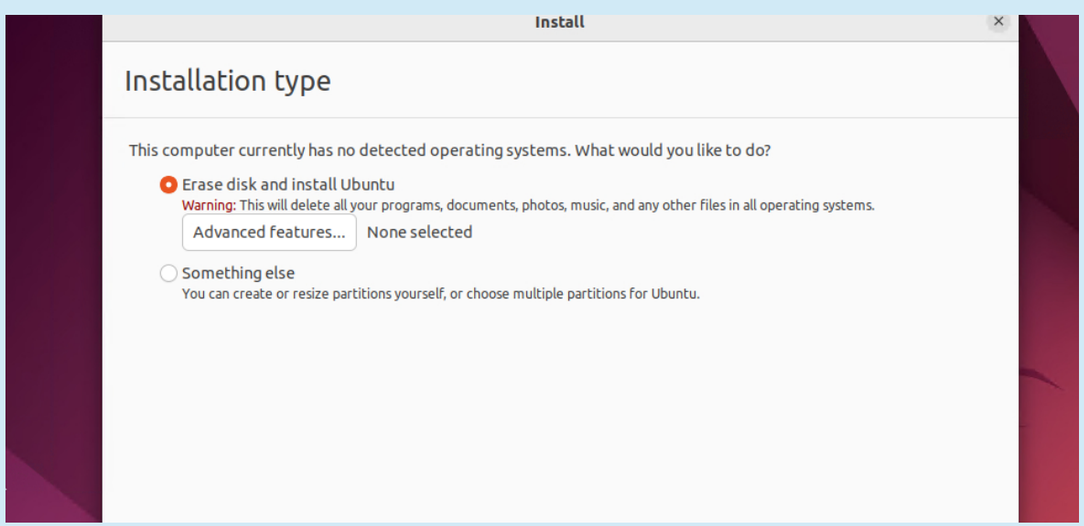


Figure 4: The Erase Disk and Install Ubuntu option is selected by default.

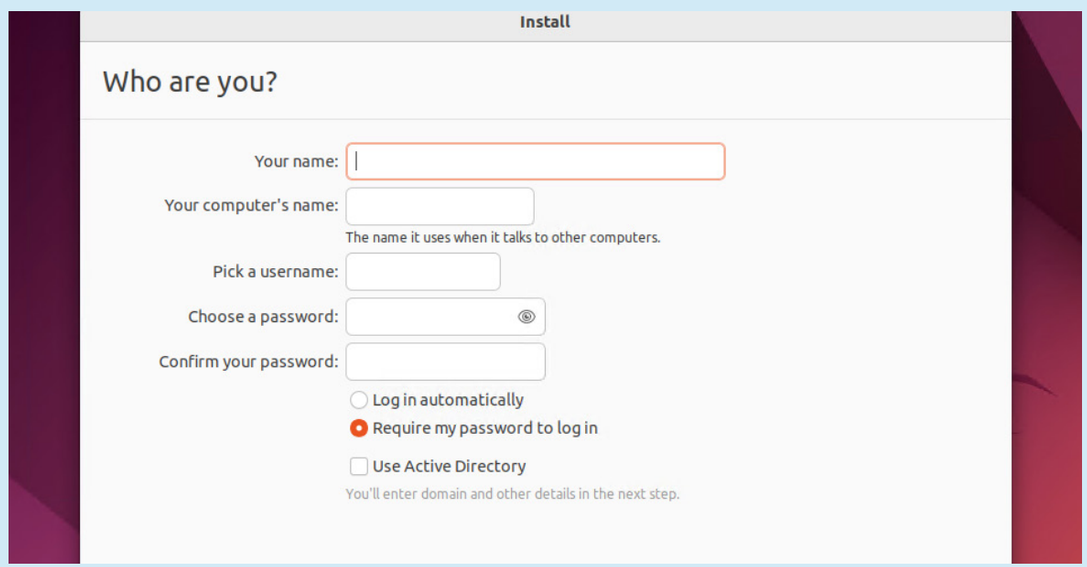


Figure 5: You will need to choose a username and password for your new Ubuntu installation.

Create Ubuntu Virtual Machines the Easy Way

Microsoft provides a simple process for creating Ubuntu virtual machines on Window desktops.

Ubuntu is an open-source Linux distribution that is based on Debian. While you can download a copy of the Ubuntu installation media and use it to set up a Ubuntu virtual machine, there is an easier option. Microsoft has greatly simplified the process of deploying Ubuntu virtual machines, particularly on Windows desktops.

In this article, you will learn how to quickly set up Ubuntu on a Windows 10 desktop.

Before we begin, this article assumes that you have already installed Hyper-V on your Windows 10 system. If Hyper-V is not currently installed, you can install it by opening the legacy Control Panel, then clicking Programs. Click the Turn Windows Features On or Off link. Now select the Hyper-V option, shown in Figure 1. Click OK, then follow the prompts to deploy Hyper-V.

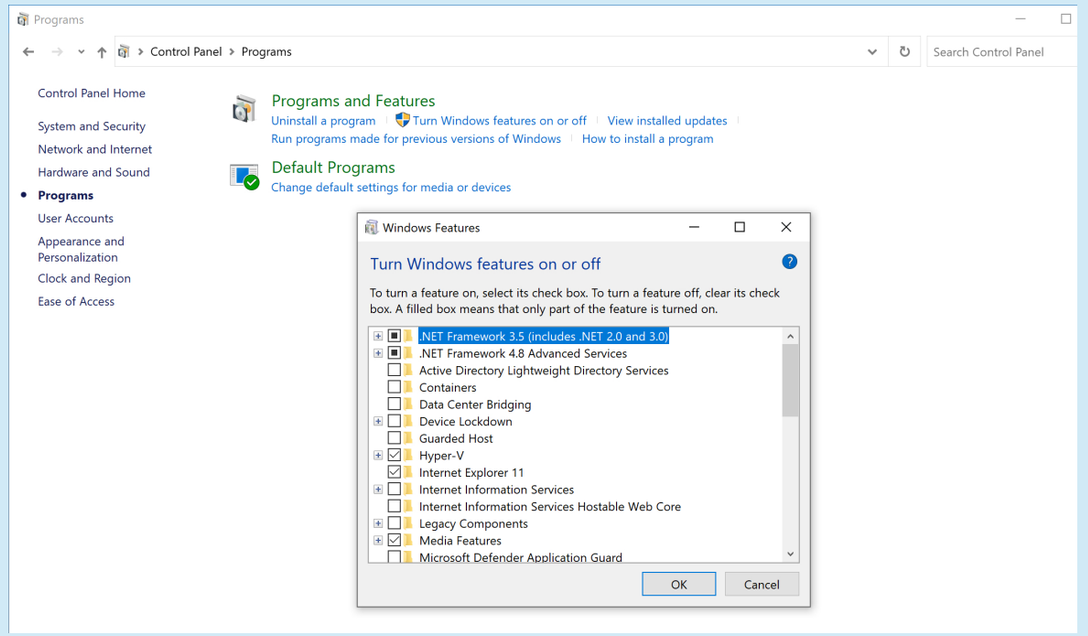


Figure 1: You will need to install Hyper-V if it is not already set up.

Create an Ubuntu Virtual Machine

The primary tool for managing Hyper-V virtual machines is the Hyper-V Manager. The simplest way to access the Hyper-V Manager on a Windows 10 machine is to type "Hyper-V" into the search box at the bottom of the Windows desktop. Click on Hyper-V Manager within the list of results.

Generally, the copy of Hyper-V that comes with Windows 10 is identical to the one that is included with Windows Server. There are some exceptions, however. For example, there are enterprise-grade features such as failover clustering and replication that are not supported on the desktop version of Hyper-V.

The desktop version of Hyper-V has at least one feature that does not exist on the Windows Server version. The feature, Quick Create, is a tool designed to simplify the process of creating virtual machines. Quick Create allows you to set up new virtual machines without having to worry about manually provisioning virtual hardware or

downloading operating system binaries.

Figure 2 shows what the Hyper-V Manager looks like. The Quick Create link is in the upper-right corner of the console (in the Actions section).

To create an Ubuntu virtual machine, click the Quick Create link. This causes Windows to open the Create Virtual Machine dialog box. As you can see in Figure 3, Microsoft provides shortcuts for different versions of Ubuntu. To get started, simply select the Ubuntu version you want to deploy, then click the Create Virtual Machine button.

Even though using Quick Create greatly streamlines the process of setting up a new virtual machine, the process can take some time to complete. That's because Windows must download the operating system binaries and any other required components prior

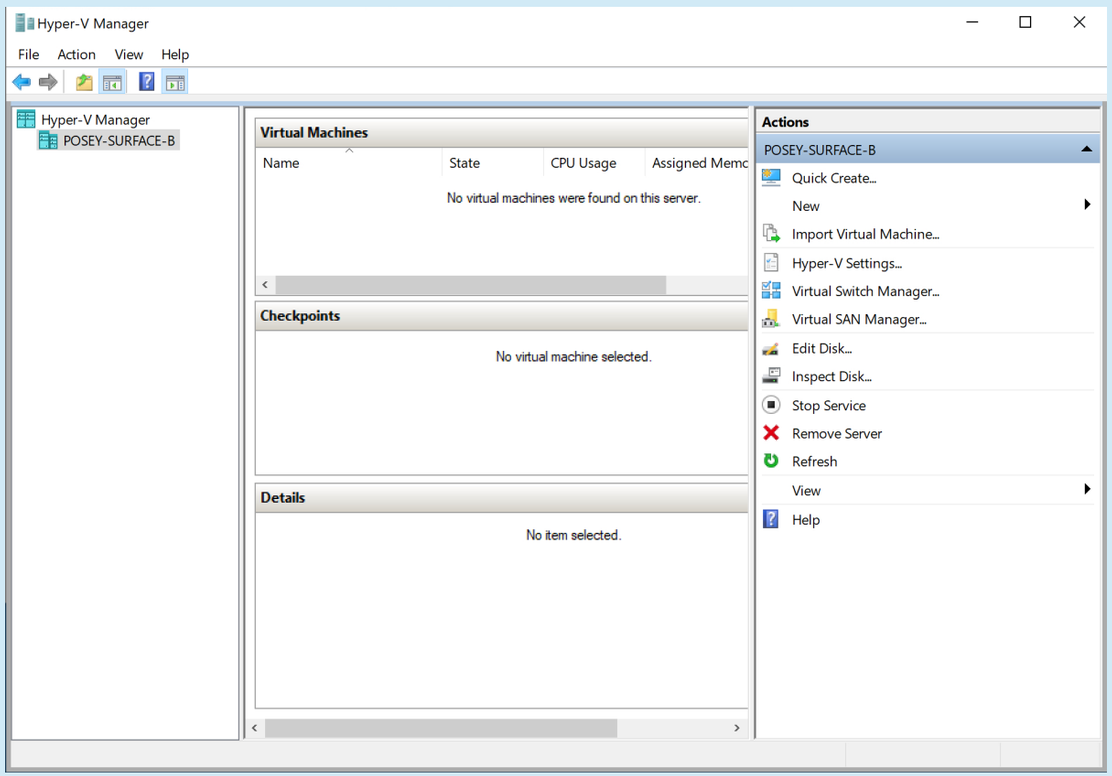


Figure 2: This is the Hyper-V Manager.

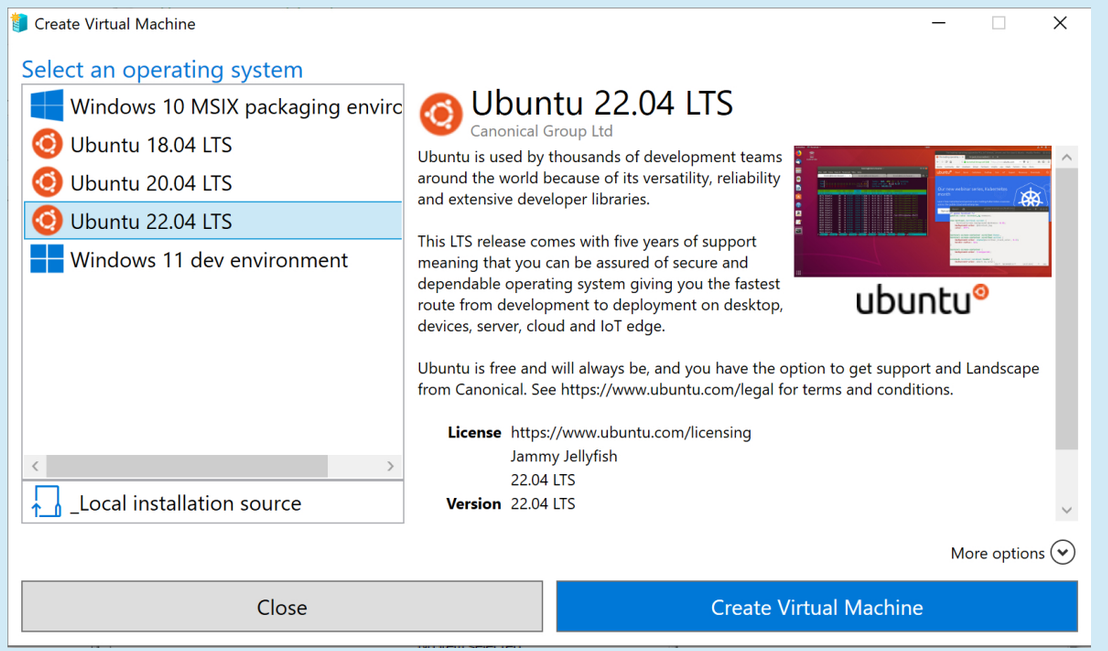


Figure 3: Choose the Ubuntu release that you want to deploy and then click the Create Virtual Machine button.

to beginning the installation process. When the deployment process eventually finishes, you will see a screen like the one shown in Figure 4.

Clicking the Connect button opens the virtual machine's console, whereas clicking the Edit button causes Windows to open the Hyper-V Settings page for the newly created virtual machine. You can use the Settings page to adjust the virtual hardware allocation (e.g., add more memory to the virtual machine). However, the default settings are typically adequate unless you plan to run a resource-intensive workload within the virtual machine.

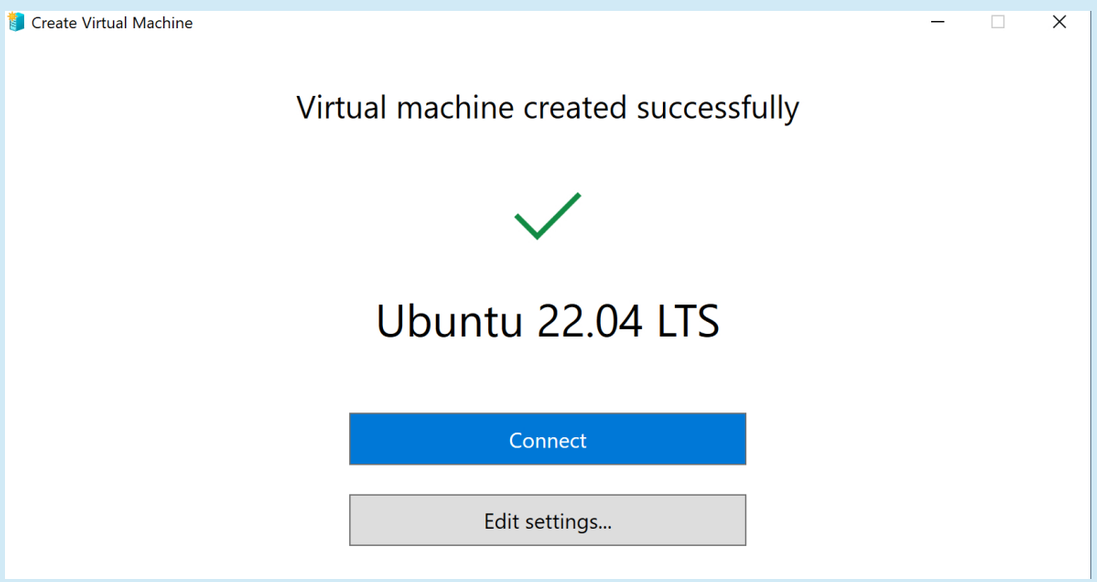


Figure 4: The virtual machine has been created.

Final Steps

The only thing left to do at this point is to finish setting up Ubuntu. To do so, just connect to the virtual machine (you may need to start the virtual machine), then follow the prompts.

As you can see in Figure 5, for example, you will need to specify the language that you want to use.

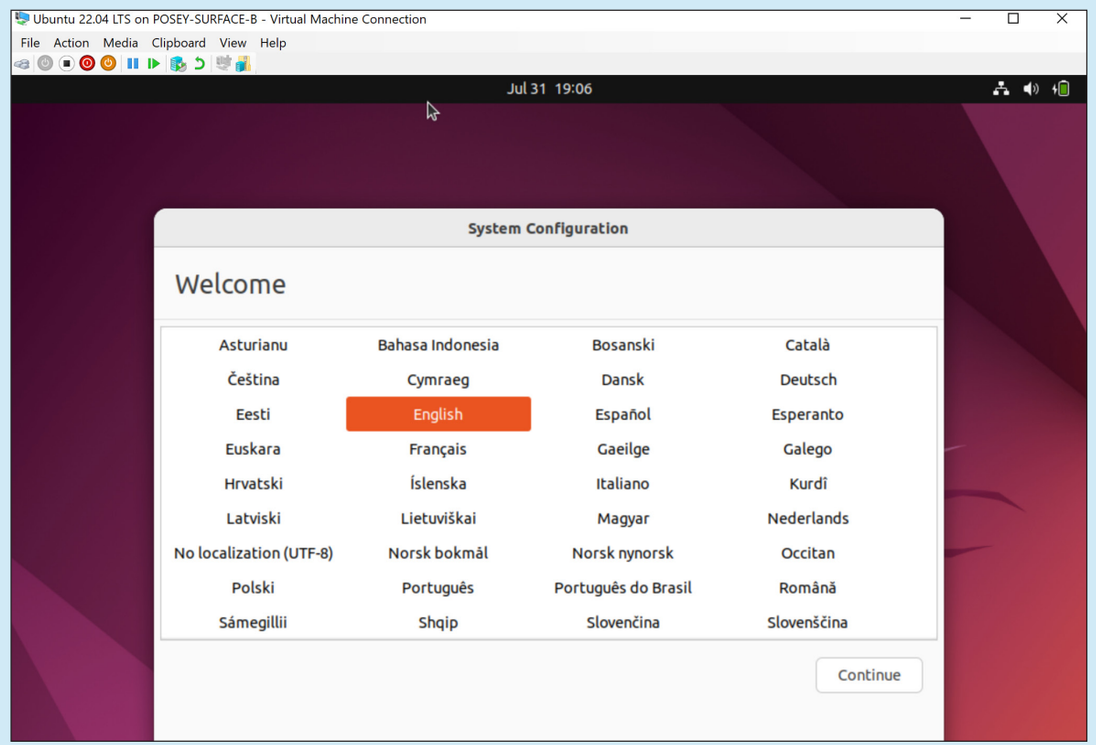


Figure 5. Complete a few minor configuration tasks and Ubuntu is ready to use.

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Installing Ubuntu on Windows Services for Linux

Windows Services for Linux, which is available on Windows 10 and 11, lets users install popular Linux distributions.

Ever since Windows 10 version 2004, Microsoft has made it possible to run Linux on top of Windows through Windows Services for Linux.

Let's look at how to use Windows Services for Linux (WSL) to deploy Ubuntu, the default Linux distribution.

What Is WSL?

WSL, which is also supported in Widnows 11, is a tool that lets you to install popular Linux distributions. Distributions include Ubuntu, Debian GNU/Linux, and SUSE Linux Enterprise Server.

WSL is accessible through PowerShell or a Command Prompt window by way of a command line tool called WSL.EXE. Entering WSL /? displays the full command syntax, as shown in Figure 1.

As you can see in the figure at right, most of the command line arguments are geared toward installing the Windows Services for Linux. The command line option that you should note is the -d argument. This is the parameter that lets you specify the Linux distribution you want to install. You can see a list of the available distributions by entering this command:

```
Wsl --list --online
```

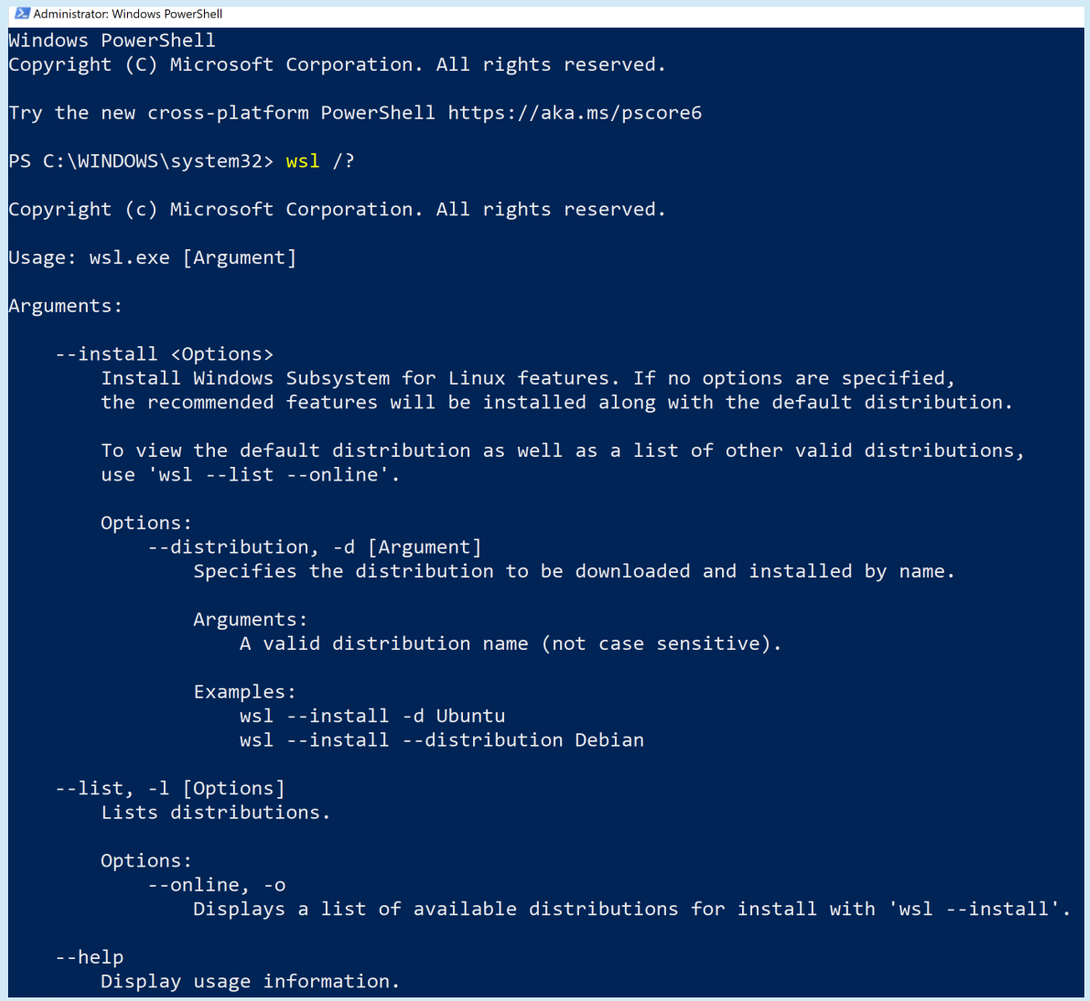

Figure 1: This is the command syntax for WSL.exe.

In Figure 2, note that Ubuntu is the very first Linux distribution on the list. It features an asterisk beside it, which indicates that Ubuntu is the default Linux distribution.

I will explain how to specify Ubuntu as the distribution to be installed so that you can see how the installation process works. (As a side note, you are not solely limited to installing the Linux distributions that are listed here. You can theoretically install any Linux distribution so long as you have the required Tarball file.)

Install Ubuntu

Let's go ahead and install Ubuntu.

Start the installation process by entering the following command:

Wsl--install -d Ubuntu

In the above command, the Install parameter tells Windows that you want to install WSL. The -D switch (which must be entered as a lowercase letter) lets you specify the distribution that you want to install — in this case, Ubuntu.

Figure 3 shows what the deployment process looks like.

When the Ubuntu installation process finishes, you will need to reboot the machine.

Upon rebooting, you should see a message indicating that the Ubuntu build is installing. This installation process can take quite a while to complete. The important thing is to avoid getting impatient and closing the window, even though it looks like nothing is happening.

Eventually, the installation process should finish up and display a message prompting you

```
PS C:\WINDOWS\system32> wsl --list --online
The following is a list of valid distributions that can be installed.
The default distribution is denoted by '*'.
Install using 'wsl --install -d <Distro>'.

  NAME            FRIENDLY NAME
* Ubuntu          Ubuntu
  Debian          Debian GNU/Linux
  kali-linux      Kali Linux Rolling
  openSUSE-42     openSUSE Leap 42
  SLES-12         SUSE Linux Enterprise Server v12
  Ubuntu-16.04    Ubuntu 16.04 LTS
  Ubuntu-18.04    Ubuntu 18.04 LTS
  Ubuntu-20.04    Ubuntu 20.04 LTS
PS C:\WINDOWS\system32>
```

Figure 2: This is the list the available Linux distributions.

```
PS C:\WINDOWS\system32> wsl --install -d Ubuntu
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: WSL Kernel
Installing: WSL Kernel
WSL Kernel has been installed.
Downloading: Ubuntu
[==========              19.9%                          ]
```

Figure 3: This is how you install Ubuntu.

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to enter a new UNIX username and password. You can see what this looks like in Figure 4. Note that the username must be entered as lowercase text.

Check Your Windows Subsystem for Linux Version

At this point, the deployment process is finished and your Ubuntu instance is ready to use. Before moving ahead, however, make sure that you are running the latest version of the Windows Subsystem for Linux.

Normally, the version won't be an issue, but if Windows is missing updates, an older version might be deployed.

To check your version, open an elevated PowerShell window and enter the following command:

Wsl --list -v

When you enter this command, you should see that version 2 of the Windows Subsystem for Linux is in use, as shown in Figure 5.

If by chance you discover that version 1 is being used, you can upgrade by entering this command:

Wsl --ser-version Ubuntu 2

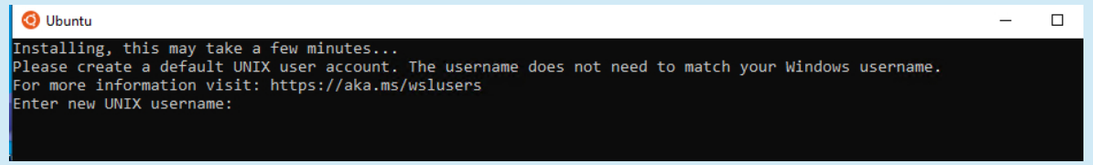

Figure 4: This is what the completion of the Ubuntu deployment process looks like.

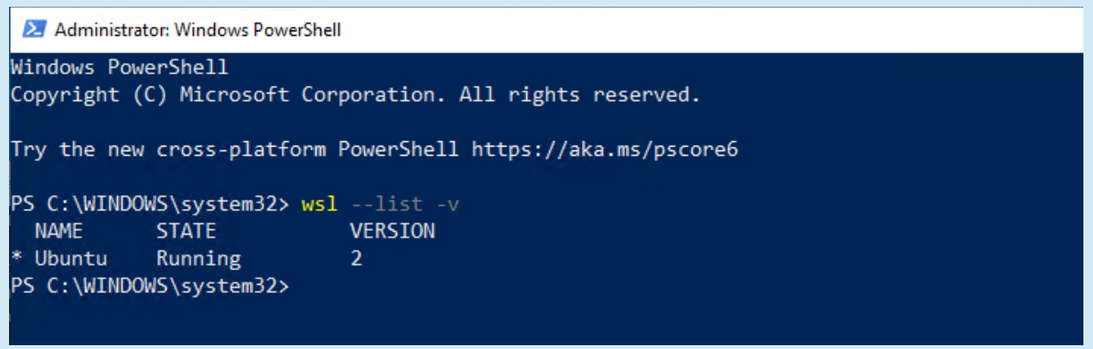

Figure 5: Ubuntu is running on version 2 of the Windows Subsystem for Linux.

How to Install Docker on Ubuntu

Installing Docker on Ubuntu is a relatively easy process. Here are the steps for doing so.

Docker is a container platform that you can use to create containers on top of Ubuntu or other Linux platforms. For those who might not have worked with containers before, they are similar to virtual machines. However, containers consume far fewer resources because they can share a common base image.

In this article, I will show you how to install Docker and create an interactive Ubuntu container on an Ubuntu server.

How To Install Docker on Ubuntu Using the Command Line

Installing Docker on Ubuntu is a relatively simple process. As with other application installation processes, it uses the Application Package Installer (APT).

Here is the command used to install Docker:

Sudo apt install docker.io

You can see what this process looks like in Figure 1. Notice that Docker will consume just under 300 megabytes of disk space. However, keep in mind that you will need additional storage space for image files and for any containers that you may create.

Once Docker has been installed, the next thing to do is install its dependencies. These dependencies exist in the form of a ***snap bundle***. A snap bundle is essentially a collection of applications and/or dependencies that are designed to work with a variety of Linux distributions, including Ubuntu.

```
brien@dove:~$ sudo apt install docker.io
[sudo] password for brien:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 0 not upgraded.
Need to get 65.6 MB of archives.
After this operation, 283 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Figure 1: The Docker installation process leverages the Application Package Installer.

```
brien@dove:~$ sudo snap install docker
Mount snap "core18" (2566)
[ 4905.633998] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x80700 phys_seg 1 prio class 0
[ 4905.634231] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x0 phys_seg 1 prio class 0
[ 4905.634265] Buffer I/O error on dev fd0, logical block 0, async page read
Mount snap "docker" (1779)
[ 4916.205388] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x80700 phys_seg 1 prio class 0
[ 4916.205584] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x0 phys_seg 1 prio class 0
[ 4916.205610] Buffer I/O error on dev fd0, logical block 0, async page read
Setup snap "docker" (1779) security profiles
[ 4917.857115] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x80700 phys_seg 1 prio class 0
[ 4917.857319] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x0 phys_seg 1 prio class 0
[ 4917.857347] Buffer I/O error on dev fd0, logical block 0, async page read
Start snap "docker" (1779) services
[ 4920.791880] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x80700 phys_seg 1 prio class 0
[ 4920.792121] blk_update_request: I/O error, dev fd0, sector 0 op 0x0:(READ) flags 0x0 phys_seg 1 prio class 0
[ 4920.792148] Buffer I/O error on dev fd0, logical block 0, async page read
Start snap "docker" (1779) services
[ 4921.065758] overlayfs: missing 'lowerdir'
docker 20.10.14 from Canonical✓ installed
brien@dove:~$ _
```

Figure 2: The Docker dependencies must be installed from a snap bundle.

To install the Docker dependencies, use this command:

Sudo snap install docker

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Testing Your Docker Installation

At this point, Docker should be installed and functional. It's a good idea to try running the "Hello World" image just to ensure Docker works properly.

To do so, enter the following command:

Sudo docker-run hello-world

When you run this command, Ubuntu should display a message that says, "Hello from Docker", which indicates that Docker works properly. However, since Docker was just recently installed, the Hello World image likely will not exist on your machine. This means that you will initially see an error message telling you that the image does not exist locally. After that, you should get a message that Docker has pulled the Hello World image from the library. You should then see the "Hello from Docker" message. You can see what this looks like in Figure 3.

Modifying the Docker Group

You might have noticed in the previous figure that I had to type *sudo* prior to entering the Docker Run command. Sudo tells Linux that a command must run with elevated privileges. However, most of the Docker tutorials that exist online show the Docker command being used without the aid of sudo.

If you would prefer not to enter sudo each time you execute a Docker command, you must add your username to the Docker group. Here is a command for adding the account that you are currently using to the Docker group:

Sudo usermod -aG docker ${USER}

Next, you will either need to log out and log back in or run the following command to make the change take effect:

Su - ${USER}

```
brien@dove:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:62af9efd515a25f84961b70f973a798d2eca956b1b2b026d0a4a63a3b0b6a3f2
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/

brien@dove:~$
```

Figure 3: You can use the Hello World image to test Docker.

If you type the word “groups,” you should see confirmation that you are now a member of the Docker group.

Working With Docker Images

Before you can create a container, you must install a base image. Assuming that the image will be based on Ubuntu, you should begin by searching for Ubuntu images.

Here is the command for searching for Ubuntu images:

Docker search ubuntu

```
brien@dove:~$ docker search ubuntu
NAME                              DESCRIPTION                                     STARS     OFFICIAL   AUTOMATED
ubuntu                            Ubuntu is a Debian-based Linux operating sys…   14962     [OK]
websphere-liberty                 WebSphere Liberty multi-architecture images …   288       [OK]
ubuntu-upstart                    DEPRECATED, as is Upstart (find other proces…   112       [OK]
neurodebian                       NeuroDebian provides neuroscience research s…   93        [OK]
ubuntu/nginx                      Nginx, a high-performance reverse proxy & we…   59
open-liberty                      Open Liberty multi-architecture images based…   54        [OK]
ubuntu-debootstrap                DEPRECATED; use "ubuntu" instead                46        [OK]
ubuntu/apache2                    Apache, a secure & extensible open-source HT…   41
ubuntu/mysql                      MySQL open source fast, stable, multi-thread…   36
ubuntu/squid                      Squid is a caching proxy for the Web. Long-t…   33
kasmweb/ubuntu-bionic-desktop     Ubuntu productivity desktop for Kasm Workspa…   31
ubuntu/prometheus                 Prometheus is a systems and service monitori…   29
ubuntu/bind9                      BIND 9 is a very flexible, full-featured DNS…   27
ubuntu/postgres                   PostgreSQL is an open source object-relation…   19
ubuntu/redis                      Redis, an open source key-value store. Long-…   11
ubuntu/kafka                      Apache Kafka, a distributed event streaming …   11
ubuntu/prometheus-alertmanager    Alertmanager handles client alerts from Prom…   7
ubuntu/grafana                    Grafana, a feature rich metrics dashboard & …   6
ubuntu/zookeeper                  ZooKeeper maintains configuration informatio…   5
ubuntu/memcached                  Memcached, in-memory keyvalue store for smal…   5
ubuntu/telegraf                   Telegraf collects, processes, aggregates & w…   4
ubuntu/dotnet-deps                Chiselled Ubuntu for self-contained .NET & A…   3
ubuntu/cortex                     Cortex provides storage for Prometheus. Long…   3
ubuntu/cassandra                  Cassandra, an open source NoSQL distributed …   2
ubuntu/loki                       Grafana Loki, a log aggregation system like …   0
brien@dove:~$ docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
2b55860d4c66: Pull complete
Digest: sha256:20fa2d7bb4de7723f542be5923b06c4d704370f0390e4ae9e1c833c8785644c1
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
brien@dove:~$ _
```

Figure 4: This is how you search for and pull a Docker base image.

Once you find an image that you want to use, enter the Docker pull command, followed by the image name. In Figure 4, for example, I found an image named “Ubuntu” and then pulled that image by typing “docker pull ubuntu”.

How To Use Ubuntu Images in Docker Containers

Now that you have a Docker base image, you can use that image to create an Ubuntu container.

We already created one container using the Hello World image. As you saw in that example, we simply entered the Docker Run command, followed by the name of the image (Hello-World).

While that technique can be used to run a container, you can also make the container interactive (giving you shell access) by specifying the -it switch. Hence, if we want to create an interactive Ubuntu container, this is the command for doing so:

Docker run -it ubuntu

As you can see, Ubuntu makes it simple to install Docker. It is equally as easy to search for and pull base images and then create containers from those images. ■

```
brien@dove:~$ docker run -it ubuntu
root@062982bd4df7:/# _
```

Figure 5: This is how you create an interactive Ubuntu container.

Ubuntu Commands for Monitoring System Resource Use

Three basic commands can help you monitor system resource use in Ubuntu and other Linux distributions.

A big part of maintaining a healthy Ubuntu machine is ensuring it has the right amount of system resources available. System resources should sufficiently accommodate any workload that may run on the machine, as well as meet the needs of the OS itself. Fortunately, there are three simple Ubuntu commands you can use to monitor hardware use.

Monitoring Disk Space: The DF Command

The first command to know is the **DF command**.

DF stands for "Disk Free." As the name implies, the DF command is used to find out how much free disk space is available.

If you come from a Windows background, you will find that the DF command works a little bit differently than the Get-ChildItem cmdlet or DIR command. Those commands display the current volume's contents and the amount of remaining disk space.

By contrast, when you enter the DF command, Ubuntu will display a list of file systems present on the system, as well as the total size and amount of free space available within each file system.

As a best practice, you should append the -H switch when using the DF command. The -H switch tells Ubuntu to put the results into a human-readable format. The output will be shown in megabytes and gigabytes as opposed to bytes. You can see what this command looks like in Figure 1.

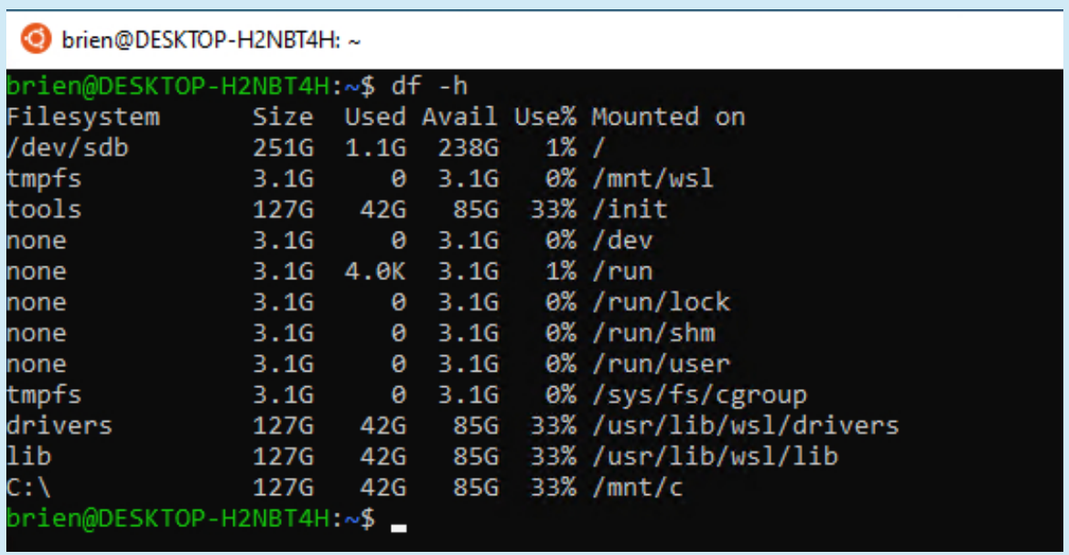

Figure 1: The DF command shows the disk's contents.

Monitoring Processes: The Top Command

Windows systems use numerous background processes to perform low-level tasks within the operating system. There are also processes associated with any applications that you might choose to run. You can view these processes through the Windows Task Manager or by using the Get-Process cmdlet within PowerShell.

The concept of processes is not unique to Windows. Ubuntu and other Linux systems also make use of processes. As in the case of Windows systems, some of these processes make extremely light use of the available hardware resources, while others tend to be far more demanding.

You can see the processes that are running on an Ubuntu machine by entering the **Top command**. After you enter this command, Linux will present a summary of the total number of tasks that are running on the system. Linux will also give you a breakdown of the individual processes. This not only includes the amount of CPU and memory resources used by each process, but also the user who launched the process, the process ID, and the command that is tied to the process.

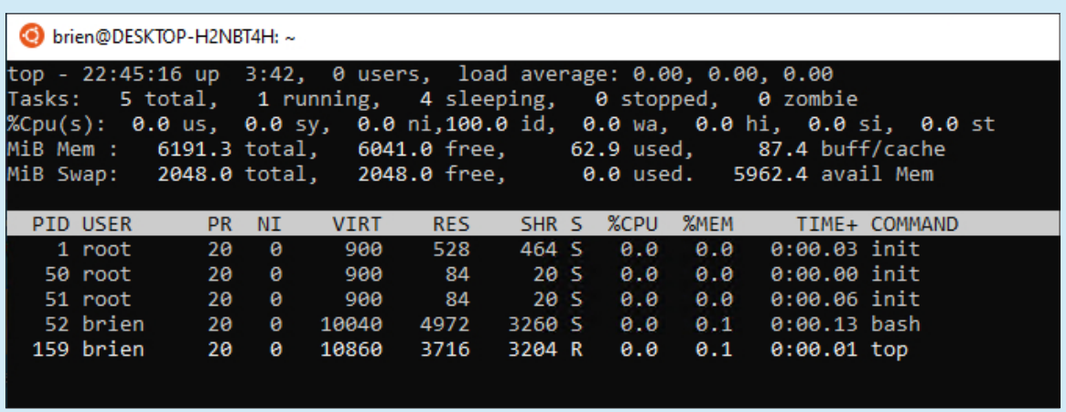

Figure 2: The Top command provides information about the processes that are running on the system.

If you try the command on your own system, the Top data will be continuously displayed until you press Ctrl+C.

Incidentally, the screen capture shown in Figure 2 was taken from a command line-only Ubuntu shell running on Windows Services for Linux. The reason why most Linux deployments are command line only is because the GUI consumes a significant amount of system resources.

To see just how much of a difference this makes, see Figure 3, which shows the results of running the Top command on an Ubuntu machine that has the Linux desktop installed.

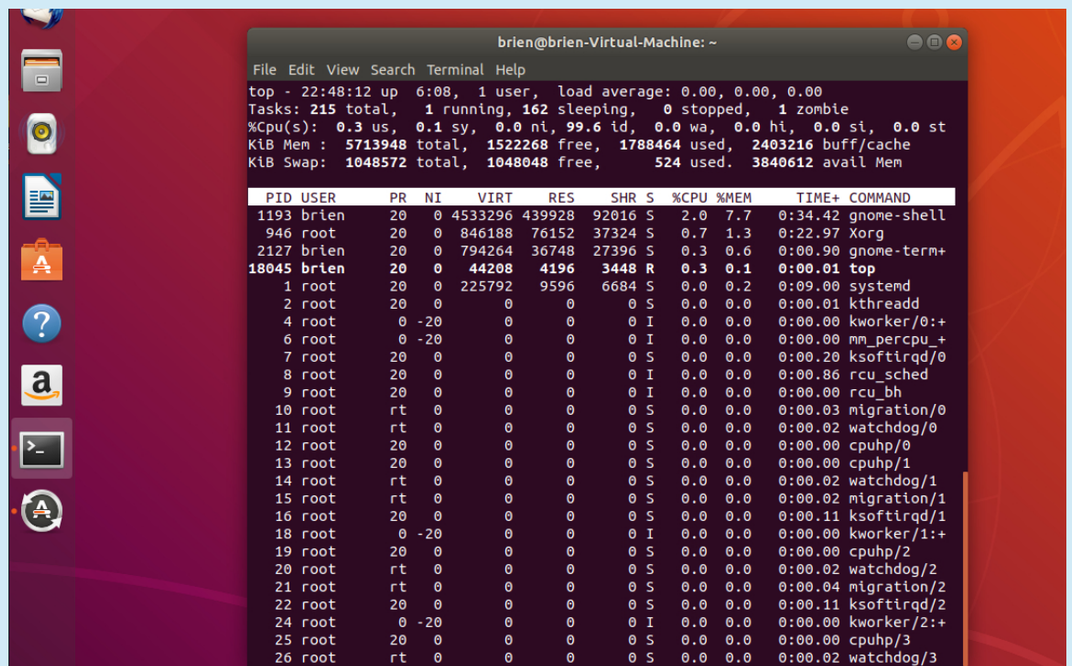

Figure 3: The GUI consumes significant system resources.

Monitoring Memory Use: The Free Command

Finally, just as the Top command will show the processes running on your system, the **Free command** will show how the system's memory is used.

Entering Free at the command prompt causes Ubuntu to display the system's total memory, how much memory is in use, and how much memory is free. You can also get information about swap memory by using the Free command. ■

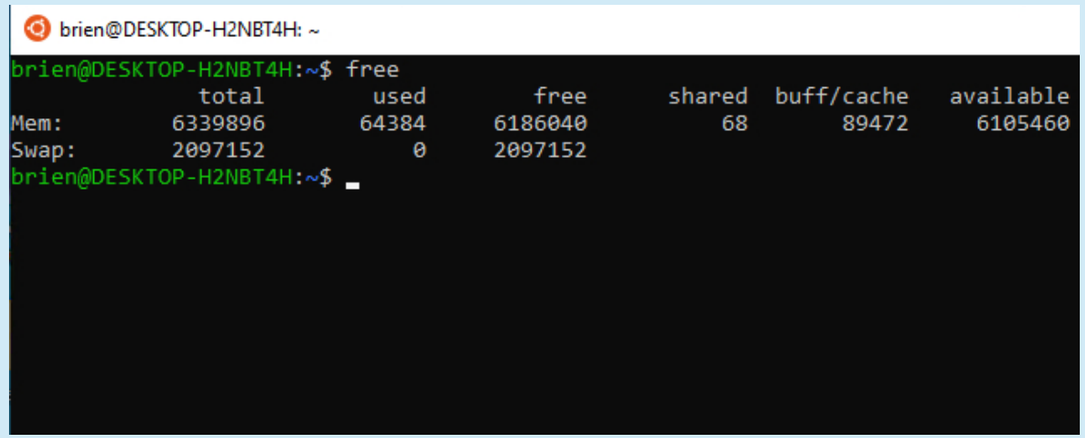

Figure 4: The Free command shows how the system is using the available memory.